



IBM Tivoli Storage Manager for UNIX Backup-Archive Clients Installation and User's Guide

Version 5 Release 1



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Note

Before using this information and the product it supports, read the general information under "Notices" on page 369.

Third Edition (September, 2002)

This edition applies to version 5, release 1, modification 5 of IBM Tivoli Storage Manager (5697-ISM, 5698-ISM), IBM Tivoli Storage Manager Extended Edition (5697-ISX, 5698-ISX) and to all subsequent releases and modifications until otherwise indicated in new editions.

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

Your feedback is important in helping to provide the most accurate and high-quality information. If you have comments about this manual or any other Tivoli Storage Manager documentation, you can send us comments electronically at:

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About this book

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

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

- A *server program* that permits systems to perform either as a backup and archive server or migration server for distributed workstations and file servers. The server program also supplies hierarchical storage management (HSM) services. See “Related publications” on page xiii for available server publications.
- An *administrative client program* that you can access from a Web browser or the command line. The program permits an administrator to control and monitor server activities, define storage management policies for backup, archive and space management services, and set up schedules to perform those services at regular intervals. For more information about the Administrative client, see “Related publications” on page xiii for available Storage Manager Administrator’s Reference publications.
- An *application program interface (API)* that permits you to enhance an existing application with storage management services. When an application is registered with a server as a client node, the application can back up, restore, archive, and retrieve objects from storage. For more information about the Storage Manager API, see *IBM Tivoli Storage Manager Using the Application Programming Interface*, GC32-0793.
- A *Web backup-archive client* that permits an authorized administrator, help desk person, or end user to perform backup, restore, archive, and retrieve services using a Web browser on a remote machine. See “Starting a Web client session” on page 52 for more information.

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

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

Who should read this manual

This manual provides instructions for an end-user to install, configure, and use the Storage Manager client. For installation information and supported operating system levels, see Chapter 1, “Installing Storage Manager”, on page 1. For configuration information, see Chapter 2, “Configuring Storage Manager”, on page 31.

This manual provides information to help you configure and use the backup-archive client on your workstation. You should be familiar with your workstation, your operating system, and your basic system administration.

Storage Manager tasks that can only be performed by authorized users and root users are identified by the phrases, **Authorized User** and **root user**. See “Root and authorized user tasks” on page 1 for more information about these tasks. An Authorized User is any user running with a real user ID of 0 (root) or a user who owns the 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*
```

Conventions used in this book

This book uses the following typographical conventions:

Table 1. Typographical conventions

Example	Description
<code>dsmc.nlm</code>	A series of lowercase letters with an extension indicates Storage Manager program file names.
archive	Boldface type indicates a command that you type at a workstation, such as a command you type on a command line.
<i>dateformat</i>	Boldface italic type indicates a 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>filespec</i>	Italicized type indicates either the name of a parameter, a new term, or a placeholder for information that you provide. Italics are also used for emphasis in the text.
<code>maxcmdretries</code>	Monospaced type represents fragments of a program or information as it would display on a screen.
plus sign (+)	A plus sign between two keys indicates you should press both keys at the same time.

Reading syntax diagrams

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

- The **▶**— symbol indicates the beginning of a syntax diagram.
- The —**▶** symbol at the end of a line indicates the syntax diagram continues on the next line.
- The **▶**— symbol at the beginning of a line indicates a syntax diagram continues from the previous line.
- The —**▶** symbol indicates the end of a syntax diagram.

Syntax items, such as a keyword or variable, can be:

- On the line (required element)
- Above the line (default element)
- Below the line (optional element).

Syntax diagram description	Example
----------------------------	---------

Abbreviations:

Uppercase letters denote the shortest acceptable truncation. If an item appears entirely in uppercase letters, it cannot be truncated.

You can type the item in any combination of uppercase or lowercase letters.

In this example, you can enter KEYWO, KEYWORD, or KEYWOrd.



Symbols:

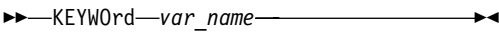
Enter these symbols exactly as they appear in the syntax diagram.

- | | |
|-----|-------------|
| * | Asterisk |
| { } | Braces |
| : | Colon |
| , | Comma |
| = | Equal Sign |
| - | Hyphen |
| () | Parentheses |
| . | Period |
| | Space |

Variables:

Italicized lowercase items (*var_name*) denote variables.

In this example, you can specify a *var_name* when you enter the KEYWORD command.

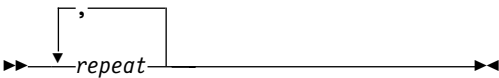


Repetition:

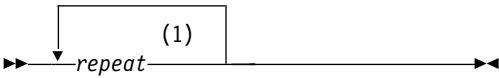
An arrow returning to the left means you can repeat the item.



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


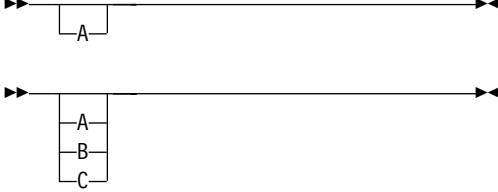

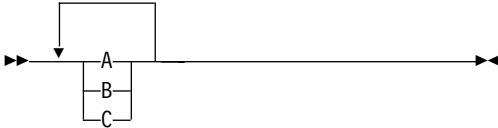



A footnote by the arrow references the number of times you can repeat the item.



Notes:

- 1 Specify *repeat* as many as 5 times.

Syntax diagram description	Example
<p>Required choices:</p> <p>When two or more items are in a stack and one of them is on the line, you <i>must</i> specify one item.</p> <p>In this example, you <i>must</i> choose A, B, or C.</p>	
<p>Optional choice:</p> <p>When an item is below the line, that item is optional. In the first example, you can choose A or nothing at all.</p> <p>When two or more items are in a stack below the line, all of them are optional. In the second example, you can choose A, B, C, or nothing at all.</p>	
<p>Defaults:</p> <p>Defaults are above the line. The default is selected unless you override it. You can override the default by including an option from the stack below the line.</p> <p>In this example, A is the default. You can override A by choosing B or C. You can also specify the default explicitly.</p>	
<p>Repeatable choices:</p> <p>A stack of items followed by an arrow returning to the left means you can select more than one item or, in some cases, repeat a single item.</p> <p>In this example, you can choose any combination of A, B, or C.</p>	
<p>Syntax fragments:</p> <p>Some diagrams, because of their length, must fragment the syntax. The fragment name appears between vertical bars in the diagram. The expanded fragment appears between vertical bars in the diagram after a heading with the same fragment name.</p>	<p>The fragment name:</p> 

Related publications

Included here is a list of the publications that are referred to in this manual.

Table 2. *Storage Manager client publications*

Publication title	Order number
Client publications	
<i>IBM Tivoli Storage Manager Messages</i>	GC32-0767
<i>IBM Tivoli Storage Manager for Windows Backup-Archive Clients Installation and User's Guide</i>	GC32-0788
<i>IBM Tivoli Storage Manager for NetWare Backup-Archive Client Installation and User's Guide</i>	GC32-0786
<i>IBM Storage Manager for Macintosh Backup-Archive Client Installation and User's Guide</i>	GC32-0787
<i>IBM Tivoli Space Manager for Unix Using the Hierarchical Storage Management Clients</i>	GC32-0794
<i>IBM Tivoli Storage Manager Using the Application Programming Interface</i>	GC32-0793
Server publications	
<i>IBM Tivoli Storage Manager for AIX Quick Start</i>	GC32-0770
<i>IBM Tivoli Storage Manager for AIX Administrator's Reference</i>	GC32-0769
<i>IBM Tivoli Storage Manager for AIX Administrator's Guide</i>	GC32-0768
<i>IBM Tivoli Storage Manager for AIX Managed System for SAN Storage Agent User's Guide</i>	GC32-0771
<i>IBM Tivoli Storage Manager for HP-UX Quick Start</i>	GC32-0774
<i>IBM Tivoli Storage Manager for HP-UX Administrator's Reference</i>	GC32-0773
<i>IBM Tivoli Storage Manager for HP-UX Managed System for SAN Storage Agent User's Guide</i>	GC32-0727
<i>IBM Tivoli Storage Manager for Linux Quick Start</i>	GC23-4692
<i>IBM Tivoli Storage Manager for Linux Administrator's Reference</i>	GC23-4691
<i>IBM Tivoli Storage Manager for Linux Managed System for SAN Storage Agent User's Guide</i>	GC23-4693
<i>IBM Tivoli Storage Manager for OS/390 and z/OS Quick Start</i>	GC32-0777
<i>IBM Tivoli Storage Manager for OS/390 and z/OS Administrator's Reference</i>	GC32-0776
<i>IBM Tivoli Storage Manager for OS/400 PASE Quick Start</i>	GC23-4696
<i>IBM Tivoli Storage Manager for Sun Solaris Quick Start</i>	GC32-0780
<i>IBM Tivoli Storage Manager for Sun Solaris Administrator's Reference</i>	GC32-0779
<i>IBM Tivoli Storage Manager for Sun Solaris Administrator's Guide</i>	GC32-0778
<i>IBM Tivoli Storage Manager for Sun Solaris Managed System for SAN Storage Agent User's Guide</i>	GC32-0781
<i>IBM Tivoli Storage Manager for Windows Quick Start</i>	GC32-0784
<i>IBM Tivoli Storage Manager for Windows Administrator's Guide</i>	GC32-0782

Accessing publications online

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

Tivoli Storage Manager Publications Version 5.1, SK3T-8176

The format of the publications is PDF and HTML. To access the publications using a Web browser, open the **infocenter.html** file. The file is in the appropriate publications directory on the product CD.

When IBM publishes an updated version of one or more online or hardcopy publications, they are posted to the Tivoli Information Center. You can access updated publications in the Tivoli Information Center from the following Customer Support for Tivoli products Web site:

<http://www.tivoli.com/support/documents/>

The Tivoli Information Center contains the most recent version of the books in the product library in PDF or HTML formats, or both. Translated Storage Manager publications are also available.

Note: If you print PDF documents on other than letter-sized paper, select the **Fit to page** check box in the **Adobe Acrobat Print** dialog. This option is available when you click **File → Print**. **Fit to page** ensures that the full dimensions of a letter-sized page print on the paper that you are using.

The IBM International Technical Support Center redbooks are available in softcopy on the IBM Redbooks Web site:

<http://www.redbooks.ibm.com>

Ordering publications

You can order many Tivoli publications online at the following Web sites:

<http://www.elink.ibm.link.ibm.com/public/applications/publications/cgibin/pbi.cgi>
<http://www.elink.ibm.link.ibm.com/pbl/pbl>

You can also order by telephone by calling one of these numbers:

- In the United States: 800-879-2755
- In Canada: 800-426-4968

In other countries, see the following Web site for a list of telephone numbers:

http://www.tivoli.com/inside/store/lit_order.html

Summary of changes for Storage Manager

This section summarizes changes made to the Tivoli Storage Manager (Storage Manager) product and this publication.

Technical changes for version 5.1.5 - September 2002

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

Lan-free data movement support on linux86 client

Storage Manager supports LAN-Free data movement in a storage area network (SAN) environment for the Linux86 client. LAN-Free data movement allows client data to move directly from the client to a SAN-attached storage device. Shifting the client data movement from the communications network to a SAN decreases the load on the server. This allows the server to support a greater number of simultaneous client connections. See “LAN-free data movement” on page 76 for more information.

New backup-archive option to preserve last access date of files

For backup and archive operations, you can use the *preservelastaccessdate* option to specify whether the client should reset the last access dates of backed up or archived files to their original value. The default behavior is to not reset the last access date. See “Preservelastaccessdate” on page 235 for more information.

Linux86 client support for the General Parallel File System (GPFS)

Storage Manager supports backup and restore of the General Parallel File System (GPFS) on the Linux86 client. See “Incremental” on page 307 for more information.

Enhanced domain processing

Domain processing is enhanced to allow you to include and exclude items from the domain. Previous versions of Storage Manager only allowed you to include items in the domain. See “Domain” on page 162 for more information.

64-Bit support for the Storage Manager HP-UX client

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

Support for a globally unique identifier (GUID)

The globally unique identifier (GUID) associates a client node with a host system. When you install the Tivoli software, the *tivguid* program is run to generate a GUID which is stored in the */etc/tivoli* directory on a UNIX system. The GUID for a client node on the server can change if the host system machine is corrupted, if the file entry is lost, or if a user uses the same node name from different host systems. You can perform the following functions from the command line:

- Create a new GUID
- View the current GUID
- Write a specific value
- Create another GUID even if one exists.

See “Associating your client node with a host system” on page 36 for more information.

Enhanced query backup and query archive commands

If you use the *detail* option with the **query archive** or **query archive** commands, the client displays the following additional information:

- Last modification date
- Last access date

See “Query Archive” on page 316 and “Query Backup” on page 318 for more information.

Technical changes for version 5.1 - April 2002

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

Support for Cyclical Redundancy Checking (CRC)

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

Support for processing Network Attached Storage (NAS) file system images

Through support of Network Data Management Protocol (NDMP), Storage Manager Windows NT, 2000, XP, AIX, and Solaris servers can efficiently back up and restore network attached storage (NAS) file system images to tape drives or libraries that are locally attached to the NAS file servers from Network Appliance. *NDMP support is available only on IBM Tivoli Storage Manager Extended Edition.* See “NDMP support version 5.1 requirements (Extended Edition only)” on page 2 for NDMP support requirements. See Appendix C, “Backing up NAS file systems using NDMP”, on page 363 for information on how to back up and restore NAS file system images using the Web client and command line client.

Support for logical volume backup as a single object (image backup) on Linux86 Client

The Linux86 client is enhanced to support a logical volume image backup of file systems and raw volumes. The Storage Manager server does not track individual files in the file system image. File system images are tracked as individual objects and management class policy will be applied to the file system image as a whole. See “Performing an image backup” on page 71 for more information.

Support for snapshot image backup of file systems and raw logical volumes on Linux86 Client

The traditional image backup prevents access to the volume by other system applications during the operation. For Linux86 *only*: Storage Manager can perform an snapshot image backup of file systems residing on a logical volume created by the Linux Logical Volume Manager, during which the volume is available to other system applications. See “Performing an image backup” on page 71 for more information.

Lan-free data movement support on HP-UX client

Storage Manager supports LAN-Free data movement in a storage area network (SAN) environment for the HP/UX client. LAN-Free data movement allows client data to move directly from the client to a SAN-attached storage device. Shifting the client data movement from the communications network to a SAN decreases the load on the server. This allows the server to support a greater number of simultaneous client connections. See “LAN-free data movement” on page 76 for more information.

Enhanced web client interface

The Web client interface is enhanced to support a JRE 1.3.1 Swing-enabled browser. The Web client facilitates the use of assistive devices for users with disabilities and contains improved keyboard navigation. The native look and feel of the platform running the browser is preserved. See “Starting a Web client session” on page 52 for more information.

Support for the z/OS file system on the OS/390 client

Storage Manager supports backup and restore of the z/OS file system on the OS/390 Client. See “Incremental” on page 307 for more information.

Support for the Sun Quick File System (QFS) 3.5.0 on the the Solaris client

Storage Manager supports backup, restore, archive and retrieve of the QFS file system on the Solaris client. QFS is a high-performance file system that enables file sharing in a SAN. It eliminates performance bottlenecks resulting from applications using very large file sizes. See “Incremental” on page 307 for more information.

Support for High Availability Cluster Multi Processing (HACMP) on AIX client

Storage Manager supports HACMP failover on AIX. This allows the client to continue operating in the event of an HACMP node failover and fallback.

Multiple session no query restore

The backup-archive clients can now utilize multiple restore sessions for no query restore operations, increasing the speed of restores. This is similar to the multiple backup session support. It exploits the mount point available on the server. If data is backed up on multiple tapes, and if the server has multiple mount points available, then the restore starts a session for each tape, up to the number your administrator configures. See “Resourceutilization” on page 243 for more information.

Consistent client return codes

Reliable, consistent, and documented return codes have been added to the command line client and the scheduler. This facilitates automation of client operations via user-written scripts. By using the **QUERY EVENT** command with the **FORMAT=DETAILED** option, administrators can now distinguish between scheduled backups that completed successfully with no skipped files and scheduled backups that completed successfully with one or more skipped files. Also if you use the processing option **preschedulecmd** to run a command, and that command returns a non-zero return code, the scheduled event will not run. This ensures that scheduled events will not run if prerequisite commands do not complete successfully. See “Return codes from the command line interface” on page 105, “Preschedulecmd/Prenschedulecmd” on page 233, and “Postschedulecmd/Postnschedulecmd” on page 231 for more information.

Chapter 1. Installing Storage Manager

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

You can access Storage Manager backup and archive features:

- Locally through the native Graphical User Interface (GUI)
- Locally through the native client command line interface
- Remotely or locally through the Web client interface

Root and authorized user tasks

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

As a **root user**, you can perform the following tasks:

- Install the backup-archive client.
- Back up or archive any file on a user's system.
- Restore or retrieve any file in storage.
- Back up, restore or query an image.
- Restore or query a backup set.

File access permissions do not restrict a root user.

As a **root user** or an **Authorized User**, you can perform the following tasks:

- Set or change the password for your workstation, if a password is required.
- Register your workstation with a server.
- Use the scheduler to perform scheduled tasks for your client node.
- Back up, archive, restore, or retrieve all eligible files in all locally mounted file systems on your workstation as permitted by your operating system file access permissions.
- Grant users access to specific files in storage.
- Delete backup and archive file systems from storage. (The node must have been granted backup or archive delete authority by a server administrator.)

Migrating from earlier versions

Upgrade path for clients and servers

As part of a migration plan from Storage Manager version 4.2 to Storage Manager version 5.1, Storage Manager clients and servers can be upgraded at different times. To help ensure that you can continue your backup and archive activities during the migration, note the following:

- A Storage Manager version 4.2 client can perform backup, restore, archive, and retrieve functions to a Storage Manager version 5.1 server.
- A Storage Manager version 5.1 client can perform backup, restore, archive, retrieve, and query functions to a Storage Manager version 4.2 or higher server.

- A Storage Manager V5.1 client can perform V3.1 functional level backup, restore, archive and retrieve functions to a Storage Manager Version 3.1 server on VM.
- A Storage Manager version 4.2 HSM client can perform migrate and recall functions to a Storage Manager Version 5.1 server.
- A Storage Manager version 5.1 HSM client can perform migrate and recall functions to a Storage Manager version 4.2 server.
- Data that has been backed up, archived, or migrated from a Storage Manager version 5.1 client to any Storage Manager server cannot be restored, retrieved, or recalled using a Storage Manager version 4.2 or lower level client.
- All command line administrative clients can administer Storage Manager version 4.2 and version 5.1 servers, and the V3.1 VM server.
- Storage agents and servers must be at the same level of code. When the server is upgraded, the storage agents which are using that particular server must be upgraded as well.

ACL support

See “File system and ACL support” on page 308 for a complete list of file systems for which Storage Manager provides ACL support.

NDMP support version 5.1 requirements (Extended Edition only)

Through support of Network Data Management Protocol (NDMP), Storage Manager can efficiently back up and restore NAS file systems to tape drives or libraries that are locally attached to the NAS file servers from Network Appliance. *NDMP support is available only on IBM Tivoli Storage Manager Extended Edition.*

NDMP support requires the following hardware and software :

- Storage Manager Version 5.1 server on AIX, Sun Solaris, and HP-UX.
- Storage Manager Version 5.1 client on Sun Solaris (32-bit and 64-bit) and AIX (32-bit and 64-bit).
- Network Appliance NAS file server. For supported models and operating systems, refer to:
www.tivoli.com/storage
- Tape drive and tape library. For supported combinations, refer to:
www.tivoli.com/storage

See Appendix C, “Backing up NAS file systems using NDMP”, on page 363 for further information, including how to back up and restore NAS file system images using the Web client and command line client.

Processing virtual mount points

Use the AFS/DFS versions of the backup client executables to process virtual mount points for AFS/DFS file systems. Version 3 and higher backup-archive clients do not process virtual mount points specified for AFS/DFS file systems. See Appendix A, “The AFS and DFS file backup clients”, on page 351 for more information.

Additional migration information

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

A command line administrative client is available on all client platforms. The primary intended interface to the server is the Web administrative interface and requires a Web browser. The Web administrative interface is packaged and installed with the server.

Client environment requirements

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

Attention

For current information concerning the client environment prerequisites for all Storage Manager supported client platforms refer to the README file that is shipped on the product installation media. For current information concerning Storage Manager, supported platforms, and documentation, refer to the Web site at:

http://www.tivoli.com/support/storage_mgr/tivolimain.html

Table 3. Client requirements

Operating system	Page
AIX client environment	3
HP-UX client environment	4
Linux for X86 client environment	5
Linux for zSeries or S/390 client environment	6
OS/390 and z/OS UNIX System Services client environment	7
Silicon Graphics IRIX client environment	8
Solaris client environment	8
Tru64 UNIX client environment	9

AIX client environment

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

Client components

- Backup-archive client (command-line and GUI)
- Administrative client (command-line)
- Web backup-archive client
- Storage Manager API (32-bit and 64-bit)
- AIX 4.3.3 only:
 - AFS/DFS client
 - X/Open API

Notes:

1. For more information about the Storage Manager API and X/Open API, see *IBM Tivoli Storage Manager Using the Application Programming Interface*, GC32-0793.
2. For more information about the Administrative client, see *IBM Tivoli Storage Manager for AIX Administrator's Reference*, GC32-0769

Hardware requirements

- AIX 4.3.3: A RISC System/6000 or pSeries
- AIX 5L: A Power PC machine (64-bit CHRP-compliant)
- Disk space: see the README file that is shipped on the product installation media
- Memory: 128 MB

This includes any applications running on IBM's Scalable POWERparallel Systems 2 (SP2).

For HACMP:

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

Software requirements

- AIX 4.3.3
- AIX 5L for POWER V5.1 (32-bit and 64-bit) with JFS2 file system support
- AIX 4.3.3 and AFS 3.6 for Storage Manager AIX AFS client
- AIX 4.3.3 and DCE/DFS 3.1 for Storage Manager AIX DFS client
- For HACMP: HACMP 4.4 or later

Tivoli Global Unique Identifier (TIVguid) is a prerequisite for the TSM API and Backup Archive Client and must be installed first. See the README.GUID file for more information. Also see "Associating your client node with a host system" on page 36.

Communication methods

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

Additional software requirements

The backup-archive client GUI requires:

- X Window System X11R6
- Motif 1.2 or 2.0
- Common Desktop Environment (CDE)

HP-UX client environment

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

Client components

- Backup-archive client (command-line and GUI)
- Administrative client (command line)
- Storage Manager API (32-bit and 64-bit)
- X/Open API
- Web backup-archive client

Notes:

1. For more information about the Storage Manager API and X/Open API, see *IBM Tivoli Storage Manager Using the Application Programming Interface*, GC32-0793.
2. For more information about the Administrative client, see *IBM Tivoli Storage Manager for HP-UX Administrator's Reference*, GC32-0773

Hardware requirements

- An HP 9000 Series 700 or 800 workstation or server
- Disk space: see the README file that is shipped on the product installation media
- Memory: 128 MB

Software requirements

- HP-UX 11.0, HP-UX 11i

Communications methods

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

Additional software requirements

The backup-archive client GUI requires:

- X Window System X11R6
- Motif 2.0
- Common Desktop Environment (CDE)
- CDE online help facility libraries: libDtHelp.sl and libDtSvc.sl, typically located in /usr/dt/lib.

Linux for X86 client environment

This section contains client environment information, Storage Manager client components, and hardware and software requirements for the Linux for X86 (Linux86) platform.

Client components

- Backup-archive client (command-line and GUI)
- Administrative client (command line)
- Storage Manager API
- Web backup-archive client

Notes:

1. For more information about the Storage Manager API, see *IBM Tivoli Storage Manager Using the Application Programming Interface*, GC32-0793.
2. For more information about the Administrative client, see *IBM Tivoli Storage Manager for Linux Administrator's Reference*, GC23-4691

Hardware requirements

- X86 based PC architecture (for example Pentium) or higher
- Disk space: see the README file that is shipped on the product installation media

- Memory: 64 MB

Software requirements

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

- Linux kernel 2.4.0 or higher
- glibc 2.2
- libstdc++2.9.0 or higher
- X Window System X11R6 (for end user GUI only)
- RPM 3.0.0 or higher, 4.0

The following Linux distributions meet these requirements:

- SuSE 7.2., 7.3 and 8.0
- RedHat 7.1, 7.2, 7.3 and Advanced Server v.2.1
- Turbo Linux 7.0 and 7.5

Notes:

1. Tivoli Global Unique Identifier (TIVguid) is a prerequisite for the TSM API and the backup-archive client and must be installed first. See the README.GUID file for more information. Also see “Associating your client node with a host system” on page 36.
2. The Linux for X86 client was certified by Tivoli for these distributions. Please verify for other distributions that the software requirements listed above are fulfilled.
3. Please note that X Windows System X11R6 is a requirement to install the client. If it is not installed and you do not plan to use the end user GUI, you have to add the --nodeps option of rpm to disable the check for requirements.

Communication methods

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

Linux for zSeries or S/390 client environment

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

Client components

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

Notes:

1. For more information about the Storage Manager API, see *IBM Tivoli Storage Manager Using the Application Programming Interface*, GC32-0793.
2. For more information about the Administrative client, see *IBM Tivoli Storage Manager for Linux Administrator's Reference*, GC23-4691

Hardware requirements

- A 9672 G5 or G6, Multiprise 3000, or zSeries 900 (32-bit mode)

- Disk space: see the README file that is shipped on the product installation media.
- Memory: 64 MB

Software requirements

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

- Linux kernel 2.4.7 or higher
- glibc 2.2.2 or higher
- libstdc++2.9.0 or higher
- RPM 3.0.6 or higher

The Linux distributions that fulfill these requirements include:

- SLES-7

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

Communication methods

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

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

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

Client components

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

Notes:

1. For more information about the Storage Manager API, see *IBM Tivoli Storage Manager Using the Application Programming Interface*, GC32-0793.
2. For more information about the Administrative client, see *IBM Tivoli Storage Manager for OS/390 and z/OS Administrator's Reference*, GC32-0776

Hardware requirements

- Any System/390 or zSeries architecture CPU
- Disk space: see the README file that is shipped on the product installation media.

Software requirements

- OS/390 V2R9, or V2R10 with SMP/E
- z/OS V1R1 or z/OS V1R2

Communication methods

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

Silicon Graphics IRIX client environment

This section contains client environment information, Storage Manager client components, and hardware and software requirements for the Silicon Graphics IRIX platform.

Client components

- Backup-archive client (command-line and GUI)
- Administrative client (command-line)
- Storage Manager API
- Web backup-archive client

Notes:

1. For more information about the Storage Manager API, see *IBM Tivoli Storage Manager Using the Application Programming Interface*, GC32-0793.
2. For more information about the Administrative client, see *IBM Tivoli Storage Manager for AIX Administrator's Reference*, GC32-0769

Hardware requirements

- A SGI workstation with MIPS processor IP19 (R4K) or higher
- Disk space: see the README file that is shipped on the product installation media.
- Memory: 128 MB

Software requirements

- IRIX UNIX 6.5 with EFS or XFS File systems

Communication methods

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

Additional software requirements

The backup-archive client GUI requires:

- X Window System X11R6
- Motif 1.2 or 2.0

Solaris client environment

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

Client components

- Backup-archive client (command-line and GUI)
- Administrative client (command-line)
- Storage Manager API (32-bit and 64-bit)
- X/Open API
- Web backup-archive client

Notes:

1. For more information about the Storage Manager API and X/Open API, see *IBM Tivoli Storage Manager Using the Application Programming Interface*, GC32-0793.
2. For more information about the Administrative client, see *IBM Tivoli Storage Manager for Sun Solaris Administrator's Reference*, GC32-0779

Hardware requirements

- A SPARCstation based on sun4u architecture
- Disk space: see the README file that is shipped on the product installation media
- Memory: 128 MB

Software requirements

One of the following operating systems:

- Sun Solaris 2.6 - 32bit kernel mode
- Sun Solaris 7 - 32bit or 64bit kernel mode
- Sun Solaris 8 - 32bit or 64bit kernel mode
- Sun Solaris 9 - 32bit or 64bit kernel mode

Tivoli Global Unique Identifier (TIVguid) is a prerequisite for the TSM API and the backup-archive client and must be installed first. See the README.GUID file for more information. Also see "Associating your client node with a host system" on page 36.

Communication methods

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

Additional software requirements

The backup-archive client GUI requires:

- X Window System X11R6
- Motif 2.0
- CDE online help facility libraries: libDtHelp.sl and libDtSvc.sl, typically located in /usr/dt/lib

Tru64 UNIX client environment

This section contains client environment information, Storage Manager client components, and hardware and software requirements for the Tru64 UNIX platform.

Client components

- Backup-archive client (command-line and GUI)
- Administrative client (command-line)
- Storage Manager API
- Web backup-archive client

Notes:

1. For more information about the Storage Manager API, see *IBM Tivoli Storage Manager Using the Application Programming Interface*, GC32-0793.
2. For more information about the Administrative client, see *IBM Tivoli Storage Manager for AIX Administrator's Reference*, GC32-0769

Hardware requirements

- Any Compaq Alpha-processor machine
- Disk space: see the README file that is shipped on the product installation media
- Memory: 128 MB

Software requirements

- Tru64 UNIX version 5.1 or 5.1A

Communication methods

To use this communication method:	Install this software:	To connect to these Storage Manager servers:
TCP/IP	TCP/IP (Standard with Tru64 UNIX)	AIX, HP-UX, Linux, OS/390, OS/400 PASE, Solaris, VM, Windows NT, z/OS

Additional software requirements

The backup-archive client GUI requires:

- X Window System X11R6
- Motif 1.2 or 2.0
- CDE

Pre-installation information

The client images, except the OS/390 and z/OS UNIX client, are contained on Storage Manager product CD-ROMs for the UNIX clients and the desktop clients. The images reside in the `tsmcli/'platform'/` directory structure, where 'platform' is one of the following platform designations: **hp11**, **linux86**, **linux390**, **sgi**, **solaris**. The AIX and AIX 5L client images are in the `/usr/sys/inst.images` directory. See the following publications for information about available OS/390 UNIX client installation media:

- *Program Directory for IBM Tivoli Storage Manager, S/390 Edition Backup-Archive Client* (5698-ISE, order number GI11-0874)
- *Program Directory for IBM Tivoli Storage Manager, S/390 Edition Backup-Archive Client* (5697-ISE), order number GI11-0922
- *Program Directory for IBM Tivoli Storage Manager, S/390 Edition Backup-Archive Client* (5698-ISM, order number GI11-0875)
- *Program Directory for IBM Tivoli Storage Manager, S/390 Edition Backup-Archive Client* (5697-ISM), order number GI11-0912
- *Program Directory for IBM Tivoli Storage Manager, S/390 API* (5698-ISE), order number GI11-0872

- *Program Directory for IBM Tivoli Storage Manager, S/390 API (5697-ISE)*, order number GI11-0921
- *Program Directory for IBM Tivoli Storage Manager, S/390 API (5698-ISM)*, order number GI11-0873
- *Program Directory for IBM Tivoli Storage Manager, S/390 API (5697-ISM)*, order number GI11-0911

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

- Install directly from the CD-ROM.
- Create client images to install.
- Transfer installable files from the UNIX CD-ROMs to a target workstation.

Online startup information

You can display online startup information, product manuals, and READMEs. On a Web browser:

1. Click **File** and then click **Open File**.
2. Select the CD-ROM drive.
3. Select the **START.HTM** file.

Installing the backup-archive client

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

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

After installation completes, see Chapter 2, “Configuring Storage Manager”, on page 31 for required and optional tasks to perform before using Storage Manager.

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

Table 4. Unix client installation reference

Installation instructions	Page
Installing the AIX clients	13
Installing the AIX 5L client	15
Installing the HP-UX clients	17
Installing the Linux86 client	20
Installing the Linux390 client	22

Table 4. Unix client installation reference (continued)

Installation instructions	Page
For information on Installing the OS/390 and z/OS UNIX System Services Client, see the following publications:	
<ul style="list-style-type: none"> • <i>Program Directory for IBM Tivoli Storage Manager, S/390 Edition Backup-Archive Client</i> (5698-ISE, order number GI11-0874) • <i>Program Directory for IBM Tivoli Storage Manager, S/390 Edition Backup-Archive Client</i> (5697-ISE), order number GI11-0922 • <i>Program Directory for IBM Tivoli Storage Manager, S/390 Edition Backup-Archive Client</i> (5698-ISM, order number GI11-0875) • <i>Program Directory for IBM Tivoli Storage Manager, S/390 Edition Backup-Archive Client</i> (5697-ISM), order number GI11-0912 • <i>Program Directory for IBM Tivoli Storage Manager, S/390 API</i> (5698-ISE), order number GI11-0872 • <i>Program Directory for IBM Tivoli Storage Manager, S/390 API</i> (5697-ISE), order number GI11-0921 • <i>Program Directory for IBM Tivoli Storage Manager, S/390 API</i> (5698-ISM), order number GI11-0873 • <i>Program Directory for IBM Tivoli Storage Manager, S/390 API</i> (5697-ISM), order number GI11-0911 	
Installing the Silicon Graphics IRIX clients	24
Installing the Solaris clients	25
Installing the Tru64 UNIX clients	28

Installing the AIX clients

Attention

For current installation and configuration information for the Storage Manager program product, refer to the README file that is shipped on the product installation media. For current information concerning supported platforms, and for the latest documentation, refer to the product Web site at: http://www.tivoli.com/support/storage_mgr/tivolimain.html

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

tivoli.tsm.client.ba.aix43.32bit

Installs the backup-archive client files (command-line and GUI), administrative client (command-line), and HSM into the `/usr/tivoli/tsm/client/ba/bin` directory.

tivoli.tsm.client.image.aix43.32bit

Installs the image backup component into the `/usr/tivoli/tsm/client/ba/bin` directory.

tivoli.tsm.client.web.aix43.32bit

Installs the Web client into the `/usr/tivoli/tsm/client/ba/bin` directory.

tivoli.tsm.client.nas.aix43.32bit

Installs the NAS backup component into the `/usr/tivoli/tsm/client/ba/bin` directory.

tivoli.tsm.client.books

Installs the PDF and HTML book files into the `/usr/tivoli/tsm/client/books` directory.

tivoli.tsm.client.ba.msg.lang

Installs NL messages for the Backup-Archive client. Where *lang* is the language identifier, for example `Ja_JP` for Japanese. American English messages are already included in the backup-archive client code. The default installation directory is `/usr/tivoli/tsm/client/ba/bin/lang`, where *lang* is the language identifier.

tivoli.tsm.client.api.aix43.32bit

Installs the 32 bit API into the `/usr/tivoli/tsm/client/api/bin` directory.

tivoli.tsm.client.api.aix43.64bit

Installs the 64 bit API into the `/usr/tivoli/tsm/client/api/bin64` directory.

tivoli.tsm.client.api.msg.lang

Installs the NL messages for API. Where *lang* is the language identifier, for example `Ja_JP` for Japanese. American English messages are already included in the API client code. The default installation directory is `/usr/tivoli/tsm/client/api/bin/lang`, where *lang* is the language identifier.

tivoli.tsm.client.afs.aix43.32bit

Installs the AFS backup-archive client files (command-line and GUI), into the `/usr/tivoli/tsm/client/ba/bin` directory.

tivoli.tsm.client.dfs.aix43.32bit

Installs the DFS backup-archive client files (command-line and GUI), into the `/usr/tivoli/tsm/client/ba/bin` directory.

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

If you are installing from a Storage Manager image run, the following command from the directory to which you copied the Storage Manager image:

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

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

Notes:

1. Tivoli Global Unique Identifier (TIVguid) is a prerequisite for the TSM API and the backup-archive client and must be installed first. See the README.GUID file for more information. Also see “Associating your client node with a host system” on page 36.
2. Do not put any user created files into `/usr/tivoli/tsm/client/ba/bin`, the base directory into which the product is installed. Any and all files in this directory might be deleted during installation processing. Include-exclude files, `dsm.opt`, and `dsm.sys` files should not reside in this directory.

To install Storage Manager from the CD-ROM:

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

The Storage Manager files are installed in the `/usr/tivoli/tsm/client/ba/bin` directory. If you move the 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 `/usr/bin` directory and in 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 Storage Manager sets the `DSM_DIR` environment variable to the newly installed directory.

See Appendix A, “The AFS and DFS file backup clients”, on page 351 for special considerations when installing and configuring the Storage Manager client for AFS/DFS on an AIX workstation.

After installation completes, see Chapter 2, “Configuring Storage Manager”, on page 31 for required and optional tasks to perform before using Storage Manager.

Installing the AIX 5L client

Attention

For current installation and configuration information for the Storage Manager product, refer to the README file that is shipped on the product installation media. For current information concerning Storage Manager, supported platforms, and documentation, refer to the Web site at:
http://www.tivoli.com/support/storage_mgr/tivolimain.html

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

tivoli.tsm.client.ba.aix51.64bit.base

Installs the backup-archive client files (command-line and GUI), administrative client (command-line) into the `/usr/tivoli/tsm/client/ba/bin` directory.

tivoli.tsm.client.ba.aix51.64bit.common

Installs the Storage Manager common files into the `/usr/tivoli/tsm/client/ba/bin` directory.

tivoli.tsm.client.ba.aix51.64bit.image

Installs the image backup component into the `/usr/tivoli/tsm/client/ba/bin` directory.

tivoli.tsm.client.ba.aix51.64bit.web

Installs the Web client into the `/usr/tivoli/tsm/client/ba/bin` directory.

tivoli.tsm.client.ba.aix51.64bit.nas

Installs the NAS backup component into the `/usr/tivoli/tsm/client/ba/bin` directory.

tivoli.tsm.client.books

Installs the PDF and HTML book files into the `/usr/tivoli/tsm/client/books` directory.

tivoli.tsm.client.ba.msg.lang

Installs NL messages for the Backup-Archive client. Where *lang* is the language identifier, for example Ja_JP for Japanese. American English messages are already included in the backup-archive client code. The default installation directory is `/usr/tivoli/tsm/client/ba/bin/lang`, where *lang* is the language identifier.

tivoli.tsm.client.ba.aix51.64bit.api

Installs the 64 bit API into the `/usr/tivoli/tsm/client/api/bin64` directory.

tivoli.tsm.client.api.msg.lang

Installs the NL messages for API. Where *lang* is the language identifier, for example Ja_JP for Japanese. American English messages are already included in the API client code. The default installation directory is `/usr/tivoli/tsm/client/api/bin/lang`, where *lang* is the language identifier.

Note: The AIX 5L client does not support the AFS/DFS backup-archive client.

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

If you are installing from a Storage Manager image run, the following command from the directory to which you copied the Storage Manager image:

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

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

Notes:

1. Tivoli Global Unique Identifier (TIVguid) is a prerequisite for the TSM API and the backup-archive client and must be installed first. See the README.GUID file for more information. Also see “Associating your client node with a host system” on page 36.
2. Do not put any user created files into `/usr/tivoli/tsm/client/ba/bin`, the base directory into which the product is installed. Any and all files in this directory might be deleted during installation processing. Include-exclude files, `dsm.opt`, and `dsm.sys` files should not reside in this directory.

To install Storage Manager from the CD-ROM:

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

The Storage Manager files are installed in the `/usr/tivoli/tsm/client/ba/bin` directory. If you move the 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 `/usr/bin` directory and in 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 Storage Manager sets the `DSM_DIR` environment variable to the newly installed directory.

After installation completes, see Chapter 2, “Configuring Storage Manager”, on page 31 for required and optional tasks to perform before using Storage Manager.

Installing the HP-UX clients

Attention

For current installation and configuration information for the Storage Manager program product, refer to the README file that is shipped on the product installation media. For current information concerning Storage Manager, supported platforms, and documentation, refer to the Web site at: http://www.tivoli.com/support/storage_mgr/tivolimain.html

The following source packages are available on the installation media:

tsmcli/hp11/TIVsmC

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

TIVsm.CLIENT

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

TIVsm.CLIENT_API

Contains the 32-bit API with the English message catalogues.

TIVsm.CLIENT_DOC

Contains the documentation.

Note: Additional language support is available under the top level product name of **TIVsmC.msg.lang**, with component names **TIVsm.CLIENT_msg_lang** and **TIVsm.CLIENT_API_lang**. Replace *lang* with the appropriate language code from Table 5 on page 18.

tsmcli/hp11/TIVsmCapi64

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

TIVsm.CLIENT_API64

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

Note: Additional language support is available under the top level product name of **TIVsm64**. The component under this is **TIVsm.CLIENT_API64_lang**. Replace *lang* with the appropriate language code from Table 5 on page 18.

tsmcli/hp11/TIVsmCapi

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

TIVsm.CLIENT_API

Contains the 32-bit API with the English message catalogues.

Note: Additional language support is available under the top level product name of **TIVsm**. The component under this is **TIVsm.CLIENT_API_lang**. Replace *lang* with the appropriate language code from Table 5 on page 18.

Table 5. Language codes for installation packages

Language	Language code
Japanese	ja_JP
Korean	ko_KR
Simplified Chinese	zh_CN
Traditional Chinese	zh_TW

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

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

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

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

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

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

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

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

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

To install only the API or the documentation, omit the last TIVsm from the command above, and mark only the fileset for installation in the swinstall user interface you want to install. The Client needs the API for Raw Logical Volume backup. Therefore, if you mark CLIENT for installation the API must also be installed.

To install additional languages, execute the following commands:

```
swinstall -x mount_all_filesystems=false -v -s 'pwd'/  
TIVsmC.msg.lang  
TIVsm.CLIENT_msg_lang TIVsm.CLIENT_API_lang
```

or

```
swinstall -x mount_all_filesystems=false -v -s 'pwd'/TIVsmCapi64.msg.lang  
TIVsm.CLIENT_API64_lang
```

or

```
swinstall -x mount_all_filesystems=false -v -s 'pwd'/TIVsmCapi.msg.lang  
TIVsm.CLIENT_API_lang
```

Replace *lang* with the appropriate language code from Table 5.

During installation:

- The Storage Manager backup-archive and Web client files are installed in the /opt/tivoli/tsm/client/ba/bin directory.

- The administrative client (dsmadm) is installed in /opt/tivoli/tsm/client/admin/bin.
- The Storage Manager API files are installed in the /opt/tivoli/tsm/client/api/bin directory.
- The Tivoli Storage Manager API 64 files are installed in the /opt/tivoli/tsm/client/api/bin64 directory.
- The Storage Manager documentation files are installed in /opt/tivoli/tsm/client/books.

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

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

After installation completes, see Chapter 2, “Configuring Storage Manager”, on page 31 for required and optional tasks to perform before using Storage Manager.

Installing the Linux86 client

Attention

For current installation and configuration information for the Storage Manager program product, refer to the README file that is shipped on the product installation media. For current information concerning Storage Manager, supported platforms, and documentation, refer to the Web site at: http://www.tivoli.com/support/storage_mgr/tivolimain.html

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

tsmcli/linux86/TIVsm-BA

Installs the backup-archive client (command-line and GUI), administrative client (command-line), and the Web client.

tsmcli/linux86/TIVsm-API

Installs the API.

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

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

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

Use the following procedure to install the Storage Manager clients:

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

```
/cdrom/tsmcli/linux86
```

3. Enter the following command to install the English version of the API:

```
rpm -i TIVsm-API.i386.rpm
```

To install additional language support, enter the following command:

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

Replace *lang* with the appropriate language code from Table 6 on page 21.

Notes:

- a. To circumvent the dependence check use the --nodeps option. You must check the dependencies manually.
 - b. Tivoli Global Unique Identifier (TIVguid) is a prerequisite for the TSM API and the backup-archive client and must be installed first. See the README.GUID file for more information. Also see “Associating your client node with a host system” on page 36.
 - c. The backup-archive client requires the API package to perform image backups.
4. Enter the following command to install English versions of the backup-archive client (command-line and GUI), the administrative client (command-line), and the Web client:

```
rpm -i TIVsm-BA.i386.rpm
```

To install additional language support, enter the following command:


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

Replace *lang* with the appropriate language code from Table 6.

Notes:

- a. To circumvent the dependence check use the `--nodeps` option. You must check the dependencies manually.
- b. Tivoli Global Unique Identifier (TIVguid) is a prerequisite for the TSM API and the backup-archive client and must be installed first. See the README.GUID file for more information. Also see “Associating your client node with a host system” on page 36.

Table 6. Language codes for installation packages

Language	Language code
German	de_DE
Spanish	es_ES
French	fr_FR
Italian	it_IT
Brazilian Portugese	pt_BR
Japanese	ja_JP
Korean	ko_KR
Simplified Chinese	zh_CN, zh_CN.GB18030
Traditional Chinese	zh_TW

During installation :

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

After installation completes, see Chapter 2, “Configuring Storage Manager”, on page 31 for required and optional tasks to perform before using Storage Manager.

Installing the Linux390 client

Attention

For current installation and configuration information for the Storage Manager program product, refer to the README file that is shipped on the product installation media. For current information concerning Storage Manager, supported platforms, and documentation, refer to the Web site at: http://www.tivoli.com/support/storage_mgr/tivolimain.html

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

tsmcli/linux390/TIVsm-BA

Installs the backup-archive client (command-line and GUI), administrative client (command-line), and the Web client.

tsmcli/linux390/TIVsm-API

Installs the API (libraries for 32 Bit applications).

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

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

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

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

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

```
/cdrom/tsmcli/linux390
```

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

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

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

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

4. Enter the following command to install the API:

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

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

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

During installation :

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

- The Storage Manager documentation files are installed in the `/opt/tivoli/tsm/client/books/html` and `/opt/tivoli/tsm/client/books/pdf` directories.

After installation completes, see Chapter 2, “Configuring Storage Manager”, on page 31 for required and optional tasks to perform before using Storage Manager.

Installing the Silicon Graphics IRIX clients

Attention

For current installation and configuration information for the Storage Manager program product, refer to the README file that is shipped on the product installation media. For current information concerning Storage Manager, supported platforms, and documentation, refer to the Web site at: http://www.tivoli.com/support/storage_mgr/tivolimain.html

The following packages are available within the install image on the installation media:

TSM.sw.base

Installs the backup-archive client (command-line and GUI) and administrative client (command-line).

TSM.sw.api

Installs the API.

TSM.sw.web

Installs the Web client.

To remove previous Storage Manager client versions use the Software Manager (swmgr).

Use the following procedure to install the Storage Manager clients:

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

```
/cdrom/tsmcli/sgi
```

3. Log in as the root user, insert the CD-ROM, and enter the following command:

```
/usr/sbin/inst -A -f `pwd`
```

Note: `pwd` may be replaced with the absolute name of the current directory.

4. To selectively install one or more components, enter the following command:

```
/usr/sbin/inst -a -f `pwd` -I TSM.sw.base[,TSM.sw.api][,TSM.sw.web]
```

Notes:

- a. You can also use the Software Manager (swmgr) to install selectively.
- b. The Web client uses files of the backup-archive client component. Ensure that both components are the same level.

During installation:

- The Storage Manager backup-archive files are installed in the /usr/tivoli/tsm/client/ba/bin directory.
- The API files are installed in the /usr/tivoli/tsm/client/api/bin directory.
- The Web client files are installed in the client directory.

After installation completes, see Chapter 2, “Configuring Storage Manager”, on page 31 for required and optional tasks to perform before using Storage Manager.

Installing the Solaris clients

Attention

For current installation and configuration information for the Storage Manager program product, refer to the README file that is shipped on the product installation media. For current information concerning Storage Manager, supported platforms, and documentation, refer to the Web site at: http://www.tivoli.com/support/storage_mgr/tivolimain.html

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

API Packages:

TIVsmCapi.pkg

Contains the Storage Manager Application Programming Interface (API), the Storage Manager API shared libraries (32 and 64 Bit mode) and samples.

TIVsmCaJa.pkg

Contains the Storage Manager Japanese API messages.

TIVsmCaKo.pkg

Contains the Storage Manager Korean API messages.

TIVsmCaSc.pkg

Contains the Storage Manager Simplified Chinese API messages.

TIVsmCaTc.pkg

Contains the Storage Manager Traditional Chinese API messages.

TIVsmCaBc.pkg

Contains the Storage Manager Traditional Chinese (BIG5) API messages.

Backup-Archive Packages:

TIVsmCba.pkg

Contains the Storage Manager backup-archive client (command-line and GUI), the administrative client (command-line), and the Web backup-archive client.

TIVsmCbJa.pkg

Contains the Storage Manager Japanese backup-archive client messages.

TIVsmCbKo.pkg

Contains the Storage Manager Korean backup-archive client messages.

TIVsmCbSc.pkg

Contains the Storage Manager Simplified Chinese backup-archive client messages.

TIVsmCbTc.pkg

Contains the Storage Manager Traditional Chinese backup-archive client messages.

TIVsmCbBc.pkg

Contains the Storage Manager Traditional Chinese (BIG5) backup-archive client messages.

HSM Package:

TIVsmChsm.pkg

Contains Storage Manager Hierarchical Storage Management (HSM).

Documentation Package:

TIVsmCdoc.pkg

Contains Storage Manager documentation in html and pdf format.

Use the following procedure to install the Storage Manager clients:

1. Remove previous versions of ADSM or Tivoli Storage Manager:

- To remove previous Tivoli Storage Manager versions, enter:

```
pkgrm TIVsmCba TIVsmCapi TIVsmCdoc
```

- To remove previous ADSM versions, enter:

```
pkgrm IBMadsm-w IBMadsm-c IBMadsm-a IBMadsm-h
```

Note: Ensure that you uninstall these packages in the given order.

2. Change to the directory where the packages are stored:

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

Notes:

- a. If the Storage Manager UNIX client CD-ROM is not mounted to /cdrom or if the packages are stored in a different directory (e.g. downloaded by ftp), please change to the correct directory.
 - b. Tivoli Global Unique Identifier (TIVguid) is a prerequisite for the TSM API and the backup-archive client and must be installed first. See the README.GUID file for more information. Also see “Associating your client node with a host system” on page 36.
3. As root user, enter the following commands and include the package name. For example, to install the backup-archive client (english version), enter:

```
pkgadd -d ./TIVsmCapi.pkg TIVsmCapi
```

```
pkgadd -d ./TIVsmCba.pkg TIVsmCba
```

To install the Asian messages (optional):

Storage Manager Japanese messages:

```
pkgadd -d ./TIVsmCaJa.pkg TIVsmCaJa
```

```
pkgadd -d ./TIVsmCbJa.pkg TIVsmCbJa
```

Storage Manager Korean messages:

```
pkgadd -d ./TIVsmCaKo.pkg TIVsmCaKo
```

```
pkgadd -d ./TIVsmCbKo.pkg TIVsmCbKo
```

Storage Manager Simplified Chinese messages:

```
pkgadd -d ./TIVsmCaSc.pkg TIVsmCaSc
```

```
pkgadd -d ./TIVsmCbSc.pkg TIVsmCbSc
```

Storage Manager Traditional Chinese messages:

```
pkgadd -d ./TIVsmCaTc.pkg TIVsmCaTc
```

```
pkgadd -d ./TIVsmCbTc.pkg TIVsmCbTc
```

Storage Manager Traditional Chinese (Big5) messages:

```
pkgadd -d ./TIVsmCaBc.pkg TIVsmCaBc
```

```
pkgadd -d ./TIVsmCbBc.pkg TIVsmCbBc
```

4. If you want to install the documentation, enter:

```
pkgadd -d ./TIVsmCdoc.pkg TIVs
```

5. Answer Yes (y) to all questions about setuid, setgid, superuser permissions during installation.

Note: If you do not want be prompted for these questions during installation, use the -a option of the pkgadd command and the tsmadmin file. For example, to install the backup-archive client (english version) use the following alternative syntax:

```
pkgadd -a ./tsmadmin -d ./TIVsmCapi.pkg TIVsmCapi
pkgadd -a ./tsmadmin -d ./TIVsmCba.pkg TIVsmCba
```

This also applies to Asian message packages.

Note: To display the Storage Manager help browser menus in your locale language, ensure the NLSPATH environment variable in the /etc/profile file contains the following path:

```
/usr/dt/lib/nls/msg/%L/%N.cat
```

During installation :

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

After installation completes, see Chapter 2, “Configuring Storage Manager”, on page 31 for required and optional tasks to perform before using Storage Manager.

Installing the Tru64 UNIX clients

Attention

For current installation and configuration information for the Storage Manager program product, refer to the README file that is shipped on the product installation media. For current information concerning Storage Manager, supported platforms, and documentation, refer to the Web site at: http://www.tivoli.com/support/storage_mgr/tivolimain.html

The following packages are available on the installation media:

tsmcli/tru64/TIVsmCba

Installs the backup-archive client (command-line and GUI), the administrative client (command-line), and the Web client.

tsmcli/tru64/TIVsmCapi

Installs the API.

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

```
/usr/sbin/setld -d TIVSMCBA TIVSMCAPI
```

Use the following procedure to install the Storage Manager clients:

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

```
tsmcli/tru64
```

3. Copy the file `tru64/TIVsm.tar` into the installation directory.
4. Extract the tar file by entering:

```
tar -xf TIVsm.tar
```

5. Install the backup-archive client and the API package by entering:

```
/usr/sbin/setld -l `pwd` TIVSMCBA TIVSMCAPI
```

Notes:

- a. ``pwd`` may be replaced with the absolute name of the current directory.
- b. Omit TIVSMCAPI if you do not want to install the Storage Manager API.

The Storage Manager files are installed in the `/usr/tivoli/tsm` directory. The Web client files are installed in the client directory. If you move the 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 `usr/bin` directory.
3. Ensure that every user of Storage Manager sets the `DSM_DIR` environment variable to the new installation directory.

After installation completes, see Chapter 2, “Configuring Storage Manager”, on page 31 for required and optional tasks to perform before using Storage Manager.

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

Table 7. Storage Manager server Quick Start publications

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

Chapter 2. Configuring Storage Manager

Attention

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

After installation, *required* configuration tasks include the following:

Task	Page
Creating and modifying the client system options file (required root user or authorized user task)	31
Registering your workstation with a server (required)	35

Optional configuration tasks include the following:

Task	Page
Creating an include-exclude list (optional)	37
Setting environment variables	44
Creating a default client user options file (optional root user or authorized user task)	32
Creating a customized client user options file (optional user task)	34
Associating your client node with a host system	36

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

During installation, the sample client system options file `dsm.sys.smp` is placed in the default installation directory. Refer to the README file that is shipped on the product installation media for the location of the `dsm.sys.smp` file for your UNIX client.

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

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

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

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:

Servename	server_a
COMMethod	TCPip
TCPPort	1500
TCPServeraddress	node.domain.company.com

Note: If you are installing the Web client, you must also specify the **passwordaccess=generate** option. See “Passwordaccess” on page 225 for more information.

As the default, your client node contacts the first server identified in the client system options file (dsm.sys). You can specify a different server to contact by entering the **servename** 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 Tivoli Space Manager client installed on your workstation) in your client system options file (dsm.sys). For more information, see “Defaultserver” on page 154.

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

Notes:

1. See Chapter 9, “Using processing options”, on page 121 for more information about these options.
2. See “Communication options” on page 122 for communication protocols supported for your UNIX client.

Use one of the following methods to modify the dsm.sys file:

- From the client GUI main window, open the **Utilities** menu and select **Setup Wizard**.
- From the client GUI main window, open the **Edit** menu and select **Preferences**.
- Use your favorite text editor.

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

See “Setting options in a file” on page 34 for information on how to set options in the dsm.sys file.

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

During installation, a sample client user options file called dsm.opt.smp is placed in the default installation directory. Refer to the README file that is shipped on the product installation media for the location of dsm.opt.smp for your UNIX client.

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

This file contains the following options:

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

See Chapter 9, “Using processing options”, on page 121 for more information about these options.

If you are a root user, you can create a default client user options file for all users on your workstation by using one of the following methods:

1. From the GUI:
 - a. Click **Utilities** and then click **Setup Wizard**.
 - b. Select **Create a new options file**.
 - c. Follow the instructions on the screen.
2. From the UNIX command line:
 - Change to the directory containing the sample file.
 - Copy the `dsm.opt.smp` file to `dsm.opt` or to a new file name of your choice.

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

- **For the default client user options file:** You can store your default client user options file in the same directory as the `dsm.sys.smp` file, or in any directory for which you have write access.
- **For the client user options file:** You can rename your client user options file and store it in any directory to which you have write access. Set the `DSM_CONFIG` environment variable to point to your new client user options file.

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

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

For the C shell, add the `DSM_CONFIG` variable to the `.cshrc` file in your `$HOME` directory. For example, we recommend that you use full path names instead of relative path names when you set environment variables.

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

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

The preferences editor uses the environment variables `DSM_DIR` to locate the client system options file (`dsm.sys`) and `DSM_CONFIG` to locate the client user

options file (default name dsm.opt). The preferences editor queries the server for options on the server, but only updates the client options file.

See “Setting options in a file” for more information about setting options in a file.

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

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

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

You can use one of the following methods to create your own client user options file:

1. From the GUI:
 - a. Open the **Utilities** menu and select **Setup Wizard**.
 - b. Select **Create a new options file**.
 - c. Follow the instructions on the screen.
2. Contact the root user on your workstation to determine the location of the sample client user options file dsm.opt.smp, and do the following:
 - a. 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.
 - b. Set the DSM_CONFIG environment variable to point to your new client user options file. For instructions to set this variable, see section, “Setting environment variables” on page 44.

You can then edit your dsm.opt file as appropriate for your system or use the GUI preferences editor by opening the **Edit** menu and selecting **Preferences**.

See “Setting options in a file” for more information about setting options in a file.

Setting options in a file

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

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

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

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

