Tivoli® Storage Manager for NetWare

Version 5.5

Backup-Archive Clients Installation and User's Guide

Tivoli® Storage Manager for NetWare

Version 5.5

IBM

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Edition notice

This edition applies to Version 5.5 of IBM Tivoli Storage Manager (5608-ISM), IBM Tivoli Storage Manager Extended Edition (5608-ISX), IBM Tivoli Storage Manager for Storage Area Networks (5608-SAN), and to all subsequent releases and modifications until otherwise indicated in new editions or technical newsletters.

Order publications through your IBM representative or the IBM branch office serving 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 IBM Tivoli Storage Manager documentation, see "Contacting customer support" on page xiii.

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About this book

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

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

- A *server program* that permits systems to perform as a backup and archive server
  for distributed workstations and file servers. See "Related publications" on page
  xii for available server publications.

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

- An *application program interface (API)* that permits you to enhance an existing
  application with storage management services. When an application is registered
  with a server as a client node, the application can back up, restore, archive, and
  retrieve objects from storage. For more information about the Tivoli Storage
  Manager API, see *IBM Tivoli Storage Manager Using the Application Programming
  Interface*, SC32-0147.

- A *Web backup-archive client* that permits an authorized administrator, help desk
  person, or end user to perform backup, restore, archive, and retrieve services
  using a Web browser on a remote system. See "Starting a Web client session" on
  page 28 for more information.

Who should read this manual

This manual provides instructions for an end-user to install, configure, and use the
Tivoli Storage Manager client. For installation information and supported operating
system levels, see Chapter 1, "Installing Tivoli Storage Manager," on page 1. For
configuration information, see Chapter 2, "Configuring Tivoli Storage Manager," on
page 7.

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

IBM Tivoli Storage Manager Web site

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

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

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

Conventions used in this book

This book uses the following typographical conventions:

Table 1. Typographical conventions

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

Reading syntax diagrams

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

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

Syntax items, such as a keyword or variable, can be:
- On the line (required element)
- Above the line (default element)
- Below the line (optional element).

Syntax diagram description	Example
Abbreviations: Uppercase letters denote the shortest acceptable truncation. If an item appears entirely in uppercase letters, it cannot be truncated. You can type the item in any combination of uppercase or lowercase letters. In this example, you can enter KEYWO, KEYWORD, or KEYWOrd.	►►—KEYWOrd———————————————►◄
Symbols: Enter these symbols exactly as they appear in the syntax diagram.	* Asterisk { } Braces : Colon , Comma = Equal Sign - Hyphen () Parentheses . Period Space
Variables: Italicized lowercase items (*var_name*) denote variables. In this example, you can specify a *var_name* when you enter the KEYWORD command.	►►—KEYWOrd—*var_name*———————————►◄
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.	►►—▼—*repeat*————————————————►◄ ►►—▼—,—*repeat*————————————————►◄ (1) ►►—▼—*repeat*————————————————►◄ **Notes:** 1 Specify *repeat* as many as 5 times.
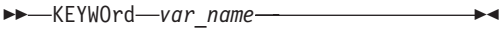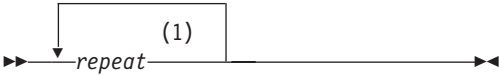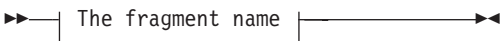
Required choices:
 	
When two or more items are in a stack and one of them is on the line, you *must* specify one item.
 	
In this example, you *must* choose A, B, or C.
	►►—┬—A—┬————————————————►◄
	     ├—B—┤
	     └—C—┘

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

Related publications

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

Table 2. IBM Tivoli Storage Manager client and server publications

Publication title	Order number
Client publications	
IBM Tivoli Storage Manager Messages	SC32-0140
IBM Tivoli Storage Manager for Windows Backup-Archive Clients Installation and User's Guide	SC32-0146
IBM Tivoli Storage Manager for UNIX and Linux Backup-Archive Clients Installation and User's Guide	SC32-0145
IBM Tivoli Storage Manager for Macintosh Backup-Archive Clients Installation and User's Guide	SC32-0143
IBM Tivoli Storage Manager Using the Application Programming Interface	SC32-0147

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

Publication title	Order number
Server publications	
IBM Tivoli Storage Manager for AIX Installation Guide	SC32-0134
IBM Tivoli Storage Manager for HP-UX Installation Guide	SC32-0135
IBM Tivoli Storage Manager for Linux Installation Guide	SC32-0136
IBM Tivoli Storage Manager for z/OS Installation Guide	SC32-0139
IBM Tivoli Storage Manager for Sun Solaris Installation Guide	SC32-0137
IBM Tivoli Storage Manager for Windows Installation Guide	SC32-0138

Downloading or ordering publications

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

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

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

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

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

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

Accessibility

Accessibility features help users with a physical disability, such as restricted mobility or limited vision, to use software products successfully. With this product, you can use assistive technologies to hear and navigate the interface. You can also use the keyboard instead of the mouse to operate all features of the graphical user interface.

Contacting customer support

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

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

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

- Visit the IBM Software Support Toolbar Web site at:

  ```
  http://www.ibm.com/software/support/toolbar/
  ```

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

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

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

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

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

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

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

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

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

We are very interested in hearing about your experience with Tivoli products and documentation. We also welcome your suggestions for improvements. If you have comments or suggestions about our documentation, complete our customer feedback survey at the following website, by selecting the Feedback link in the left navigation bar:

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

Reporting a problem

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

Internet

To search multiple Internet resources for your product, go to the support web site for the product:

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

and look for the section to search the support knowledge base. From this section,
you can search a variety of resources including:

- IBM technotes
- IBM downloads
- IBM Redbooks
- Forums and newsgroups

You can also check the following IBM Software Support Toolbar Web site, and
choose **Tivoli** –> **Tivoli developerWorks**® –> **Forums**. http://www.ibm.com/
software/support/toolbar/

A newsgroup, *listserv@marist.edu*, is implemented by a third party. IBM supports
this newsgroup on a best-effort basis only. See "Online forums" on page 31 for
more information.

Summary of changes for Tivoli Storage Manager

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

Technical changes for Version 5.5 - November 2007

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

Transparent encryption support
> Support has been added for transparent encryption, using the *encryptkeygenerate* option. Refer to "Encryptkey" on page 137 for more information about this option.

Auditlogging and auditlogname options
> The *auditlogging* option generates an audit log with an entry for each file that is processed during an incremental, selective, archive, restore, or retrieve operation. Refer to "Auditlogging" on page 104 for more information about this option.
>
> The *auditlogname* option specifies the path and file name where you want to store audit log information. This option applies when audit logging is enabled. Refer to "Auditlogname" on page 106 for more information about this option.

Unicode support
> Unicode file names are now supported on NetWare. New file spaces will be backed up in Unicode. Existing file spaces will continue to be backed up as non-Unicode until the *autofsrename* option is turned *on*.
>
> See the following sections for more information about using the Unicode-enabled client:
> - "Migrating to the Unicode-enabled client" on page 2
> - "Creating an include-exclude list (optional)" on page 15
> - "Pre-backup considerations" on page 34
> - "Autofsrename" on page 108
> - "Inclexcl" on page 157
> - "Query Filespace" on page 287
> - "Restoring from file spaces that are not Unicode-enabled" on page 304
> - "Retrieving from file spaces that are not Unicode-enabled" on page 313
> - "Set Access" on page 321

Technical changes for Version 5.4 - January 2007

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

Password file format changes
> The format of the Tivoli Storage Manager password file has changed. Your existing password file will be migrated to the new format during the first session with a Tivoli Storage Manager server after you install the client. See "Upgrade path for clients and servers" on page 1 for more information about the changes.

Reducing the memory used during the incremental backup function
The *memoryefficient diskcachemethod* option uses local disk space, which reduces the amount of memory required to complete an incremental backup. See "Memoryefficientbackup" on page 170 for more information about using *memoryefficient diskcachemethod*.

The *diskcachelocation* option specifies the location where the disk cache database will be created if the option *memoryefficientbackup=diskcachem* is set during an incremental backup. See "Diskcachelocation" on page 131 for information about how to use this option.

Support for include.fs
The *include.fs* option controls how Tivoli Storage Manager processes your file space for incremental backup. See "Include options" on page 159 for more information about using the *include.fs* option.

Dropped support for NetWare Version 5.1
Beginning with this release of Tivoli Storage Manager, NetWare Version 5.1 is no longer supported.

Technical changes for Version 5.3 - October 2005

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

Event-based policy retention protection
In addition to traditional backup archive processing to a Tivoli Storage Manager server, the Tivoli Storage Manager Backup-Archive Clients can now archive data to an IBM System Storage Archive Manager server by using the *enablearchiveretentionprotection* option. When connected to any Tivoli Storage Manager server Version 5.2.2 and above, the Tivoli Storage Manager Backup-Archive Clients can take advantage of event-based archive management policies. With the new **set event** command the client can also signal events and request deletion hold and deletion release for specific files. This feature is intended to help customers meet regulatory requirements. See "Using event-based policy retention protection" on page 84, "Enablearchiveretentionprotection" on page 135 and "Set Event" on page 323 for more information.

Include-exclude enhancements
A preview function allows you to view the objects that would be backed up or archived according to the include-exclude list. This enhancement is useful for validating the include-exclude list.

The Tivoli Storage Manager Client Web client directory tree shows detailed information of included and excluded objects.

See Chapter 2, "Configuring Tivoli Storage Manager," on page 7, Chapter 4, "Backing up your data," on page 33, Chapter 6, "Archiving and retrieving data," on page 63, and Chapter 10, "Using commands," on page 247 for more information.

Enhancements to query schedule command

To more accurately determine the status of scheduled events, the **query schedule** command on a Tivoli Storage Manager Version 5.3 and above client reports new parameters. See Chapter 7, "Automating tasks," on page 69 and Chapter 10, "Using commands," on page 247 for more information about these enhancements. Also see the Administrator's Guide and Administrator's Reference for your operating system.

Support for deleting individual backups from a server file space
> If your administrator has given you authority, you can delete individual backup copies from the Tivoli Storage Manager server without deleting the entire file space. This can be useful in the following situations:
> - You need to delete sensitive files which were mistakenly backed up.
> - You need to delete a subset of backup files which were inadvertently backed up.
> - You need to delete files that are found to contain viruses.
>
> See "Deleting backup files" on page 46 for more information.

Technical changes for Version 5.3 - December 2004

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

New options, Errorlogmax and Schedlogmax
> *Errorlogmax* and *Schedlogmax* are new options for controlling log size. *Errorlogmax* specifies the maximum size for the error log, in megabytes. *Schedlogmax* specifies the maximum size for the scheduler log, in megabytes. See Chapter 9, "Using processing options," on page 87 for more information.

Include-exclude enhancements
> A preview function allows you to view the objects that would be backed up or archived according to the include-exclude list. This enhancement is useful for validating the include-exclude list.
>
> The Tivoli Storage Manager Client Web client directory tree shows detailed information of included and excluded objects.
>
> See Chapter 2, "Configuring Tivoli Storage Manager," on page 7, Chapter 4, "Backing up your data," on page 33, Chapter 6, "Archiving and retrieving data," on page 63, and Chapter 10, "Using commands," on page 247 for more information.

Enhancements to query schedule command

> To more accurately determine the status of scheduled events, the **query schedule** command on a Tivoli Storage Manager Version 5.3 and above client reports new parameters. See Chapter 7, "Automating tasks," on page 69 and Chapter 10, "Using commands," on page 247 for more information about these enhancements. Also see the Administrator's Guide and Administrator's Reference for your operating system.

Tivoli Storage Manager Administration Center
> The hyperlink from the new Java based Tivoli Storage Manager Administration Center to a Tivoli Storage Manager client system provides the administrator ID and encrypted password to the Web client through a Java portlet. This enables the launching of the Web client GUI without the administrator signing on again. The Tivoli Storage Manager Version 5.3 or higher Web client is required for this support. See "Configuring the Web client" on page 9 and the *IBM Tivoli Storage Manager Administrator's Guide* for your operating system, for more information.

Web client enhancements
> You can now perform the following functions from the Web client:
> - Find files in the backup, restore, archive or retrieve window.
> - Back up, restore, archive, or retrieve your files by filtering file names or filtering the directory tree.
> - Restore your data from backup sets without a server connection.

Support for deleting individual backups from a server file space
> If your administrator has given you authority, you can delete individual
> backup copies from the Tivoli Storage Manager server without deleting the
> entire file space. This can be useful in the following situations:
> * You need to delete sensitive files which were mistakenly backed up.
> * You need to delete a subset of backup files which were inadvertently
>   backed up.
> * You need to delete files that are found to contain viruses.
>
> See "Deleting backup files" on page 46 for more information.

Enhancements for excluding system files
> The Tivoli Storage Manager NetWare client automatically generates the
> system exclude list. See "Excluding system files" on page 18 for more
> information.

Optimized option default values
> The *tcpnodelay* option specifies whether to send small transactions to the
> server, without buffering them first. Setting the *tcpnodelay* option to *yes*
> (the default) can improve performance in higher-speed networks. Table 3
> lists the default values which have been optimized to improve
> performance. See "Tcpnodelay" on page 229 for more information.

Table 3. Optimized option default values

Option	Change	Page
diskbuffsize	Allows you to specify I/O buffer size (in kilobytes) that the client can use to optimize backup, archive, or HSM client performance. **Recommendation:** Use the default value instead of specifying the *diskbuffsize* option.	130
largecommbuffers	This option has been replaced by the *diskbuffsize* option. At this time, *largecommbuffers* will continue to be accepted by the Tivoli Storage Manager client in order to ease the transition to the new option. However, the value specified by *largecommbuffers* will be ignored in favor of the *diskbuffsize* setting. **Recommendation:** Discontinue the use of *largecommbuffers* because future releases of Tivoli Storage Manager might not accept this option.	130
tcpbuffsize	The default value was changed from 31 kilobytes to 32 kilobytes.	225

Table 3. Optimized option default values (continued)

Option	Change	Page
tcpnodelay	The default value was changed from *no* to *yes*. **tcpnodelay** *yes* disables the TCP/IP Nagle algorithm. This algorithm is used to reduce the number of small segments sent across the network, but in some environments this might negatively impact Tivoli Storage Manager performance. **Recommendation:** Use the default of *yes*, unless you fully understand the effects of the TCP Nagle algorithm on network transmissions and how its use affects the performance of Tivoli Storage Manager in your environment.	229
tcpwindowsize	The default value was changed from 32 kilobytes to 63 kilobytes.	232
txnbytelimit	The default value was changed from 2048 kilobytes to 25600 kilobytes.	237

Chapter 1. Installing Tivoli Storage Manager

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

You can access Tivoli Storage Manager backup and archive features:
* Locally through the native client command line interface
* Remotely or locally through the Web client interface

This chapter provides migration, environment, and installation information for the Tivoli Storage Manager client. After installation, see Chapter 2, "Configuring Tivoli Storage Manager," on page 7 for required configuration tasks to perform before using Tivoli Storage Manager.

Migrating from earlier versions

The following sections explain what you need to do if you are migrating to Tivoli Storage Manager Version 5.5 from a previous version.

Upgrade path for clients and servers

As part of a migration plan from Tivoli Storage Manager Version 5.4 to Tivoli Storage Manager Version 5.5, Tivoli Storage Manager clients and servers can be upgraded at different times. This configuration is supported as long as the older version is supported. To help prevent disruption to your backup and archive activities during the migration, follow these guidelines:

* A Tivoli Storage Manager Version 5.4 client can perform backup, restore, archive, and retrieve functions to a Tivoli Storage Manager Version 5.5 server.

* A Tivoli Storage Manager Version 5.5 client can perform backup, restore, archive, retrieve, and query functions to a Tivoli Storage Manager Version 5.4 server.

* If you back up or archive data from a Tivoli Storage Manager Version 5.3 or Version 5.4 client to any Tivoli Storage Manager server, you can restore or retrieve that data using a Tivoli Storage Manager Version 5.5 client.

* If you back up or archive data from a Tivoli Storage Manager Version 5.5 client, you can restore or retrieve that data using a Tivoli Storage Manager Version 5.4 client.

* If you are migrating from Tivoli Storage Manager Version 5.3, the format of the Tivoli Storage Manager password file has changed. Your existing password file will be migrated to the new format during the first session with a Tivoli Storage Manager server after you install the Tivoli Storage Manager Version client. After the password file has been migrated, previous versions of the Tivoli Storage Manager client will not process the updated password file correctly. If you use Tivoli Storage Manager client data encryption and you ever need to go back to an older client version, follow these steps to avoid problems restoring your data with the updated password file and the older client:

  1. Before installing the new version, make a copy of the password file. See "Passworddir" on page 186 for information about finding the location of the password file.

2. After installing the new version, run a backup and enter the encryption key password when prompted.

   If data encryption is used, you will be prompted for the encryption key password on the first backup after the upgrade, to ensure that the correct encryption key is now used.
3. If you need to go back to an older version, follow these steps:
   a. Uninstall the client.
   b. Restore the saved passwords file.
   c. Install the older version.

Migrating to the Unicode-enabled client

Unicode is a universal character encoding standard that supports the interchange, processing, and display of text that is written in any of the languages of the modern world. Unicode-enabled file spaces provide support for multilingual workstations without regard for the current locale. Beginning with Tivoli Storage Manager Version 5.4.1, the NetWare client is Unicode-enabled. The Unicode-enabled client supports Unicode for file, directory, and file space names.

Benefits of using the Unicode-enabled client

The following list includes some benefits of using the Unicode-enabled client.
- If you back up or archive objects with a Unicode-enabled client, you can restore or retrieve these objects with a Unicode-enabled client in any other supported language environment. For example, a Japanese Unicode-enabled client can restore files backed up by a German Unicode-enabled client.
- The Unicode-enabled client is cross language, meaning that it works with files using different code pages. The Unicode-enabled client can handle a mixture of files from different code pages or locales in the same file space.
- Without the support for storing Unicode-enabled file spaces, some earlier NetWare clients have experienced backup failures. This occurs when file spaces contain names of directories or files in multiple languages or have names that cannot be converted to the client's current code page.

How to migrate to the Unicode-enabled client

New clients storing data on the server for the first time require no special set up. In this case, the server automatically stores data in Unicode-enabled file spaces. However, if your client already stores data on the server, you need to plan for the migration of your file spaces to Unicode-enabled file spaces. The migration involves renaming your file spaces on the server and creating new Unicode-enabled file spaces on the server using the *autofsrename* option.

The Tivoli Storage Manager administrator can specify three possible values using the server *autofsrename* option: `yes`, `no`, or `client`. Note that the server setting for this option overrides the setting on the client.
- If the server specifies `no`, the existing file spaces for your node are not renamed or Unicode-enabled, even if you have a Unicode-enabled client installed.
- If the server specifies `yes`, and the client performs an incremental backup with *domain=all-local*, all file spaces specified in the current operation that are not Unicode-enabled are renamed. The Unicode-enabled client then creates new Unicode-enabled file spaces.

   If the client performs a selective backup, only the file spaces you specify in the current operation are renamed and Unicode-enabled.
- If the server specifies `client`, the client can set the *autofsrename* option in the client options file (dsm.opt) to `prompt`, `yes`, or `no`. If the client sets the option to

no, the file spaces that are not Unicode-enabled are not renamed and are not Unicode-enabled. If the client specifies *prompt*, the client prompts you whether to rename file spaces. The client prompts you only once to rename a particular file space.

Note: The Web GUI will not prompt you if the *autofsrename* option is set to prompt. The option will be ignored and the file space will remain non-Unicode.

Optionally, your Tivoli Storage Manager administrator can rename the file spaces on the server that are not Unicode-enabled.

For options and results when using the *autofsrename* option, see the table below.

Server option	Client option	Result
Yes	Prompt, Yes, No	Renamed
No	Prompt, Yes, No	Not Renamed
Client	No	Not Renamed
Client	Yes	Renamed
Client	Prompt	CLI: Based on User Response Web GUI: Not renamed

For detailed information about the *autofsrename* option, see "Autofsrename" on page 108.

Considerations for migrating to the Unicode-enabled client

When migrating to the Tivoli Storage Manager NetWare Unicode-enabled client, consider the following guidelines:

- Ensure that you install the fonts for the languages you want to display. If you do not have the necessary fonts installed, the file names and archive descriptions might not display properly. However, the Unicode-enabled clients can still back up, restore, archive, and retrieve the files and directories.

- The name of the Unicode-enabled file space might be unreadable if the server cannot display the Unicode name. In this case, use the file space identifier (fsID) of the file space to identify these file spaces on the server. Use the **query filespace** command with the *detail* option to display the fsID of a file space.

- After installing a Unicode-enabled client, perform a full incremental backup to rename all existing file spaces that are not Unicode-enabled and back up the files and directories within them under the new Unicode-enabled file spaces.

- Renamed file spaces remain on the server and are managed as stabilized file spaces. *These file spaces contain all the original data, which can still be restored until the file spaces are deleted.* You can find additional information in the IBM Tivoli Storage Manager Administrator's Guide.

- When an existing file space is renamed during Unicode conversion, any access rules defined for the file space remain applicable to the original file space. New access rules must be defined to apply to the new Unicode file space, if necessary.

- When backing up files to a file space that is not Unicode-enabled, the Unicode-enabled client behaves as if it were not Unicode-enabled, so it might skip the files and directories with names containing characters from a code page other than the current locale. Until you migrate to Unicode-enabled file spaces, you will not gain any Unicode advantages.

• When a client performs a selective backup of an object and the original file space is renamed, the new Unicode-enabled file space contains only that object. Tivoli Storage Manager will back up all other directories and file spaces during the next full incremental backup.

	• The Unicode-enabled client has a file and directory name size limitation of 504 bytes. Depending on the UTF-8 encoding (which can be 2 bytes, 3 bytes, or 4 bytes) of the Unicode character, this translates to a maximum of 126 to 252 characters.

	Attention: If you do not follow the migration instructions properly, you might have two file spaces, one Unicode and one non-Unicode, with different file space identifiers (fsID) for the same client volume. In this case, the Tivoli Storage Manager client uses the non-Unicode file space as the default file space for backup and restore operations.

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.

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

	See the `client_message.chg` file in the client package for a list of new and changed messages since the Tivoli Storage Manager Version 5.4 release.

NetWare client environment

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

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

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

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

	Note: For more information about the Tivoli Storage Manager API, see *IBM Tivoli Storage Manager Using the Application Programming Interface*, SC32-0147.

Hardware requirements
	• Any Intel® based or equivalent computer running as a NetWare file server
	• Disk space:
		– 13 MB for the NetWare Backup-Archive and Web Client package
		– 3 MB for the NetWare Client API
	• Minimum memory is 125 bytes per file; Maximum memory is 362 bytes per file. Multiply bytes per file by the number of files and directories being backed up. Memory usage can vary because the directory name size and file name size can vary.

- When performing incremental backups, memory requirements can double in size because we must compare meta data stored on the Tivoli Storage Manager Server with local file and directory information.
- To decrease memory requirements see "Memoryefficientbackup" on page 170.
- A minimum screen resolution of 800 by 600 pixels is required to display the Tivoli Storage Manager Backup-Archive Client Web GUI.

Software requirements

- Novell NetWare OES SP2 (NW 6.5 SP5). This Novell NetWare server level is required for local or remote Tivoli Storage Manager operations. See the README file that is shipped on the product installation media for information on supported patches from Novell.

Communications method

To use this communication method:	Install this software on file server:	To connect to these Tivoli Storage Manager servers:
TCP/IP	TCP/IP (Standard with Novell NetWare)	AIX®, HP-UX, Linux®, Solaris, Windows®, z/OS®

SMS software requirements

For current information on supported Storage Management Services (SMS) modules available from Novell, refer to the README file that is shipped on the product installation media.

Notes:

1. If you want to execute local or remote Tivoli Storage Manager operations, SMDR.NLM must be loaded on the source and target servers, and the TSA modules must be loaded on the target server. SMDR.NLM is loaded automatically on the client; the TSA modules are not.

2. NetWare 6.5 is supported for remote backup. Remote backup is supported for servers residing in a different NDS tree. If you are backing up a remote NetWare server in a different tree you must specify the *full distinguished name* of your NetWare administrator id. For example:

   ```
   .cn=admin.o=itsm
   ```

   or

   ```
   .admin.itsm
   ```

Installing the client program (required)

The Tivoli Storage Manager NetWare client is included on the desktop client installation CD in the `tsmcli/ntw` directory structure. However, you must have **Create** access to the directory where Tivoli Storage Manager components are installed.

From a Web browser:
1. Click **File** and then click **Open File**.
2. Select the CD drive.
3. Select the **START.HTM** file.

Installing from the CD

1. Mount the client CD.
2. Load the NetWare Server Installation routine NWconfig.NLM. You can use RCONSOLE.
3. Select **Product Options** and press Enter.
4. Select **Install a product not listed** and press Enter.
5. Press F3 to specify `{Volume}:\TSMCLI\NTW`, where `{Volume}` is the volume name of the mounted CD.
6. Select the components you wish to install. Follow the instructions on the screen.
7. Press F10 to start the installation.

Uninstalling the client

1. Manually delete all files and directories in the IBM Tivoli Storage Manager installation directory on the hard drive.
2. Use NWconfig.NLM to remove IBM Tivoli Storage Manager components product records from the Novell NetWare install database. Using NWconfig.NLM does not delete product files. To delete the product files, use the NetWare Administrator utility or the PURGE command line utility.

Tivoli Storage Manager server installation and configuration

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

Table 4. Tivoli Storage Manager server Installation Guides

Publication title	Order number
IBM Tivoli Storage Manager for AIX Installation Guide	SC32-0134
IBM Tivoli Storage Manager for HP-UX Installation Guide	SC32-0135
IBM Tivoli Storage Manager for Linux Installation Guide	SC32-0136
IBM Tivoli Storage Manager for Sun Solaris Installation Guide	SC32-0137
IBM Tivoli Storage Manager for Windows Installation Guide	SC32-0138
IBM Tivoli Storage Manager for z/OS Installation Guide	SC32-0139

Chapter 2. Configuring Tivoli Storage Manager

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

Optional configuration tasks include the following:

Creating and modifying the client options file (required)

During installation, Tivoli Storage Manager provides a sample client option file called `dsm.smp`. This file is a template containing options required to establish client-server communications. By default, Tivoli Storage Manager places the `dsm.smp` file in `SYS:\tivoli\tsm\client\ba` or in another location you select during installation.

To create and customize your own client options file:

1. From a NetWare requestor, change your current directory to the Tivoli Storage Manager installation directory.
2. Copy the `dsm.smp` file to `dsm.opt` by entering:

   ```
   copy dsm.smp dsm.opt
   ```
3. Start the NetWare text editor using the **load edit** command. Use the NetWare **load edit** command with caution because loss of data can occur. This text editor is normally used to modify small text files. Do not edit large files with this utility. You can also use an editor available from the NetWare requester machine.
4. Modify the required options according to your needs. The following options are required to establish communication with a Tivoli Storage Manager server:

   ```
   NODename          ABNERYOUNG

     COMMmethod        TCPIP
     TCPPort           1520
     TCPServeraddress  node.domain.company.com
   ```

   Note: The TCPPORT and TCP Server address must correspond to the Tivoli Storage Manager server to which you are connecting.

   You can also specify the following types of options in your `dsm.opt` file:
   - 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 9, "Using processing options," on page 87 for more information about these options.

Setting options in the client options file

This section describes how to set options in your client options file (dsm.opt), and how to use options with commands. To set an option in this file, enter the option name and one or more blank spaces, followed by the option value. 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 options file dsm.opt:
- Begin each comment with an asterisk (*) as the first character in a line.
- Do not enter comments on the same line as an option.
- Indent options with spaces or tabs.
- Enter each option on a separate line and enter all parameters for an option on the same line.
- Enter one or more blank spaces between parameters.
- The maximum number of characters in a file name is 256. The maximum combined length of the file name and path name is 1023 characters. The maximum length of a file name is limited to 504 bytes (not characters). The Unicode representation of a character can occupy several bytes, so the maximum number of characters that a file name might contain can vary.

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

You can use the **query options** command to display all or part of your options and their current settings. This command accepts an argument to specify a subset of options. The default is to display all options. See "Query Options" on page 294 for more information.

Registering your workstation with a server (required)

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

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

Using closed registration

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

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

Using open registration

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

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

To register your NetWare server with additional servers, edit the dsm.opt file and change the communication options. Then, when you start a session, your NetWare server is registered.

When you use open registration:
- Your client node is assigned to a policy domain named **standard**.
- You can delete archived copies of files from server storage, but not backup versions of files.

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

Configuring the Web client

To configure the Web client from the command line, perform the following steps:
1. Ensure that you specify *passwordaccess* *generate* and *nwpwfile* *yes* in the client options file (dsm.opt). For more information on *passwordaccess*, see "Passwordaccess" on page 184.
2. Start the backup-archive client (dsmc.nlm) by entering:

```
dsmc query session
```

> when prompted, enter your Storage Manager node name and password to authenticate with the server.

3. To authenticate with the NetWare Filesystem TSA, enter:

   ```
   dsmc query tsa
   ```

   when prompted, enter your NetWare user ID and password to authenticate with the NetWare server.

4. To authenticate with the Novell eDirectory TSA, enter:

   ```
   dsmc query tsa nds
   ```

   when prompted, enter your NetWare user ID and password to authenticate with the NetWare tree under which the NetWare server belongs.

5. Start the client acceptor program by entering dsmcad from the NetWare console. The remote client agent program (dsmagent.nlm) starts automatically when needed.

   The options applicable to the **dsmcad** program are *optfile*, *httpport*, *managedservices*, *webports*, *nodename*, *tcpclientaddress*, *tcpserveraddress*, and *tcpserverport*. The **dsmcad** program contacts the server during initialization, and registers the *tcpserverport* and *tcpserveraddress* of its TCP/IP listening port. If the *tcpclientaddress* is set in the options file, it is used. Otherwise, the TCP/IP address used by this initialization connection to the server is used.

   You can use the *managedservices* option to specify whether the Tivoli Storage Manager Client Acceptor daemon (CAD) also manages the Tivoli Storage Manager scheduler. See Chapter 9, "Using processing options," on page 87 for more information about these options.

   All Web client messages are written to the Web client log file, dsmwebcl.log. Error messages are written to the error log file dsmerror.log, or the file you specify with the *errorlogname* option. The dsmwebcl.log and dsmerror.log files reside in the current working directory. See Chapter 9, "Using processing options," on page 87 for more information.

6. To access the Web client from a network that is DNS enabled, enter the following URL from any supported browser:

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

   To access the Web client from a network that is not DNS enabled, enter the following URL from any supported browser:

   ```
   http://your_machine_IP_address:1581
   ```

   where *your_machine_name* and *your_machine_IP_address* is the host name and the IP address, respectively, 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 154 for more information.

After installing and configuring the Web client on your workstation you can use the Web client to perform backup, archive, restore, and retrieve operations from any browser that is at least JRE (Java™ Runtime Environment) 1.3.1 Swing-enabled. See "Starting a Web client session" on page 28 for more information.

Starting the client scheduler

See "Configuring the client scheduler" on page 13 for more information.

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

For NetWare, enter the following command:

```
DSMC SCHEDULE
```

Configuring Tivoli Storage Manager client/server communication across a firewall

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

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

Method 1:

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

TCP/IP port

To enable the backup-archive client and the scheduler to run outside a firewall, the port specified by the server option *tcpport* (default 1500) must be opened by the firewall administrator. This port is set on the client and the server using the *tcpport* option. The setting must be the same on the client and server. See "Tcpport" on page 230 for more information. This will allow Tivoli Storage Manager scheduler communications in both *polling* and *prompted* mode, CAD-managed schedulers, and regular backup-archive client operations.

HTTP port

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

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

TCP/IP ports for the remote workstation

The two TCP/IP ports for the remote workstation client must be opened. Use the *webports* option in the remote workstation client options file to specify these ports. If you do not specify the values for the *webports* option, the default zero (0) causes TCP/IP to randomly assign two free port numbers. See "Webports" on page 245 for more information about the *webports* option.

Method 2:

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

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

Notes:

1. If *sessioninitiation* is set to *serveronly*, the value for the *tcpclientaddress* client option must be the same as the value for the *HLAddress* option of the **update node** or **register node** server command. The value for the *tcpclientport* client option must be the same as the value for the *LLAddress* option of the **update node** or **register node** server command.

2. Using the *sessioninitiation* option requires a Tivoli Storage Manager Version 5.2 or higher server.

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

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

   Note: The Tivoli Storage Manager client cannot prompt for the encryption key password in scheduler mode. If you are using Tivoli Storage Manager data encryption, you must run an initial interactive backup once to set up the encryption key by opening the TCP/IP connection from the client machine to the server machine. See 11 for more information about setting up this communication. After the encryption key is set, you can use server-initiated sessions to back up the files using Tivoli Storage Manager encryption.

   If you set the *sessioninitiation* option to *client*, the client will initiate sessions with the server (11) by communicating on the TCP/IP port defined with the *server* option *tcpport*. This is the default. Server prompted scheduling can be used to prompt the client to connect to the server.

   See "Sessioninitiation" on page 215 for more information about the *sessioninitiation* option.

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

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

the client creates a new connection to the Tivoli Storage Manager server when prompted. This means that the firewall configuration discussed above must be in place.

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

Configuring the client scheduler

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

The Tivoli Storage Manager Client Acceptor (CAD) can manage the scheduler. **Recommendation:** Use the CAD to manage the client 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. This reduces the number of background processes on your workstation and resolves memory retention problems that can occur when running the scheduler service without CAD management.

To configure the client scheduler, use either of the following methods:

CAD-managed

The CAD-managed method is the preferred method to run scheduler services on Novell NetWare:

1. Specify the following required options in the client options file (dsm.opt):
   managedservices schedule
   passwordaccess generate
   nwpwfile yes
2. Specify any additional options to control which files will be backed up (*include*, *exclude*, *domain*, etc).
3. The Novell SMS/TSA interface must be active.
   ```
   load smdr.nlm
   load tsands.nlm
   ```
   load tsa**xxx** (where **xxx** is the specific Target Service Agent). For example:
   ```
   tsafs.nlm
   ```
4. If this is your first time running the scheduler, you must initialize the Tivoli Storage Manager password files, as follows:
   a. Issue the following command:
      ```
      load dsmc.nlm
      ```

      When prompted, enter your Tivoli Storage Manager password.

      Note: The load command assumes that the path where dsmc.nlm is already added to your search path.

b. Issue the following command:

```
q tsa
```

Enter your NetWare administrator ID followed by your password.

c. Issue the following command:

```
q tsa nds
```

Enter your NetWare administrator id followed by your password.

5. You can start the scheduler services manually with the following commands:

- If you have a search path specified which contains the directory path to Tivoli Storage Manager, you can specify:

```
load dsmcad.nlm
```

- If you do not have a search path specified, you can specify:

```
load sys:\tivoli\tsm\client\ba\dsmcad.nlm
```

(assuming that you installed the client on the sys volume and you are using the default install path).

You can start the scheduler services automatically when NetWare starts, by adding the above commands in your `autoexec.ncf` file.

Traditional method

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

```
load dsmc schedule
```

See Chapter 7, "Automating tasks," on page 69 for information about the following tasks:
- Starting the client scheduler
- Displaying information about available schedules
- Displaying information about work that the schedule has completed
- Modifying scheduling options in the client options file

See Appendix A, "Using the Tivoli Storage Manager central scheduler," on page 327 for supplemental information about the Tivoli Storage Manager central scheduler.

Updating AUTOEXEC.NCF (optional)

After the installation program completes, use a text editor to add the following entry to your NetWare server's `autoexec.ncf` file:

```
search add VOLUME:INSTALL_DIRECTORY
```

where `VOLUME:INSTALL_DIRECTORY` is the destination you specified for the installation files.

Creating an include-exclude list (optional)

This is an optional task but an important one. If you do not create an include-exclude list, Tivoli Storage Manager considers all files for backup services and uses the default management class for backup and archive services. For information on management classes and policy domains, see Chapter 8, "Understanding storage management policies," on page 75.

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

Attention: There are some system files that you should exclude. See "Excluding system files" on page 18 for more information.

Specify your include-exclude list in your client options file (dsm.opt). The include-exclude list can also go into a separate file, which is referred to by the *inclexcl* option.

The client options file, dsm.opt, must be in a non-Unicode format. However, if you are using a separate include-exclude file, it can be in Unicode or non-Unicode format. See "Inclexcl" on page 157 for instructions on creating a Unicode include-exclude file.

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.opt, in the same order, and processed accordingly.

See "Inclexcl" on page 157 for important detailed information about specifying an include-exclude file using the *inclexcl* option.

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

1. Determine your include and exclude requirements.
2. Enter your *include* and *exclude* statements using the appropriate include-exclude options as described in "Using include-exclude options" on page 16. Tivoli Storage Manager evaluates all *exclude.dir* statements *first* (regardless of their position within the include-exclude list), and removes the excluded directories and files from the list of objects available for processing. All other include-exclude statements are processed from the bottom of the list up. Therefore, it is important to enter all your include-exclude statements in the proper order. For example, in the following include-exclude list the includefile.txt file *is not* backed up:

   ```
   include sys:\test\includefile.txt
   exclude sys:\test\...\*
   ```

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

   ```
   exclude sys:\test\...\*
   include sys:\test\includefile.txt
   ```
3. Save the file and close it.

4. Restart your Tivoli Storage Manager client and the scheduler and client acceptor services to enable your include-exclude list.

Using include-exclude options

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

Excluding directories

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

Table 5. Option for excluding directories

Option	Description	Page
exclude.dir	Excludes a directory, its files, and all its subdirectories and their files from backup processing. For example, the statement `exclude.dir nw6\sys:test/dan/data1` excludes the `nw6\sys:test/dan/data1` directory, its files, and all its subdirectories and their files. Using the *exclude.dir* option is preferable over the standard *exclude* option to exclude large directories containing many files that you do not want to back up. You cannot use *include* options to override an *exclude.dir* statement. Only use *exclude.dir* when excluding an entire directory branch.	143

Notes:

1. If you define an exclude statement without using a drive letter, such as `exclude.dir dirname`, this will exclude from processing any directory named `dirname` on any drive.

2. The following examples illustrate valid `exclude.dir` statements:

   Exclude directory `nw6/sys:` and its files and subdirectories:

   `exclude.dir nw6/sys:*`

   Exclude all directories below `nw6/sys:`. Note that directory `nw6/sys:` and the files immediately below `nw6/sys:` will still be eligible for backup.

   `exclude.dir nw6/sys:*`

   Exclude all directories whose names begin with `temp`, and are located within directory `\documents and settings\` and its subdirectories on any volume.

   `exclude.dir "*:\documents and settings\...\temp*"`

   Exclude all directories whose names begin with `temp`, regardless of the drive or directory in which they reside:

   `exclude.dir temp*`

   The following example is invalid because it ends with a directory delimiter:

   `exclude.dir nw6/sys:\`

3. Use the following statements to exclude drive `nw6/sys:` altogether from backup processing. Note that the drive root (`nw6/sys:`) will still be backed up, but all other files and directories on `nw6/sys:` will be excluded.

   `exclude nw6/sys:*`
   `exclude.dir nw6/sys:*`

4. An alternative method for excluding an entire drive from domain incremental backup is to use a domain statement to exclude the drive. For example:

   `domain -nw6/sys:`

   This alternative still permits selective backup processing of files on `nw6/sys:`.

   This alternative also permits explicit incremental. For example:

   `Inc nw6/sys:`

Controlling backup and archive processing

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

Table 6. Options for controlling backup and archive processing

Option	Description	Page
Backup processing		
exclude *exclude.backup* *exclude.file* *exclude.file.backup*	*These options are equivalent*. Use these options to exclude a file or group of files from backup services.	143
include *include.backup* *include.file*	Use these options to include files or assign management classes for backup processing.	159
include.fs	Controls how Tivoli Storage Manager processes your file space for incremental backups.	159
Archive processing		
exclude.archive	Excludes a file or group of files from archive services.	143
include *include.archive*	*These options are equivalent*. Use these options to include files or assign management classes for archive processing.	159

Excluding system files

Tivoli Storage Manager has no recommended system file excludes that should be placed in the dsm.opt file. There are exclude statements automatically generated by the Tivoli Storage Manager client. These files are either locked by the operating system or they can cause problems during restore. The implicitly generated statements can be seen in the lines of output of the **query inclexcl** command with the source "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 7. This table applies to *include* and *exclude* statements *only*. For information about using wildcard characters in Tivoli Storage Manager commands, see "Using wildcard characters" on page 253.

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

Table 7. Wildcard and other special characters

Character	Function
?	The match one character matches any single character *except* the directory separator; it does not match the end of the string. For example: • The **pattern** ab?, **matches** abc, but **does not match** ab, abab, or abzzz. • The **pattern** ab?rs, **matches** abfrs, but **does not match** abrs, or abllrs. • The **pattern** ab?ef?rs, **matches** abdefjrs, but **does not match** abefrs, abdefrs, or abefjrs. • The **pattern** ab??rs, **matches** abcdrs, abzzrs, but **does not match** abrs, abjrs, or abkkkrs.

Table 7. Wildcard and other special characters (continued)

Character	Function
*	The match-all character. For example: • The **pattern** ab*, **matches** ab, abb, abxxx, but **does not match** a, b, aa, bb. • The **pattern** ab*rs, **matches** abrs, abtrs, abrsrs, but **does not match** ars, or aabrs, abrss. • The **pattern** ab*ef*rs, **matches** abefrs, abefghrs, but **does not match** abefr, abers. • The **pattern** abcd.*, **matches** abcd.c, abcd.txt, but **does not match** abcd, abcdc, or abcdtxt.
\...	The match-*n* character matches zero or more directories.
.	The NDS container separator character. The match-n character matches zero or more NDS containers. For example: exclude NDS:.....*License* will exclude any NDS object that contains the ″License″ string.

\	The directory separator character limits the scope of the search for the matching *n* characters and directories. If a pattern does not begin with a directory separator (or one does not follow the drive specification), a match-all directories is appended to the pattern. For example, these patterns are equivalent:
	
	```sys:*```
	```sys:.../*```
	
	Note that both characters (\) and (/) can be used as a directory delimiter.

/	The directory separator character limits the scope of the search for the matching *n* characters and directories. If a pattern does not begin with a directory separator (or one does not follow the file system specification), a match-all directories is appended to the pattern. For example, these patterns are equivalent:
	
	```core```
	```/.../core```

[	The open character-class character begins the enumeration of a character class. For example: ```xxx[abc] matches xxxa, xxxb, or xxxc.```
–	The character-class range includes characters from the first character to the last character specified. For example: ```xxx[a-z] matches xxxa, xxxb, xxxc, ... xxxz.```
/	The literal escape character. When used within a character class it causes the next character to be treated literally. When used outside a character class, it is used as a directory separator. 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. This is also a server name delimiter when it is placed before a volume delimiter (:). For example: ```servername\volumename:/directoryname/filename```
]	The close character-class character ends the enumeration of a character class.
:	The volume separator character separates a file specification. The characters *before* the colon identify a volume name. The characters *after* the colon identify file specification or pattern. For example: ```volumename:/directoryname/filename```

Examples using wildcards with include and exclude patterns

Tivoli Storage Manager accepts the *exclude.dir* option which can be used to exclude directory entries. However, *include* and *exclude.dir* cannot be used together. For example, the following statements will *not* produce the expected results:

```
exclude.dir nds:.o=adsm
include nds:.o=adsm.ou=tucson.*
```

You must code the following statements to include only the objects in the **.o=adsm.ou=tucson** branch of the NDS:

```
exclude nds:.o=adsm
include nds:.o=adsm.ou=tucson.*
```

Table 8 contains examples of ways you might use wildcard characters with *include* and *exclude* patterns.

Table 8. Using wildcard characters with include and exclude patterns

Task	Pattern
Exclude all files with an extension of *.bak*, except those found on servera in the one:/dev directory.	`exclude servera\*:.../*.bak` `include servera\one:dev/*.bak`
Exclude all files and directories under any tmp directory that might exist on servera, *except* for the file vol:/tmp/save.fil. Include this file.	`exclude servera\*:.../tmp/.../*` `include servera\vol:tmp/save.fil`
Exclude any .obj file in any directory on volumec, volumee, volumef, and volumeg.	`exclude servera\volume[ce-g]:/.../ *.obj`
Exclude the .obj files found in the root directory in the volumed drive *only*.	`exclude servera\volumed:*.obj`
Exclude any file that resides under the tmp directory found on any volume.	`exclude servera\*:tmp/.../*`
Exclude the servera\volumed:mydir/test1 directory and any files and subdirectories under it.	`exclude.dir servera\volumed:mydir/ test1`
Exclude all directories under the mydir directory with names beginning with test.	`exclude.dir servera\volumed:mydir/ test*`
Exclude all directories directly under the mydir directory with names beginning with test, on any volume.	`exclude.dir servera\*:mydir/test*`

Exclude a license object.	`exclude "nds:.O=TSM.OU=CTRL.OU=`
	`TMP.NLS:Publisher=Novell+NLS:Product=`
	`NetWare 5 Server+NLS:Version=510.NLS:`
	`License ID=SN:123456782"`

Exclude all files and directories in a volume	`exclude.dir servera\vol:/.../*`

Controlling compression and encryption processing

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

Table 9. Options for controlling compression and encryption processing

Option	Description	Page
Compression processing		
exclude.compression	Excludes files from compression processing if *compression=yes* is specified. This option applies to backups and archives.	143

Table 9. Options for controlling compression and encryption processing (continued)

Option	Description	Page
include.compression	Includes files for compression processing if *compression=yes* is specified. This option applies to backups and archives.	159
	Encryption processing	
exclude.encrypt	Excludes files from encryption processing.	143
include.encrypt	Includes files for encryption processing.	159
	The data that you include is stored in encrypted form, and encryption does not affect the amount of data sent or received.	
	Attention: The *include.encrypt* option is the only way to enable encryption on the Backup-Archive client. If no *include.encrypt* statements are used encryption will not occur.	

Testing an include-exclude list with the Preview command

You can preview the list of objects to be backed up or archived according to the include-exclude list, prior to sending any data to the server. The Tivoli Storage Manager client Web GUI directory tree shows detailed information of included and excluded objects. The directory tree windows in the Tivoli Storage Manager Client Web GUI allow you to select files and directories to include or exclude. You should use this **Preview** command to make sure that you include and exclude the correct files. The following is a sample scenario for using the include-exclude preview function.

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

See "Preview" on page 279 for more information about the **Preview** command.

Processing include and exclude options

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

When performing an incremental backup, Tivoli Storage Manager evaluates all *exclude.dir* statements *first*, and removes the excluded directories and files from the list of objects available for processing. See "Excluding directories" on page 16 and "Exclude options" on page 143 for more information about the *exclude.dir* option.

After evaluating all *exclude.dir* statements, Tivoli 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 87 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 291 for more information.

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

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

   Note: A very large include-exclude list can 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 `servera\data:` is defined as the domain, and that you defined the following statements for the *exclude* and *include* options:

Note: In a NetWare environment, if you do not specify a server name, the client program uses the local server name.

```
exclude servera\*:*.obj
include servera\data:foo/.../*.obj
exclude servera\data:foo/junk/*.obj
```

The current file being processed is: `servera\data:foo/dev/test.obj`. Processing follows these steps:

1. Rule 3 (the last *include* or *exclude* statement defined) is checked *first* because of bottom-up processing. The pattern `servera\data:foo/junk/ *.obj` does not match the current file name that is being processed.

2. Processing moves to Rule 2 and checks. This time, pattern `servera\data:foo/.../*.obj` matches the current file name that is being processed. Processing stops, the option is checked, and it is **include**.

3. File `servera\data:foo/dev/test.obj` is backed up.

Example 2

Assume that `servera\data:` is defined as the domain, and that you defined the following statements for the *exclude* and *include* options:

```
exclude servera\*:*.obj
include servera\data:foo/.../*.obj
exclude servera\data:foo/junk/*.obj
```

The current file being processed is: `servera\data:widg/copyit.bat`. 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 `servera\data:widg/copyit.bat` is implicitly included and is backed up.

Example 3

Assume that `servera\data:` is defined as the domain, and that you defined the following statements for the *exclude* and *include* options:

```
exclude servera\*:*.obj
include servera\data:foo/.../*.obj
exclude servera\data:foo/junk/*.obj
```

The current file that processes is: `servera\data:lib/objs/printf.obj`. 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 `servera\data:lib/objs/printf.obj` is not backed up.

Note: *include* and *exclude.dir* cannot be used together. For example the following example is not valid:

```
exclude.dir nds:.o=adsm
include nds:.o=adsm.ou=tucson.*
```

To achieve the expected results, enter:

```
exclude nds:.o=adsm.*
include nds:.o=adsm.ou=tucson.*
```

Example 4: Backing up the NDS

To back up objects in container `.ou=islands.o=greece`, code the following statements in the dsm.opt file:

```
exclude nds:.o=greece.*
include nds:.o=greece.ou=Islands.*
```

You must specify the syntax as it appears in the examples.

Notes:

1. *Include* and *exclude* processing does not affect processing of container entries. All containers are backed up.

2. The NDS names that are stored by Tivoli Storage Manager are case sensitive; file space qualifiers are not.

Accessing remote NetWare servers

You can access other NetWare servers with Tivoli Storage Manager if you have a user ID and password with administrator or supervisor equivalence.

Remote Novell NetWare servers must be running an operating system level that is supported by the Tivoli Storage Manager client performing the backup, restore, archive, or retrieve of files on that remote server. See "NetWare client environment" on page 4 for environment requirements for the Tivoli Storage Manager client.

Recommendation: Install the Tivoli Storage Manager client locally on each Novell NetWare server. Utilizing Tivoli Storage Manager functions on remote Novell NetWare Servers can affect performance.

To back up, restore, archive, or retrieve files on remote NetWare servers, you must have:
- **Version 6.5 NetWare server**: Run SMDR.NLM on the local server, and TSAFS.NLM or TSANDS.NLM and SMDR.NLM on the remote server.

When requesting Tivoli Storage Manager services, specify the remote NetWare server name and volume at the beginning of any directory, file, or path name you want to operate on. When you try to contact a remote NetWare server, you are prompted for an ID and a password if one of the following occurs:
- You do not specify the *nwuser* option.
- You initially start a Tivoli Storage Manager session and are prompted for your client node ID and password.
- You initially connect to another NetWare server.
- Your supervisor password or passwords expire.
- Your Tivoli Storage Manager client node password has changed.

For details about the *nwuser* option, see "Nwuser" on page 179.

Chapter 3. Getting started

This chapter includes instructions for the following tasks:

Tivoli Storage Manager client authentication

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

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

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

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

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

Client access
> To use the Web Client to back up and restore files on a remote client system, you must have an administrative user ID with client access authority over the node name for the remote client system. If you do not want Tivoli Storage Manager administrators with client access authority over your node name to be able to back up and restore files on your system, specify the *revokeremoteaccess* option in your client options file (dsm.opt). See "Revokeremoteaccess" on page 205 for more information.
>
> Client access authority only allows Tivoli Storage Manager administrators to back up and restore files on remote systems. They do not have physical access to the data. That is, they cannot restore the data belonging to the

remote system to their own systems. To restore data belonging to a remote system to your own system, you must possess at least client owner authority.

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

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

Starting a session

- On the command line enter **dsmc** followed by the command, to execute a single command (*batch mode*).
- On the command line enter **dsmc**. This places you in *interactive mode*, permitting you to run several commands without preceding each with **dsmc**.

During installation of the NetWare backup-archive client, you might have updated your autoexec.ncf file to include the Tivoli Storage Manager directory in your path. To start Tivoli Storage Manager from this directory, begin a Tivoli Storage Manager command with **dsmc**. If you did not update the autoexec.ncf file or you want to start Tivoli Storage Manager from a different directory, you must include the directory in the command line. For example:

```
sys:tivoli/tsm/client/ba/dsmc
```

Your Tivoli Storage Manager administrator can require you to use a password to connect to the server.

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

Using batch mode

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

For example, to archive the file t9\sys:plan/proj1/file1.txt, enter the command:
```
dsmc archive t9\sys:plan/proj1/file1.txt
```

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

Depending upon the current setting of your *passwordaccess* option, Tivoli Storage Manager might prompt you for your password before the command is processed in a batch mode session. See "Passwordaccess" on page 184 for more information.

If a Tivoli Storage Manager password is required at your NetWare server, Tivoli Storage Manager prompts you for your password each time you enter a command. For example, to issue the **incremental** command, enter the following at the NetWare colon prompt:
```
dsmc incremental
```

If your client node name is **nwserver**, Tivoli Storage Manager responds:

```
Please enter password for node "nwserver":
```

When you type in your password and press Enter, the password is not displayed on your screen.

You can also enter your password with the command. For example, to issue the **incremental** command with your password in batch mode, enter the following:

```
dsmc incremental –password=secret
```

where `secret` is your password.

If Tivoli Storage Manager is unable to authenticate your ID and password, you are returned to the NetWare colon prompt without being able to use Tivoli Storage Manager services. If Tivoli Storage Manager authenticates your ID and password, it asks you for your NetWare user ID:

```
Please enter NetWare user for "nwserver":
```

Next, Tivoli Storage Manager requests your NetWare password.

```
Please enter the password on "nwserver" for NetWare user "username":
```

After your NetWare ID and password are accepted, the command processes, displays any messages it generates, and returns to the NetWare colon prompt.

Using interactive mode

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

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

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

```
tsm>
```

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

For example, to archive a file named t9\sys:plan/proj1/file1.txt, enter the command:

```
archive t9\sys:plan/proj1/file1.txt
```

The first time you enter a command in an interactive session, Tivoli Storage Manager prompts you for your password, if a password is required. For example, if you enter the following as the first command in your session:

```
incremental
```

Tivoli Storage Manager responds:

```
Please enter password for node "nwserver"
```

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

You can also enter your password with the **loop** command:

```
dsmc loop –password=secret
```

If Tivoli Storage Manager is unable to authenticate your ID and password, you cannot use Tivoli Storage Manager services. If Tivoli Storage Manager authenticates your ID and password, it then asks you for your NetWare user ID:

```
Please enter NetWare user for "nwserver":
```

Next, you are prompted for your NetWare password.

```
Please enter the password on "nwserver" for NetWare user "username":
```

After your NetWare ID and password are accepted, Tivoli Storage Manager processes your command, displays any messages it generates, and returns to the tsm> prompt.

If you have specified *nwpwfile yes* in your client options file, Tivoli Storage Manager saves your NetWare ID and password in a file in your installation directory with a **.PWD** extension. When you enter additional commands within the same interactive session, Tivoli Storage Manager gets your NetWare ID and password from this file instead of prompting you for them. For more information on the *nwpwfile* option, see "Nwpwfile" on page 178.

See "Options handling in interactive mode" on page 250 for a discussion of how options are handled in interactive mode.

See Chapter 10, "Using commands," on page 247 for more information on how to start and use the command-line client.

Starting a Web client session

After installing the Web client on your workstation (see "Configuring the Web client" on page 9) you can use the Web client to perform backup, archive, restore, and retrieve operations from any browser that is running Java Runtime Environment (JRE) 1.5 or 1.4.*x*, where *x* is greater than or equal to 1. 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 runs in the following browsers:
- Microsoft® Internet Explorer 5.0 or higher with JRE 1.5 or 1.4.*x* , where *x* is greater than or equal to 1

You can use the Web client in conjunction with Storage Manager Web Client Agent for NetWare to provide a graphical user interface from a Web browser.

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

1. Open the **Tools** menu and select **Internet Options**

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

If your browser does not have the correct JRE level, the Web client will notify you and if possible, will try to automatically install the correct JRE for you.
- The Web Client will let you know if your browser does not have the correct JRE level. For Microsoft Internet Explorer on Windows platforms, the Web client will automatically download and install JRE 1.4.x, where x is greater than or equal to 1

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

You can download and install JRE 1.5 or 1.4.x, where x is greater than or equal to 1 (unless otherwise noted), manually from the appropriate URL:

Note: Proxy server users: The JRE 1.4.x , where x is greater than or equal to 1 might 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 system:
  - **Change your Java plug-in settings**:
  - **Change your browser settings to enable a direct connection to the Internet**:
    – For Mozilla: 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/index.html`

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

To use the Web client, specify the URL of the client workstation running the Web client in your Web browser. You also need to specify the 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.

Setting user privileges

If you plan to use the Web client, ensure that you were assigned an administrative user ID with system privilege, policy privilege, client access authority, or client owner authority. When a new node is registered with the server, by default it is given an admin ID of the same node name with client owner authority. See "Tivoli Storage Manager client authentication" on page 25 for more information about these authorities.

Note: You can use the *revokeremoteaccess* option to prevent a Tivoli Storage Manager administrator with client access privilege from performing client operations on your workstation through the Web client. However, Tivoli Storage Manager administrators with client owner privilege, system privilege, or policy privilege can still perform client operations on your workstation through the Web client. See "Revokeremoteaccess" on page 205 for more information about the *revokeremoteaccess* option. See "Tivoli Storage Manager client authentication" on page 25 for more information about access authorities.

Accessing the NetWare server

Tivoli Storage Manager requires two connections to the NetWare server for normal operations. These two connections do not count against the licensed user connections. For example, if you have a five-user NetWare server, Tivoli Storage Manager uses connection numbers 6 and 7.

Sorting file lists using the Tivoli Storage Manager Web client GUI

Table 10. Working with your files using the Tivoli Storage Manager Web client GUI

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

Notes:

1. On the Web client 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 56).

2. An *active* file is the most recent backup version of a file that existed on your workstation when you ran your last backup. All other backup versions of that file are *inactive*. Only active backup versions of files are displayed, unless you select the **Display active/inactive files** menu option. If you delete the file from your workstation, the active version becomes inactive the next time you run an incremental backup.

   On the command-line client, you can use the *inactive* and *pick* options with query and restore commands to display both active and inactive objects. See "Inactive" on page 156 and "Pick" on page 187 for more information.

Displaying online help

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

- **From the Web client:**
  - Select the **Help** menu.
  - Click the **Help** button in current window.

- **From the dsmc command line:** Enter the **help** command. A menu of topics is displayed for which help is available. See "Help" on page 271 for more information about the **Help** command.

Ending a session

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

- **From the Tivoli Storage Manager backup-archive Web client:**
  - Open the **File** menu and select **Exit**.
  - Open the **System** menu and select **Close**.
  - Open a different URL or close the browser.

- **From the DSMC command line:** In batch mode, each **dsmc** command you enter is a complete session. Tivoli Storage Manager ends the session when it finishes processing the command. To end an interactive session, enter **quit** at the `tsm>` prompt.

Online forums

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

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

`listserv@vm.marist.edu`

The body of the message must contain the following:

`SUBSCRIBE ADSM-L yourfirstname yourlastname`

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

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

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

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

The body of the message must contain the following:

```
SIGNOFF ADSM-L
```

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

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

Other sources of online help

An anonymous FTP server (ftp.software.ibm.com/storage) is available where you can find maintenance and other Tivoli Storage Manager-related materials. Three other anonymous servers are unofficially maintained by non-IBM volunteers. These servers are:

```
ftp.rz.uni-karlsruhe.de (mirror - Germany)
ftp.wu-wien.ac.at (mirror - Austria)
ftp.cac.psu.edu (mirror - Pennsylvania)
```

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

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

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

Chapter 4. Backing up your data

A primary function of Tivoli Storage Manager is to create and maintain a set of backup versions of the files on your NetWare server. This allows you to recover older versions of your files if the current files are lost or damaged. This chapter discusses different ways to back up files, and how to restore these files when you need them.

As a quick reference, this chapter provides instructions for the following tasks:

Table 11. Backup: Primary tasks

Task	Page
Performing an incremental, selective, or incremental-by-date backup	38
Deleting backup files	46
Group backup: Backing up files from one or more file spaces	43
Requesting backup and archive services for remote servers	47

Planning your backups

If you are a first-time user, or if you only back up files occasionally, you should use Table 12 as a checklist of preliminary steps to consider before performing a backup.

Table 12. Planning your backups

___	Decide whether you want to back up files or archive them. See "When to back up and when to archive files" for more information.
___	See "Pre-backup considerations" on page 34 for important considerations before backing up files and directories.
___	Decide what type of backup you want according to your needs. See the following sections for more information: • "Performing an incremental, selective, or incremental-by-date backup" on page 38 • "Group backup: Backing up files from one or more file spaces" on page 43
___	If a file is important, ensure that it is closed before backing it up. See "Backing up open files" on page 46 for more information.
___	For further backup considerations, see "Backing up files: Advanced considerations" on page 48.

When to back up and when to archive files

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

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

Backup data is managed by version, using predetermined policy based rules. Using these rules, the Tivoli Storage Manager administrator can control the following:

- The number of versions
- The number of days each additional backup copy is kept
- What happens to backup data versions when the file is deleted on the client system

Each copy of the file stored on the server is considered to be a separate and unique version of the file.

Archive is a powerful and extremely flexible mechanism for storing long term data. Archive data is kept for a specified number of days. Archive has no concept or support for versions. The user or Tivoli Storage Manager administrator is responsible for determining what files get added to an archive.

Recommendation: If archive is run multiple times against a file using the same archive description, a new copy of the file will be added to the archive each time that archive is run. To simplify retrieve, store only one copy of a file in each archive.

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

Note: If you frequently create archives for the same data, consider using instant archives (backup sets) instead. Frequent archive operations can create a large amount of metadata in the server database increasing database growth and decreasing performance for operations such as expiration. See "Restoring data from a backupset" on page 57 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 NetWare server 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 NetWare server. See Chapter 6, "Archiving and retrieving data," on page 63 for more information about archiving and retrieving files.

Pre-backup considerations

Beginning with Tivoli Storage Manager Version 5.4.1, the NetWare client is Unicode-enabled. However, client versions before Version 5.4.1 were not enabled. If you are backing up a system that had previously used a client version older than Version 5.4.1, and the file spaces have not yet been migrated to Unicode, then you need to plan for the migration of file spaces to Unicode. This involves renaming your file spaces on the server and creating new Unicode-enabled file spaces on the server using the *autofsrename* option.

