Tivoli® Storage Manager for SAN for Windows

IBM

Version 6.1

Storage Agent User's Guide

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Version 6.1

IBM

Storage Agent User's Guide

Contents

Preface

This publication contains installation and operating instructions for the IBM®
Tivoli® Storage Manager for Storage Area Networks.

Who should read this guide

This guide is for administrators who install and use the storage agent component
of the Tivoli Storage Manager for Storage Area Networks product (referred to as
the *storage agent* throughout this publication).

It provides:
- An overview of LAN-free data transfer
- Detailed explanations for installing, configuring, and using the Tivoli Storage
  Manager client and storage agent, and the Tivoli Storage Manager server)

To use this guide, you must know:
- The operating system on which the server will be installed
- The devices that can use Tivoli Storage Manager
- The workstation operating systems on which the clients reside
- The communication protocols installed on your client and server systems
- Storage area network (SAN) administration

Publications

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

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

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

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

Tivoli Storage Manager publications

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

Table 1. Tivoli Storage Manager server publications

Publication title	Order number
IBM Tivoli Storage Manager Messages	GC23-9787
IBM Tivoli Storage Manager Performance Tuning Guide	GC23-9788
IBM Tivoli Storage Manager Problem Determination Guide	GC23-9789
IBM Tivoli Storage Manager for AIX Installation Guide	GC23-9781

Table 1. Tivoli Storage Manager server publications (continued)

Publication title	Order number
IBM Tivoli Storage Manager for AIX Administrator's Guide	SC23-9769
IBM Tivoli Storage Manager for AIX Administrator's Reference	SC23-9775
IBM Tivoli Storage Manager for HP-UX Installation Guide	GC23-9782
IBM Tivoli Storage Manager for HP-UX Administrator's Guide	SC23-9770
IBM Tivoli Storage Manager for HP-UX Administrator's Reference	SC23-9776
IBM Tivoli Storage Manager for Linux Installation Guide	GC23-9783
IBM Tivoli Storage Manager for Linux Administrator's Guide	SC23-9771
IBM Tivoli Storage Manager for Linux Administrator's Reference	SC23-9777
IBM Tivoli Storage Manager for Sun Solaris Installation Guide	GC23-9784
IBM Tivoli Storage Manager for Sun Solaris Administrator's Guide	SC23-9772
IBM Tivoli Storage Manager for Sun Solaris Administrator's Reference	SC23-9778
IBM Tivoli Storage Manager for Windows Installation Guide	GC23-9785
IBM Tivoli Storage Manager for Windows Administrator's Guide	SC23-9773
IBM Tivoli Storage Manager for Windows Administrator's Reference	SC23-9779
IBM Tivoli Storage Manager Server Upgrade Guide	SC23-9554
IBM Tivoli Storage Manager for System Backup and Recovery Installation and User's Guide	SC32-6543

Table 2. Tivoli Storage Manager storage agent publications

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

Table 3. Tivoli Storage Manager client publications

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

Table 3. Tivoli Storage Manager client publications (continued)

Publication title	Order number
Program Directory for IBM Tivoli Storage Manager z/OS Edition Application Program Interface	GI11-8911

Table 4. Tivoli Storage Manager Data Protection publications

Publication title	Order number
IBM Tivoli Storage Manager for Advanced Copy Services: Data Protection for Snapshot Devices Installation and User's Guide	SC33-8331
IBM Tivoli Storage Manager for Databases: Data Protection for Microsoft SQL Server Installation and User's Guide	SC32-9059
IBM Tivoli Storage Manager for Databases: Data Protection for Oracle for UNIX and Linux Installation and User's Guide	SC32-9064
IBM Tivoli Storage Manager for Databases: Data Protection for Oracle for Windows Installation and User's Guide	SC32-9065
IBM Tivoli Storage Manager for Enterprise Resource Planning: Data Protection for SAP Installation and User's Guide for DB2	SC33-6341
IBM Tivoli Storage Manager for Enterprise Resource Planning: Data Protection for SAP Installation and User's Guide for Oracle	SC33-6340
IBM Tivoli Storage Manager for Mail: Data Protection for Lotus Domino® for UNIX, Linux, and OS/400® Installation and User's Guide	SC32-9056
IBM Tivoli Storage Manager for Mail: Data Protection for Lotus Domino for Windows Installation and User's Guide	SC32-9057
IBM Tivoli Storage Manager for Mail: Data Protection for Microsoft Exchange Server Installation and User's Guide	SC23-9796
Program Directory for IBM Tivoli Storage Manager for Mail (Data Protection for Lotus Domino)	GI11-8909

Related software publications

Publication Title	Order Number
IBM TotalStorage SAN File System Administrator's Guide and Reference	GA27–4317
IBM Tivoli SANergy Administrator's Guide	GC26–7389
General Parallel File System: Concepts, Planning, and Installation Guide	GA76-0413

Support information

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

Getting technical training

Information about Tivoli technical training courses is available online.

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

Searching knowledge bases

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

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

Searching the Internet

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

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

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

Using IBM Support Assistant

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

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

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

Finding product fixes

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

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

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

Getting e-mail notification of product fixes

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

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

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

Contacting IBM Software Support

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

Before you contact IBM Software Support, follow these steps:

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

Then see "Submit the problem to IBM Software Support" on page xi for information on contacting IBM Software Support.

Setting up a software maintenance contract

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

- For IBM distributed software products (including, but not limited to, Tivoli, Lotus®, and Rational® products, as well as IBM DB2® and IBM WebSphere® products that run on Microsoft® Windows® or UNIX® operating systems), enroll in IBM Passport Advantage® in one of the following ways:
  - **Online:** Go to the Passport Advantage Web page at http://www.ibm.com/software/lotus/passportadvantage/, click **How to enroll**, and follow the instructions.
  - **By Phone:** For the phone number to call in your country, go to the IBM Software Support Handbook Web page at http://www14.software.ibm.com/webapp/set2/sas/f/handbook/home.html and click **Contacts**.

- For server software products, you can purchase a software maintenance agreement by working directly with an IBM sales representative or an IBM Business Partner. For more information about support for server software products, go to the IBM Technical support advantage Web page at http://www.ibm.com/servers/.

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

Determine the business impact

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

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

Describe the problem and gather background information

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

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

Submit the problem to IBM Software Support

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

Online

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

By phone

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

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

Conventions used in this publication

The typographic conventions used in Storage Agent User's Guide.

Command to be entered on the command line:

```
> dsmadmc
```

Command to be entered on the command line of an administrative client:

```
query devclass
```

Reading syntax diagrams

To read a syntax diagram for entering a command, follow the path of the line. Read from left to right and from top to bottom.

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

Abbreviations

The command name can consist of a single action word, such as HALT, or it can consist of an action word and an object for the action, such as DEFINE DOMAIN. You can enter the entire command name or the abbreviation that is specified in the syntax diagram for the command. Uppercase letters denote the shortest acceptable abbreviation. If an item appears entirely in uppercase letters, you cannot abbreviate the item. Enter the command in any column of the input line.

You can enter the item in uppercase letters, lowercase letters, or any combination. In this example, you can enter CMDNA, CMDNAM, or CMDNAME in any combination of uppercase and lowercase letters.

```
►►──CMDNAme──────────────────────────────────────────────────────────►◄
```

Variables

Highlighted lowercase items (*like this*) denote variables. In this example, *var_name* represents a variable you must specify when you code the CMDNAME command.

```
►►──CMDNAme──var_name─────────────────────────────────────────────────►◄
```

Positional parameters

Commands can have required or optional positional parameters. For positional parameters, you do not use an equal sign to specify a value. You must enter positional parameters in the order indicated in the syntax diagram for a command.

For example, to copy a policy set:

```
►►──COPy POlicyset──domain_name──current_set_name──new_set_name────────►◄
```

1. Enter the name of the policy domain to which the policy set belongs
2. Enter the name of the policy set you want to copy
3. Enter the name you want to assign the copy

```
copy policyset domain1 oldset newset
```

Keyword parameters

Commands can have required or optional keyword parameters. When included in a command, a keyword parameter must follow any positional parameters in the command. You use the equal sign with a keyword to specify its value. A keyword parameter can provide a description of an object, identify an object (such as a storage pool or policy domain), or specify a setting for an option. You can enter either the entire keyword or the abbreviation that is identified in the syntax diagram for the command.

For example, to include a description for a new policy domain, enter:

```
define domain acctg description="accounting"
```

Do not include any blanks immediately before or after the equal sign (=).

Symbols

You must code these symbols exactly as they appear in the syntax diagram.

*   Asterisk

:   Colon

,   Comma

=   Equal Sign

-      Hyphen

( )   Parentheses

.   Period

"	quotation mark
'	single quotation mark

Repetition

An arrow returning to the left means that the item can be repeated. A character within the arrow means that you must separate repeated items with that character.

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

A footnote (1) by the arrow refers to a limit that tells how many times the item can be repeated.

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

Notes:

1   Specify *repeat* up to 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 CMDNAME=A, CMDNAME=B, or CMDNAME=C.

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

Do not include any blanks immediately before or after the equal sign (=).

Optional choices

When an item is below the line, the item is optional. In this example, you can choose CMDNAME=A or nothing at all. Do not include any blanks immediately before or after the equal sign (=).

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

When two or more items are in a stack below the line, all of them are optional. In this example, you can choose CMDNAME=A, CMDNAME=B, CMDNAME=C, or nothing at all. Do not include any blanks immediately before or after the equal sign (=).

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

Defaults

Defaults are above the line. The system uses the default unless you override it. You can override the default by coding an option from the stack below the line.

In this example, CMDNAME=A is the default. You can also code CMDNAME=A, CMDNAME=B, or CMDNAME=C. Do not include any blanks before or after the equal sign (=).

```
        ┌─CMDNAme──=──A─┐
►►──────┴───────────────┴──────────────────────────────────────────►◄
        └─CMDNAme──=──┬─A─┬─
                      ├─B─┤
                      └─C─┘
```

Repeatable choices

A stack of items followed by an arrow returning to the left means that you can select more than one item or, in some cases, repeat a single item. In this example, you can choose more than one value, with each name delimited with a comma. Do not include any blanks before or after the equal sign (=).

```
                   ┌───,───┐
►►──CMDNAme──=──────┬─value1─┬─────────────────────────────────────►◄
                    ├─value2─┤
                    └─value3─┘
```

Syntax fragments

Some diagrams, because of their length, must display parts of the syntax with fragments. The fragment name appears between vertical bars in the diagram.

The expanded fragment appears in the diagram after all other parameters or at the bottom of the diagram. A heading with the fragment name identifies the expanded fragment. Commands appearing directly on the line are required.

In this example, the fragment is named "Fragment".

```
►►──┤ Fragment ├───────────────────────────────────────────────────►◄
```

Fragment:

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

Syntax diagram descriptions

This section covers syntax diagrams including descriptions and examples:

Abbreviations: Uppercase letters denote the shortest acceptable abbreviation. If an item appears entirely in uppercase letters, you cannot abbreviate the item.

You can type the item in uppercase letters, lowercase letters, or any combination. In this example, you can enter CMDNA, CMDNAM, or CMDNAME in any combination of uppercase and lowercase letters.

```
►►──CMDNAme─────────────────────────────────────────────────►◄
```

Symbols: You must code these symbols exactly as they appear in the syntax diagram.

*	Asterisk
:	Colon
,	Comma
=	Equal Sign
-	Hyphen
( )	Parentheses
.	Period

Variables: Highlighted lowercase items (*like this*) denote variables. In this example, *var_name* represents a variable you must specify when you code the CMDNAME command.

```
►►──CMDNAme──var_name──────────────────────────────────────►◄
```

Repetition: An arrow returning to the left means that the item can be repeated. A character within the arrow means that you must separate repeated items with that character.

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

A footnote (1) by the arrow refers to a limit that tells how many times the item can be repeated.

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

Notes:

1   Specify *repeat* up to 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 CMDNAME=A, CMDNAME=B, or
CMDNAME=C. Do not include any blanks immediately before or after the equal
sign (=).

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

Optional Choices: When an item is below the line, the item is optional. In this
example, you can choose CMDNAME=A or nothing at all. Do not include any
blanks immediately before or after the equal sign (=).

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

When two or more items are in a stack below the line, all of them are optional. In
this example, you can choose CMDNAME=A, CMDNAME=B, CMDNAME=C, or
nothing at all. Do not include any blanks immediately before or after the equal
sign (=).

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

Defaults: Defaults are above the line. The system uses the default unless you
override it. You can override the default by coding an option from the stack below
the line.

In this example, CMDNAME=A is the default. You can also code CMDNAME=A,
CMDNAME=B, or CMDNAME=C. Do not include any blanks before or after the
equal sign (=).

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

Repeatable Choices: A stack of items followed by an arrow returning to the left
means that you can select more than one item or, in some cases, repeat a single
item. In this example, you can choose more than one value, with each name
delimited with a comma. Do not include any blanks before or after the equal sign
(=).

```
              ┌────,────┐
►►──CMDNAme──=──▼──┬──value1──┬──┴──────────────────────────────►◄
                   ├──value2──┤
                   └──value3──┘
```

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 in the diagram after all other parameters or at the bottom of the diagram. A heading with the fragment name identifies the expanded fragment. Commands appearing directly on the line are required.

In this example, the fragment is named "Fragment".

```
►►─┤ Fragment ├─────────────────────────────────────►◄
```

Fragment:

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

New for Tivoli Storage Manager for Storage Area Networks Version 6.1

With Tivoli Storage Manager for Storage Area Networks Version 6.1, you can use the file-device-sharing software IBM General Parallel File System™. You can also continue to use either Tivoli SANergy® or IBM TotalStorage® SAN File System. IBM General Parallel File System is the preferred option for the operating systems on which it is supported.

Chapter 1. Storage agent overview

Tivoli Storage Manager for Storage Area Networks allows client systems to write data directly to, or read data directly from, storage devices attached to a SAN. This is called *LAN-free data movement*.

LAN-free data movement makes LAN bandwidth available for other uses and decreases the load on the Tivoli Storage Manager server, allowing it to support a greater number of concurrent client connections.

The key component of Tivoli Storage Manager for Storage Area Networks is the storage agent. You install the storage agent on a client system that shares storage resources with the Tivoli Storage Manager server, as shown in Figure 1.
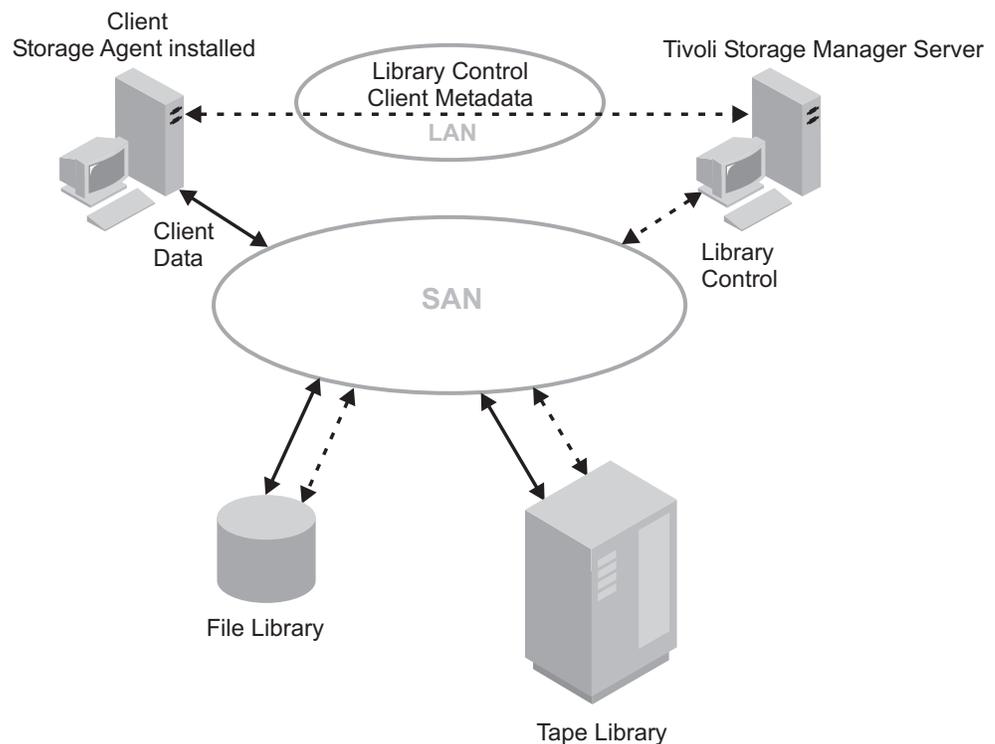
Figure 1. SAN data movement. Solid lines indicate data movement. Broken lines indicate movement of control information and metadata.

