

gFiler™ Gateway Series Data ONTAP™ 6.5.1 **Upgrade Guide**

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Preface

Introduction

This guide describes how to upgrade the Network Appliance™ gFiler™ gateways to the latest release of Data ONTAP™ software. The information in this guide pertains to all the supported gFiler platforms: GF270c, GF825/GF825c, GF920/GF920c, GF940/GF940c, and the GF960/GF960c.

Audience

This guide is for system engineers and system administrators who are familiar with operating systems that run on the gateway's clients, such as UNIX®, Windows® 95, Windows NT®, and Windows 2000. This guide does not cover basic system or network administration topics, such as IP addressing, routing, and network topology; it emphasizes the characteristics of the NetApp® gateway.

Terminology

When the term “gateway” or “gFiler” is used, the information applies to all NetApp gateway models unless a specific model is specified.

This guide uses the term “type” to mean pressing one or more keys on the keyboard. It uses the term “enter” to mean pressing one or more keys and then pressing the Enter key.

Where you enter commands

You can enter Data ONTAP commands either on the system console or from any client computer that can access your gateway through a Telnet session.

Command conventions

In examples that illustrate commands executed on a UNIX workstation, this guide uses the command syntax of SunOS 4.1.x. The command syntax and output might differ, depending on your version of UNIX.

Keyboard conventions

When describing key combinations, this guide uses the hyphen (-) to separate individual keys. For example, “Ctrl-D” means pressing the “Control” and “D” keys simultaneously. Also, this guide uses the term “Enter” to refer to the key that generates a carriage return, although the key is named “Return” on some keyboards.

Typographic conventions

The following table describes typographic conventions used in this guide.

Convention	Type of information
<i>Italic font</i>	Words or characters that require special attention. Placeholders for information you must supply. For example, if the guide says to enter the <code>arp -d hostname</code> command, you enter the characters “arp -d” followed by the actual name of the host. Book titles in cross-references.
Monospaced font	Command and daemon names. Information displayed on the system console or other computer monitors. The contents of files.
Bold monospaced font	Words or characters you type. What you type is always shown in lowercase letters, unless you must type it in uppercase letters.

Special messages

This guide might contain 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.



Do not proceed with gFiler software upgrade or installation until you have read the *Getting Started Guide* for your vendor and the *Release Notes*. These documents contain information about storage system software and parameter settings that are essential for a successful gFiler software upgrade and installation.

The following *Getting Started Guides* are available in the gFiler Gateway Series library:

- ◆ *Getting Started for Hitachi Data Systems*
- ◆ *Getting Started for IBM*
- ◆ *Getting Started for Hitachi, Limited*

Caution

Be sure to follow the procedures in this upgrade guide to upgrade your gFiler to Data ONTAP 6.5.1. Certain steps are required to upgrade to 6.5.1 from releases prior to the 6.5 family that have not been required for previous gFiler upgrades.

About this chapter

This chapter contains information to help you ensure that your gFilers meet the requirements for upgrading to the new version of Data ONTAP. Additionally, this chapter provides information about some issues you might encounter during an upgrade. Because new features are introduced in each release of Data ONTAP, you might encounter issues when upgrading, especially if you are not upgrading from the immediately previous version of Data ONTAP.

Topics in this chapter

This chapter describes the following topics:

- ◆ [“Client and system requirements”](#) on page 2
- ◆ [“Pre-upgrade checklists”](#) on page 3
- ◆ [“Tips for upgrading to Data ONTAP 6.5.1”](#) on page 5
- ◆ [“Firmware and software requirements”](#) on page 7
- ◆ [“Planning for upgrading clusters”](#) on page 9
- ◆ [“Planning for upgrading gFilers running SnapMirror”](#) on page 12
- ◆ [“Planning for gFilers with FC-AL adapters”](#) on page 14
- ◆ [“Changes in Data ONTAP 6.5 that affect upgrade”](#) on page 17

Client and system requirements

Client requirements The client from which you upgrade your gFiler must have access to at least one of the following:

- ◆ An HTTP server containing Data ONTAP updates
- ◆ The NetApp NOW Web site
- ◆ A CD-ROM drive

You must be able to administer the gFiler from the client.

You can upgrade from either a Windows client or a UNIX client. The following table lists the requirements for each type of client.

Client	Requirement
UNIX	Any available version of UNIX
Windows	Any version of Windows (Windows NT must be version 3.51 or later)

Pre-upgrade checklists

Preparation for site visits

If you are a system engineer responsible for customer upgrade and installations, use the following information to determine what you need to do before you go to customer sites.

	Task	How to do it	Comments
	Materials to obtain before going to the customer site		
	(Optional) Obtain 256-MB CompactFlash™ cards if you want to replace 32-MB cards with 256-MB cards.	If you are using the existing Return Material Authorization (RMA) process to replace a 32-MB card with a 256-MB card, obtain the card by submitting a request at http://now.netapp.com/Self-Service/FORMS/frmSearch.asp?ObjType=NA_WEB_SUBMIT_RMA or by following the instructions from your authorized reseller.	See “ Secondary image on systems with 32-MB CompactFlash cards ” on page 4 for information to help you decide whether to install 256-MB cards.
	(Recommended) Download the required gFiler system firmware and the required Data ONTAP software onto your laptop computer before going to a customer site.	See the instructions in Chapter 2, “ About upgrading the system firmware ,” on page 22 and Chapter 3, “ Upgrading Data ONTAP on the gFiler ,” on page 43.	The gFiler must be upgraded to system firmware 4.2.2 or later before upgrading to Data ONTAP 6.5.1. If the gFiler is running Data ONTAP 6.4 or 6.4.1, you must upgrade to Data ONTAP 6.4.2x before upgrading to 6.5.1.

Secondary image on systems with 32-MB CompactFlash cards:

During a Data ONTAP upgrade on CompactFlash-based systems, the down load command copies a new boot image to the CompactFlash card and attempts to back up the existing boot image as a secondary boot image. Beginning with Data ONTAP 6.5, two boot images cannot fit on 32-MB CompactFlash media; therefore, a secondary CompactFlash boot image is not available. Although the secondary image is no longer available, the alternative mechanisms of booting over a network (netboot) for recovery are adequate. It is unlikely that a secondary image will be required.

Note

NetApp gFilers support only CompactFlash media distributed by NetApp and its partners.

Upgrade overview for a gFiler

The following checklist provides an overview of the main steps in upgrading a gFiler after you complete planning.

	Task	How to do it	Comments
	At the console of the gFiler, check the current gFiler firmware level	Enter the following command: sysconfig -v 0	If the system firmware is not at version 4.2.2 or later, see Chapter 2, “ About upgrading the system firmware ,” on page 22 for the procedure for how to upgrade the firmware.
	Determine the version of Data ONTAP that the gFiler is running.	Enter the following command at the console: version	The upgrade process differs depending on the version of the software installed on the gFiler.
	Upgrade the Data ONTAP software.	Follow the instructions in Chapter 3, “ Upgrading Data ONTAP on the gFiler ,” on page 43.	—

Tips for upgrading to Data ONTAP 6.5.1

Tips for a smooth conversion

Starting with Data ONTAP 6.5, support for larger inodes is provided. For the smoothest conversion to larger inodes, keep the following tips in mind before upgrading to Data ONTAP 6.5.1:

- ◆ Upgrade during non-peak hours.
- ◆ Keep the gFiler workload moderate to enable faster upgrade.
- ◆ If you are serving files with the CIFS protocol, ensure that the file system is not 100% full.
- ◆ Avoid performing a quota initialization prior to upgrading. If a quota initialization is begun prior to upgrading, wait for the initialization to be completed.

Note

Depending on your system, the 6.5.1 upgrade from a pre-6.5 release can take several hours. During the upgrade, the gFiler continues to serve data, however. An upgrade within the 6.5 release family takes less time.

Rules for reverting to an earlier release

If you begin upgrading to Data ONTAP 6.5.1 and then decide that you want to revert to an earlier Data ONTAP release, you must complete the 6.5.1 upgrade before reverting.

You should revert to an earlier release only with the assistance of NetApp staff or your authorized reseller. For more information, see Chapter 4, “[Reverting 6.5.1 Software to a Previous Release](#),” on page 89. Also, the following guidelines apply:

- ◆ If you are reverting to a release prior to 6.5, you must disable any 6.5 family features before reverting.
- ◆ Reverting more than once is not recommended.

NetApp Technical Support contact information

The NetApp Technical Support contact information is included in the following table.

Telephone	FAX	Email
For U.S. customers: +1 (888) 463-8277 For international customers: +1 (408) 822-6000 (ask for Technical Support)	+1 (408) 822-4501	support@netapp.com

Firmware and software requirements

Firmware and software version requirements

The following table summarizes the gFiler system firmware and Data ONTAP software upgrade paths for upgrading to Data ONTAP 6.5.1.

If you are upgrading from this Data ONTAP release...	Your upgrade requirements are...
6.4 or 6.4.1	System firmware ◆ Upgrade to 4.2.2 or later. See “Requirements if you are upgrading from 6.4.1” on page 7. Data ONTAP ◆ Upgrade to a version of Data ONTAP 6.4.2 first, then upgrade to 6.5.1 (or later).
6.4.2 (any version of)	System firmware ◆ Upgrade to 4.2.2 or later. Data ONTAP ◆ Upgrade directly to 6.5.1 (or later, for example, to a 6.5.1R release).
6.5 or 6.5R1	System firmware ◆ Optionally upgrade to a version later than 4.2.2. Data ONTAP ◆ Upgrade directly to 6.5.1 (or later).

Requirements if you are upgrading from 6.4.1

Requirements when upgrading from Data ONTAP 6.4.1 are as follows.

Service partition: You must manually format the service partition before upgrading the system firmware to version 4.2.2 or later. Otherwise, the gFiler cannot upgrade to 4.2.2 and future firmware releases. See “[Installing the](#)

[firmware/diagnostic service image—GF800 series](#)” on page 26 or “[Installing the firmware/diagnostic service image—GF900 series](#)” on page 31 for information about how to manually format the service partition.

Progressive upgrade path: If your gFiler is running a version of Data ONTAP earlier than 6.4.2, you must install Data ONTAP 6.4.2 or the latest Data ONTAP 6.4.x version before upgrading to Data ONTAP 6.5.1. If you attempt to download Data ONTAP 6.5.1 on your gFiler before installing the latest version of Data ONTAP 6.4.x, the download stops and the gFiler displays a message similar to the following:

```
hw-173> download
download: Depending on system load, it may take many minutes
download: to complete this operation. Until it finishes, you will
download: not be able to use the console. You can cancel this
download: operation by hitting Ctrl-C in the next 6 seconds.
Mon Dec 15 20:55:46 GMT [download.request:notice]: Operator
requested download initiated
download: Files /etc/boot/netapp-x86 and /etc/boot/na_bootcard-x86
are not the same version.
hw-173> Mon Dec 15 20:55:47 GMT [download.requestDone:notice]:
Operator requested download completed
```

Sources of upgrade firmware and Data ONTAP software

The following sources are for upgrading firmware and system software:

- ◆ The NetApp on the Web (NOW) site at <http://now.netapp.com>.
NOW login information is on the protocol license sheet sent with the gFiler.
- ◆ The CD-ROM supplied in the media package
- ◆ Your authorized reseller

Planning for upgrading clusters

Before upgrading clustered gFilers

Before upgrading your clustered gFilers, complete the following steps.

Step	Action
1	Verify that the cluster is properly configured by using the Cluster Configuration Checker (cf-config-check.cgi). The Cluster Configuration Checker is a Perl script that detects errors in the configuration of a pair of clustered gFilers. It is available on NOW at http://now.netapp.com/NOW/download/tools/cf_config_check/ .
2	Identify and resolve any cluster configuration issues before continuing with the upgrade.
3	Determine the method that you will use to upgrade your cluster.

For more information about the Cluster Configuration Checker, see Chapter 7, “Cluster Management” in the *Data ONTAP Storage Management Guide*.

Cluster upgrade methods

The following methods are available for how you can upgrade cluster partners:

- ◆ Nondisruptive
- ◆ Standard

When planning for your upgrade, evaluate the advantages and disadvantages of each method. Each method is described in this section.

How nondisruptive cluster upgrades work

In a *nondisruptive upgrade* (also called a *rolling upgrade*), clustering technology is used to enable a takeover gFiler to assume the functions of the “failed” partner while the failed partner is being upgraded. One gFiler, therefore, is always alive. Because the gFiler’s cluster partner fulfills service requests during the gFiler’s upgrade, no disruption in service is experienced by the clients.

Additionally, because the takeover gFiler assures continuous availability of the failed gFiler's storage, more extensive upgrades requiring a system halt—such as system firmware upgrades and hardware adapter replacements—can be performed without disrupting services that are based on stateless protocols (such as NFS, FCP, and iSCSI).

NetApp recommends that you use the nondisruptive upgrade procedure to minimize service disruption in your clusters when one or more of the following is being performed:

- ◆ An upgrade within a release family (for example, from 6.5 to 6.5.1)
A release family is the set of releases that have the same feature release name denoted by the first two digits of the release number; for example, 6.5, 6.5R1, and 6.5.1 are in the same release family.

Note

You cannot use the nondisruptive upgrade method if you are upgrading from a release family earlier than 6.5, for example, from 6.4.1 to 6.5.1.

- ◆ A system firmware upgrade
See “[Installing system firmware—nondisruptive cluster method](#)” on page 35 for instructions.
- ◆ Certain hardware upgrades
See Appendix A, “[Nondisruptive Hardware Upgrade in a Cluster](#),” on page 103 for more information.