For additional information about working with Unicode-enabled file spaces, see the following references:
- "Migrating to the Unicode-enabled client" on page 2

Configure memory-constrained systems to run incremental backups

Incremental backup performance suffers if the system has a low amount of memory available before starting the backup. If your system is memory constrained, specify the *memoryefficientbackup* *yes* option in your client options file (dsm.opt). This option causes Tivoli Storage Manager to process only one directory at a time, which reduces memory consumption but increases backup time. When you specify *yes*, Tivoli Storage Manager analyzes only one directory at a time for backup consideration. If performance remains poor, check your communication buffer settings and the communication link between your system and the Tivoli Storage Manager server. If your system is not memory constrained, setting the *memoryefficientbackup* option to *yes* will degrade your backup performance.

Configure systems with large numbers of files to run incremental backups

The client can use very large amounts of memory to perform incremental backup operations, especially on file systems that contain large numbers of files.

On average, the client uses approximately 300 bytes of memory per object (file or directory). Thus for a file system with one million files and directories, the Tivoli Storage Manager client will require, on average, approximately 300 MB of virtual memory. The exact amount of memory used per object will vary, depending on the length of the object path and name length, or the nesting depth of directories. The number of bytes of data is not an important factor in determining the Tivoli Storage Manager backup client virtual memory requirement.

The maximum number of files can be determined by dividing the maximum amount of virtual memory available to a process by the average amount of memory needed per object.

The virtual memory requirement can be reduced by any of the following methods:

- Use the client option *memoryefficientbackup* *yes*. The average virtual memory used by the client then becomes 300 bytes times the number of directories plus 300 bytes per file in the directory being processed. Note that for file systems with large numbers (millions) of directories, the client still might not be able to allocate enough memory to perform incremental backup with *memoryefficientbackup* *yes*.
- If the client option *resourceutilization* is set to a value greater than 4, and there are multiple file systems being backed up, then reducing *resourceutilization* to 4 or lower will limit the process to incremental backup of a single file system at a time. This will reduce the virtual memory requirement. If backup of multiple file systems in parallel is required for performance reasons, and the combined virtual memory requirements exceed the process limits, then multiple instances of the backup client can be used to back up multiple file systems in parallel. For example, you want to back up two file systems at the same time but their virtual memory requirements exceed the limits of a single process, then start one

instance of the client to back up one of the file systems, and start a second instance of the client to back up the other file system.

- Use the *-incrbydate* client option to perform an "incremental-by-date" backup.
- Use the Tivoli Storage Manager client *exclude.dir* option to prevent the client from traversing and backing up directories that do not need to be backed up.
- Use the client image backup function to back up the entire volume. This might actually use less system resources and run faster than incremental backup of some file systems with a large number of small files.
- Reduce the number of files per file system by spreading the data across multiple file systems.
  - Use the client option *memoryefficientbackup diskcachemethod*. This choice reduces the use of virtual memory to a minimum at the expense of performance and a significant increase in disk space required for the backup. The file description data from the server is stored in a disk-resident temporary database, not in memory. As directories on the workstation are scanned, the database is consulted to determine whether to back up, update, or expire each object. At the completion of the backup, the database file is deleted.

Using the include-exclude list to control processing

Usually, there are files on your disk that you do not want to back up. These files might be operating system or application files that could be easily recovered by reinstalling the program, or any other file that you could easily rebuild.

Use the *include* and *exclude* options in the client options file (dsm.opt) to define which files to include or exclude from incremental or selective backup processing. A file is eligible for backup unless excluded by an *exclude* option. It is not necessary to use an *include* option to include specific files for backup unless those files are in a directory containing other files you want to exclude.

Tivoli Storage Manager uses *management classes* to determine how to manage your backups on the server. Every time you back up a file, the file is assigned a management class. The management class is either a default chosen for you, or one you assign to the file using the *include* option in the include-exclude list. If you assign a management class, it must contain a backup copy group for the file to be backed up. See Chapter 7, "Automating tasks," on page 69 for more information on management classes and how to assign them to files.

For more information on setting up an include-exclude list, see "Creating an include-exclude list (optional)" on page 15.

Support for long file names

If you have file names longer than the DOS name space permits, you can specify that Tivoli Storage Manager stores the long names during backup. Long names with spaces must be enclosed in double quotes.

If you are upgrading from ADSM client version 3, Release 1, Level 0.7 or ADSM server version 3, Release 1, Level 2.1 , a one time conversion from short to long names will be performed during the first full incremental backup.

If you have removed the long name space from your NetWare volume, the Tivoli Storage Manager client does not perform a conversion from a long to a short name space. If the Tivoli Storage Manager server name space is NTW:LONG but the

local volume does not have long name support, the client issues an error message and ceases any backup or archive operation.

If you want to continue backing up using long names, add the long name space support back to the volume in question. You can also use a short name to back up the volume by renaming the file space on the server before attempting a back up.

Mac name space is not supported
Tivoli Storage Manager does not support Macintosh name space. If a NetWare volume has only DOS and Mac name spaces, Tivoli Storage Manager uses the DOS name for Macintosh file names. If you use only DOS and Mac names spaces on a NetWare volume, you should add Long name space to that volume. This will ensure that NetWare converts Macintosh file names to the Long name before the file is backed up.

The Macintosh namespace information is not lost when backing up or restoring a Macintosh file. The only issue is how the client will display the name when performing a query, restore, or retrieve operation.

Encrypting data during a backup or archive operation

You can encrypt the data that is sent to the server during a backup or archive operation using standard DES 56-bit encryption. The data that you include is stored in encrypted form, and encryption does not affect the amount of data sent or received. If you use the DES 56-bit encryption feature to encrypt your data during backup or archive, you *must* have the encryption key in order to restore or retrieve the data. If the encryption key is not available on the client machine (with the *encryptkey* option) and you forgot the encryption key, then the data *cannot* be restored or retrieved under any circumstances.

Use the *include.encrypt* and *exclude.encrypt* options to select files for encryption processing. By default, the client does not encrypt files unless you include them for encryption processing using the *include.encrypt* option. For more information about the *include.encrypt* option, see "Include options" on page 159. For more information about the *exclude.encrypt* option, see "Exclude options" on page 143.

To encrypt file data, you must select an encryption key password, which Tivoli Storage Manager uses to generate the encryption key for encrypting and decrypting the file data. You can save the encryption key password in the TSM.PWD file using the *encryptkey* option.

Tivoli Storage Manager client encryption allows you to enter a value of up to 63 characters in length. This encryption password needs to be confirmed when encrypting the file for backup, and also needs to be entered when performing restores of encrypted files.

While restoring the encrypted file, the client prompts you for the key password to decrypt the file in the following cases:
- If you set the *encryptkey* option to Prompt.
- If the encryption key password you supply at the prompt does not match.
- If you set the *encryptkey* option to Save and the local key available does not match.

For more information about this option, see "Encryptkey" on page 137.

Maximum file size for operations

The maximum file size for backup, restore, archive, and retrieve operations is 4,294,963,200 (4GB -4KB) using the Tivoli Storage Manager NetWare client on traditional Novell NetWare file systems. On NetWare 6.5 the Tivoli Storage Manager NetWare client supports file sizes greater than 4 GB on NSS volumes, and the ability to back up or restore directory space limitations on NSS volumes.

How Tivoli Storage Manager handles long user and group names

Tivoli Storage Manager can handle user and group names that are up to 64 characters without any issues. However, names longer than 64 characters require special handling by Tivoli Storage Manager.

Recommendation: Do not exceed the 64 character limit for user and group names. If you do, Tivoli Storage Manager will shorten the name to fall within this limit by using the following transformation: Take the first 53 characters, append a /, and then the numeric id as a character string.

An error message will be logged containing both the long name and the resulting shortened string. For most functions, you do not need to be aware of the shortened name. The exceptions are:

- The **set access** command
- The *fromowner* option
- The *users* and *groups* (authorization) options

In each of these cases, when you need to enter a name, you will either have to find the error message containing the transformation, or construct the name using the above outlined rule.

Performing an incremental, selective, or incremental-by-date backup

Your administrator might have set up schedules to back up files on your NetWare server automatically. See Chapter 7, "Automating tasks," on page 69 for information on checking and running the schedules available to you. The following sections discuss how to back up files without using a schedule.

Understanding which files are backed up

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

- The file is not specified in an exclude statement in your include-exclude list. If you do not have an include-exclude list, all files are considered eligible for backup.
- The selected management class contains a backup copy group. See Chapter 7, "Automating tasks," on page 69 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 is in use each time Tivoli Storage Manager attempts to back it up, the file is not backed up. See "Using management classes and copy groups" on page 75 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 has not changed. See "Using management classes and copy groups" on page 75 for more information.

- The file meets the 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. See "Using management classes and copy groups" on page 75 for more information. (Frequency is ignored for partial incrementals.)

The server can also define include-exclude statements in the include-exclude list. To view the contents of your include-exclude list, use the **query inclexcl** command.

Attention: When you run an incremental backup, the client also backs up all directory information. When you back up a file, the directories in the path that contain the file are also backed up. Directories and NDS container objects are counted in the number of objects backed up.

There are three types of backup: *full incremental*, *Incremental-By-Date*, and *selective*. You can use all types of backup to back up the NDS. In addition, Tivoli Storage Manager saves trustee rights, file attributes, name spaces, and associated name space information with the backup versions of the files.

Full and partial incremental backup

If you select entire file systems, you are performing a full incremental backup. If you select a directory tree or individual files, you are performing a partial incremental backup.

The first time you run a full incremental backup, Tivoli Storage Manager backs up all the files and directories on the volumes you specify. This process can take a long time if the number of files is large, or if one or more very large files must be backed up. Subsequent full incremental backups will only back up new and changed files. This allows the backup server to maintain current versions of your files, without having to waste time or space by backing up files that already exist in server storage.

Depending on your storage management policies, the server might keep more than one version of your files in storage. The most recently backed up files are active backup versions. Older copies of your backed up files are inactive versions. However, if you delete a file from your NetWare server, the next full incremental backup will cause the active backup version of the file to become inactive. If you need to restore a file you have deleted, and if a full incremental backup has been run since you deleted the file, then you will need to restore an inactive version of the file (assuming that a version still exists on the server). The number of inactive versions maintained by the server and how long they are retained is governed by the management policies defined by your server administrator. The purpose of the active versions is to represent which files existed on your file system at the time of the backup. See Chapter 8, "Understanding storage management policies," on page 75 for more information about storage management policies.

To perform a full incremental backup using the command-line client, see "Using the command line to back up data" on page 42. To perform a full incremental backup using the Web client, see "Using the Web client to back up data" on page 45.

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:

- Rename files if the information about the NetWare volume name has changed.
- Back up new files
- Back up files whose contents changed since the last backup. Changes include *any* of the following:
  - File size
  - Date or time of last modification
  - File attributes, except for the A attribute (the archive attribute). The client ignores the archive attribute because other programs change the attribute during file copying, even if the file does not change. When you restore a file, Tivoli Storage Manager restores the attributes to what they were when you backed up the file.
  - Trustee rights
- Back up files whose directory attributes have changed
- 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 NetWare server will not have active backup versions on the server. However, inactive versions will be retained according to rules defined by the Tivoli Storage Manager administrator.
- Rebind backup versions if management class assignments change. Only objects that have active backup versions are rebound. Objects for which only inactive backup versions exist are not rebound.

Attention: Each directory is also backed up under the following circumstances:
- It has not been backed up previously
- Its permissions have changed since the last backup
- Its Access Control List has changed since the last backup
- Its Extended Attributes have changed since the last backup
- Its time stamp has changed since the last backup

Directories and NDS container objects 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 143.

Understanding which files are backed up

When you request a backup, Tivoli Storage Manager backs up a file if all of the following requirements are met:
- The selected management class contains a backup copy group. See Chapter 8, "Understanding storage management policies," on page 75 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 75 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 75 for more information.
- The file meets the frequency requirements defined in the backup copy group. The specified minimum number of days since the last backup must elapse before a file is backed up. See "Using management classes and copy groups" on page 75 for more information.

Incremental-by-date backup

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

To perform an incremental-by-date backup using the command-line client, see "Using the command line to back up data" on page 42. To perform an incremental-by-date backup using the Web client, see "Using the Web client to back up data" on page 45.

The client backs up only those files whose modification date and time is later than the date and time of the last incremental backup of the file system on which the file resides. Files added by the client after the last incremental backup, but with a modification date earlier than the last incremental backup, are not backed up.

Files that were renamed after the last incremental backup, but otherwise remain unchanged, will not be backed up. Renaming a file does not change the modification date and time of the file. However, renaming a file does change the modification date of the directory in which it is located. In this case, the directory is backed up, but not the files it contains.

If you run an incremental-by-date backup of the whole file system, the server updates the date and time of the last incremental backup. If you perform an incremental-by-date backup on only part of a file system, the server does not update the date of the last full incremental backup. In this case, the next incremental-by-date backup will back up these files again.

Tip: Unlike incremental backups, incremental-by-date backups do not expire deleted files or rebind backup versions to a new management class if you change the management class.

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

Full incremental, partial incremental, and incremental-by-date all back up new and changed files. An incremental-by-date backup takes less time to process than a full incremental backup and requires less memory.

An incremental-by-date backup might not place exactly the same backup files into server storage because the incremental-by-date backup:
- Does not expire backup versions of files that you delete from the NetWare server.
- 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.
- Does not handle name space changes on the volume.

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 command-line client, see "Using the command line to back up data." To perform a selective backup using the Web client, see "Using the Web client to back up data" on page 45.

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 size, modification timestamp, or permissions have not changed.
- Does not expire deleted files.
- Does not rebind backup versions to a new management class if you change the management class.

Saving access permissions

When you back up your files, Tivoli Storage Manager also saves NetWare Trustee Rights.

Using the command line to back up data

You can use the **incremental** or **selective** commands to perform backups. Table 13 shows examples of using these commands to perform different tasks.

Table 13. Command line backup examples

Task	Command	Considerations
	Incremental backups	
Perform an incremental backup of your client domain.	dsmc incremental	See "Incremental" on page 272 for more information about the **incremental** command. See "Full and partial incremental backup" on page 39 for detailed information about incremental backups.
Back up the usr: volume in addition to the sys:, data:, and nds: volumes defined in your client domain.	dsmc incremental -domain=usr:	See "Domain" on page 132 for more information about the *domain* option.
Back up all local volumes defined in your client domain *except* the sys: volume.	dsmc incremental -domain="all-local -sys:"	You cannot use the (-) operator in front of the domain keyword all-local.
Back up *only* the data: and sys: volumes.	dsmc incremental data: sys:	None
Back up all files in the sys:proj directory and all its subdirectories.	dsmc incremental sys:proj/ -subdir=yes	See "Subdir" on page 221 for more information about the *subdir* option.
If the local NetWare server has a master NDS replica, Tivoli Storage Manager includes the NDS in the all-local domain. In this case, back up the NDS as a part of the all-local domain.	dsmc incremental -domain=all-local	See "Domain" on page 132 for more information about the *domain* option.

Table 13. Command line backup examples (continued)

Task	Command	Considerations
If the local NetWare server has a master NDS replica, Tivoli Storage Manager includes the NDS in the all-local domain. In this case, exclude the NDS from the backup of the all-local domain.	`dsmc incremental -domain="all-local -nds"`	See "Domain" on page 132 for more information about the *domain* option.
Assuming that you initiated a snapshot of the SYS: volume and mounted the snapshot as the SNAP1: volume, run an incremental backup of all files and directories under the local snapshot and manage them on the Tivoli Storage Manager server under the sys: volume.	`dsmc incremental sys: -snapshotroot=SNAP1:`	See "Snapshotroot" on page 218 for more information.
Incremental-by-date backup		
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 162 for more information about the *incrbydate* option.
Selective backups		
Back up the sys:proj directory and all its subdirectories.	`dsmc selective sys:proj/ -subdir=yes`	See "Subdir" on page 221 for more information about the *subdir* option.
Back up the sys:h1.doc and sys:test.doc files.	`dsmc selective sys:h1.doc sys:test.doc`	You can specify as many file specifications as available resources or other operating system limits permit. Separate file specifications with a space. You can also use the *filelist* option to process a list of files. The Tivoli Storage Manager client opens the file you specify with this option and processes the list of files within according to the specific command. See "Filelist" on page 146 for more information.
Back up a list of files in the sys: volume.	`selective -filelist=sys:filelist.txt`	Use the *filelist* option to process a list of files. See "Filelist" on page 146 for more information.
Assuming that you initiated a snapshot of the SYS: volume and mounted the snapshot as the SNAP1: volume, run a selective backup of the sys:/system/dir1 directory tree from the local snapshot and manage it on the Tivoli Storage Manager server under the file space name sys:.	`dsmc selective sys:/system/dir1/* -subdir=yes -snapshotroot=SNAP1:`	See "Snapshotroot" on page 218 for more information.

Group backup: Backing up files from one or more file spaces

You can use the **backup group** command to create and back up a group containing a list of files from one or more file space origins to a virtual file space on the Tivoli Storage Manager server. See "Backup Group" on page 257 for more information.

A *group backup* allows you to create a consistent point-in-time backup of a group of files that is managed as a single logical entity:

- All objects in the group are assigned to the same management class. See "Include options" on page 159 for more information about using the *include* option to bind a group to a management class.
- Existing *exclude* statements for any files in the group are ignored.
- All objects in the group are exported together.
- All objects in the group are expired together as specified in the management class. No objects in a group are expired until all other objects in the group are expired, even when another group they belong to gets expired.

A group backup can be added to a backup set. See "Restoring data from a backupset" on page 57 for more information about backup sets.

You can perform a full or differential backup using the *mode* option. See "Backup Group" on page 257 and "Mode" on page 172 for more information.

For example, to perform a full backup of the files listed in the filelist `sys:/tivoli/acct.lst` to the virtual file space name `accounting` containing the group leader `group1`, enter:

```
dsmc backup group -filelist=sys:/tivoli/acct.lst -groupname=group1
-virtualfsname=accounting -mode=full
```

Associating a local snapshot with a server file space

Use the *snapshotroot* option with the **incremental** and **selective** commands in conjunction with a third-party application that provides a snapshot of a logical volume, to associate the data on the local snapshot with the real file space data that is stored on the Tivoli Storage Manager server. The *snapshotroot* option does not provide any facilities to take a volume snapshot, only to manage data created by a volume snapshot. See "Snapshotroot" on page 218 for more information.

Displaying backup processing status

During a backup, by default Tivoli Storage Manager displays the status of each file it attempts to back up. Tivoli Storage Manager reports the file's size, path, file name, total number of bytes transferred, and whether the backup attempt was successful. These are also recorded in the dsmsched.log file for scheduled commands.

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

Table 14. Client command line informational messages

Informational message	Meaning
Directory-->	Indicates the directory that you back up.
Updating-->	Indicates that only the file meta data is sent, not the data itself.
Expiring-->	Indicates an object (file or directory) on the server that no longer exists on the client is expired and made inactive on the server.
Total number of objects inspected:	As indicated.
Total number of objects backed up:	As indicated.
Total number of objects updated:	These are files whose attributes, such as file owner or file permissions, have changed.

Table 14. Client command line informational messages (continued)

Informational message	Meaning
`Total number of objects rebound:`	See "Binding management classes to files" on page 83 for more information.
`Total number of objects deleted:`	This is a count of the objects deleted from the client workstation after being successfully archived on the server. The count is zero for all backup commands.
`Total number of objects expired:`	See "Full and partial incremental backup" on page 39 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 might not match the file statistics if the operation was retried due to a communications failure or session loss. The transfer statistics display the bytes attempted to be transferred across all command attempts.
`Network data transfer rate:`	The average rate at which the network transfers data between the client and the server. This is calculated by dividing the total number of bytes transferred by the time to transfer the data over the network. The time it takes to process objects is not included in the network transfer rate. Therefore, the network transfer rate is higher than the aggregate transfer rate.
`Aggregate data transfer rate:`	The average rate at which Tivoli Storage Manager and the network transfer data between the client and the server. This is calculated by dividing the total number of bytes transferred by the time that elapses from the beginning to the end of the process. Both Tivoli Storage Manager processing and network time are included in the aggregate transfer rate. Therefore, the aggregate transfer rate is lower than the network transfer rate. **Note:** On occasion, the aggregate data transfer rate might be higher than the network data transfer rate. This is because the backup-archive client can have multiple simultaneous sessions with the backup server. If you set the *resourceutilization* option, Tivoli Storage Manager attempts to improve performance and load balancing by using multiple sessions when it backs up a volume or other set of files. When multiple sessions are open during backup, the data transfer time represents the sum of the times reported by all sessions. In this case, aggregate data transfer time is incorrectly reported as higher. However, when running with a single session, the aggregate data transfer rate should always be reported as lower than the network data transfer rate.
`Objects compressed by:`	Specifies the percentage of data sent over the network divided by the original size of the file on disk. For example, if the net data-bytes are 10K and the file is 100K, then Objects compressed by: == (1 - (10240/102400)) x 100 == 90%.
`Elapsed processing time:`	The active processing time to complete a command. This is calculated by subtracting the starting time of a command process from the ending time of the completed command process.
`Total number of bytes transferred:`	As indicated.

Using the Web client to back up data

You can use Tivoli Storage Manager to back up specific files, a group of files with similar names, or entire directories. If you have the Web client acceptor started on your workstation, you can perform the backup tasks using the Web client backup-archive GUI. See "Starting a Web client session" on page 28 for information on starting the Web client.

You can perform the backup tasks using the Web client backup-archive GUI, as follows:

1. Click the **Backup** button from the main window. The Backup by Tree window appears.
2. Expand the directory tree by clicking on the + sign. Click the selection boxes next to the object or objects you want to back up.
3. Select one of the following backup types from the pull-down menu:
   a. To run an incremental backup, click **Incremental (complete)**.
   b. To run an incremental backup by date, click **Incremental (date only)**.
   c. To run a selective backup, click **Always backup**.
4. To modify specific backup options, click the **Options** button. Any options you change are effective during the current session *only*.
5. Click **Backup**. The Backup Task List window displays the backup processing status. When processing completes, the Backup Report window displays processing details. To monitor processing of an operation from the Web GUI main window, open the **Actions** menu and select **TSM Activities**.

Considerations

- Select **File details** on the **View** menu to display file attributes for any file.
- The following functions are not supported on the Web client:
  - Estimate
  - Searching and Filtering
  - Preferences editor
  - Setup Wizard

Deleting backup files

If your administrator has given you authority, you can delete individual archive copies from the Tivoli Storage Manager server without deleting the entire file space.

Use the **delete backup** command to delete backup copies. See "Delete Backup" on page 263 for more information.

Backing up open files

Some files on your system might be in use when you try backing them up (these are called *open files*, because they are opened by an application for its use). Because an open file can change, it is likely that any backup of an open file will not correctly reflect the contents of the file at a given time.

There are some files that are open exclusively to an application, that applications such as Tivoli Storage Manager cannot read for back up, regardless of the policy settings on the server which dictate taking fuzzy copies of open files. Files that are opened exclusively by other applications should be considered for exclusion from backup.

If certain files are not backed up because they are open or they get changed when Tivoli Storage Manager backs them up, consider the following:

- If the file is unimportant, or can be easily rebuilt (for example, a temporary file), you might not care that the file is not backed up.
- If the file is important:
  - Close the file before Tivoli Storage Manager attempts to back it up. If backups are run according to a schedule, use the *preschedulecmd* option to issue a command that closes the file before the backup occurs. For example, if the

open file is a database, use the database's shutdown command to shut down the database. You can use the *postschedulecmd* option to restart the application that uses the file after the backup completes.

If you are not using a schedule for the backup, ensure that you close the application that uses the file before you start the backup.

– Tivoli Storage Manager can back up the file even if it is open and gets changed during the backup. This type of backup can be acceptable if it does not matter that the content of the file changes while the file is being backed up. To back up these files, assign them a management class with the serialization **dynamic** or **shared dynamic**. See "Selecting a management class for files" on page 80 for information on assigning management classes, and "Displaying information about management classes and copy groups" on page 77 for information on determining which management classes are available to you.

Note: If the open file has its share flag set to deny_read, Tivoli Storage Manager cannot back it up.

Requesting backup and archive services for remote servers

You can request backup and archive services for multiple NetWare file servers.

To back up files on a remote NetWare file server, you must have a user ID and password with administrator or supervisor equivalence.

Tivoli Storage Manager includes two options that relate to backing up and archiving files for remote servers:

- *nwuser*—Allows you to specify a user ID and password for a local or remote NetWare server. You can use this option as many times as necessary in your client options file to provide password information for each remote file server for which you plan to back up and archive files.

  If you do not store password information for local or remote servers in your client options file, Tivoli Storage Manager prompts you for that information when you issue commands to back up or archive files stored on those servers.

- *nwpwfile*—If you choose not to include password information for a local or remote NetWare server in your client options file, you can use this option to specify whether you want Tivoli Storage Manager to save the user ID and password you provide when prompted.

  If you set *nwpwfile* to *yes*, the first time you issue a command to back up or archive files for a local or remote NetWare server, Tivoli Storage Manager encrypts the user ID and password you provide and stores that information in the TSM.PWD file in your installation directory. When you issue subsequent commands to back up or archive files for that server, Tivoli Storage Manager obtains the password information from that file instead of issuing a prompt. This is the default for this option. If you are running in loop mode, the password is committed to system memory. In loop mode, other commands will then access the ID and password from memory.

  If you set *nwpwfile* to *no*, Tivoli Storage Manager prompts you for the user IDs and passwords for local or remote NetWare servers each time you issue a command to back up or archive files stored on those servers.

You can include volumes stored on remote NetWare file servers in your default client domain specified with the *domain* option in your client options file. For example, to specify the sys: volume on three remote NetWare file servers as well as all local volumes and the NDS, use:

```
      domain all-local  servb\sys:  servc\sys:  servd\sys:
```

You can also use the *domain* option with the **incremental** command to specify
volumes stored on remote NetWare file servers. For example:

```
   load dsmc incremental -domain="servb\sys: servc\sys:"
```

In addition, you can selectively back up or archive files stored on a remote server.
For example:

```
   load dsmc selective servb\sys:test/*
   load dsmc archive servc\sys:test2/proj1/
```

Backing up files: Advanced considerations

This section discusses additional topics related to performing backups. You do not
need to understand this information in order to do basic work.

Understanding how files are managed

Tivoli Storage Manager uses *management classes* to determine how to manage your
backups on the server. Every time you back up a file, the file is assigned a
management class. The management class used is either a default chosen for you,
or one you assigned to the file using the *include* option in the include-exclude list.
The chosen management class must contain a backup copy group in order for the
file to be backed up. See Chapter 7, "Automating tasks," on page 69 for more
information on management classes and how to assign them to files.

Select **Utilities → View Policy Information** from the Web client GUI to view the
backup policies defined by the Tivoli Storage Manager server for your client node.
See Chapter 8, "Understanding storage management policies," on page 75 for more
information on management classes, how an Authorized User assigns management
classes to files, and storage management policies.

Understanding which files are backed up

When you request a selective backup, Tivoli Storage Manager backs up a file if all
of the following requirements are met:
- The file is not specified on an exclude statement in your include-exclude list. If
  you do not have an include-exclude list, all files are considered for backup.
- The selected management class contains a backup copy group.
- The file meets the serialization requirements defined in the backup copy group.
  If serialization is *static* or *shared static*, and the file is in use each time Tivoli
  Storage Manager attempts to back it up, the file is not backed up.

For selective backups, Tivoli Storage Manager does not check frequency or mode,
and does not check to see whether a file has changed since it was last backed up.
The only criteria for selective backups are that the file is not excluded from backup
services and the management class associated with it has a backup copy group.

When you run a selective backup, Tivoli Storage Manager also backs up all directory
information. You can exclude the files within a directory, but you cannot exclude a
directory from being backed up. Directories and NDS containers are counted in the number
of objects backed up.

When you use the *volinformation* option with the **selective** command, volume
information such as disk space restrictions and volume root directory trustee rights
are backed up.

Understanding how deleted file systems are handled

When a file system or drive has been deleted, or it is no longer backed up by Tivoli Storage Manager, the existing backup versions for each file are managed according to the following policy attributes:

- Number of days to keep inactive backup versions
- Number of days to keep the last backup version (if there is no active version)

If you do nothing else, active backup versions remain indefinitely. If you do not need to keep the active versions indefinitely, use the **expire** command to inactive the active versions.

If you do not need to keep any of the backup versions, use the **delete backup** command to delete all backup versions in the file space. Your Tivoli Storage Manager server administrator must give you the authority to use this command. Use the **query session** command to determine whether you have delete backup authority. Alternatively, you can ask your Tivoli Storage Manager server administrator to delete the file space for you.

See Chapter 8, "Understanding storage management policies," on page 75 for further information about policy management.

Chapter 5. Restoring your data

You can use the **restore** command to restore backup versions of specific files, a group of files with similar names, entire directories, or backup sets.

Note: When restoring a directory, its modification date and time is set to the date and time of the restore, not to the date and time the directory had when it was backed up. This is because Tivoli Storage Manager restores the directories first, then adds the files to the directories.

For more information on restoring backup sets, see "Restoring data from a backupset" on page 57.

As a quick reference, this chapter contains instructions for the following tasks:

Table 15. Restore: Primary tasks

Task	Page
Using the command line to restore data	53
Performing large restore operations	54
Performing point-in-time restores	56
Using the Web client to restore data	57
Restoring data from a backupset	57
Authorizing another client node to restore or retrieve your files	60
Restoring or retrieving files from another client node	60
Restoring or retrieving your files to another client node	61

Standard query restore, no query restore, and restartable restore

The following sections describe the standard (or classic) restore and the no query restore processes.

Standard restore process

The standard restore process is also known as classic restore, and is outlined below.

1. The client queries the server for a list of files backed up for the client file space you want to restore.
2. The server sends a list of backed up files that match the restore criteria. If you want to restore both active and inactive files, the server sends information about all backed up files to the client.
3. The list of files returned from the server is sorted in client memory to determine the file restore order and to minimize tape mounts required to perform the restore.
4. The client tells the server to restore file data and directory objects.
5. The directories and files you want to restore are sent from the server to the client.

No query restore process

The no query restore process is outlined below.

1. The client tells the server that a no query restore is going to be performed and provides the server with details about file spaces, directories, and files.
2. The server sorts the data using an internal sort table which minimizes tape mounts.
3. The data to be restored is sent to the client. File and directory objects stored on disk are sent immediately since sorting for such data is not required before restoring it.
4. You can use multiple sessions to restore the data. If the data resides on multiple tapes, there are multiple mount points available at the server. The combination of using the *resourceutilization* option and MAXNUMMP allows multiple sessions. See "Resourceutilization" on page 202 for more information.

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*, *todate*, or *volinformation*, the client uses a *no query restore* method for restoring files and directories from the server. This method is called *no query restore* because instead of querying the server for each object to be restored, a single restore request is sent to the server. In this case, the server returns the files and directories to the client without further action by the client. The client merely accepts the data coming from the server and restores it to the destination named on the **restore** command.

Using the command-line client, an example of an unrestricted wildcard command would be:

```
servera\one:dev/*
```

An example of a restricted wildcard file specification would be:

```
servera\one:dev/*.bak
```

Restartable restore process

If the restore process stops because of a power outage or network failure, the server records the point at which this occurred. This record is known to the client as a *restartable restore*. It is possible to have more than one restartable restore session. Use the **query restore** command 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 might consist of one or more files, not completely restored when the interruption occurred. Because of this, you might receive some replace prompts for files from the interrupted transaction which were already restored.

For more information on using the command line to begin restartable restores, see "Restore" on page 304. To perform restartable restores using the Web client GUI, follow these steps:

1. Select **Actions –> Restartable restores** from the main panel.
2. Select the restartable restore session you want to complete.

3. Click the **Restart** button at the bottom of the panel.

Using the command line to restore data

This section explains how to restore the following types of data:
- Active or inactive backups
- Large restore operations

Restoring active or inactive backups

Your administrator determines how many backup versions Tivoli Storage Manager maintains for each file on your NetWare server. Frequently, the administrator maintains more than one version of each file. Having multiple versions of a file allows you to restore older versions in case the most recent backup is damaged.

Tivoli Storage Manager considers the most recent backup version to be the *active* version. Any other backup version is considered an *inactive* version.

Every time Tivoli Storage Manager backs up your files, it marks the new backup version as the active backup, and it changes what used to be the active backup to an inactive backup. When the maximum number of inactive versions is reached, Tivoli Storage Manager deletes the oldest inactive version.

Normally, you want to restore active backup versions of files. However, there might be times when you want to restore an inactive version. For example, you might want to restore a file with the contents it contained on or before a specific date. Or you might accidentally erase a file, and then run an incremental backup. The active backup version of the file is now inactive. To get your file back, you need to restore the most recent inactive backup version of the file.

The **restore** command restores only *active* backup versions of files, unless you use the following options:
- *latest*—Causes Tivoli Storage Manager to restore the latest backup version of a file regardless of whether it is active or inactive.
- *pick* and *inactive*—Causes Tivoli Storage Manager to display a list of both active and inactive backup versions of files. From that list, you can choose the versions you want to restore.

Table 16 shows examples of using the **restore** command to restore objects from Tivoli Storage Manager server storage. See "Restore" on page 304 for additional examples, and detailed information about the **restore** command.

Table 16. Command line restore examples

Task	Command	Considerations
Restore the most recent backup version of the sys:h1.doc file, even if the backup is inactive.	dsmc restore sys:h1.doc -latest	If the file you are restoring no longer resides on your workstation, and you have run an incremental backup since deleting the file, there is no active backup of the file on the server. In this case, use the *latest* option to restore the most recent backup version. Tivoli Storage Manager restores the latest backup version, whether it is active or inactive. See "Latest" on page 165 for more information.

Table 16. Command line restore examples (continued)

Task	Command	Considerations
Display a list of active and inactive backup versions of files from which you can select versions to restore.	`dsmc restore servb\sys:user/ project/* -pick -inactive`	If you try to restore both an active and inactive version of a file at the same time, only the active version is restored. See "Pick" on page 187 and "Inactive" on page 156 for more information.
Restore the `sys:doc/h1.doc` file to its original directory.	`dsmc restore sys:doc/h1.doc`	If you do not specify a destination, the files are restored to their original location.
Restore the `sys:doc/h1.doc` file under a new name and directory.	`dsmc restore sys:doc/h1.doc sys:newdoc/h2.doc`	None
Restore the files in the `sys:` volume and all of its subdirectories.	`dsmc restore sys:* -subdir=yes`	See "Subdir" on page 221 for more information about the *subdir* option.
Restore all files in the `sys:user/project` directory to their state as of 1:00 PM on August 17, 2002.	`dsmc restore -pitd=8/17/2002 -pitt=13:00:00 sys:user/project/`	See "Pitdate" on page 188 and "Pittime" on page 189 for more information about the *pitdate* and *pittime* options.
Restore the NDS on T9 server.	`dsmc res T9/nds:* -subdir=y`	For information about NDS restore considerations, see Appendix B, "Tivoli Storage Manager NetWare backup and recovery guide," on page 341
Restore all of the objects contained within the `.o=ibm` organization in the NDS of `adsm40` server.	`dsmc res adsm40\nds.o=ibm.* -subdir=yes`	For information about NDS restore considerations, see Appendix B, "Tivoli Storage Manager NetWare backup and recovery guide," on page 341.
Restore all files from the `sys:projecta` directory that end with `.bak` to another directory on a different NetWare server, `serverb\sys:projectn`. The projectn directory does not need to exist on `serverb`.	`dsmc restore sys:projecta/*.bak serverb\sys:projectn/`	If the destination is a directory, specify the delimiter (/) as the last character of the destination. If you omit the delimiter and your specified source is a directory or a file spec with a wildcard, you will receive an error.
Restore files specified in the `restore.txt` file to a different location.	`dsmc res -filelist=sys:dir1/dir2/ restore.txt sys:home/`	See "Filelist" on page 146 for more information about restoring a list of files.
Restore all members of the `{accounting}:group1` group backup stored on the Tivoli Storage Manager server.	`dsmc restore group {accounting}:group1`	See "Restore Group" on page 311 for more information.

Performing large restore operations

If you need to restore a large number of files, you can improve performance by issuing multiple **restore** commands at one time.

By issuing multiple **restore** commands at one time, you can start several restore sessions simultaneously. This will only work when the restore is no query restore (NQR).

See "Resourceutilization" on page 202 for more information.

For example, to restore all the files in your `sys:user` file space, you could enter:

```
load dsmc restore sys:user/ -subdir=yes -replace=all -tapeprompt=no
```

However, if you issue multiple commands for directories in your `sys:user` file space, Tivoli Storage Manager can restore the files faster.

For example, you could issue these commands:

```
load dsmc res sys:user/jones/ -subdir=yes -rep=all -tapep=no
load dsmc res sys:user/smith/ -subdir=yes -rep=all -tapep=no
load dsmc res sys:user/brown/ -subdir=yes -rep=all -tapep=no
```

Or, if you need to restore multiple volumes, you could issue a **restore** command for each volume. For example:

```
load dsmc restore sys:*  -subdir=yes -replace=all -tapeprompt=no
load dsmc restore app:*  -subdir=yes -replace=all -tapeprompt=no
load dsmc restore data:* -subdir=yes -replace=all -tapeprompt=no
```

Note: If you already have the appropriate values set for the *subdir*, *replace* and *tapeprompt* options in your client options file, you do not need to include those options in the commands.

When you issue multiple commands to restore your files, you must specify a unique part of the file space in each **restore** command. Be sure that you do not use any overlapping file specifications in the commands.

To display a list of the root directories in a file space, use the **query backup** command. For example:

```
load dsmc query backup <filespace> -dirsonly -subdir=no
```

As a general rule, you can issue 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. Starting multiple instances manually can lead to tape contention at the server. This can lead to tapes being mounted multiple times for each manually started restore.

The speed at which Tivoli Storage Manager can restore the files also depends on how many tape drives are available, and whether your administrator is using collocation to keep file spaces assigned to as few volumes as possible.

For example, if `sys:user/jones` and `sys:user/smith` are on the same tape, the restore for `sys:user/smith` must wait until the restore for `sys:user/jones` is complete. However, if `sys:user/brown` is on a different tape, and there are at least two tape drives available, the restore for `sys:user/brown` can begin at the same time as the restore for `sys:user/jones`.

If your administrator is using collocation, the number of sequential access media mounts required for restore operations is also reduced.

Other options you can choose to use in multiple **restore** commands are:

quiet   The advantage of using this option is that messages are not printed to your screen, and processing is faster. The disadvantage is that you do not receive information about individual files that are processed. Tivoli Storage Manager records only summary information.

> *errorlogname*
>
>> You can use this option to specify a different error log file for each **restore** command. Be sure to keep track of which command goes with each log file.

Performing point-in-time restores

Use a *point-in-time* restore to restore files to the state that existed at a specific date and time. A point-in-time restore can eliminate the effect of data corruption by restoring data from a time prior to known corruption, or recover a basic configuration to a prior condition.

You can perform a point-in-time restore of a file space, directory, or file.

Perform incremental backups to support a point-in-time restore. During an incremental backup, the client notifies the server when files are deleted from a client file space or directory. Selective and incremental-by-date backups do not notify the server about deleted files. Run incremental backups at a frequency consistent with possible restore requirements.

If you request a point-in-time restore with a date and time that is prior to the oldest version maintained by the Tivoli Storage Manager server, the object is not restored to your system. Files which were deleted from your workstation prior to the point-in-time specified will not be restored.

Notes:

1. Your administrator must define copy group settings that maintain enough inactive versions of a file to guarantee that you can restore that file to a specific date and time. If enough versions are not maintained, Tivoli Storage Manager might not be able to restore all objects to the point-in-time you specify.

2. If you delete a file or directory, the next time you run an incremental backup, the active backup version becomes inactive and the oldest versions that exceed the number specified by the *versions data deleted* attribute of the management class are deleted. See Chapter 8, "Understanding storage management policies," on page 75 for more information about the *versions data deleted* attribute.

When performing a point-in-time restore, consider the following:

- Tivoli Storage Manager restores file versions from the most recent backup before the specified point-in-time date. Ensure the point-in-time that you specify is not the same as the date and time this backup was performed.
- If the date and time you specify for the object you are trying to restore is earlier than the oldest version that exists on the server, Tivoli Storage Manager cannot restore that object.
- Point-in-time restore will restore files deleted from the client workstation after the point-in-time date but not files deleted before this date.
- Tivoli Storage Manager cannot restore a file created after the point-in-time date and time. When a point-in-time restore runs, files that were created on the client after the point-in-time date are not deleted.

To perform a point-in-time restore using the Web client GUI, use the following steps:

1. Click the **Restore** button in the main window. The Restore window appears.
2. Click the **Point-in-Time** button from the Restore window. The Point in Time Restore window appears.

3. Select the **Use a Point-in-Time Date** selection box. Select the date and time and click **OK**. The point in time that you specified appears in the Point in Time display field in the Restore window.

4. Display the objects you want to restore. You can search for an object by name, filter the directory tree, or work with the directories in the directory tree.

5. Click the selection boxes next to the objects you want to restore.

6. Click the **Restore** button. The Restore Destination window is displayed. Enter the appropriate information.

7. Click the **Restore** button to start the restore. The Restore Task List window displays the restore processing status.

Note: If there are no backup versions of a directory for the point-in-time you specify, files within that directory are not restorable from the Web client 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.

Using the Web client to restore data

Your administrator determines how many backup versions Tivoli Storage Manager maintains for each file on your workstation. Frequently, the administrator maintains more than one version of each file. Having multiple versions of a file permits you to restore older versions in the event the most recent backup is damaged. Tivoli Storage Manager considers the most recent backup version to be the *active* version. Any other backup version is considered to be an *inactive* version. To restore a backup version that is inactive, you must display both active and inactive versions by clicking on **Display Active/Inactive Files** on the View menu. If you try to restore both an active and inactive version of a file at the same time, only the active version will be restored.

To restore your backup versions:

1. Click on **Restore** on the main window. The Restore by Tree window displays.

2. Expand the directory tree by clicking on the **+** sign. Click the selection boxes next to the object or objects you want to back up.

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 displays. Enter the appropriate information in the Restore Destination window.

5. Click **Restore**. The Restore Task List window displays the processing status. To monitor processing of an operation from the GUI main window, open the **Actions** menu and select **TSM Activities**.

Restoring data from a backupset

Your Tivoli Storage Manager administrator can generate a backupset (a collection of your files that reside on the server) onto portable media created on a device using a format that is compatible with the client device.

It is possible to generate a backupset as a number of special files if the device class the Tivoli Storage Manager administrator specifies when creating it is *file*. These files can be stored locally (on the client) to provide more restore flexibility.

You can restore backupsets from the following locations:
- Directly from the server
- From portable media on a device attached to your client workstation
- From a backupset file on your client workstation

Backupsets 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 backupset.

Notes:
1. If you cannot restore a backupset from portable media, check with your Tivoli Storage Manager administrator to ensure that the portable media was created on a device using a format that is compatible with your device.
2. There is no support in the Tivoli Storage Manager API for the backupset format.

Restoring an entire or partial backupset

Tivoli Storage Manager considers a backupset as one object containing the whole file structure. You can restore the entire backupset or just select portions. The backupset media is self-describing and contains all the information required to perform a successful restore.

If you are connected to a Tivoli Storage Manager Version 5.4 or higher server, your Tivoli Storage Manager administrator can create backup sets that are "stacked". Stacked backup sets can contain data from multiple client nodes, and they can contain different types of data for a particular client node.

Note: Application data restore is only available when restoring from the server. It is not supported from a client local backupset restore.

When a backup set is stacked, you can only restore data for your own node. Data for all other nodes will be skipped. When restoring data from a stacked backup set on a local device, you can only restore file level data for your own client node.

Attention: Due to the portability of local backup sets, additional steps should be taken to secure local backup sets on portable media. The backup set media should be physically secured since the backup set can be restored locally without authenticating with the server. Each user has access to all of the data on the stacked backup set, which means that the user has access to data that they do not own, by changing the node name or viewing the backup set in its raw format. Encryption or physical protection of the media are the only methods to ensure that the data is protected.

If you restore backupset data from the server, individual files, directories or entire backupset data can be restored in a single operation from the Web client GUI or

the command line. When you restore backupset data locally, the Web client GUI can only display and restore an entire backupset. The command line can be used to restore individual files or directories stored in a backupset locally. Refer to the *backupsetname* option on the **restore** and **query** commands for more information.

Restoring backupsets using the Web client GUI

Attention: Before you begin a restore, be aware that backupsets can contain data for multiple file spaces. If you specify a destination other than the original location, data from *all* file spaces are restored to the location you specify.

To restore a backupset, perform the following steps:

- Click **Restore** from the Web client GUI main window. The Restore window appears.

  If you have not logged in to the server, the TSM Login window appears. Fill in the TSM Login window, then click the **Login** button

- Locate the **Backup Sets** directory tree object and expand it by clicking the plus sign (+) beside it.
  - To restore the backupset from a local device, expand the **Local** object and the Specify backupset location dialog is displayed. On the dialog, select **File name:** from the dropdown list and then enter the file name location. You can also click the **Browse** button to open a file selection window and select a backupset.
  - To restore data from backupset from the server, first expand the **Server** object and then either **Filelevel** or **Image**, depending on the type of restore requested.
- Click the selection box next to the backupset or directory or file within the backupset that you want to restore.

  You can select files from within a backupset if that backupset is located at the server and it was generated with a table of contents.

- Click **Restore**. The Restore Destination window appears. Enter the appropriate information.
- Click **Restore**. The Task List window displays the restore processing status.

Notes:

1. If the object you want to restore is part of a backupset generated on a node, and the node name is changed on the server, any backupset 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 backupset was generated.

2. Certain local 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.

3. The following feature of a backupset restore from the server is not available when restoring locally:

   a. The Web client GUI display and restore of individual files and directories. The command line can be used to restore an individual directory or file from a local backupset

Restoring backupsets using the command-line client

The **restore backupset** command restores a backupset from the Tivoli Storage Manager server or a local file To restore individual files, folders, and images from

a backupset, use the **restore** command with the *backupsetname* option instead. Refer to the *backupsetname* option on the **restore backupset**, **restore**, and **query** commands for more information.

Use the *location* option with the **restore backupset**, **restore**, and **query** commands to specify where Tivoli Storage Manager searches for a backupset during a query or restore operation. You can use this option to locate backupsets on the server or local files. Refer to the *location* option on the **restore backupset**, **restore**, and **query** commands for more information.

Use the **query backupset** command to query a backupset from a local file or the Tivoli Storage Manager server. The **query backupset** command displays the backupset name, generation date, retention, and description. Refer to the **query backupset** command for more information.

Restoring files: Advanced considerations

This section discusses additional topics related to performing restores. You do not need to understand this information in order to use Tivoli Storage Manager for basic tasks.

Authorizing another client node to restore or retrieve your files

You can authorize another client node to restore your backup versions or retrieve your archive copies.

To authorize another node to restore or retrieve your files, use the **set access** command. You can also use the **query access** command to see your current list, and **delete access** to delete nodes from the list. For more information about these commands, see:
- "Set Access" on page 321
- "Query Access" on page 280
- "Delete Access" on page 260

The Tivoli Storage Manager node you are authorizing must be registered with your Tivoli Storage Manager server.

Restoring or retrieving files from another client node

If you want to restore backups or archives from another NetWare client node, you need access to those files as described in "Authorizing another client node to restore or retrieve your files."

If you are granted access to files backed up by a different client node, you can restore those files by using the *fromnode* option with the **restore** command. For example, you could enter the following:

    dsmc res -fromnode=nw2 servb\sys:home/proj/* serva\sys:home/proj/

where **nw2** is the node name for another NetWare server, **servb\sys:home/proj/***
indicates the name of the server and the files you want to restore, and
serva\sys:home/proj/ indicates where you want to place the files you are restoring.
You must specify a destination, or Tivoli Storage Manager attempts to restore the files to the server from which the files were backed up.

You can retrieve archived files in the same way, using the **retrieve** command.

For more information about the *fromnode* option, see "Fromnode" on page 151.

For more information about using the *fromnode* option with the **restore** command, see "Restore" on page 304.

Restoring or retrieving your files to another client node

Tivoli Storage Manager lets you restore backups or archives from your own NetWare server when you are using a different NetWare server. You must enter your node name, because your backups and archives are stored according to your node, not your specific machine. Your Tivoli Storage Manager password protects your data.

To restore or retrieve files to another NetWare server, use the *nodename* option to specify the node name of the NetWare server from which you backed up or archived the files. You can either use the *nodename* option when starting Tivoli Storage Manager or update the client options file on the NetWare server. (If you are using someone else's machine, you can avoid changing their configuration by using the *nodename* option on the **dsmc** command.)

For example, enter the following:

```
dsmc res -nodename=nw1 serva\sys:home/proj/* servb\sys:home/proj/
```

where nw1 is the node name for the NetWare server from which you backed up the files, serva\sys:home/proj/* identifies the server and the files you want to restore, and servb\sys:home/proj/ indicates where you want to place the files you are restoring. You must specify a destination, or Tivoli Storage Manager attempts to restore the files to the node from which the files were backed up.

You can enter the *password* option with the **restore** or **retrieve** command, or allow Tivoli Storage Manager to prompt you for the password for the client node you specified with the *nodename* option.

Restoring a disk in case of disk loss

Tivoli Storage Manager can only recover your files if you can run the client. If the disk that contains the client is lost, you must reinstall the client before you can recover your files. If you also lose the disk that contains the operating system and communication software, you must recover them before you can connect to the server.

Notes:

1. Data can be restored from a backup set stored on local drives or portable media without setting up communication with server. See "Restoring data from a backupset" on page 57 for more information about backup sets.

2. When restoring an entire volume, do not specify the *Volinformation* processing option. Doing so will result in a classic restore instead of a no query restore. A no query restore is preferable, because it sends only a single restore request to the server.

Deleting file spaces

If your administrator gives you authority, you can delete entire file spaces from the server. When you delete a file space, you delete all the files, both backup versions and archive copies, that are contained within the file space.

Carefully consider what you are doing before you attempt to delete a file space.

You cannot delete individual backup versions kept on the server.

If you decide you do not need the file space, use the **delete file space** command. See "Delete Filespace" on page 266 for more information.

Chapter 6. Archiving and retrieving data

Archiving and retrieving files is similar to backing up and restoring files. Many of the concepts are similar. In this chapter, we cover the main archive and retrieve tasks, but where concepts are the same as for backup and restore, we provide references to Chapter 4, "Backing up your data," on page 33. See "When to back up and when to archive files" on page 33 for a discussion of the difference between backups and archives.

This chapter provides instructions for the following tasks:

Table 17. Archive and retrieve: Primary tasks

Task	Page
Using the command line to archive data	64
Using the Web client to archive data	65
Deleting archived files	66
Requesting archive services for remote servers	66
Using the command line to retrieve data	66
Using the Web client to retrieve data	67

Archiving your data

Understanding how your archives are managed

When archiving files, Tivoli Storage Manager checks the *include* options in your include-exclude list to determine which management class to assign to the files. If you do not specifically assign a management class to a file with an *include* option, Tivoli Storage Manager assigns the file the default management class.

Tivoli Storage Manager can only archive a file if the selected management class contains an archive copy group.

For information on the various management class attributes used to manage your archives, see "Displaying information about management classes and copy groups" on page 77. For information on assigning management classes, see "Assigning a management class to files" on page 81.

Note: When retrieving a directory, its modification date and time is set to the date and time of the retrieve, not to the date and time the directory had when it was archived. This is because Tivoli Storage Manager retrieves the directories first, then adds the files to the directories.

Attention: When you retrieve a file without any specifications, and more than one version of the archive copy exists on the server, Tivoli Storage Manager retrieves all of the copies. After the first copy is retrieved, the second copy will be retrieved. If there is an existing copy on your client machine, you are prompted to replace, skip, or cancel.

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Using the command line to archive data

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 NetWare server.

In addition, Tivoli Storage Manager stores trustee directory rights, trustee file assignments, file attributes, name spaces, and associated name space information with the archive copies of the files.

Associating a local snapshot with a server file space

Use the *snapshotroot* option with the **archive** command in conjunction with a third-party application that provides a snapshot of a logical volume, to associate the data on the local snapshot with the real file space data that is stored on the Tivoli Storage Manager server. The *snapshotroot* option does not provide any facilities to take a volume snapshot, only to manage data created by a volume snapshot. See "Snapshotroot" on page 218 for more information.

Table 18 shows examples of using the **archive** command to archive objects. See "Archive" on page 255 for additional examples and detailed information about the **archive** command.

Table 18. Command line archive examples

Task	Command	Considerations
Archive all files in the t9\sys:plan/proj1 directory with a file extension of .txt.	`dsmc archive t9\sys:plan/proj1/ *.txt`	Use wildcards to archive more than one file at a time.
Archive all files in the small:testdir directory and delete the files on your NetWare server.	`dsmc archive small:testdir/* -deletefiles`	Retrieve the archived files to your NetWare server whenever you need them again. See "Deletefiles" on page 124 for more information about the *deletefiles* option.
Archive the sys:proj/h1.doc file and the sys:h2.doc file	`dsmc archive sys:proj/h1.doc sys:h2.doc`	You can specify as many file specifications as available resources or other operating system limits permit. Separate file specifications with a space. You can also use the *filelist* option to process a list of files. The Tivoli Storage Manager client opens the file you specify with this option and processes the list of files within according to the specific command. See "Filelist" on page 146 for more information.
Archive a list of files in the sys:filelist.txt file.	`dsmc archive -filelist=sys:filelist.txt`	Use the *filelist* option to process a list of files. See "Filelist" on page 146 for more information.
Archive the sys:ch1.doc file and assign a description to the archive.	`dsmc archive sys:ch1.doc -description="Chapter 1, first version"`	The maximum length of a description is 254 characters. 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 125 for more information about the *description* option.

Table 18. Command line archive examples (continued)

Task	Command	Considerations
Archive all of the files in the `sys:proj` directory and its subdirectories.	`dsmc archive sys:proj/ -subdir=yes`	See "Subdir" on page 221 for more information about the *subdir* option.
Use the *v2archive* option with the **archive** command to archive only files in the `sys:relx/dir1` directory.	`dsmc archive sys:relx/dir1/ -v2archive`	Tivoli Storage Manager archives only files in the `sys:relx/dir1` directory. Directories that exist in the path are not processed. Do not use the *v2archive* option when archiving the NDS. See "V2archive" on page 239 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 t3\sys:plan/proj1/budget.jan`	See "Archmc" on page 103 for more information about the *archmc* option. See Chapter 8, "Understanding storage management policies," on page 75 for more information about management classes.
Assuming that you initiated a snapshot of the SYS: volume and mounted the snapshot as the SNAP1: volume, archive the `sys:/system/dir1` directory tree from the local snapshot and manage it on the Tivoli Storage Manager server under the file space name sys:.	`dsmc archive sys:/system/dir1/* -subdir=yes -snapshotroot=SNAP1:`	See "Snapshotroot" on page 218 for more information.

Using the Web client to archive data

You can use Tivoli Storage Manager to archive specific files, a group of files with similar names, or entire directories. You can also assign a unique description for each group of files you archive (archive package). The maximum length of a description is 254 characters. If you have the Web client started on your NetWare server, you can archive your data using the Web client backup-archive GUI. See "Starting a Web client session" on page 28 for information on starting the Web client.

To archive your files using the Web client GUI:

1. Click the **Archive** button from the main window. The Archive window appears.
2. Expand the directory tree by clicking on the **+** sign. Click the selection boxes next to the files or directories you want to archive.
3. Enter a description, accept the default description, or select an existing description for your archive package in the **Description** pull down box.
4. To modify specific archive options, click the **Options** button Any options you change are effective during the current session *only*.
5. Click the **Archive** button. The Archive Status window displays the progress of the archive. To monitor processing of an operation from the GUI main window, open the **Actions** menu and select **TSM Activities**.

Considerations:

- Select **File details** on the **View** menu to display file attributes for any file.
- The following functions are not supported on the Web client:
  - Estimate
  - Searching and Filtering

- Preferences editor
- Setup Wizard

Archiving files: Advanced considerations

This section discusses some advanced considerations for archiving files. You do not need to use this information when performing basic archive tasks.

Deleting archived files

If your administrator has given you authority, you can delete individual archive copies from the Tivoli Storage Manager server without deleting the entire file space.

Use the **delete archive** command to delete archive copies. See "Delete Archive" on page 261 for more information.

Requesting archive services for remote servers

You can request archive services for multiple NetWare file servers. See "Requesting backup and archive services for remote servers" on page 47 for more information.

Retrieving your data

This section discusses how to retrieve your data using the command line client and the Web client.

Note: When retrieving a directory, its modification date and time is set to the date and time of the retrieve, not to the date and time the directory had when it was archived. This is because Tivoli Storage Manager retrieves the directories first, then adds the files to the directories.

Using the command line to retrieve data

You *retrieve* a file when you want to return an archive copy from the server to your NetWare server. You can retrieve a single file, a group of files, or all the files in a directory or subdirectory. When you retrieve a file, Tivoli Storage Manager sends you a copy of that file. The archived file remains in storage.

Use the **retrieve** command to retrieve files from storage to your NetWare server. Table 19 shows examples of using the **retrieve** command. See "Retrieve" on page 313 for additional examples, and detailed information about the **retrieve** command.

Table 19. Command line examples of retrieving archives

Task	Command	Considerations
Retrieve the `sys:doc/h1.doc` file to its original directory.	`dsmc retrieve sys:doc/h1.doc`	If you do not specify a destination, the files are retrieved to their original location.
Retrieve the `sys:doc/h1.doc` file under a new name and directory.	`dsmc retrieve sys:doc/h1.doc sys:newdoc/h2.doc`	None
Retrieve all files from the `sys:projecta` directory that end with the characters `.bak` to the `sys:projectn/` directory on the `servb` NetWare server. The `servb` NetWare server can be a local or remote NetWare server.	`dsmc retrieve sys:projecta/*.bak servb\sys:projectn/`	If the destination is a directory, you must 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.

Table 19. Command line examples of retrieving archives (continued)

Task	Command	Considerations
Use the *pick* option display a list of archives from which you can select files to retrieve.	`dsmc retrieve sys:project/* -pick`	See "Pick" on page 187 for more information about the *pick* option.
Retrieve a list of files specified in the `filelist.txt` file to their original directory.	`dsmc retrieve filelist=sys:filelist.txt`	See "Filelist" on page 146 for more information about retrieving a list of files.

Using the Web client to retrieve data

You can use Tivoli Storage Manager Web client to retrieve archive copies of specific files or entire directories as follows:

1. Click the **Retrieve** button from the main window. The Retrieve window appears.
2. Expand the directory tree by clicking on the **+** sign. Click the selection boxes next to the files or directories you want to retrieve.
3. Click **Retrieve**. The Retrieve Destination window appears. Enter the appropriate information in the Retrieve Destination window.
4. To modify specific retrieve options, click the **Options** button. Any options you change are effective during the current session *only*.
5. Click **Retrieve**. The Retrieve Status window displays the processing status. To monitor processing of an operation from the GUI main window, open the **Actions** menu and select **TSM Activities**.

Chapter 7. Automating tasks

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

With client scheduling, you can also:
- Display information about available schedules.
- Display information about work that the schedule has completed.
- Modify scheduling options in the client options file (dsm.opt). See "Scheduling options" on page 93 for more information.

Notes:

1. The schedule start time is based on the time of day of the server and the client.
2. As part of the initial sign-on greeting, the command-line client displays the current time at both the server and the client.
3. 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 options file (dsm.opt) 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 93.

Displaying information about scheduled work

Schedules can be classic or enhanced, depending on how the interval to the next execution is defined. Classic schedules allow the period to be as small as an hour. Enhanced schedules allow actions to be executed on specific days.

To view schedules that are defined for your client node, enter:

```
load dsmc query schedule
```

Tivoli Storage Manager displays detailed information about all scheduled work for your client node. Figure 1 on page 70 displays sample classic **query schedule** output.

```
    Schedule Name: DAILY_INC
      Description: Daily System-wide backup
   Schedule Style: Classic
          Action: Incremental
         Options: QUIET
         Objects:
        Priority: 1
   Next Execution: 30 minutes
        Duration: 4 Hours
          Period: 1 Day
     Day of Week: Any
           Month:
    Day of Month:
   Week of Month:
          Expire: Never

    Schedule Name: WEEKLY_INC
      Description: Weekly backup for project files
   Schedule Style: Classic
          Action: Incremental
         Options: QUIET
         Objects: NDS NDS:
        Priority: 1
   Next Execution: 60 minutes
        Duration: 8 Hours
          Period: 7 Days
     Day of Week: Friday
           Month:
    Day of Month:
   Week of Month:
          Expire: Never
```

Figure 1. Sample classic query schedule output

The schedule name, **WEEKLY_INC**, starts a weekly incremental backup of the NDS.

The schedule name, **DAILY_INC**, starts a daily incremental backup. The next incremental backup will start in 30 minutes. Because no objects are listed, Tivoli Storage Manager runs the incremental backup on your default domain. The schedule has no expiration date.

To more accurately determine the status of scheduled events, the **query schedule** output for an enhanced schedule, on Tivoli Storage Manager Version 5.3 client and above, includes new fields. These fields are always displayed, even if it is a classic schedule or a Tivoli Storage Manager Version 5.3 client session with a pre-Version 5.3 server, but the new fields are blank. Note that for a down-level (prior to Tivoli Storage Manager Version 5.3) client, the server reports the period as indefinite and the day of week as an illegal day. Figure 2 on page 71 displays sample enhanced **query schedule** output.

```
Schedule Name: QUARTERLY_FULL
   Description: Quarterly full backup
Schedule Style: Enhanced
        Action: Selective
       Options: subdir=yes
       Objects: SYS:\* DATA1:\*
      Priority: 5
Next Execution: 1744 Hours and 26 Minutes
      Duration: 1 Day
        Period:
   Day of Week: Friday
         Month: March, June, September, December
  Day of Month: Any
 Week of Month: Last
        Expire: Never
```

Figure 2. Sample enhanced query schedule output

For more information about the enhanced **query schedule**, see the following
publications:
- *IBM Tivoli Storage Manager for AIX Administrator's Reference*
- *IBM Tivoli Storage Manager for AIX Administrator's Guide*
- *IBM Tivoli Storage Manager for HP-UX Administrator's Reference*
- *IBM Tivoli Storage Manager for Linux Administrator's Reference*
- *IBM Tivoli Storage Manager for Sun Solaris Administrator's Reference*
- *IBM Tivoli Storage Manager for Sun Solaris Administrator's Guide*
- *IBM Tivoli Storage Manager for Windows Administrator's Reference*
- *IBM Tivoli Storage Manager for Windows Administrator's Guide*

Displaying information about completed work

When you run the **schedule** command in the foreground, your screen displays
output from the scheduled commands. Output is also directed to the dsmsched.log
file in the installation directory unless you change the directory and file name
using the *schedlogname* option.

