Dell EMC PowerProtect DD6400

System Maintenance and Upgrade Guide

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DELL Technologies

Notes, cautions, and warnings

NOTE: A NOTE indicates important information that helps you make better use of your product.

CAUTION: A CAUTION indicates either potential damage to hardware or loss of data and tells you how to avoid the problem.

WARNING: A WARNING indicates a potential for property damage, personal injury, or death.

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FRU and Upgrade Overview

The tool, safety, and connection information in this chapter applies to all component replacement procedures for the PowerProtect system. Verify that the required tools are available, review the safety information, and connect to the system before proceeding.

This chapter contains the following information:

Topics:

Tools and supplies needed

Ensure that you have the required tools and supplies on hand for the PowerProtect system installation.

You will need:

- Antistatic wrist strap and conductive foam pad
- Screwdrivers:
  - Phillips #1
  - Phillips #2 with a 4- to 6-inch blade and a magnetic tip
  - Phillips #2 with a 12 in. or longer blade and magnetic tip
  - Flat head with a 3/16 in. blade
  - Flat head with a 1/4 in. blade
  - Torx T5
  - Torx T6
  - Torx T8
  - Torx T10
  - Torx T30 with adjustable torque setting
  - Torque
- Flashlight (free-standing for single-person installations)
- Roll of 5/8 inch Velcro cable tie material (3M Scotchmate SJ-3401 or similar)
- Null modem cable with DB-9 female connector to connect a service laptop to the PowerProtect system.
- Power adapter or a power cord for your laptop power adapter so that you can power your laptop from a rack PDU

The following additional tools and supplies might be needed when working with PowerProtect systems:

- Torque screwdriver
- Pliers
  - Needle nose
  - Regular
  - Locking
- 10 mm socket or wrench
- Diagonal wire cutters (for cutting tie wraps)
- exFAT formatted 4 GB or greater USB flash memory drive
- Tie wraps (4 in. and 8 in.)
- Labels
- Pen or marker
- Masking tape

Safety overview

CAUTION:

- **If the system is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.**
- **The RJ45 sockets on the motherboard, PCI cards, or I/O modules are for Ethernet connection only and must not be connected to a telecommunications network.**

CAUTION: Improper installation on the rails may damage the rails or cause the system to fall when extended. When extending the system from the rack, pull outward slowly and verify the system is properly installed on the rails.

Review this list of important safety recommendations.

- All plug-in modules and blank plates are part of the fire enclosure and must be removed only when a replacement can be added immediately. The system must not be run without all parts in place.
- A DD6400 system must be operated only from a power supply input voltage range of 100–240 VAC and 50–60 Hz.
- The system is intended to operate with all installed power supplies working as intended.
- Provide a suitable power source with electrical overload protection.
- A safe electrical earth connection must be provided to each power cord. Check the grounding of the power sources before applying power.
- The plug on each power supply cord is used as the main device to disconnect power from the system. Ensure that the socket outlets are located near the equipment and are easily accessible.
- Permanently unplug the unit if you think it is damaged in any way and before moving the system. To completely remove system power, you must disconnect all power supplies.
- The power connections must always be disconnected prior to removal or replacement of a power supply module from any of the components in the system.
- A faulty power supply module should be replaced within 24 hours.
- Do not lift system components by yourself. A DD6400 system weighs up to 72.91 lbs (33.1 kg).

  CAUTION: PowerProtect systems are heavy. Use at least two people or a mechanical lift to move any system.
- To comply with applicable safety, emission, and thermal requirements, covers must not be removed and all bays must be fitted with plug-in modules.
- For ESD protection, Dell EMC recommends that you wear a suitable antistatic wrist or ankle strap. Observe all conventional ESD precautions when handling plug-in modules and components.

Safety instructions

WARNING: Whenever you need to lift the system, get others to assist you. To avoid injury, do not attempt to lift the system by yourself.

WARNING: Opening or removing the system cover while the system is powered on may expose you to a risk of electric shock.

CAUTION: Do not operate the system without the cover for a duration exceeding five minutes. Operating the system without the system cover can result in component damage.

CAUTION: Many repairs may only be done by a certified service technician. You should only perform troubleshooting and simple repairs as authorized in your product documentation, or as directed by the online or telephone service and support team. Damage due to servicing that is not authorized by Dell is not covered by your warranty. Read and follow the safety instructions that are shipped with your product. Always use a static mat and anti-static wristband while working on components inside the system.

NOTE: It is recommended that you always use an anti-static mat and an anti-static wristband while working on components inside the system.

CAUTION: To ensure proper operation and cooling, all bays in the system and system fans must be always populated with a component or a blank.

Establish a serial management connection to the PowerProtect system

About this task

The PowerProtect system supports a direct serial connection, or Serial over LAN (SOL). Both methods cannot be enabled at the same time. The serial port and Ethernet ports are located on the back of the system.

The serial and Ethernet ports are located on the lower left-hand side of the system.

CAUTION: Enabling SOL disables the serial console. If SOL is enabled on the PowerProtect DD controller and the controller subsequently requires servicing, disable SOL and enable the serial console port to prevent confusion and unnecessary troubleshooting should service personnel attempt to use the serial port to access the system.

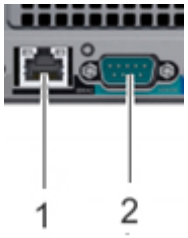


Figure 1. Maintenance connections

1. Ethernet port
2. Serial port (COM 1)

Steps

Verify whether the system uses a serial connection or SOL, and follow one of the procedures below as required.

Establish a serial connection to the serial port

Steps

1. Connect a serial console cable from the management station or laptop to the serial port.
2. Launch a terminal emulation program from your computer and configure the following communication settings:

   NOTE: 115200 baud rate is required for the system to work correctly; 9600 baud rate does not work.

Table 1. Communications settings

Setting	Value
Baud rate	115200
Data bits	8
Stop bits	1
Parity	None
Flow control	None
Emulation	VT-100

3. Log in as a system administrator, such as sysadmin.

Establish an SOL connection

Prerequisites

The system must be configured to accept SOL connections. The Hardware Overview and Installation Guide for this system provides instructions to configure the system for SOL.

Steps

1. Open an SSH shell.
2. Run the following command to connect to iDRAC.

   `ssh <iDRAC-IP-address> -l <iDRAC-username>`.
3. Log in with the credentials for the iDRAC username.
4. Run one of the following commands to initiate the SOL session.
   - `console com2`
   - `connect`

Component characteristics

The following table lists the replaceable components, whether the component is hot-swappable, and whether the procedure can be completed by a customer (CRU), or a Dell EMC or partner technician (FRU):

Component	Hot-swappable	CRU/FRU
Bezel	Y	CRU
Front disk (OS, cache, and data)	Y	CRU
Power supply	Y	CRU
Cable management accessory	Y	CRU
Fan	Y	CRU
DIMM	N	CRU
Network daughter card	N	CRU
PCIe HBA	N	CRU
NVRAM	N	FRU
TPM	N	FRU
System board	N	FRU
CPU/heatsink	N	FRU
Chassis	N	FRU
Rail kit	N	CRU

The following table lists the available upgrades, whether they can be performed with the system powered on, and whether the procedure is a CRU or a FRU.

Component	Can be performed with the system powered on	CRU/FRU
Add a PCIe HBA	N	CRU
Add an ES40 disk shelf (up to a maximum of two)	Y	CRU

2

Replace an Operating System Disk

Complete the following procedure to replace a disk mounted in the front of the chassis.

This CRU can be completed with the system powered on.

After replacing the disk, it takes approximately 2 hours for the disk rebuild process to complete.

NOTE: This is an estimate, and the rebuild may take significantly longer depending on the amount of activity on the system.

Topics:

Identify a failed OS disk

Prerequisites

Establish a connection to the system.

About this task

Complete the following steps to identify the failed OS drive.

Steps

1. Verify the drive fault LED on the left control panel at the front of the system is illuminated solid amber.

Figure 2. Drive fault LED

2. Run the `alerts show current` command to identify the location of the failed disk. Record the slot number of the failed disk.

   CAUTION: The physical labeling of the disks on the system chassis, and the disk numbering in do not match. The physical labeling starts with Disk 0, and starts with Disk 1.

   NOTE: The sample output below only includes the alert object and alert message. It does not include the columns for the alert ID, post time, severity, and alert class which are part of the actual output.

```
# alerts show current
sysadmin@localhost# alerts show current
Object                        Message
---------------------------
------------------------------------------------------------------------------
Enclosure=1:Disk=2:Cause=NA   EVT-STORAGE-00031: Disk has a hardware fault and may need
to be replaced.
---------------------------
------------------------------------------------------------------------------
There are 1 active alerts.
```

3. Match the slot number of the failed disk from the `alerts show current` output to the physical location of the disk.
4. Run the `disk beacon` command on the failed disk to illuminate the LED.

```
# disk beacon 1.2
```

Remove the front bezel to access front panel hard drives

Steps

1. Unlock the bezel by using the bezel key.
2. Press the release button, and pull the left end of the bezel.
3. Unhook the right end, and remove the bezel.

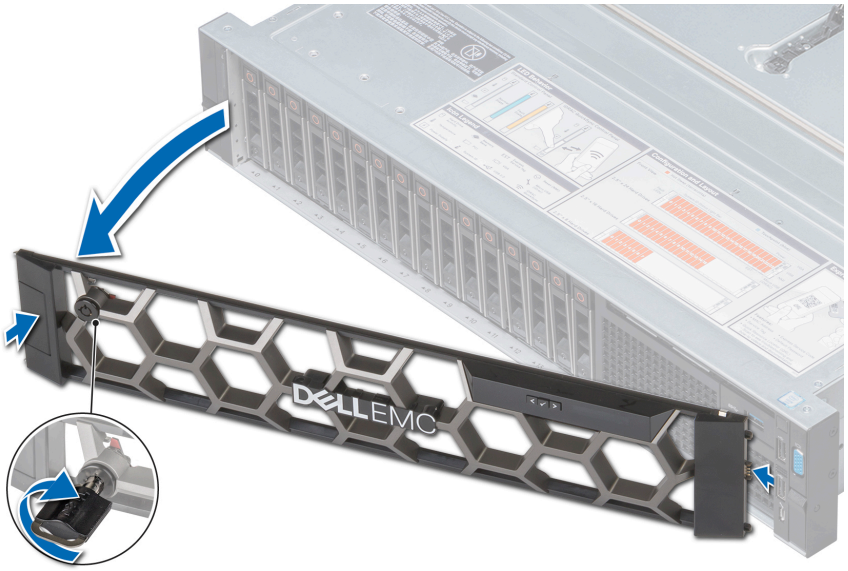


Figure 3. Removing the front bezel

Remove a hard drive

Prerequisites

Follow the safety guidelines listed in Safety instructions.

Steps

1. Press the release button to open the hard drive release handle.
2. Holding the handle, slide the hard drive out of the hard drive slot.

Figure 4. Removing a hard drive

3. If you are not replacing the hard drive immediately, insert a hard drive blank in the empty hard drive slot to maintain proper system cooling.

Removing the drive from the drive carrier

Steps

1. Using a Phillips #1 screwdriver, remove the screws from the slide rails on the drive carrier.

   NOTE: If the hard drive or SSD carrier has Torx screw, use Torx 6 (for 2.5-inch drive) or Torx 8 (for 3.5-inch drive) screwdriver to remove the drive.

2. Lift the drive out of the drive carrier.

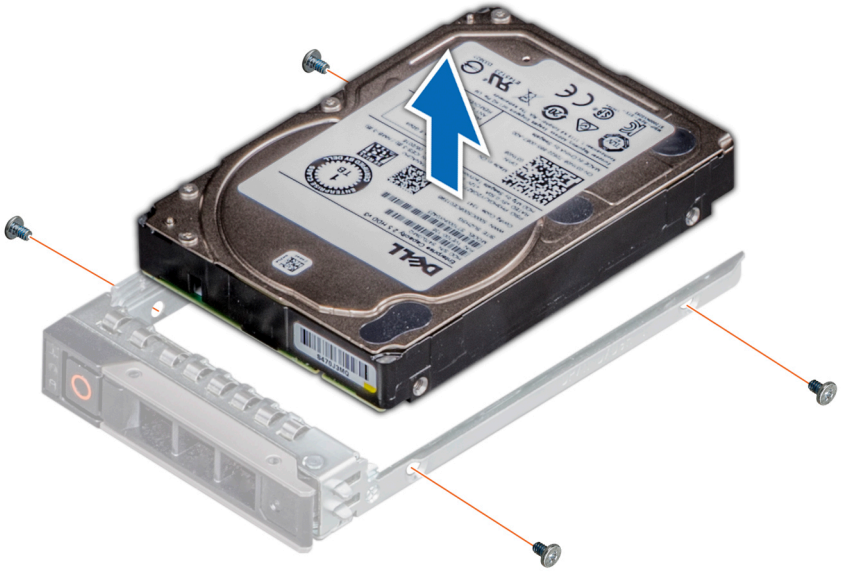


Figure 5. Removing the drive from the drive carrier

Installing a drive into the drive carrier

Steps

1. Insert the drive into the drive carrier with the connector end of the drive towards the back of the carrier.
2. Align the screw holes on the drive with the screws holes on the drive carrier.
   When aligned correctly, the back of the drive is flush with the back of the drive carrier.
3. Using a Phillips #1 screwdriver, secure the drive to the drive carrier with screws.

   NOTE: If the hard drive or SSD carrier has Torx screw, use Torx 6 (for 2.5-inch drive) or Torx 8 (for 3.5-inch drive) screwdriver to install the drive.

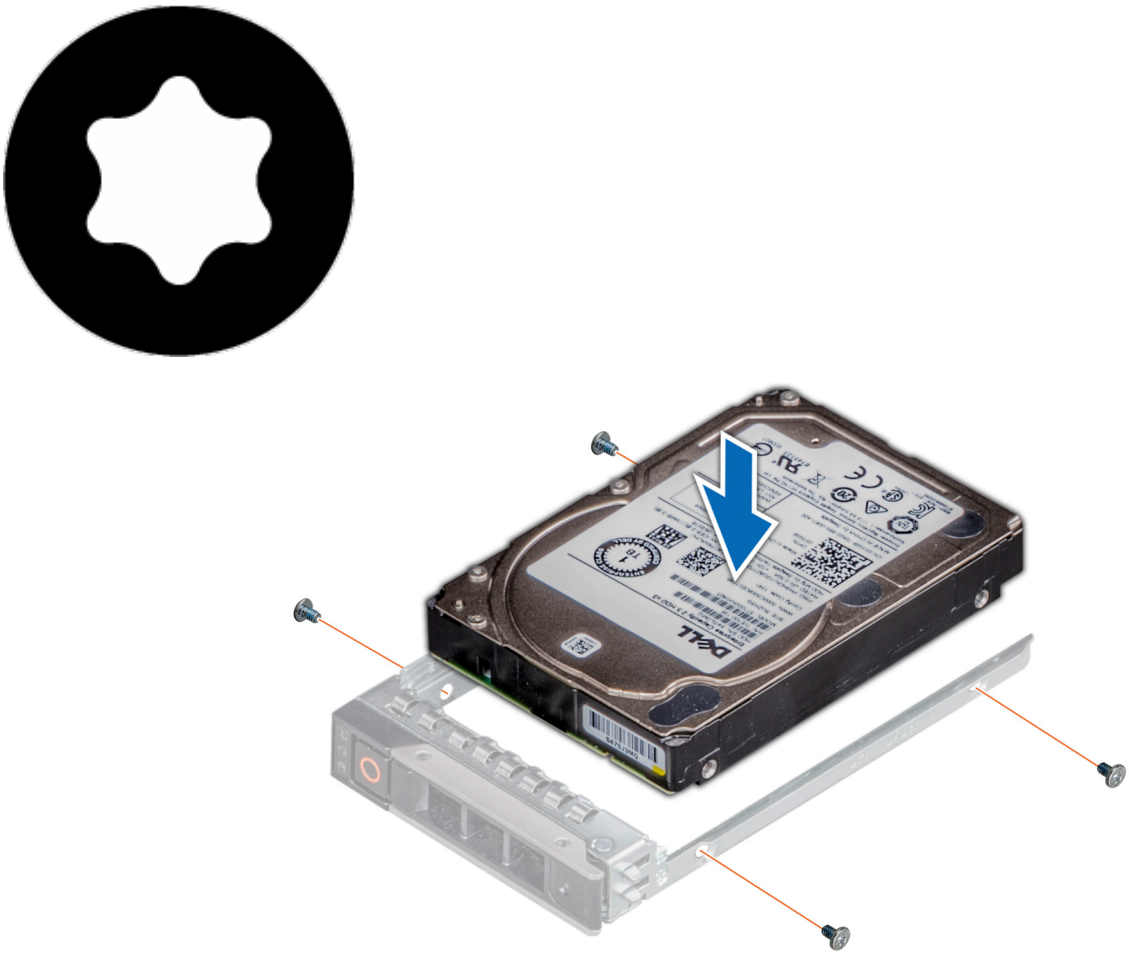


Figure 6. Installing a drive into the drive carrier

Install the hard drive

Prerequisites

Follow the safety guidelines listed in Safety instructions.

Steps

1. Press the release button on the front of the hard drive to open the release handle.
2. Insert the hard drive into the hard drive slot and slide until the hard drive connects with the backplane.
3. Close the hard drive release handle to lock the hard drive in place.

Figure 7. Installing a hard drive

Install the front bezel

Steps

1. Align and insert the right end of the bezel onto the system.
2. Press the release button and fit the left end of the bezel onto the system.
3. Lock the bezel by using the key.

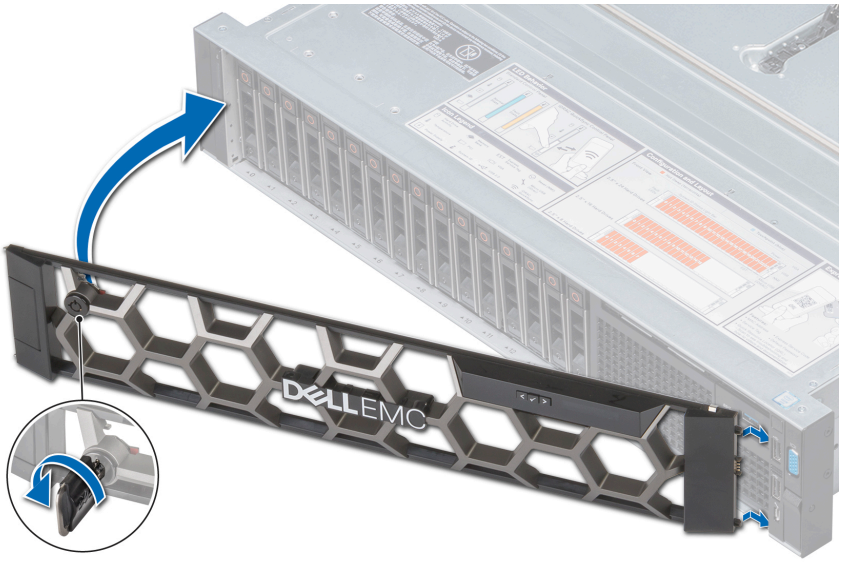


Figure 8. Installing the front bezel

Verify the replacement data disk

About this task

The system reports the state of a replacement disk drive depending on the history of the disk. Use the `disk show state` command to display the state of all disk drives.

A replacement disk drive that is inserted into the system is recognized as a failed disk drive and is noted as failed when first installed. An auto-spare process should change the status to spare in a few minutes.

Steps

1. Verify the drive fault LED on the left control panel at the front of the system is off.

Figure 9. Drive fault LED

2. In the CLI, press **`Ctrl + C`** to turn off the disk beacon.
3. Run the `disk show hardware` command to verify all the disks appear correctly.
4. Run the **`storage add force`** ***`disk`*** command to add the replacement disk to the system, where *disk* is the number of the disk from the hardware failure alert message.

```
# storage add force disk 1.2

The 'storage add force' command will make the disk available to the
        filesystem. Any existing data on this will be lost.
        Are you sure? (yes|no) [no]: yes

Checking storage requirements...done
Adding disk 1.2 to the system...done

Updating system information...done

Disk 1.2 successfully added to the system
```

5. Use the `alerts show current` (or `alerts show current-detailed`) command.

```
# alerts show current
No active alerts
```

6. Run the `disk show state command` to verify the disk rebuild status.

3

Replace a Cache Tier Disk

Complete the following procedure to replace a Cache Tier disk mounted in the front of the chassis.

This CRU can be completed with the system powered on.

Cache Tier disks are not RAID protected, so no disk rebuild is required.

Topics:

Identify a failed Cache Tier disk

Prerequisites

Establish a connection to the system as described in Establish a serial management connection to the PowerProtect system.

About this task

Complete the following steps to identify the failed drive.

Steps

1. Verify the drive fault LED on the left control panel at the front of the system is illuminated solid amber.

Figure 10. Drive fault LED

2. Run the `alerts show current` command to identify the location of the failed disk. Record the slot number of the failed disk.

   CAUTION: The physical labeling of the disks on the system chassis, and the disk numbering in DD OS do not match. The physical labeling starts with Disk 0, and DD OS starts with Disk 1.

   NOTE: The sample output below only includes the alert object and alert message. It does not include the columns for the alert ID, post time, severity, and alert class which are part of the actual output.

```
# alerts show current
sysadmin@localhost# alerts show current
Object                        Message
---------------------------
------------------------------------------------------------------------------
Enclosure=1:Disk=3:Cause=NA   EVT-STORAGE-00031: Disk has a hardware fault and may need
to be replaced.
---------------------------
------------------------------------------------------------------------------
There are 1 active alerts.
```

3. Match the slot number of the failed disk from the `alerts show current` output to the physical location of the disk. Although the physical slots are numbered starting from 0, the software identifies the slots starting at 1.
4. Run the `disk beacon` command on the failed disk to illuminate the LED.

Remove the front bezel to access front panel hard drives

Steps

1. Unlock the bezel by using the bezel key.
2. Press the release button, and pull the left end of the bezel.
3. Unhook the right end, and remove the bezel.

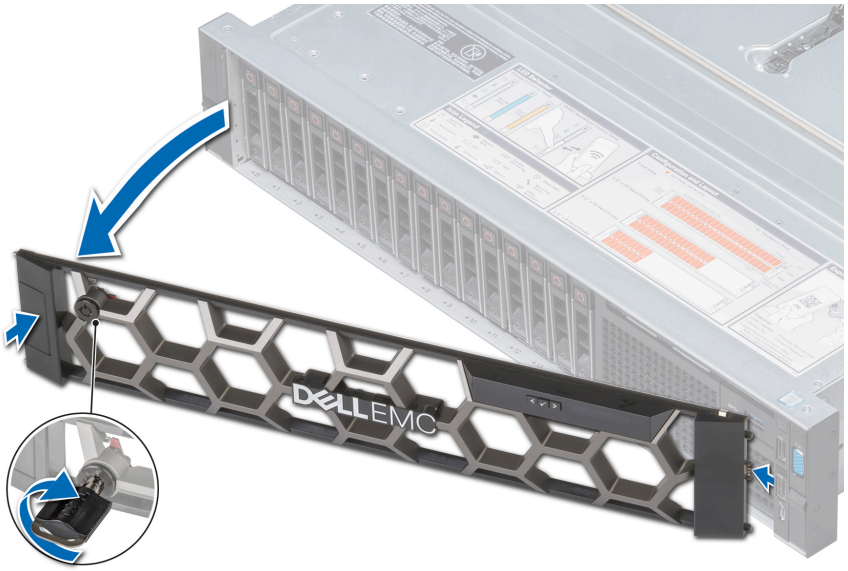


Figure 11. Removing the front bezel

Remove a hard drive

Prerequisites

Follow the safety guidelines listed in Safety instructions.

Steps

1. Press the release button to open the hard drive release handle.
2. Holding the handle, slide the hard drive out of the hard drive slot.

Figure 12. Removing a hard drive

3. If you are not replacing the hard drive immediately, insert a hard drive blank in the empty hard drive slot to maintain proper system cooling.

Removing the drive from the drive carrier

Steps

1. Using a Phillips #1 screwdriver, remove the screws from the slide rails on the drive carrier.

   NOTE: If the hard drive or SSD carrier has Torx screw, use Torx 6 (for 2.5-inch drive) or Torx 8 (for 3.5-inch drive) screwdriver to remove the drive.

2. Lift the drive out of the drive carrier.

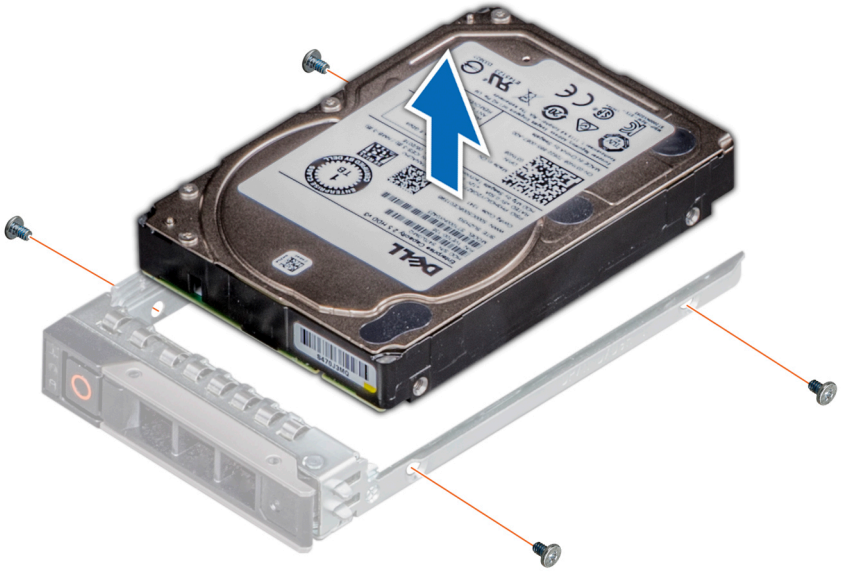


Figure 13. Removing the drive from the drive carrier

Installing a drive into the drive carrier

Steps

1. Insert the drive into the drive carrier with the connector end of the drive towards the back of the carrier.
2. Align the screw holes on the drive with the screws holes on the drive carrier.
   When aligned correctly, the back of the drive is flush with the back of the drive carrier.
3. Using a Phillips #1 screwdriver, secure the drive to the drive carrier with screws.

   NOTE: If the hard drive or SSD carrier has Torx screw, use Torx 6 (for 2.5-inch drive) or Torx 8 (for 3.5-inch drive) screwdriver to install the drive.

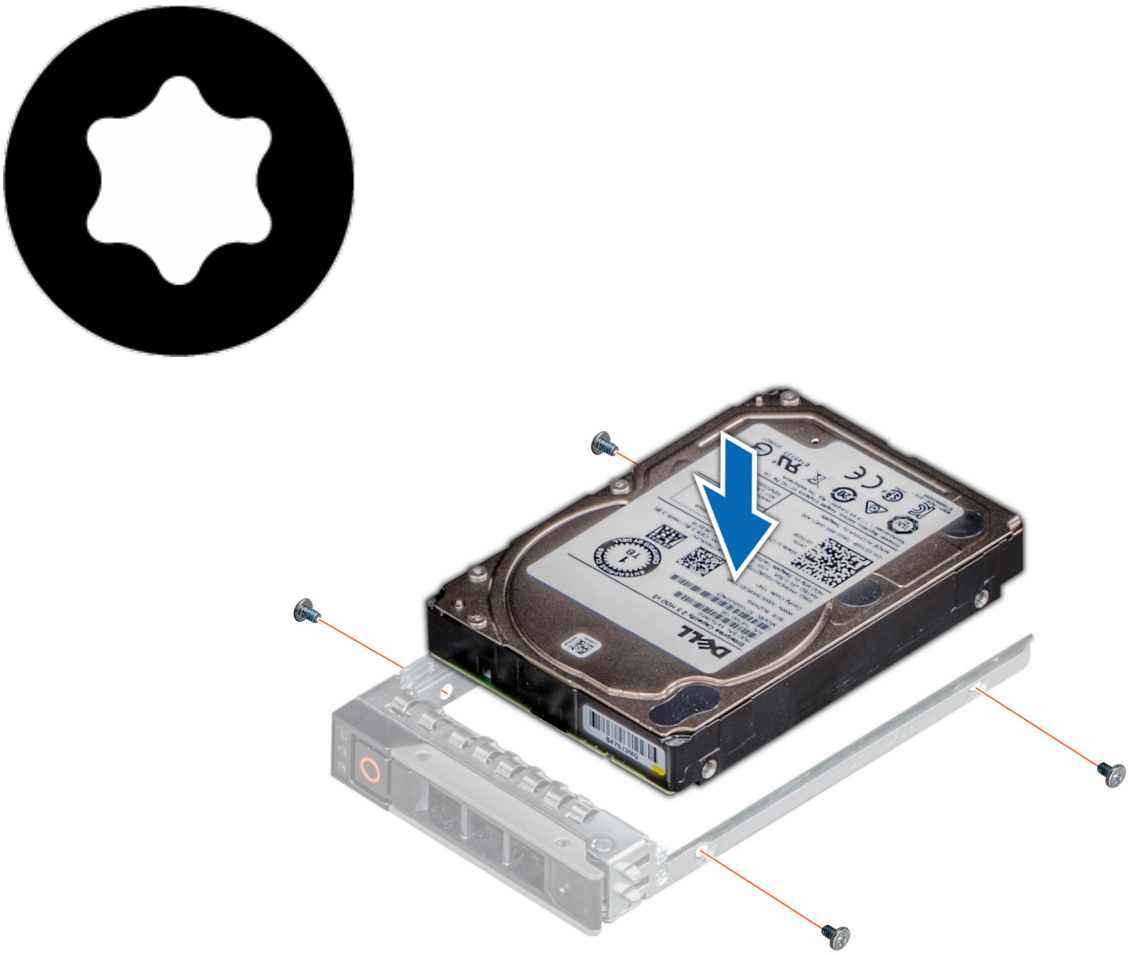


Figure 14. Installing a drive into the drive carrier

Install the hard drive

Prerequisites

Follow the safety guidelines listed in Safety instructions.

Steps

1. Press the release button on the front of the hard drive to open the release handle.
2. Insert the hard drive into the hard drive slot and slide until the hard drive connects with the backplane.
3. Close the hard drive release handle to lock the hard drive in place.

Figure 15. Installing a hard drive

Install the front bezel

Steps

1. Align and insert the right end of the bezel onto the system.
2. Press the release button and fit the left end of the bezel onto the system.
3. Lock the bezel by using the key.

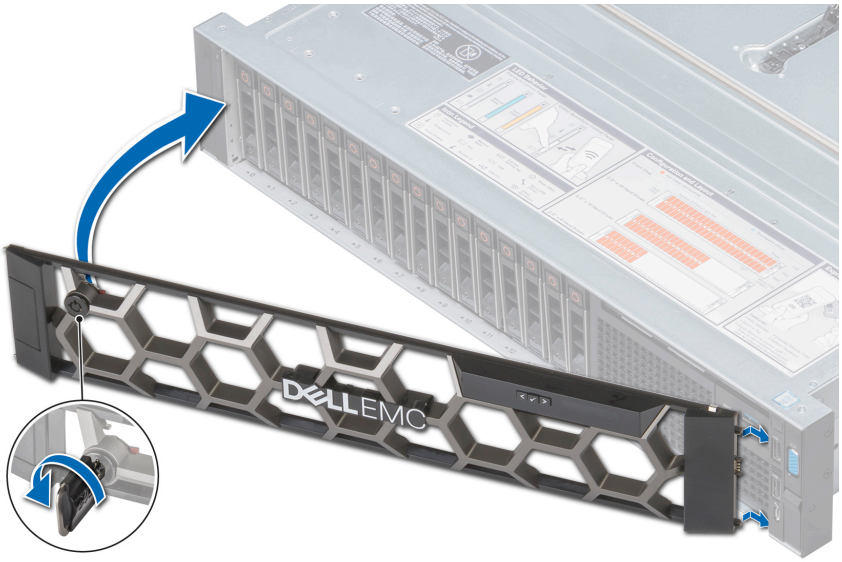


Figure 16. Installing the front bezel

Verify the replacement drive

About this task

Complete the following tasks to verify the replacement disk.

Steps

1. Verify the drive fault LED on the left control panel at the front of the system is off.

Figure 17. Drive fault LED

2. In the CLI, press **Ctrl + C** to turn off the disk beacon.
3. Run the **disk show hardware** command to verify all the disks appear correctly.
4. Run the **storage add disk 1.*<n>*** command to add the disk back to the Cache Tier, where *<n>* is the number of the disk from the hardware failure alert message.
5. Run the `filesys expand` command to set the new cache disk as in-use.
6. Use the **alerts show current** (or **alerts show current-detailed**) command.

```
# alerts show current
No active alerts
```

4

Replace a Data Disk

Complete the following procedure to replace a disk mounted in the front of the chassis.

This CRU can be completed with the system powered on.

After replacing the disk, it takes approximately 2 hours for the disk rebuild process to complete.

NOTE: This is an estimate, and the rebuild may take significantly longer depending on the amount of activity on the system.

Topics:

Identify a failed data disk

Prerequisites

Establish a connection to the system as described in Establish a serial management connection to the PowerProtect system.

About this task

Complete the following steps to identify the failed data disk.

Steps

1. Verify the drive fault LED on the left control panel at the front of the system is illuminated solid amber.

Figure 18. Drive fault LED

2. Run the `alerts show current` command to identify the location of the failed disk. Record the slot number of the failed disk.

   CAUTION: The physical labeling of the disks on the system chassis, and the disk numbering in do not match. The physical labeling starts with Disk 0, and starts with Disk 1.

   NOTE: The sample output below only includes the alert object and alert message. It does not include the columns for the alert ID, post time, severity, and alert class which are part of the actual output.

```
# alerts show current
sysadmin@localhost# alerts show current
Object                        Message
---------------------------
------------------------------------------------------------------------------
Enclosure=1:Disk=5:Cause=NA   EVT-STORAGE-00031: Disk has a hardware fault and may need
to be replaced.
---------------------------
------------------------------------------------------------------------------
There are 1 active alerts.
```

3. Match the slot number of the failed disk from the `alerts show current` output to the physical location of the disk.
4. Run the `disk beacon` command on the failed disk to illuminate the LED.

```
# disk beacon 1.5
```

Remove the front bezel to access front panel hard drives

Steps

1. Unlock the bezel by using the bezel key.
2. Press the release button, and pull the left end of the bezel.
3. Unhook the right end, and remove the bezel.

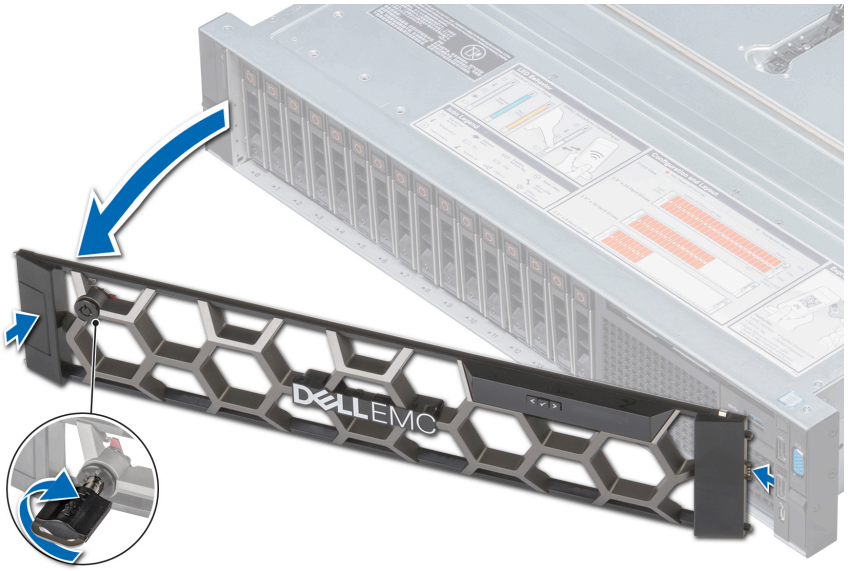


Figure 19. Removing the front bezel

Remove a hard drive

Prerequisites

Follow the safety guidelines listed in Safety instructions.

Steps

1. Press the release button to open the hard drive release handle.
2. Holding the handle, slide the hard drive out of the hard drive slot.

Figure 20. Removing a hard drive

3. If you are not replacing the hard drive immediately, insert a hard drive blank in the empty hard drive slot to maintain proper system cooling.

Removing the drive from the drive carrier

Steps

1. Using a Phillips #1 screwdriver, remove the screws from the slide rails on the drive carrier.

   NOTE: If the hard drive or SSD carrier has Torx screw, use Torx 6 (for 2.5-inch drive) or Torx 8 (for 3.5-inch drive) screwdriver to remove the drive.

2. Lift the drive out of the drive carrier.

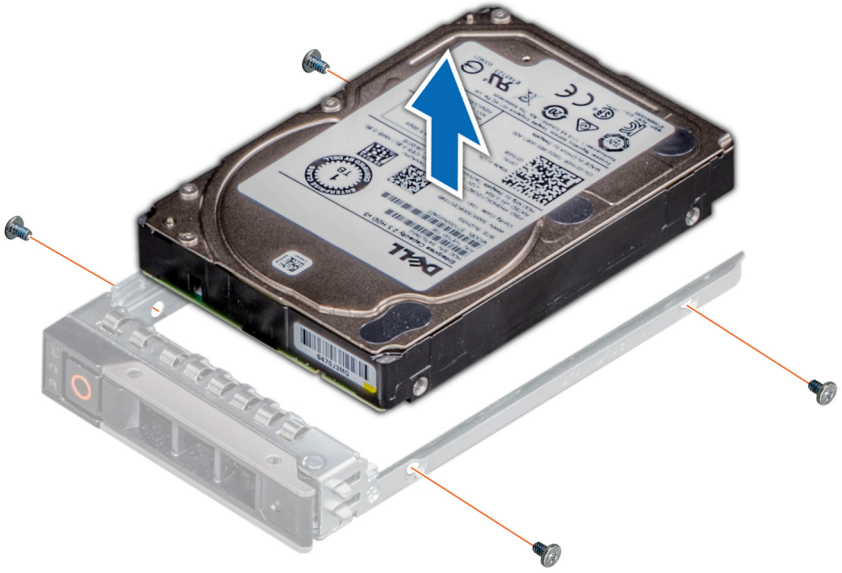


Figure 21. Removing the drive from the drive carrier

Installing a drive into the drive carrier

Steps

1. Insert the drive into the drive carrier with the connector end of the drive towards the back of the carrier.
2. Align the screw holes on the drive with the screws holes on the drive carrier.
   When aligned correctly, the back of the drive is flush with the back of the drive carrier.
3. Using a Phillips #1 screwdriver, secure the drive to the drive carrier with screws.

   NOTE: If the hard drive or SSD carrier has Torx screw, use Torx 6 (for 2.5-inch drive) or Torx 8 (for 3.5-inch drive) screwdriver to install the drive.

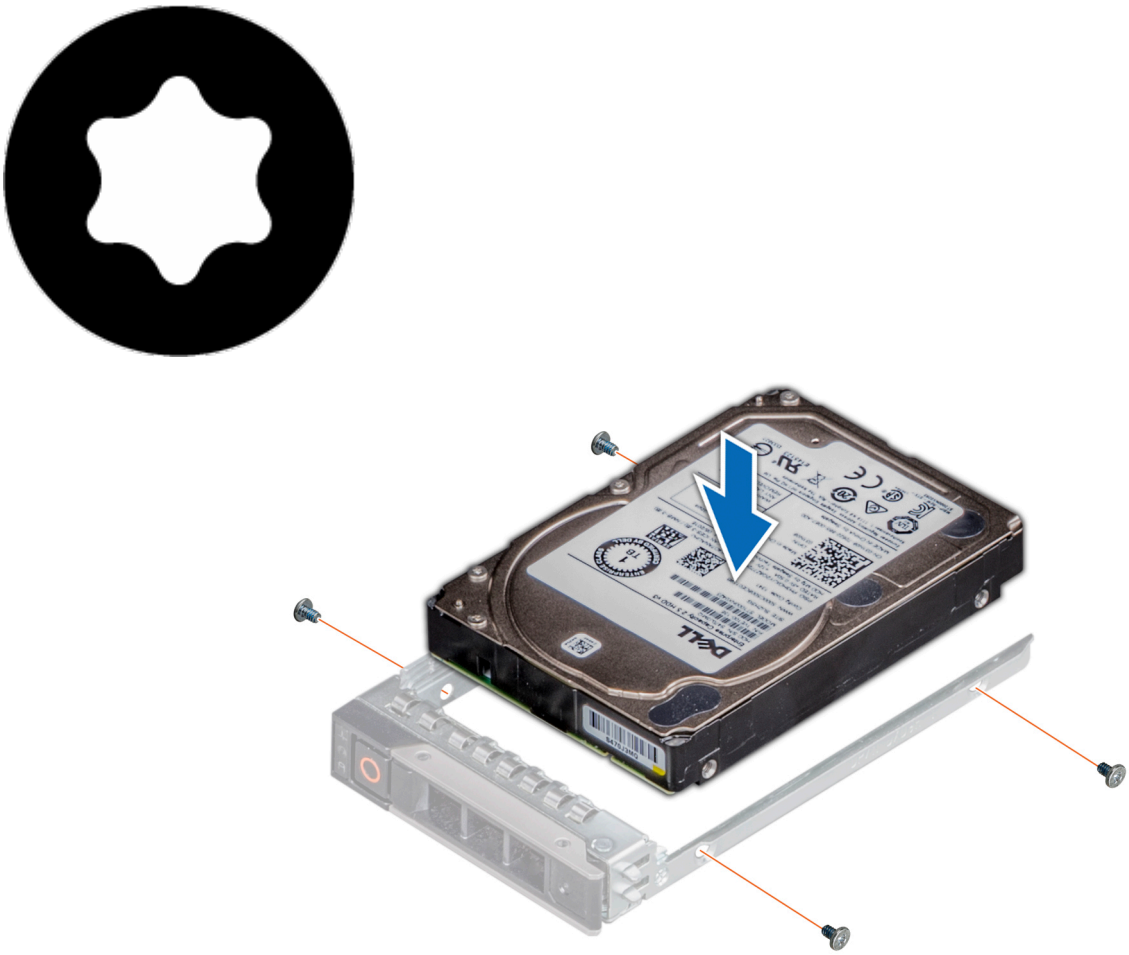


Figure 22. Installing a drive into the drive carrier

Install the hard drive

Prerequisites

Follow the safety guidelines listed in Safety instructions.

Steps

1. Press the release button on the front of the hard drive to open the release handle.
2. Insert the hard drive into the hard drive slot and slide until the hard drive connects with the backplane.
3. Close the hard drive release handle to lock the hard drive in place.

Figure 23. Installing a hard drive

Install the front bezel

Steps

1. Align and insert the right end of the bezel onto the system.
2. Press the release button and fit the left end of the bezel onto the system.
3. Lock the bezel by using the key.

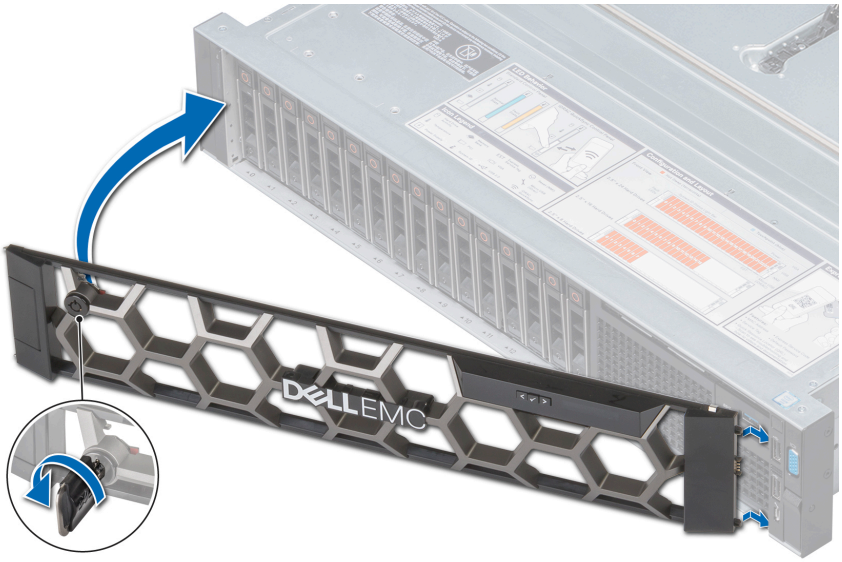


Figure 24. Installing the front bezel

Verify the replacement data disk

About this task

The system reports the state of a replacement disk drive depending on the history of the disk. Use the `disk show state` command to display the state of all disk drives.

A replacement disk drive that is inserted into the system is recognized as a failed disk drive and is noted as failed when first installed. An auto-spare process should change the status to spare in a few minutes.

