Dell PowerEdge C6320p

Owner's Manual

Regulatory Model: B08S Series
Regulatory Type: B08S004
October 2020
Rev. A03

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.

Contents

1

Dell PowerEdge C6320p overview

The Dell PowerEdge C6300 is an ultra-dense 2U enclosure that can support up to four independent single-socket (1S) sleds connected to a direct backplane that supports twenty four 2.5-inch hard drives and two hot plug power supply units. Each PowerEdge C6320p sled has the following features:

- Each sled features an Intel Xeon Phi 72XX or 72XXF processor with 64, 68, or 72 cores
- Each processor features a 16 GB MCDIMM
- Support for up to six DDR4 LRDIMM or RDIMM memory modules
- Each sled supports six 2.5-inch hard drives or Solid State Drives.
- Intel C612 chipset for I/O connectivity
- Each sled has the integrated iDRAC8 express systems management with a dedicated RJ45 management port
- Each sled has an embedded 1 Gigabit Ethernet controller (RJ45)
- Optional integrated Mellanox ConnectX-4 VPI EDR / 100 GbE Port

WARNING: Sleds using the Intel Xeon Phi 72XX and Phi 72XXF processors must not be installed in the same enclosure.

NOTE: Mixing the PowerEdge C6320 and PowerEdge C6320p sleds in the same PowerEdge C6300 enclosure is not supported.

Topics:

Supported configurations for PowerEdge C6300 enclosure and C6320p sled

The Dell PowerEdge C6300 enclosure supports the following configurations:

Figure 1. Supported configurations for C6300

The Dell PowerEdge C6320p sled supports the following configurations:

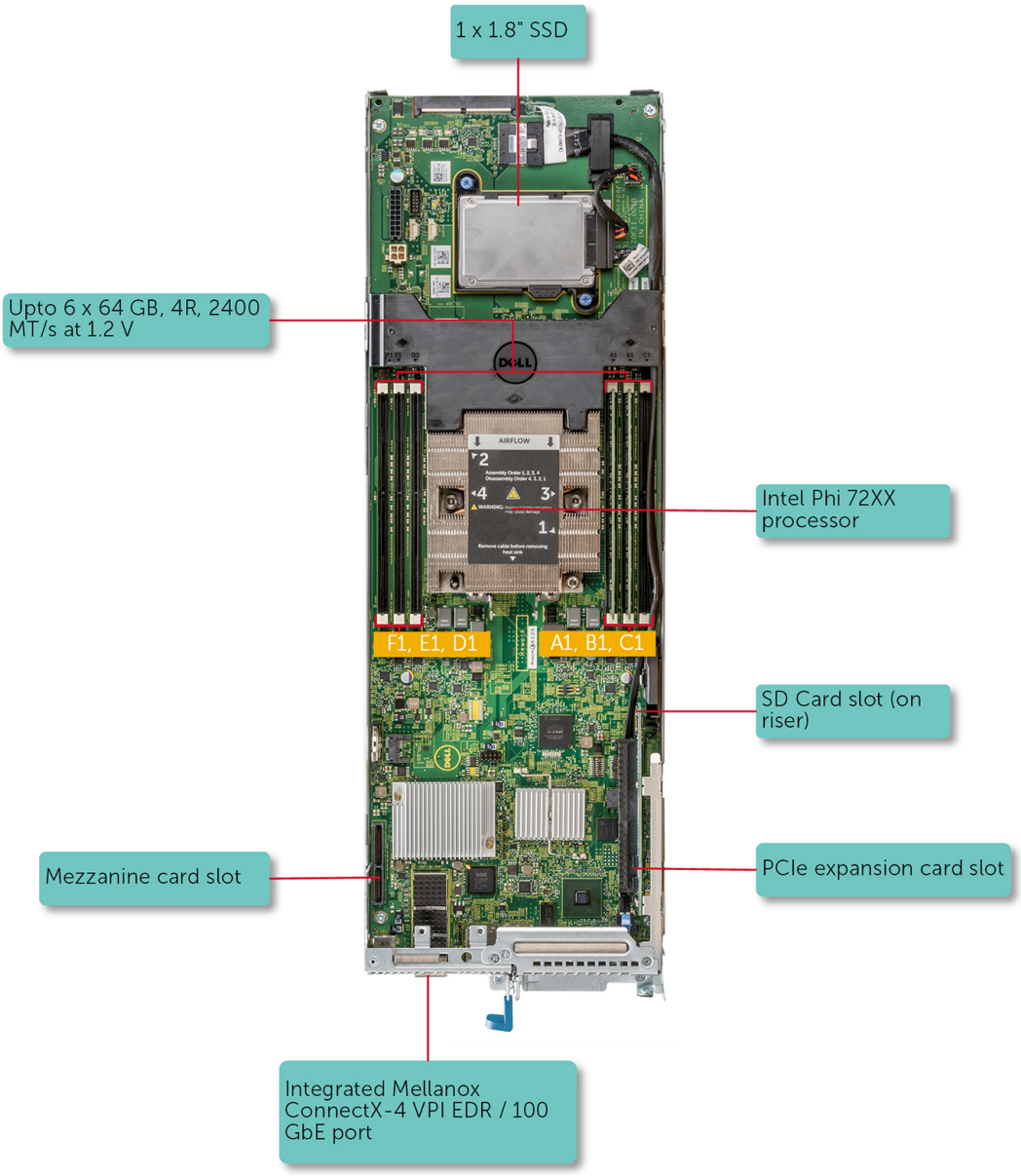

Figure 2. Supported configuration for the C6320p sled with an Intel Phi 72xx processor

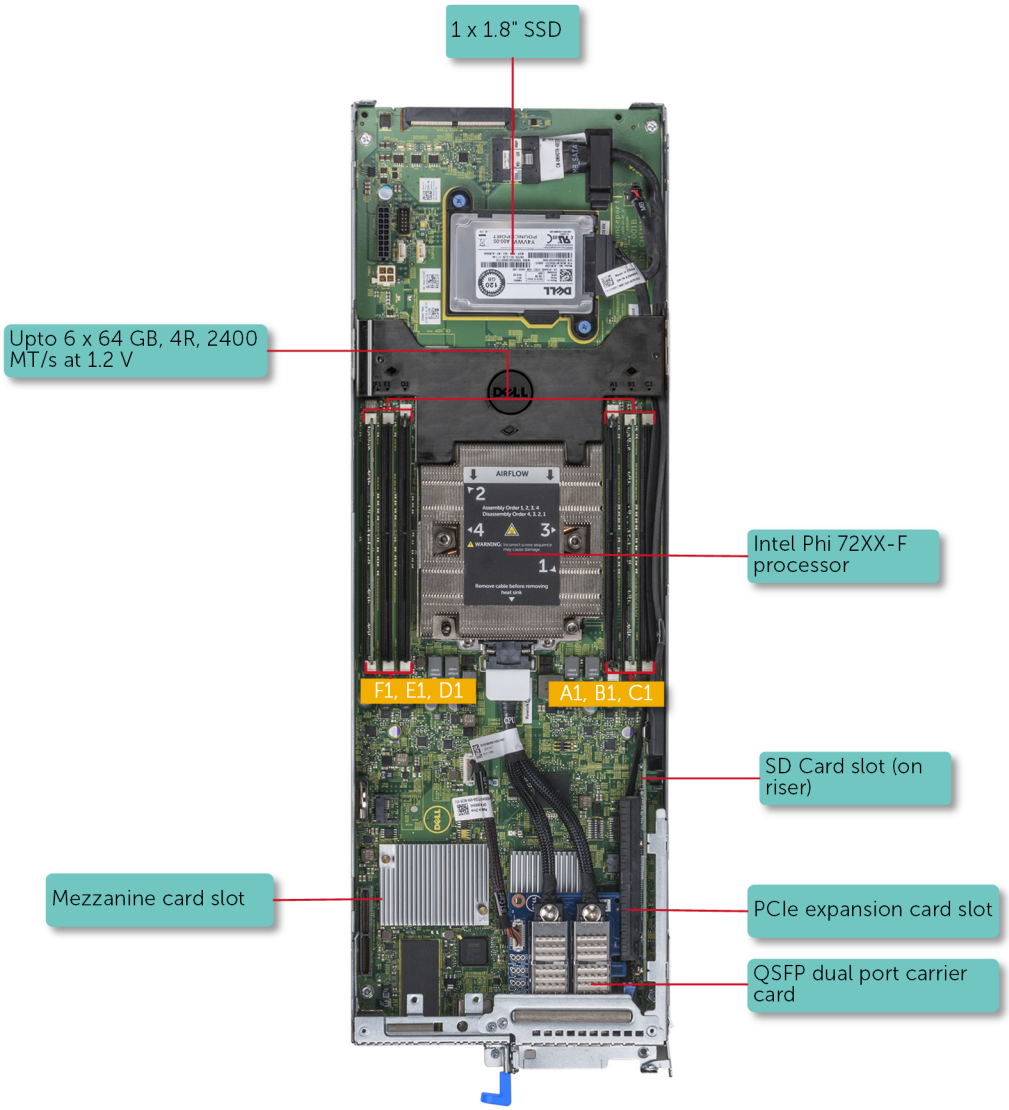

Figure 3. Supported configuration for the C6320p sled with an Intel Phi 72xx-F processor

Front panel

The front panel provides access to the features available on the front of the server, such as the power button, and the system identification button. The hot swappable hard drives are accessible from the front panel.

Front panel features of the PowerEdge 6300 enclosure with PowerEdge C6320p sleds

Figure 4. Front panel features and indicators

1. system identification indicator for sled 1
2. power button for sled 1
3. hard drives (24)
4. ambient temperature sensor cover
5. power button for sled 3
6. system identification indicator for sled 3
7. power button for sled 4
8. system identification indicator for sled 4
9. system identification indicator for sled 2
10. power button for sled 2

Table 1. Front panel features and indicators

Item	Indicator, Button, or Connector	Icon	Description
1	System identification indicator or button for sled 1		Press the system ID button: • To locate a particular sled within the enclosure. • To turn the system ID on or off. **NOTE:** If the sled stops responding during POST, press and hold the sled ID button (for more than five seconds) to enter the BIOS progress mode.
2	Power-on indicator or system state indicator or power button for sled 1		Press the power button to turn the sled on or off. The indicator on the button indicates if the sled is on or off. The power-on indicator turns Amber when a critical system event occurs. **NOTE:** To gracefully shut down an ACPI-compliant operating system, press the power button.

Table 1. Front panel features and indicators (continued)

Item	Indicator, Button, or Connector	Icon	Description
3	Hard drives		Up to 24, hot-swappable, 2.5-inch hard drives. Six hard drives are allocated to each sled in the enclosure.
4	Ambient temperature sensor cover		Ambient temperature sensor is located behind this cover.
5	Power-on indicator or system state indicator or power button for sled 3		Press the power button to turn the sled on or off. The indicator on the button indicates if the sled is on or off. The power-on indicator turns Amber when a critical system event occurs. **NOTE:** To gracefully shut down an ACPI-compliant operating system, press the power button.
6	System identification indicator or button for sled 3		Press the system ID button: • To locate a particular sled within the enclosure. • To turn the system ID on or off. **NOTE:** If the sled stops responding during POST, press and hold the system ID button (for more than five seconds) to enter the BIOS progress mode.
7	Power-on indicator or system state indicator or power button for sled 4		Press the power button to turn the sled on or off. The indicator on the button indicates if the sled is on or off. The power-on indicator turns Amber when a critical system event occurs. **NOTE:** To gracefully shut down an ACPI-compliant operating system, press the power button.
8	System identification indicator or button for sled 4		Press the system ID button: • To locate a particular sled within the enclosure. • To turn the system ID on or off. **NOTE:** If the sled stops responding during POST,

Table 1. Front panel features and indicators (continued)

Item	Indicator, Button, or Connector	Icon	Description
			press and hold the system ID button (for more than five seconds) to enter the BIOS progress mode.
9	System identification indicator or button for sled 2		Press the system ID button: • To locate a particular sled within the enclosure. • To turn the system ID on or off. **NOTE:** If the sled stops responding during POST, press and hold the system ID button (for more than five seconds) to enter the BIOS progress mode.
10	Power-on indicator or system state indicator or power button for sled 2		Press the power button to turn the sled on or off. The indicator on the button indicates if the sled is on or off. The power-on indicator turns Amber when a critical system event occurs. **NOTE:** To gracefully shut down an ACPI-compliant operating system, press the power button.

Back panel

The back panel provides access to the features available on the back of the server, such as the system identification button, power supply sockets, iDRAC connectivity port, NIC ports, and USB and the VGA port. Most of the expansion card ports can be accessed from the back panel.

Back panel features of the PowerEdge 6300 enclosure with PowerEdge C6320p sleds

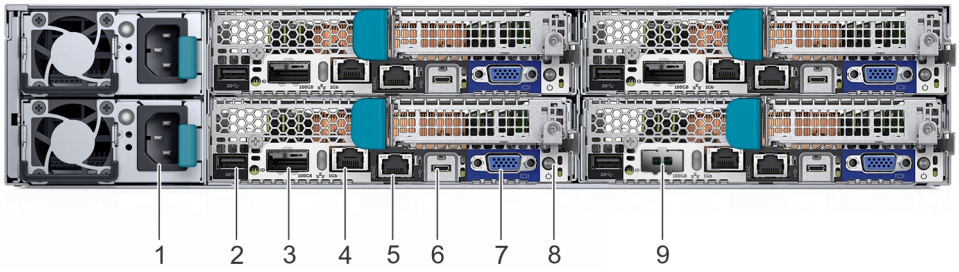

Figure 5. Back panel features and indicators Intel Phi 72xx processor based sleds

1. Power supply unit (2)
2. Universal Serial Bus port
3. Integrated Quad Small Form-factor Pluggable port
4. Ethernet port
5. iDRAC Enterprise management port
6. Micro Universal Serial Bus port
7. VGA port
8. Power button/power-on indicator
9. Sled without the integrated Quad Small Form-factor Pluggable port

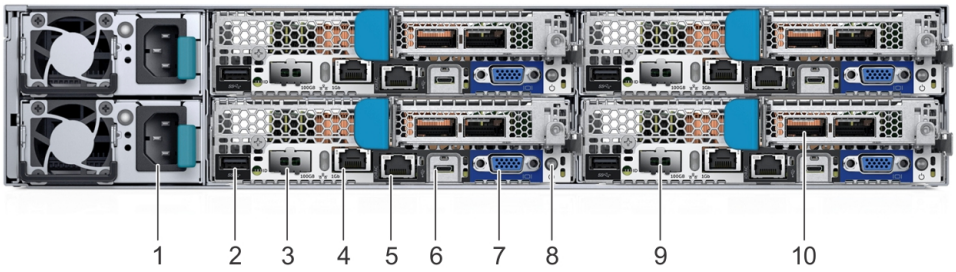

Figure 6. Back panel features and indicators Intel Phi 72xx-F processor based sleds

1. Power supply unit (2)
2. Universal Serial Bus port
3. Sled without the integrated Quad Small Form-factor Pluggable port
4. Ethernet port
5. iDRAC Enterprise management port
6. Micro Universal Serial Bus port
7. VGA port
8. Power button/power-on indicator
9. Sled without the integrated Quad Small Form-factor Pluggable port
10. Sled with the Quad Small Form-factor Pluggable carrier card

Table 2. Back panel features and indicators

Item	Indicator, Button, or Connector	Icon	Description
1	Power supply unit (2)		Up to two hot swappable 1400 W or 1600 W AC Power supply unit (PSU).

Table 2. Back panel features and indicators (continued)

Item	Indicator, Button, or Connector	Icon	Description
			NOTE: PSU's with different wattages cannot be mixed.
2	Universal Serial Bus (USB port)		Use the USB 3.0 port to connect USB devices to the system. This port is a 9-pin, USB 3.0 compliant port.
3	Quad Small Form-factor Pluggable (QSFP port)		Mellanox ConnectX-4 VPI EDR / 100 GbE Embedded Port (optional)
4	Ethernet port		Single Port 1Gb LOM Ethernet port
5	iDRAC Enterprise management port		Use the iDRAC8 Enterprise management port to remotely access iDRAC. For more information, see the Integrated Dell Remote Access Controller User's Guide at **Dell.com/idracmanuals**.
6	Micro Universal Serial Bus (USB port)		Use the port to connect the system to a host.
7	VGA port		Use the video/VGA port to connect a display to the system. For more information about the supported video/VGA port, see the Technical specifications section.
8	Power button/power-on indicator		The power-on indicator glows green when the system power is on. The power-on indicator turns amber when there a critical system event occurs. The power button controls the PSU output to the system board. **NOTE:** When turning on the system, the video monitor can take from several seconds to over two minutes to display an image, on the basis of the disk space available in the system. **NOTE:** On ACPI-compliant operating systems, turning off the system by using the power button causes the

Table 2. Back panel features and indicators (continued)

Item	Indicator, Button, or Connector	Icon	Description
			system to perform a graceful shutdown before the system is turned off. **NOTE:** To force an ungraceful shutdown, press and hold the power button for five seconds.
9	Sled without the integrated Quad Small Form-factor Pluggable port		Sled without the (optional) Mellanox ConnectX-4 VPI EDR / 100 GbE Embedded Port.
10	Sled with the Quad Small Form-factor Pluggable carrier card		Sled with the Quad Small Form-factor Pluggable carrier card and the fabric based processor.

Diagnostic indicators

The diagnostic indicators on the system indicate operation and error status.

Hard drive indicator patterns

Figure 7. Hard drive front view

1. hard drive status indicator (green and amber)
2. hard drive activity indicator (green)

Table 3. Hard drive indicator patterns

Controller	Hard drive type	Function	Activity LED	Status LED
			Green	Green
Onboard Controller	SATA3	Drive on-line	Off/Blinking when active	On
		Fail	Off	On

Network ports indicator codes

Figure 8. LAN indicators on the QSFP carrier card

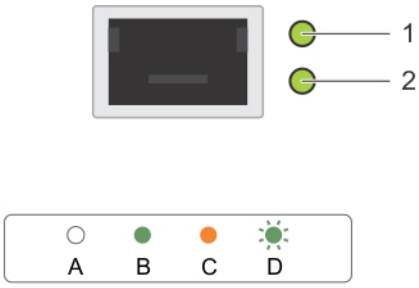

Figure 9. LAN indicators

1. Link indicator
2. Activity indicator

Table 4. QSFP port indicator codes

Connection State	QSFP Upper green LED	QSFP Lower green LED
No link / Not Connected	Off	Off
InfiniBand Physical Link - No Logical Link	Green	Off
InfiniBand Logical Link – No Traffic	Green	Green
InfiniBand Logical Link - Traffic	Green	Blink
InfiniBand Physical Link Issue	Blink	Green
Ethernet Link – No Traffic	Green	Green
Ethernet - Traffic	Green	Blink

NOTE: The LED blink speed varies according to the traffic bandwidth.

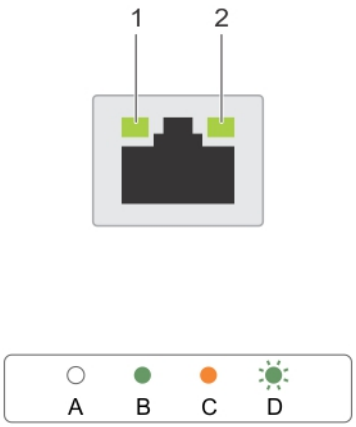

Figure 10. Ethernet port indicator codes

1. speed indicator
2. link and activity indicator

Table 5. Ethernet port indicator codes

Convention	Status	Condition
A	Link and activity indicators are off	The NIC is not connected to the network.
B	Link indicator is green	The NIC is connected to a valid network at its maximum port speed (1 Gbps).
C	Link indicator is amber	The NIC is connected to a valid network at less than its maximum port speed.
D	Activity indicator is flashing green	Network data is being sent or received.

Power Supply Unit indicator codes

Each AC power supply unit (PSU) has an illuminated translucent handle that indicates whether power is present or whether a power fault has occurred.

1400 W AC or HVDC Power supply units

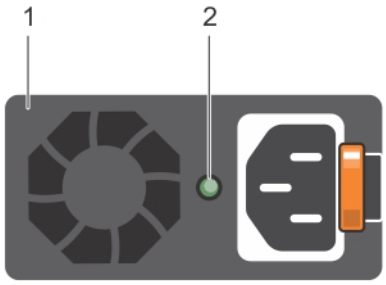

Figure 11. Power supply unit (PSU) status indicators

1. PSU
2. PSU status indicator LED

Table 6. 1400 W AC or HVDC PSU indicators

Power Indicator Pattern	Condition
Green	A valid power source is connected to the PSU and the PSU is operational.
Flashing green	When the PSU firmware is being updated, the PSU LED flashes green. **CAUTION: Do not disconnect the power cord or unplug the PSU when updating firmware. If firmware update is interrupted, the PSUs will not function. You must roll back the PSU firmware by using Dell Lifecycle Controller. For more information, see Dell Lifecycle Controller User's Guide at Dell.com/idracmanuals.**
Flashing green and turns off	When hot-adding a PSU, the PSU LED flashes green five times at 4 Hz rate and turns off. This indicates that there is a PSU mismatch with respect to efficiency, feature set, health status, and supported voltage. **NOTE:** Ensure that both the PSUs are of the same capacity. **NOTE:** Mixing PSUs from previous generations of Dell PowerEdge servers can result in a PSU mismatch condition and failure to turn the system on.
Flashing amber	Indicates a problem with the PSU. **CAUTION: When correcting a PSU mismatch, replace only the PSU with the flashing indicator. Swapping the other PSU to make a matched pair can result in an error condition and unexpected system shutdown. To change from a High Output configuration to a Low Output configuration or vice versa, you must turn off the system.** **CAUTION: If two PSUs are used, they must be of the same type and have the same maximum output power.**
Not lit	Power is not connected.

1600 W AC or HVDC Power supply unit

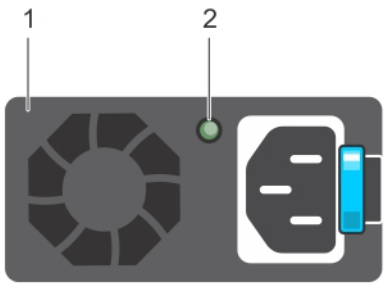

Figure 12. Power supply unit (PSU) status indicator

1. PSU
2. Power indicator

Table 7. 1600 W AC or HVDC PSU indicators

Convention	Power Indicator Pattern	Description
A	Green	A valid power source is connected to the PSU and the PSU is operational.
B	Flashing green	When the firmware of the PSU is being updated, the PSU LED flashes green. **CAUTION: Do not disconnect the power cord or unplug the PSU when updating firmware. If firmware update is interrupted, the PSUs will not function. You must roll back the PSU firmware by using Dell Lifecycle Controller. See *Dell Lifecycle Controller User's Guide* at Dell.com/idracmanuals.** **CAUTION: Do not disconnect the power cord or unplug the PSU when updating firmware. If firmware update is interrupted, the PSUs will not function.** **NOTE:** Ensure that both the PSUs are of the same capacity. **NOTE:** Mixing PSUs from previous generations of Dell PowerEdge servers will result in a PSU mismatch condition or failure to turn the system on.
C	Flashes green and turns off	When hot-adding a PSU, the PSU LED flashes green five times at 4 Hz rate and turns off. This indicates that there is a PSU mismatch with respect to efficiency, feature set, health status, and supported voltage.
D	Flashing amber	Indicates a problem with the PSU. **CAUTION: When correcting a PSU mismatch, replace only the PSU with the flashing indicator. Swapping the other PSU to make a matched pair can result in an error condition and unexpected system shutdown. To change from a High Output configuration to a Low Output configuration or vice versa, you must turn off the system.** **NOTE:** AC PSUs support both 220 V and 110 V input voltages. When two identical PSUs receive different input voltages, they can output different wattages, and trigger a mismatch. **CAUTION: If two PSUs are used, they must be of the same type**

Table 7. 1600 W AC or HVDC PSU indicators (continued)

Convention	Power Indicator Pattern	Description
		and have the same maximum output power.
E	Not lit	Power is not connected.

Power and system board indicator codes

The LEDs on the enclosure front panel and back panel display status codes during system startup and operation. For location of the LEDs on the front panel, see the Front panel features and indicators section. For location of the LEDs on the back panel, see the Back panel features and indicators section.

Table 8. Status indicator codes

Component	Indicator		Condition
Power-on indicator (A bi-color LED on power button)	Green	Solid	Power On (S0)
	Amber	Off	
	Green	Off	iDRAC critical condition event in Power Off mode (S4/S5)
	Amber	Blinking	
	Green	Off	iDRAC critical condition event in Power On mode (S0)
	Amber	On	
System identification indicator	Steady blue		IPMI using Chassis Identify Command On or ID Button Press ID On
	Blinking blue		Only IPMI using Chassis Identify Command Blink On
	Off		IPMI using Chassis Identify Command Off or ID Button Press ID Off

iDRAC heart beat LED

The system board provides iDRAC heart beat LED (CR17) for iDRAC debugging. The iDRAC heart beat LED is green. When the power is connected, the LED is on. When iDRAC firmware is ready, the iDRAC heart beat LED blinks.

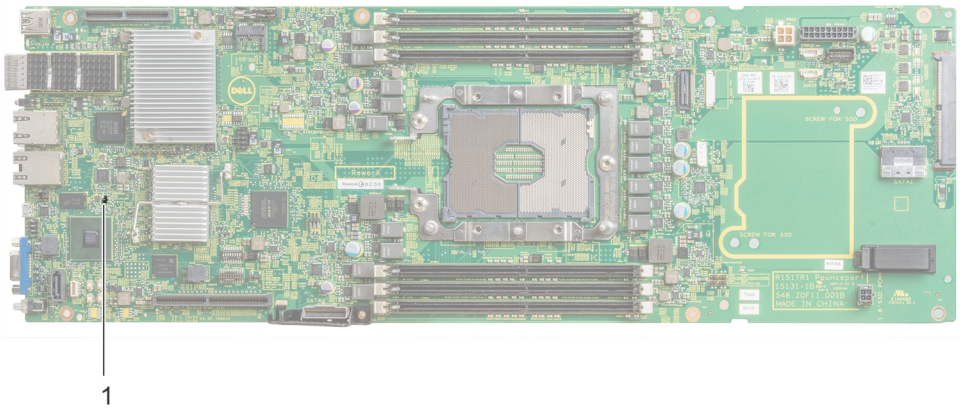

Figure 13. iDRAC heart beat LED

1. iDRAC heart beat LED

Configuration restrictions of the Intel Xeon Phi 72XX or Phi 72XXF processor

WARNING: Sleds using the Intel Xeon Phi 72XX and Phi 72XXF processors must not be installed in the same enclosure.

CAUTION: Certain system hardware configurations may require reductions in the upper temperature limits.

NOTE: System performance may be impacted when operating above 35°C (95°F) or with a faulty fan.

Table 9. Configuration restrictions of the Intel Xeon Phi 72XX or Phi 72XXF processor

Processor wattage	Processor model	Applicable restrictions
215 W	Phi 7210	10°C (50°F) to 35°C (95°F) with a maximum temperature gradation of 10 degree C per hour
	Phi 7230	
	Phi 7250	
230	Phi 7210F	
	Phi 7230F	
	Phi 7250F	
245	Phi 7290	Ambient temperature limited to 23°C (73.4°F)
260	Phi 7290F	

Sled to hard drive connection layout

The connection of the twenty four 2.5–inch hot swappable hard drives to the four sleds is shown as follows:

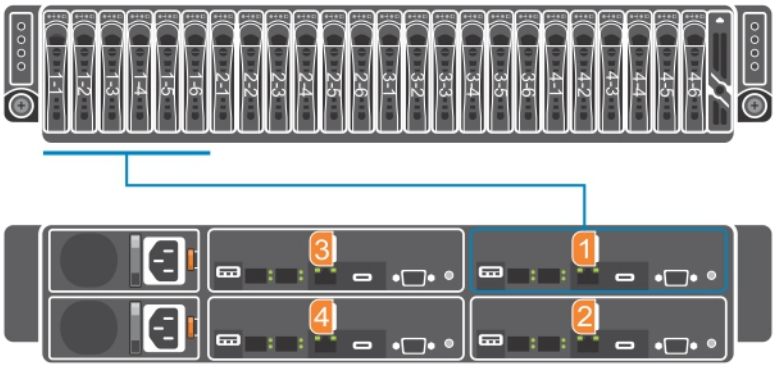

Figure 14. Sled to hard drive connection layout

NOTE: The warranty of the hard drives are linked to the Service Tag of the corresponding sled.

Locating your system Service Tag

Your system is identified by a unique Express Service Code and Service Tag number. The Express Service Code is found on the front of the system and Service Tag is found on the front of the system. Alternatively, the information may be on a sticker on the chassis of the system. This information is used by Dell to route support calls to the appropriate personnel. The Service Tag locations on the chassis are as follows:

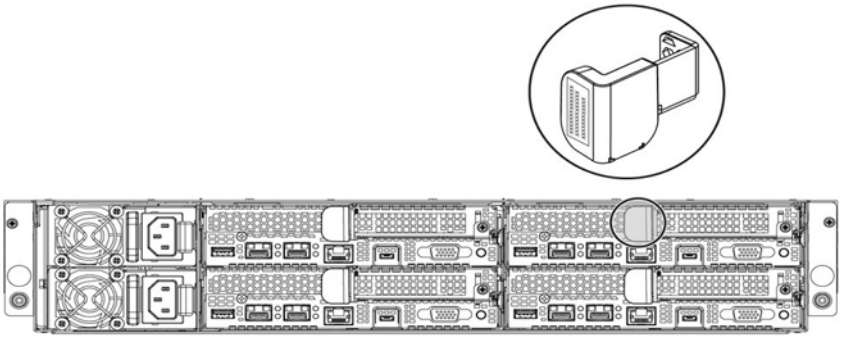

Figure 15. Service Tag location

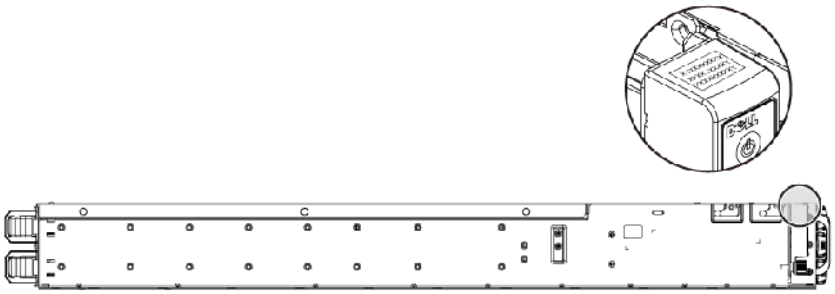

Figure 16. Service Tag location on the left front panel

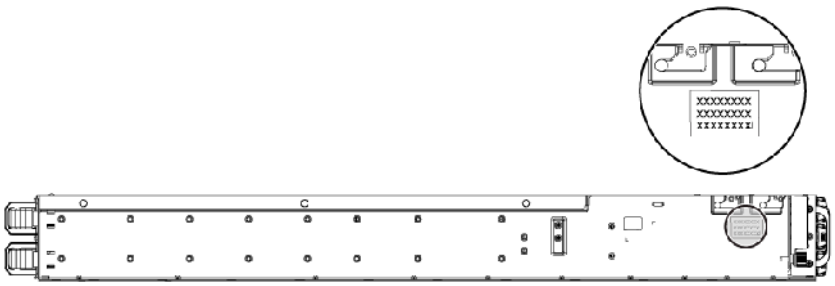

Figure 17. Service Tag location on the chassis

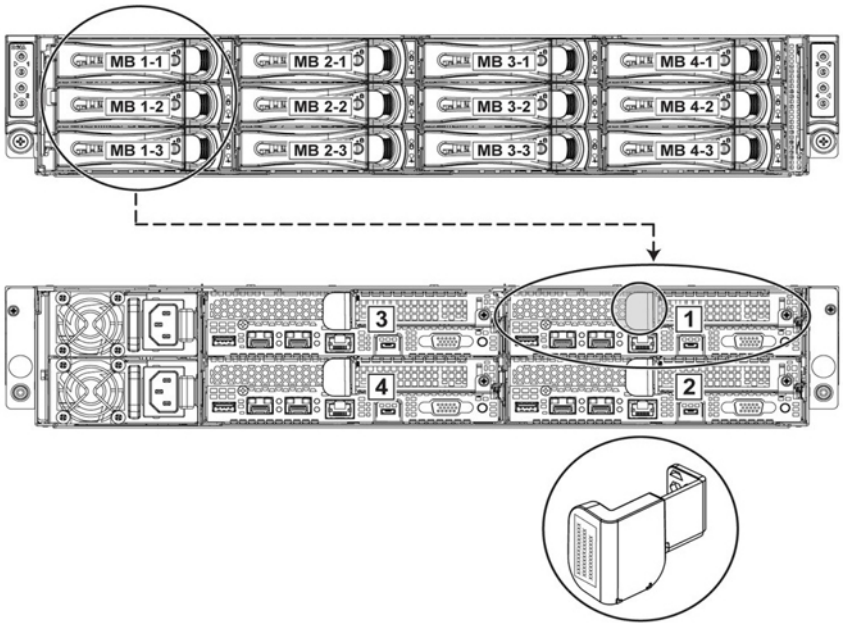

Figure 18. Service Tag linkage

NOTE: Hard drives that are under warranty are linked to the appropriate Service Tag of the node.

2

Documentation resources

This section provides information about the documentation resources for your system.

To view the document that is listed in the documentation resources table:

- From the Dell EMC support site:
  1. Click the documentation link that is provided in the Location column in the table.
  2. Click the required product or product version.

     NOTE: To locate the product name and model, see the front of your system.
  3. On the Product Support page, click **Manuals & documents**.
- Using search engines:
  - Type the name and version of the document in the search box.

Table 10. Additional documentation resources for your system

Task	Document	Location
Setting up your system	For information about installing the system into a rack, see the Rack documentation included with the *Getting Started With Your System* document that is shipped with your system.	www.dell.com/poweredgemanuals
Configuring your system	For information about the iDRAC features, configuring and logging in to iDRAC, and managing your system remotely, see the Integrated Dell Remote Access Controller User's Guide. For information about understanding Remote Access Controller Admin (RACADM) subcommands and supported RACADM interfaces, see the RACADM CLI Guide for iDRAC. For information about Redfish and its protocol, supported schema, and Redfish Eventing are implemented in iDRAC, see the Redfish API Guide. For information about iDRAC property database group and object descriptions, see the Attribute Registry Guide.	www.dell.com/poweredgemanuals
	For information about earlier versions of the iDRAC documents, see the iDRAC documentation. To identify the version of iDRAC available on your system, on the iDRAC web interface, click **?** > **About**.	www.dell.com/idracmanuals

Table 10. Additional documentation resources for your system (continued)

Task	Document	Location
	For information about installing the operating system, see the operating system documentation.	www.dell.com/operatingsystemmanuals
	For information about updating drivers and firmware, see the Methods to download firmware and drivers section in this document.	www.dell.com/support/drivers
Managing your system	For information about systems management software offered by Dell, see the Dell OpenManage Systems Management Overview Guide.	www.dell.com/poweredgemanuals
	For information about setting up, using, and troubleshooting OpenManage, see the Dell OpenManage Server Administrator User's Guide.	www.dell.com/openmanagemanuals > OpenManage Server Administrator
	For information about installing, using, and troubleshooting Dell OpenManage Essentials, see the Dell OpenManage Essentials User's Guide.	www.dell.com/openmanagemanuals > OpenManage Essentials
	For information about installing, using, and troubleshooting Dell OpenManage Enterprise, see the Dell OpenManage Enterprise User's Guide.	www.dell.com/openmanagemanuals > OpenManage Enterprise
	For information about installing and using Dell SupportAssist, see the Dell EMC SupportAssist Enterprise User's Guide.	https://www.dell.com/serviceabilitytools
	For information about partner programs enterprise systems management, see the OpenManage Connections Enterprise Systems Management documents.	www.dell.com/openmanagemanuals
	Working with the Dell PowerEdge RAID controllers	For information about understanding the features of the Dell PowerEdge RAID controllers (PERC), Software RAID controllers, or BOSS card and deploying the cards, see the Storage controller documentation. www.dell.com/storagecontrollermanuals
Understanding event and error messages	For information about the event and error messages that are generated by the system firmware and agents that monitor system components, see the Error Code Lookup.	www.dell.com/qrl
Fan Control Board firmware update and	For information about updating the Fan Control Board firmware and setting the chassis type to	www.dell.com/poweredgemanuals

Table 10. Additional documentation resources for your system (continued)

Task	Document	Location
Set Chassis Type procedure	accommodate either PowerEdge C6320 or PowerEdge C6320p sleds in the PowerEdge C6300 enclosure, see the Fan Control Board firmware update and Set Chassis Type procedure section in this document.	
Troubleshooting your system	For information about identifying and troubleshooting the PowerEdge server issues, see the Server Troubleshooting Guide.	www.dell.com/poweredgemanuals

3

Technical specifications

The technical and environmental specifications of your system are outlined in this section.

Topics:

Chassis dimensions

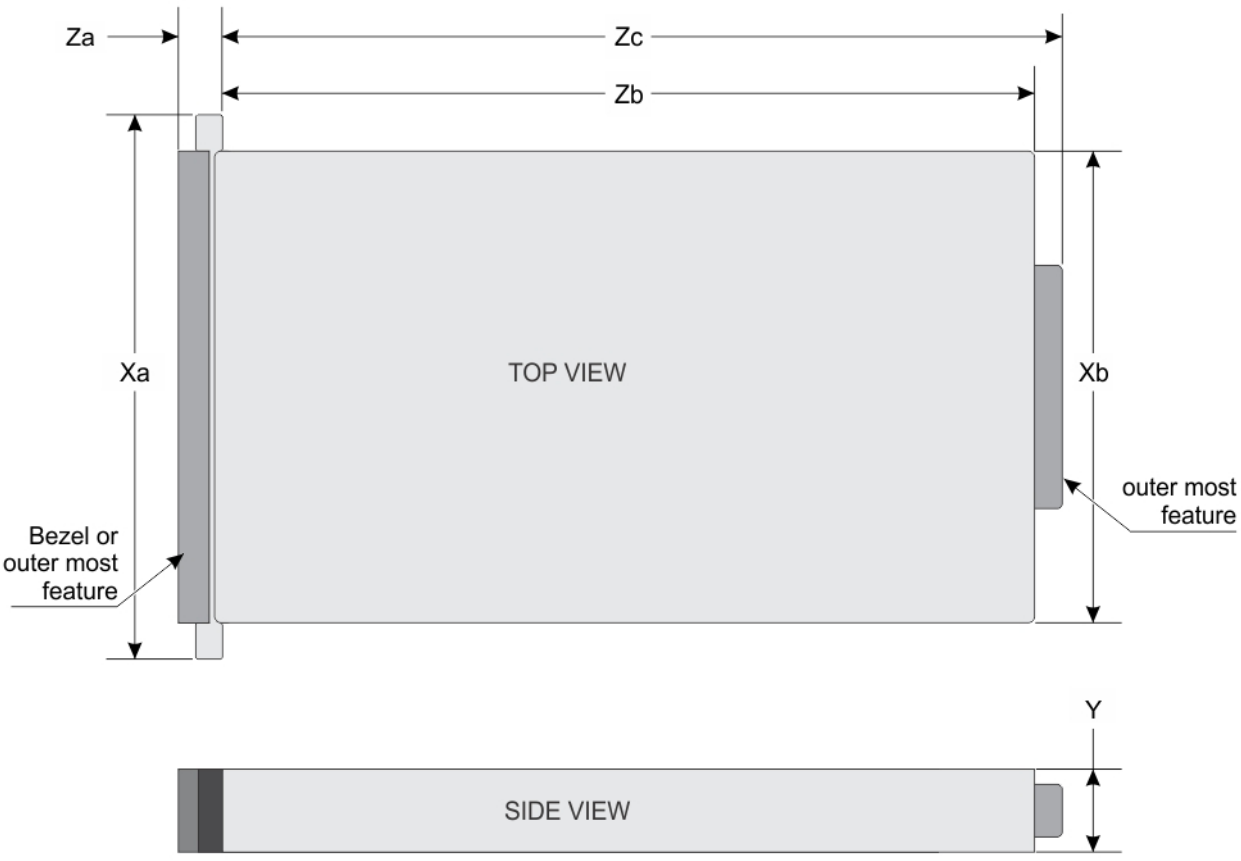

Figure 19. Chassis dimensions of PowerEdge C6300 enclosure

Table 11. Dimensions of the Dell PowerEdge C6300 enclosure

Xa	Xb	Y	Za (with bezel)	Za (without bezel)	Zb	Zc
482.3 mm	448.0 mm	86.8 mm	N/A	41.4 mm	762.1 mm	795.9 mm

Chassis weight

Table 12. Chassis weight

System	Maximum weight (with all sleds and hard drives/SSDs)
PowerEdge C6300 enclosure and the PowerEdge C6320p sleds	36.5 Kg (80.4 lb)

Processor specifications

The Dell PowerEdge C6320p supports an Intel Xeon Phi 72XXF or 72XX product family processor in four independent sleds.

PSU specifications

Dell PowerEdge C6300 enclosure supports up to two AC or HVDC power supply units (PSUs). Dell PowerEdge C6320p does not support a mixed installation of 1400 W and 1600 W PSUs. The 1400 W and 1600 W PSUs are hot swappable and support hot swap in any condition if the system has the power throttling feature enabled.

Table 13. PSU specifications

PSU	Heat dissipation (maximum)	Frequency	Voltage	Maximum input current	Maximum inrush current (peak)
1400 W AC	5220.763 BTU/hr	50/60 Hz	200-240 V AC	9 A	Initial inrush current cannot exceed 55 A (peak). Secondary inrush current cannot exceed 25 A (peak).
1400 W HVDC (China only)		–	240 V DC	9 A	
1600 W AC	5966.586 BTU/hr	50/60 Hz	100-120 V AC 200-240 V AC	12 A 10 A	Initial inrush current and secondary inrush current cannot exceed 35 A (peak).
1600 W HVDC		–	240 V DC	10 A	

System battery specifications

Dell PowerEdge C6320p sled supports CR2032 3.0-V lithium coin cell battery.

Memory specifications

Dell PowerEdge C6320p system supports DDR4 registered DIMMs (RDIMMs) and Load Reduced DIMMS (LRDIMMS).

Table 14. Memory specifications

Memory module sockets	Architecture	Memory capacity and ranking	Minimum RAM	Maximum RAM
Six 288-pin	2400 MT/s DDR4 RDIMMs and LRDIMMS with support for memory optimized operation	• Single rank - 8 GB • Dual rank - 16 GB • Dual rank - 32 GB • Quad rank - 64 GB	8 GB	Up to 384 GB

NOTE: Memory modules of different speeds and capacities cannot be mixed.

Hard drives and storage specifications

The PowerEdge C6320p sled supports SAS, SATA, Solid State Drives (SSDs), and SDHC storage options.

NOTE: SAS hard drives are supported only if the LSI 2008 Mezzanine card is installed.

Table 15. Supported hard drive, SSD, and storage options for the PowerEdge C6320p sled

2.5" hard drive per server node (6 Gbps SATA/SAS)	6
Internal 1.8" SSD (optional) for boot (120 GB or 240 GB)	1
SDHC Card (optional) for boot (up to 16 GB)	1

Internal SD card slot

The PowerEdge C6320p sled supports a Micro Secure Digital (SD) card slot on the PCIe riser card.

Ports and connectors specifications

USB ports

The PowerEdge C6320p sled supports one USB 3.0 compliant and one micro USB 2.0 compliant port on the back panel.

The following table provides more information about the USB specifications:

Table 16. USB specifications

PowerEdge C6320p back panel
One 9-pin, USB 3.0 compliant port One 4-pin, micro USB 2.0 compliant port **NOTE:** The micro USB port should not be used for general USB purposes, it is reserved for use as a serial port only.

NIC ports

The PowerEdge C6320p sled supports one 10/100/1000 Mbps Network Interface Controller (NIC) port and Mellanox ConnectX-4 VPI EDR / 100 GbE Embedded Port (optional) on the back panel.

VGA ports

The Video Graphic Array (VGA) port enables you to connect the sled to a VGA display. The PowerEdge C6320p sled supports one 15-pin VGA port on each sled's back panel.

Video specifications

The PowerEdge C6320p sled supports a Matrox G200 graphics card with 16 MB RAM.

Table 17. Supported video resolution options

Resolution	Refresh rate (Hz)	Color depth (bits)
640 x 480	60, 70	8, 16, 32
800 x 600	60, 75, 85	8, 16, 32
1024 x 768	60, 75, 85	8, 16, 32
1152 x 864	60, 75, 85	8, 16, 32
1280 x 1024	60, 75	8, 16, 32
1440 x 900	60	8, 16, 32

Environmental specifications

NOTE: For additional information about environmental measurements for specific system configurations, see **Dell.com/environmental_datasheets**.

Table 18. Temperature specifications

Temperature	Specifications
Storage	–40°C to 65°C (–40°F to 149°F)
Continuous operation (for altitude less than 950 m or 3117 ft)	10°C to 35°C (50°F to 95°F) with no direct sunlight on the equipment. **NOTE:** Certain system configurations may require reductions in the upper temperature limits.
Maximum temperature gradient (operating and storage)	20°C/h (36°F/h)

Table 19. Relative humidity specifications

Relative humidity	Specifications
Storage	5% to 95% (non-condensing)
Operating	20% to 80% (non-condensing) with a maximum humidity gradation of 10% per hour.

Table 20. Maximum vibration specifications

Maximum vibration	Specifications
Operating	0.26 G_{rms} at 5 Hz–350 Hz (all operation orientations).

Table 20. Maximum vibration specifications (continued)

Maximum vibration	Specifications
Storage	1.88 G_{rms} at 10 Hz–500 Hz for 15 min (all six sides tested).

Table 21. Maximum shock specifications

Maximum shock	Specifications
Operating	One shock pulse in the positive z axis of 31 G for 2.6 ms in the operational orientation
Storage	Six consecutively executed shock pulses in the positive and negative x, y, and z axes (one pulse on each side of the system) of 27 G faired square wave pulse with velocity change at 235 inches per second (597 centimeters per second)

Table 22. Maximum altitude specifications

Maximum altitude	Specifications
Operating	-15.2 m–3,048 m (-50–10,000 ft.)
Storage	-15.2 m–10,668 m (-50–35,000 ft.)

Table 23. Airborne contaminant level specification

Airborne contaminant level (Class)	G1 as defined by ISA-S71.04-1985

Table 24. Operating temperature de-rating specifications

Operating temperature de-rating	Specifications
Up to 35°C (95°F)	Maximum temperature is reduced by 1°C/300 m (1°F/547 ft) above 950 m (3,117 ft).

4

Initial system setup and configuration

Topics:

Accessing system features during startup

The following keystrokes provide access to system features during startup.

NOTE: PXE support is available in BIOS boot mode only. There is no hot key to boot in the UEFI mode.

Keystroke	Description
F2	Enters the System Setup program.
F10	Enters the LifeCycle Controller Configuration menu
F11	Enters the BIOS Boot Manager.
F12	Starts Preboot eXecution Environment (PXE)/iSCSI boot.

Setting up your system

Complete the following steps to set up your system:

Steps

1. Unpack the system.
2. Install the system into the rack. For more information about installing the system into the rack, see your system *Rack Installation Placemat* at **Dell.com/poweredgemanuals**.
3. Connect the peripherals to the system.
4. Connect the system to its electrical outlet.
5. Turn the sled on by pressing the corresponding power button on the front or back panel or by using iDRAC.
6. Turn on the attached peripherals.

iDRAC configuration

The Integrated Dell Remote Access Controller (iDRAC) is designed to make system administrators more productive and improve the overall availability of Dell EMC systems. iDRAC alerts administrators to system issues, helps them perform remote system management, and reduces the need for physical access to the system.

Options to set up iDRAC IP address

You must configure the initial network settings based on your network infrastructure to enable the communication to and from iDRAC. You can set up the IP address by using one of the following interfaces:

Interfaces	Document/Section
iDRAC Settings utility	See *iDRAC User's Guide* available at https://www.dell.com/idracmanuals
Dell Deployment Toolkit	See *OpenManage Deployment Toolkit User's Guide* available at https://www.dell.com/openmanagemanuals
Dell Lifecycle Controller	See *Lifecycle Controller User's Guide* available at https://www.dell.com/idracmanuals

You must use the default iDRAC IP address 192.168.0.120 to configure the initial network settings, including setting up DHCP or a static IP for iDRAC.

NOTE: To access iDRAC, ensure that you connect the network cable to the Ethernet port in shared mode or the iDRAC Management port on the system board.

NOTE: Ensure that you change the default user name and password after setting up the iDRAC IP address.

Log in to iDRAC

You can log in to iDRAC as:

- iDRAC user
- Microsoft Active Directory user
- Lightweight Directory Access Protocol (LDAP) user

The default user name and password are `root` and `calvin`. You can also log in by using Single Sign-On or Smart Card.

NOTE: You must have iDRAC credentials to log in to iDRAC.

For more information about logging in to iDRAC and iDRAC licenses, see the latest Integrated Dell Remote Access Controller User's Guide at **Dell.com/idracmanuals**.

Options to install the operating system

The system is shipped without an operating system, install the supported operating system by using one of the following resources:

Table 25. Resources to install the operating system

Resources	Location
Dell Systems Management Tools and Documentation media	https://www.dell.com/operatingsystemmanuals
Dell Lifecycle Controller	https://www.dell.com/idracmanuals
Dell OpenManage Deployment Toolkit	https://www.dell.com/openmanagemanuals
Supported operating systems on Dell PowerEdge systems	www.dell.com/ossupport
Installation and How-to videos for supported operating systems on Dell PowerEdge systems	https://www.youtube.com/playlist?list=PLe5xhhyFjDPfTCaDRFfIB_VsoLpL8x84G

Methods to download firmware and drivers

You can download the firmware and drivers by using any of the following methods:

Table 26. Firmware and drivers

Methods	Location
From the Dell Support site	Global Technical Support

Table 26. Firmware and drivers (continued)

Methods	Location
Using Dell Remote Access Controller Lifecycle Controller (iDRAC with LC)	Dell.com/idracmanuals
Using Dell Repository Manager (DRM)	Dell.com/openmanagemanuals > OpenManage Deployment Toolkit
Using Dell OpenManage Essentials (OME)	Dell.com/openmanagemanuals > OpenManage Deployment Toolkit
Using Dell Server Update Utility (SUU)	Dell.com/openmanagemanuals > OpenManage Deployment Toolkit
Using Dell OpenManage Deployment Toolkit (DTK)	Dell.com/openmanagemanuals > OpenManage Deployment Toolkit

Downloading the drivers and firmware

Dell EMC recommends that you download and install the latest BIOS, drivers, and systems management firmware on your system.

Prerequisites

Ensure that you clear the web browser cache before downloading the drivers and firmware.

Steps

1. Go to Dell.com/support/drivers.
2. In the **Drivers & Downloads** section, type the Service Tag of your system in the **Service Tag or Express Service Code** box, and then click **Submit**.

   NOTE: If you do not have the Service Tag, select **Detect My Product** to allow the system to automatically detect your Service Tag, or in **General support**, navigate to your product.

3. Click **Drivers & Downloads**.
   The drivers that are applicable to your selection are displayed.
4. Download the drivers to a USB drive, CD, or DVD.

5

Pre-operating system management applications

You can manage basic settings and features of a system without booting to the operating system by using the system firmware.

Topics:

Options to manage the pre-operating system applications

Your system has the following options to manage the pre-operating system applications:

- System Setup
- Boot Manager
- Dell Lifecycle Controller
- Preboot Execution Environment (PXE)

Related concepts

System Setup on page 37
Boot Manager on page 62
Dell Lifecycle Controller on page 62
PXE boot on page 63

System Setup

By using the **System Setup** screen, you can configure the BIOS settings, iDRAC settings, and device settings of your system.

NOTE: Help text for the selected field is displayed in the graphical browser by default. To view the help text in the text browser, press F1.

You can access system setup by using two methods:

- Standard graphical browser — The browser is enabled by default.
- Text browser — The browser is enabled by using Console Redirection.

Related references

System Setup details on page 38

Related tasks

Viewing System Setup on page 38

Viewing System Setup

To view the **System Setup** screen, perform the following steps:

Steps

1. Turn on, or restart your system.
2. Press F2 immediately after you see the following message:

```
F2 = System Setup
```

NOTE: If your operating system begins to load before you press F2, wait for the system to finish booting, and then restart your system and try again.

Related concepts

System Setup on page 37

Related references

System Setup details on page 38

System Setup details

The **System Setup Main Menu** screen details are explained as follows:

Option	Description
System BIOS	Enables you to configure BIOS settings.
iDRAC Settings	Enables you to configure iDRAC settings. The iDRAC settings utility is an interface to set up and configure the iDRAC parameters by using UEFI (Unified Extensible Firmware Interface). You can enable or disable various iDRAC parameters by using the iDRAC settings utility. For more information about this utility, see *Integrated Dell Remote Access Controller User's Guide* at **Dell.com/idracmanuals**.
Device Settings	Enables you to configure device settings.

