



Converting a FAS2240 system in an HA pair to a disk shelf and attaching it to another system in an HA pair

You can convert a FAS2240 storage system in an HA pair into a root disk shelf or a data disk shelf and then attach it to a storage system in an HA pair.

Before you begin

- The system to which you will attach the converted FAS2240 disk shelf already must be configured with a root volume and with storage. Typically, the system is configured at the factory before shipment.
- You should have collected system performance data by running the Performance and Statistics Collector (Perfstat) tool during normal peak time; you must have completed this task one to three weeks before upgrading the system. Perfstat collects performance information and writes it to a text file, which can help troubleshoot any issues after the upgrade. You can find information about Perfstat and download the tool from the Downloads section of the the NetApp Support Site at mysupport.netapp.com.

About this task

This procedure is for systems running Data ONTAP 8.2.x operating in 7-Mode. 8080 systems require Data ONTAP 8.2.2 or later.

This procedure is written with the following assumptions:

- That the new system is running Data ONTAP 8.2.x or later.
- That the original and new system might be in an FC or iSCSI environment. If your system is in an FC or iSCSI environment, you need to take specific steps included in this procedure, and you must use the root volume of the original system on the upgraded system. See the Data ONTAP SAN Configuration Guide for 7-Mode and the Data ONTAP SAN Administration Guide for 7-Mode for more information about setting up and managing systems in SAN environments.
- Either the FAS2240 system or the new system might have Storage Encryption on its disk drives.
- That there is no FC disk shelf attached to the FAS2240 system that needs to be moved. However, the system might have attached non-FC disk shelves that need to be moved.

Note: This document uses the term *HA pair* to describe two-controller storage systems in which one controller takes over and serves data if the other controller fails. Before the release of Data ONTAP 8.0, such systems were called *active/active configurations*.

Steps

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Guidelines for upgrading the controllers

In order to upgrade the original controllers, you need to follow certain guidelines and be aware of restrictions that affect the procedure.

Supported upgrade paths

You can upgrade the FAS2240 system to be either the root-disk shelf or a data-disk shelf of another system in a different family.

You can attach the converted FAS2240 shelf to one of the following systems:

- FAS2240
- FAS255x
- 32xx
- 62xx
- 80xx

Note: The system that you are upgrading to should be new and unused.

If you have a FAS2240-2 system, you will convert it to a DS2246 disk shelf; if you have a FAS2240-4 system, you will convert it to a DS4246 disk shelf.

In this procedure, the system to which you attach the converted FAS2240 disk shelf is called *the new system*.

Licensing in Data ONTAP 8.2

Starting with Data ONTAP 8.2, all license keys are 28 upper-case alphabetic characters in length.

In Data ONTAP 8.2, you need to obtain a new, 28-character license key for each package. You can get license keys from the NetApp Support Site in the *My Support* section under *Software licenses*. If the site does not have the license keys you need, contact your NetApp sales representative.

You have 90 days to install the matching keys for each controller. During the grace period, the new controller can use the same licensed functionality that the original controller had. After 90 days, the original controller's keys will be removed.

During the grace period, you have 24 hours after the first valid license key is installed to complete license installation for all packages that you want the new controller to use. After the 24-hour period, all previously installed licenses that were associated with the original system serial number are removed.

You can use the `license show` command to check the time available before the grace period expires.

Note: For systems in HA pair, you need to install licenses for both controllers.

For detailed information about licensing in Data ONTAP 8.2, see the *Data ONTAP System Administration Guide for 7-Mode* and the *Data ONTAP Release Notes for 7-Mode*.

Storage Encryption

The original nodes or the new nodes might be enabled for Storage Encryption. In that case, you need to take additional steps in this procedure to ensure that Storage Encryption is set up properly.

If you want to use Storage Encryption, all the disk drives associated with the nodes must have self-encrypting disk drives.

Limitations

If your system is in an ESX environment, and you upgrade the original system using the new system's root volume, the LUN serial numbers will change after the upgrade to reflect a serial number based on the new NVRAM ID. This causes an

unnecessary resigature event that should be avoided. See the knowledgebase article *What causes ESX VMFS to "disappear"?* on the NetApp Support Site at mysupport.netapp.com.

Gathering the tools and documentation

Before beginning the upgrade process, you need to gather the necessary tools and recommended documentation.

Steps

1. Gather the tools that you need to perform the upgrade:
 - Grounding strap
 - #2 Phillips screwdriver
2. Download from the NetApp Support Site at mysupport.netapp.com documents that contain information helpful during the upgrade:

Document	Contents
<i>Installation and Setup Instructions and Hardware Overview</i> for the system to which you will attach the converted FAS2240 disk shelf	Contains information about installing and setting up the system. Included in the box with the controller and also available on the NetApp Support Site.
<i>Data ONTAP Upgrade and Revert/Downgrade Guide for 7-Mode</i>	Describes how to upgrade to the latest version of Data ONTAP software and presents information you need to consider before upgrading your software.
<i>Data ONTAP Software Setup Guide for 7-Mode</i>	Describes how to use Data ONTAP software to set up and configure storage systems. Also contains information about Storage Encryption.
<i>Data ONTAP System Administration Guide for 7-Mode</i>	Describes general system administration for storage systems.
<i>Data ONTAP Storage Management Guide for 7-Mode</i>	Describes how to manage your storage on storage systems with Data ONTAP, using disks, RAID groups, aggregates, volumes, qtrees, and quotas. Also contains information about Storage Encryption and instructions for stopping deduplication.
<i>Data ONTAP Data Protection Online Backup and Recovery Guide for 7-Mode</i>	Contains information about quiescing SnapMirror.
<i>Data ONTAP Software Setup Guide for 7-Mode</i>	Contains instructions for accessing the messages log, obtaining information to set up the SP, editing files in the <code>/etc</code> directory, and for performing other administrative tasks.
<i>DS4243, DS2246, DS4486, and DS4246 Disk Shelf Installation and Service Guide</i> or <i>DS4243, DS2246, DS4486, and DS4246 Disk Shelf Installation and Service Guide</i>	Contains information for installing disk shelves.
<i>Universal SAS and ACP Cabling Guide</i>	Contains information for cabling SAS shelves applicable to all platforms.