```
compression  yes
nodename      client_a
```

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

```
verbose
ve
```

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

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

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

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

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

Registering your workstation with a server (required)

Authorized User

Before you can use Storage Manager, your client 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 administrator chooses the type of registration for your site.

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

Using closed registration

With closed registration, an administrator must register your workstation as a client node with the server. If your enterprise uses closed registration, you must provide the following information to your Storage Manager administrator:

- Your node name (the value returned by the **hostname** command or the node name you specified with the **nodename** option).
- The initial password you want to use, if required.
- Contact information, such as your name, user ID, and phone number.

In addition to possibly defining certain options in your options file, your administrator defines the following for you:

- The policy domain to which your client node belongs. A policy domain contains policy sets and management classes, defined by your administrator, that control how 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, you can register your workstation as a client node with the server.

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

When you use open registration:

- Your client node is assigned to a policy domain named **standard**.
- You can define whether or not to compress files before sending them to the server. See “Compression” on page 151 for more information about the **compression** option.
- You can delete archived copies of files from server storage, but not backup versions of files.

If necessary, your administrator can change these defaults later.

Associating your client node with a host system

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

The globally unique identifier (GUID) associates a client node with a host system. When you install the Tivoli software, the tivguid program is run to generate a GUID which is stored in the /etc/tivoli directory on a UNIX system. The GUID for a client node on the server can change if the host system machine is corrupted, if the file entry is lost, or if a user uses the same node name from different host systems. You can perform the following functions from the command line:

- Create a new GUID
- View the current GUID
- Write a specific value
- Create another GUID even if one exists.

Table 8 describes the GUID functions and the associated commands.

Table 8. GUID commands

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

Table 8. GUID commands (continued)

Function	Enter on the command line:
Write the GUID that is specified in the -GUID option to the file. For example, -Write GUID = 'string' uses the value in 'string' rather than creating a new GUID. The string must be a valid Tivoli GUID (32 hexadecimal values).	<code>tivguid -Write -guid=38.70.92.a1.9a.93.11.d6.a2.f9.00.04.ac.dd.76.38</code>
<p>This function is useful in the following cases:</p> <ul style="list-style-type: none"> • If the Tivoli GUID is corrupted you can use the administrative client to query the server for the value using the <code>q node nodename f=d</code> command, and set that value on the current machine. • If you want to set up multiple physical machines with the same guid (for example on cluster). 	
Create a new GUID even if one exists.	<code>tivguid -Write -New</code>

Creating an include-exclude list (optional)

Authorized User

This is an optional task but an important one. If you do not create an include-exclude list, Storage Manager considers all files for backup services and uses the default management class for backup and archive services. For information on management classes and policy domains, see Chapter 8, “Understanding storage management policies”, on page 111.

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

Attention: There are some system files that you should exclude. See “Excluding system files” on page 40 for more information.

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

Note: For the AIX DFS client: Specify an include-exclude file with the **dfsinclexcl** option and then specify the include-exclude list in that file *only*. See “Dfsinclexcl” on page 159 for more information.

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

See “Inclexcl” on page 193 for detailed information about specifying an include-exclude file using the **inclexcl** option.

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

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

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

1. Determine your include and exclude requirements.
2. Locate the server stanza in your client system options file (dsm.sys).
Note: Each server stanza must have its own include-exclude list.
3. Enter your **include** and **exclude** statements using the appropriate include-exclude options as described in “Using include-exclude options”. Because Storage Manager processes your include-exclude list from the bottom of the list up, it is important to enter all your include-exclude statements in the proper order. For example, in the following include-exclude list the includefile.txt file *is not* backed up:

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

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

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

4. Save the file and close it.
5. Restart your Storage Manager client to enable your new client system options file (dsm.sys).

You can create a separate include-exclude file using the **incl excl** option. The file can be located in any directory to which all users on your workstation have read access. See “Incl excl” on page 193 for more information.

Using include-exclude options

This section provides the following information:

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

Excluding file spaces and directories

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

Table 9. Options for excluding file Spaces and directories

Option	Description	Page
<i>exclude.fs</i>	Excludes file spaces matching the pattern. The client does not consider the specified file space for processing and the usual deleted-file expiration process cannot occur. If you exclude a file space that was previously included, existing backup versions remain on the server subject to retention rules specified in the associated management class definition. See “Exclude options” on page 176 for more information.	176
<i>exclude.fs.nas</i>	Excludes file systems on the NAS filer from an image backup when used with the backup nas command. If you do not specify a NAS node name, the file system identified applies to all NAS filers. The backup nas command ignores all other exclude statements including <i>exclude.fs</i> and <i>exclude.dir</i> statements. This option is for AIX, AIX 5L, and Solaris clients only.	176
<i>exclude.dir</i>	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.	176

Controlling backup, archive, and image processing

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

If you exclude an object that was previously included, Storage Manager marks existing backup versions inactive during the next incremental backup.

Table 10. Options for controlling backup, archive, and image processing

Option	Description	Page
Backup processing		
<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.	176
<i>include</i> <i>include.backup</i> <i>include.file</i>	<i>These options are equivalent.</i> Use these options to include files or assign management classes for backup processing.	194
Archive processing		
<i>exclude.archive</i>	Excludes a file or group of files from archive services.	176
<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.	194
Image processing		
<i>exclude.image</i>	Excludes from image backup mounted file systems and raw logical volumes that match the pattern when used with the backup image command. This option is valid for AIX, AIX 5L, HP-UX, Solaris, and Linux86.	176

Table 10. Options for controlling backup, archive, and image processing (continued)

Option	Description	Page
<i>exclude.fs.nas</i>	Excludes file systems on the NAS filer from an image backup when used with the backup nas command. If you do not specify a NAS node name, the file system identified applies to all NAS filers. The backup nas command ignores all other exclude statements including <i>exclude.fs</i> and <i>exclude.dir</i> statements. This option is for AIX, AIX 5L, and Solaris clients <i>only</i> .	176
<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 backup image command. The backup image command ignores all other include options. This option is valid for AIX, AIX 5L, HP-UX, Solaris, and Linux86 <i>only</i> .	194
<i>include.fs.nas</i>	Assigns a management class when used with the backup nas command. If you do not specify a NAS node name, the file system identified applies to all NAS filers. The backup nas command ignores all other include statements. This option is for AIX, AIX 5L, and Solaris clients <i>only</i> .	194

Controlling compression and encryption processing

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

Table 11. Options for controlling compression and encryption processing

Option	Description	Page
Compression processing		
<i>exclude.compression</i>	Excludes files from compression processing if <i>compression=yes</i> is specified. This option applies to backups and archives.	176
<i>include.compression</i>	Includes files for compression processing if <i>compression=yes</i> is specified. This option applies to backups and archives.	194
Encryption processing		
<i>exclude.encrypt</i>	Excludes files from encryption processing.	176
<i>include.encrypt</i>	Includes files for encryption processing.	194

Excluding system files

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

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

If you are using AFS, also specify:

```
exclude /usr/vice/cache/*
exclude /var/vice/cache/*
```

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

Including and excluding groups of files

To specify groups of files that you want to include or exclude, use the wildcard characters listed in Table 12. This table applies to **include** and **exclude** statements *only*. For information about using wildcard characters in Storage Manager commands, see “Using wildcard characters” on page 290.

Notes:

1. A very large include-exclude list may decrease backup performance. Use wildcards and eliminate unnecessary include statements to keep the list as short as possible.
2. You can also use the **filelist** option to include a list of files for backup, restore, archive, or retrieve operations without using wildcard characters. See “Filelist” on page 179 for more information.

Table 12. 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"> • The pattern ab?, matches abc, but does not match ab, abab, or abzzz. • The pattern ab?rs, matches abfrs, but does not match abrs, or abllrs. • The pattern ab?ef?rs, matches abdefjrs, but does not match abefrs, abdefrs, or abefjrs. • The pattern ab??rs, matches abcdrs, abzzrs, but does not match abrs, abjrs, or abkkrs.
*	The match-all character. For example: <ul style="list-style-type: none"> • The pattern ab*, matches ab, abb, abxxx, but does not match a, b, aa, bb. • The pattern ab*rs, matches abrs, abtrs, abrsrs, but does not match ars, or aabrs, abrss. • The pattern ab*ef*rs, matches abefrs, abefghrs, but does not match abefr, abers. • The pattern abcd.*, matches abcd.c, abcd.txt, but does not match abcd, abcdc, or abcdtxt.
/...	The match- <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>
\	The literal escape character. When used within a character class, it treats the next character literally. When used outside of a character class, it is not treated in this way. For example, if you want to include the ']' in a character class, enter [...\]]...]. The escape character removes the usual meaning of ']' as the close character-class character.
]	The close character-class character ends the enumeration of a character class.

Examples using wildcards with include and exclude patterns

Table 13 on page 42 contains examples of ways you might use wildcard characters with **include** and **exclude** patterns. For more information about using the **exclude.backup** option, see “Exclude options” on page 176.

Note: The **include** and **exclude** commands do not work with symbolic links to directories. Do not use /u in these commands. For example, instead of entering:

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

enter:

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

The **exclude** command works with symbolic links to directories when you enter the backup command with the absolute path that contains the symbolic link.

You cannot use wildcard characters with the **include.fs.nas** and **exclude.fs.nas** options.

Table 13. Using wildcard characters with include and exclude patterns

Task	Pattern
Exclude all files during backup with an extension of <i>bak</i> , except those found on the /usr file system in the dev directory.	exclude *.bak include /usr/dev/*.bak
Exclude all files and directories in any tmp directory that might exist, <i>except</i> for the file /home/tmp/save.fil. Include this file.	exclude ../tmp/.../* include /home/tmp/save.fil
Exclude any .o file in any directory on the /usr1, /usr2, and /usr3 file systems.	exclude /usr[1-3]/.../*.o
Exclude the .o files found in the root directory in the usr2 file system <i>only</i> .	exclude /usr2/*.o
Exclude any file that resides under the tmp directory found in any file space .	exclude ../tmp/.../*
Exclude the entire directory structure /var/spool from all processing.	exclude.dir /var/spool
Exclude all file systems mounted anywhere in the /test/myfs/fs01 and /test/myfs/fs02 directory tree from backup processing.	exclude.fs /test/myfs/.../* exclude.fs /test/myfs/*
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. (You must use the */* suffix to include or exclude logical volumes).	exclude.image /dev/hd0/*/*

Processing include and exclude options

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

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

When performing an incremental backup, Storage Manager evaluates all **exclude.fs** and **exclude.dir** statements *first*, and removes the excluded file spaces, directories, and files from the list of objects available for processing. See “Excluding file spaces and directories” on page 38 and “Exclude options” on page 176 for more information about the **exclude.fs** and **exclude.dir** options.

After evaluating all **exclude.fs** and **exclude.dir** statements, Storage Manager evaluates the include-exclude list from the bottom up and stops when it finds an include or exclude statement that matches the file it is processing. The order in which the include and exclude options are entered therefore affects which files are included and excluded. See Chapter 9, “Using processing options”, on page 121 for more information about the order in which all options are processed.

To display a list of all include-exclude statements in effect on your client workstation in the actual order they are processed, use the **query inclexcl** command. See “Query Inclexcl” on page 323 for more information.

The client program processes the **include** and **exclude** options as follows:

1. Files are checked; directories are *only* checked if the **exclude.dir** option is specified.
2. **File names are compared to the patterns in the include-exclude list from the bottom up.** When a match is found, the processing stops and checks whether the option is **include** or **exclude**. If the option is **include**, the file is backed up. If the option is **exclude**, the file *is not* backed up.

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

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

The following examples demonstrate *bottom up* processing.

Example 1

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

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

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

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

3. File `/home/foo/dev/test.o` is backed up.

Example 2

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

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

The file being processed is: `/home/widg/copyit`. Processing follows these steps:

1. Rule 3 is checked and finds no match.
2. Rule 2 is checked and finds no match.
3. Rule 1 is checked and finds no match.
4. Because a match is not found, file `/home/widg/copyit.bat` is implicitly included and backed up.

Example 3

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

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

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

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

Setting environment variables

Setting language environment variables

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

You can use the **LANG** environment variable to specify the language for the AIX, AIX 5L, HP-UX, Linux, and Solaris clients. For all other UNIX clients, only American English is available.

Storage Manager supports the following language locales:

Languages	AIX, AIX 5L	HP-UX	Solaris	Linux X86
American English	en_US	en_US	en_US	en_US
Simplified Chinese	zh_CN	zh_CN.eucCN	zh_CN, zh_CN.EUC	zh_CN

Languages	AIX, AIX 5L	HP-UX	Solaris	Linux X86
Traditional Chinese	zh_TW, Zh_TW.big5	zh_TW.eucTW	zh_TW, zh_TW.EUC, Zh_TW.big5	zh_TW.big5
Japanese	ja_JP, Ja_JP	ja_JP.eucJP	ja, ja_JP.eucJP	ja_JP
Korean	ko_KR	ko_KR.eucKR	ko_KR, ko_KR.EUC	ko_KR
French (Standard)	fr_FR			fr_FR
German (Standard)	de_DE			de_DE
Italian (Standard)	it_IT			it_IT
Portuguese (Brazil)	pt_BR			pt_BR

Note:

- Traditional Chinese BIG5 has locale zh_TW on Linux, while zh_TW is used on other platforms for eucTW.
- The zh_CN.GB18030 locale is supported on the Linux86 client command line only.
- Only the command line interface is supported for Linux86.
- Not all UNIX shells are able to show multi-byte characters.
- For Motif: Make sure that your command line shell is capable of showing the selected locale. The native GUI has to be started from a Window Manager, such as CDE, KDE2 (Linux86), or Gnome (Linux86), that supports the selected locale.

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

```
export LANG=fr_FR
```

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

Notes:

1. To display the Storage Manager help browser menus in the language of your current locale, insure that the NLSPATH environment variable in the /etc/profile file contains the following path:
NLSPATH=/usr/dt/lib/nls/msg/%L/%N.cat:\$NLSPATH export NLSPATH
2. For double byte languages on AIX (ja, zh, ko), we recommend that you change the language via the **Options** button on the cde login screen, rather than exporting LANG environment variable via the command line.

Note:

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

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

characters. If you are using multi-byte character sets (MBCS) as your language environment, the backup-archive client backs up file names that consist of valid characters in the current environment.

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

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

Setting font defaults

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

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

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

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

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

```
!  
! ja_JP locale  
!  
!dsm*fontList: -adobe-helvetica-medium-r*--14-*-*-*-*-*-*-*;\br/>!               -misc-*-*medium-r*--14-*-*-*-*-*-*-*;  
  
!  
! zh_CN locale  
!  
!dsm*fontList: --helvetica-medium-r-normal-*--120-*-*-*-*iso8859-*;\br/>!               -isas-fangsong ti-medium-r-normal--16-160-72-72-c-160-gb2312.1980-0:  
  
!  
! zh_TW locale  
!  
!dsm*fontList: --helvetica-medium-r-normal-*--140-*-*-*-*iso8859-*;\br/>!               -default-ming-medium-r-normal--16-*-*-*-*c-160-big5-0:  
  
!  
! ko_KR  
!  
!dsm*fontList: --helvetica-medium-r*--120-*-*-*-*iso8859-*;\br/>!               -daewoo-mincho-medium-r-normal--16-120-100-100-c-160\  
!               -ksc5601.1987-*;*-r-*;  
  
!
```

Setting processing environment variables

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

DSM_DIR

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

When you request an image or a NAS backup or restore, 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 and AIX 5L

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

Solaris

`/opt/tivoli/tsm/client/ba/bin/plugins`

HP-UX

`/opt/tivoli/tsm/client/ba/bin/plugins`

Linux86

`/opt/tivoli/tsm/client/ba/bin/plugins`

Tru64 and Silicon Graphics IRIX

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

DSM_CONFIG

Contains the fully-qualified path and file name of the client user options file for users who create their own personalized options file.

If `DSM_CONFIG` is *not* set, the client user options file is expected to satisfy both of these requirements:

1. The options file should be named `dsm.opt`
2. The options file should reside in the directory pointed to by `DSM_DIR`

However, if `DSM_DIR` is *not* set, then `dsm.opt` is expected in the default installation directory.

DSM_LOG

Points to the directory where you want the `dsmerror.log`, `dsmwebcl.log`, and `dsmsched.log` files to reside. The `dsmerror.log` file cannot be a symbolic link. In addition, 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 Storage Manager technical support team diagnose severe errors.

If you define `DSM_LOG`, Storage Manager writes messages to the `dsmerror.log`, `dsmwebcl.log`, and `dsmsched.log` files in the directory you specify.

If you define `DSM_DIR`, but not `DSM_LOG`, Storage Manager writes messages to the `dsmerror.log`, `dsmwebcl.log`, and `dsmsched.log` files in the directory specified by `DSM_DIR`.

If you do not define `DSM_LOG` or `DSM_DIR`, Storage Manager writes messages to the `dsmerror.log`, `dsmwebcl.log`, and `dsmsched.log` files in the current directory.

If you use the ***errorlogname*** option to specify the fully qualified path where you want to store the `dsmerror.log` file, this value overrides the

definitions in the DSM_LOG or DSM_DIR environment variables. The dsmwebcl.log and dsmsched.log files will be created in the same directory as the dsmerror.log file.

When Storage Manager cannot write to the log file, it issues a warning message.

Setting Bourne and Korn shell variables

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

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

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

Setting C shell variables

For the C shell, add the DSM_CONFIG, DSM_LOG and DSM_DIR variables to the .cshrc file in your \$HOME directory. For example, if /home/davehil/dsm.opt is the path and file name of your client user options file, and the /home/davehil directory is where you want to store the dsmerror.log file:

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

Setting API environmental variables

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

DSMI_DIR

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

DSMI_CONFIG

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

DSMI_LOG

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

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

Chapter 3. Getting started

This chapter includes instructions for the following tasks:

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Storage Manager client authentication

When using the backup-archive GUI, command line client, or the Web client, you can logon using a nodename and password *or* administrative user ID and password. Storage Manager prompts for your user ID and compares it to the configured nodename. If they match, Storage Manager attempts to authenticate the user ID as a nodename. If the authentication fails or if the user ID does not match the configured nodename, 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.
- *Policy privilege* - Authority over the node's domain.
- *Client owner* - Authority over the configured nodename. With client owner authority, you own the data and have physical access to it.

To use the Web Client to back up and restore files on a remote client machine, you must have an administrative user ID with client access authority over the node name for the remote client machine. If you do not want administrators with client access authority over your node name to be able to back up and restore files on your machine, specify the **revokeremoteaccess** option in your client options file. See "Revokeremoteaccess" on page 246 for more information

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

You can use the **virtualnodename** option to temporarily access your node's data from another machine. This option differs from the **nodename** option in that, if the **passwordaccess** option is set to *generate* along with the **virtualnodename** option, the password is not stored on the local machine. If you specify the **nodename** option, the password is stored on the local machine. See "Virtualnodename" on page 279 for more information about the **virtualnodename** option.

Starting a GUI session

Check to see if a session is already started; look on your workstation desktop for the Storage Manager icon.

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

To run in the foreground, enter:

```
dsm
```

To run in the background, enter:

```
dsm &
```

Storage Manager locates the *client user options* file (dsm.opt) and starts with the options specified in that file. See Chapter 2, "Configuring Storage Manager", on page 31 for more information about the client user options file.

Password and user ID

Your administrator can require you to use a password to connect to the server. Storage Manager prompts you for the password if one is required. Contact your administrator if you do not know your password. For information about changing your password, see "Changing your password" on page 57.

Configuration Wizard

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

Note: The setup wizard is not available through the Web client.

Starting a command line session

Start a command line session using one of the following methods:

- On the command line, change directory to the Storage Manager installation directory and enter **dsmc** followed by the command, if you want to run a single command (*batch mode*).

- On the command line, change directory to the Storage Manager installation directory and enter **dsmc**. This places you in *interactive mode*, permitting you to run several commands without preceding each with **dsmc**.

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

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

Using batch mode

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

If a Storage Manager password is required at your server, Storage Manager prompts you for your password each time you enter a command. If you set the **passwordaccess** option to *generate* you are only prompted the first time.

For example, to issue the **incremental** command, enter the following at the \$ prompt:

```
dsmc incremental
```

When you type in your password and press Enter, the password does not display on your screen.

Using interactive mode

Use *interactive* mode when you want to issue a series of commands. Because 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 the **dsmc** or **dsmc loop** command. When you press Enter, this prompt displays 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**.

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

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

Most options are valid only on the initial command line. However, some options are valid on the initial command line and in interactive (loop mode). These options remain in effect throughout the interactive session unless you reenter them with a different setting. See “Client options reference” on page 139 for more information about these options.

See Chapter 10, “Using commands”, on page 285 for information on how to start and use the command line client.

Starting: Additional considerations

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

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

```
dsm -servername=server_b
```

Starting a Web client session

After installing the Web client on your workstation (see “Installing and using the Web client” on page 54) you can use the Web client to perform backup, archive, restore, and retrieve operations from any browser that is at least JRE1.3.1 Swing-enabled. The Web client facilitates the use of assistive devices for users with disabilities and contains improved keyboard navigation. The native look and feel of the platform running the browser is preserved. The Web client will use most desktop font and color settings when run in browsers on Windows platforms.

The Web client runs on the following browsers:

- Netscape Navigator 6.0 or later with the Java support option installed.
- Netscape Navigator 4.7 or later with Java Plug-in 1.3.1
- Microsoft Internet Explorer 5.0 or later with Java Plug-in 1.3.1. The minimum JRE level required for Microsoft Internet Explorer browsers running on Windows platforms is JRE 1.3.1_01.

To run the Web Client from Netscape browsers, **Enable JavaScript** must be checked. This setting is enabled by default, but to verify it:

1. Open Netscape Navigator's **Edit** menu and select **Preferences**.
2. In the Preferences dialog under Category, select **Advanced**.
3. Ensure there is a check mark next to **Enable JavaScript**.

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

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

If your browser does not have the correct level of the Java plug-in, the Web client will notify you and if possible, will try to automatically install the correct plug-in for you.

- For Microsoft Internet Explorer browsers: The Web client will automatically download and install the 1.3.1_01 JRE Plug-in for you.
- For Netscape browsers: The Storage Manager Web client will provide the link to the web site where you can download the latest 1.3.1 plug-in. Netscape browsers do not support the automated plug-in and JRE installation.
- For browsers running on HP, AIX, and SGI platforms: Downloading the plug-in and JRE requires registration at their web sites, so the Storage Manager Web

client cannot automate the JRE installation on these platforms. Instead, the Web client displays a message containing the appropriate URL from which you can download the JRE for manual installation.

- On all platforms except for AIX and Internet Explorer browsers on Windows platforms, the Web client will tolerate the JRE at level 1.3.0. If Java plug-in 1.3.0 is installed, the Web client will not prompt you to install a later version. If you experience problems with the Web client using the JRE 1.3.0, manually install the 1.3.1 plug-in.

If you already have a JRE installed on your system, uninstall it before installing a new JRE or make sure that when you install the new JRE, it is not installed into the same directory as the previous JRE. Installing one JRE into the same directory as a previous installation can result in erratic behavior of the JRE. You can download and install the JRE 1.3.1 (unless otherwise noted) plug-in manually from the appropriate URL:

- For Windows, Solaris, Linux:

<http://java.sun.com/j2se/1.3/jre/>

- AIX:

<http://www-106.ibm.com/developerworks/java/jdk/aix/index.html>
Version 1.3.1

- HP-UX:

http://www.hp.com/products1/unix/java/java2/sdkrtel_3/downloads/index.html

- SGI IRIX:

<http://www.sgi.com/developers/devtools/languages/javaplugin131.html>

- Macintosh OS X, Version 10.1:

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

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

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

For Windows:

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

For UNIX:

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

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

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

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

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

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

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

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

<http://myhost.mycompany.com:1581>

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

Setting user privileges

If you plan to use the Web client, ensure that you were assigned an administrative user ID with system privilege, policy privilege, client access authority, or client owner authority. When a new node is registered with the server, by default it is given an admin ID of the same name with client owner authority. See “Storage Manager client authentication” on page 49 for more information about these authorities.

Note: Use the **revokeremoteaccess** option to prevent an administrator with client access privilege from performing client operations on your workstation through the Web client. However, administrators with client owner privilege, system privilege, or policy privilege can still perform client operations on your workstation through the Web client. See “Revokeremoteaccess” on page 246 for more information about the **revokeremoteaccess** option. See “Storage Manager client authentication” on page 49 for more information about access authorities.

Installing and using the Web client

You can use the GUI Setup Wizard or command line to install and configure the Web client.

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

1. Ensure that you specify **passwordaccess generate** in the client system options file (dsm.sys). For more information on **passwordaccess**, see “Passwordaccess” on page 225.
2. To generate the Storage Manager password, start the backup-archive client by entering:


```
dsmc query session
```


when prompted, enter your user ID and password.
3. Start the client acceptor service by entering:


```
dsmcad
```

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

The only options applicable to the **dsmcad** program are **optfile**, **httpport** and **webports**. You can specify the **httpport** and **webports** options in the `dsm.sys` file. You can specify the **optfile** option on the command line only.

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. See Chapter 9, “Using processing options”, on page 121 for more information.

4. To access the Web client, enter the following URL from any supported browser:
`http://your_machine_name:1581`

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

Port 1581 is the default port number. You can set a different port number using the **httpport** option. See “Httpport” on page 189 for more information.

You can also access the Web client workstation through the Web administrative GUI.

Storage Manager firewall support

In most cases, the Storage Manager server and clients can work across a firewall. The ports that the client and server need to communicate must be opened in the firewall by the firewall administrator. Because every firewall is different, the firewall administrator may need to consult the instructions for the firewall software or hardware in use.

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

This port is set on the client and the server using the **tcpport** option. The setting must be the same on the client and server. The default TCP/IP port is 1500. See “Tcpport” on page 265 for more information.

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's client option file to specify this port. The default HTTP port is 1581.

To use the administrative Web interface for a server across a firewall, the HTTP port for the server must be opened. Use the **httpport** option in the server options file to specify this port. The default HTTP port is 1580.

TCP/IP ports for the remote workstation

The two TCP/IP ports for the remote workstation client must be opened. Use the **webports** option in the remote workstation's option file to specify these ports. If you do not specify the values for the **webports** option, the default zero (0) causes TCP/IP to randomly assign two free port numbers. See “Webports” on page 282 for more information about the **webports** option.

In an enterprise environment, we strongly recommend that you use the Tivoli Storage Manager Secure Web Administrator Proxy for Web administration of the Storage Manager server. Install the proxy on a Web server that sits on the firewall so that the Web server can access resources on both sides of the firewall (this is sometimes called the *demilitarized zone*). When you set up the proxy, you can use it to administer any Storage Manager server at Version 3.7 or higher. For more information on how to install and use the proxy, see the appendix about the Web proxy in the Tivoli Storage Manager Quick Start manuals listed in Table 14.

Table 14. Storage Manager client publications

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

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

- To use the Web client to connect to a client across a firewall, the Web client and the backup-archive client must be Version 4.1.2 or later.
- To enable the backup-archive client, command line admin client, and the scheduler (running in polling mode) to run outside a firewall, the port specified by the server option **tcppport** (default 1500) must be opened by the firewall administrator.

Note: Storage Manager does not support the scheduler running in *prompted* mode outside a firewall. In *prompted* mode the Storage Manager server needs to contact the client. In order to do this, some software must be installed on the Storage Manager server to route the request through the firewall. This software routes the server request through a sock port on the firewall. This is typically called *socksifying* a system. Proxies are not supported, since they only route a few types of communication protocols (HTTP, FTP, GOPHER) and Storage Manager is not one of these communication protocols that are routed. It is important to note that the client creates a new connection to the Storage Manager server when prompted. This means that the firewall configuration discussed above must be in place.

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

Starting the client scheduler automatically

Root User

You can start the client scheduler automatically when you login to your workstation. If the administrator has defined schedules for your node, starting the client scheduler permits you to automatically back up your workstation (or perform other scheduled actions). See Chapter 7, “Automating tasks”, on page 105 for more information about the client scheduler.

You can also use the Storage Manager Client Acceptor service to manage the scheduler. See “Managing the client scheduler using the CAD” on page 107 for more information.

Changing your password

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

To change your password from the GUI:

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

To change your password from the command line, enter:

```
dsmc set password
```

Then, enter your old and new passwords when prompted.

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

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

A password is not case sensitive. See “Password” on page 224 for additional password information.

The following are additional password information sources:

- “Starting the client scheduler automatically” on page 56
- “Starting: Additional considerations” on page 52
- “Password” on page 224
- “Set Password” on page 349

Sorting file lists

Using the Storage Manager GUI, you can sort a list of files by various attributes, such as name, directory, size, or modification date. Sorting files by the last backup date can be useful in determining what date and time to use for the point-in-time function (see “Performing point-in-time restores” on page 88).

To sort a file list, select one of the **Sort by** items from the **View** menu bar. You can also click the appropriate column heading in the **File List** box.

The **Display active/inactive files** menu option controls whether to display both active and inactive backup versions of files. An *active* file is the most recent backup version of a file that existed on your workstation when you ran your last backup. All other backup versions of that file are *inactive*. Only active backup versions of files are displayed, unless you select the **Display active/inactive files** menu option.

If you delete the file from your workstation, the active version becomes inactive the next time you run an incremental backup.

On the command line client, you can use the **inactive** and **pick** options with query and restore commands to display both active and inactive objects. See “Inactive” on page 192 and “Pick” on page 228 for more information.

Displaying online help

You can display online help in any of the following ways:

From the GUI:

- Place the cursor on an option or field of interest and press F1.
- Open the **Help** menu.
- Click the **Help** button in the current window.

From the Web client:

- Select the **Help** menu.
- Click the **Help** button in current window.
- **From the dsmc command line:** Enter the **help** command.

Ending a session

You can end a Storage Manager client session in any one of the following ways:

From the GUI:

- Open the **File** menu and select **Exit**.
- Double-click the **System** menu (the button in the upper left corner on the title bar).
- Open the **System** menu and select **Close**.
- **From the DSMC command line:** Enter **quit** (when working in interactive mode).
- **From the Web Client:** Open a different URL or close the browser.

Online forum

To participate in user discussions of Storage Manager you can subscribe to the ADSM-L list server. This is a user forum maintained by Marist College and subscribed to by more than 1,600 users (at the time of this writing). While not officially supported by IBM, 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 at the following URL:

<http://www.adsm.org>

Other sources of online help

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

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

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

http://www.tivoli.com/support/storage_mgr/tivolimain.html

Contacting customer support

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

- Visit the Storage Manager technical support Web site at:
http://www.tivoli.com/support/storage_mgr/tivolimain.html
- Submit a problem management record (PMR) electronically at **IBMSERV/IBMLINK**. You can access the IBMLINK from the IBM Web site at:
<http://www.ibm.link.ibm.com>
- Submit a problem management record (PMR) electronically from the Tivoli Web site at:
<http://www.tivoli.com/support>
- Send e-mail to: **support@tivoli.com**.

Customers in the United States can also call 1-800-TIVOLI8 (1-800-848-6548). For product numbers: IBM Tivoli Storage Manager (5697-ISM, 5698-ISM) and IBM Tivoli Storage Manager Extended Edition (5697-ISX, 5698-ISX), call 1-800-237-5511.

If you have a problem with any Tivoli product, you can contact Customer Support. See the *Tivoli Customer Support Handbook* at the following Web site:

<http://www.tivoli.com/support/handbook/>

The handbook provides information about how to contact Customer Support, depending on the severity of your problem, and the following information:

- Registration and eligibility
- Telephone numbers and e-mail addresses, depending on the country in which you are located
- Information you must have before contacting Customer Support

To access most of the documentation, you need an ID and a password. To obtain an ID for use on the support Web site, go to:

<http://www.tivoli.com/support/getting/>

You can order documentation by e-mail at **swdist@tivoli.com**. Please provide the publication number, part number, or order number of the appropriate document. Alternatively, you can provide the document title, version number, and date of publication.

We are very interested in hearing about your experience with Tivoli products and documentation. We also welcome your suggestions for improvements. If you have comments or suggestions about our documentation, please contact us in one of the following ways:

- Send e-mail to **pubs@tivoli.com**.
- Complete our customer feedback survey at:

<http://www.tivoli.com/support/survey/>

Chapter 4. Backing up files and directories

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

All client backup and restore procedures in this chapter also apply to the Web client, except the following:

- Estimate
- View Policy Information
- Access Another User
- Searching and Filtering
- User Access List
- Preferences Editor

See “Starting a Web client session” on page 52 for information on starting the Web client.

Note: Files backed up or archived by an OS/390 UNIX backup-archive client can only be restored or retrieved by an OS/390 UNIX backup-archive client.

The following table identifies tasks described in this chapter:

Task	Page
Planning your backups	61
Using an include-exclude options list to control processing	63
Backing up data using the GUI	68
Backing up data using the command line	68
Performing an image backup	71
LAN-free data movement	76
Backing up NAS file systems	77

Planning your backups

If you are a first-time user, or if you only back up files occasionally, you may wish to use Table 15 as a checklist of preliminary steps to consider before performing a backup.

Table 15. Preliminary steps for backing up files

—	Decide whether you want to back up files or archive them. See “Do you want to back up or archive files?” on page 62 for more information.
—	Do you plan to use the AFS or DFS backup client, or both. See “Using the AFS/DFS backup clients” on page 62 for more information.
—	Do you need to exclude files from backup services? See “Using an include-exclude options list to control processing” on page 63 for more information.

Table 15. Preliminary steps for backing up files (continued)

—	Decide what type of backup you want according to your needs. See the following sections for more information: <ul style="list-style-type: none">• “Full and partial incremental backup” on page 64• “Incremental-by-date backup” on page 65• “Comparing full incremental, partial incremental, and incremental-by-date backups” on page 66• “Performing an image backup” on page 71• “LAN-free data movement” on page 76• “Backing up NAS file systems” on page 77
—	If you are performing an image backup, ensure that you have accounted for unique considerations. See “Performing an image backup” on page 71 for more information.
—	For further backup considerations, see “Backup: Additional considerations” on page 77.

Do you want to back up or archive files?

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

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

Note: If you need to frequently create archives for the same data, consider using instant archives (backup sets) instead. Frequent archive operations can create a large amount of metadata in the server database increasing database growth and decreasing performance for operations such as expiration. See “Restoring data from a backup set” on page 90 for more information on how backup sets can be generated and restored.

Archive copies are saved for long-term storage. Your administrator can limit how long archive copies are kept. The server can store an unlimited number of archive versions of a file. Archives are useful if you need to go back to a particular version of your files, or you want to delete a file from your workstation and retrieve it at a later time, if necessary. For example, you might need to save spreadsheets for tax purposes, but because you are not using them, you do not want to leave them on your workstation. See Chapter 6, “Archiving and retrieving files”, on page 97 for more information about archiving and retrieving files.

Use backups to protect against unforeseen damage to your files, and use archives for maintaining more permanent versions of your files.

Using the AFS/DFS backup clients

If you are working on an AIX workstation, and you want to back up or archive **AFS or DFS** files, ask the root user responsible for setting up Storage Manager on your workstation if you can use the AFS or DFS version of Storage Manager. See Chapter 4, “Backing up files and directories”, on page 61 for more information.

The AFS/DFS backup clients are available on AIX workstations. Storage Manager includes executable files for the graphical user interface and the command-line interface in non-AFS/DFS, AFS, and DFS versions.

If you perform a command-line backup of AFS or DFS files using the non-AFS/DFS versions, Storage Manager backs up the files and saves standard UNIX access permissions and extended permissions, but does not back up AFS or DFS access control lists for directories. If you want to back up AFS or DFS access control lists, or to recognize AFS or DFS virtual mount points, you must use the AFS or DFS versions of the executable files.

For more information, please see Appendix A, “The AFS and DFS file backup clients”, on page 351.

Using an include-exclude options list to control processing

There may be files on your file systems that you do not want to back up. These files may be core files, local caches of network file systems, operating system or application files that could be easily recovered by reinstalling the program, or any other files that you could easily rebuild.

An Authorized User on your workstation can use the **exclude** and **include** options in your include-exclude options list to specify which files to exclude from backup processing.

Storage Manager uses the include-exclude options file for incremental and selective backups and backs up any file that is not explicitly excluded. You do not need to use an **include** option to include specific files unless those files are in a directory you want to exclude.

You can also specify the **include** and **exclude** options in the client system options file `dsm.sys`. For more information on creating an include-exclude options file, see “Creating an include-exclude list (optional)” on page 37.

Encryption

You can encrypt the data that is sent to the server during a backup or archive operation using standard DES 56-bit encryption. Files are selected for encryption using **include.encrypt** and **exclude.encrypt** processing. By default, files are not encrypted unless they are explicitly included using the **include.encrypt** option. For more information about the **exclude.encrypt** option, see “Exclude options” on page 176. For more information about the **include.encrypt** option, see “Include options” on page 194.

To encrypt file data, you must select an encryption key password, which Storage Manager uses to generate the encryption key for encrypting and decrypting the file data. Store the encryption key password for later use. You can specify whether to save the encryption key password in a file named `TSM.PWD` by using the **encryptkey** option. While restoring the encrypted file, Storage Manager will prompt you for the key password to decrypt the file in the following cases:

- If the **encryptkey** option is set to Prompt.
- If the key supplied by the user in the above case does not match.
- If the **encryptkey** option is set to Save and the locally saved key password does not match the encrypted file.

For more information about this option, see “Encryptkey” on page 172.

Backing up files and directories

Your administrator might have set up schedules to automatically back up files on your workstation. See Chapter 7, “Automating tasks”, on page 105 for information on checking and running the schedules available to you. The following sections discuss how to back up files without using a schedule.

There are two types of incremental backup: **full incremental** and **partial incremental**.

Full and partial incremental backup

The first time you run a full incremental backup, Storage Manager backs up all the files and directories on the file systems you specify. This process can take a long time if there are a large number of files, or one or more very large files. Subsequent full incremental backups will only back up new and changed files. This allows the backup server to maintain current versions of your workstation files, without having to waste time or space by backing up files that already exist in server storage. Depending on your storage management policies, the server may keep more than one version of your files in storage. The most recently backed up files are active backup versions. Older copies of your backed up files are inactive versions. However, if you delete a file from your workstation, the next full incremental backup will cause the active backup version of the file to become inactive. If you need to restore a file you have deleted, and if a full incremental backup has been run since you deleted the file, then you will need to restore an inactive version of the file (assuming that a version still exists on the server). The number of inactive versions maintained by the server and how long they are retained is governed by the management policies defined by your server administrator. The purpose of the active versions is to represent what files existed on your file system at the time of the backup. See Chapter 8, “Understanding storage management policies”, on page 111 for more information about storage management policies.

To perform a full or partial incremental backup using the client GUI, select the **Incremental (complete)** option from the type of backup pull-down menu on the backup window or use the **incremental** command. Specify file systems, directory trees, or individual files to include in the 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. You must have performed at least one full incremental backup for a file system before using the incremental-by-date feature for that file system.

During an incremental backup, the client queries the server to determine the exact state of your files since the last incremental backup. The client uses this information to:

- Back up new files
- Back up files whose contents changed since the last backup. The client considers a file changed if any of the following attributes changed since the last backup:
 - File size
 - Date or time of last modification
 - Access Control List

If *only* the following items change, they are updated without causing the entire file to be backed up to the server:

- File owner
- File permissions

- Last access time
- Inode
- Group ID
- Expire backup versions of files on the server that do not have corresponding files on the workstation. The result is that files which no longer exist on your workstation will not have active backup versions on the server.
- Rebind backup versions to management classes if you change management class assignments, even if you do not back up the file.

Attention: Each directory is also backed up if it has not yet been backed up, or if its permissions or time stamp have changed since the last time it was backed up.

You can use the ***preservelastaccessdate*** option during a backup or archive operation to specify whether to reset the last access date to its original value following a backup or archive operation. By default, the Storage Manager client *will not* reset the last access date of any backed up or archived files to their original value prior to the backup or archive operation. See “Preservelastaccessdate” on page 235 for more information.

Directories are counted in the number of objects backed up. To exclude directories and their contents from backup, use the ***exclude.dir*** option. For more about ***exclude.dir***, see “Exclude options” on page 176.

Understanding which files are backed up

When you request a backup, Storage Manager backs up a file if all of the following requirements are met:

- You do not exclude the file from backup in your include-exclude list. If you do not have an include-exclude list, all files will be candidates for backup.
- The selected management class contains a backup copy group. See Chapter 7, “Automating tasks”, on page 105 for more information on management classes and backup copy groups.
- The file meets the serialization requirements defined in the backup copy group. If serialization is *static* or *shared static*, and the file changes during backup, the file will not be backed up. See “Using management classes and copy groups” on page 112 for more information.
- The file meets the mode requirements defined in the backup copy group. If the mode is *modified*, the file must have changed since the last backup. If the mode is *absolute*, the file can be backed up even if it does not change. See “Using management classes and copy groups” on page 112 for more information.
- The file meets the frequency requirements defined in the backup copy group. The specified minimum number of days since the last backup must elapse before a file is backed up. Frequency is ignored for partial incremental backups. See “Using management classes and copy groups” on page 112 for more information.

Incremental-by-date backup

For a disk or volume to be eligible for incremental-by-date backups, you must have performed at least one full incremental backup of that entire disk or volume. Running an incremental backup of only a directory branch or individual file will not make the disk or volume eligible for incremental-by-date backups.

To perform an incremental-by date backup using the GUI, select the ***Incremental (date only)*** option from the *type of backup* pull-down menu or use the ***incrbydate*** option with the ***incremental*** command.

The client backs up only those files whose modification date and time is later than the date and time of the last incremental backup of the file system on which the file resides. Files added by the client after the last incremental backup, but with a modification date earlier than the last incremental backup, are not backed up. Files that were renamed after the last incremental backup, but otherwise remain unchanged, will not be backed up. This is because renaming a file does not cause the modification date and time to change. The directories in the path that contain the file are also backed up, unless they already exist on the server. A directory that already exists on the server is only backed up again if its modification timestamp changes. The files under the directory are also backed up even if their modification timestamps have not changed.

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 that case, the next incremental-by-date backup will back up these files again.

Comparing full incremental, partial incremental, and incremental-by-date backups

Full incremental, partial incremental, and incremental-by-date all back up new and changed files. An incremental-by-date backup takes less time to process than a full incremental backup and requires less memory. A full incremental and an incremental-by-date backup might not place exactly the same backup files into server storage because the incremental-by-date backup:

- Does not expire backup versions of files that you delete from the workstation.
- Does not rebind backup versions to a new management class if you change the management class.
- Does not back up files with attributes that change, unless the modification dates and times also change.
- Ignores the copy group frequency attribute of management classes.

Selective backup

Use a selective backup when you want to back up specific files or directories regardless of whether a current copy of those files exists on the server. Incremental backups are generally part of an automated system to back up entire file systems. In contrast, selective backups allow you to manually select a set of files to back up regardless of whether they have changed since your last incremental backup.

To perform a selective backup using the client GUI, see “Backing up data using the GUI” on page 68 for more information.

Use the **selective** command to perform a selective backup from the client command line. See “Selective” on page 344 for more information.

Unlike incremental backups, a selective backup:

- Does not cause the server to update the date and time of the last incremental.
- Backs up directory and file entries even if their modification timestamp or permissions have not changed.

Saving access permissions

When you back up your files, 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, Storage Manager saves access control lists.

If you use the AFS or DFS versions of the **dsm** and **dsmc** commands (**dsmafs** and **dsmcafs** for AFS, **dsmdfs** and **dsmcdfs** for DFS) to back up AFS or DFS files (on an AIX workstation only), Storage Manager also saves the access control lists that exist for each AFS or DFS directory. If you perform a command line backup of AFS or DFS files using the non-AFS/DFS versions, Storage Manager backs up the files and standard UNIX access permissions, but does not save the AFS or DFS access control lists for directories. See “Using the AFS/DFS backup clients” on page 62 for more information.

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 back up files beginning with a specific directory within a file system, you can define that directory as a virtual mount point (see “Virtualmountpoint” on page 277).

Defining a virtual mount point within a file system provides a direct path to the files you want to back up, thus saving processing time. It is more efficient than defining the file system with the **domain** option and then using an **exclude** option to exclude the files you do not want to back up. It also allows you to store backups and archives for specific directories in separate storage file spaces.

Note: The backup-archive client does not recognize AFS/DFS volume mount points. You must install the AFS/DFS client. For more information about using the AFS/DFS backup-archive clients, see Appendix A, “The AFS and DFS file backup clients”, on page 351.

Estimating backup processing time

You can use the **Estimate** function to estimate the amount of time it takes to process files and directories. The estimated time is a rough calculation of the time required to transfer your data and is based on previous transfers of data between your workstation and the current server. The actual transfer time could be longer or shorter than the estimate due to factors like network traffic, system load on your workstation, or system load on the server.

Since the Estimated Transfer Time is based on previous backup transfer rates, you must run at least one backup operation first. Note that the estimate function does not take into account whether or not files are excluded from backup. The assumption made by the estimation algorithm is that all the files selected will be sent to the server. The Estimated Transfer Time field reads N/A if no files are sent to or from the current server.

Note: During installation, Storage Manager creates the **.adsmrc** file to record statistics from the backup-archive client estimate function. The **.adsmrc** file resides in the directory named in the **\$HOME** environment variable.

Backing up data using the GUI

You can back up specific files, a group of files with similar names, or entire directories. 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.

1. Click **Backup files and directories** from the main window. The Backup window appears.
2. Expand the directory tree. Click on the selection boxes next to the object or objects you want to back up. To search or filter files, click the **Search** icon on the tool bar.

To search:

- a. Enter your search criteria in the Find Files (Backup) window.
- b. Click the **Search** button. The Matching Files (Backup) window appears.
- c. Click the selection boxes next to the files you want to back up and close the Matching Files (Backup) window.

To filter:

- 1) Enter your filter criteria in the Find Files (Backup) window.
- 2) Click the **Filter** button. The Backup window displays the filtered files.
- 3) Click the selection boxes next to the filtered files or directories you want to back up.
3. Select one of the following backup types from the pull-down menu:
 - To run an incremental backup, click **Incremental (complete)**.
 - To run an incremental-by-date backup, click **Incremental (date only)**.
 - To run a selective backup, click **Always backup**.
4. To modify specific backup options, click the **Options** button. The options you select are effective during the current session *only*.
5. Click **Backup**. The Backup **Task List** window displays the backup processing status.

Considerations:

- To perform an automatic incremental backup of your default domain, select **Actions** → **Backup Domain**. Your default domain is set with the **domain** option in your client user options file (dsm.opt). If you do not have the **domain** option set, the default domain is *all local file systems*. See “Domain” on page 162 for more information.
- You may use the Preferences editor to exclude file systems in your default domain from backup processing.

Backing up data using the command line

You can use the **incremental** or **selective** commands to perform backups. Table 16 shows examples of using these commands to perform different tasks. See “Incremental” on page 307 and “Selective” on page 344 for more information about these commands.

Table 16. 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 307 for more information about the incremental command. See “Full and partial incremental backup” on page 64 for detailed information about incremental backups.

Table 16. Command line backup examples (continued)

Task	Command	Considerations
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 162 for more information about the domain 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 162 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 258 for more information about the subdir option.
<i>Incremental-by-date backup</i>		
Perform an incremental-by-date backup of your default client domain.	dsmc incremental -incrbydate	Use the incrbydate option with the incremental command to back up new and changed files with a modification date later than the last incremental backup stored at the server. See "Incrbydate" on page 198 for more information about the incrbydate option.
<i>Selective backups</i>		
Back up all files in the /home/proj directory.	dsmc selective /home/proj/	Use the selective command to back up specific files or directories regardless of whether they have changed since your last incremental backup. You can use wildcards to back up multiple files at once. See "Selective" on page 344 for more information about the selective command.
Back up all files in the the /home/proj directory and all its subdirectories.	dsmc selective /home/proj/ -subdir=yes	If you specify -subdir=yes when backing up a specific path and file, 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, Storage Manager does not back up the files in that subdirectory when you use the subdir=yes option. See "Subdir" on page 258 for more information about the subdir option.
Back up the /home/dir1/h1.doc and /home/dir1/test.doc files.	dsmc selective /home/dir1/h1.doc /home/dir1/test.doc	You can enter up to 20 file names on the selective command. Enter a space between each file name. If you want to specify more than 20 file names, you can use the filelist option. See "Filelist" on page 179 for more information about this option.

Table 16. Command line backup examples (continued)

Task	Command	Considerations
Back up a list of files in the /home file system.	selective -filelist=/home/filelist.txt	Use the filelist option to process a list of files. See “Filelist” on page 179 for more information.

Displaying backup processing status

During a backup, by default Storage Manager displays the status of each file it attempts to back up. Storage Manager reports the file’s size, path, file name, total number of bytes transferred, and whether the backup attempt was successful. Similar statistics are produced by the **selective** and **archive** commands. These also display in the `dsmsched.log` file for scheduled commands.

The Web client and backup-archive client GUI provide a **Task List** window that displays information about files during processing. When a task completes, a **Backup Report** window displays processing details. Click the **Help** button in the Backup Report window for context help.

The command line displays similar information. On the backup-archive command line the name of each file displays after it is sent to the server. The progress indicator shows overall progress. Informational messages may display as follows:

- 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. Storage Manager processes only device and named pipe special files. Socket special files are not processed.
- Symbolic Link-->. Indicates that Storage Manager backs up a symbolic link.
- Updating-->. Indicates that only the file meta data is sent, if file attributes change and not the data itself.
- Expiring-->. Indicates an object (file or directory) on the server that no longer exists on the client is expired and made inactive on the server.
- Total number of objects inspected.
- Total number of objects backed up.
- Total number of objects updated. These are files whose attributes, such as file owner or file permissions, have changed.
- Total number of objects rebound. See “Binding and rebinding management classes to files” on page 118 for more information.
- Total number of objects deleted. This is a count of the objects deleted from the client workstation after being successfully backed up to the server. The count is zero for all backup commands.
- Total number of objects expired. See “Full and partial incremental backup” on page 64 for more information.
- Total number of objects failed. Objects can fail for several reasons. Check the `dsmerror.log` for details.
- Data transfer time. The total time to transfer data across the network. Transfer statistics may not match the file statistics if the operation was retried due to a

communications failure or session loss. The transfer statistics display the bytes attempted to be transferred across all command attempts.

- Network data transfer rate. The average rate at which the network transfers data between the client and the server. This is calculated by dividing the total number of bytes transferred by the time to transfer the data over the network. The time it takes to process objects is not included in the network transfer rate. Therefore, the network transfer rate is higher than the aggregate transfer rate.
- Aggregate data transfer rate. The average rate at which 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 Storage Manager processing and network time are included in the aggregate transfer rate. Therefore, the aggregate transfer rate is lower than the network transfer rate.

Note: On occasion, the aggregate data transfer rate may be higher than the network data transfer rate. This is because the backup-archive client can have multiple simultaneous sessions with the backup server. If you set the **resourceutilization** option, 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 mistakenly reported as higher. However, when running with a single session, the aggregate data transfer rate should always be reported as lower than the network data transfer rate.

- Objects compressed by. Specifies the number of file-data bytes sent over the net 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.
- LanFree bytes transferred. The total number of data bytes transferred during a lan-free operation. If the **enablelanfree** option is set to *no*, this line will not appear.

Performing an image backup

Root User

From your local workstation, you can back up one or more volumes or raw logical volumes as a single object (image backup) on your system.

An image backup provides the following benefits:

- Backs up file systems containing a large number of files faster than a full file system (containing large number of files) incremental back up.
- Improves the speed with which 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 image backup prevents access to the volume by other system applications during the operation. Use the ***imagetype=dynamic*** option to back up the volume *as is* without remounting it read-only. Corruption of the backup can occur if applications write to the volume while the backup is in progress. In this case, run **fsck** after a restore. This option replaces the dependency on the Copy Serialization value in the management class to perform an image backup. See “Imagetype” on page 191 for more information.

For Linux86 *only*: By default, Storage Manager performs a *snapshot* image backup of file systems residing on a logical volume created by the Linux Logical Volume Manager, during which the volume is available to other system applications.

You can use the ***imagetype*** option with the **backup image** command or the ***include.image*** option to specify whether to perform a static, dynamic, or snapshot image backup. See “Imagetype” on page 191 for more information.

Before you perform an image backup

Before you perform an image backup, consider the following:

- A snapshot image backup requires a Version 5.1 Storage Manager server.
- *For static image backups only*: Ensure that no other application is using the volume when you run a static image backup. The client will unmount and remount the volume as read only, so that no other applications can access it, to ensure a consistent image. The volume remains mounted but unavailable. If the volume is in use when the client attempts to unmount, the backup will fail.

If the client cannot unmount and remount the volume as read only because it is in use, and snapshot image backup is not available, you can use the ***imagetype*** option to force the client to perform an image backup without unmounting and remounting the volume in read-only mode. Set the ***imagetype*** option to *dynamic* in an ***include.image*** statement or from the command line. The backup can be corrupted if applications write to the volume while the backup is in progress. This can be corrected by running **fsck** after a restore to fix any corrupted blocks. See “Include options” on page 194 for more information.

Important: If a mounted file system has nested mount points, unmount them before attempting a backup. Otherwise, Storage Manager will be unable to unmount the volume. The file system is rendered *busy* if it contains any mounts.

Do not include system files in an image backup because file systems being actively used cannot be unmounted.

- You can assign a management class to manage the volume image. If you do not assign a management class, the default management class is used for the image. To assign a management class, use the ***include.image*** option. See “Include options” on page 194 for more information. See Chapter 8, “Understanding storage management policies”, on page 111 for more information about management classes.

Note: Static and dynamic copy serialization values are no longer controlled by the server management class, but are instead controlled directly from the client, using the ***imagetype*** option. See “Imagetype” on page 191 for more information.

- You can exclude a volume from image backup using the ***exclude.image*** option. See “Exclude options” on page 176 for more information.
- You must assign a mount point for the volume on which you want to perform an image backup. Storage Manager will not back up a volume without a mount point.

Volume device type support for an image backup: The following table lists devices supported by the **backup image** command. A raw device might be a disk slice, a partition, or a logical volume.

Table 17. 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, AIX 5L
Sun Solstice Volume Mgr	Meta Devices	/dev/md/dsk/dl	Solaris
Veritas Volume Mgr	Logical Volumes	/dev/vx/dsk/rootg/vol01 /dev/vg00/lvol01	Solaris HP-UX
Raw Disk	Partitions	/dev/hda1, /dev/sda3	Linux86
Linux Logical Volume Mgr	Logical Volumes	/dev/myvolgroup/ myvolume	Linux86
Raw Disk	Disk Slices	/dev/dsk/c0tld0s0	Solaris

The client must support the raw device type on the specific platform in order to perform an image backup of a raw device. If you want to perform an image backup for a file system mounted on a raw device, the raw device must be supported. Remember to specify raw devices by their block device name.

Notes:

1. On HP-UX, raw logical volume backup does not support devices other than logical volumes, such as /dev/dsk/c0t0d1. Logical volume devices usually take the form /dev/vgXY/lvolAB. A volume group must begin with vg to be correctly detected.
2. You should not back up disk slices containing cylinder 0 on Solaris because the volume table of contents (VTOC) will be overwritten after a restore.
3. For AIX JFS clients, when doing image backup directly to tape, the **resourceutilization** option value cannot exceed the value of the MAXNUMMP on the server for that node. If it does, the backup can fail with an *Unknown System Error* message.

Utilizing image backup to perform file system incremental backup

There are two methods of utilizing image backups to perform efficient incremental backups of your file system. These backup methods allow you to perform point-in-time restore of your file systems and improve backup and restore performance. You can perform the backup only on formatted volumes; not on raw logical volumes. You can use one of the following methods to perform image backups of volumes with mounted file systems.

Method 1: Using image backup with file system incremental:

1. Perform a full incremental backup of the file system (See “Backing up data using the GUI” on page 68 for instructions). This establishes a baseline for future incremental backups.
2. Perform an image backup of the same file system to make image restores possible. See “Performing an image backup using the GUI” on page 75 for instructions.
3. Perform incremental backups of the file system periodically to ensure that the server records additions and deletions accurately.

4. Perform an image backup periodically to ensure faster restore.
5. Restore your data by performing an incremental restore (See “Performing an image restore using the GUI” on page 89 for instructions). Ensure that you select the **Image plus incremental directories and files** and **Delete inactive files from local** options in the Restore Options window before beginning the restore. During the restore, the client does the following:
 - Restores the most recent image on the server.
 - Deletes all the files that are inactivated on server. Deletes all of the files restored in the previous step which are inactive on the server. These are files which existed at the time of the image backup, but were subsequently deleted and recorded by a later incremental backup.
 - Restores new and changed files from the incremental backups.

Method 2: Using image backup with incremental-by-date image backup:

1. Perform an image backup of the file system. See “Performing an image backup using the GUI” on page 75 for instructions.
2. Perform an incremental-by-date image backup of the file system (See “Performing an image backup using the GUI” on page 75 for instructions). This sends only those files that were added or changed since the last image backup to the server.
3. Periodically, perform full image backups (See “Performing an image backup using the GUI” on page 75 for instructions).
4. Restore your volume by performing an incremental restore (See “Performing an image restore using the GUI” on page 89 for instructions). Ensure that you select the **Image plus incremental directories and files** option in the Restore Options window before beginning the restore. This will first restore the most recent image and will then restore all the incremental backups performed since that date.

- Note:** You should perform full image backups periodically in the following cases:
- When a file system changes substantially (more than 40%), as indicated in step 4 of method 1 and step 3 of method 2. On restore, this would provide a file system image close to what existed at the time of last incremental-by-date image backup and also improves restore time.
 - Once each month.
 - As appropriate for your environment.

This will improve restore time because fewer changes are applied from incrementals.

The following restrictions apply when using method 2:

- The file system can have no previous full incremental backups.
- Incremental-by-date image backup does not inactivate files on the server; therefore, when you restore an image with the **incremental** option, files deleted after the original image backup will be present after the restore.
- If this is the first image backup for the file system, a full image backup is performed.
- If file systems are running at or near capacity, an out-of-space condition could result during the restore.

Comparing methods 1 and 2: To help you decide which method is appropriate for your environment, Table 18 on page 75 is a comparison of methods 1 and 2.

Table 18. Comparing incremental image backup methods

Method 1: Using image backup with file system incremental	Method 2: Using image backup with incremental-by-date image backup
Files are expired on the server when they are deleted from the file system. On restore, you have the option to delete files which are expired on serve from image.	Files are not expired on server. After the image incremental restore completes, all files deleted on the file system after the image backup will be present after the restore. If file systems are running at or near capacity, an out-of-space condition could result.
Incremental backup time is the same as regular incremental backups.	Incremental image backup is faster because the client does not query the server for each file that is copied.
Restore is much faster compared to a full incremental file system restore.	Restore is much faster compared to a full incremental file system restore.
Directories deleted from the file system after the last image backup are not expired.	Directories and files deleted from the file system after the last full image backup are not expired.

Performing an image backup using the GUI

For the Linux86 client, when you perform an image backup using the client GUI **Image Backup** option, Storage Manager honors the image type setting of the **include.image** or **imagetype** options in your client system options file (dsm.sys). If you set the image type to *snapshot*, the client performs an snapshot image backup of file systems residing on a logical volume created by the Linux Logical Volume Manager, during which the volume is available to other system applications. If you set the image type to *static*, the client will unmount and remount the volume as read-only, so that no other applications can access it. If you do not specify either of these options, the client performs a snapshot image backup.

For the AIX, HP-UX, and Solaris clients, selecting the **Image Backup** option performs a static or dynamic image backup depending on the image type setting of the **include.image** or **imagetype** options in your client system options file (dsm.sys). If the image type is set to *static*, the client will unmount and remount the volume as read-only, so that no other applications can access it. If the image type is set to *dynamic*, the client performs the image backup without making the file system read-only during the backup. If you do not specify either of these options, the client performs a static image backup.

To create an image backup of your file system or raw logical volume, perform the following steps:

1. Click on the **Backup files and directories** button in the Storage Manager main window. The Backup window appears.
2. Expand the directory tree and select the objects you want to back up. To back up a raw logical volume, locate and expand the **RAW** directory tree object.
 - To perform an image backup as defined by the **imagetype** option setting in your client options file (dsm.sys), select **Image Backup** from the drop-down list.
 - To perform a *snapshot* image backup, select **Image snapshot backup** from the drop-down list. (Linux only)
 - To perform an incremental-by-date image backup, select **Incremental image (date only)** from the drop-down list.
3. Click **Backup**. The Backup **Task List** window displays the backup processing status. The Backup Report window displays a detailed status report.

Considerations:

- To modify specific backup options, click the **Options** button. The options you select are effective during the current session *only*.
- If you want to estimate the amount of time it takes to process your files and directories, click the **Estimate** button. The Estimated Transfer Time field reads N/A if there has not been a previous backup between the client node and the server. The estimate is based on the historical transfer rate between a given client-server combination.

Performing an image backup using the command line

Use the **backup image** and **restore image** commands to perform image backup and restore operations on a single volume. See “Backup Image” on page 293 and “Restore Image” on page 336 for more information.

You can use the **imagetype** option with the **backup image** command or the **include.image** option in your dsm.sys file or on the command line to specify whether to perform a static, dynamic, or snapshot image backup. See “Imagetype” on page 191 for more information.

Use the **mode** option with the **backup image** command to perform an incremental-by-date image backup that backs up only new and changed files after the last full image backup. However, this only backs up files with a changed date, not files with changed permissions. See “Mode” on page 214 for more information.

LAN-free data movement

AIX, AIX 5L, HP-UX, Linux86, and Solaris clients support LAN-free data movement, which shifts the movement of client data from the communications network to a storage area network (SAN). Shifting the client data movement from the communications network to a SAN decreases the load on the Storage Manager server.

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

LAN-free prerequisites

To enable LAN-Free support, you must install and configure the Tivoli Storage Manager Managed System for SAN Storage Agent on the client workstation. For more information, refer to the following publications:

- *IBM Tivoli Storage Manager for AIX Managed System for SAN Storage Agent User's Guide*, GC32-0771
- *IBM Tivoli Storage Manager for Sun Solaris Managed System for SAN Storage Agent User's Guide*, GC32-0781
- *IBM Tivoli Storage Manager for HP-UX Managed System for SAN Storage Agent User's Guide*, GC32-0727
- *IBM Tivoli Storage Manager for Linux Managed System for SAN Storage Agent User's Guide*, GC23-4693

LAN-free options

After installing and configuring the Tivoli Storage Manager Managed System for SAN feature on the client workstation, you can use the following options to enable LAN-Free data movement:

enablelanfree

Specifies whether to enable an available LAN-free path to SAN-attached storage device. See “Enablelanfree” on page 170 for more information.

lanfreecommmethod

Specifies a communication protocol between the client and the Storage Agent. See “Lanfreecommmethod” on page 200 for more information.

lanfreetcppport

Specifies the TCP/IP port number where the Storage Agent is listening. See “Lanfreetcppport” on page 203 for more information.

lanfreeshmport

Specifies the Shared Memory port number where the Storage Agent is listening. See “Lanfreeshmport” on page 202 for more information.

Backing up NAS file systems

Storage Manager supports backup and restore of network attached storage (NAS) file system images to tape drives or libraries that are locally attached to NAS file servers. Tivoli Data Protection for NDMP enables backup and restore support on the Storage Manager Windows NT, 2000, XP, AIX, and Solaris servers for NAS file servers from Network Appliance. *Data Protection for NDMP is available only with IBM Tivoli Storage Manager Extended Edition.* See Appendix C, “Backing up NAS file systems using NDMP”, on page 363 for more information.

Backup: Additional considerations

This section includes topics related to incremental and selective backups. You do not need to understand this information to use Storage Manager for basic work.

Understanding how files are stored

When you back up and archive files, 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, 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/*"
```

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, 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/*"
```

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/*"
```

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.

