



Upgrading a single-controller system to a different single-controller system by moving disk shelves

You can upgrade a single-controller storage system to a single-controller storage system in another family by replacing the controller.

Before you begin

You should have collected system performance data by running the Performance and Statistics Collector (Perfstat) tool during normal peak time; you must have performed 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 support.netapp.com.

About this task

This procedure is intended for systems running Data ONTAP 8.2.x operating in 7-Mode. FAS8080 systems require Data ONTAP 8.2.2 or later.

This procedure is written with the following assumptions:

- You are upgrading a system without internal storage and with disk shelves supported by the new system.
If you want to upgrade a system with internal storage or with disk shelves not supported by the new system, see *Upgrading a single-controller FAS2240 system with internal storage to another single-controller system by copying volumes*.
- You are upgrading to a system with the following characteristics:
 - It is new and unused.
 - It supports at least as many disks as the original system.
The *Hardware Universe* at hwu.netapp.com lists the number of disks supported by each system.
 - It might have internal storage or attached disk shelves.
 - It runs Data ONTAP 8.2 or later.
 - It will have the same name and IP address as the original system.
- Your 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.
- Your current system and the system to which you are upgrading might have Storage Encryption on their disk drives.
- You have basic UNIX administration skills and storage knowledge.

Steps

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Guidelines for upgrading the controller

To upgrade the original nodes, you must follow certain guidelines and be aware of restrictions that affect the procedure.

Supported upgrade paths

You can upgrade systems as follows:

From	To
FAS22xx	FAS2500, 3220, 3250, 6220, 6250, 6290, FAS80xx
FAS31xx	3220, 3250, 6220, 6250, 6290, FAS80xx
FAS3210	3220, 3250, 6220, 6250, 6290, FAS80xx
3220	3250, 6220, 6250, 6290, FAS80xx
FAS3240	FAS3250
3240, 3270	3250, 6220, 6250, 6290, FAS80xx
3250	6220, 6250, 6290, FAS80xx
6040, 6080	6220, 6250, 6290, FAS80xx
FAS6210	6220, FAS8060, FAS8080
6220	FAS8060, FAS8080
FAS6240	6250, 6290, FAS8080
FAS6280	FAS6290
6280	FAS8080

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

Note: If the new system has fewer slots than the original system, or if it has fewer or different ports, you might need to add an adapter to the new system. See the *Hardware Universe* on the NetApp Support Site for details about specific platforms.

Licensing in Data ONTAP 8.2.x

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

In Data ONTAP 8.2.x, 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 the license installation for all the 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 will be removed.

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

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

Gathering tools and documentation

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

Steps

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

Download the version of the document for the version of Data ONTAP that the system is running.

Document	Contents
<i>Site Requirements Guide</i>	Contains information about the physical requirements of storage systems.
<i>Data ONTAP Storage Management Guide for 7-Mode</i>	Contains instructions for stopping deduplication processes and reassigning disks. Also contains information about Storage Encryption.
<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 information about configuring the Service Processor (SP) and about Storage Encryption.
<i>Data ONTAP System Administration 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>Data ONTAP Upgrade and Revert/Downgrade Guide for 7-Mode</i>	Contains instructions for downloading Data ONTAP.
<i>Installation and Setup Instructions for the new system.</i>	Contains platform-specific instructions for installing and cabling the new system. Included in the box with the controller and also available on the the NetApp Support Site.
The appropriate disk shelf guide	Contains instructions for installing and monitoring disk shelves and replacing disk shelf devices.
<i>Universal SAS and ACP Cabling Guide</i>	Contains information for cabling SAS shelves applicable to all platforms.

Document	Contents
<i>Data ONTAP SAN Administration Guide for 7-Mode</i>	Contains instructions for configuring and managing iSCSI and FC protocols for SAN environments.
<i>Data ONTAP SAN Configuration Guide for 7-Mode</i>	Contains information about FC and iSCSI topologies and wiring schemes.

