

Data ONTAP™ 6.5.2

Upgrade Guide

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Preface

Introduction

This guide describes how to upgrade Network Appliance™ filers to the latest release of Data ONTAP™ firmware and software. It covers all filer models.

Note

Upgrade procedures for gateway filers (gFilers) are covered in gFiler documentation. The information in this guide does not apply to gFilers.

Audience

This guide is for system administrators who are familiar with operating systems that run on the filer's clients, such as UNIX®, Windows 95™, Windows NT®, and Windows® 2000. It assumes that you know how to use a Web browser.

Accessing Data ONTAP man pages

Network Appliance provides Data ONTAP manual (man) pages for the following types of information. They are grouped into sections according to standard UNIX naming conventions.

Types of information	Man page section
Commands	1
Special files	4
File formats and conventions	5
System management and services	8

Man pages can be viewed in the following ways:

- ◆ At the filer command line, by entering
`man command_or_file_name`
- ◆ From the FilerView® main navigational page
- ◆ In the *Command Reference Guide*

Note

All Network Appliance man pages are stored on the filer in files whose names are prefixed with the string “na_” to distinguish them from client man pages. The prefixed names are used to refer to filer man pages from other man pages and sometimes appear in the NAME field of the man page, but the prefixes are not part of the command, file, or services.

For more information, see the NetApp® man(1) man page.

Terminology and conventions

When the term “filer” is used, the information applies to all Network Appliance filer models, including the 900 series storage appliances and the NearStore® storage appliances.

In examples that illustrate commands executed on a UNIX workstation, the command syntax and output might differ, depending on your version of UNIX.

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, or clicking in a field in a graphical interface and typing information into it.

Where you enter commands

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

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 <i>hostname</i></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.

The upgrade process

The upgrade process requires the following main steps.

Step	Task
1	Plan your upgrade by familiarizing yourself with requirements and issues described in Chapter 2, “Before You Upgrade: What Is Required,” on page 3. Plan to do the following: ◆ Understand any requirements for upgrading to Data ONTAP 6.5.2 from your existing software. ◆ Note any potential changes to your system after the upgrade. ◆ If you have clustered filers, select an upgrade method. ◆ If you run SnapMirror, identify filers with destination and source volumes.
2	If necessary, perform any required preliminary upgrades before upgrading to Data ONTAP 6.5.2. Required upgrades might include the following: ◆ Performing an intermediate upgrade, as described in “Resolving upgrade issues” on page 12 ◆ “Upgrading the system firmware” on page 32 ◆ “Upgrading disk firmware” on page 38
3	Obtain the Data ONTAP system files from the NetApp® on the Web (NOW) site or the CD-ROM.
4	Install the 6.5.2 system files and download them to your filers as described in Chapter 4, “Upgrading Filer Software,” on page 41.
5	Conclude the upgrade with any of the tasks discussed in “Concluding the upgrade” on page 80.

Upgrading from clients

The Data ONTAP Upgrade Utility is an alternative upgrade method. It is a Perl script that allows you to upgrade filers from UNIX or Windows clients. The script is also available in executable form for Windows clients. The utility is especially useful if you do not have Common Internet File System (CIFS) or

Network File System (NFS) licensed—for example, on a filer serving only Fiber Channel Protocol (FCP)—and the conventional methods for copying system files to the filer are not available.

For more information about acquiring and using the Upgrade Utility, see the NOW site at http://now.netapp.com/NOW/download/tools/upgrade_ontap/.

Note

You must be running Java on the filer to use the Upgrade Utility.

Upgrade sources

The following are sources for upgrading firmware and system software:

- ◆ The NOW site at <http://now.netapp.com/>
NOW login information is on the protocol license sheet sent with the filer.
- ◆ The CD-ROM supplied in the media package

You can also find utilities on the NOW site that can help ensure an efficient upgrade. See the Tools & Utilities page at <http://now.netapp.com/NOW/cgi-bin/toolsutils/>.

Reverting to a previous release

For information about reverting to a previous Data ONTAP release, see Chapter 5, “[Reverting Filer Software](#),” on page 83.

About this chapter

This chapter contains information to help you ensure that your filers 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.

Information about bug fixes

For a list of bugs fixed in this release, access Bugs Online by completing the following steps.

Step	Action
1	Use a Web browser to go to http://now.netapp.com/cgi-bin/bol/ .
2	Click Service & Support.
3	Click Access Software Bug Tools.

D or P patches might not be included: Data ONTAP 6.5.2 might not contain all the bug fixes in preceding D or P patch releases.

Caution

If your filer is running a patch release, compare the bug fixes for this release to the bug fixes for your patch release to determine whether you should upgrade. For information about these bug fixes, see Bugs Online at <http://now.netapp.com/cgi-bin/bol/>.

Topics in this chapter

This chapter describes the following topics:

- ◆ “[System requirements](#)” on page 4
- ◆ “[Upgrade host requirements](#)” on page 6
- ◆ “[Planning for upgrading clusters](#)” on page 7
- ◆ “[Planning for upgrading filers running SnapMirror](#)” on page 10
- ◆ “[Resolving upgrade issues](#)” on page 12

System requirements

Data ONTAP versions supported

To determine whether your filer supports Data ONTAP 6.5.2, 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	In the Select Platform list box in the Data ONTAP product row, select your filer type.
5	Click Go. Result: You see a list of the versions of Data ONTAP supported by your filer platform. If Data ONTAP 6.5.2 is listed as a release for your filer, you can upgrade to it.

Filer firmware availability

To view system firmware versions available for your filers, complete the following steps.

Note

The F85 and F87 filers use firmware that does not need to be upgraded.

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

Step	Action	
5	If you are upgrading ...	Then...
	A CompactFlash®-based filer	Click System Firmware/Diagnostics for CompactFlash-based Filers & NearStores.
	A diskette-based filer	Click System Firmware for Filers & NetCache.

For more information about system firmware updates, see [“Upgrading the system firmware”](#) on page 32.

Fibre Channel disk firmware requirement

To view the latest required firmware revisions for Fibre Channel disk drives, complete the following steps.

Step	Action
1	Use a Web browser to go to http://now.netapp.com/ .
2	Click Service & Support.
3	Click Disk Support Matrix & Firmware. Result: The Disk Drive & Firmware matrix appears, where you can click the link to the firmware revision needed for your drives.

For more information about disk firmware requirements and updates, see [“Upgrading disk firmware”](#) on page 38.

Upgrade host requirements

About upgrade hosts

An upgrade host is a system from which you install the Data ONTAP upgrade package on your filer. There are two types of upgrade host: a Windows or UNIX client, or an HTTP server. The type of host determines how you install an upgrade package:

- ◆ From a Windows or UNIX client

You copy the Data ONTAP upgrade package to a client directory that is mapped as a drive (Windows) or mounted (UNIX) from the filer being upgraded. You then use commands on the client system to unpack the upgrade package. The client is usually the filer's admin host.

- ◆ From an HTTP server

You copy the Data ONTAP upgrade package to an HTTP server, then copy it to the filer and unpack it using commands on the filer console.

The host from which you upgrade your filer must have access to at least one of the following:

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

Requirements for the client

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

The following lists the requirements for each type of client.

- ◆ UNIX client—any available version of UNIX
- ◆ Windows client—any version of Windows (Windows NT must be version 3.51 or later.)

Requirements for the HTTP server

You must be able to serve the upgrade package from the HTTP server, and you must know the exact URL (including any necessary host and port information) to enter at the filer console.

Planning for upgrading clusters

Before upgrading clustered filers

Before upgrading your clustered filers, verify that the cluster is properly configured by using the Cluster Configuration Checker. Identify and resolve any cluster configuration issues before continuing with the upgrade.

The Cluster Configuration Checker is a Perl script that detects errors in the configuration of a pair of clustered NetApp filers. The script is available on the NOW site at http://now.netapp.com/NOW/download/tools/cf_config_check/.

See also the chapter on cluster management in the *Storage Management Guide*.

Selecting an upgrade method for your cluster

The following methods are available for upgrading cluster partners:

- ◆ Nondisruptive (CompactFlash-based systems only)
- ◆ Standard

Depending on the nature of the upgrade, nondisruptive cluster upgrades ensure better filer availability than single system or standard cluster upgrades.

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

About nondisruptive cluster upgrades

In a nondisruptive upgrade (also called a *rolling upgrade*), clustering technology is used to enable a takeover filer to assume the functions of the “failed” partner while it is being upgraded. There is a takeover and giveback operation for each cluster node. Because the cluster partner node fulfills service requests during the “failed” filer’s upgrade, no disruption in service is experienced by the clients.

In addition, because the takeover filer assures continuous availability of the “failed” filer’s disks, more extensive upgrades requiring a system halt—such as system firmware upgrades and hardware adapter replacements—can be performed without disrupting services based on stateless protocols.

Network Appliance recommends nondisruptive clustered upgrades to minimize service disruption when one or more of the following is being performed:

- ◆ Upgrades within a release family (for example, from 6.5 to 6.5.2)
- ◆ System firmware upgrades
- ◆ Certain hardware upgrades

Before undertaking a nondisruptive upgrade procedure, Network Appliance recommends that you do the following:

- ◆ Familiarize yourself with the nondisruptive upgrade method.
Nondisruptive upgrades require more planning and procedural steps than standard upgrades. Make sure to thoroughly review this document before starting a nondisruptive upgrade. See especially Appendix D, “[Optimizing Service Availability During Upgrades](#),” on page 105.
- ◆ Ensure that your cluster is optimally configured and functioning correctly.
You can verify that your clustered filers are properly configured by running the Cluster Configuration Checker as described in “[Before upgrading clustered filers](#)” on page 7.
- ◆ Ensure that your clients are optimally configured and functioning correctly.
Configure client timeout settings to optimize availability as described in “[Service and protocol considerations](#)” on page 106.

You should not use nondisruptive upgrades in the following circumstances:

- ◆ You have filers actively serving CIFS to clients.
Because CIFS is session-oriented, sessions must be terminated before upgrade procedures to prevent data loss.
- ◆ You have filers actively serving File Transfer Protocol (FTP) or Network Data Management Protocol (NDMP) clients that cannot be postponed.
Because these protocols are session-oriented, outstanding sessions must complete, and these services must be disabled in order to use nondisruptive upgrades.
- ◆ You need to upgrade disk firmware.
Disk firmware upgrades automatically take disks offline until the upgrade is complete. Services and data are unavailable until they are back online.
- ◆ You use diskette-based clustered filers (F700 series filers, and F810, F820, and F840 filers).
On diskette-based clustered filers, the takeover and giveback operations are much slower than on CompactFlash-based filers and possibly slower than rebooting.

For these conditions, Network Appliance recommends standard upgrades.

Note

Nondisruptive upgrades cannot be employed for upgrades between release families—standard upgrades must be used.

About standard cluster upgrades

In a standard upgrade, the cluster is disabled and each node is updated. When the cluster is disabled, each node behaves as a single-node (non-clustered) filer; in other words, system services associated with that node are interrupted for as long as it takes the system to reboot.

In general, standard cluster upgrades are most appropriate if you schedule regular downtime for your filers. Other maintenance upgrades, such as system firmware and hardware, can also take place when the cluster is disabled.

Standard cluster upgrades must be employed for upgrades between Data ONTAP release families.

Planning for upgrading filers running SnapMirror

Upgrade requirements for SnapMirror

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

This requirement applies to both asynchronous and synchronous SnapMirror deployments.

Caution

If you do not upgrade SnapMirror destination and source filers in the correct order, SnapMirror volume replication will be 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 filers on which they reside before upgrading the filer where the source volume resides. In addition, when you upgrade filers in a cascading series, you should upgrade the filers in order, beginning with the destination filers furthest in your topology from the source filer.

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

Step	Action
1	On the filer 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 filers running synchronous SnapMirror

When you upgrade Data ONTAP on filers running synchronous SnapMirror, SnapMirror goes into asynchronous mode. When in asynchronous mode, the source filer 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 filers that have a mirrored relationship with each other using SnapMirror, the order in which you upgrade the filers 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 filer reads a snapshot of the source filer. Therefore, the destination filer must be upgraded first, so that it can read the snapshots of the earlier release. If the source filer is upgraded first, the destination filer cannot read the source filer's file system, thereby disabling SnapMirror.

For more information

For more information about running SnapMirror, see the *Data Protection Online Backup and Recovery Guide*.

Resolving upgrade issues

What you need to know

Every Data ONTAP release family has unique requirements concerning upgrades. Before you decide whether to upgrade, you should understand

- ◆ Issues you must resolve before upgrading to the new release
- ◆ New system behavior after upgrading to the new release

Because significant new features are introduced in each new Data ONTAP release family, you might encounter issues when upgrading to a new release family, especially if you are not upgrading from the immediately previous version of Data ONTAP.

For example, if you are upgrading from a release in the 6.2 family to Data ONTAP 6.5.2, you must review and resolve upgrade issues associated with the 6.3, 6.4, and 6.5 release families (but not 6.2 or earlier) before upgrading to 6.5.2.

For more information, see Appendix C, “[Understanding Release Family Upgrades](#),” on page 103.

The following sections discuss upgrade issues and new system behavior associated with release families:

- ◆ “[Upgrading to Data ONTAP 6.5 or later](#)” on page 13
- ◆ “[Upgrading from releases earlier than Data ONTAP 6.4](#)” on page 25
- ◆ “[Upgrading from releases earlier than Data ONTAP 6.3](#)” on page 26
- ◆ “[Upgrading from releases earlier than Data ONTAP 6.2](#)” on page 27
- ◆ “[Upgrading from releases earlier than Data ONTAP 6.1](#)” on page 28
- ◆ “[Upgrading from releases earlier than Data ONTAP 5.3](#)” on page 30

Required intermediate upgrades

Depending on the version of Data ONTAP software you currently have installed and the model of your filer, you might have to upgrade to an intermediate release before upgrading to Data ONTAP 6.5.2.

