



# Chassis

## Install and maintain

NetApp  
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# Table of Contents

- Chassis..... 1
  - Overview of chassis replacement - AFF C190..... 1
  - Shut down the controllers - AFF C190..... 1
  - Move and replace hardware - AFF C190..... 2
  - Restore and verify the configuration - AFF C190..... 6

# Chassis

## Overview of chassis replacement - AFF C190

To replace the chassis, you must move the power supplies, hard drives, and controller module or modules from the impaired chassis to the new chassis, and swap out the impaired chassis from the equipment rack or system cabinet with the new chassis of the same model as the impaired chassis.

All other components in the system must be functioning properly; if not, you must contact technical support.

- You can use this procedure with all versions of ONTAP supported by your system.
- This procedure is written with the assumption that you are moving all drives and controller module or modules to the new chassis, and that the chassis is a new component from NetApp.
- This procedure is disruptive. For a two-node cluster, you will have a complete service outage and a partial outage in a multi-node cluster.

## Shut down the controllers - AFF C190

You must shut down the controller or controller in the chassis prior to moving them to the new chassis.

### About this task

- If you have a cluster with more than two controllers, it must be in quorum. If the cluster is not in quorum or a healthy controller shows `false` for eligibility and health, you must correct the issue before shutting down the impaired controller; see the [Administration overview with the CLI](#).

- If AutoSupport is enabled, suppress automatic case creation by invoking an AutoSupport message:

```
system node autosupport invoke -node * -type all -message  
MAINT=number_of_hours_downh
```

The following AutoSupport message suppresses automatic case creation for two hours: `cluster1:*>`

```
system node autosupport invoke -node * -type all -message MAINT=2h
```

### Steps

1. If your system has two controller modules, disable the HA pair.

If your system is running clustered ONTAP with...	Then...
Two controllers in the cluster	<code>cluster ha modify -configured false storage failover modify -node node0 -enabled false</code>
More than two controllers in the cluster	<code>storage failover modify -node node0 -enabled false</code>

2. Halt the controller, pressing `y` when you are prompted to confirm the halt: `system node halt -node  
node_name`

The confirmation message looks like the following:

```
Warning: This operation will cause controller "node-name" to be marked
as unhealthy. Unhealthy nodes do not participate in quorum voting. If
the controller goes out of service and one more controller goes out of
service there will be a data serving failure for the entire cluster.
This will cause a client disruption. Use "cluster show" to verify
cluster state. If possible bring other nodes online to improve the
resiliency of this cluster.
```

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



You must perform a clean system shutdown before replacing the chassis to avoid losing unwritten data in the nonvolatile memory (NVMEM/NVRAM). Depending on your system, if the NVMEM/NVRAM LED is flashing, there is content in the NVMEM/NVRAM that has not been saved to disk. You need to reboot the controller and start from the beginning of this procedure. If repeated attempts to cleanly shut down the controller fail, be aware that you might lose any data that was not saved to disk.

3. Where applicable, halt the second controller to avoid a possible quorum error message in an HA pair configuration: `system node halt -node second_node_name -ignore-quorum-warnings true -skip-lif-migration-before-shutdown true`

Answer `y` when prompted.

## Move and replace hardware - AFF C190

Move the power supplies, hard drives, and controller module or modules from the impaired chassis to the new chassis, and swap out the impaired chassis from the equipment rack or system cabinet with the new chassis of the same model as the impaired chassis.

### Step 1: Move the power supply

Moving out a power supply when replacing a chassis involves turning off, disconnecting, and removing the power supply from the old chassis and installing and connecting it on the replacement chassis.

1. If you are not already grounded, properly ground yourself.
2. Turn off the power supply and disconnect the power cables:
  - a. Turn off the power switch on the power supply.
  - b. Open the power cable retainer, and then unplug the power cable from the power supply.
  - c. Unplug the power cable from the power source.
3. Squeeze the latch on the power supply cam handle, and then open the cam handle to fully release the power supply from the mid plane.
4. Use the cam handle to slide the power supply out of the system.



When removing a power supply, always use two hands to support its weight.

5. Repeat the preceding steps for any remaining power supplies.
6. Using both hands, support and align the edges of the power supply with the opening in the system chassis, and then gently push the power supply into the chassis using the cam handle.

The power supplies are keyed and can only be installed one way.



Do not use excessive force when sliding the power supply into the system. You can damage the connector.

7. Close the cam handle so that the latch clicks into the locked position and the power supply is fully seated.
8. Reconnect the power cable and secure it to the power supply using the power cable locking mechanism.