Note

The nondisruptive upgrade process is applicable only to clusters; it cannot be used to upgrade a single node.

There is no advantage to employing nondisruptive upgrades for service availability for gFilers serving CIFS, FTP, and NDMP clients. Because these protocols are session-oriented, sessions must be terminated before upgrade procedures to prevent data loss.

How standard cluster upgrades work

In a standard upgrade, you must disable the cluster and update and reboot each node as quickly as possible. When you disable the cluster, each node behaves as a single-node (non-clustered) gFiler; that is, the system services associated with that node are disrupted for as long as it takes the system to reboot. Other maintenance upgrades, such as system firmware and hardware, must also take place when the cluster is disabled.

In general, standard upgrades are most appropriate when you can schedule a downtime for your gFiler.

You must use a standard upgrade for upgrades between Data ONTAP release families.

Mixing Data ONTAP software versions in clusters

You can run different versions of Data ONTAP 6.5x on cluster partners, for example, 6.5 on one partner and 6.5.1 on the other partner. However, you cannot run 6.4.x on one gFiler in the cluster and 6.5 or later on the other.

Planning for upgrading gFilers running SnapMirror

Upgrade requirements for SnapMirror

If you are upgrading Data ONTAP on gFilers that are running SnapMirror® software, you must upgrade the gFilers with SnapMirror destination volumes *before* you upgrade the gFilers with SnapMirror source volumes. For SnapMirror volume replication, the destination volume must run under a version of Data ONTAP the same as or later than the version of the SnapMirror source volume.

This requirement applies to both asynchronous and synchronous SnapMirror deployments.

Caution

If you do not upgrade the gFilers with SnapMirror destination volumes before upgrading those with source volumes (in other words, if you do not upgrade SnapMirror destination and source gFilers in the correct order), SnapMirror volume replication is disabled.

Identifying SnapMirror destination volumes

SnapMirror source volumes can be replicated to single or multiple destination volumes (replication to multiple destination volumes is also referred to as replication to *cascading destinations*). When you upgrade Data ONTAP, you must identify all destination volumes and then upgrade the gFilers on which they reside before upgrading the gFiler where the source volume resides. In addition, when you upgrade gFilers in a cascading series, upgrade the gFilers in order, beginning with the destination gFilers furthest in your topology from the source gFiler.

To identify gFilers with SnapMirror destination volumes, complete the following step.

Step	Action
1	On the gFiler with the source volume, enter the following command: <pre>snapmirror destinations</pre> Result: The <code>snapmirror</code> command lists all destination volumes, including cascaded destinations. For more information about the <code>snapmirror</code> command and options, see the NetApp <code>snapmirror(1)</code> man page.

**Upgrading gFilers
running
synchronous
SnapMirror**

When you upgrade Data ONTAP on gFilers running synchronous SnapMirror, SnapMirror goes into an asynchronous mode. When in asynchronous mode, the source gFiler asynchronously replicates data to the destination every minute until a synchronous replication can be reestablished.

**Why you must plan
for SnapMirror
upgrades**

When you upgrade Data ONTAP on gFilers that have a mirrored relationship with each other using SnapMirror, the order in which you upgrade the gFilers is critical. If you do not upgrade in the correct order, you can cause a lapse in SnapMirror replication coverage.

A SnapMirror transfer is initiated when the destination gFiler reads a snapshot of the source gFiler. Therefore, the destination gFiler must be upgraded first, so that it can read the snapshots of the earlier release. If the source gFiler is upgraded first, the destination gFiler cannot read the source gFiler's file system, thereby disabling SnapMirror.

**For more
information**

For more information about running SnapMirror on gFilers configured for network attached storage (NAS), see the *Data ONTAP Data Protection Online Backup and Recovery Guide*.

Planning for gFilers with FC-AL adapters

Upgrade issues for gFilers with FC-AL adapters

If your gFiler has FC-AL adapters, you might need to change the jumpers on the adapter when you upgrade. For gFilers, an FC-AL adapter is the Fibre Channel Host Bus Adapter (HBA) that connects to your storage subsystem.

If the gFiler is running Data ONTAP release...	Then...
6.5 or later	The operation can be 1 Gb and 2 Gb or 1 Gb only. You do not need to change adapter settings.
6.4, 6.4.1, 6.4.2x*	The operation must be 1 Gb only—the jumper must be on pins 2 and 3 no matter what firmware version is running on the gFiler.

* Data ONTAP 6.4.3 and 6.4.4 are not supported on gFilers. For filers running Data ONTAP 6.4.3 or 6.4.4, the operation can be 1 Gb and 2 Gb or 1 Gb only.

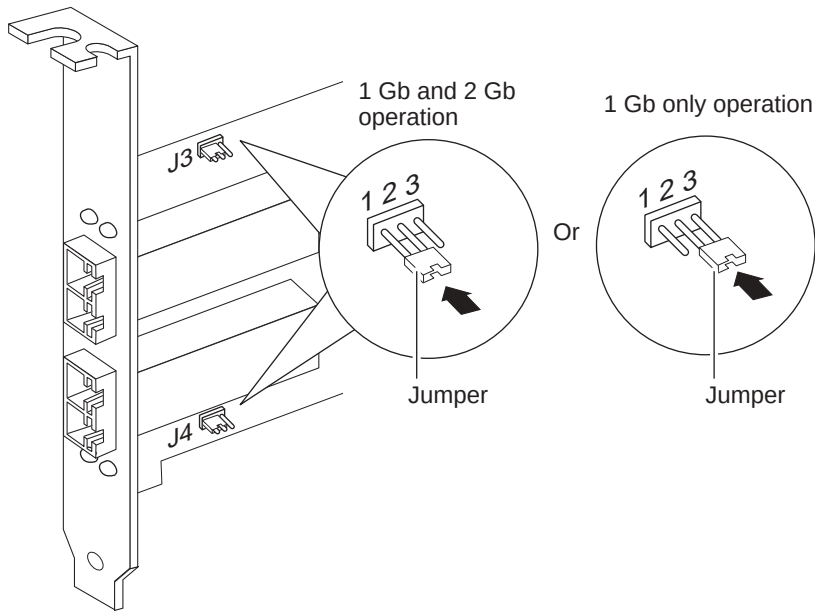
Configuring FC-AL adapters on the gFiler: The procedure described in this section applies if the FC-AL adapters on your gFiler have the following marketing and spare part numbers:

- ◆ X2050A (SP-2050A)—Connects to storage
- ◆ X2051A (SP-2051A)—Connects to a tape backup device

To configure FC-AL adapters, complete the following steps, using the figure for reference.

Note_____

Do not apply any configuration changes to FCP target-mode adapters.



Step	Action
1	Verify that your system is running the correct software and, if applicable, the correct firmware for your FC-AL adapter configuration. Caution—— You must verify the software and firmware requirements of your system. Having the incorrect software or firmware version on your system might cause your FC-AL adapters to function improperly.

Step	Action	
2	Wearing an antistatic grounding leash, carefully remove the new FC-AL adapter from the plastic bag. If you are configuring existing FC-AL adapters in your system, remove these adapters from your system chassis, as described in your hardware guide. Caution_____ Do not remove your FCP target-mode adapters or change the jumper settings on your FCP target-mode adapters.	
3	If you are configuring your FC-AL adapter for...	Then...
	1 Gb and 2 Gb operations	(Optional) Verify that both jumpers are on pins 1 and 2. If not, change the jumpers to pins 1 and 2.
	1 Gb operation only Note _____ This configuration requires that all devices connected to your FC-AL adapters are configured for 1 Gb operation.	Verify that both jumpers are on pins 2 and 3. If not, change the jumper to pins 2 and 3.
4	Verify that both jumper posts J3 and J4 on the adapter have the same jumper settings. Caution_____ Your FC-AL adapter does not function properly if the two jumper posts have different jumper settings.	
5	Install your FC-AL adapter, as described in your gFiler hardware guide.	

Changes in Data ONTAP 6.5 that affect upgrade

New access rules for `/etc/exports` file

In Data ONTAP 6.5, access rules in the `/etc/exports` file changed. Rules that previously allowed read access to all hosts have been changed to allow no access. For example, this is a rule in pre-6.5 versions of Data ONTAP:

```
/vol/vol1 -rw=host1:host2
```

The rule meant that the hosts named `host1` and `host2` both had read-write access to `vol1`, while all other hosts had *read access*.

In Data ONTAP 6.5 and later, the rule now means that `host1` and `host2` have read-write access and all other hosts have *no access*. To allow read access for all hosts in 6.5, you need to add `-ro` after `vol1` to allow read access to all hosts:

```
/vol/vol1 -ro,rw=host1:host2
```

The first time you upgrade to Data ONTAP 6.5 or later, the `/etc/exports` file is changed automatically to be sure your rules work the same way:

```
/vol/vol1 -rw=host1:host2
```

are converted to the form

```
/vol/vol1 -ro,rw=host1:host2
```

When subsequent upgrades are performed, Data ONTAP assumes that the rules in the `/etc/exports` file have already been converted and additional conversions do not take place.

Other changes to the `/etc/exports` file in Data ONTAP 6.5 include the following:

- ◆ Line length is no longer restricted.
- ◆ The `-access` option is no longer available.
The `-access` option was used to list hosts that could have any access. Instead, the `-rw` and `-ro` options are used together to enable the same privileges.
- ◆ You can now list netgroups in the `rw=`, `ro=`, and `root=` options.
- ◆ The number of entries in an access option is no longer restricted.

RAID group size limits

The sizes of existing volumes' RAID groups remain the same as before the Data ONTAP 6.5 upgrade, even if the size exceeds the new limits. However, the `raidsize` option changes to the new, reduced limit, and any new RAID groups that are created as disks are added to the volumes to conform to the new `raidsize` option.

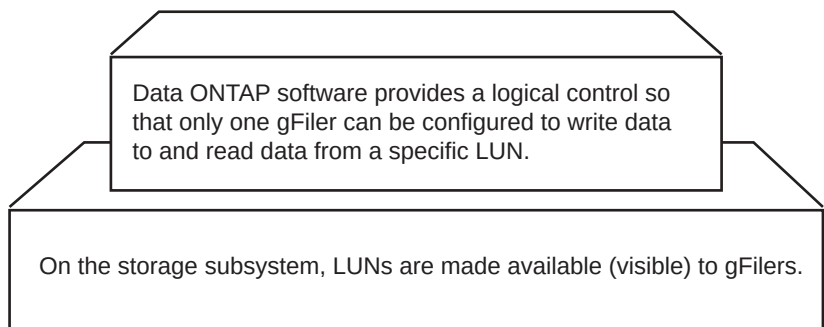
The default RAID group size for gFilers is 8; the limit is 14.

Change in the LUN ownership scheme in Data ONTAP 6.5

If you are upgrading from 6.5 or a 6.5R release, you can skip this section.

In pre-6.5 Data ONTAP releases, gFiler ownership of LUNs was based on a fixed Host LUN ID scheme that was configured by NetApp for you. For clusters, NetApp configured all LUNs with Host LUN IDs from 0 to 127 to one gFiler in the cluster, setting the LUN ownership to low. NetApp configured all LUNs with Host IDs from 128 to 255 to the other gFiler in the cluster, setting the LUN ownership to high.

Starting with Data ONTAP 6.5, gFilers began using a software-based scheme instead of the fixed scheme to control access of gFilers to LUNs that a storage subsystem makes available to gFilers. The following illustration shows the relationship between the LUNs that are made available for gFilers on the storage subsystem and configuration of the gFiler.



When you follow the upgrade procedure in this guide, the previous fixed LUN ownership scheme is upgraded to the new software-based scheme.

Caution

The gFiler software-based scheme provides LUN ownership control only for gFilers. It does not prevent gFilers and non-gFiler hosts from overwriting data in the same LUN. See the *gFiler Gateway Series Software Setup, Installation, and Management Guide* for deployment recommendations.

Flexibility provided by the software-based scheme

The software scheme enables you to make changes at the software level that previously could only be made at the hardware level. See the *gFiler Gateway Series Software Setup, Installation, and Management Guide* for more information about the software LUN ownership scheme for gFilers.

Reverting: If you revert to a version of Data ONTAP prior to 6.5, you must revert the LUN ownership scheme used in Data ONTAP 6.5 and later to the fixed scheme used by previous releases. See “[gFiler-specific reversion issues and procedures—6.5.1 to pre-6.5](#)” on page 94 for more information about how to revert to the fixed ownership scheme and issues involved with reverting.

About this chapter

This chapter provides information about firmware requirements and explains how you upgrade the firmware on the gFiler.

Topics in this chapter

This chapter discusses the following topics:

- ◆ [“About upgrading the system firmware”](#) on page 22
- ◆ [“Installing system firmware—single node and standard cluster method”](#) on page 26
- ◆ [“Installing system firmware—nondisruptive cluster method”](#) on page 35

About upgrading the system firmware

Required firmware version

You must upgrade the system firmware and diagnostics files to version 4.2.2 or later before upgrading to Data ONTAP 6.5. The Data ONTAP 6.5 image does not fit on the 32-MB CompactFlash™ cards as they are currently formatted. If you attempt to download Data ONTAP 6.5 on your gFiler before installing firmware version 4.2.2 or later, the download stops and the gFiler displays a message prompting you to install the latest firmware.

About upgrading system firmware in a cluster

NetApp recommends that, with a cluster, you perform the system firmware upgrade on one node while the other node is in takeover mode. If you perform the firmware upgrade in this manner, services to clients can continue.

To perform the upgrade, you must have access to the gFiler's serial console.

