



I/O module

Install and maintain

NetApp
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I/O module

Overview of I/O module maintenance - ASA C30

The ASA C30 storage system offers flexibility in expanding or replacing I/O modules to enhance network connectivity and performance. Adding, hot-swapping, or replacing an I/O module is essential when upgrading network capabilities or addressing a failed module.

You can replace a failed I/O module in your storage system with the same type of I/O module, or with a different type of I/O module. You can hot-swap a cluster and HA I/O module when your storage system meets specific requirements. You can also add an I/O module to a storage system with available slots.

- [Add an I/O module](#)

Adding additional I/O modules can improve redundancy, helping to ensure that the storage system remains operational even if one I/O module fails.

- [Hot-swap an I/O module](#)

You can hot-swap certain I/O modules for an equivalent I/O module to restore the storage system to its optimal operating state. Hot-swapping is done without having to perform a manual takeover.

To use this procedure, your storage system must be running ONTAP 9.17.1 or later and meet specific system requirements.

- [Replace an I/O module](#)

Replacing a failing I/O module can restore the storage system to its optimal operating state.

Add an I/O module - ASA C30

Add an I/O module to your ASA C30 storage system to enhance network connectivity and expand your system's ability to handle data traffic.

You can add an I/O module to your ASA C30 storage system if there are available slots. If all slots are fully populated, you can replace an existing module to add a new one.

About this task

If needed, you can turn on the storage system location (blue) LEDs to aid in physically locating the affected storage system. Log into the BMC using SSH and enter the `system location-led on` command.

A storage system has three location LEDs: one on the operator display panel and one on each controller. Location LEDs remain illuminated for 30 minutes.

You can turn them off by entering the `system location-led off` command. If you are unsure if the LEDs are on or off, you can check their state by entering the `system location-led show` command.

Step 1: Shut down the impaired controller

To shut down the impaired controller, you must determine the status of the controller and, if necessary, take over the controller so that the healthy controller continues to serve data from the impaired controller storage.

About this task

- If you have a SAN system, you must have checked event messages (`cluster kernel-service show`) for the impaired controller SCSI blade. The `cluster kernel-service show` command (from `priv advanced mode`) displays the node name, [quorum status](#) of that node, availability status of that node, and operational status of that node.

Each SCSI-blade process should be in quorum with the other nodes in the cluster. Any issues must be resolved before you proceed with the replacement.

- If you have a cluster with more than two nodes, 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 [Synchronize a node with the cluster](#).

Steps

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

```
system node autosupport invoke -node * -type all -message MAINT=<# of hours>h
```

The following AutoSupport message suppresses automatic case creation for two hours:

```
cluster1:> system node autosupport invoke -node * -type all -message MAINT=2h
```

2. Disable automatic giveback:

- a. Enter the following command from the console of the healthy controller:

```
storage failover modify -node impaired_node_name -auto-giveback false
```

- b. Enter `y` when you see the prompt *Do you want to disable auto-giveback?*

3. Take the impaired controller to the LOADER prompt:

If the impaired controller is displaying...	Then...
The LOADER prompt	Go to the next step.
Waiting for giveback...	Press Ctrl-C, and then respond <code>y</code> when prompted.
System prompt or password prompt	<p>Take over or halt the impaired controller from the healthy controller:</p> <pre>storage failover takeover -ofnode <i>impaired_node_name</i> -halt true</pre> <p>The <code>-halt true</code> parameter brings you to the LOADER prompt.</p>

Step 2: Add the new I/O module

If the storage system has available slots, install the new I/O module into one of the available slots. If all slots are occupied, remove an existing I/O module to make space and then install the new one.

Before you begin

- Check the [NetApp Hardware Universe](#) to make sure that the new I/O module is compatible with your storage system and version of ONTAP you're running.
- If multiple slots are available, check the slot priorities in [NetApp Hardware Universe](#) and use the best one available for your I/O module.
- All other components in the storage system must be functioning properly; if not, contact [NetApp Support](#) before continuing with this procedure.