Document	Contents
<i>Data ONTAP High Availability and MetroCluster Configuration Guide for 7-Mode</i>	Describes installation and management for HA pairs.

The NetApp Support Site also contains documentation about disk shelves, NICs, and other hardware that you might use with your system. It also contains the *Hardware Universe*, which provides information about the hardware that the new system supports.

Preparing the site and equipment for the upgrade

Preparing for the upgrade includes ensuring that the new system supports any hardware you are migrating and obtaining IP addresses for the Service Processors (SPs) on the new system.

About this task

This procedure is written with the assumption that you are upgrading to a new system with the same name and IP address that the FAS2240 system has.

This procedure also assumes that the original system might be running an older version of Data ONTAP than the new system and includes steps for upgrading Data ONTAP on the original system, if necessary. However, if the original system is running the desired version of Data ONTAP and the new system is running an older version, you need to update Data ONTAP on the new system before upgrading the controller hardware. See the *Data ONTAP Upgrade and Revert/Downgrade Guide for 7-Mode* for information.

Steps

1. Ensure that all cables connected to the back of the existing controllers are clearly labeled with the controller and port name.
2. Perform the following substeps to check the status of the HA pair:

- a. Check if either of the controllers is in takeover mode—that is, actively taking over for its partner—by entering the following command:

```
cf status
```

If a controller is in takeover mode, the system displays a message similar to the following example:

```
local_node(takeover)>
local_node has taken over for partner_node
```

Additional lines in the output might give the reason for the failover or say that the partner node is ready for giveback.

- b. If one of the controllers is in takeover mode, perform giveback by entering the following command:

```
cf giveback
```

- c. Make sure that both controllers are up by entering the following command on both controllers:

```
cf status
```

When both controllers are up and neither is in takeover mode, the system displays the following message:

```
Controller Failover enabled, partner_name is up.
```

3. Ensure that all deduplication processes are stopped.

See the *Data ONTAP Storage Management Guide for 7-Mode* for information about deduplication.

4. Ensure that all SnapMirror processes are quiesced.
See the *Data ONTAP Data Protection Online Backup and Recovery Guide for 7-Mode* for information about SnapMirror.

5. Review the message log to make sure that there are no critical system issues.
See the *Data ONTAP System Administration Guide for 7-Mode* for information about accessing the message log.

6. Send an AutoSupport message to NetApp by entering the following command:

```
options autosupport.doit starting_disruptive_controller_head_upgrade
```

Keeping AutoSupport enabled and sending AutoSupport messages when you make changes in your system can help identify problems and solutions should problems occur.

7. Obtain system information and backup configuration by entering the following commands and recording their output:

```
disk show -v
vol status
storage show disk -p
options
sysconfig -a
sysconfig -c
sysconfig -r
aggr status
ifconfig -a
system node service-processor show
config dump -v config_file
```

The file containing system information and backup configuration saved with the `config dump` command is saved in the `/etc/configs` directory. You can give the file any name you choose.

8. Make sure that you have enough space in the equipment rack or system cabinet for the converted FAS2240 system, the new system, and any disk shelves.
9. Check the *Hardware Universe* on the NetApp Support Site at mysupport.netapp.com to ensure that the new system supports the disk shelves and any tape devices that you are migrating from the FAS2240 system.
10. Check with the tape backup vendor to ensure that the backup utility is compatible with the NDMP backup application in Data ONTAP.
11. Obtain IP addresses, mailboxes, and other information required for the SPs on the new system.
If you used the SPs on the FAS2240 system, you might want to reuse their network parameters for the SPs on the new system.
12. Check the *Data ONTAP Upgrade Guide* for issues that might affect the upgrade of the FAS2240 system.
13. Check the version of Data ONTAP running on the FAS2240 system.
14. Take one of the following actions:

If the version of Data ONTAP on the FAS2240 system is...	Then...
---	----------------

The same as the version running on the new system	Go to Step 15.
---	----------------

If the version of Data ONTAP on the FAS2240 system is...	Then...
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Different from the version running on the new system	Upgrade the software on the FAS2240 system to the same version that is running on the new system by following the instructions in the <i>Data ONTAP Upgrade and Revert/Downgrade Guide for 7-Mode</i> .
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15. If you want the new controllers to have the same licensed functionality as the original controllers, enter the following command to display a list of licenses and capture its output:

```
license show
```

16. Obtain new license keys for the new controllers from the NetApp Support Site at mysupport.netapp.com.

If the site does not have the license keys you need, contact your NetApp sales representative.

17. Back up the data on the FAS2240 system.

Be sure to copy or save any information about site-specific customizations that you might want to reuse or save for reference.

18. Take one of the following actions:

If your system is...	Then...
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Is not in a SAN environment	Enter the following commands and note their output: <pre>rdfile /etc/rc</pre> <pre>rdfile /etc/hosts</pre> <pre>rdfile /etc/exports</pre> <pre>cifs shares</pre>
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Is in a SAN environment	Enter the following commands and note their output: <pre>rdfile /etc/rc</pre> <pre>rdfile /etc/hosts</pre> <pre>rdfile /etc/exports</pre> <pre>cifs shares</pre> <pre>igroup show -v</pre> <pre>fcp nodename</pre> <pre>fcp portname show -v</pre> <pre>iscsi nodename</pre> <pre>lun show -v</pre>
-------------------------	--

19. Take one of the following actions:

If you are upgrading a...	Then...
---------------------------	---------

FAS2240 system that uses Storage Encryption	Complete Step 20 through Step 23 and then go to Step 24. Note: Contact technical support to perform an optional step to preserve the security of the encrypted drives by rekeying all drives to a known authentication key.
---	---