Related concepts

System Setup on page 37

Related tasks

Viewing System Setup on page 38

System BIOS

You can use the **System BIOS** screen to edit specific functions such as boot order, system password, setup password, set the RAID mode, and enable or disable USB ports.

Related references

System BIOS Settings details on page 39
Boot Settings on page 53
Network Settings on page 40
System Information on page 45
Memory Settings on page 46
Processor Settings on page 49
SATA Settings on page 50

Integrated Devices on page 55
Serial Communication on page 56
System Profile Settings on page 58
Miscellaneous Settings on page 59
iDRAC Settings utility on page 60
Device Settings on page 61

Related tasks

Viewing System BIOS on page 39

Viewing System BIOS

To view the **System BIOS** screen, perform the following steps:

Steps

1. Turn on, or restart your system.
2. Press F2 immediately after you see the following message:

```
F2 = System Setup
```

NOTE: If your operating system begins to load before you press F2, wait for the system to finish booting, and then restart your system and try again.

3. On the **System Setup Main Menu** screen, click **System BIOS**.

Related references

System BIOS on page 38
System BIOS Settings details on page 39

System BIOS Settings details

About this task

The **System BIOS Settings** screen details are explained as follows:

Option	Description
System Information	Specifies information about the system such as the system model name, BIOS version, and Service Tag.
Memory Settings	Specifies information and options related to the installed memory.
Processor Settings	Specifies information and options related to the processor such as speed and cache size.
SATA Settings	Specifies options to enable or disable the integrated SATA controller and ports.
Boot Settings	Specifies options to specify the boot mode (BIOS or UEFI). Enables you to modify UEFI and BIOS boot settings.
Network Settings	Specifies options to change the network settings.UEFI Boot Mode only.
Integrated Devices	Specifies options to manage integrated device controllers and ports and specify related features and options.
Serial Communication	Specifies options to manage the serial ports and specify related features and options.
System Profile Settings	Specifies options to change the processor power management settings, memory frequency, and so on.

Option	Description
System Security	Specifies options to configure the system security settings, such as system password, setup password, Trusted Platform Module (TPM) security. It also manages the power and NMI buttons on the system.
Miscellaneous Settings	Specifies options to change the system date, time, and so on.

Related references

System BIOS on page 38

Related tasks

Viewing System BIOS on page 39

Network Settings

You can use the **Network Settings** screen to modify PXE device settings. The network settings option is available only in the UEFI mode.

NOTE: The BIOS does not control network settings in the BIOS mode. For the BIOS boot mode, the optional Boot ROM of the network controllers handles the network settings.

Related concepts

UEFI iSCSI Settings on page 41

Related references

Network Settings screen details on page 41
UEFI iSCSI Settings details on page 42
System BIOS on page 38

Related tasks

Viewing Network Settings on page 40
Viewing UEFI iSCSI Settings on page 41

Viewing Network Settings

To view the **Network Settings** screen, perform the following steps:

Steps

1. Turn on, or restart your system.
2. Press F2 immediately after you see the following message:

```
F2 = System Setup
```

NOTE: If your operating system begins to load before you press F2, wait for the system to finish booting, and then restart your system and try again.

3. On the **System Setup Main Menu** screen, click **System BIOS**.
4. On the **System BIOS** screen, click **Network Settings**.

Related references

Network Settings on page 40
Network Settings screen details on page 41

Network Settings screen details

The **Network Settings** screen details are explained as follows:

About this task

Option	Description
PXE Device n (n = 1 to 4)	Enables or disables the device. When enabled, a UEFI boot option is created for the device.
PXE Device n Settings(n = 1 to 4)	Enables you to control the configuration of the PXE device.

Related references

Network Settings on page 40

Related tasks

Viewing Network Settings on page 40

UEFI iSCSI Settings

You can use the iSCSI Settings screen to modify iSCSI device settings. The iSCSI Settings option is available only in the UEFI boot mode. BIOS does not control network settings in the BIOS boot mode. For the BIOS boot mode, the option ROM of the network controller handles the network settings.

Related references

UEFI iSCSI Settings details on page 42
UEFI iSCSI Settings on page 41

Related tasks

Viewing UEFI iSCSI Settings on page 41

Viewing UEFI iSCSI Settings

To view the **UEFI iSCSI Settings** screen, perform the following steps:

Steps

1. Turn on, or restart your system.
2. Press F2 immediately after you see the following message:

```
F2 = System Setup
```

NOTE: If your operating system begins to load before you press F2, wait for the system to finish booting, and then restart your system and try again.

3. On the **System Setup Main Menu** screen, click **System BIOS**.
4. On the **System BIOS** screen, click **Network Settings**.
5. On the **Network Settings** screen, click **UEFI iSCSI Settings**.

Related references

UEFI iSCSI Settings on page 41

UEFI iSCSI Settings details

The **UEFI ISCSI Settings** screen details are explained as follows:

Option	Description
ISCSI Initiator Name	Specifies the name of the iSCSI initiator (iqn format).
ISCSI Device n (n = 1 to 4)	Enables or disables the iSCSI device. When disabled, a UEFI boot option is created for the iSCSI device automatically.

System Security

You can use the **System Security** screen to perform specific functions such as setting the system password, setup password and disabling the power button.

Related references

Operating with a setup password enabled on page 45
System BIOS on page 38

Related tasks

System Security Settings details on page 42
Viewing System Security on page 42
Creating a system and setup password on page 43
Using your system password to secure your system on page 44
Deleting or changing system and setup password on page 44

Viewing System Security

To view the **System Security** screen, perform the following steps:

Steps

1. Turn on, or restart your system.
2. Press F2 immediately after you see the following message:

```
F2 = System Setup
```

NOTE: If your operating system begins to load before you press F2, wait for the system to finish booting, and then restart your system and try again.

3. On the **System Setup Main Menu** screen, click **System BIOS**.
4. On the **System BIOS** screen, click **System Security**.

Related references

System Security on page 42

Related tasks

System Security Settings details on page 42

System Security Settings details

About this task

The **System Security Settings** screen details are explained as follows:

Option	Description
Intel AES-NI	Improves the speed of applications by performing encryption and decryption by using the Advanced Encryption Standard Instruction Set (AES-NI). This option is set to **Enabled** by default.
System Password	Sets the system password. This option is set to **Enabled** by default and is read-only if the password jumper is not installed in the system.
Setup Password	Sets the setup password. This option is read-only if the password jumper is not installed in the system.
Password Status	Locks the system password. This option is set to **Unlocked** by default.
TPM Security	**NOTE:** The TPM menu is available only when the TPM module is installed. Enables you to control the reporting mode of the TPM. The **TPM Security** option is set to **Off** by default. You can only modify the TPM Status, and TPM Activation fields if the **TPM Status** field is set to either **On with Pre-boot Measurements** or **On without Pre-boot Measurements**.
TPM Information	Changes the operational state of the TPM. This option is set to **No Change** by default.
TPM Status	Specifies the TPM status.
TPM Command	**CAUTION: Clearing the TPM results in the loss of all keys in the TPM. The loss of TPM keys may affect booting to the operating system.** Clears all the contents of the TPM. The **TPM Clear** option is set to **No** by default.
Power Button	Enables or disables the power button on the front of the system. This option is set to **Enabled** by default.
AC Power Recovery	Sets how the system behaves after AC power is restored to the system. This option is set to **Last** by default.
AC Power Recovery Delay	Sets the time delay for the system to power up after AC power is restored to the system. This option is set to **Immediate** by default.
User Defined Delay (60s to 240s)	Sets the **User Defined Delay** option when the **User Defined** option for **AC Power Recovery Delay** is selected.
UEFI Variable Access	Provides varying degrees of securing UEFI variables. When set to **Standard** (the default), UEFI variables are accessible in the operating system per the UEFI specification. When set to **Controlled**, selected UEFI variables are protected in the environment and new UEFI boot entries are forced to be at the end of the current boot order.

Related references

System Security on page 42

Related tasks

Viewing System Security on page 42

Creating a system and setup password

Prerequisites

Ensure that the password jumper is enabled. The password jumper enables or disables the system password and setup password features. For more information, see the System board jumper settings section.

NOTE: If the password jumper setting is disabled, the existing system password and setup password are deleted and you need not provide the system password to boot the system.

Steps

1. To enter System Setup, press F2 immediately after turning on or rebooting your system.
2. On the **System Setup Main Menu** screen, click **System BIOS** > **System Security**.
3. On the **System Security** screen, verify that **Password Status** is set to **Unlocked**.
4. In the **System Password** field, type your system password, and press Enter or Tab.

Use the following guidelines to assign the system password:

- A password can have up to 32 characters.
- The password can contain the numbers 0 through 9.
- Only the following special characters are allowed: space, (”), (+), (,), (-), (.), (/), (;), ([), (\), (]), (`).

A message prompts you to reenter the system password.

5. Reenter the system password, and click **OK**.
6. In the **Setup Password** field, type your setup password and press Enter or Tab.
   A message prompts you to reenter the setup password.
7. Reenter the setup password, and click **OK**.
8. Press Esc to return to the System BIOS screen. Press Esc again.
   A message prompts you to save the changes.
   NOTE: Password protection does not take effect until the system reboots.

Related references

System Security on page 42

Using your system password to secure your system

About this task

If you have assigned a setup password, the system accepts your setup password as an alternate system password.

Steps

1. Turn on or reboot your system.
2. Type the system password and press Enter.

Next steps

When **Password Status** is set to **Locked**, type the system password and press Enter when prompted at reboot.

NOTE: If an incorrect system password is typed, the system displays a message and prompts you to reenter your password. You have three attempts to type the correct password. After the third unsuccessful attempt, the system displays an error message that the system has stopped functioning and must be turned off. Even after you turn off and restart the system, the error message is displayed until the correct password is entered.

Related references

System Security on page 42

Deleting or changing system and setup password

Prerequisites

NOTE: You cannot delete or change an existing system or setup password if the **Password Status** is set to **Locked**.

Steps

1. To enter System Setup, press F2 immediately after turning on or restarting your system.
2. On the **System Setup Main Menu** screen, click **System BIOS** > **System Security**.
3. On the **System Security** screen, ensure that **Password Status** is set to **Unlocked**.
4. In the **System Password** field, alter or delete the existing system password, and then press Enter or Tab.
5. In the **Setup Password** field, alter or delete the existing setup password, and then press Enter or Tab.

If you change the system and setup password, a message prompts you to reenter the new password. If you delete the system and setup password, a message prompts you to confirm the deletion.

6. Press Esc to return to the **System BIOS** screen. Press Esc again, and a message prompts you to save the changes.

Related references

System Security on page 42

Operating with a setup password enabled

If **Setup Password** is set to **Enabled**, type the correct setup password before modifying the system setup options.

If you do not type the correct password in three attempts, the system displays the following message:

```
Invalid Password! Number of unsuccessful password attempts: <x> System Halted! Must
power down.
```

Even after you turn off and restart the system, the error message is displayed until the correct password is typed. The following options are exceptions:

- If **System Password** is not set to **Enabled** and is not locked through the **Password Status** option, you can assign a system password. For more information, see the System Security Settings screen section.
- You cannot disable or change an existing system password.

NOTE: You can use the password status option with the setup password option to protect the system password from unauthorized changes.

Related references

System Security on page 42

System Information

You can use the **System Information** screen to view system properties such as Service Tag, system model name, and the BIOS version.

Related references

System Information details on page 46
System BIOS on page 38

Related tasks

Viewing System Information on page 45

Viewing System Information

To view the **System Information** screen, perform the following steps:

Steps

1. Turn on, or restart your system.
2. Press F2 immediately after you see the following message:

   ```
   F2 = System Setup
   ```

   NOTE: If your operating system begins to load before you press F2, wait for the system to finish booting, and then restart your system and try again.

3. On the **System Setup Main Menu** screen, click **System BIOS**.
4. On the **System BIOS** screen, click **System Information**.

Related references

System Information on page 45

System Information details

About this task

The **System Information** screen details are explained as follows:

Option	Description
System Model Name	Specifies the system model name.
System BIOS Version	Specifies the BIOS version installed on the system.
System Management Engine Version	Specifies the current version of the Management Engine firmware.
System Service Tag	Specifies the system Service Tag.
System Manufacturer	Specifies the name of the system manufacturer.
System Manufacturer Contact Information	Specifies the contact information of the system manufacturer.
System CPLD Version	Specifies the current version of the system complex programmable logic device (CPLD) firmware.
UEFI Compliance Version	Specifies the UEFI compliance level of the system firmware.

Related references

System Information on page 45
System Information details on page 46

Related tasks

Viewing System Information on page 45

Memory Settings

You can use the **Memory Settings** screen to view all the memory settings and enable or disable specific memory functions, such as memory testing and node interleaving.

Related references

Memory Settings details on page 47
System BIOS on page 38

Related tasks

Viewing Memory Settings on page 47

Viewing Memory Settings

To view the **Memory Settings** screen, perform the following steps:

Steps

1. Turn on, or restart your system.
2. Press F2 immediately after you see the following message:

```
F2 = System Setup
```

NOTE: If your operating system begins to load before you press F2, wait for the system to finish booting, and then restart your system and try again.

3. On the **System Setup Main Menu** screen, click **System BIOS**.
4. On the **System BIOS** screen, click **Memory Settings**.

Related references

Memory Settings on page 46
Memory Settings details on page 47

Memory Settings details

About this task

The **Memory Settings** screen details are explained as follows:

Option	Description
System Memory Model	Displays options to select the memory models which determine how the tiles align with memory on the package. The default setting is **Quadrant**. When set to All2All, memory traffic is uniformly hashed across all distributed directories. All the cores will be serviced by all CHA's (Caching Home Agent). When set to SNC-2 (Sub-NUMA Cluster), the processor tile array is divided into equal halves each configured as a separate Non-Uniform Memory Architecture (NUMA) domain to the O/S. When set to SNC-4 (Sub-NUMA Cluster), the processor tile array is divided into four quadrants each configured as a separate NUMA domain to the O/S. When set to Hemisphere all the CHAs, EDCs, MCs are equally split and assigned to two clusters (system address space is interleaved instead of split). When set to Quadrant all the CHAs, EDCs, MCs are equally split and assigned to four clusters (system address space is interleaved instead of split). **NOTE:** **Quadrant** and **Hemisphere** mode are transparent to operating system software (OS) and therefore do not require a NUMA aware OS to take advantage of any performance gains. OS software does not see separate NUMA nodes for each half or quadrant. **NOTE:** The System Memory Model switches to All2All mode automatically when single DIMM is installed. **NOTE:** SNC-2 (Sub-NUMA Cluster) and Hemisphere modes are not supported on Intel Xeon Phi 72XX and Phi 72XXF processors.
Processor Embedded Memory Mode	Displays options to select the processor memory mode which determines how the embedded memory is allocated to either cache, system memory, or both. The default setting is **Cache**. When set to Memory, all the embedded memory is allocated to system memory. When set to Cache, all the embedded memory is allocated to cache. When set to Hybrid, half of the embedded memory is allocated to cache and half to system memory.

Option	Description
	NOTE: DIMM sockets 01 to 08 are not available when Processor Embedded Memory Mode is set to Cache mode. **NOTE:** Memory size of DIMMs installed on sockets 01 to 08 is reduced when Processor Embedded Memory Mode mode is changed from Memory to Hybrid. **NOTE:** Cache and Hybrid modes are not supported on All2All mode of System Memory Model on Intel Xeon Phi 72XX and Phi 72XXF processors.
Memory Throttling Mode	Displays processor embedded memory thermal management/throttling modes. The default setting is **CLTT**. When set to CLTT, the processor periodically polls the thermal sensor data of the DIMMs for optimal power management. When set to OLTT, thermal throttling happens at a preconfigured temperature levels. OLTT should be used on error cases of CLTT where DIMM temperature reading sensors are not available.
System Memory Testing	Specifies whether the system memory tests are run during system boot. Options are **Enabled** and **Disabled**. This option is set to **Disabled** by default.
Memory Operating Mode	Specifies the memory operating mode. The available option is **Optimizer Mode**.
Processor Embedded Memory Total Size	Displays the total size of the processor embedded memory.
Processor Embedded Memory Allocated for Cache	Displays size of the processor embedded memory allocated to cache.
Processor Embedded Memory Allocated for System	Displays size of the processor embedded memory allocated to system memory.
Installed Memory Size	Displays the amount of DDR4 memory installed in the system.
System Memory Size	Specifies the memory size in the system.
System Memory Type	Specifies the type of memory installed in the system.
System Memory Speed	Specifies the memory speed.
System Memory Voltage	Specifies the memory voltage.
Video Memory	Specifies the amount of video memory.

Related references

Memory Settings on page 46

Related tasks

Viewing Memory Settings on page 47

Processor Settings

You can use the **Processor Settings** screen to view the processor settings, and perform specific functions such as enabling virtualization technology, hardware prefetcher, and logical processor idling.

Related references

Processor Settings details on page 49
System BIOS on page 38

Related tasks

Viewing Processor Settings on page 49

Viewing Processor Settings

To view the **Processor Settings** screen, perform the following steps:

Steps

1. Turn on, or restart your system.
2. Press F2 immediately after you see the following message:

```
F2 = System Setup
```

   NOTE: If your operating system begins to load before you press F2, wait for the system to finish booting, and then restart your system and try again.

3. On the **System Setup Main Menu** screen, click **System BIOS**.
4. On the **System BIOS** screen, click **Processor Settings**.

Related references

Processor Settings on page 49
Processor Settings details on page 49

Processor Settings details

About this task

The **Processor Settings** screen details are explained as follows:

Option	Description
L1 Prefetcher	Enables or disables the L1 Prefetcher. This setting can affect performance, depending on the application running on the server. Recommended for High Performance Computing applications. The default setting is set to **Enabled**.
L2 Prefetcher	Enables or disables the L2 Prefetcher. This setting can affect performance, depending on the application running on the server. Recommended for High Performance Computing applications. The default setting is set to **Enabled**.
Logical Processor	Enables or disables the logical processor and displays the logical processors. If this option is set to **Enabled**, the BIOS displays the logical processors. If this option is set to **Disabled**, the BIOS displays only one logical processor per core. This option is set to **Enabled** by default.
Logical Processor Idling	Enables you to improve the energy efficiency of a system. It uses the operating system core parking algorithm and parks some of the logical processors in the system which in turn allows the corresponding processor cores to transition into a lower power idle state. This option can only be enabled if the operating system supports it. It is set to **Disabled** by default.

Option	Description
Configurable TDP	Enables you to reconfigure the processor Thermal Design Power (TDP) levels during POST based on the power and thermal delivery capabilities of the system. TDP verifies the maximum heat the cooling system is needed to dissipate. This option is set to **Nominal** by default. **NOTE:** This option is only available on certain stock keeping units (SKUs) of the processors.
X2Apic Mode	Displays the X2Apic Mode setting that is read only and permanently set to enabled.
Processor 64-bit Support	Specifies if the processor(s) support 64-bit extensions.
Processor Core Speed	Specifies the maximum core frequency of the processor.
Processor 1	The following settings are displayed for each processor installed in the system:

Option	Description
Family-Model-Stepping	Specifies the family, model, and stepping of the processor as defined by Intel.
Brand	Specifies the brand name.
Level 2 Cache	Specifies the total L2 cache.
Number of Cores	Specifies the number of cores per processor.
Microcode	Indicates the Microcode update signature.

Related references

Processor Settings on page 49

Related tasks

Viewing Processor Settings on page 49

SATA Settings

You can use the **SATA Settings** screen to view the SATA settings of SATA devices and enable RAID on your system.

Related references

System BIOS on page 38

Related tasks

SATA Settings details on page 51
Viewing SATA Settings on page 50

Viewing SATA Settings

To view the **SATA Settings** screen, perform the following steps:

Steps

1. Turn on, or restart your system.
2. Press F2 immediately after you see the following message:

```
F2 = System Setup
```

NOTE: If your operating system begins to load before you press F2, wait for the system to finish booting, and then restart your system and try again.

3. On the **System Setup Main Menu** screen, click **System BIOS**.
4. On the **System BIOS** screen, click **SATA Settings**.

Related references

SATA Settings on page 50

Related tasks

SATA Settings details on page 51

SATA Settings details

About this task

The **SATA Settings** screen details are explained as follows:

NOTE:

- Port A is for the internal SATA SSD.
- Ports B — G are for the six front panel hard drives.

Option	Description
Embedded SATA	Enables the embedded SATA option to be set to **Off**, **ATA**, or**AHCI** modes. This option is set to **AHCI** by default.
Security Freeze Lock	Sends Security Freeze Lock command to the Embedded SATA drives during POST. This option is applicable only for ATA and AHCI modes.
Write Cache	Enables or disables the command for Embedded SATA drives during POST.
Port A	Sets the drive type of the selected device. For **Embedded SATA settings** in **ATA** mode, set this field to **Auto** to enable BIOS support. Set it to **OFF** to turn off BIOS support. For **AHCI** mode, BIOS support is always enabled.

Option	Description
Model	Specifies the drive model of the selected device.
Drive Type	Specifies the type of drive attached to the SATA port.
Capacity	Specifies the total capacity of the hard drive. This field is undefined for removable media devices such as optical drives.

Port B	Sets the drive type of the selected device. For **Embedded SATA settings** in **ATA** mode, set this field to **Auto** to enable BIOS support. Set it to **OFF** to turn off BIOS support. For **AHCI** mode, BIOS support is always enabled.

Option	Description
Model	Specifies the drive model of the selected device.
Drive Type	Specifies the type of drive attached to the SATA port.
Capacity	Specifies the total capacity of the hard drive. This field is undefined for removable media devices such as optical drives.

Port C	Sets the drive type of the selected device. For **Embedded SATA settings** in **ATA** mode, set this field to **Auto** to enable BIOS support. Set it to **OFF** to turn off BIOS support. For **AHCI** or **RAID** mode, BIOS support is always enabled.

Option	Description

Option	Description
Model	Specifies the drive model of the selected device.
Drive Type	Specifies the type of drive attached to the SATA port.
Capacity	Specifies the total capacity of the hard drive. This field is undefined for removable media devices such as optical drives.

Port D

Sets the drive type of the selected device. For **Embedded SATA settings** in **ATA** mode, set this field to **Auto** to enable BIOS support. Set it to **OFF** to turn off BIOS support.

For **AHCI** mode, BIOS support is always enabled.

Option	Description
Model	Specifies the drive model of the selected device.
Drive Type	Specifies the type of drive attached to the SATA port.
Capacity	Specifies the total capacity of the hard drive. This field is undefined for removable media devices such as optical drives.

Port E

Sets the drive type of the selected device. For **Embedded SATA settings** in **ATA** mode, set this field to **Auto** to enable BIOS support. Set it to **OFF** to turn off BIOS support.

For **AHCI** mode, BIOS support is always enabled.

Option	Description
Model	Specifies the drive model of the selected device.
Drive Type	Specifies the type of drive attached to the SATA port.
Capacity	Specifies the total capacity of the hard drive. This field is undefined for removable media devices such as optical drives.

Port F

Sets the drive type of the selected device. For **Embedded SATA settings** in **ATA** mode, set this field to **Auto** to enable BIOS support. Set it to **OFF** to turn off BIOS support.

For **AHCI** mode, BIOS support is always enabled.

Option	Description
Model	Specifies the drive model of the selected device.
Drive Type	Specifies the type of drive attached to the SATA port.
Capacity	Specifies the total capacity of the hard drive. This field is undefined for removable media devices such as optical drives.

Port G

Sets the drive type of the selected device. For **Embedded SATA settings** in **ATA** mode, set this field to **Auto** to enable BIOS support. Set it to **OFF** to turn off BIOS support.

For **AHCI** mode, BIOS support is always enabled.

Option	Description
Model	Specifies the drive model of the selected device.
Drive Type	Specifies the type of drive attached to the SATA port.
Capacity	Specifies the total capacity of the hard drive. This field is undefined for removable media devices such as optical drives.

Related references

SATA Settings on page 50

Related tasks

Viewing SATA Settings on page 50

Boot Settings

You can use the **Boot Settings** screen to set the boot mode to either **BIOS** or **UEFI**. It also enables you to specify the boot order.

Related references

System BIOS on page 38
Choosing the system boot mode on page 54

Related tasks

Boot Settings details on page 53
Viewing Boot Settings on page 53
Changing the boot order on page 55

Viewing Boot Settings

To view the **Boot Settings** screen, perform the following steps:

Steps

1. Turn on, or restart your system.
2. Press F2 immediately after you see the following message:

```
F2 = System Setup
```

   NOTE: If your operating system begins to load before you press F2, wait for the system to finish booting, and then restart your system and try again.

3. On the **System Setup Main Menu** screen, click **System BIOS**.
4. On the **System BIOS** screen, click **Boot Settings**.

Related references

Boot Settings on page 53
Choosing the system boot mode on page 54

Related tasks

Boot Settings details on page 53
Changing the boot order on page 55

Boot Settings details

About this task

The **Boot Settings** screen details are explained as follows:

Option	Description
Boot Mode	Enables you to set the boot mode of the system. **CAUTION: Switching the boot mode may prevent the system from booting if the operating system is not installed in the same boot mode.** If the operating system supports UEFI, you can set this option to **UEFI**. Setting this field to **BIOS** allows compatibility with non-UEFI operating systems. This option is set to **BIOS** by default.

Option	Description
	NOTE: Setting this field to **UEFI** disables the **BIOS Boot Settings** menu. Setting this field to **BIOS** disables the **UEFI Boot Settings** menu.
Boot Sequence Retry	Enables or disables the Boot Sequence Retry feature. If this option is set to **Enabled** and the system fails to boot, the system reattempts the boot sequence after 30 seconds. This option is set to **Enabled** by default.
Hard-Disk Failover	Specifies the hard drive that is booted in the event of a hard drive failure. The devices are selected in the **Hard-Disk Drive Sequence** on the **Boot Option Setting** menu. When this option is set to **Disabled**, only the first hard drive in the list is attempted to boot. When this option is set to **Enabled**, all hard drives are attempted to boot in the order selected in the **Hard-Disk Drive Sequence**. This option is not enabled for UEFI Boot Mode.
Boot Option Settings	Configures the boot sequence and the boot devices.
BIOS Boot Settings	Enables or disables BIOS boot options. **NOTE:** This option is enabled only if the boot mode is BIOS.
UEFI Boot Settings	Enables or disables UEFI Boot options. The Boot options include **IPv4 PXE** and **IPv6 PXE**. This option is set to **IPv4** by default. **NOTE:** This option is enabled only if the boot mode is UEFI.

Related references

Boot Settings on page 53
Choosing the system boot mode on page 54

Related tasks

Viewing Boot Settings on page 53
Changing the boot order on page 55

Choosing the system boot mode

System Setup enables you to specify one of the following boot modes for installing your operating system:

- BIOS boot mode (the default) is the standard BIOS-level boot interface.
- Unified Extensible Firmware Interface (UEFI) (the default) boot mode is an enhanced 64-bit boot interface. If you have configured your system to boot to UEFI mode, it replaces the system BIOS.

1. From the **System Setup Main Menu**, click **Boot Settings**, and select **Boot Mode**.
2. Select the boot mode you want the system to boot into.
   CAUTION: Switching the boot mode may prevent the system from booting if the operating system is not installed in the same boot mode.
3. After the system boots in the specified boot mode, proceed to install your operating system from that mode.

NOTE:

- Operating systems must be UEFI-compatible to be installed from the UEFI boot mode. DOS and 32-bit operating systems do not support UEFI and can only be installed from the BIOS boot mode.
- For the latest information about supported operating systems, go to Dell.com/ossupport.

Related references

Boot Settings on page 53

Related tasks

Boot Settings details on page 53
Viewing Boot Settings on page 53

Changing the boot order

About this task

You may have to change the boot order if you want to boot from a USB key or an optical drive. The following instructions may vary if you have selected **BIOS** for **Boot Mode**.

Steps

1. On the **System Setup Main Menu** screen, click **System BIOS** > **Boot Settings** > **BIOS Boot Setting**.
2. Click **Boot Option Settings** > **Boot Sequence**.
3. Use the arrow keys to select a boot device, and use the plus (+) and minus (-) sign keys to move the device down or up in the order.
4. Click **Exit**, and then click **Yes** to save the settings on exit.

Related references

Boot Settings on page 53

Related tasks

Boot Settings details on page 53
Viewing Boot Settings on page 53

Integrated Devices

You can use the **Integrated Devices** screen to view and configure the settings of all integrated devices including the video controller, integrated RAID controller, and the USB ports.

Related references

System BIOS on page 38

Related tasks

Integrated Devices details on page 56
Viewing Integrated Devices on page 55

Viewing Integrated Devices

To view the **Integrated Devices** screen, perform the following steps:

Steps

1. Turn on, or restart your system.
2. Press F2 immediately after you see the following message:

```
F2 = System Setup
```

NOTE: If your operating system begins to load before you press F2, wait for the system to finish booting, and then restart your system and try again.

3. On the **System Setup Main Menu** screen, click **System BIOS**.
4. On the **System BIOS** screen, click **Integrated Devices**.

Related references

Integrated Devices on page 55

Related tasks

Integrated Devices details on page 56

Integrated Devices details

About this task

The **Integrated Devices** screen details are explained as follows:

Option	Description
USB 3.0 Setting	Enables or disables the USB 3.0 support. Enable this option only if your operating system supports USB 3.0. If you disable this option, devices operate at USB 2.0 speed. USB 3.0 is enabled by default.
User Accessible USB Ports	Enables or disables the USB ports. Selecting **All Ports Off** disables all USB ports. The USB keyboard and mouse operate during boot process in certain operating systems. After the boot process is complete, the USB keyboard and mouse do not work if the ports are disabled. **NOTE:** Selecting **All Ports Off** disables the USB management port and also restricts access to iDRAC features.
Internal USB Port 1	Enables or disables the internal USB port.
Internal USB Port 2	Enables or disables the internal USB port.
Embedded NIC1 (i350 LOM)	Enables or disables the Embedded NIC1 port.
Embedded NIC2 (optional Mellanox Connect-X4)	Enables or disables the Embedded NIC2 port.
I/OAT DMA Engine	Enables or disables the I/OAT option. Enable only if the hardware and software support the feature.
Embedded Video Controller	Enables or disables the **Embedded Video Controller** option. This option is set to **Enabled** by default.
Current State of Embedded Video Controller	Displays the current state of the embedded video controller. The **Current State of Embedded Video Controller** option is a read-only field. If the Embedded Video Controller is the only display capability in the system (that is, no add-in graphics card is installed), then the Embedded Video Controller is automatically used as the primary display even if the **Embedded Video Controller** setting is set to **Disabled**.
OS Watchdog Timer	If your system stops responding, this watchdog timer aids in the recovery of your operating system. When this option is set to **Enabled**, the operating system initializes the timer. When this option is set to **Disabled** (the default), the timer does not have any effect on the system.
Memory Mapped I/O above 4 GB	Enables or disables the support for PCIe devices that need large amounts of memory. This option is set to **Enabled** by default.

Related references

Integrated Devices on page 55

Related tasks

Viewing Integrated Devices on page 55

Serial Communication

You can use the **Serial Communication** screen to view the properties of the serial communication port.

Related references

System BIOS on page 38

Related tasks

Serial Communication details on page 57
Viewing Serial Communication on page 57

Viewing Serial Communication

To view the **Serial Communication** screen, perform the following steps:

Steps

1. Turn on, or restart your system.
2. Press F2 immediately after you see the following message:

```
F2 = System Setup
```

NOTE: If your operating system begins to load before you press F2, wait for the system to finish booting, and then restart your system and try again.

3. On the **System Setup Main Menu** screen, click **System BIOS**.
4. On the **System BIOS** screen, click **Serial Communication**.

Related references

Serial Communication on page 56

Related tasks

Serial Communication details on page 57

Serial Communication details

About this task

The **Serial Communication** screen details are explained as follows:

Option	Description
Serial Communication	Selects serial communication devices (Serial Device 1 and Serial Device 2) in BIOS. Enables the **COM1** port. This option is set to **On with Console Redirection via COM1** by default.
Serial Port Address	Enables you to set the port address for serial devices. This option is set to **Serial Device1=COM1, Serial Device 2 = COM2** by default. **NOTE:** You can use only Serial Device 2 for the Serial Over LAN (SOL) feature. To use console redirection by SOL, configure the same port address for console redirection and the serial device. **NOTE:** Every time the system boots, the BIOS syncs the serial MUX setting saved in iDRAC. The serial MUX setting can independently be changed in iDRAC. Loading the BIOS default settings from within the BIOS setup utility may not always revert the serial MUX setting to the default setting of Serial Device 1.
External Serial Connector	Enables you to associate the External Serial Connector to Serial Device 1, Serial Device 2, or the Remote Access Device by using this option. **NOTE:** Only Serial Device 2 can be used for Serial Over LAN (SOL). To use console redirection by SOL, configure the same port address for console redirection and the serial device. **NOTE:** Every time the system boots, the BIOS syncs the serial MUX setting saved in iDRAC. The serial MUX setting can independently be changed in iDRAC. Loading the BIOS default settings from within the BIOS setup utility may not always revert this setting to the default setting of Serial Device 1.

Option	Description
Failsafe Baud Rate	Specifies the failsafe baud rate for console redirection. The BIOS attempts to determine the baud rate automatically. This failsafe baud rate is used only if the attempt fails, and the value must not be changed. This option is set to **115200** by default.
Remote Terminal Type	Sets the remote console terminal type. This option is set to **ANSI** by default.
Redirection After Boot	Enables or disables the BIOS console redirection when the operating system is loaded. This option is set to **Enabled** by default.

Related references

Serial Communication on page 56

Related tasks

Viewing Serial Communication on page 57

System Profile Settings

You can use the **System Profile Settings** screen to enable specific system performance settings such as power management.

Related references

System BIOS on page 38

Related tasks

System Profile Settings details on page 59
Viewing System Profile Settings on page 58

Viewing System Profile Settings

To view the **System Profile Settings** screen, perform the following steps:

Steps

1. Turn on, or restart your system.
2. Press F2 immediately after you see the following message:

```
F2 = System Setup
```

NOTE: If your operating system begins to load before you press F2, wait for the system to finish booting, and then restart your system and try again.

3. On the **System Setup Main Menu** screen, click **System BIOS**.
4. On the **System BIOS** screen, click **System Profile Settings**.

Related references

System Profile Settings on page 58

Related tasks

System Profile Settings details on page 59

System Profile Settings details

About this task

The **System Profile Settings** screen details are explained as follows:

Option	Description
System Profile	Sets the system profile. If you set the **System Profile** option to a mode other than **Custom**, the BIOS automatically sets the rest of the options. You can only change the rest of the options if the mode is set to **Custom**. **NOTE:** All the parameters on the system profile setting screen are available only when the **System Profile** option is set to **Custom**.
CPU Power Management	Sets the CPU power management. This option is set to **Maximum Performance** by default.
Memory Frequency	Sets the speed of the memory. You can select **Maximum Performance**, **Maximum Reliability**, or a specific speed.
Turbo Boost	Enables or disables the processor to operate in the turbo boost mode. This option is set to **Enabled** by default.
Energy Efficient Turbo	Enables or disables the **Energy Efficient Turbo** option. Energy Efficient Turbo (EET) is a mode of operation where a processor's core frequency is adjusted to be within the turbo range based on workload.
C States	Enables or disables the processor to operate in all available power states. This option is set to **Disabled** by default.
Memory Patrol Scrub	Sets the memory patrol scrub frequency. This option is set to **Standard** by default.
Memory Refresh Rate	Sets the memory refresh rate to either 1x or 2x. This option is set to **1x** by default.
Monitor/Mwait	Enables the Monitor/Mwait instructions in the processor. This option is set to **Enabled** for all system profiles, except **Custom** by default. **NOTE:** This option can be disabled only if the **C States** option in the **Custom** mode is set to **disabled**. **NOTE:** When **C States** is set to **Enabled** in the **Custom** mode, changing the Monitor/Mwait setting does not impact the system power or performance.

Related references

System Profile Settings on page 58

Related tasks

Viewing System Profile Settings on page 58

Miscellaneous Settings

You can use the **Miscellaneous Settings** screen to perform specific functions such as updating the asset tag and changing the system date and time.

Related references

System BIOS on page 38

Related tasks

Miscellaneous Settings details on page 60
Viewing Miscellaneous Settings on page 60

Viewing Miscellaneous Settings

To view the **Miscellaneous Settings** screen, perform the following steps:

Steps

1. Turn on, or restart your system.
2. Press F2 immediately after you see the following message:

```
F2 = System Setup
```

NOTE: If your operating system begins to load before you press F2, wait for the system to finish booting, and then restart your system and try again.

3. On the **System Setup Main Menu** screen, click **System BIOS**.
4. On the **System BIOS** screen, click **Miscellaneous Settings**.

Related references

Miscellaneous Settings on page 59

Related tasks

Miscellaneous Settings details on page 60

Miscellaneous Settings details

About this task

The **Miscellaneous Settings** screen details are explained as follows:

Option	Description
System Time	Enables you to set the time on the system.
System Date	Enables you to set the date on the system.
Asset Tag	Specifies the asset tag and enables you to modify it for security and tracking purposes.
Keyboard NumLock	Enables you to set whether the system boots with the NumLock enabled or disabled. This option is set to **On** by default. **NOTE:** This option does not apply to 84-key keyboards.
F1/F2 Prompt on Error	Enables or disables the F1/F2 prompt on error. This option is set to **Enabled** by default. The F1/F2 prompt also includes keyboard errors.
Load Legacy Video Option ROM	Enables you to determine whether the system BIOS loads the legacy video (INT 10H) option ROM from the video controller. Selecting **Enabled** in the operating system does not support UEFI video output standards. This field is available only for UEFI boot mode.

Related references

Miscellaneous Settings on page 59

Related tasks

Viewing Miscellaneous Settings on page 60

iDRAC Settings utility

The iDRAC settings utility is an interface to set up and configure the iDRAC parameters by using UEFI. You can enable or disable various iDRAC parameters by using the iDRAC settings utility.

NOTE: Accessing some of the features on the iDRAC settings utility needs the iDRAC Enterprise License upgrade.

For more information about using iDRAC, see *Dell Integrated Dell Remote Access Controller User's Guide* at Dell.com/idracmanuals.

Related concepts

Device Settings on page 61

Related references

System BIOS on page 38

Related tasks

Entering the iDRAC Settings utility on page 61
Changing the thermal settings on page 61

Entering the iDRAC Settings utility

Steps

1. Turn on or restart the managed system.
2. Press F2 during Power-on Self-test (POST).
3. On the **System Setup Main Menu** page, click **iDRAC Settings**.
   The **iDRAC Settings** screen is displayed.

Related references

iDRAC Settings utility on page 60

Changing the thermal settings

The iDRAC settings utility enables you to select and customize the thermal control settings for your system.

NOTE: Selection of thermal profile does not change the default Fan speed. Fan speed automatically changes as per the system temperature irrespective of the **THERMAL PROFILE** in effect or select the **Custom** fan speed option to set it to desired speed.

1. Click **iDRAC Settings** > **Thermal**.
2. Under **SYSTEM THERMAL PROFILE** > **Thermal Profile**, select one of the following options:
   - Default Thermal Profile Settings
   - Maximum Performance (Performance Optimized)
   - Minimum Power (Performance per Watt Optimized)
3. Under **USER COOLING OPTIONS**, set the **Fan Speed Offset**, **Minimum Fan Speed**, and **Custom Minimum Fan Speed**.
4. Click **Back** > **Finish** > **Yes**.

Related references

iDRAC Settings utility on page 60

Device Settings

Device Settings enables you to configure device parameters.

Related references

System BIOS on page 38

Dell Lifecycle Controller

Dell Lifecycle Controller (LC) provides advanced embedded system management capabilities including system deployment, configuration, update, maintenance, and diagnosis. LC is delivered as part of the iDRAC out-of-band solution and Dell EMC system embedded Unified Extensible Firmware Interface (UEFI) applications.

Related references

Embedded systems management on page 62

Embedded systems management

The Dell Lifecycle Controller provides advanced embedded systems management throughout the lifecycle of the system. The Dell Lifecycle Controller can be started during the boot sequence and can function independently of the operating system.

NOTE: Certain platform configurations may not support the full set of features provided by the Dell Lifecycle Controller.

For more information about setting up the Dell Lifecycle Controller, configuring hardware and firmware, and deploying the operating system, see the Dell Lifecycle Controller documentation at **Dell.com/idracmanuals**.

Related references

Dell Lifecycle Controller on page 62

Boot Manager

The **Boot Manager** screen enables you to select boot options and diagnostic utilities.

Related references

Boot Manager main menu on page 63
System BIOS on page 38

Related tasks

Viewing Boot Manager on page 62

Viewing Boot Manager

To enter **Boot Manager**:

Steps

1. Turn on, or restart your system.
2. Press F11 when you see the following message:

   ```
   F11 = Boot Manager
   ```

   If your operating system begins to load before you press F11, allow the system to complete the booting, and then restart your system and try again.

Related references

Boot Manager on page 62
Boot Manager main menu on page 63

Boot Manager main menu

Menu item	Description
Continue Normal Boot	The system attempts to boot to devices starting with the first item in the boot order. If the boot attempt fails, the system continues with the next item in the boot order until the boot is successful or no more boot options are found.
One-shot Boot Menu	Enables you to access boot menu, where you can select a one-time boot device to boot from.
Launch System Setup	Enables you to access System Setup.
Launch Lifecycle Controller	Exits the Boot Manager and invokes the Dell Lifecycle Controller program.
System Utilities	Enables you to launch System Utilities menu such as System Diagnostics and UEFI shell.

Related references

Boot Manager on page 62

Related tasks

Viewing Boot Manager on page 62

One-shot BIOS boot menu

One-shot BIOS boot menu enables you to select a boot device to boot from.

Related references

Boot Manager on page 62

System Utilities

System Utilities contains the following utilities that can be launched:

- Launch Diagnostics
- BIOS/UEFI Update File Explorer
- Reboot System

NOTE: Depending on the boot mode selected, you might have BIOS or UEFI Update File Explorer.

Related references

Boot Manager on page 62

PXE boot

You can use the Preboot Execution Environment (PXE) option to boot and configure the networked systems, remotely.

NOTE: To access the **PXE boot** option, boot the system and then press F12. The system scans and displays the active networked systems.

6

Updating the Fan Control Board firmware

The following section outlines the steps needed to update the Fan Control Board (FCB) firmware on the PowerEdge C6300 enclosure and set the chassis type sticky bits. This procedure is only applicable for the PowerEdge C6300 2U chassis with 2.5-inch x24 hard drives backplane without an expander.

NOTE: Mixing the PowerEdge C6320 and PowerEdge C6320p sleds in the same PowerEdge C6300 chassis is not supported.

In the event that PowerEdge C6320 and PowerEdge C6320p sleds are installed in the same PowerEdge C6300 chassis, the following error conditions are noticed:

- The system state LED on the unsupported sled blinks with an amber color.
- On the front panel of the enclosure the power indictor blinks with an amber color.
- The system state LED of the unsupported sled blinks blue on the front panel.
- The fans will run at high speed.
- A System Event Log (SEL) is generated in the unsupported sleds iDRAC logs. For example: `Unable to control the fan speed because a sled mismatch or hardware incompatiblity is detected.`

Topics:

Fan control board firmware

The fan control board (FCB) firmware update can be initiated from any sled installed in the C6300 chassis.

NOTE: The FCB firmware can be updated only from a sled that uses a supported Linux operating system.

NOTE: When the FCB firmware is updated through RACADM, the updated process will take at least 20 minutes to complete.

Updating the fan control board firmware using Racadm

Prerequisites

Prepare Network File Share (NFS) environment and share folder to place the update file. For more information see, How to configure a Network File System

Steps

1. The **rpcbind** and **nfs-util** tools should be installed in the operating system.
2. Set the NFS configuration. For example: `vim /etc/exports` or `/MyDocument 192.168.0.0/125(rw)`

3. Start the NFS service using any one of these commands:

```
/etc/init.d/rpcbind start
```

```
/etc/init.d/nfs start
```

```
/etc/init.d/nfslock start
```

```
chkconfig rpcbind on
```

```
chkconfig nfs on
```

```
chkconfig nfslock on
```

4. Check the connection status of the share folder. `showmount [-ae] [hostname|IP]` For example: `showmount -e localhost`
5. Connect LAN port of the sled, and set the IP address to the same domain. For example: Remote address 192.168.0.2
   a. Open and set the terminal tool. Use **ssh** in **Putty.exe** and set the sled address. For example: **Sled address: 192.168.0.120**
   b. Log in with user name: **root** and password: **calvin**
   c. Start the NFS service. By using this command: `/etc/init.d/rpcbind start`
   d. Check share folder. By using this command: `showmount -e 192.168.0.2`
   e. **NOTE:**
      - To run the **racadm update** command from the operating system, ensure that the Remote Access component is installed. You can install the Remote Access component from the OpenManage DVD or the ISO image.
      - To run the **racadm update** command from iDRAC shell, use SSH in Putty.exe and login as an administrator.

      Rename the extension of the firmware update file to ***.sc** (for example: `rename FC309.bin to FC309.sc`) and run the firmware update by executing the command: `racadm update -f <updatefile.sc> -l 1.2.3.4:/share folder`. For example: `racadm update -f FC309.sc -l 192.168.0.2:/Mydocument`

   NOTE: After the update process starts this message is displayed **RAC1066: Firmware update for FC309.sc initiated successfully**. The iDRAC takes approximately 20 minutes to complete the process after you receive this message.

   NOTE: The fan control board (FCB) firmware update file name **FC309.sc** depends on the firmware level of the version being updated.

6. **NOTE:** Ensure that all the installed servers are shut down.

   Restart the PE C6300 enclosure after updating the FCB firmware by turning off the main power sources.

Checking the FCB firmware version

Steps

Check the fan control board (FCB) firmware version by executing this IPMI command `ipmitool -U server_user_name -P server_user_pass_word -H server_IP -I lanplus raw 0x30 0x12`. For example, to check the FCB firmware version v3.09, execute this command:

```
ipmitool -U root -P calvin -H 10.3.25.127 -I lanplus raw 0x30 0x12
```

Response: `01 69 1b` **03 09** ***06*** `26 00 00` **04** `ff 00 01 2a 2f ff ff 0f c2 00 00 01 04 01 04 31 c5 11 ff 0f`

NOTE:

- The FCB version will be listed in the 4th and 5th bytes (from the left) of the output. In this output, **03 09** (4th and 5th bytes from the left) indicates the FCB version.

- The fan table version is listed in the 6th byte of the output. In this output, ***06*** (6th byte from the left) indicates the fan table version.
- The node slot is listed in the 10th byte of the output. In this output, **04** (10th byte from the left) indicates the node slot.

Chassis type sticky bits

The chassis type sticky bits are used to define the enclosure support for the PowerEdge C6320p sled.

Installing a sled in the PowerEdge C6300 chassis that does not match the chassis type sticky bits results in:

- The enclosure fans running to 100% speed
- The sled UID LED blinking blue
- The sled power button blinking amber
- An “Unable to control the fan speed because a sled mismatch or hardware incompatibility is detected” entry being logged in the System Event Log (SEL) of the sled
- Unable to control the fan speed due to sled mismatch or hardware incompatibility is detected

Setting chassis type sticky bits for the PowerEdge C6320p sleds

Steps

Use the IPMI cmd: `ipmitool -U server_user_name -P server_user_pass_word -H server IP -I lanplus raw 0x30 0xc8 0x00 0x0A 0x05 0x00 0x00 0x00 0x05 0x00 0x70 0x8e 0x02` to set the chassis type for the PowerEdge C6320p sled. For example: To set chassis type for the PowerEdge C6320p sled execute this command

```
ipmitool -U server_user_name -P server_user_pass_word -H server IP -I lanplus raw 0x30
0xc8 0x00 0x0A 0x05 0x00 0x00 0x00 0x05 0x00 0x70 0x8e 0x02
```

Response: `0x0a 0x05 0x00 0x00 0x00`

Checking the chassis type sticky bits for the PowerEdge C6320p sled

Steps

Use the IPMI cmd: `ipmitool -U server_user_name -P server_user_pass_word -H server IP -I lanplus raw 0x30 0xc8 0x01 0x0A 0x05 0x00 0x00 0x00` to check if the chassis type is set for the PowerEdge C6320p sled. For example: To check if the chassis type is set for the PowerEdge C6320p sled execute this command

```
ipmitool -U root -P calvin -H 10.3.25.127 -I lanplus raw  0x30 0xc8 0x01 0x0A 0x05 0x00
0x00 0x00
```

Response: `0x0a 0x05 0x00 0x00 0x00 0x5 0x00` **0x70 0x8e 0x02**

7

Prerequisites for installing and removing components

Topics:

Safety instructions

NOTE: 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.

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.

NOTE: It is recommended that you always use an antistatic mat and antistatic strap while working on components inside the system.

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

Before working inside your system

Prerequisites

Follow the safety guidelines listed in the Safety instructions section.

Steps

1. Turn off the system, including any attached peripherals.
2. Disconnect the system from the electrical outlet and disconnect the peripherals.
3. If applicable, remove the system from the rack.
   For more information, see the *Dell PowerEdge C6320p Getting Started Guide* at **Dell.com/poweredgemanuals**.
4. Remove the system cover.

Related references

Safety instructions on page 67

Related tasks

Removing the system cover on page 148

After working inside your system

Prerequisites

Follow the safety guidelines listed in the Safety instructions section.

Steps

1. Install the system cover.
2. If applicable, install the system into the rack.
   For more information, see the *Dell PowerEdge C6320p Getting Started Guide* at **Dell.com/poweredgemanuals**.
3. Reconnect the peripherals and connect the system to the electrical outlet.
4. Turn on the system, including any attached peripherals.

Related references

Safety instructions on page 67

Related tasks

Installing the system cover on page 149

Recommended tools

You need the following tools to perform the removal and installation procedures:

- Phillips #1 screwdriver
- Phillips #2 screwdriver
- 1/4 inch flat head screwdriver
- Torx #T20 screwdriver
- Torx #T30 screwdriver
- Wrist grounding strap

8

Installing and removing sled components

Topics:

Inside the system

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.

CAUTION: This system must be operated with the system cover installed to ensure proper cooling.

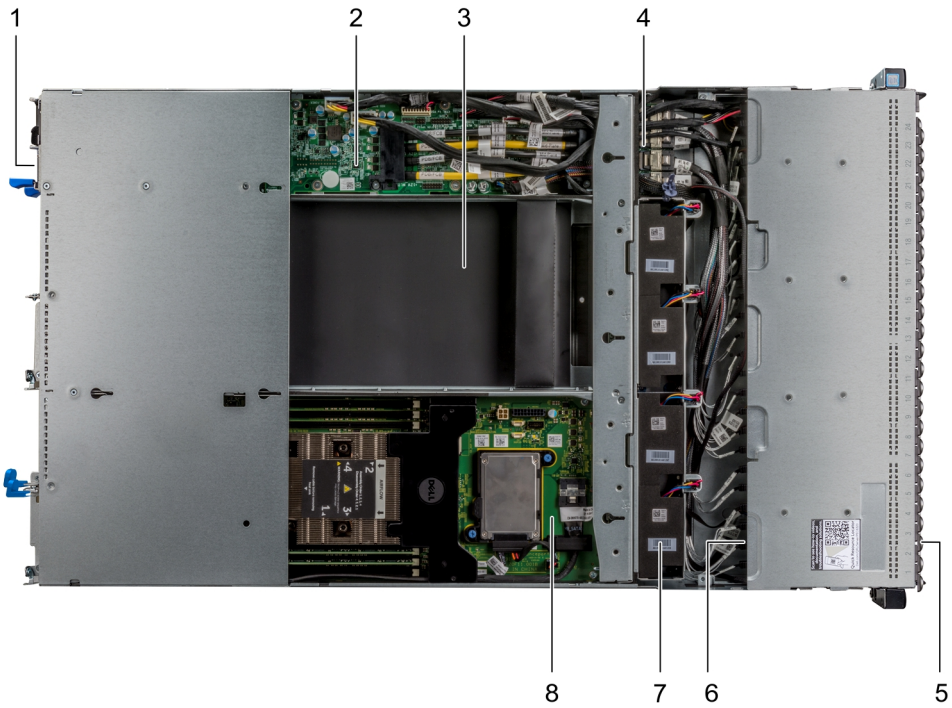

Figure 20. Inside the system

1. power supply unit (2)
2. power distribution board *(2)
3. sled blank
4. midplane (2)
5. hard drive (24)
6. backplane
7. cooling fan (4)
8. sled

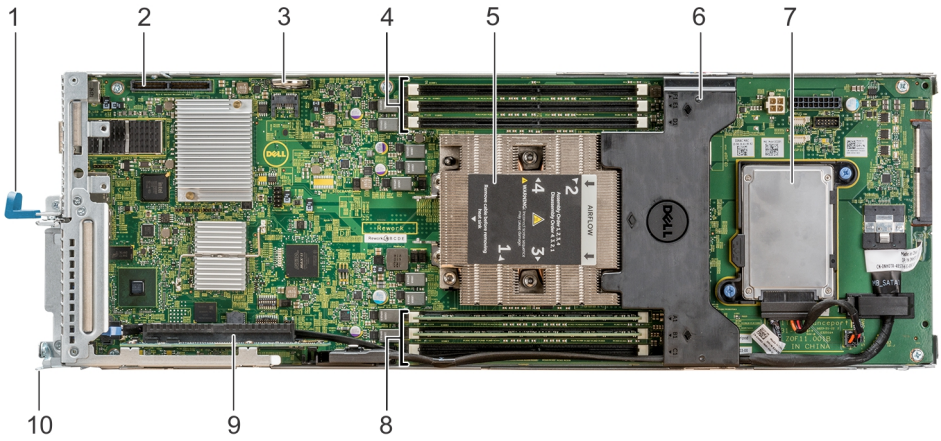

Figure 21. Inside the sled

1. sled pull handle
2. mezzanine card slot
3. system battery
4. memory slot (3)
5. processor heat sink module
6. air shroud
7. 1.8 inch Solid State Drive
8. memory slot (3)
9. PCIe riser slot
10. sled release handle

PowerEdge C6320p sled

The PowerEdge C6320p sled is a server unit that is installed into the PE C6300 enclosure. The sled features a processor, memory, slots for the PCIe expansion cards and onboard storage. Most of the hardware on the sled is dedicated for the sled.