As shown in Figure 2 on page 2, the storage agent can support several clients while installed on only one of the clients. You can also install the storage agent on a client system that does not share storage resources with the Tivoli Storage Manager server, but that is connected to a client system that does share storage resources. The LANFREECOMMMETHOD option allows a client system that shares storage resources to communicate with the storage agent. The LANFREECOMMMETHOD option also allows the storage agent to support several clients while installed on only one of the clients.
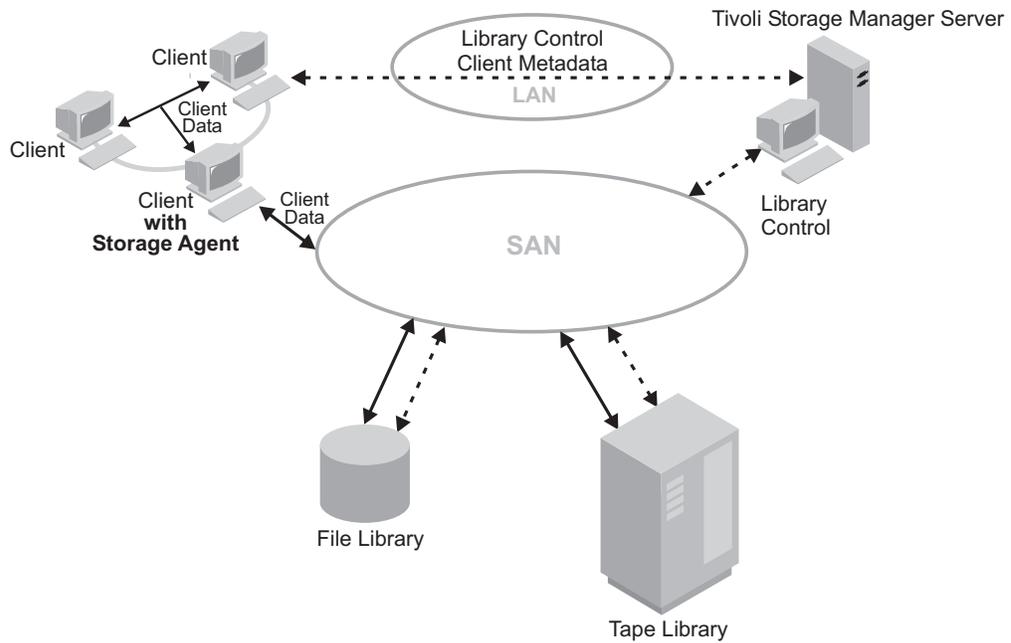
*Figure 2. SAN data movement with the LANFREECOMMMETHOD option.* Solid lines indicate data movement. Broken lines indicate movement of control information and metadata.

A Tivoli Storage Manager server, acting as a library manager, controls the storage devices. This server can be the server working in conjunction with the storage agent or another Tivoli Storage Manager server in the enterprise. The Tivoli Storage Manager server keeps track of the metadata that the client has stored. The metadata, such as policy information and file name and size, is passed over the LAN connection between the storage agent and server.

The storage agent communicates with the server to obtain and store database information and to coordinate device and volume access. The server and client coordinate and transfer data access through the SAN. The client uses the storage agent for operations where appropriate. For example, if a SAN path is defined, the client (by means of the storage agent) transfers data on that path. If a failure occurs on the SAN path, failover occurs and the client uses its LAN connection to the Tivoli Storage Manager server and moves the client data over the LAN.

The storage agent can send the data directly to the server using the LAN control paths between the storage agent and the server. An example is a LAN-free storage pool that is updated to read-only after the client connects to the server and obtains its initial policy information. The storage agent, instead of failing the operation, sends the data to the server. If the storage hierarchy is configured so that the Next storage pool destination is available, the server performs the operation.

You can also prevent data from transferring over the LAN by specifying the Tivoli Storage Manager server parameters DATAREADPATH and DATAWRITEPATH with the REGISTER NODE or UPDATE NODE commands for the desired node. To review these settings, issue the following command on the server for the node:

```
query node node_name format=detailed
```

Tivoli Storage Manager supports SAN-attached device sharing in the following environments:

- Tivoli Storage Manager native library management support consisting of an ACSLS, SCSI, or 349X library manager and library clients or just a library manager.
- Shared disk storage using a FILE library and the integration of IBM General Parallel File System, Tivoli SANergy, or IBM TotalStorage SAN File System. IBM General Parallel File System is the preferred option for operating systems on which it is supported.
- External libraries. For a description of external libraries, see the *Administrator's Guide*.

Related concepts

"ACSLS, SCSI, and 349X tape library sharing" on page 6
When Tivoli Storage Manager servers share an ACSLS, SCSI tape, or 349X tape library device, one server, the *library manager*, owns and controls the device.

"File device sharing using Tivoli SANergy" on page 9
When Tivoli Storage Manager servers share access to disk storage, the environment contains a shared FILE device class and utilizes file-sharing software such as Tivoli SANergy.

"External Libraries" on page 10
If Tivoli Storage Manager native library (SCSI, 3494, and ACSLS) support cannot be used, the alternative is to configure external library support.

Scenario: LAN-free client data backup

Media to be used for client backup data resides in a storage pool that uses a device shared on a SAN. A library manager sends the location to a storage agent. Backup data goes directly to the device over a SAN.

A typical scenario for LAN-free data movement consists of the following steps:

1. The backup-archive client begins a backup operation. The server reports policy information to the client, including whether a destination is LAN-free. As the client assigns policy settings for files during backup processing, it sends the data LAN-free when the destination for that policy is LAN-free enabled.

   A storage pool is a LAN-free destination when the storage pool uses a device shared on a SAN. That device must also have a defined path between the device and the storage agent.

2. The storage agent receives data for those files backed up by the client and assigned to policy settings that use a LAN-free enabled storage pool. The storage agent sends a request for a volume mount to the library manager server. In external libraries, the storage agent contacts the external library manager, using the path to the executable.

3. A request is made to the storage device to mount the appropriate media.

4. The library manager notifies the storage agent of the location where the mounted media resides. In external libraries, the storage agent is informed of the device location by the external library manager.

5. The client, by means of the storage agent, writes the backup data directly to the device over the SAN.

6. The storage agent sends metadata information to the Tivoli Storage Manager server, and the server stores the information in its database.

Scenario: Multi-session no-query restore for LAN-free path

When performing a no-query restore, the Tivoli Storage Manager server builds a list of files to restore and sends data to the client while continuing to build the list. This allows the restore to be restarted if interrupted.

Multiple sessions are used for the no-query restore when data for the restore resides on devices with a LAN-free path and devices with a LAN-only path. Some sessions restore data from the server with a LAN-only path. The other sessions use the storage agent to restore data over the LAN-free path. This works only with clients at Version 4.2 or above.

The number of sessions used for the restore is dependent on the value of the client RESOURCEUTILIZATION option and the number of server volumes that contain the client data to be restored.

The following actions outline a typical multi-session no-query restore for a LAN-free path:

1. The client requests a file space to be restored. This request is forwarded to the server.
2. The server determines the files to restore and the volume on which those files reside. The server generates a list, sorted by the volume name.
3. The client is informed of the progress and the number of volumes. The client can start more sessions to restore the information.
4. The location of the volume, and whether or not the storage agent can access the volume, will determine how the data is handled. When the volume can be mounted on a shared device that the storage agent can access, the data is read from the volume by the storage agent and sent to the client. When the volume cannot be mounted on a shared device that the storage agent can access, the data is read from the volume by the server and sent directly to the client. The client then begins additional sessions: some to the storage agent for the volumes that are LAN-free enabled and some sessions to the server for those volumes that are not LAN-free enabled.

The process repeats until all files in the list are restored.

Communications between the client, storage agent, and Tivoli Storage Manager server

Configuration tasks link the storage agent, the client, and the Tivoli Storage Manager server.

Figure 3 on page 5 shows how configuration connects the client, the storage agent, and the Tivoli Storage Manager server. Use this figure as a reference point while installing software on client systems and while defining the storage agent and configuring devices on the server.

Tivoli Storage Manager Client Workstation

```
Client - DATAOWNER

  dsm.opt file

  enablelanfree yes
  lanfreecommmethod tcpip
  lanfreetcpserveraddress test.example.com
  lanfreetcpport 1500
  commmethod tcpip
  tcpserveraddress tsmsrver.example.com
  tcpport 1502
```

```
Storage Agent - STORAGNT

  dsmsta.opt file

  servername tsmsrver
  devconfig devconfig.out
  commmethod tcpip
  tcpport 1500

  devconfig.out file

  set staname storagnt
  set stapassword xxxxxxx
  set stahladdress agent.example.com
  define server tsmsrver serverpassword=xxxxxxxx
     hladdress=tsmsrver.example.com
     lladdress=1502
```

Tivoli Storage Manager Server - TSMSRVER

```
  define server storagnt serverpassword=fun4me
     hladdress=agent.example.com
     lladdress=1502

  register node dataowner bak2work
     domain=sandomain
```

Figure 3. Connections between the client, storage agent, and server. The passwords are shown as *xxxxxxx* because they are encrypted in the file.

Chapter 2. Planning for storage agent installation and configuration

Planning the system configuration provides a smooth transition through system setup and into production.

As part of your planning, you need to identify the following:
- Which environment to implement.
- Devices to be used for LAN-free data movement.
- The clients that will use LAN-free data movement.
- The server that will manage particular clients' data.

- The library used for the LAN-free enabled device. If the library is a Tivoli Storage Manager shared library, you must identify the Tivoli Storage Manager server that is the library manager. If the library is an externally managed library using Sun StorageTek ACSLS, you must identify the control point.

Supported operating systems

Tivoli Storage Manager for Storage Area Networks is supported on AIX®, HP-UX, Linux®, Sun Solaris, and Microsoft Windows. The storage agent can also work in conjunction with a Tivoli Storage Manager server on z/OS®.

The storage agents on the designated operating systems can work in conjunction with a Tivoli Storage Manager server on any of the same platforms. If you are using the storage agent with a Tivoli Storage Manager server on z/OS, you must install and configure another server on another operating system (AIX, HP-UX, Linux, Solaris, or Windows) to function as the library manager. Alternatively, you can implement library support through an external library manager, for example, IBM Integrated Removable Media Manager. For details about using the storage agent with z/OS, see the *Administrator's Guide* and the *Administrator's Reference*.

When using a shared ACSLS library, the library manager must be a Tivoli Storage Manager server on AIX, HP-UX, Linux, Solaris, or Windows.

Storage devices and the configuration of your environment

The type of storage device you use for LAN-free data storage determines how to configure your environment.

For details about configuring the storage agent in an Microsoft Cluster Service environment, see *IBM Tivoli Storage Manager in a Clustered Environment*. This is one of the IBM Redbooks.

ACSLS, SCSI, and 349X tape library sharing

When Tivoli Storage Manager servers share an ACSLS, SCSI tape, or 349X tape library device, one server, the *library manager*, owns and controls the device.

The library manager operations include checking volumes into and out of the library, labeling volumes, mounting and dismounting volumes, auditing volumes, and tracking an inventory of library contents. The storage agents, along with other Tivoli Storage Manager servers that share this library are *library clients*. As a library client, the storage agent stores data and requests drives, tapes, and volumes.

When the Tivoli Storage Manager server (data manager server) is also the library manager for the devices where data is stored by the storage agent, then the storage agent communicates requests to this Tivoli Storage Manager server. When the Tivoli Storage Manager server (data manager server) is another library client, then the storage agent communicates requests for itself or the metadata server directly to the library manager. The library manager operations include checking volumes into and out of the library, labeling volumes, mounting and dismounting volumes, auditing volumes, and tracking an inventory of library contents.

When using a shared ACSLS library, the library manager must be a Tivoli Storage Manager server on AIX, HP-UX, Linux, Solaris, or Windows.

A library client requests shared library resources, such as drives or media, from the library manager, but uses the resources independently. The library manager coordinates the access to these resources. Data moves over the SAN between the storage device and either the library manager or the library client. Either the library manager or any library client can manage the LAN-free movement of client data as long as the client system includes a storage agent.

In this library-sharing environment, the most important relationship is the one between the server and the storage agent. The server, working in conjunction with the storage agent, manages the storage hierarchy. The server could be a library client or library manager. It is responsible for:

- Migrations
- Expiration of files based on policy information
- Reclamation of free space on volumes and consolidation of the volumes
- Disaster recovery

The storage agent contributes information to the storage hierarchy through various operations, but this role is independent of the library sharing role.

The library manager and library client configurations are represented in Figure 4 and Figure 5 on page 8.
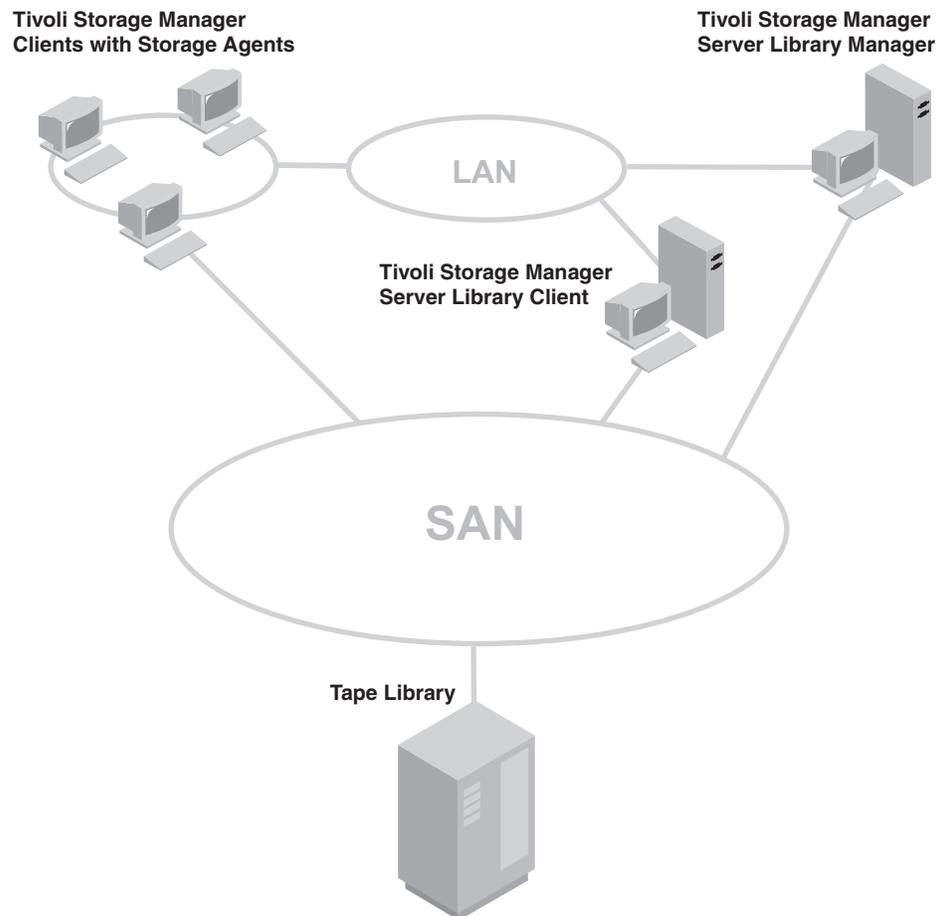

Figure 4. Library manager and client LAN-free configuration

Tips:

- An environment can have a library manager without a library client.
- In an environment where ACSLS library support is required, the library client can reside on a Tivoli Storage Manager server on AIX, HP-UX, Linux, Solaris, Windows, or z/OS. The library manager must reside on a Tivoli Storage Manager server on AIX, HP-UX, Linux, Solaris, or Windows.

