

gFiler™ Gateway Series

Getting Started with the gFiler for IBM®

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Part number 210-00668
May 2004

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Preface

About this guide

This guide introduces you to the gFiler, provides an overview of the tasks required to set up a gFiler, and provides configuration guidelines and sample configurations.

Audience

This guide is for users who are familiar with operating systems, such as UNIX®, Windows® 95, Windows NT®, and Windows 2000, and who will be installing gFiler gateways. This guide does not discuss basic system or network administration topics, such as IP addressing, routing, and network topology; it emphasizes the characteristics of the NetApp® gateway.

Special messages

This guide contains special messages that are described as follows:

Note

A note contains important information that helps you install or operate the system efficiently.

Caution

A caution contains instructions that you must follow to avoid damage to the equipment, a system crash, or loss of data.

About this chapter

This chapter introduces you to the gFiler™ gateway and provides an overview of the tasks that you need to do to set up your storage subsystem, gFiler hardware, and Data ONTAP™ software on a gFiler. Use this guide in conjunction with the *Hardware Installation and Configuration Guide* and the *Software, Setup, and Management Guide*.

Topics in this chapter

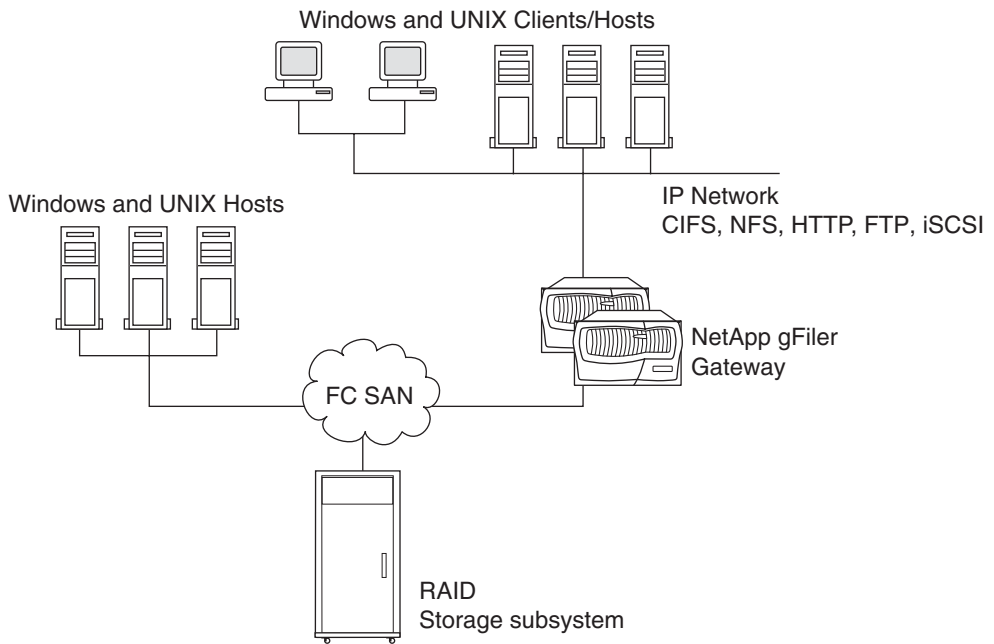
This chapter discusses the following topics:

- ◆ [“What a gFiler is”](#) on page 2
- ◆ [“Features”](#) on page 3
- ◆ [“Setup task overview”](#) on page 5

What a gFiler is

Description of a gFiler

The NetApp® gFiler gateway is a storage consolidation solution that functions as a NAS file server front-end to an installed SAN storage environment. The gFiler is an industry-standard NAS gateway that provides file-level access to data stored in Fibre Channel storage subsystems through client systems and application servers on an IP network. Like all NetApp storage appliances, the gFiler gateway is based on the Data ONTAP operating system that supports multiprotocol file services and advanced data management capabilities for consolidating, protecting, and recovering mission-critical data for applications and users.



Features

Supported gFiler platforms

The following gFiler platforms are supported:

- ◆ GF270c
- ◆ GF825, GF825c
- ◆ GF940, GF940c
- ◆ GF960, GF960c

Supported storage subsystem

The gFiler supports the following storage subsystem platform:

- ◆ IBM® ESS Model 800

License Internal Code

Your storage subsystem License Internal Code should be 2.2.0.677.

Note

Contact your IBM customer service representative for more information.

Multiple storage subsystems

Multiple storage subsystems can connect to one or more gateways if the storage subsystems are in the same series.

Data ONTAP features not supported

The gFiler supports most Data ONTAP 6.5 features that are described in the Data ONTAP documentation set. You can read about any differences in the gFiler's use with a feature in the *gFiler Gateway Series Software Setup, Installation, and Management Guide*. The following Data ONTAP features are not supported by the gFiler:

- ◆ RAID-4

The gFiler uses RAID-0 on top of RAID-1, RAID-5, or RAID-10 on RAID storage subsystems. See Appendix A, “[Terminology](#),” on page 53 for more information.

- ◆ Disk sanitization and disk scrubbing

Setup task overview

Setup task overview The following table provides a high-level summary of the tasks involved in setting up the storage subsystems and the gFiler to work together. For each task, you are directed to where you can find the information that you need to perform the task.

Note
The gFiler gateway series documents refer to IBM volumes as LUNs to distinguish them from Data ONTAP volumes. For more detail, see [“Terminology”](#) on page 53.

Step	Task	Description
1	Planning your gateway configuration	You decide the gateway configuration in which you connect your gateway to your storage subsystem. 1. Select the type of configuration in which you deploy your gateway, as discussed in Chapter 2, “Planning your configuration,” on page 9 of this guide. 2. Review the configuration rules for your gateway before you allocate space on your storage subsystem for your gateway, as discussed in Chapter 3, “Supported Configurations,” on page 19 of this guide. 3. Verify all site prerequisite information by reviewing Chapter 1, “Preparing Your Site for Your Gateway,” in the <i>gFiler Gateway Series Hardware Installation Guide</i>.

Step	Task	Description
2	Installing the gateway and connecting it to the storage subsystem	You install the gateway in a rack and connect the gateway to the storage subsystem. 1. Install the gateway into a rack, as described in Chapter 2, “Installing your gateway into a rack,” in the <i>gFiler Gateway Series Hardware Installation Guide</i>. 2. You connect your gateway to your storage subsystem, as described in Chapter 4, “Connecting to your Storage Subsystem,” in the <i>gFiler Gateway Series Hardware Installation Guide</i>. 3. You connect your gateway to an ASCII terminal and power it on in Maintenance mode to obtain WWNs for the ports on your HBAs, as described in Chapter 4, “Preparing Your Gateway for LUN Configuration” in the <i>gFiler Gateway Series Hardware Installation Guide</i>.
3	Setting up the storage subsystem to work with the gFilers	You must create LUNs on the storage subsystem and make them accessible to the gFiler, as described in Chapter 4, “Configuring LUNs on the Storage Subsystem,” on page 37. See your storage subsystem documentation per model for information about configuring LUNs on the storage subsystem.
4	Connecting your gFiler to a network and any third-party tape backup devices, and then powering and booting in regular mode	You connect your gateway to a network, to any third-party tape backup devices, if applicable, and to an AC power source, as described in Chapter 5, “Connecting Your Gateway,” in the <i>gFiler Series Hardware Installation Guide</i>.

Step	Task	Description
5	Basic initial software setup and installation	Your initial setup and configuration of gFilers involves ◆ Designating which gFiler can read data from and write data to a specific LUN on a storage subsystem. ◆ Providing system information, such as IP address and media type ◆ Installing the Data ONTAP software See the <i>gFiler Gateway Series Software Setup, Installation, and Management Guide</i> for details. Note_____ If you are upgrading the Data ONTAP software on a gFiler, specific steps must be followed to ensure that a gFiler has read and write capability to LUNs on the storage subsystem under the new scheme introduced in Data ONTAP 6.5. See the <i>gFiler Gateway Series Data ONTAP 6.5 Upgrade Guide</i> for more information.
6	Configuring Data ONTAP features that you want to use to manage your gFiler	You might want to use some Data ONTAP features to manage your gFilers. Use the Data ONTAP documentation set in conjunction with the <i>gFiler Gateway Series Software Setup, Installation, and Management Guide</i> to learn about the Data ONTAP features that are available and how to set them up. Features that are specific to the gFiler (that is, not applicable to the filer) are described in the <i>gFiler Gateway Series Software Setup, Installation, and Management Guide</i>. Additionally, the <i>gFiler Gateway Series Software Setup, Installation, and Management Guide</i> discusses any special considerations in using standard Data ONTAP features with gFilers.

About this section

This section discusses configuration types and rules for connecting your gateway to your storage subsystem.

Topics in this chapter

This chapter discusses the following topics:

- ◆ [“Types of configurations”](#) on page 10
- ◆ [“Rules for configuring gateways to your storage subsystem”](#) on page 11
- ◆ [“Guidelines for configuring ports on your storage subsystem”](#) on page 15
- ◆ [“Storage subsystem restrictions”](#) on page 17
- ◆ [“Arranging your gFiler neighborhood”](#) on page 18

Types of configurations

Types of configuration

You can connect your gateway to your storage subsystem in the following configurations:

- ◆ Direct-attached stand-alone
- ◆ Direct-attached cluster
- ◆ Switch-attached stand-alone
- ◆ Switch-attached cluster
- ◆ MetroCluster

Planning your configuration

You must devise a port-to-port connectivity scheme after selecting the configuration you plan to deploy.

