

# Dell PowerEdge C6615

## Installation and Service Manual

## 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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# About this document

This document provides an overview about the system, information about installing and replacing components, diagnostic tools, and guidelines to be followed while installing certain components.

# PowerEdge C6615 system configurations and features

The PowerEdge C6615 system is a 1U sled that supports:

- One AMD EPYC™ processor with up to 64 cores
- 6 DDR5 DIMM slots
- Two redundant AC or DC power supply units
- Up to 16 x 2.5-inch SAS/SATA (HDD/SSD) drives
- Up to 16 x 2.5-inch SATA/NVMe drives on Universal Backplane configuration

**NOTE:** For more information about how to hot swap NVMe PCIe SSD U.2 device, see the *Dell Express Flash NVMe PCIe SSD User's Guide* at <https://www.dell.com/support> > **Browse all products** > **Infrastructure** > **Data Center Infrastructure** > **Storage Adapters & Controllers** > **Dell PowerEdge Express Flash NVMe PCIe SSD** > **Select This Product** > **Documentation** > **Manuals and Documents**.

**NOTE:** All instances of SAS, SATA drives are referred to as drives in this document, unless specified otherwise.

## Topics:

- [System configurations - rear view for PowerEdge C6615](#)
- [System configurations - inside view for PowerEdge C6615](#)
- [Network ports indicator codes](#)
- [Sled to hard drive mapping](#)
- [C6600 chassis options and drive enumerations](#)
- [Locating the Express Service Code and Service Tag](#)
- [System information label](#)

## System configurations - rear view for PowerEdge C6615

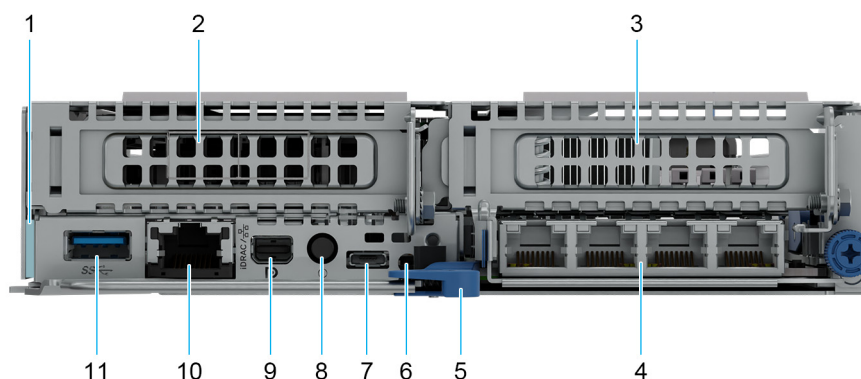






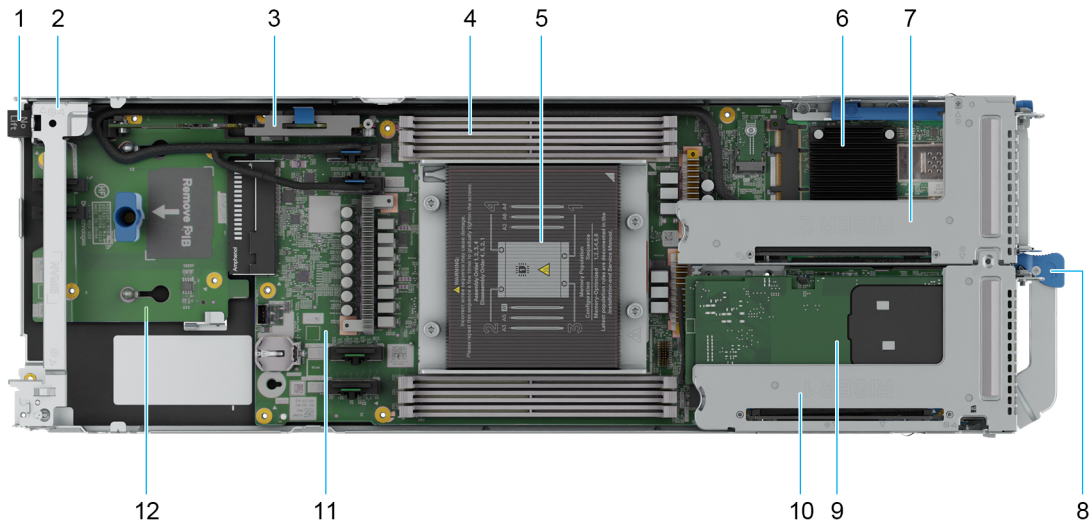
Figure 1. Rear view of the system (air cooling configuration)

**Table 1. Rear view of the system (air cooling configuration)**

Item	Ports, panels, or slots	Icon	Description
1	Express Service Tag	N/A	The Express Service Tag is a slide-out label panel that contains system information such as Service Tag, NIC, MAC address, and so on. If you have opted for the secure default access to iDRAC, the Information tag will also contain the iDRAC secure default password.
2	PCIe expansion card riser 1 (R1A)	N/A	The expansion card riser enables you to connect PCI Express expansion cards.
3	PCIe expansion card riser 2 (R2C)	N/A	The expansion card riser enables you to connect PCI Express expansion cards.
4	OCP 3.0	N/A	The OCP NIC card supports OCP 3.0. The NIC ports are integrated on the OCP card which is connected to the system board.
5	Lock release for sled handle	N/A	Enables you to release and then pivot the handle to remove the sled from the enclosure.
6	UID LED	N/A	When pressed, the system ID LED in the back panel blinks until either the front or rear button is pressed again. Press the button to toggle between on or off mode.
7	iDRAC Direct port (Micro AB-USB)		The iDRAC Direct (Micro-AB USB) port enables you to access the iDRAC direct Micro-AB USB features. For more information, see the <i>Integrated Dell Remote Access Controller User's Guide</i> at <a href="http://www.dell.com/poweredgemanuals">www.dell.com/poweredgemanuals</a> .
8	Sled power button	N/A	Enables you to power on the sled while accessing it from the rear.
9	Mini-DisplayPort		Enables you to connect a display device to the system.
10	iDRAC or NIC or RJ45 port		The NIC ports that are integrated on the LOM card provide network connectivity which is connected to the system board.  or  Enables you to remotely access iDRAC. For more information, see the <i>Integrated Dell Remote Access Controller User's Guide</i> at <a href="http://www.dell.com/poweredgemanuals">www.dell.com/poweredgemanuals</a> .
11	USB 3.0 port		The USB ports are 9-pin, 3.0-compliant. These ports enable you to connect USB devices to the system.



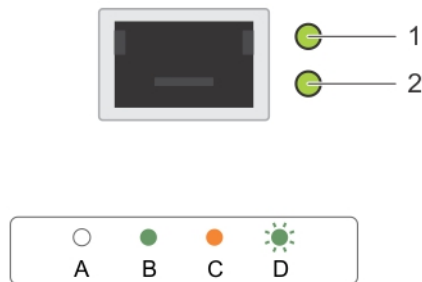
# System configurations - inside view for PowerEdge C6615



**Figure 2. Inside view of the PowerEdge C6615 sled (air cooling configuration)**

- 1. Power connector
- 2. Support bracket
- 3. BOSS-N1: HWRAID 1, 2 x M.2 SSDs
- 4. Memory module sockets
- 5. Processor 1 and heat sink module
- 6. OCP 3.0 card
- 7. Expansion card riser (R2C)
- 8. Lock release for sled handle
- 9. LOM
- 10. Expansion card riser (R1A)
- 11. System board
- 12. Power Interposer Board (PIB)

## Network ports indicator codes



**Figure 3. LAN indicators on the QSFP OCP card**

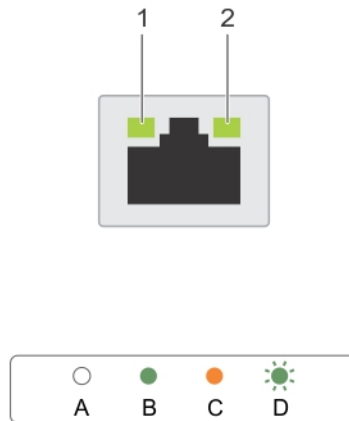
- 1. Link indicator

2. Activity indicator

**Table 2. QSFP port on OCP card indicator codes**

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

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



**Figure 4. Ethernet port indicator codes**

1. Speed indicator
2. Link and activity indicator

**Table 3. Ethernet port indicator codes**

Convention	Status	Condition
A	Link and activity indicators are off	The NIC is not connected to the network.
B	Link indicator is green	The NIC is connected to a valid network at its maximum port speed.
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.

# Sled to hard drive mapping

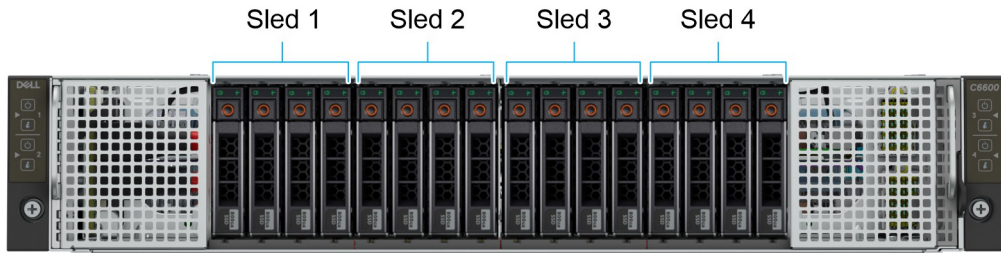


Figure 5. Sled to drive mapping for 16 x 2.5-inch drive configuration

1. Drives 0–3 mapped to sled 1
2. Drives 4–7 mapped to sled 2
3. Drives 8–11 mapped to sled 3
4. Drives 12–15 mapped to sled 4

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

## C6600 chassis options and drive enumerations

### C6600 chassis - 16 x 2.5-inch SAS/SATA drive configuration

The C6600 chassis with 16 x 2.5-inch SAS/SATA drive configuration supports SAS/SATA backplane and up to four SAS/SATA drives per C6615 sled and a total of 16 SAS/SATA drives per chassis.

### C6600 chassis - 16 x 2.5-inch SATA/NVMe Universal backplane configuration

The C6600 chassis supports with 16 x 2.5-inch SATA/NVMe Universal backplane configuration supports SATA/NVMe backplane and up to four NVMe drives per sled and a total of 16 NVMe drives per chassis.

**NOTE:**

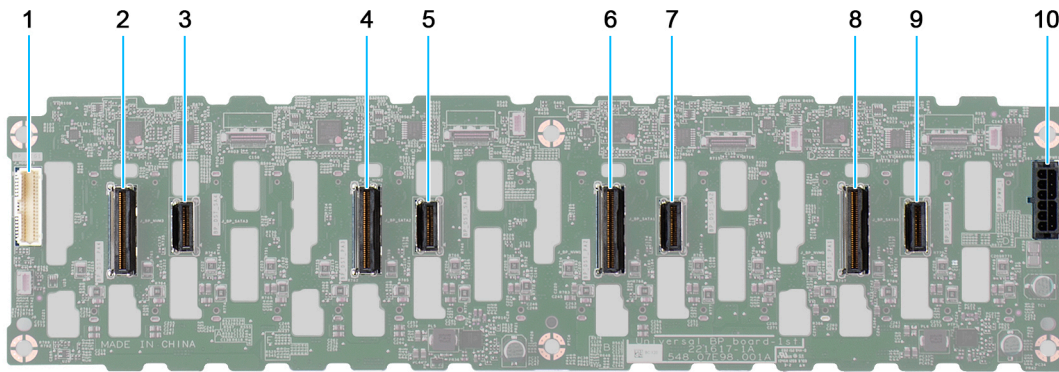
- The chassis is optimized for High-Performance Computing (HPC), High Performance Data Analytics (HPDA), Saas/laaS, Financial Modeling, vSAN.
- Using an M.2 boot drive in each C6615 sled enables use of front 2.5-inch drives entirely for application data.
- An NVMe PCI card can be used in the LP slot in each C6615 to provide high performance storage for say writes/cache.



Figure 6. C6600 chassis - 16 x 2.5-inch SAS/SATA backplane with four C6615 sleds



**Figure 7. C6600 chassis - 16 x 2.5-inch SATA/NVMe Universal backplane configuration with four C6615 sleds**



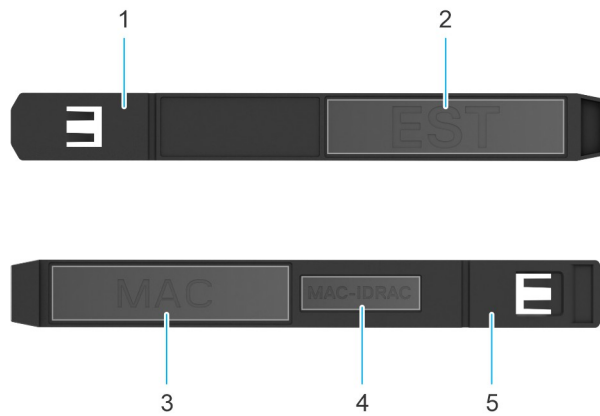
**Figure 8. 16 x 2.5-inch drive Universal Backplane**

- |                                                      |                                          |
|------------------------------------------------------|------------------------------------------|
| 1. BP_SIG_1 (Backplane signal cable to system board) | 2. BP_DST_PA4                            |
| 3. BP_DST_SA4                                        | 4. BP_DST_PA3                            |
| 5. BP_DST_SA3                                        | 6. BP_DST_PA2                            |
| 7. BP_DST_SA2                                        | 8. BP_DST_PA1                            |
| 9. BP_DST_SA1                                        | 10. BP_PWR_1 (Backplane Power connector) |

## Locating the Express Service Code and Service Tag

The unique Express Service Code and Service Tag are used to identify the system.

The information tag is located on the rear of the system that includes system information such as the Service Tag, Express Service Code, Manufacture date, NIC, MAC address, QRL label, and so on.



**Figure 9. Locating the Service Tag of your system**

1. Information tag (top view)
2. Express Service Tag label
3. MAC address information label
4. iDRAC MAC address information label
5. Information tag (bottom view)

Alternatively, the Service Tag information is located on a label on the left wall of the chassis.

# System information label

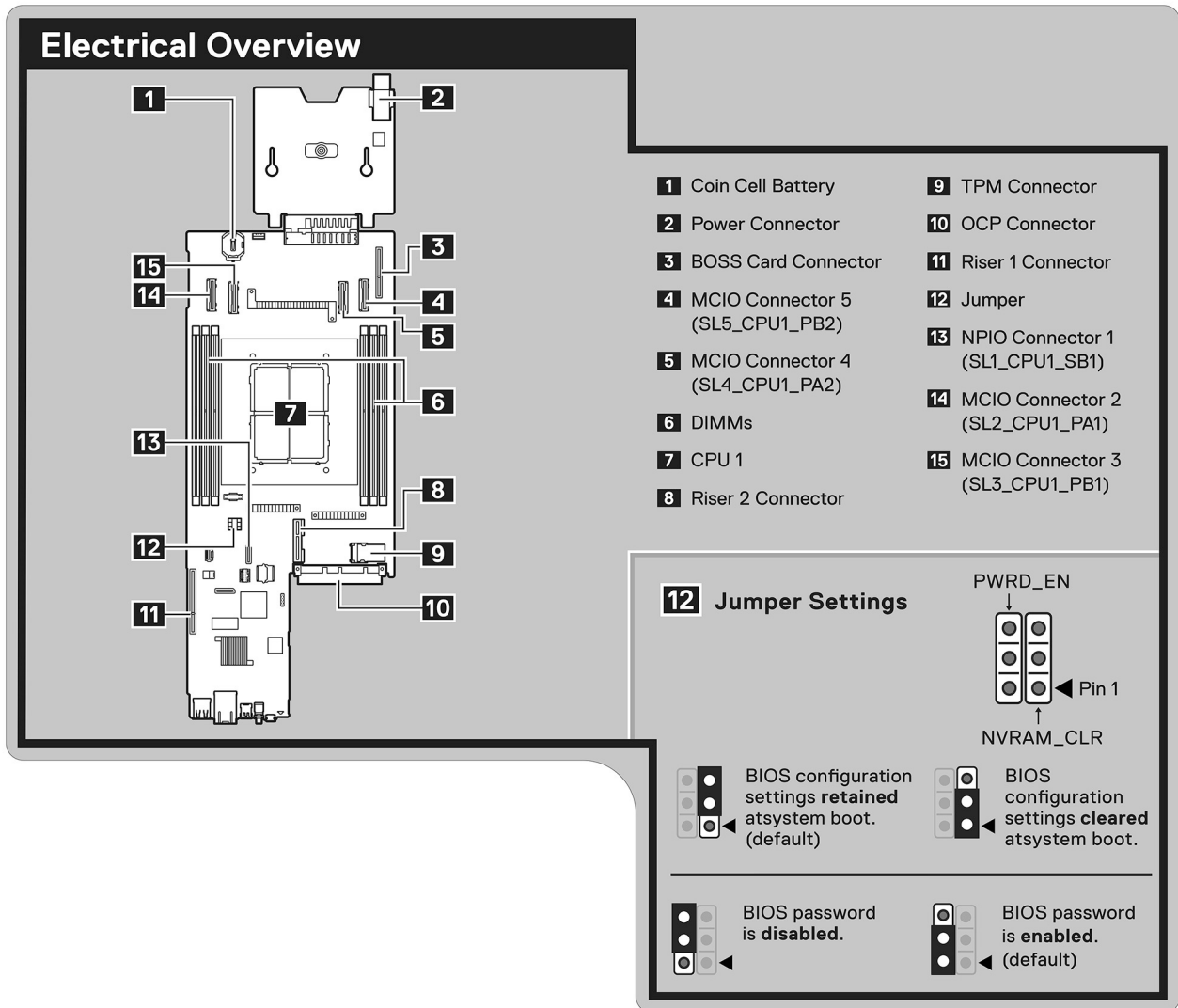


Figure 10. System board connections and Jumper settings

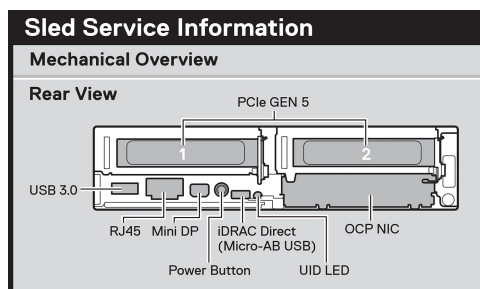


Figure 11. Mechanical Overview

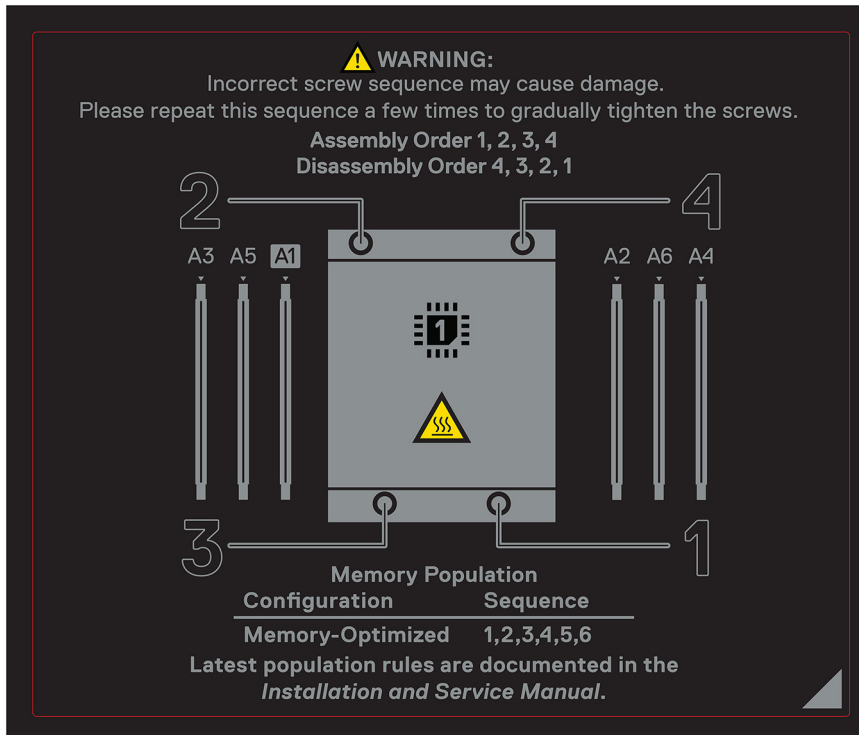


Figure 12. Heatsink and Memory population information

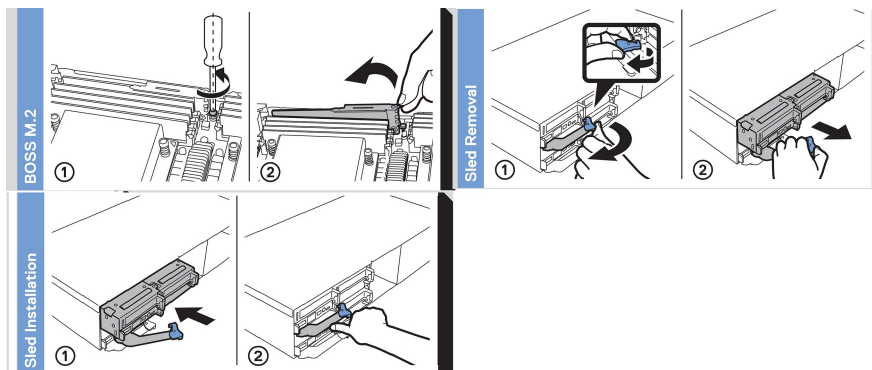


Figure 13. System tasks: BOSS M.2, Sled install and remove

## Technical specifications

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

### Topics:

- Sled dimensions
- System weight
- Processor specifications
- PSU specifications
- Supported operating systems
- System battery specifications
- Expansion card riser specifications
- Memory specifications
- Storage controller specifications
- Drives
- Ports and connectors specifications
- Video specifications
- Environmental specifications

## Sled dimensions

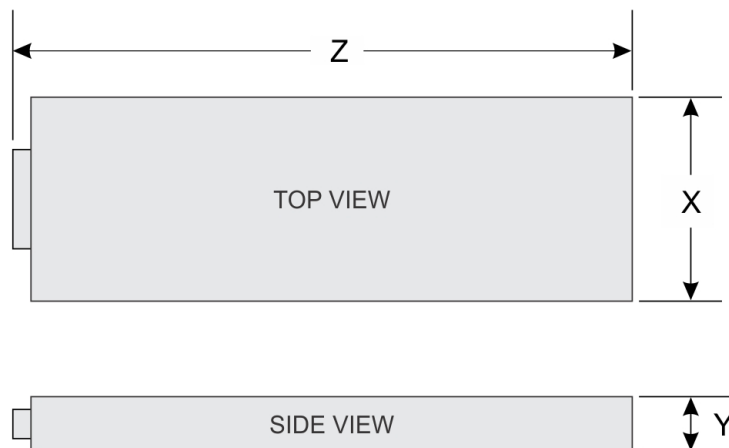


Figure 14. Sled dimensions

Table 4. PowerEdge C6615 sled dimensions

X	Y	Z
174.4 mm (6.86 inches)	40.0 mm (1.57 inches)	549.7 mm (21.64 inches) - diskless configuration 561.3 mm (22.10 inches) - SAS/SATA or NVMe or E3.S or Universal configuration



# System weight

**Table 5. PowerEdge C6615 system weight**

System configuration	Maximum weight
Air cooling	3.7 kg (8.15 pounds)

# Processor specifications

**Table 6. PowerEdge C6615 processor specifications**

Supported processor	Number of processors supported
AMD EPYC™ processor with up to 64 cores	One

# PSU specifications

The PowerEdge C6615 system supports up to two AC or DC power supply units (PSUs).

**Table 7. PSU specifications**

PSU	Class	Heat dissipation (maximum) (BTU/hr)	Frequency (Hz)	Voltage	AC		DC	Current (A)
					High line wattage	Low line wattage		
3200 W	NA	12000 BTU/hr	NA	336 V DC	NA	NA	3200 W	11.5 A
	NA		50/60 Hz	277 V AC	3200 W	NA	NA	13.0 A
2800 W	NA	10500 BTU/hr	NA	240 V DC	NA	NA	2800 W	13.6 A
	Titanium		50/60 Hz	200-240 V AC	2800 W	NA	NA	15.6 A
2400 W	NA	9000 BTU/hr	NA	240 V DC	NA	NA	2400 W	11.2 A
	Platinum		50/60 Hz	100-240 V AC	2400 W	1400 W	NA	16-13.5 A
1800 W	NA	6610 BTU/hr	NA	240 VDC	NA	NA	1800 W	8.2 A
	Titanium		50/60 Hz	200-240 V AC	1800 W	NA	NA	10 A

- NOTE:** Heat dissipation is calculated using the PSU wattage rating.
- NOTE:** When selecting or upgrading the system configuration, to ensure optimum power utilization, verify the system power consumption with the Enterprise Infrastructure Planning Tool available at [Dell.com/calc](http://Dell.com/calc).
- NOTE:** If a system with AC 2400 W PSUs operates at low line 100-120 Vac, then the power rating per PSU is degraded to 1400 W.



**Figure 15. PSU power cords**

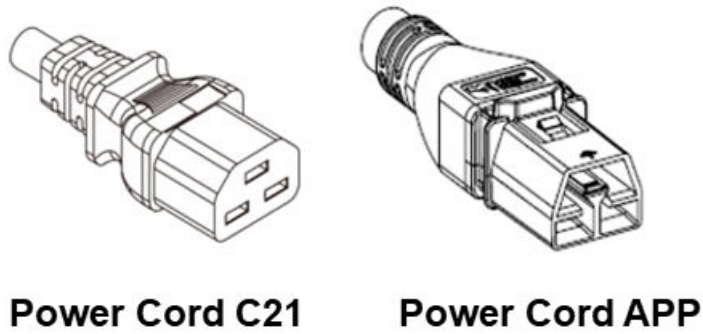


Figure 16. Types of PSU power cords

Table 8. PSU power cords

Form factor	Output	Power cord
Redundant 60 mm	1800 W AC	C15
Redundant 86 mm	2400 W AC	C19
	2800 W AC	C21
	3200 W AC	APP 2006G1

**NOTE:** C19 power cord combined with C20 to C21 jumper power cord can be used to adapt 2800 W PSU.

**NOTE:** C13 power cord combined with C14 to C15 jumper power cord can be used to adapt 1800 W PSU.

## Supported operating systems

The PowerEdge C6615 system supports the following operating systems:

- Canonical Ubuntu Server LTS
- Microsoft Windows Server with Hyper-V
- Red Hat Enterprise Linux
- SUSE Linux Enterprise Server
- VMware vSAN/ESXi

For more information, go to [www.dell.com/ossupport](http://www.dell.com/ossupport).

## System battery specifications

The PowerEdge C6615 system supports CR 2032 3.0-V lithium coin cell system battery.

## Expansion card riser specifications

The PowerEdge C6615 system supports up to two PCI express (PCIe Gen5) slots on the system board.

Table 9. Expansion card slots supported on the system board

PCIe slot	Expansion card riser	Processor connection	Height	Length	Slot width
Slot 1	Riser 1A	Processor 1	Low Profile	Half length	PCIe Gen5 x16

**Table 9. Expansion card slots supported on the system board (continued)**

PCIe slot	Expansion card riser	Processor connection	Height	Length	Slot width
Slot 2	Riser 2C	Processor 1	Low Profile	Half length	PCIe Gen5 x16

## Memory specifications

The PowerEdge C6615 system supports the following memory specifications for optimized operation.

**Table 10. Memory specifications**

DIMM type	DIMM rank	DIMM capacity	Single processor	
			Minimum system capacity	Maximum system capacity
DDR5 RDIMM	Single rank	16 GB	16 GB	96 GB
	Dual rank	32 GB	32 GB	192 GB
		64 GB	64 GB	384 GB

**NOTE:** DDR4 DIMMs are not supported in the C6615 system.

**NOTE:** Mixing of DIMMs with different memory capacities is not supported.

**Table 11. Memory module sockets**

Memory module sockets	Speed
6, 288-pin	4800 MT/s

**NOTE:** Memory DIMM slots are not hot swappable.

## Storage controller specifications

The PowerEdge C6615 system supports the following controller cards:

**Table 12. Storage controller cards**

Supported storage controller cards
Internal controllers <ul style="list-style-type: none"> <li>PERC H755N</li> <li>PERC H355</li> </ul>
Internal Boot <ul style="list-style-type: none"> <li>Boot Optimized Storage Subsystem (NVMe BOSS-N1): HWRAID 1, 2 x M.2 SSDs</li> </ul>
Software RAID <ul style="list-style-type: none"> <li>S160</li> </ul>
SAS Hot Bus Adapters (HBA) <ul style="list-style-type: none"> <li>HBA355i</li> </ul>

## Drives

The PowerEdge C6615 system supports:

- Up to 16 x 2.5-inch SAS/SATA (HDD/SSD) drives

- Up to 16 x 2.5-inch SATA/NVMe drives on Universal Backplane configuration

**i** **NOTE:** For more information about how to hot swap NVMe PCIe SSD U.2 device, see the *Dell Express Flash NVMe PCIe SSD User's Guide* at <https://www.dell.com/support> > **Browse all Products** > **Data Center Infrastructure** > **Storage Adapters & Controllers** > **Dell PowerEdge Express Flash NVMe PCIe SSD** > **Documentation** > **Manuals and Documents**.

## Ports and connectors specifications

### USB ports specifications

The PowerEdge C6615 system supports one USB 3.0 on the rear of the system.

### Display port specifications

The PowerEdge C6615 system supports one Mini-DisplayPort on the rear of the system.

### NIC port specifications

The PowerEdge C6615 system supports up to two 10/100/1000 Mbps Network Interface Controller (NIC) ports embedded on the LAN on Motherboard (LOM) and integrated on the optional Open Compute Project (OCP) cards.

**Table 13. NIC port specification for the system**

Feature	Specifications
LOM card	1 GbE x 1
OCP card (OCP 3.0)	1 GbE x 4, 10 GbE x 2, 25 GbE x 2, 25 GbE x 4

### iDRAC port specifications

The PowerEdge C6615 system supports one iDRAC Direct port (Micro-AB USB 2.0-compliant port) on the rear of the system.

