Dell EMC VxRail™ P470/P470F/V470/V470F Appliance

Owner's Manual

Regulatory Model: E31S Series
Regulatory Type: E31S001

Notes, cautions, and warnings

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

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

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

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Overview

The Dell EMC VxRail™ P470/P470F/V470/V470F is a hyper-converged appliance that supports:

- Two Intel Xeon E5-2600 v4 processors
- Up to 24 DIMMs
- Two AC or DC redundant power supply units
- 16 drive hard drives or solid state drives (SSDs)

NOTE: The appliance supports only internal, hot swappable hard drives.

NOTE: In this document, HDD generically refers to both HDD and SSD.

Topics:

Supported configurations

The Dell EMC VxRail™ P470/P470F/V470/V470F appliance supports the following configurations:

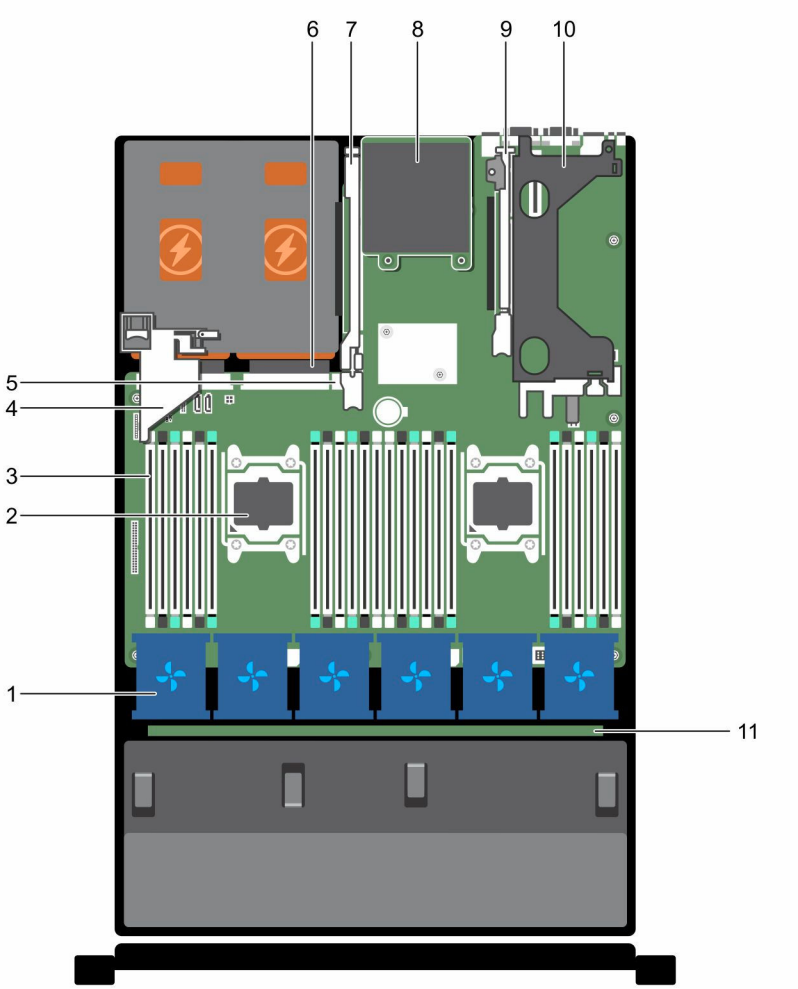


Figure 1. Supported configurations

1	Cooling fan in the cooling fan assembly (6)	2	Processor (2)
3	DIMMs (24)	4	PCIe card holder
5	Internal USB port	6	Power supply unit (2)
7	Expansion card riser 3	8	Network daughter card
9	Expansion card riser 2	10	Expansion card riser 1
11	Hard drive backplane		

Front panel

The front panel provides access to the features available on the front of the appliance, such as the power button, NMI button, appliance identification tag, appliance identification button, and USB ports. The diagnostic LEDs are prominently located on the front panel. The hot swappable hard drives are accessible from the front panel.

16 x 2.5-inch hard drive chassis

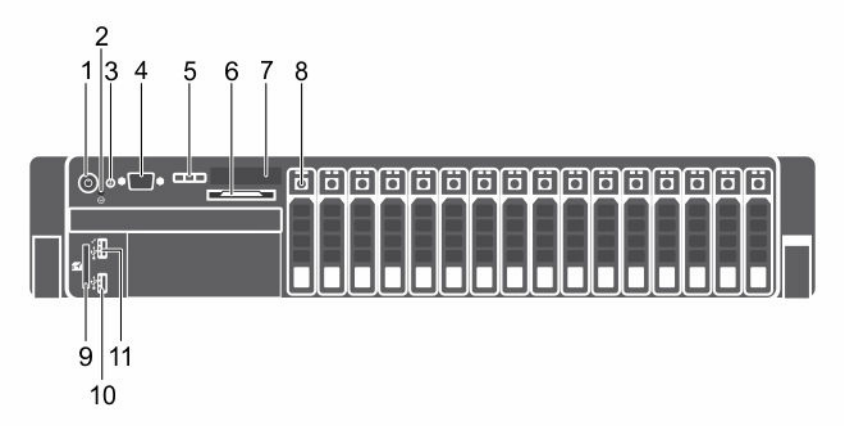


Figure 2. Front panel of 16 x 2.5-inch hard drive chassis

1	Power button	2	NMI button
3	Appliance identification button	4	Video connector
5	LCD menu buttons	6	Information tag
7	LCD panel	8	Hard drives
9	vFlash media card slot	10	USB port
11	USB management port/iDRAC Direct		

Table 1. Front panel features of 16 x 2.5-inch hard drive chassis

Item	Indicator, button, or connector	Icon	Description
1	Power-on indicator, power button		The power-on indicator lights when the appliance power is on. The power button controls the power supply output to the appliance. **NOTE: On ACPI compliant operating systems, when the power button is used to shutdown the appliance, the operating system performs a graceful shutdown before the appliance power is turned off.**
2	NMI button		Used to troubleshoot software and device driver errors when running certain operating systems. This button can be pressed using the end of a paper clip. Use this button only if directed to do so by qualified support personnel or by the operating system documentation.
3	Appliance identification button		The identification buttons on the front and back panels can be used to locate a particular appliance within a rack. When one of these buttons is pressed, the LCD panel on the front and the appliance

Item	Indicator, button, or connector	Icon	Description
			status indicator on the back flashes until one of the buttons is pressed again. Press to toggle the appliance ID on and off. If the appliance stops responding during POST, press and hold the appliance ID button for more than five seconds to enter BIOS progress mode. To reset iDRAC (if not disabled in F2 iDRAC setup) press and hold the button for more than 15 seconds.
4	Video connector		Enables you to connect a display to the appliance.
5	LCD menu buttons		Enable you to navigate the control panel LCD menu.
6	Information tag		A slide-out label panel which allows you to record appliance information such as Service Tag, NIC, MAC address, and so on, as per your need.
7	LCD panel		Displays appliance ID, status information, and system error messages. For more information, see LCD panel features.
8	Hard drives		Up to sixteen 2.5-inch hot-swappable hard drives.
9	vFlash media card slot		Enables you to insert a vFlash media card.
10	USB connector		Enables you to connect USB devices to the appliance. The ports are USB 2.0-compliant.
11	USB management port or iDRAC Direct		The USB management port is USB 2.0 compliant. Enables you to connect USB devices to the appliance or provides access to the iDRAC Direct features. For more information, see the Integrated Dell Remote Access Controller User's Guide at **Dell.com/idracmanuals**.

LCD panel

The LCD panel of your appliance provides appliance information, status, and error messages to indicate if the appliance is functioning correctly or if the appliance needs attention. For more information about error messages, see the *Dell Event and Error Messages Reference Guide* at **Dell.com/openmanagemanuals** >**OpenManage software**.

- The LCD backlight turns blue during normal operating conditions.
- When the appliance needs attention, the LCD turns amber, and displays an error code followed by descriptive text.

  NOTE: If the appliance is connected to a power source and an error is detected, the LCD turns amber regardless of whether the appliance is turned on or off.
- The LCD backlight is turned off when the appliance is in standby mode and can be turned on by pressing either the Select, Left, or Right button on the LCD panel.
- The LCD backlight remains off if LCD messaging is turned off using the iDRAC utility, the LCD panel, or other tools.

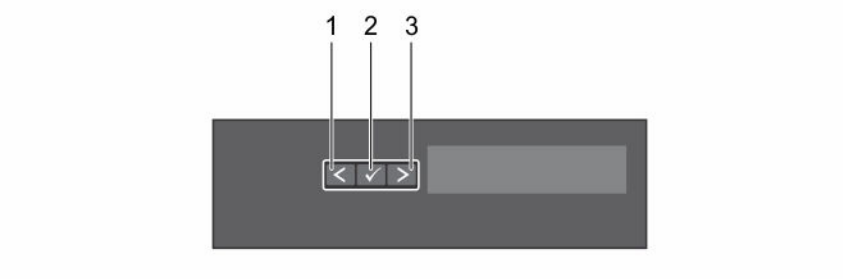


Figure 3. LCD panel features

Table 2. LCD panel features

Item	Button	Description
1	Left	Moves the cursor back in one-step increments.
2	Select	Selects the menu item highlighted by the cursor.
3	Right	Moves the cursor forward in one-step increments. During message scrolling: • Press and hold the button to increase scrolling speed. • Release the button to stop. **NOTE: The display stops scrolling when the button is released. After 45 seconds of inactivity, the display starts scrolling.**

Viewing Home screen

The **Home** screen displays user-configurable information about the appliance. This screen is displayed during normal appliance operation when there are no status messages or errors. When the appliance is in standby mode, the LCD backlight turns off after a few minutes of inactivity, if there are no error messages.

1 To view the **Home** screen, press one of the three navigation buttons (Select, Left, or Right).
2 To navigate to the **Home** screen from another menu, complete the following steps:
   a Press and hold the navigation button till the up arrow is displayed.
   b Navigate to the using the up arrow
   c Select the **Home** icon.
   d On the **Home** screen, press the **Select** button to enter the main menu.

Setup menu

NOTE: When you select an option in the Setup menu, you must confirm the option before proceeding to the next action.

Option	Description
iDRAC	Select **DHCP** or **Static IP** to configure the network mode. If **Static IP** is selected, the available fields are **IP**, **Subnet (Sub)**, and **Gateway (Gtw)**. Select **Setup DNS** to enable DNS and to view domain addresses. Two separate DNS entries are available.

Option	Description
Set error	Select **SEL** to view LCD error messages in a format that matches the IPMI description in the SEL. This enables you to match an LCD message with an SEL entry. Select **Simple** to view LCD error messages in a simplified user-friendly description. For more information about error messages, see the *Dell Event and Error Messages Reference Guide* at **Dell.com/openmanagemanuals** > **OpenManage software**.
Set home	Select the default information to be displayed on the **Home** screen. See View menu section for the options and option items that can be set as the default on the **Home** screen.

View menu

NOTE: When you select an option in the View menu, you must confirm the option before proceeding to the next action.

Option	Description
iDRAC IP	Displays the **IPv4** or **IPv6** addresses for iDRAC8. Addresses include **DNS** (**Primary** and **Secondary**), **Gateway**, **IP**, and **Subnet** (IPv6 does not have Subnet).
MAC	Displays the MAC addresses for **iDRAC**, **iSCSI**, or **Network** devices.
Name	Displays the name of the **Host**, **Model**, or **User String** for the appliance.
Number	Displays the **Asset tag** or the **Service tag** for the appliance.
Power	Displays the power output of the appliance in BTU/hr or Watts. The display format can be configured in the **Set home** submenu of the **Setup** menu.
Temperature	Displays the temperature of the appliance in Celsius or Fahrenheit. The display format can be configured in the **Set home** submenu of the **Setup** menu.

Back panel

The back panel provides access to the features available on the back of the appliance, such as the appliance identification button, power supply sockets, cable management arm connectors, NIC ports, and USB ports. A majority of the expansion card ports can be accessed from the back panel.

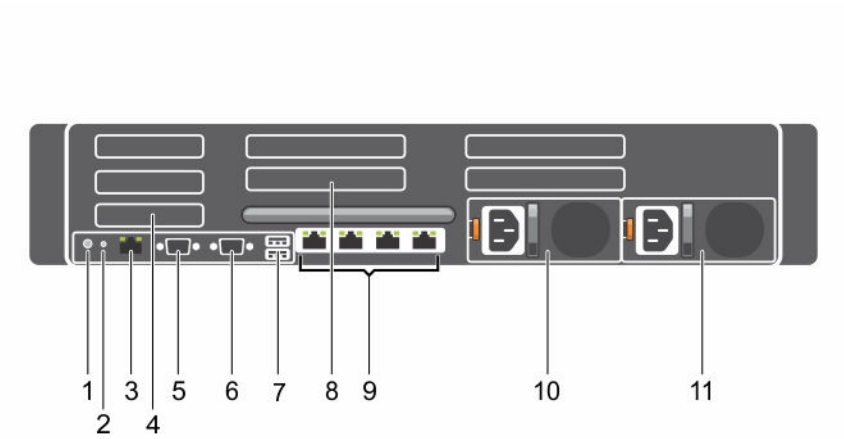


Figure 4. Back panel features

1	Appliance identification button	2	Appliance identification connector
3	iDRAC8 Enterprise port	4	Half-height PCIe expansion card slot
5	Serial connector	6	Video connector
7	USB port	8	Full-height PCIe expansion card slot
9	Ethernet connector	10	Power supply unit 1
11	Power supply unit 2		

Table 3. Back panel features

Item	Indicator, button, or connector	Icon	Description
1	Appliance identification button		The identification buttons on the front and back panels can be used to locate a particular appliance within a rack. Press to toggle the appliance identification (ID) on or off. If the appliance stops responding during POST, press and hold the appliance ID button for more than five seconds to enter BIOS progress mode. To reset iDRAC (if not disabled in F2 iDRAC setup) press and hold the button for more than 15 seconds.
2	Appliance identification connector		Connects the optional appliance status indicator assembly through the optional cable management arm.
3	iDRAC8 Enterprise port		Dedicated management port.
4	Half-height PCIe expansion card slot (3)		Enables you to connect up to three half-height PCI Express expansion cards.
5	Serial connector		Enables you to connect a serial device to the appliance.

Item	Indicator, button, or connector	Icon	Description
6	Video connector		Enables you to connect a VGA display to the appliance.
7	USB port (2)		Enables you to connect USB devices to the appliance. The ports are USB 3.0-compliant.
8	Full-height PCIe expansion card slot (4)		Enables you to connect up to four full-height PCI Express expansion cards.
9	Ethernet connector (4)		Four integrated connectors that include: • Two 10/100/1000 Mbps RJ45 connectors • Two 100 Mbps/1 Gbps/10 Gbps SFP+ or RJ45 connectors
10	Power supply unit (PSU1)		**AC** 1100 W or **DC** 1100 W
11	Power supply unit (PSU2)		**AC** 1100 W or **DC** 1100 W
12	Hard drive (2) (back)		Up to two hot-swappable 3.5-inch hard drives.

Hard drive indicator codes

Each hard drive carrier has an activity indicator and a status indicator. The indicators provide information about the current status of the hard drive. The activity LED indicates whether hard drive is currently in use or not. The status LED indicates the power condition of the hard drive.

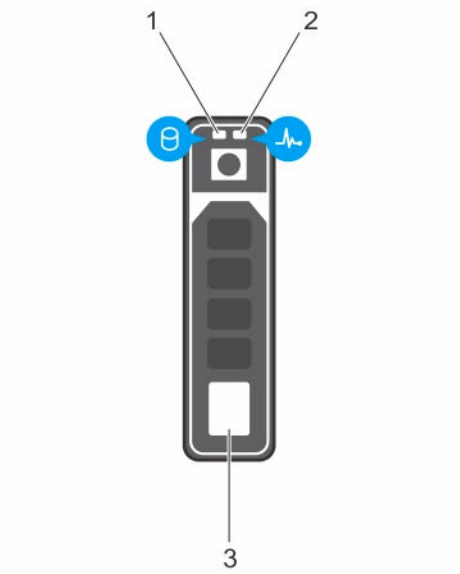


Figure 5. Hard drive indicators

1 hard drive activity indicator
2 hard drive status indicator
3 hard drive

NOTE: If the hard drive is in the Advanced Host Controller Interface (AHCI) mode, the status indicator (on the right side) does not turn on.

NIC indicator codes

The NIC on the back panel has an indicator that provides information about the network activity and link status. The activity LED indicates whether the NIC is currently connected or not. The link LED indicates the speed of the connected network.

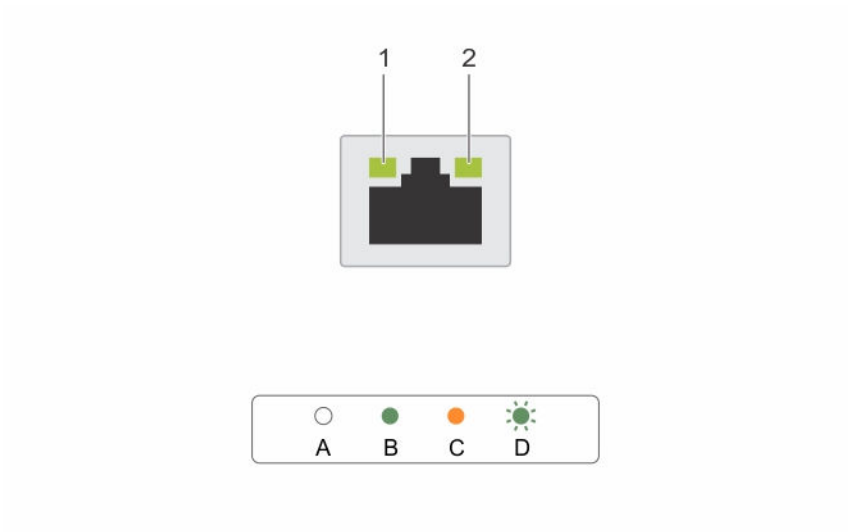


Figure 6. NIC indicators

1	link indicator	2	activity indicator

Table 4. NIC indicators

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 or 10 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

AC power supply units (PSUs) have an illuminated translucent handle that serves as an indicator and DC PSUs have an LED that serves as an indicator. The indicator shows whether power is present or a power fault has occurred.

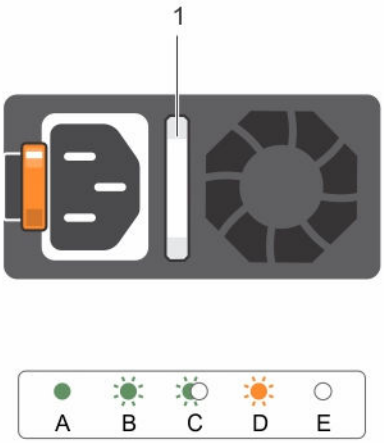


Figure 7. AC PSU status indicator

1 AC PSU status indicator/handle

Table 5. AC PSU status indicators

Convention	Power indicator pattern	Condition
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 handle flashes green.
C	Flashing green and turns off	When hot-adding a PSU, the PSU handle flashes green five times at 4 Hz rate and turns off. This indicates 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.** **CAUTION: For AC PSUs, use only PSUs with the Extended Power Performance (EPP) label on the back.**
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 PSU to make a matched pair can result in an error condition and unexpected appliance shutdown. To change from a high output configuration to a low output configuration or vice versa, you must turn off the appliance.** **CAUTION: If two PSUs are used, they must be of the same type and have the same maximum output power.** **CAUTION: Combining AC and DC PSUs is not supported and triggers a mismatch.**
E	Not lit	Power is not connected.

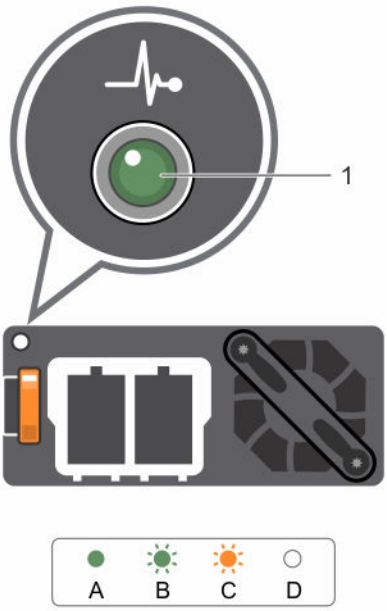


Figure 8. DC PSU status indicator

1 DC PSU status indicator

Table 6. DC PSU status indicators

Convention	Power indicator pattern	Condition
A	Green	A valid power source is connected to the PSU and that the PSU is operational.
B	Flashing green	When hot-adding a PSU, the PSU indicator flashes green. This indicates that there is a PSU mismatch with respect to efficiency, feature set, health status, and supported voltage. Ensure that both the PSUs are of the same capacity.
C	Flashing amber	Indicates a problem with the PSU. **CAUTION: When correcting a PSU mismatch, replace only the PSU with the flashing indicator. Swapping the PSU to make a matched pair can result in an error condition and unexpected appliance shutdown. To change from a High Output configuration to a Low Output configuration or vice versa, you must turn off the appliance.** **CAUTION: If two PSU are used, they must be of the same type and have the same maximum output power.** **CAUTION: Combining AC and DC PSU is not supported and triggers a mismatch.**
D	Not lit	Power is not connected.

iDRAC Direct LED indicator codes

The iDRAC Direct LED indicator lights up to indicate that the port is connected and is being used as a part of the iDRAC subsystem.

NOTE: The iDRAC Direct LED indicator does not turn on when the USB port is used in the USB mode.

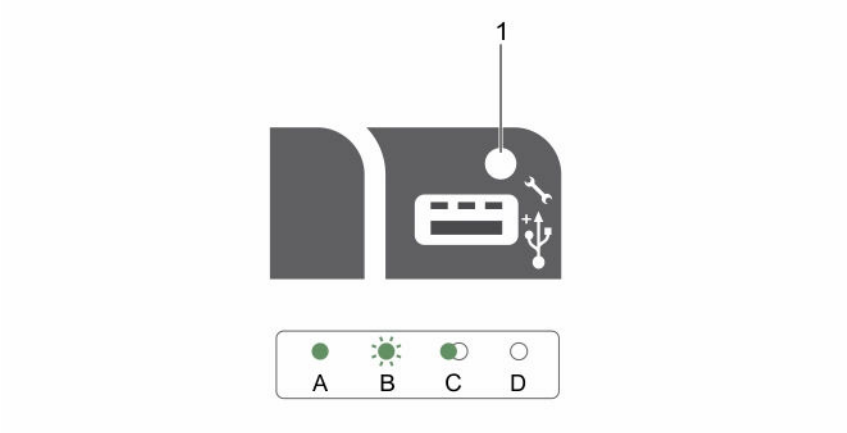


Figure 9. iDRAC Direct LED indicator

1 iDRAC Direct status indicator

The iDRAC Direct LED indicator table describes iDRAC Direct activity when configuring iDRAC Direct by using the management port (USB XML Import).

Table 7. iDRAC Direct LED indicators

Convention	iDRAC Direct LED indicator pattern	Condition
A	Green	Turns green for a minimum of two seconds to indicate the start and end of a file transfer.
B	Flashing green	Indicates file transfer or any operation tasks.
C	Green and turns off	Indicates that the file transfer is complete.
D	Not lit	Indicates that the USB is ready to be removed or that a task is complete.

The following table describes iDRAC Direct activity when configuring iDRAC Direct by using your laptop and cable (Laptop Connect):

Table 8. iDRAC Direct LED indicator patterns

iDRAC Direct LED indicator pattern	Condition
Solid green for two seconds	Indicates that the laptop is connected.
Flashing green (on for two seconds and off for two seconds)	Indicates that the laptop connected is recognized.
Turns off	Indicates that the laptop is unplugged.

Locating serial number of your appliance

To get support for your appliance, use the VxRail Appliance serial number, also called the "PSNT" (Product Serial Number Tag). The PSNT is a 14-digit number used to identify your appliance to Dell EMC support.

NOTE: Only use the VxRail Appliance serial number to contact Customer Support. Under some circumstances, you may need to supply the 8-digit Service Tag number

There are two identification tags on your appliance:

- The VxRail appliance serial number — You can find this in **VxRail Manager**, or printed on the information tag.
- The Service Tag — You can find this printed on the physical appliance.

Looking up your appliance serial number in VxRail Manager

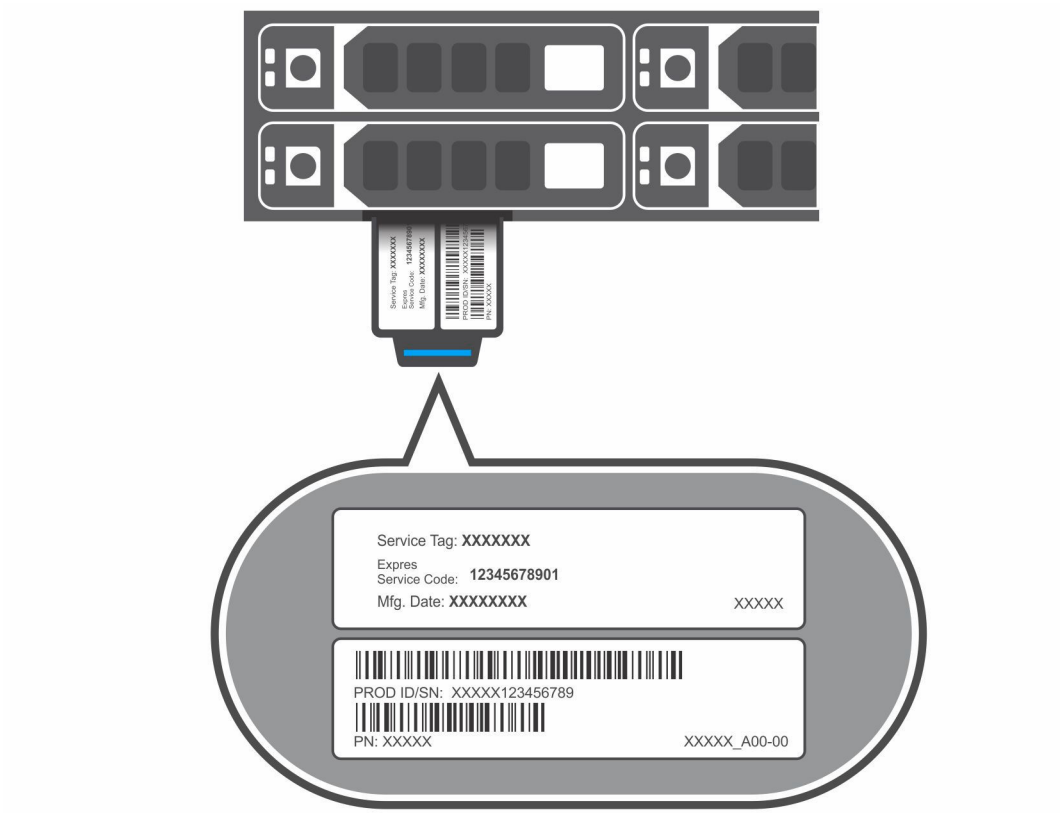
1 In **VxRail Manager**, on the left navigation bar, click **Health**.
2 To display appliance information, click **Physical**.
3 Observe the VxRail Appliance serial number, listed under the appliance ID as the **PSNT**.

Locating your physical Dell EMC VxRail™ Service Tag number

Your hardware is also identified by a unique Service Tag number. The Service Tag is found on the front of the appliance by pulling out the information tag.

Alternatively, the information may be on a sticker on the chassis of the appliance. This information is used by Dell EMC to route support calls to the appropriate personnel.

Figure 10. Dell EMC VxRail™ Service Tag



NOTE: Use the 8-digit Service Tag, only if instructed by Technical Support.

2

Documentation matrix

The documentation matrix provides information on documents that you can refer to for setting up and managing your appliance.

Table 9. Documentation matrix

Document	Provides information about...	Location
Software Documents		
Online help in the VxRail Manager UI	All admin tasks, licensing, and product architecture information.	VxRail Manager Online Help
Product Guide	Help with admin tasks and includes conceptual information.	emc.com/vxrailsupport
Release Notes	Product related information that includes critical information about the release.	emc.com/vxrailsupport
Hardware Documents		
Getting started with your appliance	Technical specifications.	emc.com/vxrailsupport
Owner's Manual	All the hardware details for your appliance along with technical specifications.	emc.com/vxrailsupport
Support Matrix	Supported software, firmware, and hardware versions.	emc.com/vxrailsupport
Rack Installation Guide	Installing the appliance into a rack.	emc.com/vxrailsupport

3

Technical specifications

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

Chassis dimensions

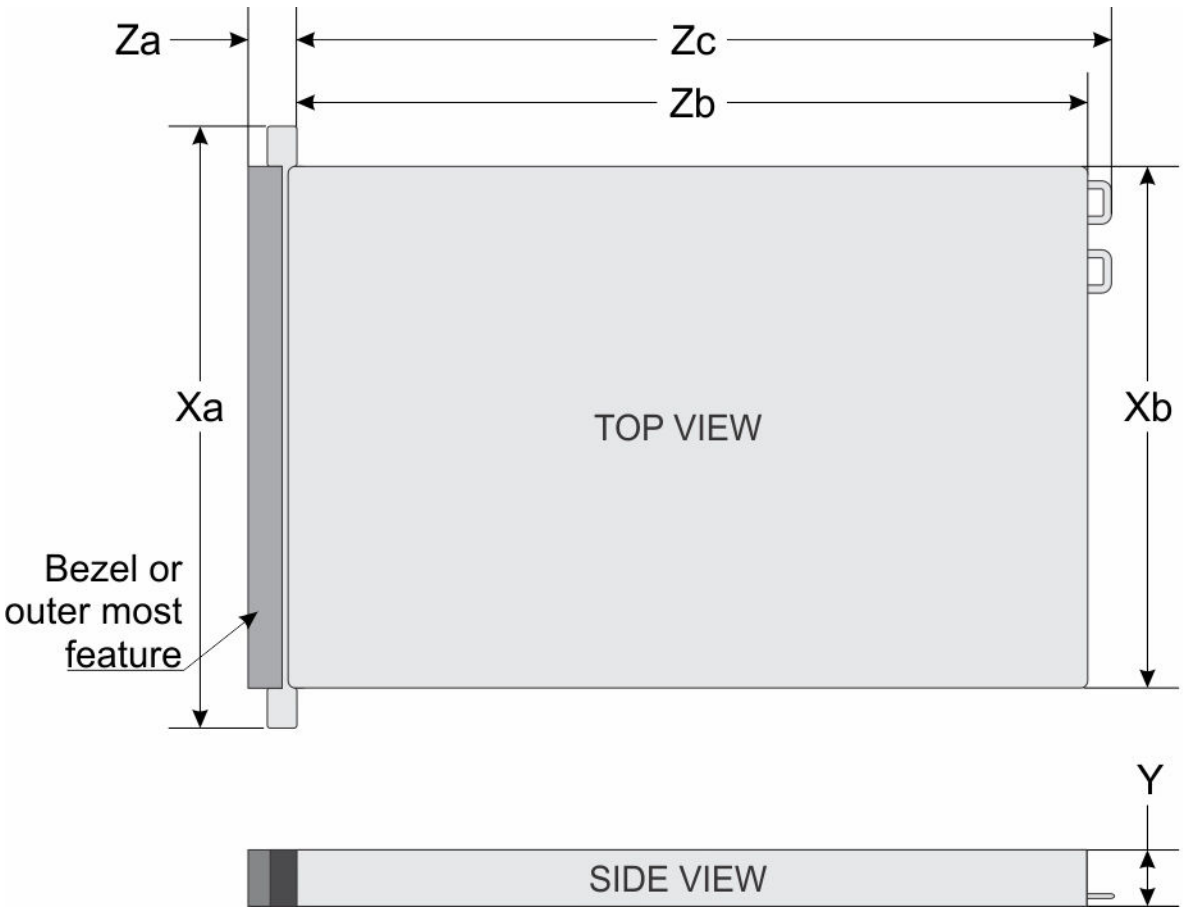


Figure 11. Chassis dimensions of Dell EMC VxRail™ P470/P470F/V470/V470F appliance

Table 10. Dimensions of Dell EMC VxRail™ P470/P470F/V470/V470F appliance

Appliance	Xa	Xb	Y	Za (with bezel)	Za (without bezel)	Zb	Zc
16 x 2.5-inch hard drive	482.4 mm	434.0 mm	42.8 mm	35.0 mm	20.4 mm	731.0 mm	752.1 mm

Chassis weight

The Dell EMC VxRail™ P470/P470F/V470/V470F appliance supports 16 x 2.5-inch hard drive with maximum weight of 31.4 kg (69.23 lb)

Processor specifications

The Dell EMC VxRail™ P470/P470F/V470/V470F appliance supports two Intel Xeon E5-2600 v4 product family processors.