- ◆ If your CompactFlash-based filer is running Data ONTAP 6.4.1 or earlier:
You must upgrade to the latest 6.4.x release before upgrading to 6.5.2.
- ◆ If your diskette-based filer is running Data ONTAP 6.2 or earlier:
You must upgrade to the latest 6.3.x release before upgrading to 6.5.2.

For more information, see “[Upgrading to Data ONTAP 6.5 or later](#)” on page 13.

Upgrading to Data ONTAP 6.5 or later

Issues you must resolve before upgrading

The following sections discuss upgrade issues that you must resolve before upgrading to the Data ONTAP 6.5 release family:

- ◆ [“Important caution for filers with DS14 or DS14Mk2 disk shelves”](#) on page 13
- ◆ [“Filers with CompactFlash cards that use Open Firmware must be running firmware 4.2.2 or later”](#) on page 15
- ◆ [“Important caution for filers with CompactFlash cards running Data ONTAP 6.4.1”](#) on page 16
- ◆ [“Filers with CompactFlash cards must be running the latest version of Data ONTAP 6.4.x before upgrading to Data ONTAP 6.5.x”](#) on page 16
- ◆ [“Upgrade recommendation for diskette-based filers before upgrading to Data ONTAP 6.5.x”](#) on page 17
- ◆ [“Upgrade recommendation for filers with FC-AL adapters”](#) on page 18
- ◆ [“OSSV Agent upgrade to version 1.1”](#) on page 19
- ◆ [“SecureAdmin upgrade to 3.0 required”](#) on page 19
- ◆ [“Array Support Library upgrade to version 1.1”](#) on page 20

New behavior in upgraded systems

The following sections discuss new behavior in systems that have been upgraded to the Data ONTAP 6.5 release family:

- ◆ [“Increased disk and CPU activity in Data ONTAP 6.5.x”](#) on page 20
- ◆ [“New access rules for /etc/exports file”](#) on page 21
- ◆ [“RAID 4 groups size limits”](#) on page 21
- ◆ [“Upgrading oversized RAID 4 groups to RAID DP”](#) on page 22
- ◆ [“iSCSI CHAP configuration not saved on upgrade”](#) on page 23
- ◆ [“Resetting the NFS exports timeout option value”](#) on page 24

Important caution for filers with DS14 or DS14Mk2 disk shelves

If you are upgrading Data ONTAP software in systems with DS14 or DS14Mk2 disk shelves, including FAS200 series systems, and you are currently running a version of Data ONTAP that does not include a fix for Bug ID 113823, *do not*

update disk firmware before upgrading, or you could risk data loss. Instead, upgrade your Data ONTAP software to a release that contains a fix for Bug ID 113823 first, then update disk firmware.

For a list of Data ONTAP versions in which Bug ID 113823 has been fixed, see the following URL:

<http://now.netapp.com/NOW/cgi-bin/bugrellist?bugno=113823>

Disk firmware is automatically updated on reboot as part of the Data ONTAP upgrade whenever the disk drives are running firmware older than the firmware version that is included with the Data ONTAP release. As disk firmware is updated, it is possible (though unlikely) that all disk drives on a shelf will receive the update at the same time. This simultaneous update might cause the firmware update process to fail, rendering the disks unusable and causing loss of data if it happens to multiple disks in the same RAID group.

Data ONTAP 6.5.2 fixes Bug ID 113823 by preventing firmware from being concurrently updated on all disk drives. For more information about this issue, see the description for Bug ID 113823, on the NOW site at the following URL: <http://now.netapp.com/NOW/cgi-bin/bol?Type=Detail&Display=113823>

Note

Bug ID 113823 occurs only when every disk drive on the shelf requires an update.

Special considerations for nondisruptive upgrades: If you are upgrading Data ONTAP software in clustered systems with DS14 or DS14Mk2 disk shelves, and you are currently running a version of Data ONTAP that does not include a fix for Bug ID 113823, *do not* update disk firmware before attempting a nondisruptive upgrade. If you determine that upgrading to Data ONTAP 6.5.2 will load new disk firmware onto your systems, you must perform a standard upgrade, which is the safe and recommended method to correct the problem for clustered filers. For more information, see “[Planning for upgrading clusters](#)” on page 7.

Checking disk firmware versions: If you have Autosupport enabled, you can use the Autosupport analysis tool, available on the NOW My Installed Products page, to verify your disk firmware version in advance and find out whether your system is vulnerable to Bug ID 113823. If the Autosupport analysis indicates that all disks on a disk shelf need firmware updates, failure to upgrade software before updating firmware could cause disk drive damage and data loss.

For instructions about using the Autosupport analysis tool to detect disk firmware requirements, see “[Detecting outdated disk firmware](#)” on page 39.

Filers with CompactFlash cards that use Open Firmware must be running firmware 4.2.2 or later

For NetApp filers that have CompactFlash cards and that run Open Firmware (OFW), you must upgrade the system firmware and diagnostics files to version 4.2.2 or later before upgrading to the Data ONTAP 6.5 release family. The Data ONTAP 6.5 image will not fit on the 32 MB CompactFlash cards as they are currently formatted. If you attempt to download Data ONTAP 6.5.x on your filer before upgrading to firmware version 4.2.2 or later, the download will stop and the filer will display a message similar to the following:

download: Failed to repartition the card.

download: The current firmware version does not support repartitioning of the boot device as required.

download: Please update your system firmware to 4.2.2 or later prior to upgrading to this OS. The System Firmware area on the NOW site has further information.

Considerations concerning system firmware upgrades: Review the following issues before upgrading system firmware.

- ◆ If you are running Data ONTAP 6.4.1, see “[Important caution for filers with CompactFlash cards running Data ONTAP 6.4.1](#)” on page 16, *before* you upgrade your system firmware and diagnostics to version 4.2.2 or later.
- ◆ If you are upgrading to 4.2.2 or 4.2.3 system firmware, you must run the `set-defaults` command from the firmware ok prompt *before* rebooting. For more information, see the Bug ID 105365 public report (on the NOW site at the following URL:
<http://now.netapp.com/NOW/cgi-bin/bol?Type=Detail&Display=105365>).
- ◆ If you are upgrading from 4.2.2 or 4.2.3 to 4.3 or later system firmware, you must run the `set-defaults` command from the firmware ok prompt *before* rebooting. For more information, see the Bug ID 105365 public report.
- ◆ If you are upgrading to system firmware version 4.3 or later from a version other than 4.2.2 or 4.2.3, or if you are already running system firmware version 4.3 or later, do not run the `set-defaults` command.

Filers affected: The following filers must be running firmware version 4.2.2 or later before upgrading to the Data ONTAP 6.5 release family:

- ◆ F825
- ◆ F880
- ◆ FAS940
- ◆ FAS960
- ◆ R100
- ◆ R150

You can find filer system firmware on the NOW site at <http://now.netapp.com/NOW/download/tools/serviceimage/>. Follow the instructions there to download and install the latest filer system firmware.

**Important caution
for filers with
CompactFlash
cards running Data
ONTAP 6.4.1**

If you are running Data ONTAP 6.4.1 on a filer that has a CompactFlash card and that runs Open Firmware (OFW), you must complete an additional procedure to manually format the service partition before upgrading the firmware to version 4.2.2 or later. If you do not complete this procedure, your filer will be unable to upgrade to 4.2.2 and future firmware releases. For more information, see the [BURT 98952](http://now.netapp.com/NOW/cgi-bin/bol?Type=Detail&Display=98952) public report on the NOW site at the following URL:
<http://now.netapp.com/NOW/cgi-bin/bol?Type=Detail&Display=98952>

Filers affected: This caution applies to the following filers running Data ONTAP 6.4.1 before upgrading to the Data ONTAP 6.5 release family:

- ◆ F825
- ◆ F880
- ◆ FAS940
- ◆ FAS960
- ◆ R100
- ◆ R150

You can find the NetApp OFW/Diagnostics Download Instructions for CompactFlash Units and firmware/diagnostics images on the NOW site at <http://now.netapp.com/NOW/download/tools/serviceimage/30800128/>.

**Filers with
CompactFlash
cards must be
running the latest
version of Data
ONTAP 6.4.x before
upgrading to Data
ONTAP 6.5.x**

If you are running a version of Data ONTAP earlier than 6.4.2 on filers that have a CompactFlash card, you must install Data ONTAP 6.4.2 or the latest Data ONTAP 6.4.x version, before upgrading to the Data ONTAP 6.5 release family. If you attempt to download Data ONTAP 6.5.x on your filer before installing the latest version of Data ONTAP 6.4.x, the download will stop and the filer will display a message similar to the following:

```
download: The boot image is larger than the primary boot device
(23068672 bytes instead of 11534336).
download: Reformatting boot device.
download: Unable to reformat the boot device. download failed.
Cannot boot off disks with latest image
```

Filers affected: The following filers must be running Data ONTAP 6.4.2 or later before upgrading to the Data ONTAP 6.5 release family:

- ◆ F87
- ◆ F825
- ◆ F880
- ◆ FAS940
- ◆ FAS960
- ◆ R100
- ◆ R150

You can download the latest release of Data ONTAP 6.4.x 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 6.4.x release and follow the instructions.

To upgrade your filer software, follow the instructions specific to your filer in “[Upgrading Filer Software](#)” on page 41.

Upgrade recommendation for diskette-based filers before upgrading to Data ONTAP 6.5.x

If you are upgrading a diskette-based filer from a version of Data ONTAP earlier than 6.2, NetApp recommends that you upgrade to Data ONTAP 6.3.3 or the latest 6.3.x release first before upgrading to the Data ONTAP 6.5 release family.

By upgrading in two steps, you reduce the number of Redundant Array of Independent Disks (RAID) and Write Anywhere File Layout (WAFL) changes. As a result, the upgrade from Data ONTAP 6.3.3 to 6.5 should finish sooner with less risk of problems.

Filers affected: NetApp recommends that the following filers upgrade to Data ONTAP 6.3.3 or the latest 6.3.x release before upgrading to the Data ONTAP 6.5 release family:

- ◆ F85
- ◆ F700 series
- ◆ F810
- ◆ F820
- ◆ F840

You can download Data ONTAP 6.3.3 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 Data ONTAP 6.3.3 release and follow the instructions.

Upgrade recommendation for filers with FC-AL adapters

When you upgrade to the Data ONTAP 6.5 release family, Network Appliance recommends that you configure your Fibre Channel-Arbitrated Loop (FC-AL) adapters to run in 1-Gb and 2-Gb mode by changing the jumpers on the adapter. During the mandatory firmware upgrade, Network Appliance also recommends that you upgrade system firmware to 4.2.3 or later in order to be compatible with the new 1-Gb and 2-Gb setting.

Note

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

FC-AL adapters configured for 1-Gb operations will continue to work in a Data ONTAP 6.5 or later environment without resetting the jumpers or upgrading firmware. However, Network Appliance recommends 1-Gb and 2-Gb mode for optimal operation of these adapters.

Complete this procedure if your FC-AL adapters have the following marketing and spare part numbers:

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

To reconfigure your FC-AL adapters and upgrade firmware, complete the following steps.

Step	Action
1	Upgrade the filer system firmware to 4.2.3 or later. You can find filer system firmware on the Service Image page (on the NOW site at http://now.netapp.com/NOW/download/tools/serviceimage/). Follow the instructions given there to download and install filer system firmware 4.2.3 or later. Note_____ If you downloaded and installed the 4.2.3 firmware upgrade, or if you are upgrading from 4.2.3 to 4.3 firmware, you must run the <code>set - defaults</code> command from the firmware ok prompt <i>before</i> rebooting your filer. For more information, see the Bug ID105365 public report (on the NOW site at http://now.netapp.com/NOW/cgi-bin/bol?Type=Detail&Display=105365).
2	Upgrade Data ONTAP to 6.5.2 or any version later than 6.5.

Step	Action
3	Remove any FC-AL adapters from your system chassis and verify that jumpers J3 and J4 are set in the 1-2 position as described in “Configuring new and existing FC-AL adapters” (on the NOW site at http://now.netapp.com/NOW/knowledge/docs/hardware/filer/adapter.pdf). Reposition the jumpers if necessary.

Filers affected: FC-AL adapters can be installed on the following filers:

- ◆ R200
- ◆ FAS960
- ◆ FAS940
- ◆ F880
- ◆ F825

OSSV Agent upgrade to version 1.1

Open Systems SnapVault™ (OSSV) Agent 1.0 is incompatible with the Data ONTAP 6.5 release family. If you are upgrading to Data ONTAP 6.5.x and you are using OSSV Agent 1.0, you must upgrade OSSV Agent to version 1.1. You can find OSSV Agent 1.1 on the Download Software page on the NOW site at the following URL:

<http://now.netapp.com/NOW/cgi-bin/software>

NetApp recommends that you upgrade the OSSV agent on your host platform before upgrading your filer to the Data ONTAP 6.5 release family.

SecureAdmin upgrade to 3.0 required

SecureAdmin™ 2.2.1 and earlier software is incompatible with Data ONTAP 6.4 and later. If your filer is licensed for SecureAdmin and you are upgrading to the Data ONTAP 6.5 release family, you must be running SecureAdmin 3.0 or later. If you need to upgrade SecureAdmin, you can find it on the Download Software page on the NOW site at the following URL:

<http://now.netapp.com/NOW/cgi-bin/software>

NetApp recommends that you upgrade SecureAdmin on your host platform *after* upgrading your filer to the Data ONTAP 6.5 release family.