## Video specifications

The PowerEdge C6615 system supports integrated Matrox G200 graphics controller from mini-DP display port.

**Table 14. Supported video resolution options**

Resolution	Refresh rate (Hz)	Color depth (bits)
640 x 480	60	8, 16, 32
800 x 600	60	8, 16, 32
1024 x 768	60	8, 16, 32
1280 x 800	60	8, 16, 32
1280 x 1024	60	8, 16, 32
1360 x 768	60	8, 16, 32
1600 x 900	60	8, 16, 32
1600 x 900	60	8, 16, 32
1680 x 1050	60	8, 16, 32

**Table 14. Supported video resolution options (continued)**

Resolution	Refresh rate (Hz)	Color depth (bits)
1920 x 1080	60	8, 16, 32
1920 x 1200	60	8, 16, 32

## Environmental specifications

**Table 15. Continuous Operation Specifications for ASHRAE A3**

Continuous Operation Specifications for ASHRAE A3	
Temperature range for altitudes <= 900 m (<= 2953 ft)	5 — 40°C (41-104°F) with no direct sunlight on the equipment
Humidity percent range (non-condensing at all times)	8% RH with -12°C minimum dew point to 85% RH with 24°C (75.2°F) maximum dew point
Operational altitude de-rating	Maximum temperature is reduced by 1°C/175 m (33.8°F/574 Ft) above 900 m (2953 Ft)

**Table 16. Continuous Operation Specifications for ASHRAE A4**

Continuous Operation Specifications for ASHRAE A3	
Temperature range for altitudes <= 900 m (<= 2953 ft)	5 — 45°C (41-113°F) with no direct sunlight on the equipment
Humidity percent range (non-condensing at all times)	8% RH with -12°C minimum dew point to 90% RH with 24°C (75.2°F) maximum dew point
Operational altitude de-rating	Maximum temperature is reduced by 1°C/125 m (33.8°F/410 Ft) above 900 m (2953 Ft)

**Table 17. Common Environmental Specifications for ASHRAE A3 and A4**

Continuous Operation Specifications for ASHRAE A3	
Maximum temperature gradient (applies to both operation and non-operation)	20°C in an hour* (36°F in an hour) and 5°C in 15 minutes (41°F in 15 minutes), 5°C in an hour* (41°F in an hour) for tape <i>i</i> <b>NOTE:</b> Per ASHRAE thermal guidelines for tape hardware, these are not instantaneous rates of temperature change.
Non-operational temperature limits	-40 to 65°C (-104 to 149°F)
Non-operational humidity limits	5% to 95% RH with 27°C (80.6°F) maximum dew point
Maximum non-operational altitude	12,000 meters (39,370 feet)
Maximum operational altitude	3,048 meters (10,000 feet)

## Thermal air restrictions

### Thermal air restrictions

### ASHRAE A3/A4 configuration restriction

- NVMe SSD and EDSFF are not supported
- A2 GPU is not supported

- 96GB Samsung, 128GB and 256GB DIMM is not supported
- CPU TDP Restriction
  - Air cooled, 2.5-inch chassis
    - Maximum supported CPU TDP is 150W

**Table 18. DIMM blank requirements**

<b>CPU installed</b>	<b>1x socket configuration</b>
<b>DIMM slots of</b>	<b>CPU1 slot</b>
DIMM blank requirement	Yes

- All sled slots must be fully populated or blanked
- All HDD slots must be fully populated or blanked
- BOSS card slot must be populated or blanked
- All PSU slots must be fully populated or blanked
- All E3.s slots must be fully populated or blanked

## Thermal restriction matrix

**Table 19. Supported ambient temperature- 2.5-inch SAS/SATA, Universal Chassis, air cooled**

<b>Processor</b>	<b>TDP</b>	<b>Mac cTDP</b>	<b>Cores</b>	<b>DIMM Capacity ≤ 64GB/DIMM</b>
8534P	200 W	225 W	64	35
8324P	200 W	225 W	32	35

# Initial system setup and configuration

This section describes the tasks for initial setup and configuration of the Dell system. The section also provides general steps to set up the system and the reference guides for detailed information.

## Topics:

- [Setting up the system](#)
- [iDRAC configuration](#)
- [Resources to install operating system](#)


## Setting up the system

Perform the following steps to set up the system:

### Steps

1. Unpack the system.
2. Install the system into the rack. For more information, see the rail installation and cable management accessory guides relevant to your rail and cable management solution at [www.dell.com/poweredgemanuals](http://www.dell.com/poweredgemanuals).
3. Connect the peripherals to the system and the system to the electrical outlet.
4. Power on the system.

For more information about setting up the system, see the *Getting Started Guide* that is shipped with your system.


 **NOTE:** For information about managing the basic settings and features of the system, see the [Pre-operating system management applications](#) chapter.

## iDRAC configuration

The Integrated Dell Remote Access Controller (iDRAC) is designed to make you more productive as a system administrator and improve the overall availability of Dell servers. iDRAC alerts you to system issues, helps you to perform remote management, and reduces the need for physical access to the system.

### Options to set up iDRAC IP address

To enable communication between your system and iDRAC, you must first configure the network settings based on your network infrastructure. The network settings option is set to **DHCP**, by default.




 **NOTE:** For static IP configuration, you must request for the settings at the time of purchase.


You can set up the iDRAC IP address using one of the interfaces in the table below. For information about setting up iDRAC IP address, see the documentation links provided in the table below.

**Table 20. Interfaces to set up iDRAC IP address**

Interface	Documentation links
iDRAC Settings utility	<i>Integrated Dell Remote Access Controller User's Guide</i> at <a href="https://www.dell.com/idracmanuals">https://www.dell.com/idracmanuals</a> or for system specific <i>Integrated Dell Remote Access Controller User's Guide</i> , go to <a href="https://www.dell.com/poweredgemanuals">https://www.dell.com/poweredgemanuals</a> > <b>Product Support</b> page of your system > <b>Documentation</b> .

**Table 20. Interfaces to set up iDRAC IP address (continued)**

Interface	Documentation links
	<p> <b>NOTE:</b> To determine the most recent iDRAC release for your platform and for latest documentation version, see KB article <a href="https://www.dell.com/support/article/sln000178115">https://www.dell.com/support/article/sln000178115</a>.</p>
OpenManage Deployment Toolkit	<p><i>Dell OpenManage Deployment Toolkit User's Guide</i> available at <a href="https://www.dell.com/openmanagemanuals">https://www.dell.com/openmanagemanuals</a> &gt; Open Manage Deployment Toolkit.</p>
iDRAC Direct	<p><i>Integrated Dell Remote Access Controller User's Guide</i> at <a href="https://www.dell.com/idracmanuals">https://www.dell.com/idracmanuals</a> or for system specific <i>Integrated Dell Remote Access Controller User's Guide</i>, go to <a href="https://www.dell.com/poweredgemanuals">https://www.dell.com/poweredgemanuals</a> &gt; <b>Product Support</b> page of your system &gt; <b>Documentation</b>.</p> <p> <b>NOTE:</b> To determine the most recent iDRAC release for your platform and for latest documentation version, see KB article <a href="https://www.dell.com/support/article/sln000178115">https://www.dell.com/support/article/sln000178115</a>.</p>
Lifecycle Controller	<p><i>Dell Lifecycle Controller User's Guide</i> at <a href="https://www.dell.com/idracmanuals">https://www.dell.com/idracmanuals</a> or for system specific <i>Dell Lifecycle Controller User's Guide</i>, go to <a href="https://www.dell.com/poweredgemanuals">https://www.dell.com/poweredgemanuals</a> &gt; <b>Product Support</b> page of your system &gt; <b>Documentation</b>.</p> <p> <b>NOTE:</b> To determine the most recent iDRAC release for your platform and for latest documentation version, see KB article <a href="https://www.dell.com/support/article/sln000178115">https://www.dell.com/support/article/sln000178115</a>.</p>

 **NOTE:** To access iDRAC, ensure that you connect the ethernet cable to the iDRAC dedicated network port or use the iDRAC Direct port by using the micro USB (type AB) cable. You can also access iDRAC through the shared mode, if the system is set it to share iDRAC port with OS as an OS NIC or shared LOM mode enabled.

## Options to log in to iDRAC

To log in to the iDRAC Web User Interface, open a browser and enter the IP address.


You can log in to iDRAC as:

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

In the login screen displayed, if you have opted for secure default access to iDRAC, the default username is `root` and enter the iDRAC secure default password available on back of the Information Tag. If you opted for legacy password, use the iDRAC legacy username and password - `root` and `calvin`, the iDRAC default password will be blank on the information tag. Then you will be prompted and required to create a password of your choice before proceeding. You can also log in by using your Single Sign-On or Smart Card.

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

For more information about logging in to the iDRAC and iDRAC licenses, see the latest *Integrated Dell Remote Access Controller User's Guide* at [www.dell.com/idracmanuals](http://www.dell.com/idracmanuals).

 **NOTE:** To determine the most recent iDRAC release for your platform and for latest documentation version, see KB article <https://www.dell.com/support/article/sln000178115>.

You can also access iDRAC using command-line protocol - RACADM. For more information, see the *Integrated Dell Remote Access Controller RACADM CLI Guide* available at <https://www.dell.com/idracmanuals>.



You can also access iDRAC using automation tool - Redfish API. For more information, see the *Integrated Dell Remote Access Controller User's Guide Redfish API Guide* available at <https://developer.dell.com>.

## Resources to install operating system

If the system is shipped without an operating system, you can install a supported operating system by using one of the resources provided in the table below. For information about how to install the operating system, see the documentation links provided in the table below.

**Table 21. Resources to install the operating system**

Resource	Documentation links
iDRAC	<i>Integrated Dell Remote Access Controller User's Guide</i> at <a href="https://www.dell.com/idracmanuals">https://www.dell.com/idracmanuals</a> or for system specific <i>Integrated Dell Remote Access Controller User's Guide</i> , go to <a href="https://www.dell.com/poweredgemanuals">https://www.dell.com/poweredgemanuals</a> > <b>Product Support</b> page of your system > <b>Documentation</b> . <i>NOTE:</i> To determine the most recent iDRAC release for your platform and for latest documentation version, see KB article at <a href="https://www.dell.com/support/article/sln000178115">https://www.dell.com/support/article/sln000178115</a> .
Lifecycle Controller	<i>Dell Lifecycle Controller User's Guide</i> at <a href="https://www.dell.com/idracmanuals">https://www.dell.com/idracmanuals</a> or for system specific <i>Dell Lifecycle Controller User's Guide</i> , go to <a href="https://www.dell.com/poweredgemanuals">https://www.dell.com/poweredgemanuals</a> > <b>Product Support</b> page of your system > <b>Documentation</b> . Dell recommends using Lifecycle Controller to install the OS, since all required drivers are installed on the system. <i>NOTE:</i> To determine the most recent iDRAC release for your platform and for latest documentation version, see KB article at <a href="https://www.dell.com/support/article/sln000178115">https://www.dell.com/support/article/sln000178115</a> .
Dell certified VMware ESXi	<a href="http://www.dell.com/virtualizationsolutions">www.dell.com/virtualizationsolutions</a>

## Options to download and install OS drivers

You can choose any one of the following options to download and install OS drivers. For information about how to download or install OS drivers, see the documentation links provided in the table below.

**Table 22. Options to download and install OS drivers**

Option	Documentation
Dell support site	<a href="#">Downloading drivers and firmware</a> section.
iDRAC virtual media	<i>Integrated Dell Remote Access Controller User's Guide</i> or for system specific, go to <i>Integrated Dell Remote Access Controller User's Guide</i> > <b>Product Support</b> page of your system > <b>Documentation</b> . <i>NOTE:</i> To determine the most recent iDRAC release for your platform and for latest documentation version, see <a href="http://www.dell.com/support/article/sln000178115">www.dell.com/support/article/sln000178115</a> .

## Downloading drivers and firmware

It is recommended that you download and install the latest BIOS, drivers, and systems management firmware on the system.

### Prerequisites

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

### Steps

1. Go to [www.dell.com/support/drivers](http://www.dell.com/support/drivers).

2. Enter the Service Tag of the system in the **Enter a Dell Service Tag, Dell Product ID or Model** field, and then press Enter.

 **NOTE:** If you do not have the Service Tag, click **Browse all products**, and navigate to your product.

3. On the displayed product page, click **Drivers & Downloads**.  
On the **Drivers & Downloads** page, all drivers that are applicable to the system are displayed.
4. Download the drivers to a USB drive, CD, or DVD.

# Pre-operating system management applications

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

## Options to manage the pre-operating system applications

You can use any one of the following options to manage the pre-operating system applications:

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

### Topics:

- [System Setup](#)
- [Dell Lifecycle Controller](#)
- [Boot Manager](#)
- [PXE boot](#)


## System Setup

Using the **System Setup** option, you can configure the BIOS settings, iDRAC settings, and device settings of the system.

You can access system setup by using any one of the following interfaces:

- Graphical User interface — To access go to iDRAC Dashboard, click **Configuration**, and click **BIOS Settings**.
- Text browser — The browser is enabled by using Console Redirection.

To view **System Setup**, power on the system, press F2, and click **System Setup Main Menu**.

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

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


**Table 23. System Setup Main Menu**

Option	Description
<b>System BIOS</b>	Enables you to configure the BIOS settings.
<b>iDRAC Settings</b>	Enables you to configure the 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 <i>Integrated Dell Remote Access Controller User's Guide</i> at <a href="http://www.dell.com/poweredgemanuals">www.dell.com/poweredgemanuals</a> .
<b>Device Settings</b>	Enabled you to configure device settings for devices such as storage controllers or network cards.

## System BIOS

To view the **System BIOS** screen, power on the system, press F2, and click **System Setup Main Menu > System BIOS**.

**Table 24. System BIOS details**

Option	Description
<b>System Information</b>	Provides information about the system such as the system model name, BIOS version, and Service Tag.
<b>Memory Settings</b>	Specifies information and options related to the installed memory.
<b>Processor Settings</b>	Specifies information and options related to the processor such as speed and cache size.
<b>SATA Settings</b>	Specifies options to enable or disable the integrated SATA controller and ports.
<b>NVMe Settings</b>	Specifies options to change the NVMe settings. If the system contains the NVMe drives that you want to configure in a RAID array, you must set both this field and the <b>Embedded SATA</b> field on the <b>SATA Settings</b> menu to <b>RAID</b> mode. You might also need to change the <b>Boot Mode</b> setting to <b>UEFI</b> . Otherwise, you should set this field to <b>Non-RAID</b> mode.
<b>Boot Settings</b>	Specifies options to specify the Boot mode (BIOS or UEFI). Enables you to modify UEFI and BIOS boot settings.
<b>Network Settings</b>	Specifies options to manage the UEFI network settings and boot protocols.  Legacy network settings are managed from the <b>Device Settings</b> menu.   <b>NOTE:</b> Network Settings are not supported in BIOS boot mode.
<b>Integrated Devices</b>	Specifies options to manage integrated device controllers and ports, specifies related features, and options.
<b>Serial Communication</b>	Specifies options to manage the serial ports, its related features, and options.
<b>System Profile Settings</b>	Specifies options to change the processor power management settings, memory frequency.
<b>System Security</b>	Specifies options to configure the system security settings, such as system password, setup password, Trusted Platform Module (TPM) security, and UEFI secure boot. It also manages the power button on the system
<b>Redundant OS Control</b>	Sets the redundant OS information for redundant OS control.
<b>Miscellaneous Settings</b>	Specifies options to change the system date and time.

## System Information

To view the **System Information** screen, power on the system, press F2, and click **System Setup Main Menu > System BIOS > System Information**.

**Table 25. System Information details**

Option	Description
<b>System Model Name</b>	Specifies the system model name.
<b>System BIOS Version</b>	Specifies the BIOS version installed on the system.
<b>System Service Tag</b>	Specifies the system Service Tag.
<b>System Manufacturer</b>	Specifies the name of the system manufacturer.
<b>System Manufacturer Contact Information</b>	Specifies the contact information of the system manufacturer.

**Table 25. System Information details (continued)**

Option	Description
<b>System CPLD Version</b>	Specifies the current version of the system complex programmable logic device (CPLD) firmware.
<b>UEFI Compliance Version</b>	Specifies the UEFI compliance level of the system firmware.
<b>AGESA Version</b>	Specifies the AGESA reference code version.
<b>SMU Version</b>	Specifies the SMU firmware version.
<b>MPIO Version</b>	Specifies the MPIO firmware version.



## Memory Settings

To view the **Memory Settings** screen, power on the system, press F2, and click **System Setup Main Menu > System BIOS > Memory Settings**.

## Processor Settings

To view the **Processor Settings** screen, power on the system, press F2, and click **System Setup Main Menu > System BIOS > Processor Settings**.

**Table 26. Processor Settings details**

Option	Description
<b>Logical Processor</b>	Each processor core supports up to two logical processors. If this option is set to <b>Enabled</b> , the BIOS displays all the logical processors. If this option is set to <b>Disabled</b> , the BIOS displays only one logical processor per core. This option is set to <b>Enabled</b> by default.
<b>Virtualization Technology</b>	Enables or disables the virtualization technology for the processor. This option is set to <b>Enabled</b> by default.
<b>IOMMU Support</b>	Enable or Disable IOMMU support. It is required to create IVRS ACPI table. This option is set to <b>Enabled</b> by default.
<b>Kernel DMA Protection</b>	When this option is set to Enabled, using IOMMU, BIOS, and the Operating System will enable direct memory access protection for DMA capable peripheral devices. Enable <b>IOMMU Support</b> to use this option. This option is set to <b>Disabled</b> by default. When set to Enabled by using Virtualization Technology, BIOS and Operating System will enable direct memory access protection for DMA capable peripheral devices. Enable Virtualization Technology to use this option.
<b>L1 Stream HW Prefetcher</b>	Enables or disables the L1 stream hardware prefetcher. This option is set to <b>Enabled</b> by default.
<b>L2 Stream HW Prefetcher</b>	Enables or disables the L2 stream hardware prefetcher. This option is set to <b>Enabled</b> by default.
<b>L1 Stride Prefetcher</b>	Enables or disables the L1 stride prefetcher. This option is set to <b>Enabled</b> by default, as it optimizes overall workload.  <b>NOTE:</b> This option is only available for 4 <sup>th</sup> Generation AMD EPYC processors.
<b>L1 Region Prefetcher</b>	Enables or disables the L1 region prefetcher. This option is set to <b>Enabled</b> by default, as it optimizes overall workload.  <b>NOTE:</b> This option is only available for 4 <sup>th</sup> Generation AMD EPYC processors.

**Table 26. Processor Settings details (continued)**

Option	Description
<b>L2 Up Down Prefetcher</b>	Enables or disables the L2 up down prefetcher. This option is set to <b>Enabled</b> by default, as it optimizes overall workload. <b>i</b> <b>NOTE:</b> This option is only available for 4 <sup>th</sup> Generation AMD EPYC processors.
<b>MADT Core Enumeration</b>	Specifies the MADT Core Enumeration. This option is set to <b>Linear</b> by default.
<b>NUMA Nodes Per Socket</b>	Specifies the number of NUMA nodes per socket. This option is set to <b>1</b> by default.
<b>L3 cache as NUMA Domain</b>	The L3 cache as NUMA Domain option can be set to <b>Enabled</b> , <b>Disabled</b> or <b>Auto</b> . This option is set to <b>Disabled</b> by default.
<b>Secure Memory Encryption</b>	Enables or disables the AMD secure encryption features such as <b>SME</b> and <b>Secure Encrypted Virtualization (SEV)</b> . It also determines if other secure encryption features such as <b>TSME</b> and <b>SEV-SNP</b> can be enabled. This option is set to <b>Disabled</b> by default. <b>i</b> <b>NOTE:</b> This option is only available for 4 <sup>th</sup> Generation AMD EPYC processors.
<b>Minimum SEV non-ES ASID</b>	Determines the number of Secure Encrypted Virtualization ES and non-ES available Address Space IDs. This option is set to <b>1</b> by default.
<b>Secured Nested Paging (SNP)</b>	Enables or disables SEV-SNP, a set of additional security protections. This option is set to <b>Disabled</b> by default.
<b>SNP Memory Coverage</b>	This option selects the operating mode of the Nested Paging (SNP) Memory and the reverse Map Table(RMP). The RMP is used to ensure a one-to-one mapping between system physical addresses and guest physical addresses
<b>Transparent Secure Memory Encryption</b>	Enables or disables the <b>TSME</b> . <b>TSME</b> is always-on memory encryption that does not require OS or hypervisor support. This option is set to <b>Disabled</b> by default. <ul style="list-style-type: none"> <li>• If the OS supports <b>SME</b>, do not enable this field.</li> <li>• If the hypervisor supports <b>SEV</b>, do not enable this field.</li> </ul> Enabling <b>TSME</b> affects the system memory performance.
<b>ACPI CST C2 Latency</b>	Enter in 18-1000 microseconds (decimal value). Larger C2 latency values will reduce the number of C2 transitions and reduce C2 residency. Fewer transitions can help when performance is sensitive to the latency of C2 entry and exit. Higher residency can improve performance by allowing higher frequency boost and reduce idle core power. With Linux kernel 6.0 or later, the C2 transition cost is significantly reduced. The best value will be dependent on kernel version, use case, and workload.
<b>Configurable TDP</b>	Allows the reconfiguration of the processor Thermal Design Power (TDP) levels based on the power and thermal delivery capabilities of the system. TDP refers to the maximum amount of power the cooling system is required to dissipate. This option is set to <b>Maximum</b> by default. <b>i</b> <b>NOTE:</b> This option is only available on certain SKUs of the processors, and the number of alternative levels varies as well.

**Table 26. Processor Settings details (continued)**

Option	Description
<b>x2APIC Mode</b>	Enables or disables x2APIC mode. This option is set to <b>Enabled</b> by default. <i>i</i> <b>NOTE:</b> For two CPU 64 cores configuration, x2APIC mode is not switchable if 256 threads are enabled (BIOS settings: All CCD, cores, and logical processors enabled).
<b>Number of CCDs per Processor</b>	Controls the number of enabled CCDs in each processor. This option is set to <b>All</b> by default.
<b>Number of Cores per CCD</b>	Specifies the number of cores per CCD. This option is set to <b>All</b> by default.
<b>Processor Core Speed</b>	Specifies the maximum core frequency of the processor.
<b>Processor n</b>	<i>i</i> <b>NOTE:</b> Depending on the number of CPUs, there might be up to n processors listed.  The following settings are displayed for each processor that is installed in the system:

**Table 27. Processor n details**

Option	Description
<b>Family-Model-Stepping</b>	Specifies the family, model, and stepping of the processor as defined by AMD.
<b>Brand</b>	Specifies the brand name.
<b>Level 2 Cache</b>	Specifies the total L2 cache.
<b>Level 3 Cache</b>	Specifies the total L3 cache.
<b>Number of Cores</b>	Specifies the number of cores per processor.
<b>Microcode</b>	Specifies the processor microcode version.

## SATA Settings

To view the **SATA Settings** screen, power on the system, press F2, and click **System Setup Main Menu > System BIOS > SATA Settings**.

**Table 28. SATA Settings details**

Option	Description
<b>Embedded SATA</b>	Enables the embedded SATA option to be set to <b>Off</b> , <b>AHCI mode</b> , or <b>RAID modes</b> . This option is set to <b>AHCI Mode</b> by default. <i>i</i> <b>NOTE:</b> <ol style="list-style-type: none"> <li>You might also need to change the Boot Mode setting to UEFI. Otherwise, you should set the field to Non-RAID mode.</li> <li>No ESXi and Ubuntu OS support under RAID mode.</li> </ol>
<b>Security Freeze Lock</b>	Sends <b>Security Freeze Lock</b> command to the embedded SATA drives during POST. This option is applicable only for AHCI Mode. This option is set to <b>Enabled</b> by default.
<b>Write Cache</b>	Enables or disables the command for the embedded SATA drives during POST. This option is set to <b>Disabled</b> by default.

## NVMe Settings

To view the **NVMe Settings** screen, power on the system, press F2, and click **System Setup Main Menu > System BIOS > NVMe Settings**

**Table 29. NVMe Settings details**

Option	Description
<b>NVMe Mode</b>	This option sets the NVMe drive mode. If the system contains NVMe drives that you want to configure in a RAID array, you must set both this field and the Embedded SATA field on the SATA settings menu to RAID Mode. You may also need to change the Boot Mode setting to UEFI. The option is set to <b>Non-RAID</b> mode by default.
<b>BIOS NVMe Driver</b>	Dell Qualified NVMe drives always use the UEFINVMe driver built into the Dell EROS. When this option is set to 'All Drives', the BIOS driver will also be used with any NVMe drives in the system that has not been qualified by Dell. The option is set to <b>Dell Qualified Drives</b> by default. <i>i</i> <b>NOTE:</b> When this option is set to 'All Drives' and non-Dell qualified NVMe drives are present, you have a configuration that has not been validated which may lead to unexpected behavior.

## 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.

- **UEFI:** The Unified Extensible Firmware Interface (UEFI) is a new interface between operating systems and platform firmware. The interface consists of data tables with platform related information, boot and runtime service calls that are available to the operating system and its loader. The following benefits are available when the **Boot Mode** is set to **UEFI**:
  - Support for drive partitions larger than 2 TB.
  - Enhanced security (e.g., UEFI Secure Boot).
  - Faster boot time.

*i* **NOTE:** You must use only the UEFI boot mode in order to boot from NVMe drives.

- **BIOS:** The **BIOS Boot Mode** is the legacy boot mode. It is maintained for backward compatibility.


To view the **Boot Settings** screen, power on the system, press F2, and click **System Setup Main Menu > System BIOS > Boot Settings**.

**Table 30. Boot Settings details**

Option	Description
<b>Boot Mode</b>	Enables you to set the boot mode of the system. 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 <b>UEFI</b> by default. <i>Δ</i> <b>CAUTION: Switching the boot mode may prevent the system from booting if the operating system is not installed in the same boot mode.</b> <i>i</i> <b>NOTE:</b> Setting this field to UEFI disables the <b>BIOS Boot Settings</b> menu.
<b>Boot Sequence Retry</b>	Enables or disables the <b>Boot Sequence Retry</b> feature. If this option is set to <b>Enabled</b> and the system fails to boot, the system re-attempts the boot sequence after 30 seconds. This option is set to <b>Enabled</b> by default.
<b>Hard Disk Failover</b>	Enables or disables the Hard-disk failover. This option is set to <b>Disabled</b> by default.
<b>Generic USB Boot</b>	Enables or disables the generic USB boot placeholder. This option is set to <b>Disabled</b> by default.
<b>Hard-disk Drive Placeholder</b>	Enables or disables the Hard-disk drive placeholder. This option is set to <b>Disabled</b> by default.






**Table 30. Boot Settings details (continued)**

Option	Description						
<b>Clean all SysPrep variables and order</b>	When set to <b>None</b> , BIOS will do nothing. When set to <b>Yes</b> , BIOS will delete variables of SysPrep #### and SysPrepOrder this option is a onetime option, will reset to none when deleting variables. This setting is only available in <b>UEFI Boot Mode</b> . This option is set to <b>None</b> by default.						
<b>UEFI Boot Settings</b>	<p>Specifies the UEFI boot sequence. Enables or disables UEFI Boot options.</p> <p> <b>NOTE:</b> This option controls the UEFI boot order. The first option in the list will be attempted first.</p> <p><b>Table 31. UEFI Boot Settings</b></p> <table border="1"> <thead> <tr> <th>Option</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td><b>UEFI Boot Sequence</b></td> <td>Enables you to change the boot device order.</td> </tr> <tr> <td><b>Boot Option Enable/Disable</b></td> <td>Enables you to select the enabled or disabled boot devices</td> </tr> </tbody> </table>	Option	Description	<b>UEFI Boot Sequence</b>	Enables you to change the boot device order.	<b>Boot Option Enable/Disable</b>	Enables you to select the enabled or disabled boot devices
Option	Description						
<b>UEFI Boot Sequence</b>	Enables you to change the boot device order.						
<b>Boot Option Enable/Disable</b>	Enables you to select the enabled or disabled boot devices						

## Choosing system boot mode

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

- UEFI boot mode (the default), is an enhanced 64-bit boot interface. If you have configured your system to boot to UEFI mode, it replaces the system BIOS.
1. From the **System Setup Main Menu**, click **Boot Settings**, and select **Boot Mode**.
  2. Select the UEFI boot mode you want the system to boot into.
    -  **CAUTION:** Switching the boot mode may prevent the system from booting if the operating system is not installed in the same boot mode.
  3. After the system boots in the specified boot mode, proceed to install your operating system from that mode.
    -  **NOTE:** Operating systems must be UEFI-compatible to be installed from the UEFI boot mode. DOS and 32-bit operating systems do not support UEFI and can only be installed from the BIOS boot mode.
    -  **NOTE:** For the latest information about supported operating systems, go to [www.dell.com/ossupport](http://www.dell.com/ossupport).


## Changing boot order

### About this task

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

-  **NOTE:** Changing the drive boot sequence is only supported in BIOS boot mode.

### Steps

1. On the **System Setup Main Menu** screen, click **System BIOS > Boot Settings > UEFI Boot Settings > UEFI Boot Sequence**.
2. 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.
3. Click **Exit**, and then click **Yes** to save the settings on exit.
  -  **NOTE:** You can also enable or disable boot order devices as needed.

## Network Settings

To view the **Network Settings** screen, power on the system, press F2, and click **System Setup Main Menu > System BIOS > Network Settings**.

**NOTE:** For information about Linux network performance settings, see the *Linux Network Tuning Guide for AMD EPYC Processor Based Servers* at [AMD.com](https://www.amd.com).