Removing a sled

Prerequisites

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.

1. Follow the safety guidelines listed in the Safety instructions section.
2. Follow the procedure listed in the Before working inside your system section.
3. Keep the Phillips #2 screwdriver ready.

NOTE: If the sled is not being replaced immediately, a sled blank needs to be installed to ensure proper cooling of the system.

NOTE: The process of removing a sled blank is the same as the sled.

Steps

1. Remove the screw that secures the retaining latch.
2. Press the retaining latch and by using the handle, slide the sled out of the enclosure.

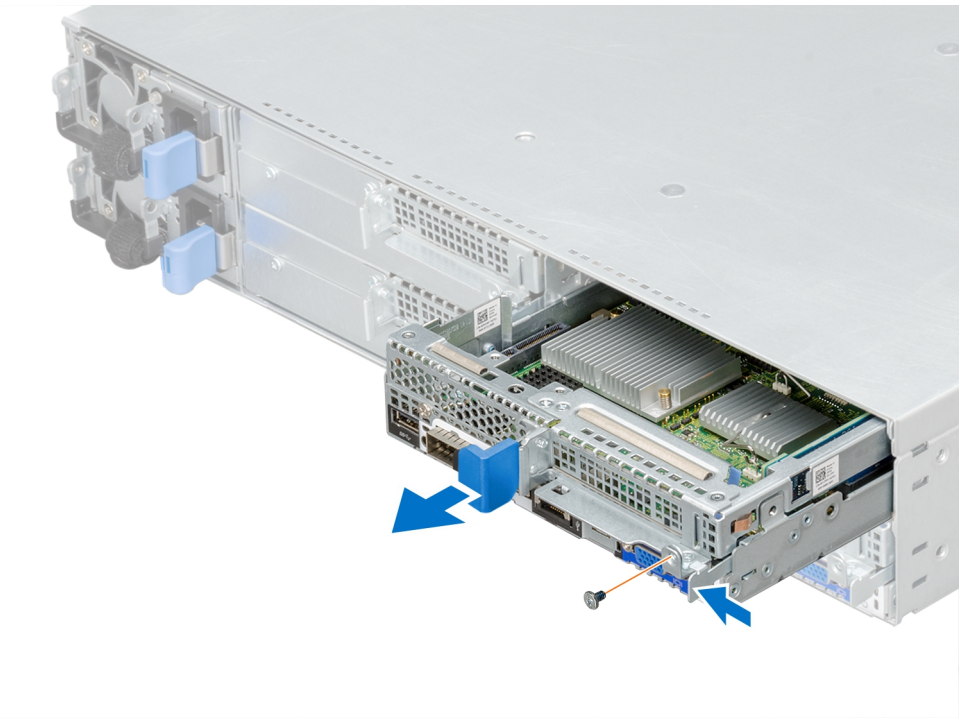

Figure 22. Removing a sled

Next steps

1. Install the sled or sled blank into the enclosure.
2. Follow the procedure listed in the After working inside your system section.

Related references

Safety instructions on page 67

Related tasks

Before working inside your system on page 67
Installing a sled on page 72
After working inside your system on page 68

Installing a sled

Prerequisites

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.

1. Follow the safety guidelines listed in the Safety instructions section.
2. Follow the procedure listed in the Before working inside your system section.
3. If installed, remove the sled blank from the enclosure.

   NOTE: The process to remove the sled blank is the same as removing a sled.
4. Keep the Phillips #2 screwdriver ready.

Steps

1. Slide the sled into the enclosure until it locks into place.
2. Replace the screw that secures the retaining latch.

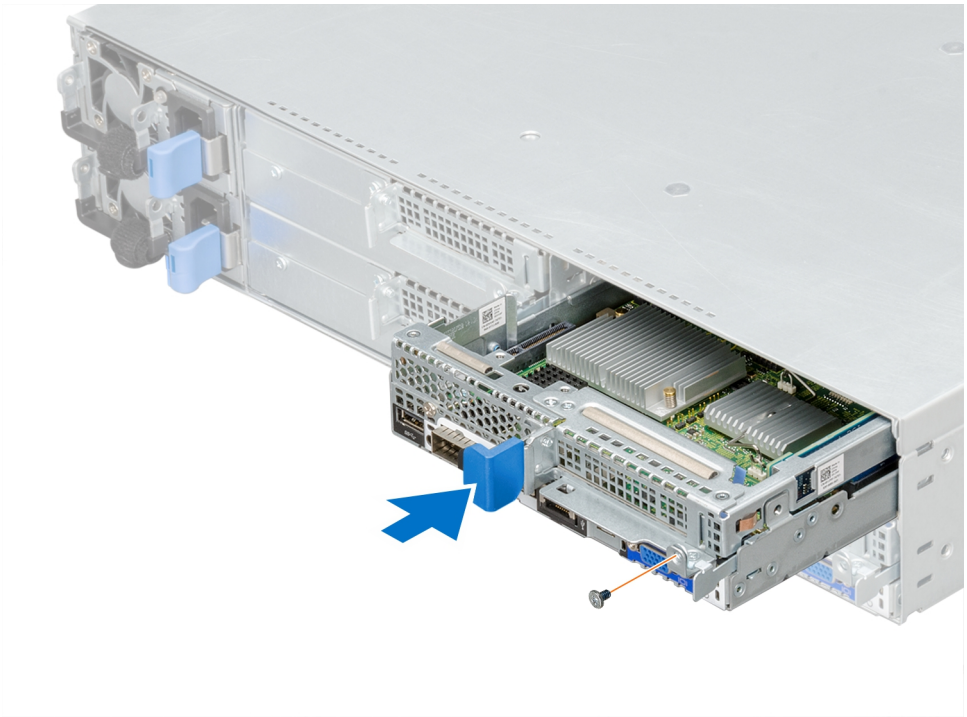

Figure 23. Installing a sled

Next steps

Follow the procedure listed in the After working inside your system section.

NOTE: To add the Service Tag of the system board to match the Service Tag of the physical node, contact Dell Technical Support.

Related references

Safety instructions on page 67

Related tasks

Before working inside your system on page 67
Removing a sled on page 71
After working inside your system on page 68

Air shroud

The air shroud aerodynamically directs the airflow across the sled. The airflow passes through all the critical parts of the sled, where the fans push the air across the entire surface area of the heat sink. There is a vacuum created by air pulled across the hard drives, thus allowing increased cooling.

Removing the air shroud

Prerequisites

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.

1. Follow the safety guidelines listed in the Safety instructions section.
2. Follow the procedure listed in the Before working inside your system section.
3. Remove the sled from the enclosure.

Steps

Pressing the locks on either side of the air shroud, lift the air shroud out of the sled.

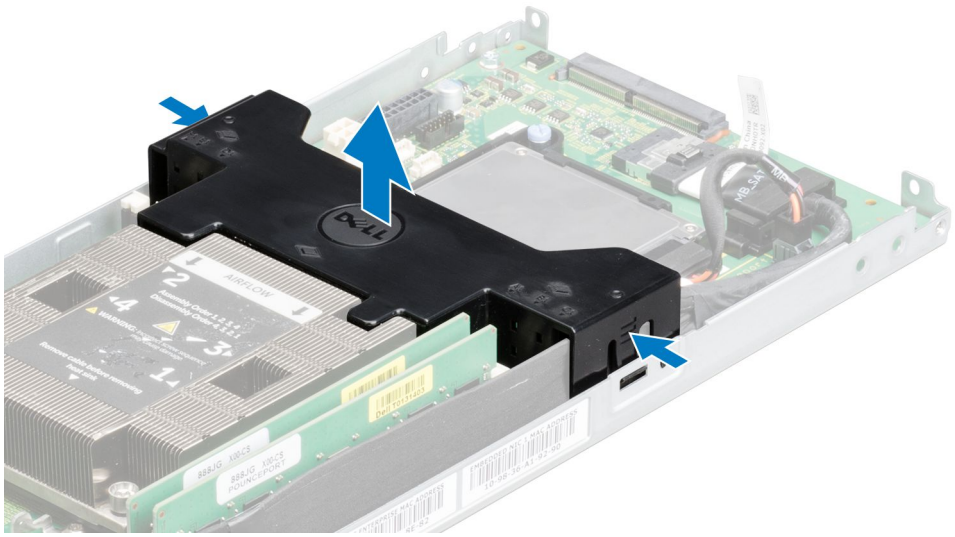

Figure 24. Removing the air shroud

Next steps

1. Install the air shroud.
2. Install the sled into the enclosure.
3. Follow the procedure listed in the After working inside your system section.

Related references

Safety instructions on page 67

Related tasks

Before working inside your system on page 67
Removing a sled on page 71
Installing the air shroud on page 74
Installing a sled on page 72
After working inside your system on page 68

Installing the air shroud

Prerequisites

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.

1. Follow the safety guidelines listed in the Safety instructions section.
2. Follow the procedure listed in the Before working inside your system section.
3. Remove the sled from the enclosure.

Steps

1. Insert the air shroud into the sled, aligning the latches with the lock slots on the sled chassis.

   NOTE: Ensure that both the SATA cables are routed through the air shroud cable guide slot behind the air shroud latches.

   NOTE: Ensure that neither of the cables are pinched or pressed under the air shroud.

2. Press the air shroud until the locks click into place.

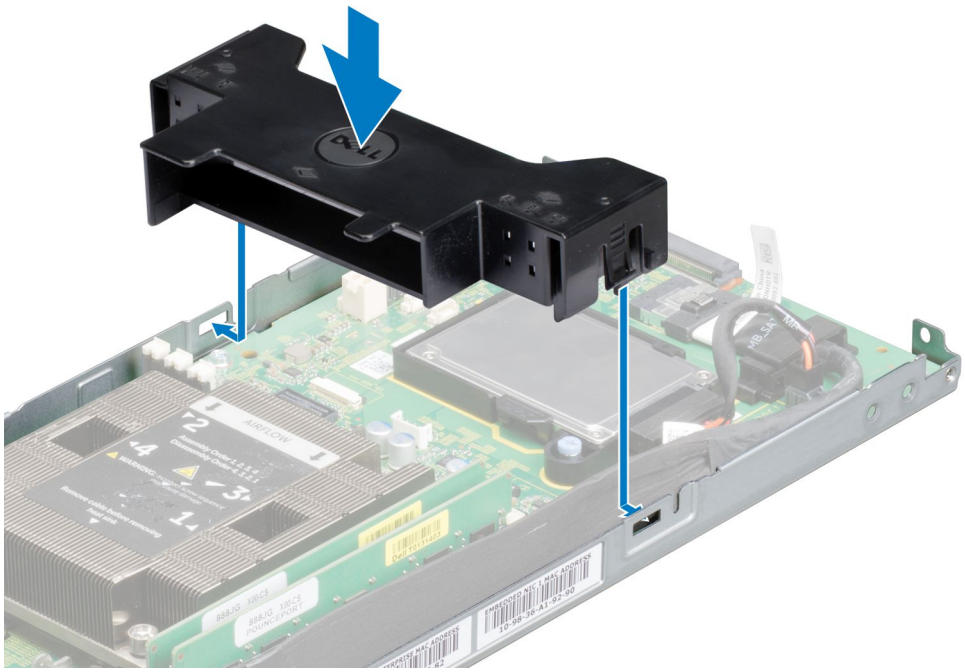

Figure 25. Installing the air shroud

Next steps

1. Install the sled into the enclosure.
2. Follow the procedure listed in the After working inside your system section.

System memory

System memory holds the instructions that the processor runs. Each system board has six DDR4 memory module sockets for the installation of DDR4-2400 MHz (2400 MHz at one DIMM per channel) memory modules. For the location of the memory modules, see the PowerEdge C6320p system board connectors section.

Memory slot features

- Support 6 channels, up to six DDR4 Registered DIMMs (RDIMMs) and Load Reduced DIMMs (LRDIMMs)
- Speed up to 2400 MT/s
- Maximum capacities: 384 GB with 64 GB LRDIMM
- Supports DDR4
- Supports Error Correction Code (ECC)

NOTE: Linux operating system does not support the S4 (hibernation) mode.

Supported memory module configuration

For the sequence of the six memory-module sockets, the system requires at least one memory module installed in DIMM slot A1 to boot up. When you insert the memory modules, always start with CH0_A1. The optimized memory module installation sequence is A1, (A1, D1), (B1, E1), (C1, F1).

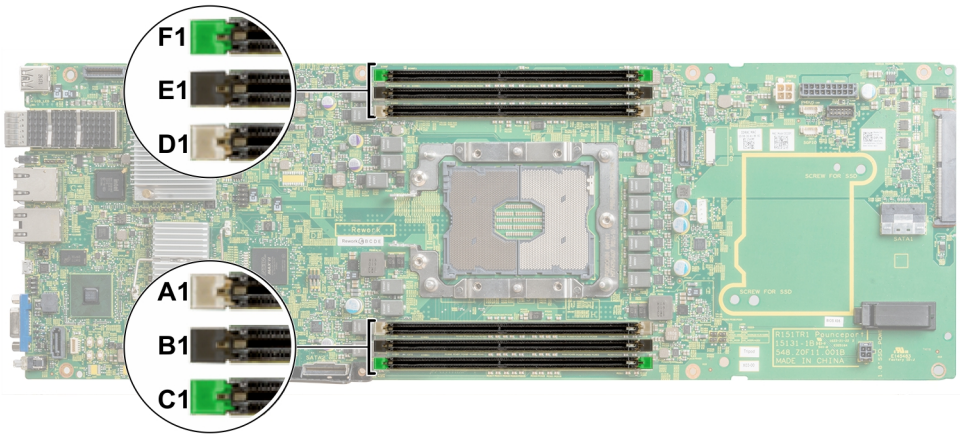

Figure 26. DIMM slot locations

Table 27. Memory module population

Memory modules	CH0	CH1	CH2	CH3	CH4	CH5
	A1	B1	C1	D1	E1	F1
1	√	–	–	–	–	–
2	√	–	–	√	–	–
4	√	√	–	√	√	–
6	√	√	√	√	√	√

NOTE: The Poweredge C6320p does not support:

- RAS modes (Advanced ECC, Sparing, Mirroring, and Fault Resilient configurations).
- mixed configurations. All populated DIMMs must be identical.
- three and five DIMMs configurations.

NOTE:

Removing the memory modules

Prerequisites

WARNING: The memory modules are hot to the touch for some time after the system has been powered down. Allow time for the memory modules to cool before handling them. Handle the memory modules by the card edges and avoid touching the components on the memory module.

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.

1. Follow the safety guidelines listed in the Safety instructions section.
2. Follow the procedure listed in the Before working inside your system section.
3. Remove the sled from the enclosure.
4. Remove the air shroud.

Steps

1. Locate the appropriate memory module socket.

CAUTION: Handle each memory module only on either card edge, ensuring not to touch the middle of the memory module. To avoid damaging components on the memory module, remove only one memory module at a time.

2. To release the memory module from the socket, simultaneously press the ejectors on both ends of the memory module socket.
3. Lift the memory module out of the socket by holding the memory module only by its edges.

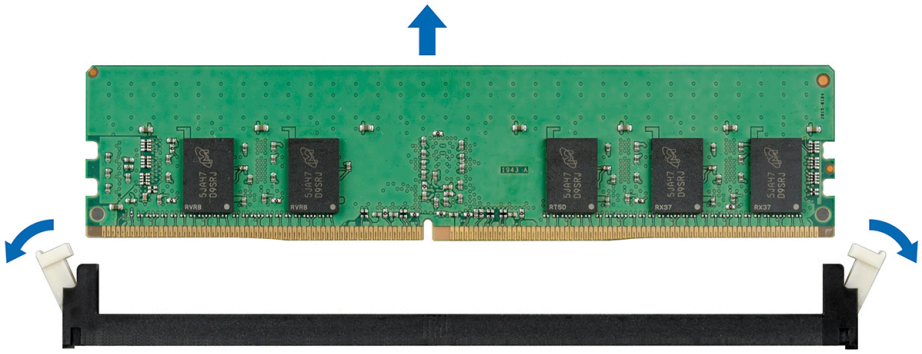

Figure 27. Removing a memory module

Next steps

1. Install the memory module.
2. Install the air shroud.
3. Install the sled into the enclosure.
4. Follow the procedure listed in the After working inside your system section.

Installing the memory modules

Prerequisites

WARNING: The memory modules are hot to the touch for some time after the system has been powered down. Allow time for the memory modules to cool before handling them. Handle the memory modules by the card edges and avoid touching the components on the memory module.

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.

1. Follow the safety guidelines listed in the Safety instructions section.
2. Follow the procedure listed in the Before working inside your system section.
3. Remove the sled from the chassis.
4. Remove the air shroud.

Steps

1. Locate the appropriate memory module socket.
2. Push out the ejectors on each end of the memory module socket.
3. Align the memory module correctly with the alignment key of the memory module socket.
4. Simultaneously press down firmly on both ends of the memory module with your thumbs until the module snaps into place.

CAUTION: Even pressure during insertion must be applied at both ends of the module simultaneously to prevent damage to the socket. No pressure should be applied to the center of the module.

5. Complete the latching of the module into the socket by applying inward pressure to the socket ejectors to ensure that the ejectors are in a locked position. When the memory module is properly seated in the socket, the ejectors on the memory module socket align with the ejectors on other identical sockets that have memory modules installed.

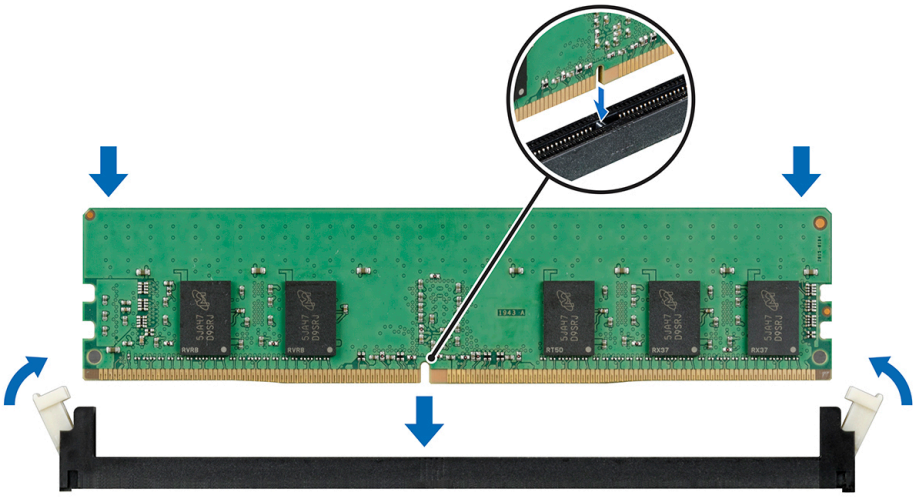

Figure 28. Installing a memory module

Next steps

1. Install the air shroud.
2. Install the sled into the chassis.
3. Follow the procedure listed in the After working inside your system section.
4. To enter **System Setup**, press F2 and check the **System Memory** setting.
5. If the value is incorrect, one or more of the memory modules may not be installed properly. Ensure that the memory modules are firmly seated in the sockets.
6. Run the system memory test in the system diagnostics.

Related references

Safety instructions on page 67

Related tasks

Before working inside your system on page 67
Removing a sled on page 71
Removing the air shroud on page 73
Installing the air shroud on page 74
Installing a sled on page 72
After working inside your system on page 68

1.8-inch Solid State Drive

A solid state drive (SSD) is a data storage device used for storing and retrieving digital information.

Each sled supports one internal 1.8-inch SSD.

Removing the 1.8-inch solid state drive

Prerequisites

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.

1. Follow the safety guidelines listed in the Safety instructions section.
2. Follow the procedure listed in the Before working inside your system section.
3. Remove the sled from the enclosure.

Steps

1. Press the drive lock button to release the solid state drive (SSD) from the drive holder.
2. Lift the SSD out from the sled.
3. Disconnect the SATA power and data cable from the SSD.
   Ensure that the SSD power connector remains connected to the system board.

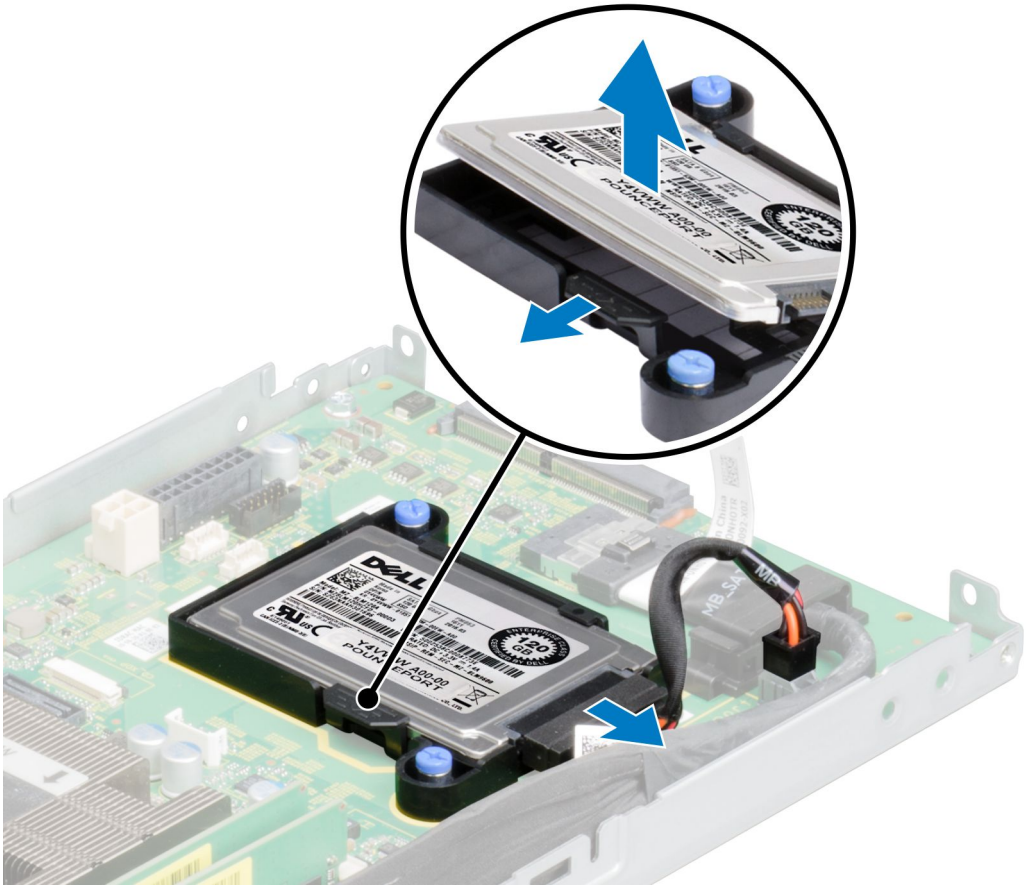

Figure 29. Removing the 1.8-inch SSD

Next steps

1. Install the SSD into the sled.
2. Install the sled into the enclosure.
3. Follow the procedure listed in the After working inside your system section.

Related references

Safety instructions on page 67

Related tasks

Before working inside your system on page 67
Removing a sled on page 71
Installing the 1.8-inch solid state drive on page 80
Installing a sled on page 72
After working inside your system on page 68

Installing the 1.8-inch solid state drive

Prerequisites

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.

1. Follow the safety guidelines listed in the Safety instructions section.
2. Follow the procedure listed in the Before working inside your system section.
3. Remove the sled from the enclosure.

Steps

1. Connect the SATA power and data cable to the solid state drive (SSD).
2. Slide the SSD with the SATA power and data cable into the SSD drive holder.
3. Press the SSD down until the drive lock clicks into place and secures the SSD.

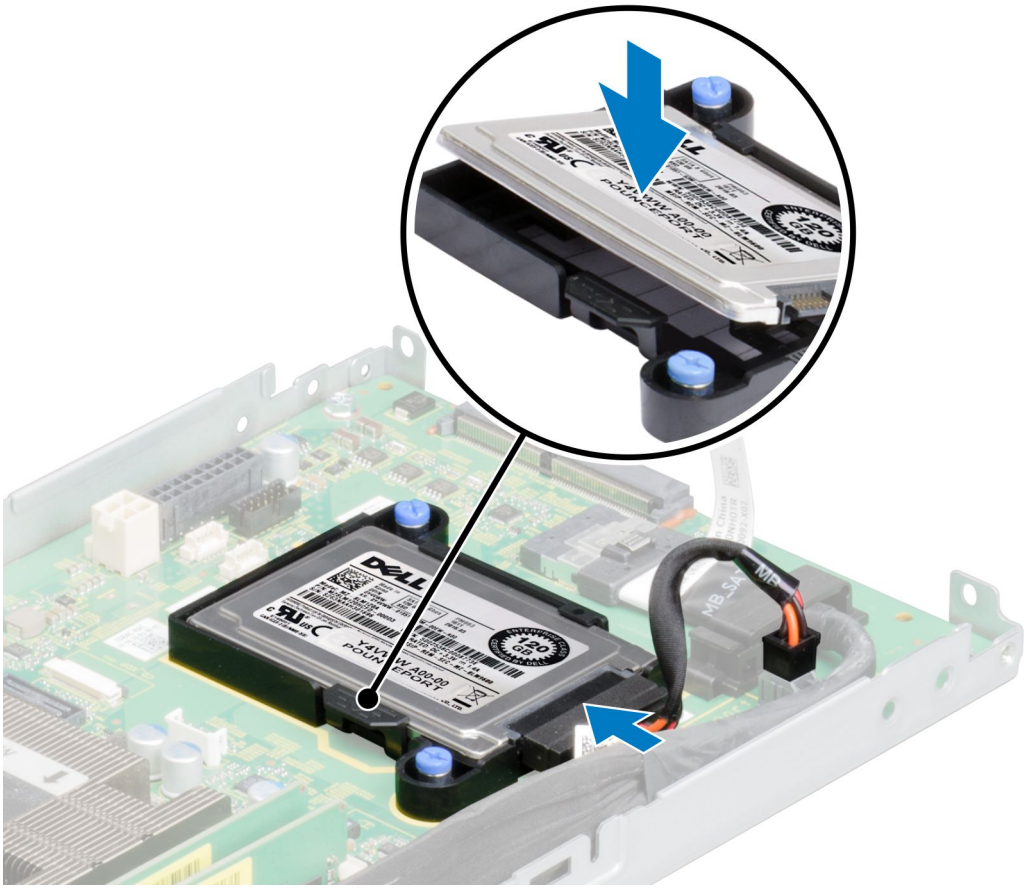

Figure 30. Installing the 1.8-inch SSD

NOTE: Ensure that the hard drive is installed with the label facing up. This is to ensure that the hard drive connector is aligned with the connector on the cable.

Next steps

1. Install the sled into the enclosure.
2. Follow the procedure listed in the After working inside your system section.

Related references

Safety instructions on page 67

Related tasks

Before working inside your system on page 67
Removing a sled on page 71
Installing a sled on page 72
After working inside your system on page 68

Removing the 1.8-inch solid state drive carrier

Prerequisites

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.

1. Follow the safety guidelines listed in the Safety instructions section.
2. Follow the procedure listed in the Before working inside your system section.
3. Remove the sled from the enclosure.
4. Remove the 1.8-inch solid state drive (SSD).
5. Keep the Phillips #2 screwdriver ready.

Steps

1. Using the Phillips screwdriver, loosen the two captive screws that secure the SSD carrier to the sled.
2. Lift the SSD carrier away from the sled.

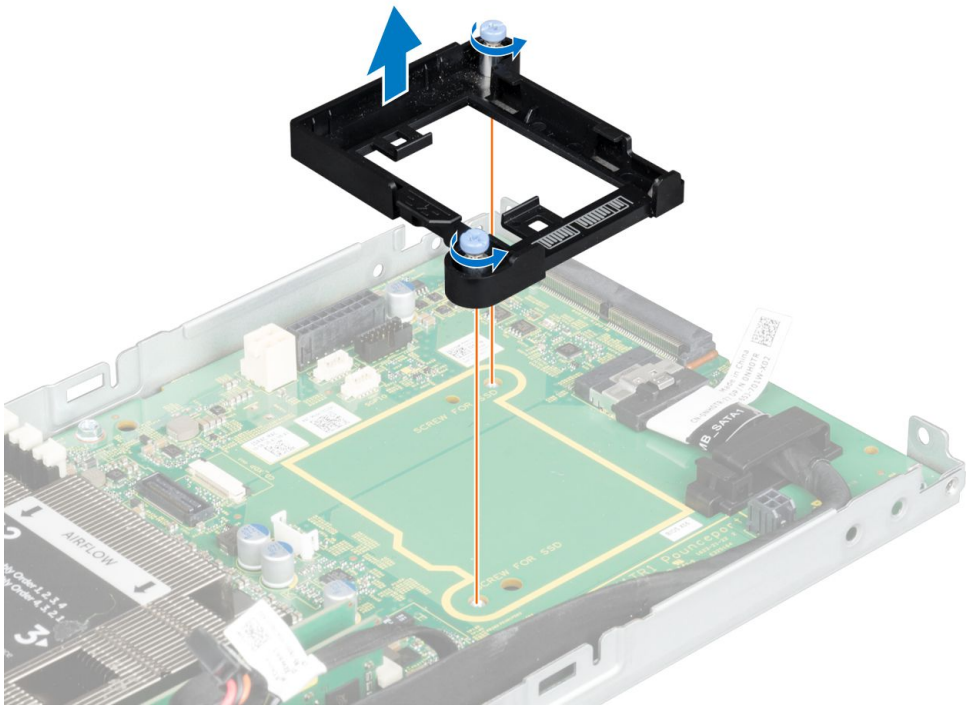

Figure 31. Removing the 1.8-inch SSD carrier

Next steps

1. Install the 1.8-inch SSD carrier.
2. Install the SSD into the carrier.
3. Install the sled into the enclosure.
4. Follow the procedure listed in the After working inside your system section.

Related references

Safety instructions on page 67

Related tasks

Before working inside your system on page 67
Removing a sled on page 71
Removing the 1.8-inch solid state drive on page 79
Installing the 1.8-inch solid state drive carrier on page 83
Installing the 1.8-inch solid state drive on page 80
Installing a sled on page 72
After working inside your system on page 68

Installing the 1.8-inch solid state drive carrier

Prerequisites

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.

1. Follow the safety guidelines listed in the Safety instructions section.
2. Follow the procedure listed in the Before working inside your system section.
3. Remove the sled from the enclosure.
4. Remove the 1.8-inch solid state drive (SSD).
5. Keep the Phillips #2 screwdriver ready.

Steps

1. Align the screws on the SSD carrier with the holes on the sled.
2. Using the Phillips screwdriver, fasten the two captive screws to secure the carrier to the sled.

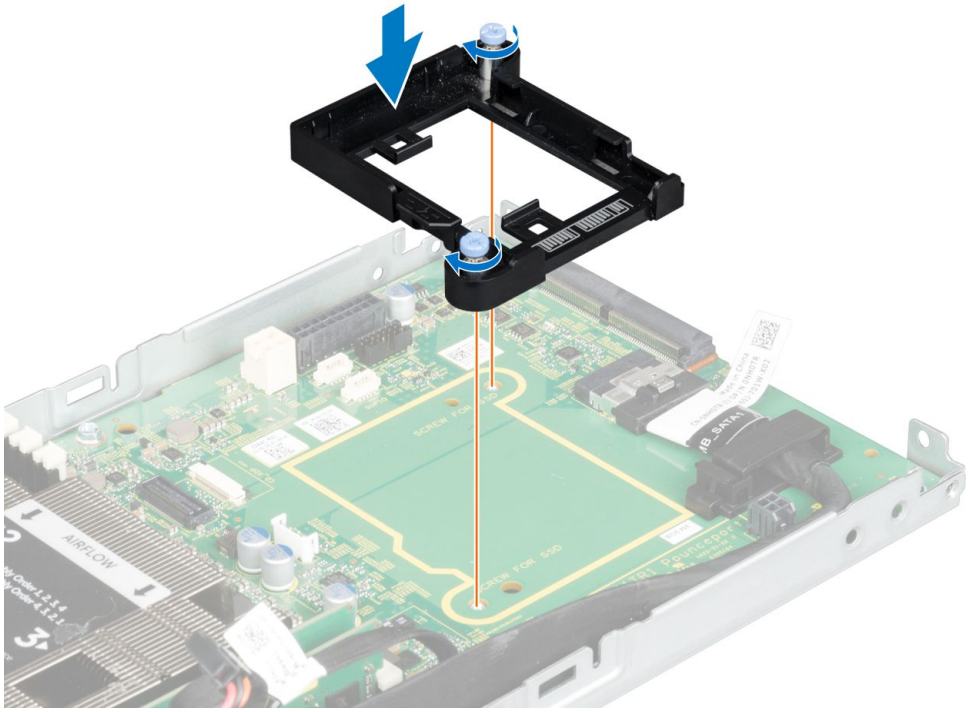

Figure 32. Installing the 1.8-inch SSD carrier

Next steps

1. Install the SSD into the carrier.
2. Install the sled into the enclosure.
3. Follow the procedure listed in the After working inside your system section.

Related references

Safety instructions on page 67

Related tasks

Before working inside your system on page 67

Removing a sled on page 71
Removing the 1.8-inch solid state drive on page 79
Installing the 1.8-inch solid state drive on page 80
Installing a sled on page 72
After working inside your system on page 68

SATA cable removal and installation for the sled

About this task

Each PowerEdge C6320p sled has two SATA cables connected to the onboard controller.

- The solid-state drive (SSD) SATA cable is used to connect the onboard SSD to the onboard controller.
- The SATA cable is used to connect the onboard controller to the hard drive backplane through the midplane. This will control up to six hot swappable hard drives.

Removing the SATA cable from the sled

Prerequisites

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.

NOTE: Observe the routing of the cable as you remove it from the sled. Route the cable properly when you replace it to prevent the cable from being pinched or crimped.

1. Follow the safety guidelines listed in the Safety instructions section.
2. Follow the procedure listed in the Before working inside your system section.
3. Remove the sled from the enclosure.
4. Remove the air shroud.

Steps

1. Open the cable retention lock to release the SATA cable.
2. Press the clips on the cable connector to release the cable from the system board. Repeat this step with the connector on the other end of the cable.
3. Lift the SATA cable out of the sled.

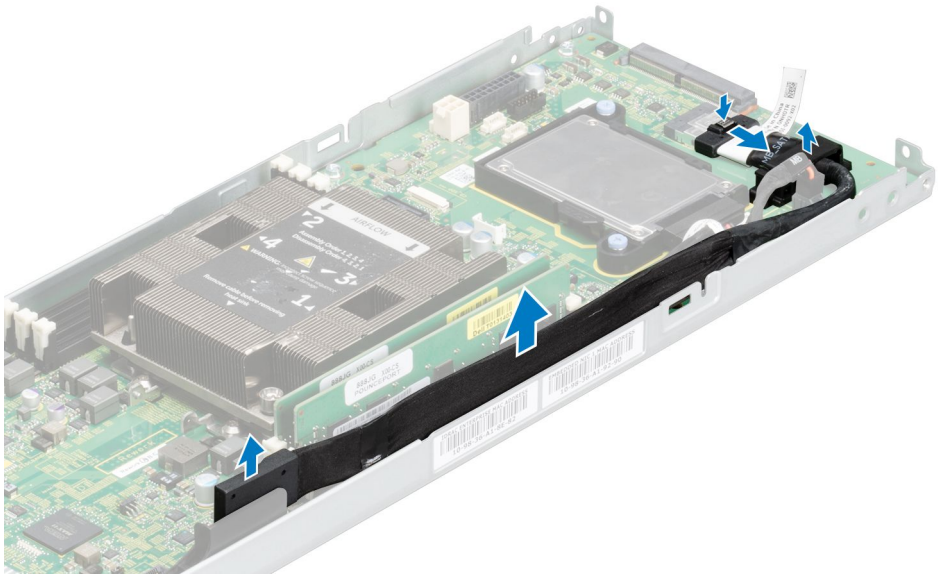

Figure 33. Removing the SATA cable

Next steps

1. Install the SATA cable.
2. Install the air shroud.
3. Install the sled into the enclosure.
4. Follow the procedure listed in the After working inside your system section.

Related references

Safety instructions on page 67

Related tasks

Before working inside your system on page 67
Removing a sled on page 71
Removing the air shroud on page 73
Installing the SATA cable into the sled on page 88
Installing the air shroud on page 74
Installing a sled on page 72
After working inside your system on page 68

Removing the SSD SATA cable from the sled

Prerequisites

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.

NOTE: Observe the routing of the cable as you remove it from the system. Route the cable properly when you replace it to prevent the cable from being pinched or crimped.

1. Follow the safety guidelines listed in the Safety instructions section.
2. Follow the procedure listed in the Before working inside your system section.
3. Remove the sled from the enclosure.
4. Remove the air shroud.

5. Remove the SATA cable.
6. If installed, remove the PCIe expansion card riser assembly.

Steps

1. Holding the blue pull tab, pull the solid-state drive (SSD) SATA cable away from the SATA port on the system board.
2. Disconnect the SSD SATA cable from the SSD power connector on the system board.
3. Disconnect the SSD SATA cable from the 1.8-inch SSD.
4. Lift the SSD SATA cable out of the sled.

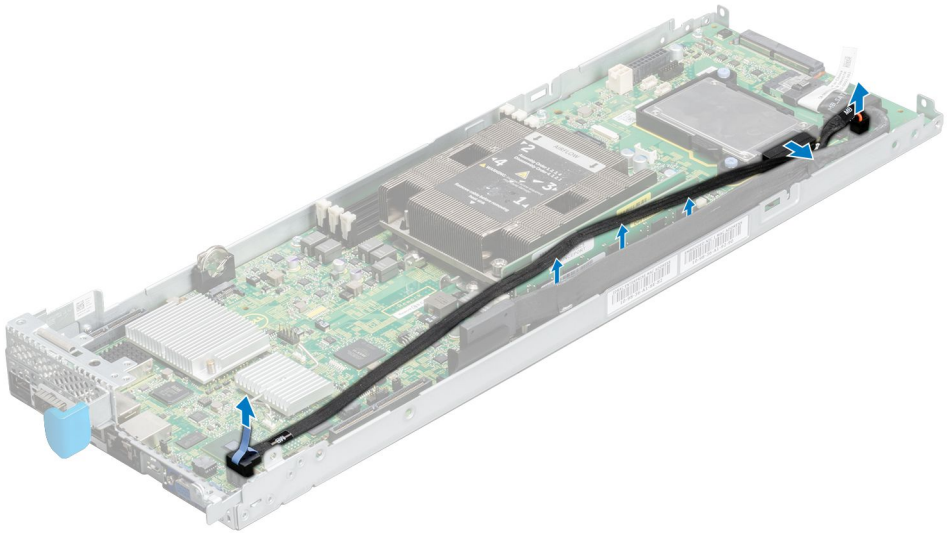

Figure 34. Removing the SSD SATA cable

Next steps

1. Install the SSD SATA cable.
2. Install the SATA cable.
3. If removed, install the PCIe expansion card riser assembly.
4. Install the air shroud.
5. Install the sled into the enclosure.
6. Follow the procedure listed in the After working inside your system section.

Related references

Safety instructions on page 67

Related tasks

Before working inside your system on page 67
Removing a sled on page 71
Removing the air shroud on page 73
Removing the SATA cable from the sled on page 84
Removing the expansion card riser assembly on page 106
Installing the SSD SATA cable into the sled on page 87
Installing the expansion card riser assembly on page 107
Installing the SATA cable into the sled on page 88
Installing the air shroud on page 74
Installing a sled on page 72
After working inside your system on page 68

Installing the SSD SATA cable into the sled

Prerequisites

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.

NOTE: Observe the routing of the cables when removing them from the system. Route these cables properly when you replace them to prevent the cables from being pinched or crimped.

1. Follow the safety guidelines listed in the Safety instructions section.
2. Follow the procedure listed in the Before working inside your system section.
3. Remove the sled from the enclosure.
4. Remove the air shroud.
5. If installed, remove the SATA cable.

   NOTE: The SSD SATA cable needs to be installed first so that it lies beneath the SATA cable.
6. If installed, remove the PCIe expansion card riser assembly.

Steps

1. Connect the cable to the 1.8 inch SSD.
2. Reconnect the SSD power cable to the connector on the system board.
3. Connect the SSD SATA cable to the connector on the system board until the clips click into place.

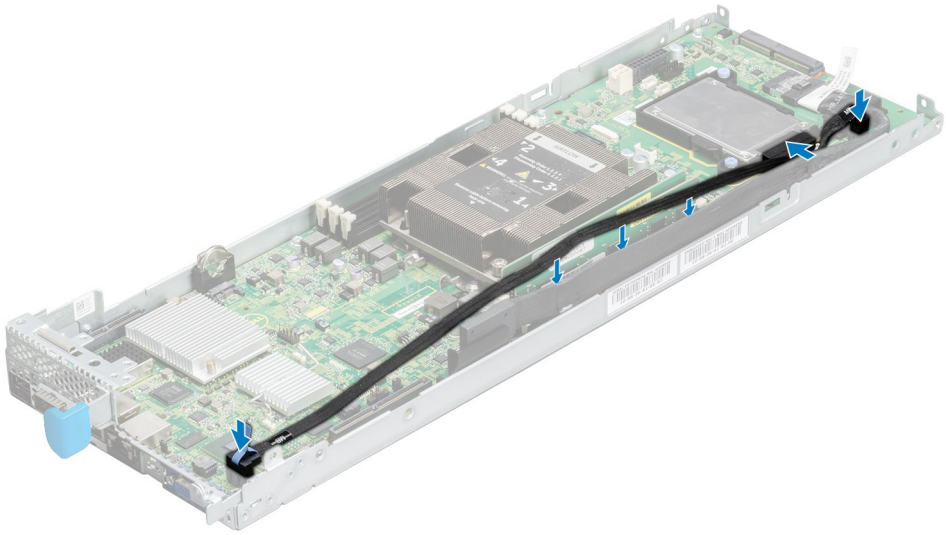

Figure 35. Installing the SSD SATA cable

Next steps

1. If removed, install the SATA cable.
2. If removed, install the PCIe expansion card riser assembly.
3. Install the air shroud.
4. Install the sled into the enclosure.
5. Follow the procedure listed in the After working inside your system section.

Related references

Safety instructions on page 67

Related tasks

Before working inside your system on page 67
Removing a sled on page 71
Removing the air shroud on page 73
Removing the SATA cable from the sled on page 84
Removing the expansion card riser assembly on page 106
Installing the expansion card riser assembly on page 107
Installing the SATA cable into the sled on page 88
Installing the air shroud on page 74
Installing a sled on page 72
After working inside your system on page 68

Installing the SATA cable into the sled

Prerequisites

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.

NOTE: Observe the routing of the cable as you remove it from the system. Route the cable properly when you replace it to prevent the cable from being pinched or crimped.

1. Follow the safety guidelines listed in the Safety instructions section.
2. Follow the procedure listed in the Before working inside your system section.
3. Remove the sled from the enclosure.
4. Remove the air shroud.

Steps

1. Open the cable retention lock.
2. Connect the SATA cable to the connector on the system board until the clips click into place. Repeat this step with the connector at the other end of the cable.
3. Close the cable retention lock.

   NOTE: Ensure that the cable is inside the edge of the sled metal edge. The cable should not be on top or outside the edge. If the cable is not inside the sled edge it may get damaged when the sled is installed in the chassis.

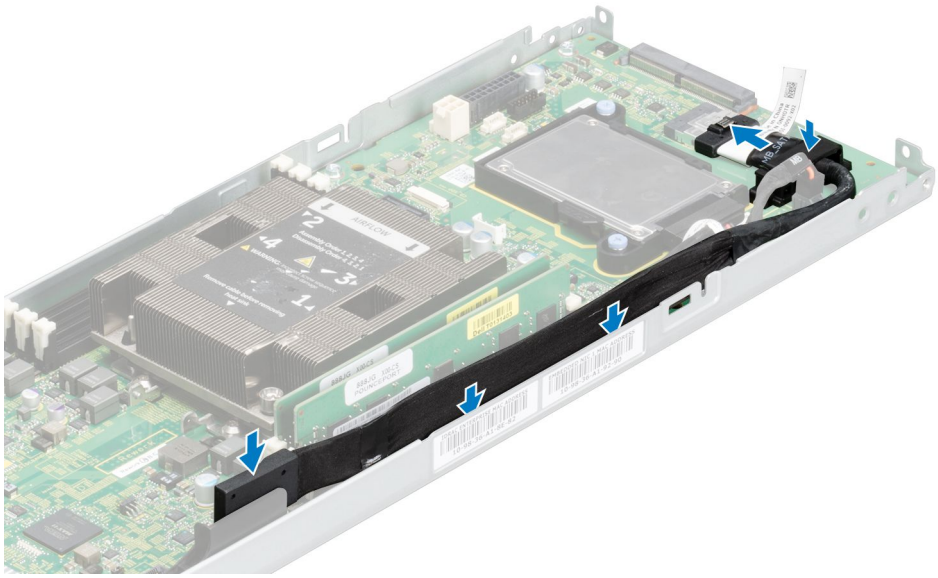

Figure 36. Installing the SATA cable

Next steps

1. Install the air shroud.
2. Install the sled into the enclosure.
3. Follow the procedure listed in the After working inside your system section.

Related references

Safety instructions on page 67

Related tasks

Before working inside your system on page 67
Removing a sled on page 71
Removing the air shroud on page 73
Installing the air shroud on page 74
Installing a sled on page 72
After working inside your system on page 68

Processor and heat sink module

WARNING: Sleds using the Intel Xeon Phi 72XX and Phi 72XXF processors must not be installed in the same enclosure.

CAUTION: This is a Field Replaceable Unit (FRU). Removal and installation procedures must be performed only by Dell certified service technicians.

NOTE: The Intel Xeon Phi 72XXF processor needs a fabric cable, a side band cable, and a carrier card to be able to fully utilise all the connectivity features.

Use the following procedure when:

- Removing and installing a heat sink
- Replacing a processor
- Removing and installing a fabric cable

Table 28. Supported processors

Processor wattage	Processor model number	Operating temperature
215 W	7210	10°C to 35°C (50°F to 95°F)
	7230	
	7250	
230 W	7210F	
	7230F	
	7250F	
245 W	7290	23°C (73.4°F)
260 W	7290F	

Removing the fabric cable from the processor

Prerequisites

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.

1. Follow the safety guidelines listed in the Safety instructions section.
2. Follow the procedure listed in the Before working inside your system section.
3. Remove the sled from the enclosure.
4. Remove the air shroud.

Steps

1. Pull the white tab on the fabric connector to release the connector from the processor base plate.
2. Slide the connector away from the processor to disengage and release it from the processor.

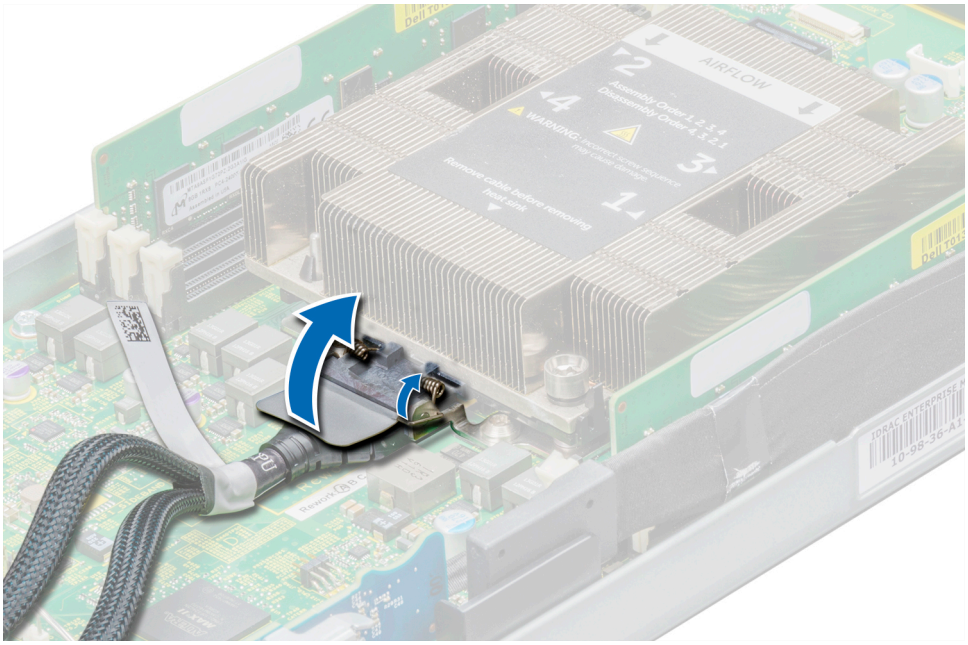

Figure 37. Unlocking the fabric cable connector

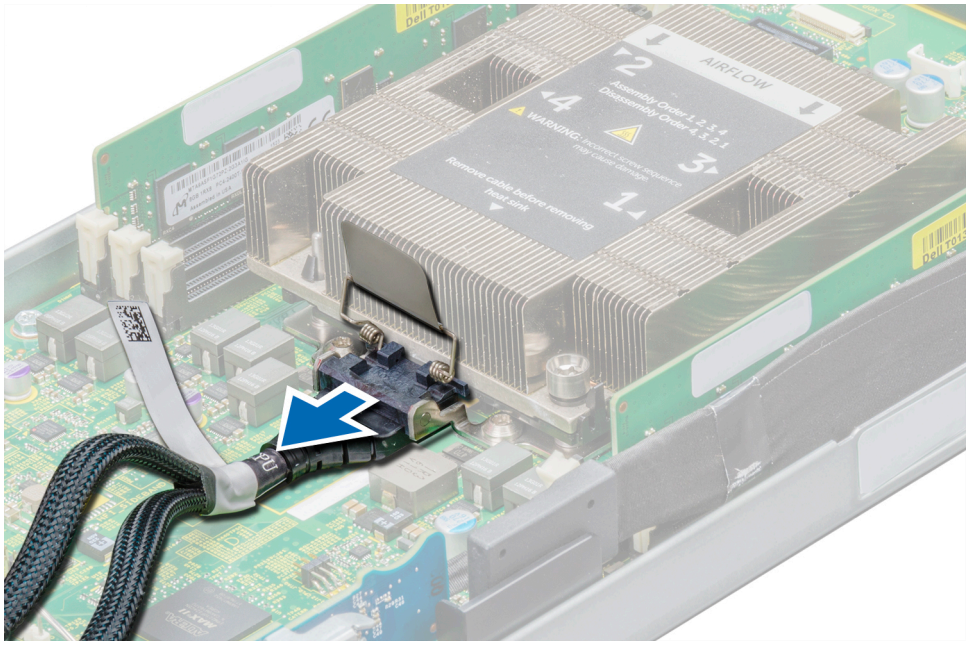

Figure 38. Disengaging the fabric connector from the processor

Next steps

1. Connect the fabric cable to the processor.
2. Install the air shroud.
3. Follow the procedure listed in the After working inside your system section.

Connecting the fabric cable to the processor

Prerequisites

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.

1. Follow the safety guidelines listed in the Safety instructions section.
2. Follow the procedure listed in the Before working inside your system section.
3. Remove the sled from the enclosure.
4. Remove the air shroud.

Steps

1. Align the notches on the fabric connector with the guide pins on the processor base plate.
2. Push the fabric connector toward the processor, till it locks into place.
3. Push the locking bar down to secure the fabric connector.

