

Version 6.1



## Installation and User's Guide





## Installation and User's Guide

**Note**

Before using this information and the product it supports, read the information in "Notices" on page 535.

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## Preface

IBM® Tivoli® Storage Manager is a client-server licensed product that provides storage management services in a multiplatform 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 as a backup and archive server for distributed workstations and file servers.  
The server program also supplies hierarchical storage management (HSM) services, and permits systems to perform as a migration server.
- 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.
- 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.
- 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 system.

Associated with Tivoli Storage Manager, but sold separately, is the *Tivoli Storage Manager for Space Management* 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® x86/x86\_64, and Solaris (SPARC) operating systems.

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

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## Who should read this publication

This publication provides instructions for a user to install, configure, and use the Tivoli Storage Manager client.

### Related information

Chapter 1, “Installing the Tivoli Storage Manager clients,” on page 1

Chapter 2, “Configuring the Tivoli Storage Manager client,” on page 41

“UNIX and Linux client root and authorized user tasks” on page 41

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## Publications

Tivoli Storage Manager publications and other related publications are available online.

You can search all publications in the Tivoli Storage Manager Information Center: <http://publib.boulder.ibm.com/infocenter/tsminfo/v6>.

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

You can also order some related publications from the IBM Publications Center Web site. The Web site provides information for ordering publications from countries other than the United States. In the United States, you can order publications by calling 800-879-2755.

### Tivoli Storage Manager publications

Publications are available for the server, storage agent, client, and Data Protection.

*Table 1. Tivoli Storage Manager server publications*

<b>Publication title</b>	<b>Order number</b>
<i>IBM Tivoli Storage Manager Messages</i>	GC23-9787
<i>IBM Tivoli Storage Manager Performance Tuning Guide</i>	GC23-9788
<i>IBM Tivoli Storage Manager Problem Determination Guide</i>	GC23-9789
<i>IBM Tivoli Storage Manager for AIX Installation Guide</i>	GC23-9781
<i>IBM Tivoli Storage Manager for AIX Administrator's Guide</i>	SC23-9769
<i>IBM Tivoli Storage Manager for AIX Administrator's Reference</i>	SC23-9775
<i>IBM Tivoli Storage Manager for HP-UX Installation Guide</i>	GC23-9782
<i>IBM Tivoli Storage Manager for HP-UX Administrator's Guide</i>	SC23-9770
<i>IBM Tivoli Storage Manager for HP-UX Administrator's Reference</i>	SC23-9776
<i>IBM Tivoli Storage Manager for Linux Installation Guide</i>	GC23-9783
<i>IBM Tivoli Storage Manager for Linux Administrator's Guide</i>	SC23-9771
<i>IBM Tivoli Storage Manager for Linux Administrator's Reference</i>	SC23-9777
<i>IBM Tivoli Storage Manager for Sun Solaris Installation Guide</i>	GC23-9784
<i>IBM Tivoli Storage Manager for Sun Solaris Administrator's Guide</i>	SC23-9772
<i>IBM Tivoli Storage Manager for Sun Solaris Administrator's Reference</i>	SC23-9778
<i>IBM Tivoli Storage Manager for Windows Installation Guide</i>	GC23-9785
<i>IBM Tivoli Storage Manager for Windows Administrator's Guide</i>	SC23-9773
<i>IBM Tivoli Storage Manager for Windows Administrator's Reference</i>	SC23-9779
<i>IBM Tivoli Storage Manager Server Upgrade Guide</i>	SC23-9554
<i>IBM Tivoli Storage Manager for System Backup and Recovery Installation and User's Guide</i>	SC32-6543



*Table 2. Tivoli Storage Manager storage agent publications*

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

*Table 3. Tivoli Storage Manager client publications*

<b>Publication title</b>	<b>Order number</b>
<i>IBM Tivoli Storage Manager for UNIX and Linux: Backup-Archive Clients Installation and User's Guide</i>	SC23-9791
<i>IBM Tivoli Storage Manager for Windows: Backup-Archive Clients Installation and User's Guide</i>	SC23-9792
<i>IBM Tivoli Storage Manager for Space Management for UNIX and Linux: User's Guide</i>	SC23-9794
<i>IBM Tivoli Storage Manager for HSM for Windows Administration Guide</i>	SC23-9795
<i>IBM Tivoli Storage Manager Using the Application Program Interface</i>	SC23-9793
<i>Program Directory for IBM Tivoli Storage Manager z/OS Edition Backup-Archive Client</i>	GI11-8912
<i>Program Directory for IBM Tivoli Storage Manager z/OS Edition Application Program Interface</i>	GI11-8911

*Table 4. Tivoli Storage Manager Data Protection publications*

<b>Publication title</b>	<b>Order number</b>
<i>IBM Tivoli Storage Manager for Advanced Copy Services: Data Protection for Snapshot Devices Installation and User's Guide</i>	SC33-8331
<i>IBM Tivoli Storage Manager for Databases: Data Protection for Microsoft SQL Server Installation and User's Guide</i>	SC32-9059
<i>IBM Tivoli Storage Manager for Databases: Data Protection for Oracle for UNIX and Linux Installation and User's Guide</i>	SC32-9064
<i>IBM Tivoli Storage Manager for Databases: Data Protection for Oracle for Windows Installation and User's Guide</i>	SC32-9065
<i>IBM Tivoli Storage Manager for Enterprise Resource Planning: Data Protection for SAP Installation and User's Guide for DB2</i>	SC33-6341
<i>IBM Tivoli Storage Manager for Enterprise Resource Planning: Data Protection for SAP Installation and User's Guide for Oracle</i>	SC33-6340
<i>IBM Tivoli Storage Manager for Mail: Data Protection for Lotus Domino® for UNIX, Linux, and OS/400® Installation and User's Guide</i>	SC32-9056
<i>IBM Tivoli Storage Manager for Mail: Data Protection for Lotus Domino for Windows Installation and User's Guide</i>	SC32-9057
<i>IBM Tivoli Storage Manager for Mail: Data Protection for Microsoft Exchange Server Installation and User's Guide</i>	SC23-9796

Table 4. Tivoli Storage Manager Data Protection publications (continued)

Publication title	Order number
<i>Program Directory for IBM Tivoli Storage Manager for Mail (Data Protection for Lotus Domino)</i>	GI11-8909

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## Support information

You can find support information for IBM products from a variety of sources.

### Getting technical training

Information about Tivoli technical training courses is available online.

Go to <http://www.ibm.com/software/tivoli/education/>.

### Searching knowledge bases

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

You can begin with the Tivoli Storage Manager Information Center at <http://publib.boulder.ibm.com/infocenter/tsminfo/v6>. From this Web site, you can search all Tivoli Storage Manager publications.

### Searching the Internet

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

To search multiple Internet resources, go to the support Web site for Tivoli Storage Manager at <http://www.ibm.com/software/sysmgmt/products/support/IBMTivoliStorageManager.html>. From there, you can search a variety of resources including:

- IBM technotes
- IBM downloads
- IBM Redbooks®

If you still cannot find the solution to the problem, you can search forums and newsgroups on the Internet for the latest information that might help you resolve your problem. To share your experiences and learn from others in the user community, go to the Tivoli Storage Manager wiki at <http://www.ibm.com/developerworks/wikis/display/tivolistoragemanager/Home>.

### Using IBM Support Assistant

At no additional cost, you can install on any workstation the IBM Support Assistant, a stand-alone application. You can then enhance the application by installing product-specific plug-in modules for the IBM products that you use.

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

- Support links
- Education links

- Ability to submit problem management reports

For more information, see the IBM Support Assistant Web site at <http://www.ibm.com/software/support/isa/>.

### Finding product fixes

A product fix to resolve your problem might be available from the IBM Software Support Web site.

You can determine what fixes are available by checking the Web site:

1. Go to the IBM Software Support Web site at <http://www.ibm.com/software/tivoli/products/storage-mgr/product-links.html>.
2. Click the **Support Pages** link for your Tivoli Storage Manager product.
3. Click **Download**, and then click **Fixes by version**.

### Getting e-mail notification of product fixes

You can get notifications about fixes and other news about IBM products.

To receive weekly e-mail notifications about fixes and other news about IBM products, follow these steps:

1. From the support page for any IBM product, click **My support** in the upper-right corner of the page.
2. If you have already registered, skip to the next step. If you have not registered, click **Register** in the upper-right corner of the support page to establish your user ID and password.
3. Sign in to **My support**.
4. On the My support page, click **Edit profiles** in the left navigation pane, and scroll to **Select Mail Preferences**. Select a product family and check the appropriate boxes for the type of information you want.
5. Click **Submit**.
6. For e-mail notification for other products, repeat steps 4 and 5.

## Contacting IBM Software Support

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

Before you contact IBM Software Support, follow these steps:

1. Set up a software maintenance contract.
2. Determine the business impact of your problem.
3. Describe your problem and gather background information.

Then see “Submit the problem to IBM Software Support” on page xviii for information on contacting IBM Software Support.

### Setting up a software maintenance contract

Set up a software maintenance contract. The type of contract that you need depends on the type of product you have.

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

- **Online:** Go to the Passport Advantage Web page at <http://www.ibm.com/software/lotus/passportadvantage/>, click **How to enroll**, and follow the instructions.
- **By Phone:** For the phone number to call in your country, go to the IBM Software Support Handbook Web page at <http://www14.software.ibm.com/webapp/set2/sas/f/handbook/home.html> and click **Contacts**.
- For server software products, you can purchase a software maintenance agreement by working directly with an IBM sales representative or an IBM Business Partner. For more information about support for server software products, go to the IBM Technical support advantage Web page at <http://www.ibm.com/servers/>.

If you are not sure what type of software maintenance contract you need, call 1-800-IBMSERV (1-800-426-7378) in the United States. For a list of telephone numbers of people who provide support for your location, go to the Software Support Handbook page at <http://www14.software.ibm.com/webapp/set2/sas/f/handbook/home.html>.

### Determine the business impact

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

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

### Describe the problem and gather background information

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

To save time, know the answers to these questions:

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

### Submit the problem to IBM Software Support

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

### Online

Go to the IBM Software Support Web site at <http://www.ibm.com/software/support/probsub.html>. Enter your information into the appropriate problem submission tool.

### By phone

For the phone number to call in your country, go to the contacts page of the IBM Software Support Handbook at <http://www14.software.ibm.com/webapp/set2/sas/f/handbook/home.html>.

If the problem that you submit is for a software defect or for missing or inaccurate documentation, IBM Software Support creates an Authorized Program Analysis Report (APAR). The APAR describes the problem in detail. If a workaround is possible, IBM Software Support provides one for you to implement until the APAR is resolved and a fix is delivered. IBM publishes resolved APARs on the Tivoli Storage Manager product support Web site at <http://www.ibm.com/software/sysmgmt/products/support/IBMTivoliStorageManager.html>, so that users who experience the same problem can benefit from the same resolutions.

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## Conventions used in this manual

This manual uses the following typographical conventions:

Example	Description
autoexec.ncf hsmgui.exe	A series of lowercase letters with an extension indicates program file names.
DSMI_DIR	A series of uppercase letters indicates return codes and other variables or values.
<b>dsmQuerySessInfo</b>	Boldface type indicates a command that you type on a command line, the name of a function call, the name of a structure, a field within a structure, or a parameter.
<i>timeformat</i>	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.
<i>dateformat</i>	Italic type indicates an option, the value of an option, a new term, a placeholder for information you provide, or for special emphasis in the text.
maxcmdretries	Monospace type indicates fragments of a program or information as it might appear on a display screen, such a command example.
plus sign (+)	A plus sign between two keys indicates that you press both keys at the same time.



---

## New for IBM Tivoli Storage Manager Version 6.1

The following features are new for IBM Tivoli Storage Manager in Version 6.1:

### **Mac OS X-specific information is now included in the UNIX and Linux publication**

The Tivoli Storage Manager for UNIX and Linux Backup-Archive Clients Installation and User's Guide includes the Mac OS X-specific information.

### **Mac OS X NLS support**

The Tivoli Storage Manager for Mac OS X Backup-Archive Client now supports the NLS languages supported by the Tivoli Storage Manager.

### **Mac OS X API support**

The Tivoli Storage Manager API is now supported on Mac OS X.

### **Improved memory usage for backup of Hierarchical Storage Management (HSM) managed file systems**

The Tivoli Storage Manager Backup-Archive client can do a full incremental backup of very large HSM managed file systems containing 100 000 000 files or more.

### **UTF-8 encoding support is added for Tivoli Storage Manager UNIX and Linux clients**

UTF-8 is added for the language locales that are already supported by the Tivoli Storage Manager Backup-Archive Client.

The Tivoli Storage Manager Version 6.1 client message catalogs and help files are encoded in UTF-8. If you are installing Tivoli Storage Manager client message catalogs for languages other than English, you must also have the appropriate iconv UTF-8 converters installed on your system. If the appropriate iconv UTF-8 converters are not installed, all Tivoli Storage Manager client messages will be displayed in English.

### **Availability of 64-bit binaries**

The client packages for Linux on POWER, Linux zSeries, and one of the AIX clients contain 64-bit binaries.

### **NetApp Snapshot Difference API (SnapDiff API) support**

When used with the incremental command, the `snappdiff` option streamlines the incremental process by performing an incremental backup of the files reported as changed by the NetApp Snapshot Difference API, instead of scanning the volume looking for files that have changed.

### ***Querysummary* option support**

You can use the *querysummary* processing option to extend the **query archive** and **query backup** commands. This support provides a restore preview so that you can determine whether to use the classic or no-query restore method.

### ***Srvoptsetencryptiondisabled* option support**

You can use the *srvoptsetencryptiondisabled* processing option to ignore encryption options in a client options set from a Tivoli Storage Manager server.

### **Enhanced help facilities**

The command-line client **help** command is enhanced so that you can specify the command, option, or message on which you want help information.

In the graphical user interface, message boxes are enhanced with a button that you can click to see detailed message information.

#### Related reference

“Diffsnapshot” on page 291

The *diffsnapshot* option controls whether Tivoli Storage Manager should create the differential snapshot when performing a *snapdiff* incremental backup. If the differential snapshot is not created by Tivoli Storage Manager, the latest snapshot found on the volume is used as the differential snapshot and as the source for the backup operation.

“Help” on page 466

Use this command to display information about commands, options, and messages.

“Query Archive” on page 477

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, and archive description.

“Query Backup” on page 479

The **query backup** command displays a list of backup versions of your files that are stored on the Tivoli Storage Manager, or that are inside a backup set from the server when the *backupsetname* option is specified.

“Querysummary” on page 375

The *querysummary* option provides statistics about files, directories and objects that are returned by the **query backup** or **query archive** commands.

“Set Password” on page 529

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.

“Snapdiff” on page 398

The *snapdiff* option is for backing up NAS/N-Series file server volumes that are NFS or CIFS attached.

“Srvoptsetencryptiondisabled” on page 407

The *srvoptsetencryptiondisabled* option allows the client to ignore encryption options in a client options set from a Tivoli Storage Manager server.



---

## Chapter 1. Installing the Tivoli Storage Manager clients

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

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 server publications to install and configure a Tivoli Storage Manager server.

---

### Migrating from earlier versions

The following sections explain what you need to do if you are migrating to Tivoli Storage Manager Version 6.1 from a previous version.

#### Upgrade path for clients and servers

As part of a migration plan from Tivoli Storage Manager Version 5.5 to Tivoli Storage Manager Version 6.1, Tivoli Storage Manager clients and servers can be upgraded at different times. This configuration is supported as long as the older version is supported.

To help prevent disruption to your backup and archive activities during the migration, follow these guidelines:

- NAS backups performed on a Tivoli Storage Manager Version 6.1 server using the server's BACKUP NODE command can only be restored using the server's RESTORE NODE command or a Tivoli Storage Manager Version 6.1 client.
- A Tivoli Storage Manager Version 5.5 client can perform backup, restore, archive, and retrieve functions to a Tivoli Storage Manager Version 6.1 server.
- A Tivoli Storage Manager Version 6.1 client can perform backup, restore, archive, retrieve, and query functions to a Tivoli Storage Manager Version 5.5 server.
- A Tivoli Storage Manager Version 5.5 Space Management client can perform migrate and recall functions to a Tivoli Storage Manager Version 6.1 server.
- A Tivoli Storage Manager Version 6.1 Space Management client can perform migrate and recall functions to a Tivoli Storage Manager Version 5.5 server.
- If you back up or archive data from a Tivoli Storage Manager Version 5.4 or Version 5.5 client to any Tivoli Storage Manager server, you can restore or retrieve that data using a Tivoli Storage Manager Version 6.1 client.  
This is also true when recalling data that was migrated with the Version 5.4 or Version 5.5 Space Management client.
- If you back up or archive data from a Tivoli Storage Manager Version 6.1 client, you cannot restore or retrieve that data using a Tivoli Storage Manager Version 5.5 or earlier client.
- All administrative clients can administer Tivoli Storage Manager Version 5.5 and Version 6.1 servers.

Refer to “Cluster environment configuration and use” on page 68 for details about using the Tivoli Storage Manager backup-archive client in the cluster environment, including the following information:

- Migrating your current AIX HACMP™ setups
- Configuring the Tivoli Storage Manager backup-archive client in a cluster environment
- Enabling the Tivoli Storage Manager storage agent for LAN-free data movement
- Enabling the Tivoli Storage Manager Web client in a cluster environment

#### **Related reference**

“Passworddir” on page 362

The *passworddir* option specifies the directory location in which to store an encrypted password file.

## **Additional migration information**

This section explains some additional information that you need to know when migrating your Tivoli Storage Manager client.

Determine which AIX package you need based on the following information:

- If you have a 64-bit system and you do not use HSM, upgrade to the 64-bit backup-archive client from your 32-bit client.
- If you have a 32-bit system or you use enhanced journaled file system (JFS2) hierarchical storage management (HSM), install the JFS2 backup-archive client.
- If you use GPFS™ HSM, install the GPFS backup-archive client

If you are using the Version 5.4 or Version 5.5 Linux x86 client to back up the VMware ESX service console, you cannot use it with Version 6.1.

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

To view the non-English online help from the Web Client applet, you must install the language versions of the help files on the agent, the system where the Tivoli Storage Manager Backup-Archive client was installed. If the language versions are not installed or are not available, the online help will be displayed in English.

A command-line administrative client is available on all UNIX, Linux, and Windows client platforms.

See the *client\_message.chg* file in the client package for a list of new and changed messages since the previous Tivoli Storage Manager release.

#### **Related tasks**

“Migrating legacy AIX HACMP setups” on page 77

If you are currently using the Tivoli Storage Manager Backup-Archive Client in an HACMP environment using the *clusternode* option, you must update your current configurations. The *clusternode* option is no longer supported.

---

## **Client environment requirements**

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

The following list shows the location of the environment prerequisites for each supported platform.

- “AIX client environment”
- “HP-UX Itanium 2 client environment” on page 5
- “Linux on POWER client environment” on page 6
- “Linux x86/x86\_64 client environment” on page 7
- “Linux for zSeries client environment” on page 9
- “Mac OS X client environment” on page 10
- “Solaris client environment” on page 11
- “z/OS UNIX System Services client environment” on page 12
- “NDMP support requirements (Extended Edition only)” on page 13

For current information concerning the client environment prerequisites for all Tivoli Storage Manager supported client platforms, go to the Web site at:

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

## 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

This topic lists the Tivoli Storage Manager client components that are available for the AIX platform.

The following components are available for the AIX client platform:

- Backup-archive client (command line)
- Administrative client (command-line)
- Backup-archive Java™ Graphical User Interface (Java GUI)
- Web backup-archive client
- Tivoli Storage Manager API (32-bit and 64-bit)
- XOpen API (32-bit)
- Hierarchical Storage Management client

**Note:** The IBM Tivoli Space Manager HSM Client for AIX, while contained on the client DVD, is a separate product, and therefore subject to the fees and licensing required by Tivoli and IBM.

### Hardware requirements

This section lists the hardware that you need to have installed on your workstation to use the AIX client.

Ensure that you have the following hardware installed before using the AIX client:

- A RISC System/6000®, IBM System p®, System i®, or compatible hardware, as supported by AIX
- For HACMP: One additional network adapter for each machine
- Memory: 128 MB
- A minimum screen resolution of 800 by 600 pixels is required to display the Tivoli Storage Manager Backup-Archive Client Java GUI and Web GUI.
- The following are the minimum disk space requirements:
  - Backup-archive client with 32-bit API and 32-bit GSKit: 59 MB, used with the HSM clients
  - Backup-archive client with 64-bit API and 64-bit GSKit: 59 MB
  - 64-bit API with 64-bit GSKit: 23 MB

- Web client: 32 MB
- Non-English language packs: 82 MB
- JFS2 HSM client: 82 MB
- GPFS HSM client: 91 MB
- Filepath Kernel extension: 3 MB

## Software requirements

This topic lists the software that you need on your workstation to use the AIX client.

You need the following software on your workstation:

- Backup-Archive client
  - AIX 6.1 (does not have a 32-bit kernel)
  - AIX 5.3 (32-bit or 64-bit kernel mode)
  - AIX GPFS support:
    - GPFS 3.2 and 3.2.1
  - HACMP support:
    - AIX 5.3 and 6.1 (32-bit or 64-bit kernel mode)
    - HACMP 5.4 and 5.5 (with IY89869)
- Java JRE 5 or 6 for the Java GUI
- A Mozilla 1.4 or higher browser for the Web client and to access online help and documentation

## Communication methods

This topic lists the client communication methods that are available for the AIX client.

The following table lists the communication methods and the software needed to connect to the different Tivoli Storage Manager servers for the AIX platform.

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

## Backup-archive client features that are available on AIX platforms

The following table shows which features are supported on the different AIX platforms.

Table 5. Supported features on AIX platforms

Features	AIX 32-bit JFS2	AIX 32-bit GPFS	AIX 64-bit
Backup-archive command-line and GUI	yes	yes	yes
HSM with JFS2	yes	no	no
HSM with GPFS	no	yes	no
Journal-based backup	yes	no	yes
NetApp Snapdiff	no	no	yes
LAN-free operations	yes	yes	yes

Table 5. Supported features on AIX platforms (continued)

Features	AIX 32-bit JFS2	AIX 32-bit GPFS	AIX 64-bit
Online image backup	yes	yes	yes
Offline image backup	yes	yes	yes

## HP-UX Itanium 2 client environment

This section contains client environment information, Tivoli Storage Manager client components, and hardware and software requirements for the HP-UX Itanium<sup>®</sup> 2 platform.

### Client components

This topic lists the Tivoli Storage Manager client components that are available for the HP-UX Itanium 2 platform.

The following components are available for the HP-UX Itanium 2 client platform:

- Backup-archive client (command-line and GUI)
- HSM client
- Administrative client (command line)
- Backup-archive Java Graphical User Interface (Java GUI)
- Tivoli Storage Manager API (32-bit and 64-bit)
- Web backup-archive client

#### Note:

1. The IBM Tivoli Space Manager HSM Client, while contained on the client DVD, 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*, SC32-0147.
3. For more information about the Administrative client, see *IBM Tivoli Storage Manager for HP-UX Administrator's Reference*, SC32-0124.

### Hardware requirements

This section lists the hardware that you need to have installed on your workstation to use the HP-UX Itanium 2 client.

Ensure that you have the following hardware installed before using the HP-UX Itanium 2 client:

- An HP-UX Itanium 2 processor
- Disk space: 570 MB hard disk space
- Memory: 512 MB
- A minimum screen resolution of 800 by 600 pixels is required to display the Tivoli Storage Manager Backup-Archive Client Java GUI and Web GUI.

### Software requirements

This topic lists the software that you need on your workstation to use the HP-UX Itanium 2 client.

You need the following software on your workstation:

- HP-UX 11i v2 (32-bit or 64-bit) or HP-UX 11i v3
- Java Runtime Environment (JRE) 5 or 6 for the Java GUI: <http://www.hp.com/products1/unix/java/index.html>
- A Mozilla 1.4 or higher browser for the Web client and to access online help and documentation

## Communications methods

This topic lists the client communications methods that you need for the HP-UX Itanium 2 platform.

The following table lists the communication methods and the software needed to connect to the different Tivoli Storage Manager servers for the HP-UX Itanium 2 platform.

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, Solaris, Windows, z/OS
Shared Memory	TCP/IP (Standard with HP-UX)	HP-UX Itanium 2

## Linux on POWER client environment

This section contains client environment information, Tivoli Storage Manager client components, and hardware and software requirements for the Linux on POWER<sup>®</sup> client platforms.

### Client components

This topic lists the Tivoli Storage Manager client components that are available for the Linux on POWER client platform.

The following components are available for the Linux on POWER client platform:

- Backup-archive client (command-line)
- Administrative client (command line)
- Backup-archive Java Graphical User Interface (Java GUI)
- Tivoli Storage Manager API (32-bit and 64-bit)
- Web backup-archive client

### Hardware requirements

This section lists the hardware that you need to have installed on your workstation to use the Linux on POWER client platforms.

Ensure that you have the following hardware installed before using the Linux on POWER client:

- Machine: Linux on POWER (64-bit mode), System i, JS20 Blades, OpenPower<sup>®</sup>
- The following are minimum requirements for the Backup-Archive client:
  - 64 MB of memory (RAM)
  - 80 MB of available disk space
- The following are minimum requirements for the API:
  - 64 MB of memory (RAM)
  - 20 MB of available disk space
  - 20 MB of available disk space for the API 64-bit
- The GUI interface requires at least 16-bit color to display properly on the local console

### Software requirements

This topic lists the software that you need on your workstation to use the Linux on POWER client platforms.

The backup-archive client requires the following software to run:

- SUSE Linux Enterprise Server 10 or Red Hat Enterprise Linux 5.0

- Java JRE 5 or 6 for the Java GUI
- A Mozilla 1.4 or higher browser for the Java GUI and to access online help and documentation

For EXT2/EXT3/XFS ACL support, you need the `acl-2.0.19-17` package.

The Tivoli Storage Manager client uses the `libacl.so` library, 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`

Ensure that there is a valid library or symbolic link present in each of the specified locations.

The image backup and restore functions for LVM2 volumes require `libdevmapper.so` Version 1.01 or higher. If the library is at a lower level than required or it is not available, image function for LVM2 volumes will fail. The `libdevmapper.so` library is distributed with the LVM2 packages.

## Communication methods

This topic lists the client communications methods that you need for the Linux on POWER client platform.

The following table lists the communication methods and the software needed to connect to the different Tivoli Storage Manager servers for the Linux on POWER platform.

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, Solaris, Windows, z/OS
Shared Memory	TCP/IP (Standard with Linux)	Linux on POWER

## Linux x86/x86\_64 client environment

This section contains client environment information, Tivoli Storage Manager client components, and hardware and software requirements for the Linux on Intel® x86 (Linux x86/x86\_64) platform.

### Client components

This topic lists the Tivoli Storage Manager client components that are available for the Linux on Intel x86 (Linux x86/x86\_64) platform.

The following components are available for the Linux on Intel x86 (Linux x86/x86\_64) client platform:

- Backup-archive client (command line)
- Administrative client (command line)
- Backup-archive Java Graphical User Interface (Java GUI)
- Tivoli Storage Manager API (32-bit and 64-bit)
- Web backup-archive client
- Hierarchical Storage Management client

**Note:** The Tivoli Space Manager HSM Client for Linux x86/x86\_64, while contained on the client DVD, is a separate product, and therefore subject to the fees and licensing required by Tivoli and IBM.

## Hardware requirements

This section lists the hardware that you need to have installed on your workstation to use the Linux on Intel x86 (Linux x86/x86\_64) platform.

Ensure that you have the following hardware installed before using the Linux on Intel x86 (Linux x86/x86\_64) client:

- x86-based PC (Pentium® or newer) or AMD64/EM64T processor
- The following are the minimum disk space requirements:
  - 8 MB for the API 32-bit
  - 17 MB for the API 64-bit (this includes the API 32-bit)
  - 29 MB for the Backup-Archive client
  - 143 MB for the HSM client
- Memory: 512 MB
- A minimum screen resolution of 800 by 600 pixels is required to display the Tivoli Storage Manager Backup-Archive Client Java GUI and Web GUI.

## Software requirements

This topic lists the software that you need on your workstation to use the Linux on Intel x86 (Linux x86/x86\_64) platform.

The backup-archive client requires the following software to run:

- One of the following:
  - Red Hat Enterprise Linux 5.0
  - SUSE Linux Enterprise Server 10 (including Novell OES distributions)
  - Asianux 3.0
- Linux x86/x86\_64 GPFS support:
  - GPFS 3.2 and 3.2.1
- Java JRE 5 or 6
- For GPFS ACL support on Linux x86/x86\_64, the Tivoli Storage Manager client uses libgpfs.so library (which comes in the standard GPFS package). For Ext2/Ext3/XFS ACL support on Linux x86/x86\_64, the Tivoli Storage Manager client uses libacl.so (which comes in the libacl package).
- A Mozilla 1.4 or higher browser for the Java GUI and to access online help and documentation

For EXT2/EXT3/XFS ACL support, you also need the acl-2.0.19-17 package.

The image backup and restore functions for LVM2 volumes require libdevmapper.so Version 1.01 or later. If the library is at an earlier level than required or it is not available, image function for LVM2 volumes fail. The libdevmapper.so library is distributed with the LVM2 packages. For Linux 64-bit support you need to install the 32-bit libdevmapper.so library.

## Communication methods

This topic lists the client communications methods that you need for the Linux on Intel x86 (Linux x86/x86\_64) platform.

The following table lists the communication methods and the software needed to connect to the different Tivoli Storage Manager servers for the Linux on Intel x86 (Linux x86/x86\_64) platform.



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, Solaris, Windows, z/OS
Shared Memory	TCP/IP (Standard with Linux)	Linux x86_64

## Linux for zSeries client environment

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

### Client components

This topic lists the Tivoli Storage Manager client components that are available for the Linux for zSeries platform.

The following components are available for the Linux for zSeries client platform:

- Backup-archive client (command line)
- Administrative client (command line)
- Tivoli Storage Manager API (31-bit and 64-bit)
- Web backup-archive client

### Hardware requirements

This section lists the hardware that you need to have installed on your workstation to use the Linux for zSeries platform.

Ensure that you have the following hardware installed before using the Linux for zSeries client:

- A Linux for zSeries 800 or 900 (64-bit mode)
- The following are the minimum disk space requirements:
  - 6 MB for the API 32-bit
  - 11 MB for the API 64-bit (this includes the API 32-bit)
  - 20 MB for the Backup-Archive client
- 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

This topic lists the software that you need on your workstation to use the Linux for zSeries platform.

The backup-archive client requires the following software to run:

- One of the following:
  - SUSE Linux Enterprise Server 10 Linux for zSeries
  - Red Hat Enterprise Linux 5.0 Linux for zSeries
- Java JRE 5 or 6 for the Java GUI
- A Mozilla 1.4 or higher browser for the Web client and to access online help and documentation

For EXT2/EXT3/XFS ACL support, you need the `acl-2.0.19-17` package.

The image backup and restore functions for LVM2 volumes require `libdevmapper.so` Version 1.01 or higher. If the library is at a lower level than

required or it is not available, image function for LVM2 volumes will fail. The `libdevmapper.so` library is distributed with the LVM2 packages.

## Communication methods

This topic lists the client communications methods that you need for the Linux for zSeries platform.

The following table lists the communication methods and the software needed to connect to the different Tivoli Storage Manager servers for the Linux for zSeries platform.

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, Solaris, Windows, z/OS
Shared Memory	TCP/IP (Standard with Linux)	Linux

## Mac OS X client environment

This section contains client environment information, Tivoli Storage Manager client components, and hardware and software requirements for the Mac OS X client.

### Client components

This topic lists the Tivoli Storage Manager client components that are available for the Mac OS X client.

The following components are included with the Tivoli Storage Manager Client for Mac OS X:

- Backup-Archive client (command line)
- Administrative client (command line)
- Backup-Archive Java Graphical User Interface (GUI)
- Web Backup-Archive client
- Tivoli Storage Manager API

**Note:** The `dsmj` shell script file is installed in the following location:

```
/Library/Application Support/tivoli/tsm/client/ba/bin
```

### Hardware requirements

This section lists the hardware that you need to have installed on your workstation to use the Mac OS X client.

Ensure that you have the following hardware installed before using the Mac OS X client:

- A PowerPC<sup>®</sup> or Intel based Macintosh
- Memory: 512 MB
- Disk space: 100 MB
- A minimum screen resolution of 800 by 600 pixels is required to display the Tivoli Storage Manager Backup-Archive Client Java GUI and Web GUI.

### Software requirements

This topic lists the software that you need on your workstation to use the Mac OS X client.

The backup-archive client requires Mac OS X, version 10.5.x, where  $x \geq 0$ .

## Communications method

This topic lists the client communications methods that you need for the Mac OS X client.

The following table lists the communication methods and the software needed to connect to the different Tivoli Storage Manager servers for the Mac OS X platform.

To use this communication method:	Install this software:	To connect to these Tivoli Storage Manager servers:
TCP/IP	TCP/IP (standard with Mac OS X)	AIX, HP-UX, Linux, Solaris, 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

This topic lists the Tivoli Storage Manager client components that are available for the Sun Solaris platform.

The following components are included with the Tivoli Storage Manager Client for Sun Solaris:

- Backup-archive client (command line)
- Administrative client (command-line)
- Backup-archive Java Graphical User Interface (Java GUI)
- Tivoli Storage Manager API (32-bit and 64-bit)
- X/Open API (SPARC only)
- Web backup-archive client
- Hierarchical Storage Management client (SPARC only)

**Note:** The IBM Tivoli Space Manager HSM Client for Solaris SPARC, while contained on the client DVD, is a separate product, and therefore subject to the fees and licensing required by Tivoli and IBM.

### Hardware requirements

This section lists the hardware that you need to have installed on your workstation to use the Sun Solaris platform.

Ensure that you have the following hardware installed before using the Sun Solaris client:

- One of the following:
  - A SPARCstation based on sun4u architecture or compatible workstation
  - x86 32-bit and 64-bit (AMD64/EM64T) based system that is explicitly compatible and fully capable of running the Solaris 10 x86 operating system
- 219 MB of available disk space

**Note:** The installation procedure requires up to 200 MB of temporary disk space in the /var file system.

- Memory: 512 MB
- A minimum screen resolution of 800 by 600 pixels is required to display the Tivoli Storage Manager Backup-Archive Client Java GUI and Web GUI.

## Software requirements

This topic lists the software that you need on your workstation to use the Sun Solaris platform.

The backup-archive client requires the following operating system to run:

- Sun Solaris 10 (update 1 or higher) 32bit and 64bit kernel mode (SPARC or x86)

The backup-archive client Java GUI requires:

- The Java Runtime Environment Java JRE 5 or 6 that you can download from the following Website: <http://java.sun.com/>

**Note:** The "java" executable needs to be found in the system PATH. To verify that you have the right JRE installed you can use the "java -version" command from a UNIX system window.

- A Mozilla 1.4 or higher browser for the Java GUI and to access online help and documentation

## Communication methods

This topic lists the client communications methods that you need for the Sun Solaris platform.

The following table lists the communication methods and the software needed to connect to the different Tivoli Storage Manager servers for the Sun Solaris platform.

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, Solaris, Windows, z/OS
Shared Memory	TCP/IP (Standard with Solaris)	Solaris

## 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 z/OS UNIX System Services platform.

### Client components

This topic lists the Tivoli Storage Manager client components that are available for the z/OS UNIX System Services platform.

The following components are included with the Tivoli Storage Manager Client for z/OS UNIX System Services:

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

### Hardware requirements

This section lists the hardware that you need to have installed on your workstation to use the z/OS UNIX System Services platform.

Ensure that you have the following hardware installed before using the z/OS UNIX System Services client:

- Any zSeries architecture processor
- The following are the disk space requirements:
  - 50 MB of available disk space for the Backup-Archive client
  - 15 MB of available disk space for the API
- A minimum screen resolution of 800 by 600 pixels is required to display the Tivoli Storage Manager Backup-Archive Client Web GUI.

### Software requirements

This topic lists the software that you need on your workstation to use the z/OS UNIX System Services platform.

The backup-archive client requires the following software to run:

- z/OS V1R8, V1R9, or V1R10
- Java JRE 5 or 6 for the Java GUI

### Communication methods

This topic lists the client communications methods that you need for the z/OS UNIX System Services platform.

The following table lists the communication methods and the software needed to connect to the different Tivoli Storage Manager servers for the z/OS UNIX System Services platform.

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, Solaris, Windows, z/OS

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

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## Installing from the Tivoli Storage Manager DVD

The UNIX and Linux client images are contained on several Tivoli Storage Manager product DVDs that are listed below.

### IBM Tivoli Storage Manager AIX Clients

Contains the AIX client images. The AIX client images are in the `/usr/sys/inst.images` directory

### IBM Tivoli Storage Manager HP Clients

Contains the HP-UX client images. The images reside in the `tsmcli/'platform'/` directory structure, where 'platform' is **hp11ia64**.

### IBM Tivoli Storage Manager Solaris Clients (SPARC and x86)

Contains the Solaris client images. The images reside in the `tsmcli/'platform'/` directory structure, where 'platform' is one of the following platform designations: **solaris**, **solaris x\_86**.

### IBM Tivoli Storage Manager Linux Clients

Contains the Linux x86/x86\_64, Linux for zSeries, and LinuxPPC client images. The images reside in the `tsmcli/'platform'/` directory structure, where 'platform' is one of the following platform designations: **Linux x86/x86\_64**, **Linux for zSeries**, **LinuxPPC (for Linux on POWER client)**.

### IBM Tivoli Storage Manager Mac OS X Client

Contains the Mac OS X client images.

See the following Web site for the program directories with information about available UNIX client installation media:

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

You can install the clients using any of the following methods:

- Install directly from the DVD.
- Create client images to install.
- Transfer installable files from the UNIX and Linux DVDs to a target workstation.

To install the Mac OS X client from the Tivoli Storage Manager DVD, follow these steps:

1. Go to the `tsmcli/mac` directory, for the Mac OS X client installer.
2. Double-click the `5.5.0.0-TIV-TSMBAC-Mac.dmg` file, to mount the disk image.
3. Double-click the "Tivoli Storage Manager" installation package icon.
4. Follow the prompts to complete the installation.

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## Installing the backup-archive client

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

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

Table 6 lists the supported UNIX and Linux clients and the location of the installation instructions for each client.

*Table 6. UNIX and Linux client installation reference*

Installation instructions	Page
"Installing the AIX client" on page 15	"Installing the AIX client" on page 15
"Installing the HP-UX Itanium 2 client" on page 19	"Installing the HP-UX Itanium 2 client" on page 19

Table 6. UNIX and Linux client installation reference (continued)

Installation instructions	Page
"Installing the Linux on POWER client" on page 22	"Installing the Linux on POWER client" on page 22
"Installing the Linux x86/x86_64 client" on page 25	"Installing the Linux x86/x86_64 client" on page 25
"Installing the Linux for zSeries client" on page 27	"Installing the Linux for zSeries client" on page 27
"Installing the Mac OS X client" on page 29	"Installing the Mac OS X client" on page 29
"Installing the Solaris clients" on page 35	"Installing the Solaris clients" on page 35
For information on Installing the z/OS UNIX System Services Client, see the program directories on the following Web site: <a href="http://www.ibm.com/software/sysmgmt/products/support/IBMTivoliStorageManager.html">http://www.ibm.com/software/sysmgmt/products/support/IBMTivoliStorageManager.html</a>	

### Related concepts

Chapter 2, "Configuring the Tivoli Storage Manager client," on page 41  
After successfully installing the Tivoli Storage Manager client, you must configure the client before performing any operations.

## Installing the AIX client

With Tivoli Storage Manager 6.1.0 AIX, you can use both 32-bit and 64-bit clients. However, only one client can be installed at a time. If you install both the 32-bit and 64-bit clients at the same time, you receive an error message.

If you are moving from a 32-bit client to a 64-bit client, first remove the 32-bit client using SMIT (tivoli.tsm.client.ba). Then install the 64-bit client (tivoli.tsm.client.ba.64bit).

If you use the 64-bit client, you must also install the 64-bit version of the API (tivoli.tsm.client.api.64bit). The 32-bit API (tivoli.tsm.client.api.32bit) is installed at the same time, and can coexist with the 64-bit API.

If the 64-bit client is installed but you want to use the 32-bit client instead, you must remove the 64-bit client. Use SMIT to remove the 64-bit client (tivoli.tsm.client.ba.64bit), and then install the 32-bit client. You do not need to uninstall the 64-bit API.

If you are upgrading from a previous version of the Tivoli Storage Manager AIX client, use SMIT to remove any national language filesets that might be installed, and install the national language filesets provided with Tivoli Storage Manager 6.1.

You cannot perform an upgrade install from the Tivoli Storage Manager Version 5.5 or earlier client to the Tivoli Storage Manager Version 6.1 64-bit client. You must remove the older 32-bit client before installing the Tivoli Storage Manager Version 6.1 64-bit client.

All of the needed packages are included in the Tivoli Storage Manager AIX client package, and they overwrite any older runtime applications on your system during installation. LibC (C Set ++<sup>®</sup>) runtime is required.

When using the **installp** command to install this client, do not change the default field values for the following two choices:

- "AUTOMATICALLY install requisite software?"
- "OVERWRITE same or newer versions?"

Disabling or changing the values will allow a lower level Tivoli Storage Manager component to install over a currently higher installed component. Under such circumstances, function calls between components at different levels might not be valid any longer.

You can install only *one* of these clients:

- tivoli.tsm.client.ba (includes the HSM JFS2 client)
- tivoli.tsm.client.ba.gpfs (required when using the GPFS HSM client)
- tivoli.tsm.client.ba64 (64-bit client; no HSM)

You can install these APIs:

- tivoli.tsm.client.api.32bit
- tivoli.tsm.client.api.64bit

**Note:**

1. All of these packages are available on the installation media.
2. HSM installation information is in the *Tivoli Storage Manager for Space Management for UNIX and Linux User's Guide*. You need an HSM license to install and use those file sets.
3. You need an Extended Edition license to use the NAS client.

**AIX client**

**tivoli.tsm.client.ba**

Installs the following Tivoli Storage Manager files:

- Backup-archive base files
- Backup-archive common files
- Backup-archive Web client
- Image backup client
- NAS backup client

**tivoli.tsm.client.ba64**

Installs the following Tivoli Storage Manager 64-bit files:

- Backup-archive base files
- Backup-archive common files



- Backup-archive Web client
- Image backup client

**tivoli.tsm.client.ba.gpfs**

Installs the following Tivoli Storage Manager files:

- Backup-archive GPFS files
- GPFS common files

**tivoli.tsm.client.hsm.gpfs**

Installs the Tivoli Storage Manager Hierarchical Storage Management GPFS client.

**tivoli.tsm.client.hsm**

Installs the Tivoli Storage Manager Hierarchical Storage Management JFS2 client.

**tivoli.tsm.client.jbb**

Installs the Tivoli Storage Manager journal-based backup component.

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

Installs the 32-bit API.

**tivoli.tsm.client.api.64bit**

Installs the 64-bit API.

**tivoli.tsm.client.msg.lang**

Installs the NL messages for API, where *lang* is the appropriate language code from Table 7 on page 18.

**tivoli.tsm.filepath\_aix**

Installs the file path kernel extension required for journal-based backup.

**gskta.rte**

SSL Toolkit 32-bit (required by the backup-archive client and its components).

**gksa.rte**

SSL Toolkit 64-bit (required by the 64-bit client API).

**Default installation directories**

Here are the default directories where some files are stored as part of the client installation:

- The Tivoli Storage Manager backup-archive, Web client, and administrative client (dsmadm) files are installed in the `/usr/tivoli/tsm/client/ba/bin` directory.
- The Tivoli Storage Manager backup-archive, Web client, and administrative client (dsmadm) 64-bit files are installed in the `/usr/tivoli/tsm/client/ba/bin64` directory.
- The Tivoli Storage Manager API files are installed in the `/usr/tivoli/tsm/client/api/bin` directory.
- The Tivoli Storage Manager API 64 files are installed in the `/usr/tivoli/tsm/client/api/bin64` directory.
- The sample system options file, `dsm.sys.smp`, is placed in the installation directory.

Table 7. AIX client: Language codes and locales for installation packages

Language	Language code	Locale
Simplified Chinese	ZH_TW	ZH_TW, ZH_TW.UTF-8
Czech	CS_CZ	CS_CZ, CS_CZ.UTF-8
French	FR_FR	FR_FR, FR_FR.UTF-8
German	DE_DE	DE_DE, DE_DE.UTF-8
Hungarian	HU_HU	HU_HU, HU_HU.UTF-8
Italian	IT_IT	IT_IT, IT_IT.UTF-8
Japanese	JA_JP	JA_JP, JA_JP.UTF-8
Korean	KO_KR	KO_KR, KO_KR.UTF-8
Polish	PL_PL	PL_PL, PL_PL.UTF-8
Brazilian Portuguese	PT_BR	PT_BR, PT_BR.UTF-8
Russian	RU_RU	RU_RU, RU_RU.UTF-8
Spanish	ES_ES	ES_ES, ES_ES.UTF-8

This installation procedure is designed to install directly from the DVD using a local or remote-mounted DVD 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 DVD:

1. Log in as the root user, insert the DVD into the DVD drive device. You will need to manually mount the DVD 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 DVD device containing the installation DVD 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 file sets you want to install by pressing the F7 key. Then press Enter.
7. On the **Install and Update From ALL Available Software** panel, press the F4 key to change any entry fields, or use the default fields. Press Enter twice to begin the installation.
8. After the installation completes, select F10 to exit.

**Note:**

1. When installing the clients in a non-English locale, the corresponding local message file sets are required in addition to the clients from the **Install and Update From ALL Available Software** panel. For example, when installing the Tivoli Storage Manager client in `es_ES` locale, the following message fileset is also required:

2. When file sets are installed, the file sets are automatically committed on the system. The previous version of Tivoli Storage Manager software is completely replaced by the newly installed version.
3. The 32-bit Application Programming Interface (tivoli.tsm.client.api.32bit) is an install prerequisite to the 64-bit Application Programming Interface (tivoli.tsm.client.api.64bit).

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 the installation completes, see Chapter 2, “Configuring the Tivoli Storage Manager client,” on page 41 for required and optional tasks to perform before using Tivoli Storage Manager.

**Note:** For AIX workload partitions (WPAR), installation in a global WPAR is supported, and installation in local WPARs is *not* supported.

## Uninstalling the AIX client

This topic lists the steps to follow to uninstall the AIX client.

1. From the AIX command line, enter the following command: `smitty remove`.
2. Hit the ENTER key.
3. In the SOFTWARE name field, press F4 to list the TSM file sets that you want to uninstall; hit the ENTER key.
4. Select the TSM file sets that you want to uninstall; press the ENTER key.
5. In the PREVIEW only? (remove operation will NOT occur) field, select No; hit the ENTER key.

**Note:** Tivoli Storage Manager client modules and components are tightly integrated and installed file sets are automatically committed. There is no option for rollbacks.

## Installing the HP-UX Itanium 2 client

This topic explains the procedure to install the HP-UX Itanium 2 client.

The following source packages are available on the installation media:

### **tsmcli/hp11ia64/TIVsmC**

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

### TIVsm.CLIENT

Contains the backup-archive client (command-line and Java GUI), administrative client (command-line), and the Web client with the English message catalogs.

### TIVsm.CLIENT\_API64

Contains the 64-bit API with the English message catalogs.

**Note:** Additional language support is available under the top level product name of `tsmcli/hp11/TIVsmC.msg.lang`. In this package, the additional language support is available for all components under the top level product name TIVsm. The component name is `TIVsm.CLIENT_msg_lang`. Replace `lang` with the appropriate language code from Table 8.

### tsmcli/hp11ia64/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.

### tsmcli/hp11ia64/TIVsmChsm

Contains the HSM Itanium 2 client. Refer to *IBM Tivoli Storage Manager for Space Management for UNIX and Linux User's Guide* for the HSM Itanium 2 client installation details.

## Default installation directories

Here are the default directories where some files are stored as part of the client installation:

- The Tivoli Storage Manager backup-archive, Web client, and administrative client (dsmadmc) files are installed in the `/opt/tivoli/tsm/client/ba/bin` directory.
- The Tivoli Storage Manager API 64 files are installed in the `/opt/tivoli/tsm/client/api/bin64` directory.
- The sample system options file, `dsm.sys.smp`, is placed in the installation directory.
- If `DSM_DIR` is not set, the executable file `dsmc`, the resource files, and the `dsm.sys` file are stored in the default installation directory.
- If `DSM_CONFIG` is not set, the client user options file must reside in the default installation directory. If `DSM_CONFIG` is set, then the file must reside in the directory specified by `DSM_DIR`.
- If you do not define `DSM_LOG`, Tivoli Storage Manager writes messages to the `dsmerror.log` and `dsmsched.log` files in the current working directory.

Table 8. HP-UX Itanium 2 client: Language codes and locales for installation packages

Language	Language code	Locale
Simplified Chinese	zh_CN	zh_CN, zh_CN.UTF-8
Traditional Chinese	zh_TW	zh_TW, zh_TW.UTF-8
Czech	cs_CZ	cs_CZ, cs_CZ.UTF-8
French	fr_FR	fr_FR, fr_FR.UTF-8
German	de_DE	de_DE, de_DE.UTF-8
Hungarian	hu_HU	hu_HU, hu_HU.UTF-8
Italian	it_IT	it_IT, it_IT.UTF-8
Japanese	ja_JP	ja_JP, ja_JP.UTF-8

Table 8. HP-UX Itanium 2 client: Language codes and locales for installation packages (continued)

Language	Language code	Locale
Korean	ko_KR	ko_KR, ko_KR.UTF-8
Polish	pl_PL	pl_PL, pl_PL.UTF-8
Brazilian Portuguese	pt_BR	pt_BR, pt_BR.UTF-8
Russian	ru_RU	ru_RU, ru_RU.UTF-8
Spanish	es_ES	es_ES, es_ES.UTF-8

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 TIVsm64
```

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

```
/usr/sbin/swremove -x mount_all_filesystems=false -v TIVsm64.CLIENT_msg_lang
```

Replace *lang* with the appropriate language code from Table 8 on page 20.

To install from the DVD follow these steps:

1. Log in as the root user
2. Mount the DVD to /dvd
3. Change the directory to tsmcli/hp11ia64
4. 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 TIVsm64`

**Note:** ``pwd`` can be used instead of the absolute name of the current directory.

To install only the API, omit the last TIVsm64 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, or  
**CLIENT\_API64** for the API

**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 command:

```
/usr/sbin/swinstall -x mount_all_filesystems=false -v -s `pwd`  
/TIVsmC.msg.lang TIVsm64.CLIENT_msg_lang
```

**Note:**

1. The *pwd* parameter can be used instead of the absolute name of the current directory.
2. Replace *lang* with the appropriate language code from Table 8 on page 20.

### Related concepts

Chapter 2, “Configuring the Tivoli Storage Manager client,” on page 41

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

## Increasing default limit of data segment size

The default limit of the data segment size of a process in HP-UX 11i v2 is 64 MB. When backing up large file systems, the Tivoli Storage Manager client might 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.

## Uninstalling the HP-UX Itanium 2 client

This topic lists the steps to uninstall the HP-UX Itanium 2 client.

Follow these steps to uninstall all of the packages related to Tivoli Storage Manager, including command line, GUI, Web GUI, and administrative Client components. Make sure that you uninstall the packages in the given order. Note that you cannot uninstall a single component of this package (for example, the Web GUI) without uninstalling the complete package.

1. HSM package: Check the *IBM Tivoli Storage Manager for Space Management for UNIX and Linux User's Guide* for instructions on removing HSM and installing a new version.
2. Enter the following command to uninstall the Tivoli Storage Manager Backup-Archive Client. This will uninstall all of the components of the Backup-Archive Client (command-line, Web GUI and the administrative Client):  
`/usr/sbin/swremove -x mount_all_filesystems=false -v TIVsm64.CLIENT`
3. If one or more Tivoli Storage Manager language messages packages have been installed, these must be removed before removing the API package. Execute the following command as root user: `/usr/sbin/swremove -x mount_all_filesystems=false -v TIVsm64.CLIENT_msg_xx_XX`, where `xx_XX` is the language you want to remove. Current supported languages are `cs_CZ`, `de_DE`, `es_ES`, `it_IT`, `fr_FR`, `hu_HU`, `ja_JP`, `ko_KR`, `pl_PL`, `pt_BR`, `ru_RU`, `zh_CN` and `zh_TW`.
4. If you also want to remove the CLIENT\_API fileset, execute the following command: `/usr/sbin/swremove -x mount_all_filesystems=false -v TIVsm64.CLIENT_API64`

## Installing the Linux on POWER client

This topic explains how to install the Linux on POWER client.

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

**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 9.

**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 9.

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

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

If an additional Language package is installed, you must uninstall it first, using the following command:

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

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

**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 DVD to /dvd.
2. Enter the following directory path where the installation packages reside on the DVD: /dvd/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: (1) rpm -i TIVsm-API.ppc64.rpm, (2) rpm -i TIVsm-BA.ppc64.rpm. To circumvent the dependence check use the --nodeps option. Be aware to check the dependencies manually using the following commands: (1) rpm -i --nodeps TIVsm-API.ppc64.rpm, (2) rpm -i --nodeps TIVsm-BA.ppc64.rpm. 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 command: rpm -i TIVsm-msg.lang.ppc64.rpm. Replace *lang* with the appropriate language code from Table 9.

Table 9. Linux on POWER client: Language codes and locale for installation packages

Language	Language code	Locale
Simplified Chinese	zh_CN	zh_CN, zh_CN.UTF-8
Traditional Chinese	zh_TW	zh_TW, zh_TW.UTF-8
Czech	cs_CZ	cs_CZ, cs_CZ.UTF-8
French	fr_FR	fr_FR, fr_FR.UTF-8
German	de_DE	de_DE, de_DE.UTF-8
Hungarian	hu_HU	hu_HU hu_HU.UTF-8

Table 9. Linux on POWER client: Language codes and locale for installation packages (continued)

Language	Language code	Locale
Italian	it_IT	it_IT, it_IT.UTF-8
Japanese	ja_JP	ja_JP, ja_JP.UTF-8
Korean	ko_KR	ko_KR, ko_KR.UTF-8
Polish	pl_PL	pl_PL, pl_PL.UTF-8
Brazilian Portuguese	pt_BR	pt_BR, pt_BR.UTF-8
Russian	ru_RU	ru_RU, ru_RU.UTF-8
Spanish	es_ES	es_ES, es_ES.UTF-8

### Default installation directories

Here are the default directories where some files are stored as part of the client installation:

- The Tivoli Storage Manager backup-archive, Web client, Java GUI, and administrative client (dsmadm) files are installed in the `/opt/tivoli/tsm/client/ba/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/tsmunix` and `/opt/tivoli/tsm/client/books/pdf/tsmunix` directories.
- The sample system options file, `dsm.sys.smp`, is placed in the installation directory.
- If `DSM_DIR` is not set, the executable file `dsmc`, the resource files, and the `dsm.sys` file are stored in the default installation directory.
- If `DSM_CONFIG` is not set, the client user options file must reside in the default installation directory. If `DSM_CONFIG` is set, then the file must reside in the directory specified by `DSM_DIR`.
- If you do not define `DSM_LOG`, Tivoli Storage Manager writes messages to the `dsmerror.log` and `dsmsched.log` files in the current working directory.

### Related concepts

Chapter 2, “Configuring the Tivoli Storage Manager client,” on page 41

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

## Uninstalling the Linux on POWER client

This topic lists the procedures to uninstall the Linux on POWER client.

1. To delete previously installed Tivoli Storage Manager client packages, log in as root and enter: `rpm -e TIVsm-BA`.
2. For the API, enter this command: `rpm -e TIVsm-API`.
3. If an additional language package is installed, uninstall it by entering these commands: (1) `rpm -e TIVsm-BA.msg.xx_XX`, and (2) `rpm -e TIVsm-API.msg.xx_XX`. Replace `xx_XX` with the language that you installed earlier.

**Note:** The version number of the packages is not needed for uninstall.



## Installing the Linux x86/x86\_64 client

This topic explains how to install the Linux x86/x86\_64 client.

If a previous version of Tivoli Storage Manager is installed, remove it before installing a new version.

This installation procedure is designed to install directly from the Tivoli Storage Manager UNIX client DVD from a local or remote-mounted DVD drive.

Table 10. Package Names and Directories

This software package	Is in this directory
TIVsm-API.i386.rpm	/opt/tivoli/tsm/client/api/bin
TIVsm-API64.i386.rpm	/opt/tivoli/tsm/client/api/bin64
TIVsm-BA.i386.rpm	/opt/tivoli/tsm/client/ba
TIVsm- msg.<xx_XX>.i386.rpm	/opt/tivoli/tsm/client/lang/<xx_XX> Where <xx_XX> defines the language installed

Follow these steps to install Tivoli Storage Manager:

1. Login as the root user and mount the Tivoli Storage Manager UNIX client DVD to /dvd.
2. Change to the directory where the packages are stored: /dvd/tsmcli/linux86. If the Tivoli Storage Manager UNIX client DVD is not mounted to /dvd, or if the packages are stored in a different directory (e.g. downloaded by ftp), change to the correct directory. Make sure that you install these packages in the given order. This is required because the Tivoli Storage Manager API package is a prerequisite of the Backup-Archive client package. The Web client is an integral part of the backup-archive client package and cannot be installed without it.
3. Enter the following commands to install the 32-bit API and the Tivoli Storage Manager Backup-Archive (B/A) client. This will install the command-line and the administrative client: (1) rpm -i TIVsm-API.i386.rpm, and rpm -i TIVsm-BA.i386.rpm.
4. Enter the following commands to install the 64-bit API and the Tivoli Storage Manager Backup-Archive client. This will install the command-line and the administrative client: (1) rpm -i TIVsm-API.i386.rpm, required for 32-bit and 64-bit, (2) rpm -i TIVsm-API64.i386.rpm, (required for 64-bit only), and (3) rpm -i TIVsm-BA.i386.rpm.
5. The Tivoli Storage Manager default language is English. To install additional languages (optional), enter the commands listed for each additional language.

To install this language	Enter this command
NLS French messages	rpm -i TIVsm-msg.fr_FR.i386.rpm
NLS German messages	rpm -i TIVsm-msg.de_DE.i386.rpm
NLS Italian messages	rpm -i TIVsm-msg.it_IT.i386.rpm
NLS Spanish messages	rpm -i TIVsm-msg.es_ES.i386.rpm
NLS Portuguese messages	rpm -i TIVsm-msg.pt_BR.i386.rpm
NLS Czech messages	rpm -i TIVsm-msg.cs_CZ.i386.rpm
NLS Hungarian messages	rpm -i TIVsm-msg.hu_HU.i386.rpm

To install this language	Enter this command
NLS Polish messages	<code>rpm -i TIVsm-msg.pl_PL.i386.rpm</code>
NLS Russian messages	<code>rpm -i TIVsm-msg.ru_RU.i386.rpm</code>
NLS Japanese messages	<code>rpm -i TIVsm-msg.ja_JP.i386.rpm</code>
NLS Korean messages	<code>rpm -i TIVsm-msg.ko_KR.i386.rpm</code>
NLS Traditional Chinese messages (EUC)	<code>rpm -i TIVsm-msg.zh_CN.i386.rpm</code>
NLS Traditional Chinese Big5 messages	<code>rpm -i TIVsm-msg.zh_TW.i386.rpm</code>

Table 11. Linux x86/x86\_64 client: Language codes and locale for installation packages

Language	Language code	Locale
French	fr_FR	fr_FR, fr_FR.UTF-8
German	de_DE	de_DE, de_DE.UTF-8
Italian	it_IT	it_IT, it_IT.UTF-8
Spanish	es_ES	es_ES, es_ES.UTF-8
Brazilian Portuguese	pt_BR	pt_BR, pt_BR.UTF-8
Czech	cs_CZ	cs_CZ, cs_CZ.UTF-8
Hungarian	hu_HU	hu_HU, hu_HU.UTF-8
Polish	pl_PL	pl_PL, pl_PL.UTF-8
Russian	ru_RU	ru_RU, ru_RU.UTF-8
Japanese	ja_JP	ja_JP, ja_JP.UTF-8
Korean	ko_KR	ko_KR, ko_KR.UTF-8
Traditional Chinese	zh_TW	zh_TW, zh_TW.UTF-8

### Default installation directories

Here are the default directories where some files are stored as part of the client installation:

- The sample system options file, `dsm.sys.smp`, is placed in the installation directory.
- If `DSM_DIR` is not set, the executable file `dsmc`, the resource files, and the `dsm.sys` file are stored in the default installation directory.
- If `DSM_CONFIG` is not set, the client user options file must reside in the default installation directory. If `DSM_CONFIG` is set, then the file must reside in the directory specified by `DSM_DIR`.
- If you do not define `DSM_LOG`, Tivoli Storage Manager writes messages to the `dsmerror.log` and `dsmsched.log` files in the current working directory.

### Related concepts

Chapter 2, “Configuring the Tivoli Storage Manager client,” on page 41

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

## Uninstalling the Linux x86/x86\_64 client

This topic explains how to uninstall the Linux x86/x86\_64 client.

Follow these steps to uninstall all the packages related to Tivoli Storage Manager and HSM, including the command line, GUI, Web GUI and administrative client components. Make sure that you uninstall the packages in the given order.

1. HSM package: Check the *IBM Tivoli Storage Manager for Space Management for UNIX and Linux User's Guide* for instructions on removing HSM and installing a new version.
2. Tivoli Storage Manager backup-archive package: Enter the following command to uninstall the Tivoli Storage Manager backup-archive client. This will uninstall all of the components of the backup-archive client (command-line, GUI, Web GUI and the administrative client): `rpm -e TIVsm-BA`. You cannot uninstall a single component of this package (e.g. Web GUI) without uninstalling the complete package
3. Tivoli Storage Manager Language packages: If one or more language messages packages are installed, they must be removed before removing the API package. Enter the following command as root user: `rpm -e TIVsm-msg.xx_XX`, where `xx_XX` is the language you want to remove
4. To remove the 64-bit API package execute the following command as root user:  
`rpm -e TIVsm-API64`
5. To remove the 32-bit API package execute the following command as root user:  
`rpm -e TIVsm-API`

#### Related information

Table 11 on page 26

## Installing the Linux for zSeries client

This topic explains how to install the Linux for zSeries client.

If a previous version of Tivoli Storage Manager is installed, remove it before installing a new version.

This installation procedure is designed to install directly from the Tivoli Storage Manager UNIX client DVD from a local or remote-mounted DVD drive.

Table 12. Package Names and Directories

This software package	Is in this directory
TIVsm-API.s390.rpm	<code>/opt/tivoli/tsm/client/api/bin</code>
TIVsm-API64.s390.rpm	<code>/opt/tivoli/tsm/client/api/bin64</code>
TIVsm-BA.s390.rpm	<code>/opt/tivoli/tsm/client/ba</code>
TIVsm- msg.<xx_XX>.s390.rpm	<code>/opt/tivoli/tsm/client/lang/&lt;xx_XX&gt;</code> Where <xx_XX> defines the language installed

Follow these steps to install Tivoli Storage Manager:

1. Login as the root user and mount the Tivoli Storage Manager UNIX client DVD to `/dvd`.
2. Change to the directory where the packages are stored: `/dvd/tsmcli/linux390`. If the Tivoli Storage Manager UNIX client DVD is not mounted to `/dvd`, or if the packages are stored in a different directory (e.g. downloaded by ftp), change to the correct directory.
3. To install the 32 Bit API , enter the following command: `rpm -i TIVsm-API.s390.rpm`.

4. To install the 64 Bit API and Backup-Archive client, enter the following commands: (1) `rpm -i TIVsm-API.s390.rpm`, (2) `rpm -i TIVsm-API64.s390.rpm`, and (3) `rpm -i TIVsm-BA.s390.rpm`

**Note:**

1. This will install the command-line, the GUI and the administrative client.
2. Make sure that you install these packages in the given order. This is required because the Tivoli Storage Manager API package is a prerequisite of the backup-archive client package.
3. The Web client is an integral part of the backup-archive client package and cannot be installed without it.

To install this language	Enter this command
NLS French messages	<code>rpm -i TIVsm-msg.fr_FR.s390.rpm</code>
NLS German messages	<code>rpm -i TIVsm-msg.de_DE.s390.rpm</code>
NLS Italian messages	<code>rpm -i TIVsm-msg.it_IT.s390.rpm</code>
NLS Spanish messages	<code>rpm -i TIVsm-msg.es_ES.s390.rpm</code>
NLS Portuguese messages	<code>rpm -i TIVsm-msg.pt_BR.s390.rpm</code>
NLS Czech messages	<code>rpm -i TIVsm-msg.cs_CZ.s390.rpm</code>
NLS Hungarian messages	<code>rpm -i TIVsm-msg.hu_HU.s390.rpm</code>
NLS Polish messages	<code>rpm -i TIVsm-msg.pl_PL.s390.rpm</code>
NLS Russian messages	<code>rpm -i TIVsm-msg.ru_RU.s390.rpm</code>
NLS Japanese messages	<code>rpm -i TIVsm-msg.ja_JP.s390.rpm</code>
NLS Korean messages	<code>rpm -i TIVsm-msg.ko_KR.s390.rpm</code>
NLS Traditional Chinese messages (EUC)	<code>rpm -i TIVsm-msg.zh_CN.s390.rpm</code>
NLS Traditional Chinese Big5 messages	<code>rpm -i TIVsm-msg.zh_TW.s390.rpm</code>

*Table 13. Linux for zSeries client: Language codes and locale for installation packages*

Language	Language code	Locale
French	fr_FR	fr_FR, fr_FR.UTF-8
German	de_DE	de_DE, de_DE.UTF-8
Italian	it_IT	it_IT, it_IT.UTF-8
Spanish	es_ES	es_ES, es_ES.UTF-8
Brazilian Portuguese	pt_BR	pt_BR, pt_BR.UTF-8
Czech	cs_CZ	cs_CZ, cs_CZ.UTF-8
Hungarian	hu_HU	hu_HU, hu_HU.UTF-8
Polish	pl_PL	pl_PL, pl_PL.UTF-8
Russian	ru_RU	ru_RU, ru_RU.UTF-8
Japanese	ja_JP	ja_JP, ja_JP.UTF-8
Korean	ko_KR	ko_KR, ko_KR.UTF-8
Traditional Chinese	zh_TW	zh_TW, zh_TW.UTF-8

**Default installation directories**

Here are the default directories where some files are stored as part of the client installation:

- The sample system options file, `dsm.sys.smp`, is placed in the installation directory.
- If `DSM_DIR` is not set, the executable file `dsmc`, the resource files, and the `dsm.sys` file are stored in the default installation directory.
- If `DSM_CONFIG` is not set, the client user options file must reside in the default installation directory. If `DSM_CONFIG` is set, then the file must reside in the directory specified by `DSM_DIR`.
- If you do not define `DSM_LOG`, Tivoli Storage Manager writes messages to the `/var/ibm/tivoli/tsm/client/ba/log` or `/var/ibm/tivoli/tsm/client/api/bin/log` files.

### Related concepts

Chapter 2, “Configuring the Tivoli Storage Manager client,” on page 41

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

## Uninstalling the Linux for zSeries client

This topic explains how to uninstall the Linux for zSeries client.

Follow these steps to uninstall all the packages related to Tivoli Storage Manager and HSM, including the command line, GUI, Web GUI and administrative client components. Make sure that you uninstall the packages in the given order.

1. Tivoli Storage Manager backup-archive package: Enter the following command to uninstall the Tivoli Storage Manager backup-archive client. This will uninstall all of the components of the backup-archive client (command-line, GUI, Web GUI and the administrative client): `rpm -e TIVsm-BA`. You cannot uninstall a single component of this package (e.g. Web GUI) without uninstalling the complete package.
2. Tivoli Storage Manager Language packages: If one or more language messages packages are installed, they must be removed before removing the API package. Enter the following command as root user: `rpm -e TIVsm-msg.xx_XX` where `xx_XX` is the language you want to remove.
3. To remove the 32-bit API package execute the following command as root user:  
`rpm -e TIVsm-API`.
4. To remove the 64-bit API package execute the following command as root user:  
`rpm -e TIVsm-API64`.

### Related information

Table 13 on page 28

## Installing the Mac OS X client

This topic explains how to install the Mac OS X client.

**Requirement:** *You must be a system administrator to install Tivoli Storage Manager.*

To install the Mac OS X client from the Tivoli Storage Manager DVD, follow these steps:

1. Go to the `tsmcli/mac` directory, for the Mac OS X client installer.
2. Double-click the `6.1.0.0-TIV-TSMBAC-Mac.dmg` file, to mount the disk image.
3. Double-click the “Tivoli Storage Manager” installation package icon.
4. Follow the on-screen prompts to complete the installation.

Installing from the command line is an optional method of installation that is useful in situations where the installation needs to be done on multiple systems or on systems with no display attached. It is done from the command line, can be scripted and requires no user interaction. To install Tivoli Storage Manager from the command line, follow these steps:

1. Change directories to where the Tivoli Storage Manager installer is located.
2. The 'custom' install package can be installed with the following command:  
`/usr/sbin/installer -pkg "/Tivoli Storage Manager.mpkg"/Contents/Packages/TsmBaDsmadm.pkg -target /`
3. To do a 'typical' installation issue this command: `/usr/sbin/installer -pkg "/Tivoli Storage Manager.mpkg" -target /`
4. To install the TSM API issue this command: `/usr/sbin/installer -pkg "/Volumes/Tivoli Storage Manager/Tivoli Storage Manager.mpkg/Contents/Packages/TsmApi.pkg" -target /`
5. To install the TSM API Samples issue this command: `/usr/sbin/installer -pkg "/Volumes/Tivoli Storage Manager/Tivoli Storage Manager.mpkg/Contents/Packages/TsmApiSample.pkg" -target /`
6. To install a language pack issue this command, `/usr/sbin/installer -pkg "/Volumes/TSM Language Pack -- <xx_XX>/TsmBa<xx_XX>.pkg" -target`, where `<xx_XX>` is the language code to install, listed in the following table.

Table 14. Mac OS X client language codes and locale

Language	Language code	Locale
English	not applicable	en_US.UTF-8
Simplified Chinese	zh_CN	zh_CN.UTF-8
Traditional Chinese	zh_TW	zh_TW.UTF-8
Czech	cs_CZ	cs_CZ.UTF-8
French	fr_FR	fr_FR.UTF-8
German	de_DE	de_DE.UTF-8
Hungarian	hu_HU	hu_HU.UTF-8
Italian	it_IT	it_IT.UTF-8
Japanese	ja_JP	ja_JP.UTF-8
Korean	ko_KR	ko_KR.UTF-8
Polish	pl_PL	pl_PL.UTF-8
Brazilian Portuguese	pt_BR	pt_BR.UTF-8
Russian	ru_RU	ru_RU.UTF-8
Spanish	es_ES	es_ES.UTF-8

The packages listed in Table 15 on page 31 are part of Tivoli Storage Manager and are used by the Mac OS X Install application. Use the information in the table to assist you if you need to do a fully customized command-line installation.

Table 15. Mac OS X installation packages

Package	Package Name	Package Description
Tivoli Storage Manager Backup-Archive Java Bundle	TsmBaJavaBundle.pkg	<p>Contains the following component:</p> <ul style="list-style-type: none"> <li>• Tivoli Storage Manager Java GUI Client</li> </ul> <p>NOTE: Requires that the following packages be installed first:</p> <ul style="list-style-type: none"> <li>• Tivoli Storage Manager Backup-Archive Java GUI Files</li> <li>• Tivoli Storage Manager Backup-Archive Client Common Java Files</li> <li>• Tivoli Storage Manager Backup-Archive Client Common Files</li> <li>• Tivoli Storage Manager Backup-Archive ICC Library</li> <li>• Tivoli Storage Manager Backup-Archive Help and Messages</li> </ul>
Tivoli Storage Manager Backup-Archive Web Applet	TsmBaWebApplet.pkg	<p>Contains the following component:</p> <ul style="list-style-type: none"> <li>• Tivoli Storage Manager Web Client</li> </ul> <p>NOTE: Requires that the following packages be installed first:</p> <ul style="list-style-type: none"> <li>• Tivoli Storage Manager Backup-Archive Java GUI Files</li> <li>• Tivoli Storage Manager Backup-Archive Client Common Java Files</li> <li>• Tivoli Storage Manager Backup-Archive Client Common Files</li> <li>• Tivoli Storage Manager Backup-Archive ICC Library</li> <li>• Tivoli Storage Manager Backup-Archive Help and Messages</li> </ul>

Table 15. Mac OS X installation packages (continued)

Package	Package Name	Package Description
Tivoli Storage Manager Administrative Client	TsmBaDsmadmc.pkg	Contains the Tivoli Storage Manager Administrative Client  NOTE: Requires that the following packages be installed first: <ul style="list-style-type: none"> <li>• Tivoli Storage Manager Backup-Archive Client Common Files</li> <li>• Tivoli Storage Manager Backup-Archive ICC Library</li> <li>• Tivoli Storage Manager Backup-Archive Help and Messages</li> </ul>
Tivoli Storage Manager Sample Option Files	TsmBaSmp.pkg	Contains the Tivoli Storage Manager sample option files
Tivoli Storage Manager Backup-Archive Client Common Files	TsmBaClientCommon.pkg	Contains the files used by all of the Tivoli Storage Manager Backup-Archive client components.
Tivoli Storage Manager Backup-Archive Client Common Java GUI Files	TsmBaJavaCommon.pkg	Contains the files used by all of the Tivoli Storage Manager Backup-Archive client Java components.
Tivoli Storage Manager Backup-Archive Java GUI Files	TsmBaJavaGui.pkg	Contains the files used by the Tivoli Storage Manager Backup-Archive Java GUI component.
Tivoli Storage Manager Backup-Archive Help and Messages	TsmBaHelpCat.pkg	Contains the Tivoli Storage Manager messages and command-line help used by all of the Tivoli Storage Manager Backup-Archive client components.
Tivoli Storage Manager Backup-Archive ICC Library	TsmBaIcc.pkg	Contains the Tivoli Storage Manager ICC Library used by all Tivoli Storage Manager Backup-Archive client components.
Tivoli Storage Manager Application Programming Interface (API)	TsmApi.pkg	Contains the following component: Tivoli Storage Manager API.
Tivoli Storage Manager Language Pack – Czech	TsmBaCS_CZ.pkg	Contains Czech localized messages for the Tivoli Storage Manager API and Backup-Archive client component.



Table 15. Mac OS X installation packages (continued)

Package	Package Name	Package Description
Tivoli Storage Manager Language Pack – German	TsmBaDE_DE.pkg	Contains German localized messages for the Tivoli Storage Manager API and Backup-Archive client component.
Tivoli Storage Manager Language Pack – Spanish	TsmBaES_ES.pkg	Contains Spanish localized messages for the Tivoli Storage Manager API and Backup-Archive client component.
Tivoli Storage Manager Language Pack – French	TsmBaFR_FR.pkg	Contains French localized messages for the Tivoli Storage Manager API and Backup-Archive client component.
Tivoli Storage Manager Language Pack – Hungarian	TsmBaHU_HU.pkg	Contains Hungarian localized messages for the Tivoli Storage Manager API and Backup-Archive client component.
Tivoli Storage Manager Language Pack – Italian	TsmBaIT_IT.pkg	Contains Italian localized messages for the Tivoli Storage Manager API and Backup-Archive client component.
Tivoli Storage Manager Language Pack – Japanese	TsmBaJA_JP.pkg	Contains Japanese localized messages for the Tivoli Storage Manager API and Backup-Archive client component.
Tivoli Storage Manager Language Pack – Korean	TsmBaKO_KR.pkg	Contains Korean localized messages for the Tivoli Storage Manager API and Backup-Archive client component.
Tivoli Storage Manager Language Pack – Polish	TsmBaPL_PL.pkg	Contains Polish localized messages for the Tivoli Storage Manager API and Backup-Archive client component.
Tivoli Storage Manager Language Pack – Brazilian Portuguese	TsmBaPT_BR.pkg	Contains Brazilian Portuguese localized messages for the Tivoli Storage Manager API and Backup-Archive client component.
Tivoli Storage Manager Language Pack – Russian	TsmBaRU_RU.pkg	Contains Russian localized messages for the Tivoli Storage Manager API and Backup-Archive client component.

Table 15. Mac OS X installation packages (continued)

Package	Package Name	Package Description
Tivoli Storage Manager Language Pack – Simplified Chinese	TsmBaZH_CN.pkg	Contains Simplified Chinese localized messages for the Tivoli Storage Manager API and Backup-Archive client component.
Tivoli Storage Manager Language Pack – Traditional Chinese	TsmBaZH_TW.pkg	Contains Traditional Chinese localized messages for the Tivoli Storage Manager API and Backup-Archive client component.

### Default installation directories

Here are the default directories where some files are stored as part of the client installation:

- The sample system options file, `dsm.sys.smp`, is placed in the installation directory.
- If `DSM_DIR` is not set, the executable file `dsmc`, the resource files, and the `dsm.sys` file are stored in the default installation directory.
- If `DSM_CONFIG` is not set, the client user options file must reside in the default installation directory. If `DSM_CONFIG` is set, then the file must reside in the directory specified by `DSM_DIR`.
- If you do not define `DSM_LOG`, Tivoli Storage Manager writes messages to the `/Library/Logs` or `~/Library/Logs` files.

## Uninstalling the Mac OS X client

This topic explains how to uninstall the Mac OS X client.

If the Tivoli Storage Manager Scheduler is configured as a Startup Item use TSM Tools for Administrators or `StopCad.sh` to stop and uninstall it before proceeding.

To assist with uninstallation, a shell script is provided. The shell script name is `uninstall.sh` and is located in the default installation directory: `/Library/Application Support/tivoli/tsm/client/ba/bin`. The `sudo` command must be used to run the script. The following steps can be done instead of using the script.

### Move the following folders to the trash:

1. `/Applications/Tivoli Storage Manager`
2. `/Library/Application Support/tivoli`

### Remove the following symbolic links:

1. `/usr/bin/dsmc`
2. `/usr/bin/dsmtca`
3. `/usr/bin/dsmcad`
4. `/usr/bin/dsmadmc`
5. `/usr/bin/dsmtrace`
6. `/usr/bin/dsmagent`
7. `/usr/lib/libxmlutil-6.1.0.dylib`

8. */usr/lib/libtsm610xerces-c1\_6\_0.dylib*

**Move the following receipts to the trash:**

1. */Library/Receipts/TsmBaClientCommon.pkg*
2. */Library/Receipts/TsmBaDsmadmc.pkg*
3. */Library/Receipts/TsmBaDsmc.pkg*
4. */Library/Receipts/TsmBaHelpCat.pkg*
5. */Library/Receipts/TsmBaIcc.pkg*
6. */Library/Receipts/TsmBaJavaBundle.pkg*
7. */Library/Receipts/TsmBaJavaCommon.pkg*
8. */Library/Receipts/TsmBaJavaGui.pkg*
9. */Library/Receipts/TsmBaSmp.pkg*
10. */Library/Receipts/TsmBaWebApplet.pkg*

**Tivoli Storage Manager might have created log files in these locations:**

1. */Library/Logs/tivoli*
2. *~/Library/Logs/tivoli*

**The Tivoli Storage Manager Option files (dsm.opt and dsm.sys) are usually located here:**

1. */Library/Preferences/Tivoli Storage Manager*
2. *~/Library/Preferences/Tivoli Storage Manager*

Removal of the log, option files, and receipts is optional.

## Installing the Solaris clients

This topic explains how to install the Solaris clients.

If a previous version of Tivoli Storage Manager has been installed, remove it before installing a new version. Refer to “Uninstalling the Solaris clients” on page 40 for information about removing previous Tivoli Storage Manager packages.

This installation procedure is designed to install directly from the Tivoli Storage Manager UNIX client DVD from a local or remote-mounted DVD drive.

The following installation packages are available on the DVD in the following locations:

- */dvd/tsmcli/solaris* (Solaris SPARC packages)
- */dvd/tsmcli/solaris\_x86* (Solaris x86 packages)

A Tivoli Storage Manager installation administration file (tsmadmin) is used in place of the default administration file (*/var/sadm/install/admin*), so that you are not asked about setuid, setgid or superuser permission during installation. If you want to use the default administration file, remove the *-a ./tsmadmin* option from the commands listed, and answer the questions about setuid, setgid, or superuser permission during installation with *y*.

Table 16. Installation package names and descriptions

Package	Package Name	Package Description
Tivoli Storage Manager Application Programming Interface (API)	TIVsmCapi.pkg	Contains the Tivoli Storage Manager API shared libraries and samples. <b>Note:</b> On Solaris SPARC and x86-based systems the installation process will install both the 32 bit and 64 bit Tivoli Storage Manager API.
Tivoli Storage Manager Backup-Archive (B/A)	TIVsmCba.pkg	Contains the following components: <ul style="list-style-type: none"> <li>• Tivoli Storage Manager Backup-Archive Client (command-line and GUI)</li> <li>• Tivoli Storage Manager Administrative Client (command-line)</li> <li>• Tivoli Storage Manager Web Backup-Archive Client</li> </ul> <b>Note:</b> <ol style="list-style-type: none"> <li>1. The Tivoli Storage Manager Backup-Archive package includes the 32-bit Backup-Archive Client which is used in 32-bit and 64-bit kernel modes on all supported Solaris releases (see “Software requirements” on page 12).</li> <li>2. The 32 bit Backup-Archive Client works with 32-bit and 64-bit Tivoli Storage Manager servers.</li> <li>3. TCP/IP and Shared memory are supported as communication methods.</li> </ol>
Tivoli Storage Manager for Space Management (HSM) (SPARC only)	TIVsmChsm.pkg	Contains the following components: <ul style="list-style-type: none"> <li>• Tivoli Storage Manager for Space Management (HSM)</li> <li>• Space Management Agent</li> <li>• IBM Tivoli Enterprise Space Management Console (HSM Java GUI)</li> </ul> For more information about the HSM Java GUI, refer to the README_hsm_enu.htm file.

Table 16. Installation package names and descriptions (continued)

Package	Package Name	Package Description
Tivoli Storage Manager French language	TIVsmClFr.pkg	Contains French localized messages for Tivoli Storage Manager API, Tivoli Storage Manager Backup-Archive Client and HSM Client.
Tivoli Storage Manager German language	TIVsmClDe.pkg	Contains German localized messages for Tivoli Storage Manager API, Tivoli Storage Manager Backup-Archive Client and HSM Client.
Tivoli Storage Manager Italian language	TIVsmClIt.pkg	Contains Italian localized messages for Tivoli Storage Manager API, Tivoli Storage Manager Backup-Archive Client and HSM Client.
Tivoli Storage Manager Portuguese language	TIVsmClPt.pkg	Contains Portuguese localized messages for Tivoli Storage Manager API, Tivoli Storage Manager Backup-Archive Client and HSM Client.
Tivoli Storage Manager Spanish language	TIVsmClEs.pkg	Contains Spanish localized messages for Tivoli Storage Manager API, Tivoli Storage Manager Backup-Archive Client and HSM Client.
Tivoli Storage Manager Czech language	TIVsmClCs.pkg	Contains Czech localized messages for Tivoli Storage Manager API, Tivoli Storage Manager Backup-Archive Client and HSM Client.
Tivoli Storage Manager Hungarian language	TIVsmClHu.pkg	Contains Hungarian localized messages for Tivoli Storage Manager API, Tivoli Storage Manager Backup-Archive Client and HSM Client.
Tivoli Storage Manager Polish language	TIVsmClPl.pkg	Contains Polish localized messages for Tivoli Storage Manager API, Tivoli Storage Manager Backup-Archive Client and HSM Client.
Tivoli Storage Manager Russian language	TIVsmClRu.pkg	Contains Russian localized messages for Tivoli Storage Manager API, Tivoli Storage Manager Backup-Archive Client and HSM Client.
Tivoli Storage Manager Japanese language	TIVsmClJa.pkg	Contains Japanese localized messages for Tivoli Storage Manager API, Tivoli Storage Manager Backup-Archive Client and HSM Client.

Table 16. Installation package names and descriptions (continued)

Package	Package Name	Package Description
Tivoli Storage Manager Korean language	TIVsmClKo.pkg	Contains Korean localized messages for Tivoli Storage Manager API, Tivoli Storage Manager Backup-Archive Client and HSM Client.
Tivoli Storage Manager Simplified Chinese language	TIVsmClSc.pkg	Contains Simplified Chinese localized messages for Tivoli Storage Manager API, Tivoli Storage Manager Backup-Archive Client and HSM Client.
Tivoli Storage Manager Traditional Chinese (EUC) language	TIVsmClTc.pkg	Contains Traditional Chinese (EUC) localized messages for Tivoli Storage Manager API, Tivoli Storage Manager Backup-Archive Client and HSM Client.
Tivoli Storage Manager Traditional Chinese (BIG5) language	TIVsmClBc.pkg	Contains Traditional Chinese (BIG5) localized messages for Tivoli Storage Manager API, Tivoli Storage Manager Backup-Archive Client and HSM Client.

Follow these steps to install Tivoli Storage Manager:

1. Login as the root user and mount the Tivoli Storage Manager UNIX client DVD to /dvd.
2. Change to the directory where the packages are stored: DVD /dvd/tsmcli/solaris. If the Tivoli Storage Manager UNIX client DVD is not mounted to /dvd, or if the packages are stored in a different directory (e.g. downloaded by ftp), change to the correct directory.
3. To install the Tivoli Storage Manager API client, enter the following command: `pkgadd -a ./tsmadmin -d ./TIVsmCapi.pkg TIVsmCapi`. This command installs the Tivoli Storage Manager API in the global zone and in all non-global zones, if they are running. If you want to install Tivoli Storage Manager in the global zone only, use the -G parameter of the pkgadd command as follows: `pkgadd -G -a ./tsmadmin -d ./TIVsmCapi.pkg TIVsmCapi`.
4. To install the Tivoli Storage Manager backup-archive (B/A) client, enter the following command: `pkgadd -a ./tsmadmin -d ./TIVsmCba.pkg TIVsmCba`. This will install the command-line, the GUI, and the administrative client. Make sure that you install these packages in the given order. This is required because the Tivoli Storage Manager backup-archive client is a prerequisite of the HSM client package and the Tivoli Storage Manager API package is a prerequisite of the backup-archive client package. The Web client is an integral part of the backup-archive client package and cannot be installed without it.
5. Refer to *IBM Tivoli Storage Manager for Space Management for UNIX and Linux User's Guide* for instructions to install the Tivoli Storage Manager HSM client. For a Solaris 10 sparse root non-global zone, the /usr file system is normally mounted as read-only (LOFS) from the global zone, and the following conditions apply: (1) If Tivoli Storage Manager is already installed in the global zone, creation of the links is not necessary. The links are already present and they are pointing to the correct executable and libraries, and (2) If Tivoli

Storage Manager is not installed in the global zone, a warning message will be provided asking the global administrator to create the required links. A list of the links with the related command will be provided in the messages.

- The Tivoli Storage Manager default language is English. To install additional languages (optional), enter the commands listed for each additional language.

To install this language	Enter this command
NLS French messages	<code>pkgadd -a ./tsmadmin -d ./TIVsmCIFr.pkg TIVsmCIFr</code>
NLS German messages	<code>pkgadd -a ./tsmadmin -d ./TIVsmCIDe.pkg TIVsmCIDe</code>
NLS Italian messages	<code>pkgadd -a ./tsmadmin -d ./TIVsmCIIt.pkg TIVsmCIIt</code>
NLS Spanish messages	<code>pkgadd -a ./tsmadmin -d ./TIVsmCIEs.pkg TIVsmCIEs</code>
NLS Portuguese messages	<code>pkgadd -a ./tsmadmin -d ./TIVsmCI Pt.pkg TIVsmCI Pt</code>
NLS Czech messages	<code>pkgadd -a ./tsmadmin -d ./TIVsmCICs.pkg TIVsmCICs</code>
NLS Hungarian messages	<code>pkgadd -a ./tsmadmin -d ./TIVsmCIHu.pkg TIVsmCIHu</code>
NLS Polish messages	<code>pkgadd -a ./tsmadmin -d ./TIVsmCIPl.pkg TIVsmCIPl</code>
NLS Russian messages	<code>pkgadd -a ./tsmadmin -d ./TIVsmCIRu.pkg TIVsmCIRu</code>
NLS Japanese messages	<code>pkgadd -a ./tsmadmin -d ./TIVsmCIJa.pkg TIVsmCIJa</code>
NLS Korean messages	<code>pkgadd -a ./tsmadmin -d ./TIVsmCIKo.pkg TIVsmCIKo</code>
NLS Simplified Chinese messages	<code>pkgadd -a ./tsmadmin -d ./TIVsmCISc.pkg TIVsmCISc</code>
NLS Traditional Chinese messages (EUC)	<code>pkgadd -a ./tsmadmin -d ./TIVsmCITc.pkg TIVsmCITc</code>
NLS Traditional Chinese Big5 messages	<code>pkgadd -a ./tsmadmin -d ./TIVsmCIBc.pkg TIVsmCIBc</code>

### Default installation directories

Here are the default directories where some files are stored as part of the client installation:

- The sample system options file, `dsm.sys.smp`, is placed in the installation directory.
- If `DSM_DIR` is not set, the executable file `dsmc`, the resource files, and the `dsm.sys` file are stored in the default installation directory.
- If `DSM_CONFIG` is not set, the client user options file must reside in the default installation directory. If `DSM_CONFIG` is set, then the file must reside in the directory specified by `DSM_DIR`.
- If you do not define `DSM_LOG`, Tivoli Storage Manager writes messages to the `dsmerror.log` and `dsmsched.log` files in the current working directory.

### Related concepts

Chapter 2, “Configuring the Tivoli Storage Manager client,” on page 41

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

## Uninstalling the Solaris clients

This topic explains how to uninstall the Solaris clients.

Follow these steps to uninstall all the packages related to Tivoli Storage Manager and HSM, including the command line, GUI, Web GUI and administrative client components. Make sure that you uninstall the packages in the given order.

A Tivoli Storage Manager installation administration file (tsmadmin) is used in place of the default administration file (/var/sadm/install/admin) so that you will not be prompted for questions about setuid, setgid or superuser permission during installation. If you want to use the default administration file, remove the "-a ./tsmadmin" option from the commands listed below and be sure to answer the questions about setuid, setgid, or superuser permission during installation with 'y'.

1. Hierarchical Storage Manager (HSM) package: See *IBM Tivoli Storage Manager for Space Management for UNIX and Linux User's Guide* for information about uninstalling HSM.
2. Enter the following command to uninstall the Tivoli Storage Manager backup-archive client: `pkgrm -n -a ./tsmadmin TIVsmCba`. This will uninstall all of the components of the backup-archive client (command-line, GUI, Web GUI, and the administrative client). You cannot uninstall a single component of this package (e.g. Web GUI) without uninstalling the complete package.
3. If one or more language messages packages are installed, they must be removed before removing the API package. Execute the following command as root user: `pkgrm -n -a ./tsmadmin TIVsmC1Fr TIVsmC1De TIVsmC1It TIVsmC1Pt \ TIVsmC1Es TIVsmC1Cs TIVsmC1Hu TIVsmC1Pl TIVsmC1Ru \ TIVsmC1Ja TIVsmC1Ko TIVsmC1Sc TIVsmC1Tc TIVsmC1Bc`
4. Enter the following command to uninstall the Tivoli Storage Manager API: `pkgrm -n -a ./tsmadmin TIVsmCapi`. The API cannot be removed if the TSM backup-archive client is installed. The Tivoli Storage Manager backup-archive client must be removed first.



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## Chapter 2. Configuring the Tivoli Storage Manager client

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

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 or file pointed to by the `DSM_CONFIG` and `DSM_DIR` environment variables, Tivoli Storage Manager accesses these files for configuration information.

There are some *required* and *optional* configuration tasks. The *required* configuration tasks include the following:

- “Creating and modifying the client options file” on page 43
- “Registering your workstation with a server (required)” on page 79

*Optional* configuration tasks include the following:

- “Creating a default client user options file (optional root user or authorized user task)” on page 45
- “Creating a customized client user options file (optional user task)” on page 46
- “Setting environment variables” on page 48
- “Configuring the Web client” on page 52
- “Configuring the client scheduler” on page 53
- “Creating an include-exclude list (optional)” on page 80

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### UNIX and Linux client root and authorized user tasks

The phrases *root user* and *authorized user* identify tasks that either a system administrator, non-administrator, or both can perform. Tivoli Storage Manager commands and options that you can use to perform these tasks are also identified in this way.

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*
```

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 file and whose owner execution permission bit is set to **s**. In the following example, the user **tivoli** is an authorized user.