For supported port-to-port connectivity schemes for each configuration type, go to Chapter 3, “[Supported Configurations](#),” on page 19.

Rules for configuring gateways to your storage subsystem

About configuration rules

You must follow these rules when configuring LUNs to your gateway.

Maximum total capacity attached to a gateway

Gateway models have the following maximum total capacity limits.

Gateway model	Maximum total capacity
GF270c	6 TB
GF825	3 TB
GF825c	6 TB
GF920	6 TB
GF920c	12 TB
GF940	12 TB
GF940c	24 TB
GF960	24 TB
GF960c	48 TB

Minimum total capacity attached to a gateway

Gateway models have the following minimum total capacity limits.

Gateway model	Minimum total capacity
GF270c	1.5
GF825	68 GB
GF940/GF960	272 GB

Connection to multiple storage subsystems

Multiple storage subsystems can connect to a stand-alone or clustered gateway if the storage subsystems are within the same series.

You can connect to multiple storage subsystems using the same configurations described in Chapter 3, “[Supported Configurations](#),” on page 19.

Maximum number of unique LUNs per gateway

A gateway can have up to the following number of unique LUNs.

Gateway model	Maximum number of unique LUNs
GF270c	42 (21 on each cluster node)
GF825	84
GF825c	168 (84 on each cluster node)
GF920	168
GF920c	336 (168 on each cluster node)
GF940	336
GF940c	672 (336 on each cluster node)
GF960	336
GF960c	672 (336 on each cluster node)

Minimum number of LUNs per gateway

A gateway must have at least one LUN. A cluster configuration must have at least two LUNs.

Note

The GF270c requires a minimum of two LUNs: one for the root volume and one for core dumps.

LUN sizes

The gateway has restrictions on the maximum and minimum size LUN supported.

Maximum LUN size: The maximum LUN size supported is 500 GB.

Minimum LUN size: The minimum LUN size supported is 1 GB.

Usable space on LUNs

LUN size is affected by the following elements:

- ◆ 12.5%—Checksum
- ◆ 10%—WAFL® (Write-Anywhere File Layout) reserve
- ◆ 1%—Core dump
- ◆ 20%—Snapshot (default setting)

Note

Space for your snapshot reserve is changeable through Data ONTAP.

Determining LUN size

You can determine LUN size in the following respects:

- ◆ Usable capacity (the actual capacity available for storage)
- ◆ Desired capacity (the exact LUN size desired)

Calculating the usable capacity: To determine the usable capacity for storage in a LUN, after taking into account Snapshot reserve, use the following formula, where Y is the usable capacity for storage and N is the total capacity of the LUN.

$$Y = N \times \{0.875 \times 0.9 \times 0.99 \times \text{Snapshot reserve}\}$$

Example: Total capacity of LUN is 4 GB with Snapshot reserve set at default:

$$4 \times \{0.875 \times 0.9 \times 0.99 \times 0.8\} = 2.49 \text{ GB}$$

Calculating desired capacity: To determine the LUN capacity needed to obtain the desired capacity, while taking reserved space into account, use the following formula, where Y is the exact desired LUN size:

$$Y \text{ divided by } \{0.875 \times 0.9 \times 0.99 \times \text{Snapshot reserve}\} = \text{Actual capacity needed}$$

Note

This formula does not take into account space for Snapshot reserve, which you should include for achieving the LUN size desired.

Example: Desired LUN capacity is 10 GB of usable capacity.

- ◆ Calculating actual LUN size without accounting for Snapshot reserve.

$$10 \text{ GB divided by } \{0.875 \times 0.9 \times 0.99\} = 13.3 \text{ GB}$$

- ◆ Snapshot reserve left on default setting.

$$10 \text{ GB divided by } \{0.875 \times 0.9 \times 0.99 \times 0.8\} = 16 \text{ GB}$$

Guidelines for configuring ports on your storage subsystem

Sharing LUNs in an array

LUNs in an array can be shared between gFiler gateways and non-gFiler hosts.

Gateway sharing storage subsystem ports with other hosts

You can share channel adapter ports on a storage subsystem among gFiler gateways and non-gFiler hosts.

Number of channel adapter ports connecting to a gFiler

You can access LUNs on the storage subsystem through a maximum of two channel adapter ports. Because LUNs are exported on all ports, you are limited to two connections to access the LUNs on your storage subsystem.

For more details, go to Chapter 3, “[Supported Configurations](#),” on page 19.

Channel adapter LUN configuration

When two ports share access to a LUN, all the LUNs accessible from one port must be accessible from the other, thus providing redundant paths to the LUNs.

This is ensured when you select RS/6000 as the host type of your gateway.

Caution

The LUN number used to map the LUNs must be the same on each of the shared ports or data corruption can occur.

Guidelines for configuring Fibre Channel ports

After selecting the Fibre Channel port you want to configure, use the following guidelines to set port options on the UI of your storage subsystem.

Port parameter		Guideline
Port address		Any port address.
Fibre Channel topology	Whether a fabric switch is used—Fabric ON or OFF	Select whether a fabric switch is used to connect the gateway to the storage subsystem. If you use a fabric switch, select Fabric ON. If not, select Fabric OFF.
Fibre Channel protocol	Connection type—Fibre Channel or Point-to-Point	Select whether the connection type is Fibre Channel or Point-to-Point. If you use a fabric switch, select Point-to-Point. If not, that is, if the gateway is directly connected to the storage subsystem, select Fibre Channel.

Storage subsystem restrictions

Host type	When you configure your storage subsystem to recognize your gateway, you must specify your gateway as an IBM RS/6000 host type.
LUN size restriction	The maximum LUN size is limited by the size of disk group.
Maximum number of LUNs for each channel adapter port	The maximum number of LUNs allowed for each channel adapter port is 4,096.

Arranging your gFiler neighborhood

About the gFiler neighborhood

A gFiler neighborhood allows multiple stand-alone gateways or clustered gateways (multiple host groups) to share ports and thus LUN access on your storage subsystem. You arrange your neighborhood through LUN ownership in Data ONTAP.

See your *gFiler Gateway Series Software Installation, Setup, and Management Guide* for more details about LUN ownership.

Note

A gFiler neighborhood can support different gFiler series gateway models; however, GF270c gateways cannot be mixed with other gFiler models in a gFiler neighborhood.

Guidelines for arranging your gFiler neighborhood

When arranging your gFiler neighborhood, you must adhere to the following guidelines:

- ◆ Zone switch ports that connect to your gateway HBAs so that each gFiler in the neighborhood can access each other's LUNs.
- ◆ Set the access control on your storage subsystem so that the gFiler gateways can access each other's LUNs.

About this chapter This chapter discusses the supported configurations for IBM storage subsystems.

Topics in this chapter This chapter discusses the following topics:

- ◆ “[Direct-attached stand-alone configuration](#)” on page 20
- ◆ “[Direct-attached cluster configuration](#)” on page 22
- ◆ “[Switch-attached stand-alone configuration](#)” on page 24
- ◆ “[Switch-attached cluster configuration](#)” on page 26
- ◆ “[MetroCluster configuration](#)” on page 31

Direct-attached stand-alone configuration

About this section

This section describes how to configure the following platforms in a direct-attached stand-alone configuration:

- ◆ GF825
- ◆ GF920
- ◆ GF940
- ◆ GF960

Connections required

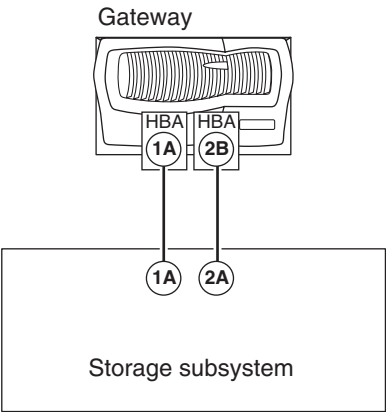
The following table describes the number of ports and cable connections required for a direct-attached stand-alone configuration.

Gateway model	Gateway HBA ports used	Storage subsystem ports used	Number of total cable connections	LUNs supported
GF825	2	2	2	84
GF920	2	2	2	168
GF940	2	2	2	336
GF960	2	2	2	336

Connectivity diagram

The following diagram shows how your gateway connects to your storage subsystem.

Direct-attached stand-alone configuration



Port-to-port connectivity

The following port-to-port connectivity scheme supports the maximum number of LUNs on each port in a redundant configuration.