**NOTE:** Network Settings are not supported in BIOS boot mode.

**Table 32. Network Settings details**

Option	Description
<b>UEFI PXE Settings</b>	Enables you to control the configuration of the UEFI PXE device.
<b>Number of PXE Devices</b>	Enables you to choose the number of PXE Devices from 1 to 4, 8, 12, 16.
<b>PXE Device n</b> (n = 1 to 16)	Enables or disables the device. When enabled, a UEFI PXE boot option is created for the device.
<b>PXE Device n Settings</b> (n = 1 to 16)	Enables you to control the configuration of the PXE device.
<b>UEFI HTTP Settings</b>	Enables you to control the configuration of the UEFI HTTP device.
<b>HTTP Device n</b> (n = 1 to 4)	Enables or disables the device. When enabled, a UEFI HTTP boot option is created for the device.
<b>HTTP Device n Settings</b> (n = 1 to 4)	Enables you to control the configuration of the HTTP device.
<b>UEFI ISCSI Settings</b>	Enables you to control the configuration of the ISCSI device.
<b>UEFI NVMe-oF Settings</b>	Enables you to control the configuration of the NVMe-oF device.

**Table 33. PXE Device n Settings details**

Option	Description
<b>Interface</b>	Specifies NIC interface used for the PXE device.
<b>Protocol</b>	Specifies Protocol used for PXE device. This option is set to <b>IPv4</b> or <b>IPv6</b> . This option is set to <b>IPv4</b> by default.
<b>VLAN</b>	Enables VLAN for PXE device. This option is set to <b>Enable</b> or <b>Disable</b> . This option is set to <b>Disable</b> by default.
<b>VLAN ID</b>	Shows the VLAN ID for the PXE device
<b>VLAN Priority</b>	Shows the VLAN Priority for the PXE device.

**Table 34. UEFI ISCSI Settings screen details**

Option	Description
<b>ISCSI Initiator Name</b>	Specifies the name of the ISCSI initiator in IQN format.
<b>ISCSI Device1</b>	Enables or disables the ISCSI device. When disabled, a UEFI boot option is created for the ISCSI device automatically. This is set to <b>Disabled</b> by default.
<b>ISCSI Device1 Settings</b>	Enables you to control the configuration of the ISCSI device.

**Table 35. ISCSI Device1 Settings screen details**

Option	Description
<b>Connection 1</b>	Enables or disables the ISCSI connection. This option is set to <b>Disable</b> by default.
<b>Connection 2</b>	Enables or disables the ISCSI connection. This option is set to <b>Disable</b> by default.
<b>Connection 1 Settings</b>	Enables you to control the configuration for the ISCSI connection.
<b>Connection 2 Settings</b>	Enables you to control the configuration for the ISCSI connection.

**Table 35. ISCSI Device1 Settings screen details (continued)**

Option	Description
Connection Order	Enables you to control the order for which the ISCSI connections will be attempted.



**Table 36. UEFI NVMe-oF Settings screen details**

Option	Description
NVMe-oF	Enables or disables the NVMe-oF device. When disabled, a UEFI boot option is created for the NVMe-oF device automatically. This is set to <b>Disabled</b> by default.
NVMe-oF Host NQN	Specifies Host NQN of the NVMe-oF device.
NVMe-oF Host Id	Specifies Host Id of the NVMe-oF device.
Host Security Key Path	Specifies Host Security Key Path of the NVMe-oF device.
NVMe-oF SubSystem Settings	Enables you to control the configuration of the NVMe-oF device.


## Integrated Devices

To view the **Integrated Devices** screen, power on the system, press F2, and click **System Setup Main Menu > System BIOS > Integrated Devices**.

**Table 37. Integrated Devices details**

Option	Description
User Accessible USB Ports	Provides the options <b>All Ports On</b> or <b>All Ports Off</b> . This option is set to <b>All Ports On</b> by default. The USB keyboard and mouse still function in certain USB ports during the boot process, depending on the selection. After the boot process is complete, the USB ports will be enabled or disabled as per the setting.
Internal SD Card Port	Enables or disables the internal SD card port. This option is set to <b>On</b> or <b>Off</b> . This option is set to <b>On</b> by default.  <b>NOTE:</b> The Internal SD Card Port on the PCIe riser is controlled by Internal USB Port.
iDRAC Direct USB Port	The iDRAC Direct USB port is managed by iDRAC exclusively with no host visibility. This option is set to <b>ON</b> or <b>OFF</b> . When set to <b>OFF</b> , iDRAC does not detect any USB devices installed in this managed port. This option is set to <b>On</b> by default. Enables or disables the integrated RAID controller. When set to <b>Disabled</b> , the device is not visible to the operating system(OS). Enables or disables the integrated RAID controller. When set to <b>Disabled</b> , the device is not visible to the operating system(OS).
Embedded NIC1	Enables or disables the <b>Embedded NIC1</b> . If set to <b>Disabled (OS)</b> , the NIC may still be available for shared network access by the embedded management controller. Configure the <b>Embedded NIC1</b> option by using the NIC management utilities of the system. This option is set to <b>Enabled</b> by default.
Embedded Video Controller	Enables or disables the use of Embedded Video Controller as the primary display. When set to <b>Enabled</b> , the Embedded Video Controller will be the primary display even if add-in graphic cards are installed. When set to <b>Disabled</b> , an add-in graphics card will be used as the primary display. BIOS will output displays to both the primary add-in video and the embedded video during POST and pre-boot environment. The embedded video will then be disabled right before the operating system boots. This option is set to <b>Enabled</b> by default.  <b>NOTE:</b> When there are multiple add-in graphic cards installed in the system, the first card discovered during PCI enumeration is selected as the



**Table 37. Integrated Devices details (continued)**

Option	Description
	primary video. You might have to re-arrange the cards in the slots in order to control which card is the primary video.
<b>Current State of Embedded Video Controller</b>	Displays the current state of the embedded video controller. The <b>Current State of Embedded Video Controller</b> option is a read-only field. If the Embedded Video Controller is the only display capability in the system (that is, no add-in graphics card is installed), then the Embedded Video Controller is automatically used as the primary display even if the <b>Embedded Video Controller</b> setting is set to <b>Disabled</b> .
<b>SR-IOV Global Enable</b>	Enables or disables the BIOS configuration of Single Root I/O Virtualization (SR-IOV) devices. This option is set to <b>Disabled</b> by default.
<b>OS Watchdog Timer</b>	If your system stops responding, this watchdog timer aids in the recovery of your operating system. When this option is set to <b>Enabled</b> , the operating system initializes the timer. When this option is set to <b>Disabled</b> (the default), the timer does not have any effect on the system.
<b>Memory Mapped I/O Limit</b>	Controls where MMIO is mapped. The <b>1 TB</b> option is designed for specific OS which cannot support MMIO over 1 TB. This option is set to <b>8 TB</b> by default. The default option is the maximum address that the system supports and recommended in most cases.
<b>Slot Disablement</b>	Enables or disables the available PCIe slots on your system. The slot disablement feature controls the configuration of the 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 system startup. If the slot is disabled, both the Option ROM and UEFI drivers are disabled. Only slots that are present on the system will be available for control. <b>Slot n</b> : Enables or disables or only the boot driver is disabled for the PCIe slot n. This option is set to <b>Enabled</b> by default.
<b>Slot Bifurcation</b>	<b>Slot Discovery Bifurcation Settings</b> allows <b>Platform Default Bifurcation</b> and <b>Manual bifurcation Control</b> . The default is set to <b>Platform Default Bifurcation</b> . The slot bifurcation field is accessible when set to <b>Manual bifurcation Control</b> and is grayed out when set to <b>Platform Default Bifurcation</b> .  <b>NOTE:</b> This option is only available for 4 <sup>th</sup> Generation AMD EPYC processors.

## Serial Communication

To view the **Serial Communication** screen, power on the system, press F2, and click **System Setup Main Menu > System BIOS > Serial Communication**.

**Table 38. Serial Communication details**

Option	Description
<b>Serial Communication</b>	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 <b>OFF</b> by default.
<b>Serial Port Address</b>	Enables you to set the port address for serial devices.  <b>NOTE:</b> 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.  <b>NOTE:</b> Every time the system boots, the BIOS syncs the serial MUX setting that is saved in iDRAC. The serial MUX setting can independently be changed in iDRAC. Loading the BIOS default settings from within the

**Table 38. Serial Communication details (continued)**

Option	Description
	BIOS setup utility may not always revert the serial MUX setting to the default setting of Serial Device 1.
<b>External Serial Connector</b>	<p>Enables you to associate the External Serial Connector to <b>Serial Device 1</b>, <b>Serial Device 2</b>, or the <b>Remote Access Device</b> by using this option. This option is set to <b>Serial Device 1</b> by default.</p> <p><b>i</b> <b>NOTE:</b> 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.</p> <p><b>i</b> <b>NOTE:</b> Every time the system boots, the BIOS syncs the serial MUX setting saved in iDRAC. The serial MUX setting can independently be changed in iDRAC. Loading the BIOS default settings from within the BIOS setup utility may not always revert this setting to the default setting of Serial Device 1.</p>
<b>Failsafe Baud Rate</b>	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 <b>115200</b> by default.
<b>Remote Terminal Type</b>	Sets the remote console terminal type. This option is set to <b>VT100/VT220</b> by default.
<b>Redirection After Boot</b>	Enables or disables the BIOS console redirection when the operating system is loaded. This option is set to <b>Enabled</b> by default.

## System Profile Settings

To view the **System Profile Settings** screen, power on the system, press F2, and click **System Setup Main Menu > System BIOS > System Profile Settings**.

**Table 39. System Profile Settings details**

Option	Description
<b>System Profile</b>	<p>Sets the system profile. If you set the System Profile option to a mode other than <b>Custom</b>, the BIOS automatically sets the rest of the options. You can only change the rest of the options if the mode is set to <b>Custom</b>. This option is set to <b>Performance Per Watt (OS)</b> by default. Other options include <b>Performance</b> and <b>Custom</b>.</p> <p><b>i</b> <b>NOTE:</b> All the parameters on the system profile setting screen are available only when the <b>System Profile</b> option is set to <b>Custom</b>.</p>
<b>CPU Power Management</b>	Sets the CPU power management. This option is set to <b>OS DBPM</b> by default. Other option includes <b>Maximum Performance</b> .
<b>Memory Frequency</b>	Sets the speed of the system memory. You can select <b>Maximum Performance</b> or a specific speed. This option is set to <b>Maximum Performance</b> by default.
<b>Turbo Boost</b>	Enables or disables the processor to operate in the turbo boost mode. This option is set to <b>Enabled</b> by default.
<b>C-States</b>	Enables or disables the processor to operate in all available power states. C States allow the processor to enter lower power states when idle. When set to <b>Enabled</b> (OS controlled) or when set to <b>Autonomous</b> (if hardware controlled is supported), the processor can operate in all available Power States to save power, but may increase memory latency and frequency jitter. This option is set to <b>Enabled</b> by default.
<b>Memory Patrol Scrub</b>	Sets the memory patrol scrub mode. This option is set to <b>Standard</b> by default.
<b>Memory Refresh Rate</b>	Sets the memory refresh rate to either 1x or 2x. This option is set to <b>1x</b> by default.

**Table 39. System Profile Settings details (continued)**

Option	Description
<b>Workload Profile</b>	Allows optimization of performance based on the workload type. The <b>Workload Profile</b> setting is not a <b>state</b> . Setting a Workload Profile is a one-time action that in turns modifies various BIOS settings to be optimized for the requested workload type. This option is set to <b>Not Configured</b> by default. <i>i</i> <b>NOTE:</b> If there is a change in the hardware configuration, it is expected that the <b>Workload Profile</b> has to be reconfigured. Ensure that the new hardware has been installed correctly, and load the default BIOS settings before enabling the <b>Workload Profile</b> .
<b>PCI ASPM L1 Link Power Management</b>	Enables or disables the PCI ASPM L1 Link Power Management. This option is set to <b>Enabled</b> by default.
<b>Determinism Slider</b>	Set the system determinism by <b>Power Determinism</b> or <b>Performance Determinism</b> . This option is set to <b>Performance Determinism</b> by default.
<b>Power Profile Select</b>	<b>High performance Mode(default):</b> Favors core performance. All DF P-States are available in this mode and the default DF P-State and DLWM algorithms are active. <b>Efficiency Mode:</b> Configures the system for power efficiency. Limits boost frequency available to cores and restricts DF P-States available in the system. <b>Maximum IO Performance Mode:</b> Sets up Date Fabric to maximize IO sub-system performance.
<b>PCIE Speed PMM Control</b>	Reduce link speed when devices are idle. This option is set to <b>Auto</b> by default.
<b>EQ Bypass To Highest Rate</b>	Controls the ability to advertise Equalization Bypass to Highest Rate Support in TSxs sent prior to LinkUp=1r. This option is set to <b>Disabled</b> by default.
<b>DF PState Frequency Optimizer</b>	<b>Disabled:</b> Disabled the DP P-state CCLK effective frequency optimizer. <b>Enabled:</b> Enables the DP P-state CCLK effective frequency optimizer. This option is set to <b>Enabled</b> by default.
<b>DF PState Latency Optimizer</b>	<b>Disabled:</b> Disables the DP P-state latency optimizer. <b>Enabled:</b> Enables the DF P-state latency optimizer. This option is set to <b>Enabled</b> by default.
<b>DF CState</b>	This field enables(0xF)/disables(0x0) DF Cstate. This option is set to <b>Enabled</b> by default.
<b>Host System Management Port(HSMP)Support</b>	This value controls Host System Management Port(HSMP) interface to provide OS-level software with access to system management functions via a set of mail box registers. This option is set to <b>Enabled</b> by default.
<b>Boost FMax</b>	Boost Fmax. This option is set to <b>0 - Auto</b> by default.
<b>Algorithm Performance Boost Disable (ApbDis)</b>	Enables or disables the Algorithm Performance Boost Disable (ApbDis). This option is set to <b>Disabled</b> by default.

## System Security

To view the **System Security** screen, power on the system, press F2, and click **System Setup Main Menu > System BIOS > System Security**.

**Table 40. System Security details**

Option	Description
<b>CPU AES-NI</b>	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 <b>Enabled</b> by default.
<b>System Password</b>	Sets the system password. This option is set to <b>Enabled</b> by default and is read-only if the password jumper is not installed in the system.
<b>Setup Password</b>	Sets the setup password. This option is read-only if the password jumper is not installed in the system.
<b>Password Status</b>	Locks the system password. This option is set to <b>Unlocked</b> by default.

**Table 41. System Security details**

Option	Description
<b>TPM Security</b>	This field controls the reporting of the Trusted Platform Module(TPM) in the system. When set to Off, the presence of the TPM is not reported to the OS. When set to Off, the presence of the TPM is not reported to the OS. When set to On, the presence of the TPM is reported to the OS.
<b>TPM Information</b>	Indicates the type of Trusted Platform Module, if present.
<b>TPM Firmware</b>	Indicates the firmware version of a Trusted Platform Module(TPM).
<b>TPM Heirachy</b>	Allows enabling, disabling or clearing the storage and endorsement hierarchies. When set to Enabled, the storage and endorsement hierarchies can be used. When set to Disabled, the storage and endorsement hierarchies cannot be used. When set to Clear, the storage and endorsement hierarchies are cleared of any values and then reset to Enabled.
<b>TPM Advanced Settings</b>	<p><b>TPM PPI Bypass Provision</b> When set to Enabled, allows the Operating System to bypass Physical Presence Interface(PPI) prompts when issuing PPI Advanced Configuration and Power Interface (ACPI) provisioning operations.</p> <p><b>TPM PPI Bypass Clear</b> When set to Enabled, allows the Operating System to bypass Physical Presence Interface(PPI) prompts when issuing PPI Advanced Configuration and Power Interface (ACPI) clear operations.</p> <p><b>TPM2 Algorithm Selection</b> Allows the user to change the cryptographic algorithms used in the Trusted Platform Module (TPM). The available options are dependant on the TPM firmware. To enable TPM2 Algorithm Selection, Intel(R) TXT technology must be disabled.</p>
<b>AMD DRTM</b>	Enable/Disable AMD Dynamic Root of Trust Measurement (DRTM) To enable AMD DRTM, below configurations must be enabled: <ol style="list-style-type: none"> <li>1. TPM2.0 must be enabled and the hash algorithm must be set to SHA256.</li> <li>2. Transparent SME (TSME) must be enabled.</li> </ol>
<b>Power Button</b>	Enables or disables the power button on the front of the system. This option is set to <b>Enabled</b> by default.
<b>AC Power Recovery</b>	Sets how the system behaves after AC power is restored to the system. This option is set to <b>Last</b> by default.
<b>AC Power Recovery Delay</b>	Sets the time delay for the system to power up after AC power is restored to the system. This option is set to <b>Immediate</b> by default.
<b>User Defined Delay (120s to 600 s)</b>	Controls the duration for which the power-on process is delayed after the AC power supply is restored. The value is only effective if AC Power Recovery Delay is set to <b>User Defined</b> . The valid range is between <b>120s and 600s</b> .
<b>UEFI Variable Access</b>	Provides varying degrees of securing UEFI variables. When set to <b>Standard</b> (the default), UEFI variables are accessible in the operating system per the UEFI specification. When set to <b>Controlled</b> , 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.
<b>SMM Security Mitigation</b>	This option <b>enables</b> or <b>disables</b> additional UEFI SMM Security Mitigation protections. This option is available only in <b>UEFI boot mode</b> . The operating system can use this feature to help protect the <b>secure environment</b> created by <b>virtualization based security</b> . Enabling this feature provides additional UEFI SMM Security Mitigation protections. However, this feature may cause <b>compatibility</b> issue or loss of functionality with some legacy tools or applications.
<b>Secure Boot</b>	Enables Secure Boot, where the BIOS authenticates each pre-boot image by using the certificates in the Secure Boot Policy. Secure Boot is set to <b>Disabled</b> by default.
<b>Secure Boot Policy</b>	When Secure Boot policy is set to <b>Standard</b> , the BIOS uses the system manufacturer's key and certificates to authenticate pre-boot images. When Secure Boot policy is set to

**Table 41. System Security details (continued)**

Option	Description
	<b>Custom</b> , the BIOS uses the user-defined key and certificates. Secure Boot policy is set to <b>Standard</b> by default.
<b>Secure Boot Mode</b>	<p>Configures how the BIOS uses the Secure Boot Policy Objects (PK, KEK, db, dbx). If the current mode is set to <b>Deployed Mode</b>, the available options are <b>User Mode</b> and <b>Deployed Mode</b>.</p> <p><b>If the current mode is set to User Mode, the available options are User Mode, Audit Mode, and Deployed Mode.</b></p>
<b>Secure Boot Policy Summary</b>	Specifies the list of certificates and hashes that secure boot uses to authenticate images.
<b>Secure Boot Custom Policy Settings</b>	Configures the Secure Boot Custom Policy. To enable this option, set the Secure Boot Policy to <b>Custom</b> option.

**Table 42. Secure Boot Mode**

Options	Descriptions
<b>User Mode</b>	In <b>User Mode</b> , PK must be installed, and BIOS performs signature verification on programmatic attempts to update policy objects. The BIOS allows unauthenticated programmatic transitions between modes.
<b>Deployed Mode</b>	<b>Deployed Mode</b> is the most secure mode. In <b>Deployed Mode</b> , PK must be installed and the BIOS performs signature verification on programmatic attempts to update policy objects. <b>Deployed Mode</b> restricts the programmatic mode transitions.
<b>Audit Mode</b>	In <b>Audit mode</b> , PK is not present. The BIOS does not authenticate programmatic updates to the policy objects, and transitions between modes. The BIOS performs a signature verification on pre-boot images and logs the results in the image Execution Information Table, but executes the images whether they pass or fail verification. <b>Audit Mode</b> is useful for programmatic determination of a working set of policy objects.

## Creating a system and setup password

### Prerequisites

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

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

### Steps

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


Use the following guidelines to assign the system password:

  - A password can have up to 32 characters.

A message prompts you to reenter the system password.
- Reenter the system password, and click **OK**.



6. In the **Setup Password** field, type your setup password and press Enter or Tab. A message prompts you to reenter the setup password.
7. Reenter the setup password, and click **OK**.
8. Press Esc to return to the System BIOS screen. Press Esc again. A message prompts you to save the changes.

 **NOTE:** Password protection does not take effect until the system reboots.

## Using your system password to secure your system

### About this task


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

### Steps

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


### Next steps

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

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


## Deleting or changing system and setup password

### Prerequisites

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

### Steps

1. To enter System Setup, press F2 immediately after turning on or restarting your system.
2. On the **System Setup Main Menu** screen, click **System BIOS > System Security**.
3. On the **System Security** screen, ensure that **Password Status** is set to **Unlocked**.
4. In the **System Password** field, alter or delete the existing system password, and then press Enter or Tab.
5. In the **Setup Password** field, alter or delete the existing setup password, and then press Enter or Tab. If you change the system and setup password, a message prompts you to reenter the new password. If you delete the system and setup password, a message prompts you to confirm the deletion.
6. Press Esc to return to the **System BIOS** screen. Press Esc again, and a message prompts you to save the changes.
7. Select **Setup Password**, change, or delete the existing setup password and press Enter or Tab.

 **NOTE:** If you change the system password or setup password, a message prompts you to reenter the new password. If you delete the system password or setup password, a message prompts you to confirm the deletion.

## Operating with setup password enabled

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


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

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

```
Password Invalid. Number of unsuccessful password attempts: <x> Maximum number of password attempts exceeded. System halted.
```

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




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

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

## Redundant OS Control

To view the **Redundant OS Control** screen, power on the system, press F2, and click **System Setup Main Menu > System BIOS > Redundant OS Control**.

**Table 43. Redundant OS Control details**

Option	Description
<b>Redundant OS Location</b>	Enables you to select a backup disk from the following device: <ul style="list-style-type: none"> <li>• <b>None</b></li> <li>• <b>BOSS PCIe Cards (Internal M.2 Drives)</b></li> </ul>
<b>Redundant OS State</b>	<p> <b>NOTE:</b> This option is disabled if <b>Redundant OS Location</b> is set to <b>None</b>.</p> <p>When set to <b>Visible</b>, the backup disk is visible to the boot list and OS. When set to <b>Hidden</b>, the backup disk is disabled and is not visible to the boot list and OS. This option is set to <b>Visible</b> by default.</p> <p> <b>NOTE:</b> BIOS disables the device in hardware, so it is not accessed by the OS.</p>
<b>Redundant OS Boot</b>	<p> <b>NOTE:</b> This option is disabled if <b>Redundant OS Location</b> is set to <b>None</b> or if <b>Redundant OS State</b> is set to <b>Hidden</b>.</p> <p>When set to <b>Enabled</b>, BIOS boots to the device specified in <b>Redundant OS Location</b>. When set to <b>Disabled</b>, BIOS preserves the current boot list settings. This option is set to <b>Enabled</b> by default.</p>


## Miscellaneous Settings

To view the **Miscellaneous Settings** screen, power on the system, press F2, and click **System Setup Main Menu > System BIOS > Miscellaneous Settings**.

**Table 44. Miscellaneous Settings details**

Option	Description
<b>System Time</b>	Enables you to set the time on the system.
<b>System Date</b>	Enables you to set the date on the system.
<b>Time Zone</b>	Times offset from UTC.
<b>Daylight Savings Time</b>	Enables or disables the Daylight Savings Time option. This option is set to <b>Disabled</b> by default.
<b>Asset Tag</b>	Specifies the asset tag and enables you to modify it for security and tracking purposes.

**Table 44. Miscellaneous Settings details (continued)**

Option	Description
<b>Keyboard NumLock</b>	Enables you to set whether the system boots with the NumLock enabled or disabled. This option is set to <b>On</b> by default.  <b>NOTE:</b> This option does not apply to 84-key keyboards.
<b>F1/F2 Prompt on Error</b>	Enables or disables the F1/F2 prompt on error. This option is set to <b>Enabled</b> by default. The F1/F2 prompt also includes keyboard errors.
<b>Load Legacy Video Option ROM</b>	Enables or disables the Load Legacy Video Option ROM option. This option is set to <b>Disabled</b> by default.
<b>Dell Wyse P25/P45 BIOS Access</b>	Enables or disables the Dell Wyse P25/P45 BIOS Access. This option is set to <b>Enabled</b> by default.
<b>Power Cycle Request</b>	Enables or disables the Power Cycle Request. This option is set to <b>None</b> by default.

## 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 <https://www.dell.com/idracmanuals>.

## Device Settings


**Device Settings** enables you to configure device parameters such as storage controllers or network cards.

## Dell Lifecycle Controller

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

## Embedded system management

The Dell Lifecycle Controller provides advanced embedded system management throughout the lifecycle of the system. The Dell Lifecycle Controller is started during the boot sequence and functions independently of the operating system.

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

For more information about setting up the Dell Lifecycle Controller, configuring hardware and firmware, and deploying the operating system, see the Dell Lifecycle Controller documentation at <https://www.dell.com/idracmanuals>.

## Boot Manager

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

To enter **Boot Manager**, power on the system and press F11.

**Table 45. Boot Manager details**

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

To access the **PXE boot** option, boot the system and then press F12 during POST instead of using standard Boot Sequence from BIOS Setup. It does not pull any menu or allows managing of network devices.

# Installing and removing system components

## Topics:

- Safety instructions
- Before working inside your system
- After working inside your system
- Recommended tools
- C6615 sled
- Air shroud
- Support bracket
- Expansion cards and expansion card risers
- M.2 SSD module
- System memory
- Processor and heat sink module
- Power Interposer Board
- Optional OCP card
- System battery
- System board
- Trusted Platform Module

## Safety instructions

**CAUTION:** Many repairs may only be done by a certified service technician. You should only perform troubleshooting and simple repairs as authorized in your product documentation, or as directed by the online or telephone service and support team. Damage due to servicing that is not authorized by Dell is not covered by your warranty. Read and follow the safety instructions that are shipped with your product.

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

**NOTE:** While replacing faulty storage controller, FC, or NIC card with the same type of card, after you power on the system, the new card automatically updates to the same firmware and configuration of the faulty one. For updating to the latest firmware and changing the configuration, see the *Lifecycle Controller User's Guide* at <https://www.dell.com/idracmanuals>.

**CAUTION:** Do not install network cards, or other PCIe devices on your system that are not validated and tested by Dell. Damage caused by unauthorized and invalidated hardware installation will null and void the system warranty.

## Before working inside your system

### Prerequisites

Follow the safety guidelines listed in the [Safety instructions](#).

### Steps

1. Power off the sled.
2. Remove the sled from the enclosure.

# After working inside your system

## Prerequisites

Follow the safety guidelines listed in [Safety instructions](#).

## Steps


Reconnect the peripherals and connect the system to the electrical outlet, and then power on the system.

# Recommended tools

You may need some or all of the following tools to perform the removal and installation procedures:

- Phillips 1 screwdriver
- Phillips 2 screwdriver
- Torx T20 screwdriver
- 5 mm hex nut screwdriver
- Plastic scribe
- 1/4-inch flat blade screwdriver
- Wrist grounding strap connected to the ground
- ESD mat
- Needle-nose pliers

You need the following tools to assemble the cables for a DC power supply unit:

- AMP 90871-1 hand-crimping tool or equivalent
  - Tyco Electronics 58433-3 or equivalent
  - Wire-stripper pliers to remove insulation from size 10 AWG solid or stranded, insulated copper wire
-  **NOTE:** Use alpha wire part number 3080 or equivalent (65/30 stranding).

# C6615 sled


## Sled installation guidelines

 **CAUTION:** Ensure that the chassis does not have a mixed architecture of PowerEdge C6420, PowerEdge C6525 and PowerEdge C6615 sled configurations.

Mixing of sleds are not supported. When chassis or sled mismatch is detected, follow the procedures below:

**Table 46. Actions taken when chassis or sled mismatch is detected**

Indicators and solution	Description
Common indications of chassis or sled mismatch	Status LED Blinking Amber (Status ID LEDs on chassis ears & SLED rear I/O).
	System generate SEL log in the mismatched Sled in iDRAC.
	Chassis fan runs full speed to maintain sleds operation.
Common indications of chassis or sled mismatch in BIOS	BIOS blocks booting and shows warning message - "Unable to boot because a mismatch is detected in node <Node Number> installed in the chassis. The installed node is <Installed Sled>, but this <Chassis Model> chassis is configured to support 1-4 Nodes of type <Supported Sled>."
Solution	<ol style="list-style-type: none"><li>1. Install same type sleds to the chassis.</li><li>2. Set up the correct Sticky Bit in Chassis Manager.</li></ol>

 **NOTE:** Ensure to install a sled blank in all the empty slots. Operating the enclosure without a blank results in overheating.