FAS2240 system that does not use Storage Encryption	Skip Step 20 through Step 23 and go to Step 24.
---	---

20. Display the key ID for each self-encrypting disk on the FAS2240 system by entering the following command at the system prompt:

```
disk encrypt show
```

Example

```
node> disk encrypt show
Disk      Key ID
0c.00.1   0x0
0c.00.0   080CF0C8000000000100000000000000A948EE8604F4598ADFFB185B5BB7FED3
0c.00.3   080CF0C8000000000100000000000000A948EE8604F4598ADFFB185B5BB7FED3
0c.00.4   080CF0C8000000000100000000000000A948EE8604F4598ADFFB185B5BB7FED3
0c.00.2   080CF0C8000000000100000000000000A948EE8604F4598ADFFB185B5BB7FED3
0c.00.5   080CF0C8000000000100000000000000A948EE8604F4598ADFFB185B5BB7FED3
Locked?
```

The first disk in the example is associated with an MSID (the default Security ID set by the manufacturer); the others are associated with a non-MSID. When a disk is locked, it requires authentication at the next disk power-on or power-cycle event. Both disks associated with an MSID and disks associated with a non-MSID can be locked or unlocked.

21. Examine the output of the `disk encrypt show` command, and if any disks are associated with a non-MSID key, rekey them to an MSID key by taking one of the following actions:

- To rekey disks individually, enter the following command, once for each disk:

```
disk encrypt rekey 0x0 disk_name
```

- To rekey all disks at once, enter the following command:

```
disk encrypt rekey 0x0 *
```

22. Ensure that all the self-encrypting disks are associated with an MSID by entering the following command and examining the output:

```
disk encrypt show
```

Example

The following example shows the output of the `disk encrypt show` command when all self-encrypting disks are associated with an MSID:

```
node> disk encrypt show
Disk      Key ID
-----
0b.10.23   0x0
0b.10.18   0x0
0b.10.0    0x0
0b.10.12   0x0
0b.10.3    0x0
0b.10.15   0x0
0a.00.1    0x0
0a.00.2    0x0
Locked?
```

23. Obtain an IP address for the external key management server.

See the *Data ONTAP Software Setup Guide for 7-Mode* for more information about the external key management server.

24. Access the boot menu by entering the following command:

```
reboot
```

The system begins the reboot process.

25. During the reboot process, observe the messages on the console, and when you see the message `Press Ctrl-C for Boot Menu.`, press `Ctrl-C` to display the boot menu.

26. Select option 5 at the boot menu prompt and continue with the boot process.

The Maintenance mode command prompt (`*>`) appears.

27. If you do not know if your system has traditional volumes or FlexVol volumes, enter the following command and examine its output:

```
vol status
```

The system displays information about the volumes on the system, including whether each volume is a traditional volume or a FlexVol volume.

28. Take one of the following actions:

If the FAS2240 system has...	Then...
Traditional volumes	Take each volume offline by entering the following command, once for each volume: vol offline vol_name Note: Only aggregates other than aggr0 need to be taken offline.
FlexVol volumes	Take each aggregate offline by entering the following command, once for each aggregate: aggr offline aggr_name Note: Only aggregates other than aggr0 need to be taken offline.

29. Exit Maintenance mode by entering the following command at the Maintenance mode prompt:

```
halt
```

30. Enter the following command from the LOADER> prompt:

```
boot_ontap
```

31. Take one of the following actions:

If you will use the FAS2240 system as a...	Then...
Data disk shelf	Skip Step 32 and Step 33 and complete Step 34 on both controllers of the FAS2240 system.
Root disk shelf, and the root volume is a traditional root volume	Skip Step 32 and Step 33 and complete Step 34 on both controllers of the FAS2240 system.
Root disk shelf, and the root volume is a FlexVol root volume	Complete Step 32 through Step 34 on both controllers of the FAS2240 system, first all the steps on one controller, and then all the steps on the other controller.

32. Check the size of the FlexVol root volume on the FAS2240 system by entering one of the following commands:

```
vol size vol_name
```

```
df vol_name
```

The FlexVol root volume of the FAS2240 system must meet the minimum FlexVol root volume size on the new system before you upgrade the hardware. See the *Hardware Universe* on the NetApp Support Site for the minimum FlexVol sizes for the new system.

33. If the FlexVol root volume of the FAS2240 system is less than the minimum for the new system, increase it by entering the following command:

```
vol size vol_name +ng
```

In the preceding command, *n* indicates the desired size of the volume and *g* specifies gigabytes.

Note: You might need to add disks to the aggregate before you can increase the size of the FlexVol root volume.

For more information about resizing FlexVol root volumes, see the *Data ONTAP Storage Management Guide for 7-Mode*.

34. Make sure that the IP settings on the FAS2240 system match the IP settings on the new system by running the `setup` command and entering the settings information at the appropriate prompts.

You might not be able to match the settings exactly. If you cannot, note the differences and update the configuration as necessary. For information about the setup command, see the *Data ONTAP Software Setup Guide for 7-Mode*.

Converting the system to the disk shelf

You must follow the correct procedure for converting the FAS2240 system to a disk shelf for use in a new system. You have your choice of two procedures, which vary depending on whether you will use the converted FAS2240 system as a root disk shelf or a data disk shelf.

About this task

If you are upgrading a system in an FC or iSCSI environment, or if you are upgrading to a system without internal storage or attached disk shelves, you need to upgrade by using the converted FAS2240 system as a root disk shelf. Do not perform the upgrade procedure by using the converted FAS2240 system as a data disk shelf.

Choices

- [Converting the FAS2240 system to a root disk shelf](#) on page 9
- [Converting the FAS2240 system to a data disk shelf](#) on page 14

Converting the FAS2240 system to a root disk shelf

Converting the system consists of installing the new system and any attached disk shelves, renaming the new system's root volume, replacing the FAS2240 controllers with I/O modules, and then adding the converted FAS2240 disk shelf to the new system.