After scheduled work is performed, check the schedule log to verify that all work
completed successfully.

When a scheduled command is processed the schedule log contains the following
entry:

```
Scheduled event eventname completed successfully
```

If the scheduled event does not complete successfully, you will receive a message
similar to the following:

```
ANS1512E Scheduled event eventname failed. Return code = code.
```

The client indicates whether Tivoli Storage Manager successfully issued the
scheduled command associated with the *eventname* (action=command). No attempt
is made to determine the success or failure of the command. You can assess the
status of the command by evaluating the return code from the scheduled
command in the schedule log. The schedule log entry for the command's return
code is prefaced with the following text:

```
Finished command. Return code is:
```

The schedule log continues to grow unless you prune it using the
schedlogretention option or specify a maximum size using the *schedlogmax* option.
See "Specifying scheduling options" on page 69 for more information.

Enabling or disabling scheduled commands

You can use the *schedcmddisabled* option to disable the scheduling of commands
by the server. Commands are scheduled by using the *action=command* option on
the **define schedule** server command.

The *schedcmddisabled* option does not disable the *preschedulecmd* and
postschedulecmd commands. However, you can specify *preschedulecmd* or
postschedulecmd with a blank or a null string to disable the scheduling of these
commands. See "Schedcmddisabled" on page 206 for more information.

You can use the *schedrestretrdisabled* option to prevent the Tivoli Storage Manager
Server administrator from executing restore or retrieve schedule operations. See
"Schedrestretrdisabled" on page 212 for more information.

You can use the *srvprepostscheddisabled* option to prevent the Tivoli Storage
Manager Server administrator from executing pre-schedule and post-schedule
commands when performing scheduled operations. See "Srvprepostscheddisabled"
on page 220 for more information.

Client return codes

The backup-archive command-line interface and the scheduler exit with return
codes that accurately reflect the success or failure of the client operation. Scripts,
batch files, and other automation facilities can use the return code from the
command-line interface. For operations that use Tivoli Storage Manager's
scheduler, the return codes are shown in the output of the QUERY EVENT
administrative command. See the *IBM Tivoli Storage Manager Administrator's
Reference* for your operating system for more information about QUERY EVENT.

In general, the return code is related to the highest severity message during the
client operation.
- If the highest severity message is informational (ANSnnnnI), then the return
  code will be 0.
- If the highest severity message is a warning (ANSnnnnW), then the return code
  will be 8.
- If the highest severity message is an error (ANSnnnnE or ANSnnnnS), then the
  return code will be 12.

Note: Even if the application explicitly sets a nonzero exit value, the NetWare
operating system ignores this value and resets it to zero. This is a NetWare
operating system limitation.

The exception to the above rules is warning or error messages that individual files
could not be processed. For such a skipped file, the return code will be 4. For cases
where the return code is not 0, you can examine the dsmerror.log file (and, for
scheduled events, the dsmsched.log file).

For a description of the return codes and their meanings, see Table 20 on page 73.

Table 20. Client return codes and their meanings

Code	Explanation
0	All operations completed successfully.
4	The operation completed successfully, but some files were not processed. There were no other errors or warnings. This return code is very common. Files are not processed for various reasons. The most common reasons are: • The file satisfies an entry 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 79.
8	The operation completed with at least one warning message. For scheduled events, the status will be *Completed*. Review dsmerror.log (and dsmsched.log for scheduled events) to determine what warning messages were issued and to assess their impact on the operation.
12	The operation completed with at least one error message (except for error messages for skipped files). For scheduled events, the status will be *Failed*. Review the dsmerror.log file (and dsmsched.log file for scheduled events) to determine what error messages were issued and to assess their impact on the operation. As a general rule, this return code means that the error was severe enough to prevent the successful completion of the operation. For example, an error that prevents an entire drive from being processed yields return code 12. When a file is not found the operation yields return code 12.
other	For scheduled operations where the scheduled action is COMMAND, the return code will be the return code from the command that was executed. If the return code is 0, the status of the scheduled operation will be *Completed*. If the return code is nonzero, then the status will be *Failed*. Some commands might issue a nonzero return code to indicate success. For these commands, you can avoid a *Failed* status by *wrapping* the command in a script that invokes the command, interprets the results, and exits with return code 0 if the command was successful (the script should exit with a nonzero return code if the command failed). Then ask your Tivoli Storage manager server administrator to modify the schedule definition to invoke your script instead of the command.

The return code for a client macro will be the highest return code issued among the individual commands that comprise the macro. For example, suppose a macro consists of these commands:

```
selective t9\sys:u/devel/* -subdir=yes
incremental t9\sys:u/devel/TestDriver/*" -subdir=yes
archive t9\sys:plan/proj1/* -subdir=yes
```

If the first command completes with return code 0; the second command completed with return code 8; and the third command completed with return code 4, the return code for the macro will be 8.

Also see "Handling return codes from preschedulecmd and postschedulecmd scripts" on page 330.

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. Your data is associated (or bound) to these policies; then when the data is backed up or archived, it is managed according to policy criteria. Policy criteria include a policy domain, a policy set, a management class, and a copy group .

Policies determine:
* Whether a file is eligible for backup or archive services.
* How many backup versions to keep.
* How long to keep inactive backup versions and archive copies.
* Where to place the copies in storage.
* For incremental backup, policies also determine:
    – How frequently a file can be backed up.
    – Whether a file must change before it is backed up again.

This chapter explains:
* Policy criteria (policy domains, policy sets, copy groups, and management classes).
* How to display policies.
* How Tivoli Storage Manager associates your data with policies.

Using policy domains and policy sets

A *policy domain* is a group of clients with similar requirements for backing up and archiving data. Policy domains contain one or more policy sets. An administrator uses policy domains to manage a group of client nodes in a logical way. For example, a policy domain might include:
* A department, such as Accounting.
* A physical location, such as a particular building or floor.
* A local area network, such as all clients associated with a particular file server.

Tivoli Storage Manager includes a default policy domain named *Standard*. At first, your client node might be associated with the default policy domain. However, your administrator can define additional policy domains if there are groups of users with unique backup and archive requirements.

A *policy set* is a group of one or more management classes. Each policy domain can hold many policy sets. The administrator uses a policy set to implement different management classes based on business and user needs. Only one of these policy sets can be active at a time. This is called the *active policy set*. Each policy set contains a *default management class* and any number of additional management classes.

Using management classes and copy groups

A *management class* is a collection of backup and archive copy groups that establishes and contains specific storage management requirements for backing up and archiving data. An administrator can establish separate management classes to meet the backup and archive requirements for different kinds of data, such as:
* System data that is critical for the business.

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- 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.

Most of the work you do with storage management policies is with management classes. Each file, directory, and NDS that you back up and each file that you archive is associated with (or *bound* to) a management class, as follows:

- If your data is not associated (or bound) to a file or the NDS with a management class, Tivoli Storage Manager uses the default management class in the active policy set.
- For backing up directories, you can specify a management class with an *include* statement or the *dirmc* option. If you do not specify a management class, Tivoli Storage Manager uses the management class in the active policy set specifying the longest retention period.
- For archiving directories, you can specify a management class with an *include.archive* statement or the *archmc* option. If you do not specify a management class, the server assigns the default management class to the archived directory. If the default management class has no archive copy group, the server assigns the management class that currently has the archive copy group with the shortest retention time.

You can use *include* statements in your include-exclude list to associate files with management classes. See "Selecting a management class for files" on page 80 for more information. In your client options file (dsm.opt), you can associate directories with a management class, using the *dirmc* option. See "Selecting a management class for directories" on page 82 for more information. To associate the NDS with a management class, use an *include* statement in your include-exclude list. See "Selecting a management class for the NDS" on page 82 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:
- How many days must elapse before a file is backed up again.
- How a file is processed during a backup if it is in use.

It also contains attributes to manage the backup versions of your files on the server. These attributes control:
- On which media type the server stores backup versions of your files and directories.
- How many backup versions the server keeps of your files and directories.
- How long the server keeps backup versions of your files and directories.
- How long the server keeps inactive backup versions.
- How long the last remaining inactive version of a file is kept.

An *archive copy group* contains attributes that control:
- Whether a file is archived if it is in use
- On which media type the server stores archived copies of your files
- How long the server keeps archived copies of your files

When the server is unable to rebind a file to an appropriate management class, the server uses one of two values to determine the number of days to retain the file. If it is a backup version, the server uses *backup retention grace period*. Archive copies are never rebound because each archive operation creates a different archive copy. Archive copies remain bound to the management class name specified when the user archived them. If the management class to which an archive copy is bound no longer exists or no longer contains an archive copy group, the server uses the default management class. If you later change or replace the default management class, the server uses the updated default management class to manage the archive copy. If the default management class does not contain an archive copy group, the server uses the *archive retention grace period* specified for the policy domain. For more information about grace periods, see "Using a retention grace period" on page 84.

Displaying information about management classes and copy groups

Use the *detail* option on the **query mgmtclass** command to view the available management classes.
- 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 21 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 21. 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 file system. 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 file system. This parameter is ignored as long as the file or directory remains in your file system.

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 system. Any subsequent updates to this parameter will not affect files that are already inactive. For example: If this parameter is set to 10 days when a file is inactivated during an incremental backup, the file will be deleted from the server in 10 days.

Copy serialization

The *Copy Serialization* attribute determines whether a file can be in use during a backup or archive, and what to do if it is. The value for this attribute can be one of the following:

- **Static**. A file or directory must not be modified during a backup or archive. If the object is changed during a backup or archive attempt, it is not backed up or archived.

- **Shared static**. A file or directory must not be modified during backup or archive. Tivoli Storage Manager attempts to perform a backup or archive as many as four additional times, depending on the value specified on the *changingretries* option in your client options file. If the object is changed during every backup or archive attempt, it is not backed up or archived.

- **Dynamic**. A file or directory is backed up or archived on the first attempt regardless of whether it changes during a backup or archive. However, if the open file has the share flag set to *Deny_Read*, the backup does not occur.

- **Shared dynamic**. A file or directory is backed up or archived regardless of whether it changes during a backup or archive. Tivoli Storage Manager attempts to perform a backup or archive as many as four additional times, depending on the value specified on the *changingretries* option in your client 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. However, if the open file has the share flag set to *Deny_Read*, the backup does not occur.

  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. Tivoli Storage Manager does not check the mode for selective backups. The value for this parameter can be one of the following:

- **Modified.** The file is considered for incremental backup *only if* it has changed since the last backup. A file is considered changed if any of the following are true:
  - The date or time of the last modification is different.
  - The file size is different.

- If only the file meta-data changes (such as access permissions), but the file data does not change, Tivoli Storage Manager might back up only the meta-data.
- The trustee rights 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.

Note: If you do not assign a management class to the NDS, the default management class is used.

When selecting a different management class for your files, consider these questions:
- Does the management class contain a backup copy group?

  If you attempt to back up a file associated with a management class that does not contain a backup copy group, the file is not backed up.
- Does the management class contain an archive copy group?

  You cannot archive a file associated with a management class that does not contain an archive copy group.
- Does the backup copy group contain attributes that back up your files often enough?

  Mode and frequency work together to control how often a file is backed up when you use incremental backup. Tivoli Storage Manager does not check those attributes for selective backup.
- Do the copy groups specify either static or shared static for serialization?

  If serialization is shared dynamic or dynamic, you might get fuzzy backups or archive copies. Verify that this is acceptable. For example, you might want to use shared dynamic or dynamic serialization for a file to which log records are continuously added. If you used static or shared static serialization, the file might never be backed up because it is constantly in use. With shared dynamic or dynamic serialization, the file is backed up, but the backup version of the file might contain inconsistent data. Do not use shared dynamic or dynamic serialization for a file if it is very important that the backup version or archive copy contain all changes.

- Does the backup copy group specify an adequate number of backup versions to keep, along with an adequate length of time to keep them?
- Does the archive copy group specify an adequate length of time to keep archived copies of files?

Assigning a management class to files

A management class defines when your files are included in a backup, how long they are kept on the server, and how many versions of the file the server should keep. The server administrator selects a default management class. You can specify your own management class to override the default management class.

To assign a management class other than the default to directories, use the *dirmc* option in your client options file (dsm.opt). See "Dirmc" on page 127 for more information.

You can assign a management class for a file or file group by using an **include** statement in your client options file. Management class names are not case-sensitive.

Using the command-line client, to associate the file /Users/jones/budget.jan with the management class budget, you would enter:

```
include sys:adsm/proj2/costs/* budget
```

To specify a management class named **managall** to use for all files to which you do not explicitly assign a management class, enter:

```
include *:\...\*  managall
```

The example below demonstrates how to use a management class:

```
exclude *:...\*.sno
include nw5/sys:winter\...\*.ice mcweekly
include nw5/sys:winter\december\*.ice mcdaily
include nw5/sys:winter\january\*.ice  mcmonthly
include nw5/sys:winter\winter\white.sno
```

Processing follows these steps:
1. The file name 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 nw5/sys:winter\january directory is assigned to the management class, **mcmonthly**.
3. Any file with an extension of ice in the nw5/sys:winter\december directory is assigned to the management class, **mcdaily**.
4. Any other files with an extension of ice in any directory under nw5\sys:winter are assigned to the management class, **mcweekly**.
5. Any file with an extension of sno (except nw5/sys:winter\winter\white.sno) in any directory is excluded from backup.

To specify your own default management class for files that are not explicitly included, specify:

```
include *:\...\* mgmt_class_name
```

as the first include or exclude option defined. See "Include options" on page 159 for more information about the *include* option.

Overriding the management class for archived files

When you archive a file, you can override the assigned management class using the **archive** command with the *archmc* option to specify a different management class.

On the command line, to associate the file budget.jan with the management class **ret2yrs**, you would enter:

```
load dsmc archive sys:plan\proj1\budget.jan -archmc=ret2yrs
```

Selecting a management class for the NDS

If you do not assign a management class to the NDS, the default management class is used. To assign a different management class to the NDS, use the same criteria that you use when assigning management classes to files. For example, you would enter:

```
include nw5\nds mgmtclname
```

where *mgmtclname* is the name of the management class. If you plan to back up *and* archive the NDS, select a management class with a backup copy group *and* an archive copy group.

The backup copy group in the management class must contain attributes that permit you to back up often and to keep as many different backup versions as you need. To verify that complete copies of the files are created when you request a backup or archive, select a management class that specifies static or shared static for serialization.

Selecting a management class for directories

If the management class in your active policy set containing the longest "Retain only version" (RETONLY) setting meets your backup requirements for directories, it might not be necessary to take any action to associate directories with that management class. Tivoli Storage Manager does it automatically when it backs up your directories.

If there is more than one management class with the longest RETONLY setting, then the Tivoli Storage Manager client selects the management class whose name is first or last in alphabetical order.

If the default management class does not meet your requirements, select a management class with an adequate retention period specified by the *retain only version* parameter. For example, if the management class happens to back up data directly to tape, but you want your directory backups to go to disk, you will need to choose a different management class. You should keep directories at least as long as you keep the files associated with those directories.

For backup directories, use the *dirmc* option to specify the management class to which directories will be bound.

For archive directories, use the *archmc* option with the **archive** command.

You can use these methods to view the available management classes and their attributes:

- GUI or Web Client: Select **View Policy Information** from the **Utilities** menu.

- command-line client: Run **dsmc query mgmtclass -detail**.

Note: During expiration processing on a Tivoli Storage Manager server, if an archived directory is eligible for expiration, the server checks if any existing archived files require the archived directory to remain. If so, the archived directory is not expired and the Tivoli Storage Manager client updates the insert date on the archived directory to ensure that the directory is not expired before the files under it.

Binding management classes to files

Binding associates a file with a management class. When you back up a file for the first time, Tivoli Storage Manager binds it to either the default management class or the management class specified in your include-exclude list.

If the backup copy group for the management class specifies keeping multiple backup versions of the file, and you request multiple backups, the server always has one active backup version (the current version) and one or more inactive backup versions of the file. All backup versions of a file are bound to the same management class and are managed based on the attributes in the backup copy group.

When you archive a file for the first time, Tivoli Storage Manager binds it to the default management class, to the management class specified in your include-exclude list, or to a management class you specify when modifying your archive options during an archive.

Archived files are never rebound to a different management class. If you change the management class for a file using an *include.archive* statement, the **archmc** option, or through the Tivoli Storage Manager Web client GUI, any previous copies of the file that you archived remain bound to the management class specified when you archived them.

If a file is deleted on the client system then that file's inactive objects are not rebound.

Refer to the *IBM Tivoli Storage Manager Administrator's Guide* for your operating system, for more information on how files and directories are associated with management classes.

Rebinding backup versions of files

Rebinding associates a file or a logical volume image with a new management class.

Backups of files are bound again to a different management class in the following conditions. In each condition, the files (active and inactive) are not bound again until the next backup.
- You specify a different management class in an Include statement to change the management class for the file. The backups are managed based on the old management class until you run another backup.
- Your administrator deletes the management class from your active policy set. The default management class is used to manage the backup versions when you back up the file again.

- Your administrator assigns your client node to a different policy domain and the active policy set in that domain does not have a management class with the same name. The default management class for the new policy domain is used to manage the backup versions.

Refer to the *IBM Tivoli Storage Manager Administrator's Guide* for your operating system, for more information on how files and directories are associated with management classes.

Using a retention grace period

Tivoli Storage Manager also provides a *backup retention grace period* and an *archive retention grace period* to help protect your backup and archive data when it is unable to rebind a file to an appropriate management class. The backup retention grace period is used when:

- You change the management class for a file, but neither the default management class nor the new management class contain a backup copy group.
- The management class to which a file is bound no longer exists, and the default management class does not contain a backup copy group.

The backup retention grace period, defined in your policy domain, starts when you run an incremental backup. The default is 30 days. However, your administrator can lengthen or shorten this period.

When Tivoli Storage Manager manages a file using the backup retention grace period, it does not create any new backup versions of the file. All existing backup versions of the file expire 30 days (or the number of days specified in your policy domain) from the day they are marked inactive.

Archive copies are never rebound because each archive operation creates a different archive copy. Archive copies remain bound to the management class name specified when the user archived them. If the management class to which an archive copy is bound no longer exists or no longer contains an archive copy group, the server uses the default management class. If you later change or replace the default management class, the server uses the updated default management class to manage the archive copy. If the default management class does not contain an archive copy group, the server uses the archive retention grace period specified for the policy domain.

Using event-based policy retention protection

All management classes with an archive copy group must specify a retention period, for example, the number of days that an archived object will be stored on the server before being deleted. Event-based policy provides the option of beginning the retention period either at the time the object is archived or at a later date when an activation event is sent to the server for that object.

Using the Tivoli Storage Manager copy group value RETINIT=CREATE starts the data retention period when the file is archived. Using the copy group value RETINIT=EVENT starts the data retention period when the server is notified that the event has occurred.

The following example demonstrates this concept:

The user has two files, `create.file` and `event.file`. The user has available two management classes; CREATE, with RETINIT= CREATE, and EVENT, with RETINIT=EVENT. Both management classes have a 60-day retention period. The user, on the same day, archives both files:

```
dsmc archive create.file -archmc=CREATE
dsmc archive event.file -archmc=EVENT
```

Ten days later, the user issues the **set event** *-type=hold* command for the `create.file` file, so the file cannot be deleted. On the same day the user issues the **set event** *-type=activate* for the `event.file` file. At this time, `create.file` has 50 days left on its retention period, and `event.file` has 60 days. If no other action is taken, `create.file` will remain on the server forever, and `event.file` will be expired 70 days after it was created (60 days after its event occurred). However, let's say that 20 days after the initial archive, the user issues **set event** *-type=release* for the `create.file` file. Thirty days of its retention period have passed, so the file will be expired in 30 days (the hold does not extend the retention period).

Archiving files on a data retention server

Up to this point, there is no difference between archiving files on a normal server or a data retention server.

The following example demonstrates the differences between the two servers, and what can be done at day 5:

If the files were archived on a non-data retention server, the user can issue the **delete archive** *create.file event.file* command and both files will be deleted. If the files were archived on a data retention server, the same command will fail both files. The data retention server forces the user to keep archives until the stated retention criteria are met.

Now let's see the difference at day 15 (after the hold):

The **delete archive** *create.file event.file* command on the non-data retention server now deletes `event.file`, but returns a *cannot delete* error for `create.file` because it is in hold status. That same command to a data retention server still rejects the deletion of both files.

Refer to "Set Event" on page 323 for more information about the **set event** command.

See the *IBM Tivoli Storage Manager Administrator's Guide* for your operating system, for more information about RETINIT.

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. See "Using options with commands" on page 97 for more information.

Overview of processing options

Tivoli Storage Manager uses *processing options* that you specify in your client system 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
- node option
- Backup and archive processing options
- Restore and retrieve processing options
- Scheduling options
- Format and language options
- Command processing options
- Authorization options
- Error processing options
- Transaction processing option
- Web client options
- Diagnostics options

See Chapter 2, "Configuring Tivoli Storage Manager," on page 7 for information on how to create and modify your client options file (dsm.opt) file.

Tivoli Storage Manager also includes a group of client command options that you can enter *only* on the command line with specific commands. You can override some of the options in your options file by entering them with appropriate backup-archive commands. For a complete list of command-line options, a description, and where to go in this book for more information, see Table 34 on page 99.

Communication options

You use communication options to specify how your client node communicates with a Tivoli Storage Manager server.

NetWare only supports the TCP/IP communication protocol. Use the *commmethod* option to specify the TCP/IP communication protocol. For more information, see "Commmethod" on page 115.

Ask your Tivoli Storage Manager administrator for assistance in setting your communication options.

TCP/IP options

To use the TCP/IP communication protocol, you must include the *tcpserveraddress* option in your client options file. The other TCP/IP options have default values that you can modify if you want to change the default value.

Table 22. TCP/IP options

Option	Description	Page
httpport	Specifies a TCP/IP port address for the Tivoli Storage Manager Web client.	154
tcpbuffsize	Specifies the size, in kilobytes, of the Tivoli Storage Manager internal TCP/IP communication buffer.	225
tcpnodelay	Specifies whether the server or client disables the delay of sending successive small packets on the network.	229
tcpcadaddress	Specifies a TCP/IP address for dsmcad.	226
tcpport	Specifies the TCP/IP port address for a Tivoli Storage Manager server.	230
tcpserveraddress	Specifies the TCP/IP address for a Tivoli Storage Manager server.	231
tcpwindowsize	Specifies the size, in kilobytes, of the TCP/IP sliding window for your client node.	232
webports	Enables the use of the Web client outside a firewall by specifying the TCP/IP port number used by the Client Acceptor daemon and the Web Client Agent service for communications with the Web GUI.	245

Node option

Use the following options to specify the client node for which to request backup-archive services.

Table 23. node options

Option	Description	Page
clusternode	Specifies whether Tivoli Storage Manager manages cluster drives in a Novell Cluster Services (NCS) environment.	112
nodename	Use the *nodename* option in your client options file dsm.opt to identify your workstation to the server to establish communications.	173
virtualnodename	The *virtualnodename* option specifies the node name of your workstation when you want to restore or retrieve files to a different workstation.	242

Backup and archive processing options

You can use the following options to control some aspects of backup and archive processing.

Table 24. 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.	103
autofsrename	Specifies whether to rename an existing file space on a Unicode-enabled server so a Unicode-enabled file space can be created for the current operation.	108
changingretries	Specifies the number of retries when attempting to back up or archive a file that is in use.	111
compressalways	The *compressalways* option specifies whether to continue compressing an object if it grows during compression. Use this option with the *compression* option.	118
compression	The *compression* option compresses files *before* you send them to the server. Compressing your files reduces data storage for backup versions and archive copies of your files.	119
deletefiles	Use the *deletefiles* option with the **archive** command to delete files from your workstation after you archive them.	124
description	The *description* option assigns or specifies a description for files when performing archive, delete, retrieve, query archive or query backupset operations.	125
detail	Use the *detail* option to display management class, file space, backup, and archive information depending on the command with which it is used.	126
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.	127
dirsonly	Backs up, restores, archives, retrieves, or queries directories *only*.	128
diskcachelocation	Specifies the location where the disk cache database will be created if the option *memoryefficient=diskcachemethod* is set during an incremental backup.	131
domain	Specifies the volumes to include in your default client domain for an incremental backup.	132
enablearchiveretentionprotection	Allows the client to connect to a data retention server.	135

Table 24. Backup and archive processing options (continued)

Option	Description	Page
exclude *exclude.backup* *exclude.file* *exclude.file.backup*	Use these options to exclude a file or group of files from backup services.	143
encryptkey	Specifies whether to save the encryption key password locally when performing a backup-archive operation or whether to prompt for the encryption key password.	137
exclude.archive	Excludes a file or a group of files that match the pattern from archive services *only*.	143
exclude.compression	Excludes files from compression processing if you set the *compression* option to *yes*. This option applies to backups and archives.	143
exclude.dir	Excludes a directory, its files, and all its subdirectories and their files from backup processing.	143
exclude.encrypt	Excludes specified files from encryption processing.	143
filelist	Specifies a list of files to be processed for the command. Tivoli Storage Manager opens the designated filelist and processes the files listed within according to the command.	146
filesonly	Backs up, restores, retrieves, or queries files *only*.	149
groupname	Use this option with the **backup group** command to specify the fully qualified name of the group leader for a group.	153
inclexcl	Specifies the path and file name of an include-exclude options file.	157
include *include.backup* *include.file*	Use these options to include files or assign management classes for backup processing.	159
include.archive	Includes files or assigns management classes for archive processing.	159
include.compression	Includes files for compression processing if you set the *compression* option to *yes*. This option applies to backups and archives.	159
include.encrypt	Includes the specified files for encryption processing. By default, Tivoli Storage Manager does not perform encryption processing.	159
include.fs	Use the *include.fs* option to control how Tivoli Storage Manager processes your file space for incremental backup.	159
incrbydate	Use with the **incremental** command to request an incremental backup by date.	162
memoryefficientbackup	Specifies a memory-saving backup algorithm for incremental backups when used with the **incremental** command.	170

Table 24. Backup and archive processing options (continued)

Option	Description	Page
mode	Use the *mode* option with the **backup group** command to specify whether you want to perform a full or differential group backup containing a list of files from one or more file space origins.	172
noprompt	suppresses the confirmation prompt that is presented by the **delete group**, **delete archive**, **expire**, **restore image**, and **set event** commands.	174
nwignorecompressbit	Specifies whether to ignore the setting of the *compressed file (Co)* attribute during selection processing for incremental backups.	177
optfile	Specifies the client options file you want to use when you start a Tivoli Storage Manager session.	182
snapshotroot	Use the *snapshotroot* option with the **incremental**, **selective**, or **archive** commands in conjunction with a third-party application that provides a snapshot of a logical volume, to associate the data on the local snapshot with the real file space data that is stored on the Tivoli Storage Manager server.	218
subdir	Specifies whether to include subdirectories of a named directory.	221
tapeprompt	Specifies whether you want Tivoli Storage Manager to wait for a tape mount if it is required for a backup, archive, restore, or retrieve process, or to be prompted for a choice.	223
type	Use the *type* option with the **query node** command to specify the type of node to query.	238
v2archive	Use the *v2archive* option with the **archive** command to archive only files to the server. Tivoli Storage Manager will not process directories that exist in the path of the source file specification.	239
virtualfsname	Use this option with the **backup group** command to specify the name of the container for the group on which you want to perform the operation.	241
volinformation	The *volinformation* option backs up or archives root-level information. For the NetWare file server, *volinformation* handles volume restrictions and volume root-level trustee information.	243

Restore and retrieve processing options

The following options relate to restore and retrieve processing.

Table 25. Restore and retrieve processing options

Option	Description	Page
dirsonly	Qualifies the operation (backup, archive, restore, retrieve) to process directories alone.	128
disablenqr	Specifies whether the Tivoli Storage Manager Backup-Archive Client can use the no-query restore method for restoring files and directories from the server.	129
filelist	Specifies a file containing a list of files to be processed by the specified command.	146
filesonly	Qualifies the operation (backup, archive, restore, retrieve) to process files alone.	149
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.	150
fromnode	Permits one node to perform commands for another node. A user on another node must use the **set access** command to permit you to query, restore, or retrieve files for the other node.	151
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.	152
ifnewer	Replaces an existing file with the latest backup version only if the backup version is newer than the existing file.	155
inactive	Displays a list of active and inactive files when used with the *pick* option.	156
latest	Restores the most recent backup version of a file whether it is active or inactive.	165
location	Specifies where Tivoli Storage Manager searches for the backup set during a query or restore operation.	166
noprompt	suppresses the confirmation prompt that is presented by the **delete group**, **delete archive**, **expire**, **restore image**, and **set event** commands.	174
optfile	Specifies the client options file you want to use when you start a Tivoli Storage Manager session.	182
pick	Creates a list of backup versions or archive copies that match the file specification you enter. From the list, you can select the versions to process. Include the *inactive* option to view both active and inactive objects.	187
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.	188

Table 25. Restore and retrieve processing options (continued)

Option	Description	Page
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.	189
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.	194
replace	Specifies whether to overwrite an existing file, or to prompt you for your selection when you restore or retrieve files.	200
showmembers	Displays all members of a group.	217
subdir	Specifies whether you want to include subdirectories of a named directory.	221
tapeprompt	Specifies whether you want Tivoli Storage Manager to wait for a tape required for a restore or retrieve to be mounted, or to prompt you for your choice.	223
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.	235
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.	235
type	Use the *type* option with the **query node** command to specify the type of node to query.	238

Scheduling options

You can use the following options to regulate central scheduling. Tivoli Storage Manager uses scheduling options only when the Scheduler is running.

Table 26. Scheduling options

Option	Description	Page
managedservices	Specifies whether the Storage Manager Client Acceptor daemon manages the Web client, the scheduler, or both.	167
maxcmdretries	Specifies the maximum number of times the client scheduler attempts to process a scheduled command that fails.	169
postschedulecmd	Specifies a command to process after running a schedule.	190
preschedulecmd	Specifies a command to process before running a schedule.	192
queryschedperiod	Specifies the number of hours the client scheduler waits between attempts to contact the server for scheduled work.	198

Table 26. Scheduling options (continued)

Option	Description	Page
retryperiod	Specifies the number of minutes the client scheduler waits between attempts to process a scheduled command that fails or between unsuccessful attempts to report results to the server.	204
schedcmddisabled	Specifies whether to disable the scheduling of generic commands specified by your Tivoli Storage Manager administrator.	206
schedlogmax	Specifies the maximum size of the scheduler log, in megabytes.	207
schedlogname	Specifies the path and file name where you want to store schedule log information.	208
schedlogretention	Specifies the number of days to keep log file entries in the schedule log, and whether to save pruned entries.	209
schedmode	Specifies which schedule mode to use, *polling* or *prompted*.	210
schedrestretrdisabled	Specifies whether to prevent the Tivoli Storage Manager Server administrator from executing restore or retrieve schedule operations.	212
sessioninitiation	Use the *sessioninitiation* option to control whether the server or client initiates sessions through a firewall. The default is that the client can initiate sessions.	215
srvprepostscheddisabled	Specifies whether to prevent the Tivoli Storage Manager Server administrator from executing pre-schedule and post-schedule commands when performing scheduled operations.	220
tcpclientaddress	Specifies a TCP/IP address if your client node has more than one address, and you want the server to contact an address other than the one that was used to make the first server contact. The server will use this address when it begins the server prompted scheduled operation. See *schedmode prompted* ("Schedmode" on page 210) for details.	227
tcpclientport	Specifies a TCP/IP port number for the server to contact the client when the server begins the server prompted scheduled operation. See *schedmode prompted* ("Schedmode" on page 210) for details.	228

Format and language options

You can use the following options to select different formats for date, time, numbers, and for different languages if you have the appropriate client language pack installed for that language.

Table 27. Format and language options

Option	Description	Page
dateformat	Specifies the format for displaying dates.	122
language	Specifies the language used for messages.	164

Table 27. Format and language options (continued)

Option	Description	Page
numberformat	Specifies the format for displaying numbers.	175
timeformat	Specifies the format for displaying time.	233

Command processing options

The following options apply when you use Tivoli Storage Manager commands.

Table 28. Command processing options

Option	Description	Page
editor	Specifies if the command-line interface editor and command retrieve capability is turned on or off.	134
quiet	Limits the number of messages that are displayed on your screen during processing. This option can be overidden by the server.	199
scrolllines	Specifies the number of lines of information that are displayed on your screen at one time. Use this option only when *scrollprompt* is set to *yes*.	213
scrollprompt	Specifies whether you want Tivoli Storage Manager to stop and wait after displaying the number of lines of information you specified with the *scrolllines* option, or scroll through and stop at the end of the information list.	214
verbose	Specifies that processing information should be displayed on your screen. The alternative is *quiet*. This option can be overridden by the server.	240

Authorization options

These options control access to a Tivoli Storage Manager server.

Table 29. Authorization options

Option	Description	Page
nwpwfile	Specifies whether to encrypt and save a NetWare user's ID and password to the TSM.PWD file.	178
nwuser	Specifies a user ID and password to connect to a NetWare server when you start a session.	179
password	Specifies a Tivoli Storage Manager password.	183
passwordaccess	Specifies whether you want to use a generated password or be prompted for a password each time you start the client.	184
passworddir	Specifies the directory in which you want to store the automatically generated password for your client node. The encryption key and password are encrypted and stored in the TSM.PWD file.	186
revokeremoteaccess	Restricts an administrator with client access privileges from accessing your workstation through the Web client.	205

Error processing options

These options specify the name of the error log file and how Tivoli Storage Manager treats the entries in the log file.

Table 30. Error processing options

Option	Description	Page
errorlogmax	Specifies the maximum size of the error log, in megabytes.	139
errorlogname	Specifies the fully qualified path and file name of the file where you want to store information about errors that occur during processing.	140
errorlogretention	Specifies how many days to maintain error log entries before pruning, and whether to save the pruned entries.	141
nwexitnlmprompt	Specifies how the client program responds while exiting a session.	181

Transaction processing options

These options control how Tivoli Storage Manager processes transactions between the client and server.

Table 31. Transaction processing options

Option	Description	Page
collocatebyfilespec	Specifies that you want the Tivoli Storage Manager client to use only one server session to send objects generated from one file specification. Setting the *collocatebyfilespec* option to *yes* eliminates interspersing of files from different file specifications, by limiting the client to one server session per file specification. Therefore, if you store the data to tape, files for each file specification are stored together on one tape (unless another tape is required for more capacity).	113
commrestartduration	Specifies the maximum number of minutes you want the client to try to reconnect to a Tivoli Storage Manager server after a communication error occurs.	116
commrestartinterval	Specifies the number of seconds you want the client to wait between attempts to reconnect to a Tivoli Storage Manager server after a communication error occurs.	117
diskbuffsize	Specifies the maximum disk I/O buffer size (in kilobytes) that the client can use when reading files.	130
processorutilization	Specifies the amount of CPU time assigned to the client program. Because this option can affect other applications on your client node, use it only when speed is a high priority.	197
resourceutilization	Use the *resourceutilization* option in your fileclient options file dsm.opt to regulate the level of resources the Tivoli Storage Manager server and client can use during processing.	202

Option	Description	Page
txnbytelimit	Specifies the number of kilobytes the client program buffers before it sends a transaction to the server.	237

Web client options

The following are options for the Tivoli Storage Manager Web Client.

Table 32. Web client options

Option	Description	Page
httpport	Specifies a TCP/IP port address for the Web client.	154
managedservices	Specifies whether the Storage Manager Client Acceptor daemon manages the Web client, the scheduler, or both.	167
revokeremoteaccess	Restricts administrator access on a client workstation through the Web client.	205
webports	Enables the use of the Web client outside a firewall by specifying the TCP/IP port number used by the Client Acceptor daemon and the Web Client Agent service for communications with the Web client.	245

Diagnostics options

Use the **query systeminfo** command to gather Tivoli Storage Manager system information and output this information to a file or the console. The **query systeminfo** command is intended primarily as a diagnostic aid. You can submit the resulting information to technical support personnel for problem diagnosis. See "Query Systeminfo" on page 298 for more information.

Table 33. Diagnostics options

Option	Description	Page
console	Use the *console* option with the **query systeminfo** command to output system information to the console.	121
filename	Use the *filename* option with the **query systeminfo** command to specify a file name in which to store the system information.	148

Using options with commands

You can override some of the options in your client options file (dsm.opt) by entering them with appropriate Tivoli Storage Manager commands.

Tivoli Storage Manager processes options in the following order (precedence):
1. Options defined on the server with server-enforced client options. The server overrides client values.
2. Options entered locally on the command line.
3. Options defined on the server for a schedule using the options parameters.

4. Options entered locally in the options file.
5. Options received from the server with client option sets not set as forced by the server. The server *does not* override client values if not forced.
6. Default option values.

Tivoli Storage Manager also includes a group of client command options that you can enter *only* on the command line with specific commands. For a complete list of command-line options, a description, and where to go in this book for more information, see Table 34 on page 99.

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="Project A" sys:usr/home/proj1/*

- For options that do not include parameters, enter a command, a dash (–) and the option name. For example,

      dsmc incremental -quiet

   Note: Use a leading dash (-) to indicate that the following text is the name of an option. If an object name begins with a dash, you must surround it in either single quotes (') or quotation marks ("). Most operating system command-line processors strip the quotes before submitting the command-line arguments to the Tivoli Storage Manager client application. In such cases, using escape characters or doubling the quotes allows the client to receive the quoted object name. In loop mode, surround such objects in either single quotes (') or quotation marks (").

- Enter either the option name, or an abbreviation for the option name. For example, to enter the *latest* option, enter either -lat or -latest. The capital letters in the syntax of each option indicate the minimum abbreviation for that option name. 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 option before or after a file specification:

      dsmc selective -subdir=yes sys:usr/home/proj1/*
      dsmc selective sys:usr/home/proj1/* -subdir=yes

- When entering several options on a command, separate them with a blank space.

- Enclose the value in quotes (" ") if the option value that you enter contains a blank space. For example:

      dsmc archive -description="Project A" "sys:usr/home/proj1/*"

- Most options that you enter on the command line override the value set in the preferences file. However, when you use the *domain* option with the **incremental** command, it adds to the domain specified in your client options file rather than overriding the current value.

- The maximum number of characters for a file name is 256. The maximum combined length of the file name and path name is 512 characters. The Unicode representation of a character can occupy several bytes, so the maximum number of characters that a file name might contain can vary.

Table 34 on page 99 lists client command options that you can enter only on the command line with specific commands.

Table 34. 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**	103
console	Use the *console* option with the **query systeminfo** command to output system information to the console.	**query systeminfo**	121
deletefiles	Deletes the local copy of files from your workstation after they are archived on the server.	**archive**	124
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**	125
detail	Displays management class, file space, backup, and archive information depending on the command with which it is used.	**delete filespace** **query archive** **query backup** **query filespace** **query mgmtclass**	126
dirsonly	Backs up, restores, archives, retrieves, or queries directories *only*.	**archive** **incremental** **query archive** **query backup** **restore** **restore backupset** **retrieve** **selective**	128
filelist	Specifies a list of files to be processed for the command. Tivoli Storage Manager opens the designated filelist and processes the files listed within according to the command.	**archive** **backup group** **delete archive** **delete backup** **expire** **incremental** **query archive** **query backup** **restore** **retrieve** **selective**	146
filename	Use the *filename* option with the **query systeminfo** command to specify a file name in which to store the system information.	**query systeminfo**	148
filesonly	Backs up, restores, retrieves, or queries files *only*.	**archive** **incremental** **query archive** **query backup** **restore** **restore backupset** **retrieve** **selective**	149

Table 34. Client command options (continued)

Command option	Description	Commands	Page
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.	**delete backup** **query archive** **query backup** **restore** **retrieve** **restore group**	150
fromnode	Permits one node to perform commands for another node. A user on another node must use the **set access** command to permit you to query, restore, or retrieve files for the other node.	**query archive** **query backup** **query filespace** **query group** **query mgmtclass** **restore** **restore group** **retrieve**	151
fromtime	Specifies a beginning time on the specified date. Use with the *fromdate* option. This option is ignored if the *fromdate* option is absent.	**query archive** **query backup** **restore** **restore group** **retrieve**	152
groupname	Specifies the fully qualified name for a group.	**backup group**	153
ifnewer	Replaces existing files with the latest backup version only if the backup version is newer than the existing version.	**restore** **restore backupset** **restore group** **retrieve**	155
inactive	Displays a list of active and inactive files when used with the *pick* option.	**delete group** **query backup** **query group** **restore** **restore group**	156
incrbydate	Requests an incremental backup by date.	**incremental**	162
latest	Restores the most recent backup version of a file whether it is active or inactive.	**restore** **restore group**	165
location	Specifies whether Tivoli Storage Manager searches for a backup set on the server or in local files during a query or restore operation.	**query backupset** **restore backupset**	166
mode	Use the *mode* option with the **backup group** command to specify whether you want to perform a full or differential group backup containing a list of files from one or more file space origins.	**backup group**	172
noprompt	suppresses the confirmation prompt that is presented by the **delete group**, **delete archive**, **expire**, **restore image**, and **set event** commands.	**delete archive** **delete backup** **delete group** **expire**	174
optfile	Specifies the client options file you want to use when you start a Tivoli Storage Manager session.		182
pick	Creates a list of backup versions or archive copies that match the file specification you enter. From the list, you can select the versions to process. Include the *inactive* option to view both active and inactive objects.	**delete archive** **delete backup** **delete group** **expire** **restore** **restore group** **retrieve**	187

Table 34. Client command options (continued)

Command option	Description	Commands	Page
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** **query group** **restore group**	188
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**	189
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** **restore group** **retrieve**	194
showmembers	Displays all members of a group.	**query group** **restore group**	217
todate	Use the *todate* option with the *totime* option to specify an ending date and time to which you want to search for backups or archives during a restore, retrieve, or query operation.	**query archive** **query backup** **restore** **retrieve** **restore group**	235
totime	Use the *totime* option with the *todate* option to specify an ending date and time to which you want to search for backups or archives during a restore, retrieve, or query operation.	**query archive** **query backup** **restore** **retrieve** **restore group**	236
type	Use the *type* option with the **query node** command to specify the type of node to query.	**query node**	238
v2archive	Use the *v2archive* option with the **archive** command to archive only files to the server. Tivoli Storage Manager will not process directories that exist in the path of the source file specification.	**archive**	239
virtualfsname	Specifies the name of the virtual file space for the group on which you want to perform the operation.	**backup group**	241
volinformation	The *volinformation* option backs up or archives root-level information. For the NetWare file server, *volinformation* handles volume restrictions and volume root-level trustee information.	**archive** **incremental** **selective** **restore** **restore group** **retrieve**	243

Initial command-line-only options

There is a subset of client options that are valid on the initial command line only. Many of these options establish the runtime environment, such as the *commmethod* and *optfile* options. Options in this category are not valid in interactive, macro, or scheduler modes. They generate an error and cause processing to stop.

Table 35. Options that are valid on the initial command line only

Options valid on the command line

commmethod	*schedlogname*
diskbuffsize	*schedlogretention*
editor	*schedmode*
errorlogname	*sessioninitiation*
errorlogretention	*tapeprompt*
language	*tcpbuffsize*
maxcmdretries	*tcpcadaddress*
nodename	*tcpclientaddress*
nwpwfile	*tcpclientport*
nwuser	*tcpport*
nwexitnlmprompt	*tcpserveraddress*
optfile	*tcpwindowsize*
password	*txnbytelimit*
postschedulecmd	*virtualnodename*
preschedulecmd	
processorutilization	
queryschedperiod	
resourceutilization	
retryperiod	

Client options reference

The following sections contain detailed information about each of the Tivoli Storage Manager processing options. Information for each option includes:

- A description of the option.
- A syntax diagram of the option. The option name contains uppercase and lowercase characters. The uppercase characters indicate the minimum abbreviation you can use for the option name. See "Reading syntax diagrams" on page 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**.

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Archmc

Use the *archmc* option with the **archive** command to specify the available
management class for your policy domain to which you want to bind your
archived files and directories. When you archive a file, you can override the
assigned management class using the *archmc* option on the **archive** command or
by using the Web client. Overriding the management class using the Web client is
equivalent to using the *archmc* option on the **archive** command.

Use the *archmc* option with the **archive** command to specify the available
management class for your policy domain to which you want to bind your
archived directories and files. If you do not use the *archmc* option, the server binds
archived directories to the default management class. If the default management
class has no archive copy group, the server binds archived directories to the
management class with the shortest retention period.

Note: The Tivoli Storage Manager client API does not support this option.

Syntax

```
►►──ARCHMc =─managementclass────────────────────────────────────────►◄
```

Parameters

managementclass
> Specifies an available management class in the active policy set of your policy
> domain. This management class overrides the default management class and
> any *include* statements for the files and directories you are archiving.

Examples

Command line:
> ```
> dsmc archive –archmc=ret2yrs t3\sys:plan/proj1/budget.jan
> ```

Auditlogging

Use the *auditlogging* option to generate an audit log which contains an entry for each file that is processed during an incremental, selective, archive, restore, or retrieve operation.

The audit log can be configured to capture either a basic level of information or a more inclusive (full) level of information.

The basic level of the audit logging feature captures the information that is in the schedule log and it records information that a file has been backed up, archived, updated, restored, retrieved, expired, deleted, skipped or failed during an incremental backup, selective backup, archive, restore or retrieve operation. In addition, the basic level of audit logging captures the input command for commands run through the Backup-Archive command line or scheduler clients.

The full level of audit logging records an action for each file that is processed by the Backup-Archive client. In addition to all of the events recorded by the basic level of audit logging, the full level of audit logging records information for a file that has been excluded or not sent during a progressive incremental backup operation because the file had not changed.

The following is an example of the messages that are issued when the audit log is configured to capture the basic level of information:

```
04/21/07 15:25:05 ANS1650I Command:
  sel SYS:/test/file.txt
04/21/07 15:25:05 ANS1651I Backed Up:
  SYS:/test/file.txt
04/21/07 15:25:05 ANS1652I Archived:
  SYS:/test/file.txt
04/21/07 15:25:05 ANS1653I Updated:
  SYS:/test/file.txt
04/21/07 15:25:05 ANS1654E Failed:
  SYS:/test/file.txt
04/21/07 15:25:05 ANS1655I Restored:
  SYS:/test/file.txt
04/21/07 15:25:05 ANS1656I Retrieved:
  SYS:/test/file.txt
04/21/07 15:25:05 ANS1657I Expired:
  SYS:/test/file.txt
04/21/07 15:25:05 ANS1658I Deleted:
  SYS:/test/file.txt
04/21/07 15:25:05 ANS1659I Skipped:
  SYS:/test/file.txt
```

The following messages can be issued when the audit log is configured to capture the full level of information (in addition to all messages issued for the basic level of audit logging):

```
04/21/07 15:25:05 ANS1660I Excluded:
  SYS:/test/file.txt
04/21/07 15:25:05 ANS1661I Unchanged:
  SYS:/test/file.txt
```

The audit log is not a substitute or a replacement for the standard error log (dsmerror.log) or for the schedule log (dsmsched.log). If an error occurs that prevents a file from being processed, a message indicating that an error has occurred will be written to the audit log, but the message will not indicate the nature of the error. For problem diagnostics the standard error log must still be used.

The audit log entries only contain a time stamp and object name. There is no information to distinguish between files and directories or any information about the size of an object.

By default, the name of the audit log is `dsmaudit.log` and it is contained in the same directory as the error log, `dsmerror.log`. The name and location of the audit log can be configured using the *auditlogname* option. There are no parameters to control the size of the audit log or to prune the audit log. The *auditlogname* option cannot be set as an option in a Tivoli Storage Manager Server client options set.

The **auditlogging** command is not supported with backup commands which interact with image-level objects such as **backup image** or **restore image**. The **auditlogging** command is supported with backup commands that interact with file-level objects such as **backup groups**, **backup was**, and **backup nds**.

If you have enabled audit logging for an operation and there is a failure trying to write to the audit log (for example, the disk on which the audit log resides is out of space), the audit logging will be disabled for the rest of the operation and the return code for the operation will be set to 12, regardless of the outcome of the operation.

Supported Clients

This option is valid for all clients.

Options File

Place this option in the dsm.opt file.

Syntax

```
►►──AUDITLOGGing──┬──off──┬──────────────────────────────────────►◄
                  ├─basic─┤
                  └─full──┘
```

Parameters

off   Specifies that the audit logging facility is not engaged. This is the default.

basic Specifies that the audit log captures a basic level of information.

full   Specifies that the audit log captures a more extensive level of information.

Examples

Run an incremental backup with audit logging enabled.

Command line:
    dsmc i -auditlogging=basic

Back up a list of files using the maximum level of auditing, which enables a separate application, such as a Perl script, to verify the results.

Auditlogname

The *auditlogname* option specifies the path and file name where you want to store audit log information. This option applies when audit logging is enabled. For more information about the audit logging facility refer to "Auditlogging" on page 104.

Supported Clients

This option is valid for all clients.

Options File

Place this option in the dsm.opt file.

Syntax

```
►►──AUDITLOGName─filespec─────────────────────────────────────────────►◄
```

Parameters

filespec

Specifies the path and file name where you want Tivoli Storage Manager to store audit log information.

If you specify a file name only, the file is stored in your current directory. The default is the installation directory with a file name of dsmaudit.log. The dsmaudit.log file *cannot* be a symbolic link.

Examples

Run an incremental backup with audit logging enabled.

Sample output

The following is a sample execution and output file:

```
> dsmc inc SYS:/* -auditlogging=full
  -auditlogname=/home/cliv3/audit.log
IBM Tivoli Storage Manager
Command Line Backup/Archive Client Interface
  Client Version 5, Release 5, Level 0.0
  Client date/time: 07/03/07   12:05:13
(c) Copyright by IBM Corporation and other(s)
    1990, 2007. All Rights Reserved.

Node Name: SYS:
Session established with server NWSERV: NetWare
  Server Version 5, Release 4, Level 0.0
  Server date/time: 07/03/07   12:05:18
  Last access: 07/03/07   12:01:57


Incremental backup of volume '/SYS:/*'
Directory-->            4,096 /SYS:/* [Sent]
Normal File-->         32,768 /SYS:
  /test/file1 [Sent]
Normal File-->         32,768 /SYS:
  /test/file2 [Sent]
Normal File-->         32,768 /SYS:
  /test/file3 [Sent]
Successful incremental backup of '/SYS:/test'


Total number of objects inspected:      11
```

```
Total number of objects backed up:         11
Total number of objects updated:            0
Total number of objects rebound:            0
Total number of objects deleted:            0
Total number of objects expired:            0
Total number of objects failed:             0
Total number of bytes transferred:     320.31 KB
Data transfer time:                      0.01 sec
Network data transfer rate:         17,141.84 KB/sec
Aggregate data transfer rate:          297.43 KB/sec
Objects compressed by:                      0%
Elapsed processing time:               00:00:01
```

The following are the audit log contents:

```
07/03/07    12:05:14 ANS1650I Command: inc SYS:/*
07/03/07    12:05:15 ANS1651I Backed Up: SYS:/test
07/03/07    12:05:15 ANS1651I Backed Up: SYS:
  /test/dir1
07/03/07    12:05:15 ANS1651I Backed Up: SYS:
  /test/dir2
07/03/07    12:05:15 ANS1651I Backed Up: SYS:
  /test/file1
07/03/07    12:05:15 ANS1651I Backed Up: SYS:
  /test/file2
07/03/07    12:05:15 ANS1651I Backed Up: SYS:
  /test/file3
07/03/07    12:05:15 ANS1651I Backed Up: SYS:
  /test/dir1/file1
07/03/07    12:05:15 ANS1651I Backed Up: SYS:
  /test/dir1/file2
07/03/07    12:05:15 ANS1651I Backed Up: SYS:
  /test/dir1/file3
07/03/07    12:05:15 ANS1651I Backed Up: SYS:
  /test/dir2/file1
07/03/07    12:05:15 ANS1651I Backed Up: SYS:
  /test/dir2/file2
07/03/07    12:05:15 ANS1651I Backed Up: SYS:
  /test/dir2/file3
```

Autofsrename

The *autofsrename* option renames an existing file space that is not Unicode-enabled on the Tivoli Storage Manager server so that a Unicode-enabled file space with the original name can be created for the current operation.

When you specify `autofsrename yes` in your client options file, and the server value of *autofsrename* is set to `client`, Tivoli Storage Manager generates a unique name by appending _OLD to the file space name you specify in the current operation. For example, Tivoli Storage Manager renames the file space NW65\DATA: to NW65\DATA_OLD:. If the new file space name already exists on the server, Tivoli Storage Manager renames the new file space NW65\DATA_OLDx:, where x is a unique number.

Tivoli Storage Manager creates new Unicode-enabled file spaces that contain only the data specified in the current operation. For example, to archive files from NW65\DATA:, issue the following command:

    arc NW65\DATA:\logs*.log

Before the archive takes place, the server renames the file space to NW65\DATA_OLD:. The archive places the data specified in the current operation into the Unicode-enabled file space named NW65\DATA:. The new Unicode-enabled file space now contains only the \logs directory and the *.log files specified in the operation. Tivoli Storage Manager stores all subsequent full and partial incremental, selective backup, and archive data in the new Unicode-enabled file spaces.

Renamed file spaces remain on the server as stabilized file spaces. *These file spaces contain all the original data, which you can restore as long as they remain on the server.*

Note: When an existing file space is renamed during Unicode conversion, any access rules defined for the file space remain applicable to the original file space. New access rules must be defined to apply to the new Unicode file space.

After installation, perform a full incremental backup and rename all existing file spaces that are not Unicode-enabled and back up the files and directories within them under the new Unicode-enabled file spaces. This operation requires increased processing time and storage on the server.

File spaces that are not Unicode-enabled can be viewed in the character set of the locale from which Tivoli Storage Manager backed up the files. A workstation running in a different locale might be unable to view or restore from these file spaces. Unicode-enabled file spaces that are backed up in one locale are visible in all other locales, provided that the workstation has the proper fonts installed. For more information on migrating to Unicode-enabled file spaces, see "Migrating to the Unicode-enabled client" on page 2.

To restore or retrieve from a file space that is not Unicode-enabled, specify the source on the server and the destination on the client. See "Restoring from file spaces that are not Unicode-enabled" on page 304 for information on how to restore from file spaces that are not Unicode-enabled. See "Retrieving from file spaces that are not Unicode-enabled" on page 313 for information on how to retrieve from file spaces that are not Unicode-enabled.

Supported Clients

This option is valid for all NetWare clients. The server can define the *autofsrename* option and override the *autofsrename* setting on the client. The Tivoli Storage Manager client API does not support this option.

Options File

Place this option in the client options file (dsm.opt) file.

Syntax

```
►►──AUTOFsrename──┬─Prompt─┬──────────────────────────────────►◄
                  ├─Yes────┤
                  └─No─────┘
```

Parameters

Yes   Specifies that Tivoli Storage Manager automatically renames all file spaces that are not Unicode-enabled in the current backup or archive operation.

No   Specifies that Tivoli Storage Manager does not rename file spaces that are not Unicode-enabled in the current backup or archive operation.

Prompt
    Specifies that Tivoli Storage Manager prompts you whether to rename the file spaces that are not Unicode-enabled in the current operation. This is the default.

Considerations:

* This option applies *only* when the server sets the *autofsrename* option to `client`.
* When the client scheduler is running, the default behavior is to not prompt you. The next interactive session prompts you to rename the file space.
* The Web GUI will not prompt you if the *autofsrename* option is set to `prompt`. The option will be ignored and the file space will remain non-Unicode.
* The client prompts you *only* one time per file space. If you specify `no` at the prompt, the client cannot rename the file spaces later. However, the Tivoli Storage Manager administrator can rename the file spaces on the server.
* When backing up files to a file space that is not Unicode-enabled, the Unicode-enabled client might skip the files and directories with names containing characters from a code page that is different from the current locale.

Examples

Options file:
    autofsrename yes

Backupsetname

The *backupsetname* option specifies either the name of the backup set, or the name of the file or tape device containing the backup set. This option is used in conjunction with the *location* option.

You can use *backupsetname* with the following commands:
- **query backup**
- **query backupset**
- **query filespace**
- **query image**
- **query systemobject**
- **query systemstate**
- **restore**
- **restore backupset**
- **restore image**
- **restore systemobject**
- **restore systemstate**

Supported Clients

This option is valid for all clients. The Tivoli Storage Manager client API does not support this option.

Options File

None. You can specify this option only on the command line.

Syntax

```
►►──BACKUPSetname──┬─backupsetname─┬───────────────────────────────────────►◄
                   ├─bset filename─┤
                   └─tape device───┘
```

Parameters

backupsetname
>   Specifies the name of the backup set on the server. The *location* option should be set to *server*.

bset filename
>   Specifies the name of the file containing the beginning of the backup set. The *location* option should be set to *file*.

tape device
>   Specifies the name of the tape device where the tape containing the start of the backup set is located. The *location* option should be set to *tape*.

Examples

Command line:
>   dsmc restore ACCOUNT:\profit.txt -backupsetname=YEAR_END_ACCOUNTING.1234

Changingretries

The *changingretries* option specifies how many additional times you want the client to attempt to back up or archive a file that is in use. Use this option with the **archive**, **incremental**, and **selective** commands.

This option is applied only when *serialization*, an attribute in a management class copy group, is *shared static* or *shared dynamic*.

With *shared static* serialization, if a file is open during an operation, the operation repeats the number of times that you specify. If the file is open during each attempt, the operation does not complete.

With *shared dynamic* serialization, if a file is open during an operation, the operation repeats the number of times that you specify. The backup or archive occurs during the last attempt whether the file is open or not.

If the open file has the share flag set to *deny_read*, the client program cannot back it up.

Notes:
1. The Tivoli Storage Manager client API does not support this option.
2. The server can also define this option.

Options File

Place this option in the client options file (dsm.opt).

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

Clusternode

The *clusternode* option specifies whether Tivoli Storage Manager manages cluster drives in a Novell Cluster Services (NCS) environment. For information on how to configure a Tivoli Storage Manager server to manage a cluster configured client, see Appendix C, "Installing and configuring the backup-archive client in a Novell Cluster Services (NCS) environment," on page 357.

Note: You must set the *clusternode* option to *yes* for all Tivoli Storage Manager-managed cluster operations. Inconsistent use of the *clusternode* option for a given Tivoli Storage Manager cluster node name can cause Tivoli Storage Manager to invalidate the cluster node name encrypted password, and prompt the user to reenter the password during the next Tivoli Storage Manager program invocation.

Use the *optfile* option to properly call the correct (cluster) dsm.opt for all Tivoli Storage Manager programs to ensure proper Tivoli Storage Manager functionality for cluster related operations. See "Optfile" on page 182 for more information.

Options File

Place this option in the client options file (dsm.opt).

Syntax

```
►►──CLUSTERnode──┬──No──┬──────────────────────────────────────►◄
                 └──Yes─┘
```

Parameters

Yes   Specifies that you want Tivoli Storage Manager to manage cluster drives in a NCS environment.

No   Specifies that you want to back up local disks. This is the default.

Examples

Options file:
      cluster no

Command line:
      -cluster=yes

This option is valid only on the initial command line. It is not valid in interactive mode.

Collocatebyfilespec

Use the *collocatebyfilespec* option to specify whether the Tivoli Storage Manager client uses only one server session to send objects generated from one file specification.

Setting the *collocatebyfilespec* option to *yes* attempts to eliminate interspersing of files from different file specifications, by limiting the client to one server session per file specification. Therefore, if you store the data to tape, files for each file specification are stored together on one tape (unless another tape is required for more capacity).

Considerations:

- Use the *collocatebyfilespec* option only if the storage pool is going directly to tape. If you use this option going to a disk storage pool, you could affect some load balancing, and therefore, performance.

Notes:
1. The Tivoli Storage Manager client API does not support this option.
2. The server can also define this option.

Options File

Place this option in the client options file (dsm.opt).

Syntax

```
              ┌─No──┐
►►──COLlocatebyfilespec─┤     ├───────────────────────────────►◄
              └─Yes─┘
```

Parameters

Yes Specifies that you want the Tivoli Storage Manager client to use only one server session to send objects generated from one file specification. Therefore, if you store the data to tape, files for each file specification are stored together on one tape, unless another tape is required for more capacity. Restore performance can increase as a result.

No Specifies that the Tivoli Storage Manager client can (depending on the execution dynamics and on the setting of the *resourceutilization* option of 3 or higher), use more than one server session to send the files from one file specification. This is the default.

Backup performance might increase as a result. If the files are backed up to tape, files will be stored on multiple tapes. Generally, the files specified in the file specification will still be contiguous.

Examples

Options file:
```
        collocatebyfilespec yes
```

Command line:
```
        -collocatebyfilespec=yes
```

This option is valid only on the initial command line. It is not valid in interactive mode.

Commmethod

The *commmethod* option specifies the communication method you use to provide connectivity for client-server communication.

Options File

Place this option in the client options file (dsm.opt).

Syntax

```
►►──COMMMethod─┬─TCPip─┬─────────────────────────────────────────────►◄
               └───────┘
```

Parameters

TCPip
: The Transmission Control Protocol/Internet Protocol (TCP/IP) communication method. This is the default.

Examples

Options file:
: commmethod tcpip

  Use only TCP/IP Version 4

Command line:
: -commm=tcpip

This option is valid only on the initial command line. It is not valid in interactive mode.

Commrestartduration

The *commrestartduration* option specifies the maximum number of minutes you want the client to try to reconnect to a Tivoli Storage Manager server after a communication error occurs.

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.

Options File

Place this option in the client options file (dsm.opt).

Syntax

►►──COMMRESTARTDuration─ *minutes*──►◄

Parameters

minutes

The maximum number of minutes you want the client to attempt to reconnect with a server after a communication failure occurs. The range of values is zero through 9999; the default is 60.

Examples

Options file:
    commrestartduration 90

Command line:
    Does not apply.

Commrestartinterval

The *commrestartinterval* option specifies the number of seconds you want the client to wait between attempts to reconnect to a Tivoli Storage Manager server after a communication error occurs.