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

The following table shows the tasks that can and cannot be performed by the root user, authorized user, and the non-authorized user.

Table 17. Root user, Authorized User, and non-Authorized user tasks

Task	Root user	Authorized user	Non-authorized user
Install the backup-archive client	Yes	No	No
Register new nodes with Tivoli Storage Manager server	Yes	Yes	No, even when the registration is set to <i>open</i> on the server
Set or recreate the Tivoli Storage Manager password for client workstations	Yes, if the password file has been deleted	Yes, if the password file has been deleted and you have write permission to the file	No, not if the password file has been deleted
Create and modify dsm.sys	Yes	Yes, if you have write permission to the file	No
Create and modify the client user options file (dsm.opt)	Yes	Yes, if you have write permission to the file	Yes, if you own the file
Create and modify an include-exclude list	Yes	Yes	No
Backup	Yes	Yes, if you have read permission, regardless of ownership	Yes, if you own the file
Restore	Yes; when restoring to a new location or the same location, file permission and ownership are preserved	Yes; however, the operating system will prevent writing to the same location if the file has read only permission. When restoring to the same location, file permissions and ownership are preserved. When restoring to a different location, the permissions of the restored file will be preserved but the ownership will be changed to that of the authorized user.	Yes, if you own the file or you are granted access. The ownership of the restored file will change to the non-authorized user.
Archive	Yes	Yes, if you have read permission, regardless of ownership	Yes, if you have read permission, regardless of ownership
Retrieve	Yes. When retrieving to a new location or to the same location, file permissions and ownership are preserved.	Yes. However, the operating system will prevent writing to the same location if the file has read only permission. Ownership of all retrieved objects will be changed to authorized user. <b>Note:</b> Retrieve for an authorized user, using the ds mj GUI only works for individual files and not when selecting directories. Retrieve each file individually using the ds mj client or use the ds mc client to restore an entire package or directory structure.	Yes, if you archived the file. Ownership of all retrieved objects will be changed to the non-authorized user.

Table 17. Root user, Authorized User, and non-Authorized user tasks (continued)

Task	Root user	Authorized user	Non-authorized user
Client scheduler	Yes	Yes	No
Grant user access to files on the Tivoli Storage Manager server	Yes	Yes	Yes, for files that you own on the Tivoli Storage Manager server
Delete Tivoli Storage Manager server file spaces	Yes, if you are granted backup or archive delete authority by a Tivoli Storage Manager server administrator	Yes, if you are granted backup or archive delete authority by a Tivoli Storage Manager server administrator	No

## Mac OS X

A system administrator is any user that is allowed to administer the system. You can check your account type using the System Preferences **Accounts** tool. System Administrators will have an account type of **Admin**.

The system administrator is responsible for configuring Tivoli Storage Manager so non-administrators can manage their own data. Non-administrators (or non-authorized users) meet the following criteria:

- They do not have a user ID of 0. They are not the root user.
- They have a user account that has not been configured as a system administrator.

When a task requires additional authority to complete, you must use the authorization application to start Tivoli Storage Manager. This allows Tivoli Storage Manager to run with sufficient system privileges to complete the task. The following table lists the authorization tools to use.

Table 18. Mac OS X authorization tools and associated Tivoli Storage Manager applications

Mac OS X authorization tool	Associated Tivoli Storage Manager application
TSM Tools For Administrators	Tivoli Storage Manager StartCad.sh StopCad.sh
sudo	dsmc

## Enabling non-administrators to manage their own data

To enable non-administrators to use Tivoli Storage Manager to manage their own data, the system administrator must do the following in addition to the normal configuration steps: (1) Set the *passwordaccess* option to *generate* in the system options file (*dsm.sys*), and (2) Generate the initial password by using Tivoli Storage Manager one time.

## Creating and modifying the client options file

The client options file is an editable file that identifies the server and communication method, and provides the configuration for backup, archiving, hierarchical storage management, and scheduling.

Creating and modifying the client system options file (dsm.sys) is a required root user or authorized user task.

For Mac OS X, if you are a **root user** or authorized user, copy the file to /Library/Preferences/Tivoli Storage Manager/dsm.sys. You *must* use the name dsm.sys for this file. It is assumed that the dsm.sys file is controlled by the system administrator.

For systems other than Solaris, if you are a **root user** or authorized user, copy the dsm.sys.smp file to dsm.sys. You *must* use the name dsm.sys for this file. It is assumed that the dsm.sys file is controlled by the system administrator.

**Important:** 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 dsm.sys file 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
COMMethod           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.

As the default, your client node contacts the first server identified in the dsm.sys file. 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 dsm.sys file.

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

You can modify your dsm.sys file using one of the following methods:

- From the client Java GUI main window, select **Edit** → **Client Preferences**.
- Use your favorite text editor.

**Restriction:** For Mac OS X, the system options file must be a plain text file. By default, TextEdit does not save files as plain text. Select **Format** → **Make PlainText** to save the user options file as a plain text file. Do not add the .txt extension.

If you update the dsm.sys file while the client is running, you must restart the process to pick up the changes.

The Tivoli Storage Manager client GUI provides a Configuration Wizard that can be used to create basic configuration files and test the connection to the Tivoli Storage Manager Server. The Configuration Wizard starts automatically if the configuration files are not found when the GUI starts. If you want to modify the configuration files after they are created, click on **Setup Wizard** from the **Tools** menu of the GUI.

#### **Related information**

“Defaultserver” on page 287

“Passwordaccess” on page 361

“Setting options in the client options file” on page 47

Chapter 10, “Using processing options,” on page 241

## **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.

For systems other than Solaris, copy the dsm.opt.smp file to dsm.opt in your installation directory and modify the required options according to your needs. On Solaris systems, this is automatically done by the installation scripts.

This file contains the following 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

If you are a root user or a system administrator, 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.
- For systems other than Solaris, copy the dsm.opt.smp file to dsm.opt or to a new file name of your choice.
- For UNIX and Linux (other than Mac OS X), use the following information:
  - **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 can set the DSM\_CONFIG environment variable or use the optfile option 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.
- For Mac OS X systems, use the following information:
  - **For the default client user options file:** You can store your default client user options file as /Library/Preferences/Tivoli Storage Manager/dsm.opt, 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 can set the DSM\_CONFIG environment variable or use the optfile option to point to your new client user options file.
  - **For the client user options file:** You can copy your client user options file to ~/Library/Preferences/Tivoli Storage Manager/dsm.opt, or in any directory to which you have write access. The user options file must be a plain text file. By default, TextEdit does not save files as plain text. Select **Format** → **Make PlainText** to save the user options file as a plain text file. Do not add the .txt extension.

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 dsm.sys file 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 cannot change the server options file.

### Related concepts

Chapter 10, “Using processing options,” on page 241

You can use defaults for processing options or you can tailor the processing options to meet your specific needs. This topic provides an overview of processing options and an options reference section that provides detailed information about each option.

## Creating a customized client user options file (optional user task)

If you 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 of the options that can be set in the default user options file.

To create or modify a client user options file, use the following method:

1. Contact the Tivoli Storage Manager administrator on your workstation to determine the location of the sample client user options file dsm.opt.smp, and to get the TCP/IP address of the backup server you will be connecting to and the port it listens on.
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.
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 Java GUI.

Once you have created an options file, you can use the following steps to edit your options file from the GUI.

1. Open the **Edit** menu and select **Preferences**.
2. Make any necessary changes, then click **OK** to save those changes.

**Note:** For Mac OS X, the user options file must be a plain text file. By default, TextEdit does not save files as plain text. Select **Format** → **Make PlainText** to save the user options file as a plain text file. Do not add the .txt extension.

#### **Related concepts**

“Setting environment variables” on page 48

This section describes how to set environment variables.

#### **Related tasks**

“Setting options in the client options file”

This section describes how to set options in your client options file, and how to use options with commands. To set an option in this file, enter the option name and one or more blank spaces, followed by the option value.

## **Setting options in the client options file**

This section describes how to set options in your client options file, and how to use options with commands. To set an option in this file, enter the option name and one or more blank spaces, followed by the option value.

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

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.

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

To set an option in your client options file, 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.
- Optionally, 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 one of the following:

```
domain /home /mfg /planning /mrkting /mgmt
Domain / /Volumes/fs2 /Volumes/fs2 /Volumes/fs3 /Volumes/fs4
```

- Enter one or more blank spaces between parameters.
- The maximum number of characters for a file name is 255. The maximum combined length of the file name and path name is 1024 characters. The Unicode representation of a character can occupy several bytes, so the maximum number of characters that a file name might contain can vary.

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. The default is to display all options.

**Note:** For Mac OS X, the user options file must be a plain text file. By default, TextEdit does not save files as plain text. Select **Format** → **Make PlainText** to save the user options file as a plain text file. Do not add the .txt extension.

#### Related reference

“Query Options” on page 493

Use the **query options** command to display all or part of your options and their current settings relevant to the command-line client.

---

## Setting environment variables

This section describes how to set environment variables.

### Setting language environment variables

The Tivoli Storage Manager client automatically detects the language of the system locale and displays in 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 in 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 UNIX and Linux clients.

**Note:** The operating system locale, the terminal character set, and the file name character set encoding must match in order to display or enter file names correctly.

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

```
export LANG=fr_FR
```

#### Note:

- This section does not apply to Mac OS X.
- To display the Tivoli Storage Manager help browser menus in the language of your current locale, ensure 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
```

If the locale of the Tivoli Storage Manager client is the same as the character encoding of the file names, then all those files will be backed up or restored correctly. If you are running in any single-byte character set (SBCS), then all file names are valid and are backed up or restored by the backup-archive client.



If you are running in a DBCS or UTF-8 locale, file names composed of characters that are not valid in the DBCS or UTF-8 locale cannot be entered on the TSM client command line. The files might be skipped when running a backup where a wild card ( "\*" ) specification is used. If files are skipped, here is an example of the error message issued:

```
ANS4042E Object name '/testData/en_US_files/file3?'  
contains one or more unrecognized characters and is not valid.
```

If all directories and files are not created with the same locale, then run your scheduled backups using a single byte character set locale. This ensures that files are not skipped due to the file name containing characters not defined in the current locale. When you restore files, run in the same locale which matches the locale encoding of the file name.

For example, file names consisting of Japanese characters might contain invalid multibyte characters if they are displayed in a Chinese locale. These files 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.

**Tip:** When using the backup-archive client scheduling mode to back up a whole system, set the **LANG** environment variable to **en\_US** (or some other SBCS language) to avoid skipped files.

#### Related information

[http://www.ibm.com/software/sysmgmt/products/support/Field\\_Guides.html](http://www.ibm.com/software/sysmgmt/products/support/Field_Guides.html)

## 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 in either of the following circumstances: (1) You want to invoke Tivoli Storage Manager from a directory other than the directory where Tivoli Storage Manager is installed, or (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.

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

**PATH** Includes the directory where the executable file dsmc resides.

#### DSM\_DIR

Specifies the directory where the executable file dsmc, the resource files, and the dsm.sys file reside. You *cannot* specify the root (/) directory for DSM\_DIR.

Refer to the installation section for your operating system to find the default installation directory information.

When you request an image backup, image restore, snapshot-based file backup, NAS backup, or NAS 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

Specifies the fully-qualified path and file name of the client user options file for users who create their own personalized options file. The root directory is *not* a valid value for DSM\_CONFIG. Specify a directory other than the root directory. If DSM\_CONFIG is *not* set, or the *-optfile* option is not used, the client user options file is expected to satisfy these requirements:

1. The options file must be named `dsm.opt`.
2. For UNIX clients other than Mac OS X, if DSM\_DIR is *not* set, then the file must reside in the default installation directory. If DSM\_DIR is set, then the file must reside in the directory specified by DSM\_DIR.
3. For Mac OS X, the file can reside in any of the following locations. These directories are searched in order, and the first option file found will be used. `~/Library Preferences/Tivoli Storage Manager`, `/Library Preferences/Tivoli Storage Manager`, or `/Library/Application Support/tivoli/tsm/client/ba/bin`.

Refer to the installation section for your operating system to find the default installation directory information.

### DSM\_LOG

Points to the directory where you want the `dsmerror.log`, `dsmwebcl.log`, and `dsmsched.log` files to reside. You *cannot* specify the root (`/`) directory for DSM\_LOG. 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.

Refer to the installation section for your operating system to find the default installation directory information.

**Important:** Set the DSM\_LOG environment variable to name a directory where read-write permissions allow the required write access for the user to create and write to the log file. This will prevent log write failures and process termination. Use the `chmod` or `setacl` commands to give the files permissions that allow all expected client user IDs to read and write them. If the log names are the default names, just set the DSM\_LOG environment variable to point to the directory where they reside. When Tivoli Storage Manager cannot write to the log file, an error message is written to `stderr` and to the `syslog` daemon. The `syslog` daemon must be running and configured to process messages with a priority of `LOG_ERR` for the error message to appear in the system log. Starting and configuring the `syslog` daemon is system specific. See "man `syslogd`" for information on starting the `syslog` daemon, and "man `syslog.conf`" for information on configuring the `syslog` daemon.

#### Note:

1. The *errorlogname* and *schedlogname* options override DSM\_LOG.
2. The log files cannot be symbolic links. Tivoli Storage Manager will detect any such links, delete the links, then exit the operation. This prevents Tivoli Storage Manager from overwriting protected data. The affected logs will be created as files in a subsequent operation.

To set the Java GUI JAVA\_BIN\_DIR path to find modules, add the java binary directory your PATH variable, where JAVA\_BIN\_DIR is the path to the "java" executable:

```
export PATH=$PATH:<JAVA_BIN_DIR>
```

### Related reference

“Optfile” on page 359

The *optfile* option specifies the client options file to use when you start a Tivoli Storage Manager session.

## Setting Bourne and Korn shell variables

Enter the environment variables in the `.profile` file (Korn shell) or `.bash_profile` file (Bourne shell) in your `$HOME` directory.

The following is an example, 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.

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

## 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.

The following is an example, 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.

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

## 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 `dserror.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*, SC32-0147.

---

## Configuring the Web client

There are some steps that you must follow to configure the Web client.

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

1. If *MANAGEDServices scheduler* is set, specify *MANAGEDServices webclient scheduler* in the *dsm.sys* file.
2. Ensure that you specify *passwordaccess generate* in the *dsm.sys* file.
3. To generate the Tivoli Storage Manager password, start the backup-archive client by entering the following command:

```
dsmc query session
```

When prompted, enter your user ID and password.

**Tip:** On Mac OS X, a password can also be generated by selecting the TSM Tools for Administrators application and starting Tivoli Storage Manager.

4. Start the client acceptor daemon (CAD) by entering the following command:

```
dsmcad
```

**Tip:** On Mac OS X you can start the client acceptor with the TSM Tools for Administrators application, by selecting **Start the TSM Connect Agent**.

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 options applicable only to the **dsmcad** program are *httpport*, *managedservices*, and *webports*. Other options such as *optfile* or *errorlogname* can also be used. You can use the *managedservices* option to specify whether the Tivoli Storage Manager client acceptor daemon also manages the Tivoli Storage Manager scheduler.

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. Set this environment variable to the directory where the log files should reside. The root directory is *not* a valid value for *DSM\_LOG*. Specify a directory other than the root directory.

5. To access the Web client, enter the following URL from any supported browser, where *your\_machine\_name* is the host name of the machine running the Web client.:

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

Port 1581 is the default port number. You can set a different port number using the *httpport* option.

After installing and configuring the Web client on your workstation you can use the Web client to perform backup, archive, restore, and retrieve operations.

### Related concepts

Chapter 10, “Using processing options,” on page 241

You can use defaults for processing options or you can tailor the processing options to meet your specific needs. This topic provides an overview of processing options and an options reference section that provides detailed information about each option.

### Related tasks

“Starting a Web client session” on page 97

After installing the Web client on your workstation you can use the Web client to perform backup, archive, restore, and retrieve operations from any browser that is running Java Runtime Environment (JRE) 5 or 6. 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.

### Related reference

“Httpport” on page 327

The *httpport* option specifies a TCP/IP port address for the Web client.

“Passwordaccess” on page 361

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.

---

## 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 perform the following tasks:

- Display information about available schedules.
- Display information about work that the schedule has completed.
- Modify scheduling options in the *dsm.sys* file.

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 run immediately or the scheduler exits. The CAD restarts the scheduler when it is time to run 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.

Use the client acceptor daemon to manage the client scheduler. You cannot use the *dsmcad* for scheduling when you set the *sessioninitiation* option to *serveronly*.

Use the *managedservices* option in your client system options file (*dsm.sys*) to specify whether the CAD manages the scheduler.

**Important:** Running the client scheduler on the command line is not recommended since it does not run the scheduler as a background service.

Perform the following steps to configure the CAD to manage the client scheduler:

1. Install the Web client.
2. Install the Scheduler.
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 want to run the Web client also, check the **Both** option.
4. Start the Client Acceptor.

**Note:**

- If the *sessioninitiation* option is set to *serveronly* in your client options file (dsm.opt), the client setup wizard and scheduler service might be unable to initiate authentication with the Tivoli Storage Manager server. To avoid this problem, ensure that the **Contact the TSM Server to validate password** checkbox on the TSM Authentication page is unchecked.
- In the Service login options window, select the **Automatically when Windows boots** option to have the service started automatically when Windows boots so that your schedules will be run.
- You can also use the **Scheduler Service Configuration** utility. The **Scheduler Service Configuration** utility must be run from an account that belongs to the Administrator/Domain Administrator group. You can start multiple client scheduler services on your system.
- If you are having the CAD manage your schedule, start the CAD service, but do not start the scheduler service. The scheduler service will be started and stopped automatically by the CAD service as needed. If you are not managing the schedule with the CAD, then you can use the Services Control Panel or the net start command to start the Scheduler service.
- If you include files for encryption, ensure that the *encryptkey save* option is set in the options file. This option is set by selecting **Save Encryption Key Password Locally** on the Authorization panel in the preference editor. Setting this option enables unattended scheduled services. If the encryption key has not been previously saved, you must perform an attended backup of at least one file so that the encryption prompt will be given and the key can be saved.

### Related concepts

“Enabling or disabling scheduled commands” on page 219

Where supported, 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.

“Scheduling options” on page 253

This topic discusses the options that you can use to regulate central scheduling. Tivoli Storage Manager uses scheduling options only when the Scheduler is running.

### Related tasks

“Configuring the Web client” on page 52

There are some steps that you must follow to configure the Web client.

“Setting the client scheduler process to run as a background task and start automatically at boot time” on page 214

You can configure the Tivoli Storage Manager client scheduler to run as a background system task which starts automatically when your system is started. This is true for both client acceptor daemon-managed and traditional methods of running the Tivoli Storage Manager client scheduler.

### Related reference

“Managedservices” on page 345

The *managedservices* option specifies whether the Tivoli Storage Manager client acceptor service manages the scheduler, the Web client, or both.

“Sessioninitiation” on page 394

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.

---

## Starting the client scheduler

Follow these steps to run scheduling services with the GUI.

### Using the command-line client to handle scheduled events

You must be a system administrator to configure Tivoli Storage Manager to use the command-line client interface to handle scheduled events. The command-line tools must be installed to enable this function.

Before starting the client scheduler, you must complete the following steps before the client acceptor daemon will work.

1. Ensure that the *managedservices* option includes *schedule* in the client systems options (dsm.sys) file.
2. Set the *passwordaccess* option to *generate* in the client systems options (dsm.sys) file.

If you include files for encryption processing, ensure that you select the **Save Encryption Key Password Locally** option in the Authorization Preferences window so that the client scheduler can perform unattended scheduled services without prompting the user for the encryption key. If the encryption key has not been previously saved, you must perform an attended backup of at least one file so that the encryption prompt will be given and the key can be saved.

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
```

If the Tivoli Storage Manager client executable directory is not in your PATH environment variable, change to the installation directory and enter the following command:

```
./dsmc schedule
```

For z/OS, enter the following path and command:

```
/usr/lpp/Tivoli/tsm/client/ba/bin/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 *dsm.sys*, then follow the procedure below for your operating system:

- **For non-z/OS 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 Mac OS X:

The system administrator must generate a password so that Tivoli Storage Manager can store the password in the *TSM.PWD* file. This can be done either with TSM Tools for Administrators or with the command line.

A system administrator must use either of the following methods to enable the Tivoli Storage Manager client acceptor daemon to launch the command-line client in schedule mode to handle scheduled events during system boot up.

#### Method 1 (preferred)

- Use TSM Tools for Administrators and Start the TSM Connect Agent applications. This installs the client acceptor daemon as a system startup item so the client acceptor daemon starts after system restarts. The client acceptor daemon is also started immediately, so you do not need to restart the system to handle scheduled events.

#### Method 2

- Use the shell script in *"/Library/Application Support/tivoli/tsm/client/ba/bin"* to install the client acceptor daemon as a startup item. The script name is *StartCad.sh*.

Complete the following steps to start the client acceptor daemon manually, and to check that it is running.

1. To check whether the client acceptor daemon is running, enter the following command:



```
sudo ps -x | grep dsmcad
```

If the client acceptor daemon is running, one of the processes listed will have the path `/usr/bin/dsmcad`.

2. To start the client acceptor daemon manually, enter the following command in a terminal window:

```
sudo /sbin/SystemStarter start dsmcad
```

#### For z/OS 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
I>/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 *includexcl* 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.

### Related tasks

“Configuring the client scheduler” on page 53

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.

### Related reference

“Managedservices” on page 345

The *managedservices* option specifies whether the Tivoli Storage Manager client acceptor service manages the scheduler, the Web client, or both.

“Passwordaccess” on page 361

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.

---

## 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 might need to consult the instructions for the firewall software or hardware in use. This section explains the different methods to enable client and server operations through a firewall.

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. 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 cannot use the port specified by the *tcpadminport* option (on the server) for a client session. That port can 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.

#### **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.

#### **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.

#### **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.

#### **Note:**

1. If *sessioninitiation* is set to *serveronly*, the value for the *tcpclientaddress* client option must be the same as the value for the *HLAddress* option of the **update node** or **register node** server command. The value for the *tcpclientport* client option must be the same as the value for the *LLAddress* option of the **update node** or **register node** server command.
2. If you set the *sessioninitiation* option to *serveronly*, with the exception of CAD-managed schedulers, the command-line client, backup-archive client Java GUI, and Web client GUI will still attempt to initiate sessions, but are blocked by the Tivoli Storage Manager server for nodes that 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 might be unable to authenticate to the server when the server contacts the client scheduler to run 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 the scheduler from the command line (`dsmc schedule`), wait until a scheduled operation starts, and enter the password for your node when prompted.
4. The Tivoli Storage Manager client cannot prompt for the encryption key password in scheduler mode. If you are using Tivoli Storage Manager data encryption, you must run an initial interactive backup once to set up the encryption key by opening the TCP/IP connection from the client machine to the server machine. See **Method 1** for more information about setting up this communication. After the encryption

key is set, you can use server-initiated sessions to back up the files using Tivoli Storage Manager encryption.

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 can be used to prompt the client to connect to the server.

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

- In *prompted* mode the Tivoli Storage Manager server needs to contact the client. In order to do this, some software might 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, because 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.

### Related tasks

“Configuring the client scheduler” on page 53

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.

### Related reference

“Sessioninitiation” on page 394

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.

“Tcpadminport” on page 414

Use the *tcpadminport* option to specify a separate TCP/IP port number on which the server waits for requests for administrative client sessions, allowing secure administrative sessions within a private network.

“Tcpport” on page 419

The *tcpport* option specifies a TCP/IP port address for a Tivoli Storage Manager server. You can obtain this address from your administrator.

“Webports” on page 434

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 client.

---

## Configuring Tivoli Storage Manager client/server communication with Secure Socket Layer

Secure socket layer (SSL) allows industry standard SSL-based secure communications between the Tivoli Storage Manager client and server.

SSL is supported on AIX only.

The following client components support SSL:

- Command-line client
- Administrative command-line client
- Java GUI
- Client API

Only outgoing client-server connections support SSL. Incoming connections (for example, CAD, server-initiated schedule connections) do not support SSL. Client-to-client communications and Web GUI do not support SSL.

In order to enable SSL communication, you need to perform the following actions:

1. Obtain the Tivoli Storage Manager server certificate.
2. Create the local key database, if it has not already been created.
3. Add the server certificate to the local key database.
4. Add the *SSL* option to the client options file.
5. Select the correct server TCP port for SSL communications.

The Tivoli Storage Manager Server certificate has a fixed file name of `cert.arm` and it is stored on the server machine in the server instance directory, for example: `/opt/tivoli/tsm/server/bin/cert.arm`. If this file does not exist when server options `SSLTCPPORT` or `SSLTCPADMINPORT` are specified, it will be created and a self-signed SSL certificate will be generated and stored in it.

Each Tivoli Storage Manager server generates its own certificate. In order to set up the SSL connection to a particular server, you need to obtain its certificate (in the form of the `cert.arm` file) from the server administrator, and import it into the local client key database.

If this is the first time you are configuring SSL on the Tivoli Storage Manager client, you need to create the client local key database (`dsmcert.kdb`). In order to do that, run the following command from the `DSM_DIR` (executables) directory:

```
# gsk7capicmd -keydb -create -db dsmcert.kdb -pw <password> -stash
```

Now that the local key database exists, you need to import the server certificate. Place the certificate file (`cert.arm`) in the current working directory and run the following command:

```
# gsk7capicmd -cert -add -db dsmcert.kdb -pw <password> -label  
  "TSM server <servername> self-signed key" -file cert.arm  
  -format ascii -trust enable
```

**Note:**

1. An arbitrary password (provided by the user) is used to encrypt the key database. The password is automatically stored encrypted in the stash file (`dsmcert.sth`). The stash file is used by the Tivoli Storage Manager client to retrieve the key database password.
2. More than one server certificate can be added to the client key database so that the client can connect to different servers. Different certificates must have different labels. The label names are not important, but meaningful names should be used.
3. If you do not run the preceding commands from the `DSM_DIR` directory, you need to copy `dsmcert.kdb` and `dsmcert.sth` into that directory.
4. By default, local key database files have root ownership and permissions and cannot be read by other users. If you plan to run the Tivoli Storage Manager client as a non-root user, you need to update the permissions. For example, to grant read access to all users and groups, run the following command:

```
# chmod go+r dsmcert.*
```

After the server certificate has been added to the client key database, add the *SSL yes* option to the client options file and update the value of the `TCPPORT` option. It is important to understand that the server is normally set up for SSL connections on a different port. In other words, two ports are opened on the server: one port accepts regular non-SSL client connections, and another port accepts SSL connections only. You cannot connect to a non-SSL port with an SSL-enabled client, and vice versa.

### Related reference

“Ssl” on page 410

The *ssl* option is used to enable Secure Socket Layer (SSL), to provide secure client and server communications.

---

## Journal daemon configuration

Journal-Based Backup is enabled by installing and configuring the Tivoli Storage Manager journal daemon. The Tivoli Storage Manager journal daemon can be configured by editing the Journal daemon configuration sample file, `tsmjbbd.ini.smp`, and saving it as `tsmjbbd.ini`. Both files should be in the default install directory.

### Note:

1. For customers already using journal-based backup, the first incremental backup after installing Tivoli Storage Manager Version 5.5 will result in a non-journal based backup, even if you are using the `PreserveDbOnExit` option in your `tsmjbbd.ini` file. This is because Tivoli Storage Manager Version 5.5 now uses a new database for better reliability and efficiency and the new database must go through normal validation before it can support journal-based backups.
2. Network and removable file systems are not supported.

The configuration file is periodically checked for updates to the list of journaled file systems.

File systems can be added to or removed from the list of monitored file systems without stopping and restarting the journal daemon.

**Attention:** If you bring a file system offline without setting the `PreserveDbOnExit` value of 1, the journaled file system journal database is deleted. `PreserveDbOnExit=1` specifies that the journaled file system journal database is not deleted when the journal file system goes offline. The database will also be valid when the journal file system comes back online.

The following is the syntax for stanza and stanza settings:

### Syntax for stanzas:

`[StanzaName]`

### Syntax for stanza settings:

`stanzaSetting=value`

### Note:

1. You can specify comments in the file by beginning the line with a semicolon.
2. Stanza and value names are not case sensitive.
3. Numeric values can be specified in hexadecimal by preceding the value with `0x` otherwise they are interpreted as decimal.
4. There is no correlation between these settings and any settings in the backup-archive client options file. The journal daemon is a completely independent process and does not process backup-archive client options.

## JournalSettings stanza

Settings under this stanza are global and apply to the entire journal daemon.

The following is the syntax for the *JournalSettings* stanza:

**Syntax for *JournalSettings* stanza:**  
*[JournalSettings]*

**Syntax for stanza settings:**  
*JournalSettings=value*

You can specify the following *JournalSettings* values:

*ErrorLog*

Specifies the log file where detailed error messages generated by the journal daemon are written. The default value is `jbberror.log` in the directory of the daemon executable. For example:

```
ErrorLog=/logs/jbberror.log
```

*JournalDir*

Directory where journal database files are stored and written.

If the path given is an absolute (for example, it begins with a `dir` delimiter) pathname, this is the directory used. If the path given is a relative directory name, then this path is appended to each file system name and the resulting path name is used.

The default is a directory named `.tSm_JoUrNaL` (used within each file system being journaled).

The advantage of having the journal database on the file system being monitored is that the database stays with the file system. The disadvantage is that the updates to the database must be processed and discarded. That is, directing the database to a non-journaled file system is more efficient and is strongly recommended, unless this file system is shared in a cluster environment.

This setting applies to all journaled file systems but can be overridden with an override stanza for each journal file system.

## JournalExcludeList stanza

This list of exclude statements filters changes from being recorded in the journal database. Changes to objects which match statements in this stanza are ignored and are not recorded in the journal database.

**Note:**

1. Excluding files from the journal has no bearing on those files being excluded by the backup client, other than preventing the file names from being sent to the backup client to be processed during journal-based backup. A file that is not excluded from the journal should still be excluded by the backup-archive client, if there is a matching exclude statement in the client options file.
2. The journal daemon only provides a subset of the INCLUDE/EXCLUDE function provided by the backup-archive client. The journal daemon does not support INCLUDE statements and it does not support the *exclude.dir* option.

There is no correlation between the journal exclude list and the backup-archive client exclude list.

The following pattern matching meta characters are supported:

- % Matches exactly one character.
- \* Matches zero or more characters.



**%EnvVar%**  
Expands environment variable.

The following is an exclude statement syntax example:

```
[JournalExcludeList]  
*.jbb.jbbdb  
*.jbbInc.jbbdb
```

## JournaledFileSystemSettings stanza

Settings under this stanza apply to each specified journaled file system unless they are overridden for individual file systems in an override stanza.

The following is the syntax for the `JournaledFileSystemSettings` stanza:

**Syntax for *JournaledFileSystemSettings* stanza:**  
`[JournaledFileSystemSettings]`

**Syntax for stanza settings:**  
`JournaledFileSystemSetting=value`

You can specify the following *JournaledFileSystemSettings* values:

### *JournaledFileSystems*

Specifies a space delimited list of file systems to journal. Full file system specifications and Windows virtual mount points are supported. There is no default value. You must specify at least one journaled file system for the journal daemon to run. Journaled file systems can be added or removed online without having to restart the daemon. For example:

```
JournaledFileSystems=/home /other
```

**Note:** The journal selects object names based strictly on a string match. The implication for the user is that care must be taken when selecting file systems to journal. For example, suppose you have a file system `/jbb` and another file system called `/jbb/mnt1`. If you ask the journal to monitor just `/jbb`, then all the changes for `/jbb/mnt1` will also match this string and be entered in the database. When, however, you do a back up on the client, it parses the name based on file systems, realizes the journal is not monitoring this file system and then tells the journal to remove the `/jbb/mnt1` files from the database. The solution is to either monitor both or use the `JournalExcludeList`. The same is true for the virtual mount point options. It is highly recommended that you are consistent with this list. For example, if you specify `/home/student1` as a virtual mount point in your `dsm.sys` option file and you want to journal `/home`, then you should specify `JournaledFileSystems=/home /home/student1`. In this case, two separate databases are created.

### *JournalDbSize*

Specifies the maximum size the journal database can grow. The journal database size is expressed in bytes. A value of zero (0) indicates that the database size is limited only by the capacity of the file system containing the journal database. The default is 0 (unlimited). For example:

```
JournalDbSize=0x10000000
```

### *NotifyBufferSize, DirNotifyBufferSize*

Specify change notification buffer sizes for a journaled file system. A large amount of change activity on a journaled file system might require this to be increased. The default is 0x00020000 (128 k) for files and 0x00010000 (64 k) for directories.

NotifyBufferSize=0x00200000

### *PreserveDbOnExit setting*

This setting allows a journal to remain valid when a journaled file system goes offline and comes back online. This is useful for preserving the journal during system reboots, and resource movement.

This setting allows a journal-based backup to continue processing when the daemon is restarted (or the file system comes back online) without performing a full incremental backup.

**Note:** Any change activity which occurs while the journal daemon is not running (or the file system is offline) will not be recorded in the journal.

A value of 1 specifies that the journaled file system journal database is not deleted when the journal file system goes offline. The database will also be valid when the journal file system comes back online. This value should be used with caution because any file system change activity which occurs while the journaled file system is offline will not be reflected in the journal database. The default setting of 0 deletes the journaled file system journal database.

**Note:** The journal will only be preserved when a journaled file system comes offline normally or is brought offline when the resource is no longer available and you specify the `deferFsMonStart` setting. If a file system comes offline due to an error such as a notification buffer overrun, the journal is not preserved.

**Note:** Set `PreserveDBonExit` only when you can ensure there is a controlled shutdown of the journal service. The scope of "controlled shutdown" includes stopping the journal service in order to reboot the system, failing over a cluster resource, or moving a cluster resource. The journal database can become corrupted if the shutdown is not controlled. Therefore, you should perform the following steps if the journal service was not shut down in a controlled manner or if the journal database was otherwise taken offline in an uncontrolled manner.

1. Stop the journal service (if it is running)
2. Delete the corrupted journal databases
3. Restart the journal service
4. Perform an incremental backup

An example for not deleting the journal database upon exit is:

```
preserveDBonExit=1
```

### *deferFSMonStart setting*

This setting defers an attempt to begin monitoring a file system in the following cases:

- When the specified journaled file system is not valid or available
- The journal directory for the specified journaled file system cannot be accessed or created

Resources are checked at the interval you specify using the `deferRetryInterval` setting.

A value of 1 indicates that the setting is on. A value of 0 indicates that the setting is off. The default value is off (set to 0) .

### *deferRetryInterval* setting

This setting specifies the value in seconds that a deferred file systems with the *deferRetryInterval* setting enabled are checked for availability and brought online. The default value is 5 seconds.

### *logFSErrors* setting

A value of 1 indicates that all errors encountered accessing a journaled file system or journal directory should be logged. A value of zero indicates that logging of errors encountered while checking deferred file systems and journal directories will be suppressed. This is usually used in conjunction with the *deferFSMonStart* setting to eliminate excessive File System unavailable messages from being written to the logs when bringing a journaled file system on-line is deferred. The default value is 1 (log all errors).

### Related concepts

#### “Overriding stanzas”

Any setting in the *JournaledFileSystemSettings* stanza, except for the buffer sizes, can be overridden for a particular journaled file system by creating an override stanza.

## Overriding stanzas

Any setting in the *JournaledFileSystemSettings* stanza, except for the buffer sizes, can be overridden for a particular journaled file system by creating an override stanza.

### *HookFileName*

In order for the journal to begin monitoring a file system, it must know the name of an existing file in that file system. This setting specifies an existing file. Access to this file is then used as a test of whether or not this file system is online. (The system definition of mounted cannot be used because we allow the use of virtual mount points in the backup-archive client. This means that the Tivoli Storage Manager system can treat a directory as a (virtual) file system).

Therefore, if this file system can be mounted and unmounted, a *HookFileName* needs to be provided.

If a *HookFileName* is not entered, the journal daemon attempts to create a temporary file in the highest directory, use it to begin monitoring, and then delete it.

The following is the syntax for the *JournaledFileSystemSettings* stanza:

#### Syntax for *JournaledFileSystemSettings* stanza:

```
[JournaledFileSystemSettings.fs]
```

#### Syntax for stanza settings:

```
JournaledFileSystemSetting=override value
```

For example, the override stanza name for /home would be:

```
JournaledFileSystemSettings./home  
HookFileName=/home/doNotDeleteThisFile
```

---

## Cluster environment configuration and use

The term *cluster* has different meanings in different environments. It can mean highly available, high performance, load balancing, grid computing, or some combination of all of these terms. There are currently several clustering products available for UNIX and Linux, and this section defines those aspects of a clustering environment that need to exist in order for this backup methodology to work correctly. A basic understanding of how your cluster software functions is needed. Cluster software related activities such as the development of application start and stop scripts are not described in this section.

A cluster environment refers to a UNIX or a Linux environment which exhibits the following characteristics:

- Disks are shared between physical machines, either in an exclusive fashion (only one host has access to the logical disk at any one time) or in a concurrent fashion.
- Disks appear as local disks to the host and not as network resources.  
**Recommendation:** Mount the file systems locally to the system, not through a LAN-based file share protocol such as network file system (NFS).
- Mount points of local disks are identical on each physical host in the environment (if file system `/group1_disk1` fails from NodeA to NodeB, it is mounted on NodeB as `/group1_disk1`).

### Overview of cluster environments

Cluster environments can be set up in many different configurations. This section describes the most popular cluster configurations.

#### **Active/Active: Pool cluster resources**

In an active/active configuration, each node is actively managing at least one resource and is configured as a backup for one or more resources in the cluster. Active/active is the most common form of a cluster environment.

#### **Active/Passive: Fault tolerant**

In an active/passive configuration, one node actively manages the resource. The other node is only used if the primary node experiences a fault and the resource needs to failover. An active/passive cluster is a subtype of an active/active cluster.

#### **Concurrent access**

In a concurrent configuration, more than one node manages a resource. When a fault occurs, the resource continues to be managed by the other nodes.

### Configuring the backup-archive client in a cluster environment

The Tivoli Storage Manager Backup-Archive Client is designed to manage the backup of cluster drives by placing the backup-archive client within the context of the cluster's resource groups. This gives the advantage of backing up data from local resources (as opposed to accessing the data across the network) to maximize the performance of the backup operation and to manage the backup data relative to the resource group. Therefore, the backup-archive client can always back up data on cluster resources as if the data were local data and maximize backup performance. This ensures that critical data is getting backed up across system failures.

For example, an active/active cluster environment has three physical hosts in the cluster named NodeA, NodeB, and NodeC.

The nodes have the following qualities:

- NodeA owns the cluster resource with file systems /A1 and /A2
- NodeB owns the cluster resources with file systems /B1 and /B2
- NodeC owns the cluster resources with file systems /C1 and /C2

**Note:** NodeA might also have two non-clustered volumes, /fs1 and /fs2, that must be backed up.

For best backup performance, you might want all nodes in the cluster to perform the backups of the shared file systems that they own. When a node failover occurs, the backup tasks of the failed node shift to the node to which the failover occurred. For example, when NodeA fails over to NodeB, the backup of /A1 and /A2 moves to NodeB.

The following are prerequisites before configuring the backup-archive client to back up cluster and non-cluster volumes:

- A separate backup-archive client scheduler process must be run for each resource group being protected. In normal conditions, each node would have two scheduler processes: one for the cluster resources, and one for the local file systems. After a failure, additional scheduler processes are started on a node in order to protect the resources that have moved over from another node.
- The backup-archive client password files must be stored on cluster disks so that after a failure, the generated backup-archive client password is available to the takeover node.
- The file systems to be protected as part of a resource group are defined using the backup-archive client domain option. The domain option is specified in the `dsm.sys` file, which should also be stored on a cluster disk so that it can be accessed by the takeover node.

Follow the steps below to configure the Tivoli Storage Manager backup-archive client in a cluster environment.

1. Register backup-archive client node definitions on the Tivoli Storage Manager Server. All nodes in the cluster must be defined on the Tivoli Storage Manager Server. If you are defining multiple cluster resources in a cluster environment to failover independently, then unique node names must be defined per resource group. For the above sample three-way active/active cluster configuration, define three nodes (one per resource), as follows: (1) `tsm: IBM>register node nodeA nodeApw domain=standard`, (2) `tsm: IBM>register node nodeB nodeBpw domain=standard`, (3) `tsm: IBM>register node nodeC nodeCpw domain=standard`.
2. Configure the backup-archive client system options file. Each node in the cluster must have separate server stanzas for each cluster resource group in order to be backed up in each respective `dsm.sys` file. You must ensure that the server stanzas are identical in the system option files on each node. Alternatively, you can place the `dsm.sys` file on a shared cluster location. The server stanzas defined to back up clustered volumes must have the following special characteristics:
  - The *nodename* option must refer to the client node name registered on the Tivoli Storage Manager Server. If the client node name is not defined, the node name will default to the host name of the node, which might conflict with other node names used for the same client system.

**Recommendation:** Use the *nodename* option to explicitly define the client node.

- The *tcpclientaddress* option must refer to the service IP address of the cluster node.
  - The *passworddir* option must refer to a directory on the shared volumes that are part of the cluster resource group.
  - The *errorlogname* and *schedlogname* options must refer to files on the shared volumes that are part of the cluster resource group to maintain a single continuous log file.
  - All include exclude statements must refer to files on the shared volumes that are part of the cluster resource group.
  - If you use the *incl excl* option, it must refer to a file path on the shared volumes that are part of the cluster group.
  - The stanza names identified with the *servername* option must be identical on all systems.
3. Other backup-archive client options can be set as needed. In the following example, all three nodes, NodeA, NodeB, and NodeC, must have the following three server stanzas in their *dsm.sys* file:

```
Servername      clinton_nodeA
nodename        NodeA
commmethod      tcpip
tcpport         1500
tcpserveraddress clinton.ibm.com
tcpclientaddress nodeA.ibm.com
passwordaccess  generate
passworddir     /A1/tsm/pwd
managementservices schedule
schedlogname    /A1/tsm/dsmsched.log
errorlogname    /A1/tsm/errorlog.log
```

```
Servername      clinton_nodeB
nodename        NodeB
commmethod      tcpip
tcpport         1500
tcpserveraddress clinton.ibm.com
tcpclientaddress nodeB.ibm.com
passwordaccess  generate
passworddir     /B1/tsm/pwd
managementservices schedule
schedlogname    /B1/tsm/dsmsched.log
errorlogname    /B1/tsm/errorlog.log
```

```
Servername      clinton_nodeC
nodename        NodeC
commmethod      tcpip
tcpport         1500
tcpserveraddress clinton.ibm.com
tcpclientaddress nodeC.ibm.com
passwordaccess  generate
passworddir     /C1/tsm/pwd
managementservices schedule
schedlogname    /C1/tsm/dsmsched.log
errorlogname    /C1/tsm/errorlog.log
```

4. Configure the backup-archive client user options file. The options file (*dsm.opt*) must reside on the shared volumes in the cluster resource group. Define the *DSM\_CONFIG* environment variable to refer to this file. Ensure that 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.
  - Define the clustered file systems to be backed up with the *domain* option.

**Note:** Ensure that you define the domain option in the dsm.opt file or specify the option in the schedule or on the Tivoli Storage Manager command-line client. This is to restrict clustered operations to cluster resources and non-clustered operations to non-clustered resources.

In the example, nodes NodeA, NodeB, and NodeC set up their corresponding dsm.opt file and DSM\_CONFIG environment variable as follows:

**NodeA:**

1) Set up the /A1/tsm/dsm.opt file:

```
servername clinton_nodeA
domain     /A1 /A2
```

2) Issue the following command or include it in your user's profile:

```
export DSM_CONFIG=/A1/tsm/dsm.opt
```

**NodeB:**

1) Set up the /B1/tsm/dsm.opt file:

```
servername clinton_nodeB
domain     /B1 /B2
```

2) Issue the following command or include it in your user's profile:

```
export DSM_CONFIG=/B1/tsm/dsm.opt
```

**NodeC:**

1) Set up the /C1/tsm/dsm.opt file:

```
servername clinton_nodeC
domain     /C1 /C2
```

2) Issue the following command or include it in your user's profile:

```
export DSM_CONFIG=/C1/tsm/dsm.opt
```

5. Set up the schedule definitions for each cluster resource group. After the basic setup is completed, define the automated schedules to back up cluster resources to meet the backup requirements. The procedure illustrates the schedule setup by using the built-in Tivoli Storage Manager scheduler. If you are using a vendor-acquired scheduler, refer to the documentation provided by the scheduler vendor.

- Define a schedule in the policy domain where cluster nodes are defined. Ensure that the schedule's startup window is large enough to restart the schedule on the failover node in case of a failure and fallback event. This means that the schedule's duration must be set to longer than the time it takes to complete the backup of the cluster data for that node, under normal conditions.

If the reconnection occurs within the start window for that event, the scheduled command is restarted. This scheduled incremental backup reexamines files sent to the server before the failover. The backup will then "catch up" to where it stopped before the failover situation.

In the following example, the clus\_backup schedule is defined in the standard domain to start the backup at 12:30 A.M. every day with the duration set to two hours (which is the normal backup time for each node's data).

```
tsm: IBM>define schedule standard clus_backup action=incr
starttime=00:30 startdate=TODAY Duration=2
```

- Associate the schedule with the all of the backup-archive client nodes defined to backup cluster resources, as follows: (1) tsm: IBM>define association standard clus\_backup nodeA, (2) tsm: IBM>define association standard clus\_backup nodeB, (3) tsm: IBM>define association standard clus\_backup nodeC.
6. Set up the scheduler service for backup. On each client node, a scheduler service must be configured for each resource that the node is responsible for backing up, under normal conditions. The DSM\_CONFIG environment variable for each resource scheduler service must be set to refer to the corresponding dsm.opt file for that resource. For the sample configuration, the following shell scripts must be created to allow dsmcad processes to be started, as needed, from any node in the cluster.

```
NodeA: /A1/tsm/startsched
#!/bin/ksh
export DSM_CONFIG=/A1/tsm/dsm.opt
dsmcad
NodeB: /B1/tsm/startsched
#!/bin/ksh
export DSM_CONFIG=/B1/tsm/dsm.opt
dsmcad
NodeC: /C1/tsm/startsched
#!/bin/ksh
export DSM_CONFIG=/C1/tsm/dsm.opt
dsmcad
```

7. Define the Tivoli Storage Manager Backup-Archive Client to the cluster application. To continue the backup of the failed resource after a failover condition, the Tivoli Storage Manager scheduler service (for each cluster client node) must be defined as a resource to the cluster application in order to participate in the failover processing. This is required in order to continue the backup of the failed resources from the node that takes over the resource. Failure to do so would result in the incomplete backup of the failed resource. The sample scripts in step 5 can be associated with the cluster resources to ensure that they are started on nodes in the cluster while the disk resources being protected move from one node to another. The actual steps required to set up the scheduler service as a cluster resource are specific to the cluster software. Refer to your cluster application documentation for additional information.
8. Ensure each node's password is generated and cached correctly in the location specified using the *passworddir* option. This can be validated by performing the following steps:
  - a. Validate that each node can connect to the Tivoli Storage Manager Server without the password prompt. You can do this by running the backup-archive command line client and issuing the following command on each node:

```
#dsmc query session
```

If you are prompted to submit your password, enter the password to run the command successfully and rerun the command. The second time, the command should run without the prompt for the password. If you get prompted for the password, check your configuration.
  - b. Validate that the other nodes in the cluster can start sessions to the Tivoli Storage Manager Server for the failed-over node. This can be done by running the same commands, as described in the step above, on the backup nodes. For example, to validate if NodeB and NodeC can start a session as NodeA in the failover event without prompting for the password, perform the following commands on NodeB and NodeC



```
#export DSM_CONFIG=/A1/tsm/dsm.opt
#dsmc query session
```

The prompt for the password might appear at this time, but this is unlikely. If you are prompted, the password was not stored in the shared location correctly. Check the *passworddir* option setting used for NodeA and follow the configuration steps again.

- c. Ensure that the schedules are run correctly by each node. You can trigger a schedule by setting the schedule's start time to now. Remember to reset the start time after testing is complete.

```
tsm: IBM>update sched standard clus_backup starttime=now
```

- d. Failover and fallback between nodeA and nodeB, while nodeA is in the middle of the backup and the schedule's start window, is still valid. Verify that the incremental backup will continue to run and finish successfully after failover and fallback.
- e. Issue the command below to cause a node's (nodeA) password to expire. Ensure that backup continues normally under normal cluster operations, as well as failover and fallback:

```
tsm: IBM>update node nodeA forcep=yes
```

9. Configure the backup-archive client to back up local resources.

- a. Define client nodes on the Tivoli Storage Manager Server. Local resources should never be backed up or archived using node names defined to back up cluster data. 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.

In the following example, assume that only NodeA has local file systems /fs1 and /fs2 to be backed up. In order to manage the local resources, register a node NodeA\_local on the Tivoli Storage Manager server: tsm: IBM>register node nodeA\_local nodeA\_localpw domain=standard.

- b. Add a separate stanza in each node's system options file dsm.sys that must back up local resources with the following special characteristics:
  - The value of the *tcpclientaddress* option must be the local host name or 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 cluster, the value of the *tcpclientaddress* option must be the boot IP address. This is the IP address used to start the system (node) before it rejoins the cluster:

Example stanza for NodeA\_local:

```
Servername      clinton_nodeA_local
nodename        nodeA_local
commethod       tcpip
tcpport         1500
tcpserveraddress clinton.ibm.com
tcpclientaddress nodeA_host.ibm.com
passwordaccess  generate
managedservices schedule
```

- c. Define the user options file dsm.opt in a path that is on a non-clustered resource.
  - The value of the *servername* option must be the server stanza in the dsm.sys file which defines parameters for backing up non-clustered volumes.
  - Use the domain option to define the non-clustered file systems to be backed up.

**Note:** Ensure that you define the domain option in the `dsm.opt` file or specify the option in the schedule or on the Tivoli Storage Manager command line client, in order to restrict the backup-archive operations to non-clustered volumes.

In the following example, `nodeA` uses the following `/home/admin/dsm.opt` file and sets up the `DSM_CONFIG` environment to refer to `/home/admin/A1.dsm.opt`.

Contents of `/home/admin/A1.dsm.opt`

```
servername ibm_nodeA_local
domain     /fs1 /fs2
```

```
export DSM_CONFIG=/home/admin/A1.dsm.opt
```

- d. Define and set up a schedule to perform the incremental backup for non-clustered file systems.

```
tsm: IBM>define schedule standard local_backup action=incr
starttime=00:30 startdate=TODAY Duration=2
```

Associate the schedule with all of the backup-archive client nodes that are defined to backup non-clustered resources.

```
tsm: IBM>define association standard nodeA_local
```

10. Restore cluster file system data. All volumes in a cluster resource are backed up under the target node defined for that cluster resource. If you need to restore the data that resides on a cluster volume, it can be restored from the client node that owns the cluster resource at the time of the restore. The backup-archive client must use the same user options file (`dsm.opt`) that was used during the backup to restore the data. There are no additional setup requirements necessary to restore data on cluster volumes.
11. Restore local file system data. The non-clustered volumes are backed up under the separate node name setup for non-clustered operations. In order to restore this data, Tivoli Storage Manager Backup-Archive Client must use the same user options file `dsm.opt` that was used during the backup. In the example, set environment variable `DSM_CONFIG` to refer to `/home/admin/A1.dsm.opt` prior to performing a Tivoli Storage Manager client restore for the local node `nodeA_local`.

### Related concepts

Chapter 5, “Restoring your data,” on page 169

Use Tivoli Storage Manager to restore backup versions of specific files, a group of files with similar names, or entire directories. You can restore these backup versions if the original files are lost or damaged. 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.

## Enabling the Tivoli Storage Manager Storage Agent to perform LAN-free Data Movement

Some general concepts on setting up the Storage Agent and Server for LAN-free data movement in cluster environment should be considered if you intend to move data over the SAN.

**Note:** This section does not apply to Mac OS X.

The simplest way to deploy Storage Agents in a cluster environment is to install a single Storage Agent on each physical host in the cluster. If a Backup-Archive Client instance fails from one physical host (`hostA`) to another physical host

(hostB), it is serviced by the Storage Agent on hostB. Remember the following concepts when deploying this type of configuration:

- The Storage Agents should have unique names on each host, for example staA on hostA and staB on hostB.
- The Storage Agents should have the same network address and communication protocol, for example, each Storage Agent can be configured to use the TCP/IP loopback address (127.0.0.1) and TCP/IP port 1500.

To enable LAN-free data movement in the example used by previous section, add the following options to each stanza in `dsm.sys` files that were described in previous sections. For example, to modify the `dsm.sys` file for NodeA, the following LAN-free options are added:

```
Servername      clinton_NodeA
nodename        NodeA
commmethod      tcpip
...
enablelanfree   yes
lanfreecommmethod tcpip
lanfreetcpsport 1500
lanfreetcpserveraddress 127.0.0.1
```

Other considerations must be taken into account to correctly manage how tape mounts are used during a failover of an instance of the Backup-Archive Client in a clustered environment. For example, an instance of the Backup-Archive Client communicating with Storage Agent staA on hostA has one or more tapes mounted to satisfy the backup request, and the Backup-Archive client fails over to hostB and starts communication with Storage Agent staB. How the tapes that were mounted on behalf of Storage Agent staA are managed depends on the configuration of the TSM server. You must consider the following:

- The Tivoli Storage Manager Server for Windows and AIX has support that will correctly identify that Storage Agent staA is no longer communicating with the Tivoli Storage Manager Server and after a short period of time, releases the relevant drives. In order to enable this support, you must ensure that the `shared=yes` and `resetdrives=yes` parameters are set for the library on the Tivoli Storage Manager Server.
- Although the Tivoli Storage Manager Server on other platforms does not have this support for the Library Manager, they can still be used as the target of LAN-free data movement in a clustered environment. In these cases, using the example above, the drives will be orphaned and no longer available for use until a Tivoli Storage Manager administrator manually releases them. This might be satisfactory if there are sufficient drives, as it would allow the backup to finish normally.
- Note that the Tivoli Storage Manager Backup-Archive Client must have sufficient mount points to handle failover cases which can orphan drives for any amount of time. This includes not only having physical mount points available but also ensuring that there are enough mount points configured to the client node. For example, the Tivoli Storage Manager Server maximum number of mount points parameter `maxnummp` must be set.

For more detailed information and examples on configuration of the Tivoli Storage Manager Storage Agents and Servers in a cluster environment refer to *IBM Tivoli Storage Manager in a Clustered Environment*.

## Enabling Tivoli Storage Manager Web client access in a Cluster Environment

If the Tivoli Storage Manager Web client access is needed during a failover condition, you must configure the Tivoli Storage Manager Web client acceptor daemon (CAD) associated with the cluster to failover along with the cluster resource.

After you have completed the configuration steps described in the *Configuring the backup-archive client in a cluster environment* section, perform the additional steps described below to complete the Web client access setup:

1. Set up the CAD to manage the Web client and scheduler. Tivoli Storage Manager CAD should be set up to manage schedulers as well as Web client access. This reduces the number of daemons that need to be configured as cluster applications and thus simplifies the configuration and administration. When a failover occurs, the Tivoli Storage Manager CAD starts on the node that is managing the takeover.
2. Update the *managedservices* option in the system options file `dsm.sys` on each node for each server stanza, as shown below for NodeA

```
Servername      clinton_NodeA
nodename        NodeA
commmethod      tcpip
tcpp            1500
tcps            clinton.sanjose.ibm.com
tcpclientaddress nodeA.sanjose.ibm.com
passwordaccess  generate
passworddir     /A1/tsm/pwd
schedlogn       /A1/tsm/dsmsched.log
errorlogname    /A1/tsm/errorlog.log
managedservices webclient schedule
```

3. Set up the CAD to use a known http port. By default, the CAD uses http port 1581, when available, for the Web client access. If this port is not available, the CAD finds the first available port, starting with 1581. In a failover condition of an active-active cluster configuration, a failover cluster host system will likely be running multiple instances of the CAD. If default settings are used for the http port, the failover node will use any available port for the CAD being failed over, since the default port will likely be in use by the failover host's current CAD processes. This causes problems for the Web client associated with the CAD that failed over, as the new http port will not be known to the Web client users. You might use the *httpport* option to specify the specific ports for the Web client access for each resource. This allows you to always use the same port when connecting from a web browser, independent of the node serving the cluster resource. Add the *httpport* option in the system options file (`dsm.sys`) on each node for each server stanza as follows, making sure that each stanza uses a unique value:

```

Servername      clinton_NodeA
nodename        NodeA
commmethod      tcpip
tcpp            1500
tcps            clinton.sanjose.ibm.com
tcpclientaddress nodeA.sanjose.ibm.com
passwordaccess  generate
passworddir     /A1/tsm/pwd
managedservices webclient schedule
schedlogn       /A1/tsm/dsmsched.log
errorlogname    /A1/tsm/errorlog.log
httpport        1510

```

```

Servername      clinton_NodeB
nodename        NodeB
commmethod      tcpip
tcpp            1500
tcps            clinton.sanjose.ibm.com
tcpclientaddress nodeB.sanjose.ibm.com
passwordaccess  generate
passworddir     /B1/tsm/pwd
managedservices webclient schedule
schedlogn       /B1/tsm/dsmsched.log
errorlogname    /B1/tsm/errorlog.log
httpport        1511

```

```

Servername      clinton_NodeC
nodename        NodeC
commmethod      tcpip
tcpp            1500
tcps            clinton.sanjose.ibm.com
tcpclientaddress nodeC.sanjose.ibm.com
passwordaccess  generate
passworddir     /C1/tsm/pwd
managedservices webclient schedule
schedlogn       /C1/tsm/dsmsched.log
errorlogname    /C1/tsm/errorlog.log
httpport        1512

```

## Migrating legacy AIX HACMP setups

If you are currently using the Tivoli Storage Manager Backup-Archive Client in an HACMP environment using the *clusternode* option, you must update your current configurations. The *clusternode* option is no longer supported.

Perform the following steps to update your current configurations:

1. Update the backup-archive client system options file. As with the *clusternode* option, each node in the cluster must continue to have separate server stanzas for each cluster resource group to be backed up in each respective *dsm.sys* file. The existing *dsm.sys* file for NodeA might appear as follows:

```

Servername      clinton_nodeA
commmethod      tcpip
tcpp            1500
tcps            clinton.sanjose.ibm.com
tcpclientaddress nodeA.sanjose.ibm.com
passwordaccess  generate
passworddir     /A1
clusternode     yes
managedservices schedule
schedlogn       /A1/dsmsched.log
errorlogname    /A1/errorlog.log

```

2. Notice that no *nodename* option is used in this sample. Make the following changes to the existing *dsm.sys* file for NodeA.

- Remove the *clusternode* option.
  - Specify a *nodename* option if you do not have one already specified. In order to avoid backing up the entire node's data again, use the existing cluster node name registered on the Tivoli Storage Manager server as the value for the *nodename* option.
3. The new `dsm.sys` file for NodeA should appear as follows:

```
Servername      clinton_nodeA
commmethod     tcpip
nodename       myclus (myclus is the existing cluster name )
tcpp           1500
tcps           clinton.sanjose.ibm.com
tcpclientaddress nodeA.sanjose.ibm.com
passwordaccess generate
passworddir    /A1
managedservices schedule
schedlogn      /A1/dsmsched.log
errorlogname   /A1/errorlog.log
```

4. Register backup-archive client nodes on the Tivoli Storage Manager server. If new backup-archive client nodes are added in the first step to replace the current default value of the cluster node name, register those nodes on the Tivoli Storage Manager Server.
5. Update schedule definitions. If new backup-archive client nodes are added in the previous step, ensure that the backup schedule definitions used earlier to back up this node's data are now associated with the new client node names.
6. Validate the setup. Follow step 6 described in the "Configuring the backup-archive client in a cluster environment" section.

---

## AIX configuration considerations prior to performing snapshot-based file backups and archives

If you are configuring your Tivoli Storage Manager AIX client to perform snapshot-based file backups and archives, there are some items that you need to consider.

- Ensure that the volume group containing the file system to be snapshot has sufficient disk space to allow JFS2 external snapshots to be created for the file system.
- Tivoli Storage Manager will be using a default size of 100 percent of the file system size for the snapshot size. This value was found to be most appropriate for file systems with even moderate file system activity. If you need to lower this value based on your experience with your own file system activity, you can use the *snapshotcachesize* option to fine-tune this value.
- Do not enable internal snapshots when creating new JFS2 file systems on AIX 6.1 or later for all file systems managed by Tivoli Storage Manager. Tivoli Storage Manager uses external snapshots and JFS2 does not allow the creation of external and internal snapshots concurrently for the same file system.

### Related reference

“Snapshotcachesize” on page 402

Use the *snapshotcachesize* option to specify an appropriate size to create the snapshot.

---

## Registering your workstation with a server (required)

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.

You must be a root user or authorized user to perform this task.

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 some information to your Tivoli Storage Manager administrator.

The following are the items that you must provide to your Tivoli Storage Manager administrator:

- Your node name (the value returned by the **hostname** command, the name of your workstation, 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.

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 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 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 to uniquely identify a particular machine (for reporting purposes), regardless of how many node names are used on the machine, which network adapter is used to connect to the Tivoli Storage Manager server, and which nodes are connected to the Tivoli Storage Manager servers.

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. The GUID is available only on HP-UX, Linux x86/x86\_64, and Solaris.

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.

---

## Creating an include-exclude list (optional)

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.

You must be an authorized user to perform this task.

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 inlexcl** 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.

Specify the include-exclude list in your `dsm.sys` file. 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 *inlexcl* 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 *inlexcl* option in `dsm.sys`, in the same order, and processed accordingly.

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

1. You can add include-exclude statements in the Tivoli Storage Manager or Web client directory tree. The online help provides detailed instructions.



2. Open the **Edit** menu and select **Client Preferences**. In the Preferences dialog, click the **Include/Exclude** section. You can specify an INCLEXCL file using the Preferences editor. However, you cannot create the INCLEXCL file using the Preferences editor.

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

1. Determine your include and exclude requirements.
2. Locate the server stanza in your dsm.sys file. Each server stanza must have its own include-exclude list.
3. Enter your *include* and *exclude* statements. 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.cpp file *is not* backed up:

```
include /Users/user01/Documents/includefile.cpp
exclude /Users/user01/Documents/.../*
```

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

```
exclude /Users/user01/Documents/.../*
include /Users/user01/Documents/includefile.cpp
```

4. Save the file and close it. For Mac OS X, ensure that you save the file as plain text. Do not add the .txt extension.
5. Restart your Tivoli Storage Manager client to enable your include-exclude list.

#### **Related concepts**

“Considerations for Unicode-enabled clients” on page 331

The include-exclude file can be in Unicode or non-Unicode format. If you specify a non-Unicode include-exclude file, that file must be in the same code page that the client is running.

“Excluding system files” on page 84

There are some recommended system file excludes that should be placed in the client options file. These system files are either locked by the operating system or they can cause problems during restore. These are system files that cannot be recovered without possibly corrupting the operating system, or temporary files with data that you can easily recreate.

Chapter 9, “Understanding storage management policies,” on page 229

Storage management policies are rules your administrator defines in order to manage your backups and archives on the server. Your data is associated (or bound) 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 management class, and a copy group.

#### **Related reference**

“Inclxcl” on page 330

The *inclxcl* option specifies the path and file name of an include-exclude options file.

## **Using include-exclude options**

This topic provides brief descriptions of the *include* and *exclude* options that you can specify in your client options file, a minimum include-exclude list that

excludes system files, a list of supported wildcard characters, and examples of how you might use wildcard characters with *include* and *exclude* patterns.

## Excluding file spaces and directories

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

Table 19. Options for excluding file spaces and directories

Option	Description
<i>exclude.fs</i> "Exclude options" on page 312	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.
<i>exclude.dir</i> "Exclude options" on page 312	Excludes a directory, its files, and all its subdirectories and their files from backup processing. For example, the statement <i>exclude.dir /test/dan/data1</i> excludes the <i>/test/dan/data1</i> directory, its files, and all its subdirectories and their files. Using the <i>exclude.dir</i> option is preferable over the standard <i>exclude</i> option to exclude large directories containing many files that you do not want to back up. You cannot use <i>include</i> options to override an <i>exclude.dir</i> statement. Only use <i>exclude.dir</i> when excluding an entire directory branch. <b>Note:</b> <ol style="list-style-type: none"> <li>Use the following statements to exclude volumes <i>/Volumes/disk2</i> altogether from backup processing. Note that the volume (<i>/Volumes/disk2</i>) will still be backed up, but all other directories on <i>/Volumes/disk2</i> will be excluded. <pre>exclude /Volumes/disk2/* exclude.dir /Volumes/disk2/*</pre> </li> <li>An alternative method for excluding an entire volume from domain incremental backup is to use a domain statement to exclude the volume. For example: <pre>domain "-/Volumes/disk2"</pre> <p>This alternative still permits selective backup processing of files on <i>/Volumes/disk2</i>.</p> </li> </ol>

## Excluding files and directories from journal-based backup

There are two methods of excluding files and directories from a journal-based backup. One method is to add exclude statements to the client options file to prevent the files or directories from being backed up during backup processing. The other method is to add exclude statements to the journal configuration file *tsmjbbd.ini*, to prevent journal entries from being added for the files or directories, which prevents them from being processed during a journal-based backup.

Journal-based backup is only supported on AIX.

**Note:** There is no correlation between the two exclude statements. It is preferable to place exclude statements in *tsmjbbd.ini* to prevent them from entering the journal database and being processed during a journal-based backup.

If you are running AIX Version 6.1 or later, add an `exclude .snapshot` statement to the `tsmjbbd.ini` file for journal-based backup.

## Controlling processing with exclude statements

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

Table 20. Options for controlling processing using include and exclude statements

Option	Description	Page
<b>Backup processing</b>		
<i>exclude</i> <i>exclude.backup</i> <i>exclude.file</i> <i>exclude.file.backup</i>	<i>These options are equivalent.</i> 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 <i>exclude.backup</i> option only excludes files from normal backup, but not from HSM.	“Exclude options” on page 312
<i>include</i> <i>include.backup</i> <i>include.file</i>	Use these options to include files or assign management classes for backup processing.	“Include options” on page 332
<i>include.fs</i>	Controls how Tivoli Storage Manager processes your file space for incremental backups.	“Include options” on page 332
<b>Archive processing</b>		
<i>exclude.archive</i>	Excludes a file or group of files from archive services.	“Exclude options” on page 312
<i>include</i> <i>include.archive</i>	<i>These options are equivalent.</i> Use these options to include files or assign management classes for archive processing.	“Include options” on page 332
<b>Image processing</b>		
<i>exclude.image</i>	Excludes mounted file systems and raw logical volumes that match the specified pattern from full image backup operations. Incremental image backup operations are unaffected by <i>exclude.image</i> . This option is valid for AIX, HP-UX, Solaris, and all Linux clients.	“Exclude options” on page 312
<i>exclude.fs.nas</i>	Excludes file systems on the NAS filer from an image backup when used with the <b>backup nas</b> command. If you do not specify a NAS node name, the file system identified applies to all NAS filers. The <b>backup nas</b> command ignores all other exclude statements including <i>exclude.fs</i> and <i>exclude.dir</i> statements. This option is for AIX and Solaris clients <i>only</i> .	“Exclude options” on page 312
<i>include.image</i>	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 <b>backup image</b> command. The <b>backup image</b> command ignores all other include options. This option is valid for AIX, HP-UX, Solaris, Linux x86/x86_64, and Linux on POWER only.	“Include options” on page 332

Table 20. Options for controlling processing using include and exclude statements (continued)

Option	Description	Page
<i>include.fs.nas</i>	Use the <i>include.fs.nas</i> 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 <i>toc</i> option with the <i>include.fs.nas</i> option in your <i>dsm.sys</i> file. See "Toc" on page 423 for more information. This option is valid for AIX and Solaris clients <i>only</i> .	"Include options" on page 332

## Excluding system files

There are some recommended system file excludes that should be placed in the client options file. These system files are either locked by the operating system or they can cause problems during restore. These are system files that cannot be recovered without possibly corrupting the operating system, or temporary files with data that you can easily recreate.

**Note:** This section applies to Mac OS X only.

The implicitly generated statements can be seen in the lines of output of the **query inclexcl** command with the source "operating system".

The Tivoli Storage Manager client adds the following exclude statements to the include-exclude list from your *dsm.sys* file. Do not include any of these statements in the *dsm.sys* file, or duplicate entries will occur.

```
EXCLUDE.ARCHIVE "/.../Desktop DB"
EXCLUDE.BACKUP "/.../Desktop DB"
EXCLUDE.ARCHIVE "/.../Desktop DF"
EXCLUDE.BACKUP "/.../Desktop DF"
EXCLUDE.ARCHIVE /.vol
EXCLUDE.BACKUP /.vol
EXCLUDE.ARCHIVE /automount
EXCLUDE.BACKUP /automount
EXCLUDE.ARCHIVE /Network
EXCLUDE.BACKUP /Network
EXCLUDE.ARCHIVE /dev
EXCLUDE.BACKUP /dev
EXCLUDE.BACKUP /.vol/.../*
EXCLUDE.ARCHIVE /.vol/.../*
EXCLUDE.BACKUP /automount/.../*
EXCLUDE.ARCHIVE /automount/.../*
EXCLUDE.BACKUP /Network/.../*
EXCLUDE.ARCHIVE /Network/.../*
EXCLUDE.BACKUP /dev/.../*
EXCLUDE.ARCHIVE /dev/.../*
EXCLUDE.DIR /.vol
EXCLUDE.DIR /automount
EXCLUDE.DIR /Network
EXCLUDE.DIR /dev
```

### Note:

1. Do not specify volumes with periods in the name (...). Tivoli Storage Manager uses the sequence of periods as part of include-exclude processing. Tivoli Storage Manager reports an invalid include-exclude statement if a volume has a sequence of periods in the name. The volume *must* be renamed.
2. Objects that have a type of *rhap* and a creator of *lcmt* are excluded from processing. Generally, these are special file-system objects, but can also be

created with the **mknod** command or are UNIX mount points. The objects or mount points must be manually recreated as part of a full system restore.

You should have the following minimum include-exclude list in your include-exclude options file:

```
EXCLUDE /.../dsmsched.log
EXCLUDE /.../dsmprune.log
EXCLUDE /.../dsmj.log
EXCLUDE /.../dsmerror.log
EXCLUDE /.../.hotfiles.bTree

EXCLUDE.DIR /private/tmp
EXCLUDE.DIR /private/var/vm
EXCLUDE.DIR /private/var/tmp
EXCLUDE.DIR /private/var/db/netinfo/local.nidb

EXCLUDE.DIR /.../.Trashes
EXCLUDE.DIR /.../.Spotlight-*
EXCLUDE.DIR /.../Library/Caches
EXCLUDE.DIR /.../.fsevents
EXCLUDE.DIR /Users/.../Library/Caches
```

## Including and excluding groups of files

To specify groups of files that you want to include or exclude, use the wildcard characters listed in the following table. This table applies to *include* and *exclude* statements *only*.

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

Table 21. Wildcard and other special characters

Character	Function
?	The match one character matches any single character <i>except</i> the directory separator; it does not match the end of the string. For example: <ul style="list-style-type: none"> <li>The <b>pattern</b> ab?, <b>matches</b> abc, but <b>does not match</b> ab, abab, or abzzz.</li> <li>The <b>pattern</b> ab?rs, <b>matches</b> abfrs, but <b>does not match</b> abrs, or abllrs.</li> <li>The <b>pattern</b> ab?ef?rs, <b>matches</b> abdefjrs, but <b>does not match</b> abefrs, abdefrs, or abefjrs.</li> <li>The <b>pattern</b> ab??rs, <b>matches</b> abcdrs, abzzrs, but <b>does not match</b> abrs, abjrs, or abkkrs.</li> </ul>
*	The match-all character. For example: <ul style="list-style-type: none"> <li>The <b>pattern</b> ab*, <b>matches</b> ab, abb, abxxx, but <b>does not match</b> a, b, aa, bb.</li> <li>The <b>pattern</b> ab*rs, <b>matches</b> abrs, abtrs, abrsrs, but <b>does not match</b> ars, or aabrs, abrss.</li> <li>The <b>pattern</b> ab*ef*rs, <b>matches</b> abefrs, abefghrs, but <b>does not match</b> abefr, abers.</li> <li>The <b>pattern</b> abcd.*, <b>matches</b> abcd.c, abcd.txt, but <b>does not match</b> abcd, abcdc, or abcdtxt.</li> </ul>
/...	The match- <i>n</i> character matches zero or more directories.
[	The open character-class character begins the enumeration of a character class. For example: <pre>xxx[abc] matches xxxa, xxxb, or xxxc.</pre>
-	The character-class range includes characters from the first character to the last character specified. For example: <pre>xxx[a-z] matches xxxa, xxxb, xxxc, ... xxxz.</pre>

Table 21. Wildcard and other special characters (continued)

Character	Function
\	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.

### Related concepts

“Using wildcard characters” on page 443

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.

### Examples using wildcards with include and exclude patterns

Tivoli Storage Manager accepts the *exclude.dir* option which can be used to exclude directory entries. However, *include* and *exclude.dir* cannot be used together.

**Note:** In the *dsm.sys* file, 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 22. Using wildcard characters with include and exclude patterns

Task	Pattern
Exclude all files that end with <i>.doc</i> , except those found in the Documents directory of aleko's home directory.	EXCLUDE <i>/*.*.doc</i> INCLUDE <i>"/home/aleko/Documents/*.*.doc"</i>
Exclude all files during backup with an extension of <i>.bak</i> , except those found on the <i>/usr</i> file system in the <i>dev</i> directory.	exclude <i>/*.*.bak</i> include <i>/usr/dev/*.*.bak</i>
Exclude all files and directories under any Documents directory that might exist, <i>except</i> for the Current file of user aleko.	EXCLUDE <i>/*.*.Documents/*.*.*</i> INCLUDE <i>"/home/aleko/Documents/Current"</i>
Exclude all files and directories in any tmp directory that might exist, <i>except</i> for the file <i>/home/tmp/save.fil</i> . Include this file.	exclude <i>/*.*.tmp/*.*.*</i> include <i>/home/tmp/save.fil</i>
Exclude any <i>.cpp</i> file in any directory on the <i>Vol1</i> , <i>Vol2</i> , <i>Vol3</i> , and <i>Vol4</i> volumes.	EXCLUDE <i>/Volumes/Vol[1-4]/*.*.cpp</i>
Exclude any <i>.cpp</i> file in any directory on the <i>Vol1</i> , <i>Vol2</i> , <i>Vol3</i> , and <i>Vol4</i> volumes.	EXCLUDE <i>/Volumes/Vol[1-4]/*.*.cpp</i>
Exclude any <i>.cpp</i> file in any directory on the <i>/fs1</i> , <i>/fs2</i> , <i>/fs3</i> and <i>/fs4</i> file systems.	EXCLUDE <i>/fs[1-4]/*.*.cpp</i>
Exclude the <i>.cpp</i> files found in the <i>/fs2/source</i> directory.	EXCLUDE <i>/fs2/source/*.*.cpp</i>

Table 22. Using wildcard characters with include and exclude patterns (continued)

Task	Pattern
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 <i>only</i> .	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.fs home:
Exclude all file systems mounted anywhere in the /test/myfs/fs01 and /test/myfs/fs02 directory tree from backup processing.	exclude.fs /test/myfs/fs01/.../* exclude.fs /test/myfs/fs02/*
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 or aliases (aliases apply to Mac OS X) from backup processing, except for the Docs directory for user1.	EXCLUDE.ATTRIBUTE.SYMLINK /.../* INCLUDE.ATTRIBUTE.SYMLINK /Users/user1/Docs/*

### Related concepts

“Examples using wildcards with include and exclude patterns” on page 86  
Tivoli Storage Manager accepts the *exclude.dir* option which can be used to exclude directory entries. However, *include* and *exclude.dir* cannot be used together.

### Related reference

“Exclude options” on page 312

Use the exclude options to exclude objects from backup, image, or archive services.

## Controlling symbolic link and alias 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 and alias processing (*exclude.attribute.symlink* and *include.attribute.symlink*) against the remaining list of objects available for processing. Alias processing applies to Mac OS X.

Table 23 on page 88 defines options for controlling symbolic link and alias processing.

Table 23. Options for controlling symbolic link and alias processing

Option	Description	Page
<i>exclude.attribute.symlink</i>	Excludes a file or a group of files that are symbolic links or aliases from backup processing only.	“Exclude options” on page 312
<i>include.attribute.symlink</i>	Includes a file or a group of files that are symbolic links or aliases within broad group of excluded files for backup processing only.	“Include options” on page 332

## Determining compression and encryption processing

Tivoli Storage Manager evaluates *exclude.dir* and any other include-exclude options controlling backup and archive processing, and then the decision is made about which files undergo compression and encryption processing.

The following options determine which files undergo compression and encryption processing.

Table 24. Options for controlling compression, encryption, and adaptive subfile backup processing

Option	Description	Page
<b>Compression processing</b>		
<i>exclude.compression</i>	Excludes files from compression processing if <i>compression=yes</i> is specified. This option applies to backups and archives.	“Exclude options” on page 312
<i>include.compression</i>	Includes files for compression processing if <i>compression=yes</i> is specified. This option applies to backups and archives.	“Include options” on page 332
<b>Encryption processing</b>		
<i>exclude.encrypt</i>	Excludes files from encryption processing.	“Exclude options” on page 312
<i>include.encrypt</i>	Includes files for encryption processing.  The data that you include is stored in encrypted form, and encryption does not affect the amount of data sent or received.  <b>Important:</b> The <i>include.encrypt</i> option is the only way to enable encryption on the Backup-Archive client. If no <i>include.encrypt</i> statements are used encryption will not occur.	“Include options” on page 332

## Testing an include-exclude list with the Preview command

You can preview the list of objects to be backed up or archived according to the include-exclude list, prior to sending any data to the server.

The Tivoli Storage Manager client Java GUI directory tree shows detailed information of included and excluded objects. The directory tree windows in the



Tivoli Storage Manager Client Java GUI allow you to select files and directories to include or exclude. You should use this **Preview** command to make sure that you include and exclude the correct files. The following is a sample scenario for using the include-exclude preview function.

For example, follow these steps to back up the files on your /Users/home file space:

1. Bring up the Tivoli Storage Manager Client Java GUI and open the Backup tree. You can see all of the directories and files that have been excluded by your options file and other sources.
2. Scroll down the tree and notice that all of the \*.o files in your /Volumes/home/mary/myobjdir will be backed up.
3. You don't want to back up all of the \*.o files, so you right click a .o file, and choose "View File Details" from the popup menu.
4. The dialog shows that these files are included, so click the "Advanced" button and create a rule to exclude all .o files from the DATA:\home file space.
5. A rule is created at the bottom of your options file. The current directory is refreshed in the Backup tree, and the .o files have the red 'X', meaning they are excluded.
6. When you look at other directories, they show the new excludes that you have added. Press "Backup" and back up the files on your /home file space.

#### Related reference

"Preview" on page 476

The **preview** command simulates a backup or archive command without sending data to the server. The **preview** command generates a tab delimited text file that can be imported into a spreadsheet program. The preview contains information such as whether the file is excluded or included. If the file is excluded, the pattern, or reason, the file is excluded will be listed, along with the source for the pattern.

## Processing include and exclude options

The Tivoli Storage Manager server can define include-exclude options using the *incl excl* parameter in a client option set. The include-exclude statements specified by the server are evaluated along with those in the client options file. 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 dsm.sys file include-exclude list contains one or more *incl excl* options that specify include-exclude files, the include-exclude statements in these files are placed in the list position occupied by the *incl excl* option and processed accordingly.

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

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.

After evaluating all *exclude.fs* and *exclude.dir* statements, Tivoli Storage Manager evaluates the include-exclude statements for controlling symbolic link or alias 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 or alias 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.

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.

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:**

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 La Pomme is not the startup disk.

```
EXCLUDE ../*.cpp
INCLUDE "/Volumes/La Pomme/Foo/../*.cpp"
EXCLUDE "/Volumes/La Pomme/Foo/Junk/*.cpp"
```

The file being processed is: /Volumes/La Pomme/Foo/Dev/test.cpp.

Processing follows these steps:

1. Rule 3 (the last *include* or *exclude* statement defined) is checked *first* because of bottom-up processing. The pattern /Volumes/La Pomme/Foo/Junk/\*.cpp does not match the file name that is being processed.
2. Processing moves to Rule 2 and checks. This time, pattern /Volumes/La Pomme/Foo/../\*.cpp matches the file name that is being processed. Processing stops, the option is checked, and it is *include*.
3. File /Volumes/La Pomme/Foo/Dev/test.cpp is backed up.

**Example 2**

Assume that La Pomme is not the startup disk.

```
EXCLUDE ../*.cpp
INCLUDE "/Volumes/La Pomme/Foo/../*.cpp"
EXCLUDE "/Volumes/La Pomme/Foo/Junk/*.cpp"
```

The file being processed is: /Volumes/La Pomme/Widget/Sample File.

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, Volumes/La Pomme/Widget/Sample File is implicitly included and is 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 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 4

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.txt . 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.txt is implicitly included and backed up.

### Example 5

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 6

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.

#### **Related concepts**

“Excluding file spaces and directories” on page 82

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

Chapter 10, “Using processing options,” on page 241

You can use defaults for processing options or you can tailor the processing options to meet your specific needs. This topic provides an overview of processing options and an options reference section that provides detailed information about each option.

#### **Related reference**

“Exclude options” on page 312

Use the exclude options to exclude objects from backup, image, or archive services.

“Query Inclexcl” on page 491

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.

---

## Chapter 3. Getting started

This topic describes some tasks that you need to do before you use the Tivoli Storage Manager Backup-Archive Client.

Perform these tasks before using Tivoli Storage Manager:

- “Starting a GUI session” on page 94
- “Starting a command-line session” on page 95
- “Starting a Web client session” on page 97
- “Starting the client scheduler automatically” on page 99
- “Changing your password” on page 99
- “Sorting file lists using the Tivoli Storage Manager GUI” on page 100
- “Displaying online help” on page 101
- “Ending a session” on page 102

---

### Tivoli Storage Manager client authentication

When using the graphical user interface or command line interface of a Tivoli Storage Manager client, you can log on using a node name and password *or* administrative user ID and password. The client prompts for your user ID and compares it to the configured node name. If they match, the client 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 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 system, 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 system, you must have an administrative user ID with client access authority over the node name for the remote client system. 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 system, specify the *revokeremoteaccess* option in your client options file.

Client access authority only allows Tivoli Storage Manager administrators to back up and restore files on remote systems. They do not have physical access to the data. That is, they cannot restore the data belonging to the remote system to their own systems. To restore data belonging to a remote system to your own system, 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.

#### Related reference

"Revokeremoteaccess" on page 382

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.

---

## Starting a GUI session

This section explains the different methods to start a GUI session.

The following procedure explains how to start a GUI session on Mac OS X systems:

- Double-click the Tivoli Storage Manager application. This will start Tivoli Storage Manager without System Administrator privileges and allow you to manage files owned by the current user.
- Double-click **TSM Tools for Administrators** and select **Tivoli Storage Manager**. After entering a System Administrator name and password, Tivoli Storage Manager will start with System Administrator privileges. This allows access to files owned by all users on the system.
- You can also start Tivoli Storage Manager client using the **dsmj** command. The client can run as either a *foreground* or *background* process using this command. The dsmj script is installed in the following location: `/Library/Application Support/tivoli/tsm/client/ba/bin`.

On UNIX systems other than Mac OS X, 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 appear on your desktop, you should start Tivoli Storage Manager using the **dsmj** (starts the Java GUI) command. Tivoli Storage Manager can run as either a *foreground* or *background* process using this command.

Tivoli Storage Manager locates the *client user options* file (dsm.opt) and starts with the options specified in that file.

### Related concepts

Chapter 2, “Configuring the Tivoli Storage Manager client,” on page 41  
After successfully installing the Tivoli Storage Manager client, you must configure the client before performing any operations.

## Using your Tivoli Storage Manager password

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

### Related tasks

“Changing your password” on page 99

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.

## Setup wizard

When the GUI client starts, it checks to see whether a client options file exists. If the client options file does not exist (which usually happens after you have installed the client for the first time on your system), the setup wizard will automatically start and guide you through the configuration process.

The client options file is `dsm.sys`.

---

## Starting a command-line session

You can start a command-line session by invoking the **dsmc** command.

**Note:** If the `/usr/bin` directory contains a symbolic link to the Tivoli Storage Manager executable, and all DSM environment variables are set, you can enter the **dsmc** command from any directory. Otherwise, enter the fully qualified path of the command.

**Note:** On Mac OS X, system administrators can use the **sudo** command to gain additional authority so Tivoli Storage Manager can access files for all users on the system.

On the command line enter **dsmc** followed by the command (*batch mode*). If the `/usr/bin` 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.

Your Tivoli Storage Manager administrator can require you to use a password to connect to the server.

### Related concepts

“Options handling in interactive mode” on page 440

In interactive mode, options that you enter on the initial command line will override the value that you specified in your client options file (`dsm.opt`). 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 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 specified within the interactive session only affects the command on which it is entered. When that command completes, the value reverts back to `-subdir=no`, the value at the beginning of the interactive session.

“UNIX and Linux client root and authorized user tasks” on page 41

The phrases *root user* and *authorized user* identify tasks that either a system administrator, non-administrator, or both can perform. Tivoli Storage Manager commands and options that you can use to perform these tasks are also identified in this way.

Chapter 11, “Using commands,” on page 435

Tivoli Storage Manager provides a command-line interface (CLI) that you can use as an alternative to the graphical user interface (GUI). This topic describes how to start or end a client command session and how to enter commands.

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

```
dsmc incremental
```

Some commands require one or more arguments. For example, to archive a file:

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

Depending upon the current setting of your *passwordaccess* option, Tivoli Storage Manager might prompt you for your password before the command is processed in a batch mode session.

When you enter your password, the password is not displayed on your screen.

### Related reference

“Passwordaccess” on page 361

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.

## 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`

The following 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, enter the command with the file specification:

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

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

When you enter your password, the password is not displayed on your screen.

---

## Starting: Additional considerations

You can include options as arguments to **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 `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
```

On UNIX clients, the Java GUI (`dsmj`) accepts command-line parameters, such as the Java `-X` options. Because of this, you can also now modify the Java Heap Size. For example:

```
dsmj -Xmx512M
```

---

## Starting a Web client session

After installing the Web client on your workstation you can use the Web client to perform backup, archive, restore, and retrieve operations from any browser that is running Java Runtime Environment (JRE) 5 or 6. 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.