Where to obtain the system firmware

You can obtain the gFiler system firmware as follows:

- ◆ If you have access to the NOW Web site, go to <http://now.netapp.com/NOW/download/tools/serviceimage/> and click the Download Instructions link for directions for installing the diagnostics and firmware service image on your gFiler.
- ◆ If you do not have access to the NOW site, contact your authorized reseller.

Obtaining firmware from NOW

To obtain the firmware from the NOW site to upgrade the firmware version on your gFiler, complete the following steps.

Step	Action
1	Use a Web browser to go to http://now.netapp.com .
2	Click Service & Support.
3	Click Download Software.
4	Scroll to Firmware & MIBs.

Step	Action
5	Click “System Firmware/Diagnostics for CompactFlash-based Filers & NearStores.”
6	Download firmware version 4.2.2 or later, as described in “Using a UNIX client to transfer the firmware file from NOW to the gFiler” on page 23 or “Using a Windows client to transfer the firmware file from NOW to the gFiler” on page 24.

Using a UNIX client to transfer the firmware file from NOW to the gFiler

To use a UNIX client to download the firmware, complete the following steps.

Step	Action
1	Create a mount point for the gFiler’s root file system on the client by entering the following command: <pre>mkdir /mnt/gfiler</pre> <i>/mnt/gFiler</i> is the directory on the client where you want to mount the gFiler's root file system. Note_____ If this directory already exists, you can skip this step. You must have root privileges to create this directory.
2	Mount the gFiler in the new directory by entering the following command: <pre>mount gfiler:/ /mnt/gfiler</pre> <i>gfiler</i> is the name or IP address of the gFiler. <i>/mnt/gfiler</i> is the new directory. Note_____ You can find the IP address of the gFiler by issuing the <code>ifconfig -a</code> command at the gFiler console.

Step	Action
3	Enter the following command to go to the client's /mnt/gfiler directory: cd /mnt/gfiler
4	If you accessed the firmware from NOW, return to the NOW page and click <i>firmwarename.tar</i> . In the browse box, enter a location for the file to be copied. If you do not have access to NOW, access <i>firmwarename.tar</i> from the location designated by your authorized reseller.
5	Download the files to the directory to which you mounted the gFiler.
6	From the client, extract the files by entering the following command: tar xvf <i>firmwarename.tar</i> Result: The tar command extracts files and reports the names in etc/boot/na_diag-x86.
7	From the client, unmount the gFiler's root file system (/) by entering the following commands: cd / umount /mnt/gfiler
8	Install the firmware/diagnostics image. See the appropriate procedure for your upgrade: ◆ “Installing the firmware/diagnostic service image—GF800 series” on page 26 ◆ “Installing the firmware/diagnostic service image—GF900 series” on page 31 ◆ “Installing system firmware—nondisruptive cluster method” on page 35

Using a Windows client to transfer the firmware file from NOW to the gFiler

To use a Windows client to download the firmware, complete the following steps. You must install WinZip on your Windows client before beginning this procedure.

Step	Action
1	Log in to your client using an account that has one of the following rights: ◆ Domain administrator rights ◆ Full control on the gFiler C\$ share (map a drive to the C\$ share)
2	Download the firmware tar file (<i>firmwarename.tar</i>) to a directory such as C:\Temp on your computer: You must have WinZip installed in your client to extract the file.
3	Go to the drive to which you downloaded the tar file.
4	Double-click the tar file. Result: A WinZip dialog box appears.
5	Use WinZip to extract the service image files from the tar file to the \\[gFiler_Name]\C\$ directory on the gFiler. The following options must be selected when extracting the service image files: ◆ Overwrite existing files ◆ Use folder names Note_____ C\$ should point to the root volume of the gFiler. This is typically vol0. If C\$ is not defined on the gFiler and you are having trouble determining which volume is the root volume, contact NetApp Technical Support or your authorized reseller. _____
6	Install the firmware/diagnostics image. See the appropriate procedure for your upgrade: ◆ “Installing the firmware/diagnostic service image—GF800 series” on page 26 ◆ “Installing the firmware/diagnostic service image—GF900 series” on page 31 ◆ “Installing system firmware—nondisruptive cluster method” on page 35

Installing system firmware—single node and standard cluster method

About this section Use the procedures in this section if you are doing either of the following:

- ◆ Upgrading a single gFiler
- ◆ Upgrading clustered gFilers by using the standard (nondisruptive) upgrade method.

The procedures for upgrading the GF800 series and GF900 series are different, so be sure to read the correct procedure.

If you want to upgrade a cluster by using the nondisruptive upgrade method, see [“Installing system firmware—nondisruptive cluster method”](#) on page 35.

Installing the firmware/diagnostic service image—GF800 series To install the firmware/diagnostics service image on your GF800 series gFiler running as a single node or as a cluster node that you are upgrading using the standard upgrade method, complete the following steps.

Step	Action
1	If the gFiler is a partner in a cluster, disable the cluster by entering the following command at the console of one of the gFilers: cf disable Wait until you see the “Cluster takeover disabled” message before proceeding to the next step.
2	Enter the following command: priv set advanced

Step	Action
3	If you are running Data ONTAP 6.4.1, enter the following command at the gFiler console to format the service partition. If you are not running release 6.4.1, you can skip this step. bootfs format 0a.0:3: SERVICE On all platforms, “3:” is the third partition, the service partition. Caution_____ Failure to complete this step results in your gFiler being unable to upgrade to 4.2.2 and future firmware releases. For more information, see the BURT 98952 public report (at http://now.netapp.com/NOW/cgi-bin/bol?Type=Detail&Display=98952).
4	At the console, enter the following command to copy the executables to the boot blocks of the gFiler's CompactFlash: download -d Result: The download -d command provides an acknowledgment similar to the following when copying is finished, and then the gFiler prompt appears again. <pre>..... done [download.requestDone:notice]: Operator requested download completed</pre> Note_____ The copying process can take a few minutes.
5	At the console, enter the following command to shut down the gFiler: halt
6	At the ok prompt, enter the following command: bye

Step	Action
7	Immediately press Delete while the memory test is in progress to interrupt the boot process. If you do not see a message that says skip-autoboot, press Ctrl-Backspace the next time. Note If you did not enter Delete or Ctrl-Backspace in time to interrupt the boot process, the gFiler continues to boot. Press Ctrl-C to go to Maintenance mode, and then enter the following commands: Halt Bye Del or Ctrl-Bksp Result: The ok prompt appears after memory tests are complete.
8	If you are upgrading the gFiler from 6.4.2x and the gFiler is in a cluster, enter the following command and record the value of the variable, which is either “high” or “low.” If the gFiler is not part of a cluster, you can skip this step. printenv LUN-ownership Note This step is not necessary for upgrades within the 6.5 release family because your gFiler is already using the software-based LUN (disk) ownership scheme introduced in 6.5.)
9	Enter the following command: update-diag The Updater program prompts you for whether to replace the diagnostic program.
10	Enter y to continue. The Updater program checks for a proper image. If the image is valid, it writes the flash. When fw_i1.rom finishes writing, it ends with the ok prompt.
11	Enter the following command: bye

Step	Action
12	Immediately press Delete while the memory test is in progress to interrupt the boot process.
13	Enter the following command: update-flash The Updater program prompts you for whether you want to update the flash.
14	Enter y to continue. The Updater program checks for a proper image. If the image is valid, it updates the diagnostics program. When the diagnostics program has been updated, it ends with the ok prompt. Note_____ Ignore the message that says to power off your system and power it back on. _____
15	If you are upgrading from firmware 4.3 or later, enter the following command: set-defaults This command restores the environment variables to their default settings.
16	Enter the following command: bye
17	Immediately press Delete while the memory test is in progress to interrupt the boot process.

Step	Action
18	If you are upgrading the gFiler from 6.4.2x and the gFiler is in a cluster a. Enter the following command: setenv LUN-ownership <value> <i>value</i> is either high or low, whichever value you recorded in Step 8. b. Enter the following command to reboot the gFiler with the new firmware and diagnostics: bye If the gFiler is not in a cluster, skip this step.
19	If the gFiler is in a cluster, enter the following command to reenable the cluster: cf enable If the gFiler is not in a cluster, skip this step.
20	Proceed to Chapter 3, “Upgrading Data ONTAP on the gFiler,” on page 43.

Installing the firmware/diagnostic service image— GF900 series

To install the firmware/diagnostics service image on your GF900 series gFiler running as a single node or in a standard cluster, complete the following steps.

Step	Action
1	If the gFiler is in a cluster, disable the cluster by entering the following command at the console of one of the gFilers: cf disable Wait until you see the “Cluster takeover disabled” message before proceeding to the next step.
2	Enter the following command: priv set advanced
3	If you are running Data ONTAP 6.4.1, enter the following command at the gFiler console to manually format the service partition. If you are not running 6.4.1, you can skip this step. bootfs format 0a.0:3: SERVICE On all platforms, “3:” is the third partition, the service partition. Caution— Failure to complete this step results in your gFiler being unable to upgrade to 4.2.2 and future firmware releases. For more information, see the BURT 98952 public report (at http://now.netapp.com/NOW/cgi-bin/bol?Type=Detail&Display=98952).

Step	Action
4	At the console, enter the following command to copy the executables to the boot blocks of the gFiler's CompactFlash card: download -d Result: The <code>download -d</code> command provides an acknowledgment similar to the following when copying is finished, and then the gFiler prompt appears again. <pre> done [download.requestDone:notice]: Operator requested download completed </pre> Note_____ The copying process can take a few minutes.
5	At the console, enter the following command to shut down the gFiler: halt
6	At the ok prompt, enter the following command: bye
7	Immediately press Delete while the memory test is in progress to interrupt the boot process. If you do not see a message that says skip-autoboot, press Ctrl-Backspace the next time. Note_____ If you did not enter Delete or Cntrl-Backspace in time to interrupt the boot process, the gFiler continues to boot. Press Ctrl-C to go to Maintenance mode, and then enter the following commands: Halt Bye Del or Ctrl-Bksp Result: The ok prompt appears after memory tests are complete.

Step	Action
8	If you are upgrading the gFiler from 6.4.2x and the gFiler is in a cluster, enter the following command and record the value of the variable for each partner, which is either “high” or “low.” If the gFiler is not in a cluster, skip this step. printenv LUN-ownership
9	Enter the following command: update-flash When the Updater program prompts you for whether you want to update the flash. Enter y to continue. Result: The Updater program checks for a proper image. If the image is valid, the program writes the flash. When fw_i2.rom finishes writing, it ends with the ok prompt. Note _____ Ignore the message that says to power off your system and power it back on. _____
10	If you are upgrading from firmware 4.3 or later, enter the following command: set-defaults This command restores the environment variables to their default settings.
11	Enter the following command: bye

Step	Action
12	Immediately press Delete while the memory test is in progress to interrupt the boot process. If you do not see a message that says skip-autoboot, press Ctrl-Backspace the next time. Note_____ If you did not enter Del or Ctrl-Backspace in time to interrupt the boot process, the gFiler will continue to boot. Press Ctrl-C to go to Maintenance mode, and then enter the following commands: Halt Bye Del or Ctrl-Bksp
13	If you are upgrading the gFiler from 6.4.2x and the gFiler is in a cluster, enter the following command: setenv LUN-ownership <value> <i>value</i> is either high or low, whichever value you recorded in Step 8. If the gFiler is not part of a cluster, skip this step.
14	Enter the following command to reboot the gFiler with the new system firmware and diagnostics: bye
15	If your node is in a cluster, enter the following command to reenble the cluster: cf enable If the gFiler is not part of a cluster, skip this step.
16	Proceed to Chapter 3, “Upgrading Data ONTAP on the gFiler,” on page 43.

Installing system firmware—nondisruptive cluster method

About this section This section includes procedures for upgrading system firmware using the nondisruptive upgrade method. The procedures for upgrading the GF800 series and GF900 series are different so be sure to read the correct procedure.

Note This section is applicable only for upgrades within the Data ONTAP 6.5 release family or for upgrades to later releases. The nondisruptive upgrade method is applicable only for upgrading clusters.

See “[Planning for upgrading clusters](#)” on page 9 for information about the standard and nondisruptive upgrade methods for clusters.

Installing the firmware/diagnostic service image—GF800 series To install the firmware/diagnostics service image on a GF800 series gFiler in a cluster, complete the following steps at the console of one of the gFilers in the cluster for a nondisruptive upgrade.

Step	Action
1	Ensure that you transferred the system firmware from the NOW site or the CD-ROM to your Windows or UNIX client.
2	At the console of gFiler A, enter the following command: priv set advanced

Step	Action	
3	At the console of gFiler A, enter the following command to copy the executables to the boot blocks of the gFiler's CompactFlash card: download -d Result: The <code>download -d</code> command provides an acknowledgment similar to the following when copying is finished, and then the gFiler prompt appears again. <pre> done [download.requestDone:notice]: Operator requested download completed </pre> Note_____ The copying process can take a few minutes. _____	
4	If...	Then...
	CIFS is not in use on the gFiler A	Go to Step 5.
	CIFS is in use on gFiler A	Enter the following command: cifs terminate -t nn <i>nn</i> is a notification period appropriate for your clients. After that time period elapses, proceed to Step 5.
5	At the console of gFiler B, enter the following command: cf takeover Result: gFiler B shuts down gracefully and leaves gFiler B in takeover mode.	