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.

Options File

Place this option in the client options file (dsm.opt).

Syntax

```
►►──COMMRESTARTInterval─ seconds─────────────────────────────────────────►◄
```

Parameters

seconds
> The number of seconds you want the client to wait between attempts to reconnect with a server after a communication failure occurs. The range of values is zero through 65535; the default is 15.

Examples

Options file:
> commrestartinterval 30

Command line:
> Does not apply.

Compressalways

The *compressalways* option specifies whether to continue compressing an object if it grows during compression. Use this option with the *compression* option.

Use the *compressalways* option with the **archive**, **incremental**, and **selective** commands.

The server can also define this option.

Options File

Place this option in the client options file (dsm.opt).

Syntax

```
              ┌─Yes─┐
►►──COMPRESSAlways──┼─────┼──────────────────────────────────────────►◄
              └─No──┘
```

Parameters

Yes File compression continues even if the file grows as a result of compression. This is the default.

No Backup-archive client objects are resent uncompressed if they grow during compression. API behavior depends on the application. Application backups might fail.

Examples

Options file:
```
compressalways yes
```

Command line:
```
-compressa=no
```

This option is valid only on the initial command line. It is not valid in interactive mode.

Compression

The *compression* option compresses files *before* you send them to the server. Compressing your files reduces data storage for backup versions and archive copies of your files. It can, however, affect Tivoli Storage Manager throughput. A fast processor on a slow network connection benefits from compression, but a slow processor on a fast network connection does not.

Note: The client will not compress files that the NetWare operating system already compresses. If you set the *compression* option to *yes* and Tivoli Storage Manager finds a file that the NetWare operating system already compresses, the file is sent to the server without further compression. The file is sent as a NetWare compressed file.

Use the *compression* option with the **archive**, **incremental**, and **selective** commands.

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 options file (dsm.opt) to exclude specific files or groups of files from compression processing. See "Exclude options" on page 143 for more information.
- Use the *include.compression* option in your client options file (dsm.opt) to include files within a broad group of excluded files for compression processing. See "Include options" on page 159 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.

The server can also define this option.

Options File

Place this option in the client options file (dsm.opt).

Syntax

```
          ┌─No──┐
►►──COMPRESSIon─┼─────┼──────────────────────────────────────►◄
               └─Yes─┘
```

Parameters

No   Files are not compressed before they are sent to the server. This is the default.

Yes   Files are compressed before they are sent to the server.

Examples

Options file:
```
compression yes
```

Command line:
    -compressi=no

This option is valid only on the initial command line. It is not valid in interactive mode.

Console

Use the *console* option with the **query systeminfo** command to output information gathered from one or more of the following items to the console:

- DSMOPTFILE - The contents of the dsm.opt file.
- ERRORLOG - The Tivoli Storage Manager error log file.
- FILE - Attributes for the file name that you specify.
- INCLEXCL - Compiles a list of include-exclude in the order in which they are processed during backup and archive operations.
- OPTIONS - Compiled options.
- OSINFO - Name and version of the client operating system
- POLICY - Policy set dump.
- SCHEDLOG - The contents of the Tivoli Storage Manager schedule log (usually dsmsched.log).

Note: The **query systeminfo** command is intended primarily as an aid for IBM support to assist in diagnosing problems, although users who are familiar with the concepts addressed by this information might also find it useful. If you use the *console* option, no special formatting of the output is performed to accommodate screen height or width. Therefore, the console output might be difficult to read due to length and line-wrapping. In this case, it is recommended that you use the *filename* option with the **query systeminfo** command to allow the output to be written to a file that can subsequently be submitted to IBM support. See "Filename" on page 148 for more information.

Syntax

```
►►──CONsole──────────────────────────────────────────────────►◄
```

Parameters

There are no parameters for this option.

Examples

Command line:
```
query systeminfo dsmoptfile errorlog -console
```

Dateformat

The *dateformat* option specifies the format you want to use to display dates.

Use this option if you want to change the default date format for the language of the message repository you are using.

Notes:

1. The *dateformat* option does not affect the Web client. The Web client uses the date format for the locale that the browser is running in. If the browser is not running in a locale that Tivoli Storage Manager supports, the Web client uses the date format for US English.

2. When you change the date format and use the *schedlogretention* option to prune the schedule log, Tivoli Storage Manager removes all entries in the schedule log with a different date format when pruning the log. When you change the date format and use the *errorlogretention* option to prune the error log, Tivoli Storage Manager removes all entries in the error log with a different date when pruning the log. When changing the date format, copy the schedule log and error log if you want to preserve log entries that contain a different date format.

You can use the *dateformat* option with the following commands:
- **delete archive**
- **delete backup**
- **expire**
- **query archive**
- **query backup**
- **query filespace**
- **restore**
- **retrieve**
- **set event**

Options File

Place this option in the client 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:
> **1**   MM/DD/YYYY
> - US English
> - Chinese (Traditional)
> - Korean
> **2**   DD-MM-YYYY
> - Brazilian Portuguese
> - Italian
> **3**   YYYY-MM-DD
> - Japanese
> - Chinese (Simplified)

- Polish
4 DD.MM.YYYY
- German
- French
- Spanish
- Czech
- Russian
5 YYYY.MM.DD
- Hungarian

Examples

Options file:
    dateformat 3

Command line:
    -date=3

This option is valid on the initial command line and in interactive mode. If you use this option in interactive mode, it affects only the command with which it is specified. When that command completes, the value reverts to the value at the beginning of the interactive session. This will be the value from the dsm.opt file unless overridden by the initial command line or by an option forced by the server.

Deletefiles

Use the *deletefiles* option with the **archive** command to delete files from your workstation after you archive them.

Note: The Tivoli Storage Manager client API does not support this option.

Syntax

```
►►──DELetefiles─────────────────────────────────────────►◄
```

Parameters

There are no parameters for this option.

Examples

Command line:
```
dsmc archive small:/testdir/* -deletefiles
```

Description

The *description* option assigns or specifies a description for files when performing archive, delete archive, retrieve, query archive, or query backupset.

For example, if you want to archive a file named budget.jan and assign to it the description **2002 Budget for Proj 1**, you would enter:

```
dsmc archive –des="2003 Budget for Proj 1" t3\sys:plan/
proj1/budget.jan
```

Notes:
1. The maximum length of a description is 254 characters.
2. Enclose the value in quotes (" ") if the option value that you enter contains a blank space.

Use the *description* option with the following commands:
- **archive**
- **delete archive**
- **query archive**
- **query backupset**
- **retrieve**

Note: The Tivoli Storage Manager client API does not support this option.

Syntax

```
►►——DEScription =— description——————————————————————————————►◄
```

Parameters

description

Assigns a description to the file you are archiving. If you do not specify a description with the **archive** command, the default is `Archive Date:x`, where x is the current system date. Note that the date is always 10 characters long. If your date format uses a two digit year, there will be two blank spaces at the end of the date. For example, a default description using a four-digit year might be `"Archive Date: 2002/05/03"`, and the same default with a two-digit year might be `"Archive Date: 02/05/03 "` (note the two spaces at the end). When retrieving files using the two-digit year description, you can enter the *-description* option string in either of the following ways:

```
-description="ArchiveDate: 02/05/03  "
 or
-description="ArchiveDate: 02/05/03*"
```

If you use the **archive** command to archive more than one file, the description you enter applies to each file. For example, to archive a group of files and assign the same description, *Project X*, to each file, you would enter:

```
dsmc archive –description="Project x"
t3\sys:allproj/*.x
```

You can then use the description to retrieve all of the files.

Examples

Command line:
```
dsmc archive –des="2003 Budget for Proj 1"
```

Detail

Use the *detail* option to display management class, file space, backup, and archive information depending on the command with which it is used.

Use the *detail* option with the **query mgmtclass** command to display detailed information about each management class in your active policy set. If you do not use the *detail* option, only the management class name and a brief description are displayed on the screen. If you specify the *detail* option, information about attributes in each copy group contained in each management class is displayed on the screen. A management class can contain a backup copy group, an archive copy group, both, or neither.

A Unicode-enabled file space might not display correctly if the server cannot display the Unicode name. In this case, use the file space identifier (fsID) of the file space to identify these file spaces on the server. Use the *detail* option with the **delete filespace** and **query filespace** commands to determine the fsID of a file space. The fsID also appears in the file information dialog in the Web client GUI.

Use the *detail* option with the **query backup** and **query archive** commands to display the last modification date and the creation date of the file you specify.
- **delete filespace**
- **query archive**
- **query backup**
- **query filespace**
- **query mgmtclass**

Note: The Tivoli Storage Manager client API does not support this option.

Syntax

```
►►──DETail──────────────────────────────────────────────────────►◄
```

Parameters

There are no parameters for this option.

Examples

Command line:
```
dsmc query mgmtclass -detail
dsmc query filespace -detail
```

Dirmc

The *dirmc* option specifies the management class you want to use for directories. If you do not specify this option to associate a management class with directories, the client program uses the management class in the active policy set of your policy domain with the longest retention period. It is recommended that you select a management class for individual directories that retains directories at least as long as it retains the files associated with them.

Note: If you want to back up specific files to a management class see "Assigning a management class to files" on page 81 for more information.

If you specify a management class with this option, all directories specified in a backup operation are bound to that management class.

The *dirmc* option specifies the management class of directories you back up and does not effect archived directories. Use the *archmc* option with the **archive** command to specify the available management class for your policy domain to which you want to bind your archived directories and files. If you do not use the *archmc* option, the server binds archived directories to the default management class. If the default management class has no archive copy group, the server binds archived directories to the management class with the shortest retention period.

The server can also define this option.

Options File

Place this option in the client options file (dsm.opt).

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**

Note: The Tivoli Storage Manager client API does not support this option.

Syntax

►►──DIrsonly──►◄

Parameters

There are no parameters for this option.

Examples

Command line:
```
dsmc query backup -dirsonly sys:*
```

Disablenqr

The *disablenqr* option specifies whether the Tivoli Storage Manager
Backup-Archive Client can use the "no query restore" method for restoring files
and directories from the server.

If you set the *disablenqr* option to *no* (the default), the client can use the "no query
restore" process. Refer to "Standard query restore, no query restore, and restartable
restore" on page 51 for more information about the "no query restore" process.

If you set the *disablenqr* option to *yes*, the client can use only the standard restore
process (also known as "classic restore"). Refer to "Standard restore process" on
page 51 for more information about the standard restore process.

Note: There is no option or value to specify that the client can use only "no query
restore" method.

Supported Clients

This option is valid for all clients. This option is also valid with the Web client and
with the command-line interface. The Tivoli Storage Manager client API does not
support this option.

Options File

Place this option in the dsm.opt file.

Syntax

```
              ┌─No──┐
►►──DISABLENQR─┼─────┼──────────────────────────────────────────────►◄
              └─Yes─┘
```

Parameters

No   Specifies that Tivoli Storage Manager can use the "no query restore" method.
        This is the default.

Yes   Specifies that the client uses only the "standard restore" method. The "no
        query restore" method is not allowed.

Examples

Options file:
```
        disablenqr yes
```

Command line
```
        -disablenqr=yes
```

Diskbuffsize

The *diskbuffsize* option specifies the maximum disk I/O buffer size (in kilobytes) that the client can use when reading files.

Note: The *diskbuffsize* option replaces the *largecommbuffers* option.

Optimal backup, archive migration client performance can usually be achieved if the value for this option is equal to or smaller than the amount of file read ahead provided by the client file system. A larger buffer will require more memory and might not improve performance.

Recommendation: Use the default setting, unless otherwise directed by IBM support personnel.

Options File

Place this option in the client options file (dsm.opt).

Syntax

```
►►──DISKBuffsize─ size───────────────────────────────────────────────►◄
```

Parameters

size   Specifies the maximum disk I/O buffer size (in kilobytes) that the client will use when reading files. The range of values is 16 through 1023; the default is 32.

Examples

Options file:
```
diskbuffsize 64
```

Diskcachelocation

The *diskcachelocation* option specifies the location where the disk cache database will be created if the option *memoryefficientbackup=diskcachemethod* is set during an incremental backup. You can specify the *diskcachelocation* option in your dsm.opt file or with the *include.fs* option. See "Include options" on page 159 for more information. If the *diskcachelocation* option appears in the option file, its value will be used for all file systems not represented by an *include.fs* option containing the *diskcachelocation* option.

The disk cache is a temporary file which is deleted after the **incremental** command is run. Use this option to select one of the following:

1. A location that has more free disk space if, when you are using *memoryefficientbackup=diskcachemethod*, you get the message that the disk cache file cannot be created because you do not have enough disk space.
2. A location on a different physical volume to reduce contention for the disk access mechanism, and therefore improve performance.

Attention: For performance reasons, do not use a remote drive for *diskcachelocation*.

The disk cache file created by subsequent disk cache incremental backups should require considerably less disk space. The actual amount of disk space required for the disk cache file created by subsequent disk cache incremental backups depends on the number of files and directories included in the backup and on the length of the longest file or directory name which is backed up. The disk cache file created by the initial disk cache incremental backup can require up to gigabytes of disk space for each million files or directories being backed up.

Supported Clients

This option is valid for all clients. The server can also define this option.

Options File

Place this option in the client options file (dsm.opt).

Syntax

```
►►──DISKCACHELocation─ path───────────────────────────────────────►◄
```

Parameters

path   Specifies the location where the disk cache database will be created if *memoryefficientbackup* is set to *diskcachemethod*. The default location is to create the disk cache file in the root of the file space being processed.

Examples

Options file:
```
diskcachelocation sys:\temp
```

Command line:
```
Does not apply.
```

Domain

The *domain* option specifies the volumes that you want to include for incremental backup in your client domain.

Notes:
1. The Tivoli Storage Manager client API does not support this option.
2. The server can also define this option.

Use the *domain* option in your client options file (dsm.opt) to define your default client domain. The server can also define this option. Tivoli Storage Manager uses your default client domain in the following situations to determine which volumes to process during an incremental backup:

- When you run an incremental backup using the **incremental** command and you do not specify which volumes to process.
- When your administrator defines a schedule to run an incremental backup for you, but does not specify which volumes to process.
- When you select the **Backup Domain** action from the Tivoli Storage Manager Web GUI .

If you do not use the *domain* option to specify volumes in your client options file, Tivoli Storage Manager uses the *all-local* parameter as the default.

When you use the *domain* option with the **incremental** command, Tivoli Storage Manager adds volumes that you specify to the volumes defined in your client options file. For example, if you enter the following in your client options file:

```
domain sys: data: NDS:
```

and the following on the command line:

```
dsmc incremental -domain=usr:
```

Tivoli Storage Manager performs an incremental backup of the sys:, data:, NDS, and usr: volumes.

If you use both a file specification and the *domain* option with the **incremental** command, Tivoli Storage Manager ignores the *domain* option and processes only those volumes that you specify in the file specification. For example, if you enter:

```
dsmc incremental sys: data: -domain=usr:
```

Tivoli Storage Manager performs an incremental backup for the sys: data: volumes only.

You can also exclude volumes, the NDS, or server specific info by specifying the dash (-) operator before the volume, the NDS, or server specific info. For example, in the following option Tivoli Storage Manager will process all local volumes except for the SYS: volume:

```
domain "ALL-LOCAL -SYS:"
```

Note: You cannot use the (-) operator in front of a domain keyword such as ALL-LOCAL.

Options File

Place this option in the client options file (dsm.opt).

Syntax

```
          ┌─all-local─┐
          ▼           │
►►─DOMain─┼───────────┼──────────────────────────────►◄
          ├─domain────┤
          ├──-domain──┤
          └─NDS───────┘
```

Parameters

all-local
Backs up all local volumes. This is the default.

The NDS is included in the all-local domain if the local NetWare server has a master NDS replica. If you want to exclude the NDS from all-local domain, subtract the NDS from the all-local domain as follows:

```
domain ALL-LOCAL -NDS
```

To include the NDS, add NDS to the domain entry if the local NetWare server does not contain a master NDS replica. You can access information about the NDS using the Novell ConsoleOne Utility or NetWare Remote Manager.

domain
Defines the volumes to include in your default client domain.

When you use *domain* with the **incremental** command, it processes these volumes in addition to those you specify in your default client domain.

-domain
Defines the volumes to exclude in your default client domain.

NDS
Specifies the NDS. The NDS is included in the all-local domain if the local NetWare server has a master NDS replica. To include the NDS, add NDS to the domain entry.

Examples

Options file:
```
domain sys: serverb\nds
domain ALL-LOCAL -SYS:
domain ALL-LOCAL -SMITH\SYS:
```

Command line:
```
-domain="servera\sys: serverb/sys:"
-domain="ALL-LOCAL -SYS:"
```

Editor

The *editor* option turns the command-line interface (CLI) editor and retrieve capability on or off.

Because certain terminal settings result in non-standard input, the editor might not work as defined in this document. In this case, you can disable the editor by setting the *editor* option to *no* in your client options file (dsm.opt).

Options File

Place this option in the client options file (dsm.opt).

Syntax

```
            ┌─No──┐
►►──EDitor──┼─────┼──────────────────────────────────────►◄
            └─Yes─┘
```

Parameters

Yes   Turns on the CLI editor and command retrieve capability.

No   Turns off the CLI editor and command retrieve capability. This is the default.

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.

Enablearchiveretentionprotection

The *enablearchiveretentionprotection* option allows the client to connect to a Tivoli Storage Manager data retention server to ensure that archive objects will not be deleted from the server until policy-based retention requirements for that object have been satisfied. This option is ignored if the client connects to a server that is not retention protection enabled. If the option is 'no' (the default) and an attempt is made to connect to a data retention server, the connection will be refused.

The data retention server is specially configured for that task, so normal backup or restore processing is rejected by the server. When the client is connected to a data retention server, the following commands will not be available. If you attempt to use these commands, a message will be displayed indicating that they are not valid with this server.

- incremental
- backup (all subcommands)
- selective
- restore (all subcommands except **restore backupset** *-location=file* or *-location=tape*)

  Note: **restore backupset** *-location=file* or *-location=tape* do not connect to any server (except the virtual one) and thus will not be blocked under any circumstances.

- restart restore
- delete backup
- delete group
- expire
- All queries *except:*
  - query access
  - query archive
  - query filespace
  - query inclexcl
  - query managementclass
  - query node
  - query options
  - query schedule
  - query session
  - query systeminfo
  - query tracestatus
  - query TSA

Supported Clients

This option is valid for all NetWare clients.

Options File

This option is valid only in client options file (dsm.opt) and is not valid in a client option set from the server. It is not valid on any command line.

Syntax

```
►►──ENABLEARCHIVERETENTIONProtection──┬─No──┬──────────────────►◄
                                      └─Yes─┘
```
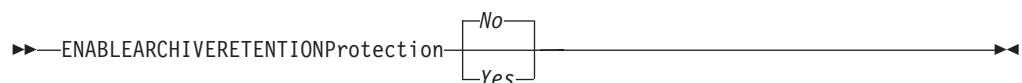
Parameters

No   The data retention server connection is refused. This is the default.

Yes   The client connects to a data retention server.

Encryptkey

The Tivoli Storage Manager client supports the option to encrypt files being backed up or archived to the Tivoli Storage Manager server. This option is enabled with the *include.encrypt* option. All files matching the pattern on the *include.encrypt* specification will be encrypted before the data is sent to the server. There are three options for managing the key used to encrypt the files (prompt, save, and generate). All three options can be used with either the Backup-Archive client or the Tivoli Storage Manager API.

Notes:

1. The Tivoli Storage Manager API has an alternate way of specifying *encryptkey=generate*; the previous *enableclientencryptkey=yes* option can also be specified to request generate encryption processing.

2. The *enableclientencryptkey=yes* API option is still supported, so it is possible when using the API to specify two conflicting options. For example, *enableclientencryptkey=yes* and *encryptkey=prompt* or *encryptkey=save*.

3. When conflicting values are specified, the Tivoli Storage Manager API will return an error message.

Attention: When using the prompt option, your encryption key is not saved in the Windows Registry or the Tivoli Storage Manager password file on UNIX®. If you forget the key, your data will be unrecoverable.

Supported Clients

This option is valid for all clients.

Options File

Place this option in the client options file (dsm.opt).

Syntax

```
           ┌─save─────┐
►►──ENCRYPTKey──┼──────────┼─────────────────────────────►◄
           ├─prompt───┤
           └─generate─┘
```

Parameters

save

The encryption key password is saved in the Tivoli Storage Manager client's password file. A prompt is issued for an initial encryption key password, and after the initial prompt, the saved encryption key password in the password file is used for the backups and archives of files matching the *include.encrypt* specification. This key can be up to 63 bytes in length. The key is retrieved from the password file on restore and retrieve operations.

When the *save* option is specified for an API application, the initial key password must be provided by the application using the API in the *dsmInitEx* function call. The API itself does not issue a prompt to the user but relies on the application to prompt the user as necessary.

This is the default.

Restrictions:

- This option can only be used when *passwordaccess* *generate* is also specified.
- The root user or a Tivoli Storage Manager authorized user must specify the initial encryption key password.
- The default for *encryptkey* is *save*, and the default for *passwordaccess* is *prompt*. However, if you specify *encryptkey=save*, you must also specify *passwordaccess* *generate*, when you specify include encrypt.

prompt

The management of the encryption key password is provided by the user. The user is prompted for the encryption key password when the Tivoli Storage Manager client begins a backup or archive. A prompt for the same key is issued when restoring or retrieving the encrypted file. This key can be up to 63 bytes in length.

When the *prompt* option is specified for an API application, the key password must be provided by the application using the API in the *dsmInitEx* function call. The API itself does not issue a prompt to the user but relies on the application to prompt the user as necessary.

Restriction: This option can only be used by the root user or a Tivoli Storage Manager authorized user.

generate

An encryption key password is dynamically generated when the Tivoli Storage Manager client begins a backup or archive. This generated key password is used for the backups of files matching the *include.encrypt* specification. The generated key password, in an encrypted form, is kept on the Tivoli Storage Manager server. The key password is returned to the Tivoli Storage Manager client to enable the file to be decrypted on restore and retrieve operations.

Examples

Options file:
```
encryptkey prompt
```

Command line:
```
Does not apply.
```

Errorlogmax

The *errorlogmax* option specifies the maximum size of the error log, in megabytes.

If you change from *errorlogmax* to *errorlogretention*, all existing log entries are retained and the log is pruned using the new *errorlogretention* criteria.

If you change from *errorlogretention* to *errorlogmax*, all records in the existing log are copied to the pruned log dsmerlog.pru, the existing log is emptied, and logging begins under the new log wrapping criteria.

If you change the value of the *errorlogmax* option, the existing log is extended or shortened to accommodate the new size. If the value is reduced, the oldest entries are deleted to reduce the file to the new size.

Restriction: You cannot specify a non-zero *errorlogmax* value *and* enable *errorlogretention*.

Options File

Place this option in the client options file (dsm.opt).

Syntax

```
►►──ERRORLOGMAX─ size──────────────────────────────────────────────►◄
```

Parameters

size
>   Specifies the maximum size, in megabytes, for the log file. The range of values
>   is 0 to 2047; the default is 0, which disables log file wrapping and allows the
>   log file to grow indefinitely.

Examples

Options file:
>   errorlogmax 2000

Command line:
>   -errorlogmax=2000

This option is valid only on the initial command line. It is not valid in interactive mode.

Errorlogname

This option specifies the fully qualified path and file name of the file where error messages are written. The dsmwebcl.log is created in the same directory as the error log file you specify with the *errorlogname* option.

Options File

Place this option in the client options file (dsm.opt).

Syntax

```
►►──ERRORLOGName── filespec─────────────────────────────────────────────◄
```

Parameters

filespec

The fully qualified path and file name in which to store error log information. If any part of the path you specify does not exist, Tivoli Storage Manager attempts to create it.

The default file name is dsmerror.log; it is placed in your current working directory.

Examples

Options file:

```
errorlogname dmmock\sys:tmp\tsmerror.log
```

Command line:

```
-errorlogname=dmmock\sys:tmp\tsmerror.log
```

This option is valid only on the initial command line. It is not valid in interactive mode.

Errorlogretention

The *errorlogretention* option specifies how many days to maintain error log entries before pruning, and whether to save the pruned entries. The error log is pruned when the first error is written to the log after a Tivoli Storage Manager session is started. If the only session you run is the client scheduler, and you run it twenty-four hours a day, the error log might not be pruned according to your expectations. Stop the session and start it again to allow the scheduler to prune the error log.

If you change from *errorlogretention* to *errorlogmax*, all records in the existing log are copied to the pruned log dsmerlog.pru, the existing log is emptied, and logging begins under the new log wrapping criteria.

If you change from *errorlogmax* to *errorlogretention*, all existing log entries are retained and the log is pruned using the new *errorlogretention* criteria.

Restriction: You cannot specify *errorlogretention* *and* a non-zero *errorlogmax* value.

Options File

Place this option in the client options file (dsm.opt).

Syntax

```
           ┌─N─┐      ┌─D─┐
►►─ERRORLOGRetention─┤   ├──┤   ├───────────────────────────►◄
           └─days─┘    └─S─┘
```
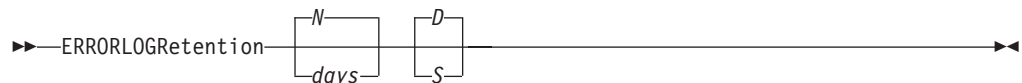
Parameters

N or *days*
> Specifies how long to wait before pruning the error log.

> *N*   Do not prune the error log. This permits the error log to grow indefinitely. This is the default.

> *days*
>> The number of days to keep log file entries before pruning the log. The range of values is zero through 9999.

D or *S*
> Specifies whether to save the pruned entries. Enter a space or comma to separate this parameter from the previous one.

> *D*   Discard the error log entries when you prune the log. This is the default.

> *S*   Save the error log entries when you prune the log.

> The pruned entries are copied from the error log to the dsmerlog.pru file located in the same directory as the error log.

Examples

Options file:
> errorlogretention 400 S

Command line:
> -errorlogr=400,S

This option is valid only on the initial command line. It is not valid in interactive mode.

Exclude options

The exclude options exclude objects from backup 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. When you exclude a file that was previously included, existing backup versions become inactive during the next incremental backup.
2. The server can define exclude options with the *inclexcl* option.
3. As with other include-exclude statements, you can use the *inclexcl* option to specify a file that can be in Unicode format, containing exclude statements with file names in Unicode. See "Inclexcl" on page 157 for more information.

Exclude any system files that could corrupt the operating system when recovered. You should also exclude the directory containing the Tivoli Storage Manager client files.

Attention: See "Excluding system files" on page 18 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 18 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 nw2:\sys:any/test
```

To exclude subdirectories that begin with `test` under the `any` directory, enter the following:

```
exclude.dir nw2:\sys:any/test*
```

Wildcards are not supported for the server name or volume name. If you do not specify a server name, Tivoli Storage Manager uses the local server name.

Options File

Place these options in the client options file (dsm.opt).

Syntax

```
▶▶──options pattern──────────────────────────────────────────────◀◀
```

exclude, exclude.backup, exclude.file, exclude.file.backup
 Use these options to exclude a file or group of files from backup services.

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 nw6\sys:test/dan/data1 excludes the nw6\sys:test/dan/data1 directory, its files, and all its subdirectories and their files.

However, selective backup of a single file overrides exclude.dir. For example, you can still back up the FILE1 file from /test/dan/data1 using a selective backup, as follows:

```
selective nw6\sys:test/dan/data1/FILE1
```

The next time that you perform an incremental backup, the previous backup versions will be inactive. If you exclude a directory that was previously included, Tivoli Storage Manager marks existing backup versions of the files and directories beneath it inactive during the next incremental backup. Use this option to exclude a portion of your data that has no underlying files to back up.

exclude.encrypt

Excludes the specified files from encryption processing. This option does not affect whether files are excluded from backup or archive processing, only whether they are excluded from encryption processing.

Parameters

pattern

Specifies the file or group of files that you want to exclude.

Note: If you do not specify a server name, Tivoli Storage Manager uses the local server name.

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.

Examples

Options file:

```
exclude servera\*:.../swapper.dat
exclude n1\*:io.sys
exclude tfr\*:.../spart.par
exclude nw2\sys:*/budget.fin
exclude nw6\sys:devel/*
exclude.archive servera*:/.../events.log
exclude.compression nw6\sys:devel/*
exclude.encrypt servera\*:.../gordon.dat
```

Command line:

```
Does not apply.
```

Controlling compression processing

If you want to exclude specific files or groups of files from compression processing during a backup or archive operation, consider the following:

- Remember that Tivoli Storage Manager compares the files it processes against the patterns specified in the include-exclude statements, reading from the bottom to the top of the options file.
- You must set the *compression* option to *yes* to enable compression processing. If you do not specify the *compression* option or you set the *compression* option to

no, Tivoli Storage Manager does not perform compression processing. See "Compression" on page 119 for more information.

If you set the *compression* option to *yes* and no *exclude.compression* statements exist, Tivoli Storage Manager considers all files for compression processing.

- Tivoli Storage Manager processes *exclude.dir* and other include-exclude statements first. Tivoli Storage Manager then considers any *exclude.compression* statements. For example, consider the following include-exclude list:

```
exclude servera\sys:proj/*.*
exclude.compression servera\sys:proj/file.txt
include servera\sys:proj/file.txt
```

Tivoli Storage Manager examines the statements (reading from bottom to top) and determines that the servera\sys:proj/file.txt file is a candidate for backup, but is not a candidate for compression processing.

- Include-exclude compression processing is valid for backup and archive processing *only*. The *exclude.compression* option does not affect whether files are excluded from backup or archive processing, only whether they are excluded from compression processing.

Filelist

Use the *filelist* option with the following commands to process a list of files:
- **archive**
- **backup group**
- **delete archive**
- **delete backup**
- **expire**
- **incremental**
- **query archive**
- **query backup**
- **restore**
- **retrieve**
- **selective**

The Tivoli Storage Manager client opens the file you specify with this option and processes the list of files within according to the specific command. With the exception of the **restore** and **retrieve** commands, when you use the *filelist* option, Tivoli Storage Manager ignores all other file specifications on the command line.

Note: The Tivoli Storage Manager client API does not support this option.

The files (entries) listed in the filelist must adhere to the following rules:
- Each entry must be a fully qualified path to a file or directory. Specify only fully qualified paths.
- Each entry must be on a new line.
- Do *not* use wildcard characters.
- Each entry results in the processing of only one object (file or directory).
- If the file name contains any spaces, enclose the file name with quotes.
- The filelist can be an MBCS file or a Unicode file with all Unicode entries.
- Tivoli Storage Manager ignores any entry that is not valid.

The following is an example of a list of files and directories within a filelist:

```
serverb\sys:/proj/dir/file1
serverb\sys:/public/tivoli/file2
serva\sys:/acctng/avi/dir1
serva\sys:/books/dir2/file3
"e\sys:/dir/Ha Ha Ha/file.txt"
"e\sys:/messages/file.txt"
```

If an entry in the filelist indicates a directory, only that directory will be processed and not the files within the directory.

If the file name (the `filelistspec`) you specify with the *filelist* option does not exist, the command fails. Tivoli Storage Manager skips any entries in the filelist that are not valid files or directories. Tivoli Storage Manager logs errors and processing continues to the next entry.

Use file specifications with the **restore** and **retrieve** commands to denote the destination for the restored filelist entries. For example, in the **restore** command:

```
dsmc restore -filelist=sys:u/proja/files vol1:u/dir1/record/
-preservepath=complete
```

the file specification vol1:u/dir1/record/ represents the restore destination for all entries in the filelist. However, in the **selective** command:

```
dsmc selective -filelist=sys:u/proja/files vol1:u/dir1/record/
```

the file specification vol1:u/dir1/record/ is ignored.

If you specify a directory in a filelist for the **delete archive** or **delete backup** command, the directory is not deleted. Filelists that you use with the **delete archive** or **delete backup** command should not include directories.

The entries in the list are processed in the order they appear in the filelist. For optimal processing performance, pre-sort the filelist by file space name and path.

Note: Tivoli Storage Manager might back up a directory twice if the following conditions exist:
- The filelist contains an entry for the directory
- The filelist contains one or more entries for files within that directory
- No backup of the directory exists

For example, your filelist includes the entries sys:proj/myfile and sys:proj. If the proj directory does not exist on the server, the sys:proj directory is sent to the server a second time.

Syntax

```
►►──FILELis t =─ filelistspec──────────────────────────────────────────►◄
```

Parameters

filelistspec
> Specifies the location and name of the file that contains the list of files to process with the command.

> **Note:** When you specify the *filelist* option on the command line, the *subdir* option is ignored.

Examples

Command line:
```
dsmc sel -filelist=serva\sys:avi/filelist.txt
```

Filename

Use the *filename* option with the **query systeminfo** command to specify a file name in which to store information gathered from one or more of the following items:

- DSMOPTFILE - The contents of dsm.opt file.
- ERRORLOG - The Tivoli Storage Manager error log file.
- FILE - Attributes for the file name that you specify.
- INCLEXCL - Compiles a list of include-exclude in the order in which they are processed during backup and archive operations.
- OPTIONS - Compiled options.
- OSINFO - Name and version of the client operating system
- POLICY - Policy set dump.
- SCHEDLOG - The contents of the Tivoli Storage Manager schedule log (usually dsmsched.log.

Note: The **query systeminfo** command is intended primarily as an aid for IBM support to assist in diagnosing problems, although users who are familiar with the concepts addressed by this information might also find it useful. If you use the *console* option, no special formatting of the output is performed to accommodate screen height or width. Therefore, the console output might be difficult to read due to length and line-wrapping. In this case, it is recommended that you use the *filename* option with the **query systeminfo** command to allow the output to be written to a file that can subsequently be submitted to IBM support. See "Console" on page 121 for more information.

Syntax

```
►►──FILEName =─ outputfilename────────────────────────────────────►◄
```

Parameters

outputfilename
Specifies a file name in which to store the information. If you do not specify a file name, by default the information is stored in the dsminfo.txt file.

Examples

Command line:
```
query systeminfo dsmoptfile errorlog -filename=tsminfo.txt
```

Filesonly

The *filesonly* option restricts backup, restore, retrieve, or query processing to files *only*. You cannot restore or retrieve directories from the Tivoli Storage Manager server when using the *filesonly* option with the **restore** or **retrieve** commands. However, directories with default attributes are created, if required, as placeholders for files that you restore or retrieve.

You can also use the *filesonly* option with the following commands:
- **archive**
- **incremental**
- **query archive**
- **query backup**
- **restore**
- **restore backupset**
- **restore group**
- **retrieve**
- **selective**

Note: The Tivoli Storage Manager client API does not support this option.

Syntax

```
►►──FILESOnly──────────────────────────────────────────►◄
```

Parameters

There are no parameters for this option.

Examples

Command line:
```
dsmc incremental -filesonly sys:*
```

Fromdate

Use the *fromdate* option with the *fromtime* option to specify a date and time from which you want to search for backups or archives during a restore, retrieve, or query operation. Files that were backed up or archived before this date and time are not included, although older directories might be included, if necessary, to restore or retrieve the files.

Use the *fromdate* option with the following commands:
- **delete backup**
- **query archive**
- **query backup**
- **restore**
- **restore group**
- **retrieve**

Note: The Tivoli Storage Manager client API does not support this option.

Syntax

```
►►──FROMDate =─ date──────────────────────────────────────────────►◄
```

Parameters

date

Specifies the date from which you want to search for backup copies or archived files. Enter the date in the format you selected with the *dateformat* option.

When you include *dateformat* with a command, it must precede the *fromdate*, *pitdate*, and *todate* options.

Examples

Command line:
```
dsmc query backup -fromdate=12/11/2003 sys:proj/h3.doc
```

Fromnode

The *fromnode* option permits one node to perform commands for another node. A user on another node must use the **set access** command to permit you to query, restore, or retrieve files for the other node.

Use the *fromnode* option with the following commands:
- **query archive**
- **query backup**
- **query filespace**
- **query group**
- **query mgmtclass**
- **restore**
- **restore group**
- **retrieve**

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 sys:*
```

Fromtime

Use the *fromtime* option with the *fromdate* option to specify a beginning time from which you want to search for backups or archives during a restore, retrieve, or query operation. Tivoli Storage Manager ignores this option if you do not specify the *fromdate* option.

Use the *fromtime* option with the following commands:
- **delete backup**
- **query archive**
- **query backup**
- **restore**
- **restore group**
- **retrieve**

Note: The Tivoli Storage Manager client API does not support this option.

Syntax

```
►►──FROMTime =─ time────────────────────────────────────────────────►◄
```

Parameters

time

Specifies a beginning time on a specific date from which you want to search for backed up or archived files. If you do not specify a time, the time defaults to 00:00:00. Specify the time in the format you selected with the *timeformat* option.

When you include the *timeformat* option in a command, it must precede the *fromtime*, *pittime*, and *totime* options.

Examples

Command line:
```
dsmc q b -timeformat=4 -fromt=11:59AM -fromd=06/30/2003 -tot=11:59PM
-tod=06/30/2003
```

Groupname

Use the *groupname* option with the **backup group** command to specify the name for a group. You can only perform operations on new groups or the current active version of the group.

Syntax

```
►►──GROUPName =─ name───────────────────────────────────────────────────────►◄
```

Parameters

name
    Specifies the name of the group which will contain the files backed up using the *filelist* option. Directory delimiters are not allowed in the group name since the group name is not a file specification, but a name field.

Examples

Command line:
```
backup group -filelist=sys:/tivoli/acct.lst -groupname=group1
-virtualfsname=accounting -mode=full
```

Httpport

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

Options File

Place this option in the client options file (dsm.opt).

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:
> -httpport=1502

Ifnewer

The *ifnewer* option replaces an existing file with the latest backup version only if the backup version is newer than the existing file. Only active backups are considered unless you also use the *inactive* or *latest* options.

Note: Directory entries are replaced with the latest backup version, whether the backup version is older or newer than the existing version.

Use the *ifnewer* option with the following commands:
- **restore**
- **restore backupset**
- **restore group**
- **retrieve**

Notes:
1. This option is ignored if the *replace* option is set to *No*.
2. The Tivoli Storage Manager client API does not support this option.

Syntax

```
►►──IFNewer──────────────────────────────────────────────────►◄
```

Parameters

There are no parameters for this option.

Examples

Command line:
```
dsmc restore -ifnewer sys:u/id/projb/
```

Inactive

Use the *inactive* option with the following commands to display both active and inactive objects:
- **delete group**
- **query backup**
- **query group**
- **restore**
- **restore group**

Notes:

1. When using the *inactive* option during a restore operation, it is recommended that you also use the *pick* option or another filtering option such as *pitdate* because, unlike the *-latest* option, it is indeterminate which version of the file will actually be restored.

2. The Tivoli Storage Manager client API does not support this option.

Syntax

```
►►──INActive──────────────────────────────────────────────────────►◄
```

Parameters

There are no parameters for this option.

Examples

Command line:
```
dsmc restore -inactive sys:u/id/projecta/ -pick
```

Inclexcl

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

Multiple inclexcl statements are permitted. However, you must specify this option for each include-exclude file.

When processing occurs, the include-exclude statements within the include-exclude file are placed in the list position occupied by the *inclexcl* option, in the same order, and processed accordingly.

Considerations for Unicode-enabled clients

The include-exclude file can be in Unicode or non-Unicode format. If you specify a non-Unicode include-exclude file, that file must be in the same code page that the client is running. For example, a non-Unicode include-exclude file on an English NetWare system cannot contain Japanese characters.

A Unicode include-exclude file provides the following benefits:
- Names with characters from another code page no longer have to be wildcarded.
- File names and directories from any code page can be *fully specified* for the Unicode-enabled client to process.

To create an include-exclude file in Unicode format, perform the following steps:
1. Open Notepad.
2. Enter your *include* and *exclude* statements using the appropriate include-exclude options in "Using include-exclude options" on page 16.
3. Click **File** and then click **Save As**. The **Save As** window displays.
4. Select the **Save as Unicode** check box, specify the file and target directory, and then save the file.
5. Place an *inclexcl* option specifying the include-exclude file you just created in your client options file (dsm.opt).
6. Restart the Tivoli Storage Manager client.

For more information about creating an include-exclude options file, see "Creating an include-exclude list (optional)" on page 15.

Options File

Place this option in the client options file (dsm.opt).

Syntax

```
►►──INCLExcl─ filespec─────────────────────────────────────────────►◄
```

Parameters

filespec
> Specifies the path and file name of *one* include-exclude options file.

Examples

Options file:
```
inclexcl servera\sys:dsm/backup.exc
```

Command line:
      Does not apply.

Include options

The include options specify any of the following:

- Objects within a broad group of excluded objects that you want to include for backup and archive services.
- Files that are included for backup or archive processing that you want to include for encryption processing.
- Files that are included for backup or archive processing that you also want to include for compression processing.
- Objects to which you want to assign a specific management class.
- A management class to assign to all objects to which you do not explicitly assign a management class.
- File spaces to which you want to assign memory-efficient backup processing or use the *diskcachelocation* option to cause specific file systems to use different, specific locations for their diskcache.

If you do not assign a specific management class to objects, Tivoli Storage Manager uses the default management class in the active policy set of your policy domain. Use the **query mgmtclass** command to display information about the management classes available in your active policy set.

Remember that Tivoli Storage Manager compares the files it processes against the patterns specified in the include-exclude statements, reading from the bottom to the top of the options file.

Notes:
1. The *exclude.dir* statement overrides all include statements that match the pattern.
2. The server can also define these options with the *inclexcl* option.

Options File

Place these options in the client options file (dsm.opt).

Syntax

```
►►─options pattern ─┬──────────────────┬───────────────────────►◄
                    └─ mgmtclassname ─┘
```

include, include.backup, include.file

Use these options to include files or assign management classes for backup processing.

The *include* option affects archive and backup processing. If you want to assign different management classes for archive and backup processing, always specify *include.archive* and *include.backup* with their own management classes. In the following example, the archmc management class is assigned when an archive operation is performed, because *include.backup* is used only for backup processing, it is not used for archive processing.

```
include.archive data:\test\*\archmc
include.backup data:\test\*
```

include.archive

Includes files or assigns management classes for archive processing.

include.compression
> Includes files for compression processing if you set the *compression* option to *yes*. This option applies to backups and archives.

include.encrypt
> Includes the specified files for encryption processing. By default, Tivoli Storage Manager does not perform encryption processing.
>
> **Attention:** The **include.encrypt** option is the only way to enable encryption on the Backup-Archive client. If no **include.encrypt** statements are used, encryption will not occur.

include.fs

> To control how Tivoli Storage Manager processes your file space for incremental backup, you can specify these additional options in your dsm.opt file, or as values of the *include.fs* option: *diskcachelocation* and *memoryefficientbackup*. If these options appear both in the options file and an *include.fs* option, the *include.fs* values will be used for the specified file space in place of any values in an option file or on the command line.
>
> **Examples:**
>
> **Options file or include/exclude file:** Each of the following `include.fs`, `memoryefficientbackup` and `diskcachelocation` options must be on the **same** line in the options file.
>
> ```
> include.fs sys:
>     memoryefficientbackup=diskcachemethod
>     diskcachelocation=data:\temp
> include.fs data:
>     memoryefficientbackup=diskcachemethod
>     diskcachelocation=sys:\temp
> ```

Parameters

pattern
> Specifies the objects to include for backup or archive processing or to assign a specific management class.
>
> 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.

mgmtclassname
> Specifies the name of the management class to assign to the objects. If a management class is not specified, the default management class is used.
>
> Use the following command to bind a management class to a group:
>
> ```
> include <virtualfname>\<groupname> <mgmt class name>
> include /myvfs/mygroupname ManagmentClass
> ```

Examples

Options file:
```
include servera\sys:proj/text/devel.*
include servera\sys:proj/text/* textfiles
include *:* managall
include.archive servera\sys:proj/text/* myarchiveclass
include.backup servera\sys:proj/text/* mybackupclass
include.compression servera\sys:proj/text/devel.*
include.encrypt serverb\sys:proj/gordon/*
```

Command line:
>   Does not apply.

Compression and encryption processing

If you want to include specific files or groups of files for compression and encryption processing during a backup or archive operation, consider the following:

- You must set the *compression* option to *yes* to enable compression processing. If you do not specify the *compression* option or you set the *compression* option to *no*, Tivoli Storage Manager does not perform compression processing. See "Compression" on page 119 for more information.

  Note: The client will not compress files that the NetWare operating system already compresses. If you set the *compression* option to *yes* and Tivoli Storage Manager finds a file that the NetWare operating system already compresses, the file is sent to the server without further compression as a NetWare compressed file.

- Tivoli Storage Manager processes *exclude.dir* and other include-exclude statements first. Tivoli Storage Manager then considers any *include.compression* and *include.encrypt* statements. For example, consider the following include-exclude list:

  ```
  exclude servera\sys:proj/file.txt
  include.compression servera\sys:proj/file.txt
  include.encrypt servera\sys:proj/file.txt
  ```

  Tivoli Storage Manager examines the `exclude servera\sys:proj/file.txt` statement first and determines that `servera\sys:proj/file.txt` is excluded from backup processing and is, therefore, not a candidate for compression and encryption processing.

- Include-exclude compression and encryption processing is valid for backup and archive processing *only*.

- As with other include-exclude statements, you can use the *inclexcl* option to specify a file which can be in Unicode format containing include statements with filenames in Unicode.

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.

Attention: Files that are modified or created after their respective directory was processed by the Tivoli Storage Manager client, but before the incremental-by-date backup completes, are not backed up and will not be backed up in future incremental-by-date backups, unless the files are modified again. For this reason, a regular incremental backup should be run periodically, without specifying the *incrbydate* option.

An incremental-by-date updates the date and time of the last incremental at the server. If you perform an incremental-by-date on only part of a file system, the date of the last full incremental is not updated and the next incremental-by-date will back up these files again.

Note: The *incrbydate* option will not work properly unless a full incremental backup was previously performed on the file system or volume. For example, file space 1 above was created by performing a full volume backup, while file space 2 was created by performing a partial backup. A new file is copied to both volumes with a date and time stamp of 10/29/2002 11:00AM. However, file space 1 contains a last incremental date and file space 2 does not. The *incrbydate* option compares the file modification date and time with the last full incremental backup date of the file space. Performing a backup on the DATA volume using the *incrbydate* option will work properly. However, because VOL1 has no previous incremental backup stored on the server, performing a backup on VOL1 using the *incrbydate* option will not backup the specified files.

```
Num    Last Incr Date     Type    File Space Name
---    --------------     ----    ---------------
  1    10/28/2002 15:08:10  NTW:LONG  NW6\DATA:
  2    00/00/0000 00:00:00  NTW:LONG  NW6\VOL1:
```

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 NetWare server files because:

- It does not expire backup versions of files that are deleted from the NetWare server.
- It does not rebind backup versions to a new management class if the management class has changed.
- It does not back up files with attributes that have changed, such as Access control list (ACL) data, unless the modification dates and times have also changed.
- It ignores the copy group frequency attribute of management classes.
- It does not handle name space changes on the volume.

Notes:

1. If you have limited time during the week to perform backups, but extra time on weekends, you can maintain current server storage of your NetWare server

files by performing an incremental backup with the *incrbydate* option on weekdays and a full incremental backup on weekends.

2. The Tivoli Storage Manager client API does not support this option.

Syntax

```
►►──INCRbydate─────────────────────────────────────────────────►◄
```

Parameters

There are no parameters for this option.

Examples

Command line:
```
dsmc incremental -incrbydate
```

Language

The *language* option specifies the national language in which to present client messages.

You can use US English (ENU) with all clients. Currently, the NetWare client only supports US English (ENU).

Note: The *language* option does not affect the Web client. The Web client displays in the language associated with the locale of the browser. If the browser is running in a locale that Tivoli Storage Manager does not support, the Web client displays in US English.

Options File

Place this option in the client options file (dsm.opt).

Syntax

```
►►──LANGuage─ language─────────────────────────────────────────────────────►◄
```

Parameters

language
    Specifies the language you want to use.

Examples

Options file:
        language enu

Command line:
        Does not apply.

Latest

Use the *latest* option with the following commands to restore the most recent backup version of a file, even if the backup is inactive:
- **restore**
- **restore group**

If you are performing a point-in-time restore (using the *pitdate* option), it is not necessary to specify *latest* since this option is implicit when *pitdate* is used.

Note: The Tivoli Storage Manager client API does not support this option.

Syntax

►►──LATest──►◄

Parameters

There are no parameters for this option.

Examples

Command line:
```
dsmc restore -latest sys:u/devel/projecta/
```

Location

The *location* option specifies where Tivoli Storage Manager searches for a backup set during a query or restore operation. You can use this option to locate backup sets on the server or locally. Backup sets that are generated on the server can be used locally specifying the *location* option and either the file name of the file containing the start of the backup set, or the tape device where the tape containing the start of the backup set is located.

Use the *location* option with the **query** and **restore** commands.

Note: The Tivoli Storage Manager client API does not support this option.

Syntax

```
►►──LOCation =──┬──server──┬────────────────────────────────────►◄
                └──file────┘
```

Parameters

server
> Specifies that Tivoli Storage Manager searches for the backup set on the server. This is the default.

file Specifies that Tivoli Storage Manager searches for the backup set file(s) on a local file system.

Examples

Command line:
>   dsmc restore backupset mybackupsetname -loc=server

Managedservices

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

See "Configuring the client scheduler" on page 13 for instructions to set up the client acceptor daemon to manage the scheduler.

Attention: You cannot use the dsmcad for scheduling when you set the *sessioninitiation* option to *serveronly*. Refer to "Sessioninitiation" on page 215 for more information.

The client acceptor daemon serves as an external timer for the scheduler. When the scheduler is started, it queries the server for the next scheduled event. The event is either executed immediately or the scheduler exits. The client acceptor daemon restarts the scheduler when it is time to execute the scheduled event.

Notes:

1. If you set the *schedmode* option to *prompt*, the server prompts the client acceptor daemon when it is time to run the schedule. The scheduler will connect and disconnect to the server when the client acceptor daemon is first started.

2. Set the *passwordaccess* option to *generate* in your client options file (dsm.opt) and generate a password, so Tivoli Storage Manager can manage your password automatically. See "Passwordaccess" on page 184 for more information.

3. The client acceptor daemon console displays information about the next scheduled event.

Using the client acceptor daemon to manage the scheduler service can provide the following benefits:

- Memory retention problems that can occur when using traditional methods of running the scheduler are resolved. Using the client acceptor daemon to manage the scheduler requires very little memory between scheduled operations.

- The client acceptor daemon can manage both the scheduler program and the Web client, reducing the number of background processes on your workstation.

- By default, if you do not specify the *managedservices* option, the client acceptor daemon manages the Web client only.

Note: The Tivoli Storage Manager client API does not support this option.

Options File

Place this option in the client options file (dsm.opt).

Syntax

```
              ┌─webclient─┐
►►──MANAGEDServices──mode──┴─schedule──┴──────────────────────────────►◄
```

Parameters

mode
> Specifies whether the client acceptor daemon manages the scheduler, the Web client, or both.

webclient
> Specifies that the client acceptor daemon manages the Web client. This is the default.

schedule
> Specifies that the client acceptor daemon manages the scheduler.

Examples

Options file:
> The following are examples of how you might specify the *managedservices* option in your client options file (dsm.opt).

> **Task** Specify that the client acceptor daemon manages the Web client *only*.
>
> ```
> managedservices webclient
> ```

> **Task** Specify that the client acceptor daemon manages the scheduler *only*.
>
> ```
> managedservices schedule
> ```

> **Task** Specify that the client acceptor daemon manages both the Web client and the scheduler.
>
> ```
> managedservices schedule webclient
> ```

> **Note:** The order in which these values are specified is not important.

Command line:
> Does not apply.

Maxcmdretries

The *maxcmdretries* option specifies the maximum number of times the client scheduler (on your workstation) attempts to process a scheduled command that fails. The command retry starts *only if* the client scheduler has not yet backed up a file, never connected to the server, or failed before backing up a file. This option is only used when the scheduler is running.

Your Tivoli Storage Manager administrator can also set this option. If your Tivoli Storage Manager administrator specifies a value for this option, that value overrides what you specify in the client options file *after* your client node successfully contacts the server.

Note: The Tivoli Storage Manager client API does not support this option.

Options File

Place this option in the client options file (dsm.opt).

Syntax

```
►►──MAXCMDRetries─ maxcmdretries───────────────────────────────────────►◄
```

Parameters

maxcmdretries
>   Specifies the number of times the client scheduler can attempt to process a scheduled command that fails. The range of values is zero through 9999; the default is 2.

Examples

Options file:
>   maxcmdr 4

Command line:
>   -maxcmdretries=4

This option is valid only on the initial command line. It is not valid in interactive mode.

Memoryefficientbackup

The *memoryefficientbackup* option specifies the memory-conserving algorithm to use for processing full file space backups. One method backs up one directory at a time, using less memory. The other method uses much less memory, but requires more disk space. Use the *memoryefficientbackup* option with the **incremental** command when your workstation is memory constrained. You can also use this option as a parameter to the *include.fs* option in order to select the algorithm Tivoli Storage Manager uses on a per-filespace basis. See "Include options" on page 159 for more details. If the *memoryefficientbackup* option appears in the option file, its value will be used for all file systems not represented by an *include.fs* option containing the *memoryefficientbackup* parameter. If a directory-level incremental is being performed, and *memoryefficientbackup*=**diskcachemethod** is present, *memoryefficientbackup*=**yes** will be used.

Use *memoryefficientbackup*=**diskcachemethod** for any file space that has too many files for Tivoli Storage Manager to complete the incremental backup with either the default setting, *memoryefficientbackup*=**no**, or with *memoryefficientbackup*=**yes**. The disk cache file created by the initial disk cache incremental backup can require up to gigabytes of disk space for each million files or directories being backed up.

The disk cache file created by subsequent disk cache incremental backups should require considerably less disk space. The actual amount of disk space required for the disk cache file created by subsequent disk cache incremental backups depends on the number of files and directories included in the backup and on the length of the longest file or directory name which is backed up. Since the disk cache file can become very large, ensure that large file support is enabled on the file system that is being used for the disk cache file.

Supported Clients

This option is valid for all clients. The server can also define this option.

Options File

Place this option in the client user options file (dsm.opt), or on the initial command line. .

Syntax

```
              No
►►──MEMORYEFficientbackup──┬──────────────┬──────────────────►◄
              ├─Yes──────────┤
              └─DISKCACHEMethod─┘
```
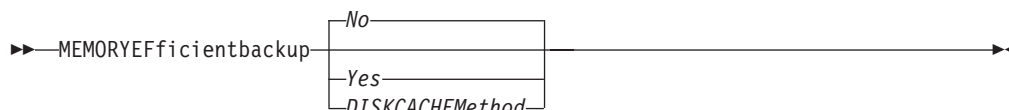
Parameters

No Your client node uses the faster, more memory-intensive method when processing incremental backups. This is the default.

Yes Your client node uses the method that requires less memory when processing incremental backups.

Diskcachemethod
Your client node uses the method that requires much less memory but more disk space when processing incremental backups for full file systems.

Examples

Options file:
```
memoryefficientbackup yes
memoryefficientbackup diskcachem
```

Command line:
```
-memoryef=no
```

Mode

Use the *mode* option with the **backup group** command to specify whether you want to perform a full or differential group backup containing a list of files from one or more file spaces.

Syntax

```
►►──MODE =─┬─full─────────┬──────────────────────────────────►◄
           └─differential─┘
```

Parameters

full
> Specifies that you want to perform a full group backup containing a list of files from one or more file space origins. This is the default.

differential
> Specifies that you want to perform a group backup of files that changed since the last full backup. If there is no copy of a full image stored on the Tivoli Storage Manager server, a full backup occurs. If a full image exists, whether it is restorable, or expired and being maintained because of dependent differential images, specifying **MODE =*differential*** sends a differential image backup. If a full image is sent during a *differential* backup, it is reflected as a full image using the **query nasbackup** server command.

> A full image can be eligible for expiration based on versioning or retention (verexists retextra), but still be maintained on the Tivoli Storage Manager server to allow for restoring dependent differential images. A full image that is eligible for expiration *cannot* be selected for restore, so it is not displayed using the **query nasbackup** server command. The differential image backups that depend on an "expired" full image can be restored.

Examples

Task Perform a full backup of all the files in filelist sys:/tivoli/acct.lst to the virtual file space name *accounting* containing the group leader group1 file.

> **Command:**
> ```
> backup group -filelist=sys/tivoli/acct.lst -groupname=group1
> -virtualfsname=accounting -mode=full
> ```

Nodename

Use the *nodename* option in your client options file (dsm.opt) to identify your workstation to the server. You can use different node names to identify multiple operating systems on your workstation.

When you use the *nodename* option, Tivoli Storage Manager prompts for the password assigned to the node you specify, if a password is required.

If you want to restore or retrieve files from the server while you are working from a different workstation, use the *virtualnodename* option. See "Virtualnodename" on page 242 for more information.

- In the absence of a *nodename* entry in the dsm.opt file, or a *virtualnodename* entry in the client options file (dsm.opt), or a virtual node name specified on a command line, the default login ID is the name that the **hostname** command returns.
- If a *nodename* entry exists in the dsm.opt file, the *nodename* entry overrides the name that the **hostname** command returns.
- If a *virtualnodename* entry exists in the client 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.

Options File

Place this option in the client options file (dsm.opt).

Syntax

```
►►──NODename── nodename───────────────────────────────────────────►◄
```

Parameters

nodename
> Specifies a 1 to 64 character node name for which you want to request Tivoli Storage Manager services. The default is the value returned with the **hostname** command.
>
> Not specifying a node name will permit the node name to default to the host name of the workstation

Examples

Options file:
> nodename cougar

Command line:
> –nodename=cougar

This option is valid only on the initial command line. It is not valid in interactive mode.

Noprompt

The *noprompt* option suppresses the confirmation prompt that is presented by the **delete group**, **delete archive**, **expire**, **restore image**, and **set event** commands.
- **delete archive**
- **delete backup**
- **delete group**
- **expire**

Note: The Tivoli Storage Manager client API does not support this option.

Syntax

```
►►──NOPrompt─────────────────────────────────────────────────►◄
```

Parameters

There are no parameters for this option.

Examples

Command line:
    dsmc delete archive sys:\test* -noprompt

Numberformat

The *numberformat* option specifies the format you want to use to display numbers.

Use this option if you want to change the default number format for the language of the message repository you are using.

Note: The *numberformat* option does not affect the Web client. The Web client uses the number format for the locale that the browser is running in. If the browser is not running in a supported locale, the Web client uses the number format for US English.

You can use the *numberformat* option with the following commands:
*   **delete archive**
*   **delete backup**
*   **expire**
*   **query archive**
*   **query backup**
*   **restore**
*   **retrieve**
*   **set event**

Options File

Place this option in the client options file (dsm.opt).

Syntax

▶▶──NUMberformat─ *number*──◀◀

Parameters

number

Displays numbers using any one of the following formats. Specify the number (0–6) that corresponds to the number format you want to use.

0   Use the locale-specified date format. This is the default.

1   1,000.00
*   US English
*   Japanese
*   Chinese (Traditional)
*   Chinese (Simplified)
*   Korean

2   1,000,00

3   1 000,00
*   French
*   Czech
*   Hungarian
*   Polish
*   Russian

4   1 000.00

5   1.000,00
*   Brazilian Portuguese
*   German
*   Italian

- Spanish

6 1'000,00

Examples

Options file:
```
num 4
```

Command line:
```
-numberformat=4
```

This option is valid on the initial command line and in interactive mode. If you use this option in interactive mode, it affects only the command with which it is specified. When that command completes, the value reverts to the value at the beginning of the interactive session. This will be the value from the dsm.opt file unless overridden by the initial command line or by an option forced by the server.

Nwignorecompressbit

The *nwignorecompressbit* option specifies whether to ignore the setting of the compressed file (Co) attribute during selection processing for incremental backups. If *nwignorecompressbit* is set to *yes* and the only change to the file is compression by the NetWare operating system, the file is not backed up incrementally. This option is valid only on NetWare clients sending an incremental backup on a file system.

Options File

Place this option in the client options file (dsm.opt).

Syntax

```
         ┌─No──┐
►►──NWIGNORECOMpressbit──┤     ├──────────────────────────────►◄
         └─Yes─┘
```

Parameters

No   Specifies that Tivoli Storage Manager does not ignore the compressed file attribute during selection processing for incremental backups. This is the default.

Yes   Specifies that Tivoli Storage Manager ignores the setting of the compressed file attribute during selection processing for incremental backups.

Examples

Options file:
      nwignorecompressbit yes

Command line:
      Does not apply.

Nwpwfile

The *nwpwfile* option encrypts the user ID and password for a local or remote NetWare server. The client saves the encrypted user ID and password in the TSM.PWD file.

Options File

Place this option in the client options file (dsm.opt).

Syntax

```
                          ┌─Yes─┐
►►──NWPWFile──┤     ├──────────────────────────────────────────►◄
                          └─No──┘
```

Parameters

Yes   Encrypts the user ID and password the first time a command is sent for a local or remote NetWare server. The encrypted information is stored in the TSM.PWD file. When you enter subsequent commands for that server, the password information is obtained from this file instead of sending a prompt. This is the default.

No   Does not encrypt the user ID and password in the TSM.PWD file. Each time you send a command to back up or archive files stored on a remote NetWare server, you are prompted for the user ID and password for the server.

Examples

Options file:
```
nwpwf yes
```

Command line:
```
-nwpwfile=no
```

This option is valid only on the initial command line. It is not valid in interactive mode.

Nwuser

The *nwuser* option specifies a user ID and password to connect to a local or remote NetWare server. The user must have NetWare supervisor authority. Use this option in your client options file for each NetWare server. If you do not use this option, you are prompted for a user ID and password for each target service when you start a backup or archive operation.

When logging into a NetWare server from Tivoli Storage Manager, enter one of the following:
- A typeful, full-distinguished name
- A bindery emulation name, used in proper context.

For example, if you received the following message:

```
Please enter NetWare user for "ELLAS":
```

You can specify either: .CN=Zorba.OU=Islands.O=Greece or Zorba (if the Bindery Context is set to OU=Islands.O=Greece. Tivoli Storage Manager allows typeless names:

```
.Zorba.Islands.Greece
```

Note: Bindery context does not affect Tivoli Storage Manager NDS processing; it is not necessary to specify it.

Options File

Place this option in the client options file (dsm.opt).