The following configurations are shown in Figure 4 on page 7:

- A Tivoli Storage Manager server library manager manages a client's data, which is stored in a tape library.
- A Tivoli Storage Manager server library client manages a client's data, which is stored in a tape library.
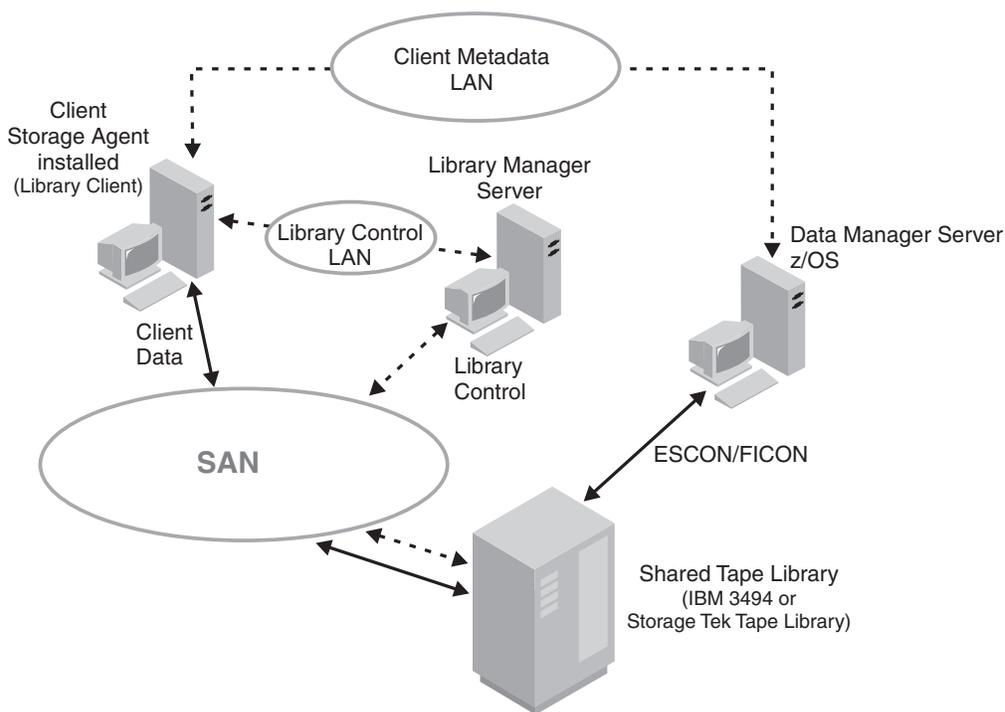
Figure 5. Library manager and client LAN-free configuration on z/OS

The following requirements apply to the library manager server:

- If your environment consists of native ACSLS support with a Sun StorageTek tape library, the library manager server can be a Tivoli Storage Manager server residing on an AIX, Solaris, or Windows operating system.
- If your environment consists of an IBM 3494 tape library, the library manager server can be a Tivoli Storage Manager server residing on an AIX, HP-UX, Linux, Solaris, or Windows operating system.
- Both environments can support the storage agent (library client) on an AIX, HP-UX, Linux, Solaris, or Windows operating system.

Remember: When using a server running on a z/OS system with shared library support and a 3494 automated tape library, you must configure a Tivoli Storage Manager server on AIX, Linux, HP-UX, Solaris, or Windows as a library manager to control storage agent mount requests. When using a Sun StorageTek library controlled by Sun StorageTek LibraryStation software, you must configure an AIX, Solaris, or Windows server as a library manager with ACSLS support to control

storage agent mount requests.

File device sharing using Tivoli SANergy

When Tivoli Storage Manager servers share access to disk storage, the environment contains a shared FILE device class and utilizes file-sharing software such as Tivoli SANergy.

Remember: SANergy is just one option for file-sharing software. IBM General Parallel File System is the preferred option for the operating systems on which it is supported. IBM TotalStorage SAN File System is another option.

SANergy provides a file-sharing accelerator. Because you are using a FILE library, you must determine the location in which to install the Tivoli SANergy client and the Tivoli SANergy Metadata Controller (MDC). On UNIX systems, Common Internet File System (CIFS) or a Network File Share (NFS) are required software.

Restriction: The Tivoli SANergy license (included with the storage agent media) is provided with Tivoli Storage Manager only for supporting LAN-free backup to disk.

Figure 6 shows the possible Tivoli SANergy configurations. (For additional information about configuring SANergy, refer to the SANergy publications.)
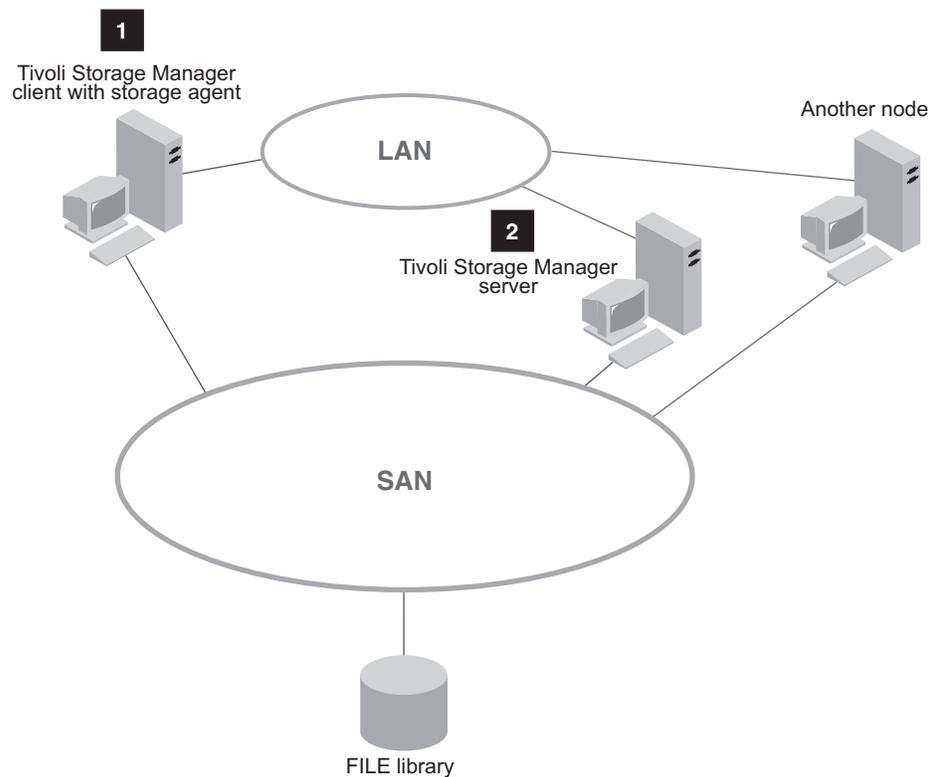
*Figure 6. Tivoli SANergy configurations*

One possible configuration is to install the Tivoli SANergy client on the Tivoli Storage Manager client system (**1**) and to install the Tivoli SANergy MDC on the Tivoli Storage Manager server (**2**). Configurations can also consist of multiple platforms. For example, an environment can consist of a SANergy MDC working with Windows and AIX clients.

External Libraries

If Tivoli Storage Manager native library (SCSI, 3494, and ACSLS) support cannot be used, the alternative is to configure external library support.

A typical external library configuration includes an external library manager such as the IBM Removable Media Manager (IRMM).

The Sun StorageTek Automated Cartridge System Library Software (ACSLS) Server or the LibraryStation on z/OS manages the physical aspects of tape cartridge storage and retrieval. (See Figure 7 on page 11.) The external library manager communicates with the ACSLS Server or the LibraryStation on z/OS to access tape cartridges in an automated Sun StorageTek library. The storage agent is installed on a system containing the external library manager and a Tivoli Storage Manager backup-archive client or a Tivoli Storage Manager data protection application client. This configuration provides access to SAN-attached storage devices using LAN-free data movement. The continued connection to the LAN provides a metadata (control information) path. If the storage agent is not available, the SAN provides a failover path for data backup and recovery.
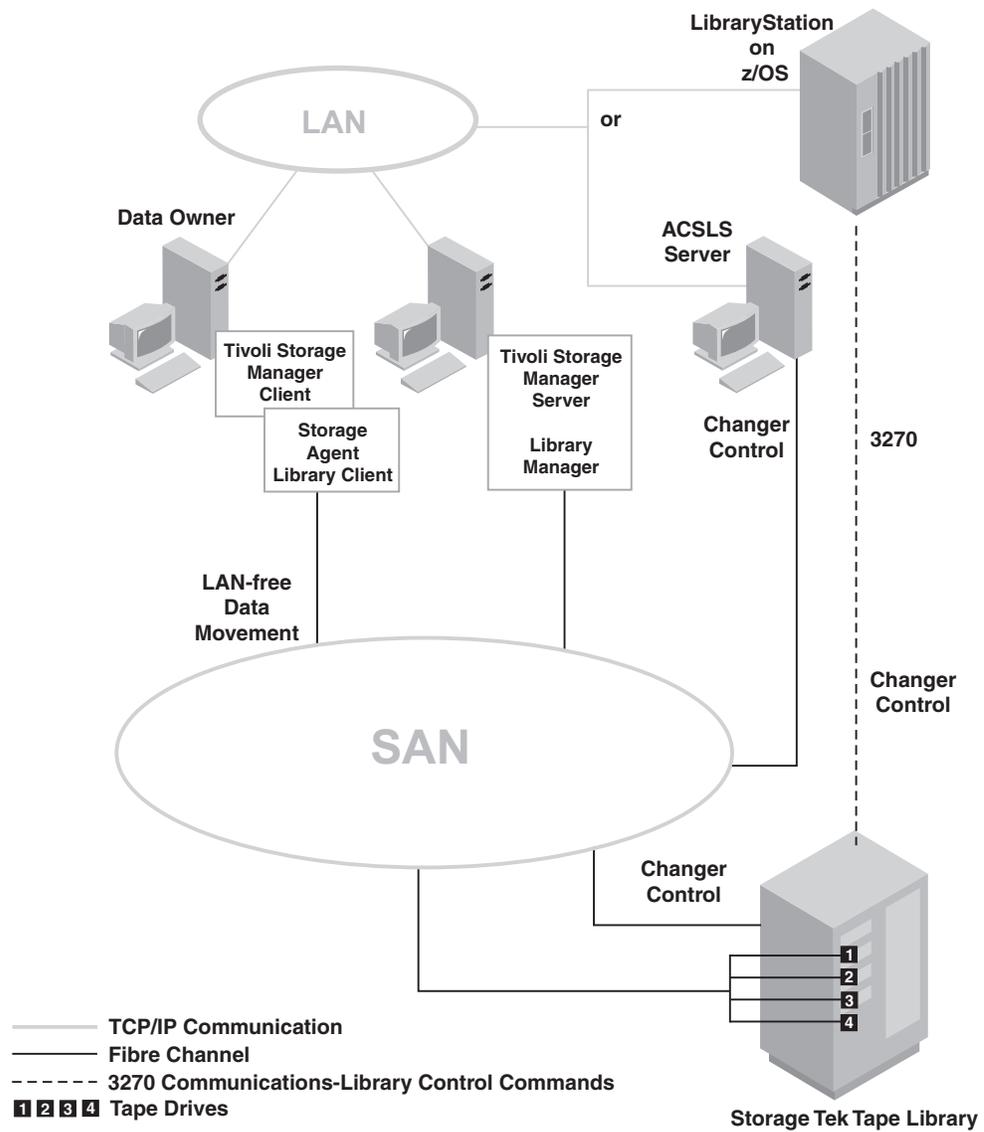
Figure 7. ACSLS library environment

For detailed information about ACSLS, refer to the appropriate Sun StorageTek documentation. For detailed information about an external library manager, such as IRMM, refer to the product's documentation.

If you currently have data associated with the Tivoli Storage Manager ACSLS library type and want to take advantage of LAN-free, you need to consider coexistence and migration issues.

If you stored data using external library support for ACSLS library access and plan to migrate to a native Tivoli Storage Manager library sharing environment, see the *Administrator's Guide*.

Related concepts

Appendix B, "ACSLS legacy data migration and coexistence," on page 57
If ACSLS shared-library support is not possible in your configuration, data migration is required.

System requirements

Tivoli Storage Manager for Storage Area Networks requires specific levels of hardware and software.

TCP/IP

TCP/IP is required for communication among the Tivoli Storage Manager server, the client, and the storage agent.

The Tivoli Storage Manager storage agent can use TCP/IP Version 6 (IPv6) as its communications protocol. IPv6 is interoperable with TCP/IP Version 4. You can specify either IPv4 or both IPv4 and IPv6 as the value of the COMMMETHOD option before starting the server, the backup-archive client, or the storage agent. The same port numbers are used by the server, the backup-archive client, and storage agent for both IPv4 and IPv6.

The server and storage agent use COMMMETHOD V6TCPIP to specify support for both IPv4 and IPv6 simultaneously, depending on the protocols configured on the system on which the server or storage agent are running. As in prior releases, COMMMETHOD TCPIP specifies that only IPv4 is used. When configuring the storage agent using the DSMSTA SETSTORAGESERVER command, use addresses that correspond to the communications method used by the backup-archive client. The backup-archive client supports either IPv4 (COMMMETHOD TCPIP) or IPv6 (COMMMETHOD V6TCPIP), but not both at the same time. Other client components (CAD, Web Client) use COMMMETHOD V6TCPIP to support both IPv4 and IPv6 simultaneously.

IPv6 address formats are acceptable for all functions that support IPv6. However, if you use IPv6 addresses for the Shared Memory Protocol function, which does not support IPv6, communications will fail. Continue to use IPv4 for Shared Memory Protocol.

Microsoft Management Console (MMC) snapin

If you are using the Microsoft Management Console (MMC) snapin, the storage agent system must have Microsoft Internet Explorer Version 5 or higher installed.

Server licensing and compatibility

You must have an AIX, HP-UX, Linux, Sun Solaris, Windows, or z/OS Tivoli Storage Manager server that has a license for LAN-free operations.

To ensure compatibility between the storage agent and the server, check the Web site for Tivoli Storage Manager storage agent and server compatibility at http://www.ibm.com/support/docview.wss?uid=swg21302789.

To download the latest interim fix, see the IBM Tivoli Storage Manager product support Web site at http://www.ibm.com/software/sysmgmt/products/support/IBMTivoliStorageManager.html.

Clients and API

To perform LAN-free data movement, you must install a Tivoli Storage Manager backup-archive client or a Tivoli Storage Manager Date Protection application client on client systems.

- For information about LAN-free requirements for data-protection clients, see the Tivoli Storage Manager data-protection documentation.
- For information about supported versions of the backup-archive client and client API, check the Web site at http://www.ibm.com/support/entdocview.wss?rs=663&context=SSGSG7&q=5.1+os%2F390+supported+windows+clients+and+tsm&uid=swg21053218.
- You can download the latest software levels from the Tivoli Storage Manager product support Web site at http://www.ibm.com/software/sysmgmt/products/support/IBMTivoliStorageManager.html. The client API is packaged with the backup-archive client.

File sharing software

If you are sharing disk storage, IBM General Parallel File System, Tivoli SANergy, or IBM TotalStorage SAN File System must be installed. Tivoli SANergy is included with the storage-agent media.

Use of the Tivoli SANergy components included with the Tivoli Storage Manager for Storage Area Networks product is limited to use to enable LAN-free backup and restore to disk in conjunction with your licensed use of the Tivoli Storage Manager for Storage Area Networks product.

If you are sharing only tape devices, file-sharing software is not required.

Encryption support

Encryption provides security and protects sensitive data on tape media. With Tivoli Storage Manager for Storage Area Networks, you can use IBM and HP LTO-4, 3592 generation 2, 3592 generation 3, and client-side encryption:

- When LTO-4 encryption is enabled, Tivoli Storage Manager manages data encryption and decryption according to specifications set when defining the LTO device class. To enable drive encryption with IBM LTO-4, you must have the IBM RMSS Ultrium device driver installed. IBM LTO-4 SCSI drives do not support encryption.
- Tivoli Storage Manager for Storage Area Networks supports client-side encryption and the Tivoli Storage Manager automatically-generated password.