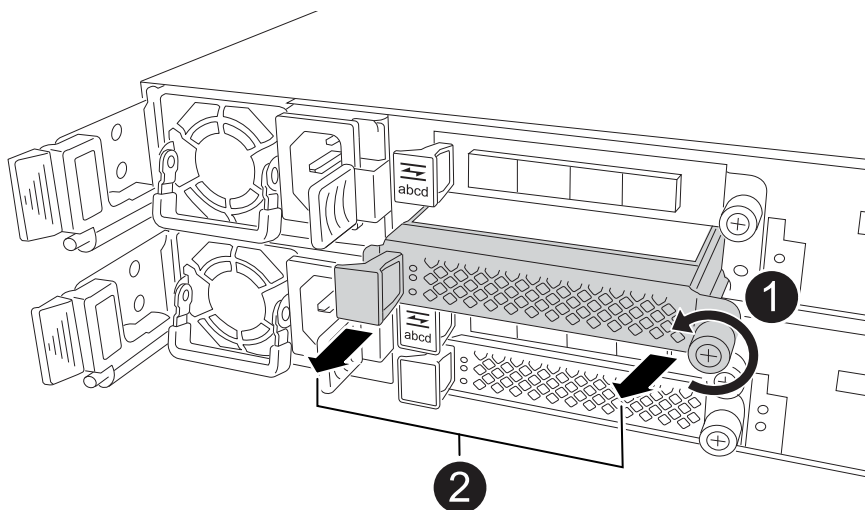
Add I/O module to an available slot

You can add a new I/O module into a storage system with available slots.

Steps

1. If you are not already grounded, properly ground yourself.
2. On the impaired controller, remove the I/O blanking module from the target slot.

Unused I/O slots should have blanking module installed to prevent possible thermal issues and for EMC compliance.



1	On the I/O blanking module, turn the thumbscrew counterclockwise to loosen.
2	Pull the I/O blanking module out of the controller using the tab on the left and the thumbscrew.

3. Install the new I/O module:
 - a. Align the I/O module with the edges of the controller slot opening.
 - b. Gently push the I/O module all the way into the slot, making sure to properly seat the module into the connector.

You can use the tab on the left and the thumbscrew to push in the I/O module.

- c. Turn the thumbscrew clockwise to tighten.
4. Cable the I/O module to the designated devices.

If you installed a storage I/O module, install and cable your NS224 shelves, as described in [Hot-add workflow](#).

5. Reboot the impaired controller from the LOADER prompt: `bye`

Rebooting the impaired controller also reinitializes the I/O modules and other components.

6. Return the impaired controller to normal operation by giving back its storage:

```
storage failover giveback -ofnode impaired_node_name.
```

7. Repeat these steps to add an I/O module to the other controller.

8. Restore automatic giveback from the console of the healthy controller:

```
storage failover modify -node local -auto-giveback true
```

9. If AutoSupport is enabled, restore (unsuppress) automatic case creation:

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

Add I/O module to a fully-populated system

You can add an I/O module to a fully-populated system by removing an existing I/O module and installing a new one in its place.

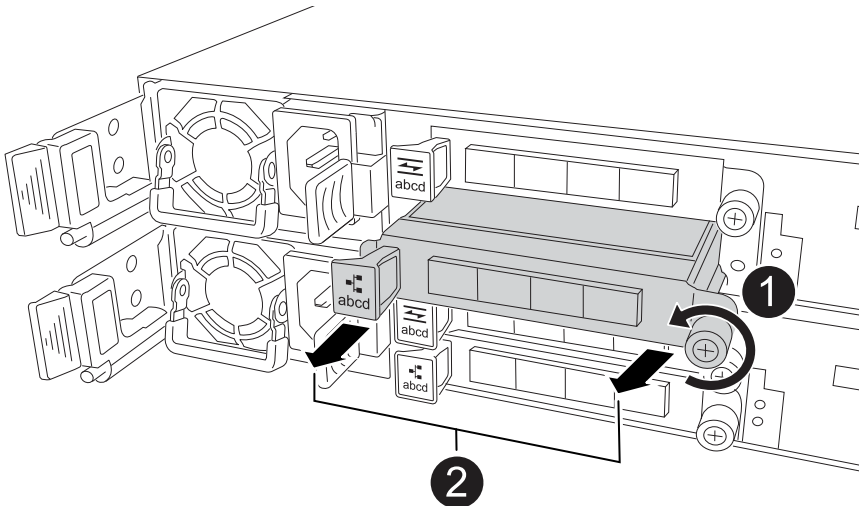
About this task

Make sure you understand the following scenarios for adding a new I/O module to a fully-populated system:

Scenario	Action required
NIC to NIC (same number of ports)	The LIFs will automatically migrate when its controller module is shut down.
NIC to NIC (different number of ports)	Permanently reassign the selected LIFs to a different home port. See Migrating a LIF for more information.
NIC to storage I/O module	Use System Manager to permanently migrate the LIFs to different home ports, as described in Migrating a LIF .