Which files are backed up

When you request an incremental or selective backup, Storage Manager backs up a file if all of the following requirements are met:

- The file is not excluded from backup in your include-exclude options list. If you do not have an include-exclude list, all files will process.
- The selected management class contains a backup copy group. See Chapter 7, “Automating tasks”, on page 105 for more information on management classes and backup copy groups.
- The file meets the copy serialization requirements defined in the backup copy group. If serialization is *static* or *shared static*, and the file is in use during backup, the backup does not occur.

When you perform an incremental backup of your files, Storage Manager also checks the following:

- Mode requirements defined in the backup copy group. If the copy mode has a value of *modified*, the file must have changed since the last backup. If the copy mode has a value of *absolute*, the file can be backed up even if it has not changed.
- Frequency requirements defined in the backup copy group. The minimum number of days since the last backup must elapse before a file is backed up.

When you run an incremental or selective backup, Storage Manager also backs up all directory information that is not already backed up. Directories are counted in the number of objects backed up.

How special file systems are handled

Special file systems contain dynamic information generated by the operating system; they contain no data or files. The 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 and SGI
- the `/dev/pts` on Linux

How files are assigned to management classes

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. See Chapter 7, “Automating tasks”, on page 105 and Chapter 8, “Understanding storage management policies”, on page 111 for more information on management classes, how an Authorized User assigns management classes to files, and storage management policies.

Understanding how symbolic links are handled

A UNIX symbolic link is a file that contains a pointer to another file or directory. Storage Manager handles symbolic links differently than it does regular files and directories. In some operations, such as a backup, only the path information that the symbolic link contains is backed up. In other operations, such as archive, the file to which the symbolic link points is archived, but under the name of the symbolic link. For more information on how symbolic links are handled during an archive operation, see “Archsymlinksfile” on page 142.

Incremental backup

— When you run an incremental backup, Storage Manager backs up only the path information to a file or directory to which a symbolic link points. The contents of the file or the contents of files in the directory are not backed up.

Selective backup

— When you run a selective backup on a symbolic link that points to a file, Storage Manager backs up only the path information to that file. The contents of the file are not backed up.

Restore — When you restore a symbolic link that originally pointed to a file, the symbolic link is restored, whether or not the file it points to still exists. If you restore a symbolic link that originally pointed to a directory:

- Without the files in the directory (for example, the `/home/gillis/symdir/` directory), and the symbolic link does not exist on your file system, nothing is returned.
- Along with the files in the directory (for example, `/home/gillis/symdir/*`), and the symbolic link does not exist on your file system, Storage Manager builds the directory on your workstation and puts the files in that directory. If the ***subdir*** option is set to yes, Storage Manager recursively restores all subdirectories of the directory.
- And the symbolic link already exists on your workstation, the result depends on how the ***followsymbolic*** option is set; if it is set to:

Yes — The symbolic link is restored and overwrites the directory on

your workstation. If the **followsymbolic** option is set to yes, a symbolic link can be used as a virtual mount point.

No — Storage Manager displays an error message. No is the default.

Note: On UNIX systems, when a symbolic link is created its modification time is set to current system time and can not be changed. When restoring a symbolic link, its modification date and time is set to the date and time of the restore, not to the date and time of the symbolic link when it was backed up. As a result, Storage Manager will back up the symbolic link again during the next incremental backup because its modification time changed since the last backup.

The following table shows symbolic link backup and restore functions along with the action taken:

Table 19. Symbolic link management table for backup and restore

Function	Action taken
Selective backup of a file.	Backs up the symbolic link only, the file is not backed up.
Selective backup of a directory.	Backs up the directory only, the symbolic link is not backed up.
Incremental backup with subdir=no .	Backs up the symbolic links only, files and directories pointed to are not backed up.
Incremental backup with subdir=yes .	Backs up the symbolic links and directories and files they point to.
Restore a symbolic link that points to a file.	The symbolic link is restored, regardless of whether the file the symbolic link points to still exists.
Restore a symbolic link that points to a directory.	The symbolic link is restored, regardless of whether the directory the symbolic link points to still exists.
Restore a symbolic link that points to a directory with subdir=yes , the directory still exists.	The symbolic link and files in the directory and subdirectories are restored.
Restore a symbolic link that points to a directory with subdir=yes , the directory and symbolic link no longer exist.	A directory is created in the directory in which the symbolic link resides and all files and subdirectories are restored to that directory; the symbolic link name is used as the new directory name.

Understanding how hard links are handled

When you back up files that are hard-linked, Storage Manager backs up each instance of the linked file. For example, if you back up two files that are hard-linked, Storage Manager will back up the file data twice.

When you restore hard-linked files, Storage Manager attempts to reestablish the links. For example, if you had a hard-linked pair of files, and only one of the hard-linked files is on your workstation, when you restore both files, they will be hard-linked. The one exception to this procedure occurs if you back up two files that are hard-linked and then break the connection between them on your workstation. If you restore the two files from the server, Storage Manager will respect the current file system and not restore the hard link.

If you do not backup and restore all files that are hard-linked at the same time, problems will occur. To ensure that hard-linked files remain synchronized, back up all hard links at the same time and restore those same files together.

Understanding how NFS hard and soft mounts are handled

When Storage Manager connects a backup-archive client to an NFS file system, you can use either a hard mount or a soft mount. 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 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 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.

Backing up opened files

Storage Manager looks for files that have changed between the start and the completion of the file's backup. Some files on your system may be in use, or open, when you try to back them up. Because an open file may change, a backup action might not reflect the correct contents of the file at a given time.

Consider if a file is important. Can you build the file again? If the file is not important, you may not want to back up the file. Or, if the file is important, a root user on your workstation can ensure the file is closed before back up.

If your backups run on a schedule, a root user can use the ***preschedulecmd*** option to enter a command to close the file. For example, if the open file is a database, use the database's ***quiesce*** command to shut down the database. A root user can use the ***postschedulecmd*** option to restart the application that uses the file after the backup completes. If you are not using a schedule for the backup, ensure that you close the application that uses the file before you start the backup.

Storage Manager can back up the file even if it is open and gets changed during the backup. This is only useful if the file will be usable even if it changes during backup. To back up these files, assign the files a management class with the serialization *dynamic* or *shared dynamic*. See "Selecting a management class for files" on page 116 and "Displaying information about management classes and copy groups" on page 113 for information.

Using wildcard characters

You can use the operating system's wildcard characters in file specifications with Storage Manager. These characters let you select groups of files that have similar names.

In a command, wildcard characters can only be used in the file name or extension. They cannot be used to specify destination files, file systems, or directories. When using wildcard characters in non-loop mode, as in

```
dsmc sel "/home/ledger.*"
```

enclose the parameter containing the asterisk in quotes to ensure the system does not interpret the wildcard character and produce unexpected results. Wildcard character information is covered in the following table.

* (Asterisk)	Zero or more characters that match all files:
*.cpp	With a cpp extension
hm*.*	Starting with hm, regardless of extension
hm*	Starting with hm, whether an extension exists or not
h.*	With an h somewhere in the file name, regardless of extension
? (Question mark)	One character that matches all files with:
?cpp	The extension cpp with one, and only one, character in the file name
hm?.cpp	Three-character names beginning with hm and that have the cpp extension
* ? (Asterisk and question mark)	Asterisk and question mark combinations matching:
??hm.*	All four-character file names ending in hm., no matter what extension they have

In a path name for a file specification, you cannot specify a directory whose name contains an asterisk (*) or a question mark (?). Storage Manager will recognize those characters only as wildcard characters.

Chapter 5. Restoring files and directories

Use Storage Manager to restore backup versions of specific files, a group of files with similar names, or entire directories. Select the files you want to restore using file specification (file path, name, and extension), a directory list, or a subdirectory path to a directory and its subdirectories. UNIX socket files are skipped during restore, including socket files that were backed up with earlier versions of Storage Manager.

Table 20 identifies tasks described in this chapter:

Table 20.

Task	Page
Restoring data using the GUI	85
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Performing large restore operations	87
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Authorizing another user to restore or retrieve your files	92
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Restore or retrieve files to another workstation	93
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All client backup and restore procedures in this chapter also apply to the Web client, except the following:

- Estimate
- View Policy Information
- Access Another User
- Searching and Filtering
- User Access List
- Preferences Editor

See “Starting a Web client session” on page 52 for information on starting the Web client.

No query restore

When you enter an unrestricted wildcard source file specification on the **restore** command and do not specify any of the options: **inactive**, **latest**, **pick**, **fromdate**, or **todate**, the client uses a different method for retrieving files and directories from the server. This method is called *no query restore* because instead of querying the server for each object to be restored, a single restore request is sent to the server. In this case, the server returns the files and directories to the client without further action by the client. The client merely accepts the data coming from the server and restores it to the destination named on the **restore** command.

An example of an unrestricted wildcard command would be:

```
/home/mydocs/2002/*
```

An example of a restricted wildcard command would be:

```
/home/mydocs/2002/sales.*
```

If the restore process stops because of a power outage or network failure, the server records the point at which this occurred. This record is known to the client as a *restartable restore*. It is possible to have more than one restartable restore session. Use the **query restore** command to find out if your client has any restartable restore sessions in the server database.

You must complete a restartable restore before attempting further backups of the file system. If you attempt to repeat the restore that was interrupted or try to back up the destination file space, the attempt will fail because you did not complete the original restore. You can restart the restore at the point of interruption by entering the **restart restore** command, or you can delete the restartable restore using the **cancel restore** command. If you restart the interrupted restore, it will restart with the first transaction, which may consist of one or more files, not completely restored when the interruption occurred. Because of this, you may receive some replace prompts for files from the interrupted transaction which were already restored.

The differences between the standard restore process and the no query restore process are outlined below.

Standard restore process

1. The client queries the server for a list of files backed up for the client file space you want to restore.
2. The server sends a list of backed up files that match the restore criteria. If you want to restore both active and inactive files, the server sends information about all backed up files to the client.
3. The list of files returned from the server is sorted in client memory to determine the file restore order and to minimize tape mounts required to perform the restore.
4. The client tells the server to restore file data and directory objects.
5. The directories and files you want to restore are sent from the server to the client.

No query restore process

1. The client tells the server that a no query restore is going to be performed and provides the server with details about file spaces, directories, and files.
2. The server sorts the data using an internal sort table which minimizes tape mounts.
3. The data to be restored is sent to the client. File and directory objects stored on disk are sent immediately since sorting for such data is not required before restoring it.

For more information on using the command line to begin restartable restores, see “Restore” on page 330. To perform restartable restores using the GUI, follow these steps:

1. Click **Help** from the Restore window.
2. Click **Restoring Backup Versions**

3. Click **Work with restartable restore sessions**.

Do you want to restore an active or inactive backup?

Your administrator determines how many backup versions 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 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, 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.

Restoring data using the GUI

To restore backup versions of individual files or subdirectories:

1. Click **Restore files and directories to your system** from the main window. The Restore window appears.
2. Expand the directory tree. Select the selection boxes next to the files or directories you want to restore. To search or filter files, click the **Search** icon on the tool bar.
To search:
 - a. Enter your search criteria in the Find Files (Restore) window.
 - b. Click the **Search** button. The Matching Files (Restore) window appears.
 - c. Click the selection boxes next to the files you want to restore and close the Matching Files (Restore) window.**To filter:**
 - 1) Enter your filter criteria in the Find Files (Restore) window.
 - 2) Click the **Filter** button. The Restore window displays the filtered files.
 - 3) Click the selection boxes next to the filtered files or directories you want to restore.
3. To modify specific restore options, click the **Options** button. Any options you change are effective during the current session *only*.
4. Click **Restore**. The Restore Destination window appears. Enter the information in the Restore Destination window.
5. Click **Restore**. The Restore **Task List** window displays the restore processing status. Transfer statistics may not match the file statistics if the operation was retried due to a failure such as a communications failure or session loss. The transfer statistics will show the bytes attempted to be transferred across all command attempts.

Restoring data using the command line

Use the **restore** command to restore files. See “Restore” on page 330 for more information about the **restore** command. Table 21 on page 86 shows examples of using the **restore** command to restore objects from Storage Manager server storage. See “Restore” on page 330 for additional examples.

Table 21. Command line restore examples

Task	Command	Considerations
Restore the most recent backup version of the /home/monnett/h1.doc file, even if the backup is inactive.	<code>dsmc restore /home/monnett/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 latest option to restore the most recent backup version. Storage Manager restores the latest backup version, whether it is active or inactive. See “Latest” on page 205 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 "/user/project/*"-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 228 and “Inactive” on page 192 for more information.
Restore the /home/monnett/h1.doc file to its original directory.	<code>dsmc restore /home/monnett/h1.doc</code>	If you do not specify a destination, the files are restored to their original location.
Restore the /home/monnett/h1.doc file under a new name and directory.	<code>dsmc restore /home/monnett/h1.doc /home/newdoc/h2.doc</code>	None
Restore the files in the /home file system and all of its subdirectories.	<code>dsmc restore /home/ -subdir=yes</code>	When restoring a specific path and file, 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 258 for more information about the subdir option.
Restore all files in the /home/mydir directory to their state as of 1:00 PM on August 17, 2002.	<code>dsmc restore -pitd=8/17/2002 -pitt=13:00:00 /home/mydir/</code>	See “Pitdate” on page 229 and “Pittime” on page 230 for more information about the pitdate and pittime options.
Restore all files from the /home/projecta directory that end with .bak to the /home/projectn/ directory.	<code>dsmc restore "/home/projecta/*.bak" /home/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.

Table 21. Command line restore examples (continued)

Task	Command	Considerations
Restore files specified in the restorelist.txt file to a different location.	dsmc restore /home/dir2/restorelist.txt /home/NewRestoreLocation/	See “Filelist” on page 179 for more information about restoring a list of 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 /usr/
```

As a general rule, you can enter from two to four **restore** commands at one time. The maximum number you can run at one time without degrading performance depends on factors such as how much memory you have and network utilization.

The speed at which you can restore the files also depends on how many tape drives are available on the server, and whether your administrator is using collocation to keep file spaces assigned to as few volumes as possible.

For example, if /home/monnett and /home/gillis are on the same tape, the restore for /home/gillis must wait until the restore for /home/monnett is complete. However, if /home/stewart is on a different tape, and there are at least two tape drives available, the restore for /home/stewart can begin at the same time as the restore for /home/monnett.

If your administrator is using collocation, the number of sequential access media mounts required for restore operations is also reduced.

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, or recover a basic configuration to a prior condition.

You can perform a point-in-time restore of a file space, directory, or file. You can also perform a point-in-time restore of image backups. For more information see “Backup Image” on page 293.

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 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.

Notes:

1. Your administrator must define copy group settings that maintain enough inactive versions of a file to guarantee that you can restore that file to a specific date and time. If enough versions are not maintained, Storage Manager may not be able to restore all objects to the point-in-time you specify.
2. If you delete a file or directory, the next time you run an incremental backup, the active backup version becomes inactive and the oldest versions that exceed the number specified by the *versions data deleted* attribute of the management class are deleted. See Chapter 8, “Understanding storage management policies”, on page 111 for more information about the *versions data deleted* attribute.

When performing a point-in-time restore, consider the following:

- 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, 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.
- 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 files and directories to your system** 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 during restore** selection box. Select the date and time and click **OK**. The point in time that you specified appears in the Point in Time display field in the Restore window.

4. Display the objects you want to restore. You can search for an object by name, filter the directory tree, or work with the directories in the directory tree.
5. Click the selection boxes next to the objects you want to restore.
6. Click the **Restore** button. The Restore Destination window displays. Enter the appropriate information.
7. Click the **Restore** button to start the restore. The Restore Task List window displays the restore processing status.

Note: If there are no backup versions of a directory for the point-in-time you specify, files within that directory are not restoreable from the GUI. However, you can restore these files from the command line.

You can start point-in-time restore from the command-line client using the ***pitdate*** and ***pittime*** options with the **query backup** and **restore** commands. For example, when you use the ***pitdate*** and ***pittime*** options with the **query backup** command, you establish the point-in-time for which file information is returned. When you use ***pitdate*** and ***pittime*** with the **restore** command, the date and time values you specify establish the point-in-time for which files are returned. If you specify ***pitdate*** without a ***pittime*** value, **pittime** defaults to 23:59:59. If you specify ***pittime*** without a ***pitdate*** value, it is ignored.

Restoring an image

Before you perform an image restore, consider the following:

- Restoring the image of a volume will restore the volume 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 does not have to be the same type as the original. The volume does not even have to be formatted. The image restore process will create the appropriately formatted file system for you.
- 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 Storage Manager client program is installed.
- If you have run progressive incremental backups *and* image backups of your file system, you can perform an incremental image restore of the file system. The process restores individual files after the complete image is restored. The individual files restored are those backed up after the original image. Optionally, if files were deleted after the original backup, the incremental restore can delete those files from the base image. Incremental backups and restores can be performed only on mounted file systems, not on raw logical volumes.
- If for some reason a restored image is corrupted, you can use the **fsck** tool to attempt to repair the image.

Performing an image restore using the GUI

Use the following procedure to restore an image of your file system or raw logical volume:

1. Click **Restore files and directories to your system** 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.
4. **(Optional)** To perform an incremental image restore, click the **Options** button to open the Restore Options window and select the **Image plus incremental directories and files** option. If you want to delete inactive files from your local file system, select the **Delete inactive files from local** check box. Click the **OK** button.
5. Click **Restore**. The Restore Destination window appears. The image can be restored to the volume with the mount point from which it was originally backed up. Alternatively, a different volume can be chosen for the restore location.
6. Click the **Restore** button to begin the restore. The **Task List** window appears showing the progress of the restore. The Restore Report window displays a detailed status report.

Considerations:

- To modify specific restore options, click the **Options** button. Any options you change are effective during the current session *only*.
- In the Restore Options window, you can choose to restore the image only or the image and incremental directories files. If you choose **Image Only**, you will restore the image from your last image backup only. This is the default.

If you ran incremental-by-date image backup on a volume or image backups on a volume with incrementals, you can choose the **Image plus incremental directories and files** option. If you choose **Image plus incremental directories and files**, you can also select **Delete inactive files from local** to delete the inactive files that are restored to your local file system. If incremental-by-date image backup was the only type of incremental backup you performed on the file system, deletion of files will not occur.

Attention: Be absolutely sure that you need to perform an incremental restore because it will replace your entire file system with the image from the server and then restore the files that you backed up using the incremental image backup operation.

- If you want to estimate the amount of time it takes to process your files and directories, click the **Estimate** button. The Estimated Transfer Time field reads N/A if there has not been a previous backup between the client node and the server. The estimate is based on the historical transfer rate between a given client-server combination.

Performing an image restore using the command line

Use the **restore image** command to restore an image using the Storage Manager command line client. See “Restore Image” on page 336 for more information.

Restoring data from a backup set

Your Storage Manager administrator can generate a backup set (a collection of your active files that reside on the server) onto portable media created on a device using a format that is compatible with the client device.

It is possible to generate a backup set as a number of special files if the device class the Storage Manager administrator specifies when creating it is *file*. These files can be stored locally (on the client) to provide more restore flexibility.

Portable media can be used on devices such as a tape, CD-ROM, DVD, and Iomega JAZ or ZIP drives. Current device support information is available at the following Web site:

http://www.tivoli.com/support/storage_mgr/requirements.html

You can restore backup sets from the following locations:

- From portable media on a device attached to your client workstation
- Directly from the server (You must be a root user to restore an entire backup set from the server, otherwise only files you own are restored.)

Backup sets can provide you with instant archive and rapid recovery capability as described below:

Instant archive

This capability allows an administrator to create an archive collection from backup versions already stored on the server.

Rapid recovery

When you are away from your office without a network connection and you lose data, you can restore the data from the backup set.

Notes:

1. If you cannot restore a backup set from portable media, check with your Storage Manager administrator to ensure that the portable media was created on a device using a format that is compatible with your device.
2. There is no support in the Storage Manager API for the backup set format.
3. To enable the GUI client to restore a backup set on an attached device on a UNIX standalone workstation, without requiring a server connection, use the **localbackupset** option. See “Localbackupset” on page 206 for more information.
4. Note that the **restore backupset** command supports restore of local backup sets from local media without using the **localbackupset** option.

Restoring an entire or partial backup set

Storage Manager considers a backup set as one object containing the whole file structure. You can restore the entire backup set or just select portions. The backup set media is self-describing and contains all the information required to perform a successful restore.

Use the GUI to restore an entire backup set *only*. The command line can be used to restore an entire backup set or individual files within a backup set. See “Restore Backupset” on page 333 for information on how to use the **restore backupset** command.

Restoring backup sets using the GUI

Attention: Before you begin a restore, be aware that backup sets can contain data for multiple file spaces. If you specify a destination other than the original location, data from *all* file spaces is restored to the location you specify.

To restore a backup set, perform the following steps:

- Click **Restore files and directories to your system** from the main window. The Restore window appears.

- Locate the **Backup Sets** directory tree object and expand it.
 - To restore the backup set from a local device, expand the **Local** object and the Specify backup set location dialog is displayed. On the dialog, select **File name** or **Tape name** from the dropdown list and then enter the tape or file name location.
 - To restore an entire backup set from the server, expand the **Server** object.

Your backup sets appear in the tree and are grouped by backup set descriptions. Expand a backup set description to see the backup sets with that description.

- Click the selection box next to the backup set that you want to restore.
- Click **Restore**. The Restore Destination window appears. Enter the appropriate information.

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.

- Click on **Restore**. The Task List window displays the restore processing status.

Note: To enable the GUI client to restore a backup set on an attached device on a UNIX standalone workstation, without requiring a server connection, use the *localbackupset* option. See “Localbackupset” on page 206 for more information. The *restore backupset* command supports restore of local backup sets from local media without using the *localbackupset* option. Also, certain local devices such as tape devices require device drivers to be set up prior to performing a restore. See the device manual for assistance with this task. You will also need to know the device address in order to perform the restore.

Restore: Additional considerations

This section discusses some advanced considerations for restoring data. You do not need to understand this information to use 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. To authorize another user to restore or retrieve your files:

1. Click on **Utilities** from the main window. Click on **User Access List**. The User Access List window appears.
2. Enter the name of the node and user you want to authorize and the directory and file name for the file to which you want the user to have access. You can give the user access to backups or archives. You must add separate authorizations for backup and archive access, even if you want to give the same user access to the same files for both. You can authorize all users by using an asterisk (*) for the user name or authorize all nodes by using an asterisk (*) for the node name.
3. Click on **Add** to add the user. While you are in the User Access List window, you can add several users at once, delete users, or change your existing authorizations. All additions, deletions, and changes are processed when you click **OK**. Click **Cancel** to exit the user access list without making any changes.

4. Click **OK** to add the user to the user access list (the user is not added until you do this).

See “Set Access” on page 346, “Query Access” on page 315, and “Delete Access” on page 301 for information on using commands.

The Storage Manager node you are authorizing must be registered with your Storage Manager server.

Restoring or retrieving another user's files

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 User**. The Access Another User window appears.
3. Type the node name of the user's host machine in the Node name field. Type the user name in the User name field.
4. Click the **Set** button.

If you are using commands, use the **fromnode** and **fromowner** options to indicate the node name and the name of the user who owns the files.

For example, to restore files to one of your own file systems that were backed up from a workstation named Node1 and owned by a user named Ann, enter:

```
dsmc restore -fromn=node1 -fromo=ann "/home/proj/*" /home/gillis/
```

Use the **query filespace** command to get a list of file spaces (see “Query Filespace” on page 321). For example, to get a list of file spaces owned by Ann on Node1, enter:

```
dsmc query filespace -fromn=node1 -fromo=ann
```

See “Fromnode” on page 184 for more information about the **fromnode** option. See “Restore” on page 330 for more information about using the **fromnode** and **fromowner** options with the **restore** command. Also see “Retrieve” on page 340 for more information about the **retrieve** command.

Restore or retrieve files to another workstation

From a different workstation, you can restore or retrieve files you have already backed up from your own workstation. You must know the 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 Storage Manager or you can add the **virtualnodename** option to your client user options file `dsm.opt`. Use the **virtualnodename** option on the **dsm** command if you are borrowing another user's machine and you do not want to update their client user options file.

Storage Manager prompts you for the password for your original node. After you enter the correct password, all file systems from your original workstation appear in the Restore or Retrieve window. You can restore or retrieve files as if you were working on your own workstation.

Attention: When you use this method to access files, you have access to all files backed up and archived from your workstation. You are considered a virtual root user.

You can use the ***virtualnodename*** option in a command. For example, to restore your ***projx*** files, enter:

```
dsmc restore -virtualnodename=nodeone "/home/monnett/projx/*"
```

If you do not want to restore or retrieve the files to the same directory name on the alternate workstation, enter a different destination.

The considerations for retrieving files are the same as restoring files.

Restoring a disk in case of disk loss

Storage Manager can recover your files only if you can run the client. If the file system that contains the client is lost, you must reinstall the client before you can recover your files. If you also lose the file system that contains the operating system and communication software, you must recover them before you can connect to the server.

To protect yourself against these kinds of losses, you need to put together a set of installation media that you can use to restore your system to a state that lets you contact the server and begin recovering data. The installation media should contain:

1. A bootable operating system that lets you perform basic functions.
2. A correctly configured communication program that lets you establish communications with the server.
3. A client with appropriate customized options files. You can use the command-line client to complete this task.

The communication package you use determines what files you need. Consult your operating system and communication software manuals to set up your installation media.

If you also have the Tivoli Space Manager installed on your workstation, your installation media should include the space manager command line client. For information about restoring migrated files, see *IBM Tivoli Space Manager for Unix Using the Hierarchical Storage Management Clients*, GC32-0794.

Note: Your administrator can schedule restore operations which can be very useful when you need to restore a large number of files.

Deleting file spaces

Authorized User

If your Storage Manager administrator gives you authority, you can delete entire file spaces from the server. You cannot delete individual backup versions that are kept on the server. When you delete a file space, you delete all the files and images, both backup versions and archive copies, that are contained within the file

space. For example, if you delete the file space for your **/home/monnet** file system, you are deleting every backup for every file in that file system and every file you archived from that file system. Carefully consider whether you want to delete a file space.

You can delete file spaces using the 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. Storage Manager prompts you for confirmation before deleting the file space.

You can also delete a file space using the **delete filesystem** command. See “Delete Filespace” on page 303 for more information. Use the **class** option with the **delete filesystem** command to delete NAS file spaces. See “Class” on page 145 for more information.

Chapter 6. Archiving and retrieving files

Archiving and retrieving files is similar to backing up and restoring files. Many of the windows and concepts are similar. In this chapter, we cover the main archive and retrieve tasks, but where windows and concepts are the same, as for backup and restore, see Chapter 4, “Backing up files and directories”, on page 61.

All client archive and retrieve procedures in this chapter also apply to the Web client, except the following:

- Estimate
- View Policy Information
- Access Another User
- Searching and Filtering
- User Access List
- Preferences Editor

See “Starting a Web client session” on page 52 for information on starting the Web client.

Table 22 identifies tasks described in this chapter:

Table 22. Archiving and retrieving tasks

Task	Page
Archiving data using the GUI	98
Archiving data using the command line	98
Deleting archived files	99
Retrieving data using the GUI	101
Retrieving data using the command line	102

Archiving files

To archive files, you need to specifically select the files to archive. You can select the files by using a file specification or by selecting them from a directory tree.

Your administrator might have set up schedules to archive certain files on your workstation automatically. See Chapter 7, “Automating tasks”, on page 105 for information on checking and running the schedules available to you. The following sections cover how to archive files without using a schedule.

If you are working on an AIX workstation, and you want to back up or archive **AFS or DFS** files, ask the root user responsible for setting up Storage Manager on your workstation if you can use the AFS or DFS version of Storage Manager. See Chapter 4, “Backing up files and directories”, on page 61 for more information.

Estimating backup processing time

You can use the estimate function to estimate the amount of time it takes to process your files and directories. The estimated time is a rough calculation of the time it takes Storage Manager to transfer your data and is based on previous transfers of data between your workstation and the current server. The actual

transfer time could be longer or shorter than the estimate due to factors like network traffic, system load on your workstation, or system load on the server.

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 files and directories into long term storage** from the main window. The Archive window appears.
2. Expand the directory tree by clicking the plus sign (+) or the folder icon next to an object in the tree. To search or filter files, click the **Search** icon from the tool bar.

To search:

- a. Enter your search criteria in the Find Files (Archive) window.
- b. Click the **Search** button. The Matching Files (Archive) window appears.
- c. Click the selection boxes next to the files you want to archive and close the Matching Files (Archive) window.

To filter:

- 1) Enter your filter criteria in the Find Files (Archive) window.
- 2) Click the **Filter** button. The Archive window displays the filtered files.
- 3) Click the selection boxes next to the filtered files or directories you want to archive.
3. Enter the description, accept the default description, or select an existing description for your archive package in the Description box. When an existing archive description is used, the files or directories selected are added to the archive package. All archived packages with the same description are grouped for retrieves, queries, and deletions.
4. To modify specific archive options, click the **Options** button. Any options you change are effective during the current session *only*. To estimate the transfer time for your archive selections click the **Estimate** button.
5. Click on **Archive**. The Archive **Task List** window displays the archive processing status.

Archiving data using the command line

You request archive services when you want to preserve copies of files in their current state, either for later use or for historical or legal purposes. You can archive a single file, a group of files, or all the files in a directory or subdirectory. After you archive a file, you can choose to delete the original file from your workstation. Use the **archive** command to archive files. See “Archive” on page 292 for more information about the **archive** command.

Table 23 shows examples of using the **archive** command to archive objects. See “Archive” on page 292 additional examples.

Table 23. 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 23. Command line archive examples (continued)

Task	Command	Considerations
Archive all files in the /home/jones/proj/ directory and delete the files on your workstation.	dsmc archive /home/jones/proj/ -deletefiles	Retrieve the archived files to your workstation whenever you need them again. See “Deletefiles” on page 155 for more information about the deletefiles option.
Archive the /home/jones/h1.doc and /home/jones/test.doc files.	dsmc archive /home/jones/h1.doc /home/jones/test.doc	The archive command will accept as many as 20 file specifications. Enter a space between each file name. If you want to specify more than 20 file names, you can use the filelist option. See “Filelist” on page 179 for more information about this option.
Archive a list of files in the /home/avi/ directory.	dsmc archive -filelist=/home/avi/filelist.txt	Use the filelist option to process a list of files. See “Filelist” on page 179 for more information.
Archive the /home/jones/ch1.doc file and assign a description to the archive.	dsmc archive /home/jones/ch1.doc -description="Chapter 1, first version"	If you do not specify a description with the archive command, the default is archive date:x , where x is the current system date. See “Description” on page 156 for more information about the description option.
Archive all of the files in the /home/jones/proj/ directory and its subdirectories.	dsmc archive /home/jones/proj/ -subdir=yes	See “Subdir” on page 258 for more information about the subdir option.
Use the v2archive option with the archive command to archive only files in the /home/relx/dir1 directory.	dsmc archive "/home/relx/dir1/*" -v2archive	Storage Manager archives only files in the /home/relx/dir1 directory. Directories that exist in the path are not processed. See “V2archive” on page 275 for more information about the v2archive option.
Use the archmc option with the archive command to specify the available management class for your policy domain to which you want to bind your archived files.	dsmc archive -archmc=ret2yrs /home/plan/proj1/budget.jan	See “Archmc” on page 141 for more information about the archmc option. See Chapter 8, “Understanding storage management policies”, on page 111 for more information about management classes.

Deleting archived files

You can delete archive copies if you decide you no longer need them. Unlike backup versions, you can delete individual archive copies without deleting the entire file space. To delete an archive copy:

1. Click on **Utilities** from the client GUI main window.

2. Click on **Delete Archive Data**. The Archive Delete window displays.
3. Expand the directory tree. The directory tree contains groups of files identified by a description and archived to the server.
4. Click the selection boxes to select the objects you want to delete.
5. Click on **Delete**. The Archive Delete Status window displays the archive deletion processing status.

If you are using commands, you can delete archive copies with the **delete archive** command.

For example, to delete the /home/jones/t.exe file, enter:

```
dsmc delete archive /home/jones/t.exe
```

Archive: Advanced considerations

This section covers some advanced considerations in archiving files. You do not need to understand this information in order to use Storage Manager for basic work.

Saving access permissions

When you archive a file, 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, Storage Manager saves access control lists.

If you are a user, and you archive a file to which you have read access, you own the archived copy of the file. You are the only user who can retrieve the archived file unless you grant access to another user.

Understanding how symbolic links are handled

When you archive a symbolic link, Storage Manager archives the file to which the symbolic link points. It does not archive path information for the directory.

If you archive a symbolic link that points to a directory, Storage Manager archives the files contained in the directory (and its subdirectories if the **subdir** option is set to yes) under the name of the symbolic link.

Use the **archsymb linkasfile** option to specify whether Storage Manager archives the symbolic link and the file or directory it points to, or the symbolic link only. See “Archsymb linkasfile” on page 142 for more information.

Table 24 shows symbolic link archive and retrieve functions and the action taken:

Table 24. 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 subdir=yes.	Archives the directory, its contents, and contents of subdirectories.
Archive of a directory with subdir=yes.	Archives the directory, its contents, and contents of subdirectories.
Archive of a symbolic link that points to a file or directory that does not exist.	Archives the symbolic link.

Table 24. Symbolic link management table for archive and retrieve (continued)

Function	Action taken
Retrieve a symbolic link that points to file; the file and link exist.	Replaces the file if replace=y is set.
Retrieve a symbolic link that points to file; the symbolic link no longer exists.	Retrieves the file replacing the file name with the symbolic link name and places it in the directory where the symbolic link resided.
Retrieve a symbolic link that points to a directory; the symbolic link and directory no longer exist.	A directory is created in the directory where the symbolic link resides, and all files and subdirectories are restored to that directory. The symbolic link name is used as the new directory name.
Retrieve a symbolic link that points to a directory; the symbolic link and directory still exist.	Storage Manager will not retrieve as long as the symbolic link exists.

Understanding how hardlinks are handled

When you archive files that are hard-linked, Storage Manager archives each instance of the linked file. For example, if you archive two files that are hard-linked, Storage Manager will archive the file data twice.

When you retrieve hard-linked files, Storage Manager attempts to reestablish the links. For example, if you had a hard-linked pair of files, and only one of the hard-linked files is on your workstation, when you retrieve both files, they will be hard-linked. The one exception to this procedure occurs if you back up two files that are hard-linked and then break the connection between them on your workstation. If you retrieve the two files from the server, Storage Manager will respect the current file system and not retrieve the hard link.

If you do not archive and retrieve all files that are hard-linked at the same time, problems will occur. To ensure that hard-linked files remain synchronized, archive all hard links at the same time and retrieve those same files together.

Retrieving archives

Retrieve a file when you want to return an archive copy from the server to your workstation.

Many of the advanced considerations for retrieving files are the same as for restoring files. See “Authorizing another user to restore or retrieve your files” on page 92, “Restoring or retrieving another user’s files” on page 93, and “Restore or retrieve files to another workstation” on page 93.

Retrieving data using the GUI

To retrieve an archived file:

1. Click **Retrieve files and directories from long term storage** from the client GUI main window. The Retrieve window appears.
2. Expand the directory tree by clicking the plus sign (+) or the folder icon next to an object you want to expand. To search or filter files, click the **Search** icon from the tool bar.

To search:

- a. Enter your search criteria in the Find Files (Retrieve) window.
- b. Click the **Search** button. The Matching Files (Retrieve) window appears.

- c. Click the selection boxes next to the files you want to retrieve and close the Matching Files (Retrieve) window.

To filter:

- 1) Enter your filter criteria in the Find Files (Retrieve) window.
- 2) Click the **Filter** button. The Retrieve window displays the filtered files.
- 3) Click the selection boxes next to the filtered files or directories you want to retrieve.
3. To modify specific retrieve options, click the **Options** button. Any options you change are effective during the current session *only*. To estimate the transfer time for your archived selections, click the **Estimate** button.
4. Click **Retrieve**. The Retrieve Destination window appears. Enter the appropriate information in the Retrieve Destination window.
5. Click **Retrieve**. The Retrieve **Task List** window displays the retrieve processing status.

Retrieving data using the command line

You *retrieve* a file when you want to return an archive copy from the server to your workstation. You can retrieve a single file, a group of files, or all the files in a directory or subdirectory. When you retrieve a file, Storage Manager sends you a copy of that file. The archived file remains in storage.

Use the **retrieve** command to retrieve files from from storage to your workstation. Table 25 shows examples of using the **retrieve** command. See “Retrieve” on page 340 for additional examples, and detailed information about the **retrieve** command.

Table 25. Command line examples of retrieving archives

Task	Command	Considerations
Retrieve the /home/jones/h1.doc file to its original directory.	dsmc retrieve /home/jones/h1.doc	If you do not specify a destination, the files are retrieved to their original location.
Retrieve the /home/jones/h1.doc file under a new name and directory.	dsmc retrieve /home/jones/h1.doc /home/smith/h2.doc	None
Retrieve all files from the /home/jones directory that end with the characters .bak to the /home/smith directory.	dsmc retrieve "/home/jones/*.bak" /home/smith/	None.
Use the pick option to display a list of archives from which you can select files to retrieve.	dsmc retrieve "/home/jones/*" -pick	See “Pick” on page 228 for more information about the pick option.
Retrieve a list of files specified in the retrievelist.txt file to their original directory.	dsmc retrieve /home/dir2/retrievelist.txt	See “Filelist” on page 179 for more information about retrieving a list of files.

Understanding how your archives are managed

As with backing up files, 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, Storage Manager assigns the file the default management class. Storage Manager can only archive a file if the selected management class contains an archive copy group.

You can override the default management class by using the ***archmc*** option, or by selecting the management class from the **Options** menu in the GUI.

For information on the various management class attributes used to manage your archives, see “Displaying information about management classes and copy groups” on page 113. See “Assigning a management class to files” on page 117 for information about using the include-exclude options list.

Chapter 7. Automating tasks

This chapter applies to the Authorized User only. Root authorization is only required when updating the `/etc/inittab` and `/etc/rc` files.

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

With client scheduling, you can also:

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

Notes:

1. The schedule start time is based on the server's local time, not the workstation's.
2. Install the command line client and ensure the communication software is running before you start the client scheduler.

Specifying scheduling options

You can modify scheduling options in the client system options file (`dsm.sys`) or in the graphical user interface. However, if your administrator specifies a value for these options, that value overrides the value in your client.

For more information about scheduling options, changing the scheduling mode, specifying the TCP/IP address or port number, or running commands before or after a schedule, see "Scheduling options" on page 131.

Return codes from the command line interface

Earlier versions of the backup-archive client did not exit with consistent, documented return codes. This made automation with scripts, batch files, or other scheduling facilities difficult, since there was no easy means of accurately determining the success or failure of the client operation.

The backup-archive command line interface and the scheduler now exit with return codes that accurately reflect the success or failure of the client operation. Users who already have scripts, batch files, or other scheduling or automation facilities that interpret the return code from the command line interface may need to make changes in order to accommodate these new return codes.

In general, the return code is related to the highest severity message during the client operation.

- If the highest severity message is informational (ANSnnnnI), then the return code will be 0.

- If the highest severity message is a warning (ANSnnnnW), then the return code will be 8.
- If the highest severity message is an error (ANSnnnnE), then the return code will be 12.

The exception to the above rules are warning or error messages that individual files could not be processed. For such a skipped file, the return code will be 4. For cases where the return code is not 0, you can examine the dsmerror.log file (and, for scheduled events, the dsmsched.log file).

For a description of the return codes and their meanings, see Table 26

Table 26. Return codes and 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"> • The file is in an exclude list. • The file was in use by another application and could not be accessed by the client. • The file changed during the operation to an extent prohibited by the copy serialization attribute. See “Copy serialization” on page 115.
8	The operation completed with at least one warning message. For scheduled events, the status will be <i>Completed</i> . Review dsmerror.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 dsmerror.log file (and dsmsched.log file for scheduled events) to determine what error messages were issued and to assess their impact on the operation. As a general rule, this return code means that the error was severe enough to prevent the successful completion of the operation. For example, an error that prevents an entire file system from being processed yields return code 12. When a file is not found the operation yields return code 12.
other	For scheduled operations where the scheduled action is COMMAND, the return code will be the return code from the command that was executed. If the return code is 0, the status of the scheduled operation will be <i>Completed</i> . If the return code is nonzero, then the status will be <i>Failed</i> . <p>Some commands may 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 Storage Manager server administrator 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 completes with return code 8; and the third command completes with return code 4, the return code for the macro will be 8.

Managing the client scheduler using the CAD

The Storage Manager Client Acceptor daemon (CAD) can manage the scheduler, reducing the number of background processes on your workstation. This also resolves memory retention problems that can occur when using manual methods of running the scheduler.

Use the **managedservices** option in your client system options file (dsm.sys) to specify whether the Client Acceptor daemon manages the scheduler. See “Managedservices” on page 210 for more information.

Configuring the CAD to manage the scheduler

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

1. Install the Web client. See “Installing and using the Web client” on page 54 for more information.
2. Install the Scheduler. See “Starting the client scheduler” for more information.
3. From the Storage Manager GUI open the **Edit** menu and select **Preferences** . Then select the **Web Client** category. Check the **Schedule** option in the **ManagedServices** options section. If you wish to run the Web client also, check the **Both** option.
4. Start the Client Acceptor. See “Installing and using the Web client” on page 54 for more information.

Starting the client scheduler

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

```
dsmc schedule
```

When you start the client scheduler, it runs continuously until you close the window, end the process, or log off your system.

To run the **schedule** command in the background and to keep the client scheduler running, even if you log off your system, enter the following:

```
nohup dsmc schedule 2> /dev/null &
```

If a Storage Manager password is required for your workstation and you want to run the **schedule** command in the background, enter the password with the command.

Root User: To start the client scheduler automatically, ensure that the **passwordaccess** option is set to generate in your client system options file (dsm.sys), then follow the procedure below for your operating system:

- **For non-OS/390 UNIX**, add the following entry to the **/etc/inittab** file:

```
tsm::once:/usr/bin/dsmc sched > /dev/null 2>&1 # TSM scheduler
```

Note: You must include the redirection to **/dev/null** in the command.

For OS/390 UNIX:

1. Create a shell script called `/tivoli/tsm/client/ba/bin/rundsmc` which contains the following entries:

```
cd /usr/lpp/Tivoli/tsm/client/ba/bin
sleep 60
./dsmc schedule
```

This prevents the creation of two jobs with the same name and enables automatic shutdown. You might need to customize the time for your system.

2. Add the following entries in the `/etc/rc` file to set environment variables to retrieve the **servername** and **nodename** options from `dsm.sys` and to start the client scheduler, as follows:

```
# Set environment variables to retrieve the servername and
# nodename options from dsm.sys.
export DSM_DIR=/tivoli/tsm/client/ba/bin
export DSM_CONFIG=/tivoli/tsm/client/ba/bin/dsm.opt
# Start the TSM Client scheduler and redirect outputs to
# schedule.out instead of the /etc/log file.
_BPX_JOBNAME='ADSMCLNT' /tivoli/tsm/client/ba/bin/rundsmc
1>/tivoli/tsm/client/ba/bin/schedule.out 2>&1 &
```

Note: Enter the `_BPX_JOBNAME` entry on a single line in the `/etc/rc` file.

The client scheduler can fail to initialize properly at IPL because TCP/IP is not fully initialized. You might need to customize the time for your system to compensate for this.

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 ***incl excl*** 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 Storage Manager uses the new file.

To manually stop the client scheduler, enter the **kill** command if it is running in the background, or press **q** or **Ctrl+C** if it is running in the foreground. To restart the client scheduler, enter the **schedule** command again.

Tape prompting does not occur during a scheduled event regardless of the ***tapeprompt*** option setting in your options file.

Use the Client Acceptor daemon to manage the Client Scheduler. See “Managing the client scheduler using the CAD” on page 107 for more information.

Displaying information about scheduled work

To view schedules that are defined for your client node, enter:

```
dsmc query schedule
```

Storage Manager displays detailed information about all scheduled work for your client node. The figure below displays sample **query schedule** output.