Step	Action
6	At the console of gFiler A, immediately press Delete while the memory test is in progress to interrupt the boot process. If you do not see a message that says skip-autoboot, press Ctrl-Backspace the next time. Note If you did not enter Delete or Ctrl-Backspace in time to interrupt the boot process, the gFiler continues to boot. Press Ctrl-C to go to Maintenance mode, and then enter the following commands: Halt Bye Del or Ctrl-Bksp Result: The ok prompt appears after memory tests are complete.
7	At the console of gFiler A, enter the following command: update-diag The Updater program prompts you for whether to replace the diagnostic program.
8	Enter y to continue. The Updater program checks for a proper image. If the image is valid, it writes the flash. When fw_i1.rom finishes writing, it ends with the ok prompt.
9	Enter the following command: bye
10	Immediately press Delete while the memory test is in progress to interrupt the boot process.
11	Enter the following command: update-flash The Updater program prompts you for whether you want to update the flash.

Step	Action
12	Enter y to continue. The Updater program checks for a proper image. If the image is valid, it updates the diagnostics program. When the diagnostics program has been updated, it ends with the ok prompt. Note_____ Ignore the message that says to power off and power on your system. _____
13	If you are upgrading from firmware 4.3 or later, enter the following command: set-defaults This command restores the environment variables to their default settings.
14	Enter the following command: bye
15	If you see a “Waiting for giveback” message on the node whose firmware you just upgraded, go to the other partner gFiler and enter the following: cf giveback Note_____ If a message appears that giveback was canceled, enter the following command: cf giveback -f _____
16	Enter the following command to check that the firmware version is at the level you expected after the upgrade: sysconfig -v 0
17	Repeat Steps 1 through 16 on the other partner.
18	Proceed to Chapter 3, “Upgrading Data ONTAP on the gFiler,” on page 43.

Installing the firmware/diagnostic service image— GF900 series

To install the firmware/diagnostics service image on a GF900 series gFiler in a cluster, complete the following steps at the console of one of the gFilers in the cluster for a nondisruptive upgrade.

Step	Action	
1	Enter the following command: priv set advanced	
2	At the console of gFiler A, enter the following command to copy the executables to the boot blocks of the gFiler's CompactFlash card: download -d Result: The download -d command provides an acknowledgment similar to the following when copying is finished, and then the gFiler prompt appears again. <pre> done [download.requestDone:notice]: Operator requested download completed </pre> Note_____ The copying process can take a few minutes. _____	
3	If...	Then...
	CIFS is not in use on Filer A	Go to Step 4.
	CIFS is in use on Filer A	Enter the following command: cifs terminate -t nn <i>nn</i> is a notification period appropriate for your clients. After that period of time, proceed to Step 4.
4	At the console of gFiler B, enter the following command: cf takeover Result: gFiler B shuts down gracefully and leaves gFiler B in takeover mode.	

Step	Action
5	At the console of gFiler A, immediately press Delete while the memory test is in progress to interrupt the boot process. If you do not see a message that says skip-autoboot, press Ctrl-Backspace the next time. Note If you did not enter Del or Ctrl-Backspace in time to interrupt the boot process, the gFiler continues to boot. Press Ctrl-C to go to Maintenance mode, and then enter the following commands: Halt Bye Del or Ctrl-Bksp Result: The ok prompt appears after memory tests are complete.
6	At the console of gFiler A, enter the following command: update-flash Enter y to continue when the Updater program prompts you for whether you want to update the flash. Result: The Updater program checks for a proper image. If the image is valid, the program writes the flash. When fw_i2.rom finishes writing, it ends with the ok prompt. Note Ignore the message that says to power off and power on your system.
7	If you are upgrading from firmware 4.3 or later, enter the following command: set-defaults This command restores the environment variables to their default settings.
8	Enter the following command to reboot the gFiler with the new system firmware and diagnostics: bye

Step	Action
9	If you see a “Waiting for giveback” message on the gFiler partner whose firmware you just upgraded, go to the other gFiler partner and enter the following command: cf giveback Note If a message appears that giveback was canceled, enter the following command cf giveback -f
10	Enter the following command to check that the firmware version is at the level you expected after the upgrade: sysconfig -v 0
11	Repeat Steps 1 through 10 on the other gFiler partner.
12	Proceed to Chapter 3, “Upgrading Data ONTAP on the gFiler,” on page 43.

About this chapter

This chapter provides you with the information you need to upgrade Data ONTAP to the latest release.

Topics in this chapter

This chapter discusses the following topics:

- ◆ [“Prerequisites to software upgrade”](#) on page 44
- ◆ [“Installing Data ONTAP system files”](#) on page 47
- ◆ [“Downloading Data ONTAP”](#) on page 56
- ◆ [“Concluding the upgrade”](#) on page 85
- ◆ [“Where to go from here”](#) on page 88

Prerequisites to software upgrade

Data ONTAP upgrade summary

The following table summarizes the Data ONTAP software upgrade paths for upgrading to Data ONTAP 6.5.1.

If you are upgrading from this Data ONTAP release...	Your upgrade requirements for Data ONTAP are...
6.4 or 6.4.1	Upgrade to a version of Data ONTAP 6.4.2 first, then upgrade to 6.5.1. See “ Requirements if you are upgrading from 6.4.1 ” on page 7.
6.4.2 (any version of)	Upgrade directly to 6.5.1.
6.5 or 6.5R1	Upgrade directly to 6.5.1.

Upgrading clusters

If you have a gFiler cluster, you can upgrade one gFiler to Data ONTAP 6.5.1 and leave the other gFiler running at least 6.5. Alternatively, you can upgrade both gFilers in the cluster to 6.5.1.

Where you can obtain Data ONTAP files

You can obtain the latest system files from the following locations:

- ◆ On NOW
If you have access to NOW, you can download the latest release of Data ONTAP from the Download Software page (on the NOW site at <http://now.netapp.com/NOW/cgi-bin/software/>). Under Data ONTAP, select your platform, then select View & Download under the latest Data ONTAP release and follow the instructions.
- ◆ On the CD-ROM that is supplied in your media package
- ◆ Your authorized reseller

Determine which additional procedures you need to perform

Before installing the latest Data ONTAP release on your gFiler, determine whether you need to perform one or more of the procedures described in the following table.

Procedure	Complete the procedure if...
Verifying that the gFiler has a domain account	You are running CIFS on the gFiler and are using a Windows NT 4.0 domain controller for authentication. In this case, the gFiler must have a domain account.
Enabling DNS with Windows 2000 name server addresses	You are running CIFS on the gFiler and are using a Windows 2000 domain controller for authentication.

Verifying that the gFiler has a domain account

To verify that the gFiler has a domain account, complete the following step.

Step	Action
1	From the gFiler, enter the following command: cifs lookup

Enabling DNS with Windows 2000 name server addresses

To enable DNS with Windows 2000 name server addresses, complete the following steps.

Step	Action
1	Using a text editor, create or open the /etc/resolv.conf file in the root volume. Enter up to three lines, each specifying a Windows 2000 name server host in the following format: nameserver ip_address Example: nameserver 192.9.200.10
2	Save the file.

Step	Action
3	Enter the following command at the gFiler console to enable DNS: options dns.enable on

Installing Data ONTAP system files

About the installation of system files

The procedure for installing system files depends on where you are installing the files from.

Note

After installing the system files, you need to install boot data onto the gFiler and perform additional steps so that the gFiler and the storage subsystems can operate together.

For detailed information

For details about installing the Data ONTAP system files, see the following topics:

- ◆ [“Installing system files from a UNIX client”](#) on page 48
- ◆ [“Installing Data ONTAP system files”](#) on page 47
- ◆ [“Data ONTAP install and download from an HTTP server”](#) on page 73.

Note

If the latest Data ONTAP upgrades are available on an HTTP server, you can download and install Data ONTAP to your gFiler without having to mount the gFiler to a UNIX administration host or map a drive to the gFiler using Windows to perform the installation.

Installing system files from a UNIX client

Tasks for installing the system files

To install the Data ONTAP system files from your UNIX client, you need to complete the following tasks in the given order:

Note

To perform the installation, you need access to both the gFiler's system console and a client system.

1. Mount the gFiler on your client.
2. Transfer (download) the system files to your client from NOW or copy them from the CD-ROM.
3. Install the system files onto the storage subsystem.

Mounting the gFiler on your client

To mount the gFiler on your UNIX client, complete the following steps.

Step	Action
1	Mount the gFiler's root file system to the client's /mnt/gfiler directory: mount gfiler:/ /mnt/gfiler <i>gfiler</i> is the name of the gFiler. <i>/mnt/gfiler</i> is the directory on the client where you want to mount the gFiler's root file system.
2	Enter the following command to change to the /mnt/gfiler directory: cd /mnt/gfiler <i>/mnt/gfiler</i> is the directory on the client where you mounted the gFiler's root file system.

Step	Action	
3	If...	Then...
	You are downloading system files from NOW	Complete the procedure described in “ Transferring the system files from NOW ” on page 49.
	You are copying system files from the CD-ROM	Complete the procedure described in “ Transferring the system files from the CD-ROM ” on page 50.

Transferring the system files from NOW

To transfer the system files from the NOW site to your client, complete the following steps.

Step	Action
1	Use a Web browser to log in to NOW.
2	Click Service & Support.
3	Click Download Software.
4	In the Software Download table, click the Select Platform list box in the Data ONTAP product row.
5	Select your gFiler model from the list and click Go.
6	Follow the prompts to reach the software download page.
7	Choose the desired UNIX system files software and download it to the mount point that you chose in the previous procedure.

Step	Action
8	From the client, extract the files with the following command: <pre>tar xvf /mnt/gfiler/filename</pre> <i>/mnt</i> is the directory on the client where you want to mount the gFiler's root file system. <i>filename</i> is the name you downloaded from NOW. Note If you get the error <code>./install_netapp: linux:uncompress: command not found</code>, enter the following command instead: <pre>gunzip tar_image.2</pre> Result: The tar command extracts the files and reports their names: <code>tar_image.Z</code> and <code>install_netapp</code>.
9	Complete the procedure described in “ Installing the system files ” on page 51.

Transferring the system files from the CD-ROM

To access the system files from the CD-ROM and copy them to your client, complete the following steps.

Step	Action
1	Mount the Data ONTAP CD-ROM onto your client.
2	From the client, extract the files by entering the following command: <pre>tar xvf /CD-ROM_MNT_PT/ONTAP/release/x86/SYSFILES.TAR</pre> <i>/CD-ROM_MNT_PT</i> is the name of your CD-ROM mount point. <i>release</i> is the release number on the CD-ROM. Result: The tar command extracts the files and reports their names: <code>tar_image.Z</code> and <code>install_netapp</code>.
3	Complete the procedure described in “ Installing the system files ” on page 51.

Installing the system files

To install the system files, complete the following steps.

Step	Action	
1	If you want to...	Then...
	Delete the tar files after the files are extracted	From the client, enter the following command: <i>./install_netapp /mnt/gfiler</i> <i>/mnt/gfiler</i> is the directory on the client where you mounted the gFiler's root file system.
	Keep the tar files after the files are extracted	From the client, enter the following command: <i>./install_netapp -k /mnt/gfiler</i> <i>/mnt/gfiler</i> is the directory on the client where you mounted the gFiler's root file system.
	Result: The install script decompresses and extracts the files.	
2	From the client, unmount the gFiler's root file system (/) by entering the following commands: cd / umount /mnt/gfiler <i>/mnt/gfiler</i> is the directory on the client where you mounted the gFiler's root file system.	
3	Complete the appropriate procedure to download Data ONTAP: ◆ For single gFilers, go to “Downloading Data ONTAP—single node upgrade” on page 57. ◆ For clustered gFilers, go to one of the following: ❖ “Downloading Data ONTAP—standard upgrade of a cluster” on page 62 ❖ “Downloading Data ONTAP—nondisruptive upgrade of a cluster” on page 70	

Installing system files from a Windows client

Tasks for installing the system files

To install the Data ONTAP system files from your Windows PC, you need to complete the following tasks in the given order:

1. Map the gFiler to a drive on your client.
2. Transfer (download) and install system files to your client from the NOW site or copy them from the CD-ROM and install them onto the storage subsystem.

Mapping the gFiler to a drive

To map the root directory of your gFiler to a drive on your client, complete the following steps.

Step	Action	
1	Log in to your client as Administrator or log in using an account that has full control on the gFiler C\$ directory.	
2	Map a drive to the C\$ directory of your gFiler according to your version of Windows.	
3	If...	Then...
	You are downloading system files from the NOW site	Complete the procedure described in “ Transferring and installing the system files from NOW ” on page 53.
	You are copying system files from the CD-ROM	Complete the procedure described in “ Transferring and installing the system files from the CD-ROM ” on page 54.

Transferring and installing the system files from NOW

To transfer the system files from the NOW site and install them onto your client, complete the following steps.

Step	Action
1	Use a Web browser to log in to NOW.
2	Click Service & Support.
3	Click Download Software.
4	In the Software Download table, click the Select Platform list box in the Data ONTAP product row.
5	Select your gFiler model from the list and click Go.
6	Follow the prompts to reach the software download page.
7	Choose the desired Windows system files software for your gFiler and download it to the drive to which you mapped the gFiler in the previous procedure.
8	Go to the drive to which you downloaded the software.
9	Double-click the file that you downloaded. Result: The WinZip dialog box appears.
10	In the WinZip dialog box, enter the letter of the drive to which you mapped the gFiler. For example, if you chose drive N, replace <DRIVE>:\ETC with the following path: N:\ETC
11	Ensure that the following check boxes are selected: ◆ Overwrite Files Without Prompting ◆ When Done Unzipping Run... Leave the other options as they are.
12	Click the Unzip button. Result: In the dialog box's lower panel, confirmation messages are displayed as files are decompressed.