Refer to the software requirements topic for your platform to find the browsers where the Web client runs.

To run the Web Client from Mozilla browsers, **Enable JavaScript™** must be checked. This setting is enabled by default, but to verify it:

1. Open Mozilla's **Edit** menu and select **Client Preferences**.

2. In the Preferences dialog under Category, select **Advanced**, then **Scripts & Plug-ins**.
3. Ensure there is a check mark next to **Enable JavaScript for Navigator**.

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.

You can download and install JRE 5 or 6 (unless otherwise noted), manually from the appropriate URL:

- For AIX:  
<http://www.ibm.com/developerworks/java/jdk/aix/index.html>
- For HP-UX:  
[http://www.hp.com/products1/unix/java/?jumpid=reg\\_R1002\\_USEN](http://www.hp.com/products1/unix/java/?jumpid=reg_R1002_USEN)
- For Solaris:  
<http://java.sun.com/javase/index.jsp>
- For Linux:  
<http://www.ibm.com/developerworks/java/jdk/linux/download.html>

You can back up and restore your own data, or a 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 HTTP port 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.

#### **Related tasks**

“Configuring the Web client” on page 52

There are some steps that you must follow to configure the Web client.

## **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.

**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.

### Related concepts

“Tivoli Storage Manager client authentication” on page 93

When using the graphical user interface or command line interface of a Tivoli Storage Manager client, you can log on using a node name and password *or* administrative user ID and password. The client prompts for your user ID and compares it to the configured node name. If they match, the client 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.

### Related reference

“Revokeremoteaccess” on page 382

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.

---

## Starting the client scheduler automatically

You can start the client scheduler automatically when you start your workstation. 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).

You can also use the Tivoli Storage Manager Client Acceptor service to manage the scheduler.

### Related tasks

“Setting the client scheduler process to run as a background task and start automatically at boot time” on page 214

You can configure the Tivoli Storage Manager client scheduler to run as a background system task which starts automatically when your system is started. This is true for both client acceptor daemon-managed and traditional methods of running the Tivoli Storage Manager client scheduler.

---

## 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. On Mac OS X clients, start Tivoli Storage Manager with TSM Tools for Administrators.
2. From the main window, open the **Utilities** menu and select **Change password**.
3. Enter your current and new passwords, and enter your new password again in the **Verify password** field.
4. Click **Change**.

To change your password from the command-line client, enter this command:

For UNIX, Linux, and Windows clients:

```
dsmc set password
```

For Mac OS X clients, enter this command to change your password from the command-line client:

```
sudo 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.

#### Related concepts

“Starting the client scheduler automatically” on page 99

You can start the client scheduler automatically when you start your workstation. 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).

#### Related tasks

“Starting: Additional considerations” on page 97

You can include options as arguments to **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.

#### Related reference

“Password” on page 360

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.

“Set Password” on page 529

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.

---

## Sorting file lists using the Tivoli Storage Manager GUI

This topic explains how to work with your files using the Tivoli Storage Manager GUI.

Table 25. 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	<ul style="list-style-type: none"><li>Click the appropriate column heading in the File List box.</li></ul>
Display active and inactive backup versions	<ul style="list-style-type: none"><li>Click the <b>Display Active/Inactive Files</b> option from the <b>View</b> menu.</li><li>Click the <b>Display both active and inactive files</b> tool on the tool bar.</li></ul>

Table 25. Working with your files using the Tivoli Storage Manager GUI (continued)

Task	Procedure
Display only active backup versions	Click the <b>Display active files only</b> option from the <b>View</b> menu.
Selecting files to restore or retrieve.	<ul style="list-style-type: none"> <li>Click the selection box next to the directory or file name that you want to restore or retrieve.</li> <li>Highlight the files that you want to restore or retrieve and click the <b>Select Items</b> tool on the tool bar.</li> <li>Highlight the files that you want to restore or retrieve and click the <b>Select Items</b> option from the <b>Edit</b> menu.</li> </ul>
Deselecting files	<ul style="list-style-type: none"> <li>Click the checked selection box next to the directory or file name.</li> <li>Highlight the files that you want to deselect and click the <b>Deselect Items</b> tool on the tool bar.</li> <li>Highlight the files that you want to deselect and click the <b>Deselect Items</b> option from the <b>Edit</b> menu.</li> </ul>
Displaying file information	<ul style="list-style-type: none"> <li>Highlight the file name, and click the <b>View File Details</b> button on the tool bar.</li> <li>Highlight the file name, and select <b>File Details</b> from the <b>View</b> menu.</li> </ul>

**Note:**

1. Unless otherwise noted, the tasks and procedures in the above table apply to all Tivoli Storage Manager GUIs.
2. Using the Tivoli Storage Manager GUIs, 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.
3. 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.

**Related reference**

“Inactive” on page 330

Use the *inactive* option to display both active and inactive objects.

“Pick” on page 363

The *pick* option creates a list of backup versions 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.

---

## Displaying online help

You can display online help in any of the following ways: On the Mac OS X Tivoli Storage Manager client GUI, on the UNIX and Windows Tivoli Storage Manager client GUIs, from the Web client, or from the dsmc command line.

- **On Tivoli Storage Manager client GUIs:**
  - Open the **Help** menu.
  - Click the **Help** button in the current window.
  - Click the GUI question mark (?) icon, which displays online information about the current operation.

- **From the dsmc command line:** Enter the **help** command. The complete table of contents for the available help text is displayed.

For the GUI-based help, the help pages contain HTML style hyper-links to other topics related to the current operation you are performing. You can select a topic of interest in the **Ask** field and search the online help for matches. Search results will be sorted by relevance. Use the left and right arrow keys in the lower right-hand corner to navigate between help pages.

#### **Related reference**

“Help” on page 466

Use this command to display information about commands, options, and messages.

---

## **Ending a session**

You can end a Tivoli Storage Manager client session from the Tivoli Storage Manager client GUI or from the dsmc command line.

- **From the Tivoli Storage Manager client GUI:**
  - Open the **File** menu and select **Quit**.
  - Press Command+Q.
  - 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.
  - To interrupt a **dsmc** command before Tivoli Storage Manager has finished processing, enter **QQ** on the Tivoli Storage Manager console. In many cases but not all, this interrupts the command. If the command cannot be interrupted, use the UNIX **kill -9** command from an available command prompt. Do not press Ctrl-C because, while it ends the session, it can lead to unexpected results.

#### **Related reference**

“Loop” on page 473

The **loop** command starts an interactive command-line session that is maintained until you enter **quit**.

---

## **Online forums**

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 ([ftp.software.ibm.com/storage](ftp://ftp.software.ibm.com/storage)) is available where you can find maintenance and other Tivoli Storage Manager-related materials. Three other anonymous servers are unofficially maintained by non-IBM volunteers.

The following are the anonymous servers:

`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>





---

## Chapter 4. Backing up your data

Use the backup-archive client to store backup versions of your files on the Tivoli Storage Manager server. You can restore these backup versions if the original files are lost or damaged. This section discusses various ways you can back up your data.

- Estimate
- Preferences editor

The following is a list of primary backup tasks.

- “Planning your backups (UNIX and Linux)”
- “Pre-backup considerations (UNIX and Linux)” on page 107
- “Performing an incremental, selective, or incremental-by-date backup (UNIX and Linux)” on page 119
- “Deleting backup data” on page 129
- “Group backup (UNIX and Linux): Backing up files from one or more file spaces” on page 131
- “Performing an image backup” on page 137
- “Backing up NAS file systems” on page 146

### Related tasks

“Starting a Web client session” on page 97

After installing the Web client on your workstation you can use the Web client to perform backup, archive, restore, and retrieve operations from any browser that is running Java Runtime Environment (JRE) 5 or 6. 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.

---

## Planning your backups (UNIX and Linux)

If you are a first-time user, or if you only back up files occasionally, you might want to use the following table as a checklist of preliminary steps to consider before performing a backup.

*Table 26. Planning your backups*

---

<input type="checkbox"/>	Decide whether you want to back up files or archive them. See “When to back up and when to archive files” on page 106 for more information.
<input type="checkbox"/>	See “Pre-backup considerations (UNIX and Linux)” on page 107 for important considerations before you back up your files and directories.
<input type="checkbox"/>	Do you need to exclude files from backup services? See “Include-exclude options to control processing” on page 110 for more information.
<input type="checkbox"/>	Decide what type of backup you want according to your needs. See the following sections for more information: <ul style="list-style-type: none"><li>• “Performing an incremental, selective, or incremental-by-date backup (UNIX and Linux)” on page 119</li><li>• “Group backup (UNIX and Linux): Backing up files from one or more file spaces” on page 131 (does not apply to Mac OS X)</li><li>• “Performing an image backup” on page 137</li><li>• “Backup with client-node proxy support (UNIX and Linux)” on page 132</li></ul>

---

Table 26. Planning your backups (continued)

- 
- |                          |   |
|--------------------------|---|
| <input type="checkbox"/> | If you are performing an image backup, ensure that you have accounted for unique considerations. See “Performing an image backup” on page 137 for more information. |
| <input type="checkbox"/> | For further backup considerations, see “Backup (UNIX and Linux): Additional considerations” on page 157.  |
- 

---

## When to back up and when to 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. Use backups to protect against unforeseen damage to your files, and use archives for maintaining more permanent versions of your files.

Backup data is managed by version, using predetermined policy based rules. Using these rules, the Tivoli Storage Manager administrator can control the following:

- The number of versions
- The number of days each additional backup copy is kept
- What happens to backup data versions when the file is deleted on the client system

Each copy of the file stored on the server is considered to be a separate and unique version of the file.

Archive is a powerful and extremely flexible mechanism for storing long term data. Archive data is kept for a specified number of days. Archive has no concept or support for versions. The user or Tivoli Storage Manager administrator is responsible for determining what files get added to an archive.

**Recommendation:** If archive is run multiple times against a file using the same archive description, a new copy of the file will be added to the archive each time that archive is run. To simplify retrieve, store only one copy of a file in each archive.

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.

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.

### Related concepts

Chapter 6, “Archiving and retrieving your data (UNIX and Linux),” on page 197  
Archiving and retrieving files is similar to backing up and restoring files. Many of the windows and concepts are similar. In this section, the main archive and retrieve tasks are covered.

“Restoring data from a backupset” on page 172

Your Tivoli Storage Manager administrator can generate a backup set (a collection of your files that reside on the server) onto portable media created on a device using a format that is compatible with the client device. You can restore data from a backup set from the Tivoli Storage Manager server, or when the backup set is locally available as a file or on a tape device.

---

## Pre-backup considerations (UNIX and Linux)

This section discusses some items to consider before you back up your data.

### LAN-free data movement

LAN-free data movement 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 using the Tivoli Storage Manager Storage Agent. The Tivoli Storage Manager Storage Agent must be installed on the same system as the client.

AIX, HP-UX, Linux and Solaris clients support LAN-free data movement.

### 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.

The Tivoli Storage Manager Managed System for SAN Storage Agent is a separate product and it is included on its own DVD, with the Tivoli Storage Manager for SAN product.

For more information about installing and configuring the Tivoli Storage Manager Managed System for SAN Storage Agent, refer to the IBM Tivoli Storage Manager Storage Agent User’s Guides.

### LAN-free options

After installing and configuring the Tivoli Storage Manager Managed System for SAN feature on the client workstation, there are several options you can use to enable LAN-free data movement.

The following are the options that you can use to enable LAN-free data movement:

*enablelanfree*

Specifies whether to enable an available LAN-free path to a SAN-attached storage device. See “Enablelanfree” on page 305 for more information.

*lanfreecommmethod*

Specifies a communication protocol between the client and the Storage Agent. See “Lanfreecommmethod” on page 339 for more information.

*lanfreshmport*

Specifies the unique number that is used by the client and the storage agent to identify shared memory area used for communications. See “Lanfreshmport” on page 340 for more information.

*lanfreetcport*

Specifies the TCP/IP port number where the Storage Agent is listening. See “Lanfreetcport” on page 341 for more information.

*lanfreetcserveraddress*

Specifies the TCP/IP address for the Tivoli Storage Manager storage agent.

## Configure memory-constrained systems to run incremental backups

Incremental backup performance suffers if the system has a low amount of memory available before starting the backup.

If your system is memory constrained, specify the *memoryefficientbackup yes* option in your client options file. This option causes Tivoli Storage Manager to process only one directory at a time, which reduces memory consumption but increases backup time. When you specify *yes*, 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 system and the Tivoli Storage Manager server. If your system is not memory constrained, setting the *memoryefficientbackup* option to *yes* will degrade your backup performance.

### Related reference

“Memoryefficientbackup” on page 348

The *memoryefficientbackup* option specifies the memory-conserving algorithm to use for processing full file space backups. One method backs up one directory at a time, using less memory. The other method uses much less memory, but requires more disk space.

## Configure systems with large numbers of files to run incremental backups

The client can use very large amounts of memory to perform incremental backup operations, especially on file systems that contain large numbers of files. The term “memory” as used here is the addressable memory available to the client process. Addressable memory is a combination of physical RAM and virtual memory.

On average, the client uses approximately 300 bytes of memory per object (file or directory). Thus for a file system with one million files and directories, the Tivoli Storage Manager client will require, on average, approximately 300 MB of memory. The exact amount of memory used per object will vary, depending on the length of the object path and name length, or the nesting depth of directories. The number of bytes of data is not an important factor in determining the Tivoli Storage Manager backup client memory requirement.

The maximum number of files can be determined by dividing the maximum amount of memory available to a process by the average amount of memory needed per object.

The total memory requirement can be reduced by any of the following methods:

- Use the client option *memoryefficientbackup diskcachemethod*. This choice reduces the use of memory to a minimum at the expense of performance and a

significant increase in disk space required for the backup. The file description data from the server is stored in a disk-resident temporary database, not in memory. As directories on the workstation are scanned, the database is consulted to determine whether to back up, update, or expire each object. At the completion of the backup, the database file is deleted.

- Use the client option *memoryefficientbackup yes*. The average memory used by the client then becomes 300 bytes times the number of directories plus 300 bytes per file in the directory being processed. Note that for file systems with large numbers (millions) of directories, the client still might not be able to allocate enough memory to perform incremental backup with *memoryefficientbackup yes*.
- UNIX clients might be able to use the *virtualmountpoint* client option to define multiple virtual mount points within a single file system, each of which can be backed up independently by the Tivoli Storage Manager client.
- If the client option *resourceutilization* is set to a value greater than 4, and there are multiple file systems being backed up, then reducing *resourceutilization* to 4 or lower will limit the process to incremental backup of a single file system at a time. This will reduce the memory requirement. If backup of multiple file systems in parallel is required for performance reasons, and the combined memory requirements exceed the process limits, then multiple instances of the backup client can be used to back up multiple file systems in parallel. For example, if you want to back up two file systems at the same time but their memory requirements exceed the limits of a single process, then start one instance of the client to back up one of the file systems, and start a second instance of the client to back up the other file system.
- Use the *-incrbydate* client option to perform an "incremental-by-date" backup.
- Use the Tivoli Storage Manager client *exclude.dir* option to prevent the client from traversing and backing up directories that do not need to be backed up.
- Except for Mac OS X, use the client image backup function to back up the entire volume. This might actually use less system resources and run faster than incremental backup of some file systems with a large number of small files.
- Reduce the number of files per file system by spreading the data across multiple file systems.

### Related reference

“Exclude options” on page 312

Use the exclude options to exclude objects from backup, image, or archive services.

“Incrbydate” on page 337

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.

“Memoryefficientbackup” on page 348

The *memoryefficientbackup* option specifies the memory-conserving algorithm to use for processing full file space backups. One method backs up one directory at a time, using less memory. The other method uses much less memory, but requires more disk space.

“Resourceutilization” on page 379

Use the *resourceutilization* option in your option file to regulate the level of resources the Tivoli Storage Manager server and client can use during processing.

“Virtualmountpoint” on page 431

**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.

## Include-exclude options to control processing

There might be files in your file systems that you do not want to back up. These files might 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 *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.

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 is either a default chosen for you, or one you assign to the file using the *include* option in the include-exclude list. If you assign a management class, it must contain a backup copy group for the file to be backed up.

### Related tasks

“Creating an include-exclude list (optional)” on page 80

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.

“Setting the client scheduler process to run as a background task and start automatically at boot time” on page 214

You can configure the Tivoli Storage Manager client scheduler to run as a background system task which starts automatically when your system is started. This is true for both client acceptor daemon-managed and traditional methods of running the Tivoli Storage Manager client scheduler.

## Encrypting data during backup or archive operations

For the strongest possible encryption, use 128-bit Advanced Encryption Standard (AES) data encryption, with the `encryptiontype` option. The data that you include is stored in encrypted form, and encryption does not affect the amount of data sent or received.

**Important:** The `include.encrypt` option is the only way to enable encryption on the backup-archive client. If no `include.encrypt` statements are used encryption will not occur.

Use the `include` and `exclude` options in `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.

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.

Tivoli Storage Manager client encryption allows you to enter a value of up to 63 characters in length. This encryption password needs to be confirmed when encrypting the file for backup, and also needs to be entered when performing restores of encrypted files.

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.

### Related reference

“Encryptiontype” on page 306

The *encryptiontype* option allows you to choose the algorithm for data encryption.

“Encryptkey” on page 307

The Tivoli Storage Manager client supports the option to encrypt files being backed up or archived to the Tivoli Storage Manager server. This option is enabled with the *include.encrypt* option.

“Exclude options” on page 312

Use the exclude options to exclude objects from backup, image, or archive services.

“Include options” on page 332

The include options specify objects that you want to include for backup and archive services.

## File system and ACL support

Special file systems contain dynamic information generated by the operating system; they contain no data or files. The UNIX and Linux clients ignore 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

The Tivoli Storage Manager client is designed and tested to work on specific file system types which are commonly used. For the list of supported file system types and ACL support, see table Table 27.

Table 27. Supported file systems and ACL support

Platform	File System	ACL Support
AIX	GPFS	yes
	JFS	yes
	JFS2	yes
	JFS2 NFSV4	yes
	VxFS	yes
HP-UX	HFS	no
	VxFS (JFS Veritas)	yes (V3.3.Layout 4)
Linux x86/x86_64	XFS	yes
	EXT2	yes
	EXT3	yes
	ReiserFS	yes
	GPFS	yes
	JFS	no
	VxFS	no
	NSS	yes
Linux on POWER	XFS	yes
	EXT2	yes
	EXT3	yes
	ReiserFS	yes
	JFS	no
	GPFS	no



Table 27. Supported file systems and ACL support (continued)

Platform	File System	ACL Support
Linux for zSeries	EXT2	yes
	EXT3	yes
	ReiserFS	yes
	JFS	no
Mac	HFS Standard (HFS)	yes
	HFS Extended (HFS+)	yes
	HFS Extended case-sensitive (HFSX)	yes
	Xsan (XSAN)	yes
	UNIX file system (UFS)	yes
	Universal disk format (UDF)	yes
	ISO9660	yes
Solaris	UFS	yes
	VxFS	yes
	QFS	no
	ZFS	yes
z/OS UNIX System Services	HFS	yes
	zFS	yes

**Note:**

1. With file systems where NFS V4 ACLs are defined and used (Solaris ZFS and AIX JFS2 V2), even if only the standard UNIX permissions or ACLs have changed (such as with the CHMOD command), the file or directory will be fully backed up again. With other file systems, this type of change causes only an attribute update on the Tivoli Storage Manager server.
2. To process all other file systems, use the *virtualmountpoint* option to enable support for the following items:
  - To backup, restore, archive, and retrieve file data
  - For basic UNIX and Linux permissions
  - For change/access/modification time stamps, and the directory tree structure

No other file-system specific attributes, such as the ACL, are valid. The file system type for such file systems is set to "UNKNOWN".

For example, if the /media/abc/DATA1 file system is not supported by Tivoli Storage Manager, add the following statement to dsm.sys to back up or archive the data in this file system:

```
VIRTUALMOUNTPOINT /media/abc/DATA1
```

This support is only available if the file system can use basic POSIX system calls, such as read or write processing on your system.

3. 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.

**Note:** Data backed up or archived by the Mac OS X client cannot be restored by any other client. Additionally, the Mac OS X client cannot restore or retrieve data from any other client.

4. Cross file system type restore or retrieve of the ACL information is allowed provided that both the original file system and the destination file system support compatible ACLs. For example, on Solaris, the ACL information backed

up from a VxFS file system will be restored to an UFS file system because these file systems support compatible ACLs. The ACL information will not be restored during cross file system type restores or retrieves if the original file system and the destination file system are incompatible with regard to ACL support or if the destination file system does not support ACLs.

5. 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.
6. 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.
7. On Mac OS X systems, the UFS and HFSX file systems are sensitive to case whereas the HFS+ file system is case-insensitive but is case-preserving. Files that you back up from a UFS or HFSX file system (case-sensitive) might not be restored properly to an HFS+ file system (case-insensitive) file system. For example, on a UFS file system, files `Afile` and `afile` are seen as different files. However, on a HFS+ file system the two files are seen as identical.

If Case-sensitive HFS+ or UFS file systems are used, it is very important that the data from the HFSX or UFS file system is not backed up to a HFS+ file system on the Tivoli Storage Manager server. Either a new name must be used on the system or the existing file space on the Tivoli Storage Manager server must be renamed. For example, consider a system that has a file system named `/Volumes/fs2` and this system is repartitioned with a Case-Sensitive HFS+ file system. Either the `/Volumes/fs2` file system on the Tivoli Storage Manager server needs to be renamed, or a new name must be used on the local system. If this is not done, Tivoli Storage Manager will mix the HFSX case-sensitive data with the HFS+ case-insensitive data that is already stored on the Tivoli Storage Manager server.

Aliases and symbolic links are backed up. However, Tivoli Storage Manager does not back up the data to which the symbolic links point.

When files backed up from an HFS volume are restored to a UFS volume, the resource forks will not have the correct owner. This can be corrected by using the **chown** command on the resource fork file.
8. On LinuxPPX, Linux390 and LinuxAMD, you must install `libacl.so` for the Tivoli Storage Manager client to back up ACLs.

**Important:** If you are running GPFS for AIX or GPFS for Linux x86/x86\_64 in a multinode 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 dsm.sys to exclude the GPFS file system from backup services.

## Maximum file size for operations

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.

The following table specifies the maximum file sizes for the native file systems on Tivoli Storage Manager UNIX and Linux client platforms.

Table 28. Maximum file size

Platform	Max file size (in bytes)
AIX 5.3 (GPFS)	109,951,162,777,600 (100 TB)
AIX 5.3 (JFS2)	1,099,511,627,264 (1 TB - 512)
AIX 6.1 (JFS2) recommended size limitations	Maximum JFS2 file system size: 32 TB Maximum JFS2 file size: 16 TB Minimum JFS2 file system size: 16 MB
HP-UX	1,099,511,627,775 (1 TB-1)
All Linux clients	9,223,372,036,854,775,807 (8 EB-1)
Mac OS X	HFS - 2,147,485,648 (2GB) HFS+, HFSX, XSAN, and UFS - 9,223,372,036,854,775,808 (8EB)
Solaris	1,099,511,627,775 (1 TB-1)
Solaris (ZFS)	18,446,744,073,709,551,616 (16 EB)
z/OS UNIX System Services	879,609,302,000 bytes

## Long user and group names

Tivoli Storage Manager can handle user and group names that are up to 64 characters without any issues. However, names longer than 64 characters require special handling by Tivoli Storage Manager.

**Recommendation:** Do not exceed the 64 character limit for user and group names. If you do, Tivoli Storage Manager will shorten the name to fall within this limit by using the following transformation: Take the first 53 characters, append a /, and then the numeric id as a character string.

An error message will be logged containing both the long name and the resulting shortened string. For most functions, you do not need to be aware of the shortened name. The exceptions are:

- The **set access** command
- The *fromowner* option
- The *users* and *groups* (authorization) options

In each of these cases, when you need to enter a name, you will either have to find the error message containing the transformation, or construct the name using the above outlined rule.

## Mac OS X volume names

Tivoli Storage Manager backs up volumes based on their UNIX mount point name. Tivoli Storage Manager maintains each volume name as a separate restore or retrieve volume. These volume names become the names of file spaces on the server.

If you change the name of a volume you have already backed up, Tivoli Storage Manager sees it as a new volume and does not relate it to the previous one. Any backup of the volume backs up the files under the new name. A mismatch might occur if you rename your volumes, or if you access Tivoli Storage Manager from a different workstation than the one from which you backed up the files.

### Mac OS X volume naming precautions

Tivoli Storage Manager creates all new Tivoli Storage Manager file spaces on the server with the UNIX mount point of the volume. If there are two volumes with the names such as "La Pomme" and "la pomme", two unique UNIX mount points are created.

The following is an example:

```
/Volumes/La Pomme  
/Volumes/la pomme
```

If duplicate volumes exist on your desktop, it is possible for the UNIX mount points to be different than the last time Tivoli Storage Manager did a backup. Tivoli Storage Manager might not back up the data to the correct file system on the Tivoli Storage Manager server.

The file system to which Tivoli Storage Manager will back up the data can be checked. In the TSM Backup window, select a file system. Then choose **File** → **Show Info**. The UNIX mount point is at the top of the Information dialog.

The best way to avoid any potential naming problems is to ensure that the volume names are unique.

#### Note:

1. The Tivoli Storage Manager client continues to use the existing file space names on the Tivoli Storage Manager Server. Only new file spaces use the UNIX mount point for the name.
2. Do not specify volumes with periods in the name (...). Tivoli Storage Manager uses the sequence of periods as part of include-exclude processing. Tivoli Storage Manager reports an invalid include-exclude statement if a volume has a sequence of periods in the name. The volume *must* be renamed.

### Mac OS X volume naming precautions on dual boot systems

If you have more than one version of Mac OS X that you switch between, it is critical that you understand how Tivoli Storage Manager uses the UNIX mount paths for file space names on the Tivoli Storage Manager server.

For example, consider a dual-boot system that has two volumes, Panther and Tiger. The finder and the Tivoli Storage Manager GUI displays these as Panther

and Tiger. However, the UNIX mount points will depend upon which version of Mac OS is running. If Panther is the startup disk, the UNIX paths are:

```
/
/Volumes/Tiger
```

If Tiger is the startup disk, the UNIX paths are:

```
/
/Volumes/Panther
```

This means that when Tivoli Storage Manager does a backup or archive, the file space names will also depend upon which version of Mac OS X is running.

Both versions of Mac OS X will backup to the / file system on the Tivoli Storage Manager server. If this happens, the system files will be intermixed.

To avoid any potential problems on dual-boot systems, complete *one* of these tasks:

- Select one version of Mac OS X on which to install and run Tivoli Storage Manager. This ensures that the UNIX mount points are the same each time Tivoli Storage Manager does a backup.
- Configure each version of Mac OS X with a unique Tivoli Storage Manager node name. Then exclude the other version of Mac OS X from backup processing with a domain statement in the system options (dsm.sys) file. For example, if Tiger is the startup disk, add this option to the system options (dsm.sys) file:

```
DOMAIN -/Volumes/Panther
```

If Panther is the startup disk, add this option to the system options (dsm.sys) file:

```
DOMAIN -/Volumes/Tiger
```

## Mac OS X Unicode considerations

The Mac OS X client is Unicode enabled. New clients storing data on the server for the first time require no special set up. The server automatically stores files and directories as Unicode enabled. However, if you are upgrading to the Unicode-enabled client, you need to plan the migration of existing file spaces so they can support Unicode.

Any file spaces that are already on the server must be renamed so Unicode-enabled file spaces can be created. Use the *autofsrename* option rename existing file spaces.

### Related reference

“Autofsrename” on page 272

The *autofsrename* option renames an existing file space that is not Unicode-enabled on the Tivoli Storage Manager server so that a Unicode-enabled file space with the original name can be created for the current operation.

## Mac OS X FileVault home directories

The Mac OS X FileVault feature compresses your home directory into a single file. Tivoli Storage Manager cannot access any user files inside a Mac OS X FileVault home directory.

Tivoli Storage Manager can back up your home directory as a single file. Due to how FileVault home directories are managed by Mac OS X, back up any Mac OS X FileVault home directories when you are not logged in. When you are logged in, the home directory is mounted in a temporary folder in /Users/.<username>, and the sparse file will be backed up again under this temporary folder.

Tivoli Storage Manager can restore your home directory if you are not logged in. This means that you cannot restore your own home directory. Your home directories can be restored by the system administrator.

Create a second system administrator account so that the primary system administrator account can be restored.

## Mac OS X Time Machine backup disk

Time Machine is the backup application available with Mac OS X 10.5.

Tivoli Storage Manager can be used at the same time as Mac OS X Time Machine. However, due to the unique nature of how the Mac OS X Time Machine backs up data, you should consider the following items before using Tivoli Storage Manager to back up the Mac OS X Time Machine data.

- The Mac OS X Time Machine backup disk makes extensive use of both file and directory hard links to minimize disk usage.

For example, if the disk backed up with the Mac OS X Time Machine is 5 GB, the first backup copies all 5 GB of data to the Mac OS X Time Machine backup disk.

Subsequent backups only copy the files that have changed since the previous backup. All files and directories that have not changed will be hard linked with the version copied over during the previous backup.

The Finder shows each backup as 5 GB, for a total size of 10 GB. However, because of the use of hard links, the total disk usage will only be slightly larger than 5 GB.

Due to how Tivoli Storage Manager handles hard linked data, it backs up all hard linked objects that are not already on the Tivoli Storage Manager Server.

For example, 10 GB of data would be sent to the Tivoli Storage Manager server.

- When files are restored that are hard linked, Tivoli Storage Manager recreates the original hard link. This can only be done if *all* files that are hard linked are restored at the same time. This is not practical for a large Mac OS X Time Machine backup disk.
- When the Mac OS X Time Machine copies files to the backup disk, ACLs are added to the files to protect them from deletion.

Tivoli Storage Manager can back up and restore files with ACLs. However, any files that are restored would still have these restrictive ACLs in place.

**Tip:** Due to how Tivoli Storage Manager handles the Mac OS X Time Machine back up data, exclude the Time Machine back up data. All Time Machine data is in a directory named Backups.backupdb.

### Related concepts

“Excluding system files” on page 84

There are some recommended system file excludes that should be placed in the client options file. These system files are either locked by the operating system or they can cause problems during restore. These are system files that cannot be recovered without possibly corrupting the operating system, or temporary files with data that you can easily recreate.

---

## Performing an incremental, selective, or incremental-by-date backup (UNIX and Linux)

Your administrator might have set up schedules to automatically back up files on your workstation. 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*.

### Related tasks

“Setting the client scheduler process to run as a background task and start automatically at boot time” on page 214

You can configure the Tivoli Storage Manager client scheduler to run as a background system task which starts automatically when your system is started. This is true for both client acceptor daemon-managed and traditional methods of running the Tivoli Storage Manager client scheduler.

## Full and partial incremental backup

An incremental backup backs up only new and changed files. Whether you perform a full or partial incremental backup depends on what you select for 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 that you specify. This process can take a long time if the number of files is large, or if one or more very large files must be backed up. 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 might 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.

To perform a full or partial incremental backup using the client Java GUI, select the **Incremental (complete)** option from the pull-down menu at the top of the screen 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 or the journal database to determine the exact state of your files since the last incremental backup. The client uses this information to perform the following tasks:

- 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
  - Extended Attributes
  - 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
- Icon location (Mac OS X only)
- Type or creator (Mac OS X only)
- 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. However, inactive versions will be retained according to rules defined by the Tivoli Storage Manager administrator.
- Rebind backup versions if management class assignments change. Only objects that have active backup versions are rebound. Objects for which only inactive backup versions exist are not rebound.

**Important:** Each directory is also backed up under the following circumstances:

- It has not been backed up previously
- Its permissions have changed since the last backup
- Its Access Control List has changed since the last backup
- Its Extended Attributes have changed since the last backup
- Its time stamp has changed since the last backup

You might be able to 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.

Directories are counted in the number of objects backed up. To exclude directories and their contents from backup, use the *exclude.dir* option.



### Related concepts

Chapter 9, “Understanding storage management policies,” on page 229  
Storage management policies are rules your administrator defines in order to manage your backups and archives on the server. Your data is associated (or bound) 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 management class, and a copy group.

### Related reference

“Exclude options” on page 312

Use the exclude options to exclude objects from backup, image, or archive services.

“Preservelastaccessdate” on page 369

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.

## Understanding which files are backed up

When you request a backup, Tivoli Storage Manager backs up a file if some requirements are met.

The following are the requirements that must be met for Tivoli Storage Manager to back up a file.

- The selected management class contains a backup copy group.
- 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.
- 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.
- 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.

### Related concepts

Chapter 9, “Understanding storage management policies,” on page 229  
Storage management policies are rules your administrator defines in order to manage your backups and archives on the server. Your data is associated (or bound) 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 management class, and a copy group.

“Using management classes and copy groups” on page 230

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.

## Journal-based backup on AIX

Journal-based backup is supported on JFS, JFS2, VxFs, and HSM-managed JFS2 file systems and the HACMP environment (not supported on GPFS file systems). A backup for a particular file system will be journal-based when the Tivoli Storage Manager journal daemon has been installed and configured to journal the particular file system, and a valid journal has been established for the file system.

To support journal-based backup you must install and configure the Tivoli Storage Manager daemon.

If you install the journal daemon and it is running, then by default the **incremental** command will perform a journal-based backup on selected file systems which are being monitored by the journal daemon. In order to successfully perform a journal-based backup, several conditions must be met. These conditions include the following:

1. The journal daemon must be set up to monitor the file system that contains the files and directories being backed up.
2. A full incremental backup was run successfully at least once on the file system being backed up.
3. The file space image of the file system at the server was not modified by an administrative command since the last full incremental
4. The storage management policy for the files being backed up has not been updated since the last full incremental.

The journal daemon records changes to an object or its attributes in a journal database. During a journal-based backup, the client obtains a list of files that are eligible for backup from the journal database. Journal-based backup can increase backup performance because the client does not scan the local file system or contact the server to determine which files to process. Journal-based backup also reduces network traffic between the client and server.

The client filters the list based on the current include-exclude list and processes, expires, and updates the resulting files according to policy constraints, such as serialization. However, the client ignores the server frequency attribute during a journal-based backup. The reason for this is because a journal-based backup eliminates the backup version query to the server. The client, therefore, does not know how many days have transpired since the last backup of the file. Thus it is not possible for the journal-based backup to use the frequency attribute.

**Note:**

1. When using antivirus software, there are limitations to journal-based backup. The files that are scanned by the antivirus software could be backed up in the journal again in the next backup after the scan.
2. A journal-based backup might not fall back to the traditional incremental backup if the policy domain of your node is changed on the server. This depends on when the policy set within the domain was last updated and the date of the last incremental backup. In this case, you must force a full traditional incremental backup to rebind the files to the new domain. Use the *nojournal* option with the **incremental** command to specify that you want to perform a traditional full incremental backup, instead of the default journal-based backup.

## 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.

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.

**Note:** Unlike incremental backups, incremental-by-date backups do not expire deleted files or rebind backup versions to a new management class if you change the management class.

#### **Related tasks**

“Backing up data using the Java GUI” on page 126

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.

## **Comparing full incremental, partial incremental, incremental-by-date, and journal-based backups**

Full incremental, partial incremental, incremental-by-date, and journal-based backups 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.

Journal-based backup applies only to AIX. The memory requirements for an initial journaling environment are the same as the memory requirements for a full file space incremental, because journal-based backups must complete the full file space incremental in order to set the journal database as valid, and to establish the baseline for journaling.

The memory requirements for subsequent journal-based backups are much less. Journal backup sessions run in parallel and are governed by the *resourceutilization* client option in the same manner as normal backup sessions. The size of the journal database file reverts to a minimal size (less than 1 K) when the last entry has been deleted from the journal. Since entries are deleted from the journal as they are processed by the client, the disk size occupied by the journal should be minimal after a complete journal backup. A full incremental backup with journaling active takes less time to process than an incremental-by-date backup.

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 (Journal-based backups also ignore this attribute).

For NAS and N-Series filers running ONTAP 7.3 or later, you can use the *snapdiff* option when performing a full volume incremental backup. Using this option reduces memory usage and speeds up the processing.

Similar to using incremental-by-date, there are some items to consider when performing a full volume incremental backup. There are also some situations when data that should be backed up is not backed up.

- A file is excluded due to an exclude rule in the include-exclude file. Tivoli Storage Manager performs a backup of the current snapshot with that exclude rule in effect. This happens when you have not made changes to the file, but you have removed the rule that excluded the file. The *snapdiff* option will not detect this include-exclude change because it only detects file changes between two snapshots.
- If you have added an include statement to the option file, that include option will not take effect unless *snapdiff* detects that the file has changed. This is because Tivoli Storage Manager does not inspect each and every file on the volume during backup.
- You have used the **dsmc delete backup** command to explicitly delete a file from the Tivoli Storage Manager inventory. *Snapdiff* will not detect that a file has been manually deleted from Tivoli Storage Manager. Therefore, the file will remain unprotected in Tivoli Storage Manager storage until it is changed on the volume and the change is detected by *snapdiff*, signalling Tivoli Storage Manager to back it up again.
- Policy changes such as changing the policy from *mode=modified* to *mode=absolute* will not be detected.
- The entire file space is deleted from the Tivoli Storage Manager inventory. This will cause *snapdiff* to create a new snapshot to use as the source, and a full incremental backup will be performed.
- Tivoli Storage Manager will not control what constitutes a changed object, that is controlled by the *snapdiff* option.

## 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.

Unlike incremental backups, a selective backup provides the following:

- Does not cause the server to update the date and time of the last incremental.
- Backs up directory and file entries even if their size, modification timestamp, or permissions have not changed.
- Does not expire deleted files.
- Does not rebind backup versions to a new management class if you change the management class.

### Related tasks

“Backing up data using the Java GUI” on page 126

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.

### Related reference

“Selective” on page 522

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 backup unless you exclude them from backup, or they do not meet management class requirements for serialization.

## Solaris global zone and local zones backup

For Solaris zones support, the incremental and selective backup of file systems should be performed where the file systems are locally mounted. Each local zone should be treated as a separate system with its own Tivoli Storage Manager node name and the backup should be performed within each of the local zones.

To perform an incremental or selective backup of the local zones from the global zone, the administrator needs to consider which files from the zone directories should be included or excluded in the backup. For example, system files and kernel files would not automatically be excluded.

## 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.

Defining a virtual mount point within a file system provides a direct path to the files you want to back up, 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.

### Related reference

“Virtualmountpoint” on page 431

**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.

## Backing up data using the Java 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 Java 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 **Find** icon on the tool bar.
3. Enter your search criteria in the Find Files (Backup) window.
4. Click the **Search** button. The Matching Files (Backup) window appears.
5. Click the selection boxes next to the files you want to back up and close the Matching Files (Backup) window.
6. Enter your filter criteria in the Find Files (Backup) window.
7. Click the **Filter** button. The Backup window displays the filtered files.
8. Click the selection boxes next to the filtered files or directories you want to back up.
9. Select one of the following backup types from the pull-down menu: (1) To run an incremental backup, click **Incremental (complete)**, (2) To run an incremental-by-date backup, click **Incremental (date only)**, (3) To run a selective backup, click **Always backup**.
10. Click **Backup**. The Backup **Task List** window displays the backup processing status.

Consider the following items when you back up your data using the Java GUI.

1. To modify specific backup options, click the **Options** button. The options you select are effective during the current session *only*.
2. 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 backup-archive client Java GUI or Web client GUI to view the backup policies defined by the Tivoli Storage Manager server for your client node.
3. 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*.
4. You can use the Preferences editor to exclude file systems in your default domain from backup processing.

The following notes are not applicable to Mac OS X.

**Note:**

1. 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.

**Related concepts**

Chapter 9, "Understanding storage management policies," on page 229  
Storage management policies are rules your administrator defines in order to manage your backups and archives on the server. Your data is associated (or bound) 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 management class, and a copy group.

**Related reference**

"Domain" on page 296

The *domain* option specifies what you want to include for incremental backup. Domain objects are backed up only if you invoke the **incremental** command without a file specification.

## Backing up data using the command line

You can use the **incremental** or **selective** commands to perform backups.

The following table shows examples of using these commands to perform different tasks.

Table 29. Command line backup examples

Task	Command	Considerations
<i>Incremental backups</i>		
Perform an incremental backup of your client domain.	dsmc incremental	See "Incremental" on page 467 for more information about the <b>incremental</b> command.
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 296 for more information about the <i>domain</i> option.
Back up the /Volumes/fs1 and /Volumes/fs2 file systems in addition to the volumes defined in your client domain.	dsmc incremental -domain="/Volumes/fs1 /Volumes/fs2"	See "Domain" on page 296 for more information about the <i>domain</i> option.
Back up all local file systems defined in your client domain <i>except</i> 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 296 for more information.
Back up <i>only</i> 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 411 for more information about the <i>subdir</i> option.
Back up all files in the /Users directory and all its subdirectories.	dsmc incremental /Users/ -subdir=yes	See "Subdir" on page 411 for more information about the <i>subdir</i> option.

Table 29. Command line backup examples (continued)

Task	Command	Considerations
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.	<code>dsmc incremental /usr -snapshotroot=/snapshot/day1</code>	Tivoli Storage Manager considers the <i>snapshotroot</i> value as a file space name. See “Snapshotroot” on page 405 for more information.
<i>Incremental-by-date backup</i>		
Perform an incremental-by-date backup of your default client domain.	<code>dsmc incremental -incrbydate</code>	Use the <i>incrbydate</i> option with the <b>incremental</b> 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 337 for more information about the <i>incrbydate</i> option.
<i>Selective backups</i>		
Back up all files in the /home/proj or /Users/van/Documents directory.	<code>dsmc selective /home/proj/ or dsmc selective /Users/van/Documents/</code>	Use the <b>selective</b> 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 522 for more information about the <b>selective</b> command.
Back up all files in the /home/proj directory and all its subdirectories.	<code>dsmc selective /home/proj/ -subdir=yes</code>	If you specify <i>-subdir=yes</i> when backing up a specific path and file, Tivoli Storage Manager recursively backs up <i>all</i> subdirectories under that path, and any instances of the specified file that exist under <i>any</i> 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 <i>subdir=yes</i> option. See “Subdir” on page 411 for more information about the <i>subdir</i> option.
Back up all files in the /Users/van/Documents directory and all its subdirectories.	<code>dsmc selective /Users/van/Documents/ -subdir=yes</code>	If you specify <i>-subdir=yes</i> when backing up a specific path and file, Tivoli Storage Manager recursively backs up <i>all</i> subdirectories under that path, and any instances of the specified file that exist under <i>any</i> 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 <i>subdir=yes</i> option. See “Subdir” on page 411 for more information about the <i>subdir</i> option.



Table 29. Command line backup examples (continued)

Task	Command	Considerations
Back up the /home/dir1/h1.doc and /home/dir1/test.doc files.	<code>dsmc selective /home/dir1/h1.doc /home/dir1/test.doc</code>	If you specify the <i>removeoperandlimit</i> option with the <b>incremental</b> or <b>selective</b> 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 377 for more information about this option.
Back up the /Users/ann/Documents/h1.doc and /Users/ann/Documents/test.doc files.	<code>dsmc selective /Users/ann/Documents/h1.doc /Users/ann/Documents/test.doc</code>	If you specify the <i>removeoperandlimit</i> option with the <b>incremental</b> or <b>selective</b> 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 377 for more information about this option.
Back up a list of files in the /home/filelist.txt file.	<code>selective -filelist=/home/filelist.txt</code>	Use the <i>filelist</i> option to process a list of files. See “Filelist” on page 316 for more information.
Back up all files listed in the /Users/filelist.txt file.	<code>dsmc selective -filelist=/Users/filelist.txt</code>	Use the <i>filelist</i> option to process a list of files. See “Filelist” on page 316 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.	<code>dsmc selective /usr/dir1/sub1 -subdir=yes -snapshotroot=/snapshot/day1</code>	Tivoli Storage Manager considers the <i>snapshotroot</i> value as a file space name. See “Snapshotroot” on page 405 for more information.

### Related reference

“Incremental” on page 467

The **incremental** command backs up all new or changed data in the locations that you specify, unless you exclude them from backup services.

“Selective” on page 522

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 backup unless you exclude them from backup, or they do not meet management class requirements for serialization.

## Deleting backup data

If your administrator has given you authority, you can delete individual backup copies from the Tivoli Storage Manager server without deleting the entire file space. To determine if you have this authority, select **File** → **Connection Information** from the Tivoli Storage Manager GUI or Web client main menu. Your authority status is provided in the **Delete Backup Files** field.

**Important:** When you delete backup files, *you cannot restore them*. Verify that the backup files are no longer needed before you delete them. Tivoli Storage Manager will prompt whether you want to continue with the delete. If you specify *yes*, the specified backup files are immediately deleted and removed from Tivoli Storage Manager server storage.

To delete backup copies using the Tivoli Storage Manager GUI or Web client:

1. Select **Delete Backup Data** from the **Utilities** menu. The Backup Delete window appears.
2. Expand the Directory tree by clicking the plus sign (+) or folder icon next to the object you want to expand.
3. Click the selection boxes next to objects that you want to delete.
4. Select an item from the drop-down list near the top of the **Backup Delete** window to specify the type of backup delete to perform. You can delete active backup versions, inactive backup versions, or all objects that you have selected in the tree.

**Note:**

1. A directory will be deleted only if you select **Delete All Objects**.
2. To delete backup copies using the Tivoli Storage Manager command line client, use the **delete backup** command.

**Related reference**

“Delete Backup” on page 459

The **delete backup** command deletes backup files from Tivoli Storage Manager server storage. Your administrator must give you authority to delete backup files.

## Deleting file spaces

If your Tivoli Storage Manager administrator gives you authority, you can delete entire file spaces from 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 /tmp file space, 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 also delete a file space using the **delete filespace** command. Use the *class* option with the **delete filespace** command to delete NAS file spaces.

You can delete individual backup versions by using the **delete backup** command.

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.

### Related reference

“Class” on page 277

The *class* option specifies whether to display a list of NAS or client objects when using the **delete filesystem**, **query backup**, and **query filesystem** commands.

“Delete Backup” on page 459

The **delete backup** command deletes backup files from Tivoli Storage Manager server storage. Your administrator must give you authority to delete backup files.

“Delete Filespace” on page 462

The **delete filesystem** command deletes file spaces in Tivoli Storage Manager server storage. A file space is a logical space on the server that contains files you backed up or archived.

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## Group backup (UNIX and Linux): 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.

**Restriction:** The **backup group** command does not apply to Mac OS X.

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.
- 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.

You can perform a full or differential backup using the *mode* option.

For example, to perform a full backup of all the files named 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
```

### Related concepts

“Restoring data from a backupset” on page 172

Your Tivoli Storage Manager administrator can generate a backup set (a collection of your files that reside on the server) onto portable media created on a device using a format that is compatible with the client device. You can restore data from a backup set from the Tivoli Storage Manager server, or when the backup set is locally available as a file or on a tape device.

### Related reference

“Backup Group” on page 446

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.

“Include options” on page 332

The include options specify objects that you want to include for backup and archive services.

“Mode” on page 350

Use the *mode* option with the **backup group**, **backup image**, **backup nas**, and **backup was** commands (if applicable) to specify whether you want to perform a full or differential group backup containing a list of files from one or more file spaces.

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## Backup with client-node proxy support (UNIX and Linux)

Backups of multiple nodes that share storage can be consolidated to a common target node name on the Tivoli Storage Manager server. This is useful when the machine responsible for performing the backup can change over time, such as with a cluster. The *asnodename* option also allows data to be restored from a different system than the one which performed the backup.

An agent node is a client node which has been granted authority to perform client operations on behalf of a target node.

A target node is a client node which grants authority to one or more agent nodes to perform client operations on its behalf.

Use the *asnodename* option with the appropriate command to back up, archive, restore, and retrieve data under the target node name on the Tivoli Storage Manager server. This support is only available with Tivoli Storage Manager Version 5.3 and higher server and client. To enable this option, follow these steps:

- Install the backup-archive client on all nodes in a shared data environment.
  - Register each node with the Tivoli Storage Manager server, if it does not exist. Register the common target node name to be shared by each of the agent nodes used in your shared data environment.
  - Register each of the nodes in the shared data environment with the Tivoli Storage Manager server. This is the agent node name that is used for authentication purposes. Data will not be stored using the node name when the *asnodename* option is used.
  - The Tivoli Storage Manager administrator must grant proxy authority to all nodes in the shared environment to access the target node name on the Tivoli Storage Manager server, using the **grant proxynode** command.
  - Use the **query proxynode** administrative client command to display the authorized user’s client nodes, granted by the **grant proxynode** command.
1. Install the backup-archive client on all nodes in a shared data environment.

2. Register each node with the Tivoli Storage Manager server, if it does not exist. Register the common target node name to be shared by each of the agent nodes used in your shared data environment.
3. Register each of the nodes in the shared data environment with the Tivoli Storage Manager server. This is the agent node name that is used for authentication purposes. Data will not be stored using the node name when the *asnodename* option is used.
4. Grant proxy authority to all nodes in the shared environment to access the target node name on the Tivoli Storage Manager server, using the **grant proxynode** command (Tivoli Storage Manager administrator).
5. Use the **query proxynode** administrative client command to display the authorized user's client nodes, granted by the **grant proxynode** command.

**Suggestions:**

- All agent nodes in the multiple node environment should be of the same platform type.
- Do not use target nodes as traditional nodes, especially if you encrypt your files before backing them up to the server.

**Restrictions enforced within a proxied session:**

- You cannot access another node (either from GUI drop down or use of the Fromnode option).
- You cannot perform NAS backup or restore.

**Related reference**

"Asnodename" on page 267

Use the *asnodename* option to allow agent nodes to back up or restore data on behalf of another node (the target node). This enables concurrent operations from multiple nodes to store data to the same target node and file space in parallel.

## Enabling multiple node operation from the GUI

There are some steps you must follow to enable multiple node operation from the GUI.

1. Verify that the client node has proxy authority to a target node (or authorized to act as the target node) using the **query proxynode** administrative client command.
2. Select **Edit** → **Preferences** to open the preferences window.
3. Select the **General** tab and fill in the **As Node Name** field with the name of the target node.
4. Click **Apply** and then **OK** to close the preferences window.

Perform one of the following steps to verify that your client node is now accessing the server as the target node:

- Open the tree window and check that the target node name specified by the **As Node Name** field appears.
- Verify the target node name in the **Accessing As Node** field in the **Connection Information** window.

To return to single node operation, delete the **As Node Name** from the **Accessing As Node** field in the **General** → **Preferences** tab.

## Setting up encryption

There are some steps you must follow to set up encryption with the `encryptkey=save` option.

1. Specify `encryptkey=save` in the options file.
2. Back up at least one file with `asnode=ProxyNodeName` to create a local encryption key on each agent node in the multiple node environment.

Follow these steps to set up encryption with the `encryptkey=prompt` option:

1. Specify `encryptkey=prompt` in the options file.
2. Ensure that users of the agent nodes in the multiple node environment are using the same encryption key.

### Important:

- If you change the encryption key, you must repeat the previous steps.
- Use the same encryption key for all files backed up in the shared node environment.

## Scheduling with client-node proxy support

Multiple nodes can be used to perform backup operations using the scheduler. By granting proxy authority to the agent nodes, they will perform scheduled backup operations on behalf of the target node. Each agent node must use the `asnodename` option within their schedule to perform multiple node backup for the agent node.

The following examples show the administrative client-server commands using the scheduler on multiple nodes.

1. The administrator registers all of the nodes to be used: (1) register node NODE-A, (2) register node NODE-B, (3) register node NODE-C.
2. The administrator grants proxy authority to each agent node: (1) grant proxynode target=NODE-Z agent=NODE-A, (2) grant proxynode target=NODE-Z agent=NODE-B, (3) grant proxynode target=NODE-Z agent=NODE-C.
3. The administrator defines the schedules: (1) define schedule standard proxy1 description="NODE-A proxy schedule" action=incremental options="-asnode=NODE-Z" objects=/Volumes/Xsan1 startdate=05/21/2005 starttime=01:00, (2) define schedule standard proxy2 description="NODE-B proxy schedule" action=incremental options="-asnode=NODE-Z" objects=/Volumes/Xsan2 startdate=05/21/2005 starttime=01:00, (3) define schedule standard proxy3 description="NODE-C proxy schedule" action=incremental options="-asnode=NODE-Z" objects=/Volumes/Xsan3 startdate=05/21/2005 starttime=01:00.

**Note:** Place the `asnode` option in the schedule definition only. Do not place it in the client options file, on the command line, or in any other location.

For more information about the server scheduler commands, see *IBM Tivoli Storage Manager Administrator Command Reference*.

Start the schedules using the following client command: `dsmc sched`

You can also use the client acceptor daemon (`dsmcad`), with `managedservices` set to `schedule` in the systems options file.

### Note:

1. Each schedule can be started from a different machine or LPAR.
2. After running the schedules, any proxied client will be able to query and restore all of the backed up data.

## Scheduling for backing up a HACMP cluster

This section shows some examples of how to back up a HACMP cluster.

In the following examples, HACMP is configured for two AIX hosts, `host_a` and `host_b`. Along with their own local data, the hosts are sharing disk storage which has two file spaces: `/disk1` and `/disk2`.

The CLUSTERNODE example shows how the *clusternode* option is used in a current HACMP environment.

1. The administrator defines 3 nodes on the Tivoli Storage Manager server: `host_a`, `host_b`, `cluster_group`, using the following commands: (1) REGISTER NODE `host_a` `mysecretpa5s`, (2) REGISTER NODE `host_b` `mysecretpa5s`, (3) REGISTER NODE `cluster_group` `mysecretpa5s`.
2. The administrator defines a `dsm.opt` file on `host_a` and `host_b` (note that the `opt` files are different on each host), using the following commands: (1) NODENAME `host_a` (option can be left as default), (2) DOMAIN `/home /usr ... etc..`
3. The administrator defines a `dsm.opt` file located somewhere on one of the cluster disk groups, for example, `/disk1/tsm/dsm.opt`, using the following commands: (1) NODENAME `cluster_group`, (2) DOMAIN `/disk1 /disk2`, (3) CLUSTERNODE YES.
4. The administrator defines a schedule on the Tivoli Storage Manager server, using the following command: DEFINE SCHEDULE STANDARD CLUSTER\_BACKUP.
5. The administrator defines associations for each of the 3 nodes, using the following command: DEFINE ASSOC STANDARD CLUSTER\_BACKUP `host_a,host_b,cluster_group`. At any one time, there are three instances of the Tivoli Storage Manager Backup-Archive client schedule running (with the scheduler for `cluster_group` being part of the cluster resources that will failover whenever the cluster group disk resources failover. Thus, it would be running on either `host_a` or `host_b` but not both simultaneously).
6. All three node names contain data on the Tivoli Storage Manager server.

The ASNODE example shows a generic solution which could be applied to UNIX cluster solutions to which we do not have support, for example: Veritas Cluster Server for Solaris.

1. The administrator defines 3 nodes on the Tivoli Storage Manager server `host_a`, `host_b`, `cluster_group`:  

```
REGISTER NODE host_a mysecretpa5s
REGISTER NODE host_b mysecretpa5s
REGISTER NODE cluster_group mysecretpa5s
```
2. The administrator defines a proxy node relationship between `host_a` and `host_b` to `hacmp_cluster`  

```
GRANT PROXYNODE TARGET=cluster_group AGENT=host_a,host_b
```
3. The administrator defines a `dsm.opt` file on `host_a` and `host_b` to handle the local file systems:  

```
NODENAME host_a (option can be left as default)
DOMAIN /home /usr ... etc.

NODENAME host_b (option can be left as default)
DOMAIN /home /usr ... etc.
```

- The administrator defines a `dsm.opt` file on the cluster resource to handle the backup of the clustered resources, e.g. `/disk1/tsm/dsmcluster.opt` (note the nodename will be the default nodename which will either be `host_a` or `host_b` depending on which machine contains the cluster group at any given time):

```
DOMAIN    /disk1 /disk2
ASNODE    cluster_group
```

- The administrator defines a schedule on the Tivoli Storage Manager server:

```
DEFINE SCHEDULE STANDARD CLUSTER_BACKUP
```

- The administrator defines associations for each one of the 3 nodes.

```
DEFINE ASSOC STANDARD CLUSTER_BACKUP host_a,host_b,cluster_group
```

- At any one time, there are three instances of the Tivoli Storage Manager Backup-Archive client schedule running with the scheduler for node `hacmp_cluster` running on either `host_a` or `host_b` but not both (it is included in the cluster resources that would failover). This scheduler would point to the `dsmcluster.opt` that is defined on each host. The three instances would be started as:

```
[host_a]      dsmc sched
[host_b]      dsmc sched
[cluster_group] dsmc sched -optfile=/disk/tsm/dsmcluster.opt
```

- All three node names will contain data on the Tivoli Storage Manager server.

For more information about the server scheduler commands, see *IBM Tivoli Storage Manager Administrator Command Reference*.

Perform the following steps to enable scheduling of multiple nodes:

- Ensure that all agent nodes must have proxy authority over the common target node
- Ensure that all agent nodes must have a schedule defined on the server:
 

```
def sched domain_name sched_name options='-asnode=target'
```
- Ensure that each agent node must have its schedule associated with a node:
 

```
def association domain_name schedule_name <agentnodename>
```

### Scheduling for backing up a GPFS file system

The following examples show the administrative client-server commands using the scheduler to back up a GPFS file system, using three nodes in the GPFS cluster which participate in the backup.

- The administrator defines four nodes on the Tivoli Storage Manager server, using the following commands: (1) `REGISTER NODE node_1 mysecretpa5s`, (2) `REGISTER NODE node_2 mysecretpa5s`, (3) `REGISTER NODE node_3 mysecretpa5s`, (4) `REGISTER NODE node_gpfs mysecretpa5s`. `node_1`, `node_2`, `node_3` and `node_gpfs`. `node_1`, `node_2`, and `node_3` are only used for authentication; all file spaces are stored with `node_gpfs`.
- The administrator defines a proxynode relationship between the nodes, using the following commands: `GRANT PROXYNODE TARGET=node_gpfs AGENT=node_1, node_2, node_3`.
- The administrator defines the node name and asnodename for each of the machines in their respective `dsm.sys` files, using the following commands: (1) `nodename node_1`, (2) `asnodename node_gpfs`.
- The administrator defines a schedule for only `node_1` to do the work, using the following commands: (1) `DEFINE SCHEDULE STANDARD GPFS_SCHEDULE ACTION=MACRO OBJECTS="gpfs_script"`, (2) `DEFINE ASSOCIATION STANDARD GPFS node_gpfs`.



5. To execute the schedule on node `node_gpfs`, enter the client command: `DSMC SCHED`.

Another way to back up GPFS is to use Tivoli Storage Manager to look for the incremental changes. The GPFS file system can be divided into three branches and each branch can be statically assigned to each node using the *virtualmountpoint* option. In the following example, you have a file system called `/gpfs` with three branches: `/gpfs/branch_1`, `/gpfs/branch_2`, and `/gpfs/branch_3`.

1. The administrator defines four nodes on the Tivoli Storage Manager server: `node_1`, `node_2`, `node_3` and `node_gpfs`. `node_1`, `node_2` and `node_3` are only used for authentication; all file spaces are stored with `node_gpfs`.

```
REGISTER NODE node_1 mysecretpa5s
REGISTER NODE node_2 mysecretpa5s
REGISTER NODE node_3 mysecretpa5s
REGISTER NODE node_gpfs mysecretpa5s
```

2. The administrator defines a proxynode relationship between the nodes:

```
GRANT PROXYNODE TARGET=node_gpfs AGENT=node_1,node_2,node_3
```

3. The administrator defines the node name, virtualmountpoint and domain for each of the three machines in their respective `dsm.sys` files:

```
nodename      node_1
virtualmountpoint /gpfs/branch_1
domain        /gpfs/branch_1
```

**Note:** The user does not want to define *asnodename* in the options file. In this case the *asnodename* must be on the schedule so that each one of the nodes can have its own schedule associated with its real node name.

4. The administrator defines a schedule for all nodes: `node_1`, `node_2` and `node_3`

```
DEFINE SCHEDULE STANDARD GPFS_SCHEDULE OPTIONS="-asnode=node_gpfs"
DEFINE ASSOCIATION STANDARD GPFS node_1,node_2,node_3
```

5. To start the scheduler on the three nodes, enter the client command:

```
DSMC SCHED
```

---

## Associating a local snapshot with a server file space (UNIX and Linux)

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.

### Related reference

"Snapshotroot" on page 405

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.

---

## Performing an image backup

From your local workstation, you can back up a logical volume as a single object (image backup) on your system. The traditional *static* image backup prevents write access to the volume by other system applications during the operation.

You must be a root user to perform this task, and image backup does not apply to Mac OS X.

An image backup provides the following benefits:

- Backs up file systems containing a large number of files faster than a full file system 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 *dynamicimage* option to back up the volume *as is* without remounting it read-only. Corruption of the backup can occur if applications continue to write to the volume while the backup is in progress, which can result in inconsistent data and data loss after the restore. This option overrides the copy serialization value in the management class to perform an image backup. After restoring an image backup taken with the *dynamicimage* option, always run the fsck utility.

To restore an image backup of a volume, the Tivoli Storage Manager client must be able to obtain an exclusive lock on the volume being restored.

**Restriction:** Tivoli Storage Manager dynamic image backups should not be used for file systems, because the file system's internal design could provide inconsistent data even when there is no write activity. Dynamic image backup could result in a fuzzy image, and is not guaranteed to be valid or complete when restored.

If the Tivoli Storage Manager client fails to mount the file system after restoring an image, you can run fsck. However, running fsck can affect the integrity of large amounts of data. Dynamic image backup is *not* recommended for AIX JFS2 file systems, so the Tivoli Storage Manager client does not allow dynamic image backup for AIX JFS2 file systems. If you specify *dynamicimage=yes* for a JFS2 file system, the Tivoli Storage Manager client will perform a snapshot-based image backup. If the snapshot cannot be created for some reason, the Tivoli Storage Manager client will instead perform a static image backup.

**Important:** To prevent data loss, avoid using *dynamicimage*, and ensure that there is no write activity on the volume while the backup is in progress.

For AIX JFS2 file systems, the amount of data backed up to the Tivoli Storage Manager server during static or snapshot image backup will be reduced by backing up only those blocks used by the file system or smaller than the *imagegapsize* option. This method of backing up your data will improve the performance of image backup. Refer to "Imagegapsize" on page 328 for more information.

For AIX clients *only*: By default, Tivoli Storage Manager performs an online snapshot image backup of JFS2 file systems, during which the volume is available to other system applications.

For Linux clients *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.

**Attention:** File systems managed by Tivoli Storage Manager for space management are not enabled for image backup.

#### Related tasks

“Performing snapshot-based file backup and archive and snapshot-based image backup” on page 145

For Tivoli Storage Manager clients running on AIX 5.3 or later JFS2 file systems as root user, snapshot-based image backup will be created using snapshots by default. Optionally, you can enable snapshot-based file level backup and archive operations by specifying the *snapshotproviderfs* option. If for some reason a snapshot cannot be taken, Tivoli Storage Manager will attempt to perform a static image backup or regular file backup.

## Before you perform an image backup

Before you perform an image backup, there are some items that you need to consider.

The following items are the image backup considerations.

- Ensure that no other application is using the volume when you run a static image backup. To ensure a consistent image during backup processing, if a file space is detected on the volume 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 *dynamicimage* option to force the client to perform an image backup without unmounting and remounting the volume in read-only mode. Set the *dynamicimage* option 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.

If no file system is detected on the volume being backed up, ensure that all applications writing to the volumes are quiesced. The backup-archive client uses the file system table and mount table to detect the supported file systems.

*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 the file system table, then after completing the image backup, all mount options for this file system, except read or write state, will be lost.

**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.

- 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.
- You can exclude a volume from image backup using the *exclude.image* option.
- 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
```

If you back up a raw volume which is formatted as a file system, ensure that the file system is not mounted and does not have an entry in /etc/filesystems.

### Related concepts

Chapter 9, “Understanding storage management policies,” on page 229  
Storage management policies are rules your administrator defines in order to manage your backups and archives on the server. Your data is associated (or bound) 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 management class, and a copy group.

### Related reference

“Exclude options” on page 312

Use the exclude options to exclude objects from backup, image, or archive services.

“Include options” on page 332

The include options specify objects that you want to include for backup and archive services.

## Volume device type support for an image backup

There are several devices supported by the **backup image** command.

The following table lists the 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 DiskSuite Volume Manager	Metadevices	/dev/md/dsk/dl	Solaris
Solstice DiskSuite or Solaris Volume Manager	Metadevices	/dev/md/dsk/dl	Solaris
Veritas Volume Mgr	Logical Volumes	/dev/vx/dsk/rootg/vol01 /dev/vg00/lvol01 /dev/vx/rootdg/vol01	Solaris SPARC AIX
Raw Disk	Partitions	/dev/hda1, /dev/sda3	Linux x86/x86_64, Linux on POWER
Raw Disk	Partitions	/dev/dasdxx	Linux for zSeries
Linux Logical Volume Mgr	Logical Volumes	/dev/myvolgroup/ myvolume	All Linux
Raw Disk	Disk Slices	/dev/dsk/c0tld0s0	Solaris SPARC/x86
HP-UX Logical Volume Mgr	Logical Volumes	/dev/dsk/c0t0d1 /dev/vg00/lvol01	HP-UX, HP-UX Itanium 2

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.

**Note:**

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, might produce inconsistent backup data if the data changes during the image backup operation.
2. On HP-UX, image backup for raw volumes is only supported for devices that are created using HP-UX LVM logical volumes, such as `/dev/dsk/c0t0d1`. HP-UX LVM logical volume devices usually take the form `/dev/vgXY/lvol1AB`. A volume group must begin with `vg` to be correctly detected.
3. For AIX 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.
4. For Solaris 10 clients, image backup is supported only for file systems that are assigned from the global zone to the non-global zone by exporting the device (add device + set match). Image backup is *not* supported for other file systems in the non-global zones because the non-global zone does not have the authority to mount or unmount the file system. An image backup on a file system other than one assigned from the global zone to the non-global zone will result in a message such as: *ANS1068E Device is not local*.
5. Also, for Solaris 10 clients, the overlap device of the root disk (`c0t0d0s2`) is not supported for raw device backup. Avoid using this feature on disks or slices that are used as swapping devices.

Meta devices created by the Veritas Volume Manager must be listed, including the disk group in `/etc/vfstab`, to be recognized by the Tivoli Storage Manager Backup-Archive client for an image backup of file systems. The file systems should be unmounted. Raw devices should not be listed in `/etc/vfstab`. For example, the following is the correct meta device name to be used in the `/etc/vfstab` file:

```
/dev/vx/dsk/<disk group>/<meta device name>
```

Specifying `/dev/vx/dsk/` would not be recognized correctly, and you would receive an error (ANS1134E).

Disk slices containing cylinder 0 should not be backed up or restored. In this case the VTOC will be overwritten. If you need to back up the first disk slice, exclude cylinder 0 by starting the disk slice from cylinder 1 (use the format utility). The Tivoli Storage Manager Backup-Archive client does not check whether cylinder 0 is contained in the device that is overwritten during a restore.

## 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 a 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

Use this method to perform image backups with file system incremental.

1. Perform a full incremental backup of the file system. This establishes a baseline for future incremental backups.
2. Perform an image backup of the same file system to make image restores possible.
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. 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 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.

**Note:** If an incremental backup is performed several times after backing up an image, make sure that the Tivoli Storage Manager server's backup copy group has enough versions for existing and deleted files on the server so that the subsequent restore image with *incremental* and *deletefiles* options will be able to delete files correctly.

### Related tasks

"Backing up data using the Java GUI" on page 126

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.

"Performing an image backup using the GUI" on page 144

If the Tivoli Storage Manager image feature is configured, you can create an image backup where the real volume is available to other system applications. A consistent image of the volume is maintained during the image backup.

"Performing an image restore using the GUI" on page 170

This topic explains the procedure that you use to restore an image of your file system or raw logical volume.

## Method 2: Using image backup with incremental-by-date image backup

Use this method to perform image backups with incremental-by-date image backup.

1. Perform an image backup of the file system.
2. Perform an incremental-by-date image backup of the file system. This sends only those files that were added or changed since the last image backup to the server.
3. Periodically, perform full image backups.
4. Restore your volume by performing an incremental restore. 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 of 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 the last incremental-by-date image backup and it 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.

### Related information

“Performing an image restore using the GUI” on page 170

“Performing an image backup using the GUI” on page 144

### Related tasks

“Performing an image backup using the GUI” on page 144

If the Tivoli Storage Manager image feature is configured, you can create an image backup where the real volume is available to other system applications. A consistent image of the volume is maintained during the image backup.

“Performing an image restore using the GUI” on page 170

This topic explains the procedure that you use to restore an image of your file system or raw logical volume.

## Comparing methods 1 and 2

This topic shows a comparison of methods 1 and 2: Using image backup with file system incremental or Using image backup with incremental-by-date image backup.

To help you decide which method is appropriate for your environment, the following table is a comparison of methods 1 and 2.

*Table 31. Comparing incremental image backup methods*

<b>Method 1: Using image backup with file system incremental</b>	<b>Method 2: Using image backup with incremental-by-date image backup</b>
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.

Table 31. Comparing incremental image backup methods (continued)

Method 1: Using image backup with file system incremental	Method 2: Using image backup with incremental-by-date image backup
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

If the Tivoli Storage Manager image feature is configured, you can create an image backup where the real volume is available to other system applications. A consistent image of the volume is maintained during the image backup.

When you perform an image backup using the client Java GUI **Image Backup** option, Tivoli Storage Manager honors the image type setting of the *include.image* or *dynamicimage* options.

For the HP-UX and Solaris clients, selecting the **Image Backup** option performs a static or dynamic image backup depending on the setting of the *dynamicimage* option. For static image backup, the client will unmount and remount the volume as read-only, so that no other applications can access it. For dynamic image backup, 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.
3. Click **Backup**. The Backup **Task List** window displays the backup processing status. The Backup Report window displays a detailed status report.
  - To perform a static image backup, select **Image Backup** from the drop-down list.
  - For AIX and Linux clients *only*: To perform a snapshot image backup, use the *snapshotproviderimage* option.
  - To perform an incremental-by-date image backup, select **Incremental image (date only)** from the drop-down list.

The following are some items to consider when you perform an snapshot-based image backup:

- To modify specific backup options, click the **Options** button. The options you select are effective during the current session *only*.
- To modify specific backup options, click the **Options** button. The options you select are effective during the current session *only*.

**Linux only:** The Tivoli Storage Manager Version 5.4 client will not recognize any LVM1 volumes for image operations. However, it will allow prior image backups of LVM1 volumes to be restored on LVM2 volumes. Table 32 on page 145 shows the combinations involving the old and new client levels handling LVM1 and LVM2 volumes for different image operations.



Table 32. LVM1 and LVM2 image operation comparisons

Tivoli Storage Manager client version	LVM1 Backup and Restore	LVM2 Backup and Restore	Mixed Volumes	
			Backup: LVM1, Restore: LVM2	Backup: LVM2, Restore: LVM1
V5.3 and prior	YES	Only static image for file system	NO	NO - raw volumes are not supported
V5.4 and beyond	NO Error msg ANS1090E displayed	YES	YES LVM1 vol must have been backed up using prior client	NO Restore to LVM1 vol will fail

#### Related reference

“Snapshotproviderimage” on page 404

Use the *snapshotproviderimage* option to enable snapshot-based image backup, and to specify a snapshot provider.

## 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.

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.

#### Related reference

“Backup Image” on page 448

The **backup image** command creates an image backup of one or more volumes on your system. These volumes can be formatted FAT, FAT32, NTFS, or unformatted RAW volumes. If a volume is NTFS-formatted, only those blocks used by the file system will be backed up. If you set the *imagegapsize* option to 0, all blocks, including unused blocks at the end of the volume, will be backed up.

“Mode” on page 350

Use the *mode* option with the **backup group**, **backup image**, **backup nas**, and **backup was** commands (if applicable) to specify whether you want to perform a full or differential group backup containing a list of files from one or more file spaces.

“Restore Image” on page 513

The **restore image** command restores a file system or raw volume image that was backed up using the **backup image** command.

---

## Performing snapshot-based file backup and archive and snapshot-based image backup

For Tivoli Storage Manager clients running on AIX 5.3 or later JFS2 file systems as root user, snapshot-based image backup will be created using snapshots by default. Optionally, you can enable snapshot-based file level backup and archive operations by specifying the *snapshotproviderfs* option. If for some reason a snapshot cannot be taken, Tivoli Storage Manager will attempt to perform a static image backup or regular file backup.

If you want to specify snapshot-based file backup and archive, set the option *snapshotproviderfs* to JFS2. This will be applicable to all JFS2 file systems for that client.

**Recommendation:** Use snapshot-based file backup and archive and snapshot-based image backup for all of your AIX JFS2 file systems.

For example, to turn *on* snapshot-based file backup and archive for all JFS2 file systems on the client, specify the following in the server stanza in the *dsm.sys* file:

```
snapshotproviderfs JFS2
```

To explicitly turn *off* snapshot-based file backup and archive for all JFS2 file systems on the client, specify the following in the server stanza in the *dsm.sys* file:

```
snapshotproviderfs NONE
```

To turn *on* snapshot-based file backup and archive for only one specific JFS2 file system on the client, specify the following in the server stanza in the *dsm.sys* file:

```
snapshotproviderfs NONE

include.fs /kalafs1 snapshotproviderfs=JFS2
```

To turn *off* snapshot-based file backup and archive for only one specific JFS2 file system on the client, specify the following in the server stanza in the *dsm.sys* file:

```
snapshotproviderfs JFS2

include.fs /kalafs2 snapshotproviderfs=NONE
```

To turn *on* snapshot-based file backup and archive for only one specific operation on the client, specify the following on the command line:

```
dsmc incr -snapshotproviderfs=JFS2 /kalafs1
```

To turn *off* snapshot-based file backup and archive for only one specific operation on the client, specify the following in the server stanza in the *dsm.sys* file:

```
snapshotproviderfs JFS2
```

Then perform the backup command. For example:

```
dsmc incr -snapshotproviderfs=NONE /kalafs2
```

The *snapshotproviderfs* option does not apply to **incremental** with the *snapdiff* and *diffsnapshot* options.

#### Related reference

“Snapshotproviderfs” on page 403

Use the *snapshotproviderfs* option to enable snapshot-based file backup and archive operations, and to specify a snapshot provider.

---

## 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.*

Incremental backup can also be used to back up NAS file system snapshots. See the **incremental** command and *snapshotroot*, *snapdiff*, and *diffsnapshot* options for more information.

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*, SC32-0117
- *IBM Tivoli Storage Manager for Sun Solaris Administrator's Guide*, SC32-0120
- *IBM Tivoli Storage Manager for Windows Administrator's Guide*, SC32-0121

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

## Related concepts

“NDMP support requirements (Extended Edition only)” on page 13  
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.*

## Backing up NAS file systems using the Web client GUI

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 the client options file 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 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 is displayed.
2. Expand the directory tree if necessary.

### Note:

- a. The root node called **Nodes** is not selectable. This node only appears if a NAS plug-in is present on the client machine.
  - b. NAS nodes display on the same level as the client workstation node. Only nodes for which the administrator has authority appear.
  - c. 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 is not displayed 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.

#### Related concepts

“Restoring NAS file systems” on page 184

You restore NAS file system images using the Web client or command line interface.

#### Related tasks

“Configuring the Web client” on page 52

There are some steps that you must follow to configure the Web client.

#### Related reference

“Toc” on page 423

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.

## Backing up NAS file systems using the command line

The following table lists the commands and options you can use to back up NAS file system images from the command line.

Table 33. NAS options and commands

Option or command	Definition	Page
<i>domain.nas</i>	Use the <i>domain.nas</i> option to specify the volumes to include in your default domain for NAS backups.	“Domain.nas” on page 300
<i>exclude.fs.nas</i>	Use the <i>exclude.fs.nas</i> option to exclude file systems on the NAS file server from an image backup when used with the <b>backup nas</b> command.	“Exclude options” on page 312
This option is valid for all Windows clients.		

Table 33. NAS options and commands (continued)

Option or command	Definition	Page
<i>include.fs.nas</i>	Use the <i>include.fs.nas</i> 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 <i>toc</i> option with the <i>include.fs.nas</i> option in your client options file.  This option is for AIX and Solaris clients <i>only</i> .  This option is valid for all Windows clients.	"Include options" on page 332
<b>query node</b>	Use the <b>query node</b> 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.	"Query Node" on page 492
<b>backup nas</b>	Use the <b>backup nas</b> command to create an image backup of one or more file systems that belong to a Network Attached Storage (NAS) file server.	"Backup NAS" on page 453
<i>toc</i>	Use the <i>toc</i> option with the <b>backup nas</b> command or the <i>include.fs.nas</i> option to specify whether Tivoli Storage Manager saves Table of Contents (TOC) information for each file system backup.	"Toc" on page 423
<b>monitor process</b>	Use the <b>monitor process</b> command to display 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.	"Monitor Process" on page 475
<b>cancel process</b>	Use the <b>cancel process</b> command to display current backup 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.	"Cancel Process" on page 455
<b>query backup</b>	Use the <b>query backup</b> command with the <i>class</i> option to display information about file system images backed up for a NAS file server.	"Query Backup" on page 479
<b>query filespace</b>	Use the <b>query filespace</b> command with the <i>class</i> option to display a list of file spaces belonging to a NAS node.	"Query Filespace" on page 485
<b>delete filespace</b>	Use the <b>delete filespace</b> command with the <i>class</i> option to display a list of file spaces belonging to a NAS node so that you can choose one to delete.	"Delete Filespace" on page 462

- 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 client platform, NAS file system specifications use the forward slash (/) separator, as in this example: /vol/vol0.

**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 might 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.

**Related reference**

“Toc” on page 423

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.

## Backing up NFS file systems

The Tivoli Storage Manager Backup-Archive client can be configured to protect files which are accessed with the Network File System (NFS) protocol. While better backup throughput performance can be realized by installing the Backup-Archive client where the file system physically resides, it is sometimes necessary to access file systems using NFS for purposes of backup and recovery. The Tivoli Storage Manager UNIX and Linux Backup-Archive client can back up, archive, restore and retrieve file data using an NFS mount. This includes all versions of the NFS protocol, including NFS version 2, NFS version 3, and NFS version 4.

The NFS version 4 protocol allows for the export of access control lists (ACL) with NFS. As shown in the following table, some of the Backup-Archive clients provide support to back up and restore ACL information on data accessed using NFS. Note that the NFS version 4 protocol must be installed on both the NFS client and NFS server in order to backup and restore ACL data.

*Table 34. Network File System (NFS) ACL support*

Tivoli Storage Manager Backup-Archive Client platform	ACL Support for data accessed using NFS version 4
AIX 5.3	yes
AIX 6.1 or later	yes

On other operating systems the Backup-Archive client cannot protect native ACL on data accessed using NFS.

Note the following restrictions using the Backup-Archive client with data accessed using NFS:

- The Tivoli Storage Manager Backup-Archive clients cannot perform image-based backups on data accessed using NFS.
- The Tivoli Storage Manager Backup-Archive AIX client cannot perform snapshot-based file backup and archive on data accessed using NFS.
- The Tivoli Storage Manager Backup-Archive AIX client cannot perform journal-based backup on data accessed using NFS.

### Related reference

“Snapdiff” on page 398

The *snapdiff* option is for backing up NAS/N-Series file server volumes that are NFS or CIFS attached.

## Using NFS with the global namespace feature

The global namespace feature, (called a referral) in AIX 5300-03, is supported.

NFS V4 clients can back up NFS file systems mounted using the referral server. All file systems in the global namespace will be backed up under a single file space.

The following are some examples:

```
server 'publications' has /doc file system
server 'projects' has /projects file system
server 'data' has /data file system
```

Server 'account1' is the main NFS server that exports all these files systems using referral, and it is the server that all of the clients know about. /etc/exports on 'account1' looks like this:

```
/doc -vers=4,refer=/doc@publications
/projects -vers=4,refer=/projects@projects
/data -vers=4,refer=/data@data
```

Client system 'payroll' mounts directories from 'account1' server and can access all three file systems:

```
payroll:/#mount -o vers=4 account1:/ /mnt
payroll:/#ls /mnt
doc/ projects/ data/
```

Client 'payroll' can back up /mnt as one NFS file system to back up all other file systems.

Use of the *virtualmountpoint* option is recommended when backing up NFSV4 file systems using global namespace for management granularity and improved performance. For example, the following entries could be added for the above example in the `dsm.sys` stanza to back up each mounted directory as a separate file space:

```
VIRTUALMOUNTPOINT /doc
VIRTUALMOUNTPOINT /projects
VIRTUALMOUNTPOINT /data
```

---

## Backing up AIX workload partition file systems

The Tivoli Storage Manager Backup-Archive AIX client allows the backup and restore of local partition file data within the global partition using the local partition name space available within the global partition. Each workload partition (WPAR) has its own security domain, so only the global root user is guaranteed to have access to all of the data.

The WPARs are partitions created entirely in software within a single AIX system image, with the following attributes:

- Usually the WPAR appears to be a complete standalone AIX system
- There is no hardware assist or configuration



Workload partitions provide a secure and isolated environment for enterprise applications in terms of process, signal and file system space. Software running within the context of a workload partition will appear to have its own separate instance of AIX.

The following example shows a WPAR configuration from within the global WPAR:

**Global partition:**

system name: shimla

file system: /home /opt

**WPAR #1 configuration:**

name: wpar1

file system: /home; name in global WPAR: /wpars/wpar1/home

**WPAR #2 configuration:**

name: wpar2

file system: /data; name in global WPAR: /wpars/wpar2/data

There are two ways to back up WPAR data, as follows:

1. Back up all WPAR file systems as the file spaces within the global partition. The file space name must be used to identify the WPAR to which it belongs. All of the data is managed on one node using one schedule. Using the example configuration mentioned previously, here is a sample dsm.sys file with one server stanza for all file systems, both global and local:

```
SErvername shimla
  TCPPort 1500
  TCPServeraddress clinton.storage.sanjose.ibm.com
  nodename shimla
  PasswordAccess generate
  Domain /wpars/wpar1/home /wpars/wpar2/data /home /opt
```

2. Back up each WPAR file system under a different node name. This provides file space name segregation for each WPAR. Each WPAR must have a separate node name and a scheduler running within the global partition. Also, three scheduler services must be set up, each using a different dsm.opt file corresponding to the server stanza name. This method allows each WPAR backup operation to be managed independently of the others. Using the example configuration mentioned previously, here is a sample dsm.sys file with three server stanzas: one for wpar1, one for wpar2, and one for global partition shimla:

```
SErvername shimla_wpar1
  TCPPort 1500
  TCPServeraddress clinton.storage.sanjose.ibm.com
  nodename wpar1
  PasswordAccess generate
  Domain /wpars/wpar1/home
```

```
SErvername shimla_wpar2
  TCPPort 1500
  TCPServeraddress clinton.storage.sanjose.ibm.com
  nodename wpar2
```

PasswordAccess	generate
Domain	/wpars/wpar2/data
SErvername	shimla
TCPPort	1500
TCPServeraddress	clinton.storage.sanjose.ibm.com
nodename	shimla
PasswordAccess	generate
Domain	/home /opt

---

## Backing up Solaris Zettabyte (ZFS) file systems

On Solaris SPARC and x86 systems, ZFS is a transactional file system, which means that the file system state is always consistent on disk. ZFS also uses the concept of storage pools to manage physical storage.

You can create a ZFS snapshot using the following command:

```
zfs snapshot tank/myZFS@mySnapshot
```

In this example, the ZFS pool name is tank and the ZFS file system name is myZFS. Files which belong to this ZFS snapshot can be found in the subdirectory tank/myZFS/.zfs/snapshot/mySnapshot/. This directory is read-only and for this reason it is excluded by default backup or archive operations

There are two possible ways to back up this ZFS snapshot:

1. Back up each file of the snapshot by using the *snapshotroot* option, as in the following example. This option allows the administrator to replace the current snapshot path with the ZFS file system path: `dsmc inc -snapshotroot=/tank/myZFS/.zfs/snapshot/mySnapshot /tank/myZFS`. Using the *snapshotroot* option, the files can be directly restored in the file system. If you have many changes in the file system during a backup, a snapshot can be made first, and then the Tivoli Storage Manager Backup-Archive Client can make a backup of the static snapshot.
2. Another way is to back up the complete snapshot, using the following command: `zfs send tank/myZFS@mySnapshot > /tmpdir/mySnapshotFile`. Using this command, the administrator can make a copy of the complete snapshot data in a single file. This file can then be backed up by the Tivoli Storage Manager Backup-Archive Client to the Tivoli Storage Manager Server, using the following command: `dsmc sel /tmpdir/mySnapshotFile`. The advantage of backing up the complete snapshot is that the full file system can be restored in a disaster recovery case. The following command creates and restores the complete file system with the data of the snapshot: `zfs receive tank/myZFS@mySnapshot < /tmpdir/mySnapshotFile`

### Related reference

“Snapshotroot” on page 405

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.

---

## Backing up AIX encrypted files

Use AIX JFS2 Encrypted File System (EFS) to back up files either in clear text or raw format. With clear text format, the file is decrypted by EFS as it is read. With raw format, the data is not decrypted. The default is raw format, but when you set the *efsdecrypt* option to *yes*, you get clear text backups.

**Important:** Whenever you run a backup that includes any files encrypted on an EFS, you must ensure that you use the correct specification of the *efsdecrypt* option. If the *efsdecrypt* option value changes between two incremental backups, all encrypted files on EFS file systems will be backed up again, even if they have not changed since the last backup. For example, if you are running an incremental backup of encrypted files that were previously backed up as raw, then ensure that *efsdecrypt* is specified as *no*. If you change *efsdecrypt* to *yes*, all the files will be backed up again in clear text even if they are unchanged, so ensure that you use this option carefully.

If you attempt to restore an encrypted file to either a work station that does not support EFS, or a file system where EFS is not active, an error message is written and the file is skipped.

Here are some reasons to back up EFS using clear text encryption:

- This type of decryption is useful if you want to use the Tivoli Storage Manager Backup-Archive Client encryption or another type of hardware encryption (for tape systems, for example).
- You can use clear text for long term archival of data, because the data is stored independent of the platform or encryption scheme.

Here are some things to consider when backing up a file in clear text:

- The user who invoked Tivoli Storage Manager must be able to decrypt it
- The user can have read access to a file, but not have access to the key

In the following scenarios an error message is issued:

1. The user is running in root guard mode, and EFS has the concept of two types of root. Root admin is the traditional mode. A root in guard mode will not have access to the unencrypted data, unless the user is the owner or a member of the file's group.
2. The user is running with a non-root user ID and attempting an archive of a file to which they have read access, but the user is not the owner or member of the file's group. EFS will not allow the data to be decrypted.

Here are some considerations when backing up EFS raw data:

- Tivoli Storage Manager will *not* honor the client encryption setting, which prevents double encryption, but only at the client. The server has no knowledge that the data is encrypted so any encryption done by a tape drive, for example, still occurs.
- Tivoli Storage Manager will *not* honor the compression setting, so the client will not even try to compress the data.
- Tivoli Storage Manager does not automatically back up or restore the keystore files. When you are restoring encrypted files, you might also have to restore keystores in order to decrypt the data.

**Recommendations:**

1. To protect the keystore, make sure the contents of `/var/efs` are included in your periodic backups.
  2. For the keystore data, use Tivoli Storage Manager storage policy with an unlimited number of versions.
- Encrypted file system (EFS) files backed up in raw mode (default) cannot be restored by a Tivoli Storage Manager Client prior to Version 5.5, or by a client on another UNIX platform.

---

## Backing up AIX JFS2 extended attributes

AIX Enhanced Journal File System (JFS2) provides backup processing for named extended attributes (EA) for all file systems that support named extended attributes. These extended attributes will automatically be backed up with each object that has extended attributes data, and no additional action is required.

The only file system that supports named user extended attributes is JFS2, when the file system is defined with the v2 format. This support is provided for files and directories. Support is not provided for extended attributes on symbolic links.

---

## 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 are also recorded in the `dsmsched.log` file for scheduled commands.

The Web client and backup-archive client Java 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 is displayed after it is sent to the server. The progress indicator shows overall progress. Informational messages might display as follows:

Table 35. 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.
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, 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. When using journal-based backup, the number of objects inspected might be less than the number of objects backed up.
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 management classes to files" on page 237 for more information.

Table 35. Client command line informational messages (continued)

Informational message	Meaning
Total number of objects deleted:	This is a count of the objects deleted from the client workstation after being successfully archived on the server. The count is zero for all backup commands.
Total number of objects expired:	See the section about full and partial incremental backup for more information.
Total number of objects failed:	Objects can fail for several reasons. Check the <code>dsmerror.log</code> for details.
Data transfer time:	The total time to transfer data across the network. Transfer statistics might 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.
Aggregate data transfer rate:	<p>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.</p> <p><b>Note:</b> On occasion, the aggregate data transfer rate might 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 <i>resourceutilization</i> 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.</p>
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: $== (1 - (10240/102400)) \times 100 == 90\%$ .
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 <i>enablelanfree</i> option is set to <i>no</i> , this line will not appear.

## Backup (UNIX and Linux): 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.

## Stored files

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.

## Special file systems

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

## NFS or virtual mount points

When files are backed up and archived from a file system or virtual mount point, Tivoli Storage Manager does not follow the nested NFS or virtual mount points (if any are defined on a file system). The nested NFS or virtual mount points will not be backed up or archived.

## Management classes

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 Java or Web client GUI to view the backup policies defined by the Tivoli Storage Manager server for your client node.

### Related concepts

Chapter 9, “Understanding storage management policies,” on page 229

Storage management policies are rules your administrator defines in order to manage your backups and archives on the server. Your data is associated (or bound) 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 management class, and a copy group.

## Symbolic links

Tivoli Storage Manager handles symbolic links differently than it does regular files and directories. How the client handles symbolic links depends on options settings, whether the target directory is accessible, and the way you specify objects.

**Note:** Symbolic link processing as described here does not apply to Mac OS X. Symbolic links are always backed up as files and are never followed.

A UNIX symbolic link is a file that contains a pointer to another file or directory. The object the symbolic link points to is called the target object.

A symbolic link can be backed up as path information to a target directory, or it can be backed up as a directory. If the symbolic link is backed up as a directory, the files and folders in the target directory can be backed up as well. What you

restore depends on how the symbolic link was backed up, the scope of the restore, the setting of the *followsymbolic* option, and whether the target directory is accessible at the time of restore.

#### Related reference

“Archsymlinkasfile” on page 266

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.

“Followsymbolic” on page 320

During a backup operation, the *followsymbolic* option specifies whether you want to use a symbolic link as a virtual mount point. During a restore or retrieve operation, the *followsymbolic* option specifies how the Tivoli Storage Manager client restores a directory whose name matches a symbolic link on the restore target file system.

“Virtualmountpoint” on page 431

**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.

### Incremental or selective backup of symbolic links

How the client backs up a symbolic link depends on whether the target of the symbolic link is a file or a directory, and how you specify the symbolic link on the incremental or selective backup command.

If a symbolic link points to a file, the client only backs up the path information. The client does not back up a file that is the target of a symbolic link.

If a symbolic link points to a directory, the backup depends on how the directory is specified on the command.

If a directory is specified with a trailing slash on a selective or incremental backup command, the client saves the symbolic link as a directory, and backs up the contents of the target directory.

If the symbolic link is entered without a trailing slash, or if a symbolic link is not explicitly stated in a backup file specification, the client backs up only the path information to the target directory. The contents of the target directory are not backed up.

In the examples below, assume that *symdir* is a symbolic link to target directory */fs1/guest/*. */fs1/guest/* contains these objects:

```
/fs1/guest/file (a file)
/fs1/guest/dir1 (a directory)
/fs1/guest/dir1/file1 (a file)
```

#### Example 1

```
dsmc incr /home/gillis/symdir/
```

In this example, the client backs up the symbolic link as a directory, and backs up the contents of the target directory */fs1/guest/*. If *subdir=yes*, the client backs up subdirectories of */fs1/guest/*.

#### Example 2a

```
dsmc incr /home/gillis/symdir/dir1
```



### Example 2b

```
dsmc incr /home/gillis/symdir/dir1/
```

In these examples, the client backs up the symbolic link as a directory, and backs up the /dir1/ subdirectory of the target directory. Trailing slash is consequential only for the symbolic link; it is inconsequential for subdirectories of the symbolic link. If *subdir=yes*, the client backs up subdirectories of /fs1/guest/dir1. Backup copies stored on the Tivoli Storage Manager server have a path like /home/gillis/symdir/dir1/file1.

### Example 3

```
dsmc incr /home/gillis/symdir
```

In this example, because there is no trailing slash after the symbolic link, the client backs up only the path to the target directory. The client does not back up the symbolic link as a directory, and does not back up files nor folders in the target directory.

### Example 4

```
dsmc incr /home/gillis/
```

In this example, because the symbolic link is not explicitly stated in the backup file specification, the client backs up only the path to the target directory. As in example 3, the client does not back up the symbolic link as a directory, and does not back up files nor folders in the target directory.

**Restriction:** If you back up a symbolic link as a directory, a future incremental backup that does not back up that symbolic link as a directory will expire that symbolic link as a directory, and will expire the files and directories in that directory.

For example, assume that you first back up the symbolic link *symdir* as a directory, and back up the contents of the target directory. The command in example 1 above does this. The client creates backup copies with a high-level path /home/gillis/symdir/. In this example, the client creates backup copies with these paths:

```
/home/gillis/symdir/  
/home/gillis/symdir/file  
/home/gillis/symdir/dir1  
/home/gillis/symdir/dir1/file1
```

Then, back up the contents of /home/gillis as follows: `dsmc inc /home/gillis/ -subdir=yes`. This command will process *symdir* as a symbolic link and will not process any objects the symbolic link points to. Hence, the client will expire backup copies in the /home/gillis/symdir/ directory that were created in the example 1 backup.

## Incremental backup of a domain only

The client backs up a symbolic link during an incremental backup of the domain, if the symbolic link is defined as a virtual mount point and the `followsymbolic` option is set to `yes`.

The client will back up a symbolic link and the target directory when all of the following are true:

- The client performs incremental backup of the domain.

- The symbolic link is defined as a virtual mount point via the `virtualmountpoint` option.
- `followsymbolic=yes`

The `virtualmountpoint` and `followsymbolic` definitions add the symbolic link to the domain. **Incremental** command backs up the domain, which in this case includes the symbolic link target.

#### Related reference

“Followsymbolic” on page 320

During a backup operation, the `followsymbolic` option specifies whether you want to use a symbolic link as a virtual mount point. During a restore or retrieve operation, the `followsymbolic` option specifies how the Tivoli Storage Manager client restores a directory whose name matches a symbolic link on the restore target file system.

“Virtualmountpoint” on page 431

**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.

### Restoring symbolic links

How the client restores a symbolic link can depend on several factors: (1) Was the target of the symbolic link a directory or a file, (2) Was the symbolic link backed up only as path information or as a directory, (3) At the time of restore, does the symbolic link still exist on the file system, (4) At the time of restore, does the target of the symbolic link still exist on the file system, and (5) What is the setting of the `followsymbolic` option.

#### Symbolic link points to a file

When you restore a symbolic link that originally pointed to a file, the symbolic link is restored, whether or not the target file is still accessible.

#### Symbolic link points to a directory, and was backed up as path information only

If the client backed up the symbolic link only as path information, the symbolic link is restored, whether or not the target directory is still accessible.

**Restriction:** On UNIX systems, when a symbolic link is created, its modification time is set to current system time and cannot 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.

#### Symbolic link points to a directory, and was backed up as a directory

If you restore a symbolic link that was backed up as a directory, the client restores a directory. Whether the directory was originally a symbolic link or a directory does not influence the restore.

When the client restores a directory, the result depends on these factors:

- Is there a symbolic link on the file system whose name matches the directory that the client is restoring
- Is the target of the symbolic link available
- What is the setting of the `followsymbolic` option

The following examples show two possible results of restoring a symbolic link that was backed up as a directory. Both examples use the restore

command: `restore /home/gillis/symdir/`. The result depends on the state of the file system and the value of the *followsymbolic* option.

Table 36. Results when restoring a symbolic link that was backed up as a directory.

State of the file system and value of <i>followsymbolic</i> option	Result
<ul style="list-style-type: none"> <li>• The symbolic link exists.</li> <li>• The target directory (<code>/fs1/guest/</code>) is accessible.</li> <li>• <i>followsymbolic=yes</i></li> </ul>	<p>The client restores the contents of the target directory. For example, in the target directory <code>/fs1/guest/</code>, the following objects are restored:</p> <pre>/fs1/guest/file /fs1/guest/dir1</pre> <p>If <i>subdir=yes</i>, the following object is restored:</p> <pre>/fs1/guest/dir1/file1</pre>
<p>Neither the symbolic link nor a directory with same path and name as the symbolic link exist.</p> <p>The value of <i>followsymbolic</i> does not matter.</p>	<p>The client creates a directory (<code>home/gillis/symdir/</code>) and populates it with the backup copies from the original target directory. For example, the following objects are created:</p> <pre>/home/gillis/symdir/file /home/gillis/symdir/dir1</pre> <p>If <i>subdir=yes</i>, the following object is restored:</p> <pre>/home/gillis/symdir/dir1/file1</pre>

## Hard links

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 files will also be hard-linked even if neither of the files exists at the time of restore, if both of the files are restored together in a single command. 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 using the standard (or classic) restore process, Tivoli Storage Manager will respect the current file system and not re-establish the hard link.

**Important:** 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.

## Sparse files

Sparse files do not have disk space allocated for every block in the whole address space, leading to holes within the file. Holes are detected by their content, which is always zeros, and these zeros take up space. The default is to restore the sparse file without the holes, which would leave more free disk space. The Tivoli Storage

Manager client detects sparse files during a backup operation and marks them as sparse on the Tivoli Storage Manager server.

**Note:** Sparse files do not apply to Mac OS X.

Tivoli Storage Manager backs up a sparse file as a regular file if client compression is off.

#### **Related reference**

“Compression” on page 283

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.

“Makesparsefile” on page 344

Use the *makesparsefile* option with the **restore** or **retrieve** commands to specify how sparse files are recreated.

## **NFS hard and soft mounts**

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()` does not return 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.

## Deleted file systems

When a file system or drive has been deleted, or it is no longer backed up by Tivoli Storage Manager, the existing backup versions for each file are managed according to the following policy attributes: Number of days to keep inactive backup versions, and number of days to keep the last backup version (if there is no active version)

If you do nothing else, active backup versions remain indefinitely. If you do not need to keep the active versions indefinitely, use the **expire** command to inactivate the active versions.

If you do not need to keep any of the backup versions, use the **delete backup** command to delete all backup versions in the file space. Your Tivoli Storage Manager server administrator must give you the authority to use this command. Use the **query session** command to determine whether you have "delete backup" authority. Alternatively, you can ask your Tivoli Storage Manager server administrator to delete the file space for you.

### Related concepts

Chapter 9, "Understanding storage management policies," on page 229  
Storage management policies are rules your administrator defines in order to manage your backups and archives on the server. Your data is associated (or bound) 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 management class, and a copy group.

## 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 might be in use, or open, when you try to back them up. Because an open file can change, a backup action might not reflect the correct contents of the file at a given time.

Consider whether the file is important, and whether you can build the file again. If the file is not important, you might not want to back it up. Or, if the file is important, a root user on your workstation can ensure the file is closed before backup.

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*.

## Related concepts

“Displaying information about management classes and copy groups” on page 231  
You can display policy information with the command line interface or with a graphical user interface. On a graphical user interface, click **View policy information** from the Utilities menu. The **Policy information** window displays the available management classes. On a command line, use the **query mgmtclass** command to view the available management classes. The *detail* option provides more information.

“Selecting a management class for files” on page 234

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.

## 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.

**Important:** Use an asterisk (\*) instead of a question mark (?) as a wildcard character when trying to match a pattern on a multibyte code page, to avoid unexpected results.

<i>* (Asterisk)</i>	<b>Zero or more characters that match all files:</b>
<b>*.cpp</b>	With a cpp extension
<b>hm*.*</b>	Starting with hm, regardless of extension, but must have the '.' character
<b>hm*</b>	Starting with hm, whether an extension exists or not
<b>*h*.*</b>	With an h somewhere in the file name, regardless of extension, but must have .
<i>? (Question mark)</i>	<b>One character that matches all files with:</b>
<b>?.*</b>	The extension cpp with one, and only one, character in the file name
<b>hm?.*</b>	Three-character names beginning with hm and that have the cpp extension
<i>* ? (Asterisk and question mark)</i>	<b>Asterisk and question mark combinations matching:</b>
<b>??hm.*</b>	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.





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## 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. You can restore these backup versions if the original files are lost or damaged. 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.

All client backup and restore procedures in this chapter also apply to the Web client, except the following:

- Estimate
- Preferences editor

Refer to *IBM Tivoli Storage Manager for Space Management for UNIX and Linux* for details about restoring migrated files and the *restoremigstate* option.

**Note:** When restoring a directory, its modification date and time is set to the date and time of the restore, not to the date and time the directory had when it was backed up. This is because Tivoli Storage Manager restores the directories first, then adds the files to the directories.

The following are the primary restore tasks:

- “Restoring an image”
- “Restoring data using the GUI” on page 186
- “Restoring data using the command line” on page 187
- “Restoring data from a backupset” on page 172
- “Performing point-in-time restores” on page 180
- “Restoring NAS file systems” on page 184
- “Authorizing another user to restore or retrieve your files” on page 192
- “Restoring or retrieving files from another client node” on page 193
- “Restoring or retrieving files to another workstation” on page 194
- “Restoring a disk in case of disk loss” on page 195
- “Deleting file spaces” on page 195

### Related tasks

“Starting a Web client session” on page 97

After installing the Web client on your workstation you can use the Web client to perform backup, archive, restore, and retrieve operations from any browser that is running Java Runtime Environment (JRE) 5 or 6. 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.

---

## Restoring an image

Before you perform an image restore, there are some items that you need to consider.

The following are the items that you should consider before performing an image restore:

- 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.

Deletion of files will be performed correctly if the Tivoli Storage Manager server's backup copy group has enough versions for existing and deleted files. 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 **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.

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 data copy utility of your choice to transfer the image from the file to a disk volume.

#### Related reference

"Imagetofile" on page 329

Use the *imagetofile* option with the **restore image** command to specify that you want to restore the source image to a file.

"Verifyimage" on page 430

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.

## Performing an image restore using the GUI

This topic explains the procedure that you use to restore an image of your file system or raw logical volume.

Follow these steps 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.

The following are some items to consider when you perform an image restore using the GUI:

- 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.

**Important:** 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.

## 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.

### Related reference

“Imagetofile” on page 329

Use the *imagetofile* option with the **restore image** command to specify that you want to restore the source image to a file.

“Verifyimage” on page 430

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.

---

## Restoring data from a backupset

Your Tivoli Storage Manager administrator can generate a backup set (a collection of your files that reside on the server) onto portable media created on a device using a format that is compatible with the client device. You can restore data from a backup set from the Tivoli Storage Manager server, or when the backup set is locally available as a file or on a tape device.

You can restore backup sets from the following locations:

- From the Tivoli Storage Manager server
- From portable media on a device attached to your client workstation
- From a backup set file on your client workstation

Backup sets can provide you with instant archive and rapid recovery capability as described in the following list.

### Instant archive

This capability allows an administrator to create an archive collection from backup versions already stored on the server.

### Rapid recovery with local backup sets

Typically, restores are performed from normal file backups that are stored on the Tivoli Storage Manager server outside of backup sets. This restore approach gives you the ability to restore the most recent backup version of every file. It is possible that a backup set does not contain the most recent backup version of your files.

In some cases restoring data from a backup set can be a better option than restoring data from normal backup files on the Tivoli Storage Manager server. Restoring from a backup set can be a better option for the following reasons:

- A backup set restore can provide for a faster recovery because all of the required files for restore are contained together within a smaller number of storage volumes.
- A backup set provides a point-in-time collection of files. You can restore to a point in time rather than restoring what is currently available from a normal file-level restore from the server.
- You can perform an ASR restore using a backup set volume.

Restoring a backup set from the Tivoli Storage Managerserver provides a larger set of restore options than restoring from a local backup set. However, restoring from a local backup set can be preferable in some cases:

- It is possible that you need to restore your data when a network connection to the Tivoli Storage Manager server is not available. This is possible in a disaster recovery situation.
- The local restore may be faster than restoring over a network connection to your Tivoli Storage Manager server.

A backup set can be restored from the Tivoli Storage Manager server while the backup set volumes are available to the server, or they can be moved to the client system for a local backup set restore. A backup set can be generated with or without a table of contents (TOC), and can contain file data or image data. On Windows systems, the backup set can contain system state or system object data.

Your ability to restore data from backup sets is restricted by the location of the backup set and the type of data in the backup set. The command-line client can restore some data that the GUI cannot restore, but the GUI can allow you to browse and choose which objects to restore. Generally, backup sets from the server with a TOC allow more options when restoring. However, local backup sets provide options that are sometimes preferable to restoring from the Tivoli Storage Manager server.

The restrictions for restoring data from backup sets using the GUI are summarized in the following table. Each interior cell represents one combination of data type and backup set location. For each situation, the cell indicates if you can use the GUI to restore only the entire backup set, to select objects within the backup set, or if you cannot use the GUI to restore the backup set.

Table 37. Backup set GUI restore restrictions

Data type in the backup set	Backup set location		
	Local (location=file or location=tape)	Tivoli Storage Manager Server (TOC available)	Tivoli Storage Manager Server (TOC not available)
file	Restore entire backup set only.	Restore entire backup set, or selected objects in the backup set.	Restore entire backup set only.
image	Cannot be restored.	Restore entire backup set, or selected objects in the backup set.	Cannot be restored.
system state or system object.	Restore entire backup set only.	Restore entire backup set, or selected objects in the backup set.	Restore entire backup set only.

The restrictions for restoring data from backup sets using the command-line client are summarized in the following table. Each interior cell represents one combination of data type and backup set location. For each situation, the cell lists the restore commands you can use. Except as noted, you can restore specific objects within a backup set, as well as the entire backup set.

Table 38. Backup set command-line restore restrictions

Data type in the backup set	Backup set location		
	Local (location=file or location=tape)	Tivoli Storage Manager Server (TOC available)	Tivoli Storage Manager Server (TOC not available)
file	Commands: restore restore backupset	Commands: restore restore backupset	Commands: restore backupset

Table 38. Backup set command-line restore restrictions (continued)

Data type in the backup set	Backup set location		
	Local (location=file or location=tape)	Tivoli Storage Manager Server (TOC available)	Tivoli Storage Manager Server (TOC not available)
image	Cannot be restored	Command: restore image	Cannot be restored
system state or system object	Command: restore backupset	Commands: restore backupset restore systemobject restore systemstate	Command: restore backupset

**Restriction:** When restoring system objects or system state using the **restore backupset** command, you cannot specify individual objects. You can only restore the entire system state or the entire system objects filesystem.

#### Related reference

“Localbackupset” on page 343

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.

“Query Backupset” on page 482

The **query backupset** command queries a backup set from a local file, tape device (if applicable) or the Tivoli Storage Manager server. This command displays the backup set name, generation date, retention (for a backup set on a Tivoli Storage Manager server), and user-supplied description.

“Query Image” on page 489

The **query image** command displays information about file system images that are stored on the Tivoli Storage Manager server, or that are inside a backup set from the Tivoli Storage Manager server, when the **backupsetname** option is specified.

“Restore” on page 498

The **restore** command obtains copies of backup versions of your files from a Tivoli Storage Manager server, or inside a backup set. 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.

“Restore Backupset” on page 503

The **restore backupset** command restores a backup set from the Tivoli Storage Manager server, a local file, or a local tape device. You can restore the entire backup set, or, in some cases, specific files within the backup set.

“Restore Image” on page 513

The **restore image** command restores a file system or raw volume image that was backed up using the **backup image** command.

## Restoring backup sets: considerations and restrictions

There are some considerations and restrictions that you must be aware of when restoring backup sets.

### Considerations

Consider the following when restoring backup sets:

- If the object you want to restore was generated from a Tivoli Storage Manager node whose name is different from your current node, specify the original node name with the **filespace** parameter on any of the restore commands.
- 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 with the parameter `-location=tape` or `-location=file`, the client does not attempt to contact the Tivoli Storage Manager server.
- When restoring a group from a backup set:
  - The entire group, or all groups, in the virtual file space will be restored. You cannot restore a single group by specifying the group name, if there are several groups in the same virtual file space. You cannot restore a part of a group by specifying a file path.
  - Specify a group by using the following values:
    - Specify the virtual file space name with the **filespace** parameter.
    - Use the `subdir` option to include subdirectories.
- Limited support is provided for restoring backup sets from tape devices attached to the client system. A native device driver provided by the device manufacturer must always be used. The device driver provided by Tivoli to be used with the Tivoli Storage Manager server cannot be used on the client system for restoring local backup sets.
- If a backup set contains files from several owners, the backup set itself will be owned by the root user ID, and non-root user IDs cannot see the backup set. In this case, non-root user IDs can restore their files by obtaining the backup set name from the Tivoli Storage Manager administrator. Non-root users can restore only their own files.
- To enable the GUI client to restore a backup set from a local device, without requiring a server connection, use the `localbackupset` option.

## Restrictions

Be aware of the following restrictions when restoring backup sets:

- A backup set data that was backed up with the API cannot be restored or used.
- You cannot restore image data from a backup set using the **restore backupset** command. You can restore image data from a backup set only with the **restore image** command.
- You cannot restore image data from a local backup set (`location=tape` or `location=file`). You can restore image data from a backup set only from the Tivoli Storage Manager server.

## Related information

“Localbackupset” on page 343

“Restore” on page 498

“Restore Image” on page 513

“Restore Backupset” on page 503

## Restoring an entire or partial backupset

Tivoli Storage Manager considers a backup set as one object containing the whole file structure. You can restore the entire backup set or, in some cases, you can select portions. The backup set media is self-describing and contains all the information required to perform a successful restore.

If you are connected to a Tivoli Storage Manager Version 5.4 or later server, your Tivoli Storage Manager administrator can create backup sets that are stacked. Stacked backup sets can contain data from multiple client nodes, and they can contain different types of data for a particular client node. The types of data can be file data or image data.

**Restriction:** Image data and application data restore processing is only available when restoring from the Tivoli Storage Manager server. You cannot restore image data and application data from a client local backup set restore.

When a backup set is stacked, you can only restore data for your own node. Data for all other nodes will be skipped. When restoring data from a stacked backup set on a local device, you can only restore file level data for your own client node. It is important that the nodename option is set to match the node name used to generate the backup set for one of the nodes in the stack.

**Important:** Due to the portability of local backup sets, you must take additional steps to secure your local backup sets on portable media. The backup set media should be physically secured because the backup set can be restored locally without authenticating with the server. Each user has access to all of the data on the stacked backup set, which means that the user has access to data that they do not own, by changing the node name or viewing the backup set in its raw format. Encryption or physical protection of the media are the only methods to ensure that the data is protected.

If you restore backup set data from the server, individual files, directories or entire backup set data can be restored in a single operation from the GUI or the command line. When you restore backup set data locally, the GUI can only display and restore an entire backup set. The command line can be used to restore individual files or directories stored in a backup set locally.

## Restoring backupsets using the GUI

The GUI client can restore data from a backup set from the server, from a local file, or from a local tape device. You can use the GUI to restore individual files from a backup set from the Tivoli Storage Manager server with a TOC, but not from a local backup set nor from a backup set from the server without a TOC.

**Important:** Before you begin a restore operation, 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 from the GUI, perform the following steps:

1. Click **Restore** from the GUI main window. The Restore window appears.
2. 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 window is displayed. On the window, select



**File name:** or **Tape name:** from the list and 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 data from backup set from the server, first expand the **Server** object and then either **Filelevel** or **Image**, depending on the type of restore requested.
3. Click the selection box next to the backup set or directory or file within the backup set that you want to restore.  
You can select files from within a backup set if that backup set is from the server and has a table of contents.
  4. Click **Restore**. The Restore Destination window appears. Enter the appropriate information.
  5. Click **Restore**. The Task List window displays the restore processing status.

**Note:**

- 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.
- The client can be used to restore a backup set on an attached device with or without a server connection. If the server connection fails, a prompt will appear to continue for purposes of local backup set restore. Also, the `localbackupset` option can be used to tell the client not to attempt the connection to the server.
- Certain local devices such as tape devices (tape devices do not apply to Mac OS X) 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.
- The following features of a backup set restore from the server are not available when restoring locally:
  1. Image restore.
  2. The GUI display and restore of individual files and directories. The command line can be used to restore an individual directory or file from a local backup set.

## Restoring backupsets using the command-line client

The command line client can restore data from a backup set from the server, from a local file, or from a local tape device. You can use the command line client to restore individual files from local backup sets and from backup sets without a TOC.

To restore a backup set from the command line client, use the **query backupset** command to display what backup set data is available, then use restore commands to restore the data.

You can use the commands below to restore data from backup sets. Use the appropriate command for the location of the backup set and the data in the backup set. (See the table in the parent topic)

**restore**  
**restore backupset**  
**restore image**

### Related reference

“Query Backupset” on page 482

The **query backupset** command queries a backup set from a local file, tape device (if applicable) or the Tivoli Storage Manager server. This command displays the backup set name, generation date, retention (for a backup set on a Tivoli Storage Manager server), and user-supplied description.

“Query Image” on page 489

The **query image** command displays information about file system images that are stored on the Tivoli Storage Manager server, or that are inside a backup set from the Tivoli Storage Manager server, when the *backupsetname* option is specified.

“Restore” on page 498

The **restore** command obtains copies of backup versions of your files from a Tivoli Storage Manager server, or inside a backup set. 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.

“Restore Backupset” on page 503

The **restore backupset** command restores a backup set from the Tivoli Storage Manager server, a local file, or a local tape device. You can restore the entire backup set, or, in some cases, specific files within the backup set.

“Restore Image” on page 513

The **restore image** command restores a file system or raw volume image that was backed up using the **backup image** command.

---

## Restoring an image to file

AIX LVM volumes from original volume groups contain the Logical Volume Control Block (LVCB) on the first sector (512 bytes) of the volume. The LVCB contains volume specific meta-data that should be preserved by applications using the volume.

When performing image backup, Tivoli Storage Manager backs up the first sector of the volume, but on restore, it skips the first sector in order to preserve the original LVCB of the destination volume. When performing image restore to file, entire volume contents, including the first sector, are restored to the file. When you copy the file, containing the image, onto an LVM volume from the original volume group, you will need to skip the LVCB from both the file and destination volume. The following **dd** command can be used for this purpose.

```
dd if=<filename> of=/dev/<vol> bs=512 skip=1 seek=1
```

The above command sets the block size to 512 bytes, which will make copying very slow. It is better to use *bs=1m* or similar. Here is a faster (but more complicated) way to copy image data:

1. Save the original first sector to a file:  

```
dd if=/dev/<vol> of=firstblk.tmp bs=512 count=1
```
2. Copy the restored image:  

```
dd if=<filename> of=/dev/<vol> bs=1m
```
3. Restore the original first sector:  

```
dd if=firstblk.tmp of=/dev/<vol> bs=512 count=1
```

With the introduction of big and scalable volume group formats on AIX, it is possible that the first sector of the logical volume cannot contain LVCB and is

available for the data. If you use big or scalable volume groups on your system, and need to restore the whole volume including the first sector, restore the volume to file and then copy it to a destination volume. The following `dd` command can be used for this purpose.

```
dd if=<filename> of=/dev/<vol> bs=1m
```

#### Related concepts

“Performing an image restore using the command line” on page 171

Use the **restore image** command to restore an image using the Tivoli Storage Manager command line client.

#### Related tasks

“Performing an image restore using the GUI” on page 170

This topic explains the procedure that you use to restore an image of your file system or raw logical volume.

---

## Restoring data to a GPFS file system with multiple storage pools

GPFS 3.1 and 3.2 allow you to manage your data using storage pools. A storage pool is a collection of disks or RAID configurations with similar properties that are managed together as a group. The group under which the storage pools are managed together is the file system. The automated placement and management of files on the storage pool level is done by policies. A policy is a set of rules that describes the life cycle of user data, based on the file’s attributes.

When a file is created, the placement policy determines the initial location of the file’s data and assigns the file to a storage pool. All data written to that file is placed in the assigned storage pool. The management policy determines file management operation, such as migration and deletion. The files within a GPFS 3.1 or 3.2 file system are distributed over different storage pools, depending on the enabled placement and migration policies.

During restore, the files are placed on the correct storage pool. Tivoli Storage Manager is not aware of pool-to-pool migrations, so the files are placed on the storage pool from where the backup has taken place. The policy engine replaces the files based on migration policies.

GPFS 3.1 handles the placement of files after a restore as follows:

- The file is placed according to the storage pool ID that is stored in the extended attributes
- The file is placed based on the current placement policy
- The file is placed in the system pool

If a storage pool ID is stored in the extended attributes of the file, and that storage pool is available, the file is always placed in that storage pool. If the storage pool is not available, the file is placed according to the placement policy. If the placement policy does not match the file, the file is placed in the system pool.

GPFS 3.2 handles the placement of files after a restore as follows:

- The file is placed in the pool that can be selected by matching the saved file attributes to a RESTORE rule
- The file is placed in the pool that it was in when it was backed up
- The file is placed based on the current placement policy
- The file is placed in the system storage pool

The GPFS RESTORE rule allows you to match files against their saved attributes rather than the current file attributes. If the file attributes do not match, GPFS tries to restore the file in the sequence described above.

For more information about the GPFS RESTORE rule, read the GPFS documentation about policies and rules.

The following restrictions apply:

- Correct placement to storage pools only works with GPFS 3.1 PTF 6 or higher
- The restore of stub files does not work with multiple storage pools, or with files that have ACLs
- Filesets are not supported
- Unlink of filesets are not allowed
- The ctime option of GPFS should be set to *no* (default), to prevent unwanted Backup-Archive backups of files after GPFS file migration from pool to pool

See the *IBM Tivoli Storage Manager Administrator's Guide* for your operating system, for more information about storage pools.

---

## 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.

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 your workstation prior to the point-in-time specified will not be restored.

### Note:

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 might 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.

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 is displayed. 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 restorable 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.

### Related concepts

Chapter 9, “Understanding storage management policies,” on page 229  
Storage management policies are rules your administrator defines in order to manage your backups and archives on the server. Your data is associated (or bound) 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 management class, and a copy group.

### Related reference

“Backup Image” on page 448

The **backup image** command creates an image backup of one or more volumes on your system. These volumes can be formatted FAT, FAT32, NTFS, or unformatted RAW volumes. If a volume is NTFS-formatted, only those blocks used by the file system will be backed up. If you set the `imagegapsize` option to 0, all blocks, including unused blocks at the end of the volume, will be backed up.

---

## Restoring AIX encrypted files

When files are backed up in raw format from an AIX JFS2 Encrypted File System (EFS), you can only restore them to the same or another JFS2 EFS. They cannot be restored to any different file system, or on a different platform.

When EFS files are backed up in clear text, then you can restore them anywhere. If you restore them to a JFS2 EFS, then they will be automatically re-encrypted only if the directory to which they are restored has AIX’s “EFS inheritance” option set.

After restoring a file backed up in raw format, you might find that the file can no longer be decrypted. The encryption key originally used for the file might not be available any longer in the user’s keystore. In this case, it will be necessary to restore the keystore used at the time of backup. Restore it to a location different from `/var/efs`, and use the AIX command `efskeymgr -f` to add its keys to the kernel key ring.

For information on backing up EFS data, refer to “Backing up AIX encrypted files” on page 154.

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## Restoring AIX workload partition file systems

All the files created by the local workload partition (WPAR) and backed up by the Tivoli Storage Manager client installed at the global WPAR can be restored by the Tivoli Storage Manager client installed at the global WPAR. See the following global partition and WPAR configuration examples.

Global partition:

```
system name: shimla  
file system: /home /opt
```

WPAR #1 configuration:

```
name: wpar1  
file system: /home; name in global WPAR: /wpars/wpar1/home
```

WPAR #2 configuration:

```
name: wpar2  
file system: /data; name in global WPAR: /wpars/wpar2/data
```

There are two ways to restore WPAR data, depending on the method used to back up the WPAR data files as described in “Backing up AIX workload partition file systems” on page 152:

1. Restore all WPAR file systems as the file spaces within the global partition. The file space name must be used to identify the WPAR to which it belongs. All of the data is managed on one node using one schedule. Using the example configuration mentioned previously, here is a sample `dsm.sys` file with one server stanza for all file systems, both global and local:

```
SErvername shimla
      TCPPort      1500
      TCPServeraddress clinton.storage.sanjose.ibm.com
      nodename      shimla
      PasswordAccess generate
      Domain        /wpars/wpar1/home /wpars/wpar2/data /home /opt
```

Use the following command to restore each file space:

```
dsmc restore /wpars/wpar1/home/*
dsmc restore /wpars/wpar2/data/*
dsmc restore /home/*
dsmc restore /opt/
```

2. Restore each WPAR file system from a different node name, if it is backed up under a different node name. Each WPAR must have a separate node name and a scheduler running within the global partition. Also, three scheduler services must be set up, each using a different `dsm.opt` file corresponding to the server stanza name. This method allows each WPAR restore operation to be managed independent of the others. Using the example configuration mentioned previously, here is a sample `dsm.sys` file with three server stanzas: one for `wpar1`, one for `wpar2`, and one for global partition `shimla`:

```
SErvername shimla_wpar1
      TCPPort      1500
      TCPServeraddress clinton.storage.sanjose.ibm.com
      nodename      wpar1
      PasswordAccess generate
      Domain        /wpars/wpar1/home

SErvername shimla_wpar2
      TCPPort      1500
      TCPServeraddress clinton.storage.sanjose.ibm.com
      nodename      wpar2
      PasswordAccess generate
      Domain        /wpars/wpar2/data

SErvername shimla
      TCPPort      1500
      TCPServeraddress clinton.storage.sanjose.ibm.com
      nodename      shimla
      PasswordAccess generate
      Domain        /home /opt
```

*Table 39. Sample WPAR restore commands with `dsm.opt` file*

In <code>dsm.opt</code> file	Sample restore command
<code>servername shimla_wpar1</code>	<code>dsmc restore /wpars/wpar1/home/*</code>
<code>servername shimla_wpar2</code>	<code>dsmc restore /wpars/wpar2/data/*</code>

Table 39. Sample WPAR restore commands with dsm.opt file (continued)

In dsm.opt file	Sample restore command
servername shimla	dsmc restore /home/* dsmc restore /opt/*

#### Related concepts

“Backing up AIX workload partition file systems” on page 152

---

## Restoring NAS file systems

You restore NAS file system images using the Web client or command line interface.

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.

#### Related tasks

“Configuring the Web client” on page 52

There are some steps that you must follow to configure the Web client.

### Restoring NAS file systems using the Web client

This section lists the steps to follow to restore NAS file systems using the Web client GUI.

1. Click the **Restore** button 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. Nodes shown are those that have been backed up and to which your administrator has authority. The root node called **Nodes** is not selectable. This node only appears if a NAS plug-in is present on the client machine. 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. 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. 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. 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. 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 file systems using the command line

The following table lists the commands and options you can use to restore NAS file system images from the command line.

Table 40. NAS options and commands

Option or command	Definition	Page
<b>query node</b>	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.	"Query Node" on page 492
<b>query backup</b>	Use the <b>query backup</b> command with the <i>class</i> option to display information about file system images backed up for a NAS file server.	"Query Backup" on page 479
<b>query filesystem</b>	Use the <b>query filesystem</b> command with the <i>class</i> option to display a list of file spaces belonging to a NAS node.	"Query Filespace" on page 485
<b>restore nas</b>	Restores the image of a file system belonging to a Network Attached Storage (NAS) file server.	"Restore NAS" on page 515
<b>monitor process</b>	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.	"Monitor Process" on page 475
<b>cancel process</b>	Displays current backup 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.	"Cancel Process" on page 455

Table 40. NAS options and commands (continued)

Option or command	Definition	Page
<b>delete filesystem</b>	Use the <b>delete filesystem</b> with the <i>class</i> option to display a list of file spaces belonging to a NAS node so that you can choose one to delete.	“Delete Filespace” on page 462

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 might 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 might display an Interrupted ... message when the mount occurs. You can ignore this message.

---

## Restoring 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.

### Related reference

“Inactive” on page 330

Use the *inactive* option to display both active and inactive objects.

---

## Restoring data using the GUI

This section lists the steps to follow 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 **Find** icon on the tool bar.
3. Enter your search criteria in the Find Files (Restore) window.
4. Click the **Search** button. The Matching Files (Restore) window appears.
5. Click the selection boxes next to the files you want to restore and close the Matching Files (Restore) window.

6. Enter your filter criteria in the Find Files (Restore) window.
7. Click the **Filter** button. The Restore window displays the filtered files.
8. Click the selection boxes next to the filtered files or directories you want to restore.
9. To modify specific restore options, click the **Options** button. Any options you change are effective during the current session *only*.
10. Click **Restore**. The Restore Destination window appears. Enter the information in the Restore Destination window.
11. Click **Restore**. The Restore **Task List** window displays the restore processing status.

**Note:** On Mac OS X, consider the following items when restoring data using the GUI:

1. When **TSM Tools for Administrators** is used to start the client, the client is running with a UID of zero. This means that if you create a folder to restore your files to, that folder is owned by root. To access the files you must change the permissions of the folder. You can change the folder owner from a terminal window using the `sudo chown` command. See your operating system documentation for more information on how to accomplish this.
2. When restoring files with the *replace* option set to *no*, existing files will not be overwritten, but existing directories will. To leave existing directories intact during a restore operation, select the **Options** button ⇒ **All selected files and directories** dropdown menu ⇒ **Files only** option.
3. When folders are restored from a UFS or HFSX file system to a HFS file system and they differ only in case, the client will restore the contents of both folders to one folder.

---

## Restoring data using the command line

Use the `restore` command to restore files. The following table shows examples of using the `restore` command to restore objects from Tivoli Storage Manager server storage.

Table 41. Command line restore examples

Task	Command	Considerations
Restore the most recent backup version of the <code>/Users/monnett/Documents/h1.doc</code> file, even if the backup is inactive.	<code>dsmc restore /Users/monnett/Documents/h1.doc -latest</code>	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 <i>latest</i> 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 343 for more information.
Display a list of active and inactive backup versions of files from which you can select versions to restore.	<code>dsmc restore "/Users/monnett/Documents/*"-pick -inactive</code>	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 363 and “Inactive” on page 330 for more information.

Table 41. Command line restore examples (continued)

Task	Command	Considerations
Restore the /Users/monnett/Documents/h1.doc file to its original directory.	<code>dsmc restore /Users/monnett/Documents/h1.doc</code>	If you do not specify a destination, the files are restored to their original location.
Restore the /Users/monnett/Documents/h1.doc file under a new name and directory.	<code>dsmc restore /Users/monnett/Documents/h1.doc /Users/gordon/Documents/h2.doc</code>	None
Restore the files in the /Users directory and all of its subdirectories.	<code>dsmc restore /Users/ -subdir=yes</code>	When restoring a specific path and file, Tivoli Storage Manager recursively restores <i>all</i> subdirectories under that path, and any instances of the specified file that exist under <i>any</i> of those subdirectories. See “Subdir” on page 411 for more information about the <i>subdir</i> option.
Restore all files in the /Users/gordon/Documents directory to their state as of 1:00 PM on August 17, 2003.	<code>dsmc restore -pitd=8/17/2003 -pitt=13:00:00 /Users/gordon/Documents/</code>	See “Pitdate” on page 364 and “Pittime” on page 365 for more information about the <i>pitdate</i> and <i>pittime</i> options.
Restore all files from the /Users/mike/Documents directory that end with .bak to the /Users/mike/projectn/ directory.	<code>dsmc restore "/Users/mike/Documents/*.bak" /Users/mike/projectn/</code>	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.	<code>dsmc restore -filelist=/Users/user2/Documents/restorelist.txt /Users/NewRestoreLocation/</code>	See “Filelist” on page 316 for more information about restoring a list of files.

### Related reference

“Restore” on page 498

The **restore** command obtains copies of backup versions of your files from a Tivoli Storage Manager server, or inside a backup set. 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.

## 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 -dironly -subdir=no /Users/
```

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 `/Users/user1` and `/Users/user2` are on the same tape, the restore for `/Users/user2` must wait until the restore for `/Users/user1` is complete. However, if `/Users/user3` is on a different tape, and there are at least two tape drives available, the restore for `/Users/user3` can begin at the same time as the restore for `/Users/user1`.

Set the system `ulimit` values to unlimited (-1) if you are restoring very large (2 GB) files with HSM or the backup-archive client. The Tivoli Storage Manager client can restore these large files with enough system resources. If the `ulimits` are set to lower values, there might be restore failures.

## Standard query restore, no query restore, and restartable restore

This topic describes the standard (or classic) restore, the no query restore, and the restartable restore processes.

### Standard restore process

The standard restore process is also known as classic restore, and is 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

The no query restore process is outlined below.

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.

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 *no query restore* 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.

Using the Tivoli Storage Manager GUI client, an example of an unrestricted wildcard command would be to select a folder from the restore tree window. An example of a restricted wildcard command would be to select individual files from a folder.

Using the command-line client, an example of an unrestricted wildcard command would be:

```
"/Users/user1/Documents/2004/*"  
/home/mydocs/2004/*
```

An example of a restricted wildcard file specification would be:

```
/Users/user1/Documents/2004/sales.*  
/home/mydocs/2004/sales.*
```

### Related reference

"Resourceutilization" on page 379

Use the *resourceutilization* option in your option file to regulate the level of resources the Tivoli Storage Manager server and client can use during processing.

### Restartable restore process

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 or choose **restartable restores** from the Actions menu 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.

From the Tivoli Storage Manager GUI **Restartable restores** dialog box you can select the interrupted restore and delete it, or you can choose to restart the restore. If you restart the interrupted restore, it will restart with the first transaction, which might consist of one or more files, not completely restored when the interruption occurred. Because of this, you might receive some replace prompts for files from the interrupted transaction which were already restored.

To perform restartable restores using the GUI, follow these steps:

1. Select **Actions** → **Restartable restores** from the main panel.
2. Select the restartable restore session you want to complete.
3. Click the **Restart** button at the bottom of the panel.

#### **Related reference**

“Restore” on page 498

The **restore** command obtains copies of backup versions of your files from a Tivoli Storage Manager server, or inside a backup set. 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.

---

## **Restoring Solaris Zettabyte (ZFS) file systems**

Zettabyte File Systems (ZFS) use storage pools to manage physical storage.

You can back up and restore ZFS snapshots in one of the following ways:

1. Back up and restore each file of the snapshot by using the ***snapshotroot*** option. This option allows the administrator to replace the current snapshot path with the ZFS file system path.

Using the ***snapshotroot*** option, the files can be directly restored in the file system. If you have many changes in the file system during a backup, a snapshot could be made first, and then the Tivoli Storage Manager Backup-Archive Client can make a backup of the static snapshot.

2. Another way is to back up and restore the complete snapshot. The administrator can then make a copy of the complete snapshot data in a single file, and this file can be backed up and restored by the Tivoli Storage Manager Backup-Archive Client to the Tivoli Storage Manager Server.

The advantage of backing up and restoring the complete snapshot is that the full file system can be restored in a disaster recovery case.

### Related concepts

“Restoring data to a GPFS file system with multiple storage pools” on page 179  
GPFS 3.1 and 3.2 allow you to manage your data using storage pools. A storage pool is a collection of disks or RAID configurations with similar properties that are managed together as a group. The group under which the storage pools are managed together is the file system. The automated placement and management of files on the storage pool level is done by policies. A policy is a set of rules that describes the life cycle of user data, based on the file’s attributes.

### Related tasks

“Backing up Solaris Zettabyte (ZFS) file systems” on page 154  
On Solaris SPARC and x86 systems, ZFS is a transactional file system, which means that the file system state is always consistent on disk. ZFS also uses the concept of storage pools to manage physical storage.

---

## 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.

**Note:** Mac OS X can *only* restore Mac OS X nodes.

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. In the Grant Access to Node field, type the node name of the user’s host machine that can access your data.
5. In the User field, type the name of the user on a node who can access your data.
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.

#### Related reference

“Delete Access” on page 457

The **delete access** command deletes authorization rules for files 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.

“Query Access” on page 477

The **query access** command shows who you have given access to backup versions or archive copies of specific files.

“Set Access” on page 525

The **set access** command gives users at other nodes access to your backup versions or archived copies.

## 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. For example, to get a list of file spaces owned by Ann on Node1, enter:

```
dsmc query filespace -fromn=node1 -fromo=ann
```

### Related reference

“Fromnode” on page 322

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 for the other node.

“Query Filespace” on page 485

The **query filesystem** command displays a list of file spaces for a node that are stored on the Tivoli Storage Manager server, or that are inside a backup set from the Tivoli Storage Manager server, when the *backupsetname* option is specified. You can also specify a single file space name to query.

“Restore” on page 498

The **restore** command obtains copies of backup versions of your files from a Tivoli Storage Manager server, or inside a backup set. 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.

“Retrieve” on page 517

The **retrieve** command obtains copies of archived files from the Tivoli Storage Manager server. You can retrieve specific files or entire directories.

## Restoring or retrieving 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 **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.

**Important:** 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 only recover your files if you can run the client. If the disk that contains the client is lost (from theft or hardware failure, for example), you must reinstall the client before you can recover your files. If you also lose the disk that contains the operating system and communication software, you must recover them before you can connect to the Tivoli Storage Manager 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 startable 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 and Linux User's Guide*, SC32-0148.

**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. 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 individual backup versions by using the **delete backup** command.

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. Use the *class* option with the **delete filespace** command to delete NAS file spaces.

### Related reference

“Class” on page 277

The *class* option specifies whether to display a list of NAS or client objects when using the **delete filesystem**, **query backup**, and **query filesystem** commands.

“Delete Backup” on page 459

The **delete backup** command deletes backup files from Tivoli Storage Manager server storage. Your administrator must give you authority to delete backup files.

“Delete Filespace” on page 462

The **delete filesystem** command deletes file spaces in Tivoli Storage Manager server storage. A file space is a logical space on the server that contains files you backed up or archived.

## Restoring files on the Red Hat Enterprise Linux 4 or 5 client (non-root users)

If you are a non-root user, and you are trying to restore files on the Red Hat Enterprise Linux 4 or 5 client, you must first enable SELinux. If you do not enable SELinux, you will have problems restoring files with modified extended attributes.

---

## Chapter 6. Archiving and retrieving your data (UNIX and Linux)

Archiving and retrieving files is similar to backing up and restoring files. Many of the windows and concepts are similar. In this section, the main archive and retrieve tasks are covered.

All client archive and retrieve procedures in this chapter also apply to the Web client, except the following:

- Estimate
- Preferences editor

The following are the primary archive and retrieve tasks:

- “Archiving data using the GUI” on page 198
- “Archiving data using the command line” on page 198
- “Deleting archive data” on page 201
- “Retrieving data using the GUI” on page 205
- “Retrieving data using the command line” on page 206

### Related concepts

Chapter 4, “Backing up your data,” on page 105

Use the backup-archive client to store backup versions of your files on the Tivoli Storage Manager server. You can restore these backup versions if the original files are lost or damaged. This section discusses various ways you can back up your data.

### Related tasks

“Starting a Web client session” on page 97

After installing the Web client on your workstation you can use the Web client to perform backup, archive, restore, and retrieve operations from any browser that is running Java Runtime Environment (JRE) 5 or 6. 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.

---

## 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. The following sections cover how to archive files without using a schedule.

### Related tasks

“Setting the client scheduler process to run as a background task and start automatically at boot time” on page 214

You can configure the Tivoli Storage Manager client scheduler to run as a background system task which starts automatically when your system is started. This is true for both client acceptor daemon-managed and traditional methods of running the Tivoli Storage Manager client scheduler.

## 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.
3. Enter your search criteria in the Find Files (Archive) window.
4. Click the **Search** button. The Matching Files (Archive) window appears.
5. Click the selection boxes next to the files you want to archive and close the Matching Files (Archive) window.
6. Enter your filter criteria in the Find Files (Archive) window.
7. Click the **Filter** button. The Archive window displays the filtered files.
8. Click the selection boxes next to the filtered files or directories you want to archive.
9. 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.
10. To modify specific archive options, click the **Options** button. Any options you change are effective during the current session *only*. The Java GUI does not have an **Estimate** button.
11. 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.

The following table shows examples of using the **archive** command to archive objects.

Table 42. 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.

Table 42. Command line archive examples (continued)

Task	Command	Considerations
Archive all files in the /home/jones/proj/ directory and delete the files on your workstation.	<code>dsmc archive /home/jones/proj/ -deletefiles</code>	Retrieve the archived files to your workstation whenever you need them again. See “Deletefiles” on page 288 for more information about the <i>deletefiles</i> option.
Archive the /home/jones/h1.doc and /home/jones/test.doc files.	<code>dsmc archive /home/jones/h1.doc /home/jones/test.doc</code>	If you specify the <i>removeoperandlimit</i> option with the <b>archive</b> 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 377 for more information about this option.
Archive a list of files in the /home/avi/filelist.txt file.	<code>dsmc archive -filelist=/home/avi/filelist.txt</code>	Use the <i>filelist</i> option to process a list of files. See “Filelist” on page 316 for more information.
Archive the /home/jones/ch1.doc file and assign a description to the archive.	<code>dsmc archive /home/jones/ch1.doc -description="Chapter 1, first version"</code>	If you do not specify a description with the <b>archive</b> command, the default is Archive Date:x, where x is the current system date. See “Description” on page 289 for more information about the <i>description</i> option.
Archive all of the files in the /home/jones/proj/ directory and its subdirectories.	<code>dsmc archive /home/jones/proj/ -subdir=yes</code>	See “Subdir” on page 411 for more information about the <i>subdir</i> option.
Use the <i>v2archive</i> option with the <b>archive</b> command to archive only files in the /home/relx/dir1 directory, but not the relx or dir1 directories.	<code>dsmc archive "/home/relx/dir1/" -v2archive</code>	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 428 for more information about the <i>v2archive</i> option.
Use the <i>archmc</i> option with the <b>archive</b> command to specify the available management class for your policy domain to which you want to bind your archived files.	<code>dsmc archive -archmc=ret2yrs /home/plan/proj1/budget.jan</code>	See “Archmc” on page 266 for more information about the <i>archmc</i> option. See Chapter 9, “Understanding storage management policies,” on page 229 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.	<code>dsmc archive /usr/dir1/sub1/ -subdir=yes -snapshotroot=/snapshot/day1</code>	Tivoli Storage Manager considers the <i>snapshotroot</i> value as a file space name. See “Snapshotroot” on page 405 for more information.

### Related reference

“Archive” on page 444

The **archive** command archives a single file, selected files, or all files in a directory and its subdirectories on a server.

### 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.

### Related reference

“Snapshotroot” on page 405

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.

## Archiving data with client node proxy

Archives of multiple nodes that share storage can be consolidated to a common target node name on the Tivoli Storage Manager server. This is useful when the machine responsible for performing the archive can change over time, such as with a Xsan or cluster. The *asnodename* option also allows data to be restored from a different system than the one which performed the backup. Use the *asnodename* option with the appropriate command to back up, archive, restore, and retrieve data under the target node name on the Tivoli Storage Manager server. This support is only available with Tivoli Storage Manager Version 5.3 and higher.

To enable this option, follow these steps:

1. Install the backup-archive client on all nodes in a shared data environment.
2. Register each node with the Tivoli Storage Manager server, if it does not exist. Register the common target node name to be shared by each of the agent nodes used in your shared data environment.
3. Register each of the nodes in the shared data environment with the Tivoli Storage Manager server. This is the agent node name that is used for authentication purposes. Data will not be stored using the node name when the *asnodename* option is used.
4. Grant proxy authority to all nodes in the shared environment to access the target node name on the Tivoli Storage Manager server, using the **grant proxynode** command (Tivoli Storage Manager administrator).
5. Use the **query proxynode** administrative client command to display the authorized user’s client nodes, granted by the **grant proxynode** command.

Follow these steps to set up encryption with the *encryptkey=save* option:

1. Specify *encryptkey=save* in the options file.
2. Back up at least one file with *asnode=ProxyNodeName* to create a local encryption key on each agent node in the multiple node environment.

Follow these steps to set up encryption with the *encryptkey=prompt* option:

1. Specify *encryptkey=prompt* in the options file.
2. Ensure that users of the agent nodes in the multiple node environment are using the same encryption key.



- If you change the encryption key, you must repeat the previous steps.
- Use the same encryption key for all files backed up in the shared node environment.

Follow these steps to enable multinode operation from the GUI:

1. Verify that the client node has proxy authority to a target node (or authorized to act as the target node) using the **query proxynode** administrative client command.
2. Select **Edit** → **Preferences** to open the preferences window.
3. Select the **General** tab and fill in the **As Node Name** field with the name of the proxy authorized target node.
4. Click **Apply** and then **OK** to close the preferences window.

Follow these steps to verify that your client node is now accessing the server as the target node:

1. Open the tree window and check that the target node name specified by the **As Node Name** field appears, or
2. Verify the target node name in the **Accessing As Node** field in the **Connection Information** window.

To return to single node operation, delete the **As Node Name** from the **Accessing As Node** field in the **General** → **Preferences** tab.

#### Suggestions:

- All agent nodes in the multiple node environment should be of the same platform type.
- Do not use target nodes as traditional nodes. Use them only for multiple node processing.

#### Restrictions enforced within a proxied session:

- You cannot perform a system object, system state or system services backup or restore.
- You cannot access another node (either from GUI drop down or use of the *fromnode* option).
- You cannot perform NAS backup or restore.

#### Related reference

“Asnodename” on page 267

Use the *asnodename* option to allow agent nodes to back up or restore data on behalf of another node (the target node). This enables concurrent operations from multiple nodes to store data to the same target node and file space in parallel.

## Deleting archive data

If your administrator has given you authority, you can delete individual archive copies from the Tivoli Storage Manager server without deleting the entire file space. To determine if you have this authority, select **File** → **Connection Information** from the Tivoli Storage Manager GUI or Web client main menu. Your authority status is provided in the **Delete Archive Files** field.

To delete archive copies from the Tivoli Storage Manager GUI or Web client:

1. Select **Delete Archive Data** from the **Utilities** menu. The Archive Delete window appears.

2. Expand the Directory tree by clicking the plus sign (+) or folder icon next to the object you want to expand. Objects on the tree are grouped by archive package description.
3. Click the selection boxes next to objects that you want to delete. If you want to estimate the amount of time it takes to process your files and directories, click the **Estimate** button.
4. Click the **Delete** button. Tivoli Storage Manager prompts you for confirmation before deleting archive selections. The Archive Delete Task List window displays the progress of the delete.

To delete archive copies using the Tivoli Storage Manager command line client, use the **delete archive** command.

#### **Related reference**

“Delete Archive” on page 457

The **delete archive** command deletes archived files from Tivoli Storage Manager server storage. Your administrator must give you authority to delete archived files.

## **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.

### **How symbolic links are handled**

Tivoli Storage Manager handles symbolic links differently than it does regular files and directories. How the client handles symbolic links depends on options settings, whether the target directory is accessible, and the way you specify objects.

A *UNIX symbolic link* is a file that contains a pointer to another file or directory. The object the symbolic link points to is called the *target object*. A symbolic link can be backed up as path information to a target directory, or it can be backed up as a directory. If the symbolic link is backed up as a directory, the files and folders in the target directory can be backed up as well. What you restore depends on how the symbolic link was backed up, the scope of the restore, the setting of the *followsymbolic* option, and whether the target directory is accessible at the time of restore.

For more information on how symbolic links are handled during archive, see the *archsymb linkasfile* option.

**Note:** Symbolic link processing as described here does not apply to Mac OS X. Symbolic links are always archived as files and are never followed.

The following table shows symbolic link archive and retrieve functions and the action taken:

Table 43. 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.
Archive of a file with <code>subdir=yes</code> .	Archives the file, directory path and all like-named files in the subtree.
Archive of a directory with <code>subdir=yes</code> .	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 <code>replace=y</code> 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.

### Related reference

“Archsymlinkasfile” on page 266

The *archsymbllinkasfile* 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.

### Incremental or selective backup:

How the client backs up a symbolic link depends on whether the target of the symbolic link is a file or a directory, and how you specify the symbolic link on the incremental or selective backup command.

If a symbolic link points to a file, the client only backs up the path information. The client does not back up a file that is the target of a symbolic link.

If a symbolic link points to a directory, the backup depends on how the directory is specified on the command. If a directory is specified with a trailing slash on a selective or incremental backup command, the client saves the symbolic link as a directory, and backs up the contents of the target directory. If the symbolic link is entered without a trailing slash, or if a symbolic link is not explicitly stated in a backup file specification, the client backs up only the path information to the target directory. The contents of the target directory are not backed up.

In the examples below, assume that *symdir* is a symbolic link to target directory `/fs1/guest/`. `/fs1/guest/` contains a subdirectory `/fs1/guest/dir1`.

*Example 1* `dsmc incr /home/gillis/symdir/`

In this example, the client backs up the symbolic link as a directory, and backs up the contents of the target directory `/fs1/guest/`. If `subdir=yes`, the client backs up subdirectories of `/fs1/guest/`.

*Example 2a* `dsmc incr /home/gillis/symdir/dir1`

*Example 2b* `dsmc incr /home/gillis/symdir/dir1/`

In these examples, the client backs up the symbolic link as a directory, and backs up the `/dir1/` subdirectory of the target directory. Trailing slash is consequential only for the symbolic link; it is inconsequential for subdirectories of the symbolic link. If the `subdir` option is set, the client backs up subdirectories of `/fs1/guest/dir1`. Backup copies stored on the Tivoli Storage Manager server have a path like `/home/gillis/symdir/dir1/file1`.

*Example 3* `dsmc incr /home/gillis/symdir`

In this example, because there is no trailing slash after the symbolic link, the client backs up only the path to the target directory. The client does not back up the symbolic link as a directory, and does not back up files nor folders in the target directory.

*Example 4* `dsmc incr /home/gillis`

In this example, because the symbolic link is not explicitly stated in the backup file specification, the client backs up only the path to the target directory. As in the third example 3, the client does not back up the symbolic link as a directory, and does not back up files nor folders in the target directory.

#### **Note:**

If you back up a symbolic link as a directory, a future incremental backup that does not back up that symbolic link as a directory will expire the that symbolic link as a directory, and will expire the files and directories in that directory.

For example, assume that you first back up the symbolic link `symdir` as a directory, and back up the contents of the target directory. The command in example 1 above does this. The client creates backup copies with a high-level path `/home/gillis/symdir/`.

In this example, the client creates backup copies with these paths:

```
/home/gillis/symdir/  
/home/gillis/symdir/file  
/home/gillis/symdir/dir1  
/home/gillis/symdir/dir1/file1
```

### **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 archive 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.

**Important:** When you retrieve a file without any specifications, and more than one version of the archive copy exists on the server, Tivoli Storage Manager retrieves all of the copies. After the first copy is retrieved, the second copy will be retrieved. If there is an existing copy on your client machine, you are prompted to replace, skip, or cancel.

### Related concepts

“Restoring or retrieving files to another workstation” on page 194

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.

### Related tasks

“Authorizing another user to restore or retrieve your files” on page 192

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.

“Restoring or retrieving files from another client node” on page 193

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.

## Retrieving data using the GUI

There are steps you must perform to retrieve an archived file.

1. Click **Retrieve** from the client Java 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.
3. Enter your search criteria in the Find Files (Retrieve) window.
4. Click the **Search** button. The Matching Files (Retrieve) window appears.
5. Click the selection boxes next to the files you want to retrieve and close the Matching Files (Retrieve) window.
6. Enter your filter criteria in the Find Files (Retrieve) window.
7. Click the **Filter** button. The Retrieve window displays the filtered files.
8. Click the selection boxes next to the filtered files or directories you want to retrieve.
9. To modify specific retrieve options, click the **Options** button. Any options you change are effective during the current session *only*.

10. Click **Retrieve**. The Retrieve Destination window appears. Enter the appropriate information in the Retrieve Destination window.
11. Click **Retrieve**. The Retrieve **Task List** window displays the retrieve processing status. When folders are retrieved from a case sensitive file system (UFS, HFSX, or XSAN) to a case insensitive file system (HFS or HFS+) and they differ only in case, the client will retrieve the contents of both folders to one folder.

## 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 storage to your workstation. The following table shows examples of using the **retrieve** command.

Table 44. Command line examples of retrieving archives

Task	Command	Considerations
Retrieve the /home/jones/h1.doc file to its original directory.	<code>dsmc retrieve /home/jones/h1.doc</code>	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.	<code>dsmc retrieve /home/jones/h1.doc /home/smith/h2.doc</code>	None
Retrieve all files from the /home/jones directory that end with the characters .bak to the /home/smith directory.	<code>dsmc retrieve "/home/jones/*.bak" /home/smith/</code>	None.
Retrieve the /home/jones/ch1.doc file and assign a description to the retrieve.	<code>dsmc retrieve /home/jones/ch1.doc -description="Chapter 1, first version"</code>	If you do not specify a description with the <b>retrieve</b> command, the default is Retrieve Date:x, where x is the current system date. See "Description" on page 289 for more information about the <i>description</i> option.
Use the <i>pick</i> option to display a list of archives from which you can select files to retrieve.	<code>dsmc retrieve "/home/jones/*" -pick</code>	See "Pick" on page 363 for more information about the <i>pick</i> option.
Retrieve a list of files specified in the retrievelist.txt file to their original directory.	<code>dsmc retrieve -filelist=/home/dir2/retrievelist.txt</code>	See "Filelist" on page 316 for more information about retrieving a list of files.

### Related reference

"Retrieve" on page 517

The **retrieve** command obtains copies of archived files from the Tivoli Storage Manager server. You can retrieve specific files or entire directories.

## 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.

You can also add include-exclude statements in the Tivoli Storage Manager Client Java GUI or Web client directory tree. Then you can use the **Utilities Preview Include-Exclude** function to preview the include-exclude list prior to sending data to the server.

#### **Related concepts**

“Assigning a management class to files” on page 235

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.

“Displaying information about management classes and copy groups” on page 231

You can display policy information with the command line interface or with a graphical user interface. On a graphical user interface, click **View policy information** from the Utilities menu. The **Policy information** window displays the available management classes. On a command line, use the **query mgmtclass** command to view the available management classes. The *detail* option provides more information.

#### **Related reference**

“Preview” on page 476

The **preview** command simulates a backup or archive command without sending data to the server. The **preview** command generates a tab delineated text file that can be imported into a spreadsheet program. The preview contains information such as whether the file is excluded or included. If the file is excluded, the pattern, or reason, the file is excluded will be listed, along with the source for the pattern.





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## Chapter 7. Using the Tivoli Storage Manager central scheduler

This section discusses how to use the Tivoli Storage Manager scheduler.

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### Overview of the Tivoli Storage Manager 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.

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 file systems 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 quotation marks around each file specification that contains blanks, then single quotes around all of the specifications.

The following are some 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/"
objects="/Users/user1/Documents/Some file.doc"
objects="/Users/user1/Documents/Some file.doc" "/Users/user5/Documents/
Another file.txt" /Users/user3/Documents/noblanks.txt'
objects="/Users/user1/My Directory With Blank Spaces/"
```

This will ensure that /home/proj1/Some file.doc is treated as a single file name, as opposed to two 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 might 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 options file. However, some of these options can be set globally on the Tivoli Storage Manager server for all Tivoli Storage Manager clients. 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
<i>managedservices</i>	X		
<i>maxcmdretries</i>	X		set maxcmdretries command
<i>maxschedsessions</i>		X	
<i>postschedulecmd</i> , <i>postnschedulecmd</i>	X		
<i>preschedulecmd</i> , <i>prenschedulecmd</i>	X		
<i>queryschedperiod</i>	X		set queryschedperiod command
<i>randomize</i>		X	
<i>retryperiod</i>	X		set retryperiod command
<i>shedcmddisabled</i>	X		
<i>shedlogname</i>	X		
<i>shedlogretention</i>	X		
<i>shedmode</i>	X		set schedmodes command
<i>sessioninitiation</i>	X	X (update node command)	
<i>tcpclientaddress</i>	X	X (also defined on server when <i>sessioninit=serveronly</i> as part of the node definition)	
<i>tcpclientport</i>	X	X (also defined on server when <i>sessioninit=serveronly</i> 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 two variations on the schedule mode: *client polling* and *server prompted*.

## Handling return codes from *preschedulecmd* and *postschedulecmd* scripts

This topic lists the return codes that you might see when you use the *preschedulecmd* and *postschedulecmd* options.

- 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* command might exit with return code 3, if *widget* ran successfully. Therefore, it is possible that the *preschedulecmd* or *postschedulecmd* command might 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* might look like this:

```
run 'widget'
  if lastcc == 3
    exit 0
  else
    exit 1
```

### Related reference

“Postschedulecmd/Postnschedulecmd” on page 365

The postschedulecmd/postnschedulecmd 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.

“Preschedulecmd/Prenschedulecmd” on page 368

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*.

---

## Using the client acceptor to manage scheduler services versus the traditional scheduler services

You can configure the Tivoli Storage Manager client to manage the scheduler process using the Tivoli Storage Manager client acceptor. The client acceptor daemon 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 client acceptor daemon to manage the scheduler is the preferred method.

The following information is a comparison of the client acceptor daemon-managed services and the traditional scheduler services methods.

### client acceptor daemon-managed Services

- Defined using the *manageservices schedule* option and started with client acceptor daemon services (dsmcad).
- The client acceptor daemon 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 client acceptor daemon services start a scheduled backup.
- Cannot be used with SESSIONINITiation=SERVEROnly backups.

### Tivoli Storage Manager traditional 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.

**Recommendation:** Restart the traditional scheduler periodically to free system resources previously used by system calls.

---

## 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 started. This is true for both client acceptor daemon-managed and traditional methods of running the Tivoli Storage Manager client scheduler.

When running a client acceptor daemon-managed schedule, only the client acceptor daemon 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 client acceptor daemon to run as a background system task which starts automatically when your system is started. To configure the client acceptor daemon 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 client acceptor daemon 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 (without a 'managedservices' stanza set).

To start the scheduler automatically at boot time, use either of the following methods:

### Client acceptor daemon-managed

1. In your `dsm.sys` file, set the *managedservices* option to *schedule* or *schedule webclient*.
2. Add the following entry into the system startup file (`/etc/inittab` for most platforms):

```
tsm::once:/usr/bin/dsmcad > /dev/null 2>&1 # TSM Client Acceptor Daemon
```
3. In your `dsm.sys` file, set the *passwordaccess* option to *generate*.
4. Run a command like `dsmc query sess` to store the node password.

### Traditional

1. In your `dsm.sys` file, either remove the *managedservices* option or set it to *webclient*.
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 z/OS 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
l>/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 `dsm.sys` file, 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 &
```

If you are using the client acceptor daemon to manage the scheduler, you must set the recovery properties for the "TSM Client Acceptor" service, but leave the settings for the "TSM Client Scheduler" to take no action for first, second, and subsequent failures.

**Requirement:** For Mac OS X, the Tivoli Storage Manager client acceptor daemon must be installed as a Startup Item. A System Administrator must use TSM Tools for Administrators to install and start the client acceptor daemon.

For Mac OS X, after the client acceptor daemon has been installed as a startup item, the SystemStarter utility can be used to start, restart, or temporarily stop the client acceptor daemon.

**To start the client acceptor daemon use the following command:**

```
sudo /sbin/SystemStarter start dsmcad
```

**To restart the client acceptor daemon use the following command:**

```
sudo /sbin/SystemStarter restart dsmcad
```

**To stop the client acceptor daemon use the following command:**

```
sudo /sbin/SystemStarter stop dsmcad
```

---

## Displaying information about scheduled work

Schedules can be classic or enhanced, depending on how the interval to the next execution is defined. Classic schedules allow the period to be as small as an hour. Enhanced schedules allow actions to be executed on specific days.

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. Figure 1 displays sample classic **query schedule** output.

---

```
Schedule Name: DAILY_INC
Description: Daily System-wide backup
Schedule Style: Classic
Action: Incremental
Options: QUIET
Objects:
Priority: 1
Next Execution: 30 minutes
Duration: 4 Hours
Period: 1 Day
Day of Week: Any
Month:
Day of Month:
Week of Month:
Expire: Never

Schedule Name: WEEKLY_INC
Description: Weekly backup for project files
Schedule Style: Classic
Action: Incremental
Options: QUIET
Objects: /proj
Priority: 1
Next Execution: 60 minutes
Duration: 8 Hours
Period: 7 Days
Day of Week: Friday
Month:
Day of Month:
Week of Month:
Expire: Never
```

---

*Figure 1. Sample classic query schedule output*

The schedule name, **WEEKLY\_INC**, starts a weekly incremental backup in the /proj file system.

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.

To more accurately determine the status of scheduled events, the **query schedule** output for an enhanced schedule, on Tivoli Storage Manager Version 5.3 client and above, includes new fields. These fields are always displayed, even if it is a classic schedule or a Tivoli Storage Manager Version 5.3 client session with a pre-Version



5.3 server, but the new fields are blank. Note that for a down-level (prior to Tivoli Storage Manager Version 5.3) client, the server reports the period as indefinite and the day of week as an illegal day. Figure 2 displays sample enhanced **query schedule** output.

---

```
Schedule Name: QUARTERLY_FULL
  Description: Quarterly full backup
  Schedule Style: Enhanced
  Action: Selective
  Options: subdir=yes
  Objects: /* /Volumes/fs2/*
  Priority: 5
  Next Execution: 1744 Hours and 26 Minutes
  Duration: 1 Day
  Period:
  Day of Week: Friday
  Month: March, June, September, December
  Day of Month: Any
  Week of Month: Last
  Expire: Never
```

---

*Figure 2. Sample enhanced query schedule output*

For more information about the enhanced **query schedule** command, see the following publications:

- *IBM Tivoli Storage Manager for AIX Administrator's Reference*
- *IBM Tivoli Storage Manager for AIX Administrator's Guide*
- *IBM Tivoli Storage Manager for HP-UX Administrator's Reference*
- *IBM Tivoli Storage Manager for Linux Administrator's Reference*
- *IBM Tivoli Storage Manager for Sun Solaris Administrator's Reference*
- *IBM Tivoli Storage Manager for Sun Solaris Administrator's Guide*
- *IBM Tivoli Storage Manager for Windows Administrator's Reference*
- *IBM Tivoli Storage Manager for Windows Administrator's Guide*

---

## 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 installation directory unless you change the directory and file name using the *shedlogname* 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. The `dsmsched.log` cannot be a symbolic link.

**Note:** On Mac OS X, by default the log can be found in one of these locations:

```
~/Library/Logs
/Library/Logs
```

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
```

If the scheduled event does not complete successfully, you will receive a message similar to the following:

```
ANS1512E Scheduled event eventname failed. Return code = code.
```

The client indicates whether Tivoli Storage Manager successfully issued the scheduled command associated with the *eventname* (action=command). 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 *shedlogretention* option or specify a maximum size using the *shedlogmax* option.

#### Related concepts

“Specifying scheduling options”

You can modify scheduling options in the client options file. You can also modify scheduling options in the graphical user interface. However, if your administrator specifies a value for these options, that value overrides the value in your client.

---

## Specifying scheduling options

You can modify scheduling options in the client options file. You can also modify scheduling options in the graphical user interface. However, if your administrator specifies a value for these options, that value overrides the value in your client.

#### Related concepts

“Scheduling options” on page 253

This topic discusses the options that you can use to regulate central scheduling. Tivoli Storage Manager uses scheduling options only when the Scheduler is running.

---

## 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 other 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 *shedcmduser* server option.

The *shedcmduser* 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.

**Note:** The *shedcmduser* option does NOT affect the user ID used for the pre-schedule and post-schedule commands. Pre-schedule and post-schedule always run as root (user ID 0).

---

## Enabling or disabling scheduled commands

Where supported, 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.

You can use the *schedrestretrdisabled* option to prevent the Tivoli Storage Manager Server administrator from executing restore or retrieve schedule operations.

Where supported, you can use the *srvprepostscheddisabled* option to prevent the Tivoli Storage Manager Server administrator from executing pre-schedule and post-schedule commands when performing scheduled operations.

On UNIX and Linux or Windows clients, you can use the *srvprepostsnapdisabled* option to prevent the Tivoli Storage Manager Server administrator from executing pre-snapshot and post-snapshot commands when performing scheduled image snapshot backup operations.

### Related reference

“Schedcmddisabled” on page 383

The *schedcmddisabled* option specifies whether to disable the scheduling of commands by the server *action=command* option on the **define schedule** server command.

“Schedrestretrdisabled” on page 390

The *schedrestretrdisabled* option specifies whether to disable the execution of restore or retrieve schedule operations.

“Srvprepostscheddisabled” on page 408

The *srvprepostscheddisabled* option specifies whether to prevent the pre-schedule and post-schedule commands specified by the Tivoli Storage Manager administrator from executing on the client system, when performing scheduled operations.

“Srvprepostsnapdisabled” on page 409

The *srvprepostsnapdisabled* option specifies whether to prevent the pre-snapshot and post-snapshot commands specified by the Tivoli Storage Manager administrator from executing on the client system, when performing scheduled image snapshot backup operations.

---

## Managing multiple schedule requirements on one system

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 system.

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 file systems on your client system must be backed up daily, and that one file system 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 backup at the same time.
- You can specify different backup criteria for each schedule started, with the 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 and Linux platforms with either the client acceptor daemon 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 *dsm.sys* file 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 might also choose to define customized *domain*, *include*, and *exclude* statements for each stanza.
- In your *dsm.sys* file, 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 *shedmode* 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 client acceptor daemon in the *dsm.sys* file. 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
tcpserver     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
tcpserver     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
sudo dsmcad
```

- In shell command window 2, enter:

```
export DSM_CONFIG=/test/dsm.opt2
sudo 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 system

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 system.

You can create a shell script to search for and kill running Tivoli Storage Manager scheduler or client acceptor daemon 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:

```
#!/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
# alternate options 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"

```

It is also possible to stop the client acceptor daemon by finding the PID of the dsmcad application and sending it a signal with the kill command:

```

sudo ps -x | grep dsmcad
sudo kill <dsmcad PID>

```

---

## Using the scheduler on clustered systems

Using Tivoli Storage Manager client in cluster environment requires additional configuration steps and can be easily done.

The following 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.

You should 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, 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.

### Related information

### Related concepts

“Cluster environment configuration and use” on page 68

The term *cluster* has different meanings in different environments. It can mean highly available, high performance, load balancing, grid computing, or some combination of all of these terms. There are currently several clustering products available for UNIX and Linux, and this section defines those aspects of a clustering environment that need to exist in order for this backup methodology to work correctly. A basic understanding of how your cluster software functions is needed. Cluster software related activities such as the development of application start and stop scripts are not described in this section.

### Related tasks

“Changing your password” on page 99

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.

---

## 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 systems. The Tivoli Storage Manager server **query event** command allows an administrator to view event records on the Tivoli Storage Manager server.

The following is a useful query which shows all of the event results for the previous day:

```
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 the following query:

```
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 45 summarizes the meaning of the event status codes which are likely to exist for a scheduled event that has already taken place:

Table 45. 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 complete for the same or a different schedule.

Table 45. Scheduled client event status codes (continued)

Status	Meaning
Started	Normally, this indicates that a scheduled event has begun. However, if an event showing a status of <i>Started</i> is followed by one more <i>Missed</i> 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. 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.

### Related tasks

“Restarting the scheduler process on a remote system” on page 221

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 system.

## 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 begin=08/21/2003 begint=08:25:00
query actlog begin=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 system is required for inspecting the schedule log.



The schedule log file typically resides in the same directory as the Tivoli Storage Manager client error log (dsmerror.log), in a file named dsmsched.log. The location of the log file can be specified using the *shedlogname* option, so you might need to refer to the options file to see if the *shedlogname* 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 remains unclear, check the client error log file (usually named dsmerror.log.)

**Note:** On Mac OS X, the default location for the scheduler log file is /Library/Logs/tivoli/tsm. The Console application can be used to view the log.

## Understanding the scheduler log

The scheduler log file provides information about which schedule runs next and which files are processed.

The schedule log continues to grow in size unless you prune it using the *shedlogretention* option or specify a maximum size using the *shedlogmax* option.

When the scheduler queries the server for the next schedule, it sends the schedule information to the log file. The following information is logged:

Table 46. Schedule log information

Category	Description
Schedule name	Specifies the name the administrator assigns to the schedule.
Action	Specifies the type of task to perform on the files listed in the Objects field: <ul style="list-style-type: none"> <li>• Incremental. Incrementally backs up the files.</li> <li>• Selective. Backs up the files.</li> <li>• Archive. Archives the files.</li> <li>• Restore. Restores the files.</li> <li>• Retrieve. Retrieves the files.</li> <li>• Command. Executes a client operating system command described in the Objects field.</li> <li>• Macro. Executes a macro whose file name is described in the Objects field.</li> </ul>
Objects	Names the volumes or files to process. If the action is a backup, archive, retrieve, or restore operation, the objects are file spaces, directories, or logical volumes. If this field is empty for an incremental backup, then the default is used. If the action is to run a command or macro, the object is the name of the command or macro to run.
Options	Overrides options that you set for scheduling in your Preferences file.
Server window start	Specifies the date and time when the next schedule will run. If the server uses randomization for schedules, the schedule then runs <i>after</i> the specified time.

Output from scheduled commands is sent to the schedule log file. After scheduled work is performed, check the log to ensure the work completed successfully.

When a scheduled command is processed the schedule log contains the following entry:

```
Scheduled event eventname completed successfully
```

This is merely an indication that 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 should assess the success or failure 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:
```

You can modify the scheduling options in your Preferences file if you do not like the current values and the options are not over-ridden by server settings for your schedule. You can determine this by comparing a 'dsmc q options' output to your local options files.

#### **Related concepts**

"Scheduling options" on page 253

This topic discusses the options that you can use to regulate central scheduling. Tivoli Storage Manager uses scheduling options only when the Scheduler is running.

---

## Chapter 8. Client return codes

The backup-archive command-line interface and the scheduler exit with return codes that accurately reflect the success or failure of the client operation. Scripts, batch files, and other automation facilities can use the return code from the command-line interface. For operations that use Tivoli Storage Manager's scheduler, the return codes are shown in the output of the QUERY EVENT administrative command.

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 or ANSnnnnS), then the return code will be 12.

The exception to the above rules is 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 dserror.log file (and, for scheduled events, the dsmsched.log file).

For a description of the return codes and their meanings, see the following table.

Table 47. Client 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: <ul style="list-style-type: none"><li>• The file satisfies an entry in an exclude list.</li><li>• The file was in use by another application and could not be accessed by the client.</li><li>• The file changed during the operation to an extent prohibited by the copy serialization attribute. See "Copy serialization" on page 233.</li></ul>
8	The operation completed with at least one warning message. For scheduled events, the status will be <i>Completed</i> . Review dserror.log (and dsmsched.log for scheduled events) to determine what warning messages were issued and to assess their impact on the operation.
12	The operation completed with at least one error message (except for error messages for skipped files). For scheduled events, the status will be <i>Failed</i> . Review the dserror.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 or file specification from being processed yields return code 12.

Table 47. Client return codes and their meanings (continued)

Code	Explanation
<i>other</i>	<p>For scheduled operations where the scheduled action is <code>COMMAND</code>, 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 <i>Completed</i>. If the return code is nonzero, then the status will be <i>Failed</i>.</p> <p>Some commands might issue a nonzero return code to indicate success. For these commands, you can avoid a <i>Failed</i> status by <i>wrapping</i> 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 to modify the schedule definition to invoke your script instead of the command.</p>

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 completed with return code 8; and the third command completed with return code 4, the return code for the macro will be 8.

See the *IBM Tivoli Storage Manager Administrator's Reference* for your operating system for more information about QUERY EVENT.

#### Related concepts

“Scheduling options for commands” on page 218

The scheduler executes commands under a user ID of 0 (root); however, some commands might need to be executed under a user ID other 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.

---

## Chapter 9. Understanding storage management policies

Storage management policies are rules your administrator defines in order to manage your backups and archives on the server. Your data is associated (or bound) 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 management class, and a copy group.

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 HSM 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.

---

## 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 HSM 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. Each file and directory that you back up, and each file that you archive, is associated with (or *bound* to) a management class, as follows:

- If your data is not associated with a management class, Tivoli Storage Manager uses the default management class in the active policy set.
- For backing up 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 archiving 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. In your client options file, you can associate directories with a management class, using the *dirmc* option.

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:

- 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:

- On which media type 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 remaining inactive version of a file is kept.

An *archive copy group* contains attributes that control:

- Whether a file is archived if it is in use
- On which media type the server stores archived copies of your files
- How long the server keeps archived copies of your files

### Related concepts

“Selecting a management class for files” on page 234

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.

“Using a retention grace period” on page 238

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.

---

## Displaying information about management classes and copy groups

You can display policy information with the command line interface or with a graphical user interface. On a graphical user interface, click **View policy information** from the Utilities menu. The **Policy information** window displays the available management classes. On a command line, use the **query mgmtclass** command to view the available management classes. The *detail* option provides more information.

Table 48 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 48. 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
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

*Copy group name* is the name of the copy group. The default value for both backup and archive is *Standard*.

## Copy type

*Copy type* is the type of the 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.

Copy frequency is ignored during a journal-based backup.

## Versions data exists

The *Versions Data Exists* attribute specifies the maximum number of different backup versions retained for files and directories. 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 deleted. This parameter is ignored until you delete the file or directory.

If you delete the file or directory, the next time you run an incremental backup, the active backup version is changed to inactive. Tivoli Storage Manager deletes the oldest versions in excess of 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 system. 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 deleted from the server 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.
- **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 options 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.
- **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 backup or archive as many as four additional times, depending on the value specified on the *changingretries* option in your 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.

**Important:** 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 dynamic serialization to back up files, unless you are absolutely certain that a restore of a fuzzy copy will be usable.

### Related reference

“Snapshotproviderimage” on page 404

Use the *snapshotproviderimage* option to enable snapshot-based image backup, and to specify a snapshot provider.

## 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.
  - If only the file metadata changes (such as access permissions), but the file data does not change, Tivoli Storage Manager might back up only the metadata.
  - 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

*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

*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 be backed 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 inconsistent data. 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 options file.

You can assign a management class for a file or file group by using an **include** statement in your options file. You can also assign a management class by using an **include** statement in include-exclude file specified by the *inlexcl* option. Management class names are not case-sensitive.