Caution

Failure to upgrade to SecureAdmin 3.0 will cause your filer to lose its SecureAdmin capabilities.

**Array Support
Library upgrade to
version 1.1**

If you are upgrading to Data ONTAP 6.5.2 in a Storage Area Network (SAN) with Solaris Fibre Channel hosts and you are using the NetApp-supplied Array Support Library (ASL) 1.0, you must upgrade to version 2.0 of the ASL before upgrading to Data ONTAP 6.5.2.

For more information, see the *SAN Host 1.3 for Fibre Channel on Solaris Release Notes*.

**Recommendations
for all filers
upgrading to Data
ONTAP 6.5.x**

The Data ONTAP 6.5 release family provides support for larger inodes. For the smoothest conversion to larger inodes, keep the following tips in mind before upgrading to Data ONTAP 6.5.x:

- ◆ Upgrade during non-peak hours.
- ◆ Keep filer workload moderate to enable faster upgrade.
- ◆ If you are serving files with the CIFS protocol, make sure 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 complete.

Note

Upgrading to the Data ONTAP 6.5 release family can take significantly longer to complete than upgrades to earlier releases. Depending on your system, the 6.5 upgrade can take several hours. During the upgrade, the filer will continue to serve data.

**Increased disk and
CPU activity in Data
ONTAP 6.5.x**

After upgrading to the Data ONTAP 6.5 release family, you might observe disk LEDs blinking on an apparently idle system. You might also observe some CPU activity even when there is no user workload present. This is due to a default “media scrub” background process that continuously finds and cleans media errors on the filer disks. This process is designed to work in self-throttling mode with negligible impact on filer performance.

New access rules for /etc/exports file

In the Data ONTAP 6.5 release family, access rules in the /etc/exports file have 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 the Data ONTAP 6.5 release family, however, the rule now means that host1 and host2 have read-write access and all other hosts have *no access*. In order 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.x, the /etc/exports file is changed automatically to be sure your rules work the same way. The rule /vol/vol1 -rw=host1:host2 is 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 the Data ONTAP 6.5 release family 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 4 groups size limits

When you upgrade to the Data ONTAP 6.5 release family, your existing volumes will be configured with RAID 4 protection and the existing volume's raidsize option, which controls the size of new RAID groups that might be created in the volume, will be changed to the default RAID 4 group size for your model appliance.

These are the default and maximum RAID 4 group sizes for NetApp appliances:

- ◆ The R100 default and limit is 8.

- ◆ The R150 default and limit is 6.
- ◆ The R200 default and limit is 7.
- ◆ The FAS250 default is 7, and the limit is 14.
- ◆ The default for other appliances is 8, and the limit is 14.

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

Example: An R150 running Data ONTAP 6.4 has a volume RAID group size of 8. When the appliance is upgraded to Data ONTAP 6.5.x, `raidsize` is changed to 6, the new limit.

Upgrading oversized RAID 4 groups to RAID DP

After the upgrade to the Data ONTAP 6.5 release family, if you have volumes with RAID 4 groups whose size exceeds the new RAID 4 limit, Network Appliance strongly recommends that you upgrade to RAID DP protection for those volumes. For volumes with oversized RAID groups, Data ONTAP issues a daily message similar to the following:

```
Wed Oct 1 03:44:51 GMT [raid.config.rg.size.reminder:warning]:
vol1 has a raid group larger than the limit for raid4 raidtype
(max. raid group size: 7, limit is 6). Convert the volume to
raid_dp.
```

Note

Converting from RAID 4 to RAID DP could take one or more hours depending on the volume size and underlying RAID groups. During this time, performance might be degraded. Network Appliance therefore recommends that you schedule conversions from RAID 4 to RAID DP during non-peak hours.

To convert the RAID protection from RAID 4 to RAID DP, complete the following steps.

Step	Action
1	Determine the number of RAID groups and the size of their parity disks in the volume by issuing the following command. <pre>vol status volname -r</pre> <i>volname</i> is the name of the oversized RAID 4 volume.

Step	Action
2	Issue the following command to make sure that a hot spare disk exists on the filer for each RAID group listed for the volume, and make sure that the hot spare disks are equal in size to the existing parity disks in those RAID groups. vol status -s If necessary, add the appropriate number of disks of the appropriate size and checksum type to the spare pool.
3	Convert the RAID protection for the volume in question with the following command: vol options volname raidtype raid_dp <i>volname</i> is the name of the volume you want to convert. Result: Data ONTAP will convert the specified volume's RAID protection from RAID 4 to RAID DP. It will add a disk from the hot spare disk pool to each existing RAID group in the volume and make that disk the additional "dparity" disk to provide double parity protection. Any subsequent RAID groups that might be created as disks are added to the specified volume will conform to the new RAID DP group size defaults and limits for the NetApp appliance in question.

Default and maximum RAID DP group sizes for the Data ONTAP 6.5 release family are as follows:

- ◆ The R100 default and limit is 12.
- ◆ The R150 default and limit is 12.
- ◆ The R200 default and limit is 14.
- ◆ The default for other appliances is 16, and the limit is 28.

For more information, see the *Storage Management Guide*.

iSCSI CHAP configuration not saved on upgrade

If you upgrade from the Data ONTAP 6.4 release family and you have Challenge Handshake Authentication Protocol (CHAP) configured for iSCSI, the CHAP configuration from the previous release is not saved.

The CHAP configuration file in Data ONTAP 6.5 and later uses a new format that is not compatible with the CHAP configuration file format of previous releases. When you upgrade, you must use the `iscsi security` command to reconfigure CHAP settings.

For information about using the `iscsi security` command, see the *Block Access Management Guide for iSCSI*.

Resetting the NFS exports timeout option value

Data ONTAP 6.5.2 includes a fix for bug 129083, which made it possible for NFS exports to be improperly rendered inaccessible after Data ONTAP is restarted.

If you modified the value of the `nfs.export.neg.timeout` option as a workaround for this problem in an earlier Data ONTAP 6.5.x release, you can reset this option to its default value (1800), or any other value you used for this option before applying the workaround.

Leaving the lowered (workaround) option value may cause an increase in name-service traffic when many clients attempt to access resources for which they do not have permissions.

To restore the default option value for caching of denied NFS requests, complete the following step:

Step	Action
1	From the Data ONTAP command line, enter the following command: <pre>options nfs.export.neg.timeout 1800</pre> Result: This command sets the length of time (in seconds) for which denied access requests are cached. Once the cache is cleared and the name service is active, access requests will be handled properly.

Upgrading from releases earlier than Data ONTAP 6.4

Information about the Data ONTAP 6.4 release family you should know

The following sections discuss upgrade issues that you should be aware of if you are upgrading from releases earlier than Data ONTAP 6.4.

Macintosh resource.frk files affected

If your filer is accessed by Macintosh computers using the DAVE™ client from Thursby Systems, the DAVE client starts using the new streams feature when Data ONTAP 6.4 or later is installed. Information that was stored in special resource.frk files is lost. To solve this problem, you should run the na_macstream conversion utility from a Windows client after the upgrade is completed and before DAVE clients access any files. For instructions about obtaining, installing, and running the na_macstream utility, see Appendix B, “[DAVE Macintosh Client resource.frk Conversion](#),” on page 99.

Upgrading from releases earlier than Data ONTAP 6.3

Information about the Data ONTAP 6.3 release family you should know

The following sections discuss upgrade issues that you should be aware of if you are upgrading from releases earlier than Data ONTAP 6.3.

Space reservation settings

If you are using space reservations with Data ONTAP 6.3, space reservations on volumes will be ignored when you upgrade to later versions of Data ONTAP. Space reservations will be turned on for all logical unit numbers (LUNs) and virtual local disks (VLDs), but will be left off for all other files.

Upgrading from releases earlier than Data ONTAP 6.2

Information about the Data ONTAP 6.2 release family you should know

The following sections discuss upgrade issues that you should be aware of if you are upgrading from releases earlier than Data ONTAP 6.2.

New options and settings for `raid.reconstruct_speed`

If you are upgrading from a release that has the `raid.reconstruct_speed` knob, you should be aware that the options and settings for this feature changed in Data ONTAP 6.2. The `raid.reconstruct_speed` option can still be set, but it only affects the value of `raid.reconstruct.perf_impact`, which is one of four new options. The ten settings previously used for the `raid.reconstruct_speed` knob translate to three settings for the new options, as follows:

- ◆ 7-10 = high
- ◆ 5-6 = medium
- ◆ 1-4 = low

For more information about the `raid.reconstruct_speed` option, see the latest *Storage Management Guide*.

Change in vif behavior

Load-balancing algorithms for virtual interfaces (vifs) were introduced in Data ONTAP 6.2. If you are using vifs, and you upgrade to Data ONTAP 6.2 or later from a pre-6.2 release, the network traffic flow out of the system may change. This could be because the vifs follow the default IP-based load-balancing policy. However, since the default load-balancing policy for most of the switches is IP-based, traffic flow is usually not disturbed. If the outbound flow of the network is not sufficiently balanced, you can change the load-balancing policy on the vif. For more information, see the *Network Management Guide*.

Upgrading from releases earlier than Data ONTAP 6.1

Information about the Data ONTAP 6.1 release family you should know

The following sections discuss upgrade issues that you should be aware of if you are upgrading from releases earlier than Data ONTAP 6.1.

Applying the same quota to a user's UNIX and Windows IDs

In Data ONTAP 6.1 and later, both UNIX and Windows IDs can be specified in the `/etc/quotas` file to track user quotas. If you previously specified a quota based on a user's UNIX IDs, and then after upgrading you specify a quota for the same user based on the Windows ID, these will be treated as separate quotas for the user. To apply the same quota whether the user logs in with the UNIX ID or Windows ID, add the following line to the `/etc/quotas` file:

QUOTA_PERFORM_USER_MAPPING on

For more information about disk space management using quotas, see the *Storage Management Guide*.

Restarting quotas

Because of the addition of Security ID (SID)-based quotas in Data ONTAP 6.1, you might see a warning message about correcting quotas if you upgrade from a pre-6.1 version of Data ONTAP.

If you see a warning message, restart quotas by completing the following steps.

Step	Action
1	Turn quotas off using the following command: quota off volume
2	Turn quotas back on using the following command: quota on volume

**Pre-6.1 snapshots
might need to be
deleted**

If you are upgrading from a version of Data ONTAP earlier than 6.1, you should delete any pre-6.1 snapshots due to changes made to the SnapMirror® feature in Data ONTAP 6.1.

**Clustered filer disk
firmware upgrade
procedure changed**

The procedure for updating a cluster's disk firmware changed with Data ONTAP 6.1.1. To update the disk firmware on clustered filers, follow the disk firmware updating procedure in the *Cluster Guide* for your filer model.

**Local administrator
account
nonexistent**

After you upgrade from a version of Data ONTAP earlier than 6.1.1, when you reboot with CIFS enabled, you might see a message that the builtin\administrator account does not exist. Add a local user named "administrator" to resolve this issue. For information about adding a local user, see the *File Access Management Guide*.

**ApplianceWatch
upgrade**

Data ONTAP 6.1.1 and later is compatible with Appliance Watch™ 1.1 software for HP® OpenView®, and ApplianceWatch 1.0 for Tivoli® Enterprise™.

If you need to upgrade ApplianceWatch, you can find it on the Download Software page on the NOW site at the following URL:

<http://now.netapp.com/NOW/cgi-bin/software>

Upgrading from releases earlier than Data ONTAP 5.3

Information about the Data ONTAP 5.3 release family you should know

The following sections discuss upgrade issues that you should be aware of if you are upgrading from releases earlier than Data ONTAP 5.3.

Only SCSI-2 compliant tape media changers supported

Starting with Data ONTAP 5.3, the filer only supports tape media changers that are SCSI-2 compliant. If you plan to upgrade from a pre-5.3 release, make sure that any tape media changers attached to your filer are SCSI-2 compliant. A noncompliant media changer would prevent the filer from booting.

CIFS cannot access pre-5.3 snapshots

Upgrading from a pre-5.3 release to Data ONTAP 5.3 or later results in a loss of CIFS access to any snapshots that you previously made.

Default SPANS device name changed

Data ONTAP 5.3 included an updated version of Simple Protocol for ATM Network Signaling (SPANS). The updated version of SPANS uses the default device name *fa0*; previous releases used the default device name *a0*.

If you are updating a filer running a pre-5.3 version, edit the filer */etc/rc* file to reflect the ATM interface name change. If you do not change the name in the */etc/rc* file, the ATM interface will not come up after the software upgrade.

Clustered F700 series filers must be running firmware 2.3_a2 or later

If you have clustered F700 series filers, you must upgrade the filer system firmware to version 2.3_a2 or later before upgrading the filers in your cluster configuration to Data ONTAP 5.3.5 or later. These releases check the filers to ensure that filer system firmware 2.3_a2 or later is running. If earlier versions of filer system firmware are running, Data ONTAP forces the filers in the cluster configuration to halt.

You can find filer system firmware 2.3_a2 on the NOW site at <http://now.netapp.com/NOW/tools/releasetable.shtml>. Follow the instructions given there to download and install filer system firmware 2.3_a2.

About this chapter This chapter explains how you upgrade the firmware on the filer and on the filer's disk array.