Step	Action
13	Complete the appropriate procedure to download Data ONTAP: ◆ For single gFilers, go to “Downloading Data ONTAP—single node upgrade” on page 57. ◆ For clustered gFilers, go to one of the following: ❖ “Downloading Data ONTAP—standard upgrade of a cluster” on page 62 ❖ “Downloading Data ONTAP—nondisruptive upgrade of a cluster” on page 70

Transferring and installing the system files from the CD-ROM

To access the system files from the Data ONTAP CD-ROM and copy them to your client, complete the following steps.

Step	Action
1	Insert the Data ONTAP CD-ROM into your CD-ROM drive.
2	Go to one of the ONTAP\release\X86 folders: <i>release</i> is the release number on the CD-ROM.
3	Double-click setup.exe. Result: The setup program displays a dialog box.
4	Make sure that you followed the steps described in the dialog box, then click OK. Result: The WinZip dialog box appears.

Step	Action
5	Follow the WinZip prompts to unzip the file that you downloaded onto the drive to which you mapped the gFiler. When appropriate, ensure that the following check boxes are selected: ◆ Overwrite Files Without Prompting ◆ When Done Unzipping Run... Leave the other options as they are. Result: In the dialog box's lower panel, confirmation messages are displayed as files are decompressed.
6	Complete the appropriate procedure to download Data ONTAP: ◆ For single gFilers, go to “Downloading Data ONTAP—single node upgrade” on page 57 ◆ For clustered gFilers, go to one of the following: ❖ “Downloading Data ONTAP—standard upgrade of a cluster” on page 62 ❖ “Downloading Data ONTAP—nondisruptive upgrade of a cluster” on page 70

Downloading Data ONTAP

About this section

After you install the Data ONTAP system files on the storage subsystem from a UNIX or Windows client, you must install the boot data on the gFiler. NetApp refers to this process as *downloading* Data ONTAP. The steps you follow for downloading Data ONTAP depend on whether your system is a single node or in a cluster.

For detailed information

For detailed information about downloading Data ONTAP, see the following topics:

- ◆ [“Downloading Data ONTAP—single node upgrade”](#) on page 57
- ◆ [“Downloading Data ONTAP—standard upgrade of a cluster”](#) on page 62
- ◆ [“Downloading Data ONTAP—nondisruptive upgrade of a cluster”](#) on page 70
- ◆ [“Data ONTAP install and download from an HTTP server”](#) on page 73

Note

If the latest Data ONTAP upgrade is available on an HTTP server, you can download and install Data ONTAP to your gFiler without having to mount the gFiler to a UNIX administration host or map a drive to the gFiler using Windows to perform the installation.

Downloading Data ONTAP—single node upgrade

Procedures to read Use the following table to determine the appropriate procedures to read when upgrading your single-node gFiler.

If you are upgrading from this version of Data ONTAP	The procedures in this section are applicable to you...
6.4 or 6.4.1	◆ “Downloading Data ONTAP—6.4 or 6.4.1 to 6.4.2 upgrade” on page 57 ◆ “Downloading Data ONTAP—6.4.2x to 6.5.1 upgrade” on page 58 If your single-node gFiler is running Data ONTAP 6.4 or 6.4.1, you must upgrade Data ONTAP to 6.4.2x first, and then to 6.5.1.
6.5 or later	◆ “Downloading Data ONTAP—6.5x to 6.5.1 upgrade” on page 60

Downloading Data ONTAP—6.4 or 6.4.1 to 6.4.2 upgrade

When you are upgrading Data ONTAP 6.4 or 6.4.1 software to a version of 6.4.2, complete the following steps at the gFiler console to download the 6.4.2 software.

Step	Action
1	Ensure that the 4.2.2 or later firmware is installed, as described in Chapter 2, “Upgrading gFiler Firmware,” on page 21.
2	Ensure that you transferred the Data ONTAP system files to your gFiler, as described earlier in the chapter.

Step	Action
3	Enter the following command to copy the executables to the boot blocks of the gFiler: download Result: The download command provides a status message similar to the following: <pre>Tue Jun 19 10:03:22 GMT [download.request:notice]: Operator requested download initiated download: Downloading boot device..... download: Downloading disks: opening Data ONTAP 6.4.2 done download: boot blocks successfully copied to disk(s)</pre> Then a message similar to the following appears: <pre>Tues Jun 19 10:11:51 GMT [download.requestDone:notice]: Operator requested download completed</pre>
4	Enter the following command: reboot
5	Upgrade to 6.5.1 by following the instructions in “Downloading Data ONTAP—6.4.2x to 6.5.1 upgrade” on page 58.

Downloading Data ONTAP—6.4.2x to 6.5.1 upgrade

To download the Data ONTAP 6.5.1 software when you are upgrading from 6.4.2x to 6.5.1, complete the following steps at the gFiler console.

Step	Action
1	Ensure that the 4.2.2 or later firmware is installed, as described in Chapter 2, “Upgrading gFiler Firmware,” on page 21.
2	Ensure that you transferred the Data ONTAP software, as described earlier in this chapter.

Step	Action
3	Enter the following command to copy the executables to the boot blocks of the gFiler: download Result: The download command provides a status message similar to the following: <pre>Tue Jun 19 10:03:22 GMT [download.request:notice]: Operator requested download initiated download: Downloading boot device..... download: Downloading disks: opening Data ONTAP 6.5.1 done download: boot blocks successfully copied to disk(s)</pre> Then a message similar to the following appears: <pre>Tues Jun 19 10:11:51 GMT [download.requestDone:notice]: Operator requested download completed</pre>
4	Enter the following command: reboot Result: The gFiler begins the boot process.
5	Interrupt the boot process by pressing Ctrl-C when you see the following message on the console: Starting Press Ctrl-C for floppy boot menu Result: The following boot options menu appears: <pre>(1) Normal boot. (2) Boot without /etc/rc. (3) Change password. (4) No disks assigned (use 'disk assign' from the Maintenance Mode). (5) Maintenance mode boot.</pre>
6	Enter 5 for Maintenance mode.

Step	Action
7	Enter the following command: disk upgrade_ownership This command updates the OFW LUN ownership rules to the software-based gFiler LUN ownership scheme introduced in 6.5.
8	Enter the following command: halt
9	Reboot the gFiler by entering the following command: bye

Downloading Data ONTAP—6.5x to 6.5.1 upgrade

If the gFiler is already running a version of Data ONTAP in the 6.5 family, use the following procedure to download Data ONTAP 6.5.1 for a single gFiler.

Step	Action
1	Upgrade the 4.2.2 firmware to a later version, if desired.

Step	Action
2	Enter the following command to copy the executables to the boot blocks of the gFiler: download Result: The download command provides a status message similar to the following: <pre>download: You can cancel this operation by hitting Ctrl-C in the next 6 seconds. download: Depending on system load, it may take many minutes download: to complete this operation. Until it finishes, download: you will not be able to use the console. Fri Mar 26 15:04:06 PST [raid-u20: download.request:notice]: Operator requested download initiated download: Downloading boot device download: Downloading boot device (Service Area) download: Downloading disks: opening netapp_6.5.1 done download: boot blocks successfully copied to disk(s) raid-u20> Fri Mar 26 15:09:25 PST [raid-u20: download.requestDone:notice]: Operator requested download completed</pre>
3	Enter the following command: reboot

Downloading Data ONTAP—standard upgrade of a cluster

Procedures to read Use the following table to determine the appropriate procedures to read when upgrading your clustered gFilers through the standard upgrade method.

If you are upgrading from this version of Data ONTAP	The procedures in this section are applicable to you...
6.4 or 6.4.1	◆ “Downloading Data ONTAP onto a cluster—6.4 or 6.4.1 to 6.4.2 upgrade” on page 62 ◆ “Downloading Data ONTAP onto a cluster—6.4.2 to 6.5.1 upgrade” on page 64 If your gFiler is running Data ONTAP 6.4 or 6.4.1, you must upgrade Data ONTAP to 6.4.2x first and then to 6.5.1.
6.5 or later in the 6.5 version family	◆ “Downloading Data ONTAP 6.5x to 6.5.1 upgrade” on page 67

Caution

Do not download Data ONTAP to a clustered gFiler while it is in takeover mode.

NetApp recommends that you perform the upgrade on one cluster node at a time in case a failure occurs during the upgrade.

Downloading Data ONTAP onto a cluster—6.4 or 6.4.1 to 6.4.2 upgrade

To download Data ONTAP to a gFiler cluster running 6.4 or 6.4.1, complete the following steps at the gFiler console.

Step	Action
1	Ensure that the 4.2.2 or later firmware is installed, as described in Chapter 2, “ Upgrading gFiler Firmware ,” on page 21.

Step	Action
2	Ensure that you transferred the Data ONTAP software to the gFiler, as described earlier in this chapter.
3	Disable the cluster by entering the following command at the console of one of the gFilers: cf disable Wait until you see the “Cluster takeover disabled” message before proceeding to the next step.
4	Enter the following command to copy the executables to the boot blocks of the gFiler: download Result: The download command provides an acknowledgment similar to the following: <pre>Tue Jun 19 10:03:22 GMT [download.request:notice]: Operator requested download initiated download: Downloading boot device..... download: Downloading disks: opening Data ONTAP 6.4.2 done download: boot blocks successfully copied to disk(s)</pre> Then a message similar to the following appears: <pre>Tues Jun 19 10:11:51 GMT [download.requestDone:notice]: Operator requested download completed</pre>
5	While the cluster is still disabled, repeat the previous steps at the gFiler console of the partner gFiler. Caution_____ Do not proceed to the next step until the new version of Data ONTAP has been downloaded onto both gFilers in the cluster. Otherwise, data loss or corruption might result. _____
6	Reboot both nodes at the same time by entering the following command on each node: reboot

Step	Action
7	Reenable the cluster by entering the following command on one of the gFilers: cf enable
8	As needed, perform the procedures described in “ Concluding the upgrade ” on page 85.

Downloading Data ONTAP onto a cluster—6.4.2 to 6.5.1 upgrade

To download Data ONTAP on a gFiler cluster running a version of 6.4.2, complete the following steps at the gFiler console.

Step	Action
1	Ensure that the 4.2.2 or later firmware is installed, as described in Chapter 2, “ Upgrading gFiler Firmware ,” on page 21.
2	Ensure that you transferred the Data ONTAP software onto the gFiler, as described earlier in this chapter.
3	Disable the cluster by entering the following command at the console of one of the filers: cf disable

Step	Action
4	Enter the following command to copy the executables to the boot blocks of the gFiler: download Result: The download command provides an acknowledgment similar to the following: <pre> download: Reminder: upgrade both the nodes in the Cluster download: You can cancel this operation by hitting Ctrl-C in the next 6 seconds. download: Depending on system load, it may take many minutes download: to complete this operation. Until it finishes, download: you will not be able to use the console. Fri Mar 26 15:04:06 PST [raid-u20: download.request:notice]: Operator requested download initiated download: Downloading boot device download: Downloading boot device (Service Area) download: Downloading disks: opening netapp_6.5.1 done download: boot blocks successfully copied to disk(s) raid-u20> Fri Mar 26 15:09:25 PST [raid-u20: download.requestDone:notice]: Operator requested download completed </pre>
5	Enter the following command at the ok prompt: reboot Result: The gFiler begins the boot process.

Step	Action
6	Interrupt the boot process by pressing Ctrl-C when you see the following message on the console: Starting Press Ctrl-C for floppy boot menu Result: The following boot options menu appears: (1) Normal boot. (2) Boot without /etc/rc. (3) Change password. (4) No disks assigned (use 'disk assign' from the Maintenance Mode). (5) Maintenance mode boot.
7	Enter 5 for Maintenance mode.
8	Enter the following command: disk upgrade_ownership This command updates the OFW LUN ownership rules to the software-based gFiler LUN ownership scheme introduced in 6.5.
9	Enter the following command to halt the gFiler: halt
10	Reboot both nodes at the same time by entering the following command on each node: bye
11	While the cluster is still disabled, repeat the previous steps at the gFiler console of the partner gFiler. Caution_____ Do not proceed to the next step until the new version of Data ONTAP has been downloaded onto both gFilers in the cluster. Otherwise, data loss or corruption might result. _____
12	Reenable the cluster by entering the following command on one of the gFilers: cf enable

Step	Action
13	As needed, perform the procedures described in “ Concluding the upgrade ” on page 85.

Downloading Data ONTAP 6.5x to 6.5.1 upgrade

If the gFiler is already running a version of Data ONTAP in the 6.5 family, use the following procedure to download Data ONTAP 6.5.1.

Step	Action
1	Upgrade the 4.2.2 firmware to a later version, if desired.
2	Disable the cluster by entering the following command at the console of one of the gFilers: cf disable

Step	Action
3	Enter the following command to copy the executables to the boot blocks of the gFiler: download Result: The download command provides an acknowledgment similar to the following: <pre>download: Reminder: upgrade both the nodes in the Cluster download: You can cancel this operation by hitting Ctrl-C in the next 6 seconds. download: Depending on system load, it may take many minutes download: to complete this operation. Until it finishes, download: you will not be able to use the console. Fri Mar 26 15:04:06 PST [raid-u20: download.request:notice]: Operator requested download initiated download: Downloading boot device download: Downloading boot device (Service Area) download: Downloading disks: opening netapp_6.5.1 done download: boot blocks successfully copied to disk(s) raid-u20> Fri Mar 26 15:09:25 PST [raid-u20: download.requestDone:notice]: Operator requested download completed</pre>
4	Enter the following command at the ok prompt: reboot Result: The gFiler begins the boot process.
5	While the cluster is still disabled, repeat the previous steps at the gFiler console of the partner gFiler. Caution_____ Do not proceed to the next step until the new version of Data ONTAP has been downloaded onto both gFilers in the cluster. Otherwise, data loss or corruption might result. _____

Step	Action
6	Reenable the cluster by entering the following command on one of the gFilers: cf enable
7	As needed, perform the procedures described in “ Concluding the upgrade ” on page 85.