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

Before you upgrade the system, you need to ensure that you provide sufficient space for the new controller. You also need to obtain information for setting up the remote management device, and you might need to update Data ONTAP on the original system.

Before you begin

Because the ports on the original system might not match the ports on the new system, you need to have planned port migration from the original system to the new system. During the procedure, you match the port locations on the original system to those on the new system.

If the original system has more onboard GbE ports per controller than the new system, and if all the onboard GbE ports on the original system are being used, you must have added one or more GbE adapters to the new system.

About this task

This procedure assumes that the original system is 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 names.
2. Ensure that all deduplication processes are stopped.

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

3. 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.

4. Review the messages 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.

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

```
options autosupport.doit starting_disruptive_controller_head_upgrade
```

6. 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|rlm status
config dump -v config_filename

```

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

7. Measure the amount of space that you have in your equipment rack or system cabinet.
You must allow for the appropriate amount of space for the new system.
8. Check the *Hardware Universe* on the NetApp Support Site at support.netapp.com to ensure that the new system supports the disk shelves and any other hardware that you are migrating from the original system.
9. If you want to migrate a tape device, verify support for the new configuration on the NetApp Support Site at support.netapp.com and with the backup application vendor.
10. Obtain an IP address, mailhost address, and other information for the SP on the new system.

Note: You might want to reuse the network parameters of the RLM or SP from the original system for the SP on the new system.

11. Check the system invoice for the version of Data ONTAP installed on the new system.
12. Take one of the following actions:

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

The same as the version on the new system	Go to Step 13.
--	----------------

Different from the version on the new system	Go to the NetApp Support Site at support.netapp.com and download the version of Data ONTAP for the original system that matches the version installed on the new system.
---	--

Note: Downloads of the same version of Data ONTAP differ according to system model. You must choose the correct file for the model of your system.

Note: Make sure that you download the software image package to a directory that is accessible to the original system. See the *Data ONTAP Upgrade and Revert/Downgrade Guide for 7-Mode* for instructions about how to download Data ONTAP.

13. If you want the new controller to have the same licensed functionality as the original controller, enter the following command to display a list of licenses and capture its output:

```
license show
```

14. Obtain new license keys for the new controller from the NetApp Support Site at support.netapp.com.
If the site does not have the license keys you need, contact your NetApp sales representative.
15. Back up the data on the original system.
16. Save any information about site-specific customizations that you might want to reuse or save for reference, including NAS shares or SAN identity information, by taking one of the following actions:

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

17. Take one of the following actions:

If the original system...	Then...
Uses Storage Encryption	Go to Step 18. 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.
Does not use Storage Encryption	Go to Step 22.

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

```
disk encrypt show
```

Example

```
disk encrypt show
Disk      Key ID
0c.00.1   0x0
0c.00.0   080CF0C800000000010000000000000A948EE8604F4598ADFFB185B5BB7FED3 No
0c.00.3   080CF0C800000000010000000000000A948EE8604F4598ADFFB185B5BB7FED3 Yes
0c.00.4   080CF0C800000000010000000000000A948EE8604F4598ADFFB185B5BB7FED3 Yes
0c.00.2   080CF0C800000000010000000000000A948EE8604F4598ADFFB185B5BB7FED3 Yes
0c.00.5   080CF0C800000000010000000000000A948EE8604F4598ADFFB185B5BB7FED3 Yes
```

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.

19. 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 *
```

20. 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:

```
cluster::> disk encrypt show
Disk      Key ID                                     Locked?
-----
0b.10.23  0x0                                       No
0b.10.18  0x0                                       No
0b.10.0   0x0                                       Yes
0b.10.12  0x0                                       Yes
0b.10.3   0x0                                       No
0b.10.15  0x0                                       No
0a.00.1   0x0                                       Yes
0a.00.2   0x0                                       Yes
```

21. 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.

22. Take one of the following actions:

If you will use the root volume of the...	Then...
New system after the upgrade	Go to Step 25.
Note: If your system is in a SAN environment, you must use the original root volume after the upgrade.	
Original system after the upgrade, and the root volume is a traditional root volume	Go to Step 25.
Original system after the upgrade, and the root volume is a FlexVol root volume	Go to Step 23.