PSU specifications

The Dell EMC VxRail™ P470/P470F/V470/V470F appliance supports two AC or DC redundant power supply units (PSUs).

Table 11. PSU specifications

PSU	Class	Heat dissipation (maximum)	Frequency	Voltage
1100 W AC	Platinum	4100 BTU/hr	50/60 Hz	100–240 V AC, autoranging
1100 W DC	N/A	4416 BTU/hr	N/A	–(48–60) V DC

NOTE: Heat dissipation is calculated by using the PSU wattage rating.

NOTE: This appliance is also designed to connect to the IT power systems with a phase to phase voltage not exceeding 230 V.

Battery specifications

The Dell EMC VxRail™ P470/P470F/V470/V470F appliance supports CR 2032 3.0-V lithium coin cell battery.

Expansion bus specifications

Table 12. Expansion card riser specifications

Expansion card riser	PCIe slots on the riser	Height	Length	Link
Riser 1	Slot 1	half-height	low-profile	x8
Riser 1	Slot 2	half-height	low-profile	x8
Riser 1	Slot 3	half-height	low-profile	x8
Riser 2	Slot 4	full-height	full-length	x16
Riser 2	Slot 5	full-height	full-length	x8
Riser 3 (alternate)	Slot 6	full-height	full-length	x16

NOTE: When using slots 1 through 4 on the riser, ensure that both the processors are installed on the appliance.

Memory specifications

The Dell EMC VxRail™ appliance supports DDR4 registered DIMMs (RDIMMs) and load-reduced DIMMs (LRDIMMs). Supported memory bus frequencies are 1866 MT/s, 2133MT/s, or 2400 MT/s.

Table 13. Memory specifications

Memory module sockets	Memory capacity	Minimum RAM	Maximum RAM
Twenty-four 288-pins	• 64 GB quad rank (LRDIMMs) • 16 GB or 32 GB dual rank (RDIMMs)	• 128 GB with dual processors (minimum four memory modules per processor)	• LRDIMM: up to 1536 GB with dual processors • RDIMM: up to 786 GB with dual processors

Drive specifications

Hard drive specifications

The Dell EMC VxRail™ P470/P470F/V470/V470F appliance supports up to sixteen 2.5-inch, internal, hot-swappable SAS, or Nearline SAS hard drives.

Ports and connectors specifications

USB ports

The Dell EMC VxRail™ P470/P470F/V470/V470F appliance supports:

- One 4-pin USB 2.0 - compliant port on the front panel
- One USB management port/iDRAC Direct on the front panel
- Two 9-pin USB 3.0 - complaint ports on the back panel

NIC ports

The Dell EMC VxRail™ P470/P470F/V470/V470F appliance supports four Network Interface Controller (NIC) ports on the back panel, which is available in following NIC configurations:

- Two 1 Gbps RJ45 connectors and two 10 Gbps SFP+ or RJ45 connectors

Serial connector

The serial connector connects a serial device to the appliance. The Dell EMC VxRail™ P470/P470F/V470/V470F appliance supports one serial connector on the back panel, which is a 9-pin connector, Data Terminal Equipment (DTE), 16550-compliant.

VGA ports

The Video Graphic Array (VGA) port enables you to connect the appliance to a VGA display. The Dell EMC VxRail™ P470/P470F/V470/V470F appliance supports two 15-pin VGA ports on the front and back panels.

Internal dual SD Module

The Internal Dual SD module (IDSDM) provides you with a redundant SD card solution. The IDSDM card offers the following feature:

- Dual card operation — Maintains a mirrored configuration by using SD cards in both the slots and provides redundancy.

NOTE: The IDSDM on the VxRail appliance is pre-configured for appliance bare metal recovery. Do not change any of the settings.

Video specifications

The Dell EMC VxRail™ P470/P470F/V470/V470F appliance supports Matrox G200eR2 graphics card with 16 MB capacity.

Table 14. Resolution information for video modes

Resolution	Refresh rate (Hz)	Color depth (bit)
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

Table 15. 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: Maximum of 135 W 20 core processor is supported with V-series appliances with a GPU.**
Maximum temperature gradient (operating and storage)	20°C/h (36°F/h)

Table 16. Relative humidity specifications

Relative humidity	Specifications
Storage	5% to 95% RH with 33°C (91°F) maximum dew point. Atmosphere must be non-condensing at all times.
Operating	10% to 80% relative humidity with 29°C (84.2°F) maximum dew point.

Table 17. Maximum vibration specifications

Maximum vibration	Specifications
Operating	0.26 G_{rms} at 5 Hz to 350 Hz (all operation orientations).
Storage	1.88 G_{rms} at 10 Hz to 500 Hz for 15 min (all six sides tested).

Table 18. Maximum shock specifications

Maximum shock	Specifications
Operating	Six consecutively executed shock pulses in the positive and negative x, y, and z axes of 40 G for up to 2.3 ms.
Storage	Six consecutively executed shock pulses in the positive and negative x, y, and z axes (one pulse on each side of the appliance) of 71 G for up to 2 ms.

Table 19. Maximum altitude specifications

Maximum altitude	Specifications
Operating	3048 m (10,000 ft)
Storage	12,000 m (39,370 ft)

Table 20. 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).
35°C to 40°C (95°F to 104°F)	Maximum temperature is reduced by 1°C/175 m (1°F/319 ft) above 950 m (3,117 ft).
40°C to 45°C (104°F to 113°F)	Maximum temperature is reduced by 1°C/125 m (1°F/228 ft) above 950 m (3,117 ft).

Particulate and gaseous contamination specifications

The following table defines the limitations that help avoid any equipment damage or failure from particulates and gaseous contamination. If the levels of particulates or gaseous pollution exceed the specified limitations and result in equipment damage or failure, you may need to rectify the environmental conditions. Re-mediation of environmental conditions is the responsibility of the customer.

Table 21. Particulate contamination specifications

Particulate contamination	Specifications
Air filtration	Data center air filtration as defined by ISO Class 8 per ISO 14644-1 with a 95% upper confidence limit. **NOTE: This condition applies only to data center environments. Air filtration requirements do not apply to IT equipment designed to be used outside a data center, in environments such as an office or factory floor.**

Particulate contamination	Specifications
	NOTE: Air entering the data center must have MERV11 or MERV13 filtration.
Conductive dust	Air must be free of conductive dust, zinc whiskers, or other conductive particles. **NOTE: This condition applies to data center and non-data center environments.**
Corrosive dust	• Air must be free of corrosive dust. • Residual dust present in the air must have a deliquescent point less than 60% relative humidity. **NOTE: This condition applies to data center and non-data center environments.**

Table 22. Gaseous contamination specifications

Gaseous contamination	Specifications
Copper coupon corrosion rate	<300 Å/month per Class G1 as defined by ANSI/ISA71.04-1985.
Silver coupon corrosion rate	<200 Å/month as defined by AHSRAE TC9.9.

NOTE: Maximum corrosive contaminant levels measured at ≤50% relative humidity.

Standard operating temperature

The standard operating temperature for altitude less than 950 meters or 3117 feet ranges from 10°C to 35°C (50°F to 95°F) with no direct sunlight on the equipment.

Expanded operating temperature

Table 23. Expanded operating temperature specifications

Expanded operating temperature	Specifications
Continuous operation	5°C to 40°C at 5% to 85% RH with 29°C dew point. **NOTE: Outside the standard operating temperature (10°C to 35°C), the appliance can operate continuously in temperatures as low as 5°C and as high as 40°C.** For temperatures between 35°C and 40°C, de-rate maximum allowable temperature by 1°C per 175 m above 950 m (1°F per 319 ft).
≤ 1% of annual operating hours	–5°C to 45°C at 5% to 90% RH with 29°C dew point. **NOTE: Outside the standard operating temperature (10°C to 35°C), the appliance can operate down to –5°C or up to 45°C for a maximum of 1% of its annual operating hours.**

Expanded operating temperature	Specifications
	For temperatures between 40°C and 45°C, de-rate maximum allowable temperature by 1°C per 125 m above 950 m (1°F per 228 ft).

NOTE: When operating in the expanded temperature range:

- The performance of the appliance may be impacted.
- The ambient temperature warnings may be reported on the LCD panel and in the System Event Log.

Expanded operating temperature restrictions

- Do not perform a cold startup below 5°C.
- The operating temperature specified is for a maximum altitude of 3050 m (10,000 ft).
- 145 W and Workstation CPU (160 W) processors are not supported.
- Redundant power supply units are required.
- Non-Dell qualified peripheral cards and/or peripheral cards greater than 25 W are not supported.
- GPU is not supported.

4

Initial setup and configuration

This appliance requires installation and deployment services. Contact your Dell EMC account team or your reseller for installation services.

NOTE: Do not install the appliance into rack or turn on the appliance.

5

Pre-operating system management applications

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

CAUTION:

- This appliance requires installation and deployment services. Do not rack this appliance or turn on the power. Contact your Dell EMC Account Team or your reseller for setting up your appliance.
- Dell EMC has optimized your appliance and recommends that you do not change any of these settings.

Topics:

Options to manage the pre-operating system applications

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

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

NOTE: Dell EMC has optimized your appliance and recommends that you do not change any of these settings.

System Setup

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

NOTE: Dell EMC has optimized your appliance and recommends that you do not change any of these settings.

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.

Viewing System Setup

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

1 Turn on, or restart your appliance.

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 appliance to finish booting, and then restart your appliance and try again.

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.

System BIOS

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

NOTE: Many of the system BIOS settings have been pre-configured for your appliance. Do not change any of these settings unless instructed by technical support.

Viewing System BIOS

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

1 Turn on, or restart your appliance.

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 appliance to finish booting, and then restart your appliance and try again.

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

System BIOS Settings details

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

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

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.

NOTE: VxRail appliances require the boot mode to be set to BIOS.

Viewing Boot Settings

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

1 Turn on, or restart your appliance.

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 appliance to finish booting, and then restart your appliancem and try again.

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

4 On the **System BIOS** screen, click **Boot Settings**.

Boot Settings details

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

NOTE: The appliance supports only BIOS boot mode.

Option	Description
Boot Mode	Enables you to set the boot mode of the appliance.

Option	Description
	CAUTION: Switching the boot mode may prevent the appliance 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. **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 appliance fails to boot, the appliance 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.**

Choosing the appliance boot mode

NOTE: VxRail appliances require the boot mode to be set to BIOS.

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 appliance 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 appliance to boot into.

CAUTION: Switching the boot mode may prevent the appliance from booting if the operating system is not installed in the same boot mode.

3 After the appliance boots in the specified boot mode, proceed to install your operating system from that mode.

Changing the boot order

About this task

NOTE: Dell EMC does not recommend changing boot order.

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**.

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.

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.

Viewing Network Settings

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

1 Turn on, or restart your appliance.
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 appliance to finish booting, and then restart your appliance and try again.

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

Network Settings screen details

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

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.

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.

Viewing UEFI iSCSI Settings

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

1 Turn on, or restart your appliance.
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 appliance to finish booting, and then restart your appliance 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**.

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 appliance password, setup password and disabling the power button.

Viewing System Security

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

1 Turn on, or restart your appliance.

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 appliance to finish booting, and then restart your appliance and try again.**

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

4 On the **System BIOS** screen, click **System Security**.

System Security Settings details

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 appliance password. This option is set to **Enabled** by default and is read-only if the password jumper is not installed in the appliance.
Setup Password	Sets the setup password. This option is read-only if the password jumper is not installed in the appliance.
Password Status	Locks the appliance 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, TPM Activation, and Intel TXT 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.

Option	Description
Intel TXT	Enables or disables the Intel Trusted Execution Technology (TXT) option. To enable the **Intel TXT** option, virtualization technology and TPM Security must be enabled with Pre-boot measurements. This option is set to **Off** by default.
Power Button	Enables or disables the power button on the front of the appliance. This option is set to **Enabled** by default.
NMI Button	Enables or disables the NMI button on the front of the appliance. This option is set to **Disabled** by default.
AC Power Recovery	Sets how the appliance behaves after AC power is restored to the appliance. This option is set to **Last** by default.
AC Power Recovery Delay	Sets the time delay for the appliance to power up after AC power is restored to the appliance. 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.
Secure Boot	Enables Secure Boot, where the BIOS authenticates each pre-boot image by using the certificates in the Secure Boot Policy. Secure Boot is disabled by default.
Secure Boot Policy	When Secure Boot policy is set to **Standard**, the BIOS uses the appliance manufacturer's key and certificates to authenticate pre-boot images. When Secure Boot policy is set to **Custom**, the BIOS uses the user-defined key and certificates. Secure Boot policy is set to **Standard** by default.
Secure Boot Policy Summary	Specifies the list of certificates and hashes that secure boot uses to authenticate images.

Secure Boot Custom Policy Settings

Secure Boot Custom Policy Settings is displayed only when **Secure Boot Policy** is set to **Custom**.

Viewing Secure Boot Custom Policy Settings

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

1 Turn on, or restart your appliance.

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 appliance to finish booting, and then restart your appliance and try again.**

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

4 On the **System BIOS** screen, click **System Security**.

5 On the **System Security** screen, click **Secure Boot Custom Policy Settings**.

Secure Boot Custom Policy Settings details

The **Secure Boot Custom Policy Settings** screen details are explained as follows:

Option	Description
Platform Key	Imports, exports, deletes, or restores the platform key (PK).
Key Exchange Key Database	Enables you to import, export, delete, or restore entries in the Key Exchange Key (KEK) Database.
Authorized Signature Database	Imports, exports, deletes, or restores entries in the Authorized Signature Database (db).

Option	Description
Forbidden Signature Database	Imports, exports, deletes, or restores entries in the Forbidden Signature Database (dbx).

Creating a appliance and setup password

Prerequisites

Ensure that the password jumper is enabled. The password jumper enables or disables the appliance 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 appliance password and setup password are deleted and you need not provide the appliance password to boot the appliance.

Steps

1 To enter System Setup, press F2 immediately after turning on or rebooting your appliance.
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 appliance password, and press Enter or Tab.
Use the following guidelines to assign the appliance 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 appliance password.
5 Reenter the appliance 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 appliance reboots.

Using your appliance password to secure your appliance

About this task

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

Steps

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

Next steps

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

NOTE: If an incorrect appliance password is typed, the appliance 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 appliance displays an error message that the appliance has stopped functioning and must be turned off. Even after you turn off and restart the appliance, the error message is displayed until the correct password is entered.

Deleting or changing appliance and setup password

Prerequisites

NOTE: You cannot delete or change an existing appliance 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 appliance.
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 appliance 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 appliance and setup password, a message prompts you to reenter the new password. If you delete the appliance 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.

Operating with a setup password enabled

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

If you do not type the correct password in three attempts, the appliance 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 appliance, 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 appliance password. For more information, see the Appliance Security Settings screen section.
- You cannot disable or change an existing appliance password.

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

System Information

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

Viewing System Information

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

1 Turn on, or restart your appliance.
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 appliance to finish booting, and then restart your appliance and try again.

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

System Information details

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

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

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.

Viewing Memory Settings

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

1. Turn on, or restart your appliance.
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 appliance to finish booting, and then restart your appliance and try again.
3. On the **System Setup Main Menu** screen, click **System BIOS**.
4. On the **System BIOS** screen, click **Memory Settings**.

Memory Settings details

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

Option	Description
System Memory Size	Specifies the memory size in the appliance.
System Memory Type	Specifies the type of memory installed in the appliance.
System Memory Speed	Specifies the memory speed.

Option	Description
System Memory Voltage	Specifies the memory voltage.
Video Memory	Specifies the amount of video memory.
System Memory Testing	Specifies whether the memory tests are run during appliance boot. Options are **Enabled** and **Disabled**. This option is set to **Disabled** by default.
Memory Operating Mode	Specifies the memory operating mode. The options available are **Optimizer Mode**, **Advanced ECC Mode**, **Mirror Mode**, **Spare Mode**, **Spare with Advanced ECC Mode**, **Dell Fault Resilient Mode** and **Dell NUMA Fault Resilient Mode**. This option is set to **Optimizer Mode** by default. **NOTE: The Memory Operating Mode option can have different default and available options based on the memory configuration of your appliance.** **NOTE: The Dell Fault Resilient Mode option establishes an area of memory that is fault resilient. This mode can be used by an operating system that supports the feature to load critical applications or enables the operating system kernel to maximize appliance availability.** **NOTE: VxRail appliances require that the Optimizer mode be selected.**
Node Interleaving	Specifies if Non-Uniform Memory architecture (NUMA) is supported. If this field is set to **Enabled**, memory interleaving is supported if a symmetric memory configuration is installed. If the field is set to **Disabled**, the appliance supports NUMA (asymmetric) memory configurations. This option is set to **Disabled** by default.
Snoop Mode	Specifies the Snoop Mode options. The Snoop Mode options available are **Home Snoop**, **Early Snoop**, and **Cluster on Die**. This option is set to **Early Snoop** by default. This field is available only when the **Node Interleaving** is set to **Disabled**.

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.

Viewing Processor Settings

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

1 Turn on, or restart your appliance.

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 appliance to finish booting, and then restart your appliance and try again.

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

4 On the **System BIOS** screen, click **Processor Settings**.

Processor Settings details

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

Option	Description
Logical Processor	Enables or disables the logical processors and displays the number of logical processors. If this option is set to **Enabled**, the BIOS displays all 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.

Option	Description
QPI Speed	Enables you to control QuickPath Interconnect data rate settings.
Alternate RTID (Requestor Transaction ID) Setting	Modifies Requestor Transaction IDs, which are QPI resources. This option is set to **Disabled** by default. **NOTE: Enabling this option may negatively impact the overall appliance performance.**
Virtualization Technology	Enables or disables the additional hardware capabilities provided for virtualization. This option is set to **Enabled** by default.
Address Translation Service (ATS)	Defines the Address Translation Cache (ATC) for devices to cache the DMA transactions. This option provides an interface between CPU and DMA Memory Management to a chipset's Address Translation and Protection Table to translate DMA addresses to host addresses. This option is set to **Enabled** by default.
Adjacent Cache Line Prefetch	Optimizes the appliance for applications that need high utilization of sequential memory access. This option is set to **Enabled** by default. You can disable this option for applications that need high utilization of random memory access.
Hardware Prefetcher	Enables or disables the hardware prefetcher. This option is set to **Enabled** by default.
DCU Streamer Prefetcher	Enables or disables the Data Cache Unit (DCU) streamer prefetcher. This option is set to **Enabled** by default.
DCU IP Prefetcher	Enables or disables the Data Cache Unit (DCU) IP prefetcher. This option is set to **Enabled** by default.
Execute Disable	Enables you to run the disable memory protection technology. This option is set to **Enabled** by default.
Logical Processor Idling	Enables you to improve the energy efficiency of a appliance. It uses the operating system core parking algorithm and parks some of the logical processors in the appliance 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.
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 appliance. TDP verifies the maximum heat the cooling appliance 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	Enables or disables the X2Apic mode.
Dell Controlled Turbo	Controls the turbo engagement. Enable this option only when **System Profile** is set to **Performance**. **NOTE: Depending on the number of installed CPUs, there may be up to four processor listings.**
Number of Cores per Processor	Controls the number of enabled cores in each processor. This option is set to **All** by default.
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	**NOTE: Depending on the number of CPUs, there may be up to four processors listed.** The following settings are displayed for each processor installed in the appliance:

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.

Option	Description

Option	Description
Level 3 Cache	Specifies the total L3 cache.
Number of Cores	Specifies the number of cores per processor.

Integrated Devices

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

Viewing Integrated Devices

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

1 Turn on, or restart your appliance.

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 appliance to finish booting, and then restart your appliance and try again.**

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

4 On the **System BIOS** screen, click **Integrated Devices**.

Integrated Devices details

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 **Only Back Ports On** disables the front 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 Only Back Ports On and All Ports Off disables the USB management port and also restricts access to iDRAC features.**
Internal USB Port	Enables or disables the internal USB port. This option is set to **Enabled** by default.
Integrated RAID Controller	Enables or disables the integrated RAID controller. This option is set to **Enabled** by default.
Integrated Network Card 1	Enables or disables the integrated network card.
Embedded NIC1 and NIC2	**NOTE: The Embedded NIC1 and NIC2 options are only available on appliances that do not have Integrated Network Card 1.** Enables or disables the Embedded NIC1 and NIC2 options. If set to **Disabled**, the NIC may still be available for shared network access by the embedded management controller. The embedded NIC1 and NIC2 options are only available on appliances that do not have Network Daughter Cards (NDCs). The Embedded NIC1 and NIC2 option is mutually exclusive with the Integrated Network Card 1 option. Configure the Embedded NIC1 and NIC2 option by using the NIC management utilities of the appliance.
I/OAT DMA Engine	Enables or disables the I/OAT option. Enable only if the hardware and software support the feature.

Option	Description
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 appliance (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**.
SR-IOV Global Enable	Enables or disables the BIOS configuration of Single Root I/O Virtualization (SR-IOV) devices. This option is set to **Disabled** by default.
OS Watchdog Timer	If your appliance 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 appliance.
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.
Slot Disablement	Enables or disables the available PCIe slots on your appliance. The slot disablement feature controls the configuration of PCIe cards installed in the specified slot. Slots must be disabled only when the installed peripheral card prevents booting into the operating system or causes delays in appliance startup. If the slot is disabled, both the Option ROM and UEFI drivers are disabled.

Serial Communication

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

Viewing Serial Communication

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

1 Turn on, or restart your appliance.

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 appliance to finish booting, and then restart your appliance and try again.**

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

4 On the **System BIOS** screen, click **Serial Communication**.

Serial Communication details

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. BIOS console redirection can also be enabled and the port address can be specified. This option is set to **Auto** by default.
Serial Port Address	Enables you to set the port address for serial devices. This option is set to **Serial Device 1=COM2, Serial Device 2=COM1** 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.**

Option	Description
	NOTE: Every time the appliance 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 appliance 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.**
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 `VT 100/VT 220` 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.

System Profile Settings

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

Viewing System Profile Settings

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

1. Turn on, or restart your appliance.
2. Press F2 immediately after you see the following message:
   `F2 = System Setup`

   NOTE:
   - VxRail appliances require that System Profile must be set to Performance.
   - If your operating system begins to load before you press F2, wait for the appliance to finish booting, and then restart your appliance and try again.
3. On the **System Setup Main Menu** screen, click **System BIOS**.
4. On the **System BIOS** screen, click **System Profile Settings**.

System Profile Settings details

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**. This option is set to **Performance** by default.

Option	Description
	NOTE: • All the parameters on the system profile setting screen are available only when the **System Profile** option is set to **Custom**. • VxRail appliances require that the System Profile be set to **Performance**.
CPU Power Management	Sets the CPU power management. This option is set to **System DBPM (DAPC)** 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.
C1E	Enables or disables the processor to switch to a minimum performance state when it is idle. This option is set to **Enabled** by default.
C States	Enables or disables the processor to operate in all available power states. This option is set to **Enabled** by default.
Collaborative CPU Performance Control	Enables or disables the CPU power management option. When set to **Enabled**, the CPU power management is controlled by the OS DBPM and the System DBPM (DAPC). 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.
Uncore Frequency	Enables you to select the **Processor Uncore Frequency** option. Dynamic mode enables the processor to optimize power resources across the cores and uncore during runtime. The optimization of the uncore frequency to either save power or optimize performance is influenced by the setting of the **Energy Efficiency Policy** option.
Energy Efficient Policy	Enables you to select the **Energy Efficient Policy** option. The CPU uses the setting to manipulate the internal behavior of the processor and determines whether to target higher performance or better power savings.
Number of Turbo Boot Enabled Cores for Processor 1	**NOTE: If there are two processors installed in the appliance, you see an entry for Number of Turbo Boost Enabled Cores for Processor 2.** Controls the number of turbo boost enabled cores for processor 1. The maximum number of cores is enabled by default.
Monitor/Mwait	Enables the Monitor/Mwait instructions in the processor. This option is set to **Enabled** for all appliance 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 appliance power or performance.**

Miscellaneous Settings

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

Viewing Miscellaneous Settings

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

1 Turn on, or restart your appliance.

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 appliance to finish booting, and then restart your appliance and try again.

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

4 On the **System BIOS** screen, click **Miscellaneous Settings**.

Miscellaneous Settings details

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

Option	Description
System Time	Enables you to set the time on the appliance.
System Date	Enables you to set the date on the appliance.
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 appliance 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. You cannot set the option to **Enabled** if **UEFI Secure Boot** mode is enabled.
In-System Characterization	Enables or disables **In-System Characterization**. This option is set to **Disabled** by default. The two other options are **Enabled** and **Enabled - No Reboot**. **NOTE: The default setting for In-System Characterization is subject to change in future BIOS releases.** When enabled, In-System Characterization (ISC) executes during POST upon detecting relevant change(s) in appliance configuration to optimize appliance power and performance. ISC takes about 20 seconds to execute, and appliance reset is needed for ISC results to be applied. The **Enabled - No Reboot** option executes ISC and continues without applying ISC results until the next time appliance reset occurs. The **Enabled** option executes ISC and forces an immediate appliance reset so that ISC results can be applied. It takes the appliance longer to be ready due to the forced appliance reset. When disabled, ISC does not execute.

iDRAC configuration

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

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.

The iDRAC IP address is pre-configured for DHCP. This can be changed to a static IP address by logging into iDRAC.

NOTE:

- To access iDRAC, connect the network cable to the Ethernet connector 1 on the system board.
- Ensure that you change the default user name and password after setting up the iDRAC IP address.

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**.

Entering the iDRAC Settings utility

1 Turn on or restart the managed appliance.
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.

Changing the thermal settings

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

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**.

Device Settings

Device Settings enables you to configure device parameters.

Dell Lifecycle Controller

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

NOTE: Dell EMC has optimized your appliance and recommends that you do not change any of these settings.

Embedded systems management

The Dell Lifecycle Controller provides advanced embedded systems management throughout the lifecycle of the appliance. 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.

Boot Manager

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

NOTE: Dell EMC has optimized your appliance and recommends that you do not change any of these settings.

Viewing Boot Manager

To enter **Boot Manager**:

1 Turn on, or restart your appliance.
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 appliance to complete the booting, and then restart your appliance and try again.

Boot Manager main menu

Menu item	Description
Continue Normal Boot	The appliance attempts to boot to devices starting with the first item in the boot order. If the boot attempt fails, the appliance 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.

One-shot BIOS boot menu

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

System Utilities

System Utilities contains the following utilities that can be launched:

- Launch Diagnostics
- BIOS Update File Explorer
- Reboot System

PXE boot

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

NOTE: To access the PXE boot option, boot the appliance and then press F12. The appliance scans and displays the active networked appliances.

NOTE: Dell EMC has optimized your appliance and recommends that you do not change any of these settings.

6

Installing and removing components

Safety instructions

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

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

CAUTION: Do not operate the appliance without the cover for a duration exceeding five minutes.

NOTE: Dell EMC recommends that you always use a static mat and static strap while working on components inside the appliance.

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

Before working inside your appliance

Prerequisites

Follow the safety guidelines listed in the Safety instructions section.

Steps

1 Turn off the appliance, including any attached peripherals.
2 Disconnect the appliance from the electrical outlet and disconnect the peripherals.
3 If installed, remove the front bezel.
4 If applicable, remove the appliance from the rack.
For more information, see the *Rack Installation* placemat at **Emc.com/vxrailsupport**.
5 Remove the appliance cover.

After working inside your appliance

Prerequisites

Follow the safety guidelines listed in the Safety instructions section.

Steps

1 Install the appliance cover.
2 If applicable, install the appliance into the rack.
For more information, see the *Rack Installation* placemat at **Emc.com/vxrailsupport**.
3 If removed, install the front bezel.
4 Reconnect the peripherals and connect the appliance to the electrical outlet.
5 Turn on the appliance, including any attached peripherals.

Recommended tools

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

- Key to the bezel lock.

The key is needed only if your appliance includes a bezel.

- Phillips #2 screwdriver
- Wrist grounding strap

Front bezel (optional)

The front bezel is attached to the front side of the appliance and prevents accidents while removing the hard drive or when pressing the reset or power button. The front bezel can also be locked for additional security.

Removing the front bezel

Prerequisites

Follow the safety guidelines listed in the Safety instructions section.

Steps

1 Locate and remove the bezel key.

NOTE: The bezel key is attached to the back of the bezel.

2 Unlock the bezel by using the key.

3 Slide the release latch up, and pull the left end of the bezel.

4 Unhook the right end, and remove the bezel.

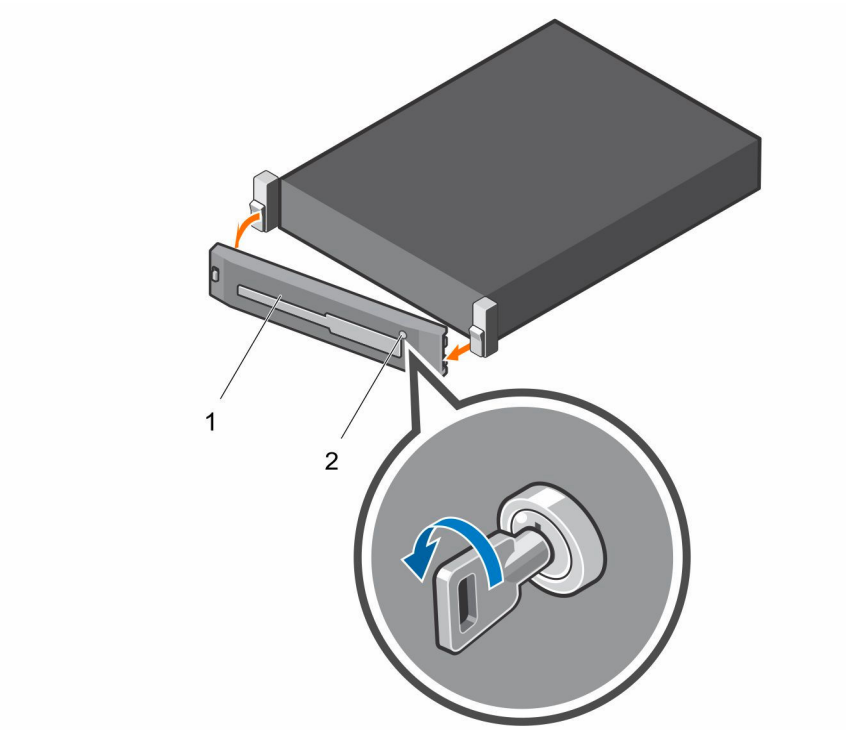


Figure 12. Removing the front bezel

1 front bezel

2 bezel lock

Installing the front bezel

Prerequisites

Follow the safety guidelines listed in the Safety instructions section.