Steps

1. If you are not already grounded, properly ground yourself.
2. On the impaired controller, unplug any cabling on the target I/O module.
3. Remove the target I/O module from the controller:



1	Turn the I/O module thumbscrew counterclockwise to loosen.
2	Pull the I/O module out of the controller using the port label tab on the left and the thumbscrew.

4. Install the new I/O module into the target slot:

- a. Align the I/O module with the edges of the slot.
- b. Gently push the I/O module all the way into the slot, making sure to properly seat the module into the connector.

You can use the tab on the left and the thumbscrew to push in the I/O Module.

- c. Turn the thumbscrew clockwise to tighten.

5. Cable the I/O module to the designated devices.

If you installed a storage I/O module, install and cable your NS224 shelves, as described in [Hot-add workflow](#).

6. Repeat the I/O module remove and install steps to add any additional I/O modules in the controller.

7. Reboot the impaired controller from the LOADER prompt:

```
bye
```

Rebooting the impaired controller also reinitializes the I/O modules and other components.

8. Return the impaired controller to normal operation by giving back its storage:

```
storage failover giveback -ofnode impaired_node_name
```

9. Restore automatic giveback from the console of the healthy controller:

```
storage failover modify -node local -auto-giveback true
```

10. If AutoSupport is enabled, restore (unsuppress) automatic case creation:

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

11. If you installed a NIC module, specify the usage mode for each port as *network*:

```
storage port modify -node node_name -port port_name -mode network
```

12. Repeat these steps for the other controller.

Hot swap an I/O module - ASA C30

You can hot swap an Ethernet I/O module in your ASA C30 storage system if a module fails and your storage system meets all ONTAP version requirements.

To hot swap an I/O module, ensure your storage system meets the ONTAP version requirements, prepare your

storage system and I/O module, hot-swap the failed module, bring the replacement module online, restore the storage system to normal operation, and return the failed module to NetApp.

About this task

- Hot-swapping the I/O module means that you do not have to perform a manual takeover before replacing the failed I/O module.
- Apply commands to the correct controller and I/O slot when you are hot-swapping the I/O module:
 - The *impaired controller* is the controller on which you are hot-swapping the I/O module.
 - The *healthy controller* is the HA partner of the impaired controller.
- You can turn on the storage system location (blue) LEDs to aid in physically locating the affected storage system. Log into the BMC using SSH and enter the `system location-led on` command.

A storage system has three location LEDs: one on the operator display panel and one on each controller. Location LEDs remain illuminated for 30 minutes.

You can turn them off by entering the `system location-led off` command. If you are unsure if the LEDs are on or off, you can check their state by entering the `system location-led show` command.

Step 1: Ensure the storage system meets the procedure requirements

To use this procedure, your storage system must be running ONTAP 9.17.1 or later, and your storage system must meet all requirements for the version of ONTAP your storage system is running.



If your storage system is not running ONTAP 9.17.1 or later, or does not meet all requirements for the version of ONTAP your storage system is running, you cannot use this procedure, you must use the [replace an I/O module procedure](#).

ONTAP 9.17.1 or 9.18.1RC

- You are hot-swapping a failed cluster and HA I/O module in slot 4 with an equivalent I/O module. You cannot change the I/O module type.
- The controller with the failed cluster and HA I/O module (the impaired controller) must have already taken over the healthy partner controller. The takeover should have occurred automatically if the I/O module has failed.

For two-node clusters, the storage system cannot discern which controller has the failed I/O module, so either controller might initiate the takeover. Hot swapping is only supported when the controller with the failed I/O module (the impaired controller) has taken over the healthy controller. Hot-swapping the I/O module is the only way to recover without an outage.