23. Check the size of the FlexVol root volume of the original system by entering one of the following commands:

```
vol size vol_name
```

```
df vol_name
```

Example

The commands in the following example check the size of a root volume name `vol0`:

```
vol size vol0
```

```
df vol0
```

The FlexVol root volume of the original system must meet the minimum root FlexVol size requirement for 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.

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

```
vol size vol_name sizeg
```

In the preceding command, *size* specifies the desired size, 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.

Example

The command in the following example increase the size of a volume named `vol0` to 250 gigabytes:

```
vol size vol0 250g
```

Alternatively, you can enter the following command to increase the volume size by a specific amount:

```
vol size vol_name +sizeg
```

In the preceding command, `+` specifies that the current volume size is to be increased, *size* specifies by how much, and *g* specifies gigabytes.

Example

The command in the following example increases the size of a volume named `vol0` by 20 gigabytes:

```
vol size vol0 +20g
```

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

25. Make sure that all adapters and, if appropriate, the port locations on the original system match the adapter and port locations on the new system.

You might not be able to match the adapter and port locations exactly. If you cannot, note the differences and update the configuration as necessary.

There are two methods for matching the adapter and port locations:

- Running the `setup` command and, on the original system, entering the adapter and port information at the appropriate prompts.

This is the recommended method. For information about the `setup` command, see the *Data ONTAP Software Setup Guide for 7-Mode*.

- Editing the `/etc/rc` file in the root volume of the original system and then saving the file on the system.

This method requires that you have an external client and that you are knowledgeable about the file contents.

Attention: Take great care in editing the `/etc/rc` file, which contains startup commands for your storage system and network parameters. Errors in the `/etc/rc` file might cause the system to become inaccessible. For information about editing the files in the `/etc` directory, see the *Data ONTAP System Administration Guide for 7-Mode*.

Note: You might need to update the `/etc/hosts` file or update host information after entering the `setup` command if the host names contain appended interface IDs.

26. When setup is complete, enter the following command, as directed by the prompt:

```
reboot
```


Replacing the controller

There are two methods for replacing the controller, depending on whether you plan to use the root volume of the original system or the root volume of the new system after the upgrade.

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 use the original system's root volume on the new system after the upgrade.

Choices

- [Replacing the controller using the original system's root volume](#) on page 9
- [Replacing the controller using the new system's root volume](#) on page 14
- [Performing post-upgrade tasks](#) on page 16

Replacing the controller using the original system's root volume

Replacing the controller consists of disconnecting the original controller, removing it from the equipment rack or system cabinet, installing the new controller, and then moving the disk shelves. You also need to rename the root volume of the new system .

Steps

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

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

Note: Different systems have different numbers of ports. You might need to add a PCI card to the new controller to match the required configuration for the upgrade.

2. Take one of the following actions, depending on the version of Data ONTAP installed on the original system:

If the version of Data ONTAP on the original system is...	Then...
The same as the version on the new system	Go to Step 3.
Different from the version on the new system	On the original system, install the version of Data ONTAP that you downloaded in <i>Preparing the site and equipment for the upgrade</i> by entering the following command: software update url -r -f url is the location of the Data ONTAP system files. Note: The -r option suppresses the automatic reboot. The -f option is required to overwrite the image.tgz file.

3. If the new system has storage, rename its root volume 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	Rename the root volume to old_vol0 by entering the following command: vol rename your_root_vol_name old_vol0

If the new system has a... Then...

FlexVol root volume Rename the root volume to `old_vol0` and the corresponding aggregates to `old_aggr0` by entering the following commands:

```
vol rename your_root_vol_name old_vol0
```

```
aggr rename your_aggr_name old_aggr0
```

4. If you have not done so already, back up the data on the original system, particularly the `/etc/rc` and `/etc/hosts` files, and save any information about site-specific customizations as described in Step 17 of the section *Preparing the site and equipment for the upgrade*.

