


Dell PowerEdge R660xs

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.

Dell PowerEdge R660xs system overview

The PowerEdge R660xs system is a 1U server that supports:

- Up to two 5th Generation Intel Xeon Scalable processors with up to 28 cores and 4th Generation Intel Xeon Scalable processors with up to 32 cores
- 16 DDR5 DIMM slots
- Two redundant AC or DC power supply units
- Up to 4 x 3.5-inch SAS/SATA (HDD/SSD) drives
- Up to 8 x 2.5-inch SAS/SATA/NVMe (HDD/SSD) drives
- Up to 10 x 2.5-inch SAS/SATA/NVMe (HDD/SSD) drives

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 [Dell 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.

CAUTION: Do not install GPUs, 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.

Topics:

- [Front view of the system](#)
- [Rear view of the system](#)
- [Inside the system](#)
- [System information label](#)
- [Locating the Express Service Code and Service Tag](#)
- [Rail sizing and rack compatibility matrix](#)

Front view of the system

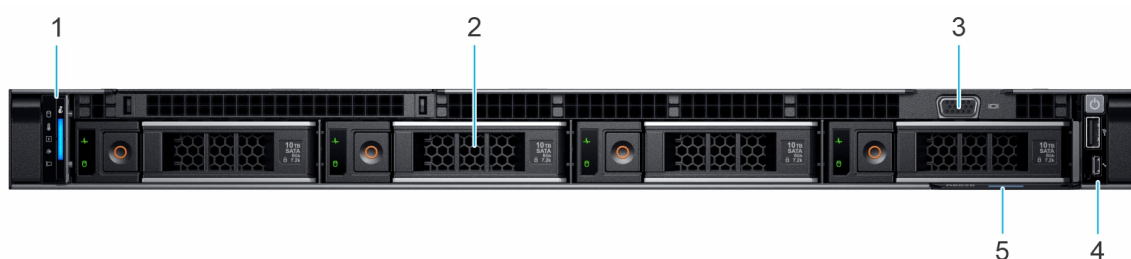


Figure 1. Front view of 4 x 3.5-inch drive system

Table 1. Features available on the front of the system

Item	Ports, panels, and slots	Icon	Description
1	Left control panel	N/A	Contains the system health, system ID, status LED, and the iDRAC Quick Sync 2 (wireless) indicator. NOTE: The iDRAC Quick Sync 2 indicator is available only on certain configurations.

Table 1. Features available on the front of the system (continued)


Item	Ports, panels, and slots	Icon	Description
			<ul style="list-style-type: none"> Status LED: Enables you to identify any failed hardware components. There are up to five status LEDs and an overall system health LED (Chassis health and system ID) bar. For more information, see the Status LED indicators section. Quick Sync 2 (wireless): Indicates a Quick Sync enabled system. The Quick Sync feature is optional. This feature allows management of the system by using mobile devices called as OpenManage Mobile (OMM) feature. Using iDRAC Quick Sync 2 with OpenManage Mobile (OMM) aggregates hardware or firmware inventory and various system level diagnostic and error information that can be used in troubleshooting the system. For more information, see the Integrated Dell Remote Access Controller User's Guide
2	Drive	N/A	Enables you to install drives that are supported on your system.
3	VGA port		Enables you to connect a display device to the system.
4	Right control panel	N/A	Contains the power button, USB port, iDRAC Direct micro port, and the iDRAC Direct status LED.
5	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.



Figure 2. Front view of 8 x 2.5-inch drive system

Table 2. Features available on the front of the system

Item	Ports, panels, and slots	Icon	Description
1	Left control panel	N/A	<p>Contains the system health, system ID, status LED, and the iDRAC Quick Sync 2 (wireless) indicator.</p> <p>NOTE: The iDRAC Quick Sync 2 indicator is available only on certain configurations.</p> <ul style="list-style-type: none"> Status LED: Enables you to identify any failed hardware components. There are up to five status LEDs and an overall system health LED (Chassis health and system ID) bar. For more information, see the Status LED indicators section. Quick Sync 2 (wireless): Indicates a Quick Sync enabled system. The Quick Sync feature is optional. This feature allows management of the system by using mobile devices called as OpenManage Mobile (OMM) feature. Using iDRAC Quick Sync 2 with OpenManage Mobile (OMM) aggregates hardware or firmware inventory and various system level diagnostic and error information that can be used in troubleshooting the system. For more information, see the Integrated Dell Remote Access Controller User's Guide

Table 2. Features available on the front of the system (continued)



Item	Ports, panels, and slots	Icon	Description
2	Drive	N/A	Enables you to install drives that are supported on your system.
3	Right control panel	N/A	Contains the power button, USB port, iDRAC Direct micro port, and the iDRAC Direct status LED.
4	VGA port		Enables you to connect a display device to the system.
5	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.



Figure 3. Front view of 10 x 2.5-inch drive system

Table 3. Features available on the front of the system

Item	Ports, panels, and slots	Icon	Description
1	Left control panel	N/A	<p>Contains the system health, system ID, status LED, and the iDRAC Quick Sync 2 (wireless) indicator.</p> <p>NOTE: The iDRAC Quick Sync 2 indicator is available only on certain configurations.</p> <ul style="list-style-type: none"> • Status LED: Enables you to identify any failed hardware components. There are up to five status LEDs and an overall system health LED (Chassis health and system ID) bar. For more information, see the Status LED indicators section. • Quick Sync 2 (wireless): Indicates a Quick Sync enabled system. The Quick Sync feature is optional. This feature allows management of the system by using mobile devices called as OpenManage Mobile (OMM) feature. Using iDRAC Quick Sync 2 with OpenManage Mobile (OMM) aggregates hardware or firmware inventory and various system level diagnostic and error information that can be used in troubleshooting the system. For more information, see the Integrated Dell Remote Access Controller User's Guide
2	Drive	N/A	Enables you to install drives that are supported on your system. For more information about drives, see the Drives section.
3	Right control panel	N/A	Contains the power button, USB port, iDRAC Direct micro port, and the iDRAC Direct status LED.
4	VGA port		Enables you to connect a display device to the system. For more information, see the VGA port specifications section.
5	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.

Left control panel view

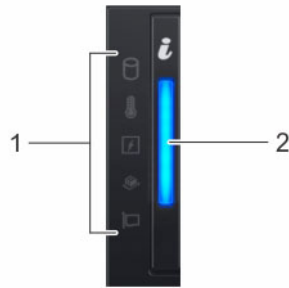


Figure 4. Left control panel

Table 4. Left control panel

Item	Indicator, button, or connector	Icon	Description
1	Status LED indicators	NA	Indicates the status of the system. For more information, see the Status LED indicators section.
2	System health and system ID indicator	<i>i</i>	Indicates the status of the system. For more information, see the System health and system ID indicator codes section.

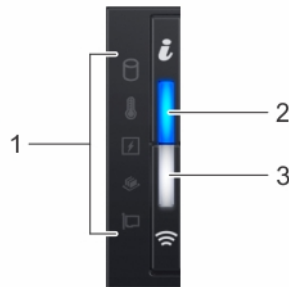


Figure 5. Left control panel with optional iDRAC Quick Sync 2 indicator

Table 5. Left control panel with optional iDRAC Quick Sync 2 indicator

Item	Indicator, button, or connector	Icon	Description
1	Status LED indicators	N/A	Indicates the status of the system. For more information, see the Status LED indicators section.
2	System health and system ID indicator	<i>i</i>	Indicates the status of the system. For more information, see the System health and system ID indicator codes section.
3	iDRAC Quick Sync 2 wireless indicator (optional)	⊞	Indicates if the iDRAC Quick Sync 2 wireless option is activated. The Quick Sync 2 feature allows management of the system using mobile devices. This feature aggregates hardware/firmware inventory and various system level diagnostic/error information that can be used in troubleshooting the system. You can access system inventory, Dell Lifecycle Controller logs or system logs, system health status, and also configure iDRAC, BIOS, and networking parameters. You can also launch the virtual Keyboard, Video, and Mouse (KVM) viewer and virtual Kernel-based Virtual Machine (KVM), on a supported mobile device. For more information, see the Integrated Dell Remote Access Controller User's Guide at PowerEdge manuals .

NOTE: For more information about the indicator codes, see the [System diagnostics and indicator codes](#) section.

Right control panel view

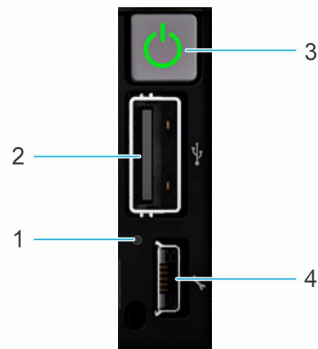





Figure 6. Right control panel

Table 6. Right control panel

Item	Indicator or button	Icon	Description
1	iDRAC Direct LED indicator	N/A	The iDRAC Direct LED indicator lights up to indicate that the iDRAC Direct port is actively connected to a device.
2	USB 2.0-compliant port		The USB port is a 4-pin connector and 2.0-compliant. This port enables you to connect USB devices to the system.
3	Power button		Indicates if the system is powered on or off. Press the power button to manually power on or off the system. NOTE: Press the power button to gracefully shut down an ACPI-compliant operating system.
4	iDRAC Direct port (Micro-AB USB)		The iDRAC Direct port (Micro-AB USB) enables you to access the iDRAC direct Micro-AB USB features. For more information, see the iDRAC Manuals . NOTE: You can configure iDRAC Direct by using a USB to micro USB (type AB) cable, which you can connect to your laptop or tablet. Cable length should not exceed 3 feet (0.91 meters). Performance could be affected by cable quality.

Rear view of the system

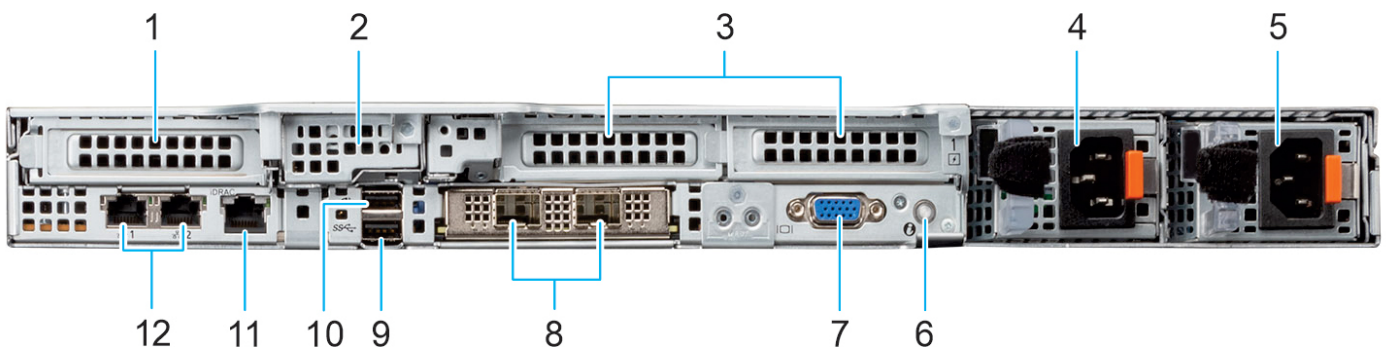










Figure 7. Rear view of the system

Table 7. Rear view of the system

Item	Ports, panels, or slots	Icon	Description
1	PCIe expansion card riser 1 (slot 1)	N/A	Enables you to connect PCI Express expansion cards.
2	BOSS riser	N/A	Enables you to connect BOSS card.
3	PCIe expansion card riser 2 (slot 2 and slot 3) or Rear drive module	N/A	Enables you to connect PCI Express expansion cards. Or Enables you to install rear drives that are supported on your system.
4	Power supply unit (PSU 1)		PSU1 is the primary PSU of the system.
5	Power supply unit (PSU 2)		PSU2 is the secondary PSU of the system.
6	System identification button		<p>Press the system ID button:</p> <ul style="list-style-type: none"> To locate a particular system within a rack. To turn the system ID on or off. <p>To reset iDRAC, press and hold the button for 16 seconds.</p> <p>NOTE:</p> <ul style="list-style-type: none"> To reset iDRAC using system ID, ensure that the system ID button is enabled in the iDRAC setup. If the system stops responding during POST, press and hold the system ID button (for more than five seconds) to enter the BIOS progress mode.
7	VGA port		Enables you to connect a display device to the system.
8	OCP NIC port	N/A	This port supports OCP 3.0.
9	USB 3.0 port		This port is USB 3.0-compliant.
10	USB 2.0 port		This port is USB 2.0-compliant.
11	iDRAC dedicated port		Enables you to remotely access iDRAC. For more information, see the iDRAC User's Guide at PowerEdge manuals .
12	NIC ports		The NIC ports that are integrated on the system board provide network connectivity. These NIC ports can also be shared with iDRAC when iDRAC network settings is set to shared mode.

Inside the system

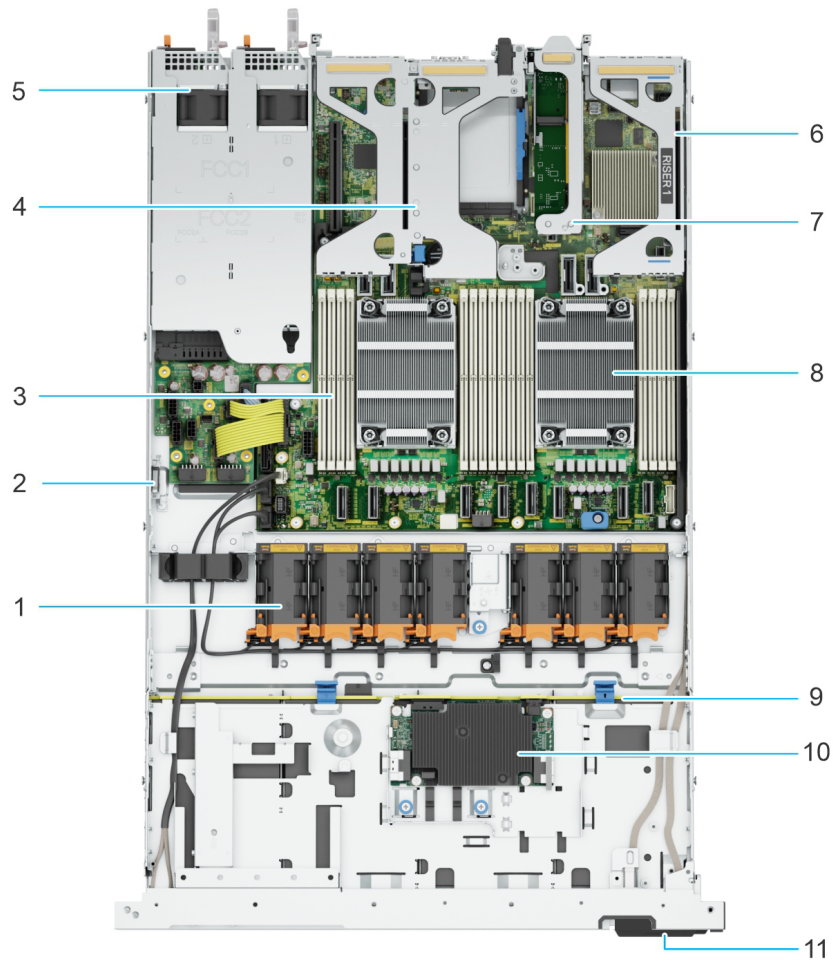


Figure 8. Inside the system

- | | |
|-------------------------|---------------------|
| 1. Fan | 2. Intrusion switch |
| 3. Memory module slots | 4. Riser 2 |
| 5. PSU 1 and PSU 2 | 6. Riser 1 |
| 7. BOSS riser | 8. Heat sink |
| 9. Drive backplane | 10. Front PERC |
| 11. Express service tag | |

System information label

The system information label is located on back of the system cover.