Steps

1 Locate and remove the bezel key.

NOTE: The bezel key is attached to the back of the bezel.

2 Hook the right end of the bezel onto the chassis.

3 Fit the free end of the bezel onto the appliance.

4 Lock the bezel by using the key.

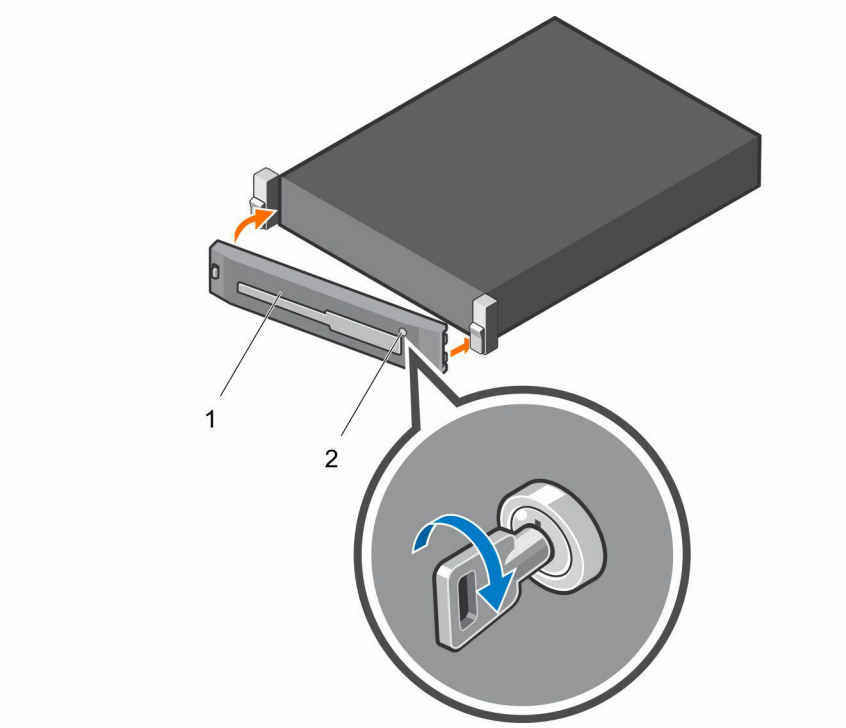


Figure 13. Installing the front bezel

1 front bezel

2 bezel lock

Appliance cover

The appliance cover protects the components inside the appliance and helps in maintaining air flow inside the appliance. Removing the appliance cover activates the intrusion switch, which aids in maintaining appliance security.

Removing the appliance cover

Prerequisites

1 Follow the safety guidelines listed in the Safety instructions section.

2 Turn off the appliance, including any attached peripherals.
3 Disconnect the appliance from the electrical outlet and disconnect the peripherals.
4 If installed, remove the optional bezel. For more information, see the Removing the optional front bezel section.

Steps

1 Rotate the latch release lock counter clockwise to the unlocked position.
2 Lift the latch toward the back of the appliance.
The appliance cover slides back and the tabs on the appliance cover disengage from the slots on the chassis.

NOTE: The position of the latch may vary depending on the configuration of your appliance.

3 Hold the cover on both sides, and lift the cover away from the appliance.

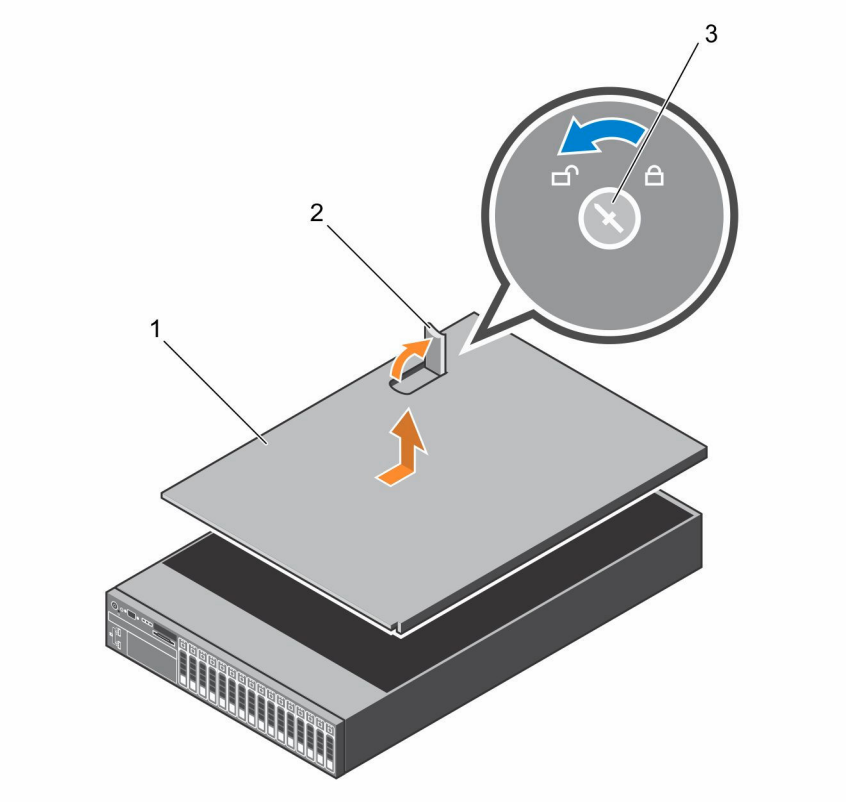


Figure 14. Removing the appliance cover

1 latch release lock
2 latch
3 appliance cover

Next steps

1 Install the appliance cover.

Installing the appliance cover

Prerequisites

1 Follow the safety guidelines listed in the Safety instructions section.
2 Ensure that all internal cables are connected and placed out of the way, and no tools or extra parts are left inside the appliance.

Steps

1 Align the slots on the appliance cover with the tabs on the chassis.

2 Push the appliance cover latch down to move the appliance cover into the closed position.

The appliance cover slides forward and the slots on the appliance cover engage with the tabs on the chassis. The appliance cover latch locks into place when the appliance cover is completely engaged with the tabs on the chassis.

3 Rotate the latch release lock clockwise to the locked position.

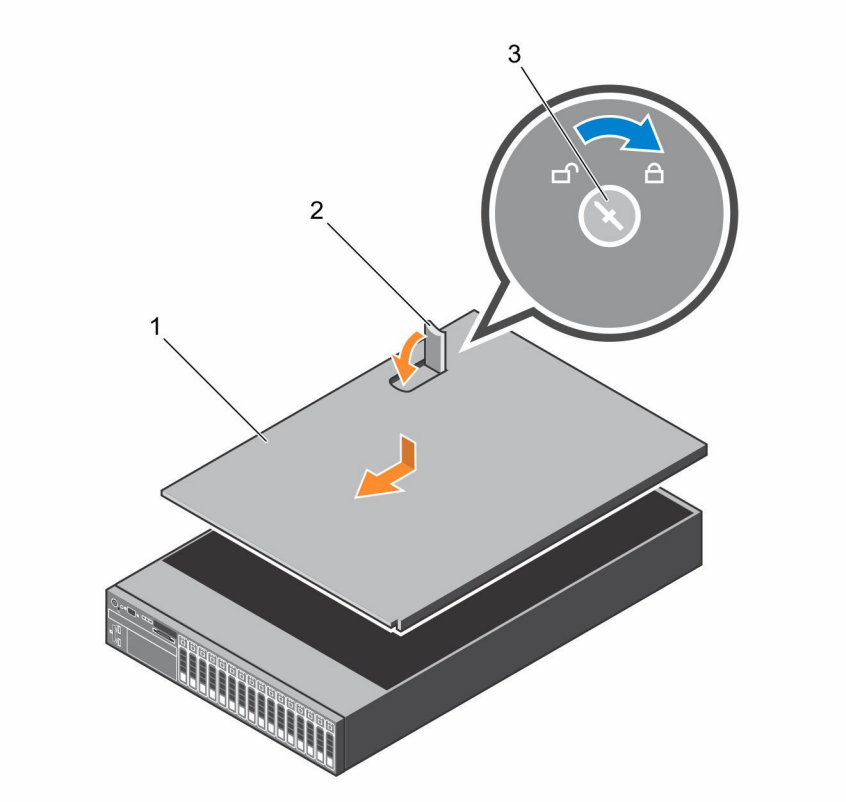


Figure 15. Installing the appliance cover

1	latch release lock	2	latch
3	appliance cover		

Next steps

1 If removed, install the front bezel.

2 Reconnect the peripherals and connect the appliance to the electrical outlet.

3 Turn on the appliance, including any attached peripherals.

Inside the appliance

NOTE: Components that are hot swappable are marked orange and touch points on the components are marked blue.

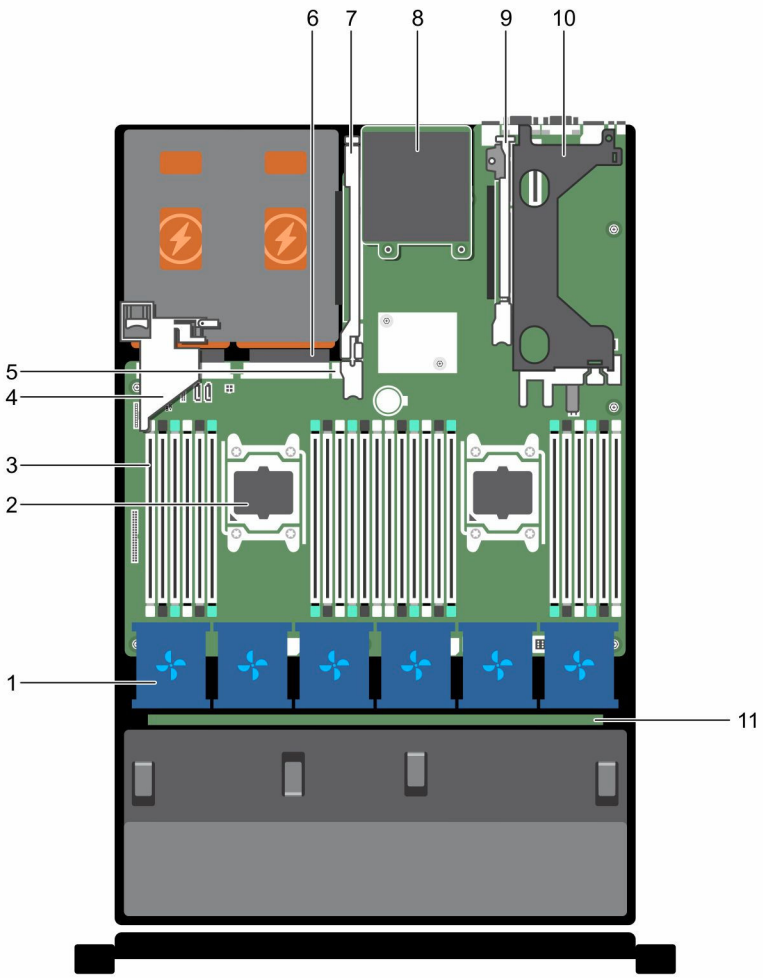


Figure 16. Inside the appliance

1	cooling fan in the cooling fan assembly (6)	2	processor (2)
3	DIMMs (24)	4	PCIe card holder
5	internal USB port	6	power supply unit (2)
7	expansion card riser 3	8	network daughter card
9	expansion card riser 2	10	expansion card riser 1
11	hard drive backplane		

Cooling shroud

The cooling shroud aerodynamically directs the airflow across the entire appliance. The airflow passes through all the critical parts of the appliance, where the vacuum pulls air across the entire surface area of the heat sink, thus allowing increased cooling.

Removing the cooling shroud

Prerequisites

CAUTION: Never operate your appliance with the cooling shroud removed. The appliance may get overheated quickly, resulting in shutdown of the appliance and loss of data.

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

Steps

Holding the touch points, lift the cooling shroud away from the appliance.

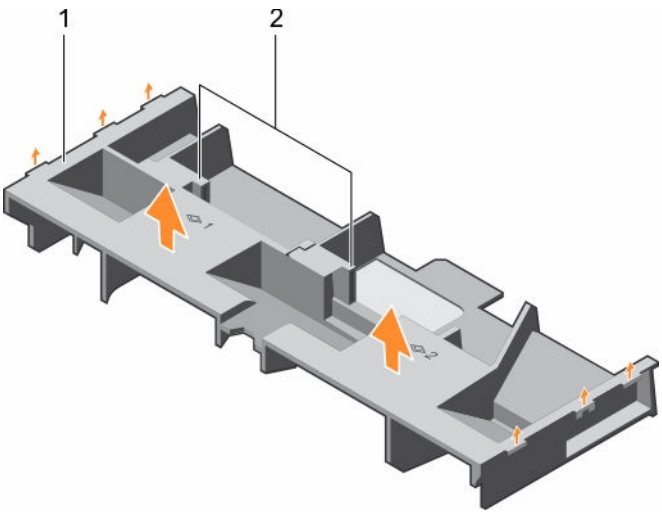


Figure 17. Removing the cooling shroud

1 cooling shroud
2 touch point (2)

Next steps

1 Install the cooling shroud.
2 Follow the procedure listed in the After working inside your appliance section.

Installing the cooling shroud

Prerequisites

1 Follow the safety guidelines listed in the Safety instructions section.
2 Follow the procedure listed in the Before working inside your appliance section.
3 If applicable, route the cables inside the appliance along the chassis wall and secure the cables by using the cable-securing bracket.

Steps

1 Align the tabs on the cooling shroud with the securing slots on the chassis.
2 Lower the cooling shroud into the chassis until it is firmly seated.

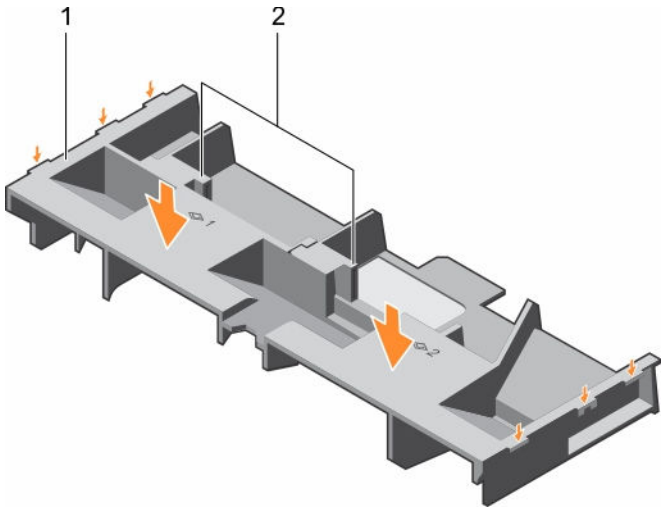


Figure 18. Installing the cooling shroud

1	cooling shroud	2	touch point (2)

Next steps

1 Follow the procedure listed in the After working inside your appliance section.

System Memory

The appliance supports DDR4 registered DIMMs (RDIMMs) and load reduced DIMMs (LRDIMMs). System memory holds the instructions that are executed by the processor.

NOTE: MT/s indicates DIMM speed in MegaTransfers per second.

Memory bus operating frequency can be 1866 MT/s, 2133 MT/s, or 2400 MT/s depending on the following factors:

- DIMM type (RDIMM or LRDIMM)
- Number of DIMMs populated per channel
- System profile selected (for example, Performance Optimized, Custom, or Dense Configuration Optimized)
- Maximum supported DIMM frequency of the processors

Your appliance contains 24 memory sockets split into two sets of 12 sockets, one set per processor. Each 12-socket set is organized into four channels. In each channel, the release tabs of the first socket are marked white, the second socket black, and the third socket green.

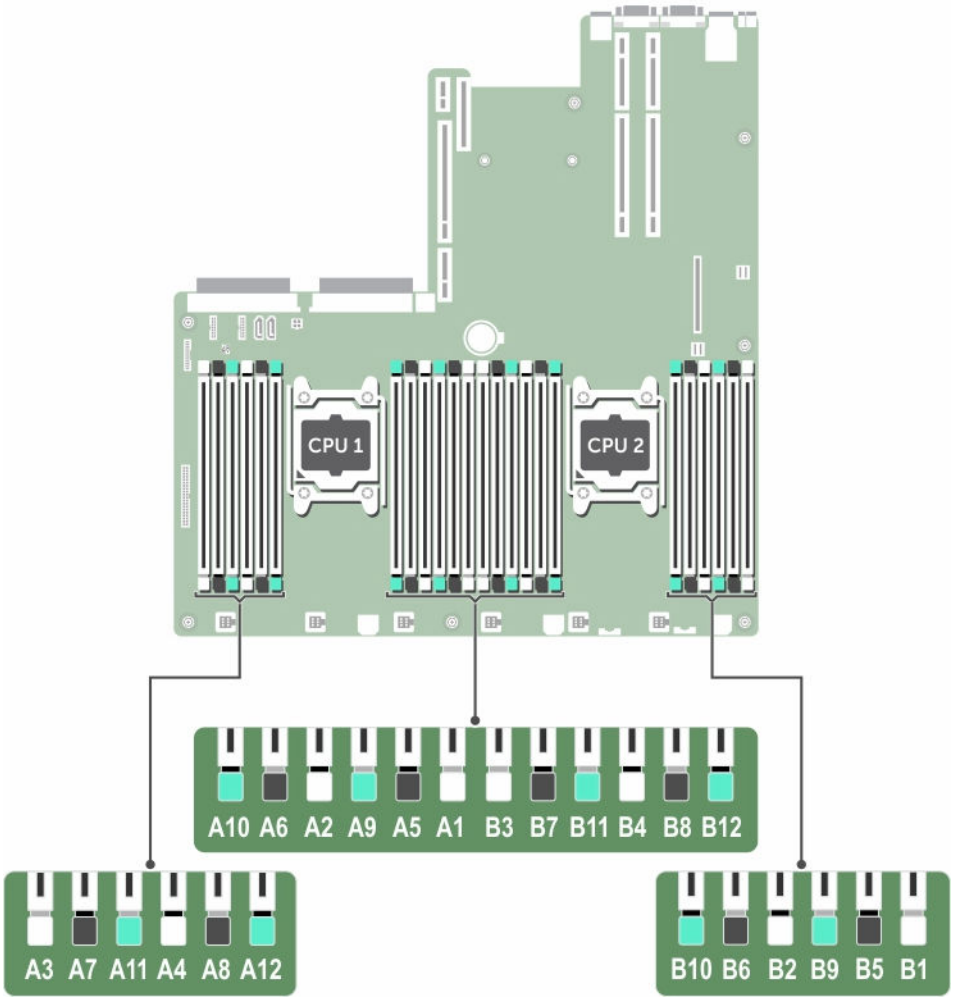


Figure 19. Memory socket locations

Memory channels are organized as follows:

Table 24. Memory channels

Processor	Channel 0	Channel 1	Channel 2	Channel 3
Processor 1	Slots A1, A5, and A9	Slots A2, A6, and A10	Slots A3, A7, and A11	Slots A4, A8, and A12
Processor 2	Slots B1, B5, and B9	Slots B2, B6, and B10	Slots B3, B7, and B11	Slots B4, B8, and B12

The following table shows the memory populations and operating frequencies for the supported configurations:

Table 25. Memory population

DIMM Type	DIMMs Populated/ Channel	Voltage	Operating Frequency (in MT/s)	Maximum DIMM Rank/Channel
RDIMM	1		2400, 2133, 1866	Dual rank or single rank
	2	1.2 V	2400, 2133, 1866	Dual rank or single rank
	3		1866	Dual rank or single rank

DIMM Type	DIMMs Populated/ Channel	Voltage	Operating Frequency (in MT/s)	Maximum DIMM Rank/Channel
LRDIMM	1		2400, 2133, 1866	Quad rank
	2	1.2 V	2400, 2133, 1866	Quad rank
	3		2133, 1866	Quad rank

General memory module installation guidelines

NOTE: Memory configurations that fail to observe these guidelines can prevent your appliance from booting, stop responding during memory configuration, or operating with reduced memory.

The appliance supports Flexible Memory Configuration, enabling the appliance to be configured and run in any valid chipset architectural configuration. The following are the recommended guidelines for installing memory modules:

- RDIMMs and LRDIMMs must not be mixed.
- x16 and x32 DRAM based memory modules can be mixed. For more information, see the Mode-specific guidelines section.
- Up to three dual- or single-rank RDIMMs can be populated per channel.
- Up to three LRDIMMs can be populated per channel regardless of rank count.
- If memory modules with different speeds are installed, they will operate at the speed of the slowest installed memory module(s) or slower depending on appliance DIMM configuration.
- Populate memory module sockets only if a processor is installed. For single-processor systems, sockets A1 to A12 are available. For dual-processor systems, sockets A1 to A12 and sockets B1 to B12 are available.
- Populate all the sockets with white release tabs first, followed by the black release tabs, and then the green release tabs.
- Mixing of more than two memory module capacities in a appliance is not supported.
- When mixing memory modules with different capacities, populate the sockets with memory modules with highest capacity first. For example, if you want to mix 16 GB and 32 GB memory modules, populate 32 GB memory modules in the sockets with white release tabs and 16 GB memory modules in the sockets with black release tabs.
- In a dual-processor configuration, the memory configuration for each processor should be identical. For example, if you populate socket A1 for processor 1, then populate socket B1 for processor 2, and so on.
- Memory modules of different capacities can be mixed provided other memory population rules are followed (for example, 16 GB and 32 GB memory modules can be mixed).
- Mixing of more than two memory module capacities in a appliance is not supported.
- VxRail Appliances require that you populate four memory modules per processor (one DIMM per channel) at a time to maximize performance.

Mode-specific guidelines

CAUTION: Dell EMC has optimized your appliance and recommends that you do not change any of these settings.

Four memory channels are allocated to each processor. The allowable configurations depend on the memory mode selected.

Advanced Error Correction Code (lockstep)

Advanced Error Correction Code (ECC) mode extends SDDC from x4 DRAM based DIMMs to both x4 and x8 DRAMs. This protects against single DRAM chip failures during normal operation.

The installation guidelines for memory modules are as follows:

- Memory modules must be identical in size, speed, and technology.

- DIMMs installed in memory sockets with white release levers must be identical and the same rule applies for sockets with black release levers. This ensures that identical DIMMs are installed in matched pair —for example, A1 with A2, A3 with A4, A5 with A6, and so on.

Memory optimized (independent channel) mode

This mode supports Single Device Data Correction (SDDC) only for memory modules that use x4 device width. It does not impose any specific slot population requirements.

Memory sparing

NOTE: To use memory sparing, this feature must be enabled in System Setup.

In this mode, one rank per channel is reserved as a spare. If persistent correctable errors are detected on a rank, the data from this rank is copied to the spare rank, and the failed rank is disabled.

With memory sparing enabled, the system memory available to the operating system is reduced by one rank per channel. For example, in a dual-processor configuration with sixteen 4 GB single-rank memory modules, the available system memory is: 3/4 (ranks/channel) × 16 (memory modules) × 4 GB = 48 GB, and not 16 (memory modules) × 4 GB = 64 GB.

NOTE: Memory sparing does not offer protection against a multi-bit uncorrectable error.

NOTE: Both Advanced ECC/Lockstep and Optimizer modes support memory sparing.

Memory mirroring

Memory mirroring offers the strongest memory module reliability mode compared to all other modes, providing improved uncorrectable multi-bit failure protection. In a mirrored configuration, the total available system memory is one half of the total installed physical memory. Half of the installed memory is used to mirror the active memory modules. In the event of an uncorrectable error, the appliance switches over to the mirrored copy. This ensures SDDC and multi-bit protection.

The installation guidelines for memory modules are as follows:

- Memory modules must be identical in size, speed, and technology.
- Memory modules installed in memory module sockets with white release levers must be identical and the same rule applies for sockets with black and green release tabs. This ensures that identical memory modules are installed in matched pairs—for example, A1 with A2, A3 with A4, A5 with A6, and so on.

Table 26. Processor configuration

Processor	Configuration	Memory population rules	Memory population information
Single CPU	Memory population order	{1,2}, {3,4}	See Memory mirroring note

Sample memory configurations

The following tables show sample memory configurations for one and two processor configurations that follow the appropriate memory guidelines.

NOTE: 1R, 2R, and 4R in the following tables indicate single, dual, and quad-rank DIMMs respectively.

Table 27. Memory configurations—two processors

Appliance capacity (in GB)	DIMM size (in GB)	Number of DIMMs	DIMM rank, organization, and frequency	DIMM slot population
128	16	8	2R, x8, 2400 MT/s 2R, x8, 2133 MT/s	A1, A2, A3, A4, B1, B2, B3, B4
256	16	16	2R, x8, 2400 MT/s 2R, x8, 2133 MT/s	A1, A2, A3, A4, A5, A6, A7, A8, B1, B2, B3, B4,B5, B6, B7, B8
384	16	24	2R, x4, 1866 MT/s	A1, A2, A3, A4, A5, A6, A7, A8, A9, A10, A11, A12, B1, B2, B3, B4, B5, B6, B7, B8, B9, B10, B11, B12
512	32	16	2R, x4, 2400 MT/s 2R, x4, 2133 MT/s	A1, A2, A3, A4, A5, A6, A7, A8, B1, B2, B3, B4,B5, B6, B7, B8
	64	8	4R, x4, 2400 MT/s 4R, x4, 2133 MT/s	A1, A2, A3, A4, A5, A6, A7, A8, B1, B2, B3, B4,B5, B6, B7, B8
768	32	24	2R, x4, 1866 MT/s	A1, A2, A3, A4, A5, A6, A7, A8, A9, A10, A11, A12, B1, B2, B3, B4, B5, B6, B7, B8, B9, B10, B11, B12
	64	16	4R, x4, 2400 MT/s 4R, x4, 2133 MT/s	A1, A2, A3, A4, A5, A6, A7, A8, A9, A10, A11, A12, B1, B2, B3, B4, B5, B6
1024	64	16	4R, x4, 2133 MT/s	A1, A2, A3, A4, A5, A6, A7, A8, A9, A10, A11, A12, B1, B2, B3, B4, B5, B6
1536	64	24	4R, x4, 1866 MT/s 4R, x4, 2133 MT/s	A1, A2, A3, A4, A5, A6, A7, A8, A9, A10, A11, A12, B1, B2, B3, B4, B5, B6, B7, B8, B9, B10, B11, B12

Removing memory modules

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 appliance section.
3 Remove the cooling shroud.

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

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

Steps

1 Locate the appropriate memory module socket.

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

2 To release the memory module from the socket, simultaneously press the ejectors on both ends of the memory module socket.

3 Lift and remove the memory module from the appliance.

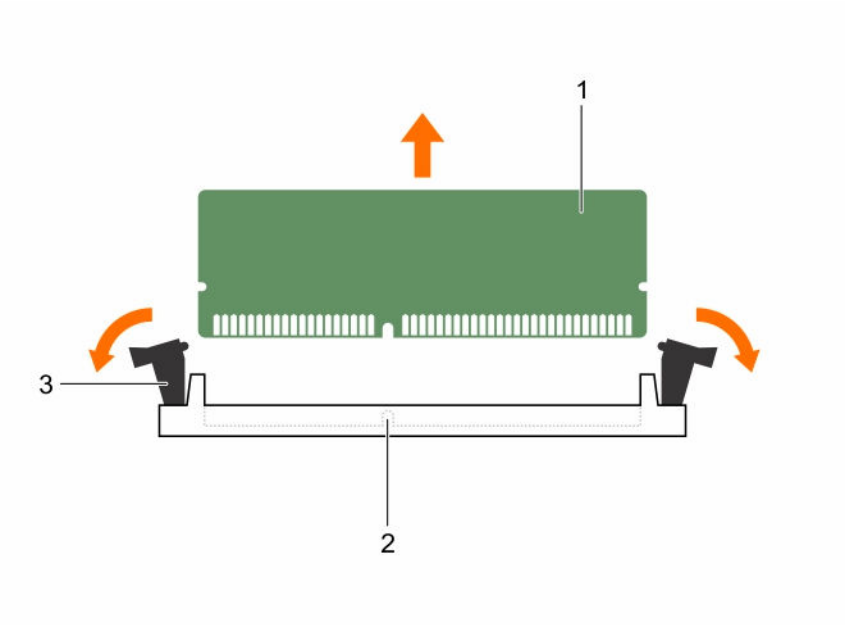


Figure 20. Removing the memory module

1 memory module
2 memory module socket
3 memory module socket ejector (2)

Next steps

1 Install the memory module.

NOTE: If you are removing the memory module permanently, install a memory module blank.

2 Install the cooling shroud.

3 Follow the procedure listed in the After working inside your appliance section.

Installing memory modules

Prerequisites

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

Steps

1 Locate the appropriate memory module socket.

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

2 Open the ejectors on the memory module socket outward to allow the memory module to be inserted into the socket.

3 Align the edge connector of the memory module with the alignment key of the memory module socket, and insert the memory module in the socket.

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

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

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

When the memory module is properly seated in the socket, the levers on the memory module socket align with the levers on the other sockets that have memory modules installed.

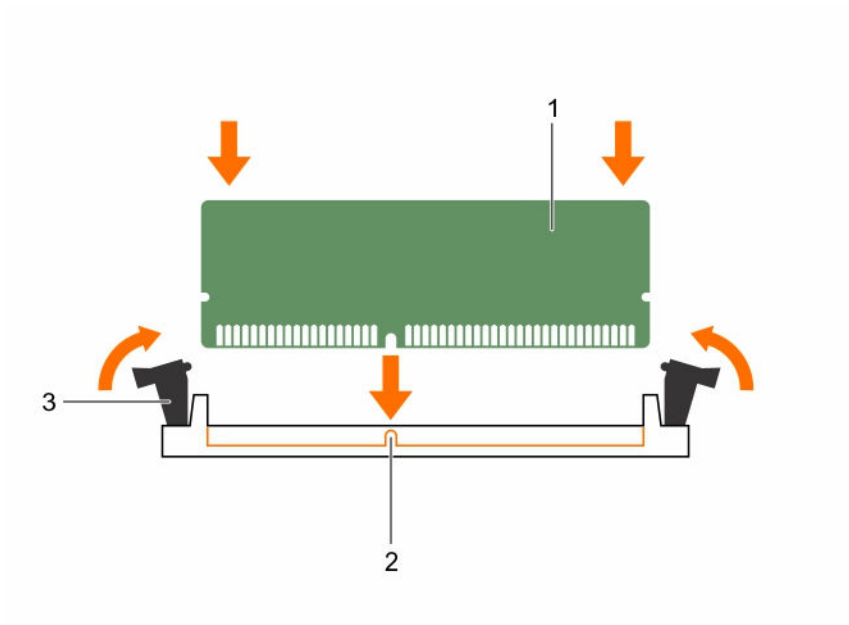


Figure 21. Installing the memory module

1 memory module
2 alignment key
3 memory module socket ejector (2)

Next steps

1 Follow the procedure listed in the After working inside your appliance section.

2 Press F2 to enter System Setup, and check the **System Memory** setting.

The appliance should have already changed the value to reflect the installed memory.

3 If the value is incorrect, one or more of the memory modules may not be installed properly. Ensure that the memory module is firmly seated in the memory module socket.