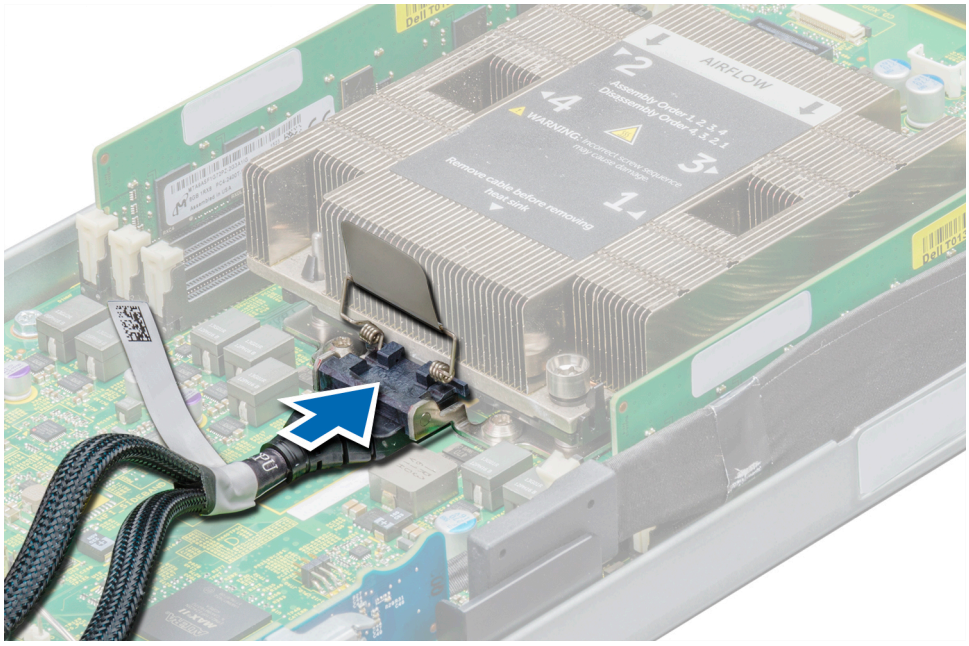

Figure 39. Connecting the fabric connector

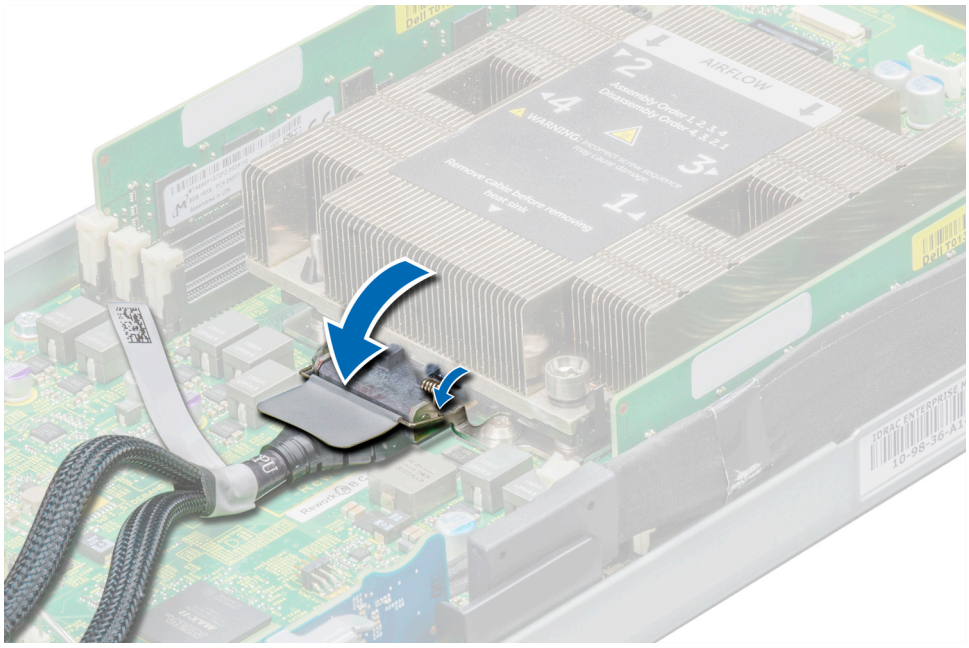

Figure 40. Securing the fabric connector

Next steps

1. Install the air shroud.
2. Follow the procedure listed in the After working inside your system section.

Removing the processor and heat sink module

Prerequisites

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.

CAUTION: Never remove the heat sink from a processor unless you intend to remove 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.

1. Follow the safety guidelines listed in the Safety instructions section.
2. Follow the procedure listed in the Before working inside your system section.
3. Remove the sled from the enclosure.
4. Remove the air shroud.
5. If installed, disconnect the fabric cable from the fabric processor.
6. Keep the Torx T30 screwdriver ready.

Steps

1. Using the Torx screwdriver, loosen the screw identified with number 4 on the heat sink label.

   NOTE: To remove the processor and heat sink module, remove the screws in reverse order-4321.

   NOTE: Ensure that the screw is loosened before moving on to the next screw.

   NOTE: Ensure that the correct removal sequence is followed to avoid damaging the processor and the socket.

2. Loosen the remaining processor and heat sink module retention screws by following the sequence on the heat sink label.
3. Lift the processor and heat sink module away from the system board, and set the module aside with the processor side facing up.

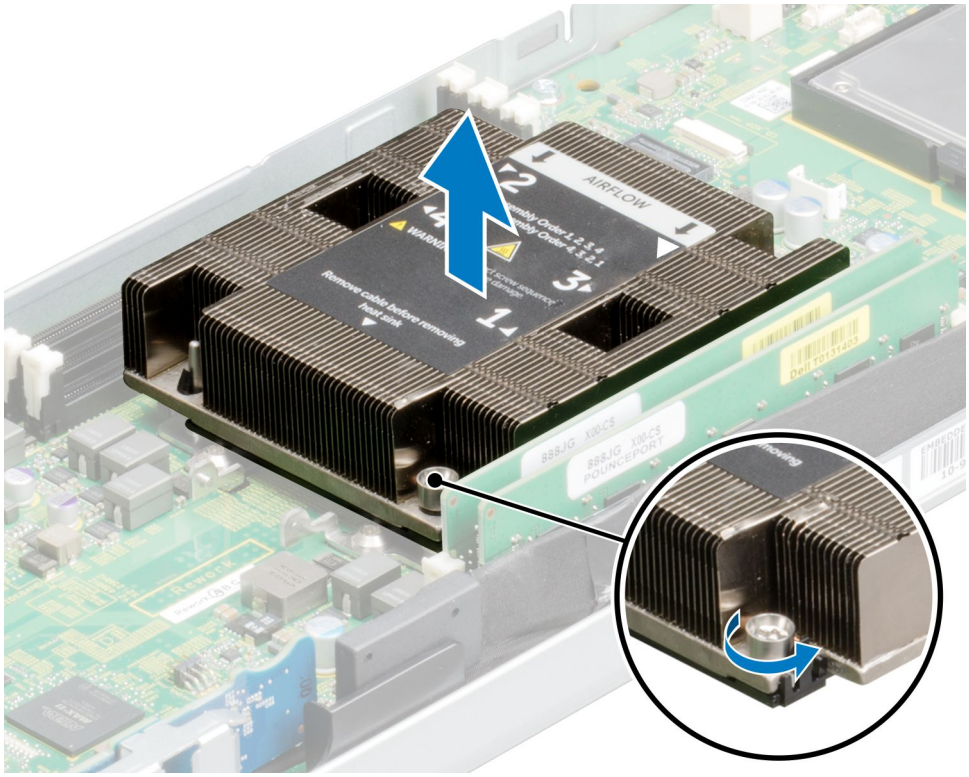

Figure 41. Removing the processor and heat sink module

Next steps

1. Replace the heat sink and processor module.

NOTE: Install the processor dust cover if the processor and heat sink module is not being replaced.

2. If removed, reconnect the fabric cable to the fabric processor.
3. Install the air shroud.
4. Follow the procedure listed in the After working inside your system section.

Related references

Safety instructions on page 67

Related tasks

Before working inside your system on page 67
Removing a sled on page 71
Removing the air shroud on page 73
Installing the processor and heat sink module on page 94
Installing the air shroud on page 74
Installing a sled on page 72
After working inside your system on page 68

Installing the processor and heat sink module

Prerequisites

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.

CAUTION: Never remove the heat sink from a processor unless you intend to remove 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.

1. Follow the safety guidelines listed in the Safety instructions section.
2. Follow the procedure listed in the Before working inside your system section.
3. Remove the sled from the enclosure.
4. Remove the air shroud.
5. If installed, disconnect the fabric cable from the fabric processor.
6. If installed, remove the processor dust cover.

   NOTE: Retain the processor dust cover for use in the future.
7. Keep the Torx T30 screwdriver ready.

Steps

1. Place the processor and heat sink module on the processor socket.

   NOTE: Ensure that the two guide pins match the guide holes on the processor and heat sink module.

2. Using the Torx screwdriver, tighten the first screw of the four heat sink retention screws. You must tighten the screws in this order (1, 2, 3, and 4)

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

   NOTE: The processor and heat sink module retention screws must not be tightened to more than 1.6 kgf-m (16.26 N.m or 12 in-lbf).

3. Tighten the processor and heat sink module screws by following the sequence on the heat sink label.

NOTE: Ensure that the correct sequence is followed while tightening the screws to avoid any damage to the processor and socket.

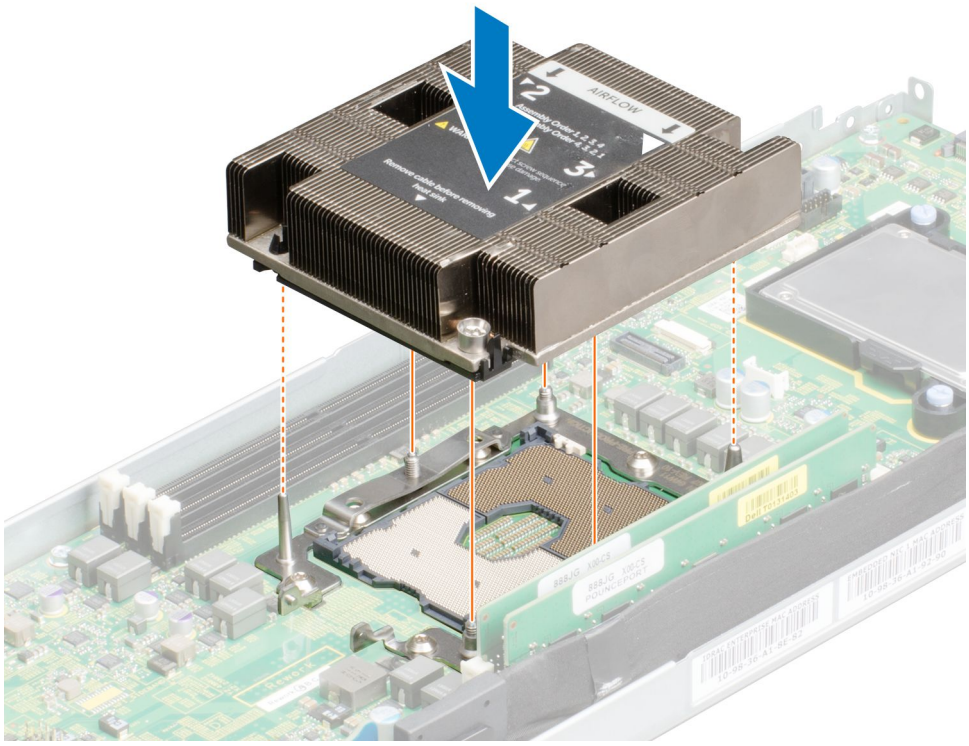

Figure 42. Installing the heat sink

Next steps

1. If removed, reconnect the fabric cable to the fabric processor.
2. Install the air shroud.
3. Install the sled into the enclosure.
4. Follow the procedure listed in the After working inside your system section.

Related references

Safety instructions on page 67

Related tasks

Before working inside your system on page 67
Removing a sled on page 71
Removing the air shroud on page 73
Installing the air shroud on page 74
Installing a sled on page 72
After working inside your system on page 68

Removing the fabric processor from the processor heat sink module

Prerequisites

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.

CAUTION: Never remove the heat sink from a processor unless you intend to remove 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.

1. Follow the safety guidelines listed in the Safety instructions section.
2. Follow the procedure listed in the Before working inside your system section.
3. Remove the sled from the enclosure.
4. Remove the air shroud.
5. Keep the flat blade screw driver ready.

Steps

1. Place the heat sink with the processor side facing up.
2. Insert the flat blade screw driver into the slot and twist the screw driver to break the seal created by the thermal paste.

   NOTE: A yellow label on the heat sink marks the location of the screw driver insertion point.

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 side down on the processor tray.
5. Flex the outer edges of the bracket close to the fabric connector to release the bracket from the processor.

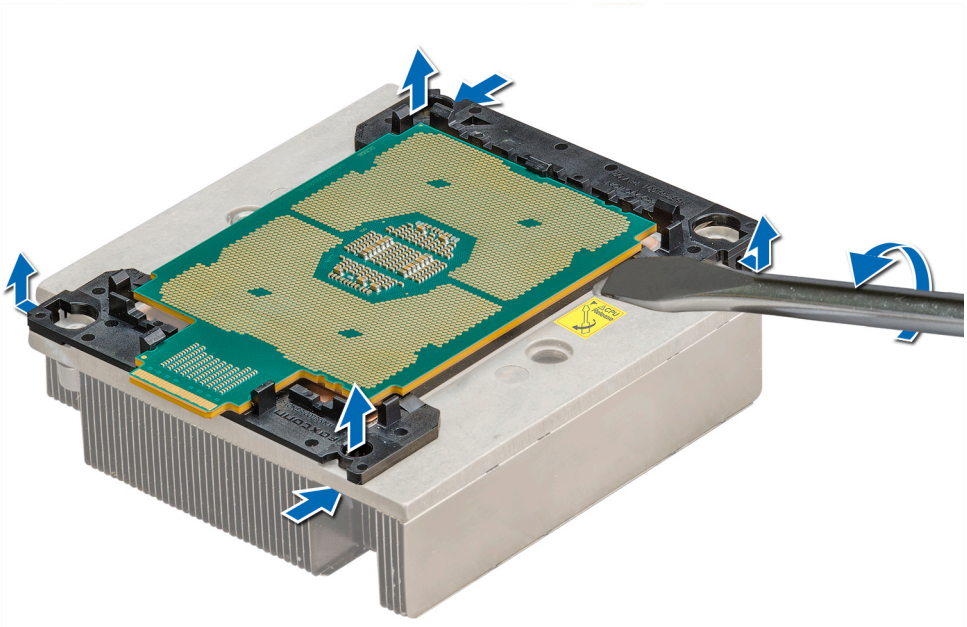

Figure 43. Loosening the processor bracket

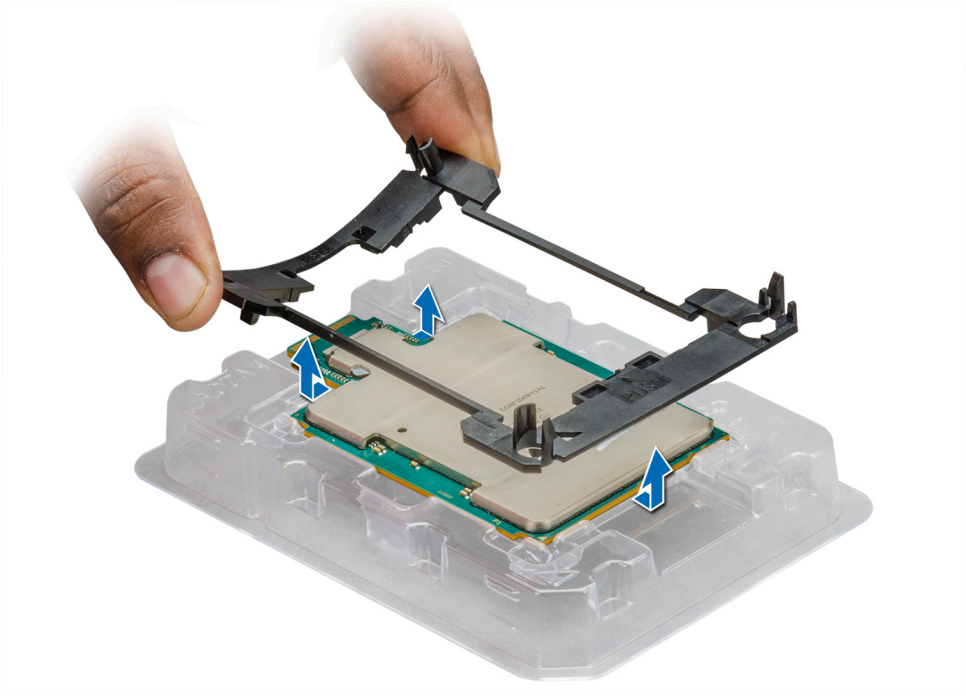

Figure 44. Removing the processor bracket

Next steps

1. Install the processer into the processor heat sink module.
2. Install the processor heat sink module into the sled.
3. Install the air shroud.
4. Install the sled into the enclosure.
5. Follow the procedure listed in the After working inside your system section.

NOTE: For more information see the video at www.Dell.com/QRL/Server/C6320p/Processor

Installing the fabric processor into the processor heat sink module

Prerequisites

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.

CAUTION: Never remove the heat sink from a processor unless you intend to remove 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.

1. Follow the safety guidelines listed in the Safety instructions section.
2. Follow the procedure listed in the Before working inside your system section.
3. Remove the sled from the enclosure.
4. Remove the air shroud.

Steps

1. Ensure that the processor is in the CPU tray.

NOTE: Ensure that pin 1 indicator on the CPU tray is aligned with the pin 1 indicator on the processor.

2. Flex the outer edges of the bracket around the processor, close to the fabric connector, ensuring that the processor is locked into the clips on the bracket.
3. Press the other end of the bracket to ensure that the clip is locked on to the processor.

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.

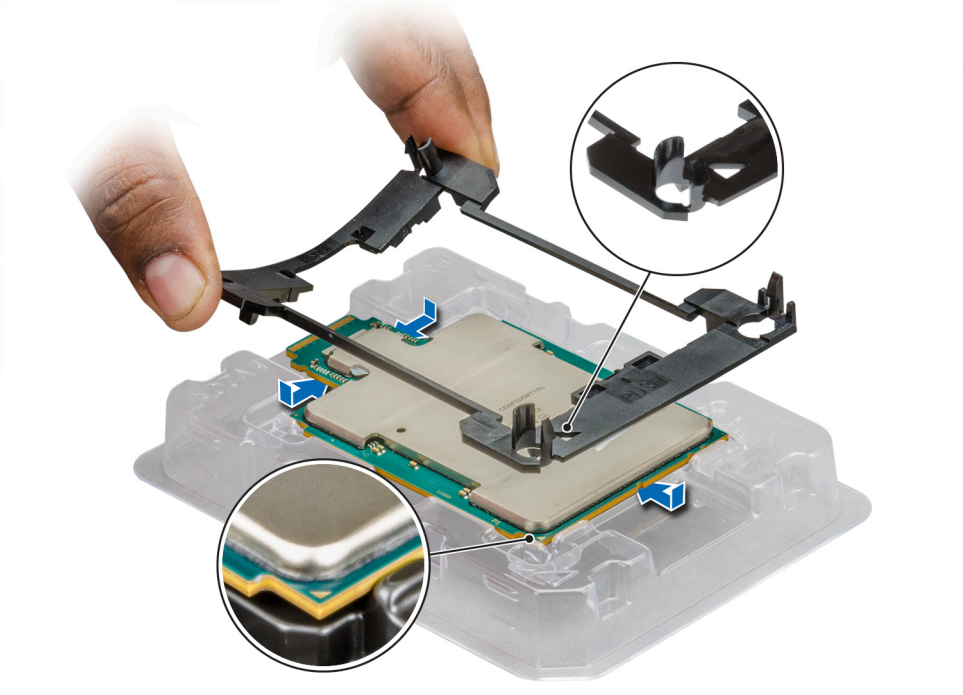

Figure 45. Installing the processor bracket

4. If you are using an existing heat sink, remove the thermal grease from the heat sink by using a clean lint-free cloth.
5. Use the thermal grease syringe included with your processor kit to apply the grease in a spiral 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 of the syringe after you use it.

Figure 46. Applying thermal grease on the top of the processor

a. processor
b. thermal grease
c. thermal grease syringe

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

NOTE:

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

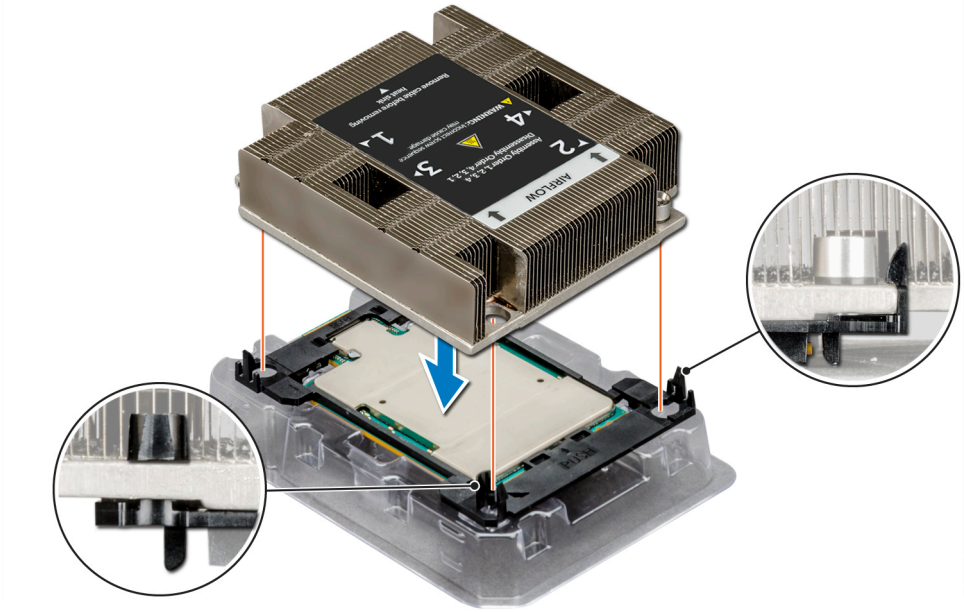

Figure 47. Installing the heat sink onto the processor

Next steps

1. Install the processor and heat sink module.
2. Install the air shroud.
3. Install the sled into the enclosure.
4. Follow the procedure listed in the After working inside your system section.

Removing the non fabric processor from the processor heat sink module

Prerequisites

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.

CAUTION: Never remove the heat sink from a processor unless you intend to remove 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.

1. Follow the safety guidelines listed in the Safety instructions section.
2. Follow the procedure listed in the Before working inside your system section.
3. Remove the sled from the enclosure.
4. Remove the air shroud.
5. Keep the flat blade screw driver ready.

Steps

1. Place the heat sink with the processor side facing up.
2. Insert the flat blade screw driver into the slot and twist the screw driver to break the seal created by the thermal paste.

   NOTE: A yellow label on the heat sink marks the location of the screw driver insertion point.

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 side down on the processor tray.
5. Flex the outer edges of the bracket to release the processor from the bracket.

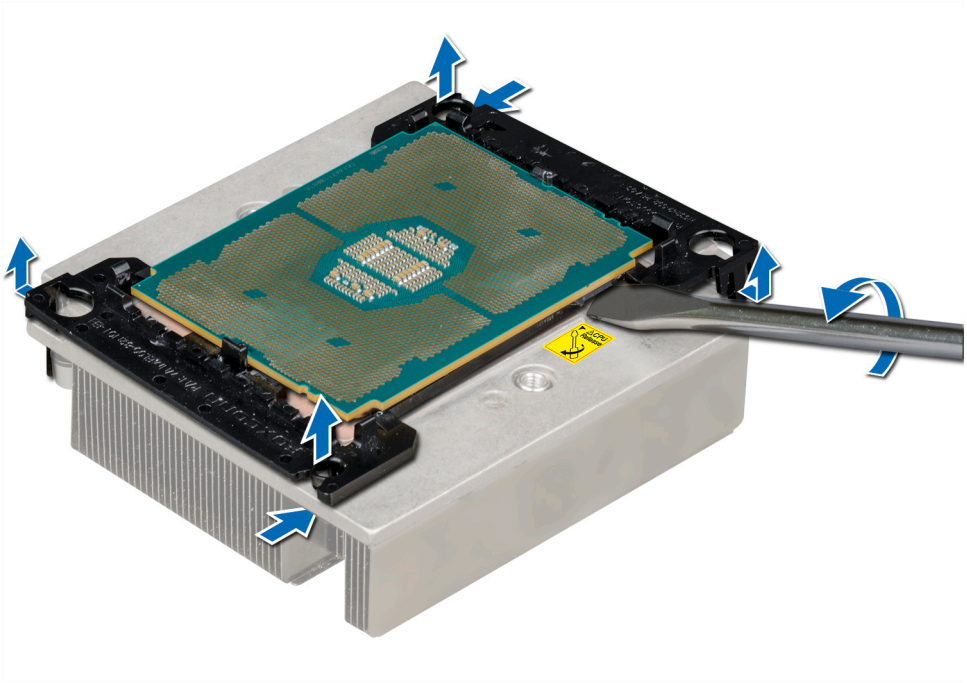

Figure 48. Loosening the processor bracket

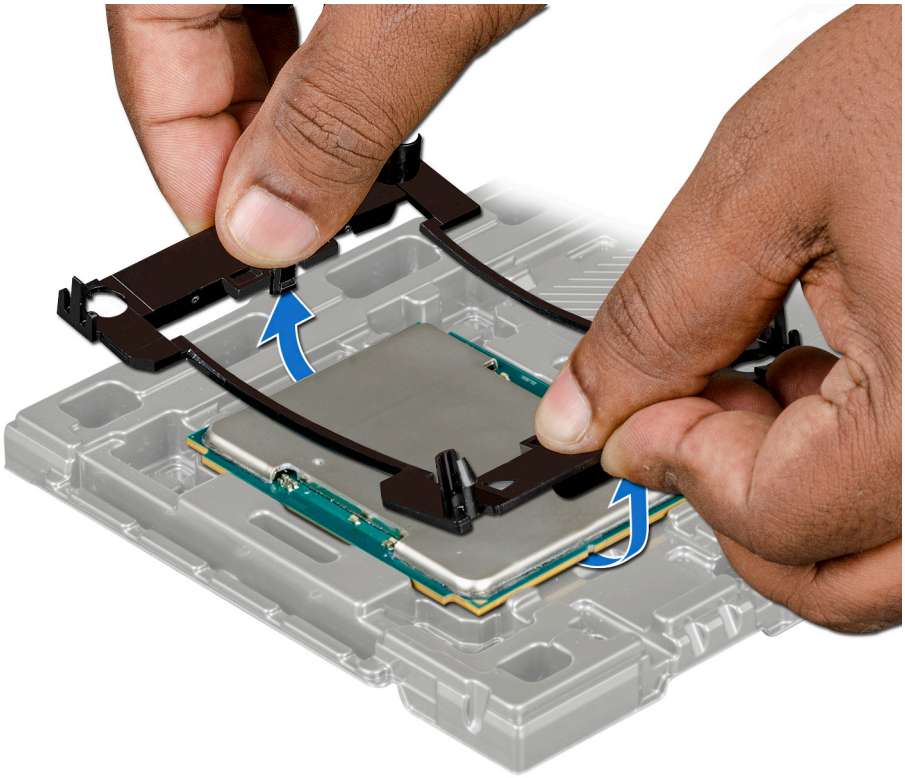

Figure 49. Removing the processor bracket

Next steps

1. Install the processer into the processor heat sink module.
2. Install the processor heat sink module into the sled.
3. Install the air shroud.
4. Install the sled into the enclosure.

5. Follow the procedure listed in the After working inside your system section.

NOTE: For more information see the video at www.Dell.com/QRL/Server/C6320p/Processor

Related references

Safety instructions on page 67

Related tasks

Before working inside your system on page 67
Removing a sled on page 71
Removing the air shroud on page 73
Installing the non fabric processor into the processor and heat sink module on page 102
Installing the processor and heat sink module on page 94
Installing the air shroud on page 74
Installing a sled on page 72
After working inside your system on page 68

Installing the non fabric processor into the processor and heat sink module

Prerequisites

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.

CAUTION: Never remove the heat sink from a processor unless you intend to remove 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.

1. Follow the safety guidelines listed in the Safety instructions section.
2. Follow the procedure listed in the Before working inside your system section.
3. Remove the sled from the enclosure.
4. Remove the air shroud.

Steps

1. Ensure that the processor is in the CPU tray.

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

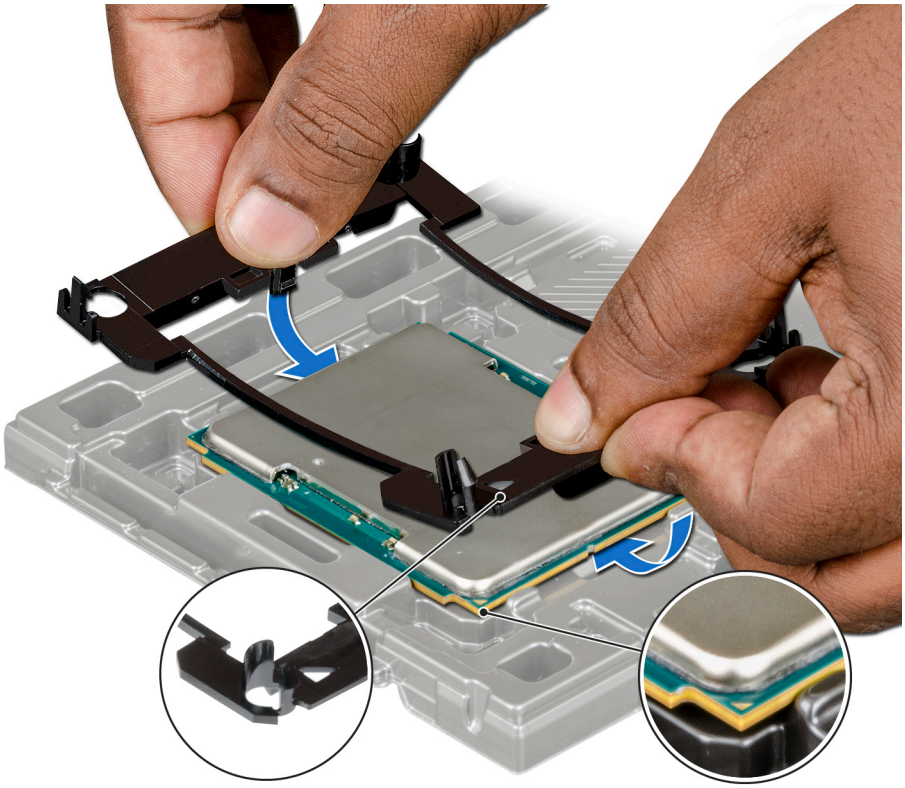

Figure 50. Installing the processor bracket

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 spiral 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 of the syringe after you use it.

Figure 51. Applying thermal grease on the top of the processor

a. processor
b. thermal grease
c. thermal grease syringe

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

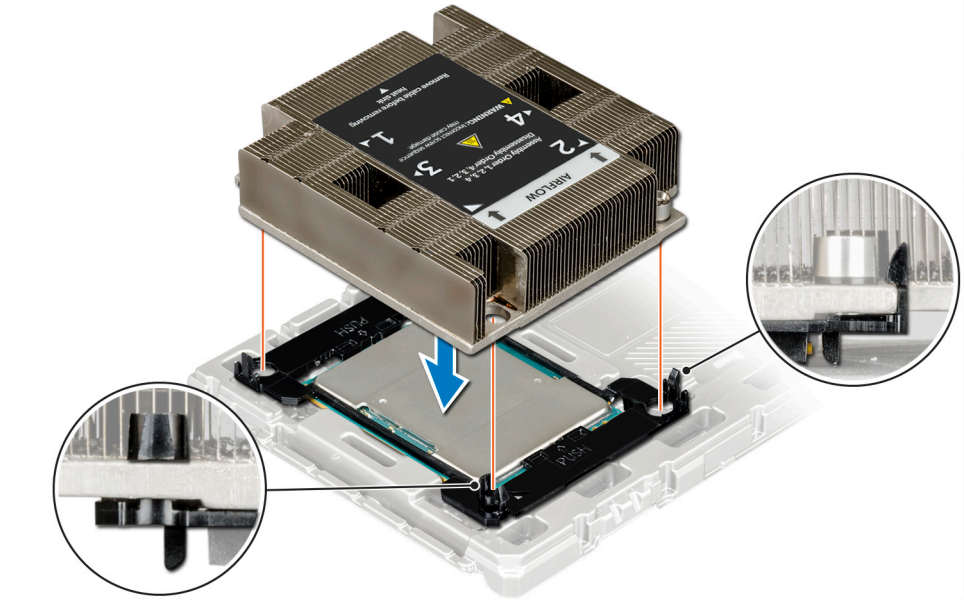

Figure 52. Installing the heat sink onto the processor

Next steps

1. Install the processor and heat sink module.
2. Install the air shroud.
3. Install the sled into the enclosure.
4. Follow the procedure listed in the After working inside your system section.

Related references

Safety instructions on page 67

Related tasks

Before working inside your system on page 67
Removing a sled on page 71
Removing the air shroud on page 73
Installing the processor and heat sink module on page 94
Installing the air shroud on page 74
Installing a sled on page 72
After working inside your system on page 68

Expansion card assembly and expansion card

The expansion card in the system is a printed circuit board that can be inserted into an expansion slot on the system board riser card to add functionality to the system through the expansion bus.

NOTE: A missing or an unsupported expansion card riser logs an System Event Log (SEL) event. It does not prevent your system from powering on and no BIOS POST messages or F1/F2 pause is displayed.

PCIe slot priority

The PE C6320p supports one PCIe card and one mezzanine card.

NOTE: There is no slot priority concern as the sled has a single PCIe slot.

NOTE: Support for a PCIe card is unavailable when an Intel Xeon Phi 72xxF processor is used, as the QSFP carrier card is installed in the PCIe slot.

Table 29. Supported expansion cards

Location	Card type	Form factor	Link width	Slot width
	Intel CNA X710 - Dual Port Adapter	Low Profile	x8	x16
	Intel Ethernet 10G 2P X540-t Adapter	Low Profile	x8	x16
	Intel OPA 100 Series Single Port	Low Profile	x8	x16
	Intel(R) Gigabit Dual Port I350-t Adapter	Low Profile	x8	x16
	Mellanox ConnectX-3 Single Port VPI FDR QSFP+ Adapter	Low Profile	x8	x16
	Mellanox ConnectX-3 Dual Port VPI FDR QSFP+ Adapter	Low Profile	x8	x16

Table 29. Supported expansion cards (continued)

Location	Card type	Form factor	Link width	Slot width
	Mellanox ConnectX-4 Dual Port 100 GbE QSFP Adapter	Low Profile	x8	x16
	Mellanox ConnectX-4 Single Port VPI EDR QSFP+ Adapter	Low Profile	x8	x16
	Mellanox ConnectX-4 Dual Port VPI EDR QSFP+ Adapter	Low Profile	x8	x16
	QSFP carrier card (with fabric processor only)	Low Profile	N/A	N/A
Mezzanine slot	LSI 2008 8-Port Adapter	Mezzanine card	x8	x4
	Intel Gigabit Dual Port I350-t Adapter	Mezzanine card	x8	x4
	Intel 82599 Dual Port 10G Adapter	Mezzanine card	x8	x4

Removing the expansion card riser assembly

Prerequisites

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.

NOTE: You must install an expansion card filler bracket over an empty expansion slot 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.

1. Follow the safety guidelines listed in the Safety instructions section.
2. Follow the procedure listed in the Before working inside your system section.
3. Remove the sled from the enclosure.
4. Keep the Phillips #2 screwdriver ready.

Steps

1. Remove the screws that secure the expansion card riser assembly.
2. Lift the expansion card riser assembly out of the sled.

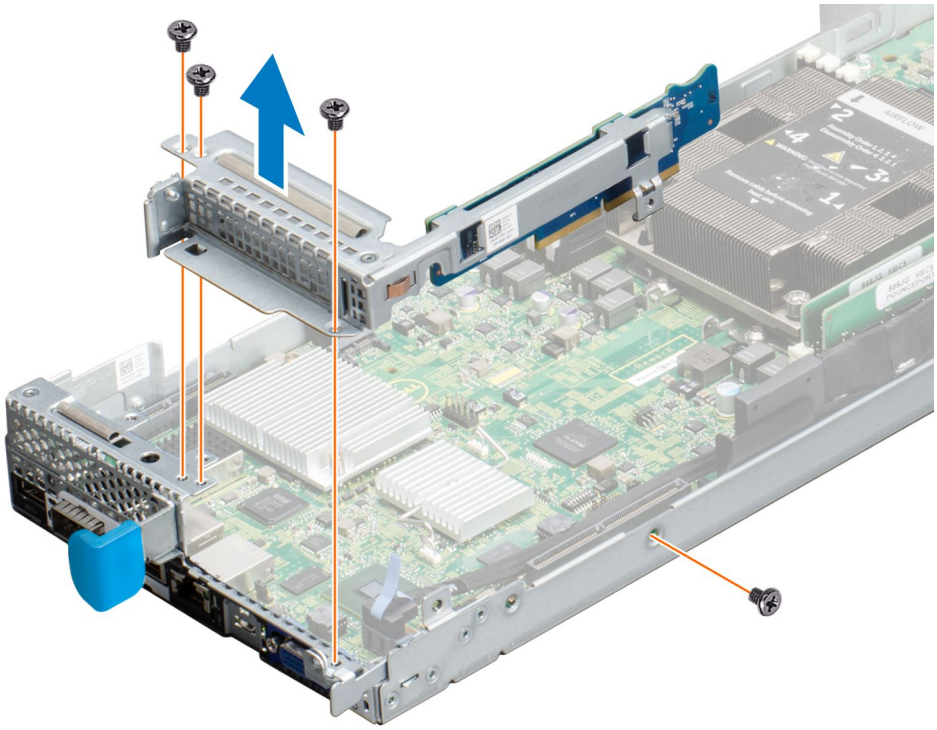

Figure 53. Removing the expansion card riser assembly

Next steps

1. Install the expansion card riser assembly.
2. Install the sled into the enclosure.
3. Follow the procedure listed in the After working inside your system section.

Related references

Safety instructions on page 67

Related tasks

Before working inside your system on page 67
Removing a sled on page 71
Installing the expansion card riser assembly on page 107
Installing a sled on page 72
After working inside your system on page 68

Installing the expansion card riser assembly

Prerequisites

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.

NOTE: You must install an expansion card filler bracket over an empty expansion slot 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.

1. Follow the safety guidelines listed in the Safety instructions section.
2. Follow the procedure listed in the Before working inside your system section.
3. Remove the sled from the enclosure.
4. Keep the Phillips #2 screwdriver ready.

Steps

1. Place the expansion card assembly into the system board assembly.
2. Align the riser card connector with the connector on the system board and press the expansion card riser assembly into place.
3. Install the screws that secure the expansion card riser assembly.

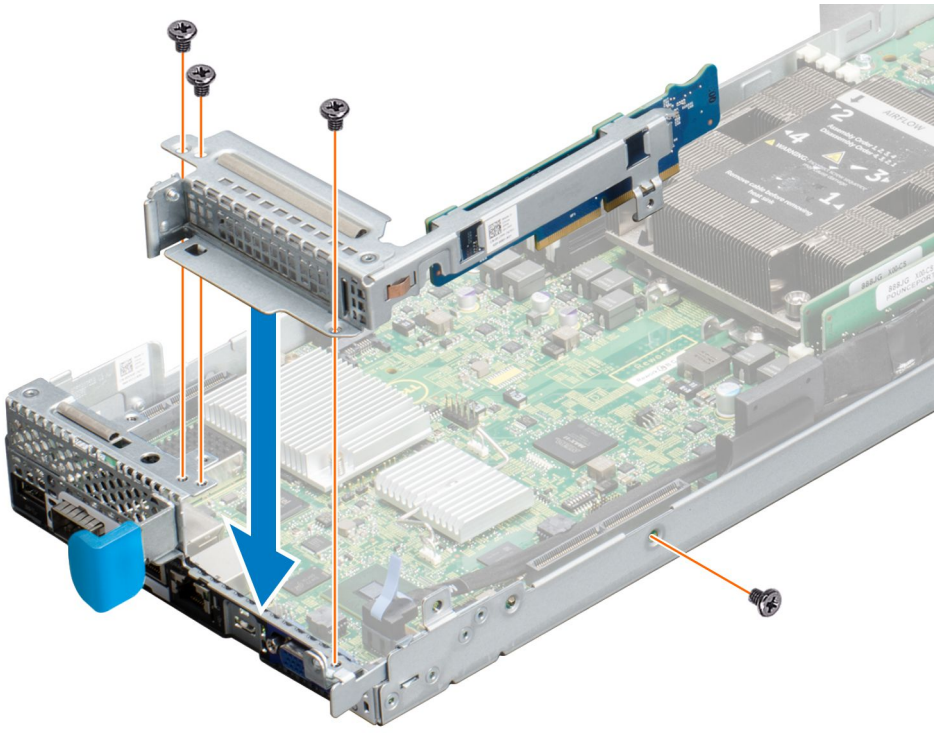

Figure 54. Installing the expansion card riser assembly

Next steps

1. Install the sled into the enclosure.
2. Follow the procedure listed in the After working inside your system section.

Related references

Safety instructions on page 67

Related tasks

Before working inside your system on page 67
Removing a sled on page 71
Installing a sled on page 72
After working inside your system on page 68

Removing an expansion card

Prerequisites

1. Follow the safety guidelines listed in the Safety instructions section.
2. Follow the procedure listed in the Before working inside your system section.
3. Remove the sled from the enclosure.
4. Remove the expansion card riser assembly.
5. Keep the Phillips #2 screwdriver ready.

Steps

1. Remove the screw that secures the expansion card to the assembly.
2. Hold the expansion card by its edges, and carefully remove it from the riser card.

NOTE: You must install an expansion card filler bracket over an empty expansion slot 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.

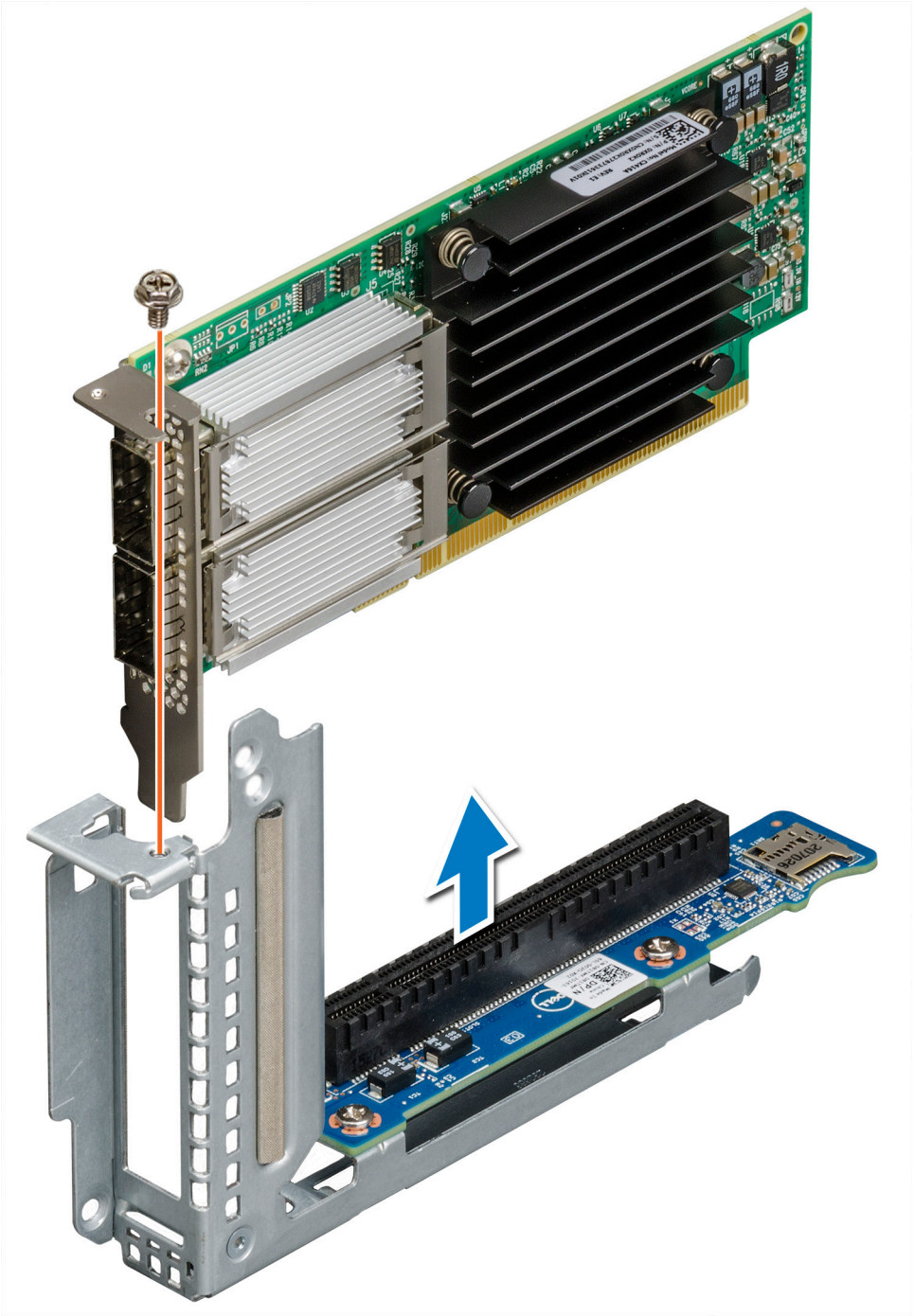

Figure 55. Removing an expansion card

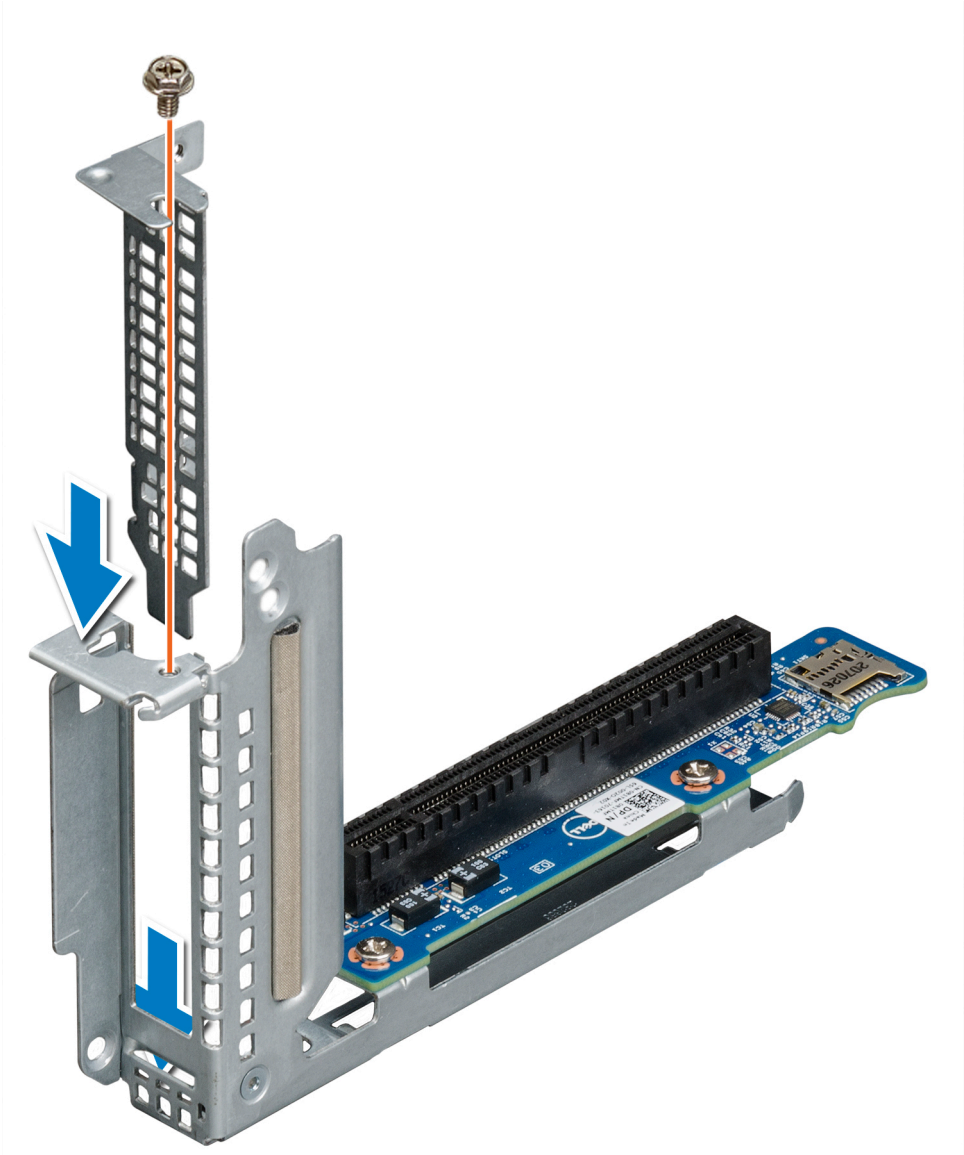

Figure 56. Installing an expansion card filler bracket

Next steps

1. Install the expansion card or the expansion card filler bracket.
2. Install the expansion card riser assembly.
3. Install the sled into enclosure.
4. Follow the procedure listed in the After working inside your system section.

Related references

Safety instructions on page 67

Related tasks

Before working inside your system on page 67
Removing a sled on page 71
Removing the expansion card riser assembly on page 106
Installing an expansion card on page 112
Installing the expansion card riser assembly on page 107
Installing a sled on page 72

After working inside your system on page 68

Installing an expansion card

Prerequisites

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.

CAUTION: Expansion cards can only be installed in the slots on the expansion card riser. Do not attempt to install expansion cards directly into the riser connector on the system board.

1. Follow the safety guidelines listed in the Safety instructions section.
2. Follow the procedure listed in the Before working inside your system section.
3. Remove the sled from the enclosure.
4. Remove the expansion card riser assembly.
5. Unpack the expansion card and prepare it for installation. For instructions, see the documentation accompanying the card.
6. Keep the Phillips #2 screwdriver ready.

Steps

1. If installed, remove the filler bracket by performing the following steps:
   a. Remove the screw that secures the filler bracket.
   b. Hold the filler bracket by its edges, and carefully remove it from the riser card.

   NOTE: You must install an expansion card filler bracket over an empty expansion slot 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.
2. Holding the card by its edges, position the card so that the card edge connector aligns with the connector on the riser card.
3. Insert the card edge connector and push the card firmly into the riser card until the card is fully seated.
4. Replace the screw that secures the expansion card.