Using the command-line client, to associate all files in the costs directory with the management class **budget**, you would enter:

```
include /home/proj2/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 the following:

```
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/february/white.sno
```

Processing follows these steps:

1. The file white.sno in the february directory in the winter directory is backed up following bottom-up processing rules. Because you did not specify a management class on this statement, the file is assigned to the default management class.
2. Any file with an extension of ice in the **january** directory is assigned to the management class, **mcmonthly**.
3. Any file with an extension of ice in the **december** directory is assigned to the management class, **mcdaily**.
4. Any other files with an extension of ice in any directory under **winter** are assigned to the management class, **mcweekly**.
5. Any file with an extension of sno in any directory is excluded from backup. The exception to this rule is white.sno in the february directory in the winter directory.

To specify your own default management class `mgmt_class_name` for files that are not explicitly included, put the statement below at the top of your include list:

```
include ../../* mgmt_class_name
```

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.

#### Related reference

“Dirmc” on page 292

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. Select a management class for individual directories that retains directories at least as long as it retains the files associated with them.

“Include options” on page 332

The include options specify objects that you want to include for backup and archive services.

---

## Overriding the management class for archived files

When you archive a file, you can override the assigned management class using the a 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.

On the command line, to associate the file `budget.jan` with the management class `ret2yrs`, enter this command:

```
dsmc archive -archmc=ret2yrs /home/jones/budget.jan
```

---

## Selecting a management class for directories

If the management class in your active policy set containing the longest “Retain only version” (RETONLY) setting meets your backup requirements for directories, it might not be 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 there is more than one management class with the longest RETONLY setting, the Tivoli Storage Manager client selects the management class whose name is last in alphabetical order.

If the default management class does not meet your requirements, select a management class with an adequate retention period specified by the *retain only version* parameter. For example, if the management class happens to back up data directly to tape, but you want your directory backups to go to disk, you will need to choose a different management class. You should keep directories at least as long as you keep the files associated with those directories.

For backup directories, use the *dirmc* option to specify the management class to which directories will be bound.

For archive directories, use the *archmc* option with the **archive** command.

You can use these methods to view the available management classes and their attributes:

- GUI or Web Client: Select **View Policy Information** from the **Utilities** menu.
- command-line client: Run **dsmc query mgmtclass -detail**.

**Note:** During expiration processing on a 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 the archived directory to ensure that the directory is not expired before the files under it.

---

## Binding 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.

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 an *include.archive* statement, the *archmc* option, or through a Tivoli Storage Manager GUI, any previous copies of the file that you archived remain bound to the management class specified when you archived them.

If a file is deleted on the client system then that file's inactive objects are not rebound.

Refer to the *IBM Tivoli Storage Manager Administrator's Guide* for your operating system, for more information on how files and directories are associated with management classes.

---

## Rebinding backup versions of files

*Rebinding* associates a file or a logical volume image with a new management class.

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.

Refer to the *IBM Tivoli Storage Manager Administrator's Guide* for your operating system, for more information on how files and directories are associated with management classes.

---

## 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 in the following cases:

- 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.

---

## Using event-based policy retention protection

All management classes with an archive copy group must specify a retention period, for example, the number of days that an archived object will be stored on the server before being deleted. Event-based policy provides the option of beginning the retention period either at the time the object is archived or at a later date when an activation event is sent to the server for that object.

Using the Tivoli Storage Manager copy group value `RETINIT=CREATE` starts the data retention period when the file is archived. Using the copy group value `RETINIT=EVENT` starts the data retention period when the server is notified that the event has occurred.

The following example demonstrates this concept:

The user has two files, `create.file` and `event.file`. The user has available two management classes; CREATE, with RETINIT= CREATE, and EVENT, with RETINIT=EVENT. Both management classes have a 60-day retention period. The user, on the same day, archives both files:

```
dsmc archive create.file -archmc=CREATE
dsmc archive event.file -archmc=EVENT
```

Ten days later, the user issues the **set event -type=hold** command for the `create.file` file, so the file cannot be deleted. On the same day the user issues the **set event -type=activate** for the `event.file` file. At this time, `create.file` has 50 days left on its retention period, and `event.file` has 60 days. If no other action is taken, `create.file` will remain on the server forever, and `event.file` will be expired 70 days after it was created (60 days after its event occurred). However, let's say that 20 days after the initial archive, the user issues **set event -type=release** for the `create.file` file. Thirty days of its retention period have passed, so the file will be expired in 30 days (the hold does not extend the retention period).

See the *IBM Tivoli Storage Manager Administrator's Guide* for your operating system, for more information about RETINIT.

#### Related reference

"Set Event" on page 527

The **set event** command allows you to specify the circumstances for when archived data is deleted.

## Archiving files on a data retention server

Up to this point, there is no difference between archiving files on a normal server or a data retention server.

The following example demonstrates the differences between the two servers, and what can be done at day 5:

If the files were archived on a non-data retention server, the user can issue the **delete archive create.file event.file** command and both files will be deleted. If the files were archived on a data retention server, the same command will fail both files. The data retention server forces the user to keep archives until the stated retention criteria are met.

Now let's see the difference at day 15 (after the hold):

The **delete archive create.file event.file** command on the non-data retention server now deletes `event.file`, but returns a *cannot delete* error for `create.file` because it is in hold status. That same command to a data retention server still rejects the deletion of both files.





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## Chapter 10. Using processing options

You can use defaults for processing options or you can tailor the processing options to meet your specific needs. This topic provides an overview of processing options and an options reference section that provides detailed information about each option.

### Related concepts

“Using options with commands” on page 257

You can override some of the options in your client options file (dsm.opt) file by entering them with appropriate Tivoli Storage Manager commands.

---

## Overview of processing options

This section provides an overview of the types of options that you can use.

Tivoli Storage Manager uses *processing options* that you specify in your 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.

- Communication options
- Server and node 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
- Diagnostics options

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.

### Related concepts

“Entering options with a command” on page 258

This topic lists the general rules for entering options with a command.

### Related tasks

“Creating and modifying the client options file” on page 43

The client options file is an editable file that identifies the server and communication method, and provides the configuration for backup, archiving, hierarchical storage management, and scheduling.

---

## Communication options

You use communication options to specify how your client node communicates with a Tivoli Storage Manager server. This topic provides information about the types of communication options you can use.

For UNIX and Linux use one of the following communication protocols:

- TCP/IP (Mac OS X)
- Shared memory (AIX, HP-UX, Linux, and Solaris)

Use the *commmethod* option to specify the communication protocol.

Ask your Tivoli Storage Manager administrator for assistance in setting your communication options.

#### Related reference

“Commmethod” on page 279

The *commmethod* option specifies the communication method you use to provide connectivity for client-server communication.

## TCP/IP options

To use the TCP/IP communication protocol, you must include the *tcpserveraddress* option in your client options file. The other TCP/IP options have default values that you can modify if you want to change the default value. This topic provides information about the types of communication options you can use.

Table 49. TCP/IP options

Option	Description
<i>httpport</i> “Httpport” on page 327	Specifies a TCP/IP port address for the Tivoli Storage Manager Web client.
<i>lanfreetcport</i> “Lanfreetcport” on page 341	Specifies the TCP/IP port number where the Tivoli Storage Manager storage agent is listening.
<i>lanfreetcpserveraddress</i> “Lanfreetcpserveraddress” on page 342	Specifies the TCP/IP address for the Tivoli Storage Manager storage agent.
<i>tcpbuffsize</i> “Tcpbuffsize” on page 414	Specifies the size, in kilobytes, of the Tivoli Storage Manager internal TCP/IP communication buffer.
<i>tcpnodelay</i> “Tcpcnodelay” on page 418	Specifies whether the server or client disables the delay of sending successive small packets on the network. This option is for all UNIX clients, except UNIX System Services client for z/OS.
<i>tcpadminport</i> “Tcpcadminport” on page 414	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.
<i>tcpcadaddress</i> “Tcpcadaddress” on page 415	Specifies a TCP/IP address for dsmcad.
<i>tcpport</i> “Tcpcport” on page 419	Specifies the TCP/IP port address for a Tivoli Storage Manager server.
<i>tcpserveraddress</i> “Tcpcserveraddress” on page 419	Specifies the TCP/IP address for a Tivoli Storage Manager server.
<i>tcpwindowsize</i> “Tcpcwindowsize” on page 420	Specifies the size, in kilobytes, of the TCP/IP sliding window for your client node.
<i>webports</i> “Webports” on page 434	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 (Web Client Agent service does not apply to Mac OS X) for communications with the Web GUI.

## Related reference

“Nfstimeout” on page 353

**Authorized user:** The *nfstimeout* option specifies the number of seconds the client waits for a status system call on an NFS file system before it times out.

## Shared memory options

This topic provides information on the shared memory options that you can use.

Table 50. Shared memory communication options

Option	Description
<i>lanfreeshmport</i> “Lanfreeshmport” on page 340	Specifies the unique number that is used by the client and the storage agent to identify shared memory area used for communications.
<i>shmport</i> “Shmport” on page 395	Specifies the unique number that is used by the client and the server to identify shared memory area used for communications.

## Server and node options

### Authorized User

This topic provides information about the server to contact for backup-archive services, and the client node to request backup-archive services.

Table 51. Server and node options

Option	Description
<i>defaultserver</i> “Defaultserver” on page 287	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 dsm.sys file.  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 <i>migrateserver</i> option. See <i>IBM Tivoli Storage Manager for Space Management for UNIX and Linux User’s Guide</i> , for more information.
<i>asnodename</i> “Asnodename” on page 267	Use the <i>asnodename</i> option to allow agent nodes to back up or restore data on behalf of another node (the target node). This enables concurrent operations from multiple nodes to store data to the same target node and file space in parallel.
<i>nasnodename</i> “Nasnodename” on page 352	Specifies the node name for the NAS file server when processing NAS file systems.
<i>nodename</i> “Nodename” on page 355	Use the <i>nodename</i> option in your dsm.sys file to identify your workstation to the server to establish communications.
<i>servername</i> “Servername” on page 392	In the dsm.sys file, this option specifies the name of a server and starts a server stanza. In the client user options file (dsm.opt), this option specifies the Tivoli Storage Manager server to contact for services.
<i>virtualnodename</i> “Virtualnodename” on page 432	The <i>virtualnodename</i> option specifies the node name of your workstation when you want to restore or retrieve files to a different workstation.

## Server options

Use the *servername* option in your `dsm.sys` file to begin a group of options (stanzas) used to connect to a Tivoli Storage Manager server. You can set up multiple groups of stanzas in the `dsm.sys` file to connect to different servers. Each *servername* stanza must have listed below it all client option stanzas required to establish communication with a server. The stanza list 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, 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 287 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 (`dsm.sys`) file.

**Note:** You cannot override the migration server specified in the client system options file.

Figure 3 shows a sample `dsm.sys` file.

```
DEFAULTServer          server2

SErvername  server1
  NODename  node1
  COMMMethod TCPip
  TCPPort   1500
  TCPSErveraddress node.domain.company.com
  PASSWORdAccess generate
  GRoups    system adsm
  USERs     ashton stewart kaitlin
  INCLExc1  /adm/adsm/backup1.excl

SErvername  server2
  COMMMethod SHAREdmem
  shmporT   1520
  PASSWORdAccess prompt
  GRoups    system adsm
  USERs     danielle derek brant
  INCLExc1  /adm/adsm/backup2.excl
```

Figure 3. Sample client system options file

## Node options

This topic explains the node options that you can specify in your `dsm.sys` file to request backup-archive services.

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## Backup and archive processing options

This topic describes the options that you can use to control some aspects of backup and archive processing.

Table 52. Backup and archive processing options

Option	Description
<i>archmc</i> “Archmc” on page 266	Use the <i>archmc</i> option with the <b>archive</b> command to specify the available management class for your policy domain to which you want to bind your archived files.
<i>archsymblinkasfile</i> “Archsymblinkasfile” on page 266	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.
<i>asnodename</i> “Asnodename” on page 267	Use the <i>asnodename</i> option to allow agent nodes to back up or restore data on behalf of another node (the target node). This enables concurrent operations from multiple nodes to store data to the same target node and file space in parallel.
<i>automount</i> “Automount” on page 274	Use this option with the <i>domain</i> option to specify all automounted file systems the Tivoli Storage Manager client tries to mount at the following points in time: <ul style="list-style-type: none"> <li>• When Tivoli Storage Manager client starts</li> <li>• When the backup is started</li> <li>• When the Tivoli Storage Manager client has reached an automounted file system during backup</li> </ul>
<i>autofsrename</i> “Autofsrename” on page 272	Specifies whether to rename an existing file space on a Unicode-enabled server so a Unicode-enabled file space can be created for the current operation.
<i>changingretries</i> “Changingretries” on page 276	Specifies the number of retries when attempting to back up or archive a file that is in use.
<i>compressalways</i>	The <i>compressalways</i> option specifies whether to continue compressing an object if it grows during compression. Use this option with the <i>compression</i> option.
<i>compression</i> “Compression” on page 283	The <i>compression</i> option compresses files <i>before</i> you send them to the server. Compressing your files reduces data storage for backup versions and archive copies of your files. <b>Note:</b> The <i>compression</i> option also applies to migrated files if you install the Tivoli Storage Manager HSM client on your workstation.
<i>deletefiles</i> “Deletefiles” on page 288	Use the <i>deletefiles</i> option with the <b>archive</b> command to delete files from your workstation after you archive them. You can also use this option with the <b>restore image</b> command and the <i>incremental</i> option to delete files from the restored image if they were deleted after the image was created.
<i>description</i> “Description” on page 289	The <i>description</i> option assigns or specifies a description for files when performing archive, delete, retrieve, query archive or query backupset operations.
<i>detail</i> “Detail” on page 290	Use the <i>detail</i> option to display management class, file space, backup, and archive information depending on the command with which it is used.
<i>diffsnapshot</i> “Diffsnapshot” on page 291	Use the <i>diffsnapshot</i> option to determine whether Tivoli Storage Manager should create the differential snapshot.

Table 52. Backup and archive processing options (continued)

Option	Description
<i>dirmc</i> “Dirmc” on page 292	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.
<i>dirsonly</i> “Dirsonly” on page 293	Backs up, restores, archives, retrieves, or queries directories <i>only</i> .
<i>diskcachelocation</i> “Diskcachelocation” on page 295	Specifies the location where the disk cache database will be created if the option <i>memoryefficient=diskcachemethod</i> is set during an incremental backup.
<i>domain</i> “Domain” on page 296	Specifies the file systems to include in your default client domain for an incremental backup.
<i>domain.image</i> “Domain.image” on page 300	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, Linux x86/x86_64, Linux on POWER, and Solaris <i>only</i> .
<i>domain.nas</i> “Domain.nas” on page 300	Specifies the volumes to include in your default domain for NAS image backups.
<i>efsdecrypt</i> “Efsdecrypt” on page 303	Specifies whether or not files encrypted by an AIX Encrypted File System (EFS) are read in encrypted or decrypted format.
<i>enablearchiveretentionprotection</i> “Enablearchiveretentionprotection” on page 304	Allows the client to connect to a data retention server.
<i>enablelanfree</i> “Enablelanfree” on page 305	Specifies whether to enable an available LAN-free path to a storage area network (SAN) attached storage device.
“Exclude options” on page 312  <i>exclude</i> <i>exclude.backup</i> <i>exclude.file</i> <i>exclude.file.backup</i>	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 <i>exclude.backup</i> option only excludes files from normal backup, but not from HSM.
<i>encryptiontype</i> “Encryptiontype” on page 306	Allows you to select AES 128-bit data encryption, providing a stronger form of data encryption than DES 56-bit data encryption.
<i>encryptkey</i> “Encryptkey” on page 307	Specifies whether to save the encryption key password locally when performing a backup-archive operation or whether to prompt for the encryption key password.
<i>exclude.archive</i> “Exclude options” on page 312	Excludes a file or a group of files that match the pattern from archive services <i>only</i> .
<i>exclude.attribute.symlink</i> “Exclude options” on page 312	Excludes a file or a group of files that are symbolic links or aliases (aliases apply to Mac OS X) from backup processing <i>only</i> .
<i>exclude.compression</i> “Exclude options” on page 312	Excludes files from compression processing if you set the <i>compression</i> option to <i>yes</i> . This option applies to backups and archives.
<i>exclude.dir</i> “Exclude options” on page 312	Excludes a directory, its files, and all its subdirectories and their files from backup processing.

Table 52. Backup and archive processing options (continued)

Option	Description
<i>exclude.encrypt</i> "Exclude options" on page 312	Excludes specified files from encryption processing.
<i>exclude.fs</i> "Exclude options" on page 312	Excludes file spaces matching a pattern. This option is valid for all UNIX clients.
<i>exclude.fs.nas</i> "Exclude options" on page 312	Excludes file systems on the NAS file server from an image backup when used with the <b>backup nas</b> command. This option is for AIX and Solaris clients <i>only</i> .
<i>exclude.image</i> "Exclude options" on page 312	Excludes mounted file systems and raw logical volumes that match the specified pattern from full image backup operations. This option is valid for AIX, HP-UX, Solaris, and all Linux clients <i>only</i> .
<i>encryptiontype</i> "Encryptiontype" on page 306	Specifies whether to use AES 128-bit or DES 56-bit data encryption during backup and archive operations. AES 128-bit encryption is the default.
<i>filelist</i> "Filelist" on page 316	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.
<i>filesonly</i> "Filesonly" on page 319	Backs up, restores, retrieves, or queries files <i>only</i> .
<i>groupname</i> "Groupname" on page 325	Use this option with the <b>backup group</b> command to specify the fully qualified name of the group leader for a group.
<i>guitreeviewafterbackup</i> "Guitreeviewafterbackup" on page 326	Specifies whether the GUI client is returned to the Backup, Restore, Archive, or Retrieve window after a successful operation completes.
<i>imagegapsize</i> "Imagegapsize" on page 328	Specifies the minimum size of empty regions on a volume that you want to skip during image backup. This option is valid for AIX JFS2 clients.
<i>inlexcl</i> "Inlexcl" on page 330	Specifies the path and file name of an include-exclude options file.
"Include options" on page 332	Use these options to include files or assign management classes for backup processing.
<i>include</i> <i>include.backup</i> <i>include.file</i>	
<i>include.archive</i> "Include options" on page 332	Includes files or assigns management classes for archive processing.
<i>include.attribute.symlink</i> "Include options" on page 332	Includes a file or a group of files that are symbolic links or aliases (aliases apply to Mac OS X) within broad group of excluded files for backup processing <i>only</i> .
<i>include.compression</i> "Include options" on page 332	Includes files for compression processing if you set the <i>compression</i> option to <i>yes</i> . This option applies to backups and archives.
<i>include.encrypt</i> "Include options" on page 332	Includes the specified files for encryption processing. By default, Tivoli Storage Manager does not perform encryption processing.

Table 52. Backup and archive processing options (continued)

Option	Description
<i>include.fs</i> "Include options" on page 332	Use the <i>include.fs</i> option to control how Tivoli Storage Manager processes your file space for incremental backup.
<i>include.fs.nas</i> "Include options" on page 332	Use the <i>include.fs.nas</i> 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 <i>toc</i> option with the <i>include.fs.nas</i> option in your <i>dsm.sys</i> file. See "Toc" on page 423 for more information. This option is valid for AIX and Solaris clients <i>only</i> .
<i>include.image</i> "Include options" on page 332	Specifies a file system or logical volume to be included for image backup processing. This option also provides a way to specify an explicit management class assignment for a specified file system or logical volume. The backup image command ignores all other include options. This option is valid for AIX, HP-UX, Solaris, and all Linux clients.
<i>incrbydate</i> "Incrbydate" on page 337	Use with the <b>incremental</b> command to request an incremental backup by date.
<i>incremental</i> "Incremental" on page 338	Use with the <b>restore image</b> 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, Linux x86/x86_64, Linux on POWER, and Solaris <i>only</i> .
<i>memoryefficientbackup</i> "Memoryefficientbackup" on page 348	Specifies a memory-saving backup algorithm for incremental backups when used with the <b>incremental</b> command.
<i>mode</i> "Mode" on page 350	Use the <i>mode</i> option with these commands, as follows: <ul style="list-style-type: none"> <li><b>backup image</b> To specify whether to perform a selective or incremental image backup of client file systems.</li> <li><b>backup nas</b> To specify whether to perform a full or differential image backup of NAS file systems.</li> <li><b>backup was</b> To specify whether to perform a full or differential backup of the WebSphere Application Server Network Deployment Manager (contains setup, application files, and configuration information) or the Application Server to the Tivoli Storage Manager server.</li> <li><b>backup group</b> To specify whether to perform a full or differential group backup containing a list of files from one or more file space origins.</li> </ul>



Table 52. Backup and archive processing options (continued)

Option	Description
<i>monitor</i> "Monitor" on page 352	Specifies whether you want to monitor an image backup of file systems belonging to a Network Attached Storage (NAS) file server.
<i>noprompt</i> "Noprompt" on page 356	suppresses the confirmation prompt that is presented by the <b>delete group</b> , <b>delete archive</b> , <b>expire</b> , <b>restore image</b> , and <b>set event</b> commands.
<i>nojournal</i> "Nojournal" on page 356	Use this option with the <b>incremental</b> command to specify that you want to perform the traditional full incremental backup, instead of the default journal-based backup.
<i>optfile</i> "Optfile" on page 359	Specifies the client user options file you want to use when you start a Tivoli Storage Manager session.
<i>postsnapshotcmd</i> "Postsnapshotcmd" on page 367	During a snapshot-based backup, this option allows you to manually bring up an application after the snapshot is created. This option is valid only for AIX JFS2 or LINUX LVM snapshot-based operations.
<i>preservelastaccessdate</i> "Preservelastaccessdate" on page 369	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 <i>will not</i> reset the last access date of any backed up or archived files to their original value prior to the backup or archive operation.
<i>presnapshotcmd</i> "Presnapshotcmd" on page 373	During a snapshot-based backup operation, this option allows you to manually quiesce an application before the snapshot is created. This option is valid only for AIX JFS2 or LINUX LVM snapshot-based operations.
<i>removeoperandlimit</i> "Removeoperandlimit" on page 377	Specifies that Tivoli Storage Manager removes the 20-operand limit. If you specify the <i>removeoperandlimit</i> option with the <b>incremental</b> , <b>selective</b> , or <b>archive</b> commands, the 20-operand limit is not enforced and is restricted only by available resources or other operating system limits.
<i>skipacl</i> "Skipacl" on page 396	Specifies whether to skip ACL processing completely.
<i>skipaclupdatecheck</i> "Skipaclupdatecheck" on page 397	Specifies whether to perform checksum and size comparisons before and after backup and during incremental processing.
<i>snapdiff</i> "Snapdiff" on page 398	When used with NAS full volume incremental backup, <i>snapdiff</i> streamlines the incremental process by performing an incremental backup of the files reported as changed by the NetApp Snapshot Difference API, instead of scanning the volume looking for files that have changed.
<i>snapshotcachesize</i> "Snapshotcachesize" on page 402	Linux and AIX only: Use this option to specify an appropriate snapshot size so that all original data blocks can be stored during file modification and deletion. A snapshot size of 100 percent will ensure a valid snapshot. This option is valid for AIX JFS2 file systems and Linux x86/x86_64 clients only and has a default value of 100 percent.

Table 52. Backup and archive processing options (continued)

Option	Description
<i>snapshotproviderfs</i> “Snapshotproviderfs” on page 403	Use the <i>snapshotproviderfs</i> option to enable snapshot-based file backup and archive operations, and to specify a snapshot provider. You must be a root user to perform a snapshot-based file backup or archive operation. If you are not a root user, the operation will fail with an error message.
<i>snapshotproviderimage</i> “Snapshotproviderimage” on page 404	Use the <i>snapshotproviderimage</i> option to enable snapshot-based image backup, and to specify a snapshot provider. You must be a root user to perform a snapshot-based image backup operation. If you are not a root user, the operation will fail with an error message.
<i>snapshotroot</i> “Snapshotroot” on page 405	Use the <i>snapshotroot</i> option with the <b>incremental</b> , <b>selective</b> , or <b>archive</b> 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 and Linux clients.
<i>subdir</i> “Subdir” on page 411	Specifies whether to include subdirectories of a named directory.
<i>tapeprompt</i> “Tapeprompt” on page 412	Specifies whether you want Tivoli Storage Manager to wait for a tape mount if it is required for a backup, archive, restore, or retrieve process, or to be prompted for a choice.
<i>toc</i> “Toc” on page 423	Use the <i>toc</i> option with the <b>backup nas</b> command or the <i>include.fs.nas</i> 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 <b>query toc</b> server command to determine the contents of a file system backup in conjunction with the <b>restore node</b> 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.
<i>type</i> “Type” on page 427	Use the <i>type</i> option with the <b>query node</b> command to specify the type of node to query.
<i>v2archive</i> “V2archive” on page 428	Use the <i>v2archive</i> option with the <b>archive</b> 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.
<i>virtualfsname</i> “Virtualfsname” on page 431 (does not apply to Mac OS X)	Use this option with the <b>backup group</b> command to specify the name of the container for the group on which you want to perform the operation.
<i>virtualmountpoint</i> “Virtualmountpoint” on page 431	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.

## Restore and retrieve processing options

This topic describes the options that you can use for restoring and retrieving.

Table 53. Restore and retrieve processing options

Option	Description
<i>dironly</i> "Dironly" on page 293	Qualifies the operation (backup, archive, restore, retrieve) to process directories alone.
<i>disablenqr</i> "Disablenqr" on page 293	Specifies whether the Tivoli Storage Manager Backup-Archive Client can use the no-query restore method for restoring files and directories from the server.
<i>filelist</i> "Filelist" on page 316	Specifies a file containing a list of files to be processed by the specified command.
<i>filesonly</i> "Filesonly" on page 319	Qualifies the operation (backup, archive, restore, retrieve) to process files alone.
<i>followsymbolic</i> "Followsymbolic" on page 320	Specifies whether you want to restore files to symbolic links or use a symbolic link as a virtual mount point.
<i>fromdate</i> "Fromdate" on page 321	Use the <i>fromdate</i> option with the <i>fromtime</i> option to specify a date and time from which you want to search for backups or archives during a restore, retrieve, or query operation.
<i>fromnode</i> "Fromnode" on page 322	Permits one node to perform commands for another node. A user on another node must use the <b>set access</b> command to permit you to query, restore, or retrieve files or images for the other node.
<i>fromowner</i> "Fromowner" on page 323	Displays file spaces for an alternate owner. Also specifies an alternate owner from which to restore or retrieve files.
<i>fromtime</i> "Fromtime" on page 324	Use the <i>fromtime</i> option with the <i>fromdate</i> option to specify a beginning time from which you want to search for backups or archives during a restore, retrieve or query operation.
<i>guitreeviewafterbackup</i> "Guitreeviewafterbackup" on page 326	Specifies whether the GUI client is returned to the Backup, Restore, Archive, or Retrieve window after a successful operation completes.
<i>ifnewer</i> "Ifnewer" on page 327	Replaces an existing file with the latest backup version only if the backup version is newer than the existing file.
<i>imagnetofile</i> "Imagnetofile" on page 329	Use the <i>imagnetofile</i> option with the <b>restore image</b> command to specify that you want to restore the source image to a file. You might 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, Linux x86/x86_64, Linux on POWER, and Solaris <i>only</i> .
<i>inactive</i> "Inactive" on page 330	Displays a list of active and inactive files when used with the <i>pick</i> option.
<i>latest</i> "Latest" on page 343	Restores the most recent backup version of a file whether it is active or inactive.
<i>localbackupset</i> "Localbackupset" on page 343	Specifies whether the Tivoli Storage Manager GUI bypasses initial logon with the server to restore a local backup set on a standalone workstation.
<i>makesparsefile</i> "Makesparsefile" on page 344 (does not apply to Mac OS X)	Use the <i>makesparsefile</i> option with the <b>restore</b> or <b>retrieve</b> commands to specify how sparse files are recreated.

Table 53. Restore and retrieve processing options (continued)

Option	Description
<i>monitor</i> "Monitor" on page 352	Specifies whether you want to monitor an image restore of one or more file systems belonging to a Network Attached Storage (NAS) file server.
<i>noprompt</i> "Noprompt" on page 356	suppresses the confirmation prompt that is presented by the <b>delete group</b> , <b>delete archive</b> , <b>expire</b> , <b>restore image</b> , and <b>set event</b> commands.
<i>optfile</i> "Optfile" on page 359	Specifies the client user options file you want to use when you start a Tivoli Storage Manager session.
<i>pick</i> "Pick" on page 363	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 <i>inactive</i> option to view both active and inactive objects.
<i>pitdate</i> "Pitdate" on page 364	Use the <i>pitdate</i> option with the <i>pittime</i> option to establish a point in time for which you want to display or restore the latest version of your backups.
<i>pittime</i> "Pittime" on page 365	Use the <i>pittime</i> option with the <i>pitdate</i> option to establish a point in time for which you want to display or restore the latest version of your backups.
<i>preservepath</i> "Preservepath" on page 371	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.
<i>replace</i> "Replace" on page 378	Specifies whether to overwrite an existing file, or to prompt you for your selection when you restore or retrieve files.
<i>showmembers</i> "Showmembers" on page 396 (does not apply to Mac OS X)	Displays all members of a group.
<i>subdir</i> "Subdir" on page 411	Specifies whether you want to include subdirectories of a named directory.
<i>tapeprompt</i> "Tapeprompt" on page 412	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.
<i>todate</i> "Todate" on page 424	Use the <i>todate</i> option with the <i>totime</i> 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.
<i>totime</i> "Totime" on page 425	Use the <i>totime</i> option with the <i>todate</i> 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.
<i>type</i> "Type" on page 427	Use the <i>type</i> option with the <b>query node</b> command to specify the type of node to query.
<i>verifyimage</i> "Verifyimage" on page 430	Use the <i>verifyimage</i> option with the <b>restore image</b> 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, Linux x86/x86_64, Linux on POWER, and Solaris <i>only</i> .

The following option is a backup-archive client option that applies only to HSM for Windows migrated files. Refer to *IBM Tivoli Storage Manager for Space Management for UNIX and Linux* for details about this option.

- *Restoremigstate*

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## Scheduling options

This topic discusses the options that you can use to regulate central scheduling. Tivoli Storage Manager uses scheduling options only when the Scheduler is running.

Table 54. Scheduling options

Option	Description
<i>managedservices</i> "Managedservices" on page 345	Specifies whether the Storage Manager Client Acceptor daemon manages the Web client, the scheduler, or both.
<i>maxcmdretries</i> "Maxcmdretries" on page 347	Specifies the maximum number of times the client scheduler attempts to process a scheduled command that fails.
<i>postschedulecmd/postnschedulecmd</i> "Postschedulecmd/Postnschedulecmd" on page 365	Specifies a command to process after running a schedule.
<i>preschedulecmd/prenschedulecmd</i> "Preschedulecmd/Prenschedulecmd" on page 368	Specifies a command to process before running a schedule.
<i>querschedperiod</i> "Querschedperiod" on page 374	Specifies the number of hours the client scheduler waits between attempts to contact the server for scheduled work.
<i>retryperiod</i> "Retryperiod" on page 381	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.
<i>schedcmddisabled</i> "Schedcmddisabled" on page 383	Specifies whether to disable the scheduling of generic commands specified by your Tivoli Storage Manager administrator.
<i>schedcmduser (server defined only)</i> "Scheduling options for commands" on page 218	The scheduler executes commands under a uid of 0, however, there might 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.
<i>schedlogmax</i> "Schedlogmax" on page 385	Specifies the maximum size of the scheduler log, in megabytes.
<i>schedlogname</i> "Schedlogname" on page 386	Specifies the path and file name where you want to store schedule log information.
<i>schedlogretention</i> "Schedlogretention" on page 387	Specifies the number of days to keep log file entries in the schedule log, and whether to save pruned entries.
<i>schedmode</i> "Schedmode" on page 388	Specifies which schedule mode to use, <i>polling</i> or <i>prompted</i> .

Table 54. Scheduling options (continued)

Option	Description
<i>schedrestretrdisabled</i> "Schedrestretrdisabled" on page 390	Specifies whether to prevent the Tivoli Storage Manager Server administrator from executing restore or retrieve schedule operations.
<i>sessioninitiation</i> "Sessioninitiation" on page 394	Use the <i>sessioninitiation</i> option to control whether the server or client initiates sessions through a firewall. The default is that the client can initiate sessions.
<i>srprepuestoscheddisabled</i> "Srvprepostscheddisabled" on page 408	Specifies whether to prevent the Tivoli Storage Manager Server administrator from executing pre-schedule and post-schedule commands when performing scheduled operations.
<i>srprepuestosnapdisabled</i> "Srvprepostsnapdisabled" on page 409	Specifies whether to prevent the Tivoli Storage Manager Server administrator from executing pre-snapshot and post-snapshot commands when performing scheduled image snapshot backup operations.
<i>tcpclientaddress</i> "Tcpclientaddress" on page 416	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. The server will use this address when it begins the server prompted scheduled operation. See <i>schedmode prompted</i> ("Schedmode" on page 388) for details.
<i>tcpclientport</i> "Tcpclientport" on page 417	Specifies a TCP/IP port number for the server to contact the client when the server begins the server prompted scheduled operation. See <i>schedmode prompted</i> ("Schedmode" on page 388) for details.

## Format and language options

Format and language options allow you to select different formats for date, time, numbers, and for different languages if you have the appropriate client language pack installed for that language.

Format options allow you to select different formats for date, time, and numbers.

Table 55. Format and language options

Option	Description
<i>dateformat</i> "Dateformat" on page 285	Specifies the format for displaying dates.
<i>numberformat</i> "Numberformat" on page 357	Specifies the format for displaying numbers.
<i>timeformat</i> "Timeformat" on page 421	Specifies the format for displaying time.

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## Command processing options

The following options apply when you use Tivoli Storage Manager commands.

Table 56. Command processing options

Option	Description
<i>editor</i> “Editor” on page 302	Specifies if the command-line interface editor and command retrieve capability is turned on or off.
<i>quiet</i> “Quiet” on page 376	Limits the number of messages that are displayed on your screen during processing. This option can be overridden by the server.
<i>scrolllines</i> “Scrolllines” on page 390	Specifies the number of lines of information that are displayed on your screen at one time. Use this option only when <i>scrollprompt</i> is set to <i>yes</i> .
<i>scrollprompt</i> “Scrollprompt” on page 391	Specifies whether you want Tivoli Storage Manager to stop and wait after displaying the number of lines of information you specified with the <i>scrolllines</i> option, or scroll through and stop at the end of the information list.
<i>verbose</i> “Verbose” on page 429	Specifies that processing information should be displayed on your screen. The alternative is <i>quiet</i> . This option can be overridden by the server.

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## Authorization options

Authorization options control access to a Tivoli Storage Manager server.

Table 57. Authorization options

Option	Description
<i>groups</i> “Groups” on page 325	Specifies the groups on your workstation that you want to authorize to request Tivoli Storage Manager services from the server.
<i>password</i> “Password” on page 360	Specifies a Tivoli Storage Manager password.
<i>passwordaccess</i> “Passwordaccess” on page 361	Specifies whether you want to use a generated password or be prompted for a password each time you start the client.
<i>passworddir</i> “Passworddir” on page 362	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.
<i>revokeremoteaccess</i> “Revokeremoteaccess” on page 382	Restricts an administrator with client access privileges from accessing your workstation through the Web client.
<i>users</i> “Users” on page 427	Authorizes specific users on your workstation to request services from a server.

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## Error processing options

Error processing options specify the name of the error log file and how Tivoli Storage Manager treats the entries in the log file.

Table 58. Error processing options

Option	Description
<i>errorlogmax</i> “Errorlogmax” on page 309	Specifies the maximum size of the error log, in megabytes.
<i>errorlogname</i> “Errorlogname” on page 310	Specifies the fully qualified path and file name of the file where you want to store information about errors that occur during processing.
<i>errorlogretention</i> “Errorlogretention” on page 311	Specifies how many days to maintain error log entries before pruning, and whether to save the pruned entries.

## Transaction processing options

Transaction processing options control how Tivoli Storage Manager processes transactions between the client and server.

Table 59. Transaction processing options

Option	Description
<i>collocatebyfilespec</i> “Collocatebyfilespec” on page 278	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 <i>collocatebyfilespec</i> option to <i>yes</i> 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).
<i>commrestartduration</i> “Commrestartduration” on page 280	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.
<i>commrestartinterval</i> “Commrestartinterval” on page 281	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.
<i>diskbuffsize</i> “Diskbuffsize” on page 294	Specifies the maximum disk I/O buffer size (in kilobytes) that the client can use when reading files.
<i>largecommbuffers</i> “Diskbuffsize” on page 294	This option has been replaced by the <i>diskbuffsize</i> option. At this time, <i>largecommbuffers</i> will continue to be accepted by the Tivoli Storage Manager client in order to ease the transition to the new option. However, the value specified by <i>largecommbuffers</i> will be ignored in favor of the <i>diskbuffsize</i> setting.  <b>Recommendation:</b> Discontinue the use of <i>largecommbuffers</i> because future releases of Tivoli Storage Manager might not accept this option.
<i>nfstimeout</i> “Nfstimeout” on page 353	Specifies the number of seconds the server waits for a status system call on an NFS file system before it times out.
<i>resourceutilization</i> “Resourceutilization” on page 379	Use the <i>resourceutilization</i> option in your dsm.sys file to regulate the level of resources the Tivoli Storage Manager server and client can use during processing.
<i>txnbytelimit</i> “Txnbytelimit” on page 426	Specifies the number of kilobytes the client program buffers before it sends a transaction to the server.



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## Web client options

This topic describes the options for the Tivoli Storage Manager Web Client.

Table 60. Web client options

Option	Description
<i>httpport</i> “Httpport” on page 327	Specifies a TCP/IP port address for the Web client.
<i>managedservices</i> “Managedservices” on page 345	Specifies whether the Storage Manager Client Acceptor daemon manages the Web client, the scheduler, or both.
<i>revokeremoteaccess</i> “Revokeremoteaccess” on page 382	Restricts administrator access on a client workstation through the Web client.
<i>webports</i> “Webports” on page 434	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 client.

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## 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.

Table 61. Diagnostics options

Option	Description
<i>console</i> “Console” on page 284	Use the <i>console</i> option with the <b>query systeminfo</b> command to output system information to the console.
<i>filename</i> “Filename” on page 318	Use the <i>filename</i> option with the <b>query systeminfo</b> command to specify a file name in which to store the system information.

### Related reference

“Query Systeminfo” on page 496

Use the **query systeminfo** command to gather information and output this information to a file or the console.

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## Using options with commands

You can override some of the options in your client options file (*dsm.opt*) file by entering them with appropriate Tivoli Storage Manager commands.

You can override some of the options in your *dsm.sys* file 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 option sets not set as forced by the server. The server *does not* override client values if not forced.
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 for more information, see Table 62 on page 259.

## Entering options with a command

This topic lists the general rules for entering 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, enter this command:  
For example, enter this command:  

```
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 quotation marks ("). 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 quotation marks (").

- 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.
- Enter options before or after command parameters. For example, you can enter the 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 them 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/*"
```
- Most options that you enter on the command line override the value set in the preferences file. However, 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 255. The maximum combined length of the file name and path name is 1024 characters. The Unicode representation of a character can occupy several bytes, so the maximum number of characters that a file name might contain can vary.
- For Mac OS X, the maximum length of a file name is limited to 504 bytes (not characters). The Unicode representation of a character can occupy several bytes, so the maximum number of characters that a file name contains can vary.

Table 62 lists client command options that you can enter only on the command line with specific commands.

Table 62. Client command options

Command option	Description	Commands
<i>archmc</i> “Archmc” on page 266	Use the <i>archmc</i> option with the <b>archive</b> command to specify the available management class for your policy domain to which you want to bind your archived files.	<b>archive</b>
<i>class</i> “Class” on page 277	Specifies whether to display a list of NAS objects or client objects when using the following commands:	<b>query backup delete filesystem query filesystem</b>
<i>console</i> “Console” on page 284	Use the <i>console</i> option with the <b>query systeminfo</b> command to output system information to the console.	<b>query systeminfo</b>
<i>deletefiles</i> “Deletefiles” on page 288	Deletes the local copy of files from your workstation after they are archived on the server. Can also be used with the <b>restore image</b> command and the <i>incremental</i> option to delete files from the restored image that are deleted from the file space after the image is created.	<b>archive restore image</b>
<i>description</i> “Description” on page 289	Assigns or specifies a description for files when performing archive, delete, retrieve, or query archive operations.	<b>archive delete archive query archive query backupset retrieve</b>
<i>detail</i> “Detail” on page 290	Displays management class, file space, backup, and archive information depending on the command with which it is used.	<b>delete filesystem query archive query backup query filesystem query mgmtclass</b>
<i>dironly</i> “Dironly” on page 293	Backs up, restores, archives, retrieves, or queries directories <i>only</i> .	<b>archive incremental query archive query backup restore restore backupset retrieve selective</b>
<i>dynamicimage</i> “Dynamicimage” on page 302	Performs a dynamic image backup.	<b>backup image</b>
<i>filelist</i> “Filelist” on page 316	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.	<b>archive backup group delete archive delete backup expire incremental query archive query backup restore retrieve selective</b>

Table 62. Client command options (continued)

Command option	Description	Commands
<i>filename</i> "Filename" on page 318	Use the <i>filename</i> option with the <b>query systeminfo</b> command to specify a file name in which to store the system information.	<b>query systeminfo</b>
<i>filesonly</i> "Filesonly" on page 319	Backs up, restores, retrieves, or queries files <i>only</i> .	<b>archive incremental query archive query backup restore restore backupset retrieve selective</b>
<i>fromdate</i> "Fromdate" on page 321	Use the <i>fromdate</i> option with the <i>fromtime</i> option to specify a date and time from which you want to search for backups or archives during a restore, retrieve, or query operation.	<b>delete backup query archive query backup restore retrieve restore group restore was</b>
<i>fromnode</i> "Fromnode" on page 322	Permits one node to perform commands for another node. A user on another node must use the <b>set access</b> command to permit you to query, restore, or retrieve files or images for the other node.	<b>query archive query backup query filespace query group query image query mgmtclass query was restore restore group restore image restore was retrieve</b>
<i>fromowner</i> "Fromowner" on page 323	Displays file spaces for an alternate owner. Also specifies an alternate owner from which to restore or retrieve files.	<b>query archive query backup query group query image query was restore restore image restore group restore was retrieve</b>
<i>fromtime</i> "Fromtime" on page 324	Specifies a beginning time on the specified date. Use with the <i>fromdate</i> option. This option is ignored if the <i>fromdate</i> option is absent.	<b>query archive query backup restore restore group retrieve restore was</b>
<i>groupname</i> "Groupname" on page 325	Specifies the fully qualified name for a group.	<b>backup group</b>

Table 62. Client command options (continued)

Command option	Description	Commands
<i>ifnewer</i> “Ifnewer” on page 327	Replaces existing files with the latest backup version only if the backup version is newer than the existing version.	<b>restore</b> <b>restore backupset</b> <b>restore group</b> <b>retrieve</b> <b>restore was</b>
<i>imagetofile</i> “Imagetofile” on page 329	Use the <i>imagetofile</i> option with the <b>restore image</b> command to specify that you want to restore the source image to a file. You might 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, Linux x86/x86_64, Linux on POWER, and Solaris <i>only</i> .	<b>restore image</b>
<i>inactive</i> “Inactive” on page 330	Displays a list of active and inactive files when used with the <i>pick</i> option.	<b>delete group</b> <b>query backup</b> <b>query group</b> <b>query image</b> <b>query nas</b> <b>query was</b> <b>restore</b> <b>restore group</b> <b>restore image</b> <b>restore nas</b> <b>restore was</b>
<i>incrbydate</i> “Incrbydate” on page 337	Requests an incremental backup by date.	<b>incremental</b>
<i>incremental</i> “Incremental” on page 338	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, Linux x86/x86_64, Linux on POWER, and Solaris <i>only</i> .	<b>restore image</b>
<i>latest</i> “Latest” on page 343	Restores the most recent backup version of a file whether it is active or inactive.	<b>restore</b> <b>restore group</b> <b>restore was</b>

Table 62. Client command options (continued)

Command option	Description	Commands
<i>mode</i> "Mode" on page 350	Use the <i>mode</i> option with these commands, as follows:  <b>backup image</b> To specify whether to perform a selective or incremental image backup of client file systems.  <b>backup nas</b> To specify whether to perform a full or differential image backup of NAS file systems.  <b>backup was</b> To specify whether to perform a full or differential backup of the WebSphere Application Server Network Deployment Manager (contains setup, application files, and configuration information) or the Application Server to the Tivoli Storage Manager server.  <b>backup group</b> To specify whether to perform a full or differential group backup containing a list of files from one or more file space origins.	<b>backup group</b> <b>backup nas</b> <b>backup image</b> <b>backup was</b> <b>restore nas</b>
<i>monitor</i> "Monitor" on page 352	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.	<b>backup nas</b> <b>restore nas</b>
<i>nojournal</i> "Nojournal" on page 356	Use this option with the with the <b>incremental</b> command to specify that you want to perform the traditional full incremental backup, instead of the default journal-based backup.	<b>incremental</b>
<i>noprompt</i> "Noprompt" on page 356	suppresses the confirmation prompt that is presented by the <b>delete group</b> , <b>delete archive</b> , <b>expire</b> , <b>restore image</b> , and <b>set event</b> commands.	<b>delete archive</b> <b>delete backup</b> <b>delete group</b> <b>expire</b> <b>restore image</b>
<i>optfile</i> "Optfile" on page 359	Specifies the client user options file you want to use when you start a Tivoli Storage Manager session.	<b>dsmc</b>
<i>pick</i> "Pick" on page 363	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 <i>inactive</i> option to view both active and inactive objects.	<b>delete archive</b> <b>delete group</b> <b>expire</b> <b>query nas</b> <b>restore</b> <b>restore group</b> <b>restore image</b> <b>restore nas</b> <b>restore was</b> <b>retrieve</b>

Table 62. Client command options (continued)

Command option	Description	Commands
<i>pitdate</i> "Pitdate" on page 364	Use the <i>pitdate</i> option with the <i>pittime</i> 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
<i>pittime</i> "Pittime" on page 365	Use the <i>pittime</i> option with the <i>pitdate</i> 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
<i>preservepath</i> "Preservepath" on page 371	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 restore group retrieve restore was
<i>removeoperandlimit</i> "Removeoperandlimit" on page 377	Specifies that Tivoli Storage Manager removes the 20-operand limit. If you specify the <i>removeoperandlimit</i> option with the <i>incremental</i> , <i>selective</i> , or <i>archive</i> commands, the 20-operand limit is not enforced and is restricted only by available resources or other operating system limits.	incremental selective archive
<i>showmembers</i> "Showmembers" on page 396	Displays all members of a group.	query group query was restore group restore was
<i>todate</i> "Todate" on page 424	Use the <i>todate</i> option with the <i>totime</i> 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
<i>totime</i> "Totime" on page 425	Use the <i>totime</i> option with the <i>todate</i> 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
<i>type</i> "Type" on page 427	Use the <i>type</i> option with the <b>query node</b> command to specify the type of node to query.	query node

Table 62. Client command options (continued)

Command option	Description	Commands
<i>v2archive</i> “V2archive” on page 428	Use the <i>v2archive</i> option with the <b>archive</b> 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.	<b>archive</b>
<i>verifyimage</i> “Verifyimage” on page 430	Use the <i>verifyimage</i> option with the <b>restore image</b> 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, Linux x86/x86_64, Linux on POWER, and Solaris <i>only</i> .	<b>restore image</b>
<i>virtualfsname</i> “Virtualfsname” on page 431	Specifies the name of the virtual file space for the group on which you want to perform the operation.	<b>backup group</b>

## 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. They generate an error and cause processing to stop.

Table 63. Options that are valid on the initial command line only

### Options valid on the initial command line

<i>commmethod</i>	<i>preschedulecmd/prenschedulecmd</i> (can be included in the schedule definition)
<i>diskbuffsize</i>	<i>queryschedperiod</i>
<i>editor</i>	<i>resourceutilization</i>
<i>enablelanfree</i>	<i>retryperiod</i>
<i>errorlogmax</i>	<i>schedlogmax</i>
<i>errorlogname</i>	<i>schedlogname</i>
<i>errorlogretention</i>	<i>schedlogretention</i>
<i>lanfreecommmethod</i>	<i>schedmode</i>
<i>lanfreeshmport</i>	<i>servername</i>
<i>lanfreetcpport</i>	<i>sessioninitiation</i>
<i>language</i>	<i>tcpbuffsize</i>
<i>maxcmdretries</i>	<i>tcpadaddress</i>
<i>nfstimeout</i>	<i>tcpclientaddress</i>
<i>nodename</i>	<i>tcpclientport</i>
<i>optfile</i>	<i>tcpwindowsize</i>
<i>password</i>	<i>txnbytelimit</i>
<i>postschedulecmd/postnschedulecmd</i> (can be included in the schedule definition)	<i>virtualnodename</i>

## Client options that can be set by the Tivoli Storage Manager server

Some client options can be set by the Tivoli Storage Manager server.



Table 64. Options that can be set by the Tivoli Storage Manager server

**Options that can be set by the Tivoli Storage Manager server**

- “Archsymlinkasfile” on page 266
- “Changingretries” on page 276
- “Collocatebyfilespec” on page 278
- “Compressalways” on page 282
- “Compression” on page 283
- “Dirmc” on page 292
- “Disablenqr” on page 293
- “Diskcachelocation” on page 295
- “Domain” on page 296
- “Domain.image” on page 300
- “Domain.nas” on page 300
- “Encryptiontype” on page 306
- “Encryptkey” on page 307
- “Exclude options” on page 312
- “Incl excl” on page 330
- “Include options” on page 332
- “Managedservices” on page 345
- MAXCANDPROCS <sup>1</sup>
- “Maxcmdretries” on page 347
- MAXMIGRATORS <sup>1</sup>
- “Memoryefficientbackup” on page 348
- “Nfstimeout” on page 353
- “Postschedulecmd/Postnschedulecmd” on page 365
- “Postsnapshotcmd” on page 367
- “Preschedulecmd/Prenschedulecmd” on page 368
- “Preservelastaccessdate” on page 369
- “Presnapshotcmd” on page 373
- “Queryschedperiod” on page 374
- “Quiet” on page 376
- “Resourceutilization” on page 379
- “Retryperiod” on page 381
- “Schedmode” on page 388
- “Scrolllines” on page 390
- “Scrollprompt” on page 391
- “Snapshotcachesize” on page 402
- “Snapshotproviderfs” on page 403
- “Snapshotproviderimage” on page 404
- “Subdir” on page 411
- “Tapeprompt” on page 412
- “Txnbytelimit” on page 426
- “Verbose” on page 429
- VSSALTSTAGINGDIR <sup>2</sup>

**Note:**

1. See Tivoli Storage Manager for Space Management for UNIX and Linux, command line client help or user’s guide.
2. See *Tivoli Storage Manager for Mail, Data Protection for Microsoft Exchange Server Installation and User’s Guide*.

**Related information**

For information about creating client options sets on the Tivoli Storage Manager server, see the Tivoli Storage Manager Administrator’s Guide for your server platform.

---

## Client options reference

The following sections contain detailed information about each of the Tivoli Storage Manager processing options. Information for each option includes the following information: a description, a syntax diagram, detailed descriptions of the parameters, examples of using the option in the client options file (if applicable),

and 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:**

1. Do not enclose an option value with single or quotation marks, unless the value is a file specification that contains spaces or wildcard characters. For example, the following option is not valid:

```
passwordaccess "generate"
```

---

## 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 Web client. Overriding the management class using the Web client is equivalent to using the *archmc* option on the **archive** command.

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 and Linux 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 /Users/van/Documents/budget.jan  
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 except Mac OS X. The server can also define this option.

## Options File

Place this option in the client user options file (dsm.opt).

## Syntax



## 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:**

```
archsymbllinkasfile no
```

**Command line:**

```
-archsymbll=no
```

---

## Asnodename

Use the *asnodename* option to allow agent nodes to back up or restore data on behalf of another node (the target node). This enables concurrent operations from multiple nodes to store data to the same target node and file space in parallel.

Your client node must be granted access to the target node by the Tivoli Storage Manager server administrative client **grant proxynode** command, and you must be a root user to use the *asnodename* option.

When the Tivoli Storage Manager administrator grants a node proxy authority, and you use the *asnodename* option to become that node, you can query and restore all files as if you had root authority.

An agent node is a client node that has been granted authority to perform client operations on behalf of a target node.

A target node is a client node that grants authority to one or more agent nodes to perform client operations on its behalf.

For example, you can use the following command to back up shared data for file space stored under the node name MyCluster:

```
/cluster1/mydata
dsmc incremental /Users -asnodename=MyCluster
```

You can also use the *asnodename* option to restore data under another node name on the Tivoli Storage Manager server. You can only restore the data that you own.

The *asnodename* option differs from the *nodename* option as follows:

- When using the *nodename* option, you must enter the password for the node name you specify.
- When using the *asnodename* option, you must enter the password for your client agent node to access the data stored for the client target node.

**Restrictions:** You cannot use the *asnodename* option with *-fromnode* and you cannot perform NAS backup using *asnodename*. Also, *asnodename* can be used for clustered systems, although no specific cluster software is supported.

## Supported Clients

This option is valid for all UNIX and Linux clients.

## Options File

Place this option in the *dsm.sys* file *within* a server stanza. You can set this option on the **General** tab of the Preferences editor.

## Syntax

▶▶—ASNODENAME— —targetnode————▶▶

## Parameters

*targetnode*

Specifies the node name on the Tivoli Storage Manager server under which you want to back up or restore data.

## Examples

**Options file:**

```
asnodename mycluster
```

**Command line:**

```
-asnodename=mycluster
```

This option is not valid in interactive mode, but it can be defined in the options portion of a schedule definition.

---

## Auditlogging

Use the *auditlogging* option to generate an audit log that contains an entry for each file that is processed during an incremental, selective, archive, restore, or retrieve operation.

The audit log can be configured to capture either a basic level of information or a more inclusive (full) level of information.

The basic level of the audit logging feature captures the information that is in the schedule log and it records information that a file has been backed up, archived, updated, restored, retrieved, expired, deleted, skipped or failed during an incremental backup, selective backup, archive, restore or retrieve operation. In

addition, the basic level of audit logging captures the input command for commands run through the Backup-Archive command line or scheduler clients.

The full level of audit logging records an action for each file that is processed by the Backup-Archive client. In addition to all of the events recorded by the basic level of audit logging, the full level of audit logging records information for a file that has been excluded or not sent during a progressive incremental backup operation because the file had not changed.

The following is an example of the messages that are issued when the audit log is configured to capture the basic level of information:

```
04/21/07 15:25:05 ANS1650I Command:
    sel /home/spike/test/*
04/21/07 15:25:05 ANS1651I Backed Up:
    /home/spike/test/file.txt
04/21/07 15:25:05 ANS1652I Archived:
    /home/spike/test/file.txt
04/21/07 15:25:05 ANS1653I Updated:
    /home/spike/test/file.txt
04/21/07 15:25:05 ANS1654E Failed:
    /home/spike/test/file.txt
04/21/07 15:25:05 ANS1655I Restored:
    /home/spike/test/file.txt
04/21/07 15:25:05 ANS1656I Retrieved:
    /home/spike/test/file.txt
04/21/07 15:25:05 ANS1657I Expired:
    /home/spike/test/file.txt
04/21/07 15:25:05 ANS1658I Deleted:
    /home/spike/test/file.txt
04/21/07 15:25:05 ANS1659I Skipped:
    /home/spike/test/file.txt
```

The following messages can be issued when the audit log is configured to capture the full level of information (in addition to all messages issued for the basic level of audit logging):

```
04/21/07 15:25:05 ANS1660I Excluded:
    /home/spike/test/file.txt
04/21/07 15:25:05 ANS1661I Unchanged:
    /home/spike/test/file.txt
```

The audit log is not a substitute or a replacement for the standard error log (`dsmerror.log`) or for the schedule log (`dsmsched.log`). If an error occurs that prevents a file from being processed, a message indicating that an error has occurred will be written to the audit log, but the message will not indicate the nature of the error. For problem diagnostics the standard error log must still be used.

The audit log entries only contain a time stamp and object name. There is no information to distinguish between files and directories or any information about the size of an object.

The Mac OS X Backup-Archive Client will create the audit log as a Unicode (UTF-16) file.

By default, the name of the audit log is `dsmaudit.log` and it is contained in the same directory as the error log, `dsmerror.log`. The name and location of the audit log can be configured using the *auditlogname* option. There are no parameters to control the size of the audit log or to prune the audit log. The *auditlogname* option cannot be set as an option in a Tivoli Storage Manager Server client options set.

The **auditlogging** command is not supported with backup commands which interact with image-level objects such as **backup image** or **restore image**. The **auditlogging** command is supported with backup commands that interact with file-level objects such as **backup groups** and **backup was**.

If you have enabled audit logging for an operation and there is a failure trying to write to the audit log (for example, the disk on which the audit log resides is out of space), the audit logging will be disabled for the rest of the operation and the return code for the operation will be set to 12, regardless of the outcome of the operation.

## Supported Clients

This option is valid for all clients.

## Options File

Place this option in the `dsm.sys` file.

## Syntax



## Parameters

*off* Specifies that the audit logging facility is not engaged. This is the default.

*basic*  
Specifies that the audit log captures a basic level of information.

*full*  
Specifies that the audit log captures a more extensive level of information.

## Examples

Run an incremental backup with audit logging enabled.

### Command line:

```
dsmc i -auditlogging=basic
```

Back up a list of files using the maximum level of auditing, which enables a separate application, such as a Perl script, to verify the results.

---

## Auditlogname

The *auditlogname* option specifies the path and file name where you want to store audit log information. This option applies when audit logging is enabled.

## Supported Clients

This option is valid for all clients.

## Options File

Place this option in the `dsm.sys` file.

## Syntax

▶—AUDITLOGName—*filespec*—▶

## Parameters

*filespec*

Specifies the path and file name where you want Tivoli Storage Manager to store audit log information.

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 `dsmaudit.log`. The `dsmaudit.log` file *cannot* be a symbolic link.

## Examples

Run an incremental backup with audit logging enabled.

### Sample output

The following is a sample execution and output file:

```
> dsmc inc /SMSVT/mfs1 -auditlogging=full
  -auditlogname=/home/cliv3/audit.log
IBM Tivoli Storage Manager
Command Line Backup/Archive Client Interface
  Client Version 5, Release 5, Level 0.0
  Client date/time: 07/03/07 12:05:13
(c) Copyright by IBM Corporation and other(s)
  1990, 2007. All Rights Reserved.
```

```
Node Name: NAXOS_CLUSTER
Session established with server
  ODINHMSERV: AIX-RS/6000
  Server Version 5, Release 4, Level 0.0
  Server date/time: 07/03/07 12:05:18
  Last access: 07/03/07 12:01:57
```

```
Incremental backup of volume '/SMSVT/mfs1'
Directory-->          4,096 /SMSVT
  /mfs1/ [Sent]
Normal File-->       32,768 /SMSVT
  /mfs1/test0 [Sent]
Normal File-->       32,768 /SMSVT
  /mfs1/test1 [Sent]
Normal File-->       32,768 /SMSVT
  /mfs1/test2 [Sent]
Normal File-->       32,768 /SMSVT
  /mfs1/test3 [Sent]
Normal File-->       32,768 /SMSVT
  /mfs1/test4 [Sent]
Normal File-->       32,768 /SMSVT
  /mfs1/test5 [Sent]
Normal File-->       32,768 /SMSVT
  /mfs1/test6 [Sent]
Normal File-->       32,768 /SMSVT
  /mfs1/test7 [Sent]
Normal File-->       32,768 /SMSVT
  /mfs1/test8 [Sent]
Normal File-->       32,768 /SMSVT
  /mfs1/test9 [Sent]
```

Successful incremental backup of '/SMSVT/mfs1'

```
Total number of objects inspected:      11
Total number of objects backed up:      11
Total number of objects updated:        0
Total number of objects rebound:       0
Total number of objects deleted:        0
Total number of objects expired:        0
Total number of objects failed:         0
Total number of bytes transferred:      320.31 KB
Data transfer time:                     0.01 sec
Network data transfer rate:             17,141.84 KB/sec
Aggregate data transfer rate:           297.43 KB/sec
Objects compressed by:                  0%
Elapsed processing time:                 00:00:01
```

The following are the audit log contents:

```
07/03/07 12:05:14 ANS1650I Command:
  inc /SMSVT/mfs1
07/03/07 12:05:15 ANS1651I Backed Up:
  /SMSVT/mfs1/
07/03/07 12:05:15 ANS1651I Backed Up:
  /SMSVT/mfs1/test0
07/03/07 12:05:15 ANS1651I Backed Up:
  /SMSVT/mfs1/test1
07/03/07 12:05:15 ANS1651I Backed Up:
  /SMSVT/mfs1/test2
07/03/07 12:05:15 ANS1651I Backed Up:
  /SMSVT/mfs1/test3
07/03/07 12:05:15 ANS1651I Backed Up:
  /SMSVT/mfs1/test4
07/03/07 12:05:15 ANS1651I Backed Up:
  /SMSVT/mfs1/test5
07/03/07 12:05:15 ANS1651I Backed Up:
  /SMSVT/mfs1/test6
07/03/07 12:05:15 ANS1651I Backed Up:
  /SMSVT/mfs1/test7
07/03/07 12:05:15 ANS1651I Backed Up:
  /SMSVT/mfs1/test8
07/03/07 12:05:15 ANS1651I Backed Up:
  /SMSVT/mfs1/test9
```

### Related information

For more information about the audit logging facility refer to “Auditlogging” on page 268.

---

## Autofsrename

The *autofsrename* option renames an existing file space that is not Unicode-enabled on the Tivoli Storage Manager server so that a Unicode-enabled file space with the original name can be created for the current operation.

**Note:** You must be an authorized user to use this option.

When you specify *autofsrename* yes in your client options file, and the server value of *autofsrename* is set to *client*, Tivoli Storage Manager generates a unique name by appending *\_OLD* to the file space name you specify in the current operation. For example, Tivoli Storage Manager renames the file space *Jaguar* to *Jaguar\_OLD*. If the new file space name is too long, the suffix replaces the last characters of the file space name. For example, the *mylongfilesystemname* file space name is renamed to:



mylongfilesystem\_OLD

If the new file space name already exists on the server, Tivoli Storage Manager renames the new file space Jaguar\_OLDx, where x is a unique number.

Tivoli Storage Manager creates new Unicode-enabled file spaces that contain only the data specified in the current operation. For example, assume that Jaguar is the name of your startup disk and you archive all of the .log files in the /Users/user5/Documents directory. Before the archive takes place, the server renames the file space to Jaguar\_OLD. The archive places the data specified in the current operation into the Unicode-enabled file space named Jaguar. The new Unicode-enabled file space now contains only the /Users/user5/logs directory and the \*.log files specified in the operation. Tivoli Storage Manager stores all subsequent full and partial incremental, selective backup, and archive data in the new Unicode-enabled file spaces.

For example, assume that Jaguar is the name of your startup disk and you archive all of the .log files in the /Users/user5/Documents directory. Before the archive takes place, the server renames the file space to Jaguar\_OLD. The archive places the data specified in the current operation into the Unicode-enabled file space named Jaguar. The new Unicode-enabled file space now contains only the /Users/user5/logs directory and the \*.log files specified in the operation. Tivoli Storage Manager stores all subsequent full and partial incremental, selective backup, and archive data in the new Unicode-enabled file spaces.

Renamed file spaces remain on the server as stabilized file spaces. *These file spaces contain all the original data, which you can restore as long as they remain on the server.*

**Note:** When an existing file space is renamed during Unicode conversion, any access rules defined for the file space remain applicable to the original file space. New access rules must be defined to apply to the new Unicode file space.

After installation, perform a full incremental backup and rename all existing file spaces that are not Unicode-enabled and back up the files and directories within them under the new Unicode-enabled file spaces. This operation requires increased processing time and storage on the server.

File spaces that are not Unicode-enabled can be viewed in the character set of the locale from which Tivoli Storage Manager backed up the files. A workstation running in a different locale might be unable to view or restore from these file spaces. Unicode-enabled file spaces that are backed up in one locale are visible in all other locales, provided that the workstation has the proper fonts installed.

The server can define the *autofsrename* option and override the *autofsrename* setting on the client.

## Supported Clients

This option is valid for Mac OS X only. The server can define the *autofsrename* option and override the *autofsrename* setting on the client. The Tivoli Storage Manager client API does not support this option.

## Options File

Place this option in the `dsm.sys` file. You can set this option on the **General** tab, **Rename non-Unicode filespaces during backup/archive** drop-down list box of the Preferences editor.

## Syntax



## Parameters

### *Yes*

Specifies that Tivoli Storage Manager automatically renames all file spaces that are not Unicode-enabled in the current backup or archive operation.

*No* Specifies that Tivoli Storage Manager does not rename file spaces that are not Unicode-enabled in the current backup or archive operation.

### *Prompt*

Specifies that Tivoli Storage Manager prompts you whether to rename the file spaces that are not Unicode-enabled in the current operation. This is the default.

## Considerations:

- This option applies *only* when the server sets the `autofsrename` option to `client`.
- When the client scheduler is running, the default behavior is to not prompt you. The next interactive session prompts you to rename the file space.
- The client prompts you *only* one time per file space. If you specify `no` at the prompt, the client cannot rename the file spaces later. However, the Tivoli Storage Manager administrator can rename the file spaces on the server.
- When backing up files to a file space that is not Unicode-enabled, the Unicode-enabled client skips the files and directories with names containing characters from a code page that is different from the current locale.
- If files and directories with names containing characters from a code page other than the current locale were previously backed up with a client that was not Unicode-enabled, they might be expired. The Unicode-enabled client expires these files if you do not migrate the file space to a Unicode-enabled file space. You can back up and archive these files to a Unicode-enabled file space.

## Examples

### Options file:

```
autofsrename yes
```

### Related information

---

## 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 backup 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.

## Supported Clients

This option is valid for all UNIX platforms except Mac OS X. 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.

## Related information

See “Domain” on page 296 for more information about working with automounted file systems and the *domain* option.

---

## Backupsetname

The backupsetname option specifies the name of a backup set from the Tivoli Storage Manager server. The backup set must reside on the server and must contain a TOC.

You must be an authorized user to use the backupsetname option.

You can use `backupsetname` option with the following commands:

- `query backup`
- `query filesystem`
- `query image`
- `restore image`

**Note:** The following commands take `backupsetname` as a positional parameter. The `backupsetname` positional parameter behaves differently from the `backupsetname` option. See the command explanations for a discussion of how the `backupsetname` positional parameter affects each of these commands:

```
query backupset
restore
restore backupset
```

## Supported Clients

This option is valid for all UNIX and Linux clients. The Tivoli Storage Manager client API does not support this option.

## Options File

None. You can specify this option only on the command line.

## Syntax

►—BACKUPSETName—*backupsetname*—◄

## Parameters

*backupsetname*

Specifies the name of a backup set from the Tivoli Storage Manager server. You cannot use wildcards.

## Examples

**Command line:**

```
dsmc query backup /Volumes/bkSets/file.1
-backupsetname=YEAR_END_ACCOUNTING.12345678
dsmc query backup /usr/projects -subdir=yes
-backupsetname=YEAR_END_ACCOUNTING.12345678
dsmc restore image /home/proj
-backupsetname=ACCOUNTING_2007.12345678
dsmc query image -backupsetname=WEEKLY_BSET.21435678
```

## Related information

“Restoring data from a backupset” on page 172

---

## Changingretries

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.

You must be an authorized user to use the *changingretries* option.

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 and Linux 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 `dsm.sys` file. You can set this option on the **Backup** tab, **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 **delete filespace**, **query backup**, and **query filespace** commands.

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



## 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
```

---

## 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* attempts to eliminate 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. If you use this 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 and Linux clients. The server can also define this option.

## Options File

Place this option in the client user options file (dsm.opt).

## Syntax



## 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 can (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 might 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 only on the initial command line. It is not valid in interactive mode.

---

## Commmethod

The *commmethod* option specifies the communication method you use to provide connectivity for client-server communication.

You must be an authorized user to use the *commmethod* option.

## Supported Clients

This option is valid for all clients.

## Options File

Place this option in the *dsm.sys* file. You can set this option on the **Communication** tab of the Preferences editor.

## Syntax



## Parameters

### *TCPIP*

The Transmission Control Protocol/Internet Protocol (TCP/IP) communication method. This is the default.

### *V6TcPIP*

Indicates that either TCP/IP Version 4 or Version 6 should be used, depending on the system configuration and the results of a domain name service lookup. A valid DNS environment must be available.

### *SHAREdmem*

Use the shared memory communication method when the client and server are running on the same system. This provides better performance than the TCP/IP protocol. This communication method is valid for AIX, HP-UX, Linux, 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.

**Important:** When using **COMMMethod** *SHAREdmem* on Linux, you might receive error message: ANR8294W Shared Memory Session unable to initialize on the server or storage agent console. By default, Linux is not set up with sufficient system resources to create the message queues. You must increase the kernel parameter, MSGMNI, to 128 (the default is 16). You can modify this parameter by performing the following command:

```
echo 128 > /proc/sys/kernel/msgmni
```

To enable this parameter to remain persistent after rebooting the system, you can instead add the following line to the file */etc/sysctl.conf*, then reboot the system:

```
kernel.msgmni=128
```

To view the current ipc settings, run this command:

```
ipcs -l
```

Now look at the max queues system wide value. The default is 16.

## Examples

### Options file:

```
commmethod tcpip
```

Use only TCP/IP Version 4

```
commmethod V6Tcpip
```

Use both TCP/IP Version 4 and Version 6, depending on how the system is configured, and the results of a domain name service lookup.

**Note:** The *dsmc schedule* command cannot be used when both *SCHEDMODE PRompt* and **COMMMethod** *V6Tcpip* are specified.

### Command line:

```
-commm=tcpip
```

```
-commm=V6Tcpip
```

This option is valid only on the initial command line. It is not valid in interactive mode.

---

## Commrestartduration

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.

You must be an authorized user to use the *commrestartduration* option.



**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 clients.

## Options File

Place this option in the `dsm.sys` file. You can set this option on the **Communication** tab, **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

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.

You must be an authorized user to use the *commrestartinterval* option.

**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 clients.

## Options File

Place this option in the `dsm.sys` file. You can set this option on the **Communication** tab, **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, and with the **archive**, **incremental**, and **selective** commands.

## Supported Clients

This option is valid for all 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** tab, **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 might fail.

## Examples

**Options file:**

```
compressalways yes
```

**Command line:**

-compressa=no

This option is valid only on the initial command line. It is not valid in interactive mode.

---

## 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. 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.

You must be an authorized user to use the *compression* option.

**Note:** The client will not compress files that the NetWare operating system already compresses. If you set the *compression* option to *yes* and Tivoli Storage Manager finds a file that the NetWare operating system already compresses, the file is sent to the server without further compression. The file is sent as a NetWare compressed file.

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 file. 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.

Tivoli Storage Manager backs up a sparse file as a regular file if client compression is off. Set the *compression* option to *yes* to enable file compression when backing up sparse files to minimize network transaction time and maximize server storage space.

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.
- 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.

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 clients. The server can also define this option.

## Options File

Place this option in the `dsm.sys` file *within* a server stanza. You can set this option on the **Backup** tab, **Compress objects** check box of the Preferences editor.

## Syntax



## 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 only on the initial command line. It is not valid in interactive mode.

## Related information

“Exclude options” on page 312

“Include options” on page 332

---

## Console

Use the *console* option with the **query systeminfo** command to output information to the console.

- DSMOPTFILE - The contents of the `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 and Linux).
- 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 might 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 might 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 option is valid for all clients.

## Syntax

►►—CONSOLE—◄◄

## Parameters

There are no parameters for this option.

## Examples

### Command line:

```
query systeminfo dsmoptfile errorlog -console
```

### Related information

“Filename” on page 318

---

## 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.

By default, 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.

### Note:

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 `shedlogretention` 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**
- **delete backup**
- **expire**
- **query archive**
- **query backup**
- **query filespace**
- **query image**
- **restore**
- **restore image**
- **restore nas**
- **retrieve**
- **set event**

## Supported Clients

This option is valid for all clients.

## Options File

Place this option in the client user options file (dsm.opt). You can set this option on the **Regional Settings** tab, **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 (does not apply to Mac OS X). 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 available translations:

- US English
- Chinese (Traditional)
- Korean

- 2 DD-MM-YYYY

This is the default for the following available translations:

- Brazilian Portuguese
- Italian

- 3 YYYY-MM-DD

This is the default for the following available translations:

- Japanese
- Chinese (Simplified)
- Polish

- 4 DD.MM.YYYY

This is the default for the following available translations:

- German
  - French
  - Spanish
  - Czech
  - Russian
- 5 YYYY.MM.DD

This is the default for the following available translations:

- 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 if more than one server is defined in the `dsm.sys` file.

By default, Tivoli Storage Manager will contact the server defined by the first stanza in the `dsm.sys` file. This option is only used if the *servername* option is not specified in the client user options file (`dsm.opt`).

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 and Linux 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 `dsm.sys` file *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. Deletion of files will be performed correctly if the Tivoli Storage Manager server's backup copy group has enough versions for existing and deleted files.

## Supported Clients

This option is valid for all 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 "/Users/dgordon/Documents/*.c" -deletefiles
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 archive, retrieve, query archive, or query backupset.

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
```

### Note:

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.

Use the *description* option with the following commands:

- **archive**
- **delete archive**
- **query archive**
- **query backupset**
- **retrieve**

## Supported Clients

This option is valid for all 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" "/Users/van/Documents/*.x"  
dsmc archive -description="Project X" "/home/allproj/*"
```

You can then use the description to retrieve all of the files.

## Examples

### Command line:

```
dsmc archive "/Users/van/Documents/*.prj" -des="2003 Budget for Proj 1"  
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 are displayed on the screen. If you specify the *detail* option, information about attributes in each copy group contained in each management class is displayed on the screen. A management class can contain a backup copy group, an archive copy group, both, or neither.

A Unicode-enabled file space might not display correctly if the server cannot display the Unicode name. In this case, use the file space identifier (fsID) of the file space to identify these file spaces on the server. Use the *detail* option with the **delete filesystem** and **query filesystem** commands to determine the fsID of a file space. The fsID also appears in the file information dialog in the backup-archive client 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.

Use the *detail* option with the following commands:

- **delete filesystem**
- **query archive**
- **query backup**
- **query filesystem**
- **query inclexcl**
- **query mgmtclass**

## Supported Clients

This option is valid for all 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
```

---

## Diffsnapshot

The *diffsnapshot* option controls whether Tivoli Storage Manager should create the differential snapshot when performing a *snaptiff* incremental backup. If the differential snapshot is not created by Tivoli Storage Manager, the latest snapshot found on the volume is used as the differential snapshot and as the source for the backup operation.

The default value is to create the differential snapshot. This option is ignored the first time the *snaptiff* option is used. The first time the *snaptiff* option is used on a volume, a snapshot must be created and used as the source for a full incremental backup. Snapshots that are created by Tivoli Storage Manager are deleted by Tivoli Storage Manager after the next incremental *snaptiff* backup is complete.

Snapshots can be created with the NetApp FilerView tool. Use the *latest* parameter if you want Tivoli Storage Manager to use the most recent snapshot that was created with this or any other method. Snapshots created by methods outside of Tivoli Storage Manager are never deleted by Tivoli Storage Manager.

### Supported Clients

This option is only valid for AIX 64-bit clients.

### Syntax



### Parameters

#### *create*

Specifies that you want to create a new, persistent, snapshot to use as the source snapshot. This is the default.

#### *latest*

Specifies that you want to use the latest snapshot that is found on the file server as the source snapshot.

### Examples

#### Command line:

Perform a *snaptiff* incremental backup of an NFS mounted file-system /vol/vol1 hosted on the file server `homestore.ibm.com`, where /net/home1 is the mount point of /vol/vol1.

```
incremental -snaptiff -diffsnapshot=latest /net/home1
```

The *-diffsnapshot* option value of *latest* means that the operation uses the latest snapshot (the active snapshot).

### Related information

“*Snaptiff*” on page 398

---

## Dirmc

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. Select a management class for individual directories that retains directories at least as long as it retains the files associated with them.

You must be an authorized user to use the *dirmc* option.

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 clients. The server can also define this option.

### Options File

Place this option in the *dsm.sys* file *within* a server stanza. You can set this option on the **Backup** tab, **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.

### Related information

If you want to back up specific files to a management class see “Assigning a management class to files” on page 235 for more information.

---

## 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 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 "/Users/*"
```

**Command line:**

```
dsmc query backup -dirsonly "*"
```

---

## Disablenqr

The *disablenqr* option specifies whether the Tivoli Storage Manager Backup-Archive Client can use the "no query restore" method for restoring files and directories from the server.

If you set the *disablenqr* option to *no* (the default), the client can use the "no query restore" process.

If you set the *disablenqr* option to *yes*, the client can use only the standard restore process (also known as "classic restore").

**Note:** There is no option or value to specify that the client can use only "no query restore" method.

### Supported Clients

This option is valid for all 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 dsm.opt file.

### Syntax



### Parameters

*No* Specifies that Tivoli Storage Manager can use the "no query restore" method. This is the default.

*Yes*

Specifies that the client uses only the "standard restore" method. The "no query restore" method is not allowed.

### Examples

#### Options file:

```
disablenqr yes
```

#### Command line

```
-disablenqr=yes
```

---

## Diskbuffsize

The *diskbuffsize* option specifies the maximum disk I/O buffer size (in kilobytes) that the client can use when reading files. The *diskbuffsize* option replaces the *largecommbuffers* option.

You must be an authorized user to use the *diskbuffsize* option.

Optimal backup, archive, or HSM migration client performance can usually be achieved if the value for this option is equal to or smaller than the amount of file read ahead provided by the client file system. A larger buffer will require more memory and might not improve performance.

**Recommendation:** Use the default setting, unless otherwise directed by IBM support personnel.

### Supported Clients

This option is valid for all clients.

### Options File

Place this option in the dsm.sys file.

### Syntax



## Parameters

*size*

Specifies the maximum disk I/O buffer size (in kilobytes) that the client will use when reading files. The range of values is 16 through 1023; the default is 32. For AIX: If the *enablelanfree* option is set to *no*, the default setting for *diskbuffsize* is 256.

## Examples

**Options file:**

```
diskbuffsize 64
```

**Command line:**

Does not apply.

---

## Diskcachelocation

The *diskcachelocation* option specifies the location where the disk cache database will be created if the option *memoryefficientbackup=diskcachemethod* is set during an incremental backup. You can specify the *diskcachelocation* option in your option file, or with the *include.fs* option. If the *diskcachelocation* option appears in the option file, its value will be used for all file systems not represented by an *include.fs* option containing the *diskcachelocation* option.

You must be an authorized user to use the *diskcachelocation* option.

The disk cache is a temporary file which is deleted after the **incremental** command is run. Use this option to select one of the following:

1. A location that has more free disk space if, when you are using *memoryefficientbackup=diskcachemethod*, you get the message that the disk cache file cannot be created because you do not have enough disk space.
2. A location on a different physical volume to reduce contention for the disk access mechanism, and therefore improve performance.

**Important:** For performance reasons, do not use a remote drive for *diskcachelocation*.

The actual amount of disk space required for the disk cache file created by disk cache incremental backups depends on the number of files and directories included in the backup and on the average length of the files and directories to be backed up. For UNIX and Linux, estimate 1 byte per character in the path name. For Mac OS X, estimate 4 bytes per character in the path name. For example, if there are 1 000 000 files and directories to be backed up and the average path length is 200 characters, then the database will occupy approximately 200 MB for UNIX and Linux, and 800 MB for Mac OS X clients. Another way to estimate for planning purposes is to multiply the number of files and directories by the length of the longest path to establish a maximum database size.

A second disk cache file is created for the list of migrated files when backing up an HSM managed file system. The combined disk cache files, created by disk cache incremental backups and HSM managed file system backups, can require above 400 MB of disk space for each million files being backed up.

## Supported Clients

This option is valid for all clients. The server can also define this option.

## Options File

Place this option in the `dsm.sys` file within a server stanza.

### Syntax

▶▶—DISKCACHELocation— —*path*—▶▶

### Parameters

*path*

Specifies the location where the disk cache database will be created if *memoryefficientbackup* is set to *diskcachemethod*. The default location is to create the disk cache file in the root of the file space being processed.

### Examples

Options file:

```
diskcachelocation /home
diskcachelocation /Volumes/hfs2
```

Command line:

Does not apply.

See “Include options” on page 332 for more information about *include.fs*.

---

## Domain

The *domain* option specifies what you want to include for incremental backup. Domain objects are backed up only if you invoke the **incremental** command without a file specification.

Tivoli Storage Manager uses the domain value 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 Tivoli Storage Manager 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 backup-archive client GUI

There are several places where the *domain* option can be defined:

- In an options file
- On the command line, when entered with a Tivoli Storage Manager command
- In a client option set, defined on the Tivoli Storage Manager server with the **define clientopt** command
- As an option on a scheduled command, defined on the Tivoli Storage Manager server with the **define schedule** command

If any of these sources contain a domain definition, then the client backs up that domain. If more than one source specifies a domain, the client will back up all specified domains. The same domain object can be defined more than once, but the



effect is the same as defining it only once. If you do not specify a domain, Tivoli Storage Manager backs up the default domain, as described in the **all-local** parameter below.

You can exclude objects from the domain by specifying the exclusion operator (-) before the object. If any domain definition excludes an object, that object is excluded from the domain, even if another definition includes the object. You cannot use the domain exclusion operator (-) in front of any domain keyword that begins with all-.

If you invoke the incremental command with a file specification, Tivoli Storage Manager ignores any domain definitions and backs up only the file specification.

You can include a virtual mount point in your client domain.

**Important:** If you are running GPFS for AIX or GPFS for Linux x86/x86\_64 in a multinode 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.

## Supported Clients

This option is valid for all 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 options file, dsm.opt or dsm.sys. You can set this option on the **Backup** tab, **Domain for Backup** section of the Preferences editor.

A single domain statement can list one or more objects for the domain. You can use more than one domain statement. The following two examples from two options files yield the same domain result:

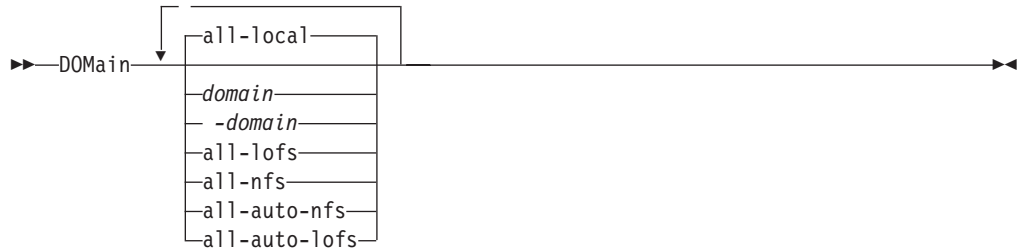
### Example 1

```
...
domain fs1
domain all-local
domain -fs3
...
```

### Example 2

```
...
domain all-local fs1 -fs3
...
```

## Syntax



## Parameters

### **all-local**

Back up all domain objects. This is the default.

The following file systems are not included in **all-local** domain:

- LOFS file systems and LOFS through automounter
- /tmp

### *object*

Specifies the domain objects to include in the domain.

An object name must be enclosed in quotes if the name includes any spaces.

### *-object*

Specifies the domain objects to exclude from the domain.

An object name must be enclosed in quotes if the name includes any spaces.

### **all-lofs**

Back up all loopback file systems, except those handled by automounter.

**Restriction:** This parameter is not supported by Mac OS X.

### **all-nfs**

Back up all network file systems, except those handled by automounter.

**Restriction:** This parameter is not supported by Mac OS X.

### **all-auto-nfs**

Back up all network file systems which are handled by automounter.

**Restriction:** This parameter is not supported by Mac OS X.

### **all-auto-lofs**

Back up all loop devices and local file systems which are handled through automounter.

**Restriction:** This parameter is not supported by Mac OS X.

## Examples

### Options file:

An options file can contain more than one domain statement. However, each domain statement below is an example of a single statement in an options file.