4 Run the ~~appliance~~ memory test in system diagnostics.

Hard drives

All hard drives connect to the system board through the hard drive backplane. Hard drives are supplied in hot swappable hard drive carriers that fit in the hard drive slots.

CAUTION: Before attempting to remove or install a hard drive while the appliance is running, see the documentation for the storage controller card to ensure that the host adapter is configured correctly to support hot swappable hard drive removal and insertion.

CAUTION: Do not turn off or reboot your appliance while the hard drive is being formatted. Doing so can cause a hard drive failure.

NOTE: Use only hard drives that have been tested and approved for use with the hard drive backplane.

NOTE: Drive replacements must be initiated in VxRail Manager.

When you format a hard drive, allow enough time for the formatting to be completed. High-capacity hard drives can take several hours to format.

Removing a 2.5-inch hard drive blank

Prerequisites

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

1 Follow the safety guidelines listed in the Safety instructions section.

2 If installed, remove the bezel.

Steps

Press the release button and slide the hard drive blank out of the hard drive slot.

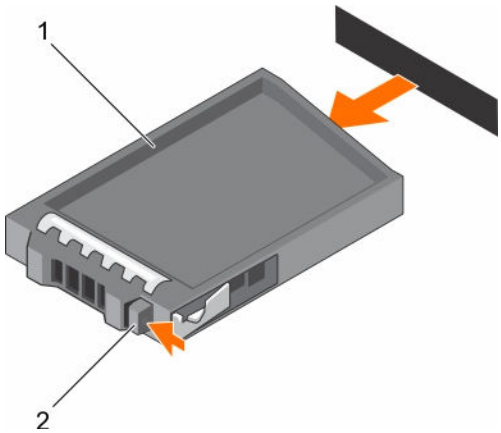


Figure 22. Removing a 2.5-inch hard drive blank

1	hard drive blank	2	release button

Installing a 2.5-inch hard drive blank

Prerequisites

1 Follow the safety guidelines listed in the Safety instructions section.
2 If installed, remove the front bezel.

Steps

Insert the hard drive blank into the hard drive slot until the release button clicks into place.

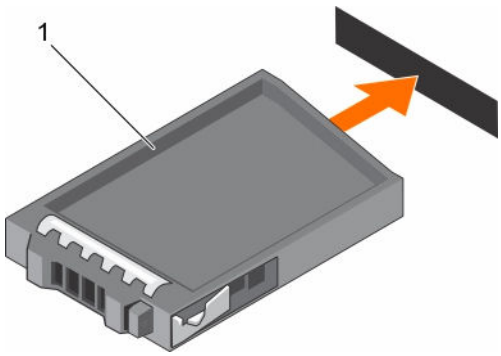


Figure 23. Installing a 2.5-inch hard drive blank

1	hard drive blank

Next steps

If removed, install the front bezel.

Removing a hot swappable hard drive or solid state drive

Prerequisites

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

3 If applicable, remove the bezel.

4 Using the management software, prepare the hard drive for removal.

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

Steps

1 Press the release button to open the hard drive or SSD carrier release handle.

2 Slide the hard drive or SSD carrier out of the hard drive slot.

CAUTION: To maintain proper appliance cooling, all empty hard drive or SSD slots must have hard drive or SSD blanks installed.

3 If you are not replacing the hard drive or SSD immediately, insert a hard drive or SSD blank in the empty hard drive slot.

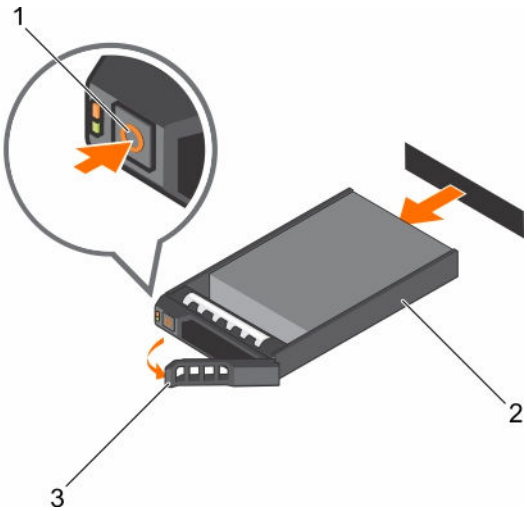


Figure 24. Removing a hot swappable hard drive or SSD

1 release button
2 hard drive or SSD carrier
3 hard drive or SSD carrier handle

Installing a hot swappable hard drive

Prerequisites

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

CAUTION: When installing a hard drive, 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-swap drive installation. See the documentation supplied with your operating system.

CAUTION: When a replacement hot swappable hard drive is installed and the appliance is powered on, the hard drive automatically begins to rebuild. Make absolutely sure that the replacement hard drive is blank or contains data that you wish to have over-written. Any data on the replacement hard drive is immediately lost after the hard drive is installed.

1 Follow the safety guidelines listed in Safety instructions section.

Steps

1 If a hard drive blank is installed in the hard drive slot, remove it.

2 Install a hard drive in the hard drive carrier. For more information, see the Installing a hot swappable hard drive into a hot swappable hard drive carrier section.

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

Next steps

Install the optional front bezel.

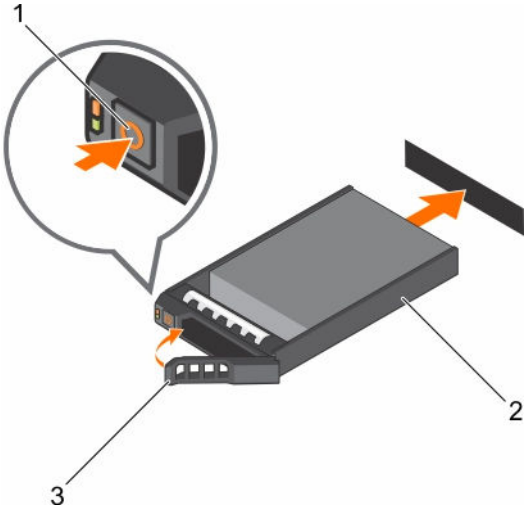


Figure 25. Installing a hot swappable hard drive

1 release button
2 hard drive or SSD carrier
3 hard drive or SSD carrier handle

Removing a hard drive or a solid state drive from a hard drive carrier

Prerequisites

1 Keep the Phillips #1 screwdriver ready.
2 Remove the hot swappable hard drive carrier from the appliance.

Steps

1 Remove the screws from the slide rails on the hard drive carrier.
2 Lift the hard drive out of the hard drive carrier.

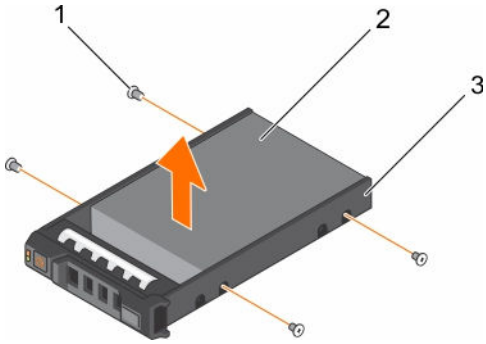


Figure 26. Removing a hard drive from a hard drive carrier

1	screw (4)	2	hard drive
3	hard drive carrier		

Next steps

If applicable, install a hard drive into the hard drive carrier.

Installing a hot swappable hard drive into a hot swappable hard drive carrier

Prerequisites

NOTE: Hot swappable hard drives are supplied in hot swappable hard drive carriers that fit in the hard drive slots.

1 Keep the Phillips #2 screwdriver ready.
2 Remove the hot swappable hard drive carrier.

Steps

1 Insert the hot swappable hard drive into the hard drive carrier with the connector end of the hard drive toward the back.
2 Align the screw holes on the hard drive with the set of screw holes on the hard drive carrier.
When aligned correctly, the back of the hard drive is flush with the back of the hard drive carrier.
3 Attach the screws to secure the hard drive to the hard drive carrier.

Next steps

Install the hard drive carrier into the appliance.

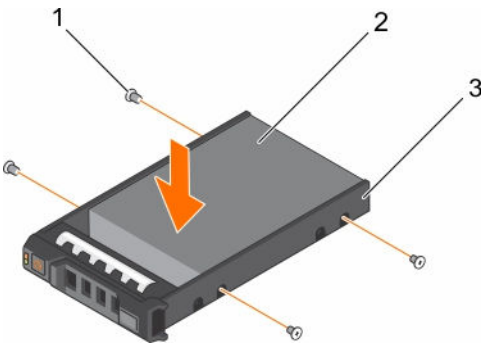


Figure 27. Installing a hot swappable hard drive into a hot swappable hard drive carrier

1	screw (4)	2	hard drive

3 hard drive carrier

SATADOM

A SATADOM is a disk-on-module (DOM) form factor with an incorporated standard SATA data connection. By default, the SATADOM comes with a power cable installed and is set in a Read/Write position.

The SATADOM uses an onboard SATA controller and does not require an additional controller.

Important information about SATADOM

The SATA Disk-On-Motherboard (SATADOM) shipped with Dell EMC VxRail appliances is intended as an appliance boot device.

NOTE: Write intensive activities and processes leveraged by Dell EMC VxRail appliances, are intended to take place on the SSDs and HDDs and not the boot device.

The hypervisor boot device is not intended for application use.

WARNING: Adding additional write intensive software to the SATADOM boot disk results in heavy wear on the device beyond design specifications resulting in premature hardware failure.

You should not run applications on the hypervisor operating system.

Examples of write intensive applications

Following are the examples of write intensive applications:

- System Center Agents.
  - System Center Configuration Manager (CCMExec.exe).
  - System Center Operations Manager (MonitoringHost.exe).
- Write-intensive Agents.
- Databases.
- Disk management utilities (third-party disk defragmentation or partitioning tools).
- Additional roles outside of the appliance's intended use (web server, domain controller, RDS, and so on).
- Client-based Antivirus.
- Run Virtual Machines directly on the SATADOM. Ensure that the Virtual Machines run on Solid State Drives (SSDs) and Hard Disk Drives (HDDs).

Removing the SATADOM

Prerequisites

1 Follow the safety guidelines listed in the Safety instructions section.
2 Turn off the appliance, including any attached peripherals.
3 Disconnect the appliance from the electrical outlet and disconnect the peripherals.

Steps

1 Unplug the power cable from the SATADOM J_TBU connector.
2 Press the lock release on the SATADOM and pull it up and away from the appliance.

NOTE: After removing the SATADOM, place it in an anti-static container for reuse, return, or temporary storage.

NOTE: Dell EMC recommends that you do not modify the SATADOM Read/Write default setting.

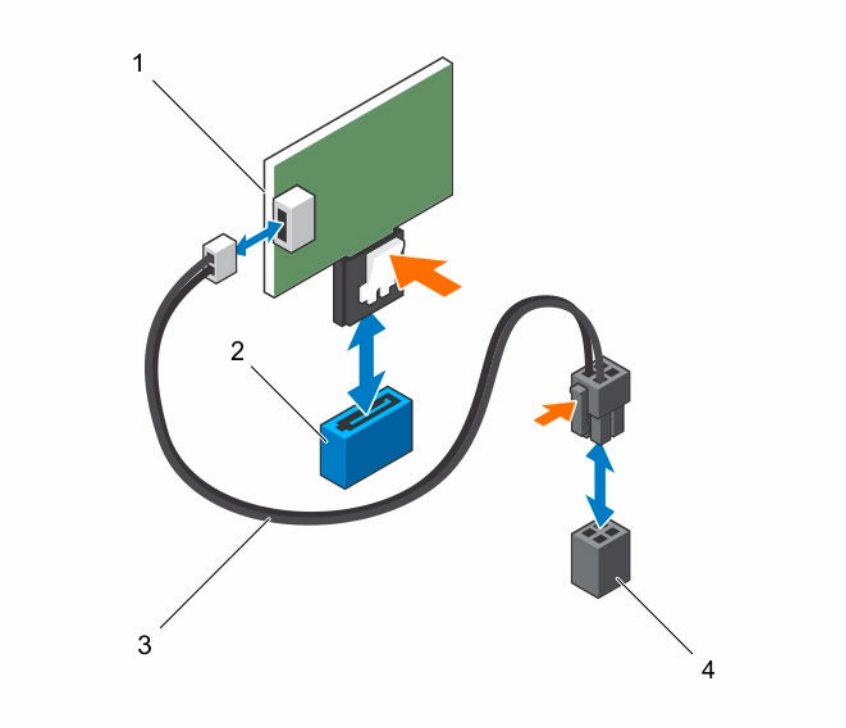


Figure 28. Removing the SATADOM

1	SATADOM	2	SATA connector SATA5
3	power cable	4	system board power connector

Installing the SATADOM

Prerequisites

Follow the safety guidelines listed in the Safety instructions section.

Steps

1. Holding the SATADOM by its edges, position it so that the card edge connector aligns with the onboard SATA connector 5 on the system board.
2. Press the SATADOM with your thumbs until it is fully seated.
3. Reconnect all the cables.

Next steps

1. Reconnect the peripherals and connect the appliance to the electrical outlet.
2. Turn on the appliance, including any attached peripherals.

Cooling fans

Your appliance supports seven hot swappable cooling fans.

NOTE: In the event of a problem with a particular fan, the fan number is referenced by the system management software, allowing you to easily identify and replace the proper fan by noting the fan numbers on the cooling fan assembly.

Removing a cooling fan

Prerequisites

WARNING: Opening or removing the appliance cover when the appliance is ON may expose you to a risk of electric shock. Exercise utmost care while removing or installing cooling fans.

CAUTION: The cooling fans are hot swappable. To maintain proper cooling while the appliance is on, replace only one fan at a time.

CAUTION: Do not operate the appliance with the cover removed for a duration exceeding five minutes.

NOTE: The procedure for removing each fan is identical.

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

Steps

Hold the fan and lift it out of the appliance.

Next steps

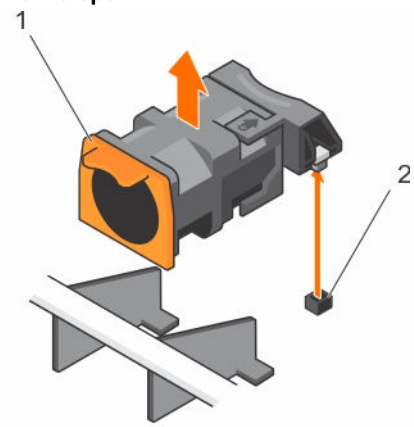


Figure 29. Removing a cooling fan

1 cooling fan (7)
2 connector on the system board (7)

Installing a cooling fan

Prerequisites

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

NOTE: Your appliance supports six hot swappable cooling fans.

NOTE: The procedure for installing each fan is identical.

Steps

1 Align the connector at the base of the cooling fan with the connector on the system board.
2 Slide the cooling fan into the securing slot until the tab locks into place.

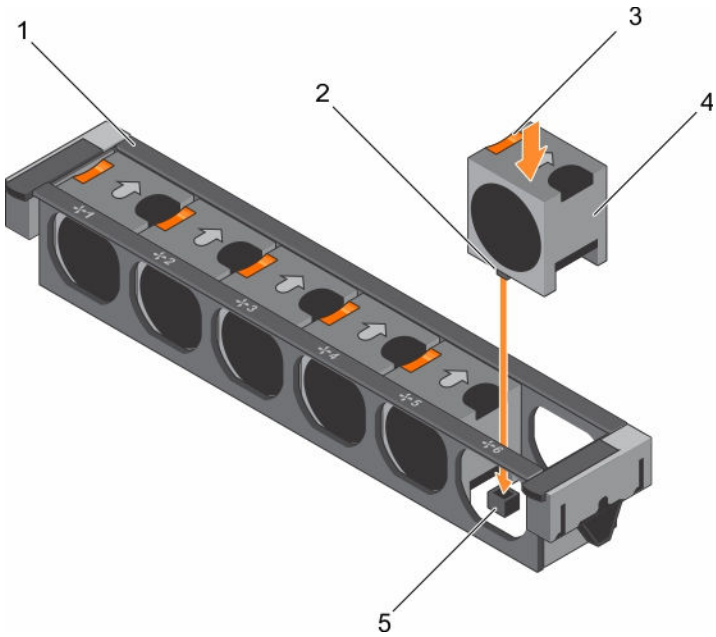


Figure 30. Installing a cooling fan

1	cooling fan assembly	2	cooling fan connector (6)
3	fan release tab (6)	4	cooling fan (6)
5	cooling fan connector on the system board (6)		

Next steps

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

Expansion cards and expansion card riser

An expansion card in the appliance is an add-on card that can be inserted into an expansion slot on the system board or riser card to add enhanced functionality to the appliance through the expansion bus.

NOTE: A System Event Log (SEL) event is logged if an expansion card riser is unsupported or missing. It does not prevent your appliance from turning on and no BIOS POST message or F1/F2 pause is displayed.

Expansion card installation guidelines

Your appliance supports PCI Express Generation 3 expansion cards.

Table 28. Guidelines for appliance supporting three PCIe expansion cards

Riser	PCIe Slot	Processor Connection	Height	Length	Link Width	Slot Width
1	1	Processor 2	Low Profile	Half Length	x8	x16
1	2	Processor 2	Low Profile	Half Length	x8	x16
1	3	Processor 2	Low Profile	Half Length	x8	x16
2	4	Processor 2	Full Height	Full Length	x16	x16
2	5	Processor 1	Full Height	Full Length	x8	x16

Riser	PCIe Slot	Processor Connection	Height	Length	Link Width	Slot Width
3	6	Processor 1	Full Height	Full Length	x16	x16

NOTE: To use PCIe slots 1 through 4 on the risers 1 and 2, both the processors must be installed.

NOTE: The expansion card slots are not hot-swappable.

The following table provides a guideline for installing expansion cards to ensure proper cooling and mechanical fit. Install the expansion card by following the card priority and slot priority order as shown in the table.

Table 29. Expansion card installation priority

Card Priority	Card Type	Slot Priority	Max allowed
1	GPU (double width)	6,4	2
	GPU (single width)	6,4	2
2	10 Gb NICs (full height)	5, 7, 4, 6	1
	10 Gb NICs (low profile)	2,3,1	1
3	Integrated Storage Controller	Integrated Slot	1
4	NDC	Integrated Slot	1
5	SATADOM	SATA connector	1

Removing an expansion card from expansion card riser 2 or 3

Prerequisites

1 Follow the safety guidelines listed in the Safety instructions section.
2 Follow the procedure listed in the Before working inside your appliance section.
3 When removing a card from riser 3, ensure that the PCIe holder latch is closed.

Steps

1 Disconnect any cables connected to the expansion card.
2 Lift the expansion card latch out of the guide slot.
3 Hold the expansion card by its edges, and remove it from the expansion card connector.
4 If you are removing the card permanently, install a metal filler bracket over the empty expansion slot opening and close the expansion card latch.

NOTE: You must install a filler bracket over an empty expansion card slot to maintain Federal Communications Commission (FCC) certification of the appliance. The brackets also keep dust and dirt out of the appliance and aid in proper cooling and airflow inside the appliance.

5 Install the expansion card latch into the slot.
6 Close the expansion card locking tabs.

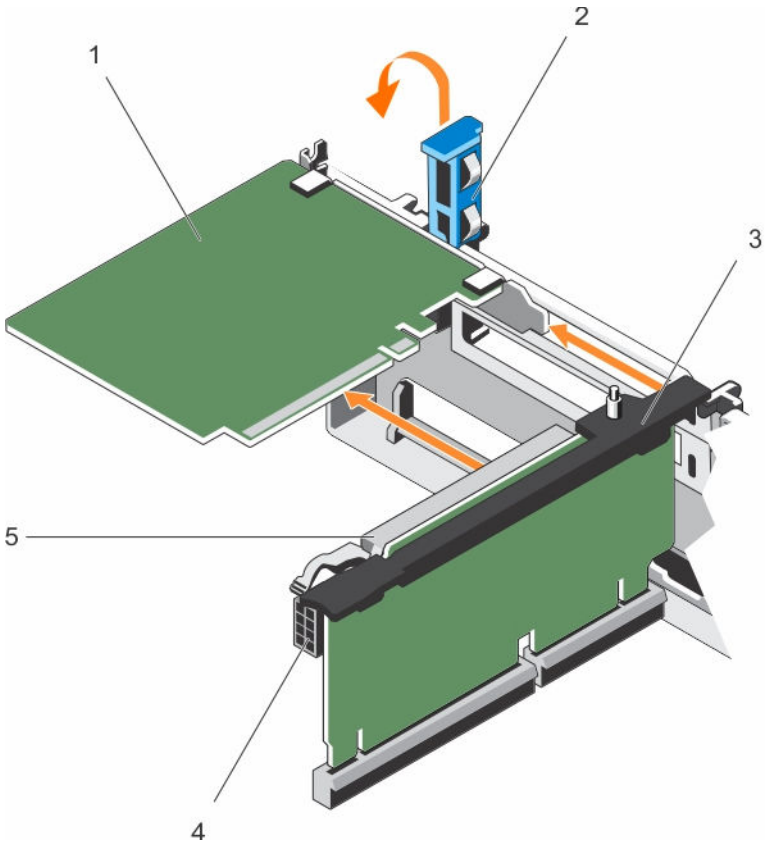


Figure 31. Removing an expansion card from expansion card riser 2 or 3

1	expansion card	2	expansion card latch
3	expansion card riser	4	power connector
5	expansion card connector		

Next steps

1. Install an expansion card into the expansion card riser.
2. Follow the procedure listed in the After working inside your appliance section.

Installing an expansion card into the expansion card riser 2 or 3

Prerequisites

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

Steps

1. Unpack the expansion card and prepare it for installation.

   For instructions, see the documentation accompanying the card.
2. Lift the expansion card latch and remove the filler bracket.
3. Holding the card by its edges, position the card so that the connector on the expansion card aligns with the expansion card connector on the riser.
4. Insert the card-edge connector firmly into the expansion card connector until the card is fully seated.
5. Press the touch points to open the expansion card locking tabs.

6 Close the expansion card latch.

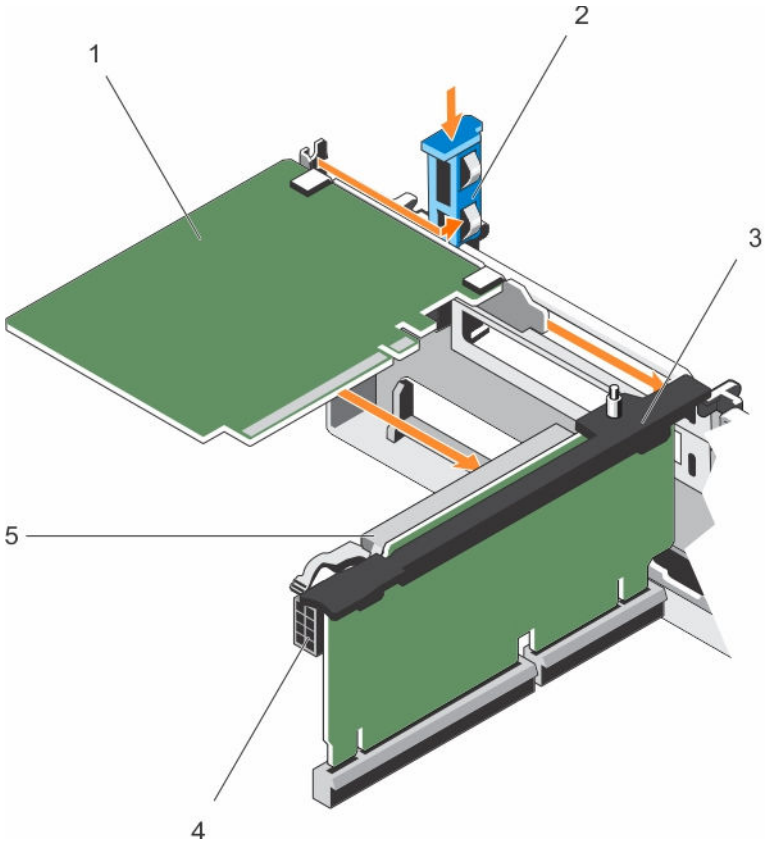


Figure 32. Installing an expansion card into the expansion card riser 2 or 3

1 expansion card
2 expansion card latch
3 expansion card riser
4 power connector (for GPU cards)
5 expansion card connector

Next steps

1 Follow the procedure listed in the After working inside your appliance section.
2 Install any device drivers required for the card as described in the documentation for the card.

Removing an expansion card from the expansion card riser 1

Prerequisites

1 Follow the safety guidelines listed in the Safety instructions section.
2 Follow the procedure listed in the Before working inside your appliance section.
3 Disconnect any cables connected to the expansion card.
4 Remove the expansion card riser.

NOTE: The expansion card riser 1 can be used only when both the processors are installed.

Steps

1 Press tab A and rotate the latch clockwise.
2 Press tab B and rotate the latch downward.

3 Remove the expansion card from the expansion card riser 1.

4 If you are removing the card permanently, install a metal filler bracket over the empty expansion slot opening, and then close the expansion card latch.

NOTE: You must install a filler bracket over an empty expansion card slot to maintain Federal Communications Commission (FCC) certification of the appliance. The brackets also keep dust and dirt out of the appliance and aid in proper cooling and airflow inside the appliance.

5 Close the latches of tab A and tab B.

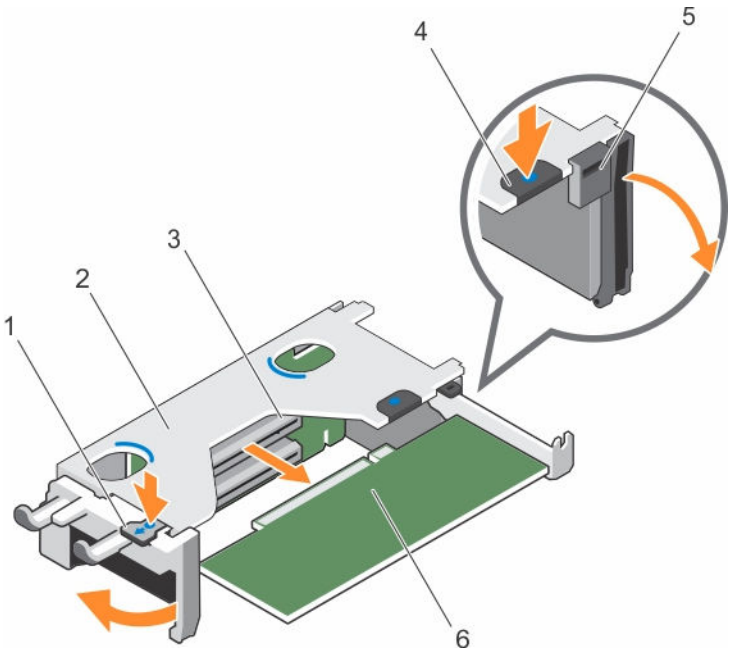


Figure 33. Removing an expansion card from expansion card riser 1

1	tab A	2	expansion card riser 1 cage
3	expansion card connector	4	tab B
5	latch	6	expansion card

Next steps

1 Install the expansion card.

2 Install the expansion card riser.

3 Follow the procedure listed in the After working inside your appliance section.

Installing an expansion card into the expansion card riser 1

Prerequisites

1 Follow the safety guidelines listed in the Safety instructions section.

2 Follow the procedure listed in the Before working inside your appliance section.

3 Remove the expansion card riser.

NOTE: The expansion card riser 1 can be used only when both the processors are installed.

Steps

1 Unpack the expansion card and prepare it for installation.

For instructions, see the documentation accompanying the card.

2 Press tab A and rotate the latch clockwise.

3 Press tab B and rotate the latch down.

4 Holding the card by its edges, position the card so that the card-edge connector aligns with the expansion card connector.

5 Insert the card-edge connector firmly into the expansion card connector until the card is fully seated.

6 Close the latches of tab A and tab B.

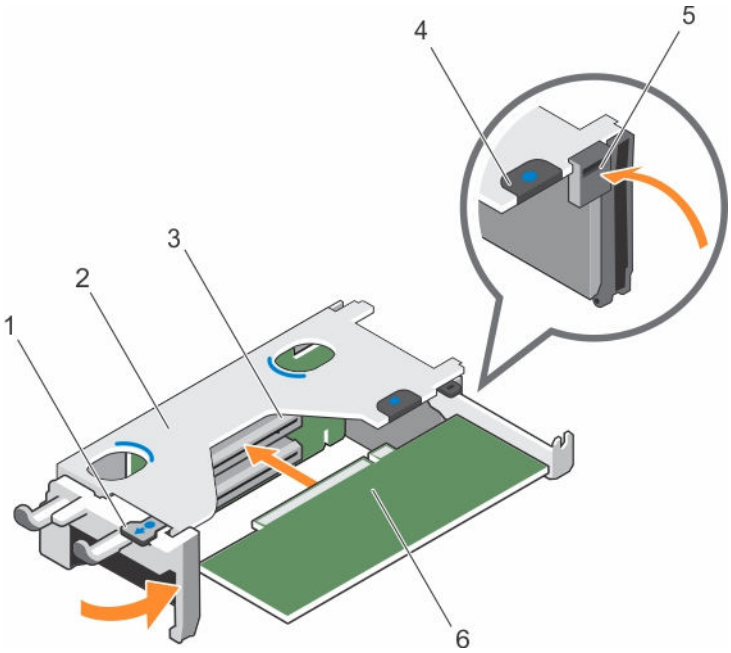


Figure 34. Installing an expansion card into the expansion card riser 1

1	tab A	2	expansion card riser 1 cage
3	expansion card connector	4	tab B
5	latch	6	expansion card

Next steps

1 Install the expansion card riser.

2 If applicable, connect any cables to the expansion card.

3 Follow the procedure listed in the After working inside your appliance section.

4 Install any device drivers required for the card as described in the documentation for the card.

Removing the riser 1 blank

Prerequisites

1 Follow the safety guidelines listed in the Safety instructions section.

2 Follow the procedure listed in the Before working inside your appliance section.

3 Remove the expansion card riser.

Steps

Press the tabs on the riser 1 blank and push the riser 1 blank out of the chassis.

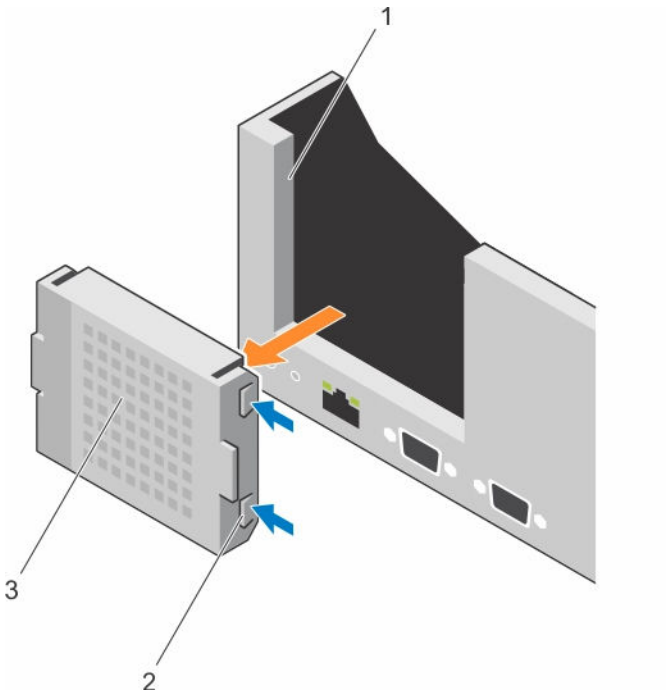


Figure 35. Removing the riser 1 blank

1	slot on the chassis	2	tab (2)
3	riser 1 blank		

Next steps

1 Install the expansion card risers.
2 Follow the procedure listed in the After working inside your appliance section.

Installing the riser 1 blank

Prerequisites

Steps

To install the riser 1 blank, align the blank with the slot on the chassis and insert it into the chassis until it clicks into place.