5. Shut down the original system and the new system by entering the following command on each system's controller:

```
halt
```

6. Properly ground yourself.

7. Take one of the following actions:

If the new system will... Then...

Be in a SAN environment

a. Turn off power to the new system and any disk shelves attached to the system.

b. 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 Turn off power to the new system and any disk shelves attached to the system.

8. Turn off the power to the original system and disk shelves attached to the system, and then disconnect the cables.

9. Cable the original system disk shelves to the new system and any disk shelves attached to the new system.

Follow the instructions in the *Installation and Setup Instructions* for the new system, the appropriate disk shelf guide, and, if you are migrating SAS disk shelves, the *Universal SAS and ACP Cabling Guide*. FC cabling instructions are in the disk shelf guides.

Note: If you are migrating SAS disk shelves, you should also connect ACP cables. If the new system does not have a dedicated onboard network interface for ACP, you must dedicate one for the controller at system startup.

10. Turn on the disk shelves and then turn on the new system controller, observing the startup messages on the console.

11. When the message `Press Ctrl-C for Boot Menu.` appears, press `Ctrl-C` to display the boot menu.

12. Select option **5** at the boot menu and continue with the boot.

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

13. View disk ownership on the new system by entering the following command 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.

14. 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
```

15. Assign the disks that you migrated from the original system 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*.

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

```
disk show -v
```

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

```
mailbox destroy local
```

Mailbox disks store configuration information.

The system displays the following message:

```
Destroying mailboxes forces a node to create new empty mailboxes,
which clears any takeover state, removes all knowledge
of out-of-date plexes of mirrored volumes, and will prevent
management services from going online in 2-node cluster
HA configurations.
Are you sure you want to destroy the local mailboxes? y
```

18. Enter `y`.

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

```
halt
```

20. Boot Data ONTAP by entering the following command at the boot loader prompt:

```
boot_ontap
```

21. Take one of the following actions:

If the system you are upgrading to...	Then...
Has storage	Go to Step 29.
Does not have storage	Skip Step 29 and Step 30 and go to Step 31.

22. Take one of the following actions, depending on the original system root volume:

If the original system had a...	Then...
Traditional root volume	<p>a. Bring the root volume from the original system online and set it to the traditional or FlexVol root volume for the new system by entering the following commands:</p> <pre>vol online vol0</pre> <pre>vol options vol0 root</pre> <p>b. Verify that the root volume is online by entering the following command and examining its output:</p> <pre>vol status vol0</pre> <p>Note: If the new system does not have any attached disk shelves, vol0 will automatically be online.</p>

If the original system had a...	Then...
FlexVol root volume	<p>a. Bring the aggregate from the original system online and set it to the root volume for the new system by entering the following commands:</p> <pre data-bbox="435 333 735 449">aggr online aggr0 vol online vol0 vol options vol0 root</pre> <p>b. Verify that the aggregate is online by entering the following command and examining its output:</p> <pre data-bbox="435 512 678 537">aggr status aggr0</pre> <p>Note: If the new system does not have any attached disk shelves, aggr0 will automatically be online.</p> <p>c. Verify that the root volume is online by entering the following command and examining its output:</p> <pre data-bbox="435 653 647 678">vol status vol0</pre> <p>Note: If the new system does not have any attached disk shelves, vol0 will automatically be online.</p>

23. Enter the following command at the system prompt:

```
reboot
```

The reboot ensures that the original root volume is used on the upgraded system after the next boot.

24. Take the following actions to install licenses.

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

```
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.

25. 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 capture in Step 13 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.

26. Ensure that the ports are assigned correctly by entering the `setup` command at the system prompt and then changing information as necessary at the appropriate prompts.

27. Download and install the appropriate version of Data ONTAP by entering the following command:

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

url is the location of the Data ONTAP system files.

The `-R` option requests a reboot, which is required at this point to complete the software update. The `-f` option is required to overwrite the `image.tgz` file. For details about installing Data ONTAP, see the *Data ONTAP Upgrade and Revert/Downgrade Guide for 7-Mode*.