Steps

1. Verify that the FAS2240 system controllers are in an HA pair by entering the following command on one of the controllers and checking that the output shows that the controller is in HA mode:

```
options cf.mode
```

2. If you have not done so already, back up the data on the FAS2240 system.
3. Install the new system and any disk shelves associated with the system, as described in the *Installation and Setup Instructions* for that system.

The *Installation and Setup Instructions* are included in the controller box and are available on the the NetApp Support Site at mysupport.netapp.com. Be sure to configure the SP on the new system.

4. Rename the root volume on the new system using one of the following methods, depending on the type of root volume on the system:

If the new system has a ...	Then...
Traditional root volume	On one controller of the new system, rename the root volume to old_vol0 by entering the following command on the console: <pre>vol rename your_root_vol_name old_vol0</pre>
Flexible root volume	On one controller of the new system, rename the root volume and the corresponding aggregate to old_vol0 and old_aggr0 by entering the following commands on the console: <pre>vol rename your_root_vol_name old_vol0 aggr rename your_aggr_name old_aggr0</pre>

5. Complete Step 4 on the other controller of the new system.

6. Disable clustering on the FAS2240 system and the new system by entering the following command on either controller of each system:

```
cf disable
```

7. Shut down the FAS2240 system and the new system by entering the following command on their respective consoles:

```
halt
```

8. Properly ground yourself.
9. Turn off the power to the new system.
10. Take one of the following actions:

If the new system will...	Then...
Be in a SAN environment	Disconnect any attached disk shelves from the new system. Attention: New disk shelves must not be connected to the new controller before the upgrade is complete or there will be a loss of configuration data.
Not be in a SAN environment	Go to Step 11.

11. Turn off the power to the FAS2240 system and uncable it.
12. Replace the controller modules with IOM6 modules.
13. Turn on the power to the FAS2240 system.
14. Set the disk shelf ID.

Note: Each disk shelf, including the FAS2240 chassis, requires a unique ID. See the appropriate disk shelf guide for information about setting disk shelf IDs.
15. Turn off the power to the converted FAS2240 system but do not power-cycle the system.

Note: As documented in disk shelf guides, you ordinarily need to power-cycle a disk shelf after changing the disk shelf ID in order for the change to take effect. That is, you turn off the power to the shelf, wait briefly, and then turn on the power to the shelf. However, in this procedure, you need to leave power to the converted FAS2240 system turned off until after the system is cabled.
16. If you are moving any disk shelves from the FAS2240 system, reset the disk shelf IDs as necessary to ensure that each SAS shelf has a unique ID.
17. Cable the converted FAS2240 disk shelf to a SAS port of the new system, and if you are using ACP cabling, to the ACP port of the new system.

See the *Installation and Setup Instructions* for the new system and the *Universal SAS and ACP Cabling Guide* for cabling information. Also follow the cabling instructions in the *Data ONTAP High Availability and MetroCluster Configuration Guide for 7-Mode*.
18. If you are moving any disk shelves attached to the FAS2240 system, cable them to the new system.
19. Turn on the disk shelves and then turn on the new system.
20. During startup, observe the messages on the console, and when you see the message `Press Ctrl-C for Boot Menu.`, press Ctrl-C to display the boot menu on each controller.

Complete Step 21 through Step 38 on both controllers of the new system, each step first on one controller and then on the other controller before moving to the next step.
21. Select option **5** at the boot menu prompt and continue with the boot process.

The Maintenance mode command prompt (`*>`) appears.

22. View disk ownership on the new system by entering the following command on one of the controllers and examining the output:

```
disk show -v
```

Verify that you can see all the attached storage. However, if you are in a SAN environment, make sure that no disks from the new system are visible.

23. Verify that you can see all the paths available to each disk by entering the following command and examining its output:

```
storage show disk -p
```

24. Assign the disks on the converted FAS2240 disk shelf to the new system by entering the following command:

```
disk reassign -s old_sysid -d new_sysid
```

For *old_sysid*, use the System ID number that you captured from the output of the `sysconfig -a` command in Step 6 of the section *Preparing the site and equipment for the upgrade*.

Note: If you are reassigning disks from the converted FAS2240 system to both controllers in the new system, assign disks from FAS2240 controller A to the new system controller module A and disks from FAS2240 controller B to new system module B.

The system displays the following prompts:

```
Partner node must not be in Takeover mode during disk reassignment from maintenance mode.
Serious problems could result!!
Do not proceed with reassignment if the partner is in takeover mode. Abort reassignment
(y/n)? n

After the node becomes operational, you must perform a takeover and giveback of the HA
partner node to ensure disk reassignment is successful.
Do you want to continue (y/n)? y

Disk ownership will be updated on all disks previously belonging to Filer with sysid
old_sysid.
Do you want to continue (y/n)? y
```

25. Respond to the prompt asking if you want to abort reassignment by typing **n** and then pressing the Enter key, and respond to the remaining prompts by typing **y** and then pressing the Enter key for each prompt.

26. Verify that the disks were reassigned correctly by entering the following command and examining its output:

```
disk show -v
```

27. If the new system was used previously, clear the mailbox by entering the following command:

```
mailbox destroy local
```

Mailbox disks store configuration information and, in an HA configuration, maintain consistency between controllers and monitor partner activity.

28. Exit Maintenance mode by entering the following command at the Maintenance mode prompt:

```
halt
```

29. Enter the following command from the `LOADER>` prompt:

```
boot_ontap
```

30. Set the root volume of the new system.

Note: This step uses *vol0* for the root volume of the original system and *aggr0* to indicate the root aggregate. However, the root volume and root aggregate on your system might have different names. Their names and other volume and aggregate information was in the output of the `vol status` and `aggr status` that you ran in Step 7 in the section *Preparing the site and equipment for the upgrade*.