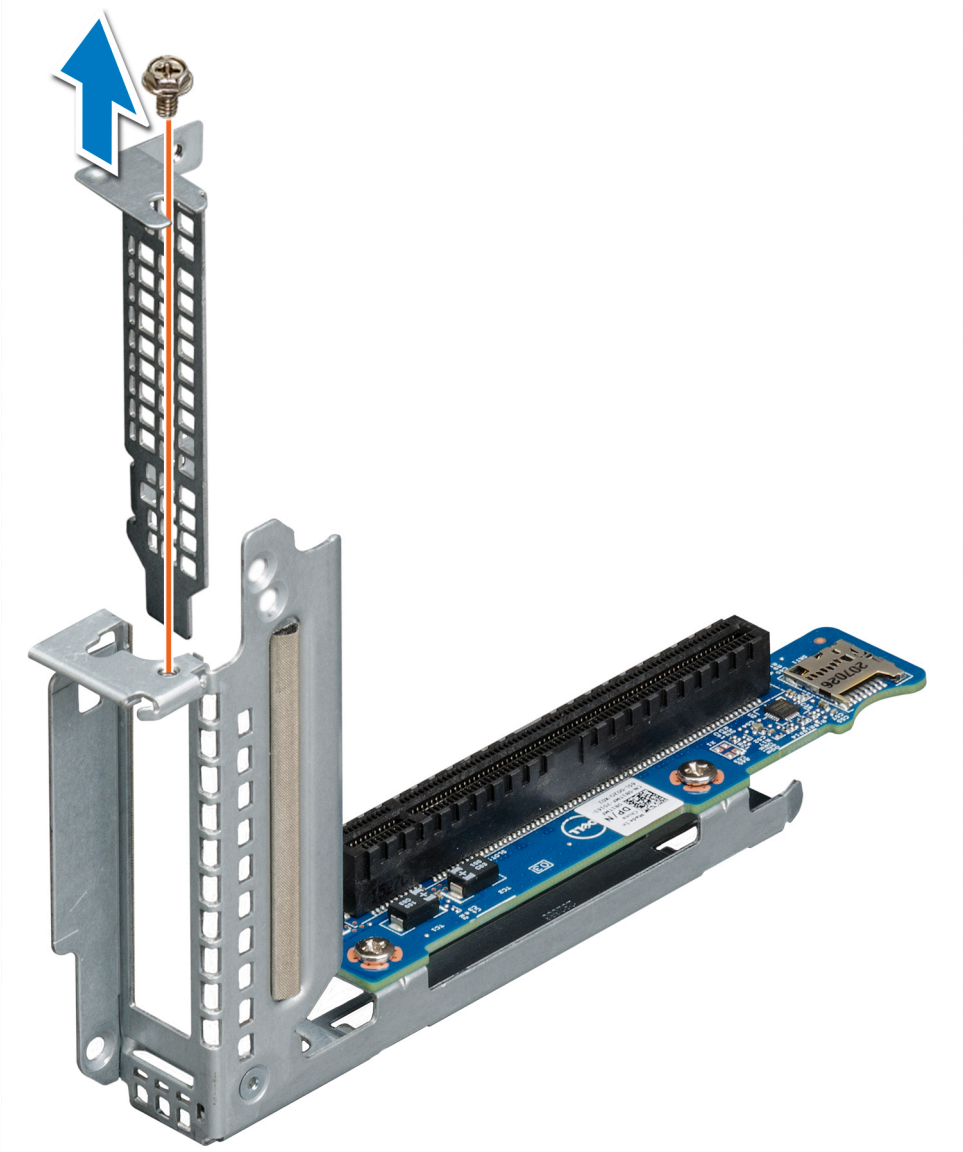

Figure 57. Removing an expansion card filler bracket

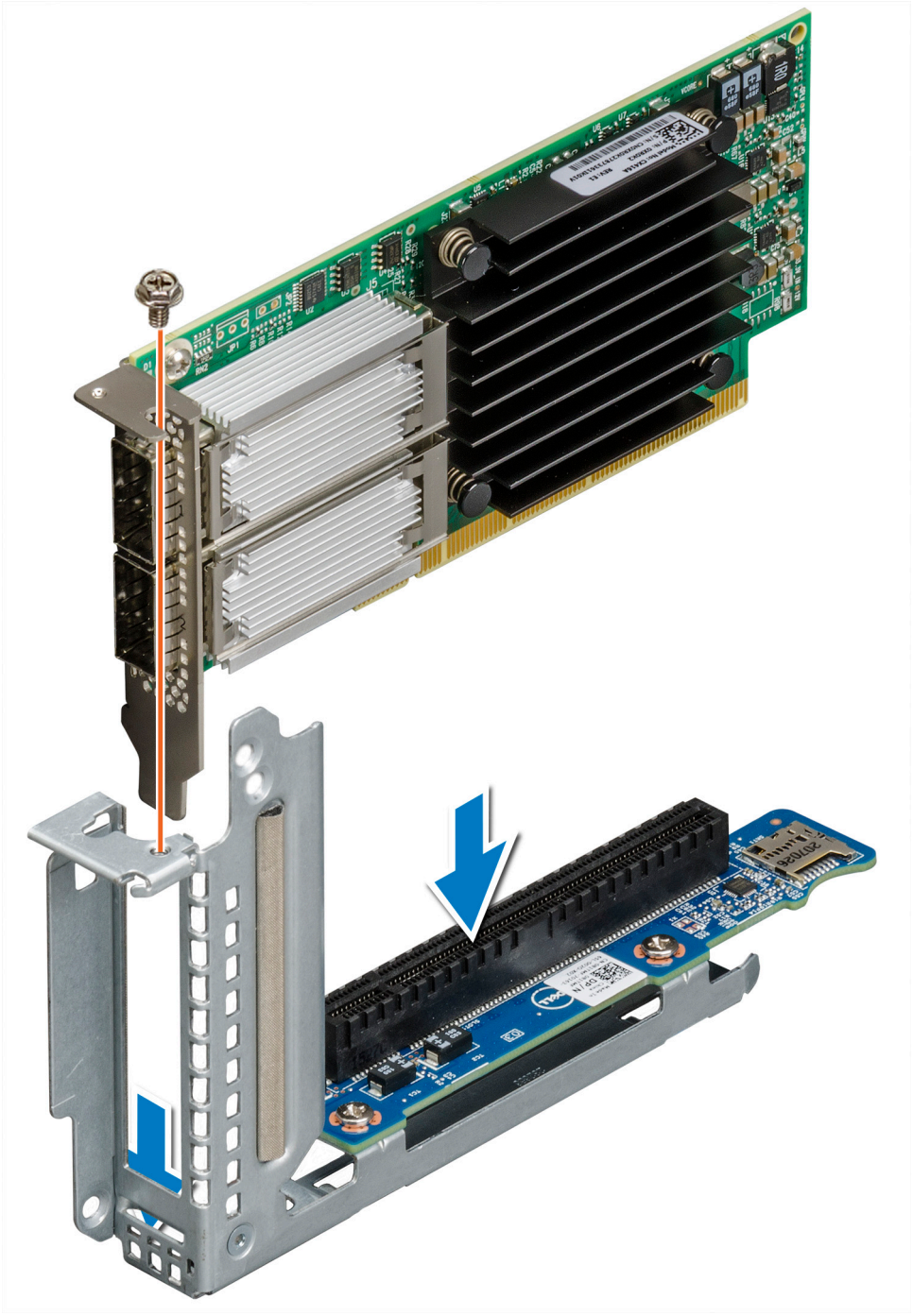

Figure 58. Installing an expansion card

Next steps

1. Install the expansion card riser assembly.
2. Install the sled into the enclosure.
3. Follow the procedure listed in the After working inside your system section.

Related references

Safety instructions on page 67

Related tasks

Before working inside your system on page 67
Removing a sled on page 71
Removing the expansion card riser assembly on page 106
Installing the expansion card riser assembly on page 107
Installing a sled on page 72
After working inside your system on page 68

Removing the riser card

Prerequisites

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.

1. Follow the safety guidelines listed in the Safety instructions section.
2. Follow the procedure listed in the Before working inside your system section.
3. Remove the sled from the enclosure.
4. Remove the expansion card riser assembly.
5. If installed, remove the expansion card.
6. Keep the Phillips #2 screwdriver ready.

Steps

1. Remove the screws that secure the riser card to the expansion card bracket.
2. Lift the riser card away from the expansion card bracket.

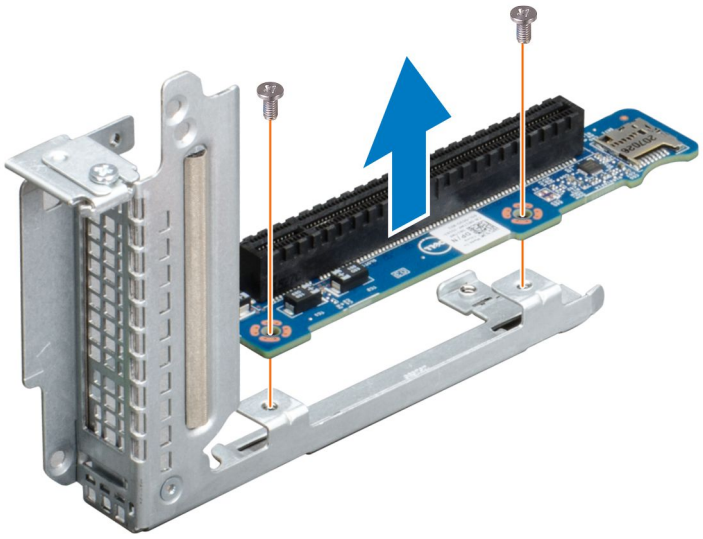

Figure 59. Removing the riser card

Next steps

1. Install the riser card.
2. If removed, install the expansion card.
3. Install the expansion card riser assembly.
4. Install the sled into the enclosure.
5. Follow the procedure listed in the After working inside your system section.

Related references

Safety instructions on page 67

Related tasks

Before working inside your system on page 67
Removing a sled on page 71
Removing the expansion card riser assembly on page 106
Removing an expansion card on page 109
Installing the riser card on page 116
Installing an expansion card on page 112
Installing the expansion card riser assembly on page 107
Installing a sled on page 72
After working inside your system on page 68

Installing the riser card

Prerequisites

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.

1. Follow the safety guidelines listed in the Safety instructions section.
2. Follow the procedure listed in the Before working inside your system section.
3. Remove the sled from the enclosure.
4. Remove the expansion card riser assembly.
5. If installed, remove the expansion card.
6. Keep the Phillips #2 screwdriver ready.

Steps

1. Place the riser card into the expansion card bracket.
2. Replace the screws that secure the riser card to the expansion card bracket.

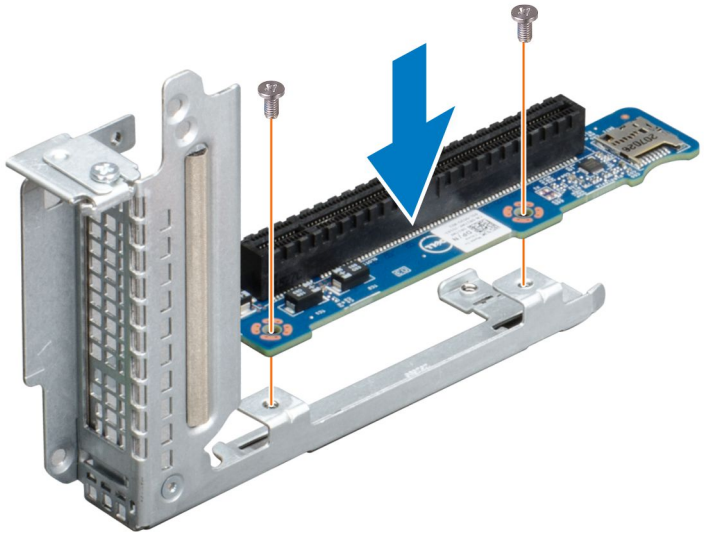

Figure 60. Installing the riser card

Next steps

1. If removed, install the expansion card.
2. Install the expansion card riser assembly.
3. Install the sled into the enclosure.
4. Follow the procedure listed in the After working inside your system section.

Related references

Safety instructions on page 67

Related tasks

Before working inside your system on page 67
Removing a sled on page 71
Removing the expansion card riser assembly on page 106
Removing an expansion card on page 109
Installing an expansion card on page 112
Installing the expansion card riser assembly on page 107
Installing a sled on page 72
After working inside your system on page 68

Removing the cables from the fabric carrier card

Prerequisites

1. Follow the safety guidelines listed in the Safety instructions section.
2. Follow the procedure listed in the Before working inside your system section.
3. Remove the sled from the enclosure.

Steps

1. Pressing the button on top of the fabric connector, release and slide the connector and cable away from the fabric carrier card.

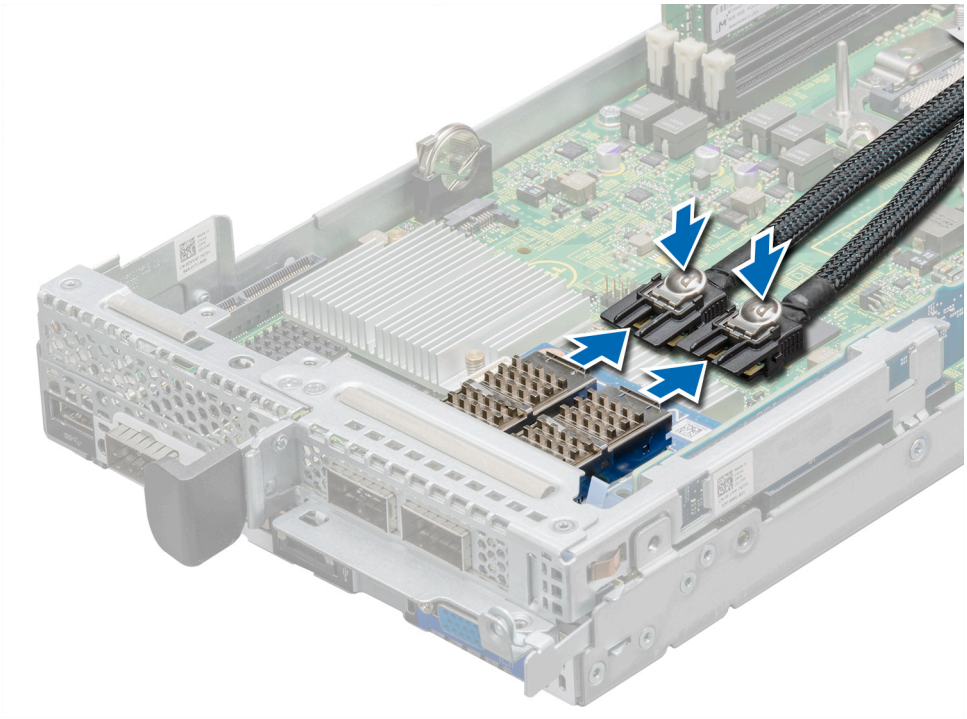

Figure 61. Removing the fabric cable from the fabric expansion card

2. Release the side band cable from the cable clamp.
3. Holding the cable connector, pull the connector away to release the cable from the socket on the system board.

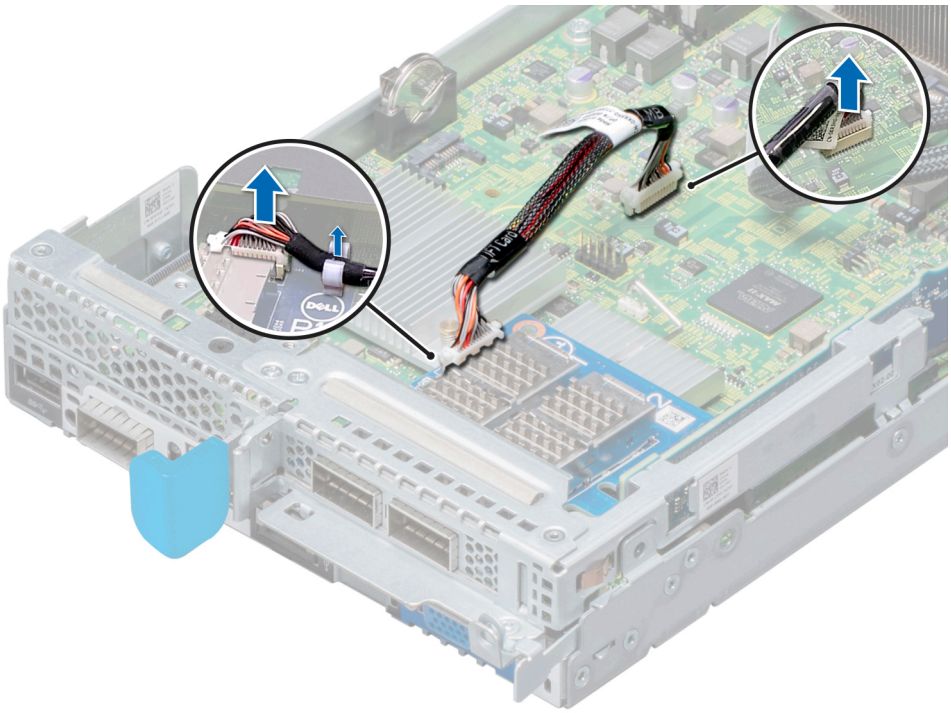

Figure 62. Removing the side band cable from the fabric carrier card

Next steps

1. Connect the fabric cable to the carrier card.
2. Install the sled into enclosure.
3. Follow the procedure listed in the After working inside your system section.

Connecting the cables to the fabric carrier card

Prerequisites

1. Follow the safety guidelines listed in the Safety instructions section.
2. Follow the procedure listed in the Before working inside your system section.
3. Remove the sled from the enclosure.

Steps

1. Insert the fabric cable connector into the connector slot on the carrier card and push the connector until it locks into place.

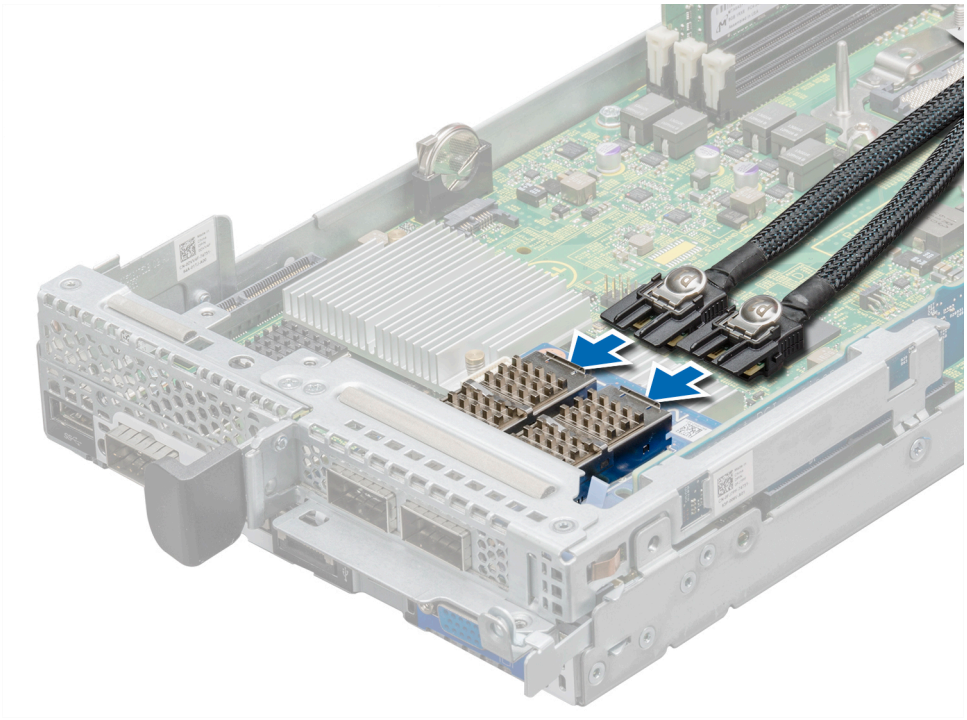

Figure 63. Installing the fabric cable to the fabric carrier card

2. Insert the side band cable connector into the socket on the carrier card and press down to lock the connector in place.
3. Secure the cable in place by routing the cable through the cable clamp.

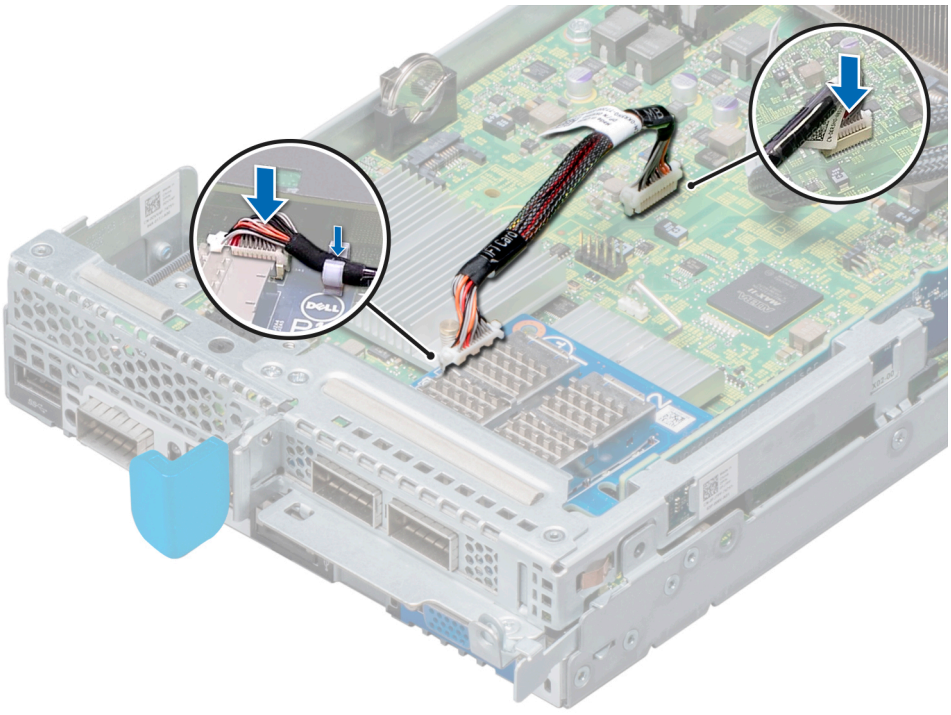

Figure 64. Installing the side band cable to the fabric carrier card

Next steps

1. Install the sled into enclosure.
2. Follow the procedure listed in the After working inside your system section.

Mezzanine cards and mezzanine bridge card

Table 30. Supported mezzanine cards

Type	Card
HBA/RAID	LSI 2008 mezzanine
Dual Port 1GbE	Powerville
Dual Port 10GbE	Intel 82599 mezzanine

Mezzanine cards connect to the PCI bus. They are physically smaller than the standard expansion card, and often connect to a dedicated connector on the system board.

The PowerEdge C6320p supports an optional Mezzanine card.

The mezzanine card bridge board is used to connect the mezzanine card to the system board.

Removing a mezzanine card

Prerequisites

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.

1. Follow the safety guidelines listed in the Safety instructions section.
2. Follow the procedure listed in the Before working inside your system section.
3. Remove the sled from the enclosure.
4. Remove the expansion card riser assembly.
5. Keep the Phillips #1 screwdriver ready.

Steps

1. Remove the screws that secure the mezzanine card to the sled.
2. Lift the mezzanine card out of the sled.

NOTE: You must install an expansion card filler bracket over an empty expansion slot 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.

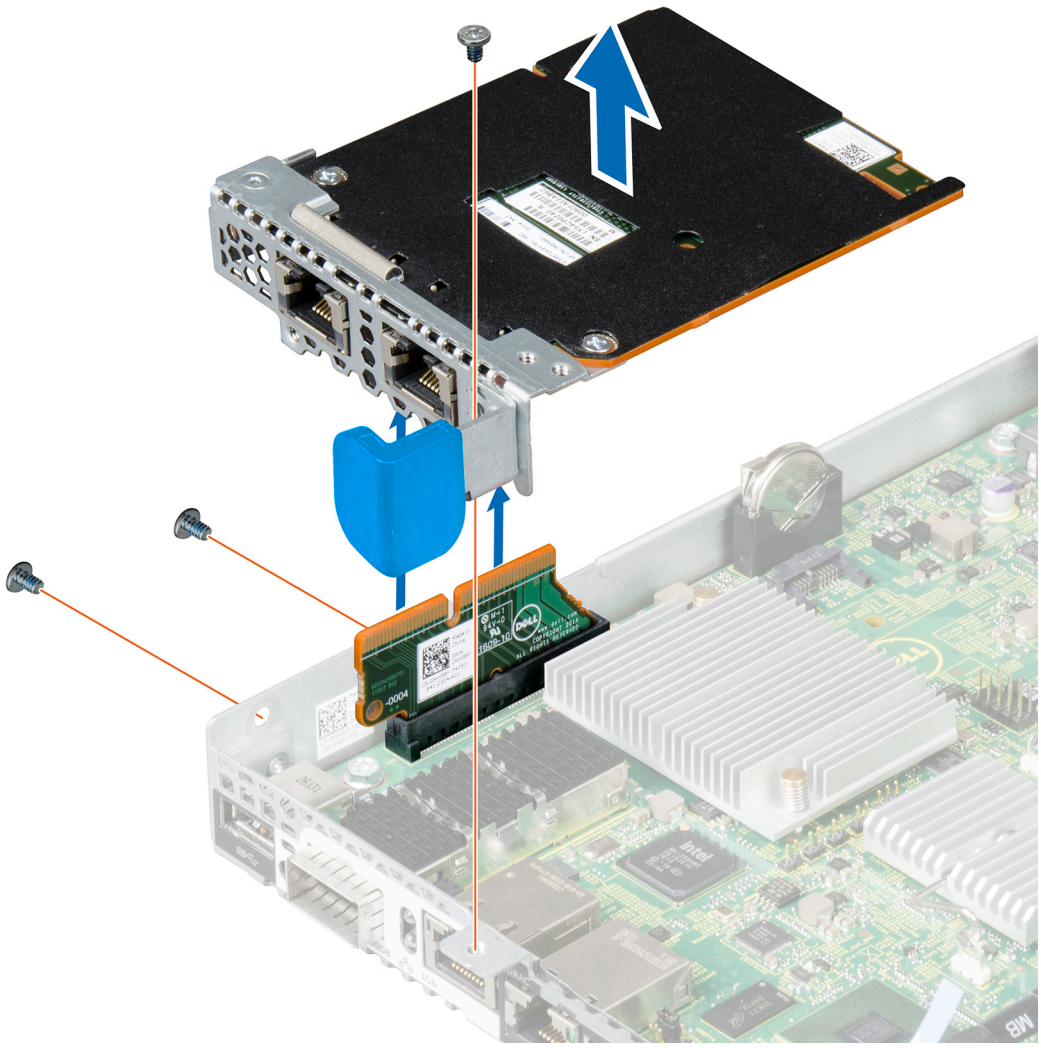

Figure 65. Removing a mezzanine card

Next steps

1. Install the mezzanine card or the mezzanine card filler bracket.
2. Install the expansion card riser assembly.
3. Install the sled into enclosure.
4. Follow the procedure listed in the After working inside your system section.

Related references

Safety instructions on page 67

Related tasks

Before working inside your system on page 67
Removing a sled on page 71
Removing the expansion card riser assembly on page 106
Installing a mezzanine card on page 122
Installing the expansion card riser assembly on page 107
Installing a sled on page 72
After working inside your system on page 68

Installing a mezzanine card

Prerequisites

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.

1. Follow the safety guidelines listed in the Safety instructions section.
2. Follow the procedure listed in the Before working inside your system section.
3. Remove the sled from the enclosure.
4. Remove the expansion card riser assembly.
5. If installed, remove the mezzanine card filler bracket.
6. Unpack the mezzanine card and prepare it for installation. For instructions, see the documentation accompanying the card.

   NOTE: If available, you must install the Mylar sheet to insulate the mezzanine card.
7. Keep the Phillips #1 screwdriver ready.

Steps

1. Attach and a secure the mezzanine card bracket to the mezzanine card.
2. Holding the card by its edges, position the card so that the card edge connector aligns with the connector of the bridge board on the system board.
3. Insert the card edge connector and push the card firmly until the card is fully seated on the bridge board.
4. Secure the mezzanine card and bracket assembly to the sled using screws.

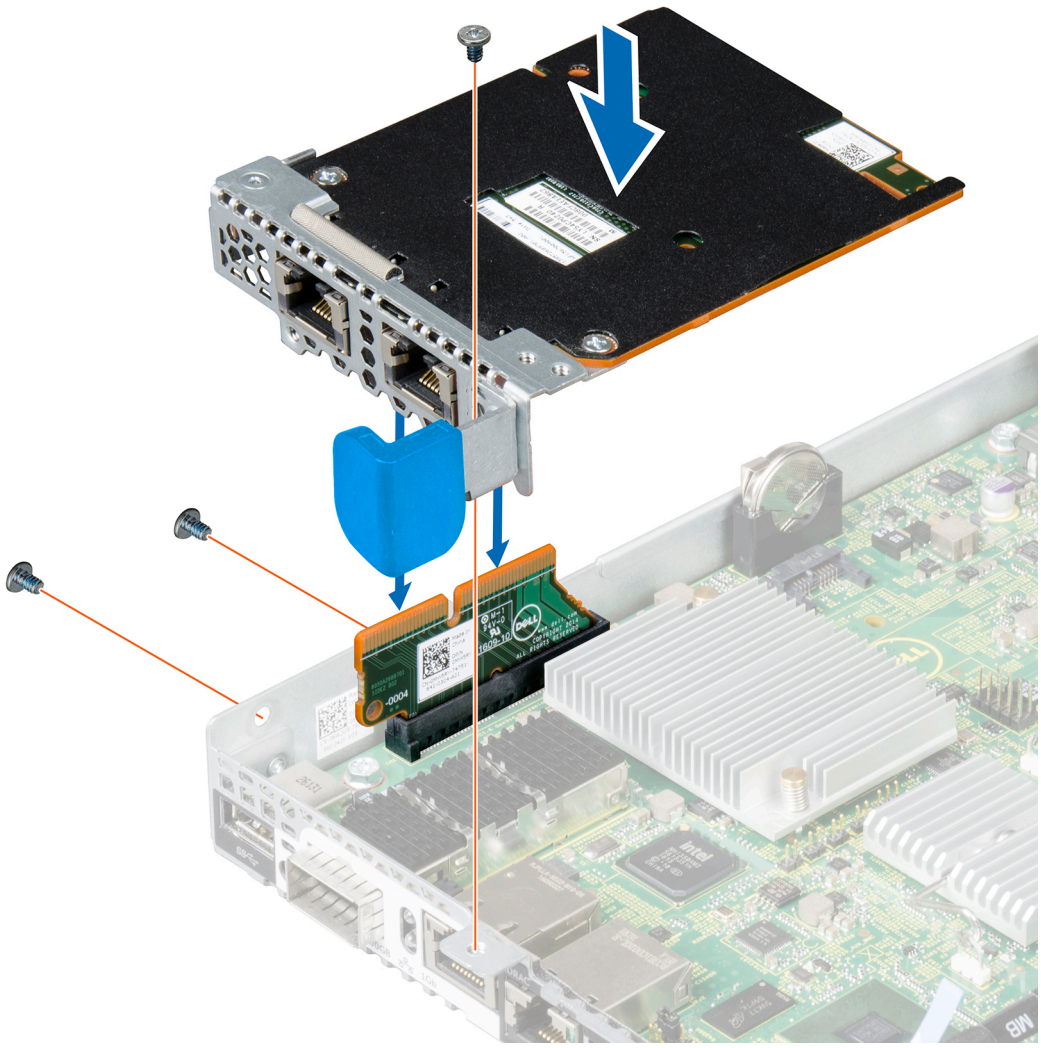

Figure 66. Installing a mezzanine card

Next steps

1. Install the expansion card riser assembly.
2. Install the sled into the enclosure.
3. Follow the procedure listed in the After working inside your system section.

Related references

Safety instructions on page 67

Related tasks

Before working inside your system on page 67
Removing a sled on page 71
Removing the expansion card riser assembly on page 106
Removing a mezzanine card filler bracket on page 126
Installing the expansion card riser assembly on page 107
Installing a sled on page 72
After working inside your system on page 68

Removing the mezzanine card bridge board

Prerequisites

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.

1. Follow the safety guidelines listed in the Safety instructions section.
2. Follow the procedure listed in the Before working inside your system section.
3. Remove the sled from the enclosure.
4. Remove the expansion card riser assembly.
5. Remove the mezzanine card.
6. Keep the Phillips #2 screwdriver ready.

Steps

Pull the mezzanine card bridge board away from the mezzanine card slot on the system board.

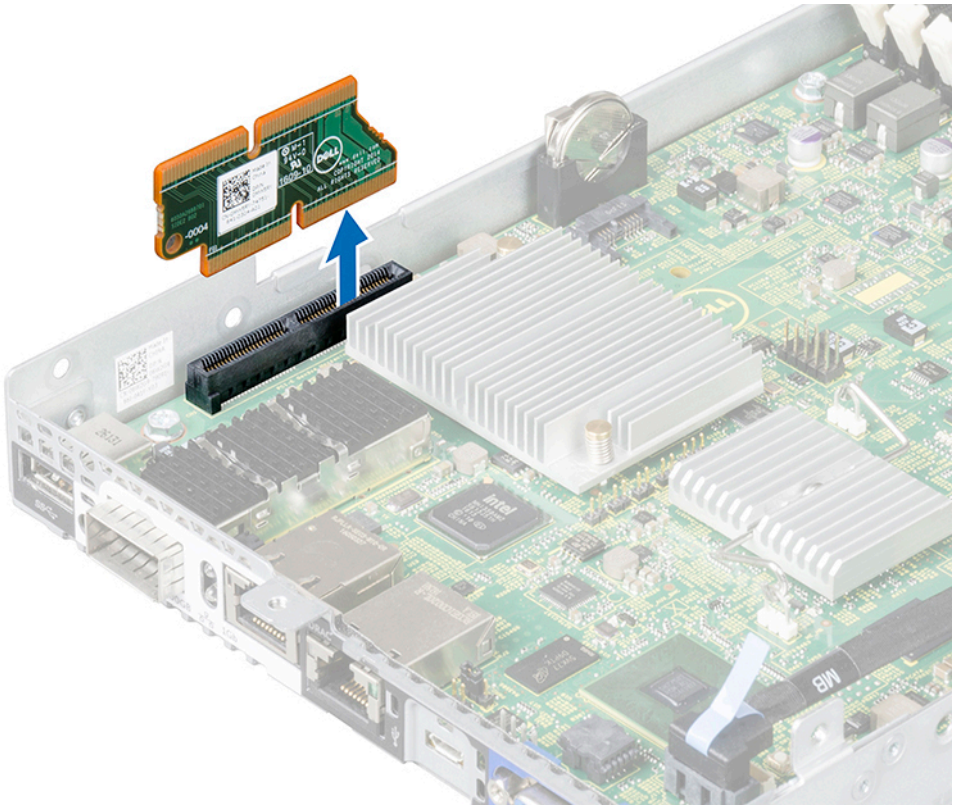

Figure 67. Removing the mezzanine card bridge board

Next steps

1. Install the mezzanine card bridge board.
2. Install the mezzanine card.
3. If a mezzanine card is not used, install the mezzanine bracket.
4. Install the expansion card riser assembly.
5. Install the sled into the enclosure.
6. Follow the procedure listed in the After working inside your system section.

Related references

Safety instructions on page 67

Related tasks

Before working inside your system on page 67
Removing a sled on page 71
Removing the expansion card riser assembly on page 106
Removing a mezzanine card on page 120
Installing the mezzanine card bridge board on page 125
Installing the expansion card riser assembly on page 107
Installing a sled on page 72
After working inside your system on page 68

Installing the mezzanine card bridge board

Prerequisites

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.

1. Follow the safety guidelines listed in the Safety instructions section.
2. Follow the procedure listed in the Before working inside your system section.
3. Remove the sled from the enclosure.
4. Remove the expansion card riser assembly.
5. Remove the mezzanine card.
6. Keep the Phillips #2 screwdriver ready.

Steps

Insert the mezzanine card bridge board into the mezzanine slot on the system board.

NOTE: The mezzanine card bridge board has an alignment key to ensure that it can only be installed in one way. Installing the bridge board incorrectly may damage the bridge board, the mezzanine card, and the system board.

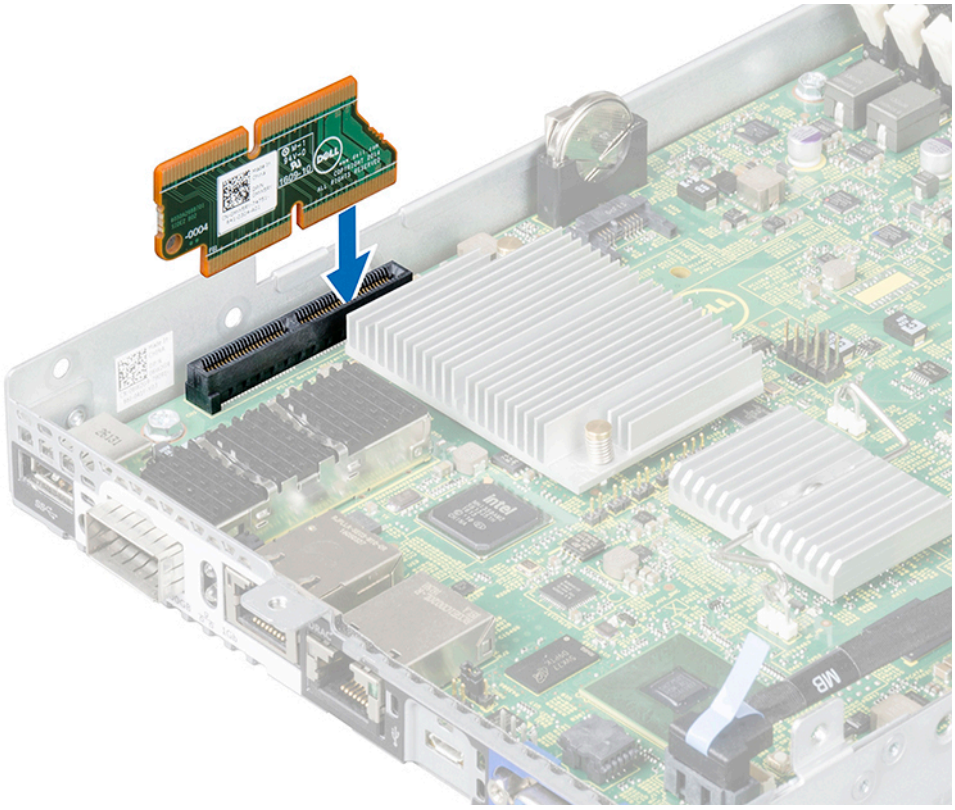

Figure 68. Installing the mezzanine card bridge board

Next steps

1. Install the mezzanine card.
2. Install the expansion card riser assembly.
3. Install the sled into the enclosure.
4. Follow the procedure listed in the After working inside your system section.

Related references

Safety instructions on page 67

Related tasks

Before working inside your system on page 67
Removing a sled on page 71
Removing the expansion card riser assembly on page 106
Removing a mezzanine card on page 120
Installing the expansion card riser assembly on page 107
Installing a sled on page 72
After working inside your system on page 68

Removing a mezzanine card filler bracket

Prerequisites

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.

1. Follow the safety guidelines listed in the Safety instructions section.
2. Follow the procedure listed in the Before working inside your system section.
3. Remove the sled from the enclosure.
4. Remove the expansion card riser assembly.
5. Keep the Phillips #1 screwdriver ready.

Steps

1. Remove the screws that secure the mezzanine card filler bracket to the sled.
2. Lift the mezzanine card filler bracket out of the sled.

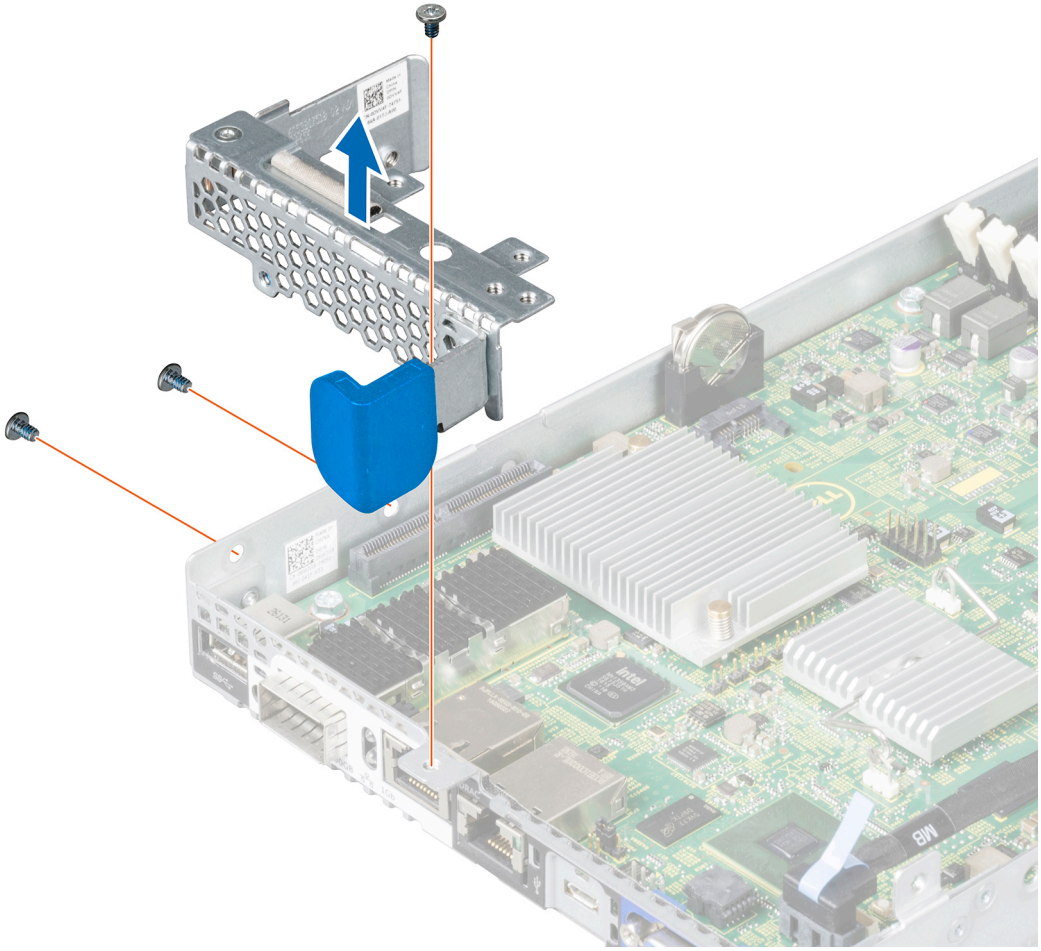

Figure 69. Removing a mezzanine card filler bracket

Next steps

1. Install the mezzanine card or the mezzanine card filler bracket.
2. Install the expansion card riser assembly.
3. Install the sled into enclosure.
4. Follow the procedure listed in the After working inside your system section.

Related references

Safety instructions on page 67

Related tasks

Before working inside your system on page 67
Removing a sled on page 71

Removing the expansion card riser assembly on page 106
Installing a mezzanine card on page 122
Installing a mezzanine card filler bracket on page 128
Installing the expansion card riser assembly on page 107
Installing a sled on page 72
After working inside your system on page 68

Installing a mezzanine card filler bracket

Prerequisites

1. Follow the safety guidelines listed in the Safety instructions section.
2. Follow the procedure listed in the Before working inside your system section.
3. Remove the sled from the enclosure.
4. Remove the expansion card riser assembly.
5. Keep the Phillips #1 screwdriver ready.

Steps

1. Install the mezzanine card filler bracket into the sled.
2. Secure the mezzanine card filler bracket with screws.

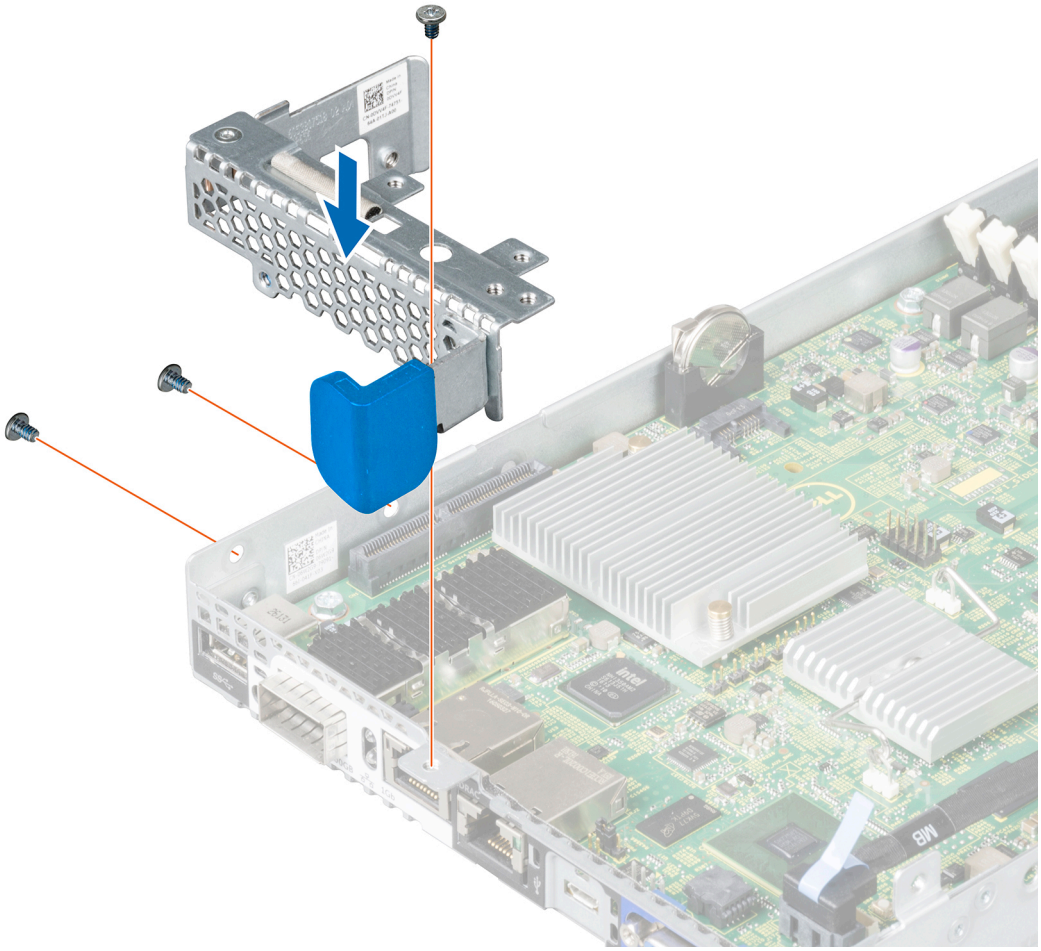

Figure 70. Installing a mezzanine card filler bracket

Next steps

1. Install the expansion card riser assembly.

2. Install the sled into the enclosure.
3. Follow the procedure listed in the After working inside your system section.

Related references

Safety instructions on page 67

Related tasks

Before working inside your system on page 67
Removing a sled on page 71
Removing the expansion card riser assembly on page 106
Installing the expansion card riser assembly on page 107
Installing a sled on page 72
After working inside your system on page 68

System battery

The system battery is used to power the real-time clock and storing the BIOS settings of the system.

NOTE: There is a system battery in each of the sleds.

Removing the system battery - option A

Prerequisites

NOTE: There is a danger of a new battery exploding if it is incorrectly installed. Replace the battery only with the same or equivalent type recommended by the manufacturer. For more information, see the safety information that shipped with your system.

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.

1. Follow the safety guidelines listed in the Safety instructions section.
2. Follow the procedure listed in the Before working inside your system section.
3. Take the sled out of the enclosure.

Steps

1. Locate the battery socket. For more information, see the System board connectors section.
2. Push the battery lock connector away from the battery.
3. Lift the battery away from the socket.

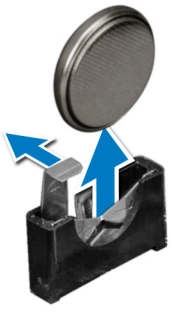

Figure 71. Removing the system battery

Next steps

1. Install the system battery.
2. Install the sled into the enclosure.
3. Follow the procedure listed in the After working inside your system section.
4. While booting, press F2 to enter System Setup and ensure that the battery is operating properly.
5. Enter the correct time and date in the System Setup **Time** and **Date** fields.
6. Exit System Setup.

Related references

Safety instructions on page 67

Related tasks

Before working inside your system on page 67
Removing a sled on page 71
Installing the system battery - option A on page 130
Installing a sled on page 72
After working inside your system on page 68

Installing the system battery - option A

Prerequisites

NOTE: There is a danger of a new battery exploding if it is incorrectly installed. Replace the battery only with the same or equivalent type recommended by the manufacturer. For more information, see the safety information that shipped with your system.

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.

1. Follow the safety guidelines listed in the Safety instructions section.
2. Follow the procedure listed in the Before working inside your system section.
3. Take the sled out of the enclosure.
4. Remove the system battery.

Steps

1. Locate the battery socket. For more information, see the System board connectors section.
2. Push the battery lock connector away from the battery.
3. Insert the battery into the socket, and release the battery lock connector to secure the battery in place.

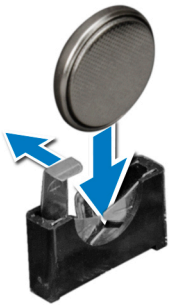

Figure 72. Installing the system battery

Next steps

1. Install the sled into the enclosure.
2. Follow the procedure listed in the After working inside your system section.
3. While booting, press F2 to enter System Setup and ensure that the battery is operating properly.
4. Enter the correct time and date in the System Setup **Time** and **Date** fields.
5. Exit System Setup.

Related references

Safety instructions on page 67

Related tasks

Before working inside your system on page 67
Removing a sled on page 71
Removing the system battery - option A on page 129
Installing a sled on page 72
After working inside your system on page 68

Removing the system battery - option B

Prerequisites

NOTE: There is a danger of a new battery exploding if it is incorrectly installed. Replace the battery only with the same or equivalent type recommended by the manufacturer. For more information, see the safety information that shipped with your system.

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.

1. Follow the safety guidelines listed in the Safety instructions section.
2. Follow the procedure listed in the Before working inside your system section.
3. Take the sled out of the enclosure.

Steps

1. Locate the battery socket. For more information, see the System board connectors section.
2. Slant the battery away from the battery holder and pull the battery out of the socket.

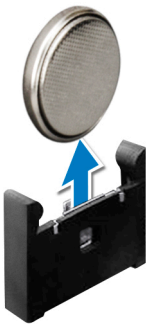

Figure 73. Removing the system battery - clamp type holder

Next steps

1. Install the system battery.
2. Install the sled into the enclosure.
3. Follow the procedure listed in the After working inside your system section.

4. While booting, press F2 to enter System Setup and ensure that the battery is operating properly.
5. Enter the correct time and date in the System Setup **Time** and **Date** fields.
6. Exit System Setup.

Installing the system battery- option B

Prerequisites

NOTE: There is a danger of a new battery exploding if it is incorrectly installed. Replace the battery only with the same or equivalent type recommended by the manufacturer. For more information, see the safety information that shipped with your system.

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.

1. Follow the safety guidelines listed in the Safety instructions section.
2. Follow the procedure listed in the Before working inside your system section.
3. Take the sled out of the enclosure.
4. Remove the system battery.

Steps

1. Locate the battery socket. For more information, see the System board connectors section.
2. Insert the battery into the socket and push down till it clicks in place.

Figure 74. Installing the system battery - clamp type holder

Next steps

1. Install the sled into the enclosure.
2. Follow the procedure listed in the After working inside your system section.
3. While booting, press F2 to enter System Setup and ensure that the battery is operating properly.
4. Enter the correct time and date in the System Setup **Time** and **Date** fields.
5. Exit System Setup.

Trusted Platform Module

Trusted Platform Module (TPM) is a dedicated microprocessor designed to secure hardware by integrating cryptographic keys into devices. A software can use a Trusted Platform Module to authenticate hardware devices. As each TPM chip has a unique and secret RSA key burned in as it is produced, it can perform the platform authentication.

CAUTION: Do not attempt to remove the Trusted Platform Module (TPM) from the system board. After the TPM is installed, it is cryptographically bound to that specific system board. Any attempt to remove an installed TPM breaks the cryptographic binding, and it cannot be re-installed or installed on another system board.

NOTE: This is a Field Replaceable Unit (FRU). Removal and installation procedures must be performed only by Dell certified service technicians.

Installing the Trusted Platform Module

Prerequisites

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.

NOTE: There is a TPM slot on the system board of each sled.

1. Follow the safety guidelines listed in the Safety instructions section.
2. Follow the procedure listed in the Before working inside your system section.
1. Remove the sled from the enclosure.
2. If installed, remove the mezzanine card.

Steps

1. Locate the TPM connector on the system board.

   NOTE: To locate the TPM connector on the system board, see the System board connectors section.

2. Align the edge connectors on the TPM with the slot on the TPM connector.
3. Insert the TPM into the TPM connector such that the plastic rivet aligns with the slot on the system board.
4. Press the plastic rivet until the rivet snaps into place.

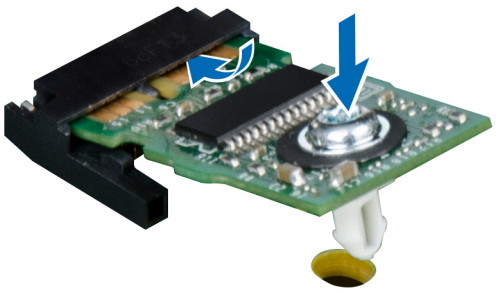

Figure 75. Installing the TPM

Next steps

1. If removed, install the mezzanine card.
2. Install the sled into the enclosure.
3. Follow the procedure listed in the After working inside your system section.

Related references

Safety instructions on page 67

Related tasks

Before working inside your system on page 67
Removing a sled on page 71
Removing a mezzanine card on page 120

PowerEdge C6320p system board connectors on page 187
Installing a sled on page 72
After working inside your system on page 68

Initializing the Trusted Platform Module

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 with Pre-boot Measurements**.
4. From the **TPM Command** option, select **Activate**.
5. Save the settings.
6. Restart the sled.

System board

A system board (also known as the motherboard) is the main printed circuit board in the system with different connectors used to connect different components or peripherals of the system. A system board provides the electrical connections to the components in the system to communicate.

Removing a system board

Prerequisites

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.

CAUTION: Do not attempt to remove the TPM plug-in module from the system board. 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, and it cannot be reinstalled or installed on another system board.

1. Follow the safety guidelines listed in the Safety instructions section.
2. Follow the procedure listed in the Before working inside your system section.
3. Remove the sled from the chassis.
4. Remove the air shroud.
5. Remove the expansion card riser assembly.
6. Remove the processor heat sink module.
7. Remove the memory modules.
8. If installed, remove the mezzanine card.
9. If installed, remove the 1.8 inch SSD.
10. If installed, remove the 1.8 inch SSD carrier.
11. Disconnect all the cables from the system board.
12. Keep the Phillips #1 screwdriver ready.

Steps

1. Remove the screws that secure the system board to the sled assembly.

   CAUTION: Do not lift the system board by holding a memory module slot, any other connector, or component.

