NX224 shelves

Install and maintain

NetApp
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NX224 shelves

Hot-add a shelf - NX224 shelves

You can expand your storage capabilities by hot-adding an NX224 shelf to your existing AFX cluster configuration.

About this task

- After you have cabled a hot-added shelf, ONTAP recognizes the shelf. NSM shelf firmware and drive firmware should be updated automatically, if needed.

  Firmware updates can take up to 30 minutes.

Before you begin

- Before hot-adding a shelf, ensure you have:
  - A paper clip with one side straightened or a narrow-tipped ballpoint pen.

    To change the shelf ID, you use the paper clip or ballpoint pen to access the shelf ID button behind the Operator Display Panel (ODP) for the change shelf ID step.

  - The correct number and type of cables to connect the shelf. See NetApp Hardware Universe.
- Understand that a fully loaded NX224 shelf can weigh an average of 56.8 lbs (25.8 kg) and requires two people to lift or use of a hydraulic lift. Avoid removing shelf components (from the front or rear of the shelf) to reduce the shelf weight, because shelf weight will become unbalanced.
- An NX224 shelf contains two NSM140 modules. The top module goes in slot A (NSM A) and the bottom module goes in slot B (NSM B).
- Your platform model and version of ONTAP must support the NX224 shelf and drives you are hot-adding. See NetApp Hardware Universe
- Your AFX cluster must have less than the maximum number of shelves supported, by at least the number of shelves you plan to hot-add.

  You cannot have exceeded the maximum number of shelves supported by your AFX cluster after hot-adding shelves. See NetApp Hardware Universe.

- **Best practice:** Ensure you have the current version of the Disk Qualification Package installed before hot-adding a shelf.

  Having the current version of the DQP installed allows your system to recognize and use newly qualified drives. This avoids system event messages about having noncurrent drive information and prevention of drive partitioning because drives are not recognized. The DQP also notifies you of noncurrent drive firmware.

- **Best practice**: Run Active IQ Config Advisor before and after hot-adding a shelf to view any storage cabling error messages and the corrective actions you should take.

  Running Active IQ Config Advisor before hot-adding a shelf provides a snapshot of the existing shelf Ethernet (ENET) connectivity, verifies NVMe shelf module (NSM) firmware versions, and allows you to verify a shelf ID already in use in the AFX cluster.

Running Active IQ Config Advisor after hot-adding a shelf allows you to verify shelves are cabled correctly and that shelf IDs are unique within the AFX cluster.

- **Best practice:** Ensure you have current versions of NVMe shelf module (NSM) firmware and drive firmware on your storage system before adding a new shelf.

  Do not revert firmware to a version that does not support your shelf and its components.

Step 1: Install a shelf for a hot-add

You need to install an NX224 shelf in a cabinet or telco rack, connect the power cords (which automatically powers on the shelf), and set the shelf ID.

Steps

1. Install the rail kit for the shelf, as needed, using the instructions included with the kit.

   Always use the appropriate rail kit for your shelf to install the shelf in a rack or cabinet.

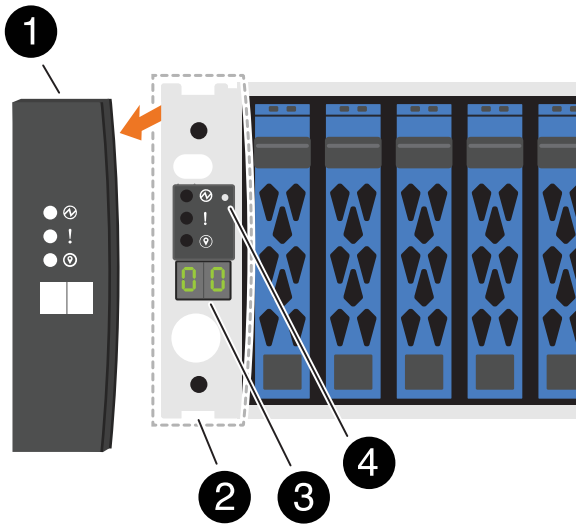
2. Install the shelf:
   a. Position the back of the shelf onto the rails, and then support the shelf from the bottom and slide it into the cabinet or telco rack.

      It is recommended to install all shelves close to the switches in the same rack.

   b. Secure the shelf to the cabinet or telco rack using the mounting screws included in the kit.
3. Connect the power:
   a. Connect the power cords to the shelf and secure them in place with the power cord retainers.
   b. Connect the power cords to different power sources for resiliency.

      A shelf powers up when connected to a power source; it does not have power switches. When functioning correctly, a power supply's bicolored LED illuminates green.
4. Set the shelf ID to a number that is unique within the AFX cluster:

   For more detailed instructions, see Change a shelf ID - NX224 shelves.



1	Shelf end cap
2	Shelf faceplate
3	Shelf ID number
4	Shelf ID button access

a. Remove the left end cap and locate the small hole to the right of the LEDs.
b. Insert the end of a paper clip or similar tool into the small hole to reach the shelf ID button.
c. Press and hold the button (for up to 15 seconds) until the first number on the digital display blinks, and then release the button.

   If the ID takes longer than 15 seconds to blink, press and hold the button again, making sure to press it in all the way.

d. Press and release the button to advance the number until you reach the desired number from 0 to 9.
e. Repeat substeps 4c and 4d to set the second number of the shelf ID.

   It can take up to three seconds (instead of 15 seconds) for the number to blink.

f. Press and hold the button until the second number stops blinking.

   After about five seconds, both numbers start blinking and the amber LED on the ODP illuminates.

g. Power-cycle the shelf to make the shelf ID take effect.

   You must unplug both power cords from the shelf, wait 10 seconds, and then plug them back in.

   When power is restored to the power supplies, their bicolored LEDs illuminate green.

Step 2: Cable shelf for hot-add

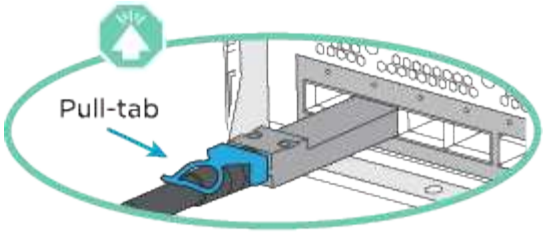
You cable each NX224 shelf you are hot-adding so that each shelf has eight connections to each switch.

Before you begin

- Familiarize yourself with proper cable connector orientation, and the location and labeling of ports on the NX224 NSM140 shelf modules.
  - Cables are inserted with the connector pull-tab facing up.

    When a cable is inserted correctly, it clicks into place.

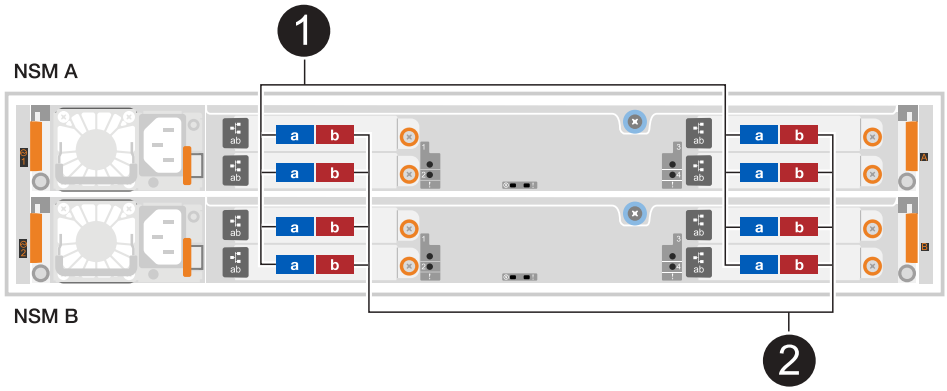
    After you connect both ends of the cable, the shelf and controller port LNK (green) LEDs illuminate. If a port LNK LED does not illuminate, reseat the cable.



- Each NSM140 module includes 4 x 100GbE CX7 Path_A ports (e1a, e2a, e3a, and e4a) and 4 x 100GbE CX7 Path_B ports (e1b, e2b, e3b, and e4b).

> Separate breakout cables are required for both the Path_A and Path_B ports on each NSM140 module, for a total of four breakout cables per shelf.

The following illustration highlights the Path_A and Path_B ports on the NSM140 modules:

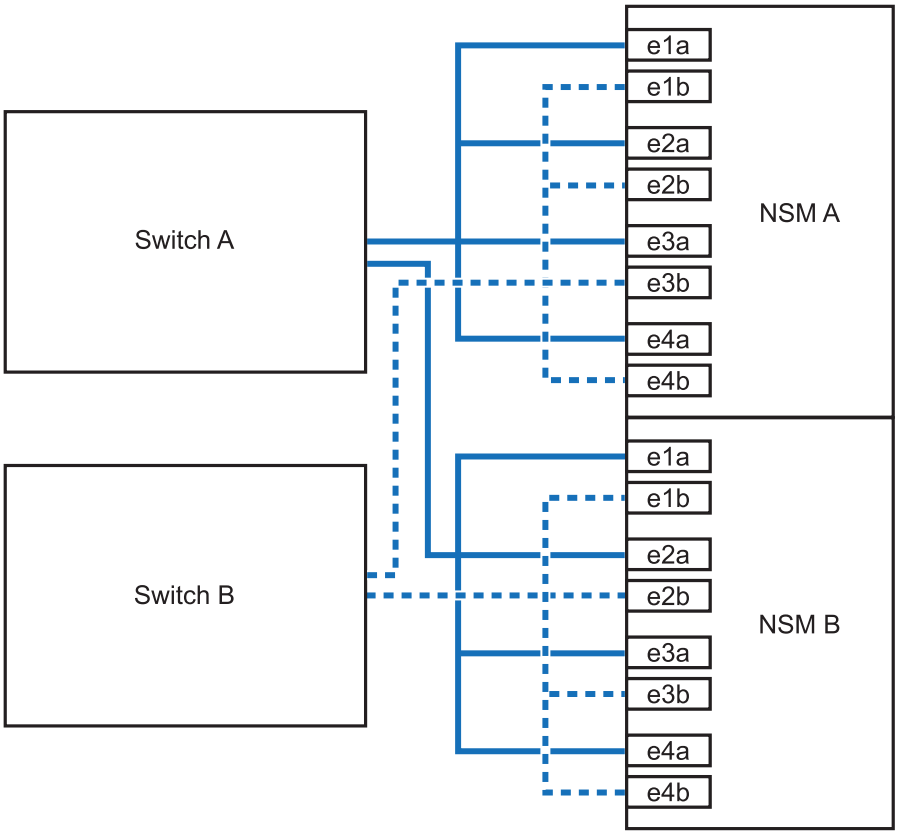


1	Path_A ports (blue ports)
2	Path_B ports (red ports)

Steps

1. Cable shelf NSM A and NSM B Path_A ports e1a, e2a, e3a, and e4a to any port on switch A.
2. Cable shelf NSM A and NSM B Path_B ports e1b, e2b, e3b, and e4b to any port on switch B.

   The following illustration highlights the cabling for hot-adding an additional shelf to a switch configuration. To add additional shelves, follow the same switch-based cabling methodology.



3. Verify that the hot-added shelf is cabled correctly using Active IQ Config Advisor.

   If any cabling errors are generated, follow the corrective actions provided.

Change a shelf ID - NX224 shelves

You can change an NX224 shelf ID in a system when ONTAP is not yet running or when hot-adding a shelf prior to it being cabled to the system. You can also change a shelf ID when ONTAP is up and running (controller modules are available to serve data) and all drives in the shelf are unowned or spares.

Before you begin

- If ONTAP is up and running (controller modules are available to serve data), you must have verified that all drives in the shelf are unowned, spares, or part of offlined aggregate(s).

  You can verify the state of the drives by using the `storage disk show -shelf shelf_number` command. Output in the `Container Type` column should display `spare` or `broken` if it is a failed drive. Additionally, the `Container Name` and `Owner` columns should have a dash.

- You need a paper clip with one side straightened or a narrow-tipped ballpoint pen.

  You use the paper clip or ballpoint pen to access the shelf ID button through the small hole, to the right of the LEDs, in the Operator Display Panel (ODP).

About this task

- A valid shelf ID is 00 through 99.

- Shelf IDs must be unique within an AFX cluster.
- You must power cycle a shelf (unplug both power cords, wait the appropriate amount of time, and then plug them back in) in order for the shelf ID to take effect.