Steps

1. Verify the drive fault LED on the left control panel at the front of the system is off.

Figure 25. Drive fault LED

2. In the CLI, press **`Ctrl + C`** to turn off the disk beacon.
3. Run the `disk show hardware` command to verify all the disks appear correctly.
4. Run the **`storage add force`** ***`disk`*** command to add the replacement disk to the system, where *disk* is the number of the disk from the hardware failure alert message.

```
# storage add force disk 1.5

The 'storage add force' command will make the disk available to the
        filesystem. Any existing data on this will be lost.
        Are you sure? (yes|no) [no]: yes

Checking storage requirements...done
Adding disk 1.5 to the system...done

Updating system information...done

Disk 1.5 successfully added to the system
```

5. Use the following command to check that the disk drive is recognized by the Data Domain system. In the command display, the disk State should be spare or reconstructing.

```
# disk show state

Enclosure   Disk
```

```
             1  2  3  4  5  6  7  8  9  10 11 12 13 14 15
---------   ---------------------------------------------
1            .  .  .  .  v  .  .  .  .  .  .  .
2            .  .  .  .  .  .  .  .  .  .  .  .  .  .  .
---------   ---------------------------------------------

Legend   State             Count
------   ---------------   -----
.        In Use Disks      26
v        Available Disks   1
------   ---------------   -----
Total 27 disks

Estimated total time remaining for reconstruction (minutes) 874
```

6. Use the `alerts show current` (or `alerts show current-detailed`) command.

```
# alerts show current
No active alerts
```

5

Replace a Fan

CAUTION: Improper installation on the rails may damage the rails or cause the system to fall when extended. When extending the system from the rack, pull outward slowly and verify the system is properly installed on the rails.

The system contains fans in the front of the chassis.

Complete the following procedure to replace a failed fan.

This CRU can be completed with the system powered on.

Topics:

Identify a failed fan

Prerequisites

Establish a connection to the system as described in Establish a serial management connection to the PowerProtect system.

About this task

Complete the following steps to identify the failed fan.

Steps

1. Use the `alerts show current` (or `alerts show current-detailed`) command that will include messages indicating fan loss or fan failure.

   NOTE: The sample output below only includes the alert object and alert message. It does not include the columns for the alert ID, post time, severity, and alert class which are part of the actual output.

```
# alerts show current
Object               Message
---------            -----------------
Enclosure=1:Fan=4    Fan fault is detected
---------            -----------------
```

2. Use the `enclosure show fans` command to check the status of each fan. Record the failed fan.

```
# enclosure show fans 1
Enclosure   Description          Level    Status
---------   -----------------    ------   ------
1           System Board Fan1    medium   OK
            System Board Fan2    medium   OK
            System Board Fan3    medium   OK
            System Board Fan4    medium   Unavailable
            System Board Fan5    medium   OK
```

```
            System Board Fan6   medium   OK
---------   -----------------   ------   ------
```

3. Map the number of the failed fan to the physical location of that fan.

   The following table shows the physical layout of the fans as seen from the front of the system.

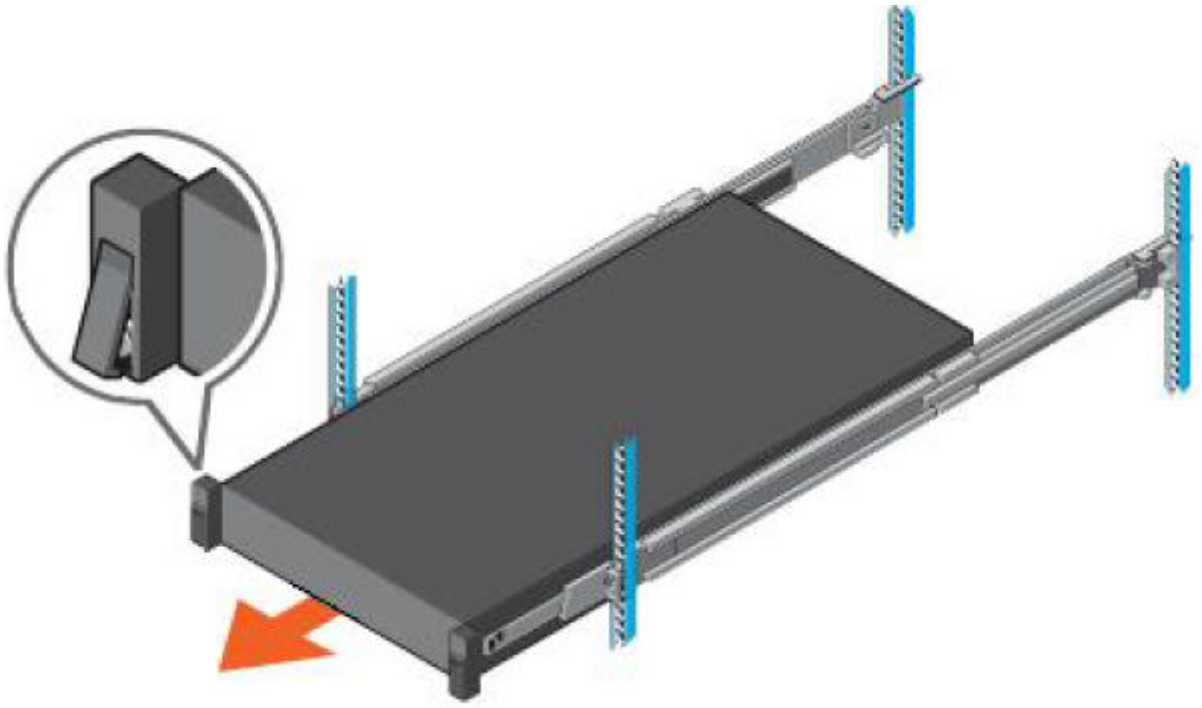
Left fan assembly			**Right fan assembly**		
Fan 1	Fan 2	Fan 3	Fan 4	Fan 5	Fan 6

Extend the system from the cabinet

Use this procedure to extend the system from the cabinet so that you can remove the system cover to access the internal FRU components, or to remove the system from the cabinet.

Steps

1. At the front of the cabinet, locate the two slam latches on the left and right sides of the system. Pull the slam latches up to release the system from the cabinet. If the slam latches do not disengage, loosen the screw under each latch.
2. Using the slam latches, pull the system from the cabinet until the rails lock in the extended position.



Remove the system cover

Steps

1. Using a flat or a Phillips head screwdriver, rotate the latch release lock counter clockwise to the unlocked position.
2. Lift the latch till the system cover slides back and the tabs on the system cover disengage from the guide slots on the system.
3. Hold the cover on both sides, and lift the cover away from the system.

Figure 26. Remove the system cover

Remove the cooling fan

Steps

Press the release tab and lift the cooling fan out of the cooling fan assembly.

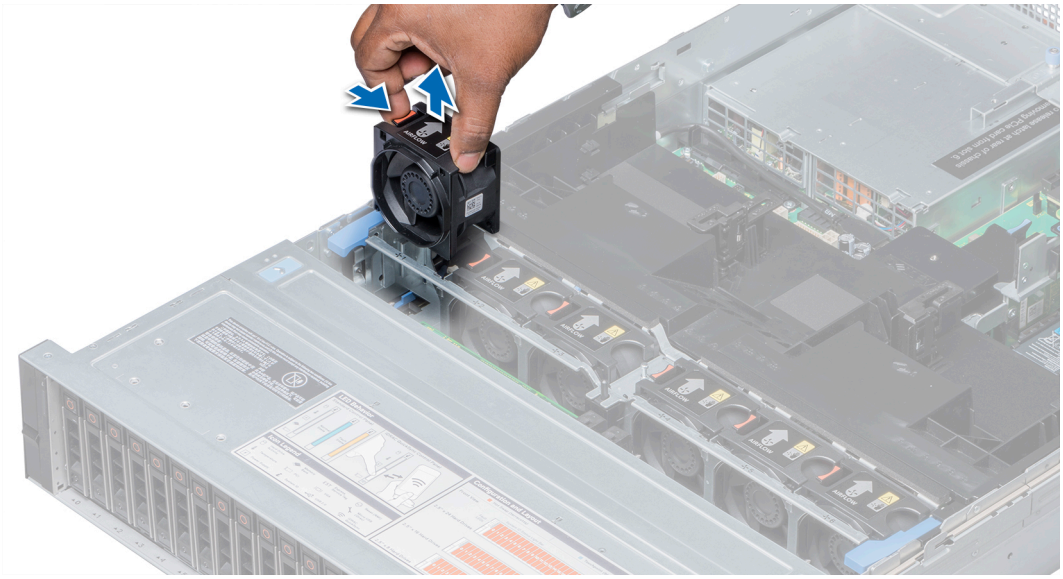


Figure 27. Removing cooling fan

Install the cooling fan

Steps

Holding the release tab, align the connector at the base of the cooling fan with the connector on the system board.

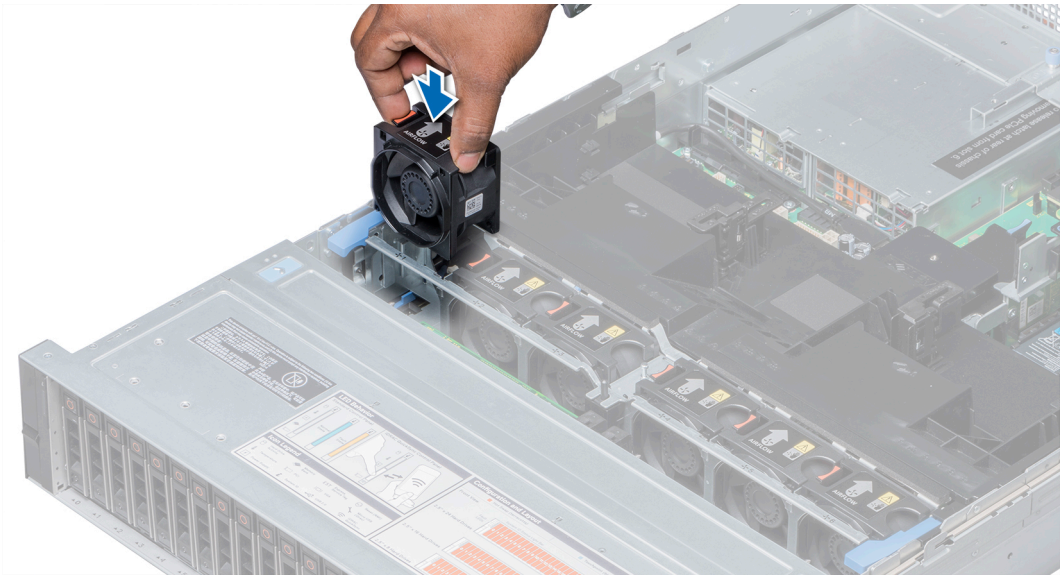


Figure 28. Installing cooling fan

Install the system cover

Prerequisites

Follow the safety guidelines.

Ensure that all internal cables are routed correctly and connected, and that no tools or extra parts are left inside the system.

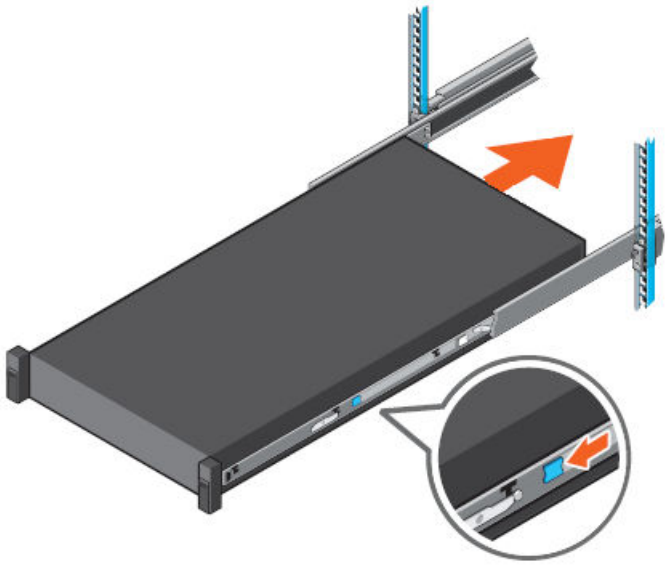
Steps

1. Align the tabs on the system cover with the guide slots on the system.
2. Push the system cover latch down.
   The system cover slides forward, the tabs on the system cover engage with the guide slots on the system and the system cover latch locks into place.
3. Using a flat or Phillips head screwdriver, rotate the latch release lock clockwise to the locked position.

Slide the system into the cabinet

Steps

1. At the front of the cabinet, push the system inward until the lock levers click into place.
2. Push the blue slide release lock tabs forward on both rails and slide the system into the cabinet. The slam latches will engage to secure the system in the cabinet.



Verify the replacement fan

Prerequisites

Establish a connection to the system as described in Establish a serial management connection to the PowerProtect system.

About this task

Complete the following steps to verify the replacement fan.

Steps

1. Use the `enclosure show fans` command to check the status of each fan. Record the failed fan.

```
# enclosure show fans 1
Enclosure   Description          Level    Status
---------   -----------------    ------   ------
1           System Board Fan1    medium   OK
            System Board Fan2    medium   OK
            System Board Fan3    medium   OK
            System Board Fan4    medium   OK
            System Board Fan5    medium   OK
            System Board Fan6    medium   OK
---------   -----------------    ------   ------
```

2. Use the `alerts show current` (or `alerts show current-detailed`) command.

```
# alerts show current
No active alerts
```

6

Replace a Power Supply

The system contains two power supplies in the rear of the chassis.

Complete the following procedure to replace a failed power supply.

This CRU can be performed with the system powered on.

Topics:

Identify a failed power supply

Prerequisites

Establish a connection to the system as described in Establish a serial management connection to the PowerProtect system.

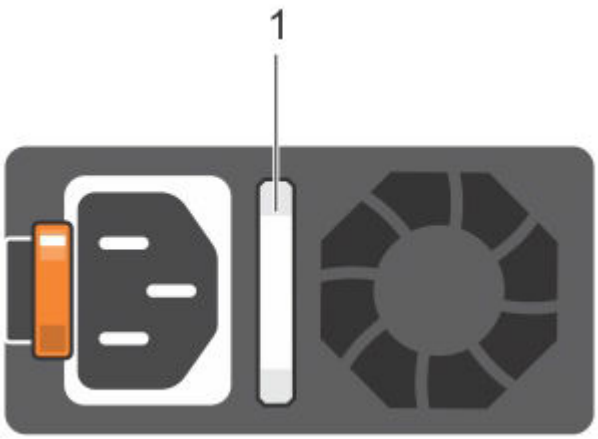
About this task

Complete the following steps to identify the failed power supply.

Steps

1. Check the LED on the affected power supply unit. The power supply handle functions as the LED.

   NOTE: If a power supply unit is found to be faulted, the LED blinks amber.



2. Enter the `alerts show current` command (or `alerts show current-detailed`) to display messages indicating power supply failure. A sample output is shown.

   NOTE: The sample output below only includes the alert object and alert message. It does not include the columns for the alert ID, post time, severity, and alert class which are part of the actual output.

```
# alerts show current
Object                Message
```

```
---------              -----------------
Encl=1:PowerSupply=2 EVT-ENVIRONMENT-00026: Power supply has failed
---------              -----------------
```

3. Enter the `enclosure show powersupply` command to check the status of each power supply.

```
# enclosure show powersupply
This command may take up to a minute to complete. Please wait...
---------   -----------   -------   ------
Enclosure   Description      Status
---------   -------------    -------
1           Power module 1   OK
1           Power module 2   FAILED
---------   -------------    -------
```

4. Map the number of the failed PSU to the physical location of that power supply.

   As seen from the back of the system, both power supplies are on the right--hand side of the system. Power supply 1 is the left-hand PSU, and power supply 2 is the right-hand PSU.

Remove a power supply

Prerequisites

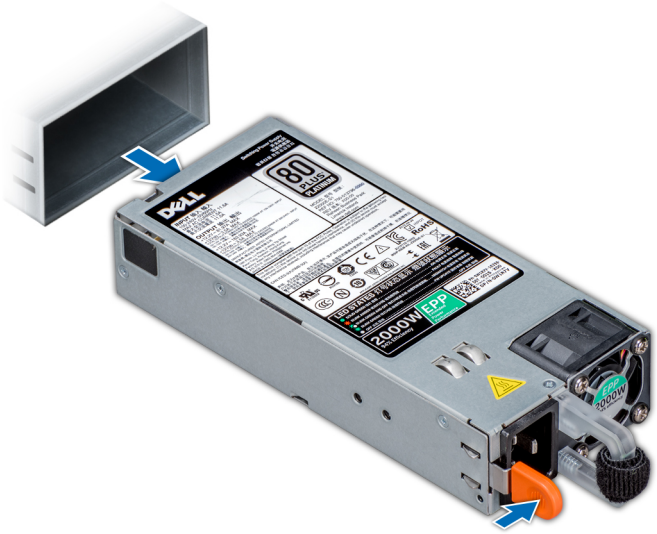
Follow the safety guidelines listed in Safety instructions.

About this task

The technical white paper *Servicing and Replacing Power Supplies for DellEMC PowerEdge R940/R740/R740xd Systems with Single and Dual CMA Solutions* provides additional details about removing power supplies with the cable management arms installed on the back of the system.

Steps

1. Disconnect the power cable from the power source and from the PSU you intend to remove, and then remove the cable from the strap on the PSU handle.
2. Press the release latch and slide the PSU out of the system by using the PSU handle.



Install the power supply unit

Prerequisites

Follow the safety guidelines listed in Safety instructions.

About this task

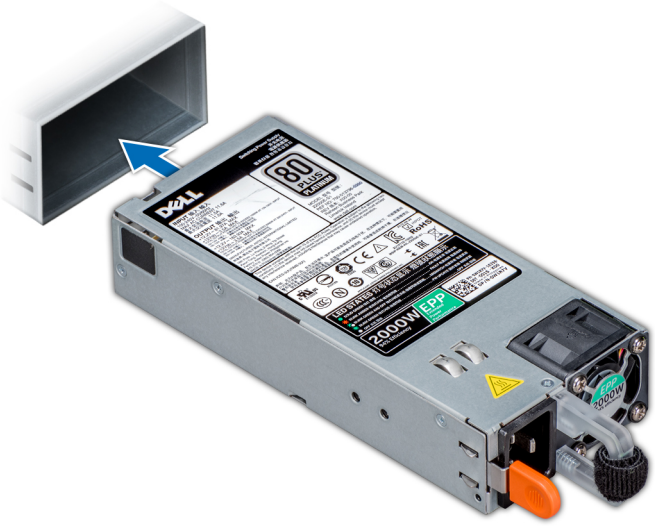
The technical white paper *Servicing and Replacing Power Supplies for DellEMC PowerEdge R940/R740/R740xd Systems with Single and Dual CMA Solutions* provides additional details about installing power supplies with the cable management arms installed on the back of the system.

Steps

1. Verify that nothing has dropped into the empty PSU slot before installing the replacement PSU.
2. Slide the PSU into the system until the PSU is fully seated and the release latch snaps into place.
3. Connect the power cable to the PSU, and plug the cable into a power outlet.

CAUTION: When connecting the power cable to the PSU, secure the cable to the PSU with the strap.

NOTE: When installing, hot swapping, or hot adding a new PSU, wait for 15 seconds for the system to recognize the PSU and determine its status. The PSU redundancy may not occur until discovery is complete. Wait until the new PSU is discovered and enabled before you remove the other PSU. The PSU status indicator turns green to signify that the PSU is functioning properly.



Verify the replacement power supply

Prerequisites

Establish a connection to the system as described in Establish a serial management connection to the PowerProtect system.

About this task

Complete the following steps to verify the replacement power supply.

Steps

1. Enter the `enclosure show powersupply` command to check the status of each power supply.

```
# enclosure show powersupply
This command may take up to a minute to complete. Please wait...
---------   -----------   -------   ------
Enclosure   Description      Status
---------   --------------   -------
1           Power module 1   OK
1           Power module 2   OK
---------   --------------   -------
```

2. Use the `alerts show current` (or `alerts show current-detailed`) command.

```
# alerts show current
No active alerts
```

7

Replace the Network Daughter Card

CAUTION: Improper installation on the rails may damage the rails or cause the system to fall when extended. When extending the system from the rack, pull outward slowly and verify the system is properly installed on the rails.

The system uses a network daughter card that contains 4 x 10 GbE ports. If a port fails, the whole card requires replacement.

Complete the following procedure to replace the network daughter card.

This CRU is not hot-swappable, and requires a system shutdown to replace.

Topics:

Verify the status of the network daughter card

Prerequisites

Establish a connection to the system as described in Establish a serial management connection to the PowerProtect system.

About this task

Complete the following steps to verify the network daughter card requires replacement.

Steps

1. Use the `enclosure show io-cards` command to check the status of the network daughter card. If the card has failed, it will not appear in the command output.
2. If the network daughter card is visible in the output of the `enclosure show io-cards` command, use the `alerts show current` command to look for alerts relating to one or more network interfaces that indicate a failure of the network daughter card.
3. Verify the link and activity LEDs on the impacted port are off.

   The network daughter card is located at the rear of the chassis, at the bottom.

The ports are labeled ethMa, ethMb, ethMc, and ethMd from left to right.

Shut down and disconnect the system

Prerequisites

Establish a connection to the system.

About this task

Complete the following steps to shut down and disconnect the system.

Steps

1. Stop the system using the `system poweroff` command to allow the proper shut down of the file system and other system components. The power down process takes approximately five minutes to complete. The `system poweroff` command immediately turns the front panel blue LED to amber, and is complete when the front panel LED turns off.

   NOTE: The system fans still run, and NIC port LEDs still flash after running the `system poweroff` command.

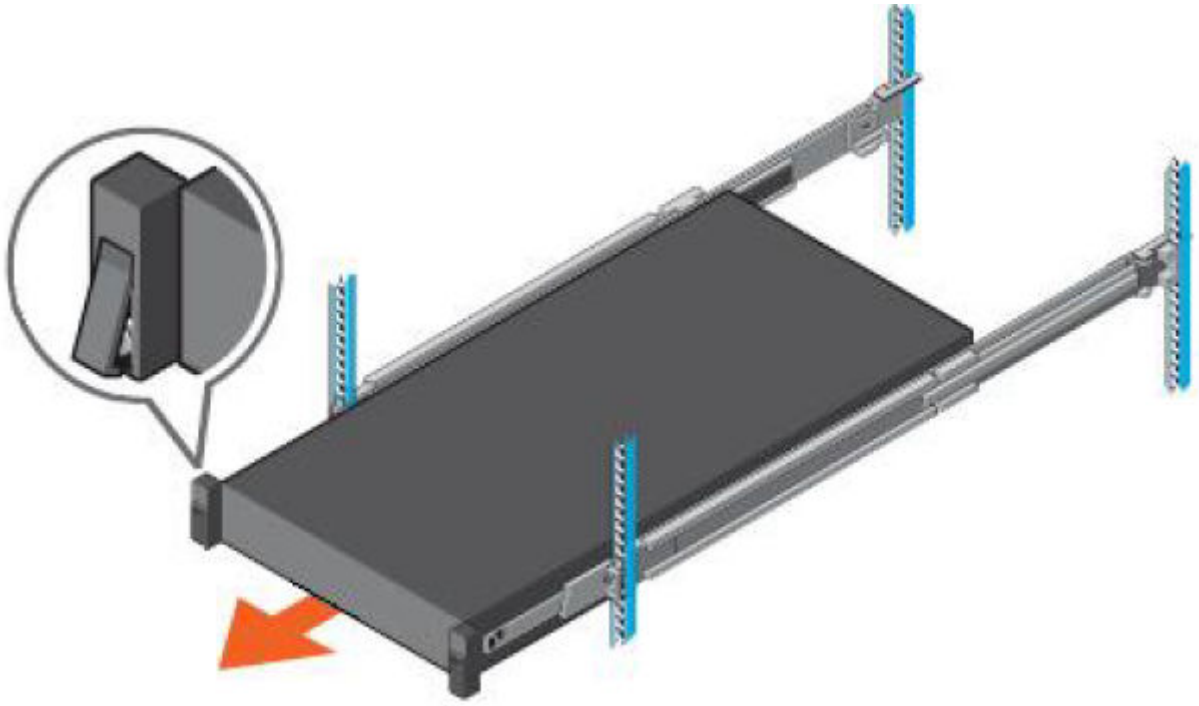
2. Open the cable management arms.
3. Label each of the cables as to their connection location. Taking a photograph for reference is also helpful for re-connecting the cables.
4. Disconnect the AC power cords from the rear of the system.
5. Disconnect all network and FC cables from the rear of the system.
6. Disconnect all SAS cables from the rear of the system.
7. Disconnect the serial console cable.

Extend the system from the cabinet

Use this procedure to extend the system from the cabinet so that you can remove the system cover to access the internal FRU components, or to remove the system from the cabinet.

Steps

1. At the front of the cabinet, locate the two slam latches on the left and right sides of the system. Pull the slam latches up to release the system from the cabinet. If the slam latches do not disengage, loosen the screw under each latch.
2. Using the slam latches, pull the system from the cabinet until the rails lock in the extended position.



Remove the system cover

Steps

1. Using a flat or a Phillips head screwdriver, rotate the latch release lock counter clockwise to the unlocked position.
2. Lift the latch till the system cover slides back and the tabs on the system cover disengage from the guide slots on the system.
3. Hold the cover on both sides, and lift the cover away from the system.

Figure 29. Remove the system cover

Removing the air shroud

Steps

Hold the air shroud at both ends and lift it away from the system.

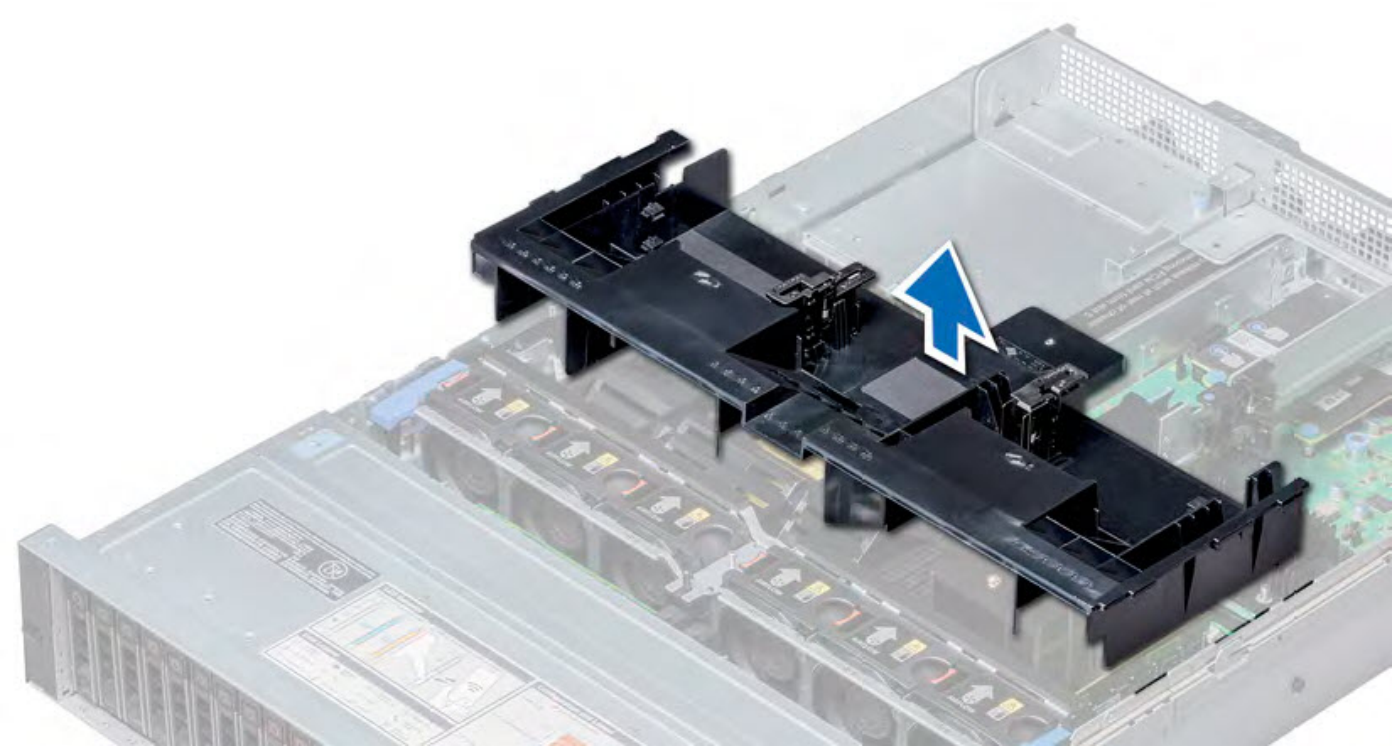


Figure 30. Removing the air shroud

Remove expansion card riser 2

Prerequisites

Follow the safety guidelines listed in Safety instructions.

Steps

1. If installed, remove expansion cards installed on the riser.
2. Disconnect any cables connected to the riser.
3. To remove expansion card riser 2:
   a. Using Phillips #2 screwdriver, loosen the screws that secure the riser to the system.
   b. Press the release tab, and holding the riser by its edges, lift the riser from the riser connector on the system board.

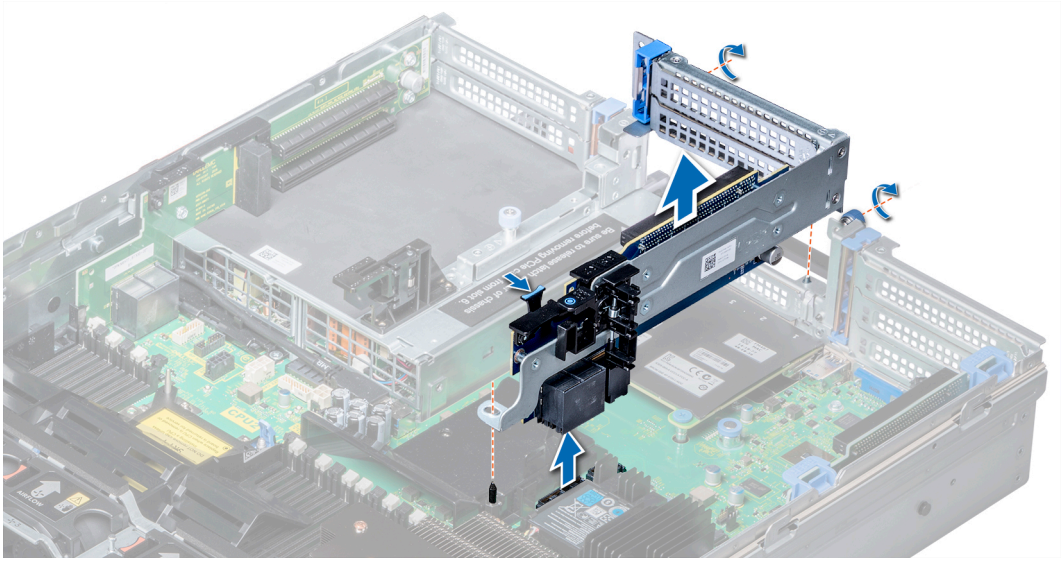


Figure 31. Removing expansion card riser 2

Remove the network daughter card

Steps

1. Using a Phillips #2 screwdriver, loosen the captive screws that secure the network daughter card (NDC) to the system board.
2. Hold the NDC by the edges on either side of the touch points, and lift to remove it from the connector on the system board.
3. Slide the NDC towards the front of the system until the Ethernet connectors are clear of the slot in the back panel.

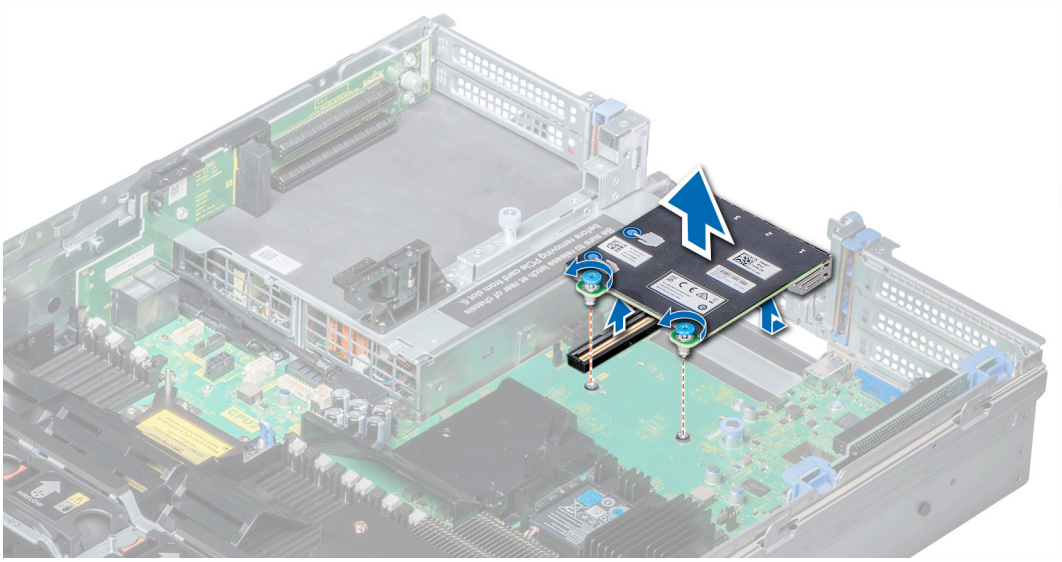


Figure 32. Removing the network daughter card

Install the network daughter card

Steps

1. Orient the NDC so that the Ethernet connectors fit through the slot in the chassis.

2. Align the captive screws at the back-end of the card with the screw holes on the system board.
3. Press the touch points on the card until the card connector is firmly seated on the system board connector.
4. Using a Phillips #2 screwdriver, tighten the captive screws to secure the NDC to the system board.

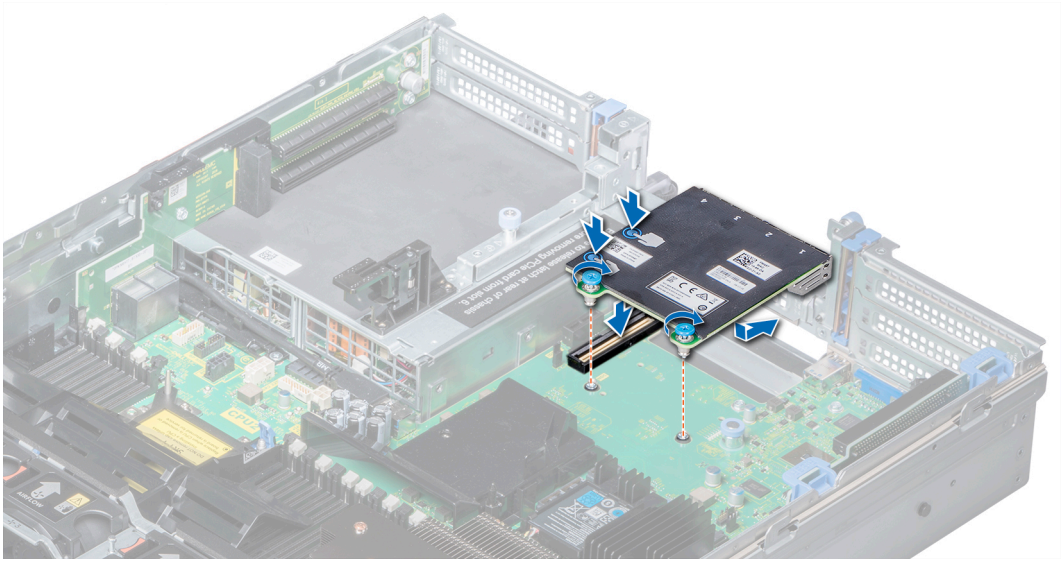


Figure 33. Installing the network daughter card

Install expansion card riser 2

Prerequisites

Follow the safety guidelines listed in Safety instructions.

Steps

To install expansion card riser 2:

a. Align the screw and tab on the riser with the screw hole and slot on the system.
b. Lower the riser into the system until the riser connector engages with the connector on the system board.
c. Using Phillips #2 screwdriver, tighten the screws to secure the riser to the system.

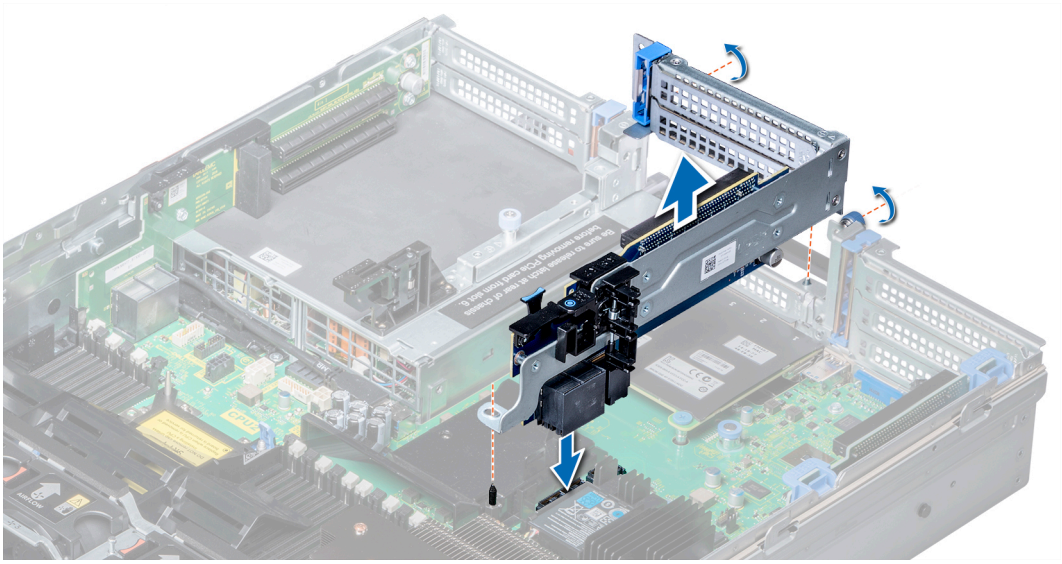


Figure 34. Installing expansion card riser 2

Installing the air shroud

Steps

1. Align the tabs on the air shroud with the slots on the system.
2. Lower the air shroud into the system until it is firmly seated.
   When firmly seated, the memory socket numbers marked on the air shroud align with the respective memory sockets.

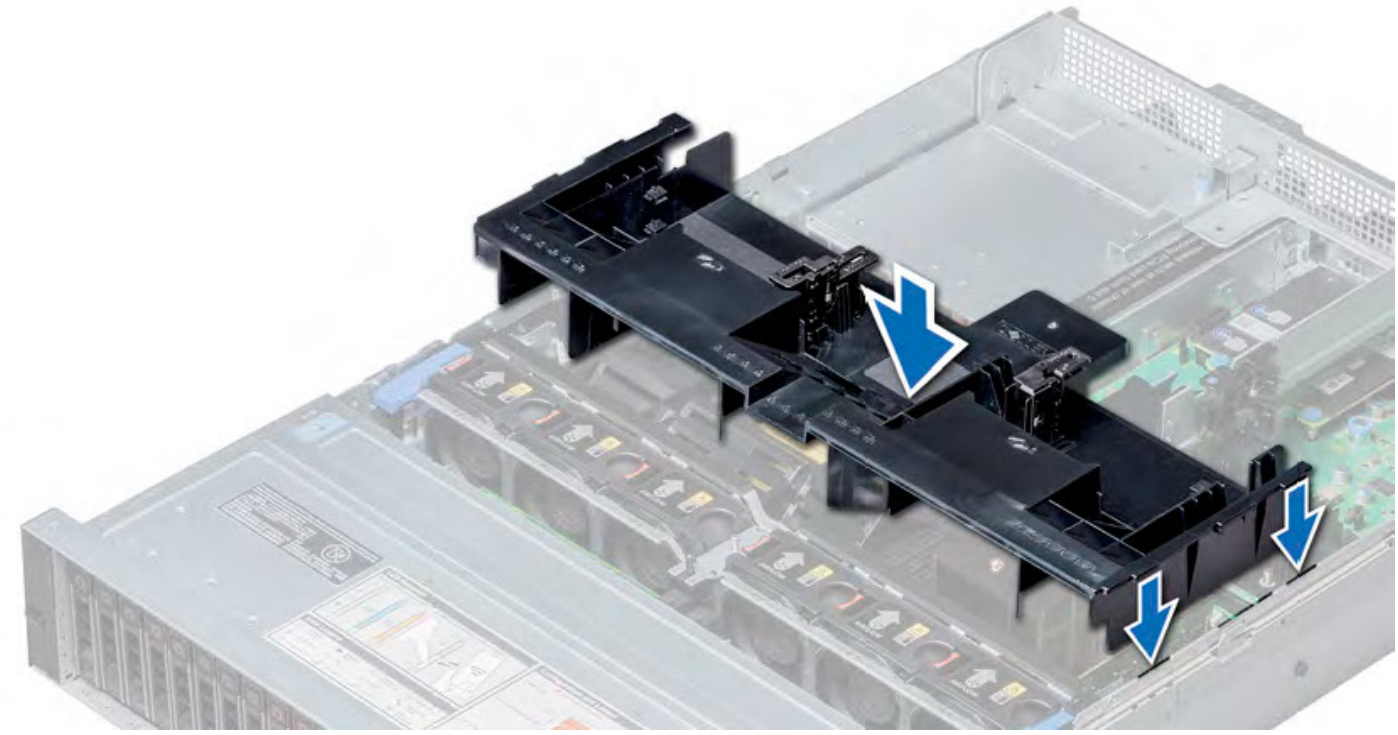


Figure 35. Installing the air shroud

Install the system cover

Prerequisites

Follow the safety guidelines.

Ensure that all internal cables are routed correctly and connected, and that no tools or extra parts are left inside the system.

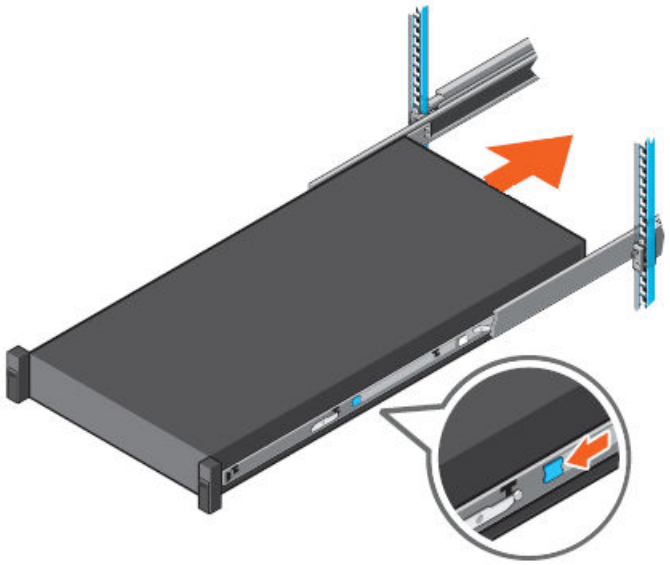
Steps

1. Align the tabs on the system cover with the guide slots on the system.
2. Push the system cover latch down.
   The system cover slides forward, the tabs on the system cover engage with the guide slots on the system and the system cover latch locks into place.
3. Using a flat or Phillips head screwdriver, rotate the latch release lock clockwise to the locked position.

Slide the system into the cabinet

Steps

1. At the front of the cabinet, push the system inward until the lock levers click into place.
2. Push the blue slide release lock tabs forward on both rails and slide the system into the cabinet. The slam latches will engage to secure the system in the cabinet.



Reconnect and power on the system

About this task

Complete the following steps to reconnect cables, power on the system, and reconnect a terminal session.

Steps

1. Use the cable labels to reconnect the cables in the same configuration as they were before starting the replacement procedure.

   CAUTION: When connecting SAS cables to the SAS cards, ensure there is sufficient slack in the cable to avoid unnecessary strain on the cable connector and the SAS card when the controller is fully extended from the rack.

2. Close the cable management arms.
3. Reconnect the serial console cable to the system serial port, and prepare the terminal session.
4. Reconnect the AC power cords to the power supplies.

   NOTE: The system may not power on automatically after plugging in the AC power cords.

5. If the system does not power on when the AC power cords were reconnected, press the power button on the right control panel at the front of the system.

6. When the system boots, log in as sysadmin.

Verify the replacement network daughter card

About this task

Complete the following steps to verify the operation of the replacement network daughter card.

Steps

1. Verify the link and activity LEDs on all ports are lit on the active ports.
   The network daughter card is located at the rear of the chassis, at the bottom.

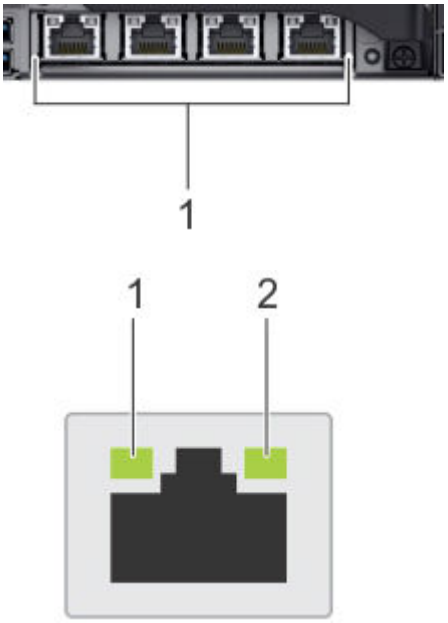


Figure 36. NIC LEDs

1. Link LED indicator

2. Activity LED indicator

The NIC LEDs have the following states:

Table 2. NIC LED states

Link indicator state	Activity indicator state	Meaning
Green	Blinking green	The NIC is connected to a valid network at its maximum port speed and data is being sent or received.
Amber	Blinking green	The NIC is connected to a valid network at less than its maximum port speed and data is being sent or received.
Green	Off	The NIC is connected to a valid network at its maximum port speed and data is not being sent or received.
Amber	Off	The NIC is connected to a valid network at less than its maximum port speed and data is not being sent or received.
Blinking green	Off	NIC identify is enabled through the NIC configuration utility.