2. Hold the system board by the edges, and lift the system board away from the sled.

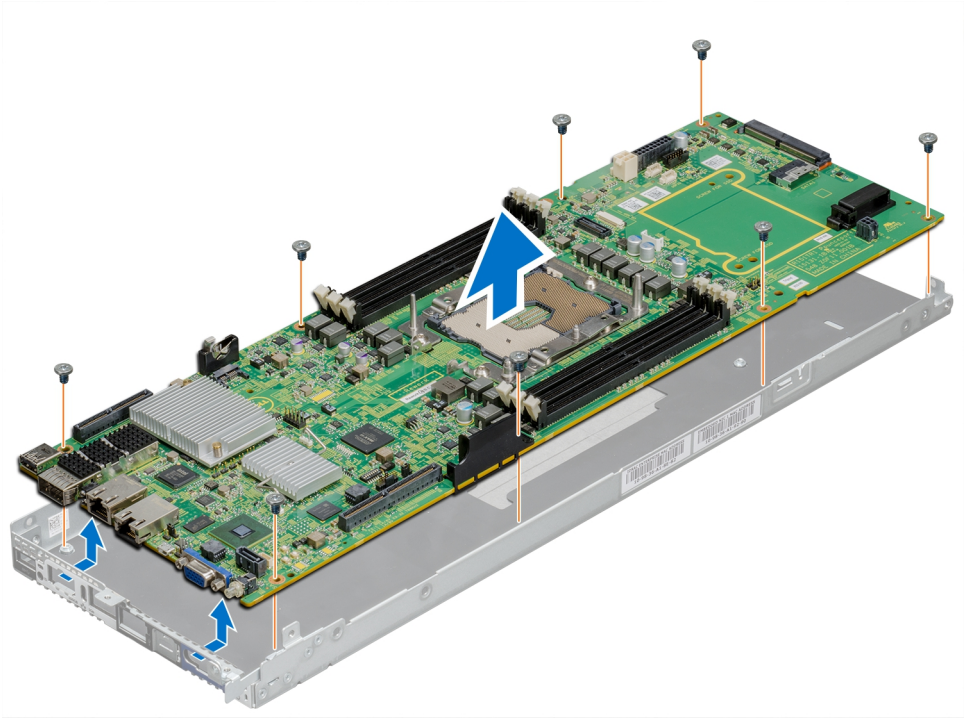

Figure 76. Removing the system board

Next steps

1. If the system board is being replaced, reuse the SAS connector protector from the old system board.
   NOTE: The SAS connector protector is not available on a new or replacement system board. Do not return the old system board with the SAS connector protector.
2. Install the system board.
3. Install all the removed components and cables.
4. Follow the procedure listed in the After working inside your system section.

Related references

Safety instructions on page 67

Related tasks

Before working inside your system on page 67
Removing a sled on page 71
Removing the air shroud on page 73
Removing the expansion card riser assembly on page 106
Removing the processor and heat sink module on page 92
Removing the memory modules on page 76
Removing the 1.8-inch solid state drive on page 79
Removing the 1.8-inch solid state drive carrier on page 81
Removing a mezzanine card on page 120
Removing the SATA cable from the sled on page 84
Removing the SSD SATA cable from the sled on page 85
Removing the SAS connector protector on page 137
Installing a system board on page 136
After working inside your system on page 68

Installing a system board

Prerequisites

1. Follow the safety guidelines listed in the Safety instructions section.
2. Follow the procedure listed in the Before working inside your system section.
3. If removed, install the SAS protector cover.
4. Keep the Phillips #1 screwdriver ready.

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.

Steps

1. Holding the system board by the edges, slide the system board into the sled.
2. Install the screws that secure the system board to the sled.
3. Remove processor dust cover and install it into the CPU socket of the motherboard that was removed previously for shipment back to Dell.

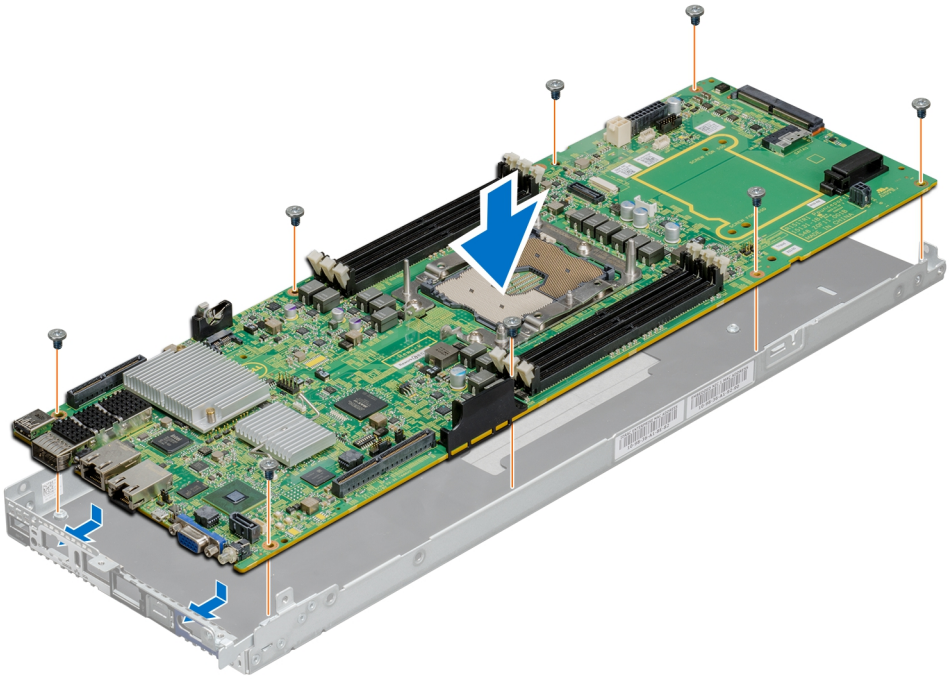

Figure 77. Installing a system board

Next steps

1. If removed, install the Trusted Platform Module (TPM). For information about how to install the TPM, see the Installing the Trusted Platform Module section. For more information about the TPM, see the Trusted Platform Module section.

   NOTE: The TPM plug-in module once installed is attached to the system board and cannot be removed. In the event of a system board replacement, a TPM plug-in module is provided along with the system board for all systems that have a TPM.
2. Reconnect all the disconnected cables.
3. Replace the following components:
   a. Processor heat sink module

      NOTE: If installed, remove the processor dust cover.
   b. Mezzanine card
   c. Expansion card riser assembly

d. 1.8 inch SSD carrier
e. 1.8 inch SSD
f. Memory modules
g. Air shroud

4. Follow the procedure listed in the After working inside your system section.
5. Import your new or existing iDRAC Enterprise license. For more information, see Integrated Dell Remote Access Controller User's Guide, at **Dell.com/esmmanuals**.
6. Ensure that you:
   a. Enter the sled Service Tag manually. For more information, see the Entering the sled Service Tag section.
   b. Re-enable the Trusted Platform Module (TPM). For more information, see the Re-enabling the Trusted Platform Module (TPM) section.
7. If necessary, update the BIOS and iDRAC versions.

Related references

Safety instructions on page 67

Related tasks

Before working inside your system on page 67
Removing a sled on page 71
Installing the SAS connector protector on page 138
Installing the SSD SATA cable into the sled on page 87
Installing the SATA cable into the sled on page 88
Installing a mezzanine card on page 122
Installing the expansion card riser assembly on page 107
Installing the processor and heat sink module on page 94
Installing the 1.8-inch solid state drive carrier on page 83
Installing the 1.8-inch solid state drive on page 80
Installing the memory modules on page 77
Installing the air shroud on page 74

SAS connector protector

The SAS connector protector is a shield that is fixed to the system board to protect the SAS connector from any damage that may occur during shipping.

Removing the SAS connector protector

Prerequisites

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.

1. Follow the safety guidelines listed in the Safety instructions section.
2. Follow the procedure listed in the Before working inside your system section.
3. Remove the sled from the enclosure.
4. Remove the system board from the sled

Steps

1. To release the SAS connector protector, lift the plastic securing hook from the system board.
2. To disengage the SAS connector protector from the guide slots on the system board, pull the protector away from the system board

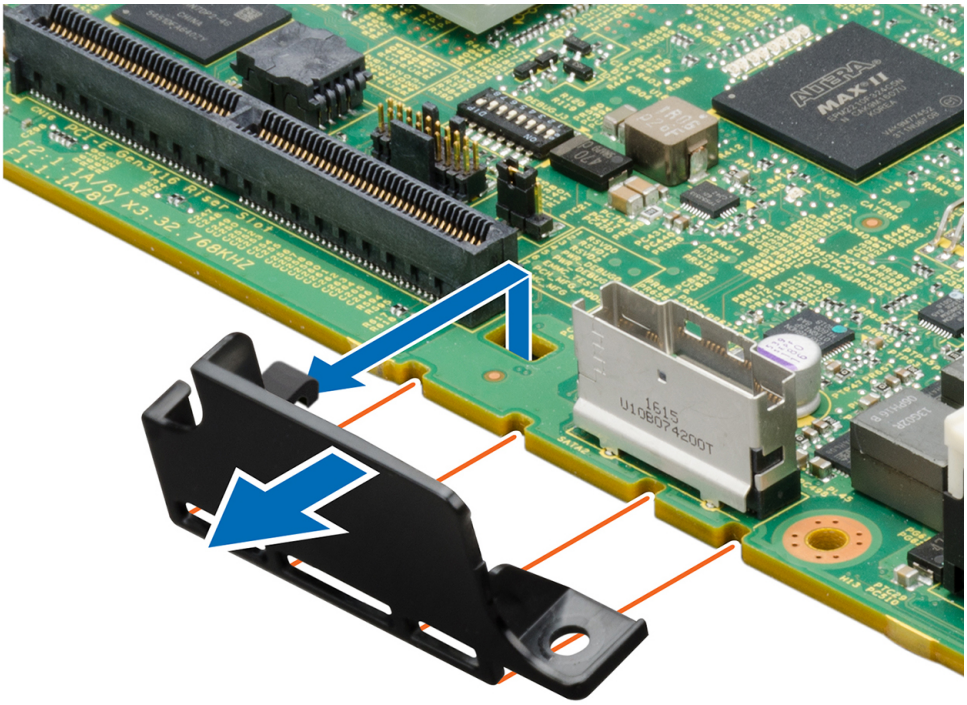

Figure 78. Removing the SAS connector protector

Next steps

1. Install the SAS connector protector.
2. Install the system board into the sled.
3. Install the sled into enclosure.
4. Follow the procedure listed in the After working inside your system section.

Installing the SAS connector protector

Prerequisites

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.

1. Follow the safety guidelines listed in the Safety instructions section.
2. Follow the procedure listed in the Before working inside your system section.
3. Remove the sled from the enclosure.
4. Remove the system board from the sled.

Steps

1. Align and insert the SAS connector protector into the guide slots on the system board.
2. Push the protector so that the plastic securing hook locks into the slot on the system board.

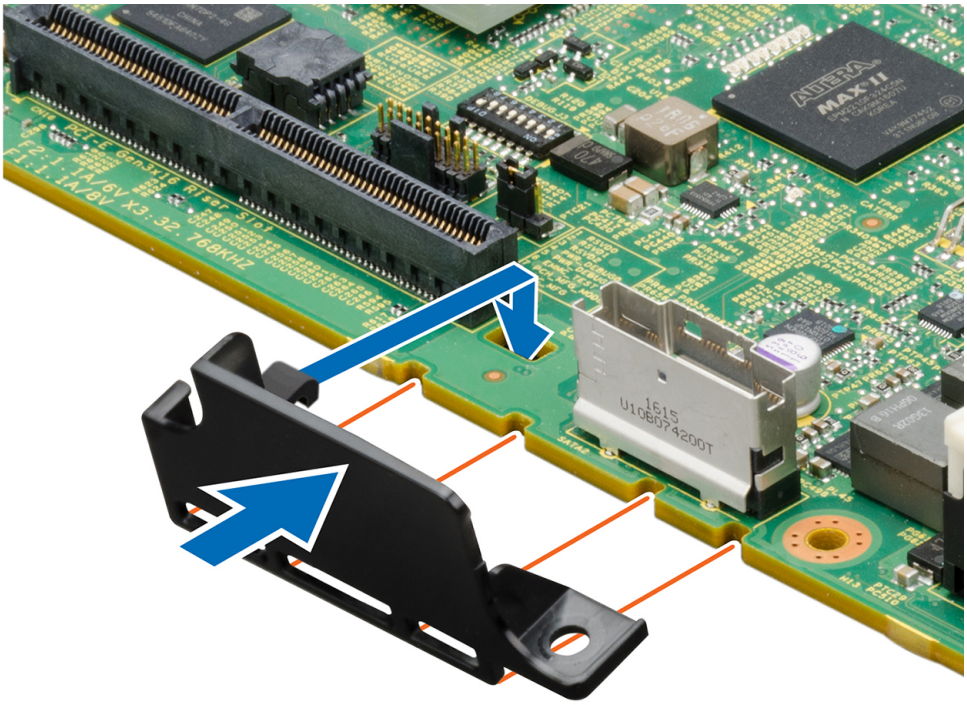

Figure 79. Installing the SAS connector protector

Next steps

1. Install the system board into the sled.
2. Install the sled into enclosure.
3. Follow the procedure listed in the After working inside your system section.

9

Installing and removing enclosure components

Topics:

2.5-inch hard drive or solid state drive

A hard drive is a data storage device used for storing and retrieving digital information.

CAUTION: Use only hard drives that have been tested and approved for use with the SAS or SATA backplane.

The following are the guidelines for installing a mix of SAS hard drives, SATA hard drives, and SSDs:

- Each sled supports six 2.5-inch hard drives or Solid State Drives.
- Only two drive types can be mixed per sled.
- Drives 0 and 1 must be of the same type.
- The remaining drives must be of the same type.
- SAS hard drive support is based on the Mezzanine card and the onboard configuration supports only SATA hard drives.

Removing a hard drive carrier

Prerequisites

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.

CAUTION: To maintain proper system cooling, all empty hard drive bays must have hard drive blanks installed.

Follow the safety guidelines listed in the Safety instructions section.

Steps

1. Turn the lock lever counterclockwise until it points to the unlock symbol.
2. Slide the release button to open the release handle.
3. Using the release handle, pull the hard drive carrier out of the hard drive bay.

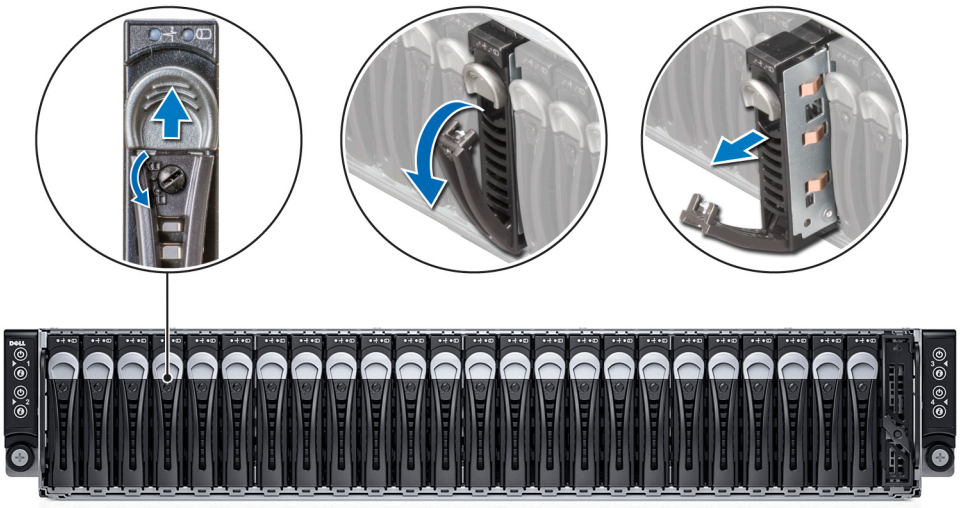

Figure 80. Removing a hard drive carrier

Next steps

Install the hard drive carrier.

Related references

Safety instructions on page 67

Related tasks

Installing a hard drive carrier on page 141

Installing a hard drive carrier

Prerequisites

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.

CAUTION: To maintain proper system cooling, all empty hard drive carrier bays must have hard drive carrier blanks installed.

Follow the safety guidelines listed in the Safety instructions section.

Steps

1. Open the release lever on the hard drive carrier and slide the hard drive carrier into the hard drive bay until the hard drive connector engages with the backplane.
2. Push the release handle to lock the hard drive carrier in place.
3. Turn the lever lock clockwise to the lock symbol.

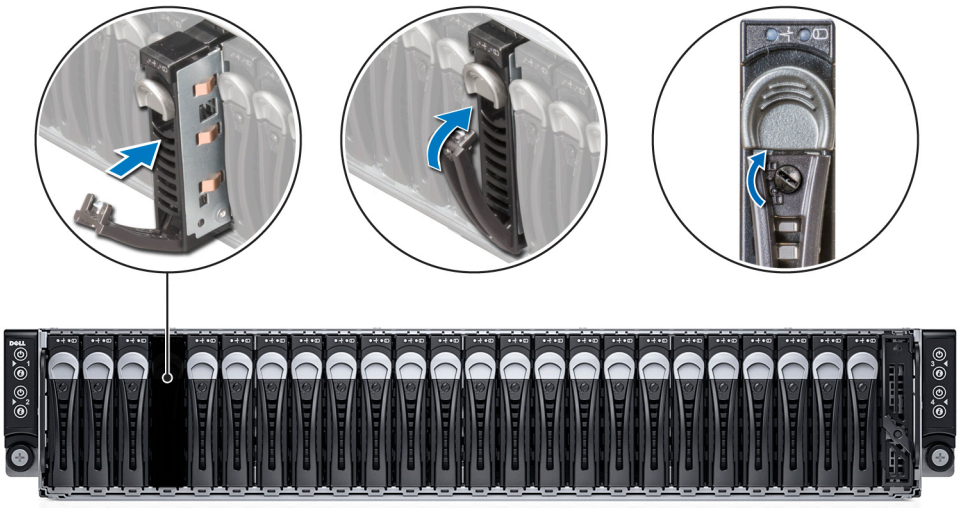

Figure 81. Installing a hard drive carrier

Next steps

1. To check the status of the hard drive, see the hard drive activity and status indicators.
2. To verify the status of the installed hard drive, check the management software.

Related references

Safety instructions on page 67

Related tasks

Hard drive indicator patterns on page 17

Removing a hard drive from a hard drive carrier

Prerequisites

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.

CAUTION: When installing a hard drive carrier, ensure that the adjacent drives are fully installed. Inserting a hard drive carrier and attempting to lock its handle next to a partially installed carrier can damage the partially installed carrier's shield spring and make it unusable.

CAUTION: To prevent data loss, ensure that your operating system supports hot-swappable drive installation. See the documentation supplied with the operating system.

1. Follow the safety guidelines listed in the Safety instructions section.
2. Remove the hard drive carrier from the system.
3. Keep the Phillips #2 screwdriver ready.

Steps

1. Remove the screws securing the hard drive to the chassis.
2. Lift the hard drive out of the hard drive carrier.

Figure 82. Removing a hard drive from the hard drive carrier

Next steps

1. Install the hard drive into the hard drive carrier.
2. Install the hard drive carrier into the hard drive bay.

Related references

Safety instructions on page 67

Related tasks

Removing a hard drive carrier on page 140
Installing a hard drive into a hard drive carrier on page 143
Installing a hard drive carrier on page 141

Installing a hard drive into a hard drive carrier

Prerequisites

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.

1. Follow the safety guidelines listed in the Safety instructions section.
2. Remove the hard drive carrier from the system.
3. If installed, remove the hard drive blank. The procedure for removing a blank is the same as removing a hard drive carrier.
4. Keep the Phillips #2 screwdriver ready.

Steps

1. Place the hard drive into the hard drive carrier.
2. Secure the hard drive to the hard drive carrier with screws.

Figure 83. Installing a hard drive into a hard drive carrier

NOTE: Ensure that the hard drive is installed with the label facing up. This is to ensure that the hard drive connector is aligned with the connector on the backplane.

Next steps

1. Install the hard drive carrier into the hard drive bay.
2. To check the status of the hard drive, see the hard drive activity and status indicators.
3. To verify the status of the installed hard drive, check the management software.

Related references

Safety instructions on page 67

Related tasks

Removing a hard drive carrier on page 140
Installing a hard drive carrier on page 141
Hard drive indicator patterns on page 17

Power supply units

NOTE: Using configurations higher than indicated in the table may change the power supply units (PSU) mode to non-redundant. In non-redundant mode, if the power requirement exceeds the installed system power capacity, the BIOS will throttle the processors performance. Also, when **Processor Power Capping** is enabled, processor throttling occurs on configurations that exceed the cap value.

NOTE: Both the PSUs are hot swappable if the system has the power throttling feature enabled.

The following table lists the maximum supported configurations where power supply unit (PSU) redundancy is guaranteed:

Table 31. Supported PSU configurations for non fabric processors

PSU	Sled configuration
1400 W	Supports up to 215 W processor, three hard drives, and four memory modules per system board (Sled with Mellanox ConnectX-4 embedded controller).
	Supports up to 215 W processor, four hard drives, and four memory modules per system board (Sled without Mellanox ConnectX-4 embedded controller).
	Supports up to 215 W processor, two hard drives, and six memory modules per system board (Sled without Mellanox ConnectX-4 embedded controller).
1600 W	Supports up to 245 W processor, two hard drives, and six memory modules per system board (Sled with Mellanox ConnectX-4 embedded controller).
	Supports up to 245 W processor, four hard drives, and four memory modules per system board (Sled with Mellanox ConnectX-4 embedded controller).
	Supports up to 245 W processor, six hard drives, and four memory modules per system board (Sled without Mellanox ConnectX-4 embedded controller).
	Supports up to 245 W processor, three hard drives, and six memory modules per system board (Sled without Mellanox ConnectX-4 embedded controller).

Table 32. PSU supported configurations for fabric processors

PSU	Sled configuration
1400 W	Supports up to 230 W processor, two hard drives, and four memory modules per system board
	Support up to 230 W processor, four hard drives, and two memory modules per system board
1600 W	Support up to 260 W processor, two hard drives, and six memory modules per system board
	Support up to 230 W processor, four hard drives, and four memory modules per system board

Removing a power supply unit

Prerequisites

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.

CAUTION: The system requires at least one working power supply unit (PSU) to operate.

1. Follow the safety guidelines listed in the Safety instructions section.
2. Follow the procedure listed in the Before working inside your system section.
3. Disconnect the power cable from the power source and the PSU, and disconnect the peripherals.

Steps

Press the release lever and by using the handle, slide the PSU out of the system.

NOTE: Removing the PSU may require considerable force.

Figure 84. Removing a PSU

Next steps

1. Install the PSU.
2. Reconnect all disconnected cables and peripherals.
3. Follow the procedure listed in the After working inside your system section.

Related references

Safety instructions on page 67

Related tasks

Before working inside your system on page 67
Installing a power supply unit on page 146
After working inside your system on page 68

Installing a power supply unit

Prerequisites

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.

CAUTION: The system requires at least one power supply unit (PSU) to operate normally.

NOTE: When installing a new PSU in a system with two PSUs, allow several seconds for the system to recognize the PSU and determine its status.

NOTE: The maximum output power is printed on the PSU label.

1. Follow the safety guidelines listed in the Safety instructions section.
2. Follow the procedure listed in the Before working inside your system section.
3. Verify that both PSUs are of the same type and have the same maximum output power.

Steps

Slide the PSU into the chassis until the PSU is fully seated and the release lever locks into place.

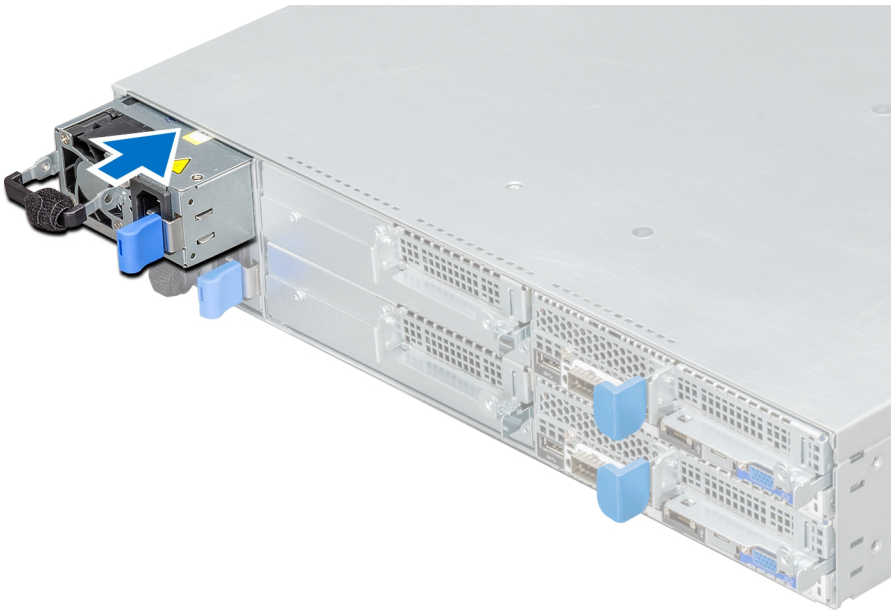

Figure 85. Installing a power supply unit

Next steps

Follow the procedure listed in the After working inside your system section.

Related references

Safety instructions on page 67

Related tasks

Before working inside your system on page 67
After working inside your system on page 68

System cover

The system cover protects the components inside the system and helps in maintaining air flow inside the system.

Removing the system cover

Prerequisites

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.

1. Follow the safety guidelines listed in the Safety instructions section.
2. Turn off each sled in the system, including all the attached peripherals.
3. Disconnect the system from the electrical outlet and disconnect the peripherals.
4. Keep the Phillips #2 screwdriver ready.

Steps

1. Remove the securing screw from the system cover.
2. Press the cover release latch lock.
3. Hold the system cover on both the sides with your palm on the traction pad, and slide out the system cover.
4. Lift the cover away from the system.

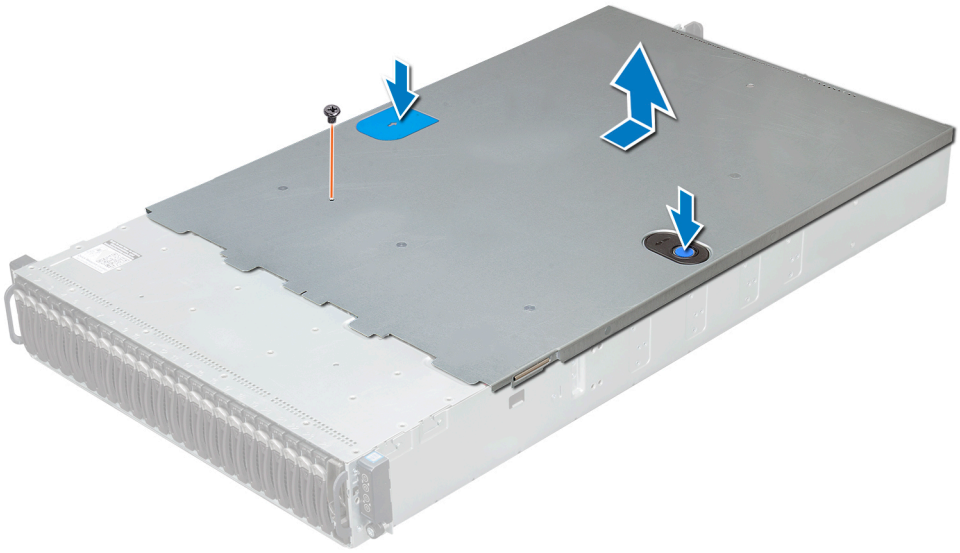

Figure 86. Removing the system cover

Next steps

Install the system cover.

Related references

Safety instructions on page 67

Related tasks

Installing the system cover on page 149

Installing the system cover

Prerequisites

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.

1. Follow the safety guidelines listed in the Safety instructions section.
2. Keep the Phillips #2 screwdriver ready.

Steps

1. Place the system cover on the chassis, and slide it to the front of the chassis until it snaps into place.
2. Secure the system cover in place with a screw.

Figure 87. Installing the system cover

Next steps

1. Reconnect the system to the electrical outlet.
2. Turn on each sled in the system, including all the attached peripherals.

Related references

Safety instructions on page 67

Cooling fans

Servers use a lot of power to function, and that in turn generates a lot of heat. That heat, without a cooling system in place to dissipate it, can destroy the electronic and mechanical parts of the server. In most cases, the simplest and most efficient way to dissipate this heat is through the use of fans.

Removing a cooling fan

Prerequisites

WARNING: Do not attempt to operate the system without the cooling fans.

WARNING: The cooling fan can continue to spin for some time after the system has been powered down. Allow time for the fan to stop spinning before removing it from the system.

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.

NOTE: Observe the routing of the cables when removing them from the system. Route these cables properly when you replace them to prevent the cables from being pinched or crimped.

1. Follow the safety guidelines listed in the Safety instructions section.
2. Follow the procedure listed in the Before working inside your system section.

Steps

Disconnect the fan cable from the connector on the cooling fan cage and lift the fan out.

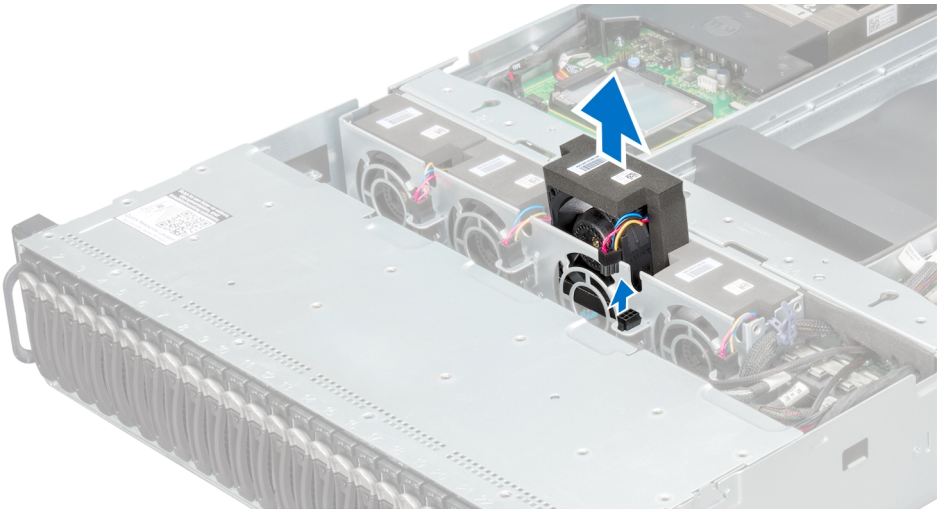

Figure 88. Removing a cooling fan

Next steps

1. Install a cooling fan.
2. Follow the procedure listed in the After working inside your system section.
3. For more information on the fan status, see the management software.

Related references

Safety instructions on page 67

Related tasks

Before working inside your system on page 67
Installing a cooling fan on page 151
After working inside your system on page 68

Installing a cooling fan

Prerequisites

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.

NOTE: Observe the routing of the cables when removing them from the system. Route these cables properly when you replace them to prevent the cables from being pinched or crimped.

1. Follow the safety guidelines listed in the Safety instructions section.
2. Follow the procedure listed in the Before working inside your system section.

Steps

1. Align the cooling fan with the sponge and slide it in the cooling fan cage until the cooling fan is firmly seated.

   NOTE: The fan blades should face the front of the system.

2. Connect the fan cable to the connector on the cooling fan cage.

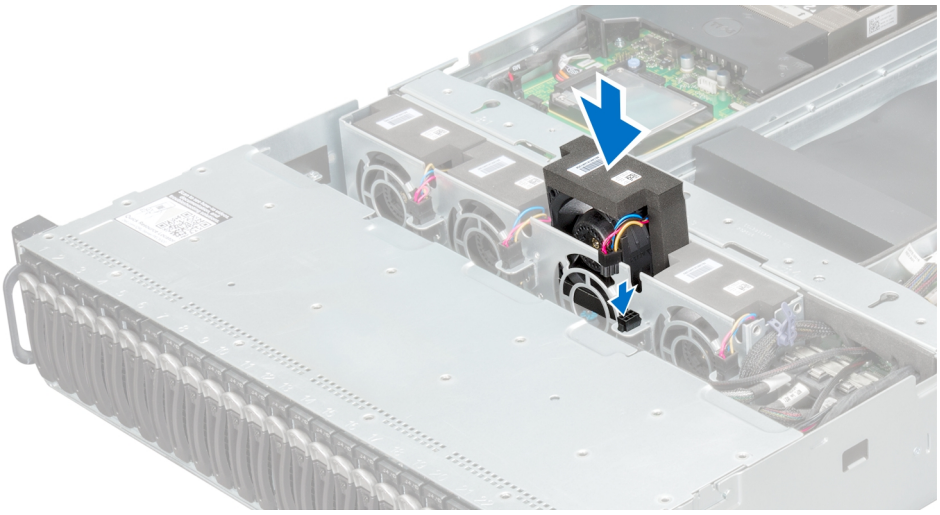

Figure 89. Installing a cooling fan

Next steps

1. Follow the procedure listed in the After working inside your system section.
2. Check the management software to see if the fan is rotating at the optimal speed.

Related references

Safety instructions on page 67

Related tasks

Before working inside your system on page 67
After working inside your system on page 68

Removing a cooling fan cage

Prerequisites

WARNING: Do not attempt to operate the system without the cooling fans.

WARNING: The cooling fan can continue to spin for some time after the system has been powered down. Allow time for the fan to stop spinning before removing it from the system.

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.

NOTE: Observe the routing of the cables when removing them from the system. Route these cables properly when you replace them to prevent the cables from being pinched or crimped.

1. Follow the safety guidelines listed in the Safety instructions section.
2. Follow the procedure listed in the Before working inside your system section.
3. Remove the cooling fans.

Steps

1. Disconnect the fan's power cable from the power distribution board 1.
2. Guide the fan cage cable out from beneath the middle-wall bracket.
3. Lift the cooling fan cage out of the chassis.

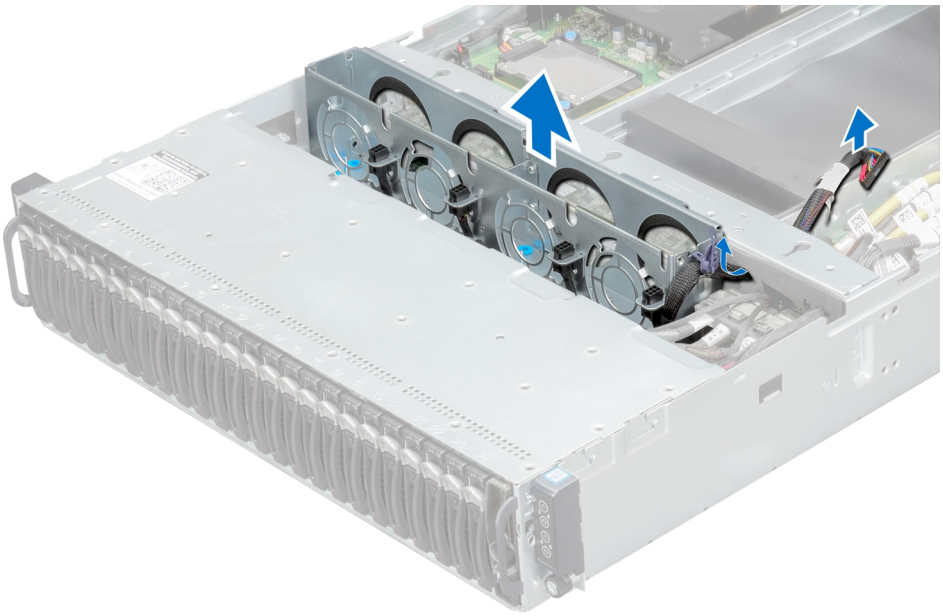

Figure 90. Removing the cooling fan cage

Next steps

1. Install the cooling fan cage.
2. Install the cooling fans.
3. Follow the procedure listed in the After working inside your system section.
4. Check the management software to see if all the fans are rotating at the optimal speed.

Related references

Safety instructions on page 67

Related tasks

Before working inside your system on page 67
Removing a cooling fan on page 150
Installing a cooling fan cage on page 153
Installing a cooling fan on page 151
After working inside your system on page 68

Installing a cooling fan cage

Prerequisites

WARNING: Do not attempt to operate the system without the cooling fans.

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.

NOTE: Observe the routing of the cables when removing them from the system. Route these cables properly when you replace them to prevent the cables from being pinched or crimped.

1. Follow the safety guidelines listed in the Safety instructions section.
2. Follow the procedure listed in the Before working inside your system section.
3. Remove the cooling fans.

Steps

1. Align the cooling fan cage with the locating pins on the chassis, and place it into the chassis until it is firmly seated.
2. Guide the fan cage cable in from beneath the middle-wall bracket.
3. Connect the fan's power cable to the connector on the power distribution board 1.
   Route this cable properly through the cable tie to prevent the cable from being pinched or crimped.

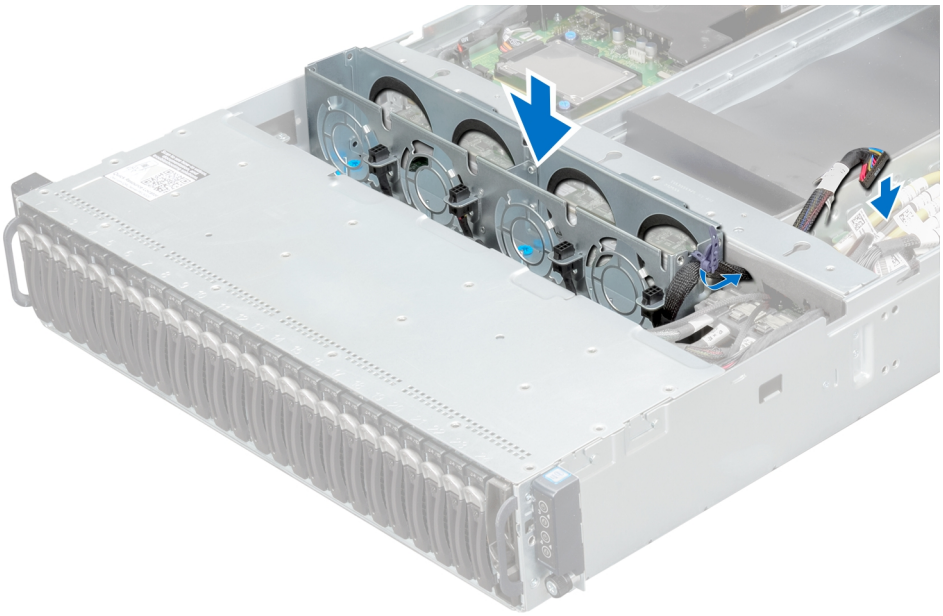

Figure 91. Installing the cooling fan cage

Next steps

1. Install the cooling fans.
2. Follow the procedure listed in the After working inside your system section.

3. Check the management software to see if all the fans are rotating at the optimal speed.

Related references

Safety instructions on page 67

Related tasks

Before working inside your system on page 67
Removing a cooling fan on page 150
Installing a cooling fan on page 151
After working inside your system on page 68

Power distribution boards

The power distribution board (PDB) is a board that connects the redundant power supply units to the system board. The Fan Control Board is a part of the PDB1. A PDB is only available in systems that support redundant power supply units. This system has two PDBs. The procedure to remove and install both the PDBs is similar. Remove PDB 1, to access PDB 2.

Removing the power distribution boards

Prerequisites

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.

1. Follow the safety guidelines listed in the Safety instructions section.
2. Follow the procedure listed in the Before working inside your system section.
3. Remove the power supply units (PSUs).
4. Keep the Philips #2 and the Torx T20 screwdrivers ready.

Steps

1. Disconnect all the cables from the power distribution board 1 (PDB 1).

   Observe the routing of the cable on the chassis as you remove them from the system. Route these cables properly when you replace them to prevent the cables from being pinched or crimped.
2. Remove the screw that secures the power cable cover to PDB 1.
3. Lift the power cable cover up straight from the locking hole on PDB 1. Then, lift it out of PDB 1.

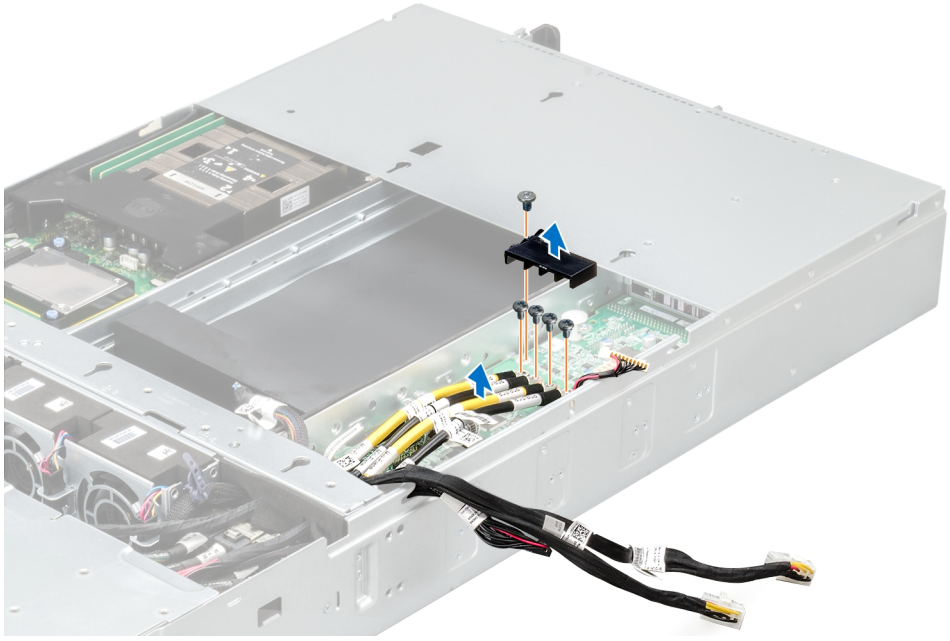

Figure 92. Removing the power cable cover and the power cables screws for PDB 1

4. Remove the screws that secure the power cables to PDB 1.
5. Remove the screws that secure PDB 1 to the system.
6. Lift PDB 1 away from the system.

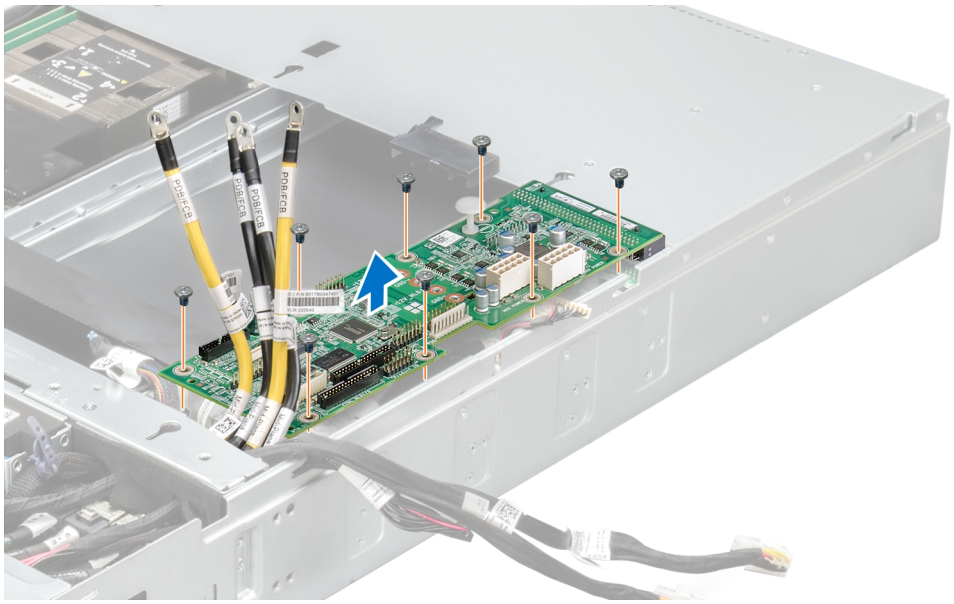

Figure 93. Removing PDB 1

7. Lift the PDB connector bridge board from the system.

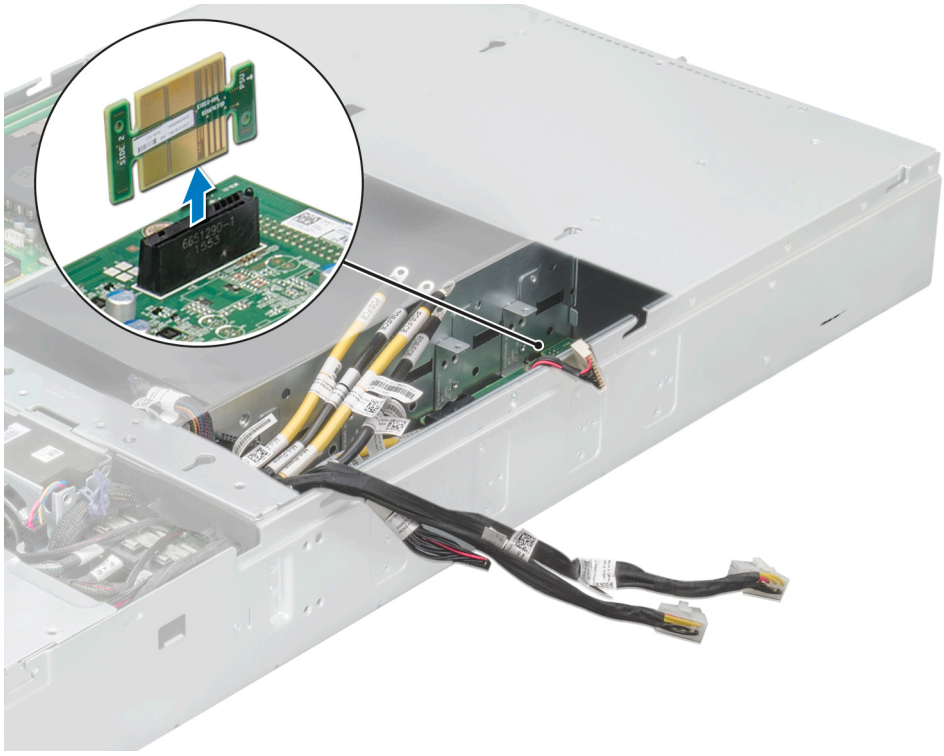

Figure 94. Removing the PDB bridge board

8. Disconnect all the cables from PDB 2.
9. Remove the screw that secures the power cable cover to PDB 2.
10. Lift power cable cover up straight from the locking hole on PDB 2. Then, lift it out of PDB 2.

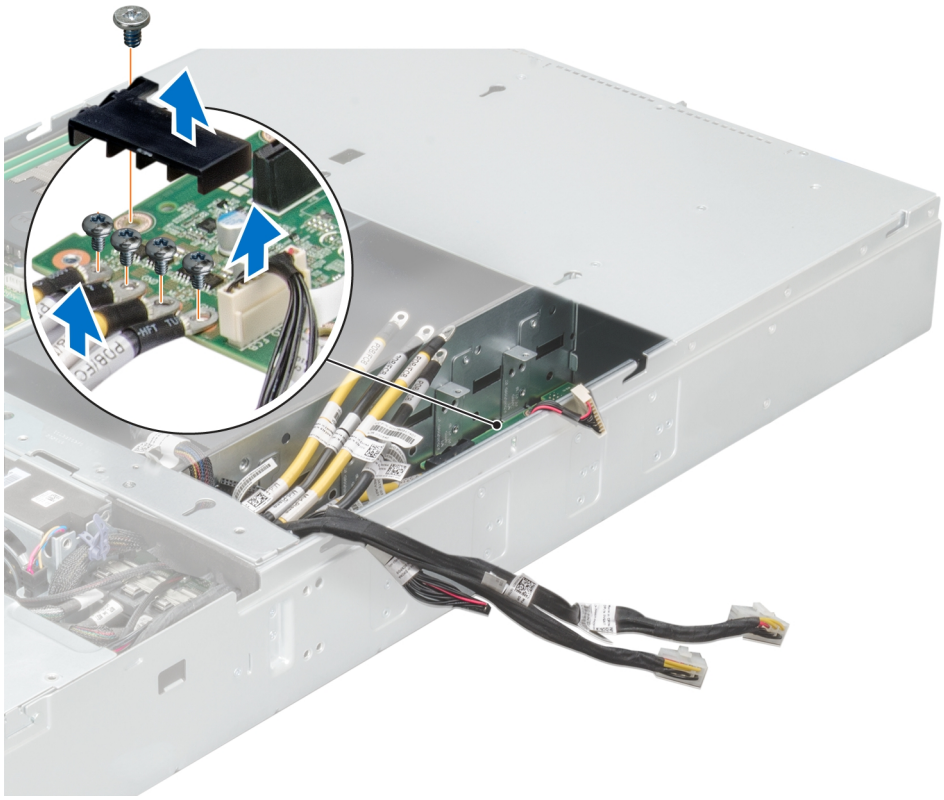

Figure 95. Removing the power cable cover and the power cables for PDB 2

11. Remove the screws securing the four power cables from PDB 2
12. Remove the four power cables from PDB 2.
13. Remove the screws that secure PDB 2 to the system.
14. Lift PDB 2 out of the system.

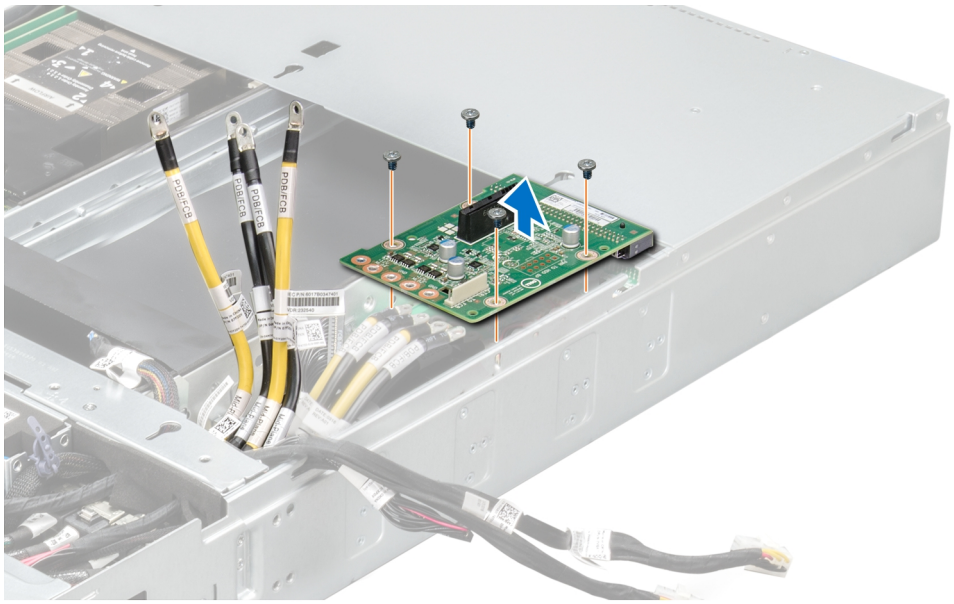

Figure 96. Removing the PDB 2

Next steps

1. Install the PDBs.
2. Install the PSUs.
3. Follow the procedure listed in the After working inside your system section.

Related references

Safety instructions on page 67

Related tasks

Before working inside your system on page 67
Removing a power supply unit on page 145
Installing the power distribution boards on page 157
Installing a power supply unit on page 146
After working inside your system on page 68

Installing the power distribution boards

Prerequisites

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.

CAUTION: If removed, you must install the power distribution board 2 (PDB 2) and the PDB bridge board, before installing PDB 1.

1. Follow the safety guidelines listed in the Safety instructions section.
2. Follow the procedure listed in the Before working inside your system section.

3. Remove the power supply units (PSUs).
4. Keep the Phillips #2 and the Torx T20 screwdrivers ready.

Steps

1. Install PDB 2
   a. Align the screw holes on PDB 2 with the holes on the chassis.

      NOTE: To install PDB 2, orient the PDB2 so that the board slides into place.

   b. Install the screws that secure PDB 2 to the system.
   c. Secure the four power cables to PDB 2 with screws.
   d. Install the power cable cover for PDB 2 and secure it with the screw.