Topics in this chapter This chapter discusses the following topics:

- ◆ “[Upgrading the system firmware](#)” on page 32
- ◆ “[Upgrading disk firmware](#)” on page 38

Upgrading the system firmware

System firmware upgrade requirements

Network Appliance recommends that you upgrade to the latest system firmware version when you upgrade Data ONTAP. In some upgrade scenarios, system firmware upgrades are mandatory.

Note

There are special system firmware requirements that must be satisfied before upgrading to the Data ONTAP 6.5.x release family. For more information, see [“Upgrading to Data ONTAP 6.5 or later”](#) on page 13.

To upgrade system firmware, you must have

- ◆ Access to the filer’s console
- ◆ One of the following:
 - ❖ Data ONTAP 6.5.2 upgrade system files downloaded to your system; for CompactFlash-based filers and NearStores (F825, F880, FAS200 series, FAS900 series, R100, R150, and R200)
 - ❖ A firmware service image; for CompactFlash-based filers and NearStores (F825, F880, FAS200 series, FAS900 series, R100, R150, and R200)
 - ❖ A firmware upgrade diskette; for diskette-based filers (F700 series filers, and F810, F820, and F840 filers)

Instructions for creating a firmware diskette are in Appendix A, [“Creating Diskettes,”](#) on page 91.

Obtaining system firmware updates

System firmware updates for CompactFlash-based filers are included with distribution files for Data ONTAP upgrades. When you run the download command, the firmware service image included with the Data ONTAP upgrade is copied to your filer’s CompactFlash card.

System firmware updates are also available at the NOW site:

- ◆ For CompactFlash-based filers, see Service Images on the NOW site at <http://now.netapp.com/NOW/download/tools/serviceimage/>.
- ◆ For diskette-based filers, see the System Firmware Release Table on the NOW site at <http://now.netapp.com/NOW/tools/releasetable.shtml>.

The following filers use firmware that does not need to be upgraded:

- ◆ F85
- ◆ F87

Command for updating system firmware

The `update-flash` command loads system firmware from media (CompactFlash card or firmware diskette) into your filer's flash Programmable ROM (PROM). The command must be run from the boot prompt—the `ok` prompt on F700 series, F800 series, FAS900 series, and NearStore systems or the `CFE` prompt on FAS200 series systems.

Determining whether your filer needs a system firmware update

To determine whether your filer needs a system firmware update, compare the version of installed system firmware with the latest version available on the NOW site.

To display the filer's current system firmware, enter the following command:

```
sysconfig -a
```

The command output will include an entry similar to the following:

```
Firmware release: 4.2_i1
```

To display the most current system firmware available on the NOW site, follow the steps described in [“Filer firmware availability”](#) on page 4.

Comparing firmware versions on CompactFlash-based systems: On CompactFlash-based systems, you can also display the system firmware version on the CompactFlash card with the `version -b` command.

You can run `version -b` immediately after you run the `download` command (which copies the new firmware to the CompactFlash card). By comparing the output of the `sysconfig -a` and `version -b` commands, you can determine if your system needs a firmware upgrade.

Examples: If the version of the newly loaded firmware displayed by the `version` command is

- ◆ The same as the installed firmware version displayed by `sysconfig`, your filer does not need a system firmware update.
- ◆ Later than the installed firmware displayed by `sysconfig`, your filer needs a system firmware update.

Caution

If you find that the system firmware version on the CompactFlash card is *older* than the installed version, *do not* update system firmware with the `update-flash` command.

Upgrading filer firmware on single systems

Download and upgrade filer firmware for your filer according to the instructions on the NOW site.

Upgrading filer firmware on clustered systems

If you are upgrading clustered filers, there are two methods available for upgrading system firmware:

- ◆ Nondisruptive (CompactFlash-based filers only)
The nondisruptive upgrade method is appropriate when you need to maintain service availability during system firmware upgrades.
- ◆ Standard
The standard upgrade method is appropriate when you can schedule downtime for system firmware upgrades.

For more information about selecting a clustered upgrade method, see “[Upgrade host requirements](#)” on page 6.

The following sections describe nondisruptive firmware upgrades and standard upgrades for CompactFlash-based and diskette-based systems. Be sure to refer to the firmware download and installation instructions on the NOW site for details about firmware upgrades on your platform.

Nondisruptive firmware upgrades: To upgrade system firmware using the nondisruptive upgrade process, complete the following steps.

Step	Action
1	Download the system firmware from the NOW site to your Windows or UNIX client as directed.
2	On each filer, enter the <code>download -d</code> command in <code>priv set</code> advanced mode as directed. If necessary, format the service partition according to the instructions.

Step	Action	
3	If ...	Then...
	CIFS is not in use in Filer A	Go to Step 4 .
	CIFS is in use in Filer A	Enter the following command: cifs terminate -t nn where <i>nn</i> is a notification period (in seconds) appropriate for your clients. After that period of time, proceed to Step 4 .
4	At the console of filer B, enter the following command: cf takeover Result: This command causes filer A to shut down gracefully and leaves filer B in takeover mode.	
5	To display the boot prompt (CFE or OK, depending on your filer) at the filer A console, complete one of the following procedures: ◆ Press Delete at the filer A console when instructed after the boot sequence starts. ◆ When the <code>Waiting for giveback</code> message appears on the console of filer A, press Ctrl-C at the filer A console. When the <code>Continue with boot?</code> message appears, enter no.	
6	At the boot prompt, enter bye and continue installing the firmware on Filer A following the directions on the NOW site. Result: After completing the firmware installation on Filer A, you see the message <code>Waiting for giveback</code> .	
7	At the console of filer B, enter the following command: cf giveback Result: This command causes filer A to reboot with the new system firmware and resume normal operation as a cluster partner.	

Step	Action
8	Repeat Step 4 through Step 7 to update the partner filer; in other words, bring down and update filer B with partner A in takeover mode.

Standard firmware upgrades on CompactFlash-based systems: To upgrade system firmware using the standard upgrade process, complete the following steps.

Step	Action	
1	Download the system firmware from the NOW site to your Windows or UNIX client as directed.	
2	On each filer, enter the download -d command in priv set advanced mode as directed. If necessary, format the service partition according to the instructions.	
3	Disable the cluster by entering the following command: cf disable	
4	Continue installing the firmware on each node following the directions on the NOW site.	
5	If a Troika card...	Then...
	Is not used as the cluster interconnect	Reenable the cluster by entering the following command on one of the filers: cf enable
	Is used as the cluster interconnect	Wait for the console to display the Troika firmware download complete and Resetting Troika NIC messages. Then reenale the cluster by entering the following command on one of the filers: cf enable

Standard firmware upgrades for diskette-based systems: To upgrade system firmware on diskette-based systems using the standard upgrade process, complete the following steps.

Step	Action	
1	Download the system firmware file from the NOW site and create a diskette as directed.	
2	Disable the cluster by entering the following command: cf disable	
3	Install the firmware on each node following the directions on the NOW site.	
4	If a Troika card...	Then...
	Is not used as the cluster interconnect	Reenable the cluster by entering the following command on one of the filers: cf enable
	Is used as the cluster interconnect	Wait for the console to display the Troika firmware download complete and Resetting Troika NIC messages. Then reenale the cluster by entering the following command on one of the filers: cf enable

Upgrading disk firmware

About disk firmware upgrades

Disk firmware is updated automatically when one of the following is true:

- ◆ You add new disks or a disk shelf.
- ◆ Data ONTAP detects disk firmware updates in the `/etc/disk_fw` directory after a reboot.

Each filer is shipped with a `/etc/disk_fw` directory that contains the latest firmware revisions. Disk firmware updates can be added to this directory at the following times:

- ◆ During a Data ONTAP upgrade
Disk firmware updates are often included when a new release family upgrade becomes available. They are occasionally included for upgrades within release families.
- ◆ During a manual firmware upgrade
If you encounter problems with certain disk types or you receive a notice from Network Appliance, you might be directed to download a disk firmware upgrade from the NOW site.

Disk firmware is specific to disk drive manufacturers, and disk firmware upgrades can include updates to firmware for one or more disk drive types. Because your filer might use drives from multiple drive manufacturers, whether you are affected by a disk firmware update depends on the contents of the disk firmware upgrade and the types of drives on your system.

Disk firmware upgrades can take many minutes depending on the number of drive types and disk drives per type on your filer. During a disk firmware upgrade, the disks of the affected drive types are not available.

Note

Because disk firmware upgrades are time consuming and can affect filer availability, Network Appliance recommends that you verify whether a disk firmware upgrade will take place during a Data ONTAP upgrade. To do so, follow the instructions described in [“Detecting outdated disk firmware”](#) on page 39.

Detecting outdated disk firmware

Autosupport messages include information about disk firmware installed on your filer. The NOW Installed Product pages use these messages to monitor the firmware versions on your filer and to post notices when installed disk firmware in the /etc/disk_fw has been superseded. These notices indicate that the disk firmware on at least some of your disks will be upgraded during your next Data ONTAP upgrade, which can help you plan your upgrade.

To use the NOW Installed Products service to monitor disk firmware versions:

- ◆ Autosupport must be enabled on your filer.
For more information about Autosupport, see the *Storage Management Guide*.
- ◆ You must have registered your Network Appliance products.
For more information, see Product Registration on the NOW site at <http://now.netapp.com/Self-Service/Forms/frmProductReg.asp>.

To determine if your filer has outdated disk firmware, complete the following steps.

Step	Action
1	Use a Web browser to go to http://now.netapp.com/ .
2	Click Installed Products.
3	Display the product details for the filer(s) you are upgrading by entering search criteria for a specific system or displaying a list of systems at your company.
4	In the AutoSupport Status category, click on Analysis. Result: You see a list of System Level Notices for your filer. If there is a notice that newer disk firmware is available for your filer, a disk firmware upgrade will take place with your next Data ONTAP upgrade. If there is no disk firmware notice, the disk firmware on your system is up to date.

When to upgrade disk firmware manually

If you receive error messages about the firmware compatibility, you must manually upgrade the disk firmware using one of the following procedures:

- ◆ Manually update disk firmware with the `disk_fw_update` command.
See “[Command for upgrading disk firmware](#)” on page 40.
- ◆ Download new disk firmware from the NOW site, then run the `disk_fw_update` command.
See “[Obtaining disk firmware updates](#)” on page 40.

Note

When you upgrade the filer software, disk firmware is updated automatically as part of the filer software upgrade process. A manual update is not necessary unless the new firmware is not compatible with the filer disks.

Command for upgrading disk firmware

You use the `disk_fw_update` command from the filer console on a running system to update firmware on all disks or a specified disk on a filer. The `disk_fw_update` command upgrades disks for which firmware files are present in the `/etc/disk_fw` directory and which need to be updated. It does not upgrade other disks.

The `disk_fw_update` command is applicable to both SCSI disks and Fibre Channel disks.

For more information, see the NetApp `disk_fw_update(1)` man page.

Note

This command makes disks inaccessible for up to two minutes, so network sessions using the filer should be terminated before running the command. This is particularly true for CIFS sessions, which otherwise are terminated while this command executes.

Obtaining disk firmware updates

System firmware updates are available from the Disk Drive & Firmware Matrix, on the NOW site at <http://now.netapp.com/NOW/download/tools/diskfw/>. Download and upgrade disk firmware according to the instructions.

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

Topics in this chapter This chapter discusses the following topics:

- ◆ [“Prerequisites to software upgrade”](#) on page 42
- ◆ [“Installing Data ONTAP system files”](#) on page 45
- ◆ [“Downloading Data ONTAP to single filers and rebooting”](#) on page 59
- ◆ [“Downloading Data ONTAP to clustered filers and rebooting”](#) on page 64
- ◆ [“Concluding the upgrade”](#) on page 80
- ◆ [“Where to go from here”](#) on page 82

Prerequisites to software upgrade

What you need for the upgrade

To upgrade the filer software to the latest release of Data ONTAP, you need the following items:

- ◆ System files
You can get the latest system files from the following locations:
 - ❖ On the NOW site at <http://now.netapp.com/>
 - ❖ On the CD-ROM that is supplied in your media package
- ◆ The latest version of the firmware for your model of filer
The version information is available on the NOW site at <http://now.netapp.com/NOW/tools/releasetable.shtml>.

Note

The system files package includes the latest version of system firmware that can be downloaded on CompactFlash-based systems.

The F85 and F87 filers use firmware that does not need to be upgraded.

- ◆ Data ONTAP system boot diskettes
You need these only if your filer meets one or more of the following conditions:
 - ❖ The filer is diskette-based (F700 series filers, and F85, F810, F820, and F840 filers).
 - ❖ The filer is running a release of Data ONTAP earlier than 4.0.
 - ❖ The filer is not running at all.

For information on creating boot diskettes, see Appendix A, “[Creating Diskettes](#),” on page 91.

Preparing for the upgrade

Before installing the latest Data ONTAP release on your filer:

- ◆ Verify that you have resolved any upgrade issues identified in “[Resolving upgrade issues](#)” on page 12.
- ◆ Verify whether you need to update filer firmware as described in “[Determining whether your filer needs a system firmware update](#)” on page 33.
- ◆ Verify whether you need to update disk firmware as described in “[Detecting outdated disk firmware](#)” on page 39.

- ◆ If you have clustered filers, verify that they are correctly configured using the Cluster Configuration Checker as described in “[Before upgrading clustered filers](#)” on page 7.
- ◆ If you are running SnapMirror, identify filers with destination volumes and upgrade them before upgrading filers with source volumes as described in “[Planning for upgrading filers running SnapMirror](#)” on page 10.

You should also check whether you need to perform one or both of the procedures described in the following table.