Syntax

```
►►──┬─NWUSer servername\user:password─┬────────────────────►◄
    ▲                                 │
    └─────────────────────────────────┘
```

Parameters

servername
> A 1 to 48 character NetWare server name to which your client node has access.

user
> A 1 to 256 character NetWare user name with supervisor authority on the NetWare server.

password
> A 1 to 128 character password for a user with supervisor authority on the NetWare server.

Examples

Options file:
> nwus servera\supervisor:secret
>
> To specify a user ID and password to back up an NDS tree, you would enter: nwuser treea\.admin.ibm:secret where **treea** is the NDS tree name.

Command line:
> -nwuser=serverb\mary:secret1

This option is valid only on the initial command line. It is not valid in interactive mode.

Nwexitnlmprompt

The *nwexitnlmprompt* option specifies that Tivoli Storage Manager responds in one of the following ways while exiting a session:

- Display a message and prompt you before returning to the NetWare console.
- Display a message and prompt you before returning to the NetWare console if an error occurs.
- Return immediately to the NetWare console.

Note: You can use the *nwexitnlmprompt* option when running Tivoli Storage Manager in an automated mode, such as, from an .NCF file. By default, you are asked to press any key to continue before exiting the session. If you specify *no*, Tivoli Storage Manager will not prompt you before exiting the session.

Options File

Place this option in the client options file (dsm.opt).

Syntax

```
         ┌─Yes───┐
►►──NWEXITNLMPrompt──┼─Error─┼──────────────────────────────►◄
         └─No────┘
```

Parameters

Yes Specifies that Tivoli Storage Manager displays any error messages and final statistics and prompts you to press any key to return to the NetWare console. This is the default.

Error
       Specifies that if an error is encountered during NLM exit, Tivoli Storage Manager displays the error message and final statistics and prompts you to press any key to return to the NetWare console. If no error is encountered, Tivoli Storage Manager returns immediately to the NetWare console.

No   Specifies that Tivoli Storage Manager returns immediately to the NetWare console.

Examples

Options file:
        nwexitnlmp yes

Command line:
        -nwexitnlmp=yes

        This option is valid only on the initial command line. It is not valid in interactive mode.

Optfile

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

Syntax

►►──OPTFILE =─ *file_name*──►◄

Parameters

file_name
> Specifies an alternate client options file, if you use the fully qualified path name. If you specify only the file name, Tivoli Storage Manager assumes the file name specified is located in the current working directory. The default is dsm.opt.

Examples

Command line:
>   dsmc query session -optfile=sys:tsm/spike.opt

client acceptor daemon:
>   dsmcad -optfile=sys:tsm/spike.opt

This option is valid only on the initial command line. It is not valid in interactive mode.

Password

The *password* option specifies a Tivoli Storage Manager password. If you do not specify this option and your administrator has set authentication to *On*, you are prompted for a password when you start a Tivoli Storage Manager session.

Notes:

1. If the server prompts for a password, the password is not displayed as you enter it. However, if you use the password option on the command line, your password will be displayed as you enter it.

2. If the Tivoli Storage Manager server name changes or Tivoli Storage Manager clients are directed to a different Tivoli Storage Manager server, all clients must re-authenticate with the server because the stored encrypted password must be regenerated.

The *password* option is ignored when the *passwordaccess* option is set to *generate*.

Options File

Place this option in the client options file (dsm.opt).

Syntax

```
►►──PASsword── password──────────────────────────────────────────────►◄
```

Parameters

password
> Specifies a 1 to 63 character password. A password is not case-sensitive. Valid characters include:

> **Characters**
>> **Description**
>
> **A–Z** Any letter, A through Z, uppercase or lowercase
> **0–9** Any number, 0 through 9
> **+** Plus
> **.** Period
> **_** Underscore
> **-** Hyphen
> **&** Ampersand

Examples

Options file:
> `password secretword`

Command line:
> `-password=secretword`

This option is valid only on the initial command line. It is not valid in interactive mode.

Passwordaccess

The *passwordaccess* option specifies whether you want to generate your password automatically or set as a user prompt. Your administrator can require a password for your client node by enabling the authentication feature. Ask your administrator if a password is required for your client node.

If a password is required, you can choose to:

- Set the password for your client node yourself and have Tivoli Storage Manager prompt for it each time you request services.
- Let Tivoli Storage Manager automatically generate a new password for your client node each time it expires, encrypt and store the password in a file, and retrieve the password from that file when you request services. You are not prompted for the password.

For information on where the password is stored, see "Passworddir" on page 186.

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* when using the Web client.
- When using the Web client.

Options File

Place this option in the client options file (dsm.opt).

Syntax

```
►►──PASSWORDAccess──┬─prompt───┬──────────────────────────────────►◄
                    └─generate─┘
```

Parameters

prompt

You are prompted for your workstation password each time a client connects to the server. This is the default.

To keep your client node password secure, enter commands without the password and wait for Tivoli Storage Manager to prompt you for the password.

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. The new password is randomly generated by the Tivoli Storage Manager client

A password prompt is displayed when registering a workstation with a server using open registration or if your administrator changes your password manually.

Examples

Options file:
> `passwordaccess generate`

Command line:
> Does not apply.

Passworddir

The *passworddir* option specifies the directory location in which to store an encrypted password file. . Regardless of where it is stored, the password file created by Tivoli Storage Manager is always named TSM.PWD. The client will prompt for password if passworddir option points to a directory that is *unavailable* for some reason.

Options File

Place this option in the client options file (dsm.opt).

Syntax

```
►►──PASSWORDDIR─ directoryname────────────────────────────────────►◄
```

Parameters

directoryname
Specifies the path in which to store the encrypted password file. The name of the password file is TSM.PWD. If any part of the specified path does not exist, Tivoli Storage Manager attempts to create it.

Examples

Options file:
```
passworddir dmmock\sys:security\tsm
```

Command line:
```
Does not apply.
```

Pick

The *pick* option creates a list of backup versions or archive copies that match the file specification you enter. From the list, you can select the versions to process. Include the *inactive* option to view both active and inactive objects.

Use the *pick* option with the following commands:
- **delete archive**
- **delete backup**
- **delete group**
- **expire**
- **restore**
- **restore group**
- **retrieve**

Note: The Tivoli Storage Manager client API does not support this option.

Syntax

```
►►──PIck──────────────────────────────────────────────►◄
```

Parameters

There are no parameters for this option.

Examples

Command line:
```
dsmc restore sys: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 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:
- **delete backup**
- **query backup**
- **query group**
- **restore**
- **restore group**

When *pitdate* is used, the *inactive* and *latest* options are implicit.

Note: The Tivoli Storage Manager client API does not support this option.

Syntax

```
►►──PITDate =─ date──────────────────────────────────────────────────►◄
```

Parameters

date

Specifies the appropriate date. Enter the date in the format you selected with the *dateformat* option.

When you include *dateformat* with a command, it must precede the *fromdate*, *pitdate*, and *todate* options.

Examples

Command line:
```
dsmc restore sys:\test\* -pitdate=08/01/2003
```

Pittime

Use the *pittime* option with the *pitdate* option to establish a point in time for which you want to display or restore the latest version of your backups. Files that were backed up *on or before* the date and time you specify, and which were not deleted *before* the date and time you specify, are processed. Backup versions that you create after this date and time are ignored. This option is ignored if you do not specify *pitdate* option.

Use the *pittime* option with the following commands:
- **delete backup**
- **query backup**
- **restore**

Note: The Tivoli Storage Manager client API does not support this option.

Syntax

```
►►──PITTime =── time───────────────────────────────────────────────►◄
```

Parameters

time

> Specifies a time on a specified date. If you do not specify a time, the time defaults to 23:59:59. Specify the time in the format you selected with the *timeformat* option.

> When you include the *timeformat* option in a command, it must precede the *fromtime*, *pittime*, and *totime* options.

Examples

Command line:
```
dsmc query backup sys:\test\* -pitt=06:00:00 -pitd=08/01/2003
```

Postschedulecmd

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.

Notes:

1. If the *postschedulecmd* command does not complete with return code 0, the client will report that the scheduled event completed with return code 8 (unless the scheduled operation encounters a more severe error yielding a higher return code). If you do not want the *postschedulecmd* command to be governed by this rule, you can create a script or batch file that invokes the command and exits with return code 0. Then configure *postschedulecmd* to invoke the script or batch file. The return code for the *postnschedulecmd* command is not tracked, and does not influence the return code of the scheduled event.

   Note: Even if the application explicitly sets a nonzero exit value, the NetWare operating system ignores this value and resets it to zero. This is a NetWare operating system limitation.

2. The Tivoli Storage Manager client API does not support this option.

3. The server can also define the *postschedulecmd* option .

Options File

Place this option in the client options file (dsm.opt).

Syntax

```
►►──POSTSchedulecmd── "cmdstring" ──────────────────────────────►◄
```

Parameters

"cmdstring"

Specifies the command to process. You can enter a command to be executed after a schedule with this option. Use only one *postschedulecmd* option.

If the command string contains blanks, enclose the command string in quotation marks. If you placed quotation marks within the command string, then enclose the entire command string in single quotes.

Use a blank, or null, string for *cmdstring* if you want to prevent any commands from running that the Tivoli Storage Manager server administrator uses for *postschedulecmd* or *preschedulecmd*. If you specify a blank or null string on *either* option, it prevents the administrator from using a command on *both* options.

If your administrator uses a blank or null string on the *postschedulecmd* option, you cannot run a post-schedule command.

Examples

Options file:

```
postschedulecmd "restart database"
```

The command string is a valid command for restarting your database.

Command line:

```
-postschedulecmd="'restart database'"
```

This option is valid only on the initial command line. It is not valid in interactive mode.

Preschedulecmd

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.

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.

   Note: Even if the application explicitly sets a nonzero exit value, the NetWare operating system ignores this value and resets it to zero. This is a NetWare operating system limitation.

2. The Tivoli Storage Manager client API does not support this option.

3. The server can also define the *preschedulecmd* option .

Options File

Place this option in the client options file (dsm.opt).

Syntax

```
►►──PRESchedulecmd── "cmdstring" ──────────────────────────────────►◄
```

Parameters

"cmdstring"
> Specifies the command to process. Use only one *preschedulecmd* option. You can enter a command to be executed before a schedule using this option.
>
> If the command string contains blanks, enclose the command string in quotation marks. If you placed quotation marks within the command string, then enclose the entire command string in single quotes.
>
> Use a blank or null string for *cmdstring* if you want to prevent any commands from running that the Tivoli Storage Manager server administrator uses for *postschedulecmd* and *preschedulecmd*. If you specify a blank or null string on *either* option, it prevents the administrator from using a command on *both* options.
>
> If your administrator uses a blank or null string on the *preschedulecmd* option, you cannot run a pre-schedule command.

Examples

Options file:
```
preschedulecmd "<your database product's quiesce command>
database"
```

The command string is a valid command for quiescing your database.

Command line:
```
-preschedulecmd="'quiesce database'"
```

This option is valid only on the initial command line. It is not valid in interactive mode.

Preservepath

The *preservepath* option specifies how much of the source path to reproduce as part of the target directory path when you restore or retrieve files to a new location. Use the *-subdir=yes* option to include the entire subtree of the source directory (directories and files below the lowest-level source directory) as source to be restored. If a required target directory does not exist, it is created. If a target file has the same name as a source file, it is overwritten. Use the *-replace=prompt* option to have Tivoli Storage Manager prompt you before files are overwritten.

Use the *preservepath* option with the following commands:
- **restore**
- **restore backupset**
- **restore group**
- **retrieve**

Note: The Tivoli Storage Manager client API does not support this option.

Syntax

```
►►──PRESERvepath =──┬──Subtree──┬────────────────────────────►◄
                    │           │
                    ├──Complete─┤
                    ├──NOBase───┤
                    └──NONe─────┘
```

Parameters

Subtree
Creates the lowest-level source directory as a subdirectory of the target directory. Files from the source directory are stored in the new subdirectory. This is the default.

Complete
Restores the entire path, starting from the root, into the specified directory. The entire path includes all the directories *except* the file space name.

NOBase
Restores the contents of the source directory without the lowest level, or base directory, into the specified destination directory.

NONe
Restores all selected source files to the target directory. No part of the source path at or above the source directory is reproduced at the target.

If you specify *=yes*, Tivoli Storage Manager restores all files in the source directories to the single target directory.

Examples

Command line:
For the examples below, assume the server file space contains the following backup copies:

```
sys:h1/m1/file.a
sys:h1/m1/file.b
sys:h1/m1/l1/file.x
sys:h1/m1/l1/file.y
```

This command:
```
dsmc res sys:h1/m1/ sys:ann/
-preser=complete
```

Restores these directories and files:
```
sys:ann/h1/m1/file.a
sys:ann/h1/m1/file.b
```

This command:
```
dsmc res sys:h1/m1/ sys:ann/ -preser=nobase
```

Restores these directories and files:
```
sys:ann/file.a
sys:ann/file.b
```

This command:
```
dsmc res backupset sys:\myfile sys:\h1\m1\ sys:\ann\ -su=y
-preser=nobase -loc=file
```

Restores these directories and files:
```
sys:ann\file.a
sys:ann\file.b
sys:ann\file.x
sys:ann\file.y
```

This command:
```
dsmc res sys:h1/m1/ sys:ann/ -preser=subtree
```

Restores these directories and files:
```
sys:ann/m1/file.a
sys:ann/m1/file.b
```

This command:
```
dsmc res sys:h1/m1/ sys:ann/ -preser=none
```

Restores these directories and files:
```
sys:ann/file.a
sys:ann/file.b
```

This command:
```
dsmc res sys:h1/m1/ sys:ann/ -su=yes -preser=complete
```

Restores these directories and files:
```
sys:ann/h1/m1/file.a
sys:ann/h1/m1/file.b
sys:ann/h1/m1/l1/file.x
sys:ann/h1/m1/l1/file.y
```

This command:
```
dsmc res sys:h1/m1/ sys:ann/ -su=yes -preser=nobase
```

Restores these directories and files:
```
sys:ann/file.a
sys:ann/file.b
sys:ann/l1/file.x
sys:ann/l1/file.y
```

This command:
```
dsmc res sys:h1/m1/ sys:ann/ -su=yes -preser=subtree
```

Restores these directories and files:

```
sys:ann/m1/file.a
sys:ann/m1/file.b
sys:ann/m1/l1/file.x
sys:ann/m1/l1/file.y
```

This command:
```
dsmc res sys:h1/m1/ sys:ann/ -su=yes -preser=none
```

Restores these directories and files:

```
sys:ann/file.a
sys:ann/file.b
sys:ann/file.x
sys:ann/file.y
```

Processorutilization

The *processorutilization* option specifies the amount of CPU time assigned to the client program. Because this option can affect other applications on your client node, use it only when speed is a high priority.

Note: The Tivoli Storage Manager client API does not support this option.

Options File

Place this option in the client options file (dsm.opt).

Syntax

►►──PROCESSORutilization── *number* ───►◄

Parameters

number
> Specifies the amount of time the client program will control the CPU, in hundredths of a second, before giving it to another application. For example, if the number is 1000, the client program controls the CPU for 10 seconds. The minimum value is zero. There is no maximum value. The default is zero.

Examples

Options file:
```
processor 2
```

Command line:
```
-processorutilization=10
```

This option is valid only on the initial command line. It is not valid in interactive mode.

Queryschedperiod

The *queryschedperiod* option specifies the number of hours you want the client scheduler to wait between attempts to contact the server for scheduled work. 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.

Note: The Tivoli Storage Manager client API does not support this option. The server can also define this option.

Options File

Place this option in the client options file (dsm.opt).

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 are displayed on your screen during processing. For example, when you run the **incremental**, **selective**, or **archive** commands, information might appear about each file that is backed up. Use the *quiet* option if you do not want to display this information.

When you use the *quiet* option, error and processing information appears on your screen, and messages are written to log files. If you do not specify *quiet*, the default option, *verbose* is used.

Notes:
1. The Tivoli Storage Manager client API does not support this option.
2. The server can also define the **quiet** option, overriding the client setting.

Options File

Place this option in the client 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 only on the initial command line. It is not valid in interactive mode.

Replace

The *replace* option specifies whether to overwrite existing files on your workstation, or to prompt you for your selection when you restore or retrieve files.

Attention: The *replace* option does not affect recovery of directory objects. Directory objects are always recovered, even when specifying **REPlace**=*no*. To prevent overwriting existing directories, use the FILESonly option.

You can use this option with the following commands:
- **restore**
- **retrieve**
- **restore backupset**
- **restore group**

Notes:

1. Replace prompting does not occur during a scheduled operation. If you set the *replace* option to prompt, Tivoli Storage Manager skips files without prompting during a scheduled operation.
2. The Tivoli Storage Manager client API does not support this option.

Options File

Place this option in the client options file (dsm.opt).

Syntax

```
                  ┌─Prompt─┐
►►──REPlace──┼────────┼──────────────────────────────────►◄
                  ├─All────┤
                  ├─Yes────┤
                  └─No─────┘
```

Parameters

Prompt
  For nonscheduled operations, you specify whether to overwrite existing files. For scheduled operations, existing files are not overwritten and no prompts are displayed. This is the default.

All
  All existing files are overwritten, including read-only files. If access to a file is denied, you are prompted to skip or overwrite the file. No action is taken on the file until there is a response to the prompt.

Yes
  Existing files are overwritten, *except* read-only files. For nonscheduled operations, you specify whether to overwrite existing read-only files. For scheduled operations, existing read-only files are not overwritten and no prompts are displayed. If access to a file is denied, the file is skipped.

No Existing files are not overwritten. No prompts will be displayed.

Examples

Options file:
```
      replace all
```

Command line:
        `-replace=no`

This option is valid on the initial command line and in interactive mode. If you use this option in interactive mode, it affects only the command with which it is specified. When that command completes, the value reverts to the value at the beginning of the interactive session. This will be the value from the dsm.opt file unless overridden by the initial command line or by an option forced by the server.

Resourceutilization

Use the *resourceutilization* option in your client options file dsm.opt to regulate the level of resources the Tivoli Storage Manager server and client can use during processing.

Regulating backup and archive sessions

When you request a backup or archive, the client can use more than one session to the server. The default is to use a maximum of two sessions; one to query the server and one to send file data. The client can use only one server session if you specify a *resourceutilization* setting of 1.

A client can use more than the default number of sessions when connecting to a server that is Version 3.7 or higher. For example, *resourceutilization*=10 permits up to eight sessions with the server. Multiple sessions can be used for querying the server and sending file data.

Multiple query sessions are used when you specify multiple file specifications with a backup or archive command. For example, if you enter:

```
inc filespaceA: filespaceB:
```

and you specify *resourceutilization*=5, the client might 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 might also try to read data from the file system and send it to the server on multiple sessions.

Note: During a backup operation, if you enter multiple file specifications, the result might be that files from one file specification are stored on multiple tapes and interspersed with files from different file specifications. This can decrease restore performance. Setting the *collocatebyfilespec* option to *yes* eliminates interspersing of files from different file specifications, by limiting the client to one server session per file specification. Therefore, if you store the data to tape, files for each file specification are stored together on one tape (unless another tape is required for more capacity). See "Collocatebyfilespec" on page 113 for more information.

Regulating restore sessions

When you request a restore, the default is to use a maximum of one session. Additional restore sessions are based on the following factors:

- Resourceutilization value
- How many tapes on which the requested data is stored
- How many tape drives are available
- The maximum number of mount points allowed for the node

Notes:

1. If all of the files are on disk, only one session is used. There is no multi-session for a pure disk storage pool restore. However, if you are performing a restore in which the files reside on 4 tapes and some on disk, you could use up to 5 sessions during the restore.
2. The Tivoli Storage Manager server can set the maximum number of mount points a node can use on the server using the MAXNUMMP parameter. If the *resourceutilization* option value exceeds the value of the MAXNUMMP on the server for a node, the backup can fail with an *Unknown System Error* message.
3. You can get a multi-session restore from your single **restore** command, and from a single volume on the server, if that volume is device class FILE.

For example, if the data you want to restore is on 5 different tape volumes, the maximum number of mount points is 5 for your node, and *resourceutilization* is set to 3, then 3 sessions will be used for the restore. If you increase the *resourceutilization* setting to 5, then 5 sessions will be used for the restore. There is a 1 to 1 relationship to the number of restore sessions allowed for the *resourceutilization* setting. Multiple restore sessions are only allowed for no query restore operations.

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 might not see performance improvement if it attempts to handle many random concurrent read requests.
- Sufficient bandwidth in the network to support the increased traffic.

Potentially undesirable aspects of running multiple sessions include:

- The client could produce multiple accounting records.
- The server might not start enough concurrent sessions. To avoid this, the server *maxsessions* parameter must be reviewed and possibly changed.
- A query node command might not summarize client activity.

Notes:
1. The Tivoli Storage Manager client API does not support this option.
2. The server can also define this option.

Options File

Place this option in the client options file (dsm.opt).

Syntax

▶▶──RESOURceutilization── *number*──────────────────────────────▶◀

Parameters

number
Specifies the level of resources the Tivoli Storage Manager server and client can use during processing. The range of values that you can specify is 1 through 10.

Examples

Options file:
        resourceutilization 7

Command line:
        -resourceutilization=7

This option is valid only on the initial command line. It is not valid in interactive mode.

Retryperiod

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 options file after your client node successfully contacts the server.

Note: The Tivoli Storage Manager client API does not support this option.

Options File

Place this option in the client options file (dsm.opt).

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.

Note: The Tivoli Storage Manager client API does not support this option.

Options File

Place this option in the client options file (dsm.opt).

Syntax

```
           None
►►──REVOKEremoteaccess──┬──────────┬──────────────────────────►◄
                        └─Access──┘
```

Parameters

None
> Does not revoke access to administrators who have client access authority for the client. This is the default.

Access
> Revokes access to administrators who have client access authority for the client.

Examples

Options file:
> revokeremoteaccess none

Command line:
> Does not apply

Schedcmddisabled

The *schedcmddisabled* option specifies whether to disable the scheduling of commands by the server *action*=**command** option on the **define schedule** server command.

This option does not disable the *preschedulecmd* and *postschedulecmd* commands. However, you can specify *preschedulecmd* or *postschedulecmd* with a blank or a null string to disable the scheduling of these commands.

You can disable the scheduling of commands defined by your Tivoli Storage Manager administrator by setting the *schedcmddisabled* option to *yes*.

Use the **query schedule** command to query the schedules defined by your administrator. See "Query Schedule" on page 296 for more information.

Notes:

1. The Tivoli Storage Manager client API does not support this option.
2. The server can also define this option.

Options File

Place this option in the client options file (dsm.opt).

Syntax

```
         ┌─No──┐
►►──SCHEDCMDDisabled─┤     ├──────────────────────────────►◄
         └─Yes─┘
```

Parameters

Yes Specifies that Tivoli Storage Manager disables the scheduling of commands by the server using the *action*=**command** option on the **define schedule** server command.

No Specifies that Tivoli Storage Manager does not disable the scheduling of commands by the server using the *action*=**command** option on the **define schedule** server command. This is the default.

Examples

Options file:
```
    schedcmddisabled no
```

Command line:
```
    Does not apply.
```

Schedlogmax

The *schedlogmax* option specifies the maximum size of the schedule log, in megabytes. Log records are added to the end of the file, until the maximum specified size is reached. When the maximum specified size is reached, a log record saying "Continued at beginning of file" is placed as the last record in the file. Subsequent logging is resumed at the top of the file. The end of the wrapped log is indicated by a record saying "END OF DATA". Log messages that are overwritten by wrapping are not saved in a prune file, as they are with the pruning method of log size management.

If you change from *schedlogmax* to *schedlogretention*, all existing log entries are retained and the log is pruned using the new *schedlogretention* criteria.

If you change from *schedlogretention* to *schedlogmax*, all records in the existing log are copied to the pruned log, dsmsched.pru, the existing log is emptied, and logging begins under the new log wrapping criteria.

If you change the value of the *schedlogmax* option, the existing log is extended or shortened to accommodate the new size. If the value is reduced, the oldest entries are deleted to reduce the file to the new size.

Restriction: You cannot specify a non-zero *schedlogmax* value *and* enable *schedlogretention*.

Options File

Place this option in the client options file (dsm.opt).

Syntax

```
►►──SCHEDLOGMAX── size──────────────────────────────────────────►◄
```

Parameters

size
> Specifies the maximum size, in megabytes, for the log file. The range of values is 0 to 2047; the default is 0, which disables log file wrapping and allows the log file to grow indefinitely.

Examples

Options file:
> schedlogmax 100

Command line:
> –schedlogmax=100

This option is valid only on the initial command line. It is not valid in interactive mode.

Schedlogname

The *schedlogname* option specifies the path and file name where you want to store schedule log information. Use this option only when you want to store schedule log information. This option applies only when the scheduler is running. If this option is not used, the dsmsched.log file is created in the same directory as the dsmerror.log file. See "Errorlogname" on page 140 for more information on placement of the dsmsched.log file.

When you run the **schedule** command, output from scheduled commands appears on your screen. Output is also sent to the file you specify with this option. If any part of the path you specify does not exist, Tivoli Storage Manager attempts to create it

Note: The Tivoli Storage Manager client API does not support this option.

Options File

Place this option in the client options file (dsm.opt).

Syntax

```
►►──SCHEDLOGName─ filespec─────────────────────────────────────────►◄
```

Parameters

filespec
Specifies the path and file name where you want to store schedule log information when processing scheduled work. If any part of the path you specify does not exist, Tivoli Storage Manager attempts to create it.

If you specify a file name only, the file is stored in your current directory. The default is the current working directory with a file name of dsmsched.log.

Examples

Options file:
> schedlogname dmmock\sys:mydir/schedlog.jan

Command line:
> -schedlogn=dmmock\sys:mydir/schedlog.jan

This option is valid only on the initial command line. It is not valid in interactive mode.

Schedlogretention

The *schedlogretention* option specifies the number of days to keep entries in the schedule log, and whether to save the pruned entries. The schedule log is pruned during the initial start of scheduler and after a scheduled event completes.

If you change from *schedlogretention* to *schedlogmax*, all records in the existing log are copied to the pruned log dsmsched.pru, the existing log is emptied, and logging begins under the new log wrapping criteria.

If you change from *schedlogmax* to *schedlogretention*, all existing log entries are retained and the log is pruned using the new *schedlogretention* criteria.

Restriction: You cannot specify a non-zero *schedlogmax* value *and* enable *schedlogretention*.

Options File

Place this option in the client options file (dsm.opt).

Syntax

```
►►──SCHEDLOGRetention──┬──N────┬──┬──D──┬──────────────────────►◄
                       └─days─┘  └──S──┘
```

Parameters

N or *days*
> Specifies how long to wait before pruning the schedule log.
>
> *N*   Do not prune the log. This permits the log to grow indefinitely. This is the default.
>
> *days*
> > Specifies the number of days to keep log file entries before pruning. The range of values is zero through 9999.

D or *S*
> Specifies whether to save the pruned entries. Use a space or comma to separate this parameter from the previous one.
>
> *D*   Discards the log entries when pruning the log. This is the default.
>
> *S*   Saves the log entries when pruning the log.
>
> > Pruned entries are copied to the dsmsched.pru file that is stored in the same directory as the schedule log.

Examples

Options file:
> schedlogretention 30 S

Command line:
> -schedlogretention=30,S

This option is valid only on the initial command line. It is not valid in interactive mode.

Schedmode

The *schedmode* option specifies whether you want to use the *polling* mode (your client node periodically queries the server for scheduled work), or the *prompted* mode (the server contacts your client node when it is time to start a scheduled operation). All communication methods can use the client polling mode, but only TCP/IP can use the server prompted mode.

This option applies *only if* you are using the TCP/IP communication method, and the **schedule** command is running.

Your administrator can specify that the server support both modes or just one mode. If your administrator specifies that both modes are supported, you can select either schedule mode. If your administrator specifies only one mode, you must specify that mode in your dsm.opt file or scheduled work will not be processed.

If you specify *prompted* mode, you should consider supplying values for the *tcpclientaddress* and *tcpclientport* options in your dsm.opt file or on the schedule command; the client can then be contacted at either an address or a port of your choice (useful for client systems with multiple network interface cards).

Notes:

1. When changing the setting of this option in the client options file (dsm.opt) you must stop and restart the scheduler service for the setting to take effect.
2. The server can also define this option.

Options File

Place this option in the client options file (dsm.opt).

Syntax

```
>>──SCHEDMODe──┬──POlling──┬──────────────────────────────────><
               └──PRompted──┘
```

Parameters

POlling
>The client scheduler queries the server for scheduled work at prescribed time intervals. This is the default. You can set the time intervals using the *queryschedperiod* option.

PRompted
>The client scheduler waits for the server to contact your client node when scheduled work needs to be done.

Examples

Options file:
>schedmode prompted

Command line:
>-schedmod=po

This option is valid only on the initial command line. It is not valid in interactive mode.

Schedrestretrdisabled

The *schedrestretrdisabled* option specifies whether to disable the execution of restore or retrieve schedule operations.

Supported Clients

This option is valid for all clients. The server cannot define this option. The Tivoli Storage Manager API does not support this option.

Options File

Place this option in the client options file (dsm.opt) for the scheduler.

Syntax

```
►►──SCHEDRESTRETRDisabled──┬──No──┬──────────────────────────────────►◄
                           └──Yes──┘
```

Parameters

No Specifies that Tivoli Storage Manager does not disable the execution of restore and retrieve schedule operations. This is the default.

Yes
Specifies that Tivoli Storage Manager disable the execution of restore and retrieve schedule operations.

Examples

Options file:
    schedrestretrdisabled yes

Command line:
    Does not apply.

Scrolllines

The *scrolllines* option specifies the number of lines of information that are displayed on your screen at one time. Use this option when you set the *scrollprompt* option to *Yes* and you use one of the following commands.

You can use the *scrolllines* option with the following commands only:
- **delete filespace**
- **query archive**
- **query backup**
- **query backupset**
- **query filespace**
- **query group**
- **query options**

Notes:
1. The Tivoli Storage Manager client API does not support this option.
2. The server can also define this option.

Options File

Place this option in the client options file (dsm.opt).

Syntax

```
►►──SCROLLLines─ number───────────────────────────────────────►◄
```

Parameters

number
Specifies the number of lines of information that are displayed on your screen at one time. The range of values is 1 through 80; the default is 20.

Examples

Options file:
```
scrolllines 25
```

Command line:
```
-scrolll=25
```

This option is valid on the initial command line and in interactive mode. If you use this option in interactive mode, it affects only the command with which it is specified. When that command completes, the value reverts to the value at the beginning of the interactive session. This will be the value from the dsm.opt file unless overridden by the initial command line or by an option forced by the server.

Scrollprompt

The *scrollprompt* option specifies whether you want Tivoli Storage Manager to stop and wait after displaying the number of lines of information you specified with the *scrolllines* option, or scroll through and stop at the end of the information list.

You can use the *scrollprompt* option with the following commands only:
- **delete filespace**
- **query archive**
- **query backup**
- **query backupset**
- **query filespace**
- **query group**
- **query options**

Notes:
1. The Tivoli Storage Manager client API does not support this option.
2. The server can also define this option.

Options File

Place this option in the client options file (dsm.opt).

Syntax

```
              ┌─No──┐
►►──SCROLLPrompt─┼─────┼──────────────────────────────────►◄
              └─Yes─┘
```
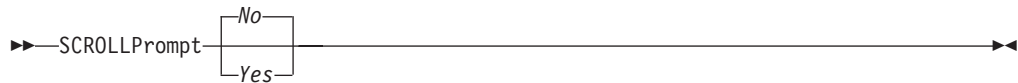
Parameters

No   Scrolls to the end of the list and stops. This is the default.

Yes   Stops and waits after displaying the number of lines you specified with the *scrolllines* option. The following prompt is displayed at the bottom of the screen:

```
Press 'Q' to quit, 'C' to continuous scroll, or 'Enter' to
continue.
```

Examples

Options file:
```
scrollprompt yes
```

Command line:
```
-scrollp=yes
```

This option is valid on the initial command line and in interactive mode. If you use this option in interactive mode, it affects only the command with which it is specified. When that command completes, the value reverts to the value at the beginning of the interactive session. This will be the value from the dsm.opt file unless overridden by the initial command line or by an option forced by the server.

Sessioninitiation

Use the *sessioninitiation* option to control whether the server or client initiates sessions through a firewall. The default is that the client initiates sessions. You can use this option with the **schedule** command.

For the client scheduler, it is unnecessary to open *any* ports on the firewall. If you set the *sessioninitiation* option to *serveronly*, the client will not attempt to contact the server. *All sessions must be initiated by server prompted scheduling* on the port defined on the client with the **tcpclientport** option. The *sessioninitiation* option only affects the behavior of the client scheduler running in the prompted mode. If you set the *sessioninitiation* option to *serveronly*, with the exception of client acceptor daemon-managed schedulers, the command-line client and Web client GUI will still attempt to initiate sessions.

Attention: You cannot use the dsmcad for scheduling when you set the *sessioninitiation* option to *serveronly*.

Note: If you set the *sessioninitiation* option to *serveronly*, the client setup wizard and scheduler service are unable to authenticate to the Tivoli Storage Manager server. In this case, you can execute the scheduler from the command line (dsmc schedule) and enter the password for your node when prompted.

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

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

Notes:

1. The Tivoli Storage Manager server can specify SESSIONINITiation=*clientorserver* or SESSIONINITiation=*serveronly* on the **register node** and **update node** commands. If the server specifies SESSIONINITiation=*clientorserver*, the client can decide which method to use. If the server specifies SESSIONINITiation=*serveronly*, all sessions are initiated by the server.
2. If *sessioninitiation* is set to *serveronly*, the value for the **tcpclientaddress** client option must be the same as the value for the *HLAddress* option of the **update node** or **register node** server command. The value for the **tcpclientport** client option must be the same as the value for the *LLAddress* option of the **update node** or **register node** server command.
3. The Tivoli Storage Manager client API does not support this option.

Options File

Place this option in the client options file (dsm.opt).

Syntax

```
               ┌─Client─────┐
►►──SESSIONINITiation──┤            ├──────────────────────────────────►◄
               └─SERVEROnly─┘
```
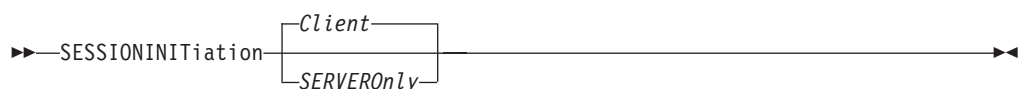
Parameters

Client
> Specifies that the client will initiate sessions with the server by communicating on the TCP/IP port defined with the *server* option **tcpport**. This is the default. Server prompted scheduling can be used to prompt the client to connect to the server.

SERVEROnly
> Specifies that the server will not accept client requests for sessions. All sessions must be initiated by server prompted scheduling on the port defined on the client with the **tcpclientport** option (see "Tcpclientport" on page 228. Except for client acceptor daemon-managed schedulers, the command-line client and Web client GUI will still attempt to initiate sessions.

Examples

Options file:
> ```
> sessioninitiation serveronly
> ```

Command line:
> ```
> schedule -sessioninitiation=serveronly
> ```

This option is valid only on the initial command line. It is not valid in interactive mode.

Showmembers

Use the *showmembers* option with the following commands to display all members of a group:
- **query group**
- **restore group**

The *showmembers* option is not valid with the *inactive* option. If you want to display members of a group that are not currently active, use the *pitdate* and *pittime* options.

Syntax

```
►►──SHOWMembers──────────────────────────────────────────────────────────►◄
```

Parameters

There are no parameters for this option.

Examples

Command line:
```
query group {accounting}:group1 -showmembers
restore group {accounting}:* -pick -showmembers
```

Snapshotroot

Use the *snapshotroot* option with the **incremental**, **selective**, or **archive** commands in conjunction with a third-party application that provides a snapshot of a logical volume, to associate the data on the local snapshot with the real file space data that is stored on the Tivoli Storage Manager server.

In the following example, `c:\snapshots\snapshot.0` is NFS mounted from a NAS filer and `/philo/test945.snapshot/backupsnap` represents the snapshot created at the NAS filer.

The *snapshotroot* option does not provide any facilities to take a volume snapshot, only to manage data created by a volume snapshot.

For example, consider an application that takes a snapshot of the sys: volume and mounts it as SNAP1: volume. If you back up this data using the following command:

```
dsmc incremental SNAP1:
```

a unique file space called SNAP1: is created on the server. However, you might want to associate the snapshot data with the data already processed for the sys: volume. Using the *snapshotroot* option, you can associate the data with the file space corresponding to the sys: volume on the Tivoli Storage Manager server:

```
dsmc incremental sys: -snapshotroot=SNAP1:
```

On a subsequent day, you can back up a snapshot that was written to an alternate location, but managed under the same file space on the server:

```
dsmc incremental sys: -snapshotroot=SNAP2:
```

You can perform incremental backups, selective backups, or archives of a single directory, directory structure, or single file using the *snapshotroot* option. In all instances, the *snapshotroot* option must identify the root of the logical volume that was created by the snapshot. For example:

```
dsmc incremental sys:/system/dir1/* -subdir=yes
    -snapshotroot=SNAP1:
dsmc selective sys:/system/dir1/file.txt -subdir=yes
    -snapshotroot=SNAP1:
dsmc archive sys:/system/dir1/*.txt -subdir=yes
    -snapshotroot=SNAP1:
```

If you want to include or exclude specific file specifications, the include and exclude statements should contain the name of the file system that was the *source* of the snapshot (the sys: volume), and *not* the name of the target of the snapshot (SNAP1:). This allows you to preserve a set of include and exclude statements regardless of the name of the logical volume to which the snapshot is written. Examples of include and exclude statements are:

```
include sys:/system/dir1/*.txt 1yrmgmtclass
exclude sys:/mydocs/*.txt
```

The following include-exclude statements are not valid because they contain the name of the snapshot:

```
include SNAP1:/dir1/*.txt 1yrmgmtclass
exclude SNAP1:/mydocs/*.txt
```

You must use the *snapshotroot* option in conjunction with a single file specification for a incremental, selective, or archive operation. You cannot specify multiple file specifications or no file specifications. For example, these commands are valid:

```
dsmc incremental sys: -snapshotroot=SNAP1:
dsmc incremental sys:/system/* -snapshotroot=SNAP1:
```

The following command is invalid because it contains two file specifications:

```
dsmc incremental sys:/system/* sys:/dir1/*
  -snapshotroot=SNAP1:
```

The following command is invalid because it contains no file specification:

```
dsmc incremental -snapshotroot=SNAP1:
```

Notes:

1. Ensure that the snapshotroot references a snapshot of the correct volume. Ensure that snapshotroot refers to the root of the snapshot. If these rules are not followed, unintended results such as files expiring incorrectly can result.
2. You cannot use the *snapshotroot* option in conjunction with the *filelist* option.
3. You cannot use the *snapshotroot* option when processing any of the special file spaces, such as NetWare NDS and SERVER SPECIFIC INFO.
4. You cannot use the *snapshotroot* option when the snapshot source is a volume on a remote server.
5. You can use the *snapshotroot* option in conjunction with the *preschedulecmd* and *postschedulecmd* options, or in a automated script that you execute with the Tivoli Storage Manager client scheduler.

Syntax

▶▶──SNAPSHOTRoot =─ *snapshot_volume_name*────────────────────────────────────◀◀

Parameters

snapshot_volume_name
> Specifies the root of the logical volume created by the third-party snapshot application.

Examples

Command line:
> ```
> dsmc incremental sys: -snapshotroot=SNAP1:
> ```

Srvprepostscheddisabled

The *srvprepostscheddisabled* option specifies whether to prevent the pre-schedule and post-schedule commands specified by the Tivoli Storage Manager administrator from executing on the client system, when performing scheduled operations. The *srvprepostscheddisabled* option can be used in conjunction with the *schedcmddisabled* and *srvprepostsnapdisabled* options to disable the execution of any unwanted Operating System command by a Tivoli Storage Manager administrator on a Tivoli Storage Manager client node.

Supported Clients

This option is valid for all Tivoli Storage Manager clients that use the Tivoli Storage Manager client scheduler. The server cannot define this option.

Options File

Place this option in the client options file (dsm.opt) for the scheduler.

Syntax

```
           ┌─No──┐
►►──SRVPREPOSTSCHeddisabled──┼─────┼──────────────────►◄
           └─Yes─┘
```

Parameters

No   Specifies that Tivoli Storage Manager allows pre-schedule and post-schedule commands defined by the Tivoli Storage Manager administrator to execute on the client system, when performing scheduled operations. If a pre-schedule or a post-schedule command is defined by both the client and the Tivoli Storage Manger administrator, the command defined by the administrator will override the corresponding command defined in the client option file. This is the default.

Yes   Specifies that Tivoli Storage Manager prevents pre-schedule and post-schedule commands defined by the Tivoli Storage Manager administrator to execute on the client system, when performing scheduled operations. If a pre-schedule or a post-schedule command is defined by both the client and the Tivoli Storage Manger administrator, the command defined by the administrator will *not* override the corresponding command defined in the client option file. This option can be used in conjunction with the *schedcmddisabled* and *srvprepostsnapdisabled* options.

Examples

Options file:
    srvprepostscheddisabled yes

Command line:
    Does not apply.

Subdir

The *subdir* option specifies whether you want to include subdirectories of named directories for processing on the following commands:
* **archive**
* **delete archive**
* **delete backup**
* **incremental** (if the file specification is not a domain)
* **query archive**
* **query backup**
* **restore**
* **restore backupset**
* **retrieve**
* **selective**

For example, if you set the *subdir* option to *yes* when backing up a specific path and file, Tivoli Storage Manager recursively backs up *all* subdirectories under that path, and any instances of the specified file that exist under *any* of those subdirectories.

Notes:
1. The Tivoli Storage Manager client API does not support this option.
2. The server can also define this option.

Options File

Place this option in the client options file (dsm.opt).

Syntax

```
►►──SUbdir──┬─No──┬──────────────────────────────────────────────────►◄
            └─Yes─┘
```

Parameters

No   Subdirectories are not processed. This is the default.

Yes Subdirectories are processed. Because the client program searches all subdirectories of a directory that is being processed, processing can take longer to complete. Specify *Yes* only when necessary.

      Note: If you use the *preservepath* option in addition to *subdir=yes*, it can affect which subdirectories are processed. For more information, see "Preservepath" on page 194.

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 sys:path/doc1/* sys:path2/ -su=y
dsmc rest sys:path/doc1/file* sys:path2/ -su=y
dsmc rest sys:path/doc1/file1* sys:path2/ -su=y
```

This option is valid on the initial command line and in interactive mode. If you use this option in interactive mode, it affects only the command with which it is specified. When that command completes, the value reverts to the value at the beginning of the interactive session. This will be the value from the dsm.opt file unless overridden by the initial command line or by an option forced by the server.

Tapeprompt

The *tapeprompt* option specifies whether you want Tivoli Storage Manager to wait for a tape mount if it is required for a backup, archive, restore, or retrieve process, or to be prompted for a choice.

In the Tivoli Storage Manager Web client GUI, the Media Mount dialog can display the **Information Not Available** value in the Device and Volume Label fields if you perform a standard (also known as classic) restore or retrieve operation. This value means that this information is only available for no query restore or retrieve operations; not a standard restore or retrieve operation. The Device field displays the name of the device on which to mount the media needed to process an object. The Volume Label field displays the name of the volume needed to process an object. See "Standard query restore, no query restore, and restartable restore" on page 51 for a discussion of standard and no query restore operations.

Tape prompting does not occur during a scheduled operation regardless of the setting for the *tapeprompt* option.

The *tapeprompt* option can be used with the following commands:
- **archive**
- **delete archive**
- **delete backup**
- **incremental**
- **restore**
- **retrieve**
- **selective**

Note: The server can also define this option.

Options File

Place this option in the client options file (dsm.opt).

Syntax

```
>>─TAPEPrompt─┬─No──┬──────────────────────────────────><
              └─Yes─┘
```
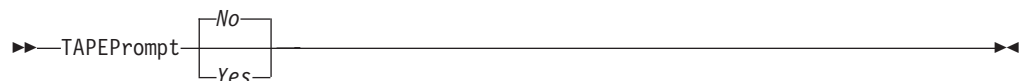
Parameters

No You are not prompted for your choice. The server waits for the appropriate tape to mount. This is the default.

Yes You are prompted when a tape is required to back up, archive, restore, or retrieve data. At the prompt, you can wait for the appropriate tape to be mounted, always wait for a tape to be mounted, skip a particular object, skip all objects on a single tape, skip all objects on all tapes, or cancel the entire operation.

Examples

Options file:
```
tapeprompt yes
```

Command line:
    `-tapep=yes`

This option is valid only on the initial command line. It is not valid in interactive mode.

Tcpbuffsize

The *tcpbuffsize* option specifies the size of the internal TCP/IP communication buffer used to transfer data between the client node and server. Although it uses more memory, a larger buffer can improve communication performance.

Options File

Place this option in the client options file (dsm.opt).

Syntax

```
►►──TCPBuffsize─ size───────────────────────────────────────────────►◄
```

Parameters

size

   Specifies the size, in kilobytes, that you want to use for the internal TCP/IP communication buffer. The range of values is 1 through 512; the default is 32.

   Depending on the operating system communication settings, your system might not accept all values in the range of 1 through 512.

Examples

Options file:
```
tcpb 32
```

Command line:
```
-tcpbuffsize=32
```

This option is valid only on the initial command line. It is not valid in interactive mode.

Tcpcadaddress

The *tpccadaddress* option specifies a TCP/IP address for dsmcad. Normally, this option is not needed. Use this option only if your client node has more than one TCP/IP address, or if TCP/IP is not the default communication method (see "Commmethod" on page 115).

Options File

Place this option in the client options file (dsm.opt).

Syntax

```
►►──TCPCADAddress─ ──cad_address────────────────────────────────►◄
```

Parameters

cad_address

Specifies a TCP/IP Internet domain name or a numeric IP address. You can specify TCPip or V6Tcpip.

Examples

Options file:

```
tcpcada dsmclnt.sanjose.ibm.com
```

Command line:

```
-tcpcadaddress=128.33.10.249
```
```
-tcpcadaddress=khoyt.mycompany.mydomain.com
```

This option is valid only on the initial command line of the dsmcad program. It is not valid with other dsm modules.

Tcpclientaddress

The *tcpclientaddress* option specifies a TCP/IP address if your client node has more than one address, and you want the server to contact an address other than the one that was used to make the first server contact. The server will use this address when it begins the server prompted scheduled operation.

Use this option only if you use the *prompted* parameter with the *schedmode* option.

If *sessioninitiation* is set to *serveronly*, the value for the *tcpclientaddress* client option should be the same as the value for the *HLAddress* server option.

Note: The Tivoli Storage Manager client API does not support this option.

Options File

Place this option in the client options file (dsm.opt).

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 numeric IP address only.

Examples

Options file:
```
tcpclienta 128.33.10.249
```

Command line:
```
-tcpclientaddress=128.33.10.249
-tcpclientaddress=khoyt.mycompany.mydomain.com
```

This option is valid only on the initial command line. It is not valid in interactive mode.

Tcpclientport

The *tcpclientport* option specifies a TCP/IP port number for the server to contact the client when the server begins the server prompted scheduled operation. Use this option only if you specify the *prompted* parameter with the *schedmode* option.

If *sessioninitiation* is set to *serveronly*, the value for the *tcpclientport* client option should be the same as the value for the *LLAddress* server option.

Note: The Tivoli Storage Manager client API does not support this option.

Options File

Place this option in the client options file (dsm.opt).

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

The *tcpnodelay* option specifies whether the client disables the delay of sending successive small packets on the network, per transaction. Change the value from the default of *yes* only under one of these conditions:

- You are directed to change the option by IBM technical support.
- You fully understand the effects of the TCP Nagle algorithm on network transmissions. Setting the option to *no* enables the Nagle algorithm, which delays sending small successive packets.

Options File

Place this option in the client options file (dsm.opt).

Syntax

```
            ┌─Yes─┐
►►──TCPNodelay─┤     ├──────────────────────────────────────────►◄
            └─No──┘
```

Parameters

No   Specifies that the server does not allow successive small packets to be sent immediately over the network. Setting this option to *no* can degrade performance.

Yes   Specifies that the server or client allows successive small packets to be sent immediately over the network. The default is *yes*.

Examples

Options file:
     tcpnodelay yes

Command line:
     Does not apply.

Tcpport

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

Options File

Place this option in the client options file (dsm.opt).

Syntax

```
►►──TCPPort─ port_address──────────────────────────────────────────►◄
```

Parameters

port_address
> Specifies the TCP/IP port address that is used to communicate with a server. The range of values is 1000 through 32767; the default is 1500.

Examples

Options file:
> tcpp 1501

Command line:
> -tcpport=1501

This option is valid only on the initial command line. It is not valid in interactive mode.

Tcpserveraddress

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

Options File

Place this option in the client options file (dsm.opt).

Syntax

```
►►──TCPServeraddress─ server_address──────────────────────────────────►◄
```

Parameters

server_address
    Specifies a 1 to 64 character TCP/IP address for a server. Specify only a numeric IP address.

Examples

Options file:
    `tcps dsmchost.endicott.ibm.com`

Command line:
    `-tcpserveraddress=129.33.24.99`

This option is valid only on the initial command line. It is not valid in interactive mode.

Tcpwindowsize

Use the *tcpwindowsize* option to specify, in kilobytes, the size you want to use for the TCP/IP sliding window for your client node. The sending host cannot send more data until it receives an acknowledgment and a TCP receive window update. Each TCP packet contains the advertised TCP receive window on the connection. A larger window allows the sender to continue sending data and can improve communication performance.

Options File

Place this option in the client options file (dsm.opt).

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 64. A value of 0 allows Tivoli Storage Manager to use the operating system default TCP window size. Values from 1 to 64 indicate that the window size is in the range of 1KB to 64KB. The default is 63.
>
> If you specify a value less than 1, the TCP window size defaults to 1. If you specify a value greater than 64, the TCP window size defaults to 64.
>
> **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.

Examples

Options file:
> tcpwindowsize 63

Command line:
> -tcpw=63

This option is valid only on the initial command line. It is not valid in interactive mode.

Timeformat

The *timeformat* option specifies the format in which you want to display system time.

Use this option if you want to change the default time format for the language of the message repository you are using.

Note: The *timeformat* option does not affect the Web client. The Web client uses the time format for the locale that the browser is running in. If the browser is not running in a locale that Tivoli Storage Manager supports, the Web client uses the time format for US English.

You can use the *timeformat* option with the following commands:
- **delete archive**
- **delete backup**
- **expire**
- **query archive**
- **query backup**
- **query filespace**
- **restore**
- **retrieve**
- **set event**

Options File

Place this option in the client 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. When you include the *timeformat* option in a command, it must precede the *fromtime*, *pittime*, and *totime* options.
  1   23:00:00
  2   23,00,00
  3   23.00.00
  4   12:00:00 A/P

Examples

Options file:
    timeformat 4

Command line:
    -time=3

This option is valid on the initial command line and in interactive mode. If you use this option in interactive mode, it affects only the command with which it is specified. When that command completes, the value reverts to the value at the beginning of the interactive session. This will be the value from the dsm.opt file

unless overridden by the initial command line or by an option forced by the server.

Todate

Use the *todate* option with the *totime* option to specify an ending date and time to which you want to search for backups or archives during a restore, retrieve, or query operation. For example, you might request a list of files that were backed up before 11:59 PM on June 30, 2002.

Use the *todate* and *totime* options with the *fromtime* and *fromdate* options to request a list of backed up or archived files within a period of time. For example, you might request a list of files that were backed up between 6:00 AM on July 1, 2002 and 11:59 PM on July 30, 2002.

Use the *todate* option with the following commands:
- **delete backup**
- **query archive**
- **query backup**
- **restore**
- **restore group**
- **retrieve**

Note: The Tivoli Storage Manager client API does not support this option.

Syntax

```
►►──TODate =─ date──────────────────────────────────────────────►◄
```

Parameters

date
> Specifies an ending date. Enter the date in the format you selected with the *dateformat* option.
>
> When you include *dateformat* with a command, it must precede the *fromdate*, *pitdate*, and *todate* options.

Examples

Command line:
```
dsmc restore sys:\test\* -todate=12/11/2003
```

Totime

Use the *totime* option with the *todate* option to specify an ending date and time to which you want to search for backups or archives during a restore, retrieve, or query operation. For example, you might request a list of files that were backed up before 11:59 PM on June 30, 2003. Tivoli Storage Manager ignores this option if you do not specify the *todate* option.

Use the *totime* and *todate* options with the *fromtime* and *fromdate* options to request a list of files that were backed up within a period of time. For example, you might request a list of files that were backed up between 6:00 AM on July 1, 2003 and 11:59 PM on July 30, 2003.

Use the *totime* option with the following commands:
- **delete backup**
- **query archive**
- **query backup**
- **restore**
- **restore group**
- **retrieve**

Note: The Tivoli Storage Manager client API does not support this option.

Syntax

```
►►──TOTime =─ time─────────────────────────────────────────────►◄
```

Parameters

time
> Specifies an ending time. If you do not specify a time, the time defaults to 23:59:59. Specify the time in the format you selected with the *timeformat* option.
>
> When you include the *timeformat* option in a command, it must precede the *fromtime*, *pittime*, and *totime* options.

Examples

Command line:
> dsmc restore sys:\test* **-totime=23:00:00 -todate=09/17/2003**

Txnbytelimit

The *txnbytelimit* option specifies the number of kilobytes the client program buffers before it sends a transaction to the server. A *transaction* is the unit of work exchanged between the client and server. Because the client program can transfer more than one file or directory between the client and server before it commits the data to server storage, a transaction can contain more than one file or directory. This is called a *transaction group*.

This option permits you to control the amount of data sent between the client and server before the server commits the data and changes to the server database, thus changing the speed with which the client performs work. The amount of data sent applies when files are batched together during backup or when receiving files from the server during a restore procedure.

The server administrator can limit the number of files or directories contained within a transaction group using the *txngroupmax* option on the server, so the actual size of a transaction can be less than your *txnbytelimit*. Once this number is reached, the client sends the files to the server *even if* the transaction byte limit is not reached.

Options File

Place this option in the client options file (dsm.opt).

Syntax

```
►►──TXNBytelimit─ number─────────────────────────────────────────────────►◄
```

Parameters

number
> Specifies the number of kilobytes the client program can buffer together in a transaction before it sends data to the server. The range of values is 300 through 2097152 (2 GB); the default is 25600.

Examples

Options file:
> txnb 25600

Command line:
> -txnb=25600

This option is valid only on the initial command line. It is not valid in interactive mode.

Type

Use the *type* option with the **query node** command to specify the type of node to query.

Syntax

```
►►──TYpe =──┬──any────┬──────────────────────────────────►◄
            ├──server─┤
            └──client─┘
```

Parameters

any
   Specifies all nodes registered at the server. This is the default.

server
   Specifies client nodes that are other Tivoli Storage Manager servers.

client
   Specifies client nodes that are backup-archive clients.

Examples

Command line:
   query node -type=client

V2archive

Use the *v2archive* option with the **archive** command to archive only files to the server. Tivoli Storage Manager will not process directories that exist in the path of the source file specification.

Note: Do not use the *v2archive* option when archiving the NDS.

This option differs from the *filesonly* option in that the *filesonly* option archives the directories that exist in the path of the source file specification.

The *v2archive* and *dirsonly* options are mutually exclusive and an error message is displayed if you use both options in the same **archive** command.

If you use this option, you might want to consider the following:
- You might experience performance problems when retrieving large amounts of data archived with this option.
- You might want to use this option only if you are concerned about expiration performance on a server that already contains extremely large amounts of archived data.
- If there are multiple files with the same name for the *v2archive* option, the files are archived multiple times, with their directory structure. The *v2archive* option archives only the files.

Note: The Tivoli Storage Manager client API does not support this option.

Syntax

►►——V2archive———►◄

Parameters

There are no parameters for this option.

Examples

This command:
> dsmc archive sys:relx/dir1/ -v2archive -su=y.

> **Archives these files:**

> sys:relx/dir1/file1
> sys:relx/dir1/file2
> sys:relx/dir1/file3
> sys:relx/dir1/dir2/file4
> sys:relx/dir1/dir2/file5

> Note: Tivoli Storage Manager does not archive sys:relx/dir1 and sys:relx/dir1/dir2.

Verbose

The *verbose* option specifies that you want to display detailed processing information on your screen. This is the default. When you run the **incremental**, **selective**, or **archive** commands, information is displayed about each file that is backed up. Use the *quiet* option if you do not want to display this information.

The following behavior applies when using the *verbose* and *quiet* options:

- If the server specifies either the *quiet* or *verbose* option in the server client option set, the server settings override the client values, even if **force** is set to *no* on the server.
- If you specify *quiet* in your dsm.opt file, and you specify *-verbose* on the command line, *-verbose* prevails.
- If you specify both *-quiet* and *-verbose* on the same command, the last option encountered during options processing prevails. If you specify *-quiet -verbose*, *-verbose* prevails. If you specify *-verbose -quiet*, *-quiet* prevails.

Notes:
1. The Tivoli Storage Manager client API does not support this option.
2. The server can also define this option.

Options File

Place this option in the client 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 only on the initial command line. It is not valid in interactive mode.

Virtualfsname

Use the *virtualfsname* option with the **backup group** command to specify the name of the virtual file space for the group on which you want to perform the operation. The *virtualfsname* cannot be the same as an existing file space name.

Syntax

```
►►──VIRTUALFSname =─ fsname──────────────────────────────────────────────►◄
```

Parameters

fsname
: Specifies the name of the container for the group on which you want to perform the operation.

Examples

Command line:
```
backup group -filelist=sys:/tivoli/acct.lst -groupname=group1
-virtualfsname=accounting -mode=full
```

Virtualnodename

The *virtualnodename* option specifies the node name of your workstation when you want to restore or retrieve files to a different workstation.

When you use the *virtualnodename* option in your client options file, or with a command:

- You must specify the name you specified with the *nodename* option in your client options file (dsm.opt). This name should be different from the name returned by the **hostname** command on your workstation.
- Tivoli Storage Manager prompts for the password assigned to the node you specify, if a password is required. If you enter the correct password, you have access to all backups and archives that originated from the specified node.

When connecting to a server, the client must identity itself to the server. This login identification is determined in the following ways:

- If the *nodename* and *virtualnodename* options are not specified, or a virtual node name is not specified on the command line, the default login ID is the name returned by the **hostname** command.
- If the *nodename* option is specified, the name specified with the *nodename* option overrides the name returned by the **hostname** command.
- If the *virtualnodename* option is specified, or a virtual node name is specified on a command line, it cannot be the same name as the name returned by the **hostname** command.

When the virtual node name is accepted by the server, a password is required (assuming authentication is on), even if the *passwordaccess* option is *generate*. Once a connection to the server is established, then access is permitted to any file backed up using this login ID.

Options File

Place this option in the client options file (dsm.opt).

Syntax

```
►►──VIRTUALNodename─ nodename───────────────────────────────────────────►◄
```

Parameters

nodename
>   Specifies a 1- to 64-character name that identifies the node for which you want to request Tivoli Storage Manager services. There is no default.

Examples

Options file:
>   virtualnodename cougar

Command line:
>   -virtualn=banshee

This option is valid only on the initial command line. It is not valid in interactive mode.

Volinformation

The *volinformation* option backs up or archives root-level information. For the NetWare file server, *volinformation* handles volume restrictions and volume root-level trustee information.

For NetWare Directory Services, *volinformation* handles the [root] container and NDS schema.

Use the *volinformation* option with the following commands:
- **archive**
- **incremental**
- **selective**
- **restore**
- **restore group**
- **retrieve**

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.

Note: The Tivoli Storage Manager client API does not support this option.

Syntax

►►──VOLinformation──►◄

Parameters

There are no parameters for this option.

Examples

Command line:

        dsmc selective sys:system*.nlm -vol

    The following commands send root-level information *to* the server:

        dsmc incremental sys: (volume information sent by default)
        dsmc selective sys: (volume information sent by default)
        dsmc archive sys: (volume information sent by default)
        dsmc incremental sys:* (volume information sent by default)
        dsmc selective sys:*   (volume information sent by default)
        dsmc archive sys:*   (volume information sent by default)
        dsmc incremental sys:\ -vol
        dsmc selective sys:\ -vol
        dsmc archive sys:\ -vol
        dsmc incremental sys:* -vol
        dsmc selective sys:* -vol
        dsmc archive sys:* -vol

    The following commands get root-level information *from* the server:

        dsmc restore sys:
        dsmc restore sys:*
        dsmc restore sys:\
        dsmc restore sys:*

```
dsmc retrieve sys:
dsmc retrieve sys:*
dsmc retrieve sys:\
dsmc retrieve sys:\*
```

Webports

The *webports* option enables the use of the Web client outside a firewall by specifying the TCP/IP port number used by the Tivoli Storage Manager Client Acceptor daemon and Web Client Agent service for communications with the Web client.

Values for both the Client Acceptor daemon and the Web Client Agent service are required.

If you do not specify this option, the default value, zero (0), is used for both ports. This causes TCP/IP to randomly assign a free port number for the Client Acceptor daemon and the Web Client Agent service.

Note: The Tivoli Storage Manager client API does not support this option.

Options File

Place this option in the client options file (dsm.opt).

Syntax

►►──WEBPorts─ *cadport*─ *agentport*───►◄

Parameters

cadport
> Specifies the *required* Tivoli Storage Manager Client Acceptor daemon port number. The range of values is 1000 through 32767. If a value is not specified, the default, zero (0), causes TCP/IP to randomly assign a free port number.

agentport
> Specifies the *required* Tivoli Storage Manager Web client agent service port number. The range of values is 1000 through 32767. If a value is not specified, the default, zero (0), causes TCP/IP to randomly assign a free port number.

Examples

Options file:
```
webports 2123 2124
```

Command line:
```
-webports=2123,2124
```

Chapter 10. Using commands

Tivoli Storage Manager provides a command-line interface (CLI) that you can use as an alternative to the Web client graphical user interface (GUI). This chapter describes how to start or end a client command session and how to enter commands. Table 36 shows a list of tasks related to entering commands.

Table 36. Entering commands

Task	Page
Starting and ending a client command session	249
Entering client commands	250
Remembering previous commands	252
Using wildcard characters	253

Table 37 provides an alphabetical list of the commands, a brief description, and where to locate more information.