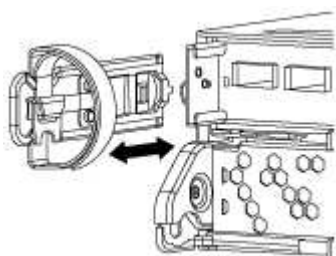
## Step 2: Remove the controller module

To replace the chassis, you must remove the controller module or modules from the old chassis.

1. If you are not already grounded, properly ground yourself.
2. Loosen the hook and loop strap binding the cables to the cable management device, and then unplug the system cables and SFPs (if needed) from the controller module, keeping track of where the cables were connected.

Leave the cables in the cable management device so that when you reinstall the cable management device, the cables are organized.

3. Remove and set aside the cable management devices from the left and right sides of the controller module.



4. Squeeze the latch on the cam handle until it releases, open the cam handle fully to release the controller module from the midplane, and then, using two hands, pull the controller module out of the chassis.



5. Set the controller module aside in a safe place, and repeat these steps if you have another controller module in the chassis.

### Step 3: Move drives to the new chassis

You need to move the drives from each bay opening in the old chassis to the same bay opening in the new chassis.

1. Gently remove the bezel from the front of the system.
2. Remove the drives:
  - a. Press the release button at the top of the carrier face below the LEDs.
  - b. Pull the cam handle to its fully open position to unseat the drive from the midplane, and then gently slide the drive out of the chassis.

The drive should disengage from the chassis, allowing it to slide free of the chassis.



When removing a drive, always use two hands to support its weight.



Drives are fragile. Handle them as little as possible to prevent damage to them.

3. Align the drive from the old chassis with the same bay opening in the new chassis.
4. Gently push the drive into the chassis as far as it will go.

The cam handle engages and begins to rotate upward.

5. Firmly push the drive the rest of the way into the chassis, and then lock the cam handle by pushing it up and against the drive holder.

Be sure to close the cam handle slowly so that it aligns correctly with the front of the drive carrier. It clicks when it is secure.

6. Repeat the process for the remaining drives in the system.

## Step 4: Replace a chassis from within the equipment rack or system cabinet

You must remove the existing chassis from the equipment rack or system cabinet before you can install the replacement chassis.

1. Remove the screws from the chassis mount points.
2. With the help of two or three people, slide the old chassis off the rack rails in a system cabinet or *L* brackets in an equipment rack, and then set it aside.
3. If you are not already grounded, properly ground yourself.
4. Using two or three people, install the replacement chassis into the equipment rack or system cabinet by guiding the chassis onto the rack rails in a system cabinet or *L* brackets in an equipment rack.
5. Slide the chassis all the way into the equipment rack or system cabinet.
6. Secure the front of the chassis to the equipment rack or system cabinet, using the screws you removed from the old chassis.
7. If you have not already done so, install the bezel.

## Step 5: Install the controller module

After you install the controller module and any other components into the new chassis, you need to boot it to a state where you can run the interconnect diagnostic test.

For HA pairs with two controller modules in the same chassis, the sequence in which you install the controller module is especially important because it attempts to reboot as soon as you completely seat it in the chassis.

1. Align the end of the controller module with the opening in the chassis, and then gently push the controller module halfway into the system.



Do not completely insert the controller module in the chassis until instructed to do so.

2. Recable the console to the controller module, and then reconnect the management port.
3. Repeat the preceding steps if there is a second controller to install in the new chassis.
4. Complete the installation of the controller module
  - a. With the cam handle in the open position, firmly push the controller module in until it meets the midplane and is fully seated, and then close the cam handle to the locked position.



Do not use excessive force when sliding the controller module into the chassis to avoid damaging the connectors.

- b. If you have not already done so, reinstall the cable management device.
  - c. Bind the cables to the cable management device with the hook and loop strap.
  - d. Repeat the preceding steps for the second controller module in the new chassis.
5. Connect the power supplies to different power sources, and then turn them on.
  6. Boot each controller to Maintenance mode:
    - a. As each controller starts the booting, press `Ctrl-C` to interrupt the boot process when you see the message `Press Ctrl-C for Boot Menu`.



If you miss the prompt and the controller modules boot to ONTAP, enter `halt`, and then at the LOADER prompt enter `boot_ontap`, press `Ctrl-C` when prompted, and then repeat this step.

- b. From the boot menu, select the option for Maintenance mode.

## Restore and verify the configuration - AFF C190

You must verify the HA state of the chassis and run System-Level diagnostics.

### Step 1: Verify and setting the HA state of the chassis

You must verify the HA state of the chassis, and, if necessary, update the state to match your system configuration.

1. In Maintenance mode, from either controller module, display the HA state of the local controller module and chassis:

```
ha-config show
```

The HA state should be the same for all components.