Port-to-port connectivity scheme	
Gateway	Storage subsystem
1A	1A
2B	2A

Direct-attached cluster configuration

About this section

This section describes how to configure the following platforms in a direct-attached cluster configuration:

- ◆ GF270c
- ◆ GF825c
- ◆ GF920c
- ◆ GF940c
- ◆ GF960c

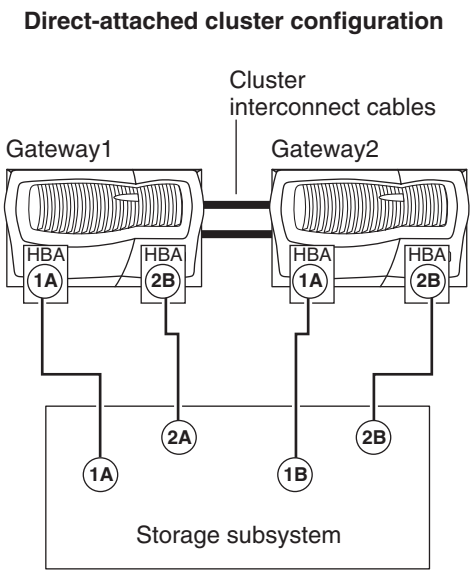
Connections required

The following table describes the number of ports and cable connections required for a direct-attached cluster configuration.

Gateway model	Gateway HBA ports used	Storage subsystem ports used	Number of total cable connections	LUNs supported
GF270c	2	2	4	42
GF825c	4	4	4	168
GF920c	4	4	4	336
GF940c	4	4	4	672
GF960c	4	4	4	672

Connectivity diagram

The following diagram shows how your gateway connects to your storage subsystem.



Port-to-port connectivity

The following port-to-port scheme supports the maximum number of LUNs on each port in a redundant configuration.

Port-to-port connectivity scheme	
Gateway 1	Storage subsystem
1A	1A
2B	2A
Gateway 2	Storage subsystem
1A	1B
2B	2B

Switch-attached stand-alone configuration

About this section

This section describes how to configure the following platforms in a switch-attached stand-alone configuration:

- ◆ GF825
- ◆ GF920
- ◆ GF940
- ◆ GF960

Connections required

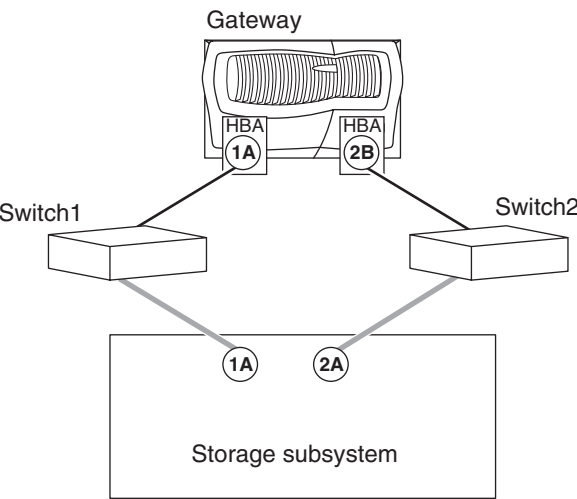
The following table describes the number of ports and cable connections required for a switch-attached stand-alone configuration.

Gateway model	Gateway HBA ports used	Storage subsystem ports used	Number of total cable connections	LUNs supported
GF825	2	2	4	84
GF920	2	2	4	168
GF940	2	2	4	336
GF960	2	2	4	336

**Connectivity
diagram**

The following diagram shows how your gateway connects to your storage subsystem.

Switch-attached stand-alone configuration



**Port-to-port
connectivity**

The following port-to-port scheme supports the maximum number of LUNs on each port in a redundant configuration.

Port-to-port connectivity scheme	
Gateway	Switch
1A	Any port on switch 1
2B	Any port on switch 2
Storage subsystem	Switch
1A	Any port on switch 1
2A	Any port on switch 2

Switch-attached cluster configuration

About this section

This section describes how to configure the following platforms in a switch-attached cluster configuration:

- ◆ GF270c
- ◆ GF825c
- ◆ GF920c
- ◆ GF940c
- ◆ GF960c

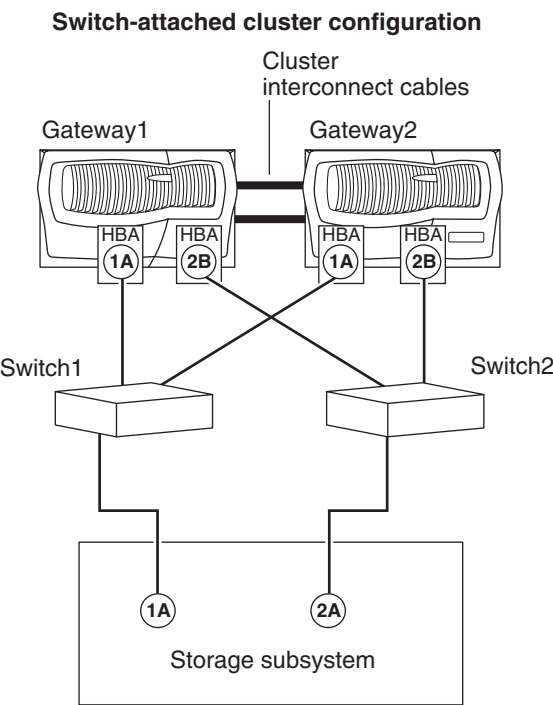
Connections required

The following table describes the number of ports and cable connections required for a switch-attached cluster configuration.

Gateway model	Gateway HBA ports used	Storage subsystem ports used	Number of total cable connections	LUNs supported
GF270c	2	2	4	42
GF825c	2	2	4	168
GF920c	2	2	4	336
GF940c	2	2	4	672
GF960c	2	2	4	672
	4	4	8	672

**Connectivity
diagram**

The following diagram shows how your gateway connects to your storage subsystem.



Port-to-port connectivity

The following port-to-port scheme supports the maximum number of LUNs in a redundant configuration for the GF825c, GF920c, GF940c, and GF960c.

Note_____

This configuration does not provide the most effective performance for the GF960. See the configuration described in “[LUN configuration for GF960c maximum performance](#)” on page 29.

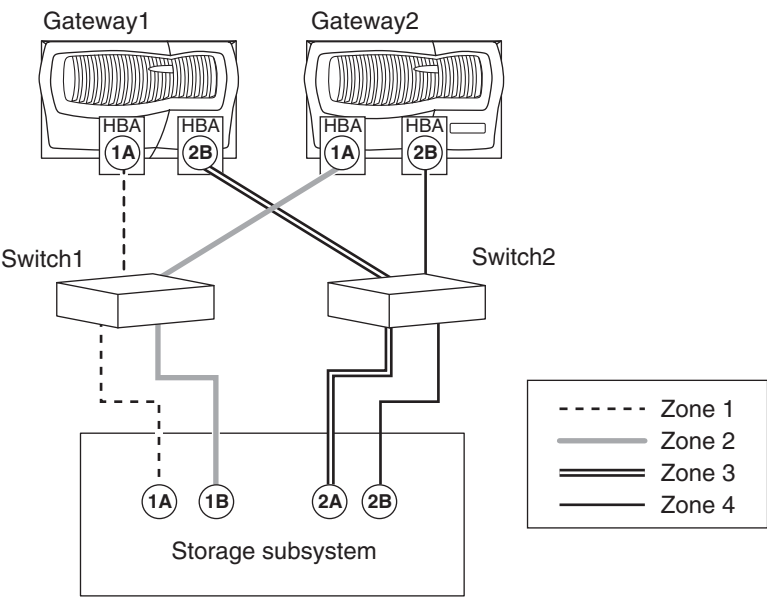
Port-to-port connectivity scheme	
Gateway 1	Switch
1A	Any port on switch 1
2B	Any port on switch 2
Gateway 2	Switch
1A	Any port on switch 1
2B	Any port on switch 2
Storage subsystem	Switch
1A	Any port on switch 1
2A	Any port on switch 2

**LUN configuration
for GF960c
maximum
performance**

Connectivity diagram: The following diagram shows how your GF960c connects to your storage subsystem for a maximum of 672 LUNs.

Caution _____
This configuration requires switch zoning. If you do not zone your switches as recommended, data corruption can occur.

Configuration shown supports a maximum of 672 LUNs



Port-to-port connectivity scheme: The following port-to-port scheme supports the maximum number of LUNs on each port in a redundant configuration.

Port-to-port connectivity scheme		
Gateway 1	Switch	Zone
1A	Any port on switch 1	1
2B	Any port on switch 2	3

Port-to-port connectivity scheme		
Gateway 2	Switch	Zone
1A	Any port on switch 1	2
2B	Any port on switch 2	4
Storage subsystem	Switch	Zone
1A	Any port on switch 1	1
1B	Any port on switch 1	2
2A	Any port on switch 2	3
2B	Any port on switch 2	4

MetroCluster configuration

About MetroCluster configurations

This section discusses how to configure your gateway in a MetroCluster configuration. The MetroCluster configuration expands on the switch-attached cluster configuration.

Also included in this section are rules for zoning switch ports, which is required for MetroCluster configurations.