Table 37. Commands

Command	Description	Page
archive	Archives files from a workstation to Tivoli Storage Manager storage.	255
backup group	Creates and backs up a group containing a list of files from one or more file space origins to a virtual file space on the Tivoli Storage Manager server.	257
cancel restore	Displays a list of restartable restore sessions from which you can select one to cancel.	259
delete access	Deletes authorization rules for files that are stored on the server.	260
delete archive	Deletes archived files from Tivoli Storage Manager server storage.	261
delete backup	Deletes active and inactive backup files from Tivoli Storage Manager server storage.	263
delete filespace	Deletes file spaces in Tivoli Storage Manager server storage.	266
delete group	Deletes a group backup on the Tivoli Storage Manager server.	267
expire	Inactivates backup objects that you specify in the file specification or with the *filelist* option.	269
help	Displays a Table of Contents of help topics for the command-line client.	271
incremental	Backs up all new or changed files or directories in the default client domain or from NetWare volumes you specify, unless you exclude them from backup services.	272
loop	Starts an interactive command session.	276

Table 37. Commands (continued)

Command	Description	Page
macro	Executes commands within a macro file that you specify.	278
preview	Generates a file that lists objects to be backed up or archived according to the include-exclude list, prior to sending any data to the server.	279
query access	Displays a list of current authorization rules.	280
query archive	Displays a list of archived files.	281
query backup	Displays a list of backup versions.	283
query backupset	Queries a backup set from a local file or the Tivoli Storage Manager server.	285
query filespace	Displays a list of file spaces in Tivoli Storage Manager storage. You can also specify a single file space name to query.	287
query group	Displays information about group backups and their members.	289
query inclexcl	Displays a list of include-exclude statements in the order in which they are processed during backup and archive operations.	291
query mgmtclass	Displays information about available management classes.	292
query node	Displays all the nodes for which an administrative user ID has authority to perform operations.	293
query options	Displays all or part of your options and their current settings.	294
query restore	Displays a list of your restartable restore sessions in the server database.	295
query schedule	Displays information about scheduled events for your node.	296
query session	Displays information about your session, including the current node name, when the session was established, server information, and server connection information.	297
query systeminfo	Gathers Tivoli Storage Manager system information and outputs this information to a file or the console.	298
query tsa	Displays information associated with a specific NetWare Target Service Agent (TSA).	300
restart restore	Displays a list of restartable restore sessions from which you can one to restart.	303
restore	Restores copies of backup versions of your files from a Tivoli Storage Manager server.	304
restore backupset	Restores a backup set from the Tivoli Storage Manager server or a local file.	308
restore group	Restores specific members or all members of a group backup.	311
retrieve	Retrieves copies of archived files from the Tivoli Storage Manager server.	313
schedule	Starts the client scheduler on the workstation.	316

Table 37. Commands (continued)

Command	Description	Page
selective	Backs up selected files.	318
set access	Authorizes another user to access your backup versions or archived copiesbackup or archive data.	321
set event	Allows you to specify the circumstances for when archived data is deleted.	323
set password	Changes the Tivoli Storage Manager password for your workstation.	325

Starting and ending a client command session

You can start or end a client command session in either batch mode or interactive mode. Use batch mode when you want to enter a *single* client command. Tivoli Storage Manager processes the command and returns to the command prompt.

Use interactive mode when you want to enter a *series* of commands. Since Tivoli Storage Manager establishes connection to the server only once for interactive mode, a series of commands can be processed more quickly. Tivoli Storage Manager processes the commands and returns to the **tsm>** prompt.

Process commands in batch mode

Some options are valid *only* on the initial command line and not in interactive mode. These options generally affect the operation of the entire session. For example, the command **dsmc query session -errorlogname=myerror.log** is accepted and it does name the error log. However, it is accepted simply because it appears in the initial command, even though the option is not valid for the query command.

There are also some options that are always valid on the initial command line as well as on individual commands in interactive mode. Therefore, certain options are accepted on the initial command line even though they have no effect on the command being entered. For example, **dsmc query session -subdir=yes** is a valid command, but in this case the *-subdir* option has no effect on the command that was entered. Refer to Chapter 9, "Using processing options," on page 87 for the option that you are using to see if it is valid only on the initial command line.

When you enter a *single* command in batch mode, precede it with the executable program name, **dsmc**. For example, to process the **incremental** command in batch mode, you would enter:

    dsmc incremental

Tivoli Storage Manager prompts you each time you enter a command if the *passwordaccess* option is set to *prompt* and authentication on the server is set to *On*. Type your password and press Enter.

You can also enter your password using the *password* option with a command, but your password appears on the screen. For example, if your password is *secret*, enter:

    dsmc incremental –password=secret

If you set the *passwordaccess* option to *generate* in your dsm.opt file, you do not need to specify the password with the command. Tivoli Storage Manager *only*

prompts you for your password if you are registering your workstation with a
server or manually changing your password.

Process commands in interactive mode

Use the *interactive* mode (or *loop* mode) to enter a series of commands. Enter **dsmc**
on the command line and press Enter. When the **tsm>** command prompt appears,
type the command name and press Enter. *Do not* precede each command with the
executable program name, **dsmc**. Alternatively, you can enter **dsmc loop** on the
command line to start a client command session in interactive mode. **Loop** is the
default command for **dsmc**.

If a password is required, Tivoli Storage Manager prompts you before you enter
the first command. Type your 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 options file
  (dsm.opt). To override an option in the client options file (dsm.opt), enter the
  option with a command. For detailed information about client options, see
  "Client options reference" on page 102.
- **Client command options**: Use this group of options with specific commands on
  the command line *only*. Table 34 on page 99 provides an alphabetical list of the
  command-line options, a brief description, and the commands with which they
  are used.

Options handling in interactive mode

In interactive mode, options you enter on the initial command line will override
the value that you specified in your client options file (dsm.opt). This value
remains in effect for the entire interactive session unless overridden by a different

value on a given interactive command. For example, if you set the *subdir* option to
yes in your client options file (dsm.opt), and you specify *-subdir=no* on the initial
command line, the *-subdir=no* setting remains in effect for the entire interactive
session unless overridden by the *-subdir=yes* value on a given interactive
command. However, the *subdir=yes* value specified within the interactive session
only affects the command on which it is entered. When that command completes,
the value reverts back to *-subdir=no*, the value at the beginning of the interactive
session.

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 from the project directory, you would enter:

```
dsmc archive t3\sys:project/budget
```

It is unnecessary to enter the NetWare server name from which you are working,
unless the file you are backing up or archiving is on a remote NetWare system. In
this case, the NetWare server name is required.

Some commands have optional parameters. If you do not enter a value for an
optional parameter, Tivoli Storage Manager uses the default value. For example,
the **restore** command includes a required parameter, *sourcefilespec*, that specifies the
path and file name in storage that you want to restore. The optional parameter,
destinationfilespec, specifies the path and file name where you want to place the
restored files. If you do not specify the *destinationfilespec*, by default Tivoli Storage
Manager restores the files to the original source path. If you want to restore the
files to a *different* directory, enter a value for *destinationfilespec*. For example, to
restore the nw1\sys:project/budget file to nw2\sys:newproj/planning, enter:

```
dsmc restore nw1\sys:project/budget nw2\sys:newproj/planning
```

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*:

- The only command that accepts a simple file space name is the **incremental**
  command. The following example is valid:

  ```
  dsmc i sys:
  ```

  The following example is *not* valid:

  ```
  dsmc sel sys:
  ```

- 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 sys:mydir/ sys: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 sys:mydir sys:away/yourdir
```

- Do not use wildcards as part of the file space name or anywhere in the *destinationfilespec*. The one exception to this rule is the **set access** command where wildcards are permitted in the two lowest-levels of the file spec. For example, to allow access to all files in all directories *in* and *below* the sys:ann directory, enter:

  ```
  set access backup sys:ann/* * *
  set access backup sys:ann/*/* * *
  ```

- The maximum number of characters for a file name is 256. The maximum combined length of the file name and path name is 512 characters. The Unicode representation of a character can occupy several bytes, so the maximum number of characters that a file name might contain can vary.

- The maximum number of file specifications per command:
  - The Query commands can accept only one file specification.
  - The **restore** and **retrieve** commands can accept a *sourcefilespec* and a *destinationfilespec*.
  - You can use the *filelist* option to process a list of files. The Tivoli Storage Manager client opens the file you specify with this option and processes the list of files within according to the specific command. Another way to prevent shell expansion from causing you to go over the 20-operand limit is by placing quotation marks around your source filespec expansion characters for restore commands.

    Note: This has the side affect of causing a no-query restore.
    See "Filelist" on page 146 for more information.

Remembering previous commands

If you set the *editor* option to *yes* in your client options file (dsm.opt), Tivoli Storage Manager permits you to recall and edit as many as 20 previously entered commands by using the Up arrow and Down arrow keys. If you set the *editor* option to *no*, the feature to recall previous commands is not active. If the editor and command retrieve functions are not working on a specific workstation setting, you should turn off the *editor* option. For more information regarding the *editor* option, see "Editor" on page 134.

Pressing the Up arrow key displays the previous command in memory. Pressing the Down arrow key displays the next command in memory. Table 38 lists other functions you can perform when you recall commands.

Table 38. 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 right.	Tab right

Table 38. Command recall and edit functions (continued)

Function	Press
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
Finish or execute the command.	Enter
Clear the current line.	Esc
End the program.	CTRL-C
End the program.	QQ (Scheduler or Incremental Backup/Restore)

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, volume names, or server names. 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 39 shows examples of each wildcard.

Table 39. Wildcard characters

Pattern	Matches	Does not match
Asterisk (*)		
ab*	ab, abb, abxxx	a, b, aa, bb
ab*rs	abrs, abtrs, abrsrs	ars, aabrs, abrss
ab*ef*rs	abefrs, abefghrs	abefr, abers
abcd.*	abcd.c, abcd.txt	abcd, abcdc, abcdtxt
Question Mark (?)		
ab?	abc	ab, abab, abzzz
ab?rs	abfrs	abrs, abllrs
ab?ef?rs	abdefjrs	abefrs, abdefrs, abefjrs
ab??rs	abcdrs, abzzrs	abrs, abjrs, abkkkrs

Attention: Use an asterisk (*) instead of a question mark (?) as a wildcard character when trying to match a pattern on a multibyte code page, to avoid unexpected results.

Entering commands

Follow the general rules below when you enter commands:
- When you enter options with a command, always precede the option with a dash (–). Do not put a space between the dash and the option name.
- Enter more than one option in any order in a command before or after the file specification. Separate multiple options with a blank space.

Client commands reference

The following sections contain detailed information about each of the Tivoli Storage Manager commands. Information for each command includes:

- A description of the command.
- A syntax diagram of the command. The command name contains uppercase and lowercase characters. The uppercase characters indicate the minimum abbreviation you can use for the command name. See "Reading syntax diagrams" on page 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.

Migrating to Unicode-enabled file spaces
See "Autofsrename" on page 108 for information about using the Unicode-enabled client.

Associating a local snapshot with a server file space
Use the *snapshotroot* option with the **archive** command in conjunction with a third-party application that provides a snapshot of a logical volume, to associate the data on the local snapshot with the real file space data that is stored on the Tivoli Storage Manager server. The *snapshotroot* option does not provide any facilities to take a volume snapshot, only to manage data created by a volume snapshot. See "Snapshotroot" on page 218 for more information.

Syntax

```
►►──Archive─────┬─────────┬──┬─►──┬─filespec─┬──┬──────────►◄
                └─options─┘      └─NDS──────┘
```
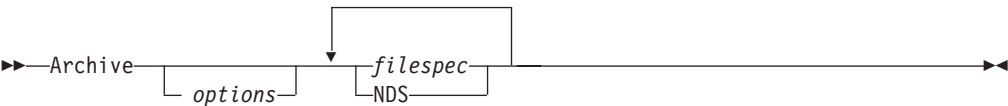
Parameters

options

Table 40. Archive command: Related options

Option	Where to use	Page
archmc	Command line only.	103
changingretries	Client options file (dsm.opt) or command line.	111
compressalways	Client options file (dsm.opt) or command line.	118
compression	Client options file (dsm.opt) or command line.	119
deletefiles	Command line only.	124
description	Command line only.	125
dirsonly	Command line only.	128
encryptkey	.	137
filelist	Command line only.	146
filesonly	Command line only.	149
snapshotroot	Command line only.	218
subdir	Client options file (dsm.opt) or command line.	221
tapeprompt	Client options file (dsm.opt) or command line.	223
v2archive	Command line only.	239
volinformation	Command line only.	243

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 specify as many file specifications as available resources or other operating system limits permit. Separate file specifications with a space. You can also use the *filelist* option to process a list of files. The Tivoli Storage Manager client opens the file you specify with this option and processes the list of files within according to the specific command. See "Filelist" on page 146 for more information. See "Maximum file size for operations" on page 38 for the maximum file size for archive processing.

NDS

> Specifies that you want to archive the NDS. To archive the entire NDS, specify NDS:* -su=y. To archive one container in the NDS, specify NDS:.o=nds_object. An NDS object can contain container objects and leaf objects.

Examples

Task   Archive a single file named budget.

> **Command:** `dsmc archive t9\sys:user/proj1\budget`

Task   Archive all files in the t9\sys:plan/proj1 directory with a file extension of .txt.

> **Command:** `dsmc archive t9\sys:plan/proj1/*.txt`

Task   Archive all files in the t9\sys:home directory.

> **Command:** `dsmc archive t9\sys:home/*`

Task   Assuming that you initiated a snapshot of the SYS: volume and mounted the snapshot as SNAP1:, archive the sys:system/dir1 directory tree from the local snapshot and manage it on the Tivoli Storage Manager server under the file space name sys:.

> **Command:** `dsmc archive sys:system/dir1/* -subdir=yes -snapshotroot=snap1:`

Task   Archive the entire NDS.

> **Command:** `dsmc archive nds:* -subdir=yes`

Backup Group

Use the **backup group** command to create and back up a group containing a list of files from one or more file space origins to a virtual file space on the Tivoli Storage Manager server.

A *group backup* allows you to create a consistent point-in-time backup of a group of files that is managed as a single logical entity:

- All objects in the group are assigned to the same management class. See "Include options" on page 159 for more information about using the *include* option to bind a group to a management class.
- Existing *exclude* statements for any files in the group are ignored.
- All objects in the group are exported together.
- All objects in the group are expired together as specified in the management class. No objects in a group are expired until all other objects in the group are expired, even when another group they belong to gets expired.
- If you are performing full and differential group backups to a sequential device, during a restore the data will be in no more than two locations. To optimize restore time, perform periodic full backups to back up the data to one location on the sequential media.
- During a full group backup, all objects in the filelist are sent to the server. During a differential group backup, only data that has changed since the last full backup is sent to the server. Objects in the filelist that have not changed since the last full backup are assigned as members of the differential group backup. This data is not resent to the server, reducing backup time.

The **backup group** command requires the following options:

filelist Specifies a list of files to add to a new group. See "Filelist" on page 146 for more information.

groupname
        Specifies the fully qualified name of the group containing a list of files. See "Groupname" on page 153 for more information.

virtualfsname
        Specifies the name of the virtual file space for the group on which you want to perform the operation. The *virtualfsname* parameter cannot be the same as an existing file space name. See "Virtualfsname" on page 241 for more information.

mode Specifies whether you want to back up all of the files in the filelist or only files that have changed since the last full backup. See "Mode" on page 172 for more information.

Notes:

1. *If any file in the group backup fails, the entire group backup will fail.*
2. Use the **query group** command to query members of a group backup on the Tivoli Storage Manager server. See "Query Group" on page 289 for more information.
3. Use the **restore group** command to restore specific members or all members of a group backup on the Tivoli Storage Manager server. See "Restore Group" on page 311 for more information.
4. Use the **delete group** command to delete a specific group backup from the Tivoli Storage Manager server. See "Delete Group" on page 267 for more information.

5. Use the **query filespace** command to display virtual file space names for your node that are stored on the Tivoli Storage Manager server. See "Query Filespace" on page 287 for more information.

6. A group backup can be added to a backup set. See "Restoring data from a backupset" on page 57 for more information about backup sets.

Syntax

►►──Backup GRoup─ *options* ───►◄

Parameters

options

Table 41. Backup Group command: Related options

Option	Where to use	Page
filelist	Command line only.	146
groupname	Command line only.	153
mode	Command line only.	172
virtualfsname	Command line only.	241

Examples

Task Perform a full backup of all the files in the `sys:/tivoli/acct.lst` file to the virtual file space name *accounting* containing the group leader `group1` file.

Command:

```
backup group -filelist=sys:/tivoli/acct.lst -groupname=group1
-virtualfsname=accounting -mode=full
```

Cancel Restore

The **cancel restore** command displays a list of your restartable restore sessions in the server database. You can select zero or more restartable restore sessions that you want to cancel. 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.

Syntax

```
►►──Cancel Restore─────────────────────────────────────────────────►◄
```

Parameters

There are no parameters for this command.

Examples

Task   Cancel a restore operation.

Command: `dsmc cancel restore`

Delete Access

The **delete access** command deletes authorization rules for files that are stored on the server. When you delete an authorization rule, you revoke user access to any files specified by that rule.

Syntax

```
►►──Delete ACcess──────────────────────────────────────────────────►◄
```

Parameters

There are no parameters for this command.

Examples

Task   Display a list of current authorization rules and select the rules you want to delete.

Command: `dsmc delete access`

See the following screen example:

```
Index  Type       Node     User   Path
─────  ─────      ─────────────   ────────────────────
1      Backup     node1     *     mo\sys:u/dev/proja
                                  /list
2      Backup     node4     *     mo\sys:u/plan/exp
                                  /deptc
4      Archive    node5     *     mo\sys:u/mfg/inv
                                  /parta
Enter Index of rule(s) to delete, or quit to cancel:
```

To delete the authorization rules that allow *node4* and *node5* to access your files, type **2 4** or **(2,4)** (your selections can be separated by commas or spaces). Then press Enter. Quit without making a selection by entering **quit**.

Delete Archive

The **delete archive** command deletes archived files from Tivoli Storage Manager server storage. Your administrator must give you authority to delete archived files.

Attention: When you delete archived files, *you cannot retrieve them.* Verify that the files are obsolete *before* you delete them.

Syntax

```
►►──Delete ARchive──┬────────────┬──┬──▼──┬─filespec─┬──┬─────────────►◄
                    └──options──┘         └─NDS─────┘
```
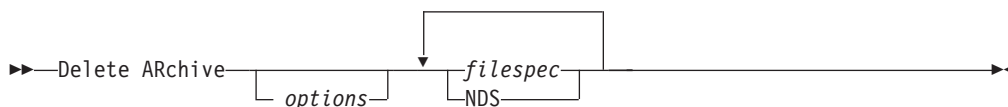
Parameters

options

Table 42. Delete Archive command: Related options

Option	Where to use	Page
dateformat	Client options file (dsm.opt) or command line.	122
description	Command line only.	125
filelist	Command line only.	146
noprompt	Command line only.	174
numberformat	Client options file (dsm.opt) or command line.	175
pick	Command line only.	187
subdir	Client options file (dsm.opt) or command line.	221
tapeprompt	Client options file (dsm.opt) or command line.	223
timeformat	Client options file (dsm.opt) or command line.	233

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 specify as many file specifications as available resources or other operating system limits permit. Separate file specifications with a space. You can also use the *filelist* option to process a list of files. The Tivoli Storage Manager client opens the file you specify with this option and processes the list of files within according to the specific command. See "Filelist" on page 146 for more information.

Examples

Task Delete a file named budget.

Command: `dsmc delete archive sys:user/plan/proj1/budget`

Task Delete all files archived from the sys:user/plan/proj1 directory with a file extension of `.txt`.

Command: `dsmc del archive sys:user/plan/proj1/*.txt`

Task Delete files archived from the sys:user/project directory using the *pick*

option to display a list of archive copies that match the file specification. From the list, you can select the versions to process.

Command: `dsmc delete archive sys:user/project/* -pick`

Task Delete selected files from the group of files archived with the description ″Monthly Budgets 1999″.

Command: `delete ar -description="Monthly Budgets 1999" -pick`

Delete Backup

The **delete backup** command deletes backup files from Tivoli Storage Manager server storage. Your administrator must give you authority to delete backup files.

Attention: After you delete backup files, *you cannot restore them.* Verify that the backup files are no longer needed before you delete them. Tivoli Storage Manager will prompt whether you want to continue with the delete. If you specify *yes*, the specified backup files are immediately deleted and removed from Tivoli Storage Manager server storage.

Syntax

```
                                    ┌─objtype=FILE─┐   ┌─deltype=ACTIVE───┐
►►──Delete BAckup─────┬─────────┬───┴──────────────┴───┼──────────────────┼──►◄
                      └─options─┘                      ├─deltype=INACTIVE─┤
                                                       └─ALL──────────────┘
```
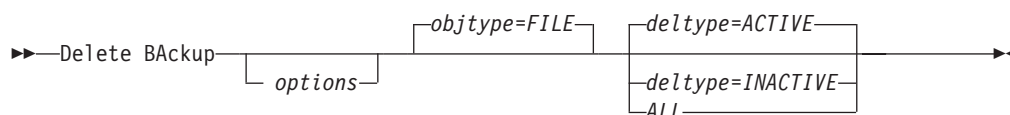
Parameters

options

Table 43. Delete Backup command: Related options

Option	Where to use	Page
description	Command line only.	125
filelist	Command line only.	146
fromdate	Command line, and in Web GUI find function.	146
fromtime	Command line, and in Web GUI find function.	146
noprompt	Command line only.	174
pick	Command line only.	187
pitdate	Command line, and in Web GUI find function.	146
pittime	Command line, and in Web GUI find function.	146
subdir	Client options file (dsm.opt) or command line.	221
tapeprompt	Client options file (dsm.opt) or command line.	223
timeformat	Client options file (dsm.opt) or command line.	233
todate	Command line, and in Web GUI find function.	146
totime	Command line, and in Web GUI find function.	146

deltype
Specifies the deletion type. Specify one of the following values:

ACTIVE
Delete only active file objects. Directory objects are not deleted. This is the default.

Note: If there are any inactive objects, then after the active object is deleted, the most current inactive object will be changed from inactive to active.

To delete all versions of a file, first issue the **delete backup** command with *-deltype=inactive*, then issue the command again with *-deltype=active*.

INACTIVE

Delete only inactive file objects. Directory objects are not deleted.

ALL

Delete all active and inactive objects below a given directory, including all subdirectories and their files.

Note: The parent directory of the deleted files and subdirectories is not deleted.

filespec

Specifies the path and file name that you want to delete from storage.

When using *-deltype=inactive* or *-deltype=active*, use wildcard characters to specify a group of files or all files in a directory.

When using *-deltype=all*, specify a fully-wildcarded directory.

You can specify as many file specifications as available resources or other operating system limits permit. Separate file specifications with a space. You can also use the *filelist* option to process a list of files. The Tivoli Storage Manager client opens the file you specify with this option and processes the list of files within according to the specific command. See "Filelist" on page 146 for more information.

NDS

Specifies that you want to delete the archived NDS.

objtype

Specifies the type of backup delete you want to perform. You can specify either of the following values:

FILE

Specifies that you want to delete directories and files. This is the default.

IMAGE

Specifies that you want to delete an image backup.

Examples

Task   Delete all active and inactive file objects named budget in directory .DATA:plan/proj1

Commands:

```
delete backup DATA:plan/proj1/budget.jan -deltype=inactive
delete backup DATA:plan/proj1/budget.jan -deltype=active
```

Note: To delete active and inactive file objects, you must first delete the inactive objects, followed by the active objects.

Task   Delete all inactive files with names ending in .txt backed up from the DATA:plan/proj1 directory and its subdirectories.

Command: delete backup DATA:plan/proj1/*.txt -deltype=inactive -subdir=yes

Task   Delete selected active files backed up from the USR:\marymb\project directory. Use the *-pick* option to display a list of backup copies that match the file specification. From the list, you can select which versions to delete.

Command: delete backup USR:marymb/project/* -pick

Task Delete all active and inactive versions of files and subdirectories in the
USR:storman/myproject directory.

Commands:

```
delete backup USR:\storman\myproject\* -deltype=all
delete backup USR:storman/myproject/* -deltype=all -subdir=yes
```

Note: The backup versions of directory object USR:storman/myproject are
not deleted.

Delete Filespace

The **delete filespace** command deletes file spaces in Tivoli Storage Manager server storage. A *file space* is a logical space on the server that contains files you backed up or archived. Tivoli Storage Manager assigns a separate file space on the server for each workstation drive from which you back up or archive files. The file space name is the same as the drive label name. When you enter the **delete filespace** command, a list of your file spaces is displayed. 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.

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*. Verify that the files are obsolete *before* you delete them.

Syntax

```
►►──Delete Filespace──────────────────────────────────►◄
                     └─ options ─┘
```

Parameters

options

Table 44. Delete Filespace command: Related options

Option	Where to use	Page
detail	Command line only.	126
scrolllines	Client options file (dsm.opt) or command line.	213
scrollprompt	Client options file (dsm.opt) or command line.	214

Examples

Task   Delete a file space.

Command: `dsmc delete filespace`

Delete Group

Use the **delete group** command to delete a group backup on the Tivoli Storage Manager server.

After deleting a group, the group leader (virtualfsname) remains on the Tivoli Storage Manager server. It contains no members (file or directories) but is reported in a subsequent **query filespace** command. It will have no files listed if the *showmembers* option is added. Deleting a group does not remove the file space that it resides in because there might be other groups in it. Use **delete filespace** if you want to remove the file space and all the data it contains.

Notes:

1. Use the *inactive* option to display both active and inactive group backup versions. By default, Tivoli Storage Manager only displays active versions. See "Inactive" on page 156 for more information.

2. Use the *pick* option to select a specific group to delete from the Tivoli Storage Manager server. See "Pick" on page 187 for more information.

3. Use the *noprompt* option if you want to suppress the confirmation prompt that normally appears before you delete a group backup version. By default, Tivoli Storage Manager prompts you for confirmation before deleting the group backup. Using this option can speed up the delete procedure. However, it also increases the danger of accidentally deleting a group backup version that you want to save. Use this option with caution. See "Noprompt" on page 174 for more information.

4. Use the **query filespace** command to display virtual file space names for your node that are stored on the Tivoli Storage Manager server. See "Query Filespace" on page 287 for more information.

Syntax

```
►►──Delete GRoup─ filespec───────────────────────────────────►◄
                          └─ options ─┘
```

Parameters

filespec
    Specifies the virtual file space name and the group name that you want to delete from the server storage.

options

Table 45. Delete Group command: Related options

Option	Where to use	Page
inactive	Command line only.	156
noprompt	Command line only.	174
pick	Command line only.	187
pitdate	Command line only.	188
pittime	Command line only.	189

Examples

Task   Delete the current active version of the `{accounting}:group1` group.

Command:

```
delete group {accounting}:group1
```

Task Delete a backup version of the {accounting}:group1 group from a list of active and inactive versions.

Command:

```
delete group {accounting}:group1 -inactive -pick
```

Expire

The **expire** command inactivates the backup objects you specify in the file specification or with the *filelist* option.

When working in interactive mode, a prompt notifies you before files are expired.

The **expire** command does not remove workstation files. If you expire a file or directory that still exists on your workstation, the file or directory is backed up again during the next incremental backup unless you exclude the object from backup processing.

If you expire a directory that contains active files, those files will not appear in a subsequent query from the GUI. However, these files will be displayed on the command line, if you specify the proper query with a wildcard character for the directory.

Note: Because the **expire** command changes the server's picture of the client file system without actually changing the client file system, the **expire** command is not allowed on files located on a file system monitored by the Tivoli Storage Manager journal.

Syntax

```
►►──EXPire──────────────── filespec ─────────────────────────────────►◄
             └─ options ─┘
```

Parameters

options

Table 46. Expire command: Related options

Option	Where to use	Page
dateformat	Client options file (dsm.opt) or command line.	122
filelist	Command line only.	146
noprompt	Command line only.	174
numberformat	Client options file (dsm.opt) or command line.	175
pick	Command line only.	187
timeformat	Client options file (dsm.opt) or command line.	233

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 sys:ann directory.

Command: `dsmc expire sys:ann/letter1.txt`

Task Inactivate all files in the sys:admin/mydir directory.

Command: `dsmc expire sys:admin/mydir/*`

Task Inactivate all files named in the serva\sys:avi/filelist.txt file.

Command: `expire -filelist=serva\sys:avi/filelist.txt`

Help

The **help** command displays a Table of Contents of help topics for the command-line client. The topics include help for the following:

- Summary of Changes
- Using Commands
- Using Processing Options
- Glossary
- Messages

Enter the number of the topic that you want to view. If there is more than one screen of topics, scroll backward or forward through the list. To exit, type **q** and press Enter.

Note: If you use the **help** command on the initial command line, no server contact is made and no password is needed.

Syntax

```
►►──Help───────────────────────────────────────────────►◄
```

Parameters

There are no parameters for this command.

Examples

Task Display a list of help topics.

Command: `dsmc help`

Incremental

The **incremental** command backs up all new or changed files or directories in the default client domain or from NetWare volumes you specify, unless you exclude them from backup services. Tivoli Storage Manager also backs up file system trustee rights along with file data. It is not possible to restore only the trustee rights; they are restored as part of the file restore process.

To incrementally back up selected files or directories, enter a file specification in the command. If you do not enter a file specification, the default is to back up files or directories in the default domain. See "Domain" on page 132 for information on how to change which objects are included in the default domain.

You can incrementally back up an entire file space (domain) or just a single file. If you specify only the file space name, the entire directory tree is traversed. If you specify a directory, only that directory is backed up, unless you set the *subdir* option to *yes*. This is considered a partial incremental back up.

The following attributes in the management class assigned to the file or directory affect whether the data is actually backed up:

Frequency
> The number of days that must elapse between successive backups for the file. The **frequency** attribute applies only to a full incremental backup.

Mode Permits you to back up only files that changed since the last backup (*modified*) or back up the files whether they changed or not (*absolute*).

Serialization
> Permits or denies backup of files or directories according to the following values:
> - **static**: In order to be backed up, data must not be modified during backup or archive.
> - **shared static**: If data in the file or directory changes during each of the allowed attempts to back up or archive it, it is not backed up or archived. The value of the *changingretries* option determines how many attempts are made. The default is 4.
> - **dynamic**: The object is backed up or archived on the first attempt whether or not data changes during the process.
> - **shared dynamic**: The object is backed up or archived on the last attempt, even if data changes during the process.

For more information on management classes, see Chapter 8, "Understanding storage management policies," on page 75.

Using the *include* option in an include-exclude list, you can override the default management class for a file or group of files.

You can perform either a *full incremental* backup or an *incremental by date* backup. The default is a full incremental backup.

You can also use the **selective** command to perform a *selective* backup that backs up only the files, directories or empty directories that you specify regardless of whether they have changed. For more information, see "Selective" on page 318.

A full incremental backs up all files or directories that are new or have changed since the last incremental backup. During a full incremental backup, the client queries the server . Tivoli Storage Manager uses this information to:

- Back up new files or directories.
- Back up files or directories whose contents have changed.
- Mark inactive backup versions on the server for files or directories that are deleted from the workstation.
- Rebind backup versions to management classes if the management class assignments change.

Migrating to Unicode-enabled file spaces

See "Autofsrename" on page 108 for information about using the Unicode-enabled client.

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. 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 NetWare server files because:
- It does not expire backup versions of files that are deleted from the NetWare server.
- 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.
- It does not handle name space changes on the volume.

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 NetWare server files.

If you are running NetWare Btrieve on your NetWare server (or any other server-based database), stop the database application before backing up the files associated with the database. Many database applications place locks on files that can prevent Tivoli Storage Manager from backing them up. Because Tivoli Storage Manager is a Storage Management Services (SMS) backup application, it supports database Target Service Agents (TSAs) as soon as they are available. This allows Tivoli Storage Manager to maintain database integrity without manual interaction.

If Tivoli Storage Manager refuses to back up a file, check to see if it is marked for execute only or it is opened and locked by another user.

If the **incremental** command is retried because of a communication failure or session loss, the transfer statistics will display the number of bytes Tivoli Storage Manager attempted to transfer during *all* command attempts. Therefore, the statistics for bytes transferred might not match the file statistics, such as those for file size.

For information about backing up server specific information, see Appendix B, "Tivoli Storage Manager NetWare backup and recovery guide," on page 341.

Associating a local snapshot with a server file space

Use the *snapshotroot* option with the **incremental** command in conjunction with a third-party application that provides a snapshot of a logical volume, to associate the data on the local snapshot with the real file space data that is stored on the Tivoli Storage Manager server. The *snapshotroot* option does not provide any facilities to take a volume snapshot, only to manage data created by a volume snapshot. See "Snapshotroot" on page 218 for more information.

Syntax
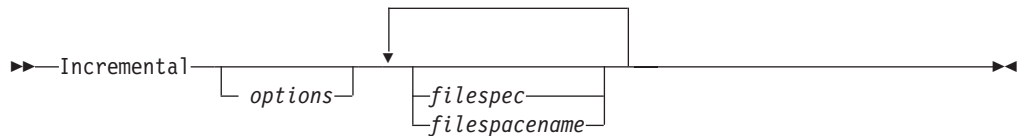
Parameters

options

Table 47. Incremental command: Related options

Option	Where to use	Page
changingretries	Client options file (dsm.opt) or command line.	111
compressalways	Client options file (dsm.opt) or command line.	118
compression	Client options file (dsm.opt) or command line.	119
dirsonly	Command line only.	128
domain	Client options file (dsm.opt) or command line only.	132
encryptkey	Client options file (dsm.opt).	137
filelist	Command line only.	146
filesonly	Command line only.	149
incrbydate	Command line only.	162
memoryefficientbackup	Client user options file (dsm.opt), server, or command line.	170
snapshotroot	Command line only.	218
subdir	Client options file (dsm.opt) or command line.	221
tapeprompt	Client options file (dsm.opt) or command line.	223
volinformation	Command line only.	243

filespec
> Specifies the path and file name that you want to back up. Use wildcards to select a group of files, all the files in a directory, all objects in a directory branch, or all objects in a volume. You can specify as many file specifications as available resources or other operating system limits permit. Separate file specifications with a space. You can also use the *filelist* option to process a list of files. The Tivoli Storage Manager client opens the file you specify with this option and processes the list of files within according to the specific command. See "Filelist" on page 146 for more information. If you do not specify a file

specification, the default domain or the domain specified as an option is backed up. See "Maximum file size for operations" on page 38 for the maximum file size for backup processing.

If you specify a volume, 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 volume, specify the volume without a trailing slash.

filespacename
Specifies the file space name on the server that contains the files you want to back up.

Examples

Task Run an incremental backup of the default client domain specified in your client options file (dsm.opt).

Command: `dsmc Incremental`

Task Run a full incremental backup for the sys: and data: volumes on server **b9**.

Command: `dsmc i b9\sys: b9\data:`

Task Run a partial incremental backup.

Command: `dsmc inc vol:system/*`

Task Run a partial incremental backup by date using the *incrbydate* option.

Command: `dsmc inc -incrbydate`

Task Incrementally back up the NDS.

Command: `dsmc inc nds:`

Task Run an incremental backup remotely for the sys: volume on server **b9**.

Command: `dsmc inc b9\sys:`

Task Run a partial incremental backup of the NDS.

Command: `dsmc inc nds:.o=ann.*`

Task Assuming that you initiated a snapshot of the sys: volume and mounted the snapshot as SNAP1:, run an incremental backup of all files and directories under the local snapshot and manage them on the Tivoli Storage Manager server under the file space name sys:.

Command: `dsmc inc sys: -snapshotroot=snap1:`

Loop

The **loop** command starts an interactive command-line session that is maintained until you enter **quit**.

If you are required to enter a password, you will be prompted for it before the loop mode prompt appears.

Note: It is not possible to enter loop mode without a valid server contact. One of the consequences is that certain commands, such as `restore backupset -location=file`, will only be accepted on the initial command line when a valid server is not available.

In an interactive command-line session, it is unnecessary to precede each command name with **dsmc** and your password, if one is required.

In interactive mode, options you enter on the initial command line will override the value that you specified in your client options file (dsm.opt). This value remains in effect for the entire interactive session unless overridden by a different value on a given interactive command. For example, if you set the *subdir* option to *yes* in your client options file (dsm.opt), and you specify *-subdir=no* on the initial command line, the *-subdir=no* setting remains in effect for the entire interactive session unless overridden by the *-subdir=yes* value on a given interactive command. However, the *subdir=yes* value only affects the command it is entered on. When that command completes, the value reverts back to *-subdir=no*, the value at the beginning of the interactive session.

You can enter all valid commands in interactive mode *except* the **schedule** and **loop** commands.

There are some options that you cannot use in the interactive session created by the **loop** command and are identified in the option description by this statement: *This option is valid only on the initial command line. It is not valid in interactive mode*.

See Chapter 9, "Using processing options," on page 87 for options that you cannot use in interactive mode.

Syntax

```
        ┌─LOOP─┐
►►──────┴──────┴──────────────────────────────────────────►◄
```

Parameters

There are no parameters for this command.

Examples

Task   Start an interactive command-line session.

        Command: `dsmc loop`

        At the **tsm>** prompt, enter a command.

        There are three methods for ending an interactive session:
        • Enter quit
        • Press the Escape key, and then enter QQ

- If other commands fail, enter the following keystroke combination: "QQ".

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.

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:
```
sys:project/proja
sys:project/projb
sys:project/projc
```

Command: `macro sys:tsm/backabc.mac`

where `backabc.mac` contains the following statements:
```
sel sys:project/proja/*
sel sys:project/projb/*
sel sys:project/projc/*
```

Preview

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

Syntax

```
►►──PREview──┬─Backup──┬──filespec──┬──-filter=ALL──┬──────────────────────────►
             └─Archive─┘            ├──-filter=INCL──┤   ┌──────────────────┐
                                    └──-filter=EXCL──┘   └─-filename= filename─┘

        ┌──────────┐   ┌──-traverse=yes──┐
►────────┴─-console─┴───┴──-traverse=no───┴─────────────────────────────────────►◄
```
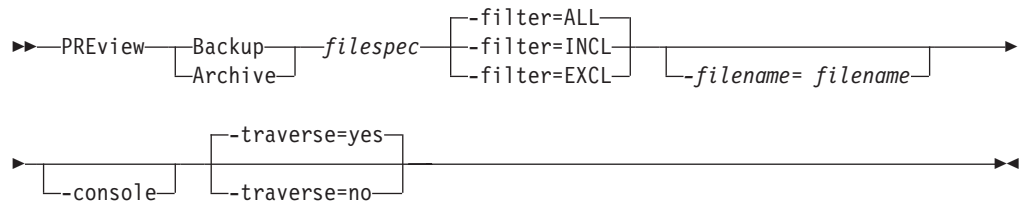
Parameters

Backup|Archive
> Indicates whether to preview output from a selective backup or archive operation.

filespec
> Specifies the path and file name that you want to back up. Use wildcard characters to select a group of files or all of the files in a directory.

-filter Specifies the output to display – included objects, excluded objects, or both.

> **ALL** Display output for included and excluded objects. This is the default.

> **INCLuded**
>> Display output for included objects only.

> **EXCLuded**
>> Display output for excluded objects only.

-filename=
> Specifies the filename in which to write the tab-delineated output. The default is dsmprev.txt.

-console
> Output is written to the console, and the file.

-traverse
> Preview the current directory and subdirectories.

> **Yes** Preview the current directories and subdirectories. This is the default.

> **No** Preview only the current directory, not subdirectories.

> **Attention:** Specifying **-traverse** does not preview directories excluded using the *exclude.dir* option.

Query Access

The **query access** command displays a list of nodes to whom you have given access to backup versions or archive copies of specific files. Tivoli Storage Manager displays a list of authorization rules that you defined with the **set access** command. The information includes:

- Authority you gave a node to restore backup versions or retrieve archive copies.
- The user(s) to whom you gave authorization.
- The files to which the node has access.

Syntax

```
►►──Query ACcess─────────────────────────────────────────────►◄
```

Parameters

There are no parameters for this command.

Examples

Task Display a list of nodes who have access to your files.

Command: `dsmc 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
- Creation date

Syntax

```
►►──Query ARchive───────────┬─────filespec──────────────►◄
                  └─options─┘  ▼ └─NDS──┘
```

Parameters

options

Table 48. Query Archive command: Related options

Option	Where to use	Page
dateformat	Client options file (dsm.opt) or command line.	122
description	Command line only.	125
detail	Command line only.	126
dirsonly	Command line only.	128
filelist	Command line only.	146
filesonly	Command line only.	149
fromdate	Command line only.	150
fromnode	Command line only.	151
fromtime	Command line only.	152
numberformat	Client options file (dsm.opt) or command line.	175
scrolllines	Client options file (dsm.opt) or command line.	213
scrollprompt	Client options file (dsm.opt) or command line.	214
subdir	Client options file (dsm.opt) or command line.	221
timeformat	Client options file (dsm.opt) or command line.	233
todate	Command line only.	235
totime	Command line only.	236

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.

NDS
　　　Displays a list of archived NDS files.

Examples

Task　Display a list of all your archived files in the servera\sys: volume.

　　　　Command: dsmc q ar –sub=y servera\sys:*

Task　Display a list of all your archived files on servera\sys:. Use the *dateformat* and *timeformat* options to reformat the dates and times.

　　　　Command: dsmc q ar –sub=yes –date=5 –time=4 servera\sys:*

Task　Display a list of all your archived files on serverb\sys:. Use the *detail* option to display the last modification date and the creation date of each file.

　　　　Command: dsmc q ar -sub=yes -detail serverb\sys:*

Task　Display a list of archived files in the servera\sys:u/proj directory whose first four characters of the file name begin with proj.

　　　　Command: dsmc q ar servera\sys:uproj/proj*

Query Backup

The **query backup** command displays a list of backup versions of your files stored on the Tivoli Storage Manager server, or inside a backupset when a backupset is specified. 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 backup** command, the client displays the following additional information:
- Last modification date
- Creation date

Syntax

```
►►──Query Backup─────────────┬─ filespec ─┬──────────────►◄
                  └─ options ─┘ └─ NDS ─────┘
```
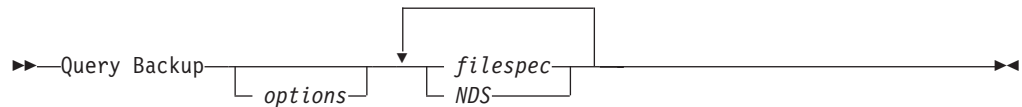
Parameters

options

Table 49. Query Backup command: Related options

Option	Where to use	Page
backupsetname	Command line only.	110
dateformat	Client options file (dsm.opt) or command line.	122
detail	Command line only.	126
dirsonly	Command line only.	128
filelist	Command line only.	146
filesonly	Command line only.	149
fromdate	Command line only.	150
fromnode	Command line only.	151
fromtime	Command line only.	152
inactive	Command line only.	156
location	Command line only.	166
numberformat	Client options file (dsm.opt) or command line.	175
pitdate	Command line only.	188
pittime	Command line only.	189
scrolllines	Client options file (dsm.opt) or command line.	213
scrollprompt	Client options file (dsm.opt) or command line.	214
subdir	Client options file (dsm.opt) or command line.	221
timeformat	Client options file (dsm.opt) or command line.	233

Table 49. Query Backup command: Related options (continued)

todate	Command line only.	235
totime	Command line only.	236

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.

NDS
>   This parameter displays a list of backed up NDS objects. To display a list of the entire NDS, specify NDS: or NDS:*. To display a list of only one container in the NDS, specify NDS:.o=container_name.

Examples

Task   Display a list of all your backups on serverb\sys:. Use the *detail* option to display the last modification date and the creation date of each file.

>   **Command:** `dsmc q backup –sub=yes -detail serverb\sys:*`

Task   Display a list of all your backed up files on the sys: volume.

>   **Command:** `dsmc q backup -su=y serva\sys:*`

Task   Display a list of all your backed up files. Use the *dateformat* and *timeformat* options.

>   **Command:** `dsmc q b –date=1 –time=4 –su=y serva\sys:*`

Task   Display a list of files that were backed up from the serva\sys:proj directory with file names that begin with proj.

>   **Command:** `dsmc q b serva\sys:proj/proj*`

Query Backupset

The **query backupset** command queries a backup set from a local file or the Tivoli Storage Manager server. This command displays the backup set name, generation date, retention, and description.

Syntax

```
►►─Query BACKUPSET──────────────────BACKUPSetname =──┬─backupsetname─┬───────────►
                    └─options─┘                      └─bset filename─┘


►─LOCation =─┬──server──┬────────────────────────────────────────────────────►◄
             └──file────┘
```
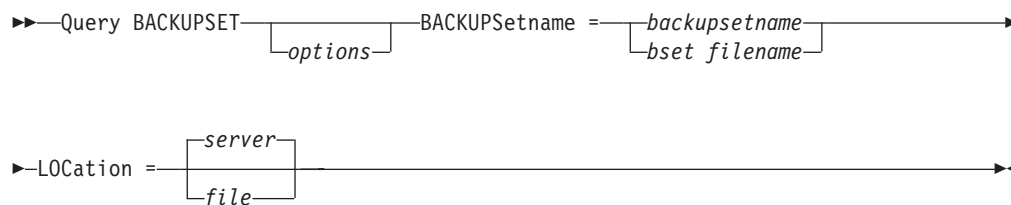
Parameters

options

Table 50. Query Backupset command: Related options

Option	Where to use	Page
location	Command line only.	166
scrolllines	Client options file (dsm.opt) or command line.	213
scrollprompt	Client options file (dsm.opt) or command line.	214

BACKUPSetname=
Specifies the name of the backup set on the server you want to query when *-location=server* is in effect. You can use wildcards to specify the backup set name. If you use wildcards or do not specify a backup set name, all backup sets that you own are displayed on the screen.

backupsetname
Specifies the name of the backup set.

bset filename
Specifies the name of the file containing the beginning of the backup set. The *location* option should be set to *file*.

LOCation=
Specifies where Tivoli Storage Manager searches for a backup set during a query or restore operation. Use this option to locate backup sets on the server or local files. Backup sets that are generated on the server can be used locally specifying the *location* option and either the file name of the file containing the start of the backup set, or the tape device where the tape containing the start of the backup set is located.

server Specifies that Tivoli Storage Manager searches for the backup set on the server. This is the default.

file Specifies that Tivoli Storage Manager searches for the backup set on a local file.

Examples

Task Query a backup set called `monthy_financial_data` on the server.

Command: `dsmc query backupset`
`-backupsetname=monthly_financial_data -loc=server`

Task Query the backup set in the `weekly_budget_data.ost` file in the budget directory.

Command: `dsmc query backupset -backupsetname=sys:u/budget/`
`weekly_budget_data.ost -loc=file`

Query Filespace

The **query filespace** command displays a list of file spaces for a node that are stored on the Tivoli Storage Manager server, or inside a backupset when a backupset is specified. You can also specify a single file space name to query. A *file space* is a logical space on the server that contains files you backed up or archived. Tivoli Storage Manager assigns a separate file space on the server for each node at your workstation from which you back up or archive files.

A Unicode file space name might not display correctly if the server is unable to display the Unicode name. In this case, use the file space identifier (fsID) to identify these file spaces on the server. Use the **query filespace** command with the *detail* option to determine the fsID of a file space.

Syntax

```
►►──Query Filespace──────────────────────────────────────────────────────►
                      └─ filespacename ─┘  └─ options ─┘

►──BACKUPSetname=──backupsetname────────────────────────────────────────►◄
```
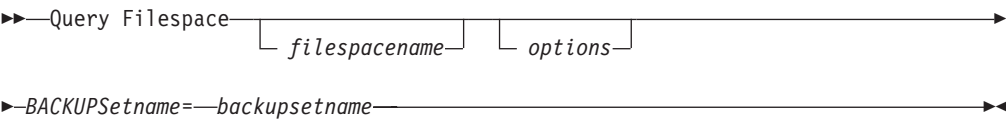
Parameters

filespacename
> Specifies an optional character string which can include wildcards. Use this argument to specify a subset of file spaces. The default is to display all file spaces.

options

Table 51. Query Filespace command: Related options

Option	Where to use	Page
backupsetname	Command line only.	110
dateformat	Client options file (dsm.opt) or command line.	122
detail	Command line only.	126
fromnode	Command line only.	151
scrolllines	Client options file (dsm.opt) or command line.	213
scrollprompt	Client options file (dsm.opt) or command line.	214
timeformat	Client options file (dsm.opt) or command line.	233

Examples

Task   Display your file spaces.

        Command: `dsmc query filespace`

Task   Display your file spaces. Use the *dateformat* and *timeformat* options to reformat the dates and times.

        Command: `dsmc query filespace –date=5 –time=4`

Task   Display the GOETHE\SYS: file space.

        Command: `query filespace GOETHE\SYS:`

Task   Display all of the file space names for NetWare server GOETHE.

Command: `query filespace GOETHE\*`

Task   Display all of the file space names with a volume name containing SYS.

Command: `query filespace *SYS*`

Query Group

Use the **query group** command to display information about a group backup and its members.

Notes:

1. Use the *pick* option to display a list of groups from which you can select one group to query.

2. Use the *showmembers* option to display and select individual group members that you want to query. The *showmembers* option is not valid with the *inactive* option. If you want to display members of a group that are not currently active, use the *pitdate* and *pittime* options to specify the backup date and time of the member you want to query.

3. Use the **query filespace** command to display virtual file space names for your node that are stored on the Tivoli Storage Manager server. For example:

```
Num     Last Incr Date    Type   File Space Name
---     --------------    ----   ---------------
  1     00/00/0000 00:00:00  MYVFS  ACCOUNTING
```

See "Query Filespace" on page 287 for more information.

4. If you perform a full and differential group backup, a query of this group using the *-inactive* option displays two active backups of the same name, one of type FULL and one of type DIFF. These backups inactivate any previous full and differential backups:

```
tsm> q files
   #     Last Incr Date     Type    File Space Name
---     --------------     ----    ---------------
  1   01/01/2007 00:00:00   TSMVFS   NEETAVFS
  2   01/01/2007 00:00:00   TSMVFS   /NEETAVFS
  3   01/01/2007 00:00:00   NTFS     //rhyme/d$
tsm>
```

If you query a group backup without the *-inactive* option, the query displays only the latest group backup, whether it is type FULL or type DIFF:

```
tsm> q group {/neetavfs}/neetag

Size       Backup Date       Mgmt Class  A/I Group
----       -----------       ----------  ---------
345,737 B 06/05/2007 13:52:04 A123456789  A FULL /NEETAVFS/NEETAG
```

Syntax

```
►►──Query GRoup─ filespec─────────────────────────────►◄
                          └─ options─┘
```

Parameters

options

Table 52. Query Group command: Related options

Option	Where to use	Page
fromnode	Command line only.	151

Table 52. Query Group command: Related options (continued)

inactive	Command line only.	156
pitdate	Command line only.	188
pittime	Command line only.	189
showmembers	Command line only.	217

filespec
> Specifies the virtual file space name (enclosed in braces) and the group name
> on the server that you want to query.

Examples

Task Display all the groups in the *accounting* file space.

Command:

```
query group {accounting}:*
```

Task Display active and inactive versions of the {accounting}:group1 filespec.

Command:

```
query group {accounting}:group1 -inactive
```

Task Display the {accounting}:group1 filespec. Use the ***showmembers*** option to
display a list of group members from which you can select one or more to
query.

Command:

```
query backup {accounting}:group1 -showmembers
```

Query Inclexcl

The **query inclexcl** command displays a list of include-exclude statements in the order in which they are processed during backup and archive operations. The list displays the type of option, the scope of the option (archive, all, etc.), and the name of the source file.

You can test the validity of patterns you want to use in your include-exclude list before you actually insert them in your options file. See the *test pattern* explanation below.

Syntax

```
►►──Query INCLexcl─┬──────────────────┬──────────────────────────────────►◄
                   └─test pattern─┘
```

Parameters

test pattern
> Use for testing the validity of patterns you want to use in your include-exclude list. When you use a test pattern with this command, the following occurs:
> - The internal include-exclude list is *not* displayed
> - The pattern is processed as if it had come from an include-exclude statement, including all the usual error checking
> - The pattern is displayed as it would appear in the include-exclude list
>
> If the test pattern has no errors, the compiled pattern result is the same as the test pattern.

Examples

Task   Display a list of include-exclude statements.

       Command: `dsmc query inclexcl`

Task   Test the validity of this pattern: SYS:/.../?x?/*.log

       Command: `dsmc query inclexcl  sys:/.../?x?/*.log`

Note: Some system files are excluded explicitly by Tivoli Storage Manager. You can use the **query inclexcl** command to display a list of these files.

Query Mgmtclass

The **query mgmtclass** command displays information about the management classes available in your active policy set.

Your administrator defines management classes that contain attributes controlling whether a file is eligible for backup or archive services. Management classes also determine how backups and archives are managed on the server.

Your active policy set contains a default management class; it can contain any number of additional management classes. You can assign specific management classes to files using *include* options that are located in the client options file (dsm.opt). If you do not assign a management class to a file, Tivoli Storage Manager uses the default management class.

When you archive files, you can override the assigned management class by using the *archmc* option.

Syntax

```
►►──Query Mgmtclass─────────────────────────────────────►◄
                    └─ options ─┘
```

Parameters

options

Table 53. Query Mgmtclass command: Related options

Option	Where to use	Page
detail	Command line only.	126
fromnode	Command line only.	151

Examples

Task   Display default and available management classes.

Command: `dsmc query mgmtclass -detail`

Query Node

The **query node** command displays all the nodes for which an administrative user ID has authority to perform operations. The authorized administrative user ID should have at least client owner authority over the client workstation node they are using either from the command line or from the web.

When using an interactive command-line session with a non-administrative ID, Tivoli Storage Manager prompts for an administrator ID.

Use the *type* option to specify the type of node to filter for. Valid values are *client*, *server*, and *any*. The default is *any*. See "Type" on page 238 for more information.

Syntax

```
►►──Query Node─────────────────────────────────────────────►◄
              └─ options ─┘
```
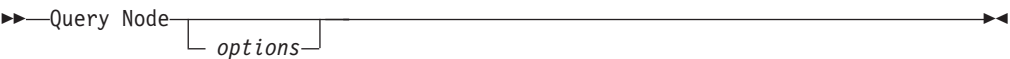
Parameters

options

Table 54. Query Node command: Related options

Option	Where to use	Page
type	Command line only.	238
scrolllines	Client options file (dsm.opt) or command line.	213
scrollprompt	Client options file (dsm.opt) or command line.	214

Examples

Task   Display all client nodes that are backup-archive clients.

Command: `query node -type=client`

Query Options

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

Syntax

```
►►──Query Options─────────────── pattern ──────────────────────────────────►◄
                 └─ options ─┘
```

Parameters

pattern
> An optional character string which can include wildcards. Use this argument to specify a subset of options. The default is to display all options.

options

Table 55. Query Options command: Related options

Option	Where to use	Page
scrolllines	Client options file (dsm.opt) or command line.	213
scrollprompt	Client options file (dsm.opt) or command line.	214

Examples

Task   Display all options and their values.

> **Command:** `query options`

Task   Display only options beginning with *comm*.

> **Command:** `query options comm*`

Task   Display the value of the *replace* option.

> **Command:** `query options replace`

Query Restore

The **query restore** command displays a list of your restartable restore sessions in the server database. The list contains these fields: owner, replace, subdir, preservepath, source, and destination.

A restartable restore session is created when a wildcard restore command fails because of network outage, client failure, server outage, or a similar problem. When such a failure occurs, the file space is locked on the server and its files cannot be moved off the server's sequential volumes. To unlock the file space, either restart the restore and allow it to complete (**restart restore** command), or cancel the restore (**cancel restore** command). Use **query restore** to determine if you have any restartable restore sessions and which file spaces are affected.

Syntax

```
►►──Query Restore──────────────────────────────────────────────►◄
```

Parameters

There are no parameters for this command.

Examples

Task Display your restartable restore session in the server database.

Command: `query restore`

Query Schedule

The **query schedule** command displays the events scheduled for your node. Your administrator can set up schedules to perform automatic backups and archives for you. To plan your work, use this command to determine when the next scheduled events occur.

The enhanced **query schedule** command on a Tivoli Storage Manager Version 5.3 and above client reports new parameters. The **query schedule** command prior to Tivoli Storage Manager Version 5.3 is referred to as classic.

Syntax

```
►►──Query SChedule───────────────────────────────────────────►◄
```

Parameters

There are no parameters for this command.

Examples

Task   Display your scheduled events.

Command: `dsmc 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.

Syntax

```
►►──Query SEssion──────────────────────────────────────────────────────►◄
```

Parameters

There are no parameters for this command.

Examples

Task   Display your session information.

        Command: `dsmc query session`

Query Systeminfo

Use the **query systeminfo** command to gather information on one or more of the following items and output this information to a file or the console:

- DSMOPTFILE - The contents of dsm.opt file.
- ERRORLOG - The Tivoli Storage Manager error log file.
- FILE - Attributes for the file name that you specify.
- INCLEXCL - Compiles a list of include-exclude in the order in which they are processed during backup and archive operations.
- OPTIONS - Compiled options.
- OSINFO - Name and version of the client operating system
- POLICY - Policy set dump.
- SCHEDLOG - The contents of the Tivoli Storage Manager schedule log (usually dsmsched.log).
- ENCRYPT - Available encryption methods.

Notes:

1. Use the *filename* option to specify a file name in which to store the information gathered from the items you specify. If you do not specify a file name, by default the information is stored in the root directory of the SYS: volume. See "Filename" on page 148 for more information.

2. Use the *console* option if you want to output the information to the console. See "Console" on page 121 for more information.

   Note: This command is intended primarily as an aid for IBM support to assist in diagnosing problems, although users who are familiar with the concepts addressed by this information might also find it useful. If you use the *console* option, no special formatting of the output is performed to accommodate screen height or width. Therefore, the console output can be difficult to read due to length and line-wrapping. In this case, it is recommended that you use the *filename* option with the **query systeminfo** command to allow the output to be written to a file that can subsequently be submitted to IBM support.

Syntax

```
              ┌─────────────────┐
►►──Query SYSTEMInfo──┴─ item ─┬───────┘────────────────────────►◄
                              └─ options ─┘
```
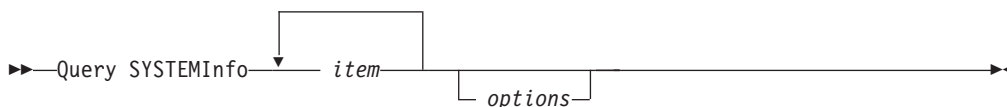
Parameters

item

   Specifies one or more items from which you want to gather information and output the information to the file name that you specify with the *filename* option or to the console.

options

Table 56. Query Systeminfo command: Related options

Option	Where to use	Page
console	Command line only.	121

Table 56. Query Systeminfo command: Related options (continued)

| *filename* | Command line only. | 148 |

Examples

Task Gather and store the contents of the dsm.opt file and the Tivoli Storage Manager error log file in the tsminfo.txt file.

Command: `query systeminfo dsmoptfile errorlog`
`-filename=tsminfo.txt`

Query TSA

The **query tsa** command displays information associated with a specific NetWare Target Service Agent (TSA). This information includes the TSA name, type, version information, and location of the password file for the TSA (if applicable).

This command also verifies the user ID and password information, depending on how they are stored. If the user ID and password are stored locally using the *nwpwfile* option, and the current password file does not contain valid information, this command prompts for the correct information. This command also prompts for the correction information if a current password files does not exist. For more information, see "Nwpwfile" on page 178.

If the password is stored in the local options file *nwuser*, the command verifies the user ID and password in that file. For more information, see "Nwuser" on page 179

Syntax

```
►►──Query TSA──┬─────────┬──┬──tsaname──────────┬─────────────►◄
               └─options─┘  ├──NDS──────────────┤
                            └──servername\NDS───┘
```
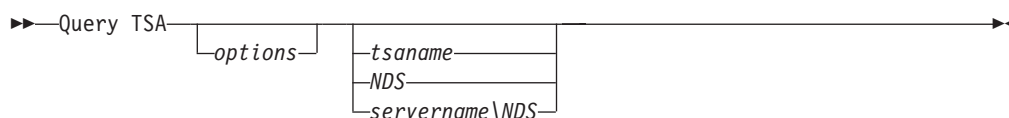
Parameters

options
> You can specify the *nwuser* option with the **query tsa** command. This is helpful for generating a locally stored password in your `nwpwfile` options file when using the **query tsa** command in batch mode.

tsaname
> Specifies the NetWare file server TSA name you want to query. If you do not specify *tsaname* or *NDS*, the client uses the local NetWare file server name.

NDS
> Specifies that you want to query the TSA (TSANDS.NLM) for the Novell eDirectory Services (NDS).

servername\NDS
> Specifies that you want to query a remote TSA (TSANDS.NLM) for the Novell eDirectory Services (NDS) which is loaded on fileserver *servername*.

Examples

Task   Query local file server TSA.

> **Command:** `dsmc q tsa`

Task   Query TSA for file server `ramke`.

> **Command:** `dsmc q tsa ramke`

Task   Query TSA for NDS.

> **Command:** `dsmc q tsa nds`

Task   Query TSA for NDS; `tsands.nlm` is loaded remotely on file server `mock`.

> **Command:** `dsmc q tsa mock/nds`

Task Create .pwd file for file server ramke in batch mode.

  Command: `dsmc q tsa ramke -nwuser=.admin.adsm:viksne -nwpwfile=yes`

Task Create .pwd file for file server ramke in interactive mode.

  Command: `dsmc q tsa ramke -nwpwfile=yes`

Task Create .pwd file for NDS interactively.

  Command: `dsmc q tsa nds -nwpwfile=yes`

Example 1

A sample output for **query tsa** follows:

```
Tivoli Storage Manager
Command Line Backup Client Interface - Version 5, Release 3
Client Date/Time: 16/03/2003 16:10:05
(C) Copyright IBM Corporation, 1990, 2004, All Rights Reserved.