**NOTE:** For optimized thermal operation, do not mix single processor and dual processor sleds within the same chassis.

**NOTE:** For optimized thermal operation, ensure to follow the sled population sequence shown in the image below:

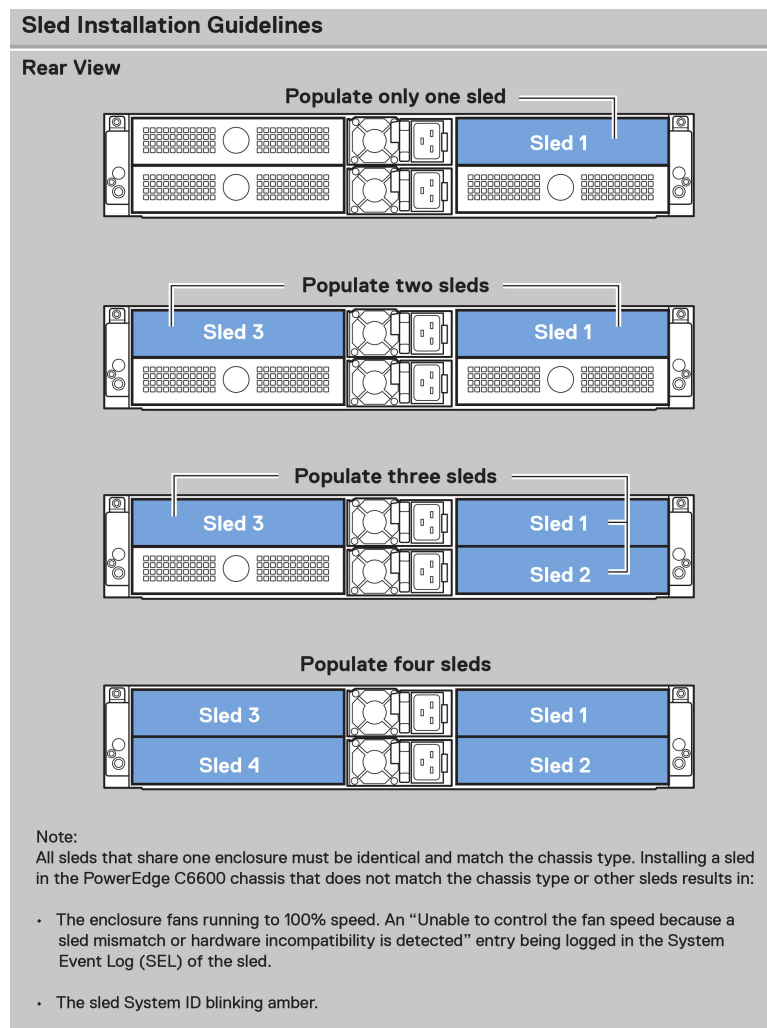


Figure 17. Sled Installation Guidelines

## Removing a sled

### Prerequisites

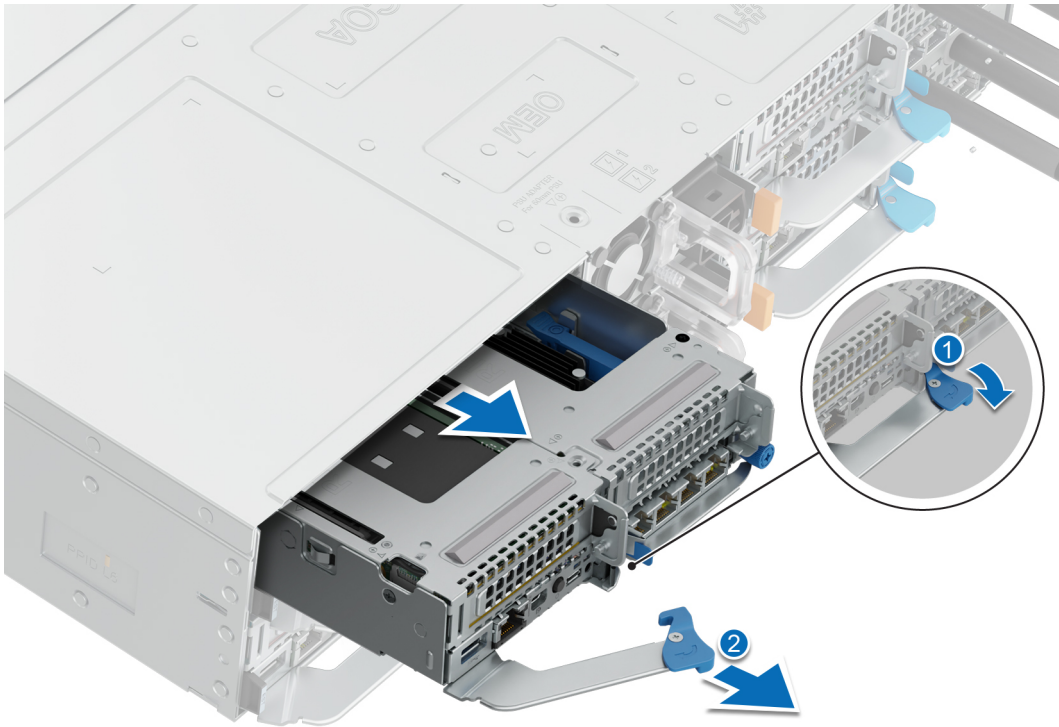
1. Follow the safety guidelines listed in [Safety instructions](#).
2. Follow the procedure listed in [Before working inside your system](#).

### Steps

1. Release the sled handle by pressing the blue latch to disengage from it from the metal hook.
2. Pull outward on the handle until it rotates to the end of its travel and fully disengages the internal sled electrical connectors.
3. Holding the sled handle with one hand, pull the sled out of the enclosure while supporting the sled underside with the other hand.

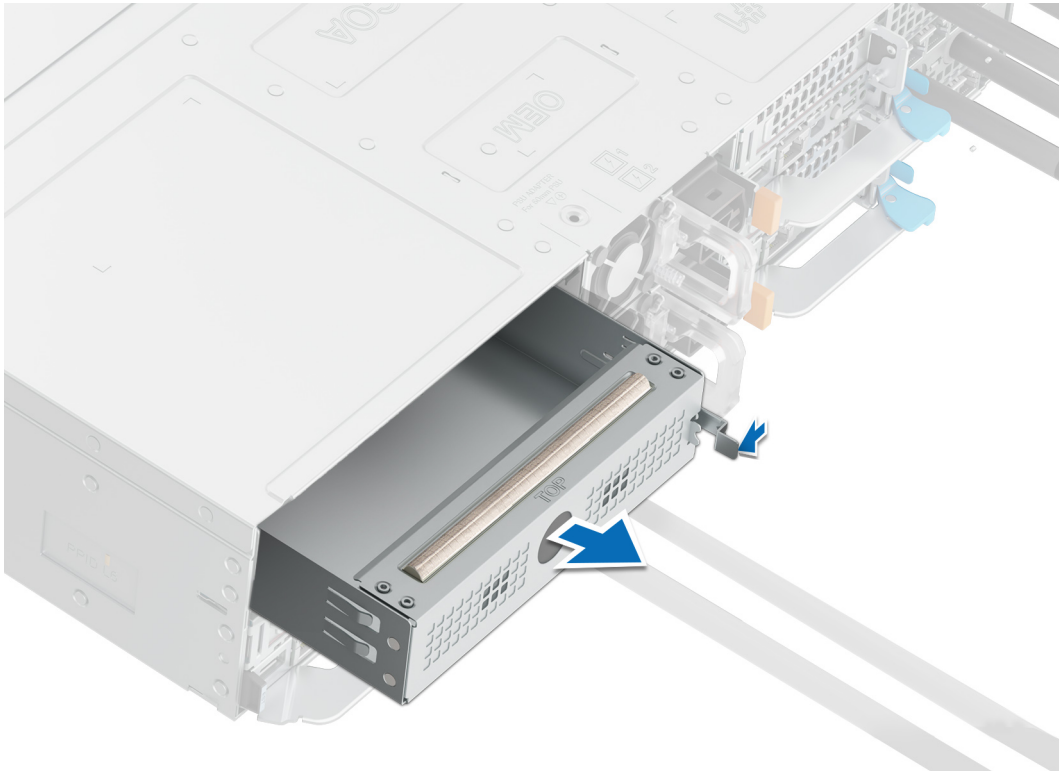
**CAUTION:** Support the sled with both hands while sliding it out of the enclosure.

**NOTE:** The numbers on the image do not depict the exact steps. The numbers are for representation of sequence.



**Figure 18. Removing a sled**

4. To release the sled blank, press the retention latch on the sled to release the sled.
5. Slide the sled blank out of the enclosure.



**Figure 19. Removing a sled blank**



## Next steps

Replace the sled.

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

## Installing a sled

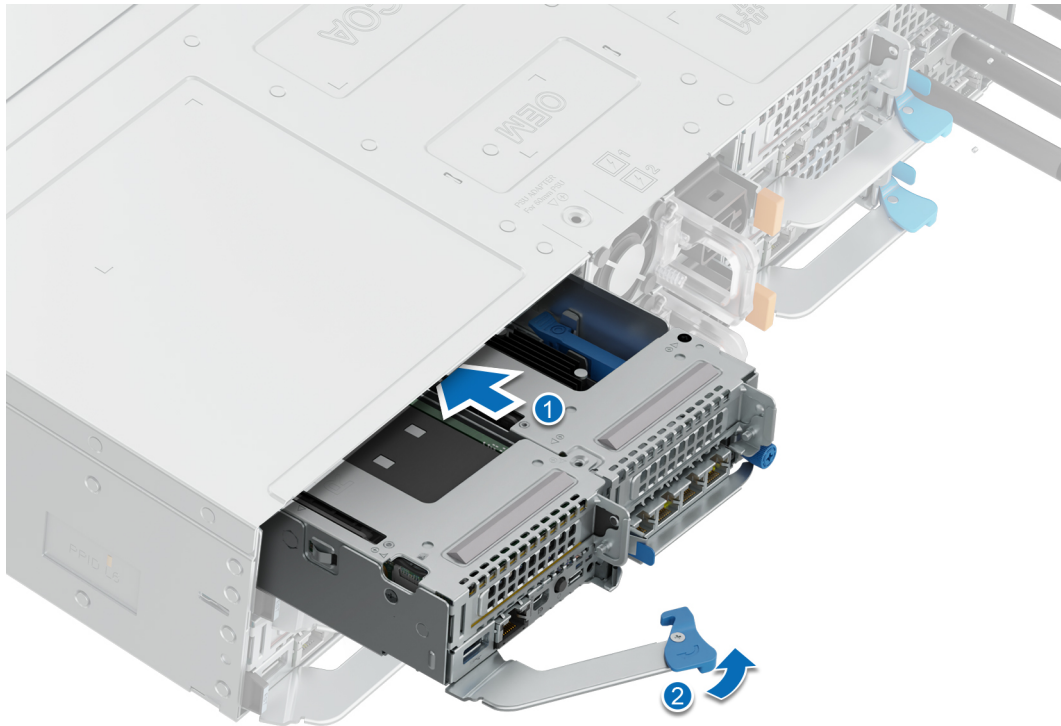
### Prerequisites

1. Follow the safety guidelines listed in [Safety instructions](#).
2. Follow the procedure listed in [Before working inside your system](#).

### Steps

1. Release the sled handle by pressing the blue latch to disengage it from the metal hook.
2. Pull the handle until it rotates to the end of its travel.
3. Holding the sled with both hands, align the sled with the sled-bay in the enclosure.

**i** **NOTE:** The numbers on the image do not depict the exact steps. The numbers are for representation of sequence.

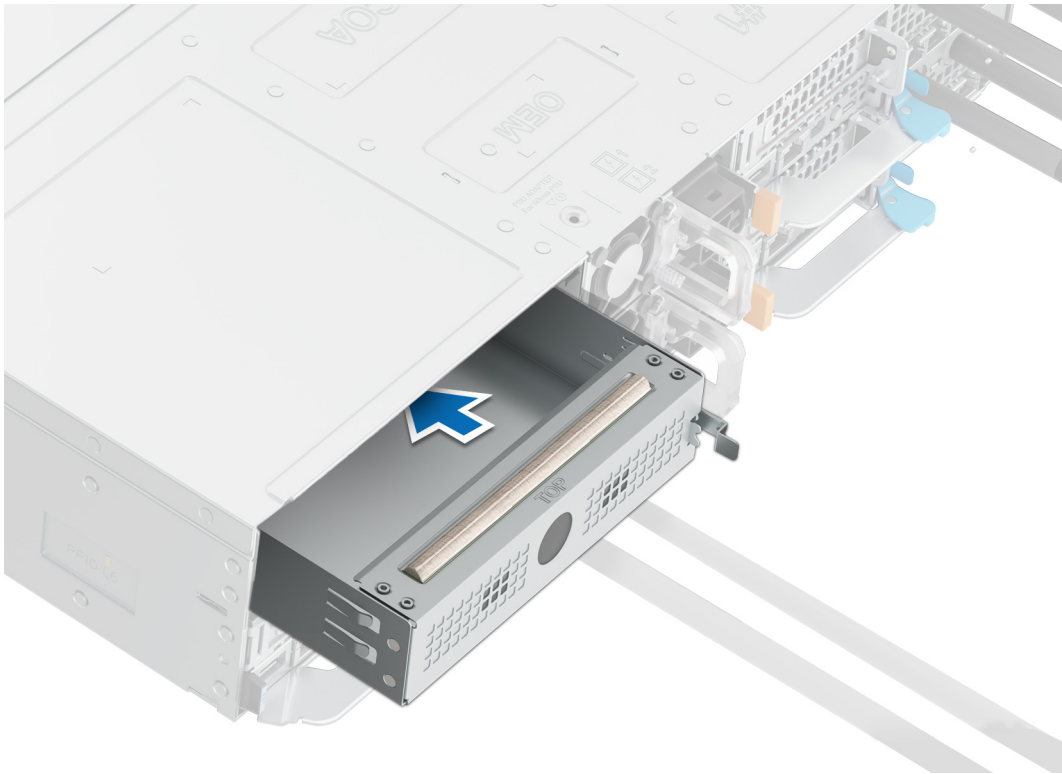


**Figure 20. Installing a sled**

4. Insert the sled into the enclosure until the edge of the sled handle touches the edge of the enclosure chassis.

**⚠ CAUTION:** To avoid any damage to the pins on the sled, do not force the sled into the enclosure. Follow the two-position insertion and gently slide the sled into the enclosure.

5. To install a sled blank, slide it into the enclosure until the retention latch locks it into place.



**Figure 21. Installing a sled blank**

# Air shroud

## Removing the air shroud

### Prerequisites

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

1. Follow the safety guidelines listed in [Safety instructions](#).
2. Follow the procedure listed in [Before working inside your system](#).

### Steps

1. Press the clip and lift the air shroud.
2. Release the snap clip on either side of the air shroud.
3. Disengage the air shroud hook from the slot on the chassis and remove the air shroud.

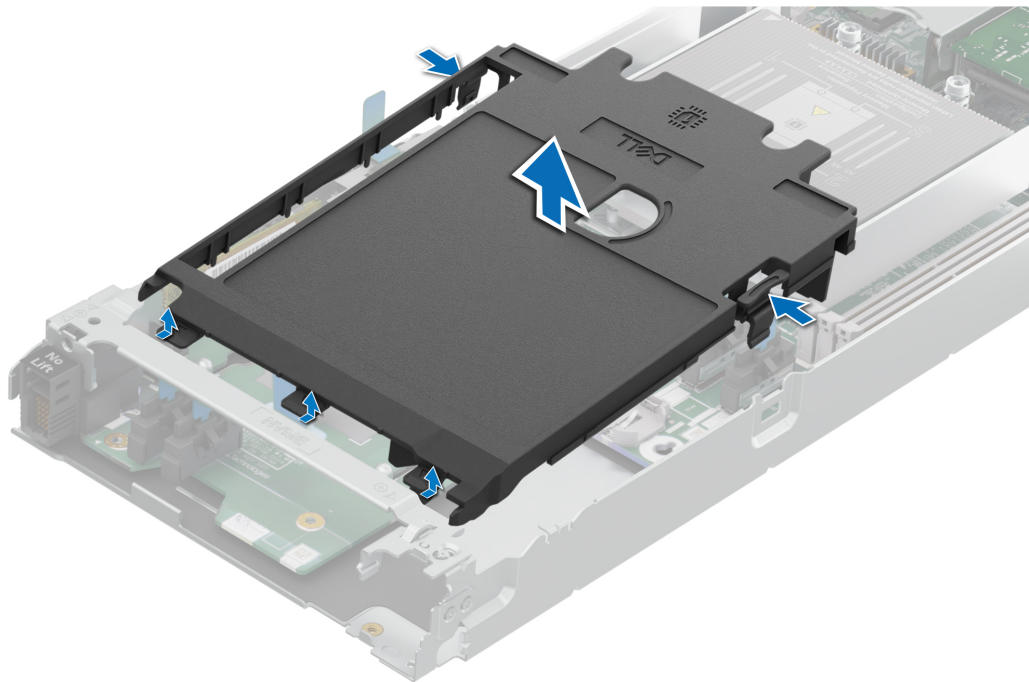


Figure 22. Removing the air shroud

### Next steps

Replace the air shroud..

## Installing the air shroud

### Prerequisites

Follow the safety guidelines listed in [Safety Instructions](#).

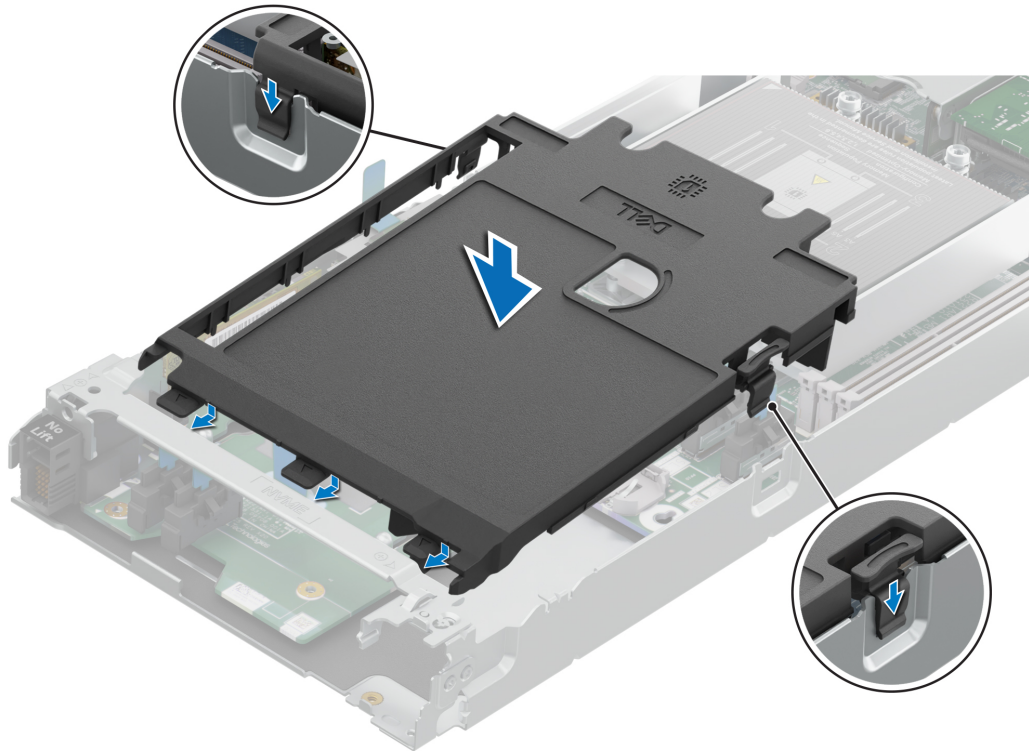
## Steps

1. Align the air shroud hooks with the link bar on the sled.

**i** **NOTE:** Ensure that the SATA cables are routed behind the air shroud clip.

2. Lower the air shroud until the snap clips on the right and left side of the shroud lock into the base of the sled.

**i** **NOTE:** Route the cable properly to prevent the cable from being pinched or crimped.



**Figure 23. Installing the air shroud**

## Next steps

Follow the procedure listed in [After working inside your system](#).

# Support bracket

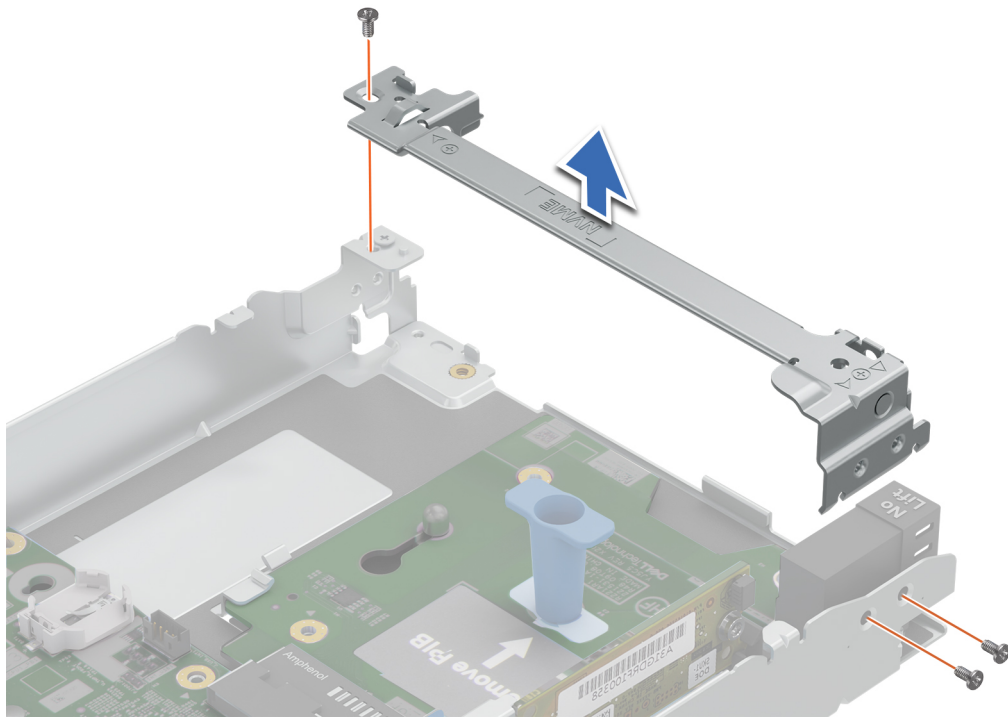
## Removing the support bracket

### Prerequisites

1. Follow the safety guidelines listed in [Safety instructions](#).
2. Follow the procedure listed in [Before working inside your system](#).
3. [Remove the air shroud](#).

## Steps

1. Using the Phillips 1 screwdriver, remove the screws that secure the support bracket to the chassis.



**Figure 24. Removing the support bracket**

2. Remove the support bracket from the chassis.

#### **Next steps**

[Replace the support bracket.](#) .

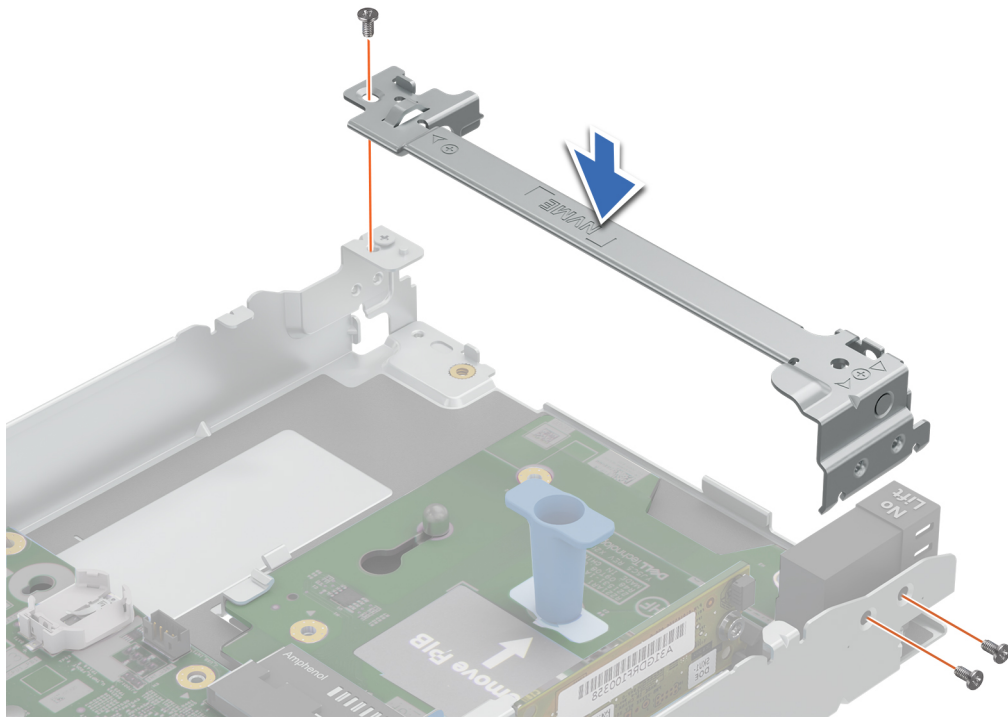
## **Installing the support bracket**

#### **Prerequisites**

1. Follow the safety guidelines listed in [Safety instructions](#).
2. Follow the procedure listed in [Before working inside your system](#).
3. [Remove the air shroud](#).

#### **Steps**

1. Align the support bracket with the stand off on the chassis.
2. Using a Phillips 1 screwdriver, tighten the screws that secure the support bracket to the chassis.



**Figure 25. Installing the support bracket**

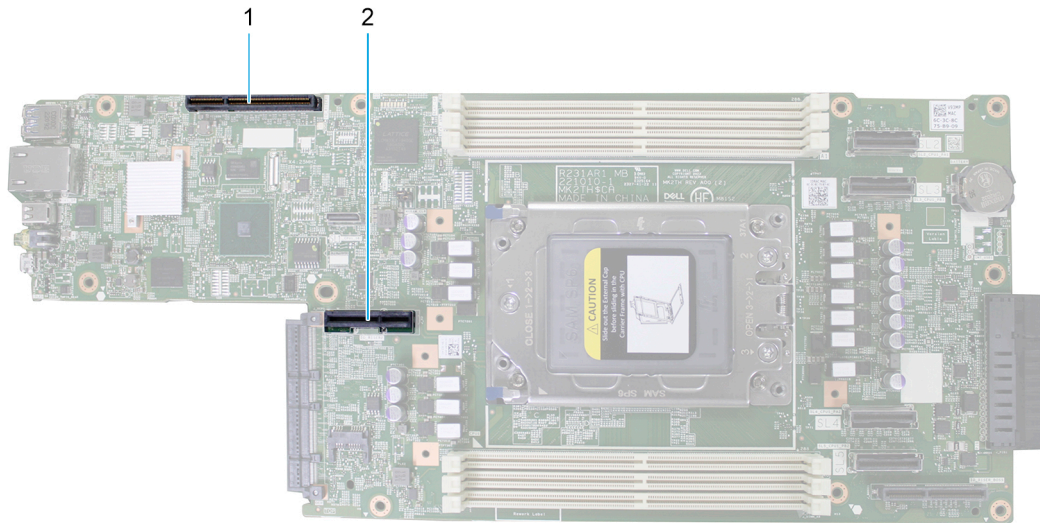
### Next steps

Follow the procedure listed in [After working inside your system](#).

## Expansion cards and expansion card risers

**NOTE:** When an expansion card is not supported or missing, the iDRAC and Lifecycle Controller logs an event. This does not prevent your system from booting. However, if a F1/F2 pause occurs with an error message, see *Troubleshooting expansion cards* section in the *PowerEdge Servers Troubleshooting Guide* at [www.dell.com/poweredgemanuals](http://www.dell.com/poweredgemanuals).

## Expansion card installation guidelines



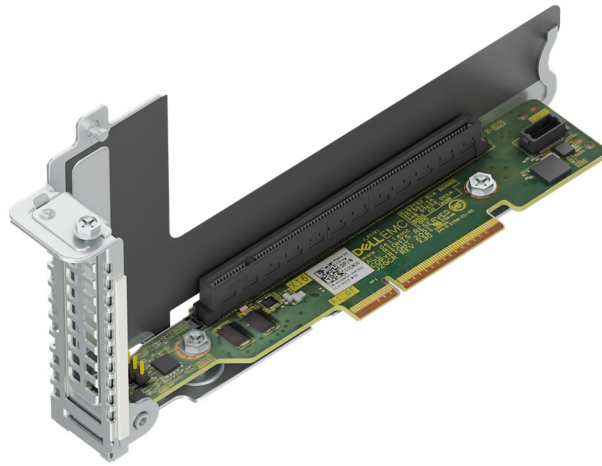
**Figure 26. Expansion card slot connectors**

1. Riser 1A (Slot 1)
2. Riser 2C (Slot 2)

The following table describes the expansion card riser configurations:

**Table 47. Expansion card riser configuration**

Configurations	Expansion card risers	PCIe Slots	Controlling processor	Height	Length	Slot width
Config1. 1xLP (Gen5)	R1A	1	Processor 1	Low Profile	Half length	x16
Config2. 2xLP (Gen5)	R1A	1	Processor 1	Low Profile	Half length	x16
	R2C	2	Processor 1	Low Profile	Half length	x16



**Figure 27. Riser 1A- Slot 1, x16, LP-HL**



**Figure 28. Riser 2C- Slot 2, x16, LP-HL**

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

The following table provides guidelines for installing expansion cards to ensure proper cooling and mechanical fit. The expansion cards with the highest priority should be installed first using the slot priority indicated. All the other expansion cards should be installed in the card priority and slot priority order.