2. Use the `enclosure show io-cards` and `net show settings` commands to check the status of the network daughter card. Verify the network daughter card appears in the list
3. Use the `alerts show current` (or `alerts show current-detailed`) command.

```
# alerts show current
No active alerts
```

8

Replace a DIMM

CAUTION: Improper installation on the rails may damage the rails or cause the system to fall when extended. When extending the system from the rack, pull outward slowly and verify the system is properly installed on the rails.

The following table lists the memory capacity and the number of DIMMs installed in the system.

Table 3. Memory mapping

Memory capacity	Number of DIMMs
192 GB	12 x 16 GB

This CRU is not hot-swappable, and requires a system shutdown to replace.

CAUTION: If any components are not fully seated, the system may not boot upon completion of the procedure. When installing a component into the system, verify it is fully seated before proceeding to the next step.

Topics:

Identify a failed DIMM

Prerequisites

Establish a connection to the system as described in Establish a serial management connection to the PowerProtect system.

About this task

Complete the following steps to identify a failed DIMM.

Steps

1. Enter the `alert show current` command to display message indicating a DIMM failure. A sample output is shown.

```
# alert show current
Id  Post Time                Severity  Class       Object  Message
--  -----------------------  --------  --------    -------  ------------------
14  Wed May 3 01:01:18 2017  ALERT   HardwareFailure     EVT-MEM-00002: Memory
                                                         size(512747300KB)
                                                         goes below the configured
                                                         size(529306480KB).
```

```
                                                    DDFS will not be started.

# alert show history
```

2. Enter the `enclosure show memory` command.

```
# enclosure show memory
Enclosure 1
       Number of DIMMS : 12
       Memory Size: 196608 MiB

      Locator Speed(MHz) Size(MiB) Part No.           Serial No.
      ------- ---------- --------- ------------------ ----------
      A1      2400       16384     18ASF2G72PDZ-2G6E1 F0086935
      A2      2400       16384     18ASF2G72PDZ-2G6E1 F0086926
      A3      2400       16384     18ASF2G72PDZ-2G6E1 F0085F59
      A4      2400       16384     18ASF2G72PDZ-2G6E1 F0086920
      A5      2400       16384     18ASF2G72PDZ-2G6E1 F0085F86
      A6      2400       16384     18ASF2G72PDZ-2G6E1 F00858DC
      B1      2400       16384     18ASF2G72PDZ-2G6E1 F008613F
      B2      2400       16384     18ASF2G72PDZ-2G6E1 F0086146
      B3      2400       16384     18ASF2G72PDZ-2G6E1 F008613C
      B4      2400       16384     18ASF2G72PDZ-2G6E1 F0085B81
      B5      2400       16384     18ASF2G72PDZ-2G6E1 F008607C
      B6      2400       16384     18ASF2G72PDZ-2G6E1 20E4CFA4
```

3. Record the failed DIMM information.
4. Identify the physical location of the failed DIMM.

Shut down and disconnect the system

Prerequisites

Establish a connection to the system as described in Establish a serial management connection to the PowerProtect system.

About this task

Complete the following steps to shut down and disconnect the system.

Steps

1. Stop the system using the `system poweroff` command to allow the proper shut down of the file system and other system components. The power down process takes approximately five minutes to complete. The `system poweroff` command immediately turns the front panel blue LED to amber, and is complete when the front panel LED turns off.

   NOTE: The system fans still run, and NIC port LEDs still flash after running the `system poweroff` command.

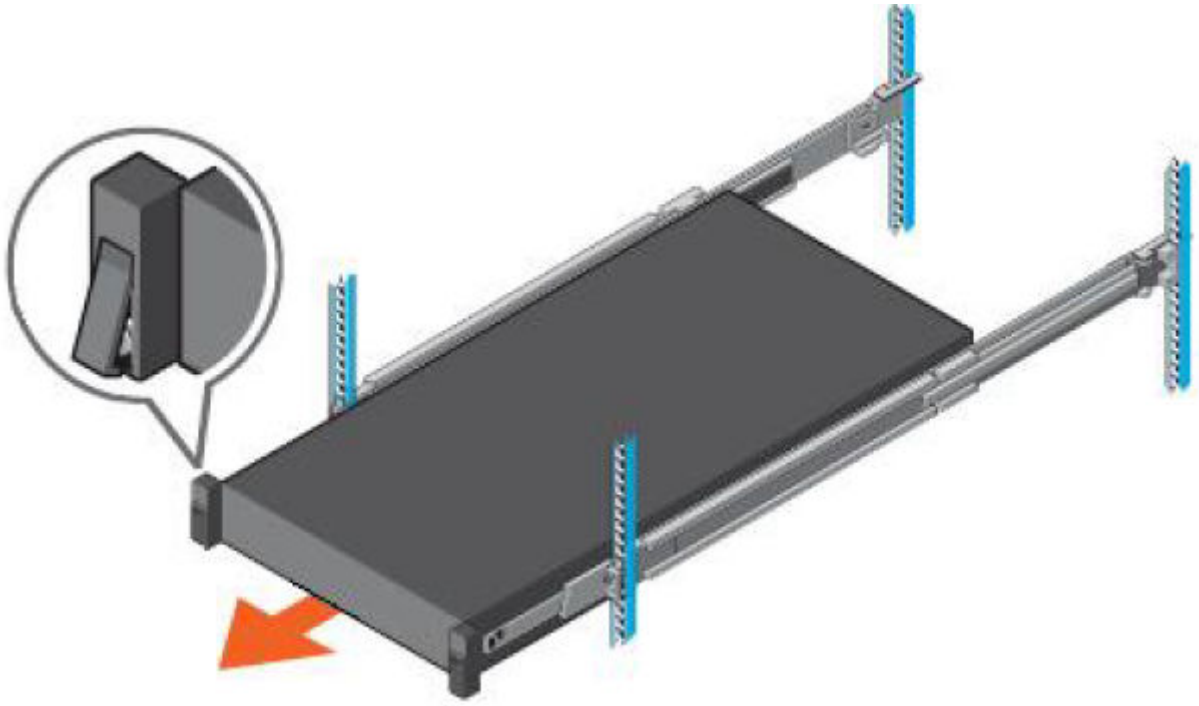
2. Open the cable management arms.
3. Disconnect the AC power cords from the rear of the system.

Extend the system from the cabinet

Use this procedure to extend the system from the cabinet so that you can remove the system cover to access the internal FRU components, or to remove the system from the cabinet.

Steps

1. At the front of the cabinet, locate the two slam latches on the left and right sides of the system. Pull the slam latches up to release the system from the cabinet. If the slam latches do not disengage, loosen the screw under each latch.
2. Using the slam latches, pull the system from the cabinet until the rails lock in the extended position.



Remove the system cover

Steps

1. Using a flat or a Phillips head screwdriver, rotate the latch release lock counter clockwise to the unlocked position.
2. Lift the latch till the system cover slides back and the tabs on the system cover disengage from the guide slots on the system.
3. Hold the cover on both sides, and lift the cover away from the system.

Figure 37. Remove the system cover

Removing the air shroud

Steps

Hold the air shroud at both ends and lift it away from the system.

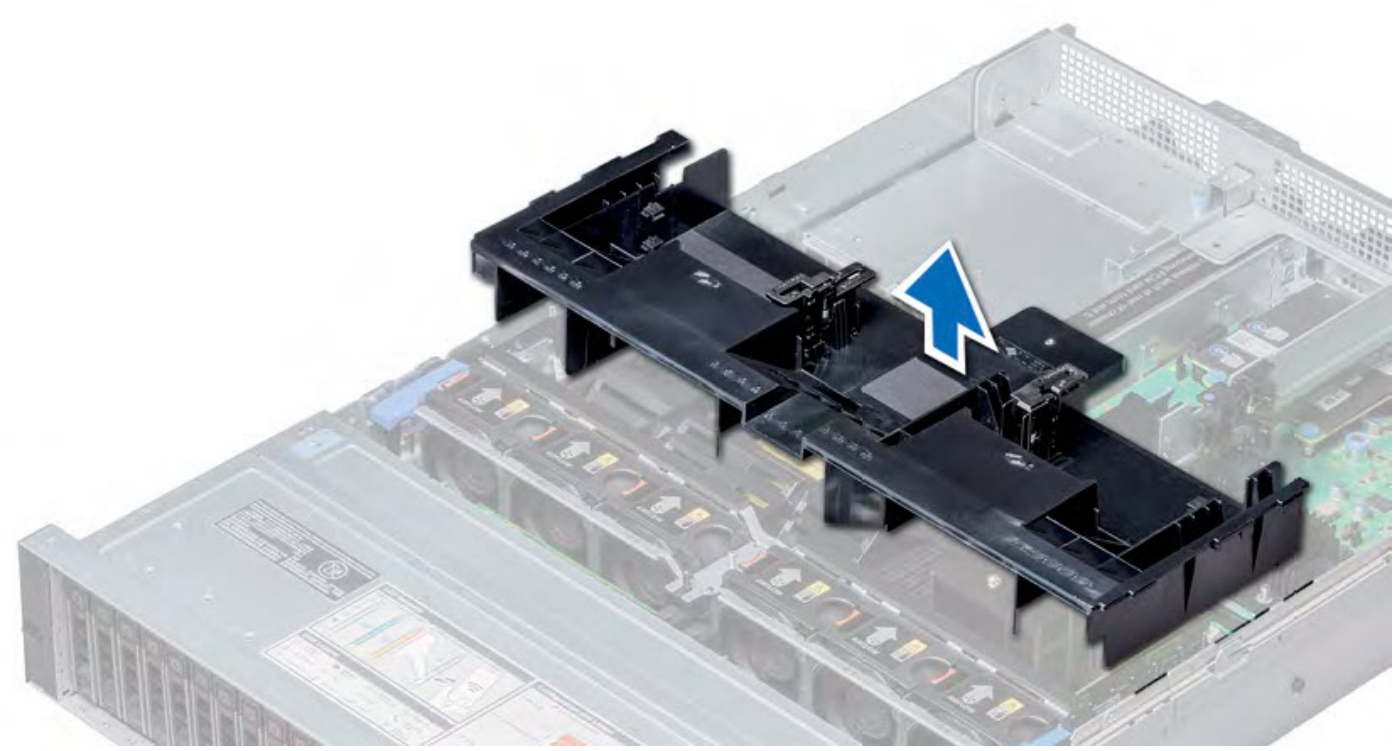


Figure 38. Removing the air shroud

Remove the memory module

Prerequisites

WARNING: Allow the memory modules to cool after you power off the system. Handle the memory modules by the card edges and avoid touching the components or metallic contacts on the memory module.

CAUTION: To ensure proper system cooling, memory module blanks must be installed in any memory socket that is not occupied. Remove memory module blanks only if you intend to install memory modules in those sockets.

Steps

1. Locate the appropriate memory module socket.

   CAUTION: Handle each memory module only by the card edges, ensuring not to touch the middle of the memory module or metallic contacts.

2. Push the ejectors outward on both ends of the memory module socket at the same time to release the memory module from the socket.
3. Lift and remove the memory module from the system.

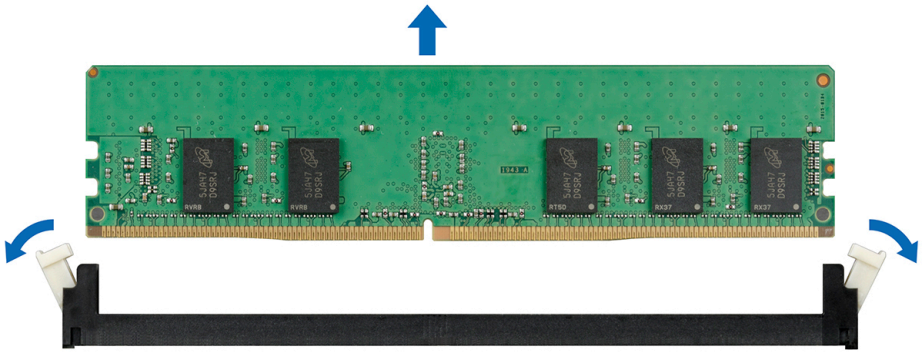


Figure 39. Removing a memory module

Install the memory module

Prerequisites

CAUTION: To ensure proper system cooling, memory module blanks must be installed in any memory socket that is not occupied. Remove memory module blanks only if you intend to install memory modules in those sockets.

Steps

1. Locate the appropriate memory module socket.

   CAUTION: Handle each memory module only by the card edges, ensuring not to touch the middle of the memory module or metallic contacts.

   CAUTION: To prevent damage to the memory module or the memory module socket during installation, do not bend or flex the memory module. You must insert both ends of the memory module simultaneously.

2. Open the ejectors on the memory module socket outward to allow the memory module to be inserted into the socket.
3. Align the edge connector of the memory module with the alignment key of the memory module socket, and insert the memory module in the socket.

   CAUTION: Do not apply pressure at the center of the memory module; apply pressure at both ends of the memory module evenly.

   NOTE: The memory module socket has an alignment key that enables you to install the memory module in the socket in only one orientation.

4. Press the memory module with your thumbs until the socket levers firmly click into place.

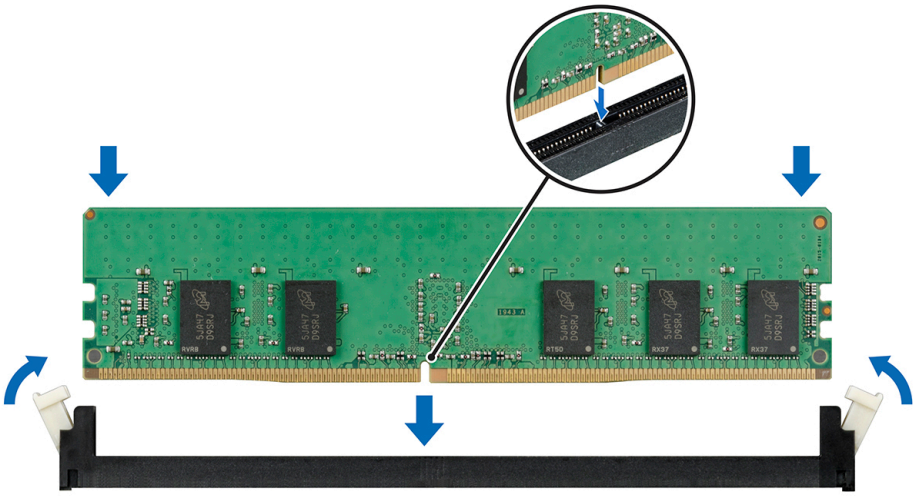


Figure 40. Installing a memory module

Installing the air shroud

Steps

1. Align the tabs on the air shroud with the slots on the system.
2. Lower the air shroud into the system until it is firmly seated.
   When firmly seated, the memory socket numbers marked on the air shroud align with the respective memory sockets.

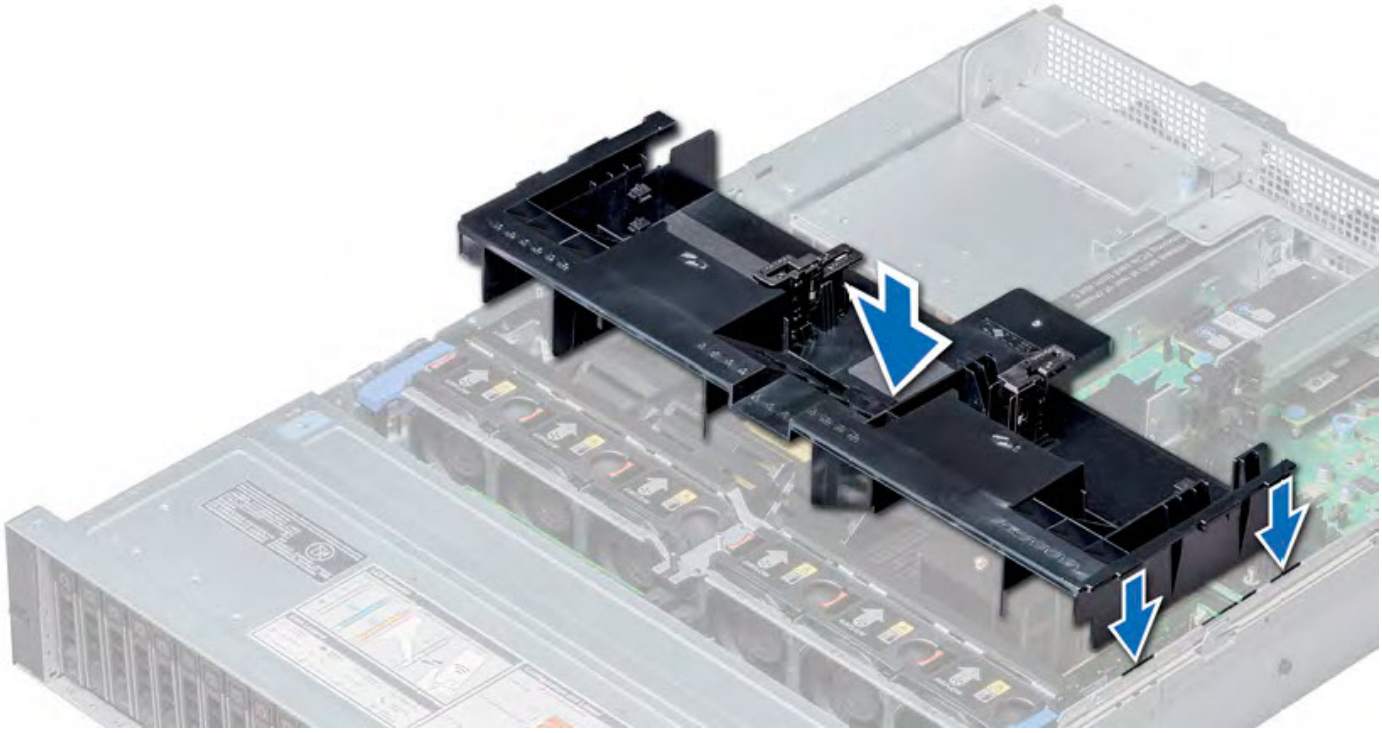


Figure 41. Installing the air shroud

Install the system cover

Prerequisites

Follow the safety guidelines.

Ensure that all internal cables are routed correctly and connected, and that no tools or extra parts are left inside the system.

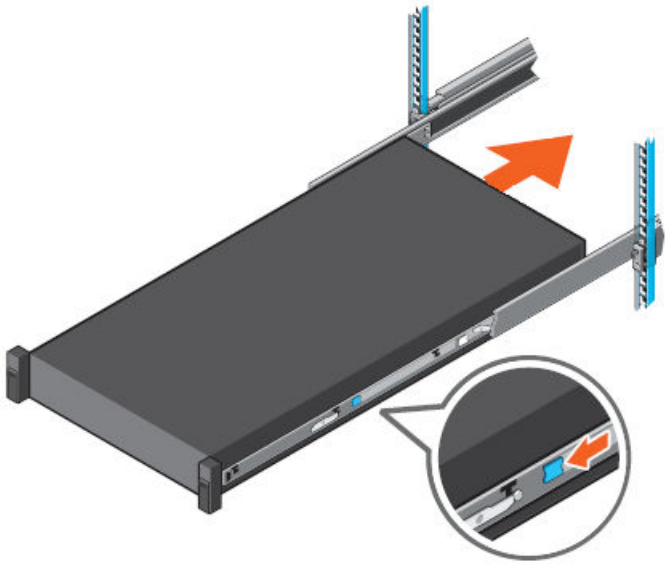
Steps

1. Align the tabs on the system cover with the guide slots on the system.
2. Push the system cover latch down.
   The system cover slides forward, the tabs on the system cover engage with the guide slots on the system and the system cover latch locks into place.
3. Using a flat or Phillips head screwdriver, rotate the latch release lock clockwise to the locked position.

Slide the system into the cabinet

Steps

1. At the front of the cabinet, push the system inward until the lock levers click into place.
2. Push the blue slide release lock tabs forward on both rails and slide the system into the cabinet. The slam latches will engage to secure the system in the cabinet.



Reconnect and power on the system

About this task

Complete the following steps to reconnect cables, power on the system, and reconnect a terminal session.

Steps

1. Close the cable management arms.
2. Prepare the terminal session.
3. Reconnect the AC power cords to the power supplies.

   NOTE: The system may not power on automatically after plugging in the AC power cords.

4. If the system does not power on when the AC power cords were reconnected, press the power button on the right control panel at the front of the system.

5. When the system boots, log in as sysadmin.

Verify the replacement DIMM

About this task

Complete the following steps to verify the replacement DIMM.

Steps

1. Enter the `system show meminfo` command to see the top level summary. Confirm that the system reports the correct amount of memory.
2. Enter the `enclosure show memory` command to verify all DIMMs are discovered.

NOTE: The DIMM part numbers and serial numbers are displayed by the command, but truncated from the sample output below for readability.

```
# enclosure show memory
Enclosure 1
       Number of DIMMS : 12
       Memory Size: 196608 MiB

      Locator Speed(MHz) Size(MiB)
      ------- ---------- ---------
      A1      2400       16384
      A2      2400       16384
      A3      2400       16384
      A4      2400       16384
      A5      2400       16384
      A6      2400       16384
      B1      2400       16384
      B2      2400       16384
      B3      2400       16384
      B4      2400       16384
      B5      2400       16384
      B6      2400       16384
```

3. Check for any new DIMM alerts.

9

Replace a PCIe HBA (SAS, FC, or NIC)

CAUTION: Improper installation on the rails may damage the rails or cause the system to fall when extended. When extending the system from the rack, pull outward slowly and verify the system is properly installed on the rails.

The system uses a variety of PCIe HBAs to provide network, FC, or storage connectivity. If a port fails, the whole card requires replacement.

CAUTION: This procedure does not apply to replacing the NVRAM module.

Complete the following procedure to replace an HBA.

This CRU is not hot-swappable, and requires a system shutdown to replace.

CAUTION: A module that is hot-inserted into the system remains powered off until the next system reboot. Removing a module with the system powered on causes an immediately reboot.

Topics:

Identify the failed PCIe HBA (SAS, FC, or NIC)

Steps

1. Enter the `alerts show current` or `alerts show current-detailed` command to display messages indicating I/O failure. A sample output is shown.

```
# alerts show current
Id Post Time                Severity Class     Object     Message
-- ----------------------- -------- --------- -------- ---------------
1  Mon May 6 18:57:00 2019  WARNING HWFailure Enclosure=1:EVT-ENVIRONMENT-00049:
                                                        The system detected an
                                                        invalid hardware
                                                        configuration.
```

   The slot layout and assignments are as follows:

Figure 42. Slot numbering

Table 4. Slot assignments

Description	Slot
Intel XXV710, 2 x 10/25GbE SFP28, PCIe Full Height	5, 7, 8
Intel X710, 4 x 10GbE SFP+, PCIe Full Height	5, 7, 8
Intel X710, 4 x 10GBT, PCIe Full Height	5, 7, 8
QLogic 2692, 2 x 16G FC, PCIe Full Height	1
Dell EMC Cavium/CN72xx, 16 GB NVRAM, PCIe Full height	2
Broadcom LSI 9300-8e, 2 x 12 Gbps SAS, PCIe Low Profile (external SAS)	3
Intel Lewisberg, QAT, PCIe Full Height	4
Broadcom LSI 9300-8e, 2 x 12 Gbps SAS, PCIe Low Profile (internal SAS)	6

2. Enter the `enclosure show io-cards` command to check the status of each I/O. Record the failed I/O. A sample output is shown.

Shut down and disconnect the system

Prerequisites

Establish a connection to the system.

About this task

Complete the following steps to shut down and disconnect the system.

Steps

1. Stop the system using the `system poweroff` command to allow the proper shut down of the file system and other system components. The power down process takes approximately five minutes to complete. The `system poweroff` command immediately turns the front panel blue LED to amber, and is complete when the front panel LED turns off.

   NOTE: The system fans still run, and NIC port LEDs still flash after running the `system poweroff` command.

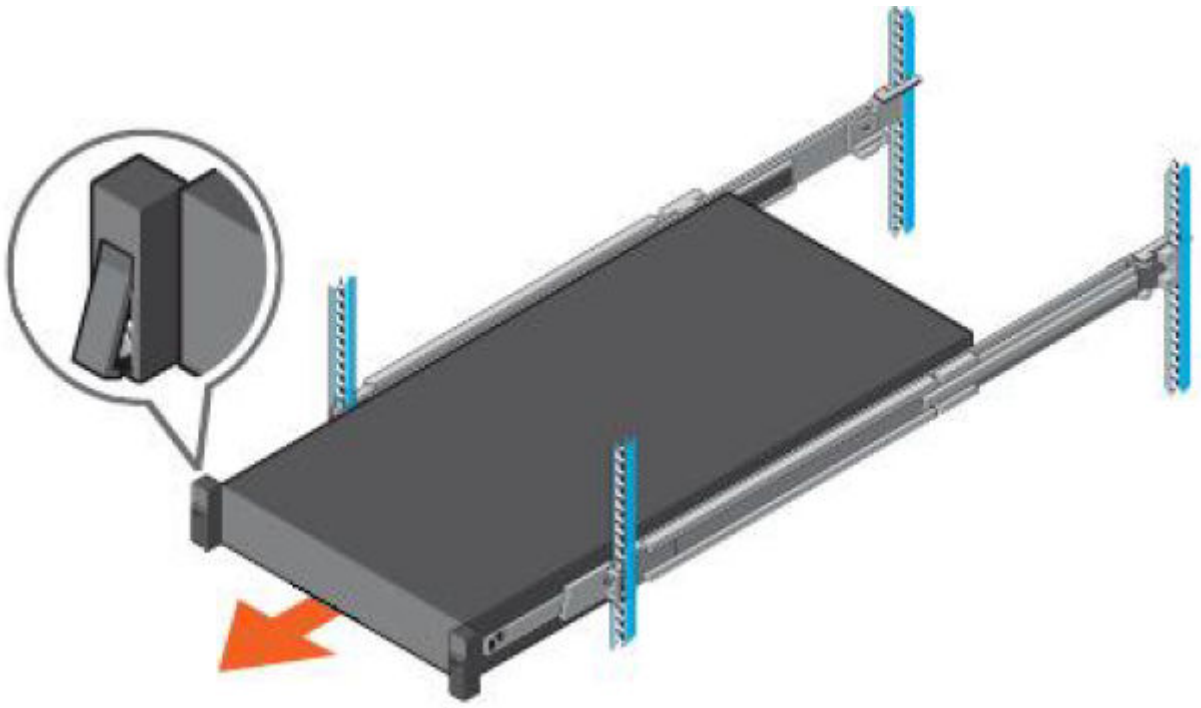
2. Open the cable management arms.
3. Label each of the cables as to their connection location. Taking a photograph for reference is also helpful for re-connecting the cables.
4. Disconnect the AC power cords from the rear of the system.
5. Disconnect all network and FC cables from the rear of the system.
6. Disconnect all SAS cables from the rear of the system.
7. Disconnect the serial console cable.

Extend the system from the cabinet

Use this procedure to extend the system from the cabinet so that you can remove the system cover to access the internal FRU components, or to remove the system from the cabinet.

Steps

1. At the front of the cabinet, locate the two slam latches on the left and right sides of the system. Pull the slam latches up to release the system from the cabinet. If the slam latches do not disengage, loosen the screw under each latch.
2. Using the slam latches, pull the system from the cabinet until the rails lock in the extended position.



Remove the system cover

Steps

1. Using a flat or a Phillips head screwdriver, rotate the latch release lock counter clockwise to the unlocked position.
2. Lift the latch till the system cover slides back and the tabs on the system cover disengage from the guide slots on the system.
3. Hold the cover on both sides, and lift the cover away from the system.

Figure 43. Remove the system cover

Remove an expansion card from an expansion card riser

Prerequisites

Follow the safety guidelines listed in Safety instructions.

About this task

NOTE: This procedure describes and illustrate expansion card removal from each type of expansion card riser. Refer to the applicable illustration to aid in removal of the expansion card from the expansion card riser.

NOTE: When removing an expansion card from riser 2 or 3, ensure that the PCIe card holder latch is closed.

Steps

1. If applicable, disconnect the cables from the expansion card.
2. Hold the expansion card by its edges, and pull the card until the card edge connector disengages from the expansion card connector on the riser.

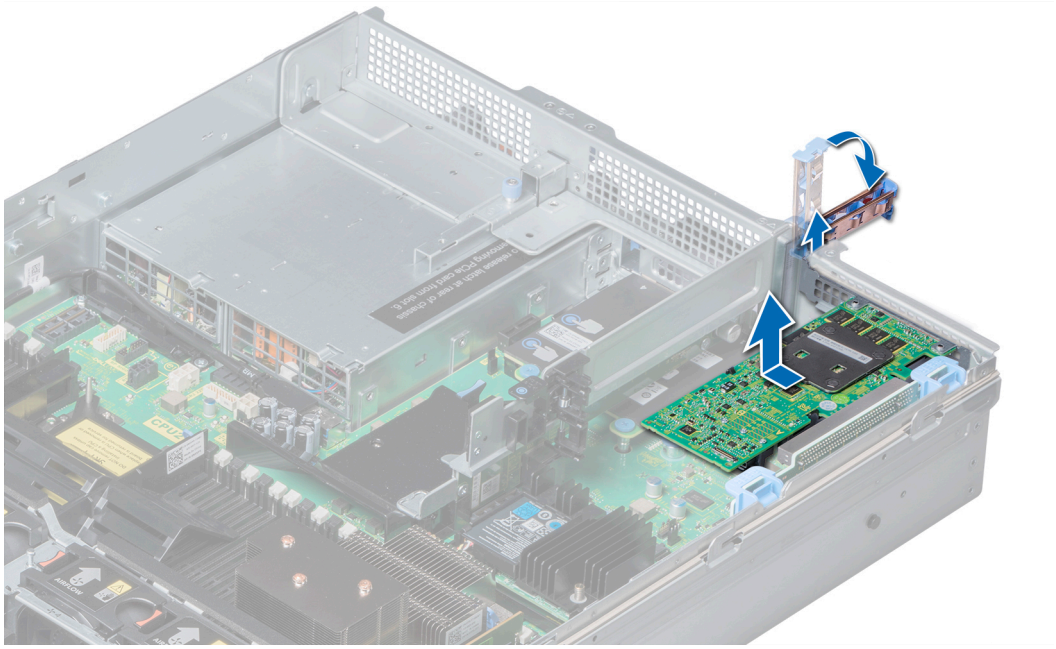


Figure 44. Removing the expansion card from expansion card riser 1

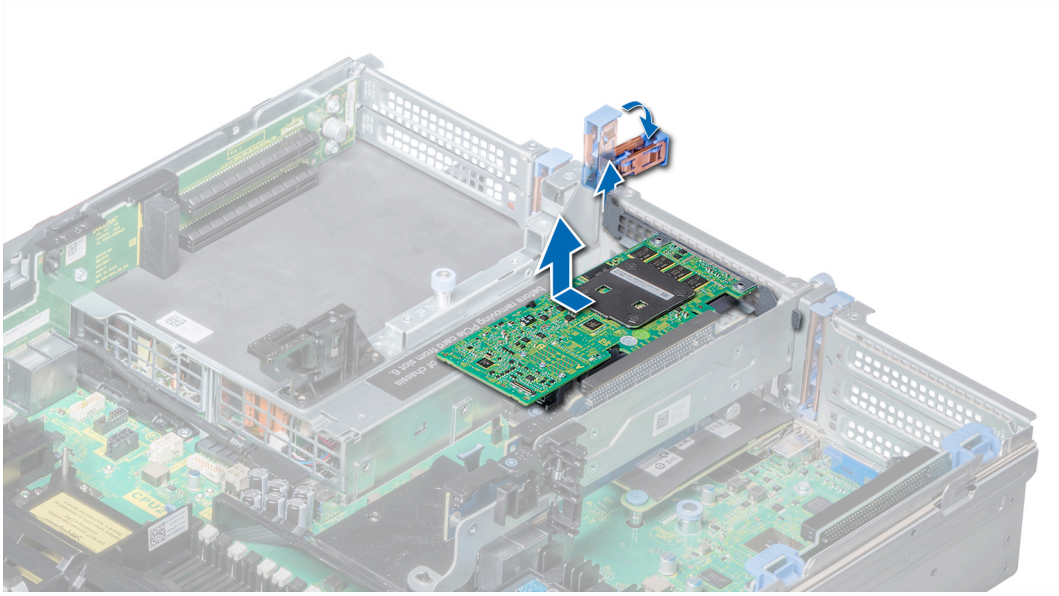


Figure 45. Removing the expansion card from expansion card riser 2

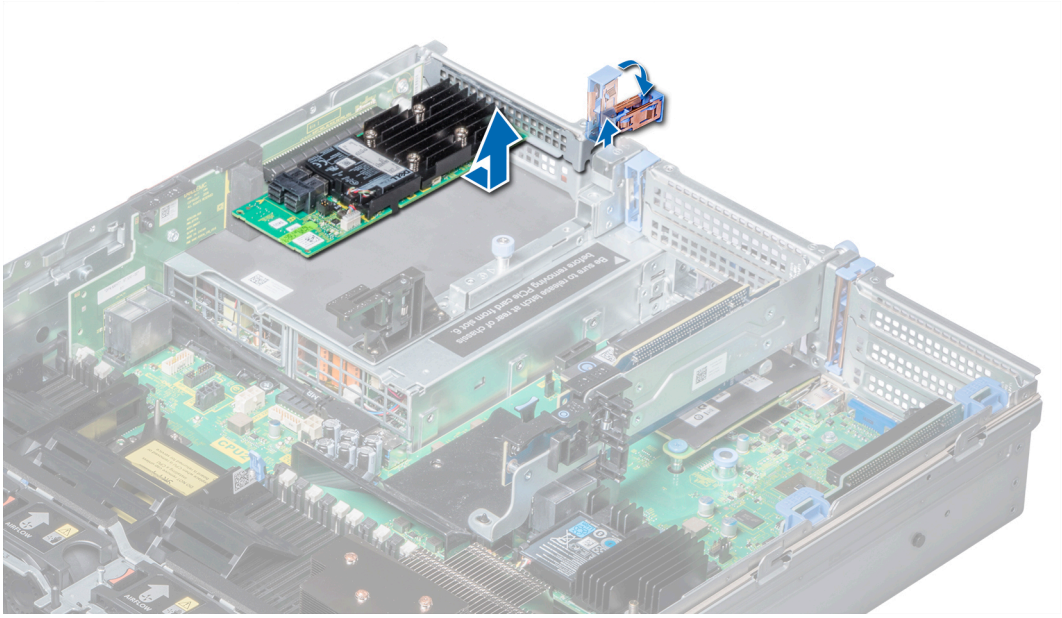


Figure 46. Removing the expansion card from expansion card riser 3

Install expansion card into expansion card riser

Prerequisites

Follow the safety guidelines listed in Safety instructions.

About this task

NOTE: When installing a card into riser 2 or 3, open the PCIe card holder latch.

Steps

1. Pull the expansion card latch.
2. If installed, remove the filler bracket.

   NOTE: Store the filler bracket for future use. Filler brackets must be installed in empty expansion card slots to maintain Federal Communications Commission (FCC) certification of the system. The brackets also keep dust and dirt out of the system and aid in proper cooling and airflow inside the system.

3. Hold the card by its edges, and align the card edge connector with the expansion card connector on the riser.
4. Insert the card edge connector firmly into the expansion card connector until the card is fully seated.
5. Push the expansion card latch.

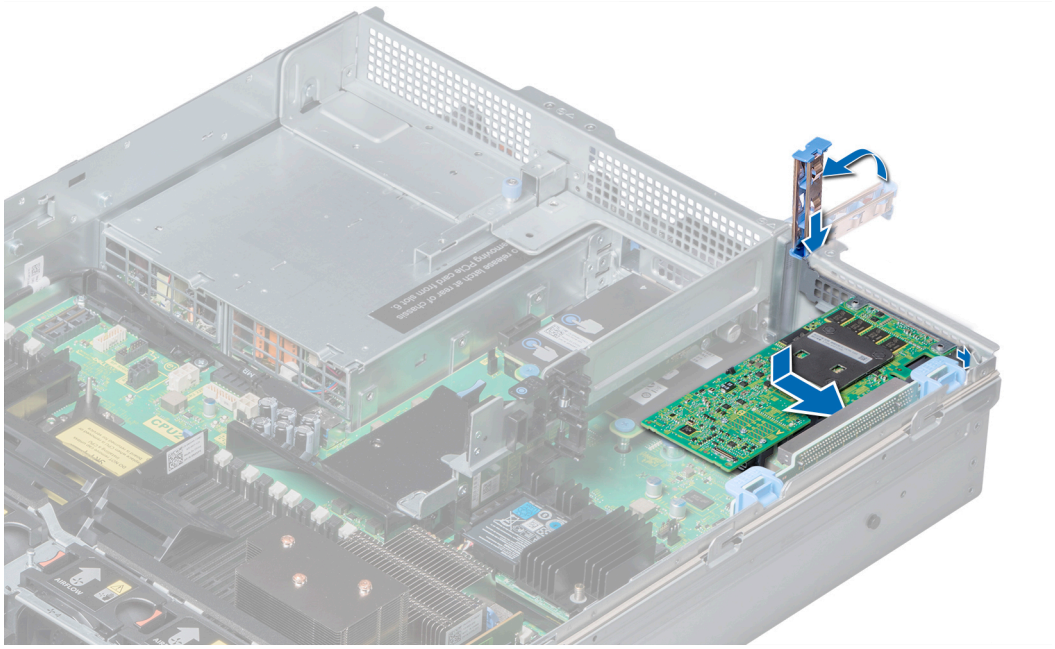


Figure 47. Installing expansion card into expansion card riser 1

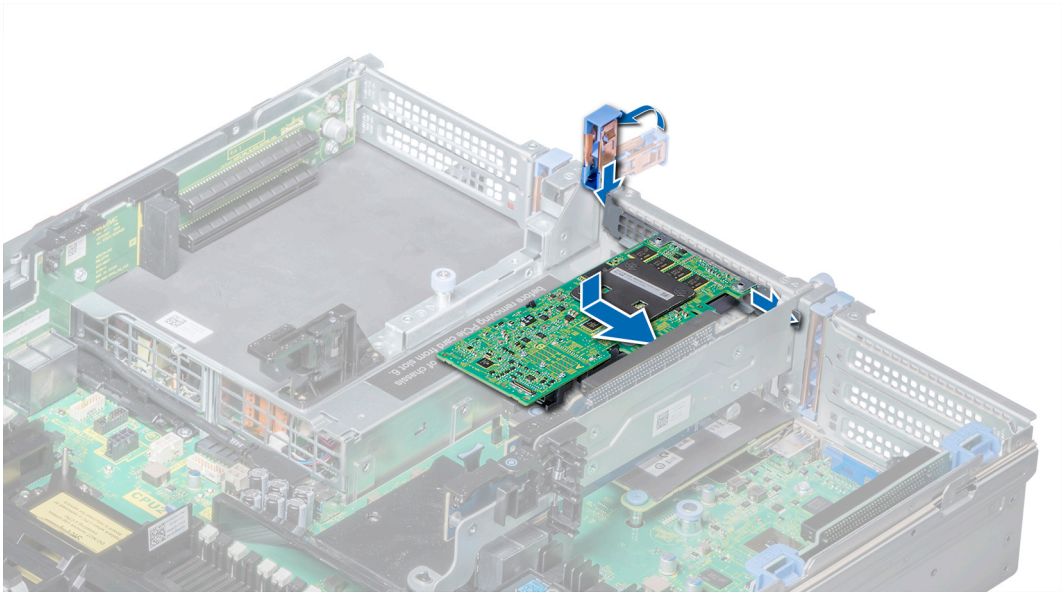


Figure 48. Installing expansion card into expansion card riser 2

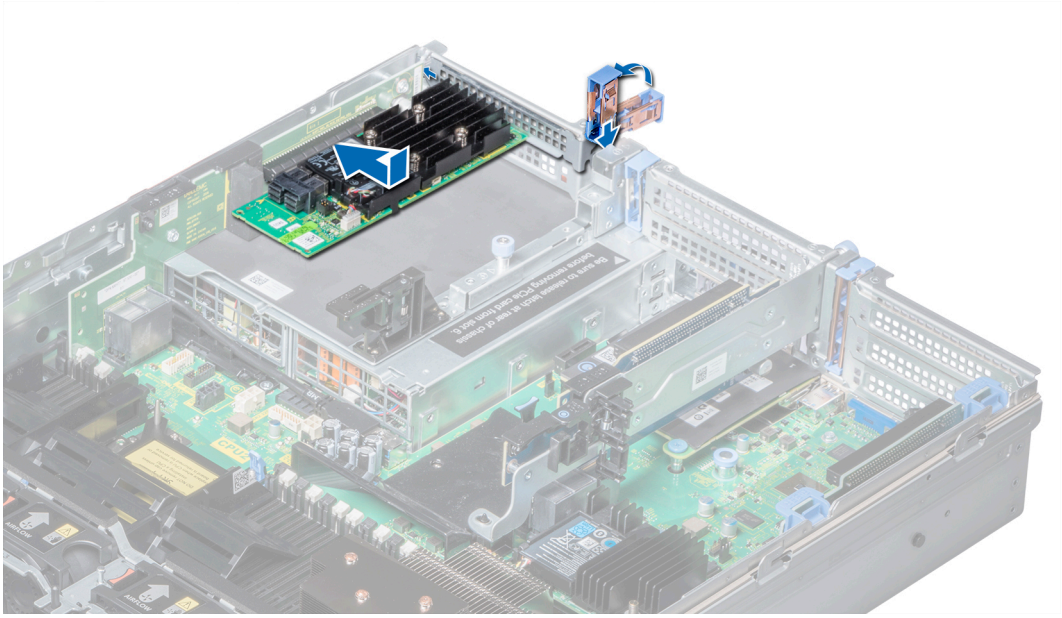


Figure 49. Installing expansion card into expansion card riser 3

Install the system cover

Prerequisites

Follow the safety guidelines.

Ensure that all internal cables are routed correctly and connected, and that no tools or extra parts are left inside the system.

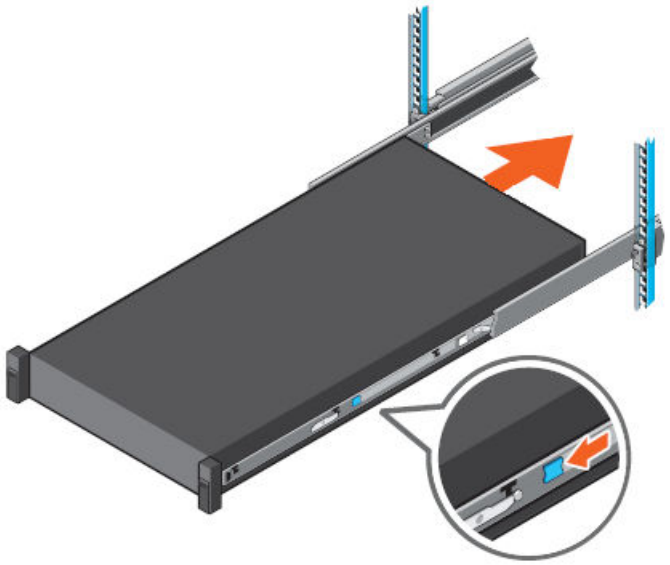
Steps

1. Align the tabs on the system cover with the guide slots on the system.
2. Push the system cover latch down.
   The system cover slides forward, the tabs on the system cover engage with the guide slots on the system and the system cover latch locks into place.
3. Using a flat or Phillips head screwdriver, rotate the latch release lock clockwise to the locked position.

Slide the system into the cabinet

Steps

1. At the front of the cabinet, push the system inward until the lock levers click into place.
2. Push the blue slide release lock tabs forward on both rails and slide the system into the cabinet. The slam latches will engage to secure the system in the cabinet.



Reconnect and power on the system

About this task

Complete the following steps to reconnect cables, power on the system, and reconnect a terminal session.

Steps

1. Use the cable labels to reconnect the cables in the same configuration as they were before starting the replacement procedure.

   CAUTION: When connecting SAS cables to the SAS cards, ensure there is sufficient slack in the cable to avoid unnecessary strain on the cable connector and the SAS card when the controller is fully extended from the rack.

2. Close the cable management arms.
3. Reconnect the serial console cable to the system serial port, and prepare the terminal session.
4. Reconnect the AC power cords to the power supplies.

   NOTE: The system may not power on automatically after plugging in the AC power cords.

5. If the system does not power on when the AC power cords were reconnected, press the power button on the right control panel at the front of the system.