Figure 9. QRL

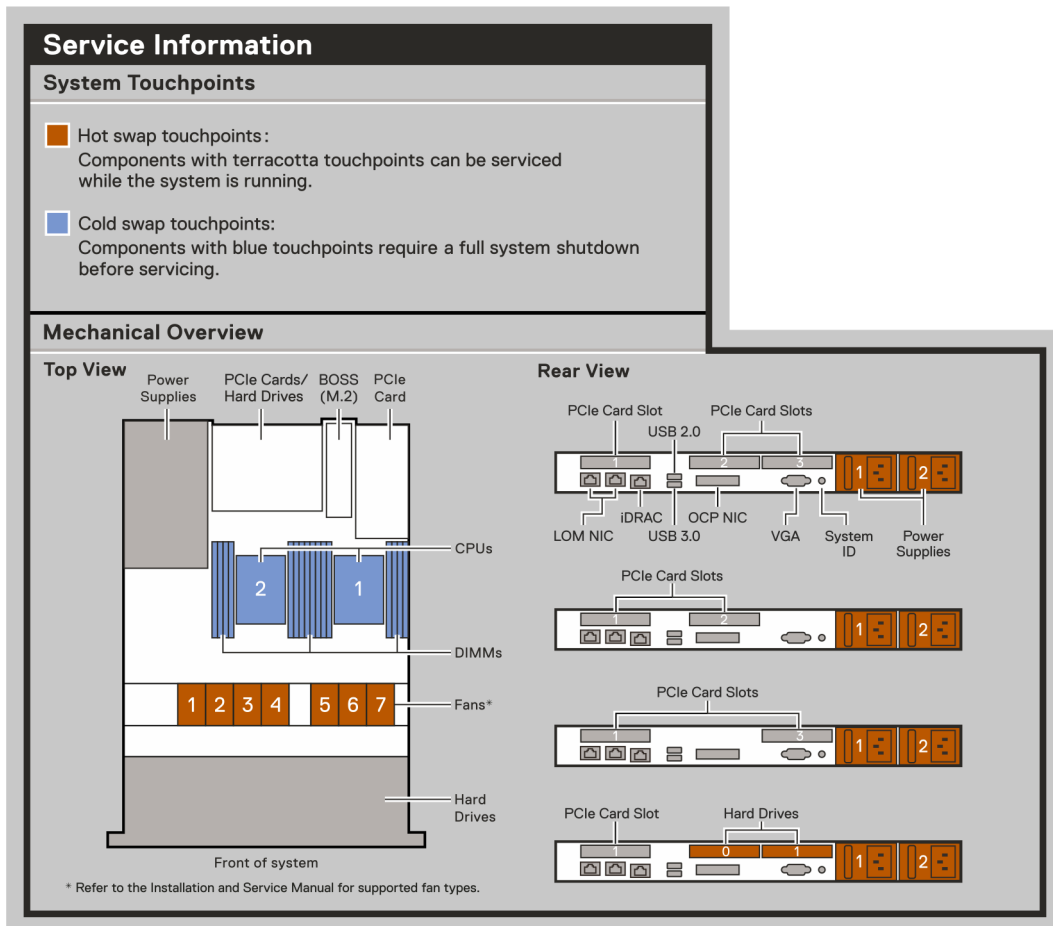


Figure 10. Service Information

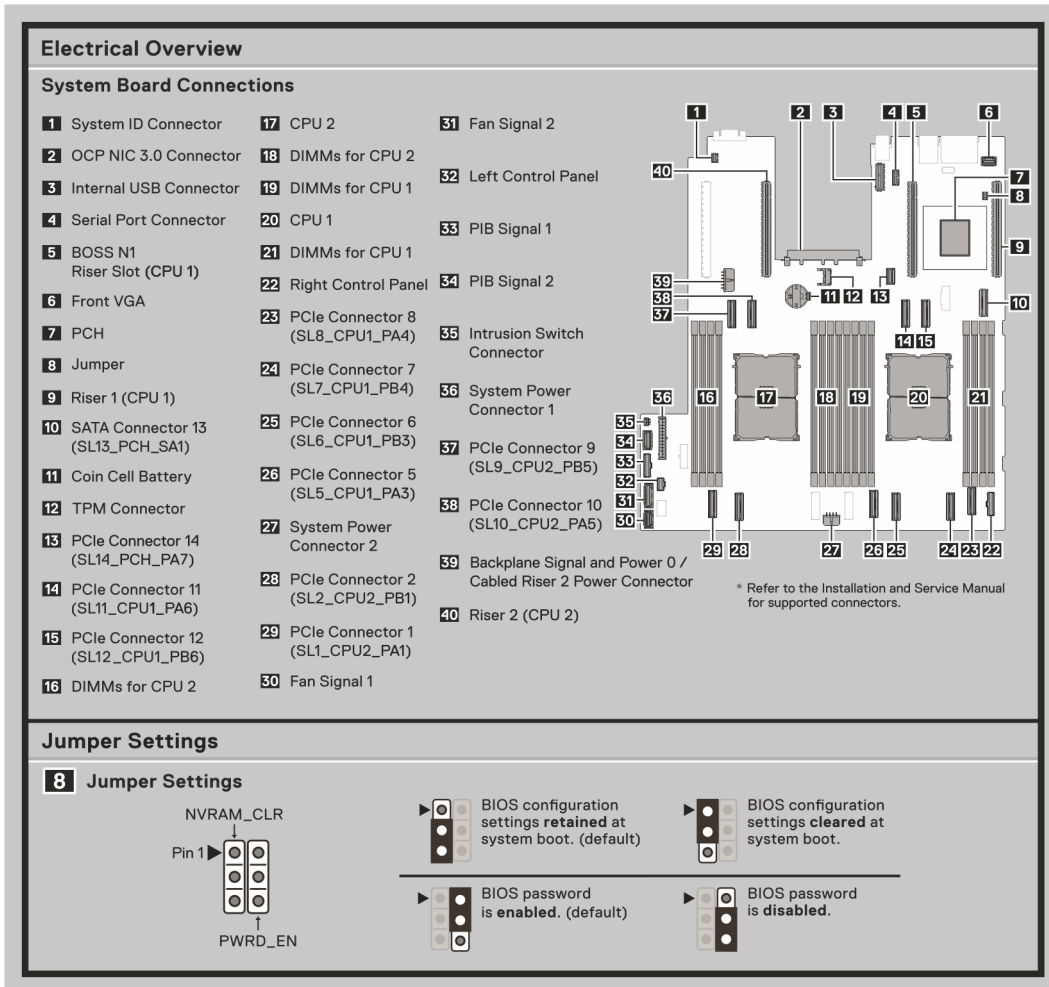


Figure 11. Electrical Overview

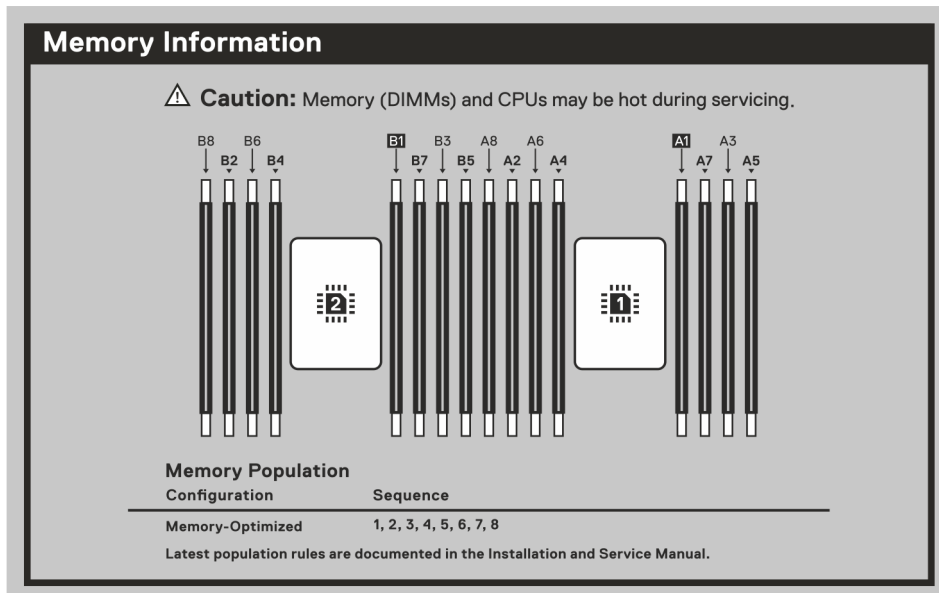


Figure 12. Memory information

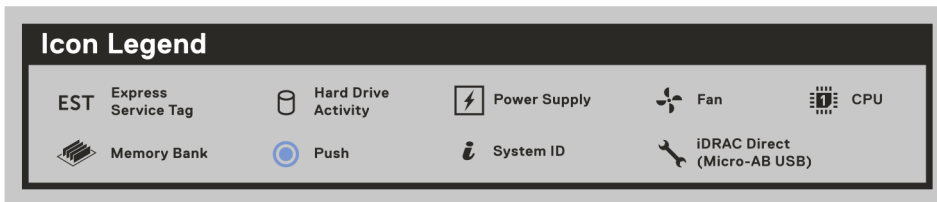


Figure 13. Icon Legend

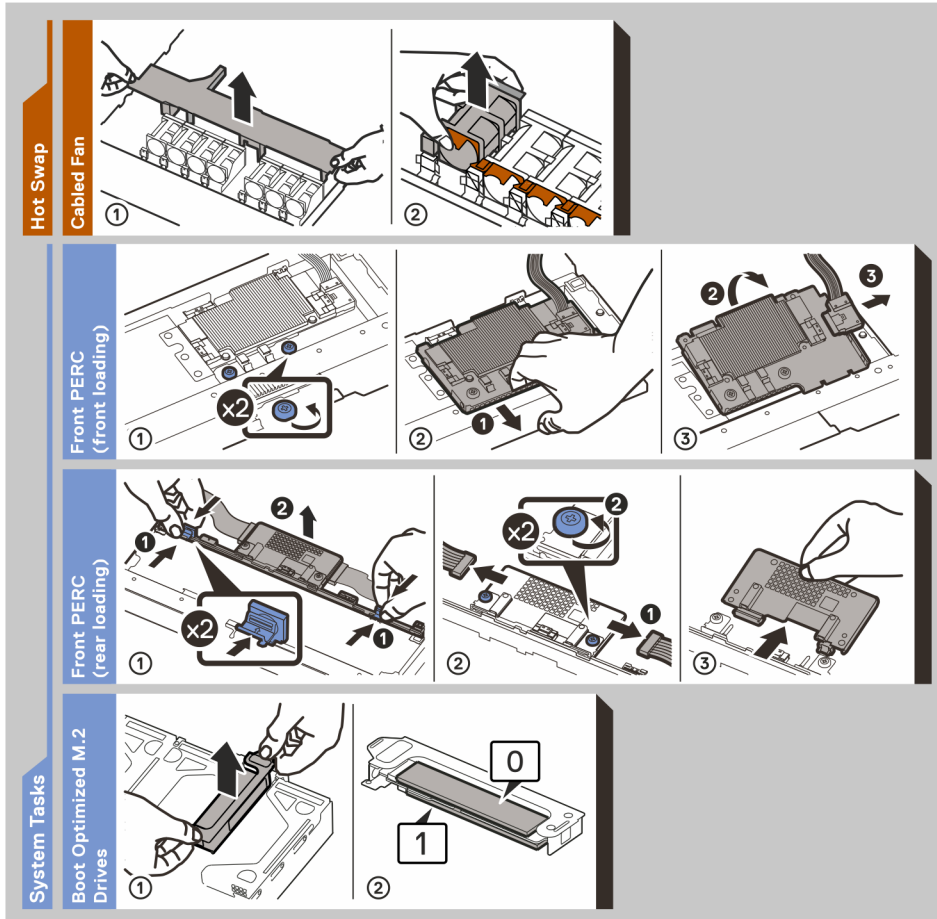


Figure 14. System task

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 front 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. If you have opted for the secure default access to iDRAC, the Information tag also contains the iDRAC secure default password.

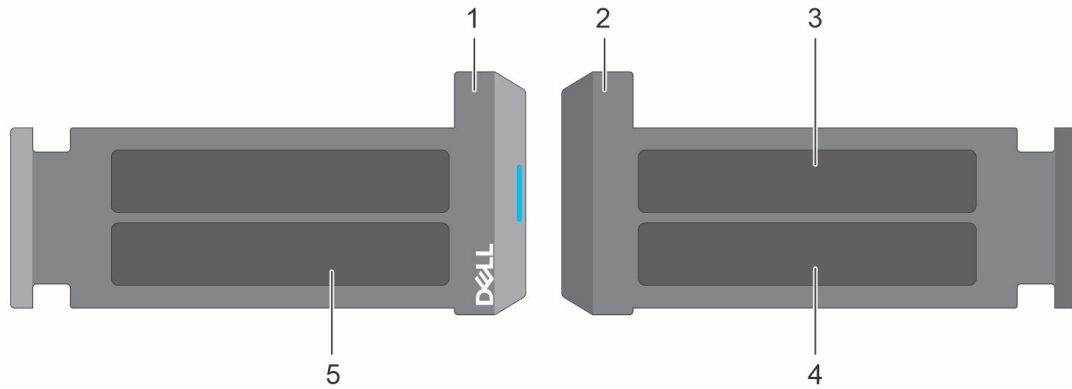


Figure 15. Locating the Express Service Code and Service tag

1. Information tag (front view)
2. Information tag (back view)
3. OpenManage Mobile (OMM) label
4. iDRAC MAC address and iDRAC secure password label
5. Service Tag, Express Service Code, QRL label

The Mini Enterprise Service Tag (MEST) label is located on the rear of the system that includes the Service Tag (ST), Express Service Code (Exp Svc Code), and Manufacture Date (Mfg. Date). The Exp Svc Code is used by Dell to route support calls to the appropriate personnel.

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

Rail sizing and rack compatibility matrix

For specific information about the rail solutions compatible with your system, see the [Dell Enterprise Systems Rail Sizing and Rack Compatibility Matrix](#).

The document provides the information that is listed below:

- Specific details about rail types and their functionalities.
- Rail adjustability range for various types of rack mounting flanges.
- Rail depth with and without cable management accessories.
- Types of racks that are supported for various types of rack mounting flanges.