**Table 48. Configuration 0: No Riser**

Card type	Slot priority	Maximum number of cards
Foxconn BOSS	Integrated Slot	1
Broadcom OCP: 1Gb	Integrated Slot	1
Broadcom OCP: 1Gb	Integrated Slot	1
Broadcom OCP: 25Gb	Integrated Slot	1



**Table 48. Configuration 0: No Riser (continued)**

Card type	Slot priority	Maximum number of cards
Broadcom OCP: 10Gb	Integrated Slot	1
Broadcom OCP: 25Gb	Integrated Slot	1
Broadcom OCP: 10Gb	Integrated Slot	1
Intel OCP: 25Gb	Integrated Slot	1
Intel OCP: 1Gb	Integrated Slot	1
Intel OCP: 10Gb	Integrated Slot	1
Intel OCP: 10Gb	Integrated Slot	1
Intel OCP: 25Gb	Integrated Slot	1
Broadcom OCP: 25Gb	Integrated Slot	1

**Table 49. Configuration 1: R1A**

Card type	Slot priority	Maximum number of cards
Foxconn BOSS	Integrated Slot	1
Broadcom NIC: 100Gb	1	1
Broadcom NIC: 1Gb	1	1
Broadcom NIC: 25Gb	1	1
Broadcom OCP: 1Gb	Integrated Slot	1
Broadcom OCP: 1Gb	Integrated Slot	1
Broadcom OCP: 25Gb	Integrated Slot	1
Broadcom OCP: 10Gb	Integrated Slot	1
Broadcom NIC: 10Gb	1	1
Broadcom OCP: 25Gb	Integrated Slot	1
Broadcom NIC: 10Gb	1	1
Broadcom OCP: 10Gb	Integrated Slot	1
Emulex HBA: FC32	1	1
Emulex HBA: FC32	1	1
Intel NIC: 100Gb	1	1
Intel NIC: 10Gb	1	1
Intel OCP: 25Gb	Integrated Slot	1
Intel NIC: 1Gb	1	1
Intel NIC: 10Gb	1	1
Intel OCP: 1Gb	Integrated Slot	1
Intel OCP: 10Gb	Integrated Slot	1
Intel OCP: 10Gb	Integrated Slot	1
Intel OCP: 25Gb	Integrated Slot	1
Intel NIC: 25Gb	1	1
Marvell HBA: FC32	1	1
Marvell HBA: FC32	1	1

**Table 49. Configuration 1: R1A (continued)**

Card type	Slot priority	Maximum number of cards
Mellanox NIC: N400	1	1
Mellanox NIC: NDRV	1	1
Mellanox NIC: N200	1	1
Mellanox NIC: H100	1	1
Mellanox NIC: 25Gb	1	1
Broadcom OCP: 25Gb	Integrated Slot	1
Mellanox NIC: 100Gb	1	1
Foxconn PERC Adapter	1	1
Foxconn PERC Adapter	1	1
Foxconn PERC Adapter	1	1
Foxconn PERC Adapter	1	1

**Table 50. Configuration 2: R1A+R2C**

Card type	Slot priority	Maximum number of cards
Foxconn BOSS	Integrated Slot	1
Broadcom NIC: 100Gb	1,2	2
Broadcom NIC: 1Gb	1,2	2
Broadcom NIC: 25Gb	1,2	2
Broadcom OCP: 1Gb	Integrated Slot	1
Broadcom OCP: 1Gb	Integrated Slot	1
Broadcom OCP: 25Gb	Integrated Slot	1
Broadcom OCP: 10Gb	Integrated Slot	1
Broadcom NIC: 10Gb	1,2	2
Broadcom OCP: 25Gb	Integrated Slot	1
Broadcom NIC: 10Gb	1,2	2
Broadcom OCP: 10Gb	Integrated Slot	1
Emulex HBA: FC32	1,2	2
Emulex HBA: FC32	1,2	2
Intel NIC: 100Gb	1,2	2
Intel NIC: 10Gb	1,2	2
Intel OCP: 25Gb	Integrated Slot	1
Intel NIC: 1Gb	1,2	2
Intel NIC: 10Gb	1,2	2
Intel OCP: 1Gb	Integrated Slot	1
Intel OCP: 10Gb	Integrated Slot	1
Intel OCP: 10Gb	Integrated Slot	1
Intel OCP: 25Gb	Integrated Slot	1
Intel NIC: 25Gb	1,2	2

**Table 50. Configuration 2: R1A+R2C (continued)**

Card type	Slot priority	Maximum number of cards
Marvell HBA: FC32	1,2	2
Marvell HBA: FC32	1,2	2
Mellanox NIC: N400	1,2	2
Mellanox NIC: NDRV	1,2	2
Mellanox NIC: N200	1,2	2
Mellanox NIC: H100	1,2	2
Mellanox NIC: 25Gb	1,2	2
Broadcom OCP: 25Gb	Integrated Slot	1
Mellanox NIC: 100Gb	1,2	2
Foxconn PERC Adapter	1	1
Foxconn PERC Adapter	1	1
Foxconn PERC Adapter	1	1
Foxconn PERC Adapter	1	1

## Removing the expansion card riser 1

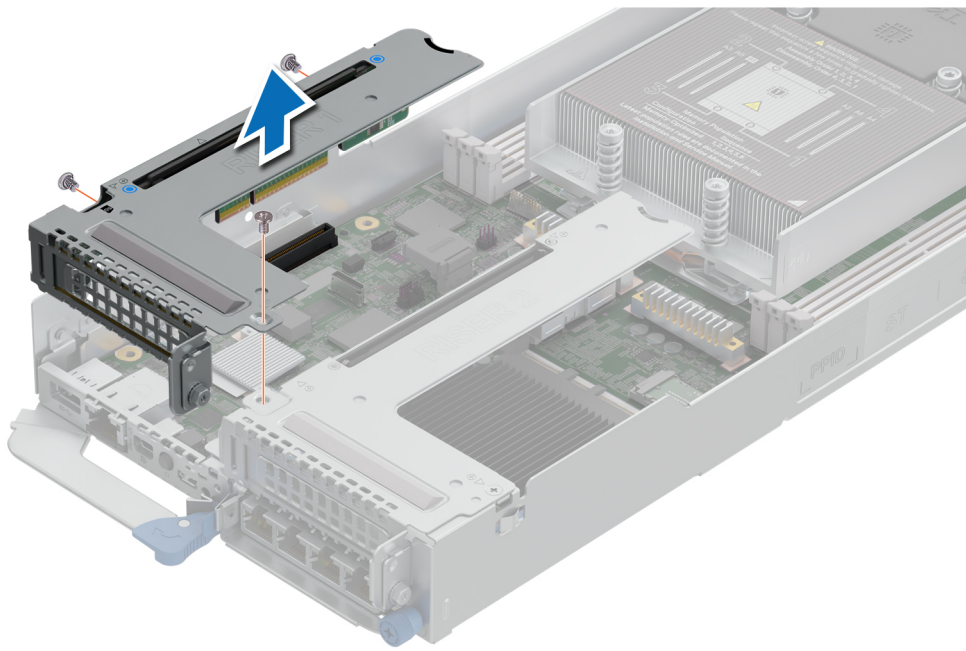
### Prerequisites

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

1. Follow the safety guidelines listed in [Safety instructions](#).
2. Follow the procedure listed in the [Before working inside your system](#).
3. If applicable disconnect the cables.

### Steps

1. Using a Phillips 1 screwdriver, remove the screws that secure the expansion card riser 1.
2. Holding the handle, lift the expansion card riser from the riser connector on the system board.



**Figure 29. Removing the expansion card riser 1**

### Next steps

Replace the expansion card riser 1.

## Installing the expansion card riser 1

### Prerequisites

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

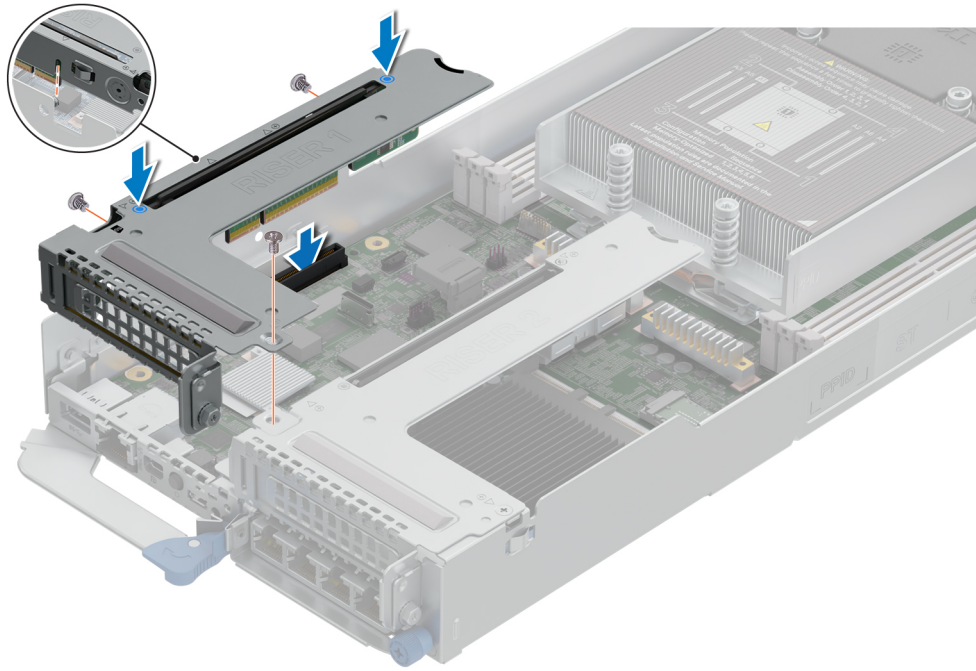
1. Follow the safety guidelines listed in [Safety instructions](#).
2. Follow the procedure listed in [Before working inside your system](#).
3. [Install the expansion card riser 2](#)
4. If applicable, reconnect the cables.

### Steps

1. Align the screw holes and the T-pin slot on the riser with the screw holes and T-pin on the sled.
2. Lower the riser firmly until the riser card is fully seated in the slot.

**i NOTE:** Install the riser card according to the blue pressure points on the bracket.

3. Using a Phillips 1 screwdriver, tighten the screws that secure the expansion card riser 1 on to the system board.



**Figure 30. Installing the expansion card riser 1**

#### Next steps

Follow the procedure listed in [After working inside your system](#).

## Removing the expansion card riser 2

#### Prerequisites

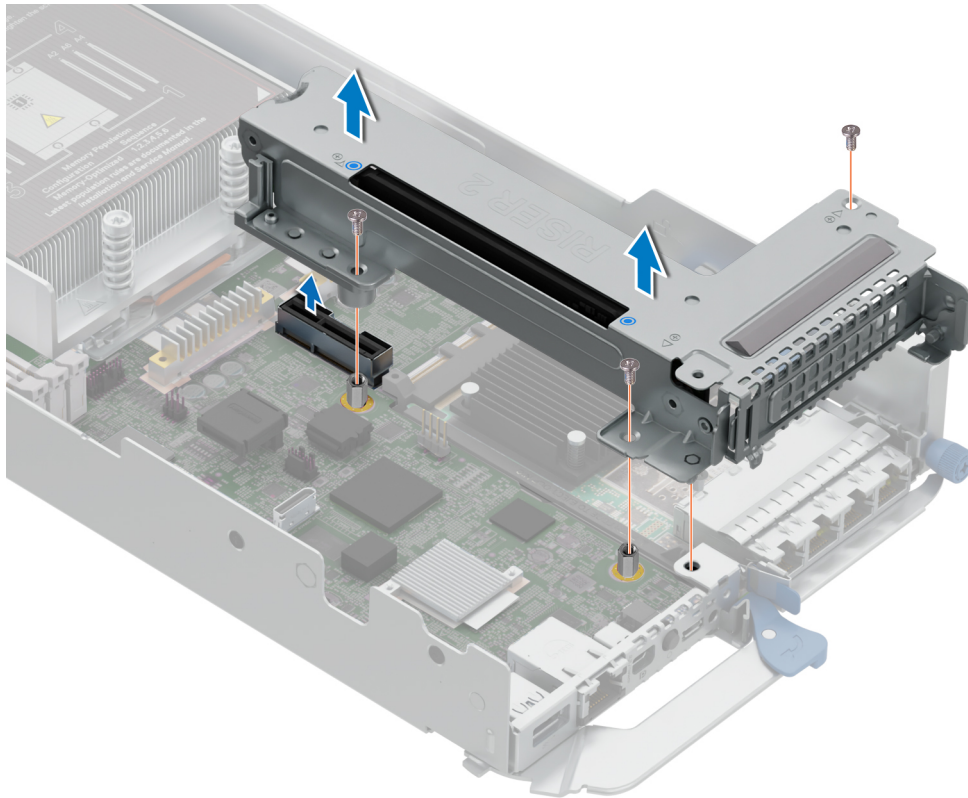
**NOTE:** Install an expansion card filler bracket over an empty expansion slot to maintain Federal Communications Commission (FCC) certification of the system. The brackets also keep dust and dirt out of the system and aid in proper cooling and airflow inside the system.

**NOTE:** The expansion card riser 2 cannot be removed without first removing the expansion card riser 1.

1. Follow the safety guidelines listed in [Safety instructions](#).
2. Follow the procedure listed in [Before working inside your system](#).
3. [Remove expansion card riser 1](#).

#### Steps

1. Using Phillips 1 screwdriver, remove the screws that secure the expansion card riser 2.
2. Holding the blue touch point and handle, lift the expansion card riser from the riser connector on the system board.



**Figure 31. Removing the expansion card riser 2**

### Next steps

Replace the expansion card riser 2.

## Installing the expansion card riser 2

### Prerequisites

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

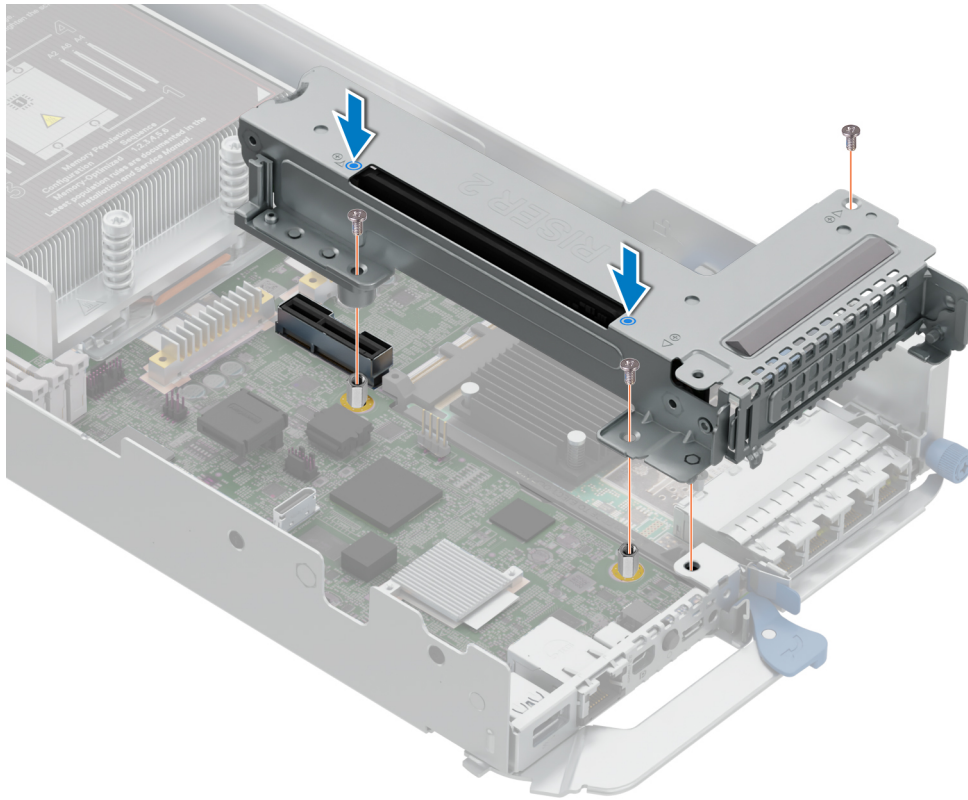
1. Follow the safety guidelines listed in [Safety instructions](#).
2. Follow the procedure listed in [Before working inside your system](#).

### Steps

1. Align the guide pins of the riser bracket with the hole on the base of the sled and align the guide hole of the riser bracket with the standoff on the system board.
2. Lower the riser card firmly until the riser card is fully seated in the slot.

**i** **NOTE:** Install the riser card according to the blue pressure points on the bracket.

3. Using a Phillips 1 screwdriver, tighten the screws that secure the expansion card riser 2 on to the system board.



**Figure 32. Installing the expansion card riser 2**

#### Next steps

1. [Install the expansion card riser 1.](#)
2. Follow the procedure listed in [After working inside your system.](#)

## Removing an expansion cards

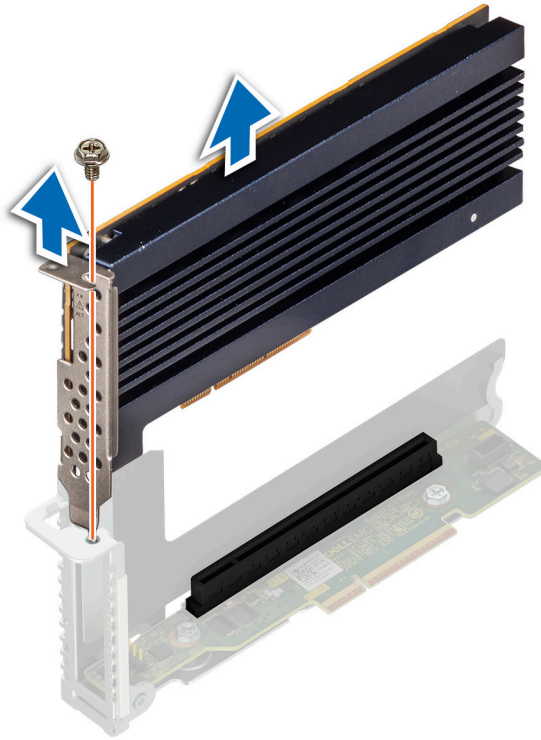
#### Prerequisites

1. Follow the safety guidelines listed in [Safety instructions.](#)
2. Follow the procedure listed in [Before working inside your system.](#)
3. [Remove expansion card riser 1](#) and [remove expansion card riser 2.](#)

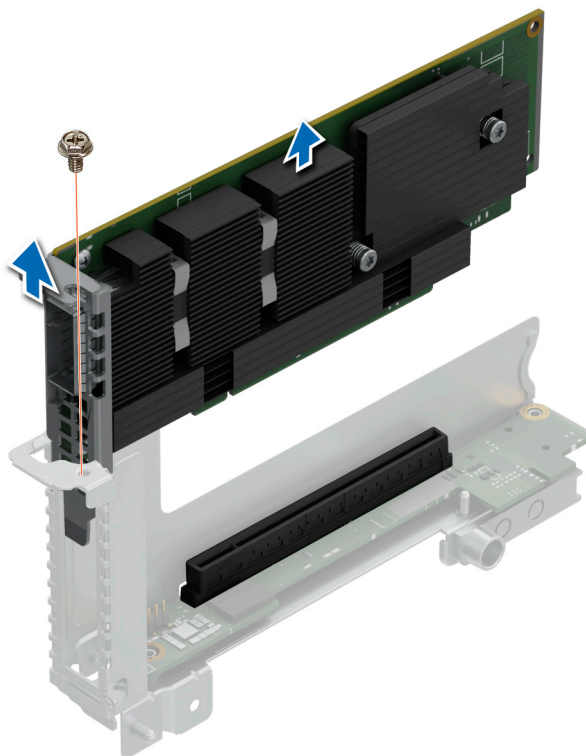
#### Steps

1. Using a Phillips 2 screwdriver, remove the screw that secures the expansion card to the riser.
2. Holding the expansion card by its edges, remove it from the riser slots.

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



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

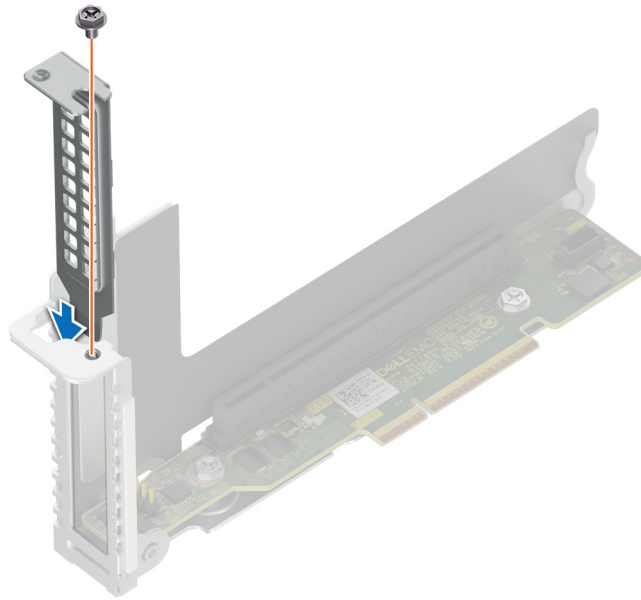


**Figure 34. Removing an expansion card from riser 2**

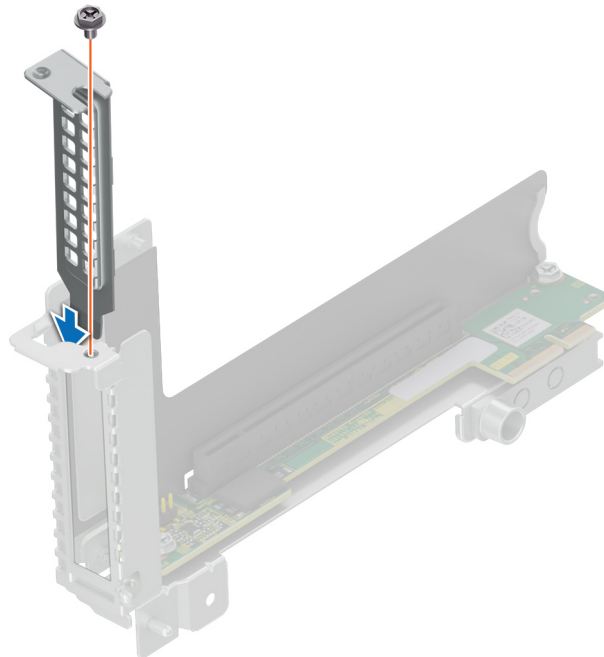
3. If the expansion card is not going to be replaced, install a filler bracket and close the card retention latch.



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



**Figure 35. Installing the expansion card filler bracket in riser 1**



**Figure 36. Installing the expansion card filler bracket in riser 2**

## Next steps

Replace the expansion card riser.

# Installing an expansion card

## Prerequisites

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

1. Follow the safety guidelines listed in [Safety Instructions](#).
2. Unpack the expansion card and prepare it for installation. For instructions, see the documentation accompanying the card.

## Steps

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

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

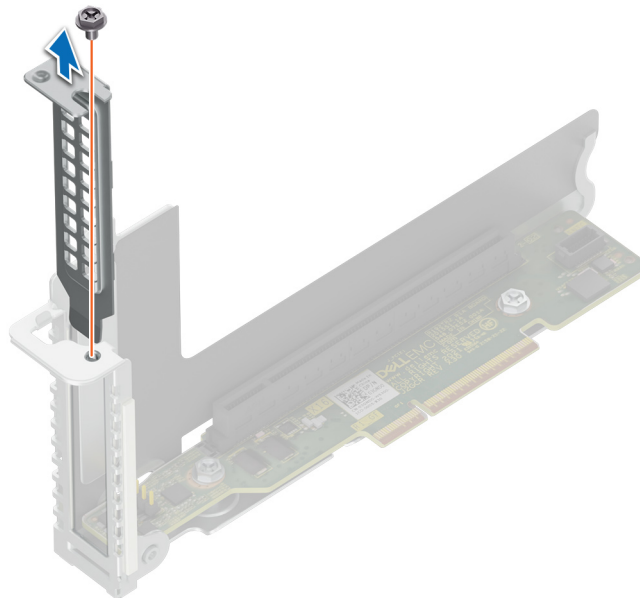
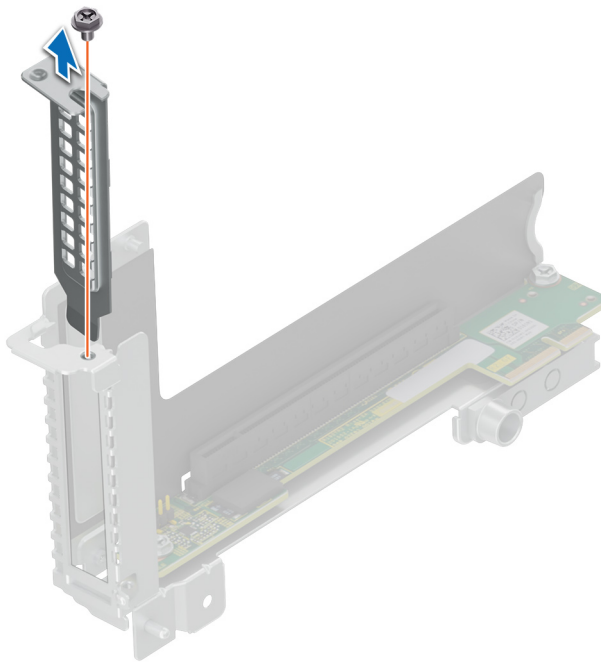
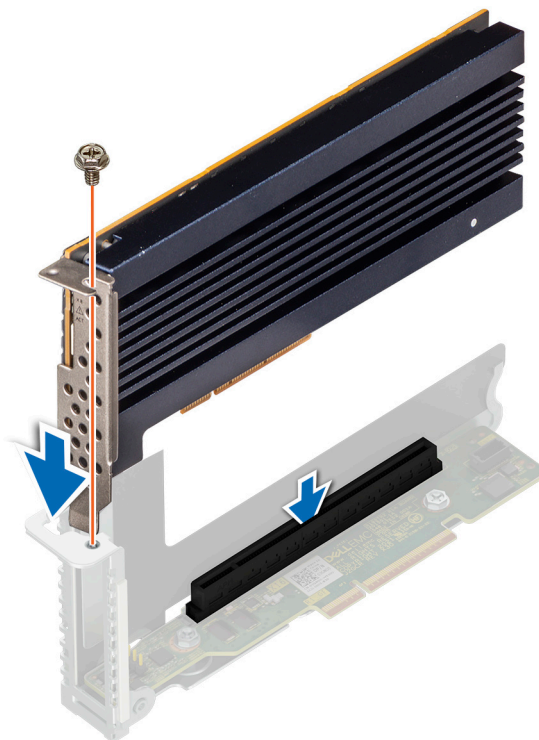


Figure 37. Removing the expansion card filler bracket for riser 1

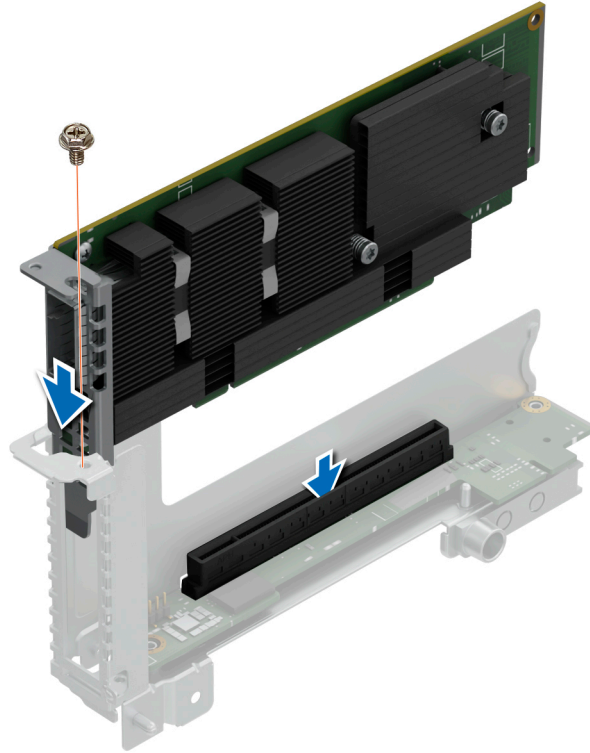


**Figure 38. Removing the expansion card filler bracket for riser 2**

2. Holding the card by its edges, align the card with the slot on the riser.
3. Insert the card firmly until it is fully seated in the slot.
4. Tighten the screw that secures the expansion card.



**Figure 39. Installing an expansion card in riser 1**



**Figure 40. Installing an expansion card in riser 2**

### Next steps

1. [Install the expansion card riser.](#)
2. Follow the procedure listed in [after working inside your system.](#)

## Removing the riser card

### Prerequisites

1. Follow the safety guidelines listed in [Safety instructions.](#)
2. Follow the procedure listed in [Before working inside your system.](#)
3. [Remove the expansion card riser 1](#) and [remove the expansion card riser 2.](#)
4. If installed, [remove the expansion card.](#)
5. If applicable, disconnect the cable from the riser card.

### Steps

1. Using a Phillips 2 screwdriver, remove the screws that secure the riser card to the expansion card riser.
2. Remove the riser card from the expansion card riser.

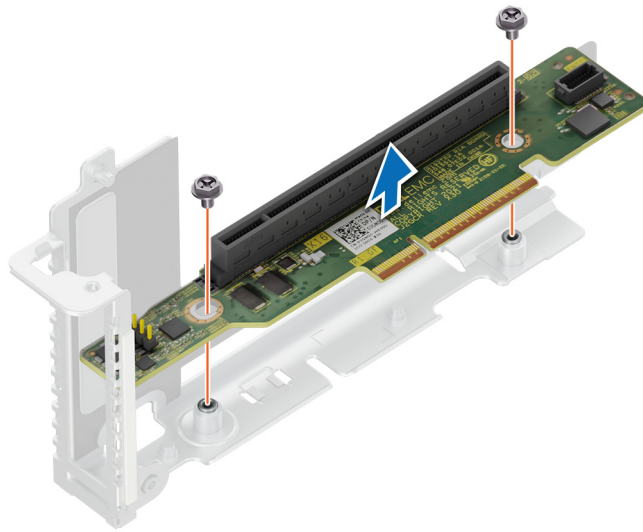


Figure 41. Removing the riser card from riser 1

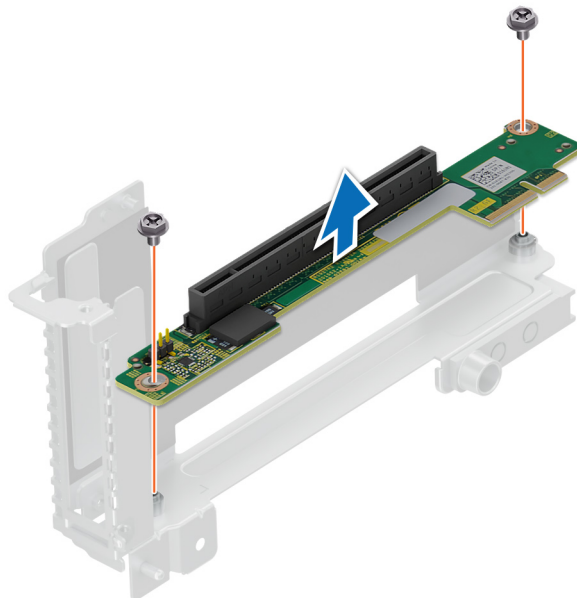


Figure 42. Removing the riser card from riser 2

**Next steps**

Replace the riser card.

## Installing the riser card

### Prerequisites

1. Follow the safety guidelines listed in [Safety instructions](#).
2. Follow the procedure listed in [Before working inside your system](#).

### Steps

1. Align and insert the riser card with the screw holes on the riser.
2. Using a Phillips 2 screwdriver, tighten the screws that secure the riser card to the expansion card riser.