Concurrent access to volumes in storage pools associated with the FILE device type

Concurrent access improves restore performance by allowing two or more client sessions, two or more storage agents, or a combination of client sessions and storage agents to access the same volume at the same time. Multiple client sessions and storage agents can read a FILE volume concurrently. In addition, one client session or storage agent can write to the volume while it is being read. To take advantage of concurrent access, both the storage-agent and the Tivoli Storage Manager server must be at version 5.5.0 or later.

Obtaining system configuration information for clients and servers

To be more efficient, obtain client- and server-system information before installing and configuring the storage agent.

Client-system and server-system configuration work sheets

Work sheets help organize the information that you need to configure the storage agent for LAN-free data movement.

Client-system information

Client-system information includes information about storage agents, client communication protocols and ports, and devices.

Storage agent properties

Type of information	Description	Use this column to record the values for your environment
Storage agent name	The name for the storage agent (for example, storagnt)	
Storage agent password	The password for the storage agent (for example, fun4me)	
TCP/IP address	The TCP/IP address of the storage agent (for example, agent.example.com)	
TCP/IP port	The TCP/IP port of the client system	

Client properties

Type of information	Description	Use this column to record the values for your environment...
LAN-free communications protocol	The communications protocol between the client and the storage agent. The following protocols are available. Use the value in parentheses as the value of the client LANFREECOMMMETHOD option. • TCP/IP Version 4 (TCPIP) • TCP/IP Version 4 or Version 6 (V6TCPIP) • Shared Memory (SHAREDMEM) • Named Pipes (NAMEDPIPES) Named Pipes is the default, and there is a default name the client uses to contact the storage agent.	
LAN-free port	The TCP/IP port that is used for LAN-free data movement. Use this value as the value of the client LANFREETCPPORT option.	
Tip: For details about the LANFREECOMMMETHOD option, see the *Backup-Archive Clients Installation and User's Guide*.		

Device information

Table 5. External library environment

Type of information	Description	Use this column to record the values for your environment...
Executable file location	The fully qualified path to the external-library-manager executable file for each storage agent to which Tivoli Storage Manager sends media-access requests.	
Library name	A 1- through 32-character name of your choosing.	

Table 6. ACSLS, 3494, or SCSI tape-library sharing environment

Type of information	Description	Use this column to record the value or values for your environment...
Device name	The name of each tape drive for which you will define a path	

Table 7. Shared disk environment

Type of information	Description	Use this column to record the value for your environment...
Local path name	The name of the local path to the network-mounted file system (for example, /shareddisk)	

Related tasks

"Obtaining device information" on page 17
You can obtain tape-device and disk-device information from the system where the storage agent is installed.

Server-system information

Server-system information includes information that the storage agent needs to communicate with the Tivoli Storage Manager server. You also need information about devices and client nodes.

To verify server information, use the QUERY STATUS command. You can issue the command from a Tivoli Storage Manager administrative command-line client.

Server properties

Type of information	Description	Use this column to record the values for your environment
Name	The name of the server (for example, tsmsrver)	
Password	The password for the server (for example, not4u)	
TCP/IP address	The TCP/IP address for the server. (for example, tsmsrver.example.com)	
TCP/IP port	The TCP/IP port for the server (for example, 1502)	

Device information

Table 8. External library environment

Type of information	Description	Use this column to record the values for your environment...
Executable file location	The fully qualified path to the external-library-manager executable file for each storage agent to which Tivoli Storage Manager can send media access requests	
Library name	A 1- through 32-character name of your choosing	

Table 9. ACSLS, 3494, or SCSI library environment

Type of information	Description	Use this column to record the values for your environment...
Library name	The name of an ACSLS, 3494, or SCSI library	
Library device name	The device name for an ACSLS, 3494, or SCSI library, which you use when you define the path	
Device name	The name of each tape drive for which you will define a path	

Table 10. Shared disk environment

Type of information	Description	Use this column to record the value for your environment...
Local path name	The name of the local path to the network-mounted file system (for example, /shareddisk)	

Client node information

Type of information	Description	Use this column to record the values for your environment...
Client node names	The names of the client nodes on which you will install and configure the storage agent. You need this information when you register the nodes, set the policy for them, and place any needed restrictions on them.	

Related tasks

"Obtaining device information" on page 17
You can obtain tape-device and disk-device information from the system where the storage agent is installed.

"Verifying and updating client node information" on page 18
Configuring LAN-free data movement requires registration and policy information about client nodes. You can also restrict when a client node uses a LAN-free path.

Obtaining device information

You can obtain tape-device and disk-device information from the system where the storage agent is installed.

You use the device information from the storage agent when defining paths for the server that functions as the library manager. In the z/OS environment, use the information for a Windows server because the z/OS servers cannot function as library managers.

Related tasks

"Configuring TSMSCSI.EXE for Windows Server 2003 and Windows Server 2008" on page 48
When you are running Tivoli Storage Manager on a Windows Server 2003 or Windows Server 2008 and using non-IBM devices, you must install an IBM Tivoli Storage Manager driver. You must also manually update the controlling driver for each device that you want to control with TSMSCSI.EXE.

Obtaining tape-device information

You can use the TSMDLST command to display the device names needed to define paths between the SAN devices, the storage agent, and the Tivoli Storage Manager server.

Before beginning this procedure:
- Ensure that the correct device driver is installed on Windows Server 2003 or Windows Server 2008. The following table lists device driver names.

	32–bit	64–bit
Windows Server 2003	TSMSCSI.SYS	TSMSCSI.SYS64
Windows Server 2008	TSMSCSI.SYS	TSMSCSI.SYS64

- If you have not added the storage agent path to the search path, you must first change to the directory where the storage agent program resides. By default, the path is c:\program files\tivoli\tsm\storageagent.

To obtain tape-device information:

1. Ensure that the device driver is running. If the device driver is not running, the command gives results that might be incorrect.
2. Enter TSMDLST at an MS-DOS command prompt. If you do not specify any parameters, the command displays a summary of device information for the local computer. Results display in the following format:

```
Computer Name:      DATAOWNER
TSM Device Driver:  Running

TSM Device Name  ID   LUN  Bus  Port   TSM Device Type  Device Identifier
---------------------------------------------------------------------------------
mt8.2.0.1        8    0    0    1      3570             IBM    03570B12    422C
lb8.3.0.1        8    1    0    1      LIBRARY          IBM    03570B12    422C
mt8.4.0.1        9    0    0    1      3570             IBM    03570B12    422C
f:\              0    0    0    0      REMOVABLEFILE    n/a
```

To issue the DEFINE PATH and UPDATE PATH commands on the server, you need the names in the column labeled TSM Device Name.

Related reference

"TSMDLST (Display information about devices)" on page 49
Use the TSMDLST command to display information about devices.

Verifying permissions for disk devices

Without appropriate permissions, the backup will not be LAN-free. If your environment includes a FILE library and a UNIX-based Tivoli Storage Manager server, such as AIX or Sun Solaris, the storage agent must have access to the volumes in the FILE library.

To verify that the appropriate permissions are available:

1. Log on to the UNIX server as the root user.
2. Change (CD) to the shared directory.
3. Create a file called prm_test. For example: touch /sharedir/prm_test
4. Log off the UNIX server.
5. Log on to the Windows client account that will start the storage agent.
6. Open a DOS command window.
7. Change to the mapped share directory.
8. Attempt to write to the prm_test file, for example,

   ```
   echo "testing 123 testing 123" > \\192.168.1.10\\sharedir\prm_test"
   ```

If the write is successful, the permission settings are correct and you start defining paths from storage agents to drives. If the permissions are not correct, an Access Denied message is issued. If you receive the Access Denied message, you can set permissions using Samba. If you are using NFS, configure NFS to allow write access from the account that is starting the storage agent.

Related tasks

"Defining paths from the storage agent to drives" on page 30
Paths allow a client, by means of a storage agent, access to the library drives that are available to the Tivoli Storage Manager server. Path-definition requirements depend on the type of device that you are using.

"Setting permissions using Samba" on page 49
To set the permissions, you must configure Samba so that the user account that is starting the storage agent has root access.

Verifying and updating client node information

Configuring LAN-free data movement requires registration and policy information about client nodes. You can also restrict when a client node uses a LAN-free path.

To verify client node information:

1. Identify the client node or nodes that will use the storage agent. In a typical environment, a storage agent is used only by the client node residing on the same system as the storage agent. However, you can configure two or more client nodes to use the same storage agent.
2. Verify that the nodes are registered. If they are not, you need to register them. For details, see the *Administrator's Guide*.
3. Verify the policy information for the nodes. The copy group for backup and archive must point to a storage pool that has a LAN-free path for a particular storage agent. You define drive LAN-free paths and make them available for the storage pool. To view the destinations that are capable of LAN-free data movement, you can issue the VALIDATE LANFREE command on the server. For details about this command, see the *Administrator's Reference*.

4. After you verify the registration and policy information for the nodes, you can place restrictions on when a node can use the LAN-free path. The node attributes **DATAWRITEPATH** and **DATAREADPATH** determine the restriction placed on the node:

   - To use only the LAN-free path on backup and archive operations, specify **DATAWRITEPATH** .

     Important: Backup and archive operations can fail if the LAN-free path is unavailable.

   - To use the LAN path on restore and retrieve operations, specify **DATAREADPATH** .

   For more information about commands and their attributes, see the *Administrator's Reference*.

Related tasks

"Configuring multiple clients to use the same storage agent" on page 50
You can configure two or more clients to use the same storage agent.

Chapter 3. Installing and configuring tape-library and file-device-sharing environments

The destination for LAN-free data can be tape media or sequential-access disk media. Configuration requirements vary depending upon the type of environment.

Before beginning this procedure:
* Make sure that you understand the overall installation and configuration process, which takes place on different systems at different times.
* Be sure that you have the information recorded in the configuration-information work sheets.

The major installation and configuration steps are:
1. "Establishing network connections"
2. Installing software on client systems:

   "Installing software on Windows client systems" on page 22
3. "Defining the storage agent and configuring devices on the server" on page 26
4. "Defining paths from the storage agent to drives" on page 30
5. "(z/OS data-manager server) Formatting volumes for LAN-free data movement" on page 32
6. "Verifying the LAN-free configuration" on page 33
7. "Determining whether the data movement was LAN-free" on page 34

Related tasks

"Setting up LAN-free data movement using the Administration Center wizard" on page 50
To set up LAN-free data movement on the server in tape-library and file-device-sharing environments, you can use the Enable LAN-free Data Movement wizard in the Administration Center.

Related reference

"Obtaining system configuration information for clients and servers" on page 14
To be more efficient, obtain client- and server-system information before installing and configuring the storage agent.

Establishing network connections

Tivoli Storage Manager for Storage Area Networks requires specific levels and models of hardware and software. You must ensure that your system meets these requirements.

To establish network connections:
1. Attach the server system and the client systems to the LAN and to the SAN along with appropriate storage devices.
2. Optional: If you are planning to use a storage agent with disk media, install IBM General Parallel File System, Tivoli SANergy, or IBM TotalStorage SAN File System on the applicable systems. Tivoli SANergy is included with the storage agent media.

Restriction: Use of the Tivoli SANergy components that are included with the IBM Tivoli Storage Manager the storage agent media is limited. You can use Tivoli SANergy components only for LAN-free backup and restore-to-disk operations in conjunction with your licensed use of the IBM Tivoli Storage Manager for Storage Area Networks product.

For details about TivoliSANergy, see the *IBM Tivoli SANergy Administrator's Guide*. For details levels and models of hardware and software, see http://www.ibm.com/software/sysmgmt/products/support/IBMTivoliStorageManager.html.

Related concepts

"File device sharing using Tivoli SANergy" on page 9
When Tivoli Storage Manager servers share access to disk storage, the environment contains a shared FILE device class and utilizes file-sharing software such as Tivoli SANergy.

Installing software on Windows client systems

The backup-archive client or the Tivoli Data Protection client software, the Tivoli Storage Manager API, and the storage agent are installed on client systems.

Perform the following tasks to install the software:
1. "Installing or upgrading the client and API"
2. "Installing and configuring the storage agent" on page 24

Related concepts

"Communications between the client, storage agent, and Tivoli Storage Manager server" on page 4
Configuration tasks link the storage agent, the client, and the Tivoli Storage Manager server.

Installing or upgrading the client and API

The client and API software must be at the appropriate level. Software configuration is required to enable communications.

Before beginning this procedure:
- Verify that the client system meets the prerequisites for client software.
- Be sure you have the information recorded in the configuration-information work sheets.

Additional information is available from the following sources:
- For details about the client-system prerequisites and about the files and file options described in this procedure, see the *Backup-Archive Clients Installation and User's Guide*.
- For details about client software and the API, see the Web site at http://www.ibm.com/software/sysmgmt/products/support/IBMTivoliStorageManager.html.
- For details about storage agent and backup-archive client compatibility, see the Web site at http://www.ibm.com/support/entdocview.wss?rs=663 &context=SSGSG7&q=5.1+os%2F390+supported+windows+clients+and+tsm &uid=swg21053218.

To install or upgrade the client and API software:

1. If the client software and the API are not already installed, install them now. To ensure software compatibility, check the Web site for Tivoli Storage Manager storage agent and backup-archive client compatibility. You can download the latest software levels from the Tivoli Storage Manager product support Web site.

   Remember: If you are using the storage agent to support multiple clients, install or upgrade the client and API software on each supported client.

2. Modify the dsm.opt client options file using the information that you collected in the configuration-information work sheets:

   a. Locate the options file and open it. The file can be located in one of several places, such as the installation directory, or in a location pointed to by an environment variable.

   b. Specify the communications method to be used between the client and server.

Table 11. Communications methods

To use this communication method...	Install this software...	To connect to these Tivoli Storage Manager servers...
TCP/IP	TCP/IP (Standard with all supported Windows platforms)	AIX, HP-UX, Linux, Solaris, Windows, z/OS
Shared memory	TCP/IP (Standard with all supported Windows platforms)	Windows
Named pipes	Named Pipes (Standard with all supported Windows platforms)	Windows

   For example:

   ```
   commmethod tcpip
   tcpserveraddress tsmsrver.example.com
   tcpport 1502
   ```

   The example uses a TCPPORT of 1502. However, the default TCPPORT is 1500.

   Keep the file open for the next step.

3. Activate the following options in the dsm.opt file. These options specify that the client will use SAN-attached devices, when the path is available, during backup, restore, archive, and retrieve processing.

   ```
   enablelanfree yes
   lanfreecommmethod tcpip
   lanfreetcpserveraddress test.example.com
   lanfreetcpport 1500
   ```

   or

   ```
   enablelanfree yes
   lanfreecoommmethod sharedmem
   lanfreeshmport 1510
   ```

   or

   ```
   lanfreecommmethod namedpipes
   lanfreeport \\hostname\\pipename
   ```

4. If you are using a data protection application client, configure the API:

   a. Download the latest Tivoli Storage Manager Windows backup-archive client and the associated bat file from the product support Web site.

b. Run the bat file to unzip the files, and follow the directions to begin the installation procedure.

c. From the Setup Type window, click **Custom**.

d. From the Select Components window, select **Client Files → Change**.

e. Select **API Client Runtime Files** and deselect the other components. To ensure software compatibility, check the Web site for Tivoli Storage Manager server (storage agent) and backup-archive client compatibility.

f. Ensure that the installation directory you specify is the same directory where the existing API is located.

Related reference

"Client-system and server-system configuration work sheets" on page 14
Work sheets help organize the information that you need to configure the storage agent for LAN-free data movement.

Installing and configuring the storage agent

The storage agent must be installed on a client system that has connections to storage resources on the SAN.

Before beginning this procedure:

- Verify that your system meets the hardware and software requirements.
- Be sure that you have the information recorded in the configuration-information work sheets.
- Close all existing Tivoli Storage Manager products prior to installing the storage agent. Installation will stop if an active Tivoli Storage Manager process is detected. If this occurs, close all active Tivoli Storage Manager products and retry installing the storage agent.

For a list of devices supported by the Tivoli Storage Manager SCSI device driver, see the Web site at http://www.ibm.com/software/sysmgmt/products/support/IBMTivoliStorageManager.html.

To reduce workload and processing time and to optimize LAN-free performance, do not install the storage agent and the Tivoli Storage Manager server on the same system.