If the FAS2240 converted disk shelf had a...	Then...
Traditional root volume	Bring the root volume from the converted FAS2240 disk shelf online and set it to the root volume for the system by entering the following commands: <pre>vol online vol0 vol options vol0 root</pre>
Flexible root volume	Bring the root aggregate from the converted FAS2240 disk shelf online and set it to the root volume for the system by entering the following commands: <pre>aggr online aggr0 vol online vol0 vol options vol0 root</pre>

31. Reboot the system.

As part of the reboot, the system enters setup. If setup does not occur automatically, start it manually by entering the `setup` at the system prompt.

32. Ensure that the ports are assigned correctly by entering changing information as necessary at the appropriate setup prompts.

33. Replace the binaries on the converted FAS2240 disk shelf by entering the following command to download and install the same version of Data ONTAP that is on the new system:

```
software update url -R -f
```

`url` is the location of the Data ONTAP system files (.tgz, or .zip). The `-R` option requests a reboot, which is required to complete the software update. The `-f` option is required to overwrite the `image.tgz` file.

34. Optional: Copy data from the old root volume to the new system's disks.

This step preserves the data from the old root volume if you remove the old root volume in the optional next step. See the *Data ONTAP Data Protection Online Backup and Recovery Guide for 7-Mode* for information about copying data.

Note: If you copy data from the old root volume, you first must bring the root volume online.

35. Optional: Remove the old root volume from the new system.

If the old root volume was a...	Then...
Traditional root volume	Enter the following commands: <pre>vol offline old_vol0 vol destroy old_vol0</pre>
Flexible volume	Enter the following commands: <pre>vol offline old_vol0 vol destroy old_vol0 aggr offline old_aggr0 aggr destroy old_aggr0</pre>

36. Halt the system by entering the following command:

```
halt
```

37. Boot Data ONTAP by entering the following command:

```
boot_ontap
```

38. Take the following actions to install licenses:

- a. Wait at least five minutes after the command-line interface is up following the reboot.
- b. Install licenses as needed by entering the following command on both controllers:

```
license add license_key, license_key, license_key...
```

The `license_key` is the license key that you obtained in the section *Preparing the site and equipment for the upgrade*. The license key consists of 28 upper-case alphabetic characters. You can add one license key at a time, or you can add multiple license keys at the same time, each separated by a comma or a space.

Note: You might be prompted to set up some features and then reboot the system.

39. Verify that the licenses are properly installed by entering the following command and examining its output:

```
license show
```

You might want to compare the output with the output you capture in Step 15 of the section *Preparing the site and equipment for the upgrade*.

Note: The `license show` command without parameters will display both old and new licenses. Use the command `license show -instance` to display a list of the controller serial number for each license.

40. Modify the RAID groups and volumes as needed as described in the *Data ONTAP Storage Management Guide for 7-Mode*.

41. Enable the HA configuration by entering the following command at the system prompt of either controller:

```
cf enable
```

42. Verify that the original system controllers are in an HA pair by entering the following command on one of the controllers and ensuring that the output shows that the controller is in HA mode:

```
cf status
```

43. Take one of the following actions:

If the new system...	Description
Is in a SAN environment	<ol style="list-style-type: none">a. Attach any new disk shelves to the new system, following the installation and setup instructions for the new system and the appropriate disk shelf guide. Also follow the cabling instructions in the <i>Data ONTAP High Availability and MetroCluster Configuration Guide for 7-Mode</i>. Note: If the converted FAS2240 will be part of a stack, you should cable it as the first or the last disk shelf in the stack.b. Go to the subsection <i>After you finish</i>.
Is not in a SAN environment	Go to the section <i>Performing post-upgrade</i> .

After you finish

If the system is in a SAN environment, verify that the setup is correct by completing the following substeps:

1. Display the LUNs, WWNNs, and WWPNNs by entering the following commands:

```
lun show
```

```
fcg config
```

2. Verify that the LUNs, WWNNs, and WWPNNs are unchanged by comparing the output of the same commands that you entered in the section *Preparing the site and equipment for the upgrade*.

If any LUNs, WWNNs, or WWPNNs have changed, contact technical support.

Converting the FAS2240 system to a data disk shelf

Converting the system consists of installing the new system and its disk shelves, renaming the FAS2240 system's root volume, inserting I/O modules (IOMs) into the FAS2240 system, and then adding the converted FAS2240 disk shelf to the new system.

Steps

1. Verify that the FAS2240 system controllers are in an HA pair by entering the following command on one of the controllers and checking if the output shows that the controller is in HA mode:

```
options cf.mode
```

2. Install the new system and any disk shelves associated with it as described in the appropriate *Installation and Setup Instructions* for the new system.

The *Installation and Setup Instructions* are included in the controller box and are available on the the NetApp Support Site at mysupport.netapp.com.

Complete Step 3 and Step 4 on one controller of the FAS2240 system.

3. If you have not done so already, back up the data on the FAS2240 system.
4. Rename the root volume on the FAS2240 system using one of the following methods, depending on the type of root volume on the system:

If the FAS2240 system had a ...	Then...
Traditional root volume	On one controller of the FAS2240 system, rename the root volume to old_vol0 by entering the following command on the console: <pre>vol rename your_root_vol_name old_vol0</pre>
Flexible root volume	On one controller of the new system, rename the root volume and the corresponding aggregate on the FAS2240 to old_vol0 and old_aggr0 by entering the following commands on the console: <pre>vol rename your_root_vol_name old_vol0 aggr rename your_aggr_name old_aggr0</pre>

5. Repeat Step 3 and Step 4 on the second node of the FAS2240 system.
6. Disable the HA configuration by entering the following command on one of the controllers of the FAS2240 system and one of the controllers of the new system:


```
cf disable
```
7. Shut down the FAS2240 system and the new system by entering the following command on their respective consoles:


```
halt
```
8. Properly ground yourself.
9. Turn off the power to the new system.
10. Turn off the power to the FAS2240 system and uncable it.
11. Replace the controller modules with IOM6 modules.
12. Turn on the power to the FAS2240 system.
13. Set the disk shelf ID.