```
Schedule Name: DAILY_INC
Description: Daily System-wide backup
Action: Incremental
Options: QUIET
Objects:
Priority: 1
Next Execution: 30 minutes
Duration: 4 Hours
Period: 1 Day
Day of Week: Any
Expire: Never

Schedule Name: WEEKLY_INC
Description: Weekly backup for project files
Action: Incremental
Options: QUIET
Objects: /proj
Priority: 1
Next Execution: 60 minutes
Duration: 8 Hours
Period: 7 Days
Day of Week: Friday
Expire: Never
```

Figure 1. Sample query schedule output

The schedule name, **DAILY_INC**, starts a daily incremental backup. The next incremental backup will start in 30 minutes. Because no objects are listed, Storage Manager runs the incremental backup on your default domain. The schedule has no expiration date.

The schedule name, **WEEKLY_INC**, starts a weekly incremental backup in the /proj file system.

Displaying information about completed work

When you run the **schedule** command in the foreground, your screen displays output from the scheduled commands. Output is also directed to the `dsmsched.log` file in the current directory unless you change the path and file name using the ***schedlogname*** option.

When you run the **schedule** command in the background, output from scheduled commands is directed to the `dsmsched.log` file in the current directory, or to the path and file name that you specified. Please note that the `dsmsched.log` cannot be a symbolic link.

After scheduled work is performed, check the schedule log to verify that all work completed successfully.

When a scheduled command is processed the schedule log contains the following entry:

```
Scheduled event eventname completed successfully
```

The client indicates whether Storage Manager successfully issued the scheduled command associated with the *eventname*. No attempt is made to determine the success or failure of the command. You can assess the status of the command by

evaluating the return code from the scheduled command in the schedule log. The schedule log entry for the command's return code is prefaced with the following text:

Finished command. Return code is:

The schedule log continues to grow unless you prune it using the ***shedlogretention*** option. See “Specifying scheduling options” on page 105 for more information.

Scheduling options for commands

The scheduler executes commands under a user ID of 0; however, some commands might need to be executed under a user ID different than 0. In this case, your 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. If this option is specified, the command is executed with the authorization of the specified user. Otherwise, it is executed with the scheduler authorization.

►—SCHEDCMDUser—*user_name*—►

user_name

Specifies the name of a valid user on the system where a scheduled command is executed.

Enabling or disabling scheduled commands

You can use the ***shedcmddisabled*** 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 ***shedcmddisabled*** option does not disable the ***preschedulecmd*** and ***postschedulecmd*** commands. However, you can specify ***preschedulecmd*** or ***postschedulecmd*** with a blank or a null string to disable the scheduling of these commands. See “Schedcmddisabled” on page 247 for more information.

Chapter 8. Understanding storage management policies

Storage management policies are rules your administrator defines in order to manage your backups and archives on the server. You can associate (or *bind*) your data to these policies; then when the data is backed up or archived, it is managed according to policy criteria. Policy criteria include a policy domain, a policy set, a copy group, and a management class.

Policies determine:

- Whether a file is eligible for backup or archive services.
- How many backup versions to keep.
- How long to keep inactive backup versions and archive copies.
- Where to place the copies in storage.
- For incremental backup, policies also determine:
 - How frequently a file can be backed up.
 - Whether a file must change before it is backed up again.

If you have the Tivoli Space Manager client installed, your administrator also defines rules that determine whether files are eligible for migration from your local file systems to storage.

This chapter explains:

- Policy criteria (policy domains, policy sets, copy groups, and management classes).
- How to display policies.
- How 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.

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 Space Manager client installed, it can also contain specific requirements for migrating files to storage.

Most of the work you do with storage management policies is with management classes. You must associate (or *bind*) each file and directory that you back up and each file that you archive with a management class. If you do not associate a file with a management class, Storage Manager uses the default management class in the active policy set. If you do not specify a management class for directories, Storage Manager uses the management class in the active policy set specifying the longest retention period.

You can use ***include*** statements in your include-exclude list to associate files with management classes. See “Selecting a management class for files” on page 116 for more information. In your client system options file (dsm.sys), you can associate directories with a management class, using the ***dirmc*** option. See “Selecting a management class for directories” on page 118 for more information.

Within a management class, the specific backup and archive requirements are in *copy groups*. Copy groups define the specific storage management attributes that describe how the server manages backed up or archived data. Copy groups include both *backup copy groups* and *archive copy groups*. A management class can have one backup copy group, one archive copy group, both, or neither.

A *backup copy group* contains attributes that are used during the backup process to determine:

- Whether a file that has changed since the last backup is backed up again.
- How many days must elapse before a file is backed up again.
- How a file is processed during a backup if it is in use.

It also contains attributes to manage the backup versions of your files on the server. These attributes control:

- Where the server stores backup versions of your files and directories.
- How many backup versions the server keeps of your files and directories.
- How long the server keeps backup versions of your files and directories.
- How long the server keeps inactive backup versions.
- How long the last version of a file is kept.

An *archive copy group* contains attributes that control:

- Whether a file is archived if it is in use
- Where the server stores archived copies of your files
- How long the server keeps archived copies of your files

When the server is unable to rebind a file to an appropriate management class, the server uses one of two values to determine the number of days to retain the file. If

it is a backup version, the server uses **backup grace period retention**. If it is an archive copy, the server uses **archive grace period retention**. For more information about grace periods, see “Using a retention grace period” on page 119.

Displaying information about management classes and copy groups

Before you select the management classes you want to use, click **View policy information** (not available on Web client) from the Utilities menu. The **Policy Information** window is displayed. You can then determine which management classes are available. You can also use the **detail** option on the **query mgmtclass** command to view the available management classes.

The **Display policy information** window provides the following information:

- The name of the default management class.
- The name of the policy domain to which the management class belongs.
- The policy set that is currently active.
- The date and time that this policy set became active.
- The number of backup versions which are maintained for files which still exist on your workstation.
- The number of backup versions which are maintained for files which have been deleted from your workstation.
- The number of days to keep inactive backup versions.
- The number of days to keep the last backup version.
- The management class name and a description.

Table 27 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 27. 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

The name of the copy group. The default value for both backup and archive is *Standard*.

Copy type

The type of copy group. The value for backup is always *Backup*, and the value for archive is always *Archive*.

Copy frequency

Copy frequency is the minimum number of days that must elapse between successive incremental backups. Use this attribute during a full incremental backup.

Copy frequency works with the *mode* parameter. For example, if frequency is *zero (0)* and mode is *modified*, a file or directory is backed up *only if* it changed since the last incremental backup. If frequency is *zero (0)* and mode is *absolute*, a file is backed up every time you run an incremental backup against it. This attribute is not checked for selective backups.

For archive copy groups, copy frequency is always CMD (command). There is no restriction on how often you archive a file.

Versions data exists

The *Versions Data Exists* attribute specifies the maximum number of different backup versions retained for files and directories currently on your workstation. If you select a management class that permits more than one backup version, the most recent version is called the *active* version. All other versions are called *inactive* versions. If the maximum number of versions permitted is five, and you run a backup that creates a sixth version, the oldest version is deleted from server storage.

Versions data deleted

The *Versions Data Deleted* attribute specifies the maximum number of different backup versions retained for files and directories that you erased from your workstation. This parameter is ignored as long as the file or directory remains on your workstation.

If you erase the file or directory, the next time you run an incremental backup, the active backup version is changed to inactive and the oldest versions are erased that exceed the number specified by this parameter.

The expiration date for the remaining versions is based on the *retain extra versions* and *retain only version* parameters.

Retain extra versions

The *Retain Extra Versions* attribute specifies how many days all but the most recent backup version is retained. The most recent version is the active version, and active versions are never erased. If *Nolimit* is specified, then extra versions are kept until the number of backup versions exceeds the *versions data exists* or *versions data deleted* parameter settings. In this case, the oldest extra version is deleted immediately.

Retain only version

The *Retain Only Version* attribute specifies the number of days the last remaining inactive version of a file or directory is retained. If *Nolimit* is specified, the last version is retained indefinitely.

This parameter goes into effect during the next incremental backup after a file is deleted from the client machine. Any subsequent updates to this parameter will

not affect files that are already inactive. For example: If this parameter is set to 10 days when a file is inactivated during an incremental backup, the file will be expired in 10 days.

Copy serialization

The *Copy Serialization* attribute determines whether a file can be in use during a backup or archive, and what to do if it is. The value for this attribute can be one of the following:

- **Static.** A file or directory must not be modified during a backup or archive. If the object is changed during a backup or archive attempt, it is not backed up or archived.

Note: For Linux86: The static copy serialization value is no longer controlled by the server management class, but is instead controlled directly from the client, using the *imagetype* option. See “Imagetype” on page 191 for more information.

- **Shared static.** A file or directory must not be modified during backup or archive. Storage Manager attempts to perform a backup or archive as many as four additional times, depending on the value specified on the *changingretries* option in your client system options (dsm.sys) file. If the object is changed during every backup or archive attempt, it is not backed up or archived.
- **Dynamic.** A file or directory is backed up or archived on the first attempt regardless of whether it changes during a backup or archive.

Note: For Linux86: The dynamic copy serialization value is no longer controlled by the server management class, but is instead controlled directly from the client, using the *imagetype* option. See “Imagetype” on page 191 for more information.

- **Shared dynamic.** A file or directory is backed up or archived regardless of whether it changes during a backup or archive. Storage Manager attempts to perform a back up or archive as many as four additional times, depending on the value specified on the *changingretries* option in your client system options file without the file changing during the attempt. The file is backed up or archived on the last try even if it has changed.

Attention: Be careful when you select a management class containing a copy group that specifies shared dynamic or dynamic for serialization backup. If you select a management class that permits a file to be backed up or archived while it is in use, the backup version or archived copy stored on the server might be a fuzzy copy. A *fuzzy copy* is a backup version or archived copy that does not accurately reflect what is currently in the file. It might contain some, but not all, of the changes. If that is not acceptable, select a management class that creates a backup version or archive copy only if the file does not change during a backup or archive.

If you restore or retrieve a file that contains a fuzzy copy, the file might not be usable. You should not use dynamic or shared dynamic serialization to back up files, unless you are absolutely certain that a restore of a fuzzy copy will be usable.

Copy mode

The *Copy Mode* attribute determines whether a file or directory is considered for incremental backup regardless of whether it changed or not since the last backup. Storage Manager does not check the mode for selective backups. The value for this parameter can be one of the following:

- **Modified.** The file is considered for incremental backup *only if* it has changed since the last backup. A file is considered changed if any of the following are true:
 - The date or time of the last modification is different.
 - The file size is different.
 - The file attributes, with the exception of archive, are different. However, if only the file meta-data changes (such as access permissions), but the file data does not change, Storage Manager may back up only the meta-data.
 - The file owner is different.
 - The file permissions are different.
- **Absolute.** The file is considered for incremental backup regardless of whether it changed since the last backup. For archive copy groups, the mode is always *absolute*, indicating that a file is archived regardless of whether it changed since the last archive request.

Copy destination

Names the destination where backups or archives are stored. The destination can be either a storage pool of disk devices or a storage pool of devices that support removable media, such as tape.

Retain versions

Specifies the number of days an archived file remains in storage. When the specified number of days elapse for an archived copy of a file, it is deleted from server storage.

Selecting a management class for files

If the default management class meets the backup and archive requirements for all the files on your workstation, it is not necessary to take any action to associate your files with that management class. This is done automatically when you back up or archive your files.

When selecting a different management class for your files, consider these questions:

- Does the management class contain a backup copy group?
If you attempt to back up a file associated with a management class that does not contain a backup copy group, the file is not backed up.
- Does the management class contain an archive copy group?
You cannot archive a file associated with a management class that does not contain an archive copy group.
- Does the backup copy group contain attributes that back up your files often enough?
Mode and frequency work together to control how often a file is backed up when you use incremental backup. Storage Manager does not check those attributes for selective backup.
- Do the copy groups specify either static or shared static for serialization?
If serialization is shared dynamic or dynamic, you might get fuzzy backups or archive copies. Verify that this is acceptable. For example, you might want to use shared dynamic or dynamic serialization for a file to which log records are continuously added. If you used static or shared static serialization, the file might never back up because it is constantly in use. With shared dynamic or dynamic serialization, the file is backed up, but the backup version of the file

might contain a truncated message. Do not use shared dynamic or dynamic serialization for a file if it is very important that the backup version or archive copy contain all changes.

- Does the backup copy group specify an adequate number of backup versions to keep, along with an adequate length of time to keep them?
- Does the archive copy group specify an adequate length of time to keep archived copies of files?

Assigning a management class to files

A management class defines when your files are included in a backup, how long they are kept on the server, and how many versions of the file the server should keep. The server administrator selects a default management class. You can specify your own management class to override the default management class.

You can assign a management class for a file or file group by using an **include** statement in your client systems options (dsm.sys) file or the include-exclude file specified by the **inclexcl** option. Management class names are not case-sensitive. For example, to associate all the files in the costs directory with a management class named **budget**, enter:

```
include /home/jones/costs/* budget
```

To specify a management class named **managall** to use for all files to which you do not explicitly assign a management class, enter:

```
include * managall
```

The example below demonstrates how to use a management class:

```
exclude /.../*.sno
include /home/winter/.../*.ice      mcweekly
include /home/winter/december/*.ice mcdaily
include /home/winter/january/*.ice  mcmonthly
include /home/winter/winter/white.sno
```

Processing follows these steps:

1. The file named white.sno is backed up following bottom-up processing rules. Because you did not specify a management class, the file is assigned to the default management class.
2. Any file with an extension of ice in the /home/winter/january directory is assigned to the management class, **mcmonthly**.
3. Any file with an extension of ice in the /home/winter/december directory is assigned to the management class, **mcdaily**.
4. Any other files with an extension of ice in any directory under /home/winter are assigned to the management class, **mcweekly**.
5. Any file with an extension of sno (except /home/winter/winter/white.sno) in any directory is excluded from backup.

To specify your own default management class for files that are not explicitly included, specify:

```
include * mgmt_class_name
```

as the first include or exclude option defined.

When you archive a file using the graphical user interface, you can select a different management class to override the management class assigned to the file.

Overriding the management class for archived files

When you archive a file, you can override the assigned management class using the graphical user interface (GUI), or by using the **archmc** option on the **archive** command. To use the GUI, press the **Options** button on the archive tree to override the management class and select a different management class. For example, to associate the file, `/home/jones/budget.jan`, with the management class **ret2yrs**, you would enter:

```
dsmc archive -archmc=ret2yrs /home/jones/budget.jan
```

Selecting a management class for directories

If the management class in your active policy set containing the longest retention period meets your backup requirements for directories, it is not necessary to take any action to associate directories with that management class. Storage Manager does it automatically when it backs up your directories.

If the default management class does not meet your requirements, select a management class with an adequate retention period specified on the *retain only version* parameter. You should keep directories at least as long as you keep the files associated with those directories.

To assign a management class other than the default to directories, use the **dirmc** option in your client system options file (`dsm.sys`). For example, to assign a management class named **direct1** to your directories, you would enter:

```
dirmc direct1
```

Note: For archive operations, directories are assigned to a management class whose retention period meets or exceeds that of the files contained in those directories. The management class is rebound as needed to ensure that directories with files do not expire.

Binding and rebinding management classes to files

Binding associates a file with a management class. When you back up a file for the first time, Storage Manager binds it to either the default management class or the management class specified in your include-exclude list. In later full incremental backups of the same file, if you change the management class, both active and inactive versions are bound again to the new management class. However, with selective backup and incremental-by-date backups, the new backups are bound to the new management class, but previous backup versions remain bound to the original management class.

If the backup copy group for the management class specifies keeping multiple backup versions of the file, and you request multiple backups, the server always has one active backup version (the current version) and one or more inactive backup versions of the file. All backup versions of a file are bound to the same management class and are managed based on the attributes in the backup copy group.

When you archive a file for the first time, 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, any previous copies of the file that you archived remain bound to the management class specified when you archived them.

Rebinding backup versions of files

Backups of files are bound again to a different management class in the following conditions. In each condition, the files (active and inactive) are not bound again until the next backup.

- You specify a different management class in an Include statement to change the management class for the file. The backups are managed based on the old management class until you run another backup.
- Your administrator deletes the management class from your active policy set. The default management class is used to manage the backup versions when you back up the file again.
- Your administrator assigns your client node to a different policy domain and the active policy set in that domain does not have a management class with the same name. The default management class for the new policy domain is used to manage the backup versions.

Using a retention grace period

Storage Manager also provides a *backup retention grace period* and an *archive retention grace period* to help protect your backup and archive data when it is unable to rebind a file to an appropriate management class. The backup retention grace period is used when:

- You change the management class for a file, but neither the default management class nor the new management class contain a backup copy group.
- The management class to which a file is bound no longer exists, and the default management class does not contain a backup copy group.

The backup retention grace period, defined in your policy domain, starts when you run an incremental backup. The default is 30 days. However, your administrator can lengthen or shorten this period.

When 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.

For archived files, if the management class to which a file is bound no longer exists, and the default management class does not contain an archive copy group, the archive retention grace period defined in your policy domain is used. The default retention period is 60 days. However, your administrator can lengthen or shorten this period.

Chapter 9. Using processing options

You can use defaults for processing options or you can tailor the processing options to meet your specific needs. This chapter:

- Provides an overview of processing options.
- Includes an options reference section that provides detailed information about each option.

As a quick reference, this chapter includes instructions for the following tasks:

Task	Page
Entering options with a command	135
Using options with commands	135

Overview of processing options

Storage Manager uses *processing options* that you specify in your client system options file (dsm.sys) or client user options file (dsm.opt) or on the command line to control communications, backup-archive processing, and other types of processing.

This section provides an overview of the following types of options that you can use:

- Communication options
- Server and Node options
- Backup and archive processing options
- Restore and retrieve processing options
- Scheduling options
- Format and language options
- Command processing options
- Authorization options
- Error processing options
- Transaction processing option
- Web client options

See Chapter 2, “Configuring Storage Manager”, on page 31 for information on how to create and modify your client system options file (dsm.sys) or client user options file (dsm.opt) file.

Storage Manager also includes a group of client command options that you can enter *only* on the command line with specific commands. You can override some of the options in your options file by entering them with appropriate backup-archive commands. For a complete list of command line options, a description, and where to go in this book for more information, see Table 40 on page 136.

Communication options

You use communication options to specify how your client node communicates with a Storage Manager server.

For UNIX use one of the following communication protocols:

- TCP/IP (all UNIX clients)
- Shared Memory (AIX, HP-UX, and Solaris only)

Use the ***commmethod*** option to specify the communication protocol. For more information, see “Commmethod” on page 147.

You can also use the ***lanfreecommmethod*** option to specify the communication protocol in a SAN environment. See “Lanfreecommmethod” on page 200 for more information.

Ask your Storage Manager administrator for assistance in setting your communication options.

TCP/IP options

To use the TCP/IP communication protocol, you must include the ***tcpserveraddress*** option in your client system options file (*dsm.sys*). The other TCP/IP options have default values which you can modify only if you want to change the default value.

If you plan to back up an NFS system, see “Nfstimeout” on page 217.

Table 28. TCP/IP options

Option	Description	Page
<i>httpport</i>	Specifies a TCP/IP port address for the Storage Manager Web client.	189
<i>lanfreectpport</i>	Specifies the TCP/IP port number where the Storage Manager storage agent is listening.	203
<i>tcpbuffsize</i>	Specifies the size, in kilobytes, of the Storage Manager internal TCP/IP communication buffer.	261
<i>tcpnodelay</i>	Specifies whether to send small transactions to the server, without buffering them first. This option is for a AIX and AIX 5L clients <i>only</i> .	264
<i>tcpport</i>	Specifies the TCP/IP port address for a Storage Manager server.	265
<i>tcpserveraddress</i>	Specifies the TCP/IP address for a Storage Manager server.	266
<i>tcpwindowsize</i>	Specifies the size, in kilobytes, of the TCP/IP sliding window for your client node.	267
<i>webports</i>	Enables the use of the Web client outside a firewall by specifying the TCP/IP port number used by the Client Acceptor daemon and the Web Client Agent service for communications with the Web GUI.	282

Shared Memory options

You must install TCP/IP on your workstation to use the Shared Memory communication method.

Table 29. Shared Memory communication options

Option	Description	Page
shmport	Specifies the TCP/IP port address on which the Storage Manager server listens to establish a Shared Memory connection.	256
lanfreeshmport	Specifies the Shared Memory port number where the Storage Manager storage agent is listening. Use this option when you specify lanfreecommmethod=SHAREdmem for communication between the Storage Manager client and storage agent when processing between the client and the SAN-attached storage device.	202

Server and Node options

Authorized User

Use the following options to specify the server to contact for backup-archive services, and the client node for which to request backup-archive services.

Server options

Use the **servername** option in your client system options file (dsm.sys) to begin a group of options (stanza) used to connect to a Storage Manager server. You can set up multiple stanzas in the dsm.sys file to connect to different servers. Each stanza must contain all options required to establish communication with a server. The stanza can also contain other options for backup-archive operations.

If your client system options file contains only one stanza - Your client node contacts the server you specify in that stanza for all services.

If your client system options file contains more than one stanza - You can specify a default server with the **defaultserver** option. If you do not specify a default server, by default 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.

Figure 2 on page 124 shows a sample client system options file (dsm.sys).

DEFAULTServer	server2
SErvername	server1
NODename	node1
COMMMethod	TCPip
TCPPort	1500
TCPServeraddress	almvmd.almaden.ibm.com
PASSWORDAccess	generate
MAILprog	/usr/bin/xsend root
GRoups	system adsm
USERS	ashton stewart kaitlin
INCLExcl	/adm/adsm/backup1.excl
SErvername	server2
COMMMethod	SHAREdmem
shmport	1520
PASSWORDAccess	prompt
GRoups	system adsm
USERS	danielle derek brant
INCLExcl	/adm/adsm/backup2.excl

Figure 2. Sample client system options file

Use the **servername** option in the default client user options file (dsm.opt) or on the command line to specify a server to contact for backup-archive services. This overrides the default server specified in your client system options file (dsm.sys).

Note: You cannot override the migration server specified in the client system options file.

Node options

You may specify the following node options in your client system options file (dsm.sys):

Table 30. Server and Node Options

Option	Description	Page
defaultserver	The name of the Storage Manager server to contact for backup-archive services by default if more than one server is defined in the client system options file (dsm.sys). Also specifies the server to contact for space management services if you have the HSM client installed and do not specify a server with the migrateserver option. See <i>IBM Tivoli Space Manager for Unix Using the Hierarchical Storage Management Clients</i> , GC32-0794 for more information.	154
clusternode	Specifies whether Storage Manager participates in a High Availability Cluster Multi Processing (HACMP) environment.	146
nasnodename	Specifies the node name for the NAS file server when processing NAS file systems.	216
nodename	Use the nodename option in your client system options file dsm.sys to identify your workstation to the server to establish communications.	218
servername	In the client system options file (dsm.sys), this option specifies the name of a server. In the client user options file (dsm.opt), this option specifies the Storage Manager server to contact for services.	254

Table 30. Server and Node Options (continued)

Option	Description	Page
virtualnodename	The virtualnodename option specifies the node name of your workstation when you want to restore or retrieve files to a different workstation.	279

Backup and archive processing options

You can use the following options to control some aspects of backup and archive processing.

Table 31. Backup and archive processing options

Option	Description	Page
archmc	Use the archmc option with the archive command to specify the available management class for your policy domain to which you want to bind your archived files.	141
archsmlinkasfile	Specifies whether you want Storage Manager to follow a symbolic link and archive the file or directory it points to, or archive the symbolic link only.	142
automount	Use the automount option Use this option with the domain option to specify all automounted file systems the Storage Manager client tries to mount at the following points in time: <ul style="list-style-type: none"> • When Storage Manager client starts • When the back up is started • When the Storage Manager client has reached an automounted file system during backup 	143
changingretries	Specifies the number of retries when attempting to back up or archive a file that is in use.	144
class	Specifies whether to display a list of NAS objects or client objects during a query operation.	145
compressalways	The compressalways option specifies whether to continue compressing an object if it grows during compression, or resend the object uncompressed. Use this option with the compression option.	150
compression	The compression 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. Note: The compression option also applies to migrated files if you install the Storage Manager HSM client on your workstation.	151
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.	155

Table 31. Backup and archive processing options (continued)

Option	Description	Page
description	The description option assigns or specifies a description for files when performing archive, delete, retrieve, or query archive operations.	156
detail	Use the detail option to display management class, file space, backup, and archive information depending on the command with which it is used.	157
dfsbackupmntpnt	Specifies whether you want Storage Manager to see a DFS mount point as a mount point or as a directory.	158
dirmc	Specifies the management class to use for directories. If you do not specify this option, the client uses the management class in the active policy set of your policy domain with the longest retention period.	160
dirsonly	Backs up, restores, archives, retrieves, or queries directories <i>only</i> .	161
domain	Specifies the file systems to include in your default client domain for an incremental backup.	162
domain.image	Specifies the mounted file systems and raw logical volumes that you want to include in your client domain for an image backup. This option is for AIX, HP/UX, Linux86, and Solaris <i>only</i> .	166
domain.nas	Specifies the volumes to include in your default domain for NAS image backups. This option is for AIX and Solaris clients <i>only</i> .	167
enablelanfree	Specifies whether to enable an available LAN-Free path to a storage area network (SAN) attached storage device.	170
exclude exclude.backup exclude.file exclude.file.backup	<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 exclude.backup option only excludes files from normal backup, but not from HSM.	176
exclude.archive	Excludes a file or a group of files that match the pattern from archive services <i>only</i> .	176
exclude.compression	Excludes files from compression processing if you set the compression option to <i>yes</i> . This option applies to backups and archives.	176
exclude.dir	Excludes a directory, its files, and all its subdirectories and their files from backup processing.	176
exclude.encrypt	Excludes specified files from encryption processing.	176
exclude.fs	Excludes file spaces matching a pattern. This option is valid for all UNIX clients.	176
exclude.fs.nas	Excludes file systems on the NAS file server from an image backup when used with the backup nas command. This option is for AIX and Solaris clients <i>only</i> .	176

Table 31. Backup and archive processing options (continued)

Option	Description	Page
exclude.image	Excludes mounted file systems and raw logical volumes that match the pattern from image processing. This option is valid for AIX, HP-UX, Solaris, and Linux86 <i>only</i> .	176
filelist	Specifies a list of files to be processed for the command. Storage Manager opens the designated filelist and processes the files listed within according to the command.	179
filesonly	Backs up, restores, retrieves, or queries files <i>only</i> .	181
guitreeviewafterbackup	Specifies whether the client is returned to the Backup, Restore, Archive, or Retrieve window after a successful operation completes.	188
imagetype	Use the imagetype option with the backup image command or the include.image option to specify the type of image backup you want to perform. This option is valid for AIX, AIX5L, Solaris, HP-UX, and Linux86 clients <i>only</i> .	191
inlexcl	Specifies the path and file name of an include-exclude options file.	193
include include.backup include.file	<i>These options are equivalent.</i> Use these options to include files or assign management classes for backup processing.	194
include.archive	Includes files or assigns management classes for archive processing.	194
include.compression	Includes files for compression processing if you set the compression option to <i>yes</i> . This option applies to backups and archives.	194
include.encrypt	Includes the specified files for encryption processing. By default, Storage Manager does not perform encryption processing.	194
include.fs.nas	Assigns a management class when used with the backup nas command. This option is for AIX and Solaris clients <i>only</i> .	194
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. This option is valid for AIX, HP-UX, Solaris, and Linux86 <i>only</i> .	194
incrbydate	Use with the incremental command to request an incremental backup by date.	198
incremental	Use with the restore image command to ensure that any changes that were made to the base image are also applied to the restored image.	199
memoryefficientbackup	Specifies a memory-saving backup algorithm for incremental backups when used with the incremental command.	213
mode	Specifies whether you want to perform a selective or incremental image backup (non-NAS objects), or a full or differential image backup of NAS file systems.	214

Table 31. Backup and archive processing options (continued)

Option	Description	Page
monitor	Specifies whether you want to monitor an image backup of file systems belonging to a Network Attached Storage (NAS) file server.	215
noprompt	Suppresses the confirmation prompt that normally appears before you delete an archived file, or when performing an image restore operation.	220
optfile	Specifies the client user options file you want to use when you start a Storage Manager session.	223
preservelastaccessdate	Use this option during a backup or archive operation to specify whether to reset the last access date of any specified files to their original value following a backup or archive operation. By default, the 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.	235
snapshotcachesize	Use the snapshotcachesize option with the backup image command, the include.image option, or in your dsm.sys file to specify an appropriate snapshot size so that all old data blocks can be stored during a snapshot image backup. A snapshot size of 100 percent will ensure a valid snapshot. This option is valid for Linux86 client <i>only</i> .	257
subdir	Specifies whether to include subdirectories of a named directory.	258
tapeprompt	Specifies whether you want Storage Manager to wait for a tape to mount if it is required for a backup, archive, restore, or retrieve process, or to be prompted for a choice.	260
type	Use the type option with the query node command to specify the type of node to query.	273
v2archive	Use the v2archive option with the archive command to archive only files to the server. Storage Manager will not process directories that exist in the path of the source file specification.	275
virtualmountpoint	Defines a virtual mount point for a file system if you want to consider files for backup that begin with a specific directory within that file system.	277
volinformation	The volinformation option backs up or archives root-level information. This option applies only when you back up or restore non-root files.	281

Restore and retrieve processing options

The following options relate to restore and retrieve processing.

Table 32. Restore and retrieve processing options

Option	Description	Page
<i>dironly</i>	Backs up, restores, archives, retrieves, or queries directories <i>only</i> .	161
<i>filelist</i>	Specifies a list of files to be processed for the command. Storage Manager opens the designated filelist and processes the files listed within according to the command.	179
<i>filesonly</i>	Backs up, restores, retrieves, or queries files <i>only</i> .	181
<i>followsymbolic</i>	Specifies whether you want to restore files to symbolic links or use a symbolic link as a virtual mount point.	182
<i>fromdate</i>	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.	183
<i>fromnode</i>	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, list, restore, or retrieve files or images for the other node.	184
<i>fromowner</i>	Displays file spaces for an alternate owner. Also specifies an alternate owner from which to restore or retrieve files.	185
<i>fromtime</i>	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.	186
<i>guitreeviewafterbackup</i>	Specifies whether the client is returned to the Backup, Restore, Archive, or Retrieve window after a successful operation completes.	188
<i>ifnewer</i>	Replaces an existing file with the latest backup version only if the backup version is newer than the existing file.	190
<i>inactive</i>	Displays a list of active and inactive files when used with the <i>pick</i> option.	192
<i>latest</i>	Restores the most recent backup version of a file whether it is active or inactive.	205
<i>localbackupset</i>	Specifies whether the Storage Manager GUI bypasses initial logon with the server to restore a local backup set on a UNIX standalone workstation.	206
<i>location</i>	Specifies where Storage Manager searches for the backup set during a query or restore operation.	207
<i>makesparsefile</i>	Use the <i>makesparsefile</i> option with the restore or retrieve commands to specify how sparse files are recreated.	208

Table 32. Restore and retrieve processing options (continued)

Option	Description	Page
monitor	Specifies whether you want to monitor an image restore of one or more file systems belonging to a Network Attached Storage (NAS) file server.	215
noprompt	Suppresses the confirmation prompt that normally appears before you delete an archived file, or when performing an image restore operation.	220
optfile	Specifies the client user options file you want to use when you start a Storage Manager session.	223
pick	Creates a list of backup versions, images, or archive copies that match the file specification you enter. From the list, you can select the versions to process. Include the inactive option to view both active and inactive objects.	228
pitdate	Use the pitdate option with the pittime option to establish a point in time for which you want to display or restore the latest version of your backups.	229
pittime	Use the pittime option with the pitdate option to establish a point in time for which you want to display or restore the latest version of your backups.	230
preservepath	Specifies how much of the source path to reproduce as part of the target directory path when you restore or retrieve files to a new location.	237
replace	Specifies whether to overwrite an existing file, or to prompt you for your selection when you restore or retrieve files.	242
subdir	Specifies whether you want to include subdirectories of a named directory.	258
tapeprompt	Specifies whether you want Storage Manager to wait for a tape required for a restore or retrieve to be mounted, or to prompt you for your choice.	260
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.	270
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.	270
type	Use the type option with the query node command to specify the type of node to query.	273

Scheduling options

You can use the following options to regulate central scheduling. Storage Manager uses scheduling options only when the Scheduler is running.

Table 33. Scheduling options

Option	Description	Page
<i>managedservices</i>	Specifies whether the Storage Manager Client Acceptor daemon manages the Web client, the scheduler, or both.	210
<i>maxcmdretries</i>	Specifies the maximum number of times the client scheduler attempts to process a scheduled command that fails.	212
<i>postschedulecmd, postnschedulecmd</i>	Specifies a command to process after running a schedule.	231
<i>preschedulecmd, prenschedulecmd</i>	Specifies a command to process before running a schedule.	233
<i>querschedperiod</i>	Specifies the number of hours the client scheduler waits between unsuccessful attempts to contact the server for scheduled work.	240
<i>retryperiod</i>	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.	245
<i>schedcmddisabled</i>	Specifies whether to disable the scheduling of generic commands specified by your Storage Manager administrator.	247
<i>schedcmduser (server defined only)</i>	The scheduler executes commands under a uid of 0, however, there may be some users who have a different user ID. In this case, your Storage Manager administrator can define schedules and allow these schedules to be executed under a uid other than 0, using this option. The Storage Manager Client API does not support this option.	110
<i>schedlogname</i>	Specifies the path and file name where you want to store schedule log information.	248
<i>schedlogretention</i>	Specifies the number of days to keep log file entries in the schedule log, and whether to save pruned entries.	249
<i>schedmode</i>	Specifies which schedule mode to use, <i>polling</i> or <i>prompted</i> .	250
<i>tcpclientaddress</i>	Specifies a TCP/IP address if your client node has more than one address, and you want the server to contact an address other than the one that was used to make the first server contact. Use this option only if you specify the <i>prompted</i> parameter with the <i>schedmode</i> option or when the <i>schedule</i> command is running.	262

Table 33. Scheduling options (continued)

Option	Description	Page
tcpclientport	Specifies a different TCP/IP port number for the server to contact than the one that was used to make the first server contact. Use this option only if you specify the <i>prompted</i> parameter with the schedmode option or when the schedule command is running.	263

Format options

You can use the following options to select different formats for date, time, and numbers.

Table 34. Format options

Option	Description	Page
dateformat	Specifies the format for displaying dates.	152
numberformat	Specifies the format for displaying numbers.	221
timeformat	Specifies the format for displaying time.	268

Command processing options

The following options apply when you use Storage Manager commands.

Table 35. Command processing options

Option	Description	Page
editor	Specifies if the command-line interface editor and command retrieve capability is turned on or off.	169
quiet	Limits the number of messages that display on your screen during processing. This option can be overridden by the server.	241
scrolllines	Specifies the number of lines of information that display on your screen at one time. Use this option only when scrollprompt is set to <i>yes</i> .	252
scrollprompt	Specifies whether you want 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.	253
verbose	Specifies that processing information should display on your screen. The alternative is <i>quiet</i> . This option can be overridden by the server.	276

Authorization options

These options control access to a Storage Manager server.

Table 36. Authorization options

Option	Description	Page
<i>encryptkey</i>	Specifies whether to save the encryption key password locally when performing a backup-archive operation or whether to prompt for the encryption key password.	172
<i>groups</i>	Specifies the groups on your workstation that you want to authorize to request Storage Manager services from the server.	187
<i>mailprog</i>	Specifies the program and user ID where you want to send a newly-generated password when the old one expires.	209
<i>password</i>	Specifies a Storage Manager password.	224
<i>passwordaccess</i>	Specifies whether you want to generate your password automatically or set as a user prompt.	225
<i>passworddir</i>	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.	227
<i>revokeremoteaccess</i>	Restricts an administrator with client access privileges from accessing your workstation through the Web client.	246
<i>users</i>	Authorizes specific users on your workstation to request services from a server.	274

Error processing options

These options specify the name of the error log file and how Storage Manager treats the entries in the log file.

Table 37. Error processing options

Option	Description	Page
<i>errorlogname</i>	Specifies the fully qualified path and file name of the file where you want to store information about errors that occur during processing.	174
<i>errorlogretention</i>	Specifies how many days to maintain error log entries before pruning, and whether to save the pruned entries.	175

Transaction processing options

These options control how Storage Manager processes transactions between the client and server.

Table 38. Transaction processing options

Option	Description	Page
<i>commrestartduration</i>	Specifies the maximum number of minutes you want the client to try to reconnect to a Storage Manager server after a communication error occurs.	148
<i>commrestartinterval</i>	Specifies the number of seconds you want the client to wait between attempts to reconnect to a Storage Manager server after a communication error occurs.	149
<i>largecommbuffers</i>	Specifies whether the client uses increased buffers to transfer large amounts of data between the client and the server.	204
<i>nfstimeout</i>	Specifies the number of seconds the server waits for a status system call on an NFS file system before it times out.	217
<i>resourceutilization</i>	Use the <i>resourceutilization</i> option in your client system options file <code>dsm.sys</code> to regulate the level of resources the Storage Manager server and client can use during processing.	243
<i>txnbytelimit</i>	Specifies the number of kilobytes the client program buffers before it sends a transaction to the server.	272

Web client options

The following are options for the Storage Manager Web Client.

Table 39. Web client options

Option	Description	Page
<i>httpport</i>	Specifies a TCP/IP port address for the Web client.	189
<i>managedservices</i>	Specifies whether the Storage Manager Client Acceptor daemon manages the Web client, the scheduler, or both.	210
<i>revokeremoteaccess</i>	Restricts administrator access on a client workstation through the Web client.	246
<i>webports</i>	Enables the use of the Web client outside a firewall by specifying the TCP/IP port number used by the Storage Manager Client Acceptor daemon and the Web Client Agent service for communications with the Web GUI.	282

Using options with commands

You can override some of the options in your options file by entering them with appropriate backup-archive commands.

Storage Manager processes options in the following order (precedence):

1. Options defined on the server with server-enforced client options. The server overrides client values.
2. Options entered locally on the command line.
3. Options defined on the server for a schedule using the options parameters.
4. Options entered locally in the options file.
5. Options received from the server with client options not enforced by the server. The server *does not* override client values.
6. Default option values.

Storage Manager also includes a group of client command options that you can enter *only* on the command line with specific commands. For a complete list of command line options, a description, and where to go in this book for more information, see Table 40 on page 136.

Entering options with a command

Follow these general rules to enter options with a command:

- Enter a command, a dash (-), the option name, an equal sign (=), and the option value or parameter. There should be no spaces on either side of the = sign. For example,

```
dsmc archive -description="year end 1999" /home/
```

- For options that do not include parameters, enter a command, a dash (-) and the option name. For example,

```
dsmc incremental -quiet
```

Note: Use a leading dash (-) to indicate that the following text is the name of an option. If an object name begins with a dash, you must surround it in either single quotes (') or double quotes ("). Most operating system command line processors strip the quotes before submitting the command line arguments to the Storage Manager client application. In such cases, using escape characters or doubling the quotes allows the client to receive the quoted object name. In loop mode, surround such objects in either single quotes (') or double quotes (").

- Enter either the option name, or an abbreviation for the option name. For example, to enter the **latest** option, enter either -lat or -latest. The capital letters in the syntax of each option indicate the minimum abbreviation for that option name. For information about how to read the syntax diagrams, see "Reading syntax diagrams" on page x.
- Enter options before or after command parameters. For example, you can enter the **subdir** option before or after a file specification:

```
dsmc selective -subdir=yes "/home/devel/proj1/*"  
dsmc selective "/home/devel/proj1/*" -subdir=yes
```

- When entering several options on a command, separate each with a blank space.
- Enclose the value in quotes (" ") if the option value that you enter contains a blank space. For example,

```
dsmc archive -description="Project A" "/home/devel/proj1/*"
```

- Any option that you enter on the command line, with the exception of **domain**, overrides the value set in the client options file. When you use the **domain**

option with the **incremental** command, it adds to the domain specified in your client options file rather than overriding the current value.

- The maximum number of characters for a file name is 256. The maximum combined length of the file name and path name is 1024 characters.

Table 40. Client command options

Command option	Description	Commands	Page
archmc	Use the archmc option with the archive command to specify the available management class for your policy domain to which you want to bind your archived files.	archive	141
class	Specifies whether to display a list of NAS objects or client objects when using the following commands:	query backup delete filesystem query filesystem	145
deletefiles	Deletes the local copy of files from your workstation after they are archived on the server. Can also be used with the restore image command and the incremental option to delete files from the restored image that are deleted from the file space after the image is created.	archive restore image	155
description	Assigns or specifies a description for files when performing archive, delete, retrieve, or query archive operations.	archive delete archive query archive query backupset retrieve	156
detail	Displays management class, file space, backup, and archive information depending on the command with which it is used.	delete filesystem query archive query backup query filesystem query mgmtclass	157
dirsonly	Backs up, restores, archives, retrieves, or queries directories <i>only</i> .	archive incremental query archive query backup restore restore backupset retrieve selective	161
filelist	Specifies a list of files to be processed for the command. Storage Manager opens the designated filelist and processes the files listed within according to the command.	archive delete archive expire incremental query backup query archive restore retrieve selective	179

Table 40. Client command options (continued)

Command option	Description	Commands	Page
filesonly	Backs up, restores, retrieves, or queries files <i>only</i> .	archive incremental query archive query backup restore restore backupset retrieve selective	181
fromdate	Use the fromdate option with the fromtime option to specify a date and time from which you want to search for backups or archives during a restore, retrieve, or query operation.	query archive query backup restore retrieve restore image query image	183
fromnode	Displays file spaces for an alternate node. Also specifies an alternate node from which to restore or retrieve files.	query archive query backup query filespace query mgmtclass restore retrieve query image restore image	184
fromowner	Displays file spaces for an alternate owner. Also specifies an alternate owner from which to restore or retrieve files.	query archive query backup query image restore restore image retrieve	185
fromtime	Specifies a beginning time on the specified date. Use with the fromdate option. This option is ignored if the fromdate option is absent.	query archive query backup restore retrieve restore image	186
ifnewer	Replaces existing files with the latest backup version only if the backup version is newer than the existing version.	restore restore backupset retrieve	190
inactive	Displays a list of active and inactive files when used with the pick option.	query backup restore restore nas query image restore image	192
incrbydate	Requests an incremental backup by date.	incremental	198
incremental	Applies changes to the base image using information from incremental backups made after the original image backup.	restore image	199
latest	Restores the most recent backup version of a file whether it is active or inactive.	restore	205

Table 40. Client command options (continued)

Command option	Description	Commands	Page
location	Specifies whether Storage Manager searches for a backup set on the server, in local files, or on a tape device during a query or restore operation.	query backupset restore backupset	207
mode	Specifies whether you want to perform a selective or incremental image backup (non-NAS objects), or a full or differential image backup of NAS file systems.	backup nas backup image restore nas	214
monitor	Specifies whether you want to monitor an image backup or restore of one or more file systems belonging to a Network Attached Storage (NAS) file server.	backup nas restore nas	215
noprompt	Suppresses the confirmation prompt that normally appears before you delete an archived file, or when performing an image restore operation.	delete archive expire restore image	220
optfile	Specifies the client user options file you want to use when you start a Storage Manager session.	dsmc.exe	223
pick	Creates a list of backup versions, images, or archive copies that match the file specification you enter. From the list, you can select the versions to process. Include the inactive option to view both active and inactive objects.	delete archive expire restore retrieve query nas restore image restore nas	228
pitdate	Use the pitdate option with the pittime option to establish a point in time for which you want to display or restore the latest version of your backups.	query backup restore restore nas query nas query image restore image	229
pittime	Use the pittime option with the pitdate option to establish a point in time for which you want to display or restore the latest version of your backups.	query backup restore restore nas query nas query image restore image	230
preservepath	Specifies how much of the source path to reproduce as part of the target directory path when you restore or retrieve files to a new location.	restore restore backupset retrieve	237
todate	Use the todate option with the totime option to specify an ending date and time to which you want to search for backups or archives during a restore, retrieve, or query operation.	query archive query backup restore retrieve	270

Table 40. Client command options (continued)

Command option	Description	Commands	Page
<i>totime</i>	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	271
<i>type</i>	Use the <i>type</i> option with the query node command to specify the type of node to query.	query node	273
<i>v2archive</i>	Use the <i>v2archive</i> option with the archive command to archive only files to the server. Storage Manager will not process directories that exist in the path of the source file specification.	archive	275
<i>volinformation</i>	The <i>volinformation</i> option backs up or archives root-level information. This option applies only when you back up or restore non-root files.	archive incremental selective restore retrieve	281

Client options reference

The following sections contain detailed information about each of the Storage Manager processing options. Information for each option includes:

- A description of the option.
- A syntax diagram of the option. The option name contains uppercase and lowercase characters. The uppercase characters indicate the minimum abbreviation you can use for the option name. See “Reading syntax diagrams” on page x for an explanation of these diagrams.
- Detailed descriptions of the option parameters. If the parameter is a constant (a value that does not change), use the minimum abbreviation.
- Examples of using the option in the client options file (if applicable).
- Examples of using the option on the command line (if applicable). Options with a command line example of **Does not apply** cannot be used with command line or scheduled commands.

Note: For options with a **yes** parameter, acceptable alternatives are **1**, **true**, and **on**.
For options with a **no** parameter, acceptable alternatives are **0**, **false**, and **off**.

Afsbackupmntpnt

Root User

The ***afsbackupmntpnt*** option specifies whether you want Storage Manager to see an AFS mount point as a mount point or as a directory. If Storage Manager sees an AFS mount point as a mount point, it backs up only the name of the mounted volume during a backup operation. It does not back up the subtree by starting from the mount point directory. For more information about this option, see “The afsbackupmntpnt option” on page 353 in the Appendix.

Supported Clients

This option is valid for all UNIX clients. The Storage Manager client API does not support this option.

Options File

Place this option in the client system options file (dsm.sys) or the client user options file (dsm.opt). Use this option with dsmafs and dsmcafs.

Syntax



Parameters

- Yes** Specifies that Storage Manager views all AFS mount points as *mount points* and backs up only the mount point information for any mount point it encounters during a backup operation. This is the default.
- No** Specifies that Storage Manager views all AFS mount points as *directories* and backs up the contents of files and subdirectories of any mount point it encounters during a backup operation.

Examples

Options file:

```
afsbackupmntpnt no
```

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.

Supported Clients

This option is valid for all UNIX clients. The 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 for the files you are archiving.

Examples

Command line:

```
dsmc archive -archmc=RET2YRS /home/plan/proj1/budget.jan
```

Archsymlinkasfile

The ***archsymlinkasfile*** option specifies whether Storage Manager follows a symbolic link and archives the file or directory it points to, or archives the symbolic link only. Use this option with the **archive** command.

Supported Clients

This option is valid for all UNIX clients. The server can also define this option.

Options File

Place this option in the client user options file (dsm.opt).

Syntax



Parameters

- Yes** Specifies that Storage Manager follows a symbolic link and archives the associated file or directory. This is the default.
- No** Specifies that Storage Manager archives the symbolic link and not the associated file or directory.

Examples

Options file:

```
archsymlinkasfile no
```

Command line:

```
-archsym1=no
```

Automount

Authorized User

The **automount** option adds an automounted file system into the domain by mounting it. Use this option with the **domain** option.

Use this option to specify all automounted file systems the Storage Manager client tries to mount at the following points in time:

- When Storage Manager client starts
- When the back up is started
- When the Storage Manager client has reached an automounted file system during backup

It is unnecessary to explicitly specify an automounted file system in the **automount** statement if you use the keywords *all-auto-nfs* or *all-auto-lofs* in the domain statement and the file system is already mounted. However, you should add this file system in the **automount** statement to ensure the file system has been mounted at all the points in time mentioned above. The automounted file systems are remounted if they have gone offline in the meantime during a backup.

See “Domain” on page 162 for more information about working with automounted file systems and the **domain** option.

Supported Clients

This option is valid for all UNIX platforms except Linux86 and Linux390. The Storage Manager client API does not support this option.

Options File

Place this option in the client user options file (dsm.opt).

Syntax



Parameters

filespacename

Specifies one or more automounted file systems that are mounted and added into the domain.

Examples

Options file:

```
automount fs1 fs2
```

Command line:

Does not apply.

Changingretries

Authorized User

The ***changingretries*** option specifies how many additional times you want the client to attempt to back up or archive a file that is in use. Use this option with the **archive**, **incremental**, and **selective** commands.

Use this option only when *serialization*, an attribute in a management class copy group, is *shared static* or *shared dynamic*.

With *shared static* serialization, if a file is open during an operation, the operation repeats the number of times that you specify. If the file is open during each attempt, the operation does not complete.

With *shared dynamic* serialization, if a file is open during an operation, the operation repeats the number of times that you specify. The backup or archive occurs during the last attempt whether the file is open or not.

Supported Clients

This option is valid for all UNIX clients. The server can also define this option. The Storage Manager client API does not support this option.

Options File

Place this option in the client system options file (dsm.sys).

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 objects or client objects when using the following commands:

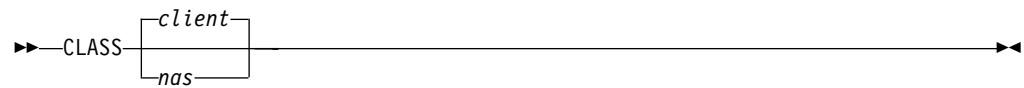
- **query backup**
- **delete filesystem**
- **query filesystem**

For example, to display a list of the file spaces belonging to a NAS node, specify the **-class=nas** option with the **query filesystem** command.

Supported Clients

This option is valid for the AIX, AIX 5L, and Solaris clients *only* clients. The Storage Manager client API does not support this option.

Syntax



Parameters

nas

Specifies that you want to display a list of file spaces for a NAS node.

client

Specifies that you want to display a list of file spaces for a client node. This is the default.

Examples

Command line:

```
q backup -class=nas
```

Clusternode

The ***clusternode*** option specifies whether Storage Manager participates in a High Availability Cluster Multi Processing (HACMP) environment. For information on how to configure a cluster server, see Appendix B, “Configuring the backup-archive client in an HACMP takeover environment”, on page 357.

Supported Clients

This option is valid for the AIX 4.3.3 (or later) client *only*.

Options File

Place this option in the client user options file (dsm.opt).

Syntax



Parameters

- Yes** Specifies that you want Storage Manager to back up cluster resources and participate in cluster failover for high availability.
- No** Specifies that you do not want the Storage Manager client to participate in cluster failover. This is the default.

Examples

Options file:

```
cluster no
```

Command line:

```
-cluster=yes
```

This option is valid only on the initial command line. It is not valid in interactive mode.

Commmethod

Authorized User

The ***commmethod*** option specifies the communication method you use to provide connectivity for client-server communication.

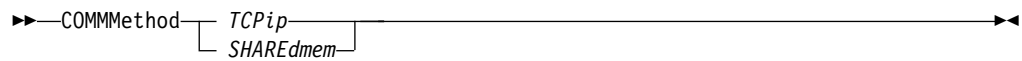
Supported Clients

This option is valid for all UNIX clients.

Options File

Place this option in the client system options file (dsm.sys).

Syntax



Parameters

TCPip

The Transmission Control Protocol/Internet Protocol (TCP/IP) communication method.

SHAREdmem

Use the Shared Memory communication method when the client and server are running on the same system. This provides better performance over the TCP/IP protocol.

When specifying this communications method on AIX, you must be logged in as root or have the same user ID as the process running the server.

Examples

Options file:

comm tcpip

Command line:

Does not apply

Commrestartduration

Authorized User

The ***commrestartduration*** option specifies the maximum number of minutes you want the client to try to reconnect to a Storage Manager server after a communication error occurs.

Note: A scheduled event will continue if the client reconnects with the server before the ***commrestartduration*** value elapses, even if the event's startup window has elapsed.

You can use the ***commrestartduration*** option and the ***commrestartinterval*** in busy or unstable network environments to decrease connection failures.

Supported Clients

This option is valid for all UNIX clients.

Options File

Place this option in the client system options file (dsm.sys).

Syntax

►►—COMMRESTARTDuration— *minutes* —————►►

Parameters

minutes

The maximum number of minutes you want the client to attempt to reconnect with a server after a communication failure occurs. The range of values is zero through 9999; the default is 60.

Examples

Options file:

```
commrestartduration 90
```

Command line:

Does not apply.

Commrestartinterval

Authorized User

The ***commrestartinterval*** option specifies the number of seconds you want the client to wait between attempts to reconnect to a Storage Manager server after a communication error occurs.

Note: Use this option only when ***commrestartduration*** is a value greater than zero.

You can use the ***commrestartduration*** option and the ***commrestartinterval*** in busy or unstable network environments to decrease connection failures.

Supported Clients

This option is valid for all UNIX clients.

Options File

Place this option in the client system options file (dsm.sys).

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, or resend the object uncompressed. Use this option with the ***compression*** option.

Use the ***compressalways*** option with the **archive**, **incremental**, and **selective** commands.

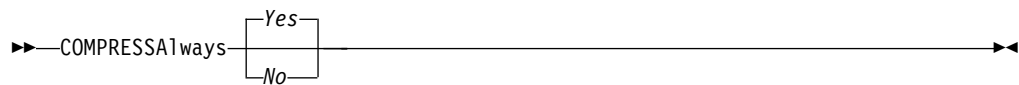
Supported Clients

This option is valid for all UNIX clients. The server can also define this option.

Options File

Place this option in the client user options file (dsm.opt).

Syntax



Parameters

- Yes** File compression continues even if the file grows as a result of compression. This is the default.
- No** Backup-archive client objects are resent uncompressed if they grow during compression. API behavior depends on the application. Application backups may fail.

Examples

Options file:
compressalways yes

Command line:
-compressa=no

Compression

Authorized User

The **compression** option compresses files *before* you send them to the server. Compressing your files reduces data storage for backup versions and archive copies of your files. It can, however, affect Storage Manager throughput. A fast processor on a slow network connection benefits from compression, but a slow processor on a fast network connection does not.

Use the **compression** option with the **archive**, **incremental**, and **selective** commands.

If you set the **compressalways** option to *yes*, compression continues even if the file size increases. To stop compression if the file size grows, and resend the file uncompressed, set the **compressalways** option to *no*.

If you set the **compression** option to *yes*, you can control compression processing in the following ways:

- Use the **exclude.compression** option in your client system options file (dsm.sys) to exclude specific files or groups of files from compression processing. See “Exclude options” on page 176 for more information.
- Use the **include.compression** option in your client system options file (dsm.sys) to include files within a broad group of excluded files for compression processing. See “Include options” on page 194 for more information.

This option controls compression *only if* your administrator specifies that your client node can compress files before sending them to the server.

Supported Clients

This option is valid for all UNIX clients. The server can also define this option.

Options File

Place this option in the client system options file (dsm.sys) *within* a server stanza.

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
```

Dateformat

The ***dateformat*** option specifies the format you want to use to display dates.

The AIX, AIX 5L, Solaris, and HP-UX clients support locales other than English that describe every user interface that varies with location or language. Solaris and HP-UX clients only support English, Korean, Simplified Chinese, Traditional Chinese, and Japanese locale information. The following are default directories for system-supplied locales:

- /usr/lib/nls/loc for AIX and AIX 5L
- /usr/lib/locale for Solaris
- /usr/lib/nls/loc/locales for HP-UX

The backup-archive and administrative clients obtain format information from the locale definition in effect at the time you start the client. Consult the documentation on your local system for details about setting up your locale definition.

Notes:

1. This ***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 Storage Manager supports, the Web client uses the date format for American English.
2. When you change the date format and use the ***schedlogretention*** option to prune the schedule log, 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, 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.

Supported Clients

This option is valid for all UNIX clients.

Options File

Place this option in the client user options file (dsm.opt).

Syntax

►►—DATEformat— *format_number* —————◄◄

Parameters

format_number

Displays the date using one of the following formats. Select the number that corresponds to the date format you want to use:

- 0 Use the locale-specified date format. For AIX, AIX 5L, HP-UX, SGI, Solaris, and Tru64 UNIX: This is the default if the locale-specified date format consists of digits and separator characters.
- 1 MM/DD/YYYY

For AIX, AIX 5L, HP-UX, SGI, Solaris, and Tru64 UNIX: This is the default if the locale-specified date format consists of anything but digits and separator characters. This is the default for the following supported languages:

- American English
- Chinese (Traditional)
- Korean

2 DD-MM-YYYY

This is the default for the following supported languages:

- Brazilian Portuguese
- Italian

3 YYYY-MM-DD

This is the default for the following supported languages:

- Japanese
- Chinese (Simplified)

4 DD.MM.YYYY

This is the default for the following supported languages:

- German
- French
- Spanish

5 YYYY.MM.DD

For AIX, AIX 5L, HP-UX, SGI, Solaris, and Tru64 UNIX: 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

Examples

Options file:

dateformat 3

Command line:

-date=4

This option is valid on the initial command line and in interactive mode. If you use this option in interactive mode, it remains in effect for the entire interactive session or until you enter another **dateformat** option

Defaultserver

Authorized User

The **defaultserver** option to specify the name of the Storage Manager server to contact for backup-archive services by default if more than one server is defined in the client system options file (dsm.sys).

If you have the HSM client installed on your workstation, and you do not specify a migration server with the **migrateserver** option, use this option to specify the server to which you want to migrate files. See *IBM Tivoli Space Manager for Unix Using the Hierarchical Storage Management Clients* for more information.

Supported Clients

This option is valid for all UNIX clients.

Options File

Place this option *at the beginning* of the client system options file (dsm.sys) *before* any server stanzas.

Syntax

►►—DEFAULTServer— *servername* —————►◄

Parameters

servername

Specifies the name of the default server to which you back up or archive files. The server to which files are migrated from your local file systems can also be specified with this option.

Examples

Options file:

defaults server_a

Command line:

Does not apply.

Deletefiles

Use the ***deletefiles*** option with the **archive** command to delete files from your workstation after you archive them.

You can also use this option with the **restore image** command and the ***incremental*** option to delete files from the restored image if they were deleted after the image was created.

Supported Clients

This option is valid for all UNIX clients. The Storage Manager client API does not support this option.

Syntax

►►—DELetefiles—◄◄

Parameters

There are no parameters for this option.

Examples

Command line:

```
dsmc archive "/home/foo/*.c" -deletefiles  
dsmc restore image /local/data -incremental -deletefiles
```

Description

The ***description*** option assigns or specifies a description for files when performing archive, delete, retrieve, or query archive operations. For example, if you want to archive a file named `budget.jan` and assign to it the description **2002 Budget for Proj 1**, you would enter:

```
dsmc archive -des="2002 Budget for Proj 1" /home/plan/
proj1/budget.jan
```

You can also use this option to specify the description of a backup set that you want to query.

Supported Clients

This option is valid for all UNIX clients. The Storage Manager client API does not support this option.

Syntax

►►—DEscription— *description* —————►►

Parameters

description

Assigns a description to the file you are archiving. If you do not specify a description with the **archive** command, the default is `Archive Date:x`, where `x` is the current system date. Note that the date is always 10 characters long. If your date format uses a two digit year, there will be two blank spaces at the end of the date. For example, a default description using a four-digit year might be `"Archive Date: 2002/05/03"`, and the same default with a two-digit year might be `"Archive Date: 02/05/03 "` (note the two spaces at the end). When retrieving files using the two-digit year description, you can enter the ***-description*** option string in either of the following ways:

```
-description="ArchiveDate: 02/05/03  "
or
-description="ArchiveDate: 02/05/03*"
```

If you use the **archive** command to archive more than one file, the description you enter applies to each file. For example, to archive a group of files and assign the same description, *Project X*, to each file, you would enter:

```
dsmc archive -description="Project X" "/home/
allproj/*."
```

You can then use the description to retrieve all of the files.

Examples

Command line:

```
dsmc archive "/home/foo/*.prj" -des="2002 Budget for Proj 1"
dsmc query backupset -loc=server -descr="My Laptop"
```

Detail

Use the ***detail*** option to display management class, file space, backup, and archive information depending on the command with which it is used.

Use the ***detail*** option with the **query mgmtclass** command to display detailed information about each management class in your active policy set. If you do not use the ***detail*** option, only the management class name and a brief description displays on the screen. If you specify the ***detail*** option, information about attributes in each copy group contained in each management class displays on the screen. A management class can contain a backup copy group, an archive copy group, both, or neither.

Use the ***detail*** option with the **delete filespace** and **query filespace** commands to determine the fsID of a file space. The fsID also appears in the file information dialog in the native and Web client GUIs.

Use the ***detail*** option with the **query backup** and **query archive** commands to display the last modification date and the last access date of the file you specify.