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

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 <code>/etc/resolv.conf</code> file in the root volume. Enter up to three lines, each specifying a Windows 2000 name server host in the following format: nameserver <i>ip_address</i> Example: <code>nameserver 192.9.200.10</code>
2	Save the file.
3	Enter the following command at the filer console to enable DNS: options dns.enable on

Verifying that the filer has a domain account

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

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

Installing Data ONTAP system files

About the installation of system files

The procedure for installing system files depends on the type of upgrade host from which you are installing the files. For more information, see “[About upgrade hosts](#)” on page 6.

For detailed information

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

- ◆ “[UNIX client steps](#)” on page 46
- ◆ “[Windows client steps](#)” on page 50
- ◆ “[HTTP server steps](#)” on page 54

UNIX client steps

When to perform UNIX client steps

Perform the steps described in this section only if you are using a UNIX client to install the upgrade.

Procedure overview

This part of the upgrade involves performing the following procedures in order:

1. Mounting the filer on your client
2. Downloading the system files to your client from NOW or copying them from the CD-ROM
3. Installing the system files

Note

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

Mounting the filer on your client

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

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

Step	Action	
3	If you are ...	Then...
	Downloading system files from NOW	Complete the procedure described in “ Downloading the system files from NOW ” on page 47.
	Copying system files from the CD-ROM	Complete the procedure described in “ Copying the system files from the CD-ROM ” on page 48.

Downloading the system files from NOW

To download 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 filer type 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.
8	From the client, extract the files with the following command: <pre>tar xvf /mnt/filename</pre> <i>/mnt</i> is the directory on the client where you want to mount the filer’s root file system. <i>filename</i> is the name you downloaded from NOW. Result: The tar command extracts files and reports the files’ names: tar_image.Z and install_netapp.

Step	Action
9	Complete the procedure described in “ Installing the system files ” on page 49.

Copying 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/type/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. <i>type</i> is one of the following values: ◆ ALPHA for an F700 series filer ◆ X86 for an F85 or F87 filer, and for F800, FAS900, or NearStore series filers ◆ MIPS for a FAS200 series filer Result: The tar command extracts the files and reports the names; they are tar_image.Z and install_netapp.
3	Complete the procedure described in “ Installing the system files ” on page 49.

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: <code>./install_netapp /mnt</code> <i>/mnt</i> is the directory on the client where you mounted the filer's root file system.
	Keep the tar files after the files are extracted	From the client, enter the following command: <code>./install_netapp -k /mnt</code> <i>/mnt</i> is the directory on the client where you mounted the filer's root file system.
	Result: The install script decompresses and extracts the files.	
2	From the client, unmount the filer's root file system (/) by entering the following commands: <code>cd /</code> <code>umount /mnt</code> <i>/mnt</i> is the directory on the client where you mounted the filer's root file system.	
3	Complete the appropriate procedure to download Data ONTAP: ◆ For single filers, go to “Downloading Data ONTAP to single filers and rebooting” on page 59. ◆ For clustered filers, go to “Downloading Data ONTAP to clustered filers and rebooting” on page 64.	

Windows client steps

When to perform Windows client steps

Perform the steps described in this section only if you are using a Windows PC to install the upgrade.

Procedure overview

This part of the upgrade involves performing the following steps:

1. Mapping the filer to a drive on your client
2. Downloading system files to your client from the NOW site or copying them from the CD-ROM and installing them

Mapping the filer to a drive

To map the root directory of your filer 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 filer C\$ directory.	
2	Map a drive to the C\$ directory of your filer.	
3	If you are ...	Then...
	Downloading system files from the NOW site	Complete the procedure described in “ Downloading and installing the system files from NOW ” on page 51.
	Copying system files from the CD-ROM	Complete the procedure described in “ Copying and installing the system files from the CD-ROM ” on page 52.

Downloading and installing the system files from NOW

To download 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 filer type 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 filer and download it to the drive to which you mapped the filer in the previous procedure.
8	Go to the drive to which you downloaded the software.
9	Double-click the file that you downloaded. Result: A dialog box appears.
10	In the WinZip dialog box, enter the letter of the drive to which you mapped the filer. 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 Open... 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 filers, go to “Downloading Data ONTAP to single filers and rebooting” on page 59. ◆ For clustered filers, go to “Downloading Data ONTAP to clustered filers and rebooting” on page 64.

Copying 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 following folders on the Data ONTAP CD-ROM: ◆ ONTAP\release\ALPHA for an F700 series filer ◆ ONTAP\release\X86 for an F85 or F87 filer, and for F800, FAS900, or NearStore series filers ◆ ONTAP\release\MIPS for a FAS200 series filer <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 filer. When appropriate, ensure that the following check boxes are selected: ◆ Overwrite Files Without Prompting ◆ When Done Unzipping Open ... 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 filers, go to "Downloading Data ONTAP to single filers and rebooting" on page 59. ◆ For clustered filers, go to "Downloading Data ONTAP to clustered filers and rebooting" on page 64.

HTTP server steps

About using an HTTP server to download Data ONTAP

If you have an HTTP server with the latest Data ONTAP upgrades accessible to your filer, you can use the software command to download and install Data ONTAP to your filer. When you use HTTP to download Data ONTAP, you do not have to mount the filer to a UNIX administration host or map a drive to the filer using Windows to perform the installation.

You can download Data ONTAP upgrades to both single and clustered filers.

For more information, see the NetApp software(1) man page.

Preparing the HTTP server

To prepare the HTTP server, copy the setup.exe file (for example, 652_setup_i.exe) from the NOW site or another system to the directory on the HTTP server from which you will serve the file.

Copying Data ONTAP to your filer without installing

You can copy a Data ONTAP upgrade to your filer without immediately installing it, for instance, if you want to perform the installation at a later time. The downloaded file is saved on the filer in the /etc/software directory.

To copy Data ONTAP onto your filer without installing the software, complete the following step from the filer 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 username, 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 filer's /etc/software directory. If a file of the same name exists and you do not use the -f flag, the download will fail and you will be prompted to use -f. <i>filename</i> is the file name you specify for the software file being downloaded to your filer. 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 filer. Example: The following is an example of the software get command using a new destination file name. <pre>software get http://www.myserver.com/netapp/R652/pc/652_setup_i.exe 652_setup_i.exe</pre> Result: You see a message similar to the following: <pre>software: copying to /etc/software/652_setup_i.exe software: 100% file read from location. software: /etc/software/652_setup_i.exe has been copied.</pre>

**Installing Data
ONTAP using HTTP**

You can use the software `install` command to copy and install the Data ONTAP upgrade files to your filer simultaneously.

To install Data ONTAP from an HTTP server, complete the following steps from your filer console.

Step	Action	
1	Enter the following command: software install <i>url</i> <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 username, password, host or port to access files on the HTTP server: <code>http://username:password@host:port/path</code> Result: The software is downloaded and installed on your filer, and you see a message similar to the following: <pre>tpubs-cf2> software install http://www.myserver.com/netapp/R652/pc/652_setup_i.exe 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>	
2	If you are upgrading...	Then...
	A single filer	Go to “ Downloading Data ONTAP to single filers and rebooting ” on page 59.
	Clustered filers	Go to “ Downloading Data ONTAP to clustered filers and rebooting ” on page 64.

Installing a file that has already been downloaded

If you previously downloaded Data ONTAP using the `software get` command, you can install the software by completing the following steps from the filer console.

Step	Action	
1	Enter the following command: <pre>software install software_filename</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 filer, and you see a message similar to the following: <pre>tpubs-cf2> software install 652_setup_i.exe 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>	
2	If you are upgrading...	Then...
	A single filer	Go to “ Downloading Data ONTAP to single filers and rebooting ” on page 59.
	Clustered filers	Go to “ Downloading Data ONTAP to clustered filers and rebooting ” on page 64.

Listing software files in the /etc/software directory

To list the files that have been downloaded to the `/etc/software` directory, complete the following step from the filer console.

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

Deleting software files in the /etc/software directory

To delete files in the /etc/software directory, complete the following step from the filer 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.

Downloading Data ONTAP to single filers and rebooting

Downloading Data ONTAP and filer firmware on an F825 or F880 filer, or a FAS900 or NearStore series filer

The F825 and F880 filers, and FAS900 and NearStore series filers, use a CompactFlash card for firmware and system software downloads.

Before initiating this download procedure, verify that you have completed any prerequisite procedures described in [“Preparing for the upgrade”](#) on page 42.

To download the Data ONTAP software and, if necessary, upgrade the firmware on one of these filers, complete the following steps at the filer console.

Step	Action
1	Enter the following command to copy the executables to the boot blocks of the filer’s hard disks: 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 6.5.2 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>
2	Enter the following command to shut down the filer: halt Result: After the filer shuts down, the ok prompt appears.
3	Enter the following command to reboot the system: bye Result: The filer begins the boot process.

Step	Action	
4	If a firmware upgrade...	Then...
	Is needed on your filer	When the memory test begins, press Del to interrupt the boot process. Note If you are using a terminal emulation package and it does not support Del, use Ctrl-Bksp instead. Result: The console displays the following messages: Skipping auto-boot Complete Startup aborted Then the console displays the ok prompt. Continue to Step 5.
	Is not needed on your filer	You are done.
5	Enter the following command: update-flash Result: The system prompts you to continue.	
6	Enter y to continue. Result: The system updates the firmware, displays several status messages, and displays the ok prompt. Note If you installed a system firmware upgrade, you might have to run the set-defaults command from the firmware ok prompt <i>before</i> rebooting your filer. For more information, see “Considerations concerning system firmware upgrades” on page 15.	

Step	Action
7	Enter the following command to reboot the system using the new firmware and software: bye

Downloading Data ONTAP and filer firmware on an FAS200 series filer

The FAS200 series filers come with a CompactFlash card that you use when downloading firmware and system software.

Before initiating this download procedure, verify that you have completed any prerequisite procedures described in [“Preparing for the upgrade”](#) on page 42.

To download the Data ONTAP software and, if necessary, upgrade the firmware on one of these filers, complete the following steps at the filer console.

Step	Action
1	Enter the following command to copy the kernel and firmware data files to the CompactFlash card: download Result: The download command provides a status message similar to the following: <pre>download: Depending on system load, it may take many download: minutes to complete this operation. Until it download: finishes, you will not be able to use the download: console. You can cancel this operation by download: hitting Ctrl-C in the next 6 seconds.</pre> <pre>Tue Jul 15 10:03:22 GMT [download.request:notice]: Operator requested download initiated download: Downloading boot device..... Mon Apr 21 15:30:24 PDT [nbns_timer:info]: All CIFS name registrations complete for local server.... download: Downloading boot device (Service Area)</pre> Then the following filer message appears: <pre>Tues Jul 15 10:11:51 GMT [download.requestDone:notice]: Operator requested download complete</pre>

Step	Action	
2	Enter the following command to shut down the filer: halt Result: After the filer shuts down, the CFE firmware prompt appears. Note_____ For more information about the Common Firmware Environment (CFE) boot environment and commands, see “Booting the FAS200 series appliances” in Appendix B of the <i>Storage Management Guide</i>. _____	
3	If a firmware upgrade...	Then...
	Is needed on your filer	Go to Step 4 .
	Is not needed on your filer	Go to Step 6 .
4	At the CFE prompt, enter the following command: update_flash Result: The update_flash command provides an acknowledgement similar to the following. Reading flash0a: Done. 493328 bytes read ** DO NOT TURN OFF YOUR MACHINE UNTIL THE FLASH UPDATE COMPLETES!! ** Programming...done. 493328 bytes written Reading fatfs://ide0.0/MIPS/firmware/FAS250/firmware.img: Done. 493392 bytes read Flash image is 493328 bytes, flags 00000002, CRC DE227E0D ** DO NOT TURN OFF YOUR MACHINE UNTIL THE FLASH UPDATE COMPLETES!! ** Programming...done. 493328 bytes written	

Step	Action
5	Enter y to continue. Result: The system updates the firmware, displays several status messages, and displays the CFE prompt.
6	At the CFE prompt, enter the following command to reboot the system using the new software and, if applicable, the new firmware: bye

Downloading Data ONTAP on F700 series filers and F85, F87, F810, F820, and F840 filers

Before initiating this download procedure, verify that you have completed any prerequisite procedures described in [“Preparing for the upgrade”](#) on page 42.

To download Data ONTAP to the disks and reboot F700 series filers and F85, F87, F810, F820, and F840 filers, complete the following steps.

Step	Action
1	At the filer console, enter the following command to copy the executables to the boot blocks of the filer’s hard disks: download Result: The download command provides an acknowledgment similar to the following: Tue Jun 19 10:03:22 GMT [download.request:notice]: Operator requested download initiated download: Downloading disks: opening Data ONTAP 6.5.2 done download: boot blocks successfully copied to disk(s) Then the following filer prompt appears: Tues Jun 19 10:11:51 GMT [download.requestDone:notice]: Operator requested download completed
2	At the filer console, reboot the filer with the following command: reboot
3	As needed, perform the procedures described in “Concluding the upgrade” on page 80.

Downloading Data ONTAP to clustered filers and rebooting

About this section

Select the proper upgrade method as described in “[Choosing a clustered upgrade procedure](#)” on page 65.

Then upgrade your clustered filers using one of the following methods:

- ◆ “[Nondisruptive upgrades](#)” on page 66
- ◆ “[Standard upgrades](#)” on page 71

Caution

Do not enter the Data ONTAP download command on a clustered filer that is in takeover mode.

Choosing a clustered upgrade procedure

Which procedure to use for clustered filer upgrades

The procedure you use to download Data ONTAP to clustered filers depends on the filer type and the kind of upgrade—nondisruptive or standard.