6. When the system boots, log in as sysadmin.

Verify the PCIe HBA replacement

Steps

1. Use the **alerts show current** command and confirm that the system has cleared the alert for the failed I/O module. It may take one to two minutes after the I/O module replacement before the system clears the alert.

```
# alerts show current
No active alerts.
```

2. Use the **system show hardware** command and confirm that all PCIe HBAs appear.

```
# system show hardware
```

3. Run activity on the new HBA to verify it functions as expected.

10

Replace an NVRAM module

CAUTION: Improper installation on the rails may damage the rails or cause the system to fall when extended. When extending the system from the rack, pull outward slowly and verify the system is properly installed on the rails.

The NVRAM module is located in slot 2.

CAUTION: This procedure does not apply to replacing the PCIe NIC, FC, or SAS module.

Complete the following procedure to replace an NVRAM module.

This FRU is not hot-swappable, and requires a system shutdown to replace.

Topics:

Prepare for NVRAM replacement

Steps

Run the `system show hardware` command to verify the current hardware configuration.

```
# system show hardware
Slot    Vendor     Device                              Ports
----    -------    --------------------------------    --------------
M       Intel      Intel X550 4x 10GBase-T (NDC)       Ma, Mb, Mc, Md
1       (empty)    (empty)
2       EMC        NVRAM 16GB Card
3       Broadcom   LSI 9300-8e Dual Port 12 Gbps SAS   3a, 3b, 3c, 3d
4       Intel      Intel QuickAssist Adapter 8970
5       Intel      Intel X710 4x 10GbE SFP+            5a, 5b, 5c, 5d
6       Broadcom   LSI 9300-8e Dual Port 12 Gbps SAS
7       Intel      Intel X710 4x 10GbE SFP+            7a, 7b, 7c, 7d
8       (empty)    (empty)
----    -------    --------------------------------    --------------
```

Single node system NVRAM data erasure

About this task

Complete the following steps to erase the NVRAM data on a single node system.

Steps

1. Check the status of the file system and disable it if necessary.

CAUTION: If the file system is not shut down, you will not be able to erase the data from the NVRAM and you will get a message such as `**** This operation is not allowed when the filesystem is enabled **** Error retrieving information (This operation is not allowed when the filesystem is enabled).`

a. Run the `filesys status` command to verify the state of the file system.
b. If the file system is enabled, run the filesys disable command to disable it.

```
# filesys disable
This action will disable the file system.
Applications may experience interruptions
while the file system is disabled.
Are you sure? (yes|no) [no]: yes

ok, proceeding.

Please wait.....
The filesystem is now disabled.
```

2. Run the `system erase nvram-flash` command to erase the data on the NVRAM.

CAUTION: This command must be run by a qualified Dell EMC user with SE permissions, otherwise the system displays a message such as `**** This command is not available for this user.` The SE user must also provide the sysadmin password to confirm the command.

```
# system erase nvram-flash
This operation will delete the last vaulted copy of nvram data.
Are you sure? (yes|no) [no]: yes

ok, proceeding.

Please enter sysadmin password to confirm 'system erase nvram-flash':
NVRAM flash erased successfully.
```

NOTE: If the command fails, skip it and continue with the NVRAM replacement.

CAUTION: After erasing the NVRAM data, the NVRAM module is unusable until it receives a new firmware installation at the factory.

Shut down and disconnect the system

About this task

Complete the following steps to shut down and disconnect the system.

Steps

1. Stop the system using the `system poweroff` command to allow the proper shut down of the file system and other system components. The power down process takes approximately five minutes to complete. The `system poweroff` command immediately turns the front panel blue LED to amber, and is complete when the front panel LED turns off.

   NOTE: The system fans still run, and NIC port LEDs still flash after running the `system poweroff` command.

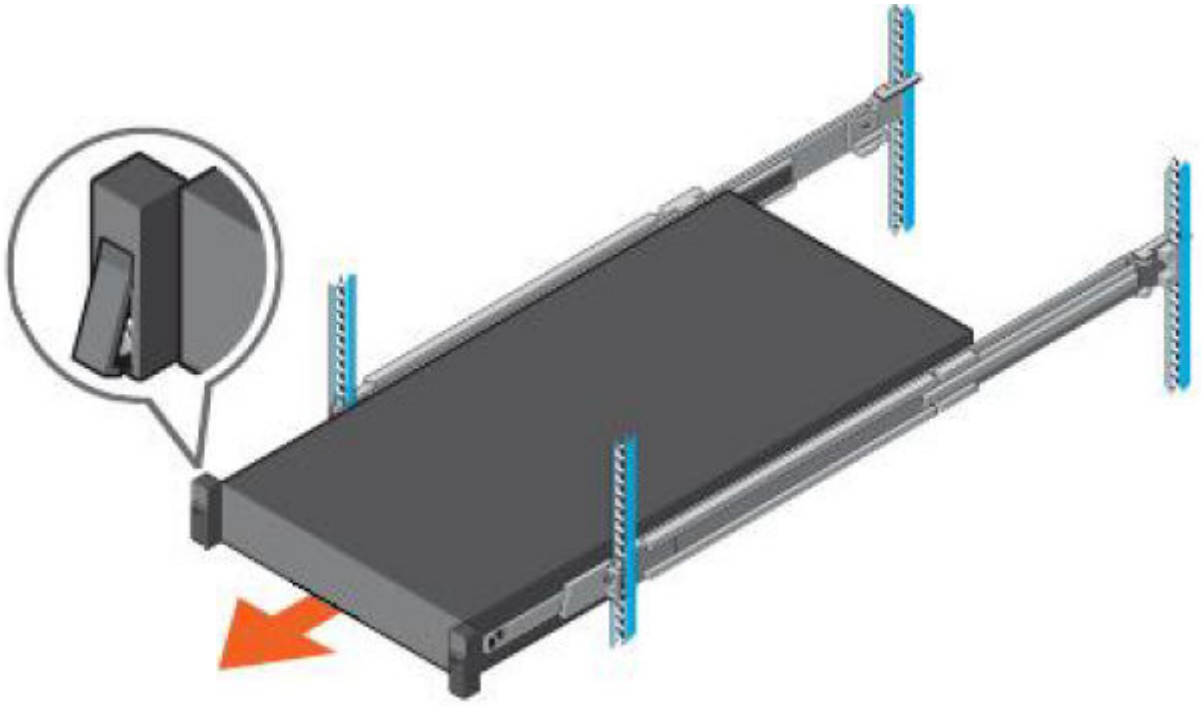
2. Open the cable management arms.
3. Label all cables connecting to PCIe riser 1 as to their connection location. Taking a photograph for reference is also helpful for re-connecting the cables.
4. Disconnect the AC power cords from the rear of the system.
5. Disconnect all network cables from PCIe riser 1.
6. Disconnect all SAS cables from PCIe riser 1.

Extend the system from the cabinet

Use this procedure to extend the system from the cabinet so that you can remove the system cover to access the internal FRU components, or to remove the system from the cabinet.

Steps

1. At the front of the cabinet, locate the two slam latches on the left and right sides of the system. Pull the slam latches up to release the system from the cabinet. If the slam latches do not disengage, loosen the screw under each latch.
2. Using the slam latches, pull the system from the cabinet until the rails lock in the extended position.



Remove the system cover

Steps

1. Using a flat or a Phillips head screwdriver, rotate the latch release lock counter clockwise to the unlocked position.
2. Lift the latch till the system cover slides back and the tabs on the system cover disengage from the guide slots on the system.
3. Hold the cover on both sides, and lift the cover away from the system.

Figure 50. Remove the system cover

Remove the NVRAM module

Prerequisites

Follow the safety guidelines listed in Safety instructions.

About this task

NOTE: This procedure describes and illustrates NVRAM module removal from slot 2 in expansion card riser 1.

Steps

1. If applicable, disconnect the cables from the expansion card in slot 1 (the top slot in riser 1).
2. Hold the expansion card by its edges, pull the card until the card edge connector disengages from the expansion card connector on the riser, and place it on an ESD-safe surface.
3. Remove the NVRAM module from slot 2 (the middle slot in riser 1)

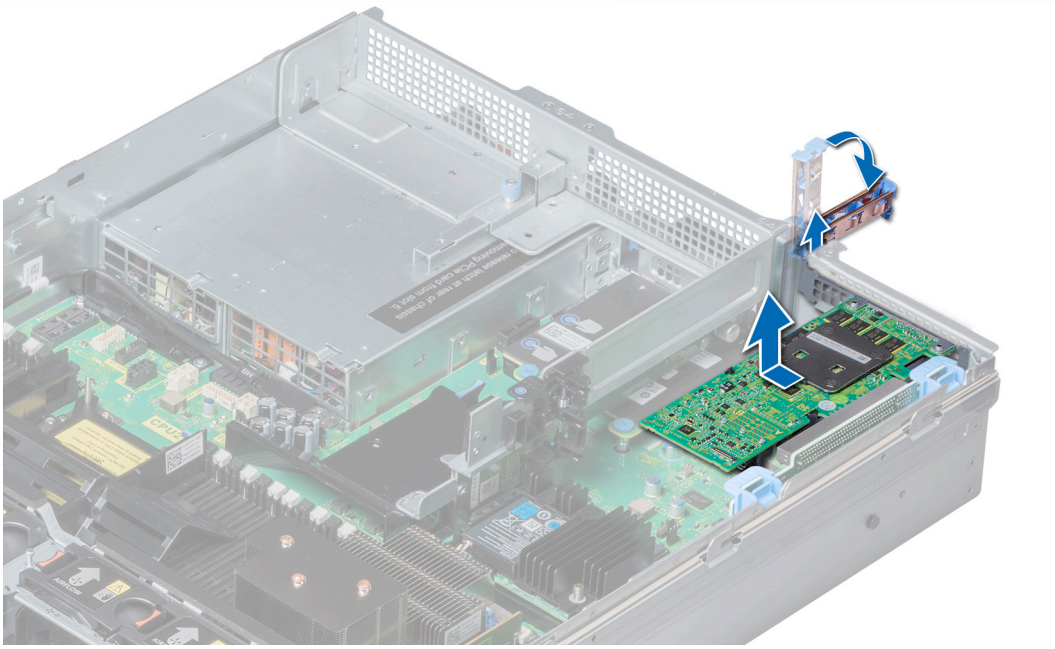


Figure 51. Removing the NVRAM module from expansion card riser 1

Figure 52. NVRAM module

Install the NVRAM module

Prerequisites

Follow the safety guidelines listed in Safety instructions.

About this task

NOTE: This procedure describes and illustrates NVRAM module installation in slot 2 in expansion card riser 1.

Steps

1. Pull the expansion card latch.
2. Hold the NVRAM module by its edges, and align the card edge connector with the expansion card connector in slot 2 on the riser.
3. Insert the NVRAM module edge connector firmly into the expansion card connector until the card is fully seated.
4. If applicable, reinstall the expansion card removed from slot 1 on the riser.
5. If applicable, reconnect the cables from the expansion card in slot 1.
6. Push the expansion card latch.

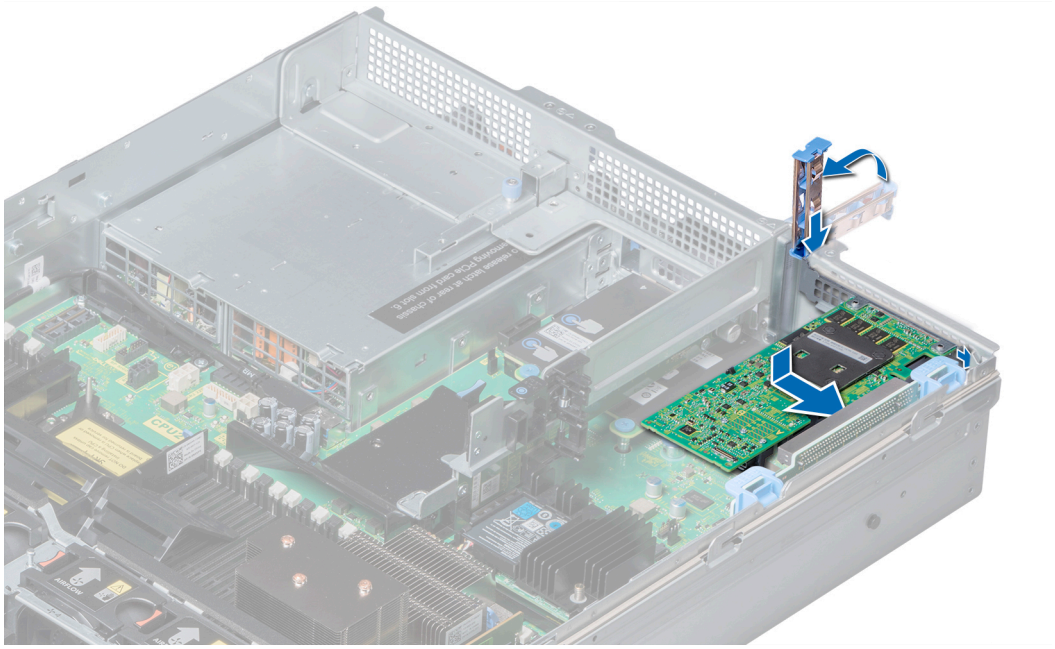


Figure 53. Installing the NVRAM module in expansion card riser 1

Install the system cover

Prerequisites

Follow the safety guidelines.

Ensure that all internal cables are routed correctly and connected, and that no tools or extra parts are left inside the system.

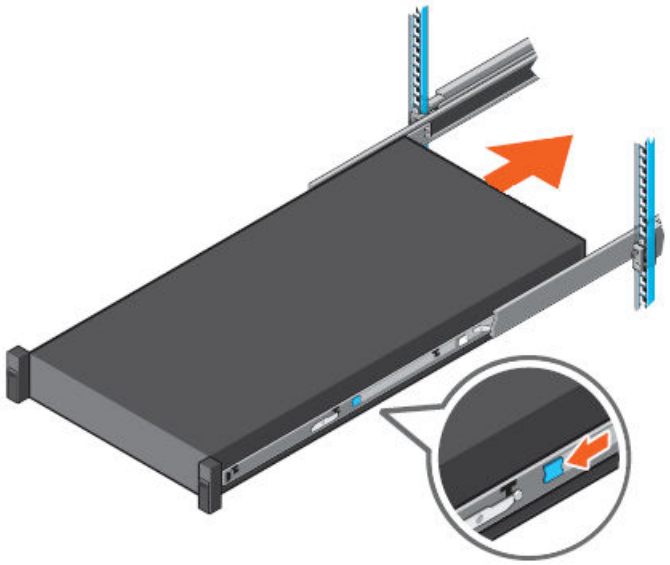
Steps

1. Align the tabs on the system cover with the guide slots on the system.
2. Push the system cover latch down.
   The system cover slides forward, the tabs on the system cover engage with the guide slots on the system and the system cover latch locks into place.
3. Using a flat or Phillips head screwdriver, rotate the latch release lock clockwise to the locked position.

Slide the system into the cabinet

Steps

1. At the front of the cabinet, push the system inward until the lock levers click into place.
2. Push the blue slide release lock tabs forward on both rails and slide the system into the cabinet. The slam latches will engage to secure the system in the cabinet.



Reconnect and power on the system

About this task

Complete the following steps to reconnect cables, power on the system, and reconnect a terminal session.

Steps

1. Use the cable labels to reconnect the cables in the same configuration as they were before starting the replacement procedure.

   CAUTION: When connecting SAS cables to the SAS cards, ensure there is sufficient slack in the cable to avoid unnecessary strain on the cable connector and the SAS card when the controller is fully extended from the rack.

2. Close the cable management arms.
3. Prepare the terminal session.
4. Reconnect the AC power cords to the power supplies.

   NOTE: The system may not power on automatically after plugging in the AC power cords.

5. If the system does not power on when the AC power cords were reconnected, press the power button on the right control panel at the front of the system.

6. When the system boots, log in as sysadmin.

Verify the new NVRAM module

Steps

1. Run the `alerts show current` command to verify the system has cleared the NVRAM failure alert.

   NOTE: It may take one to two minutes for the system to clear the alert.

```
# alerts show current
No active alerts.
```

2. Run the `system show nvram` command to verify the NVRAM appears.

   NOTE: This command shows the charge level of the NVRAM battery. The battery must be at least 80% charged for the file system to start.

```
# system show nvram
```

3. Run the `filesys enable` command to enable the file system.

```
# filesys enable
```

4. Run the `filesys status` command to verify the file system is enabled.

```
# filesys status
```

5. Run the `system show hardware` command to verify the hardware configuration is the same as it was before replacing the NVRAM module.

```
# system show hardware
Slot    Vendor     Device                              Ports
----    -------    --------------------------------    --------------
M       Intel      Intel X550 4x 10GBase-T (NDC)       Ma, Mb, Mc, Md
1       (empty)    (empty)
2       EMC        NVRAM 16GB Card
3       Broadcom   LSI 9300-8e Dual Port 12 Gbps SAS   3a, 3b, 3c, 3d
4       Intel      Intel QuickAssist Adapter 8970
```

```
5       Intel     Intel X710 4x 10GbE SFP+          5a, 5b, 5c, 5d
6       Broadcom  LSI 9300-8e Dual Port 12 Gbps SAS
7       Intel     Intel X710 4x 10GbE SFP+          7a, 7b, 7c, 7d
8       (empty)   (empty)
----    -------   -------------------------------   --------------
```

11

Replace the Trusted Platform Module (TPM)

CAUTION: Improper installation on the rails may damage the rails or cause the system to fall when extended. When extending the system from the rack, pull outward slowly and verify the system is properly installed on the rails.

The PowerProtect system uses a TPM to secure the system.

Complete the following procedure to replace the TPM.

This FRU is not hot-swappable, and requires a system shutdown to replace.

Topics:

Verify the status of the TPM

Prerequisites

Establish a connection to the system as described in Establish a serial management connection to the PowerProtect system.

About this task

Complete the following steps to verify the TPM replacement.

Steps

Run the `system show all` command, and look for the line indicating the TPM. If it is not present, the TPM requires replacement:

```
TPM device: Nuvoton chip for Rest of World
```

Shut down and disconnect the system

About this task

Complete the following steps to shut down and disconnect the system.

Steps

1. Stop the system using the `system poweroff` command to allow the proper shut down of the file system and other system components. The power down process takes approximately five minutes to complete. The `system poweroff` command immediately turns the front panel blue LED to amber, and is complete when the front panel LED turns off.

NOTE: The system fans still run, and NIC port LEDs still flash after running the `system poweroff` command.

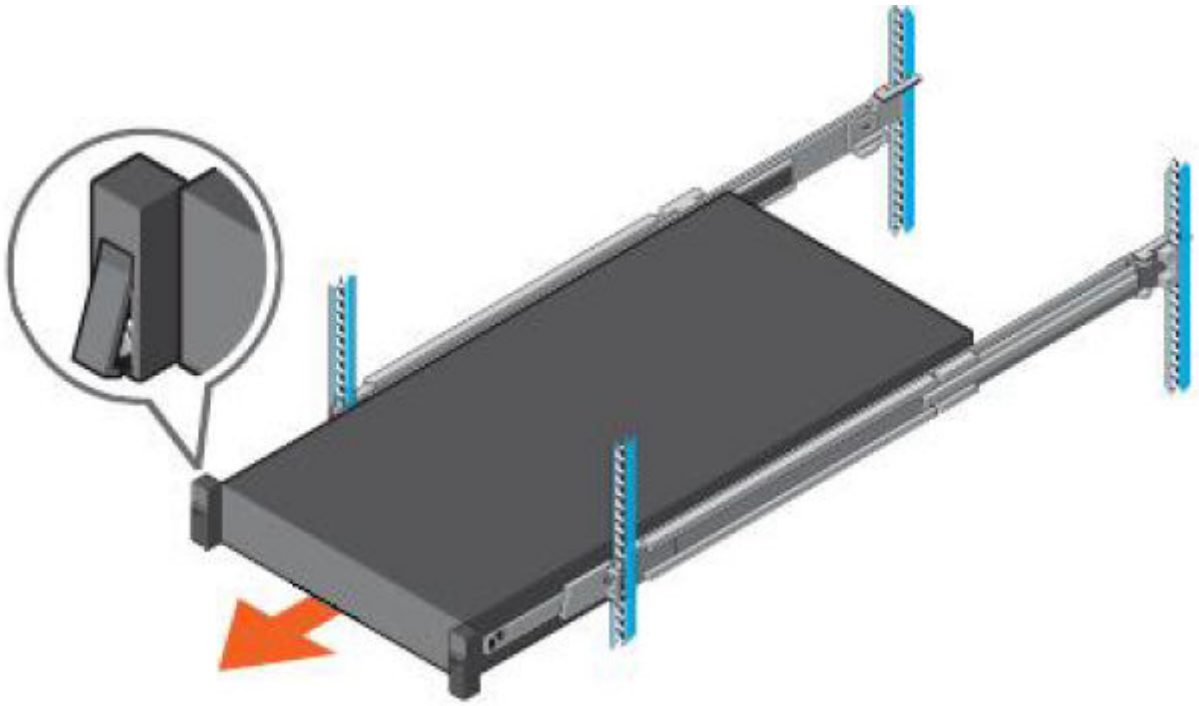
2. Open the cable management arms.
3. Label all cables connecting to PCIe riser 1 as to their connection location. Taking a photograph for reference is also helpful for re-connecting the cables.
4. Disconnect the AC power cords from the rear of the system.
5. Disconnect all network cables from PCIe riser 1.
6. Disconnect all SAS cables from PCIe riser 1.

Extend the system from the cabinet

Use this procedure to extend the system from the cabinet so that you can remove the system cover to access the internal FRU components, or to remove the system from the cabinet.

Steps

1. At the front of the cabinet, locate the two slam latches on the left and right sides of the system. Pull the slam latches up to release the system from the cabinet. If the slam latches do not disengage, loosen the screw under each latch.
2. Using the slam latches, pull the system from the cabinet until the rails lock in the extended position.



Remove the system cover

Steps

1. Using a flat or a Phillips head screwdriver, rotate the latch release lock counter clockwise to the unlocked position.
2. Lift the latch till the system cover slides back and the tabs on the system cover disengage from the guide slots on the system.
3. Hold the cover on both sides, and lift the cover away from the system.

Figure 54. Remove the system cover

Locate the TPM

About this task

The TPM is connected to the system board, behind the internal SAS HBA330 (PERC) module that is next to the PCIe riser1 as shown in the image.

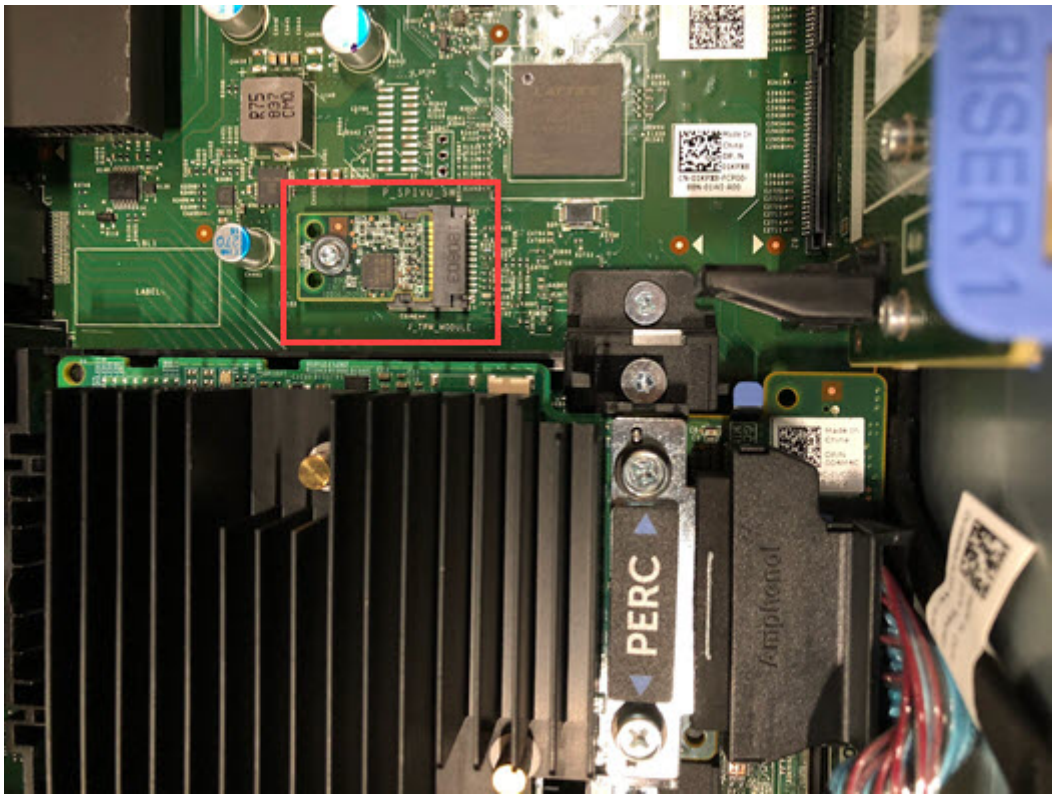


Figure 55. TPM location

Upgrading the Trusted Platform Module

About this task

CAUTION: If you are using the Trusted Platform Module (TPM) with an encryption key, you may be prompted to create a recovery key during program or System Setup. Work with the customer to create and safely store this recovery key. When replacing this system board, you must supply the recovery key when you restart your system or program before you can access the encrypted data on your hard drives.

CAUTION: Once the TPM plug-in module is installed, it is cryptographically bound to that specific system board. Any attempt to remove an installed TPM plug-in module breaks the cryptographic binding, the removed TPM cannot be reinstalled or installed on another system board.

Removing the TPM

Steps

1. Locate the TPM connector on the system board.
2. Press to hold the module down and remove the screw using the security Torx 8-bit shipped with the TPM module.
3. Slide the TPM module out from its connector.
4. Push the plastic rivet away from the TPM connector and rotate it 90° counterclockwise to release it from the system board.
5. Pull the plastic rivet out of its slot on the system board.

Installing the TPM

Steps

1. To install the TPM, align the edge connectors on the TPM with the slot on the TPM connector.
2. Insert the TPM into the TPM connector such that the plastic rivet aligns with the slot on the system board.
3. Press the plastic rivet until the rivet snaps into place.

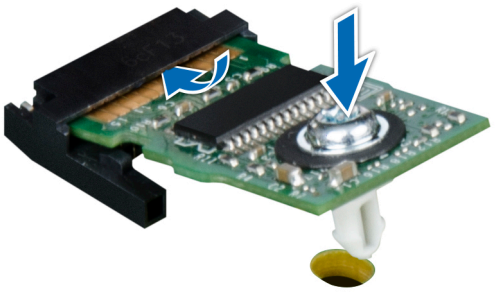


Figure 56. Installing the TPM

Install the system cover

Prerequisites

Follow the safety guidelines.

Ensure that all internal cables are routed correctly and connected, and that no tools or extra parts are left inside the system.

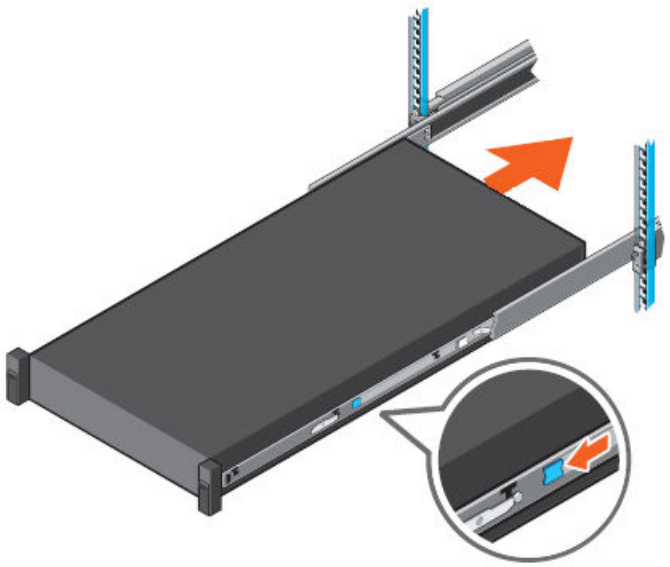
Steps

1. Align the tabs on the system cover with the guide slots on the system.
2. Push the system cover latch down.
   The system cover slides forward, the tabs on the system cover engage with the guide slots on the system and the system cover latch locks into place.
3. Using a flat or Phillips head screwdriver, rotate the latch release lock clockwise to the locked position.

Slide the system into the cabinet

Steps

1. At the front of the cabinet, push the system inward until the lock levers click into place.
2. Push the blue slide release lock tabs forward on both rails and slide the system into the cabinet. The slam latches will engage to secure the system in the cabinet.



Reconnect and power on the system

About this task

Complete the following steps to reconnect cables, power on the system, and reconnect a terminal session.

Steps

1. Use the cable labels to reconnect the cables in the same configuration as they were before starting the replacement procedure.

   CAUTION: When connecting SAS cables to the SAS cards, ensure there is sufficient slack in the cable to avoid unnecessary strain on the cable connector and the SAS card when the controller is fully extended from the rack.

2. Close the cable management arms.
3. Prepare the terminal session.
4. Reconnect the AC power cords to the power supplies.

   NOTE: The system may not power on automatically after plugging in the AC power cords.

5. If the system does not power on when the AC power cords were reconnected, press the power button on the right control panel at the front of the system.

Initializing the TPM 2.0 for TXT users

Steps

1. While booting your system, press F2 to enter System Setup.
2. On the **System Setup Main Menu** screen, click **System BIOS** > **System Security Settings**.
3. From the **TPM Security** option, select **On**.
4. Save the settings.
5. Restart your system.
6. Enter **System Setup** again.
7. On the **System Setup Main Menu** screen, click **System BIOS** > **System Security Settings**.
8. Select the **TPM Advanced Settings** option.
9. From the **TPM2 Algorithm Selection** option, select **SHA256**, then go back to **System Security Settings** screen.
10. On the **System Security Settings** screen, from the **Intel TXT** option, select **On**.
11. Save the settings.
12. Restart your system.

12

Replace a CPU

CAUTION: Improper installation on the rails may damage the rails or cause the system to fall when extended. When extending the system from the rack, pull outward slowly and verify the system is properly installed on the rails.

Complete the following procedure to replace a CPU.

This FRU is not hot-swappable, and requires a system shutdown to replace.

Topics:

Verify the status of the CPU

Prerequisites

Establish a connection to the system as described in Establish a serial management connection to the PowerProtect system.

About this task

Complete the following steps to verify the status of the CPU.

Steps

Use the `enclosure show cpu` command to verify a CPU failure.

Shut down and disconnect the system

Prerequisites

Establish a connection to the system as described in Establish a serial management connection to the PowerProtect system.

About this task

Complete the following steps to shut down and disconnect the system.

Steps

1. Stop the system using the `system poweroff` command to allow the proper shut down of the file system and other system components. The power down process takes approximately five minutes to complete. The `system poweroff` command immediately turns the front panel blue LED to amber, and is complete when the front panel LED turns off.

   NOTE: The system fans still run, and NIC port LEDs still flash after running the `system poweroff` command.

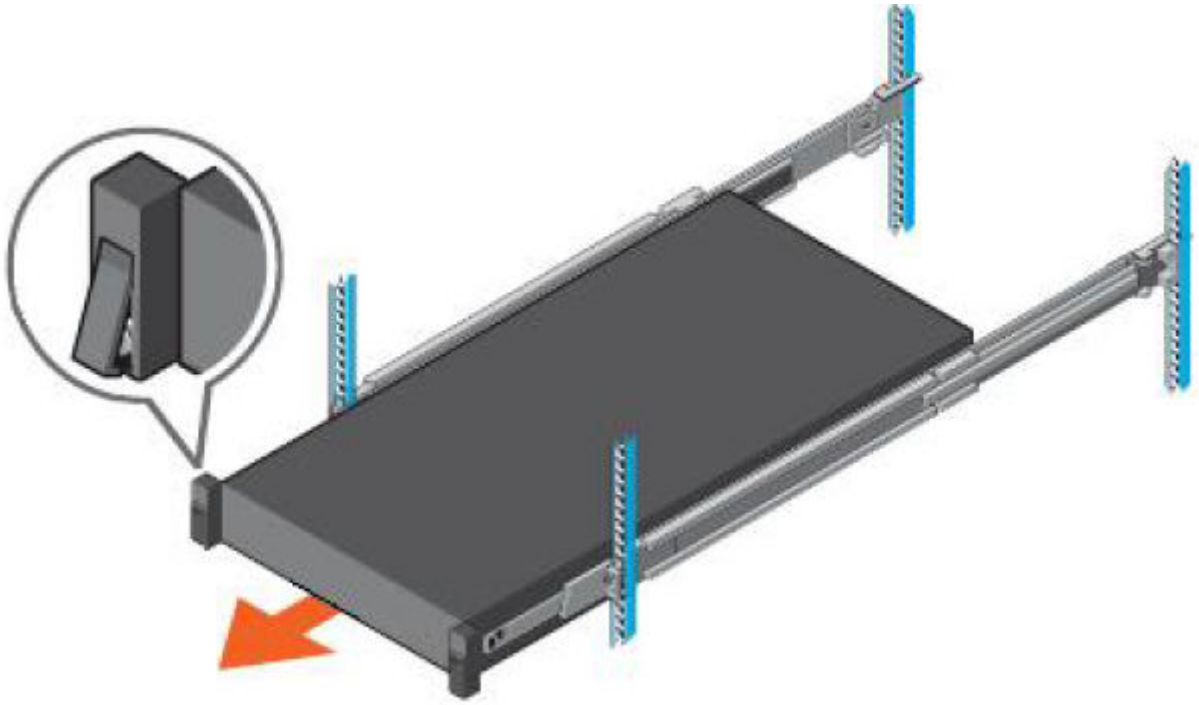
2. Open the cable management arms.
3. Disconnect the AC power cords from the rear of the system.

Extend the system from the cabinet

Use this procedure to extend the system from the cabinet so that you can remove the system cover to access the internal FRU components, or to remove the system from the cabinet.

Steps

1. At the front of the cabinet, locate the two slam latches on the left and right sides of the system. Pull the slam latches up to release the system from the cabinet. If the slam latches do not disengage, loosen the screw under each latch.
2. Using the slam latches, pull the system from the cabinet until the rails lock in the extended position.



Remove the system cover

Steps

1. Using a flat or a Phillips head screwdriver, rotate the latch release lock counter clockwise to the unlocked position.
2. Lift the latch till the system cover slides back and the tabs on the system cover disengage from the guide slots on the system.
3. Hold the cover on both sides, and lift the cover away from the system.

Figure 57. Remove the system cover

Removing the air shroud

Steps

Hold the air shroud at both ends and lift it away from the system.

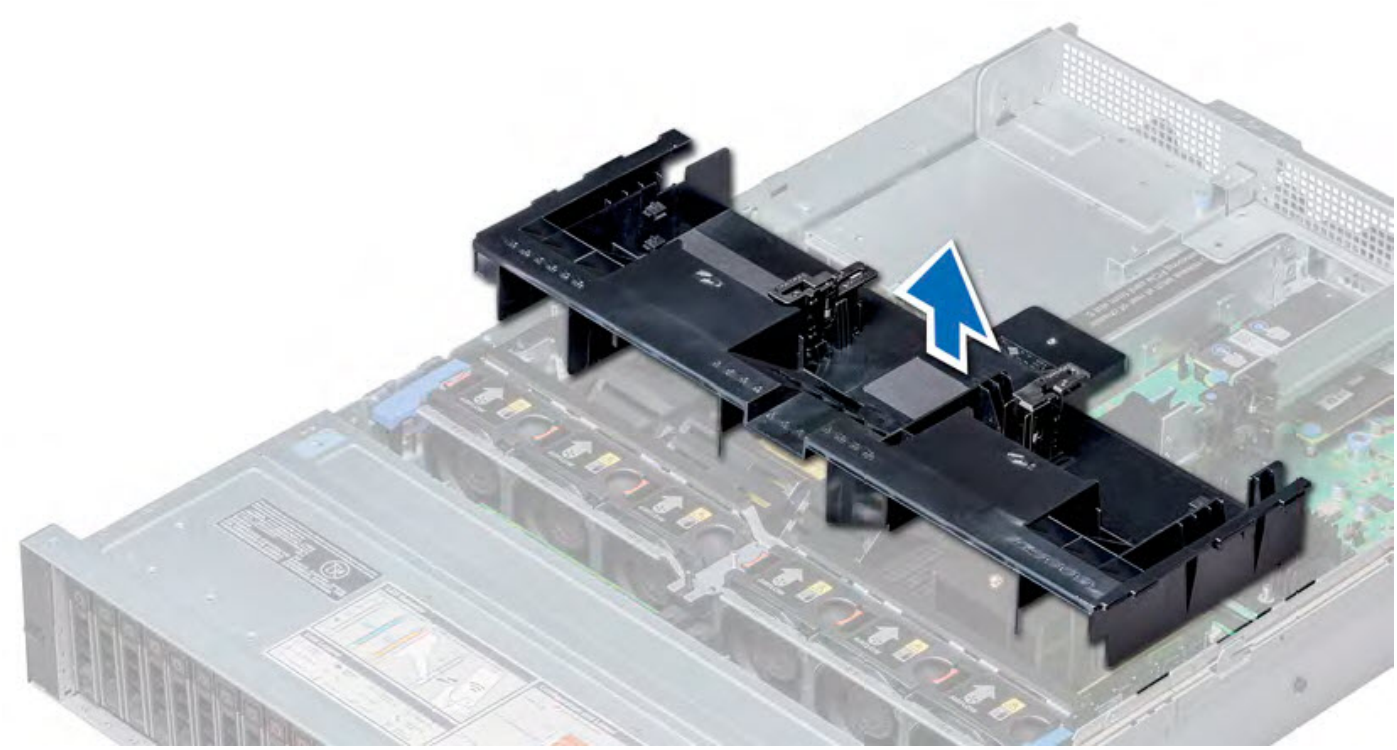


Figure 58. Removing the air shroud

Remove processor and heat sink module

Prerequisites

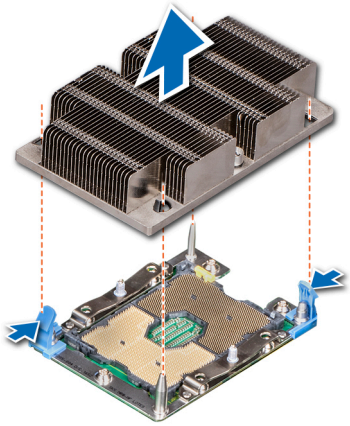
WARNING: The heat sink may be hot to touch for some time after the system has been powered down. Allow the heat sink to cool before removing it.

Steps

1. Using a Torx #T30 screwdriver, loosen the screws on the heat sink.

   NOTE: Ensure that you loosen one screw before moving on to the next screw.

2. Pushing both blue retention clips simultaneously, lift the processor and heat sink module (PHM) out of the system.
3. Set the PHM aside with the processor side facing up.



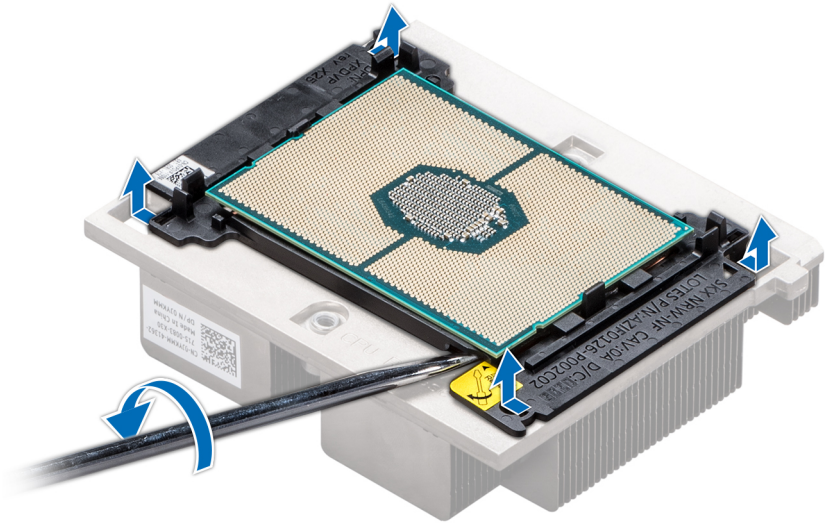
Remove the processor from the processor and heat sink module

Prerequisites

WARNING: The heat sink may be hot to touch for some time after the system has been powered down. Allow the heat sink to cool before removing it.

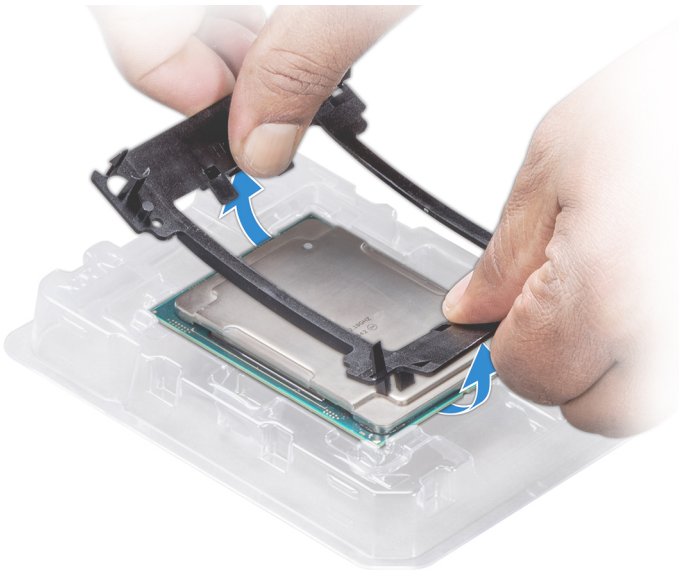
Steps

1. Place the heat sink with the processor side facing up.
2. Insert a flat blade screwdriver into the release slot marked with a yellow label. Twist (do not pry) the screwdriver to break the thermal paste seal.
3. Push the retaining clips on the processor bracket to unlock the bracket from the heat sink.



4. Lift the bracket and the processor away from the heat sink, and place the processor connector side down on the processor tray.
5. Flex the outer edges of the bracket to release the processor from the bracket.

NOTE: Ensure that the processor and the bracket are placed in the tray after you remove the heat sink.



Install the processor into a processor and heat sink module

Steps

1. Place the processor in the processor tray.

NOTE: Ensure that the pin 1 indicator on the processor tray is aligned with the pin 1 indicator on the processor. The pin 1 indicator is a triangle marking on the corner of the heatsink and on the corner of the processor.

2. Flex the outer edges of the bracket around the processor ensuring that the processor is locked into the clips on the bracket.

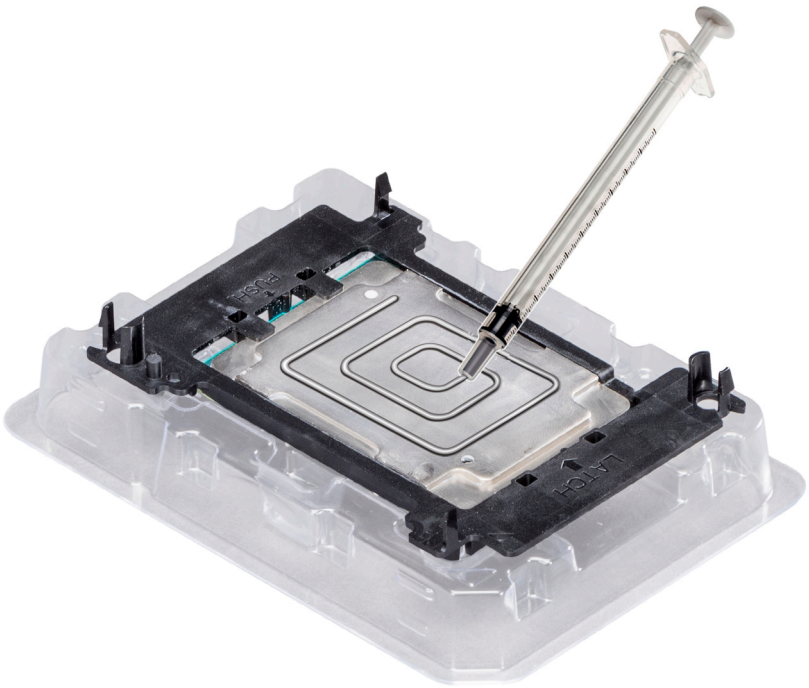
NOTE: Ensure that pin 1 indicator on the bracket is aligned with the pin 1 indicator on the processor before placing the bracket on the processor.

NOTE: Ensure that the processor and the bracket are placed in the tray before you install the heat sink.

3. If you are using an existing heat sink, remove the thermal grease from the heat sink by using a clean lint-free cloth.
4. Use the thermal grease syringe included with your processor kit to apply the grease in a quadrilateral design on the top of the processor.

CAUTION: Applying too much thermal grease can result in excess grease coming in contact with and contaminating the processor socket.