Technical specifications

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

Topics:

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

Chassis dimensions

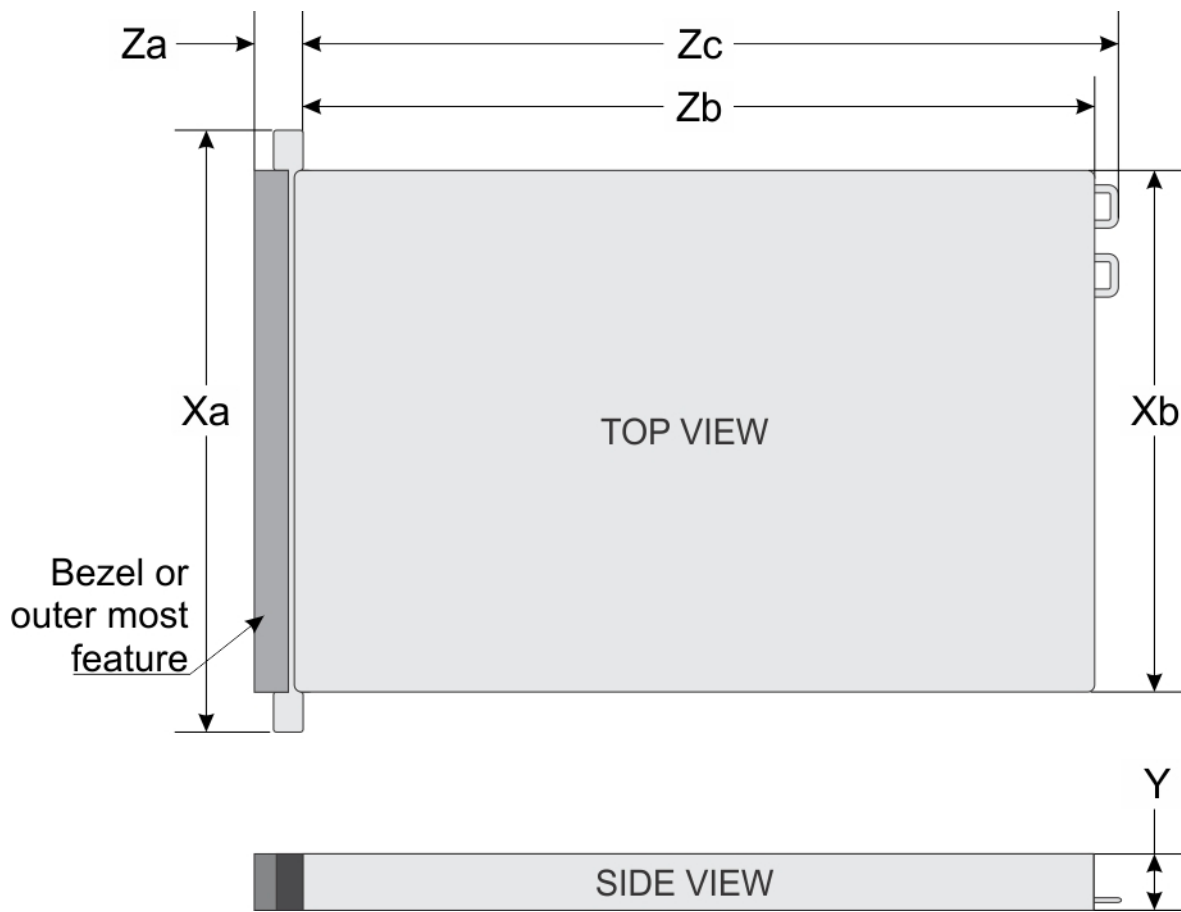


Figure 16. Chassis dimensions

Table 8. PowerEdge R660xs chassis dimensions

Drives	Xa	Xb	Y	Za	Zb	Zc
10 or 4 SATA/ SAS/NVMe drives	482 mm (18.976 inches)	434.0 mm (17.08 inches)	42.8 mm (1.685 inches)	35.84 mm (1.41 inches)With bezel	677.1 mm (26.65 inches) Ear to rear wall	712.95 mm (28.05 inches) Ear to PSU handle without velcro strap
8 NVMe drives				22 mm (0.86 inches)Without bezel		
8 SATA/SAS drives or No backplane configuration	482 mm (18.976 inches)	434.0 mm (17.08 inches)	42.8 mm (1.685 inches)	35.84 mm (1.41 inches)With bezel	626.42 mm (24.66 inches) Ear to rear wall	661.37 mm (26.03 inches) Ear to PSU handle without velcro strap
				22 mm (0.86 inches)Without bezel		

NOTE: Zb is the nominal rear wall external surface where the system board I/O connectors reside.

System weight

Table 9. PowerEdge R660xs system weight

System configuration	Maximum weight (with all drives/SSDs)
10 x 2.5-inch	18.74 kg (41.31 pound)
4 x 3.5-inch	19.45 Kg (55.33 pound)
8 x 2.5-inch	18.25 kg (40.23 pound)
No backplane configuration	15.38 kg (33.90 pound)

Table 10. PowerEdge system weight handling recommendations

Chassis weight	Description
40 pounds - 70 pounds	Recommend two person to lift
70 pounds- 120 pounds	Recommend three person to lift
≥ 121 pounds	Recommend to use a server-lift

Processor specifications

Table 11. PowerEdge R660xs processor specifications

Supported processor	Number of processors supported
Up to two 5 th Generation Intel Xeon Scalable processors with up to 28 cores and 4 th Generation Intel Xeon Scalable processors with up to 32 cores	Up to two

PSU specifications

The PowerEdge R660xs system supports up to two AC or DC power supply units (PSUs).

Table 12. R660xs PSU specifications

PSU	Class	Heat dissipation (maximum) (BTU/hr)	Frequency (Hz)	AC Voltage			DC Voltage			Current (A)
				100–120 V	200–240 V	277 V	240 V	336 V	- (48 V – 60 V)	
600 W mixed mode	Platinum	2250	50/60	600 W	600 W	N/A	N/A	N/A	N/A	7.1 A - 3.6 A
	N/A		N/A	N/A	N/A	N/A	600 W	N/A	N/A	2.9 A
700 W mixed mode HLAC	Titanium	2625	50/60	N/A	700 W	N/A	N/A	N/A	N/A	4.1 A
	N/A		N/A	N/A	N/A	N/A	700 W	N/A	N/A	3.4 A
800 W mixed mode	Platinum	3000	50/60	800 W	800 W	N/A	N/A	N/A	N/A	9.2 A - 4.7 A
	N/A		N/A	N/A	N/A	N/A	800 W	N/A	N/A	3.8 A
1100 W -48 V DC	N/A	4265	N/A	N/A	N/A	N/A	N/A	N/A	1100 W	27 A

Table 12. R660xs PSU specifications (continued)

PSU	Class	Heat dissipation (maximum) (BTU/hr)	Frequency (Hz)	AC Voltage			DC Voltage			Current (A)
				100–120 V	200–240 V	277 V	240 V	336 V	-(48 V – 60 V)	
1100 W mixed mode	Titani-um	4125	50/60	1050 W	1100 W	N/A	N/A	N/A	N/A	12 A - 6.3 A
	N/A		N/A	N/A	N/A	N/A	1100 W	N/A	N/A	5.2 A
1400 W mixed mode	Titani-um	5250	50/60	1050 W	1400 W	N/A	N/A	N/A	N/A	12 A - 8 A
	N/A		N/A	N/A	N/A	N/A	1400 W	N/A	N/A	6.5 A
1400 W mixed mode	Platin-um	5250	50/60	1050 W	1400 W	N/A	N/A	N/A	N/A	12 A - 8 A
	N/A		N/A	N/A	N/A	N/A	1400 W	N/A	N/A	6.6 A
1400 W 277 V AC and HVDC	Titani-um	5250	50/60	N/A	N/A	1400 W	N/A	N/A	N/A	5.8 A
		5250	N/A	N/A	N/A	N/A	N/A	1400 W	N/A	5.17 A
1800 W mixed mode HLAC	Titani-um	6610	50/60	N/A	1800 W	N/A	N/A	N/A	N/A	10 A
	N/A		N/A	N/A	N/A	N/A	1800 W	N/A	N/A	8.2 A

- NOTE:** Heat dissipation is calculated using the PSU wattage rating.
- NOTE:** HLAC stands for High-Line AC, with a range of 200 - 240V AC. HVDC stands for High-Voltage DC, with 336V DC.
- 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 [calc](#).

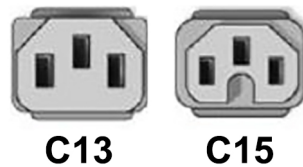


Figure 17. PSU power cords

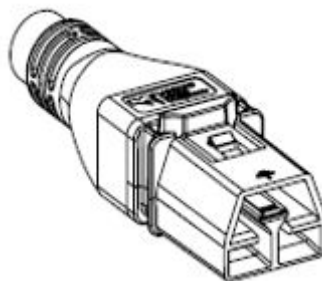


Figure 18. APP 2006G1 power cord

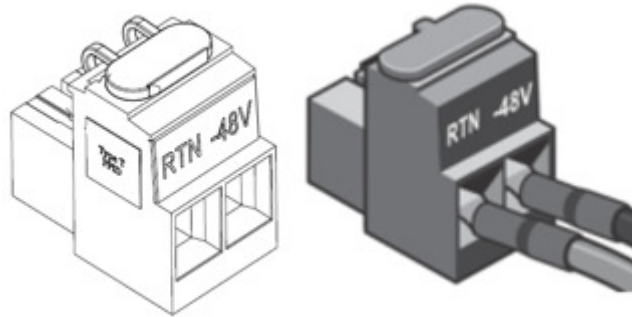


Figure 19. Lotes DC PSU connector

Table 13. PSU power cords

Form factor	Output	Power cord
Redundant 60 mm	600 W Mixed Mode	C13
	700 W Mixed Mode HLAC	C13
	800 W Mixed Mode	C13
	1100 W Mixed Mode	C13
	1100 W -48 V DC	Lotes DC PSU connector
	1400 W Mixed Mode	C13
	1400 W 277 VAC and HVDC	APP 2006G1
	1800 W Mixed Mode HLAC	C15

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 R660xs 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 [Operating System Manuals](#).

Cooling fan specifications

The PowerEdge R660xs system supports up to seven, hot-swappable Standard fans (STD) and High performance (HPR) gold grade fans.



Figure 20. Hot swappable Standard fan



Figure 21. Hot swappable High performance (HPR) gold grade fan

System battery specifications

The PowerEdge R660xs system uses one CR 2032 3.0-V lithium coin cell battery.

Expansion card riser specifications

The PowerEdge R660xs system supports up to three PCI express (PCIe) Gen 5 expansion cards.

Table 14. Expansion card slots supported on the system board

PCIe slot	Riser	PCIe slot height	PCIe slot length	PCIe slot width
Slot 1	Riser 1a	Low Profile	Half length	x16
	Riser 1b	Low Profile	Half length	x8
Slot 2 and 3	Riser 2a	Low Profile	Half length	x8 + x8
Slot 3	Riser 2c	Low Profile	Half length	x16
Slot 2	Riser 2d	Low Profile	Half length	x8
	Riser 2e	Low Profile	Half length	x16

Memory specifications

The PowerEdge R660xs system supports the following memory specifications for optimized operation.

Table 15. Memory specifications for 4th Generation Intel Xeon Scalable Processors

DIMM type	DIMM rank	DIMM capacity	Single processor		Dual processors	
			Minimum memory capacity	Maximum memory capacity	Minimum memory capacity	Maximum memory capacity
RDIMM	Single rank	16 GB	16 GB	128 GB	32 GB	256 GB
	Dual rank	32 GB	32 GB	256 GB	64 GB	512 GB
		64 GB	64 GB	512 GB	128 GB	1 TB

Table 16. Memory module sockets for 4th Generation Intel Xeon Scalable Processors

Memory module sockets	Speed
16, 288-pin	4000 MT/s, 4400 MT/s, 4800 MT/s

Table 17. Memory specifications for 5th Generation Intel Xeon Scalable Processors

DIMM type	DIMM rank	DIMM capacity	Single processor		Dual processors	
			Minimum memory capacity	Maximum memory capacity	Minimum memory capacity	Maximum memory capacity
RDIMM	Single rank	16 GB	16 GB	128 GB	32 GB	256 GB

Table 17. Memory specifications for 5th Generation Intel Xeon Scalable Processors (continued)

DIMM type	DIMM rank	DIMM capacity	Single processor		Dual processors	
			Minimum memory capacity	Maximum memory capacity	Minimum memory capacity	Maximum memory capacity
	Dual rank	32 GB	32 GB	256 GB	64 GB	512 GB
		64 GB	64 GB	512 GB	128 GB	1 TB
		96 GB	96 GB	768 GB	192 GB	1.5 TB

Table 18. Memory module sockets for 5th Generation Intel Xeon Scalable Processors

Memory module sockets	Speed
16, 288-pin	4000 MT/s, 4400 MT/s, 4800 MT/s, 5200 MT/s, 5600 MT/s

NOTE: Memory DIMM slots are not hot pluggable.

NOTE: The processor may reduce the performance of the rated DIMM speed.

Storage controller specifications

The PowerEdge R660xs system supports the following controller cards:

Table 19. Storage controller cards

Supported storage controller cards
Internal controllers <ul style="list-style-type: none"> PERC H965i PERC H755N PERC H755 PERC H355 HBA355i HBA465i
External controllers <ul style="list-style-type: none"> HBA355e adapter HBA965e
Internal Boot <ul style="list-style-type: none"> Boot Optimized Storage Subsystem (BOSS-N1): HWRAID 1, 2 x M.2 SSDs USB
Software RAID <ul style="list-style-type: none"> S160

Drives

The PowerEdge R660xs system supports:

- 0 drive
- Up to 4 x 3.5-inch SAS/SATA (HDD/SSD) drives
- Up to 8 x 2.5-inch SAS/SATA/NVMe (HDD/SSD) drives
- Up to 10 x 2.5-inch SAS/SATA/NVMe (HDD/SSD) drives
- Up to 2 x 2.5-inch SAS/SATA/NVMe (HDD/SSD) drives on rear of the system

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 [Dell Support > Browse all products > Infrastructure > Data Center Infrastructure > Storage](#)

Ports and connectors specifications

NIC port specifications

The PowerEdge R660xs 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 20. NIC port specification for the system

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

Serial connector specifications

The PowerEdge R660xs system supports one optional card type serial connector on rear of the system, which is a 9-pin connector, Data Terminal Equipment (DTE), 16550-compliant .

The process to install the optional serial connector card is similar to an expansion card filler bracket.

USB ports specifications

Table 21. PowerEdge R660xs system USB ports specifications

Front		Rear		Internal (Optional)	
USB port type	No. of ports	USB port type	No. of ports	USB port type	No. of ports
USB 2.0-compliant port	One	USB 2.0-compliant port	One	Internal USB 3.0-compliant port	One
iDRAC Direct port (Micro-AB USB 2.0-compliant port)	One	USB 3.0-compliant port	One		

NOTE: The micro USB 2.0 compliant port can only be used as an iDRAC Direct or a management port.

NOTE: The USB 2.0 specifications provide a 5 V supply on a single wire to power connected USB devices. A unit load is defined as 100 mA in USB 2.0, and 150 mA in USB 3.0. A device may draw a maximum of 5 unit loads (500 mA) from a port in USB 2.0; 6 (900 mA) in USB 3.0.

NOTE: The USB 2.0 interface can provide power to low-power peripherals but must adhere to USB specification. An external power source is required for higher-power peripherals to function, such as external CD/DVD Drives.

VGA ports specifications

The PowerEdge R660xs system supports two DB-15 VGA ports, one each on the front and rear panels of the system.

Video specifications

The PowerEdge R660xs system supports integrated Matrox G200 graphics controller with 16 MB of video frame buffer.

Table 22. Supported video resolution options for the system

Resolution	Refresh rate (Hz)	Color depth (bits)
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
1440 x 900	60	8, 16, 32
1600 x 900	60	8, 16, 32
1600 x 1200	60	8, 16, 32
1680 x 1050	60	8, 16, 32
1920 x 1080	60	8, 16, 32
1920 x 1200	60	8, 16, 32

Environmental specifications

i **NOTE:** For additional information about environmental certifications, refer to the Product Environmental Datasheet located with the Documentation on [Dell Support](#).

Table 23. Continuous Operation Specifications for ASHRAE A2

Operational climatic range for category A2	Allowable continuous operations
Temperature range for altitudes <= 900 m (<= 2953 ft)	10–35°C (50–95°F) with no direct sunlight on the equipment
Humidity percent range (non-condensing at all times)	8% RH with -12°C (10.4°F) minimum dew point to 80% RH with 21°C (69.8°F) maximum dew point
Operational altitude de-rating	Maximum temperature is reduced by 1°C/300 m (1.8°F/984 Ft) above 900 m (2953 Ft)

Table 24. Continuous Operation Specifications for ASHRAE A3

Operational climatic range for category A3	Allowable continuous operations
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 (10.4°F) 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 (1.8°F/574 Ft) above 900 m (2953 Ft)

Table 25. Continuous Operation Specifications for ASHRAE A4

Operational climatic range for category A4	Allowable continuous operations
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 (10.4°F) 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 (1.8°F/410 Ft) above 900 m (2953 Ft)

Table 26. Continuous Operation Specifications for Rugged Environment

Operational climatic range for category A4	Allowable continuous operations
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 (10.4°F) 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 (1.8°F/410 Ft) above 900 m (2953 Ft)

Table 27. Common Environmental Specifications for ASHRAE A2, A3, A4 and Rugged

Environmental Specifications for ASHRAE A2, A3, A4 and Rugged	Allowable continuous operations
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 (9°F in 15 minutes), 5°C in an hour* (9°F in an hour) for tape <i>i</i> NOTE: * - 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)

Table 28. Maximum vibration specifications

Maximum vibration	Specifications
Operating	0.21 G _{rms} at 5 Hz to 500 Hz for 10 minutes (all operation orientations)
Storage	1.88 G _{rms} at 10 Hz to 500 Hz for 15 minutes (all six sides tested)

Table 29. Maximum shock pulse specifications

Maximum shock pulse	Specifications
Operating	Six consecutively executed shock pulses in the positive and negative x, y, and z axis of 6 G for up to 11 ms.
Storage	Six consecutively executed shock pulses in the positive and negative x, y, and z axis (one pulse on each side of the system) of 71 G for up to 2 ms.