- ◆ Nondisruptive upgrades are most appropriate for the following circumstances:
 - ❖ Your filers use CompactFlash cards (F825 and F880 filers, and FAS270 and FAS900 series filers).
 - ❖ You are upgrading within a release family (for example, from Data ONTAP 6.5 to 6.5.2).
 - ❖ There is no disk firmware upgrade associated with the software upgrade.
 - ❖ High availability of filer services is critical.

For instructions on performing nondisruptive upgrades of all filer types, see [“Nondisruptive upgrades”](#) on page 66.

- ◆ Standard upgrades are most appropriate when you can schedule downtime for major software changes.

You must use standard upgrade procedures when you upgrade from one release family to another.

For instructions on performing standard upgrades, see the section appropriate to your filer type:

- ❖ [“Downloading Data ONTAP to clustered F825 and F880 filers, and clustered FAS900 series filers”](#) on page 71
- ❖ [“Downloading Data ONTAP to clustered FAS270 filers”](#) on page 75
- ❖ [“Downloading Data ONTAP to clustered F810, F820, and F840 filers, and clustered F700 series filers”](#) on page 78

For more information about which upgrade procedure is most appropriate for your filers and upgrade circumstances, see [“Planning for upgrading clusters”](#) on page 7.

For more information about determining whether system or disk firmware upgrades are required, see:

- ◆ [“Determining whether your filer needs a system firmware update”](#) on page 33
- ◆ [“Detecting outdated disk firmware”](#) on page 39

Downloading Data ONTAP to clustered filers and rebooting

Nondisruptive upgrades

Upgrading your clustered filers using the nondisruptive method

Before initiating the nondisruptive upgrade procedure, verify that you have completed any prerequisite procedures described in “Preparing for the upgrade” on page 42.

To download Data ONTAP to clustered filers for a nondisruptive upgrade, complete the following steps at the console of one of the filers in the cluster.

Step	Action
1	At the console of each filer, enter the following command to copy the executables to the boot blocks of the filer's hard disks: 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 6.5.2 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> Note_____ The filer console is unavailable until the download procedure is complete. _____

Step	Action	
2	At the console of each filer, enter the following commands to compare the installed version of system firmware with the version on the CompactFlash card: <pre>sysconfig -a</pre> <pre>version -b</pre> Result: The sysconfig command output contains an entry similar to the following: <pre>Firmware release: 4.2_i1</pre> The version command output contains an entry similar to the following: <pre>1:/x86/firmware/xfiler/firmware.img: Firmware 4.2.2_i2</pre> If the version of the newly loaded firmware displayed by the version command is ◆ The same as the installed firmware version displayed by sysconfig, your filer does not need a system firmware update. ◆ Later than the installed firmware displayed by sysconfig, your filer needs a system firmware update. ◆ Earlier than the installed firmware displayed by sysconfig, <i>do not</i> update system firmware with the update-flash command.	
3	If ...	Then...
	CIFS is not in use in Filer A	Go to Step 4 .
	CIFS is in use in Filer A	Enter the following command: <pre>cifs terminate -t nn</pre> where <i>nn</i> is a notification period (in seconds) appropriate for your clients. After that period of time, proceed to Step 4.

Step	Action	
4	At the console of filer B, enter the following command: cf takeover Result: This command causes filer A to shut down gracefully and leaves filer B in takeover mode. Note_____ When filer A displays the <code>waiting for giveback</code> message, you can also halt filer A to perform other upgrade and maintenance procedures. For more information, see “About nondisruptive cluster upgrades” on page 7. _____	
5	If ...	Then...
	You do not need to upgrade system firmware	Got to Step 12 .
	If you need to update system firmware	Go to Step 6 .
6	To display the boot prompt (CFE or OK, depending on your filer) at the filer A console, complete one of the following procedures: ◆ Press Del at the filer A console when instructed after the boot sequence starts. ◆ When the <code>waiting for giveback</code> message appears on the console of filer A, press Ctrl-C at the filer A console. When the <code>Continue with boot?</code> message appears, enter no.	
7	At the boot prompt, enter the following command: bye	

Step	Action
8	During the memory test, press Del to interrupt the boot process. Note_____ If you have a terminal emulation package and it does not support Del, use Ctrl-Bksp instead. Result: The console displays the following messages: Skipping auto-boot Complete Startup aborted Then the console displays the boot prompt (CFE or OK).
9	Enter the following command: update-flash Result: The system prompts you to continue.
10	Enter y to continue. Result: The system updates the firmware, displays several status messages, and displays the boot prompt. Note_____ If you installed a system firmware upgrade on a filer running Open Firmware (OFW), you might have to run the set-defaults command from the firmware ok prompt <i>before</i> rebooting your filer. For more information, see “Considerations concerning system firmware upgrades” on page 15.
11	Enter the following command to reboot the system using the new firmware and software: bye

Step	Action
12	When the <code>Waiting for giveback</code> message appears on the console of filer A, enter the following command at the console of filer B: cf giveback Result: This command causes filer A to reboot with the new system configuration—a Data ONTAP version or other system firmware and hardware changes—and resume normal operation as a cluster partner.
13	Repeat Step 3 through Step 12 to update the partner filer; in other words, bring down and update filer B with partner A in takeover mode.
14	As needed, perform the procedures described in “Concluding the upgrade” on page 80.

Downloading Data ONTAP to clustered filers and rebooting

Standard upgrades

Downloading Data ONTAP to clustered F825 and F880 filers, and clustered FAS900 series filers

The F825 and F880 filers and FAS900 series filers use a CompactFlash card for firmware and system software downloads.

Before initiating the standard upgrade procedure, verify that you have completed any prerequisite procedures described in “[Preparing for the upgrade](#)” on page 42.

To download Data ONTAP to an F825 and F880 cluster, or a FAS900 series cluster using the standard upgrade procedure, complete the following steps at the filer console.

Step	Action
1	Disable the cluster by entering the following command at the console of one of the filers: cf disable
2	Enter the following command to copy the executables to the boot blocks of the filer's hard disks: download Result: The download command provides an acknowledgment similar to the following: Tue Jun 19 10:03:22 GMT [download.request:notice]: Operator requested download initiated download: Downloading boot device..... download: Downloading disks: opening Data ONTAP 6.5.2 done download: boot blocks successfully copied to disk(s) Then a message similar to the following appears: Tues Jun 19 10:11:51 GMT [download.requestDone:notice]: Operator requested download completed

Step	Action
3	Enter the following commands to compare the installed version of system firmware with the version on the CompactFlash card: <pre>sysconfig -a version -b</pre> Result: The sysconfig command output contains an entry similar to the following: <pre>Firmware release: 4.2_i1</pre> The version command output contains an entry similar to the following: <pre>1:/x86/firmware/xfiler/firmware.img: Firmware 4.2.2_i2</pre> If the version of the newly loaded firmware displayed by the version command is ◆ The same as the installed firmware version displayed by sysconfig, your filer does not need a system firmware update. ◆ Later than the installed firmware displayed by sysconfig, your filer needs a system firmware update. ◆ Earlier than the installed firmware displayed by sysconfig, <i>do not</i> update system firmware with the update-flash command.
4	Enter the following command to shut down the filer: <pre>halt</pre> Result: After the filer shuts down, the ok prompt appears.
5	Enter the following command: <pre>bye</pre>

Step	Action	
6	During the memory test, press Del to interrupt the boot process. Note If you have a terminal emulation package and it does not support Del, use Ctrl-Bksp instead. Result: The console displays the following messages: Skipping auto-boot Complete Startup aborted Then the console displays the ok prompt.	
7	If a firmware upgrade...	Then...
	Is needed on your filer	Go to Step 8 .
	Is not needed on your filer	Go to Step 10 .
8	Enter the following command: update-flash Result: The system prompts you to continue.	
9	Enter y to continue. Result: The system updates the firmware, displays several status messages, and displays the ok prompt. Note If you installed a system firmware upgrade, you might have to run the set-defaults command from the firmware ok prompt <i>before</i> rebooting your filer. For more information, see “Considerations concerning system firmware upgrades” on page 15.	
10	Enter the following command to reboot the system using the new firmware and software: bye	

Step	Action	
11	While the cluster is disabled, repeat Step 2 through Step 10 at the filer console of the partner filer. Caution_____ Do not proceed to Step 13 until both filers in the cluster have been rebooted with the new version of Data ONTAP. _____	
12	If a Troika card...	Then...
	Is not used as the cluster interconnect	Reenable the cluster by entering the following command on one of the filers: cf enable
	Is used as the cluster interconnect	Wait for the console to display the Troika firmware download complete and Resetting Troika NIC messages. Then reenale the cluster by entering the following command on one of the filers: cf enable
13	Update the disk firmware by entering the following command first at the console of one of the clustered filers and then at the console of the partner filer: disk_fw_update	
14	As needed, perform the procedures described in “Concluding the upgrade” on page 80.	

**Downloading Data
ONTAP to clustered
FAS270 filers**

FAS270 filers use a CompactFlash card for firmware and system software downloads.

Before initiating the standard upgrade procedure, verify that you have completed any prerequisite procedures described in “[Preparing for the upgrade](#)” on page 42.

To download Data ONTAP to clustered FAS270 filers using the standard upgrade procedure, complete the following steps at the console of one of the filers in the cluster.

Step	Action
1	Disable the cluster by entering the following command at the console of one of the filers: cf disable
2	Enter the following command to copy the executables to the boot blocks of the filer's hard disks: download Result: The download command provides a status message similar to the following: download: Depending on system load, it may take many download: minutes to complete this operation. Until it download: finishes, you will not be able to use the download: console. You can cancel this operation by download: hitting Ctrl-C in the next 6 seconds. Tue Jul 15 10:03:22 GMT [download.request:notice]: Operator requested download initiated download: Downloading boot device..... Mon Apr 21 15:30:24 PDT [nbns_timer:info]: All CIFS name registrations complete for local server... download: Downloading boot device (Service Area) Then the following filer message appears: Tues Jul 15 10:11:51 GMT [download.requestDone:notice]: Operator requested download complete

Step	Action	
3	Enter the following commands to compare the installed version of system firmware with the version on the CompactFlash card: <pre>sysconfig -a version -b</pre> Result: The sysconfig command output contains an entry similar to the following: Firmware release: CFE 1.1.0 The version command output contains an entry similar to the following: <pre>1:/mips/firmware/fas270/firmware.img: Firmware 1.1.0</pre> If the version of the newly loaded firmware displayed by the version command is ◆ The same as the installed firmware version displayed by sysconfig, your filer does not need a system firmware update. ◆ Later than the installed firmware displayed by sysconfig, your filer needs a system firmware update. ◆ Earlier than the installed firmware displayed by sysconfig, <i>do not</i> update system firmware with the update-flash command.	
4	Enter the following command to shut down the filer: <pre>halt</pre> Result: After the filer shuts down, the CFE firmware prompt appears. Note_____ For more information about the Common Firmware Environment (CFE) boot environment and commands, see the section on booting the FAS200 series appliances in the <i>Storage Management Guide</i>. _____	
5	If a firmware upgrade...	Then...
	Is needed on your filer	Go to Step 6 .
	Is not needed on your filer	Go to Step 8 .

Step	Action
6	At the CFE prompt, enter the following command: update_flash Result: The update_flash command provides an acknowledgement similar to the following. Reading flash0a: Done. 493328 bytes read ** DO NOT TURN OFF YOUR MACHINE UNTIL THE FLASH UPDATE COMPLETES!! ** Programming...done. 493328 bytes written Reading fatfs://ide0.0/MIPS/firmware/FAS250/firmware.img: Done. 493392 bytes read Flash image is 493328 bytes, flags 00000002, CRC DE227E0D ** DO NOT TURN OFF YOUR MACHINE UNTIL THE FLASH UPDATE COMPLETES!! ** Programming...done. 493328 bytes written
7	Enter y to continue. Result: The system updates the firmware, displays several status messages, and displays the CFE prompt.
8	At the CFE prompt, enter the following command to reboot the system using the new software and, if applicable, the new firmware: bye
9	While the cluster is disabled, repeat Step 4 through Step 8 at the filer console of the partner filer. Caution_____ Do not proceed to Step 11 until both filers in the cluster have been rebooted with the new version of Data ONTAP. _____
10	Reenable the cluster by entering the following command on one of the filers: cf enable

Step	Action
11	Update the disk firmware by entering the following command first at the console of one of the clustered filers and then at the console of the partner filer: disk_fw_update
12	As needed, perform the procedures described in “ Concluding the upgrade ” on page 80.

Downloading Data ONTAP to clustered F810, F820, and F840 filers, and clustered F700 series filers

Before initiating the standard upgrade procedure, verify that you have completed any prerequisite procedures described in “[Preparing for the upgrade](#)” on page 42.

To download Data ONTAP to clustered F810, F820, or F840 filers, or to clustered F700 series filers using the standard upgrade procedure, complete the following steps at the console of one of the filers in the cluster.