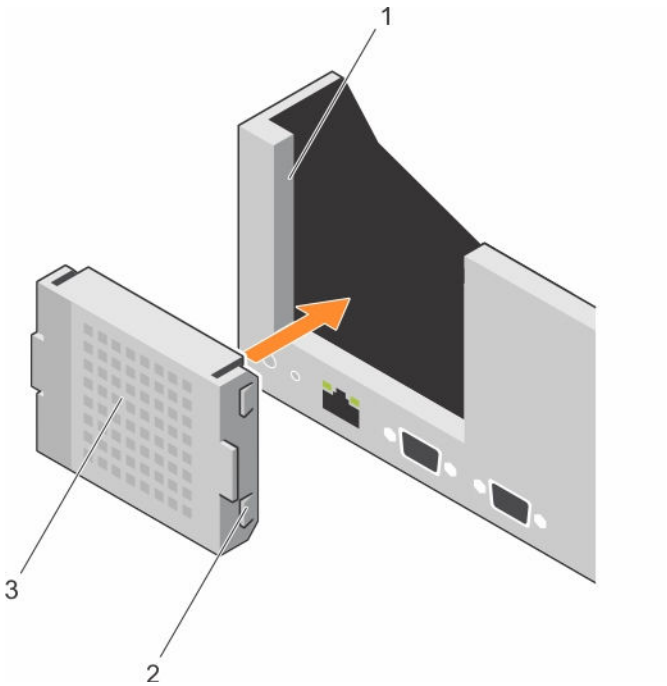


Figure 36. Installing the riser 1 blank

1	slot on the chassis	2	tab (2)
3	riser 1 blank		

Next steps

1 Install the expansion card risers.
2 Follow the procedure listed in the After working inside your appliance section.

Removing expansion card risers

Prerequisites

1 Follow the safety guidelines listed in the Safety instructions section.
2 Follow the procedure listed in the Before working inside your appliance section.
3 If installed, remove any expansion card installed on risers 2 and 3.

NOTE: The expansion card riser 1 can be used only when both the processors are installed.

Steps

1 Holding the slots on the expansion card riser, lift the riser from the riser connector on the system board.
2 To remove expansion card risers 2 and 3, hold the edges of the expansion card riser, and lift the riser from the riser connector on the system board.

NOTE: To ensure proper cooling, the riser 1 blank must be installed in the riser 1 slot. Remove the riser 1 blank only if you are installing riser 1.

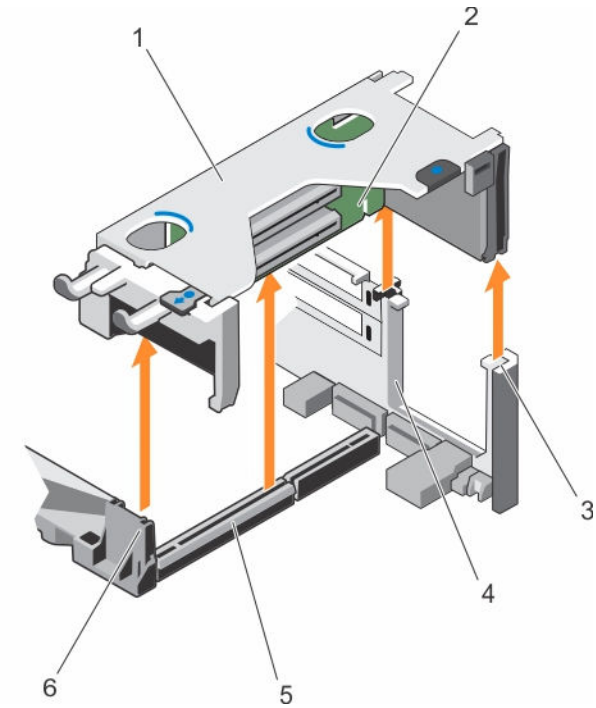


Figure 37. Removing the expansion card riser 1

1	expansion card riser 1 cage	2	expansion card riser 1
3	riser guide-back (right)	4	riser guide-back (left)
5	expansion card riser 1 connector	6	riser guide-front

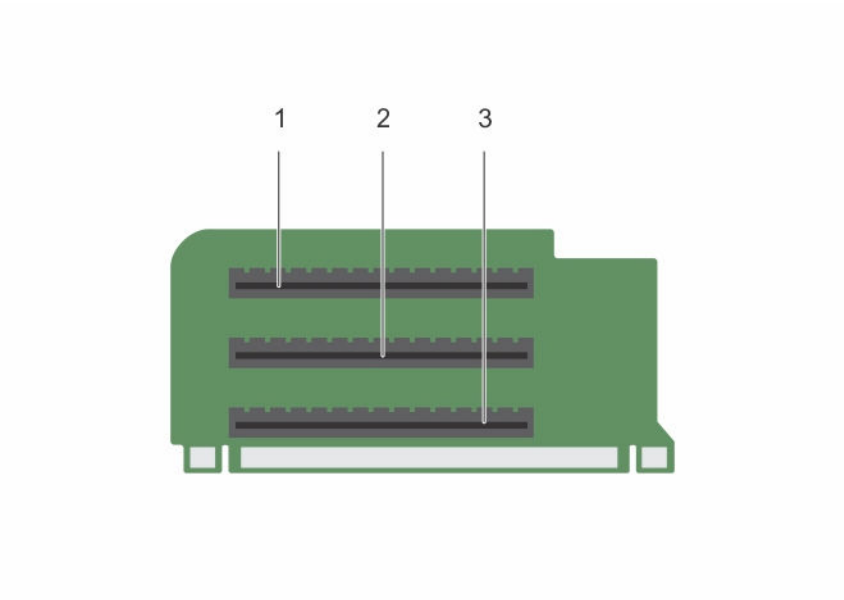


Figure 38. Identifying connectors on the expansion card riser 1

1	expansion card slot 1	2	expansion card slot 2
3	expansion card slot 3		

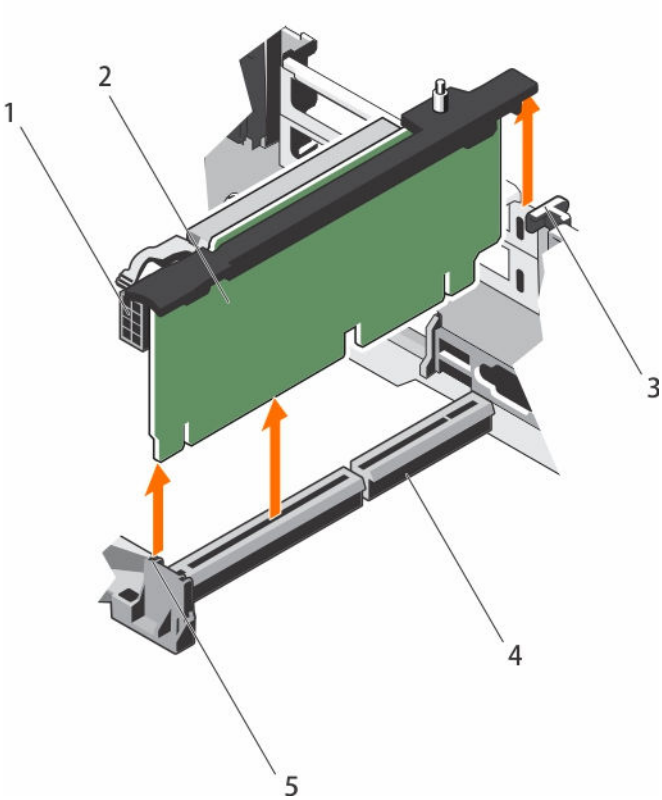


Figure 39. Removing the expansion card riser 2

1	power connector (for GPU cards)	2	expansion card riser 2
3	riser guide-back	4	expansion card riser 2 connector
5	riser guide-front		

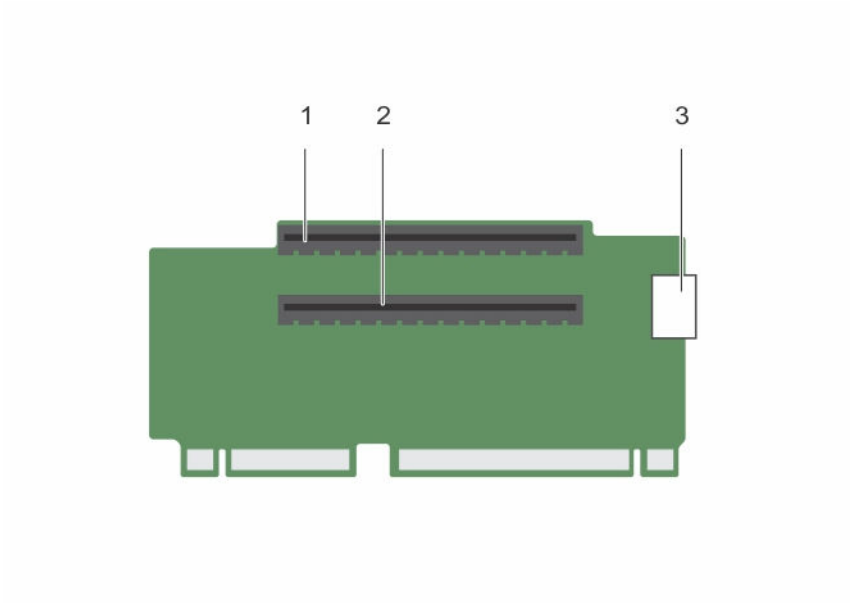


Figure 40. Identifying connectors on the expansion card riser 2

1	expansion card slot 4	2	expansion card slot 5

3 power connector (for GPU cards)

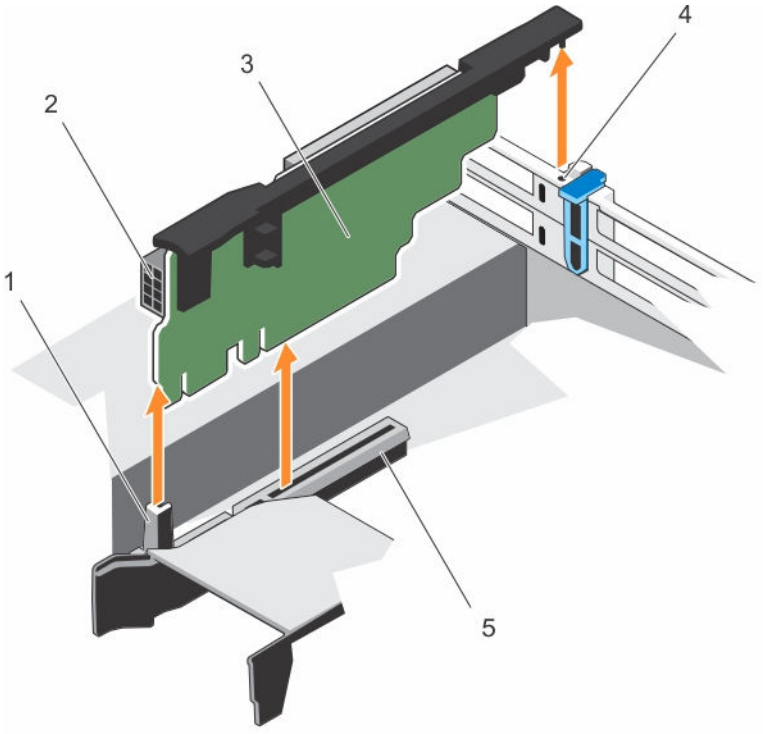


Figure 41. Removing the expansion card riser 3

1 riser guide-front
2 power connector (for GPU cards)
3 expansion card riser 3
4 riser guide-back
5 expansion card riser 3 connector

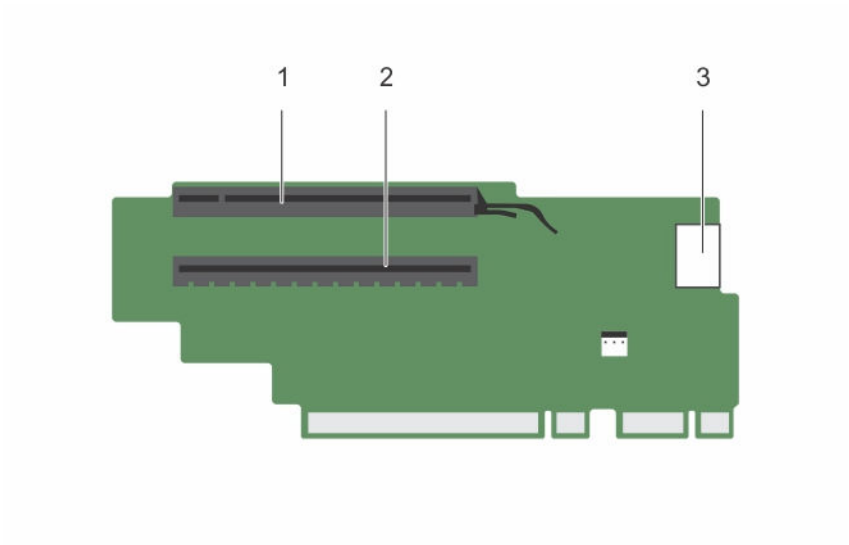


Figure 42. Identifying connectors on the expansion card riser 3 (default)

1 expansion card slot 6
2 expansion card slot 7
3 power connector (for GPU cards)

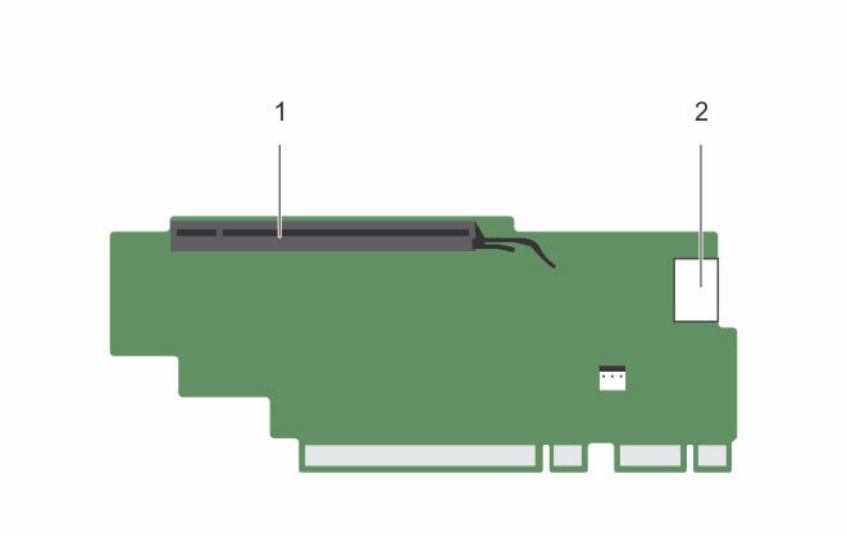


Figure 43. Identifying connectors on the expansion card riser 3 (alternate)

1	expansion card slot 6	2	power connector (for GPU cards)

Next steps

1 If removed, install an expansion card on the riser.
2 If applicable, replace the expansion card riser.
3 Follow the procedure listed in the After working inside your appliance section.

Installing expansion card risers

Prerequisites

1 Follow the safety guidelines listed in the Safety instructions section.
2 Follow the procedure listed in the Before working inside your appliance section.
3 If removed, install the expansion card(s) into the expansion card riser 1.

Steps

1 Align the expansion card riser with the connectors and the riser guides on the system board.
2 Lower the expansion card riser into place until the expansion card riser is fully seated in the connector.

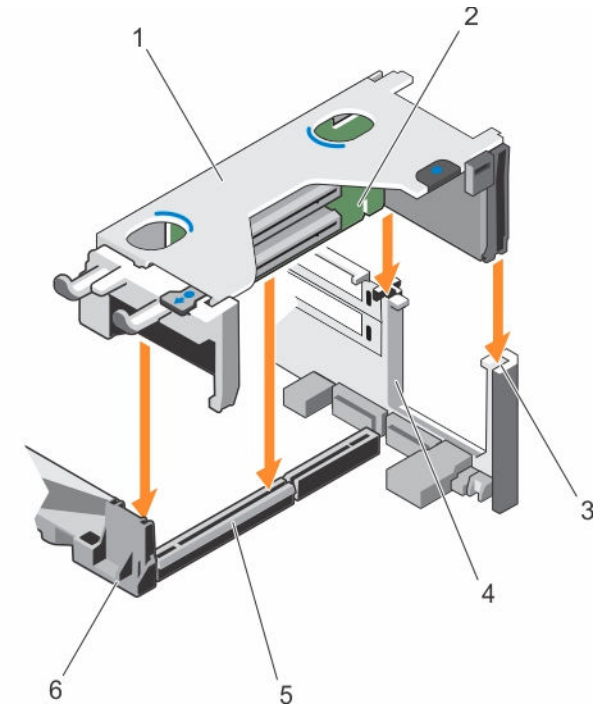


Figure 44. Installing the expansion card riser 1

1	expansion card riser 1 cage	2	expansion card riser 1
3	riser guide-back (right)	4	riser guide-back (left)
5	expansion card riser 1 connector	6	riser guide-front

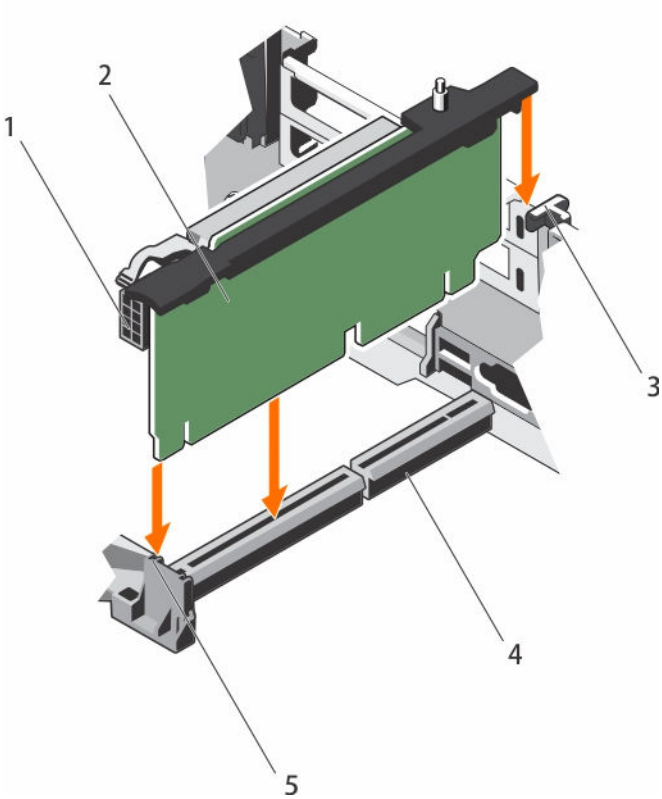


Figure 45. Installing the expansion card riser 2

1 power connector (for GPU cards)
2 expansion card riser 2
3 riser guide-back
4 expansion card riser 2 connector
5 riser guide-front

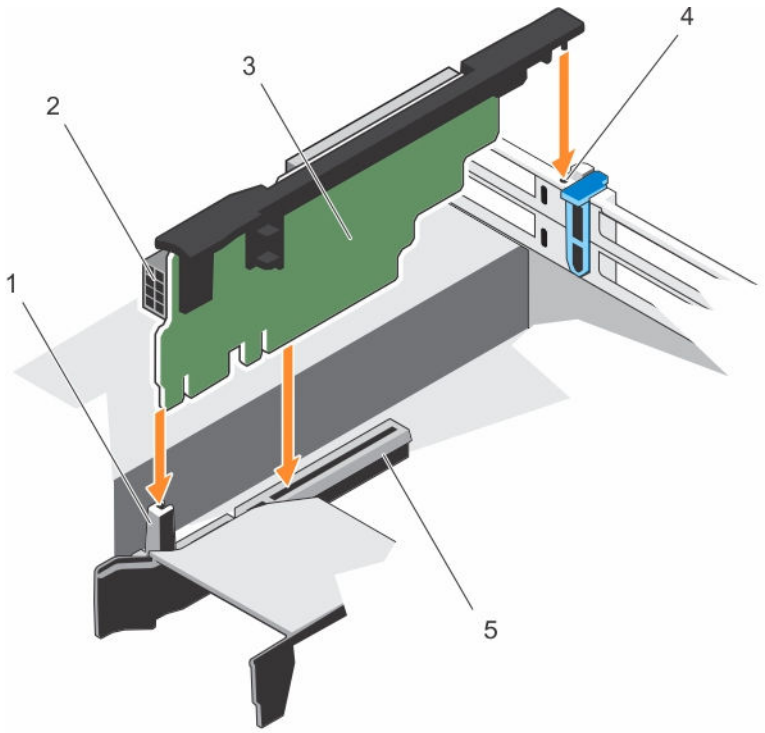


Figure 46. Installing the expansion card riser 3

1	riser guide-front	2	power connector (for GPU cards)
3	expansion card riser 3	4	riser guide-back
5	expansion card riser 3 connector		

Next steps

1. Install the expansion card(s) into the expansion card risers 2 or 3.
2. Follow the procedure listed in the After working inside your appliance section.
3. Install any device drivers required for the card as described in the documentation for the card.

GPU card installation guidelines

- Ensure that both the processors are installed.
- The processor must be of 135 W or less.
- The processor must use a GPU kit low-profile heat sink.
- Due to the high power consumption of GPUs, the ambient inlet temperature is restricted to 30°C to ensure adequate cooling when one or more GPU cards are installed.
- Ensure that the GPU enablement kit is available.

  The GPU enablement kit includes:
  - Low-profile heat sinks
  - Power cables for the GPU cards
  - Filler brackets with closeout EMI shield for unoccupied PCIe slots
- All GPU cards must be of the same type and model.
- You can install up to two double-wide GPU cards.
- You can install up to two single-wide GPU cards.

- Ensure that your appliance uses the redundant 1100 W power supplies.

Removing the GPU card

Prerequisites

1 Follow the safety guidelines listed in Safety instructions section.

2 Follow the procedure listed in the Before working inside your appliance section.

Steps

1 Lift the expansion card latch.

2 Close the expansion card locking tabs on the cooling shroud and the risers.

3 Hold the GPU card by its edges and slide out the GPU card at an angle to release it from the connector on the riser card.

4 Disconnect the cable from the GPU card.

5 If you are removing the card permanently, install a metal filler bracket over the empty slot opening and close the expansion card locking tabs.

> **NOTE: You must install a filler bracket over an empty expansion card slot to maintain Federal Communications Commission (FCC) certification of the appliance. The brackets also keep dust and dirt out of the appliance and aid in proper cooling and airflow inside the appliance.**

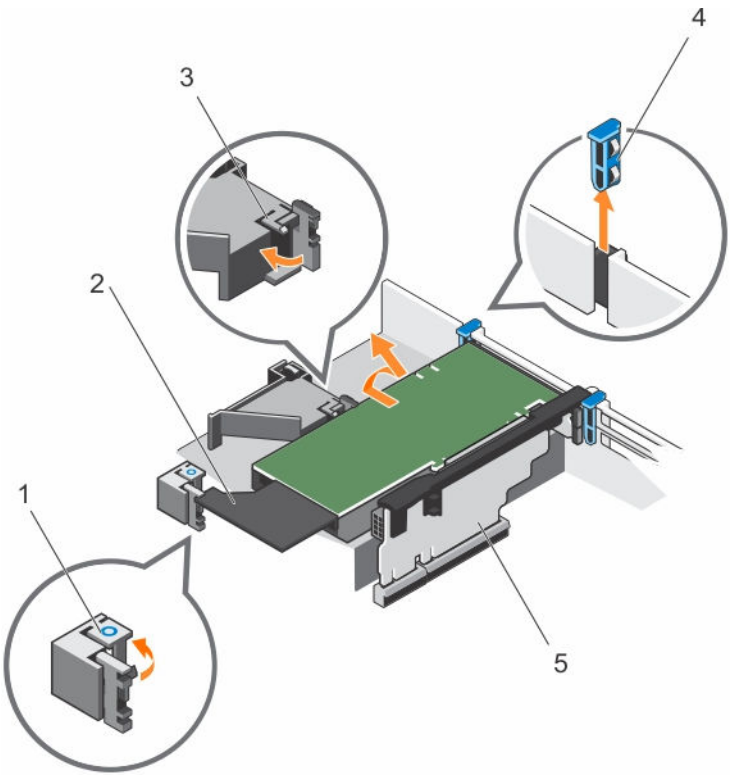


Figure 47. Removing the GPU card

1	expansion card locking tab (3)	2	GPU card
3	PCIe card holder latch	4	expansion card latch
5	expansion card riser 3		

Next steps

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

Installing a GPU card

Prerequisites

1 Follow the safety guidelines listed in Safety instructions section.
2 Follow the procedure listed in the Before working inside your appliance section.
3 Remove the cooling shroud.
4 Remove the heat sinks.

Steps

1 Unpack the GPU cards and the GPU enablement kit.
2 Install the heat sinks from the kit and reinstall the cooling shroud.
3 Close the expansion card locking tab on the cooling shroud and riser.
4 Lift the expansion card latch.
5 Remove the filler brackets for the single- or double-wide GPU cards.
6 Replace the remaining filler brackets with the brackets from the GPU kit.
7 Align the GPU card connector with the slot on the riser.
8 Insert the GPU card into the riser slot until it is fully seated.
9 Locate the GPU power connectors on the cable and plug them to the six-pin and eight-pin connectors on the GPU card.

NOTE: Ensure that the GPU card is installed correctly into the GPU card lock.

10 Press down on the GPU card lock to secure the card in position.
11 Ensure that the GPU card is seated into the PCIe card holder latch.
12 Press the touch point to open the PCIe card holder latch and/or the expansion card locking tabs.
13 Connect the GPU power cable to the riser.
14 Close the expansion card latch/latches.

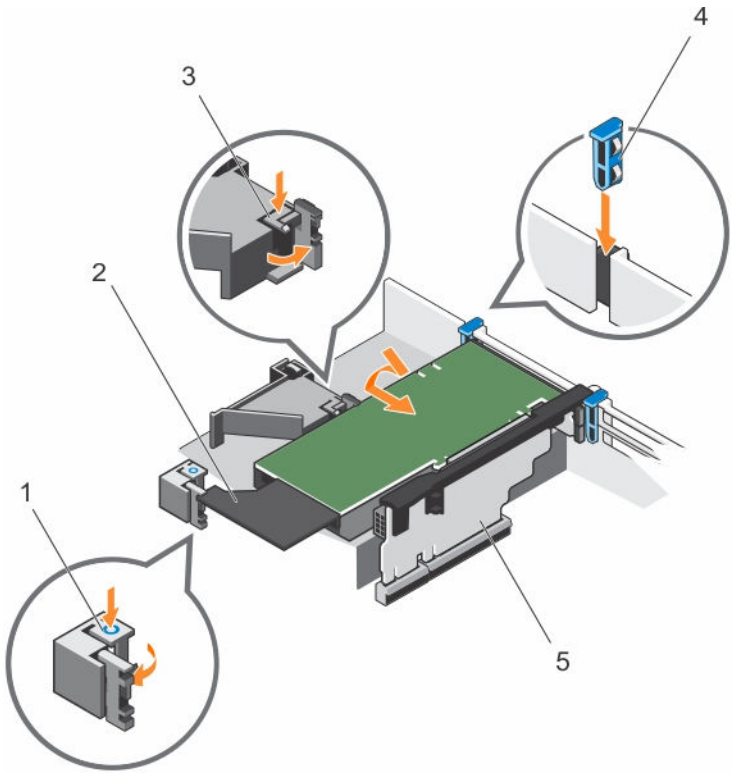


Figure 48. Installing the GPU card

1	expansion card locking tab (3)	2	GPU card
3	PCIe card holder latch	4	expansion card latch
5	expansion card riser 3		

Next steps

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

Internal dual SD Module

The Internal Dual SD module (IDSDM) provides you with a redundant SD card solution. The IDSDM card offers the following feature:

- Dual card operation — Maintains a mirrored configuration by using SD cards in both the slots and provides redundancy.

NOTE: The IDSDM on the VxRail appliance is pre-configured for appliance bare metal recovery. Do not change any of the settings.

Removing an internal SD Card

Prerequisites

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

Steps

Locate the SD card slot on the internal dual SD module or the backplane expander board and press inward on the card to release it from the slot and remove the card.

Next steps

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

Installing an internal SD card

Prerequisites

1 Follow the safety guidelines listed in the Safety instructions section.

2 Follow the procedure listed in the Before working inside your appliance section.

NOTE: To use an SD card with your appliance, ensure that the internal SD card port is enabled in the System Setup.

Steps

1 Locate the SD card connector on the internal dual SD module or the backplane expander board. With the label side facing up, insert the contact-pin end of the card into the slot.

NOTE: The slot is keyed to ensure correct insertion of the card.

2 To lock the card into place, press it into the card slot.

Next steps

Follow the procedure listed in the After working inside your appliancesection.

Removing the internal dual SD module

Prerequisites

1 Follow the safety guidelines listed in the Safety instructions section.

2 Follow the procedure listed in the Before working inside your appliance section.

3 If installed, remove the SD cards.

NOTE: Temporarily label each SD card with its corresponding slot number before removal. Reinstall the SD cards into the corresponding slots.

Steps

1 Locate the internal dual SD module (IDSDM) on the system board. To locate the internal dual SD module connector, see the System board connectors section.

2 Holding the pull tab, lift the IDSDM out of the appliance.

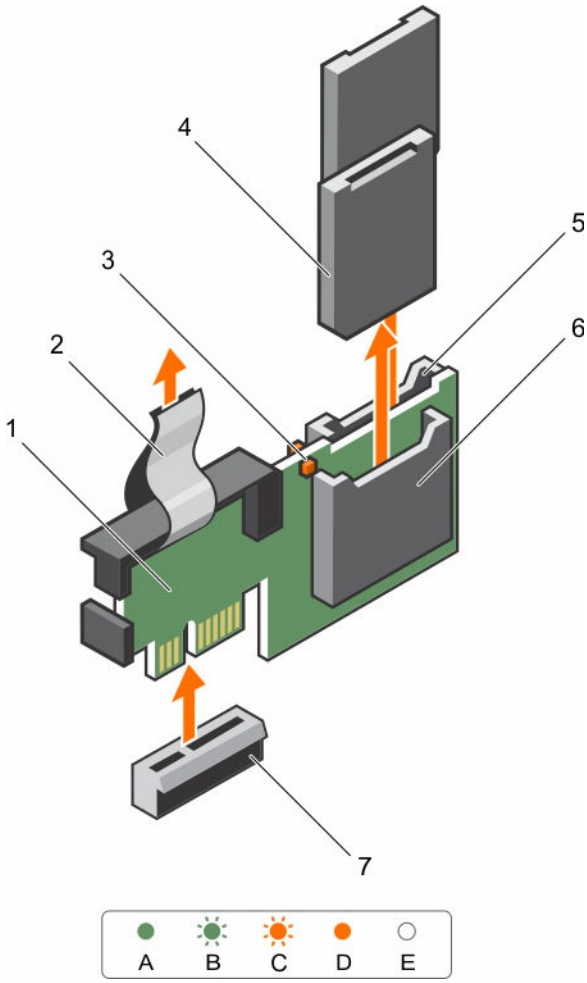


Figure 49. Removing the internal dual SD module (IDSDM)

1 IDSDM
2 pull tab
3 IDSDM connector

The following table describes the IDSDM indicator codes:

Table 30. IDSDM indicator codes

Convention	IDSDM indicator code	Description
A	Green	Indicates that the card is online.
B	Flashing green	Indicates rebuild or activity.
C	Flashing amber	Indicates card mismatch or that the card has failed.
D	Amber	Indicates that the card is offline, has failed, or is write protected.
E	Not lit	Indicates that the card is missing or is booting.