Note: Each disk shelf, including the FAS2240 chassis, requires a unique ID. See the appropriate disk shelf guide for information about setting disk shelf IDs.

14. Turn off the power to the converted FAS2240 system but do not power-cycle the system.

Note: As documented in disk shelf guides, you ordinarily need to power-cycle a disk shelf after changing the disk shelf ID for the change to take effect. You turn off the power to the shelf, wait briefly, and then turn on the power to the shelf. However, in this procedure, you need to leave power to the converted FAS2240 system turned off until after the system is cabled.
15. If you are moving any disk shelves from the FAS2240 system, reset the disk shelf IDs as necessary to ensure that each SAS shelf has a unique ID.
16. Cable the converted FAS2240 disk shelf as the first disk shelf on the SAS port of the new system, and if you are using ACP cabling, to the dedicated network interface of the new system.

Note: If you are adding the converted FAS2240 disk shelf to an existing stack, you should cable it as the first or the last disk shelf in the stack.

See the *Installation and Setup Instructions* for the new system and the *Universal SAS and ACP Cabling Guide* for cabling information. Also follow the cabling instructions in the *Data ONTAP High Availability and MetroCluster Configuration Guide for 7-Mode*.

17. If you are moving any disk shelves attached to the FAS2240 system, cable them to the new system.
18. Turn on the disk shelves and then turn on the new system.
19. During startup, observe the messages on the console, and when you see the message `Press Ctrl-C for Boot Menu.`, press Ctrl-C to display the boot menu on each controller.

Complete Step 20 through Step 32 on both controllers of the new system, each step first on one controller and then on the other controller before moving to the next step.

20. Select option **5** at the boot menu prompt and continue with the boot process.

The Maintenance mode command prompt (`*>`) appears.
21. View disk ownership on the new system by entering the following command on one of the controllers and examining the output:

```
disk show -v
```

Verify that you can see all the attached storage.

22. Verify that you can see all the paths available to each disk by entering the following command and examining its output:

```
storage show disk -p
```

23. Assign the disks on the converted FAS2240 disk shelf to the new system by entering the following command:

```
disk reassign -s old_sysid -d new_sysid
```

For `old_sysid`, use the System ID number that you captured from the output of the `sysconfig -a` command in Step 6 of the section *Preparing the site and equipment for the upgrade*.

Note: If you are reassigning disks from the converted FAS2240 system to both controllers in the new system, assign disks from FAS2240 controller A to the new system controller module A and disks from FAS2240 controller B to new system module B.

The system displays the following prompts:

```
Partner node must not be in Takeover mode during disk reassignment from maintenance mode.
Serious problems could result!!
Do not proceed with reassignment if the partner is in takeover mode. Abort reassignment
(y/n)? n

After the node becomes operational, you must perform a takeover and giveback of the HA
partner node to ensure disk reassignment is successful.
Do you want to continue (y/n)? y
```

```
Disk ownership will be updated on all disks previously belonging to Filer with sysid
old_sysid.
Do you want to continue (y/n)? y
```

24. Respond to the prompt asking if you want to abort reassignment by typing **n** and then pressing the Enter key, and respond to the remaining prompts by typing **y** and then pressing the Enter key for each prompt.

25. Verify that the disks were reassigned correctly by entering the following command and examining its output:

```
disk show -v
```

26. If the system was used previously, clear the mailbox by entering the following command:

```
mailbox destroy local
```

Mailbox disks store configuration information and, in an HA pair, maintain consistency between the nodes and monitor partner activity.

27. Exit Maintenance mode by entering the following command at the Maintenance mode prompt:

```
halt
```

28. Enter the following command from the LOADER> prompt:

```
boot_ontap
```

29. Check the volume status by entering the following command:

```
vol status
```

30. Optional: Copy the data from the old root volume to the new system's disks.

This step preserves the data from the old root volume if you remove the old root volume in the optional next step. See the *Data ONTAP Data Protection Online Backup and Recovery Guide for 7-Mode* for information about copying data.

Note: If you copy data from the old root volume, you first must bring the root volume and its aggregate online.

31. Optional: Remove the old root volume from the new system.

If the old root volume was a...	Then...
Traditional root volume	Enter the following commands: <pre>vol offline old_vol0 vol destroy old_vol0</pre>
Flexible root volume	<p>a. If you did not perform Step 30, bring the root volume and its aggregate online.</p> <p>b. Enter the following commands:</p> <pre>vol offline old_vol0 vol destroy old_vol0 aggr offline old_aggr0 aggr destroy old_aggr0</pre>

32. Modify the RAID groups and volumes as needed, as described in the *Storage Management Guide*.

33. Take the following actions to install licenses:

a. Wait at least five minutes after the command-line interface is up following the reboot.

b. Install licenses as needed by entering the following command on both controllers:

```
license add license_key, license_key, license_key...
```


The `license_key` is the license key that you obtained in the section *Preparing the site and equipment for the upgrade*. The license key consists of 28 upper-case alphabetic characters. You can add one license key at a time or you can add multiple license keys at the same time, each separated by a comma or a space.

Note: You might be prompted to set up some features and then reboot the system.

34. Verify that the licenses are properly installed by entering the following command and examining its output:

```
license show
```

You might want to compare the output with the output that you captured in Step 15 of the section *Preparing the site and equipment for the upgrade*.

Note: The `license show` command without parameters will display both old and new licenses. Use the command `license show -instance` to display a list of the controller serial numbers for each license.

35. Halt the system by entering the following command on both controllers:

```
halt
```

36. Boot Data ONTAP by entering the following command on both controllers:

```
boot_ontap
```

As part of the boot, the system enters setup. If setup does not occur automatically, start it manually by entering the `setup` at the system prompt.