28. (Optional) If `vol0` or `aggr0` were renamed in Step 3, and you plan to remove them, 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 online.

29. (Optional) If vol0 or aggr0 were renamed in Step 3, remove them by entering one of the following sets of commands.

If the old root volume on the new system was a...	Then...
Traditional volume	Remove the old root volume by entering the following commands: vol offline old_vol0 vol destroy old_vol0
FlexVol volume	Remove the old root volume by entering the following commands: vol offline old_vol0 vol destroy old_vol0 aggr offline old_aggr0 aggr destroy old_aggr0

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

31. 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.

32. Take one of the following actions:

If the new system is...	Then...
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. b. Go to the subsection <i>After you finish</i>.
Not in a SAN environment	Go to the section <i>Performing post-upgrade tasks</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 WWPNS by entering the following commands:

```
lun show
fcp config
```

2. Verify that the LUNs, WWNNs, and WWPNS 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 WWPNS have changed, contact technical support.

3. Verify the initiator/target mode configuration of the FC FCoE cards by completing the following substeps:

- a. Enter the following commands and record their output:

```
fcadmin config
ucadmin show
```

- b. Verify that the configuration is unchanged by comparing the output of the commands that you entered in Step 3a with the output of the same commands that you entered in the section *Preparing the site and equipment for the upgrade*.

- c. If the mode of any ports have changed, contact technical support.

Replacing the controller using the new system's root volume

Replacing the controller consists of disconnecting the original controller, removing it from the equipment rack or system cabinet, and then installing the new controller. You also need to rename the root volume of the original system.

Steps

1. Install the new system and any disk shelves associated with it, 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 support.netapp.com.

Note: Different systems have different numbers of ports. You might need to add a PCI card to the new controller to match the required configuration for the upgrade.

2. Take one of the following actions, depending on the version of Data ONTAP that is installed on the original system:

If the version of Data ONTAP on the original system is...	Then...
The same as the version on the new system	Go to Step 3.
Different from the version on the new system	<p>On the original system, install the version of Data ONTAP that you downloaded in <i>Preparing for the upgrade</i> by entering the following command:</p> <pre>software update url -r -f</pre> <p><i>url</i> is the location of the Data ONTAP system files (.tar, .tgz, or .zip file).</p> <p>Note: The <code>-r</code> option suppresses the automatic reboot. The <code>-f</code> option is required to overwrite the <code>image.tgz</code> file.</p>

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

If the original system has a...	Then...
Traditional root volume	<p>Rename the root volume by entering the following command:</p> <pre>vol rename your_root_vol_name old_vol0</pre>
FlexVol root volume	<p>Rename the root volume and the corresponding aggregates by entering the following commands:</p> <pre>vol rename your_root_vol_name old_vol0 aggr rename your_aggr_name old_aggr0</pre>

4. Shut down the original system and the new system by entering the following command on the console of each controller:
`halt`
5. Properly ground yourself.
6. Turn off the power to the new system and disk shelves.
7. Turn off the power to the original system and its attached disk shelves, and then disconnect the cables.
8. Cable the original system disk shelves to the new system as well as any disk shelves attached to the new system.

Follow the instructions in the *Installation and Setup Instructions* for the new system, the appropriate disk shelf guide, and, if you are migrating SAS disk shelves, the *Universal SAS and ACP Cabling Guide*. FC cabling instructions are in the disk shelf guides.

Note: If you are migrating SAS disk shelves, you should also connect ACP cabling. If the new system does not have a dedicated onboard network interface for ACP, you must dedicate one for the controller at system startup.

9. Turn on the disk shelves and then turn on the new controller, observing the startup messages on the console.
10. When the message `Press Ctrl-C for Boot Menu.` appears, press Ctrl-C to display the boot menu.
11. Select option **5** at the boot menu and continue with the boot.

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

12. View disk ownership on the new system by entering the following command:

```
disk show -v
```

Verify that you can see all the attached storage.