Thermal restrictions

Table 30. Thermal restriction matrix for processor and fans

Configurati on / Processor TDP	No Backplane	4 x 3.5-inch SAS/SATA		8 x 2.5-inch SAS3/SATA	
Rear Storage	Rear 3 LP	Rear 3 LP	1 LP + 2 Rear drives	Rear 3 LP	Rear 1 LP + 2 Rear drives
125 W	STD fan STD HSK 45 °C	STD fan STD HSK 40 °C	STD fan STD HSK 35 °C	STD fan STD HSK 40 °C	HPR (Gold) fan STD HSK 35 °C
135 W	STD fan STD HSK	STD fan STD HSK	STD fan STD HSK	STD fan STD HSK	HPR (Gold) fan STD HSK

Table 30. Thermal restriction matrix for processor and fans (continued)

Configurati on / Processor TDP	No Backplane	4 x 3.5-inch SAS/SATA		8 x 2.5-inch SAS3/SATA	
	45 °C	40 °C	35 °C	40 °C	35 °C
150 W	STD fan STD HSK 40 °C	STD fan STD HSK 40 °C	STD fan STD HSK 35 °C	STD fan STD HSK 40 °C	HPR (Gold) fan STD HSK 35 °C
165 W	STD fan HPR HSK 40 °C	STD fan HPR HSK 35 °C	STD fan HPR HSK 35 °C	STD fan HPR HSK 35 °C	HPR (Gold) fan HPR HSK 35 °C
185 W	STD fan HPR HSK 40 °C	STD fan HPR HSK 35 °C	STD fan HPR HSK 35 °C	STD fan HPR HSK 35 °C	HPR (Gold) fan HPR HSK 35 °C
195 W	STD fan HPR HSK 35 °C	STD fan HPR HSK 35 °C	STD fan HPR HSK 35 °C	****HPR (Gold) fan HPR HSK 35 °C	HPR (Gold) fan HPR HSK 35 °C
205 W	STD fan HPR HSK 35 °C	STD fan HPR HSK 35 °C	STD fan HPR HSK 35 °C	STD fan HPR HSK 35 °C	HPR (Gold) fan HPR HSK 35 °C
225 W	STD fan HPR HSK 35 °C	*	*	HPR (Gold) fan HPR HSK 35 °C	HPR (Gold) fan HPR HSK 35 °C

Table 31. Thermal restriction matrix for processor and fans

Configur ation / Processo r TDP	10 x 2.5-inch SAS4/SATA		8 x 2.5-inch NVMe		10 x 2.5-inch NVMe	
Rear Storage	Rear 3 LP	1 LP + 2 Rear drives	Rear 3 LP	1 LP + 2 Rear drives	Rear 3 LP	1 LP + 2 Rear drives
125 W	HPR (Gold) fan STD HSK 40 °C	HPR (Gold) fan STD HSK 35 °C	HPR (Gold) fan STD HSK 40 °C	HPR (Gold) fan STD HSK 35 °C	HPR (Gold) fan STD HSK 40 °C	HPR (Gold) fan STD HSK 35 °C
135 W	HPR (Gold) fan STD HSK 40 °C	HPR (Gold) fan STD HSK 35 °C	HPR (Gold) fan STD HSK 40 °C	HPR (Gold) fan STD HSK 35 °C	HPR (Gold) fan STD HSK 40 °C	HPR (Gold) fan STD HSK 35 °C
150 W	HPR (Gold) fan STD HSK 40 °C	HPR (Gold) fan STD HSK 35 °C	HPR (Gold) fan STD HSK 40 °C	HPR (Gold) fan STD HSK 35 °C	HPR (Gold) fan STD HSK 40 °C	HPR (Gold) fan STD HSK 35 °C
165 W	HPR (Gold) fan HPR HSK	HPR (Gold) fan HPR HSK	HPR (Gold) fan HPR HSK	HPR (Gold) fan HPR HSK	HPR (Gold) fan HPR HSK	HPR (Gold) fan HPR HSK

Table 31. Thermal restriction matrix for processor and fans (continued)

Configur ation / Process or TDP	10 x 2.5-inch SAS4/SATA		8 x 2.5-inch NVMe		10 x 2.5-inch NVMe	
	35 °C	35 °C	35 °C	35 °C	35 °C	35 °C
185 W	HPR (Gold) fan HPR HSK 35 °C	HPR (Gold) fan HPR HSK 35 °C	HPR (Gold) fan HPR HSK 35 °C	HPR (Gold) fan HPR HSK 35 °C	HPR (Gold) fan HPR HSK 35 °C	HPR (Gold) fan HPR HSK 35 °C
195 W	HPR (Gold) fan HPR HSK 35 °C	HPR (Gold) fan HPR HSK 30 °C	HPR (Gold) fan HPR HSK 35 °C	HPR (Gold) fan HPR HSK 30 °C	HPR (Gold) fan HPR HSK 35 °C	HPR (Gold) fan HPR HSK 30 °C
205 W	HPR (Gold) fan HPR HSK 35 °C	HPR (Gold) fan HPR HSK 30 °C	HPR (Gold) fan HPR HSK 35 °C	HPR (Gold) fan HPR HSK 30 °C	HPR (Gold) fan HPR HSK 35 °C	HPR (Gold) fan HPR HSK 30 °C
225 W	HPR (Gold) fan HPR HSK 35 °C	HPR (Gold) fan HPR HSK 30 °C	HPR (Gold) fan HPR HSK 35 °C	HPR (Gold) fan HPR HSK 30 °C	HPR (Gold) fan HPR HSK 35 °C	HPR (Gold) fan HPR HSK 30 °C

NOTE:

- ** 5x fans is required for 1xProcessor without rear drive configuration.
- *** 7xfans is required for 2xProcessors configuration and 1xProcessor with rear drive configuration.
- **** Intel 6434/6526Y/6534 CPU would need HPR Gold Fan to support in this configuration.
- 4x3.5" SAS/SATA config only support DIMM up to 96G and all the other configs support DIMM up to 128G.

Table 32. Thermal restriction matrix for processor and fans with TDP > 205 W, 225 W

Front storage module Configurati on with Restriction s	No Backplane	2 x 3.5-inch SAS/SATA		4 x 2.5-inch SAS3/SATA	
Drives	No	HDD 0 ~ 1		HDD 0 ~ 3	
Rear Storage	Rear 3 LP	PCIe 1 + OCP only. PCIe 2, PCIe 3 and BOSS are not supported	1 LP + 2 Rear drives	Rear 3 LP	Rear 1 LP + 2 Rear drives
225 W	*	STD fan HPR HSK 35 °C	STD fan HPR HSK 30 °C	*	*
250 W	STD fan HPR HSK 35 °C	STD fan HPR HSK 35 °C	STD fan HPR HSK 30 °C	HPR (Gold) fan STD HSK 35 °C	HPR (Gold) fan STD HSK 35 °C

Table 33. Thermal restriction matrix for processor and fans with TDP > 205 W, 225 W

Front storage module Configuration with Restrictions	6 x 2.5-inch SAS4/SATA		4 x 2.5-inch NVMe		4 x 2.5-inch NVMe	
Drives	HDD 0 ~ 5		HDD 0 ~ 3		HDD 0 ~ 3	
Rear Storage	Rear 3 LP	1 LP + 2 Rear drives	Rear 3 LP	1 LP + 2 Rear drives	Rear 3 LP	1 LP + 2 Rear drives
225 W	*	*	*	*	*	*
250 W	HPR (Gold) fan HPR HSK 35 °C	HPR (Gold) fan HPR HSK 30 °C	HPR (Gold) fan HPR HSK 35 °C	HPR (Gold) fan HPR HSK 30 °C	HPR (Gold) fan HPR HSK 35 °C	HPR (Gold) fan HPR HSK 30 °C

NOTE:

- * Configs supported in the "without HW restriction thermal restriction table"
- ** Except cold aisle configuration: 5 fans is required for 1 x Processor + without rear drive configuration
- *** Except cold aisle configuration: 7 fans is required for 2 x Processors configuration. and 1 x Processor + rear drive configuration
- 2 x3.5" SAS/SATA config only support DIMM up to 96GB and all the other configs support DIMM up to 128GB.

Table 34. Label reference

Label	Description
STD	Standard
LP	Low Profile
HPR (Gold)	High performance (gold grade)
HSK	Heat sink

Thermal Restriction for ASHRAE A2/A3/A4

Table 35. No BP Configuration with iDRAC

Dell PowerEdge Server Standard Operating Support (ASHRAE A2 compliant) All options supported unless otherwise noted.	Dell PowerEdge Server Extended Inletient 40° C Operating Support (ASHRAE A3 compliant)	Dell PowerEdge Server Extended Inletient 45° C Operating Support (ASHRAE A4 compliant)
<ul style="list-style-type: none"> • STD Fan is required. • STD HSK is required for CPU Base TDP <=150W • HPR HSK is required for CPU Base TDP >150W • 2-processor all configs or 1-processor with Rear storage module config requires 7x fans • 1-processor without Rear storage module config requires 5x fans • 100G PCIe NIC could not support MFS1S00-VxxE (spec 75C) transceiver 	<ul style="list-style-type: none"> • Not support CPU Base TDP > 185W • STD Fan is required. • STD HSK is required for CPU Base TDP <=150W • HPR HSK is required for CPU Base TDP >150W. • Not support BOSS M.2 Module • Not support Non-Dell qualified peripheral cards and Channel devices (FW) cards • Not support NIC consuming power >= 25W. 	<ul style="list-style-type: none"> • Not support CPU Base TDP > 135W • STD Fan and STD HSK is required. • Not support BOSS M.2 Module • Not support Non-Dell qualified peripheral cards and Channel devices (FW) cards • Not support NIC consuming power >= 25W. Or PCIe cooling Tier> 5 • Not Support Config with Rear storage module • Not support OCP3.0 transfer rate >25G or OCP3.0 cooling tier > 6

Table 35. No BP Configuration with iDRAC

Dell PowerEdge Server Standard Operating Support (ASHRAE A2 compliant) All options supported unless otherwise noted.	Dell PowerEdge Server Extended Inletient 40° C Operating Support (ASHRAE A3 compliant)	Dell PowerEdge Server Extended Inletient 45° C Operating Support (ASHRAE A4 compliant)
<ul style="list-style-type: none"> ● 100G OCP3.0 NIC could only support optic transceiver with thermal spec 85C and power <=2.5W (DPN:4WGYD) ● 25G OCP3.0 NIC with 4 ports or PCIe cooling tier higher than or equal to 5 could only support optic transceiver with thermal spec 85C and power <=1.2W (DPN: M14MK) ● 25G OCP3.0 NIC with PCIe cooling tier lower than 5 could not support spec 70C optic transceiver with power higher than 1.2W (DPN: 0YR96) ● H965e cannot be installed on PCIe slot 1 	<ul style="list-style-type: none"> ● Not Support Config with Rear storage module ● Not support OCP transfer rate >25G or cooling tier > 9 ● Optic Transceiver with spec 85C is required ● Two PSUs are required. System performance may be reduced in the event of a PSU failure 	<ul style="list-style-type: none"> ● Optic Transceiver with spec 85C is required. ● Two PSUs are required. System performance may be reduced in the event of a PSU failure

Table 36. 4 x 3.5-inch SAS/SATA Configuration with iDRAC

Dell PowerEdge Server Standard Operating Support (ASHRAE A2 compliant) All options supported unless otherwise noted.	Dell PowerEdge Server Extended Inletient 40° C Operating Support (ASHRAE A3 compliant)	Dell PowerEdge Server Extended Inletient 45° C Operating Support (ASHRAE A4 compliant)
<ul style="list-style-type: none"> ● STD Fan is required. ● STD HSK is required for CPU Base TDP <=150W ● HPR HSK is required for CPU Base TDP >150W ● 2-processor all configs or 1-processor with Rear storage module config requires 7x fans ● 1-processor without Rear storage module config requires 5x fans ● HW restriction is required for CPU Base TDP >205W <ul style="list-style-type: none"> ○ Front storage module only support 2x3.5 at HDD#0, HDD1 and HDD Blank F3F7V x 2 are required at HDD#2 and HDD#3 ○ RIO only support PCIe1 and OCP3.0. Could not support BOSS, PCIe2 and PCIe3. ○ With Rear storage module config only support max. 30C ambient. ● Only support DDR5 DIMM up to 96 G.B ● 100G PCIe NIC could not support MFS1S00-VxxE (spec 75C) transceiver. ● 100G PCIe and OCP3.0 NIC could only support optic transceiver with thermal Spec 85C and power <=2.5W ● 25G PCIe NIC could only support optic transceiver with thermal Spec 85C and power <=1.2W 	<ul style="list-style-type: none"> ● Not support CPU Base TDP > 150W ● STD Fan is required. ● STD HSK is required ● Not support BOSS M.2 Module ● Not support Non-Dell qualified peripheral cards and Channel devices (FW) cards ● Not support NIC consuming power >= 25W. ● Not Support Config with Rear storage module ● Not support OCP transfer rate >25G or cooling tier > 10 ● Optic Transceiver with spec 85C is required ● Two PSUs are required. System performance may be reduced in the event of a PSU failure 	<ul style="list-style-type: none"> ● Not support

Table 36. 4 x 3.5-inch SAS/SATA Configuration with iDRAC

Dell PowerEdge Server Standard Operating Support (ASHRAE A2 compliant) All options supported unless otherwise noted.	Dell PowerEdge Server Extended Inletient 40° C Operating Support (ASHRAE A3 compliant)	Dell PowerEdge Server Extended Inletient 45° C Operating Support (ASHRAE A4 compliant)
<ul style="list-style-type: none"> ● 25G OCP3.0 NIC with 4 ports or PCIe cooling tier higher than 5 could only support optic transceiver with thermal spec 85C and power <=1.2W ● 25G OCP3.0 NIC with PCIe cooling tier lower than or equal to 5 could not support thermal spec 70C optic transceiver with power higher than 1.2W ● The following SAS drives could NOT support in Rear storage module. (But could support in front SM) <ul style="list-style-type: none"> ○ Kioxia PM6 SAS all capacities ○ SATA SSD, Hynix SE5031 all capacities or thermal spec <70C ● H965e cannot be installed on PCIe slot 1 		

Table 37. 8 x 2.5-inch SAS3/SATA Configuration with iDRAC

Dell PowerEdge Server Standard Operating Support (ASHRAE A2 compliant) All options supported unless otherwise noted.	Dell PowerEdge Server Extended Inletient 40° C Operating Support (ASHRAE A3 compliant)	Dell PowerEdge Server Extended Inletient 45° C Operating Support (ASHRAE A4 compliant)
<ul style="list-style-type: none"> ● STD Fan is required for CPU Base TDP<=205W ● HPR Gold (VHP) Fan is required for CPU Base TDP>205W and Intel 6434/ 6526Y/6534 CPU base TDP 195W. ● STD HSK is required for CPU Base TDP <=150W ● HPR HSK is required for CPU Base TDP >150W ● 2-processor all configs or 1-processor with Rear storage module config requires 7x fans ● 1-processor without Rear storage module config requires 5x fans ● HW restriction is required for CPU Base TDP >225W <ul style="list-style-type: none"> ○ Front storage moduleonly support 4x2.5"SAS/SATA drives at HDD#0~3, and HDD Bracket GG6M3 x1 and M8KTX x1 are required at empty HDD bay ● 100G PCIe and OCP3.0 NIC could only support optic transceiver with thermal Spec 85C and power <=2.5W ● 25G PCIe NIC could only support optic transceiver with thermal Spec 85C and power <=1.2W ● 25G OCP3.0 NIC with 4 ports or PCIe cooling tier higher than 5 could 	<ul style="list-style-type: none"> ● Not support CPU Base TDP > 150W ● STD Fan is required. ● STD HSK is required ● Not support BOSS M.2 Module ● Not support Non-Dell qualified peripheral cards and Channel devices (FW) cards ● Not support NIC consuming power >= 25W. ● Not Support Config with Rear storage module ● Not support OCP transfer rate >25G or cooling tier > 10 ● Optic Transceiver with spec 85C is required ● Two PSUs are required. System performance may be reduced in the event of a PSU failure 	<ul style="list-style-type: none"> ● Not support