To install and configure the storage agent:

1. Insert the Tivoli Storage Manager for Storage Area Networks CD in the drive of the client system. Follow instructions on the screen to install the storage agent.

2. Ensure that the DEVCONFIG option is specified in the dsmsta.opt file. For example, for a device configuration file named devconfig.out located in c:\program files\tivoli\tsm\storageagent, edit the dsmsta.opt file and enter the following line: `devconfig devconfig.out`

3. Use the information that you collected in the configuration-information work sheets to issue the DSMSTA SETSTORAGESERVER command. For example:

```
dsmsta setstorageserver myname=storagnt mypassword=fun4me
myhladdress=agent.example.com
servername=tsmsrver serverpassword=not4u
 hladdress=tsmsrver.example.com lladdress=1502
```

The HLADDRESS must match the TCPSERVERADDRESS located in the dsm.sys file on the Tivoli Storage Manager client. When configuring the storage agent using the DSMSTA SETSTORAGESERVER command, use addresses that correspond to the communications method used by the backup-archive client.

The backup-archive client supports either IPv4 (**COMMMETHOD TCPIP**) or IPv6 (**COMMMETHOD V6TCPIP**), but not both at the same time. The command generates the following lines in the device configuration file for the storage agent:

```
set staname storagnt
set stapassword xxxxxxx
set stahladdress agent.example.com
define server tsmsrver serverpassword=xxxxxxxxxxx
  hladdress=tsmsrver.example.com lladdress=1502
```

The passwords (shown as *xxxxxxxxxx*) are encrypted in the file.

The command also generates the following line in the dsmsta.opt file:

```
servername tsmsrver
```

The options file for the storage agent (dsmsta.opt) is created in the path c:\program files\tivoli\tsm\storageagent.

Related tasks

"Configuring TSMSCSI.EXE for Windows Server 2003 and Windows Server 2008" on page 48
When you are running Tivoli Storage Manager on a Windows Server 2003 or Windows Server 2008 and using non-IBM devices, you must install an IBM Tivoli Storage Manager driver. You must also manually update the controlling driver for each device that you want to control with TSMSCSI.EXE.

Related reference

"System requirements" on page 12
Tivoli Storage Manager for Storage Area Networks requires specific levels of hardware and software.

"Client-system and server-system configuration work sheets" on page 14
Work sheets help organize the information that you need to configure the storage agent for LAN-free data movement.

"The storage agent options file" on page 52
The storage agent options file contains the name of the server with which the storage agent communicates, along with other options. Normally, you do not need to make any changes to the options file unless your Tivoli Storage Manager server changes.

"The device configuration file for the storage agent" on page 56
The device configuration file for the storage agent includes information about the storage agent and about the Tivoli Storage Manager server with which the storage agent communicates and that is managing the SAN-attached libraries and drives that the storage agent uses.

"DSMSTA SETSTORAGESERVER" on page 50
Use the DSMSTA SETSTORAGESERVER command to initialize the storage agent and add communication information to the device configuration file and the storage agent options file dsmsta.opt.

Defining the storage agent and configuring devices on the server

To set up LAN-free communications on the Tivoli Storage Manager server, you must set up server-to-server communication, define storage agents to the server, configure SAN drives, set the LAN-free destination storage pool, and confirm node registration and configuration.

Before beginning this procedure, be sure that you have the information recorded in the configuration-information work sheets.

Note: The Tivoli Storage Manager server console (Microsoft Management Console) provides a snapin that contains a storage agent configuration wizard. This wizard performs all of the manual steps listed here and allows you to skip to "Setting the LAN-free destination" on page 29. For additional information, see the Tivoli Storage Manager server console online help.

Perform these tasks to define the storage agent and configure devices on the server:

1. "Setting up server-to-server communication"
2. "Defining storage agents to the Tivoli Storage Manager server" on page 27
3. "Configuring SAN drives" on page 27
4. "Setting the LAN-free destination" on page 29
5. "Confirming client node registration and configuration" on page 29

Related concepts

"Communications between the client, storage agent, and Tivoli Storage Manager server" on page 4
Configuration tasks link the storage agent, the client, and the Tivoli Storage Manager server.

Related reference

"Obtaining system configuration information for clients and servers" on page 14
To be more efficient, obtain client- and server-system information before installing and configuring the storage agent.

Setting up server-to-server communication

Server-to-server communication is required for Tivoli Storage Manager servers and storage agents to share library devices on a SAN.

To set up server-to-server communication, issue the following commands on the Tivoli Storage Manager server. Replace the example values with values from the configuration-information work sheet.

```
set servername tsmsrver
set serverpassword not4u
set serverhladdress tsmsrver.example.com
set serverlladdress 1502
```

These commands establish the server's name, password, TCP/IP address, and port.

Verify that the password has been set for the server by issuing the QUERY STATUS command from a Tivoli Storage Manager administrative command line. The value of the Server Password Set field in the command output must equal YES.

Defining storage agents to the Tivoli Storage Manager server

For each client the will use LAN-free data transfer, you must define the client's storage agent to the server as if the storage agent is another server.

To define the storage agent, issue the DEFINE SERVER command from the Tivoli Storage Manager server (library manager or library client) that will manage the client's data. Use the same name and password that you specified for the storage agent when you installed it on the client system.

```
define server storagnt serverpassword=fun4me
hladdress=agent.tucson.ibm.com lladdress=1500
```

If the library to be used for LAN-free data movement is a Tivoli Storage Manager shared library and the data manager server is a library client, then you must define the storage agent to the library manager as well as the library client. The storage agent needs to be able to contact the library manager directly when making mount requests. If the storage agent is only defined to the library client, it will attempt to use information from the library client to define itself to the library manager. If the storage agent is unable to define itself to the library manager, then you must define the storage agent manually using the DEFINE SERVER command issued from the library manager.

To verify that the storage agent is defined to the library manager, issue the following command from the library manager server:

```
query server server_name format=detailed
```

Important: If the library manager server is different than the library client server that hosts the storage agent, define the storage agent as a server on both the library manager server and the library client server.

Configuring SAN drives

Drive-configuration requirements vary depending on whether you are using tape devices or disk devices.

Configuring tape drives

Configuration requirements vary depending on whether you are connecting the storage agent to a library manager or to a library client.

- To connect the storage agent to a library manager:
  1. Define a shared ACSLS, SCSI, or 3494 library using the SHARED=YES option.
  2. Define paths to the library using the DEFINE PATH command on the server.
  3. Define drives that are associated with the library.
  4. Define paths to the drives using the DEFINE PATH command on the server.
  5. Define the device class.
  6. Define the storage pool.

  When using a shared ACSLS library, the library manager must be a Tivoli Storage Manager server on AIX, HP-UX, Linux, Solaris, or Windows.

  Running the DSMMAXSG utility increases the maximum transfer length for Host Bus Adapters (HBAs) and, consequently, the block size used by the Tivoli Storage Manager server for writing data to and getting data from certain types of tape drives. With this utility, the maximum supported block size is 256 KB. Depending on your system environment, the increase in block size could

improve the rate at which Tivoli Storage Manager processes data for backups and restores and for archives and retrieves. However, the utility does not affect the generation of backup sets.

The only supported tape drives are those that are attached to SCSI or Fibre Channel HBAs and that have the following device types:

– 3570
– 3590
– 3592
– 8MM_SAIT
– DLT
– DTF
– ECARTRIDGE
– LTO

Normally, the DSMMAXSG utility runs automatically as part of the Tivoli Storage Manager server and storage agent installation. However, if you install a new HBA on your system after server or storage agent installation or if you install a new version of an existing HBA device driver that resets the value of the maximum transfer size, you must run the utility manually in order to take advantage of the larger block size. To run the utility, enter the command:

`dsmmaxsg`

When you run this utility, it modifies one registry key for every HBA driver on your system. The name of the key is MaximumSGList.

Important: If data is backed up or archived to tape using the 256 KB block size, the tape cannot be appended to or read from using an HBA that does not support the 256 KB block size. For example, if you use a 256 KB Windows system for backing up client data to the Tivoli Storage Manager server, you cannot restore the data using a Windows system that supports a different transfer length. You need to install an HBA that supports 256 KB transfers.

* To connect the storage agent to a library client:
    1. On the library manager, complete step 1 on page 27 through step 5 on page 27.
    2. On the library client:
        a. Define a shared ACSLS, SCSI, or 3494 library using a library type of shared (LIBTYPE=SHARED).
        b. Define the device class.
        c. Define the storage pool.

Configuring disk drives

A FILE (sequential-access disk) device class is required for disk drives.

To configure disk drives:

1. Configure server-to-server communication.
2. Define a device class of DEVTYPE=FILE and SHARED=YES. Tivoli Storage Manager automatically defines a new FILE library and also defines drives corresponding to the mount limit for the FILE device class. The FILE library name is the same as the device class name. Each drive uses the library name with a numeric suffix. If the mount limit is changed, the number of drives also changes.

Each session gets exclusive access to a file volume. To optimize performance, match the mount limit to the number of volumes.

Setting the LAN-free destination

The destination for data must be a LAN-free capable storage pool

To set a LAN-free destination:

1. Define a copy group with its destination being the LAN-free capable storage pool that you created when you configured the SAN drives. For example:

   ```
   define copygroup sandirect sandirectpolicy sandirectdefmft
   type=backup destination=storage_pool_name
   ```

   Note: If you are using a hierarchical storage management (HSM) client configured for LAN-free data movement, set the management class (not the copy group) to a LAN-free capable storage pool.

2. Activate the policy set. For example:

   ```
   activate policyset sandirect sandirectpolicy
   ```

For details about changing policy for clients that can use SAN drives, see the *Administrator's Guide*. For details about commands, see the *Administrator's Reference*.

Remember: If you decide not to use the default management class for the SAN drives, you need to create a new management class. Clients that use SAN drives need an include statement to bind their files to the new management class. For details about the include-exclude list, see the *Backup-Archive Clients Installation and User's Guide*.

Confirming client node registration and configuration

Client nodes must be registered and configured for LAN-free backups.

To verify that node settings are correct, issue the following command:

```
query node node_name format=detailed
```

If node settings are not correct, issue the UPDATE NODE command to adjust the settings. If the node was not registered and configured for LAN-free backups, register the node with the REGISTER NODE command.

To improve performance of your LAN and SAN resources for LAN-free data movement, you can control the path that data transfers take for each LAN-free capable client. Use the REGISTER NODE and UPDATE NODE commands to specify whether data read/write operations use the LAN path only, the LAN-free path only, or either path.

If the node belongs to a multi-threaded client and there are drives available, the **MAXNUMMP** parameter might restrict the number of drives that are available for the storage agent to use on behalf of the client. Specify the **MAXNUMMP** parameter on the REGISTER NODE or UPDATE NODE command.

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

Defining paths from the storage agent to drives

Paths allow a client, by means of a storage agent, access to the library drives that are available to the Tivoli Storage Manager server. Path-definition requirements depend on the type of device that you are using.

Remember: If your environment is using disk devices, verify that the storage agent has root authority access to the file system, configuration, and test-system access permissions.

The result of completing this step is shown in Figure 8.

Tivoli Storage Manager Client Workstation

```
Storage Agent
    device name: mt3.0.1.0
```

SAN

```
Tape Library Drive
```

Tivoli Storage Manager Server - TSMSRVER

```
define drive sanlib1 drive1
define path tsmsrver drive1 srctype=server
    destype=drive library=sanlib1 device=mt5.0.1.0
define path storagnt drive1 srctype=server
    destype=drive library=sanlib1 device=mt3.0.1.0
```
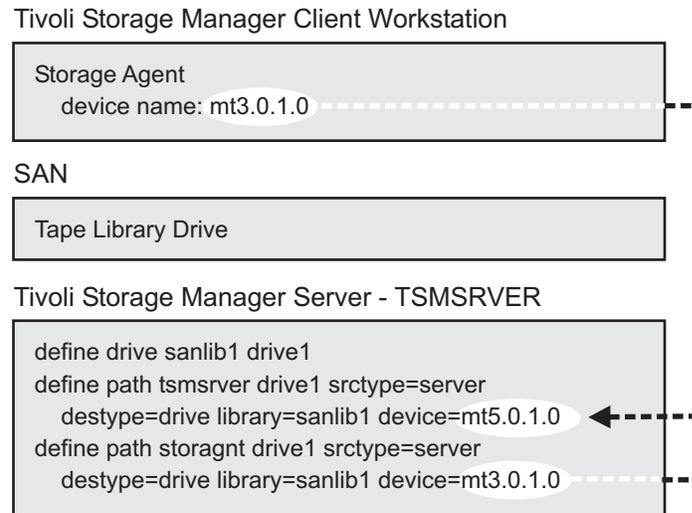
Figure 8. Device information

Before you begin defining paths to your SAN drives, consider the following guidelines:

- If you have not already done so, obtain the names of your tape or disk devices. If you are configuring tape devices, review the device names. The name of a tape device as known to the server will probably not match the name of the same tape device as known to the storage agent.
- You must define paths on the library manager from the storage agent to each drive that the storage agent will access. In addition, you must define a path from the library manager to each drive so that the storage agent can use the drive.

For information about defining paths, see the following topics:
- "Defining paths for tape devices" on page 31
- "Defining paths for tape devices" on page 31

Related tasks

"Obtaining device information" on page 17
You can obtain tape-device and disk-device information from the system where the storage agent is installed.

Defining paths for tape devices

You must define paths on the Tivoli Storage Manager server using the device names as identified by the storage agent on each client system.

To define paths, issue the DEFINE PATH command on the Tivoli Storage Manager server designated as the library manager. For example:

```
define path storagnt drive1 srctype=server desttype=drive
 library=sanlib1 device=mt3.0.1.0
```

Be sure that the device names are what the storage agent identifies on each client system. For the same tape device, the device name as known to the server will probably not match the device name as known to the storage agent. Failures can occur if incorrect device information is provided in the DEFINE PATH command. For details about this command, see the *Administrator's Reference*.

Depending on the operating system of the Tivoli Storage Manager server, there might not be a quick way to confirm which device names on the storage agent correspond to device names on the Tivoli Storage Manager server without using a trial-and-error method.

To confirm device names, work with one online drive at a time, and cycle through the storage agent device names until you can run a successful backup. The server cannot validate path information that is provided on the server for use by the storage agent.

When defining paths on the server, you can specify AUTODETECT=YES to automatically update the serial number for a drive or library in the database. The updated serial number is the same serial number that the drive reports to Tivoli Storage Manager. After completing a backup to verify LAN-free configuration, you can issue the QUERY DRIVE command to determine the device name from the storage agent.

For a review of the results of the steps that you have just completed, see:

Figure 8 on page 30

Related tasks

"Verifying the LAN-free configuration" on page 33
To ensure LAN-free data movement, you must verify that the hardware and software components are configured correctly.

Defining paths for disk devices

You must define paths on the Tivoli Storage Manager server using the disk device names as seen by the storage agent on each client system.

For example, suppose the directory d:\tsmdata\server1 is available on SAN hardware. On the storage agent, the directory is accessed through SANergy as \\192.168.1.10\tsmdata\server1. Issue the DEFINE PATH command to create the path for this scenario.

In the following example, disklib1 represents the destination file drive in the disk library named disklib:

```
define path storagnt disklib1 srctype=server desttype=drive library=disklib
device=file directory=\\192.168.1.10\d\tsmdata\server1\fs1,\\192.168.1.10\
tsmdata\server1
```

Recommendation: Make each directory correspond to a file system on a separate physical drive. The server cannot validate PATH information that is provided on

the server for use by the storage agent. Failures can occur if incorrect device information is provided in the DEFINE PATH command.

If you specify multiple directories for the device class associated with the FILE library, you must specify the same number of directories for each path to the FILE library. To keep the device class and path synchronized, do not change or move existing directories on the server that the storage agent is using. Adding directories is permitted. Specifying a mismatched number of directories can cause a runtime failure. For more information, see the *Administrator's Guide*.

To help ensure that your configuration is valid for sharing the FILE library between the server and storage agent, use a universal naming convention (UNC) name. A UNC name lets you associate the directory with a particular physical drive. If the storage agent lacks permission to access remote storage, the storage agent will experience mount failures.