You can verify that the impaired controller successfully took over the healthy controller by entering the `storage failover show` command.

If you are not sure which controller has the failed I/O module, contact [NetApp Support](#).

- Your storage system configuration must have only one cluster and HA I/O module located in slot 4, not two cluster and HA I/O modules.
- Your storage system must be a two-node (switchless or switched) cluster configuration.
- All other components in the storage system must be functioning properly; if not, contact [NetApp Support](#) before continuing with this procedure.

ONTAP 9.18.1GA or later

- You are hot swapping an Ethernet I/O module in any slot having any combination of ports used for cluster, HA, and client with an equivalent I/O module. You cannot change the I/O module type.

Ethernet I/O modules with ports used for storage or MetroCluster are not hot-swappable.

- Your storage system (switchless or switched cluster configuration) can have any number of nodes supported for your storage system.
- All nodes in the cluster must be running the same ONTAP version (ONTAP 9.18.1GA or later) or running different patch levels of the same ONTAP version.

If nodes in your cluster are running different ONTAP versions, this is considered a mixed-version cluster and hot-swapping an I/O module is not supported.

- The controllers in your storage system can be in either of the following states:
 - Both controllers can be up and running I/O (serving data).
 - Either controller can be in a takeover state if the takeover was caused by the failed I/O module and the controllers are otherwise functioning properly.

In certain situations, ONTAP can automatically perform a takeover of either controller due to the failed I/O module. For example, if the failed I/O module contained all of the cluster ports (all of the cluster links on that controller go down) ONTAP automatically performs a takeover.

- All other components in the storage system must be functioning properly; if not, contact [NetApp Support](#) before continuing with this procedure.

Step 2: Prepare the storage system and I/O module slot

Prepare the storage system and I/O module slot so that it is safe to remove the failed I/O module:

Steps

1. Properly ground yourself.
2. Unplug the cables from the failed I/O module.

Make sure to label the cables so you can reconnect them to the same ports later in this procedure.



The I/O module should be failed (ports should be in the link down state); however, if the links are still up and they contain the last functioning cluster port, unplugging the cables triggers an automatic takeover.

Wait five minutes after unplugging the cables to ensure any takeovers or LIF failovers complete before continuing with this procedure.

3. 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 down>h
```

For example, the following AutoSupport message suppresses automatic case creation for two hours:

```
node2::> system node autosupport invoke -node * -type all -message MAINT=2h
```

4. As needed for the version of ONTAP your storage system is running and the state of the controllers, disable automatic giveback:

ONTAP version	If...	Then...
9.17.1 or 9.18.1RC	If the impaired controller took over the healthy controller automatically	Disable automatic giveback: 1. Enter the following command from the console of the impaired controller <pre>storage failover modify -node local -auto-giveback false</pre> 2. Enter <i>y</i> when you see the prompt <i>Do you want to disable auto-giveback?</i>
9.18.1GA or later	If either controller took over its partner automatically	Disable automatic giveback: 1. Enter the following command from the console of the controller that took over its partner: <pre>storage failover modify -node local -auto-giveback false</pre> 2. Enter <i>y</i> when you see the prompt <i>Do you want to disable auto-giveback?</i>

ONTAP version	If...	Then...
9.18.1GA or later	Both controllers are up and running I/O (serving data)	Go to the next step.

5. Prepare the failed I/O module for removal by removing it from service and powering it off:

a. Enter the following command:

```
system controller slot module remove -node impaired_node_name -slot
slot_number
```

b. Enter *y* when you see the prompt *Do you want to continue?*

For example, the following command prepares the failed module in slot 4 on node 2 (the impaired controller) for removal, and displays a message that it is safe to remove:

```
node2::> system controller slot module remove -node node2 -slot 4

Warning: IO_2X_100GBE_NVDA_NIC module in slot 4 of node node2 will be
powered off for removal.

