



Stage 1. Prepare for upgrade

Upgrade controllers

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Stage 1. Prepare for upgrade

Stage 1 overview

During Stage 1, you verify that you have the correct hardware for your upgrade, run prechecks and, if required, correct aggregate ownership. You also record certain information if you are managing Storage Encryption by using the Onboard Key Manager and you can choose to quiesce the SnapMirror relationships.

Steps

1. [Verify the upgrade hardware](#)
2. [Prepare the nodes for upgrade](#)
3. [Manage Storage Encryption using the Onboard Key Manager](#)

Verify the upgrade hardware

Before starting the upgrade, verify that you have the correct hardware for your upgrade. Depending on your upgrade, for each HA pair that you are upgrading, you must have two controller modules or two controller modules and two NVRAM modules for the replacement system. If there are parts missing, contact technical support or your NetApp sales representative for assistance.

If you are upgrading ...	Replacement system must have ...
AFF A800	Two controller modules, two NVRAMs, and new IO modules
AFF A220 configured as an ASA to ASA A150	Two controller modules
AFF A220, AFF A200, or AFF C190 to AFF A150	Two controller modules
FAS2620 or FAS2720 to FAS2820	Two controller modules
AFF A700 configured as an ASA to ASA A900	Two controller and two NVRAM modules
AFF A700 to AFF A900	Two controller and two NVRAM modules
FAS9000 to FAS9500	Two controller and two NVRAM modules

Prepare the nodes for upgrade

The controller replacement process begins with a series of prechecks. You also gather information about the original nodes for use later in the procedure and, if required, determine the type of self-encrypting drives that are in use.

Steps

1. List the Service Processor (SP) or baseboard management controller (BMC) firmware version running on the old controller:

```
service-processor show
```

Verify that you have a supported SP or BMC firmware version:

Old controller	SP or BMC	Minimum firmware version
AFF A800	BMC	10.9
AFF A220	BMC	11.9P1
AFF A200	SP	5.11P1
AFF C190	BMC	11.9P1
FAS2620	SP	5.11P1
FAS2720	BMC	11.9P1

2. Begin the controller replacement process by entering the following command in the advanced privilege mode of the ONTAP command line:

```
set -privilege advanced
```

```
system controller replace start -nodes node_names
```

You will see output similar to the following example. The output displays the ONTAP version running on your cluster:

Warning:

1. Current ONTAP version is 9.15.1

2. Verify that NVMEM or NVRAM batteries of the new nodes are charged, and charge them if they are not. You need to physically check the new nodes to see if the NVMEM or NVRAM batteries are charged. You can check the battery status either by connecting to a serial console or using SSH, logging into the Service Processor (SP) or Baseboard Management Controller (BMC) for your system, and use the system sensors to see if the battery has a sufficient charge.

Attention: Do not try to clear the NVRAM contents. If there is a need to clear the contents of NVRAM, contact NetApp technical support.

3. If a controller was previously part of a different cluster, run `wipeconfig` before using it as the replacement controller.

4. Note: This is not a MetroCluster configuration. Controller replacement supports only ARL based procedures.

Do you want to continue? {y|n}: y

3. Select `y`. You will see the following output:

Controller replacement operation: Prechecks in progress.
Controller replacement operation has been paused for user intervention.

During the prechecks phase, the system runs the following list of checks in the background.

Precheck	Description
Cluster Health Check	Checks all the nodes in the cluster to confirm that they are healthy.
Aggregate Relocation Status Check	Checks whether an aggregate relocation is already in progress. If another aggregate relocation is in progress, the check fails.
Model Name Check	Checks whether the controller models are supported for this procedure. If the models are not supported, the task fails.
Cluster Quorum Check	Checks that the nodes being replaced are in quorum. If the nodes are not in quorum, the task fails.
Image Version Check	Checks that the nodes being replaced run the same version of ONTAP. If the ONTAP image versions are different, the task fails. The new nodes must have the same version of ONTAP 9.x installed on them that is installed on the original nodes. If the new nodes have a different version of ONTAP installed, you need to netboot the new controllers after you install them. For instructions on how to upgrade ONTAP, refer to References to link to <i>Upgrade ONTAP</i> .
HA Status Check	Checks if both the nodes being replaced are in a high availability (HA) pair configuration. If storage failover is not enabled for the controllers, the task fails.
Aggregate Status Check	If the nodes being replaced own aggregates for which they are not the home owner, the task fails. The nodes should not own any non-local aggregates.
Disk Status Check	If any nodes being replaced have missing or failed disks, the task fails. If any disks are missing, refer to References to link to <i>Disk and aggregate management with the CLI</i> , <i>Logical storage management with the CLI</i> , and <i>High Availability management</i> to configure storage for the HA pair.
Data LIF Status Check	Checks if any of the nodes being replaced have non-local data LIFs. The nodes should not contain any data LIFs for which they are not the home owner. If one of the nodes contains non-local data LIFs, the task fails.
Cluster LIF Status	Checks whether the cluster LIFs are up for both nodes. If the cluster LIFs are down, the task fails.
ASUP Status Check	If AutoSupport notifications are not configured, the task fails. You must enable AutoSupport before beginning the controller replacement procedure.