Downloading Data ONTAP—nondisruptive upgrade of a cluster

When to use the nondisruptive upgrade method

NetApp recommends that you use the nondisruptive upgrade procedure to minimize service disruption in your clusters when you are upgrading Data ONTAP within a release family.

Note—
You cannot use the nondisruptive upgrade method if you are upgrading between release families, for example, from 6.4.1 to 6.5.1. At this time, this feature is supported only in the 6.5 release family; 6.5 and 6.5x and 6.5.1 are in the same release family.

System firmware and some hardware upgrades can be performed at the same time as Data ONTAP software upgrades.

Downloading Data ONTAP onto a gFiler cluster

To download Data ONTAP to clustered gFilers by using the nondisruptive upgrade method, complete the following steps at the console of one of the gFilers in the cluster.

Step	Action
1	Ensure that you transferred the Data ONTAP software onto the gFiler, as described earlier in this chapter.

Step	Action	
2	At the console of gFiler A, enter the following command to copy the executables to the boot blocks of the gFiler: download Result: The download command provides an acknowledgment similar to the following: <pre>download: Reminder: upgrade both the nodes in the Cluster download: You can cancel this operation by hitting Ctrl-C in the next 6 seconds. download: Depending on system load, it may take many minutes download: to complete this operation. Until it finishes, download: you will not be able to use the console. Fri Mar 26 15:04:06 PST [raid-u20: download.request:notice]: Operator requested download initiated download: Downloading boot device download: Downloading boot device (Service Area) download: Downloading disks: opening netapp_6.5.1 done download: boot blocks successfully copied to disk(s) raid-u20> Fri Mar 26 15:09:25 PST [raid-u20: download.requestDone:notice]: Operator requested download completed</pre>	
3	If...	Then...
	CIFS is not in use on gFiler A	Go to Step 4 .
	CIFS is in use on gFiler A	Enter the following command: cifs terminate -t nn <i>nn</i> is a notification period appropriate for your clients. After that period of time, proceed to Step 4.

Step	Action
4	At the console of gFiler B, enter the following command: <pre>cf takeover</pre> Result: This command causes gFiler A to shut down gracefully and leaves gFiler B in takeover mode. Note: At this point, you could perform a hardware upgrade procedure. To do so, you would do the following: - Turn off the power on gFiler A according to instructions in the <i>gFiler Gateway Series Hardware Installation Guide</i>. - After you complete the upgrade of hardware on gFiler A, turn on the power of gFiler A. gFiler A then attempts to boot.
5	When you see the message on gFiler A, waiting for giveback, go to Step 6.
6	At the console of gFiler B, enter the following command: <pre>cf giveback</pre> Result: This command causes gFiler A to reboot with the new Data ONTAP version and resume normal operation as a cluster partner. Note _____ If a message appears that giveback was canceled, enter the following command: <pre>cf giveback -f</pre>
7	Repeat Step 1 through Step 6 to update the partner gFiler; that is, shut down and update gFiler B with partner A in takeover mode.
8	As needed, perform the procedures described in “Concluding the upgrade” on page 85.

Data ONTAP install and download from an HTTP server

About using an HTTP server to download Data ONTAP

If the latest Data ONTAP upgrades are available on an HTTP server, you can download and install Data ONTAP to your gFiler without having to mount the gFiler to a UNIX administration host or map a drive to the gFiler using Windows to perform the installation.

By using the HTTP server method, you can download the Data ONTAP files to your gFiler and install them

- ◆ At the same time
- ◆ Later

Procedures to read

Use the following table to determine the appropriate procedures to read when downloading and installing Data ONTAP by using the HTTP server method.

If you are upgrading from this version of Data ONTAP	The procedures in this section are applicable to you...
6.4 or 6.4.1	◆ “Downloading and installing Data ONTAP simultaneously—6.4 or 6.4.1 to 6.4.2” on page 74 ◆ “Downloading and installing Data ONTAP simultaneously—6.4.2 to 6.5.1” on page 76 or ◆ “Downloading Data ONTAP without installing it immediately” on page 79 Note————— If your single node gFiler is running Data ONTAP 6.4 or 6.4.1, you must upgrade Data ONTAP to 6.4.2x first and then to 6.5.1. —————

If you are upgrading from this version of Data ONTAP	The procedures in this section are applicable to you...
6.5 or later in the 6.5 version family	◆ “Downloading and installing Data ONTAP simultaneously—6.5 to 6.5.1” on page 78 - or ◆ “Downloading Data ONTAP without installing it immediately” on page 79

Downloading and installing Data ONTAP simultaneously—6.4 or 6.4.1 to 6.4.2

To download and install Data ONTAP 6.4 or 6.4.1 to 6.4.2 from an HTTP server at the same time, complete the following steps from your gFiler console.

Step	Action
1	Ensure that the 4.2.2 or later firmware is installed, as described in Chapter 2, “Upgrading gFiler Firmware,” on page 21.
2	Ensure that you transferred the Data ONTAP software to the gFiler, as described earlier in this chapter.

Step	Action
3	Enter the following command: <pre>software install url</pre> <i>url</i> is the HTTP location from which you want to download Data ONTAP. Use the following URL syntax if you need to specify a user name, password, host, or port to access files on the HTTP server: <pre>http://username:password@host:port/path</pre> Result: The software is downloaded and installed on your gFiler, and you see a message similar to the following. The software version changes depending on the version of software you are downloading and installing. <pre>tpubs-cf2> software install http://www.netapp.com/r1se/R6.5.1/pc/dist/PCdist.zip software: installing software, this could take a few minutes... software: installation completed. Please type download to load the new software and reboot subsequently for changes to take affect. tpubs-cf2></pre>
4	Enter the following command: <pre>download</pre>
5	Enter the following command: <pre>halt</pre>
6	When the download is complete, enter the following command: <pre>bye</pre>

Downloading and installing Data ONTAP simultaneously—6.4.2 to 6.5.1

To download and install Data ONTAP 6.4.2 to 6.5.1 from an HTTP server at the same time, complete the following steps from your gFiler console.

Step	Action
1	Ensure that the 4.2.2 or later firmware is installed, as described in Chapter 2, “ Upgrading gFiler Firmware ,” on page 21
2	Ensure that you transferred the Data ONTAP software onto the gFiler, as described earlier in this chapter.
3	Enter the following command: <pre>software install url</pre> <i>url</i> is the HTTP location from which you want to download Data ONTAP. Use the following URL syntax if you need to specify a user name, password, host, or port to access files on the HTTP server: <pre><i>http://username:password@host:port/path</i></pre> Result: The software is downloaded and installed on your gFiler, and you see a message similar to the following. <pre>tpubs-cf2> software install http://www.netapp.com/r1se/R6.5.1/pc/dist/PCdist.zip software: installing software, this could take a few minutes... software: installation completed. Please type download to load the new software and reboot subsequently for changes to take affect. tpubs-cf2></pre>
4	Enter the following command: <pre>download</pre>
5	Enter the following command at the ok prompt. <pre>reboot</pre> Result: The gFiler begins the boot process.

Step	Action
6	Interrupt the boot process by pressing Ctrl-C when you see the following message on the console: <pre>Starting Press Ctrl-C for floppy boot menu</pre> Result: The following boot options menu appears: <pre>(1) Normal boot. (2) Boot without /etc/rc. (3) Change password. (4) No disks assigned (use 'disk assign' from the Maintenance Mode). (5) Maintenance mode boot.</pre>
7	Enter 5 for Maintenance mode.
8	Enter the following command: <pre>disk upgrade_ownership</pre> This command updates the pre-6.5 OFW LUN ownership rules to the new software-based gFiler LUN ownership scheme introduced in 6.5.
9	Enter the following command: <pre>reboot</pre>

Note

The following message appears if you did not perform Steps 6, 7, and 8:

```
No root volume found
Rebooting (ctrl-c to break reboot loop)
AL[LCD:info] No disks!
```

Downloading and installing Data ONTAP simultaneously—6.5 to 6.5.1

If a version of Data ONTAP 6.5 is already running on the gFiler and you want to download and install Data ONTAP 6.5.1 from an HTTP server at the same time, complete the following steps from your gFiler console.

Step	Action
1	Ensure that the 4.2.2 or later firmware is installed, as described in Chapter 2, “ Upgrading gFiler Firmware ,” on page 21.
2	Ensure that you transferred the Data ONTAP software onto the gFiler, as described earlier in this chapter.
3	Enter the following command: <pre>software install url</pre> <i>url</i> is the HTTP location from which you want to download Data ONTAP. Use the following URL syntax if you need to specify a user name, password, host, or port to access files on the HTTP server: <pre>http://username:password@host:port/path</pre> Result: The software is downloaded and installed on your gFiler, and you see a message similar to the following. <pre>tpubs-cf2> software install http://www.netapp.com/r1se/R6.5.1/pc/dist/PCdist.zip software: installing software, this could take a few minutes... software: installation completed. Please type download to load the new software and reboot subsequently for changes to take affect. tpubs-cf2></pre>
4	Enter the following command: <pre>download</pre>
5	Enter the following command at the ok prompt. <pre>reboot</pre> Result: The gFiler begins the boot process.

Downloading Data ONTAP without installing it immediately

You can download a Data ONTAP upgrade from an HTTP server to your gFiler without immediately installing it. The downloaded file is saved on the gFiler in the /etc/software directory.

To download Data ONTAP from the HTTP server onto your gFiler without installing the software, complete the following step from the gFiler console.

Step	Action
1	Enter the following command: <pre>software get url -f filename</pre> <i>url</i> is the HTTP location from which you want to download Data ONTAP. Use the following URL syntax if you need to specify a user name, password, host, or port to access files on the HTTP server: <pre>http://username:password@host:port/path</pre> Use the -f flag to overwrite an existing software file of the same name in the gFiler's /etc/software directory. If a file of the same name exists and you do not use the -f flag, the download fails and you are prompted to use -f. <i>filename</i> is the file name you specify for the software file being downloaded to your gFiler. If no destination file name is specified, Data ONTAP uses the file name listed in the URL from which you are downloading and places the copy in the /etc/software directory on the gFiler. Example: The following is an example of the software get command using a new destination file name: <pre>software get http://www.netapp.com/rlse/R6.5.1/pc/dist/PCdist.zip myfile.zip</pre> Result: You see a message similar to the following: <pre>software: copying to /etc/software/PCdist.zip software: 100% file read from location. software: /etc/software/PCdist.zip has been copied.</pre>

Installing a file that was previously downloaded—6.4 or 6.4.1 to

6.4.2: If you previously downloaded Data ONTAP 6.4.2 without installing it (by using the `software get` command), you can install the software by completing the following steps from the gFiler console.

Step	Action
1	Ensure that the 4.2.2 or later firmware is installed, as described in Chapter 2, “ Upgrading gFiler Firmware ,” on page 21
2	Ensure that you installed the Data ONTAP software, as described earlier in this chapter.
3	Enter the following command: <code>software install software_filename</code> <i>software_filename</i> is the name of the file you downloaded using the <code>software get</code> command. Result: The software is downloaded and installed on your gFiler, and you see a message similar to the following: <pre>tpubs-cf2> software install PCdist.zip software: installing software, this could take a few minutes... software: installation completed. Please type download to load the new software and reboot subsequently for changes to take affect. tpubs-cf2></pre>
4	Enter the following command: <code>download</code>
5	Enter the following command: <code>reboot</code>
6	Continue to “ Installing a file that was previously downloaded—6.4.2 to 6.5.1 ” on page 80.

Installing a file that was previously downloaded—6.4.2 to 6.5.1: If

you previously downloaded Data ONTAP 6.5.1 without installing it (by using the `software get` command), you can install the software by completing the following steps from the gFiler console.

Step	Action
1	Ensure that the 4.2.2 or later firmware is installed, as described in Chapter 2, “ Upgrading gFiler Firmware ,” on page 21.
2	Ensure that you installed the Data ONTAP software, as described earlier in this chapter.
3	Enter the following command: <pre>software install <i>software_filename</i></pre> <i>software_filename</i> is the name of the file you downloaded using the <code>software get</code> command. Result: The software is downloaded and installed on your gFiler, and you see a message similar to the following: <pre>tpubs-cf2> software install PCdist.zip software: installing software, this could take a few minutes... software: installation completed. Please type download to load the new software and reboot subsequently for changes to take affect. tpubs-cf2></pre>
4	Enter the following command: <pre>download</pre>
5	Enter the following command at the ok prompt. <pre>reboot</pre> Result: The gFiler begins the boot process.

Step	Action
6	Interrupt the boot process by pressing Ctrl-C when you see the following message on the console: Starting Press Cntrl-C for floppy boot menu Result: The following boot options menu appears: (1) Normal boot. (2) Boot without /etc/rc. (3) Change password. (4) No disks assigned (use 'disk assign' from the Maintenance Mode). (5) Maintenance mode boot.
7	Enter 5 for Maintenance mode.
8	Enter the following command: disk upgrade_ownership This command updates the pre-6.5 OFW LUN ownership rules to the new software-based gFiler LUN ownership scheme introduced in 6.5.
9	Enter the following command: reboot

Installing a 6.5.1 file that was previously downloaded: If you previously downloaded Data ONTAP 6.5.1 without installing it (by using the software get command), you can install the software by completing the following steps from the gFiler console.

Step	Action
1	Ensure that the 4.2.2 or later firmware is installed, as described in Chapter 2, “ Upgrading gFiler Firmware ,” on page 21
2	Ensure that you installed the Data ONTAP software, as described earlier in this chapter.