13. 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
```

14. Assign the disks that you migrated from the original system 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*.

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

```
disk show -v
```

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

```
mailbox destroy local
```

Mailbox disks store configuration information.

The system displays the following message:

```
Destroying mailboxes forces a node to create new empty mailboxes,
which clears any takeover state, removes all knowledge
of out-of-date plexes of mirrored volumes, and will prevent
management services from going online in 2-node cluster
HA configurations.
Are you sure you want to destroy the local mailboxes? y
```

17. Enter `y`.
18. Exit Maintenance mode by entering the following command at the Maintenance mode prompt:

```
halt
```

19. Boot Data ONTAP by entering the following command at the boot environment prompt:

```
boot_ontap
```

20. Check the volume status by entering the following command at the system prompt:

```
vol status
```

21. 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.

22. Optional: Remove the old root volume by entering one of the following sets of commands:

If the old root volume on the original was a...	Then...
Traditional volume	Enter the following commands: <code>vol offline old_vol0</code> <code>vol destroy old_vol0</code>
FlexVol volume	Enter the following commands: <code>vol offline old_vol0</code> <code>vol destroy old_vol0</code> <code>aggr offline old_aggr0</code> <code>aggr destroy old_aggr0</code>

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

24. 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:

```
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 space.

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

25. 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 13 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.

26. Ensure that the ports are assigned correctly by entering the `setup` command at the system prompt and then changing information as necessary at the appropriate prompts.

27. 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 completed the upgrade, you should set up Storage Encryption on the new controller if its disks are encryption-enabled. You also might need to verify and change any converged network adapter (CNA) port configurations. You should also decommission the old hardware.

Steps

1. [Sending a post-upgrade AutoSupport message](#) on page 17
2. [Setting up Storage Encryption on the new controller](#) on page 17
3. [Configuring CNA ports](#) on page 18
4. [Decommissioning the old system](#) on page 20

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
```

Setting up Storage Encryption on the new controller

If the new controller has 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 controller.

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 2 through Step 4 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	<ol style="list-style-type: none">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.b. Take one of the following actions:<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 controller.

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.

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 10GbE 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. Enter Maintenance mode by completing the following steps:

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

Data ONTAP 8.2.0 or 8.2.1	
---------------------------	--

- a. Enter the following command:

```
boot_ontap
```

- b. Interrupt the boot by pressing Ctrl-C.
The system displays the boot menu.

- c. Select (5) Maintenance mode boot by entering 5, and then enter **y** when prompted to continue with the boot.
-

Data ONTAP 8.2.2 or later	
---------------------------	--

Access Maintenance mode by entering the following command:

```
boot_ontap maint
```

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

```
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
*>
```

You can use the `-c` option to display the supported personality mode and FC4 type, as shown in the following example:

```
node*> ucadmin show -c
Adapter  Mode    FC Supported Types    CNA Supported Types
-----
1a       fc      initiator,target     -
1b       fc      initiator,target     -
2a       fc      initiator,target     -
2b       fc      initiator,target     -
```

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` 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 6.
Have the personality that you want	Skip Step 6 through Step 8 and go to Step 9.

6. If the adapter is in initiator mode, and if 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` is the personality mode, `fc` or `10GbE cna`.
- `-t` is the FC4 type, `target` or `initiator`.

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

- Enter the following command:

```
boot_ontap
```

- Verify the settings by entering one of the following commands:

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

- Online any target ports by entering the following command:

```
fcv config adapter_name up
```

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

- Cable the port.

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

- Go to the NetApp Support Site at support.netapp.com and log in.
- Click the link **My Installed Products**.
- On the Installed Products page, enter the serial number of the old system in the form and then click **Go!**
A new page displays information about the controller.
- 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"> Select Decommission this system in the Product Tool Site drop-down menu. Go to Step 5.
Not correct...	<ol style="list-style-type: none"> Click the feedback link to open the form for reporting the problem. Fill out and submit the form.

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

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