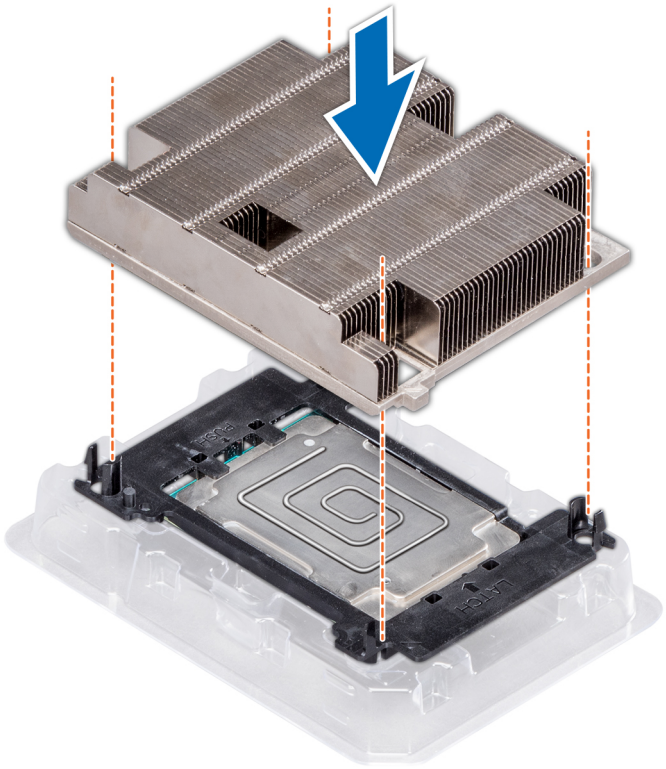
NOTE: The thermal grease syringe is intended for single use only. Dispose the syringe after you use it.



5. Place the heat sink on the processor and push down until the bracket locks onto the heat sink.

NOTE:

- Ensure that the two guide pin holes on the bracket match the guide holes on the heat sink.
- Ensure that the pin 1 indicator on the heat sink is aligned with the pin 1 indicator on the bracket before placing the heat sink onto the processor and bracket.



Install a processor and heat sink module

Prerequisites

CAUTION: Never remove the heat sink from a processor unless you intend to replace the processor. The heat sink is necessary to maintain proper thermal conditions.

WARNING: The heat sink may be hot to touch for some time after the system has been powered down. Allow the heat sink to cool before removing it.

Steps

1. Align the pin 1 indicator of the heat sink to the system board and then place the processor and heat sink module (PHM) on the processor socket.

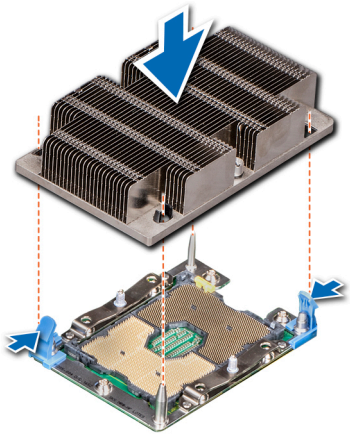
   CAUTION: To avoid damaging the fins on the heat sink, do not press down on the heat sink fins.

   NOTE: Ensure that the PHM is held parallel to the system board to prevent damaging the components.

2. Push the blue retention clips inward to allow the heat sink to drop into place.
3. Using the #Torx T30 screwdriver with adjustable torque, tighten one screw at a time.

   NOTE: Ensure that the screw is tightened completely before moving onto the next screw.

   NOTE: The processor and heat sink module retention screws should not be tightened to more than 0.13 kgf-m (1.35 N.m or 12 in-lbf).



Installing the air shroud

Steps

1. Align the tabs on the air shroud with the slots on the system.
2. Lower the air shroud into the system until it is firmly seated.
   When firmly seated, the memory socket numbers marked on the air shroud align with the respective memory sockets.

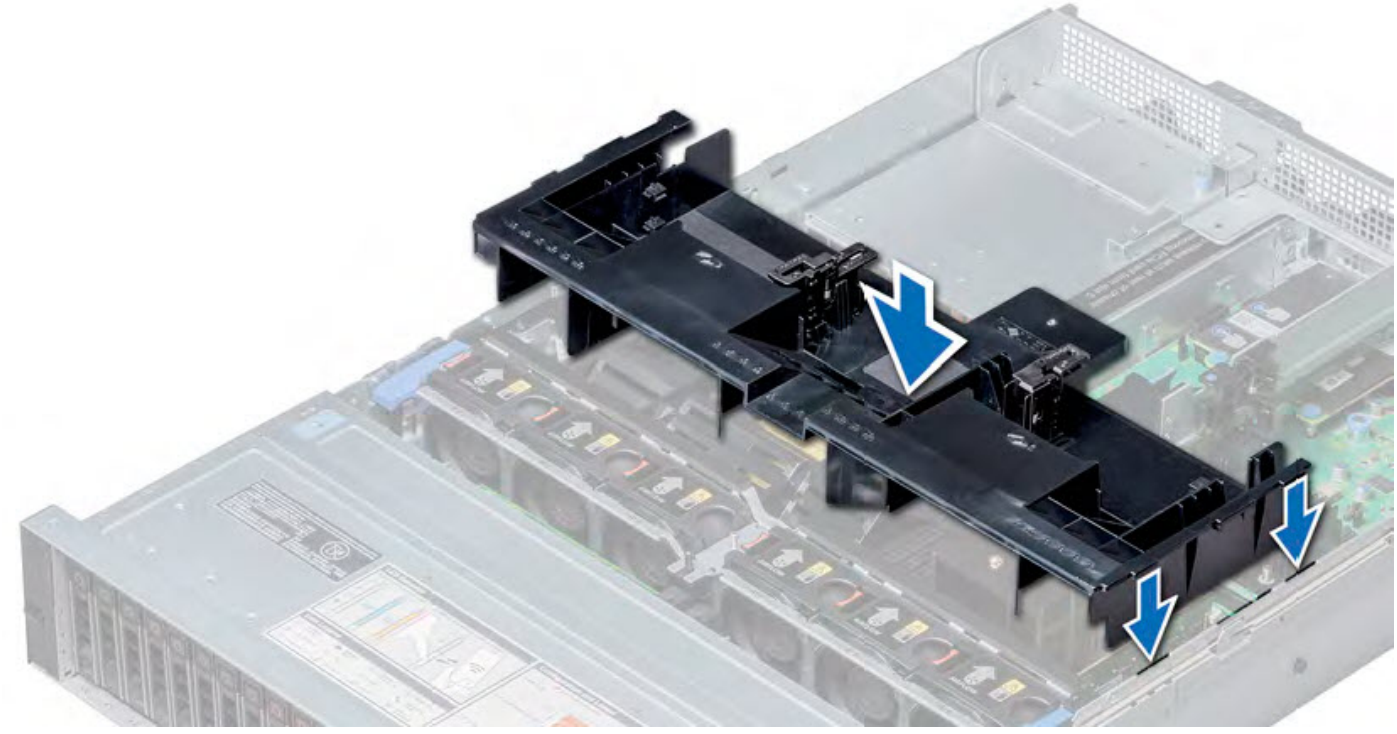


Figure 59. Installing the air shroud

Install the system cover

Prerequisites

Follow the safety guidelines.

Ensure that all internal cables are routed correctly and connected, and that no tools or extra parts are left inside the system.

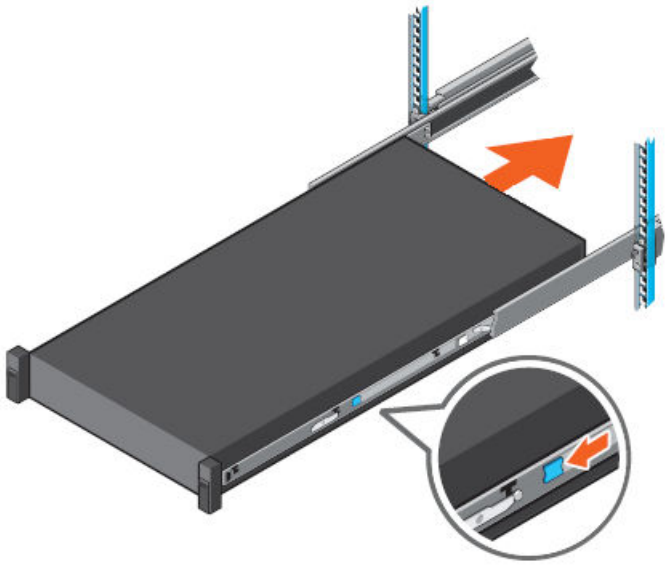
Steps

1. Align the tabs on the system cover with the guide slots on the system.
2. Push the system cover latch down.
   The system cover slides forward, the tabs on the system cover engage with the guide slots on the system and the system cover latch locks into place.
3. Using a flat or Phillips head screwdriver, rotate the latch release lock clockwise to the locked position.

Slide the system into the cabinet

Steps

1. At the front of the cabinet, push the system inward until the lock levers click into place.
2. Push the blue slide release lock tabs forward on both rails and slide the system into the cabinet. The slam latches will engage to secure the system in the cabinet.



Reconnect and power on the system

About this task

Complete the following steps to reconnect cables, power on the system, and reconnect a terminal session.

Steps

1. Close the cable management arms.
2. Prepare the terminal session.
3. Reconnect the AC power cords to the power supplies.

   NOTE: The system may not power on automatically after plugging in the AC power cords.

4. If the system does not power on when the AC power cords were reconnected, press the power button on the right control panel at the front of the system.

5. When the system boots, log in as sysadmin.

Verify the replacement CPU

About this task

Complete the following steps to verify the operation of the replacement CPU.

Steps

1. Use the `enclosure show cpu` command to verify the new CPU.
2. Use the `alerts show current` (or `alerts show current-detailed`) command.

```
# alerts show current
No active alerts
```

13

Replace the system board

CAUTION: Improper installation on the rails may damage the rails or cause the system to fall when extended. When extending the system from the rack, pull outward slowly and verify the system is properly installed on the rails.

Complete the following procedure to replace the system board.

This FRU is not hot-swappable, and requires a system shutdown to replace.

After a system board replacement, user-configured iDRAC settings and users are reset. Those settings must be reconfigured manually.

CAUTION: Do not move the TPM from the old system board to the new system board. A new TPM is included with the replacement system board.

Topics:

Verify the status of the system board

Prerequisites

Establish a connection to the system as described in Establish a serial management connection to the PowerProtect system.

About this task

Complete the following steps to verify the system board.

Steps

Shut down and disconnect the system

Prerequisites

Establish a connection to the system.

About this task

Complete the following steps to shut down and disconnect the system.

Steps

1. Stop the system using the `system poweroff` command to allow the proper shut down of the file system and other system components. The power down process takes approximately five minutes to complete. The `system poweroff` command immediately turns the front panel blue LED to amber, and is complete when the front panel LED turns off.

   NOTE: The system fans still run, and NIC port LEDs still flash after running the `system poweroff` command.

2. Open the cable management arms.
3. Label each of the cables as to their connection location. Taking a photograph for reference is also helpful for re-connecting the cables.
4. Disconnect the AC power cords from the rear of the system.
5. Disconnect all network and FC cables from the rear of the system.
6. Disconnect all SAS cables from the rear of the system.
7. Disconnect the serial console cable.

Remove a power supply

Prerequisites

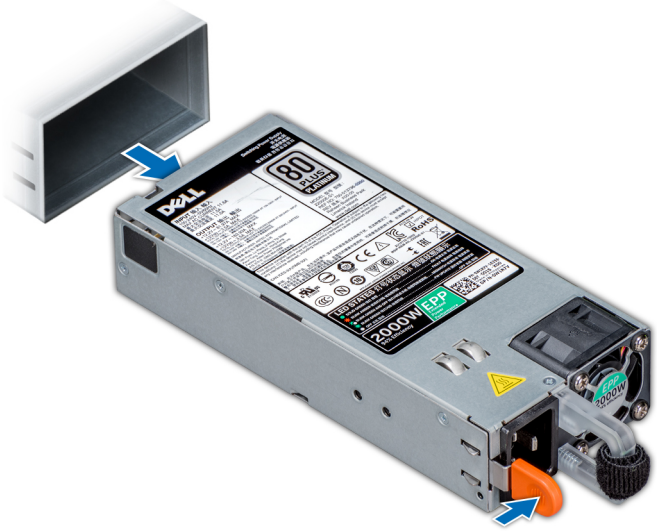
Follow the safety guidelines listed in Safety instructions.

About this task

The technical white paper *Servicing and Replacing Power Supplies for DellEMC PowerEdge R940/R740/R740xd Systems with Single and Dual CMA Solutions* provides additional details about removing power supplies with the cable management arms installed on the back of the system.

Steps

1. Disconnect the power cable from the power source and from the PSU you intend to remove, and then remove the cable from the strap on the PSU handle.
2. Press the release latch and slide the PSU out of the system by using the PSU handle.

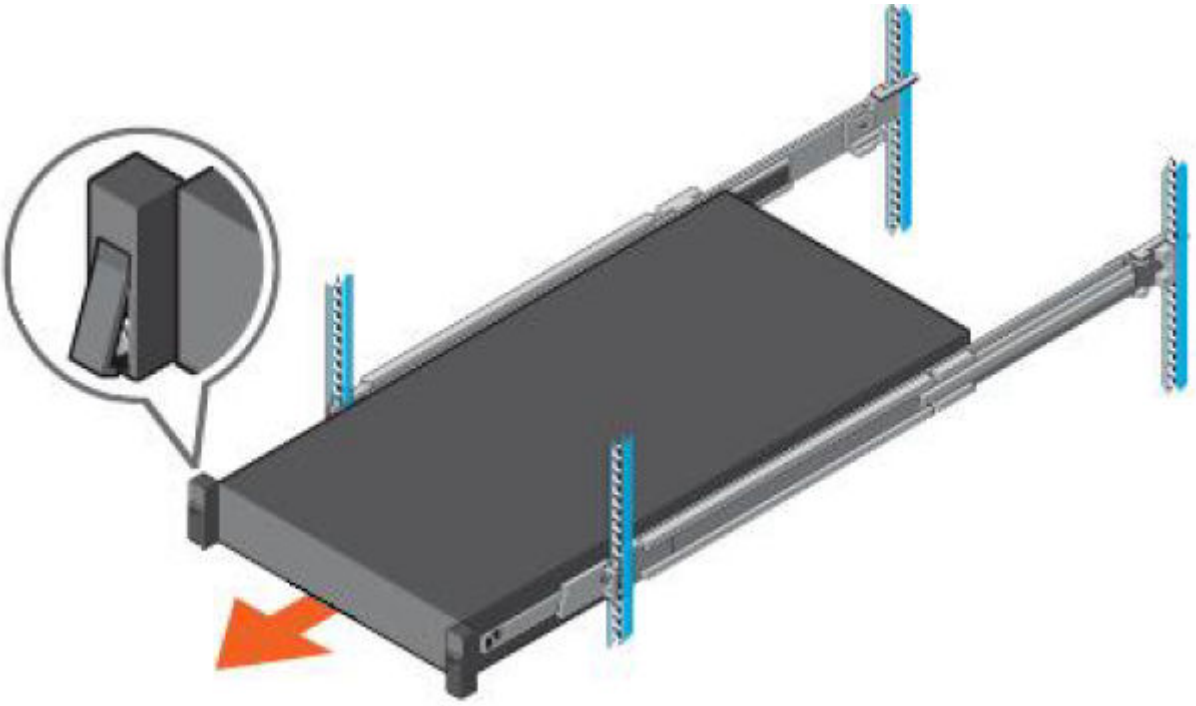


Extend the system from the cabinet

Use this procedure to extend the system from the cabinet so that you can remove the system cover to access the internal FRU components, or to remove the system from the cabinet.

Steps

1. At the front of the cabinet, locate the two slam latches on the left and right sides of the system. Pull the slam latches up to release the system from the cabinet. If the slam latches do not disengage, loosen the screw under each latch.
2. Using the slam latches, pull the system from the cabinet until the rails lock in the extended position.



Remove the system cover

Steps

1. Using a flat or a Phillips head screwdriver, rotate the latch release lock counter clockwise to the unlocked position.
2. Lift the latch till the system cover slides back and the tabs on the system cover disengage from the guide slots on the system.
3. Hold the cover on both sides, and lift the cover away from the system.

Figure 60. Remove the system cover

Removing the air shroud

Steps

Hold the air shroud at both ends and lift it away from the system.

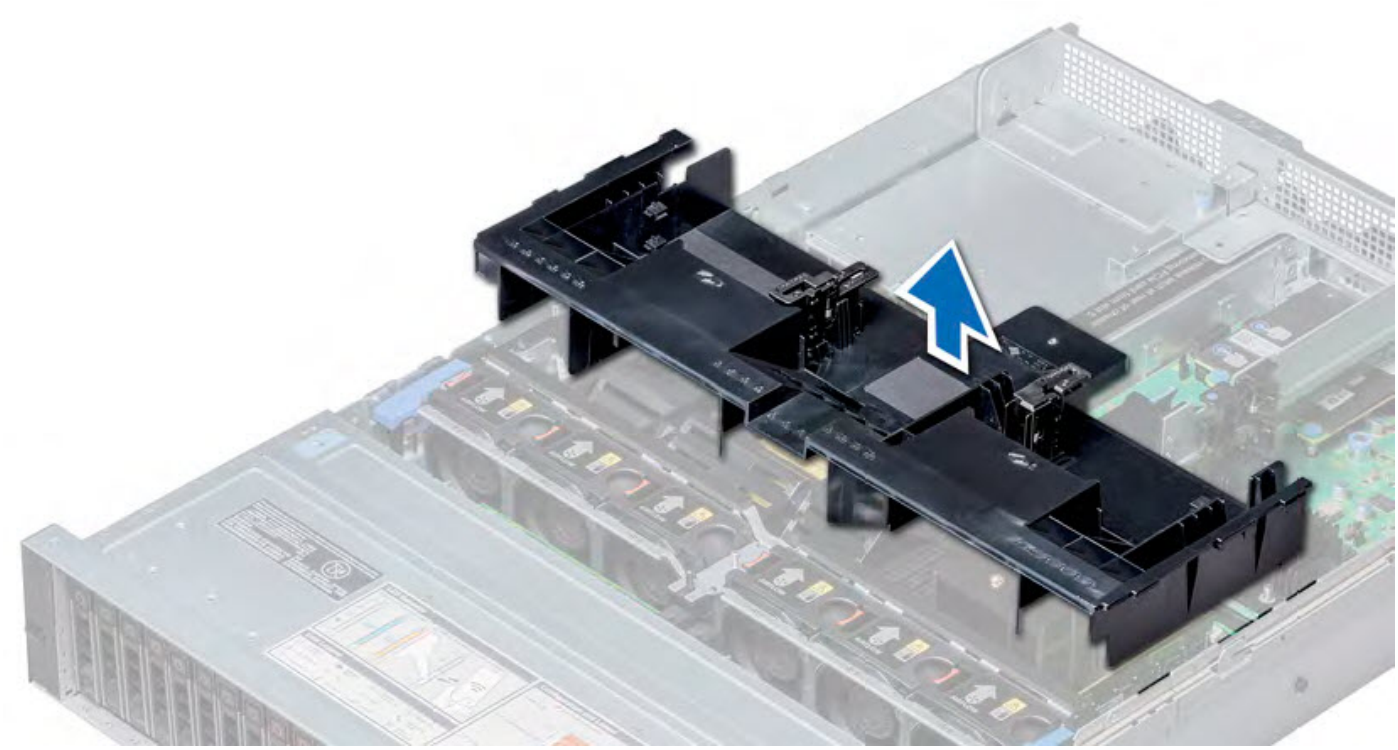


Figure 61. Removing the air shroud

Remove the cooling fan assembly

Steps

1. Lift the release levers to unlock the cooling fan assembly from the system.
2. Hold the release levers, and lift the cooling fan assembly away from the system.

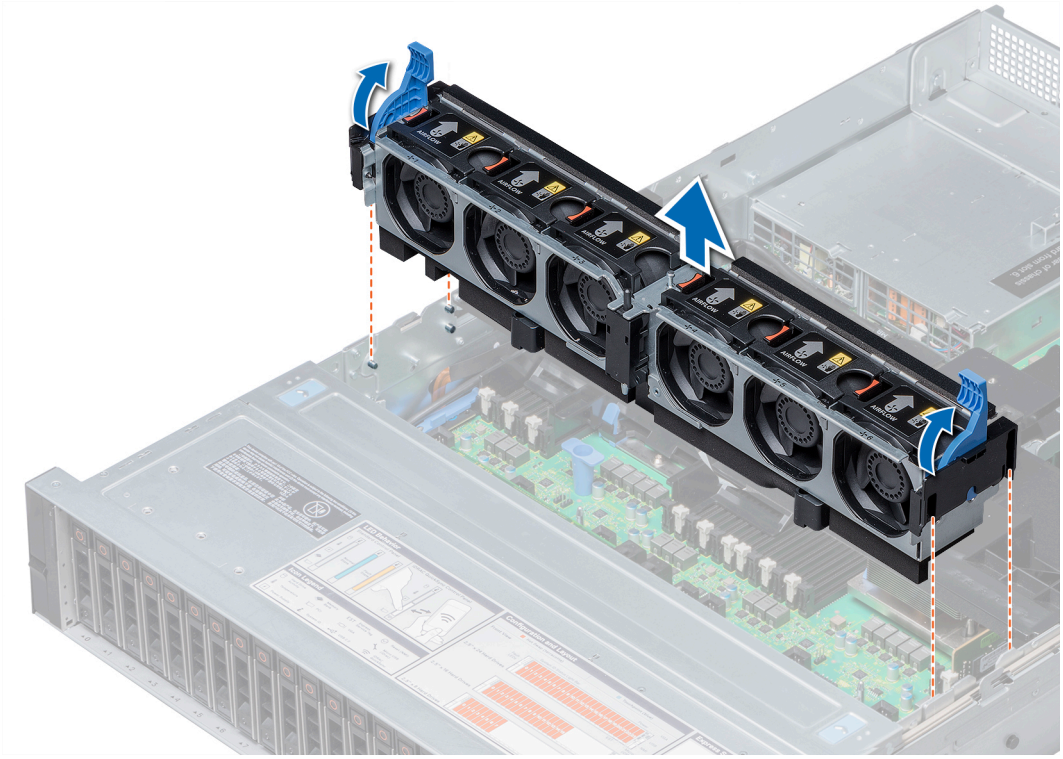


Figure 62. Removing the cooling fan

Remove expansion card risers

The expansion card risers contain all the PCIe HBAs installed in the system, including the NVRAM card, SAS HBAs, and NICs. Remove these cards as directed below.

Remove expansion card riser 1

Prerequisites

Follow the safety guidelines.

Steps

1. If installed, remove the expansion cards from the riser.
2. Disconnect any cables connected to the riser.
3. Press the release latches, and lift the riser from the riser connector on the system board.

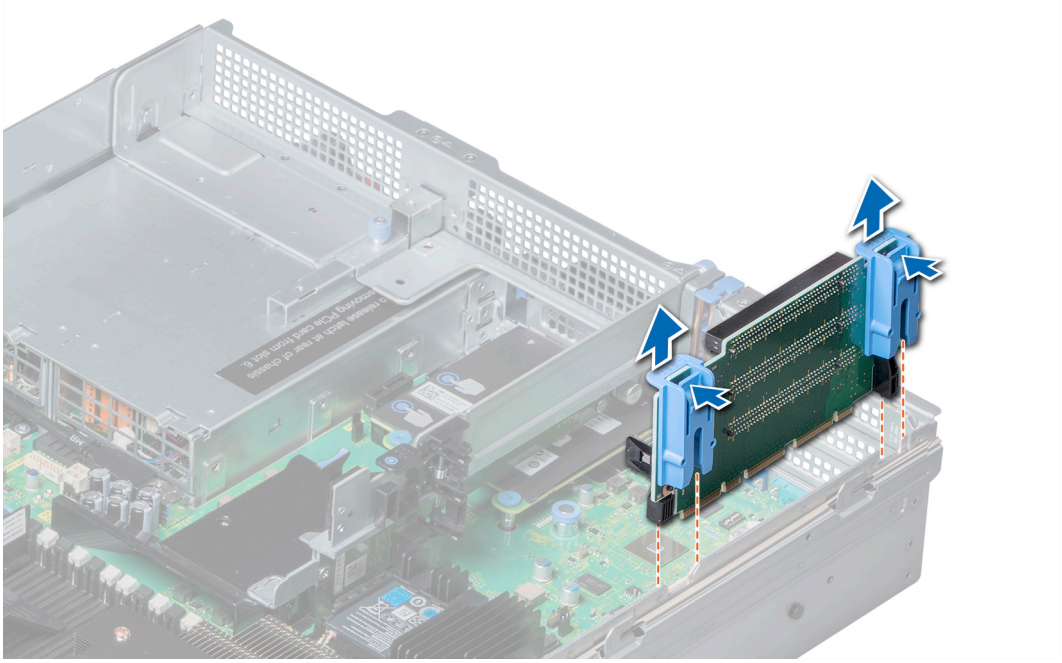


Figure 63. Removing expansion card riser 1

Remove expansion card riser 2

Prerequisites

Follow the safety guidelines listed in Safety instructions.

Steps

1. If installed, remove expansion cards installed on the riser.
2. Disconnect any cables connected to the riser.
3. To remove expansion card riser 2:
   a. Using Phillips #2 screwdriver, loosen the screws that secure the riser to the system.
   b. Press the release tab, and holding the riser by its edges, lift the riser from the riser connector on the system board.

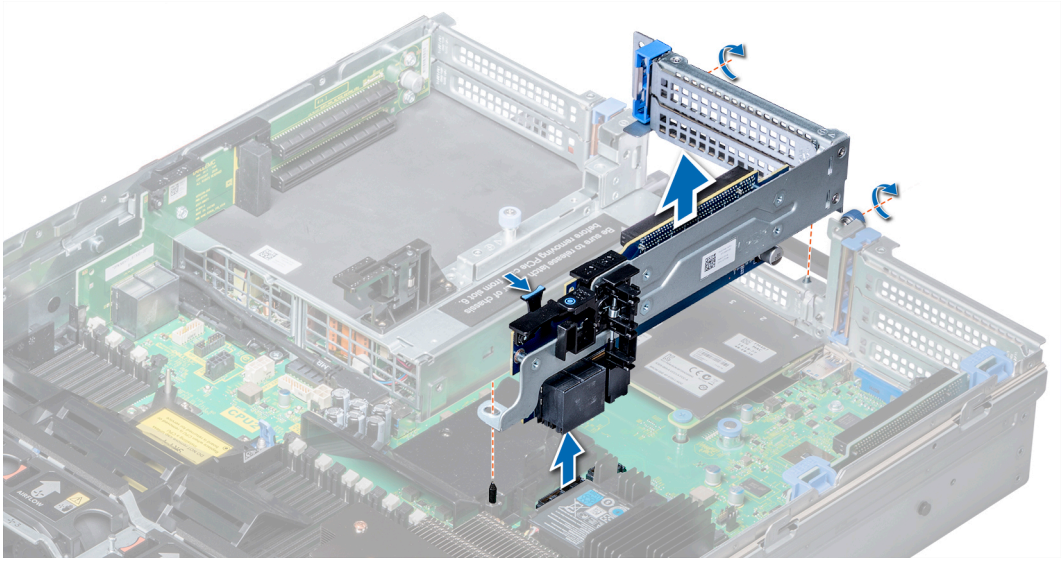


Figure 64. Removing expansion card riser 2

Remove expansion card riser 3

Prerequisites

Follow the safety guidelines.

Steps

1. If installed, remove expansion cards installed on the riser.
2. Disconnect any cables connected to the riser.
3. Using Phillips #2 screwdriver, loosen the screw that secures the riser to the system.
4. Press the release tab, and holding the riser by its edges, lift the riser from the riser connector on the system board.

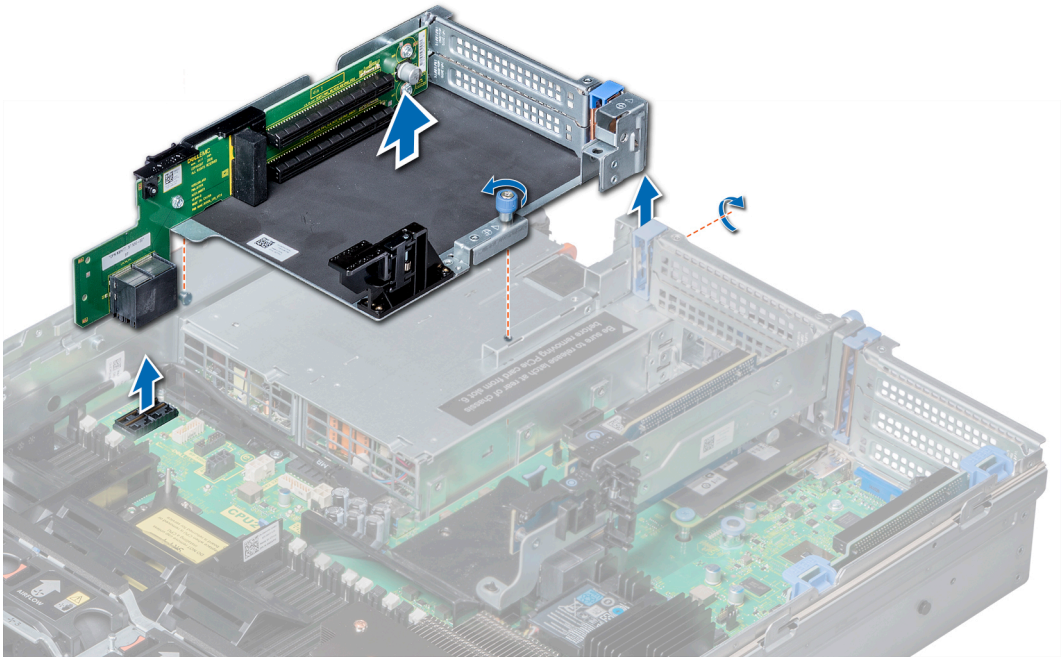


Figure 65. Removing expansion card riser 3

Remove the memory module

Prerequisites

WARNING: Allow the memory modules to cool after you power off the system. Handle the memory modules by the card edges and avoid touching the components or metallic contacts on the memory module.

CAUTION: To ensure proper system cooling, memory module blanks must be installed in any memory socket that is not occupied. Remove memory module blanks only if you intend to install memory modules in those sockets.

Steps

1. Locate the appropriate memory module socket.

   CAUTION: Handle each memory module only by the card edges, ensuring not to touch the middle of the memory module or metallic contacts.

2. Push the ejectors outward on both ends of the memory module socket at the same time to release the memory module from the socket.
3. Lift and remove the memory module from the system.

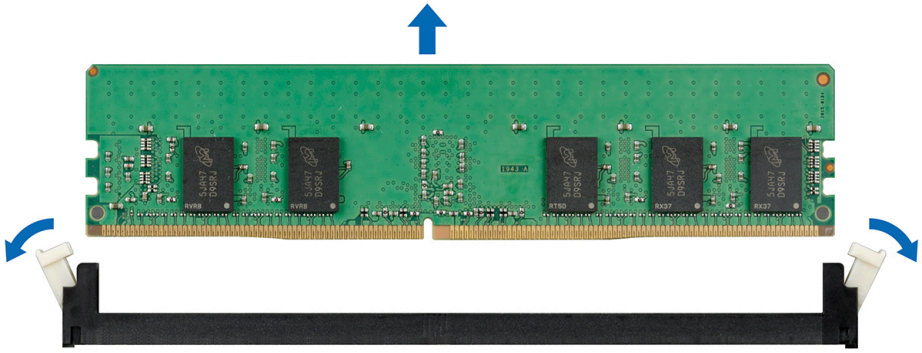


Figure 66. Removing a memory module

Remove processor and heat sink module

Prerequisites

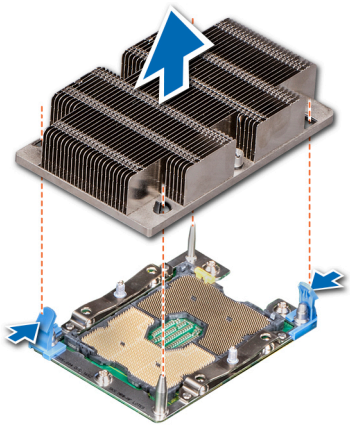
WARNING: The heat sink may be hot to touch for some time after the system has been powered down. Allow the heat sink to cool before removing it.

Steps

1. Using a Torx #T30 screwdriver, loosen the screws on the heat sink.

   NOTE: Ensure that you loosen one screw before moving on to the next screw.

2. Pushing both blue retention clips simultaneously, lift the processor and heat sink module (PHM) out of the system.
3. Set the PHM aside with the processor side facing up.



Remove the system board

Prerequisites

Steps

1. Disconnect all cables from the system board.

   CAUTION: Take care not to damage the system identification button while removing the system board from the chassis.

   CAUTION: Do not lift the system board by holding a memory module, processor, or other components.

2. Holding the system board holder, pull the blue release pin, and slide the system board toward the front of the system to disengage the connectors from the slots on the system.
3. Incline the system board at an angle, and lift the system board out of the system.

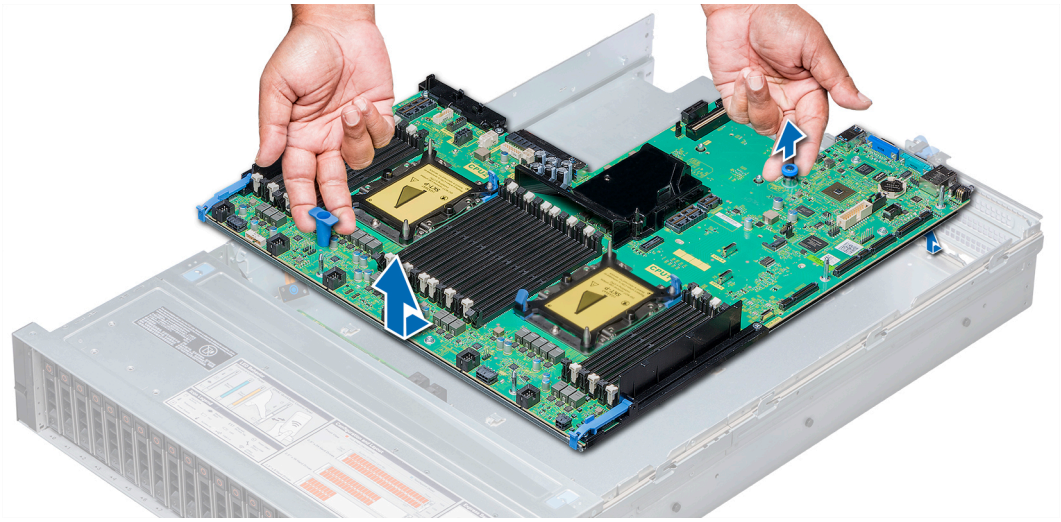


Figure 67. Removing the system board

Install the system board

Prerequisites

Follow the safety guidelines.

Steps

1. Unpack the replacement system board assembly.

   CAUTION: Do not lift the system board by holding a memory module, processor, or other components.

   CAUTION: Take care not to damage the system identification button while placing the system board into the chassis.

2. Holding the system board holder and blue release pin, push the system board toward the back of the system until the release pin clicks into place.
3. Reconnect all cables to the system board.

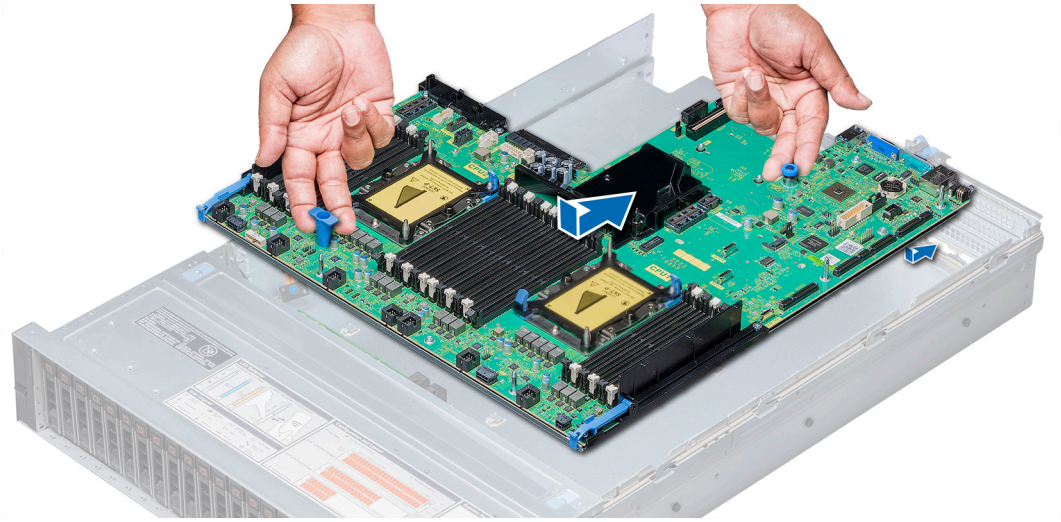


Figure 68. Installing system board

Install a processor and heat sink module

Prerequisites

CAUTION: Never remove the heat sink from a processor unless you intend to replace the processor. The heat sink is necessary to maintain proper thermal conditions.

WARNING: The heat sink may be hot to touch for some time after the system has been powered down. Allow the heat sink to cool before removing it.

Steps

1. Align the pin 1 indicator of the heat sink to the system board and then place the processor and heat sink module (PHM) on the processor socket.

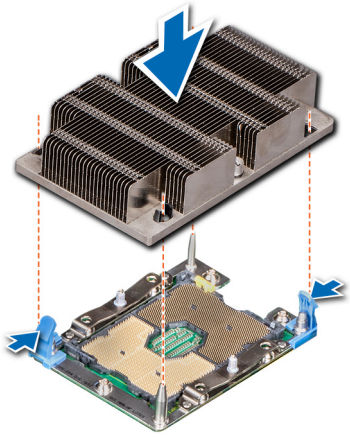
   CAUTION: To avoid damaging the fins on the heat sink, do not press down on the heat sink fins.

   NOTE: Ensure that the PHM is held parallel to the system board to prevent damaging the components.

2. Push the blue retention clips inward to allow the heat sink to drop into place.
3. Using the #Torx T30 screwdriver with adjustable torque, tighten one screw at a time.

NOTE: Ensure that the screw is tightened completely before moving onto the next screw.

NOTE: The processor and heat sink module retention screws should not be tightened to more than 0.13 kgf-m (1.35 N.m or 12 in-lbf).



Install the memory module

Prerequisites

CAUTION: To ensure proper system cooling, memory module blanks must be installed in any memory socket that is not occupied. Remove memory module blanks only if you intend to install memory modules in those sockets.

Steps

1. Locate the appropriate memory module socket.

   CAUTION: Handle each memory module only by the card edges, ensuring not to touch the middle of the memory module or metallic contacts.

   CAUTION: To prevent damage to the memory module or the memory module socket during installation, do not bend or flex the memory module. You must insert both ends of the memory module simultaneously.

2. Open the ejectors on the memory module socket outward to allow the memory module to be inserted into the socket.
3. Align the edge connector of the memory module with the alignment key of the memory module socket, and insert the memory module in the socket.

   CAUTION: Do not apply pressure at the center of the memory module; apply pressure at both ends of the memory module evenly.

   NOTE: The memory module socket has an alignment key that enables you to install the memory module in the socket in only one orientation.

4. Press the memory module with your thumbs until the socket levers firmly click into place.

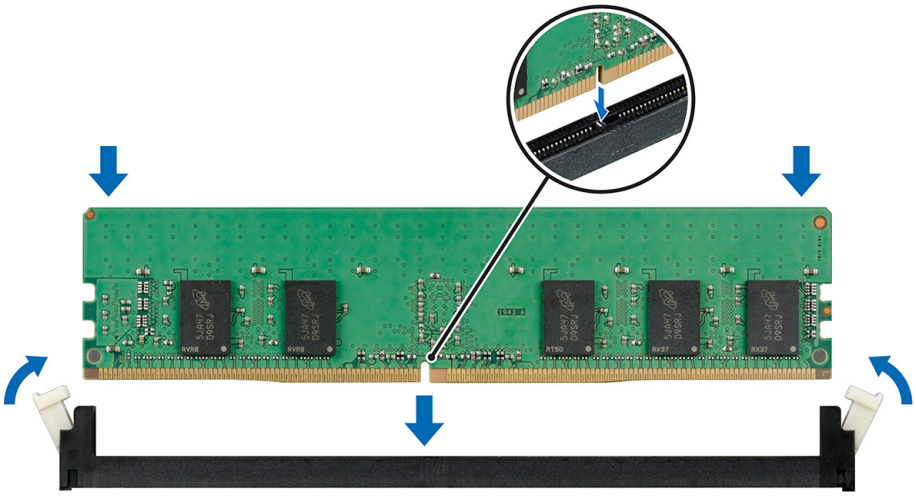


Figure 69. Installing a memory module

Install expansion card riser 1

Prerequisites

Follow the safety guidelines.

Steps

1. Align the guide rails on the riser with the standoffs on the side of the system.
2. Lower the riser into the system until the riser connector engages with the connector on the system board.

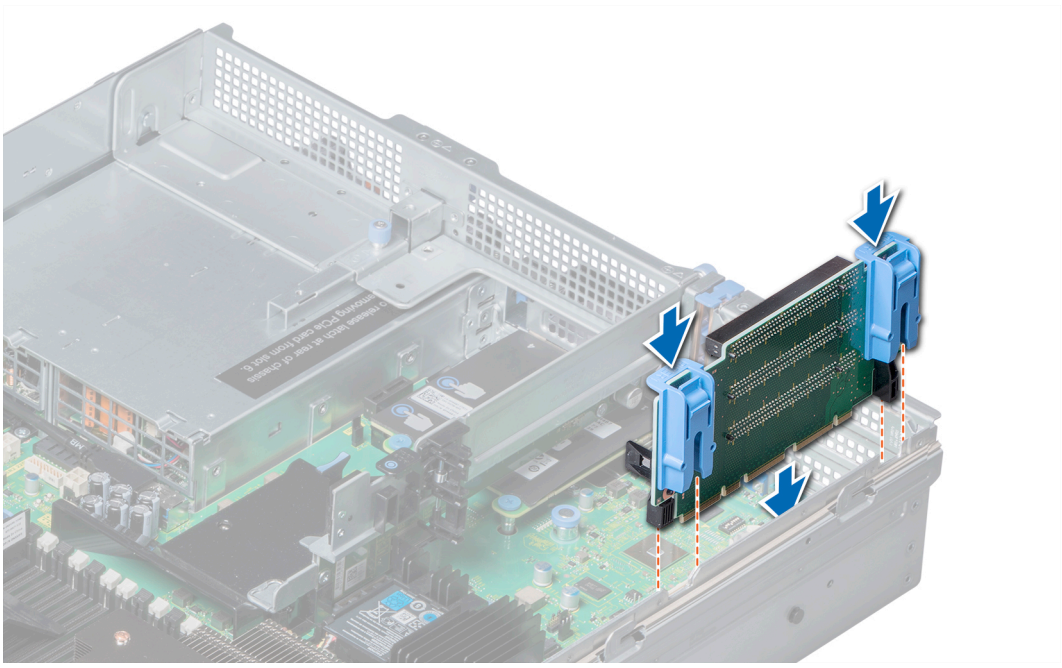


Figure 70. Installing expansion card riser 1

Install expansion card riser 2

Prerequisites

Follow the safety guidelines listed in Safety instructions.

Steps

To install expansion card riser 2:

a. Align the screw and tab on the riser with the screw hole and slot on the system.
b. Lower the riser into the system until the riser connector engages with the connector on the system board.
c. Using Phillips #2 screwdriver, tighten the screws to secure the riser to the system.

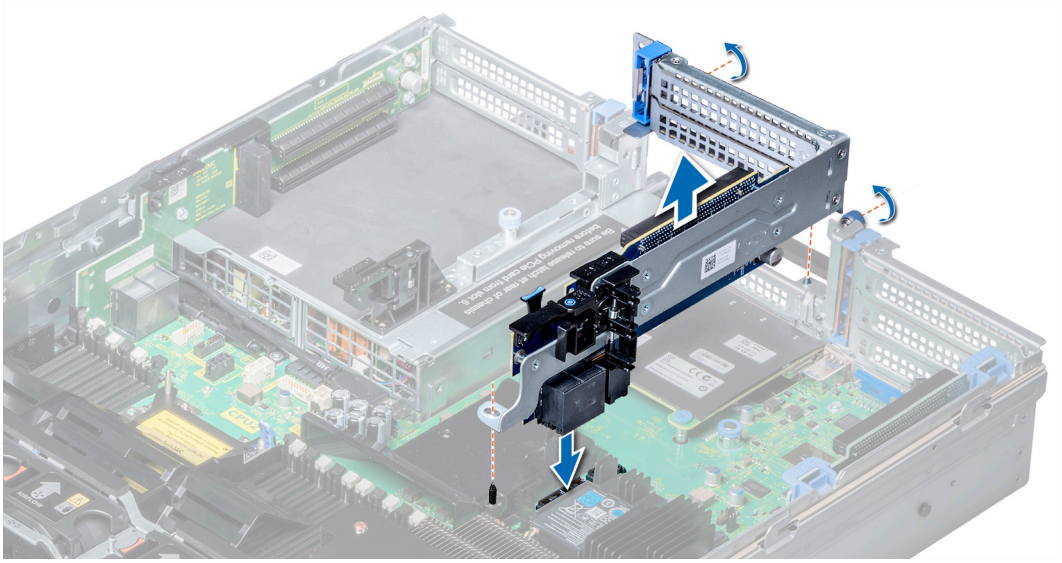


Figure 71. Installing expansion card riser 2

Install expansion card riser 3

Prerequisites

Follow the safety guidelines.