Supported Clients

This option is valid for all UNIX clients. The 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
```

Dfsbackupmntpnt

Root User

The ***dfsbackupmntpnt*** option specifies whether you want Storage Manager to see a DFS mount point as a mount point or as a directory. If Storage Manager sees a DFS mount point as a mount point, it backs up only the name of the mounted fileset during a backup operation. It does not back up the subtree by starting from the mount point directory.

For more information on using the ***dfsbackupmntpnt*** option, see “The dfsbackupmntpnt option” on page 353 in the Appendix.

Supported Clients

This option is valid for all UNIX clients.

Options File

Place this option in the client system options file (dsm.sys) *within* a server stanza, or in the client options file (dsm.opt). Use this option with the dsmdfs and dsmcdf client programs.

Syntax



Parameters

- Yes** Specifies that Storage Manager views all DFS mount points as *mount points* and backs up only the name of the mounted fileset for any mount point it encounters during a backup operation. This is the default.
- No** Specifies that Storage Manager views all DFS mount points as *directories* and backs up the contents of files and subdirectories of any mount point it encounters during a backup operation.

Examples

Options file:

```
dfsbackupmntpnt no
```

Dfsinlexcl

Root User

If you use a DFS include-exclude options file, the ***dfsinlexcl*** option specifies the path and file name. You can use a DFS include-exclude options file to exclude DFS files or directories from backup. You can use a DFS include-exclude options file to assign different management classes to specific files or groups of files.

A DFS include-exclude options file pointed to by the ***dfsinlexcl*** option is used *only* when DFS files are examined for backup. For more information about setting DFS processing options, see “Setting processing options” on page 355 in the Appendix.

Attention: A separate DFS include-exclude options file is required because the prefix /... means the global root in DFS. In a DFS include-exclude options file, the /... prefix is interpreted as the global root of DFS, while a non-DFS include-exclude option uses the /... prefix to match zero or more directories.

Supported Clients

This option is valid for all UNIX clients. The Storage Manager client API does not support this option.

Options File

Place this option in the client system options file (dsm.sys).

Syntax

►►—DFSIncl`excl`— *filespec*—◄◄

Parameters

filespec

Specifies the path and file name of your DFS include-exclude options file.

Examples

Options file:

```
dfsinlexcl /usr/lpp/adsm/bin/backup.excl.dfs
```

Dirmc

Authorized User

The **dirmc** option specifies the management class you want to use for directories. If you do not specify this option to associate a management class with directories, the client program uses the management class in the active policy set of your policy domain with the longest retention period. Select a management class for individual directories that retains directories at least as long as it retains the files associated with them.

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. Archived directories are always bound to the default management class.

Supported Clients

This option is valid for all UNIX clients. The server can also define this option.

Options File

Place this option in the client system options file (dsm.sys) *within* a server stanza.

Syntax

►►—DIRMc— *mgmtclassname* —————◄◄

Parameters

mgmtclassname

Specifies the name of the management class you want to associate with directories. The client uses the management class name that you specify for all directories that you back up. If you do not specify this option, the client associates the management class with the longest retention period with directories.

Examples

Options file:

dirm managdir

Command line

Does not apply.

Dirsonly

The ***dirsonly*** option processes directories *only*. The client does not process files.

Use the ***dirsonly*** option with the following commands:

- **archive**
- **incremental**
- **query archive**
- **query backup**
- **restore**
- **restore backupset**
- **retrieve**
- **selective**

Supported Clients

This option is valid for all UNIX clients. The Storage Manager client API does not support this option.

Syntax

►►—Dirsonly—◄◄

Parameters

There are no parameters for this option.

Examples

Command line:

```
dsmc query backup -dirsonly "*"
```

Domain

The **domain** option specifies the file systems that you want to include for incremental backup in your client domain.

Use the **domain** option in your client system options file (dsm.sys) to define your default client domain. Storage Manager uses your default client domain in the following situations to determine which file systems to process during an incremental backup:

- When you run an incremental backup using the **incremental** command and you do not specify which file systems to process.
- When your administrator defines a schedule to run an incremental backup for you, but does not specify which file systems to process.
- When you select the **Backup Domain** action from the Storage Manager native GUI or Web GUI.

If you do not use the **domain** option to specify file systems in your client options file, Storage Manager uses the *all-local* parameter as the default.

Note: You can include a virtual mount point in your client domain. For information about defining a virtual mount point, see “Virtualmountpoint” on page 277.

When you use the **domain** option with the **incremental** command, Storage Manager adds file systems that you specify to the file system defined in your client options file. For example, if you enter the following in your client options file:

```
domain /home /usr /datasave
```

and the following on the command line:

```
dsmc incremental -domain="/fs1 /fs2"
```

Storage Manager performs an incremental backup for your /home, /usr, /datasave, /fs1, and /fs2 file systems

If you use both a file specification and the **domain** option with the **incremental** command, Storage Manager ignores the **domain** option and processes only those file systems that you specify in the file specification. For example, if you enter:

```
dsmc incremental /fs1 /fs2 -domain="/fs3 /fs4"
```

Storage Manager performs an incremental backup for the /fs1 and /fs2 file systems *only*.

You can also exclude file systems by specifying the dash (-) operator before the file systems. For example, in the following option Storage Manager will process all local file systems except for the /home file system:

```
domain ALL-LOCAL -/home
```

Note: You cannot use the (-) operator in front of a domain keyword such as ALL-LOCAL.

Attention: If you are running GPFS for AIX or GPFS for Linux86 in a multi-node cluster, and all nodes share a mounted GPFS file system, Storage Manager processes this file system as a local file system. 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 system options file to list the file systems you want that node to back up.
- Set the **exclude.fs** option in the client system options file to exclude the GPFS file system from backup services.

Automounted file systems

When performing a backup with the **domain** option set to *all-local*, files handled by automounter and loopback file systems are not backed up.

If you back up a file system with the **domain** option set to *all-local*, any subdirectories that are mount points for an automounted file system (autofs) are excluded from backup. Any files that exist on the server for the automounted subdirectory are expired.

When performing a backup with the **domain** option set to *all-lofs*, all explicit loopback file systems (LOFS) are backed up and all automounted file systems are excluded. For loopback file systems handled by automounter, set the **domain** option to *all-auto-lofs*.

You should use the **automount** option with the **domain** option to specify one or more automounted file systems to be mounted and added into the domain. If you specify the **automount** option, automounted file systems are remounted if they have gone offline during the execution of the **incremental** command. See “Automount” on page 143 for more information.

Virtual mount points cannot be used with automounted file systems.

For HP-UX: The **domain** option is enhanced with the new keywords *all-auto-lofs* and *all-auto-nfs* to support automounted file systems. To use this enhancement, set the *autofs* parameter to 1 in the `/etc/rc.config.d/nfsconf` file. Changing this parameter requires a reboot. For further information please refer to the HP documentation on this issue.

The following UNIX platforms support automounter, LOFS, or LOFS through automounter, as indicated:

Platform	automounter	LOFS	LOFS through automounter
AIX and AIX 5L	yes	yes	yes
Solaris	yes	yes	yes
HP-UX	yes	yes	no
SGI	yes	no	yes
OS/390 UNIX	yes	no	no
Tru64 UNIX	yes	no	no

Notes:

1. The Linux clients are not enabled for automounter support.

2. The Linux operating system does not support loopback file systems (LOFS). Instead a loop device is available to allow devices or files mounted as whole file systems. Loop devices are supported by the Storage Manager Linux clients in the same way as loopback file systems for other UNIX operating systems. They are not part of the local domain, but domain LOFS. You must use the **domain** option to add them to your domain.

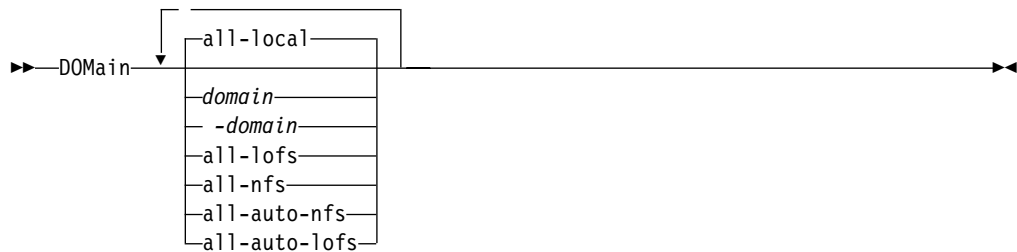
Supported Clients

This option is valid for all UNIX clients. The server can also define this option. The Storage Manager client API does not support this option.

Options File

Place this option in the client system options file (dsm.sys) or the client user options file (dsm.opt).

Syntax



Parameters

all-local

Backs up all local file systems except LOFS file systems and LOFS through automounter. This is the default.

The /tmp directory is not included.

domain

Defines the file systems to include in your default client domain.

When you use **domain** with the **incremental** command, it processes these file systems in addition to those you specify in your default client domain.

-domain

Defines the file systems to exclude in your default client domain.

all-lofs

Backs up all loopback file systems, except those handled by automounter.

all-nfs

Backs up all network file systems, except those handled by automounter.

all-auto-nfs

Backs up all network file systems which are handled by automounter.

all-auto-lofs

Backs up all loopback file systems which are handled through automounter.

Examples

Options file:


```
domain /tst /datasave /joe  
"domain all-local"  
domain ALL-LOCAL -/home  
domain ALL-NFS -/mount/nfs1
```

Command line:

```
-domain="/fs1 /fs2"  
-domain=/tmp  
-domain="ALL-LOCAL -/home"
```

Domain.image

The ***domain.image*** option specifies the mounted file systems and raw logical volumes that you want to include in your client domain for an image backup. Raw logical volumes must be named explicitly.

If you do not specify a file system with the **backup image** command, the file systems you specify with the ***domain.image*** option are backed up.

When you specify a file system with the **backup image** command, the ***domain.image*** option is ignored.

If you do not use the ***domain.image*** option to specify file systems in your client options file, and you do not specify a file system with the **backup image** command, a message is issued and no backup occurs.

Supported Clients

This option is valid for AIX, AIX 5L, HP-UX, Linux86, Solaris *only*. The server can also define this option. The Storage Manager client API does not support this option.

Options File

Place this option in the client system options file (dsm.sys).

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. 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.

Storage Manager uses your domain for NAS image backups when you run a **backup nas** command and you do not specify which volumes to process.

When you perform a NAS file system image backup using the **backup nas** command, Storage Manager adds volumes that you specify on the command line to the volumes defined in your dsm.sys file. For example, if you enter the following in your dsm.sys file:

```
domain.nas nas1/vol/vol0 nas1/vol/vol1
```

and you enter the following on the command line

```
dsmc backup nas -nasnodename=nas1 /vol/vol2
```

Storage Manager backs up the vol/vol0, vol/vol1, and vol/vol2 volumes on node nas1.

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. Storage Manager processes all mounted volumes on the NAS file server.

Supported Clients

This option is valid for AIX, AIX 5L, 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.

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.

Examples

Options file:

```
domain.nas nas1/vol/vol0 nas1/vol/vol1  
domain.nas all-nas
```

Command line:

Does not apply.

Editor

The ***editor*** option turns the command line interface (CLI) editor and retrieve capability on or off.

If the editor and command retrieve functions are not working on a specific workstation setting, you can turn off this function.

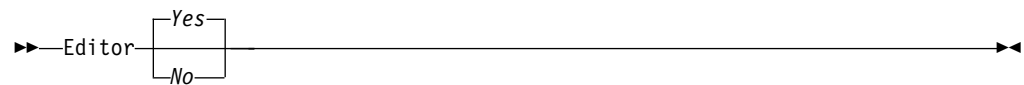
Supported Clients

This option is valid for all UNIX (except OS/390 UNIX System Services) clients.

Options File

Place this option in the client system options file (dsm.sys) *or* the client user options file (dsm.opt).

Syntax



Parameters

Yes Turns on the CLI editor and command retrieve capability. This is the default.

No Turns off the CLI editor and command retrieve capability.

Note: The editor is not supported on OS/390 UNIX System Services, so the ***editor*** option should be set to *No*.

Examples

Options file:

```
editor yes
```

Command line:

```
-editor=yes
```

This option is valid only on the initial command line. It is not valid in interactive mode.

Enablelanfree

Authorized User

The **enablelanfree** option specifies whether to enable an available LAN-free path to a storage area network (SAN) attached storage device. A LAN-free path allows backup, restore, archive, and retrieve processing between the Storage Manager client and the SAN-attached storage device.

To support LAN-free data movement you must install and configure the Tivoli Storage Manager Managed System for SAN Storage Agent on the client workstation. For more information, refer to the following publications:

- *IBM Tivoli Storage Manager for AIX Managed System for SAN Storage Agent User's Guide*, GC32-0771
- *IBM Tivoli Storage Manager for Sun Solaris Managed System for SAN Storage Agent User's Guide*, GC32-0781
- *IBM Tivoli Storage Manager for HP-UX Managed System for SAN Storage Agent User's Guide*, GC32-0727
- *IBM Tivoli Storage Manager for Linux Managed System for SAN Storage Agent User's Guide*, GC23-4693

Notes:

1. If you place the **enablelanfree** option in the client option file (dsm.opt), but zero (0) bytes were transferred through the SAN during an operation, ensure that you bind the data to a LAN-free enabled management class.
2. To restore backup sets in a SAN environment, see "Restore Backupset" on page 333 for more information.
3. The **enablelanfree** option is not valid if HSM is installed. See *IBM Tivoli Space Manager for Unix Using the Hierarchical Storage Management Clients*, GC32-0794 for more information.

To specify a communication protocol between the Storage Manager client and Storage Agent, see "Lanfreecommmethod" on page 200 for more information.

Supported Clients

This option is valid for AIX, AIX 5L, HP-UX, Linux86, and Solaris clients *only*.

Options File

Place this option in the client system options file (dsm.sys) *within* a server stanza.

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.

Encryptkey

Authorized User

The **encryptkey** option specifies whether to save the encryption key password locally when performing a backup-archive operation or whether to prompt for the encryption key password. The encryption key password is saved to the TSM.PWD file in encrypted format.

Note: Your Storage Manager administrator must migrate the password from the password file created by Tivoli Storage Manager version 4.1.2 and earlier versions, to the newly formatted password file TSM.PWD before giving access to non-root users in the case of 64Bit API on HP/UX.

If you set the **encryptkey** option to *save*, you are only prompted the first time you perform an operation. Thereafter, Storage Manager does not prompt for the password.

The Web client saves the encryption key password in the TSM.PWD file. If you do not save the encryption key password, you are prompted for the initial encryption key password when you begin encryption processing.

Table 41 shows how both Authorized Users and non-Authorized Users can encrypt or decrypt data during a backup or restore operation depending on the value you specify for the **passwordaccess** option. The TSM.PWD file must exist to perform the following Authorized User and non-Authorized User operations. The Authorized User creates the TSM.PWD file and sets the **encryptkey** option to *save* and the **passwordaccess** option to *generate*.

Table 41. Encrypting or decrypting data

Operation	Passwordaccess option	Encryptkey option	Result
Authorized user backup	generate	save	data encrypted
	generate	prompt	data encrypted
	prompt	prompt	data encrypted
	prompt	save	data not encrypted
Authorized user restore	prompt	save	prompted for encryptkey password and data decrypted
Non-Authorized User Backup	generate	prompt	data not encrypted
	generate	save	data encrypted
	prompt	prompt	data not encrypted
	prompt	save	data not encrypted
Non-authorized user restore	generate	prompt	menu to skip or proceed
	generate	save	data decrypted
	prompt	prompt	menu to skip or proceed
	prompt	save	menu to skip or proceed

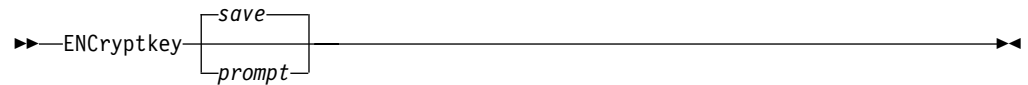
Supported Clients

This option is valid for all UNIX clients.

Options File

Place this option in the client system options file (dsm.sys).

Syntax



Parameters

save

Specifies that you want to save the encryption key password to a local TSM.PWD file. If you set the ***encryptkey*** option to *save*, you are only prompted the first time you perform an operation. Thereafter, Storage Manager does not prompt for the password. This is the default.

prompt

Storage Manager prompts for the password for each backup, archive, and restore operation.

Examples

Options file:

```
encryptkey prompt
```

Errorlogname

Authorized User

The ***errorlogname*** option specifies the fully qualified path and file name of the file where you want to store information about errors that occur during processing. The value for this option overrides the DSM_LOG or DSM_DIR environment variables. The dsmwebcl.log and dsmsched.log files are created in the same directory as the error log file you specify with the ***errorlogname*** option.

Supported Clients

This option is valid for all UNIX clients.

Options File

Place this option in the client system options file (dsm.sys).

Syntax

►►—ERRORLOGName— *filespec*—————►►

Parameters

filespec

The fully qualified path and file name where you want to store error log information. Ensure that all directories and subdirectories in the path exist and are accessible by client processing. Storage Manager will not create directories for you.

The default is the path indicated by the DSM_LOG or DSM_DIR environment variable. If DSM_LOG or DSM_DIR are not specified, the dsmerror.log file will reside in the current working directory.

The dsmerror.log file *cannot* be a symbolic link.

Examples

Options file:

errorlogname /tmp/tsmerror.log

Command line:

Does not apply

Errorlogretention

Authorized User

The ***errorlogretention*** option specifies how many days to maintain error log entries before pruning, and whether to save the pruned entries. The error log is pruned when the first error is written to the log after a Storage Manager session is started. If the only session you run is the client scheduler, and you run it twenty-four hours a day, the error log might not be pruned according to your expectations. Stop the session and start it again to prune the error log when the next error is written.

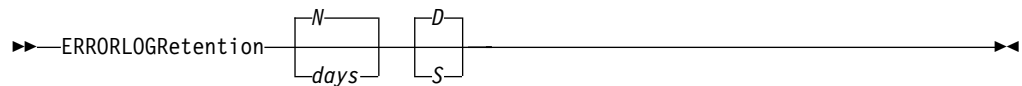
Supported Clients

This option is valid for all UNIX clients.

Options File

Place this option in the client system options file (dsm.sys).

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

Authorized User

The exclude options exclude objects from backup, image, or archive services. For example, you might want to exclude all temporary files, any local caches of network files, all files that contain compiled object code that you can easily reproduce using other methods, or your operating system files.

You can exclude specific files from encryption processing during a backup.

Notes:

1. With the exception of ***exclude.fs***, when you exclude a file that was previously included, existing backup versions become inactive during the next incremental backup.
2. The server can define exclude options with the ***incl excl*** option.

Exclude any system files or images that could corrupt the operating system when recovered. You should also exclude the client directory containing the client files.

Attention: See “Excluding system files” on page 40 for a list of files that you should always exclude.

Use wildcard characters to exclude a broad range of files. See “Including and excluding groups of files” on page 41 for a list of wildcard characters that you can use. Then, if necessary, use the ***include*** option to make exceptions.

To exclude an entire directory called /any/test, enter the following:

```
exclude.dir /any/test
```

To exclude subdirectories that begin with test under the /any directory, enter the following:

```
exclude.dir /any/test*
```

Compression processing

If you want to exclude specific files or groups of files from compression processing during a backup or archive operation, consider the following:

- You must set the ***compression*** option to *yes* to enable compression processing. If you do not specify the ***compression*** option or you set the ***compression*** option to *no*, Storage Manager does not perform compression processing. See “Compression” on page 151 for more information.

If you set the ***compression*** option to *yes* and no ***exclude.compression*** statements exist, Storage Manager considers all files for compression processing.

- Storage Manager processes ***exclude.fs***, ***exclude.dir***, and other include-exclude statements first. 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
```

Storage Manager examines the statements (reading from bottom to top) and determines that the /home/jones/proj1/file.txt file is a candidate for back up, but is not a candidate for compression processing.

- Include-exclude compression processing is valid for backup and archive processing *only*.

Processing NAS file systems

Use the ***exclude.fs.nas*** option to exclude file systems from Network Attached Storage (NAS) image backup processing.

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 Storage Manager. You can prefix the NAS node name to the file specification to specify the file server to which the exclude statement applies. If you do not specify a NAS node name, the file system you specify applies to all NAS file servers.
- Regardless of the client platform, NAS file system specifications use the forward slash (/) separator, as in this example: /vol/vol0.
- You cannot use wildcards with ***exclude.fs.nas*** and ***include.fs.nas*** statements.

For example, to exclude the /vol/vol1 file system of a NAS node called netappsj, specify the following exclude statement:

```
exclude.fs.nas netappsj/vol/vol1
```

To exclude /vol/vol1 from backup services on all NAS nodes, specify the following exclude statement:

```
exclude.fs.nas /vol/vol1
```

Supported Clients

This option is valid for all UNIX clients.

Options File

Place these options in the client system options file (dsm.sys).

Syntax

►► *options pattern* ◄◄

exclude, exclude.backup, exclude.file, exclude.file.backup

These options are equivalent. Use these options to exclude a file or group of files from backup services and space management services (if the HSM client is installed). The ***exclude.backup*** option only excludes files from normal backup, but not from HSM.

exclude.archive

Excludes a file or a group of files that match the pattern from archive services *only*.

exclude.compression

Excludes files from compression processing if the ***compression*** option is set to yes. This option applies to backups and archives.

exclude.dir

Excludes a directory, its files, and all its subdirectories and their files from backup processing. For example, the statement ***exclude.dir /test/dan/data1*** excludes the /test/dan/data1 directory, its files, and all its subdirectories and their files.

exclude.encrypt

Excludes the specified files from encryption processing.

exclude.fs

Excludes file spaces matching the pattern. The client does not consider the specified file space for processing and the usual deleted-file expiration process cannot occur. If you exclude a file space that was previously included, existing backup versions remain on the server subject to retention rules specified in the associated management class definition.

exclude.fs.nas

Excludes file systems on the NAS file server from an image backup when used with the **backup nas** command. If you do not specify a NAS node name, the file system identified applies to all NAS file servers. The **backup nas** command ignores all other exclude statements including **exclude.fs** and **exclude.dir** statements. This option is for AIX, AIX 5L, and Solaris clients *only*.

exclude.image

Excludes mounted file systems and raw logical volumes that match the pattern from image processing. This option is valid for AIX, AIX 5L, HP-UX, Linux86, and Solaris *only*.

Parameters

pattern

Specifies the file or group of files that you want to exclude. End the pattern with a file specification.

Note: For NAS file systems: You must prefix the NAS node name to the file specification to specify the file server to which the exclude statement applies. If you do not specify a NAS node name, the file system identified refers to the NAS nodename specified in the client system options file (dsm.sys) or on the command line.

If the pattern begins with a single or double quote or contains any embedded blanks or equal signs, you must surround the value in either single (') or double (") quotation marks. The opening and closing quotation marks must be the same type of quotation marks.

For the **exclude.image** option, the pattern is the name of a mounted file system or raw logical volume.

Examples

Options file:

```
exclude /unix/
exclude ../../core
exclude /home/jones/proj1/*
exclude.archive ../../core
exclude.backup /home/jones/proj1/devplan/
exclude.dir /home/jones/tmp
exclude.backup /users/home1/file1
exclude.image /usr/*/*
exclude.encrypt /users/home2/file1
exclude.compression /home/gordon/proj1/*
exclude.fs.nas netappsj/vol1/vol0
```

Command line:

Does not apply.

Filelist

Use the **filelist** option to process a list of files. The 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, Storage Manager ignores all other file specifications on the command line.

Use the **filelist** option with the following commands:

- **archive**
- **delete archive**
- **expire**
- **incremental**
- **query archive**
- **query backup**
- **restore**
- **retrieve**
- **selective**

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.
- Storage Manager ignores any entry that is not valid.

The following is an example of a list of files within a filelist:

```
/home/dir/file1
/usr/tivoli/file2
/usr/avi/dir1
/fs1/dir2/file3
"/fs2/Ha Ha Ha/file.txt"
"/fs3/file.txt"
```

If an entry in the filelist indicates a directory, only that directory will process and not the files within the directory.

If the file name (the `filelistspec`) you specify with the **filelist** option does not exist, the command fails. Storage Manager skips any entries in the filelist that are not valid files or directories. Storage Manager logs errors and processing continues to the next entry.

Use file specifications with the **restore** and **retrieve** commands to denote the destination for the restored filelist entries. For example, in the **restore** command:

```
restore -filelist=/home/dir/file3 /usr/record
```

the file specification `/usr/record` represents the restore destination for all entries in the filelist. However, in the **selective** command:

```
selective -filelist=/home/dir/file3 /usr/record
```

the file specification `/usr/record` is ignored.

If you specify a directory in a filelist for the **delete archive** command, the directory is not deleted. Filelists that you use with the **delete archive** command should not include directories.

The entries in the list will be processed in the order they appear in the filelist. For optimal processing performance, pre-sort the filelist by file space name and path.

Note: Storage Manager may back up a directory twice if the following conditions exist:

- The filelist contains an entry for the directory
- The filelist contains one or more entries for files within that directory
- No backup of the directory exists

For example, your filelist includes the entries `/home/dir/file1` and `/home/dir`. If the `/dir` directory does not exist on the server, the `/home/dir` directory is sent to the server a second time.

Supported Clients

This option is valid for all UNIX clients. The 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, you cannot use the **subdir** option.

Examples

Command line:

```
sel -filelist=/home/avi/filelist.txt
```

Filesonly

The ***filesonly*** option restricts backup, restore, retrieve, or query processing to files *only*. You cannot restore or retrieve directories from the 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**
- **retrieve**
- **selective**

Supported Clients

This option is valid for all UNIX clients. The Storage Manager client API does not support this option.

Syntax

►►—FILESOnly—◄◄

Parameters

There are no parameters for this option.

Examples

Command line:

```
dsmc incremental -filesonly
```

Followsymbolic

The ***followsymbolic*** option specifies whether you want to restore files to symbolic links or use a symbolic link as a virtual mount point. Use this option with the **restore** and **retrieve** commands, or in the client user options file (dsm.opt).

The ***followsymbolic*** option does not determine whether Storage Manager follows symbolic links during backup or archive operations. During a backup operation, symbolic links are never followed. During an archive operation, you can use the ***archsymb linkasfile*** option to specify whether Storage Manager follows a symbolic link and archives the file or directory it points to, or archives the symbolic link only. See “Archsymb linkasfile” on page 142 for more information about the ***archsymb linkasfile*** option. See “Understanding how symbolic links are handled” on page 79 for more information about how Storage Manager handles symbolic links.

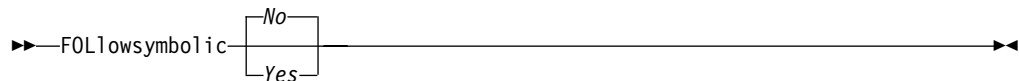
Supported Clients

This option is valid for all UNIX clients.

Options File

Place this option in the client options file (dsm.opt).

Syntax



Parameters

- No** Specifies that you do not want to restore to symbolic links, or to use symbolic links as virtual mount points. This is the default.
- Yes** Specifies that you want to restore to symbolic links, or to use a symbolic link as a virtual mount point.

Examples

Options file:

```
followsymbolic Yes
```

Command line:

```
-fol=Yes
```

Fromdate

Use the ***fromdate*** option with the ***fromtime*** option to specify a date and time from which you want to search for backups or archives during a restore, retrieve, or query operation. Files that were backed up or archived before this date and time are not included, although older directories might be included, if necessary, to restore or retrieve the files.

Use the ***fromdate*** option with the following commands:

- **query archive**
- **query backup**
- **restore**
- **restore image**
- **retrieve**

Supported Clients

This option is valid for all UNIX clients. The 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=12/11/2002 /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, list, restore, or retrieve files or images for the other node.

Use the ***fromnode*** option with the following commands:

- **query archive**
- **query backup**
- **query filespace**
- **query image**
- **query mgmtclass**
- **restore**
- **restore image**
- **retrieve**

Supported Clients

This option is valid for all UNIX clients.

Syntax

►►—FROMNode— *node* —————►◄

Parameters

node

Specifies the node name on a workstation or a file server whose backup copies or archived files you want to access.

Examples

Command line:

```
dsmc query archive -fromnode=bob -subdir=yes "/home/jones/*"
```

Fromowner

The **fromowner** option specifies an alternate owner from which to restore files or images. The owner must give access to another to use the files or images. For example, to restore files from the `/home/devel/proja` directory belonging to *usermike* on system **puma**, and place the restored files in a directory you own named `/home/id/proja`, enter:

```
dsmc restore -fromowner=usermike -fromnode=puma /home/devel/proja/  
/home/id/proja/
```

Non-root users can specify **-fromowner=root** to access files owned by the root user if the root user has granted them access.

Note: If you specify the **fromowner** option without the **fromnode** option, the active user must be on the same node as the **fromowner** user.

Use the **fromowner** option with the following commands:

- **query archive**
- **query backup**
- **query image**
- **restore**
- **restore image**
- **retrieve**

Supported Clients

This option is valid for all UNIX clients.

Syntax

►►—FROMOwner— owner —◀◀

Parameters

owner

Name of an alternate owner.

Examples

Command line:

```
dsmc query archive "/home/id/proja/*" -fromowner=mark
```

Fromtime

Use the ***fromtime*** option with the ***fromdate*** option to specify a beginning time from which you want to search for backups or archives during a restore, retrieve, or query operation. Storage Manager ignores this option if you do not specify the ***fromdate*** option.

Use the ***fromtime*** option with the following commands:

- **query archive**
- **query backup**
- **restore**
- **restore image**
- **retrieve**

Supported Clients

This option is valid for all UNIX clients. The 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 23:59:59. Specify the time in the format you selected with the ***timeformat*** option.

When you include the ***timeformat*** option in a command, it must precede the ***fromtime***, ***pittime***, and ***totime*** options.

Examples

Command line:

```
dsmc q b -timeformat=4 -fromt=11:59AM -fromd=06/30/99 -tot=11:59PM  
-tod=06/30/99 /home/*
```

Groups

Authorized User

The **groups** option specifies groups on your workstation that you want to authorize to request 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 Storage Manager services. If you use both the **groups** option and the **users** option, only users specified with these options can request Storage Manager services. A root user is always authorized to request services.

Supported Clients

This option is valid for all UNIX clients. The Storage Manager client API does not support this option.

Options File

Place this option in the client system options file (dsm.sys).

Syntax



Parameters

groupname

Specifies the name of a group you want to authorize to request Storage Manager services.

Examples

Options file:

```
groups dsmcdev group1 test1 test2 design1
groups endicott almaden qadev qadev1 tools23
```

Command line:

Does not apply.

Guitreeviewafterbackup

The ***guitreeviewafterbackup*** option specifies whether the client returns to the Backup, Restore, Archive, or Retrieve window after a successful operation completes.

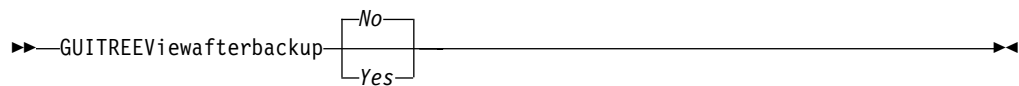
Supported Clients

This option is valid for all UNIX clients.

Options File

Place this option in the client user options file (dsm.opt) *or* the client system options file (dsm.sys).

Syntax



Parameters

- No* Returns you to the Storage Manager main window after a successful operation completes. This is the default.
- Yes* Returns you to the Backup, Restore, Archive, or Retrieve window after a successful operation completes.

Examples

Options file:

guitreeviewafterbackup yes

Command line:

Does not apply.

Httpport

Authorized User

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

Storage Manager firewall support

The **webports** option enables the use of the Web client outside a firewall by specifying the TCP/IP port number used by the Storage Manager Client Acceptor daemon and Web Client Agent service for communications with the Web GUI.

The ports you specify with the **webports** option and the client option **httpport** must be opened in the firewall.

To enable the backup-archive client, Command Line Admin client, and the Scheduler (running in polling mode) to run outside a firewall, the port specified by the server option **tcpport** (default 1500) must be opened in the firewall.

See “Tcpport” on page 265 and “Webports” on page 282 for more information. See “Storage Manager firewall support” on page 55 for further considerations regarding Storage Manager firewall support.

Note: Storage Manager does not support the scheduler running in *prompted* mode outside a firewall.

Supported Clients

This option is valid for all UNIX clients. The Storage Manager client API does not support this option.

Options File

Place this option in the client system options file (dsm.sys).

Syntax

►►—HTTPport— *port_address* —————►◄

Parameters

port_address

Specifies the TCP/IP port address that is used to communicate with the Web client. The range of values is 1000 through 32767; the default is 1581.

Examples

Options file:

httpport 1502

Command line:

Does not apply.

Ifnewer

The ***ifnewer*** option replaces an existing file with the latest backup version only if the backup version is newer than the existing file. Only active backups are considered unless you also use the ***inactive*** or ***latest*** options.

Use the ***ifnewer*** option with the **restore**, **restore backupset**, and **retrieve** commands.

Note: This option is ignored if the ***replace*** option is set to *No*.

Supported Clients

This option is valid for all UNIX clients. The Storage Manager client API does not support this option.

Syntax

►►—IFNewer—◄◄

Parameters

There are no parameters for this option.

Examples

Command line:

```
dsmc restore "/home/grover/*" -sub=y -rep=y -ifnewer
```

Imagetype

Authorized User

Use the ***imagetype*** option with the **backup image** command or the ***include.image*** option to specify the type of image backup you want to perform.

Place the ***include.image*** statement containing the ***imagetype*** value in your client system options file `dsm.sys`.

Supported Clients

This option is valid for AIX, AIX5L, Solaris, HP-UX, and Linux86 clients *only*. The Storage Manager client API does not support this option.

Options File

Place this option in the client system options file (`dsm.sys`).

Syntax

►►—`IMAGetype= value`—————►►

Parameters

value

Specifies one of the following values:

snapshot

Specifies that you want to perform an snapshot image backup during which the volume is available to other system applications. This is the default for file systems residing on a logical volume created by the Linux Logical Volume Manager. Valid for Linux86 *only*.

dynamic

Replaces the dependency on the copy serialization value in the management class to perform an image backup without unmounting and remounting the file system read-only. Use this option only if the volume cannot be unmounted and remounted read-only. Storage Manager backs up the volume *as is* without remounting it read-only. Corruption of the backup may occur if applications write to the volume while the backup is in progress. In this case, run **fsck** after a restore.

static

Replaces the dependency on the copy serialization value in the management class. Specifies that you want to perform an image backup during which the volume is unmounted and remounted read-only. This is the default for AIX, AIX5L, HP-UX, and Solaris. This option is valid for AIX, AIX5L, Solaris, HP-UX, and Linux86 *only*.

Examples

Options file:

```
include.image /home MYMC imagetype=static
```

Command line:

```
-imagetype=static
```

Inactive

Use the ***inactive*** option with the following commands and the ***pick*** option to display both active and inactive objects:

```
restore
restore nas
query backup
restore image
query image
query nas
```

You can also use the ***pick*** option to display backup versions, archive copies, and images that match the file specification you enter.

Only active backups are considered unless you also use either the ***inactive*** or the ***latest*** option.

Supported Clients

This option is valid for all UNIX clients. The Storage Manager client API does not support this option.

Syntax

►►—INActive—◄◄

Parameters

There are no parameters for this option.

Examples

Command line:

```
dsmc restore "/home/zoe/*" -inactive -pick
```

Incl excl

Authorized User

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

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.

For more information about creating an include-exclude options file, see “Creating an include-exclude list (optional)” on page 37.

Supported Clients

This option is valid for all UNIX clients.

Options File

Place this option in the client system options file (*dsm.sys*) *within* a server stanza.

Syntax

►►—**INCL EXCL**— *filespec* —————►◄

Parameters

filespec

Specifies the path and file name of *one* include-exclude options file.

Examples

Options file:

```
incl excl /usr/dsm/backup.excl
incl excl /etc/incl excl.def
```

Command line:

Does not apply.

Include options

Authorized User

The include options specify one of the following:

- Objects within a broad group of excluded objects that you want to include for backup, archive, image, and space management services, if you have the HSM client installed.
- Files within a broad group of excluded files that you want to include for encryption processing.
- Files within a broad group of excluded files that you want to include for compression processing.
- Objects to which you want to assign a specific management class and a management class name.
- A management class to assign to all objects to which you do not explicitly assign a management class.

If you do not assign a specific management class to objects, Storage Manager uses the default management class in the active policy set of your policy domain.

Notes:

1. The ***exclude.fs*** and ***exclude.dir*** statements override all include statements that match the pattern.
2. The server can also define these options with the ***inclexcl*** option.

Compression processing

If you want to include specific files or groups of files for compression processing during a backup or archive operation, consider the following:

- You must set the ***compression*** option to **yes** to enable compression processing. If you do not specify the ***compression*** option or you set the ***compression*** option to **no**, Storage Manager does not perform compression processing. See “Compression” on page 151 for more information.
- Storage Manager processes ***exclude.fs***, ***exclude.dir***, and other include-exclude statements first. Storage Manager then considers any ***include.compression*** statements. For example, consider the following include-exclude list:

```
include.compression /home/jones/proj1/file.txt
exclude /home/jones/proj1/file.txt
```

Storage Manager examines the `exclude /home/jones/proj1/file.txt` statement first and determines that `/home/jones/proj1/file.txt` is excluded from processing and is not a candidate for compression processing.

- Include-exclude compression processing is valid for backup and archive processing *only*.

Processing NAS file systems

Use the ***include.fs.nas*** option to bind a management class to Network Attached Storage (NAS) file systems for backup processing.

A NAS file system specification uses the following conventions:

- NAS nodes represent a new node type. The NAS node name uniquely identifies NAS file server and its data to 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.

dynamic

Replaces the dependency on the copy serialization value in the management class to perform an image backup without unmounting and remounting the file system read-only. Use this option only if the volume cannot be unmounted and re-mounted read-only. Storage Manager backs up the volume *as is* without remounting it read-only. The backup may be corrupted if applications write to the volume while the backup is in progress. This may be corrected by running **fsck** after a restore. Valid for AIX, AIX5L, Solaris, HP-UX, and Linux86 *only*.

static

Replaces the dependency on the copy serialization value in the management class. Specifies that you want to perform an image backup during which the volume is unmounted and remounted read only. This is the default for AIX, AIX5L, HP-UX, and Solaris. This option is valid for AIX, AIX5L, Solaris, HP-UX, and Linux86 *only*.

snapshotcachesize

Specifies an appropriate snapshot size so that all old data blocks can be stored during a snapshot image backup. A snapshot size of 100 percent will ensure a valid snapshot. See “Snapshotcachesize” on page 257 for more information. Valid for Linux86 *only*.

Parameters

pattern

Specifies the objects to include for backup or archive processing or to assign a specific management class. End the pattern with a file specification.

Note: For NAS file systems: You must prefix the NAS node name to the file specification to specify the file server to which the include statement applies. If you do not specify a NAS node name, the file system identified refers to the NAS node name specified in the client system options file (dsm.sys) or on the command line.

If the pattern begins with a single or double quote or contains any embedded blanks or equal signs, you must surround the value in either single (') or double (") quotation marks. The opening and closing quotation marks must be the same type of quotation marks.

For the ***include.image*** option, the pattern is the name of a mounted file system or raw logical volume.

mgmtclassname

Specifies the name of the management class to assign to the objects. If a management class is not specified, the default management class is used.

Examples

Options file:

```
include /home/proj/text/devel.*
include /home/proj/text/* textfiles
include * managall
include.image /home/*/*
include.archive /home/proj/text/* myarchiveclass
include.backup /home/proj/text/* mybackupclass
include.compression /home/proj/text/devel.*
include.encrypt /home/proj/gordon/*
include.fs.nas netappsj/vol/vol0 homemgmtclass
```



```
include.image /home MGMTCLASSNAME type=snapshot snapshotcachesize=40  
include.image /home imagetype=static  
include.image /home imagetype=snapshot  
include.image /home MGMTCLASSNAME imagetype=static
```

Command line:

Does not apply.

Incrbydate

Use the ***incrbydate*** option with the **incremental** command to back up new and changed files with a modification date later than the last incremental backup stored at the server, unless you exclude the file from backup. Files added at the client after the last incremental backup, but with a modification date earlier than the last incremental, are not backed up.

An incremental-by-date updates the date and time of the last incremental at the server. If you perform an incremental-by-date on only part of a file system, the date of the last full incremental is not updated and the next incremental-by-date will back up these files again.

Both full incrementals and incrementals-by-date back up new and changed files. An incremental-by-date takes less time to process than a full incremental and requires less memory. However, unlike a full incremental, an incremental-by-date does not maintain current server storage of *all* your workstation files because:

- It does not expire backup versions of files that are deleted from the workstation.
- It does not rebind backup versions to a new management class if the management class has changed.
- It does not back up files with attributes that have changed unless the modification dates and times have also changed, such as Access control list (ACL) data.
- It ignores the copy group frequency attribute of management classes.

Note: If you have limited time during the week to perform backups, but extra time on weekends, you can maintain current server storage of your workstation files by performing an incremental backup with the ***incrbydate*** option on weekdays and a full incremental backup on weekends.

Supported Clients

This option is valid for all UNIX clients. The Storage Manager client API does not support this option.

Syntax

►►—INCRbydate—◄◄

Parameters

There are no parameters for this option.

Examples

Command line:

```
dsmc incremental -incrbydate
```

Incremental

Use the ***incremental*** option with the **restore image** command to ensure that any changes that were made to the base image are also applied to the restored image.

If you also use the ***deletefiles*** option, changes include the deletion of files and directories that were in the original image but later deleted from the workstation.

Supported Clients

This option is valid for AIX, AIX 5L, HP/UX, Linux86, and Solaris *only*. The Storage Manager client API does not support this option.

Syntax

►►—INCREmental—————◄◄

Examples

Command line:

```
res i "/home/devel/projecta/*" -incremental
```

Lanfreecommmethod

Authorized User

The **lanfreecommmethod** option specifies the communications protocol between the Storage Manager client and Storage Agent. This enables processing between the client and the SAN-attached storage device.

Use the **lanfreeshmport** to specify the Shared Memory port number where the Storage Agent is listening. See “Lanfreeshmport” on page 202 for more information

Attention: The **lanfreecommmethod** option is not valid if HSM is installed. See *IBM Tivoli Space Manager for Unix Using the Hierarchical Storage Management Clients*, GC32-0794 for more information.

Supported Clients

This option is valid for AIX, AIX 5L, HP-UX, Linux86, and Solaris clients *only*.

Options File

Place this option in the client system options file (dsm.sys) *within* a server stanza.

Syntax

►►—LANFREECOMMmethod— *commmethod* —◄◄

Parameters

commmethod

Specifies the supported protocol for your Storage Manager client:

TCPip

The Transmission Control Protocol/Internet Protocol (TCP/IP) communication method.

Use the **lanfreetcppport** option to specify the TCP/IP port number where the Storage Agent is listening. See “Lanfreetcppport” on page 203 for more information. For AIX, AIX 5L and HP-UX *root* users, the Shared Memory communication method is the default and TCP/IP is optional. AIX, AIX 5L and HP-UX *non-root* users can only use the TCP/IP communication method. Solaris *root* and *non-root* users can only use the TCP/IP communication method.

SHAREdmem

Use the Shared Memory communication method when the client and server are running on the same system. Shared Memory provides better performance than the TCP/IP protocol. This is the default communication method for AIX, AIX 5L, and HP-UX *root* users. When specifying this communications method on AIX, the backup-archive client user must be logged in as root or have the same user ID as the process running the Storage Agent. AIX, AIX 5L, and HP-UX *non-root* users must use the default TCP/IP communication method and cannot use the Shared Memory communication method. See “Commmethod” on page 147 for logon restrictions when using this communication method.

Examples

Options file:

lanfreec tcp

Command line:

-lanfreec=tcp

This option is valid only on the initial command line. It is not valid in interactive mode.

Lanfreeshmport

Authorized User

The **lanfreeshmport** option specifies the Shared Memory port number where the Storage Manager Storage Agent is listening. This option is valid for AIX, AIX 5L, HP-UX, and Solaris clients *only*.

Attention: The **lanfreeshmport** option is not valid if HSM is installed. See *IBM Tivoli Space Manager for Unix Using the Hierarchical Storage Management Clients*, GC32-0794 for more information.

Use this option when **lanfreecommmethod=SHAREDmem** is specified for communication between the Storage Manager client and Storage Agent. This enables processing between the client and the SAN-attached storage device. See “Lanfreecommmethod” on page 200 for more information about the **lanfreecommmethod** option.

Supported Clients

This option is valid for AIX, AIX 5L, 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 Shared Memory port number where the Storage Agent is listening. The range of values is 1000 through 32767; the default is 1510.

Examples

Options file:

```
lanfrees 1520
```

Command line:

```
-lanfrees=1520
```

This option is valid only on the initial command line. It is not valid in interactive mode.

Lanfreetcpport

Authorized User

The **lanfreetcpport** option specifies the TCP/IP port number where the Storage Manager Storage Agent is listening.

Attention: The **lanfreetcpport** option is not valid if HSM is installed. See *IBM Tivoli Space Manager for Unix Using the Hierarchical Storage Management Clients*, GC32-0794 for more information.

Use this option when you specify **lanfreecommmethod=TCPIP** for communication between the Storage Manager client and Storage Agent. See “Lanfreecommmethod” on page 200 for more information about the **lanfreecommmethod** option.

Supported Clients

This option is valid for AIX, AIX 5L, HP-UX, Linux86, and Solaris clients *only*.

Options File

Place this option in the client system options file (dsm.sys) *within* a server stanza.

Syntax

►►—LANFREETCPport— *port_address* —————►►

Parameters

port_address

Specifies the TCP/IP port number where the Storage Agent is listening. The range of values is 1000 through 32767; the default is 1500.

Examples

Options file:

```
lanfreetc 1520
```

Command line:

```
-lanfreetc=1520
```

This option is valid only on the initial command line. It is not valid in interactive mode.

Largecommbuffers

Authorized User

The **largecommbuffers** option specifies whether the client uses increased buffers to transfer large amounts of data between the client and the server. You can disable this option when your workstation is running low on memory.

Supported Clients

This option is valid for all UNIX clients.

Options File

Place this option in the client system options file (dsm.sys).

Syntax



Parameters

- No** Specifies that increased buffers *are not* used to transfer large amounts of data to the server. This is the default. For AIX and AIX 5L, the default is **Yes**.
- Yes** Specifies that increased buffers *are* used to transfer large amounts of data to the server. On AIX the buffer is increased to 256KB which matches the server buffer, allowing increased performance. This is the default for AIX and AIX 5L *only*.

Examples

Options file:

```
largecommbuffers yes
```

Command line:

```
-largecommbuffers=yes
```

This option is valid only on the initial command line. It is not valid in interactive mode.

Latest

Use the ***latest*** option with the **restore** command to restore the most recent backup version of a file, even if the backup is inactive. Only active versions are considered for a restore unless you use either the ***inactive*** or the ***latest*** option.

Supported Clients

This option is valid for all UNIX clients. The Storage Manager client API does not support this option.

Syntax

►►—LATEST—◄◄

Parameters

There are no parameters for this option.

Examples

Command line:

```
dsmc restore "/home/devel/projecta/*" -latest
```

Localbackupset

The **localbackupset** option specifies whether the Storage Manager GUI bypasses initial logon with the Storage Manager server to restore a local backup set on a standalone workstation. You can use this option on the command line or place it your client options file (dsm.opt).

If you set the **localbackupset** option to *yes*, the GUI does not attempt initial logon with the server. In this case, the GUI only enables the restore functionality.

If you set the **localbackupset** option to *no* (the default), the GUI attempts initial logon with the server and enables all GUI functions.

To start the GUI and bypass the initial logon with the server to restore a local backup set on a standalone workstation, enter:

```
dsm -localbackupset=yes
```

Note: The **restore backupset** command supports restore of local backup sets on a standalone workstation *without* using the **localbackupset** option. See “Restore Backupset” on page 333 for more information.

Supported Clients

This option is valid for all UNIX clients.

Options File

Place this option in the client user options file (dsm.opt) or the client system options file (dsm.sys).

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
```

Command line:

```
dsm -localbackupset=yes
```

Note: The **localbackupset** option is not valid with the **dsmsc** command line client.

Location

The **location** option specifies where Storage Manager searches for the backup set for a query or restore operation. You can use this option to locate backup sets on the server or local files. Tapes that are generated on the server can be used locally by specifying the **location** option and either the file name or the tape device.

Use the **location** option with the **query backupset** and **restore backupset** commands.

Supported Clients

This option is valid for all UNIX clients. The Storage Manager client API does not support this option.

Syntax



Parameters

server

Specifies that Storage Manager searches for the backup set on the server. This is the default.

file Specifies that Storage Manager searches for the backup set on a local file .

tape

Specifies that Storage Manager searches for the backup set on a local tape device. It is no longer necessary to specify a specific tape device type name. Specifying **location=tape** covers all tape device types. This parameter is valid for Solaris, AIX, AIX 5L, and HP-UX clients.

Note: For Solaris, AIX, AIX 5L, HP-UX, and Solaris: If you want to restore a backup set from a 3570 or 3590 tape device, but you do not have the 3570 or 3590 generic device driver on your client workstation, you can download these device drivers from the following Web site:

<ftp://ftp.software.ibm.com/storage/devdrv/>

For Solaris: Use tapes that are fully compliant with Sun standards.

Examples

Command line:

```
restore backupset "/dev/rmt0" -loc=tape
restore backupset mybackupsetname -loc=server
restore backupset /home/budget/backupsetfile.name
-loc=file
```

Makesparsefile

Use the ***makesparsefile*** option with the **restore** or **retrieve** commands to specify how sparse files are recreated. Sparse files do not have disk space allocated for every block in the whole address space, leading to holes within the file. The Storage Manager client detects sparse files during a backup operation and marks them as sparse on the 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.

Note: On some UNIX systems, it may be necessary to back up system specific files as non-sparse files. Use the ***makesparsefile*** option for files where the existence of physical disk blocks is required, such as ufsboot on Solaris, which is executed during boot time. The boot file loader of the operating system accesses physical disk blocks directly and does not support sparse files.

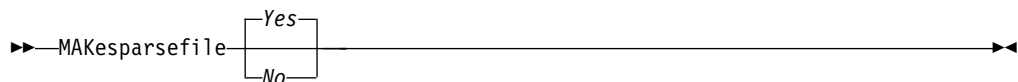
Supported Clients

This option is valid for all UNIX clients.

Options File

Place this option in the client user options file (dsm.opt).

Syntax



Parameters

- Yes** Specifies that holes within the file are not written so that no additional disk space is allocated during a restore. This is the default.
- No** Specifies that holes are not recreated leading to disk blocks allocated for the whole address space.

Examples

Options file:

```
makesparsefile no
```

Command line:

```
-makesparsefile=no
```

Mailprog

Authorized User

The **mailprog** option specifies the program and user ID to which you want to send a newly-generated password when the old password expires. Use this option only when you select *generate* with the **passwordaccess** option.

Supported Clients

This option is for all UNIX clients.

Options File

Place this option in the client system options file (dsm.sys).

Syntax

►►MAILprog *filespec userid*◄◄

Parameters

filespec

Specifies the path and file name of the program to which you want to send a newly-generated password. The program you specify must accept standard output.

userid

Specifies the user ID of the user to whom you want to send a newly-generated password. For OS/390 UNIX System Services, enter the user ID in uppercase letters.

Examples

Options file:

```
mailprog /usr/bin/xsend root (for AIX, AIX 5L)
mailprog /bin/mailx USER1 (for OS/390 UNIX System Services)
```

Note: Run the **enroll** command before you use *xsend*.

Command line:

Does not apply.

Managedservices

Authorized User (UNIX requires access authority.)

The ***managedservices*** option specifies whether the Storage Manager Client Acceptor daemon (CAD) manages the scheduler, the Web client, or both.

See “Configuring the CAD to manage the scheduler” on page 107 for instructions to set up the CAD to manage the scheduler.

The CAD serves as an external timer for the scheduler. When the scheduler is started, it queries the server for the next scheduled event. The event is either executed immediately or the scheduler exits. The CAD restarts the scheduler when it is time to execute the scheduled event.

Notes:

1. If you set the ***schedmode*** option to *prompt*, the server prompts the CAD when it is time to run the schedule. The scheduler will connect and disconnect to the server when the CAD is first started.
2. Set the ***passwordaccess*** option to *generate* in your client system options, so that Storage Manager generates your password automatically. See “Passwordaccess” on page 225 for more information.

Using the ***managedservices*** option can provide the following benefits:

- Memory retention problems that may occur when using traditional methods of running the scheduler are resolved. Using the CAD to manage the scheduler requires very little memory between scheduled operations.
- The CAD can manage both the scheduler program and the Web client, reducing the number of background processes on your workstation.
- By default, if you do not specify the ***managedservices*** option, the CAD manages the Web client to provide backward compatibility.

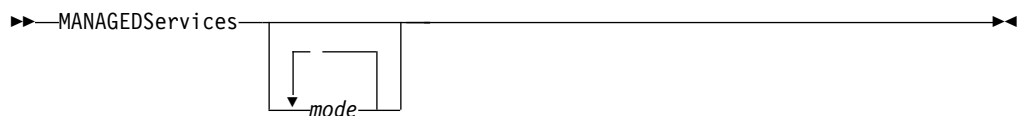
Supported Clients

This option is valid for all UNIX clients. The Storage Manager client API does not support this option.

Options File

Place this option in the client system options file (dsm.sys).

Syntax



Parameters

mode

Specifies whether the CAD manages the scheduler, the Web client, or both.

webclient

Specifies that the CAD manages the Web client. This is the default.

schedule

Specifies that the CAD manages the scheduler.

Examples

Options file:

The following are examples of how you might specify the *managedservices* option in your client system options file (dsm.sys).

Task Specify that the CAD manages the Web client *only*.

`managedservices webclient`

Task Specify that the CAD manages the scheduler *only*.

`managedservices schedule`

Task Specify that the CAD manages both the Web client and the scheduler.

`managedservices schedule webclient`

Note: The order in which these values are specified is not important.

Command line:

Does not apply.

Maxcmdretries

Authorized User

The ***maxcmdretries*** option specifies the maximum number of times the client scheduler (on your workstation) attempts to process a scheduled command that fails. The command retry starts *only if* the client scheduler has not yet backed up a file, never connected to the server, or failed before backing up a file. Use this option *only when* the scheduler is running.

Your administrator can also set this option. If your administrator specifies a value for this option, that value overrides what you specify in the client options file *after* your client node successfully contacts the server.

Supported Clients

This option is valid for all UNIX clients. The Storage Manager client API does not support this option.

Options File

Place this option in the client system options file (dsm.sys).

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=3
```

This option is valid only on the initial command line. It is not valid in interactive mode.

Memoryefficientbackup

The ***memoryefficientbackup*** option specifies a memory-conserving algorithm for processing incremental backups, that backs up one directory at a time, using less memory. Use this option with the **incremental** command when your workstation is memory constrained.

Supported Clients

This option is valid for all UNIX clients. The server can also define this option.

Options File

Place this option in the client user options file (dsm.opt).

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.

Examples

Options file:

```
memoryefficientbackup yes
```

Command line:

```
-memoryef=no
```

Mode

The **mode** option specifies whether you want to perform a selective or incremental image backup (non-NAS objects), or a full or differential image backup of NAS file systems. The **mode** option has no effect on a raw logical device backup.

Use the **mode** option with the **backup image** or **backup nas** commands.

Supported Clients

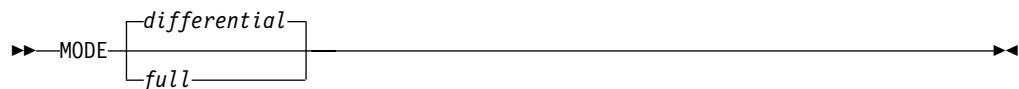
This option is valid for AIX, AIX 5L, HP/UX, Linux86, and Solaris *only*. The Storage Manager client API does not support this option.

Syntax

For non-NAS objects



For NAS File Systems



Parameters

selective

Specifies that you want to perform a full (selective) image backup. This is the default.

incremental

Specifies that you want to back up only new and changed files after the last full image backup. Deleted files are not inactivated on the server.

full

Specifies that you want to perform a NAS image backup of an entire file system.

differential

Specifies that you want to perform a NAS image backup of files that changed since the last full image backup. If an eligible full image backup does not exist, a full image backup occurs. This is the default.

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`

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**, Storage Manager monitors the current NAS image backup or restore operation and displays processing information on your screen. This is the default.

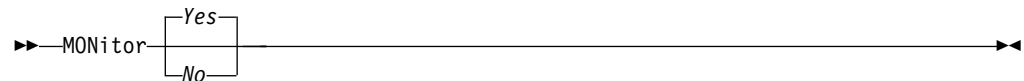
If you specify **monitor=no**, Storage Manager does not monitor the current NAS image backup or restore operation and is available to process the next command.

Use this option with the **backup nas** or **restore nas** commands.

Supported Clients

This option is valid for the AIX, AIX 5L, and Solaris clients *only* clients.

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 Storage Manager server. The server must register the NAS file server.

You can specify this option on the command line or in the client system options file (dsm.sys).

You can override the default value in the dsm.sys file by entering a different value on the command line. If you do not specify the ***nasnodename*** option in the dsm.sys file, you *must* specify this option on the command line when processing NAS file systems.

You can use the ***nasnodename*** option with the following commands:

```
backup nas
delete filespace
query backup
query filespace
restore nas
```

Supported Clients

This option is valid for the AIX, AIX 5L, and Solaris clients *only*. The Storage Manager client API does not support this option.

Options File

Place this option in the client system options file (dsm.sys).

Syntax

►►—NASNodename— *nodename* —————►◄

Parameters

nodename
Specifies the node name for the NAS file server.

Examples

Options file:
nasnodename nas2

Command line:
-nasnodename=nas2

Nfstimeout

The *nfsttimeout* option specifies the number of seconds the server waits for a status system call on an NFS file system before it times out.

You can use this option to mitigate the default behavior of status calls on NFS 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.

Supported Clients

This option is for all UNIX clients. The server can also define this option.

Options File

Place this option in the client system options file (dsm.sys) within a server stanza or the client options file (dsm.opt).

Syntax

►►—NFSTIMEout *number*—————◄◄

Parameters

number

Specifies the number of seconds the server waits for a status system call on an NFS file system before timing out. The range of values is 0 through 120; the default is 0 seconds.

Examples

Options file:

```
nfsttimeout 10
```

Command line:

```
-nfsttimeout=10
```

This option is valid only on the initial command line. It is not valid in interactive mode.

Nodename

Authorized User

Use the ***nodename*** option in your client system options file `dsm.sys` to identify your workstation to the server. You can use different node names to identify multiple operating systems on your workstation.

When you use the ***nodename*** option, Storage Manager prompts for the password assigned to the node you specify, if a password is required.

If you want to restore or retrieve files from the server while you are working from a different workstation, use the ***virtualnodename*** option. See “Virtualnodename” on page 279 for more information.

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 client system options file (`dsm.sys`), or a ***virtualnodename*** entry in the client user options file (`dsm.opt`), or a virtual node name specified on a command line, the default login ID is the name that the ***hostname*** command returns.
- If a ***nodename*** entry exists in the client system options file (`dsm.sys`), the ***nodename*** entry overrides the name that the ***hostname*** command returns.
- If a ***virtualnodename*** entry exists in the client user options file (`dsm.opt`), or a virtual node name is specified on a command line, it cannot be the same name as the name returned by the ***hostname*** command. When the server accepts the virtual node name, a password is required (if authentication is on), even if the ***passwordaccess*** option is *generate*. When a connection to the server is established, access is permitted to any file that is backed up using this login ID.