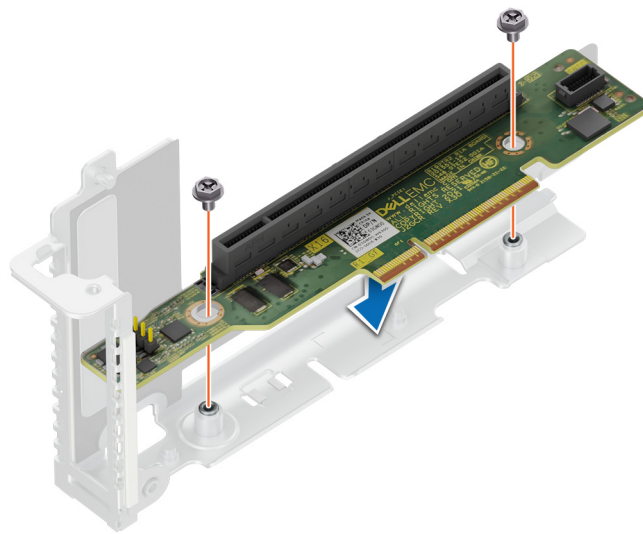
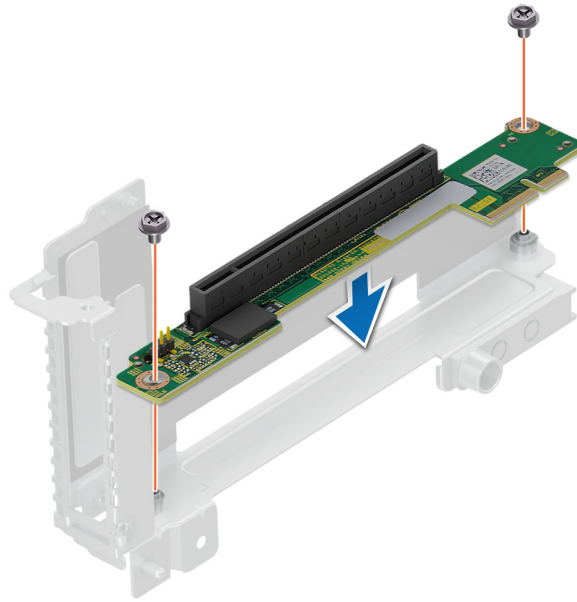


Figure 43. Installing the riser card in riser 1



**Figure 44. Installing the riser card in riser 2**

#### **Next steps**

1. If applicable, connect the cable to the riser card.
2. [Install the expansion card riser 1](#) and [install the expansion card riser 2](#).
3. Follow the procedure listed in [After working inside your system](#).

## **M.2 SSD module**

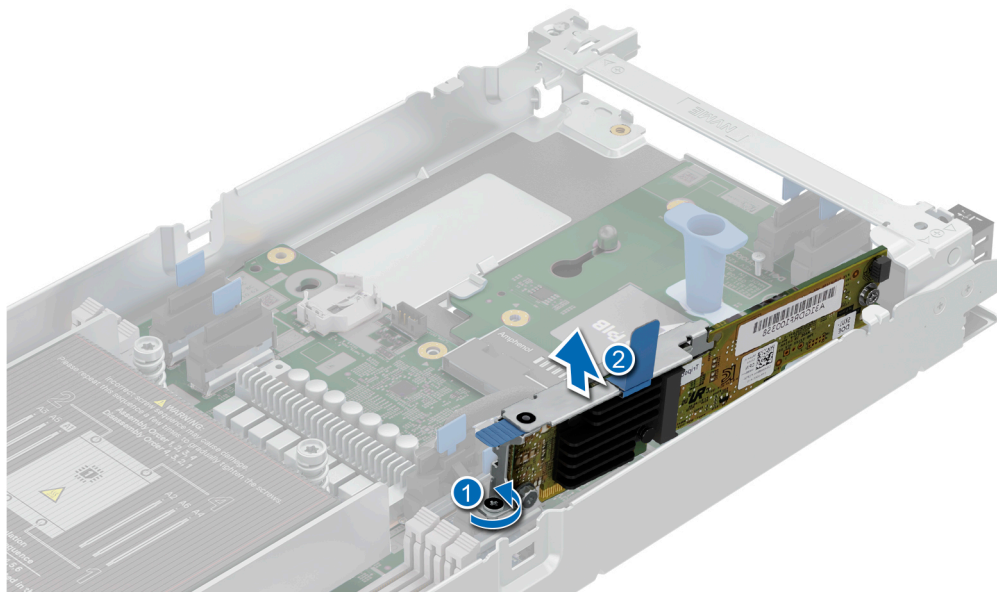
### **Removing the M.2 riser**

#### **Prerequisites**

1. Follow the safety guidelines listed in [Safety instructions](#).
2. Follow the procedure listed in [Before working inside your system](#).
3. [Remove the air shroud](#).

#### **Steps**

1. Using a Phillips 1 screwdriver, remove the screw that secures the riser to the chassis.
2. Holding the blue tag, lift the riser to disengage the riser from the connector on the system board.



**Figure 45. Removing the M.2 riser**

### Next steps

Replace the M.2 riser.

## Installing the M.2 riser

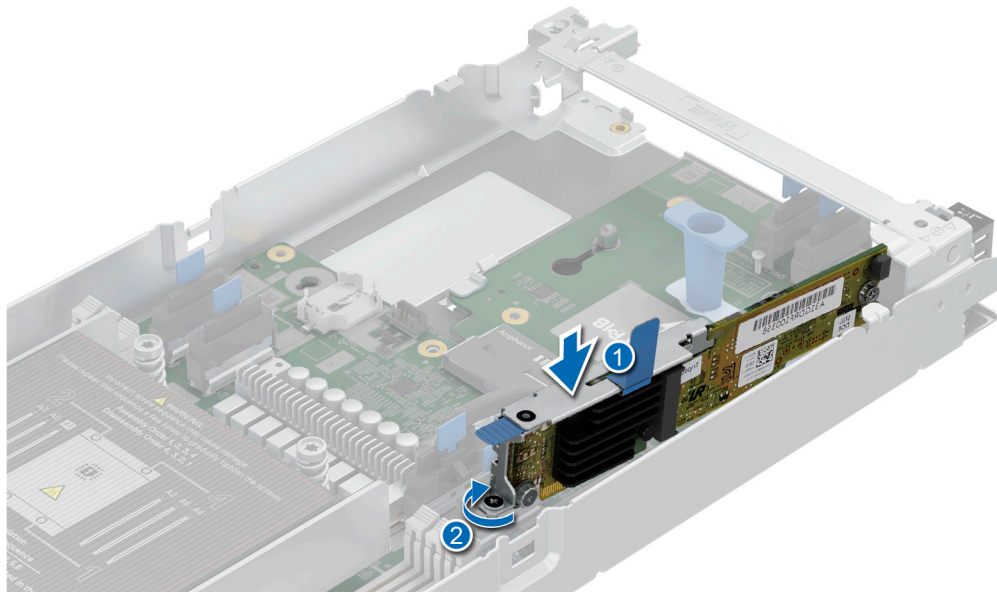
### Prerequisites

1. Follow the safety guidelines listed in [Safety instructions](#).
2. Follow the procedure listed in [Before working inside your system](#).
3. [Remove the air shroud](#).

### Steps

1. Align the M.2 riser with the stand off on the system board and insert it firmly until the riser is fully seated in the slot.
2. Using a Phillips 1 screwdriver, tighten the screw that secures the riser to the chassis.





**Figure 46. Installing the M.2 riser**

### Next steps

1. [Replace the air shroud.](#)
2. Follow the procedure listed in [After working inside your system.](#)

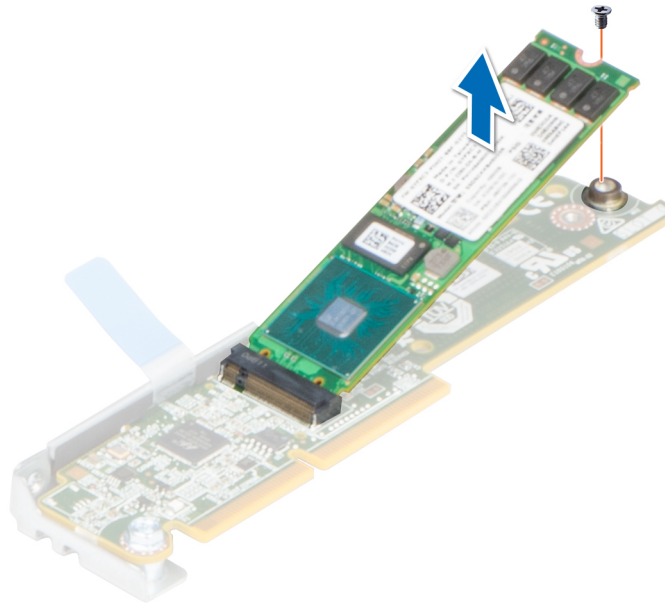
## Removing the M.2 SSD module

### Prerequisites

1. Follow the safety guidelines listed in [Safety instructions.](#)
2. Follow the procedure listed in [Before working inside your system.](#)
3. [Remove the M.2 Riser.](#)

### Steps

1. Using a Phillips 1 screwdriver, remove the screw securing the M.2 SSD module to the M.2 riser.
2. Pull the M.2 SSD module to disconnect from the connector on the M.2 riser.



**Figure 47. Removing the M.2 SSD module from the M.2 riser**

#### **Next steps**

Replace the M.2 SSD module.

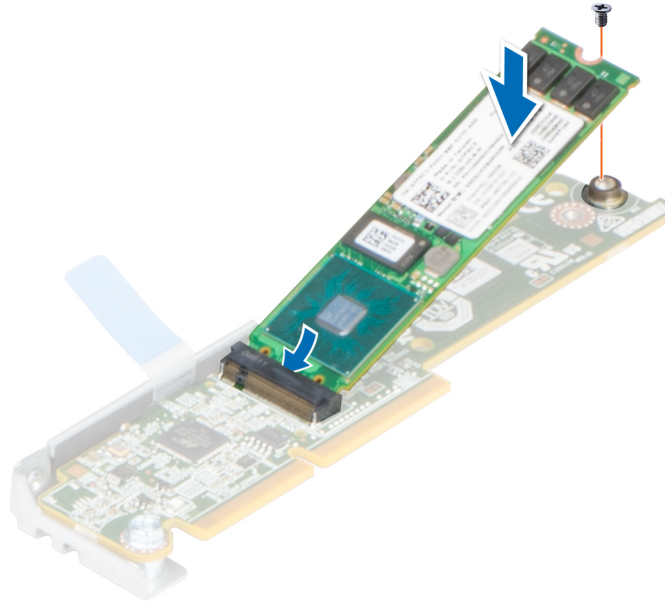
## **Installing the M.2 SSD module**

#### **Prerequisites**

1. Follow the safety guidelines listed in [Safety instructions](#).
2. Follow the procedure listed in [Before working inside your system](#).

#### **Steps**

1. Align the M.2 SSD module at an angle with the connector on the M.2 riser.
2. Insert the M.2 SSD module firmly until it is fully seated in the connector on the M.2 riser.



**Figure 48. Installing the M.2 SSD module on the M.2 riser**

- Using a Phillips 1 screwdriver, tighten the M.2 SSD module on the M.2 riser with the screw.

**Next steps**

- Install the M.2 riser.
- Follow the procedure listed in [After working inside your system](#).

## System memory

### System memory guidelines

The PowerEdge C6615 system supports DDR5 registered DIMMs (RDIMMs). System memory holds the instructions that are executed by the processor.

Your system contains 6 memory sockets.

Memory channels are organized as follows:

**Table 51. Memory channels**

Processor	Channel A	Channel B	Channel C	Channel D	Channel E	Channel F
Processor 1	A1	A5	A3	A4	A6	A2

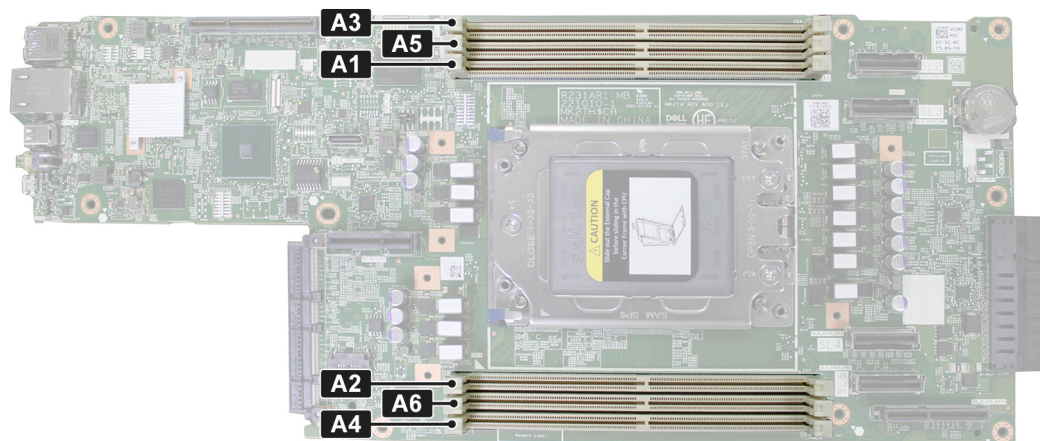


Figure 49. Memory slots

Table 52. Supported memory matrix

DIMM type	Rank	Capacity	DIMM rated voltage and speed	DIMMs per Channel (DPC)
RDIMM	1R	16 GB	DDR5 (1.1V), 4800 MT/s	4800 MT/s
	2R	32 GB, 64 GB		

**NOTE:** Mixing of memory module capacities in a system is not supported.

## General memory module installation guidelines

To ensure optimal performance of your system, observe the following general guidelines when configuring your system memory. If your system's memory configuration fails to observe these guidelines, your system might not boot, stop responding during memory configuration, or operate with reduced memory.

The memory bus may operate at speeds of 4800 MT/s, 4400 MT/s or 4000 MT/s depending on the following factors:

- System profile selected (for example, Performance, Performance Per Watt Optimized (OS), or Custom [can be run at high speed or lower])
- Maximum supported DIMM speed of the processors
- Maximum supported speed of the DIMMs

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

- All DIMMs must be DDR5.
- Memory mixing is not supported for:
  - X4 and X8 DRAM memory modules
- If memory modules with different speeds are installed, they operate at the speed of the slowest installed memory module(s).
- Populate memory module sockets only if a processor is installed.
- For single-processor systems, sockets A1 to A6 are available.
- A minimum of 1 DIMM must be populated for each installed processor.

Table 53. Memory population rules

Processor	Memory population	Memory population information
Single processor	A{1}, A{2}, A{3}, A{4}, A{5}, A{6}	1, 2, 4 and 6 DIMMs are allowed.

**NOTE:** For best performance, populate all memory channels equally.

**NOTE:** DDR4 DIMMs are not supported in the C6615 system.

**NOTE:** Nodes Per Socket (NPS) support varies with memory channel population. For instance, NPS4 requires 4 memory channels populated.

**Table 54. Nodes Per Socket (NPS) supported**

Number of DIMMs populated	Nodes Per Socket (NPS) supported
6	NPS2, NPS1
4	NPS4, NPS2, NPS1
2	NPS2, NPS1
1	NPS1

This table shows the memory population information for AMD Family 19h Models A0h-AFh Socket SP6 processors with support for NPS.

## Removing a memory module

### Prerequisites

1. Follow the safety guidelines listed in the [Safety instructions](#).
2. Follow the procedure listed in the [Before working inside your system](#).

**WARNING:** The memory modules are hot to touch for some time after the system has been powered off. Allow the memory modules to cool before handling them.

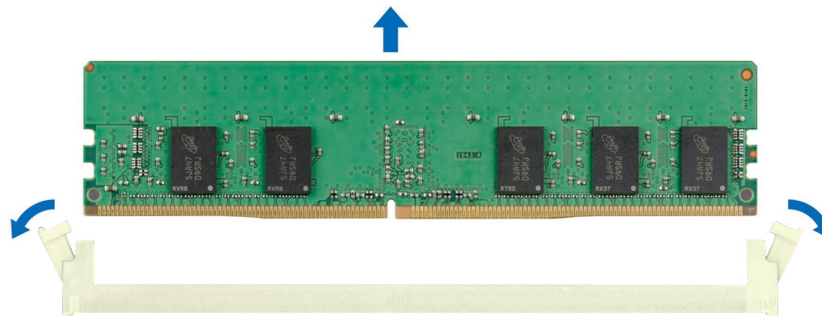
**NOTE:** To ensure proper system cooling, memory module blanks must be installed in any memory socket that is not occupied. The memory module blanks compatible with the C6615 are DDR5 gray color blanks. Remove the memory module blanks only if you intend to install memory modules in those sockets.

### Steps

1. Locate the appropriate memory module socket.
2. To release the memory module from the socket, simultaneously press the ejectors on both ends of the memory module socket to fully open.

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

3. Lift the memory module away from the system.



**Figure 50. Removing a memory module**

#### Next steps

1. [Replace the memory module.](#)
2. If you are removing the memory module permanently, install a memory module blank. The procedure to install a memory module blank is similar to that of the memory module.

**NOTE:** When operating your system with single processor, install memory module blanks in processor 2 memory sockets.

## Installing a memory module

#### Prerequisites

1. Follow the safety guidelines listed in the [Safety instructions](#).
2. Follow the procedure listed in the [Before working inside your system](#).

#### 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.

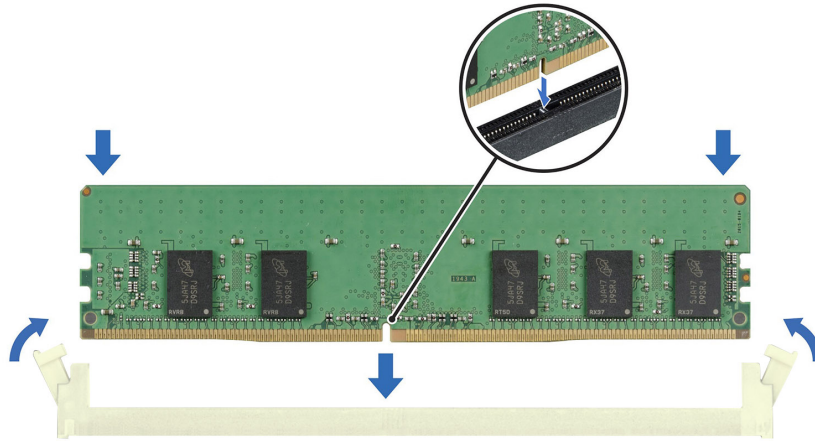
2. Align the edge connector of the memory module with the alignment key of the memory module socket, and insert the memory module in the socket.

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

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

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

3. Press the memory module with your thumbs until the ejectors 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 51. Installing a memory module**

#### Next steps

1. Follow the procedure listed in [After working inside your system](#).
2. To verify that the memory module has been installed properly, press F2 during reboot and navigate to **System Setup Main Menu > System BIOS > Memory Settings**. In the **Memory Settings** screen, the System Memory Size must reflect the updated capacity of the installed memory.
3. If the System Memory Size is incorrect, one or more of the memory modules may not be installed properly. Shut down the system and ensure that the memory modules are firmly seated in the correct sockets.
4. Run the system memory test in system diagnostics.

## Processor and heat sink module

This is a service technician replaceable part only.

### Removing a heat sink

#### Prerequisites

1. Follow the safety guidelines listed in the [Safety instructions](#).
2. Follow the procedure listed in the [Before working inside your system](#).
3. [Remove the air shroud](#).
  - NOTE:** The heat sink and processor are too hot to touch for some time after the system has been powered down. Allow the heat sink and processor to cool down before handling them.

#### Steps

1. Using a Torx T20 screwdriver, fully loosen the captive screw all the way before moving to the next screw (on one-screw-at-a-time basis).
  - NOTE:** Follow the screw sequence defined on the heat sink label. Disassembly order: 4, 3, 2, 1
  - NOTE:** The captive screw numbers are marked on the heat sink.
2. Lift the heat sink from the system.

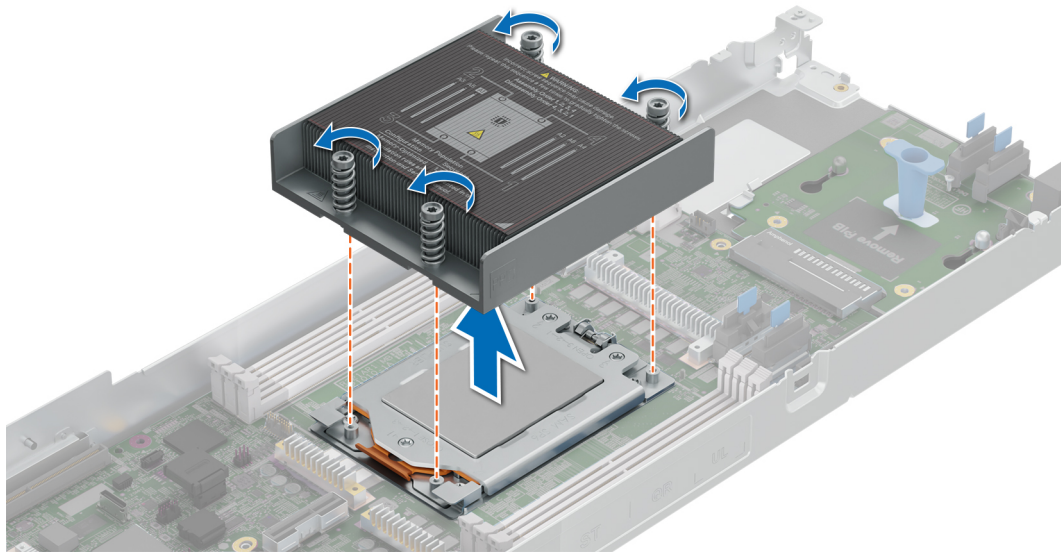


Figure 52. Removing a heat sink

### Next steps

If you are removing a faulty heat sink, replace the heat sink, if not, [remove the processor](#).

## Removing the processor

### Prerequisites

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

1. Follow the safety guidelines listed in the [Safety instructions](#).
2. Follow the procedure listed in the [Before working inside your system](#).
3. [Remove the air shroud](#).
4. [Remove the heat sink](#).

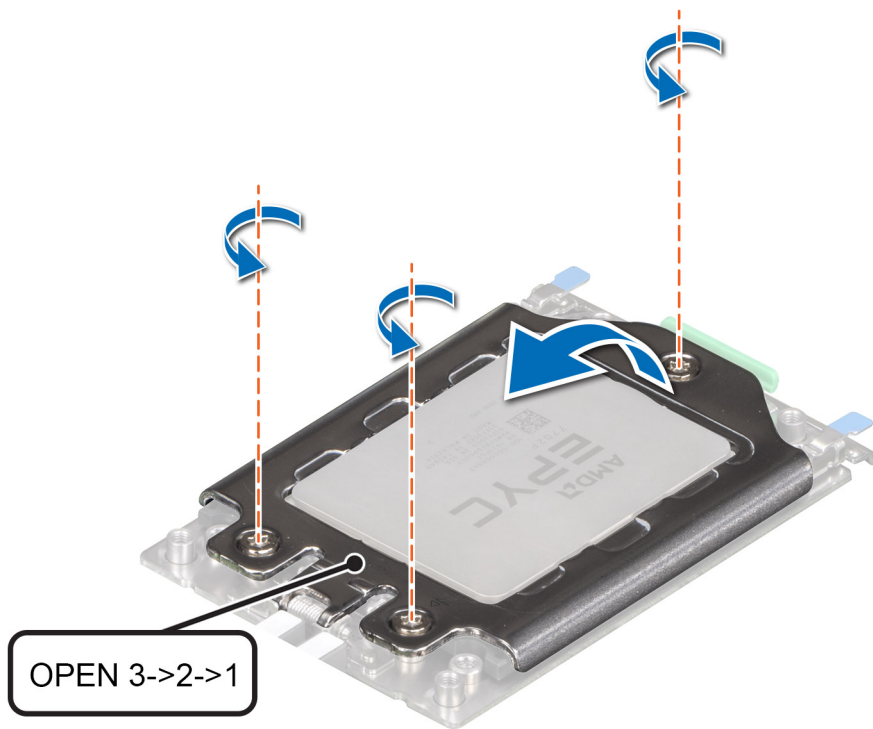
**⚠ CAUTION:** You may find the CMOS battery loss or CMOS checksum error displayed during the first instance of powering on the system after the processor or system board replacement which is expected. To fix this, simply go to setup option to configure the system settings.

### Steps

1. Using a Torx T20 screwdriver, loosen the Socket Actuation Mechanism (SAM) screws according to the screw sequence defined on the SAM. Disassembly order: 3, 2 and 1. Hold and lift the retention frame upwards and rotate it slightly past the vertical position (105 degrees).

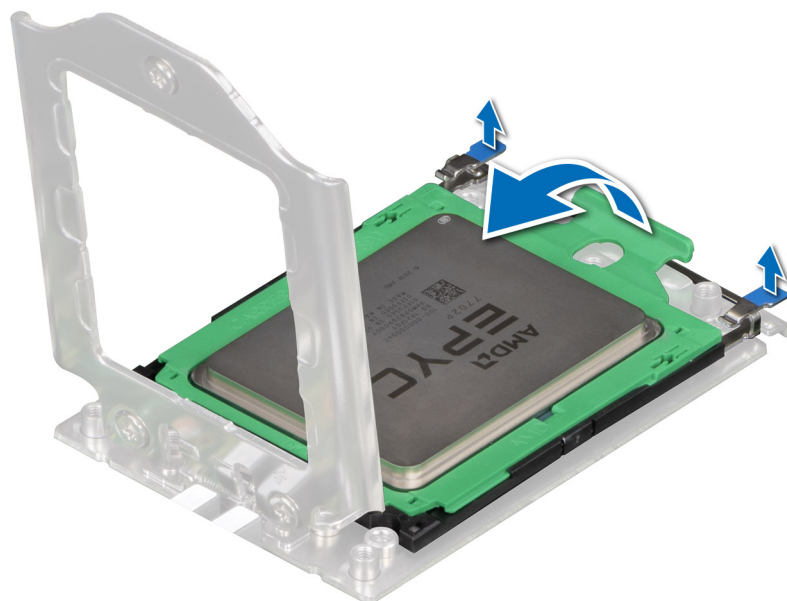
**i NOTE:** The spring loading will keep the retention frame at its "open" position.





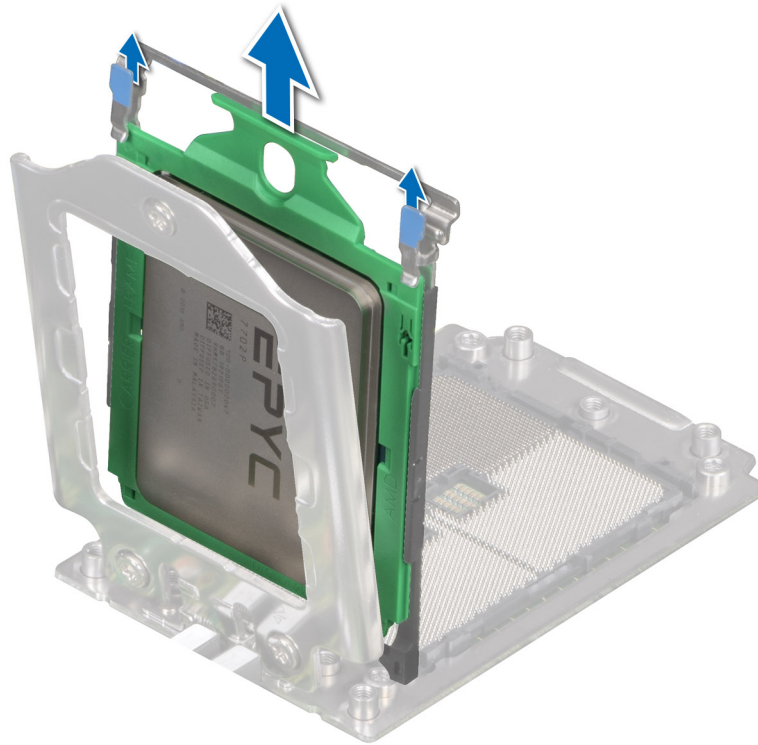
**Figure 53. Removing screws on the retention frame**

2. Release the processor socket rail frame by holding both blue tabs to lift the blue latches.



**Figure 54. Lifting the rail frame**

3. Holding the handle on the carrier frame, slide the tray out of the rail frame.



**Figure 55. Removing the carrier frame**

#### **Next steps**

Replace the processor.

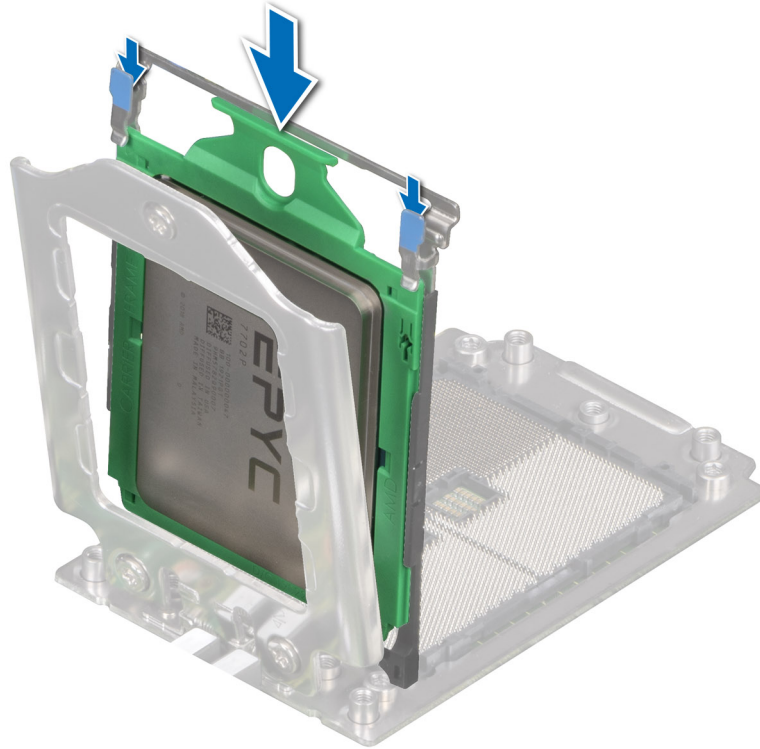
## **Installing the processor**

#### **Prerequisites**

1. Follow the safety guidelines listed in the [Safety instructions](#).
2. Follow the procedure listed in the [Before working inside your system](#).