2. If the displayed system state for the chassis does not match your system configuration:

- a. Set the HA state for the chassis:

```
ha-config modify chassis HA-state
```

The value for *HA-state* can be one of the following:

- `ha`
- `non-ha`

- b. Confirm that the setting has changed:

```
ha-config show
```

3. If you have not already done so, recable the rest of your system.
4. The next step depends on your system configuration.

If your system is in...	Then...
A stand-alone configuration	<ol style="list-style-type: none"><li>a. Exit Maintenance mode:  <code>halt</code></li><li>b. Go to <a href="#">"Completing the replacement process."</a></li></ol>
An HA pair with a second controller module	<p>Exit Maintenance mode: <code>halt</code></p> <p>The LOADER prompt appears.</p>



## Step 2: Run system-level diagnostics

After installing a new chassis, you should run interconnect diagnostics.

Your system must be at the LOADER prompt to start System Level Diagnostics.

All commands in the diagnostic procedures are issued from the controller where the component is being replaced.

1. If the controller to be serviced is not at the LOADER prompt, perform the following steps:
  - a. Select the Maintenance mode option from the displayed menu.
  - b. After the controller boots to Maintenance mode, halt the controller:

**halt**

After you issue the command, you should wait until the system stops at the LOADER prompt.



During the boot process, you can safely respond `y` to prompts:

2. Repeat the previous step on the second controller if you are in an HA configuration.



Both controllers must be in Maintenance mode to run the interconnect test.

3. At the LOADER prompt, access the special drivers specifically designed for system-level diagnostics to function properly:

**boot\_diags**

During the boot process, you can safely respond `y` to the prompts until the Maintenance mode prompt (`*>`) appears.

4. Enable the interconnect diagnostics tests from the Maintenance mode prompt:

**sldiag device modify -dev interconnect -sel enable**

The interconnect tests are disabled by default and must be enabled to run separately.

5. Run the interconnect diagnostics test from the Maintenance mode prompt:

**sldiag device run -dev interconnect**

You only need to run the interconnect test from one controller.

6. Verify that no hardware problems resulted from the replacement of the chassis:

**sldiag device status -dev interconnect -long -state failed**

System-level diagnostics returns you to the prompt if there are no test failures, or lists the full status of failures resulting from testing the component.

7. Proceed based on the result of the preceding step.

If the system-level diagnostics tests...	Then...
Were completed without any failures	<p>a. Clear the status logs:</p> <pre>sldiag device clearstatus</pre> <p>b. Verify that the log was cleared:</p> <pre>sldiag device status</pre> <p>The following default response is displayed:</p> <div data-bbox="672 531 1484 632" style="border: 1px solid #ccc; padding: 10px; margin: 10px 0;"> <pre>SLDIAG: No log messages are present.</pre> </div> <p>c. Exit Maintenance mode on both controllers:</p> <pre>halt</pre> <p>The system displays the LOADER prompt.</p> <div data-bbox="699 877 756 940" style="display: inline-block; text-align: center; vertical-align: middle;">  </div> <div data-bbox="818 877 1330 945" style="display: inline-block; vertical-align: middle;"> <p>You must exit Maintenance mode on both controllers before proceeding any further.</p> </div> <p>d. Enter the following command on both controllers at the LOADER prompt:</p> <pre>bye</pre> <p>e. Return the controller to normal operation:</p>
If your system is running ONTAP...	Then...
With two nodes in the cluster	<p>Issue these commands:</p> <pre>node::&gt; cluster ha modify -configured true</pre> <pre>node::&gt; storage failover modify -node node0 -enabled true</pre>
With more than two nodes in the cluster	<p>Issue this command:</p> <pre>node::&gt; storage failover modify -node node0 -enabled true</pre>
In a stand-alone configuration	<p>You have no further steps in this particular task. You have completed system-level diagnostics.</p>

If your system is running ONTAP...	Then...
Resulted in some test failures	<p>Determine the cause of the problem.</p> <ul style="list-style-type: none"> <li>a. Exit Maintenance mode:  <b>halt</b></li> <li>b. Perform a clean shutdown, and then disconnect the power supplies.</li> <li>c. Verify that you have observed all of the considerations identified for running system-level diagnostics, that cables are securely connected, and that hardware components are properly installed in the storage system.</li> <li>d. Reconnect the power supplies, and then power on the storage system.</li> <li>e. Rerun the system-level diagnostics test.</li> </ul>

### Step 3: Return the failed part to NetApp

Return the failed part to NetApp, as described in the RMA instructions shipped with the kit. See the [Part Return & Replacements](#) page for further information.

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