Table 37. 8 x 2.5-inch SAS3/SATA Configuration with iDRAC

Dell PowerEdge Server Standard Operating Support (ASHRAE A2 compliant) All options supported unless otherwise noted.	Dell PowerEdge Server Extended Inletient 40° C Operating Support (ASHRAE A3 compliant)	Dell PowerEdge Server Extended Inletient 45° C Operating Support (ASHRAE A4 compliant)
<p>only support optic transceiver with thermal spec 85C and power <=1.2W</p> <ul style="list-style-type: none"> ● 25G OCP3.0 NIC with PCIe cooling tier lower than or equal to 5 could not support thermal spec 70C optic transceiver with power higher than 1.2W ● The following SAS drives could NOT support in Rear storage module. (But could support in front storage) <ul style="list-style-type: none"> ○ Kioxia PM6 SAS all capacities ○ SATA SSD, Hynix SE5031 all capacities or thermal spec <70C ● H965e cannot be installed on PCIe slot 1 		

Table 38. 10 x 2.5-inch SAS4/SATA Configuration with iDRAC

Dell PowerEdge Server Standard Operating Support (ASHRAE A2 compliant) All options supported unless otherwise noted.	Dell PowerEdge Server Extended Inletient 40° C Operating Support (ASHRAE A3 compliant)	Dell PowerEdge Server Extended Inletient 45° C Operating Support (ASHRAE A4 compliant)
<ul style="list-style-type: none"> ● HPR Gold (VHP) Fan is required for all configurations ● STD HSK is required for CPU Base TDP <=150W ● HPR HSK is required for CPU Base TDP >150W ● 2-processor all configs or 1-processor with Rear storage module config requires 7x fans ● 1-processor without Rear storage module config requires 5x fans ● HW restriction is required for CPU Base TDP >225W <ul style="list-style-type: none"> ○ Front storage module only support 6x2.5"SAS/SATA drives at HDD#0~5, and HDD Bracket GG6M3 x2 are required at empty HDD bay. ● 100G PCIe and OCP3.0 NIC could only support optic transceiver with thermal Spec 85C and power <=2.5W ● 25G PCIe NIC could not support thermal spec 70C optic transceiver with power higher than 1.2W ● 25G OCP3.0 NIC with 4 ports or PCIe cooling tier higher 5 could only support optic transceiver with thermal spec 85C and power <=1.2W ● 25G OCP3.0 NIC with PCIe cooling tier lower than or equal to 5 could not support thermal spec 70C optic transceiver with power higher than 1.2W 	<ul style="list-style-type: none"> ● Not support CPU Base TDP > 150W ● . ● HPR Gold (VHP) Fan is required. ● STD HSK is required ● Not support BOSS M.2 Module ● Not support Non-Dell qualified peripheral cards and Channel devices (FW) cards ● Not support NIC consuming power >= 25W. ● Not Support Config with Rear storage module ● Not support OCP transfer rate >25G or cooling tier > 10 ● Optic Transceiver with spec 85C is required ● Two PSUs are required. System performance may be reduced in the event of a PSU failure 	<ul style="list-style-type: none"> ● Not support

Table 38. 10 x 2.5-inch SAS4/SATA Configuration with iDRAC

Dell PowerEdge Server Standard Operating Support (ASHRAE A2 compliant) All options supported unless otherwise noted.	Dell PowerEdge Server Extended Inletient 40° C Operating Support (ASHRAE A3 compliant)	Dell PowerEdge Server Extended Inletient 45° C Operating Support (ASHRAE A4 compliant)
<ul style="list-style-type: none"> ● With Rear storage module config only support max. 30C ambient when CPU Base TDP>=205W ● The following SAS drives could NOT support in Rear storage module. (But could support in front storage) <ul style="list-style-type: none"> ○ Kioxia PM6 SAS all capacities ○ SATA SSD, Hynix SE5031 all capacities or thermal spec <70C 		

Table 39. 8 x 2.5-inch NVMe configuration with iDRAC

Dell PowerEdge Server Standard Operating Support (ASHRAE A2 compliant) All options supported unless otherwise noted.	Dell PowerEdge Server Extended Inletient 40° C Operating Support (ASHRAE A3 compliant)	Dell PowerEdge Server Extended Inletient 45° C Operating Support (ASHRAE A4 compliant)
<ul style="list-style-type: none"> ● HPR Gold (VHP) Fan is required for all configurations ● STD HSK is required for CPU Base TDP <=150W ● HPR HSK is required for CPU Base TDP >150W ● 2-processor all configs or 1-processor with Rear storage module config requires 7x fans ● 1-processor without Rear storage module config requires 5x fans ● HW restriction is required for CPU Base TDP >225W <ul style="list-style-type: none"> ○ Front storage module only support 4x2.5"NVMe at HDD#0~3, and HDD Bracket GG6M3 x3 are required at empty HDD bay. ● 100G PCIe and OCP3.0 NIC could only support optic transceiver with thermal spec 85C and power <=2.5W ● 25G OCP3.0 NIC with 4 ports or PCIe cooling tier higher 5 could only support optic transceiver with thermal spec 85C and power <=1.2W ● 25G OCP3.0 NIC with PCIe cooling tier lower than or equal to 5 could not support thermal spec 70C optic transceiver with power higher than 1.2W ● With Rear storage module config only support max. 30C ambient when CPU Base TDP>=205W ● The following NVMe drives could NOT support in Rear storage module. (But could support in front storage) <ul style="list-style-type: none"> ○ Samsung PM1735a/PM1735 Capacities > 6.4TB ○ Samsung PM1733a/PM1733 Capacities > 7.68TB 	<ul style="list-style-type: none"> ● Not support CPU Base TDP > 150W ● HPR Gold (VHP) Fan is required. ● STD HSK is required ● Not support BOSS M.2 Module ● Not support Non-Dell qualified peripheral cards and Channel devices (FW) cards ● Not support NIC consuming power >= 25W. ● Not Support Config with Rear storage module ● Not support OCP transfer rate >25G or cooling tier > 10 ● Optic Transceiver with spec 85C is required ● Two PSUs are required. System performance may be reduced in the event of a PSU failure 	<ul style="list-style-type: none"> ● Not support

Table 39. 8 x 2.5-inch NVMe configuration with iDRAC

Dell PowerEdge Server Standard Operating Support (ASHRAE A2 compliant) All options supported unless otherwise noted.	Dell PowerEdge Server Extended Inletient 40° C Operating Support (ASHRAE A3 compliant)	Dell PowerEdge Server Extended Inletient 45° C Operating Support (ASHRAE A4 compliant)
<ul style="list-style-type: none"> ○ Skhynix PE8010 capacity > 960 GB ○ Kioxia CM6 all capacities ○ Redtail NVMe all capacities ○ Skhynix PE8110 capacity > 960 GB 		

Table 40. 10 x 2.5-inch NVMe configuration with iDRAC

Dell PowerEdge Server Standard Operating Support (ASHRAE A2 compliant) All options supported unless otherwise noted.	Dell PowerEdge Server Extended Inletient 40° C Operating Support (ASHRAE A3 compliant)	Dell PowerEdge Server Extended Inletient 45° C Operating Support (ASHRAE A4 compliant)
<ul style="list-style-type: none"> ● HPR Gold (VHP) Fan is required for all configurations ● STD HSK is required for CPU Base TDP <=150W ● HPR HSK is required for CPU Base TDP >150W ● 2-processor all configs or 1-processor with Rear storage module config requires 7x fans ● 1-processor without Rear storage module config requires 5x fans ● HW restriction is required for CPU Base TDP >225W <ul style="list-style-type: none"> ○ Front storage module only support 4x2.5"NVMe at HDD#0~3, and HDD Bracket GG6M3 x3 are required at empty HDD bay. . ● 100G PCIe NIC could not support MFS1S00-VxxE (spec 75C) transceiver but could support optic transceiver with thermal spec 70C and 85C. ● 100G PCIe and OCP3.0 NIC could only support optic transceiver with thermal spec 85C and power <=2.5W ● 25G OCP3.0 NIC with 4 ports or PCIe cooling tier higher 5 could only support optic transceiver with thermal spec 85C and power <=1.2W ● 25G OCP3.0 NIC with PCIe cooling tier lower than or equal to 5 could not support thermal spec 70C optic transceiver with power higher than 1.2W ● With Rear storage module config only support max. 30C ambient when CPU Base TDP>=205W ● The following NVMe drives could NOT support in Rear storage module. (But could support in front storage) <ul style="list-style-type: none"> ○ Samsung PM1735a/PM1735 Capacities > 6.4TB 	<ul style="list-style-type: none"> ● Not support CPU Base TDP > 150W ● HPR Gold (VHP) Fan is required. ● STD HSK is required ● Not support BOSS M.2 Module ● Not support Non-Dell qualified peripheral cards and Channel devices (FW) cards ● Not support NIC consuming power >= 25W. ● Not Support Config with Rear storage module ● Not support OCP transfer rate >25G or cooling tier > 10 ● Optic Transceiver with spec 85C is required ● Two PSUs are required. System performance may be reduced in the event of a PSU failure 	<ul style="list-style-type: none"> ● Not support

Table 40. 10 x 2.5-inch NVMe configuration with iDRAC

Dell PowerEdge Server Standard Operating Support (ASHRAE A2 compliant) All options supported unless otherwise noted.	Dell PowerEdge Server Extended Inletient 40° C Operating Support (ASHRAE A3 compliant)	Dell PowerEdge Server Extended Inletient 45° C Operating Support (ASHRAE A4 compliant)
<ul style="list-style-type: none"> o Samsung PM1733a/PM1733 Capacities > 7.68TB o Skhynix PE8010 Capacity > 960 GB o Kioxia CM6 all capacities o Redtail NVMe all capacities o Skhynix PE8110 capacity > 960 GB 		

Table 41. Thermal Solution Configuration

Configurations	Rear drive configurations	Processor (TDP)	Fan type	Heat sink type	Air Shroud	Memory Blank	Processor Blank	Fan Counts	Fan Blank			
4 x 3.5-inch drives	without rear drives	TDP <= 150 W	STD fan	STD HSK	Yes	No	Only required on processor 2 for 1 processor Configuration	7 x fans for 2 processors and 1xProcessor + Rear HDD Configuration	Only required on fan Slot 1 and slot 2 for 5x Fans configuration			
		150 W < TDP <= 205 W	STD fan	HPR HSK								
	with rear drives	TDP <= 150 W	STD fan	STD HSK		Yes						
		150 W < TDP <= 205 W		HPR HSK								
8 x 2.5-inch SAS/SATA drives	without rear drives	TDP <= 150 W	STD fan	STD HSK		No				No	5 x fans for 1 processor Configuration + W/O Rear HDDs Config	
		150 W < TDP <= 205 W	**STD fan	HPR HSK								
		205 W < TDP <= 225 W	HPR Gold Fan (VHP)	HPR HSK								
8 x 2.5-inch SAS/SATA drives	with rear drives	TDP <= 150 W	HPR Gold Fan (VHP)	STD HSK								
		150 W < TDP <= 225 W		HPR HSK								
10 x 2.5-inch SAS4/SATA drives	without rear drives	TDP <= 150 W	HPR Gold Fan (VHP)	STD HSK	No							
		150 W < TDP <= 225 W		HPR HSK								
	with rear drives	TDP <= 150 W	HPR Gold Fan (VHP)	STD HSK		Yes						
		150 W < TDP <= 225 W		HPR HSK								
8 and 10 x 2.5-inch drives	without rear drives	TDP <= 150 W	HPR Gold Fan (VHP)	STD HSK	Yes							

Table 41. Thermal Solution Configuration (continued)

Configurations	Rear drive configurations	Processor (TDP)	Fan type	Heat sink type	Air Shroud	Memory Blank	Processor Blank	Fan Counts	Fan Blank
NVMe drives		150 W < TDP ≤ 225 W		HPR HSK					
8 and 10 x 2.5-inch NVMe drives	with rear drives	TDP ≤ 150 W	HPR Gold Fan (VHP)	STD HSK		Yes			
		150 W < TDP ≤ 225 W		HPR HSK					
No Backplane	without rear drives	TDP ≤ 150 W	STD fan	STD HSK		No			
		150 W < TDP ≤ 250 W		HPR HSK					

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 [PowerEdge manuals](#).
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 42. Interfaces to set up iDRAC IP address

Interface	Documentation links
iDRAC Settings utility	Integrated Dell Remote Access Controller User's Guide at iDRAC Manuals or for system-specific Integrated Dell Remote Access Controller User's Guide, go to PowerEdge Manuals > Product Support page of your system > Documentation .

Table 42. Interfaces to set up iDRAC IP address (continued)

Interface	Documentation links
	<p> NOTE: To determine the most recent iDRAC release for your platform and for the latest documentation version, see KB article KB78115.</p>
OpenManage Deployment Toolkit	Dell OpenManage Deployment Toolkit User's Guide available at OpenManage Manuals > OpenManage Deployment Toolkit.
iDRAC Direct	<p>Integrated Dell Remote Access Controller User's Guide at iDRAC Manuals or for system-specific Integrated Dell Remote Access Controller User's Guide, go to PowerEdge Manuals > Product Support page of your system > Documentation.</p> <p> NOTE: To determine the most recent iDRAC release for your platform and for the latest documentation version, see KB article KB78115.</p>
Lifecycle Controller	<p>Dell Lifecycle Controller User's Guide at iDRAC Manuals or for system-specific Dell Lifecycle Controller User's Guide, go to PowerEdge Manuals > Product Support page of your system > Documentation.</p> <p> NOTE: To determine the most recent iDRAC release for your platform and for the latest documentation version, see KB article KB78115.</p>
Server LCD panel	LCD panel section.
iDRAC Direct and Quick Sync 2 (optional)	<p>Integrated Dell Remote Access Controller User's Guide at iDRAC Manuals or for system-specific Integrated Dell Remote Access Controller User's Guide, go to PowerEdge Manuals > Product Support page of your system > Documentation.</p> <p> NOTE: To determine the most recent iDRAC release for your platform and for the latest documentation version, see KB article KB78115.</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 LOM mode, if you have opted for a system that has the 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](#)

 **NOTE:** To determine the most recent iDRAC release for your platform and for latest documentation version, see KB article [KB78115](#).



You can also access iDRAC using command-line protocol - RACADM. For more information, see the [Integrated Dell Remote Access Controller RACADM CLI Guide](#) .


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](#).

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 43. Resources to install the operating system

Resource	Documentation links
iDRAC	Integrated Dell Remote Access Controller User's Guide or for system specific Integrated Dell Remote Access Controller User's Guide, go to PowerEdge Manuals > Product Support page of your system > Documentation .  NOTE: To determine the most recent iDRAC release for your platform and for latest documentation version, see KB article at KB78115 .
Lifecycle Controller	Dell Lifecycle Controller User's Guide at iDRAC Manuals or for system specific Dell Lifecycle Controller User's Guide , go to PowerEdge Manuals > Product Support page of your system > Documentation . Dell recommends using Lifecycle Controller to install the OS, since all required drivers are installed on the system.  NOTE: To determine the most recent iDRAC release for your platform and for latest documentation version, see KB article at KB78115 .
OpenManage Deployment Toolkit	OpenManage Manuals > OpenManage Deployment Toolkit
Dell certified VMware ESXi	Virtualization solutions

 **NOTE:** For more information about installation and how-to videos for operating systems supported on PowerEdge systems, see [Supported Operating Systems for Dell PowerEdge systems](#).