Supported gateways

The following gateways support the MetroCluster configuration:

- ◆ GF825
- ◆ GF920
- ◆ GF940
- ◆ GF960

Required adapters and hardware for connectivity

You need the following adapters for a MetroCluster:

- ◆ Fibre Channel HBAs
- ◆ Virtual Interface MetroCluster adapter (VI-MC)
- ◆ Inter Switch Link (ISL)

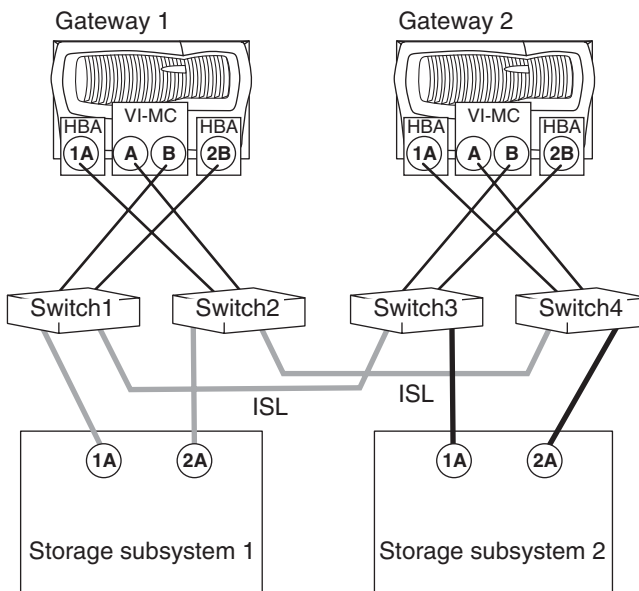
Connectivity overview

The following table describes the number of ports and cable connections needed for a MetroCluster configuration.

Number of gateways	Number of storage subsystems	Number of switches	Number of ISL connected switches	Number of cables from gateway to switch
2	2	4	2	18
4	2	4	2	24

Connecting a gateway

Configuration A: The following diagram provides an example of how the GF825 and GF940 connect to your storage subsystem for maximum capacity.



Port-to-port connectivity

The following port-to-port scheme supports a maximum of 448 LUNs for the GF940 and a maximum of 512 LUNs for the GF960 in a redundant configuration.

Port-to-port connectivity scheme			
Gateway 1		Switch	Zone
FC HBA	1A	Any port on switch 1	Optional
	2B	Any port on switch 2	
VI-MC	A	Any port on switch 1	1
	B	Any port on switch 2	2
Storage subsystem 1		Switch	Zone
CL1-A		Any port on switch 1	Optional
CL2-A		Any port on switch 2	
Gateway 2		Switch	Zone
FC HBA	1A	Any port on switch 3	Optional
	2B	Any port on switch 4	
VI-MC	A	Any port on switch 3	1
	B	Any port on switch 4	2
Storage subsystem 2		Switch	Zone
CL1-C		Any port on switch 3	Optional
CL2-D		Any port on switch 4	
ISL connection			Zone
Any port on switch 1		Any port on switch 3	None
Any port on switch 2		Any port on switch 4	None

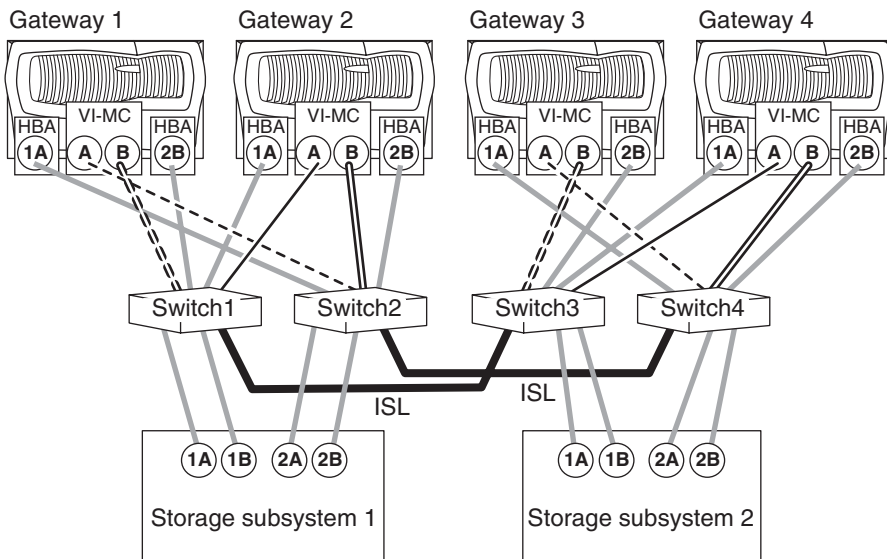
Configuration B: The following diagram provides an example of how the GF960 connects to your storage subsystem for a maximum of 672 LUNs.

Note

HBA connections must never share the same zone as VI-MC connections. Zoning individual HBA connections is not required.

The following illustration shows a MetroCluster configuration with two cluster nodes. Gateways 1 and 3 are partner nodes and gateways 2 and 4 are partner nodes.

Configuration shown supports maximum of 672 LUNs



-----	Zone 1
- . - . - .	Zone 2
————	Zone 3
=====	Zone 4
—————	Zone 5

This MetroCluster configuration requires that you specify the switch ID and zone the ports on the switch.

Each fabric contains its own set of zones:

- Switch 1 and 3 belong to one fabric
- Switch 2 and 4 belong to another fabric

Port-to-port connectivity

The following port-to-port scheme supports a maximum of 672 LUNs in a redundant configuration.

Port-to-port scheme			
First MetroCluster pair		Fabric 1	
Gateway 1		Switch	Zone
FC HBA	1A	Any port on switch 1	Optional
	2B	Any port on switch 2	
VI-MC	A	Any port on switch 1	1
	B	Any port on switch 2	2
Gateway 2		Switch	Zone
FC HBA	1A	Any port on switch 1	Optional
	2B	Any port on switch 2	
VI-MC	A	Any port on switch 1	3
	B	Any port on switch 2	4
Storage subsystem 1		Switch	Zone
CL1-A		Any port on switch 1	Optional
CL2-A		Any port on switch 2	
CL1-B		Any port on switch 1	
CL2-B		Any port on switch 2	

Port-to-port scheme			
Second MetroCluster pair		Fabric 2	
Gateway 3		Switch	Zone
FC HBA	1A	Any port on switch 3	Optional
	2B	Any port on switch 4	
VI-MC	A	Any port on switch 3	1
	B	Any port on switch 4	2
Gateway 4		Switch	Zone
FC HBA	1A	Any port on switch 1	Optional
	2B	Any port on switch 2	
VI-MC	A	Any port on switch 1	3
	B	Any port on switch 2	4
Storage subsystem 2		Switch	Zone
CL1-C		Any port on switch 3	Optional
CL2-D		Any port on switch 4	
CL1-D		Any port on switch 3	
CL2-C		Any port on switch 4	
ISL connection			Zone
Any port on switch 1		Any port on switch 3	None
Any port on switch 2		Any port on switch 4	None

Caution

You can attach a standard cluster to either the first or second pair of MetroCluster gateways, but not to both pairs.

About this chapter

This chapter describes how to configure LUNs on your storage subsystem and how to map those LUNs to your gFiler gateway.

Configuration process

The following table lists the tasks you need to perform to configure LUNs on your storage subsystem and map those LUNs to your gateway.

Note

The following processes take place on your storage subsystem user interface (UI) after you connect your gateway to your subsystem.

Stage	Process
1	Gain access to your storage subsystem through the ESS UI.
2	Check the License Internal Code.
3	Add your gateway to the host list on your storage subsystem.
4	Configure host adapter ports on your storage subsystem.
5	Add LUNs.
6	Modify LUN assignments.

Topics in this chapter

This chapter discusses the following topics:

- ◆ [“Gaining access to your storage subsystem”](#) on page 38
- ◆ [“Checking the License Internal Code”](#) on page 39
- ◆ [“Adding your gateway to the host list on your storage subsystem”](#) on page 41
- ◆ [“Configuring host adapter ports on the storage subsystem”](#) on page 45
- ◆ [“Adding LUNs”](#) on page 46
- ◆ [“Modifying LUNs on your storage subsystem”](#) on page 50

Gaining access to your storage subsystem

Gaining access to your storage subsystem To gain access to your storage subsystem, complete the following steps.

Step	Action
1	Initiate the ESS UI either directly through the console or through a Web browser, and then enter your user name and password.
2	Click ESS Specialist from the menu on the main screen of the UI, as shown in the figure.