Supported Clients

This option is valid for all UNIX clients.

Options File

Place this option in the client system options file (`dsm.sys`) *within* a server stanza.

Syntax

►►—NODename— *nodename* —————►►

Parameters

nodename

Specifies a 1 to 64 character node name for which you want to request Storage Manager services. The default is the name of the workstation. If you set the ***clusternode*** option to *yes*, the default is the cluster name.

Examples

Options file:

`nodename cougar`

Command line:

Does not apply.

Noprompt

The ***noprompt*** option suppresses the confirmation prompt that normally appears before you delete an archived file, or when performing an image restore operation. Using this option can speed up the delete procedure. However, it also increases the danger of accidentally deleting an archived file that you want to save. ***Use this option with caution.***

Supported Clients

This option is valid for all UNIX clients. The Storage Manager client API does not support this option.

Syntax

►►—NOPrompt—◄◄

Parameters

There are no parameters for this option.

Examples

Command line:

```
dsmc delete archive -noprompt "/home/project/*"
```

Numberformat

The ***numberformat*** option specifies the format you want to use to display numbers.

The AIX, AIX 5L, Solaris, and HP-UX clients support locales other than English that describe every user interface that varies with location or language. Solaris and HP-UX clients only support English, Simplified Chinese, and Japanese locale information. The default directories for system-supplied locales are as follows:

- /usr/lib/nls/loc for AIX and AIX 5L
- /usr/lib/locale for Solaris
- /usr/lib/nls/loc/locales for HP-UX

The backup-archive and administrative clients obtain format information from the locale definition in effect at the time the client is called. Consult the documentation on your local system for details about setting up your locale definition.

Note: This ***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 American English.

Supported Clients

This option is valid for all UNIX clients.

Options File

Place this option in the client user options file (dsm.opt).

Syntax

►►—NUMBERformat— *number* —————►►

Parameters

number

Displays numbers using any one of the following formats. Specify the number (1–6) that corresponds to the number format you want to use.

1 1,000.00

This is the default for the following supported languages:

- American English
- Japanese
- Chinese (Traditional)
- Chinese (Simplified)
- Korean

2 1,000,00

3 1 000,00

This is the default for the French locale.

4 1 000.00

5 1.000,00

This is the default for the following supported languages:

- Brazilian Portuguese
- German
- Italian

- Spanish
- 6 1'000,00

For AIX, AIX 5L, HP-UX, SGI, Solaris, and Tru64 UNIX: 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.

Optfile

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

Supported Clients

This option is valid for all UNIX clients.

Syntax

►►—OPTFILE— *file_name* —————►◄

Parameters

file_name

Specifies an alternate client options file, if you use the fully qualified path name. If you specify only the file name, Storage Manager assumes you want the current directory. The default is dsm.opt.

Examples

Command line:

```
dsmc query session -optfile=myopts.opt
```

This option is valid only on the initial command line. It is not valid in interactive mode.

Password

The **password** option specifies a 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 Storage Manager session.

Notes:

1. If the server prompts for a password, the password does not display as you enter it. *On Solaris, if you use the password option on the command line, your password will display as you enter it. On all other UNIX clients, your password does not display as you enter it on the command line.*
2. If the Storage Manager server name changes or Storage Manager clients are directed to a different Storage Manager server, all clients must re-authenticate with the server because the stored encrypted password must be regenerated.

The **password** option is ignored when the **passwordaccess** option is set to *generate*.

Supported Clients

This option is valid for all UNIX clients.

Options File

Place this option in the client user options file (dsm.opt).

Syntax

►►—PASSword— password —————►►

Parameters

password

Specifies a 1 to 63 character password. A password is not case-sensitive. Valid characters include:

Characters

	Description
A-Z	Any letter, A through Z, uppercase or lowercase
0-9	Any number, 0 through 9
+	Plus
.	Period
_	Underscore
-	Hyphen
&	Ampersand

Examples

Options file:

```
password secretword
```

Command line:

```
-password=secretword
```

This option is valid only on the initial command line. It is not valid in interactive mode.

Passwordaccess

Authorized User

The ***passwordaccess*** option specifies whether you want to generate your password automatically or set as a user prompt. Your administrator can require a password for your client node by enabling the authentication feature. Ask your administrator if a password is required for your client node.

If a password is required, you can choose to:

- Set the password for your client node yourself and have Storage Manager prompt for it each time you request services.
- Let Storage Manager automatically generate a new password for your client node each time it expires, encrypt and store the password in a file, and retrieve the password from that file when you request services. You are not prompted for the password.

Use the ***passworddir*** option in your client system options file (dsm.sys) to specify the directory location in which to store the encrypted password file. The default directory location depends on how the client was installed.

When the ***passwordaccess*** option is set to *generate* and you specify the ***password*** option, the ***password*** option is ignored.

Set the ***passwordaccess*** option to *generate* in the following situations:

- When using the HSM client.
- When using the Web client.
- When performing NAS operations.

Supported Clients

This option is valid for all UNIX clients.

Options File

Place this option in the client system options file (dsm.sys) *within* a server stanza.

Syntax



Parameters

prompt

You are prompted for your workstation password each time a client connects to the server. This is the default.

To keep your client node password secure, enter commands without the password and wait for Storage Manager to prompt you for the password.

Each user must know the Storage Manager password for your client node. Any user who knows the password for your client node can gain access to *all* backups and archives that originate from your client node. For example:

- If the user enters the node name and password for your client node from a different client node, the user becomes a virtual root user.
- If you change the name of your client node (using the **nodename** option in the dsm.sys file, and you specify the same node name in the dsm.opt file, a user who enters the correct password becomes a virtual root user. The same is true if a user specifies the same node name using the **nodename** option with a command and enters the correct password.

API applications must supply the password when a session is initiated. The application is responsible for obtaining the password.

generate

Encrypts and stores your password locally and generates a new password when the old password expires.

A password prompt displays when registering a workstation with a server using open registration or if your administrator changes your password manually.

You can use the **mailprog** option to specify the program and user ID where you want to send the new password each time the old password expires.

When logging in locally, users do not need to know the Storage Manager password for the client node. However, by using the **nodename** option at a remote node, users can access files they own and files to which another user grants access. If you change the name of your client node (using the **nodename** option in the dsm.sys file, and you specify the same node name in the dsm.opt file) Storage Manager prompts the users for the client node password. If a user enters the correct password, the user becomes a virtual root user. The same is true if a user specifies the same node name using the **nodename** option with a command.

Examples

Options file:

```
passwordaccess generate
```

Command line:

```
Does not apply
```

Passworddir

Authorized User

The ***passworddir*** option specifies the directory location in which to store an encrypted password file. The directory location depends upon where the client was installed.

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, Storage Manager attempts to create it.

The default directory for AIX and AIX 5L is /etc/security/adsm and for other UNIX platforms it is /etc/adsm.

Examples

Options file:

```
passworddir /etc/security/tsm
```

Command line:

Does not apply.

Pick

The ***pick*** option creates a list of backup versions, images, or archive copies that match the file specification you enter. From the list, you can select the versions to process. Include the ***inactive*** option to view both active and inactive objects.

For images, if you do not specify a source file space and destination file space, the pick list contains all backed up images. In this case, the images selected from the pick list are restored to their original location. If you specify the source file space and the destination file space, you may select only one entry from the pick list.

Use the ***pick*** option with the following commands:

- **delete archive**
- **expire**
- **restore**
- **restore image**
- **restore nas**
- **retrieve**

Supported Clients

This option is valid for all UNIX clients. The Storage Manager client API does not support this option.

Syntax

►►—Pick—◄◄

Parameters

There are no parameters for this option.

Examples

Command line:

```
dsmc restore "/home/project/*" -pick -inactive
```

Pitdate

Use the ***pitdate*** option with the ***pittime*** option to establish a point in time for which you want to display or restore the latest version of your backups. Files or images that were backed up *on or before* the date and time you specified, and which were not deleted *before* the date and time you specified, are processed. Backup versions that you create after this date and time are ignored.

Use the ***pitdate*** option with the following commands:

- **query backup**
- **query image**
- **query nas**
- **restore**
- **restore image**
- **restore nas**

Supported Clients

This option is valid for all UNIX clients. The Storage Manager client API does not support this option.

Syntax

►►—PITDate— *date* —————►◄

Parameters

date

Specifies the appropriate date. Enter the date in the format you selected with the ***dateformat*** option.

When you include ***dateformat*** with a command, it must precede the ***fromdate***, ***pitdate***, and ***todate*** options.

Examples

Command line:

```
dsmc restore "/fs1/*" -sub=y -pitdate=08/01/2002 -pittime=06:00:00
```

Pitttime

Use the ***pitttime*** option with the ***pitdate*** option to establish a point in time for which you want to display or restore the latest version of your backups. Files or images that were backed up *on or before* the date and time you specify, and which were not deleted *before* the date and time you specify, are processed. Backup versions that you create after this date and time are ignored. This option is ignored if you do not specify ***pitdate*** option.

Supported Clients

This option is valid for all UNIX clients. The 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***, ***pitttime***, and ***totime*** options.

Examples

Command line:

```
dsmc q b "/fs1/*" -pitt=06:00:00 -pitd=08/01/2002
```

Postschedulecmd/Postnschedulecmd

Authorized User

The ***postschedulecmd*** option specifies a command that the client program processes after it runs a schedule. The client program waits for the command to complete before it continues with other processing.

If you do not want to wait, specify ***postnschedulecmd***.

Notes:

1. Successful completion of the ***postschedulecmd*** command is considered a prerequisite to running the scheduled operation. If the ***postschedulecmd*** command does not complete with return code 0, the client will report that the scheduled event completed with return code 8 (unless the scheduled operation encounters a more severe error yielding a higher return code). If you do not want the ***postschedulecmd*** command to be governed by this rule, you can create a script or batch file that invokes the command and exits with return code 0. Then configure ***postschedulecmd*** to invoke the script or batch file. The return code for the ***postnschedulecmd*** command is not tracked, and does not influence the return code of the scheduled event.
2. The server can also define the ***postschedulecmd*** option (and the ***postnschedulecmd*** option).

Supported Clients

This option is valid for all UNIX clients. The Storage Manager client API does not support this option.

Options File

Place this option in the client system options file (dsm.sys).

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.

Use a blank, or null, string for *cmdstring* if you want to prevent any commands from running that the 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.

If the command string contains blanks, enclose the command string in double quotes. If you placed double quotes within the command string, then enclose the entire command string in single quotes.

Examples

Options file:

```
postschedulecmd "restart database"
```

The command string is a valid command for restarting your database.

Command line:

Does not apply

Preschedulecmd/Prenschedulecmd

Authorized User

The **preschedulecmd** option specifies a command that the client program processes before it runs a schedule. The client program waits for the command to complete before it starts the schedule.

If you do not want it to wait, specify **prenschedulecmd**.

Notes:

1. Successful completion of the **preschedulecmd** command is considered to be a prerequisite to running the scheduled operation. If the **preschedulecmd** command does not complete with return code 0, the scheduled operation and any **postschedulecmd** and **postnschedulecmd** commands will not run. The client will report that the scheduled event failed, and the return code will be 12. If you do not want the **preschedulecmd** command to be governed by this rule, you can create a script or batch file that invokes the command and exits with return code 0. Then configure **preschedulecmd** to invoke the script or batch file. The return code for the **prenschedulecmd** command is not tracked, and does not influence the return code of the scheduled event.
2. The server can also define the **preschedulecmd** option (and the **prenschedulecmd** option).

Supported Clients

This option is valid for all UNIX clients. The Storage Manager client API does not support this option.

Options File

Place this option in the client system options file (dsm.sys).

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.

Use a blank or null string for *cmdstring* if you want to prevent any commands from running that the 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.

If the command string contains blanks, enclose the command string in double quotes. If you placed double quotes within the command string, then enclose the entire command string in single quotes.

Examples

Options file:

```
preschedulecmd "<your database product's quiesce command>  
database"
```

The command string is a valid command for quiescing your database.

Command line:

Does not apply

Preservelastaccessdate

Any application that touches a file may implicitly cause that file's last access date to change to the time that the application touches it. This is a function of the file system, not the application. Because of this, when the client backs up or archives a file, it may trigger an update to the file's last access date. This can cause problems for other applications such as Storage Resource Management (SRM) or Hierarchical Storage Management, whose processing relies on accurate last access dates.

Use the ***preservelastaccessdate*** option during a backup or archive operation to specify whether to reset the last access date of any specified files to their original value following the backup or archive operation. By default, the Storage Manager client *will not* reset the last access date of any backed up or archived files to their original value following the backup or archive operation.

Use this option with the **incremental**, **selective**, or **archive** commands.

Notes:

1. This option only applies to files; it does not apply to directories.
2. Resetting the last access date may interfere with Storage Resource Management (SRM) or Hierarchical Storage Management processing. Do not set this option if either of these applications are running.
3. The last access date, obtained with command `ls -lu`, is modified when a file is accessed. Incremental backups may back up a file again, even though the file has not changed, due to a previous incremental backup having accessed the file.
4. Resetting the last access date incurs additional overhead that may impact backup and archive performance. The last access date should be reset only if you are using other another application, such as a Storage Resource Management (SRM) or Hierarchical Storage Management that relies on accurate last access dates.

Supported Clients

This option is valid for all UNIX clients.

Options File

Place this option in the client user options file (`dsm.opt`).

Syntax



Parameters

- No** Specifies that the 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 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 Storage Manager prompt you before files are overwritten.

Use the **preservepath** option with the **restore**, **restore backupset**, and **retrieve** commands.

Supported Clients

This option is valid for all UNIX clients. The Storage Manager client API does not support 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 **subdir=yes**, Storage Manager restores all files in the source directories to the single target directory.

Examples

Command line:

For the examples below, assume that the server file space contains the following backup copies:

```
/fs/h1/m1/file.a  
/fs/h1/m1/file.b  
/fs/h1/m1/l1/file.x  
/fs/h1/m1/l1/file.y
```

This command:

```
dsmc res /fs/h1/m1/ /u/ann/ -preser=complete
```

Restores these directories and files:

```
/u/ann/h1/m1/file.a  
/u/ann/h1/m1/file.b
```

This command:

```
dsmc res /fs/h1/m1/ /u/ann/ -preser=nobase
```

Restores these directories and files:

```
/u/ann/file.a  
/u/ann/file.b
```

This command:

```
dsmc res backupset /fs/h1/m1/ /u/ann/ -su=yes  
-preser=nobase -loc=file
```

Restores these directories and files:

```
/u/ann/file.a  
/u/ann/file.b  
/u/ann/file.x  
/u/ann/file.y
```

This command:

```
dsmc res /fs/h1/m1/ /u/ann/ -preser=subtree
```

Restores these directories and files:

```
/u/ann/m1/file.a  
/u/ann/m1/file.b
```

This command:

```
dsmc res /fs/h1/m1/ /u/ann/ -preser=none
```

Restores these directories and files:

```
/u/ann/file.a  
/u/ann/file.b
```

This command:

```
dsmc res /fs/h1/m1/ /u/ann/ -su=yes  
-preser=complete
```

Restores these directories and files:

```
/u/ann/h1/m1/file.a  
/u/ann/h1/m1/file.b  
/u/ann/h1/m1/l1/file.x  
/u/ann/h1/m1/l1/file.y
```

This command:

```
dsmc res /fs/h1/m1/ /u/ann/ -su=yes -preser=nobase
```

Restores these directories and files:

```
/u/ann/file.a  
/u/ann/file.b  
/u/ann/l1/file.x  
/u/ann/l1/file.y
```

This command:

```
dsmc res /fs/h1/m1/ /u/ann/ -su=yes -preser=subtree
```

Restores these directories and files:

```
/u/ann/m1/file.a  
/u/ann/m1/file.b  
/u/ann/m1/l1/file.x  
/u/ann/m1/l1/file.y
```

This command:

```
dsmc res /fs/h1/m1/ /u/ann/ -su=yes -preser=none
```

Restores these directories and files:

```
/u/ann/file.a  
/u/ann/file.b  
/u/ann/file.x  
/u/ann/file.y
```

Queryschedperiod

Authorized User

The ***queryschedperiod*** option specifies the number of hours you want the client scheduler to wait between attempts to contact the server for scheduled work. This option applies only when you set the ***schedmode*** option to *polling*. This option is used only when the **scheduler** is running.

Your administrator can also set this option. If your administrator specifies a value for this option, that value overrides the value set in your client options file after your client node successfully contacts the server.

Supported Clients

This option is valid for all UNIX clients. The 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).

Syntax

►►—QUERYSChedperiod— *hours* —————►►

Parameters

hours

Specifies the number of hours the client scheduler waits between attempts to contact the server for scheduled work. The range of values is 1 through 9999; the default is 12.

Examples

Options file:

```
querysch 6
```

Command line:

```
-queryschedperiod=8
```

This option is valid only on the initial command line. It is not valid in interactive mode.

Quiet

The **quiet** option limits the number of messages that display on your screen during processing. For example, when you run the **incremental**, **selective**, or **archive** commands, information may appear about each file that is backed up. Use the **quiet** option if you do not want to display this information.

When you use the **quiet** option, error and processing information appears on your screen, and messages are written to log files. If you do not specify **quiet**, the default option, **verbose** is used.

Supported Clients

This option is valid for all UNIX clients. The server can also define the **quiet** option, overriding the client setting. The Storage Manager client API does not support this option.

Options File

Place this option in the client user options file (dsm.opt).

Syntax

►►—QUIET—◄◄

Parameters

There are no parameters for this option.

Examples

Options file:

quiet

Command line:

-quiet

This option is valid on the initial command line and in interactive mode.

Replace

The **replace** option specifies whether to overwrite an existing files on your workstation, or to prompt you for your selection when you restore or retrieve files. This option applies to the **restore**, **retrieve**, and **restore backupset** commands *only*.

Notes:

1. Replace prompting does not occur during a scheduled operation. If you set the **replace** option to prompt, Storage Manager skips files without prompting during a scheduled operation.
2. The Storage Manager client API does not support this option.

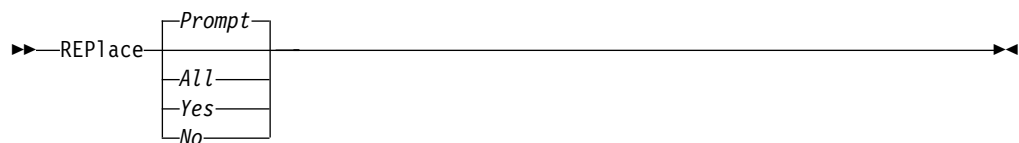
Supported Clients

This option is valid for all UNIX clients.

Options File

Place this option in the client user options file (dsm.opt).

Syntax



Parameters

Prompt

You are prompted whether to overwrite a file that already exists on your workstation. If the existing file is read-only, you are prompted whether to overwrite it. This is the default.

All

All existing files are overwritten, including read-only files. If access to a file is denied, you are prompted to skip or overwrite the file. No action is taken on the file until there is a response to the prompt.

Yes

Any existing files are overwritten, *except* read-only files. If a file is read-only, you are prompted to overwrite the file or skip it. No action is taken on the file until there is a response to the prompt. If access to a file is denied, the file is skipped.

No Existing files are not overwritten. No prompts will display.

Examples

Options file:

```
replace all
```

Command line:

```
-replace=no
```

Resourceutilization

Authorized User

Use the **resourceutilization** option in your client system options file `dsm.sys` to regulate the level of resources the Storage Manager server and client can use during processing.

Regulating backup and archive sessions

When you request a backup or archive, the client can use more than one session to the server. The default is to use a maximum of two sessions; one to query the server and one to send file data. The client can use only one server session if you specify a **resourceutilization** setting of 1. The client is also restricted to a single session if a user who is not an authorized user invokes a UNIX client with **passwordaccess=generate** specified.

A client can use more than the default number of sessions when connecting to a server that is Version 3.7 or higher. For example, **resourceutilization=10** permits up to eight sessions with the server. Multiple sessions may be used for querying the server and sending file data.

Multiple query sessions are used when you specify multiple file specifications with a backup or archive command. For example, if you enter:

```
inc filespaceA filespaceB
```

and you specify **resourceutilization=5**, the client may start a second session to query files on file space B. Whether or not the second session starts depends on how long it takes to query the server about files backed up on file space A. The client may also try to read data from the file system and send it to the server on multiple sessions.

Regulating restore sessions

When you request a restore, the default is to use a maximum of one session, based on how many tapes the requested data is stored on, how many tape drives are available, and the maximum number of mount points allowed for the node.

Notes:

1. If all of the files are on disk, only one session is used. There is no multi-session for a pure disk storage pool restore. However, if you are performing a restore in which the files reside on 4 tapes and some on disk, you could use up to 5 sessions during the restore.
2. The Storage Manager server can set the maximum number of mount points a node can use on the server using the `MAXNUMMP` parameter. If the **resourceutilization** option value exceeds the value of the `MAXNUMMP` on the server for a node, the backup can fail with an *Unknown System Error* message.

For example, if the data you want to restore is on 5 different tape volumes, the maximum number of mount points is 5 for your node, and **resourceutilization** is set to 3, then 3 sessions will be used for the restore. If you increase the **resourceutilization** setting to 5, then 5 sessions will be used for the restore. There is a 1 to 1 relationship to the number of restore sessions allowed and the **resourceutilization** setting. Multiple restore sessions are only allowed for no query restore operations.

Considerations

The following factors can affect the throughput of multiple sessions:

- The server's ability to handle multiple client sessions. Is there sufficient memory, multiple storage volumes, and CPU cycles to increase backup throughput?
- The client's ability to drive multiple sessions (sufficient CPU, memory, etc.).
- The configuration of the client storage subsystem. File systems that are striped across multiple disks, using either software striping or RAID-5 can better handle an increase in random read requests than a single drive file system. Additionally, a single drive file system may not see performance improvement if it attempts to handle many random concurrent read requests.
- Sufficient bandwidth in the network to support the increased traffic.

Potentially undesirable aspects of running multiple sessions include:

- The client could produce multiple accounting records.
- The server may not start enough concurrent sessions. To avoid this, the server *maxsessions* parameter must be reviewed and possibly changed.
- A query node command may not summarize client activity.

Supported Clients

This option is valid for all UNIX clients. The server can also define this option. The Storage Manager client API does not support this option.

Options File

Place this option in the client system options file (dsm.sys) *within* a server stanza.

Syntax

►►—RESOURceutilization— *number* —————►◄

Parameters

number

Specifies the level of resources the 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:

Does not apply

Retryperiod

Authorized User

The ***retryperiod*** option specifies the number of minutes the client scheduler waits between attempts to process a scheduled command that fails, or between unsuccessful attempts to report results to the server. Use this option only when the scheduler is running.

Your administrator can also set this option. If your administrator specifies a value for this option, that value overrides the value in your client system options file after your client node successfully contacts the server.

Supported Clients

This option is valid for all UNIX clients. The Storage Manager client API does not support this option.

Options File

Place this option in the client system options file (dsm.sys).

Syntax

►►—RETRYPeriod— *minutes* —————►◄

Parameters

minutes

Specifies the number of minutes the client scheduler waits between attempts to contact the server, or to process a scheduled command that fails. The range of values is 1 through 9999; the default is 20.

Examples

Options file:

```
retryp 10
```

Command line:

```
-retryperiod=10
```

This option is valid only on the initial command line. It is not valid in interactive mode.

Revokeremoteaccess

The **revokeremoteaccess** option restricts an administrator with client access privilege from accessing a client workstation that is running the Web client. This option does not restrict administrators with client owner, system, or policy privilege from accessing your workstation through the Web client.

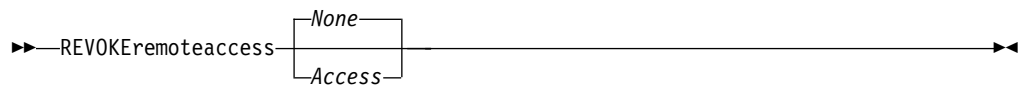
Supported Clients

This option is valid for all UNIX clients. The Storage Manager client API does not support this option.

Options File

Place this option in the client user options file (dsm.opt) *or* the client system options file (dsm.sys).

Syntax



Parameters

None

Does not revoke access to administrators who have client access authority for the client. This is the default.

Access

Revokes access to administrators who have client access authority for the client.

Examples

Options file:

```
revokeremoteaccess none
```

Command line:

Does not apply

Schedcmddisabled

Authorized User

The ***schedcmddisabled*** option specifies whether to disable the scheduling of commands by the server ***action=command*** option on the **define schedule** server command.

This option does not disable the ***preschedulecmd*** and ***postschedulecmd*** commands. However, you can specify ***preschedulecmd*** or ***postschedulecmd*** with a blank or a null string to disable the scheduling of these commands. Commands scheduled by the server using the ***action=command*** option on the **define schedule** server command may also be disabled in the same way.

Use the **query schedule** command to query the schedules defined by your administrator. See “Query Schedule” on page 327 for more information.

Supported Clients

This option is valid for all UNIX clients. The server can also define this option. The Storage Manager client API does not support this option.

Options File

Place this option in the client system options file (dsm.sys) *within* a server stanza.

Syntax



Parameters

- Yes** Specifies that Storage Manager disables the scheduling of commands by the server using the ***action=command*** option on the **define schedule** server command.
- No** Specifies that Storage Manager does not disable the scheduling of commands by the server using the ***action=command*** option on the **define schedule** server command. This is the default.

Examples

Options file:

```
schedcmddisabled no
```

Command line:

```
Does not apply.
```

Schedlogname

Authorized User

The ***schedlogname*** option specifies the path and file name where you want to store schedule log information. Use this option only when the scheduler is running.

When you run the **schedule** command, output from scheduled commands appears on your screen. Output is also sent to the file you specify with this option.

Supported Clients

This option is valid for all UNIX clients. The Storage Manager client API does not support this option.

Options File

Place this option in the client system options file (dsm.sys).

Syntax

►►—SCHEDLOGName— *filespec*—————►►

Parameters

filespec

Specifies the path and file name where you want to store schedule log information when processing scheduled work.

If you specify a file name only, the file is stored in your current directory. The default is the installation directory with a file name of dsmsched.log. The dsmsched.log file *cannot* be a symbolic link.

Examples

Options file:

```
schedlogname /home/mydir/schedlog.jan
```

Command line:

```
Does not apply
```

Schedlogretention

Authorized User

The ***schedlogretention*** option specifies the number of days to keep entries in the schedule log, and whether to save the pruned entries. The schedule log is pruned after a scheduled event completes.

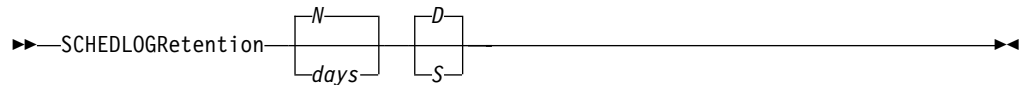
Supported Clients

This option is valid for all UNIX clients.

Options File

Place this option in the client system options file (dsm.sys).

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

Authorized User

The ***schedmode*** option specifies whether you want to use the *polling* mode (your client node periodically queries the server for scheduled work), or the *prompted* mode (the server contacts your client node when it is time to start a scheduled operation). All communication methods can use the client polling mode, but only TCP/IP can use the server prompted mode.

Note: 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 client options file or scheduled work will not process.

If you specify the *prompted* mode, you must supply values for the ***tcpclientaddress*** and ***tcpclientport*** options in your dsm.sys file or on the **schedule** command. You can then be contacted at an address or port other than the one that made first contact with the server.

Notes:

1. When changing the setting of this option in the client system options file (dsm.sys) you must stop and restart the scheduler service for the setting to take effect.
2. Storage Manager does not support the scheduler running in prompted mode outside a firewall.
3. The server can also define this option.

Supported Clients

This option is valid for all UNIX clients.

Options File

Place this option in the client system options file (dsm.sys).

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 ***querryschedperiod*** option.

PRompted

The client scheduler waits for the server to contact your client node when scheduled work needs to be done.

Examples

Options file:

 schedmode prompted

Command line:

 -schedmod=po

 This option is valid only on the initial command line. It is not valid in interactive mode.

Scrolllines

The ***scrolllines*** option specifies the number of lines of information that display on your screen at one time. Use this option when you set the ***scrollprompt*** option to *Yes* and you use commands.

Use the ***scrollprompt*** option with all query commands except the following:

- query mgmtclass**
- query schedule**
- query session**
- query inclexcl**

Supported Clients

This option is valid for all UNIX clients. The server can also define this option. The Storage Manager client API does not support this option.

Options File

Place this option in the client user options file (dsm.opt).

Syntax

►►—SCROLLLines— *number* —————►►

Parameters

number

Specifies the number of lines of information that display on your screen at one time. The range of values is 1 through 80; the default is 20.

Examples

Options file:

`scrolllines 25`

Command line:

`-scroll=25`

This option is valid on the initial command line and in interactive mode.

Scrollprompt

The ***scrollprompt*** option specifies whether you want 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.

Use the ***scrollprompt*** option with all query commands except the following:

- query mgmtclass**
- query schedule**
- query session**
- query inclexcl**

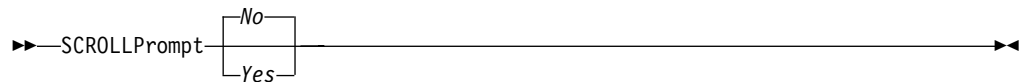
Supported Clients

This option is valid for all UNIX clients. The server can also define this option. The 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 Scrolls to the end of the list and stops. This is the default.

Yes Stops and waits after displaying the number of lines you specified with the ***scrolllines*** option. The following prompt displays at the bottom of the screen:
Press 'Q' to quit, 'C' to continuous scroll, or 'Enter' to continue.

Examples

Options file:

```
scrollprompt yes
```

Command line:

```
-scrollp=yes
```

This option is valid on the initial command line and in interactive mode.

Servername

In your client system options file (dsm.sys), the **servername** option specifies the name you want to use to identify a server and to begin a stanza containing options for that server. You can name and specify options for more than one server.

The following example demonstrates how to specify options for two different servers:

```
SErrname      server_a
COMMethod      TCPip
TCPPort        1500
TCPServeraddress alvmmd.almaden.ibm.com
PASSWORDAccess prompt
GRoups         tsm
USERS          sullivan mushock tallan
INCLExcl       /adm/tsm/backup.excl

SErrname      server_b
COMMethod      SHAREdmem
shmpor         1520
PASSWORDAccess generate
MAILprog       /usr/bin/xsend root
GRoups         system tsm
INCLExcl       /adm/tsm/archive.excl
```

In your client user options file (dsm.opt), the **servername** option specifies which server, of those named in your client system options file (dsm.sys), to contact for backup-archive services. When specified in a client options file or on the command line, the **servername** option overrides the default server specified in your client system options file.

Notes:

1. You cannot use the **servername** option to override the server that is specified for migration in your client system options file.
2. If the Storage Manager server name changes or Storage Manager clients are directed to a different Storage Manager server, all clients will need to have a new password initialized for the new server name.

Supported Clients

This option is for all UNIX clients.

Options File

Place this option in the client user options file (dsm.opt) and the client system options file (dsm.sys).

Syntax

►►—SErrname *servername*—►►

Parameters

servername

In your client system options file (dsm.sys), specify the name you want to assign to a particular server. In your client user options file (dsm.opt) or on the

command line, specify the name of the server you want to contact for backup-archive services. A server name is not case sensitive; it can have up to 64 characters.

Examples

Options file:

```
servername server_a
```

Command line:

```
-se=server_b
```

This option is valid only on the initial command line. It is not valid in interactive mode.

Shmport

Authorized User

The ***shmport*** option specifies the TCP/IP port address on which the Storage Manager server listens to establish a Shared Memory connection. To use Shared Memory, TCP/IP must be installed on your workstation.

Note: The value specified for the ***shmport*** option in the client system options file must match the value specified for ***shmport*** in the server options file.

Supported Clients

This option is valid for AIX, AIX 5L, HP-UX, and Solaris clients *only*.

Options File

Place this option in the client system options file (dsm.sys).

Syntax

►►—SHMPort *port_address*—————◄◄

Parameters

port_address

Specifies the TCP/IP address that the server is listening on to establish a Shared Memory connection. The range of values is 1000 through 32767; the default is 1510.

Examples

Options file:

shmport 1520

Command line:

Does not apply.

Snapshotcachesize

Authorized User

Use the *snapshotcachesize* option with the **backup image** command, the *include.image* option, or in your dsm.sys file to specify an appropriate snapshot size so that all old data blocks can be stored during a snapshot image backup. A snapshot size of 100 percent will ensure a valid snapshot.

Supported Clients

This option is valid for Linux86 client *only*. The Storage Manager client API does not support this option.

Options File

Place this option in the client system options file (dsm.sys).

Syntax

►►—SNAPSHOTCACHESize— *snapshotcachesize* —————►►

Parameters

snapshotcachesize

Specifies an appropriate snapshot size so that all old data blocks can be stored during a snapshot image backup. The value is a percent of the total size of the volume being backed up. The range of values is one through 100 percent; the default is 100 percent.

Examples

Options file:

```
snapshotcachesize 40
```

Command line:

```
-snapshotcachesize=40
```

Subdir

The **subdir** option specifies whether you want to include subdirectories of named directories for processing on the following commands:

archive
delete archive
incremental
query archive
query backup
query backupset
restore
restore backupset
retrieve
selective

For example, if you set the **subdir** option to *yes* when backing up a specific path and file, Storage Manager recursively backs up *all* subdirectories under that path, and any instances of the specified file that exist under *any* of those subdirectories.

Supported Clients

This option is valid for all UNIX clients. The server can also define this option. The 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. For more information, see “Preservepath” on page 237.

If a subdirectory is a mounted file system, it will not process even if you specify **subdir=yes**.

Examples

Options file:

subdir no

Command line:

To restore the structure:

```
/path2/dir1  
/path2/dir1/file1  
/path2/dir1/dir2  
/path2/dir1/dir2/file1
```

enter any of the following commands:

```
dsmc rest "/path/dir1/*" /path2/ -su=yes  
dsmc rest "/path/dir1/file*" /path2/ -su=yes  
dsmc rest "/path/dir1/file1*" /path2/ -su=yes
```

Tapeprompt

The ***tapeprompt*** option specifies whether you want Storage Manager to wait for a tape to mount if it is required for a backup, archive, restore, or retrieve process, or to be prompted for a choice.

Tape prompting does not occur during a scheduled operation regardless of the setting for the ***tapeprompt*** option.

The ***tapeprompt*** option can be used with the following commands:

archive
incremental
restore
retrieve
selective

Note: The server can also define this option.

Supported Clients

This option is valid for all UNIX clients.

Options File

Place this option in the client user options file (dsm.opt).

Syntax



Parameters

- No** You are not prompted for your choice. The server waits for the appropriate tape to mount. This is the default.
- Yes** You are prompted when a tape is required to back up, archive, restore, or retrieve data. At the prompt, you can wait for the appropriate tape to be mounted, always wait for a tape to be mounted, skip a particular object, skip all objects on a single tape, skip all objects on all tapes, or cancel the entire operation.

Examples

Options file:
tapeprompt yes

Command line:
-tapep=yes

Tcpbuffsize

Authorized User

The *tcpbuffsize* option specifies the size of the internal TCP/IP communication buffer used to transfer data between the client node and server. Although it uses more memory, a larger buffer can improve communication performance.

Supported Clients

This option is valid for all UNIX clients.

Options File

Place this option in the client system options file (dsm.sys).

Syntax

►►—TCPBuffsize— *size* —————◄◄

Parameters

size

Specifies the size, in kilobytes, that you want to use for the internal TCP/IP communication buffer. The range of values is 1 through 512; the default is 31.

Depending on the operating system communication settings, your system might not accept all values in the range of 1 through 512.

Examples

Options file:

tcpb 2

Command line:

-tcpbuffsize=31

This option is valid only on the initial command line. It is not valid in interactive mode.

Tcpclientaddress

Authorized User

The ***tcpclientaddress*** option specifies a TCP/IP address if your client node has more than one address, and you want the server to contact an address other than the one that was used to make the first server contact.

Use this option only if you use the *prompted* parameter with the ***shedmode*** option or when the **schedule** command is running.

Supported Clients

This option is valid for all UNIX clients. The Storage Manager client API does not support this option.

Options File

Place this option in the client system options file (dsm.sys).

Syntax

►►—TCPCLIENTAddress— *client_address* —————►►

Parameters

client_address

Specifies the TCP/IP address you want the server to use to contact your client node. Specify a TCP/IP Internet domain name or a dot address.

Examples

Options file:

```
tcpclienta dsmclnt.sanjose.ibm.com
```

Command line:

```
-tcpclientaddress=128.33.10.249
```

This option is valid only on the initial command line. It is not valid in interactive mode.

Tcpclientport

Authorized User

The ***tcpclientport*** option specifies a different TCP/IP port number for the server to contact than the one that was used to make the first server contact. If the default port or the specified port is busy, the server attempts to use any available port. Use this option only if you specify the *prompted* parameter with the ***shedmode*** option or when the **schedule** command is running.

Supported Clients

This option is valid for all UNIX clients. The Storage Manager client API does not support this option.

Options File

Place this option in the client system options file (dsm.sys).

Syntax

►►—TCPCLIENTPort— *client_port_address* —————►◄

Parameters

client_port_address

Specifies the TCP/IP port address you want the server to use to contact your client node. The range of values is 1000 through 32767; the default is 1501.

Examples

Options file:

tcpclientp 1502

Command line:

-tcpclientport=1492

This option is valid only on the initial command line. It is not valid in interactive mode.

Tcpnodelay

Authorized User

The ***tcpnodelay*** specifies whether to send small transactions to the server, without buffering them first. A *small transaction* is smaller than the byte limit set with the ***txnbytelimit*** option. Specifying ***tcpnodelay*** *yes* might improve performance in higher-speed networks.

Note: This option is for AIX and AIX 5L clients *only*. All other UNIX clients buffer small transactions before sending them to the server.

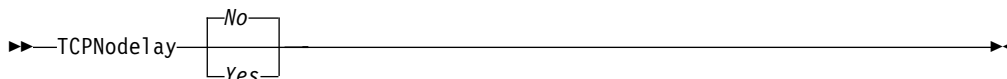
Supported Clients

This option is valid for AIX and AIX 5L clients.

Options File

Place this option in the client system options file (dsm.sys).

Syntax



Parameters

- No* Do not send small transactions without buffering them first. This is the default.
- Yes* Send small transactions without buffering them first. When you specify ***tcpnodelay*** *yes*, data packets less than the maximum transmission unit (MTU) size are sent immediately. Specifying ***tcpnodelay*** *yes* might improve performance in higher-speed networks.

Examples

Options file:

tcpnodelay yes

Command line:

Does not apply.

Tcpport

Authorized User

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

Storage Manager firewall support

To enable the backup-archive client, Command Line Admin client, and the Scheduler (running in polling mode) to run outside a firewall, the port specified by the option ***tcpport*** (default 1500) must be opened in the firewall.

Note: Storage Manager does not support the scheduler running in *prompted* mode outside a firewall.

The ***webports*** option enables the use of the Web client outside a firewall by specifying the TCP/IP port number used by the Storage Manager Client Acceptor daemon and the Web Client Agent service for communications with the Web GUI.

The ports specified with the ***webports*** option and the client option ***httpport*** must be opened in the firewall. See “Httpport” on page 189 and “Webports” on page 282 for more information.

See “Storage Manager firewall support” on page 55 for further considerations regarding Storage Manager firewall support.

Supported Clients

This option is valid for all UNIX clients.

Options File

Place this option in the client system options file (dsm.sys).

Syntax

►►—TCPPort— *port_address* —————►◄

Parameters

port_address

Specifies the TCP/IP port address that is used to communicate with a server. The range of values is 1000 through 32767; the default is 1500.

Examples

Options file:

tcpp 1501

Command line:

Does not apply

Tcpserveraddress

Authorized User

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

Supported Clients

This option is valid for all UNIX clients.

Options File

Place this option in the client system options file (dsm.sys).

Syntax

►—TCPServeraddress— *server_address* —◄

Parameters

server_address

Specifies a 1 to 64 character TCP/IP address for a server. Specify a TCP/IP domain name or a dot address.

Examples

Options file:

tcps dsmchost.endicott.ibm.com

Command line:

Does not apply

Tcpwindowsize

Authorized User

Use the ***tcpwindowsize*** option to specify, in kilobytes, the size you want to use for the TCP/IP sliding window for your client node. The sending host cannot send more data until it receives an acknowledgment and a TCP receive window update. Each TCP packet contains the advertised TCP receive window on the connection. A larger window allows the sender to continue sending data and may improve communication performance, especially on fast networks with high latency.

Supported Clients

This option is valid for all UNIX clients.

Options File

Place this option in the client system options file (dsm.sys).

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 Storage Manager to use the operating system default TCP window size. Values from 1 to 2048 indicate that the window size is in the range of 1KB to 2MB. The default is 32.

Notes:

1. The TCP window acts as a buffer on the network. It is not related to the ***tcpbuffsize*** option, or to the send and receive buffers allocated in client or server memory.
2. A window size larger than the buffer space on the network adapter might degrade throughput due to resending packets that were lost on the adapter.
3. Depending on the operating system communication settings, your system might not accept all values in the range of values.
4. For AIX and AIX 5L the default is 63.
5. For Solaris the maximum value is 1024.

Examples

Options file:

```
tcpwindowsize 1
```

Command line:

```
-tcpw=24
```

This option is valid only on the initial command line. It is not valid in interactive mode.

Timeformat

The **timeformat** option specifies the format in which you want to display system time.

The AIX, AIX 5L, Solaris, and HP-UX clients support locales other than English that describe every user interface that varies with location or language. Solaris and HP-UX clients only support English, Simplified Chinese, and Japanese locale information. The default directories for system-supplied locales are as follows:

- /usr/lib/nls/loc for AIX and AIX 5L
- /usr/lib/locale for Solaris
- /usr/lib/nls/loc/locales for HP-UX

The backup-archive and administrative clients obtain format information from the locale definition in effect at the time the client is called. Consult the documentation on your local system for details about setting up your locale definition.

Note: This **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 Storage Manager supports, the Web client uses the time format for American English.

Supported Clients

This option is valid for all UNIX clients.

Options File

Place this option in the client user options file (dsm.opt).

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.

0 Use the locale-defined time format.

For AIX, AIX 5L, HP-UX, SGI, Solaris, and Tru64 UNIX: This is the default if the locale-specified format consists of digits, separator characters, and, if applicable, the AM or PM string.

1 23:00:00 (This is the default)

For AIX, AIX 5L, HP-UX, SGI, Solaris, and Tru64 UNIX: 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, AIX 5L, HP-UX, SGI, Solaris, and Tru64 UNIX: 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`

Todate

Use the ***todate*** option with the ***totime*** option to specify an ending date and time to which you want to search for backups or archives during a restore, retrieve, or query operation. For example, you might request a list of files that were backed up before 11:59 PM on June 30, 2002.

Use the ***todate*** and ***totime*** options with the ***fromtime*** and ***fromdate*** options to request a list of backed up or archived files within a period of time. For example, you might request a list of files that were backed up between 6:00 AM on July 1, 2002 and 11:59 PM on July 30, 2002.

Use the ***todate*** option with the following commands:

- **query archive**
- **query backup**
- **restore**
- **retrieve**

Supported Clients

This option is valid for all UNIX clients. The Storage Manager client API does not support this option.

Syntax

►►—TODate— *date* —————►►

Parameters

date

Specifies an ending date. Enter the date in the format you selected with the ***dateformat*** option.

When you include ***dateformat*** with a command, it must precede the ***fromdate***, ***pitdate***, and ***todate*** options.

Examples

Command line:

```
dsmc restore "/home/user1/*" -todate=12/11/2002
```

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, 2002. 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, 2002 and 11:59 PM on July 30, 2002.

Use the ***totime*** option with the following commands:

- **query archive**
- **query backup**
- **restore**
- **retrieve**

Supported Clients

This option is valid for all UNIX clients. The 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 "/home/user1/*" -todate=09/17/2002 -totime=23:00:00
```

Txnbytelimit

Authorized User

The ***txnbytelimit*** option specifies the number of kilobytes the client program buffers before it sends a transaction to the server.

Note: The server can also define and adjust this option during self-tuning operations.

A *transaction* is the unit of work exchanged between the client and server. Because the client program can transfer more than one file or directory between the client and server before it commits the data to server storage, a transaction can contain more than one file or directory. This is called a *transaction group*.

This option permits you to control the amount of data sent between the client and server before the server commits the data and changes to the server database, thus changing the speed with which the client performs work. The amount of data sent applies when files are batched together during backup or when receiving files from the server during a restore procedure.

The server administrator can limit the number of files or directories contained within a transaction group using the ***txngroupmax*** option; the actual size of a transaction can be less than your limit. Once this number is reached, the client sends the files to the server *even if* the transaction byte limit is not reached.

Supported Clients

This option is valid for all UNIX clients.

Options File

Place this option in the client system options file (dsm.sys).

Syntax

►►—TXNBytelimit— *number* —————◄◄

Parameters

number

Specifies the number of kilobytes the client program can buffer together in a transaction before it sends data to the server. The range of values is 300 through 2097152 (2 GB); the default is 2048.

Examples

Options file:

txnb 2048

Command line:

-txnb=2048

This option is valid only on the initial command line. It is not valid in interactive mode.

Type

Use the ***type*** option with the **query node** command to specify the type of node to query.

Supported Clients

This option is valid for the AIX, AIX 5L, and Solaris clients *only*. The Storage Manager client API does not support this option.

Syntax



Parameters

- any*
Specifies all nodes registered at the server. This is the default.
- nas*
Specifies all NAS nodes registered at the server.
- server*
Specifies client nodes that are other Storage Manager servers.
- client*
Specifies client nodes that are backup-archive clients.

Examples

Command line:
q 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 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 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 Storage Manager client API does not support this option.

Options File

Place this option in the client system options file (dsm.sys).

Syntax



Parameters

username

Names a user that you want to authorize to request 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. Storage Manager will not process directories that exist in the path of the source file specification.

This option differs from the **filesonly** option in that the **filesonly** option archives the directories that exist in the path of the source file specification.

The **v2archive** and **dirsonly** options are mutually exclusive and an error message displays if you use both options in the same **archive** command.

This option is not persistent; you must explicitly specify this option in each **archive** command.

If you use this option, you may want to consider the following:

- You may experience performance problems when retrieving large amounts of data archived with this option.
- You may want to use this option only if you are concerned about expiration performance on a server that already contains extremely large amounts of archived data.

Supported Clients

This option is valid for all UNIX clients. The Storage Manager client API does not support this option.

Syntax

►—V2archive—◄

Parameters

There are no parameters for this option.

Examples

This command:

```
dsmc archive "/home/relx/dir1/*" -v2archive -su=y.
```

Archives these files:

```
/home/relx/dir1/file1  
/home/relx/dir1/file2  
/home/relx/dir1/file3  
/home/relx/dir1/dir2/file4  
/home/relx/dir1/dir2/file5
```

Note: Storage Manager does not archive /home/relx/dir1 and /home/relx/dir1/dir2.

Verbose

The **verbose** option specifies that you want processing information to display on your screen. This is the default. When you run the **incremental**, **selective**, or **archive** commands, information displays about each file that is backed up. Use the **quiet** option if you do not want to display this information.

The following behavior applies when using the **verbose** and **quiet** options

- If the server specifies either the **quiet** or **verbose** option in the server client option set, the server settings override the client values, even if **force** is set to *no* on the server.
- If you specify **quiet** in your dsm.opt file, and you specify **-verbose** on the command line, **-verbose** prevails.
- If you specify both **-quiet** and **-verbose** on the same command, the last option encountered during options processing prevails. If you specify **-quiet -verbose**, **-verbose** prevails. If you specify **-verbose -quiet**, **-quiet** prevails.

Supported Clients

This option is valid for all UNIX clients. The server can also define this option. The Storage Manager client API does not support this option.

Options File

Place this option in the client user options file (dsm.opt).

Syntax

►►—VErbose—◄◄

Parameters

There are no parameters for this option.

Examples

Options file:

verbose

Command line:

-verbose

This option is valid on the initial command line and in interactive mode.

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. Use the AFS/DFS backup clients to process virtual mount points for AFS/DFS file systems.

Note: If the directory that you want to specify as a virtual mount point is a symbolic link, set the ***followsymbolic*** option to **Yes**. If that option is set to *no* (the default), you are not permitted to use a symbolic link as a virtual mount point.

After you define a virtual mount point, you can specify the path and directory name with the ***domain*** option in either the default client options file or on the ***incremental*** command to include it for incremental backup services. You can also specify the path and directory name of the virtual mount point with the ***domain*** option in your client options files and on the ***incremental*** command. When you perform a backup or archive using the ***virtualmountpoint*** option, the ***query 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 requires that the ***virtualmountpoint*** option is specified in the dsm.sys file to restore or retrieve the data.

Supported Clients

This option is valid for all UNIX clients. The Storage Manager client API does not support this option.

Options File

Place this option in the client system options file (dsm.sys).

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 user options file, or with a command:

- You must specify the name you specified with the **nodename** option in your client system options file (dsm.sys). This name should be different from the name returned by the **hostname** command on your workstation.
- 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.

Supported Clients

This option is valid for all UNIX clients.

Options File

Place this option in the client user options file (dsm.opt).

Syntax

►►—VIRTUALNodename— *nodename*—————►►

Parameters

nodename

Specifies a 1- to 64-character name that identifies the node for which you want to request 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.

Volinformation

The ***volinformation*** option backs up or archives root-level information. This option applies only when you back up or restore non-root files.

Specify ***volinformation*** either with the ***selective*** or the ***archive*** command, or any ***incremental*** command that does not target the entire volume. Entering the ***incremental*** command on an entire volume implicitly backs up the root-level information.

Supported Clients

This option is valid for all UNIX clients. The Storage Manager client API does not support this option.

Syntax

►►—VOLinformation—————►►

Parameters

There are no parameters for this option.

Examples

Command line:

```
dsmc selective -vol
```

Webports

The **webports** option enables the use of the Web client outside a firewall by specifying the TCP/IP port number used by the Storage Manager Client Acceptor daemon and Web Client Agent service for communications with the Web GUI.

Values for both the Client Acceptor daemon and the Web Client Agent service are required.

If you do not specify this option, the default value, zero (0), is used for both ports. This causes TCP/IP to randomly assign a free port number for the Client Acceptor daemon and the Web Client Agent service.

The ports you specify with the **webports** and **httpport** options must be opened in the firewall.

To enable the backup-archive client, Command Line Admin client, and the Scheduler (running in polling mode) to run outside a firewall, the port specified by the server option **tcpport** (default 1500) must be opened in the firewall.

Note: Storage Manager does not support the scheduler running in *prompted* mode outside a firewall.

To enable the administrative Web interface to run outside a firewall the port specified by server option **httpport** (default is 1580) must be opened in the firewall.

See “Httpport” on page 189 and “Tcpport” on page 265 for more information.

Notes:

1. See “Storage Manager firewall support” on page 55 for further considerations regarding Storage Manager firewall support.
2. The Storage Manager client API does not support this option.

Supported Clients

This option is valid for all UNIX clients.

Options File

Place this option in the client system options file (dsm.sys).

Syntax

►►—WEBPorts— *cadport*— *agentport* —◄◄

Parameters

cadport

Specifies the *required* Storage Manager Client Acceptor daemon port number. If a value is not specified, the default, zero (0), causes TCP/IP to randomly assign a free port number.

agentport

Specifies the *required* Storage Manager Web client agent service port number. If a value is not specified, the default, zero (0), causes TCP/IP to randomly assign a free port number.

Examples

Options file:

webports 2123 2124

Command line:

Does not apply.

Chapter 10. Using commands

Storage Manager provides a command line interface (CLI) that you can use as an alternative to the graphical user interface (GUI). This chapter describes how to start or end a client command session and how to enter commands. Table 42 shows a list of tasks related to entering commands.

Table 42. Entering commands

Task	Page
Starting and ending a client command session	286
Entering client commands	287
Remembering previous commands	290
Using wildcard characters	290

Table 43 provides an alphabetical list of the commands, a brief description, and where to locate more information.

Table 43. Commands

Command	Description	Page
archive	Archives files from a workstation to Storage Manager storage.	292
backup image	Creates an image backup of one or more file systems or logical volumes that you specify.	293
backup nas	Creates an image backup of one or more file systems belonging to a NAS file server.	297
cancel process	Displays a list of current NAS image backup and restore processes from which you can select one to cancel.	299
cancel restore	Displays a list of restartable restore sessions from which you can select one to cancel.	300
delete access	Revokes authorization for a user to restore or retrieve files.	301
delete archive	Deletes archived files from Storage Manager storage.	302
delete filespace	Deletes file spaces in Storage Manager storage.	303
expire	Inactivates backup objects that you specify.	305
help	Displays online command help.	306
incremental	Backs up new and changed files.	307
loop	Starts an interactive command session.	312
macro	Executes commands within a macro file that you specify.	313
monitor process	Displays a list of current NAS image backup and restore processes from which you can select one to cancel.	314
query access	Displays a list of current authorization rules.	315
query archive	Displays a list of archived files.	316
query backup	Displays a list of backup versions.	318

Table 43. Commands (continued)

Command	Description	Page
query backupset	Queries a backup set from the server or a local file. A backup set can also be queried from a tape device.	320
query filespace	Displays a list of file spaces in Storage Manager storage.	321
query image	Displays information regarding backed up images.	322
query inclexcl	Displays a list of include-exclude statements in the order in which they are processed during backup and archive operations.	323
query mgmtclass	Displays information about available management classes.	324
query node	Displays all the nodes for which a particular administrative user ID has authority to perform operations. The authorized administrative user ID should have at least client owner authority over both the NAS node and the client workstation node that they are using either from command line or from the web.	325
query restore	Displays a list of your restartable restore sessions in the server database.	326
query schedule	Displays information about scheduled events.	327
query session	Displays information about the current session.	328
restart restore	Displays a list of restartable restore sessions from which you can one to restart.	329
restore	Restores backup versions from Storage Manager storage.	330
restore backupset	Restores a backup set from the server or a local file. You can also restore a backup from a tape device.	333
restore image	Restores a backed up image.	336
restore nas	Restores the image of a file system belonging to a NAS file server.	338
retrieve	Retrieves archived files from Storage Manager storage.	340
schedule	Starts the client scheduler on the workstation.	342
selective	Backs up selected files.	344
set access	Authorizes another user to access your backup versions or archive copies.	346
set password	Changes the Storage Manager password for your workstation.	349

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. Storage Manager processes the command and returns to the shell command prompt.

Use interactive mode when you want to enter a *series* of commands. Since Storage Manager establishes connection to the server only once for interactive mode, a series of commands can process more quickly. Storage Manager processes the commands and returns to the **tsm>** prompt.

Process commands in batch mode

When you enter a *single* command in batch mode, precede it with the executable program name, **dsmc**. Storage Manager processes the command and returns to the shell command prompt. For example, to process the **incremental** command in batch mode, you would enter:

```
dsmc incremental
```

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. Storage Manager *only* prompts you for your password if you are registering your workstation with a server or manually changing your password.

Process commands in interactive mode

Use the *interactive* mode 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, Storage Manager prompts you when 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.

Entering client commands

A client command can include one or more of these components:

- Command name
- Options
- Parameters

The sections that follow describe each of these components.

Command name

The first part of a command is the command name. The command name consists of a single word, such as **help** or **schedule**, or an action word and an object for

that action, such as **query archive**. Enter the full command name, or its minimum abbreviation. For example, you can enter any of the following versions of the **query schedule** command:

```
query schedule
q sc
q sched
query sc
```

Options

There are two groups of options that you can use with commands:

- **Client options:** The group of options that are set in your client user options file (dsm.opt). To override an option in the client options file, enter the option with a command. For detailed information about client options, see “Client options reference” on page 139.
- **Client command options:** Use this group of options with specific commands on the command line *only*. For detailed information about client command options, see “Client options reference” on page 139.

Parameters

Commands can have required parameters, optional parameters, or no parameters at all. Required parameters provide information to perform a task. The most commonly required parameter is a file specification. For example, if you want to archive a file named `budget.fin` from the `/project` directory, you would enter:

```
dsmc archive /project/budget.fin
```

Some commands have optional parameters. If you do not enter a value for an optional parameter, Storage Manager uses the default value. For example, the **restore** command includes a required parameter, *sourcefilespec*, that specifies the path and file name in storage that you want to restore. The optional parameter, *destinationfilespec*, specifies the path and file name where you want to place the restored files. If you do not specify the *destinationfilespec*, by default Storage Manager restores the files to the original source path. If you want to restore the files to a *different* directory, enter a value for *destinationfilespec*. For example, to restore the `/project/budget.fin` file to `/newproj/newbudg.fin`, enter:

```
dsmc restore /project/budget.fin /newproj/newbudg.fin
```

Enter parameters in the order indicated in the command syntax diagram.

File specification syntax

Use the following syntax rules when entering file specification parameters, such as *filespec*, *sourcefilespec*, and *destinationfilespec*:

- If a file specification does not begin with a file space name (an opening directory delimiter), the file specification is assumed to be a subdirectory of the current working directory and Storage Manager builds the fully qualified file specification. For example, if the current working directory is `/home/me`, then the *destinationfilespec* would be `/home/me/mydir` in the following command:

```
dsmc restore "/fs/dir1/*" mydir/
```

- The only command that accepts a simple file space name is the **incremental** command. The following example is valid:

```
dsmc i /fs
```

The following example is *not* valid:

```
dsmc sel /fs
```

- When entering the *sourcefilespec*, if the directory name ends with /, then /* is implied.

When entering a *destinationfilespec*, if the name ends with /, then it is considered a directory, otherwise it is considered a file.

The following example illustrates these two rules. Even though *mydir* and *yourdir* are directories, the command will fail because /* is implied after *mydir*, and *yourdir* is considered a file:

```
restore /home/mydir/ /away/yourdir
```

The following example illustrates the second rule. Even though *mydir* and *yourdir* are directories, the command will fail because *mydir* and *yourdir* are considered files:

```
restore /home/mydir /away/yourdir
```

- Do not use wildcards as part of the file space name or anywhere in the *destinationfilespec*. The one exception to this rule is the **set access** command where wildcards are permitted in the two lowest-levels of the file spec. For example, use the following command to grant access to all files in and below the /fs/dir1 directory:

```
dsmc set access "/fs/dir1/*/*"
```

Do not use wildcards for the directory path name, for example:

```
/home/j*asler/file1.c
```

- The maximum number of characters for a file name is 256. The maximum number of characters for a path name is 1024 characters.
- The maximum number of file specifications per command:
 - The Query commands can accept only one file specification.
 - The **restore** and **retrieve** commands can accept a *sourcefilespec* and a *destinationfilespec*.
 - The **archive**, **delete archive**, **incremental**, and **selective** commands will accept as many as 20 file specifications.

Separate file specifications with a blank space.

Note: You can overcome these limitations by using the **filelist** option to process a list of files. The Storage Manager client opens the file you specify with this option and processes the list of files within according to the specific command. See “Filelist” on page 179 for more information.

Maximum file size for operations

Table 44 specifies the maximum file sizes for backup, restore, archive, and retrieve operations.

Table 44. Maximum file size for backup, restore, archive, and retrieve

Platform	Max file size (in bytes)
AIX	68,589,453,312 (64GB)
AIX 5L	68,589,453,312 (64GB)
HP-UX	1,099,511,627,775 (1TB-1)
Linux86 and 390	9,223,372,036,854,775,807 (8EB-1)
OS/390 UNIX	4,294,967,295 (4GB)
SGI	18,446,744,073,709,551,615 (16EB-1)
Solaris 2.6 or higher	1,099,511,627,775 (1TB-1)

Table 44. Maximum file size for backup, restore, archive, and retrieve (continued)

Platform	Max file size (in bytes)
Tru64 UNIX	1,099,511,627,776 (1TB)

Remembering previous commands

If you set the **editor** option to *yes* in your client options file (dsm.opt), Storage Manager permits you to recall and edit as many as 20 previously entered commands by using the Up arrow and Down arrow keys. If you set the **editor** option to *no*, the feature to recall previous commands is not active. If the editor and command retrieve functions are not working on a specific workstation setting, you should turn off the **editor** option. For more information regarding the **editor** option, see “Editor” on page 169.

Pressing the Up arrow key displays the previous command in memory. Pressing the Down arrow key displays the next command in memory. Table 45 lists other functions you can perform when you recall commands.

Note: Because of the limited functionality of the dtterm application, not all function keys of the command line clients operate as expected. The Control-Left and Control-Right combinations and the Home and End key do not work.

Table 45. 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
Move to the beginning of the previous word	Ctrl-left arrow or CTRL-L
Move to the beginning of the next word.	Ctrl-right arrow or CTRL-R
Delete a character to the right of the cursor.	Delete
Delete a character to the left of the cursor.	Backspace
Insert a character.	Toggle the Insert key
Erase to the end of the line.	Ctrl-delete or Ctrl-D
Finish or execute the command.	Enter
Quit the program.	F3 or Esc
End the program.	CTRL-C

Using wildcard characters

In a command, you can use wildcard characters in the file name or file extension *only*. You cannot use them to specify destination files, file systems, or directories. You cannot specify a directory whose name contains an asterisk (*) or a question Mark (?). Storage Manager recognizes these characters only as wildcard characters.

Use wildcard characters when you want to specify multiple files with similar names in *one* command. Without wildcard characters, you must repeat the command for each file. Valid wildcard characters that you can use include:

- * Asterisk. Matches zero or more characters.
- ? Question mark. Matches any single character at the present position.

Table 46 shows examples of each wildcard.

Table 46. Wildcard characters

Pattern	Matches	Does not match
Asterisk (*)		
ab*	ab, abb, abxxx	a, b, aa, bb
ab*rs	abrs, abtrs, abrsrs	ars, aabrs, abrss
ab*ef*rs	abefrs, abefghrs	abefr, abers
abcd.*	abcd.c, abcd.txt	abcd, abcdc, abcdtxt
Question Mark (?)		
ab?	abc	ab, abab, abzzz
ab?rs	abfrs	abrs, abllrs
ab?ef?rs	abdefjrs	abefrs, abdefrs, abefjrs
ab??rs	abcdrs, abzzrs	abrs, abjrs, abkkrs

Note: In batch mode, you must enclose values containing wildcards in double quotes. For example:

```
dsmc selective "/home/me/*.c"
```

Entering commands

Follow the general rules below when you enter commands:

- Enter a maximum of 256 characters on the command line. Enter the characters in a continuous string. If you press the return key, the command will process.
- When you enter options with a command, always precede the option with a dash (-).
- Enter more than one option in any order in a command before or after the file specification. Separate multiple options with a blank space.

Client commands reference

The following sections contain detailed information about each of the Storage Manager commands. Information for each command includes:

- A description of the command.
- A syntax diagram of the command. The command name contains uppercase and lowercase characters. The uppercase characters indicate the minimum abbreviation you can use for the command name. See “Reading syntax diagrams” on page x for an explanation of these diagrams.
- Detailed descriptions of the command parameters. If the parameter is a constant (a value that does not change), the minimum abbreviation appears in uppercase letters.
- Examples of using the command.

Archive

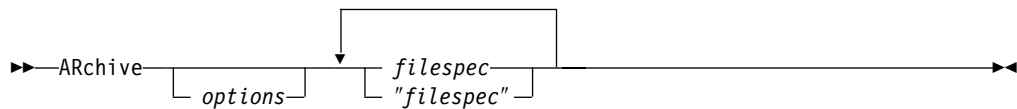
The **archive** command archives a single file, selected files, or all files in a directory and its subdirectories on a server.

Archive files that you want to preserve in their current condition. To release storage space on your workstation, delete files as you archive them using the **deletefiles** option. Retrieve the archived files to your workstation whenever you need them again.

Supported Clients

This command is valid for all UNIX clients.

Syntax



Parameters

options

You can use these client options with the **archive** command: **archmc**, **archsmlinkasfile**, **changingretries**, **compressalways**, **compression**, **deletefiles**, **description**, **dironly**, **filelist**, **filesonly**, **preservelastacessdate**, **subdir**, **tapeprompt**, **v2archive**, **volinformation**. For more information about these options, see “Client options reference” on page 139.

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. You can also enter up to 20 file specifications in a command. See “Maximum file size for operations” on page 289 for the maximum file size for archive processing.

Examples

- Task** Archive a single file named budget in the /home/proj1 directory.
Command: archive /home/proj1/budget
- Task** Archive all files in the /home/proj1 directory that contain 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/*"

Backup Image

The **backup image** command creates an image backup of one or more volumes on your system.

Notes:

1. The Storage Manager API must be installed to use the **backup image** command.
2. Image backup of the Sun QFS file system is not supported.
3. Open file support, the usage of GPFS snapshot, and image backup is not supported for GPFS file systems on Linux86.

The Storage Manager client must support the raw device type on the specific platform to perform an image backup of a raw device. You can only perform an image backup on local devices. Clustered devices or file systems as well as devices or file systems shared between two or more systems are not supported. If you want to perform an image backup for a file system mounted on a raw device, the raw device must be supported. See “Volume device type support for an image backup” on page 73 for specific information about supported devices for the **backup image** command.

Use the **include.image** option to include a file system or logical volume for image backup, or to specify volume-specific options for image backup.

Static, dynamic, and snapshot image backup

The traditional image backup prevents access to the volume by other system applications during the operation. Use the **imagetype=dynamic** option to back up the volume *as is* without remounting it read-only. Corruption of the backup may occur if applications write to the volume while the backup is in progress. In this case, run **fsck** after a restore.

For Linux86 *only*: 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 Storage Manager server.

You can use the **imagetype** option with the **backup image** command or the **include.image** option to specify whether to perform a static, dynamic, or snapshot image backup. See “Imagetype” on page 191 for more information.

The Linux Logical Volume Manager allows the creation of a snapshot of a logical volume while the logical volume itself is still online. The snapshot is created inside the same volume group as the source logical volume. You must ensure that the volume group provides enough free disk space to create the snapshot. The snapshot contains the old data blocks while the modified data is stored in the source logical volume. Use the **snapshotcachesize** option with the **backup image** command, in the **dsm.opt** file, or with the **include.image** option to specify an appropriate snapshot size so that all old data blocks can be stored while the image backup occurs. A snapshot size of 100 percent will ensure a valid snapshot. See “Snapshotcachesize” on page 257 for more information.

Utilizing image backup to perform file system incremental backup

There are two methods of utilizing image backups to perform efficient incremental backups of your file system. These backup methods allow you to perform point-in-time restore of your file systems and improve backup and restore performance. You can perform the backup only on formatted volumes; not on raw

logical volumes. You can use one of the following methods to perform image backups of volumes with mounted file systems.

Method 1 Using image backup with file system incremental:

1. Perform a full incremental backup of the file system, for example:

```
dsmc incremental /myfilesystem
```

2. Perform an image backup of the same file system, for example:

```
dsmc backup image /myfilesystem
```

3. Periodically, perform incremental backups, for example:

```
dsmc incremental /myfilesystem
```

You must follow these steps in the order shown to ensure that the server records additions and deletions accurately.

4. The following command restores the file system to its exact state as of the last incremental backup:

```
dsmc restore image /myfilesystem -incremental -deletefiles
```

During the restore, the client does the following:

- Restores the most recent image on the server.
- Deletes all the files that are inactivated on server. Deletes all of the files restored in the previous step which are inactive on the server. These are files which existed at the time of the image backup, but were subsequently deleted and recorded by a later incremental backup.
- Restores new and changed files from the incremental backups.

If you do not follow the steps exactly, two things can occur:

- After the original image is restored, all files backed up with the **incremental** command are restored individually.
- If you perform a **backup image** before performing an **incremental**, files deleted from the original image are *not* deleted from the final restored file system.

Method 2 Using image backup with image incremental mode:

1. Perform an image backup of the same file system, for example:

```
dsmc backup image /myfilesystem
```

2. Perform an incremental image backup of the file system, for example:

```
dsmc backup image /myfilesystem -mode=incremental
```

This sends only those files that were added or changed since the last image backup to the server. For more information, see “Mode” on page 214.

3. Periodically, perform full image backups, for example:

```
dsmc backup image /myfilesystem
```

4. Restore the image as follows:

```
dsmc restore image /myfilesystem -incremental
```

On restore, Storage Manager ignores the **deletefiles** option when the image+image incremental technique of backing up has been used. The restore will include files that were deleted after the last full image backup plus the latest versions of files added or changed after the last image backup.

Note: You should perform full image backups periodically in the following cases:

- When a file system changes substantially (more than 40%), as indicated in step 3 of methods 1 and 2.

- Once each month.
- As appropriate for your environment.

This will improve restore time because fewer changes are applied from incrementals.

The following restrictions apply when using method 2:

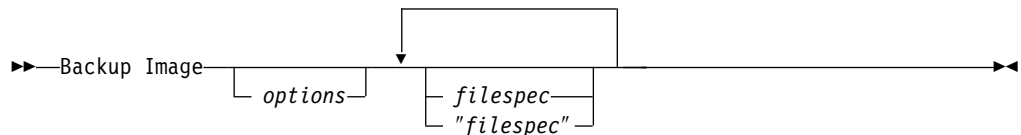
- The file system can have no previous full incremental backups produced by the **incremental** command.
- Incremental-by-date image backup does not inactivate files on the server; therefore, when files are restored, none can be deleted.
- If this is the first image backup for the file system, a full image backup is performed.
- Using **mode=incremental** backs up only files with a changed date, not files with changed permissions.
- If file systems are running at or near capacity, an out-of-space condition could result during the restore.

To help you decide which method is appropriate for your environment, see “Comparing methods 1 and 2” on page 74.

Supported Clients

This command is valid for AIX, AIX 5L, HP/UX, Linux86, and Solaris *only*.

Syntax



Parameters

options

You can use these client options with the **backup image** command: **imagetype**, **mode**, **snapshotcachesize**. For information, see Chapter 9, “Using processing options”, on page 121.

filespec

Specifies the name of one or more logical volumes. If you want to back up more than one file system, separate their names with spaces. Do not use pattern matching characters. If you do not specify a volume name, the logical volumes specified with the **domain.image** option will process. If you do not use the **domain.image** option to specify file systems to process, an error message displays and no image backup occurs.

Specify the file space over which the logical volume is mounted or the logical volume name. If there is a file system configured in the system for a given volume, you cannot back up the volume with the device name. For example, if /dev/lv01 is mounted on /home you can issue backup image /home but backup image /dev/lv01 will fail with an error: ANS1063E Invalid path specified.

For Sun systems: Specify either a file system name or a raw device name (block device type).

Examples

Task Back up the /home/test file space over which the logical volume is mounted and perform an image incremental backup that backs up only new and changed files after the last full image backup.

Command: `dsmc backup image /home/test -mode=incremental`

Task Perform a static image backup of the /home directory.

Command: `dsmc backup image /home -imagetype=static`

Task Perform a snapshot image backup of the /home directory.

Command: `dsmc backup image /home -imagetype=snapshot`

Task Back up the /dev/lv01 raw logical volume.

Command: `dsmc backup image /dev/lv01`

Backup NAS

The **backup nas** command creates an image backup of one or more file systems belonging to a Network Attached Storage (NAS) file server. The NAS file server performs the outboard data movement. A server process starts in order to perform the backup.

Use the **nasnodename** option to specify the node name for the NAS file server. When using an interactive command line session with a non-administrative ID, Storage Manager prompts for an administrator ID. The NAS node name identifies the NAS file server to the Storage Manager server; the NAS node name must be registered at the server. Place the **nasnodename** option in your client system options file (dsm.sys). The value in the client system options file is the default, but can be overridden on the command line. See “Nasnodename” on page 216 for more information.

Use the **mode** option to specify whether to perform a full or differential NAS image backup. A full image backup backs up the entire file system. The default is a differential NAS image backup on files that change after the last full image backup. If an eligible full image backup does not exist, a full image backup is performed. See “Mode” on page 214 for more information.

Use the **monitor** option to specify whether you want to monitor a NAS file system image backup and display processing information on your screen. See “Monitor” on page 215.

Use the **monitor process** command to display a list of all processes for which an administrative user ID has authority. The authorized administrative user ID should have at least client owner authority over both the NAS node and the client workstation node they are using either from command line or from the web.

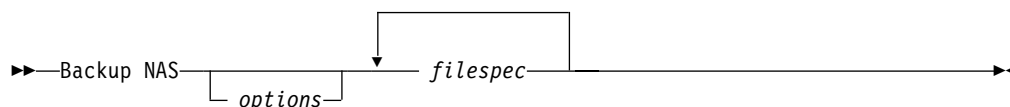
Use the **cancel process** command to stop NAS back up processing. For more information, see “Cancel Process” on page 299.

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, AIX 5L, and Solaris clients *only*.

Syntax



Parameters

options

You can use these client options with the **backup nas** command: **mode**, **monitor**, **nasnodename**, **quiet**, **verbose**. For more information, see Chapter 9, “Using processing options”, on page 121.

filespec

Specifies the name of one or more file systems on the NAS file server. If you do not specify this parameter, Storage Manager processes all of the file systems defined by the **domain.nas** option. For more information about this option, see “Domain.nas” on page 167.

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

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, Storage Manager prompts for an administrator ID.

Supported Clients

This command is valid for AIX, AIX 5L, and Solaris clients *only*.

Syntax

►►—Cancel Process—◄◄

Parameters

There are no parameters for this option.

Examples

Task Cancel current NAS image backup or restore processes.

Command: cancel process

Cancel Restore

The **cancel restore** command displays a list of your restartable restore sessions in the server database. You can only cancel one restartable restore session at a time. Run the **cancel restore** command again to cancel additional restores. To restart restartable restore sessions, use the **restart restore** command.

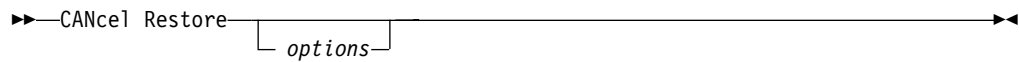
Use the **cancel restore** command when:

- You cannot back up files affected by the restartable restore.
- Restartable restore sessions lock the file space so that files cannot be moved off of the server's sequential volumes.

Supported Clients

This command is valid for all UNIX clients.

Syntax



Parameters

options

See Chapter 9, “Using processing options”, on page 121 for information about client options that you can use with the **cancel restore** command.

Examples

Task Cancel a restore operation.

Command: cancel restore

Delete Archive

The **delete archive** command deletes archived files from server storage. Your administrator must give you authority to delete archived files.

Attention: When you delete archived files, ***you cannot retrieve them.*** Verify that the files are obsolete *before* you delete them.

Supported Clients

This command is valid for all UNIX clients.

Syntax

```
►► Delete ARchive [ options ] [ filespec ] _____ ►►  
                    [ "filespec" ]
```

Parameters

options

You can use these client options with the **delete archive** command: ***description***, ***filelist***, ***noprompt***, ***pick***, ***subdir***. For more information about these options, see “Client options reference” on page 139.

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. You can also enter up to 20 file specifications in a command

Examples

Task Delete a file named budget.

Command: del ar /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.

Command: d ar "/user/project/*" -pick

Delete Filespace

Authorized User

The **delete filesystem** command deletes file spaces from server storage. A *file space* is a logical space on the server that contains files or images you backed up or archived. 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 displays. From this list, select the file space that you want to delete.

Your administrator must give you authority to delete a file space. You need BACKDEL authority if the file space you want to delete contains backup versions, or ARCHDEL authority if the file space contains archive copies. If the file space contains *both* backup versions and archive copies, you need both types of authority.

Deleting NAS file spaces

You can use the **delete 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, Storage Manager prompts for an administrator ID. Place the **nasnodename** option in your client system options file (dsm.sys). The value in the client system options file is the default, but this value can be overridden on the command line. If the **nasnodename** option is not specified in the client system options file, you must specify this option on the command line when processing NAS file systems. See “Nasnodename” on page 216 for more information.

Use the **class** option to specify the class of the file space to delete. To display a list of file spaces belonging to a NAS node so that you may choose one to delete, use the **-class=nas** option. Using the default, **-class=client**, will not change the current **delete filesystem** behavior. See “Class” on page 145 for more information.

To delete NAS file spaces using the Web client, see Chapter 4, “Backing up files and directories”, on page 61.

Attention: When you delete a file space, you delete *all* backup versions and archive copies within that file space. When you delete a file space, ***you cannot restore the files or images***. Verify that the files or images are obsolete *before* you delete them.

Supported Clients

This command is valid for all UNIX clients.

Syntax

➤➤ Delete Filespace ————— ➤➤
 └ options ─┘

Parameters

options

You can use these client options with the **delete filesystem** command: ***detail***, ***class***, ***nasnodename***, ***scrolllines***, ***scrollprompt***. For more information, see “Client options reference” on page 139.

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

Expire

The **expire** command inactivates the backup objects you specify in the file specification or with the **filelist** option.

When working in interactive mode, a prompt notifies you before files are expired.

The **expire** command does not remove workstation files. If you expire a file or directory that still exists on your workstation, the file or directory is backed up again during the next incremental backup unless you exclude the object from backup processing.

If you expire a directory that contains active files, those files will not appear in a subsequent query from the GUI. However, these files will display on the command line if you specify the proper query with a wildcard character for the directory.

Supported Clients

This command is valid for all UNIX clients.

Syntax

►►—EXpire—options—filespec—►►

Parameters

options

You can use these client options with the **expire** command: **pick**, **filelist**, **noprompt**. For more information about these options, see “Client options reference” on page 139.

Note: If you specify **filelist**, then **pick** is ignored.

filespec

Specifies a path and a filename that you want to expire. You can enter only one file specification on this command. However, you can use wildcards to select a group of files or all the files in a directory. If you specify the **filelist** option, the *filespec* designation is ignored.

Examples

Task Inactivate the letter1.txt file in the home directory.

Command: expire "u/home/letter1.txt"

Task Inactivate all files in the admin/mydir directory.

Command: expire u/admin/mydir/*

Help

The **help** command displays a Table of Contents of help topics for the command line client. Enter the number of the topic that you want to view. If there is more than one screen of topics, scroll backward or forward through the list. To exit, type **q** and press Enter.

Supported Clients

This command is valid for all UNIX clients.

Syntax

►►—Help—►►
└─ *options* ─┘

Parameters

options

For information about client options that you can use with this command, see Chapter 9, “Using processing options”, on page 121.

Examples

Task Display a list of help choices.

Command: help

Incremental

The **incremental** command backs up all new or changed files or directories in the default client domain or from file systems, directories, or files you specify, unless you exclude them from backup services.

To incrementally back up selected files or directories, enter a file specification in the command. If you do not enter a file specification, the default is to back up files or directories in the default domain.

The following attributes in the management class assigned to the file or directory affect whether the data is actually backed up:

Frequency

The number of days that must elapse between successive backups for the file. The **frequency** attribute applies only to a full incremental backup.

Mode Permits you to back up only files that changed since the last backup (*modified*). Also permits you to back up the files whether they changed or not (*absolute*).

Serialization

Permits or denies backup of files or directories according to the following values:

- **static**: In order to be backed up, data must not be modified during backup or archive.
- **shared static**: If data in the file or directory changes during each of the allowed attempts to back up or archive it, it is not backed up or archived. The value of the **changingretries** option determines how many attempts are made. The default is 4.
- **dynamic**: The object is backed up or archived on the first attempt whether or not data changes during the process.
- **shared dynamic**: The object is backed up or archived on the last attempt, even if data changes during the process.

For more information on management classes, see Chapter 8, “Understanding storage management policies”, on page 111.

Using the **include** option in an include-exclude list, you can assign the default management class to a file. You can also assign a specific management class to a file.

You can perform either a *full incremental* backup or an *incremental by date* backup. The default is a full incremental backup.

You can also use the **selective** command to perform a *selective* backup that backs up only the files, directories or empty directories that you specify. For more information, see “Selective” on page 344.

A full incremental backs up all files or directories that are new or have changed since the last incremental backup. During a full incremental backup, the client queries the server to determine the exact condition of your storage. 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.

Incremental-by-Date

An incremental-by-date backup backs up new and changed files with a modification date later than the date of the last incremental backup stored at the server, unless the files are excluded from backup by an **exclude** statement.

If an incremental-by-date is performed on only part of a file system, the date of the last full incremental is not updated, and the next incremental-by-date will back up these files again. Changes to the access control lists (ACL) are not backed up during an incremental-by-date. Use the **query filespace** command to determine the date and time of the last incremental backup of the entire file system.

To perform an incremental-by-date backup, use the **incrbydate** option with the **incremental** command.

Unlike a full incremental, an incremental-by-date does not maintain current server storage of *all* your workstation files because:

- It does not expire backup versions of files that are deleted from the workstation.
- It does not rebind backup versions to a new management class if the management class has changed.
- It does not back up files with attributes that have changed, unless the modification dates and times have also changed.
- It ignores the copy group frequency attribute of management classes.

For these reasons, if you have limited time during the week to perform backups, but extra time on the weekends, you can perform an incremental-by-date backup on weekdays and a full incremental backup on weekends to maintain current server storage of your workstation files.

If the **incremental** command is retried because of a communication failure or session loss, the transfer statistics will display the number of bytes Storage Manager attempted to transfer during *all* command attempts. Therefore, the statistics for bytes transferred may not match the file statistics, such as those for file size.

File system and ACL support

Special file systems contain dynamic information generated by the operating system; they contain no data or files. The UNIX client ignores special file systems and their contents. Special file systems include the following:

- the **/proc** file system on most of the UNIX platforms
- the **/dev/fd** file system on Solaris and SGI
- the **/dev/pts** on Linux

Storage Manager provides ACL support for the client file systems in Table 47.

Table 47. Supported file systems and ACL Support

Platform	File System	ACL Support
AIX	jfs	yes
	gpfs	yes
	afs/dfs	yes
	JFS2	yes

Table 47. Supported file systems and ACL Support (continued)

Platform	File System	ACL Support
AIX 5L	jfs	yes
	gpfs	yes
	afs/dfs	yes
	JFS2	yes
HP-UX	hfs	yes
	VxFS (JFS Veritas)	yes (V3.3.Layout 4)
Linux86	ext2	no
	ext3	no
	jfs	no
	reiserfs	no
	gpfs	yes
Linux/390	ext2	yes
	reiserfs	no
OS/390 UNIX	hfs	no
	zfs	yes
SGI	efs	no
	xfs	yes
Solaris	ufs	yes
	VxFS	yes
	QFS	no
Tru64 UNIX	ufs	yes
	advfs (advanced FS)	yes

Notes:

- Beginning with Version 3.7.2, Storage Manager provides full ACL support for GPFS file systems on the AIX client and XFS file systems on the SGI client. Files with an ACL set, backed up with a Version 3.7.1 or lower client, must be backed up again even if the files have not changed. This updates the ACL data on the server.
- For GPFS ACL support on Linux86, the Storage Manager client uses libgpfs.so library (which comes in the standard GPFS package), so it is searched for in the following locations:
 - A colon-separated list of directories in the user's LD_LIBRARY_PATH environment variable.
 - The list of libraries cached in /etc/ld.so.cache.
 - /usr/lib, followed by /lib.
- 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.

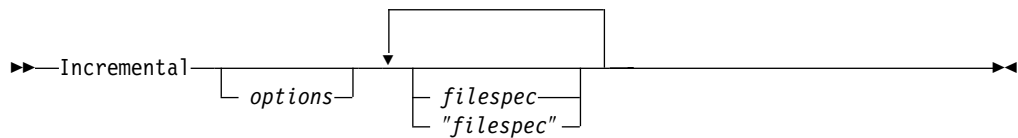
Attention: If you are running GPFS for AIX or GPFS for Linux86 in a multi-node cluster, and all nodes share a mounted GPFS file system, Storage Manager processes this file system as a local file system. Storage Manager backs up the file system on each node during an incremental backup. To avoid this, you can do *one* of the following:

- Explicitly configure the **domain** statement in the client system options file (dsm.sys) to list the file systems you want that node to back up.
- Set the **exclude.fs** option in the client system options file (dsm.sys) to exclude the GPFS file system from backup services.

Supported Clients

This command is valid for all UNIX clients.

Syntax



Parameters

options

You can use these client options with the **incremental** command: **changingretries**, **compressalways**, **compression**, **dironly**, **domain**, **filelist**, **filesonly**, **incrbydate**, **memoryefficientbackup**, **preservelastaccessdate**, **subdir**, **tapeprompt**, **volinformation**. For more information, see “Client options reference” on page 139.

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. You can also enter up to 20 file specifications in a command by separating the file specifications with a space. 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 all files in the /fs/dir1 directory that begin with the string abc.

Command: Incremental -subdir=yes "/fs/dir1/abc*"

Task Run an incremental backup of the abc file in the /fs/dir1 directory.

Command: Incremental -subdir=yes /fs/dir1/abc

Task Run an incremental backup of the directory object /fs/dir1, but not any of the files in the /fs/dir1 directory.

Command: Incremental /fs/dir1

Task Run an incremental backup of the directory object /fs/dir1 and all of the files in the /fs/dir1 directory.

Command: Incremental -subdir=yes /fs/dir1/

Loop

The **loop** command starts an interactive command line session that is maintained until you enter **quit**. In an interactive command line session, it is unnecessary to precede each command name with **dsmc** and your password, if one is required. After you start an interactive session, most of the options you enter with other commands are in effect throughout the session, unless you enter them again using a different setting.

You can enter all valid commands in interactive mode *except* the **schedule** and **loop** commands.

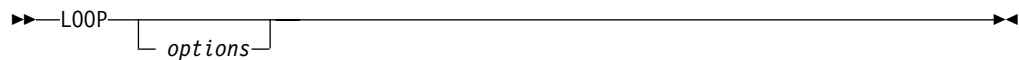
There are some options that you cannot use in the interactive session created by the **loop** command and are identified in the option description by this statement: *This option is valid only on the initial command line. It is not valid in interactive mode.*

See Chapter 9, “Using processing options”, on page 121 for options that you cannot use in interactive mode.

Supported Clients

This command is valid for all UNIX clients.

Syntax



Parameters

options

For information about client options that you can use with this command, see “Client options reference” on page 139.

Examples

Task Start an interactive command line session.

Command: dsmc

At the **tsm>** prompt, enter a command.

Macro

The **macro** command executes a series of commands that you specify in a macro file. By including the **macro** command within a macro file, you can nest as many as ten levels of commands.

Comment lines are not supported within the macro file that you specify for the **macro** command.

Supported Clients

This command is valid for all UNIX clients.

Syntax

►►—Macro— *macroname* —————►►

Parameters

macroname

Specifies the fully qualified name of the file containing the commands.

Examples

The following is an example of how to use the **macro** command.

Task Selectively back up files in the following directories:

/devel/project/proja
/devel/project/projb
/devel/project/projc

Command: macro backabc.mac

where backabc.mac contains the following statements:

Selective /devel/project/proja/
Selective /devel/project/projb/
Selective /devel/project/projc/

Monitor Process

The **monitor process** command displays a list of current NAS (if NDMP support is enabled) image backup and restore processes for which the administrative user has authority. The administrative user can then select one process to monitor. Client owner privilege is sufficient authority to monitor the selected NAS image backup or restore processes.

When using an interactive command line session with a non-administrative ID, Storage Manager prompts for an administrator ID.

Supported Clients

This command is valid for AIX, AIX 5L, and Solaris clients *only*.

Syntax

►►—MONitor Process—◄◄

Parameters

There are no parameters for this command.

Examples

Task Monitor current NAS image backup or restore processes.

Command: monitor process

Query Access

The **query access** command displays a list of users to whom you have given access to backup versions or archive copies of specific files. Storage Manager displays a list of authorization rules that you defined with the **set access** command or with **User Access List** on the graphical user interface (GUI) Utilities menu. The information includes:

- Authority you gave a user to restore backup versions or retrieve archive copies.
- The node name of the user to whom you gave authorization.
- The ID of the user at that node to whom you gave authorization.
- The files to which the user has access.

Supported Clients

This command is valid for all UNIX clients.

Syntax

►► Query Access options ◄◄

Parameters

options

You can use the following client options with the **query access** command: **scrolllines**, **scrollprompt**. For more information about client options you can use with this command, see Chapter 9, “Using processing options”, on page 121.

Examples

Task Display a list of users who have access to your files.

Command: query access

Query Archive

The **query archive** command displays a list of your archived files and the following information about each file:

- File size
- Archive date
- File specification
- Expiration date
- Archive description

If you use the **detail** option with the **query archive** command, the client displays the following additional information:

- Last modification date
- Last access date

Supported Clients

This command is valid for all UNIX clients.

Syntax

```
→ Query Archive [ options ] [ filespec "filespec" ] →
```

Parameters

options

You can use these client options with the **query archive** command: **description**, **detail**, **dironly**, **filelist**, **filesonly**, **fromdate**, **fromnode**, **fromowner**, **fromtime**, **scrolllines**, **scrollprompt**, **sudir**, **todate**, **totime**. For more information, see “Client options reference” on page 139.

filespec

Specifies the path and file name that you want to query. Use wildcard characters to specify a group of files or all the files in a directory. If you use wildcard characters, enclose the file specification in double quotation marks. Specify an asterisk (*) to query all archived files in the current directory.

Examples

Task Display a list of all your archived files in the current working directory.

Command: q archive "*"

Task Display a list of all your archived files in the /devel directory and all of its subdirectories.

Command: query archive "/devel/*" -subdir=yes

Task Display a list of all your archived files in the current directory. Use the **dateformat** and **timeformat** options to reformat the dates and times.

Command: q ar -date=5 -time=1 "*"

Task Display a list of all your archived files in the current directory. Use the **detail** option to display the last modification date and the last access date of each file.

Command: q ar -detail "*"

Task Display a list of archived files in the /home/proj directory whose first four characters of the file name begin with proj.

Command: `q ar "/home/proj/proj*"`

Query Backup

The **query backup** command displays a list of backup versions of your files. File information includes the following:

- File specification
- File size
- Backup date
- Whether the file is active or inactive
- The management class assigned to the file. Only the first ten characters of the management class name appear.

If you use the **detail** option with the **query archive** command, the client displays the following additional information:

- Last modification date
- Last access date

Querying NAS file system images

You can use the **query backup** command to display information about file system images backed up for a NAS file server.

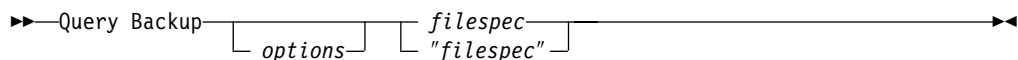
Use the **nasnodename** option to identify the NAS file server to query. When using an interactive command line session with a non-administrative ID, Storage Manager prompts for an administrator ID. Place the **nasnodename** option in your client system options file (dsm.sys). The value in the client system options file is the default, but this value can be overridden on the command line. See “Nasnodename” on page 216 for more information.

Use the **class** option to specify the class of the file space to query. To display a list of images belonging to a NAS node, use the **-class=nas** option. Using the default, **-class=client**, will not change the current **query backup** behavior. See “Class” on page 145 for more information.

Supported Clients

This command is valid for all UNIX clients.

Syntax



Parameters

options

You can use these client options with the **query backup** command: **class**, **detail**, **dirsonly**, **filelist**, **filesonly**, **fromdate**, **fromnode**, **fromowner**, **fromtime**, **inactive**, **nasnodename**, **pitdate**, **pittime**, **scrolllines**, **scrollprompt**, **subdir**, **todate**, **totime**. For more information, see “Client options reference” on page 139.

filespec

Specifies the path and file name that you want to query. Use wildcard characters to specify a group of files or all the files in a directory. If you use wildcard characters, enclose the file specification in double quotation marks. Specify an asterisk (*) to display information about backup versions for all of your files in the current directory. Do not use wild cards when you query NAS file system images with **-class=nas** option.

Examples

- Task** Display a list of all active and inactive backup versions of your files in the current directory.
- Command:** `query backup -inactive "*"`
- Task** Display a list of all your backups in the current directory. Use the ***detail*** option to display the last modification date and the last access date of each file.
- Command:** `q backup -detail "*"`
- Task** Display a list of files that were backed up from the `/home/proj` directory with file names that begin with `proj`. Use the ***dateformat*** and ***timeformat*** options.
- Command:** `q b -date=1 -time=4 "/home/proj/proj*"`
- Task** Display a list of active and inactive backup file versions in the `/home` file system. Use the ***dateformat*** and ***timeformat*** options.
- Command:** `q b -date=5 -time=1 -ina -su=yes /home/`
- Task** Query file system images from the **nas2** NAS file server.
- Command:** `query backup -nasnodename=nas2 -class=nas`

Query Backupset

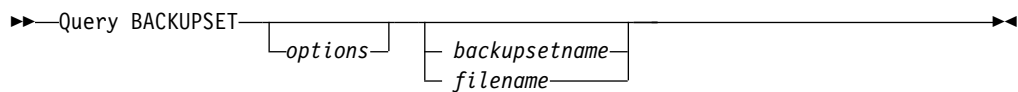
The **query backupset** command queries a backup set from a local file, tape device, or the server. See “Location” on page 207 for information on how to specify supported tape devices. This command displays the backup set name, generation date, retention, and description.

You can use this command to query backup sets on a tape device with AIX, AIX 5L, Solaris, and HP clients *only*.

Supported Clients

This command is valid for all UNIX clients.

Syntax



Parameters

options

You can use these client options with the **query backupset** command: ***description, location, scrolllines, scrollprompt, subdir***. See “Client options reference” on page 139 for information about these options.

backupsetname

Specifies the name of the backup set on the server you want to query when ***-location=server*** is in effect. You can use wildcards to specify the backup set name. If you do not specify a backup set name, all backup sets display on the screen.

filename

Specifies the file name on your local workstation that contains the backup set you want to query when ***-location=file*** is in effect.

Examples

Task Query a backup set called mybackupsetname on the server.

Command: query backupset "mybackupsetname" -loc=server

Task Query the backup set in the backupsetfile.name file in the budget directory.

Command: dsmc query backupset "/home/budget/backupsetfile.name"
-loc=file

Task Query the backup set on the /dev/rmt0 tape device.

Command: dsmc query backupset /dev/rmt0 -loc=tape

Query Image

The **query image** command displays information about file system images backed up by a client. The options are used to determine the content and detail of the information.

Note: The Storage Manager API must be installed to use the **query image** command.

Supported Clients

This command is valid for AIX, AIX 5L, HP/UX, Linux86, and Solaris *only*.

Syntax

►►—Query Image—┐ options ┐ logicalvolumename
filespace name ┐◄◄

Parameters

options

You can use these client options with the **query image** command: ***inactive***, ***fromnode***, ***fromowner***, ***pitdate***, ***pittime***, ***scrolllines***, ***scrollprompt***. See “Client options reference” on page 139 for information about these options.

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 name

Specifies the file system name that you want to query.

Omitting *logicalvolumename* and *filespace name* causes all images to display.

Examples

Task Display all backed up images.

Command: q image

Task Display all backed up images owned by **kutras** at node **avalon**.

Command: query image -fromnode=avalon -fromowner=kutras

Task Display active and inactive version of the **/usr** image.

Command: q i /usr -inactive

Query Inclexcl

The **query inclexcl** command displays a list of include-exclude statements in the order in which they are processed during backup and archive operations. The list displays the type of option, the scope of the option (archive, all, etc.), and the name of the source file.

You can test the validity of patterns you wish to use in your include-exclude list before you actually insert them in your options file. See the *test pattern* explanation below.

Supported Clients

This command is valid for all UNIX clients.

Syntax

►►—Query INCLexcl—┐
 └test pattern┘◄◄

Parameters

test pattern

Use for testing the validity of patterns you wish to use in your include-exclude list. When you use a test pattern with this command, the following occurs:

- The internal include-exclude list is *not* displayed
- The pattern is processed as if it had come from an include-exclude statement, including all the usual error checking
- The pattern is displayed as it would appear in the include-exclude list

If the test pattern has no errors, the compiled pattern result is the same as the test pattern.

Examples

Task Display a list of include-exclude statements.

Command: query inclexcl

Task Test the validity of this pattern: /.../?x?/*.log

Command: query inclexcl /.../?x?/*.log

Query Mgmtclass

The **query mgmtclass** command displays information about the management classes available in your active policy set.

Your administrator defines management classes that contain attributes controlling whether a file is eligible for backup or archive services. Management classes also determine how backups and archives are managed on the server.

Your active policy set contains a default management class; it can contain any number of additional management classes. You can assign specific management classes to files using **include** options that are located in the client user options file (dsm.opt). If you do not assign a management class to a file, Storage Manager uses the default management class.

When you archive files, you can override the assigned management class by using the **archmc** option.

Supported Clients

This command is valid for all UNIX clients.

Syntax

```
►►—Query Mgmtclass—┐ options┘────────────────────────────────────────►►
```

Parameters

options

You can use these client options with the **query mgmtclass** command: **detail**, **fromnode**. For more information about these options, see “Client options reference” on page 139.

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 both the NAS node and the client workstation node they are using either from command line or from the web.

When using an interactive command line session with a non-administrative ID, Storage Manager prompts for an administrator ID.

Use the **type** option to specify the type of node to filter for. Valid values are *nas*, *client*, *server* and *any*. The default is *any*. See “Type” on page 273 for more information.

Supported Clients

This command is valid for AIX, AIX 5L, and Solaris clients *only*.

Syntax

►► Query Node options ◄◄

Parameters

options

You can use these client options with the **query node** command: **type**, **scrolllines**, **scrollprompt**. For more information, see Chapter 9, “Using processing options”, on page 121.

Examples

Task Display all NAS nodes.

Command: query node -type=nas

Query Restore

The **query restore** command displays a list of your restartable restore sessions in the server database. The list contains these fields: owner, replace, subdir, preservepath, source, and destination.

A restartable restore session is created when a wildcard restore command fails because of network outage, client failure, server outage, or a similar problem. When such a failure occurs, the file space is locked on the server and its files cannot be moved off the server's sequential volumes. To unlock the file space, either restart the restore and allow it to complete (**restart restore** command), or cancel the restore (**cancel restore** command). Use **query restore** to determine if you have any restartable restore sessions and which file spaces are affected.

Supported Clients

This command is valid for all UNIX clients.

Syntax

►► Query Restore [*options*] ◄◄

Parameters

options

For information about client options you can use with the **query restore** command, see Chapter 9, "Using processing options", on page 121.

Examples

Task Display your restartable restore session in the server database.

Command: query restore

Query Schedule

The **query schedule** command displays the events scheduled for your node. Your administrator can set up schedules to perform automatic backups and archives for you. To plan your work, use this command to determine when the next scheduled events occur.

Supported Clients

This command is valid for all UNIX clients.

Syntax

```
►►—Query SChedule—┐ options┘◄◄
```

Parameters

options

You can use the **dateformat** client option with the **query schedule** command. See “Dateformat” on page 152 for more information.

Examples

Task Display your scheduled events.

Command: query schedule

Query Session

The **query session** command displays information about your session, including the current node name, when the session was established, server information, and server connection information.

Supported Clients

This command is valid for all UNIX clients.

Syntax

```
►►—Query Session—┐ options ┘◄◄
```

Parameters

options

For information about client options you can use with the **query session** command, see Chapter 9, “Using processing options”, on page 121.

Examples

Task Display your session information.

Command: query session

A sample **query session** display follows:

```
Tivoli Storage Manager
Command Line Backup Client Interface - Version 5, Release 1,
Level 0.0 (C) Copyright IBM Corporation, 1990, 2002 All
Rights Reserved.
```

```
Node Name: EPSILON3
Session established with server FIJI_0918GA: AIX-RS/6000
  Server Version 5, Release 1, Lev. 0.0
  Server date/time: 03/04/2002 15:09:52
  Last access: 03/04/2002 15:09:40
```

Server Connection Information

```
Server Name.....: FIJI_0918GA
Server Type.....: AIX-RS/6000
Server Version.....: Ver. 5, Rel. 1, Lev. 0.0
Last Access Date.....: 09/04/1999 15:09:40
Delete Backup Files.....: Yes
Delete Archive Files.....: Yes
```

```
Node Name.....: EPSILON3
User Name.....: thompson
```

Restart Restore

The **restart restore** command displays a list of your restartable restore sessions in the server database. You can only restart one restartable restore session at a time. Run the **restart restore** command again to restart additional restores.

The restarted restore uses the same options you used in the failed restore. The restarted restore continues from the point at which the restore previously failed.

To cancel restartable restore sessions, use the **cancel restore** command. Use the **restart restore** command when:

- Restartable restore sessions lock the file space at the server so that files cannot be moved off the server's sequential volumes.
- You cannot back up files affected by the restartable restore.

Options from the failed session supersede new or changed options for the restarted session.

Supported Clients

This command is valid for all UNIX clients.

Syntax

►►—REStArt Restore —————►◄
 └ options ─┘

Parameters

options

For information about client options you can use with the **restart restore** command, see Chapter 9, “Using processing options”, on page 121.

Examples

Task Restart a restore.

Command: restart restore

Restore

The **restore** command obtains copies of backup versions of your files from a server. To restore files, specify the directories or selected files, or select the files from a list. Restore files to the directory from which you backed them up or to a different directory. Storage Manager uses the ***preservepath*** option with the ***subtree*** value as the default for restoring files. For more information, see “Preservepath” on page 237.

Note: On UNIX systems when a symbolic link is created its modification time is set to the current system time and cannot be changed. So, when restoring a symbolic link its modification date and time is set to the date and time of the restore, not to the date and time the link had when it was backed up. As a result, Storage Manager will back up the symbolic link during the next incremental backup because its modification time changed since the last backup.

If you set the ***subdir*** option to *yes* when restoring a specific path and file, 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***, ***today***, and ***fromdate*** options on the **restore** command, Storage Manager tracks which objects are restored. If the restore process is interrupted for any reason, you can restart the restore at the point of interruption by entering the **restart restore** command. It is possible to create more than one restartable restore session. Restores are only restartable if the *filespec* is fully wildcarded. For example, for a restore which is restartable, enter:

```
dsmc rest /home/* -sub=yes
```

For a restore which is not restartable, enter:

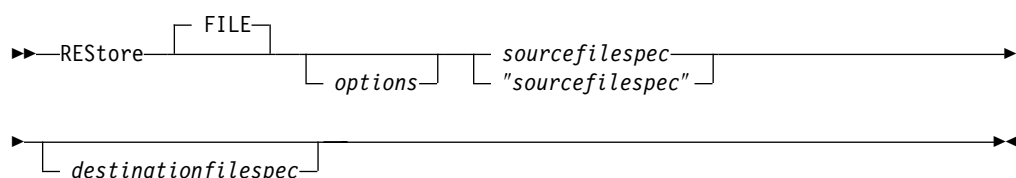
```
dsmc rest /home/file?.c -sub=yes
```

Use the **query restore** command to display a list of your restartable restore sessions in the server database. Further backups of the file system cannot be performed unless the restartable restore completes using the **restart restore** command or is cancelled using the **cancel restore** command.

Supported Clients

This command is valid for all UNIX clients.

Syntax



Parameters

file

This parameter specifies that the source file specification is an explicit filename.

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**. See “Maximum file size for operations” on page 289 for the maximum file size for restore processing.

options

You can use these client options with the **restore** command: **dironly**, **filelist**, **filesonly**, **followsymbolic**, **fromdate**, **fromnode**, **fromowner**, **fromtime**, **ifnewer**, **inactive**, **latest**, **pick**, **pitdate**, **pittime**, **preservepath**, **replace**, **subdir**, **tapeprompt**, **todate**, **totime**, **volinformation**. For more information, see “Client options reference” on page 139.

sourcefilespec

Specifies the path and file name in storage that you want to restore. Use wildcard characters to specify a group of files or all the files in a directory.

destinationfilespec

Specifies the path and file name where you want to place the restored files. If you do not specify a destination, Storage Manager restores the files to the original source path.

Note: If you do not specify a destination, Storage Manager determines whether the original file system can be reached. If the original file system cannot be reached, Storage Manager will not restore the file. This failure can also occur if you remove the **virtualmountpoint** option from the dsm.sys file. In this case, you can specify a different destination or restore the original **virtualmountpoint** option to the dsm.sys file, restart the client, and retry the command.

Examples

Task Restore a single file named budget.

Command: restore /home/devel/projecta/budget

Task Restore a single file named budget which resides in the current directory.

Command: restore file budget

Task Restore all files with a file extension of .c from the /home/devel/projecta directory.

Command: restore "/home/devel/projecta/*.c"

Task Restore files in the /user/project directory. Use the **pick** and **inactive** options to select active and inactive backup versions.

Command: restore "/user/project/*" -pick -inactive

Task Restore all files from the /home/devel/projecta directory that end with the character .c to the /home/newdevel/projectn/projecta directory. If the projectn or the projectn/projecta directory does not exist, it is created.

Command: restore "/home/devel/projecta/*.c"
/home/newdevel/projectn/

Task Restore all files in the /home/mydir directory to their state as of 1:00 PM on August 17, 2002.

Command: restore -pitd=8/17/2002 -pitt=13:00:00 /home/mydir/

Task Restore all objects in the /home/myid/ directory. Since this restore is fully wildcarded, if the restore process is interrupted, a restartable restore

session is created. Use the **restart restore** command to restart a restartable restore session. Use the **cancel restore** command to cancel a restartable restore session.

Command: `res /home/myid/*`

Task Restore files specified in the filelist to a different location.

Command: `res -filelist=/home/avi/restorelist.txt
/home/NewRestoreLocation/`

Restore Backupset

The **restore backupset** command restores a backup set from the server, a local file, or a local tape device.

If you are restoring a file space from a backup set to a system that did not perform the original backup, you may need to:

- Specify a destination
- Use the syntax below to specify the source file
- Do both of the above

```
dsmc restore backupset backupsetname {/fsname}/* /destfs/ -subdir=yes
```

You must be a root user to restore an entire backup set from the server, otherwise only files you own are restored. A backup set can also be restored from a tape device on the AIX, AIX 5L, Solaris, and HP clients. See “Location” on page 207 for more information.

If you are unable to restore a backup set from portable media, check with your Storage Manager administrator to ensure that the portable media was created on a device using a compatible format.

Note: There is no support in the API for the backup set format. Therefore, backup set data that was backed up via the API cannot be restored or used.

Attention: If the object you want to restore is part of a backup set generated on a node, and the node name is changed on the server, any backup set objects that were generated prior to the name change will not match the new node name. Ensure that the node name is the same as the node for which the backup set was generated.

Restoring backup sets in a SAN environment

You can restore backup sets in a storage area network (SAN) in the following ways:

- If the backup set is on a SAN-attached storage device, specify the device using the *filename* parameter and use the **location=tape** option. Storage Manager restores the backup set directly from the SAN-attached storage device, gaining high-speed restore performance.

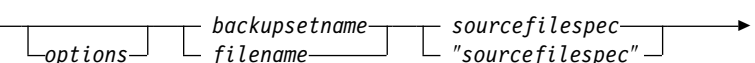
Note: You must ensure that the correct tape is mounted in the SAN-attached tape drive prior to issuing the **restore** command. The backup-archive client will not initiate a SCSI autochanger to mount the tape automatically.

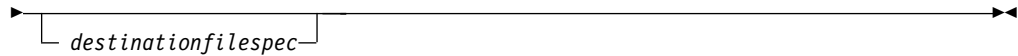
- If the backup set is not on local media or a SAN-attached storage device, you can specify the backup set using the *backupsetname* parameter. Use the **location=server** option to restore the backup set directly from the server via the LAN.

Supported Clients

This command is valid for all UNIX clients.

Syntax

```
➤—REStore BACKUPSET—
```



Parameters

options

You can use these client options with the **restore backupset** command:
dirsonly, **filesonly**, **ifnewer**, **location**, **preservepath**, **quiet**, **replace**, **subdir**. See
“Client options reference” on page 139 for information about these options.

backupsetname

Specifies the name of the backup set on the server from which to perform a restore operation. You cannot use wildcard characters to specify the backup set name. Storage Manager restores the backup set from the server via LAN.

filename

Specifies the name of a local file or device from which to perform a restore operation.

sourcefilespec

Specifies the source path which can be a portion of the backup set. The default is to restore the entire backup set.

destinationfilespec

Specifies the destination path for the restored files. If you do not specify a *sourcefilespec*, you cannot specify a *destinationfilespec*. If you do not specify a destination, Storage Manager restores the files to the original source path. If you are restoring more than one file, you must end the specification with a directory delimiter (/), otherwise, Storage Manager assumes the last name is a file name and reports an error. If you are restoring a single file, you can optionally end the specification with a file name if you want to give the restored file a new name.

Examples

Task Restore a backup set called mybackupsetname from the server.

Command: dsmc restore backupset mybackupsetname -loc=server

Task Restore the backup set contained in the backupsetfile.name file in the budget directory.

Command: dsmc restore backupset "/home/budget/backupsetfile.name"
-loc=file

Task Restore a backup set from the /dev/rmt0 device.

Command: dsmc restore backupset "/dev/rmt0" -loc=tape

Task Restore a single file named budget.dev from the /dev/rmt0 device, to the original source path.

Command: dsmc restore backupset /dev/rmt0 "/home/jones/budget.dev"
-loc=tape

Task Restore all files in the budget directory that contain a file extension of .txt from the tape(s) on the /dev/rmt0 device, to the original source path.

Command: dsmc restore backupset /dev/rmt0 "/home/budget/*.txt"
-loc=tape

Task Restore the backup set bset01.001 from the server.

Command: `dsmc restore backupset bset01.001 -loc=server`

Task Restore the backup set contained in local file `"/home/jones/bset01.file"`.

Command: `dsmc restore backupset "/home/jones/bset01.file"
-loc=file`

Restore Image

The **restore image** command restores a file system or raw volume image that was backed up using the **backup image** command. This command can restore an active base image, or a point-in-time base image, with associated incremental updates.

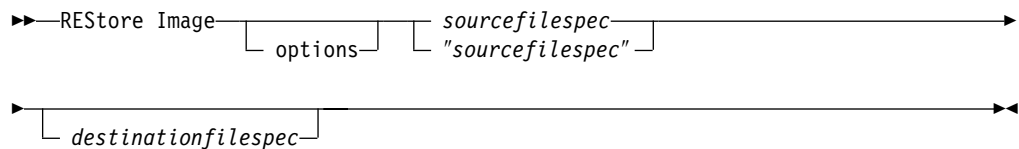
Considerations:

- The API must be installed to use the **restore image** command.
- Image restore of the Sun QFS file system is not supported.
- Image restore is not supported for GPFS file systems on Linux86.
- 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, Linux86, and Solaris *only*.

Syntax



Parameters

options

You can use these client options with the **restore image** command: **deletefiles**, **fromdate**, **fromnode**, **fromowner**, **fromtime**, **inactive**, **incremental**, **noprompt**, **pick**, **pitdate**, **pittime**. For detailed information about these options, see “Client options reference” on page 139.

sourcefilespec

Specifies the name of a source image file system to be restored. Only a single source image may be specified; you cannot use wildcard characters.

destinationfilespec

Specifies the name of an existing mounted file system 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`

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.

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, Storage Manager prompts for an administrator ID. The NAS node name identifies the NAS file server to the Storage Manager server. You must register the NAS node name at the server. Place the **nasnodename** option in your client system options file (dsm.sys). The value in the client system options file is the default, but this value can be overridden on the command line. See “Nasnodename” on page 216 for more information.

You can use the **pick** option to display a list of NAS images owned by the NAS node you specify. From this list you can select one or more images to restore. If you select multiple images to restore using the **pick** option, do not use the **monitor** option or you will serialize the restores. To start multiple restore processes simultaneously when restoring multiple images, do not specify **monitor=yes**.

Use the **monitor** option to specify whether you want to monitor a NAS file system image restore and display processing information on your screen. See “Monitor” on page 215.

Use the **monitor process** command to display a list of current restore processes for all NAS nodes for which your administrative user ID has authority. The authorized administrative user ID should have at least client owner authority over both the NAS node and the client workstation node they are using either from command line or from the web.

Use the **cancel process** command to stop NAS restore processing. For more information, see “Cancel Process” on page 299.

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, AIX 5L, and Solaris clients *only*.

Syntax

```
➤—REStore NAS — [ options ] — sourcefilespec — [ destinationfilespec ] —➤
```

Parameters

options

You can use these client options with the **restore nas** command: **inactive**, **mode**, **monitor**, **nasnodename**, **pick**, **pitdate**, **pittime**. For more information, see “Client options reference” on page 139.

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

Retrieve

The **retrieve** command obtains copies of archived files from the 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. Storage Manager uses the **preservepath** option with the **subtree** value as the default for restoring files. For more information, see “Client options reference” on page 139.

Supported Clients

This command is valid for all UNIX clients.

Syntax