Step	Action
1	Disable the cluster by entering the following command: cf disable
2	Enter the following command to copy the executables to the boot blocks of the filer's hard disks: download Result: The download command provides a status message similar to the following: Tue Jun 19 10:03:22 GMT [download.request:notice]: Operator requested download initiated download: Downloading disks: opening Data ONTAP 6.5.2 done download: boot blocks successfully copied to disk(s) Then a message similar to the following appears: Tues Jun 19 10:11:51 GMT [download.requestDone:notice]: Operator requested download completed

Step	Action	
3	Reboot the filer with the following command: reboot	
4	While the cluster is disabled, repeat Step 2 and Step 3 on the partner filer. Caution _____ Do not proceed to Step 6 until both filers in the cluster have been rebooted with the new version of Data ONTAP. _____	
5	If a Troika card...	Then...
	Is not used as the cluster interconnect	Reenable the cluster by entering the following command on one of the filers: cf enable
	Is used as the cluster interconnect	Wait for the console to display the Troika firmware download complete and Resetting Troika NIC messages. Then reenable the cluster by entering the following command on one of the filers: cf enable
6	a. Update the disk firmware by entering the following command at the console of one of the clustered filers: disk_fw_update b. Repeat Step 6a on the partner filer.	
7	As needed, perform the procedures described in “ Concluding the upgrade ” on page 80.	

Concluding the upgrade

Check what you need to do to conclude

Check the following table to determine whether you need to perform additional procedures to conclude your upgrade.

Procedure	Complete the procedure if...
Entering codes for new licenses	You purchased any new service or protocol that you are starting to use with the upgrade.
Creating a serial number file	You want to have a serial number file. A serial number file makes it easier for Network Appliance Technical Support to assist you after receiving an Autosupport e-mail message from your filer.

Entering codes for new licenses

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

Step	Action
1	Enter the following command: <pre>license add <i>code</i> ...</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. <pre>license add CIFS ABCDEFG</pre> Result: The filer 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.</pre>

Creating a serial number file

If the `/vol/vol0/etc/serialnum` file does not exist on your filer, complete the following steps.

Step	Action
1	Record your filer's serial number. You can determine the serial number by entering the <code>sysconfig</code> command at the filer console.
2	From a UNIX or Windows client, use a text editor to create a file called <code>serialnum</code> in <code>/vol/vol0/etc/</code> , and put the filer's serial number in it.

Where to go from here

Other resource documents

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

- ◆ Set up CIFS, NFS, Fibre Channel Protocol (FCP), Internet SCSI (iSCSI), or HTTP by following the instructions in the *Software Setup Guide*.
- ◆ Learn about the features of Data ONTAP by reading the following manuals:
 - ❖ *Storage Management Guide*
 - ❖ *File Access Management Guide*
 - ❖ *Block Access Management Guide for FCP*
 - ❖ *Block Access Management Guide for iSCSI*
 - ❖ *Data Protection: Online Backup and Recovery*
 - ❖ *Data Protection: Tape Backup and Recovery*
 - ❖ *Network Management Guide*
 - ❖ *MultiStore™ Management Guide*

About this chapter

This chapter provides you with the information you need to revert Data ONTAP software to an earlier release.

Topics in this chapter

This chapter discusses the following topics:

- ◆ [“Reverting to a previous release”](#) on page 84
- ◆ [“Reversion issues between release families”](#) on page 85

Reverting to a previous release

About reverting to a previous release

If you need to revert to a previous release of Data ONTAP, contact Network Appliance Technical Support.

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

Note_____

In some cases, you cannot revert to an earlier version of Data ONTAP. For more information, see “[Reversion issues between release families](#)” on page 85.

Reversion issues between release families

Why there might be issues

You might encounter issues if you upgrade and then decide to revert to a previous version of Data ONTAP, because features introduced in a new release might be incompatible with features of the previous release.

If you need to revert to a previous release of Data ONTAP, call Network Appliance Technical Support for assistance. For more information, see [“Reverting to a previous release”](#) on page 84.

General guidelines for reverting from Data ONTAP 6.5

The following guidelines apply when reverting from Data ONTAP 6.5 to an earlier version:

- ◆ You must disable any 6.5 features before reverting.
- ◆ You cannot revert to a release earlier than Data ONTAP 6.3.
To revert the filer to an earlier release of Data ONTAP, you must first revert to a Data ONTAP 6.3.x release and once on that release revert to an earlier version.
- ◆ You cannot revert if an upgrade is in progress.

Upgrade must complete before any reversion is attempted

If you begin the upgrade procedure to Data ONTAP 6.5 and then decide that you want to revert to an earlier Data ONTAP release, you must complete the 6.5 upgrade before reverting.

Reversion with larger inodes

If you upgrade to Data ONTAP 6.5, your filer is upgraded to support larger inodes. There are two instances in which 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 there are not enough 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: <pre>priv set advanced</pre> Result: The filer prompt now displays an asterisk (*) after the filer name to indicate that you are in advanced mode.
2	Enter the following command: <pre>wapl scan status</pre> Example: If the upgrade is still in progress, the filer 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 reverting, 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.

To view the number of used and free inodes, complete the following step.

Step	Action
1	At the filer console, enter the following command: df -i

Excessive subdirectories and hard links

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 before you revert. When too many hard links exist during a revert, you will 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

The Data ONTAP 6.5 release family allows larger directories than in previous versions. If you have a directory larger than 65,535 KB, the directory will be accessible when you revert to a pre-6.5 version of Data ONTAP and will remain at its current size, but you cannot make it any larger.

Reverting entries in the /etc/exports file

When you upgrade to the Data ONTAP 6.5 release family, 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 will be scanned to determine whether it conforms to the pre-6.5 format. If not, the reversion will not proceed until the file has been fixed.

To fix the file, you can edit it manually or use the `exportfs -d` command to revert the file. Using `exportfs -d` will fix most of the revert issues. However, 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. This happens in the following circumstances:

- ◆ Lines greater than 4,096 characters, excluding comments
- ◆ Entries exceeding 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 `NetApp exports(5)` man page.

RAID-related errors

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

RAID reversion issue	Message with required action
RAID DP volumes are present	There is a <code>raid_dp</code> volume present which cannot be reverted. Downgrade these volumes with <code>'vol options <vol> raidtype raid 4'</code> .
RAID label assimilation in progress	RAID label assimilation in progress. Wait for assimilation to complete before reverting.
Failed Disk Registry in process of being updated	Please wait one moment while RAID updates the Failed Disk Registry.
Sanitized disk present	There are sanitized disks present. Either remove them or issue a <code>'disk sanitize release'</code> to return sanitized disks to the spare pool.
Disk in process of being sanitized is present	There are sanitized disks present. Either wait for the sanitize to complete, or issue a <code>'disk sanitize abort'</code> to return sanitized disks to the spare pool.

RAID reversion issue	Message with required action
Sparecore disk present	There is a sparecore disk present which cannot be reverted. Wait for the sparecore to complete before running revert.

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 filer contains disks that were previously upgraded with Data ONTAP 6.5, and were not reverted using the `revert_to` command. In cases where a disk has not been properly reverted, the following actions occur:

- ◆ The disk is not assimilated.
- ◆ The disk is moved to the broken disk pool with “bad label” given as the reason.
- ◆ An Autosupport notice is sent to Network Appliance and the customer.

SnapLock volumes must be removed before reverting

Before reverting to a pre-6.5 release of Data ONTAP, SnapLock volumes must be removed. For more information about SnapLock, see the *Storage Management Guide*.

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 with vFiler™ systems. If you have defined vFiler storage 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.

Finding reversion issues for releases earlier than Data ONTAP 6.3

To find reversion issue information for releases earlier than Data ONTAP 6.3, go to the Information Library for Archived Documentation on the NOW site, at http://now.netapp.com/NOW/knowledge/docs/archive_docs.shtml, for a list of documentation for earlier releases of Data ONTAP.

Reversion with home directory paths in the cifs_homedir.cfg file

If you upgrade to Data ONTAP 6.3 or later and convert home directory path entries from the `cifs.home_dir` option to the `cifs_homedir.cfg` file, then if you revert to a pre-6.3 release, the filer will attempt to write as many of the paths as possible back to the registry for the `cifs.home_dir` option. If some of the paths fail to be written to the registry, you might need to manually transfer the paths from the `cifs_homedir.cfg` file to the `cifs.home_dir` option. The `cifs_homedir.cfg` file remains intact during reversion.

About this appendix This appendix describes how to create the following diskettes from a UNIX or Windows client:

- ◆ System boot diskettes
- ◆ A system firmware diskette

When to create diskettes

You do not need to create diskettes for F825, F880, FAS200 series, FAS900 series, or NearStore series filers. These filers do not have a floppy drive and use a CompactFlash card for firmware, diagnostics, and system software downloads.

For all other filers (F700 series filers and F85, F87, F810, F820, and F840 filers):

- ◆ You need to create a set of system boot diskettes if you do not have boot diskettes for the release that you are running.
- ◆ You need to create a firmware upgrade diskette whenever you need to upgrade firmware, unless you have an F85 or F87 filer.

Note

The F85 and F87 filers use firmware that does not need to be upgraded.

Diskette requirements

For each diskette that you want to create, you must have a write-enabled, 1.44-MB, PC-formatted diskette.

The number of diskettes you need for each kind of software is shown in the following table.

Software	Number of diskettes required
System boot	8
Firmware	1

Topics in this appendix

This appendix discusses the following topics:

- ◆ [“Creating diskettes from NOW”](#) on page 92
- ◆ [“Creating diskettes from the CD-ROM”](#) on page 96

Creating diskettes from NOW

About creating diskettes from NOW

You can create diskettes from either a UNIX client or a Windows client. You use different procedures to create boot diskettes and firmware diskettes.

Creating a system boot diskette set from a UNIX client

From a UNIX client, to create a system boot diskette set from the NOW site, complete the following steps.

Step	Action
1	Use a Web browser to log in to NOW.
2	Go to the NOW software download page for this release.
3	Copy the UNIX boot diskette files to your client.
4	Copy each boot diskette file to a separate diskette using the following command: <pre>dd if=file of=drivedev bs=512</pre> <i>file</i> is the name of the file. <i>drivedev</i> is the device name of the diskette drive. Result: A message listing file counts similar to the following example appears, confirming that the diskette has been written. <pre>2880+0 records in 2880+0 records out</pre>
5	Remove, write-protect, and label each diskette after creating it. Include the release number, diskette number, and filer model. Example: Release 6.5.2, Disk 1 of 8, NetApp F840 Note_____ It is important to record the filer model on the diskette label, especially if you have different models on site. Filers in different NetApp filer series use different boot files. _____

Creating a system boot diskette set from a Windows client

From a Windows client, to create a system boot diskette set from the NOW site, complete the following steps.

Step	Action	
1	If...	Then...
	You do not have RaWrite on your Windows client	Complete the procedure described in “ Downloading the RaWrite utility to a Windows client ” on page 94, then go to Step 2 of this procedure.
	You have RaWrite on your Windows client	Go to Step 2 of this procedure.
2	Log in to NOW.	
3	Go to the NOW software download page for this release.	
4	Copy the boot diskette files to your client.	
5	If you are running...	Then...
	The Windows version of RaWrite	Double-click RAWRITEWIN.EXE.
	The DOS version of RaWrite	Enter the following command at the Windows client command line: rawrite
6	For each diskette file in the system boot diskette set, follow the RaWrite prompts. As appropriate, enter the path name of one of the boot files that you downloaded and the drive letter for the diskette. Result: RaWrite displays confirmation messages and writes the diskette.	

Step	Action
7	Remove, write-protect, and label each diskette after creating it. Include the release number, diskette number, and filer model. Example: Release 6.5.2, Disk 1 of 8, NetApp F840 Note _____ It is important to record the filer model on the diskette label, especially if you have different models on site. Filers in different NetApp filer series use different boot files. _____

Downloading the RaWrite utility to a Windows client

You need the RaWrite utility on your Windows client to extract the system boot diskette software and write it to the diskette. To download the RaWrite utility to your Windows client, complete the following steps.

Step	Action
1	Go to the NOW site at the following URL: http://now.netapp.com/NOW/cgi-bin/toolsutils/
2	Find either the DOS or Windows RaWrite utility.
3	Copy the RaWrite utility file to your client.
4	If the file ends in .zip, unzip the file by double-clicking it.

Creating a system firmware diskette from either a UNIX or Windows client

To create a system firmware diskette from the NOW site, complete the following steps.

Step	Action
1	Log in to NOW.
2	Go to the System Firmware Release Table at http://now.netapp.com/NOW/tools/releasetable.shtml .
3	Click system firmware-related links until you see a page that displays firmware versions.
4	Select filer system firmware 4.3 or later.

Step	Action
5	Follow the directions on the download page for your firmware.
6	Remove, write-protect, and label the diskette after creating it. Include the firmware revision, diskette number, and filer model. Example: Firmware 4.3, Disk 1 of 1, NetApp F840 Note_____ It is important to record the filer model on the diskette label, especially if you have different models on site. Filers in different NetApp filer series use different firmware files. _____

Creating diskettes from the CD-ROM

About creating diskettes from the CD-ROM

You can create diskettes from either a UNIX client or a Windows client. From a Windows client, you use different procedures to create boot diskettes and system firmware diskettes.

Creating boot or firmware diskettes from a UNIX client

From a UNIX client, to create boot or firmware diskettes from a file on the Data ONTAP CD-ROM, complete the following steps.

Step	Action
1	Mount the Data ONTAP CD-ROM on your client.
2	Use the /files.htm file to locate the desired firmware or system boot software files.
3	Copy each desired firmware or boot file to a diskette using the following command: dd if=file of=drivedev bs=512 <i>file</i> is the name of the file. <i>drivedev</i> is the device name of the diskette drive. Result: A message listing file counts similar to the following appears, confirming that the diskette has been written. 2880+0 records in 2880+0 records out
4	Remove, write-protect, and label each diskette after creating it. Include the firmware revision or Data ONTAP release number, diskette number, and filer model. Example: Release 6.5.2, Disk 1 of 8, NetApp F840 Note_____ It is important to record the filer model on the diskette label, especially if you have different models on site. Filers in different NetApp filer series use different firmware files. _____

Creating a boot diskette set from a Windows client

From a Windows client, to create a boot diskette set from files on the Data ONTAP CD-ROM, complete the following steps.