Steps

1. Align the tab on the riser with the slot on the system, and guide rails on the riser with the standoffs on the side of the system.
2. Lower the riser into the system until the riser edge connector engages with the connector on the system board. The riser card edge engages with the riser guide on the system.
3. Using a Phillips #2 screwdriver, tighten the screw to secure the riser to the system.

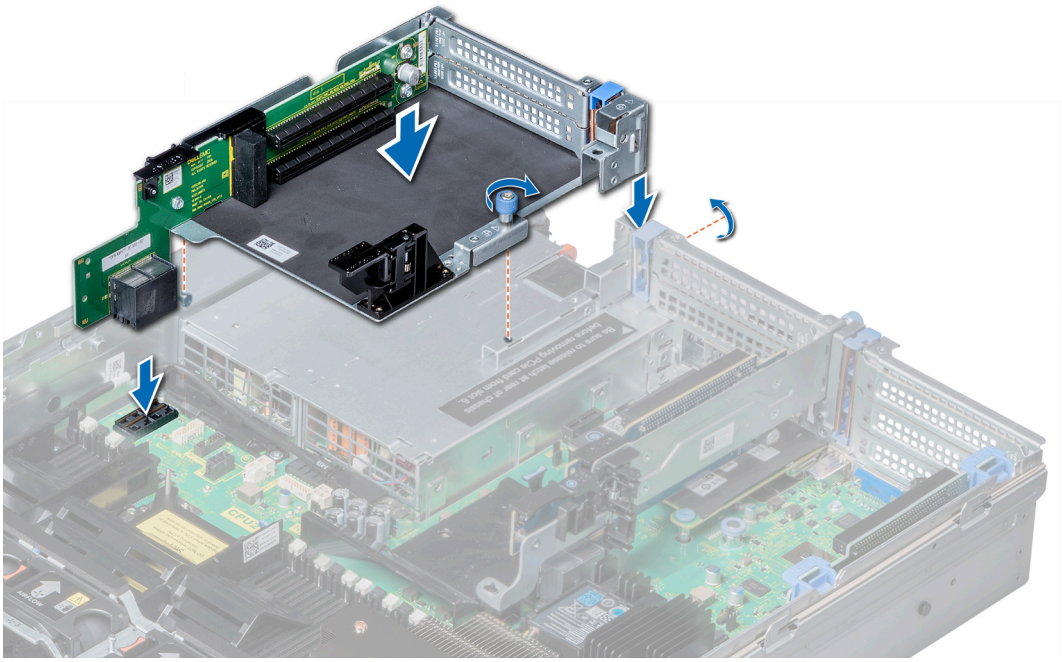


Figure 72. Installing expansion card riser 3

Install the cooling fan assembly

Prerequisites

Follow the safety guidelines.

About this task

CAUTION: Ensure that the cables inside the system are correctly installed and retained by the cable retention bracket before installing the cooling fan assembly. Incorrectly installed cables may get damaged.

Steps

1. Align the guide rails on the cooling fan assembly with the standoffs on the system.
2. Lower the cooling fan assembly into the system until the cooling fan connectors engage with the connectors on the system board.
3. Press the release levers to lock the cooling fan assembly into the system.

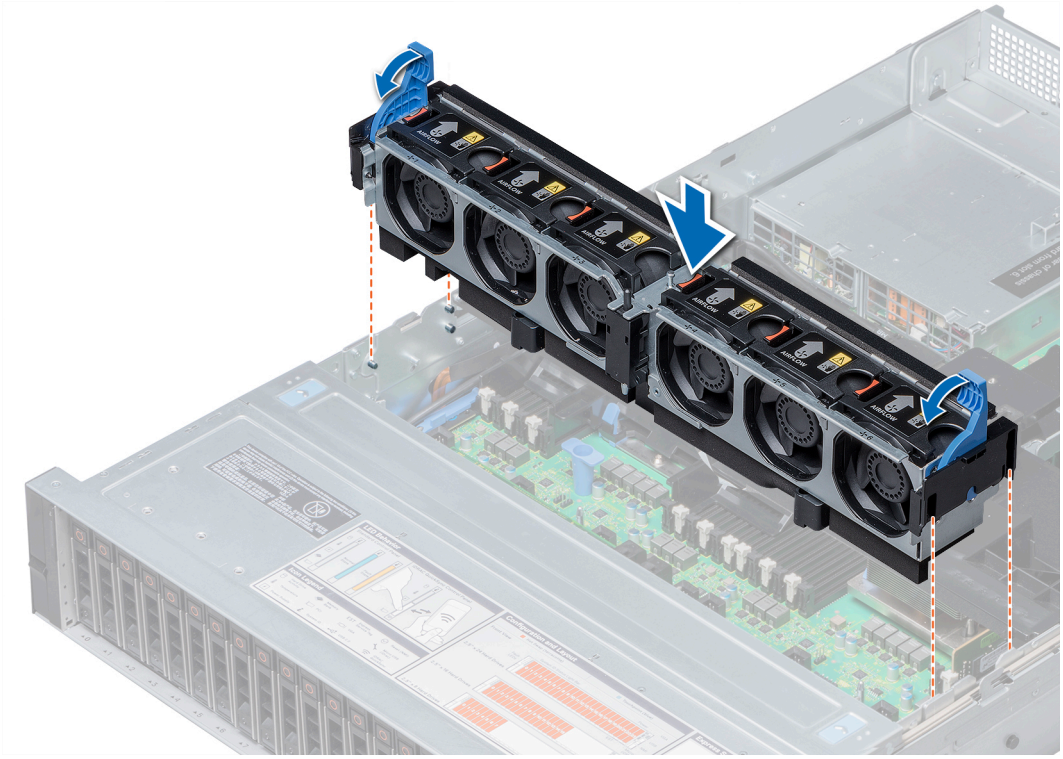


Figure 73. Installing the cooling fan assembly

Installing the air shroud

Steps

1. Align the tabs on the air shroud with the slots on the system.
2. Lower the air shroud into the system until it is firmly seated.
   When firmly seated, the memory socket numbers marked on the air shroud align with the respective memory sockets.

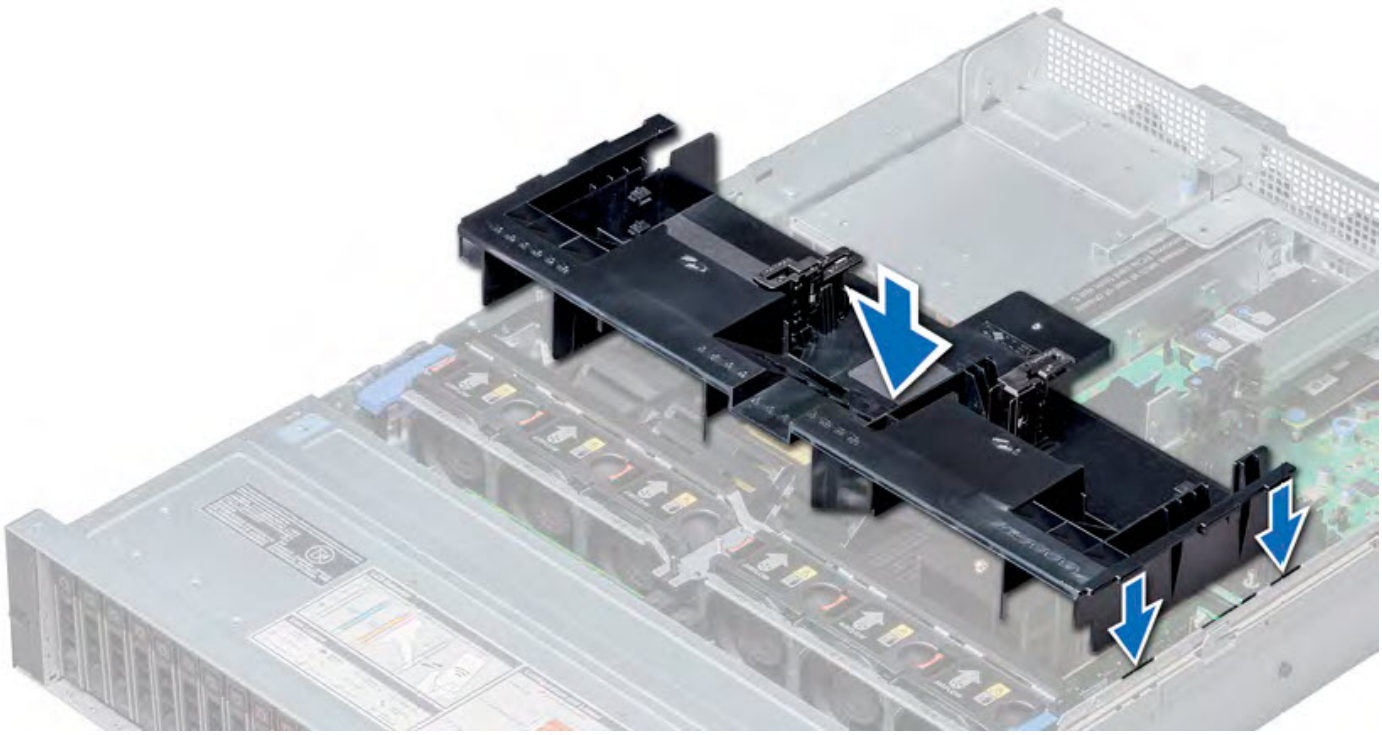


Figure 74. Installing the air shroud

Install the system cover

Prerequisites

Follow the safety guidelines.

Ensure that all internal cables are routed correctly and connected, and that no tools or extra parts are left inside the system.

Steps

1. Align the tabs on the system cover with the guide slots on the system.
2. Push the system cover latch down.
   The system cover slides forward, the tabs on the system cover engage with the guide slots on the system and the system cover latch locks into place.
3. Using a flat or Phillips head screwdriver, rotate the latch release lock clockwise to the locked position.

Install the power supply unit

Prerequisites

Follow the safety guidelines listed in Safety instructions.

About this task

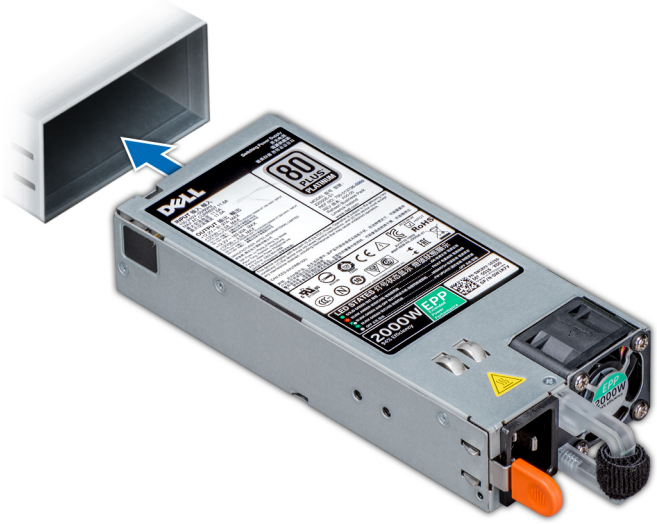
The technical white paper *Servicing and Replacing Power Supplies for DellEMC PowerEdge R940/R740/R740xd Systems with Single and Dual CMA Solutions* provides additional details about installing power supplies with the cable management arms installed on the back of the system.

Steps

1. Verify that nothing has dropped into the empty PSU slot before installing the replacement PSU.
2. Slide the PSU into the system until the PSU is fully seated and the release latch snaps into place.
3. Connect the power cable to the PSU, and plug the cable into a power outlet.

CAUTION: When connecting the power cable to the PSU, secure the cable to the PSU with the strap.

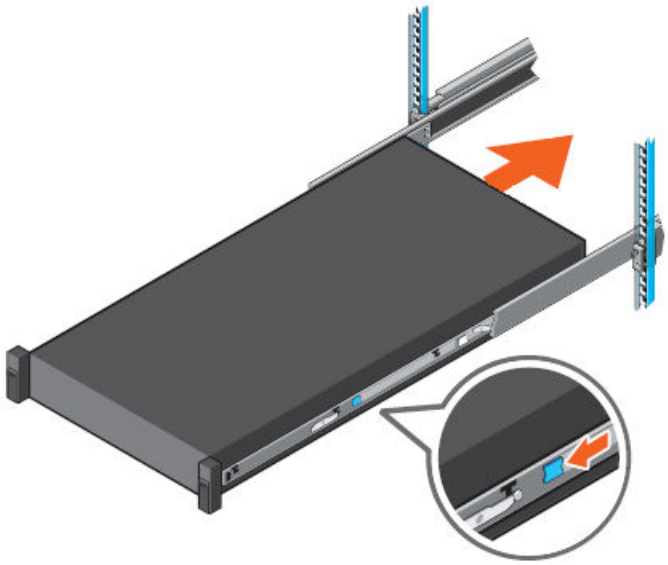
NOTE: When installing, hot swapping, or hot adding a new PSU, wait for 15 seconds for the system to recognize the PSU and determine its status. The PSU redundancy may not occur until discovery is complete. Wait until the new PSU is discovered and enabled before you remove the other PSU. The PSU status indicator turns green to signify that the PSU is functioning properly.



Slide the system into the cabinet

Steps

1. At the front of the cabinet, push the system inward until the lock levers click into place.
2. Push the blue slide release lock tabs forward on both rails and slide the system into the cabinet. The slam latches will engage to secure the system in the cabinet.



Reconnect and power on the system

About this task

Complete the following steps to reconnect cables, power on the system, and reconnect a terminal session.

Steps

1. Use the cable labels to reconnect the cables in the same configuration as they were before starting the replacement procedure.

   CAUTION: When connecting SAS cables to the SAS cards, ensure there is sufficient slack in the cable to avoid unnecessary strain on the cable connector and the SAS card when the controller is fully extended from the rack.

2. Close the cable management arms.
3. Reconnect the serial console cable to the system serial port, and prepare the terminal session.
4. Reconnect the AC power cords to the power supplies.

   NOTE: The system may not power on automatically after plugging in the AC power cords.

5. If the system does not power on when the AC power cords were reconnected, press the power button on the right control panel at the front of the system.

6. As the system boots, press **F2** to access the System Setup menu.

Restoring the Service Tag by using the Easy Restore feature

The Service Tag, iDRAC license, UEFI configuration, and system configuration data are backed up automatically. Use the Easy Restore feature to restore this data after replacing the system board. If the BIOS detects a new system board and the backup of the old Service Tag is available, the BIOS prompts the user to restore the information from the backup.

About this task

If the BIOS detects a new system board, and if the backup of the old Service Tag is available, BIOS displays the Service Tag, the status of the license, and the **UEFI Diagnostics** version.

Steps

1. Perform one of the following steps:
   - Press **Y** to restore the Service Tag, license, and diagnostics information.
   - Press **N** to navigate to the Dell Lifecycle Controller based restore options.
   - Press F10 to restore data from a previously created **Hardware Server Profile**.

   After the restore process is complete, the BIOS prompts to restore the system configuration data.
2. Perform one of the following steps:
   - Press **Y** to restore the system configuration data.
   - Press **N** to use the default configuration settings.

   After the restore process is complete, the system restarts.

Enter the system Service Tag by using System Setup

If the automatic transfer of system information to the new system board during BIOS boot fails, the system prompts for the system Service Tag information. Use System Setup to enter the Service Tag.

Steps

1. Press F2 to enter System Setup.

2. Click **Service Tag Settings**.
3. Enter the Service Tag.

   NOTE: You can enter the Service Tag only when the **Service Tag** field is empty. Ensure that you enter the correct Service Tag. After the Service Tag is entered, it cannot be updated or changed.

4. Click **Ok**.
5. Import your new or existing iDRAC Enterprise license.

   For more information, see the *Integrated Dell Remote Access Controller User's Guide* for your version of iDRAC at https://Dell.com/idracmanuals.

Import server profile

Use the backup image file to import or restore the configuration and firmware for the system without a reboot.

Prerequisites

The system must support iDRAC9, and you need to know the first two digits of the iDRAC firmware version.

About this task

The *Integrated Dell Remote Access Controller 9 User's Guide*, available at https://www.dell.com/idracmanuals, provides additional information.

The following KB articles, available from the Online Support website, provide instructions to retrieve the iDRAC Enterprise license from the Dell Digital Locker:

- *Accessing Dell Electronic Entitlement (DEE) Portal*
- *iDRAC9 Enterprise license retrieval from Dell Digital Locker*

If you are unable to access the Digital Locker, contact Dell Support and provide them with the system Service Tag number to receive the iDRAC Enterprise license.

Upgrade the identity module firmware

Manually upgrade the identity module firmware after replacing the system board and entering the service tag number.

Prerequisites

The `.pm` firmware file must be on the local system you are using to connect to iDRAC.

Steps

1. Using your laptop, connect a USB port on laptop to the console port on the front of the PowerProtect system. Use the default IP address 192.168.0.120.
2. Login with the user name **`root`** and the password **`calvin`**.
3. Select **Maintenance** > **System Update** > **Manual Update**.
4. Select **Local** for the location type.
5. Click **Choose File** to browse for the firmware file on the local system. Note the version number in the file name.
6. Click **Upload** to upload the file to the PowerProtect DD system.
7. Select the firmware file in the **Upgrade Details** area and click **Install**.
   The system displays a confirmation that it added the identity module firmware upgrade to the job queue. Click **Job Queue** to check the status. The job will complete in approximately one minute.
8. Select **Dashboard** > **Power Off System** to shut the system down.
9. Remove the AC power cords from the back of the system and wait five seconds before reconnecting them.
10. Press the power button to power the system back on.
    The life cycle controller will upgrade the identity module firmware during the system boot process.
11. After the system reboot, log back into iDRAC with the user name **`root`** and the password **`calvin`**.
12. Select **System** > **Inventory** > **Firmware Inventory**.

The identity module should be in the list with a version number that matches the version number of the upgrade file selected in Step 5.

Next steps

After a system board replacement, user-configured iDRAC settings and users are reset. Those settings must be reconfigured manually.

Bring up the existing file system

Steps

1. Run the `disk show state` command to verify the system lists all the installed enclosures and disks.

   The output should indicate that the data storage is in the `Foreign` state.

```
# disk show state
Enclosure   Disk
             1  2  3  4  5  6  7  8  9  10 11 12 13 14 15
---------   ------------------------------------------------
1            .  .  .  .  O  O  O  O  O  O  O  O
2            O  O  O  O  O  O  O  O  O  O  O  O  O  O  s
---------   ------------------------------------------------

Legend   State                Count
------   ------------------   -----
.        In Use Disks         4
s        Spare Disks          1
O        Foreign Disks        22
------   ------------------   -----
Total 27 disks
```

2. After verifying that the disks are visible to the destination system as foreign devices, run the following command in SE mode.

   CAUTION: This command must be run by a qualified user with SE permissions.

```
# reg set group.upgrade.iknowheadswaprisk=1
```

3. Run the `system headswap` command.

```
# system headswap
```

   The system responds:

```
This command returns the system back to its prior operational
conditions. The system will be rebooted before resuming normal operations.

**   If system passphrase was set on the old head, you will
  need to do one of the following after headswap completes:
      - unlock the filesystem          if you have encrypted data, or
      - set the system passphrase      if you don't have encrypted data
         Are you sure? (yes|no|?) [no]: yes
ok, proceeding.
Please enter sysadmin password to confirm 'system headswap':
Restoring the system configuration, do not power off / interrupt process ...

This command may take several minutes to complete; please wait.

Success
 deployment chassis replacement..........[start]
 Reassemble external shelf...............[OK]
 Save external storage UUID to Head .....[OK]
 Save head serial to external storage ...[OK]
 Mount management volume.................[OK]
 deployment chassis replacement..........[done]
```

NOTE: This command might take 30 minutes or longer to complete, depending on the number of shelves and the amount of data on the shelves. The system should reboot automatically to complete the headswap process.

4. If the `system headswap` command fails , run the following command in bash mode.

```
# dd_voltool --headswap
```

5. Run the `disk show state` command to verify the system has updated the disk status.

   The output should indicate that the data storage is in the `In Use` state.

```
# disk show state
Enclosure   Disk
             1  2  3  4  5  6  7  8  9  10 11 12 13 14 15
---------   ---------------------------------------------
1            .  .  .  .  .  .  .  .  .  .  .  .
2            .  .  .  .  .  .  .  .  .  .  .  .  .  .  s
---------   ---------------------------------------------

Legend   State                Count
------   ------------------   -----
.        In Use Disks         26
s        Spare Disks          1
------   ------------------   -----
Total 27 disks
```

6. Run the `filesys status` command to verify the status of the file system.
   The system displays the message `The filesystem is locked: Use 'filesys encryption unlock' to enter the passphrase.` if the file system is encrypted and locked.
7. If necessary, run the `filesys encryption unlock` command to unlock the file system.

   The security officer must enter the system passphrase to unlock the file system.
8. Determine if the system time must be corrected. If it must be corrected:

   CAUTION: The file system is disabled if the difference between the time on the system and the NTP time is more than 60 seconds. KB article 497028 *The Data Domain File System (DDFS) may be disabled if there is a backwards jump in system time configured on the system*, available from https://support.emc.com/, provides more information.

   a. Run the `ntp status` command and note the NTP status, time, and date.

```
# ntp status
Status Enabled
Current Clock Time Thu Feb 20 00:41:22.411 2020
Clock Last Synchronized Thu Feb 20 0 0:38:18.196 2020
Clock Last Synchronized With Time Server 10.173.240.1
```

   If NTP is disabled, no time adjustments are required.

   b. Run the `date` command and note the system time and date.

```
# date
Thu Jan 01 00:31:33 PST 2017
```

   c. If the NTP time and system time are not within 60 seconds of each other, run the `ntp disable` command to disable NTP.

```
# ntp disable
```

   d. Run the `system set date <MMDDhhmmYYYY>` command to set the system date and time within 60 seconds of the NTP time.

```
# system set date 02200041202
```

   e. Run the `ntp enable` command to enable NTP.

```
# ntp enable
```

f. Run the `alerts show current` command to verify there are no active alerts on the system.

```
# alerts show current
```

g. Run the `filesys enable` command to enable the file system.

```
# filesys enable
```

NOTE: If the date and time were set backwards, an error message is logged in the `messages.engineering` log on the system. This message identifies the change and notes that the file system is disabled. KB article 497028 *The Data Domain File System (DDFS) may be disabled if there is a backwards jump in system time configured on the system*, available from https://support.emc.com/, provides more information.

9. Run the `system upgrade status` to check the progress of the system upgrade and index rebuild.

```
# system upgrade status
EThu July 2 15:22:50 PDT 2020
Current upgrade status: upgrading file system
Time remaining: 240 minutes Start: 14:20:54
Stage: index_rebuild Status: running
Reason: none

# system upgrade status
Current Upgrade Status: DD OS upgrade succeeded
End time: 2020.07.02:18:20
```

14

Replace the Chassis.

CAUTION: Improper installation on the rails may damage the rails or cause the system to fall when extended. When extending the system from the rack, pull outward slowly and verify the system is properly installed on the rails.

It will be necessary to move the following parts from the old chassis to the new chassis:

- Bezel
- Disk drives and solid state drives (SSDs)

  CAUTION: The disk drives and SSDs must be installed in the same slots in the new chassis as they were installed in the old chassis.
- Power supplies
- Fans
- PCIe risers containing the PCIe HBAs and the network daughter card
- System board
- Blank fillers for empty HBA and drive slots

CAUTION: The DIMMs must be installed in the same slots in the new chassis as they were installed in the old chassis.

NOTE:

- Only trained and qualified service engineer should be allowed to install or replace this equipment.
- Before removing the chassis, label all cables attached to the chassis so that the cables can be reconnected correctly after the chassis replacement.
- During the procedure, wear a grounding wrist strap to avoid ESD damage to the equipment.

Place the current chassis and the new chassis on an ESD-free work surface that is large enough for the new and old systems to be side-by-side on a table or counter top to ensure the correct placement of all components in the new chassis.

The system may take more than an hour to reboot after a chassis replacement due to automatic firmware updates on the new chassis.

CAUTION: If any components are not fully seated, the system may not boot upon completion of the procedure. When installing a component into the system, verify it is fully seated before proceeding to the next step.

Topics:

- Install the hard drive
- Install the front bezel
- Install the power supply unit
- Install the system in the cabinet
- Reconnect and power on the system
- Verify the system and perform a system headswap
- Verify the system

Preliminary and troubleshooting steps

About this task

The chassis replacement procedure includes a series of commands that rediscover the data stored on the external shelves.

Steps

If the system is online, it is beneficial to run the following commands and save the output on the system that is to be replaced before replacing the chassis. If the system is not online, skip this step and proceed with the procedure to replace the chassis.

Use this information to verify that the procedure has completed successfully:

```
# storage show all
# disk show state
# disk show hardware
# system show ports
# disk multipath status
# filesys show space
# enclosure show topology
# enclosure show power supply
```

NOTE:

- When you run these commands before and after the chassis replacement, the output should be the same. Save this information in case any configuration problems are found after the procedure has completed.
- See the *DD OS Command Reference Guide* for detailed information about these commands.

Shut down and disconnect the system

Prerequisites

Establish a connection to the system.

About this task

Complete the following steps to shut down and disconnect the system.

Steps

1. Stop the system using the `system poweroff` command to allow the proper shut down of the file system and other system components. The power down process takes approximately five minutes to complete. The `system poweroff` command immediately turns the front panel blue LED to amber, and is complete when the front panel LED turns off.

   NOTE: The system fans still run, and NIC port LEDs still flash after running the `system poweroff` command.

2. Open the cable management arms.
3. Label each of the cables as to their connection location. Taking a photograph for reference is also helpful for re-connecting the cables.
4. Disconnect the AC power cords from the rear of the system.
5. Disconnect all network and FC cables from the rear of the system.

6. Disconnect all SAS cables from the rear of the system.
7. Disconnect the serial console cable.

Remove the system from the cabinet

Prerequisites

Follow all safety guidelines.

About this task

CAUTION: The system is heavy and should be removed from a cabinet by two people. To avoid personal injury and/or damage to the equipment, do not attempt to remove the system from a cabinet without a mechanical lift and/or help from another person.

The following components must be moved from the old chassis to the replacement chassis:

- Bezel
- Disk drives and solid state drives (SSDs)
  CAUTION: The disk drives and SSDs must be installed in the same slots in the new chassis as they were installed in the old chassis.
- Power supplies
- Fans
- PCIe risers containing the PCIe HBAs and the network daughter card
- System board
- Blank fillers for empty HBA and drive slots

You will need suitable work surface(s), capable of supporting the weight of the systems while the transfer is accomplished.

Steps

1. At the front of the cabinet, locate the two slam latches on left and right side of the system. Pull the slam latches up to release the system from the cabinet. If the slam latches do not disengage, loosen the screw under each latch.
2. Using the slam latches, pull the system from the cabinet until the rails lock in the extended position.

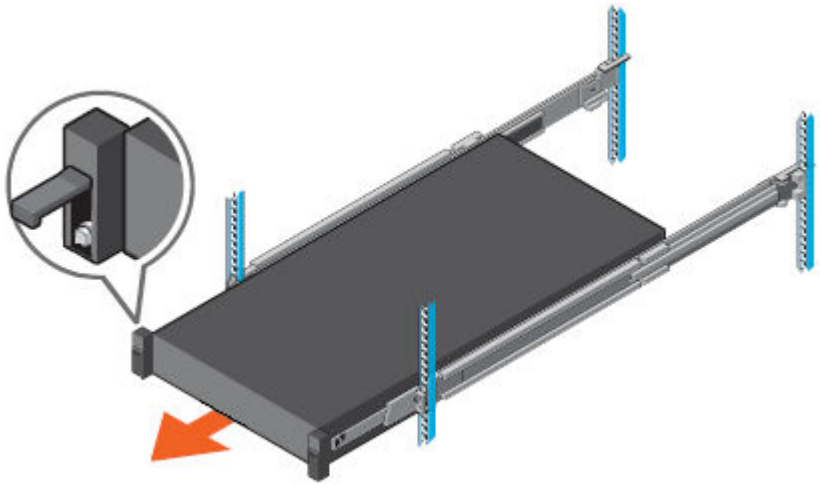


Figure 75. Release and extend system from cabinet

3. Locate the lock levers on the sides of the inner rails (1). Unlock each lever by rotating it up to its release position (2). Grasp the sides of the system (3) firmly and pull it forward until the standoffs are at the front of the J-slots in the rails. Lift the system up and away from the rails.

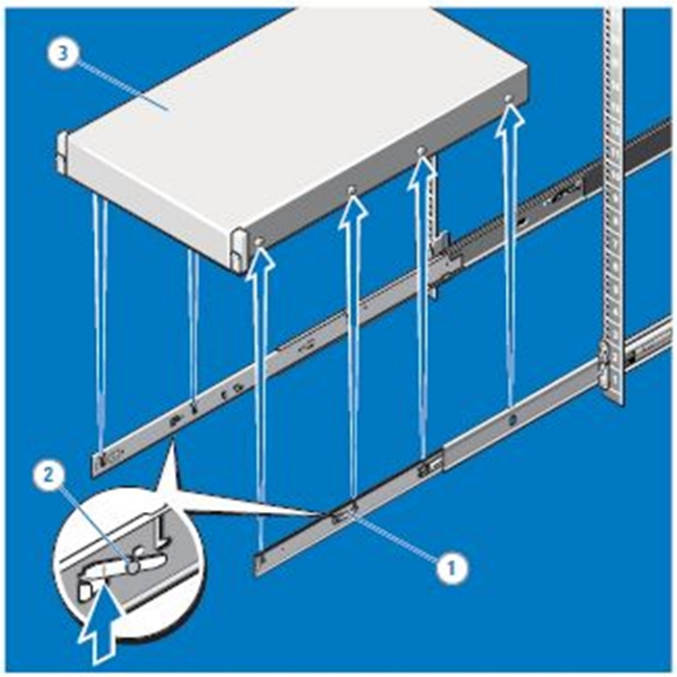


Figure 76. Removing system from rails

4. Place the system on a suitable work surface. Ensure the work surface(s) is capable of supporting the weight.

Remove a power supply

Prerequisites

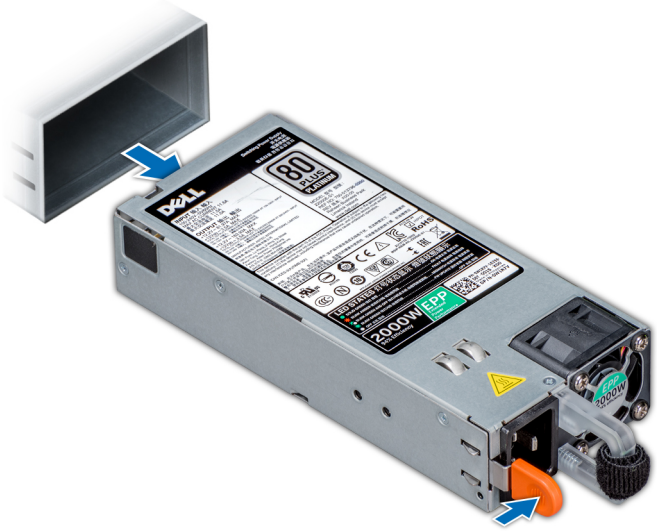
Follow the safety guidelines listed in Safety instructions.

About this task

The technical white paper *Servicing and Replacing Power Supplies for DellEMC PowerEdge R940/R740/R740xd Systems with Single and Dual CMA Solutions* provides additional details about removing power supplies with the cable management arms installed on the back of the system.

Steps

1. Disconnect the power cable from the power source and from the PSU you intend to remove, and then remove the cable from the strap on the PSU handle.
2. Press the release latch and slide the PSU out of the system by using the PSU handle.



Remove the front bezel to access front panel hard drives

Steps

1. Unlock the bezel by using the bezel key.
2. Press the release button, and pull the left end of the bezel.
3. Unhook the right end, and remove the bezel.

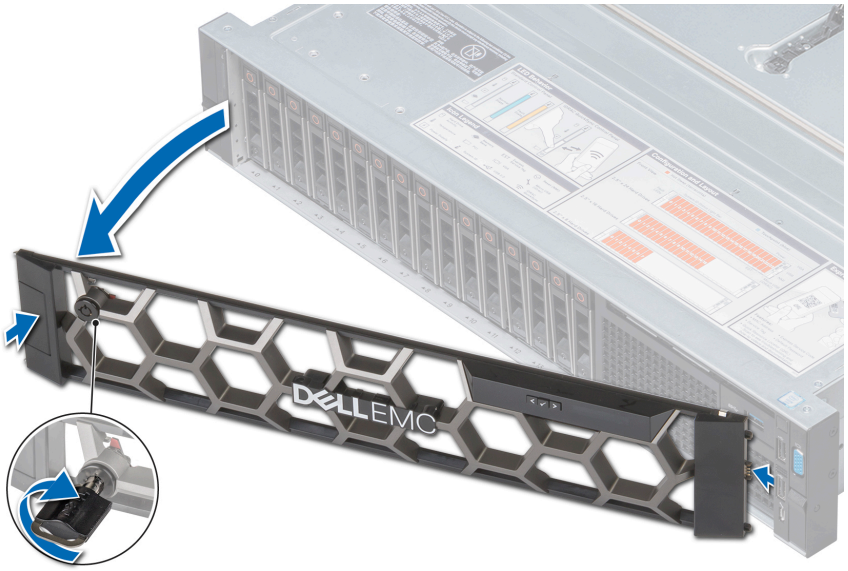


Figure 77. Removing the front bezel

Remove a hard drive

Prerequisites

Follow the safety guidelines listed in Safety instructions.

Steps

1. Press the release button to open the hard drive release handle.
2. Holding the handle, slide the hard drive out of the hard drive slot.

Figure 78. Removing a hard drive

3. If you are not replacing the hard drive immediately, insert a hard drive blank in the empty hard drive slot to maintain proper system cooling.

Remove the system covers

This procedure is used to remove the system covers from the faulted system and the replacement system.

Prerequisites

Follow all safety guidelines.

Steps

1. Using a flat or a Phillips head screwdriver, rotate the latch release lock counter clockwise to the unlocked position.
2. Lift the latch till the system cover slides back and the tabs on the system cover disengage from the guide slots on the system.
3. Hold the cover on both sides, and lift the cover away from the system.

Figure 79. Removing the system cover

Remove the cooling fan assembly

Steps

1. Lift the release levers to unlock the cooling fan assembly from the system.
2. Hold the release levers, and lift the cooling fan assembly away from the system.

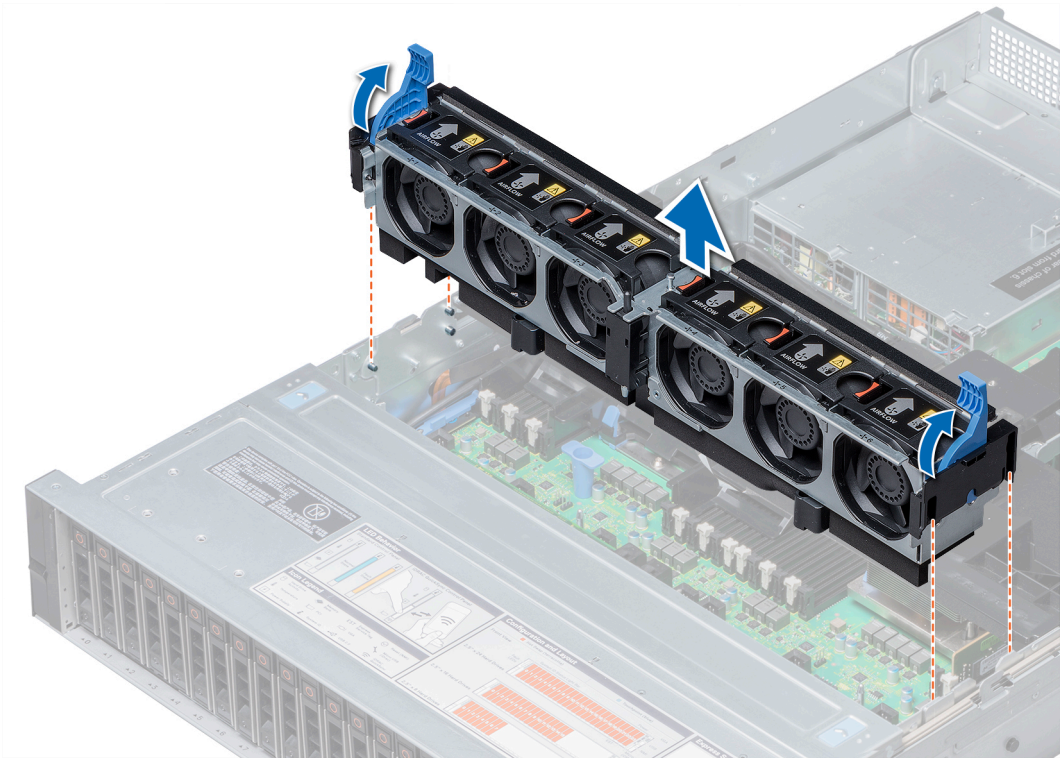


Figure 80. Removing the cooling fan

Removing the air shroud

Steps

Hold the air shroud at both ends and lift it away from the system.

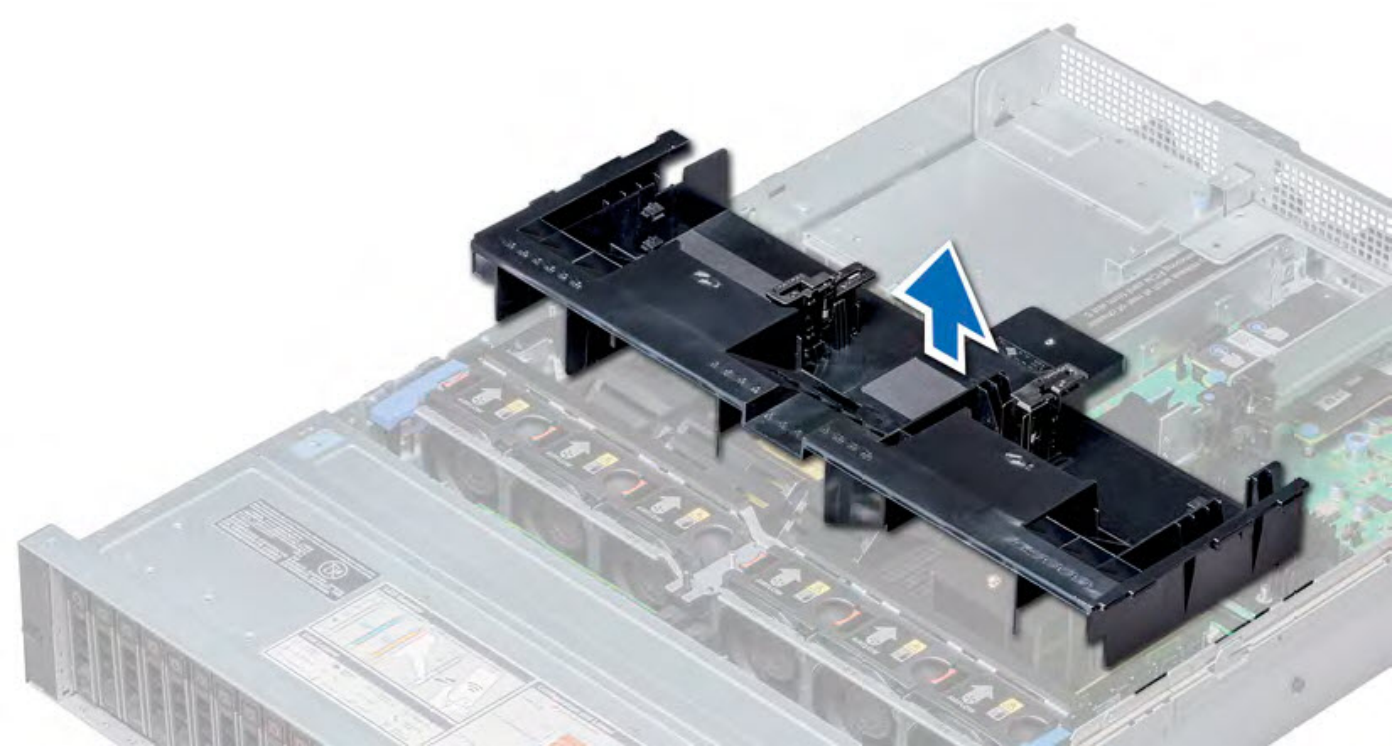


Figure 81. Removing the air shroud

Remove expansion card risers

The expansion card risers contain all the PCIe HBAs installed in the system, including the NVRAM card, SAS HBAs, and NICs. Remove these cards as directed below.

Remove expansion card riser 1

Prerequisites

Follow the safety guidelines.

Steps

1. If installed, remove the expansion cards from the riser.
2. Disconnect any cables connected to the riser.
3. Press the release latches, and lift the riser from the riser connector on the system board.

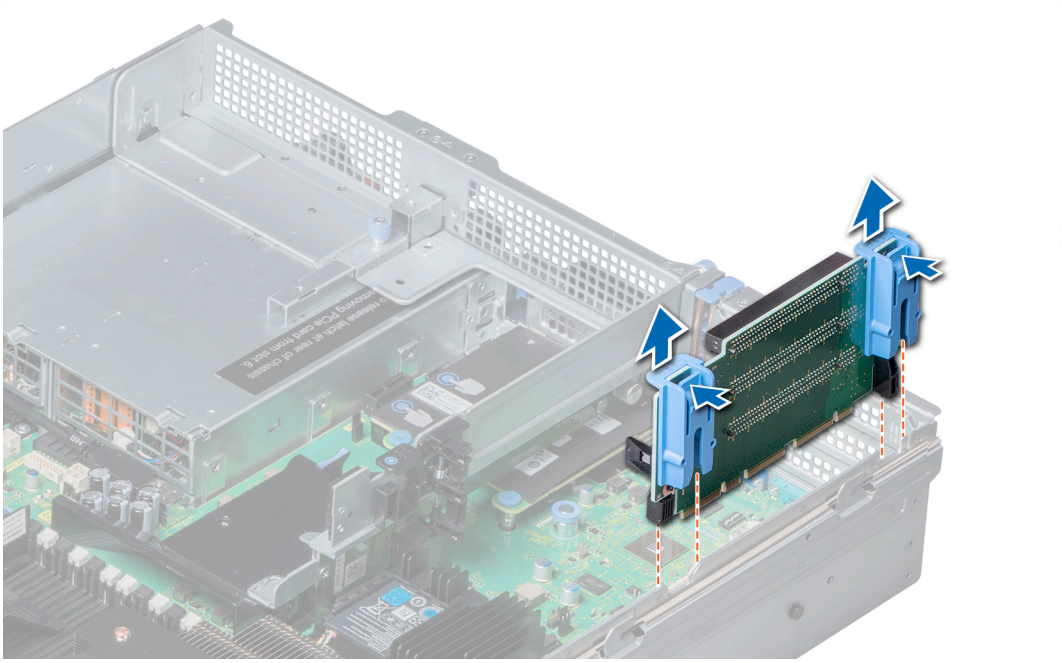


Figure 82. Removing expansion card riser 1

Remove expansion card riser 2

Prerequisites

Follow the safety guidelines listed in Safety instructions.

Steps

1. If installed, remove expansion cards installed on the riser.
2. Disconnect any cables connected to the riser.
3. To remove expansion card riser 2:
   a. Using Phillips #2 screwdriver, loosen the screws that secure the riser to the system.
   b. Press the release tab, and holding the riser by its edges, lift the riser from the riser connector on the system board.

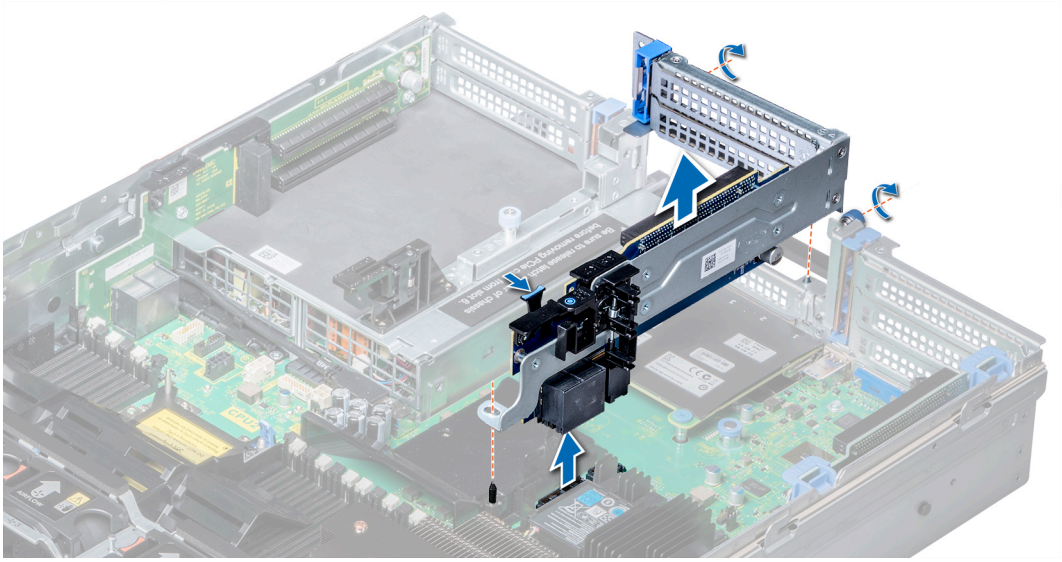


Figure 83. Removing expansion card riser 2

Remove expansion card riser 3

Prerequisites

Follow the safety guidelines.