```
domain all-local
domain all-local -/Volumes/volume2
domain all-local '-/Volumes/Macintosh HD'
```

```

domain /tst /datasave /joe
domain all-local
domain ALL-LOCAL -/home
domain ALL-NFS -/mount/nfs1

```

**Command line:**

```

-domain="/ /Volumes/volume2"
-domain="all-local -/Volumes/volume2"

-domain="/fs1 /fs2"
-domain=/tmp
-domain="ALL-LOCAL -/home"

```

**Domain definition interaction**

Domain can be defined in several sources, and the result is a summation of all domain definitions. As an example of the interaction of domain definitions, consider how domain definitions from several sources yield different backup results. In the table, FS<sub>n</sub> is a file system. This table shows only commands entered at the command line. For scheduled commands, the command line column is not relevant, and options from the scheduled command must be considered.

*Table 65. Interaction of domain definitions from several sources*

options file	command line	client option set	Objects backed up via incremental command
domain FS1	incremental -domain=FS2	domain FS3	FS1 FS2 FS3
domain FS1	incremental	domain FS3	FS1 FS3
	incremental -domain=FS2		FS2
	incremental -domain=FS2	domain FS3	FS2 FS3
	incremental	domain FS3	FS3
	incremental		all-local
domain all-local	incremental	domain FS3	all-local + FS3
domain all-local domain -FS1	incremental		all-local, but not FS1
domain -FS1	incremental		none
domain FS1 FS3	incremental	domain -FS3	FS1
domain all-local	incremental	domain -FS3	all-local, but not FS3
	incremental FS1 -domain=all-local		FS1
	incremental FS1	domain all-local	FS1
domain -FS1	incremental FS1		FS1

**Related information**

For information about defining a virtual mount point, see “Virtualmountpoint” on page 431.

---

## Domain.image

The *domain.image* option specifies what you want to include in your client domain for an image backup.

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, Linux x86/x86\_64, Linux on POWER, and Solaris. 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** tab → **Domain for Backup** box of the Preferences editor.

### Syntax



### 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.

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 use this option in your client system options file (dsm.sys), the *domain.nas* option defines your default domain for NAS image backups. When you perform a NAS file system image backup using the **backup nas** command, Tivoli Storage Manager adds the volumes that you specify on the command line to the volumes defined in your dsm.sys file. For example, if you enter *domain.nas nas1/vol/vol0 nas1/vol/vol1* in your dsm.sys file and you enter `dsmc backup nas -nasnodename=nas1 /vol/vol2` on the command line, 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).

## Syntax



## 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.

---

## Dynamicimage

Use the *dynamicimage* option with the **backup image** command or the *include.image* option to specify that you want to perform a dynamic image backup. Place the *include.image* statement containing the *dynamicimage* value in the server stanza in your system options file, *dsm.sys*.

### Supported Clients

This option is valid for AIX, Solaris, HP-UX and all Linux clients. The Tivoli Storage Manager API does not support this option.

### Options File

Place this option in the *include.image* statement in the server stanza in the systems option file, *dsm.sys*. You can also set this option using the Preferences editor.

### Syntax

►—DYNAMICImage— *value*—►

### Parameters

*value*

Specifies one of the following values:

**yes**

Use this option only if the volume cannot be unmounted and remounted as read-only. Tivoli Storage Manager backs up the volume as is without remounting it as 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 and manually mount the file system in order to regain access to the volume. This option is valid for AIX, Solaris, HP-UX and all Linux clients.

**Note:** This option is not allowed for AIX JFS2 file systems.

**no** Use this option if you do not want to perform a dynamic image backup. This is the default. The default behavior depends on the platform and file system type. For platforms and file systems that support snapshot, namely AIX JFS2 file systems and LINUX LVM file systems, the default is snapshot-based image backup. For all other UNIX platforms and file systems, the default is static image backup.

### Examples

**Options file:**

```
include.image /kalafs1 dynamicimage=yes
```

**Command line on backup image:**

```
dynamicimage=yes
```

---

## Editor

The *editor* option turns the command-line interface (CLI) editor and retrieve capability on or off.

Certain terminal settings result in non-standard input, so the editor might not work as defined in this document. In this case, you can disable the editor by setting the *editor* option to *no* in your *dsm.sys* file.

Using the command line editor, you can enter multiple-byte characters. However, the editor processes of special keys such as delete, escape, home, and so on, is dependent on the terminal emulator being used and on the value of the TERM environment variable. The processing of these keys may or may not work correctly.

## Supported Clients

This option is valid for all UNIX and Linux clients (except z/OS UNIX System Services).

## Syntax



## 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 z/OS 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.

---

## Efsdecrypt

The *efsdecrypt* option allows you to control whether or not files encrypted by an AIX Encrypted File System (EFS) are read in encrypted or decrypted format.

The *efsdecrypt* option default is *no*, which is to back up the encrypted or raw data. If you specify *yes*, the files are backed up as clear text, which means that they are backed up as normal files, as if the files existed in unencrypted form on the file system.

**Important:** Whenever you run a backup that includes any files encrypted on an EFS, you must ensure that you use the correct specification of the *efsdecrypt* option. If the *efsdecrypt* option value changes between two incremental backups, all encrypted files on EFS file systems will be backed up again, even if they have not changed since the last backup. For example, if you are running an incremental backup of encrypted files that were previously backed up as "raw," then ensure

that *efsdecrypt* is specified as *no*. If you change *efsdecrypt* to *yes*, all the files will be backed up again in clear text even if they are unchanged, so ensure that you use this option carefully.

**Note:** This is a global option that is applied to the complete backup. Two separate invocations of the client are required to back up some encrypted files as raw data and others as clear text.

## Supported Clients

This option is valid for AIX clients.

## Options File

Place this option in the `dsm.sys` file or the client user options file (`dsm.opt`).

## Syntax



## Parameters

*No* Encrypted files are read in encrypted or raw data format, and Tivoli Storage Manager encryption and compression is forced off. This is the default.

*Yes*

Encrypted files are read in decrypted or clear text format.

## Examples

### Options file:

```
EFSDecrypt yes
```

### Command line:

```
-EFSDecrypt=no
```

---

## Enablearchiveretentionprotection

The *enablearchiveretentionprotection* option allows the client to connect to a Tivoli Storage Manager data retention server. This ensures that archive objects will not be deleted from the server until policy-based retention requirements for that object have been satisfied.

This option is ignored if the client connects to a server that is not retention protection enabled. If the option is *no* (the default) and an attempt is made to connect to a data retention server, the connection will be refused.

The data retention server is specially configured for this task, so normal backup or restore processing is rejected by the server. When the client is connected to a data retention server, the following commands will not be available. If you attempt to use these commands, a message will be displayed indicating that they are not valid with this server.

- incremental
- backup (all subcommands)
- selective



- restore (all subcommands except **restore backupset** *-location=file* or *-location=tape*)

**Note:** **restore backupset** *-location=file* or *-location=tape* do not connect to any server (except the virtual one) and thus will not be blocked under any circumstances.

- restart restore
- delete backup
- delete group
- expire
- All queries *except*:
  - query access
  - query archive
  - query filespace
  - query inxexcl
  - query managementclass
  - query node
  - query options
  - query schedule
  - query session
  - query systeminfo
  - query tracestatus

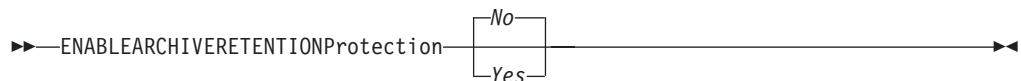
## Supported Clients

This option is valid for all clients.

## Options File

This option is valid only in the `dsm.sys` file *within* a server stanza and is not valid in a client option set from the server. It is not valid on any command line.

## Syntax



## Parameters

*No* The data retention server connection is refused. This is the default.

*Yes*

The client connects to a data retention server.

---

## Enablelanfree

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.

You must be an authorized user to use the *enablelanfree* option.

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 Tivoli Storage Manager Managed System for SAN Storage Agent publications.

**Note:**

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 503 for more information.

## Supported Clients

This option is valid for AIX, HP-UX, Linux x86/x86\_64, Linux on POWER, and Solaris clients.

## Options File

Place this option in the dsm.sys file *within* a server stanza. You can set this option on the **General** tab → **Enable Lanfree** check box of the Preferences editor.

## Syntax



## 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.

## Related information

To specify a communication protocol between the Tivoli Storage Manager client and Storage Agent, see “Lanfreecommmethod” on page 339.

---

## Encryptiontype

The *encryptiontype* option allows you to choose the algorithm for data encryption.

The *encryptiontype* option allows you to use AES 128-bit data encryption, providing a stronger form of data encryption than DES 56-bit data encryption. The encryption type only affects backup and archive operations. The data that you include is stored in encrypted form, and encryption does not affect the amount of data sent or received. During restore and retrieve operations, the encrypted data will be decrypted with the proper encryption algorithm, regardless of the setting for this option.

**Note:**

1. HSM data migration only supports 56-bit DES encryption. Therefore, even though you enabled AES 128-bit encryption for the backup-archive client, migrated files will be backed up using 56-bit DES encryption.

## Supported Clients

This option is valid for all clients.

## Options File

Place this option in the `dsm.sys` file. You can also set this option on the **Authorization** tab of the Preferences editor. The server can override this.

## Syntax



## Parameters

*AES128*

AES 128-bit data encryption. AES 128-bit data encryption provides a stronger form of data encryption than DES 56-bit data encryption. This is the default.

*DES56*

DES 56-bit data encryption.

## Examples

**Options file:**

```
encryptiontype des56
```

**Command line:**

Does not apply.

---

## Encryptkey

The Tivoli Storage Manager client supports the option to encrypt files being backed up or archived to the Tivoli Storage Manager server. This option is enabled with the *include.encrypt* option.

All files matching the pattern on the *include.encrypt* specification will be encrypted before the data is sent to the server. There are three options for managing the key used to encrypt the files (prompt, save, and generate). All three options can be used with either the backup-archive client or the Tivoli Storage Manager API.

The encryption key password is case-sensitive and can be up to 63 characters in length and include the following characters:

- A-Z** Any letter, A through Z, uppercase or lowercase. National language characters are not allowed.
- 0-9** Any number, 0 through 9
- +** Plus
- .** Period
- \_** Underscore
- Hyphen
- &** Ampersand

**Note:**

1. The Tivoli Storage Manager API has an alternate way of specifying *encryptkey=generate*; the previous *enableclientencryptkey=yes* option can also be specified to request generate encryption processing.
2. The *enableclientencryptkey=yes* API option is still supported, so it is possible when using the API to specify two conflicting options. For example, *enableclientencryptkey=yes* and *encryptkey=prompt* or *encryptkey=save*.
3. When conflicting values are specified, the Tivoli Storage Manager API will return an error message.

**Attention:** When using the prompt option, your encryption key is not saved in the Tivoli Storage Manager password file on UNIX. If you forget the key, your data will be unrecoverable.

## Supported Clients

This option is valid for all clients. 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 **Authorization** tab, **Encryption Key Password** section of the Preferences editor.

## Syntax



## Parameters

### *save*

The encryption key password is saved in the Tivoli Storage Manager client's password file. A prompt is issued for an initial encryption key password, and after the initial prompt, the saved encryption key password in the password file is used for the backups and archives of files matching the *include.encrypt* specification. The password can be up to 63 bytes in length. The key is retrieved from the password file on restore and retrieve operations.

When the *save* option is specified for an API application (does not apply to Mac OS X), the initial key password must be provided by the application using the API in the *dsmInitEx* function call. The API itself does not issue a prompt to the user but relies on the application to prompt the user as necessary.

This is the default.

**Restrictions:**

- This option can only be used when *passwordaccess generate* is also specified.
- The root user or a Tivoli Storage Manager authorized user must specify the initial encryption key password.

*prompt*

The management of the encryption key password is provided by the user. The user is prompted for the encryption key password when the Tivoli Storage Manager client begins a backup or archive. A prompt for the same password is issued when restoring or retrieving the encrypted file. This password can be up to 63 bytes in length.

When the *prompt* option is specified for an API application (does not apply to Mac OS X), the key password must be provided by the application using the API in the *dsmInitEx* function call. The API itself does not issue a prompt to the user but relies on the application to prompt the user as necessary.

**Restriction:** This option can only be used by the root user or a Tivoli Storage Manager authorized user.

*generate*

An encryption key password is dynamically generated when the Tivoli Storage Manager client begins a backup or archive. This generated key password is used for the backups of files matching the *include.encrypt* specification. The generated key password, in an encrypted form, is kept on the Tivoli Storage Manager server. The key password is returned to the Tivoli Storage Manager client to enable the file to be decrypted on restore and retrieve operations.

## Examples

**Options file:**

encryptkey prompt

**Command line:**

Does not apply.

---

## Errorlogmax

The *errorlogmax* option specifies the maximum size of the error log, in megabytes.

You must be an authorized user to use the *errorlogmax* option.

If you change from *errorlogmax* to *errorlogretention*, all existing log entries are retained and the log is pruned using the new *errorlogretention* criteria.

If you change from *errorlogretention* to *errorlogmax*, all records in the existing log are copied to the pruned log *dsmerlog.pru*, the existing log is emptied, and logging begins under the new log wrapping criteria.

If you change the value of the *errorlogmax* option, the existing log is extended or shortened to accommodate the new size. If the value is reduced, the oldest entries are deleted to reduce the file to the new size.

**Restriction:** You cannot specify a non-zero *errorlogmax* value *and* enable *errorlogretention*.

## Supported Clients

This option is valid for all clients.

## Options File

Place this option in the *dsm.sys* file. You can set this option on the **General** tab, **Select Error Log** button of the Preferences editor.

## Syntax

▶—ERRORLOGMAX— *size*—▶

## Parameters

*size*

Specifies the maximum size, in megabytes, for the log file. The range of values is 0 to 2047; the default is 0, which disables log file wrapping and allows the log file to grow indefinitely.

## Examples

**Options file:**

```
errorlogmax 2000
```

**Command line:**

```
-errorlogmax=2000
```

This option is valid only on the initial command line. It is not valid in interactive mode.

---

## Errorlogname

This option specifies the fully qualified path and file name of the file that contains the error messages.

**Authorized user:** The value for this option overrides the *DSM\_LOG* environment variable. The *dsmwebcl.log* and *dsmsched.log* files are created in the same directory as the error log file you specify with the *errorlogname* option.

For Mac OS X, the default location is one of the following:

```
~/Library/Logs/tivoli/tsm/  
/Library/Logs/tivoli/tsm/
```

The *dsmerror.log* cannot be a symbolic link.

## Supported Clients

This option is valid for all clients.

## Options File

Place this option in the `dsm.sys` file. You can set this option on the **General** tab, **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 `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

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 allow the scheduler to prune the error log.

You must be an authorized user to use the *errorlogretention* option.

If you change from *errorlogretention* to *errorlogmax*, all records in the existing log are copied to the pruned log `dsmerlog.pru`, the existing log is emptied, and logging begins under the new log wrapping criteria.

If you change from *errorlogmax* to *errorlogretention*, all existing log entries are retained and the log is pruned using the new *errorlogretention* criteria.

**Restriction:** You cannot specify *errorlogretention* and a non-zero *errorlogmax* value.

## Supported Clients

This option is valid for all clients.

## Options File

Place this option in the `dsm.sys` file. You can set this option on the **General** tab, **Select Error Log** button of the Preferences editor.

## Syntax



## 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

Use the exclude options to exclude objects from backup, image, or archive services.

**Authorized User:** 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.

### Note:

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 *inlexcl* option.

Exclude any system files or images that could corrupt the operating system when recovered. You should also exclude the directory containing the Tivoli Storage Manager client files.

Use wildcard characters to exclude a broad range of files.

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*
```

## Supported Clients

This option is valid for all clients.

## Options File

Place these options in the `dsm.sys` file. You can set these options on the **Include-Exclude** tab, **Define Include-Exclude Options** section of the Preferences editor.

## Syntax

► *options* — *pattern* ◄

### **exclude, exclude.backup, exclude.file, exclude.file.backup**

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 or aliases (aliases apply to Mac OS X) from backup processing only.

**Note:** For Mac OS X aliases are excluded.

### **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.

If you exclude a directory that was previously included, Tivoli Storage Manager expires existing backup versions of the files and directories beneath it during the next incremental backup. Use this option to exclude a portion of your data that has no underlying files to back up.

**Note:** Avoid performing a selective backup of an individual file within an excluded directory. The next time that you perform an incremental backup, any files backed up in this manner will be expired.

#### **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 systems that match the specified pattern from file system incremental backup operations and incremental image backup operations. If files from the excluded file systems were ever backed up, then management class rebinding and deleted file expiration will not occur. However, existing backup versions will remain on the server subject to associated management class settings.

Use **exclude.image** to exclude file systems from full image backup operations.

#### **exclude.fs.nas**

Excludes file systems on the NAS file server from an image backup when used with the **backup nas** command. The NAS node name must be prefixed to the file system name, for example: `netappsj1/vol/vol1`. To apply this exclude to all NAS nodes, replace the NAS node name with a wildcard, for example: `*/vol/vol1`. The **backup nas** command ignores all other exclude statements including *exclude.fs* and *exclude.dir* statements. This option is valid for AIX and Solaris clients *only*.

#### **exclude.image**

**Note:** This option does not apply to Mac OS X.

Excludes mounted file systems and raw logical volumes that match the specified pattern from full image backup operations. This option is valid for AIX, HP-UX, all Linux clients, and Solaris *only*. Use *exclude.fs* to exclude file systems from incremental image backup operations.

## **Parameters**

### *pattern*

Specifies the file or group of files that you want to exclude.

**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 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 *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.

**Related information**

See “Excluding system files” on page 84 for a list of files that you should always exclude.

“Inclxcl” on page 330

See “Including and excluding groups of files” on page 85 for a list of wildcard characters that you can use. Then, if necessary, use the *include* option to make exceptions.

## Controlling symbolic link and alias processing

Tivoli Storage Manager treats symbolic links and aliases (aliases apply to Mac OS X only) 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 dsm.sys file:

```
exclude.attribute.symlink /.../*
include.attribute.symlink /home/spike/.../*
```

**Related reference**

“Include options” on page 332

The include options specify objects that you want to include for backup and archive services.

## Controlling compression processing

This topic lists some items to consider if you want to exclude specific files or groups of files from compression processing during a backup or archive operation.

- Remember that Tivoli Storage Manager compares the files it processes against the patterns specified in the include-exclude statements, reading from the bottom to the top of the options file.
- 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.

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 backup, 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.

#### Related reference

“Compression” on page 283

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.

## Processing NAS file systems

Use the *exclude.fs.nas* option to exclude file systems from NAS image backup processing.

**Note:** *Exclude.fs.nas* does not apply to incremental *snappdiff*.

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 identified 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 `/vol/vol1` from backup services on all NAS nodes, specify the following exclude statement:

```
exclude.fs.nas */vol/vol1
```

---

## Filelist

Use the *filelist* option to process a list of files.

You can use the *filelist* option with the following commands:

- **archive**
- **backup group**
- **delete archive**
- **delete backup**
- **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.
- The filelist can be an MBCS file or a Unicode file with all Unicode entries. For Mac OS X, the filelist can be encoded in the current operating system language or UTF-16.
- 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 be processed and not the files within the directory.

If the file name (the *filelistspe*) 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 following **restore** command, the file specification `/usr/record/` represents the restore destination for all entries in the filelist.

```
restore -filelist=/home/dir/file3 /usr/record/
```

However, in the following **selective** command, the file specification `/usr/record/` is ignored.

```
selective -filelist=/home/dir/file3 /usr/record/
```

However, in the following **selective** command, the file specification `d:\dir\` is ignored.

```
selective -filelist=c:\filelist.txt d:\dir\
```

If you specify a directory in a filelist for the **delete archive** or **delete backup** command, the directory is not deleted. Filelists that you use with the **delete archive** or **delete backup** 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 might 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 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.

You can store information gathered from one or more of the following items:

- DSMOPTFILE - The contents of the `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 and Linux).
- 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 might 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 might 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 option is valid for all 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
```

## Related information

“Console” on page 284

---

## Filesonly

The *filesonly* option restricts backup, 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 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

During a backup operation, the `followsymbolic` option specifies whether you want to use a symbolic link as a virtual mount point. During a restore or retrieve operation, the `followsymbolic` option specifies how the Tivoli Storage Manager client restores a directory whose name matches a symbolic link on the restore target file system.

For backup operations, `followsymbolic` option can influence the `virtualmountpoint` setting. If you use the `virtualmountpoint` option to specify a symbolic link as a virtual mount point, you must also set `followsymbolic`. If a symbolic link is not specified as a virtual mount point, `followsymbolic` is of no consequence during backup operations.

During restore and retrieve operations, `followsymbolic` can influence how the client handles a symbolic link on the file system. Set `followsymbolic` only when the client attempts to restore a directory whose name matches a symbolic link on the restore target file system.

If `followsymbolic=no` (the default), the client does not restore the contents of the directory, but returns this error message: `ANS4029E Error processing 'filespace name path-name file-name': unable to build a directory path; a file exists with the same name as a directory.`

If `followsymbolic=yes`, the client restores the contents of the directory to the target of the symbolic link.

For example, assume the client backed up a file with this path: `/fs1/dir1/subdir1/file1`. Assume also that there exists on the restore target file system a symbolic link `/fs1/dir1`, which links to `/fs88/dir88/subdir88`. Restore the file with the command: `restore /fs1/dir1/subdir1/file1`. If `followsymbolic=no`, the client does not restore the file, but returns the error message. If `followsymbolic=yes`, the client restores `file1` to `/fs88/dir88/subdir88/subdir1/file1`.

If you restore a symbolic link (not a directory) whose name matches a symbolic link on the restore target file system, the `followsymbolic` option has no consequence. The client restores the symbolic link.



Use this option with the **incremental**, **restore** and **retrieve** commands, or in the client user options file (dsm.opt).

## Supported Clients

This option is valid for all UNIX clients except Mac OS X.

## Options File

Place this option in the client options file (dsm.opt).

## Syntax



## Parameters

*No* Do not back up a virtual mount point that is a symbolic link. Do not restore a directory if the restore target file system contains a symbolic link with matching name. This is the default.

*Yes*

Restore the contents of a directory to the target of a symbolic link.

## Examples

### Options file:

```
followsymbolic Yes
```

### Command line:

```
-fo1=Yes
```

## Related information

During archive, the “Archsymlinkasfile” on page 266 option determines how the client handles symbolic links.

For operating systems other than Mac OS X, see “Symbolic links” on page 159 for more information about how Tivoli Storage Manager handles symbolic links.

---

## 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:

- **delete backup**
- **query archive**
- **query backup**
- **restore**

- **restore group**
- **retrieve**

## Supported Clients

This option is valid for all 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 "/Users/van/Documents/*"
```

**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 for the other node.

Use the *fromnode* option with the following commands:

- **query archive**
- **query backup**
- **query filespace**
- **query image**
- **query mgmtclass**
- **query was**
- **restore**
- **restore group**
- **restore image**
- **restore was**
- **retrieve**

## Supported Clients

This option is valid for all 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 "/Users/van/
Documents/*"
```

**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 the following command:

```
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**
- **restore**
- **restore image**
- **restore group**
- **retrieve**

## Supported Clients

This option is valid for all UNIX and Linux 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:

- **delete backup**
- **query archive**
- **query backup**
- **restore**
- **restore group**
- **retrieve**

## Supported Clients

This option is valid for all 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 and Linux clients except Mac OS X.

### 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 and Linux 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 dsm.sys file *within* a server stanza.

### Syntax

▶—GRoups =— —*groupname*—▶

## 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 clients.

## Options File

Place this option in the client user options file (*dsm.opt*) or the *dsm.sys* file. You can set this option on the **General** tab, **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

The *httpport* option specifies a TCP/IP port address for the Web client.

You must be an authorized user to use the *httpport* option.

### Supported Clients

This option is valid for all 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** tab → **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:**

**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.

**Note:** Directory entries are replaced with the latest backup version, whether the backup version is older or newer than the existing version.

Use the *ifnewer* option with the following commands:

- **restore**
- **restore backupset**
- **restore group**
- **retrieve**

**Note:** This option is ignored if the *replace* option is set to *No*.

### Supported Clients

This option is valid for all 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 "/Users/grover/Documents/*" -sub=y -rep=y -ifnewer
```

### Command line:

```
dsmc restore "/home/grover/*" -sub=y -rep=y -ifnewer
```

---

## Imagegapsize

Use the *imagegapsize* option with the **backup image** command, in the options file, or with the *include.image* option to specify the minimum size of empty regions on a volume that you want to skip during image backup. Use this option for LAN-based and LAN-free image backup.

For example, if you specify a gap size of 10, this means that an empty region on the disk that is larger than 10 k in size will not be backed up. Gaps that are exactly 10 k will be backed up. Empty regions that are exactly 10 k and that are smaller than 10 k will be backed up, even though they do not contain data. However, an empty region that is smaller than 10 k will be backed up, even though it does not contain data. A smaller image gap size means less data will need to be transferred, but with potentially decreased throughput. A larger image gap size results in more data being transferred, but with potentially better throughput.

## Supported Clients

This option is valid for AIX JFS2 clients only. The Tivoli Storage Manager client API does not support this option.

## Options File

Place this option in the server stanza of the client systems options file (dsm.sys), or in the *include.image* statement in the dsm.sys file.

## Syntax

▶▶—IMAGEGapsize— *size* —▶▶

## Parameters

*size*

Specifies the minimum size of empty regions in an AIX JFS2 file system that should be skipped during an image backup. You can specify k (kilobytes) m (megabytes) or g (gigabytes) qualifiers with the value. Without a qualifier, the value is interpreted in kilobytes. Valid values are 0 through 4294967295. If you specify a value of 0, all blocks, including unused blocks at the end of the volume, will be backed up. If you specify any value other than 0, unused



blocks at the end of the volume will *not* be backed up. For LAN-based and LAN-free image backup the default value is 32 k. This option is applicable to both static and snapshot-based image backup.

**Note:** This option is valid for AIX JFS2 file systems. If you specify an `imagegapsize` that is greater than 0 for a file system other than AIX JFS2, the error log receives a warning message.

## Examples

### Options file:

Add the following to the server stanza in the `dsm.sys` file: `imagegapsize 1m`

**Include-exclude list example:** `include.image /kalafs1`  
`imagegapsize=-128k`

### Command line:

`-imagegapsize=64k`

---

## Imagetofile

Use the *imagetofile* option with the **restore image** command to specify that you want to restore the source image to a file.

You might 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 data copy utility of your choice to transfer the image from the file to a disk volume.

Linux supports mounting an image file as a logical volume, so you can get access to file data within the image. The following are some examples:

- The file system `/usr` has been backed up by Tivoli Storage Manager. The following command will restore the file system image to the file `/home/usr.img`:  

```
# dsmc restore image /usr /home/usr.img -imagetofile
```
- To mount the image file at the `/mnt/usr` directory, the following mount command can be executed:  

```
# mount /home/usr.img /mnt/usr -o loop=/dev/loop0
```

Now the image contents are available from `/mnt/usr` as if a regular file system was mounted at that directory.

## Supported Clients

This option is valid for AIX, HP-UX, all Linux, and Solaris clients. 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
```

---

## Inactive

Use the *inactive* option to display both active and inactive objects.

You can use the *inactive* option with the following commands:

- **delete group**
- **query backup**
- **query group**
- **query image**
- **query nas**
- **restore**
- **restore group**
- **restore image**
- **restore nas**

**Recommendation:** When using the *inactive* option during a restore operation, also use the *pick* or some other filtering option because, unlike the *latest* option, all versions will be restored in an indeterminate order. This option is implicit when *pitdate* is used.

## Supported Clients

This option is valid for all 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 "/Users/zoe/Documents/*" -inactive -pick
```

**Command line:**

```
dsmc restore "/home/zoe/*" -inactive -pick
```

---

## Incl excl

The *incl excl* option specifies the path and file name of an include-exclude options file.

You must be an authorized user to use the *incl excl* option.

Multiple *incl excl* 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 *incl excl* 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.

## Supported Clients

This option is valid for all clients. The server can also define this option.

## Options File

Place this option in the `dsm.sys` file *within* a server stanza. You can set this option on the **Include-Exclude** tab 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 /Users/user1/Documents/backup.excl
incl excl /usr/dsm/backup.excl
incl excl /etc/incl excl.def
```

### Command line:

Does not apply.

## Related information

For more information about creating an include-exclude options file, see “Creating an include-exclude list (optional)” on page 80.

## Considerations for Unicode-enabled clients

The include-exclude file can be in Unicode or non-Unicode format. If you specify a non-Unicode include-exclude file, that file must be in the same code page that the client is running.

For example, a non-Unicode include-exclude file on an English Mac OS X system cannot contain Japanese characters.

**Note:** This section applies to Mac OS X only.

A Unicode include-exclude file provides the following benefits:

- Names with characters from another code page no longer have to be wildcarded.

- File names and directories from any code page can be *fully specified* for the Unicode-enabled client to process.

To create an include-exclude file in Unicode format, perform the following steps:

1. Open TextEdit. Click **Format** → **Make PlainText**.
2. Enter your *include* and *exclude* statements.
3. Click **File** and then click **Save As**. The **Save As** window displays.
4. From **PlainText Encoding**, select **Unicode (UTF-16)**, specify the file and target directory, and then save the file.
5. Place an *incl excl* option specifying the include-exclude file you just created in your dsm.sys file.
6. Restart the Tivoli Storage Manager client.

## Include options

The include options specify objects that you want to include for backup and archive services.

You must be an authorized user to use the include options.

The include options specify any of the following:

- Objects within a broad group of excluded objects that you want to include for backup, archive, image, and space management services.
- 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 for compression processing.
- Objects to which you want to assign a specific management class.
- A management class to assign to all objects to which you do not explicitly assign a management class.
- File spaces to which you want to assign memory-efficient backup processing or use the *diskcachelocation* option to cause specific file systems to use different, specific locations for their diskcache.

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.

Remember that Tivoli Storage Manager compares the files it processes against the patterns specified in the include-exclude statements, reading from the bottom to the top of the options file.

### Note:

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 *incl excl* option.

## Supported Clients

This option is valid for all clients. The server can also define include.fs.nas.

## Options File

Place these options in the dsm.sys file. You can set these options on the **Include-Exclude** tab, **Define Include-Exclude Options** section of the Preferences editor.

### Syntax

► *options* — *pattern* — —*mgmtclassname*— ►

#### **include, include.backup, include.file**

Use these options to include files or assign management classes for backup processing.

The *include* option affects archive and backup processing. If you want to assign different management classes for archive and backup processing, always specify *include.archive* and *include.backup* with their own management classes. In the following example, the archmc management class is assigned when an archive operation is performed, because *include.backup* is used only for backup processing, it is not used for archive processing.

```
include.archive /home/test/* archmc
include.backup /home/test/*
```

#### **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 or aliases within a broad group of excluded files for backup processing only.

**Note:** For Mac OS X, aliases are included.

#### **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.

**Important:** The **include.encrypt** option is the only way to enable encryption on the Backup-Archive client. If no **include.encrypt** statements are used, encryption will not occur.

#### **include.fs**

For AIX JFS2 file systems: Use the *snapshotcachesize* option in the dsm.sys file or with the *include.fs* option to specify an appropriate snapshot size so that all old data blocks can be stored while the snapshot based file backup or archive occurs. The default snapshot size is 20 percent.

To control how Tivoli Storage Manager processes your file space for incremental backup, you can specify these additional options in your dsm.opt file, or as values of the *include.fs* option: *diskcachelocation* and *memoryefficientbackup*. If these options appear both in the options file and an *include.fs* option, the *include.fs* values will be used for the specified file space in place of any values in an option file or on the command line.

**Examples:**

**Options file or include/exclude file:** Each of the following `include.fs`, `memoryefficientbackup` and `diskcachelocation` options must be on the **same** line in the options file.

```
include.fs /home
    memoryefficientbackup=diskcachemethod
    diskcachelocation=/usr
include.fs /usr
    memoryefficientbackup=diskcachemethod
    diskcachelocation=/home
include.fs /Volumes/hfs3
    memoryefficientbackup=diskcachemethod
    diskcachelocation=/Volumes/hfs2
AIX JFS2 filesystems only: include.fs
    /kalafs1 snapshotproviderfs=JFS2
```

### **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 `dsm.sys` file. 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.

For Linux x86/x86\_64 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.

For AIX JFS2 file systems: Use the *snapshotcachesize* option with the **backup image** command, in the `dsm.sys` 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. The default snapshot size is 20 percent.

This option is valid for AIX, HP-UX, Solaris, and all Linux clients *only*.

## **Parameters**

### *pattern*

Specifies the objects to include for backup or archive processing or to assign a specific management class.

**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.

Use the following command to bind a management class to a group:

```
include <file of dir spec> <mgmtcname>
```

Here is a sample command:

```
include /myvfs/mygroupname ManagmentClass
```

## 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
```

AIX only:

```
include.image /home
 MGMTCLASSNAME
 snapshotproviderimage=JFS2
 snapshotcachesize=40
include.image /home
 snapshotproviderimage=NONE
include.fs /kalafs1
 snapshotproviderfs=JFS2
```

LINUX only:

```
include.image /home
 snapshotproviderimage=LINUX_LVM
include.image /myfs1 dynamicimage=yes
include.image /home MGMTCLASSNAME
 snapshotproviderimage=NONE
include.image /myfs1 dynamicimage=yes
include.attribute.symlink /home/spike/.../*
include.fs /usr
 memoryefficientbackup=diskcachemethod
```

### Command line:

Does not apply.

### Related information

“Snapshotcachesize” on page 402

“Toc” on page 423

## Controlling symbolic link and alias processing

Tivoli Storage Manager treats symbolic links and aliases (aliases apply to Mac OS X only) as actual files and backs them up. However, the file referenced by the symbolic link is not backed up. In some cases symbolic links and aliases can be easily recreated and need not be backed up. In addition, backing up these symbolic links or aliases 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 or aliases from backup processing. If necessary, you can use the *include.attribute.symlink* option to include symbolic links or aliases within broad group of excluded files for backup processing. For example, to exclude all symbolic links or aliases from backup processing, except those that exist under the /home/spike directory, enter these statements in your dsm.sys file:

```
exclude.attribute.symlink /.../*
include.attribute.symlink /home/spike/.../*
```

### Related reference

“Exclude options” on page 312

Use the exclude options to exclude objects from backup, image, or archive services.

## Compression, encryption, and adaptive subfile backup processing

This topic lists some items to consider if you want to include specific files or groups of files for compression and encryption processing during a backup or archive operation.

- 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.
- Tivoli Storage Manager processes *exclude.fs*, *exclude.dir*, and other include-exclude statements first. Tivoli Storage Manager then considers any *include.compression* and *include.encrypt* statements. For example, consider the following include-exclude list:

```
exclude /home/jones/proj1/file.txt
include.compression /home/jones/proj1/file.txt
include.encrypt /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*.

### Related reference

“Compression” on page 283

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.

## 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.



**Note:** *Include.fs.nas* does not apply to incremental *snapdiff*.

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/vol10.

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 423 for more information.

For example, to assign a management class to the /vol/vol11 file system of a NAS node called netappsj, specify the following include statement:

```
include.fs.nas netappsj/vol/vol11 nasMgmtClass toc=yes
```

---

## 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.

**Recommendation:** Files that are modified or created after their respective directory was processed by the Tivoli Storage Manager client, but before the incremental-by-date backup completes, are not backed up and will not be backed up in future incremental-by-date backups, unless the files are modified again. For this reason, a regular incremental backup should be run periodically, without specifying the *incrbydate* option.

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.

### **Important:**

The last incremental backup time refers to the server time and the file modification time refers to the client time. If the client and server time are not synchronized, or the client and server are in different time zones, this affects incremental-by-date backup and image backup with *mode=incremental*.

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, such as Access control list (ACL) data, unless the modification dates and times have also changed.
- 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 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.

**Note:** Using the *incremental* option with the **restore image** command to perform a dynamic image backup is not supported.

## Supported Clients

This option is valid for AIX, HP-UX, Linux x86/x86\_64, Linux on POWER, 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

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.

You must be an authorized user to use the *lanfreecommmethod* option. If you are using LAN failover, you must have *lanfreecommmethod TCPip* in the dsm.sys file *within* a server stanza.

For AIX, HP-UX, Linux and Solaris, use the *lanfreeshmport* option to specify the shared memory port number where the Storage Agent is listening.

## Supported Clients

This option is valid for AIX, HP-UX, Linux, and Solaris clients *only*.

## Options File

Place this option in the dsm.sys file *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. The TCP/IP communication method is the default for *non-root* users on all supported platforms. On Linux, this is the only communication method you can use.

*V6Tcpip*

Indicates that either TCP/IP Version 4 or Version 6 should be used, depending on the system configuration and results of a domain name

service lookup. The only time this is not true is when 'dsmc schedule' is used *and* *shedmode* is prompt. A valid DNS environment must be available.

#### *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, HP-UX, and Solaris *root* users. When specifying this communication method on AIX, the backup-archive client user can be logged in as root or non-root, as long as the Storage Agent is running as root. If the Storage Agent is not running as root, the user ID running the backup-archive client must match the user ID running the Storage Agent. *SHAREdmem* is not valid for Linux clients.

## Examples

### Options file:

```
lanfreecommmethod tcp
```

Use only TCP/IP Version 4

```
lanfreecommmethod V6Tcpip
```

Use both TCP/IP Version 4 or Version 6, depending on how the system is configured and the results of a domain name service lookup.

### Command line:

```
-lanfreec=tcp
```

```
-lanfreec=V6Tcpip
```

This option is valid only on the initial command line. It is not valid in interactive mode.

### Related information

"Lanfreeshmport"

"Lanfreetcpport" on page 341

---

## Lanfreeshmport

Use the *lanfreeshmport* 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.

You must be an authorized user to use the *lanfreeshmport* option.

## 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) *within* a server stanza.

## Syntax

▶▶—LANFREESHmport— *port\_address*—▶▶

## Parameters

*port\_address*

Specifies the number that is used to connect to the storage agent. The range of values is 1 through 32767; the default is 1.

## 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.

## Related information

“Lanfreecommmethod” on page 339

---

## Lanfreetcport

The *lanfreetcport* option specifies the TCP/IP port number where the Tivoli Storage Manager Storage Agent is listening.

You must be an authorized user to use the *lanfreetcport* option.

Use this option when you specify *lanfreecommmethod=TCPIP* for communication between the Tivoli Storage Manager client and Storage Agent. Do not specify the *lanfreetcport* option if you want to use the NAMEDpipes communication method for LAN-free communication.

## Supported Clients

This option is valid for AIX, HP-UX, Linux x86/x86\_64, Linux on POWER, and Solaris clients *only*.

## Options File

Place this option in the dsm.sys file *within* a server stanza.

## Syntax

▶▶—LANFREETCport— *port\_address*—▶▶

## Parameters

*port\_address*

Specifies the TCP/IP port number where the Storage Agent is listening. The range of values is 1 through 32767; the default is 1500.

**Note:** The client *lanfreetcport* value must match Storage Agent *tcppport* value for communications with the Storage Agent (virtual server). The client *tcppport* value must match the server *tcppport* 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.

### Related information

“Lanfreecommmethod” on page 339

---

## Lanfreetcpserveraddress

The *lanfreetcpserveraddress* option specifies the TCP/IP address for a Tivoli Storage Manager Storage Agent. Use this option when you specify *lanfreecommmethod=TCPIP* or *V6Tcpip* for communication between the Tivoli Storage Manager client and Storage Agent.

Overriding the default for this option is useful when configuring LAN-free in an environment where the client and storage agent are running on different systems. You can obtain this Storage Agent address from your administrator.

You must be an authorized user to use the *lanfreetcpserveraddress* option.

## Supported Clients

This option is valid for AIX, HP-UX, Linux x86/x86\_64, Linux on POWER, and Solaris clients *only*.

## Options File

Place this option in the client system options file.

## Syntax

▶▶—LANFREETCPServeraddress— —*stagent\_address*————▶▶

## Parameters

*stagent\_address*

Specifies a 1 to 64 character TCP/IP address for a server. Specify a TCP/IP domain name or a numeric IP address. The numeric IP address can be either a TCP/IP v4 or TCP/IP v6 address. The default value is 127.0.0.1 (localhost).

## Examples

### Options file:

```
LANFREETCPServeraddress stagent.bayamon.ibm.com
```

```
LANFREETCPServeraddress 192.168.1.50
```

### Command line:

Does not apply.

---

## Latest

Use the *latest* option to restore the most recent backup version of a file, even if the backup is inactive.

You can use the *latest* option with the following commands:

- **restore**
- **restore group**

If you are performing a point-in-time restore (using the *pitdate* option), it is not necessary to specify *latest* since this option is implicit when *pitdate* is used.

## Supported Clients

This option is valid for all 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 "/Users/devel/projecta/*" -latest
```

### 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.

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.

**Note:** The **restore backupset** command supports restore of local backup sets on a standalone workstation *without* using the *localbackupset* option.

## Supported Clients

This option is valid for all clients.

## Options File

Place this option in the `dsm.sys` file.

## Syntax



## 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
```

This option is not valid with the **dsmc** command-line client. (Does not apply to Mac OS X)

### Related information

“Restore Backupset” on page 503

---

## 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 and Linux systems, it might 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 and Linux clients except Mac OS X.

## Options File

Place this option in the client user options file (dsm.opt).

## Syntax



## 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
```

This option is valid only on the initial command line. It is not valid in interactive mode.

---

## Managedservices

The *managedservices* option specifies whether the Tivoli Storage Manager client acceptor service manages the scheduler, the Web client, or both.

**Restriction:** You cannot use the dsmcad for scheduling when you set the *sessioninitiation* option to *serveronly*.

The client acceptor daemon 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 client acceptor daemon restarts the scheduler when it is time to execute the scheduled event.

**Note:**

1. If you set the *schedmode* option to *prompt*, the server prompts the client acceptor daemon when it is time to run the schedule. The scheduler will connect and disconnect to the server when the client acceptor daemon is first started.

The `dsmc schedule` command cannot be used when both *SCHEDMODE* *PRompt* and *COMMMethod* *V6Tcpip* are specified.

2. For Mac OS X, if you do not specify the *managedservices* option, the client acceptor daemon manages the scheduler program by default.
3. Set the *passwordaccess* option to *generate* in your `dsm.sys` file and generate a password, so Tivoli Storage Manager can manage your password automatically.

Using the client acceptor daemon to manage the scheduler service can provide the following benefits:

- Memory retention problems that can occur when using traditional methods of running the scheduler are resolved. Using the client acceptor daemon to manage the scheduler requires very little memory between scheduled operations.
- The client acceptor daemon can manage both the scheduler program and the Web client, reducing the number of background processes on your workstation.
- To use the Web client, you must specify this option in the client system options file.

## Supported Clients

This option is valid for all 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`) *within* a server stanza. You can set this option on the **Web Client** tab of the Preferences editor.

## Syntax

►►—MANAGEDServices—mode—◄◄

## Parameters

*mode*

Specifies whether the client acceptor daemon manages the scheduler, the Web client, or both.

*webclient*

Specifies that the client acceptor daemon manages the Web client. This is the default for UNIX and Linux. Both *webclient* and *schedule* are the defaults for Mac OS X.

*schedule*

Specifies that the client acceptor daemon manages the scheduler. This is the default for Mac OS X.

*none*

For Mac OS X only, specifies that the client acceptor daemon not manage the Web client or schedules. Set *managedservices none* to enable the **dsmc schedule** command.

## 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 client acceptor daemon manages the Web client *only*.

```
managedservices webclient
```

**Task** Specify that the client acceptor daemon manages the scheduler *only*.

```
managedservices schedule
```

**Task** Specify that the client acceptor daemon manages both the Web client and the scheduler.

```
managedservices schedule webclient
```

**Note:** The order in which these values are specified is not important.

**Task** For Mac OS X, to use the **dsmc schedule** command, specify:

```
managedservices none
```

### Command line:

Does not apply.

### Related information

“Passwordaccess” on page 361

See “Configuring the client scheduler” on page 53 for instructions to set up the client acceptor daemon to manage the scheduler.

“Sessioninitiation” on page 394

---

## Maxcmdretries

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.

You must be an authorized user to use the *maxcmdretries* option.

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 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 `dsm.sys` file. You can set this option on the **Scheduler** tab, **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 the memory-conserving algorithm to use for processing full file space backups. One method backs up one directory at a time, using less memory. The other method uses much less memory, but requires more disk space.

Use the *memoryefficientbackup* option with the **incremental** command when your workstation is memory constrained. You can also use this option as a parameter to the *include.fs* option in order to select the algorithm Tivoli Storage Manager uses on a per-filespace basis.

If the *memoryefficientbackup* option appears in the option file, its value will be used for all file systems not represented by an *include.fs* option containing the *memoryefficientbackup* parameter. If a directory-level incremental is being performed, and *memoryefficientbackup=diskcachemethod* is present, *memoryefficientbackup=yes* will be used.

Use *memoryefficientbackup=diskcachemethod* for any file space that has too many files for Tivoli Storage Manager to complete the incremental backup with either the default setting, *memoryefficientbackup=no*, or with *memoryefficientbackup=yes*.

The actual amount of disk space required for the disk cache file created by disk cache incremental backups depends on the number of files and directories included in the backup and on the average path length of the files and directories to be backed up. For UNIX and Linux estimate 1 byte per character in the path name. For Mac OS X, estimate 4 bytes per character in the path name. For example, if there are 1 000 000 files and directories to be backed up and the average path length is 200 characters, then the database will occupy approximately 200 MB for

UNIX and Linux, and 800 MB for Mac OS X clients. Another way to estimate for planning purposes is to multiply the number of files and directories by the length of the longest path to establish a maximum database size.

A second disk cache file is created for the list of migrated files when backing up an HSM managed file system. The combined disk cache files, created by disk cache incremental backups and HSM managed file system backups, can require above 400 MB of disk space for each million files being backed up.

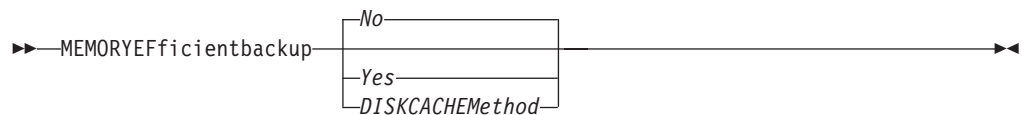
## Supported Clients

This option is valid for all clients. The server can also define this option.

## Options File

This option is allowed in both `dsm.sys` and `dsm.opt`, but the value in `dsm.opt` is ignored if it also appears in `dsm.sys`. You can also place this option within a server stanza, or on the initial command line. You can set this option on the **Performance Tuning** tab, **Use memory-saving algorithm** check box of the Preferences editor.

## Syntax



## 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.

*Diskcachemethod*

Your client node uses the method that requires much less memory but more disk space when processing incremental backups for full file systems.

## Examples

**Options file:**

```
memoryefficientbackup yes
memoryefficientbackup diskcachem
```

**Command line:**

```
-memoryef=no
```

## Related information

“Include options” on page 332

## Mode

Use the *mode* option with the **backup group**, **backup image**, **backup nas**, and **backup was** commands (if applicable) to specify whether you want to perform a full or differential group backup containing a list of files from one or more file spaces.

You can use the *mode* option with the following commands:

### **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 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, Linux x86/x86\_64, Linux on POWER, Linux for zSeries 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, Linux x86/x86\_64, and Linux on POWER).



*For image backup of NAS file systems* (AIX and Solaris).



*For group and Websphere Application Server backups* AIX, Solaris, Linux x86/x86\_64.



## 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 most recent image backup (full or incremental). If an image backup has not yet been made, then the first backup will be a full image backup, regardless of the mode option.

Deleted files are not marked inactive on the server.

### *full*

Specifies that you want to perform a full backup of NAS, Websphere Application Server, or group objects. This is the default for Websphere Application Server and group backups.

### *differential*

This is the default for NAS objects. Specifies that you want to perform a NAS, Websphere Application Server, or group backup of files that changed since the last full backup. If there is no copy of a full image stored on the Tivoli Storage Manager server, a full backup occurs. If a full image exists, whether it is restorable, or expired and being maintained because of dependent differential images, specifying **MODE =differential** sends a differential image backup. If a full image is sent during a *differential* backup, it is reflected as a full image using the **query nasbackup** server command.

A full image can be eligible for expiration based on versioning or retention (verexists retextra), but still be maintained on the Tivoli Storage Manager server to allow for restoring dependent differential images. A full image that is eligible for expiration *cannot* be selected for restore, so it is not displayed using the **query nasbackup** server command. The differential image backups that depend on an "expired" full image can be restored.

## 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



### 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 filesystem**
- **query backup**
- **query filesystem**
- **restore nas**

You can use the **delete filesystem** 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.

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 can choose one to delete, use the *-class=nas* option.

To delete NAS file spaces using the Web client, see the topic for backing up your data.

## 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** tab 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

**Authorized user:** The *nfstimeout* option specifies the number of seconds the client 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()` does not return 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.

## Supported Clients

This option is for all UNIX and Linux clients. The server can also define this option.

## Options File

Place this option in the `dsm.sys` file within a server stanza *or* the client options file (`dsm.opt`).

## Syntax

▶▶—NFSTIMEout— *number*—————▶▶

## Parameters

*number*

Specifies the number of seconds the client 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.

## Related information

See “NFS hard and soft mounts” on page 164 for a discussion of how NFS hard and soft mounts are handled.

---

## Nodename

Use the *nodename* option in your client options file to identify your workstation to the server. You can use different node names to identify multiple operating systems on your workstation.

You must be an authorized user to use the *nodename* option.

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. You can also use the *asnodename* option, if it is set up by the administrator.

When connecting to a server, the client must identify itself to the server. This login identification is determined in the following manner:

- In the absence of a *nodename* entry in the *dsm.sys* file, 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 *dsm.sys* file, the *nodename* entry overrides the name that the **hostname** command returns.
- If a *virtualnodename* entry exists in the client system options file (*dsm.sys*), 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 clients.

## Options File

Place this option in the *dsm.sys* file *within* a server stanza. You can set this option on the **General** tab, **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 value returned with the **hostname** command.

Not specifying a node name will permit the node name to default to the host name of the workstation

## Examples

### Options file:

```
nodename cougar
```

“Virtualnodename” on page 432

---

## Nojournal

Use the *nojournal* option with the **incremental** command to specify that you want to perform a traditional full incremental backup, instead of the default journal-based backup.

Journal-based incremental backup differs from the traditional full incremental backup in the following ways:

- Tivoli Storage Manager does not enforce non-default copy frequencies (other than 0).
- UNIX special file changes are not detected by the Journal daemon and are not, therefore, backed up.

For these reasons, you want to use the *nojournal* option periodically to perform a traditional full incremental backup.

## Supported Clients

This option is valid for the AIX Backup-Archive client.

## Syntax

```
▶▶—NOJournal—▶▶
```

## Parameters

There are no parameters for this option.

## Examples

### Command line:

```
dsmc incr /home -nojournal
```

## Related information

See “Journal-based backup” on page 471 for more information about journal-based incremental backup.

---

## Noprompt

The *noprompt* option suppresses the confirmation prompt that is presented by the **delete group**, **delete archive**, **expire**, **restore image**, and **set event** commands.

- **delete archive**
- **delete backup**
- **delete group**
- **expire**
- **restore image**

## Supported Clients

This option is valid for all 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 "/Users/van/Documents/*"
```

### 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.

By default, 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**
- **delete backup**
- **expire**
- **query archive**
- **query backup**
- **query image**
- **query nas**
- **restore**
- **restore image**
- **restore nas**
- **retrieve**
- **set event**

## Supported Clients

This option is valid for all clients.

## Options File

Place this option in the client user options file (dsm.opt). You can set this option on the **Regional Settings** tab, **Number Format** field of the Preferences editor.

### Syntax

►—NUMBERformat— —*number*—◄

### Parameters

#### *number*

Displays numbers using any one of the following formats. Specify the number (0–6) that corresponds to the number format you want to use.

**0** Use the locale-specified date format. This is the default (does not apply to Mac OS X).

**1** 1,000.00

This is the default for the following available translations:

- US English
- Japanese
- Chinese (Traditional)
- Chinese (Simplified)
- Korean

**2** 1,000,00

**3** 1 000,00

This is the default for the following available translations:

- French
- Czech
- Hungarian
- Polish
- Russian

**4** 1 000.00

**5** 1.000,00

This is the default for the following available translations:

- 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 options file to use when you start a Tivoli Storage Manager session.

## Supported Clients

This option is valid for all 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`.

**Restriction:** Specify the full path when you use this option with the Client Acceptor Daemon (`dsmcad`), because the client acceptor daemon changes its working directory to root ("/") after initialization.

## Examples

### Command line:

```
dsmc query session -optfile=myopts.opt
```

### client acceptor daemon:

```
dsmcad -optfile=/usr/tivoli/tsm/client/ba/bin/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.

You must be an authorized user to use the *password* option.

### Note:

1. If the server prompts for a password, the password is not displayed as you enter it. However, if you use the *password* option on the command line, your password will be displayed 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 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

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.

You must be an authorized user to use the *passwordaccess* option.

If a password is required, you can choose one of the following methods:

- 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.

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.
- When using Tivoli Continuous Data Protection for Files.

## Supported Clients

This option is valid for all clients.

## Options File

Place this option in the *dsm.sys* file *within* a server stanza. You can set this option on the **Authorization** tab, **Password Access** section of the Preferences editor.

## Syntax



## Parameters

### *prompt*

You are prompted for your Tivoli Storage Manager client node 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.

API applications must supply the password when a session is initiated. The application is responsible for obtaining the password (does not apply to Mac OS X).

#### *generate*

Encrypts and stores your password locally and generates a new password when the old password expires. The new password is randomly generated by the Tivoli Storage Manager client

A password prompt is displayed when registering a workstation with a server using open registration or if your administrator changes your password manually.

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.

## Examples

### Options file:

```
passwordaccess generate
```

### Command line:

Does not apply.

### Related information

For information on where the password is stored, see “Passworddir.”

---

## Passworddir

The *passworddir* option specifies the directory location in which to store an encrypted password file.

**Authorized user:** The default directory for AIX is `/etc/security/adsm` and for other UNIX and Linux platforms it is `/etc/adsm`. 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`).

## 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.

## Examples

### Options file:

```
passworddir "/Users/user1/Library/Preferences/Tivoli Storage Manager/"  
passworddir /etc/security/tsm
```

### Command line:

Does not apply.

---

## Pick

The *pick* option creates a list of backup versions 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 can select only one entry from the pick list.

Use the *pick* option with the following commands:

- **delete archive**
- **delete backup**
- **delete group**
- **expire**
- **restore**
- **restore group**
- **restore image**
- **restore nas**
- **retrieve**

## Supported Clients

This option is valid for all 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 "/Users/van/Documents/*" -pick -inactive
```

### Command line:

```
dsmc restore "/home/project/*" -pick -inactive
```

---

## Pitdate

Use the *pitdate* option with the *pittime* option to establish a point in time to display or restore the latest version of your backups. Files 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.

Use the *pitdate* option with the following commands:

- **delete backup**
- **query backup**
- **query group**
- **query image**
- **restore**
- **restore group**
- **restore image**
- **restore nas**

When *pitdate* is used, the *inactive* and *latest* options are implicit.

## Supported Clients

This option is valid for all 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 "/Volumes/proj4/myproj/*" -sub=y -pitdate=08/01/2003  
-pittime=06:00:00
```

**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 to display or restore the latest version of your backups. Files 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:

- **delete backup**
- **query backup**
- **query image**
- **restore**
- **restore image**
- **restore nas**

### Supported Clients

This option is valid for all 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 *tottime* options.

### Examples

**Command line:**

```
dsmc query backup -pitt=06:00:00 -pitd=08/01/2003
"/Volumes/proj5/myproj/*"
```

**Command line:**

```
dsmc q b "/fs1/*" -pitt=06:00:00 -pitd=08/01/2003
```

---

## Postschedulecmd/Postnschedulecmd

The *postschedulecmd/postnschedulecmd* 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.

You must be an authorized user to use the *postschedulecmd* option.

If you do not want to wait, specify *postnschedulecmd*.

## Note:

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 *postschedulecmd* 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 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 *dsm.sys* file. You can set this option on the **Scheduler** tab, **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 quotation marks. If you placed quotation marks 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.

For Mac OS X, if the *postschedulecmd* schedule command is a UNIX shell script, enter the name of the script to run. For example, if "*presched.sh*" is a UNIX shell script, enter this command:

```
postschedulecmd "/Volumes/La Pomme/Scripting/presched.sh"
```

## Examples

Options file:

```
postschedulecmd "/Volumes/La Pomme/Scripting/postsched.sh"
```

Options file:

```
postschedulecmd "restart database"
```

The command string is a valid command for restarting your database.

**Command line:**

```
-postschedulecmd="/Volumes/La Pomme/Scripting/postsched.sh"
```

**Command line:**

```
-postschedulecmd="'restart database'"
```

This option is valid only on the initial command line. It is not valid in interactive mode.

---

## Postsnapshotcmd

The *postsnapshotcmd* option allows you to run operating system shell commands or scripts after the Tivoli Storage Manager client starts a snapshot during a snapshot-based backup operation.

AIX only: This option is only applicable to JFS2 snapshot-based file backup or archive and snapshot-based image backup. For a snapshot-based file backup or archive, use this option with the **backup** command, the *include.fs* option, or in the *dsm.sys* file.

Linux only: This option is only valid if the LVM is installed and configured on your system, allowing you to perform a snapshot-based image backup operation.

AIX and Linux only: For a snapshot-based image backup, use this option with the **backup image** command, the *include.image* option, or in the *dsm.sys* file.

If the *postsnapshotcmd* fails the operation continues, but appropriate warnings are logged.

### Supported Clients

This option is valid for AIX clients and Linux x86/x86\_64 clients only. 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 also set this option on the **Image-Snapshot** tab of the Preferences editor.

### Syntax

►—POSTSNAPshotcmd— —"*cmdstring*"—◄

### Parameters

*"cmdstring"*

Specifies a command to process.

Use the *srvprepostsnapdisabled* option to prevent the Tivoli Storage Manager server administrator from executing operating system commands on the client system.

If the command string contains blanks, enclose the command string in quotation marks:

```
"resume database myDb"
```

If you placed quotation marks within the command string, then enclose the entire command string in single quotes:

```
'resume database "myDb"'
```

## Examples

### Options file:

```
postsnapshotcmd "any command"
```

The command string is a valid command for restarting your application.

### Command line:

```
backup image -postsnapshotcmd="any command"
```

This option is valid only on the initial command line. It is not valid in interactive mode.

### Related information

“Include options” on page 332

“Srvprepostscheddisabled” on page 408

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## Preschedulecmd/Prenschedulecmd

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*.

You must be an authorized user to use this option.

### Note:

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 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 `dsm.sys` file. You can set this option on the **Scheduler** tab, **Schedule Command** button of the Preferences editor.



## Syntax



## 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 quotation marks. If you placed quotation marks 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.

For Mac OS X, if the *preschedulecmd* schedule command is an AppleScript, you must use the `osascript` command to run the script. For example, if *"Database Script"* is an apple script, enter this command:

```
preschedulecmd osascript "/Volumes/La Pomme/Scripting/  
Database Script"
```

## 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

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. This option requires extra processing time during backup and archive for each file that is sent to the Tivoli Storage Manager server, so it should only be enabled when necessary.

If you have enabled open file support, the last access date for files will always be preserved regardless of the setting for *preservelastaccessdate*. When using open file support, leave this option disabled.

Use this option with the **incremental**, **selective**, or **archive** commands.

**Note:**

1. This option only applies to files; it does not apply to directories.
2. Resetting the last access date incurs additional overhead that can 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 and Linux clients except Mac OS X.

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** tab of the Preferences editor.

## Syntax



## 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**
- **restore group**
- **retrieve**

### Supported Clients

This option is valid for all clients. The Tivoli Storage Manager client API does not support this option. The server can also define this option.

### Syntax



### 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 *=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
```

## Presnapshotcmd

The *presnapshotcmd* option allows you to run operating system commands before the Tivoli Storage Manager client starts a snapshot. This allows you to quiesce an application before the Tivoli Storage Manager client starts the snapshot during a snapshot-based backup or archive.

AIX only: This option is only applicable to JFS2 snapshot-based file backup or archive and snapshot-based image backup. For a snapshot-based file backup or archive, use this option with the **backup** command, the *include.fs* option, or in the dsm.sys file.

Linux only: This option is only valid if the LVM is installed and configured on your system, allowing you to perform a snapshot-based image backup.

AIX and Linux only: For a snapshot-based image backup, use this option with the **backup image** command, the *include.image* option, or in the dsm.sys file.

If the *presnapshotcmd* fails it is assumed that the application is not in a consistent state and the client will stop the operation and display the appropriate error message.

### Supported Clients

This option is valid for AIX JFS2 and Linux x86/x86\_64 clients *only*. 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 also this option on the **Image-Snapshot** tab of the Preferences editor.

### Syntax

```
►►—PRESNAPshotcmd— —"cmdstring"—————►►
```

## Parameters

*"cmdstring"*

Specifies a command to process.

Use the *srvprepostsnapdisabled* option to prevent the Tivoli Storage Manager server administrator from executing operating system commands on the client system.

If the command string contains blanks, enclose the command string in quotation marks:

```
"quiesce database myDb"
```

If you placed quotation marks within the command string, then enclose the entire command string in single quotes:

```
'resume database "myDb"'
```

## Examples

### Options file:

```
presnapshotcmd "any shell command or script"
```

### Command line:

```
backup image -presnapshotcmd="any shell command or script"
```

This option is valid only on the initial command line. It is not valid in interactive mode.

### Related information

“Include options” on page 332

“Srvprepostscheddisabled” on page 408

---

## Queryschedperiod

The *queryschedperiod* option specifies the number of hours you want the client scheduler to wait between attempts to contact the server for scheduled work.

You must be an authorized user to use the *queryschedperiod* option.

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 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 *dsm.sys* file. You can set this option on the **Scheduler** tab, **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.

---

## Querysummary

The *querysummary* option provides statistics about files, directories and objects that are returned by the **query backup** or **query archive** commands.

The following statistics are provided by the *querysummary* option:

- The aggregate number of files and directories that are returned by the query backup or query archive command
- The aggregate amount of data of the objects that are returned by the query backup or query archive command
- The classic restore memory-utilization estimate to restore objects that are returned by the query backup or query archive command
- The total number of unique server volumes where the objects that are returned by the query command reside

## Supported Clients

This option is valid for all clients. The Tivoli Storage Manager client API does not support this option.

## Syntax

►►—QUERYSUMMARY—◄◄

## Parameters

There are no parameters for this option.

## Examples

**Command line:**

```
dsmc q ba '/usr/fs1/*' -sub=yes -querysummary
```

```
[root@kaveri:/home/cpark] $ dsmc q ba '/kalafs1/*' -sub=yes -querysummary
IBM Tivoli Storage Manager
Command Line Backup-Archive Client Interface
  Client Version 6, Release 1, Level 0.0 0804FB
  Client date/time: 08/19/08 08:09:48
(c) Copyright by IBM Corporation and other(s) 1990, 2008. All Rights Reserved.
```

```
Node Name: KAVERI
Session established with server TEMPLAR: AIX-RS/6000
  Server Version 5, Release 4, Level 3.0
  Server date/time: 08/19/08 08:09:02 Last access: 08/19/08 07:48:59
```

Size	Backup Date	Mgmt Class	A/I	File
4,096	B 08/07/08 12:07:30	BASVT2	A	/kalafs1/
256	B 08/07/08 12:07:30	BASVT2	A	/kalafs1/dir1
10,485,760	B 08/07/08 12:07:30	DEFAULT	A	/kalafs1/info1
5,242,880	B 08/07/08 12:07:30	DEFAULT	A	/kalafs1/info2
1,044	B 08/07/08 12:07:30	DEFAULT	A	/kalafs1/dir1/subfile1
1,044	B 08/07/08 12:07:30	DEFAULT	A	/kalafs1/dir1/subfile2

#### Summary Statistics

Total Files	Total Dirs	Avg. File Size	Total Data	Memory Est.
4	2	3.75 MB	15.00 MB	1.07 KB

Estimated Number of Volumes: 2

```
[root@kaveri:/home/cpark] $
```

---

## Quiet

The *quiet* option limits the number of messages that are displayed on your screen during processing. For example, when you run the **incremental**, **selective**, or **archive** commands, information might 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 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** tab, **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 only on the initial command line. It is not valid in interactive mode.

---

## Removeoperandlimit

The *removeoperandlimit* option specifies that Tivoli Storage Manager removes the 20-operand limit. 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 can invoke the command-line client with a large number of operands. For example, you can 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.

### Note:

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 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 dsm.sys file.

## Supported Clients

This option is valid for all UNIX and Linux clients.

## Syntax

►—REMOVEOPerandl imit—◄

## 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.

**Important:** The *replace* option does not affect recovery of directory objects. Directory objects are always recovered, even when specifying **REPlace=no**. To prevent overwriting existing directories, use the FILESONly option.

You can use this option with the following commands:

- **restore**
- **retrieve**
- **restore backupset**
- **restore group**

**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 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** tab, **Action for files that already exist** section of the Preferences editor.

## Syntax



## Parameters

### *Prompt*

For nonscheduled operations, you specify whether to overwrite existing files. For scheduled operations, existing files are not overwritten and no prompts are displayed. 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*

Existing files are overwritten, *except* read-only files. For nonscheduled operations, you specify whether to overwrite existing read-only files. For

scheduled operations, existing read-only files are not overwritten and no prompts are displayed. If access to a file is denied, the file is skipped.

*No* Existing files are not overwritten. No prompts will be displayed.

## 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

Use the *resourceutilization* option in your option file to regulate the level of resources the Tivoli Storage Manager server and client can use during processing.

You must be an authorized user to use the *resourceutilization* option.

## Supported Clients

This option is valid for all 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 `dsm.sys` file *within* a server stanza. You can set this option on the **General** tab, **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.

## 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.

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 or Linux 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 can 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 the following commands and you specify *resourceutilization=5*, the client might start a second session to query files on file space B.

```
inc /Volumes/filespaceA /Volumes/filespaceB
```

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 might 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 might 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).

### Related reference

“Collocatebyfilespec” on page 278

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.

## Regulating restore sessions

When you request a restore, the default is to use a maximum of one session. Additional restore sessions are based on: *resourceutilization* value, how many tapes on which the requested data is stored, how many tape drives are available, and the maximum number of mount points allowed for the node.

### Note:

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.
3. You can get a multi-session restore from your single **restore** command, and from a single volume on the server, if that volume is device class FILE.

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.

## Multiple client session considerations

This topic lists some items to consider when working with multiple client sessions.

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 might 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 might not start enough concurrent sessions. To avoid this, the server *maxsessions* parameter must be reviewed and possibly changed.
- A query node command might not summarize client activity.

---

## Retryperiod

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.

You must be an authorized user to use the *retryperiod* option.

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 clients. The Tivoli Storage Manager client API does not support this option.

## Options File

Place this option in the `dsm.sys` file. You can set this option on the **Scheduler** tab, **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 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** tab of the Preferences editor.

## Syntax

►—REVOKERemoteaccess— 

None
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

The *schedcmddisabled* option specifies whether to disable the scheduling of commands by the server *action=command* option on the **define schedule** server command.

You must be an authorized user to use the *schedcmddisabled* option.

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.

## Supported Clients

This option is valid for all 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 *dsm.sys* file *within* a server stanza.

## Syntax



## 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.

### Related information

“Query Schedule” on page 495

---

## Schedcmdexception

The *schedcmdexception* option is used in conjunction with the *schedcmddisabled* option to disable the scheduling of commands by the server *action=command* option on the **define schedule** server command, except for specific command strings.

You must be an authorized user to use the *schedcmddisabled* option.

You must specify the exact string that matches the “objects” definition in the schedule for the scheduled server command to be accepted. If the string does not match exactly (for example, there is an extra space or the capitalization is different), the scheduled command action is blocked.

You can provide multiple *schedcmdexception* options in the options file. This option is not honored if *schedcmddisabled* is not enabled. The placement of this option in the options file is independent of the placement of the *schedcmddisabled* option.

## Supported Clients

This option is valid for all clients. This option is not valid in the Tivoli Storage Manager Server client options set.

## Options File

Place this option in the dsm.sys file *within* a server stanza.

## Syntax

►►—SCHEDCMDEXCEPTION—string—►►

## Parameters

*string*

For commands scheduled by the *action=command* option on the **define schedule** server command, this parameter indicates the objects pattern to enable if the *schedcmddisabled=yes* option is specified. This parameter is case sensitive, and must match the command string on the Tivoli Storage Manager Server schedule definition exactly.

## Examples

### Options file:

```
schedcmddisabled yes
```



```
schedcmdexception "start echo hello, world!"
```

**Examples:**

Disable the scheduling of commands by the server *action=command* option on the **define schedule** server command, except for two schedules defined on the Tivoli Storage Manager Server:

**Related information**

"Schedcmddisabled" on page 383

---

## Schedlogmax

The *schedlogmax* option specifies the maximum size of the schedule log, in megabytes.

Log records are added to the end of the file, until the maximum specified size is reached. When the maximum specified size is reached, a log record saying "Continued at beginning of file" is placed as the last record in the file. Subsequent logging is resumed at the top of the file. The end of the wrapped log is indicated by a record saying "END OF DATA". Log messages that are overwritten by wrapping are not saved in a prune file, as they are with the pruning method of log size management.

You must be an authorized user to use the *schedlogmax* option.

If you change from *schedlogmax* to *schedlogretention*, all existing log entries are retained and the log is pruned using the new *schedlogretention* criteria.

If you change from *schedlogretention* to *schedlogmax*, all records in the existing log are copied to the pruned log, dsmsched.pru, the existing log is emptied, and logging begins under the new log wrapping criteria.

If you change the value of the *schedlogmax* option, the existing log is extended or shortened to accommodate the new size. If the value is reduced, the oldest entries are deleted to reduce the file to the new size.

**Restriction:** You cannot specify a non-zero *schedlogmax* value *and* enable *schedlogretention*.

### Supported Clients

This option is valid for all clients.

### Options File

Place this option in the dsm.sys file. You can set this option on the **Scheduler** tab, **Schedule Log** button of the Preferences editor.

### Syntax

►►—SCHEDLOGMAX— —size—◄◄

## Parameters

*size*

Specifies the maximum size, in megabytes, for the log file. The range of values is 0 to 2047; the default is 0, which disables log file wrapping and allows the log file to grow indefinitely.

## Examples

### Options file:

```
schedlogmax 100
```

### Command line:

```
-schedlogmax=100
```

This option is valid only on the initial command line. It is not valid in interactive mode.

---

## Schedlogname

The *schedlogname* option specifies the path and file name where you want to store schedule log information. Use this option only when you want to store schedule log information. This option applies only when the scheduler is running.

If this option is not used, the `dsmsched.log` file is created in the same directory as the `dsmerror.log` file.

You must be an authorized user to use the *schedlogname* option.

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 clients. The Tivoli Storage Manager client API does not support this option.

## Options File

Place this option in the `dsm.sys` file. You can set this option on the **Scheduler** tab, **Schedule Log** button of the Preferences editor.

**Important:** Set the `DSM_LOG` environment variable to name a directory where the log is to be placed. The directory specified must have permissions which allow write access from the account under which the client is run. The root directory is *not* a valid value for `DSM_LOG`.

## 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 current working directory with a file name of `dsmsched.log`. The `dsmsched.log` file *cannot* be a symbolic link.

For Mac OS X, if you specify a file name only, the file is stored in your default folder. The default directories are:

```
~/Library/Logs/tivoli/tsm
/Library/Logs/tivoli/tsm
```

For Mac OS X, the TSM Schedule Log file *cannot* be a symbolic link.

## Examples

### Options file:

```
SCHEDLOGN /Users/user1/Library/Logs/schedlog.jan
schedlogname /home/mydir/schedlog.jan
```

### Command line:

```
-schedlogname=/Users/user1/Library/Logs/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.

### Related information

See “Errorlogname” on page 310 for more information on placement of the `dsmsched.log` file.

---

## Schedlogretention

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 during the initial start of scheduler and after a scheduled event completes.

You must be an authorized user to use the *schedlogretention* option.

If you change from *schedlogretention* to *schedlogmax*, all records in the existing log are copied to the pruned log `dsmsched.pru`, the existing log is emptied, and logging begins under the new log wrapping criteria.

If you change from *schedlogmax* to *schedlogretention*, all existing log entries are retained and the log is pruned using the new *schedlogretention* criteria.

**Restriction:** You cannot specify a non-zero *schedlogmax* value *and* enable *schedlogretention*.

## Supported Clients

This option is valid for all clients.

## Options File

Place this option in the `dsm.sys` file. You can set this option on the **Scheduler** tab, **Schedule Log** button of the Preferences editor.

## Syntax



## 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 `dsm sched.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

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.

You must be an authorized user to use the *polling* 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 be processed.

If you specify *prompted* mode, you should consider supplying values for the *tcpclientaddress* and *tcpclientport* options in your `dsm.sys` file or on the `schedule` command; the client can then be contacted at either an address or a port of your choice (useful for client systems with multiple network interface cards).

**Note:**

1. When changing the setting of this option in the `dsm.sys` file you must stop and restart the scheduler service for the setting to take effect.
2. The server can also define this option.

## Supported Clients

This option is valid for all clients.

## Options File

Place this option in the `dsm.sys` file. You can set this option on the **Scheduler** tab, **Schedule Mode** section of the Preferences editor.

## Syntax



## 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 *querschedperiod* option.

### *PRompted*

The client scheduler waits for the server to contact your client node when scheduled work needs to be done.

**Note:** If you use the `dsmc schedule` command and both *SCHEDMODE* *PRompt* and *COMMMethod V6Tcpip* are specified, the client and Tivoli Storage Manager server must be configured for IPv6. Additionally, the client host name must be set up for the IPv6 address.

## 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.

---

## Schedrestretrdisabled

The *schedrestretrdisabled* option specifies whether to disable the execution of restore or retrieve schedule operations.

You must be an authorized user to use the *schedrestretrdisabled* option.

### Supported Clients

This option is valid for all clients. The server cannot define this option. The Tivoli Storage Manager API does not support this option.

### Options File

Place this option in the `dsm.sys` file within a server stanza for the scheduler. You can set this option on the **Scheduler** tab, **Schedule Command** button of the Preferences editor.

### Syntax



### Parameters

*No* Specifies that Tivoli Storage Manager does not disable the execution of restore and retrieve schedule operations. This is the default.

*Yes* Specifies that Tivoli Storage Manager disable the execution of restore and retrieve schedule operations.

### Examples

**Options file:**  
    *schedrestretrdisabled yes*

**Command line:**  
    Does not apply.

---

## Scrolllines

The *scrolllines* option specifies the number of lines of information that are displayed on your screen at one time.

Use this option when you set the *scrollprompt* option to *Yes*.

You can use the *scrolllines* option with the following commands only:

- **delete filespace**
- **query archive**
- **query backup**
- **query backupset**
- **query filespace**
- **query group**
- **query image**
- **query nas**

- **query node**
- **query options**

## Supported Clients

This option is valid for all 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** tab, **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 are displayed 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:**

```
-scroll=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 only:

- **delete filespace**
- **query archive**
- **query backup**
- **query backupset**
- **query filespace**
- **query group**
- **query image**
- **query nas**
- **query node**
- **query options**

## Supported Clients

This option is valid for all 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** tab, **Pause after displaying the following number of lines** field of the Preferences editor.

## Syntax



## 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 is displayed 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 dsm.sys file, 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 server_hostname2.domain.company.com
PASSWORDAccess  prompt
GROups          tsm
USERS           sullivan mushock tallan
INCLExcl       /adm/tsm/backup.excl

SErvername      server_b
COMMMethod      SHAREdmem
shmpoort        1520
PASSWORDAccess  generate
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 `dsm.sys` file, 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.

**Note:**

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 `dsm.sys` file.

### Syntax

▶▶—SErvername— —*servername*—▶▶

### Parameters

*servername*

In your `dsm.sys` file, 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

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.

You must be an authorized user to use the *sessioninitiation* option.

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 client acceptor daemon-managed schedulers, the command-line client, backup-archive client Java GUI, and Web client GUI will still attempt to initiate sessions.

**Important:** You cannot use the dsmcad for scheduling when you set the *sessioninitiation* option to *serveronly*.

**Note:** If you set the *sessioninitiation* option to *serveronly*, the client setup wizard and scheduler service are 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 can be used to prompt the client to connect to the server.

**Note:**

1. The Tivoli Storage Manager server can specify `SESSIONINITiation=clientorserver` or `SESSIONINITiation=serveronly` on the **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.
2. If *sessioninitiation* is set to *serveronly*, the value for the *tcpclientaddress* client option must be the same as the value for the *HLAddress* option of the **update node** or **register node** server command. The value for the *tcpclientport* client option must be the same as the value for the *LLAddress* option of the **update node** or **register node** server command.
3. The Tivoli Storage Manager client API does not support this option.

## Supported Clients

This option is valid for all clients.

## Options File

Place this option in the `dsm.sys` file *within* a server stanza. You can set this option on the **Scheduler** tab, **Session Initiation** field of the Preferences editor.

## Syntax



## 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 can 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. Except for client acceptor daemon-managed schedulers, the command-line client, backup-archive client Java 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.

### Related information

“Configuring the client scheduler” on page 53

“Tcpclientport” on page 417

---

## Shmport

The *shmport* option specifies the TCP/IP port address of a server when using shared memory. All shared memory communications start with a TCP/IP connection.

You must be an authorized user to use the *shmport* option.

**Note:** The value specified for the *shmport* option in the `dsm.sys` file must match the value specified for *shmport* in the server options file.

## Supported Clients

This option is valid for AIX, HP-UX, Linux, and Solaris clients *only*.

## Options File

Place this option in the client system options file (dsm.sys).

### Syntax

▶▶—SHMPort— *port\_number*—▶▶

### Parameters

*port\_number*

Specifies the port number. You can specify a value from 1000 to 32767. The default value is 1510.

### Examples

Options file:

```
shmport 1580
```

Command line:

Does not apply.

---

## Showmembers

Use the *showmembers* option to display all members of a group.

You can use the *showmembers* option with the **query group**, **query was**, **restore group**, and **restore was** commands.

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 and Linux clients except Mac OS X.

### Syntax

▶▶—SHOWMembers—▶▶

### Parameters

There are no parameters for this option.

### Examples

Command line:

```
restore group /virtfs/* -pick -showmembers
```

---

## Skipacl

The *skipacl* option allows you to back up or restore ACL data.

When set to *yes* (default is *no*), the Tivoli Storage Manager client will skip ACL processing completely. No ACL data will be backed up or restored. *skipacl=yes* should be used only when ACLs are not defined on the file system or when the loss of data contained in the ACLs during restore is acceptable. The file mode permissions (rwx) will continue to be backed up and restored as before.

If a prior version of the file being restored has ACL data backed up, ACLs will be restored even when the *skipacl* option is set.

## Supported Clients

This option is valid for all UNIX and Linux clients.

## Options File

Place this option in the client user options (dsm.opt) file.

## Syntax



## Parameters

*No* If you specify *No*, the ACL data is backed up. This is the default.

*Yes*

If you specify *Yes*, the ACL data is not backed up. *skipacl=yes* overrides *skipaclupdatecheck* settings.

## Examples

Options file:  
skipacl yes

---

## Skipaclupdatecheck

The *skipaclupdatecheck* option disables checksum and size comparisons of ACL data.

When set to *yes* (default is *no*), the Tivoli Storage Manager client will not perform checksum and size comparisons before or after backup and during incremental processing (ACL checksum from previous backup and current ACL) to detect ACL updates. However, current ACL data will be backed up if the file is selected for backup due to other reasons. If only ACLs are updated on a file, the next incremental backup will not recognize this ACL update, and the file will not be backed up.

## Supported Clients

This option is valid for all UNIX and Linux clients.

## Options File

Place this option in the client user options (dsm.opt) file.

## Syntax



## Parameters

*No* If you specify *No*, the Tivoli Storage Manager client performs checksum and size comparisons of the ACL data, before and after backup and during incremental processing. This is the default.

*Yes*

If you specify *Yes*, the Tivoli Storage Manager client does not perform checksum and size comparisons of the ACL data.

## Examples

**Options file:**

```
skipaclup yes
```

---

## Snapdiff

The *snapdiff* option is for backing up NAS/N-Series file server volumes that are NFS or CIFS attached.

When used with the **incremental** command, *snapdiff* streamlines the incremental process by performing an incremental backup of the files that were reported as changed by the NetApp Snapshot Difference API, instead of scanning the volume looking for files that have changed.

To enable *snapdiff* processing, set up a user ID and password on the Tivoli Storage Manager client. To set up the client for *snapdiff* processing, first use the **dsmc set password** command to establish a user ID and password for the *snapdiff* operation. The user ID and password must have root authority in order to perform NAS/N-Series *snapdiff* operations. The NAS/N-Series file server volumes that are being NFS mounted for *snapdiff* operation must be exported with both root and read-write access for the AIX host being used.

Use this option with an incremental backup of a NAS filer volume instead of a simple incremental or incremental with *snapshotroot* whenever the NAS filer is running ONTAP V7.3 or later, for performance reasons. Do not use the *snapdiff* and *snapshotroot* options together.

**Restriction:** Incremental backup using snapshot difference is only available with the 64-bit Tivoli Storage Manager client for AIX.

The first time you perform an incremental backup with this option, a snapshot is created (the base snapshot) and a traditional incremental backup is performed using this snapshot as the source. The name of the snapshot that is created is recorded in the Tivoli Storage Manager database.

The second time an incremental backup is run with this option, a newer snapshot is either created or an existing one is used to find the differences between these two snapshots. This second snapshot is called the *diffsnapshot*. Tivoli Storage Manager then incrementally backs up the files reported as changed by *snapdiff* to

the Tivoli Storage Manager server. The file space selected for *snappdiff* processing must be mapped or mounted to the root of the volume. You cannot use the *snappdiff* option for any file space that is not mounted or mapped to the root of the volume. After backing up data using the *snappdiff* option, the snapshot that was used as the base snapshot is deleted from the `.snapshot` directory. Tivoli Storage Manager does not delete the snapshot if it was not created by Tivoli Storage Manager. You can also perform a *snappdiff* incremental backup with the `-DiffSnapShot=Latest` option.

For NAS and N-Series filers running ONTAP 7.3 or later, you can use the *snappdiff* option when performing a full volume incremental backup. Using this option reduces memory usage and speeds up the processing. However, similar to using the incremental-by-date method, the following considerations and situations apply:

- A file is excluded due to an exclude rule in the include-exclude file. Tivoli Storage Manager performs a backup of the current snapshot with that exclude rule in effect. This happens when you have not made changes to the file, but you have removed the rule that excluded the file. The *snappdiff* option does not detect this include-exclude change because it only detects file changes between two snapshots.
- If you have added an include statement to the option file, that include option will not take effect unless the *snappdiff* option detects that the file has changed. This is because Tivoli Storage Manager does not inspect each file on the volume during backup.
- You have used the **dsmc delete backup** command to explicitly delete a file from the Tivoli Storage Manager inventory. The *snappdiff* option does not detect that a file has been manually deleted from Tivoli Storage Manager. Therefore, the file remains unprotected in Tivoli Storage Manager storage until it is changed on the volume and the change is detected by the *snappdiff* option, signalling Tivoli Storage Manager to back it up again.
- Policy changes such as changing the policy from `mode=modified` to `mode=absolute` are not detected.
- The entire file space is deleted from the Tivoli Storage Manager inventory. This causes the *snappdiff* option to create a new snapshot to use as the source, and a full incremental backup will be performed.
- The *snappdiff* option controls what constitutes a changed object.

**Note:** In the list of options used by the traditional **incremental** command, the last column shows each option's interaction with the *snappdiff* option. The definitions of **valid**, **not valid**, and **no effect** are:

**Valid** Processing runs normally when the option is used.

**Not valid**

If the option is used with the *snappdiff* option, an error message is generated.

**No effect**

The option can be used, but it is ignored.

Table 66. Incremental command: Related options

Option	Where specified	With <i>snappdiff</i>
<i>asnodename</i> "Asnodename" on page 267	Client system options file (dsm.sys) or command line.	Valid
<i>autofsrename</i> "Autofsrename" on page 272	Client system options file (dsm.sys) only.	No effect

Table 66. Incremental command: Related options (continued)

Option	Where specified	With snapdiff
<i>automount</i> "Automount" on page 274	Client options file (dsm.opt).	No effect
<i>changingretries</i> "Changingretries" on page 276	Client system options file (dsm.sys) or command line.	No effect
<i>compressalways</i> "Compressalways" on page 282	Client options file (dsm.opt) or command line.	Valid
<i>compression</i> "Compression" on page 283	Client system options file (dsm.sys) <i>within</i> a server stanza, or command line.	Valid
<i>diffsnapshot</i> "Diffsnapshot" on page 291	Command line only.	Valid
<i>dironly</i> "Dironly" on page 293	Command line only.	Valid
<i>domain</i> "Domain" on page 296	Client system options file (dsm.sys), client user options file (dsm.opt), or command line.	Valid
<i>efsdecrypt</i> "Efsdecrypt" on page 303	Client system options file (dsm.sys), client user options file (dsm.opt), or command line.	No effect
<i>enablelanfree</i> "Enablelanfree" on page 305	Client system options file (dsm.sys) or command line.	Valid
<i>encryptiontype</i> "Encryptiontype" on page 306	System options file (dsm.sys) within a server stanza.	Valid
<i>encryptkey</i> "Encryptkey" on page 307	System options file (dsm.sys) within a server stanza.	Valid
<i>exclude.fs.nas</i> "Exclude options" on page 312	Client system options file (dsm.sys).	No effect
<i>filelist</i> "Filelist" on page 316	Command line only.	Not valid
<i>filesonly</i> "Filesonly" on page 319	Command line only.	Valid
<i>followsymboliclink</i> "Followsymbolic" on page 320	Client options file (dsm.opt).	No effect
<i>include.fs.nas</i> "Include options" on page 332	Client system options file (dsm.sys) or command line.	No effect
<i>inlexcl</i> "Inlexcl" on page 330	Client system options file (dsm.sys).	Valid, but only when a file change is detected by snapdiff
<i>incrbydate</i> "Incrbydate" on page 337	Command line only.	Not valid
<i>memoryefficientbackup</i> "Memoryefficientbackup" on page 348	This option is allowed in both dsm.sys and dsm.opt, but the value in dsm.opt is ignored if it also appears in dsm.sys. You can also place this option within a server stanza, or on the initial command line.	No effect
<i>monitor</i> "Monitor" on page 352	Command line only.	Not valid
<i>nojournal</i> "Nojournal" on page 356	Command line only.	Not valid



Table 66. Incremental command: Related options (continued)

Option	Where specified	With snapdiff
<i>postsnapshotcmd</i> "Postsnapshotcmd" on page 367	Client system options file (dsm.sys) or with the <i>include.fs</i> option.	Valid
<i>preservelastaccessdate</i> "Preservelastaccessdate" on page 369	Client user options file (dsm.opt) or command line.	Valid
<i>presnapshotcmd</i> "Presnapshotcmd" on page 373	Client system options file (dsm.sys) or with the <i>include.fs</i> option.	Valid
<i>removeoperandlimit</i> "Removeoperandlimit" on page 377	Command line only.	Valid
<i>skipaclupdatecheck</i> "Skipaclupdatecheck" on page 397	Client options file (dsm.opt).	Valid
<i>snapshotcachesize</i> "Snapshotcachesize" on page 402	Client system options file (dsm.sys) or with the <i>include.fs</i> option.	No effect
<i>snapshotproviderfs</i> "Snapshotproviderfs" on page 403	System options file (dsm.sys) within a server stanza or with the <i>include.fs</i> option.	Not valid
<i>snapshotproviderimage</i> "Snapshotproviderimage" on page 404	Client system options file (dsm.sys) or with the <i>include.image</i> option.	Not valid
<i>snapshotroot</i> "Snapshotroot" on page 405	Command line only.	Not valid
<i>subdir</i> "Subdir" on page 411	Client options file (dsm.opt) or command line.	Not valid
<i>tapeprompt</i> "Tapeprompt" on page 412	Client options file (dsm.opt) or command line.	Valid
<i>toc</i> "Toc" on page 423	Command line only.	Not valid
<i>virtualfsname</i> "Virtualfsname" on page 431	Command line only.	Not valid
<i>virtualmountpoint</i> "Virtualmountpoint" on page 431	Client system options file (dsm.sys).	Not valid

## Supported Clients

This option is only valid for AIX 64-bit clients.

## Syntax

▶▶—SNAPdiff—▶▶

## Parameters

There are no parameters for this option.

## Examples

### Command line:

Perform a snapdiff incremental backup of an NFS mounted file-system /vol/vol1 hosted on the file sever homestore.ibm.com, where /net/home1 is the mount point of /vol/vol1.

```
incremental -snapdiff -diffsnapshot=latest /net/home1
```

### Related information

“Diffsnapshot” on page 291

“Set Password” on page 529

---

## Snapshotcachesize

Use the *snapshotcachesize* option to specify an appropriate size to create the snapshot.

The size estimation is needed for storing the original data blocks for modified and deleted data for the point in time when the snapshot was taken.

For snapshot-based file backup or archive, use the *snapshotcachesize* option with the *include.fs* option, or in the server stanza in the dsm.sys file.

For snapshot-based 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 AIX and Linux clients *only*. 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 server stanza in the dsm.sys file. You can set this option on the **Image-Snapshot** tab of the Preferences editor.

### Syntax

▶▶—SNAPSHOTCACHESize— *size* —▶▶

### Parameters

*size*

Specifies an appropriate size to create the snapshot for storing the original data blocks for modified and deleted data for the point in time when the snapshot was taken. The value is the percent of the file system size that is changed due to file system activity. The range of values is 1 to 100 percent. For AIX JFS2 and Linux the default value is 100 percent of the file system size. If a sufficient amount of free space is not available to create the snapshot, the command will fail with an error message. You can then either increase the size of the volume group or retry the operation. If based on your experience with your AIX JFS2 file system activity, you find that a snapshot size of 100 percent is not necessary, you can fine-tune the value.

AIX only: If you have enabled snapshot-based file backup or archive or snapshot-based image backup for your JFS2 file system and you expect a lot of file system activity such as creation, modification and deletion of files (in particular, deletion of large files or a large number of files), then make sure that you set the *snapshotcachesize* greater than the default, which is 20 percent of your file system size. For example, if you are deleting one or more files that

occupy 60 percent of your file system, set *snapshotcachesize* to about 70 percent. In the scenario where the entire file system will be deleted, you might have to set *snapshotcachesize* to 100 percent.

## Examples

### Options file:

```
snapshotcachesize 95

AIX only: include.fs /kalafs1
          snapshotproviderfs=JFS2 snapshotcachesize=95
AIX only: include.image /kalafs2
          snapshotcachesize=95
Linux only: include.image /linuxfs1
           snapshotcachesize=100
```

### Command line:

```
-snapshotcachesize=95
```

### Related information

See “Include options” on page 332 for more information about *include.fs*.

---

## Snapshotproviderfs

Use the *snapshotproviderfs* option to enable snapshot-based file backup and archive operations, and to specify a snapshot provider.

You must be a root user to perform a snapshot-based file backup or archive operation. If you are not a root user, the operation will fail with an error message.

### Supported Clients

This option is valid for AIX clients *only*. The Tivoli Storage Manager API does not support this option. The server can also define this option.

### Options File

Specify this option in the server stanza of the system options file, *dsm.sys*, to enable snapshots for all JFS2 file systems on the client. You can override the client-wide option for a specific operation by specifying this option on the command line for the backup and archive commands. You can also override the client-wide option for a specific file system by using the *include.fs* statement in the *dsm.sys* file. You can also set this option using the Preferences editor.

### Syntax

```
▶—SNAPSHOTPROVIDERFS— value —▶
```

### Parameters

*value*

Specifies one of the following values:

### JFS2

Specifies that you want to perform a snapshot-based file backup or archive while the file system is available to other system applications. Valid for JFS2 file systems on AIX clients *only*.

### NONE

Specifies that no snapshots should be used. This will perform a file backup or archive operation using the specified file system. This is the default.

## Examples

### Options file:

```
snapshotproviderfs JFS2
include.fs /kalafs1 snapshotproviderfs=JFS
```

### Command line:

```
-snapshotproviderfs=JFS2
```

---

## Snapshotproviderimage

Use the *snapshotproviderimage* option to enable snapshot-based image backup, and to specify a snapshot provider.

You must be a root user to perform a snapshot-based image backup operation. If you are not a root user, the operation will fail with an error message.

## Supported Clients

This option is valid for AIX clients *only*. The Tivoli Storage Manager API does not support this option. The server can also define this option.

## Options File

Specify this option in the server stanza of the system options file, *dsm.sys*, to enable snapshots for all the file systems on the client. You can override the client-wide option for a specific operation by specifying this option on the command line for the **backup image** command. You can also override the client-wide option for a specific file system using the *include.image* statement in the *dsm.sys* file. You can also set this option using the Preferences editor.

## Syntax

▶▶—SNAPSHOTPROVIDERImage— *value*————▶▶

## Parameters

*value*

Specifies one of the following values:

### JFS2

Specifies that you want to perform a snapshot-based image backup while the file system is available to other system applications. This is the default for JFS2 file systems. Valid for AIX clients *only*.

### LINUX\_LVM

Specifies that you want to perform a snapshot-based image backup while the

file system is available to other system applications. This is the default for file systems residing on logical volumes created by the Linux Logical Volume Manager. Valid for Linux clients *only*.

#### NONE

Specifies that you do not want to perform a snapshot-based image backup operation. This will perform a static image backup operation using the specified file system. This is the default for file systems other than AIX JFS2 and Linux LVM.

### Examples

#### Options file:

```
snapshotprovideri JFS2
include.image /kalafs1 snapshotprovideri=JFS2
```

#### Command line:

```
-snapshotprovideri=NONE
```

---

## 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 can be used to back up NFS mounted file systems. Both the back up specification (source) and the *snapshotroot* value can be a NFS mounted file specification. For example, the *snapshotroot* option can be used to back up a NFS file system hosted on a network-attached storage (NAS) that supports snapshot.

This option should be used with an incremental backup of a NAS filer volume instead of a simple incremental or incremental with *snapshotroot* option whenever the NAS filer is running ONTAP V7.3 for performance reasons. The *snappdiff* and *snapshotroot* options should not be used together.

In the following example, filesystem test495 is NFS-mounted from a NAS filer philo and /philo/test945/.snapshot/backupsnap represents the snapshot created at the NAS filer.

```
dsmc i /philo/test945 -snapshotroot=/philo/test945/.snapshot/backupsnap
```

You can also specify a directory with the *snapshotroot* option when backing up each fileset as a separate file space.

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, a unique file space called /snapshot/day1 is created on the server.

```
dsmc incremental /snapshot/day1
```

However, you might 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. The following are examples of include and exclude statements.

```
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
```

**Note:**

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 can result.
2. You cannot use the *snapshotroot* option in conjunction with the *filelist* option.
3. You cannot use the *snapshotroot* option with the *snapdiff* option.

4. 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 and Linux clients except Mac OS X.