  The amount of time you wait before plugging the power cords back in depends on the state of ONTAP, as described later in this procedure.

  NX224 shelves do not have power switches on the power supplies.

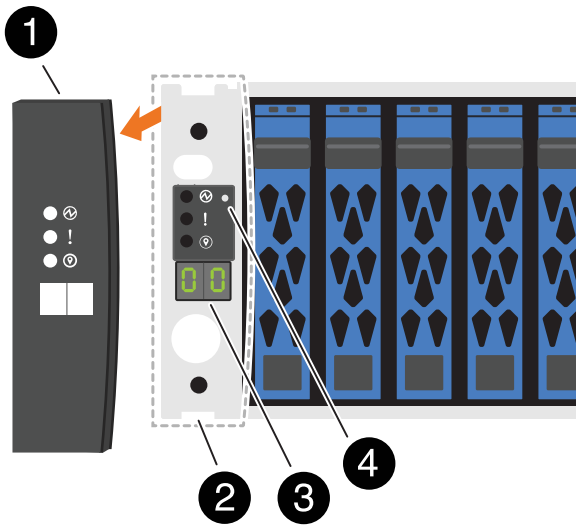
Steps

1. Power on the shelf, if it's not already on.

   You connect the power cords first to the shelf, securing them in place with the power cord retainer, and then connect the power cords to different power sources for resiliency.

   A power supply is powered on as soon as the power cord is plugged in. Its bicolored LED should illuminate green. Wait for the shelf ID to display before continuing to the next step.

2. Remove the left end cap to locate the small hole to the right of the LEDs.



1	Shelf end cap
2	Shelf faceplate
3	Shelf ID number
4	Shelf ID button access

3. Change the first number of the shelf ID:
   a. Insert the paper clip or ballpoint pen into the small hole.
   b. Press and hold the button until the first number on the digital display blinks, and then release the button.

It can take up to 15 seconds for the number to blink. This activates the shelf ID programming mode.

> If the ID takes longer than 15 seconds to blink, press and hold the button again, making sure to press it in all the way.

c. Press and release the button to advance the number until you reach the desired number from 0 to 9.

Each press and release duration can be as short as one second.

The first number continues to blink.

4. Change the second number of the shelf ID:
   a. Press and hold the button until the second number on the digital display blinks.

      It can take up to three seconds for the number to blink.

      The first number on the digital display stops blinking.

   b. Press and release the button to advance the number until you reach the desired number from 0 to 9.

      The second number continues to blink.

5. Lock in the desired number and exit the programming mode by pressing and holding the button until the second number stops blinking.

   It can take up to three seconds for the number to stop blinking.

   Both numbers on the digital display start blinking and the amber LED on the ODP illuminates after about five seconds, alerting you that the pending shelf ID has not yet taken effect.

6. Power-cycle the shelf to make the shelf ID take effect.

   You must unplug the power cord from both power supplies on the shelf, wait the appropriate amount of time, and then plug them back into the shelf power supplies to complete the power cycle.

   A power supply is powered on as soon as the power cord is plugged in. Its bicolored LED should illuminate green.

   - If ONTAP is not yet running or you are hot-adding a shelf (that has not yet been cabled to the system), wait at least 10 seconds.
   - If ONTAP is running (controllers are available to serve data), and all drives in the shelf are unowned, spares, wait at least 180 seconds.

     This time allows ONTAP to properly delete the old shelf address and update the copy of the new shelf address.

7. Replace the left end cap.

Maintain

Replace the boot media - NX224 shelves

You can replace a failed boot media in an NX224 shelf. Replacing the boot media can be

done nondisruptively, while the shelf is powered on, and I/O is in progress.

About this task

- After the boot media is replaced, the boot image from the shelf's partner NSM is automatically copied to the replacement boot media.

  This can take up to five minutes.

- Allow at least 70 seconds between removal and installation of the NVMe shelf module (NSM).

  This allows enough time for ONTAP to process the NSM removal event.

- If needed, you can turn on the shelf's location (blue) LEDs to aid in physically locating the affected shelf: `storage shelf location-led modify -shelf-name shelf_name -led-status on`

  If you do not know the *shelf_name* of the affected shelf, run the `storage shelf show` command.

  A shelf has three location LEDs: one on the operator display panel and one on each NSM. Location LEDs remain illuminated for 30 minutes. You can turn them off by entering the same command, but using the `off` option.

- After replacing the boot media, you can return the failed part to NetApp as described in the RMA instructions shipped with the kit.

  If you need the RMA number or additional help with the replacement procedure, contact technical support at NetApp Support, 888-463-8277 (North America), 00-800-44-638277 (Europe), or +800-800-80-800 (Asia/Pacific).

Before you begin

- The shelf's partner NSM must be up and running and cabled correctly so that your shelf maintains connectivity when you remove the NSM with the failed FRU (target NSM). You can verify the partner NSM's status by downloading and running Config Advisor.
- All other components in the system must be functioning properly.

Steps

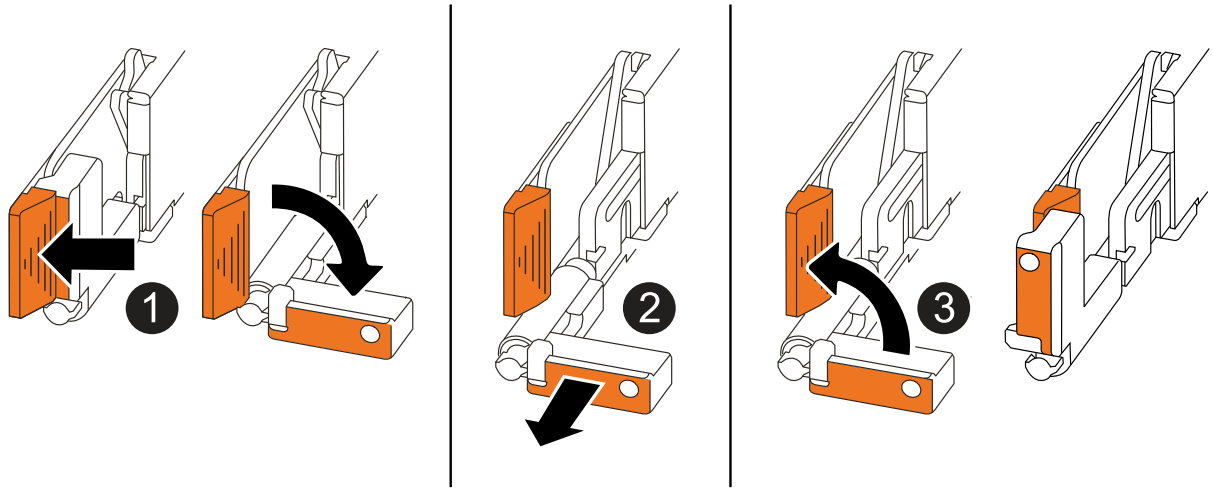
1. Properly ground yourself.
2. Disconnect the cabling from the NSM that contains the FRU that you are replacing:
   a. Disconnect the power cord from the power supply by opening the power cord retainer and then unplugging the power cord from the power supply.

      Power supplies do not have a power switch.

   b. Disconnect the storage cabling from the NSM ports.

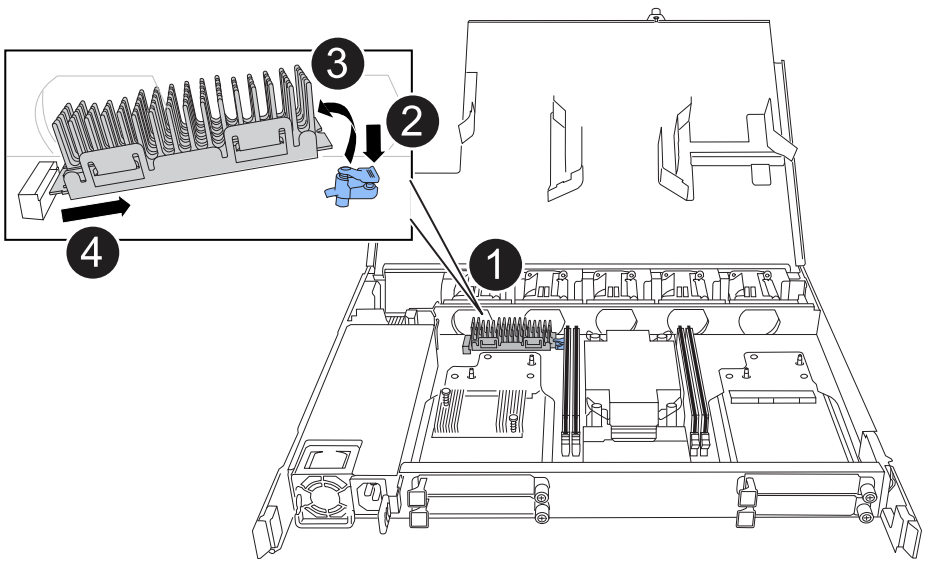
      Make a note of the NSM ports that each cable is connected to. You reconnect the cables to the same ports when you reinsert the NSM, later in this procedure.

3. Remove the NSM:



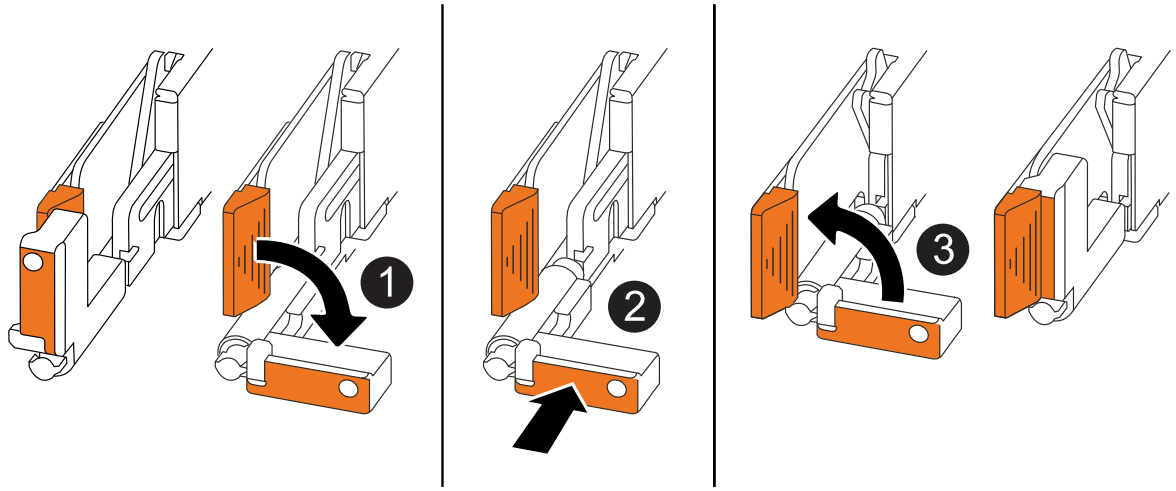
1	On both ends of the NSM, push the vertical locking tabs outward to release the handles.
2	• Pull the handles towards you to unseat the NSM from the midplane. As you pull, the handles extend out from the shelf. When you feel some resistance, keep pulling. • Slide the NSM out of the shelf and place it on a flat, stable surface. Make sure that you support the bottom of the NSM as you slide it out of the shelf.
3	Rotate the handles upright (next to the tabs) to move them out of the way.

4. Open the NSM cover by turning the thumbscrew counterclockwise to loosen it, and then open the cover.
5. Physically locate the failed boot media.
6. Remove the boot media:



1	Boot media location
2	Press down on the blue tab to release the right end of the boot media.
3	Lift the right end of the boot media up at a slight angle to get a good grip along the sides of the boot media.
4	Gently pull the left end of the boot media out of its socket.

7. Install the replacement boot media:
   a. Align the edges of the boot media with the socket housing, and then gently push it squarely into the socket.
   b. Rotate the boot media down toward the locking button.
   c. Push the locking button, rotate the boot media all the way down, and then release the locking button.
8. Close the NSM cover, and then tighten the thumb screw.
9. Insert the NSM into the shelf:



1	If you rotated the NSM handles upright (next to the tabs) to move them out of the way while you serviced the NSM, rotate them down to the horizontal position.
2	Align the rear of the NSM with the opening in the shelf, and then gently push the NSM using the handles until it is fully seated.
3	Rotate the handles to the upright position and lock in place with the tabs.