37. Ensure that the ports are assigned correctly by entering changing information as necessary at the appropriate setup prompts.

38. Enable the HA configuration by entering the following command at the system prompt of one of the controllers:

```
cf enable
```

39. Verify that the FAS2240 system controllers are in an HA pair by entering the following command on one of the controllers and checking if the output shows that the controller is in HA mode:

```
cf status
```

40. Configure the SP by using the `system node service-processor network modify` command.

See the *Data ONTAP System Administration Guide for 7-Mode* for information about the SP and the *Data ONTAP Commands: Manual Page Reference for 7-Mode, Volume 1* for detailed information about the `system node service-processor network modify` command.

Performing post-upgrade tasks

After you have converted the FAS2240 system to a disk shelf and attached it to the new system, you should test failover and giveback and should set up Storage Encryption on the new controllers. If either of the new controllers has a unified network adapter, you also must restore any 10Gb Ethernet port configurations in the HA pair and might need to change the personality of the adapter. .

Steps

1. [Sending a post-upgrade AutoSupport message](#) on page 18
2. [Testing takeover and giveback](#) on page 18
3. [Setting up Storage Encryption on the new controllers](#) on page 19
4. [Configuring CNA ports](#) on page 20
5. [Decommissioning the old system](#) on page 23

Sending a post-upgrade AutoSupport message

After you upgrade the controller, you should send an AutoSupport message.

About this task

Keeping AutoSupport enabled and sending AutoSupport messages when you make changes in your system can help you identify problems and solutions.

Step

1. Send an AutoSupport message to NetApp by entering the following command:

```
options autosupport.doit completing_disruptive_controller_head_upgrade
```

Testing takeover and giveback

After you configure all aspects of your HA pair, you need to verify that it is operating as expected in maintaining uninterrupted access to both nodes' storage during takeover and giveback operations. Throughout the takeover process, the local (or takeover) node should continue serving the data normally provided by the partner node. During giveback, control and delivery of the partner's storage should return to the partner node.

Steps

1. Check the cabling on the interconnect cables to make sure that they are secure.
2. Verify that you can create and retrieve files on both nodes for each licensed protocol.
3. Enter the following command from the local node's console:

```
cf takeover
```

See the man page for command details.

The local node takes over the partner node and displays the following output:

```
...  
Failover monitor: takeover completed  
...  
This node has taken over node2.  
...  
node1(takeover)>
```

Note: The local node prompt reflects the takeover state.

4. Check if the controller is in takeover mode by entering the following command:

```
cf status
```

In takeover mode, a controller actively takes over for its partner and displays a message similar to the following:

```
node1 (takeover)> cf status  
local_node has taken over partner_node  
node1 (takeover)>
```

Additional lines in the output may indicate the reason for the failover or indicate that the partner node is ready for giveback.

5. Use the `sysconfig -r` command to ensure that the local (takeover) node can access its partner's disks.
6. Give back the partner node's data service after it displays the `waiting for giveback` message by entering the following command:

cf giveback

The local node releases the partner node, which reboots and resumes normal operation. The following message is displayed on the local node's console when the process is complete:

```
...  
Failover monitor: giveback completed  
...  
NodeA>
```

Note: The local node prompt returns to normal.

7. Proceed depending on whether you saw the message that giveback was completed successfully:

If takeover and giveback...	Then...
Is completed successfully	Repeat Step 2 through Step 5 on the partner node.
Fails	Correct the takeover or giveback failure and then repeat this procedure.

Setting up Storage Encryption on the new controllers

If the new controllers have Storage Encryption enabled, you might need to complete a series of additional steps to ensure uninterrupted Storage Encryption functionality. These steps include collecting network information, obtaining private and public SSL certificates, and running the Storage Encryption setup wizard.

Before you begin

All the disks on the storage system must be encryption-enabled before you set up Storage Encryption on the new controllers.

About this task

You can skip this section if the system that you upgraded to does not have Storage Encryption enabled.

If you used Storage Encryption on the original system and migrated the disk shelves to the new system, you can reuse the SSL certificates that are stored on migrated disk drives for Storage Encryption functionality on the upgraded system. However, you should check that the SSL certificates are present on the migrated disk drives. If they are not present you will need to obtain them.

Note: Step 1 through Step 3 are only the overall tasks required for configuring Storage Encryption. You need to follow the detailed instructions for each task in the *Data ONTAP Software Setup Guide for 7-Mode*.

Steps

1. Take one of the following actions:

If the original controller...	Then...
Used Storage Encryption	<p>a. Check whether SSL certificates are stored in the <code>/etc/keymgr/cert</code> directory on the disk drives migrated from the original system. You need to have the public and private SSL certificates for the storage system and a public SSL certificate for each external key manager that will be used. See the <i>Data ONTAP System Administration Guide for 7-Mode</i> for information about accessing the <code>/etc</code> directory. Administration information for individual nodes is contained in the 7-Mode guide.</p> <p>b. Take one of the following actions:</p> <ul style="list-style-type: none"> • If the SSL certificates are in the <code>/etc/keymgr/cert</code> directory, go to Step 3 • If the SSL certificates are not in the <code>/etc/keymgr/cert</code> directory, go to Step 2.
Did not use Storage Encryption	Go to Step 2.

2. Obtain and install private and public SSL certificates for the storage system and a private SSL certificate for each key management server that you plan to use.

Requirements for obtaining the certificates and instructions for installing them are contained in the *Data ONTAP Software Setup Guide for 7-Mode*.

3. Collect the information required to configure Storage Encryption on the new controllers.

This includes the network interface name, the network interface IP address, and the IP address for external key management server. The required information is contained in the *Data ONTAP Software Setup Guide for 7-Mode*.

4. Launch and run the Storage Encryption setup wizard, responding to the prompts as appropriate.
5. If you have not done so, repeat Step 2 through Step 4 on the other controller.