Steps

1. If installed, remove expansion cards installed on the riser.
2. Disconnect any cables connected to the riser.
3. Using Phillips #2 screwdriver, loosen the screw that secures the riser to the system.
4. Press the release tab, and holding the riser by its edges, lift the riser from the riser connector on the system board.

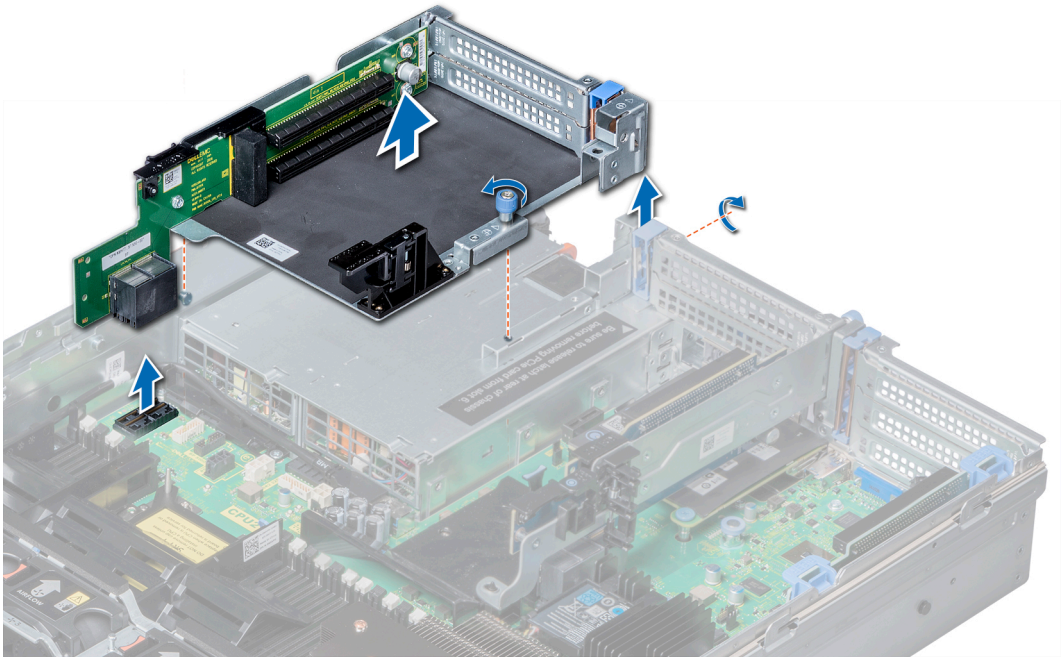


Figure 84. Removing expansion card riser 3

Remove the system board

Prerequisites

Steps

1. Disconnect all cables from the system board.

   CAUTION: Take care not to damage the system identification button while removing the system board from the chassis.

   CAUTION: Do not lift the system board by holding a memory module, processor, or other components.

2. Holding the system board holder, pull the blue release pin, and slide the system board toward the front of the system to disengage the connectors from the slots on the system.
3. Incline the system board at an angle, and lift the system board out of the system.

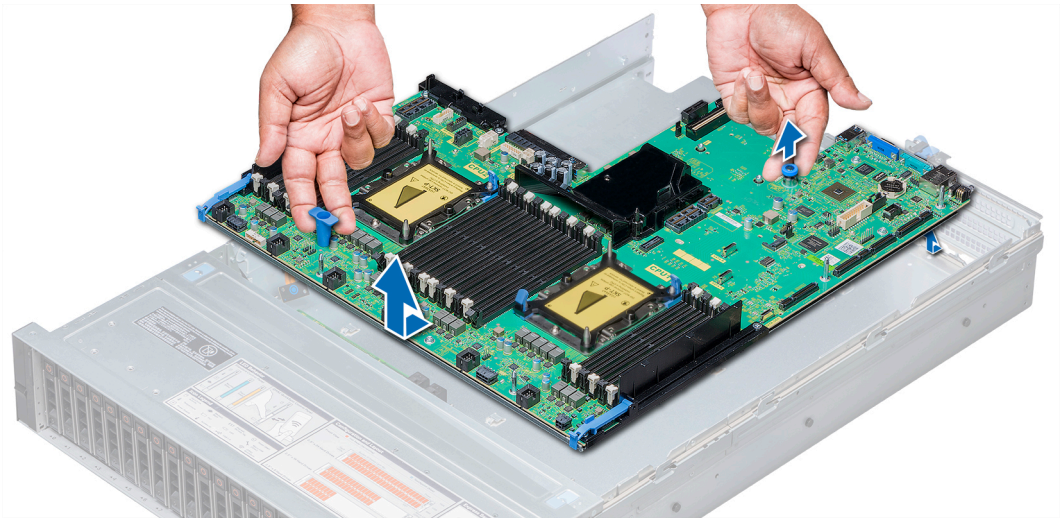


Figure 85. Removing the system board

Install the system board

Prerequisites

Follow the safety guidelines.

Steps

1. Unpack the replacement system board assembly.

   CAUTION: Do not lift the system board by holding a memory module, processor, or other components.

   CAUTION: Take care not to damage the system identification button while placing the system board into the chassis.

2. Holding the system board holder and blue release pin, push the system board toward the back of the system until the release pin clicks into place.
3. Reconnect all cables to the system board.

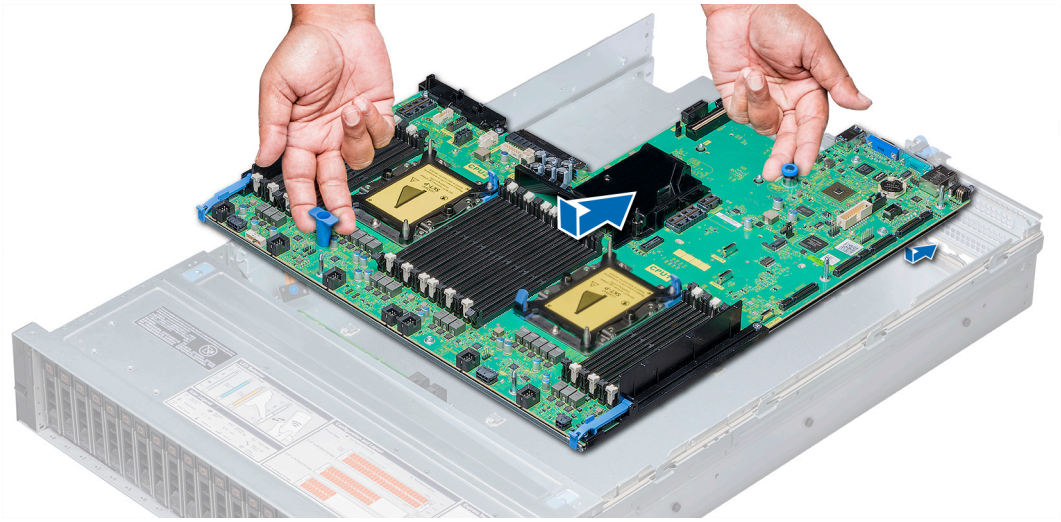


Figure 86. Installing system board

Install expansion card riser 1

Prerequisites

Follow the safety guidelines.

Steps

1. Align the guide rails on the riser with the standoffs on the side of the system.
2. Lower the riser into the system until the riser connector engages with the connector on the system board.

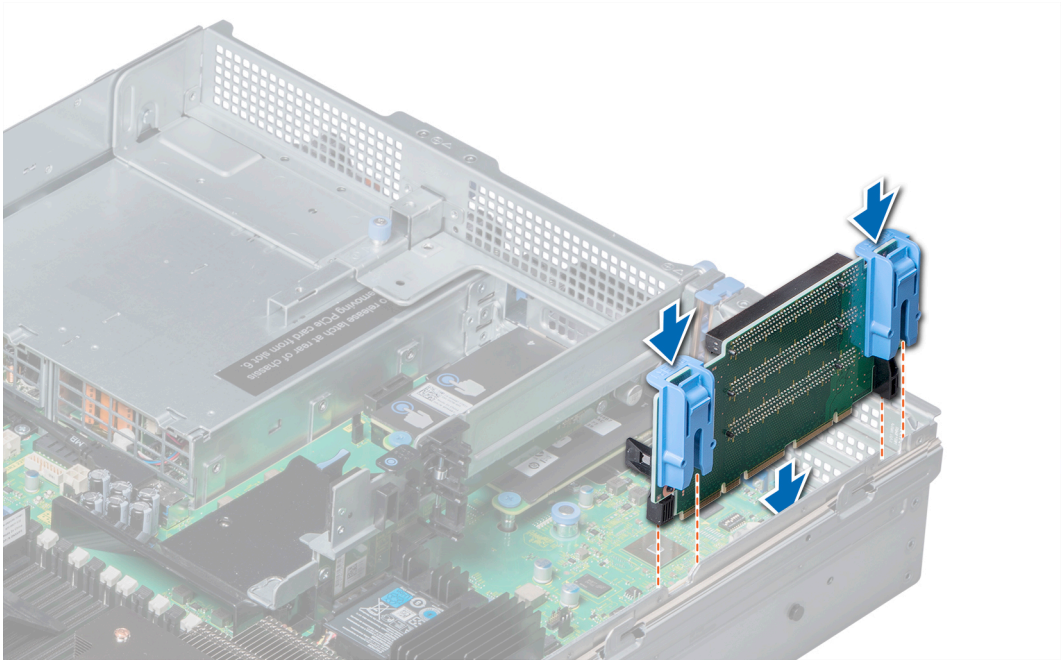


Figure 87. Installing expansion card riser 1

Install expansion card riser 2

Prerequisites

Follow the safety guidelines listed in Safety instructions.

Steps

To install expansion card riser 2:

a. Align the screw and tab on the riser with the screw hole and slot on the system.
b. Lower the riser into the system until the riser connector engages with the connector on the system board.
c. Using Phillips #2 screwdriver, tighten the screws to secure the riser to the system.

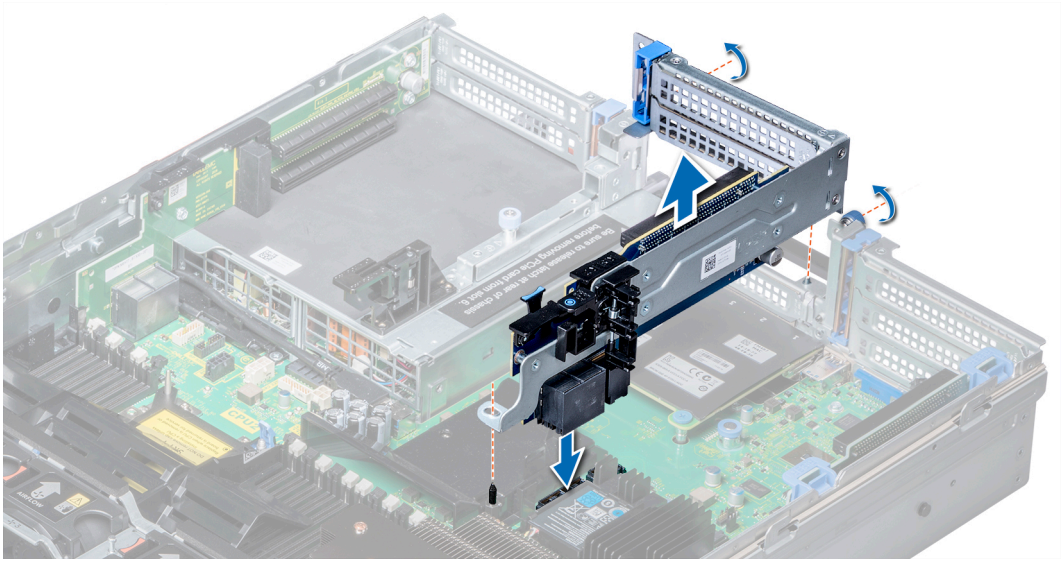


Figure 88. Installing expansion card riser 2

Install expansion card riser 3

Prerequisites

Follow the safety guidelines.

Steps

1. Align the tab on the riser with the slot on the system, and guide rails on the riser with the standoffs on the side of the system.
2. Lower the riser into the system until the riser edge connector engages with the connector on the system board. The riser card edge engages with the riser guide on the system.
3. Using a Phillips #2 screwdriver, tighten the screw to secure the riser to the system.

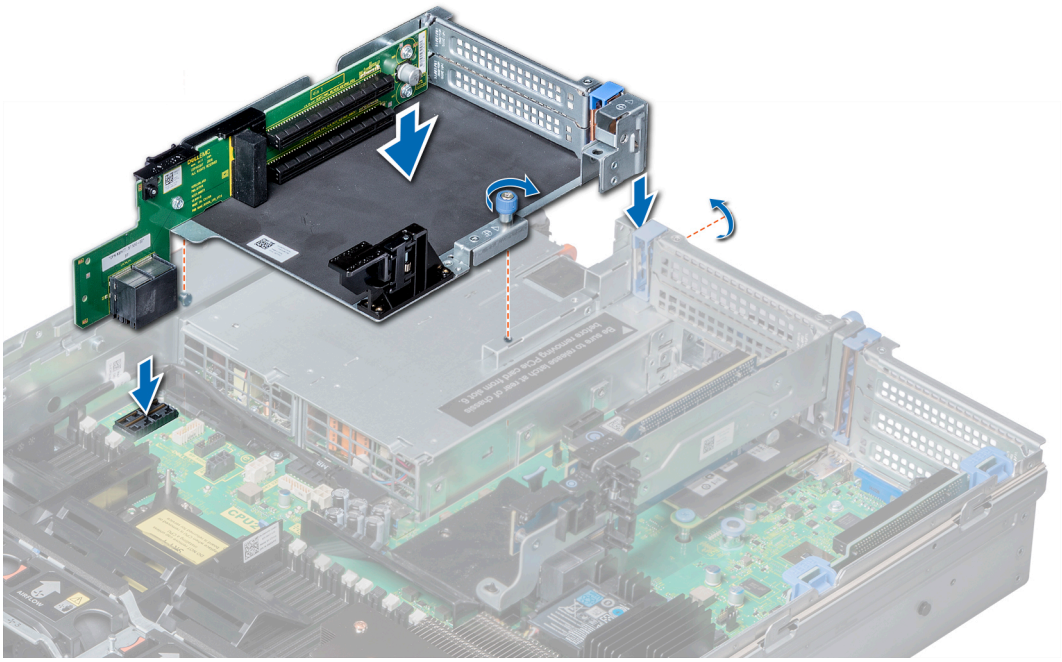


Figure 89. Installing expansion card riser 3

Installing the air shroud

Steps

1. Align the tabs on the air shroud with the slots on the system.
2. Lower the air shroud into the system until it is firmly seated.
   When firmly seated, the memory socket numbers marked on the air shroud align with the respective memory sockets.

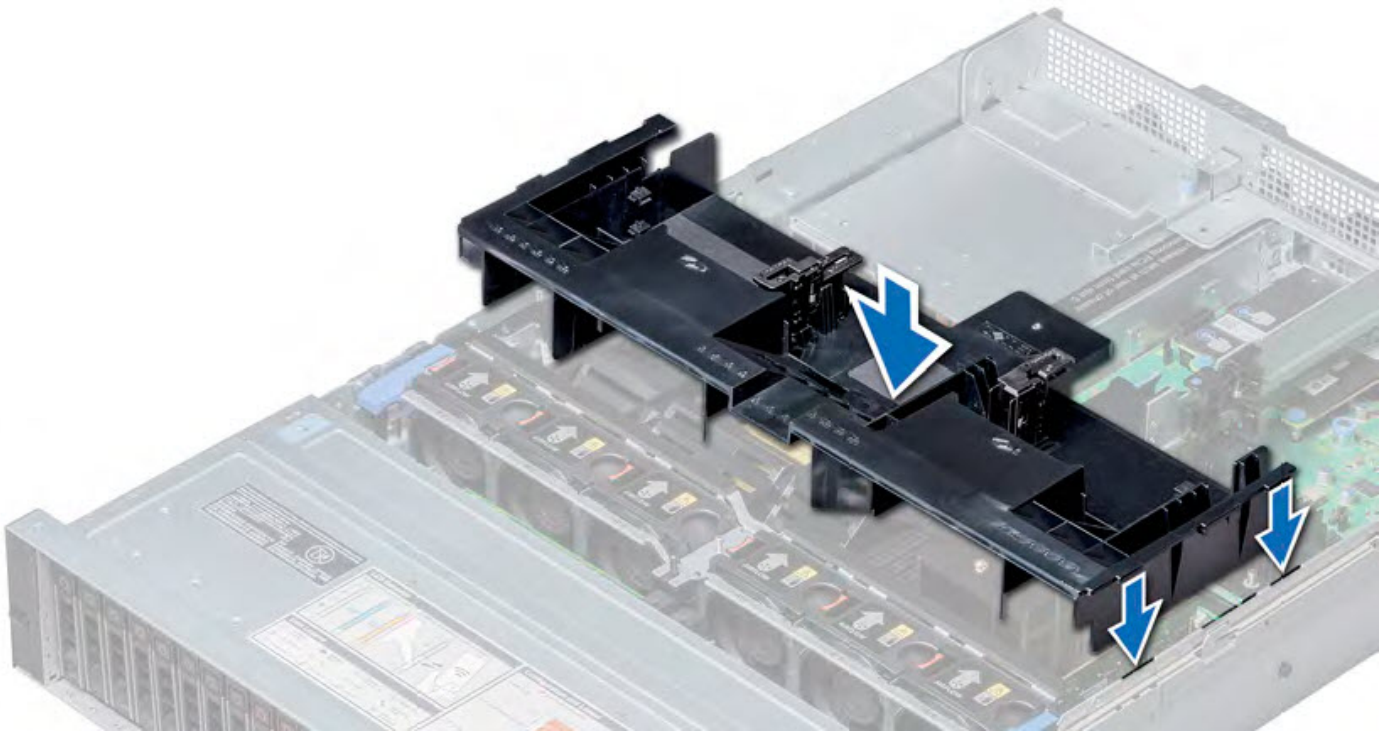


Figure 90. Installing the air shroud

Install the cooling fan assembly

Prerequisites

Follow the safety guidelines.

About this task

CAUTION: Ensure that the cables inside the system are correctly installed and retained by the cable retention bracket before installing the cooling fan assembly. Incorrectly installed cables may get damaged.

Steps

1. Align the guide rails on the cooling fan assembly with the standoffs on the system.
2. Lower the cooling fan assembly into the system until the cooling fan connectors engage with the connectors on the system board.
3. Press the release levers to lock the cooling fan assembly into the system.

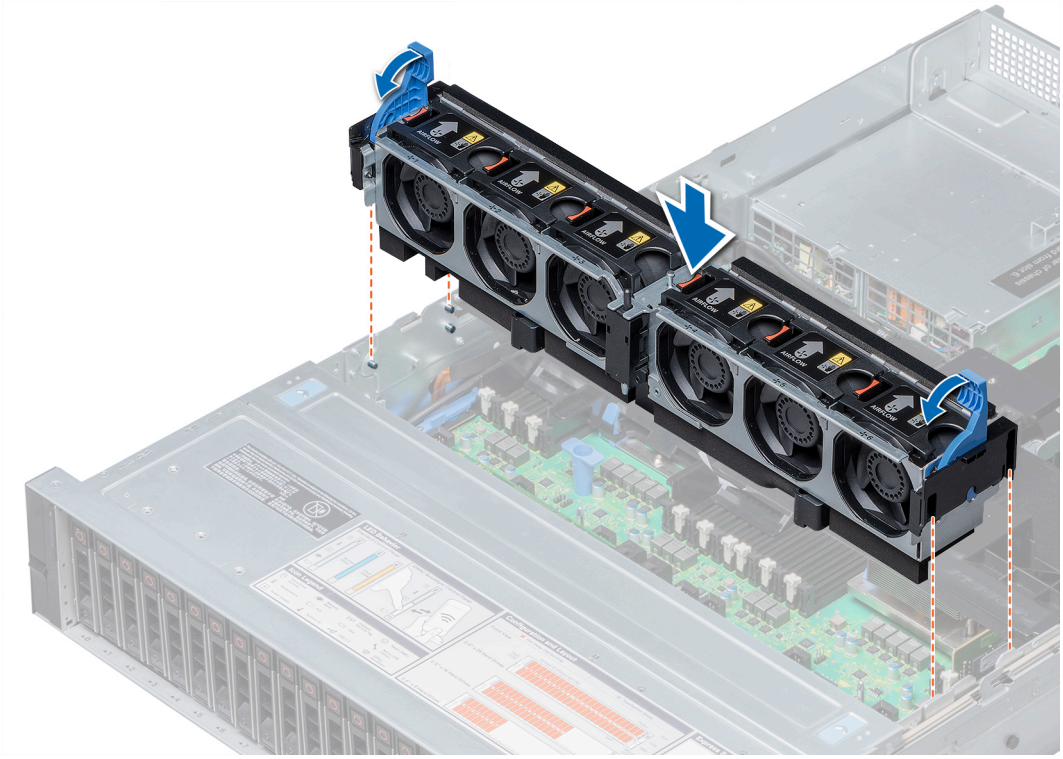


Figure 91. Installing the cooling fan assembly

Install the system cover

Prerequisites

Follow the safety guidelines.

Ensure that all internal cables are routed correctly and connected, and that no tools or extra parts are left inside the system.

Steps

1. Align the tabs on the system cover with the guide slots on the system.
2. Push the system cover latch down.
   The system cover slides forward, the tabs on the system cover engage with the guide slots on the system and the system cover latch locks into place.
3. Using a flat or Phillips head screwdriver, rotate the latch release lock clockwise to the locked position.

Install the hard drive

Prerequisites

Follow the safety guidelines listed in Safety instructions.

Steps

1. Press the release button on the front of the hard drive to open the release handle.
2. Insert the hard drive into the hard drive slot and slide until the hard drive connects with the backplane.
3. Close the hard drive release handle to lock the hard drive in place.

Figure 92. Installing a hard drive

Install the front bezel

Steps

1. Align and insert the right end of the bezel onto the system.
2. Press the release button and fit the left end of the bezel onto the system.
3. Lock the bezel by using the key.

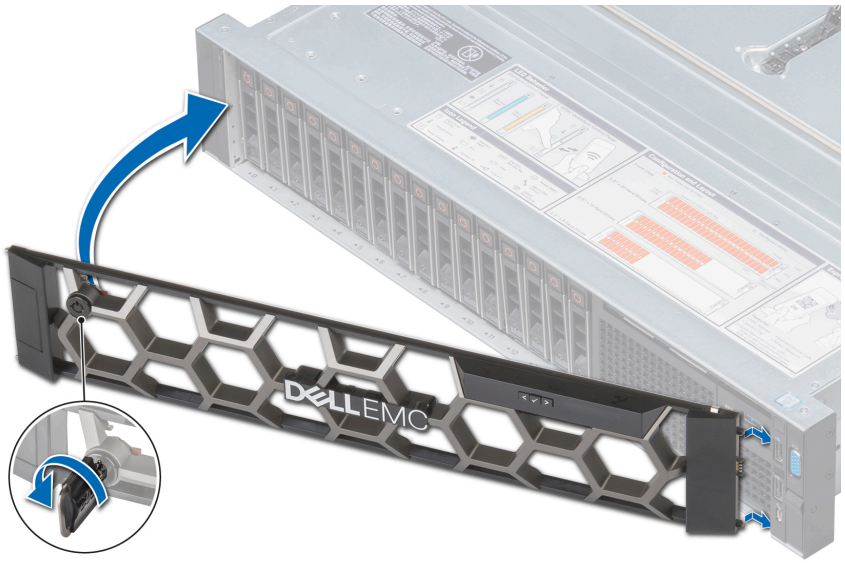


Figure 93. Installing the front bezel

Install the power supply unit

Prerequisites

Follow the safety guidelines listed in Safety instructions.

About this task

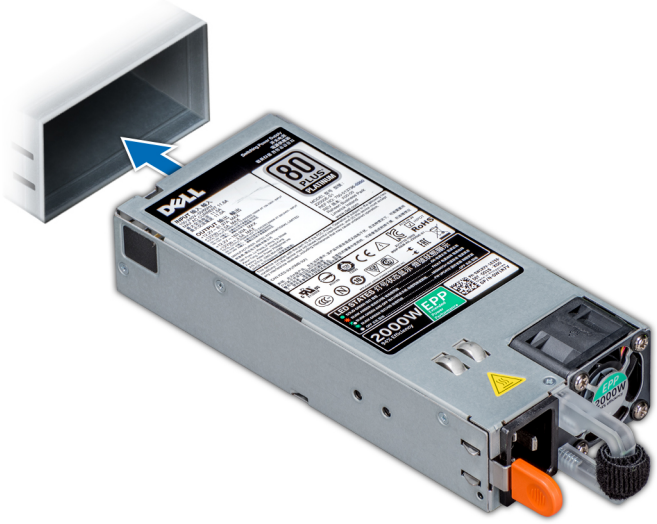
The technical white paper *Servicing and Replacing Power Supplies for DellEMC PowerEdge R940/R740/R740xd Systems with Single and Dual CMA Solutions* provides additional details about installing power supplies with the cable management arms installed on the back of the system.

Steps

1. Verify that nothing has dropped into the empty PSU slot before installing the replacement PSU.
2. Slide the PSU into the system until the PSU is fully seated and the release latch snaps into place.
3. Connect the power cable to the PSU, and plug the cable into a power outlet.

CAUTION: When connecting the power cable to the PSU, secure the cable to the PSU with the strap.

NOTE: When installing, hot swapping, or hot adding a new PSU, wait for 15 seconds for the system to recognize the PSU and determine its status. The PSU redundancy may not occur until discovery is complete. Wait until the new PSU is discovered and enabled before you remove the other PSU. The PSU status indicator turns green to signify that the PSU is functioning properly.



Install the system in the cabinet

In an angled drop-in design, inner (chassis) rails are attached to the sides of the system and then the system slides into the outer (cabinet) rails that are installed in the rack.

About this task

WARNING: The system is heavy. To avoid personal injury and/or damage to the equipment, do not attempt to install the system in a cabinet without a mechanical lift and/or help from another person.

Steps

1. Pull the inner rails out of the rack until they lock into place.
2. Release the inner rail lock by pulling forward on the white tabs and sliding the inner rail out of the intermediate rails.

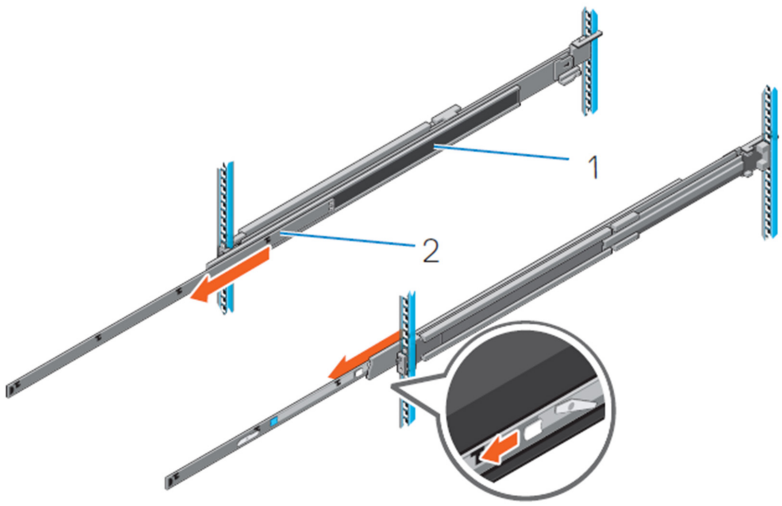


Figure 94. Pull out the intermediate rail

1. Intermediate rail
2. Inner rail

3. Attach the inner rails to the sides of the system by aligning the J-slots on the rail with the standoffs on the system and sliding forward on the system until they lock into place.

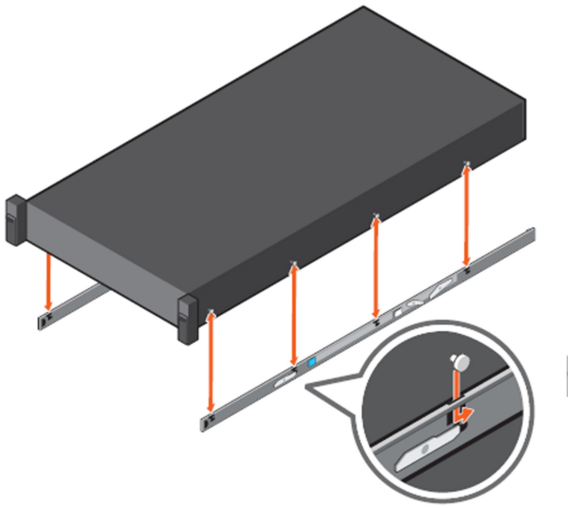


Figure 95. Attach the inner rails to the system

4. Verify all the J-slots on the rails are aligned with the rail standoffs on the system.

   CAUTION: Improper installation on the rails may damage the rails or cause the system to fall when extended.

5. With the intermediate rails extended, install the system into the extended rails.

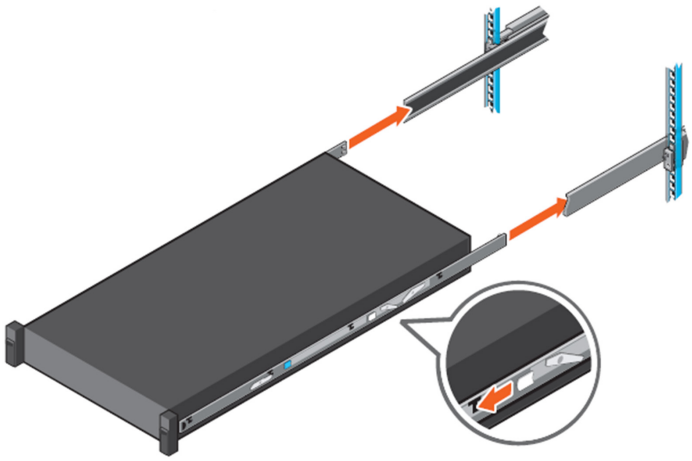


Figure 96. Install system into the extended rails

6. Pull the blue slide release lock tabs forward on both the rails, and slide the system into the rack.

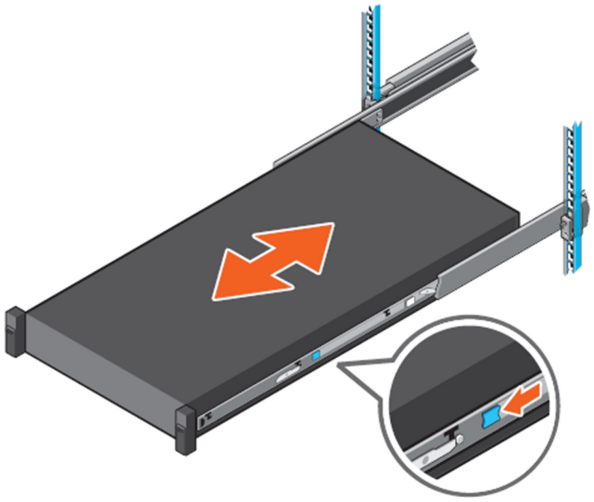


Figure 97. Slide system into the rack

Reconnect and power on the system

About this task

Complete the following steps to reconnect cables, power on the system, and reconnect a terminal session.

Steps

1. Use the cable labels to reconnect the cables in the same configuration as they were before starting the replacement procedure.

   CAUTION: When connecting SAS cables to the SAS cards, ensure there is sufficient slack in the cable to avoid unnecessary strain on the cable connector and the SAS card when the controller is fully extended from the rack.

2. Close the cable management arms.
3. Reconnect the serial console cable to the system serial port, and prepare the terminal session.
4. Reconnect the AC power cords to the power supplies.

   NOTE: The system may not power on automatically after plugging in the AC power cords.

5. If the system does not power on when the AC power cords were reconnected, press the power button on the right control panel at the front of the system.

6. When the system boots, log in as sysadmin.

Verify the system and perform a system headswap

Steps

1. If configuration details were captured before the procedure (see Preliminary and troubleshooting steps), confirm that the new system configuration is complete and accurate.
2. Run the `disk rescan` command to discover the disks.
   a. If all of the disks are not listed, perform another rescan.
   b. If all of the disks are still not listed, reboot the system.
3. Check the disk status by entering:

   The output should indicate:

   - The correct disks are seen.
   - The data storage is not configured.
   - The data storage is foreign storage and that there is a complete set of foreign storage available.
4. After verifying that the disks are visible by the replacement system as foreign devices, enter:

```
# system headswap
```

5. Log in again as `sysadmin`.
6. After the file system is up and running, verify the health of the file system by entering these two commands:

```
# filesys status
```

   NOTE: If the output of this command shows that the file system is down, attempt to enable the file system using the `filesys enable` command before entering the `filesys show space` command.

```
# filesys show space
```

7. If the host name of the system changes after the headswap procedure, modify the following as applicable:
   a. For systems using CIFS: Re-join the CIFS domain by issuing the command:

```
# cifs set authentication active-directory
domainname
```

   b. For systems with the Replication feature: Use the `replication modify` commands to update the hostname.
8. Because the system disks and network are moved from the old chassis to the new chassis, no changes are required for drive mappings or network settings. If such changes are required, however, use the details captured in Preliminary and troubleshooting steps to confirm the configuration. Refer also to the *DD OS System Controller Upgrade Guide* for more information.

Verify the system

About this task

When the system first boots after replacing the chassis, it displays a menu that prompts for permission to perform a headswap.

CAUTION: If a headswap is not performed, the system will not boot.

Steps

1. From the System Misconfigured menu, select **Show Head Swap Menu** > **Do a Head Swap**.
2. Select **Yes** at the confirmation prompt.
3. Run the `disk rescan` command to discover the disks.
   a. If all of the disks are not listed, perform another rescan.
   b. If all of the disks are still not listed, reboot the system.

4. Run the `disk show state` command.

```
# disk show state
Enclosure   Disk
             1  2  3  4  5  6  7  8  9  10 11 12 13 14 15
---------   ---------------------------------------------
1            O  O  O  O  O  O  O  O  O  O  O  O
2            O  O  O  O  O  O  O  O  O  O  O  O  O  O  O
3            O  O  O  O  O  O  O  O  O  O  O  O  O  O  O
---------   ---------------------------------------------

Legend   State           Count
------   -------------   -----
O        Foreign Disks   42
------   -------------   -----
Total 42 disks
```

The output should indicate:

- The correct disks are seen.
- The data storage is not configured.
- The data storage is foreign storage and that there is a complete set of foreign storage available.

5. Run the `system headswap` command.

NOTE: If a passphrase was configured on the original system, the command prompts for that in addition to the sysadmin password.

```
# system headswap
This command returns the system back to its prior operational
conditions. The system will be rebooted before
resuming normal operations.

If system passphrase was set on the old head, you will
need to do one of the following after headswap completes:
unlock the filesystem if you have encrypted data, or
set the system passphrase if you don't have encrypted data
Are you sure? (yes|no) [no]: yes

ok, proceeding.

Please enter sysadmin password to confirm 'system headswap':
Restoring the system configuration, do not power off / interrupt process ...

sysadmin@dd6400-203#
Broadcast message from root (Fri Oct 1 11:46:08 2021):

The system is going down for reboot NOW!
Connection to dd6400-203.datadomain.com closed by remote host.
Connection to dd6400-203.datadomain.com closed.
```

6. After the system reboots, run the `disk show state` command to verify the disks display correctly.

```
# disk show state
Enclosure   Disk
             1  2  3  4  5  6  7  8  9  10 11 12 13 14 15
---------   ---------------------------------------------
1            .  .  .  .  .  .  .  .  .  .  .  .
2            s  .  .  .  .  .  .  .  .  .  .  .  .  .  .
3            .  .  .  .  .  .  .  .  .  .  .  .  .  .  s
---------   ---------------------------------------------

Legend   State           Count
------   -------------   -----
.        In Use Disks    40
s        Spare Disks     2
------   -------------   -----
Total 42 disks
```

7. Run the `filesys status` command to determine if the file system is enabled.
8. If the file system is disabled, run the `filesys enable` command to bring the file system online.
9. Run the `filesys show space` command to verify the file system shows the correct amount of capacity.

10. If configuration details were captured before the procedure, confirm that the new system configuration is complete and accurate.

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Replace the Bezel

Complete the following procedure to replace the bezel.

This CRU can be completed with the system powered on.

Topics:

Remove the front bezel to access front panel hard drives

Steps

1. Unlock the bezel by using the bezel key.
2. Press the release button, and pull the left end of the bezel.
3. Unhook the right end, and remove the bezel.

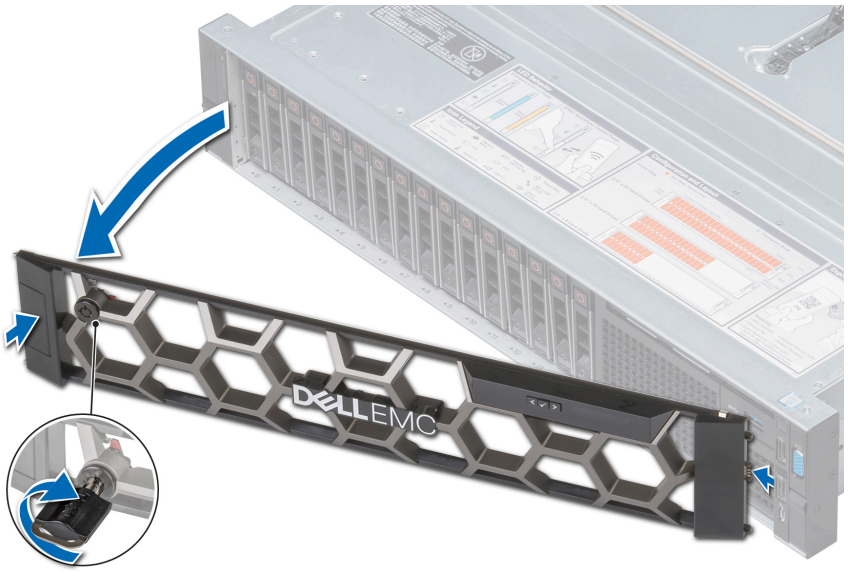


Figure 98. Removing the front bezel

Install the front bezel

Steps

1. Align and insert the right end of the bezel onto the system.
2. Press the release button and fit the left end of the bezel onto the system.
3. Lock the bezel by using the key.

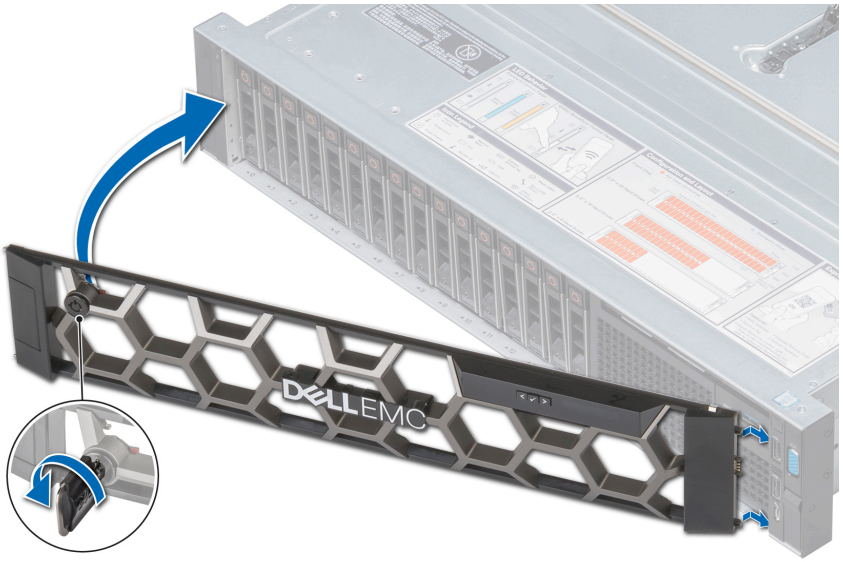


Figure 99. Installing the front bezel

16

Replace the Rail Kit

CAUTION: Improper installation on the rails may damage the rails or cause the system to fall when extended. When extending the system from the rack, pull outward slowly and verify the system is properly installed on the rails.

Complete the following procedure to replace the rail kit.

This CRU is not hot-swappable, and requires a system shutdown to replace.

Topics:

Shut down and disconnect the system

Prerequisites

Establish a connection to the system.

About this task

Complete the following steps to shut down and disconnect the system.

Steps

1. Stop the system using the `system poweroff` command to allow the proper shut down of the file system and other system components. The power down process takes approximately five minutes to complete. The `system poweroff` command immediately turns the front panel blue LED to amber, and is complete when the front panel LED turns off.

   NOTE: The system fans still run, and NIC port LEDs still flash after running the `system poweroff` command.

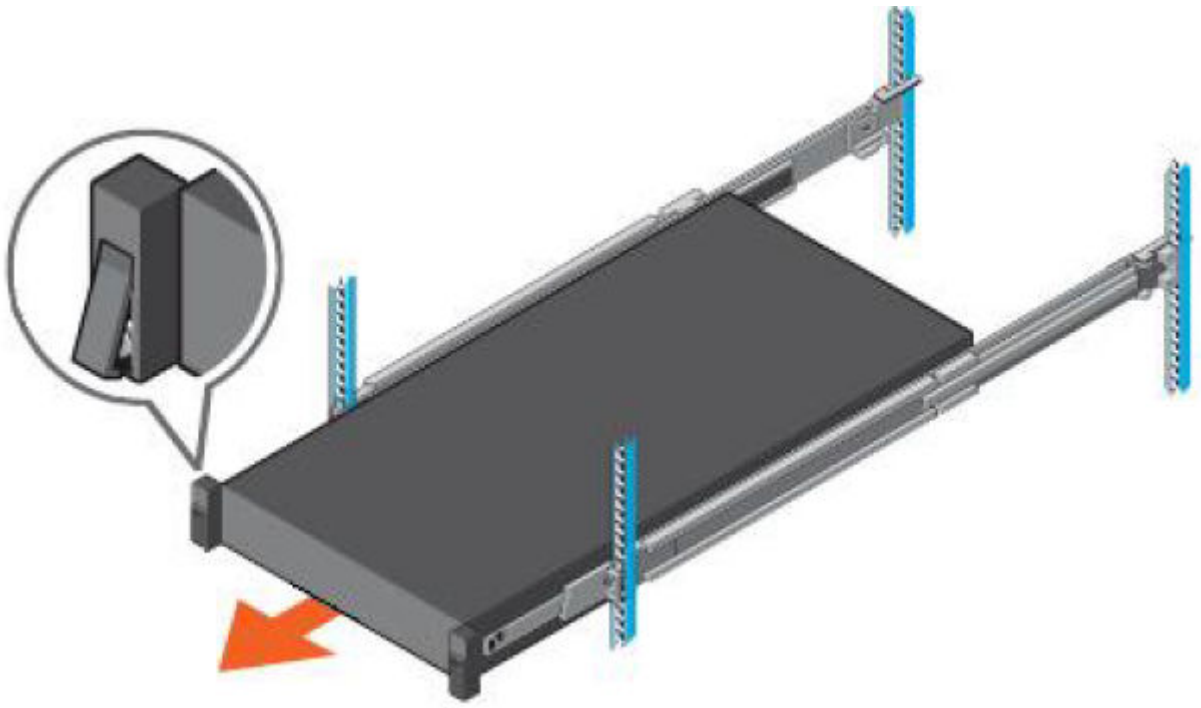
2. Open the cable management arms.
3. Label each of the cables as to their connection location. Taking a photograph for reference is also helpful for re-connecting the cables.
4. Disconnect the AC power cords from the rear of the system.
5. Disconnect all network and FC cables from the rear of the system.
6. Disconnect all SAS cables from the rear of the system.
7. Disconnect the serial console cable.

Extend the system from the cabinet

Use this procedure to extend the system from the cabinet so that you can remove the system cover to access the internal FRU components, or to remove the system from the cabinet.

Steps

1. At the front of the cabinet, locate the two slam latches on the left and right sides of the system. Pull the slam latches up to release the system from the cabinet. If the slam latches do not disengage, loosen the screw under each latch.
2. Using the slam latches, pull the system from the cabinet until the rails lock in the extended position.



Identifying the rail kit components

The 2U sliding rail assemblies allow the server to be secured in the cabinet, and extended from the cabinet so that the system cover can be removed to access the internal FRUs.