10. Reconnect the cabling to the NSM:
    a. Reconnect the storage cabling to the same eight NSM ports.

       Cables are inserted with the connector pull-tab facing up. When a cable is inserted correctly, it clicks into place.

b. Reconnect the power cord to the power supply, and then secure the power cord with the power cord retainer.

   When functioning correctly, a power supply's bicolored LED illuminates green.

   Additionally, both NSM port LNK (green) LEDs illuminate. If a LNK LED does not illuminate, reseat the cable.

11. Verify that the attention (amber) LEDs on the NSM containing the failed boot media and the shelf operator display panel are no longer illuminated.

    It can take between 5 to 10 minutes for the attention LEDs to turn off. This is the amount of time it takes the NSM to reboot and the boot media image copy to complete.

    If the fault LEDs remain on, the boot media might not be seated correctly or there might be another issue and you should contact technical support for assistance.

12. Verify that the NSM is cabled correctly, by running Active IQ Config Advisor.

    If any cabling errors are generated, follow the corrective actions provided.

Replace a DIMM - NX224 shelves

You can replace a faulty DIMM nondisruptively in an NX224 drive shelf that is powered on, and while I/O is in progress.

About this task

- Allow at least 70 seconds between removal and installation of the NVMe shelf module (NSM).

  This allows enough time for ONTAP to process NSM removal event.

- **Best practice:** The best practice is to have current versions of NVMe shelf module (NSM) firmware and drive firmware on your system before replacing FRU components. You can visit the NetApp Support Site to download disk shelf firmware and download disk drive firmware.

  Do not revert firmware to a version that does not support your shelf and its components.

- If needed, you can turn on the shelf's location (blue) LEDs to aid in physically locating the affected shelf: `storage shelf location-led modify -shelf-name shelf_name -led-status on`

  If you do not know the *`shelf_name`* of the affected shelf, run the `storage shelf show` command.

  A shelf has three location LEDs: one on the operator display panel and one on each NSM. Location LEDs remain illuminated for 30 minutes. You can turn them off by entering the same command, but using the `off` option.

- When you unpack the replacement DIMM, save all packing materials for use when you return the failed DIMM.

  If you need the RMA number or additional help with the replacement procedure, contact technical support at NetApp Support, 888-463-8277 (North America), 00-800-44-638277 (Europe), or +800-800-80-800 (Asia/Pacific).

Before you begin

- The shelf's partner NSM must be up and running, and be cabled correctly so that your shelf maintains connectivity when you remove the NSM with the failed FRU (target NSM). You can verify the partner NSM's status by downloading and running Config Advisor.
- All other components in the system, including the other three DIMMs, must be functioning properly.

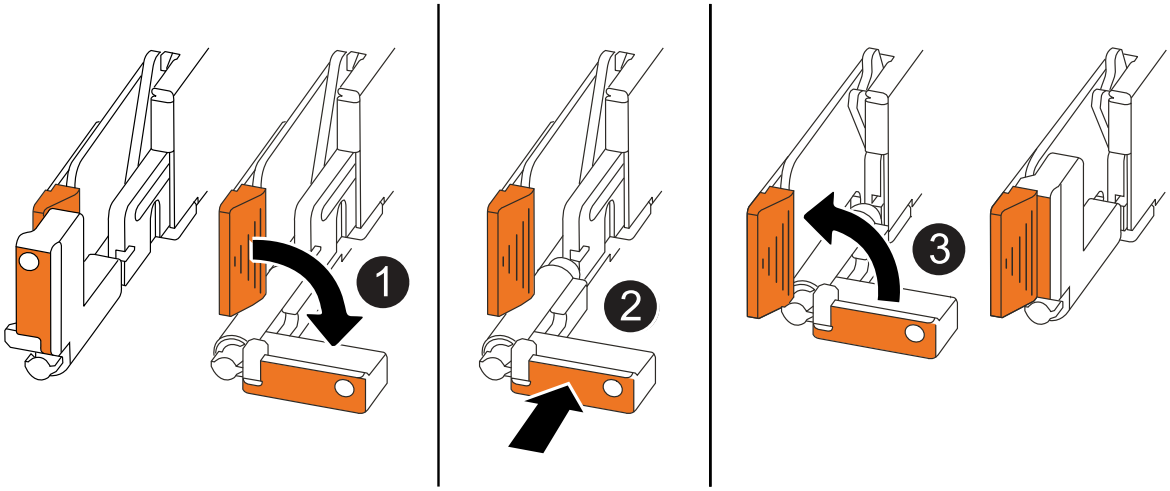
Steps

1. Properly ground yourself.
2. Disconnect the cabling from the NSM that contains the FRU that you are replacing:
   a. Disconnect the power cord from the power supply by opening the power cord retainer and then unplugging the power cord from the power supply.

      Power supplies do not have a power switch.

   b. Disconnect the storage cabling from the NSM ports.

      Make a note of the NSM ports that each cable is connected to. You reconnect the cables to the same ports when you reinsert the NSM, later in this procedure.
3. Insert the NSM into the shelf:



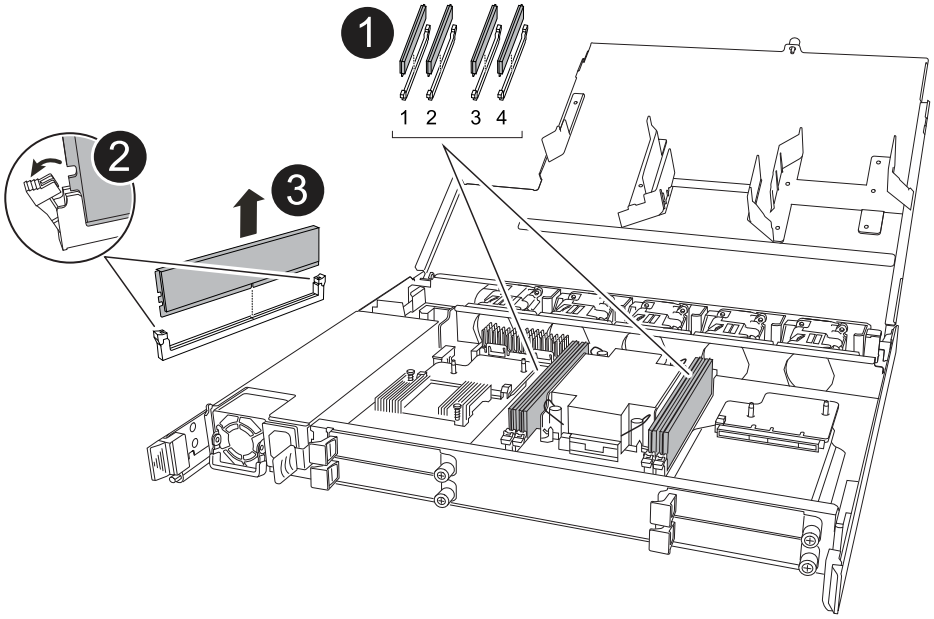
1	If you rotated the NSM handles upright (next to the tabs) to move them out of the way while you serviced the NSM, rotate them down to the horizontal position.
2	Align the rear of the NSM with the opening in the shelf, and then gently push the NSM using the handles until it is fully seated.
3	Rotate the handles to the upright position and lock in place with the tabs.

4. Open the NSM cover by turning the thumbscrew counterclockwise to loosen, and then open the cover.

   The FRU label on the NSM cover shows the location of the four DIMMs in the NSM.
5. Physically identify the faulty DIMM.

When a DIMM is faulty, the system logs a warning message to the system console indicating which DIMM needs to be replaced.

6. Remove the faulty DIMM:



1	DIMM slot numbering and positions.
2	• Note the orientation of the DIMM in the socket so that you can insert the replacement DIMM using the same orientation. • Eject the faulty DIMM by slowly pushing apart the two DIMM ejector tabs on both ends of the DIMM slot. Carefully hold the DIMM by the corners or edges to avoid pressure on the DIMM circuit board components.
3	Lift the DIMM up and out of the slot. The ejector tabs remain in the open position.

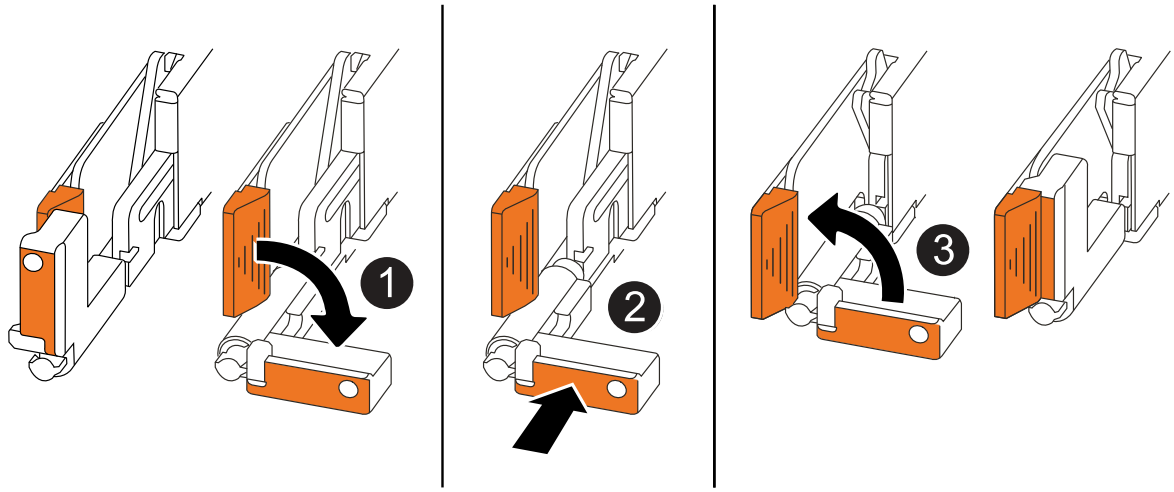
7. Replace the DIMM:
   a. Remove the replacement DIMM from its antistatic shipping bag.
   b. Hold the DIMM by the corners, and then insert the DIMM squarely into a slot.

      The notch on the bottom of the DIMM, among the pins, should line up with the tab in the slot.

      When inserted correctly, the DIMM should go in easily but fit tightly in the slot. If not, reinsert the DIMM.

   c. Push down carefully, but firmly, on the top edge of the DIMM until the ejector tabs snap into place over the notches at both ends of the DIMM.
8. Close the NSM cover, and then tighten the thumb screw.

9. Insert the NSM into the shelf:



1	If you rotated the NSM handles upright (next to the tabs) to move them out of the way while you serviced the NSM, rotate them down to the horizontal position.
2	Align the rear of the NSM with the opening in the shelf, and then gently push the NSM using the handles until it is fully seated.
3	Rotate the handles to the upright position and lock in place with the tabs.

10. Reconnect the cabling to the NSM:
    a. Reconnect the storage cabling to the same eight NSM ports.

       Cables are inserted with the connector pull-tab facing up. When a cable is inserted correctly, it clicks into place.

    b. Reconnect the power cord to the power supply, and then secure the power cord with the power cord retainer.

       When functioning correctly, a power supply's bicolored LED illuminates green.

       Additionally, both NSM port LNK (green) LEDs illuminate. If a LNK LED does not illuminate, reseat the cable.

11. Verify that the attention (amber) LEDs on the NSM containing the failed DIMM and the shelf operator display panel are no longer illuminated.

    The NSM attention LEDs turn off after the NSM reboots and no longer detects a DIMM issue. This can take three to five minutes.

12. Verify that the NSM is cabled correctly, by running Config Advisor.

    If any cabling errors are generated, follow the corrective actions provided.

Hot-swap a drive - NX224 shelves

You can replace a failed drive nondisruptively in an NX224 shelf that is powered on, and while I/O is in progress.

Before you begin

- The drive that you are installing must be supported by the NX224 shelf. You can verify your shelf's compatible drives in the NetApp Hardware Universe.
- If SED authentication is enabled, you must use the SED replacement instructions in the ONTAP documentation.

  You can view the additional steps that must be completed before and after replacing an SED in the NetApp encryption overview with the CLI documentation.
- All other components in the system must be functioning properly; if not, contact technical support.
- Verify that the drive you are removing is failed.