Node Name: GOETHE
Session established with server spikes: Windows
  Server Version 5, Release 2
  Server date/time: 16/03/2003 16:09:52
  Last access: 16/03/2003 16:08:39

Connecting to a NetWare File System (goethe)

Connected to goethe

TSA Name..........: goethe
TSA Module Name........: TSA600.NLM
TSA Version.....: 6.50.3
SMDR Version....: 6.50.3
User/Password Location..: goethe\sys:tsm/030199/tsm.pwd
User/Password Valid.....: Yes

tsm>
```

Example 2

A sample output for **query tsa nds** (no password file present) follows:

```
Tivoli Storage Manager
Command Line Backup Client Interface - Version 5, Release 3
Client Date/Time: 16/03/2003 16:10:05
(C) Copyright IBM Corporation, 1990, 2004, All Rights Reserved.

Node Name: goethe
Session established with server spikes: Windows
  Server Version 5, Release 2
  Server date/time: 03/04/2003 16:09:52
  Last access: 03/04/2003 16:08:39

Connecting to a Novell Directory (goethe_tree)

Please enter NetWare user for "goethe_tree":.admin.adsm

Please enter the password on "goethe_tree" for NetWare
user".admin.adsm":*****

Connected to goethe_tree

NetWare TSA Information

TSA Name..........: goethe
TSA Module Name........: tsands
TSA Version.....: 6.50.3
SMDR Version....: 6.50.3
User/Password Location..: goethe\sys:tsm/040199/tsm.pwd
User/Password Valid.....: Yes

tsm>
```

Example 3

A sample output for **query tsa** (non-NetWare platforms) follows:

```
Tivoli Storage Manager
Command Line Backup Client Interface - Version 5, Release 3
Client Date/Time: 03/04/2003 16:10:05
(C) Copyright IBM Corporation, 1990, 2004, All Rights Reserved.

Node Name: spikes
Session established with server spikes: Windows
  Server Version 5, Release 3
  Server date/time: 03/04/2003 16:09:52
  Last access: 03/04/2003 16:08:39

Selected function is not supported for this client platform.

tsm>
```

Restart Restore

The **restart restore** command displays a list of your restartable restore sessions in the server database. You can select zero or more restartable restore sessions that you want to restart.

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.

Syntax

```
►►──RESTArt Restore──────────────────────────────────────────────►◄
```

Parameters

There are no parameters for this command.

Examples

Task   Restart a restore.

          Command: `restart restore`

This command is only valid in interactive mode.

Restore

The **restore** command obtains copies of backup versions of your files from a Tivoli Storage Manager server, or inside a backupset when a backupset is specified. To restore files, specify the directories or selected files, or select the files from a list. Restore files to the directory from which you backed them up or to a different directory. Tivoli Storage Manager uses the *preservepath* option with the *subtree* value as the default for restoring files. For more information, see "Preservepath" on page 194.

Note: When restoring a directory, its modification date and time is set to the date and time of the restore, not to the date and time the directory had when it was backed up. This is because Tivoli Storage Manager restores the directories first, then adds the files to the directories.

If you set the *subdir* option to *yes* when restoring a specific path and file, Tivoli Storage Manager recursively restores *all* subdirectories under that path, and any instances of the specified file that exist under *any* of those subdirectories.

System trustee rights are restored as part of the file restore process. They cannot be restored alone.

You can use the **restore** command to restore a backup set. See "Restore Backupset" on page 308 for the syntax.

Restoring from file spaces that are not Unicode-enabled

If you want to restore from file spaces that are not Unicode-enabled, you must specify the source on the server and a destination on the client. For example, you backed up files from your DATA: volume from your NetWare server GOETHE prior to installing the Unicode-enabled client. After the installation, you issue the following command for a selective backup:

```
sel data:/logs/*.log
```

If you choose to rename the DATA file space before the backup takes place, the server renames the file space to GOETHE\DATA_OLD. The backup continues placing the data specified in the current operation into the Unicode-enabled file space named GOETHE\DATA:. That file space now contains only the \logs directory and the *.log files. If you want to restore a file from the (old) *renamed* file space to its original location, you must enter both the source and destination as follows:

```
restore GOETHE\DATA_OLD:/docs/myresume.doc DATA:/docs/
```

Syntax

```
>>--REStore----+--FILE--+----------+--------+--sourcefilespec--+-->
                        +-options--+        +--NDS-------------+

>------+----------------------+----BACKUPSetname=---+--backupsetname--+-->
       +--destinationfilespec-+                     +--bset filename--+
                                                    +--tape device----+
```

►►─LOCation=─┬─*server*─┬───►◄
             ├─*file*──┤
             └─*tape*──┘
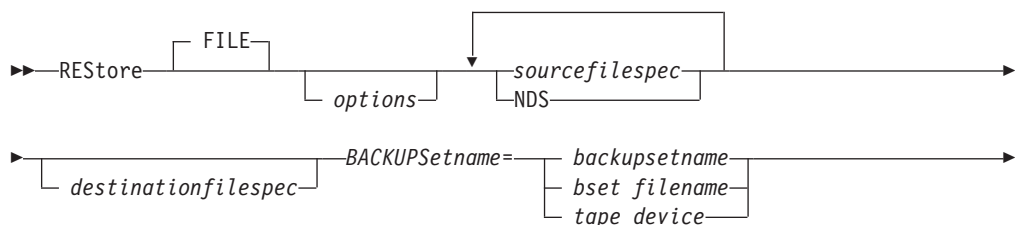
Parameters

file

This parameter specifies that the source file specification is an explicit file name. This parameter is required when you restore a file name from the current path, when you do not specify a relative or absolute path, and when the file name conflicts with one of the reserved **restore** command keywords, such as **restore** *backupset*.

options

Table 57. Restore command: Related options

Option	Where to use	Page
backupsetname	Command line only.	110
dateformat	Client options file (dsm.opt) or command line.	122
dirsonly	Command line only.	128
filelist	Command line only.	146
filesonly	Command line only.	149
fromdate	Command line only.	150
fromnode	Command line only.	151
fromtime	Command line only.	152
ifnewer	Command line only.	155
inactive	Command line only.	156
latest	Command line only.	165
location	Command line only.	166
numberformat	Client options file (dsm.opt) or command line.	175
pick	Command line only.	187
pitdate	Command line only.	188
pittime	Command line only.	189
preservepath	Command line only.	194
replace	Client options file (dsm.opt) or command line.	200
subdir	Client options file (dsm.opt) or command line.	221
tapeprompt	Client options file (dsm.opt) or command line.	223
timeformat	Client options file (dsm.opt) or command line.	233
todate	Command line only.	235
totime	Command line only.	236
volinformation	Command line only.	243

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.

NDS

Restores the NDS. To restore the entire NDS, enter:

```
restore NDS:* -sub=yes
```

To restore one container, enter:

```
restore NDS:.o=container_name
```

Note: Objects added after the backup version was created are *not* deleted.

destinationfilespec

Specifies the path and file name where you want to place the restored files. If you do not specify a destination, Tivoli Storage Manager restores the files to the original source path.

- If the *sourcefilespec* names a single file, the *destinationfilespec* can be a file or a directory. If you are restoring a single file, you can optionally end the specification with a file name if you want to give the restored file a new name.
- If the *sourcefilespec* is wildcarded or **subdir**=*yes* is specified, the *destinationfilespec* must be a directory and end with a directory delimiter (\).

Note: If the destination path or any part of it does not exist, Tivoli Storage Manager will create it.

Examples

Task   Restore a single file named budget in the /Users/user1/Documents directory.

Command: `dsmc restore sys:u/projecta/budget`

Task   Restore all files with a file extension of .bak from the sys:projecta directory.

Command: `dsmc res sys:u/projecta/*.bak`

Task   Restore files in the sys:user/project directory. Use the *pick* and *inactive* options to select active and inactive backup versions.

Command: `dsmc res servb\sys:user/project/* -pick -inactive`

Task   Restore all files in the sys:user/project directory to their state as of 1:00 PM on August 17, 2002.

Command: `restore -pitd=8/17/2002 -pitt=13:00:00 sys:user/project/`

Task   Restore all files from the sys:projecta directory that end with .bak to the sys:projectn directory.

Attention: 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.

Command: `dsmc res sys:projecta/*.bak sys:projectn/`

Task   Restore all files from the sys:projecta directory that end with .bak to another directory on a different NetWare server, serverb\sys:projectn. The projectn directory does not need to exist on serverb.

Command: `dsmc restore sys:projecta/*.bak serverb\sys:projectn/`

Task   Restore the NDS.

Command: `dsmc res T9/nds:* -su=y -replace=y`

Task Restore all of the objects contained within the .o=ibm organization in the NDS.

Command: `dsmc res adsm40\nds.o=ibm.* -sudir=yes`

Task Restore files in the sys:user/project directory. Use the *pick* option and the *inactive* option.

Command: `dsmc res servb\sys:user/projedct/* -pick -inactive`

Task Restore files specified in the filelist to a different location.

Command: `dsmc res -filelist=sys:dir1/dir2/restorelist.txt sys:home/NewRestoreLocation/`

Restore Backupset

The **restore backupset** command restores a backup set from the Tivoli Storage Manager server or a local file.

Use the *backupsetname* and *location* options with the **restore backupset** command to specify where Tivoli Storage Manager searches for a backup set during the restore operation. See "Location" on page 166 for more information.

If you are restoring a file space from a backup set to a system that did not perform the original backup, you might need to:
- Specify a destination
- Use the syntax below to specify the source file

You can restore a group from a backup set with the following considerations:
- You must set the *subdir* option to *yes*.
- The *sourcefilespec* must be the virtual file space name enclosed in braces {}, followed with a terminating directory delimiter. For example:

```
restore backupset {myGrpFs}\* c:\myGroupRestDir
  -backupsetname=groupData.1234 -location=server -subdir=yes
```

```
restore backupset {accounting}:* data1:user/
  projectb/ -backupsetname=mybackupset -loc=server -subdir=yes
```

The entire group, or groups in the virtual file space will be restored. You cannot restore a partial group by specifying a qualified source file space.

NDS restores are not supported. If Tivoli Storage Manager creates a backup set containing only the NDS, and you attempt to restore it with the **restore backupset** command, an error message appears. If a backup set contains both a file specification and the NDS, no error message is produced, however only the file specification is restored. To restore the NDS, you must use the use the **restore** command from the command line.

The **restore backupset** command restores a backup set from the server or a local file only. For example, the following command restores a backup set from the server: `tsm> res backupset bkset.101394 -su=y -rep=all`, and the following command restores the backup set from `file` on a local NetWare server: `tsm> res backupset sys:\34477804.ost -su=y -rep=all -loc=file`.

If you copy a backup set from the Tivoli Storage Manager server to the NetWare server in order to restore it, you must specify `-loc=file`. The backup set can reside on NetWare volumes, CDROM, DVD, or a similar device that can be mounted as a volume with files that can be accessed as file specifications.

You cannot restore a subset of files from a local backup set. The following error message appears: *"Invalid source file specification."*

Considerations:
- If you are unable to restore a backup set from portable media, check with your Tivoli Storage Manager administrator to ensure that the portable media was created on a device using a compatible format.
- If you use the **restore backupset** command on the initial command line and you set the *location* option to *file*, no attempt is made to contact the server.
- There is no support in the API for the backup set format. Therefore, backup set data that was backed up with the API cannot be restored or used.

- If the object you want to restore is part of a backup set generated on a node, and the node name is changed on the server, any backup set objects that were generated prior to the name change will not match the new node name. Ensure that the node name is the same as the node for which the backup set was generated.

You can restore backup sets in a storage area network (SAN) by specifying the *location*=*server* option to restore the backup set directly from the server using the LAN.

Syntax

```
►►──REStore Backupset──sourcefilespec──────────────────────────────────►
                              └─destfilespec─┘  └─options─┘


              ┌─server─┐
►──BACKUPSetname =──┬─backupsetname─┬──LOCation =──┤         ├──────────►◄
                    └─bset filename─┘              └─file─┘
```
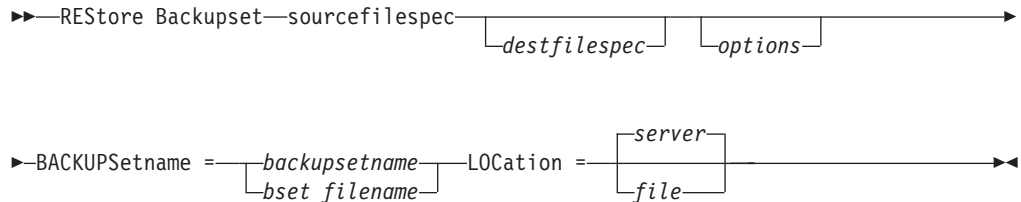
Parameters

options

Table 58. Restore Backupset command: Related options

Option	Where to use	Page
dirsonly	Command line only.	128
filesonly	Command line only.	149
ifnewer	Command line only.	155
location	Command line only.	166
preservepath	Command line only.	194
quiet	Client options file (dsm.opt) or command line.	199
replace	Client options file (dsm.opt) or command line.	200
subdir	Client options file (dsm.opt) or command line.	221

sourcefilespec
　　Specifies that you want to restore all Windows XP system objects from the backup set. You cannot restore individual system objects from the backup set. This parameter is for the Windows XP clients only.

destinationfilespec
　　Specifies the destination path for the restored files. If you do not specify a *sourcefilespec*, you cannot specify a *destinationfilespec*. If you do not specify a destination, Tivoli Storage Manager restores the files to the original source path. If you are restoring more than one file, you must end the file specification with a directory delimiter (/), otherwise, Tivoli Storage Manager assumes the last name is a file name and reports an error. If you are restoring a single file, you can optionally end the destination file specification with a file name if you want to give the restored file a new name.

BACKUPSetname=
　　Specifies the name of the backup set on the server from which to perform a

restore operation. You cannot use wildcard characters to specify the backup set name. Tivoli Storage Manager restores the backup set from the server using the LAN.

backupsetname
Specifies the name of the backup set on the server from which to perform a restore operation. The *location* option should be set to *server*.

bset filename
Specifies the name of the file containing the beginning of the backup set. The *location* option should be set to *file*.

LOCation=
Specifies where Tivoli Storage Manager searches for a backup set during a query or restore operation. Use this option to locate backup sets on the server or local files. Backup sets that are generated on the server can be used locally specifying the *location* option and either the file name of the file containing the start of the backup set, or the tape device where the tape containing the start of the backup set is located.

server   Specifies that Tivoli Storage Manager restores the backup set on the server. This is the default.

file   Specifies that Tivoli Storage Manager restores the backup set on a local file.

Examples

Task   Restore a backup set called `monthly_financial_data` from the server.

Command: `dsmc restore backupset -backupsetname=monthly_financial_data -loc=server`

Task   Restore the backup set contained in the `weekly_budget_data.ost` file in the budget directory.

Command: `dsmc restore backupset -backupsetname=sys:u/budget/ weekly_budget_data.ost -location=file`

Task   Restore a group from the backup set `mybackupset` on the Tivoli Storage Manager server to the `servb\sys:user/projectb` directory.

Command: `dsmc restore backupset {accounting}: servb\sys:user/ projectb/ -backupsetname=mybackupset -loc=server -subdir=yes`

Restore Group

Use the **restore group** command to restore specific members or all members of a group backup.

Notes:

1. Use the *pick* option to display a list of groups from which you can select one group to restore.
2. Use the *showmembers* option with the *pick* option to display and restore one or more members of a group. In this case, you first select the group from which you want to restore specific members, then you select one or more group members to restore.
3. You can restore a group from a backup set. See "Restore Backupset" on page 308 for more information.

Syntax

```
►►──restore group──┬──────────┬── sourcefilespec ──┬───────────────────┬────►◄
                   └─options──┘                     └─destinationfilespec─┘
```

Parameters

options

Table 59. Restore Group command: Related options

Option	Where to use	Page
backupsetname	Command line only.	110
fromdate	Command line only.	150
fromnode	Command line only.	151
fromtime	Command line only.	152
ifnewer	Command line only.	155
inactive	Command line only.	156
latest	Command line only.	165
pick	Command line only.	187
pitdate	Command line only.	188
pittime	Command line only.	189
replace	Client options file (dsm.opt) or command line.	200
showmembers	Command line only.	217
tapeprompt	Client options file (dsm.opt) or command line.	223
todate	Command line only.	235
totime	Command line only.	236
volinformation	Command line only.	243

sourcefilespec
> Specifies the virtual file space name (enclosed in braces) and the group name on the server that you want to restore.

destinationfilespec
> Specifies the path where you want to place the group or one or more group members. If you do not specify a destination, the client restores the files to their original location.

Examples

Task   Restore all members in the {accounting}:group1 group backup to their original location on the client system.

> **Command:**
> ```
> restore group {accounting}:group1
> ```

Task   Display all groups within the *accounting* virtual file space. Use the *showmembers* option to display a list of group members from which you can select one or more to restore.

> **Command:**
> ```
> restore group {accounting}:* -pick -showmembers
> ```

Task   Display a list of groups within the *accounting* virtual file space from which you can select one or more groups to restore.

> **Command:**
> ```
> restore group {accounting}:* -pick
> ```

Retrieve

The **retrieve** command obtains copies of archived files from the Tivoli Storage Manager server. You can retrieve specific files or entire directories.

Use the *description* option to specify the descriptions assigned to the files you want to retrieve.

Use the *pick* option to display a list of your archives from which you can select an archive to retrieve.

Retrieve the files to the same directory from which they were archived, or to a different directory. Tivoli Storage Manager uses the *preservepath* option with the *subtree* value as the default for restoring files. For more information, see "Client options reference" on page 102.

Notes:

1. When retrieving a directory, its modification date and time is set to the date and time of the retrieve, not to the date and time the directory had when it was archived. This is because Tivoli Storage Manager retrieves the directories first, then adds the files to the directories.

2. If you are retrieving files to a different directory than the original directory, file names become the names you specify with the *destinationfilespec* parameter. Because only DOS names are valid within the client, the file name becomes a DOS name.

Retrieving from file spaces that are not Unicode-enabled

If you want to retrieve archives from file spaces that were renamed by the Unicode-enabled client, you must specify the source on the server and a destination on the client. For example, you archived files from your DATA: volume from your NetWare server GOETHE prior to installing the Unicode-enabled client. After the installation, you issue the following archive command:

```
arc data:/logs/*.log
```

Before the archive takes place, the server renames the file space to GOETHE\DATA_OLD:. The archive continues placing the data specified in the current operation into the Unicode-enabled file space named GOETHE\DATA:. That file space now contains only the \logs directory and the *.log files. If you want to retrieve a file from the (old) *renamed* file space to its original location, you must enter both the source and destination as follows:

```
retrieve GOETHE\DATA_OLD:/docs/myresume.doc DATA:/docs/
```

Syntax

```
>>──RETrieve──┬──────────┬──┬─▼──sourcefilespec─┬──┬────────────────────┬──><
              └─options─┘  └─NDS─────────────┘  └─destinationfilespec─┘
```

Parameters

options

Table 60. Retrieve command: Related options

Option	Where to use	Page

Table 60. Retrieve command: Related options (continued)

dateformat	Client options file (dsm.opt) or command line.	122
description	Command line only.	125
dirsonly	Command line only.	128
filelist	Command line only.	146
filesonly	Command line only	149
fromdate	Command line only	150
fromnode	Command line only.	151
fromtime	Command line only	152
ifnewer	Command line only	155
pick	Command line only.	187
preservepath	Command line only.	194
replace	Client options file (dsm.opt) or command line.	200
subdir	Client options file (dsm.opt) or command line.	221
tapeprompt	Client options file (dsm.opt) or command line.	223
timeformat	Client options file (dsm.opt) or command line.	233
todate	Command line only.	235
totime	Command line only.	236
volinformation	Command line only	243

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 38 for the maximum file size for retrieve processing.

NDS
> Retrieves the NDS.

destinationfilespec
> Specifies the path and file name where you want the files to reside. If you do not specify a destination, Tivoli Storage Manager restores the files to the original source path.

Examples

Task   Retrieve a single file named budget.

> **Command:** `dsmc ret sys:projecta/budget`

Task   Retrieve all files with an extension of .bak from the sys:projecta directory.

> **Command:** `dsmc retrieve sys:projecta/*.bak`

Task   Retrieve files in the sys:project directory. Use the *pick* option.

> **Command:** `dsmc ret sys:project/* -pick`

Task   Retrieve all files from the sys:projecta directory that end with the characters .bak to the sys:projectn/ directory.

> **Command:** `dsmc ret sys:/projecta/*.bak servb\sys:projectn/`

Note: If the destination is a directory, you must 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.

Task Retrieve all files in the sys:home directory.

Command: `dsmc retrieve sys:home/*`

Note: To retrieve files contained in a subdirectory, you must specify the subdirectory in another **retrieve** command.

Task Retrieve files in the sys:project directory. Use the *pick* option.

Command: `ret sys:project/* -pick`

Task Retrieve a file from the renamed file space to its original location. Enter both the source and destination as follows:

Command:

Schedule

The **schedule** command starts the client scheduler on your workstation. The client scheduler must be running before scheduled work can start.

Notes:

1. The **schedule** command cannot be used if the *managedservices* option is set to *schedule*.
2. This command is valid only on the initial command line. It is not valid in interactive mode or in a macro file.

If the *schedmode* option is set to polling, the client scheduler contacts the server for scheduled events at the hourly interval you specified with the *queryschedperiod* option in your client options file (dsm.opt). If your administrator sets the *queryschedperiod* option for all nodes, that setting overrides the client setting.

If you are using TCP/IP communications, the server can prompt your workstation when it is time to run a scheduled event. To do so, set the *schedmode* option to *prompted* in the client options file (dsm.opt) or on the **schedule** command.

After you start the client scheduler, it continues to run and to start scheduled events. To end the scheduler, enter **QQ**. If the scheduler is active, it completes necessary transactions, then stops.

Syntax

```
►►──SCHedule─────────────────────────────────────────────►◄
              └─ options ─┘
```
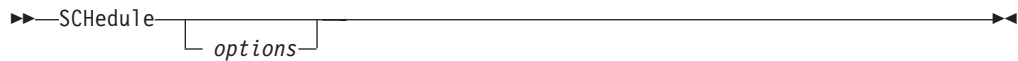
Parameters

options

Table 61. Schedule command: Related options

Option	Where to use	Page
maxcmdretries	Client options file (dsm.opt) or command line.	169
password	client options file (dsm.opt)	183
queryschedperiod	Client options file (dsm.opt) or command line.	198
retryperiod	Client options file (dsm.opt) or command line.	204
schedlogname	Client options file (dsm.opt) or command line.	208
schedmode	Client options file (dsm.opt) or command line.	210
sessioninitiation	Client options file (dsm.opt) or command line.	215
tcpclientport	Client options file (dsm.opt) or command line.	228

Examples

Task   Start the client scheduler.

   Command: `dsmc schedule –password=notell`

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 options file (dsm.opt). If you do not specify a directory path with the file name in the *schedlogname* option, the dsmsched.log will reside in the current working directory.

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 NetWare 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.

You can selectively back up single files and directories from the NetWare server. You can also selectively back up the NDS. Use wildcard characters to back up groups of related files.

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.

If back up of a file fails, determine if it is marked for execute only or if it is opened and locked by another user.

If you set the *subdir* option to *yes* when backing up a specific path and file, Tivoli Storage Manager recursively backs up *all* subdirectories under that path, and any instances of the specified file that exist under *any* of those subdirectories.

During a selective backup, a directory path might be backed up, even if the specific file that was targeted for backup is not found. For example:

```
dsmc selective sys:dir1/dir2/bogus.txt
```

still backs up dir1 and dir2 even if the file bogus.txt does not exist.

If the **selective** command is retried because of a communication failure or session loss, the transfer statistics will display the number of bytes Tivoli Storage Manager attempts to transfer during *all* command attempts. Therefore, the statistics for bytes transferred might not match the file statistics, such as those for file size.

Migrating to Unicode-enabled file spaces
See "Autofsrename" on page 108 for information about using the Unicode-enabled client.

Associating a local snapshot with a server file space
Use the *snapshotroot* option with the **selective** command in conjunction with a third-party application that provides a snapshot of a logical volume, to associate the data on the local snapshot with the real file space data that is stored on the Tivoli Storage Manager server. The *snapshotroot* option does not provide any facilities to take a volume snapshot, only to manage data created by a volume snapshot. See "Snapshotroot" on page 218 for more information.

Syntax

```
►►──Selective──────────────┬─────filespec──────────────────►◄
                  └─ options ─┘   └─NDS─┘
```
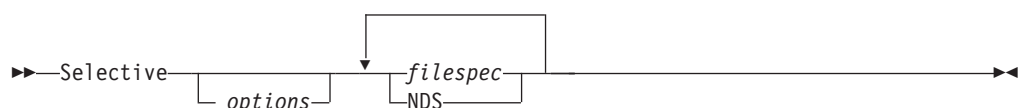
Parameters

options

Table 62. Selective command: Related options

Option	Where to use	Page
changingretries	Client options file (dsm.opt) or command line.	111
compressalways	Client options file (dsm.opt) or command line.	118
compression	Client options file (dsm.opt) or command line.	119
dirsonly	Command line only.	128
filelist	Command line only.	146
filesonly	Command line only.	149
snapshotroot	Command line only.	218
subdir	Client options file (dsm.opt) or command line.	221
tapeprompt	Client options file (dsm.opt) or command line.	223
volinformation	Command line only.	239

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 specify as many file specifications as available resources or other operating system limits permit. Separate file specifications with a space. You can also use the *filelist* option to process a list of files. The Tivoli Storage Manager client opens the file you specify with this option and processes the list of files within according to the specific command. See "Filelist" on page 146 for more information.

NDS
> Specifies that you want to back up the NDS. To back up the entire NDS, specify NDS:* -su=y. To back up one container in the directory, specify NDS:.o=nds_object. An NDS object can contain container objects and leaf objects.

Examples

Task   Back up the proja file in the sys:u/devel directory.

   Command: `dsmc selective sys:u/devel/proja`

Task   Back up all files in the sys:u/devel directory whose file names begin with proj.

   Command: `dsmc selective sys:u/devel/proj*`

Task   Back up all files in the sys:u/devel directory whose file names begin with proj. Back up the single file named budget in the sys:user directory.

   Command: `dsmc selective sys:u/devel/proj* sys:user/budget`

Task   Back up the entire NDS.

   Command: `dsmc selective t9\NDS:.* -su=y`

Task   Back up the tfr organization container of the NDS.

   Command: `dsmc selective t9\NDS:.o=tfr.* -su=y`

Task   Assuming that you initiated a snapshot of the sys: volume and mounted

the snapshot as SNAP1:, run a selective backup of the sys:system/dir1 directory tree from the local snapshot and manage it on the Tivoli Storage Manager server under the file space name sys:.

Command: `dsmc sel sys:system/dir1/* -subdir=yes -snapshotroot=snap1:`

Set Access

The **set access** command gives users at other nodes access to your backup versions or archived copies. You can give another user access to a specific file, multiple files, 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. Access is enabled only between like platforms. You can grant access only to another NetWare client node.

When an existing file space is renamed during Unicode conversion, any access rules that are defined for the file space remain applicable to the original file space. However, new access rules must be defined to apply to the new Unicode file space.

Supported Clients

This command is valid for all NetWareclients.

Syntax

```
>>--SET Access--+-- Archive--+-- filespec-- node---------------------------><
                +-- Backup---+
```

Parameters

Archive
> Permits access to archived files.

Backup
> Permits access to backup versions of files.

filespec
> Specifies the path, file or directory to which you are giving access to another node or user. Use wildcard characters to specify a group of files, or all files in a directory; all objects in a directory branch; or all objects in a volume. Use a single asterisk ″*″ for the file spec to give access to all files owned by you and backed up on the server. When the command **set access backup** ″*″ **node user** 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 sys:ann/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 sys:ann, use file spec sys:ann/*/*.

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: sys:ann/sub1/subsub1.
- The sys:ann directory contains the h1.txt and h2.txt files.
- The sys:ann/sub1 directory contains file s1.htm.
- The sys:ann/sub1/sub2 directory contains the ss1.cpp file.

To allow access to all files in the sys:ann/sub1/sub2 directory, enter:
```
set access backup sys:ann/sub1/sub2/* * *
```

To allow access to only those files in the sys:ann directory, enter:
```
set access backup sys:ann/* * *
```

To allow access to all files in all directories *in* and *below* the sys:ann directory, enter:
```
set access backup sys:ann/* * *
set access backup sys:ann/*/* * *
```

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.
>
>   A node name that begins with a (/) or a (-) character must be contained within single (') or double (") quotes. If the *node* parameter is specified when the **set access** command is run in batch mode, the node name must be contained within *both* sets of quotes. For example:
> ```
> dsmc set access backup sys:\*\* "'-testnode'"
> ```

Examples

Task   Give the user at node_2 authority to restore the budget file from the sys:user directory.

>   **Command:** dsmc set access backup sys:budget node_2

Task   Give node_3 authority to retrieve all files in the sys:devel/proja directory whose file names end with .sys.

>   **Command:** dsmc set access archive sys:devel/proja/*.sys node_3

Task   Give node_3 the authority to retrieve all files in the sys:u/devel/proja directory.

>   **Command:** dsmc set a archive sys:u/devel/proja node_3

Task   Give all nodes whose names end with bldgb the authority to restore all files in sys:system.

>   **Command:** dsmc set a b sys:system/* *bldgb

Task   Give node3 authority to restore all your backed up files.

>   **Command:** dsmc set access b * node3

Set Event

The **set event** command allows you to specify the circumstances for when archived data is deleted. You can use the **set event** command to:

- Prevent the deletion of data at the end of its assigned retention period (Deletion hold)
- Allow the expiration to take place, as defined by the archive copy group (Release a deletion hold)
- Start the expiration clock running when a particular event occurs (Notify the server that an event has occurred)

Objects affected can be specified with a standard Tivoli Storage Manager filespec (including wildcards), a list of files whose names are in the file specified using the *filelist* option, or a group of archived files with the description specified with the *description* option.

Note: When only a <filespec> is used, *all* archived copies of files or folders matching the filespec are affected. If you only want to affect certain versions of a file, use the *-pick* option and select from the displayed list.

Interaction with down-level servers:

If the **set event** command is issued when the client is connected to a server that does not support event-based policy (previous to Tivoli Storage Manager 5.2.2), the command will be rejected with an error message indicating that the current server does not support event-based policy.

Syntax

```
►►──SET Event──-TYPE=──┬──Hold──────────────┬──── ──<filespec>────────────────────►
                       ├──Release───────────┤
                       └──Activateretention─┘

►── ──-filelist=<filespec>── ──-description=──-pick──────────────────────────────►◄
```

Parameters

TYPE=

    Specifies the event type setting. This parameter must be specified.

hold

    Prevents the object from being deleted regardless of expiration policy.

release

    Allows normal event-controlled expiration to take place.

activateretention

    Signals the server that the controlling event has occurred and starts the expiration clock running.

-pick

    Provides a list of objects from which the user can select to apply the event.

The following options can also be used and serve their usual purpose:

- *Dateformat* (See "Dateformat" on page 122)
- *Numberformat* (See "Numberformat" on page 175)
- *Noprompt* (See "Noprompt" on page 174)
- *Subdir* (See "Subdir" on page 221)
- *Timeformat* (See "Timeformat" on page 233)

Examples

Task   The following example displays the verbose and statistics output from the
set event command `set event -type=hold SYS:/accounting/ledgers/`
`*05.books`, with objects rebound (as opposed to archived or some other
notation):

```
Rebinding--> 274 SYS:/accounting/ledgers/
   jan05.books
Rebinding--> 290 SYS:/accounting/ledgers/
   feb05.books

Total number of objects archived:       0
Total number of objects failed:         0
Total number of objects rebound:        2
Total number of bytes transferred:      0  B
Data transfer time:                  0.00 sec
Network data transfer rate:          0.00 KB/sec
Aggregate data transfer rate:        0.00 KB/sec
Objects compressed by:                  0%
Elapsed processing time:         00:00:02
```

Task   The -pick option used with the set event command `set event`
`-type=activate data:/tsm521/common/` will show the event type instead of
the command name:

```
TSM Scrollable PICK Window - Retention Event :  ACTIVATE

#    Archive Date/Time      File Size   File
-----------------------------------------------------
1. | 08/05/2003 08:47:46      766  B   data:/tsm521
                                          /common/
2. | 08/01/2003 10:38:11      766  B   data:/tsm521
                                          /common/
3. | 08/05/2003 08:47:46     5.79 KB   data:/tsm521
                                          /common/
4. | 08/01/2003 10:38:11     5.79 KB   data:/tsm521
                                          /common/
5. | 08/05/2003 08:47:46    10.18 KB   data:/tsm521
                                          /common/
```

Set Password

The **set password** command changes the Tivoli Storage Manager password for your workstation. If you omit the old and new passwords when you enter the **set password** command, you are prompted once for the old password and twice for the new password.

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

Syntax

```
►►──SET Password──────────────────────────────────────────►◄
                  └─ oldpw newpw─┘
```

Parameters

oldpw
    Specifies the current password for your workstation.

newpw
    Specifies the new password for your workstation.

Examples

The following is an example of using the **set password** command.

Task   Change your password from `osecret` to `nsecret`.

        Command: `dsmc set password osecret nsecret`

Appendix A. Using the Tivoli Storage Manager central scheduler

This section discusses how to use the Tivoli Storage Manager scheduler.

Overview of the Tivoli Storage Manager scheduler

The Tivoli Storage Manager central scheduler allows client operations to occur automatically at specified times. In order to understand scheduling with Tivoli Storage Manager, several terms need to be defined:

schedule definition
> A definition on the Tivoli Storage Manager server which specifies critical properties of the automated activity including the type of action, the time the action should take place, and how frequently the action will take place. There are numerous other properties which can be set (see the appropriate *Tivoli Storage Manager Administrator's Reference Guide* for a detailed description of the **define schedule**.)

schedule association
> An assignment to a specific schedule definition for a client node. Multiple schedule associations allow single schedule definitions to be used by many client nodes. Because schedule definitions are included with specific policy domains, it is only possible for nodes defined to a certain policy domain to be associated with schedules defined in that domain.

scheduled event
> A specific occurrence of when a schedule will be executed for a node. The following conditions must be met before automatic scheduled events will take place for a client:
> - A schedule definition must exist for a specific policy domain.
> - A schedule association must exist for the required node which belongs to that policy domain.
> - The client scheduler process must be running on the client system (see "Setting the client scheduler process to run as a background task and start automatically at boot time" on page 331 for more information).

When creating a schedule definition on the Tivoli Storage Manager server, schedule actions that you can take include incremental, selective, archive, restore, retrieve, command, and macro. The scheduled action that is most frequently used is incremental with the *objects* parameter left undefined. With this setting, the Tivoli Storage Manager client performs a domain incremental backup of all drives defined by the client domain option. A schedule definition using the *command* action allows an operating system command or shell script to be executed. When automating tasks for *Tivoli Storage Manager for Data Protection* clients, you must use *command* action schedule definitions which invoke the command-line utilities for the "Tivoli Storage Manager for" application.

The schedule *startup window* indicates the acceptable time period for a scheduled event to start. The startup window is defined by these schedule definition parameters: *startdate*, *starttime*, *durunits*, and *duration*. The *startdate* and *starttime* options define the beginning of the startup window for the very first scheduled event. The beginning of the startup windows for subsequent scheduled events will vary depending on the *period* and *perunit* values of the schedule definition. The

duration of the schedule window defines the length of the startup window. The schedule action is required to start within the startup window. To illustrate, consider the results of the following schedule definition:

```
define schedule standard test1 action=incremental starttime=12:00:00 period=1
perunits=hour dur=30 duru=minutes
```

Event	Window start	Window end	Actual start (just an example, times will vary)
1	12:00:00	12:30:00	12:05:33
2	13:00:00	13:30:00	13:15:02
3	14:00:00	14:30:00	14:02:00
and so on			

The variation in actual start times is a result of the randomization feature provided by the Tivoli Storage Manager central scheduler which helps to balance the load of scheduled sessions on the Tivoli Storage Manager server.

Handling spaces in file names in schedule definitions

When defining or updating a schedule *objects* parameter with file specifications that contain blank spaces, use quotation marks around each file specification that contains blanks, then single quotes around all of the specifications. Examples:

```
objects='"t9\sys:plan/proj1/Some file.doc"'
objects='"t9\sys:plan/proj1/Some file.doc" "t9\sys:plan/proj1/Another file.txt"
C:\noblanks.txt'
objects='"t9\sys:plan/My Directory With Blank Spaces/"'
```

This will ensure that t9\sys:plan/proj1/Some file.doc is treated as a single file name, as opposed to two separate files (t9\sys:plan/proj1/Some, and file.doc).

You can also refer to the *objects* parameter information for the **define schedule** and **update schedule** commands in the appropriate *IBM Tivoli Storage Manager Administrator's Reference*

Preferential start times for certain nodes

Occasionally, you might want to ensure that a particular node begins its scheduled activity as close as possible to the schedule's defined start time. The need for this typically arises when prompted mode scheduling is in use. Depending on the number of client nodes associated with the schedule and where the node is in the prompting sequence, the node might be prompted significantly later than the start time for the schedule. In this case, you can perform the following steps:

1. Copy the schedule to a new schedule with a different name (or define a new schedule with the preferred attributes).
2. Set the new schedule priority attribute so that it has a higher priority than the original schedule.
3. Delete the association for the node from the original schedule, then associate the node to the new schedule.

Now the Tivoli Storage Manager server will process the new schedule first.

Understanding scheduler processing options

There are several processing options which impact the behavior of the client scheduler. On the Tivoli Storage Manager client, you can define most of these options in the client options file (dsm.opt). However, some of these options can be set globally on the Tivoli Storage Manager server for all Tivoli Storage Manager clients. The **Managing Throughput of Scheduled Operations** section of the *Tivoli Storage Manager Administrator's Guide* provides detailed information on all topics described in the section.

Option	Client defined	Server defined	Server global override
managedservices	X		
maxcmdretries	X		**set maxcmdretries** command
maxschedsessions		X	
postschedulecmd	X		
preschedulecmd	X		
queryschedperiod	X		**set queryschedperiod** command
randomize		X	
retryperiod	X		**set retryperiod** command
schedcmddisabled	X		
schedlogname	X		
schedlogretention	X		
schedmode	X		**set schedmodes** command
sessioninitiation	X	X (**update node** command)	
tcpclientaddress	X	X (also defined on server when *sessioninit=serveronly* as part of the node definition)	
tcpclientport	X	X (also defined on server when *sessioninit=serveronly* as part of the node definition)	

Client defined options are defined in the dsm.opt file. The Tivoli Storage Manager server can also define some options in a client options set, or as part of the options parameter of the schedule definition. The Tivoli Storage Manager server can also set some options globally for all clients. By default, the client setting for these options is honored. If the global override on the Tivoli Storage Manager server is set, the client setting for the option is ignored. Defining client options as part of the schedule definition is useful if you want to use specific options for a scheduled action that differ from the option settings normally used by the client node, or are different for each schedule the node will execute.

The *schedmode* option controls the communication interaction between the Tivoli Storage Manager client and server. There are two variations on the schedule mode: *client polling* and *server prompted*.

Handling return codes from preschedulecmd and postschedulecmd scripts

Beginning with Tivoli Storage Manager Version 5.1, the scheduler exhibits the following behavior when the *preschedulecmd* and *postschedulecmd* options are used:

- If the command specified by the *preschedulecmd* option ends with a nonzero return code, Tivoli Storage Manager considers the command to have failed. In this case, neither the scheduled event nor any *postschedulecmd* or *postnschedulecmd* command will run. The administrative **query event** command with *format=detailed* option will show that the event failed with return code 12.

- If the command specified by the *postschedulecmd* option ends with a nonzero return code, Tivoli Storage Manager considers the command to have failed. The administrative **query event** command with *format=detailed* option will show that the event completed with return code 8, unless the scheduled operation completed with a higher return code, in which case the higher return code prevails. Therefore, if the scheduled operation completes with return code 0 or 4 and the *postschedulecmd* command fails, the administrative **query event** command will show that the event completed with return code 8. If the scheduled operation completes with return code 12, that return code prevails, and **query event** will show that the event failed with return code 12.

When interpreting the return code from a command, Tivoli Storage Manager considers 0 to mean success, and anything else to mean failure. While this behavior is widely accepted in the industry, it is not 100% guaranteed. For example, the developer of the command might exit with return code 3, if ran successfully. Therefore, it is possible that the *preschedulecmd* or *postschedulecmd* command might end with a nonzero return code and be successful. To prevent Tivoli Storage Manager from treating such commands as failed, you should wrap these commands in a script, and code the script so that it interprets the command return codes correctly. The script should exit with return code 0 if the command was successful; otherwise it should exit with a nonzero return code.

See the following references for more information:
- "Postschedulecmd" on page 190
- "Preschedulecmd" on page 192
- "Client return codes" on page 72

Using the client acceptor to manage scheduler services versus the traditional scheduler services

You can configure the Tivoli Storage Manager client to manage the scheduler process using the Tivoli Storage Manager client acceptor. The client acceptor daemon provides a light-weight timer which automatically starts and stops the scheduler process as needed. Alternatively, the traditional method keeps the Tivoli Storage Manager scheduler process running continuously. Generally, using the client acceptor daemon to manage the scheduler is the preferred method. These methods are compared as follows:

client acceptor daemon-managed Services

- Defined using the *managedservices schedule* option and started with client acceptor daemon services (dsmcad).
- The client acceptor daemon starts and stops the scheduler process as needed for each scheduled action.
- Requires fewer system resources when idle.
- Tivoli Storage Manager client options and Tivoli Storage Manager server override options are refreshed each time the client acceptor daemon services start a scheduled backup.
- Cannot be used with SESSIONINITiation=SERVEROnly backups.

Tivoli Storage Manager traditional scheduler services

- Started with command `dsmc sched` command.
- Remains active, even after scheduled backup is complete.
- Requires higher use of system resources when idle.
- Tivoli Storage Manager client options and Tivoli Storage Manager server override options are only processed once when `dsmc sched` is started.
- You must restart the scheduler process for updated Tivoli Storage Manager options to take effect.

Recommendation: Restart the traditional scheduler periodically to free system resources previously used by system calls.

Setting the client scheduler process to run as a background task and start automatically at boot time

You can configure the Tivoli Storage Manager client scheduler to run as a background system task which starts automatically when your system is started. This is true for both client acceptor daemon-managed and traditional methods of running the Tivoli Storage Manager client scheduler. When running a client acceptor daemon-managed schedule, only the client acceptor daemon process should be set to start automatically at boot time; not the scheduler process. For the traditional method, the scheduler process should be set up to start automatically at boot time.

You can configure the client acceptor daemon to run as a background system task which starts automatically when your system is started. To configure the client acceptor daemon to manage scheduled backups, you must set the *managedservices* option to manage the scheduler, or both the scheduler and Web client. The method for setting up the client acceptor daemon as a system task varies for each platform.

In order for the scheduler to start unattended, you must enable the client to store its password by setting the *passwordaccess* option to *generate*, and store the password by running a simple Tivoli Storage Manager client command such as `dsmc query session`. Note that for testing purposes, you can always start the scheduler in the foreground by running `dsmc sched` from a command prompt (without a 'managedservices' stanza set).

The client acceptor daemon-managed method is the preferred method to run scheduler services on Novell NetWare:

1. Specify the following required options in the client options file (dsm.opt):
     managedservices schedule
     passwordaccess generate
     nwpwfile yes

2. Specify any additional options to control which files will be backed up (*include*, *exclude*, *domain*, etc).

3. The Novell SMS/TSA interface must be active. Usually SMDR.NLM and SMSUT.NLM are loaded automatically with the SMSSTART.NCF batch file. You can add the "load TSANDS.NLM" command to either SMSSTART.NCF or AUTOEXEC.NCF, so that TSANDS is loaded at boot time. If SMS/TSA modules are not loaded, you can load them manually:

   ```
   load smdr.nlm
   load tsands.nlm
   load tsafs
   ```

4. If this is your first time running the scheduler, you must initialize the Tivoli Storage Manager password files, as follows:

   a. Issue the following command:

      ```
      load dsmc.nlm
      ```

      When prompted, enter your Tivoli Storage Manager password.

      Note: The load command assumes that the path where dsmc.nlm is already added to your search path.

   b. Issue the following command:

      ```
      q tsa
      ```

      Enter your NetWare administrator id followed by your password.

   c. Issue the following command:

      ```
      q tsa nds
      ```

      Enter your NetWare administrator id followed by your password.

5. You can start the scheduler services manually with the following commands:

   • If you have a search path specified which contains the directory path to Tivoli Storage Manager, you can specify:

      ```
      load dsmcad.nlm
      ```

   • If you do not have a search path specified, you can specify:

      ```
      load sys:\tivoli\tsm\client\ba\dsmcad.nlm
      ```

      (assuming that you installed the client on the sys volume and you are using the default install path)

   You can start the scheduler services automatically when NetWare starts, by adding the above commands in your autoexec.ncf file.

Managing multiple schedule requirements on one system

In certain situations it is preferable to have more than one scheduled activity for each client system. Normally, you can do this by associating a node with more than one schedule definition. This is the standard method of running multiple schedules on one system. You must ensure that the schedule windows for each schedule do not overlap. A single client scheduler process is not capable of executing multiple scheduled actions simultaneously, so if there is overlap, the second schedule to start will be missed if the first schedule does not complete before the end of the startup window of the second schedule. Suppose that most of the drives on your client system must be backed up daily, and that one drive containing critical data must be backed up hourly. In this case, you would need to

define two schedules to handle this requirement. To avoid conflict between the hourly and daily backup schedule, the *starttime* of each schedule needs to be varied.

In certain cases, it is necessary to run more than one scheduler process on a system. Multiple processes require a separate options file for each process and must contain the following information:

- Define a unique node name for each process
- Specify unique schedule and error logs for each process
- When running in prompted mode, you must use the *tcpclientport* option to specify a unique port for each process.

The advantages of using multiple schedule processes:

- You can run more than one scheduled backup at the same time.
- You can specify different backup criteria for each schedule started, with the Tivoli Storage Manager client option file or Tivoli Storage Manager server override options.

The disadvantages of using multiple schedule processes:
- A unique file space for each node name on the Tivoli Storage Manager server is created.
- When restoring the data, you must use the same node name associated with the backup.

Attention: If you are using Tivoli Storage Manager for NetWare 6.5, you should use client acceptor daemon-managed scheduler services method. All previous versions should use the legacy (Traditional) scheduler services method.

Traditional scheduler service method

1. Create multiple client options files, such as dsm1.opt, dsm2.opt, etc., containing unique node name and backup criteria specifications, such as *include*, *exclude*, and *domain* statements.

2. Enter the following options in each options file:
   ERRORLOGName (must contain full path and unique name)
   SCHEDLOGName (must contain full path and unique name)
   PASSWORDAccess generate
   NWPWFile yes

3. You must have a scheduler backup definition and association defined on the Tivoli Storage Manager server for each node name. These can also contain Tivoli Storage Manager server override options.

4. The Novell SMS/TSA interface must be active. Usually SMDR.NLM and SMSUT.NLM are loaded automatically with the SMSSTART.NCF batch file. You can add the "load TSANDS.NLM" command to either SMSSTART.NCF or AUTOEXEC.NCF, so that TSANDS is loaded at boot time. If SMS/TSA modules are not loaded, you can load them manually:
   ```
   load smdr.nlm
   load tsands.nlm
   load tsafs
   ```

5. If this is your first time running the scheduler, you must initialize the Tivoli Storage Manager password files for each options file, as follows:
   ```
   load sys:\tivoli\tsm\client\ba\dsmc
     -optfile=sys:\tivoli\tsm\client\ba\dsm1.opt
   ```

When prompted, enter your Tivoli Storage Manager password.

6. Issue the following command:

```
q tsa
```

Enter your NetWare administrator id followed by your password.

7. Issue the following command:

```
q tsa nds
```

Enter your NetWare administrator id followed by your password.

8. After entering your Tivoli Storage Manager, TSA and NDS passwords. You must quit the Tivoli Storage Manager client.

9. Start the client scheduler service using command-line option -optfile. For example:

```
load sys:\tivoli\tsm\client\ba\dsmc
   -optfile=sys:\tivoli\tsm\client\ba\dsm1.opt
load sys:\tivoli\tsm\client\ba\dsmc
   -optfile=sys:\tivoli\tsm\client\ba\dsm2.opt
```

You can start the Tivoli Storage Manager scheduler service manually by entering the above commands on the NetWare console or automate it by adding the command to the autoexec.ncf file.

client acceptor daemon-managed scheduler services method (Tivoli Storage Manager Version 5.1.5 or higher)

1. Create multiple client options files, such as dsm1.opt, dsm2.opt, etc., containing unique node name and backup criteria specifications, such as *include*, *exclude*, and *domain* statements.

2. Enter the following options in each options file:

   - **MANAGEDServices schedule** (You can also specify the *webclient* value if you are using the Tivoli Storage Manager Web client)
   - **ERRORLOGName** (must contain full path and unique name)
   - **SCHEDLOGName** (must contain full path and unique name)
   - **PASSWORDAccess generate**
   - **NWPWFile yes**

3. You must have a scheduler backup definition and association defined on the Tivoli Storage Manager server for each node name. These can also contain Tivoli Storage Manager server override options.

4. The Novell SMS/TSA interface must be active. Usually SMDR.NLM and SMSUT.NLM are loaded automatically with the SMSSTART.NCF batch file. You can add the "load TSANDS.NLM" command to either SMSSTART.NCF or AUTOEXEC.NCF, so that TSANDS is loaded at boot time. If SMS/TSA modules are not loaded, you can load them manually:

```
load smdr.nlm
load tsands.nlm
load tsafs
```

5. If this is your first time running the scheduler:

   a. Iinitialize the Tivoli Storage Manager password files for each options file, as follows:

   ```
   load sys:\tivoli\tsm\client\ba\dsmc
   ```

   When prompted, enter your Tivoli Storage Manager password.

   b. Issue the following command:

```
q tsa
```

Enter your NetWare administrator id followed by your password.

   c. Issue the following command:

```
q tsa nds
```

Enter your NetWare administrator id followed by your password.

6. After entering your Tivoli Storage Manager, TSA and NDS passwords. You must quit the Tivoli Storage Manager client.

7. Start the client client acceptor daemon service using command-line option -optfile. For example:

```
load sys:\tivoli\tsm\client\ba\dsmc
   -optfile=sys:\tivoli\tsm\client\ba\dsm1.opt
load sys:\tivoli\tsm\client\ba\dsmc
   -optfile=sys:\tivoli\tsm\client\ba\dsm2.opt
```

You can start the Tivoli Storage Manager client acceptor daemon service manually by entering the above commands on the NetWare console or automate it by adding the command to the autoexec.ncf file.

Restarting the scheduler process on a remote system

When managing a large number of Tivoli Storage Manager clients running scheduler processes, it is helpful to be able to start and stop the client service from a remote system.

It is recommended that you install a local copy of the Tivoli Storage Manager client on each NetWare file server to be backed up or archived.

Advantages of remote backup

- You can manage multiple NetWare file server backups from one system.
- Data backed up from the remote NetWare file server is associated with the node name on the local system at the Tivoli Storage Manager server, but can be identified from the file space name which contains the NetWare server name.

Disadvantages of remote backup

- Performance issues occur.
- When backing up data, Tivoli Storage Manager uses the SMS interface provided from Novell. All backed up data is transferred using the SMS interface over the network to the local NetWare system where Tivoli Storage Manager client is running. The Tivoli Storage Manager client forwards this data to the Tivoli Storage Manager server. However, a local copy of Tivoli Storage Manager running on each NetWare server only needs to send the data once over the network directly to the Tivoli Storage Manager server.

The remote and local NetWare operating system must be supported by the Tivoli Storage Manager client. The Novell NetWare SMS interface must be active on both the local and remote NetWare system (smdr.nlm, tsafs.nlm).

The steps outlined in "Setting the client scheduler process to run as a background task and start automatically at boot time" on page 331 are required to set up a scheduler service. The following are additional steps required to support a remote backup:

- Specify the remote NetWare server name using the *domain* option in your client options file (dsm.opt). For example:

  ```
  domain  remote_server_name/sys:
  ```

- If this is your first time running the scheduler, you must initialize the Tivoli Storage Manager password files, as follows:

  1. Issue the following command:

     ```
     load dsmc.nlm
     ```

     When prompted, enter your Tivoli Storage Manager password.

  2. Issue the following command:

     ```
     q tsa remote_server_name
     ```

     Enter your NetWare administrator id followed by your password. If the remote system is in a different NDS tree, you must specify your administrator name as the *full distinguished name*. For example:

     ```
     cn=admin.o=itsm
     ```

     or

     ```
     .admin.itsm
     ```

  3. Issue the following command:

     ```
     q tsa remote_server_name/nds
     ```

     Enter your NetWare administrator id followed by your password. If the remote system is in a different NDS tree, you must specify your administrator name as the *full distinguished name*. For example:

     ```
     cn=admin.o=itsm
     ```

     or

     ```
     .admin.itsm
     ```

Using the scheduler on clustered systems

Using Tivoli Storage Manager client in cluster environment requires additional configuration steps and can be easily done. There are some concepts to keep in mind when configuring Tivoli Storage Manager client in cluster environment:

- The Tivoli Storage Manager client is not a cluster aware application and processes data from shared volumes in the same way as from local volumes.

- If the Tivoli Storage Manager client backs up the same shared volume from two different cluster nodes using same Tivoli Storage Manager node, two different file spaces are created on the Tivoli Storage Manager server containing the same data. To avoid this, you must set the *clusternode* option to *yes* in the Tivoli Storage Manager client options file (dsm.opt). This setting changes the file space naming convention to CLUSTER_NAME\VOLUME_NAME and allows the Tivoli Storage Manager client to successfully manage backups of shared volumes taken from different cluster nodes. At the same time, this change in file space naming will result in mixing data from physically different local volumes under one file space on the Tivoli Storage Manager server.

It is recommended that you separate the backup of shared and local volumes. If the cluster has several shared disk resources which can migrate from one cluster node to another, it is recommended to run a separate instance of the Tivoli Storage Manager client for each disk resource. This allows Tivoli Storage Manager client instances to migrate together with disk resources, in case of failover or failback.

See cluster software documentation for information about how to create a program resource. In case of a failover or failback, the disk resources must be up and running before the Tivoli Storage Manager client starts.

The Tivoli Storage Manager client will prompt for the password if it is not readable from a password file. The Tivoli Storage Manager node password must be available for all Tivoli Storage Manager client cluster nodes where the Tivoli Storage Manager client resource can migrate to. For example, if a cluster has three nodes A, B and C and the Tivoli Storage Manager client resource can execute on nodes A and C, passwords must be readable on nodes A and C but not on B.

For information on how to configure a Tivoli Storage Manager server to manage a cluster configured client, see Appendix C, "Installing and configuring the backup-archive client in a Novell Cluster Services (NCS) environment," on page 357.

Troubleshooting the Tivoli Storage Manager scheduler

The Tivoli Storage Manager server maintains records of scheduled events which can be helpful when managing Tivoli Storage Manager schedules on several client systems. The Tivoli Storage Manager server **query event** command allows an administrator to view event records on the Tivoli Storage Manager server. A useful query which shows all of the event results for the previous day is:

```
query event * * begind=today-1 begint=00:00:00 endd=today-1 endt=23:59:59
```

You can limit query results to exception cases with:

```
query event * * begind=today-1 begint=00:00:00 endd=today-1 endt=23:59:59
exceptionsonly=yes
```

Query results include a status field which gives a summary of the result for a specific event. By using the *format=detailed* option on the **query event** command, complete information for events displays, including the return code passed back by the Tivoli Storage Manager client. Table 63 summarizes the meaning of the event status codes which are likely to exist for a scheduled event that has already taken place:

Table 63. Scheduled client event status codes

Status	Meaning
Completed	The scheduled client event ran to completion without a critical failure. There is a possibility that the event completed with some errors or warnings. Query the event with detailed format to inspect the event result for more information. The result can either be 0, 4, or 8.
Missed	The schedule start window elapsed without action from the Tivoli Storage Manager client. Common explanations are that the schedule service is not running on the client or a previous scheduled event is not complete for the same or a different schedule.

Table 63. Scheduled client event status codes (continued)

Status	Meaning
Started	Normally, this indicates that a scheduled event has begun. However, if an event showing a status of *Started* is followed by one more *Missed* events, it is possible that the client scheduler encountered a hang while processing that event. One common cause for a hanging client schedule is the occurrence of a user interaction prompt, such as a prompt for an encryption key, to which the user has not responded.
Failed	The client event ran to completion, however, a critical failure occurred.

Investigating abnormal scheduled events

If a particular client node displays multiple consecutive events with a result of *missed*, the client scheduler process is not running, has terminated, or is hanging. If a scheduled event is missed, but other consecutive scheduled events for that node show a result of *completed*, investigate the server activity log and the client schedule log to determine the cause. Scheduled events with a result of *failed*, have encountered a processing error originating either from the Tivoli Storage Manager client or server. The first place to check is the server activity log during the time period in which the scheduled event was processed. The activity log shows Tivoli Storage Manager server processing errors and some client errors which have been remotely logged to the Tivoli Storage Manager server. If the explanation cannot be found in the activity log, check the client schedule log.

Checking the server activity log

When checking the server activity log, narrow the query results down to the time period in which the scheduled event occurred. Begin the event log query at a time shortly before the start window of the scheduled event. For example, if you are investigating the following suspect event:

```
Scheduled Start       Actual Start        Schedule Name Node Name    Status
-------------------- -------------------- ------------- ------------- -------
08/21/2003 08:27:33                       HOURLY        NODEA         Missed
```

You could use one of the following queries:

```
query actlog begind=08/21/2003 begint=08:25:00
query actlog begind=08/21/2003 begint=08:25:00 originator=client node=nodea
```

Inspecting the Client Schedule Log

The Tivoli Storage Manager client maintains a detailed log of all scheduled activities. If queries of the server activity log do not explain a failed scheduled event, check the Tivoli Storage Manager client schedule log. Access to the client system is required for inspecting the schedule log. The schedule log file typically resides in the same directory as the Tivoli Storage Manager client error log (dsmerror.log), in a file named dsmsched.log. The default location for this log is the Tivoli Storage Manager client directory. The location of the log file can be specified using the *schedlogname* option, so you might need to refer to the options file to see if the *schedlogname* option was used to relocate the log file. When you

locate the schedule log, it is easy to search through the file to find the time period corresponding the start date and time of the scheduled event. Here are some tips on what to look for:

- If you are investigating a *missed* event, check the details of the previous event, including the time at which the previous event completed.
- If you are investigating a *failed* event, look for error messages which explain the failure, such as an exceeded Tivoli Storage Manager server session limit.
- If an explanation remains unclear, check the client error log file (usually named dsmerror.log.)

Understanding the scheduler log

The scheduler log file provides information about which schedule runs next and which files are processed. The default file name, dsmsched.log, is created in the Tivoli Storage Manager client directory. Use the *schedlogname* option to change the location and name of this file.

The schedule log continues to grow in size unless you prune it using the *schedlogretention* option or specify a maximum size using the *schedlogmax* option.

When the scheduler queries the server for the next schedule, it sends the schedule information to the log file. The following information is logged:

Output from scheduled commands is sent to the schedule log file. After scheduled work is performed, check the log to ensure the work completed successfully.

When a scheduled command is processed the schedule log contains the following entry:

```
Scheduled event eventname completed successfully
```

This is merely an indication that Tivoli Storage Manager successfully issued the scheduled command associated with the *eventname*. No attempt is made to determine the success or failure of the command. You should assess the success or failure of the command by evaluating the return code from the scheduled command in the schedule log. The schedule log entry for the command's return code is prefaced with the following text:

```
Finished command. Return code is:
```

You can modify the scheduling options in your Preferences file if you do not like the current values and the options are not over-ridden by server settings for your schedule. You can determine this by comparing a 'dsmc q options' output to your local options files. For more information about scheduling options, see "Scheduling options" on page 93.

Appendix B. Tivoli Storage Manager NetWare backup and recovery guide

This chapter discusses the basic structure of the NDS (Novell eDirectory Services), and provides recovery scenarios to protect NDS data against loss or corruption.

The NDS is an object-oriented, hierarchical database that manages resources such as servers, users, groups, file systems, and printers in a network. The NDS is a global service that physically resides on multiple servers within a network. Refer to the publication, Novell NetWare *Introduction to Novell eDirectory Services*, for general information about the NDS. This publication should be included in the NetWare installation package.

NDS backup considerations

This section discusses some things to consider when using NDS for backup.

Storage Management Services

Tivoli Storage Manager uses Novell's Storage Management Services (SMS) as the interface to the NetWare operating system. This section discusses the pertinent components of the SMS architecture.

Note that any limitations existing in the SMS architecture imply a limitation of Tivoli Storage Manager.

Target Service Agent (TSA)
> A *target* in the context of SMS is an entity on the network that requires back up. To Tivoli Storage Manager, these targets are NetWare servers and NDS trees.
>
> The TSA presents data in a system independent data format known as SIDF (system independent data format).
>
> To back up the NDS, the target service agent TSANDS.NLM must be loaded on one of the NetWare servers in the network. Typically, TSANDS.NLM is loaded on the same server on which DSMC.NLM is loaded, but these modules can be loaded on separate servers. See "Specifying the entire NDS for backup" on page 342 for more discussion.
>
> The target service agent for NetWare servers is TSAFS.NLM.

Storage Management Data Requester (SMDR)
> SMDR is the communication agent between the backup application and the target service agent. You must load the SMDR.NLM module to perform a backup or restore of file system objects or the NDS. Tivoli Storage Manager automatically loads the SMDR.NLM module.

Use current SMS modules
> It is important to use the most current SMS modules available from Novell to avoid problems such as memory leaks or server crashes. The Tivoli Storage Manager NetWare client does not include these SMS modules. You can obtain current copies of the TSAFS.NLM, SMSUT.NLM, TSANDS.NLM, and SMDR.NLM modules through Novell. For current information about Novell NLM, current operating systems, and SMS code levels, visit:

```
http://www.novell.com
```

For current information about Tivoli Storage Manager client environment requirements, visit:

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

on the Web or our FTP server at

```
ftp://ftp.software.ibm.com
```

Tivoli Storage Manager and NDS

This section describes the nuances used in the Tivoli Storage Manager client when dealing with NDS trees.

Naming conventions for NDS objects

Tivoli Storage Manager Version 4 and above store NDS object names as the typeful, distinguished object name including '.[Root]'.

For example, the object *CN=Spike.OU=Development.O=TSM* backed up from server **GOETHE** would have the following Tivoli Storage Manager name:

```
.[Root].O=TSM.OU=DEVELOPMENT.CN=SPIKE
```

Note: Tivoli Storage Manager stores all NDS names on the server in upper case to allow mixed-case searches. Tivoli Storage Manager preserves the case of NDS objects during a restore or retrieve operation.

NDS backup using Tivoli Storage Manager

Tivoli Storage Manager Version 5.1 and above use a file space name of **NDS** when backing up the NDS. As a result, consider the following:

- You *cannot* backup or archive a NetWare volume named **NDS:**. We recommend that you do not use **NDS** as a NetWare volume name.
- When using the Tivoli Storage Manager for the first time, you should back up the NDS.
- If you need to restore a version of the NDS that was backed up by a Tivoli Storage Manager Version 3 client, you must use the Tivoli Storage Manager client version used to back up the NDS.

Specifying the entire NDS for backup

Any server on which the TSANDS.NLM module is loaded can back up the NDS. The module TSANDS.NLM is not server centric. You can load this module on any server containing an NDS partition. If the module TSANDS.NLM is loaded on a different server than DSMC.NLM, the former server must be explicitly specified. For example, if you load TSANDS.NLM on server **GOETHE**, you can load DSMC.NLM on a different server and backup the NDS using the following command:

```
load dsmc incremental goethe/NDS:
```

The Tivoli Storage Manager client supports remote backup for servers residing in a different NDS tree.

The NDS is included in the all-local domain if the local NetWare server has a master NDS replica. If you want to exclude the NDS from all-local domain, subtract the NDS from the all-local domain as follows:

```
domain ALL-LOCAL -NDS
```

To include the NDS, add NDS to the domain entry if the local NetWare server does not contain a master NDS replica. You can access information about the NDS using the Novell ConsoleOne Utility or NetWare Remote Manager.
- To back up the entire NDS, enter the following:

  ```
  load dsmc selective nds:* -subdir=yes -volinfo
  ```
- To archive the entire NDS, enter the following:

  ```
  load dsmc archive nds:* -subdir=yes -volinfo
  ```
- To perform an incremental backup of the entire NDS, enter the following:

  ```
  load dsmc incremental nds    - or -
  load dsmc incremental nds:
  ```

The *incremental* command will always process the *.[Root]* and *Schema* objects.

Specifying NDS objects for backup, restore, and queries

The following examples show how to specify NDS objects for backup, archive, restore, retrieve, and query operations:
- Specifying entire NDS tree:

  ```
  selective nds:* -subdir=yes
  ```
- Specifying all objects in a container (e.g., organizational unit)

  ```
  restore nds:.o=tsm.* -subdir=no
  ```
- Specifying all objects in a container and all sub-containers

  ```
  retrieve nds:.o=tsm.* -subdir=yes
  ```
- Specifying all objects containing the string *spike* in the object name

  ```
  query backup nds:*spike* -subdir=yes
  ```
- Specifying the root object, Schema, and high-level organization

  ```
  archive nds:* -volinfo -subdir=no
  ```

Note: The following commands are not case sensitive and will produce the same results:

```
query backup nds:.O=TSM.*
query backup nds:.o=Tsm.*
```

Include-exclude processing

You can use *include* and *exclude* statements to control which sections of the NDS tree are eligible for backup processing. You can use include-exclude processing to help distribute the NDS backup over multiple servers.

The following are examples of excluding NDS objects:
- To exclude all objects under organization .O=TSM (inclusive):

  ```
  exclude.dir nds:.o=tsm
  ```
- To exclude all common (leaf) objects under organizational unit .O=TSM. All containers (i.e., organizations) under .O=TSM will be processed.