Step	Action
3	Enter the following command: <pre>software install <i>software_filename</i></pre> <i>software_filename</i> is the name of the file you downloaded using the <code>software get</code> command. Result: The software is downloaded and installed on your gFiler, and you see a message similar to the following: <pre>tpubs-cf2> software install PCdist.zip software: installing software, this could take a few minutes... software: installation completed. Please type download to load the new software and reboot subsequently for changes to take affect. tpubs-cf2></pre>
4	Enter the following command: <pre>download</pre>
5	Enter the following command: <pre>reboot</pre>

Listing software files in the /etc/software directory

To list the files that were downloaded to the `/etc/software` directory, complete the following step from the gFiler console.

Step	Action
1	Enter the following command: <pre>software list</pre>

Deleting software files from the /etc/software directory

To delete files from the /etc/software directory, complete the following step from the gFiler console.

Step	Action
1	To delete one or more files, enter the following command: software delete <i>software_file1</i> <i>software_file2</i> <i>software_file1</i> and <i>software_file2</i> are the names of the files you want to delete.

Concluding the upgrade

Potential tasks for concluding the upgrade

The following table lists the tasks that you might need to perform to complete upgrade.

If...	Then see...
Your deployment includes a shared switch	“Specifying the target queue depth length for a port” on page 85
You upgraded from Data ONTAP 5.0 or earlier and want to use a security style that is compatible with CIFS	“Changing to CIFS-compatible security styles” on page 86
You purchased any new service or protocol that you are starting to use with the upgrade	“Entering codes for new licenses” on page 87
You want to configure NetApp volumes, add LUNs to NetApp volumes, or configure other Data ONTAP features	<i>gFiler Gateway Series Setup, Installation, and Management Guide</i> and the Data ONTAP documentation library

Specifying the target queue depth length for a port

If your deployment includes a shared switch, you need to plan for and configure the gFilers to limit the number of commands (read and write requests) that the storage subsystem port must handle as a result of gFilers and non-gFiler hosts accessing the port through the switch; that is, you need to plan for limiting the target queue length. When multiple initiators are accessing a target port on the storage subsystem, you do not want the outstanding commands in the queue buffer, from all initiators together, to exceed 256. Otherwise, the performance of gFiler and non-gFiler hosts can suffer.

Beginning with Data ONTAP 5.0, on gFilers you use the `disk.target_port.cmd_queue_depth` option to set the number of commands that the gFiler can send to the target port on the data subsystem.

Non-gFiler hosts also provide a means for limiting the target queue length. See the documentation for the host for information about limiting target queue length.

Note

Target queue length might also be referred to as Q-Depth or Max Throttle.

Guidelines for determining the appropriate target queue length: You need to consider the impact of all the initiators on the port when you are planning the configuration for a specific gFiler or a specific non-gFiler host. If your deployment includes more than one initiator, you need to configure each initiator so that the total commands by all initiators does not exceed 256. The default for target queue depth value is 256.

Some guidelines for determining the appropriate target queue length are as follows:

- ◆ 0 (zero) means no limit on the outstanding commands. Therefore, do not configure a value of 0.
- ◆ You could divide 256 by the number of gFiler and non-gFiler hosts that will be acting as initiators on the target port on the storage subsystem, configuring each gFiler and non-gFiler host with the value that resulted.
- ◆ You could consider the volume of commands that specific initiators would be likely to send to the target port. You could then configure higher values for initiators likely to send a greater number of requests and a lower value for initiators likely to send a lesser number of requests.

Configure non-gFiler hosts according to the guidelines provided for those hosts.

Setting the target queue depth length: To set the `disk.target_port.cmd_queue_depth` option, complete the following steps.

Step	Action
1	Enter the following command at the Data ONTAP command line: <code>disk.target_port.cmd_queue_depth <value></code> Do not use a value of 0 (zero) because it means no limit on the outstanding commands.

Changing to CIFS-compatible security styles

You change the security style of a gFiler by changing the qtree security style of its root volume. The new security style applies to the root volume and is the default security style for subsequently created volumes and qtrees.

To change the security style of the root volume to mixed or to the NT file system (NTFS) to make it compatible with CIFS, complete the following step at the gFiler console.

Step	Action
1	Enter the following command: <pre>qtree security /vol/vol0/ security_style</pre> <i>security_style</i> is either <i>mixed</i> or <i>ntfs</i>. ◆ <i>mixed</i> allows both UNIX-style and Windows NT-style permissions. ◆ <i>ntfs</i> allows only Windows NT-style permissions.

Entering codes for new licenses

To enter new license codes, complete the following step from the gFiler console.

Step	Action
1	Enter the following command: <pre>license add code ...</pre> <i>code</i> is the license code that you were given when you purchased the license for a service or protocol. Example: In this example, the license code for CIFS is ABCDEFG and the license code for DAFS is TUVWXYZ. <pre>license add ABCDEFG TUVWXYZ</pre> Result: The gFiler acknowledges each license, as shown in the following example: <pre>A cifs site license has been installed. Use "cifs setup" to configure cifs. Run cifs setup to enable cifs. A multistore site license has been installed. Use "multistore setup" to configure dafs.</pre>

Where to go from here

Other resource documents

When your gFiler is available and running Data ONTAP, you should perform at least one of the following actions:

- ◆ Set up CIFS, NFS, Internet SCSI (iSCSI), or HTTP by following the instructions in the Data ONTAP documentation library.
- ◆ Learn about deployments for gateways and storage subsystems, and gFiler and Data ONTAP feature configuration and management, by reading the gFiler and Data ONTAP product manuals.

About this chapter

This chapter provides information about some issues that can emerge during the process of reverting to a previous release. If you need to revert to a previous release of Data ONTAP, call Network Appliance Technical Support or your authorized reseller for assistance. In some cases, you cannot revert to an earlier version of Data ONTAP.

Topics in this chapter

This chapter describes the following topics:

- ◆ [“General Data ONTAP 6.5/6.5.1 reversion issues”](#) on page 90
- ◆ [“gFiler-specific reversion issues and procedures—6.5.1 to pre-6.5”](#) on page 94
- ◆ [“Reverting from 6.5.1 to 6.4.x for a single node gFiler”](#) on page 95

General Data ONTAP 6.5/6.5.1 reversion issues

General guidelines for reverting from Data ONTAP 6.5.1

The following guidelines apply when reverting from Data ONTAP 6.5.1 to an earlier version:

- ◆ If you are reverting to a release prior to 6.5, you must disable any 6.5 features before reverting.
- ◆ You cannot revert if an upgrade is in progress.

Stale file handles on vFilers

Data ONTAP 6.4 included a change in the Network File System (NFS) file handle format that is not backward compatible. If you have defined vFiler™ logical units on your system and you upgrade to 6.4 or later and then revert to an earlier version, NFS clients might report stale file handles on the vFilers. To prevent this problem, unmount any NFS clients that are mounted on vFilers. You can remount them after reverting.

Reversion with larger inodes

Starting with 6.5, when you upgrade, your gFiler is upgraded to support larger inodes. There are two instances when larger inodes can cause a reversion to an earlier release to fail:

- ◆ While the inode upgrade is still in progress
- ◆ When there is not enough disk space or free inodes in a volume

Note

Reverting to an earlier release can take several hours, depending on the number of total inodes and inodes used on your system.

To determine whether an inode upgrade is still in progress, complete the following steps.

Step	Action
1	Enter the following command: priv set advanced Result: The gFiler prompt displays an asterisk (*) after the gFiler name to indicate that you are in advanced mode.

Step	Action
2	Enter the following command: <pre>wabl scan status</pre> Example: If the upgrade is still in progress, the gFiler displays a message similar to the following: <pre>Volume vol1: Scan id Type of scan progress 2 inofile upgrade 849387 of 33554472</pre> Note_____ If an inofile upgrade scan type is not displayed, the inode upgrade is done. _____

When more disk space or free inodes are needed for a reversion, you see a message similar to the following:

```
Volume vol1: There are not enough free inodes to revert the ACLs
with nlinks over 65535.
A minimum of ### inodes needed (maximum ###).
```

Minimum and maximum inodes needed depends on the number of nlinks over 65,355.

You can free up inodes in a volume by deleting files or by moving files to a volume that has free inodes.

Excessive number of subdirectories and hard links must be moved or deleted

If you have more than 65,533 subdirectories or 65,535 hard links, you must move the extra subdirectories to another directory and delete the extra hard links. When too many hard links exist during a reversion, you see an error message similar to the following:

```
Scanning all inodes in volume "vol1" for non-ACL inodes with nlinks
over 65535 0% done
inode 102, file has too high of an nlink (81519)
inode 101, file has too high of an nlink (90001)
0% done.
```

Large directories can be reverted but cannot be made larger

Starting with Data ONTAP 6.5, larger directories are allowed than in pre-6.5 versions. If you have a directory larger than 65,535 KB, when you revert to a pre-6.5 version of Data ONTAP, the directory is accessible and remains at its current size, but you cannot make it any larger.

Reverting entries in the /etc/exports file

Starting with 6.5, when you upgrade to a new version of Data ONTAP, new access rules are applied to the /etc/exports file. If you revert to a pre-6.5 version of Data ONTAP, the /etc/exports file is scanned to determine whether it conforms to the pre-6.5 format. If not, the reversion does not proceed until the file is fixed.

To fix the file, you can edit it manually or use the `exportfs -d` command to revert the file. Using `exportfs -d` fixes most of the reversion issues. Some changes to the /etc/exports file are not fixed with the `exportfs -d` command, and cause a message to be sent to the console during a reversion. If any of these issues are not fixed, that line in the /etc/exports file does not load and access is denied for that resource. These include the following:

- ◆ Lines greater than 4,096 characters, excluding comments
- ◆ Entries that exceed 256 characters in either the `-rw` or `-root` options
- ◆ Too many entries in the `-access` option

Data ONTAP has no way to determine whether entries in an access list represent a netgroup or a host name; therefore, no checking is done on names during reversion. If netgroups exist in the `-rw` and `-root` options, you must manually edit the file to conform to the pre-6.5 format; otherwise, the export line containing the netgroup does not load and access is denied for that resource.

For more information about the /etc/exports file, see the `na_exports.5` man page.

RAID-related errors

Starting with Data ONTAP 6.5, updates made to RAID can sometimes cause problems when you revert to an earlier version, and the reversion might fail. The following is a list of possible problems and the resulting error messages that are sent to the console.

Message with required action	RAID reversion issue
RAID label assimilation in progress. Wait for assimilation to complete before reverting.	RAID label assimilation in progress

Message with required action	RAID reversion issue
Please wait one moment while RAID updates the Failed Disk Registry.	Failed Disk Registry in process of being updated
There is a sparecore disk present which cannot be reverted. Wait for the sparecore to complete before running revert.	Sparecore disk present

Running a RAID label version that is too new

When you install a pre-6.5 version of Data ONTAP, you might get a message that the RAID label version you are running is either invalid or too new. This can happen when the gFiler contains LUNs that were previously upgraded with Data ONTAP 6.5, and were not reverted using the `revert_to` command. In cases where a LUN was not properly reverted, the following actions occur:

- ◆ The LUN is not assimilated.
- ◆ The LUN is moved to the broken LUN pool with “bad label” given as the reason.
- ◆ An Autosupport notice is sent to NetApp and to you.

gFiler-specific reversion issues and procedures—6.5.1 to pre-6.5

About this section

Use the information and procedures in this section if you want to revert your gFiler from Data ONTAP 6.5.1 to a version prior to 6.5.

Issues regarding LUN ownership

When you revert to a Data ONTAP version prior to 6.5, you must return to the pre-6.5 LUN ownership scheme. The reversion process removes all LUN ownership data from the storage subsystems that Data ONTAP 6.5 wrote to the LUNs. See [“Reverting from 6.5.1 to 6.4.x for a single node gFiler”](#) on page 95.

Requirement to create a LUN 0 on storage subsystem ports

Before you revert, you must configure LUN 0 on each channel adapter port accessible to a gateway. In releases prior to 6.5, Data ONTAP uses LUN 0 to gather information about other LUNs configured on the port.

When you cannot revert

Starting with Data ONTAP 6.5, you have the flexibility to mix the LUNs from the ranges among the gFilers. However, if you do so, you cannot revert to a release of Data ONTAP prior to 6.5.

Note

In pre-6.5 releases, gFiler ownership of LUNs was based on the fixed Host LUN ID scheme that was configured by NetApp for you. For clusters, NetApp configured all LUNs with Host LUN IDs from 0 to 127 to one gFiler in the cluster; that is, the cluster node was set with the LUN-ownership set to low. NetApp configured all LUNs with Host IDs from 128 to 255 to the other gFiler in the cluster; that is, that cluster node was set with LUN-ownership set to high.

Deployment issues when reverting

When you revert to a Data ONTAP version prior to 6.5, you must return to either of the configurations allowed for previous releases:

- ◆ One single node
- ◆ Two-node cluster

Starting with Data ONTAP 6.5, up to six gFilers can access LUNs on a storage subsystem. However, when you revert to a version of Data ONTAP prior to 6.5, you must return to the pre-6.5 LUN ownership scheme in which LUNs on the storage subsystem can be seen by a single gFiler or by a clustered pair. You must disconnect the remaining gFilers from storage subsystem.

Features not supported in pre-6.5 releases

The following features are not supported in pre-6.5 Data ONTAP releases:

- ◆ SnapMover
- ◆ SyncMirror
- ◆ MetroCluster

Mixing software releases in a cluster

If you are reverting one partner in the cluster to a pre-6.5 release of Data ONTAP, you must also revert the other partner to a pre-6.5 release of Data ONTAP.