  You can verify that the drive is failed by running the `storage disk show -broken` command. The failed drive appears in the list of failed drives. If it does not, you should wait, and then run the command again.

  Depending on the drive type and capacity, it can take up to several hours for the drive to appear in the list of failed drives.

About this task

- **Best practice:** Ensure your system can recognize and use newly qualified drives by downloading the current version of the Disk Qualification Package.

  This avoids system event messages about having noncurrent drive information and prevention of drive partitioning because drives are not recognized. The DQP also notifies you of noncurrent drive firmware.
- **Best practice:** The best practice is to have current versions of NVMe shelf module (NSM) firmware and drive firmware on your system before replacing FRU components. You can visit the NetApp Support Site to download disk shelf firmware and download disk drive firmware.

  Do not revert firmware to a version that does not support your shelf and its components.
- Drive firmware is automatically updated (nondisruptively) on new drives that have non-current firmware versions.

  Drive firmware checks occur every two minutes.
- If needed, you can turn on the shelf's location (blue) LEDs to aid in physically locating the affected shelf: `storage shelf location-led modify -shelf-name *shelf_name* -led-status on`

  If you do not know the *`shelf_name`* of the affected shelf, run the `storage shelf show` command.

  A shelf has three location LEDs: one on the operator display panel and one on each NSM. Location LEDs remain illuminated for 30 minutes. You can turn them off by entering the same command, but using the `off` option.

- When you unpack the replacement drive, save all packing materials for use when you return the failed drive.

  If you need the RMA number or additional help with the replacement procedure, contact technical support at NetApp Support, 888-463-8277 (North America), 00-800-44-638277 (Europe), or +800-800-80-800 (Asia/Pacific).

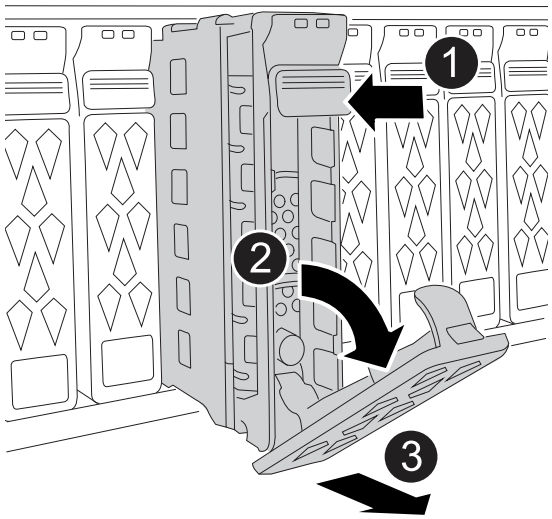
Steps

1. Properly ground yourself.
2. Physically identify the failed drive.

   When a drive fails, the system logs a warning message to the system console indicating which drive failed. Additionally, the attention (amber) LED on the shelf operator display panel and the failed drive illuminate.

   The activity (green) LED on a failed drive can be illuminated (solid), which indicates that the drive has power, but should not be blinking, which indicates I/O activity. A failed drive has no I/O activity.

3. Remove the failed drive:



1	Press the release button on the drive face to open the cam handle.
2	Rotate the cam handle downward to disengage the drive from the midplane.
3	Slide the drive out of the shelf using the cam handle and supporting the drive with your other hand.

4. Wait a minimum of 70 seconds before inserting the replacement drive.

   This allows the system to recognize that a drive was removed.

5. Insert the replacement drive:
   a. With the cam handle in the open position, use both hands to insert the drive.

b. Gently push until the drive stops.

c. Close the cam handle so that the drive is fully seated into the mid plane and the handle clicks into place.

   Be sure to close the cam handle slowly so that it aligns correctly with the face of the drive.

6. Verify that the drive's activity (green) LED is illuminated.

   When the drive's activity LED is solid, it means that the drive has power. When the drive's activity LED is blinking, it means that the drive has power and I/O is in progress. If the drive firmware is automatically updating, the LED blinks.

7. If you are replacing another drive, repeat the preceding steps.

Drive shelf

Overview of shelf maintenance - NX224 shelves

You can take the following actions to maintain your NX224 shelf:

- Hot-add a drive
- Monitor shelf LEDs

Hot-add a drive - NX224 shelves

You can add new drives to a powered-on shelf non-disruptively, even during I/O operations.

Use the NetApp Knowledge Base article Best practices for adding disks to an existing shelf or cluster.

Monitor drive shelf LEDs - NX224 shelves

You can monitor the health of your shelf by understanding the location and status conditions of the LEDs on your drive shelf components.

- The location (blue) LEDs, on a shelf's operator display panel (ODP) and both NVMe shelf modules (NSMs), can be activated to aid in physically locating the shelf that needs servicing: `storage shelf location-led modify -shelf-name shelf_name -led-status on`

  If you do not know the *`shelf_name`* of the affected shelf, run the `storage shelf show` command.

  Location LEDs remain illuminated for 30 minutes. You can turn them off by entering the same command, but using the `off` option.

- An LED state can be:
  - "On": The LED illumination is solid/steady
  - "Off": The LED is not illuminated
  - "Blink": The LED turns on and off at varying intervals depending on the FRU status
  - "Any state": The LED can be "On", "Off", or "Blink"

Operator display panel LEDs

The LEDs on the drive shelf front operator display panel (ODP) indicate whether your drive shelf is functioning normally or there are problems with the hardware.

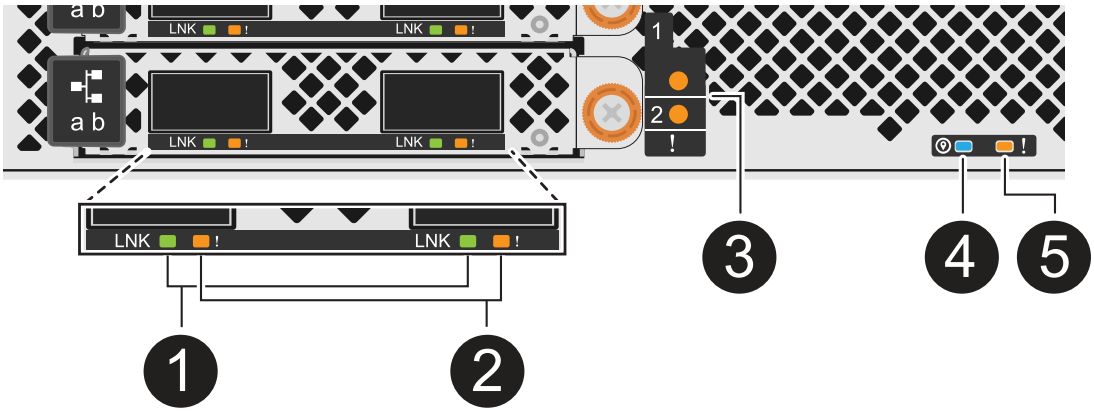
The following illustration and table describes the three LEDs on the ODP:

LED icon	LED name & color	State	Description
	Power (Green)	On	One or more power supplies are supplying power to the drive shelf.
!	Attention (Amber)	On	• An error occurred with the function of one of more shelf FRUs. Check event messages to determine corrective action to take. • If the two-digit shelf ID is also blinking, the shelf ID is in a pending state. Power cycle the drive shelf for the shelf ID to take affect.
	Location (Blue)	On	The system administrator activated this LED function.

NSM LEDs

The LEDs on an NSM indicate whether the module is functioning normally, whether it is ready for I/O traffic, and whether there are any problems with the hardware.

The following illustration and tables describe NSM LEDs associated with the function of a module and the function of each NVMe port on a module.



Call out	LED icon	Color	Description
1	LNK	Green	NVMe port/link: status
2	!	Amber	NVMe port/link: attention
3	!	Amber	I/O module: attention
4		Blue	NSM: Location
5	!	Amber	NSM: Attention

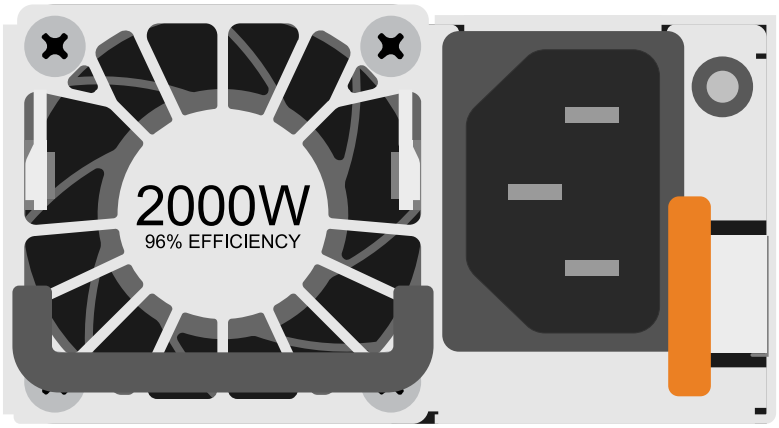
Status	NSM Attention (Amber)	Port LNK (Green)	Port Attention (Amber)	I/O Module Attention
NSM normal	Off	Any state	Off	Off
NSM fault	On	Any state	Any state	Off
NSM VPD Error	On	Any state	Any state	Off
No host port connection	Any state	Off	Off	Off
Host port connection link active	Any state	On/Blinks with activity	Any state	Off
Host port connection w/ fault	On	On/Off if all lanes are faulted	On	Off
BIOS boot from BIOS image after power up	Blink	Any state	Any state	Off

Status	NSM Attention (Amber)	Port LNK (Green)	Port Attention (Amber)	I/O Module Attention
I/O Module is missing	On	N/A	N/A	On

Power supply LEDs

The LEDs on an AC power supply (PSU) indicate whether the PSU is functioning normally or there are hardware problems.

The following illustration and tables describe the LED on a PSU.



Call out	Description
1	The bi-color LED indicates power/activity when green and a fault when red.

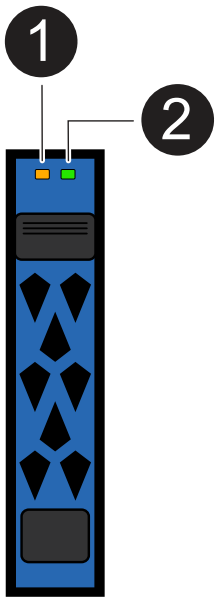
Status	Power/activity (Green)	Attention (Red)
No AC power to the enclosure	Off	Off
No AC power to the PSU	Off	On
AC power on, but PSU not in enclosure	Blink	Off
PSU operating correctly	On	Off
PSU failure	Off	On
Fan failure	Off	On
Firmware update mode	Blink	Off

Drive LEDs

The LEDs on an NVMe drive indicates whether it is functioning normally or there are problems with the

hardware.

The following illustration and tables describe the two LEDs on an NVMe drive:



Call out	LED name	Color
1	Attention	Amber
2	Power/activity	Green

Status	Power/Activity (Green)	Attention (Amber)	Associated ODP LED
Drive installed and operational	On/Blinks with activity	Any state	N/A
Drive failure	On/Blinks with activity	On	Attention (Amber)
SES device identify set	On/Blinks with activity	Blinks	Attention (Amber) is off
SES device fault bit set	On/Blinks with activity	On	Attention (Amber)
Power control circuit failure	Off	Any state	Attention (Amber)

Replace a fan module - NX224 shelves

If one or both of the fans in your fan module fail, you can replace your fan module. This

procedure can be completed nondisruptively in an NX224 shelf that is powered on with I/O in progress.

About this task

- Allow at least 70 seconds between removal and installation of the NVMe shelf module (NSM).

  This allows enough time for ONTAP to process the NSM removal event.

- **Best practice:** The best practice is to have current versions of NSM firmware and drive firmware on your system before replacing FRU components. You can visit the NetApp Support Site to download disk shelf firmware and download disk drive firmware.

  Do not revert firmware to a version that does not support your shelf and its components.

- If needed, you can turn on the shelf's location (blue) LEDs to aid in physically locating the affected shelf: `storage shelf location-led modify -shelf-name shelf_name -led-status on`

  If you do not know the *`shelf_name`* of the affected shelf, run the `storage shelf show` command.

  A shelf has three location LEDs: one on the operator display panel and one on each NSM. Location LEDs remain illuminated for 30 minutes. You can turn them off by entering the same command, but using the `off` option.

- When you unpack the replacement fan, save all packing materials for use when you return the failed fan.