The account associated with the storage agent service must be either an account within the local administrator's group or an account within the domain administrator's group. If the account is in the local administrator's group, the user ID and password must match that of an account with permissions to access storage, as provided by the system that administers the remote share. For example, if a SAMBA server is providing access to remote storage, the user ID and password in the SAMBA configuration must match that of the local administrator user ID and password associated with the storage agent service.

In the following example, the DEFINE DEVCLASS command establishes the shared file system in the directory accessed by the server as D:\FILEDIR\DIR1. However, the storage agent uses UNC name \\192.168.1.10\FILEDIR\DIR1:

```
define devclass file devtype=file shared=yes mountlimit=1 directory=d:\filedir\dir1

define path sta1 file1 srctype=server desttype=drive library=file1
   device=file directory=\\192.168.1.10\d\filedir\dir1
```

The system with TCP/IP address 192.168.1.10 is sharing the same directory using FILEDIR as the shared name. Also, the storage agent service has an account that can access this storage. You can replace 192.168.1.10 with a symbolic name. For example: example.yourcompany.com.

For details about the DEFINE PATH command, see the *Administrator's Reference*.

(z/OS data-manager server) Formatting volumes for LAN-free data movement

If you are using the z/OS data manager server, LAN-free sessions to sequential-access storage pools will fail if the pools do not contain any formatted volumes and do not allow automatic formatting.

Format volumes before using them in sequential-access storage pools that support LAN-free data movement. For information about how to format volumes, see the FORMAT LFVOLUME command in the z/OS *Administrator's Reference*.

Verifying the LAN-free configuration

To ensure LAN-free data movement, you must verify that the hardware and software components are configured correctly.

Before beginning this procedure, verify that the server is online and running.

To verify LAN-free configuration:

1. Start the storage agent:
   a. Restart the client system.
   b. Open the Tivoli Storage Manager Console and click the storage agent icon.
   c. Click the **Start** icon.

   When the storage agent starts, it contacts all available shared libraries, including those libraries that do not have a defined path defined. As a result, a delay might occur during startup processing. The storage agent also determines if the Tivoli Storage Manager server is a library client or library manager. If the server is a library client, the storage agent attempts to define itself to the library manager if it is not known to the library manager.

2. Specify the DISPLAYLFINFO=YES option in your server options file. Doing so allows the accounting records and summary table entries to report the storage agent name.

   Important: This option might cause existing outboard automation that relies on the summary table or accounting records to fail to recognize some activities for a given client. Before setting this option, consider how this outcome might affect your environment.

3. To determine which destinations for a node are capable of LAN-free data movement, issue the VALIDATE LANFREE command. The output of this command also provides explanations about destinations that are not LAN-free capable. Use this information to correct your configuration before proceeding to the next step.

4. Run a backup operation from the client.

5. If you receive a message indicating that the backup failed, verify the following:

   - The Tivoli Storage Manager server is running. If the Tivoli Storage Manager server is not running, the storage agent will not start.
   - The client, storage agent, and server are communicating with each other as expected.
   - The device driver on the storage agent is running.
   - The paths to the drives are correctly defined.
   - All drives in a library have defined paths from the server.

   If you retry the backup operation after the first failure, the client attempts to use the LAN connection for data movement. To force LAN-free data movement, stop and restart the client.

Determining whether the data movement was LAN-free

Messages and backup reports can indicate whether LAN-free operations are successful. You can also use the QUERY SESSION and QUERY ACTLOG commands to verify LAN-free operations.

Use one or more of the following methods to determine whether the data movement was LAN-free:

- When data transfers on a LAN-free path, the following message displays informing you that the client is starting a session with the storage agent and that LAN-free data movement occurred:

  ANR0415I Session *session_number* proxied by *storage_agent_name* for node *your_node_name*

- View the backup report issued when backup processing completes. If LAN-free data movement occurred, the number of LAN-free bytes that are transferred is greater than zero.

- Verify that the proper sessions have been established and that LAN-free data movement is occurring:

  1. Using a Tivoli Storage Manager administrative command-line client, log in to the storage agent and the Tivoli Storage Manager server.
  2. Issue the QUERY SESSION command for the node that is running the LAN-free backup. In the command output, look for information about bytes sent and bytes received. If LAN-free data movement is occurring:

     – Querying a session on the storage agent shows bytes received for the node increasing to the total amount of data being backed up.

     – Querying a session on the Tivoli Storage Manager server shows a very small number of bytes of metadata received for the same node.

  If the node's session has these characteristics, the data movement is LAN-free.

  Tip: During a failover when the storage agent is sending data directly to the server by proxy because it cannot store the data directly, the session statistics on the server show a much higher byte count.

- Issue either of the following QUERY ACTLOG commands on the server to which the client is connected:

  – query actlog search=*storage_agent_name* msgno=8337
  – query actlog search=*storage_agent_name*

  If the query locates entries in the activity log that relate to the storage agent, the client is using LAN-free data transfer.

Chapter 4. Installing and configuring external library environments

An external library is controlled by software acquired from another vendor, such as Sun StorageTek ACSLS software. To use the drives in the external library, the Tivoli Storage Manager server (storage agent) acts as a client application to the software.

Before beginning this procedure:

- Make sure that you understand the overall installation and configuration process because it takes place on different systems at different times.
- Be sure that you have the information recorded in the configuration-information work sheets.
- Obtain an external library manager capable of exploiting the external library interface, for example, IBM Integrated Removable Media Manager. For details about interfaces, see the *Administrator's Guide*.
- If you plan to use ACSLS, you must install Sun StorageTek Library Attach software.
- You can use the Sun StorageTek LibraryStation to manage the environment instead of ACSLS. However, if you are using a z/OS data manager server, Sun StorageTek LibraryStation is required.

  Restriction: A Tivoli Storage Manager server defined as a library manager requires installation of the latest version of Sun StorageTek Library Attach software.

The major installation and configuration steps are:

1. "Establishing network connections" on page 36
2. Installing software on client systems:

   "Installing software on Windows client systems" on page 36
3. "Defining the storage agent and configuring devices on the server" on page 39
4. "Verifying the LAN-free configuration" on page 43
5. "Determining whether the data movement was LAN-free" on page 44

Related concepts

"External Libraries" on page 10
If Tivoli Storage Manager native library (SCSI, 3494, and ACSLS) support cannot be used, the alternative is to configure external library support.

Related reference

"Obtaining system configuration information for clients and servers" on page 14
To be more efficient, obtain client- and server-system information before installing and configuring the storage agent.

Establishing network connections

Tivoli Storage Manager for Storage Area Networks requires specific levels and models of hardware and software. You must ensure that your system meets these requirements.

To establish network connections, attach the server system and the client systems to the LAN and to the SAN along with appropriate storage devices. For details levels and models of hardware and software, see http://www.ibm.com/software/sysmgmt/products/support/IBMTivoliStorageManager.html.

Installing software on Windows client systems

The backup-archive client or the Tivoli Data Protection client software, the Tivoli Storage Manager API, and the storage agent are installed on client systems.

Perform the following tasks to install the software:
1. "Installing or upgrading the client and API"
2. "Installing and configuring the storage agent (Windows)" on page 38

Related concepts

"Communications between the client, storage agent, and Tivoli Storage Manager server" on page 4
Configuration tasks link the storage agent, the client, and the Tivoli Storage Manager server.

Installing or upgrading the client and API

The client and API software must be at the appropriate level. Software configuration is required to enable communications.

Before beginning this procedure:
- Verify that the client system meets the prerequisites for client software.
- Be sure you have the information recorded in the configuration-information work sheets.

Additional information is available from the following sources:
- For details about the client-system prerequisites and about the files and file options described in this procedure, see the *Backup-Archive Clients Installation and User's Guide*.
- For details about client software and the API, see the Web site at http://www.ibm.com/software/sysmgmt/products/support/IBMTivoliStorageManager.html.
- For details about storage agent and backup-archive client compatibility, see the Web site at http://www.ibm.com/support/entdocview.wss?rs=663 &context=SSGSG7&q=5.1+os%2F390+supported+windows+clients+and+tsm &uid=swg21053218.

To install or upgrade the client and API software:
1. If the client software and the API are not already installed, install them now. To ensure software compatibility, check the Web site for Tivoli Storage Manager storage agent and backup-archive client compatibility. You can download the latest software levels from the Tivoli Storage Manager product support Web site.

Remember: If you are using the storage agent to support multiple clients, install or upgrade the client and API software on each supported client.

2. Modify the dsm.opt client options file:

   a. Locate the options file and open it. The file can be in one of several places, such as the installation directory, or in a location pointed to by an environment variable.

   b. Specify the communications method between the Tivoli Storage Manager client and server. For example:

   ```
   COMMmethod tcpip
   TCPServeraddress tsmsrver.example.com
   TCPPport 1502
   ```

   The example uses a TCPPORT of 1502. However, the default TCPPORT is 1500.

   Keep the file open for the next step.

   c. Add options to specify that the client will use SAN-attached devices when a LAN-free path is available during backup, restore, archive, and retrieve processing.

   Add the options to the dsm.opt file.

   ```
   enablelanfree yes
   LANFREECommmethod tcpip
   LANFREETCPPORT 1500
   ```

   or

   ```
   LANFREECommmethod sharedmem
   LANFREESHMPORT 1510
   ```

   or

   ```
   LANFREECommmethod namedpipes
   LANFREEPort \\hostname\\pipename
   ```

3. If you are using a data protection application client, configure the API:

   a. Download the Tivoli Storage Manager Version 5.4 (or later) Windows backup-archive client and the associated .bat file from the Tivoli Storage Manager support site.

   b. Run the .bat file to extract the files, and follow the directions to begin the installation procedure.

   c. From the Setup Type window, click **Custom**.

   d. From the Select Components window, select **Client Files → Change**.

   e. Select **API Client Runtime Files** and deselect the other components. To ensure software compatibility, check the Web site for Tivoli Storage Manager server (storage agent) and backup-archive client compatibility.

   f. Ensure that the installation directory that you specify is the same directory where the existing API resides.

Related reference

"Obtaining system configuration information for clients and servers" on page 14
To be more efficient, obtain client- and server-system information before installing and configuring the storage agent.

Installing and configuring the storage agent (Windows)

The storage agent must be installed on a client system that has connections to storage resources on the SAN.

Before beginning this procedure:

- Verify that your system meets the hardware and software requirements.
- Be sure that you have the information recorded in the configuration-information work sheets.

To reduce workload and processing time and to optimize LAN-free performance, do not install the storage agent and the Tivoli Storage Manager server on the same system.

To install and configure the storage agent:

1. Insert the Tivoli Storage Manager for Storage Area Networks CD in the drive of the client system. Follow instructions on the screen to install the storage agent.
2. Ensure that the DEVCONFIG option is specified in the dsmsta.opt file. For example, for a device configuration file named devconfig.out located in c:\program files\tivoli\tsm\storageagent, edit the dsmsta.opt file and enter the following line: `devconfig devconfig.out`
3. Use the information that you collected in the configuration-information worksheets to issue the DSMSTA SETSTORAGESERVER command. For example:

   ```
   dsmsta setstorageserver myname=storagnt mypassword=fun4me
   myhladdress=agent.example.com
   servername=tsmsrver serverpassword=not4u
   hladdress=tsmsrver.example.com lladdress=1502
   ```

   When configuring the storage agent using the DSMSTA SETSTORAGESERVER command, use addresses that correspond to the communications method used by the backup-archive client. The backup-archive client supports either IPv4 (**COMMMETHOD TCPIP**) or IPv6 (**COMMMETHOD V6TCPIP**), but not both at the same time. The command generates the following lines in the device configuration file for the storage agent:

   ```
   set staname storagnt
   set stapassword xxxxx
   set stahladdress agent.example.com
   define server tsmsrver serverpassword=xxxxx
    hladdress=tsmsrver.example.com lladdress=1502
   ```

   The passwords (shown here as *xxxxxxxx*) are encrypted in the file. Save the file to the same directory as the executable and close it.

   The command also generates the following line in the dsmsta.opt file:
   ```
   servername tsmsrver
   ```
4. Optional: If you want the storage agent to run as a Windows service, use the install.exe utility located in the console subdirectory of the product installation. Issue the following command:

   ```
   install "TSM StorageAgentx" "C:\Program Files\Tivoli\TSM\
       storageagent\dstasvc.exe" LocalSystem
   ```

   where *x* is a value from 1 to 4. The Tivoli Storage Manager storage agent service must follow the "TSM StorageAgent*x*" naming convention.

   If you need to change the Tivoli Storage Manager storage agent service name, remove and then reinstall the service using a Tivoli Storage Manager storage

agent service name with the correct format. Use the remove.exe and install.exe
utilities located in the console subdirectory. For example:

```
remove "TSM Storage Agent"
install "TSM StorageAgent1" "C:\Program Files\Tivoli\TSM\
    storageagent\dstasvc.exe" LocalSystem
```

For information about the install.exe and remove.exe utilities, type INSTALL or
REMOVE from a command prompt while in the storage agent directory.

The results of the installation are:
- The software is installed
- The options file for the storage agent (dsmsta.opt) is created in the path
  c:\program files\tivoli\tsm\storageagent.

Related reference

"Obtaining system configuration information for clients and servers" on page 14
To be more efficient, obtain client- and server-system information before installing
and configuring the storage agent.

"The storage agent options file" on page 52
The storage agent options file contains the name of the server with which the
storage agent communicates, along with other options. Normally, you do not need
to make any changes to the options file unless your Tivoli Storage Manager server
changes.

"The device configuration file for the storage agent" on page 56
The device configuration file for the storage agent includes information about the
storage agent and about the Tivoli Storage Manager server with which the storage
agent communicates and that is managing the SAN-attached libraries and drives
that the storage agent uses.

Defining the storage agent and configuring devices on the server

To set up LAN-free communications on the Tivoli Storage Manager server, you
need to set up server-to-server communication, define the client's storage agent to
the server, and configure the paths to the library.

Before beginning this procedure, be sure that you have the information recorded in
the configuration-information work sheets.

Perform these tasks to define the storage agent and configure devices on the
server:
1. "Setting up server-to-server communication" on page 40
2. "Installing an external media manager" on page 40
3. "Defining storage agents to the Tivoli Storage Manager server" on page 40
4. "Configuring a path to the library manager" on page 41
5. "Defining paths for ACSLS" on page 42
6. "Setting the LAN-free destination" on page 42
7. "Confirming client node registration and configuration" on page 43

Related concepts

"Communications between the client, storage agent, and Tivoli Storage Manager
server" on page 4
Configuration tasks link the storage agent, the client, and the Tivoli Storage
Manager server.

Setting up server-to-server communication

Server-to-server communication is required for Tivoli Storage Manager servers and storage agents to share library devices on a SAN

To set up server-to-server communication, issue the following commands on the Tivoli Storage Manager server. Replace the values in the example with values from the configuration-information work sheet.

```
set servername tsmsrver
set serverpassword not4u
set serverhladdress tsmsrver.example.com
set serverlladdress 1502
set crossdefine on
```

These commands establish the server's name, password, TCP/IP address, and port. They also allow other servers to define a connection on this server.

Verify that the password has been set for the server by issuing the QUERY STATUS command from a Tivoli Storage Manager administrative command line. The value of the Server Password Set field in the command output must be YES.

For details about server-to-server communication, see the *Administrator's Guide*.

Installing an external media manager

If you are using an ACSLS-managed external library, install middleware (for example, IBM Integrated Removable Media Manager) that enables an external library. For installation information, see the product's documentation.

Defining storage agents to the Tivoli Storage Manager server

For each client the will use LAN-free data transfer, define a storage agent to the server as if the storage agent is another server.

To define the storage agent, issue the DEFINE SERVER command from the Tivoli Storage Manager server that will manage the client's data. Use the same name and password that you specified for the storage agent when you installed it on the client system, for example,

```
define server storagnt serverpassword=fun4me
   hladdress=agent.tucson.ibm.com lladdress=1500 validateprotocol=all
```

The **VALIDATEPROTOCOL** parameter in the example is optional. This parameter specifies whether a cyclic redundancy check will be performed to validate data on all metadata transferred between the storage agent and the Tivoli Storage Manager server.
For details about data validation, see the *Administrator's Guide*. For details about the DEFINE SERVER command, see the *Administrator's Reference*.