## 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
```

## Srvoptsetencryptiondisabled

The *srvoptsetencryptiondisabled* option allows the client to ignore encryption options in a client options set from a Tivoli Storage Manager server.

If the option is set to *yes* in the client options file, the client will ignore the following options in a client options set from a Tivoli Storage Manager server:

- *encryptkey generate*
- *exclude.encrypt*
- *include.encrypt*

## Supported Clients

This option is valid for all clients. The Tivoli Storage Manager client API does not support this option.

## Options File

Place this option in the client options file (*dsm.sys*) within a server stanza.

## Syntax

▶▶—SRVOPTSETENCryptiondisabled  *no*  *yes*—▶▶

## Parameters

*yes*

Tivoli Storage Manager client ignores the values of the listed encryption options in a client options set from a Tivoli Storage Manager server.

*no* Tivoli Storage Manager client processes the setting of the listed encryption options in a client options set from a Tivoli Storage Manager server. This is the default.

## Examples

### Options file:

```
srvoptsetencryptiondisabled no
```

### Command line:

Does not apply.

---

## Srvprepostscheddisabled

The *srvprepostscheddisabled* option specifies whether to prevent the pre-schedule and post-schedule commands specified by the Tivoli Storage Manager administrator from executing on the client system, when performing scheduled operations.

The *srvprepostscheddisabled* option can be used in conjunction with the *schedcmddisabled* and *srvprepostsnapdisabled* options to disable the execution of any unwanted Operating System command by a Tivoli Storage Manager administrator on a Tivoli Storage Manager client node.

You must be an authorized user to use the *srvprepostscheddisabled* option.

## Supported Clients

This option is valid for all Tivoli Storage Manager clients that use the Tivoli Storage Manager client scheduler. The server cannot define this option.

## Options File

Place this option in the `dsm.sys` file within a server stanza for the scheduler. You can set this option on the **Scheduler** tab of the Preferences editor.

## Syntax



## Parameters

*No* Specifies that Tivoli Storage Manager allows pre-schedule and post-schedule commands defined by the Tivoli Storage Manager administrator to execute on the client system, when performing scheduled operations. If a pre-schedule or a post-schedule command is defined by both the client and the Tivoli Storage Manager administrator, the command defined by the administrator will override the corresponding command defined in the client option file. This is the default.

### *Yes*

Specifies that Tivoli Storage Manager prevents pre-schedule and post-schedule commands defined by the Tivoli Storage Manager administrator to execute on the client system, when performing scheduled operations. If a pre-schedule or a post-schedule command is defined by both the client and the Tivoli Storage



Manger administrator, the command defined by the administrator will *not* override the corresponding command defined in the client option file. This option can be used in conjunction with the *schedcmddisabled* and *srvprepostsnapdisabled* options.

## Examples

### Options file:

```
srvprepostscheddisabled yes
```

### Command line:

Does not apply.

---

## Srvprepostsnapdisabled

The *srvprepostsnapdisabled* option specifies whether to prevent the pre-snapshot and post-snapshot commands specified by the Tivoli Storage Manager administrator from executing on the client system, when performing scheduled image snapshot backup operations.

The *srvprepostsnapdisabled* option can be used in conjunction with the *schedcmddisabled* and *srvprepostscheddisabled* options to disable the execution of any unwanted Operating System command by a Tivoli Storage Manager administrator on a Tivoli Storage Manager client node.

You must be an authorized user to use the *srvprepostsnapdisabled* option.

## Supported Clients

This option is valid for Linux clients that support the image snapshot backup command. The server cannot define this option. The Tivoli Storage Manager API does not support this option.

## Options File

Place this option in the `dsm.sys` file within a server stanza for the scheduler. You can set this option on the **Image-Snapshot** tab of the Preferences editor.

## Syntax



## Parameters

*No* Specifies that Tivoli Storage Manager allows pre-snapshot and post-snapshot commands defined by the Tivoli Storage Manager administrator to execute on the client system, when performing scheduled image snapshot backup operations. If a pre-snapshot or a post-snapshot command is defined by both the client and the Tivoli Storage Manager administrator, the command defined by the administrator will override the corresponding command defined in the client option file. This is the default.

### *Yes*

Specifies that Tivoli Storage Manager allows pre-snapshot and post-snapshot commands defined by the Tivoli Storage Manager administrator to execute on

the client system, when performing scheduled image snapshot backup operations. If a pre-snapshot or a post-snapshot command is defined by both the client and the Tivoli Storage Manger administrator, the command defined by the administrator will *not* override the corresponding command defined in the client option file. This option can be used in conjunction with the *schedcmddisabled* and *srvprepostscheddisabled* options.

## Examples

### Options file:

```
srvprepostsnapdisabled yes
```

### Command line:

Does not apply.

---

## Ssl

The *ssl* option is used to enable Secure Socket Layer (SSL), to provide secure client and server communications.

You must be an authorized user to use the *ssl* option.

## Supported Clients

This option is valid for AIX clients.

## Options File

Place this option in the *dsm.sys* file. You can set this option on the **Communications** tab of the Preferences editor.

## Syntax



## Parameters

*No* Specifies that the Tivoli Storage Manager client disables SSL. This is the default.

*Yes*

Specifies that the Tivoli Storage Manager client enables SSL.

In addition to specifying *ssl=yes* to enable SSL, you should also change the value of the *tcppport* option, because the Tivoli Storage Manager server is usually set up to listen for SSL connections on a separate port.

## Examples

### Options file:

```
ssl yes
```

### Command line:

Does not apply.

## Related information

---

## Subdir

The *subdir* option specifies whether you want to include subdirectories of named directories for processing.

You can use the *subdir* option with the following commands:

- **archive**
- **delete archive**
- **delete backup**
- **incremental**
- **query archive**
- **query backup**
- **restore**
- **restore backupset**
- **restore group**
- **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 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



### 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.

If a subdirectory is a mounted file system, it will not be processed even if you specify *subdir=yes*.

## Examples

### Options file:

```
subdir no
```

### Command line:

To restore the structure:

```
/Users/mike/dir1  
/Users/mike/dir1/file1  
/Users/mike/dir1/dir2  
/Users/mike/dir1/dir2/file1
```

enter any of the following commands:

```
dsmc rest "/Users/van/dir1/*" /Users/mike/ -su=yes  
dsmc rest "/Users/van/dir1/file*" /Users/mike/ -su=yes  
dsmc rest "/Users/van/dir1/file1*" /Users/mike/ -su=yes
```

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.

### Related information

“Preservepath” on page 371

---

## Tapeprompt

The *tapeprompt* option specifies whether you want Tivoli Storage Manager to wait for a tape 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.

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**

- delete archive
- delete backup
- incremental
- restore
- retrieve
- selective

**Note:** The server can also define this option.

## Supported Clients

This option is valid for all clients.

## Options File

Place this option in the client user options file (dsm.opt). You can set this option on the **General** tab, **Prompt before mounting tapes** checkbox of the Preferences editor.

## Syntax



## Parameters

*No* You are not prompted for your choice. The server waits for the appropriate tape to mount. This is the default.

**Note:** For API applications, this is recommended to permit backup directly to tape.

*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

Use the *tcpadminport* option to specify a separate TCP/IP port number on which the server waits for requests for administrative client sessions, allowing secure administrative sessions within a private network.

You must be an authorized user to use the *tcpadminport* option.

The client *tcpadminport* setting depends on how the Tivoli Storage Manager server *tcpadminport* and *adminonclientport* options are configured. The Tivoli Storage Manager server has a *tcpadminport* setting that indicates on which port the server listens for administrative sessions, and the *adminonclientport* setting, which can be either *yes* or *no*.

If *tcpadminport* is not set on the server, then administrative sessions will be allowed on the same port as client sessions.

If *tcpadminport* is set on the server, then administrative sessions will be allowed on the port specified by that setting. In this case, if *adminonclientport yes* is in effect, then administrative sessions can connect on either the regular client port *or* the port specified by *tcpadminport*. If *adminonclientport no* is in effect, then administrative sessions can connect only on the port specified by *tcpadminport*.

### Supported Clients

This option is valid for all 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 *dsm.sys* file *within* a server stanza. You can set this option on the **Communication** tab, **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

---

## Tcpbuffsize

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.

You must be an authorized user to use the *tcpbuffsize* option.

## Supported Clients

This option is valid for all clients.

## Options File

Place this option in the `dsm.sys` file. You can set this option on the **Communication** tab, **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 32.

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 32
```

**Command line:**

```
-tcpbuffsize=32
```

This option is valid only on the initial command line. It is not valid in interactive mode.

---

## Tpcadaddress

The *tpcadaddress* option specifies a TCP/IP address for `dsmcad`. Normally, this option is not needed. Use this option only if your client node has more than one TCP/IP address, or if TCP/IP is not the default communication method.

You must be an authorized user to use the *tpcadaddress* option.

## Supported Clients

This option is valid for all clients. The Tivoli Storage Manager client API does not support this option.

## Options File

Place this option in the `dsm.sys` file within a server stanza.

## Syntax

►►—TCPCADAddress— *cad\_address*—►►

## Parameters

### *cad\_address*

Specifies a TCP/IP Internet domain name or a numeric IP address. You can specify TCPip or V6Tcpip. This option uses TCP/IP Version 4 if TCPip is specified and uses Version 6 if V6Tcpip is specified. You can only use IPv6 addresses if you specified the *commmethod V6Tcpip* option.

## Examples

### Options file:

```
tcpcada dsmclnt.sanjose.ibm.com
```

### Command line:

```
-tcpcadaddress=128.33.10.249  
-tcpcadaddress=khozt.mycompany.mydomain.com  
-tcpcadaddress=2002:92b:111:221:128:33:10:249
```

This option is valid only on the initial command line of the dsmcad program. It is not valid with other dsm modules.

### Related information

See “Commmethod” on page 279 to determine if your client node has more than one TCP/IP address, or if TCP/IP is not the default communication method.

---

## Tcpclientaddress

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. The server will use this address when it begins the server prompted scheduled operation.

You must be an authorized user to use the *tcpclientaddress* option.

Use this option only if you use the *prompted* parameter with the *shedmode* option.

If *sessioninitiation* is set to *serveronly*, the value for the *tcpclientaddress* client option should be the same as the value for the *HLAddress* server option.

## Supported Clients

This option is valid for all clients. The Tivoli Storage Manager client API does not support this option.

## Options File

Place this option in the dsm.sys file *within* a server stanza. You can set this option on the **Scheduler** tab, **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 numeric IP address. The numeric IP address can be either a TCP/IPv4 or TCP/IPv6 address. You can only use IPv6 addresses if you specified the *commmethod V6Tcip* option.

## Examples

### Options file:

```
tcpclienta dsmlnt.mycompany.mydomain.com  
or  
tcpclienta 192.168.0.1
```

### Options file:

```
tcpclienta dsmlnt.sanjose.ibm.com
```

This option is valid only on the initial command line. It is not valid in interactive mode.

---

## Tcpclientport

The *tcpclientport* option specifies a TCP/IP port number for the server to contact the client when the server begins the server prompted scheduled operation.

You must be an authorized user to use the *tcpclientport* option

Use this option only if you specify the *prompted* parameter with the *shedmode* option.

If *sessioninitiation* is set to *serveronly*, the value for the *tcpclientport* client option should be the same as the value for the *LLAddress* server option.

## Supported Clients

This option is valid for all clients. The Tivoli Storage Manager client API does not support this option.

## Options File

Place this option in the *dsm.sys* file *within* a server stanza. You can set this option on the **Scheduler** tab, **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 1 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

The *tcpnodelay* option specifies whether the client disables the delay of sending successive small packets on the network, per transaction.

You must be an authorized user to use the *tcpnodelay* option.

Change the value from the default of *yes* only under one of the following conditions:

- You are directed to change the option by IBM technical support.
- You fully understand the effects of the TCP Nagle algorithm on network transmissions. Setting the option to *no* enables the Nagle algorithm, which delays sending small successive packets.

## Supported Clients

This option is valid for all UNIX and Linux clients, except UNIX System Services client for z/OS.

## 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** tab of the Preferences editor.

## Syntax



## Parameters

*No* Specifies that the server does not allow successive small packets to be sent immediately over the network. Setting this option to *no* can degrade performance.

*Yes*

Specifies that the server or client allows successive small packets to be sent immediately over the network. The default is *yes*.

## Examples

### Options file:

```
tcpnodelay yes
```

**Command line:**  
Does not apply.

---

## Tcpport

The *tcpport* option specifies a TCP/IP port address for a Tivoli Storage Manager server. You can obtain this address from your administrator.

You must be an authorized user to use the *tcpport* option.

### Supported Clients

This option is valid for all clients.

### Options File

Place this option in the *dsm.sys* file. You can set this option on the **Communication** tab, **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 1 through 32767; the default is 1500.

### Examples

**Options file:**  
tcp 1501

**Command line:**  
Does not apply.

---

## Tcpserveraddress

The *tcpserveraddress* option specifies the TCP/IP address for a Tivoli Storage Manager server. You can obtain this server address from your administrator.

You must be an authorized user to use the *tcpserveraddress* option.

### Supported Clients

This option is valid for all clients.

### Options File

Place this option in the *dsm.sys* file. You can set this option on the **Communication** tab, **Server Address** field of the Preferences editor.

If this option is not specified, the client will attempt to contact a Tivoli Storage Manager server running on the same computer as the Tivoli Storage Manager client.

## 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 numeric IP address. The numeric IP address can be either a TCP/IP v4 or TCP/IP v6 address. You can only use IPv6 addresses if you specified the *commmethod V6Tcpip* option.

## Examples

**Options file:**

tcps dsmchost.endicott.ibm.com

**Command line:**

Does not apply.

---

## Tcpwindowsize

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 can improve communication performance.

You must be an authorized user to use the *tcpwindowsize* option.

## Supported Clients

This option is valid for all clients.

## Options File

Place this option in the dsm.sys file. You can set this option on the **Communication** tab, **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. For Mac OS X, the range of values is 1 through 128. If you specify a value less than 1, the TCP window size defaults to 1. If you specify a value greater than 2048, the TCP window size defaults to 2048.

**Note:**

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.

## Examples

**Options file:**

```
tcpwindowsize 63
```

**Command line:**

```
-tcpw=63
```

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.

By default, 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**
- **delete backup**
- **expire**
- **query archive**
- **query backup**
- **query filespace**
- **query image**
- **query nas**
- **restore**
- **restore image**
- **restore nas**
- **retrieve**
- **set event**

## Supported Clients

This option is valid for all clients.

## Options File

Place this option in the client user options file (dsm.opt). You can set this option on the **Regional Settings** tab, **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*, *pitime*, and *totime* options.

**0** Use the locale-defined time format (does not apply to Mac OS X).

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

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 *dsm.sys* file.

### Syntax



### 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:

- **delete backup**
- **query archive**
- **query backup**
- **restore**
- **restore group**
- **retrieve**

## Supported Clients

This option is valid for all 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 "/Users/agordon/Documents/*" -todate=12/11/2003
```

### 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:

- **delete backup**
- **query archive**
- **query backup**
- **restore**
- **restore group**
- **retrieve**

### Supported Clients

This option is valid for all 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 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 restore "/Users/van/Documents/myfiles/*" -todate=09/17/2003  
-totime=23:00:00
```

**Command line:**

```
dsmc restore "/home/user1/*" -todate=09/17/2003 -totime=23:00:00
```

---

## Txnbytelimit

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*.

You must be an authorized user to use the *txnbytelimit* option.

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 on the server, so the actual size of a transaction can be less than your *txnbytelimit*. 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 clients. The server can also define this option.

### Options File

Place this option in the `dsm.sys` file. You can set this option on the **General** tab **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 25600.

### Examples

**Options file:**

```
txnb 25600
```

**Command line:**

```
-txnb=25600
```

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. Use this option with the **set event** command to activate, hold, or release.

### Supported Clients

This option is also valid for the **set password** command with *TSM* on AIX clients.

This option is valid for AIX and Solaris clients *only*. The Tivoli Storage Manager client API does not support this option.

### Syntax



### Parameters

*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 `dsm.sys` file *within* a server stanza.

## Syntax



## 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 is displayed if you use both options in the same **archive** command.

If you use this option, you might want to consider the following:

- You might experience performance problems when retrieving large amounts of data archived with this option.
- You might 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.
- If there are multiple files with the same name for the *v2archive* option, the files are archived multiple times, with their directory structure. The *v2archive* option archives only the files.

## Supported Clients

This option is valid for all 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 "/Users/user2/Documents/*" -v2archive -su=y.
```

#### Archives these files:

```
/Users/user2/Documents/file1  
/Users/user2/Documents/file2  
/Users/user2/Documents/file3  
/Users/user2/Documents/dir2/file4  
/Users/user2/Documents/dir2/file5
```

Note: Tivoli Storage Manager does not archive `/Users/user2/Documents` and `/Users/user2/Documents/dir2`.

### 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 to display detailed processing information on your screen. This is the default. When you run the **incremental**, **selective**, or **archive** commands, information is displayed 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.

The information is displayed on your screen in the Scheduler Status window. This option only applies when you are running the scheduler and Tivoli Storage Manager is performing scheduled work.

## Supported Clients

This option is valid for all 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** tab, **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 only on the initial command line. It is not valid in interactive mode.

---

## 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, all Linux clients, 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. The *virtualfsname* cannot be the same as an existing file space name.

### Supported Clients

This option is valid for all UNIX and Linux clients except for Mac OS X.

### 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=/Users/van/Documents/filelist1 -groupname=group1
-virtualfsname=virtfs -mode=full
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. Also, if you back up a file system, then add a virtual mount point, and then do another incremental on the file system, the files and directories in the virtual mount point directory will be expired, because they are logically contained within the virtual mount point directory and not the file system.

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. When you perform a backup or archive using the **virtualmountpoint** option, the **query filesystem** 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 require that the **virtualmountpoint** option is specified in the **dsm.sys** file to restore or retrieve the data.

**Note:** When you specify a **virtualmountpoint** option, the path that it specifies is added to the default backup domain (domain **all-local**). The **virtualmountpoint** path is always considered a local "mount point" regardless of the real file system type it points to.

## Supported Clients

This option is valid for all UNIX clients except Mac OS X. The Tivoli Storage Manager client API does not support this option.

## Options File

Place this option in the **dsm.sys** file.

## Syntax



## 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 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 identify 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.

For the Java GUI, the *virtualnodename* option will only work if you are root user. If you need to use the *virtualnodename* option with a non-root user account, use the command-line client (or native GUI, for platforms that still have one).

## Supported Clients

This option is valid for all 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.

---

## 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 client.

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.

### Supported Clients

This option is valid for all clients. The Tivoli Storage Manager client API does not support this option.

### Options File

Place this option in the *dsm.sys* file *within* a server stanza. You can set this option on the **Web Client** tab, **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:

For UNIX and Linux other than Mac OS X: `webports 2123 2124`

For Mac OS X: `webports 2123`

#### Command line:

Does not apply.

---

## Chapter 11. 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 topic describes how to start or end a client command session and how to enter commands.

The following is a list of tasks related to entering commands.

- “Starting and ending a client command session” on page 437
- “Entering client command names, options, and parameters” on page 439
- “Recalling previous commands” on page 442
- “Using wildcard characters” on page 443

The following table provides an alphabetical list of the commands and a brief description.

Table 67. Commands

Command	Description
<b>archive</b> “Archive” on page 444	Archives files from a workstation to Tivoli Storage Manager storage.
<b>backup group</b> “Backup Group” on page 446	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.
<b>backup image</b> “Backup Image” on page 448	Creates an image backup of one or more file systems or logical volumes that you specify.
<b>backup nas</b> “Backup NAS” on page 453	Creates an image backup of one or more file systems belonging to a Network Attached Storage (NAS) file server.
<b>cancel process</b> “Cancel Process” on page 455	Displays a list of current NAS (if NDMP support is enabled) image backup and restore processes for which the administrative user has authority.
<b>cancel restore</b> “Cancel Restore” on page 456	Displays a list of restartable restore sessions from which you can select one to cancel.
<b>delete access</b> “Delete Access” on page 457	Deletes authorization rules for files that are stored on the server. On those clients that support image backup, this command deletes authorization rules for images that are stored on the server.
<b>delete archive</b> “Delete Archive” on page 457	Deletes archived files from Tivoli Storage Manager server storage.
<b>delete backup</b> “Delete Backup” on page 459	Deletes active and inactive backup files from Tivoli Storage Manager server storage.
<b>delete filespace</b> “Delete Filespace” on page 462	Deletes file spaces in Tivoli Storage Manager server storage.
<b>delete group</b> “Delete Group” on page 463	Deletes a group backup on the Tivoli Storage Manager server.
<b>expire</b> “Expire” on page 464	Inactivates backup objects that you specify in the file specification or with the <i>filelist</i> option.
<b>help</b> “Help” on page 466	Displays a Table of Contents of help topics for the command-line client.

Table 67. Commands (continued)

Command	Description
<b>incremental</b> “Incremental” on page 467	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.
<b>loop</b> “Loop” on page 473	Starts an interactive command session.
<b>macro</b> “Macro” on page 474	Executes commands within a macro file that you specify.
<b>monitor process</b> “Monitor Process” on page 475	Displays a list of current NAS image backup and restore processes from which you can select one to cancel.
<b>preview</b> “Preview” on page 476	Generates a file that lists objects to be backed up or archived according to the include-exclude list, prior to sending any data to the server.
<b>query access</b> “Query Access” on page 477	Displays a list of current authorization rules.
<b>query archive</b> “Query Archive” on page 477	Displays a list of archived files.
<b>query backup</b> “Query Backup” on page 479	Displays a list of backup versions.
<b>query backupset</b> “Query Backupset” on page 482	Queries a backup set from a local file or the Tivoli Storage Manager server. On those clients that support tape devices, this command can query a backup set from a tape device.
<b>query filespace</b> “Query Filespace” on page 485	Displays a list of file spaces in Tivoli Storage Manager storage. You can also specify a single file space name to query.
<b>query group</b> “Query Group” on page 487	Displays information about group backups and their members.
<b>query image</b> “Query Image” on page 489	Displays information about image backups.
<b>query inclexcl</b> “Query Inclexcl” on page 491	Displays a list of include-exclude statements in the order in which they are processed during backup and archive operations.
<b>query mgmtclass</b> “Query Mgmtclass” on page 492	Displays information about available management classes.
<b>query node</b> “Query Node” on page 492	Displays all the nodes for which an administrative user ID has authority to perform operations.
<b>query options</b> “Query Options” on page 493	Displays all or part of your options and their current settings.
<b>query restore</b> “Query Restore” on page 494	Displays a list of your restartable restore sessions in the server database.
<b>query schedule</b> “Query Schedule” on page 495	Displays information about scheduled events for your node.
<b>query session</b> “Query Session” on page 495	Displays information about your session, including the current node name, when the session was established, server information, and server connection information.
<b>query systeminfo</b> “Query Systeminfo” on page 496	Gathers Tivoli Storage Manager system information and outputs this information to a file or the console.
<b>restart restore</b> “Restart Restore” on page 498	Displays a list of restartable restore sessions from which you can one to restart.

Table 67. Commands (continued)

Command	Description
<b>restore</b> "Restore" on page 498	Restores copies of backup versions of your files from a Tivoli Storage Manager server.
<b>restore backupset</b> "Restore Backupset" on page 503	Restores a backup set from the Tivoli Storage Manager server or a local file. On those clients that support tape devices, this command can restore a backup set from a tape device.
<b>restore group</b> "Restore Group" on page 510	Restores specific members or all members of a group backup.
<b>restore image</b> "Restore Image" on page 513	Restores a file system or raw volume image backup.
<b>restore nas</b> "Restore NAS" on page 515	Restores the image of a file system belonging to a Network Attached Storage (NAS) file server.
<b>retrieve</b> "Retrieve" on page 517	Retrieves copies of archived files from the Tivoli Storage Manager server.
<b>schedule</b> "Schedule" on page 520	Starts the client scheduler on the workstation.
<b>selective</b> "Selective" on page 522	Backs up selected files.
<b>set access</b> "Set Access" on page 525	Authorizes another user to access your backup versions or archived copies. On those clients that support image backup, this command can set authorization rules for images that are stored on the server.
<b>set event</b> "Set Event" on page 527	Allows you to specify the circumstances for when archived data is deleted.
<b>set password</b> "Set Password" on page 529	Changes the Tivoli Storage Manager password for your workstation.

For proper operation, the was node must be restored to the same location and under the same name.

**Attention:** Restoring data other than at the group level can corrupt your Websphere Application Server installation. Restore your data at the Network Deployment Manager node or Application Server node level only.

---

## 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 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 be processed more quickly. Tivoli Storage Manager processes the commands and returns to the **tsm>** prompt.

### Process commands in batch mode

Some options are valid *only* on the initial command line and not in interactive mode. These options generally affect the operation of the entire session. For example, the command **dsmc query session -errorlogname=myerror.log** is

accepted and it does name the error log. However, it is accepted simply because it appears in the initial command, even though the option is not valid for the query command.

There are also some options that are always valid on the initial command line as well as on individual commands in interactive mode. Therefore, certain options are accepted on the initial command line even though they have no effect on the command being entered. For example, **dsmc query session -subdir=yes** is a valid command, but in this case the *-subdir* option has no effect on the command that was entered.

When you enter a *single* command in batch mode, precede it with the executable program name, **dsmc**. 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.

### Related concepts

Chapter 10, “Using processing options,” on page 241

You can use defaults for processing options or you can tailor the processing options to meet your specific needs. This topic provides an overview of processing options and an options reference section that provides detailed information about each option.

## 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.

#### Note for UNIX clients:

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.

---

## Entering client command names, options, and parameters

A client command can include one or more of these components: *Command name*, *options*, and *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

When you enter options with a command always precede the option with a dash (-). Do not put a space between the dash and the option name. Enter more than one option in any order in a command before or after the file specification. Separate multiple options with a blank space.

There are two groups of options that you can use with commands: Client options (set in your options file), or client command options (used on the command line).

- **Client options:** The group of options that are set in your client options file (dsm.opt). You can override an option in the client options file when you enter the option with a command on the command line.
- **Client command options:** Use a client command option *only* when you enter the option with a command on the command line. You cannot set these options in an options file.

## Related concepts

“Client options reference” on page 265

The following sections contain detailed information about each of the Tivoli Storage Manager processing options. Information for each option includes the following information: a description, a syntax diagram, detailed descriptions of the parameters, examples of using the option in the client options file (if applicable), and 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.

## Options handling in interactive mode

In interactive mode, options that you enter on the initial command line will override the value that you specified in your client options file (dsm.opt). 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 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 specified within the interactive session only affects the command on which it is entered. When that command completes, the value reverts back to *-subdir=no*, the value at the beginning of the interactive session.

In interactive mode, options that you enter on the initial command line will override the value that you specified in your client user options file (dsm.opt) or dsm.sys file. 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 specified within the interactive session only affects the command on which it is entered. 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 the following:

```
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 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**.

**Example: Restore the file /project/budget.fin to the new path /newproj/newbudg.fin**

```
dsmc restore /project/budget.fin /newproj/
```



Enter parameters in the order indicated in the command syntax diagram.

## File specification syntax

There are some syntax rules that you need to know about when entering file specification parameters, such as **filespec**, **sourcefilespec**, and **destinationfilespec**.

The following are the syntax rules:

- 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.

**Example: Allow access to all files in all directories in and below the /home directory:**

```
set access backup /home/* * *
set access backup /home/*/* * *
```

With UNIX clients, do not use wildcards for the directory path name, for example:

```
/home/j*asler/file1.c
```

- There is a maximum number of file specifications per command:
  - The **Query** commands can accept only one file specification.
  - The **restore** and **retrieve** commands can accept a source file specification and a destination file specification.
  - There is a limit of 20 operands on some commands. This is to prevent excessive sessions that are caused when wildcards are expanded by the UNIX shell command processor.

You can prevent shell expansion from causing you to go over the 20-operand limit by placing quotation marks around your source filespec expansion characters for restore commands.

**Note:** Using quotation marks has the side affect of causing a no-query restore.

You can use the **removeoperandlimit** option to specify that Tivoli Storage Manager removes the 20-operand limit. 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 length of a file specification is limited.
  - The maximum number of characters for a file name is 255. The maximum combined length of the file name and path name is 1024 characters. The Unicode representation of a character can occupy several bytes, so the maximum number of characters that a file name might contain can vary.
- 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
```

- 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. The client appends the destination file specification to the working directory to build the complete path.

For example, if the current working directory is /home/me and the command is `dsmc res "/fs/dir1/*" mydir/`, the complete restore path is this:  
/home/me/mydir.

- The only command that accepts a simple file space name is the **incremental** command. The following example is valid:

```
dsmc i /Users
```

The following example is not valid, because the command is the **selective** command:

```
dsmc sel /Users
```

### Related reference

"Filelist" on page 316

Use the *filelist* option to process a list of files.

"Removeoperandlimit" on page 377

The *removeoperandlimit* option specifies that Tivoli Storage Manager removes the 20-operand limit. 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.

---

## Recalling 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.

Pressing the Up arrow key displays the previous command in memory. Pressing the Down arrow key displays the next command in memory. The following table lists other functions you can perform when you recall commands.

**Note for UNIX clients:** The following keys or key combinations are not guaranteed to work in all terminal applications. Depending on your application's specifics, they might not work at all or they might map to the wrong commands.

Table 68. 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
Move five spaces to the left.	Tab left
Move five spaces to the right.	Tab right

Table 68. Command recall and edit functions (continued)

Function	Press
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.	Del
Delete a character to the right of the cursor.	Delete
Delete a character to the left 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.	Return or Enter
Quit the program.	F3 or Esc

### Related reference

“Editor” on page 302

The *editor* option turns the command-line interface (CLI) editor and retrieve capability on or off.

## Using 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.

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 server names. You cannot specify a directory whose name contains an asterisk (\*) or a question mark (?).

Valid wildcard characters that you can use include:

- \* Asterisk. Matches zero or more characters.
- ? Question mark. Matches any single character at the present position.

The following table shows examples of each wildcard.

Table 69. Wildcard characters

Pattern	Matches	Does not match
<i>Asterisk (*)</i>		
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
<i>Question Mark (?)</i>		
ab?	abc	ab, abab, abzzz
ab?rs	abrs	abrs, abllrs
ab?ef?rs	abdefjrs	abefrs, abdefrs, abefjrs
ab??rs	abcdrs, abzzrs	abrs, abjrs, abkkrs

**Important:** Use an asterisk (\*) instead of a question mark (?) as a wildcard character when trying to match a pattern on a multibyte code page, to avoid unexpected results.

**Note:** In batch mode, it is recommended that you enclose values containing wildcards in quotation marks. Otherwise, UNIX shells expand unquoted wildcards, and it is easy to exceed the 20 operand limit. It is more efficient to let the client process wildcard file specifications because many fewer server interactions are needed to complete the task. For example:

```
dsmc selective "/home/me/*.c"
```

---

## Client commands reference

The following sections contain detailed information about each of the Tivoli Storage Manager commands.

Information for each command includes the following information:

- A description of the command.
- A syntax diagram of the command.
- 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.

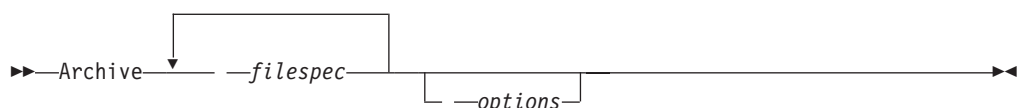
Use the *snapshotroot* option with the **archive** command in conjunction with a third-party application that provides a snapshot of a logical volume, to associate the data on the local snapshot with the real file space data that is stored on the Tivoli Storage Manager server. The *snapshotroot* option does not provide any facilities to take a volume snapshot, only to manage data created by a volume snapshot.

AIX only: You can enable snapshot-based file archive by using the option *snapshotproviderfs=JFS2*.

### Supported Clients

This command is valid for all clients.

### Syntax



## Parameters

### *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. Separate file specifications with a space. 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.

There is a limit of 20 operands. This is to prevent excessive sessions that are caused when wildcards are expanded by the UNIX shell command processor. You can prevent shell expansion from causing you to go over the 20-operand limit by placing quotation marks around your source *filespec* expansion characters.

**Note:** Using quotation marks has the side affect of causing a no-query restore.

You can use the *removeoperandlimit* option to specify that Tivoli Storage Manager removes the 20-operand limit. If you specify the *removeoperandlimit* option, the 20-operand limit is not enforced and is restricted only by available resources or other operating system limits.

### *options*

Table 70. Archive command: Related options

Option	Where to use
<i>archmc</i>	Command line only.
<i>archsymbinkasfile</i>	Client user options file (dsm.opt) or command line.
<i>autofsrename</i>	Client options file (dsm.opt) only.
<i>changingretries</i>	Client system options file or command line.
<i>compressalways</i>	Client user options file (dsm.opt) or command line.
<i>compression</i>	dsm.sys file <i>within</i> a server stanza or command line.
<i>deletefiles</i>	Command line only.
<i>description</i>	Command line only.
<i>dironly</i>	Command line only.
<i>encryptiontype</i>	dsm.sys file <i>within</i> a server stanza.
<i>encryptkey</i>	dsm.sys file <i>within</i> a server stanza.
<i>filelist</i>	Command line only.
<i>filesonly</i>	Command line only.
<i>preservelastaccessdate</i>	Client user options file (dsm.opt) or command line.
<i>removeoperandlimit</i>	Command line only.
<i>snapshotroot</i>	Command line only.
<i>subdir</i>	Client options file (dsm.opt) or command line.
<i>tapeprompt</i>	Client options file (dsm.opt) or command line.
<i>v2archive</i>	Command line only.

## 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

### Related information

"File system and ACL support" on page 112

"Snapshotproviderfs" on page 403

---

## 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.

You must be an authorized user to use this command.

AIX only: You can enable snapshot-based group backup by using the option `snapshotproviderfs=JFS2`.

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.
- 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.

**groupname**

Specifies the fully qualified name of the group containing a list of files.

**virtualfsname**

Specifies the name of the virtual file space for the group on which you want to perform the operation. The virtualfsname option cannot be the same as an existing file space name.

**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.

**Note:**

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.
3. Use the **restore group** command to restore specific members or all members of a group backup on the Tivoli Storage Manager server.
4. Unless you are running Mac OS X, use the **delete group** command to delete a specific group backup from the Tivoli Storage Manager server.
5. Use the **query filesystem** command to display virtual file space names for your node that are stored on the Tivoli Storage Manager server.
6. A group backup can be added to a backup set.

**Supported Clients**

This command is valid for all UNIX and Linux clients except Mac OS X.

**Syntax**

► Backup Group — *options* —►

**Parameters**

*options*

Table 71. Backup Group command: Related options

Option	Where to use
filelist "Filelist" on page 316	Command line only.
groupname "Groupname" on page 325	Command line only.
mode "Mode" on page 350	Command line only.
snapshotproviderfs "Snapshotproviderfs" on page 403	System options file (dsm.sys) within a server stanza or with the include.fs option.
virtualfsname "Virtualfsname" on page 431	Command line only.

**Examples**

**Task** Perform a full backup of all the files in the /home/dir1/filelist1 file to the virtual file space name accounting containing the group leader /home/group1 file.

**Command:**

```
backup group -filelist=/home/dir1/filelist1 -groupname=group1
-virtualfsname=virtfs -mode=full
```

### Related information

“Include options” on page 332

“Query Group” on page 487

“Restore Group” on page 510

“Delete Group” on page 463

“Query Filespace” on page 485

---

## Backup Image

The **backup image** command creates an image backup of one or more volumes on your system. These volumes can be formatted FAT, FAT32, NTFS, or unformatted RAW volumes. If a volume is NTFS-formatted, only those blocks used by the file system will be backed up. If you set the `imagegapsize` option to 0, all blocks, including unused blocks at the end of the volume, will be backed up.

If you specify an AIX JFS2 file system for image backup, only those blocks used by the file system will be backed up. If you set the `imagegapsize` option to zero, all blocks, including blocks at the end of the volume, will be backed up.

### Note:

1. AIX only: By default, snapshot-based image backup is enabled for JFS2 volumes. You can disable this by using the option `snapshotproviderimage=NONE`.
2. 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, can produce inconsistent backup data if the data changes during the image backup operation.
3. Backup image is not supported on any GPFS file system.
4. The Tivoli Storage Manager API must be installed to use the **backup image** command.
5. When you change the attribute of a JFS2 file system to an HSM-managed file system, an image backup is not done for that file system.

### Important:

The last incremental backup time refers to the server time and the file modification time refers to the client time. If the client and server time are not synchronized, or the client and server are in different time zones, this affects incremental-by-date backup and image backup with `mode=incremental`.

The client backs up the files whose modification date and time (client time) is later than the date and time of the last incremental backup of the file system on which the file resides (server time).

If the server time is ahead of the client time, an incremental-by-date operation or image backup with `mode=incremental` will skip the files, which had been created or



modified after the last incremental or image backup with a modification date earlier than the last incremental backup time stamp.

If the client time is ahead of the server time, all files that had been created or modified before the last incremental or image backup and have a modification time stamp later than the last incremental backup time stamp, are backed up again. Typically, these files would not get backed up because they had already been backed up.

The backup date can be checked by the **query filespace** 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.

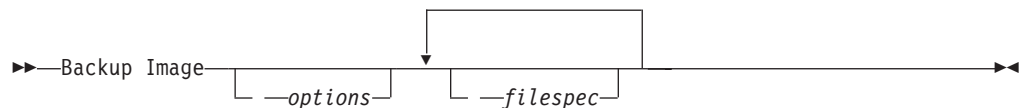
Use the `include.image` option to include a file system or logical volume for image backup, or to specify volume-specific options for image backup.

The **backup image** command uses the compression option.

## Supported Clients

This command is valid for AIX, HP-UX, all Linux clients, and Solaris.

## Syntax



## Parameters

*options*

Table 72. Backup Image command: Related options

Option	Where to use
compressalways "Compressalways" on page 282	Client options file (dsm.opt) or command line.
compression "Compression" on page 283	Client options file or command line.
dynamicimage "Dynamicimage" on page 302	Use with the <b>backup image</b> command or the <code>include.image</code> option in the options file.
imagegapsize "Imagegapsize" on page 328	Use with the <b>backup image</b> command, the <code>include.image</code> option, or in the options file.
mode "Mode" on page 350	Command line only.

Table 72. Backup Image command: Related options (continued)

Option	Where to use
postsnapshotcmd "Postsnapshotcmd" on page 367	Use with the <b>backup image</b> command, the include.image option, or in the options file.
presnapshotcmd "Presnapshotcmd" on page 373	Use with the <b>backup image</b> command, the include.image option, or in the options file.
snapshotcachesize "Snapshotcachesize" on page 402	Use with the <b>backup image</b> command, the include.image option, or in the options file.
<b>snapshotproviderimage</b> "Snapshotproviderimage" on page 404	Client options file or with include.image option.

### *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 be processed. If you do not use the *domain.image* option to specify file systems to process, an error message is displayed 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.

**Note:** 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:** Command: dsmc backup image /home  
-snapshotproviderimage=none

**Task** Perform a dynamic image backup of the logical volume mounted at the /home directory.

**Command:** dsmc backup image /home -dynamicimage=yes

**Task** Perform a snapshot image backup of the /home directory.

**Command:**

AIX client: dsmc backup image /home  
-snapshotproviderimage=JFS2  
Linux client: dsmc backup image /home  
-snapshotproviderimage=LINUX\_LVM

**Task** Back up the /dev/1v01 raw logical volume.

**Command:** `dsmc backup image f:`

### **Related information**

“Imagegapsize” on page 328

“Snapshotproviderimage” on page 404

“Snapshotcachesize” on page 402

“Mode” on page 350

“Comparing methods 1 and 2” on page 143 to decide which method is appropriate for your environment.

## **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 `dynamicimage` 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.

The `dynamicimage` option is not supported for JFS2 volumes.

For Linux x86/x86\_64 clients 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. Snapshot image backup requires a Version 5.1 Tivoli Storage Manager server.

For AIX clients only: By default, Tivoli Storage Manager performs a snapshot image backup of JFS2 volumes during which the volume is available to other system applications. AIX allows the creation of a snapshot of a JFS2 volume while it is still online. The snapshot is created inside the same volume group as the source 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 volume. Use the `snapshotcachesize` option with the `backup image` command, in the `dsm.sys` 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 20 percent will ensure a valid snapshot.

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.sys` 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.

## 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 either use *image backup with file system incremental* or you can use *image backup with image incremental mode* to perform image backups of volumes with mounted file systems.

The following are some examples of using *image backup with file system incremental*.

- To perform a full incremental backup of the file system: `dsmc incremental /myfilesystem`
- To perform an image backup of the same file system: `dsmc backup image /myfilesystem`
- To periodically perform incremental backups: `dsmc incremental /myfilesystem`

You must follow the next steps in the order shown to ensure that the server records additions and deletions accurately.

Use this command to restore 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:

1. After the original image is restored, all files backed up with the **incremental** command are restored individually.
2. 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.

The following are some examples of using *image backup with image incremental mode*.

- To perform an image backup of the same file system: `dsmc backup image /myfilesystem`
- To perform an incremental image backup of the file system: `dsmc backup image /myfilesystem -mode=incremental`

This sends only those files that were added or changed since the last image backup to the server.

- To periodically perform full image backups: `dsmc backup image /myfilesystem`
- To restore the image: `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. This will improve restore time because fewer changes are applied from incrementals.

- When a file system changes substantially (more than 40%).
- Once each month.
- As appropriate for your environment.

The following restrictions apply when using the image backup with image incremental mode:

- 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.

---

## 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 options file (*dsm.opt*). The value in the client options file is the default, but can be overridden on the command line.

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. 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.

Specifying **MODE =differential** on the **backup node** server command or the **backup nas** command where no full image exists, shows that a full backup was started. Using the **query process** server command shows that a full backup is in process.

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. If a full image exists, whether it is restorable, or expired and being maintained because of dependent differential images, specifying **MODE =differential** sends a differential image backup. If a full image is sent during a differential backup, it is reflected as a full image using the **query nasbackup** server command. The **query nasbackup** server command also displays NAS images that are restorable and will display full image or differential image as the object type.

Use the *monitor* option to specify whether you want to monitor a NAS file system image backup and display processing information on your screen.

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.

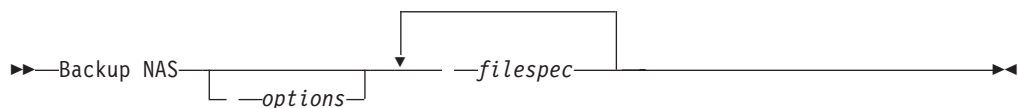
Use the **cancel process** command to stop NAS backup processing.

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



## Parameters

*options*

Table 73. Backup NAS command: Related options

Option	Where to use
mode "Mode" on page 350	Command line only.
monitor "Monitor" on page 352	Command line only.
nasnodename "Nasnodename" on page 352	Client options file (dsm.sys) or command line.

Table 73. Backup NAS command: Related options (continued)

Option	Where to use
toc "Toc" on page 423	Command line or with the include.fs.nas option in your client options file (dsm.sys).

### *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.

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

## Related information

"Nasnodename" on page 352

"Toc" on page 423

"Mode" on page 350

"Monitor" on page 352

"Cancel Process"

"Domain.nas" on page 300

---

## 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.

## 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 under the following circumstances:

- 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 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 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 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.

**Important:** 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 clients.

### Syntax

►►—Delete ARchive— [—options—] [—filespec—] [—{—filespace—}—filespec—]►►

## Parameters

### *options*

Table 74. Delete Archive command: Related options

Option	Where to use
dateformat "Dateformat" on page 285	Client options file (dsm.opt) or command line.
description "Description" on page 289	Command line only.
filelist "Filelist" on page 316	Command line only.
noprompt "Noprompt" on page 356	Command line only.
numberformat "Numberformat" on page 357	Client options file (dsm.opt) or command line.
pick "Pick" on page 363	Command line only.
subdir "Subdir" on page 411	Client options file (dsm.opt) or command line.
tapeprompt "Tapeprompt" on page 412	Client options file (dsm.opt) or command line.
timeformat "Timeformat" on page 421	Client options file (dsm.opt) or command line.

### *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. Separate file specifications with a space. 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.

**Note:** If you indicate *filespace*, do not include a drive letter in the file specification.

### *{filespace}*

Specifies the file space (enclosed in braces) on the server that contains the file you want to delete. This is the name on the workstation drive from which the file was archived.

Use the *filespace* if the name has changed, or if you are deleting files archived from another node with drive labels that are different from yours.

## 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

**Task** Delete selected files from the group of files archived with the description "Monthly Budgets 1999" located in /user/projects and its subdirectories.

**Command:** delete ar "/user/projects/\*" -description="Monthly Budgets 1999" -pick -subdir=yes

### Related information

## Delete Backup

The **delete backup** command deletes backup files from Tivoli Storage Manager server storage. Your administrator must give you authority to delete backup files.

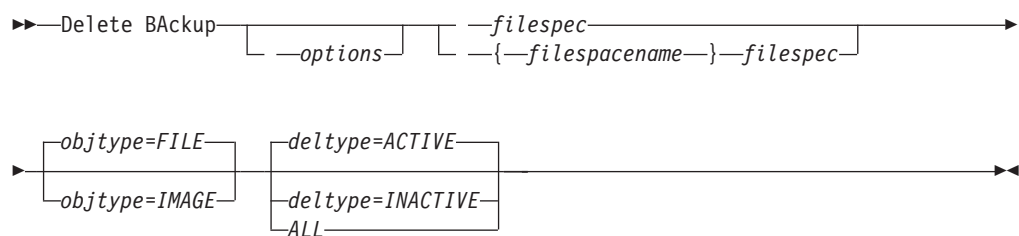
You can delete your backed up files from the Tivoli Storage Manager client node workstation if the function is enabled on the Tivoli Storage Manager node's definition. When you do this, the Tivoli Storage Manager server will take all of the backed up files that meet the 'filespec' and 'deltype' specified and deactivate them. The server also assigns a deactivation date of 'infinite-minus' so that the files are no longer available for restore and are purged, immediately on the subsequent run of file expiration. The file is not physically removed until the expiration process runs.

**Important:** After you delete backup files, you cannot restore them. Verify that the backup files are no longer needed before you delete them. Tivoli Storage Manager will prompt whether you want to continue with the delete. If you specify yes, the specified backup files are immediately deleted and removed from Tivoli Storage Manager server storage.

### Supported Clients

This command is valid for all clients.

### Syntax



### Parameters

*options*

Table 75. Delete Backup command: Related options

Option	Where to use
description "Description" on page 289	Command line only.

Table 75. Delete Backup command: Related options (continued)

Option	Where to use
filelist "Filelist" on page 316	Command line only.
fromdate "Fromdate" on page 321	Command line, and in the GUI find function.
fromtime "Fromtime" on page 324	Command line, and in the GUI find function.
noprompt "Noprompt" on page 356	Command line only.
pick "Pick" on page 363	Command line only.
pitdate "Pitdate" on page 364	Command line, and in the GUI find function.
pittime "Pittime" on page 365	Command line, and in the GUI find function.
subdir "Subdir" on page 411	Client options file (dsm.opt) or command line.
tapeprompt "Tapeprompt" on page 412	Client options file (dsm.opt) or command line.
timeformat "Timeformat" on page 421	Client options file (dsm.opt) or command line.
todate "Todate" on page 424	Command line, and in the GUI find function.
totime "Totime" on page 425	Command line, and in the GUI find function.

### *deltype*

Specifies the deletion type. Specify one of the following values:

#### **ACTIVE**

Delete only active file objects. Directory objects are not deleted. This is the default.

**Note:** If there are any inactive objects, then after the active object is deleted, the most current inactive object will be changed from inactive to active.

To delete all versions of a file, first issue the **delete backup** command with `-deltype=inactive`, then issue the command again with `-deltype=active`.

#### **INACTIVE**

Delete only inactive file objects. Directory objects are not deleted.

#### **ALL**

Delete all active and inactive objects below a given directory, including all subdirectories and their files.

**Note:** The parent directory of the deleted files and subdirectories is not deleted.

### *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. Separate file specifications with a space. 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.

**Note:** If you indicate *filespace*, do not include a drive letter in the file specification.

When using `-deltype=inactive` or `-deltype=active`, use wildcard characters to specify a group of files or all files in a directory.

When using `-deltype=all`, specify a fully-wildcarded directory.

#### *objtype*

Specifies the type of backup delete you want to perform. You can specify either of the following values:

#### **FILE**

Specifies that you want to delete directories and files. This is the default.

#### **IMAGE**

Specifies that you want to delete an image backup. Specifies that you want to delete an image backup. `Objtype=image` is not supported on z/OS or Mac OS X.

## **Examples**

**Task** Delete all active and inactive file objects named budget in directory `/data/plan/proj1`.

#### **Commands:**

```
delete backup /data/plan/proj1/budget.jan
  -deltype=inactive
delete backup /data/plan/proj1/budget.jan
  -deltype=active
```

**Task** Delete all inactive files with names ending in `.txt` backed up from the `/data/plan/proj1` directory and its subdirectories.

**Command:** `delete backup "/data/plan/proj1/*.txt" -deltype=inactive -subdir=yes`

**Task** Delete selected active files backed up from the `/home/marymb/project` directory. Use the `-pick` option to display a list of backup copies that match the file specification. From the list, you can select which versions to delete.

**Command:** `delete backup "/home/marymb/project/*" -pick`

**Task** Delete all active and inactive versions of files and subdirectories in the `/home/storman/myproject` directory. Then delete all active and inactive versions of the `/user/myproject` directory.

#### **Command:**

```
delete backup "/home/storman/myproject*"
  -deltype=all
```

## **Related information**

"Filelist" on page 316

## Delete Filespace

The **delete filesystem** command deletes file spaces in Tivoli Storage Manager server storage. A file space is a logical space on the server that contains files you backed up or archived.

This command is for an **Authorized User or System Administrator**.

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 filesystem** command, a list of your file spaces is displayed. From this list, select the file space that you want to delete.

Your Tivoli Storage Manager 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.

**Important:** 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*. Verify that the files are obsolete before you delete them.

You can use the **delete filesystem** command to interactively delete NAS file spaces from server storage. Use the `nasnodename` option to identify the NAS file server. Use the `class` option to specify the class of the file space to delete.

### Supported Clients

This command is valid for all clients.

### Syntax

►► Delete Filespace `[options]` ►►

### Parameters

*options*

Table 76. Delete Filespace command: Related options

Option	Where to use
<code>class</code> "Class" on page 277	Command line only.
<code>detail</code> "Detail" on page 290	Command line only.
<code>nasnodename</code> "Nasnodename" on page 352	Client system options file or command line.
<code>scrolllines</code> "Scrolllines" on page 390	Client system options file or command line.
<code>scrollprompt</code> "Scrollprompt" on page 391	Client system options file or command line.

### Examples

**Task** Delete a file space.

**Command:** delete filesystem

**Task** Delete NAS file spaces from the **dagordon** NAS file server stored on the server.

**Command:** delete filesystem -nasnodename=dagordon -class=nas

### Related information

“Nasnodename” on page 352

“Class” on page 277

---

## Delete Group

Use the **delete group** command to delete a group backup on the Tivoli Storage Manager server.

This command is for an **Authorized User**.

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 filesystem** 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 might be other groups in it. Use **delete filesystem** if you want to remove the file space and all the data it contains.

### Note:

1. Use the inactive option to display both active and inactive group backup versions. By default, Tivoli Storage Manager only displays active versions.
2. Use the pick option to select a specific group to delete from the Tivoli Storage Manager server.
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.
4. Use the **query filesystem** command to display virtual file space names for your node that are stored on the Tivoli Storage Manager server.

### Supported Clients

This command is valid for all UNIX and Linux clients, except for Mac OS X.

### Syntax

►► Delete GRoup — *filespec* — [ — *options* — ]

### Parameters

*filespec*

Specifies the virtual file space name and the group name that you want to delete from the server storage.

options

Table 77. Delete Group command: Related options

Option	Where to use
inactive "Inactive" on page 330	Command line only.
noprompt "Noprompt" on page 356	Command line only.
pick "Pick" on page 363	Command line only.
pitdate "Pitdate" on page 364	Command line only.
pittime "Pittime" on page 365	Command line only.

## Examples

**Task** Delete the current active version of the /virtfs/group1 group.

**Command:**

```
delete group /virtfs/group1
```

**Task** Delete a backup version of the /virtfs/group1 group from a list of active and inactive versions.

**Command:**

```
delete group /virtfs/group1 -inactive -pick
```

### Related information

"Inactive" on page 330

"Pick" on page 363

"Noprompt" on page 356

"Query Filespace" on page 485

---

## 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 be displayed on the command line, if you specify the proper query with a wildcard character for the directory.



**Note:** Because the **expire** command changes the server’s picture of the client file system without actually changing the client file system, the **expire** command is not allowed on files located on a file system monitored by the Tivoli Storage Manager journal daemon.

## Supported Clients

This command is valid for all clients.

## Syntax

```

▶▶—EXpire—┌──────────┐—filespec—▶▶
           └──options──┘
  
```

## Parameters

*options*

Table 78. *Expire* command: Related options

Option	Where to use
<i>dateformat</i> “Dateformat” on page 285	Client user options file (dsm.opt) or command line.
<i>filelist</i> “Filelist” on page 316	Command line only.
<i>noprompt</i> “Noprompt” on page 356	Command line only.
<i>numberformat</i> “Numberformat” on page 357	Client user options file (dsm.opt) or command line.
<i>pick</i> “Pick” on page 363	Command line only.
<i>timeformat</i> “Timeformat” on page 421	Client user options file (dsm.opt) or command line.

**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 "/home/letter1.txt"

**Task** Inactivate all files in the /admin/mydir directory.

**Command:** expire /admin/mydir/\*

**Task** Inactivate all files named in the /home/avi/filelist.txt file.

**Command:** expire -filelist=/home/avi/filelist.txt

# Help

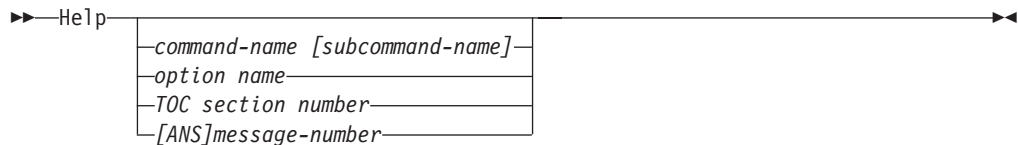
Use this command to display information about commands, options, and messages.

**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 clients.

## Syntax



Entering the **help** command with no arguments will cause help to display the complete table of contents. Either with the initial command or when HELP displays a prompt, you can enter the following parameters.

## Parameters

*command-name* [*subcommand-name*]

Specifies a command name and, optionally, a subcommand name or their abbreviation, for example: **backup image**, or **b i**. In this case the combination should be unique. Non-unique abbreviations result in the display of the first section of the entire help file matching the abbreviation. This parameter is optional.

*option name*

Specifies the name of an option, for example: *domain* or *do*. This parameter is optional.

*TOC section number*

Specifies a table of contents section number, for example: 1.5.3. This parameter is optional.

[*ANS*]*message-number*

Specifies a message number with or without its prefix, for example: ans1036 or 1036. This parameter is optional. The severity code is never necessary. Entering ans1036E will result in a not-found response.

**Note:** Entering arguments not fitting these descriptions can cause unexpected results (or no results) to be displayed. Entering more than two arguments will cause rejection of the help request. Where a command name and an option name are the same, for example: **incremental** (command) and *incremental* (option), you can only get help on the option by entering its table-of-contents section number.

The requested help text will be displayed in one or more sections, depending on the number of display lines available in your command window. When enough lines have been displayed to fill the display space, or when the end of the requested help text is displayed, you see with a prompt along with instructions for what can be entered at that prompt. To continue displaying text for your current

selection, press enter or type the 'd' key to scroll down. To scroll up in the current selection, press the 'u' key and hit enter. Other choices might be presented, so read the prompt instructions.

Proper display of the help text requires a usable display width of 72 characters. A display width less than 72 characters causes sentences that are 72 characters wide to wrap to the next line. This can cause the displayed help text to begin somewhere within the section rather than at the beginning. The undisplayed lines can be viewed by using the terminal's scrolling function to move up.

## Examples

**Task** Display the table of contents of the help topics.

**Command:** `dsmc help`

**Task** Display the information in help topic 2.1.2

**Command:** `dsmc help 2.1.2`

**Task** Display help information on the **archive** command.

**Command:** `dsmc help archive`

**Task** Display help information on message ANS1036.

**Command:** `dsmc help 1036`

**Command:** `dsmc help ANS1036`

---

## Incremental

The **incremental** command backs up all new or changed data in the locations that you specify, unless you exclude them from backup services.

You can back up all new or changed files or directories in the default client domain or from file systems, directories, or files.

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.

AIX only: You can enable snapshot-based incremental backup by using the option *snapshotproviderfs =JFS2* .

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. This management class attribute is ignored during a journal-based 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.

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.

If you are journaling a file system and the journal is valid, the full incremental backup performs a journal-based backup. More than one journal-based backup session can be started, but only one journal-based backup session can proceed. All other journal-based backup sessions that need access to the same filespace must wait until the current journal-based backup session has completed before the next session can proceed. You can perform a full incremental backup without the journal by using the *nojournal* option.

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.

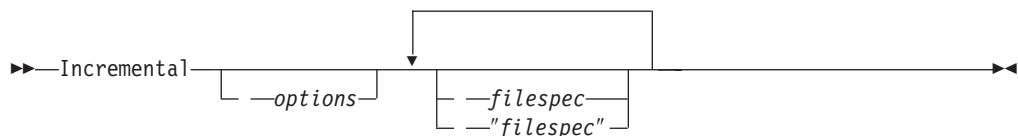
A full incremental backs up all files or directories that are new or have changed since the last incremental backup. During a full incremental backup, the client queries the server. Tivoli Storage Manager uses this information to:

- 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.

## Supported Clients

This command is valid for all clients.

## Syntax



## Parameters

### options

Table 79. Incremental command: Related options

Option	Where to use
<i>changingretries</i> “Changingretries” on page 276	dsm.sys file or command line.
<i>compressalways</i> “Compressalways” on page 282	Client user options file (dsm.opt) or command line.
<i>compression</i> “Compression” on page 283	dsm.sys file <i>within</i> a server stanza or command line.
<i>diffsnapshot</i> “Diffsnapshot” on page 291	Command line only.
<i>dirsonly</i> “Dirsonly” on page 293	Command line only.
<i>domain</i> “Domain” on page 296	dsm.sys file or the client user options file (dsm.opt) or command line only.
<i>encryptiontype</i> “Encryptiontype” on page 306	System options file (dsm.sys) within a server stanza.
<i>encryptkey</i> “Encryptkey” on page 307	System options file (dsm.sys) within a server stanza.
<i>filelist</i> “Filelist” on page 316	Command line only.
<i>filesonly</i> “Filesonly” on page 319	Command line only.
<i>incrbydate</i> “Incrbydate” on page 337	Command line only.
<i>memoryefficientbackup</i> “Memoryefficientbackup” on page 348	Client user options file (dsm.opt), client system options file (dsm.sys), server, or command line.
<i>nojournal</i> “Nojournal” on page 356	Command line only.
<i>preservelastaccessdate</i> “Preservelastaccessdate” on page 369	Client user options file (dsm.opt) or command line.
<i>removeoperandlimit</i> “Removeoperandlimit” on page 377	Command line only.
<i>snapdiff</i> “Snapdiff” on page 398	Command line only.
<i>snapshotproviderfs</i> “Snapshotproviderfs” on page 403	System options file (dsm.sys) within a server stanza or with <i>include.fs</i> option.
<i>snapshotroot</i> “Snapshotroot” on page 405	Command line only.
<i>subdir</i> “Subdir” on page 411	Client user options file (dsm.opt) or command line.
<i>tapeprompt</i> “Tapeprompt” on page 412	Client user options file (dsm.opt) or command line.

### 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.

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, all of the files in the fs/dir1 directory, and all files and subdirectories under /fs/dir1.  
**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
- Task** Run an incremental backup for the /home file system using the *snapdiff* option. Tell Tivoli Storage Manager to create the difference snapshot. Here /home is the NFS mount point for a NAS/N-Series Filer volume.  
**Command:** incremental /home -snapdiff -diffsnapshot=create
- Task** Run an incremental backup of the /proj file system using the *snapdiff* option. Tell Tivoli Storage Manager to use the latest snapshot on the Filer as the difference snapshot. Here /proj is the NFS mount point for a NAS/N-Series Filer volume.  
**Command:** incremental /proj -snapdiff -diffsnapshot=latest

## Related information

“Journal-based backup” on page 471

“Selective” on page 522

“Include options” on page 332

Chapter 10, “Using processing options,” on page 241 for adaptive subfile backups.

## Journal-based backup

Journal-based backup is supported on the AIX Backup-Archive client, on JFS, JFS2, and VxFS file systems. A backup for a particular file system is journal-based when the Tivoli Storage Manager journal daemon is installed and configured to journal the file system, and a valid journal has been established.

If the *journal daemon* is installed and running, then by default the **incremental** command will perform a journal-based backup on file systems which are being monitored by the journal engine daemon. The following conditions must be met in order to successfully perform a journal-based backup:

- The journal daemon must be set up to monitor the file system that contains the files and directories being backed up.
- A full incremental backup must have been run successfully at least once on the file system being backed up.
- The file space image of the file system at the server cannot have been modified by an administrative command since the last full incremental backup.
- The storage management policy for the files being backed up cannot have been updated since the last full incremental backup.

The *journal daemon* records changes to an object or its attributes in a journal database. During a journal-based backup, the client obtains a list of files that are eligible for backup from the journal database. Journal-based backup can increase backup performance because the client does not scan the local file system or contact the server to determine which files to process. Journal-based backup also reduces network traffic between the client and server.

Tivoli Storage Manager filters the list based on the current include-exclude list and processes, expires, and updates the resulting files according to policy constraints, such as serialization. However, the client ignores the server frequency attribute during a journal-based backup. The reason for this is because a journal-based backup eliminates the backup version query to the server; therefore, the client does not know how many days have transpired since the last backup of the file.

The journal daemon does not record changes in UNIX special files.

The journal daemon excludes specific system files from having changes recorded in the journal. Because changes to these files are not journaled, Tivoli Storage Manager does not back up these files. See the journal daemon configuration file `tsmjbbd.ini` located in the Tivoli Storage Manager installation directory for specific system files that are excluded.

### Note:

1. When using antivirus software, there are limitations to journal-based backup. Some antivirus software can incorrectly generate change notifications to the TSM journal service, causing files that have not changed to be incorrectly backed up during journal based backup. To avoid these problems, use Norton Anti-Virus Corporate Edition 8.0 and higher.
2. A journal-based backup might not fall back to the traditional incremental backup if the policy domain of your node is changed on the server. This depends on when the policy set within the domain was last updated and the date of the last incremental backup. In this case, you must force a full traditional incremental backup to rebind the files to the new domain. Use the *nojournal* option with the **incremental** command to specify that you want to perform a traditional full incremental backup, instead of the default

journal-based backup. Add an exclude snapshot statement to the `tsmjbbd.ini` file for AIX 6.1 or later to avoid JFS2 internal snapshot directories to be monitored by the journal-based backup daemon.

Under the following conditions, the journal database is considered invalid and the client reverts to the traditional full incremental backup:

- A journaled file space name has changed.
- The client node name has changed.
- The client contacts a different server to do the backup.
- Policy changes have occurred (new policy set activation).
- The journal is corrupt (out of space conditions, disk error).
- The journal is not running.

Journal-based backup differs from the traditional full incremental backup in the following ways:

- Tivoli Storage Manager does not enforce non-default copy frequencies (other than 0).
- Changes to UNIX special files are not detected.

You can use the *nojournal* option with the **incremental** command to perform a traditional full incremental backup instead of the default journal-based backup.

## 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) or Extended Attributes do not cause the files to be 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 for the following reasons:

- 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 might 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.

---

## 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 not 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 `dsm.sys` file. 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.*

**Note:**

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 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.

There are two methods for ending an interactive session:

- Enter quit
- If you set *editor=yes*, you can do the following:
  1. Press the Escape key (Esc).
  2. Type Q and press the Enter key.

**Note:** The default setting is *editor=yes*.

**Note:** To interrupt a **dsmc** command before Tivoli Storage Manager has finished processing, enter **QQ** on the Tivoli Storage Manager console. In many cases, but not all, this will interrupt the command.

## Related information

Chapter 10, “Using processing options,” on page 241 for options that you cannot use in interactive mode.

“Editor” on page 302

---

## 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 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

---

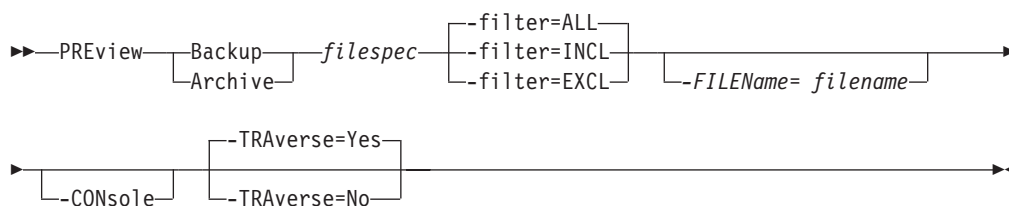
## Preview

The **preview** command simulates a backup or archive command without sending data to the server. The **preview** command generates a tab delimited text file that can be imported into a spreadsheet program. The preview contains information such as whether the file is excluded or included. If the file is excluded, the pattern, or reason, the file is excluded will be listed, along with the source for the pattern.

## Supported Clients

This command is valid for all clients.

## Syntax



## Parameters

### Backup|Archive

Indicates whether to preview output from a selective backup or archive operation.

### filespec

Specifies the path and file name that you want to back up. Use wildcard characters to select a group of files or all of the files in a directory.

**-filter** Specifies the output to display – included objects, excluded objects, or both.

**ALL** Display output for included and excluded objects. This is the default.

### INCLUDED

Display output for included objects only.

### EXCLUDED

Display output for excluded objects only.

### -FILEName=

Specifies the filename in which to write the tab-delineated output. The default is dsmprev.txt.

### -CONsole

Output is written to the console, and the file.

### -TRAverse

Preview the current directory and subdirectories.

**Yes** Preview the current directories and subdirectories. This is the default.

**No** Preview only the current directory, not subdirectories.

**Important:** Specifying **-traverse** does not preview directories excluded using the *exclude.dir* option.

---

## Query Access

The **query access** command shows who 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 following information is included.

- 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 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, and 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 clients.

## Syntax

► Query ARchive [ *options* ] [ *filespec* ] [ *"filespec"* ] ►

## Parameters

*options*

Table 80. Query Archive command: Related options

Option	Where to use
<i>dateformat</i> "Dateformat" on page 285	Client user options file (dsm.opt) or command line.
<i>description</i> "Description" on page 289	Command line only.
<i>detail</i> "Detail" on page 290	Command line only.
<i>dironly</i> "Dironly" on page 293	Command line only.
<i>filelist</i> "Filelist" on page 316	Command line only.
<i>filesonly</i> "Filesonly" on page 319	Command line only.
<i>fromdate</i> "Fromdate" on page 321	Command line only.
<i>fromnode</i> "Fromnode" on page 322	Command line only.
<i>fromowner</i> "Fromowner" on page 323	Command line only.
<i>fromtime</i> "Fromtime" on page 324	Command line only.
<i>numberformat</i> "Numberformat" on page 357	Client user options file (dsm.opt) or command line.
<i>querysummary</i> "Querysummary" on page 375	Command line only.
<i>scrolllines</i> "Scrolllines" on page 390	Client user options file (dsm.opt) or command line.
<i>scrollprompt</i> "Scrollprompt" on page 391	Client user options file (dsm.opt) or command line.
<i>subdir</i> "Subdir" on page 411	Client user options file (dsm.opt) or command line.
<i>timeformat</i> "Timeformat" on page 421	Client user options file (dsm.opt) or command line.
<i>todate</i> "Todate" on page 424	Command line only.
<i>totime</i> "Totime" on page 425	Command line only.

*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 that are stored on the Tivoli Storage Manager, or that are inside a backup set from the server when the *backupsetname* option is specified.

The command displays the following file information:

- File specification
- File size
- Backup date
- Whether the file is active or inactive
- The management class that is assigned to the file. Only the first ten characters of the management class name appear.

If you use the **detail** option with the **query backup** command, the client displays the following additional information:

- Last modification date
- Last access date

## Supported Clients

This command is valid for all clients.

## Syntax

► Query Backup —options— —filespec— ►

## Parameters

*options*

Table 81. Query Backup command: Related options

Option	Where to use
backupsetname "Backupsetname" on page 275	Command line only.
class "Class" on page 277	Command line only.
dateformat "Dateformat" on page 285	Client user options file (dsm.opt) or command line.
detail "Detail" on page 290	Command line only.
dironly "Dironly" on page 293	Command line only.
filelist "Filelist" on page 316	Command line only.
filesonly "Filesonly" on page 319	Command line only.
fromdate "Fromdate" on page 321	Command line only.
fromowner "Fromnode" on page 322	Command line only.
fromowner "Fromowner" on page 323	Command line only.
fromtime "Fromtime" on page 324	Command line only.
inactive "Inactive" on page 330	Command line only.
nasnodename "Nasnodename" on page 352	Client system options file (dsm.sys) or command line.
numberformat "Numberformat" on page 357	Client user options file (dsm.opt) or command line.
pitdate "Pitdate" on page 364	Command line only.
pittime "Pittime" on page 365	Command line only.
querysummary "Querysummary" on page 375	Command line only.
scrolllines "Scrolllines" on page 390	Client user options file (dsm.opt) or command line.



Table 81. Query Backup command: Related options (continued)

Option	Where to use
scrollprompt "Scrollprompt" on page 391	Client user options file (dsm.opt) or command line.
subdir "Subdir" on page 411	Client user options file (dsm.opt) or command line.
timeformat "Timeformat" on page 421	Client user options file (dsm.opt) or command line.
todate "Todate" on page 424	Command line only.
totime "Totime" on page 425	Command line only.

### *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 setting.

## 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`.

**Command:** `q b "/home/proj/proj*"`

**Task** Display a list of active and inactive backup file versions in the `/home` file system.

**Command:** `q b -ina -su=yes /home/`

**Task** Query file system images from the `nas2` NAS file server.

**Command:** `query backup -nasnodename=nas2 -class=nas`

### Related information

"Restoring data from a backupset" on page 172

## 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.

Where supported, 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.

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.

#### Related reference

“Class” on page 277

The *class* option specifies whether to display a list of NAS or client objects when using the **delete filesystem**, **query backup**, and **query filesystem** commands.

“Nasnodename” on page 352

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.

## Query Backupset

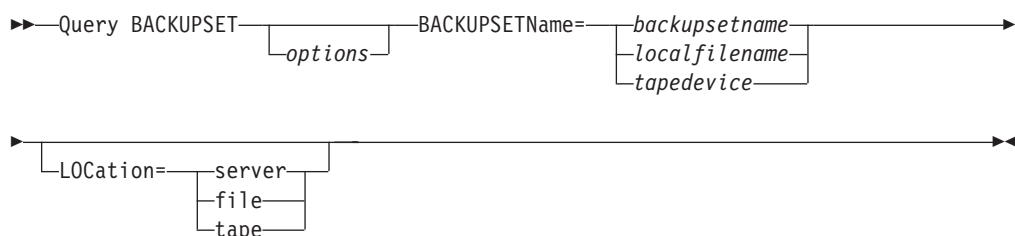
The **query backupset** command queries a backup set from a local file, tape device (if applicable) or the Tivoli Storage Manager server. This command displays the backup set name, generation date, retention (for a backup set on a Tivoli Storage Manager server), and user-supplied description.

### Supported Clients

This command is valid for all clients.

Tape support is only available on AIX, Solaris, and HP-UX.

### Syntax



### Parameters

*options*

Table 82. Query Backupset command: Related options

Option	Where to use
description “Description” on page 289	Command line only.
scrolllines “Scrolllines” on page 390	Client user options file (dsm.opt) or command line.
scrollprompt “Scrollprompt” on page 391	Client user options file (dsm.opt) or command line.

**BACKUPSETName=**

Specifies the name of a backup set you want to query. 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 are displayed. This parameter is required.

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.

The value of **backupsetname** depends on the location of the backup set, and corresponds to one of the three choices below.

**backupsetname**

Specifies the name of the backup set from the Tivoli Storage Manager server. If the **location** parameter is specified, you must set `-location=server`.

**localfilename**

Specifies the file name of the first backup set volume. You must set `-location=file`.

**tapedevice**

Specifies the name of the tape device containing the backup set volume. You must use a Windows native device driver, not the device driver provided by Tivoli. You must set `-location=tape`.

**LOCation=**

Specifies where Tivoli Storage Manager searches for the backup set. If you do not specify the location parameter, the client searches for backup sets on the Tivoli Storage Manager server.

**server** Specifies that Tivoli Storage Manager searches for the backup set from the server. This is the default.

**file** Specifies that Tivoli Storage Manager searches for the backup set from a local file.

**tape** Specifies that Tivoli Storage Manager searches for the backup set from a local tape device.

**Examples**

**Task** Query all backup sets from the Tivoli Storage Manager server.

**Command:** `query backupset -backupsetname=*`

**Task** Query a backup set called `monthly_financial_data` from the Tivoli Storage Manager server.

**Command:** `query backupset  
-backupsetname=monthly_financial_data.12345678`

**Task** Query the backup set in the file `/home/budget/weekly_budget_data.ost`.

**Command:** `dsmc query backupset -backupsetname="/home/budget/  
weekly_budget_data.ost" -loc=file`

**Task** Query the backup set from the `/dev/rmt0` tape device.

**Command:** `dsmc query backupset -backupsetname=/dev/rmt0 -loc=tape`

**Related information**

“Restoring data from a backupset” on page 172

## Query Backupset without the backupsetname parameter

The **query backupset** command can be used without the **backupsetname** parameter.

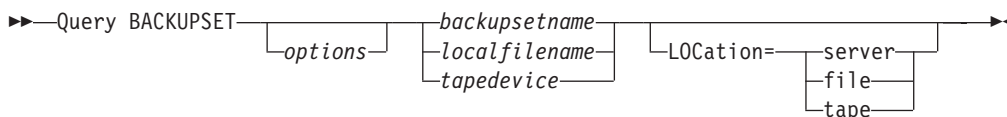
The preferred syntax for **query backupset** command requires the **backupsetname** parameter. Prior to the introduction of the **backupsetname** parameter, the Tivoli Storage Manager client queried backup sets with a different syntax.

While you can use syntax from previous releases for this command, do not do so unless you have a specific need and cannot replace the old syntax with the syntax in Tivoli Storage Manager Version 6.1. For best results, use the **backupsetname** parameter.

### Supported Clients

This command is valid for all clients. Tape support is only available on AIX, Solaris, and HP-UX.

### Syntax



### Parameters

*options*

Table 83. Query Backupset command: Related options

Option	Where to use
description “Description” on page 289	Command line only.
scrolllines “Scrolllines” on page 390	Client user options file (dsm.opt) or command line.
scrollprompt “Scrollprompt” on page 391	Client user options file (dsm.opt) or command line.

#### **backupsetname**

Specifies the name of the backup set from the Tivoli Storage Manager server. If the **location** parameter is specified, you must set **-location=server**.

#### **localfilename**

Specifies the file name of the first backup set volume. You must set **-location=file**.

#### **tapedevice**

Specifies the name of the tape device containing the backup set volume. You must use a Windows native device driver, not the device driver provided by Tivoli. You must set **-location=tape**.

### *LOCation=*

Specifies where Tivoli Storage Manager searches for the backup set. If you do not specify the location parameter, the client searches for backup sets on the Tivoli Storage Manager server.

**server** Specifies that Tivoli Storage Manager searches for the backup set from the server. This is the default.

**file** Specifies that Tivoli Storage Manager searches for the backup set from a local file.

**tape** Specifies that Tivoli Storage Manager searches for the backup set from a local tape device.

## Examples

**Task** Query all backup sets from the Tivoli Storage Manager server.

**Command:** `query backupset`

**Task** Query a backup set called `monthly_financial_data` from the Tivoli Storage Manager server.

**Command:** `query backupset monthly_financial_data.12345678`

**Task** Query the backup set in the file `/home/budget/weekly_budget_data.ost`.

**Command:** `dsmc query backupset /home/budget/weekly_budget_data.ost -loc=file`

**Task** Query the backup set from the `/dev/rmt0` tape device.

**Command:** `dsmc query backupset /dev/rmt0 -loc=tape`

## Related information

“Restoring data from a backupset” on page 172

---

## Query Filespace

The **query filesystem** command displays a list of file spaces for a node that are stored on the Tivoli Storage Manager server, or that are inside a backup set from the Tivoli Storage Manager server, when the `backupsetname` option is specified. 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 node at your workstation from which you back up or archive files.

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.

## Supported Clients

This command is valid for all clients.

## Syntax

►► Query Filespace \_filespace\_name\_ \_options\_ ►►

## Parameters

### *filespace\_name*

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 84. Query Filespace command: Related options

Option	Where to use
backupsetname "Backupsetname" on page 275	Command line only.
class "Class" on page 277	Command line only.
dateformat "Dateformat" on page 285	Client user options file (dsm.opt) or command line.
detail "Detail" on page 290	Command line only.
fromnode "Fromnode" on page 322	Command line only.
fromowner "Fromowner" on page 323	Command line only.
nasnodename "Nasnodename" on page 352	Client system options file (dsm.sys) or command line.
scrolllines "Scrolllines" on page 390	Client user options file (dsm.opt) or command line.
scrollprompt "Scrollprompt" on page 391	Client user options file (dsm.opt) or command line.
timeformat "Timeformat" on page 421	Client user options file (dsm.opt) or command line.

## 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`

### Related information

“Restoring data from a backupset” on page 172

“Nasnodename” on page 352

“Class” on page 277

## 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.

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.

---

## Query Group

Use the **query group** command to display information about a group backup and its members.

You must be a root user to use the **query group** command.

### Note:

1. 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.
2. Use the **query filespace** command to display virtual file space names for your node that are stored on the Tivoli Storage Manager server.
3. 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:

```
tsm> q files
#      Last Incr Date      Type      File Space Name
---      -
1      01/01/2007 00:00:00  TSMVFS    NEETAVFS
2      01/01/2007 00:00:00  TSMVFS    /NEETAVFS
3      01/01/2007 00:00:00  NTFS      //rhyme/d$
tsm>
```

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:

```
tsm> q group {/neetavfs}/neetag
```

Size	Backup Date	Mgmt Class	A/I Group
345,737 B	06/05/2007 13:52:04	A123456789	A FULL /NEETA VFS /NEETAG

## Supported Clients

This option is valid for all clients, except for Mac OS X.

## Syntax

```
►► Query Group — filespec [ — options ] ◀◀
```

## Parameters

*options*

Table 85. Query Group command: Related options

Option	Where to use
<i>fromnode</i> "Fromnode" on page 322	Command line only.
<i>fromowner</i> "Fromowner" on page 323	Command line only.
<i>inactive</i> "Inactive" on page 330	Command line only.
<i>pitdate</i> "Pitdate" on page 364	Command line only.
<i>pittime</i> "Pittime" on page 365	Command line only.
<i>showmembers</i> "Showmembers" on page 396 (does not apply to Mac OS X)	Command line only.

*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 /virtfs file space.

**Command:**

```
query group /virtfs/*
```

**Task** Display active and inactive versions of the /virtfs/group1 file space.

**Command:**

```
query group /virtfs/group1 -inactive
```



**Task** Display the /virtfs/group1 file space. Use the *showmembers* option to display a list of group members from which you can select one or more to query.

**Command:**

```
query backup /virtfs/group1 -showmembers
```

**Related information**

“Query Filespace” on page 485

## Query Image

The **query image** command displays information about file system images that are stored on the Tivoli Storage Manager server, or that are inside a backup set from the Tivoli Storage Manager server, when the backupsetname option is specified.

The following information about file system images is displayed:

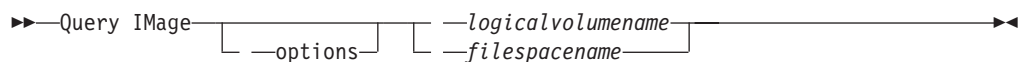
- Image Size - This is the volume size which was backed up.
- Stored Size - This is the actual image size stored on the server. The stored image on the Tivoli Storage Manager server is the same size as the volume capacity. For online snapshot-based image backups, the stored image can be larger than the file system based on the size of the cache files. 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



### Parameters

*options*

Table 86. Query Image command: Related options

Option	Where to use
backupsetname “Backupsetname” on page 275	Command line only.
dateformat “Dateformat” on page 285	Client user option file (dsm.opt) or command line.

Table 86. Query Image command: Related options (continued)

Option	Where to use
fromnode "Fromnode" on page 322	Command line only.
fromowner "Fromowner" on page 323	Command line only.
inactive "Inactive" on page 330	Command line only.
numberformat "Numberformat" on page 357	Client user option file (dsm.opt) or command line.
pitdate "Pitdate" on page 364	Command line only.
pittime "Pittime" on page 365	Command line only.
scrolllines "Scrolllines" on page 390	Client user options file (dsm.opt) or command line.
scrollprompt "Scrollprompt" on page 391	Client user options file (dsm.opt) or command line.
timeformat "Timeformat" on page 421	Client user option file (dsm.opt) or command line.

*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).

*filespace*

Specifies the file system name that you want to query.

Omitting *logicalvolumename* and *filespace* causes all images to be displayed.

## 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

**Task** Display all images that are contained within the backup set weekly\_backup\_data.32145678.

**Command:** query image -backupsetname=weekly\_backup\_data.32145678

## Related information

"Restoring data from a backupset" on page 172

---

## 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 want to use in your include-exclude list before you actually insert them in your options file. See the *test pattern* explanation below.

Use the detail option to display the management class associated with an include-exclude statement.

### Supported Clients

This command is valid for all clients.

### Syntax

```
►► Query INCLexcl — [test pattern] — [-DETail] —►►
```

### Parameters

#### *test pattern*

Use for testing the validity of patterns you want 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.

#### *-DETail*

Display the management class associated with the include-exclude statement.

### Examples

**Task** Display a list of include-exclude statements.

**Command:** query inclexcl

**Task** Display a list of include-exclude statements. Display the management class associated with each statement.

**Command:** query inclexcl -detail

**Task** Test the validity of this pattern: `/.../?x?/*.log`

**Command:** query inclexcl `/.../?x?/*.log`

**Note:** Some system files are excluded explicitly by Tivoli Storage Manager. You can use the **query inclexcl** command to display a list of these files.

---

## 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 clients.

### Syntax

```
▶▶ Query Mgmtclass [—options—] ▶▶
```

### Parameters

*options*

Table 87. Query Mgmtclass command: Related options

Option	Where to use
<i>detail</i> "Detail" on page 290	Command line only.
<i>fromnode</i> "Fromnode" on page 322	Command line only.

### 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 the 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. The following are the valid values.

- nas
- client
- server
- any

The default is *any*.

## Supported Clients

This command is valid for all clients.

## Syntax

►► Query Node —options— ►►

## Parameters

*options*

Table 88. Query Node command: Related options

Option	Where to use
<i>type</i> “Type” on page 427	Command line only.
<i>scrolllines</i> “Scrolllines” on page 390	Client user options file (dsm.opt) or command line.
<i>scrollprompt</i> “Scrollprompt” on page 391	Client user options file (dsm.opt) or command line.

## Examples

**Task** Display all NAS nodes.

**Command:** query node -type=nas

**Task** Display all client nodes that are backup-archive clients.

**Command:** query node -type=client

## Related information

“Type” on page 427

---

## Query Options

Use the **query options** command to display all or part of your options and their current settings relevant to the command-line client.

## Supported Clients

This command is valid for all clients.

## Syntax

►► Query Options —options— —pattern—►►

## 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 89. Query Options command: Related options

Option	Where to use
<i>scrolllines</i> “Scrolllines” on page 390	Client user options file (dsm.opt) or command line.
<i>scrollprompt</i> “Scrollprompt” on page 391	Client user options file (dsm.opt) or command line.

## 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 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.

The enhanced **query schedule** command on a Tivoli Storage Manager Version 5.3 and above client reports new parameters. The **query schedule** command prior to Tivoli Storage Manager Version 5.3 is referred to as classic. Refer to the Administrator's Guide and Administrator's Reference for your operating system for more information on the classic and enhanced commands.

## Supported Clients

This command is valid for all 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 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:

TSM 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.....: "No"
Delete Archive Files.....: "Yes"
```

```
Node Name.....: EPSILON3
User Name.....: thompson
```

**Task**

A sample **query session** display with LAN-free enabled follows:

TSM Server Connection Information

```
Server Name.....: SERVER1
Server Type.....: Windows
Server Version.....: Ver. 5, Rel. 3, Lev. 0.0
Last Access Date.....: 07/02/2004 12:45:02
Delete Backup Files.....: "Yes"
Delete Archive Files.....: "Yes"
```

```
Node Name.....: GOETHE
User Name.....:
```

```
Storage Agent Name.....: AVI_STA
Storage Agent Type.....: Windows
Storage Agent Version...: Ver. 5, Rel. 2, Lev. 3.
```

---

## Query Systeminfo

Use the **query systeminfo** command to gather information and output this information to a file or the console.

You can gather information on 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.
- ENCRYPT - Available encryption methods.

**Note:**

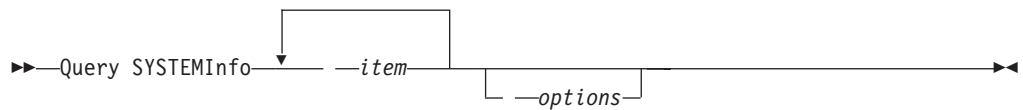
1. Use the *filename* option to specify a file name in which to store the information gathered from the items you specify. If you do not specify a file name, by default the information is stored in the /Library/Application Support/tivoli/tsm/client/ba/bin/dsminfo.txt file (for Mac OS X) or the dsminfo.txt file (for other UNIX and Linux).
2. Use the *console* option if you want to output the information to the console.

**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 might 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 can 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 clients.

### Syntax



### 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 90. Query Systeminfo command: Related options

Option	Where to use
<i>console</i> "Console" on page 284	Command line only.
<i>filename</i> "Filename" on page 318	Command line only.

### 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 dsmpoptfile errorlog  
-filename=tsminfo.txt

### Related information

“Filename” on page 318

“Console” on page 284

---

## 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 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, or inside a backup set. 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.

### Note:

1. On UNIX and Linux 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.
2. When restoring a directory, its modification date and time is set to the date and time of the restore, not to the date and time the directory had when it was backed up. This is because Tivoli Storage Manager restores the directories first, then adds the files to the directories.

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 "/Users/user1/file?.c" -sub=yes
```

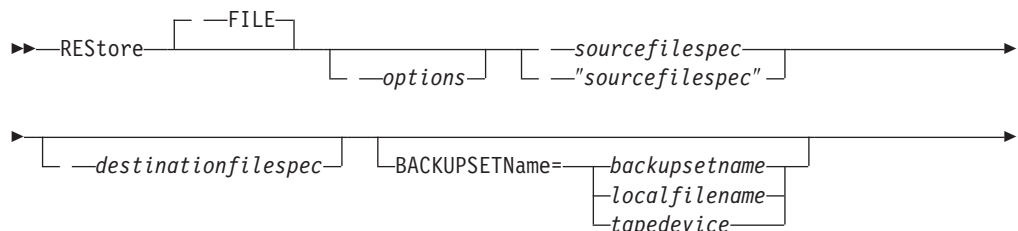
Use the **query restore** command to display a list of your restartable restore sessions in the server database. Further backups of the file system cannot be performed unless the restartable restore completes using the **restart restore** command or is cancelled using the **cancel restore** command.