  If you need the RMA number or additional help with the replacement procedure, contact technical support at NetApp Support, 888-463-8277 (North America), 00-800-44-638277 (Europe), or +800-800-80-800 (Asia/Pacific).

Before you begin

The shelf's partner NSM must be up and running and cabled correctly so that your shelf maintains connectivity when you remove the NSM with the failed FRU (target NSM). You can verify the partner NSM's status by downloading and running Config Advisor.

Steps

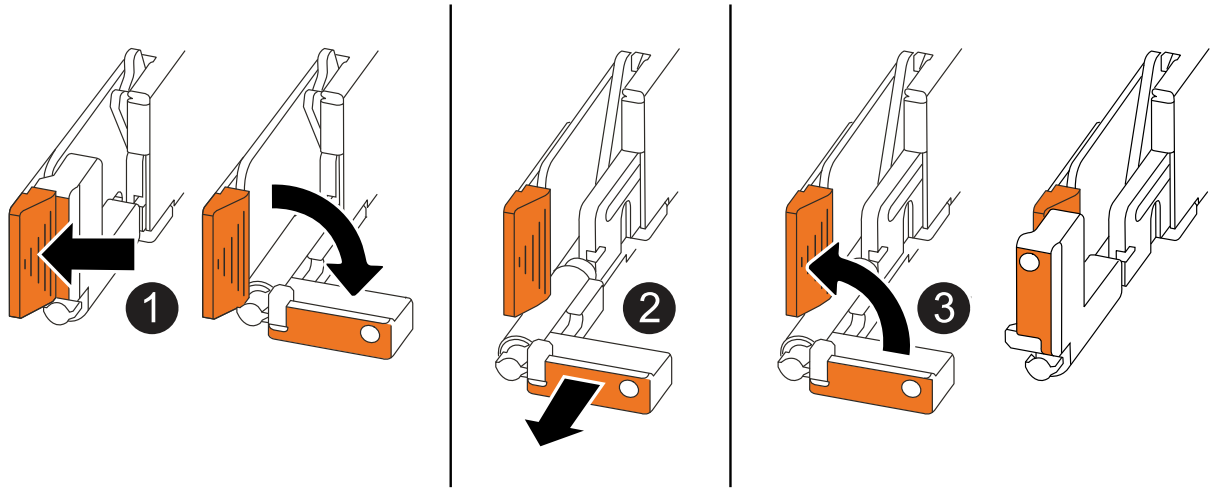
1. Properly ground yourself.
2. Disconnect the cabling from the NSM that contains the FRU that you are replacing:
   a. Disconnect the power cord from the power supply by opening the power cord retainer and then unplugging the power cord from the power supply.

      Power supplies do not have a power switch.

   b. Disconnect the shelf cabling from the NSM ports.

      Make a note of the NSM ports that each cable is connected to. You reconnect the cables to the same ports when you reinsert the NSM later in this procedure.

3. Remove the NSM:



1	On both ends of the NSM, push the vertical locking tabs outward to release the handles.
2	• Pull the handles towards you to unseat the NSM from the midplane. As you pull, the handles extend out from the shelf. When you feel some resistance, keep pulling. • Slide the NSM out of the shelf and place it on a flat, stable surface. Make sure that you support the bottom of the NSM as you slide it out of the shelf.
3	Rotate the handles upright (next to the tabs) to move them out of the way.

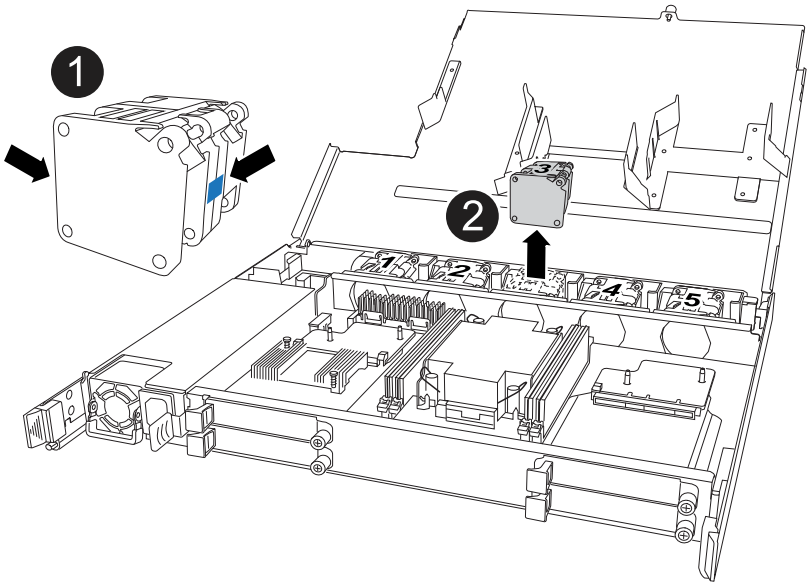
4. Open the NSM cover by turning the thumbscrew counterclockwise to loosen, and then open the cover.

   The FRU label on the NSM cover shows the location of the five fans, along the rear wall of the NSM.

5. Physically identify the failed fan.

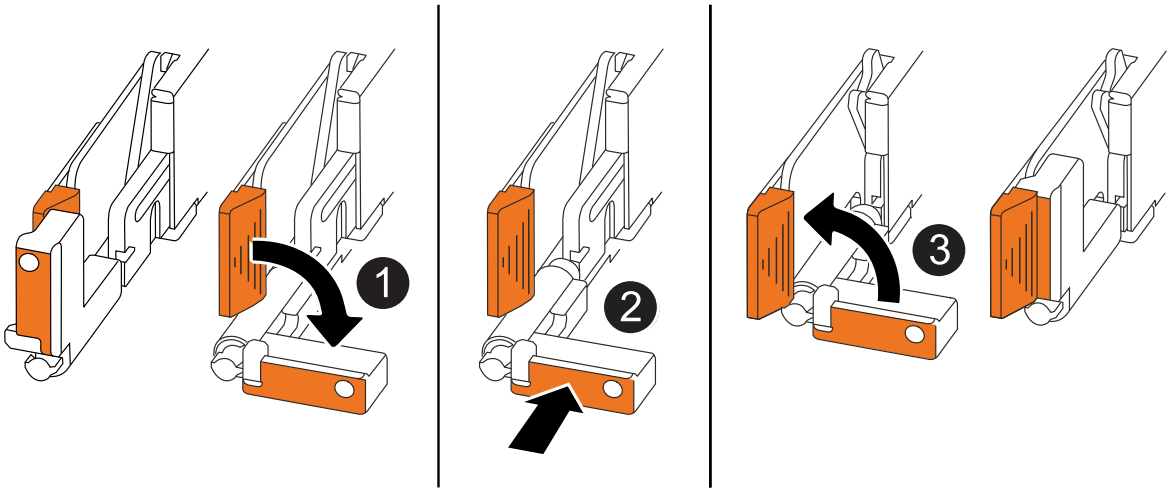
   When a fan fails, the system logs a warning message to the system console indicating which fan failed.

6. Replace the failed fan:



1	Remove the failed fan by firmly grasping the sides where the blue touch points are located, and then pull it straight up out of its socket.
1	Insert the replacement fan by aligning it within the guides, and then push down until the fan connector is fully seated in the socket.

7. Close the NSM cover, and then tighten the thumb screw.
8. Insert the NSM into the shelf:



1	If you rotated the NSM handles upright (next to the tabs) to move them out of the way while you serviced the NSM, rotate them down to the horizontal position.
2	Align the rear of the NSM with the opening in the shelf, and then gently push the NSM using the handles until it is fully seated.
3	Rotate the handles to the upright position and lock in place with the tabs.

9. Reconnect the cabling to the NSM:
   a. Reconnect the shelf cabling to the same eight NSM ports.

      Cables are inserted with the connector pull-tab facing up. When a cable is inserted correctly, it clicks into place.

   b. Reconnect the power cord to the power supply, and then secure the power cord with the power cord retainer.

      When functioning correctly, a power supply's bicolored LED illuminates green.

      Additionally, both NSM port LNK (green) LEDs illuminate. If a LNK LED does not illuminate, reseat the cable.

10. Verify that the attention (amber) LEDs on the NSM containing the failed fan and the shelf operator display panel are no longer illuminated.

    The NSM attention LEDs turn off after the NSM reboots and no longer detects a fan issue. This can take three to five minutes.

11. Verify that the NSM is cabled correctly, by running Active IQ Config Advisor.

    If any cabling errors are generated, follow the corrective actions provided.

Replace the Ethernet I/O module - NX224 shelves

You can replace a failed Ethernet I/O module nondisruptively in an NX224 shelf that is powered on, and while I/O is in progress.

About this task

- Allow at least 70 seconds between removal and installation of the NVMe shelf module (NSM).

  This allows enough time for ONTAP to process the NSM removal event.

- **Best practice:** The best practice is to have current versions of NVMe shelf module (NSM) firmware and drive firmware on your system before replacing FRU components. You can visit the NetApp Support Site to download disk shelf firmware and download disk drive firmware.

  Do not revert firmware to a version that does not support your shelf and its components.

- Shelf (NSM) firmware is automatically updated (nondisruptively) on a new NSM that has a non-current firmware version.

  NSM firmware checks occur every 10 minutes. An NSM firmware update can take up to 30 minutes.

- If needed, you can turn on the shelf's location (blue) LEDs to aid in physically locating the affected shelf: `storage shelf location-led modify -shelf-name shelf_name -led-status on`

  If you do not know the `shelf_name` of the affected shelf, run the `storage shelf show` command.

  A shelf has three location LEDs: one on the operator display panel and one on each NSM. Location LEDs remain illuminated for 30 minutes. You can turn them off by entering the same command, but using the `off` option.

- When you unpack the replacement NSM, save all packing materials for use when you return the failed NSM.

  If you need the RMA number or additional help with the replacement procedure, contact technical support at NetApp Support, 888-463-8277 (North America), 00-800-44-638277 (Europe), or +800-800-80-800 (Asia/Pacific).

Before you begin

- The shelf's partner NSM must be up and running and cabled correctly so that your shelf maintains connectivity when you remove the failed NSM. You can verify the partner NSM's status by downloading and running Config Advisor.
- All other components in the system must be functioning properly.

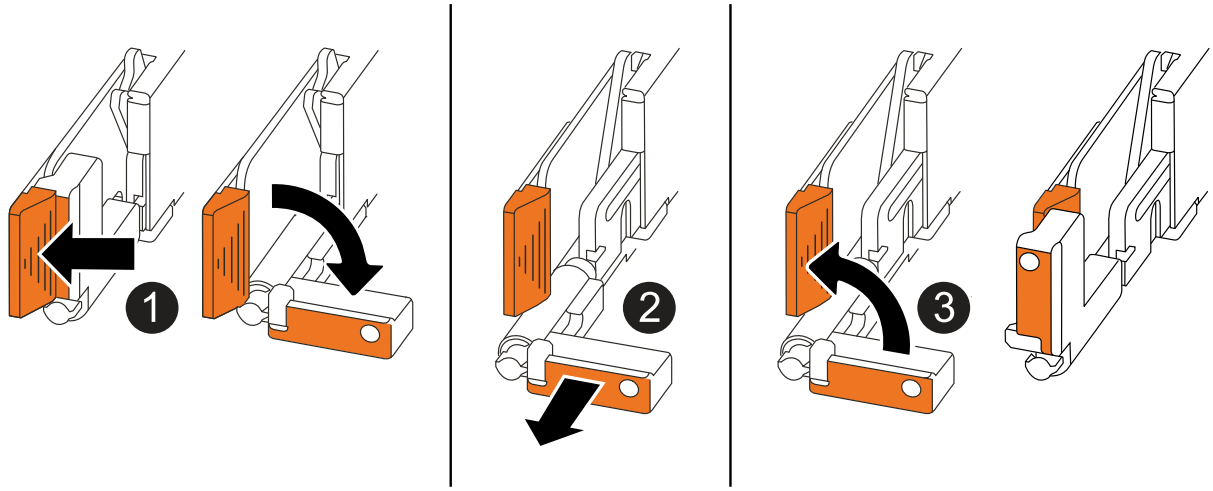
Steps

1. Properly ground yourself.
2. Disconnect the cabling from the NSM that contains the FRU that you are replacing:
   a. Disconnect the power cord from the power supply by opening the power cord retainer and then unplugging the power cord from the power supply.