Step	Action
1	Insert the Data ONTAP CD-ROM into your CD-ROM drive.
2	Open the Utils folder.
3	Open the RaWrite folder.
4	Double-click Rawrite.exe.
5	For each diskette file in the system boot diskette set, follow the RaWrite prompts, supplying an image source and the drive letter for the formatted diskette that will be one of the system boot diskettes. For the image source, enter the following path name: X:\ontap\Release\Type\bootN X is your CD-ROM drive letter. Release is the release number on the front of your CD-ROM. Type is one of the following: ◆ ALPHA for an F700 series filer ◆ X86 for an F810, F820, or F840 filer N is the number of the diskette you are creating. Result: RaWrite displays confirmation messages and writes the diskette.
6	Remove, write-protect, and label each diskette after creating it. Include the release number, diskette number, and filer model. Example: Release 6.5.2, Disk 1 of 8, NetApp F840 Note _____ It is important to record the filer model on the diskette label, especially if you have different models on site. Filers in different NetApp filer series use different boot files. _____

Creating a firmware diskette from a Windows client

From a Windows client, to create a firmware diskette from a file on the Data ONTAP CD-ROM, complete the following steps.

Step	Action
1	Insert the Data ONTAP CD-ROM into your CD-ROM drive.
2	Open the CD-ROM and use the files.htm file to locate the desired firmware.
3	Copy the desired file to the diskette.
4	Remove, write-protect, and label each diskette after creating it. Include the firmware revision, diskette number, and filer model. Example: Firmware 4.3, Disk 1 of 1, NetApp F840 Note_____ It is important to record the filer model on the diskette label, especially if you have different models on site. Filers in different NetApp filer series use different firmware files. _____

Why you should convert resource.frk files

When you upgrade a filer to Data ONTAP 6.5.2 from a version of Data ONTAP prior to 6.0, any Macintosh client using Thursby Software Systems DAVE software starts to use the new Windows streams feature. This means that the information that was formerly stored in special resource.frk files, such as desktop icons for programs and files, is lost.

You can avoid losing this information by using a Windows conversion utility called `na_macstream` to make resource.frk files use the Windows streams feature.

When you use na_macstream

It is recommended to use `na_macstream` after you install Data ONTAP 6.5.2, but before Macintosh clients running DAVE software start to access their files.

If you did not run `na_macstream` before users accessed files, see “[Converting resource.frk files using na_macstream](#)” on page 101 for information on how to replace these files using the `/overwrite` option of the `na_macstream` command.

Note

This is a one-way conversion. After completing the conversion, you cannot go back to the original resource.frk file method if you want to revert to an earlier version of Data ONTAP.

Where na_macstream is located

The `na_macstream` conversion utility is in the `utils\na_macstream` directory on the Data ONTAP CD-ROM for this release.

The `na_macstream` utility is also on the NOW site on the Tools & Utilities page.

Copying na_macstream

To use na_macstream, you must copy na_macstream from the CD-ROM or the NOW site to a Windows host that is attached to the upgraded filer.

Copying na_macstream from the CD-ROM: To copy na_macstream from the CD-ROM, complete the following steps.

Step	Action
1	Insert the CD-ROM into the Windows host's CD-ROM drive.
2	Copy the na_macstream utility from the utils\na_macstream directory. Note _____ Also included in the directory is a readme.txt file. Check this file for last-minute information about na_macstream. _____

Copying the utility from NOW: To copy the na_macstream utility from NOW, complete the following steps.

Step	Action
1	Use a browser on a Windows client to go to http://now.netapp.com/ .
2	Click Service & Support.
3	Click Download Software.
4	Click Tools & Utilities.
5	Locate the na_macstream utility and click the link to download the software to a directory on the Windows NT client.

Guidelines for using na_macstream

Follow these guidelines when using na_macstream:

- ◆ You must specify at least one path (file or directory) and only one action (/list or /upgrade).
- ◆ You can use the root of the path that maintains Macintosh users' files to convert all files.
If a directory is specified, all files and directories in it are converted.
- ◆ You can abbreviate all options.
- ◆ You can use options in any order.

Converting resource.frk files using na_macstream

To convert resource.frk files to use streams, complete the following step.

Step	Action
1	From a Windows host connected to the filer that has been upgraded to Data ONTAP 6.5.2, enter the following command from the MS-DOS Prompt window: <pre>na_macstream path [path...] {/list /upgrade} [/verbose] [/overwrite] [/stop-on-err]</pre> <i>path</i> is the Universal Naming Convention (UNC) path to the filer and file or directory that is to be converted. /list lists the names of resource.frk files to be converted to streams. /upgrade upgrades or converts resource.frk files to use streams. /verbose displays the name of each file as it is processed. /overwrite allows any existing streams to be overwritten with the data in the resource.frk files. This option is useful if you did not run na_macstream before users accessed files. /stop-on-err stops the program when it encounters an error. If you do not use this option, na_macstream attempts to continue even if errors are encountered.

Example of the na_macstream conversion

The following command converts all resource.frk files in the share mshare on the filer engmix and displays each file as it is processed:

```
na_macstream \\engmix\mshare /upgrade /verbose
```


About this appendix This appendix explains why differences between releases and release families might pose issues during upgrades.

Why there might be issues Each release family introduces new features, some of which pose compatibility issues when upgrading from previous releases. Network Appliance creates upgrade procedures to resolve these issues. Some issues are resolved automatically in the Data ONTAP software, but a few issues require manual configuration.

When you upgrade and there are one or more intermediate release families between your source and target release, the latest release usually includes any automatic upgrade software included in previous releases (unless otherwise specified). However, you might need to review and resolve upgrade issues associated with intermediate release families before upgrading to the new release.

Differentiating among types of upgrades Data ONTAP releases are identified by a combination of numerals and letters in three positions, x.y.z. When you upgrade from one Data ONTAP release to another, the upgrade can be from one release family to another or within a release family. 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, 6.4, 6.4R1, 6.4.1, 6.4.1P1, 6.4.2, and 6.4.2D1 are all releases within the same release family.

Data ONTAP release types are defined in the Data ONTAP Release Model, available on the NOW site at the following address:
http://now.netapp.com/NOW/products/ontap_releasemodel/index.shtml.

Upgrading within a release family An upgrade *within* a release family is one in which the release number x.y.z does not change in the x or y components, only in the z components, when comparing the original to the target release. The following are examples of upgrades within release families:

- ◆ 6.5 to 6.5R1
- ◆ 6.5R1 to 6.5.2
- ◆ 6.5R1P2 to 6.5.2
- ◆ 6.5.1 to 6.5.2

Major changes are not usually introduced within a release family, and updates to system and disk firmware are not usually required when you upgrade. Rather, these releases usually include bug fixes and minor feature enhancements.

For these reasons, upgrades within a release family are usually simpler and involve less service disruption than upgrades between release families.

Upgrading between release families

An upgrade *between* release families is one in which the release number *x.y.z* changes in the *x* or *y* components from the original to the target release. The following are examples of upgrades between release families:

- ◆ 6.4.2P6 to 6.5R1
- ◆ 6.4 to 6.5
- ◆ 6.2.3 to 6.5.2
- ◆ 5.3 to 6.5

A new release family usually includes major changes in infrastructure and subsystems. When you upgrade from one release family to another, one or more of the following might have been introduced on your platform:

- ◆ Fundamental infrastructure changes—for example, changes to Write Anywhere File Layout (WAFL) or Redundant Array of Independent Disks (RAID) operation
- ◆ Version number changes requiring a filesystem upgrade—for example, in RAID, WAFL, Non-Volatile LOG (NVLOG) or Java subsystems
- ◆ New system firmware or disk firmware requirements

Such feature changes and requirements are cumulative between succeeding release families. You do not have to upgrade sequentially to each new release family—in other words, you can skip release families—but you must comply with the requirements of any intermediate release and you should be aware of any new system behavior introduced in an intermediate release. For example, if you are upgrading from 6.3.3 to 6.5.2, you must satisfy the upgrade requirements of the 6.4 release family.

For these reasons, upgrades between release families sometimes take longer, involve more steps, and interrupt filer services longer than upgrades within a release family.

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

About service availability during upgrades

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

The following factors can affect the availability of filer services during upgrades:

- ◆ Whether the system being upgraded is a single node or a member of a cluster
Clustered systems are designed to provide optimal service availability.
For more information, see [“Upgrade host requirements”](#) on page 6.
- ◆ The types of services licensed and their susceptibility to timeout errors
See [“Service and protocol considerations”](#) on page 106.
- ◆ Upgrading between release families or within a release family
Upgrades between release families involve more steps and are potentially more disruptive than upgrades within a release family.
For more information, see [“Resolving upgrade issues”](#) on page 12.
- ◆ Whether a system firmware upgrade is required
System firmware upgrades require a system halt and reboot. They can disrupt services in single filer and standard cluster upgrades but do not affect services in nondisruptive cluster upgrades.
For more information, see [“Upgrading the system firmware”](#) on page 32.
- ◆ Whether disk firmware upgrades are required and on how many disks and disk types
For more information, see [“Upgrading disk firmware”](#) on page 38.
- ◆ The types of applications in use and their susceptibility to timeout errors
The availability of client applications during upgrades depends on features, protocols, and configuration. See your application documentation for more information.

Note

All hardware and software upgrades in any storage solution are potentially at least somewhat disruptive to filer services. Network Appliance recommends that you review upgrade options carefully to determine the best method of upgrading for maintaining optimal service availability.

Service and protocol considerations

During an upgrade, the filer 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 and receipt is not acknowledged within a timeout period, a transmission error is assumed to have occurred. In a filer environment, if the client's timeout period is greater than the disruption period on the filer (for example, the amount of time a reboot or cluster giveback takes), the client will not perceive a disruption of filer services.

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

The following list summarizes the behavior of filer services and protocols during upgrades. See also *The Compatibility and Configuration Guide for NetApp's FCP and iSCSI Products*, on the NOW site at the following address:
http://now.netapp.com/NOW/knowledge/docs/san/fcp_iscsi_config/index.shtml.

- ◆ NFS hard mounts
 - No adverse behavior on the clients. Clients might receive some messages similar to NFS server not responding, retrying until the filer reboots.
- ◆ NFS soft mounts
 - Network Appliance recommends that you not use soft mounts for NFS traffic.
- ◆ FCP, Direct Attached
 - No adverse behavior on the clients if the reboot takes less than the user-configurable node and link timeouts on the following hosts:
 - ❖ For Windows 2000 hosts, the host parameters are called NodeTimeout, HLinkTimeout, and LinkTimeout.
 - ❖ For Solaris hosts, the host parameters are called nodev - tmo and linkdown - tmo, and are set in the /kernel/drv/lpfc.conf file.
 - The recommended value for these parameters for Direct Attach FCP configurations is 255 seconds. (Check the NOW site for the latest values.)
- ◆ FCP, Fabric Attach
 - No adverse behavior on the clients if the reboot takes less than the user-configurable node timeouts on the following hosts:
 - ❖ For Windows 2000 hosts, the parameter is called NodeTimeout.
 - ❖ For Solaris hosts, the parameter is called nodev - tmo.

When the host is fabric-attached to a filer that is not clustered, the recommended value for these parameters is 255 seconds.

- ◆ iSCSI
No adverse behavior on the clients. Clients might receive some messages similar to `Server not responding`, retrying until the filer reboots.
- ◆ CIFS
Client sessions are terminated. Inform users to end their sessions before you upgrade. To do so, issue the `cifs terminate -t` command before the cluster takeover or before the reboot, or issue the `reboot -t` command.
- ◆ FTP, NDMP, and HTTP
State is lost and the client user must retry the operation.
- ◆ Backups and restores
State is lost and the client user must retry the operation.

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 or Exchange)
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.

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

For more information on nondisruptive upgrades of clustered systems, see [“Planning for upgrading clusters”](#) on page 7.

Note

See the Network Appliance hardware documentation for your filers before upgrading hardware components.

When hardware updates can be performed

Hardware maintenance and upgrades can be performed using the nondisruptive clustered upgrade method. Nondisruptive hardware updates can be performed independently or in conjunction with a Data ONTAP upgrade of clustered filers.

If hardware and software are updated together, the new software must be downloaded first. If you are upgrading within a release family, you can upgrade the hardware and Data ONTAP together. If you are upgrading between release families, you need to upgrade Data ONTAP first, which might cause a small disruption, but you can use the nondisruptive upgrade procedure to cover the longer period required for hardware upgrades.

In a nondisruptive upgrade, each node is successively “failed” and its partner is put in takeover state at one point in the procedure. While the “failed” node is in the waiting for giveback state, it can be interrupted and brought to the firmware ok prompt or powered off.

Supported hardware upgrades

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

- ◆ Replacing the head (with the same type as before, and with the same adapter cards)
 - ◆ Replacing the motherboard
 - ◆ Replacing or adding an adapter card
- You can replace a nonvolatile RAM (NVRAM), disk, or network interface card (NIC) component, 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 FC).
- ◆ Replacing the Cluster Interconnect card

- ◆ Installing onboard firmware on various platforms; for example, the Baseboard Management Controller (BMC) on 9xx filers.

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.

When these procedures are completed, you can reboot the node into the waiting for giveback state. In the rest of the nondisruptive upgrade procedure, the partner node will then do a `cf giveback` and the node will boot on its new hardware and firmware.

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