TotalStorage
Solutions



ESS Specialist

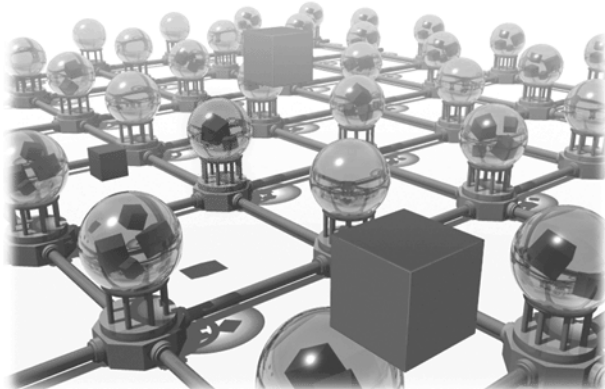
Copy Services

Tools

Help

Welcome to

IBM TotalStorage™ Enterprise Storage Server™



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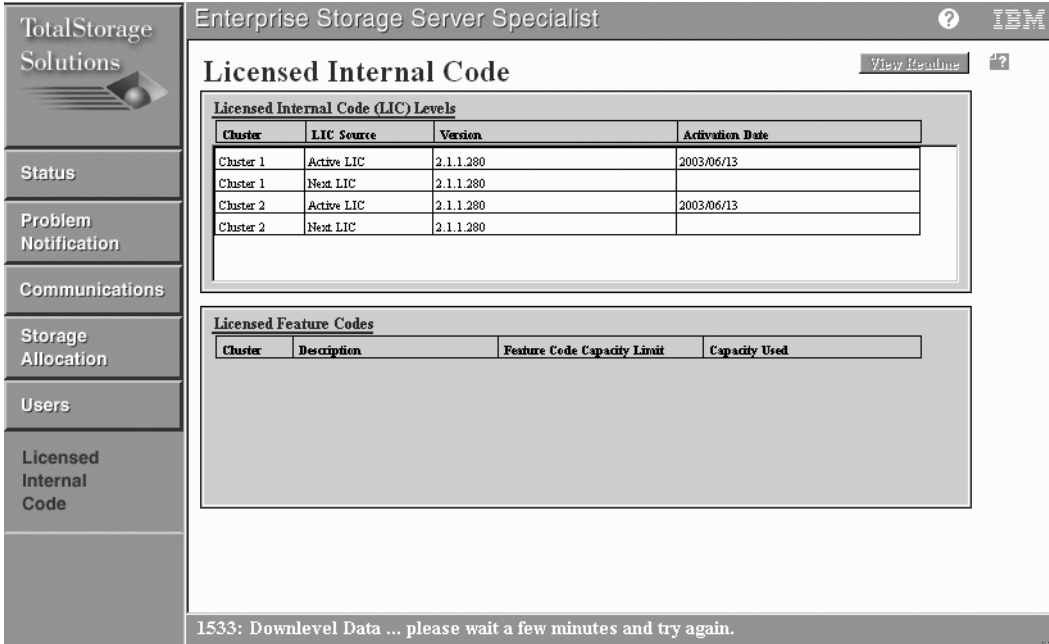
Do not close, resize, or reload this browser window while any ESS Specialist or Copy Services window is displayed and in use.

Checking the License Internal Code

Checking the License Internal Code

To check the License Internal Code, complete the following steps.

Step	Action
1	Click ESS Specialist from the menu on the first screen of the UI.
2	Click Licensed Internal Code from the menu on the main screen, as shown in the figure. 

Step	Action
3	Verify the correct License Internal Code as it appears on the screen, as shown in the figure. Note_____ The following illustration does not necessarily contain the actual License Internal Code you should be using. Go to “Features” on page 3 for the supported License Internal Code. _____  The screenshot shows the 'Enterprise Storage Server Specialist' application window. On the left is a sidebar with the 'TotalStorage Solutions' logo and several menu items: Status, Problem Notification, Communications, Storage Allocation, Users, and Licensed Internal Code (which is currently selected). The main window title is 'Enterprise Storage Server Specialist' with a help icon and the IBM logo. Below the title bar, the section 'Licensed Internal Code' is active, with a 'View Details' button. It contains two tables. The first table, 'Licensed Internal Code (LIC) Levels', has columns for Cluster, LIC Source, Version, and Activation Date, and lists data for Cluster 1 and Cluster 2. The second table, 'Licensed Feature Codes', has columns for Cluster, Description, Feature Code Capacity Limit, and Capacity Used, but it is currently empty. At the bottom of the window, a status bar displays the message: '1533: Downlevel Data ... please wait a few minutes and try again.'

Adding your gateway to the host list on your storage subsystem

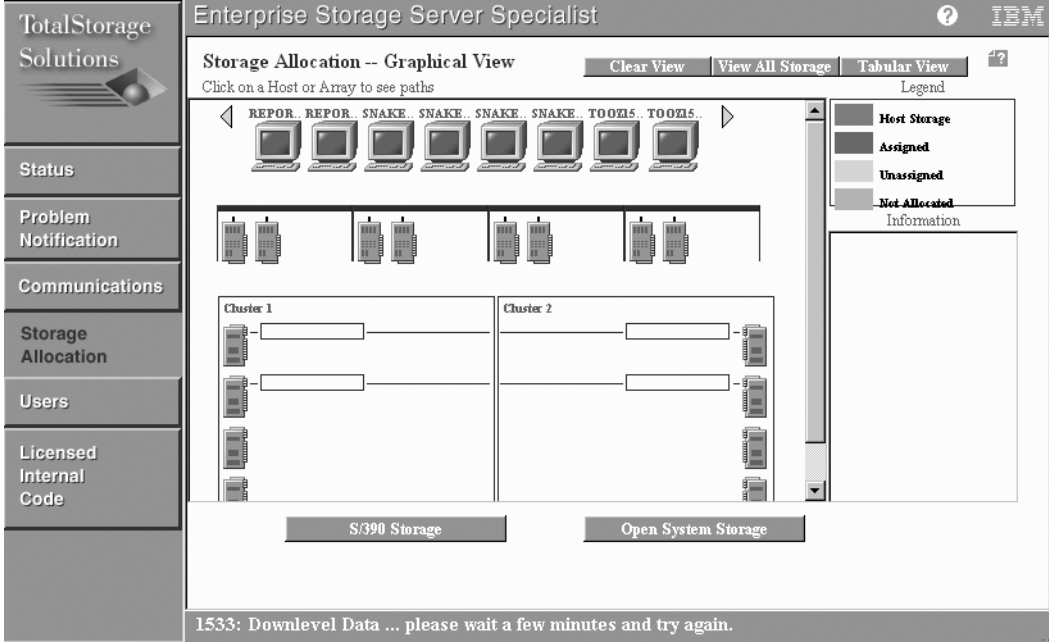
About adding your gateway You must create a host group for each HBA port you plan to make a connection from to your storage subsystem.

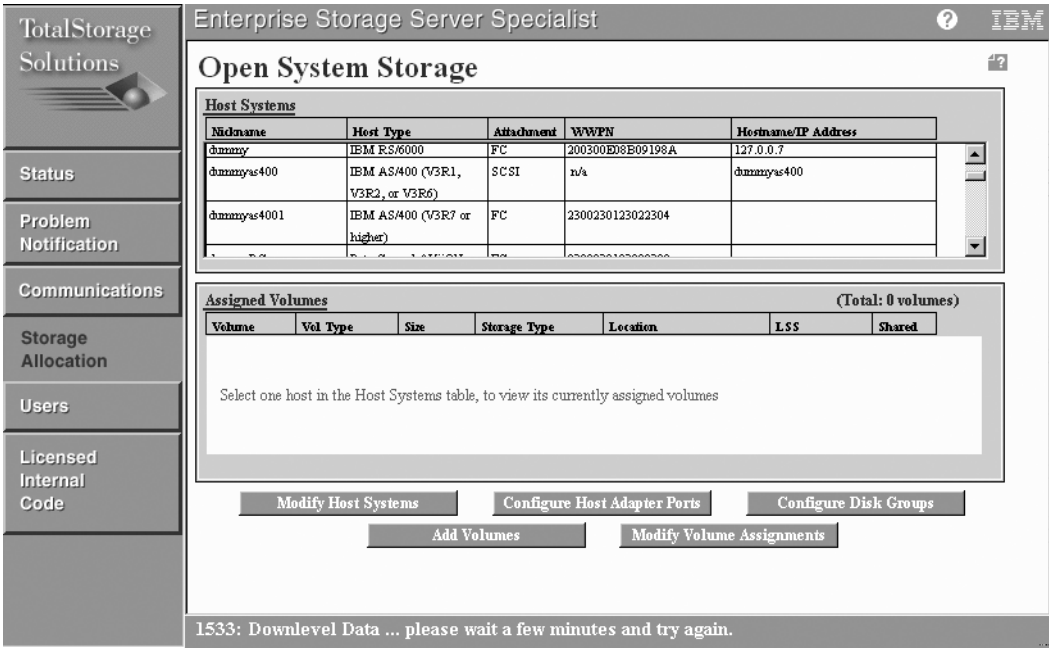
Because formatting LUNS takes time to complete, you should first create a dummy host, which you use to create and format LUNs prior to assigning them to the actual gFiler gateways. You can do this before your gateway is installed. For more details, go to “[Adding LUNs](#)” on page 46.