      Power supplies do not have a power switch.

   b. Disconnect the storage cabling from the NSM ports.

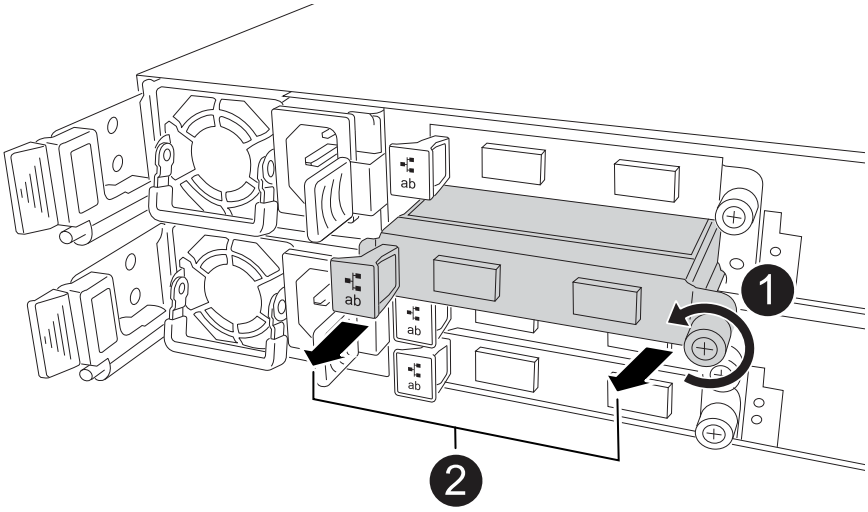
      Make a note of the NSM ports that each cable is connected to. You reconnect the cables to the same ports when you reinsert the NSM, later in this procedure.
3. Remove the NSM:



1	On both ends of the NSM, push the vertical locking tabs outward to release the handles.

2	• Pull the handles towards you to unseat the NSM from the midplane. As you pull, the handles extend out from the shelf. When you feel some resistance, keep pulling. • Slide the NSM out of the shelf and place it on a flat, stable surface. Make sure that you support the bottom of the NSM as you slide it out of the shelf.
3	Rotate the handles upright (next to the tabs) to move them out of the way.

4. Remove the failed I/O module from the NSM:

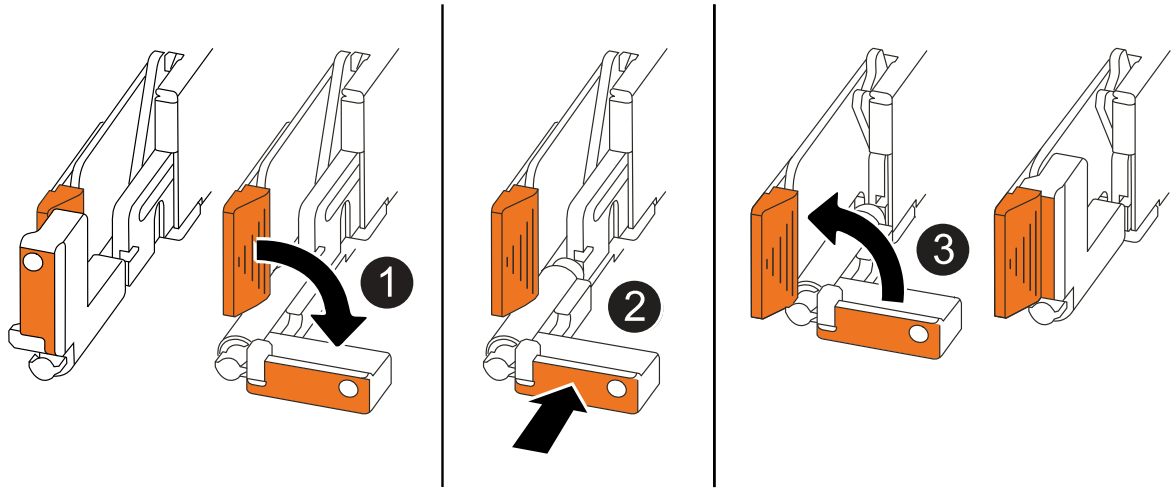


1	Turn the I/O module thumbscrew counterclockwise to loosen.
2	Pull the I/O module out of the NSM using the port label tab on the left and the thumbscrew.

5. 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.
6. Insert the NSM into the shelf:



1	If you rotated the NSM handles upright (next to the tabs) to move them out of the way while you serviced the NSM, rotate them down to the horizontal position.
2	Align the rear of the NSM with the opening in the shelf, and then gently push the NSM using the handles until it is fully seated.
3	Rotate the handles to the upright position and lock in place with the tabs.

7. Recable the NSM:
   a. Reconnect the storage cabling to the same eight NSM ports.

      Cables are inserted with the connector pull-tab facing up. When a cable is inserted correctly, it clicks into place.

   b. Reconnect the power cord to the power supply, and then secure the power cord with the power cord retainer.

      When functioning correctly, a power supply's bicolored LED illuminates green.

      Additionally, both NSM port LNK (green) LEDs illuminate. If a LNK LED does not illuminate, reseat the cable.

8. Verify that the attention (amber) LEDs on the NSM containing the failed I/O module and the shelf operator display panel are no longer illuminated.

   The NSM attention LEDs turn off after the NSM reboots and no longer detects an I/O module issue. This can take three to five minutes.

9. Verify that the NSM is cabled correctly, by running Active IQ Config Advisor.

   If any cabling errors are generated, follow the corrective actions provided.

Replace an NSM - NX224 shelves

You can replace an impaired NVMe shelf module (NSM) nondisruptively in an NX224

drive shelf that is powered on, and while I/O is in progress.

About this task

- Replacing the NSM involves moving the DIMMs, fans, boot media, I/O module, and power supply from the impaired NSM to the replacement NSM.

  You do not move the real-time clock (RTC) battery. It comes preinstalled in the replacement NSM.

- Allow at least 70 seconds between removal and installation of the NSM.

  This allows enough time for ONTAP to process the NSM removal event.

- **Best practice:** The best practice is to have current versions of NSM firmware and drive firmware on your system before replacing FRU components. You can visit the NetApp Support Site to download disk shelf firmware and download disk drive firmware.

  Do not revert firmware to a version that does not support your shelf and its components.

- Shelf (NSM) firmware is automatically updated (nondisruptively) on a new NSM that has a non-current firmware version.

  NSM firmware checks occur every 10 minutes. An NSM firmware update can take up to 30 minutes.

- If needed, you can turn on the shelf's location (blue) LEDs to aid in physically locating the affected shelf: `storage shelf location-led modify -shelf-name shelf_name -led-status on`

  If you do not know the `shelf_name` of the affected shelf, run the `storage shelf show` command.

  A shelf has three location LEDs: one on the operator display panel and one on each NSM. Location LEDs remain illuminated for 30 minutes. You can turn them off by entering the same command, but using the `off` option.

- When you unpack the replacement NSM, save all packing materials for use when you return the failed NSM.

  If you need the RMA number or additional help with the replacement procedure, contact technical support at NetApp Support, 888-463-8277 (North America), 00-800-44-638277 (Europe), or +800-800-80-800 (Asia/Pacific).

Before you begin

- The shelf's partner NSM must be up and running, and be cabled correctly so that your shelf maintains connectivity when you remove the failed NSM. You can verify the partner NSM's status by downloading and running Config Advisor.
- All other components in the system must be functioning properly.

Steps

1. Properly ground yourself.
2. Physically identify the impaired NSM.

   The system logs a warning message to the system console indicating which module is impaired. Additionally, the attention (amber) LED on the drive shelf operator display panel and the impaired module illuminate.

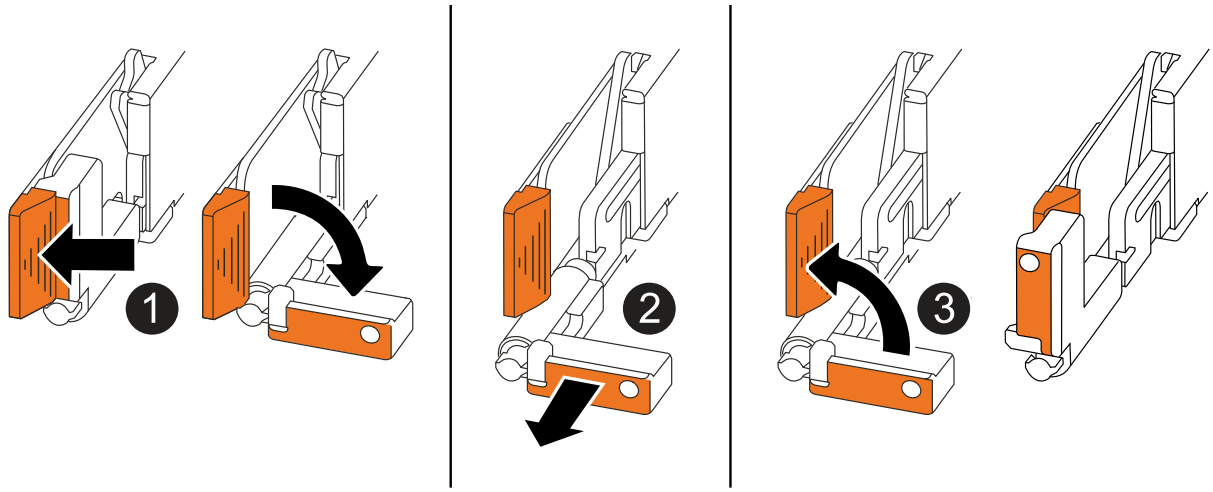
3. Disconnect the cabling from the impaired NSM:
   a. Disconnect the power cord from the power supply by opening the power cord retainer and then unplugging the power cord from the power supply.

      Power supplies do not have a power switch.

   b. Disconnect the storage cabling from the NSM ports.

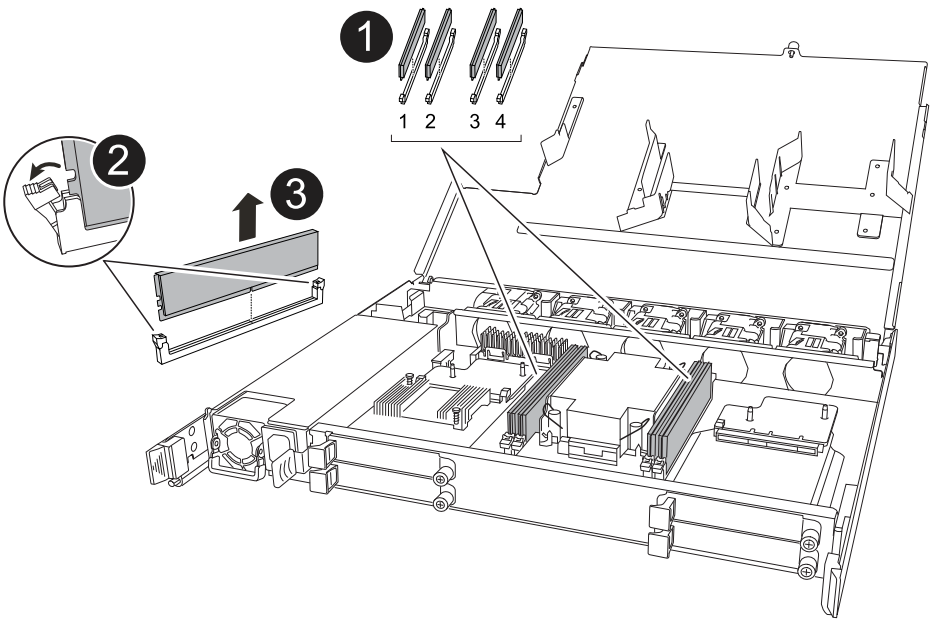
      Make a note of the NSM ports that each cable is connected to. You reconnect the cables to the same ports on the replacement NSM, later in this procedure.

4. Remove the NSM:



1	On both ends of the NSM, push the vertical locking tabs outward to release the handles.
2	• Pull the handles towards you to unseat the NSM from the midplane. As you pull, the handles extend out from the shelf. When you feel some resistance, keep pulling. • Slide the NSM out of the shelf and place it on a flat, stable surface. Make sure that you support the bottom of the NSM as you slide it out of the shelf.
3	Rotate the handles upright (next to the tabs) to move them out of the way.