  ```
  exclude nds:.o=tsm.*
  ```
- To exclude all objects under organizational unit .O=TSM.San Jose (inclusive). If the organizational unit name contains spaces, enclose the target in quotes.

  ```
  exclude.dir "nds:.o=tsm.ou=San Jose"
  ```
- To exclude all leaf-objects named *RAMKE*:

  ```
  exclude nds:*.cn=ramke
  ```
- To exclude a license object:

  ```
  EXCLUDE "nds:.O=TSM.OU=CTRL.OU=TMP.NLS:Publisher=Novell+NLS:Product=NetWare 5
  Server+NLS:Version=510.NLS:License ID=SN:123456782"
  ```

Note: Include-exclude processing does not affect processing of container entries. As with directories, all containers will be backed up regardless of the include-exclude statements you use. Tivoli Storage Manager client Versions 4 and above accept the *exclude.dir* option which also exclude directory entries.

Note: You CANNOT use the *include* and *exclude.dir* options together. The following example will not produce expected results:

```
exclude.dir nds:.O=TSM
include nds:.O=TSM.OU=Tucson.*
```

You must use the following statements to include only the objects in the *.O=TSM.OU=Tucson* branch of the NDS:

```
exclude nds:.O=TSM.*
include nds:.O=TSM.OU=Tucson.*
```

User rights required to backup or restore NDS

SMS currently requires that you possess supervisory object rights to the highest level of container during a backup or restore operation. For the entire NDS tree, this implies that you possess supervisory object rights to **[Root]**.

Conventions for logging into a NetWare server

When logging into a NetWare server from Tivoli Storage Manager, you must use one of the following:
* A typeful, full distinguished name
* A typeless, full distinguished name
* A bindery-emulation name used in proper context.

For example, if you receive the following message:

```
Please enter NetWare user for "ELLAS":
```

You can specify one of the following:
* The typeful, full distinguished name

  ```
  .CN=Admin.O=TSM
  ```
* The typeless, full distinguished name

  ```
  .Admin.TSM
  ```
* The bindery-emulation name used in proper context.

  ```
  Admin (if the Context is set to .O=TSM)
  ```

Note: You do not need to specify the context. The context does not affect Tivoli Storage Manager NDS processing.

The Tivoli Storage Manager login to the NetWare server follows the same protocol as other logins to the NetWare server. NetWare will not allow Tivoli Storage Manager to login to the NetWare server under the following conditions:
* The user-id you specify has a login restriction based on time-of-day.
* The user-id you specify has a login restriction based on number of concurrent connections.
* NetWare is not allowing logins (DISABLE LOGIN was issued at the console).
* The password is incorrect or has expired.

Schema backup or restore

The client will backup or archive the NDS Schema (including the *extended schema*) during an incremental backup of the NDS or explicitly with the *volinformation* option. For example, you can use the following commands to backup or archive of the Schema:

```
load dsmc incremental nds
load dsmc selective nds:* -subdir=no -volinfo (explicit)
load dsmc archive nds:* -subdir=no -volinfo (explicit)
```

You can restore or retrieve the Schema information when performing a full or explicit NDS restore. The Schema object will always be the first object restored or retrieved. The *volinformation* option is not necessary for restore or retrieve:

```
load dsmc restore nds:* -subdir=yes -replace=all
load dsmc retrieve nds:* -subdir=yes -replace=all
```

You can explicitly restore or retrieve the NDS Root, Schema, and top-level Organization as follows (note that there is no file specification):

```
load dsmc restore nds: -subdir=no
```

Server specific information

When a server is lost due to a hard disk failure or disaster, the server object can be replaced by Tivoli Storage Manager backup data during the NetWare installation process by restoring the *server specific information* resource using Tivoli Storage Manager.

Ensure that the server specific information is being backed up on regular basis. The server specific information will be backed up on NetWare servers as part of the incremental backup process if you specify the *all-local* domain in the client options file *dsm.opt*. If you specify the *all-local* domain, the incremental process always backs up server specific information first, before the SYS: volume. You can also explicitly specify server specific information in the *domain* statement, as follows:

```
   domain all-local (implicit)
   domain serverspecificinfo (explicit)
```

You can also selectively backup the server specific information as follows:

```
   load dsmc selective serverspecificinfo
```

You can verify that the server specific information is backed up by querying the node's file spaces from the admin or backup client. There should be a file space called *servername***SERVERSPECIFICINFO** associated with the node.

To restore a server which has failed with server specific information available:

1. After the server failure, restore the server specific information to another server so that it can be used during the server installation process. For example, you have two NetWare servers, *SERVER-A* and *SERVER-B*. *SERVER-A* experiences a failure and must be restored. Restore the server specific information of *SERVER-A* onto *SERVER-B* by issuing the following command from *SERVER-B*:

   ```
      load dsmc restore server-a/serverspecifcinfo server-b/serverspecificinfo
      -replace=yes
   ```

   The server specific information for *SERVER-A* is restored to the following location:

   ```
      server-b/sys:\system\server-a
   ```

Note: If the NetWare server name you are restoring is more than eight characters, the directory name created during the server specific information restore is truncated to eight characters.

Tivoli Storage Manager restores the following files during the server specific information restore:

SERVDATA.NDS
Contains the information needed by the NetWare installation procedure to restore the server object to its original state.

DSMISC.LOG
A text file containing various NDS information, including the server's replica list.

VOLSINFO.TXT
A text file which contains the full server name (i.e., if the directory name had been truncated), a list of volumes present on the server at the time of the last server specific information backup, the name spaces and extend file formats (e.g., compression) enabled on the volumes. This file is meant to aid the user during server recovery.

AUTOEXEC.NCF
The server's *autoexec.ncf* file.

STARTUP.NCF
The server's *startup.ncf* file.

2. Reinstall the NetWare operating system on the failed server. You *must* specify the same *FILE SERVER NAME* and the same *IPX INTERNAL NET* number if you wish to recover the server object properly. You can find this information in the failed server's *autoexec.ncf* file, which is restored with the server specific information (see point above). Follow the NetWare installation instructions until you are prompted to install NDS.

After restoring the server object back into the NDS, you can proceed to restore the rest of the operating system from backup; you will not need to copy the rest of the files normally copied during the install process. Refer to "NDS restore considerations" on page 349 for more information about restoring the NetWare servers and NDS in their entireties.

NDS specific backup issues

Before realizing an NDS recovery solution, it is necessary to understand NDS concepts as they relate to the backup procedure. This section introduces NDS concepts in the context of the backup procedure.

Partitions

Partition boundary information is not backed up by SMS. We recommend that you make a blueprint of the NDS tree structure to accommodate the recovery after the loss of the entire NDS tree. When restored, you can use utilities like NetWare Remote Manager (NRM) and iManager to reset the partition boundaries within the tree.

Replicas

Partition replication is the best mechanism to protect NDS information against loss in a multi-server environment. We recommend that you replicate each partition at least three times. If possible, do not store all replicas in the same location, in case a disaster devastates the entire location. Replica assignments (i.e. Master,

Read/Write, Read/Only, Subordinate) are not backed up by SMS. This information should be part of your NDS tree blueprint and can be reset using NetWare utilities.

Schema

The schema is the set of rules which governs the properties of the NDS (structural relationships, object properties, etc). The schema is global and is replicated on each server that contains an NDS replica.

OEM products can extend the schema to create new object classes. These extensions are globally copied to each server that contains an NDS replica. Therefore, in a multi-server environment, the loss of a single server would not effect the schema extensions.

In the case of a loss of the entire NDS (e.g., a single-server environment), the base schema is available when the initial NDS is created by the NetWare install procedure.

See "Schema backup or restore" on page 345 for complete information about backing up and restoring the schema.

Object references

Some NDS objects have attributes which are references to other objects. These object references are stored as full distinguished names. An example is an alias, which can reference a User or Group object.

During the restore of an object, the object being restored might reference an object that does not currently exist. In this case, a *place-holder* object is created to satisfy the object reference. These place-holders are eventually replaced by the real objects in the restore process.

During partial restores of the NDS, it is possible that the place-holder object is not specified for restore. In this case, the place-holder object will remain in the tree, appearing as an object of type *unknown*. These unknown objects can be handled by either deleting the unknown object or selectively restoring the real object.

Tivoli Storage Manager also treats place-holders as existing objects. As a result, we recommend that you specify the *-replace=yes* option during all NDS restorations, even if you are restoring the NDS from scratch.

In general, be careful with partial restores of the NDS. The current SMS architecture might not be robust enough to provide a partial restore, depending on the number and extent of object references in the NDS tree. The *unknown"* objects are created and left in the tree if referenced objects are not selected for the restore, or if you specify the *-replace=no* option during the restore.

Server centric IDs

Server centric ids are unique ids assigned to each server. You can back up server centric ids on a NetWare operating system as part of the *server specific information* resource using the Tivoli Storage Manager client. See "Server specific information" on page 345 for more information about backup and restore processing for this resource.

If you do not have a backup of the server specific information, or do not have the ability to backup this information, read the following information:

When servers are lost due to hard disk failures or disasters, Server objects must be manually deleted because NetWare currently requires that new Server objects be created during the installation process (see following recovery scenarios for examples). When the old Server object is deleted, any objects which have references to the Server object will lose their references. Therefore, objects that reference Server objects will have to be handled accordingly.

Currently, there are two object types in the base schema which have references to server objects:
*   Directory Map Objects
*   Queue Objects

If the Server object is lost, you can perform either of the following steps to recover these object types:
*   Delete the referencing object and then restore the object from Tivoli Storage Manager
*   Delete the referencing object and recreate the object manually using the NetWare utilities.

Because of the dependency on the server centric id, you cannot restore these objects types over existing objects.

Server references

Other objects, such as User objects, have optional attributes such as Home Directory and Default Server which reference Server objects. When you delete the Server object, these references are also deleted.

Restoring objects with server references is much like restoring files with trustee assignments. First, the Server object must be recreated, then the objects which have references to the server must be restored to correctly restore the server references.

Current backup limitations

To summarize, the following is a list of the current NDS backup limitations inherent in the SMS architecture:
*   Partition or replica boundaries are not backed up.
*   Partial restores are not practical due to object references.

Novell is aware of these limitations and is working to provide solutions in the future.

Backup recommendations

*   Backup the entire NDS tree periodically. Ensure that the *NDS* is included in the domain of at least one of your nightly, scheduled backups. Use include-exclude processing to potentially divide larger NDS tree backups over several servers.
*   Exploit partition replication. Replicate each partition at least three times, potentially having replicas in different physical locations.
*   Keep a blueprint of the NDS tree. Partition boundary information, replica assignments and schema extensions are not currently protected by the backup process. Keep an accurate blueprint of the NDS tree so that this information is available after a disaster.

Testing considerations

We recommend that you rigorously test your backup plan before introducing it into a production environment. This section introduces some considerations during the testing phase.

Realistic test scenarios

To adequately test restoration of the NDS tree, you must create an autonomous NDS tree. It is not adequate to simply restore a tree to another server, as the target server is probably part of the same NDS tree as the source server. If you want to merge or reorganize your NDS tree, there are better tools available from Novell to achieve this. The goal should be testing the recovery mechanism for loss of the entire NDS tree. To do this properly, an autonomous NDS tree must be created.

Synchronization awareness

The NDS relies on a synchronization process to ensure that all replicas hold identical information. After changes are made to the NDS, the synchronization might not be immediate. This can affect testing in some instances.

For example, there might be a situation where you are testing the restore of a single object. You delete the object from a replica and then restore it using Tivoli Storage Manager. The object still appears to exist to Tivoli Storage Manager, because the replicas have not synchronized.

Synchronization should not play a major part of your testing, but be aware of its existence and its ramifications.

Testing verification

You can verify the NDS tree after a restore operation by running a *DSREPAIR* operation against the NDS (either an unattended full repair or local DS repair). This operation will produce a log reporting any inconsistencies found in the NDS.

Trustee assignments to files and directories can be *spot checked* after a restore operation to verify their validity.

NDS restore considerations

This section outlines recovery procedures for the following scenarios:
* Loss of a non-SYS volume
* Loss of SYS volume (or entire server)
* Loss of entire NDS

Example 1: Loss of a non-SYS volume

NDS information is stored only on the SYS volume. Therefore, if you experience a hard disk failure on a non-SYS volume, you do not have to modify or restore any part of the NDS tree. You only need to restore file system data (including file and trustee data).

To restore a non-SYS volume after a hard disk failure:

1. Do not delete the Volume object for the failed volume from the NDS tree. In this situation, you can leave the Volume object in the NDS tree to preserve any references that other objects might have to the failed volume. If the Volume object is deleted, you will need to replace any objects that have references to the failed volume to reestablish the references correctly.
2. Bring down the server and replace the failed hard disk(s).

3. Bring the server up and recreate the volume using the Netware Remote
   Manager or NSSMU.NLM utility. At the server console, type

   ```
   load nwconfig
   ```

   and create a NetWare partition on the new disk, thus redefining the volume to
   NetWare. NetWare will (re)place the Volume object in the NDS tree.

4. Remount the volume.

5. Load the necessary SMS target service agents. At the target NetWare server
   console type:

   ```
   load tsands
   load tsafs
   ```

6. Restore the volume(s) using Tivoli Storage Manager. Enter the following
   NetWare console command for each volume you want to restore:

   ```
   load dsmc restore vol1:\* -subdir=yes -replace=all -volinfo
   ```

   Where vol1: is the name of the failed volume.

Example 2: Loss of a SYS volume or entire server

Since NDS information is stored on the SYS volume, the loss of the SYS volume
might require the restoration of all or part of the NDS (depending on the
availability of replicas) in addition to the file system data (including trustee rights).

Three different examples are presented:
- Single-server network
- Multiple-server network (replica present)
- Multiple-server network (replica not present)

Note that in all cases, the NetWare OS and the NDS must be reinstalled to the
server before proceeding.

Example 2a: Single-Server network

In a single-server network, the loss of the SYS volume implies the loss of the entire
NDS. To restore the server, perform the following steps:

1. Replace the failed hard disk(s).

2. Reinstall the NetWare OS and NDS on the server. This step replaces the Server
   and Volume object(s). Note the following precautions:
   - Use the same server name in the install.
   - Use the same admin parent container and password as the last NDS backup.
   - Ensure all hard disk partitions are at least as large as they were on the failed
     server.
   - Use the same volume names as on the failed server.

3. Ensure that the NetWare OS has the correct patches for Tivoli Storage Manager
   to function properly. Refer to the client README file for more information
   about dependencies on NetWare OS patches.

4. If the server had volumes other then SYS, and these volumes were not affected
   by the failure, run *DSREPAIR* to purge the file system of invalid trustees on
   those volumes. This step cleans-up the volume directory entry tables (DET) and
   file entry tables (FET) so that the trustee assignments can be restored correctly.
   At the server console, *LOAD DSREPAIR* and choose the **Unattended Full
   Repair** option. (This automatically purges invalid trustee assignments).

5. Install Tivoli Storage Manager and reestablish the communications protocol.
   Use the NWCONFIG.NLM utility to reinstall the Tivoli Storage Manager code

on the NetWare server. Reconfigure the communications protocol so that the Tivoli Storage Manager client can communicate with the Tivoli Storage Manager server.

6. Load the necessary SMS target service agents. At the target NetWare server console type:

```
load tsands
load tsafs
```

7. Restore the entire NDS tree from Tivoli Storage Manager.

   Use the following command at the NetWare server console:

```
load dsmc restore NDS -replace=yes
```

   The *-replace=yes* option is required to ensure that place-holders created by the restore process are properly replaced by real NDS objects.

8. Restore the volume(s) using Tivoli Storage Manager. Use the following NetWare console command for each volume you want to restore:

```
load dsmc restore sys:\* -subdir=yes -replace=all -volinfo
```

   Where sys: is the name of the failed volume.

9. Verify restoration of the NDS, file data and trustee data.

Example 2b: Multiple-Server network (replica present)

You can use this example in a situation in which the SYS volume (or entire server) is lost but replicas of all partitions which were present on the failed server exist on other servers. You can also use this example when a failed SYS volume (or entire server) contains no NDS replications.

In this example, you must restore NDS objects which referenced the failed Server object and failed Volume object(s), as well as the volume data (including trustee data). Perform the following steps to ensure recovery:

1. If the failed server contains any Master partitions, reassign the master to another server using the *DSREPAIR* utility.

2. Replace the failed hard disk(s).

3. Reinstall the NetWare OS and NDS on the server in the same NDS tree. If a backup copy of the server specific information is available, take the needed information from it. See "Server specific information" on page 345 for more information. Note the following precautions:
   - Use the same server name in the install
   - Use the same admin parent container and password as the last NDS backup.
   - Ensure all hard disk partitions are at least as large as they were on the failed server.
   - Use the same volume names as on the failed server.

4. Ensure that the NetWare OS has the correct patches for Tivoli Storage Manager to function properly. Refer to the client README file shipped with the Tivoli Storage Manager client for more information about dependencies on NetWare OS patches.

5. If the server had volumes other then SYS, and these volumes were not affected by the failure, run DSREPAIR to purge the file system of invalid trustees on those volumes. This step cleans-up the volume DETs and FETs so that the trustee assignments can be restored correctly. At the server console, LOAD DSREPAIR and choose the **Unattended Full Repair** option. (This automatically purges invalid trustee assignments).

6. Install Tivoli Storage Manager and reestablish the communications protocol. Use the NWCONFIG.NLM utility to reinstall the Tivoli Storage Manager code on the NetWare server. Reconfigure the communications protocol so that the Tivoli Storage Manager client can communicate with the Tivoli Storage Manager server.

7. Load the necessary SMS target service agents. At the target NetWare server console enter:

```
load tsands
load tsafs
```

8. The following steps are necessary if the server specific information was not restored from a backup:
   a. Delete any objects which had server specific references. See "Server centric IDs" on page 347 for more information about objects which reference the server object.
   b. Replace the objects which contained references to the failed Server and Volume objects. You can do this by restoring the entire NDS using the following command at the NetWare console:

   ```
   load dsmc restore NDS -replace=yes -subdir=yes
   ```

   The *-replace=yes* option ensures that place-holders created by the restore process are properly replaced by real NDS objects. If you are not comfortable with replacing the entire NDS, you can selectively restore each object or manually recreate the objects with NWADMIN or NETADMIN.

9. Restore the volume(s) using Tivoli Storage Manager. Use the following NetWare console command for each volume you want to restore:

```
load dsmc restore sys:\* -subdir=yes -replace=all -volinfo
```

Where SYS: is the name of the failed volume.

10. Verify restoration of the NDS, file data, and trustee data.

Example 2c Multiple-Server network (replica not present)

This example can be used in a situation in which the SYS volume (or entire server) is lost and partitions contained on the server were not replicated. In this example, you must restore any partitions that were not replicated, NDS objects which referenced the failed Server object and failed Volume object(s), and the volume data (including trustee data). The following steps are necessary for recovery:

1. If the failed server contains any Master partitions which was replicated, reassign the master to another server using the DSREPAIR utility.

2. Replace the failed hard disk(s).

3. Reinstall the NetWare OS and NDS on the server. If a backup copy of the server specific information is available, take the needed information from it. See "Server specific information" on page 345 for more information. Note the following precautions:
   - Use the same server name in the install
   - Use the same admin parent container and password as the last NDS backup.
   - Ensure all hard disk partitions are at least as large as they were on the failed server.
   - Use the same volume names as on the failed server.

4. Ensure that the NetWare OS has the correct patches for Tivoli Storage Manager to function properly. Refer to the client README file shipped with the Tivoli Storage Manager client for more information about dependencies on NetWare OS patches.

5. If the server had volumes other then SYS, and these volumes were not affected by the failure, run DSREPAIR to purge the file system of invalid trustees on those volumes. This step cleans-up the volume DETs and FETs so that the trustee assignments can be restored correctly. At the server console, LOAD DSREPAIR and choose the **Unattended Full Repair** option. (This automatically purges invalid trustee assignments).

6. Install Tivoli Storage Manager and reestablish the communications protocol. Use the NWCONFIG.NLM utility to reinstall the Tivoli Storage Manager code on the NetWare server. Reconfigure the communications protocol so that the Tivoli Storage Manager client can communicate with the Tivoli Storage Manager server.

7. Load the necessary SMS target service agents. At the target NetWare server console enter:

   ```
   load tsands
   load tsafs
   ```

8. Delete any objects which had server specific references. See "Server centric IDs" on page 347 for more information about objects which reference the server object.

9. Restore the replicas. You can do this by issuing a restore at the replica root. For example, if the replica root was:

   ```
   OU=Islands.O=Greece
   ```

   you must issue the command:

   ```
   load dsmc restore nds:.o=greece.ou=islands.* -replace=yes -subdir=yes
   ```

   Since this is a partial restore, you might decide to restore the entire NDS by entering the following command at the NetWare console:

   ```
   load dsmc restore nds -replace=yes -subdir=yes
   ```

   This eliminates the need for the next step while ensuring a consistent restore of the NDS tree. See "Object references" on page 347 for more details about partial restore limitations.

10. Replace the objects which contained references to the failed Server and Volume objects. You can do this by restoring the entire NDS using the following command at the NetWare console:

    ```
    load dsmc restore nds -replace=yes -subdir=yes
    ```

    The *-replace=yes* option ensures that place-holders created by the restore process are properly replaced by real NDS objects. If you are not comfortable with replacing the entire NDS, you can selectively restore each object or manually recreate the objects.

11. Restore the volume(s) using Tivoli Storage Manager. Use the following NetWare console command for each volume you want to restore:

    ```
    load dsmc restore sys:\* -subdir=yes -replace=all -volinfo
    ```

    Where SYS: is the name of the failed volume.

12. Verify restoration of the NDS, file data, and trustee data.

Example 3: Loss of an entire NDS tree

In a situation in which all network servers are destroyed because of a disaster, you must restore the entire NDS tree and all file information. To do this, perform the following steps:

1. Reinstall the NetWare OS and NDS on a primary server. By default, this server will hold the Root partition of the NDS tree.
2. Install the remaining servers into the network. After this step, you should have a *skeleton* of your original NDS. Ensure that you note the following precautions:
   - Use the same servers name in the install.
   - Use the same admin parent container and password as the last NDS backup.
   - Ensure all hard disk partitions are at least as large as they were on the failed server.
   - Use the same volume names as on the failed servers.
   - Place the servers in the same context as the original tree.
3. Ensure that the NetWare OS has the correct patches for Tivoli Storage Manager to function properly. Refer to the client README file shipped with the Tivoli Storage Manager client for more information about dependencies on NetWare OS patches.
4. Install Tivoli Storage Manager and reestablish the communications protocol. Use the NWCONFIG.NLM utility to reinstall the Tivoli Storage Manager code on the NetWare server. Reconfigure the communications protocol so that the Tivoli Storage Manager client can communicate with the Tivoli Storage Manager server.
5. Load the necessary SMS target service agents. At the target NetWare server console enter:

   ```
   load tsands
   load tsafs
   ```

6. Restore the entire NDS tree from Tivoli Storage Manager. Use the following command at the NetWare server console:

   ```
   load dsmc restore nds -replace=yes -subdir=yes
   ```

   The *-replace=yes* option ensures that place-holders created by the restore process are properly replaced by real NDS objects.

7. Restore the volume(s) using Tivoli Storage Manager. Use the following NetWare console command for each volume you want to restore:

   ```
   load dsmc restore sys:\* -subdir=yes -replace=all -volinfo
   ```

   Where SYS: is the name of the failed volume.

8. Verify restoration of the NDS, file data, and trustee data.

Print queues

Backup and recovery of print queues

This section discusses how the backup and recovery procedures relate to print queues, i.e., the physical directories and files relating to the NetWare printing environment. The objects relating to the printing environment (i.e., printer, print queue, and print server objects) which are stored in the NDS are backed up and restored as part of the NDS backup and restore procedures in this chapter.

Print queue: File and directory entries

The print queue: The print queue proper is a directory entry where network print jobs reside until the actual printing. This directory is named by the object id and has a .QDR extension. The directory entries are located in the \QUEUES directory on a volume chosen by the administrator:

```
DATA:\QUEUES\05000005.QDR
```

The directory entries for the print queues are not recreated when you restore the NDS. Therefore, the directory entries must be restored from backup.

Hidden print queue files: There are two file types which are created in the print queue directories which are hidden, system files: a print server ID file and system print information file.

The print server ID file has a `.SRV` extension and contains the IDs of print servers that are currently attached:

`DATA:\QUEUES\05000004.QDR\Q_0005.SYS`

The system print information file has a `.SYS` extension and contains print job information and links to the current print job files:

`DATA:\QUEUES\05000004.QDR\Q_0005.SYS`

These files are always opened with an access of **Deny Read/Deny Write** while the print server is active, and therefore cannot be processed by Tivoli Storage Manager. These files will be recreated after a restore when the print server driver (e.g., PSERVER.NLM) is loaded. We recommend that you exclude these files from Tivoli Storage Manager processing.

Queued print jobs: Network print jobs which are queued to printers exists as files in the print queue directories with a `.Q` extension:

`DATA:\QUEUES\05000004.QDR\00050001.Q`

Print jobs which are actively being printed (i.e., status=Active) are opened with an access of **Deny Read/Deny Write** and therefore cannot be processed by Tivoli Storage Manager. Print jobs which are queued to be printed (i.e., status=Ready) have no special attributes and can be processed by Tivoli Storage Manager as normal files.

Individual administrators must decide whether to backup queued print jobs. Since these files are temporary and can be quite large, we recommend that these files be excluded from Tivoli Storage Manager processing. After a restore, however, you must resubmit the print jobs if they are not processed by Tivoli Storage Manager.

Other related file and directory entries: There are two other files related to the print queues which should be mentioned which are used by the print server to reference the printer and print queues: PRINT.id and QUEUE.id. These files reside in a directory entry under \QUEUES which correlates to the print server object id:

`DATA:\QUEUES\05000004\PRINT.000`
`DATA:\QUEUES\05000004\QUEUE.000`

These files can be processed normally by Tivoli Storage Manager and thus need no special consideration. These files do not appear to be used in the NetWare 4 and 5 environments, although they are present.

Include-exclude recommendations for print queues

We recommend that you back up the print queue directories but exclude the files contained in these directories since Tivoli Storage Manager cannot open them. To do this, you can specify the following *exclude* statement in your `dsm.opt` file:

`EXCLUDE <vol>:\QUEUES\*.QDR\*`

where `<vol>` is the volume on which the print queues reside.

If you want to process the actual queued print jobs, you can include these by specifying the following *include* statement in your `dsm.opt` file:

```
INLCUDE <vol>:\QUEUES\*.QDR\*.Q
```

Note: Do not use the *exclude.dir* statement to exclude the print queue directories because this will exclude the directory entries from processing.

Print queue restore procedures

Local print servers - PSERVER.NLM: If the print server drivers reside locally on the NetWare server (i.e., PSERVER.NLM), there are no explicit steps to restore the print environment if you use the include-exclude recommendations in "Include-exclude recommendations for print queues" on page 355. You can restore the print environment using the restore procedures in this chapter:
- Restoring the NDS will restore the printer, print server, and print queue objects.
- Restoring the NetWare volumes will restore the proper directory entries.
- Loading PSERVER.NLM (usually in autoexec.ncf) will ensure the creation of the proper files in the print server directories.

Network print servers: Network cards (e.g., HP's JetDirect) can provide print server services which attach directly to the network. In such environments, PSERVER.NLM is not used and special explicit considerations must be made to recreate the necessary `.SRV` and `.SYS` files in the print queue directories. To explicitly create these files after all other restore procedures have been accomplished, use the following steps:
1. Execute the `PCONSOLE.EXE` utility.
2. Select *Print Queues* from the *Available Options* menu.

   Note: Repeat this step for each print queue.
3. Select the individual print queue from the *Print Queues* menu. This creates the `.SRV` and `.SYS` files in the print queue directory.

After this step, the print queue is fully functional. This procedure has been verified in a JetDirect environment to correctly create the files necessary to make the print queues functional after a restore.

Appendix C. Installing and configuring the backup-archive client in a Novell Cluster Services (NCS) environment

The following Novell Cluster Services (NCS) versions are supported:

Novell Cluster Services 1.6
Introduced in NetWare 6.

Novell Cluster Services 1.7
Introduced in NetWare 6.5.

Before installing the backup-archive client on the cluster nodes

To support a NetWare cluster, you must load the TSAFS.nlm module with the /nocluster option (TSAFS.NLM /nocluster). This was previously /cluster=off for TSA600.NLM. If you do not load the TSAFS.nlm module with /nocluster, backups can fail with the following error message:

```
ANS1945E The long namespace has been removed from the local filespace.
If you wish to proceed wth the backup/archive operation, rename your
filespace on the server.
```

Loading the TSAFS.nlm module with the /nocluster flag does not turn off the cluster environment. It only allows Tivoli Storage Manager to access the cluster driver as a local device through the TSA interface. On Netware 6.5, TSAFS is loaded automatically. To turn on the /nocluster flag, TSAFS should be unloaded and then reloaded with /nocluster, using autoexec.ncf.

Here is the syntax:

```
unload tsafs
load tsafs /nocluster
```

For example, cluster **ncs-cluster** contains two NetWare servers: *node-1* and *node-2*, and the *group-a* cluster group containing physical disk resources. In this case, install an instance of the Tivoli Storage Manager backup-archive scheduler for *node-1*, *node-2*, and *group-a*. Define a node on the Tivoli Storage Manager server for *node-1*, *node-2* and *group-a*. This ensures that proper resources are available to the backup-archive client when shared disks move (or fail) between cluster nodes.

The *clusternode* option ensures that Tivoli Storage Manager manages backup data logically, regardless of which cluster node backs up a cluster disk resource. In this example, you would use the *clusternode* option for *group-a* since the Tivoli Storage Manager node *group-a* will be processing data on a clustered drive. Use this option for Tivoli Storage Manager nodes that process cluster disk resources, and not local resources. See "Clusternode" on page 112 for more information.

Note: Restoring data from one cluster to another cluster is not supported.

Installing the backup-archive client on the cluster nodes

Recommendation: Install Tivoli Storage Manager on a local disk on each NetWare server participating in the cluster, and configure an instance of the Tivoli Storage Manager backup-archive client scheduler for each cluster group containing physical disk resources.

The executables should reside in the same location on each local drive. See "Configuring the backup-archive client to process local nodes and cluster disk resources" for configuration information, after you have installed Tivoli Storage Manager.

Configuring the backup-archive client to process local nodes and cluster disk resources

This section explains how to configure the Tivoli Storage Manager backup-archive client to process both local nodes and cluster disk resources.

Processing local nodes

Process local disk drives by editing your dsm.opt file on each local node, using the following options:

passworddir
> Specify this option when using *clusternode=yes* to specify a directory on one of the cluster disks to store the Tivoli Storage Manager password information so that it is available to any NetWare server accessing the disk.

nodename
> If no value is specified, the backup-archive client uses the local system name. See "Nodename" on page 173 for more information.

domain
> You must explicitly indicate a domain statement for any instance of Tivoli Storage Manager backup-archive client executing in an NCS environment. If you are processing local drives, you cannot use DOMAIN ALL-LOCAL as this will also include any cluster drives that are available to the NetWare server. See "Domain" on page 132 for more information.

clusternode
> Do not specify this option when processing local drives. See "Clusternode" on page 112 for more information.

You can configure the Tivoli Storage Manager backup-archive scheduler to back up the local cluster nodes.

Processing cluster disk resources

Ensure that the backup-archive client manages each cluster group that contains physical disk resources as a unique node. This ensures that the backup-archive client correctly manages all disk resources, regardless of which cluster node owns the resource at the time of back up.

Place the client options file (dsm.opt) on the shared cluster volume so that it is accessible from any physical node in the cluster. We recommend that you place the error log, schedule log, and password directory on shared volumes for this same reason. Refer to the *optfile*, *errorlogname*, *schedlogname*, and *passworddir* client options to understand how to place these files in a shared location. See "Step 2: Configure the client options file" on page 359 for more information.

Step 1: Register the cluster nodes to manage cluster disk resources

Use the NCS program to determine which nodes contain resources for the backup-archive client to process. Register a unique node name on the backup server. For example, the **ncs-cluster** contains the following resource group:

group-a
> Contains the shared data: cluster drive.

We recommend that you chose a node name unique to the cluster group, and not unique to either the physical system name or the cluster name. A node name that is the same as the physical system name will conflict with the node name that is responsible for the local back up of the physical system. Since there can be several physical disk resource groups in a cluster, all of which should be managed by separate node names, choosing the cluster name for the node name will not provide the desired uniqueness. In this example, a good choice might be *ncs-cluster-group-a*. The administrator would register this node name by entering the following command:

```
register node ncs-cluster-group-a <password>
```

Step 2: Configure the client options file

Configure the client options file (dsm.opt) for each cluster group. Locate the option file on one of the shared cluster drive that is owned by the cluster group. For example, the option file for should reside on the data: shared cluster volume. To configure the dsm.opt file for each cluster group, specify the following options:

nodename
> Specify a unique name for each cluster group. For example:
>
> ```
> nodename ncs-cluster-group-a
> ```
>
> See "Nodename" on page 173 for more information about this option.

domain
> Specify the cluster drive that is shared by the cluster group. For example:
>
> ```
> domain data:
> ```
>
> **Note:** If you want to back up your local sys: drive, you must specify the following in your dsm.opt file:
> > ```
> > domain sys:
> > ```
>
> See "Domain" on page 132 for more information about this option.

optfile Specifies the client options file you want to use when you start a Storage Manager session. See "Optfile" on page 182 for more information about this option.

errorlogname
> Set the error log name as follows:
>
> ```
> errorlogname data:\dsmerror.log
> ```
>
> See "Errorlogname" on page 140 for more information about this option.

schedlogname
> Set the schedule log name as follows:
>
> ```
> schedlogname data:\dsmsched.log
> ```
>
> See "Schedlogname" on page 208 for more information about this option.

clusternode
> Specify the *yes* value, as follows:
>
> ```
> clusternode yes
> ```
>
> See "Clusternode" on page 112 for more information about this option.

passworddir
> Specify the directory in which you want to store the automatically generated password for your client node. For example:
>
> ```
> passworddir data:\tsmpass
> ```

See "Passworddir" on page 186 for more information about this option.

passwordaccess
> Set the value for this option to generate if you want Tivoli Storage Manager to generate the password for you and save it in a password file, as follows:
>
> ```
> passwordaccess generate
> ```
>
> See "Passwordaccess" on page 184 for more information about this option.

nwpwfile
> Set the value for this option to *yes* to encrypt your NetWare user ID and password and save this information in the TSM.PWD file, as follows:
>
> ```
> nwpwfile yes
> ```
>
> See "Nwpwfile" on page 178 for more information about this option.

schedmode
> Set the value for this option to *polling*:
>
> ```
> schedmode polling
> ```
>
> See "Schedmode" on page 210 for more information about this option.

Step 3: Configure the scheduler service

Configure an instance of the Tivoli Storage Manager backup-archive client for each cluster group, using the NCS program. Place an instance of the Tivoli Storage Manager backup-archive client scheduler in each resource group that contains a physical disk resource.

To install the Tivoli Storage Manager scheduler for **group-a** from system **node-1**, ensure that **node-1** currently owns **group-a**, and install the Tivoli Storage Manager client software on system **node-1**.

Using NCS, move **group-a** to **node-2**. From **node-2**, install the Tivoli Storage Manager client software on system **node-2**. Define the schedule for **ncs-cluster-group-a** node on the backup server. Repeat this procedure for each cluster group.

The node that owns the cluster resource can launch the scheduler, as follows:
1. Generate the Tivoli Storage Manager and TSA passwords, as follows:

   To generate your Tivoli Storage Manager password, enter:
   ```
   SYS:\tivoli\tsm\client\ba\dsmc query session -optfile=data:\dsm.opt
   ```
   To generate your TSA passwords, enter:
   ```
   SYS:\tivoli\tsm\client\ba\dsmc query tsa -optfile=data:\dsm.opt
   and
   SYS:\tivoli\tsm\client\ba\dsmc query tsa nds -optfile=data:\dsm.opt
   ```
2. Start the scheduler by entering the following command:
   ```
   SYS:\tivoli\tsm\client\ba\dsmc schedule -optfile=data:\dsm.opt
   ```

When a failover occurs to **node-2**, **node-2** will launch the schedule command. If the failover occurs within the scheduled backup window, the schedule will reprocess all of the data on the volume. If the schedule is executing an incremental backup, incremental processing will determine that the data processed before the failover will not need to be reprocessed because it has not changed.

Step 4: Creating a generic service resource for failover

All configuration of failover behavior should be done with Console One application. Since only one node in cluster can access shared volume in case of fail over, shared volumes must be unmounted from the failed cluster node and mounted on another cluster node.

Make sure all commands in load and unload scripts have a return code 0 (completely successful). A failed command in script can put cluster node in *comatose* state. If command completes unsuccessfully, it is good idea to use perl interpreter to execute it since perl interpreter always finishes successfully after executing of operating system command.

Sample setup for a two-node cluster

The following example will give you detailed step-by-step instructions for configuring a two-node NetWare 6.5 cluster. This is a test environment configuration.

- There is a two-node NetWare 6.5 cluster: *Node1* and *Node2*
- There are two shared volumes: *Share1* and *Share2*
- The Tivoli Storage Manager backup-archive client is installed locally on each cluster node in the default location:

      SYS:\tivoli\tsm\client\ba

The objective in setting up the Tivoli Storage Manager client in a test environment is so that:

- The Tivoli Storage Manager scheduler will back up the assigned shared volume
- The migration of the shared volume (fail over and fail back) starts the Tivoli Storage Manager scheduler on the target node and stops the scheduler on the original node
- The scheduled event continues from the point of failure on the target node
- A single Tivoli Storage Manager node is used for all shared volumes and it uses one Tivoli Storage Manager schedule
- Other applications running on the original cluster node are not affected by the Tivoli Storage Manager backup-archive client migration

The expected result is:

- All shared volumes are backed up under a single Tivoli Storage Manager node on the Tivoli Storage Manager server
- The backup process migrates between the cluster nodes with a shared volume
- The backup process continues on the target node from where it was stopped on the original node

The general approach is:

- Use DSMCAD to manage scheduled events on each cluster node
- Using DSMCAD is the preferred method for scheduled events because it uses less memory
- Run a dedicated copy of DSMCAD for each shared volume
- Update load and unload scripts for each shared volume so that the migration of volumes between cluster nodes cause the migration of the associated DSMCAD
- As a result of DSMCAD, the migration schedule will stop on the original cluster node and start the target cluster node

Here are the test setup example details. This solution was tested on NetWare 6.5.

- Create a separate copy of DSMCAD.NLM for each shared volume, due to the NetWare limitation with unloading nlms: DSMCAD1.NLM and DSMCAD2.NLM. This is necessary for unloading purposes, because unloading DSMCAD.NLM will result in unloading all instances of DSMCAD that are running at the time. Unloading DSMCAD1 will unload only DSMCAD1.

- Create a separate copy of the dsm.opt, DSM1.OPT, and DSM2.OPT file for each shared volume, so that DSMCAD can be started with own dsm.opt. In the DSM1.OPT file, use the domain option to specify the default domain as SHARE1, (DOMAIN SHARE1:), and DOMAIN SHARE2: in DSM2.OPT accordingly.

```
DSM1.OPT:
     NODENAME        NTWCLUSTER
     CLUSTERNODE     YES
     PASSWOARDACCESS GENERATE
     DOMAIN          SHARE1:
     MANAGEDSERVICES SCHEDULE
     NWEXITNLMPROMPT NO
  DSM2.OPT:
     NODENAME        NTWCLUSTER
     CLUSTERNODE     YES
     PASSWOARDACCESS GENERATE
     DOMAIN          SHARE2:
     MANAGEDSERVICES SCHEDULE
     NWEXITNLMPROMPT NO
```

- Make sure that passwords are generated and written to the password file successfully. Issue commands: **DSMC Q SESS, DSMC Q TSA, DSMC Q TSA NDS** and verify that the Tivoli Storage Manager client can successfully make all the necessary connections.

- When the scheduled event is due, DSMCAD.NLM will start DSMC.NLM with the specified DSM.OPT file. DSMC.NLM will exit after the scheduled backup is finished.

- Use the option *NWEXITNLMPROMPT* to change the Tivoli Storage Manager client behavior at exit time. By default it is set to *YES* -- display a message and prompt before returning to the NetWare console. It should be set to *NO* -- return immediately to console.

- Update the load script for SHARE1 with following command:

```
#start dsmcad
load SYS:/TIVOLI/TSM/BA/DSMCAD1.NLM
-optfile=SYS:/TIVOLI/TSM/BA/DSM1.OPT
```

- Update the unload script for SHARE1 with following command:

```
#stop dsmcad
unload DSMCAD1
```

- Make similar updates for SHARE2:

```
load scipt:
#start dsmcad
load SYS:/TIVOLI/TSM/BA/DSMCAD2.NLM
-optfile=SYS:/TIVOLI/TSM/BA/DSM2.OPT
unload script:
#stop dsmcad
unload DSMCAD2
```

- Make sure that the lines for load and unload DSMCAD.NLM are the last lines in load and unload scripts.

Notes:

1. Do not unload DSMC.NLM started by dsmcad for the following reasons:
   - DSMC will detect the absence of the volume and fail

| • Unloading DSMC.NLM from the unload script can cause the unloading of
| other DSMC.NLM instances running at the time of the unload, due to
| NetWare limitations
| • Unloading DSMC.NLM can result in a server abend
| 2. The scheduled event might not start immediately after DSMCAD.NLM is
| loaded on the target node. It might take several minutes for the backup to
| continue. If the schedule window expires before the restart, the current
| scheduled event will be missed.

Configuring the Web client in a NCS environment

To use the Web client in a NCS environment, you must configure and run the
Client Acceptor Daemon (CAD).

Configuring the Web client to process cluster disk resources

After configuring the Client Acceptor Daemon (CAD), perform the following steps.

Step 1: Identify the cluster groups to manage

Perform the steps under **Step 1** of "Configuring the backup-archive client to
process local nodes and cluster disk resources" on page 358.

Step 2: Configure the client options file

Perform the steps under **Step 2** of "Configuring the backup-archive client to
process local nodes and cluster disk resources" on page 358. In addition, specify
the following option in the dsm.opt file for each cluster group:

httpport
> Specify a unique TCP/IP port number that the Web client uses to
> communicate with the client acceptor service associated with the cluster
> group. See "Httpport" on page 154 for more information about this option.

Step 3: Install a client acceptor daemon and client agent

Configure an instance of the Tivoli Storage Manager backup-archive client for each
cluster group using the NCS program. The Tivoli Storage Manager client software
contains the Web client.

To install the Tivoli Storage Manager Web client for *group-a* from system *node-1*,
ensure that *node-1* currently owns *group-a*, and install the Tivoli Storage Manager
client software on system *node-1*.

Using NCS, move *group-a* to *node-2*. From *node-2*, install the Tivoli Storage
Manager client software on system *node-2*. To configure the Web client, see
"Configuring the Web client" on page 9. Repeat this procedure for each cluster
group.

Step 4: Create a generic service resource for failover

All configuration of fail over behavior should be done with Console One
application. Since only one node in cluster can access shared volume in case of fail
over, shared volumes must be unmounted from the failed cluster node and
mounted on another cluster node.

To add a Generic Service resource to each cluster group managed by Tivoli Storage
Manager, use the Console One application to create a client acceptor daemon
resource.

If the group is moved (failed) to the other nodes in the cluster, the service should correctly fail over between the cluster nodes and notify both cluster nodes of automatic password changes.

Note: If you manually change the password, you will need to stop the remote agent and the client acceptor services, regenerate the password, and restart the client acceptor service (do not restart the remote agent). You can generate the password by running this command:

```
dsmc query session -optfile=qq:\tsm\dsm.opt
```

Step 6: Start the Web client

1. Start the Tivoli Storage Manager Client Acceptor daemon for each resource group on each node.
2. To start the Web client, point your browser at the IP address and httpport specified for the Resource Group. For example, if you used an IP address of 9.110.158.205 and specified an httpport value of 1583, open the web address: `http://9.110.158.205:1583`.

Alternatively, you can point your browser at the network name and httpport. For example, if you used a network name of *cluster1groupa* and specified an httpport value of 1583, open the web address: `http://cluster1groupa:1583`.

Note that the Web client connects to whichever system currently owns the resource group. The Web client displays all of the local file spaces on that system, but to ensure that the files are backed up with the correct node name you should only back up the files for the resource group.

When failing back to the original node after a failover scenario, ensure that the remote agent on the original system is not loaded. The remote agent will be unloaded automatically after 20 to 25 minutes of inactivity.

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Glossary

The terms in this glossary are defined as they pertain to the IBM Tivoli Storage Manager library. If you do not find the term you need, refer to the IBM Software Glossary on the Web at this address: http://www.ibm.com/ibm/terminology/. You can also refer to IBM Dictionary of Computing, New York: McGraw-Hill, 1994.

This glossary 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 mode.   A backup copy group mode that specifies that a file is considered for incremental backup even if the file has not changed since the last backup. See also *mode*. Contrast with *modified mode*.

access control list (ACL).

1. In computer security, a collection of all access rights for one object.
2. In computer security, a list associated with an object that identifies all the subjects that can access the object and their access rights. For example, an access control list is a list that is associated with a file that identifies the users who can access the file and that identifies the users' access rights to that file.

ACL.   See *access control list*.

active policy set.   The activated policy set that contains the policy rules currently in use by all client nodes assigned to the policy domain. See also *policy domain* and *policy set*.

active version.   The most recent backup copy of a file stored by Tivoli Storage Manager. The active version of a file cannot be deleted until a backup process detects that the user has either replaced the file with a newer version or has deleted the file from the workstation. Contrast with *inactive version*.

administrative client.   A program that runs on a file server, workstation, or mainframe that administrators use to control and monitor the Tivoli Storage Manager server. Contrast with *backup-archive client*.

administrator.   A user who has been registered to the server. Administrators can be authorized to one or more of the following administrative privilege classes: system, policy, storage, operator, or analyst. Administrators can use the administrative commands and queries allowed by their privileges.

agent node.   A client node that has been granted proxy authority to perform operations on behalf of another client node, which is the target node.

aggregate data transfer rate.   Dividing the total number of bytes transferred by the elapsed processing time calculates the data transfer rate.

archive.   To copy one or more files to a storage pool for long-term storage. Archived files can include descriptive information, and you can retrieve them by archive date, file name, or by description. Contrast with *retrieve*.

archive copy.   A file or group of files that have been archived to the Tivoli Storage Manager server.

archive copy group.   A policy object containing attributes that control the generation, destination, and expiration of archived files. An archive copy group belongs to a management class.

archive retention grace period. The number of days that Tivoli Storage Manager retains an archived copy when the server is unable to rebind the file to an appropriate management class.

authentication. The process of checking and authorizing a user's password before allowing that user to access the Tivoli Storage Manager server. An administrator with system privilege can enable or disable authentication.

authorization rule. A specification allowing another user to either restore or retrieve a user's files from Tivoli Storage Manager storage.

B

back up. To copy information to another location to ensure against loss of data. In IBM Tivoli Storage Manager, you can back up user files, the IBM Tivoli Storage Manager database, and storage pools. Contrast with *restore*. See also *incremental* backup and *selective* backup.

backup-archive client. A program that runs on a file server, PC, or workstation and provides a means for users to back up, archive, restore, and retrieve files. Contrast with *administrative client*.

backup copy group. A policy object containing attributes controlling the generation, destination, and expiration of backup versions of files. The backup copy group belongs to a management class.

backup retention grace period. The number of days Tivoli Storage Manager retains a backup version when the server is unable to rebind the file to an appropriate management class.

backup set. A collection of active files in your file spaces that reside on the Tivoli Storage Manager server. The Tivoli Storage Manager administrator creates the backup set and copies it onto portable media device that is supported by the Tivoli Storage Manager server and client.

backup version. A file that a user backed up to server storage. More than one backup version can exist in server storage, but only one backup version is the active version. See also *active version* and *inactive* version.

bindery. A database that consists of three system files for a NetWare server. The files contain user IDs and user restrictions.

binding. The process of associating a file with a management class name. See also *rebinding*.

boot. To prepare a computer system for operation by loading an operating system.

C

CAD. Client acceptor daemon

central schedule. A function that allows an administrator to schedule client operations and administrative commands. The operations can be scheduled to occur periodically or on a specific date. See *client schedule*.

client. A program running on a PC, workstation, file server, LAN server, or mainframe that requests services of another program, called the server. The following types of clients can obtain services from a Tivoli Storage Manager server: administrative client, application client, API client, backup-archive client, and HSM client (also known as Tivoli Storage Manager for Space Management). See *administrative client* and *backup-archive client*.

client acceptor. A Web client process that is an HTTP daemon that serves the Web client Java applet to the Web browsers. The program that starts the client acceptor process is called dsmcad. On NetWare, the client acceptor is an NLM that should be loaded as part of the NetWare startup.

client domain. The set of drives, file systems, or volumes that a user selects to back up or archive using the backup-archive client.

client node. A file server or workstation on which the backup-archive client program has been installed, and which has been registered to the server.

client options file. A file that a client can change, containing a set of processing options that identify the server, communication method, and options for backup, archive, hierarchical storage management, and scheduling. Also called the dsm.opt file.

client options set. Client option sets allow the Tivoli Storage Manager administrator to specify additional options that not be included in the client options file, (dsm.opt). Client option sets are used in conjunction with client option files on client nodes.

client-polling scheduling mode. A client and server communication technique where the client node queries the server for scheduled work. Contrast with *server-prompted scheduling mode*.

client/server. A communications network architecture in which one or more programs (clients) request computing or data services from another program (the server).

closed registration. A registration process in which a Tivoli Storage Manager administrator must register workstations as client nodes with the server. Contrast with *open registration*.

collocation. The process of keeping all data belonging to a single client file space, a single client node, or a group of client nodes on a minimal number of sequential-access volumes within a storage pool. Collocation can reduce the number of volumes that must be accessed when a large amount of data must be restored.

collocation group. A user-defined group of client nodes whose data is stored on a minimal number of volumes through the process of collocation.

command-line interface. A type of user interface where commands are specified on the command line. Contrast with *graphical user interface*.

communication method. The method by which a client and server exchange information. For Tivoli Storage Manager backup-archive clients, the method can be TCP/IP. See *Transmission Control Protocol/Internet Protocol*.

communication protocol. A set of defined interfaces that permits computers to communicate with each other.

copy group. A policy object that contains attributes that control backup and archive file:
• Generation
• Destination
• Expiration.

Backup and archive copy groups belong to management classes. See *frequency*, *destination*, *mode*, *retention*, *serialization*, and *version*.

D

default management class. A management class assigned to a policy set. This class is used to govern backed up or archived files when a user does not explicitly associate a file with a specific management class through the include-exclude list.

destination. A copy group attribute that specifies the storage pool in which to back up or archive a file. At installation, Tivoli Storage Manager provides two storage destinations named **backuppool** and **archivepool**.

domain. See *policy domain* or *client domain*.

drag. Move the mouse while holding down the mouse button, thus moving the selected object.

drag-and-drop. Move (drag) an object on top of another object and release the mouse button, thus relocating the object.

dsm.opt file. See *options file*. Also called client options file.

dynamic. A copy group serialization value that specifies Tivoli Storage Manager accept the first attempt to back up or archive an object, regardless of any changes made during backup or archive processing. See *serialization*. Contrast with *shared static* and *static*.

E

error log. A text file written on disk that contains Tivoli Storage Manager processing error messages. The Tivoli Storage Manager server detects and saves these errors.

exabyte (EB). (1) For processor storage, real and virtual storage, and channel volume, 1 152 921 504 606 846 976 bytes. (2) For disk storage capacity and communications volume, 1 000 000 000 000 000 000 bytes.

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.

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.

expiring file. A migrated or premigrated file that is marked for expiration and removal from Tivoli Storage Manager storage. If a stub file or an original copy of a premigrated file is deleted from a local file system, or if the original copy of a premigrated file is updated, the corresponding migrated or premigrated file is marked for expiration the next time reconciliation is run. It expires and is removed from Tivoli Storage Manager storage after the number of days specified with the *migfileexpiration* option have elapsed.

F

file server. A dedicated computer and its peripheral storage devices connected to a local area network that stores both programs and files shared by users on the network.

file space. A logical space on the Tivoli Storage Manager server that contains a group of files. In Tivoli Storage Manager, users can restore, retrieve, or delete file spaces from Tivoli Storage Manager storage. A file space for systems:
- **Windows**— file spaces for removable media are identified by volume label. Fixed drive file spaces are identified by Universal Naming Convention (UNC) name.
- **UNIX** — Logical space that contains a group of files backed up or archived from the same file system, or part of a file system defined with the virtualmountpoint option in the client system options file.

frequency. A copy group attribute that specifies the minimum interval, in days, between incremental backups.

fuzzy backup. A backup version of a file that might not accurately reflect what is currently in the file because the file was backed up at the same time as it was being modified.

fuzzy copy. An archive copy of a file that might not accurately reflect what is currently in the file because Tivoli Storage Manager archived the file while the file was being modified.

G

group backup. Back up of a group containing a list of files from one or more file space origins.

generate password. Processing that stores a new password in an encrypted password file when the old password expires. Automatic generation of a password prevents password prompting. Password generation can be set in the options file (passwordaccess option). See *options file.*

gigabyte (GB). (1) One billion (10^9) bytes. (2) When referring to memory capacity, 1 073 741 824 in decimal notation.

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.

GUID. See *globally unique identifier.*

H

hierarchical storage management client. A program that runs on a workstation or file server to provide space management services. The hierarchical storage management client automatically migrates eligible files to Tivoli Storage Manager storage to maintain specific levels of free space on local file systems. Automatic recalls are made for migrated files when they are accessed. Users are also permitted to migrate and recall specific files.

HSM. Hierarchical Storage Management.

I

inactive version. A copy of a backup file in Tivoli Storage Manager storage that either is not the most recent version, or the corresponding original file was deleted from the client file system. Inactive backup versions are eligible for expiration according to the management class assigned to the file.

include-exclude file. A file containing statements to determine the files to back up and the associated management classes to use for backup or archive. See *include-exclude list*.

include-exclude list. A list of include and exclude options that include or exclude selected files for backup. An exclude option identifies files that should not be backed up. An include option identifies files that are exempt from the exclusion rules or assigns a management class to a file or a group of files for backup or archive services. The include-exclude list is defined in one or more include-exclude files or in the client options file (dsm.opt) file. The include-exclude list contain entries from any or all of the following sources: the client options file (Windows), the client system options file (UNIX and Linux), separate include-exclude files, or the Tivoli 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 directories or files. These 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*.

IPL. Initial Program Load. See *boot* and *reboot*.

L

LAN. Local area network.

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 be a hard disk, tape drive, or other device which understands the SCSI protocol.

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

NDS. Novell eDirectory Services.

Novell eDirectory Services (NDS). A database used by Novell NetWare to organize resources for an entire network of NetWare servers. The database itself can be distributed across the network and accessed by all servers. The NDS is available in NetWare Version 4.0 and later versions.

NetWare Loadable Module (NLM). Novell NetWare software that provides extended server capability. Support for various Tivoli Storage Manager and NetWare platforms are examples of NLMs.

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.

NLM. NetWare Loadable Module.

node. See *client node*.

node name. A unique name used to identify a workstation, file server, or PC to the server.

O

open registration. A registration process in which users can register their own workstations or PCs as client nodes with the server. Contrast with *closed registration*.

options file. A file that contains processing options.

- **dsm.opt**

  Identifies Tivoli Storage Manager servers, specifies communication methods, defines scheduling options, selects backup, archive, restore, and retrieve options. Also called the client options file.

owner. The owner of backup-archive files sent from a multi-user client node, such as UNIX, Linux, or Mac OS X.

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

rebinding. The process of associating a backup with a new management class name. For example, rebinding occurs when the management class associated with a file is deleted. See also *binding*.

reboot. To restart the operating system.

registration. The process of identifying a client node or administrator to the server by specifying a user ID, password, and contact information. For client nodes, a policy domain, compression status, and deletion privileges are also specified.

restore. A function that permits users to copy a version of a backup file from the storage pool to a workstation or file server. The backup copy in the storage pool is not affected. Contrast with *backup*.

retention. The amount of time, in days, that inactive backed up or archived files are retained in the storage pool before they are deleted. The following copy group attributes define retention: retain extra versions, retain only version, retain version.

retrieve. A function permitting users to copy an archived file from the storage pool to the workstation or file server. The archive copy in the storage pool is not affected. Contrast with *archive*.

S

scheduling mode. The type of scheduling operation for the client-server node. Tivoli Storage Manager supports two scheduling modes: client-polling and server-prompted.

scroll. Move through a list of items in a window by operating the scrollbars with the mouse cursor.

select. Choose an item from a list or group of items.

selective backup. A function permitting users to back up specified files. These files are not excluded in the include-exclude list and meet the requirement for serialization in the backup copy group of the management class assigned to each file. Contrast with *incremental backup*.

serialization. A copy group attribute that specifies whether a file can be modified during a backup or archive operation. See *static*, *dynamic*, *shared static*, and *shared dynamic*.

server. A program running on a mainframe, workstation, or file server that provides shared services such as backup and archive to other various (often remote) programs (called clients).

server-prompted scheduling mode. A client-server communication technique where the server contacts the client node when tasks need to be done. Contrast with *sclient-polling scheduling mode*.

session. A period of time in which a user can communicate with a server to perform backup, archive, restore, or retrieve requests.

shared dynamic. A Tivoli Storage Manager copy group serialization mode. This mode specifies if a file changes during backup or archive and continues to change after a number of retries. The last retry commits the file to the Tivoli Storage Manager server whether or not the file changed during backup or archive. Contrast with *dynamic*, *shared static*, and *static*.

shared static. A copy group serialization value specifying that a file must not be modified during a backup or archive operation. Tivoli Storage Manager attempts to retry the operation a number of times. If the file is in use during each attempt, the file is not backed up or archived. See *serialization*. Contrast with *dynamic*, *shared dynamic*, and *static*.

share point. A drive or directory on Windows XP and .NET whose files are available for shared access across a network. The share point name is part of a UNC name. See *Universal Naming Convention (UNC)* name.

shift-click. Click 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.

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.

static. A copy group serialization value specifying that a file must not be modified during a backup or archive operation. If the file is in use during the first attempt, Tivoli Storage Manager will not back up or archive the file. See *serialization*. Contrast with *dynamic*, *shared dynamic*, and *shared static*.

storage pool. A named set of storage volumes used as the destination of backup, archive, or migrated copies.

T

target node. A client node for which other client nodes (called agent nodes) have been granted proxy authority. The proxy authority allows the agent nodes to perform operations such as backup and restore on behalf of the target node, which owns the data being operated on.

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.

V

version. Storage management policy 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 with 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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