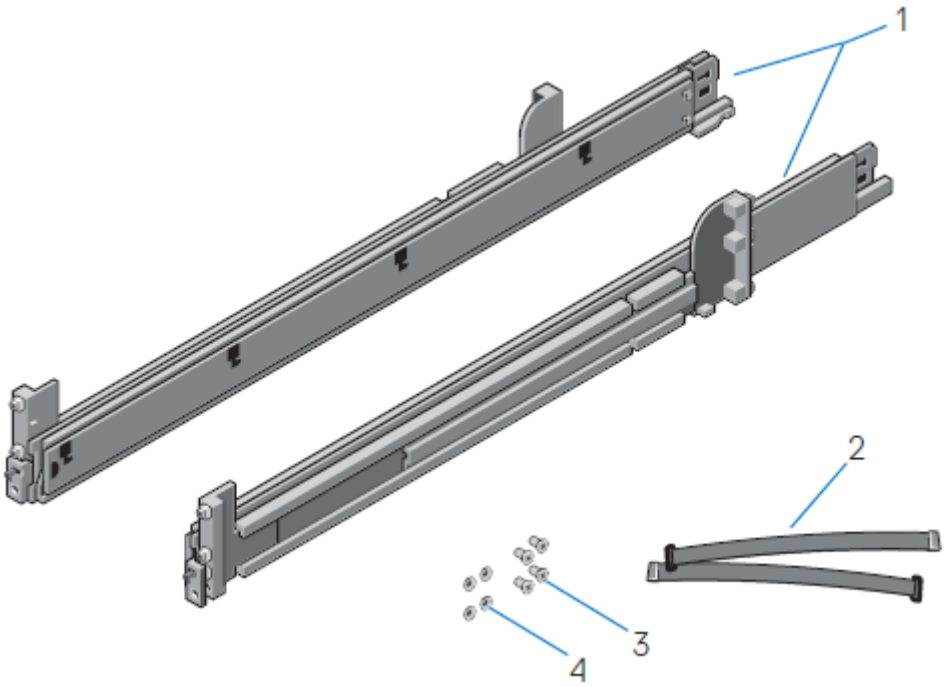


Figure 100. Sliding rail assembly - 2U systems

1. Sliding rail (2)
2. Velcro strap (2)
3. Screw (4)
4. Washer (4)

The rails are compatible with racks with square holes, unthreaded round holes, and threaded round holes.

The CMA assembly consists of one articulated arm, and one separator.

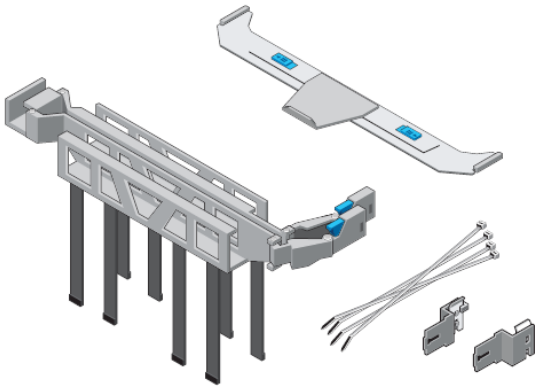


Figure 101. CMA arm and separator

Remove the system from the cabinet

Steps

1. At the front of the cabinet, locate the two slam latches on left and right side of the system. Pull the slam latches up to release the system from the cabinet. If the slam latches do not disengage, loosen the screw under each latch.
2. Using the slam latches, pull the system from the cabinet until the rails lock in the extended position.

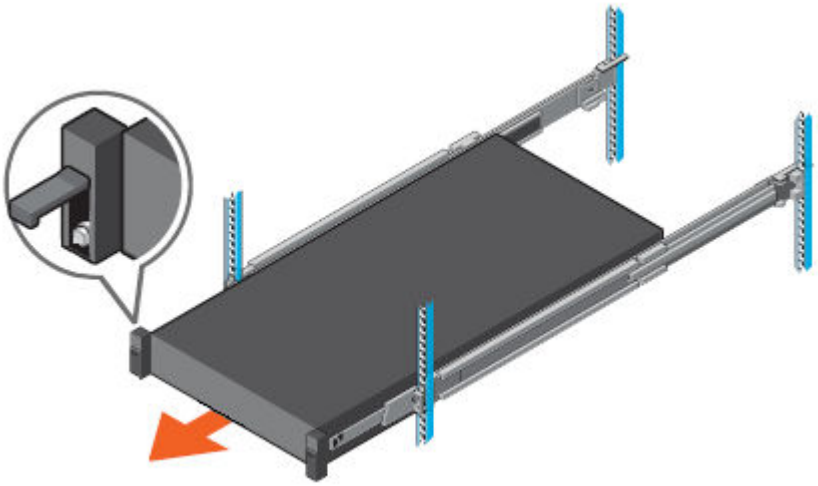


Figure 102. Release and extend system from cabinet

3. Locate the lock levers on the sides of the inner rails (1). Unlock each lever by rotating it up to its release position (2). Grasp the sides of the system (3) firmly and pull it forward until the standoffs are at the front of the J-slots in the rails. Lift the system up and away from the rails.

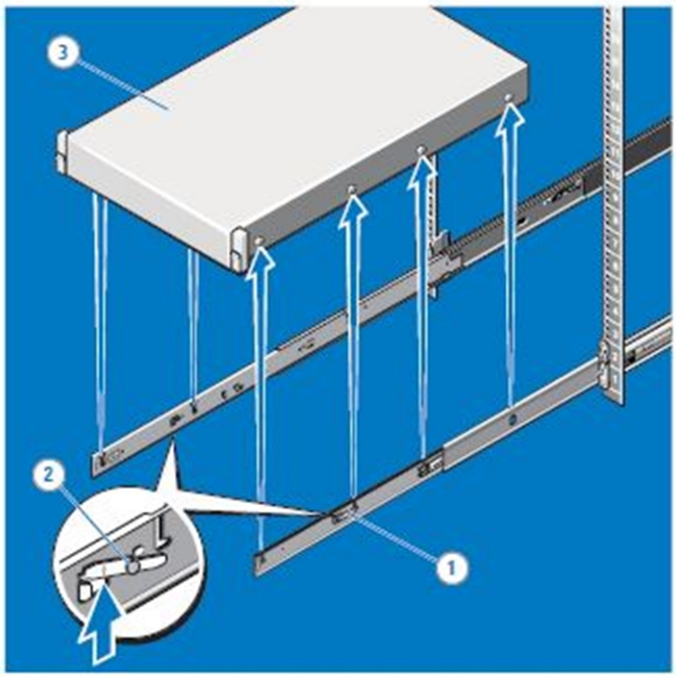


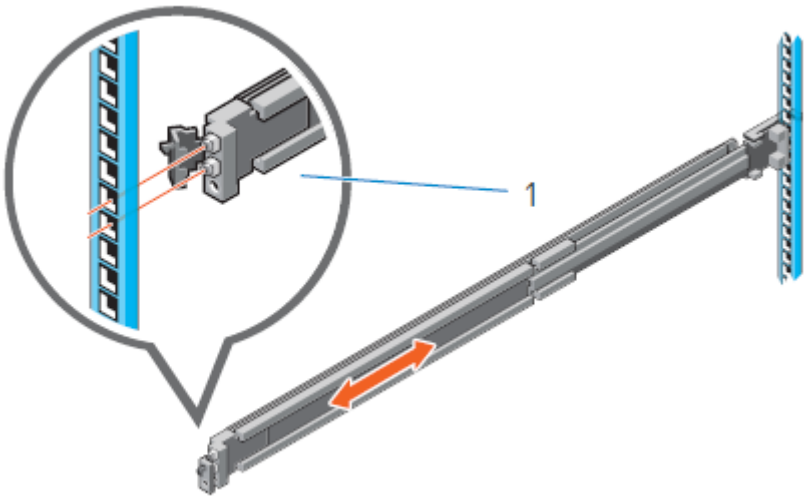
Figure 103. Removing system from rails

4. Place the system on a suitable work surface. Ensure the work surface(s) is capable of supporting the weight.

Removing the rails

Steps

1. Open the front latch and disengage the rail from the flange.



2. Pull the entire rail forward to release the rear end of the rail from the flange.

Remove the original CMA brackets

About this task

The system rails may ship with CMA brackets already attached. If the brackets are attached, they must be removed.

Steps

1. Remove the two screws holding the CMA bracket to the rail.

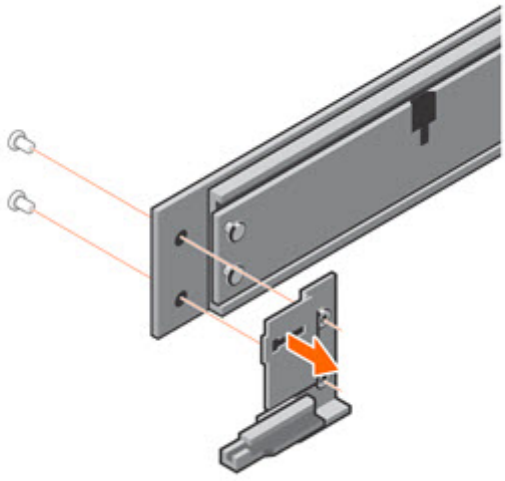


Figure 104. Remove the original CMA bracket

2. Repeat the previous step for the second rail.

Attach the new CMA brackets

About this task

The brackets are labeled left and right, and cannot be interchanged. The top of each bracket is labeled **Up**.

Steps

1. Use the included screws to install the outer bracket to the rail.

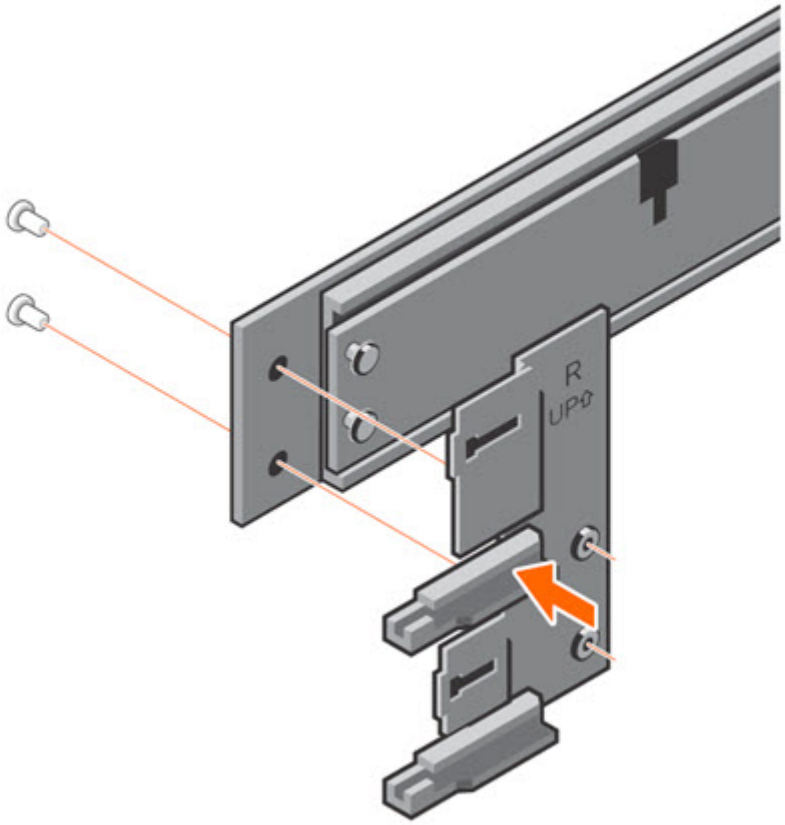


Figure 105. Attach outer CMA bracket to the rails

2. Align the hole of the inner bracket and push down to attach it to the rail.

   NOTE: Some pressure is required to push the inner bracket down and secure it. The bracket clicks when it locks in place.

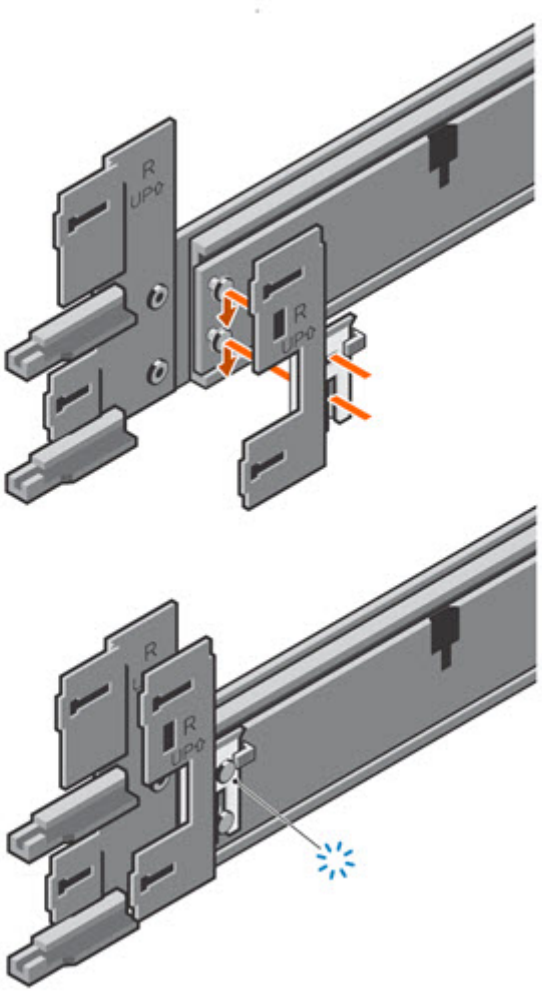


Figure 106. Attach inner CMA bracket to the rails

3. Repeat the preceding steps to attach the outer and inner brackets to the other rail.

Install the rails

About this task

The rails are labeled left and right, and cannot be interchanged. The front side of each rail is labeled **Left Front** or **Right Front** when viewed from the cabinet front.

Steps

1. Determine where to mount the system, and use masking tape or a felt-tip pen to mark the location at the front and back of the cabinet.

   NOTE: Install the left rail assembly first.

2. Fully extend the rear sliding bracket of the rail.
3. Position the rail end piece labeled **Left Front** facing inward and orient the rear end piece to align with the holes on the rear cabinet flanges.
4. Push the rail straight toward the rear of the rack until the latch locks in place.

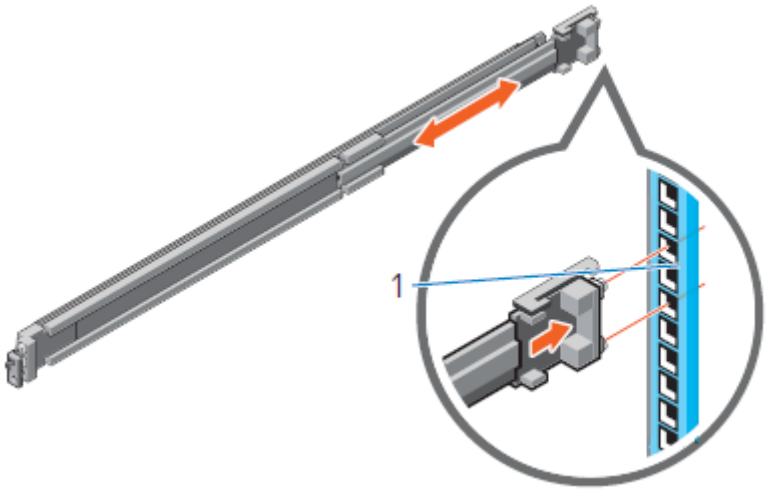


Figure 107. Installing the rear end of the rail

5. For the front end piece, rotate the latch outward and pull the rail forward until the pins slide into the flange, and release the latch to secure the rail in place.

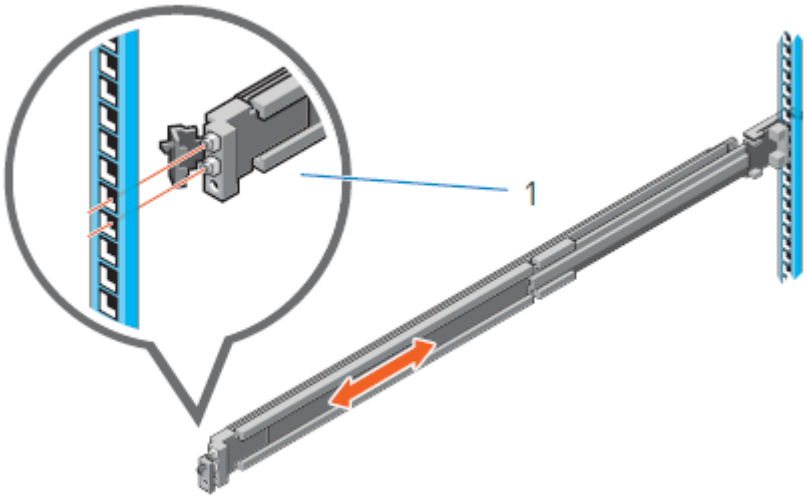


Figure 108. Installing the front end of the rail

6. Repeat the preceding steps to install the right rail assembly.

Secure the rail assemblies to the cabinet

The supplied screws and washers are used to secure the rail assemblies to the front and rear of the cabinet.

About this task

NOTE: For square hole cabinets, install the supplied conical washer before installing the screw. For unthreaded round hole cabinets, install only the screw without the conical washer.

Steps

1. Align the screws with the designated U spaces on the front and rear rack flanges.
   Ensure that the screw holes on the tab of the system retention bracket are seated on the designated U spaces.

2. Insert and tighten the two screws using the Phillips #2 screwdriver.

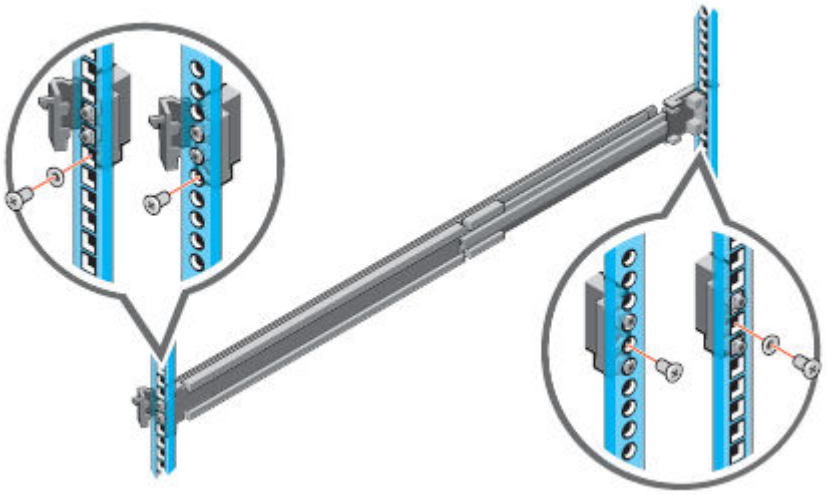


Figure 109. Installing screws

Install the system in the cabinet

In an angled drop-in design, inner (chassis) rails are attached to the sides of the system and then the system slides into the outer (cabinet) rails that are installed in the rack.

About this task

WARNING: The system is heavy. To avoid personal injury and/or damage to the equipment, do not attempt to install the system in a cabinet without a mechanical lift and/or help from another person.

Steps

1. Pull the inner rails out of the rack until they lock into place.
2. Release the inner rail lock by pulling forward on the white tabs and sliding the inner rail out of the intermediate rails.

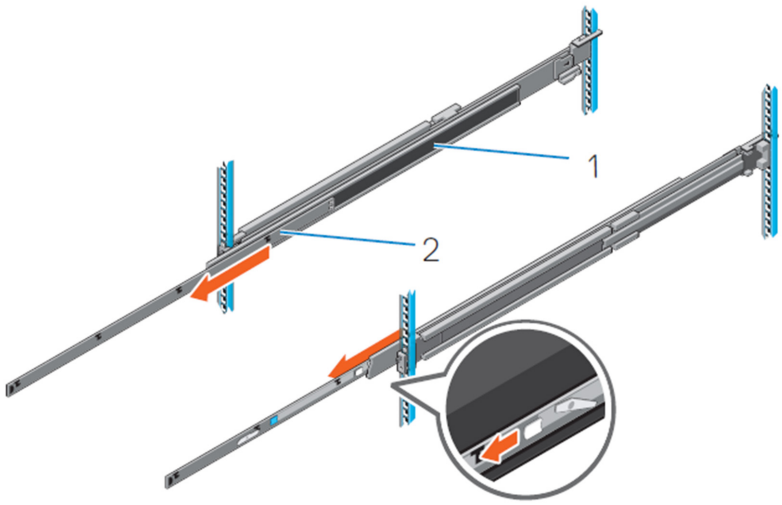


Figure 110. Pull out the intermediate rail

1. Intermediate rail
2. Inner rail

3. Attach the inner rails to the sides of the system by aligning the J-slots on the rail with the standoffs on the system and sliding forward on the system until they lock into place.

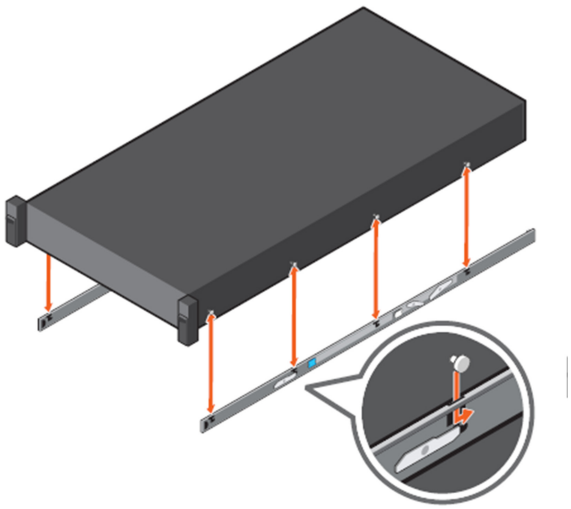


Figure 111. Attach the inner rails to the system

4. Verify all the J-slots on the rails are aligned with the rail standoffs on the system.

   CAUTION: Improper installation on the rails may damage the rails or cause the system to fall when extended.

5. With the intermediate rails extended, install the system into the extended rails.

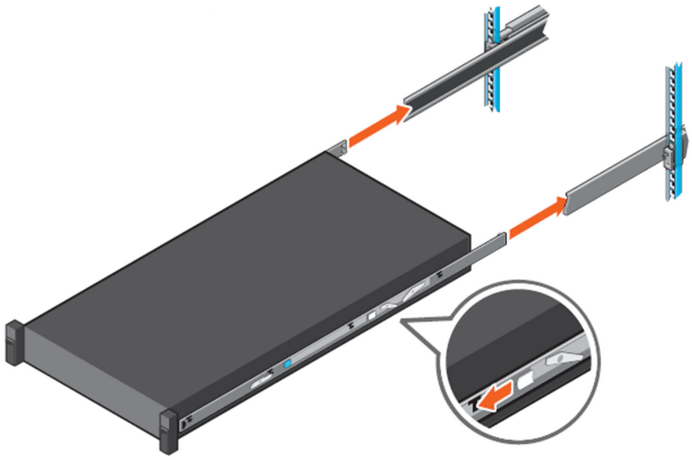


Figure 112. Install system into the extended rails

6. Pull the blue slide release lock tabs forward on both the rails, and slide the system into the rack.

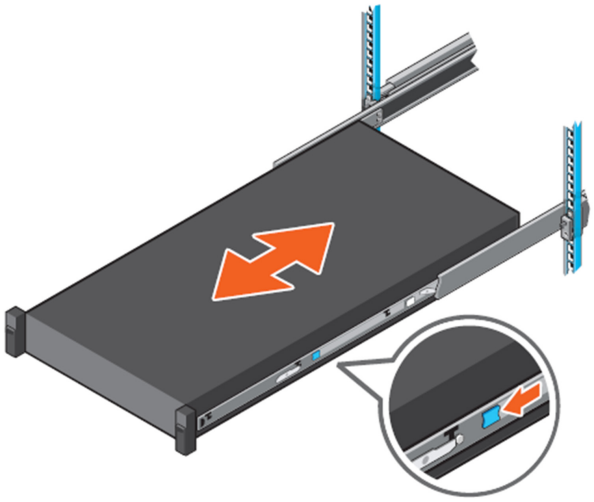


Figure 113. Slide system into the rack

Install the CMA arm

Steps

1. Install the separator on the bracket.

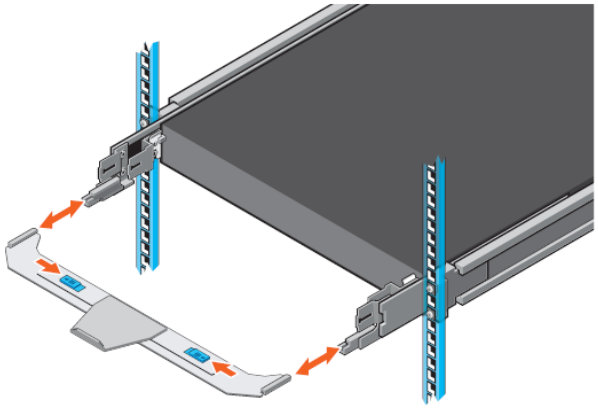


Figure 114. Install the seperator

2. Install the arm on the right side of the chassis, on top of the separator with the open side up.

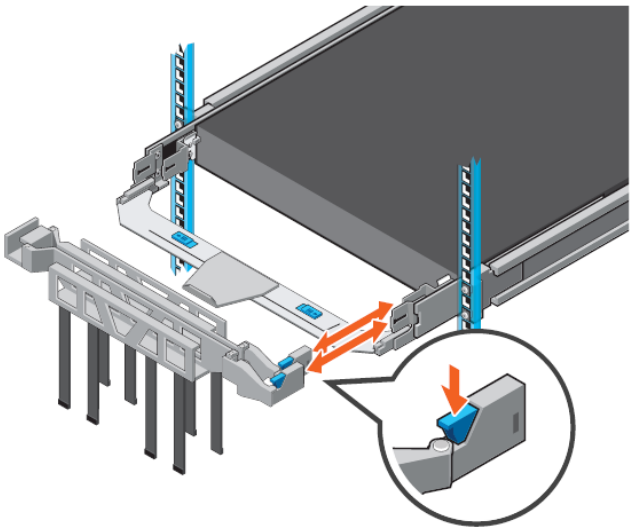


Figure 115. Install the arm

3. Close the arm by connecting it to the bracket on the left side of the chassis.

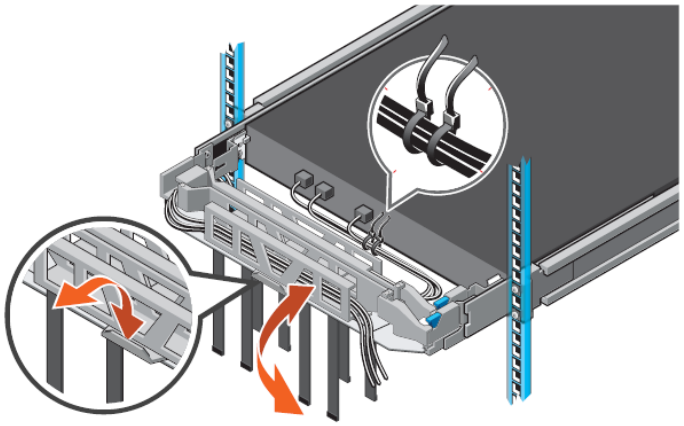
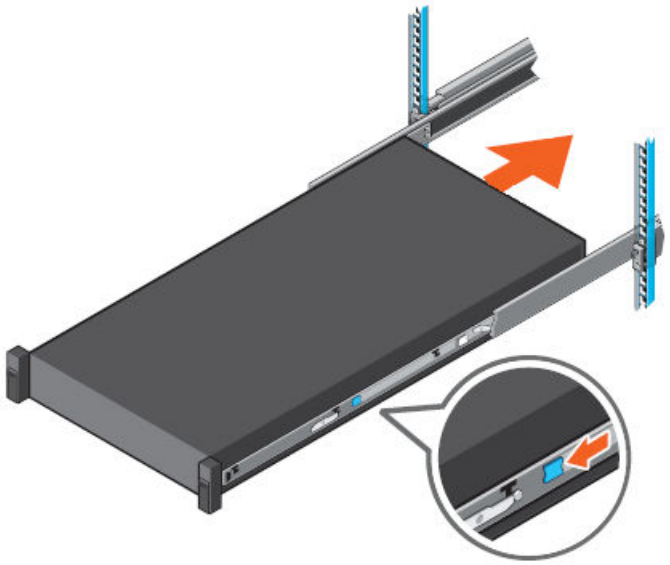


Figure 116. Close the arm

Slide the system into the cabinet

Steps

1. At the front of the cabinet, push the system inward until the lock levers click into place.
2. Push the blue slide release lock tabs forward on both rails and slide the system into the cabinet. The slam latches will engage to secure the system in the cabinet.



Reconnect and power on the system

About this task

Complete the following steps to reconnect cables, power on the system, and reconnect a terminal session.

Steps

1. Use the cable labels to reconnect the cables in the same configuration as they were before starting the replacement procedure.

   CAUTION: When connecting SAS cables to the SAS cards, ensure there is sufficient slack in the cable to avoid unnecessary strain on the cable connector and the SAS card when the controller is fully extended from the rack.

2. Close the cable management arms.
3. Reconnect the serial console cable to the system serial port, and prepare the terminal session.
4. Reconnect the AC power cords to the power supplies.

   NOTE: The system may not power on automatically after plugging in the AC power cords.

5. If the system does not power on when the AC power cords were reconnected, press the power button on the right control panel at the front of the system.

6. When the system boots, log in as sysadmin.

17

Add a PCIe HBA

CAUTION: Improper installation on the rails may damage the rails or cause the system to fall when extended. When extending the system from the rack, pull outward slowly and verify the system is properly installed on the rails.

The system has up to four available slots to install optional PCIe HBAs for network or FC connectivity.

Complete the following procedure to add an HBA.

This upgrade requires a system shutdown to replace.

CAUTION: A module that is hot-inserted into the system remains powered off until the next system reboot.

Topics:

Adding a PCIe HBA

The system provides up to four slots to add additional HBAs for network or FC connectivity. Slots 1, 5, 7, and 8 are available for adding PCIe HBAs. The slot layout and assignments are as follows:

Figure 117. Slot numbering

Table 5. Slot assignments

Description	Slot
QLogic 2692, 2 x 16G FC, PCIe Full Height	1
Intel XXV710, 2 x 10/25GbE SFP28, PCIe Full Height	5, 7, 8
Intel X710, 4 x 10GbE SFP+, PCIe Full Height	5, 7, 8
Intel X710, 4 x 10GBT, PCIe Full Height	5, 7, 8

Shut down and disconnect the system

Prerequisites

Establish a connection to the system.

About this task

Complete the following steps to shut down and disconnect the system.

Steps

1. Stop the system using the `system poweroff` command to allow the proper shut down of the file system and other system components. The power down process takes approximately five minutes to complete. The `system poweroff` command immediately turns the front panel blue LED to amber, and is complete when the front panel LED turns off.

   NOTE: The system fans still run, and NIC port LEDs still flash after running the `system poweroff` command.

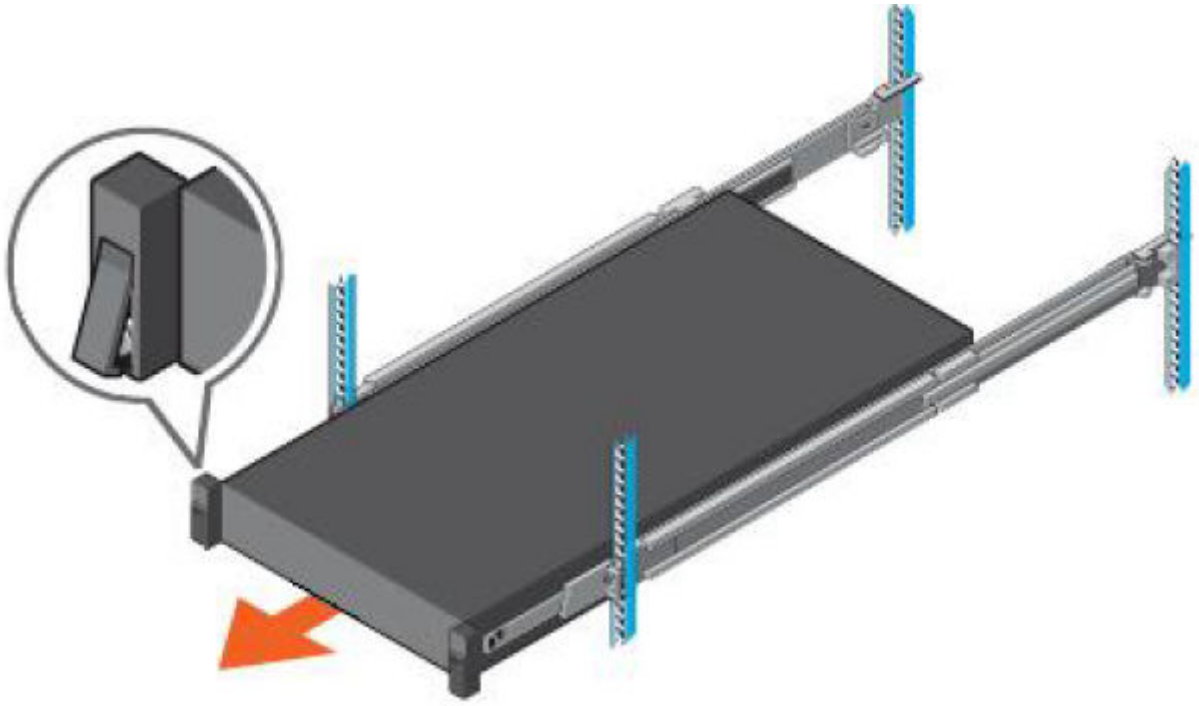
2. Open the cable management arms.
3. Label each of the cables as to their connection location. Taking a photograph for reference is also helpful for re-connecting the cables.
4. Disconnect the AC power cords from the rear of the system.
5. Disconnect all network and FC cables from the rear of the system.
6. Disconnect all SAS cables from the rear of the system.
7. Disconnect the serial console cable.

Extend the system from the cabinet

Use this procedure to extend the system from the cabinet so that you can remove the system cover to access the internal FRU components, or to remove the system from the cabinet.

Steps

1. At the front of the cabinet, locate the two slam latches on the left and right sides of the system. Pull the slam latches up to release the system from the cabinet. If the slam latches do not disengage, loosen the screw under each latch.
2. Using the slam latches, pull the system from the cabinet until the rails lock in the extended position.



Remove the system cover

Steps

1. Using a flat or a Phillips head screwdriver, rotate the latch release lock counter clockwise to the unlocked position.
2. Lift the latch till the system cover slides back and the tabs on the system cover disengage from the guide slots on the system.
3. Hold the cover on both sides, and lift the cover away from the system.

Figure 118. Remove the system cover

Install expansion card into expansion card riser

Prerequisites

Follow the safety guidelines listed in Safety instructions.

About this task

NOTE: When installing a card into riser 2 or 3, open the PCIe card holder latch.

Steps

1. Pull the expansion card latch.
2. If installed, remove the filler bracket.

   NOTE: Store the filler bracket for future use. Filler brackets must be installed in empty expansion card slots to maintain Federal Communications Commission (FCC) certification of the system. The brackets also keep dust and dirt out of the system and aid in proper cooling and airflow inside the system.

3. Hold the card by its edges, and align the card edge connector with the expansion card connector on the riser.
4. Insert the card edge connector firmly into the expansion card connector until the card is fully seated.
5. Push the expansion card latch.

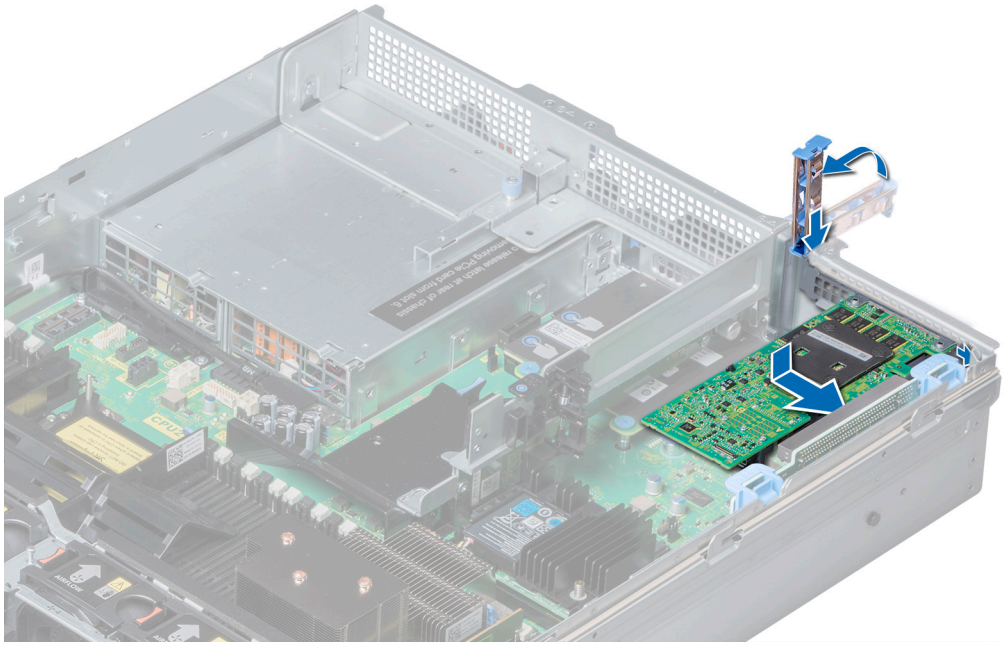


Figure 119. Installing expansion card into expansion card riser 1

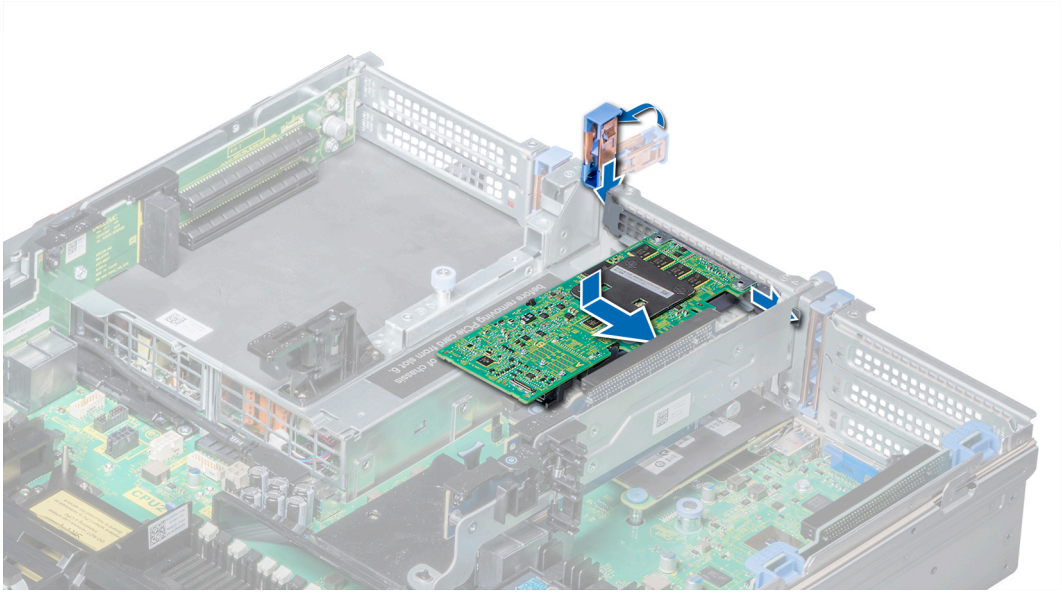


Figure 120. Installing expansion card into expansion card riser 2

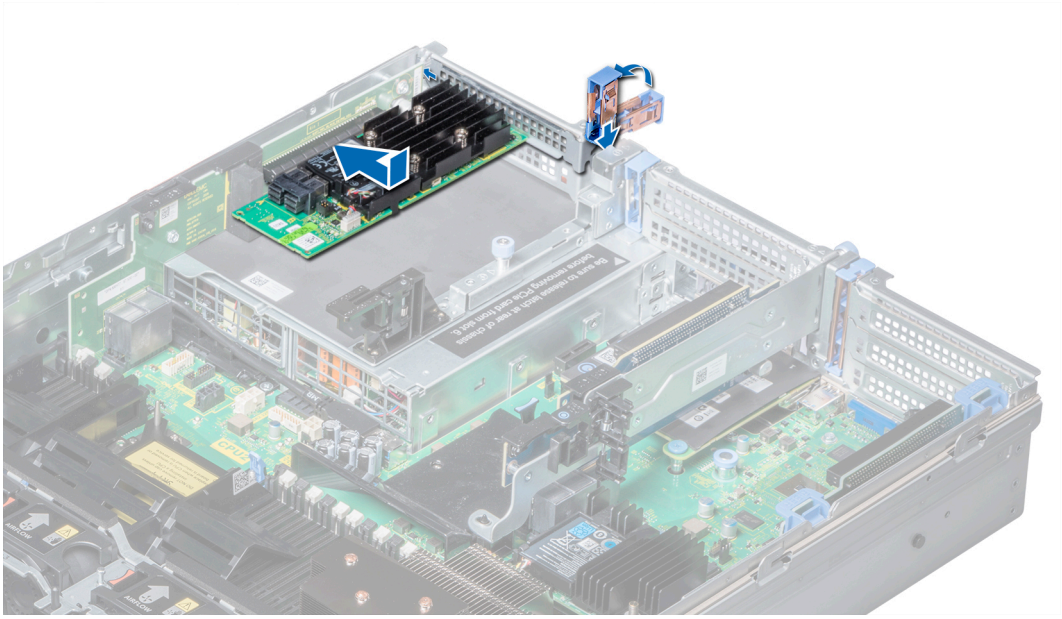


Figure 121. Installing expansion card into expansion card riser 3

Install the system cover

Prerequisites

Follow the safety guidelines.

Ensure that all internal cables are routed correctly and connected, and that no tools or extra parts are left inside the system.

Steps

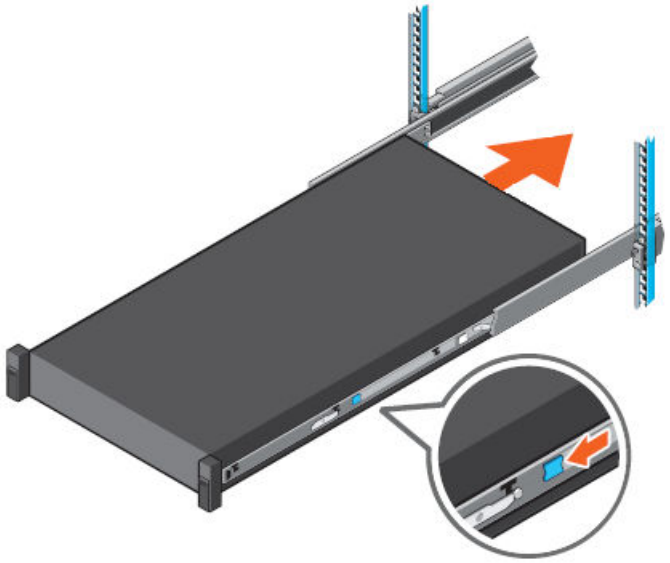
1. Align the tabs on the system cover with the guide slots on the system.
2. Push the system cover latch down.
   The system cover slides forward, the tabs on the system cover engage with the guide slots on the system and the system cover latch locks into place.

3. Using a flat or Phillips head screwdriver, rotate the latch release lock clockwise to the locked position.

Slide the system into the cabinet

Steps

1. At the front of the cabinet, push the system inward until the lock levers click into place.
2. Push the blue slide release lock tabs forward on both rails and slide the system into the cabinet. The slam latches will engage to secure the system in the cabinet.



Reconnect and power on the system

About this task

Complete the following steps to reconnect cables, power on the system, and reconnect a terminal session.

Steps

1. Use the cable labels to reconnect the cables in the same configuration as they were before starting the replacement procedure.

   CAUTION: When connecting SAS cables to the SAS cards, ensure there is sufficient slack in the cable to avoid unnecessary strain on the cable connector and the SAS card when the controller is fully extended from the rack.

2. Close the cable management arms.
3. Reconnect the serial console cable to the system serial port, and prepare the terminal session.
4. Reconnect the AC power cords to the power supplies.

   NOTE: The system may not power on automatically after plugging in the AC power cords.

5. If the system does not power on when the AC power cords were reconnected, press the power button on the right control panel at the front of the system.

6. When the system boots, log in as sysadmin.

Configure the new PCIe HBA

About this task

Complete the following steps to verify and configure the new PCIe HBA.

Steps

1. Connect cables to the new HBA.
2. Use the `system show hardware` command and confirm that all PCIe HBAs appear.

```
# system show hardware
```

3. Use the `alerts show current` command and confirm no alerts are present on the system.

```
# alerts show current
No active alerts.
```

Configure a new Fibre Channel HBA

Steps

1. Use the `scsitarget enable` command to enable the SCSI target services.
2. Use the `system show ports` command to verify the FC module appears in the list.
3. Use the `scsitarget port show list` command to verify all four FC ports are enabled.

4. Use the `alerts show current` (or `alerts show current-detailed`) command.

```
# alerts show current
No active alerts
```

Configure a new Ethernet HBA

Steps

1. Use the `enclosure show io-cards` command to verify the Ethernet HBA appears in the list.
2. Use the **`net config eth<X>a <IP-address>`** command to set the IP address for the first port on the new HBA, where <*X*> is the slot where the HBA is installed.

   NOTE: The *DD OS Command Reference Guide* provides additional details and options for the `net config` command.

3. Repeat the `net config` command for each port on the Ethernet HBA.

   NOTE: Dual port cards have ports eth<*X*>a and eth<*X*>b, while four part cards have ports eth<*X*>a eth<*X*>b, eth<*X*>c, and eth<*X*>d, where <*X*> is the slot where the HBA is installed.

4. Use the `net show settings` command to verify the HBA configuration is properly set.
5. Use the `alerts show current` (or `alerts show current-detailed`) command.

```
# alerts show current
No active alerts
```