5. Unpack the replacement NSM, and set it on a level surface near the impaired NSM.
6. Open the covers of both NSMs by loosening the thumbscrew on each cover.
7. Move all four DIMMs from the impaired NSM to the replacement NSM:
   a. Remove each DIMM from the impaired NSM:



1	DIMM slot numbering and positions.
2	• Note the orientation of the DIMM in the socket so that you can insert it into the replacement DIMM using the same orientation. • Eject the faulty DIMM by slowly pushing apart the two DIMM ejector tabs on both ends of the DIMM slot. Carefully hold the DIMM by the corners or edges to avoid pressure on the DIMM circuit board components.
3	Lift the DIMM up and out of the slot. The ejector tabs remain in the open position.

b. Install each DIMM in the replacement NSM:

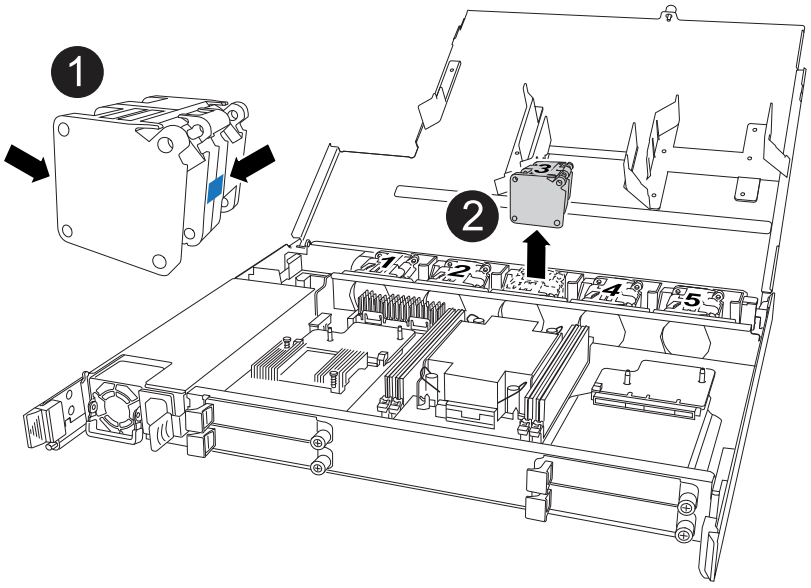
i. Hold the DIMM by the corners, and then insert the DIMM squarely into a slot.

The notch on the bottom of the DIMM, among the pins, should line up with the tab in the slot.

When inserted correctly, the DIMM should go in easily but fit tightly in the slot. If not, reinsert the DIMM.

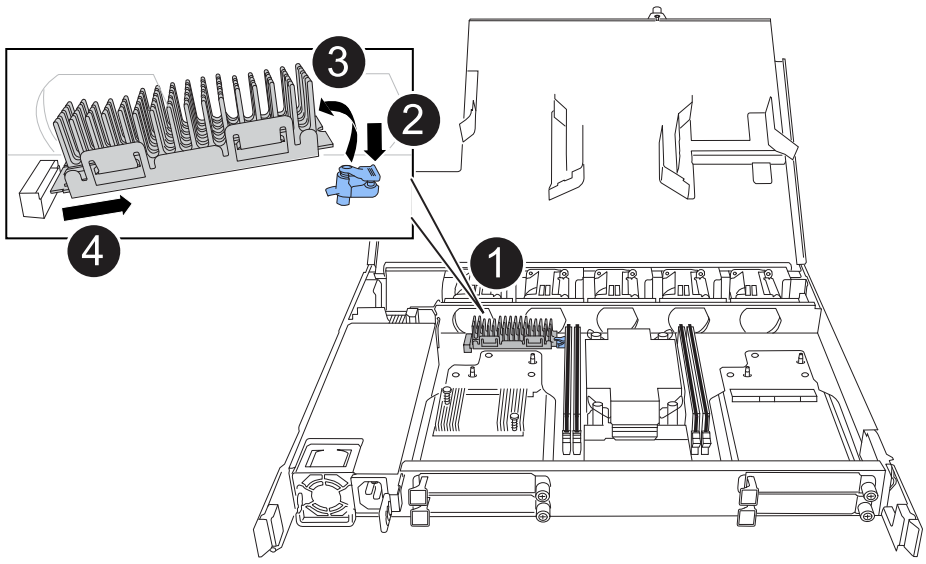
ii. Push down carefully, but firmly, on the top edge of the DIMM until the ejector tabs snap into place over the notches at both ends of the DIMM.

8. Move all fans from the impaired NSM to the replacement NSM:



1	Remove the failed fan by firmly grasping the sides where the blue touch points are located, and then pull it straight up out of its socket.
1	Insert the replacement fan by aligning it within the guides, and then push down until the fan connector is fully seated in the socket.

9. Move the boot media to the replacement NSM:
   a. Remove the boot media from the impaired NSM:



1	Boot media location
2	Press down on the blue tab to release the right end of the boot media.

3	Lift the right end of the boot media up at a slight angle to get a good grip along the sides of the boot media.
4	Gently pull the left end of the boot media out of its socket.

b. Install the boot media in the replacement NSM:

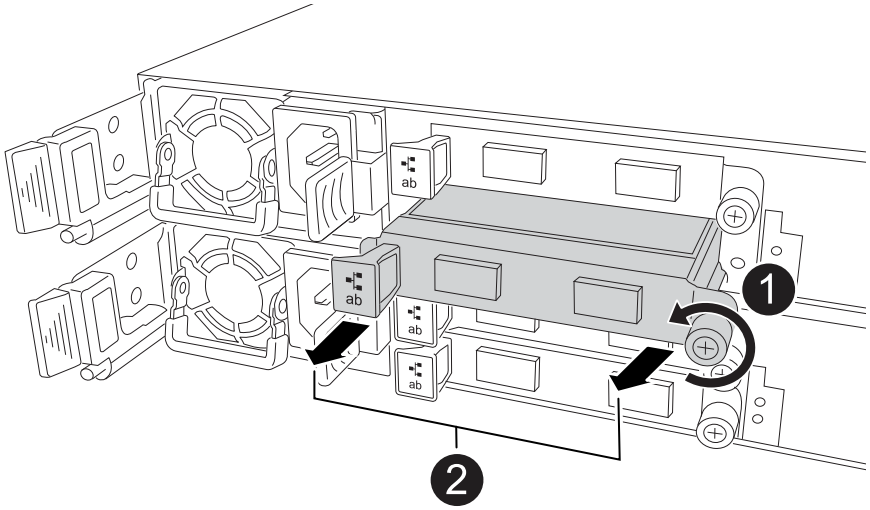
i. Align the edges of the boot media with the socket housing in the replacement NSM, and then gently push it squarely into the socket.

ii. Rotate the boot media down toward the locking button.

iii. Push the locking button, rotate the boot media all the way down, and then release the locking button.

10. Move all four I/O modules from the impaired NSM to the replacement NSM.

a. Remove each I/O module from the impaired NSM:



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

b. Install each I/O module in the replacement NSM:

i. Align the I/O module with the edges of the slot in the replacement NSM.

ii. 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.

11. Close the cover of each NSM, and then tighten each thumbscrew.

12. Move the power supply from the impaired NSM to the replacement NSM:

a. Rotate the power supply handle up, to its horizontal position, and then grasp it.

b. With your thumb, press the terra-cotta tab on the power supply to release the locking mechanism.

c. Pull the power supply out of the NSM while using your other hand to support its weight.

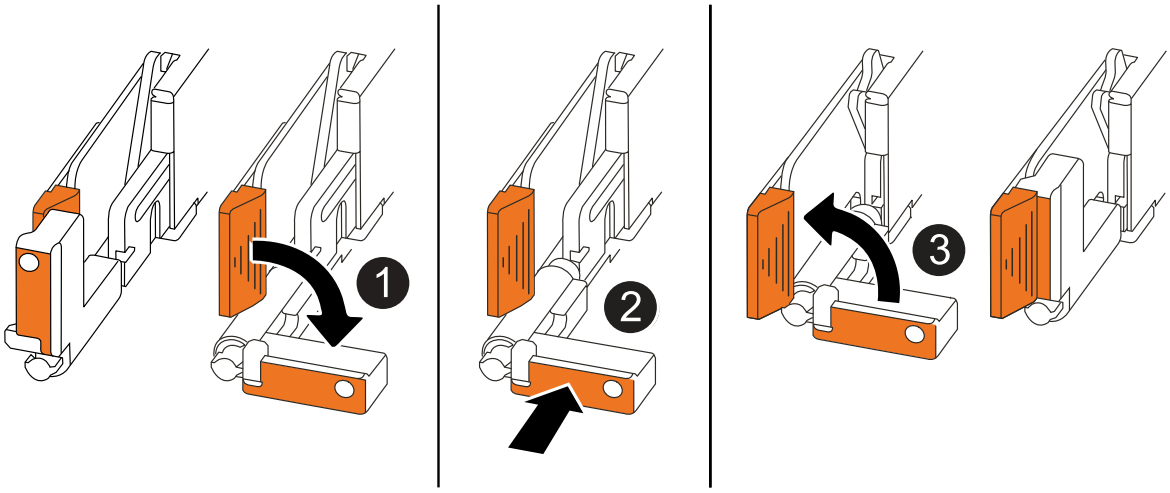
d. Using both hands, support and align the edges of the power supply with the opening in the replacement NSM.

e. Gently push the power supply into the NSM until the locking mechanism clicks into place.

> Do not use excessive force or you might damage the internal connector.

f. Rotate the power supply handle down, so it is out of the way of normal operations.

13. Insert the NSM into the shelf:



1	If you rotated the NSM handles upright (next to the tabs) to move them out of the way while you serviced the NSM, rotate them down to the horizontal position.
2	Align the rear of the NSM with the opening in the shelf, and then gently push the NSM using the handles until it is fully seated.
3	Rotate the handles to the upright position and lock in place with the tabs.

14. Reconnect the cabling to the NSM:

a. Reconnect the storage cabling to the same eight NSM ports.

Cables are inserted with the connector pull-tab facing up. When a cable is inserted correctly, it clicks into place.

b. Reconnect the power cord to the power supply, and then secure the power cord with the power cord retainer.

When functioning correctly, a power supply's bicolored LED illuminates green.

Additionally, both NSM port LNK (green) LEDs illuminate. If a LNK LED does not illuminate, reseat the cable.

15. Verify that the attention (amber) LED on the shelf operator display panel is no longer illuminated.

The operator display panel attention LED turns off after the NSM reboots. This can take three to five minutes.

16. Verify that the NSM is cabled correctly, by running Active IQ Config Advisor.

    If any cabling errors are generated, follow the corrective actions provided.

17. Make sure that both NSMs in the shelf are running the same version of firmware: version 0300 or later.

Hot-swap a power supply - NX224 shelves

You can replace a failed power supply nondisruptively in an NX224 shelf that is powered on, and while I/O is in progress.

About this task

- Do not mix power supplies with different efficiency ratings or with different input types.

  Always replace like for like.

- If you are replacing more than one power supply, you must do so one at a time so that the shelf maintains power.
- **Best practice:** The best practice is to replace the power supply within two minutes of removal from the NSM.

  If you exceed the two minutes, the shelf continues to function, but ONTAP sends messages to the console about the degraded power supply until the power supply is replaced.

- Do not revert firmware to a version that does not support your shelf and its components.
- If needed, you can turn on the shelf's location (blue) LEDs to aid in physically locating the affected shelf: `storage shelf location-led modify -shelf-name shelf_name -led-status on`

  If you do not know the `shelf_name` of the affected shelf, run the `storage shelf show` command.

  A shelf has three location LEDs: one on the operator display panel and one on each NSM. Location LEDs remain illuminated for 30 minutes. You can turn them off by entering the same command, but using the off option.

- When you unpack the replacement power supply, save all packing materials for use when you return the failed power supply.

  If you need the RMA number or additional help with the replacement procedure, contact technical support at NetApp Support, 888-463-8277 (North America), 00-800-44-638277 (Europe), or +800-800-80-800 (Asia/Pacific).