Options to download drivers and firmware

You can download the firmware from the Dell support site. For information about downloading firmware, see the [Downloading drivers and firmware](#) section.

You can also choose any one of the following options to download the firmware. For information about how to download the firmware, see the documentation links provided in the table below.

Table 44. Options to download firmware

Option	Documentation link
Using Integrated Dell Remote Access Controller Lifecycle Controller (iDRAC with LC)	iDRAC Manuals
Using Dell Repository Manager (DRM)	OpenManage Manuals
Using Dell Server Update Utility (SUU)	OpenManage Manuals
Using Dell OpenManage Deployment Toolkit (DTK)	OpenManage Manuals
Using iDRAC virtual media	iDRAC Manuals

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 45. Options to download and install OS drivers

Option	Documentation
Dell support site	Downloading drivers and firmware section.
iDRAC virtual media	Integrated Dell Remote Access Controller User's Guide or for system specific, go to Integrated Dell Remote Access Controller User's Guide > Product Support page of your system > Documentation . NOTE: To determine the most recent iDRAC release for your platform and for latest documentation version, see Integrated Dell Remote Access Controller Release Notes .

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 [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 **Configurations > BIOS Settings**.
- Text browser — To enable the text browser, use the 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 options on the

System Setup Main Menu screen are described in the following table:

Table 46. System Setup Main Menu

Option	Description
System BIOS	Enables you to configure the BIOS settings.
iDRAC Settings	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 PowerEdge Manuals .

Table 46. System Setup Main Menu (continued)

Option	Description
Device Settings	Enables you to configure device settings for devices such as storage controllers or network cards.
Service Tag Settings	Enables you to configure the System Service Tag.

System BIOS

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

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 47. System Information details

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

Memory Settings

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

Table 48. Memory Settings details

Option	Description
System Memory Size	Specifies the size of the system memory.
System Memory Type	Specifies the type of memory installed in the system.
System Memory Speed	Specifies the speed of the system memory.
Video Memory	Specifies the size video memory.
System Memory Testing	Specifies whether the system memory tests are run during system boot. The two options available are Enabled and Disabled . This option is set to Disabled by default.
Memory Operating Mode	This field selects the memory operating mode. This feature is active only if a valid memory configuration is detected. When Optimizer Mode is enabled, the DRAM controllers operate independently in 64-bit mode and provide optimized memory performance. When Dell Fault Resilient Mode (FRM) is enabled, a percentage of the total installed memory is configured to create a fault resilient zone starting from lowest system memory address for use by select hypervisors for host virtualization

Table 48. Memory Settings details (continued)

Option	Description
	resilience. Specify the FRM percentage by using the Fault Resilient Mode Memory Size[%] feature. When Dell NUMA Fault Resilient Mode (FRM) is enabled, a percentage of the installed memory in every NUMA node is configured to create a fault resilient zone for use by select hypervisors for host virtualization resilience. Specify the FRM percentage by using the Fault Resilient Mode Memory Size[%] feature.
Current State of Memory Operating Mode	Specifies the current state of the memory operating mode.
Fault Resilient Mode Memory Size[%]	Select to define the percent of total memory size that must be used by the fault resilient mode, when selected in the Memory Operating mode. When Fault Resilient Mode is not selected, this option is grayed out and not used by Fault Resilient Mode.
Node Interleaving	Enables or disables the Node interleaving option. Specifies if the Non-Uniform Memory Architecture (NUMA) is supported. If this field is set to Enabled , memory interleaving is supported if a symmetric memory configuration is installed. If the field is set to Disabled , the system supports NUMA (asymmetric) memory configurations. This option is set to Disabled by default.
ADDDC Settings	Enables or disables ADDDC Setting feature. When Adaptive Double DRAM Device Correction (ADDDC) is enabled, failing DRAMs are dynamically mapped out. When set to Enabled it can impact the system performance under certain workloads. This feature is applicable for x4 DIMMs only. This option is set to Enabled by default.
Memory training	<p>When option is set to Fast and memory configuration is not changed, the system uses previously saved memory training parameters to train the memory subsystems and system boot time is also reduced. If memory configuration is changed, the system automatically enables Retrain at Next boot to force one-time full memory training steps, and then go back to Fast afterward.</p> <p>When option is set to Retrain at Next boot, the system performs the force one-time full memory training steps at next power on and boot time is slowed on next boot.</p> <p>When option is set to Enable, the system performs the force full memory training steps on every power on and boot time is slowed on every boot.</p>
DIMM Self Healing (Post Package Repair) on Uncorrectable Memory Error	Enables or disables Post Packing Repair (PPR) on uncorrectable memory error. This option is set to Enabled by default.
Correctable Error Logging	Enables or disables correctable error logging. This option is set to Disabled by default.
Memory Map Out	This option controls DIMMs slots on the system. This option is set to Enabled by default. It allows to disable system installed DIMMs.

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 49. Processor Settings details

Option	Description
Logical Processor	Each processor core supports up to two logical processors. If this option is set to Enabled , the BIOS displays all the logical processors. If this option is set to Disabled , the BIOS displays

Table 49. Processor Settings details (continued)

Option	Description
	only one logical processor per core. This option is set to Enabled by default.
CPU Interconnect Speed	<p>Enables you to govern the frequency of the communication links among the processors in the system.</p> <p>NOTE: The standard and basic bin processors support lower link frequencies.</p> <p>The options available are Maximum data rate, 16 GT/s, 14.4 GT/s, and 12.8 GT/s. This option is set to Maximum data rate by default.</p> <p>Maximum data rate indicates that the BIOS runs the communication links at the maximum frequency supported by the processors. You can also select specific frequencies that the processors support, which can vary.</p> <p>For best performance, you should select Maximum data rate. Any reduction in the communication link frequency affects the performance of non-local memory access and cache coherency traffic. In addition, it can slow access to non-local I/O devices from a particular processor.</p> <p>However, if power saving considerations outweigh performance, reduce the frequency of the processor communication links. Before reducing the frequency, you must localize the memory and I/O access to the nearest NUMA node to minimize the impact to system performance.</p>
Virtualization Technology	Enables or disables the virtualization technology for the processor. This option is set to Enabled by default.
Kernel DMA Protection	This option is set to Disabled by default. When option is set to Enabled , BIOS and Operating System will enable direct memory access protection for DMA capable peripheral devices using virtualization technology.
Directory Mode	Enables or disables the directory mode. This option is set to Enabled by default.
Adjacent Cache Line Prefetch	Optimizes the system for applications that need high utilization of sequential memory access. This option is set to Enabled by default. You can disable this option for applications that need high utilization of random memory access.
Hardware Prefetcher	Enables or disables the hardware prefetcher. This option is set to Enabled by default.
DCU Streamer Prefetcher	Enables or disables the Data Cache Unit (DCU) streamer prefetcher. This option is set to Enabled by default.
DCU IP Prefetcher	Enables or disables the Data Cache Unit (DCU) IP prefetcher. This option is set to Enabled by default.
Sub NUMA Cluster	Enables or disables the Sub NUMA Cluster. This option is set to Disabled by default.
MADT Core Enumeration	Specifies the MADT Core Enumeration. This option is set to default in Round Robin . Linear option supports industry core enumeration whereas, Round Robin option supports Dell optimized core enumeration.
UMA Based Clustering	It is a read-only field and displays as Quadrant , when Sub NUMA Cluster is disabled or displays as Disabled , when Sub NUMA Cluster is either 2-way or 4-way.

Table 49. Processor Settings details (continued)

Option	Description
UPI Prefetch	Enables you to get the memory read started early on DDR bus. The Ultra Path Interconnect (UPI) Rx path spawns the speculative memory that is read to Integrated Memory Controller (iMC) directly. This option is set to Enabled by default.
XPT Prefetch	This option is set to Enabled by default.
LLC Prefetch	Enables or disables the LLC Prefetch on all threads. This option is set to Enabled by default.
Dead Line LLC Alloc	Enables or disables the Dead Line LLC Alloc. This option is set to Enabled by default. You can enable this option to enter the dead lines in LLC or disable the option to not enter the dead lines in LLC.
Directory AtoS	Enables or disables the Directory AtoS. AtoS optimization reduces remote read latencies for repeat read accesses without intervening writes. This option is set to Disabled by default.
AVX P1	Enables you to reconfigure the processor Thermal Design Power (TDP) levels during POST based on the power and thermal delivery capabilities of the system. TDP verifies the maximum heat the cooling system is must dissipate. This option is set to Normal by default. NOTE: This option is only available on certain stock keeping units (SKUs) of the processors.
Dynamic SST-Performance Profile	Enables you to reconfigure the processor using Dynamic or Static Speed Select Technology. This option is set to Disabled by default.
SST-Performance Profile	Enables you to reconfigure the processor using Speed Select Technology.
Intel SST-BF	Enables Intel SST-BF. This option is displayed if Performance Per Watt (operating system) or Custom (when OSPM is enabled) system profiles are selected. This option is set to Disabled by default.
Intel SST-CP	Enables Intel SST-CP. This option is displayed if Performance Per Watt (operating system) or Custom (when OSPM is enabled) system profiles are selected. This option is displayed and selectable for each system profile mode. This option is set to Disabled by default.
x2APIC Mode	Enables or disables x2APIC mode. This option is set to Enabled by default. NOTE: For two processors 64 cores configuration, x2APIC mode is not switchable if 256 threads are enabled (BIOS settings: All CCD, cores, and logical processors enabled).
AVX ICCP Pre-Grant License	Enables or disables AVX ICCP Pre-Grant License. This option is set to Disabled by default.
AVX ICCP Pre-Grant Level	This option is enabled after AVX ICCP Pre-Grant License option is enabled. The AVX ICCP Pre-Grant Level displays the different levels for grant levels.
Dell Controlled Turbo	
Dell Controlled Turbo Setting	This item can be selected for each system profile mode. This option is set to Disabled by default. Controls the turbo engagement. Enable this option only when System Profile is set to Performance or Custom , and CPU Power Management is set to Performance .

Table 49. Processor Settings details (continued)

Option	Description
	<p>i NOTE: Depending on the number of installed processors, there might be up to two processor listings.</p>
Dell AVX Scaling Technology	Enables you to configure the Dell AVX scaling technology. This option is set to 0 by default. Enter the value from 0 to 12 bins. The value that is entered decreases the Dell AVX Scaling Technology frequency when the Dell-controlled Turbo feature is enabled.
Number of Cores per Processor	Controls the number of enabled cores in each processor. This option is set to All by default.
CPU Physical Address Limit	Limit CPU physical address to 46 bits to support older Hyper-V. If enabled, automatically disables TME-MT. This option is set to Enabled by default.
AMP Prefetch	This option enables one of the Mid-Level Cache (MLC) AMP hardware Prefetcher. This option is set to Disabled by default.
Homeless Prefetch	This option allows L1 Data Cache Unit (DCU) to prefetch, when the Fill Buffers (FB) is full. Auto maps to hardware default setting. This option is set to Auto by default.
Uncore Frequency RAPL	This setting controls whether the Running Average Power Limit (RAPL) balancer is enabled or not. If enabled, it activates the uncore power budgeting. This option is set to Enabled by default.
Processor Core Speed	Specifies the maximum core frequency of the processor.
Processor Bus Speed	Specifies the bus speed of the processor. i NOTE: The processor bus speed option displays only when both processors are installed.
Local Machine Check Exception	Enables or disables the local machine check exception. This is an extension of the MCA Recovery mechanism providing the capability to deliver Uncorrected Recoverable (UCR) Software Recoverable Action Required (SRAR) errors to one or more specific logical processors threads receiving previously poisoned or corrupted data. When enabled, the UCR SRAR Machine Check Exception is delivered only to the affected thread rather than broadcast to all threads in the system. The feature supports operating system recovery for cases of multiple recoverable faults that are detected close, which would otherwise result in a fatal machine check event. The feature is available only on Advanced RAS processors. This option is set to Enabled by default.
CPU Crash Log Support	This field controls Intel CPU Crash Log feature for collection of previous crash data from shared SRAM of Out-of-Band Management Service Module at post reset. This option is set to Disabled by default.
PROCESSOR n	<p>i NOTE: Depending on the number of processors, there might be up to n processors listed.</p> <p>The following settings are displayed for each processor:</p>

Table 50. Processor n details

Option	Description
Family-Model-Stepping	Specifies the family, model, and stepping of the processor as defined by Intel.

Table 50. Processor n details (continued)

Option	Description
Brand	Specifies the brand name.
Level 2 Cache	Specifies the total L2 cache.
Level 3 Cache	Specifies the total L3 cache.
Number of Cores	Specifies the number of cores per processor.
Microcode	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 51. SATA Settings details

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

Table 52. Port n

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

NVMe Settings

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.

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

Table 53. NVMe Settings details

Option	Description
NVMe Mode	To enable the NVMe mode, set the Boot Mode to UEFI and set Embedded SATA to RAID Mode. The option is set to Non-RAID mode by default.


Table 53. NVMe Settings details (continued)

Option	Description
BIOS NVMe Driver	Sets the drive type to boot the NVMe driver. The available options are Dell Qualified Drives and All Drives . This option is set to Dell Qualified Drives by default.

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. The **Boot Settings** only support **UEFI** mode.

- **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.

 **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 54. Boot Settings details




Option	Description
Boot Mode	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 UEFI by default.  CAUTION: Switching the boot mode may prevent the system from booting if the operating system is not installed in the same boot mode.  NOTE: Setting this field to UEFI disables the BIOS Boot Settings menu.
Boot Sequence Retry	Enables or disables the Boot sequence retry feature or resets the system. When this option is set to Enabled and the system fails to boot, the system re-attempts the boot sequence after 30 seconds. When this option is set to Reset and the system fails to boot, the system reboots immediately. This option is set to Enabled by default.
Hard-disk Failover	Enables or disables the Hard-disk failover. This option is set to Disabled by default.
Generic USB Boot	Enables or disables the generic USB boot placeholder. This option is set to Disabled by default.
Hard-disk Drive Placeholder	Enables or disables the Hard-disk drive placeholder. This option is set to Disabled by default.
Clean all SysPrep variables and order	When this option is set to None , BIOS will do nothing. When set to Yes , 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 UEFI Boot Mode . This option is set to None by default.
UEFI Boot Settings	Specifies the UEFI boot sequence. Enables or disables UEFI Boot options.  NOTE: This option controls the UEFI boot order. The first option in the list will be attempted first.

Table 55. UEFI Boot Settings

Option	Description
UEFI Boot Sequence	Enables you to change the boot device order.


Table 55. UEFI Boot Settings (continued)

Option	Description
Boot Option Enable/Disable	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 [OS support](#).

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

Table 56. Network Settings details

Option	Description
UEFI PXE Settings	Enables you to control the configuration of the UEFI PXE device.
Number of PXE Devices	This field specifies the number of PXE devices. This option is set to 4 by default.
PXE Devicen (n = 1 to 4)	Enables or disables the device. When enabled, a UEFI PXE boot option is created for the device.
PXE Devicen Settings (n = 1 to 4)	Enables you to control the configuration of the PXE device.