Next steps

1 Install the IDSDM.
2 If removed, install the SD cards.
3 Follow the procedure listed in the After working inside your appliance section.

Installing the internal dual SD module

Prerequisites

1 Follow the safety guidelines listed in the Safety instructions section.

2 Follow the procedure listed in the Before working inside your appliance section.

NOTE: Temporarily label each SD card with its corresponding slot before removal.

Steps

1 Locate the internal dual SD module (IDSDM) connector on the system board. To locate the IDSDM connector, see the System board connectors section.

2 Align the IDSDM with the connector on the system board.

3 Push the IDSDM until it is firmly seated on the system board.

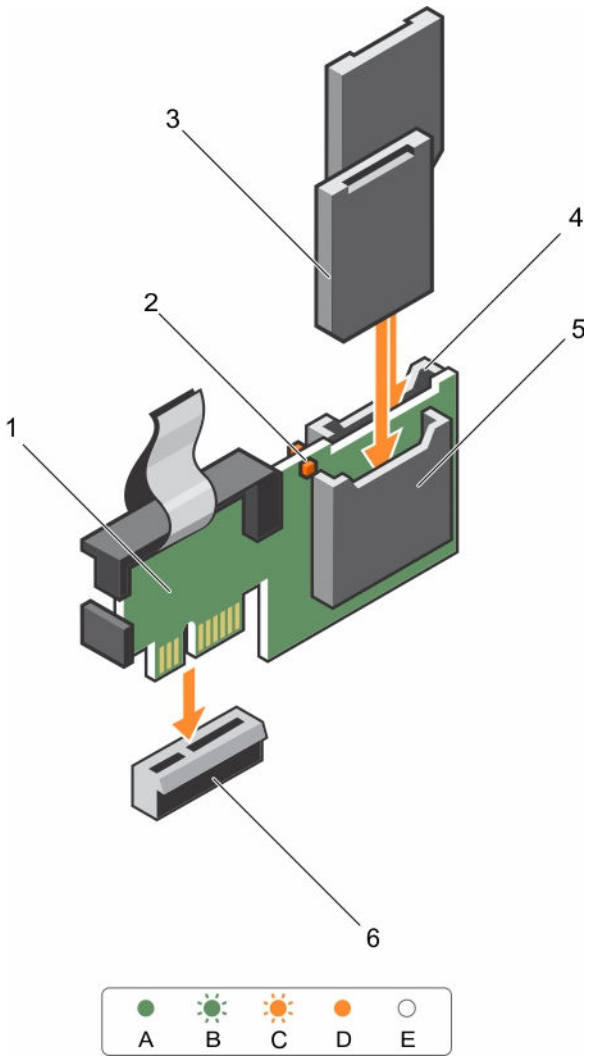


Figure 50. Installing the optional internal dual SD module

1 IDSDM
2 pull tab
3 IDSDM connector

Next steps

1 Install the SD cards.

NOTE: Re-install the SD cards into the same slots based on the labels you had marked on the cards during removal.

2 Follow the procedure listed in the After working inside your appliance section.

Integrated storage controller card

Your appliance includes a dedicated expansion card slot on the system board for an integrated storage controller card. The integrated storage controller card provides the integrated storage subsystem for the internal hard drives in your appliance.

Removing the integrated storage controller card

Prerequisites

1 Follow the safety guidelines listed in the Safety instructions section.
2 Follow the procedure listed in the Before working inside your appliance section.
3 Remove the cooling shroud.
4 Keep the Phillips #2 screwdriver ready.

Steps

1 Loosen the screws that secure the integrated storage controller cable to the integrated storage controller card connector on the system board.
2 Lift the integrated storage controller cable away from the integrated storage controller.
3 Lift one end of the card and angle it to disengage the card from the integrated storage controller card holder on the system board.
4 Lift the card out of the appliance.

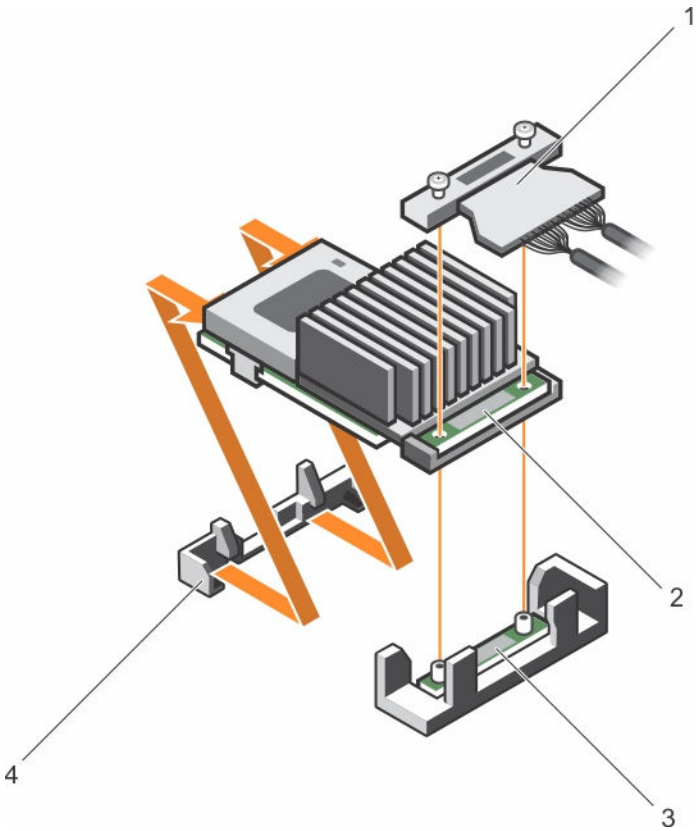


Figure 51. Removing the integrated storage controller card

1	integrated storage controller cable	2	integrated storage controller card
3	integrated storage controller card connector on the system board	4	integrated storage controller card holder

Next steps

1. Install the cooling shroud.
2. Installing the integrated storage controller card.
3. Follow the procedure listed in the After working inside your appliance section.

Installing the integrated storage controller card

Prerequisites

1. Follow the safety guidelines listed in the Safety instructions section.
2. Follow the procedure listed in the Before working inside your appliance section.
3. Remove the cooling shroud.
4. Keep the Phillips #2 screwdriver ready.

Steps

1. Align the end of the integrated storage controller card with the controller card connector on the system board.
2. Lower the connector side of the integrated storage controller card into the integrated storage controller card connector on the system board.

NOTE: Ensure that the tabs on the system board align with the screw holes on the integrated storage controller card.

3 Align the screws on the integrated storage controller card cable with the screw holes on the connector.

4 Tighten the screws to secure the integrated storage controller card cable with the integrated storage controller card connector on the system board.

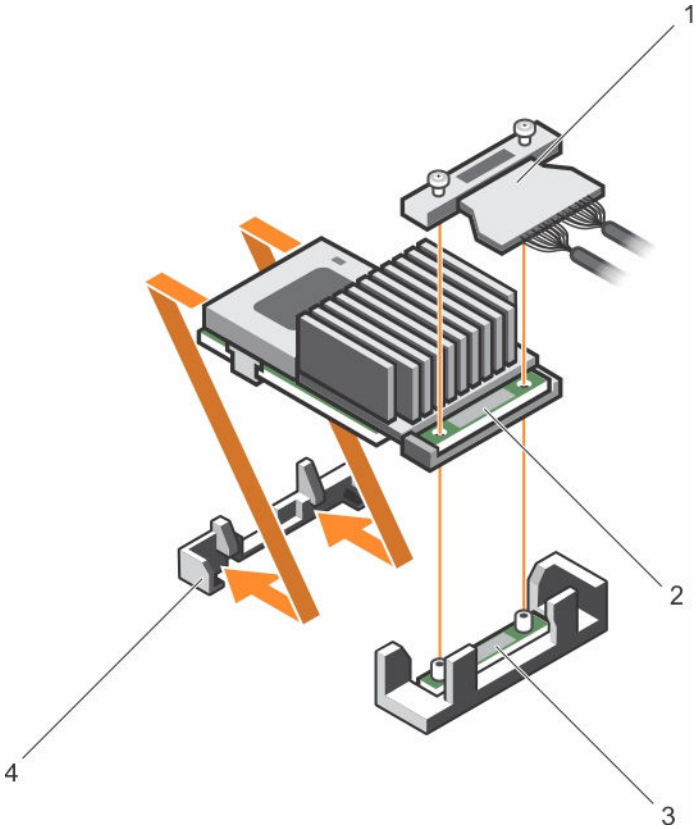


Figure 52. Installing the integrated storage controller card

1	integrated storage controller cable	2	integrated storage controller card
3	integrated storage controller card connector on the system board	4	integrated storage controller card holder

Next steps

1 Install the cooling shroud.

2 Follow the procedure listed in the After working inside your appliance section.

Network daughter card

The Network daughter card (NDC) is a small, removable mezzanine card. The NDC provides you with the flexibility of choosing different network connectivity options, for example — 2 x 10GbE and 2 x 1GbE.

Removing the network daughter card

Prerequisites

1 Follow the safety guidelines listed in the Safety instructions section.

2 Follow the procedure listed in the Before working inside your appliance section.

3 Keep the Philips #2 screwdriver handy.

Steps

1 Remove the expansion card riser 3.
2 Using a Phillips #2 screwdriver, loosen the two captive screws that secure the Network Daughter Card (NDC) to the system board.
3 Hold the NDC by the edges on either side of the touch points and lift to remove it from the connector on the system board.
4 Slide the NDC away from the back of the appliance until the Ethernet connectors are clear of the slot in the back panel.
5 Lift the NDC out of the appliance.

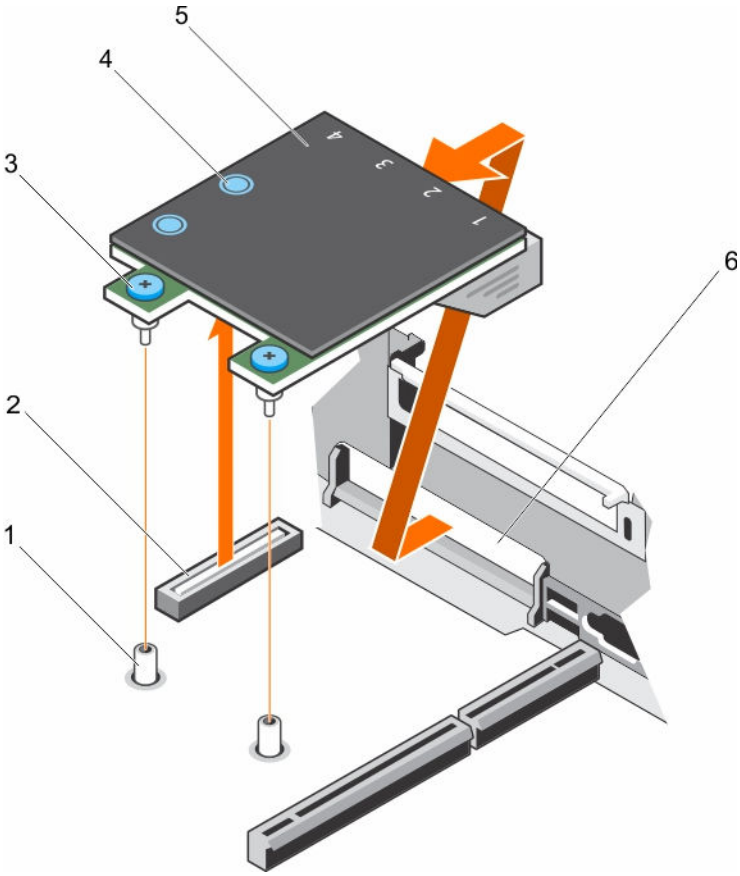


Figure 53. Removing the NDC

1 captive screw socket (2)
2 connector on the system board
3 captive screw (2)
4 touch point (2)
5 NDC
6 back panel slots for Ethernet connectors

Installing the network daughter card

Prerequisites

1 Follow the safety guidelines listed in the Safety instructions section.
2 Follow the procedure listed in the Before working inside your appliance section.
3 Keep the Philips #1 screwdriver handy.

NOTE: If the appliance has three PCIe cards, ensure that you install the PCIe cooling shroud in your appliance.

Steps

1 Orient the NDC so that the Ethernet connectors fit through the slot in the back panel.
2 Align the captive screws at the back-end of the card with the screw holes on the system board.
3 To ensure that the connector on the card is in contact with the connector on the system board, press the touch point on the card.
4 Tighten the two captive screws to secure the NDC to the system board.
5 Install the expansion card riser 3.

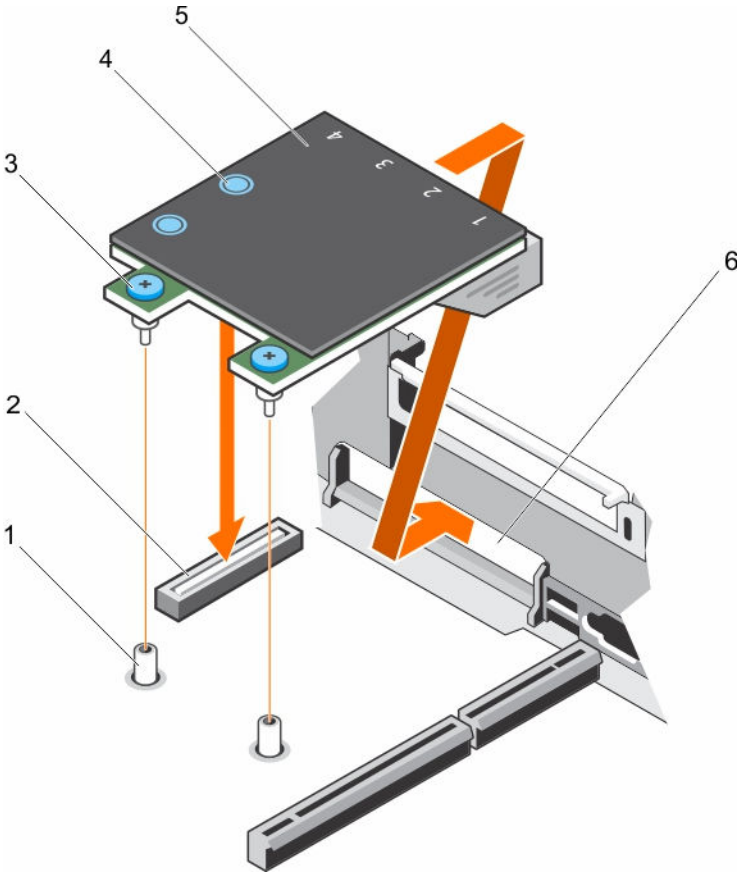


Figure 54. Installing the NDC

1 captive screw socket (2)
2 connector on the system board
3 captive screw (2)
4 touch point (2)
5 NDC
6 back panel slots for Ethernet connectors

Next steps

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

Processors and heat sinks

Use the following procedures when:

- Removing and installing a heat sink
- Installing an additional processor
- Replacing a processor

NOTE: To ensure proper cooling, you must install a processor blank in any empty processor socket.

Removing a heat sink

Prerequisites

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 is hot to touch. Allow the heat sink to cool for some time after powering down the appliance.

1 Follow the safety guidelines listed in the Safety instructions section.
2 Follow the procedure listed in the Before working inside your appliance section.
3 If installed, remove the full-length PCIe card(s).
4 Remove the cooling shroud.
5 Keep the Phillips #2 screwdriver ready.

Steps

1 Loosen one of the screws that secure the heat sink to the system board.
Allow some time (approximately 30 seconds) for the heat sink to loosen from the processor.
2 Remove the screw diagonally opposite to the screw that you first removed.
3 Repeat step 1 and 2 for removing the remaining two screws.
4 Remove the heat sink.

Next steps

1 Replace the heat sink(s) and processor(s).
2 Replace the processor and heat sink.
3 Follow the procedure listed in the After working inside your appliance section.

Removing a processor

Prerequisites

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

NOTE: To ensure proper appliance cooling, you must install a processor blank in any empty processor socket.

1 Follow the safety guidelines listed in the Safety instructions section.
2 Follow the procedure listed in the Before working inside your appliance section.
3 Keep the Phillips #2 screwdriver ready.
4 Remove the cooling shroud.
5 Remove the heat sink.

WARNING: The processor is hot to touch for some time after the appliance has been powered down. Allow the processor to cool before removing it.

CAUTION: The processor is held in its socket under strong pressure. Be aware that the release lever can spring up suddenly if not firmly grasped.

Steps

1 Release the *open first* socket lever near the unlock icon by pushing the lever down and out from under the tab.

2 Release the *close first* socket release lever near the lock icon by pushing the lever down and out from under the tab. Lift the lever 90 degrees upward.

3 Lower the *open first* socket-release lever to lift the processor shield.

4 Hold the tab on the processor shield and lift the processor shield until the *open first* socket-release lever lifts up.

CAUTION: The socket pins are fragile and can be permanently damaged. Be careful not to bend the pins in the socket when removing the processor out of the socket.

5 Lift the processor out of the socket and leave the *open first* socket-release lever up.

NOTE: If you are permanently removing the processor, you must install a socket protective cap in the vacant socket to protect the socket pins and keep the socket free of dust.

NOTE: After removing the processor, place it in an anti-static container for reuse, return, or temporary storage. Do not touch the bottom of the processor. Touch only the side edges of the processor.

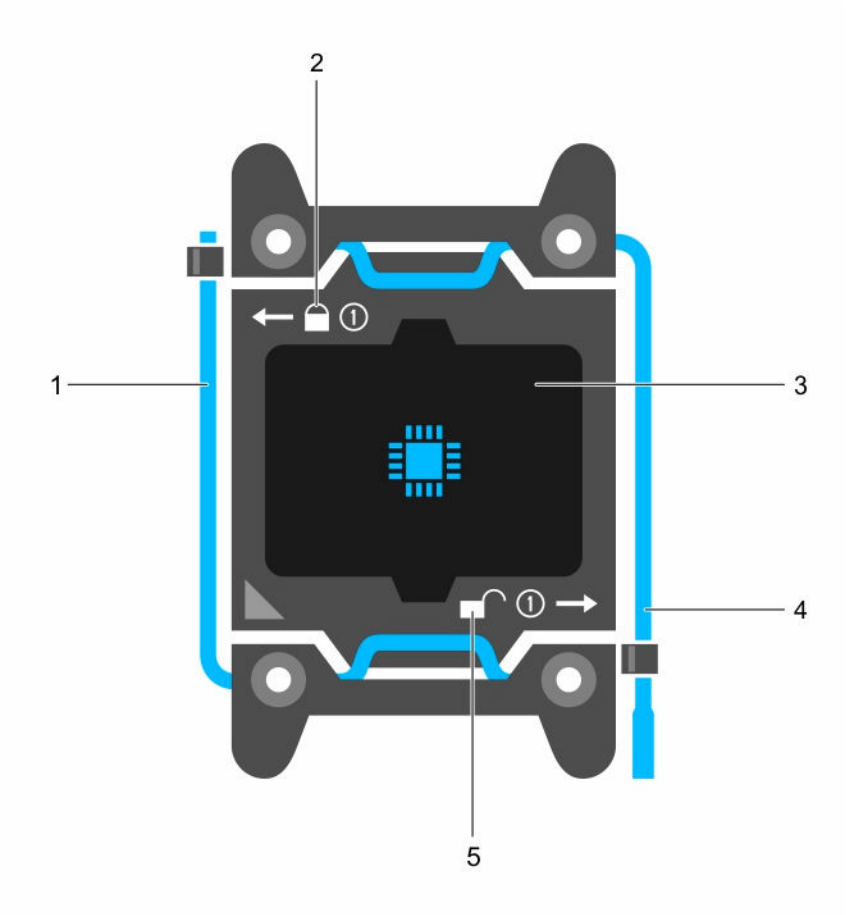


Figure 55. Processor shield

1 *close first* socket release lever
2 lock icon
3 processor
4 *open first* socket release lever
5 unlock icon

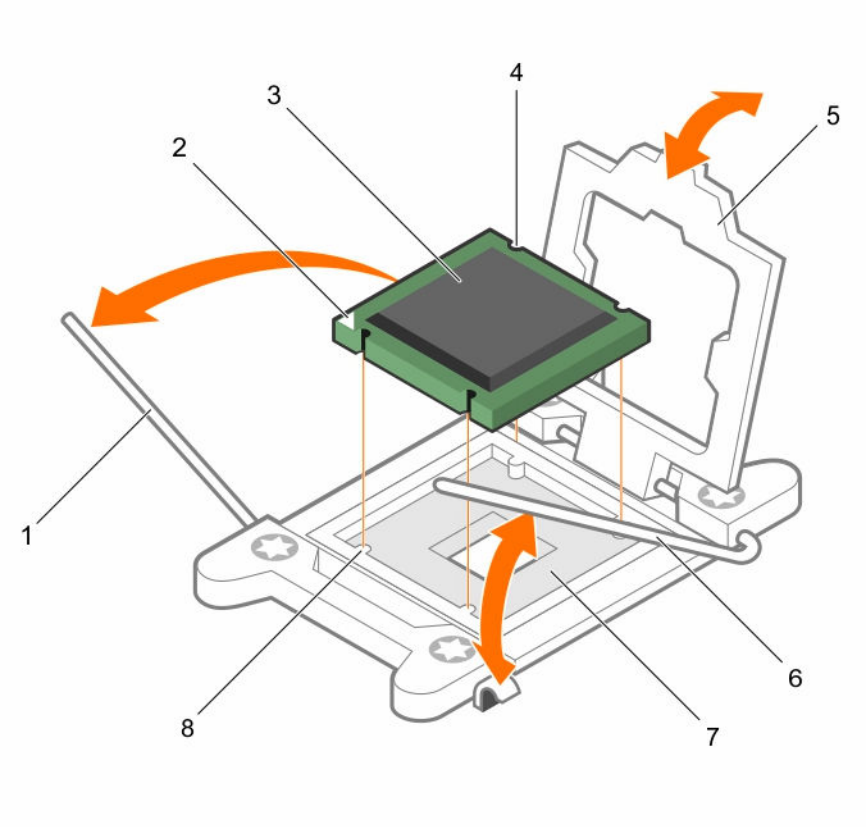


Figure 56. Removing a processor

1	*close first* socket-release lever	2	pin-1 indicator of processor
3	processor	4	slot (4)
5	processor shield	6	*open first* socket-release lever
7	socket	8	socket keys (4)

Next steps

1. Replace the processor(s).
2. Install the heat sink.
3. Reinstall the cooling shroud.
4. Follow the procedure listed in the After working inside your appliance section.

Installing a processor

Prerequisites

1. Follow the safety guidelines listed in the Safety instructions section.
2. Follow the procedure listed in the Before working inside your appliance section.
3. Keep the Phillips #2 screwdriver ready.
4. Remove the cooling shroud.

   NOTE: If applicable, close the expansion card latch on the cooling shroud to release the full length card.
5. If connected, disconnect the cables from expansion card(s).
6. If installed, remove the expansion card riser.

WARNING: The heat sink and processor are too hot to touch for some time after the appliance has been powered down. Allow the heat sink and processor to cool down before handling them.

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.

NOTE: If you are installing a single processor, it must be installed in socket CPU1.

Steps

1 Unpack the new processor.

NOTE: If the processor has previously been used in a appliance, remove any remaining thermal grease from the processor by using a lint-free cloth.

2 Locate the processor socket.

3 If applicable, remove the socket protective cap.

4 Release the *open first* socket-release lever near the unlock icon by pushing the lever down and out from under the tab.

5 Similarly, release the *close first* socket-release lever near the lock icon by pushing the lever down and out from under the tab. Lift the lever 90 degrees upward.

6 Hold the tab near the lock symbol on the processor shield and lift it up and out of the way.

CAUTION: Positioning the processor incorrectly can permanently damage the system board or the processor. Be careful not to bend the pins in the socket.

CAUTION: While removing or reinstalling the processor, wipe your hands of any contaminants. Contaminants on the processor pins such as thermal grease or oil can damage the processor.

7 Align the processor with the socket keys.

CAUTION: Do not use force to seat the processor. When the processor is positioned correctly, it engages easily into the socket.

8 Align the pin-1 indicator of the processor with the triangle on the system board.

9 Place the processor on the socket such that the slots on the processor align with the socket keys.

10 Close the processor shield.

11 Lower the *close first* socket-release lever near the lock icon and push it under the tab to lock it.

12 Similarly, lower the *open first* socket-release lever near the unlock icon and push it under the tab to lock it.

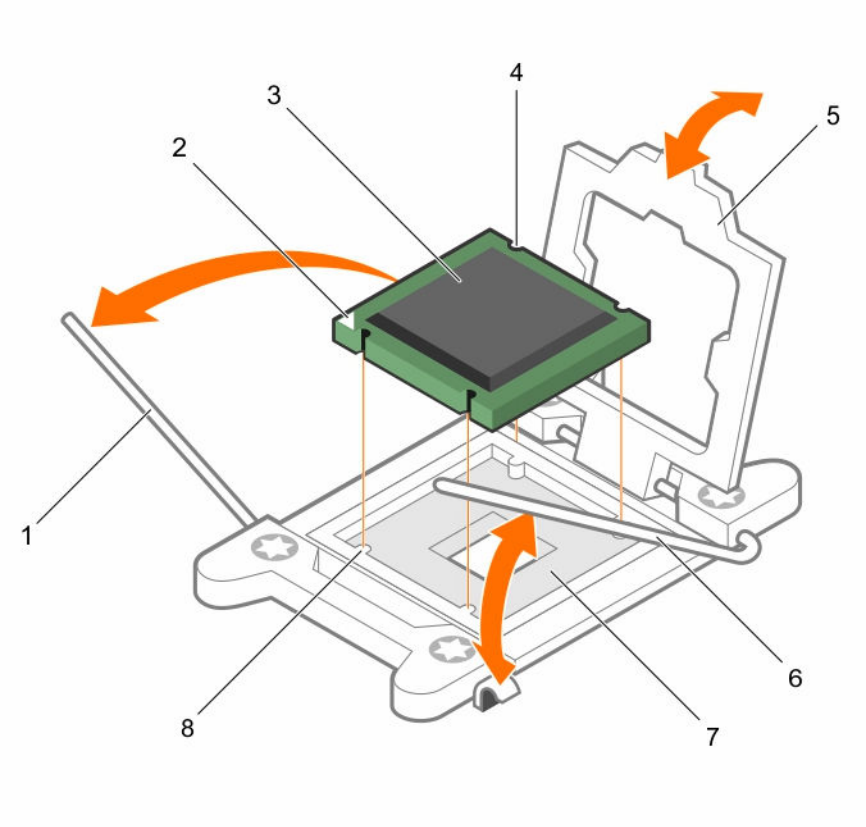


Figure 57. Installing a processor

1	socket-release lever 1	2	pin–1 corner of the processor
3	processor	4	slot (4)
5	processor shield	6	socket-release lever 2
7	processor socket	8	tab (4)

Next steps

NOTE: Ensure that you install the heat sink after you install the processor. The heat sink is necessary to maintain proper thermal conditions.

1. Install the heat sink.
2. If removed, reinstall the PCIe expansion card riser.
3. If disconnected, reconnect the cables to the expansion card(s).
4. Follow the procedure listed in the After working inside your appliance.
5. While booting, press F2 to enter System Setup and verify that the processor information matches the new appliance configuration.
6. Run the system diagnostics to verify that the new processor operates correctly.

Installing a heat sink

Prerequisites

1. Follow the safety guidelines listed in the Safety instructions section.
2. Follow the procedure listed in the Before working inside your appliance section.
3. Install the processor.

4 Keep the Phillips #2 screwdriver ready.

Steps

1 If you are using an existing heat sink, remove the thermal grease from the heat sink by using a clean lint-free cloth.

2 Use the thermal grease syringe included with your processor kit to apply the grease in a thin spiral 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 one-time use only. Dispose of the syringe after you use it.

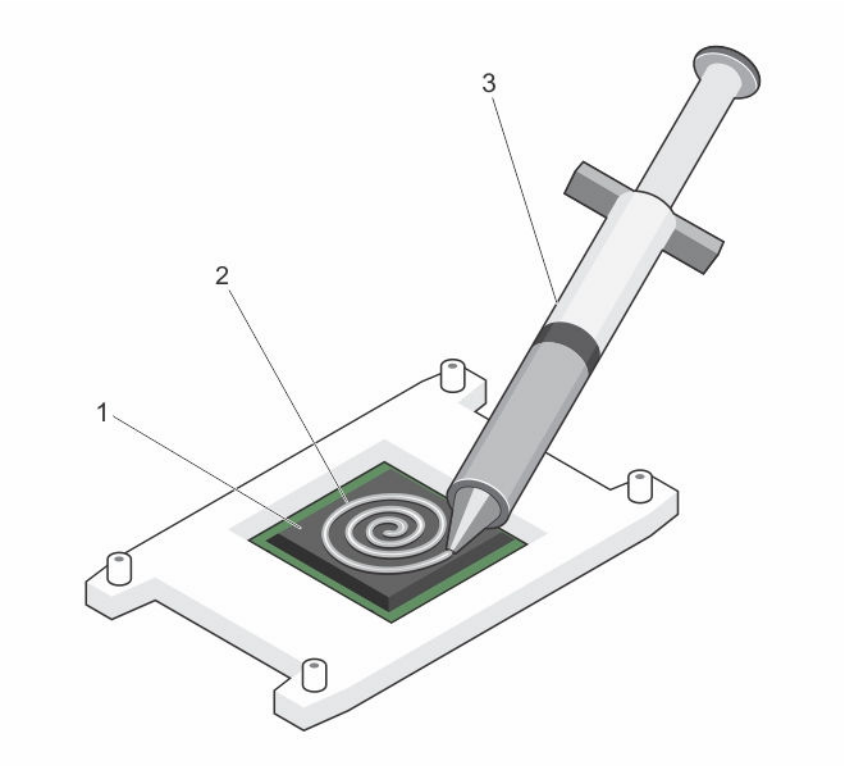


Figure 58. Applying thermal grease on the top of the processor

1 processor
2 thermal grease
3 thermal grease syringe

3 Place the heat sink onto the processor.

4 Tighten one of the four screws to secure the heat sink to the system board.

5 Repeat the procedure for the remaining two screws.

Next steps

1 Follow the procedure listed in the After working inside your appliance section.

2 While booting, press F2 to enter System Setup and verify that the processor information matches the new appliance configuration.

3 Run the system diagnostics to verify that the new processor operates correctly.

Power supply units

Your appliance supports one of the following:

- Two 1100 W AC PSUs

- Two 1100 W DC PSUs

CAUTION: For AC PSUs, use only PSUs with the Extended Power Performance (EPP) label on the back. Mixing PSUs from previous generations of appliances can result in a PSU mismatch condition or failure to turn on.

NOTE: Dell EMC has optimized your appliance and recommends that you do not change any of these settings.

NOTE: When two identical PSUs are installed, power supply redundancy (1+1 – with redundancy or 2+0 – without redundancy) is configured in system BIOS. In redundant mode, power is supplied to the appliance equally from both PSUs when Hot Spare is disabled. When Hot Spare is enabled, one of the PSUs will be put into standby when appliance utilization is low to maximize efficiency.