You must also define the storage agent to the library manager. The storage agent needs to be able to contact the library manager directly when making mount requests. If the storage agent is only defined to the library client, it will attempt to use information from the client to define itself to the library manager. If the storage agent is unable to define itself to the library manager, then you must define the storage agent manually using the DEFINE SERVER command issued from the library manager, for example,

```
define server storagnt serverpassword=fun4me
   hladdress=agent.tucson.ibm.com lladdress=1500
```

Configuring a path to the library manager

Configure a path to the library manager.

The procedure for configuring a path to the library manager depends on whether you are using a shared ACSLS library manager or an ACSLS-managed external library.

- If you are using a shared ACSLS library manager, configure a path to the library manager:
  1. Define a library type of ACSLS. For example:

     ```
     define library libmgr1 libtype=ACSLS shared=YES
     primarymanager=tsmsrvr
     ```
  2. Define a path from the server to the library manager. For example:

     ```
     define path tsmsrver libmgr1 srctype=server desttype=library
     ```
  3. Define a device class with a device type of SERVER. For example:

     ```
     define devclass device_class_name library=libmgr1
      devtype=server servername=tsmsrvr
     ```
  4. Define the storage pool. For example:

     ```
     define stgpool pool_name device_class_name pooltype=primary
     ```
- If you are using an ACSLS-managed external library, configure a path to the external library manager.
  1. Define a library type of EXTERNAL. For example:

     ```
     define library stk-lib libtype=external
     ```

     If a library name remains constant but the library type changes from EXTERNAL to shared ACSLS, stop and restart the storage agent to register this change.
  2. Define a path from the server to the external media manager. For example:

     ```
     define path tsmsrver stk-lib srctype=server desttype=library
      externalmanager=path_name
     ```

     In the example, the path provided for the external manager depends on the operating system on which Tivoli Storage Manager server runs.
  3. Define a device class with a device type of ECARTRIDGE. For example:

     ```
     define devclass device_class_name library=library_name
      devtype=ecartridge format=drive
     ```

     If you are using Sun StorageTek 9840B tape devices with the z/OS data manager server, the value of the **FORMAT** parameter of the device class must match the device type of the tape drive (9840B).
  4. Define the storage pool. For example:

     ```
     define stgpool pool_name device_class_name pooltype=primary
     ```

Defining paths for ACSLS

If you are using a shared ACSLS library manager, you must define a path from the storage agent to the library manager. If you are using an ACSLS-managed external library, you must define a path from the storage agent to the external manager.

- To define a path for a shared ACSLS library manager, use the DEFINE PATH command. For example:

  ```
  define path storagnt libmgr1 srctype=server desttype=library
  ```

- To define a path for an ACSLS-managed external library, use the DEFINE PATH command and define a path to the external media manager. For example:

  ```
  define path storagnt stk-lib srctype=server desttype=library
    externalmediamanager=path_name
  ```

For details about the DEFINE PATH command, see the *Administrator's Reference*.

Setting the LAN-free destination

The destination for data must be a LAN-free capable storage pool.

To set a LAN-free destination:

1. Define a copy group with its destination being the LAN-free capable storage pool (You created this storage pool as part of the procedure of configuring a path to the library manager.) For example,

   ```
   define copygroup sandirect sandirectpolicy sandirectdefmft
     type=backup destination=storage_pool_name
   ```

2. Activate the policy set, for example,

   ```
   activate policyset sandirect sandirectpolicy
   ```

For details about changing policy for clients that can use SAN drives, see the *Administrator's Guide*. For details about the commands, see the *Administrator's Reference*.

Remember:

- If you decide not to use the default management class for the SAN drives, create a new management class. Clients that use the SAN drives need an include statement to bind their files to this new management class. For details about the include-exclude list, see the *Backup-Archive Clients Installation and User's Guide*.
- With a hierarchical storage management (HSM) client configured for LAN-free data movement, the management class (not the copy group) is set to a LAN-free capable storage pool.

Related tasks

"Configuring a path to the library manager" on page 41
Configure a path to the library manager.

Confirming client node registration and configuration

Client nodes must be registered and configured for LAN-free backups.

To verify that node settings are correct, issue the following command:

```
query node node_name format=detailed
```

If node settings are not correct, issue the UPDATE NODE command to adjust settings for the node. If the node has not been registered and configured for LAN-free backups, register the node with the REGISTER NODE command.

To help tune the use of your LAN and SAN resources for LAN-free data movement, you can control the path that data transfers take for clients that have LAN-free data movement capability. For each client, you can select whether data read/write operations use the LAN path, the LAN-free path, or either path. You can specify these settings with the REGISTER NODE and UPDATE NODE commands.

If the node belongs to a multi-threaded client and there are drives available, the MAXNUMMP parameter might restrict the number of drives that are available for the storage agent to use on behalf of the client. Specify the MAXNUMMP parameter on the REGISTER NODE or UPDATE NODE command.

For details about commands, see the *Administrator's Reference*.

Verifying the LAN-free configuration

To ensure LAN-free data movement, you must verify that the hardware and software components are configured correctly.

Verifying the LAN-free configuration

Before beginning this procedure, ensure that the correct device driver is installed when you are running Tivoli Storage Manager on a Windows Server 2003 or Windows Server 2008 and using non-IBM devices:

	32–bit	64–bit
Windows Server 2003	TSMSCSI.SYS	TSMSCSI.SYS64
Windows Server 2008	TSMSCSI.SYS	TSMSCSI.SYS64

To verify the LAN-free configuration:
1. Start the storage agent:
   a. Restart the client system.
   b. Open the Tivoli Storage Manager Console and click the storage agent icon.
   c. Click the **Start** icon.
2. Run a backup operation from the client.
3. Log in to the Tivoli Storage Manager server and storage agent using a Tivoli Storage Manager administrative command-line client.
4. To verify that the backup is LAN-free and the proper sessions have been established, issue the QUERY SESSION command. In the command output, look for information about bytes sent and bytes received. If LAN-free data movement is occurring:

- Querying a session on the storage agent shows bytes received for the node increasing to the total amount of data being backed up.
- Querying a session on the Tivoli Storage Manager server shows a very small number of bytes (metadata) received for the same node.

If the node's session has these characteristics, and you receive a message stating that the backup was successful, you configured your system correctly.

There are several ways to use the QUERY SESSION command. If the process is running in the foreground, you can issue the command on the storage agent console. Alternatively, you can use a command-line client to connect to the storage agent on the administration port of the storage agent. Use the same administrator ID and password for this command as you use on the server.

5. If you receive a message saying that the backup has failed, ensure that the following conditions exist:
- The Tivoli Storage Manager server is running. If the Tivoli Storage Manager server is not running, the storage agent will not start.
- The client, storage agent, and server are communicating with each other as expected.
- The device driver on the storage agent is running.
- The mount and message is displayed on the storage agent console.

If you retry the backup operation after the first failure, the client attempts to use the LAN connection for data movement. To force LAN-free data movement, stop and restart the client.

Determining whether the data movement was LAN-free

Messages and backup reports can indicate whether LAN-free operations are successful. You can also use the QUERY SESSION and QUERY ACTLOG commands to verify LAN-free operations.

Determining whether the data movement was LAN-free

Messages and backup reports can indicate whether LAN-free operations are successful. You can also use the QUERY SESSION and QUERY ACTLOG commands to verify LAN-free operations.

To determine whether data movement is LAN-free, use one or both of the following methods:
- Monitor the QUERY SESSION output against the node that is running the LAN-free backup. Verify that the proper sessions have been established:
  1. Log in to the Tivoli Storage Manager server and storage agent using a Tivoli Storage Manager administrative command-line client.
  2. To verify that the backup is LAN-free and the proper sessions have been established, issue the QUERY SESSION command. In the command output, look for information about bytes sent and bytes received. If LAN-free data movement is occurring:
     - Querying a session on the storage agent shows bytes received for the node increasing to the total amount of data being backed up.
     - Querying a session on the Tivoli Storage Manager server shows a very small number of bytes (metadata) received for the same node.

If the node's session shows these characteristics, the data movement is LAN-free.

Remember: During a failover where the storage agent is sending data directly to the server by proxy because it cannot store the data directly, the QUERY SESSION statistics on the server show a much higher byte count.

* Issue either of the following QUERY ACTLOG commands on the server to which the client is connected:

```
query actlog search=storage_agent_name msgno=8337
query actlog search=storage_agent_name
```

If the query locates entries in the activity log that relate to the storage agent, the client is using LAN-free data transfer.

Appendix A. Administration and configuration information

You can start and stop the storage agent manually or automatically. You can also add communication information to the device configuration file and the storage agent options file.

Starting and stopping the storage agent

You can configure the storage agent to start automatically when the system restarts. You can also start and stop the storage agent manually.

Automating the storage agent startup

The storage agent configuration wizard lets you run the storage agent in background mode as a Windows service.

You can choose a logon account for the Tivoli Storage Manager storage agent service and specify whether the service starts manually or automatically. If you specify automatic start up, Windows starts the storage agent each time the system is rebooted.

To access the storage agent configuration wizard, use the Tivoli Storage Manager Console.

Manually starting and stopping the storage agent

You can start and stop the storage agent from the storage agent directory. You can also use an administrative client to issue commands supported by the storage agent.

To start the storage agent:
1. Restart the client system.
2. Open the Tivoli Storage Manager Console and click the **Storage Agent** icon.
3. Click **Start**.
4. From the operating system command line, change to the storage agent directory (the default is c:\program files\tivoli\tsm\storageagent) and issue the DSMSTA command.

To stop the storage agent:
1. Open the Tivoli Storage Manager Console and click the **Storage Agent** icon.
2. Click **Stop**.

In most cases it is not necessary to halt and restart a LAN-free storage agent to pick up changes from the data manager server. However, restarting the storage agent might be necessary if an attempt was made to change storage pool, library, device class, or drive information while LAN-free data movement was in process.

The effects on LAN-free storage pools resulting from an attempted change are not critical enough to create serious problems. The storage agent keeps a list of storage pools, libraries, and device classes in memory to determine potential LAN-free destinations. Target volume selection occurs on the data manager server.

Certain storage pool attributes can result in failed requests rather than the LAN failover by the storage agent. If the storage agent accurately identifies a LAN-free destination, the LAN-free operation will probably be successful. However, if the storage agent inaccurately identifies a LAN-free destination and the server is unable to process the request, the operation has advanced beyond the point when LAN failover occurs, and the storage agent request does not succeed. If this occurs, stop and restart the storage agent, and then retry the operation.

Configuring TSMSCSI.EXE for Windows Server 2003 and Windows Server 2008

When you are running Tivoli Storage Manager on a Windows Server 2003 or Windows Server 2008 and using non-IBM devices, you must install an IBM Tivoli Storage Manager driver. You must also manually update the controlling driver for each device that you want to control with TSMSCSI.EXE.

Remember: You do not need to configure TSMSCSI.EXE for IBM devices.

TSMSCSI.EXE is included in the storage agent package. The following table lists device driver names.

|	**32–bit**	**64–bit**
Windows Server 2003	TSMSCSI.SYS	TSMSCSI.SYS64
Windows Server 2008	TSMSCSI.SYS	TSMSCSI.SYS64

On the Windows Server 2003 Windows Server 2008, devices are automatically controlled by the default Windows device driver.

To configure devices for TSMSCSI.EXE:
1. From the Device Manager Console, right-click on the device and select **Properties**. To see the driver that is currently controlling your device, select the driver tab and **Driver File Details**.
2. Right-click the device and select **Update Driver** or select **Action → Update Driver**. The Hardware Update wizard displays.
3. From a list or specific location (Advanced), select **Install**.
4. Click **Next**.
5. Select **Don't search. I will choose to install**.
6. Click **Next**.
7. In the Hardware Installation panel, click **Continue Anyway**.
8. Verify that the device has been configured correctly for TSMSCSI.EXE.
   a. Right-click the device and select **Properties**.
   b. Select the driver tab and driver details.

TSMDLST (Display information about devices)

Use the TSMDLST command to display information about devices.

```
►►──TSMDLST─────────────────────────────────────────────────────────────►◄
                 └─/computer──=──computer_name─┘  ┌──────────────────┐
                                                  └─/details─┘ └─/all─┘
                                                  └─/?─┘
```
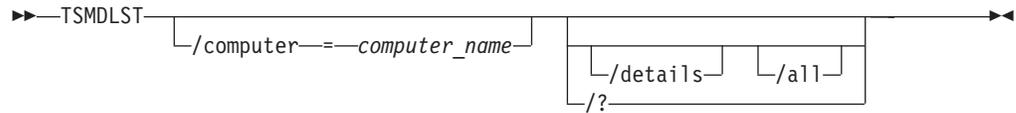
Parameters

/computer=_computer_name_
> Specifies the name of the computer for which devices will be listed. The default is the local system.

/details
> Display details on devices in the list. By default, a summary is shown.

/all
> Display information on all types of devices. By default, only tape drives and tape libraries are included in the results.

/? Display information about the command and its parameters.

Setting permissions using Samba

To set the permissions, you must configure Samba so that the user account that is starting the storage agent has root access.

The following example explains how to configure Samba 2.2.2. Other versions of Samba might require different configuration steps.

1. Set the Samba share directory read-only parameter to NO.
2. Set the Samba guest **ok** parameter to NO.
3. Use a username map file that maps a Windows login name to an existing UNIX name. Create a file called user.map and place it in the /usr/local/samba/bin directory on the UNIX server.

   Tip: Previous versions of Samba might install in the /opt directory.
4. Add the following line to the user.map file, where _admin_ represents the user account that is starting the storage agent:

   ```
   root = root administrator admin
   ```
5. Add the following line to the global section of the Samba smb.conf file:

   ```
   username map = /usr/local/samba/bin/user.map
   ```
6. To test whether the permission settings, perform the permission-testing procedure.

Related tasks

"Obtaining device information" on page 17
You can obtain tape-device and disk-device information from the system where the storage agent is installed.

Setting up LAN-free data movement using the Administration Center wizard

To set up LAN-free data movement on the server in tape-library and file-device-sharing environments, you can use the Enable LAN-free Data Movement wizard in the Administration Center.

1. Install or upgrade the client and API software:
   - "Installing or upgrading the client and API" on page 22

   Configure the API only if you are using a Tivoli Storage Manager data protection application client.

2. Specify the DEVCONFIG option in the storage agent options file and issue the DSMSTA SETSTORAGESERVER command to initialize the storage agent and to update the device configuration file and the storage agent options file:
   - See steps 2 and 3 in "Installing and configuring the storage agent" on page 24.

3. "(z/OS data-manager server) Formatting volumes for LAN-free data movement" on page 32

4. "Verifying the LAN-free configuration" on page 33

5. "Determining whether the data movement was LAN-free" on page 34

Configuring multiple clients to use the same storage agent

You can configure two or more clients to use the same storage agent.

To configure clients:

- If the clients reside on the same system as the storage agent, set the appropriate options and values in the dsm.opt file.
- If the clients do not reside on the same system as the storage agent, set the following options with the appropriate values:
  - LANFREECOMMMETHOD TCPIP
  - LANFREETCPSERVERADDRESS

    Specify the TCP/IP address of the system where the storage agent is installed.
  - LANFREETCPPORT

    Specify the same TCP/IP port address as specified by the TCPPORT option in the storage agent options file dsmsta.opt.

DSMSTA SETSTORAGESERVER

Use the DSMSTA SETSTORAGESERVER command to initialize the storage agent and add communication information to the device configuration file and the storage agent options file dsmsta.opt.

Use this utility on the client system where the storage agent has been installed.

This utility does not remove any previous entries in the files. It appends information to the existing files. The option DEVCONFIG, which sets a name for the device configuration file, must be in the dsmsta.opt file for the command to work. See "Examples" on page 52.

When configuring the storage agent using the DSMSTA SETSTORAGESERVER command, use addresses that correspond to the communications method used by

the backup-archive client. The backup-archive client supports either IPv4
(**COMMMETHOD TCPIP**) or IPv6 (**COMMMETHOD V6TCPIP**), but not both at
the same time.