Table 56. Network Settings details (continued)

Option	Description
UEFI HTTP Settings	Enables you to control the configuration of the UEFI HTTP device.
HTTP Device_n (n = 1 to 4)	Enables or disables the device. When enabled, a UEFI HTTP boot option is created for the device.
HTTP Device_n Settings (n = 1 to 4)	Enables you to control the configuration of the HTTP device.
UEFI iSCSI Settings	Enables you to control the configuration of the iSCSI device.
iSCSI Initiator Name	Specifies the name of the iSCSI initiator in IQN format.
iSCSI Device₁	Enables or disables the iSCSI device. When disabled, a UEFI boot option is created for the iSCSI device automatically. This is set to Disabled by default.
iSCSI Device₁ Settings	Enables you to control the configuration of the iSCSI device.
UEFI NVMe-oF Settings	Enables you to control the configuration of the NVMe-oF devices.
NVMe-oF	Enables or disables the NVMe-oF feature. When enabled, it allows to configure the host and target parameters needed for fabric connection. This is set to Disabled by default.
NVMe-oF Host NQN	This field specifies the name of the NVMe-oF host NQN. Allowed input is in the following format: nqn.yyyy-mm.<Reserved Domain Name>:<Unique String>. Leave it empty to use system generated value with following format: nqn.1988-11.com.dell:<Model name>.<Model number>.<Service Tag>.
NVMe-oF Host Id	This field specifies a 16 bytes value of the NVMe-oF host identifier that uniquely identifies this host with the controller in the NVM subsystem. Allowed input is a hexadecimal-encoded string in this format: 00112233-4455-6677-8899-aabbccddeeff. Leave it empty to use system generated value. A value of all FF is not allowed.
Host Security Key Path	This field specifies the Host security key path.
NVMe-oF SubSystem Settings	This field controls the parameters for the NVMe-oF subsystem n connections.

Table 57. PXE Device n Settings details

Option	Description
Interface	Specifies NIC interface used for the PXE device.
Protocol	Specifies Protocol used for PXE device. This option is set to IPv4 or IPv6 . This option is set to IPv4 by default.
VLAN	Enables VLAN for PXE device. This option is set to Enabled or Disabled . This option is set to Disabled by default.
VLAN ID	Shows the VLAN ID for the PXE device
VLAN Priority	Shows the VLAN Priority for the PXE device.

Table 58. HTTP Device n Settings details

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

Table 58. HTTP Device n Settings details (continued)

Option	Description
VLAN Priority	Shows the VLAN Priority for the HTTP device.
DHCP	Enables or disables DHCP for this HTTP device. This option is set to Enabled by default.
IP Address	Specifies IP address for the HTTP device.
Subnet Mask	Specifies subnet mask for the HTTP device.
Gateway	Specifies gateway for the HTTP device.
DNS info via DHCP	Enables or disables DNS Information from DHCP. This option is set to Enabled by default.
Primary DNS	Specifies the primary DNS server IP address for the HTTP Device.
Secondary DNS	Specifies the secondary DNS server IP address for the HTTP Device.
URI (will obtain from DHCP server if not specified)	Obtain URI from the DHCP server if not specified
TLS Authentication Configuration	Specifies the option for TLS authentication configuration.

Table 59. iSCSI Device1 Settings screen details

Option	Description
Connection 1	Enables or disables the iSCSI connection. This option is set to Disabled by default.
Connection 2	Enables or disables the iSCSI connection. This option is set to Disabled by default.
Connection 1 Settings	Enables you to control the configuration for the iSCSI connection.
Connection 2 Settings	Enables you to control the configuration for the iSCSI connection.
Connection Order	Enables you to control the order for which the iSCSI connections will be attempted.

Table 60. Connection 1 Settings details

Option	Description
Interface	Specifies NIC interface used for the HTTP device.
Protocol	Specifies Protocol used for HTTP device. This option is set to IPv4 or IPv6 . This option is set to IPv4 by default.
VLAN	Enables VLAN for HTTP device. This option is set to Enable or Disable . This option is set to Disable by default.
VLAN ID	Shows the VLAN ID for the HTTP device
VLAN Priority	Shows the VLAN Priority for the HTTP device.
Retry Count	Specifies the retry count for Connection 1 Settings. This option is set to 3 by default.
Timeout	Specifies the time out for Connection 1 Settings. This option is set to 10000 by default.
DHCP	Enables and disables the DHCP for Connection 1 Settings. This option is set to Disabled by default.
Initiator IP Address	Specifies the Initiator IP Address for Connection 1 Settings.
Initiator Subnet Mask	Specifies the Initiator Subnet Mask for Connection 1 Settings.
Initiator Gateway	Specifies the Initiator Gateway for Connection 1 Settings.
Target info via DHCP	Enables and disables the Target DHCP for this iSCSI connection. This option is set to Disabled by default.
Target Name	Shows the Target name for this iSCSI connection in IQN format.

Table 60. Connection 1 Settings details (continued)

Option	Description
Target IP Address	Shows the Target IP Address for this iSCSI connection.
Target Port	Shows the Target Port for this iSCSI connection. The standard port number for iSCSI connections is 3260.
Target Boot Lun	Shows the Target LUN for this iSCSI connection. The value format is a string containing a hexadecimal-encoded representation of the 64-bit SCSI Logical Unit Number in the format description in the T10 SCSI Architecture Model specification.
ISID	Enables ISID (Initiator Session ID) to use for this iSCSI connection. The value is 6 hexadecimal numbers - such as 3ABBCCDDEEFF or 000000000000.
Authentication Type	Specifies the authentication type for this iSCSI device connection. This option is set to None by default.
CHAP Type	Shows the CHAP type for this iSCSI connection. This option is set to One Way by default.
CHAP Name	Shows the CHAP name for this iSCSI connection.
CHAP Secret	Shows the CHAP secret for this iSCSI connection.
Reverse CHAP Name	Shows the Reverse CHAP name for this iSCSI connection.
Reverse CHAP Secret	Shows the Reverse CHAP secret for this iSCSI connection.

Table 61. TLS Authentication Configuration screen details

Option	Description
TLS Authentication Mode	View or modify the device's boot TLS Authentication Mode. This option is set to One Way by default. None means the HTTP server and the client will not authenticate each other for this boot.
Root Certificate Configuration	Import, delete, or export the root certificate.

Table 62. NVMe-oF SubSystem Settings screen details

Option	Description
NVMe-oF SubSystemn (n = 1 to 4)	Enables or disables NVMe-oF SubSystem. This option is set to Disabled by default.
NVMe-oF SubSystemn Settings (n = 1 to 4)	Enables you to control the configuration of the NVMe-oF SubSystem, if Enabled .

Table 63. NVMe-oF SubSystem n Settings

Option	Description
Interface	NIC interface used for NVMe-oF connections. This option is set to Embedded NIC 1 Port 1 Partition 1 by default.
Transport Type	This field sets the value of transport type for NVMe-oF connection. This option is set to TCP by default.
Protocol	This field sets the value of protocol type for NVMe-oF connection. This option is set to IPv4 by default.
VLAN	Enables or disables VLAN for this NVMe-oF connections. This option is set to Disabled by default.
VLAN ID	Specifies the VLAN Id for this NVMe-oF connection. This option is set to 1 by default.
VLAN Priority	Specifies the VLAN priority for this NVMe-oF connection. This option is set to 0 by default.
Retry Count	Specifies the retry count for this NVMe-oF connection. This option is set to 3 by default.

Table 63. NVMe-oF SubSystem n Settings (continued)

Option	Description
Timeout	Specifies the time out for this NVMe-oF connection. This option is set to 10000 by default.
DHCP	Enables and disables the DHCP for this NVMe-oF connection. This option is set to Disabled by default.
Host IP Address	Specifies the Host IP Address for this NVMe-oF connection.
Host Subnet Mask	Specifies the Host Subnet Mask for this NVMe-oF connection.
Host Gateway	Specifies the Host Gateway for this NVMe-oF connection.
NVMe-oF subsystem info via DHCP	Enables and disables the NVMe-oF subsystem's DHCP for this connection. This option is set to Disabled by default.
NVMe-oF subsystem NQN	Specifies the NVMe-oF subsystem's NQN for this connection.
NVMe-oF subsystem Address	Specifies the NVMe-oF subsystem's IP address for this connection.
NVMe-oF subsystem Port	Specifies the NVMe-oF subsystem's port for this connection. This option is set to 4420 by default.
NVMe-oF subsystem NID	Specifies the NamespaceID (NID) for this NVMe-oF connection.
NVMe-oF subsystem Controller ID	Specifies the NVMe-oF subsystem's Controller ID for this connection. This option is set to 0 by default.
Security	Enables or disables the security option for this NVMe-oF connection. This option is set to Disabled by default.
Authentication Type	Specifies the authentication type for this NVMe-oF connection. This option is set to None by default.
SecurityKeyPath	Specifies the Securitykeypath for this NVMe-oF connection.

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 64. Integrated Devices details

Option	Description
User Accessible USB Ports	<p>Configures the user accessible USB ports. Selecting Only Back Ports On disables the front USB ports; selecting All Ports Off disables all front and back USB ports.; selecting All Ports Off (Dynamic) disables all front and back USB ports during POST. and front ports can be enabled or disabled dynamically by authorized user without resetting the system. This option is set to All Ports On by default.</p> <p>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.</p>
Internal USB Port	Enables or disables the internal USB port. This option is set to On or Off . This option is set to On by default.
iDRAC Direct USB Port	The iDRAC Direct USB port is managed by iDRAC exclusively with no host visibility. This option is set to ON or OFF . When set to OFF , iDRAC does not detect any USB devices installed in this managed port. This option is set to On by default.
Integrated Network Card 1	Enables or disables the integrated network card. When this option is set to Enabled , the card is not available to the operating system. This option is set to On by default.

Table 64. Integrated Devices details (continued)

Option	Description
	<p>i NOTE: If set to Disabled (operating system), the Integrated NICs might still be available for shared network access by iDRAC.</p>
Embedded NIC1 and NIC2	<p>Enables or disables the OS interface of the Embedded NIC1 and NIC2 controller. If set to Disabled (OS), the NIC may still be available for shared network access by the embedded management controller. Configure the Embedded NIC1 and NIC2 option by using the NIC management utilities of the system. This option is set to Enabled by default.</p>
I/OAT DMA Engine	<p>Enables or disables the I/O Acceleration Technology (I/OAT) option. I/OAT is a set of DMA features designed to accelerate network traffic and lower CPU utilization. Enable only if the hardware and software support the feature. This option is set to Disabled by default.</p>
Embedded Video Controller	<p>Enables or disables the use of Embedded Video Controller as the primary display. When set to Enabled, the Embedded Video Controller will be the primary display even if add-in graphic cards are installed. When set to Disabled, an add-in graphics card is used as the primary display. BIOS will output displays to both the primary add-in video and the embedded video during POST and preboot environment. The embedded video will then be disabled right before the operating system boots. This option is set to Enabled by default.</p> <p>i NOTE: When there are multiple add-in graphic cards installed in the system, the first card discovered during PCI enumeration is selected as the primary video. You might have to rearrange the cards in the slots in order to control which card is the primary video.</p>
I/O Snoop HoldOff Response	<p>Selects the number of cycles PCI I/O can withhold snoop requests, from the CPU, to allow time to complete its own write to LLC. This setting can help improve performance on workloads where throughput and latency are critical. The options available are 256 Cycles, 512 Cycles, 1K Cycles, 2K Cycles, 4K Cycles, 8K Cycles, 16K Cycles, 32K Cycles, 64K Cycles and 128K Cycles. This option is set to 2K Cycles by default.</p>
Current State of Embedded Video Controller	<p>Displays the current state of the embedded video controller. The Current State of Embedded Video Controller option is a read-only field. If the Embedded Video Controller is the only display capability in the system (that is, no add-in graphics card is installed), then the Embedded Video Controller is automatically used as the primary display even if the Embedded Video Controller setting is set to Disabled.</p>
SR-IOV Global Enable	<p>Enables or disables the BIOS configuration of Single Root I/O Virtualization (SR-IOV) devices. This option is set to Disabled by default.</p>
OS Watchdog Timer	<p>If your system stops responding, this watchdog timer aids in the recovery of your operating system. When this option is set to Enabled, the operating system initializes the timer. When this option is set to Disabled (the default), the timer does not have any effect on the system.</p>
Empty Slot Unhide	<p>Enables or disables the root ports of all the empty slots that are accessible to the BIOS and operating system. This option is set to Disabled by default.</p>
Slot Disablement	<p>Enables or disables or boot driver 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. When this option is set to boot driver disabled, both the Option ROM and UEFI driver from the slot will not run during POST. The system will not boot from the card and its pre-boot services will not be available. However, the card is available to the operating system.</p>

Table 64. Integrated Devices details (continued)

Option	Description
	Slot n: Enables or disables or only the boot driver is disabled for the PCIe slot n. This option is set to Enabled by default.
Slot Bifurcation	<p>Auto Discovery Bifurcation Settings allows Platform Default Bifurcation, Auto Discovery of Bifurcation, and Manual bifurcation Control.</p> <p>This option is set to Platform Default Bifurcation by default. The slot bifurcation field is accessible when set to Manual bifurcation Control and is grayed out when set to Platform Default Bifurcation and Auto Discovery of Bifurcation.</p> <p>NOTE: The slot bifurcation supports on PCIe slot only, does not support slot type from Paddle card to Riser and Slimline connector to Riser.</p>

Serial Communication

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

NOTE: The serial port is optional for the PowerEdge R660xs system. The Serial Communication option is applicable only if the serial COM port is installed in the system.

Table 65. Serial Communication details

Option	Description
Serial Communication	<p>Enables the serial communication options. 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.</p> <p>The options available for System without serial COM port (DB9) are On without Console Redirection, On with Console Redirection, Off, Auto. This option is set to Auto by default.</p>
Serial Port Address	<p>Enables you to set the port address for serial devices. This option is set to either COM1 or COM2 for the serial device (COM1=0x3F8,COM2=0x2F8) and set to COM1 by default.</p> <p>NOTE: You can use only Serial Device 2 for the Serial Over LAN (SOL) feature. To use console redirection by SOL, configure the same port address for console redirection and the serial device.</p> <p>NOTE: 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 BIOS setup utility may not always revert the serial MUX setting to the default setting of Serial Device 1.</p>
External Serial Connector	<p>Enables you to associate the External Serial Connector to Serial Device 1, Serial Device 2, or the Remote Access Device by using this option. This option is set to Serial Device 1 by default.</p> <p>NOTE: Only Serial Device 2 can be used for Serial Over LAN (SOL). To use console redirection by SOL, configure the same port address for console redirection and the serial device.</p> <p>NOTE: Every time the system boots, the BIOS syncs the serial MUX setting saved in iDRAC. The serial MUX setting can independently be changed in iDRAC. Loading the BIOS default settings from within the BIOS setup utility may not always revert this setting to the default setting of Serial Device 1.</p>

Table 65. Serial Communication details (continued)

Option	Description
Failsafe Baud Rate	Specifies the failsafe baud rate for console redirection. The BIOS attempts to determine the baud rate automatically. This failsafe baud rate is used only if the attempt fails, and the value must not be changed. This option is set to 115200 by default.
Remote Terminal Type	Sets the remote console terminal type. This option is set to VT100/VT220 by default.
Redirection After Boot	Enables or disables the BIOS console redirection when the operating system is loaded. This option is set to Enabled by default.

System Profile Settings

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 66. System Profile Settings details

Option	Description
System Profile	Sets the system profile. If you set the System Profile option to a mode other than Performance Per Watt (DAPC) , the BIOS automatically sets the rest of the options. You can only change the rest of the options if the mode is set to Custom . This option is set to Performance Per Watt (DAPC) by default. Other options include Custom, Performance, Performance Per Watt (OS) and Workstation Performance .  NOTE: All the parameters on the system profile setting screen are available only when the System Profile option is set to Custom .
CPU Power Management	Sets the CPU power management. This option is set to System DBPM (DAPC) by default. Other option includes Maximum Performance, OS DBPM .
Memory Frequency	Sets the speed of the system memory. You can select Maximum Performance, Maximum Reliability or a specific speed. This option is set to Maximum Performance by default.
Turbo Boost	Enables or disables the processor to operate in the turbo boost mode. This option is set to Enabled by default.
Energy Efficient Turbo	Energy Efficient Turbo (EET) is a mode of operation where a processor's core frequency is adjusted within the turbo range based on workload. This option is set to Enabled by default.
C1E	Enables or disables the processor to switch to a minimum performance state when it is idle. This option is set to Enabled by default.
C-States	Enables or disables the processor to operate in all available power states. C States allow the processor to enter lower power states when idle. When set to Enabled (OS controlled) or when set to Autonomous (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 Enabled by default.
Memory Patrol Scrub	Sets the memory patrol scrub mode. This option is set to Standard by default.
Memory Refresh Rate	Sets the memory refresh rate to either 1x or 2x. This option is set to 1x by default.
Uncore Frequency	Enables you to select the Uncore Frequency option. Dynamic mode enables the processor to optimize power resources across cores and uncores during runtime. The optimization of the uncore frequency to either save power or optimize performance is influenced by the setting of the Energy Efficiency Policy option.
Energy Efficient Policy	Enables you to select the Energy Efficient Policy option. The CPU uses the setting to manipulate the internal behavior of the processor and determines whether to target higher performance or better power savings. This option is set to Balanced Performance by default.