After you finish

See the *Data ONTAP Storage Management Guide for 7-Mode* for information about managing Storage Encryption on the updated system.

Configuring CNA ports

If a node has onboard CNA ports or a CNA card, you must check the configuration of the ports and possibly reconfigure them, depending on how you want to use the upgraded system.

Before you begin

You must have the correct SFP+ modules for the CNA ports.

About this task

CNA ports can be configured into native Fibre Channel (FC) mode or CNA mode. FC mode supports FC initiator and FC target; CNA mode allows concurrent NIC and FCoE traffic over the same 10-GbE SFP+ interface and supports FC target.

Note: NetApp marketing materials might use the term *UTA2* to refer to CNA adapters and ports. However, the CLI and product documentation use the term *CNA*.

CNA ports might be on an adapter or onboard the controller and have the following configurations:

- CNA cards ordered when the controller is ordered are configured before shipment to have the personality you request.
- CNA cards ordered separately from the controller are shipped with the default FC target personality.
- Onboard CNA ports on new controllers are configured before shipment to have the personality you request.

However, you should check the configuration of the CNA ports on the node and change them, if necessary.

Steps

1. Check how the ports are currently configured by entering one of the following commands on one of the new controllers:

If the system you are upgrading...	Then...
Has storage disks	Enter the following command: system node hardware unified-connect show
Is a V-Series system or has FlexArray Virtualization Software and is connected to storage arrays	Enter the following command: ucadmin show

The system displays output similar to the following examples:

```
cluster1::> system node hardware unified-connect show
Node   Adapter  Current Mode   Current Type   Pending Mode   Pending Type   Admin Status
-----
f-a    0e       fc     initiator -      -      online
f-a    0f       fc     initiator -      -      online
f-a    0g       cna    target  -      -      online
f-a    0h       cna    target  -      -      online
f-b    0e       fc     initiator -      -      online
f-b    0f       fc     initiator -      -      online
f-b    0g       cna    target  -      -      online
f-b    0h       cna    target  -      -      online
8 entries were displayed.
```

```
node*> ucadmin show
Adapter  Current Mode   Current Type   Pending Mode   Pending Type   Status
-----
0e       fc     initiator -      -      online
0f       fc     initiator -      -      online
0g       cna    target  -      -      online
0h       cna    target  -      -      online
0e       fc     initiator -      -      online
0f       fc     initiator -      -      online
0g       cna    target  -      -      online
0h       cna    target  -      -      online
*>
```

2. Check how the ports are currently configured by entering one of the following commands on one of the new controllers:

ucadmin show

The system displays output similar to the following example:

```
node*> ucadmin show
Adapter  Current Mode   Current Type   Pending Mode   Pending Type   Status
-----
0e       fc     initiator -      -      online
0f       fc     initiator -      -      online
0g       cna    target  -      -      online
0h       cna    target  -      -      online
0e       fc     initiator -      -      online
0f       fc     initiator -      -      online
0g       cna    target  -      -      online
0h       cna    target  -      -      online
*>
```

3. If the current SFP+ module does not match the desired use, replace it with the correct SFP+ module.
4. Examine the output of the `ucadmin show` or `system node hardware unified-connect show` command and determine whether the CNA ports have the personality you want.
5. Take one of the following actions:

If the CNA ports ...	Then...
Do not have the personality that you want	Go to Step 7.
Have the personality that you want	Go to Step 9.

6. If the adapter is in initiator mode and the CNA port is online, take the CNA port offline by entering the following command:
`storage disable adapter adapter-name`
 Adapters in target mode are automatically offline in Maintenance mode.

7. If the current configuration does not match the desired use, enter the following commands to change the configuration as needed:

```
ucadmin modify -m fc|cna -t initiator|target adapter_name
```

- `-m` or `-mode` is the personality mode, `fc` or `10GbE cna`.
- `-t` or `-type` is the FC4 type, `target` or `initiator`.

Note: You need to use an FC initiator for tape drives, FlexArray Virtualization systems, and MetroCluster. You also need to use an FC initiator for MetroCluster if you are using a FibreBridge6500N bridge. You need to use an FC target for SAN clients.

8. Verify the settings by entering the following command and examining its output:

```
ucadmin show
```

9. Enter the following command:

```
halt
```

The system stops at the boot environment prompt.

10. Enter the following command:

```
boot_ontap
```

11. Verify the settings by entering the following command:

```
ucadmin show
```

Example

The output in the following examples show that the FC4 type of adapter 1b is changing to initiator and that the mode of adapters 2a and 2b is changing to `cna`:

```
node> ucadmin show
Adapter      Current Mode   Current Type   Pending Mode   Pending Type   Status
-----
1a           fc         initiator -         -         online
1b           fc         target   -         initiator online
2a           fc         target   cna        -         online
2b           fc         target   cna        -         online
node>
```

12. Place any target ports online by entering the following command:

```
fcv config adapter_name up
```

It is not necessary to place initiator ports online. They automatically come online if they are connected to a device.

13. Cable the port.
14. Repeat Step 1 through Step 13 on the other controller.

Decommissioning the old system

After upgrading, you can decommission the old system through the NetApp Support Site. Decommissioning the system tells NetApp that the system is no longer in operation and removes it from support databases.

Steps

1. Go to the NetApp Support Site at mysupport.netapp.com and log in.
2. Click the link **My Installed Systems**.
3. On the **Installed Systems** page, enter the serial number of the old system in the form and then click **Go!**
A new page displays information about the controller.
4. Make sure that the information about the controller is correct.

If the information about the controller is...	Then...
Correct...	<ol style="list-style-type: none">a. Select Decommission this system in the Product Tool Site drop-down menu.b. Go to Step 5.
Not correct...	<ol style="list-style-type: none">a. Click the feedback link to open the form for reporting the problem.b. Fill out and submit the form.

5. On the **Decommission Form** page, fill out the form and click **Submit**.

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