Precheck	Description
CPU Utilization Check	Checks if the CPU utilization is more than 50% for any of the nodes being replaced. If the CPU usage is more than 50% for a considerable period of time, the task fails.
Aggregate Reconstruction Check	Checks if reconstruction is occurring on any data aggregates. If aggregate reconstruction is in progress, the task fails.
Node Affinity Job Check	Checks if any node affinity jobs are running. If node affinity jobs are running, the check fails.

- After the controller replacement operation is started and the prechecks are completed, the operation pauses, enabling you to collect output information that you might need later in the controller upgrade process.
- Run the below set of commands as directed by the controller replacement procedure on the system console.

Run the commands from the serial port connected to each node, run and save the output of the commands individually:

```

° vsriver services name-service dns show
° network interface show -curr-node local -role cluster,intercluster,node-
  mgmt,cluster-mgmt,data
° network port show -node local -type physical
° service-processor show -node local -instance
° network fcp adapter show -node local
° network port ifgrp show -node local
° system node show -instance -node local
° run -node local sysconfig
° run -node local sysconfig -ac
° run -node local aggr status -r
° vol show -fields type
° run local aggr options data_aggregate_name
° vol show -fields type , space-guarantee
° storage aggregate show -node local
° volume show -node local
° storage array config show -switch switch_name
° system license show -owner local
° storage encryption disk show
° security key-manager onboard show-backup

```

- `security key-manager external show`
- `security key-manager external show-status`
- `network port reachability show -detail -node local`



If NetApp Volume Encryption (NVE) or NetApp Aggregate Encryption (NAE) using the Onboard Key Manager is in use, keep the key-manager passphrase ready to complete the key manager resync later in the procedure.

6. If your system uses self-encrypting drives, see the Knowledge Base article [How to tell if a drive is FIPS certified](#) to determine the type of self-encrypting drives that are in use on the HA pair that you are upgrading. ONTAP software supports two types of self-encrypting drives:

- FIPS-certified NetApp Storage Encryption (NSE) SAS or NVMe drives
- Non-FIPS self-encrypting NVMe drives (SED)



You cannot mix FIPS drives with other types of drives on the same node or HA pair.

You can mix SEDs with non-encrypting drives on the same node or HA pair.

[Learn more about supported self-encrypting drives.](#)

Correct aggregate ownership if an ARL precheck fails

If the Aggregate Status Check fails, you must return aggregates owned by the partner node to the home owner node and initiate the precheck process again.

Steps

1. Return the aggregates currently owned by the partner node to the home owner node:

```
storage aggregate relocation start -node source_node -destination destination-  
node -aggregate-list *
```

2. Verify that neither node1 nor node2 still owns aggregates for which it is the current owner (but not the home owner):

```
storage aggregate show -nodes node_name -is-home false -fields owner-name,  
home-name, state
```

The following example shows the output of the command when a node is both the current owner and home owner of aggregates:

```
cluster::> storage aggregate show -nodes node1 -is-home true -fields
owner-name,home-name,state
aggregate    home-name    owner-name    state
-----
aggr1        node1         node1         online
aggr2        node1         node1         online
aggr3        node1         node1         online
aggr4        node1         node1         online

4 entries were displayed.
```

After you finish

You must restart the controller replacement process:

```
system controller replace start -nodes node_names
```

License

Each node in the cluster must have its own NetApp License File (NLF).

If you do not have an NLF, currently licensed features in the cluster are available to the new controller. However, using unlicensed features on the controller might put you out of compliance with your license agreement, so you should install the NLF for the new controller after the upgrade is complete.

Refer to [References](#) to link to the *NetApp Support Site* where you can obtain your NLF. The NLFs are available in the *My Support* section under *Software licenses*. If the site does not have the NLFs that you need, contact your NetApp sales representative.

For detailed information about licensing, refer to [References](#) to link to the *System Administration Reference*.

Manage storage encryption using the Onboard Key Manager

You can use the Onboard Key Manager (OKM) to manage encryption keys. If you have the OKM set up, you must record the passphrase and backup material before beginning the upgrade.

Steps

1. Record the cluster-wide passphrase.

This is the passphrase that was entered when the OKM was configured or updated using the CLI or REST API.

2. Back up the key-manager information by running the `security key-manager onboard show-backup` command.

Quiesce the SnapMirror relationships (optional)

Before continuing with the procedure, you must confirm that all the SnapMirror relationships are quiesced. When a SnapMirror relationship is quiesced, it remains quiesced across reboots and failovers.

Steps

1. Verify the SnapMirror relationship status on the destination cluster:

```
snapmirror show
```



If the status is "Transferring", you must abort those transfers:

```
snapmirror abort -destination-vserver vserver_name
```

The abort fails if the SnapMirror relationship is not in the "Transferring" state.

2. Quiesce all relationships between the cluster:

```
snapmirror quiesce -destination-vserver *
```

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