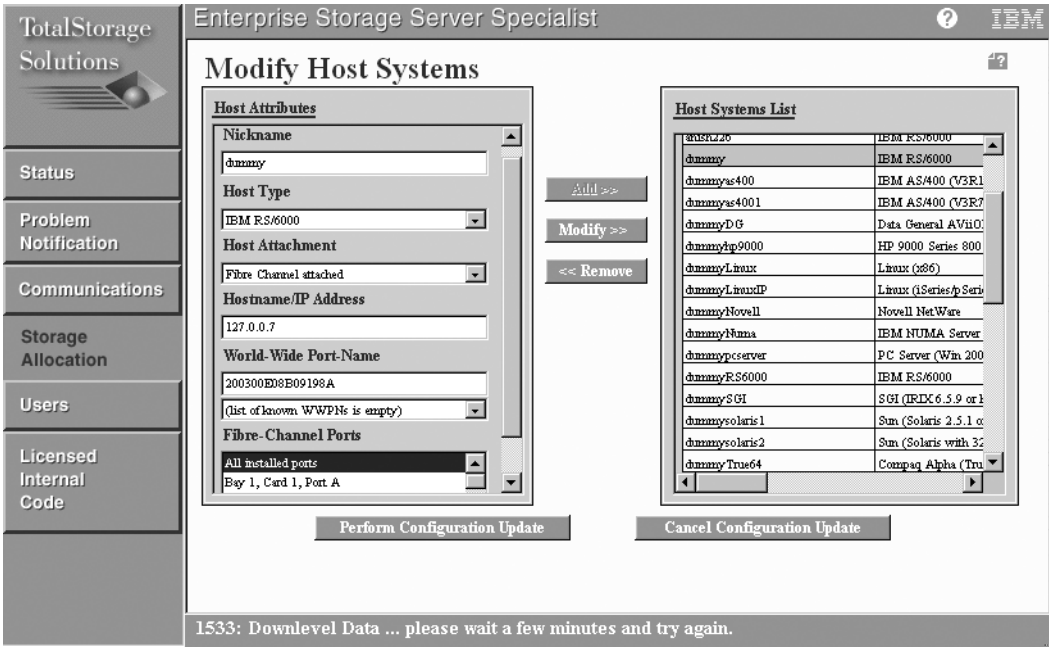
Adding your gateway You add your gateway to the host list on your storage subsystem to establish a logical connection for mapping LUNs.

To add your gateway to the host list, complete the following steps.

Step	Action
1	Go to the main screen.

Step	Action
2	Click Storage Allocation, which produces the Storage Allocation-Graphical View screen, as shown in the figure.  The screenshot shows the 'Enterprise Storage Server Specialist' application window. The title bar includes a question mark icon and the IBM logo. Below the title bar, the window is titled 'Storage Allocation -- Graphical View'. There are three buttons: 'Clear View', 'View All Storage', and 'Tabular View'. A legend on the right side indicates: 'Host Storage' (dark gray), 'Assigned' (medium gray), 'Unassigned' (light gray), and 'Not Allocated' (white). The main area displays two clusters, Cluster 1 and Cluster 2, each with a list of storage units. At the bottom, there are two buttons: 'S/390 Storage' and 'Open System Storage'. A status bar at the very bottom displays the message: '1533: Downlevel Data ... please wait a few minutes and try again.'
3	Click Open System Storage at the bottom of the screen.

Step	Action
4	Click Modify Host Systems at the bottom of the screen. 
5	Select the correct attributes to add your gateway as a host, according to the following list: ◆ Nickname—The following naming conventions are recommended: ❖ Name one host <i>dummy</i> for adding LUNs. The dummy host must specify only the host type attribute, which is RS/6000. ❖ Name hosts based on a series for gateway HBAs (for example, snake-1, snake-2) ◆ Host Type—IBM RS/6000 ◆ Host Attachment—Fibre Channel Protocol ◆ Hostname/IP address—provided by user ◆ World-Wide Port-Name—provided by accessing gateway WWNs ◆ Fibre Channel Ports—select All Installed Ports

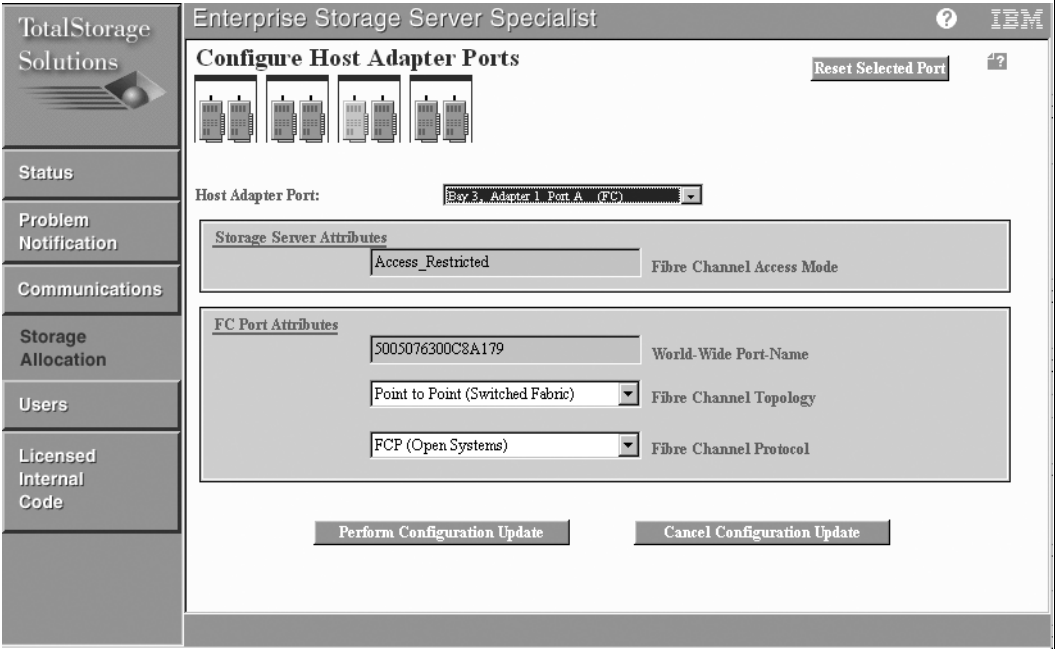
Step	Action
6	Click Add to add your gateway to the Host Systems List:  1533: Downlevel Data ... please wait a few minutes and try again.

Configuring host adapter ports on the storage subsystem

Configuring host adapter ports

You configure host adapter ports on your storage subsystem to establish port access to LUNs.

To configure your host adapter ports, complete the following steps.

Step	Action
1	Return to the Open Systems Storage screen.
2	Click Configure Host Adapter Ports at the bottom of the Open Systems Storage screen.
3	Select the correct Host Adapter Port from the drop-down menu at the top of the screen and select the correct attributes, as shown in the figure.
	
4	After you finish modifying the host and configuring the host adapter ports, click Perform Configuration Update at the bottom of the screen.

Adding LUNs

When to add LUNs You add LUNs (called *volumes* on the IBM storage subsystem UI) for your gateway after you create the dummy host on the storage subsystem. You can use the dummy host to create more LUNs for your gateway.

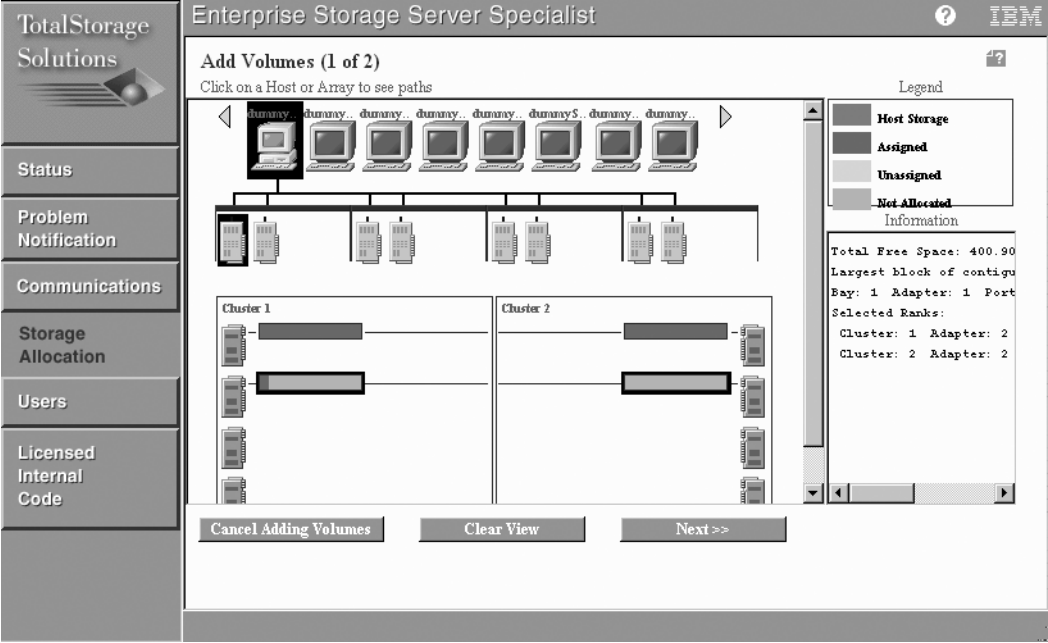
To map LUNs to the actual gFiler gateway, follow the procedure described in Chapter 4, “[Modifying LUNs on your storage subsystem](#),” on page 50.