NOTE: If two PSUs are used, they must be of the same maximum output power.

Hot spare feature

Your appliance supports the hot spare feature that significantly reduces the power overhead associated with power supply unit (PSU) redundancy.

When the hot spare feature is enabled, one of the redundant PSUs is switched to the sleep state. The active PSU supports 100 percent of the load, thus operating at higher efficiency. The PSU in the sleep state monitors output voltage of the active PSU. If the output voltage of the active PSU drops, the PSU in the sleep state returns to an active output state.

If having both PSUs active is more efficient than having one PSU in the sleep state, the active PSU can also activate the sleeping PSU.

The default PSU settings are as follows:

- If the load on the active PSU is more than 50 percent, then the redundant PSU is switched to the active state.
- If the load on the active PSU falls below 20 percent, then the redundant PSU is switched to the sleep state.

You can configure the hot spare feature by using the iDRAC settings. For more information about iDRAC settings, see the *Integrated Dell Remote Access Controller User's Guide* available at **Dell.com/idracmanuals**.

Removing an AC power supply unit

Prerequisites

CAUTION: The appliance needs one power supply unit (PSU) for normal operation. On power-redundant appliances, remove and replace only one PSU at a time in a appliance that is powered on.

If applicable, unlatch and lift the optional cable management arm if it interferes with the power supply unit (PSU) removal. For information about the cable management arm, see the appliance's rack documentation.

Follow the safety guidelines listed in the Safety instructions section.

Steps

1 Disconnect the power cable from the power source and from the PSU you intend to remove, and then remove the cables from the strap.

2 Press the release latch and slide the PSU out of the chassis by using the PSU handle.

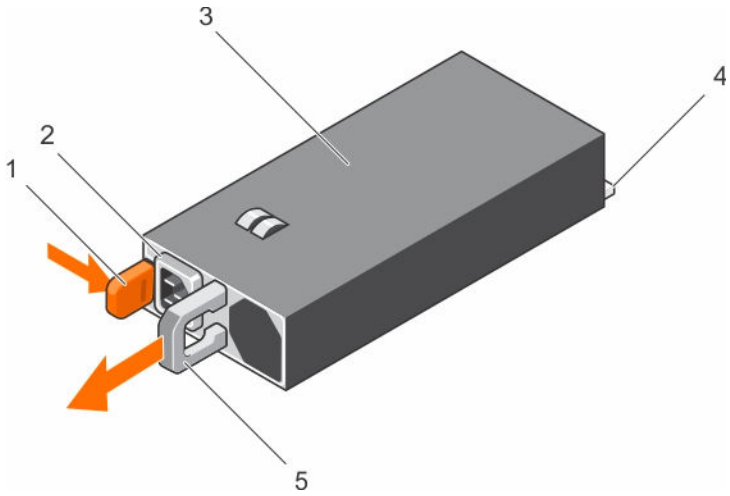


Figure 59. Removing an AC PSU

1	release latch	2	PSU cable connector
3	PSU	4	power connector
5	PSU handle		

Next steps

- If applicable, install the AC PSU.

Installing an AC power supply unit

Prerequisites

NOTE: The maximum output power (shown in watts) is listed on the PSU label.

1 Follow the safety guidelines listed in the Safety instructions section.

2 For appliances that support redundant power supply units (PSUs), ensure that both the PSUs are of the same type and have the same maximum output power.

Steps

1 Slide the PSU into the chassis until the PSU is fully seated and the release latch snaps into place.

2 If applicable, relatch the cable management arm.

For information about the cable management arm, see the rack documentation of your appliance.

3 Connect the power cable to the PSU, and plug the cable into a power outlet.

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

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

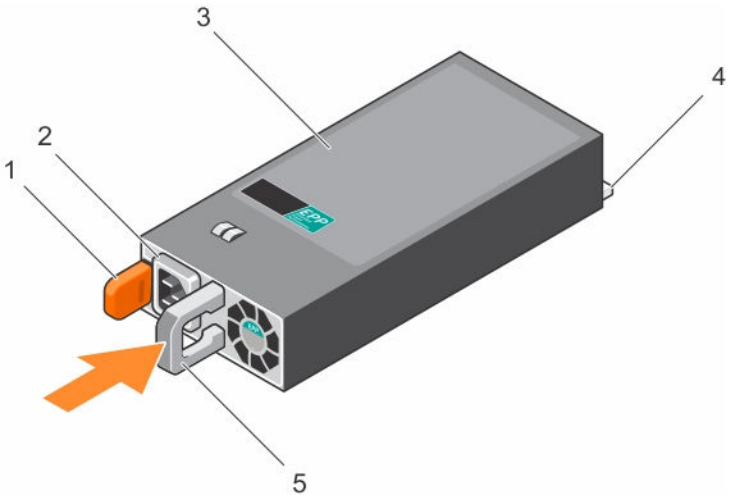


Figure 60. Installing an AC PSU

1	release latch	2	PSU cable connector
3	PSU	4	power connector
5	PSU handle		

Removing a DC power supply unit

Prerequisites

WARNING: For equipment using –(48–60) V DC power supply units (PSUs), a qualified electrician must perform all connections to DC power and to safety grounds. Do not attempt connecting to DC power or installing grounds yourself. All electrical wiring must comply with applicable local or national codes and practices. Damage due to servicing that is not authorized by Dell is not covered by your warranty. Read and follow all safety instructions that came with the product.

CAUTION: The system needs one power supply for normal operation. On power-redundant appliances, remove and replace only one power supply at a time in a appliance that is powered on.

NOTE: You may have to unlatch and lift the optional cable management arm if it interferes with power supply removal. For information about the cable management arm, see the rack documentation of your appliance.

Steps

1 Disconnect the power wires from the power source and the connector from the PSU you intend to remove.
2 Disconnect the safety ground wire.
3 Press the release latch and slide the PSU out of the chassis by using the PSU handle.

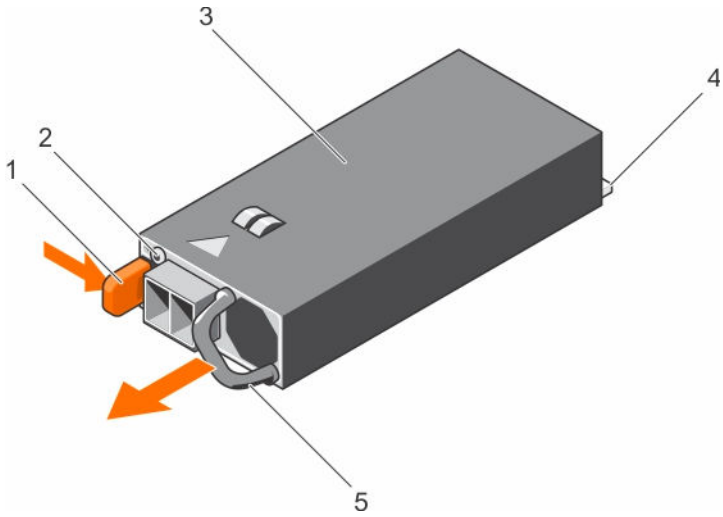


Figure 61. Removing a DC PSU

1	release latch	2	power supply status indicator
3	PSU	4	power connector
5	PSU handle		

Installing a DC power supply unit

Prerequisites

WARNING: For equipment using –(48–60) V DC power supply units (PSUs), a qualified electrician must perform all connections to DC power and to safety grounds. Do not attempt connecting to DC power or installing grounds yourself. All electrical wiring must comply with applicable local or national codes and practices. Damage due to servicing that is not authorized by Dell is not covered by your warranty. Read and follow all safety instructions that came with the product.

1 Follow the safety guidelines listed in the Safety instructions section.
2 Follow the procedure listed in the Before working inside your appliance section.
3 If installed, remove the PSU blank.
4 Verify that both the PSUs are of the same type and have the same maximum output power.

NOTE: The maximum output power (shown in watts) is listed on the PSU label.

Steps

1 Slide the PSU into the chassis until the PSU is fully seated and the release latch snaps into place.

NOTE: If you have unlatched the cable management arm, relatch it. For information about the cable management arm, see the rack documentation.

2 Connect the safety ground wire.
3 Install the DC power connector in the PSU.

CAUTION: When connecting the power wires, ensure that you secure the wires with the strap to the PSU handle.

4 Connect the wires to a DC power source.

NOTE: When installing, hot-swapping, or hot-adding a new PSU, wait for 15 seconds for the appliance to recognize the PSU and determine its status. The PSU status indicator turns green to signify that the PSU is functioning properly.

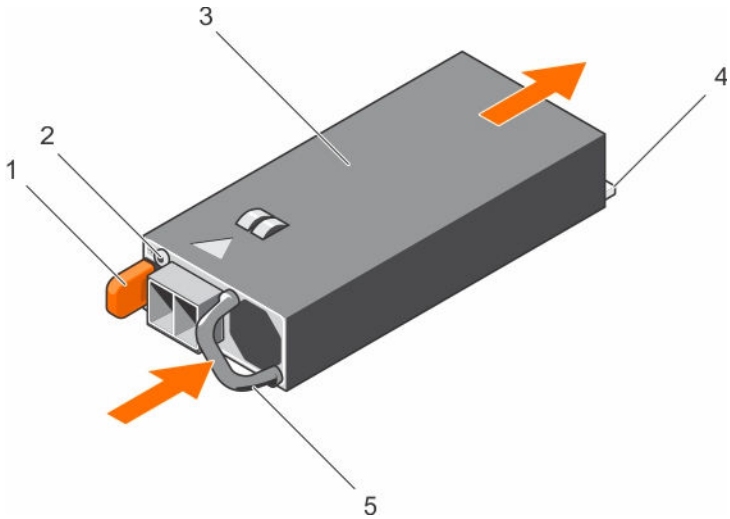


Figure 62. Installing a DC PSU

1	release latch	2	power supply status indicator
3	PSU	4	power connector
5	PSU handle		

Next steps

- Follow the procedure listed in the After working inside your appliance section.

Battery

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

Replacing the battery

Prerequisites

WARNING: 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 appliance.

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

Steps

1 Locate the battery socket. For more information, see the Jumpers and connectors section.

CAUTION: To avoid damage to the battery connector, you must firmly support the connector while installing or removing a battery.

2 Place your finger between the securing tabs at the negative side of the battery connector, and lift the battery out of the socket.

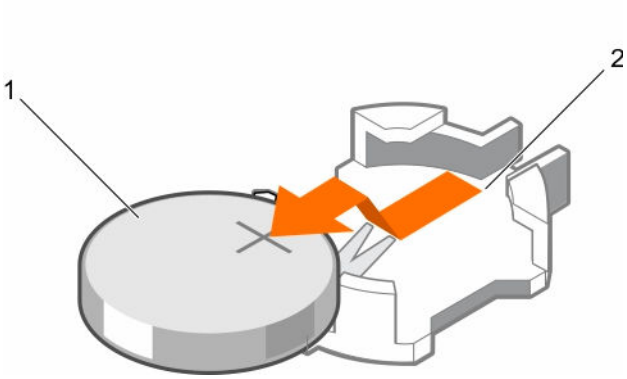


Figure 63. Removing the battery

1	battery	2	battery slot

3 To install a new battery, hold the battery with the "+" facing up and slide it under the securing tabs.
4 Press the battery into the connector until it snaps into place.

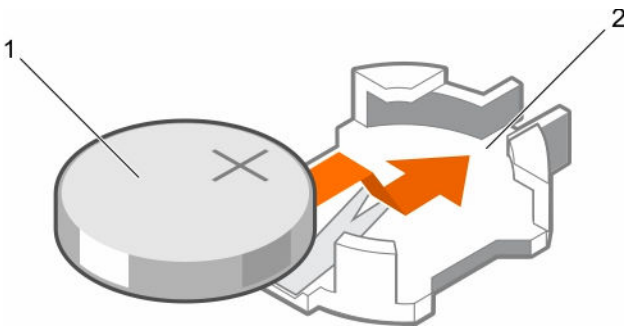


Figure 64. Installing the battery

1	battery	2	battery slot

Next steps

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

Hard drive backplane

Depending on the configuration, your appliance supports one of the following:

16 hard drive appliance supports	2.5 inch (x16) SAS backplane that supports (x16) SAS HDDs and SSDs

Removing the hard drive backplane

Prerequisites

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

1 Follow the safety guidelines listed in the Safety instructions section.
2 Follow the procedure listed in the Before working inside your appliance section.
3 Remove the cooling shroud.
4 Remove the cooling fan assembly.
5 Remove all hard drives.

Steps

1 Disconnect the SAS/SATA data, signal, and power cable(s) from the backplane.
2 Press the release tabs and lift the backplane upward and slide it toward the back of the chassis.

NOTE: To prevent damage to the control panel flex cable, unlatch the blocking tab on the connector before removing the flex cable. Do not bend the flex cable at the connector. To unlatch the blocking tab for the x12 backplane, pull the locking tab up. For the x18 and x2 backplanes, rotate the locking tab 90 degrees clockwise.

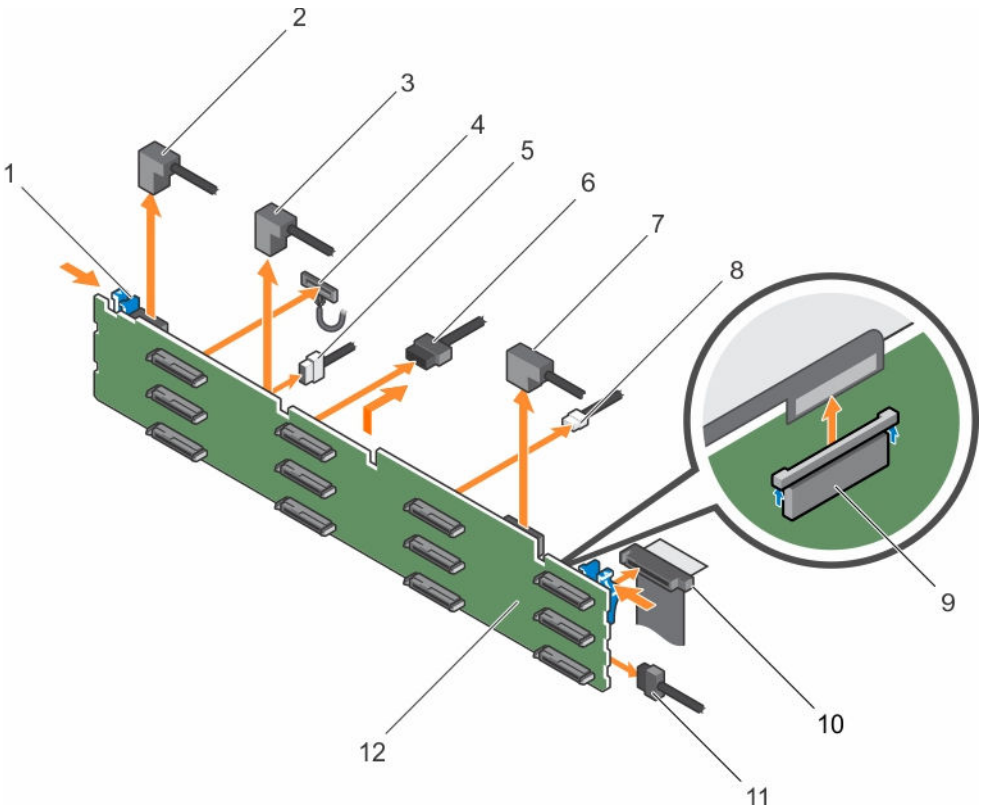


Figure 65. Removing the 3.5 inch (x12) SAS/SATA backplane

1 release tab (2)
2 SAS cable A2
3 SAS cable A1
4 left ear control panel cable

5	backplane signal cable	6	backplane power cable (2)
7	SAS cable A0/B0	8	USB cable
9	control panel cable	10	right ear control panel flex cable
11	hard drive backplane	12	hard drive backplane connector (12)

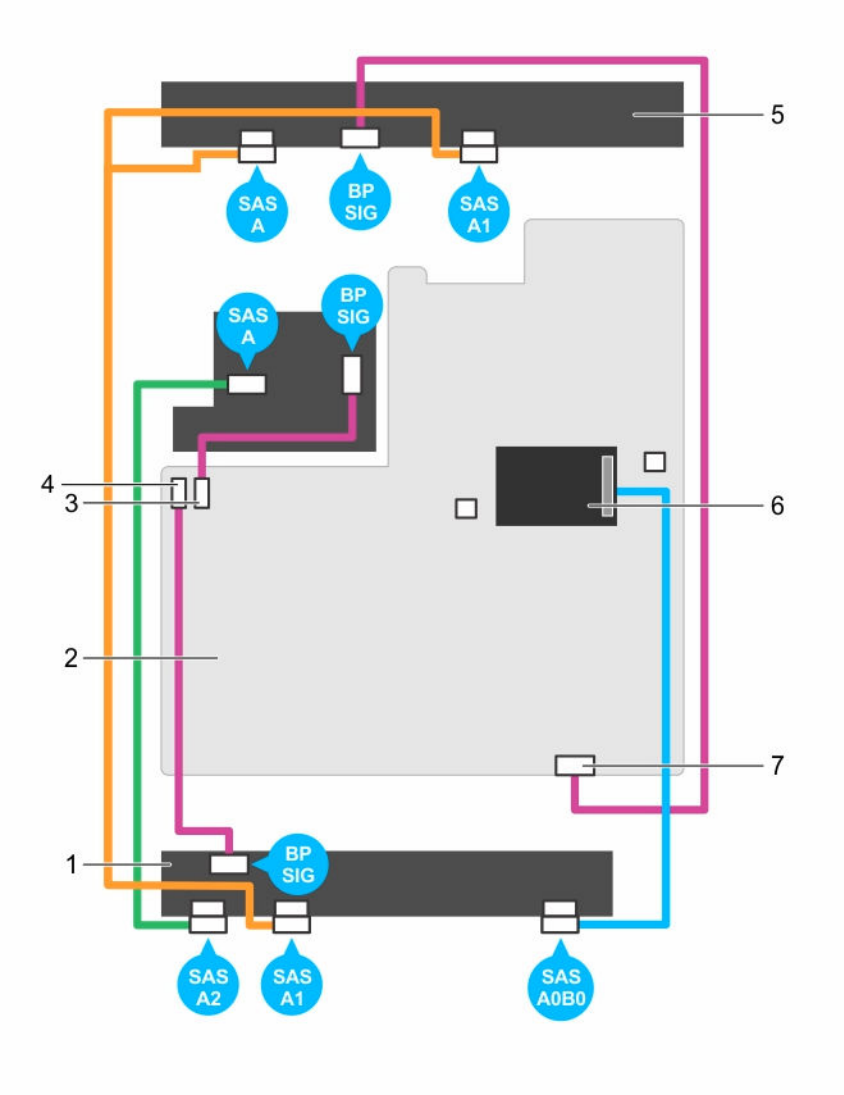


Figure 66. Cabling diagram—3.5 inch (x12) SAS/SATA backplane (option 2)

1	hard drive backplane	2	system board
3	backplane signal connector 0	4	backplane signal connector 1
5	hard drive mid plane	6	integrated storage controller card
7	backplane signal connector 2		

Next steps

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

Installing the hard drive backplane

Prerequisites

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

CAUTION: To prevent damage to the control panel flex cable, do not bend the control panel flex cable after it is inserted into the connector.

Steps

1 Use the hooks on the chassis as guides to align the hard drive backplane.
2 Lower the hard drive backplane until the release tabs snap into place.
3 Connect the SAS /SATA SSD data, signal, and power cable(s) to the backplane.

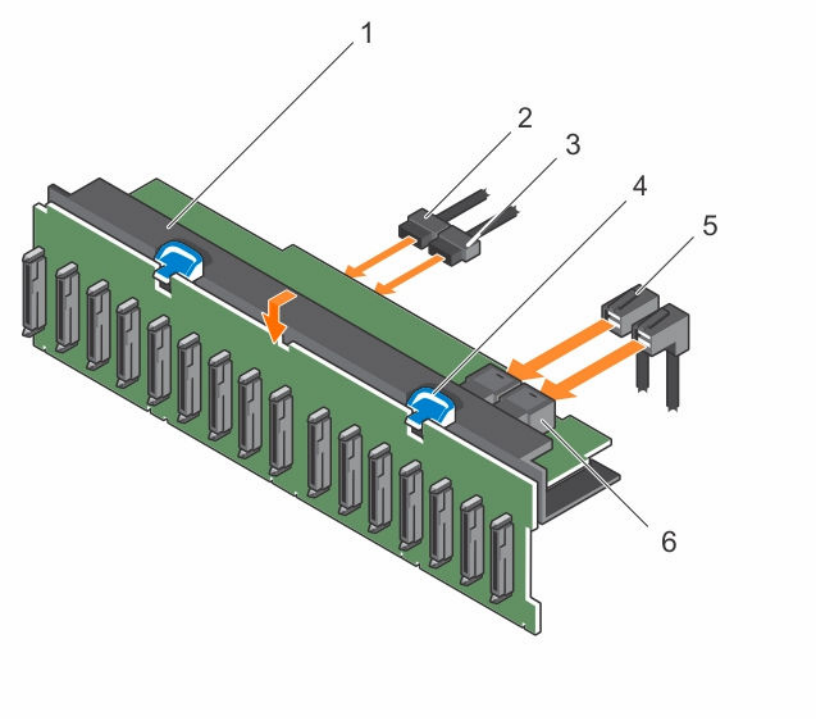


Figure 67. Installing the 2.5 inch (x16) SAS backplane

1	hard drive backplane assembly	2	backplane signal cable
3	backplane power cable	4	release tab (2)
5	SAS cable (2)	6	mini SAS connector (2)

Next steps

1 Replace the cooling fan assembly.
2 Replace the cooling shroud.
3 Install the hard drives in their original locations.
4 Follow the procedure listed in the After working inside your appliance section.

Control panel assembly

Removing the control panel

Prerequisites

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

Steps

1 Using a Phillips #2 screwdriver, remove the screw(s) securing the control panel to the chassis.

> **CAUTION: Do not use excessive force when removing the control panel as it can damage the connectors.**

2 From inside the appliance, push the control panel out of the chassis.
3 Remove all the cables connecting the control panel to the chassis.

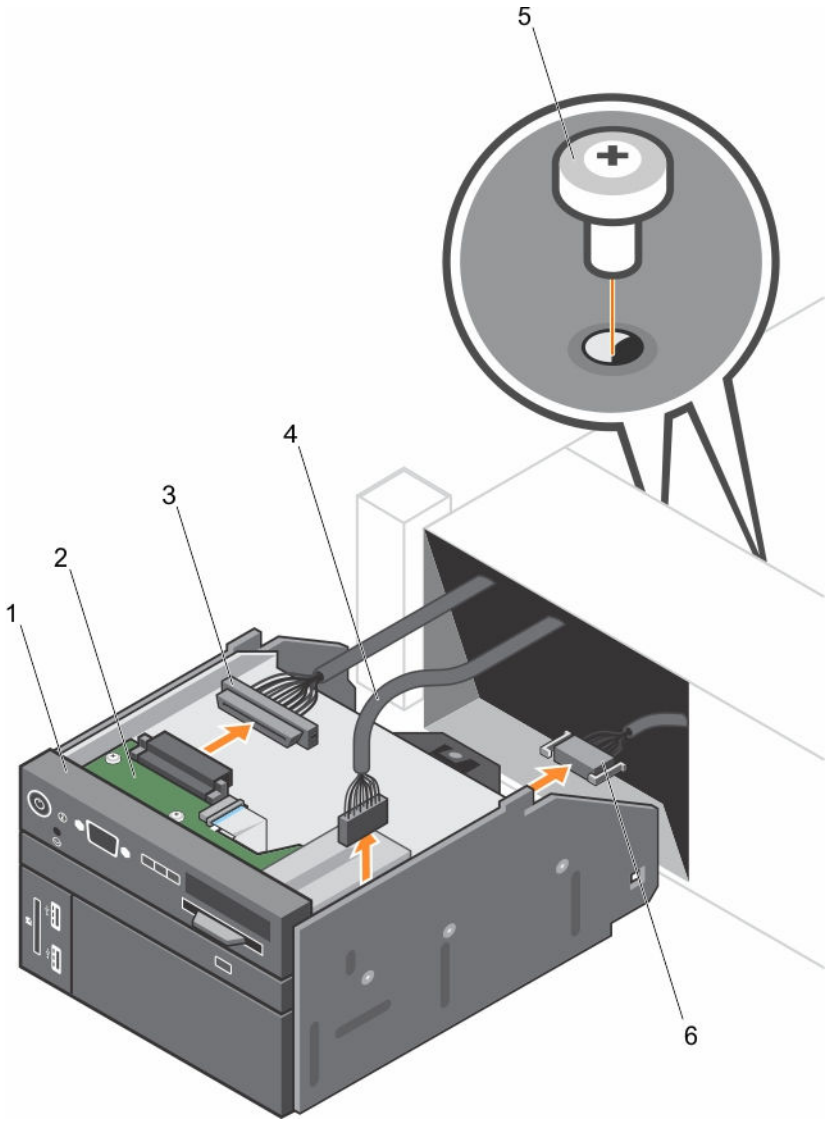


Figure 68. Removing the control panel—2.5 inch hard drive appliance

1	control panel	2	control panel board
3	control panel connector cable	4	USB connector cable
5	screw (2)	6	vFlash media connector cable

4 Locate and press the tabs on the information tag.

5 Push the information tag out of the slot to remove it from the control panel.

NOTE: Retain the information tag for replacement in the new control panel.

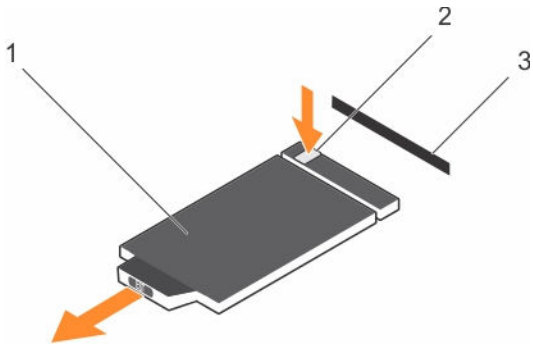


Figure 69. Removing the information tag

1	information tag	2	tab
3	slot		

Next steps

1 Replace the control panel.
2 Follow the procedure listed in the After working inside your appliance section.

Installing the control panel

Prerequisites

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

Steps

1 Replace the blank information tag in the new control panel with the information tag retained from the old control panel.

NOTE: Information tag lists appliance information such as Service Tag, NIC, and MAC address.

2 To install the information tag, push the information tag into the control panel slot.
3 Connect all the applicable cables to the control panel.
4 Slide the control panel into the slot in the chassis and secure the module with the screw.

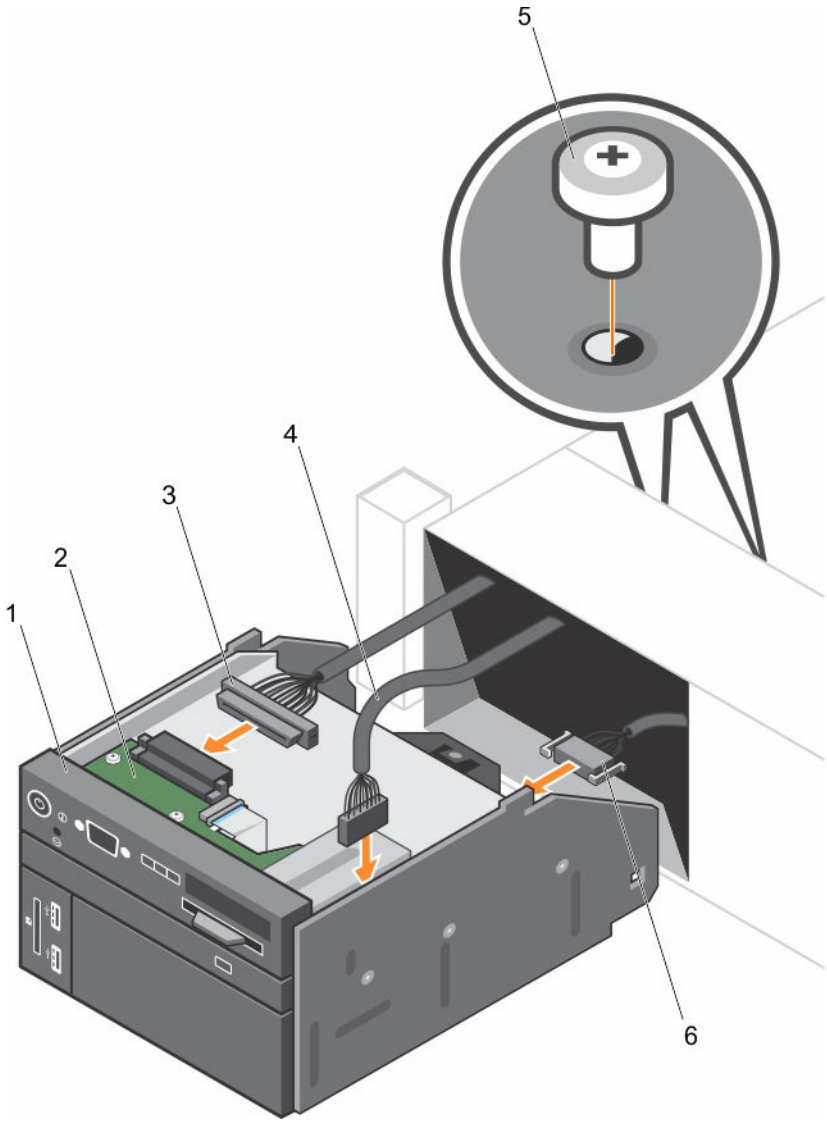


Figure 70. Installing the control panel—2.5 inch hard drive appliance

1	control panel	2	control panel board
3	control panel connector cable	4	USB connector cable
5	screw (2)	6	vFlash media connector cable

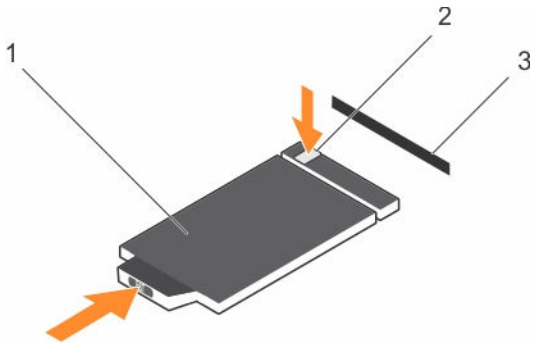


Figure 71. Installing the information tag

1	information tag	2	tab
3	slot		

Next steps

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

System board

A system board (also known as the motherboard) is the main printed circuit board found in appliances. The system board allows communication between many of the crucial electronic components of the appliance, such as the central processing unit (CPU) and memory, and also provides connectors for other peripherals. Unlike a backplane, a system board contains a significant number of subsystems such as the processor, expansion cards, and other components.

Removing the system board

Prerequisites

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

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 re-installed 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 appliance section.
3. Remove the following:
   a. Cooling shroud
   b. Cooling fan assembly
   c. Power supply unit(s)
   d. All expansion card risers
   e. Integrated storage controller card
   f. Internal dual SD module
   g. PCIe card holder
   h. Cable retention bracket
   i. Heat sink(s)/heat sink blank(s)
   j. Processors(s)/processor blank(s)

CAUTION: To prevent damage to the processor pins when replacing a faulty system board, ensure that you cover the processor socket with the processor protective cap.

k Memory modules and memory module blanks

l Network daughter card

Steps

1 Disconnect all cables from the system board.

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

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

2 Hold the system board holder, lift the blue release pin, lift the system board, and then slide it toward the front of the chassis.
Sliding the system board toward the front of the chassis disengages the connectors from the back of the chassis slots.