Steps

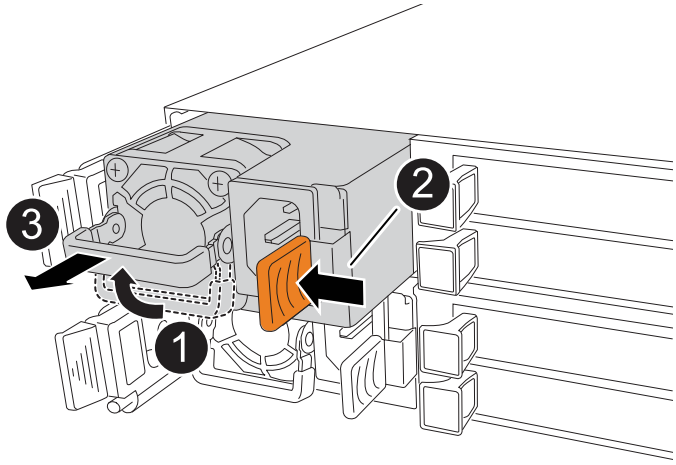
1. Properly ground yourself.
2. Physically identify the failed power supply.

   The system logs a warning message to the system console indicating which power supply failed. Additionally, the attention (amber) LED on the shelf operator display panel illuminates and the bicolored LED on the failed power supply illuminates red.

3. Disconnect the power cord from the power supply by opening the power cord retainer, and then unplug the power cord from the power supply.

   Power supplies do not have a power switch.

4. Remove the power supply:



1	Rotate the handle up, to its horizontal position, and then grasp it.
2	With your thumb, press the terra-cotta tab to release the locking mechanism.
3	Pull the power supply out of the NSM while using your other hand to support its weight.

5. Insert the replacement power supply:
   a. Using both hands, support and align the edges of the power supply with the opening in the NSM.
   b. Gently push the power supply into the NSM until the locking mechanism clicks into place.

      Do not use excessive force or you might damage the internal connector.

   c. Rotate the handle down, so it is out of the way of normal operations.
6. Connect the power cord to the power supply and secure the power cord with the power cord retainer.

   When functioning correctly, a power supply's bicolored LED illuminates green.

Replace the real-time clock battery - NX224 shelves

You can replace a failed real-time clock (RTC) battery nondisruptively in an NX224 shelf that is powered on, and while I/O is in progress.

Before you begin

- The shelf's partner NSM must be up and running and cabled correctly so that your shelf maintains connectivity when you remove the NSM with the failed FRU (target NSM). You can verify the partner NSM's status by downloading and running Config Advisor.

- All other components in the system must be functioning properly.

About this task

- Allow at least 70 seconds between removal and installation of the NVMe shelf module (NSM).

  This allows enough time for ONTAP to process the NSM removal event.

- After you replace the RTC battery, reinstall the NSM, and the module boots, the real-time clock time is updated by ONTAP.
- **Best practice:** The best practice is to have current versions of NVMe shelf module (NSM) firmware and drive firmware on your system before replacing FRU components. You can visit the NetApp Support Site to download disk shelf firmware and download disk drive firmware.

  Do not revert firmware to a version that does not support your shelf and its components.

- If needed, you can turn on the shelf's location (blue) LEDs to aid in physically locating the affected shelf: `storage shelf location-led modify -shelf-name shelf_name -led-status on`

  If you do not know the `shelf_name` of the affected shelf, run the `storage shelf show` command.

  A shelf has three location LEDs: one on the operator display panel and one on each NSM. Location LEDs remain illuminated for 30 minutes. You can turn them off by entering the same command, but using the `off` option.

- When you unpack the replacement RTC battery, save all packing materials for use when you return the failed RTC battery.

  If you need the RMA number or additional help with the replacement procedure, contact technical support at NetApp Support, 888-463-8277 (North America), 00-800-44-638277 (Europe), or +800-800-80-800 (Asia/Pacific).

Steps

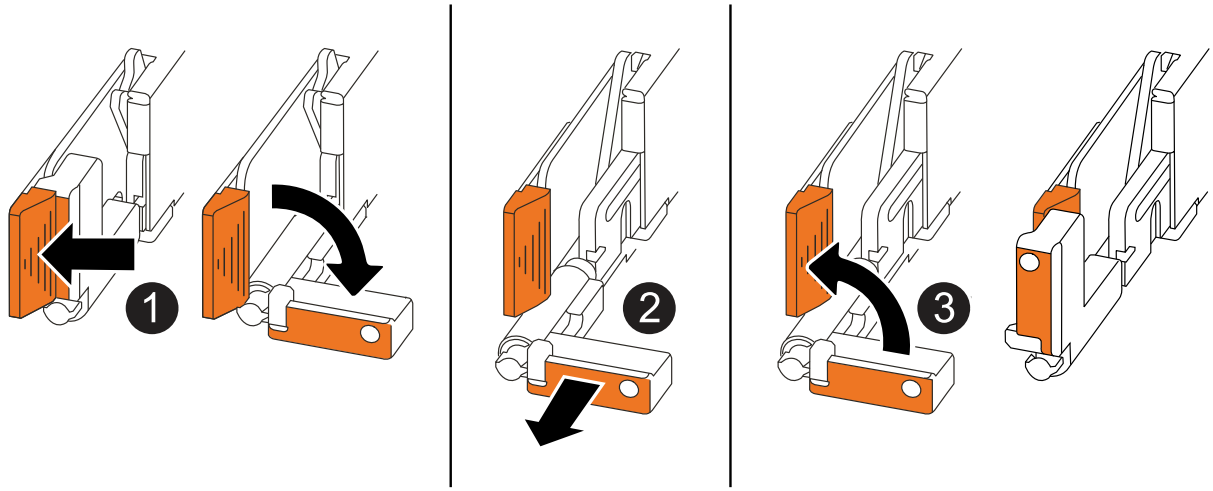
1. Properly ground yourself.
2. Disconnect the cabling from the NSM that contains the FRU that you are replacing:
   a. Disconnect the power cord from the power supply by opening the power cord retainer and then unplugging the power cord from the power supply.

      Power supplies do not have a power switch.

   b. Disconnect the storage cabling from the NSM ports.

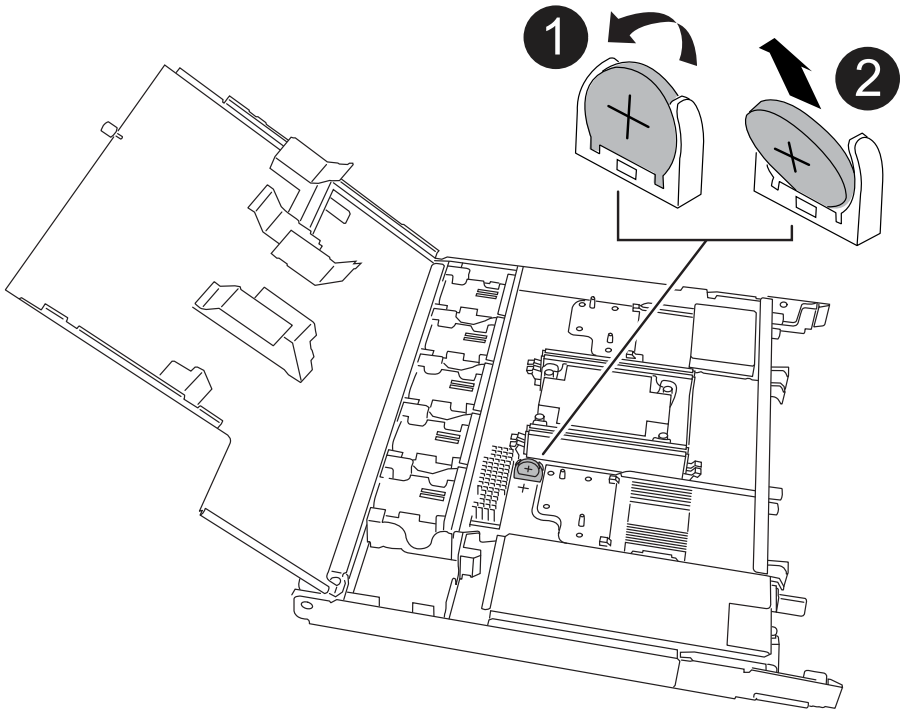
      Make a note of the NSM ports that each cable is connected to. You reconnect the cables to the same ports when you reinsert the NSM, later in this procedure.

3. Remove the NSM:



1	On both ends of the NSM, push the vertical locking tabs outward to release the handles.
2	• Pull the handles towards you to unseat the NSM from the midplane. As you pull, the handles extend out from the shelf. When you feel some resistance, keep pulling. • Slide the NSM out of the shelf and place it on a flat, stable surface. Make sure that you support the bottom of the NSM as you slide it out of the shelf.
3	Rotate the handles upright (next to the tabs) to move them out of the way.

4. Open the module cover by turning the thumbscrew counterclockwise to loosen, and then open the cover.
5. Locate the RTC battery and replace it.
   a. Remove the failed battery:



1	Gently rotate the RTC battery at an angle away from its holder.
2	Lift the RTC battery out of its holder.

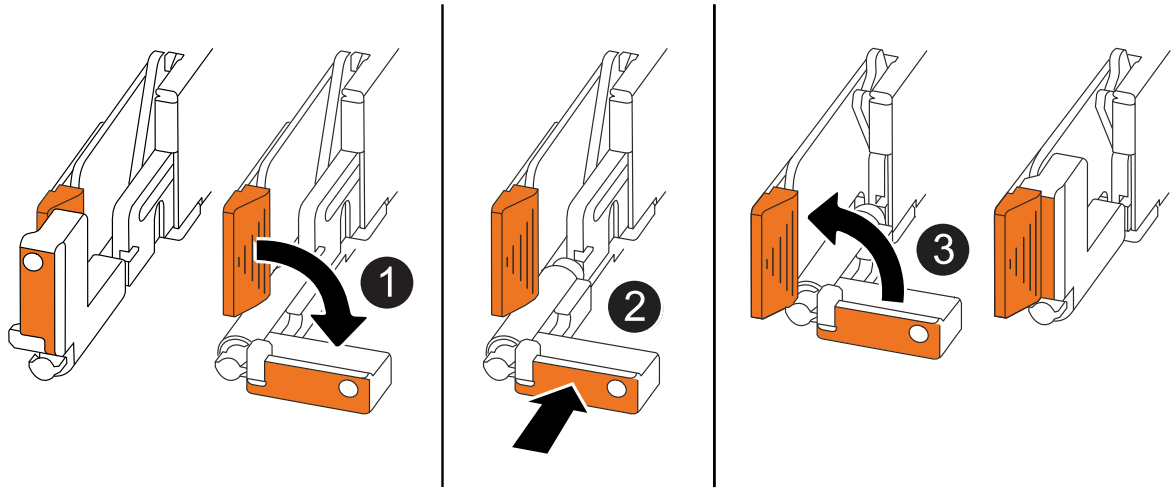
b. Remove the replacement battery from the antistatic shipping bag.

c. Note the polarity of the RTC battery, and then insert it into the holder by tilting the battery at an angle and pushing down.

> You must ensure that the plus sign on the battery corresponds to the plus sign on the motherboard.

d. Visually inspect the battery to make sure that it is completely installed into the holder and that the polarity is correct.

6. Close the NSM cover and turn the thumbscrew clockwise until tightened.
7. Insert the NSM into the shelf:



1	If you rotated the NSM handles upright (next to the tabs) to move them out of the way while you serviced the NSM, rotate them down to the horizontal position.
2	Align the rear of the NSM with the opening in the shelf, and then gently push the NSM using the handles until it is fully seated.
3	Rotate the handles to the upright position and lock in place with the tabs.

8. Recable the NSM.
   a. Reconnect the storage cabling to the same eight NSM ports.

      Cables are inserted with the connector pull-tab facing up. When a cable is inserted correctly, it clicks into place.

   b. Reconnect the power cord to the power supply, and then secure the power cord with the power cord retainer.

      When functioning correctly, a power supply's bicolored LED illuminates green.

      Additionally, both NSM port LNK (green) LEDs illuminate. If a LNK LED does not illuminate, reseat the cable.

9. Verify that the attention (amber) LEDs on the NSM containing the failed RTC battery and the shelf operator display panel are no longer illuminated

   The NSM attention LEDs turn off after the NSM reboots and no longer detects an RTC battery issue. This can take three to five minutes.

10. Verify that the NSM is cabled correctly, by running Active IQ Config Advisor.

    If any cabling errors are generated, follow the corrective actions provided.

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