Reverting from 6.5.1 to 6.4.x for a single node gFiler

To revert to an earlier version of Data ONTAP when a gFiler is not a member of a cluster, complete the following steps.

Step	Action
1	Obtain the system files from the CD-ROM or from the NOW Web site, as described in Chapter 3, “ Upgrading Data ONTAP on the gFiler ,” on page 43.
2	Transfer the system files onto the gFiler using either the UNIX NFS or Windows method described in “ Installing Data ONTAP system files ” on page 47.
3	From the console prompt, enter the following command: download Note _____Do not reboot your gFiler at this step. If your gFiler reboots itself, contact NetApp Technical Support or your authorized reseller. _____
4	From the console prompt, enter the following command: revert_to 6.4

Step	Action
5	Follow the instructions on the screen about the conditions that you need to complete.
6	From the console prompt, enter the following command again: revert_to 6.4 Result: The 6.4.x release is restored on the gFiler.
7	At the ok prompt, enter the following command: bye
8	Configure the initiators-per-port option, as described in “Setting the initiators-per-port environment variable” on page 101.

Reverting to 6.4.x when a gFiler is a cluster member

To revert to an earlier version of Data ONTAP for gFilers in a cluster, complete the following steps.

Note

If you mixed LUNs from the ranges among the gFilers in the cluster, you cannot revert. See [“When you cannot revert”](#) on page 94.

Step	Action
1	Obtain the system files from the CD-ROM or from the NOW Web site, as described in Chapter 3, “Upgrading Data ONTAP on the gFiler,” on page 43.
2	Transfer the system files onto one gFiler in the cluster using either the UNIX NFS or Windows method described in “Installing Data ONTAP system files” on page 47.
3	Disable the cluster by entering the following command at the console of one of the gFilers: cf disable

Step	Action
4	Enter the following command and note whether the LUNs are in the low range or high range: sysconfig -r If the LUN numbers are in the range of 0 to 127, they are in the low range. See “When you cannot revert” on page 94 for issues related to mixed ranges that prevent reverting.
5	From the console prompt, enter the following command: download
6	From the console prompt, enter the following command: revert_to 6.4 If the revert fails with the message “Unable to revert since LUN firmware isn’t set!,” - Halt the gFiler. - At the prompt, enter one of the following commands, depending on the range of the LUNs on this gFiler: setenv LUN-ownership high OR setenv LUN-ownership low Note _____ If you set the LUN-ownership to high on this gFiler, you must set LUN-ownership to low on the other gFiler. _____
7	Follow the instructions on the screen about the conditions that you need to complete.
8	From the console prompt, enter the following command again: revert_to 6.4 Result: The 6.4.x release is restored on the gFiler.

Step	Action
9	Press Delete while the memory test is in progress to interrupt the boot process.
10	Configure the initiators-per-port option, as described in “Setting the initiators-per-port environment variable” on page 101.
11	Enter the following command: bye
12	On the partner in the gFiler cluster, follow Steps 1 through 11. Ensure that if you set LUN-ownership to high on the other gFiler that you set it to low on this gFiler, and vice versa.
13	Reenable the cluster by entering the following command on one of the gFilers: cf enable

gFiler reversion issues and procedures—6.5.1 to 6.5x

About this section

Use the information and procedures in this section if you want to revert your gFiler from Data ONTAP 6.5.1 to 6.5 or 6.5Rx.

About reverting from 6.5.1 to 6.5 or 6.5Rx

Features introduced in Data ONTAP 6.5—SnapMover, SyncMirror, and MetroCluster—are not affected by a reversion from 6.5.1 to 6.5 (or 6.5Rx). Therefore, you do not have to disable them before you revert a gFiler to 6.5 (or 6.5Rx).

If you installed 6.5.1 on a cluster, you can revert just one of the cluster partners to 6.5 (or 6.5Rx) if desired. You cannot, however, revert one cluster member to a Data ONTAP version prior to 6.5.

Reverting from 6.5.1 to 6.5 or 6.5.x for a single node gFiler

To revert to an earlier 6.5 version of Data ONTAP when a gFiler is not a member of a cluster, complete the following steps.

Step	Action
1	Obtain the system files from the CD-ROM or from the NOW Web site, as described in Chapter 3, “ Upgrading Data ONTAP on the gFiler ,” on page 43.
2	Transfer the system files onto the gFiler using either the UNIX NFS or Windows method described in “ Installing Data ONTAP system files ” on page 47.
3	From the console prompt, enter the following command: download
4	Enter the following command: reboot

Reverting from 6.5.1 to 6.5 (or 6.5Rx) for a cluster

To revert to an earlier version of Data ONTAP 6.5 for gFilers in a cluster, complete the following steps.

Step	Action
1	Obtain the system files from the CD-ROM or from the NOW Web site, as described in Chapter 3, “ Upgrading Data ONTAP on the gFiler ,” on page 43.
2	Transfer the system files onto one gFiler in the cluster using either the UNIX NFS or Windows method described in “ Installing Data ONTAP system files ” on page 47.
3	Disable the cluster by entering the following command at the console of one of the gFilers: cf disable
4	From the console prompt, enter the following command: download
5	Enter the following command: reboot
6	On the partner in the gFiler cluster, follow Steps 1 through 5.
7	Reenable the cluster by entering the following command on one of the gFilers: cf enable

Reversion requirement if using switches

Setting the initiators-per-port environment variable

If you are using switches between the gateway and the storage subsystem and you are reverting to is a release prior to Data ONTAP 6.5, you need to set the initiators-per-port environment variable. The variable can be set to 2 or 4, depending on the number of port-to-port connections there are going into a switch from the gateway or gateway cluster.

To set the initiators-per-port environment variable, complete the following step.

Step	Action
1	Enter the following command at the console: setenv initiators-per-port x x is the number of connections from the gateway to switches and can be either 2 or 4.

About this appendix This appendix describes the process of changing hardware components by using the nondisruptive cluster upgrade method.

In a nondisruptive upgrade, each node is successively “failed;” that is, partners take over for each other at specific points of the procedure. While the “failed” node is in the waiting for giveback loop, it can be interrupted and brought to the firmware ok prompt or powered off. For more information about nondisruptive upgrades of clustered gFilers, see [“Planning for upgrading clusters”](#) on page 9.

When hardware updates can be performed

Hardware maintenance and upgrades that are supported by the nondisruptive process can be performed in conjunction with upgrading Data ONTAP on clustered gFilers if the upgrade is within a release family (from 6.5 and later).

If the upgrade is from a release prior to 6.5, you can upgrade Data ONTAP to 6.5.1 first using the standard upgrade method, thereby causing a small disruption in service. Then you can use the nondisruptive upgrade method for hardware upgrades; this method results in a longer period of disruption than if you were using the standard method.

Note

In these circumstances, the new Data ONTAP software must be downloaded first.

Supported hardware upgrades

When a cluster node is in “failed” mode, you can perform the following hardware upgrades:

- ◆ Replacing the head (with the same type as before, and with the same adapters)
- ◆ Replacing the motherboard
- ◆ Replacing or adding an NVRAM or NIC, either with the same component or with an improved component (for example, you can upgrade from 2-port to 4-port gigabit Ethernet (GbE), or 1-port to 2-port Fibre Channel).
- ◆ Replacing the Cluster Interconnect card
- ◆ Installing on-board firmware on various platforms (for example, the BMC on the GF9xx models)

You can also run diagnostics on various components of the “failed” machine (for example, motherboard or NVRAM.)

Note

Running diagnostics on parts of the machine that are still visible to or in use by the partner—notably disks and the Cluster Interconnect card—can present problems. See the diagnostics documentation.

After any of the listed upgrades are complete, the node can be rebooted into the waiting for giveback state. During the rest of the nondisruptive upgrade procedure, the partner node does a `cf giveback` and the node boots on its new hardware and firmware.

Performing a nondisruptive hardware upgrade

If you are performing a nondisruptive upgrade for hardware separately from a Data ONTAP or system firmware upgrade, complete the following steps at the console of one of the gFilers in the cluster.

Step	Action	
1	If...	Then...
	CIFS is not in use on gFiler A	Go to Step 2.
	CIFS is in use on gFiler A	Enter the following command: cifs terminate -t nn <i>nn</i> is a notification period appropriate for your clients. After that period of time, proceed to Step 2.
2	At the console of gFiler B, enter the following command: cf takeover Result: This command causes gFiler A to shut down gracefully and leaves gFiler B in takeover mode.	
3	Turn off the power on gFiler A. After you complete the upgrade of hardware on gFiler A, turn on the power on gFiler A, which causes it to boot. When the message <code>waiting for giveback</code> appears, go to Step 4.	

Step	Action
4	At the console of gFiler B, enter the following command: cf giveback Result: This command causes gFiler A to reboot and resume normal operation as a cluster partner.
5	Repeat Step 1 through Step 4 to update the partner gFiler; that is, to shut down and update gFiler B with partner gFiler A in takeover mode.

About this appendix This appendix explains the factors affecting service availability during upgrades and provides details about service and protocol behavior.

Factors for minimizing service disruption during upgrades

Service interruptions during Data ONTAP upgrades can be mitigated through planning and configuration. In some cases, upgrades can be completely nondisruptive from the clients' perspective.

The following factors can affect the length of service interruption.

Factor	Comments
The types of services licensed and their susceptibility to time-out errors	See “Service and protocol considerations” on page 108.
The types of applications and their susceptibility to time-out errors	The availability of client applications during upgrades depends on its features, protocols used, and configuration. See your application documentation for more information.
Whether a system firmware upgrade is required	System firmware upgrades can be disruptive in single gFiler and standard cluster upgrades because they require a system halt and reboot. In nondisruptive cluster upgrades, no system halt and reboot is required. For more information, see Chapter 2, “Upgrading gFiler Firmware,” on page 21.
Upgrading from a release prior to 6.5	Upgrading from a release prior to Data ONTAP 6.5 interrupts service.
Upgrading within a 6.5 or later release family	Starting with the 6.5 release family, nondisruptive upgrades are available for clusters in the circumstances described in “How nondisruptive cluster upgrades work” on page 9.

Factor	Comments
Whether the system being upgraded is a single node or a member of a cluster	When you upgrade a single gFiler, you must reboot it. The result is that during the time the gFiler is going through the reboot process services are interrupted. For clusters, less disruption of service occurs if you can use the nondisruptive process. See “Planning for upgrading clusters” on page 9 for more information.

Note

All hardware and software upgrades in any storage solution are potentially at least somewhat disruptive to gFiler services. NetApp recommends that you review upgrade options carefully to determine the method of upgrading to maintain optimal service availability.

Service and protocol considerations

During an upgrade, the gFiler must be rebooted (by issuing the reboot command or by initiating a cluster takeover and giveback) to load the new software. In general, services based on stateless protocols—such as NFS, FCP, and iSCSI—are less susceptible to service interruptions during upgrades than session-oriented protocols—such as CIFS, FTP, NDMP, and HTTP. Furthermore, services based on stateless protocols usually remain available during nondisruptive upgrades of clustered systems.

Stateless protocols usually include a timeout procedure. For example, if a message is sent but receipt is not acknowledged within a timeout period, a transmission error is assumed to have occurred. In a gFiler environment, if the client’s timeout period is greater than the disruption period on the gFiler (for example, a reboot or cluster giveback), the client does not perceive a disruption of gFiler services.

In session-oriented protocols, there is no concept of timeout to protect the service from disruption. If session-oriented gFiler services are disrupted, state information about any operation in progress is lost and the operation must be restarted by the user.

The following list summarizes the behavior of gFiler services and protocols in a nondisruptive upgrade.

- ◆ NFS hard mounts

There is no adverse effect on the clients. Clients might receive some messages similar to NFS server not responding, retrying until the gFiler reboots.

- ◆ NFS soft mounts

NetApp recommends that you do not use NFS soft mounts for NFS traffic.

- ◆ FCP, Direct Attached

There is no adverse effect on the clients if the reboot takes less than the user-configurable node and link timeouts on the following hosts:

- ❖ For Windows 2000 hosts, these host parameters are called `NodeTimeout`, `HLinkTimeout`, and `LinkTimeout`.
- ❖ For Solaris hosts, these host parameters are called `nodev-tmo` and `linkdown-tmo`, as set in the `/kernel/drv/lpfc.conf` file.

The recommended value for these parameters for Direct Attached FCP configurations is to set them all to 255 seconds. (Check NOW for the latest values).

- ◆ FCP, Fabric Attached

There is no adverse effect on the clients if the reboot takes less than the user-configurable node timeouts on the following hosts:

- ❖ For Windows 2000 hosts, this parameter is called `NodeTimeout`.
- ❖ For Solaris hosts, this parameter is called `nodev-tmo`.

When the host is fabric attached to a gFiler that is not in a cluster, the recommended value for these parameters is 255 seconds.

- ◆ iSCSI

There is no adverse effect on the clients. Clients might receive some messages similar to Server not responding, retrying until the gFiler reboots.

- ◆ CIFS

Client sessions are terminated. Inform users to end their sessions before you upgrade.

To upgrade, issue the `cifs terminate -t` command before the cluster takeover or before the reboot, or issue the `reboot -t` command.

- ◆ FTP, NDMP, and HTTP

The state is lost and the operation must be retried by the client user.

- ◆ Backups and restores

The state is lost and the operation must be retried by the client user.

Caution

Do not initiate a backup or restore operation during or immediately before an upgrade. Doing so might result in data loss.

- ◆ Applications (for example, Oracle®, Exchange, etc.)
Effects depend on the applications. For timeout-based applications, you might be able to change the timeout setting to longer than the Data ONTAP reboot time to minimize adverse effects.