#### **Steps**

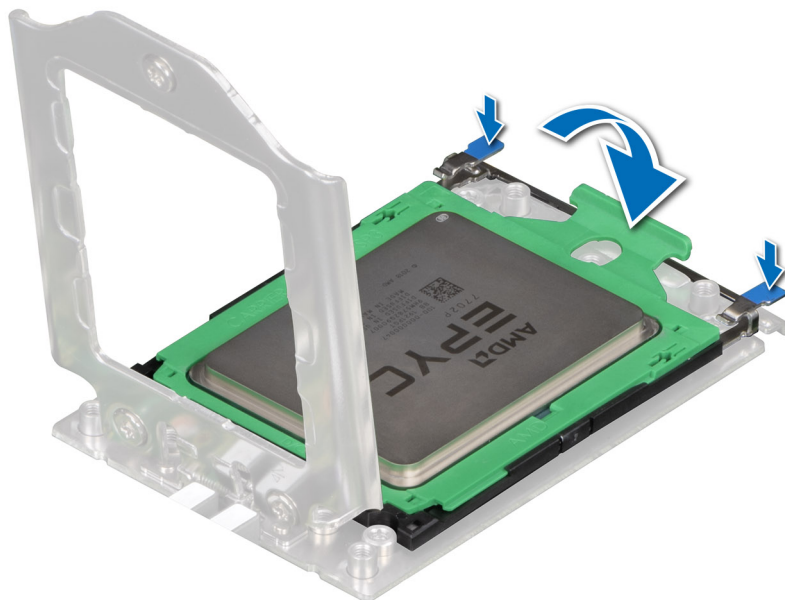
1. Holding the handle of the carrier frame, slide the tray into the processor socket rail frame until firmly seated.



**Figure 56. Placing the carrier frame into the rail frame**

2. Holding both of blue tabs to push the rail frame down until the blue latches lock into place.

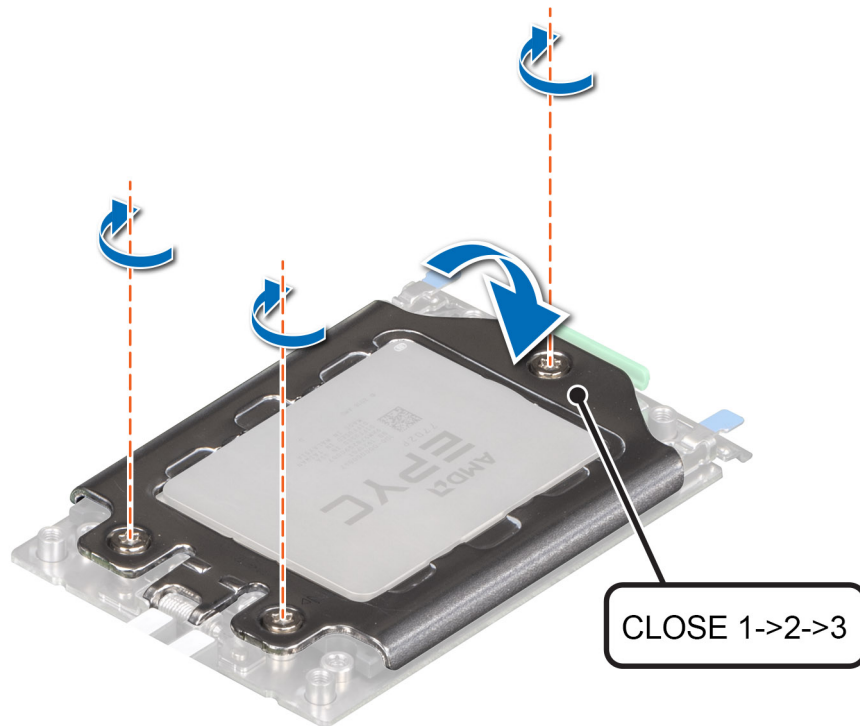
**NOTE:** Ensure that the CPU carrier does not climb up the rail frame rib of the Socket actuation mechanism (SAM).



**Figure 57. Closing the rail frame**

3. Secure the retention frame by holding down the retention frame with one hand while using the other hand to operate the screw driver to engage and fasten the Socket actuation mechanism (SAM) screws according to the screw sequence defined on the SAM. Assembly order: 1, 2 and 3.

**NOTE:** Press the retention frame while tightening the screws to avoid tilting of the processor cover out of the processor socket.



**Figure 58. Securing the retention frame**

#### Next steps

1. [Install the heat sink.](#)
2. [Install the air shroud.](#)
3. Follow the procedure listed in [After working inside your system.](#)

## Installing the heat sink

#### Prerequisites

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

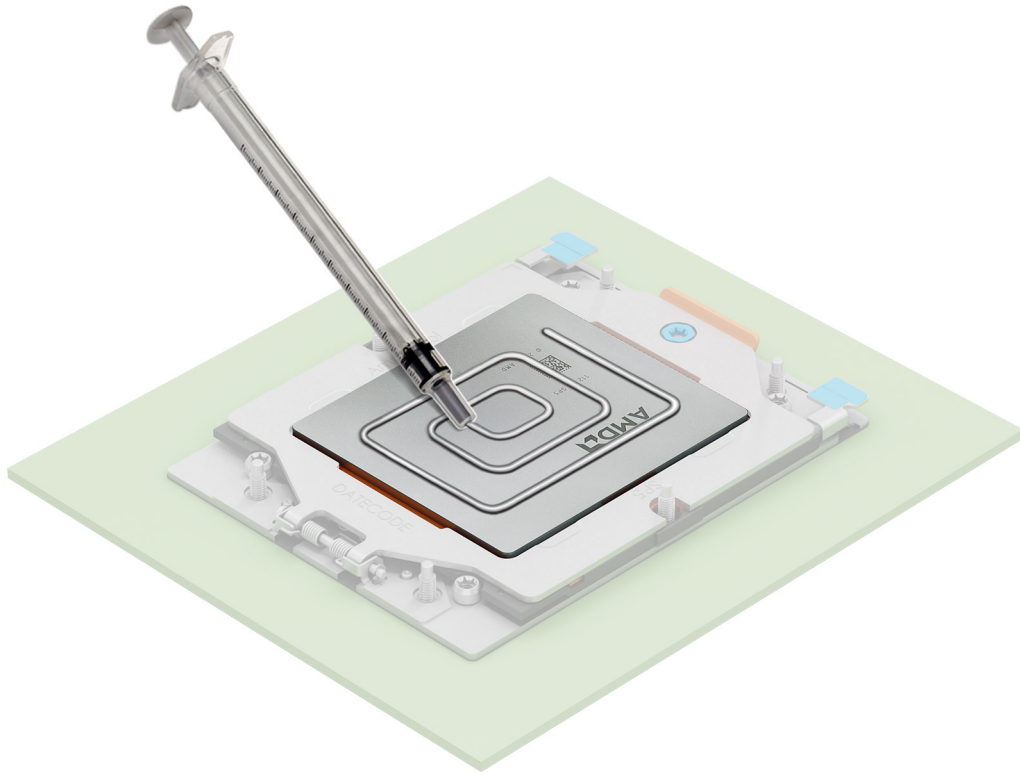
1. Follow the safety guidelines listed in the [Safety instructions.](#)
2. Follow the procedure listed in the [Before working inside your system.](#)
3. [Remove the air shroud.](#)
4. If installed, remove the processor dust cover.

#### Steps

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

**NOTE:** For a new heat sink, the thermal paste is pre-applied to the heat sink. Remove the protective cover, and install the heat sink.

2. Apply thermal grease in a thin spiral on the top of the processor.



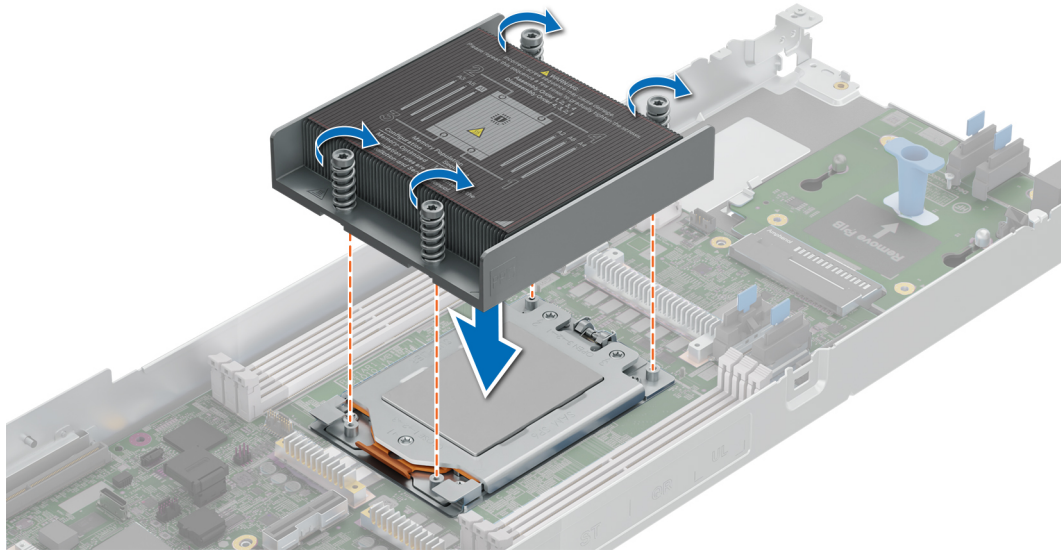
**Figure 59. Applying thermal grease**

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

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

**NOTE:** Refer to the airflow direction on heat sink label as visual hint of heat sink install orientation.

3. Align the heat sink label indicated by a triangle mark on the top corner with the system board triangle mark.
  4. Align the outline of the heat sink with the white system board silkscreen.
  5. Align the screws on the heat sink with the standoff screws on the system board
  6. Using a Torx T20 screwdriver, fully tighten the captive screw all the way down before moving to the next screw (on one-screw-at-a-time basis).
- NOTE:** Follow the screw sequence defined on heat sink label. Assembly order: 1, 2, 3, and 4. Repeat the sequence a few times to gradually tighten the screws.



**Figure 60. Installing the heat sink**

#### **Next steps**

1. [Replace the air shroud.](#)
2. Follow the procedure listed in the [After working inside your system.](#)

## **Power Interposer Board**

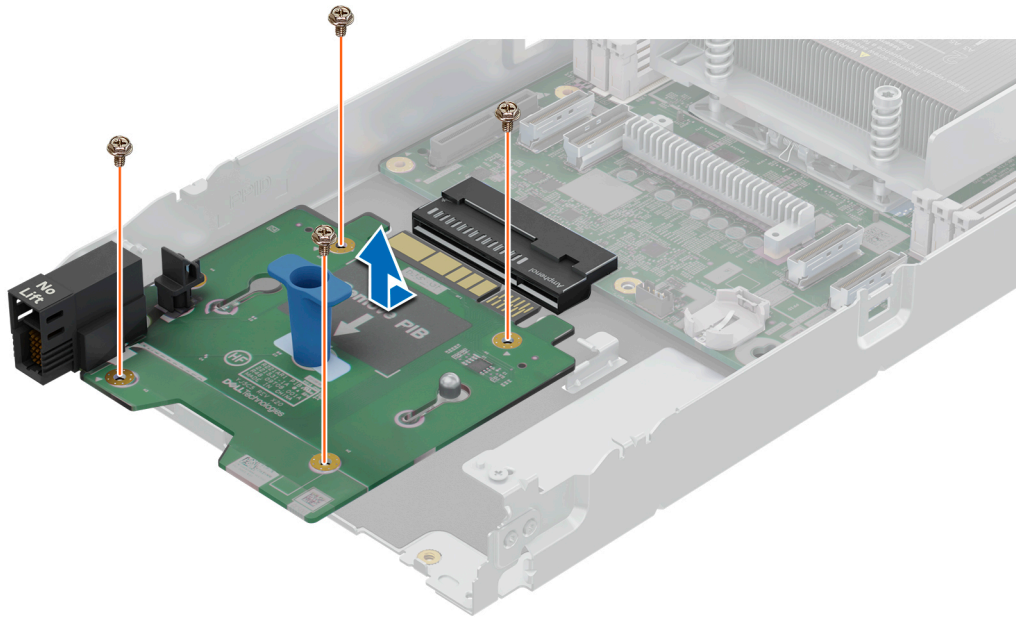
### **Removing the Power Interposer Board**

#### **Prerequisites**

1. Follow the safety guidelines listed in [Safety instructions.](#)
2. Follow the procedure listed in [Before working inside your system.](#)
3. [Remove the air shroud.](#)
4. [Remove the support bracket](#)

#### **Steps**

1. Using a Phillips 2 screwdriver, remove the screws that secure the Power Interposer Board (PIB) from the sled.
2. Using the blue holder, slide out the PIB from the slot to remove it from the system.



**Figure 61. Removing the Power Interposer Board**

#### **Next steps**

1. [Replace the Power Interposer Board.](#)

## **Installing the Power Interposer Board**

#### **Prerequisites**

1. Follow the safety guidelines listed in [Safety instructions](#).
2. Follow the procedure listed in [Before working inside your system](#).
3. [Remove the air shroud.](#)
4. [Remove the support bracket](#)

#### **Steps**

1. Align the guide hole of the Power Interposer Board (PIB) with the T-shaped pin on the sled.
2. Align the power interposer board and using the blue holder, slide the PIB into the slot on the system board.
3. Using a Phillips 2 screwdriver, tighten the screws that secure the PIB on the sled.

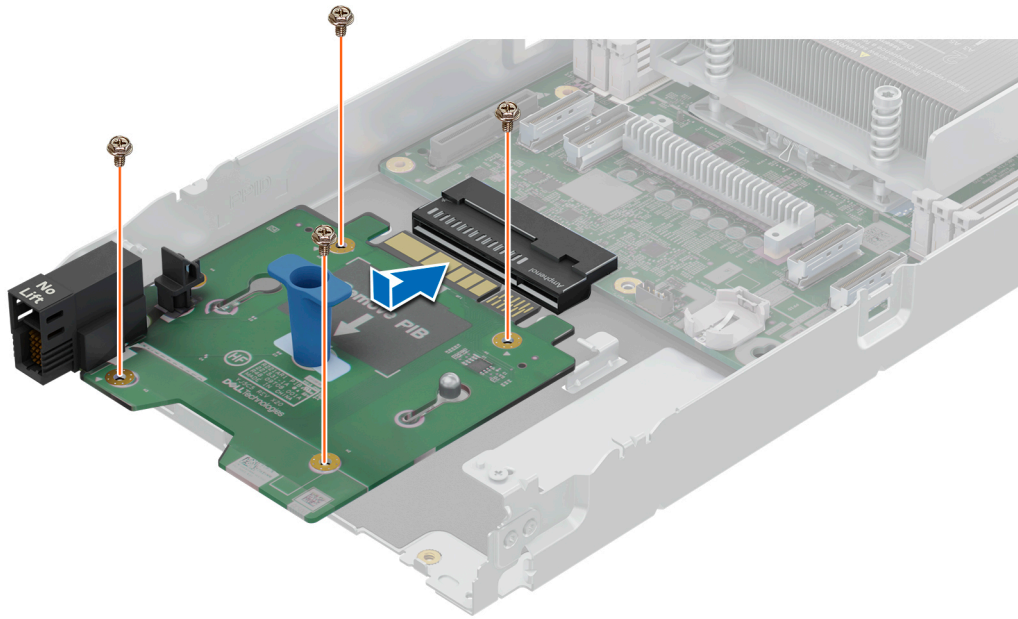


Figure 62. Installing the Power Interposer Board

## Optional OCP card

### Removing the OCP filler

#### Prerequisites

1. Follow the safety guidelines listed in [Safety instructions](#).
2. Follow the procedure listed in [Before working inside your system](#).
3. [Remove the air shroud](#).
4. [Remove the support bracket](#).
5. [Remove the expansion card riser 1](#)
6. [Remove the expansion card riser 2](#)

#### Steps

Hold and lift the OCP filler from the OCP slot on the chassis.



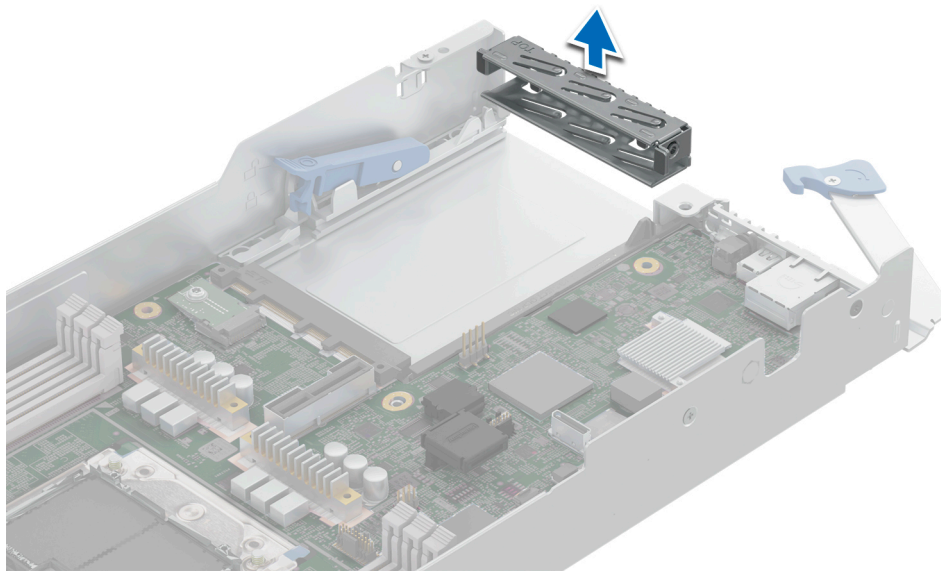


Figure 63. Removing the OCP filler

#### Next steps

1. Install the OCP card.

## Removing an OCP card

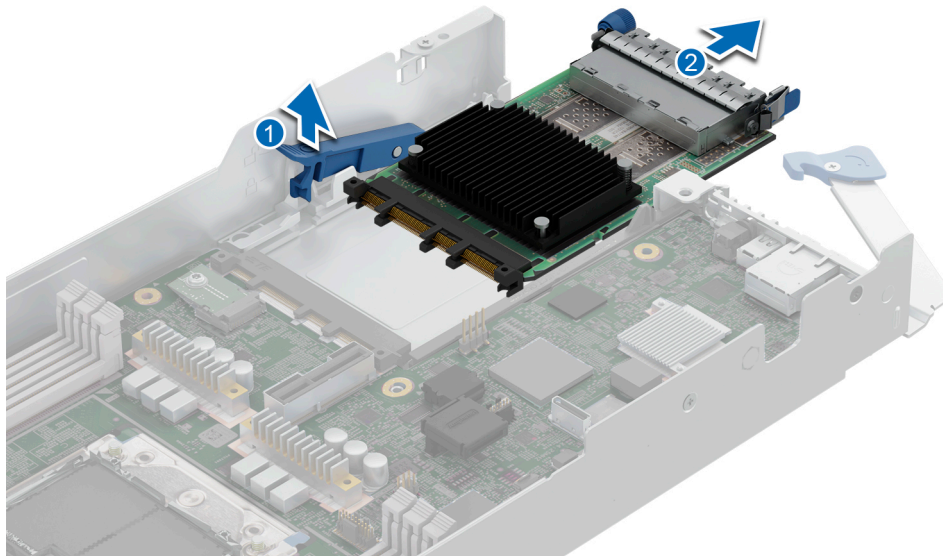
#### Prerequisites

1. Follow the safety guidelines listed in [Safety instructions](#).
2. Follow the procedure listed in [Before working inside your system](#).
3. [Remove the air shroud](#).
4. [Remove the support bracket](#).
5. [Remove the expansion card riser 1](#)
6. [Remove the expansion card riser 2](#)

#### Steps

1. Lift the OCP card retention latch.
2. Disengage the OCP card and remove it from the sled.

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



**Figure 64. Removing an OCP card**

#### **Next steps**

1. [Install the OCP card filler.](#)

## **Installing an OCP card**

#### **Prerequisites**

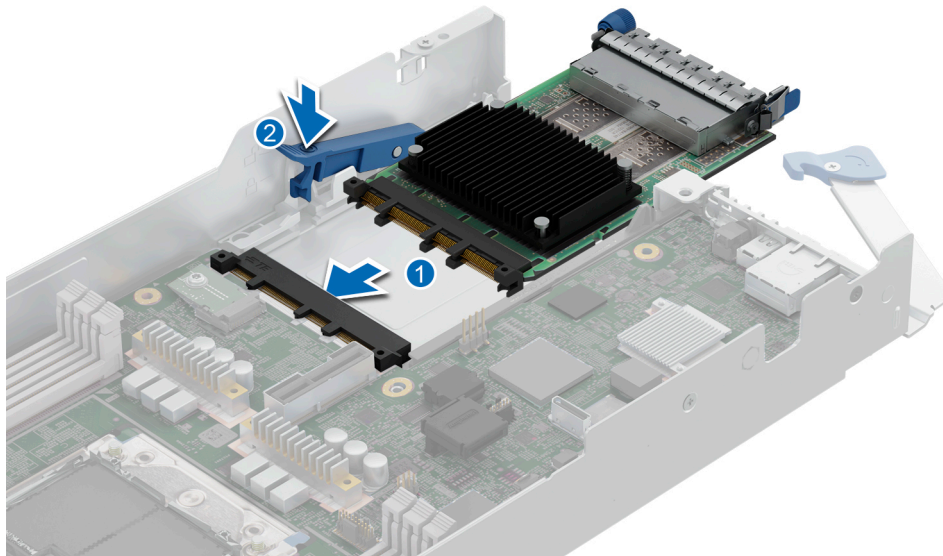
1. Follow the safety guidelines listed in [Safety instructions](#).
2. Follow the procedure listed in [Before working inside your system](#).
3. [Remove the OCP card filler.](#)
4. [Remove the expansion card riser 1](#)
5. [Remove the expansion card riser 2](#)

#### **Steps**

1. Align and insert the OCP card into the sled. Slide the OCP card and push firmly until it is fully connected to the system board connector.

**NOTE:** Ensure to lift the OCP card retention latch if it is in the lock position.

2. Close the OCP card retention latch to secure the card in place.



**Figure 65. Installing an OCP card**

#### **Next steps**

1. Follow the procedure listed in [After working inside your system.](#)

## **Installing the OCP card filler**

#### **Prerequisites**

1. Follow the safety guidelines listed in [Safety instructions.](#)
2. Follow the procedure listed in [Before working inside your system.](#)
3. [Remove the air baffle.](#)
4. [Remove the support bracket.](#)
5. [Remove the expansion card riser 1](#)
6. [Remove the expansion card riser 2](#)

#### **Steps**

Align and insert the OCP filler firmly until it is fully seated.

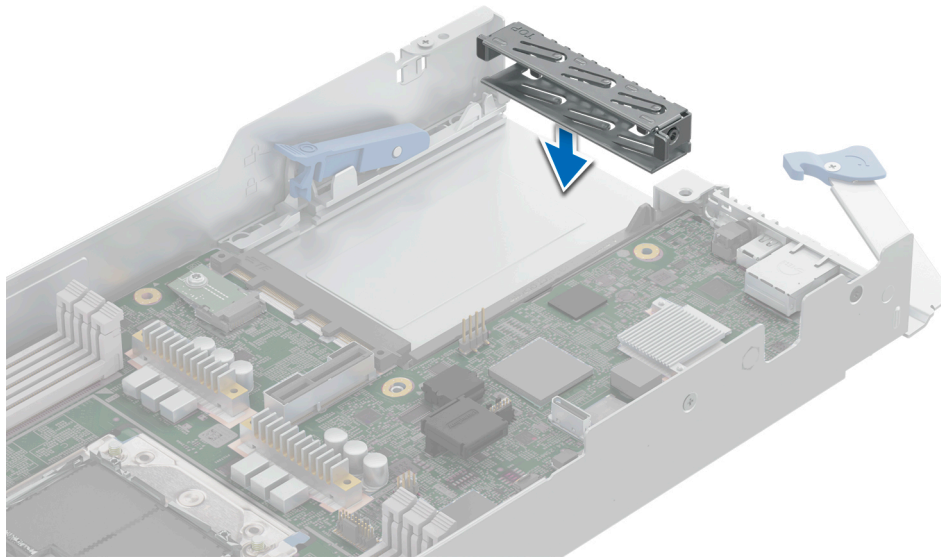


Figure 66. Installing the OCP card filler

#### Next steps

1. [Install the support bracket.](#)

## System battery

This is a service technician replaceable part only.

## Replacing the system 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. Discard used batteries according to the manufacturer's instructions. See the Safety instructions that came with your system for more information.

1. Follow the safety guidelines listed in the [Safety instructions](#).
2. Follow the procedure listed in [Before working inside your system](#).
3. [Remove the air baffle.](#)

#### Steps

1. To remove the battery:
  - a. Push the battery holder clip away from the battery.

**⚠ CAUTION:** To avoid damage to the battery holder clip, ensure that you do not bend the battery holder clip while installing or removing a battery.

- b. Pull the battery out of the battery holder.

**i NOTE:** Ensure that the + side of the battery is facing the battery holder clip.

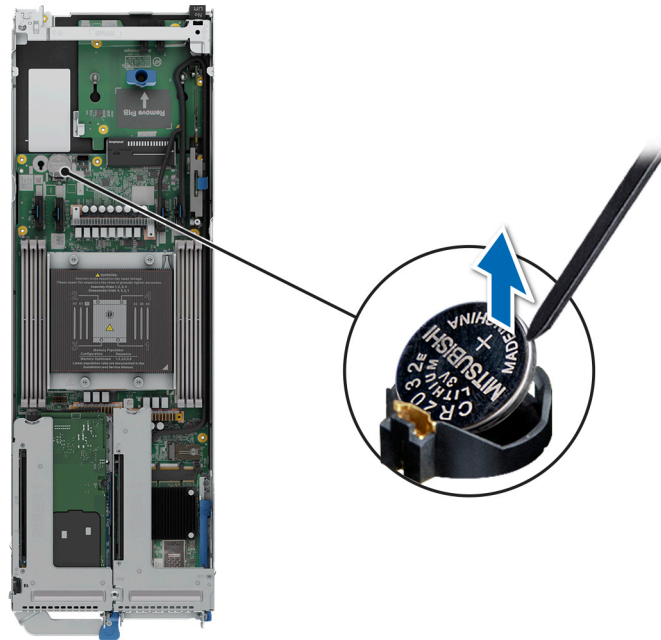


Figure 67. Removing the system battery

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

2. To install a new system battery:

a. Push the battery holder clip away.

**NOTE:** Ensure that the + side of the battery is facing the battery holder clip.

b. Insert the battery in the battery holder until the battery holder clip snaps into place.

**CAUTION:** To avoid damage to the battery holder clip, ensure that you do not bend the battery holder clip while installing or removing a battery.

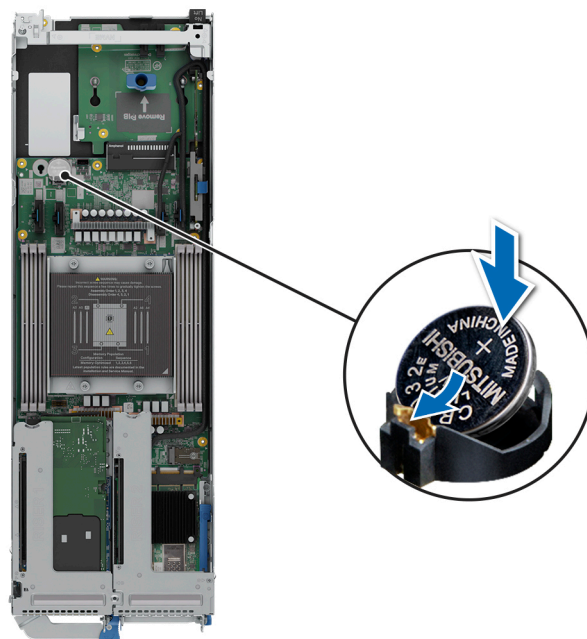


Figure 68. Installing the system battery

### Next steps


1. If applicable, [Installing the expansion card riser 1](#).
2. Follow the procedure listed in the [After working inside your system](#).
3. Confirm that the battery is operating properly, by performing the following steps:
  - a. Enter the System Setup, while booting, by pressing F2.
  - b. Enter the correct time and date in the System Setup **Time** and **Date** fields.
  - c. **Exit** the System Setup.
  - d. To test the newly installed battery, remove the system from the enclosure for at least an hour.
  - e. Reinstall the system into the enclosure after an hour.
  - f. Enter the System Setup and if the time and date are still incorrect, see [Getting help](#) section.


## System board

This is a service technician replaceable part only.

## 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 system or program before you can access the encrypted data on your drives.


 **CAUTION:** To avoid damage to the system board, ensure that the system board does not touch the side walls of the sled chassis, while sliding the system board into the sled.

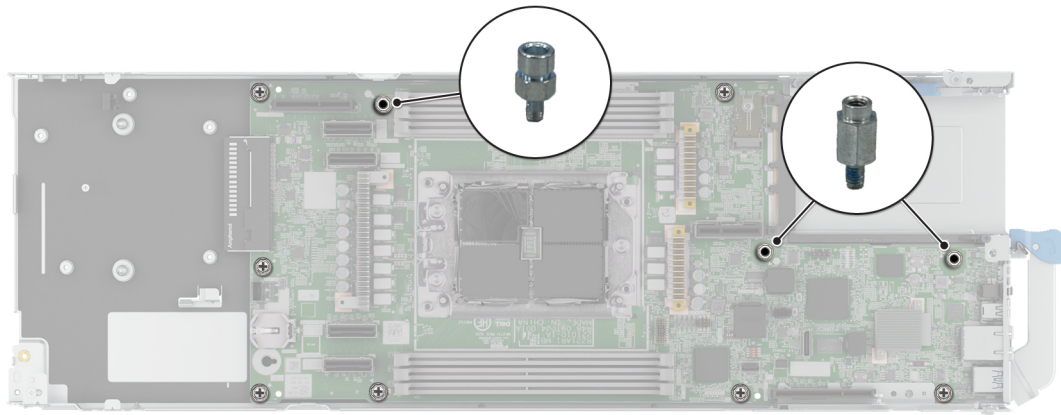
1. Follow the safety guidelines listed in the [Safety instructions](#).
2. Follow the procedure listed in [Before working inside your system](#).
3. Remove the following components:
  - a. [Sled](#)
  - b. [Expansion cards and expansion card risers](#)
  - c. [Memory modules](#)
  - d. If installed, [OCP card](#)
  - e. [Power Interposer Board \(PIB\)](#)
  - f. Disconnect all cables from the system board.