Syntax

```
►►──DSMSTA SETSTORAGESERVER──MYName──=──storage_agent_name───────────────►

►──MYPAssword──=──storage_agent_password────────────────────────────────►

►──MYHLAddress──=──storage_agent_hladdress──SERVERName──=──server_name───►

►──SERVERPAssword──=──server_password──HLAddress──=──server_tcpip_address─►

►──LLAddress──=──server_tcpip_port──────────────────────────────────────►◄
```

Parameters

All parameters are required. Allowed abbreviations for the options are shown in
uppercase letters.

MYName
> Specifies the name of the storage agent. This name appears in the SET
> STANAME command that is inserted into the device configuration file.
>
> You must use the same name when you define the storage agent as a server to
> the Tivoli Storage Manager server.

MYPAssword
> Specifies the password of the storage agent. This value is encrypted and used
> in the SET STAPASSWORD command that is inserted into the device
> configuration file.
>
> You must use the same password when you define the storage agent as a
> server to the Tivoli Storage Manager server.

MYHLAddress
> Specifies the TCP/IP address of the storage agent. This value is used internally
> in the SET STAHLADDRESS command that is inserted into the device
> configuration file.

SERVERName
> Specifies the name of the Tivoli Storage Manager server. This name appears in
> theDEFINE SERVER command that is inserted into the device configuration
> file.

SERVERPAssword
> Specifies the password of the server. This value is encrypted and appears in
> the **SERVERPASSWORD** parameter of the DEFINE SERVER command that is
> inserted into the device configuration file.

HLAddress
> Specifies the TCP/IP address of the server. This value is used in the
> **HLADDRESS** parameter of the DEFINE SERVER command.

LLAddress
> Specifies the TCP/IP port on which to access the server. This value is used in
> the **LLADDRESS** parameter of the DEFINE SERVER command.

Examples

Issue the DSMSTA SETSTORAGESERVER command with the following information:

- Storage agent

  Name: storagnt

  Password: fun4me

  TCP/IP address: agent.example.com

- Tivoli Storage Manager server

  Name: tsmsrver

  Password: not4u

  TCP/IP address: tsmsrver.example.com

  TCP/IP port: 1502

The command is:

```
dsmsta setstorageserver myname=storagnt mypassword=fun4me
myhladdress=agent.example.com
servername=tsmsrver serverpassword=not4u
  hladdress=tsmsrver.example.com lladdress=1502
```

The command generates the following lines in the device configuration file for the storage agent:

```
set staname storagnt
set stapassword xxxxx
set stahladdress agent.example.com
define server tsmsrver serverpassword=xxxxxxxx
  hladdress=tsmsrver.example.com lladdress=1502
```

The passwords (shown as *xxxxxxx*) are encrypted in the file.

The command also generates the following line in the dsmsta.opt file for the storage agent:

```
servername tsmsrver
```

Related tasks

"Installing and configuring the storage agent" on page 24
The storage agent must be installed on a client system that has connections to storage resources on the SAN.

The storage agent options file

The storage agent options file contains the name of the server with which the storage agent communicates, along with other options. Normally, you do not need to make any changes to the options file unless your Tivoli Storage Manager server changes.

The options file for the storage agent is named dsmsta.opt. The dsmsta.opt file is located where the storage agent program was installed. The default path is:

  c:\program files\tivoli\tsm\storageagent

For detailed information about these options, see the *Administrator's Reference*.

For detailed information about the COMMMETHOD and LANFREECOMMMETHOD options, see the *Backup-Archive Clients Installation and User's Guide*.

Required options

Note: Uppercase letters indicate allowed abbreviations.

DEVCONFig *file_name*
>The name of the device configuration file for the storage agent. A typical name for the file is devconfig.

SERVERName *server_name*
>The name of the Tivoli Storage Manager server with which the storage agent communicates. The DSMSTA SETSTORAGESERVER command inserts this option.

TCPPort *number*

>Specifies the port number on which the server TCP/IP communication driver is to wait for requests for client sessions.

>Using different port numbers for the options TCPPORT and TCPADMINPORT enables you to create one set of firewall rules for client sessions and another set for other session types (administrative sessions, server-to-server sessions, SNMP subagent sessions, storage agent sessions, library client sessions, managed server sessions, and event server sessions). If the two port numbers are different, separate threads will be used to service client sessions and the other session types. If you allow the two options to use the same port number (by default or by explicitly setting them to the same port number), a single server thread will be used to service all session requests.

Additional options

ADMINONClientport
>Specifies whether or not the TCPPORT can be used by administrative sessions. You can specify one of the following values:
>
>- **YES** (default)
>
> If the option is set to YES, or if the TCPPORT and TCPADMINPORT are the same value (the default), then the administrative sessions can use the TCPPORT.
>
>- **NO**
>
> If the option is set to NO, and if the TCPADMINPORT value is different than the TCPPORT value, then administrative sessions cannot use TCPPORT.

COMMTimeout *seconds*
>Specifies the maximum number of seconds that the server waits for an expected client message during an operation that causes a database update. The default value is 60. The minimum value is 1. If the length of time exceeds this time-out, the server ends the session with the client. You may want to increase the time-out value to prevent clients from timing out. Clients may time out if there is a heavy network load in your environment or when they are backing up large files.

IDLETimeout *minutes*
>Specifies the maximum number of minutes that a client session can be idle before the server cancels the session. The default value is 15 minutes. The minimum value is 1 minute. You may want to increase the time-out value to prevent clients from timing out if there is a heavy network load in your environment. Note, however, that a large number of idle sessions could prevent other users from connecting to the server.

MAXSessions *number_of_sessions*

Specifies the maximum number of simultaneous client sessions that can connect with the server. The default value is 25 client sessions. The minimum value is 2 client sessions. The maximum value is limited only by available virtual memory size or communication resources.

MSGSTACKTRACE *on|off*

Specifies that a list of functions will be shown on the server console, and will also be directed to the activity log after specific messages have been issued. The output will help the Tivoli Storage Manager service team to diagnose specific problems quicker. It is recommended that this option be set to ON.

RESOURCETimeout *minutes*

Specifies the maximum number of minutes that a storage agent waits for a resource on the server. The default value is 60 minutes. The minimum value is 1 minute.

For database resources and sessions on the storage agent, the Tivoli Storage Manager resource monitor picks the shortest time-out value to start a recovery process.

In contrast, in the case of library sharing, the resource monitor picks the longest time for both the library manager and library client to recover. For more efficient management of shared library resources, consider setting resource time-outs at the same limit for all participants in a shared configuration. In any case of error recovery, Tivoli Storage Manager always defers to the longest timeout limit.

You should also specify this option in the server options file. The server uses this option to monitor some of the storage agent sessions and resources and will cancel sessions based on the value you specify.

Important: If this option is specified in the server options file, that value will override the value specified in the storage agent's options file.

SANDISCOVERY

Specifies whether the Tivoli Storage Manager SAN discovery function is enabled. When set to ON, the storage agent will perform SAN discovery in the following instances:

- During storage agent initialization
- When the device path has been changed and there is a conflict between the device serial number and the device path provided by the server

Using SAN discovery, the storage agent can automatically correct the device's special file name if it has been changed. If the HBA used by the storage agent does not support SAN device mapping, you should set the SANDISCOVERY option to OFF.

For information about Tivoli Storage Manager supported HBAs for SAN device mapping, see the Tivoli Storage Manager product support site at http://www.ibm.com/software/sysmgmt/products/support/IBMTivoliStorageManager.html.

The storage agent does not require persistent binding with the SAN discovery function enabled.

STAMaxpooledsessions *number*

Specifies the number of individual sessions that are allowed to start and stop between the storage agent and the Tivoli Storage Manager server. The

range of values is 0 - 150, with a default of 25. Each session is governed by the IDLETIMEOUT option and is stopped when the timeout value is exceeded. If the storage agent needs more sessions than specified, additional sessions are allowed. Although the default value is typically sufficient, setting this option with a low number can adversely affect performance. Be aware that if the storage agent has multiple client sessions, increasing the value of this option will help support these sessions.

TCPADMINPORT *number*

Specifies the port number on which the server TCP/IP communication driver is to wait for requests for sessions other than client sessions. This includes administrative sessions, server-to-server sessions, SNMP subagent sessions, storage agent sessions, library client sessions, managed server sessions, and event server sessions. The default is the value of TCPPORT.

Using different port numbers for the options TCPPORT and TCPADMINPORT enables you to create one set of firewall rules for client sessions and another set for the other session types listed above. By using the **SESSIONINITIATION** parameter of REGISTER NODE and UPDATE NODE, you can close the port specified by TCPPORT at the firewall, and specify nodes whose scheduled sessions will be started from the server. If the two port numbers are different, separate threads will be used to service client sessions and the session types. If you allow the two options to use the same port number (by default or by explicitly setting them to the same port number), a single server thread will be used to service all session requests.

Client sessions that attempt to use the port specified by TCPADMINPORT will be terminated (if TCPPORT and TCPADMINPORT specify different ports). Administrative sessions are allowed on either port, (unless the ADMINONCLIENTPORT option is set to NO) but by default will use the port specified by TCPADMINPORT.

THROUGHPUTDatathreshold *kilobytes_per_second*

Specifies the throughput that client sessions must achieve to prevent cancellation after THROUGHPUTTIMETHRESHOL *minutes* have elapsed. The default value of 0 prevents examining client sessions for insufficient throughput. Throughput is computed by adding send and receive byte counts and dividing by the length of the session. The length does not include time spent waiting for media mounts and starts at the time a client sends data to the server for storage. The minimum value is 0; the maximum is 99999999.

THROUGHPUTTimethreshold *minutes*

Specifies the threshold for examining client sessions and cancelling them if the data throughput threshold is not met (see THROUGHPUTDATATHRESHOLD). This threshold does not include time spent waiting for media mounts. The time threshold starts when a client begins sending data to the server for storage (as opposed to setup or session housekeeping data). The default value of 200 prevents examining client sessions for low throughput. The minimum value is 0; the maximum is 99999999.

USELARGEBUFFERS *yes|no*

Specifies that large buffers are used for client-server communications. The default of YES specifies that large buffers are used; NO specifies that they are not used.

The device configuration file for the storage agent

The device configuration file for the storage agent includes information about the storage agent and about the Tivoli Storage Manager server with which the storage agent communicates and that is managing the SAN-attached libraries and drives that the storage agent uses.

The file is typically named devconfig and is located with the storage agent program:

   c:\program files\tivoli\tsm\storageagent

The DSMSTA SETSTORAGESERVER command normally generates the contents of the file, and you can also use the command to add information to the file.

Typical contents of the device configuration file are as follows:

```
set staname storagnt
set stapassword fun4me
set stahladdress agent.example.com
define server tsmsrver serverpassword=not4u
  hladdress=tsmsrver.example.com lladdress=1502
```

In this example, storagnt is the name of the storage agent and tsmsrver is the name of the Tivoli Storage Manager server.

Properties

SET STANAME
> Sets the name of the storage agent. The name must be the same as the name that was used to define the storage agent as a server to the Tivoli Storage Manager server.

SET STAPASSWORD
> Sets the password of the storage agent. The password must be the same as the password that was used when defining the storage agent as a server to the Tivoli Storage Manager server. The password is encrypted.

SET STAHLADDRESS
> Sets the TCP/IP address of the storage agent.

DEFINE SERVER
> Define the Tivoli Storage Manager server with which the storage agent communicates.

Appendix B. ACSLS legacy data migration and coexistence

If ACSLS shared-library support is not possible in your configuration, data migration is required.

If your environment consists of Tivoli Storage Manager storage pools associated with an ACSLS library type and an ECARTRIDGE device type, the library can be updated with the SHARED=YES option to enable LAN-free data movement. However, if your environment consists of Tivoli Storage Manager storage pools associated with an ACSLS library type and a GENERICTAPE device type, data migration is required rather than coexistence because Tivoli Storage Manager ACSLS shared library support cannot co-exist with external library support.

Data migration of ACSLS to external library support is necessary only when Tivoli Storage Manager ACSLS shared library support is not possible in your configuration. The only situation where ACSLS shared library support is not possible is when your environment does not contain a Tivoli Storage Manager server installed on AIX, Solaris, or Windows to serve as the library manager. Migrate the existing data from existing (old) storage pools to new storage pools associated with the appropriate policy, device class, and library definitions. Migration of data also allows the entire environment to be LAN-free, providing better performance and better utilization of tape drives and media.

Figure 9 displays the normal migration path from an old storage pool containing the data associated with the ACSLS library type to a new storage pool associated with an EXTERNAL library type and an ECARTRIDGE device class.
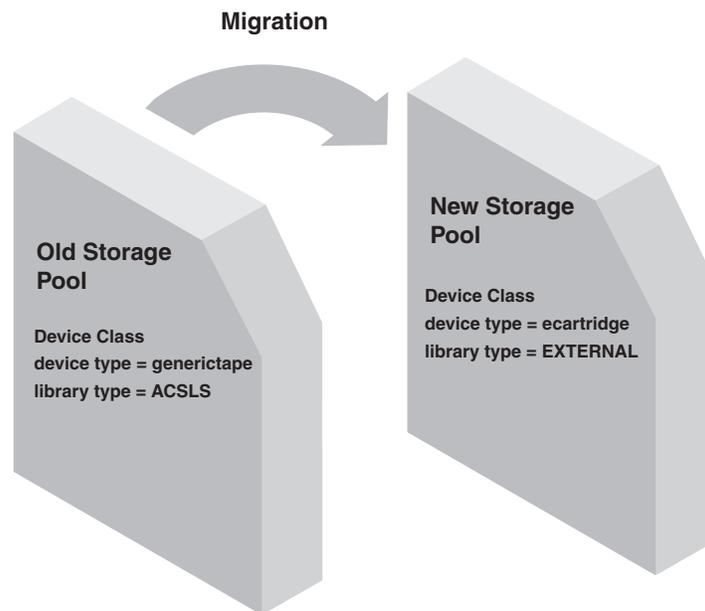

Figure 9. Legacy ACSLS data migration

Two methods to migrate data are:

- Use the IBM Tivoli Storage Manager server MOVE DATA command. This method allows the legacy ACSLS data to move to a new storage pool without moving any expired files in the aggregates. For more information, see the *Administrator's Guide*.
- Use the IBM Tivoli Storage Manager server storage pool reclamation function. This method works by reclaiming the active files from the legacy ACSLS storage pools. Reclamation processing, however, is very resource intensive and should be performed during periods of little activity on the server. For more information, see the *Administrator's Guide*.

For detailed information about how to migrate from an external library environment to a shared ACSLS library environment, see the *Administrator's Guide*.

Related concepts

"External Libraries" on page 10
If Tivoli Storage Manager native library (SCSI, 3494, and ACSLS) support cannot be used, the alternative is to configure external library support.

Appendix C. Accessibility features for Tivoli Storage Manager

Accessibility features help a user who has a physical disability, such as restricted mobility or limited vision, to use software products successfully. The major accessibility features of Tivoli Storage Manager are described in this topic.

Accessibility features

The following list includes the major accessibility features in Tivoli Storage Manager:

- Keyboard-only operation
- Interfaces that are commonly used by screen readers
- Keys that are discernible by touch but do not activate just by touching them
- Industry-standard devices for ports and connectors
- The attachment of alternative input and output devices
- User documentation provided in HTML and PDF format. Descriptive text is provided for all documentation images.

The Tivoli Storage Manager Information Center, and its related publications, are accessibility-enabled.

Keyboard navigation

The Tivoli Storage Manager for Windows Console follows Microsoft conventions for all keyboard navigation and access. Drag and Drop support is managed using the Microsoft Windows Accessibility option known as MouseKeys. For more information about MouseKeys and other Windows accessibility options, please refer to the Windows Online Help (keyword: MouseKeys).

Vendor software

Tivoli Storage Manager includes certain vendor software that is not covered under the IBM license agreement. IBM makes no representation about the accessibility features of these products. Contact the vendor for the accessibility information about its products.

Related accessibility information

You can view the publications for Tivoli Storage Manager in Adobe® Portable Document Format (PDF) using the Adobe Acrobat Reader. You can access these or any of the other documentation PDFs at the IBM Publications Center at http://www.ibm.com/shop/publications/order/.

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Glossary

A glossary is available with terms and definitions for the IBM Tivoli Storage Manager server and related products.

The glossary is located in the Tivoli Storage Manager Version 6.1 information center: http://publib.boulder.ibm.com/infocenter/tsminfo/v6

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