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

The module has been successfully removed from service and powered
off. It can now be safely removed.
```

6. Verify the failed I/O module is powered off:

```
system controller slot module show
```

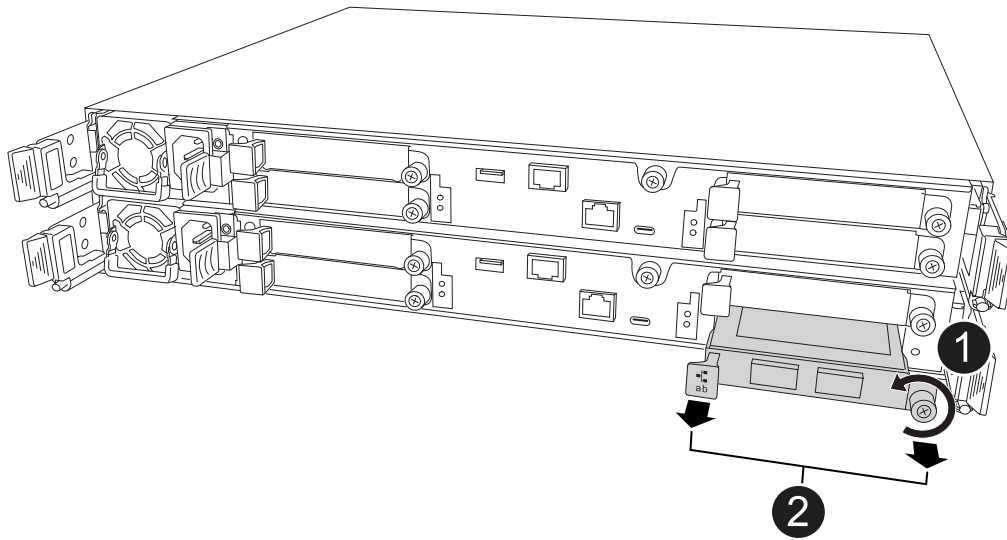
The output should show *powered-off* in the *status* column for the failed module and its slot number.

Step 3: Hot swap the failed I/O module

Hot swap the failed I/O module with an equivalent I/O module:

Steps

1. If you are not already grounded, properly ground yourself.
2. Remove the failed I/O module from the impaired controller:



1	Turn the I/O module thumbscrew counterclockwise to loosen.
2	Pull the I/O module out of the controller using the port label tab on the left and the thumbscrew on the right.

3. Install the replacement I/O module:

- a. Align the I/O module with the edges of the slot.
- b. Gently push the I/O module all the way into the slot, making sure to properly seat the I/O module into the connector.

You can use the tab on the left and the thumbscrew on the right to push in the I/O module.

- c. Turn the thumbscrew clockwise to tighten.

4. Cable the replacement I/O module.

Step 4: Bring the replacement I/O module online

Bring the replacement I/O module online, verify the I/O module ports initialized successfully, verify the slot is powered on, and then verify the I/O module is online and recognized.

About this task

After the I/O module is replaced and the ports are returned to a healthy state, LIFs are reverted to the replaced I/O module.

Steps

1. Bring the replacement I/O module online:

- a. Enter the following command:

```
system controller slot module insert -node impaired_node_name -slot
slot_number
```

- b. Enter *y* when you see the prompt, *Do you want to continue?*

The output should confirm the I/O module was successfully brought online (powered on, initialized, and placed into service).

For example, the following command brings slot 4 on node 2 (the impaired controller) online, and displays a message that the process was successful:

```
node2::> system controller slot module insert -node node2 -slot 4

Warning: IO_2X_100GBE_NVDA_NIC module in slot 4 of node node2 will be
powered on and initialized.

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

The module has been successfully powered on, initialized and placed
into service.
```

2. Verify that each port on the I/O module successfully initialized:

a. Enter the following command from the console of the impaired controller:

```
event log show -event *hotplug.init*
```



It might take several minutes for any required firmware updates and port initialization.

The output should show one or more hotplug.init.success EMS events indicating each port on the I/O module initiated successfully.

For example, the following output shows initialization succeeded for I/O ports e4b and e4a:

```
node2::> event log show -event *hotplug.init*

Time                Node                Severity          Event
-----
-----

7/11/2025 16:04:06  node2          NOTICE          hotplug.init.success:
Initialization of ports "e4b" in slot 4 succeeded

7/11/2025 16:04:06  node2          NOTICE          hotplug.init.success:
Initialization of ports "e4a" in slot 4 succeeded