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

### Steps

1. Using a Phillips 2 screwdriver, remove the screws that secure the system board to the chassis.
2. Using a 5 mm hex nut driver, remove the standoff screws that secure the system board to the chassis.

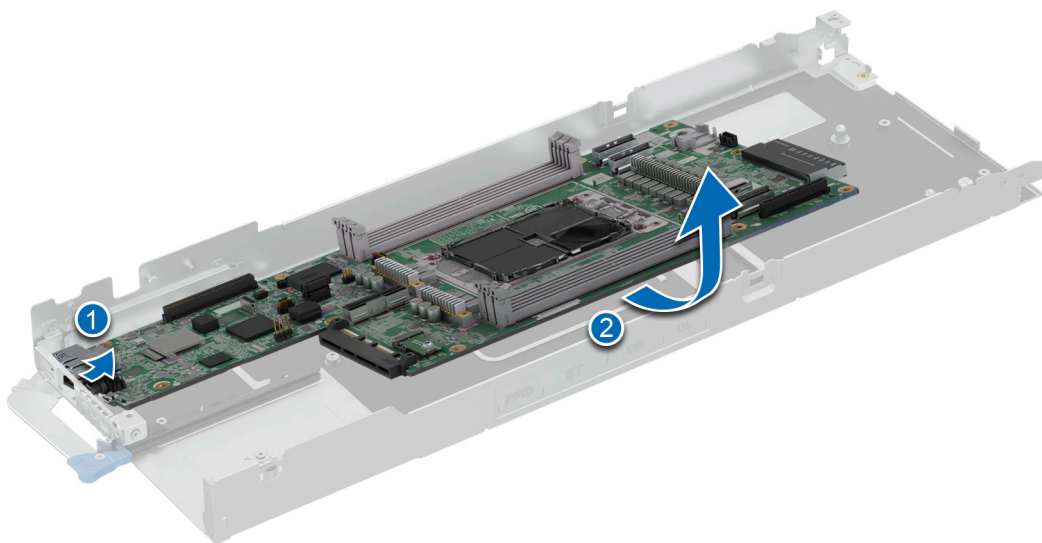
 **CAUTION:** Do not lift the system board by holding a memory module slot, any other connector, or component.



**Figure 69. System board screws**

3. To disengage the ports from the slots on the chassis, slide the system board toward the front of the chassis.
4. Incline the system board at an angle and lift the system board out of the chassis.

**NOTE:** The numbers on the image do not depict the exact steps. The numbers are for representation of sequence.



**Figure 70. Removing the system board**

#### **Next steps**

Replace the system board.

# Installing the system board

## Prerequisites

**NOTE:** Before replacing the system board, replace the old iDRAC MAC address label in the Information tag with the iDRAC MAC address label of the replacement system board

1. Follow the safety guidelines listed in the [Safety instructions](#).
2. Follow the procedure listed in [Before working inside your system](#).
3. If you are replacing the system board, remove all the components that are listed in the [remove the system board](#) section.

**CAUTION:** To avoid damage to the system board, ensure that the system board does not touch the side walls of the sled chassis, while sliding the system board into the sled.

## 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 system identification button while placing the system board into the chassis.

2. Holding the system board by the edges, lower the system board into the chassis.
3. Incline the system board at an angle and align the connectors on the system board with the slots on the rear of the chassis until the connectors are firmly seated in the slots.

**NOTE:** The numbers on the image do not depict the exact steps. The numbers are for representation of sequence.

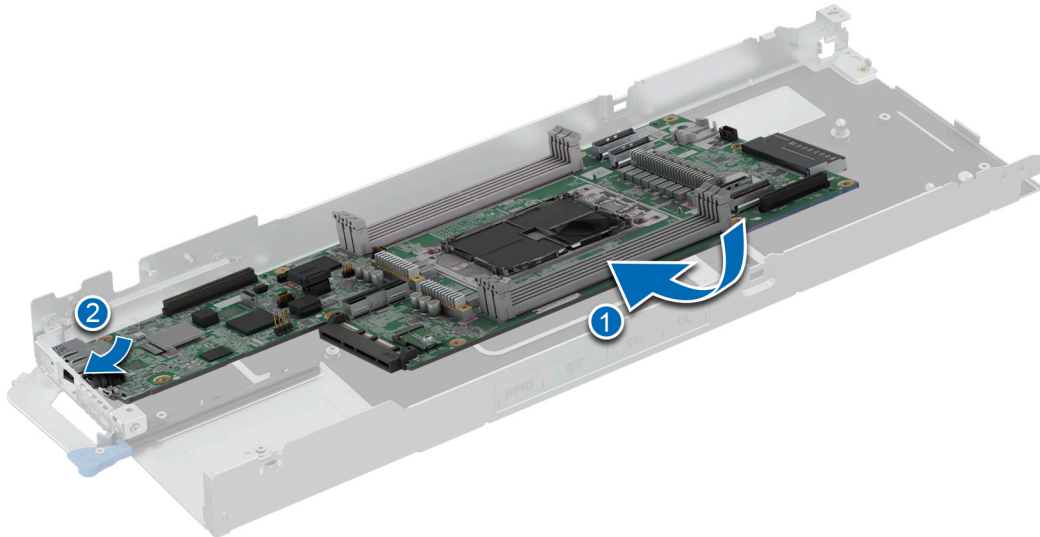
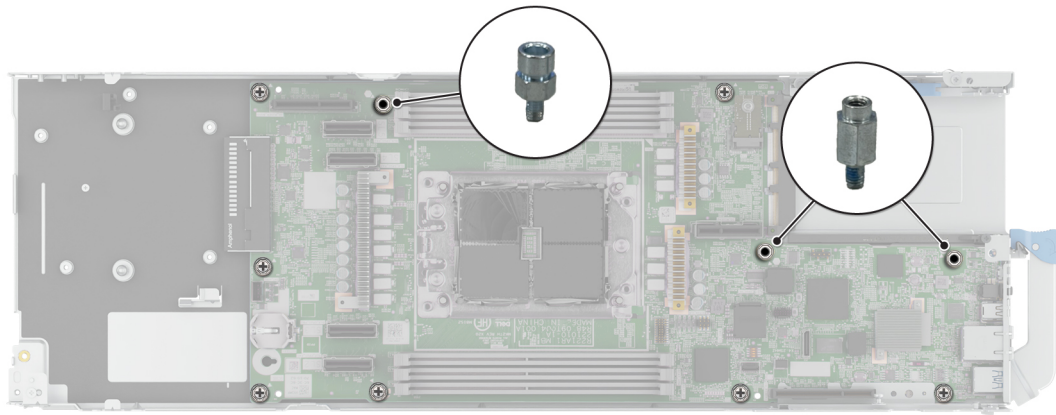


Figure 71. Installing the system board

4. Using a 5 mm hex nut driver, secure the standoff screws that secure the system board to the chassis.
5. Using a Phillips 2 screwdriver, tighten the screws that secure the system board to the chassis.





**Figure 72. Tightening the screws on the system board**

### Next steps

1. Replace the following components:
  - a. [Trusted Platform Module](#)
    - i** **NOTE:** The TPM Module must be replaced only while installing new system board.
  - b. [Expansion cards and expansion card risers](#)
  - c. [Memory modules](#)
  - d. If installed, [OCP card](#)
  - e. [Power Interposer Board \(PIB\)](#)
2. Reconnect all cables to the system board.
  - i** **NOTE:** Ensure that the cables inside the system are routed along the chassis wall and secured using the cable securing bracket.
3. Ensure that you perform the following steps:
  - a. Use the Easy Restore feature to restore the Service Tag. See the [Restoring the system by using the Easy Restore feature](#) section.
  - b. If the service tag is not backed up in the backup flash device, enter the system service tag manually. See the [Manually update the Service Tag by using System Setup](#) section.
  - c. Update the BIOS and iDRAC versions.
    - Re-enable the Trusted Platform Module (TPM). See the [Upgrading the Trusted Platform Module](#) section.
4. If you are not using Easy restore, import your new or existing iDRAC Enterprise license. For more information, see the [Integrated Dell Remote Access Controller User's Guide](#) available at <https://www.dell.com/idracmanuals..>
5. Follow the procedure listed in [After working inside your system](#).

## Restoring the system using Easy Restore

The Easy Restore feature enables you to restore your service tag, license, UEFI configuration, and the system configuration data after replacing the system board. All data is backed up in a backup flash device automatically. The LOM daughter card acts as the rSPI device that supports the EasyRestore feature. 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.

### About this task

Below is a list of options/steps available:

### Steps

1. Restore the service tag, license, and diagnostics information, press **Y**
2. Navigate to the Lifecycle Controller based restore options, press **N**
3. Restore data from a previously created **Hardware Server Profile**, press **F10**

 **NOTE:** When the restore process is complete, BIOS prompts to restore the system configuration data.

4. Restore data from a previously created **Hardware Server Profile**, press **F10**
5. To restore the system configuration data, press **Y**
6. To use the default configuration settings, press **N**

 **NOTE:** After the restore process is complete, system reboots.

## Manually update the Service Tag


After replacing a system board, if Easy Restore fails, follow this process to manually enter the Service Tag, using **System Setup**.

### About this task

If you know the system service tag, use the **System Setup** menu to enter the service tag.

### Steps

1. Power on the system.
2. To enter the **System Setup**, press **F2**.
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. Once the service tag is entered, it cannot be updated or changed. Incorrectly entered service tag will lead to system board replacement.

5. Click **OK**.

## Trusted Platform Module

This is a service technician replaceable part only.

## Upgrading the Trusted Platform Module


### Removing the TPM

#### Prerequisites

1. Follow the safety guidelines listed in the [Safety instructions](#).
2. Follow the procedure listed in [Before working inside your system](#).

#### **NOTE:**

- Ensure the operating system is compatible with the TPM version you are installing.
- Ensure that you download and install the latest BIOS firmware on your system.
- Ensure that the BIOS is configured to enable UEFI boot mode.

 **CAUTION:** The TPM plug-in module is cryptographically bound to that particular system board after it is installed. When the system is powered on, any attempt to remove an installed TPM plug-in module breaks the cryptographic binding, and the removed TPM cannot be installed on another system board. Ensure any keys you have stored on the TPM have been securely transferred.

### Steps

1. Locate the TPM connector on the system board. For more information, see .

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

## Installing the TPM

### Prerequisites

1. Follow the safety guidelines listed in the [Safety instructions](#).
2. Follow the procedure listed in [Before working inside your system](#).

### Steps

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

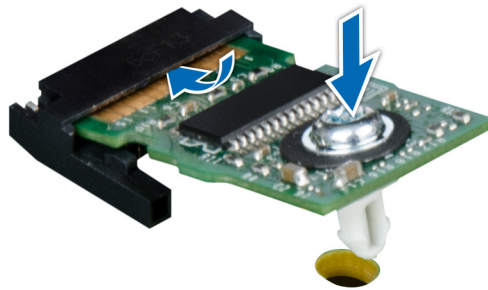


Figure 73. Installing the TPM

## Initializing TPM for users

### Steps

1. Initialize the TPM.  
For more information, see [Initializing the TPM 2.0 for users](#).
2. The **TPM Status** changes to **Enabled, Activated**.

## Initializing the TPM 2.0 for users

### Steps

1. While booting your system, press F2 to enter System Setup.
2. On the **System Setup Main Menu** screen, click **System BIOS > System Security Settings**.
3. From the **TPM Security** option, select **On**.
4. Save the settings.
5. Restart your system.

# Minimum to POST and system management configuration validation

This section describes the minimum to POST system requirement and system management configuration validation of the Dell system.

## Topics:

- [Minimum configuration to POST](#)
- [Configuration validation](#)

## Minimum configuration to POST

The components listed below are the minimum configuration to POST:

- One processor in processor socket 1
- One memory modules (DIMM) in slot A1
- One power supply unit
- C6600 chassis (backplane board, link board, CM board, mid board, PIB board, cables)
- System board
- C6615 sled

## Configuration validation

The new generation of Dell systems have added interconnect flexibility and advanced iDRAC management features to collect precise system configuration information and report configuration errors.

When the system is powered on, information about installed cables, risers, backplanes, power supplies, floating card (fPERC, BOSS), and processor is obtained from the CPLD and backplane memory maps are analyzed. This information forms a unique configuration, which is compared with one of the qualified configurations that are stored in a table maintained by iDRAC.

One or more sensors are assigned to each of the configuration elements. During POST, any configuration validation error is logged in the System Event Log (SEL)/LifeCycle (LC) log. The reported events are categorized in the configuration validation error table.

**Table 55. Configuration validation error**

Error	Description	Possible cause and recommendations	Example
Config Error	A configuration element within the closest match contains something that is unexpected and does not match any Dell qualified configuration.	Wrong configuration	Config Error: Backplane cable CTRS_SRC_SA1 and BP-DST_SA1
		The element reported in HWC8010 errors are assembled incorrectly. Verify element (cable, risers, etc) placement in the system.	Config Error : SL Cable PLANAR_SL7 and CTRL_DST_PA1
Config Missing	iDRAC found a configuration element missing within the closest match detected.	Missing or damaged cable, device, or part	Config Missing: Float card front PERC/HBAadapter PERC/HBA
		Missing element or cable is reported in HWC8010 error logs. Install the	Config Missing : SL cable PLANAR_SL8 and CTRL_DST_PA1

**Table 55. Configuration validation error (continued)**

Error	Description	Possible cause and recommendations	Example
		missing element (cable, risers, etc).	
Comm Error	A configuration element is not responding to iDRAC using the management interface while running an inventory check.	System management sideband communication Unplug AC Power, reseal the element and replace the element if the problem persists.	Comm Error: Backplane 2

## Error messages

This section describes the error messages displayed on the screen during POST or captured in the system event log (SEL)/ LifeCycle (LC) log.

**Table 56. Error message HWC8010**

Error code	HWC8010
Message	The System Configuration Check operation resulted in the following issue involving the indicated component type
Arguments	Riser, floating card (fPERC like BOSS), backplane, processor, cable, or other components
Detailed Description	The issue identified in the message is observed in the System Configuration Check operation.
Recommended Response Action	Do the following and retry the operation: <ol style="list-style-type: none"> <li>1. Disconnect the input power.</li> <li>2. Check for proper cable connection and component placement. If the issue persists, contact the service provider.</li> </ol>
Category	System Health (HWC = Hardware Config)
Severity	Critical
Trap/EventID	2329

**Table 57. Error message HWC8011**

Error code	HWC8011
Message	The System Configuration Check operation resulted in multiple issues involving the indicated component type
Arguments	Riser, floating card (fPERC like BOSS), backplane, processor, cable, or other components
Detailed Description	Multiple issues are observed in the System Configuration Check operation.
Recommended Response Action	Do the following and retry the operation: <ol style="list-style-type: none"> <li>1. Disconnect the input power.</li> <li>2. Check for proper cable connection and component placement. If the issue persists, contact the service provider.</li> </ol>
Category	System Health (HWC = Hardware Config)
Severity	Critical

# Upgrade Kits

The table lists the available After Point Of Sale [APOS] kits.

**Table 58. Upgrade kits**

Kits	Related links to service instructions
Processors	See <a href="#">Installing the processor</a>
Risers	N/A
Memory modules	See <a href="#">Installing a memory module</a>
Hard drives	N/A
Hard drives SAS/SATA SSD	N/A
Hard drives NVMe SSD	N/A
BOSS N1	See <a href="#">Installing the M.2 SSD module</a>
PCIe SSD card	See <a href="#">Installing the M.2 SSD module</a>
Storage controller cards	See <a href="#">Installing the expansion card</a>
HBA/CNA (3rd party card)	See <a href="#">Installing the expansion card</a>
Network cards	See <a href="#">Installing the expansion card</a>
Cables	N/A
Embedded management firmware (iDRAC)	N/A
Embedded management hardware (iDSDM, vflash)	N/A
Fans	N/A
Heat sink	N/A
Management software (OpenManage,etc)	N/A
Optics, transceivers	N/A
Power cords	N/A
Power supplies	N/A
SD cards	N/A
TPM	See <a href="#">Upgrading the Trusted Platform Module</a>
Rail kit	N/A
Operating system	N/A
Power supply dummy	N/A

## Jumpers and connectors

This topic provides some basic and specific information about jumpers and switches. It also describes the connectors on the various boards in the system. Jumpers on the system board help to disable the system and reset the passwords. To install components and cables correctly, you must know the connectors on the system board.

### Topics:

- System board jumpers and connectors
- System board jumper settings
- Disabling a forgotten password

## System board jumpers and connectors

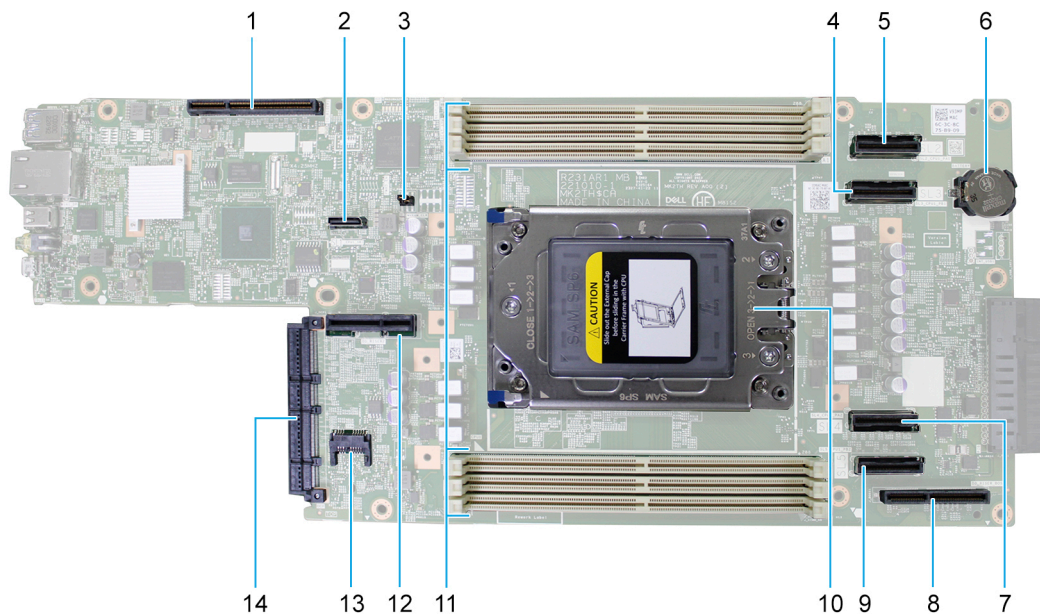


Figure 74. System board jumpers and connectors

Table 59. System board jumpers and connectors

Item	Connector	Description
1	Riser 1	Riser 1 connector
2	SL1_CPU1_SB1	NPIO Connector 1
3	NVRAM_CLR and PWRD_EN	Jumper
4	SL3_CPU1_PB1	MCIO Connector 3
5	SL2_CPU1_PA1	MCIO Connector 2
6	Coin Cell Battery	Coin Cell Battery
7	SL4_CPU1_PA2	MCIO Connector 4
8	BOSS card connector	BOSS card connector





**Table 59. System board jumpers and connectors (continued)**

Item	Connector	Description
9	SL5_CPU1_PB2	MCIO Connector 5
10	CPU 1	CPU 1
11	A1, A3, A5, A2, A4, and A6	DIMMs for CPU 1
12	Riser 2	Riser 2 connector
13	TPM connector	TPM connector
14	OCP connector	OCP connector

## System board jumper settings

For information about resetting the password jumper to disable a password, see the [disabling the forgotten password](#) section.

**Table 60. System board jumper settings**

Jumper	Setting	Description
NVRAM_CLR	 1 2 3 (default)	The BIOS configuration settings are retained at system boot.
	 1 2 3	The BIOS configuration settings are cleared at system boot.
PWRD_EN	 1 2 3 (default)	The BIOS password feature is enabled.
	 1 2 3	The BIOS password feature is disabled. iDRAC local access is unlocked at next AC power cycle. iDRAC password reset is enabled in F2 iDRAC settings menu.

**CAUTION:** You should be cautious when changing the BIOS settings. The BIOS interface is designed for advanced users. Any changes in the setting might prevent your system from starting correctly and may even result in data loss.

## Disabling a forgotten password

The software security features of the system include a system password and a setup password. The password jumper enables or disables password features and clears any password(s) currently in use.

### Prerequisites

**CAUTION:** Many repairs may only be done by a certified service technician. You should only perform troubleshooting and simple repairs as authorized in your product documentation, or as directed by the online or telephone service and support team. Damage due to servicing that is not authorized by Dell is not covered by your warranty. Read and follow the safety instructions that are shipped with your product.

### Steps

- Power off the compute sled and remove the compute sled from chassis.
- Move the jumper on the system board from pins 1 and 2 to pins 2 and 3.
  - NOTE:** The existing passwords are not disabled (erased) until the system boots with the jumper on pins 2 and 3. However, before you assign a new system and/or setup password, you must move the jumper back to pins 1 and 2.
  - NOTE:** If you assign a new system and/or setup password with the jumper on pins 2 and 3, the system disables the new password(s) the next time it boots.



3. Insert compute sled into chassis and power on the compute sled.
4. Power off the compute sled and remove the compute sled from chassis.
5. Move the jumper on the system board from pins 2 and 3 to pins 1 and 2.
6. Insert compute sled into chassis and power on the compute sled.
7. Assign a new system and/or setup password.

# Using system diagnostics

If you experience an issue with the system, run the system diagnostics before contacting Dell for technical assistance. The purpose of running system diagnostics is to test the system hardware without using additional equipment or risking data loss. If you are unable to fix the issue yourself, service and support personnel can use the diagnostics results to help you solve the issue.

## Topics:

- [Dell Embedded System Diagnostics](#)

## 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 provide 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 issues encountered during testing

## Running the Embedded System Diagnostics from Boot Manager

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

### Steps

1. When the system is booting, press F11.
2. Use the up arrow and down arrow keys to select **System Utilities > Launch Diagnostics**.
3. Alternatively, when the system is booting, press F10, select **Hardware Diagnostics > Run Hardware Diagnostics**.  
The **ePSA Pre-boot System Assessment** window is displayed, listing all devices detected in the system. The diagnostics starts executing the tests on all the detected devices.

## Running the Embedded System Diagnostics from the Dell Lifecycle Controller

### Steps

1. When the system is booting, press F10.
2. Select **Hardware Diagnostics → Run Hardware Diagnostics**.  
The **ePSA Pre-boot System Assessment** window is displayed, listing all devices detected in the system. The diagnostics start executing the tests on all the detected devices.

## System diagnostic controls

Table 61. System diagnostic controls

Menu	Description
<b>Configuration</b>	Displays the configuration and status information of all detected devices.
<b>Results</b>	Displays the results of all tests that are run.
<b>System health</b>	Provides the current overview of the system performance.
<b>Event log</b>	Displays a time-stamped log of the results of all tests run on the system. This is displayed if at least one event description is recorded.

# Getting help

## Topics:

- [Recycling or End-of-Life service information](#)
- [Contacting Dell Technologies](#)
- [Accessing system information by using QRL](#)
- [Receiving automated support with SupportAssist](#)

## Recycling or End-of-Life service information

Take back and recycling services are offered for this product in certain countries. If you want to dispose of system components, visit [www.dell.com/recyclingworldwide](http://www.dell.com/recyclingworldwide) and select the relevant country.

## Contacting Dell Technologies

Dell provides online and telephone based support and service options. If you do not have an active internet connection, you can find Dell contact information on your purchase invoice, packing slip, bill or Dell product catalog. The availability of services varies depending on the country and product, and some services may not be available in your area. To contact Dell for sales, technical assistance, or customer service issues follow these steps:

### Steps

1. Go to [www.dell.com/support/home](http://www.dell.com/support/home).
2. Select your country from the drop-down menu on the lower right corner of the page.
3. For customized support:
  - a. Enter the system Service Tag in the **Enter a Service Tag, Serial Number, Service Request, Model, or Keyword** field.
  - b. Click **Search**.  
The support page that lists the various support categories is displayed.
4. For general support:
  - a. Select your product category.
  - b. Select your product segment.
  - c. Select your product.  
The support page that lists the various support categories is displayed.
5. For contact details of Dell Global Technical Support:
  - a. Click [Contact Technical Support](#).
  - b. The **Contact Technical Support** page is displayed with details to call, chat, or e-mail the Dell Global Technical Support team.

## Accessing system information by using QRL

You can use the Quick Resource Locator (QRL) located on the information tag in the front of the system, to access information about PowerEdge C6615. There is also another QRL for accessing product information located on the back of the system cover.

### Prerequisites

Ensure that your smartphone or tablet has a QR code scanner installed.

The QRL includes the following information about your system:

- How-to videos
- Reference materials, including the Installation and Service Manual, and mechanical overview
- The system service tag to quickly access the specific hardware configuration and warranty information
- A direct link to Dell to contact technical assistance and sales teams

### Steps

1. Go to [www.dell.com/qrl](http://www.dell.com/qrl), and navigate to your specific product or
2. Use your smart phone or tablet to scan the model-specific Quick Resource (QR) code on your system or in the Quick Resource Locator section.



**Figure 75. Quick Resource Locator for PowerEdge C6615 system**

## Receiving automated support with SupportAssist

Dell SupportAssist is an optional Dell Services offering that automates technical support for your Dell server, storage, and networking devices. By installing and setting up a SupportAssist application in your IT environment, you can receive the following benefits:


- Automated issue detection — SupportAssist monitors your Dell devices and automatically detects hardware issues, both proactively and predictively.
- Automated case creation — When an issue is detected, SupportAssist automatically opens a support case with Dell Technical Support.
- Automated diagnostic collection — SupportAssist automatically collects system state information from your devices and uploads it securely to Dell. This information is used by Dell Technical Support to troubleshoot the issue.
- Proactive contact — A Dell Technical Support agent contacts you about the support case and helps you resolve the issue.

The available benefits vary depending on the Dell Service entitlement purchased for your device. For more information about SupportAssist, go to [www.dell.com/supportassist](http://www.dell.com/supportassist).

## Documentation resources

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

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

- From the Dell support site:
  1. Click the documentation link that is provided in the Location column in the table.
  2. Click the required product or product version.
-  **NOTE:** To locate the model number, see the front of your system.
- 3. On the Product Support page, click **Documentation**.
- Using search engines:
  - Type the name and version of the document in the search box.

**Table 62. Additional documentation resources for your system**

Task	Document	Location
Setting up your system	For information about setting up your system, see the <i>Getting Started Guide</i> document that is shipped with your system.	<a href="http://www.dell.com/poweredgemanuals">www.dell.com/poweredgemanuals</a>
Configuring your system	For information about the iDRAC features, configuring and logging in to iDRAC, and managing your system remotely, see the Integrated Dell Remote Access Controller User's Guide.	<a href="http://www.dell.com/poweredgemanuals">www.dell.com/poweredgemanuals</a>
	For information about understanding Remote Access Controller Admin (RACADM) subcommands and supported RACADM interfaces, see the RACADM CLI Guide for iDRAC.	
	For information about Redfish and its protocol, supported schema, and Redfish Eventing implemented in iDRAC, see the Redfish API Guide.	
	For information about iDRAC property database group and object descriptions, see the Attribute Registry Guide.	
	For information about Intel QuickAssist Technology, see the Integrated Dell Remote Access Controller User's Guide.	
	For information about earlier versions of the iDRAC documents.  To identify the version of iDRAC available on your system, on the iDRAC web interface, click <b>? &gt; About</b> .	<a href="http://www.dell.com/idracmanuals">www.dell.com/idracmanuals</a>
	For information about installing the operating system, see the operating system documentation.	<a href="http://www.dell.com/operatingsystemmanuals">www.dell.com/operatingsystemmanuals</a>
	For information about updating drivers and firmware, see the Methods to download firmware and drivers section in this document.	<a href="http://www.dell.com/support/drivers">www.dell.com/support/drivers</a>

**Table 62. Additional documentation resources for your system (continued)**

Task	Document	Location
Managing your system	For information about systems management software offered by Dell, see the Dell OpenManage Systems Management Overview Guide.	<a href="http://www.dell.com/poweredgemanuals">www.dell.com/poweredgemanuals</a>
	For information about setting up, using, and troubleshooting OpenManage, see the Dell OpenManage Server Administrator User's Guide.	<a href="http://www.dell.com/openmanagemanuals">www.dell.com/openmanagemanuals</a> > OpenManage Server Administrator
	For information about installing and using Dell SupportAssist, see the Dell SupportAssist Enterprise User's Guide.	<a href="https://www.dell.com/serviceabilitytools">https://www.dell.com/serviceabilitytools</a>
	For information about partner programs enterprise systems management, see the OpenManage Connections Enterprise Systems Management documents.	<a href="http://www.dell.com/openmanagemanuals">www.dell.com/openmanagemanuals</a>
Working with the Dell PowerEdge RAID controllers	For information about understanding the features of the Dell PowerEdge RAID controllers (PERC), Software RAID controllers, or BOSS card and deploying the cards, see the Storage controller documentation.	<a href="http://www.dell.com/storagecontrollermanuals">www.dell.com/storagecontrollermanuals</a>
Understanding event and error messages	For information about the event and error messages generated by the system firmware and agents that monitor system components, go to <a href="http://qrl.dell.com">qrl.dell.com</a> > <b>Look Up</b> > <b>Error Code</b> , type the error code, and then click <b>Look it up</b> .	<a href="http://www.dell.com/qrl">www.dell.com/qrl</a>
Troubleshooting your system	For information about identifying and troubleshooting the PowerEdge server issues, see the Server Troubleshooting Guide.	<a href="http://www.dell.com/poweredgemanuals">www.dell.com/poweredgemanuals</a>