```
dsmc rest "/Users/user1/file?.c" -sub=yes
```

## Supported Clients

This command is valid for all clients.

## Syntax





## 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 91. Restore command: Related options

Option	Where to use
dateformat "Dateformat" on page 285	Client user options file (dsm.opt) or command line.
dirsonly "Dirsonly" on page 293	Command line only.
filelist "Filelist" on page 316	Command line only.
filesonly "Filesonly" on page 319	Command line only.
followsymbolic "Followsymbolic" on page 320	Client user options file (dsm.opt) or command line.
fromdate "Fromdate" on page 321	Command line only.
fromnode "Fromnode" on page 322	Command line only.
fromowner "Fromowner" on page 323	Command line only.
fromtime "Fromtime" on page 324	Command line only.
ifnewer "Ifnewer" on page 327	Command line only.
inactive "Inactive" on page 330	Command line only.
latest "Latest" on page 343	Command line only.
numberformat "Numberformat" on page 357	Client user options file (dsm.opt) or command line.
pick <b>Note:</b> If you specify the <b>backupsetname</b> parameter with the <b>restore</b> command, you cannot use the pick option. "Pick" on page 363	Command line only.

Table 91. Restore command: Related options (continued)

Option	Where to use
pitdate "Pitdate" on page 364	Command line only.
pittime "Pittime" on page 365	Command line only.
preservepath "Preservepath" on page 371	Command line only.
replace "Replace" on page 378	Client user options file (dsm.opt) or command line.
subdir "Subdir" on page 411	Client user options file (dsm.opt) or command line.
tapeprompt "Tapeprompt" on page 412	Client user options file (dsm.opt) or command line.
timeformat "Timeformat" on page 421	Client user options file (dsm.opt) or command line.
todate "Todate" on page 424	Command line only.
totime "Totime" on page 425	Command line only.

*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.

*{filespace}*

Specifies the file space (enclosed in braces) on the server that contains the files you want to restore. This is the name on the workstation drive from which the files were backed up.

Specify the file space name if the drive label name has changed or if you are restoring files backed up from another node with drive labels that are different from yours.

*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.

- If the *sourcefilespec* names a single file, the *destinationfilespec* can be a file or a directory. 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.
- If the *sourcefilespec* is wildcarded or *subdir=yes* is specified, the *destinationfilespec* must be a directory and end with a directory delimiter (\).

**Note:** If the destination path or any part of it does not exist, Tivoli Storage Manager will create it.

**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. In this case, you can specify a different destination and retry the command.

**BACKUPSETName=**

Specifies the name of a backup set. This parameter is optional. If you specify **backupsetname** parameter with the **restore** command, you cannot use **pick** option.

The value of **backupsetname** depends on the location of the backup set, and corresponds to one of the three choices below.

**backupsetname**

Specifies the name of the backup set from the Tivoli Storage Manager server. If the **location** parameter is specified, you must set **-location=server**. If the backup set resides in Tivoli Storage Manager server storage, the backup set must have a TOC.

**localfilename**

Specifies the file name of the first backup set volume. You must set **-location=file**.

**tapedevice**

Specifies the name of the tape device containing the backup set volume. You must use a Windows native device driver, not the device driver provided by Tivoli. You must set **-location=tape**.

**LOCation=**

Specifies where Tivoli Storage Manager searches for the backup set. If you do not specify the location parameter, the client searches for backup sets on the Tivoli Storage Manager server.

**server** Specifies that Tivoli Storage Manager searches for the backup set from the server. This is the default.

**file** Specifies that Tivoli Storage Manager searches for the backup set from a local file.

**tape** Specifies that Tivoli Storage Manager searches for the backup set from a local tape device.

**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.

**Command:** res /home/myid/\*

**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 a single file named budget.fin contained within the backup set daily\_backup\_data.12345678.

**Command:** restore c:\projecta\budget.fin  
-backupsetname=daily\_backup\_data.12345678 -location=server

### Related information

“Restoring data from a backupset” on page 172

“Preservepath” on page 371

“File system and ACL support” on page 112

## Restoring from file spaces that are not Unicode-enabled

If you want to restore from file spaces that are not Unicode-enabled, you must specify the source on the server and a destination on the client, prior to installing the Unicode-enabled client.

**Note:** This Unicode section applies only to Mac OS X.

For example, assume that Jaguar is the name of your startup disk and you back up all of the .log files in the /Users/user5/Documents directory. Before the backup takes place, the server renames the file space to Jaguar\_0LD. The backup places the data specified in the current operation into the Unicode-enabled file space named /. The new Unicode-enabled file space now contains only the /Users/user5/Documents directory and the \*.log files specified in the operation.

If you want to restore a file from the *renamed* (old) file space to its original location, you must enter both the source and destination as follows:

```
restore Jaguar_0LD/Users/user5/Documents  
/mylog.log /Users/user5/Documents/
```

---

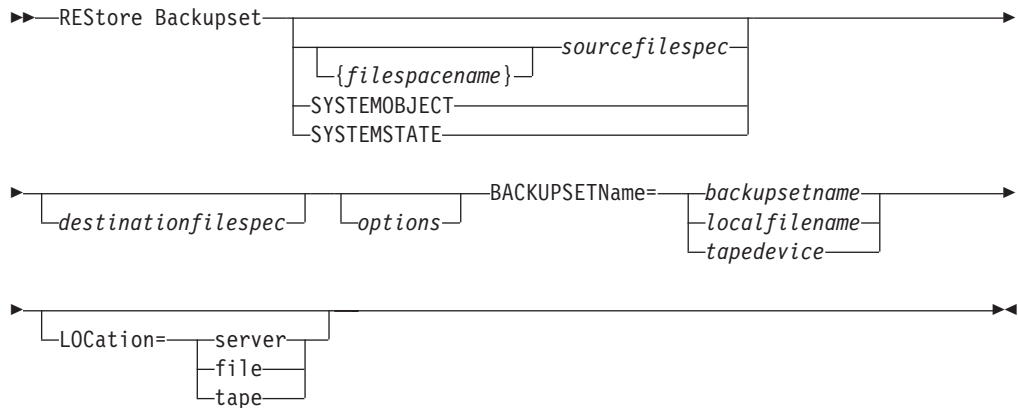
## Restore Backupset

The **restore backupset** command restores a backup set from the Tivoli Storage Manager server, a local file, or a local tape device. You can restore the entire backup set, or, in some cases, specific files within the backup set.

### Supported Clients

This command is valid for all clients.

## Syntax



## Parameters

*options*

Table 92. Restore Backupset command: Related options

Option	Where to use
dironly "Dironly" on page 293	Command line only.
filesonly "Filesonly" on page 319	Command line only.
ifnewer "Ifnewer" on page 327	Command line only.
preservepath "Preservepath" on page 371	Command line only.
quiet "Quiet" on page 376	Client user options file (dsm.opt) or command line.
replace "Replace" on page 378	Client user options file (dsm.opt) or command line.
subdir "Subdir" on page 411	Client user options file (dsm.opt) or command line.

*{filespace name}*

Specifies the file space (enclosed in braces) on the server that contains the files you want to restore. This is the name on the workstation drive from which the files were backed up, or the virtual file space name for a group.

Specify a file space name when you restore a backup set containing a group.

Specify a file space name when the **sourcefilespec** does not exist on the target computer. This can occur if the drive label name has changed or if you are restoring files backed up from another node with drive labels that are different from yours.

*sourcefilespec*

Specifies the source path of a portion of the backup set. The default is to restore the entire backup set.

**SYSTEMOBJECT**

Specifies that you want to restore all system objects from the backup set. You



cannot restore individual system objects from the backup set. This parameter is for the Windows 2003 and Windows XP clients only. To restore individual system objects from a backup set, use the **restore systemobject** command.

#### **SYSTEMSTATE**

Specifies that you want to restore the entire backup of the system state from the backup set. You cannot restore individual system state components from the backup set. This parameter is valid only for systems that support system state. To restore individual system state components from a backup set, use the **restore systemstate** command.

#### *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 file 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 destination file specification with a file name if you want to give the restored file a new name. When the **sourcefilespec** does not exist on the target machine, you must specify **destinationfilespec**.

#### **BACKUPSETName=**

Specifies the name of the backup set from which to perform a restore operation. You cannot use wildcard characters to specify the backup set name. The value of backupsetname depends on the location of the backup set, and corresponds to one of the three choices below.

#### **backupsetname**

Specifies the name of the backup set on the server from which to perform a restore operation. If **location** option is specified, you must set **-location=server**.

#### **localfilename**

Specifies the file name of the first backup set volume. You must set **-location=file**.

#### **tapedevice**

Specifies the name of the tape device containing the backup set volume. You must use a Windows native device driver, not the device driver provided by Tivoli. You must set **-location=tape**.

#### **LOCation=**

Specifies the location of the backup set. If you do not specify the location parameter, the Tivoli Storage Manager client searches for backup sets on the Tivoli Storage Manager server. If you specify the location parameter, the value must be one of the three choices below.

**server** Specifies that the backup set is on the Tivoli Storage Manager server. This is the default.

**file** Specifies that the backup set is on an available file system.

**tape** Specifies that the backup set is on an available tape device.

### **Examples**

**Task** Restore the entire backup set called `monthly_financial_data.87654321` from the server.

- Command:** dsmc restore backupset  
-backupsetname=monthly\_financial\_data.87654321 -loc=server
- Task** Restore the entire backup set contained in the file: /home/budget/weekly\_budget\_data.ost.
- Command:** dsmc restore backupset -backupsetname="/home/budget/weekly\_budget\_data.ost" -loc=file
- Task** Restore the entire backup set from the /dev/rmt0 device.
- Command:** dsmc restore backupset "-backupsetname=/dev/rmt0" -loc=tape
- Task** Restore a single file named /home/jones/budget.dev from the /dev/rmt0 tape device, to the original source path.
- Command:** dsmc restore backupset -backupsetname=/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 "/home/budget/\*.txt"  
-backupsetname=/dev/rmt0 -loc=tape
- Task** Restore the entire backup set contained in local file "/home/jones/bset01.file"
- Command:** dsmc restore backupset -backupsetname="/home/jones/bset01.file" -loc=file
- Task** Restore groups from the backup set mybackupset.12345678 on the Tivoli Storage Manager server to the /home/devel/projectb directory. The groups' virtual file space is accounting.
- Command:** dsmc restore backupset {/accounting}/\*  
/home/devel/projectb/ -backupsetname=mybackupset.12345678  
-loc=server -subdir=yes
- Task** Restore groups from the local backup set mybackupset.ost to the /home/devel/projectb/ directory. The groups' virtual file space is accounting.
- Command:** dsmc restore backupset {/accounting}/\*  
/home/devel/projectb/ -backupsetname=mybackupset.ost -loc=server  
-subdir=yes

#### Related information

"Restoring data from a backupset" on page 172

## Restoring backup sets: considerations and restrictions

There are some considerations and restrictions that you must be aware of when restoring backup sets.

### Considerations

Consider the following when restoring backup sets:

- If the object you want to restore was generated from a Tivoli Storage Manager node whose name is different from your current node, specify the original node name with the **filespace** parameter on any of the restore commands.
- 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 with the parameter `-location=tape` or `-location=file`, the client does not attempt to contact the Tivoli Storage Manager server.
- When restoring a group from a backup set:
  - The entire group, or all groups, in the virtual file space will be restored. You cannot restore a single group by specifying the group name, if there are several groups in the same virtual file space. You cannot restore a part of a group by specifying a file path.
  - Specify a group by using the following values:
    - Specify the virtual file space name with the **filespace** parameter.
    - Use the `subdir` option to include subdirectories.
- Limited support is provided for restoring backup sets from tape devices attached to the client system. A native device driver provided by the device manufacturer must always be used. The device driver provided by Tivoli to be used with the Tivoli Storage Manager server cannot be used on the client system for restoring local backup sets.
- If a backup set contains files from several owners, the backup set itself will be owned by the root user ID, and non-root user IDs cannot see the backup set. In this case, non-root user IDs can restore their files by obtaining the backup set name from the Tivoli Storage Manager administrator. Non-root users can restore only their own files.
- To enable the GUI client to restore a backup set from a local device, without requiring a server connection, use the `localbackupset` option.

## Restrictions

Be aware of the following restrictions when restoring backup sets:

- A backup set data that was backed up with the API cannot be restored or used.
- You cannot restore image data from a backup set using the **restore backupset** command. You can restore image data from a backup set only with the **restore image** command.
- You cannot restore image data from a local backup set (`location=tape` or `location=file`). You can restore image data from a backup set only from the Tivoli Storage Manager server.

## Related information

“Localbackupset” on page 343

“Restore” on page 498

“Restore Image” on page 513

“Restore Backupset” on page 503

## 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* option. Use the *location=server* option to restore the backup set directly from the server using the LAN.

## Restore Backupset without the backupsetname parameter

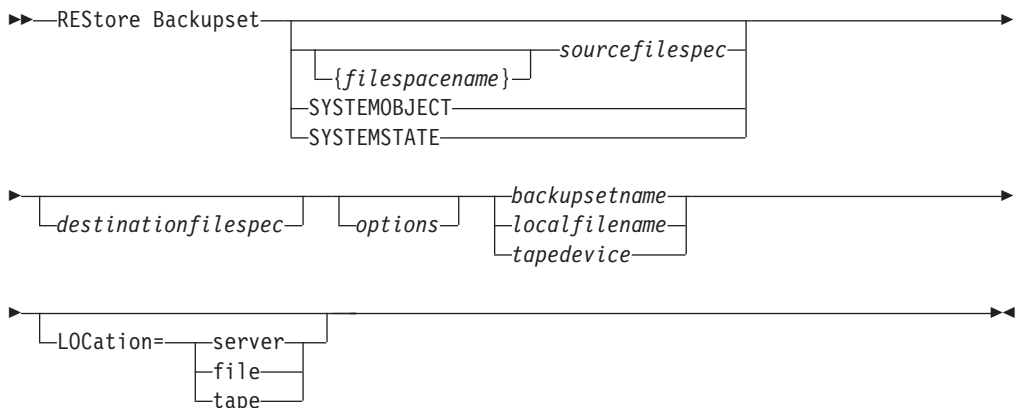
The **restore backupset** command can be used without the **backupsetname** parameter.

The preferred syntax for **restore backupset** command requires the **backupsetname** parameter. Prior to the introduction of the **backupsetname** parameter, the Tivoli Storage Manager client restored backup sets with a different syntax. The previous syntax is currently supported, but whenever possible, follow the syntax that requires the **backupsetname** parameter. The previous syntax is documented for those cases when it cannot be replaced by the preferred syntax.

### Supported Clients

This command is valid for all clients.

### Syntax



### Parameters

#### options

All options that are valid with the preferred syntax of **restore backupset** are valid with the legacy syntax of **restore backupset**.

*{filespace}*

Specifies the file space (enclosed in braces) on the server that contains the files you want to restore. This is the name on the workstation drive from which the files were backed up, or the virtual file space name for a group.

Specify a file space name when you restore a backup set containing a group.

Specify a file space name when the **sourcefilespec** does not exist on the target computer. This can occur if the drive label name has changed or if you are restoring files backed up from another node with drive labels that are different from yours.

*sourcefilespec*

Specifies the source path of a portion of the backup set. The default is to restore the entire backup set.

### **SYSTEMOBJECT**

Specifies that you want to restore all system objects from the backup set. You cannot restore individual system objects from the backup set. This parameter is for the Windows 2003 and Windows XP clients only. To restore individual system objects from a backup set, use the **restore systemobject** command.

### **SYSTEMSTATE**

Specifies that you want to restore the entire backup of the system state from the backup set. You cannot restore individual system state components from the backup set. This parameter is valid only for systems that support system state. To restore individual system state components from a backup set, use the **restore systemstate** command.

*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 file 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 destination file specification with a file name if you want to give the restored file a new name. When the **sourcefilespec** does not exist on the target machine, you must specify **destinationfilespec**.

### **backupsetname**

Specifies the name of the backup set from the Tivoli Storage Manager server. If the **location** parameter is specified, you must set **-location=server**.

### **localfilename**

Specifies the file name of the first backup set volume. You must set **-location=file**.

### **tapedevice**

Specifies the name of the tape device containing the backup set volume. You must use a Windows native device driver, not the device driver provided by Tivoli. You must set **-location=tape**.

### **LOCation=**

Specifies the location of the backup set. If you do not specify the location parameter, the Tivoli Storage Manager client searches for backup sets on the Tivoli Storage Manager server. If you specify the location parameter, the value must be one of the three choices below.

- server** Specifies that the backup set is on the Tivoli Storage Manager server. This is the default.
- file** Specifies that the backup set is on an available file system.
- tape** Specifies that the backup set is on an available tape device.

## Examples

- Task** Restore the entire backup set called `monthly_financial_data.87654321` from the server.  
**Command:** `dsmc restore backupset monthly_financial_data.87654321 -loc=server`
- Task** Restore the entire backup set contained in the file: `/home/budget/weekly_budget_data.ost`.  
**Command:** `dsmc restore backupset "/home/budget/weekly_budget_data.ost" -loc=file`
- Task** Restore the entire backup set from the `/dev/rmt0` device.  
**Command:** `dsmc restore backupset "/dev/rmt0" -loc=tape`
- Task** Restore a single file named `/home/jones/budget.dev` from the `/dev/rmt0` tape 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 entire backup set contained in local file `/home/jones/bset01.file`.  
**Command:** `dsmc restore backupset "/home/jones/bset01.file" -loc=file`
- Task** Restore groups from the backup set `mybackupset.12345678` on the Tivoli Storage Manager server to the `/home/devel/projectb` directory. The groups' virtual file space is `accounting`.  
**Command:** `dsmc restore backupset mybackupset.12345678 {/accounting}/* /home/devel/projectb/ -loc=server -subdir=yes`
- Task** Restore groups from the local backup set `mybackupset.ost` to the `/home/devel/projectb/` directory. The groups' virtual file space is `accounting`.  
**Command:** `dsmc restore backupset mybackupset.ost {/accounting}/* /home/devel/projectb/ -loc=server -subdir=yes`

## Related information

"Restoring data from a backupset" on page 172

---

## Restore Group

Use the **restore group** command to restore specific members or all members of a group backup.

You must be an authorized user or system administrator use the **restore group** command.

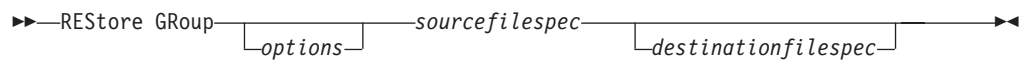
**Note:**

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.

**Supported Clients**

This command is valid for all clients, except Mac OS X.

**Syntax**



**Parameters**

*options*

Table 93. Restore Group command: Related options

Option	Where to use
<i>backupsetname</i> "Backupsetname" on page 275	Command line only.
<i>followsymbolic</i> "Followsymbolic" on page 320	Client user options file (dsm.opt) or command line.
<i>fromdate</i> "Fromdate" on page 321	Command line only.
<i>fromnode</i> "Fromnode" on page 322	Command line only.
<i>fromowner</i> "Fromowner" on page 323	Command line only.
<i>fromtime</i> "Fromtime" on page 324	Command line only.
<i>ifnewer</i> "Ifnewer" on page 327	Command line only.
<i>inactive</i> "Inactive" on page 330	Command line only.
<i>latest</i> "Latest" on page 343	Command line only.
<i>pick</i> "Pick" on page 363	Command line only.
<i>pitdate</i> "Pitdate" on page 364	Command line only.
<i>pittime</i> "Pittime" on page 365	Command line only.

Table 93. Restore Group command: Related options (continued)

Option	Where to use
<i>preservepath</i> "Preservepath" on page 371	Command line only.
<i>replace</i> "Replace" on page 378	Client user options file (dsm.opt) or command line.
<i>showmembers</i> "Showmembers" on page 396 (does not apply to Mac OS X)	Command line only.
<i>subdir</i> "Subdir" on page 411	Client user options file (dsm.opt) or command line.
<i>tapeprompt</i> "Tapeprompt" on page 412	Client user options file (dsm.opt) or command line.
<i>todate</i> "Todate" on page 424	Command line only.
<i>totime</i> "Totime" on page 425	Command line only.

*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 system.

**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
```

## Related information

"Restore Backupset" on page 503



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## Restore Image

The **restore image** command restores a file system or raw volume image that was backed up using the **backup image** command.

The restore obtains the backup image from a Tivoli Storage Manager server, or inside a backup set from the Tivoli Storage Manager server, when the `backupsetname` option is specified. This command can restore an active base image, or a point-in-time base image, with associated incremental updates.

### Note:

1. Using the incremental option with the **restore image** command to perform a dynamic image backup is not supported.
2. If you use HSM for Windows or HSM for UNIX, and you restore a file system image backup and plan to run reconciliation, you must restore the files that have been backed up after the image backup. Otherwise, migrated files that have been created after the image backup expire from the HSM archive storage on the Tivoli Storage Manager server.

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.

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 data copy utility of your choice to transfer the image from the file to a disk volume.

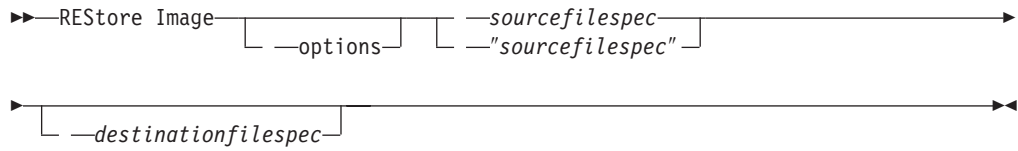
### Considerations:

- 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 Linux x86/x86\_64, Linux on POWER and Linux for zSeries.
- 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



## Parameters

### *options*

Table 94. Restore Image command: Related options

Option	Where to use
backupsetname "Backupsetname" on page 275	Command line only.
dateformat "Dateformat" on page 285	Client user option file (dsm.opt) or command line.
deletefiles "Deletefiles" on page 288	Command line only.
fromnode "Fromnode" on page 322	Command line only.
fromowner "Fromowner" on page 323	Command line only.
imagetofile "Imagetofile" on page 329	Command line only.
inactive "Inactive" on page 330	Command line only.
incremental "Incremental" on page 338	Command line only.
noprompt "Noprompt" on page 356	Command line only.
pick "Pick" on page 363	Command line only.
pitdate "Pitdate" on page 364	Command line only.
pittime "Pittime" on page 365	Command line only.
timeformat "Timeformat" on page 421	Client user option file (dsm.opt) or command line.
verifyimage "Verifyimage" on page 430	Command line only.

### *sourcefilespec*

Specifies the name of a source image file system to be restored. Only a single source image can 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`

## Related information

“Verifyimage” on page 430

“Imagetofile” on page 329

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## 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.

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.

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.

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 [ options ] sourcefilespec [ destinationfilespec ] ▶▶
```

## Parameters

*options*

Table 95. Restore NAS command: Related options

Option	Where to use
<i>dateformat</i> "Dateformat" on page 285	Client user option file (dsm.opt) or command line.
<i>inactive</i> "Inactive" on page 330	Command line only.
<i>mode</i> "Mode" on page 350	Command line only.
<i>monitor</i> "Monitor" on page 352	Command line only.
<i>nasnodename</i> "Nasnodename" on page 352	Client system options file (dsm.sys) or command line.

Table 95. Restore NAS command: Related options (continued)

Option	Where to use
<i>numberformat</i> "Numberformat" on page 357	Client user option file (dsm.opt) or command line.
<i>pick</i> "Pick" on page 363	Command line only.
<i>pitdate</i> "Pitdate" on page 364	Command line only.
<i>pittime</i> "Pittime" on page 365	Command line only.
<i>timeformat</i> "Timeformat" on page 421	Client user option file (dsm.opt) or command line.

#### *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

## Related information

"Nasnodename" on page 352

"Monitor" on page 352

"Cancel Process" on page 455

---

## 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.

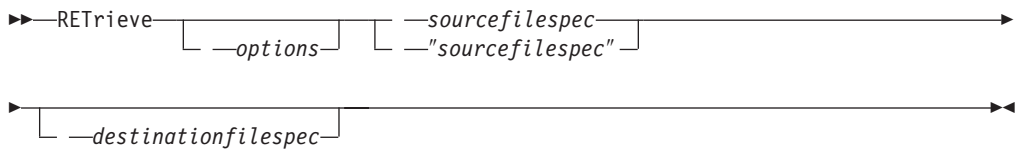
Retrieve the files to the same directory from which they were archived, or to a different directory. Tivoli Storage Manager uses the *preservepath* option with the *subtree* value as the default for restoring files.

**Note:** When retrieving a directory, its modification date and time is set to the date and time of the retrieval, not to the date and time the directory had when it was archived. This is because Tivoli Storage Manager retrieves the directories first, then adds the files to the directories.

## Supported Clients

This command is valid for all clients.

## Syntax



## Parameters

*options*

Table 96. Retrieve command: Related options

Option	Where to use
<i>dateformat</i> "Dateformat" on page 285	Client user options file (dsm.opt) or command line.
<i>description</i> "Description" on page 289	Command line only.
<i>dironly</i> "Dironly" on page 293	Command line only.
<i>filelist</i> "Filelist" on page 316	Command line only.
<i>filesonly</i> "Filesonly" on page 319	Command line only.
<i>followsymbolic</i> "Followsymbolic" on page 320	Client user options file (dsm.opt) or command line.
<i>fromdate</i> "Fromdate" on page 321	Command line only.
<i>fromnode</i> "Fromnode" on page 322	Command line only.
<i>fromowner</i> "Fromowner" on page 323	Command line only.
<i>fromtime</i> "Fromtime" on page 324	Command line only.
<i>ifnewer</i> "Ifnewer" on page 327	Command line only.
<i>pick</i> "Pick" on page 363	Command line only.

Table 96. Retrieve command: Related options (continued)

Option	Where to use
<i>preservepath</i> "Preservepath" on page 371	Command line only.
<i>replace</i> "Replace" on page 378	Client user options file (dsm.opt) or command line.
<i>subdir</i> "Subdir" on page 411	Client user options file (dsm.opt) or command line.
<i>tapeprompt</i> "Tapeprompt" on page 412	Client user options file (dsm.opt) or command line.
<i>timeformat</i> "Timeformat" on page 421	Client user options file (dsm.opt) or command line.
<i>todate</i> "Todate" on page 424	Command line only.
<i>totime</i> "Totime" on page 425	Command line only.

*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.

*destinationfilespec*

Specifies the path and file name where you want the files to reside. 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
```

**Task** Retrieve a file from the renamed file space Jaguar\_OLD to its original location. Enter both the source and destination as follows:

**Command:** `ret Jaguar_OLD/user5/Documents/myresume.doc /Users/user5/Documents/`

### Related information

"Client options reference" on page 265

## Retrieving from file spaces that are not Unicode-enabled

If you want to retrieve archives from file spaces that were renamed by the Unicode-enabled client, you must specify the source on the server and a destination on the client.

This section applies to Mac OS X only. For example, assume that Jaguar is the name of your startup disk and you archive all of the .log files in the /Users/user5/Documents directory. Before the archive takes place, the server renames the file space to Jaguar\_OLD. The archive places the data specified in the current operation into the Unicode-enabled file space named /. The new Unicode-enabled file space now contains only the Users/user5/Documents directory and the \*.log files specified in the operation.

If you want to retrieve a file from the *renamed* (old) file space to its original location, you must enter both the source and destination as follows:

```
retrieve Jaguar_OLD/Users/user5/Documents/mylog.log /Users/user5/Documents/
```

---

## Schedule

The **schedule** command starts the client scheduler on your workstation. The client scheduler must be running before scheduled work can start.

**Authorized User:** The **schedule** command starts the client scheduler on your workstation. The client scheduler must be running before scheduled work can start.

**Note:**

1. The **schedule** command cannot be used if the *managedservices* option is set to *schedule* (does not apply to Mac OS X).
2. For Mac OSX only, to use the **schedule** command, specify *managedservices none* in the dsm.sys file.



3. This command is valid only on the initial command line. It is not valid in interactive mode or in a macro file.

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.

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.

After you start the client scheduler, it continues to run and to start scheduled events until you press Ctrl+C, press the Q key twice, 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 clients.

## Syntax

```
►►—SCHedule [—options—]◄◄
```

## Parameters

*options*

Table 97. Schedule command: Related options

Option	Where to use
<i>maxcmdretries</i> "Maxcmdretries" on page 347	Client system options file (dsm.sys) or command line.
<i>password</i> "Password" on page 360	client user options file (dsm.opt)
<i>queryschedperiod</i> "Queryschedperiod" on page 374	Client system options file (dsm.sys) or command line.
<i>retryperiod</i> "Retryperiod" on page 381	Client system options file (dsm.sys) or command line.
<i>schedlogname</i> "Schedlogname" on page 386	Client system options file (dsm.sys) or command line.

Table 97. Schedule command: Related options (continued)

Option	Where to use
<i>schedmode</i> "Schedmode" on page 388	Client system options file (dsm.sys) or command line.
<i>sessioninitiation</i> "Sessioninitiation" on page 394	Client system options file (dsm.sys) or command line.
<i>tcpclientport</i> "Tcpclientport" on page 417	Client system options file (dsm.sys) or command line.

## Examples

**Task** Start the client scheduler.

**Command:** `dsmc sch -password=notell`

**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/bin/dsmc sched > /dev/null 2>&1 #TSM`

**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` will reside in the current working directory, except for Mac OS X. For Mac OS X, the `dsmsched.log` will reside in the `/Library/Logs/tivoli/tsm/` directory.

**Important:** To prevent log write failures and process termination in certain cases, set the `DSM_LOG` environment variable to name a directory where default permissions allow the required access.

### Related information

"Sessioninitiation" on page 394

---

## 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 backup unless you exclude them from backup, or they do not meet management class requirements for serialization.

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 might be backed up, even if the specific file that was targeted for backup is not found. For example the following command still backs up *dir1* and *dir2* even if the file *bogus.txt* does not exist.

```
selective /Users/user1/Documents/dir1/bogus.txt
selective "/dir1/dir2/bogus.txt"
```

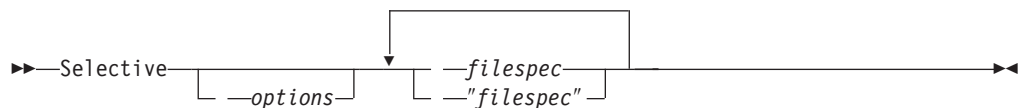
If the **selective** command is retried because of a communication failure or session loss, the transfer statistics will display the number of bytes Tivoli Storage Manager attempts to transfer during *all* command attempts. Therefore, the statistics for bytes transferred might not match the file statistics, such as those for file size.

You can use the *removeoperandlimit* option to specify that Tivoli Storage Manager removes the 20-operand limit. 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.

## Supported Clients

This command is valid for all clients.

## Syntax



## Parameters

*options*

Table 98. Selective command: Related options

Option	Where to use
<i>changingretries</i> "Changingretries" on page 276	Client system options file (dsm.sys) or command line.
<i>compressalways</i> "Compressalways" on page 282	Client user options file (dsm.opt) or command line.
<i>compression</i> "Compression" on page 283	Client user options file (dsm.opt) or command line.
<i>dirsonly</i> "Dirsonly" on page 293	Command line only.
<i>filelist</i> "Filelist" on page 316	Command line only.

Table 98. Selective command: Related options (continued)

Option	Where to use
<i>filesonly</i> "Filesonly" on page 319	Command line only.
<i>preservelastaccessdate</i> "Preservelastaccessdate" on page 369	Client user options file (dsm.opt) or command line.
<i>removeoperandlimit</i> "Removeoperandlimit" on page 377	Command line only.
<i>snapshotproviderfs</i> "Snapshotproviderfs" on page 403	System options file (dsm.sys) within a server stanza or with <i>include.fs</i> option.
<i>snapshotroot</i> "Snapshotroot" on page 405	Command line only.
<i>subdir</i> "Subdir" on page 411	Client user options file (dsm.opt) or command line.
<i>tapeprompt</i> "Tapeprompt" on page 412	Client user options file (dsm.opt) or command line.

### *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 proj file in the /home/devel directory.

**Command:** selective /home/devel/proj

**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 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

## Related information

## 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.

AIX only: You can perform a snapshot-based selective backup by specifying the option *snapshotproviderfs=JFS2*.

---

## Set Access

The **set access** command gives users at other nodes access to your backup versions or archived copies.

You can also use the **set access** command to give users at other nodes access to your 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.

When an existing file space is renamed during Unicode conversion, any access rules that are defined for the file space remain applicable to the original file space. However, new access rules must be defined to apply to the new Unicode file space.

## Supported Clients

This command is valid for all clients.

## Syntax

```
►► SET Access [ -Archive ] [ -Backup ] [ -filespec ] [ -image-fs ] [ -node ] [ -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 you 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/*/*`.

**Important:** 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 can 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. This parameter is applicable for UNIX clients only. NetWare and Windows clients can omit this parameter. If this parameter is specified on a NetWare or Windows client, it will be ignored.

## 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 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 Event

The **set event** command allows you to specify the circumstances for when archived data is deleted.

You can use the **set event** command to:

- Prevent the deletion of data at the end of its assigned retention period (Deletion hold)
- Allow the expiration to take place, as defined by the archive copy group (Release a deletion hold)
- Start the expiration clock running when a particular event occurs (Notify the server that an event has occurred)

Objects affected can be specified with a standard Tivoli Storage Manager filespec (including wildcards), a list of files whose names are in the file specified using the *filelist* option, or a group of archived files with the description specified with the *description* option.

**Note:** When only a <filespec> is used, *all* archived copies of files or folders matching the filespec are affected. If you only want to affect certain versions of a file, use the *-pick* option and select from the displayed list.

### Interaction with down-level servers:

If the **set event** command is issued when the client is connected to a server that does not support event-based policy (previous to Tivoli Storage Manager 5.2.2), the command will be rejected with an error message indicating that the current server does not support event-based policy.

## Supported Clients

This command is valid for all clients.

## Syntax

►► SET Event --TYPE= Hold | Release | Activateretention --<filespec>

► `--filelist=<filespec> --description=--pick` ◀

## Parameters

*TYPE=*

Specifies the event type setting. This parameter must be specified.

*hold*

Prevents the object from being deleted regardless of expiration policy.

*release*

Allows normal event-controlled expiration to take place.

*activate*

Signals the server that the controlling event has occurred and starts the expiration clock running.

*-pick*

Provides a list of objects from which the user can select to apply the event.

The following options can also be used and serve their usual purpose:

- *Dateformat*
- *Numberformat*
- *Noprompt*
- *Subdir*
- *Timeformat*

## Examples

**Task** The following example displays the verbose and statistics output from the **set event** command `set event type=hold /home/accounting/ledgers/*05.books`, with objects rebound (as opposed to archived or some other notation).

```
Rebinding--> 274 /home/accounting/ledgers/
  jan05.books
Rebinding--> 290 /home/accounting/ledgers/
  feb05.books

Total number of objects archived:      0
Total number of objects failed:       0
Total number of objects rebound:     2
Total number of bytes transferred:    0 B
Data transfer time:                   0.00 sec
Network data transfer rate:           0.00 KB/sec
Aggregate data transfer rate:         0.00 KB/sec
Objects compressed by:                0%
Elapsed processing time:               00:00:02
```

**Task** The `-pick` option used with the `set event` command `set event type=activate /user/tsm521/common/unix` will show the event type instead of the command name:

```
TSM Scrollable PICK Window - Retention Event : ACTIVATE

#   Archive Date/Time      File Size  File
-----
1. | 08/05/2003 08:47:46    766 B    /user/tsm521
   |                               /common/unix
2. | 08/01/2003 10:38:11    766 B    /user/tsm521
```



3.		08/05/2003 08:47:46	5.79 KB	/common/unix /user/tsm521
4.		08/01/2003 10:38:11	5.79 KB	/common/unix /user/tsm521
5.		08/05/2003 08:47:46	10.18 KB	/common/unix /user/tsm521 /common/unix

### Related information

“Dateformat” on page 285

“Numberformat” on page 357

“Noprompt” on page 356

“Subdir” on page 411

“Timeformat” on page 421

---

## Set Password

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.

You must be an authorized user or system administrator to use this command.

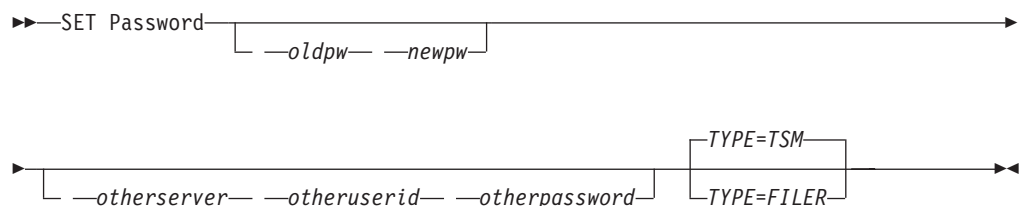
A password is *not* case-sensitive, and it can be as many as 63 characters. Valid characters are:

- 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 clients.

### Syntax



## Parameters

*oldpw*

Specifies the current password for your workstation.

*newpw*

Specifies the new password for your workstation.

*TYPE*

Specifies whether this password is for the Tivoli Storage Manager client or file server. Use *TYPE=TSM* to specify the Tivoli Storage Manager password for your client. *TYPE=FILER* (valid for AIX only) to specify that this password is for snapshot difference operations on a file server. The default is *TSM*.

For *TYPE=FILER* you must specify the file server name, the user ID, and the password. For example: `dsmc set password -type=filer myfiler filerid filerpasswd.`

If you are using the **dsmc** command in batch mode, and your password contains any special characters (for example, pa\$word), you must enclose the password in single quotation marks to avoid truncation (for example, pa):

```
dsmc
set password -type=filer myfiler "pa$word"
```

*otherserver*

Specifies the file server host name if you specify *TYPE=FILER*. The file server host name must be the fully qualified DNS name and cannot be the IP address in dotted-decimal format or the short local-host name. This parameter only applies if you specify *TYPE=FILER*.

*otheruserid*

Specifies the user ID to be used for the entity named by the *otherserver* parameter. This parameter only applies if you specify *TYPE=FILER*.

*otherpassword*

Specifies the password to be used for the entity named by the *otherserver* parameter. This parameter only applies if you specify *TYPE=FILER*.

When you specify *TYPE=FILER* (valid for AIX only), the password is stored in the TSM.PWD file without validating that the password is valid. Passwords that are stored with *TYPE=FILER* can be shared between Tivoli Storage Manager nodes. For example, a password stored by NODEA can be used by NODEB. Only one set of credentials is stored per file server.

## Examples

The following examples use the **set password** command.

**Task** Change your password from osecret to nsecret.

**Command:** `set password osecret nsecret`

**Task** Set up a user ID and password for the root user on the file server myFiler.example.com.

**Command:** `dsmc set password -type=filer myFiler.example.com root`

```
Please enter password for user id "root@myFiler.example.com":
***** Re-enter the password for verification:***** ANS0302I
Successfully done.
```

**Task** Set up a user ID and password for the root user on the file server myFiler.example.com.

**Command:** `dsmc set password -type=filer myFiler.example.com root secret`

**Related reference**

“Snapdiff” on page 398

The *snapdiff* option is for backing up NAS/N-Series file server volumes that are NFS or CIFS attached.



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## Appendix. Accessibility features for Tivoli Storage Manager

Accessibility features help a user who has a physical disability, such as restricted mobility or limited vision, to use software products successfully. The major accessibility features of Tivoli Storage Manager are described in this topic.

### Accessibility features

The following list includes the major accessibility features in Tivoli Storage Manager:

- Keyboard-only operation
- Interfaces that are commonly used by screen readers
- Keys that are discernible by touch but do not activate just by touching them
- Industry-standard devices for ports and connectors
- The attachment of alternative input and output devices
- User documentation provided in HTML and PDF format. Descriptive text is provided for all documentation images.

The Tivoli Storage Manager Information Center, and its related publications, are accessibility-enabled.

### Keyboard navigation

Tivoli Storage Manager follows Macintosh operating-system conventions for keyboard navigation and access.

### Vendor software

Tivoli Storage Manager includes certain vendor software that is not covered under the IBM license agreement. IBM makes no representation about the accessibility features of these products. Contact the vendor for the accessibility information about its products.

### Related accessibility information

You can view the publications for Tivoli Storage Manager in Adobe® Portable Document Format (PDF) using the Adobe Acrobat Reader. You can access these or any of the other documentation PDFs at the IBM Publications Center at <http://www.ibm.com/shop/publications/order/>.

### IBM and accessibility

For more information about the commitment that IBM has to accessibility, see the IBM Human Ability and Accessibility Center at <http://www.ibm.com/able>.



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# Glossary

This glossary includes terms and definitions for IBM Tivoli Storage Manager.

To view glossaries for other IBM products, go to <http://www.ibm.com/software/globalization/terminology/>.

The following cross-references are used in this glossary:

- *See* refers the reader from a term to a preferred synonym, or from an acronym or abbreviation to the defined full form.
- *See also* refers the reader to a related or contrasting term.

## A

### **absolute mode**

In storage management, 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 *modified mode*.

### **access control list (ACL)**

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 associated with a file that identifies the users who can access that file and their access rights.

### **access mode**

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

### **acknowledgment**

The transmission of acknowledgment characters as a positive response to a data transmission.

**ACL** See *access control list*.

### **activate**

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

### **active-data pool**

A named set of storage pool volumes that contain only active versions of client backup data.

### **active file system**

A file system to which space management has been added. With space management, tasks for an active file system include automatic migration, reconciliation, selective migration, and recall. Contrast with *inactive file system*.

### **active policy set**

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

### **active version**

The most recent backup copy of a file stored. 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 file server or workstation. Contrast with *inactive version*.

### **activity log**

A log that records normal activity messages that are generated by the server. These messages include information about server and client operations, such as the start time of sessions or device I/O errors.

### **adaptive subfile backup**

A type of backup that sends only changed portions of a file to the server, instead of sending the entire file. Adaptive subfile backup reduces network traffic and increases the speed of the backup.

### **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*.

### **administrative command schedule**

A database record that describes the planned processing of an administrative

command during a specific time period.  
See also *client schedule*.

**administrative privilege class**

See *privilege class*.

**administrative session**

A period of time during which an administrator user ID communicates with a server to perform administrative tasks. Contrast with *client node session*.

**administrator**

A user who is registered to the server as an administrator, and who is authorized to perform tasks and issue commands through the assignment of an administrative privilege class.

**Advanced Program-to-Program Communication (APPC)**

An implementation of the SNA LU 6.2 protocol that allows interconnected systems to communicate and share the processing of programs.

**agent node**

A client node that has been granted proxy authority to perform operations on behalf of another client node, which is the target node.

**aggregate**

An object, stored in one or more storage pools, consisting of a group of logical files that are packaged together. See also *logical file* and *physical file*.

**aggregate data transfer rate**

A performance statistic that indicates the average number of bytes that were transferred per second while processing a given operation.

**APPC** See *Advanced Program-to-Program Communication*.

**application client**

A program that is installed on a system to protect an application. The Tivoli Storage Manager server provides backup services to an application client.

**archive**

To copy programs, data, or files to another storage media, usually for long-term storage or security. Contrast with *retrieve*.

**archive copy**

A file or group of files that was archived to server storage.

**archive copy group**

A policy object containing attributes that control the generation, destination, and expiration of archived files.

**archive-retention grace period**

The number of days that the storage manager retains an archived file when the server is unable to rebind the file to an appropriate management class. See also *bind*.

**association**

(1) The defined relationship between a client node and a client schedule. An association identifies the name of a schedule, the name of the policy domain to which the schedule belongs, and the name of a client node that performs scheduled operations.

(2) On a configuration manager, the defined relationship between a profile and an object such as a policy domain. Profile associations define the configuration information that is distributed to a managed server when it subscribes to the profile.

**audit**

To check for logical inconsistencies between information that the server has and the actual condition of the system. The storage manager can audit information about items such as volumes, libraries, and licenses. For example, when a storage manager audits a volume, the server checks for inconsistencies between information about backed-up or archived files that are stored in the database and the actual data that are associated with each backup version or archive copy in server storage.

**authentication**

The process of checking a user's password before permitting user access to the Tivoli Storage Manager server. Authentication can be turned on or off by an administrator with system privilege.

**authentication rule**

A specification that another user can use to either restore or retrieve files from storage.

**authority**

The right to access objects, resources, or functions. See also *privilege class*.

**authorization rule**

A specification that permits another user to either restore or retrieve a user's files from 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.

**AutoFS**

See *automounted file system*.

**automatic detection**

A feature that detects, reports, and updates the serial number of a drive or library in the database when the path from the local server is defined.

**automatic migration**

The process that is used to automatically move files from a local file system to storage, based on options and settings that are chosen by a root user on a workstation. See also *threshold migration* and *demand migration*.

**automatic reconciliation**

The process that is used to reconcile file systems at regular intervals. The intervals are set by a user with root user authority. See also *reconciliation*.

**automounted file system (AutoFS)**

A file system that is managed by an automounter daemon. The automounter daemon monitors a specified directory path, and automatically mounts the file system to access data.

**B****backup-archive client**

A program that runs on a workstation or file server and provides a means for users to back up, archive, restore, and retrieve files. Contrast with *administrative client*.

**backup copy group**

A policy object containing attributes that control the generation, destination, and expiration of backup versions of files. A backup copy group belongs to a management class.

**backup-retention grace period**

The number of days the storage manager retains a backup version after the server is unable to rebind the file to an appropriate management class.

**backup set**

A portable, consolidated group of active versions of backup files that are generated for a backup-archive client.

**backup set collection**

A group of backup sets that are created at the same time and which have the same backup set name, volume names, description, and device classes. The server identifies each backup set in the collection by its node name, backup set name, and file type.

**backup version**

A file or directory that a client node 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*.

**bindery**

A database that consists of three system files for a NetWare server. The files contain user IDs and user restrictions.

**bind**

To associate a file with a management class name. See *rebind*.

**C****cache**

To place a duplicate copy of a file on random access media when the server migrates a file to another storage pool in the hierarchy.

**cache file**

A snapshot of a logical volume created by Logical Volume Snapshot Agent. Blocks are saved immediately before they are modified during the image backup and their logical extents are saved in the cache files.

**CAD**

See *client acceptor*.

**central scheduler**

A function that permits an administrator to schedule client operations and administrative commands. The operations can be scheduled to occur periodically or on a specific date. See *client schedule* and *administrative command schedule*.

**client** A software program or computer that requests services from a server.

**client acceptor daemon (CAD)**

See *client acceptor*.

**client acceptor**

An HTTP service that serves the Java applet for the Web client to Web browsers. On Windows systems, the client acceptor is installed and run as a service. On AIX, UNIX, and Linux systems, the client acceptor is run as a daemon, and is also called the *client acceptor daemon* (CAD).

**client domain**

The set of drives, file systems, or volumes that the user selects to back up or archive data, 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 node session**

A session in which a client node communicates with a server to perform backup, restore, archive, retrieve, migrate, or recall requests. Contrast with *administrative session*.

**client options file**

An editable file that identifies the server and communication method, and provides the configuration for backup, archive, hierarchical storage management, and scheduling.

**client option set**

A group of options that are defined on the server and used on client nodes in conjunction with client options files.

**client-polling scheduling mode**

A method of operation in which the client queries the server for work. Contrast with *server-prompted scheduling mode*.

**client schedule**

A database record that describes the planned processing of a client operation during a specific time period. The client operation can be a backup, archive, restore, or retrieve operation, a client operating system command, or a macro. See also *administrative command schedule*.

**client/server**

Pertaining to the model of interaction in distributed data processing in which a program on one computer sends a request to a program on another computer and awaits a response. The requesting program is called a client; the answering program is called a server.

**client system-options file**

A file, used on AIX, UNIX, or Linux system clients, containing a set of processing options that identify the servers to be contacted for services. This file also specifies communication methods and options for backup, archive, hierarchical storage management, and scheduling. This file is also called the *dsm.sys* file. See also *client user-options file*.

**client user-options file**

A file that contains the set of processing options that the clients on the system use. The set can include options that determine the server that the client contacts, and options that affect backup operations, archive operations, hierarchical storage management operations, and scheduled operations. This file is also called the *dsm.opt* file. For AIX, UNIX, or Linux systems, see also *client system-options file*.

**closed registration**

A registration process in which only an administrator can register workstations as client nodes with the server. Contrast with *open registration*.

**collocation**

The process of keeping all data belonging to a single-client file space, a single client node, or a group of client nodes on a minimal number of sequential-access volumes within a storage pool. Collocation can reduce the number of volumes that must be accessed when a large amount of data must be restored.

**collocation group**

A user-defined group of client nodes whose data is stored on a minimal number of volumes through the process of collocation.

**commit point**

A point in time when data is considered consistent.

**communication method**

The method by which a client and server exchange information. See also *Transmission Control Protocol/Internet Protocol*.

**Common Programming Interface for Communications (CPI-C)**

A call-level interface that provides a consistent application programming interface (API) for applications that use program-to-program communications. CPI-C uses LU 6.2 architecture to create a set of interprogram services that can establish and end a conversation, send and receive data, exchange control information, and notify a partner program of errors.

**communication protocol**

A set of defined interfaces that permit computers to communicate with each other.

**compression**

A function that removes repetitive characters, spaces, or strings of characters from the data being processed and replaces the repetitive characters with control characters. Compression reduces the amount of storage space that is required for the data.

**configuration manager**

A server that distributes configuration information, such as policies and schedules, to managed servers according to their profiles. Configuration information can include policy and schedules. See also *managed server* and *profile*.

**conversation**

A connection between two programs over a session that allows them to communicate with each other while processing a transaction.

**copy backup**

A full backup in which the transaction log files are not deleted so that backup procedures that use incremental or differential backups are not disrupted.

**copy group**

A policy object containing attributes that control how backup versions or archive copies are generated, where backup versions or archive copies are initially

located, and when backup versions or archive copies expire. A copy group belongs to a management class. See also *archive copy group*, *backup copy group*, *backup version*, and *management class*.

**copy storage pool**

A named set of volumes that contain copies of files that reside in primary storage pools. Copy storage pools are used only to back up the data that is stored in primary storage pools. A copy storage pool cannot be a destination for a backup copy group, an archive copy group, or a management class (for space-managed files). See also *primary storage pool* and *destination*.

**CPI-C** See *Common Programming Interface for Communications*.

**D****daemon**

A program that runs unattended to perform continuous or periodic functions, such as network control.

**damaged file**

A physical file in which Tivoli Storage Manager has detected read errors.

**data access control mode**

A mode that controls whether a command can access a migrated file, see a migrated file as zero-length, or receive an input/output error if it attempts to access a migrated file. See also *execution mode*.

**database backup series**

One full backup of the database, plus up to 32 incremental backups made since that full backup. Each full backup that is run starts a new database backup series. A number identifies each backup series.

**database snapshot**

A complete backup of the entire database to media that can be taken off-site. When a database snapshot is created, the current database backup series is not interrupted. A database snapshot cannot have incremental database backups associated with it. See also *database backup series*. Contrast with *full backup*.

**data manager server**

A server that collects metadata information for client inventory and manages transactions for the storage

agent over the local area network. The data manager server informs the storage agent with applicable library attributes and the target volume identifier.

**data mover**

A device that moves data on behalf of the server. A network-attached storage (NAS) file server is a data mover.

**data storage-management application-program interface (DSMAPI)**

A set of functions and semantics that can monitor events on files, and manage and maintain the data in a file. In an HSM environment, a DSMAPI uses events to notify data management applications about operations on files, stores arbitrary attribute information with a file, supports managed regions in a file, and uses DSMAPI access rights to control access to a file object.

**default management class**

A management class that is assigned to a policy set. This class is used to govern backed up or archived files when a file is not explicitly associated with a specific management class through the include-exclude list.

**demand migration**

The process that is used to respond to an out-of-space condition on a file system for which hierarchical storage management (HSM) is active. Files are migrated to server storage until space usage drops to the low threshold that was set for the file system. If the high threshold and low threshold are the same, one file is migrated.

**desktop client**

The group of backup-archive clients that includes clients on Microsoft Windows, Apple, and Novell NetWare operating systems.

**destination**

A copy group or management class attribute that specifies the primary storage pool to which a client file will be backed up, archived, or migrated.

**device class**

A named set of characteristics that are applied to a group of storage devices.

Each device class has a unique name and represents a device type of disk, file, optical disk, or tape.

**device configuration file**

(1) For a server, a file that contains information about defined device classes, and, on some servers, defined libraries and drives. The information is a copy of the device configuration information in the database.

(2) For a storage agent, a file that contains the name and password of the storage agent, and information about the server that is managing the SAN-attached libraries and drives that the storage agent uses.

**device driver**

A program that provides an interface between a specific device and the application program that uses the device.

**disaster recovery manager (DRM)**

A function that assists in preparing and using a disaster recovery plan file for the server.

**disaster recovery plan**

A file that is created by the disaster recovery manager (DRM) that contains information about how to recover computer systems if a disaster occurs and scripts that can be run to perform some recovery tasks. The file includes information about the software and hardware that is used by the server, and the location of recovery media.

**domain**

A grouping of client nodes with one or more policy sets, which manage data or storage resources for the client nodes. See *policy domain* or *client domain*.

**DRM** See *disaster recovery manager*.

**DSMAPI**

See *data storage-management application-program interface*.

**dynamic serialization**

A type of copy serialization in which a file or folder is backed up or archived on the first attempt regardless of whether it changes during a backup or archive.

**E**

**EA** See *extended attribute*.



**EB** See *exabyte*.

**EFS** See *Encrypted File System*.

**Encrypted File System (EFS)**

A file system that uses file system-level encryption.

**enterprise configuration**

A method of setting up servers so that the administrator can distribute the configuration of one of the servers to the other servers, using server-to-server communication. See also *configuration manager, managed server, profile, and subscription*.

**enterprise logging**

The process of sending events from a Tivoli Storage Manager server to a designated event server. The event server routes the events to designated receivers, such as to a user exit. See also *event*.

**error log**

A data set or file that is used to record error information about a product or system.

**estimated capacity**

The available space, in megabytes, of a storage pool.

**event** (1) An administrative command or a client operation that is scheduled to be run using Tivoli Storage Manager scheduling.

(2) A message that an Tivoli Storage Manager server or client issues. Messages can be logged using Tivoli Storage Manager event logging.

**event record**

A database record that describes actual status and results for events.

**event server**

A server to which other servers can send events for logging. The event server routes the events to any receivers that are enabled for the sending server's events.

**exabyte (EB)**

For processor storage, real and virtual storage, and channel volume, 1 152 921 504 606 846 976 bytes. For disk storage capacity and communications volume, 1 000 000 000 000 000 000 bytes.

**exclude**

The process of identifying files in an

include-exclude list. This process prevents the files from being backed up or migrated whenever a user or schedule enters an incremental or selective backup operation. A file can be excluded from backup and space management, backup only, or space management only.

**exclude-include list**

See *include-exclude list*.

**execution mode**

A mode that controls the space-management related behavior of commands that run under the **dsmmode** command.

**expiration**

The process by which files, data sets, or objects are identified for deletion because their expiration date or retention period has passed.

**expiring file**

A migrated or premigrated file that has been marked for expiration and removal from storage. If a stub file or an original copy of a premigrated file is deleted from a local file system, or if the original copy of a premigrated file is updated, the corresponding migrated or premigrated file is marked for expiration the next time reconciliation is run.

**extend**

To increase the portion of available space that can be used to store database or recovery log information.

**extended attribute (EA)**

Names or value pairs that are associated with files or directories. There are three classes of extended attributes: user attributes, system attributes, and trusted attributes.

**external library**

A type of library that is provided by Tivoli Storage Manager that permits LAN-free data movement for StorageTek libraries that are managed by Automated Cartridge System Library Software (ACSL). To activate this function, the Tivoli Storage Manager library type must be EXTERNAL.

**F**

**file access time**

On AIX, UNIX, or Linux systems, the time when the file was last accessed.

**file age**

For migration prioritization purposes, the number of days since a file was last accessed.

**file device type**

A device type that specifies the use of sequential access files on disk storage as volumes.

**file server**

A dedicated computer and its peripheral storage devices that are connected to a local area network that stores programs and files that are shared by users on the network.

**file space**

A logical space in server storage that contains a group of files that have been backed up or archived by a client node, from a single logical partition, file system, or virtual mount point. Client nodes can restore, retrieve, or delete their file spaces from server storage. In server storage, files belonging to a single file space are not necessarily stored together.

**file space ID (FSID)**

A unique numeric identifier that the server assigns to a file space when it is stored in server storage.

**file state**

The space management mode of a file that resides in a file system to which space management has been added. A file can be in one of three states: resident, premigrated, or migrated. See also *resident file*, *premigrated file*, and *migrated file*.

**file system migrator (FSM)**

A kernel extension that intercepts all file system operations and provides any space management support that is required. If no space management support is required, the operation is passed to the operating system, which performs its normal functions. The file system migrator is mounted over a file system when space management is added to the file system.

**file system state**

The storage management mode of a file system that resides on a workstation on

which the hierarchical storage management (HSM) client is installed. A file system can be in one of these states: native, active, inactive, or global inactive.

**frequency**

A copy group attribute that specifies the minimum interval, in days, between incremental backups.

**FSID** See *file space ID*.

**FSM** See *file system migrator*.

**full backup**

The process of backing up the entire server database. A full backup begins a new database backup series. See also *database backup series* and *incremental backup*. Contrast with *database snapshot*.

**fuzzy 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**

A backup version or archive copy of a file that might not accurately reflect the original contents of the file because it was backed up or archived the file while the file was being modified. See also *backup version* and *archive copy*.

**G****General Parallel File System™**

A high-performance shared-disk file system that can provide data access from nodes in a cluster environment.

**gigabyte (GB)**

In decimal notation, 1 073 741 824 when referring to memory capacity; in all other cases, it is defined as 1 000 000 000.

**global inactive state**

The state of all file systems to which space management has been added when space management is globally deactivated for a client node. When space management is globally deactivated, hierarchical storage management (HSM) cannot perform migration, recall, or reconciliation. However, a root user can update space management settings and add space management to additional file systems. Users can access resident and premigrated files.

**Globally Unique Identifier (GUID)**

An algorithmically determined number that uniquely identifies an entity within a system.

**GPFS** See *General Parallel File System*.

**GPFS node set**

A mounted, defined group of GPFS file systems.

**group backup**

The backup of a group containing a list of files from one or more file space origins.

**GUID** See *Globally Unique Identifier*.

**H****hierarchical storage management (HSM)**

A function that automatically distributes and manages data on disk, tape, or both by regarding devices of these types and potentially others as levels in a storage hierarchy that range from fast, expensive devices to slower, cheaper, and possibly removable devices. The objectives are to minimize access time to data and maximize available media capacity.

**hierarchical storage management (HSM) client**

A client program that works with the Tivoli Storage Manager server to provide hierarchical storage management (HSM) for a system. See also *hierarchical storage management* and *space manager client*.

**HSM** See *hierarchical storage management*.

**HSM client**

See *hierarchical storage management client*.

**I**

**ILM** See *information lifecycle management*.

**image** A file system or raw logical volume that is backed up as a single object.

**image backup**

A backup of a full file system or raw logical volume as a single object.

**inactive file system**

A file system for which space management has been deactivated. Contrast with *active file system*.

**inactive version**

A backup version of a file that is either not the most recent backup version, or that is a backup version of a file that no longer exists on the client system. Inactive

backup versions are eligible for expiration processing according to the management class assigned to the file. Contrast with *active version*.

**include-exclude file**

A file containing statements to determine the files to back up and the associated management classes to use for backup or archive. See also *include-exclude list*.

**include-exclude list**

A list of 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.

**incremental backup**

(1) A copy of all database data that has changed since the most recent successful full backup operation. An incremental backup is also known as a *cumulative backup image* because each incremental backup includes the contents of the previous incremental backup.

(2) The process of backing up information in the database that is new or changed since the last full backup. Contrast with *full backup*. See also *database backup series*.

(3) For Data Protection for Microsoft Exchange Server, a backup in which the transaction logs are backed up and then cleared.

**individual mailbox restore**

See *mailbox restore*.

**information lifecycle management (ILM)**

GPFS policy-based file management for storage pools and file sets.

**i-node** The internal structure that describes the individual files on AIX, UNIX, or Linux systems. An i-node contains the node, type, owner, and location of a file.

**i-node number**

A number specifying a particular i-node file in the file system.

**IP address**

A unique address for a device or logical unit on a network that uses the IP standard.

## J

### job file

A generated file that contains configuration information for a migration job. The file is XML format and can be created and edited in the hierarchical storage management (HSM) client for Windows client graphical user interface.

### journal-based backup

A method for backing up Windows clients and AIX clients that exploits the change notification mechanism in a file to improve incremental backup performance by reducing the need to fully scan the file system.

### journal daemon

On AIX, UNIX, or Linux systems, a program that tracks change activity for files residing in file systems.

### journal service

In Microsoft Windows, a program that tracks change activity for files residing in file systems.

## K

### kilobyte (KB)

For processor storage, real and virtual storage, and channel volume, 210 or 1 024 bytes. For disk storage capacity and communications volume, 1 000 bytes.

## L

**LAN** See *local area network*.

### LAN-free data movement

The movement of client data between a client system and a storage device on a storage area network (SAN), bypassing the local area network. This process is also referred to as *LAN-free data transfer*.

### LAN-free data transfer

See *LAN-free data movement*.

### leader data

Bytes of data, from the beginning of a migrated file, that are stored in the file's corresponding stub file on the local file system. The amount of leader data that is stored in a stub file depends on the stub size that is specified.

### library

(1) A repository for demountable recorded media, such as magnetic disks and magnetic tapes.

(2) A collection of one or more drives, and possibly robotic devices (depending on the library type), which can be used to access storage volumes.

### library client

A server that uses server-to-server communication to access a library that is managed by another storage management server. See also *library manager*.

### library manager

A server that controls device operations when multiple storage management servers share a storage device. See also *library client*.

**local** Pertaining to a device, file, or system that is accessed directly from a user's system, without the use of a communication line.

### local area network (LAN)

A network that connects several devices in a limited area (such as a single building or campus) and that can be connected to a larger network.

### local shadow volumes

Data that is stored on shadow volumes localized to a disk storage subsystem.

**LOFS** See *loopback virtual file system*.

### logical file

A file that is stored in one or more server storage pools, either by itself or as part of an aggregate. See also *aggregate* and *physical file*.

### logical occupancy

The space that is used by logical files in a storage pool. This space does not include the unused space created when logical files are deleted from aggregate files, so it might be less than the physical occupancy.

### logical unit (LU)

An access point through which a user or application program accesses the Systems Network Architecture (SNA) network to communicate with another user or application program.

### logical unit number (LUN)

In the Small Computer System Interface (SCSI) standard, a unique identifier that is used to differentiate devices, each of which is a logical unit (LU).

**logical volume**

A portion of a physical volume that contains a file system.

**logical volume backup**

A back up of a file system or logical volume as a single object.

**Logical Volume Snapshot Agent (LVSA)**

Software that can act as the snapshot provider for creating a snapshot of a logical volume during an online image backup.

**loopback virtual file system (LOFS)**

A file system that is created by mounting a directory over another local directory, also known as mount-over-mount. A LOFS can also be generated using an automounter.

**LU** See *logical unit*.

**LUN** See *logical unit number*.

**LVSA** See *Logical Volume Snapshot Agent*.

**M**

**MB** See *megabyte*.

**macro file**

A file that contains one or more storage manager administrative commands, which can be run only from an administrative client using the MACRO command. Contrast with *Tivoli Storage Manager command script*.

**mailbox restore**

A function that restores Microsoft Exchange Server data (from IBM Data Protection for Exchange backups) at the mailbox level or mailbox-item level.

**managed object**

In Tivoli Storage Manager, a definition in the database of a managed server that was distributed to the managed server by a configuration manager. When a managed server subscribes to a profile, all objects that are associated with that profile become managed objects in the database of the managed server. In general, a managed object cannot be modified locally on the managed server. Objects can include policy, schedules, client option sets, server scripts, administrator registrations, and server and server group definitions.

**managed server**

A Tivoli Storage Manager server that receives configuration information from a configuration manager using a subscription to one or more profiles. Configuration information can include definitions of objects such as policy and schedules. See also *configuration manager*, *subscription*, and *profile*.

**management class**

A policy object that users can bind to each file to specify how the server manages the file. The management class can contain a backup copy group, an archive copy group, and space management attributes. See also *copy group*, *space manager client*, *bind*, and *rebind*.

**maximum transmission unit**

The largest possible unit of data that can be sent on a given physical medium in a single frame. For example, the maximum transmission unit for Ethernet is 1500 bytes.

**megabyte (MB)**

- (1) 1 048 576 bytes (two to the twentieth power) when used in this publication.
- (2) For processor storage, real and virtual storage, and channel volume, 2 to the power of 20 or 1 048 576 bits. For disk storage capacity and communications volume, 1 000 000 bits.

**metadata**

Data that describes the characteristics of data; descriptive data.

**migrate**

To move data from one storage location to another. In Tivoli Storage Manager products, migrating can mean moving data from a client node to server storage, or moving data from one storage pool to the next storage pool defined in the server storage hierarchy. In both cases the movement is controlled by policy, such as thresholds that are set. See also *migration threshold*.

**migrated file**

A file that has been copied from a local file system to Tivoli Storage Manager storage. For HSM clients on UNIX or Linux systems, the file is replaced with a stub file on the local file system. On Windows systems, creation of the stub file

is optional. See also *stub file* and *resident file*. For HSM clients on UNIX or Linux systems, contrast with *premigrated file*.

**migrate-on-close recall mode**

A mode that causes a migrated file to be recalled back to its originating file system temporarily. Contrast with *normal recall mode* and *read-without-recall recall mode*.

**migration job**

A specification of files to migrate, and actions to perform on the original files after migration. See also *job file*.

**migration threshold**

High and low capacities for storage pools or file systems, expressed as percentages, at which migration is set to start and stop.

**mirroring**

The process of writing the same data to multiple locations at the same time. Mirroring data protects against data loss within the recovery log.

**mode** A copy group attribute that specifies whether to back up a file that has not been modified since the last time the file was backed up. See *modified mode* and *absolute mode*.

**modified mode**

In storage management, a backup copy-group mode that specifies that a file is considered for incremental backup only if it has changed since the last backup. A file is considered a changed file if the date, size, owner, or permissions of the file have changed. See also *absolute mode*.

**mount limit**

The maximum number of volumes that can be simultaneously accessed from the same device class. The mount limit determines the maximum number of mount points. See also *mount point*.

**mount point**

On the Tivoli Storage Manager server, a logical drive through which volumes in a sequential access device class are accessed. For removable-media device types, such as tape, a mount point is a logical drive that is associated with a physical drive. For the file device type, a mount point is a logical drive that is associated with an I/O stream. The number of mount points for a device class

is defined by the value of the mount limit attribute for that device class. See also *mount limit*.

**mount retention period**

The maximum number of minutes that the server retains a mounted sequential-access media volume that is not being used before it dismounts the sequential-access media volume.

**mount wait period**

The maximum number of minutes that the server waits for a sequential-access volume mount request to be satisfied before canceling the request.

**MTU** See *maximum transmission unit*.

**N**

**Nagle algorithm**

An algorithm that reduces congestion of TCP/IP networks by combining smaller packets and sending them together.

**named pipe**

A type of interprocess communication that permits message data streams to pass between peer processes, such as between a client and a server.

**NAS** See *network-attached storage*.

**NAS node**

A client node that is a network-attached storage (NAS) file server. Data for the NAS node is transferred by a NAS file server that is controlled by the network data management protocol (NDMP). A NAS node is also called a NAS file server node.

**native file system**

A file system that is locally added to the file server and is not added for space management. The hierarchical storage manager (HSM) client does not provide space management services to the file system.

**native format**

A format of data that is written to a storage pool directly by the Tivoli Storage Manager server. Contrast with *non-native data format*.

**NDMP**

See *Network Data Management Protocol*.

**NetBIOS**

See *Network Basic Input/Output System*.

**network-attached storage (NAS) file server**

A dedicated storage device with an operating system that is optimized for file-serving functions. A NAS file server can have the characteristics of both a node and a data mover.

**Network Basic Input/Output System (NetBIOS)**

A standard interface to networks and personal computers that is used on local area networks to provide message, print-server, and file-server functions. Application programs that use NetBIOS do not have to handle the details of LAN data link control (DLC) protocols.

**Network Data Management Protocol (NDMP)**

A protocol that allows a network storage-management application to control the backup and recovery of an NDMP-compliant file server, without installing vendor-acquired software on that file server.

**network data-transfer rate**

A rate that is calculated by dividing the total number of bytes that are transferred by the data transfer time. For example, this rate can be the time that is spent transferring data over a network.

**node** A file server or workstation on which the backup-archive client program has been installed, and which has been registered to the server.

**node name**

A unique name that is used to identify a workstation, file server, or PC to the server.

**node privilege class**

A privilege class that gives an administrator the authority to remotely access backup-archive clients for a specific client node or for all clients in a policy domain. See also *privilege class*.

**non-native data format**

A format of data that is written to a storage pool that differs from the format that the server uses for operations.

**normal recall mode**

A mode that causes a migrated file to be copied back to its originating file system when it is accessed.

**O****offline volume backup**

A backup in which the volume is locked so that no other system applications can access it during the backup operation.

**online volume backup**

A backup in which the volume is available to other system applications during the backup operation.

**open registration**

A registration process in which users can register their workstations as client nodes with the server. Contrast with *closed registration*.

**operator privilege class**

A privilege class that gives an administrator the authority to disable or halt the server, enable the server, cancel server processes, and manage removable media. See also *privilege class*.

**options file**

A file that contains processing options. On Windows and NetWare systems, the file is called *dsm.opt*. On AIX, UNIX, Linux, and Mac OS X systems, the file is called *dsm.sys*.

**originating file system**

The file system from which a file was migrated. When a file is recalled using normal or migrate-on-close recall mode, it is always returned to its originating file system.

**orphaned stub file**

A file for which no migrated file can be found on the Tivoli Storage Manager server that the client node is contacting for space management services. For example, a stub file can be orphaned when the client system-options file is modified to contact a server that is different than the one to which the file was migrated.

**out-of-space protection mode**

A mode that controls whether the program intercepts out-of-space conditions. See also *execution mode*.

**P****pacing**

In SNA, a technique by which the receiving system controls the rate of transmission of the sending system to prevent overrun.

**packet** In data communication, a sequence of binary digits, including data and control signals, that is transmitted and switched as a composite whole.

**page** A defined unit of space on a storage medium or within a database volume.

**partial-file recall mode**

A recall mode that causes the hierarchical storage management (HSM) function to read just a portion of a migrated file from storage, as requested by the application accessing the file.

**password generation**

A process that creates and 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 also *options file*.

**path** An object that defines a one-to-one relationship between a source and a destination. Using the path, the source accesses the destination. Data can flow from the source to the destination, and back. An example of a source is a data mover (such as a network-attached storage [NAS] file server), and an example of a destination is a tape drive.

**pattern-matching character**

See *wildcard character*.

**physical file**

A file that is stored in one or more storage pools, consisting of either a single logical file, or a group of logical files that are packaged together as an aggregate. See also *aggregate* and *logical file*.

**physical occupancy**

The amount of space that is used by physical files in a storage pool. This space includes the unused space that is created when logical files are deleted from aggregates. See also *physical file*, *logical file*, and *logical occupancy*.

**plug-in**

A self-contained software component that modifies (adds, or changes) the function in a particular system. When a plug-in is added to a system, the foundation of the original system remains intact.

**policy domain**

A grouping of policy users with one or more policy sets, which manage data or storage resources for the users. The users are client nodes that are associated with the policy domain.

**policy privilege class**

A privilege class that gives an administrator the authority to manage policy objects, register client nodes, and schedule client operations for client nodes. Authority can be restricted to certain policy domains. See also *privilege class*.

**policy set**

A group of rules in a policy domain. The rules specify how data or storage resources are automatically managed for client nodes in the policy domain. Rules can be contained in management classes. See also *active policy set* and *management class*.

**premigrated file**

A file that has been copied to Tivoli Storage Manager storage, but has not been replaced with a stub file on the local file system. An identical copy of the file resides both on the local file system and in Tivoli Storage Manager storage. Premigrated files occur on UNIX and Linux file systems to which space management has been added. Contrast with *migrated file* and *resident file*.

**premigrated files database**

A database that contains information about each file that has been premigrated to Tivoli Storage Manager storage. The database is stored in a hidden directory named *.SpaceMan* in each file system to which space management has been added.

**premigration**

The process of copying files that are eligible for migration to Tivoli Storage Manager storage, but leaving the original file intact on the local file system.

**premigration percentage**

A space management setting that controls whether the next eligible candidates in a file system are premigrated following threshold or demand migration.



**primary storage pool**

A named set of volumes that the server uses to store backup versions of files, archive copies of files, and files migrated from client nodes. See also *destination* and *copy storage pool*.

**privilege class**

A level of authority that is granted to an administrator. The privilege class determines which administrative tasks the administrator can perform. See also *node privilege class*, *operator privilege class*, *policy privilege class*, *storage privilege class*, and *system privilege class*.

**profile**

A named group of configuration information that can be distributed from a configuration manager when a managed server subscribes. Configuration information can include registered administrator IDs, policies, client schedules, client option sets, administrative schedules, storage manager command scripts, server definitions, and server group definitions. See also *configuration manager* and *managed server*.

**Q**

**quota** (1) For HSM on AIX, UNIX, or Linux systems, the limit (in megabytes) on the amount of data that can be migrated and premigrated from a file system to server storage.

(2) For HSM on Windows systems, a user-defined limit to the space that is occupied by recalled files.

**R****randomization**

The process of distributing schedule start times for different clients within a specified percentage of the schedule's startup window.

**raw logical volume**

A portion of a physical volume that is comprised of unallocated blocks and has no journaled file system (JFS) definition. A logical volume is read/write accessible only through low-level I/O functions.

**read-without-recall recall mode**

A mode that causes hierarchical storage management (HSM) to read a migrated file from storage without storing it back

on the local file system. The last piece of information read from the file is stored in a buffer in memory on the local file system. Contrast with *normal recall mode* and *migrate-on-close recall mode*.

**rebind**

To associate a backed-up file with a new management class name. For example, rebinding occurs when the management class associated with a file is deleted. See also *bind*.

**recall** In Tivoli Storage Manager, to copy a migrated file from server storage back to its originating file system using the space management client. See also *transparent recall*, *selective recall*, and *recall mode*.

**recall mode**

A mode that is assigned to a migrated file with the **dsmatr** command that determines how the file is processed when it is recalled. It determines whether the file is stored on the local file system, is migrated back to Tivoli Storage Manager storage when it is closed, or is read from Tivoli Storage Manager storage without storing it on the local file system.

**receiver**

A server repository that contains a log of server and client messages as events. For example, a receiver can be a file exit, a user exit, or the Tivoli Storage Manager server console and activity log. See also *event*.

**reclamation**

The process of consolidating the remaining data from many sequential-access volumes onto fewer, new sequential-access volumes.

**reclamation threshold**

The percentage of space that a sequential-access media volume must have before the server can reclaim the volume. Space becomes reclaimable when files are expired or are deleted.

**reconciliation**

The process of synchronizing a file system with the Tivoli Storage Manager server, and then removing old and obsolete objects from the Tivoli Storage Manager server.

**recovery log**

A log of updates that are about to be

written to the database. The log can be used to recover from system and media failures. The recovery log consists of the active log (including the log mirror) and archive logs.

**register**

To define a client node or administrator ID that can access the server.

**registry**

A repository that contains access and configuration information for users, systems, and software.

**resident file**

On a Windows system, a complete file on a local file system that might also be a migrated file because a migrated copy can exist in Tivoli Storage Manager storage. On a UNIX or Linux system, a complete file on a local file system that has not been migrated or premigrated, or that has been recalled from Tivoli Storage Manager storage and modified. Contrast with *stub file* and *premigrated file*. See *migrated file*.

**restore**

To copy information from its backup location to the active storage location for use. For example, to copy information from server storage to a client workstation.

**retention**

The amount of time, in days, that inactive backed-up or archived files are kept in the storage pool before they are deleted. Copy group attributes and default retention grace periods for the domain define retention.

**retrieve**

To copy archived information from the storage pool to the workstation for use. The retrieve operation does not affect the archive version in the storage pool.

**roll back**

To remove changes that were made to database files since the last commit point.

**root user**

A system user who operates without restrictions. A root user has the special rights and privileges needed to perform administrative tasks.

**S**

**SAN** See *storage area network*.

**schedule**

A database record that describes client operations or administrative commands to be processed. See *administrative command schedule* and *client schedule*.

**scheduling mode**

The type of scheduling operation for the server and client node that supports two scheduling modes: client-polling and server-prompted.

**scratch volume**

A labeled volume that is either blank or contains no valid data, that is not defined, and that is available for use.

**script**

A series of commands, combined in a file, that carry out a particular function when the file is run. Scripts are interpreted as they are run. Contrast with *Tivoli Storage Manager command script*.

**Secure Sockets Layer (SSL)**

A security protocol that provides communication privacy. With SSL, client/server applications can communicate in a way that is designed to prevent eavesdropping, tampering, and message forgery.

**selective backup**

The process of backing up certain files or directories from a client domain. The files that are backed up are those that are not excluded in the include-exclude list. The files must meet the requirement for serialization in the backup copy group of the management class that is assigned to each file. Contrast with *incremental backup*.

**selective migration**

The process of copying user-selected files from a local file system to Tivoli Storage Manager storage and replacing the files with stub files on the local file system. Contrast with *threshold migration* and *demand migration*.

**selective recall**

The process of copying user-selected files from Tivoli Storage Manager storage to a local file system. Contrast with *transparent recall*.

**serialization**

The process of handling files that are modified during backup or archive processing. See *dynamic serialization*, *static*

- serialization, shared static serialization, and shared dynamic serialization.*
- server** A software program or a computer that provides services to other software programs or other computers.
- server options file**  
A file that contains settings that control various server operations. These settings affect such things as communications, devices, and performance.
- server-prompted scheduling mode**  
A client/server communication technique where the server contacts the client node when tasks must be done. Contrast with *client-polling scheduling mode*.
- server storage**  
The primary, copy, and active-data storage pools that are used by the server to store user files such as backup versions, archive copies, and files migrated from space manager client nodes (space-managed files). See also *active-data pool, primary storage pool, copy storage pool, storage pool volume, and volume*.
- session**  
A logical or virtual connection between two stations, software programs, or devices on a network that allows the two elements to communicate and exchange data.
- session resource usage**  
The amount of wait time, processor time, and space that is used or retrieved during a client session.
- shared dynamic serialization**  
A value for serialization that specifies that a file must not be backed up or archived if it is being modified during the operation. Tivoli Storage Manager retries the backup or archive operation a number of times; if the file is being modified during each attempt, Tivoli Storage Manager will back up or archive the file on its last try. See also *serialization*. Contrast with *dynamic serialization, shared static serialization, and static serialization*.
- shared library**  
A library device that is used by multiple storage manager servers.
- shared static serialization**  
A copy-group serialization value that specifies 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 also *serialization*. Contrast with *dynamic serialization, shared dynamic serialization, and static serialization*.
- snapshot**  
An image backup type that consists of a point-in-time view of a volume.
- space-managed file**  
A file that is migrated from a client node by the space manager client. The space manager client recalls the file to the client node on demand.
- space management**  
The process of keeping sufficient free storage space available on a local file system for new data by migrating files to server storage. Synonymous with *hierarchical storage management*.
- space manager client**  
A program that runs on a UNIX or Linux system to manage free space on the local file system by migrating files to server storage. The program can recall the files either automatically or selectively. Also called *hierarchical storage management (HSM) client*.
- space monitor daemon**  
A daemon that checks space usage on all file systems for which space management is active, and automatically starts threshold migration when space usage on a file system equals or exceeds its high threshold.
- sparse file**  
A file that is created with a length greater than the data it contains, leaving empty spaces for the future addition of data.
- special file**  
On AIX, UNIX, or Linux systems, a file that defines devices for the system, or temporary files that are created by processes. There are three basic types of special files: first-in, first-out (FIFO); block; and character.
- SSL** See *Secure Sockets Layer*.

**stabilized file space**

A file space that exists on the server but not on the client.

**stanza** A group of lines in a file that together have a common function or define a part of the system. Each stanza is identified by a name that occurs in the first line of the stanza. Depending on the type of file, a stanza is ended by the next occurrence of a stanza name in the file, or by an explicit end-of-stanza marker. A stanza can also be ended by the end of the file.

**startup window**

A time period during which a schedule must be initiated.

**static serialization**

A copy-group serialization value that specifies that a file must not be modified during a backup or archive operation. If the file is in use during the first attempt, the storage manager cannot back up or archive the file. See also *serialization*. Contrast with *dynamic serialization*, *shared dynamic serialization*, and *shared static serialization*.

**storage agent**

A program that enables the backup and restoration of client data directly to and from storage attached to a storage area network (SAN).

**storage area network (SAN)**

A dedicated storage network that is tailored to a specific environment, combining servers, systems, storage products, networking products, software, and services.

**storage hierarchy**

(1) A logical order of primary storage pools, as defined by an administrator. The order is typically based on the speed and capacity of the devices that the storage pools use. The storage hierarchy is defined by identifying the next storage pool in a storage pool definition. See also *storage pool*.

(2) An arrangement of storage devices with different speeds and capacities. The levels of the storage hierarchy include: main storage, such as memory and direct-access storage device (DASD) cache; primary storage (DASD containing user-accessible data); migration level 1

(DASD containing data in a space-saving format); and migration level 2 (tape cartridges containing data in a space-saving format).

**storage pool**

A named set of storage volumes that are the destination that is used to store client data. A storage pool contains backup versions, archive copies, and files that are migrated from space manager client nodes. A primary storage pool is backed up to a copy storage pool. See also *primary storage pool*, *copy storage pool*, and *active-data pool*.

**storage pool volume**

A volume that has been assigned to a storage pool. See also *volume*, *active-data pool*, *copy storage pool*, and *primary storage pool*.

**storage privilege class**

A privilege class that gives an administrator the authority to control how storage resources for the server are allocated and used, such as monitoring the database, the recovery log, and server storage. See also *privilege class*.

**stub**

A shortcut on the Windows file system that is generated by the hierarchical storage management (HSM) client for a migrated file that allows transparent user access. A stub is the sparse file representation of a migrated file, with a reparse point attached.

**stub file**

A file that replaces the original file on a local file system when the file is migrated to storage. A stub file contains the information that is necessary to recall a migrated file from Tivoli Storage Manager storage. It also contains additional information that can be used to eliminate the need to recall a migrated file.

**stub file size**

The size of a file that replaces the original file on a local file system when the file is migrated to Tivoli Storage Manager storage. The size that is specified for stub files determines how much leader data can be stored in the stub file. The default for stub file size is the block size defined for a file system minus 1 byte.

**subscription**

In a Tivoli environment, the process of identifying the subscribers that the profiles are distributed to. For Tivoli Storage Manager, a subscription is the process by which a managed server receives configuration information associated with a particular profile on a configuration manager. See also *managed server*, *configuration manager*, and *profile*.

**Systems Network Architecture (SNA)**

The description of the logical structure, formats, protocols, and operational sequences for transmitting information through and controlling the configuration and operation of networks.

**system privilege class**

A privilege class that gives an administrator the authority to issue all server commands. See also *privilege class*.

**T****tape library**

A set of equipment and facilities that support an installation's tape environment. The tape library can include tape storage racks, mechanisms for automatic tape mounting, a set of tape drives, and a set of related tape volumes mounted on those drives.

**tape volume prefix**

The high-level-qualifier of the file name or the data set name in the standard tape label.

**target node**

A client node for which other client nodes (called agent nodes) have been granted proxy authority. The proxy authority allows the agent nodes to perform operations such as backup and restore on behalf of the target node, which owns the data.

**TCA** See *trusted communications agent*.

**TCP/IP**

See *Transmission Control Protocol/Internet Protocol*.

**threshold migration**

The process of moving files from a local file system to Tivoli Storage Manager storage based on the high and low thresholds that are defined for the file

system. Contrast with *demand migration*, *selective migration*, and *migration job*.

**throughput**

In storage management, the total bytes in the workload, excluding overhead, that are backed up or restored, divided by elapsed time.

**timeout**

A time interval that is allotted for an event to occur or complete before operation is interrupted.

**timestamp control mode**

A mode that determines whether commands preserve the access time for a file or set it to the current time.

**Tivoli Storage Manager command script**

A sequence of Tivoli Storage Manager administrative commands that are stored in the database of the Tivoli Storage Manager server. The script can run from any interface to the server. The script can include substitution for command parameters and conditional logic.

**Transmission Control Protocol/Internet Protocol (TCP/IP)**

An industry-standard, nonproprietary set of communication protocols that provides reliable end-to-end connections between applications over interconnected networks of different types.

**transparent recall**

The process that is used to automatically recall a file to a workstation or file server when the file is accessed. See also *recall mode*. Contrast with *selective recall*.

**trusted communications agent (TCA)**

A program that handles the sign-on password protocol when clients use password generation.

**U**

**UCS-2** A 2-byte (16-bit) encoding scheme based on ISO/IEC specification 10646-1. UCS-2 defines three levels of implementation: Level 1-No combining of encoded elements allowed; Level 2-Combining of encoded elements is allowed only for Thai, Indic, Hebrew, and Arabic; Level 3-Any combination of encoded elements are allowed.

**UNC** See *Universal Naming Convention name*.

**Unicode**

A character encoding standard that supports the interchange, processing, and display of text that is written in the common languages around the world, plus some classical and historical texts. The Unicode standard has a 16-bit character set defined by ISO 10646.

**Unicode-enabled file space**

Unicode file space names provide support for multilingual workstations without regard for the current locale.

**Unicode transformation format 8**

Unicode Transformation Format (UTF), 8-bit encoding form, which is designed for ease of use with existing ASCII-based systems. The CCSID value for data in UTF-8 format is 1208.

**Universal Naming Convention (UNC) name**

A name that is used to access a drive or directory containing files shared across a network. The UNC name includes the system name and a SharePoint name that represents the shared drive or directory.

**Universally Unique Identifier (UUID)**

The 128-bit numerical identifier that is used to ensure that two components do not have the same identifier.

**UTF-8** See *Unicode transformation format 8*.

**UUID** See *Universally Unique Identifier*.

**V****validate**

To check a policy set for conditions that can cause problems if that policy set becomes the active policy set. For example, the validation process checks whether the policy set contains a default management class.

**version**

A backup copy of a file stored in server storage. The most recent backup copy of a file is the active version. Earlier copies of the same file are inactive versions. The number of versions retained by the server is determined by the copy group attributes in the management class.

**virtual file space**

A representation of a directory on a network-attached storage (NAS) file system as a path to that directory.

**virtual volume**

An archive file on a target server that represents a sequential media volume to a source server.

**volume**

A discrete unit of storage on disk, tape or other data recording medium that supports some form of identifier and parameter list, such as a volume label or input/output control. See also *scratch volume*, and *storage pool volume*.

**volume history file**

A file that contains information about volumes that have been used by the server for database backups and for export of administrator, node, policy, or server data. The file also has information about sequential-access storage pool volumes that have been added, reused, or deleted. The information is a copy of volume information that is recorded in the server database.

**Volume Shadow Copy Service**

A set of Microsoft application-programming interfaces (APIs) that you can use to create shadow copy backups of volumes, exact copies of files, including all open files, and so on.

**VSS** See *Volume Shadow Copy Service*.

**VSS Backup**

A backup operation that uses Microsoft Volume Shadow Copy Service (VSS) technology. The backup operation produces an online snapshot (point-in-time consistent copy) of Exchange data. This copy can be stored on local shadow volumes or on Tivoli Storage Manager server storage.

**VSS Fast Restore**

A function that uses a Microsoft Volume Shadow Copy Service (VSS) software provider to restore VSS Backups (IBM Data Protection for Exchange database files and log files) that reside on local shadow volumes.

**VSS Instant Restore**

A volume-level hardware-assisted Microsoft Volume Shadow Copy Service (VSS) function where target volumes that contain the snapshot are copied back to the original source volumes.

**VSS offloaded backup**

A backup operation that uses a Microsoft Volume Shadow Copy Service (VSS) hardware provider (installed on an alternate system) to move IBM Data Protection for Exchange data to the Tivoli Storage Manager server. This type of backup operation shifts the backup load from the production system to another system.

**VSS Restore**

A function that uses a Microsoft Volume Shadow Copy Service (VSS) software provider to restore VSS Backups (IBM Data Protection for Exchange database files and log files) that reside on Tivoli Storage Manager server storage to their original location.

**W****wildcard character**

A special character such as an asterisk (\*) or a question mark (?) that can be used to represent one or more characters. Any character or set of characters can replace the wildcard character.

**workstation**

A configuration of input/output equipment at which an operator works. A workstation is a terminal or microcomputer at which a user can run applications and that is usually connected to a mainframe or a network.

**worldwide name**

A 64-bit, unsigned name identifier that is unique.

**workload partition (WPAR)**

A partition within a single operating system instance.





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Program Number: 5608-E01, 5608-E02, 5608-E07

Printed in USA

SC23-9791-00