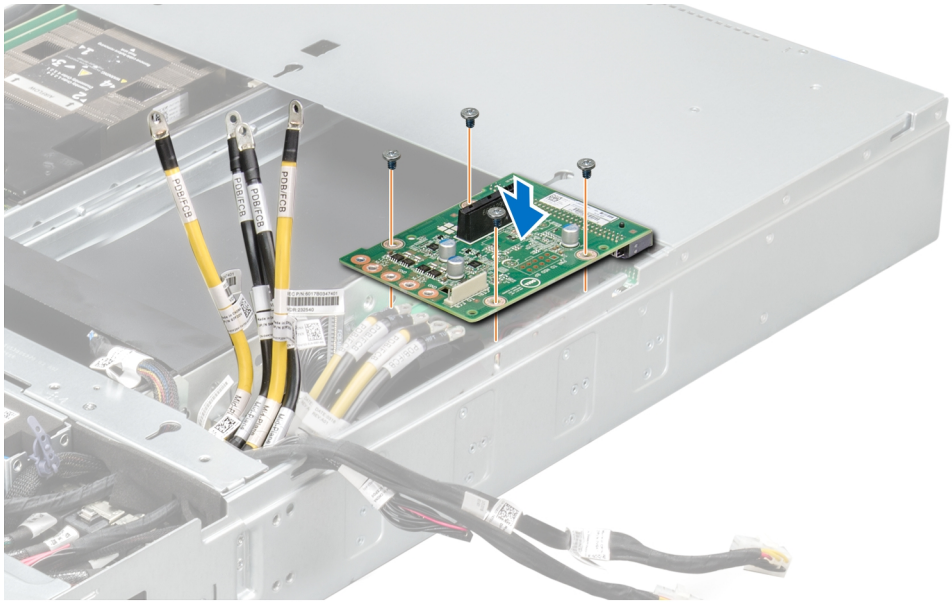

Figure 97. Installing PDB 2

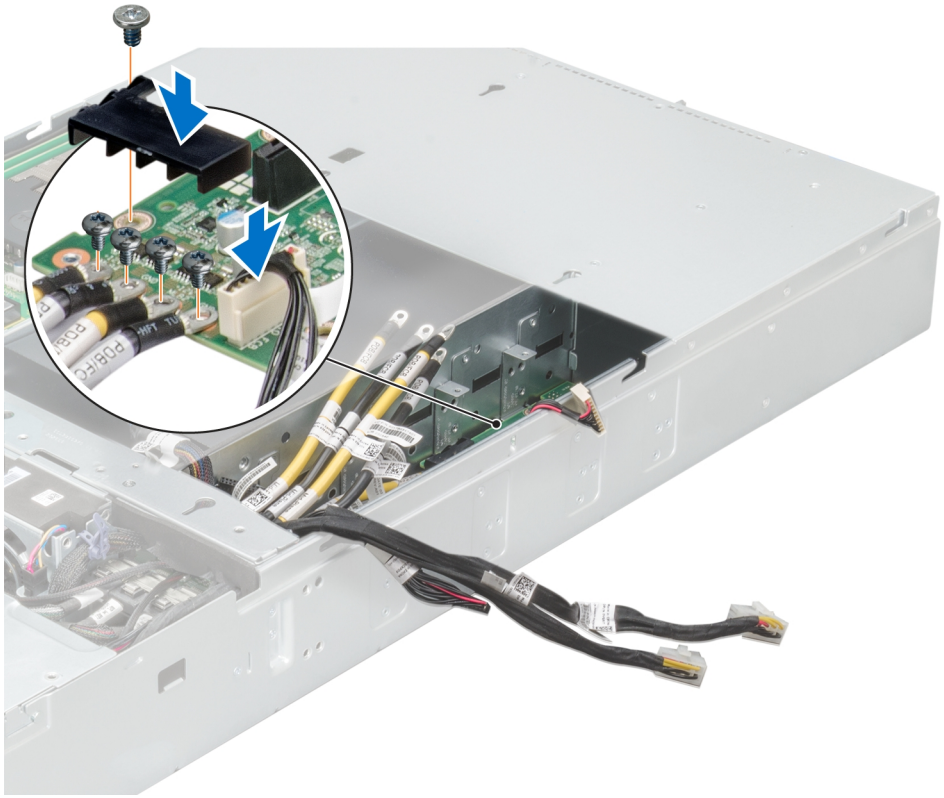

Figure 98. Installing the power cables and the power cable cover for PDB 2

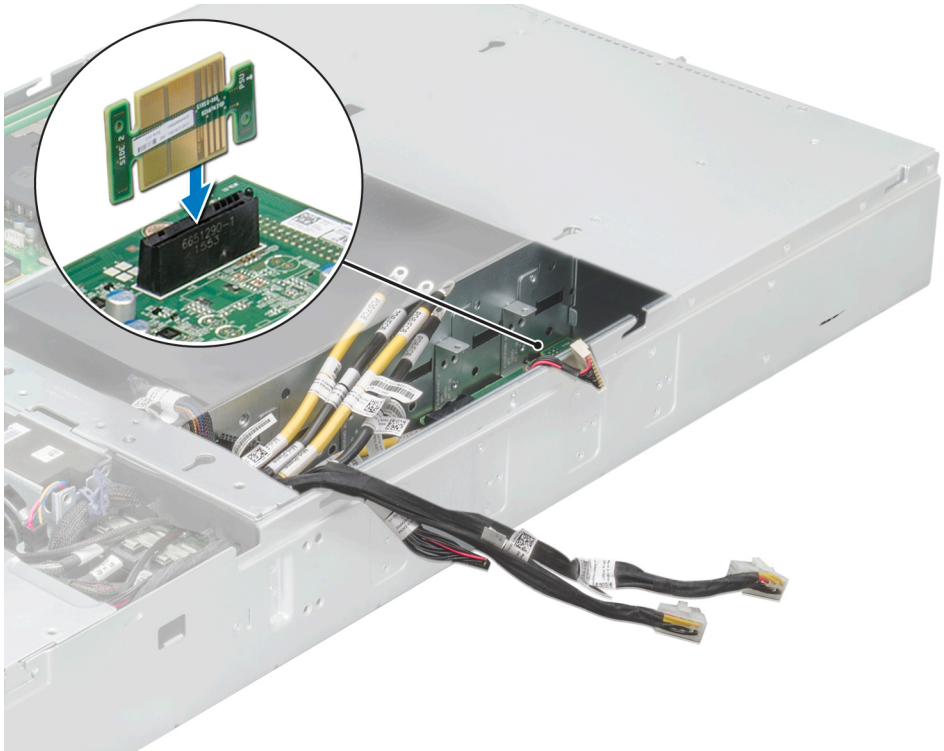

Figure 99. Installing the PDB bridge board

e. Install the power distribution board bridge board.
f. Connect all the other cables to PDB 2.
   Route these cables properly through the tabs on the chassis to prevent them from being pinched or crimped.

2. Install PDB 1

a. Lower the PDB 1 such that the slot at the bottom of PDB 1 inserts into the PDB bridge board on PDB 2.

   When the slot at the bottom of PDB 1 inserts into the PDB bridge board on PDB 2, the screw holes align with the holes on the chassis.

b. Insert the screws that secure PDB 1 to the system.
c. Secure the power cables to PDB 1 by using screws.
d. Install the power cable cover for PDB 1 and secure it with the screw.
e. Connect all the cables to PDB 1.

   Route these cables properly through the tabs on the chassis to prevent them from being pinched or crimped.

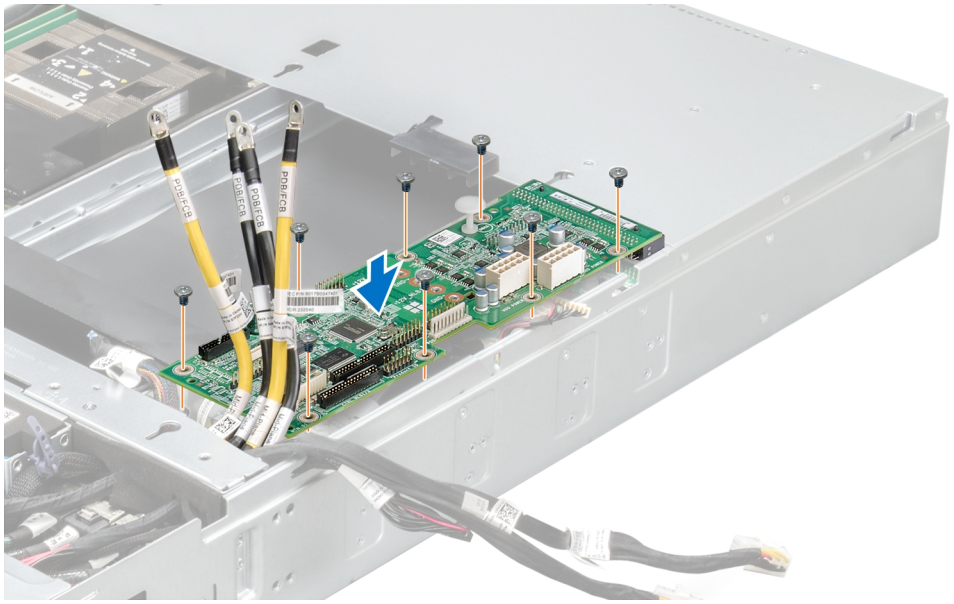

Figure 100. Installing PDB 1

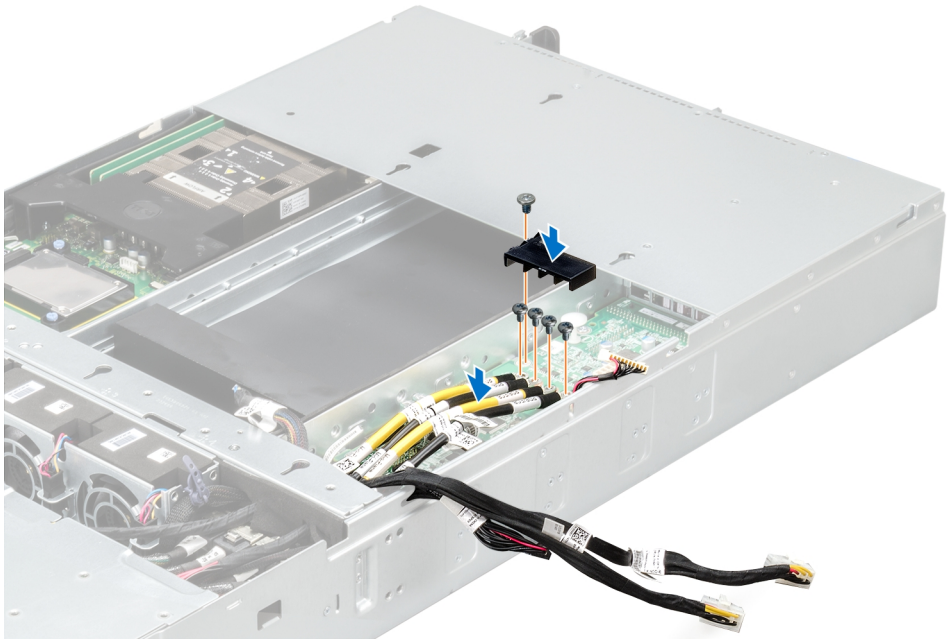

Figure 101. Installing the power cables and the power cable cover for PDB 1

Next steps

1. Install the power supply units.
2. Follow the procedure listed in the After working inside your system section.

Related references

Safety instructions on page 67

Related tasks

Before working inside your system on page 67
Removing a power supply unit on page 145
Installing a power supply unit on page 146
After working inside your system on page 68

Cable routing and connectors of the power distribution boards

About this task

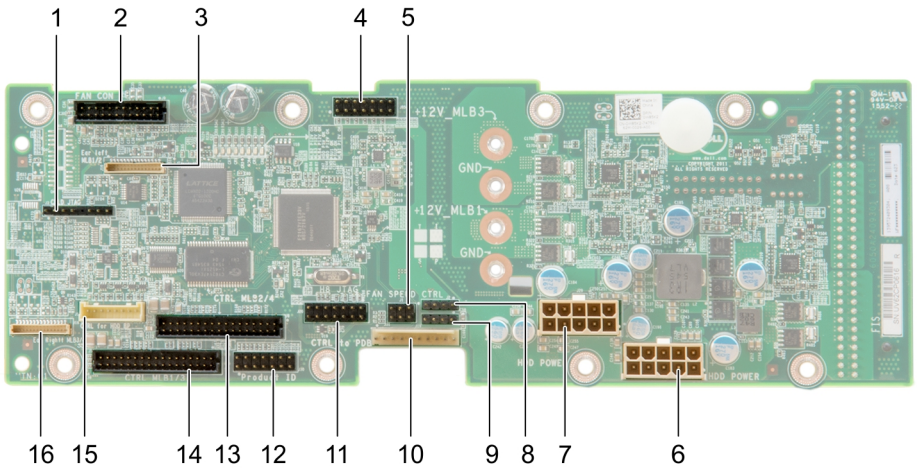

Figure 102. Features of the power distribution board 1

1. CPLD JTAG
2. fan control connector
3. left ear control panel connector
4. power throttling connector
5. fan speed control connector
6. backplane power connector
7. backplane power connector
8. power on control connector
9. UART connector
10. control panel to power distribution board connector
11. H8 JTAG
12. product identification
13. control motherboard 2 and 4
14. control motherboard 1 and 3
15. control for hard disks
16. right ear control panel connector

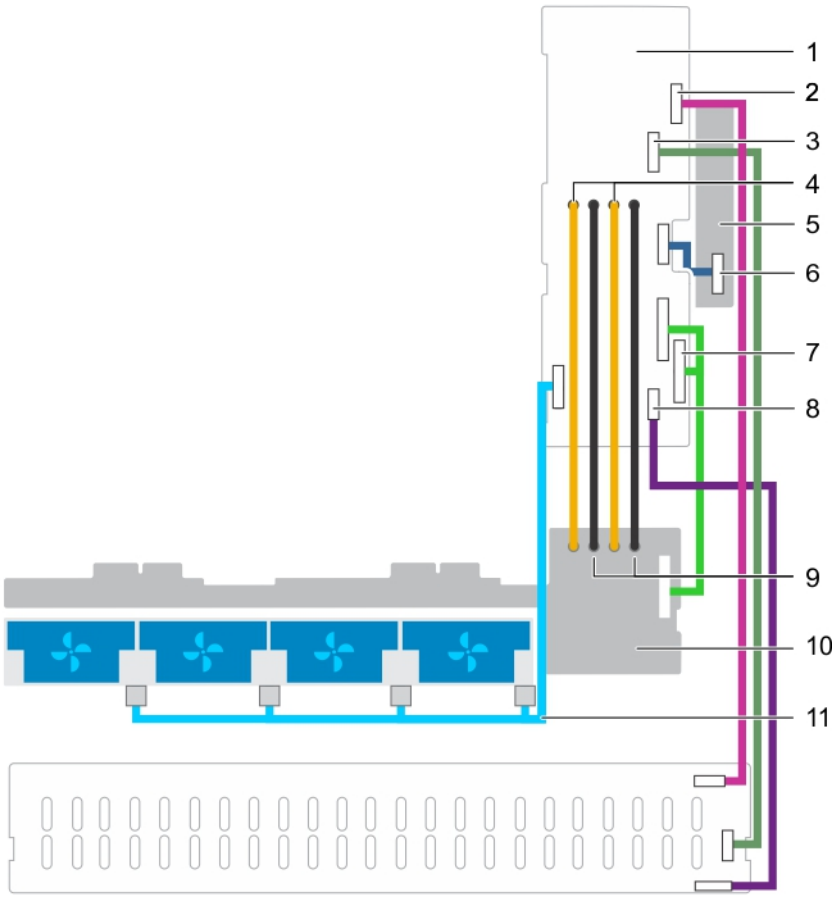

Figure 103. Cable routing–power distribution board 1 (top)

1. PDB 1
2. backplane power cable
3. backplane power cable
4. 12 V power cable
5. PDB 2
6. PDB 2 data cable
7. control system board 1 and 3 and control system board 2 and 4
8. hard disk control cable
9. ground cable
10. midplane
11. fan control and power cable

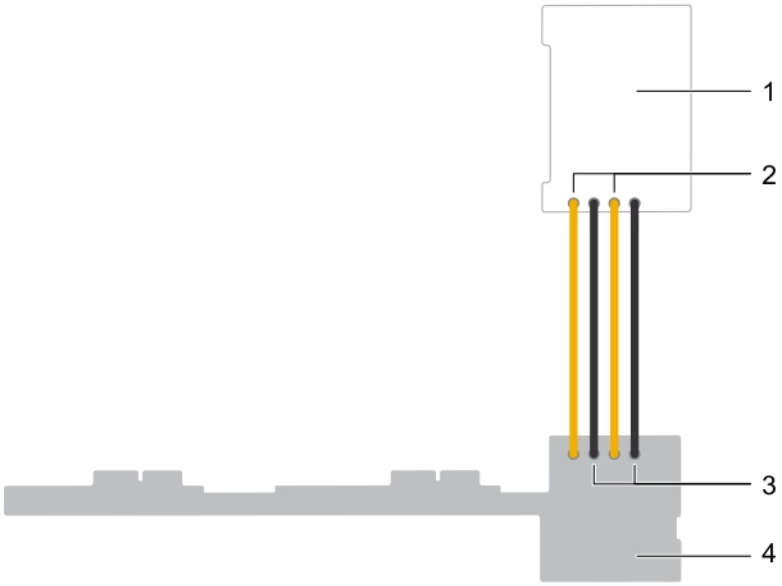

Figure 104. Cable routing–power distribution board 2 (bottom)

1. PDB 2
2. 12 V power cable
3. ground cable
4. midplane

Midplanes

In a 2.5 inch hard drive configuration, two midplanes connect the system boards of the sleds to the 2.5-inch hard drive backplane.

Removing the midplanes

Prerequisites

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.

1. Follow the safety guidelines listed in the Safety instructions section.
2. Follow the procedure listed in the Before working inside your system section.
3. Remove all the sleds from the enclosure.
4. Remove the cooling fan cage.
5. Keep the Philips #2 and the Torx T20 screwdrivers ready.

Steps

1. Remove the screws that secure the middle wall bracket and lift the bracket out of the chassis.

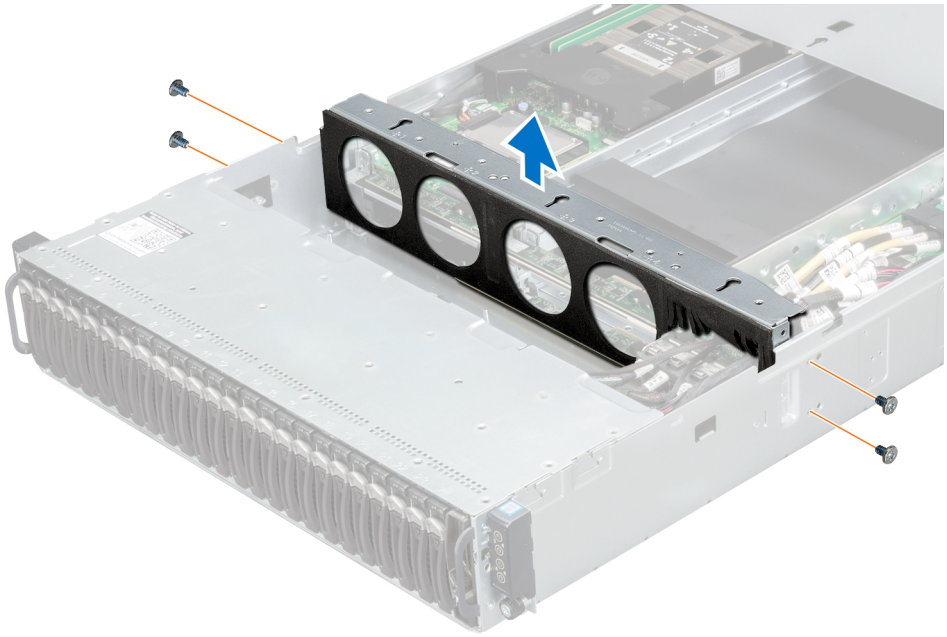

Figure 105. Removing the middle-wall bracket

2. Disconnect all the cables from the upper midplane.

   NOTE: Observe the routing of the cable on the chassis as you remove them from the system. Route these cables properly when you replace them to prevent the cables from being pinched or crimped.

3. Remove the screw that secures the power cable cover to the upper midplane and lift the power cable out.
4. Remove the screws that secure the power cables to the upper midplane.

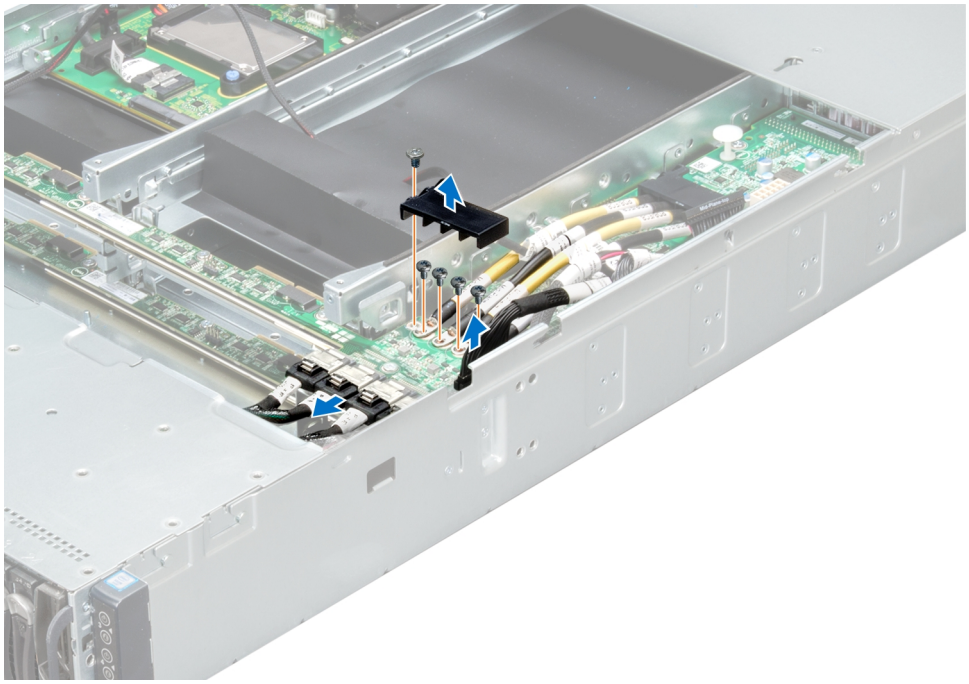

Figure 106. Removing the power cables and cover

5. Remove the screws that secure the upper midplane to the midplane holder.
6. Lift the upper midplane out.

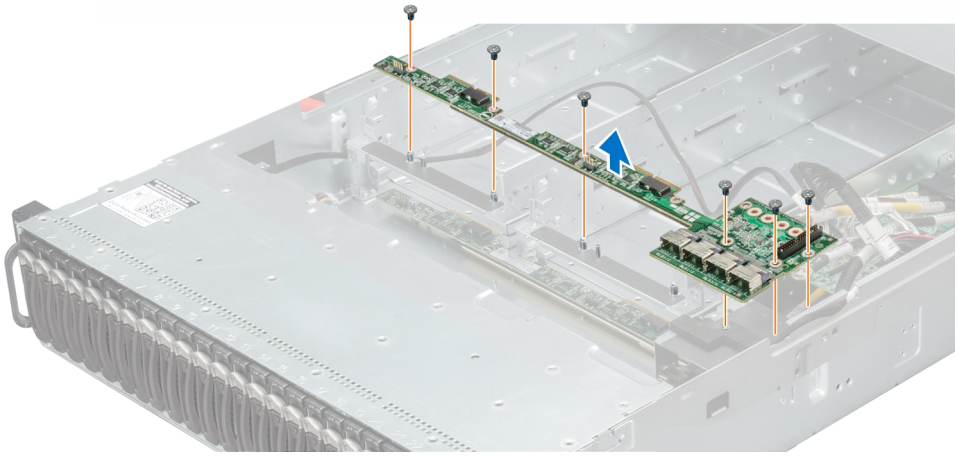

Figure 107. Removing the upper midplane

7. Remove the screws that secure the midplane holder support to the chassis.
8. Lift the midplane holder support out of the chassis.

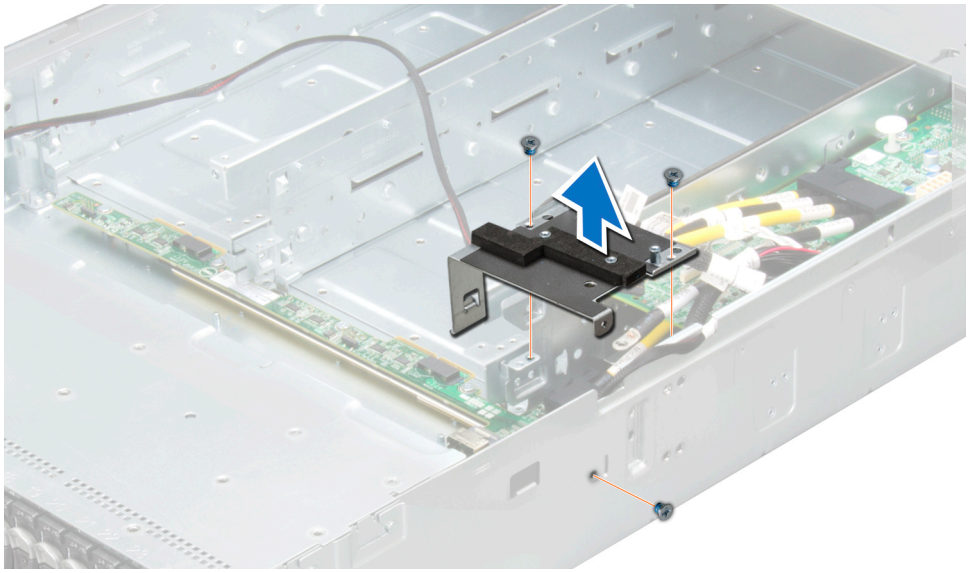

Figure 108. Removing the midplane holder support

9. Remove the screws that secure the midplane holder to the chassis.
10. Lift the midplane holder out of the chassis.

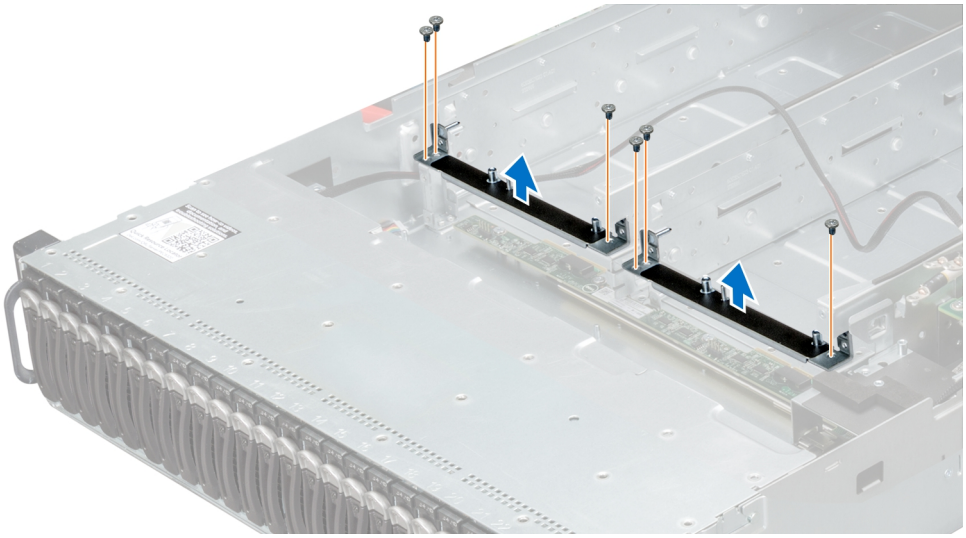

Figure 109. Removing the midplane holder

11. Disconnect all the cables from the lower midplane.

    NOTE: Note the routing of the cable on the chassis as you remove them from the system. Route these cables properly when you replace them to prevent the cables from being pinched or crimped.

12. Remove the screw that secures the power cable cover on the lower midplane.
13. Remove the power cable cover from the lower midplane.
14. Remove the screws that secure the power cables on the lower midplane.
15. Remove the four power cables from the lower midplane.
16. Remove the screws that secure the lower midplane to the chassis.
17. Lift the lower midplane out of the chassis.

Next steps

1. Install the midplanes.
2. Install the cooling fan cage.
3. Install the sleds into the enclosure.
4. Follow the procedure listed in the After working inside your system section.

Related references

Safety instructions on page 67

Related tasks

Before working inside your system on page 67
Removing a sled on page 71
Removing a cooling fan cage on page 152
Installing the midplanes on page 167
Installing a cooling fan cage on page 153
Installing a sled on page 72
After working inside your system on page 68

Installing the midplanes

Prerequisites

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.

NOTE: The procedure to remove the lower midplane is similar to removing the upper midplane.

NOTE: You must route the cables properly on the chassis to prevent them from being pinched or crimped.

1. Follow the safety guidelines listed in the Safety instructions section.
2. Follow the procedure listed in the Before working inside your system section.
3. Remove all the sleds from the enclosure.
4. Remove the cooling fan cage.
5. Keep the Philips #2 and the Torx T20 screwdrivers ready.

Steps

1. Place the lower midplane into the chassis.
2. Replace the screws that secure the lower midplane to the chassis.
3. Connect all the cables to the lower midplane.
4. Secure the screws that secure the power cables to the lower midplane.
5. Replace the power cable cover to the lower midplane.
6. Secure the power cable cover with a screw.
7. Place the midplane holder into the chassis.

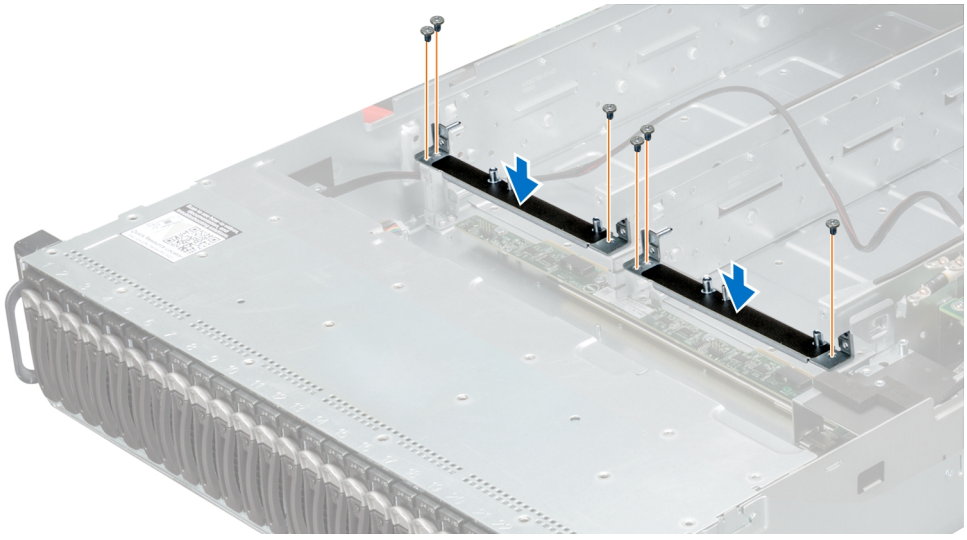

Figure 110. Install the midplane holder

8. Replace the screws that secure the midplane holder to the chassis.
9. Place the midplane holder support into the chassis.
10. Replace the screws that secure the midplane holder support to the chassis.
11. Place the upper midplane on the midplane holder.
12. Replace the screws that secure the midplane to the midplane holder.
13. Connect all the cables to the upper midplane.
14. Secure the power cables to the upper midplane with screws.
15. Replace the power cable cover to the upper lower midplane.

16. Secure the power cable cover with a screw.
17. Place the middle wall bracket into the chassis.
18. Replace the screws that secure the middle wall bracket to the chassis.

Next steps

1. Install the cooling fan cage.
2. Install the sleds into the enclosure.
3. Follow the procedure listed in the After working inside your system section.

Related references

Safety instructions on page 67

Related tasks

Before working inside your system on page 67
Removing a sled on page 71
Removing a cooling fan cage on page 152
Installing a cooling fan cage on page 153
Installing a sled on page 72
After working inside your system on page 68

Cable routing–midplane to the hard drive backplane

About this task

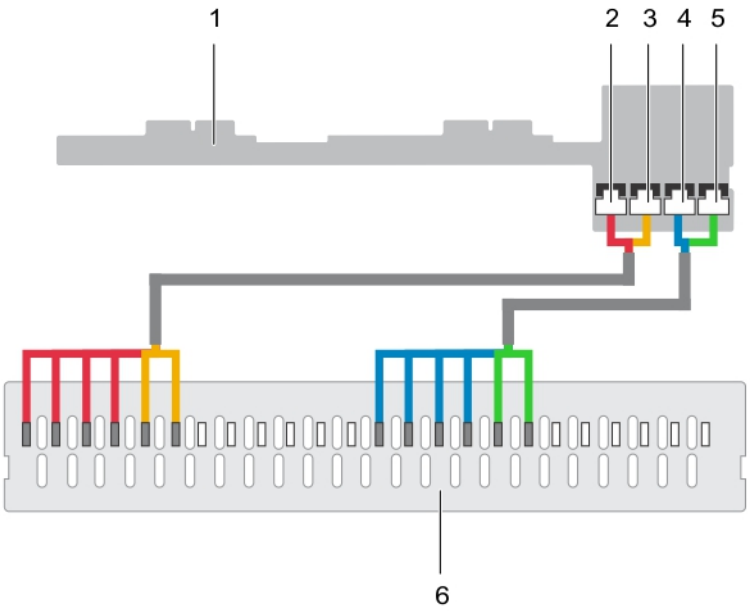

Figure 111. Cable routing–top midplane to hard drive backplane for 24 x2.5-inch hard drive configuration

1. top midplane
2. Mini-SAS connector for system board 1
3. Mini-SAS connector for system board 1
4. Mini-SAS connector for system board 3
5. Mini-SAS connector for system board 3
6. backplane

Table 33. Cable routing–top midplane to backplane for 24 x2.5-inch hard drive configuration

Item	Cable	From (top midplane)	To (backplane)
1	Hard drive backplane cable	Mini-SAS connector for system board 1 (hard drive 1, 2, 3 and 4) (J1)	SATA2 hard drive connectors 1 to 4 for system board 1 (from right to left)
2	Hard drive backplane cable	Mini-SAS connector for system board 1 (hard drive 5 and 6) (J2)	SATA2 hard drive connectors 5 to 6 for system board 1 (from right to left)
3	Hard drive backplane cable	Mini-SAS connector for system board 3 (hard drive 1, 2, 3 and 4) (J3)	SATA2 hard drive connectors 1 to 4 for system board 3 (from right to left)
4	Hard drive backplane cable	Mini-SAS connector for system board 3 (hard drive 5 and 6) (J4)	SATA2 hard drive connectors 5 to 6 for system board 3 (from right to left)

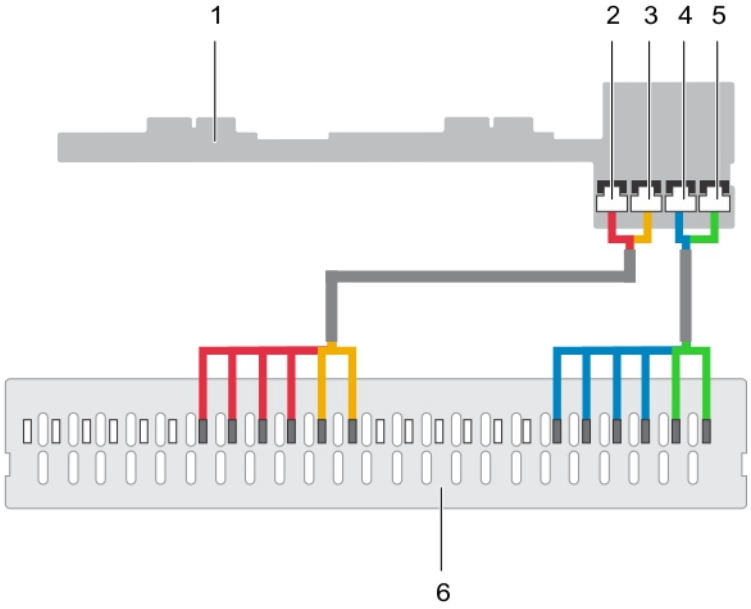

Figure 112. Cable routing–bottom midplane to hard drive backplane for 24 x2.5-inch hard drive configuration

1. bottom midplane
2. Mini-SAS connector for system board 2
3. Mini-SAS connector for system board 2
4. Mini-SAS connector for system board 4
5. Mini-SAS connector for system board 4
6. backplane

Table 34. Cable routing–bottom midplane to backplane for 24 x2.5-inch hard drive configuration

Item	Cable	From (bottom midplane)	To (backplane)
1	Hard drive backplane cable	Mini-SAS connector for system board 2 (hard drive 1, 2, 3 and 4) (J1)	SATA2 hard drive connectors 1 to 4 for system board 2 (from right to left)
2	Hard drive backplane cable	Mini-SAS connector for system board 2 (hard drive 5 and 6) (J2)	SATA2 hard drive connectors 5 to 6 for system board 2 (from right to left)
3	Hard drive backplane cable	Mini-SAS connector for system board 4 (hard drive 1, 2, 3 and 4) (J3)	SATA2 hard drive connectors 1 to 4 for system board 4 (from right to left)

Table 34. Cable routing–bottom midplane to backplane for 24 x2.5-inch hard drive configuration (continued)

Item	Cable	From (bottom midplane)	To (backplane)
4	Hard drive backplane cable	Mini-SAS connector for system board 4 (hard drive 5 and 6) (J4)	SATA2 hard drive connectors 5 to 6 for system board 4 (from right to left)

Hard drive backplanes

Servers use a backplane to attach hot swappable hard drives. A backplane has pins that pass directly into hard drive sockets without cables. They may have single connector to connect one disk array controller or multiple connectors that can be connected to one or more controllers.

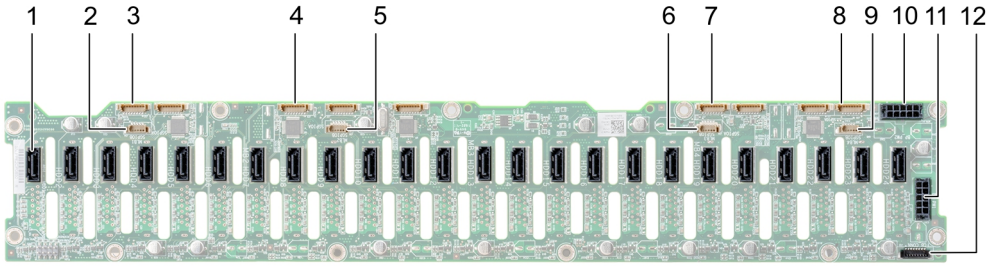

Figure 113. Back view of the 2.5 inch backplane

1. SATA connector (24)
2. SGPIO connector B for system board 1
3. SGPIO connector A for system board 1
4. SGPIO connector A for system board 2
5. SGPIO connector B for system board 2
6. SGPIO connector B for system board 3
7. SGPIO connector A for system board 3
8. SGPIO connector A for system board 4
9. SGPIO connector B for system board 4
10. backplane power connector for power supply unit 2
11. backplane power connector for power supply unit 1
12. system board connector

Removing the hard drive backplane

Prerequisites

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.

CAUTION: To prevent damage to the drives and backplane, you must remove the hard drives from the system before removing the backplane.

CAUTION: You must note the number of each hard drive and temporarily label them before removal so that you can replace them in the same locations.

NOTE: Observe the routing of the cable on the chassis as you remove them from the system. You must route these cables properly when you replace them to prevent the cables from being pinched or crimped.

1. Follow the safety guidelines listed in the Safety instructions section.
2. Follow the procedure listed in the Before working inside your system section.
3. Remove all the hard drives.
4. Disconnect all the cables from the backplane.
5. Disconnect the control panel cables from the power distribution board.
6. Keep the Phillips #2 screwdriver ready.

Steps

1. Remove the screws that secure the hard drive cage to the chassis.
2. Remove the screws that secure the control panel to the chassis.
3. Remove the hard drive cage from the chassis.

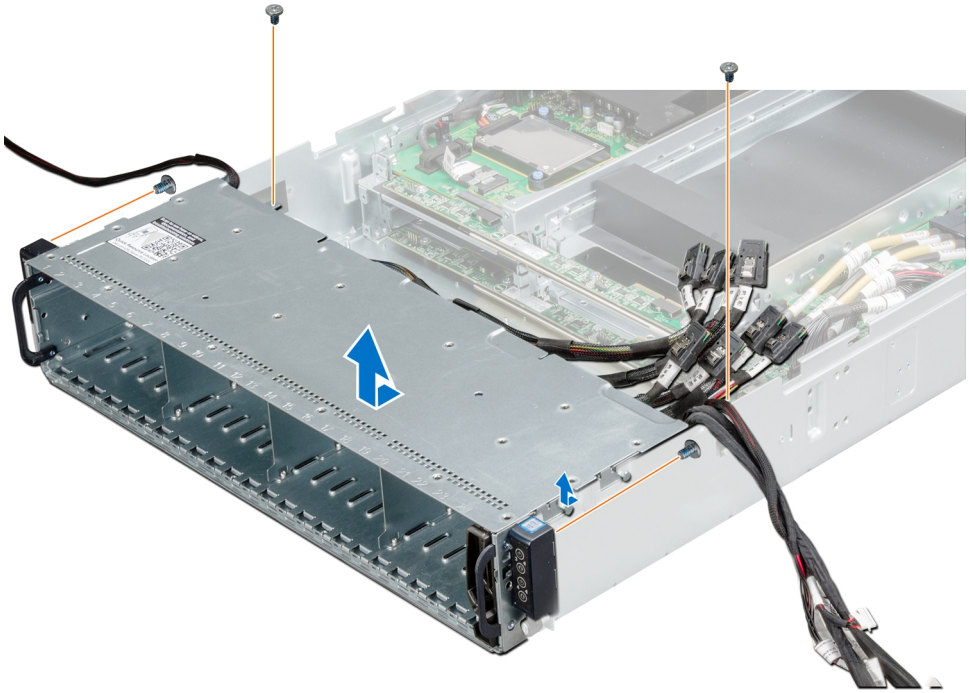

Figure 114. Removing the hard drive cage

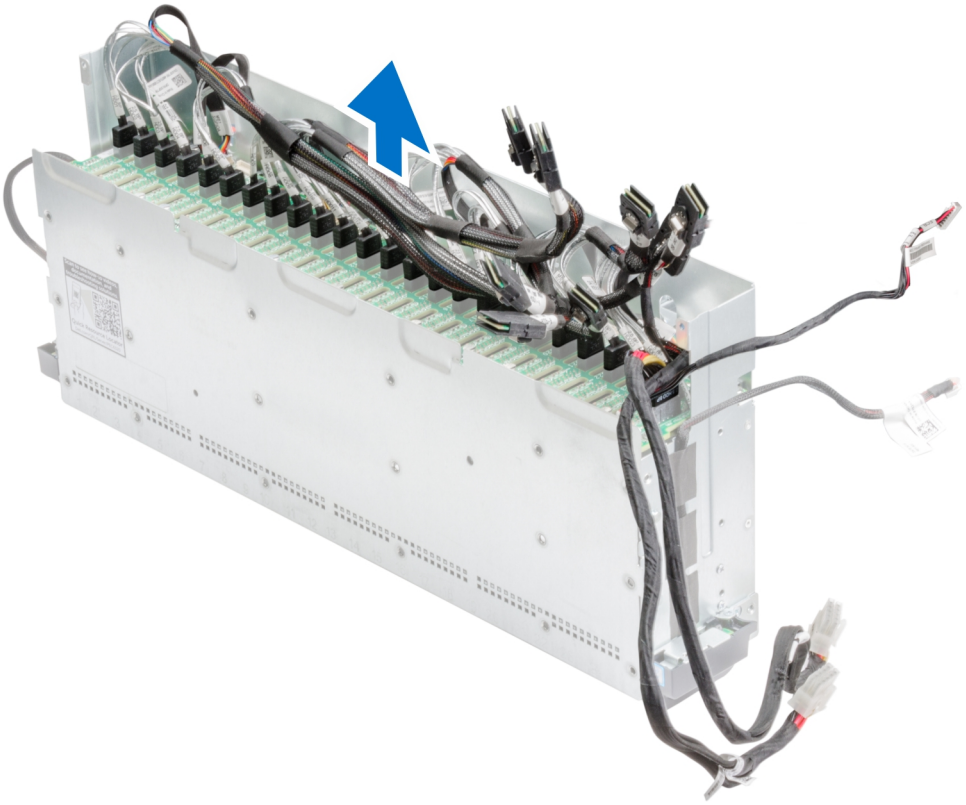

Figure 115. Removal of all the backplane cables

4. Disconnect all the cables connected to the hard drive backplane.
5. Remove the screws that secure the backplane to the hard drive cage.
6. Remove the backplane from the hard drive cage.

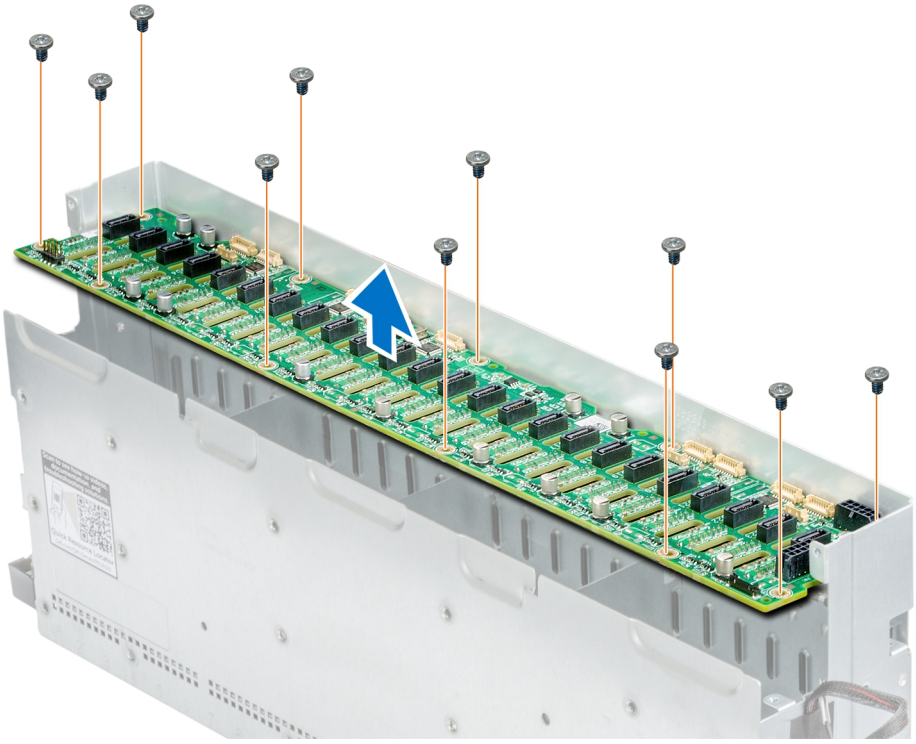

Figure 116. Removing the backplane from the hard drive cage

Next steps

1. Install the hard drive backplane.
2. Install the hard drives.
3. Follow the procedure listed in the After working inside your system section.

Related references

Safety instructions on page 67

Related tasks

Before working inside your system on page 67
Removing a hard drive carrier on page 140
Installing the hard drive backplane on page 172
Installing a hard drive carrier on page 141
After working inside your system on page 68

Installing the hard drive backplane

Prerequisites

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.

CAUTION: To prevent damage to the drives and backplane, you must remove the hard drives from the system before removing the backplane.

CAUTION: You must note the number of each hard drive and temporarily label them before removal so that you can replace them in the same locations.

NOTE: You must route the cables properly through the tabs on the chassis to prevent them from being pinched or crimped.

1. Follow the safety guidelines listed in the Safety instructions section.
2. Follow the procedure listed in the Before working inside your system section.
3. Remove all the hard drives.
4. Keep the Phillips #2 screw driver ready.

Steps

1. Install the backplane into the hard drive cage.

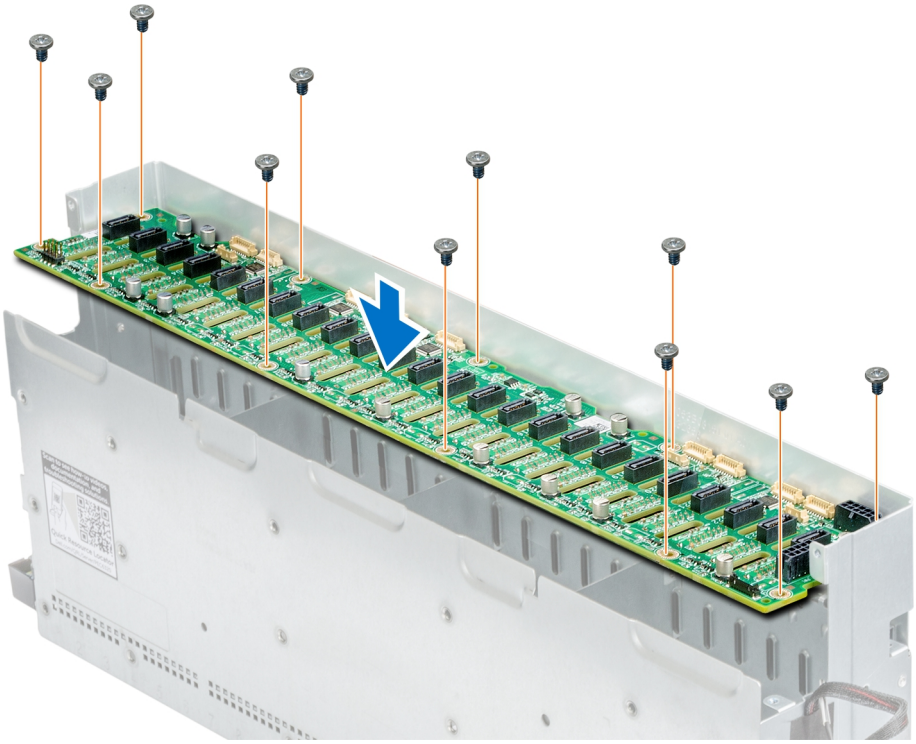

Figure 117. Install the backplane into the hard drive cage

2. Install the screws that secure the backplane to the hard drive cage.
3. Connect all the cables to the backplane.

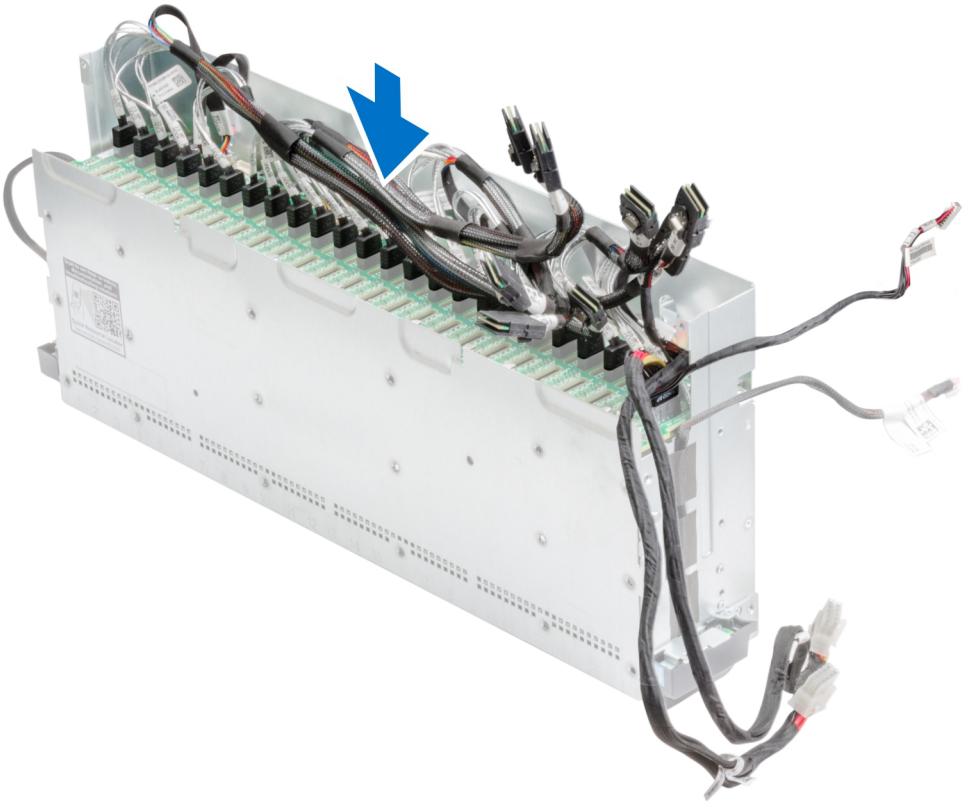

Figure 118. Connect the backplane cables

4. Install the hard drive cage into the chassis.

   NOTE: Ensure that uniform pressure is exerted while installing the hard drive cage into the enclosure.

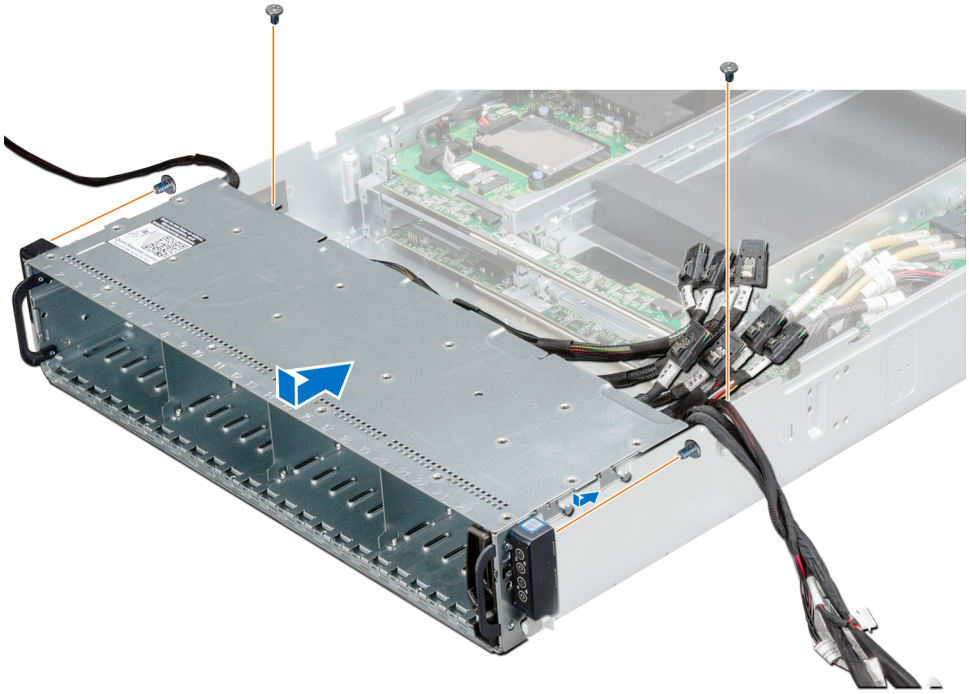

Figure 119. Installing the hard drive cage

5. Install the screws that secure the hard drive cage to the chassis.

6. Install the screws that secure the control panel to the chassis.
7. Reconnect the cables to the midplanes and PDB 1.

Next steps

1. Install the hard drives.
2. Follow the procedure listed in the After working inside your system section.

Related references

Safety instructions on page 67

Related tasks

Before working inside your system on page 67
Removing a hard drive carrier on page 140
Installing a hard drive carrier on page 141
After working inside your system on page 68

Control panel

A control panel allows you to manually control the inputs to the server. The control panel of the PE C6320p system has power buttons and system identification buttons.