Table 66. System Profile Settings details (continued)

Option	Description
Monitor/Mwait	Enables the Monitor/Mwait instructions in the processor. This option is set to Enabled for all system profiles, except Custom by default. <i>i</i> NOTE: This option can be disabled when System Profile is set to Custom . <i>i</i> NOTE: When C States is set to Enabled in the Custom mode, changing the Monitor/Mwait setting does not impact the system power or performance.
Workload Profile	This option allows the user to specify the targeted workload of a server. It allows optimization of performance based on the workload type. This option is set to Not Configured by default.
CPU Interconnect Bus Link Power Management	Enables or disables the CPU Interconnect Bus Link Power Management. This option is set to Enabled by default.
PCI ASPM L1 Link Power Management	Enables or disables the PCI ASPM L1 Link Power Management . This option is set to Enabled 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 67. System Security details

Option	Description
CPU AES-NI	Improves the speed of applications by performing encryption and decryption by using the Advanced Encryption Standard Instruction Set (AES-NI). This option is set to Enabled by default.
System Password	Sets the system password. This option is set to Enabled by default and is read-only if the password jumper is not installed in the system.
Setup Password	Sets the setup password. This option is read-only if the password jumper is not installed in the system.
Password Status	Locks the system password. This option is set to Unlocked by default.
TPM Information	Indicates the type of Trusted Platform Module, if present.
CPU TDX/IFS features	This option is disabled by default.

Table 68. TPM 2.0 security information

Option	Description
TPM Information	
TPM Security	<i>i</i> NOTE: The TPM menu is available only when the TPM module is installed. Enables you to control the reporting mode of the TPM. 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. The TPM Security option is set to Off by default.
	When TPM 2.0 is installed, the TPM Security option is set to On or Off . This option is set to Off by default.
TPM Information	Indicates the type of Trusted Platform Module, if present.
TPM Firmware	Indicates the firmware version of the TPM.
TPM Hierarchy	Enables, disables, or clears the storage and endorsement hierarchies. When set to Enabled , the storage and endorsement hierarchies can be used.

Table 68. TPM 2.0 security information (continued)

Option	Description	
	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 .	
TPM Advanced Settings	Specifies TPM Advanced Settings details.	
	TPM PPI Bypass Provision	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
	TPM PPI Bypass Clear	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.
	TPM Algorithm Selection	Allows to choose between the TPM encryption standards SHA1 and SHA256

Table 69. System Security details

Option	Description
Intel(R) TXT	Enables you to set the Intel Trusted Execution Technology (TXT) option. To enable the Intel TXT option, virtualization technology and TPM Security must be enabled with Pre-boot measurements. This option is set to Off by default. It is set On for Secure Launch (Firmware Protection) support on Windows 2022.
Memory Encryption	Enables or disables the Intel Total Memory Encryption (TME) and Multi-Tenant (Intel® TME-MT). When option is set to Disabled , BIOS disables both TME and MK-TME technology. When option is set to Single Key BIOS enables the TME technology. When option is set to Multiple Keys , BIOS enables the TME-MT technology. This option is set to Disabled by default.
TME Encryption Bypass	Allows the option to bypass the Intel Total Memory Encryption. This option is set to Disabled by default.
Intel(R) SGX	Enables you to set the Intel Software Guard Extension (SGX) option. To enable the Intel SGX option, processor must be SGX capable, memory population must be compatible (minimum x8 identical DIMM1 to DIMM8 per CPU socket, not support on persistent memory configuration), memory operating mode must be set at optimizer mode, memory encryption must be enabled and node interleaving must be disabled. This option is set to Off by default. When this option is to Off , BIOS disables the SGX technology. When this option is to On , BIOS enables the SGX technology.
SGX Package Info In-Band Access	Enables you to access the Intel Software Guard Extension (SGX) package info in-band option. This option is set to Off by default.
PPMRR Size	Sets the PPMRR size.
SGX QoS	Enables or disables the SGX quality of service.
Select Owner EPOCH input type	Enables you to select Change to New random Owner EPOCHs or Manual User Defined Owner EPOCHs . Each EPOCH is 64-bit. After generating a new EPOCH by selecting Change to New random Owner EPOCHs , the selection reverts back to Manual User Defined Owner EPOCHs .
	Software Guard Extensions Epoch n: Sets the Software Guard Extensions Epoch values.
Enable writes to SGXLEPUBKEYHASH[3:0] from OS/SW	Enables or disables the Enable writes to SGXLEPUBKEYHASH[3:0] from OS/SW.
	SGX LE Public Key Hash0: Sets the bytes from 0-7 for SGX Launch Enclave Public Key Hash.
	SGX LE Public Key Hash1: Sets the bytes from 8-15 for SGX Launch Enclave Public Key Hash.


Table 69. System Security details (continued)

Option	Description
	<p>SGX LE Public Key Hash2: Sets the bytes from 16-23 for SGX Launch Enclave Public Key Hash.</p> <p>SGX LE Public Key Hash3: Sets the bytes from 24-31 for SGX Launch Enclave Public Key Hash.</p>
Enable/Disable SGX Auto MP Registration Agent	Enables or disables the SGX Auto MP Registration. The MP registration agent is responsible to register the platform.
SGX Factory Reset	Enables you to reset the SGX option to factory settings. This option is set to Off by default.
Power Button	Enables or disables the power button on the front of the system. This option is set to Enabled/Disabled by default.
AC Power Recovery	<p>Sets how the system behaves after AC power is restored to the system. This option is set to Last by default.</p> <p>NOTE: The host system will not power on up until iDRAC Root of Trust (RoT) is completed, host power on will be delayed by minimum 90 seconds after the AC applied.</p>
AC Power Recovery Delay	Sets the time delay for the system to power up after AC power is restored to the system. This option is set to Immediate by default. When this option is set to Immediate , there is no delay for power up. When this option is set to Random , the system creates a random delay for power up. When this option is set to User Defined , the system delay time is manually to power up.
User Defined Delay (120s to 600s)	Sets the User Defined Delay option when the User Defined option for AC Power Recovery Delay is selected. The actual AC recovery time needs to add iDRAC root of trust time (around 50 seconds).
UEFI Variable Access	Provides varying degrees of securing UEFI variables. When set to Standard (the default), UEFI variables are accessible in the operating system per the UEFI specification. When set to Controlled , selected UEFI variables are protected in the environment and new UEFI boot entries are forced to be at the end of the current boot order.
In-Band Manageability Interface	<p>When set to Disabled, this setting hides the Management Engine's (ME), HECI devices, and the system's IPMI devices from the operating system. This prevents the operating system from changing the ME power capping settings, and blocks access to all in-band management tools. All management should be managed through out-of-band. This option is set to Enabled by default.</p> <p>NOTE: BIOS update requires HECI devices to be operational, and DUP updates require IPMI interface to be operational. This setting needs to be set to Enabled to avoid updating errors.</p>
SMM Security Mitigation	Enables or disables the UEFI SMM security migration protections. It is enabled for Windows 2022 support.
Secure Boot	Enables Secure Boot, where the BIOS authenticates each pre-boot image by using the certificates in the Secure Boot Policy. Secure Boot is set to Disabled by default.
Secure Boot Policy	When Secure Boot policy is set to Standard , the BIOS uses the system manufacturer's key and certificates to authenticate pre-boot images. When the Secure Boot policy is set to Custom , the BIOS uses the user-defined key and certificates. The secure Boot policy is set to Standard by default.
Secure Boot Mode	<p>Configures how the BIOS uses the Secure Boot Policy Objects (PK, KEK, db, dbx).</p> <p>If the current mode is set to Deployed Mode, the available options are User Mode and Deployed Mode. If the current mode is set to User Mode, the available options are User Mode, Audit Mode, and Deployed Mode</p> <p>Below are the details of different boot modes available in the Secure Boot Mode option.</p>

Table 69. System Security details (continued)

Option	Description
	<p>User Mode In User Mode, PK must be installed, and BIOS performs signature verification on programmatic attempts to update policy objects. The BIOS allows unauthenticated programmatic transitions between modes.</p> <p>Audit mode In Audit Mode, PK is not present. BIOS does not authenticate programmatic update 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. Audit Mode is useful for programmatic determination of a working set of policy objects.</p> <p>Deployed Mode Deployed Mode is the most secure mode. In Deployed Mode, PK must be installed and the BIOS performs signature verification on programmatic attempts to update policy objects. Deployed Mode restricts the programmatic mode transitions.</p>
Secure Boot Policy Summary	<p>Specifies the list of certificates and hashes that secure boot uses to authenticate images.</p> <ul style="list-style-type: none"> ● Platform Key (PK): Shows the Type, Issuer, Subject, Signature Owner GUID details. ● Key Exchange Key (KEK) Database Entries: Shows the Type, Issuer, Subject, Signature Owner GUID details. ● Authorized Signature Database (db) Entries: Shows the Type, Issuer, Subject, Signature Owner GUID details. ● Forbidden Signature Database (dbx) Entries: Shows the number of entries in the database.
Secure Boot Custom Policy Settings	<p>Configures the Secure Boot Custom Policy. To enable this option, set the Secure Boot Policy to Custom option. Below are the list of options available for Secure Boot Custom Policy Settings screen:</p> <p>Platform Key (PK) : Shows the Type, Issuer, Subject, Signature Owner GUID details.</p> <p>Key Exchange Key Database (KEK) : Shows the Type, Issuer, Subject, Signature Owner GUID details.</p> <p>Authorized Signature Database (db) : Shows the Type, Issuer, Subject, Signature Owner GUID details.</p> <p>Forbidden Signature Database (dbx) : Shows the number of entries in the database.</p> <p>Delete All Policy Entries (PK, KEK, db, and dbx) : Enables to delete the PK, KEK, db and dbx details.</p> <p>Restore Default Policy Entries (PK, KEK, db, and dbx) : Enables to restore the PK, KEK, db and dbx details.</p> <p>Export Firmware Hash Values .</p>


Table 69. System Security details (continued)

Option	Description
Intel Trust Domain Extension(TDX)	Intel Trust Domain Extension (TDX) is a hardware-based trusted execution environment. It is designed to protect sensitive data and applications in Trust Domain(TD) or Virtual Machine(VM) from unauthorized access. Memory Encryption must be set to Multiple Keys for TDX to be enabled. TDX is set to Disabled by default.  NOTE: To enable the TDX option, processor must be TDX capable, memory population must be compatible as SGX setting (minimum x8 identical DIMM1 to DIMM8 per CPU socket, not support on persistent memory configuration)
TME-MT/TDX Key Spilt to non-zero value	When the TME-MT/TDX Key Spilt to non-zero value is set to 1, 2, 3, 4, 5, or 6, it designates the number of bits for TDX usage, while the rest will be used by TME-MT. It is set to 1 by default.
TDX Secure Arbitration Mode Loader(SEAM)	This SW module runs in a new CPU Secure Arbitration Mode (SEAM) as peer virtual machine manager (VMM). This SEAM module supports TD entry and exit using the existing virtualization infrastructure. It is set to Disabled by default.
Intel(R) In-Field Scan	The Intel(R) In-field Scan feature allows software to scan processor cores for latent faults. The scan can be performed in the field after the server is deployed. When Enabled , the BIOS configures all processors to respond to software scan requests. When this setting is Disabled , the processors will not respond to software scan requests. It is set to Disabled by default.

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 section.

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

Steps

1. To enter System Setup, press F2 immediately after turning on or rebooting your system.
2. On the **System Setup Main Menu** screen, click **System BIOS > System Security**.
3. On the **System Security** screen, verify that **Password Status** is set to **Unlocked**.
4. In the **System Password** field, type your system password, and press Enter or Tab.
Use the following guidelines to assign the system password:
 - A password can have up to 32 characters.
 A message prompts you to reenter the system password.
5. Reenter the system password, and click **OK**.
6. In the **Setup Password** field, type your setup password and press Enter or Tab.
A message prompts you to reenter the setup password.
7. Reenter the setup password, and click **OK**.
8. Press Esc to return to the System BIOS screen. Press Esc again.
A message prompts you to save the changes.

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

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.
```

Even after you power 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 70. Redundant OS Control details

Option	Description
Redundant OS Location	Enables you to select a backup disk from the following devices:
Redundant OS State	<p> NOTE: This option is disabled if Redundant OS Location is set to None.</p> <p>When set to Visible, the backup disk is visible to the boot list and OS. When set to Hidden, the backup disk is disabled and is not visible to the boot list and OS. This option is set to Visible by default.</p> <p> NOTE: BIOS disables the device in hardware, so it is not accessed by the OS.</p>
Redundant OS Boot	<p> NOTE: This option is disabled if Redundant OS Location is set to None or if Redundant OS State is set to Hidden.</p> <p>When set to Enabled, BIOS boots to the device specified in Redundant OS Location. When set to Disabled, BIOS preserves the current boot list settings. This option is set to Disabled 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 71. Miscellaneous Settings details

Option	Description
System Time	Enables you to set the time on the system.
System Date	Enables you to set the date on the system.
Time Zone	Enables you to select required Time Zone.
Daylight Savings Time	Enables or disables Daylight Savings Time. This option is set to Disabled by default.
Asset Tag	Specifies the asset tag and enables you to modify it for security and tracking purposes.
Keyboard NumLock	Enables you to set whether the system boots with the NumLock enabled or disabled. This option is set to On by default.  NOTE: This option does not apply to 84-key keyboards.
F1/F2 Prompt on Error	Enables or disables the F1/F2 prompt on error. This option is set to Enabled by default. The F1/F2 prompt also includes keyboard errors.
Load Legacy Video Option ROM	This option determines whether the system BIOS will load legacy video (INT 10h) option ROM from the video controller. This option is set to Disabled by default.  NOTE: This option cannot be set to Enabled, when the Boot mode is UEFI and Secure Boot is enabled.
Dell Wyse P25/P45 BIOS Access	Enables or disables the Dell Wyse P25/P45 BIOS Access. This option is set to Enabled by default.
Power Cycle Request	Enables or disables the Power Cycle Request. This option is set to None by default.

iDRAC Settings

The iDRAC settings 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.

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

For more information about using iDRAC, see *Dell Integrated Dell Remote Access Controller User's Guide* at [iDRAC Manuals](#).

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 [iDRAC Manuals](#).

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 72. Boot Manager details

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

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 power supply unit
- System board
- One processor in socket processor 1
- One memory module (DIMM) installed in the socket A1

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 73. 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/HBA, adapter PERC/HBA
		Missing element or cable is reported in HWC8010 error logs. Install the missing element (cable, risers, etc).	Config Missing : SL cable PLANAR_SL8 and CTRL_DST_PA1

Table 73. Configuration validation error (continued)

Error	Description	Possible cause and recommendations	Example
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 74. 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 (fPERClike 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"> 1. Disconnect the input power. 2. Check for proper cable connection and component placement. If the issue persists, contact the service provider.
Category	System Health (HWC = Hardware Config)
Severity	Critical
Trap/EventID	2329

Table 75. 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 (fPERClike 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"> 1. Disconnect the input power. 2. Check for proper cable connection and component placement. If the issue persists, contact the service provider.
Category	System Health (HWC = Hardware Config)
Severity	Critical