2 entries were displayed.
```

b. If the port initialization fails, review the EMS log for the next steps to take.

3. Verify the I/O module slot is powered on and ready for operation:

```
system controller slot module show
```

The output should show the slot status as *powered-on* and therefore ready for operation of the I/O module.

4. Verify that the I/O module is online and recognized.

Enter the command from the console of the impaired controller:

```
system controller config show -node local -slot slot_number
```

If the I/O module was successfully brought online and is recognized, the output shows I/O module information, including port information for the slot.

For example, you should see output similar to the following for a I/O module in slot 4:

```
node2::> system controller config show -node local -slot 4

Node: node2
Sub- Device/
Slot slot Information
----
4      - Dual 40G/100G Ethernet Controller CX6-DX
        e4a MAC Address: d0:39:ea:59:69:74 (auto-100g_cr4-fd-
up)
        QSFP Vendor:          CISCO-BIZLINK
        QSFP Part Number:     L45593-D218-D10
        QSFP Serial Number:   LCC2807GJFM-B
        e4b MAC Address: d0:39:ea:59:69:75 (auto-100g_cr4-fd-
up)
        QSFP Vendor:          CISCO-BIZLINK
        QSFP Part Number:     L45593-D218-D10
        QSFP Serial Number:   LCC2809G26F-A
        Device Type:          CX6-DX PSID(NAP0000000027)
        Firmware Version:     22.44.1700
        Part Number:          111-05341
        Hardware Revision:    20
        Serial Number:        032403001370
```

Step 5: Restore the storage system to normal operation

Restore your storage system to normal operation by giving back storage to the controller that was taken over (as needed), restoring automatic giveback (as needed), verifying LIFs are on their home ports, and reenabling AutoSupport automatic case creation.

Steps

1. As needed for the version of ONTAP your storage system is running and the state of the controllers, give back storage and restore automatic giveback on the controller that was taken over:

ONTAP version	If...	Then...
9.17.1 or 9.18.1RC	If the impaired controller took over the healthy controller automatically	<ol style="list-style-type: none"> 1. Return the healthy controller to normal operation by giving back its storage: <pre>storage failover giveback -ofnode healthy_node_name</pre> 2. Restore automatic giveback from the console of the impaired controller: <pre>storage failover modify -node local -auto-giveback true</pre>
9.18.1GA or later	If either controller took over its partner automatically	<ol style="list-style-type: none"> 1. Return the controller that was taken over to normal operation by giving back its storage: <pre>storage failover giveback -ofnode controller_that_was_taken_over_name</pre> 2. Restore automatic giveback from the console of the controller that was taken over: <pre>storage failover modify -node local -auto-giveback true</pre>
9.18.1GA or later	Both controllers are up and running I/O (serving data)	Go to the next step.

2. Verify that the logical interfaces are reporting to their home server and ports: `network interface show -is-home false`

If any LIFs are listed as false, revert them to their home ports: `network interface revert -vserver * -lif *`

3. If AutoSupport is enabled, restore automatic case creation:

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

Step 6: 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 and Replacements](#) page for further information.

Replace an I/O module - ASA C30

Replace an I/O module in your ASA C30 storage system when the module fails or requires an upgrade to support higher performance or additional features. The replacement process involves shutting down the controller, replacing the failed I/O

module, rebooting the controller, and returning the failed part to NetApp.

Use this procedure to replace a failed I/O module.

Before you begin

All other components in the storage system must be functioning properly; if not, you must contact [NetApp Support](#) before continuing with this procedure.

About this task

If needed, you can turn on the storage system location (blue) LEDs to aid in physically locating the affected storage system. Log into the BMC using SSH and enter the `system location-led on` command.

A storage system has three location LEDs: one on the operator display panel and one on each controller. Location LEDs remain illuminated for 30 minutes.

You can turn them off by entering the `system location-led off` command. If you are unsure if the LEDs are on or off, you can check their state by entering the `system location-led show` command.

Step 1: Shut down the impaired controller

To shut down the impaired controller, you must determine the status of the controller and, if necessary, take over the controller so that the healthy controller continues to serve data from the impaired controller storage.

About this task

- If you have a SAN system, you must have checked event messages (`cluster kernel-service show`) for the impaired controller SCSI blade. The `cluster kernel-service show` command (from `priv advanced` mode) displays the node name, [quorum status](#) of that node, availability status of that node, and operational status of that node.

Each SCSI-blade process should be in quorum with the other nodes in the cluster. Any issues must be resolved before you proceed with the replacement.

- If you have a cluster with more than two nodes, 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 [Synchronize a node with the cluster](#).

Steps

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