3 Lift the system board out of the chassis.

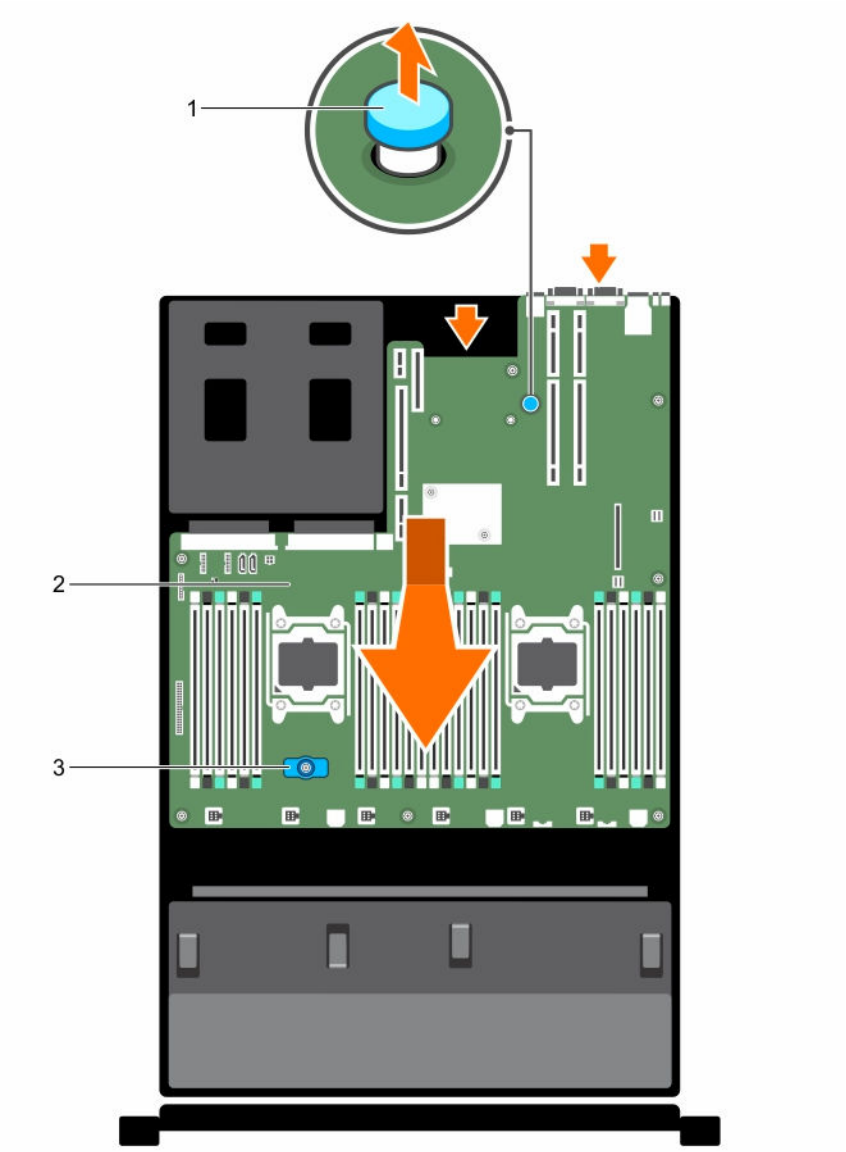


Figure 72. Removing the system board

1 release pin

2 system board

3 system board holder

Next steps

1 Install the system board.
2 Follow the procedure listed in the After working inside your appliance section.

Installing the 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 appliance section.

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 Unpack the new system board assembly.

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

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

2 Hold the touch points and lower the system board into the chassis.
3 Push the system board toward the back of the chassis until the board clicks into place.

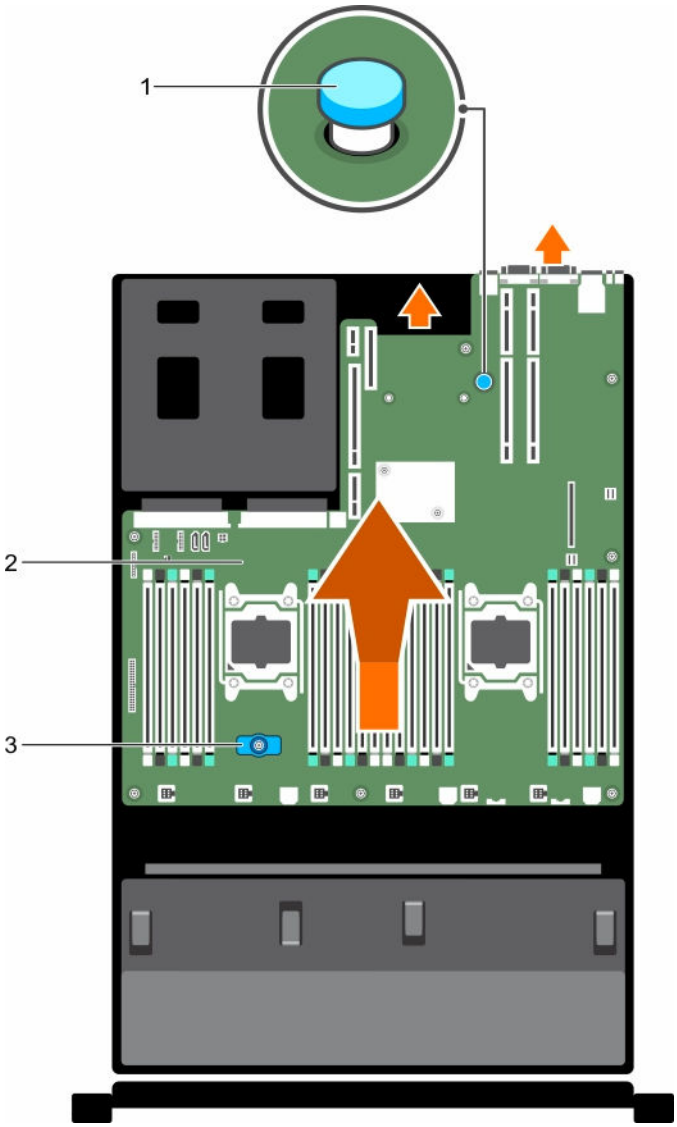


Figure 73. Installing the system board

1	release pin	2	system board
3	system board holder		

Next steps

1 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 on the TPM, see the Trusted Platform Module section.

> **NOTE: The TPM plug-in module is attached to the system board and cannot be removed. A replacement TPM plug-in module will be provided for all system board replacements where a TPM plug-in module was installed.**

2 Replace the following:

a Cable retention bracket
b PCIe card holder
c Integrated storage controller card
d Internal dual SD module
e All expansion card risers
f Heat sink(s)/heat sink blank(s) and processors(s)/processor blank(s)

g Memory modules and memory module blanks
h Network daughter card
i Cooling fan assembly
j Cooling shroud
k Power supply unit(s)

3 Reconnect all cables to the system board.

NOTE: Ensure that the cables inside the appliance are routed along the chassis wall and secured using the cable securing bracket.

4 Follow the procedure listed in the After working inside your appliance 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 Use the Easy Restore feature to restore the Service Tag. For more information, see the Easy restore section.
b If the Service Tag is not backed up in the backup flash device, enter the Service Tag manually. For more information, see the Entering the Service Tag section.
c Update the BIOS and iDRAC versions.
d Re-enable the Trusted Platform Module (TPM). For more information, see the Re-enabling the Trusted Platform Module (TPM) section.

Entering the appliance Service Tag by using System Setup

If Easy Restore fails to restore the Service Tag, use System Setup to enter the Service Tag.

1 Turn on the appliance.
2 Press F2 to enter System Setup.
3 Click **Service Tag Settings**.
4 Enter the Service Tag.

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

5 Click **Ok**.
6 Import your new or existing iDRAC Enterprise license.
For more information, see the *Integrated Dell Remote Access Controller User's Guide* at **Dell.com/idracmanuals**.

Restoring the Service Tag by using the Easy Restore feature

By using the Easy Restore feature, you can restore your Service Tag, license, UEFI configuration, and the appliance configuration data after replacing the system board. All data is automatically backed up in a backup flash device. If BIOS detects a new system board and the Service Tag in the backup flash device, BIOS prompts the user to restore the backup information.

1 Turn on the appliance.
If BIOS detects a new system board, and if the Service Tag is present in the backup flash device, BIOS displays the Service Tag, the status of the license, and the **UEFI Diagnostics** version.
2 Perform one of the following steps:
After the restore process is complete, BIOS prompts to restore the appliance configuration data.
3 Perform one of the following steps:
- Press **Y** to restore the appliance configuration data.
- Press **N** to use the default configuration settings.

After the restore process is complete, the appliance restarts.

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 EMC certified service technicians.

Installing the Trusted Platform Module

Prerequisites

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

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.

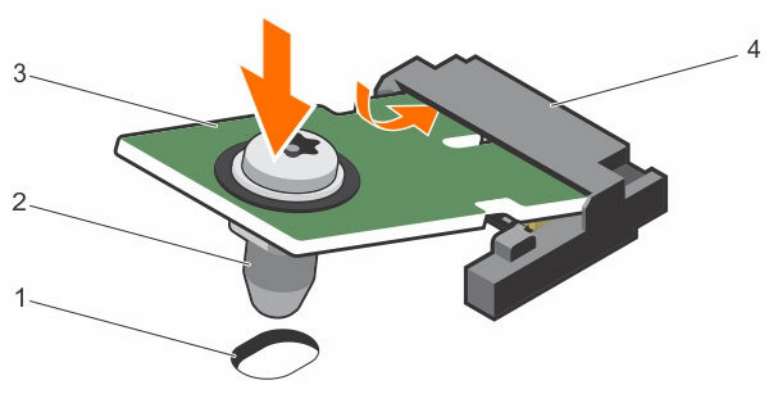


Figure 74. Installing the TPM

1 rivet slot on the system board
2 plastic rivet
3 TPM
4 TPM connector

Next steps

1 Install the system board.
2 Follow the procedure listed in the After working inside your appliance section.

Initializing the TPM for TXT users

1. While booting your appliance, 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 your appliance.
7. Enter **System Setup** again.
8. On the **System Setup Main Menu** screen, click **System BIOS** > **System Security Settings**.
9. From the **Intel TXT** option, select **On**.

7

Using system diagnostics

If you experience a problem with your appliance, run the system diagnostics before contacting Dell for technical assistance. The purpose of running system diagnostics is to test your appliance 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: Dell EMC has optimized your appliance and recommends that you do not change any of these settings.

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

NOTE: Dell EMC has optimized your appliance and recommends that you do not change any of these settings.

Running the Embedded System Diagnostics from Boot Manager

Prerequisites

Run the Embedded System Diagnostics (ePSA) if your appliance does not boot.

Steps

1. When the appliance is booting, press F11.
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 appliance. The diagnostics starts executing the tests on all the detected devices.

Running the Embedded System Diagnostics from the Dell Lifecycle Controller

1. As the appliance boots, press F11.
2. Select **Hardware Diagnostics** → **Run Hardware Diagnostics**.

   The **ePSA Pre-boot System Assessment** window is displayed, listing all devices detected in the appliance. 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.
Appliancehealth	Provides the current overview of the appliance performance.
Event log	Displays a time-stamped log of the results of all tests run on the appliance. This is displayed if at least one event description is recorded.

8

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 appliance. Jumpers on the system board help to disable the appliance and setup passwords. You must know the connectors on the system board to install components and cables correctly.

Topics:

System board jumper settings

For information about resetting the password jumper to disable a password, see the Disabling a forgotten password section.

Table 31. System board jumper settings

Jumper	Setting	Description
PWRD_EN	 (default)	The password feature is enabled (pins 4–6).
		The password feature is disabled (pins 2–4). iDRAC local access is unlocked at the next AC power cycle.
NVRAM_CLR	 (default)	The configuration settings are retained at appliance boot (pins 1–3).
		The configuration settings are cleared at the next appliance boot (pins 3–5).

System board jumpers and connectors

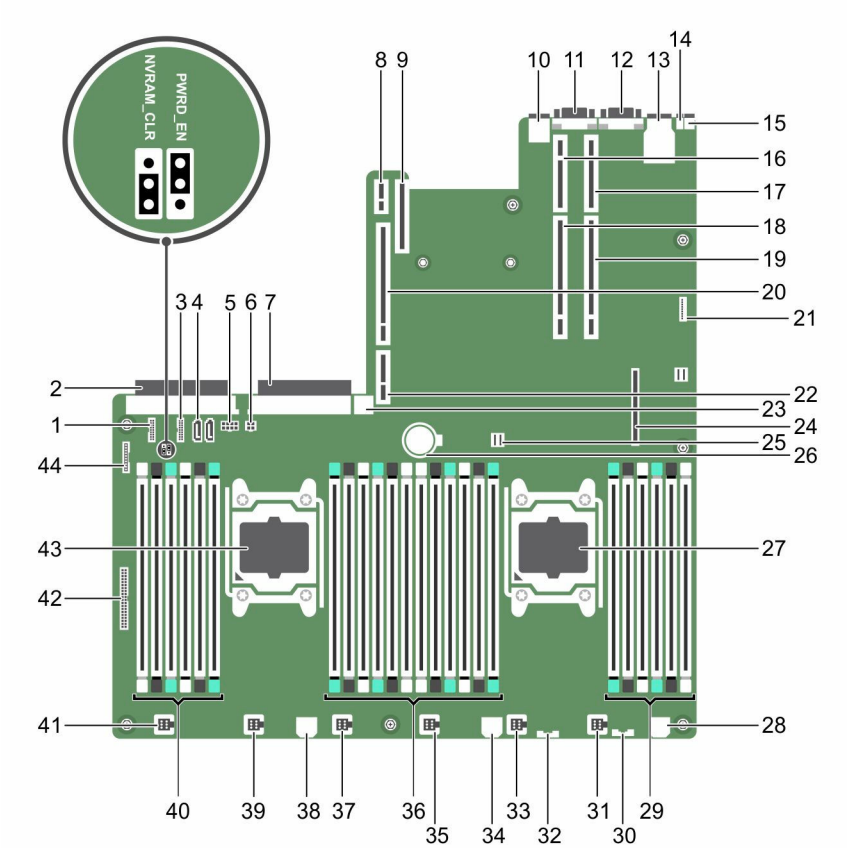


Figure 75. System board jumpers and connectors

Table 32. System board jumpers and connectors

Item	Connector	Description
1.	J_BP_SIG1	Backplane signal connector 1
2.	J_PS2	PSU 2 power connector
3.	J_BP_SIG0	Backplane signal connector 0
4	J_SATA_CD	SATADOM connector
5.	J_BP0	Backplane power connector
6.	J_TBU	SATADOM power connector
7.	J_PS1	PSU 2 power connector
8	J_IDSDM	Internal dual SD module connector
9.	J_NDC	Network daughter card connector
10.	J_USB	USB port
11	J_VIDEO_REAR	Video connector

Item	Connector	Description
12	J_COM1	Serial connector
13	J_IDRAC_RJ45	iDRAC7 connector
14	J_CYC	Appliance identification connector
15	CYC_ID	Appliance identification button
16	J_RISER_2AX	Riser 2 connector
17	J_RISER_1AX	Riser 1 connector
18	J_RISER_2BX	Riser 2 connector
19	J_RISER_1BX	Riser 1 connector
20	J_RISER_3AX	Riser 3 connector
21	J_SATA_B	SATA connector
22	J_RISER_3BX	Riser 3 connector
23	J_USB_INT	Internal USB port
24	J_STORAGE	Storage controller card connector
25	J_SATA_A	SATA connector
26	BAT	Battery connector
27	CPU2	Processor socket 2
28	J_FAN1U_7	Cooling fan connector
29	B1, B5, B9, B2, B6, B10	Memory module sockets
30	J_BP3	Hard drive backplane power connector
31	J_FAN1U_6	Cooling fan connector
32	J_BP_SIG2	Backplane signal connector 2
33	J_FAN1U_5	Cooling fan connector
34	J_BATT_SIG	Battery signal connector
35	J_FAN1U_4	Cooling fan connector
36	A1, A5, A9, A2, A6, A10, B3, B7, B11, B4, B8, B12	Memory module sockets
37	J_FAN1U_3	Cooling fan connector
38	J_FAN2U	Cooling fan connector
39	J_FAN1U_2	Cooling fan connector
40	A12, A8, A4, A7, A11, A3	Memory module sockets
41	J_FAN1U_1	Cooling fan connector
42	J_CTRL_PNL	Control panel connector
43	CPU1	Processor socket 1
44	J_FP_USB	Front panel USB port

Disabling a forgotten password

The software security features include a appliance password and a setup password. The password jumper enables the password features or disables them and clears any passwords currently in use.

1 Turn off the appliance, including any attached peripherals, and disconnect the appliance from the electrical outlet.
2 Open the appliance.
3 Move the jumper on the system board jumper from pins 4 and 6 to pins 2 and 4.
4 Close the appliance.

The existing passwords are not disabled (erased) until the appliance boots with the jumper on pins 2 and 4. However, before you assign a new appliancem and/or setup password, move the jumper back to pins 4 and 6.

NOTE: If you assign a new appliance and/or setup password with the jumper on pins 2 and 4, the appliance disables the new passwords the next time it boots.

5 Reconnect the system board jumper to its electrical outlet and turn on the appliance, including any attached peripherals.
6 Turn off the appliance, including any attached peripherals, and disconnect the appliance from the electrical outlet.
7 Open the appliance.
8 Move the jumper on the system board jumper from pins 2 and 4 to pins 4 and 6.
9 Close the appliance.
10 Reconnect the appliance to its electrical outlet and turn on the appliance, including any attached peripherals.
11 Assign a new appliance and/or setup password.

9

Troubleshooting your appliance

Safety first — for you and your appliance

NOTE: Dell EMC has optimized your appliance and recommends that you do not change any of these settings.

NOTE: Solution validation was performed by using the factory shipped hardware configuration.

Topics:

Troubleshooting appliance startup failure

If you boot the appliance to the BIOS boot mode after installing an operating system from the UEFI Boot Manager, the appliance 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.

NOTE: By default, set this appliance to BIOS boot mode.

Troubleshooting external connections

Before troubleshooting any external devices, ensure that all external cables are securely attached to the external connectors on your appliance before troubleshooting any external devices.

Troubleshooting the video subsystem

Prerequisites

NOTE: Ensure the Local Server Video Enabled option is selected in the iDRAC Graphical User Interface (GUI), under Virtual Console. If this option is not selected, local video is disabled.

Steps

1 Check the cable connections (power and display) to the monitor.

2 Check the video interface cabling from the appliance to the monitor.

3 Run the appropriate diagnostic test.

If the tests run successfully, the problem is not related to video hardware.

Next steps

If the tests fail, see the Getting help section.

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.

Steps

1 Disconnect the keyboard and/or mouse cables from the appliance and reconnect them.

2 If the problem persists, connect the keyboard and/or mouse to another USB port on the appliance.

3 If the problem is resolved, restart the appliance, 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 appliance.

If the problem is not resolved, proceed to troubleshoot other USB devices attached to the appliance.

7 Turn off all attached USB devices, and disconnect them from the appliance.

8 Restart the appliance.

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 appliance.

11 If the appliance is not accessible, reset the NVRAM_CLR jumper inside your appliance 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.

Troubleshooting iDRAC Direct (USB XML configuration)

For information about USB storage device and appliance configuration, see *Integrated Dell Remote Access Controller User's Guide* at **Dell.com/idracmanuals**.

Steps

1. Ensure that your USB storage device is connected to the front USB Management Port, identified by  icon.
2. Ensure that your USB storage device is configured with an NTFS or an FAT32 file system with only one partition.
3. Verify that the USB storage device is configured correctly. For more information about configuring the USB storage device, see *Integrated Dell Remote Access Controller User's Guide* at **Dell.com/idracmanuals**.
4. In the **iDRAC Settings Utility**, ensure that **USB Management Port Mode** is configured as **Automatic** or **iDRAC Direct Only**.
5. Ensure that the **iDRAC Managed: USB XML Configuration** option is either **Enabled** or **Enabled only when the server has default credential settings**.
6. Remove and reinsert the USB storage device.
7. If import operation does not work, try with a different USB storage device.

Next steps

If all troubleshooting fails, see the Getting help section.

Troubleshooting iDRAC Direct (Laptop connection)

For information about USB laptop connection and appliance configuration, see the *Integrated Dell Remote Access Controller User's Guide* at **Dell.com/idracmanuals**.

Steps

1. Ensure that your laptop is connected to the front USB Management Port, identified by  icon with a USB Type A/A cable.
2. On the **iDRAC Settings Utility** screen, ensure that **USB Management Port Mode** is configured as **Automatic** or **iDRAC Direct Only**.
3. If the laptop is running Windows operating system, ensure that the iDRAC Virtual USB NIC device driver is installed.
4. If the driver is installed, ensure that you are not connected to any network through WiFi or cabled ethernet, as iDRAC Direct uses a non-routable address.

Next steps

If all troubleshooting fails, see the Getting help section.

Troubleshooting a serial I/O device

Prerequisites

Steps

1. Turn off the appliance and any peripheral devices connected to the serial port.
2. Swap the serial interface cable with a known working cable, and turn on the appliance and the serial device.

   If the problem is resolved, replace the interface cable with a known working cable.
3. Turn off the appliance and the serial device, and swap the serial device with a compatible device.
4. Turn on the appliance and the serial device.

Next steps

If the problem persists, see the Getting help section.

Troubleshooting a NIC

Steps

1 Run the appropriate diagnostic test. For more information, see the Using system diagnostics section for the available diagnostic tests.
2 Restart the appliance 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 ports are enabled on the **Integrated Devices** screen.
6 Ensure that all the NICs, hubs, 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 the NICs 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.
8 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.

Troubleshooting a wet appliance

Steps

1 Turn off the appliance and attached peripherals, and disconnect the appliance from the electrical outlet.
2 Remove the appliance cover.
3 Remove the following components (if installed) from the appliance:
   - Power supply unit(s)
   - Hard drives
   - Hard drive backplane
   - USB memory key
   - Cooling shroud
   - Expansion card risers (if installed)
   - Expansion cards
   - Cooling fan assembly (if installed)
   - Cooling fan(s)
   - Memory modules
   - Processor(s) and heat sink(s)
   - System board
4 Let the appliance dry thoroughly for at least 24 hours.
5 Reinstall the components you removed in step 3 except the expansion cards.
6 Install the appliance cover.
7 Turn on the appliance and attached peripherals.
   If the problem persists, see the Getting help section.
8 If the appliance starts properly, turn off the appliance, 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.

Troubleshooting a damaged appliance

Steps

1 Turn off the appliance and attached peripherals, and disconnect the appliance from the electrical outlet.
2 Remove the appliance 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
   - hard-drive carriers or cage
   - hard drive backplane
4 Ensure that all cables are properly connected.
5 Install the appliance 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.

Troubleshooting the appliance battery

Prerequisites

NOTE: If the appliance is turned off for long periods of time (for weeks or months), the NVRAM may lose the appliance configuration information. This situation is caused by a defective battery.

NOTE: Some software may cause the appliance time to speed up or slow down. If the appliance 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 appliance, and disconnect it from the electrical outlet for at least an hour.
3 Reconnect the appliance to the electrical outlet, and turn on the appliance.
4 Enter System Setup.
   If the date and time displayed in System Setup are not correct, check the System Error Log (SEL) for appliance battery messages.

Next steps

If the problem persists, see the Getting help section.

Troubleshooting power supply units

The following sections provide information on troubleshooting power source and power supply units problems.

Troubleshooting power source problems

1 Press the power button to ensure that your appliance 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.

Power supply unit problems

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 appliance, ensure that the PSU has enough power to support the new appliance.
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 appliance to recognize the PSU and determine if it is working properly.

If the problem persists, see the Getting help section.

Troubleshooting cooling problems

Ensure that the following conditions exist:

- Appliance cover, cooling shroud, EMI filler panel, memory module blank, or back filler bracket is not removed.
- Ambient temperature is not higher than the appliance 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:

1 Click **Hardware** > **Fans** > **Setup**.
2 From the **Fan Speed Offset** drop-down list, select the cooling level required or set the minimum fan speed to a custom value.

From F2 System Setup:

1 Select **iDRAC Settings** > **Thermal**, and set a higher fan speed from the fan speed offset or minimum fan speed.

From RACADM commands:

1 Run the command `racadm help system.thermalsettings`

For more information, see the Integrated Dell Remote Access User's Guide at **Dell.com/idracmanuals**.

Troubleshooting cooling fans

Prerequisites

NOTE: The fan number is referenced by the management software of the appliance. 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 appliance section.

Steps

1 Reseat the fan or the fan's power cable.

2 Restart the appliance.

Next steps

1 Follow the procedure listed in the After working inside your appliance section.

2 If the problem persists, see the Getting help section.

Troubleshooting memory

Steps

1 If the appliance 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 provided by the diagnostic tests.

2 If the appliance is not operational, turn off the appliance and attached peripherals, and unplug the appliance from the power source. Wait at least for 10 seconds, and then reconnect the appliance to the power source.

3 Turn on the appliance 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 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 appliance and attached peripherals, and disconnect the appliance from the electrical outlet.

6 Remove the appliance cover.

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 appliance cover.

10 Enter System Setup and check the ~~appliance~~ memory setting.

If the problem is not resolved, proceed with step 11.

11 Remove the appliance cover.

12 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.

13 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 the installed DIMM type(s), incorrect DIMM installation, or defective DIMM(s). Follow the on-screen instructions to resolve the problem.

14 Install the appliance cover.

15 As the appliance boots, observe any error message that is displayed and the diagnostic indicators on the front of the appliance.

16 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.

Troubleshooting an SD card

Prerequisites

NOTE: Certain SD cards have a physical write-protect switch on the card. If the write-protect switch is turned on, the SD card is not writable.

Steps

1 Enter System Setup, and ensure that the **Internal SD Card Port** is enabled.

2 Turn off the appliance, including any attached peripherals, and disconnect the appliance from the electrical outlet.

3 Remove the appliance cover.

NOTE: When an SD card failure occurs, the internal dual SD module controller notifies the appliance. On the next restart, the appliance displayed a message indicating the failure. If redundancy is enabled at the time of SD card failure, a critical alert will be logged and chassis health will degrade.

4 Replace the failed SD card with a new SD card.

5 Install the appliance cover.

6 Reconnect the appliance to its electrical outlet and turn on the appliance, including any attached peripherals.

7 Enter System Setup, and ensure that the **Internal SD Card Port** and **Internal SD Card Redundancy** modes are set to the needed modes.

Verify that the correct SD slot is set as **Primary SD Card**.

8 Check if the SD card is functioning properly.

9 If the **Internal SD Card Redundancy** option is set to **Enabled** at the time of the SD card failure, the appliance prompts you to perform a rebuild.

NOTE: The rebuild is always sourced from the primary SD card to the secondary SD card.

Troubleshooting a hard drive or SSD

Prerequisites

CAUTION: This troubleshooting procedure can erase data stored on the hard drive. Before you proceed, back up all files on the hard drive.

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 Ensure that the needed device drivers for your controller card are installed and are configured correctly. For more information, see the operating system documentation.

3 Restart the appliance and enter the System Setup.

4 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.

Troubleshooting a storage controller

NOTE: When troubleshooting a controller, see the documentation for your operating system and the controller.

NOTE: When troubleshooting a SAS controller, see the documentation for your operating system and the controller.

1 Run the appropriate diagnostic test. See the Using system diagnostics section.
2 Turn off the appliance and attached peripherals, and disconnect the appliance from the electrical outlet.
3 Remove the appliance cover.
4 Verify that the installed expansion cards are compliant with the expansion card installation guidelines.
5 Ensure that each expansion card is firmly seated in its connector.
6 Install the appliance cover.
7 Reconnect the appliance to the electrical outlet, and turn on the appliance and attached peripherals.
8 If the problem is not resolved, turn off the appliance and attached peripherals, and disconnect the appliance from the electrical outlet.
9 Remove the appliance cover.
10 Remove all expansion cards installed in the appliance.
11 Install the appliance cover.
12 Reconnect the appliance to the electrical outlet, and turn on the appliance and attached peripherals.
13 Run the appropriate diagnostic test. See the Using system diagnostics section. If the tests fail, see the Getting help section.
14 For each expansion card you removed in step 10, perform the following steps:
   a Turn off the appliance and attached peripherals, and disconnect the appliance from the electrical outlet.
   b Remove the appliance cover.
   c Reinstall one of the expansion cards.
   d Install the appliance cover.
   e Run the appropriate diagnostic test. See the Using system diagnostics section.

If the problem persists, see the Getting help section.

Troubleshooting expansion cards

Prerequisites

NOTE: When troubleshooting an expansion card, you also have to see the documentation for your operating system and the expansion card.

Steps

1 Run the appropriate diagnostic test. See the Using system diagnostics section.
2 Turn off the appliance and attached peripherals, and disconnect the appliance from the electrical outlet.
3 Remove the appliance cover.
4 Ensure that each expansion card is firmly seated in its connector.
5 Install the appliance cover.
6 Turn on the appliance and attached peripherals.
7 If the problem is not resolved, turn off the appliance and attached peripherals, and disconnect the appliance from the electrical outlet.
8 Remove the appliance cover.
9 Remove all expansion cards installed in the appliance.
10 Install the appliance cover.
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 appliance and attached peripherals, and disconnect the appliance from the electrical outlet.
   b Remove the appliance cover.
   c Reinstall one of the expansion cards.
   d Install the appliance cover.
   e Run the appropriate diagnostic test. See the Using system diagnostics section.

Next steps

If the problem persists, see the Getting help section.

Troubleshooting processors

1 Run the appropriate diagnostics test. See the Using system diagnostics section.
2 Turn off the appliance and attached peripherals, and disconnect the appliance from the electrical outlet.
3 Remove the appliance cover.
4 Ensure that the processor and heat sink are properly installed.
5 Install the appliance cover.
6 Run the appropriate diagnostic test. See the Using system diagnostics section.
7 If the problem persists, see the Getting help section.

10

Getting help

Topics:

Contacting Dell EMC

You can link your Online Support account with **VxRail Manager** and access support resources without having to log in separately.

NOTE: If you plan to set up EMC Secure Remote Services (ESRS), you have to link your Online Support account to VxRail Manager under the same ID or it may not work properly.

Registering for online support

You can create an **Online Support** account to access support resources such as:

- Register your appliance.
- Obtain product license files and software updates.
- Download Dell EMC VxRail Series product documentation.
- Download the SolVe Desktop Procedure Generator.
- Browse the Dell EMC VxRail Series community and support information.
- Link your support account for access to resources from within **VxRail Manager**.

To register for online support:

1. Point your Web browser to emc.com/vxrailsupport or support.emc.com.
2. Click **Register here**.
3. Fill in the required information.

Support will send you a confirmation email, typically within 48 hours.

Accessing support resources

You can access support resources for your Dell EMC VxRail™ appliance by one of the following:

- VxRail Manager Support
- emc.com/vxrailsupport (or support.emc.com)
- https://solve.emc.com

NOTE: Additional Dell EMC VxRail™ Series information is available through the SolVe desktop tool. SolVe includes step-by-step procedures for replacing certain hardware components, as well as other tasks.