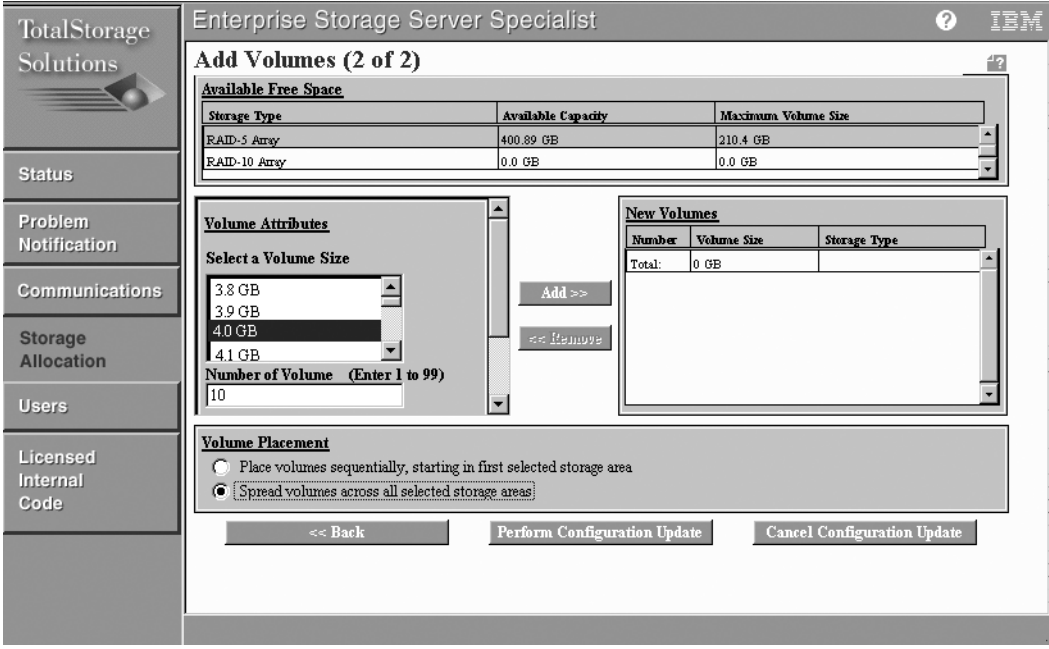
Caution—
You must always add LUNs to the dummy host. The gFiler gateway cannot recognize LUNs while they are being formatted by the storage subsystem. Adding LUNs to the actual gFiler gateway using the *Add Volumes* option can cause data corruption.

Adding LUNs To add LUNs on your storage subsystem, complete the following steps.

Note—
The term *volume* is used to mean *LUN* in the following procedure.

Step	Action
1	Go to the Open Systems Storage screen.
2	Click Add Volumes on the Open Systems Storage screen.

Step	Action
3	Select the dummy host and the cluster on which your gateway connects to your storage system by clicking the appropriate icons, as shown in the figure.  The screenshot displays the 'Enterprise Storage Server Specialist' application window. The title bar reads 'Enterprise Storage Server Specialist' with an IBM logo. The main window is titled 'Add Volumes (1 of 2)' and includes a sub-instruction: 'Click on a Host or Array to see paths'. At the top, there is a row of eight dummy host icons, each labeled 'dummy.'. The first icon is highlighted with a black border. Below the hosts, a tree structure shows four clusters. The first cluster, 'Cluster 1', is highlighted. The interface also features a legend on the right with three categories: 'Host Storage' (Assigned, Unassigned, Not Allocated) and an 'Information' panel. The information panel displays: 'Total Free Space: 400.90', 'Largest block of contiguous space: 400.90', 'Bay: 1 Adapter: 1 Port: 1', and 'Selected Ranks: Cluster: 1 Adapter: 2 Cluster: 2 Adapter: 2'. At the bottom of the window are three buttons: 'Cancel Adding Volumes', 'Clear View', and 'Next >>'.
4	When you complete this stage, click Next at the bottom of the screen.

Step	Action
5	Select the Volume Size from the Volume Attributes scrolling list and determine the number of volumes desired at that size, as shown in the figure.  The screenshot shows the 'Enterprise Storage Server Specialist' interface. On the left is a sidebar with 'TotalStorage Solutions' and a menu with options: Status, Problem Notification, Communications, Storage Allocation, Users, and Licensed Internal Code. The main window is titled 'Add Volumes (2 of 2)'. It contains three main sections: 'Available Free Space' with a table of storage types and capacities; 'Volume Attributes' with a 'Select a Volume Size' list (showing 3.8 GB, 3.9 GB, 4.0 GB, 4.1 GB) and a 'Number of Volume' field (set to 10); and 'New Volumes' with a table for adding new volumes. At the bottom, there are radio buttons for 'Volume Placement' (sequential or spread across areas) and three buttons: '<< Back', 'Perform Configuration Update', and 'Cancel Configuration Update'.

Step	Action																																	
6	When you finish selecting the attributes of the volume you are creating, click Add, which is between the Volume Attributes list and New Volumes list, as shown in the figure. TotalStorage Solutions Status Problem Notification Communications Storage Allocation Users Licensed Internal Code Enterprise Storage Server Specialist Add Volumes (2 of 2) Available Free Space <table><thead><tr><th>Storage Type</th><th>Available Capacity</th><th>Maximum Volume Size</th></tr></thead><tbody><tr><td>RAID-5 Array</td><td>360.88 GB</td><td>190.4 GB</td></tr><tr><td>RAID-10 Array</td><td>0.0 GB</td><td>0.0 GB</td></tr></tbody></table> Volume Attributes Select a Volume Size 0.1 GB 0.2 GB 0.3 GB 0.4 GB Number of Volume Add >> << Remove New Volumes <table><thead><tr><th>Number</th><th>Volume Size</th><th>Storage Type</th></tr></thead><tbody><tr><td>1</td><td>4.0 GB</td><td>RAID-5 Array</td></tr><tr><td>2</td><td>4.0 GB</td><td>RAID-5 Array</td></tr><tr><td>3</td><td>4.0 GB</td><td>RAID-5 Array</td></tr><tr><td>4</td><td>4.0 GB</td><td>RAID-5 Array</td></tr><tr><td>5</td><td>4.0 GB</td><td>RAID-5 Array</td></tr><tr><td>6</td><td>4.0 GB</td><td>RAID-5 Array</td></tr><tr><td>7</td><td>4.0 GB</td><td>RAID-5 Array</td></tr></tbody></table> Volume Placement ☐ Place volumes sequentially, starting in first selected storage area ☒ Spread volumes across all selected storage areas << Back Perform Configuration Update Cancel Configuration Update	Storage Type	Available Capacity	Maximum Volume Size	RAID-5 Array	360.88 GB	190.4 GB	RAID-10 Array	0.0 GB	0.0 GB	Number	Volume Size	Storage Type	1	4.0 GB	RAID-5 Array	2	4.0 GB	RAID-5 Array	3	4.0 GB	RAID-5 Array	4	4.0 GB	RAID-5 Array	5	4.0 GB	RAID-5 Array	6	4.0 GB	RAID-5 Array	7	4.0 GB	RAID-5 Array
Storage Type	Available Capacity	Maximum Volume Size																																
RAID-5 Array	360.88 GB	190.4 GB																																
RAID-10 Array	0.0 GB	0.0 GB																																
Number	Volume Size	Storage Type																																
1	4.0 GB	RAID-5 Array																																
2	4.0 GB	RAID-5 Array																																
3	4.0 GB	RAID-5 Array																																
4	4.0 GB	RAID-5 Array																																
5	4.0 GB	RAID-5 Array																																
6	4.0 GB	RAID-5 Array																																
7	4.0 GB	RAID-5 Array																																
7	When you finish configuring the volumes, click Perform Configuration Update at the bottom of the screen. Note_____ This task can take up to several hours to complete. _____																																	

Modifying LUNs on your storage subsystem

When to modify LUNs

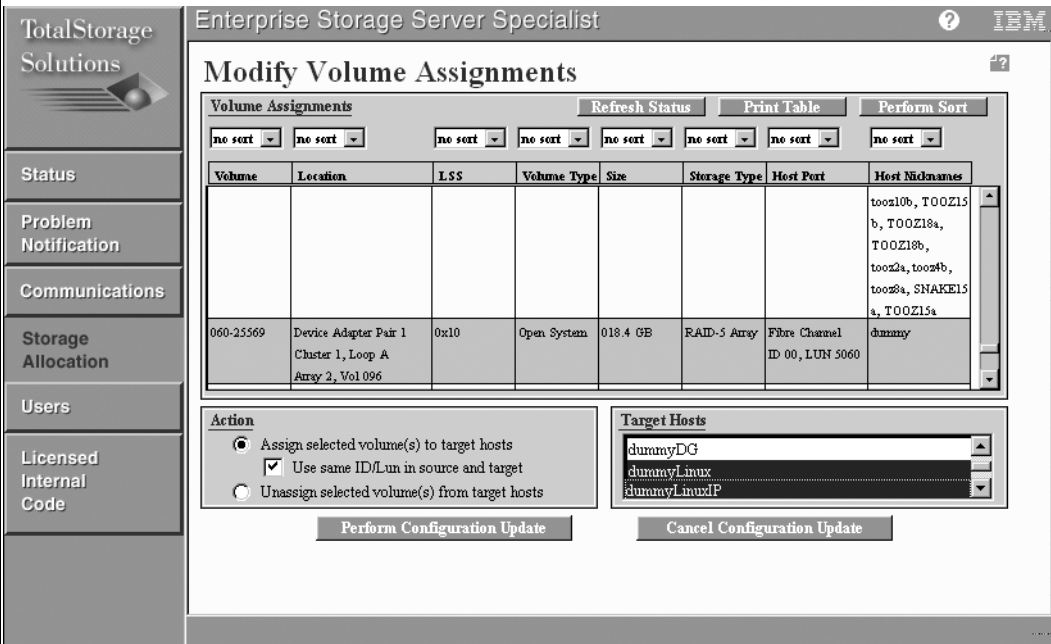
You modify LUNs after you have created your LUNs for the dummy host. You then reassign LUNs to the correct target hosts.