```
system node autosupport invoke -node * -type all -message MAINT=<# of hours>h
```

The following AutoSupport message suppresses automatic case creation for two hours:

```
cluster1:> system node autosupport invoke -node * -type all -message MAINT=2h
```

2. Disable automatic giveback:

- a. Enter the following command from the console of the healthy controller:

```
storage failover modify -node impaired_node_name -auto-giveback false
```

- b. Enter `y` when you see the prompt *Do you want to disable auto-giveback?*

3. Take the impaired controller to the LOADER prompt:

If the impaired controller is displaying...	Then...
The LOADER prompt	Go to the next step.
Waiting for giveback...	Press Ctrl-C, and then respond <i>y</i> when prompted.
System prompt or password prompt	<p>Take over or halt the impaired controller from the healthy controller:</p> <pre>storage failover takeover -ofnode impaired_node_name -halt true</pre> <p>The <i>-halt true</i> parameter brings you to the LOADER prompt.</p>

Step 2: Replace a failed I/O module

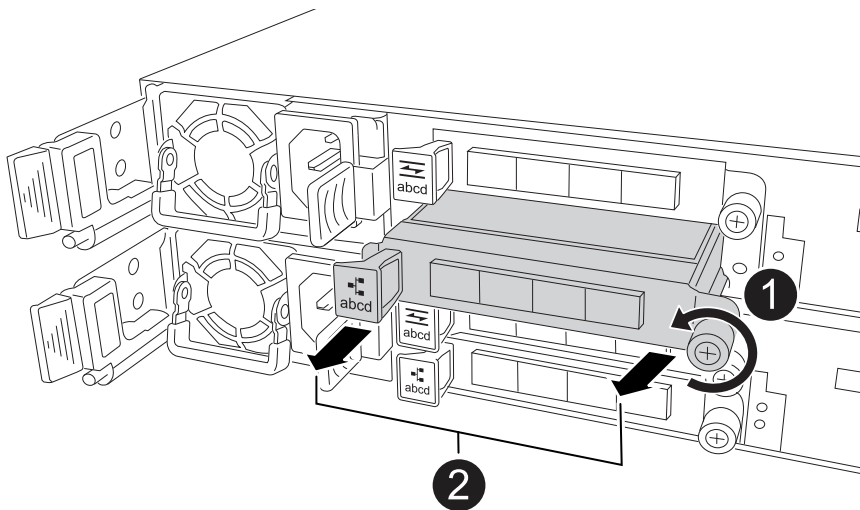
To replace a failed I/O module, locate it in the controller and follow the specific sequence of steps.

Steps

1. If you are not already grounded, properly ground yourself.
2. Unplug cabling from the failed I/O module.

Make sure to label the cables so that you know where they came from.

3. Remove the failed I/O module from the controller:



1	Turn the I/O module thumbscrew counterclockwise to loosen.
2	Pull the I/O module out of the controller using the port label tab on the left and the thumbscrew.

4. Install the replacement I/O module into the target slot:
 - a. Align the I/O module with the edges of the slot.

- b. Gently push the I/O module all the way into the slot, making sure to properly seat the module into the connector.

You can use the tab on the left and the thumbscrew to push in the I/O Module.

- c. Turn the thumbscrew clockwise to tighten.
5. Cable the I/O module.

Step 3: Reboot the controller

After you replace an I/O module, you must reboot the controller.

Steps

1. Reboot the controller from the LOADER prompt: `bye`

Rebooting the impaired controller also reinitializes the I/O modules and other components.

2. Return the node to normal operation: `storage failover giveback -ofnode impaired_node_name`
3. Restore automatic giveback from the console of the healthy controller: `storage failover modify -node local -auto-giveback true`

Step 4: 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 and Replacements](#) page for further information.

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