```
►► RETrieve [ options ] [ sourcefilespec "sourcefilespec" ] [ destinationfilespec ] ◀◀
```

Parameters

options

You can use these client options with the **retrieve** command: **description**, **dirsonly**, **filelist**, **filesonly**, **followsymbolic**, **fromdate**, **fromnode**, **fromowner**, **fromtime**, **ifnewer**, **pick**, **preservepath**, **replace**, **subdir**, **tapeprompt**, **todate**, **totime**, **volinformation**. For more information, see “Client options reference” on page 139.

sourcefilespec

Specifies the path and file name that you want to retrieve. Use wildcard characters to specify a group of files or all the files in a directory. See “Maximum file size for operations” on page 289 for the maximum file size for retrieve processing.

destinationfilespec

Specifies the path and file name where you want to retrieve the files to. If you do not specify a destination, Storage Manager restores the files to the original source path.

Note: If you do not specify a destination, Storage Manager determines whether the original file system can be reached. If the original file system cannot be reached, Storage Manager will not restore the file. This failure can also occur if you remove the **virtualmountpoint** option from the dsm.sys file. In this case, you can specify a different destination or restore the original **virtualmountpoint** option to the dsm.sys file, restart the client, and retry the command.

Examples

Task Retrieve a single file named budget.

Command: retrieve /home/devel/projecta/budget

- Task** Retrieve all files with an extension of .c from the /home/devel/projecta directory.
- Command:** retrieve "/home/devel/projecta/*.c"
- Task** Retrieve all files in the /home directory.
- Command:** retrieve /home/
- Task** Retrieve all files with a file extension of .c from the /home/devel/projecta directory to the /home/newdevel/projectn/projecta directory. If the /projectn or the /projectn/projecta directory does not exist, it is created.
- Command:** retrieve "/home/devel/projecta/*.c"
/home/newdevel/projectn/
- Task** Retrieve files in the /user/project directory. Use the ***pick*** option.
- Command:** ret "/user/project/*" -pick
- Task** Retrieve all files archived from the /proj directory with the description "2002 survey results."
- Command:** retrieve "/proj/*" -desc="2002 survey results"
- Task** Retrieve archived file /home/devel/budget with description "my budget" to the /dev/rmt1 tape drive.
- Command:**
mkfifo fifo
dd if=fifo of=/dev/rmt1&
dsmc retrieve -replace=yes -description="mybudget"
/home/devel/budget fifo

Schedule

Authorized User

The **schedule** command starts the client scheduler on your workstation. The client scheduler must be running before scheduled work can start.

If the **shedmode** 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 **shedmode** option to **prompted** in the client user options file (dsm.opt) or on the **schedule** command.

Note: Storage Manager does not support the client scheduler running in **prompted** mode across a firewall. Use the client scheduler in **polling** mode across 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.

Note: You *cannot* enter this command in interactive mode.

Supported Clients

This command is valid for all UNIX clients.

Syntax

►►—Schedule—┐
 └ options ┘◄◄

Parameters

options

You can use these client options: **maxcmdretries**, **password**, **queryschedperiod**, **retryperiod**, **schedlogname**, **shedmode**, and **tcpclientport**. See Chapter 9, “Using processing options”, on page 121 for more information.

Examples

Task For AIX, AIX 5L: Start the scheduler at system bootup time by entering this command in the /etc/inittab file. Ensure the **passwordaccess** option is set to **generate**.

Command: tsm::once:/usr/lpp/adsm/bin/dsmc sched > /dev/null 2>&1
#TSM Scheduler

Task Interactively start the scheduler and keep it running in the background.

Command: nohup dsmc sched 2> /dev/null &

When you run the **schedule** command, all messages regarding scheduled work are sent to the dsmsched.log file or to the file you specify with the **schedlogname**

option in your client user options file (dsm.opt). If you do not specify a directory path with the file name in the ***dsmschedlogname*** option, the dsmsched.log file will reside in the default installation directory.

Selective

The **selective** command backs up files that you specify. If these files become damaged or lost, you can replace them with backup versions from the server. When you run a selective backup, all the files are candidates for back up unless you exclude them from backup, or they do not meet management class requirements for serialization.

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, Storage Manager recursively backs up *all* subdirectories under that path, and any instances of the specified file that exist under *any* of those subdirectories.

During a selective backup, a directory path may be backed up, even if the specific file that was targeted for backup is not found. For example:

```
selective "/dir1/dir2/bogus.txt"
```

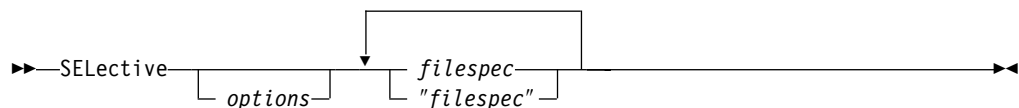
still backs up dir1 and dir2 even if the file bogus.txt does not exist.

If the **selective** command is retried because of a communication failure or session loss, the transfer statistics will display the number of bytes Storage Manager attempts to transfer during *all* command attempts. Therefore, the statistics for bytes transferred may not match the file statistics, such as those for file size.

Supported Clients

This command is valid for all UNIX clients.

Syntax



Parameters

options

You can use these client options with the **selective** command: **changingretries**, **compressalways**, **compression**, **dironly**, **filelist**, **filesonly**, **preservelastaccessdate**, **quiet**, **subdir**, **tapeprompt**, **volinformation**. For more information, see “Client options reference” on page 139.

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. You can enter

up to 20 file specifications in a command, separating the file specifications with a space. 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

Set Access

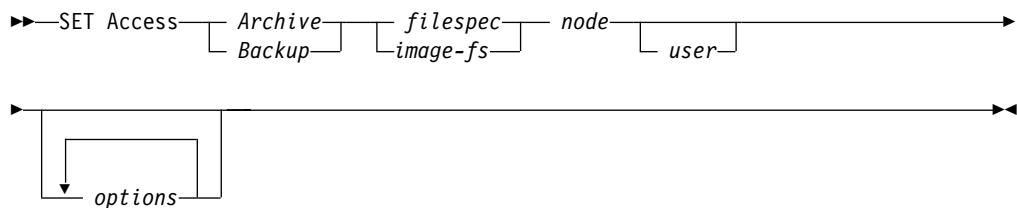
The **set access** command gives users at other nodes access to your backup versions, archived copies, or backup images. You can give another user access to a specific file or image, multiple files or images, or all files in a directory. When you give access to another user, that user can restore or retrieve your objects. Specify in the command whether you are giving access to archives or backups.

Note: You cannot give access to both archives and backups using a single command.

Supported Clients

This command is valid for all UNIX clients.

Syntax



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/*/***.

Attention: Use of the form **/*/*** alone will not give access to objects in the named directory; only those in directories below the named directory will be accessible.

The rules are essentially the same when considering the root directory. Enter `/*` on one set access command and `/*/*` on another if you want another user to have access to all files and directories *in* and *below* the root directory. The first `/*` gives access to all directories and all files in the root directory. The second `/*` allows access to all directories and files below the root directory.

For example:

- Your directory structure is multilevel: `/home/sub1/subsub1`.
- The `/home` directory contains the `h1.txt` and `h2.txt` files.
- The `/home/sub1` directory contains file `s1.htm`.
- The `/home/sub1/sub2` directory contains the `ss1.cpp` file.

To allow access to all files in the `/home/sub1/sub2` directory, enter:

```
set access backup /home/sub1/sub2/* * *
```

To allow access to only those files in the `/home` directory, enter:

```
set access backup /home/* * *
```

To allow access to all files in all directories *in* and *below* the `/home` directory, enter:

```
set access backup /home/* * *  
set access backup /home/*/* * *
```

image-fs

The name of the image file system to be shared. This may be specified as an asterisk (*) to allow access to all images owned by the user granting access.

node

Specifies the client node of the user to whom you are giving access. Use wildcards to give access to more than one node with similar node names. Use an asterisk (*) to give access to all nodes.

user

This is an optional parameter that restricts access to the named user at the specified node.

options

See Chapter 9, “Using processing options”, on page 121 for information about client options that you can use with this command.

Examples

Task Give the user at `node_2` authority to restore the budget file from the `/home/user` directory.

Command: `set access backup /home/user/budget node_2`

Task Give `node_3` authority to retrieve all files in the `/home/devel/proja` directory whose file names end with `.c`.

Command: `set access archive "/home/devel/proja/*.c" node_3`

Task Give `node_3` the authority to retrieve all files in the `/home/devel/proja` directory.

Command: `set ac archive /home/devel/proja/ node_3`

Task Give all nodes whose names end with `bldgb` the authority to restore all backup versions from directories with a file space name of `project`.

Command: `set ac b "{project}/*" "*bldgb"`

Task Give user serena at node_5 authority to restore all images of the file space mounted on directory /home/devel/proja.

Command: set acc backup "home/devel/proja/*/*" node_5 serena

Set Password

Authorized User

The **set password** command changes the Storage Manager password for your workstation. If you omit the old and new passwords when you enter the **set password** command, you are prompted once for the old password and twice for the new password.

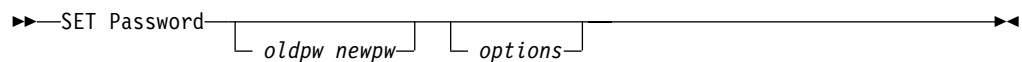
A password is *not* case-sensitive, and it can be as many as 63 characters. Valid characters are:

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

Supported Clients

This command is valid for all UNIX clients.

Syntax



Parameters

oldpw

Specifies the current password for your workstation.

newpw

Specifies the new password for your workstation.

options

Select any valid client option. For more information, see Chapter 9, “Using processing options”, on page 121.

Examples

The following is an example of using the **set password** command.

Task Change your password from osecret to nsecret.

Command: set password osecret nsecret

Appendix A. The AFS and DFS file backup clients

There are three pairs of AIX file backup clients for the GUI and the command line. Runtime requirements for the AFS/DFS file backup clients include conditions for the following:

- Presence of the AFS or DFS kernel extension.
- Product licensing.

The AFS and DFS file backup GUI and command line clients back up, restore, archive, and retrieve:

- AFS/DFS files
- Directories
- Access control lists (ACLs)
- Mount points metadata

Note: The AFS/DFS versions of Storage Manager executable files are available for *AIX only*.

Contrasting AIX file backup clients

The current AIX AFS and DFS file backup clients (**dsmafs**, **dsmcafs**, **dsmdfs**, and **dsmcdfs**) include **dsm** and **dsmc** functions that are not available in AIX clients. See the table, Table 48, for a summary of the differences.

Table 48. Differences between AIX file backup clients

AIX clients	What they can do
dsm , dsmc	Back up and archive AFS and DFS files and directories.
dsmafs , dsmcafs	Back up and archive AFS directories, files, and ACLs. In addition, they back up mount points.
dsmdfs , dsmcdfs	Back up and archive DFS directories, files, and ACLs. In addition, they back up mount points.

Select backup functions

The commands below contain current AFS and DFS file backup functions.

Command	Function
/usr/tivoli/tsm/client/ba/bin/dsmafs	Starts a GUI session with the current AFS support.
/usr/tivoli/tsm/client/ba/bin/dsmcafs	Starts a command line session with the current AFS support.
/usr/tivoli/tsm/client/ba/bin/dsmdfs	Starts a GUI session with the current DFS support.
/usr/tivoli/tsm/client/ba/bin/dsmcdfs	Starts a command line session with the current DFS support.

If you want all users to select the same Storage Manager backup clients with the current AFS or DFS support, perform the following steps:

1. Delete or rename **dsm** and **dsmc**.
2. Rename **dsmafs** or **dsmdfs** and **dsmcafs** or **dsmcdfs** to **dsm** and **dsmc**.

Then, you can enter **dsm** to start a GUI session or **dsmc** to start a command line session with the current AFS or DFS support.

Set the **exclude.fs** option

You can specify that you do not want to back up an entire AFS or DFS directory tree that begins with **/afs** or **/...**. For AFS, enter **exclude.fs /afs** in a file specified by the **incl excl** option. For DFS, enter **exclude.fs /...** in a file specified by the **dfsincl excl** option. This prevents the directory from appearing in the backup-archive list and from being included in incremental backups.

For more information about the **exclude.fs** option, see “Creating an include-exclude list (optional)” on page 37 and “Exclude options” on page 176.

Understanding potential backup problems caused by mount points

AFS mount points are UNIX symbolic links with special syntax. They can cause problems for a backup program that crosses the tree formed with these mount points. For example, user foo creates an AFS mount point for the user.foo volume in his home directory. User foo also forms a cycle in the directory tree. The backup program enters an infinite loop that looks like this:

```
/afs/xyz-cell/u/foo
/afs/xyz-cell/u/foo/foo
/afs/xyz-cell/u/foo/foo/foo
⋮
```

User foo can also create a mount point for a root volume of a foreign cell. This expands the subdirectory of user foo to include a tree that would be unimportant to back up.

With DFS, you can create infinite loops by adding tightly nested DFS mount points. For example user Alice creates a mount point in directory Alice for user Bob. Bob creates a mount point in Bob's directory for user Alice. The backup program enters an infinite loop that looks like this:

```
/.../xyz-cell/fs/Alice
/.../xyz-cell/fs/Alice/Bob
/.../xyz-cell/fs/Alice/Bob/Alice
/.../xyz-cell/fs/Alice/Bob/Alice/Bob
```

You also can create a mount point for a root fileset of a foreign cell. This action expands your subdirectory to include a large tree that would be unimportant to back up.

With AFS, you can add volume mount points in any directory where you have write access. The command for performing this task is the AFS **fs mkmount** command.

With DFS, you can add fileset mount points in any directory where you have write access. The command for performing this task is the DFS **fts crmount** command.

The following options address these problems:

- **afsbackupmntpnt**
- **dfsbackupmntpnt**
- **virtualmountpoint**
- **domain**

The **afsbackupmntpnt** option

By default, Storage Manager AFS file backup clients do not cross AFS mount points. AFS mount points and symbolic links require similar backups. For example, if you define `/afs/xyz-cell/u/foo` as a Storage Manager virtual mount point and enter this command:

```
incremental /afs/xyz-cell/u/foo
```

Storage Manager performs the following incremental backup for `/foo`:

1. Backs up any files under `/foo`: that are eligible for backup.
2. Backs up directories under `/foo`: that are not AFS mount points.
3. Backs up mount point information for any AFS mount point under `/foo`.

Note: Storage Manager does *not* process files or subdirectories under any AFS mount point encountered under `/foo`. Processing stops at each mount point.

If you want the file backup clients to cross AFS mount points, set the **afsbackupmntpnt** option to *no*. Storage Manager backs up the mount point as a *directory* rather than as a symbolic link to the target volume. For more information about the **afsbackupmntpnt** option, see “Afsbackupmntpnt” on page 140.

When you use the archive client, the directory that is pointed to by the mount point is archived.

The **dfsbackupmntpnt** option

By default, Storage Manager DFS file backup clients do not cross DFS mount points. The DFS mount points and symbolic links require similar backups. For example, if you define `/.../xyz-cell/fs/u/foo` as a Storage Manager virtual mount point and you enter this command:

```
incremental /.../xyz-cell/fs/u/foo
```

Storage Manager performs the following incremental backup for `/foo`:

1. Backs up any files under `/foo` that are eligible for backup.
2. Backs up directories under `/foo` that are not DFS mount points.
3. Backs up mount point information for any DFS mount point under `/foo`.

Note: Storage Manager does not process files or subdirectories under any DFS mount point it encounters under `/foo`. Processing stops at each mount point.

If you want the file backup clients to cross DFS mount points, set the **dfsbackupmntpnt** option to *no*. Storage Manager backs up the mount point as a *directory* rather than as a symbolic link to the target fileset. For more information about the **dfsbackupmntpnt** option, see “Dfsbackupmntpnt” on page 158.

When you use the archive client, the directory that is pointed to by the mount point is archived.

Set the **virtualmountpoint** and **domain** options

Use the **exclude.fs** option to exclude `/afs` or `/...` as a file space. Add Storage Manager virtual mount point definitions in your client system options (`dsm.sys`) file for the portions of AFS or DFS that you want to back up.

Specify a Storage Manager virtual mount point for every AFS volume or DFS fileset that you want to back up. Set **afsbackupmntpnt** to *yes* (the default) or **dfsbackupmntpnt** to *yes* (the default). For example, to schedule incremental

backups of *all* AFS volumes, define a virtual mount point for each directory that begins a user volume. See the example below.

```
virtualmountpoint /afs/sanjose.ibm.com/u/alice
virtualmountpoint /afs/sanjose.ibm.com/u/bob
virtualmountpoint /afs/sanjose.ibm.com/u/charlie
```

To schedule incremental backups of *all* DFS volumes, define a virtual mount point for each directory that begins a user volume. See the example below.

```
virtualmountpoint /.../sanjose.ibm.com/fs/u/alice
virtualmountpoint /.../sanjose.ibm.com/fs/u/bob
virtualmountpoint /.../sanjose.ibm.com/fs/u/charlie
```

Set corresponding **domain** options in your client user options (dsm.opt) file to include the virtual mount points in your default client domain. See the example below.

```
domain /afs/sanjose.ibm.com/u/alice
domain /afs/sanjose.ibm.com/u/bob
domain /afs/sanjose.ibm.com/u/charlie
```

You can then schedule a daily incremental backup using the **dsmdafs incremental** or **dsmdfs incremental** command through a crontab job (or any other scheduling tool).

For more information about the **virtualmountpoint** option, see “Virtualmountpoint” on page 277. For more information about the **domain** option, see “Domain” on page 162.

Use another method to set these options

You can set the **virtualmountpoint** and **domain** options without specifying all the AFS volume mount points or all the DFS fileset mount points. For example, rather than listing all AFS or DFS user home directories, specify their parent directory (/afs/sanjose.ibm.com/u or /.../sanjose.ibm.com/fs/u) as a virtual mount point. See the examples below. **For AFS:**

```
virtualmountpoint /afs/sanjose.ibm.com/u
```

Set the **afsbackupmntpnt** option to *no*. The client program crosses the AFS volume mount points in the /afs/sanjose.ibm.com/u directory, then backs up all the mounted AFS user volumes. For example, enter the following line in the client system options file:

```
afsbackupmntpnt no
```

Attention: Use this AFS setup with caution because it backs up all volumes mounted below /afs/sanjose.ibm.com/u. When you create AFS mount points, you expose the backup operation to potential cyclic mount points. If you link to the root of a foreign AFS cell, you also expose the backup operation to potential mount points.

For DFS:

```
virtualmountpoint /.../sanjose.ibm.com/fs/u
```

Set the **dfsbackupmntpnt** option to *no*. The client program crosses the DFS fileset mount points in the /.../sanjose.ibm.com/fs/u directory. The client program then backs up all the mounted DFS user filesets. For example, enter the following line in the client system options file:

```
dfsbackupmntpnt no
```

Attention: Use this DFS setup with caution because it backs up all filesets mounted below `.../sanjose.ibm.com/fs/u`. When you create AFS mount points, you expose the backup operation to potential cyclic mount points. If you link to the root of a foreign DFS cell, you also expose the backup operation to potential mount points.

You can set **domain** options in your client user options file to include the virtual mount point in your default client domain. See the examples below.

For AFS:

```
domain /afs/sanjose.ibm.com/u
```

For DFS:

```
domain /.../sanjose.ibm.com/fs/u/alice
domain /.../sanjose.ibm.com/fs/u/bob
domain /.../sanjose.ibm.com/fs/u/charlie
```

You can then schedule a daily incremental backup using the **dsmcafs incremental** or **dsmdfs incremental** command through a crontab job (or any other scheduling tool).

Setting the ACLs and Kerberos login

Ensure that the **dsmcafs** program has the read and list (rl) permissions on all directories that you must back up. If you want the backup program to access the files, set up the directory ACLs correctly.

Use the AFS administrator identity to back up any AFS directory.

Setting the ACLs and DCE login

Ensure that the **dsmdfs** program has the read and list (rl) permissions on all directories and the read (r) permission on all files. To access files, set up the directory and file ACLs correctly.

An AIX user can log on as the DCE root principal to back up any DFS directory and file.

Restoring AFS or DFS files

Ensure that you have ACL access to the AFS or DFS destination directories and files where you want to restore the data.

Setting processing options

This section provides information about AFS/DFS options for AFS/DFS file backup clients. The table below lists the processing options and their function.

Table 49. Processing options

Option	Function
detail	Use this option with the delete filespace and query filespace commands to determine the fsID of a file space.

Table 49. Processing options (continued)

Option	Function
<i>afsbackupmntpnt</i>	Specifies whether you want Storage Manager to see an AFS mount point as a mount point or as a directory.
<i>dfsbackupmntpnt</i>	Specifies whether you want Storage Manager to see a DFS mount point as a mount point or as a directory.
<i>dfsinclexcl</i>	Specifies the path and file name of your DFS include-exclude options file. Note: AFS uses the regular <i>inclexcl</i> options file.
<i>domain</i>	Specifies the file systems you want to include in your client domain for incremental backup.
<i>exclude</i>	Excludes files, directories, and file systems from backup services.
<i>virtualmountpoint</i>	Defines a virtual mount point for a file system if you want backup beginning with a specific directory within that file system.

Appendix B. Configuring the backup-archive client in an HACMP takeover environment

High Availability Cluster Multi Processing (HACMP) allows scheduled Storage Manager client operations to continue processing during a failover situation.

For example, a scheduled incremental backup of a clustered volume is running on **machine-a**. A situation causes the CAD to failover to **machine-b**. **machine-b** then reconnects to the server. If the reconnection occurs within the start window for that event, the scheduled command is restarted. This scheduled incremental backup will reexamine files sent to the server before the failover. The backup will then "catch up" to where it terminated before the failover situation.

If a failover occurs during a user initiated client session, the Storage Manager client acceptor daemon (CAD) starts on the node that is handling the takeover. This allows it to process scheduled events and provide Web client access. You can install Storage Manager locally on each node of an HACMP environment. You can also install and configure the Storage Manager Scheduler Service for each cluster node to manage all local disks and each cluster group containing physical disk resources.

The **clusternode** option determines if you want the Storage Manager client to back up cluster resources and participate in cluster failover for high availability. See "Clusternode" on page 146 for more information.

The following software is required:

- HACMP for AIX Version 4.4 (or later) or HACMP/ES for AIX Version 4.4 (or later)
- AIX 4.3.3 (or later)

The HACMP Cluster Information Daemon must also be running.

Installing the backup-archive client

Install the Storage Manager Backup-Archive client software on a local disk on each node in the cluster you want to participate in an HACMP takeover. The following client configuration files must be stored locally:

- The client executables and related files should reside in the same location on each node in the cluster.
- The API executable and configuration files should reside in the default API installation directory (/usr/tivoli/tsm/client/api/bin)
- The system options file (dsm.sys) should reside in the default client installation directory (/usr/tivoli/tsm/client/ba/bin)

The following client configuration files must be stored externally in a shared disk subsystem so they can be defined as a cluster resource and be available to the takeover node during a failover. Each resource group must have the following configuration:

- The client option file (dsm.opt), include-exclude file, and password file must be placed in a directory on the shared disk.

- The client error log file must be placed on the shared disk volumes to maintain a single continuous error log file.

Configuring the backup-archive client to process local nodes

You can edit your `dsm.opt` file on each local node to process local disk drives using the following options:

clusternode

Do not specify this option when processing local drives. See “Clusternode” on page 146 for more information.

nodename

If no value is specified, Storage Manager uses the local machine name. See “Nodename” on page 218 for more information.

domain

If no value is specified, Storage Manager processes all local drives that are not owned by the cluster. See “Domain” on page 162 for more information.

You can also configure the Storage Manager Backup-Archive Scheduler Service to back up the local cluster nodes.

Configuring Storage Manager backup-archive client to process cluster disk resources

Ensure that Storage Manager manages each cluster group that contains physical disk resources as a unique node. This ensures that Storage Manager correctly manages all disk resources, regardless of which cluster node owns the resource at the time of back up.

Step 1: Register the client to a server

A Storage Manager client in an HACMP cluster must be registered to a Storage Manager server with an assigned node name. Consider the following conditions when registering your node name:

- If local volumes that are *not* defined as cluster resources will be backed up, separate node names (and separate client instances) must be used for both non-clustered and clustered volumes.
- The node name used to back up clustered volumes defaults to the cluster name, not the host name. We recommend that you choose a node name related to the cluster resource group to be managed by that node.
- If multiple resource groups are defined in the HACMP environment to failover independently, then separate node names must be defined per resource group.

Step 2: Configure the client system options file

Each node in the HACMP cluster that runs the Storage Manager client must have the following settings defined in each respective `dsm.sys` file:

- Separate server stanzas to back up non-clustered volumes
- Separate server stanzas for each cluster resource group to be backed up

The server stanzas defined to back up non-clustered volumes must have the following special characteristics:

- The value of the ***tcpclientaddress*** option must be the *service* IP address. This is the IP address used for primary traffic to and from the node.

- If the client will back up and restore non-clustered volumes without being connected to the HACMP cluster, the value of the **tcpclientaddress** option must be the *boot* IP address. This is the IP address used to start the machine (node) before it rejoins the HACMP cluster.

The server stanzas defined to back up clustered volumes must have the following special characteristics:

- **clusternode** *yes*
- The **nodename** value must be related to the resource group. If **nodename** is not specified, the cluster name is used.
- The **tcpclientaddress** option must refer to the service IP address of the HACMP node.
- The **passworddir** option must point to a directory on the shared volumes that are part of the cluster resource group.
- The **errorlogname** and **schedlogname** options must point to files on the shared volumes that are part of the cluster resource group.
- All **inclexcl** statements must point to files on the shared volumes that are part of the cluster resource group.
- Set the **managedservices** statement to indicate that the scheduler (or web client) should be managed by the client acceptor daemon.

Other options can be set as desired.

Step 3: Configure the client user options file

The client user options file (dsm.opt) for the Storage Manager client that will manage your clustered file spaces must reside on the shared volumes in the cluster resource group. Define the DSM_CONFIG environment variable to point to this dsm.opt file. Make sure the dsm.opt file contains the following settings:

- The value of the **servername** option must be the server stanza in the dsm.sys file which defines parameters for backing up clustered volumes. The dsm.sys file may reside on shared space.
- If the dsm.sys file resides on a local disk, each node on the cluster must have a matching stanza.
- Define clustered filespaces to be backed up with the **domain** option.
- Other options can be set as desired.

Defining the client as an HACMP application

The Storage Manager client must be defined as an application to HACMP to participate in failover processing. See *HACMP for AIX 4.4.1 Installation Guide*, SC23-4278, for detailed instructions on how to perform this procedure. Following is a summary of this procedure:

1. Start HACMP for AIX system management with the following command:

```
smit hacmp
```
2. Select **Cluster Configuration, Cluster Resources, Define Application Servers, and Add an Application Server**.
3. Enter the following field values:

Server Name

Enter an ASCII text string that identifies the server. You use this name to refer to the application server when you define it as a resource during node configuration. The server name can include alphabetic and numeric characters and underscores. Use no more than 31 characters.

Start Script

Enter the full path name of the script that starts the server. This script is called by the cluster event scripts and must reside on a local disk. This script must be in the same location on each cluster node that might start the server. The start script is used in the following cases:

- a. when HACMP is started and resource groups are activated
- b. when a failover occurs and the resource group is started on another node
- c. when fallback occurs (a failed node re-enters the cluster) and the resource group is transferred back to the node re-entering the cluster.

A sample start script (StartClusterTsmClient.sh.smp) is provided in the `/usr/tivoli/tsm/client/ba/bin` directory.

Stop Script

Enter the full path name of the script that stops the server. This script is called by the cluster event scripts and must reside on a local disk. This script must be in the same location on each cluster node that might stop the server. The stop script is used in the following cases:

- a. when HACMP is stopped
- b. when a failover occurs due to a component failure in a resource group, the other members are stopped so that the entire group can be restarted on the target node in the failover
- c. when a fallback occurs and the resource group is stopped on the node currently hosting it to allow transfer back to the node re-entering the cluster.

A sample stop script (StopClusterTsmClient.sh.smp) is provided in the `/usr/tivoli/tsm/client/ba/bin` directory.

4. Press Enter to add your information to the HACMP for AIX.
5. Press F10 after the command completes to exit `smit` and return to the command line. Press F3 to perform other configuration tasks.

The Storage Manager client must be in a resource group with a *cascading* or *rotating* takeover relationship. The client does not support a concurrent access resource group. See *HACMP for AIX 4.4.1 Planning Guide*, SC23-4277, for additional information regarding HACMP topology and strategy.

Creating an HACMP resource group to add a client

You must first create an HACMP resource group so you can add the client to it. The following is a summary of this procedure:

1. Start HACMP for AIX system management with the following command:
`smit hacmp`
2. Select **Cluster Configuration, Cluster Resources, Define Resource Groups**, and **Add a Resource Group**. The Add a Resource Group window is displayed.
3. On the Add a Resource Group window, enter the following field values:

Resource Group Name

Enter an ASCII text string that identifies the resource group. The resource group name can include alphabetic and numeric characters and underscores. Use no more than 31 characters.

Node Relationship

Select **Cascading**.

Participating Node Names/Default Node Priority

Select the node names that are participating in the resource group. Add the nodes in order of priority. The node owner of the resource group should be the first node listed.

4. Click **OK**.
5. Press F10 to exit `smit` and return to the command line. Press F3 to perform other configuration tasks.

The Storage Manager client must be in a resource group with a *cascading* or *rotating* takeover relationship. The client does not support a concurrent access resource group. See *HACMP for AIX 4.4.1 Planning Guide*, SC23-4277, for additional information regarding HACMP topology and strategy.

Adding the client to an HACMP resource group

The Storage Manager client must be defined to a cluster resource group. See *HACMP for AIX 4.4.1 Installation Guide*, SC23-4278, for detailed instructions on how to perform this procedure. Following is a summary of how to define resources as part of a resource group:

1. Start HACMP for AIX system management with the following command:
`smit hacmp`
2. Select **Cluster Configuration, Cluster Resources, and Change/Show Resources/Attributes for a Resource Group**. Press Enter.
3. Select the desired resource group.
4. Press Enter. The **Configure a Resource Group** screen appears.
5. Enter values that define all the resources you want to add to this resource group.
6. Synchronize cluster resources after entering field values in Step 5. Do this by selecting **Cluster Configuration, Cluster Resources, and Synchronize Cluster Resources**.
7. Press F10 to exit `smit` and return to the command line. Press F3 to perform other configuration tasks.

The Storage Manager client must be added to the resource group that contains the file systems to be backed up. These file systems must also be the same file systems specified by the ***domain*** option in the `dsm.opt` file defined for this client instance.

Both JFS and NFS file systems can be defined as cluster resources. NFS supports only 2 node clusters in a cascading takeover relationship.

Appendix C. Backing up NAS file systems using NDMP

Through support of Network Data Management Protocol (NDMP), Storage Manager Windows NT, 2000, XP, AIX, and Solaris servers can efficiently back up and restore network attached storage (NAS) file system images to tape drives or libraries that are locally attached to the NAS file servers from Network Appliance. *NDMP support is available only on IBM Tivoli Storage Manager Extended Edition. See “NDMP support version 5.1 requirements (Extended Edition only)” on page 2 for NDMP support requirements.*

For information on how to configure NDMP support on the Storage Manager server, see the following publications:

- *IBM Tivoli Storage Manager for AIX Administrator's Guide*, GC32-0768
- *IBM Tivoli Storage Manager for Sun Solaris Administrator's Guide*, GC32-0778
- *IBM Tivoli Storage Manager for Windows Administrator's Guide*, GC32-0782

After configuring NDMP support, the server connects to the NAS device and uses NDMP to initiate, control, and monitor each backup and restore operation. The NAS device performs outboard data transfer to and from the NAS file system to a locally attached tape drive or library.

It is not necessary for a client node to mount a NAS file system to perform backup or restore operations on that file system.

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
- Restoring or tracking of individual files within a file system image.
- Client scheduling. Use server commands to schedule a NAS backup.
- Detection of damaged files.
- Data-transfer operations for NAS data stored by Storage Manager:
 - Migration
 - Reclamation
 - Storage pool backup and restore
 - Move data
 - Export

Backing up NAS File Systems using the Web client GUI

For information on how to install and configure the Web client, see “Installing and using the Web client” on page 54.

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.

To back up NAS file systems using the Web client GUI:

1. Click **Backup files and directories** from the main window. The Backup window displays.
2. Expand the directory tree if necessary.

Notes:

- a. The root node called **Nodes** is not selectable. This node only appears if Data Protection for NDMP is enabled on the server.
 - b. NAS nodes display on the same level as the client workstation node. Only nodes for which the administrator has authority will display.
 - c. NAS nodes are expandable 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.
 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 estimated size of the backup, which is the occupancy of the file system. After the backup completes, the NAS Backup Report window displays processing details, including the *actual* size of the backup.

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 **Monitor TSM Activities**. During a differential backup, the status bar indicates processing status. A percentage estimate does not display.

To restore NAS file system images using the Web client GUI, see “Restoring NAS file systems” on page 366.

Performing a command line backup

Table 50 lists the commands and options you can use to back up NAS file system images from the command line.

Table 50. NAS options and commands

Option or command	Definition	Page
<i>domain.nas</i>	Specifies the volumes to include in your default domain for NAS backups.	167
<i>exclude.fs.nas</i>	Excludes file systems on the NAS file server from an image backup when used with the backup nas command. This option is for AIX, AIX 5L, and Solaris clients <i>only</i> .	176
<i>include.fs.nas</i>	Includes a file system or assigns a management class when used with the backup nas command. This option is for AIX, AIX 5L, and Solaris clients <i>only</i> .	194
query node	Displays all the nodes for which a particular administrative user ID has authority to perform operations. The authorized administrative user ID should have at least client owner authority over both the NAS node and the client workstation node they are using either from command line or from the web.	325
backup nas	Creates an image backup of one or more file systems that belong to a Network Attached Storage (NAS) file server.	297
monitor process	Displays current back up and restore processes for all NAS nodes for which an administrative user has authority. The administrative user can then select one process to monitor.	314
cancel process	Displays current back up and restore processes for all NAS nodes for which an administrative user has authority. From the display, the administrative user can select one process to cancel.	299
query backup	Use the query backup command with the class option to display information about file system images backed up for a NAS file server.	318
query filesystem	Use the query filesystem command with the class option to display a list of file spaces belonging to a NAS node.	321
delete filesystem	Use the delete filesystem with the class option to display a list of file spaces belonging to a NAS node so that you may choose one to delete.	303

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, the server starts a process to initiate, control, and monitor the operation. It may take several moments before you notice progress at the command line client interface because the server must perform mount and other necessary tasks before data movement occurs.

Restoring NAS file systems

You can restore full or differential NAS file system images that were backed up previously. If you restore a differential image, 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.

For information on how to install and configure the Web client, see “Installing and using the Web client” on page 54.

To restore NAS file systems using the Web client GUI:

1. Click the **Restore files and directories to your system** from the main window. The Restore window appears.
 - To restore to earlier backup versions of NAS file system images select **View** -> **Display active/inactive files** from the main window.
 - To restore NAS file system images to the state that existed at a specific date and time, click the **Point In Time** button on the Restore window and enter the appropriate information.
2. Expand the directory tree if necessary. To expand a node in the tree, click the plus sign (+) next to an object in the tree.

Notes:

- a. The root node called **Nodes** is not selectable. This node only appears if Tivoli Data Protection for NDMP is enabled on the server.
 - b. NAS nodes display on the same level as the client workstation's node. Only nodes to which the administrator has authority appear.
 - c. NAS nodes will expand to reveal file systems. Under each file system are images which you can select to restore.
3. Click the selection boxes next to the nodes, file systems or images you want to restore.
 4. Click **Restore**. The Restore Destination window appears. Enter the information in the Restore Destination window.

Note: You can restore NAS file system images to any volume on the NAS file server from which they were backed up. You cannot restore images to another NAS file server.

5. Click **Restore**. The NAS Restore **Task List** window displays the restore processing status and progress bar. The number next to the progress bar indicates the estimated size of the restore. After the restore completes, the NAS Restore Report window displays processing details, including the actual size of the restore.

Note: If it is necessary to close the Web browser session, current NAS operations will continue after disconnect. You can use the **Dismiss** button on the NAS Restore **Task List** window to quit monitoring processes without ending the current operation.

6. (Optional) To monitor processing of an operation, select the **Actions** -> **Monitor TSM Activities** from the main window.

Table 51 on page 367 lists the commands and options you can use to restore NAS file system images from the command line.

Table 51. NAS options and commands

Option or command	Definition	Page
query node	Displays all the nodes for which a particular administrative user ID has authority to perform operations. The authorized administrative user ID should have at least client owner authority over both the NAS node and the client workstation node they are using either from command line or from the web.	325
query backup	Use the query backup command with the class option to display information about file system images backed up for a NAS file server.	318
query filesystem	Use the query filesystem command with the class option to display a list of file spaces belonging to a NAS node.	321
restore nas	Restores the image of a file system belonging to a Network Attached Storage (NAS) file server.	338
monitor process	Displays current backup and restore processes for all NAS nodes for which an administrative user has authority. The administrative user can then select one process to monitor.	314
cancel process	Displays current back up and restore processes for all NAS nodes for which an administrative user has authority. From the display, the administrative user can select one process to cancel.	299
delete filesystem	Use the delete filesystem with the class option to display a list of file spaces belonging to a NAS node so that you may choose one to delete.	303

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, the server starts a process to initiate, control, and monitor the operation. It may take several moments before you notice progress at the command line client interface because the server must perform mount and other necessary tasks before data movement occurs. Storage Manager may display an Interrupted ... message when the mount occurs. You can ignore this message.

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Term definitions in this glossary pertain to the Storage Manager library. If you do not find a term you are looking for, you can refer to the following publications:

- *IBM Dictionary of Computing*, at URL:
<http://www.ibm.com/networking/nsg/nsgmain.htm>
- *Tivoli Software Glossary*, at URL:
<http://www.tivoli.com/support/documents/glossary/termsm03.htm>

This glossary may include terms and definitions from:

- The *American National Standard Dictionary for Information Systems*, ANSI X3.172-1990, copyright (ANSI). You can purchase copies from the American National Standards Institute, 11 West 42nd Street, New York, New York 10036.
- The *Information Technology Vocabulary*, developed by Subcommittee 1, Joint Technical Committee 1, of the International Organization for Standardization and the International Electrotechnical Commission (ISO/IEC JTC2/SC1).

A

absolute. A copy group mode value that indicates a file is considered for incremental backup even though the file has not changed since the last time it was backed up. See *mode*. Contrast with *modified*.

access control list (ACL).

1. In computer security, a collection of all access rights for one object.
2. In computer security, a list associated with an object that identifies all the subjects that can access the object and their access rights; for example, a list associated with a file that identifies users who can access the file and identifies their access rights to that file.

ACL. access control list

active policy set. The policy set within a policy domain that contains the most recently activated policy. All client nodes assigned to the current policy domain use this policy set. See *policy set*.

active version. The most recent backup copy of a file stored in Storage Manager storage for a file that currently exists on a file server or workstation. An active version remains active and exempt from deletion until:

- Replaced by a new backup version.
- Storage Manager detects, during an incremental backup, that the user has deleted the original file from a file server or workstation.

administrative client. A program that runs on a file server, workstation, or mainframe. This program lets administrators monitor and control Storage Manager servers using administrator commands. Contrast with *backup-archive client*.

administrator. A user who is registered to the server as an administrator. Administrators may possess one or more privilege classes. Administrators can use the administrative client to enter Storage Manager server commands and queries according to their privileges.

aggregate data transfer rate. Dividing the total number of bytes transferred by the elapsed processing time calculates the data transfer rate.

archive. A function permitting users to copy one or more files to a long-term storage device. Archive copies can:

- Carry associated descriptive information
- Be compressed to minimize storage requirements
- Be retrieved by archive date, file name, or description

Contrast with *retrieve*.

archive copy. A file or group of files residing in an archive storage pool in Storage Manager storage.

archive copy group. A policy object containing attributes that control the generation, destination, and expiration of archived files. The archive copy group belongs to a management class.

archive retention grace period. The number of days Storage Manager retains an archived copy when the server is unable to rebind the file to an appropriate management class.

authentication. The process of checking and authorizing a user's password before permitting user access to the Storage Manager server. An administrator with system privilege can enable or disable authentication.

authorization rule. A specification permitting another user to either restore or retrieve a user's files from Storage Manager storage.

Authorized User. A user who has administrative authority for the Storage Manager client on a workstation. This user changes passwords, performs open registrations, and deletes file spaces. An Authorized User is any user running with a real user ID of 0 (root) or a user who owns an executable whose owner execution permission bit is set to **s**. In the following example, the user **tivoli** is an Authorized User while running **dsmc** since the **dsmc** owner execution permission bit is set to **s**:

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

automounted file system (AutoFS). A file system managed by an automounter daemon. The automounter daemon monitors a specified directory path and automatically mounts the file system to access data.

B

backup. A function permitting users to copy one or more files to a storage pool to protect against data loss. Contrast with *restore*.

backup-archive client. A program that runs on a file server, PC, or workstation and provides a means for users to back up, archive, restore, and retrieve files. Contrast with *administrative client*.

backup copy group. A policy object that contains attributes controlling the generation, destination, and expiration of backup files. The backup copy group belongs to a management class.

backup retention grace period. The number of days Storage Manager retains a backup version when the server is unable to rebind the file to an appropriate management class.

backup version. A backed up file, directory, or file space that resides in a backup storage pool in Storage Manager storage. The *active* version is the most recent backup version. See *active version* and *inactive version*.

binding. The process of associating a file with a management class name.

boot. To prepare a computer system for operation by loading an operating system.

C

central scheduling. A function permitting an administrator to schedule backup and archive operations from a central location. Schedule operations on a periodic basis or on an explicit date.

client. A program running on a file server, PC, workstation, or terminal that requests services of another program called the server. There are two types of Storage Manager clients: administrative and backup-archive. See *administrative client* and *backup-archive client*.

client domain. The set of drives, file systems, or volumes selected by a user for processing during a backup or archive operation.

client node. A file server or workstation registered with the server on which the backup-archive client program is installed.

client polling. A client and server communication technique where the client node queries the server for scheduled work.

client/server. A communications network architecture in which one or more programs (clients) request computing or data services from another program (the server).

client system options file. An editable file that contains communication, authorization, central scheduling, backup, archive, and space management options. A root user on your workstation sets the options in a client system options file. The file name is **dsm.sys** located in your Storage Manager installation directory.

client user options file. A user-editable file containing options that identify the Storage Manager server to contact, specify backup, archive, restore, retrieve, and space management options, and set date, time, and number formats. The file name is **dsm.opt** located in your Storage Manager installation directory.

closed registration. A registration process in which a Storage Manager administrator must register workstations as client nodes with the server. Contrast with *open registration*.

command line interface. A type of user interface where commands are specified on the command line. Contrast with *graphical user interface*.

communication method. The method by which a client and server exchange information. For Storage Manager backup-archive clients, the method can be TCP/IP. See *Transmission Control Protocol/Internet Protocol*.

communication protocol. A set of defined interfaces that permits computers to communicate with each other.

copy group. A policy object that contains attributes that control backup and archive file:

- Generation
- Destination
- Expiration.

Backup and archive copy groups belong to management classes. See *frequency*, *destination*, *mode*, *retention*, *serialization*, and *version*.

D

default management class. A management class assigned to a policy set. This class is used to govern backed up or archived files when a user does not explicitly associate a file with a specific management class through the include-exclude list.

destination. A copy group attribute that specifies the storage pool in which to back up or archive a file. At installation, Storage Manager provides two storage destinations named **backuppools** and **archivepool**.

domain. See *policy domain* or *client domain*.

drag. Move the mouse while holding down the mouse button, thus moving the selected object.

drag-and-drop. Move (drag) an object on top of another object and release the mouse button, thus relocating the object.

dsm.opt file. See *options file*. See also *client user options file*. Also called client options file.

dsm.sys file. See *options file* or *client system options file*.

dynamic. A copy group serialization value that specifies Storage Manager accept the first attempt to back up or archive an object, regardless of any changes made during backup or archive processing. See *serialization*. Contrast with *shared dynamic*, *shared static*, and *static*.

E

error log. A text file written on disk that contains Storage Manager processing error messages. The Storage Manager server detects and saves these errors.

exclude. To identify files in an include-exclude list that you do not want to include in a specific client operation, such as backup or archive.

exabyte (EB). (1) For processor storage, real and virtual storage, and channel volume, 1,152,921,504,606,846,976 bytes. (2) For disk storage capacity and communications volume, 1,000,000,000,000,000 bytes.

expiration. The process in which files are identified for deletion because their expiration date or retention period is passed. Backups or archives are marked for deletion based on the criteria defined in the backup or archive copy group.

F

file server. A dedicated computer and its peripheral storage devices connected to a local area network that stores both programs and files shared by users on the network.

file space. A logical space on the Storage Manager server that contains a group of files. In Storage Manager, users can restore, retrieve, or delete file spaces from Storage Manager storage. A file space for systems:

- **Windows**— file spaces for removable media are identified by volume label. Fixed drive file spaces are identified by Universal Naming Convention (UNC) name.
- **UNIX** — Logical space that contains a group of files backed up or archived from the same file system, or part of a file system defined with the `virtualmountpoint` option in the client system options file.

frequency. A copy group attribute that specifies the minimum interval, in days, between incremental backups.

fuzzy backup. A backup version of a file that might not accurately reflect what is currently in the file because the file was backed up at the same time as it was being modified.

fuzzy copy. An archive copy of a file that might not accurately reflect what is currently in the file because Storage Manager archived the file while the file was being modified.

G

generate password. Processing that stores a new password in an encrypted password file when the old password expires. Automatic generation of a password prevents password prompting. Password generation can be set in the options file (`passwordaccess` option). See *options file*.

gigabyte (GB). (1) One billion (10^9) bytes. (2) When referring to memory capacity, 1 073 741 824 in decimal notation.

globally unique identifier (GUID). A 16-byte code that identifies an interface to an object across all computers and networks. The identifier is unique because it contains a time stamp and a code based on the network address that is hard-wired on the host computer's LAN interface card.

GPFS node set. A set of AIX SP nodes that can mount a defined group of GPFS file systems.

graphical user interface (GUI). A graphical user interface offers pictorial rather than text-based access to a computer. A graphical user interface includes:

- A combination of graphics and icons
- Use of a mouse or pointing device
- Menu bars, dropdown lists, and overlapping windows

Contrast with *command line interface*. See *windowed interface*.

GUI. Graphical user interface.

H

hierarchical storage management client. A program that runs on a workstation or file server to provide space management services. The hierarchical storage management client automatically migrates eligible files to Storage Manager storage to maintain specific levels of free space on local file systems. Automatic recalls are made for migrated files when they are accessed. Users are also permitted to migrate and recall specific files.

HSM. Hierarchical Storage Management.

I

image. A full file system or raw logical volume backup as a single object.

inactive version. A copy of a backup file in Storage Manager storage that either is not the most recent version, or the corresponding original file was deleted from the client file system. Inactive backup versions are eligible for expiration according to the management class assigned to the file.

include-exclude file. A file containing statements to determine the files to back up and the associated management classes to use for backup or archive. See *include-exclude list*.

include-exclude list. A list of include and exclude options that include or exclude selected files for backup. An exclude option identifies files that should not be backed up. An include option identifies files that are exempt from the exclusion rules or assigns a management class to a file or a group of files for backup or archive services. The include-exclude list is defined in one or more include-exclude files or in the client system options file. The include-exclude list may contain entries from any or all of the following sources: the client options file (Windows), the client system options file (Unix), separate include-exclude files, or the Storage Manager server. See *options file*.

incremental backup. A function that permits user to back up new or changed files or directories from a client domain or from specified file systems, directories, or files. These file systems, directories, or files are not excluded in the include-exclude list and meet the requirements for frequency, mode, and serialization as defined by a backup copy group of the management class assigned to each file. Contrast with *selective backup*.

inode. A data structure that describes the individual files in an operating system. There is one inode for each file. The number of inodes in a file system, and therefore the maximum number of files a file system can contain, is set when the file system is created. Hardlinked files share the same inode.

inode number. A number that specifies a particular inode in a file system.

IPL. Initial Program Load. See *boot* and *reboot*.

L

LAN. Local area network.

LAN-free data transfer. The movement of client data between the client and a storage device over a SAN, bypassing the LAN.

Local Area Network (LAN). A variable-sized communications network placed in one location. LAN connects servers, PCs, workstations, a network operating system, access methods, and communications software and links.

logical unit number (LUN). A logical unit number (LUN) is a unique identifier used on a SCSI bus that enables it to differentiate between up to eight separate devices (each of which is a logical unit). Each LUN is a unique number that identifies a specific logical unit, which may be a hard disk, tape drive, or other device which understands the SCSI protocol.

logical volume backup. A back up of a file system or logical volume as a single object

Loopback Virtual File System (LOFS). A file system created by mounting a directory over another local directory, also known as mount-over-mount. A LOFS can also be generated using an automounter.

M

management class. A policy object that is a named collection of copy groups. A management class is associated with a file to specify how the server should manage backup versions or archive copies of workstation files. See *binding* and *copy group*.

mode. A copy group attribute that specifies whether a backup file should be created for a file that was not modified since the last time the file was backed up. See *absolute* and *modified*.

modified. A backup copy group attribute indicating a file is considered for backup only if the file has been changed since the last backup. A file is considered changed if the date, size, owner, or permissions have changed. See *absolute* and *mode*.

N

NAS node. A type of node that is a NAS file server. The NAS node name uniquely identifies the NAS file server and its data to Storage Manager. Through support of Network Data Management Protocol (NDMP), Storage Manager can efficiently back up and restore NAS file systems to tape drives or libraries that are locally attached to the NAS file servers.

NDMP. Network Data Management Protocol.

Network Attached Storage (NAS) file server. A network attached storage (NAS) device is a specialized file-serving box whose operating system is streamlined and optimized for file-serving functions. Through support of Network Data Management Protocol (NDMP), Storage Manager can efficiently back up and restore NAS file systems to tape drives or libraries that are locally attached to the NAS file servers.

Network Data Management Protocol. Open standard network protocol. Enables efficient back up and restore of Network Attached Storage (NAS) file systems to tape drives or libraries that are locally attached to the NAS file servers.

network data transfer rate. The data transfer rate calculated by dividing the total number of bytes transferred by the data transfer time. For example, the time spent transferring data over the network.

node. See *client node*.

node name. A unique name used to identify a workstation, file server, or PC to the server.

O

open registration. A registration process in which users can register their own workstations or PCs as client nodes with the server. Contrast with *closed registration*.

options file. A file that contains processing options.

- **dsm.opt**

Non-UNIX — Identifies Storage Manager servers, specifies communication methods, defines scheduling options, selects backup, archive, restore, and retrieve options. Also called the client options file.

UNIX — Identifies the Storage Manager server to contact, specifies backup, archive, restore, and retrieve options. Also called the client user options file.

- **dsm.sys**

UNIX — Contains stanzas describing Storage Manager servers to contact for services. These stanzas also specify communication methods, backup and archive options, and scheduling options. Also called the client system options file.

- **TSM User Preferences file**

For the Macintosh client only: Identifies Storage Manager servers to contact, specifies communication methods, defines scheduling options, selects backup, archive, restore, and retrieve options.

- **TSM System Preferences file**

For the Macintosh client only: Contains stanzas describing Storage Manager servers to contact for services. These stanzas also specify communication methods, backup and archive options, and scheduling options.

owner. The owner of backup-archive files sent from a multi-user client node, such as AIX.

P

pattern-matching character. See *wildcard character*.

plug-in. A self-contained software component that modifies (adds or changes) function in a particular software system. When you add a plug-in to a software system, the foundation of the original software system remains intact.

policy domain. A policy object that contains one or more policy sets. Client nodes are associated with a policy domain. See *policy set*, *management class*, and *copy group*.

policy set. A policy object that contains a group of management class definitions that exist for a policy domain. At any one time, there can be many policy sets within a policy domain, but only one policy set can be active. See *active policy set* and *management class*.

progress indicator. A control used to inform a user about the progress of a process.

R

raw logical volume. A portion of a physical volume which is comprised of unallocated blocks and has no Journaled File System (JFS) definition. A raw logical volume is read/write accessible only through low level I/O functions.

reboot. To restart the operating system.

registration. The process of identifying a client node or administrator to the server by specifying a user ID, password, and contact information. For client nodes, a policy domain, compression status, and deletion privileges are also specified.

restore. A function that permits users to copy a version of a backup file from the storage pool to a workstation or file server. The backup copy in the storage pool is not affected. Contrast with *backup*.

retention. The amount of time, in days, that inactive backed up or archived files are retained in the storage pool before they are deleted. The following copy group attributes define retention: retain extra versions, retain only version, retain version.

retrieve. A function permitting users to copy an archived file from the storage pool to the workstation or file server. The archive copy in the storage pool is not affected. Contrast with *archive*.

root user (UNIX). The authority level for a root user permits this user to do authorized tasks for Storage Manager.

S

SAN. Storage area network.

scheduling mode. The type of scheduling operation for the client-server node. Storage Manager supports two scheduling modes: client-polling and server-prompted.

scroll. Move through a list of items in a window by operating the scrollbars with the mouse cursor.

select. Choose an item from a list or group of items.

selective backup. A function permitting users to back up specified files. These files are not excluded in the include-exclude list and meet the requirement for serialization in the backup copy group of the management class assigned to each file. Contrast with *incremental backup*.

serialization. A copy group attribute that specifies whether a file can be modified during a backup or archive operation. See *static*, *dynamic*, *shared static*, and *shared dynamic*.

server. A program running on a mainframe, workstation, or file server that provides shared services such as backup and archive to other various (often remote) programs (called clients).

server-prompted scheduling. A client-server communication technique where the server contacts the client node when tasks need to be done.

session. A period of time in which a user can communicate with a server to perform backup, archive, restore, or retrieve requests.

shared dynamic. A Storage Manager copy group serialization mode. This mode specifies if a file changes during backup or archive and continues to change after a number of retries. The last retry commits the file to the Storage Manager server whether or not the file changed during backup or archive. Contrast with *dynamic*, *shared static*, and *static*.

shared static. A copy group serialization value specifying that a file must not be modified during a backup or archive operation. Storage Manager attempts to retry the operation a number of times. If the file is in use during each attempt, the file is not backed up or archived. See *serialization*. Contrast with *dynamic*, *shared dynamic*, and *static*.

share point. A drive or directory on Windows NT, 2000, Me, or XP whose files are available for shared access across a network. The share point name is part of a UNC name. See *Universal Naming Convention (UNC)* name.

shift-click. Click on an item while pressing the Shift key.

space management. The process of keeping sufficient free storage space available on a local file system for new data and making the most efficient and economical use of distributed storage resources.

sparse file. A file that is created with a length greater than the data it contains, leaving empty spaces for future addition of data.

special files. Special files define devices for the system or temporary files created by processes. There are three basic types of special files: FIFO (first-in, first-out), block, and character. FIFO files are also called pipes. Pipes are created by one process to temporarily allow communication with another process. These files cease to exist when the first process finishes. Block and character files define devices. Storage Manager processes only device and named pipe special files. Socket special files are not processed.

snapshot image backup. During an snapshot image backup, the volume is available to other system applications during the operation.

stabilized file space. A file space that exists on the server but not on the client. This situation can arise in at least two instances:

1. A drive is removed from a client workstation
2. A file space is renamed on the server

Stabilized file spaces remain on the server until deleted by the user or administrator. Files and directories can be restored and retrieved from a stabilized file space. However, it is not possible to back up or archive data to a stabilized file space.

stanza. In the AIX OS, a stanza is a group of lines in a file that together have a common function or define a part of the system. The Storage Manager Client System Options file (**dsm.sys**) contains a stanza for each server to which the client can connect. Each stanza begins with the **servername** option and ends at the next **servername** option or the end of file, whichever comes first. Each stanza must include communications options.

static. A copy group serialization value specifying that a file must not be modified during a backup or archive operation. If the file is in use during the first attempt, Storage Manager will not back up or archive the file. See *serialization*. Contrast with *dynamic*, *shared dynamic*, and *shared static*.

storage area network (SAN). A high-speed communications network optimized for storage.

storage agent. A program that enables Storage Manager to back up and restore client data directly to and from SAN-attached storage.

storage pool. A named set of storage volumes used as the destination of backup, archive, or migrated copies.

system drive or partition. On Windows NT, the drive or partition on which Windows NT is installed.

T

TCA. Trusted Communications Agent

TCP/IP. Transmission Control Protocol/Internet Protocol.

timeout. A time event involving:

- An event that happens at the end of a predetermined period of time that began at the happening of another specified event.
- A time interval allotted for certain operations to happen. For example, response to polling or addressing before system operation is interrupted and must be restarted.
- A terminal feature that logs off a user if an entry is not made within a specified period of time.

Tivoli Storage Manager. A client-server licensed program product that provides storage management and data access services to customers in a multivendor computer environment.

Transmission Control Protocol/Internet Protocol (TCP/IP). A standard set of communication protocols that supports peer-to-peer connectivity of functions for both local and wide-area networks.

Trusted Communications Agent (TCA) (UNIX). A program that can handle the sign-on password protocol when password access is generated. The main process (for example, *dsm*, *dsme*) makes a run time decision based on the password access option setting, the user ID, and the executables' access privileges to run this program. The file that contains this program must have the 's' bit set in its mode field and the owner must be root.

V

version. Storage management policy may allow back-level copies of backed up objects to be kept at the server whenever an object is newly backed up. The most recent backed up copy is called the "active" version. Earlier copies are "inactive" versions. The following backup copy group attributes define version criteria: versions data exists, and versions data deleted.

W

wildcard character. An asterisk (*) or question mark (?) character used to represent multiple (*) or single (?) characters when searching for various combinations of characters in alphanumeric and symbolic names.

windowed interface. A type of user interface that is either a graphical user interface or a text-based interface. The text-based interface maintains a close affinity to the graphical user interface, including action bars and their associated pull-down menus and windows. See *graphical user interface*.

workstation. A programmable high-level workstation (usually on a network) with its own processing hardware such as a high-performance personal computer. In a local area network, a personal computer that acts as a single user or client. A workstation can also be used as a server.

world wide name. A unique 48 or 64 bit number assigned by a recognized naming authority (often via block assignment to a manufacturer) that identifies a connection or a set of connections to the network. Abbreviated WWN. A WWN is assigned for the life of a connection (device). Most networking technologies (e.g., Ethernet, FDDI, etc.) use a world wide name convention.

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