Removing the control panel

Prerequisites

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.

NOTE: Observe the routing of the cable on the enclosure as you remove them. You must route these cables properly when you replace them to prevent the cables from being pinched or crimped.

1. Follow the safety guidelines listed in the Safety instructions section.
2. Follow the procedure listed in the Before working inside your system section.
3. Remove all the hard drives.
4. Disconnect all the cables from the backplane.
5. Disconnect control panel cables from the power distribution board.
6. Remove the hard drive cage from the enclosure. The procedure to remove the hard drive cage is similar to Removing the backplane.
7. Keep the Phillips #1 screwdriver ready.

Steps

1. Remove the screws that secure the control panel assemblies to the enclosure.
2. Remove the screws that secure the control panel assembly to the hard drive cage.
3. Orient the hard drive cage so that the front of the cage is facing down.
4. Remove the control panel assembly from the hard drive cage.

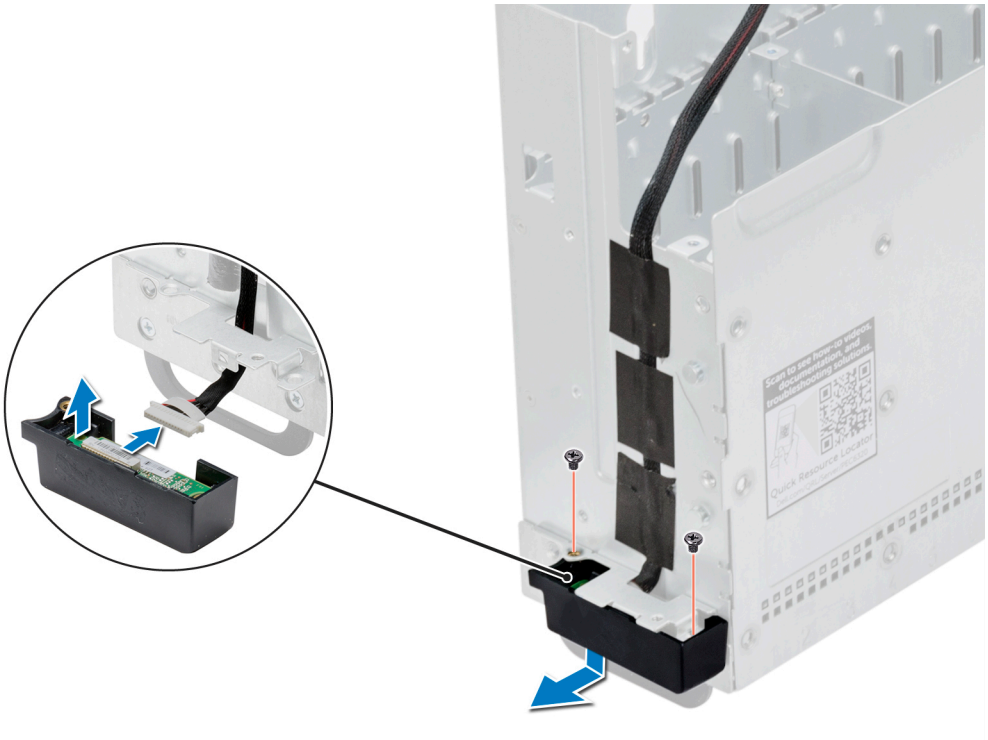

Figure 120. Removing the left control panel assembly

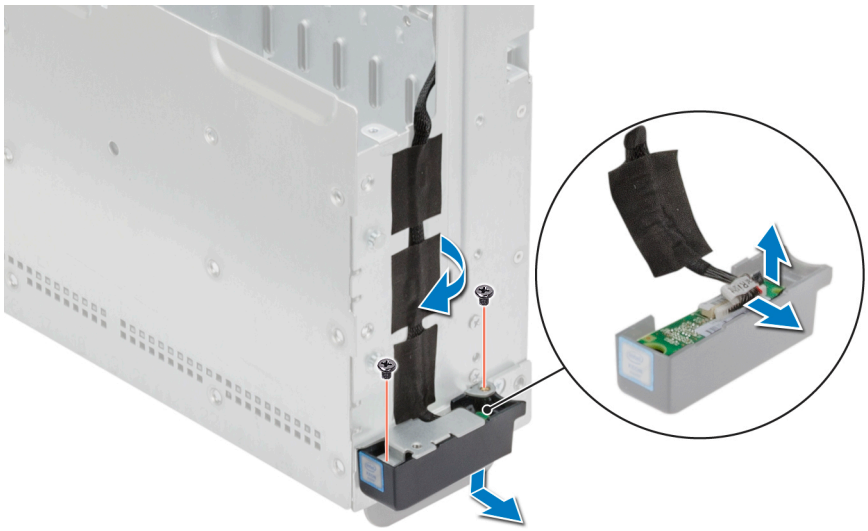

Figure 121. Removing the right control panel assembly

5. Push aside the retention hooks on the control panel assembly.
6. Remove the control panel from the control panel assembly.
7. Disconnect the control panel cable.

Next steps

1. Install the control panel assembly.
2. Install the hard drive cage into the enclosure. The procedure to install the hard drive cage is similar to Installing the backplane.
3. Reconnect the disconnected cables.
4. Install all the removed hard drives.

5. Follow the procedure listed in the After working inside your system section.

Related references

Safety instructions on page 67

Related tasks

Before working inside your system on page 67
Removing a hard drive carrier on page 140
Installing the control panel on page 177
Installing a hard drive carrier on page 141
After working inside your system on page 68

Installing the control panel

Prerequisites

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.

NOTE: Observe the routing of the cable on the chassis as you remove them from the system. You must route these cables properly when you replace them to prevent the cables from being pinched or crimped.

NOTE: Additional tape maybe required to secure the cables.

1. Follow the safety guidelines listed in the Safety instructions section.
2. Follow the procedure listed in the Before working inside your system section.
3. Remove the control panel.
4. Keep the Phillips #1 screwdriver ready.

Steps

1. Connect the control panel cable to the control panel.
2. Push aside the retention hooks on the control panel assembly and place the control panel into the control panel assembly.
3. Install the control panel assembly into the hard drive cage.

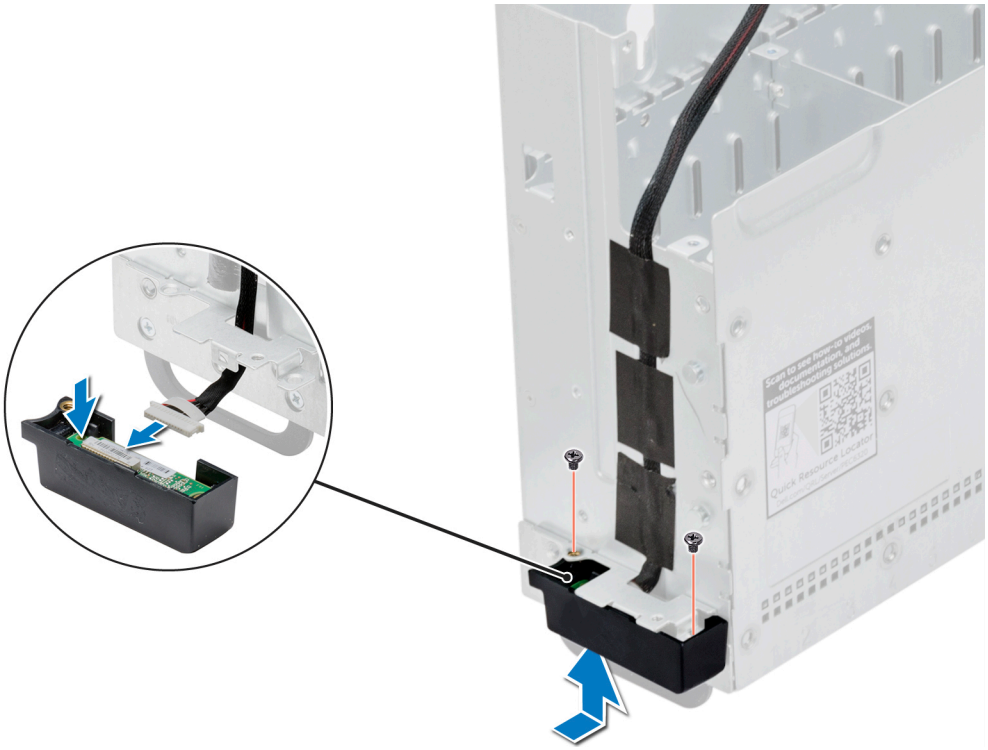

Figure 122. Installing the left side control panel

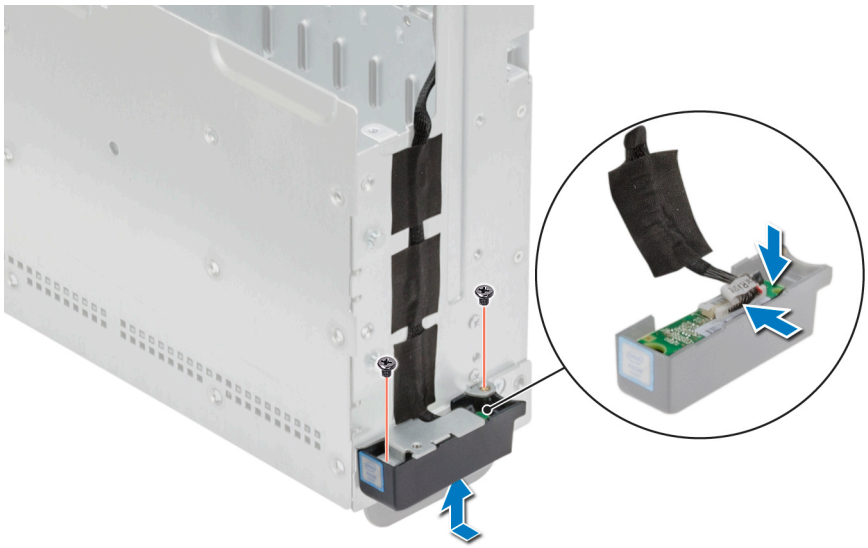

Figure 123. Installing the right side control panel

4. Install the screws that secure the control panel assembly to the hard drive cage.
5. Install the screws that secure the control panel assemblies to the chassis.

Next steps

1. Install the hard drive cage into the enclosure.
2. Connect all the cables to the backplane.
3. Connect the control panel cables to the power distribution board.
4. Install all the removed hard drives.
5. Follow the procedure listed in the After working inside your system section.

Related references

Safety instructions on page 67

Related tasks

Before working inside your system on page 67
Removing the control panel on page 175
Removing a hard drive carrier on page 140
Installing a hard drive carrier on page 141
After working inside your system on page 68

Thermal sensor board

The thermal sensor board is used to the monitor the ambient temperature around the enclosure.

Removing the sensor board cover

Prerequisites

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.

CAUTION: To maintain proper system cooling, all empty hard drive bays must have hard drive blanks installed.

Follow the safety guidelines listed in the Safety instructions section.

Steps

Pull the handle on the sensor board cover to remove the the sensor board cover out of the hard drive bay.

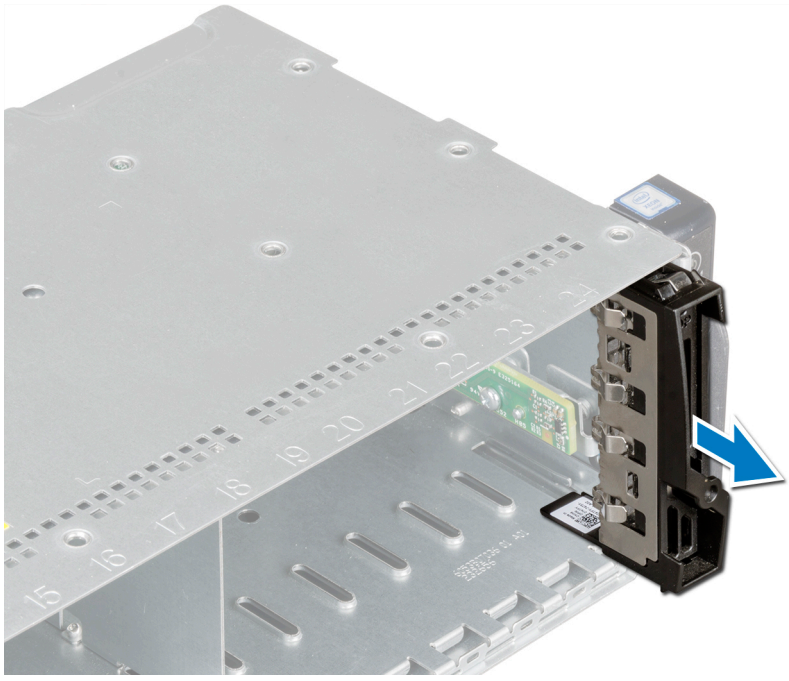

Figure 124. Removing the sensor board cover

Next steps

Install the sensor board cover.

Related references

Safety instructions on page 67

Related tasks

Installing the sensor board cover on page 180

Installing the sensor board cover

Prerequisites

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.

Follow the safety guidelines listed in the Safety instructions section.

Steps

1. With the latch facing up, slide the latch into the hard drive bay.
2. Push the the sensor board cover with a slight inclination into the bay until the the sensor board cover clicks into place.

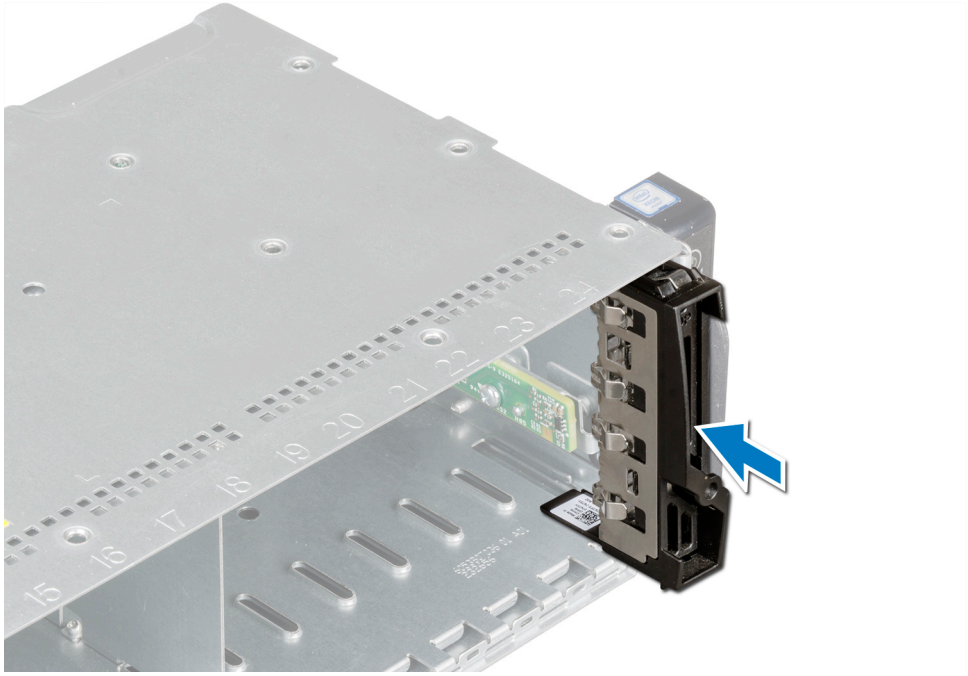

Figure 125. Installing thesensor board cover

Related references

Safety instructions on page 67

Removing the sensor board

Prerequisites

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.

CAUTION: To prevent damage to the drives and backplane, you must remove the hard drives from the system before removing the backplane.

CAUTION: You must note the number of each hard drive and temporarily label them before removal so that you can replace them in the same locations.

NOTE: Observe the routing of the cable on the chassis as you remove them from the system. You must route these cables properly when you replace them to prevent the cables from being pinched or crimped.

1. Follow the safety guidelines listed in the Safety instructions section.
2. Follow the procedure listed in the Before working inside your system section.
3. Remove all the hard drives.
4. Disconnect all the cables from the backplane.
5. Disconnect control panel cables from the power distribution board.
6. Remove the hard drive cage from the chassis.
7. Keep the Phillips #2 screwdriver ready.

Steps

1. Remove the screw that secures the sensor board assembly to the hard drive cage.
2. Disconnect the cable from the sensor board assembly.
3. Remove the sensor board assembly from the hard drive cage.

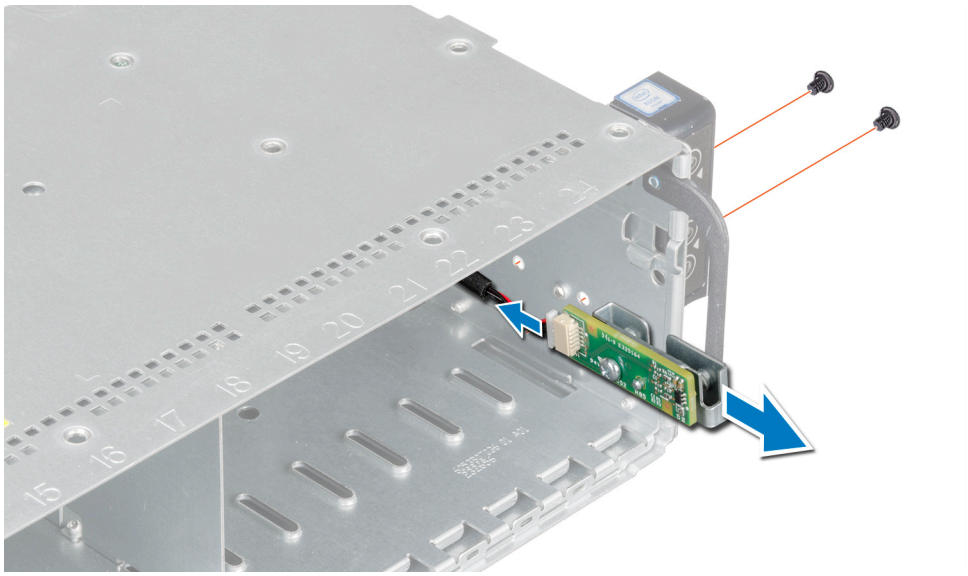

Figure 126. Removing the sensor board

4. Remove the screw that secures the sensor board to the sensor board holder.
5. Remove the sensor board from the sensor board holder.

Next steps

1. Install the sensor board
2. Install the hard drive cage.

3. Reconnect all the disconnected cables.
4. Install the hard drives
5. Follow the procedure listed in the After working inside your system section.

Related references

Safety instructions on page 67

Related tasks

Before working inside your system on page 67
Removing a hard drive carrier on page 140
Installing the sensor board on page 182
Installing a hard drive carrier on page 141
After working inside your system on page 68

Installing the sensor board

Prerequisites

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.

NOTE: You must route these cables properly on the chassis to prevent them from being pinched or crimped.

1. Follow the safety guidelines listed in the Safety instructions section.
2. Follow the procedure listed in the Before working inside your system section.
3. Remove all the hard drives.
4. Remove the hard drive cage.
5. Disconnect all the cables connected to the backplane and sensor board.
6. Keep the Phillips #1 screwdriver ready.

Steps

1. Install the sensor board into the sensor board holder and secure it with the screw.
2. Connect the sensor board cable to the sensor board.
3. Install the sensor board assembly into the hard drive cage.
4. Insert the screws that secure the sensor board to the hard drive cage.

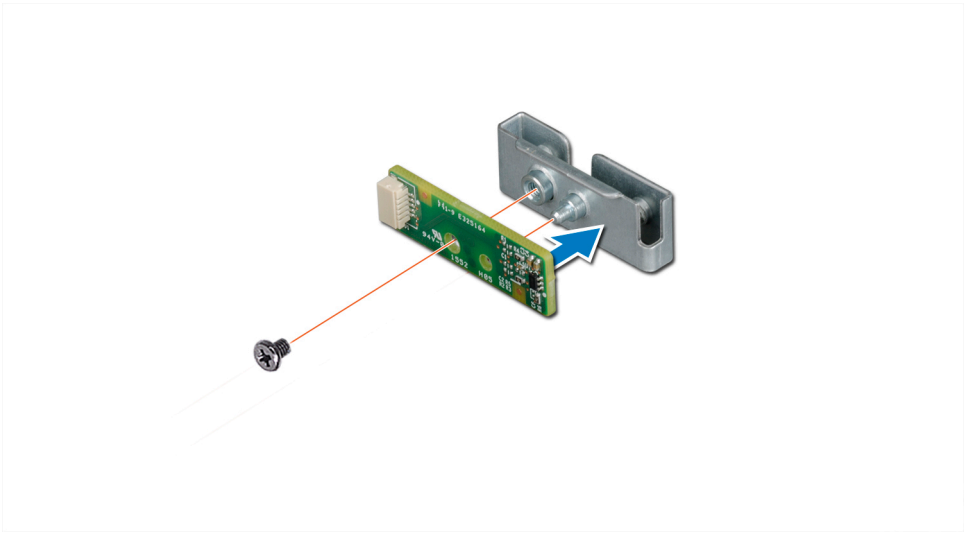

Figure 127. Installing the sensor board

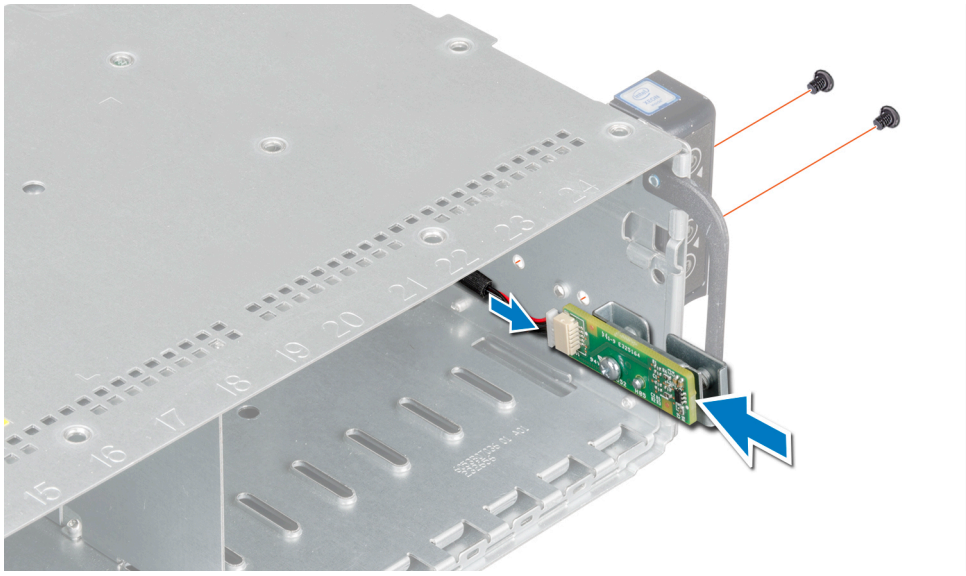

Figure 128. Installing the sensor board assembly

Next steps

1. Replace the hard drive cage into the chassis.
2. Connect all the cables to the backplane.
3. Connect the control panel cables to the power distribution board.
4. Install the hard drives.
5. Follow the procedure listed in the After working inside your system section.

Related references

Safety instructions on page 67

Related tasks

Before working inside your system on page 67
Removing a hard drive carrier on page 140
Installing a hard drive carrier on page 141
After working inside your system on page 68

Cable routing for sensor board and control panel for 2.5-inch hard drive system

Steps

1. Connect the Y-shaped cable for the sensor board and right control panel to the connector on the power distribution board 1, and connect the other two ends of the cable to the connectors on the sensor board and the right control panel respectively.
2. Connect the control panel cable to the connector on the power distribution board 1, and connect the other end of the cable to the connector on the left control panel.

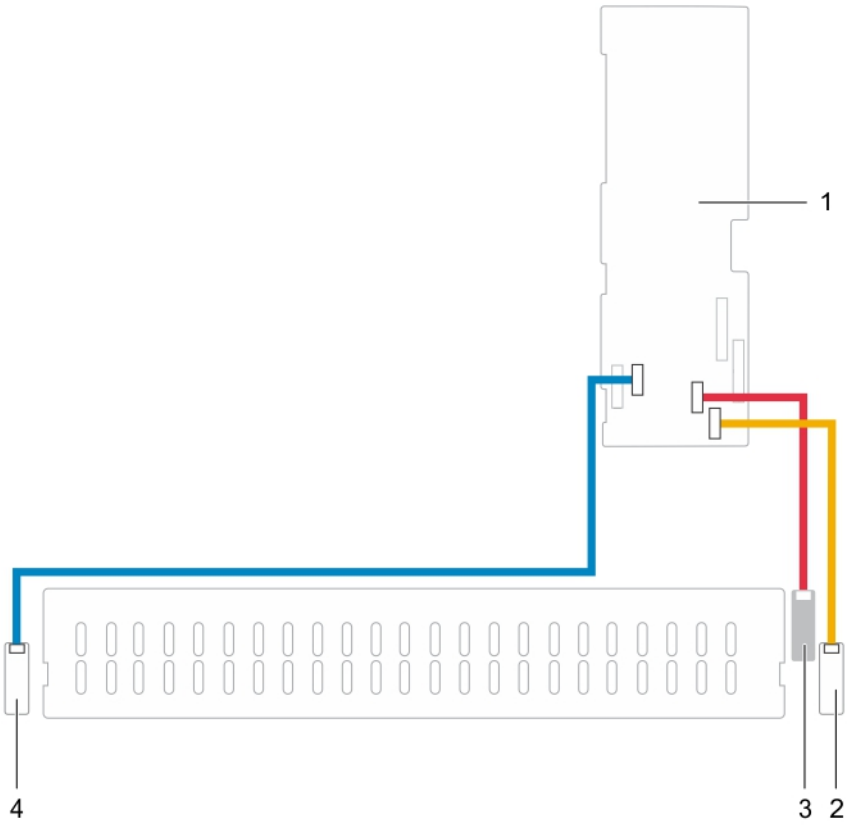

Figure 129. Cable routing–sensor board and control panel

1. PDB 1
2. right control panel
3. thermal sensor board
4. left control panel

10

Using system diagnostics

If you experience a problem with your system, run the system diagnostics before contacting Dell for technical assistance. The purpose of running system diagnostics is to test your system hardware without using additional equipment or risking data loss. If you are unable to fix the problem yourself, service and support personnel can use the diagnostics results to help you solve the problem.

NOTE: For more information about OEM diagnostic event messages, see the Event and Error Message Reference Guide for 13th Generation Dell PowerEdge Servers Version 1.2

Topics:

Dell Embedded System Diagnostics

NOTE: The Dell Embedded System Diagnostics is also known as Enhanced Pre-boot System Assessment (ePSA) diagnostics.

The Embedded System Diagnostics provides a set of options for particular device groups or devices allowing you to:

- Run tests automatically or in an interactive mode
- Repeat tests
- Display or save test results
- Run thorough tests to introduce additional test options to provide extra information about the failed device(s)
- View status messages that inform you if tests are completed successfully
- View error messages that inform you of problems encountered during testing

When to use the Embedded System Diagnostics

Run the Embedded System Diagnostics (ePSA) if your system does not boot.

Running the Embedded System Diagnostics from Boot Manager

Prerequisites

Run the Embedded System Diagnostics (ePSA) if your system does not boot.

Steps

1. When the system is booting, press F10.
2. Use the up arrow and down arrow keys to select **System Utilities** > **Launch Diagnostics**.
   The **ePSA Pre-boot System Assessment** window is displayed, listing all devices detected in the system. The diagnostics starts executing the tests on all the detected devices.

Running the Embedded System Diagnostics from the Dell Lifecycle Controller

Steps

1. As the system boots, press F10.
2. Select **Hardware Diagnostics** → **Run Hardware Diagnostics**.

The **ePSA Pre-boot System Assessment** window is displayed, listing all devices detected in the system. The diagnostics starts executing the tests on all the detected devices.

System diagnostic controls

Menu	Description
Configuration	Displays the configuration and status information of all detected devices.
Results	Displays the results of all tests that are run.
Systemhealth	Provides the current overview of the system performance.
Event log	Displays a time-stamped log of the results of all tests run on the system. This is displayed if at least one event description is recorded.

11

Jumpers and connectors

This topic provides specific information about the jumpers. It also provides some basic information about jumpers and switches and describes the connectors on the various boards in the system. Jumpers on the system board help to disable the system and setup passwords. You must know the connectors on the system board to install components and cables correctly.

Topics:

PowerEdge C6320p system board connectors

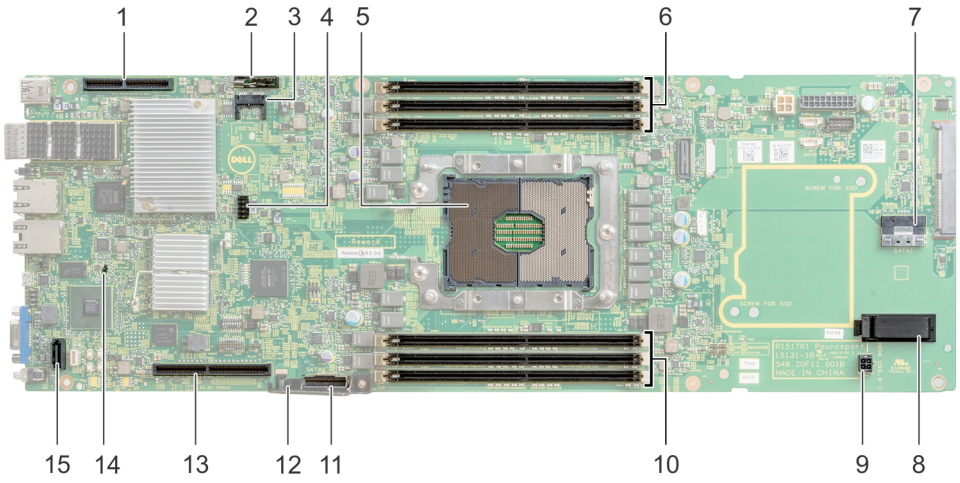

Figure 130. PowerEdge C6320p system board connectors

1. PCIe Gen3 x4 mezzanine slot
2. system battery
3. TPM connector
4. internal USB
5. processor socket
6. DIMM sockets (3)
7. SATA 1 connector
8. SATA 1 cable lock
9. 1.8” SSD power connector
10. DIMM sockets (3)
11. SATA 2 connector
12. SAS connector protector
13. PCIe Gen3x16 riser slot
14. iDRAC heart beat LED
15. SATA 3 connector

Table 35. PowerEdge C6320p system board connectors

Item	Connector	Description
1	PCIe Gen3 x4 mezzanine slot	PCIe Gen3 x4 mezzanine slot
2	BT1	system battery
3	TPM	TPM connector
4	Internal USB	Internal USB connector
5	processor	processor
6	DIMM sockets (3)	DIMM D1, DIMM E1, and DIMM F1

Table 35. PowerEdge C6320p system board connectors (continued)

Item	Connector	Description
7	SATA 1	SATA 1 connector
8	SATA 1 cable lock	SATA 1 cable lock
9	1.8” SSD power	1.8” SSD power connector
10	DIMM sockets (3)	DIMM A1, DIMM B1, and DIMM C1
11	SATA 2 connector	SATA 2
12	PCIe Gen3x16 riser slot	PCIe Gen3x16 riser slot
13	iDRAC heart beat LED	iDRAC heart beat LED
14	SATA 3 connector	SATA 3 connector

Jumper settings on the PowerEdge C6320p system board

The function of system configuration jumpers installed on each PowerEdge C6320p system board is shown below:

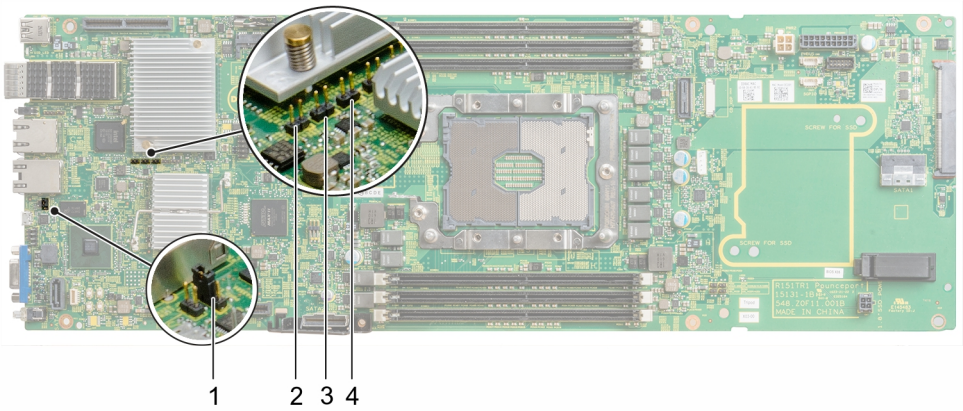

Figure 131. System configuration jumpers on the PowerEdge C6320p system board

1. PWRD_EN
2. ME RCVR
3. BIOS RCVR
4. NVRAM CLR

Table 36. System configuration jumper on the PowerEdge C6320p system board

Jumpers	Function	Default state	Non-default state
1	PWRD_EN	Enabled (Jumper between pin 1-2)	Disabled (Jumper between pin 2-3)
2	ME RCVR	Disabled (No jumper)	Enabled (Jumper between pin 1-2)
3	BIOS RCVR	Disabled (No jumper)	Enabled (Jumper between pin 1-2)
4	NVRAM CLR	Disabled (No jumper)	Enabled (Jumper between pin 1-2)

12

Troubleshooting your system

Safety first—for you and your system

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.

Topics:

Troubleshooting system startup failure

If you boot the system to the BIOS boot mode after installing an operating system from the UEFI Boot Manager, the system stops responding. To avoid this issue, you must boot to the same boot mode in which you installed the operating system.

For all other startup issues, note the system messages that appear on the screen.

Troubleshooting external connections

Before troubleshooting any external devices, ensure that all external cables are securely attached to the external connectors on your system.

- Compare the technical specification of the system with the external device to check the compatibility.
- Check the external device functionality with some other similar system so that we are sure that the device is working fine.
- Check any other similar external device with this system so that we are sure that the system port is working fine.

For any further queries contact, Global Technical Support.

Troubleshooting the video subsystem

Steps

1. Check the system and power connections to the monitor.
2. Check the video interface cabling from the system to the monitor.
3. Run the appropriate diagnostic test.

Results

If the tests run successfully, the problem is not related to video hardware.

Troubleshooting a USB device

Prerequisites

NOTE: Follow steps 1 to 6 to troubleshoot a USB keyboard or mouse. For other USB devices, go to step 7.

NOTE: The sled has a single USB port that can be expanded by using a USB hub.

Steps

1. Disconnect the keyboard and/or mouse cables from the system and reconnect them.
2. If the problem persists, connect the keyboard and/or mouse to another USB port on the system.
3. If the problem is resolved, restart the system, enter System Setup, and check if the non-functioning USB ports are enabled.

   NOTE: Older operating systems may not support USB 3.0.

4. Check if USB 3.0 is enabled in System Setup. If enabled, disable it and see if the issue is resolved.
5. In **iDRAC Settings Utility**, ensure that **USB Management Port Mode** is configured as **Automatic** or **Standard OS Use**.
6. If the problem is not resolved, replace the keyboard and/or mouse with a known working keyboard or mouse.

   If the problem is not resolved, proceed to step 7 to troubleshoot other USB devices attached to the system.

   If the problem is not resolved, proceed to troubleshoot other USB devices attached to the system.

7. Turn off all attached USB devices, and disconnect them from the system.
8. Restart the system.
9. If your keyboard is functioning, enter System Setup, verify that all USB ports are enabled on the **Integrated Devices** screen. If your keyboard is not functioning, use remote access to enable or disable the USB options.
10. Check if USB 3.0 is enabled in System Setup. If it is enabled, disable it and restart your system.
11. If the system is not accessible, reset the NVRAM_CLR jumper inside your system and restore the BIOS to the default settings. See the System board jumper setting section
12. In the **IDRAC Settings Utility**, ensure that **USB Management Port Mode** is configured as **Automatic** or **Standard OS Use**.
13. Reconnect and turn on each USB device one at a time.
14. If a USB device causes the same problem, turn off the device, replace the USB cable with a known good cable, and turn on the device.

Next steps

If all troubleshooting fails, see the Getting help section.

Related references

Getting help on page 200

Troubleshooting a serial input and output device

Prerequisites

NOTE: The PowerEdge C6320p, does not have a 9-pin serial port, instead uses a micro-USB port for serial I/O

Steps

1. Turn off the system and any peripheral devices connected to the serial port.
2. Swap the serial interface cable with a known working cable, and turn on the system and the I/O serial device.

   If the problem is resolved, replace the interface cable with a known working cable.
3. Turn off the system and the I/O serial device, and swap the serial device with a compatible device.
4. Turn on the system and the I/O serial device.

Next steps

If the problem persists, see the Getting help section.

Related references

Getting help on page 200

Troubleshooting a NIC

Prerequisites

NOTE: Network Daughter Card (NDC) slot is not hot-pluggable.

Steps

1. Run the appropriate diagnostic test. For more information, see the Using system diagnostics section for the available diagnostic tests.
2. Restart the system and check for any system messages pertaining to the NIC controller.
3. Check the appropriate indicator on the NIC connector:
   - If the link indicator does not glow, the cable connected might be disengaged.
   - If the activity indicator does not glow, the network driver files might be damaged or missing. Install or replace the drivers as necessary. For more information, see the NIC documentation.
   - Try another known good network cable.
   - If the problem persists, use another connector on the switch or hub.
4. Ensure that the appropriate drivers are installed and the protocols are bound. For more information, see the NIC documentation.
5. Enter System Setup and confirm that the NIC port is enabled on the **Integrated Devices** screen.
6. Ensure that all the NIC and switches on the network are set to the same data transmission speed and duplex. For more information, see the documentation for each network device.
7. Ensure that all network cables are of the proper type and do not exceed the maximum length.

Next steps

If the problem persists, see the Getting help section.

Related references

Getting help on page 200
Using system diagnostics on page 185

Troubleshooting a wet system

Prerequisites

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.

Steps

1. Turn off the system and attached peripherals, and disconnect the system from the electrical outlet.
2. Remove the system cover.
3. Remove the following components (if installed) from the system:
   - Power supply unit(s)
   - Optical drive
   - Hard drives
   - Hard drive backplane
   - USB memory key
   - Hard drive tray
   - Cooling shroud
   - Expansion card risers (if installed)
   - Expansion cards
   - Cooling fan assembly (if installed)
   - Cooling fan(s)
   - Memory modules
   - Processor and heat sink module
   - System board
   - Mezzanine card
   - Power distribution boards
   - Midplanes
4. Let the system dry thoroughly for at least 24 hours.
5. Reinstall the components you removed in step 3 except the expansion cards.
6. Install the system cover.
7. Turn on the system and attached peripherals.

   If the problem persists, see the Getting help section.
8. If the system starts properly, turn off the system, and reinstall all the expansion cards that you removed.
9. Run the appropriate diagnostic test. For more information, see the Using system diagnostics section.

Next steps

If the tests fail, see the Getting help section.

Related references

Getting help on page 200
Using system diagnostics on page 185

Troubleshooting a damaged system

Prerequisites

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.

Steps

1. Turn off the system and attached peripherals, and disconnect the system from the electrical outlet.
2. Remove the system cover.
3. Ensure that the following components are properly installed:
   - cooling shroud
   - expansion card risers (if installed)
   - expansion cards
   - power supply unit(s)
   - cooling fan assembly (if installed)
   - cooling fan(s)
   - processor(s) and heat sink(s)
   - memory modules
   - drive carriers or cage
   - drive backplane
4. Ensure that all cables are properly connected.
5. Install the system cover.
6. Run the appropriate diagnostic test. For more information, see the Using system diagnostics section.

Next steps

If the problem persists, see the Getting help section.

Related references

Getting help on page 200
Using system diagnostics on page 185

Troubleshooting the system battery

Prerequisites

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.

NOTE: If the system is turned off for long periods of time (for weeks or months), the NVRAM may lose the system configuration information. This situation is caused by a defective battery.

NOTE: Some software may cause the system time to speed up or slow down. If the system seems to operate normally except for the time set in System Setup, the problem may be caused by a software, rather than by a defective battery.

Steps

1. Re-enter the time and date in System Setup.
2. Turn off the system, and disconnect it from the electrical outlet for at least an hour.
3. Reconnect the system to the electrical outlet, and turn on the system.
4. Enter System Setup.

   If the date and time displayed in System Setup are not correct, check the System Error Log (SEL) for system battery messages.

Next steps

If the problem persists, see the Getting help section.

Related references

Getting help on page 200

Troubleshooting power supply units

Prerequisites

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.

The following sections provide information on troubleshooting power source and power supply units problems.

NOTE: Power Supply Units (PSUs) are hot-pluggable.

Troubleshooting power source problems

Steps

1. Press the power button to ensure that your system is turned on. If the power indicator does not glow when the power button is pressed, press the power button firmly.
2. Plug in another working power supply unit to ensure that the system board is not faulty.
3. Ensure that no loose connections exist.

   For example, loose power cables.
4. Ensure that the power source meets applicable standards.
5. Ensure that there are no short circuits.
6. Have a qualified electrician check the line voltage to ensure that it meets the needed specifications.

Results

NOTE: Some power supply units require 200-240V AC to deliver their rated capacity. For more information, see the system Technical Specifications section in the Installation and Service Manual available at www.dell.com/poweredgemanuals.

Power supply unit problems

Steps

1. Ensure that no loose connections exist.

   For example, loose power cables.
2. Ensure that the power supply unit (PSU) handle or LED indicates that the PSU is working properly.

   For more information about PSU indicators, see the Power indicator codes section.
3. If you have recently upgraded your system, ensure that the PSU has enough power to support the new system.
4. If you have a redundant PSU configuration, ensure that both the PSUs are of the same type and wattage.

   You may have to upgrade to a higher wattage PSU.
5. Ensure that you use only PSUs with the Extended Power Performance (EPP) label on the back.
6. Reseat the PSU.

   NOTE: After installing a PSU, allow several seconds for the system to recognize the PSU and determine if it is working properly.

   If the problem persists, see the Getting help section.

Related references

Getting help on page 200

Troubleshooting cooling problems

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.

Ensure that the following conditions exist:

- System cover, cooling shroud, EMI filler panel, or back filler bracket is not removed.
- Ambient temperature is not higher than the system specific ambient temperature.
- External airflow is not obstructed.
- A cooling fan is not removed or has not failed.
- The expansion card installation guidelines have been followed.

Additional cooling can be added by one of the following methods:

From the iDRAC web GUI click **Hardware** > **Fans** > **Setup**:

1. **Thermal Profile** – is a drop-down list containing different thermal profile options.
2. **Minimum Fan Speed in PWM (% of Max)** – option button to select "Default" or "Custom" fan speed options.

From RACADM commands:

1. Run the command `racadm help system.thermalsettings`

For more information, see *Integrated Dell Remote Access User's Guide* at www.dell.com/poweredgemanuals

Troubleshooting cooling fans

Prerequisites

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.

NOTE: The fan number is referenced by the management software of the system. In the event of a problem with a particular fan, you can easily identify and replace it by noting down the fan numbers on the cooling fan assembly.

1. Follow the safety guidelines listed in the Safety instructions section.
2. Follow the procedure listed in the Before working inside your system section.

Steps

1. Reseat the fan or the fan's power cable.
2. Restart the system.

Next steps

1. Follow the procedure listed in the After working inside your system section.
2. If the problem persists, see the Getting help section.

Related references

Getting help on page 200
Safety instructions on page 67

Related tasks

Before working inside your system on page 67

Troubleshooting system memory

Prerequisites

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.

NOTE: Memory slots are not hot-pluggable.

NOTE: NVDIMM-N battery is not hot-pluggable.

Steps

1. If the system is operational, run the appropriate diagnostic test. See the Using system diagnostics section for the available diagnostic tests.

   If the diagnostic tests indicate a fault, follow the corrective actions that are provided by the diagnostic tests.

2. If the system is not operational, turn off the system and attached peripherals, and unplug the system from the power source. Wait at least for 10 seconds, and then reconnect the system to the power source.
3. Turn on the system and attached peripherals, and note the messages on the screen.

   If an error message is displayed indicating a fault with a specific memory module, go to step 12.

4. Enter System Setup, and check the system memory setting. Make any changes to the memory settings, if needed.

   If the memory settings match the installed memory but the problem still persists, go to step 12.

5. Turn off the system and attached peripherals, and disconnect the system from the electrical outlet.
6. Remove the sled from the chassis.
7. Check the memory channels and ensure that they are populated correctly.

   NOTE: See the system event log or system messages for the location of the failed memory module. Reinstall the memory device.

8. Reseat the memory modules in their sockets.
9. Install the system cover.
10. Enter System Setup, and check the system memory setting.

    If the problem is not resolved, proceed with step 11.

11. If a diagnostic test or error message indicates a specific memory module as faulty, swap or replace the module with a known working memory module.
12. To troubleshoot an unspecified faulty memory module, replace the memory module in the first DIMM socket with a module of the same type and capacity.

    If an error message is displayed on the screen, this may indicate a problem with one or more installed DIMM types, incorrect DIMM installation, or defective DIMMs. Follow the on-screen instructions to resolve the problem.

13. As the system boots, observe any error message that is displayed and the diagnostic indicators on the front of the system.
14. If the memory problem persists, repeat step 12 through step 15 for each memory module installed.

Next steps

If the problem persists, see the Getting help section.

Related references

Getting help on page 200

Using system diagnostics on page 185

Troubleshooting a micro SD card

Prerequisites

NOTE: Certain micro SD cards have a physical write-protect power on the card. If the write-protect switch is turned on, the micro SD card is not writable.

NOTE: IDSDM and vFlash slots are not hot-pluggable.

Steps

1. Enter System Setup, and ensure that the **Internal SD Card Port** is enabled.
2. Turn off the system, including any attached peripherals, and disconnect the system from the electrical outlet.
3. Remove the sled from the enclosure.

   NOTE: When an SD card failure occurs, the internal dual SD module controller notifies the system. On the next restart, the system displayed a message indicating the failure.

4. Replace the failed micro SD card with a new micro SD card.
5. Install the sled into the enclosure.
6. Reconnect the system to its electrical outlet and turn on the system, including any attached peripherals.
7. Enter System Setup, and ensure that the **Internal SD Card Port** mode is enabled.
8. Check if the micro SD card is functioning properly.

Troubleshooting a drive or SSD

Prerequisites

CAUTION: This troubleshooting procedure can erase data stored on the drive. Before you proceed, back up all files on the drive.

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.

NOTE: Ensure that the sleds internal SATA cables are connected correctly.

Steps

1. Run the appropriate diagnostic test. See the Using system diagnostics section.

   Depending on the results of the diagnostics test, proceed as required through the following steps.

2. If your system has a RAID controller and your drives are configured in a RAID array, perform the following steps:
   a. Restart the system and press F10 during system startup to run the Dell Lifecycle Controller, and then run the Hardware Configuration wizard to check the RAID configuration.

      See the Dell Lifecycle Controller documentation or online help for information about RAID configuration.
   b. Ensure that the drives are configured correctly for the RAID array.
   c. Take the drive offline and reseat the drive.
   d. Exit the configuration utility and allow the system to boot to the operating system.
3. Ensure that the needed device drivers for your controller card are installed and are configured correctly. For more information, see the operating system documentation.
4. Restart the system and enter the System Setup.
5. Verify that the controller is enabled and the drives are displayed in the System Setup.

Next steps

If the problem persists, see the Getting help section.

Related references

Getting help on page 200
Using system diagnostics on page 185

Troubleshooting expansion cards

Prerequisites

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.

NOTE: When troubleshooting an expansion card, you also have to see the documentation for your operating system and the expansion card.

NOTE: Riser slots are not hot-pluggable.

Steps

1. Run the appropriate diagnostic test. See the Using system diagnostics section.
2. Turn off the system and attached peripherals, and disconnect the system from the electrical outlet.
3. Remove the sled from the enclosure.
4. Ensure that each expansion card is firmly seated in its connector.
5. Install the sled into the enclosure.
6. Turn on the system and attached peripherals.
7. If the problem is not resolved, turn off the system and attached peripherals, and disconnect the system from the electrical outlet.
8. Remove the sled from the enclosure.
9. Remove all expansion cards installed in the sled.
10. Install the sled into the enclosure.
11. Run the appropriate diagnostic test. See the Using system diagnostics section.

    If the tests fail, see the Getting help section.

12. For each expansion card you removed in step 8, perform the following steps:
    a. Turn off the system and attached peripherals, and disconnect the system from the electrical outlet.
    b. Remove the sled from the enclosure.
    c. Reinstall one of the expansion cards.
    d. Install the sled into the enclosure.
    e. Run the appropriate diagnostic test. See the Using system diagnostics section.

Next steps

If the problem persists, see the Getting help section.

Related references

Getting help on page 200
Using system diagnostics on page 185
Safety instructions on page 67

Troubleshooting processors

Prerequisites

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.

NOTE: Processor sockets are not hot-pluggable.

Steps

1. Run the appropriate diagnostics test. See the Using system diagnostics section.
2. Turn off the system and attached peripherals, and disconnect the system from the electrical outlet.
3. Remove the sled from the enclosure.
4. Ensure that the processor and heat sink module are properly installed.
5. Install the sled into the enclosure.
6. Run the appropriate diagnostic test. See the Using system diagnostics section.
7. If the problem persists, see the Getting help section.

Related references

Getting help on page 200
Using system diagnostics on page 185

System messages

For information about the event and error messages generated by the system firmware and agents that monitor system components, go to qrl.dell.com > **Look Up** > **Error Code**, type the error code, and then click **Look it up**.

Warning messages

A warning message alerts you to a possible problem and prompts you to respond before the system continues a task. For example, before you format a hard drive, a message warns you that you may lose all data on the hard drive. Warning messages usually interrupt the task and need you to respond by typing y (yes) or n (no).

NOTE: Warning messages are generated by either the application or the operating system. For more information, see the documentation that shipped with the operating system or application.

Diagnostic messages

The system diagnostic utility generates messages if there are errors detected when you run diagnostic tests on your system. For more information about system diagnostics, see the For information about the event and error messages generated by the system firmware and agents that monitor system components, go to qrl.dell.com > **Look Up** > **Error Code**, type the error code, and then click **Look it up**..

Alert messages

The systems management software generates alert messages for your system. Alert messages include information, status, warning, and failure messages for drive, temperature, fan, and power conditions. For more information, see the systems management software documentation links listed in the Documentation resources section of this manual.

13

Getting help

Topics:

Contacting Dell EMC

Dell EMC provides several online and telephone based support and service options. If you do not have an active internet connection, you can find contact information about your purchase invoice, packing slip, bill, or Dell EMC product catalog. Availability varies by country and product, and some services may not be available in your area. To contact Dell EMC for sales, technical assistance, or customer service issues:

Steps

1. Go to www.dell.com/support/home.
2. Select your country from the drop-down menu on the lower right corner of the page.
3. For customized support:
   a. Enter your system Service Tag in the **Enter your Service Tag** field.
   b. Click **Submit**.
   The support page that lists the various support categories is displayed.
4. For general support:
   a. Select your product category.
   b. Select your product segment.
   c. Select your product.
   The support page that lists the various support categories is displayed.
5. For contact details of Dell EMC Global Technical Support:
   a. Click Global Technical Support.
   b. Enter your system Service Tag in the **Enter your Service Tag** field on the Contac Us webpage.

Documentation feedback

Click the **Feedback** link in any of the Dell EMC documentation pages, fill out the form, and click **Submit** to send your feedback.

Accessing system information by using QRL

You can use the Quick Resource Locator (QRL) located on the information tag in the front of the system, to access the information about the PowerEdge system.

Prerequisites

Ensure that your smartphone or tablet has the QR code scanner installed.

The QRL includes the following information about your system:

- How-to videos
- Reference materials, including the Installtion and Service Manual, and mechanical overview
- A direct link to Dell to contact technical assistance and sales teams

Steps

1. Go to www.dell.com/qrl and navigate to your specific product or
2. Use your smartphone or tablet to scan the model-specific Quick Resource (QR) code on your system or in the Quick Resource Locator section.

Quick Resource Locator for the PowerEdge C6320p system

Figure 132. Quick Resource Locator for the PowerEdge C6320p system