Caution—————
Your LUNs must be finished formatting before you modify LUNs on your storage subsystem or else data corruption can occur.

Modifying LUNs

To modify LUNs on your storage subsystem, complete the following steps.

Step	Action
1	Go to the Open Systems Screen.
2	Click Modify Volume Assignments at the bottom of the screen.

Step	Action																
3	Scroll through the Volume Assignments list and complete the following steps, using the figure for reference.  The screenshot shows the 'Enterprise Storage Server Specialist' interface. On the left is a sidebar with navigation options: TotalStorage Solutions, Status, Problem Notification, Communications, Storage Allocation (selected), Users, and Licensed Internal Code. The main window is titled 'Modify Volume Assignments'. It features a 'Volume Assignments' table with columns: Volume, Location, LSS, Volume Type, Size, Storage Type, Host Port, and Host Nicknames. Below the table are two sections: 'Action' with radio buttons for 'Assign selected volume(s) to target hosts' (selected), 'Use same ID/Lun in source and target' (checked), and 'Unassign selected volume(s) from target hosts'; and 'Target Hosts' with a list box containing 'dummyDG', 'dummyLinux', and 'dummyLinuxIP'. At the bottom are buttons for 'Perform Configuration Update' and 'Cancel Configuration Update'. <table><thead><tr><th>Volume</th><th>Location</th><th>LSS</th><th>Volume Type</th><th>Size</th><th>Storage Type</th><th>Host Port</th><th>Host Nicknames</th></tr></thead><tbody><tr><td>060-25569</td><td>Device Adapter Pair 1 Cluster 1, Loop A Array 2, Vol 096</td><td>0x10</td><td>Open System</td><td>018.4 GB</td><td>RAID-5 Array</td><td>Fibre Channel ID 00, LUN 5060</td><td>tooz10b, TOOZ15 b, TOOZ18a, TOOZ18b, tooz2a, tooz4b, tooz8a, SNAKE15 a, TOOZ15a dummy</td></tr></tbody></table> Action ☒ Assign selected volume(s) to target hosts ☒ Use same ID/Lun in source and target ☐ Unassign selected volume(s) from target hosts Target Hosts dummyDG dummyLinux dummyLinuxIP Perform Configuration Update Cancel Configuration Update 1. Scroll through the Volume Assignments list and select the volume you want to modify. 2. Click Assign Selected Volume(s) To Target Hosts. 3. Scroll through the Target Hosts list and select the appropriate host. 4. Click Perform Configuration Update at the bottom of the screen.	Volume	Location	LSS	Volume Type	Size	Storage Type	Host Port	Host Nicknames	060-25569	Device Adapter Pair 1 Cluster 1, Loop A Array 2, Vol 096	0x10	Open System	018.4 GB	RAID-5 Array	Fibre Channel ID 00, LUN 5060	tooz10b, TOOZ15 b, TOOZ18a, TOOZ18b, tooz2a, tooz4b, tooz8a, SNAKE15 a, TOOZ15a dummy
Volume	Location	LSS	Volume Type	Size	Storage Type	Host Port	Host Nicknames										
060-25569	Device Adapter Pair 1 Cluster 1, Loop A Array 2, Vol 096	0x10	Open System	018.4 GB	RAID-5 Array	Fibre Channel ID 00, LUN 5060	tooz10b, TOOZ15 b, TOOZ18a, TOOZ18b, tooz2a, tooz4b, tooz8a, SNAKE15 a, TOOZ15a dummy										

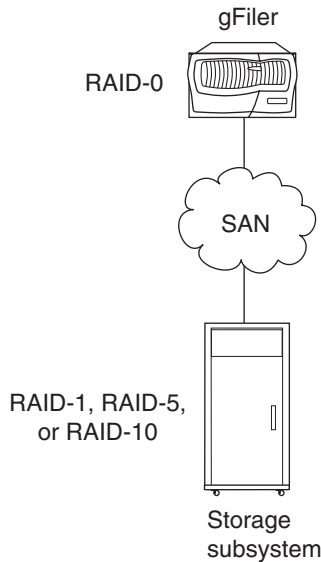
About this appendix This appendix defines some basic terms that are used in Data ONTAP that you might not be familiar with, and provides a “mapping” between the terms that the storage system users and the gFiler users might be using.

Topics in this appendix This chapter discusses the following topics:

- ◆ [“Terms”](#) on page 54
- ◆ [“Terminology differences in Data ONTAP documents”](#) on page 57

Terms

Array	On the storage subsystem, the arrangement of disks in the back-end that together form the defined RAID level.
Channel adapter (CHA)	Includes the Client-Host Interface Processor (CHIP). The interface between the system and hosts or servers on an open system.
Cluster	Two gFilers directly connected to each other. This type of deployment provides redundancy in case one gFiler in the cluster becomes unavailable. Each of the gFilers in the cluster might be referred to as a node—a local node or a partner node.
LUN	Logical Unit Number (LUN). An area on the storage subsystem that is available for a gFiler or non-gFiler host to read data from or write data to. The gFiler gateway series documents use the term LUN instead of the IBM term volume to distinguish the storage area on the storage subsystem from Data ONTAP volumes. See <i>Volume</i> .
gFiler Neighborhood	The number of nodes that can see each others' LUNs. When you configure LUNs on the storage subsystem, you identify the hosts in particular gFiler neighborhoods.
Node	In a gFiler cluster, either the local or partner gFiler.
RAID protocols supported	gFilers support storage subsystems that use the RAID-1, RAID-5, and RAID-10 protocols, although the gFilers do not themselves use RAID-1, RAID-5, or RAID-10. The following illustration provides a conceptual view of RAID-0 used on the gFiler and the RAID-1, RAID-5, and RAID-10 storage subsystems.



The gFiler stripes across LUNs in RAID-0, thereby maximizing performance because it is using more spindles. Another benefit of the gFiler using RAID-0 for striping across LUNs is that you can add LUNs to a NetApp volume.

There is no need for the gFiler to provide disk protection. The LUNs are already protected with the redundancy provided by RAID-1, RAID-5, and RAID-10 on the storage systems.

Note

NetApp filers use the RAID-4 protocol for disk protection. RAID-4 protocol is not needed for gFilers because the storage subsystems provide disk protection. Most of the disk information in the Data ONTAP documentation does not apply to the gFiler because it is about RAID-4.

RAID group

A NetApp volume is composed of one or more NetApp RAID (Redundant Array of Independent Disks) groups. From the perspective of gFilers, Data ONTAP uses RAID groups to determine where to allocate data to the LUNs. (From the perspective of NetApp filers, a RAID group is composed of one or more data disks, across which client data is striped and stored, plus one or two parity disks that ensure data recoverability even if as many as two disks within the RAID group fail.)

Each RAID group belongs to only one volume (physical file system); you cannot assign a RAID group to more than one volume.

See “[Volume](#)” on page 56.

Volume

On IBM storage subsystems, a volume is an area on the storage subsystem that is available for a gFiler or non-gFiler host to read data from or write data to. gFiler documents refer to such an area as a *LUN*. When you see the term *volume* in the gFiler and Data ONTAP documentation, the term refers to Data ONTAP volumes.

In Data ONTAP, *volumes* are the primary means of organizing and managing data. You can think about a volume as a container for storing data. You identify the collection of LUNs that are to be in the volume (where collection could mean only one LUN); those LUNs provide the capability for data storage. You manage data storage by managing volumes through the Data ONTAP system administration interface.

The capability of associating LUNs with volumes provides you a great deal of flexibility for data management. For example, you could create volumes to accommodate your users if they speak more than one language; you could create one volume for data in French and another for data in German. Alternatively, you can include all LUNs in one volume, the root volume that the gFiler setup process creates. The *gFiler Gateway Series Software Installation, Setup, and Management Guide* contains information about volume management.

Relationship of RAID groups to volumes: A Data ONTAP volume is composed of one or more NetApp RAID groups.

Terminology differences in Data ONTAP documents

Terminology differences

In some cases, different terminology is used between filer users and gFiler users. In most cases, the Data ONTAP documents use the terminology relevant to filer users. Therefore, you have to “translate” some of the words in the Data ONTAP documents to the context applicable to the gFiler. For example:

- ◆ Filers store data on disks in disk shelves. gFiler gateways access data stored in LUNS on the storage subsystems.
- ◆ Translate the term *filer* to *gFiler* or *gateway*.
- ◆ Translate the term *disk* to *LUN*.

If a command uses the term *disk*, replace it with the term *LUN*. For example, the `vol create` command syntax after replacing *disk* with *LUN* is

```
vol create volname LUN-list
```

- ◆ Generally, you can disregard discussions about disk shelves.

Any specific platform information stated for the filer is true for the gFiler series counterpart.

Feature update history

The following table lists and describes the history of changes made to this manual. When a change is implemented, it applies to the release in which it was implemented and all subsequent releases, unless otherwise specified.

Feature updates	Feature first implemented in	Feature release date
◆ Initial release of this manual	Data ONTAP 6.5	January 2004
◆ Update for GF270c	Data ONTAP 6.5.1	May 2004

