

Dell PowerEdge R670 CSP Edition

Technical Guide

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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PowerEdge R670 CSP Edition system configurations and features

The PowerEdge R670 CSP Edition system is a 1U server that supports:

- Two Intel Xeon 6 Processors with up to 144 cores
- 32 DIMM slots
- Two AC or DC power supply units
- Up to 8 x EDSFF E3.S NVMe drives.

NOTE: For more information about how to hot swap NVMe PCIe SSD device, see the *Dell Express Flash NVMe PCIe SSD User's Guide* at [Dell Support](#) page > **Browse all products > Infrastructure > Data Center Infrastructure > Storage Adapters & Controllers > Dell PowerEdge Express Flash NVMe PCIe SSD > Select This Product > Documentation > Manuals and Documents.**

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:

- [Key workloads](#)
- [New technologies](#)

Key workloads

The Dell PowerEdge R670 CSP Edition offers powerful performance in a purpose-built, cyber resilient, mainstream server. Ideal for:

- Max virtualization, Hyper converged, and Cloud Native
- Big Data & Analytics
- Software Defined Storage
- GPU support

New technologies

Table 1. New technologies

Technology	Detailed Description
Intel Xeon 6 Processors	Core count: Up to 144 core processor
	UPI speed: 16 GT/s, 20 GT/s, 24 GT/s
	Maximum number of PCIe lanes per CPU: Integrated 88 PCIe 5.0 lanes
	Speeds up to 2.4 GHz
	Maximum TDP: 330 W
6400 MT/s DDR5 Memory	Max 16 DIMMs per processor and 32 DIMMs per system
	Supports RDIMM, DDR5 with ECC up to 6400 MT/s
PCIe Gen	Gen5 @32 GT/s

Table 1. New technologies (continued)

Technology	Detailed Description
PCIe Slot	Up to 2 slots on the front (for front I/O configuration) or 2 slots on the rear (for Rear I/O configuration)
Flex I/O	OCP NIC card 3.0 : 2 slots on the front (for front I/O configuration) or 2 slots on the rear (for Rear I/O configuration)
	Rear I/O with: <ul style="list-style-type: none"> ● 1 x Dedicated BMC Ethernet port ● 2 x USB 3.1 ● 1 x VGA
	Serial Port Option for front I/O configuration
	Front I/O with: <ul style="list-style-type: none"> ● 1 x USB 2.0 Type C port ● 1 x USB 2.0 (optional) ● 1 x Mini-DisplayPort (optional) ● 1 x DB9 Serial (with front I/O configuration) ● 1 x Dedicated BMC Ethernet port (with front I/O configuration)
Data Center Secured Control Module (DC-SCM)	For BMC/FPGA/BIOS & RJ-45 dedicated for BMC
PESTI	Half-duplex protocol between MCU and CPLD, like 1wire for Cordoba protocol
Dedicated PERC	N/A
Software RAID	N/A
Power Supplies	60 mm dimension is the new PSU form factor on a 17G design
	Titanium 1500 W AC/HVDC
	Platinum 1100 W AC/HVDC
	Platinum 800 W AC/HVDC

Product comparison

Table 2. Comparison of PowerEdge R670 CSP Edition and R660




Feature	PowerEdge R670 CSP Edition	PowerEdge R660
Processor	Two Intel Xeon 6 processors, with up to 144 cores per processor	<ul style="list-style-type: none"> Two 4th Generation Intel® Xeon® Scalable or Intel® Xeon® Max Processors Two 5th Generation Intel® Xeon® Scalable Processors
Chipset	N/A	Intel C620 series chipset
Accelerators	Up to two single width 75 W accelerators	Up to three single width 3 75 W accelerators
Memory		
DIMM speed	Up to 6400 MT/s	Up to 5600 MT/s
Memory type	RDIMM	RDIMM
Memory module slots	32 DDR5 DIMM slots	32 DDR5 DIMM slots
	 NOTE: Supports registered ECC DDR5 DIMMs only.	 NOTE: Supports registered ECC DDR5 DIMMs only.
Storage		
Front bays	Up to 8 x EDSFF E3.S NVMe(SSD)	<ul style="list-style-type: none"> Up to 8 x 2.5-inch NVMe SSD max 122.88 TB Up to 10 x 2.5-inch SAS/SATA/ NVMe (HDD/SSD) max 153.6 TB Up to 14 x EDSFF E3.S (NVMe Gen5) max 179.2 TB Up to 16 x EDSFF E3.S (NVMe Gen5) max 204.8 TB
Rear bays	N/A	<ul style="list-style-type: none"> Up to 2 x 2.5-inch SAS4/SATA (HDD/SSD) max 30.72 TB Up to 2 x EDSFF E3.S (NVMe Gen5) max 25.6 TB
Storage controllers		
Internal controllers	N/A	<ul style="list-style-type: none"> PERC H965i, PERC H755, PERC H755N, PERC H355, HBA355i
External controllers	N/A	<ul style="list-style-type: none"> HBA355e,PERC H965e, PERC H965i
Software RAID	N/A	S160
Internal boot	Boot Optimized Storage Subsystem (BOSS-N1 Flatbread): HWRAID 1, 2 x M.2 NVMe SSDs 480 GB or 960GB	Boot Optimized Storage Subsystem (BOSS-N1): HW RAID 1, 2 x M.2 NVMe SSDs 480 GB or 960GB
	Internal USB	Internal USB
System management	Open Server Manager	iDRAC with Lifecycle Controller, Quick Sync 2.0, iDRAC Direct, OpenManage Enterprise

Table 2. Comparison of PowerEdge R670 CSP Edition and R660 (continued)

Feature	PowerEdge R670 CSP Edition	PowerEdge R660
Power supply	<ul style="list-style-type: none"> • 1500 W Titanium 100—240 VAC or 240 VDC • 1100 W Platinum 100—240 VAC or 240 VDC • 800 W Platinum 100—240 VAC or 240 VDC 	<ul style="list-style-type: none"> • 1800 W Titanium 200-240 HLAC or 240 HVDC • 1400 W Platinum 100-240 VAC or 240 HVDC • 1100 W Titanium 100-240 VAC or 240 HVDC • 1100 W -48 - -60 VDC • 800 W Platinum 100-240 VAC or 240 HVDC • 700 W Titanium 200-240 HLAC or 240 HVDC • 800 W -48- -60 VDC • 1400 277 VAC or 336 HVDC Hot swap PSUs with full redundancy.
Ports		
Network options	OCP NIC card 3.0 : 2 slots on the front or 2 slots on the rear	2 x 1GbE LOM card (optional) 1 x OCP card 3.0 (optional) ⓘ NOTE: The system allows either LOM card or OCP card or both to be installed in the system.
Front ports	1 x USB 2.0 Type C port (supports Host mode)	1 x Dedicated iDRAC Direct micro-USB
	1 x USB 2.0 (optional)	1 x USB 2.0
	1 x Mini-DisplayPort (optional)	1 x VGA
	1 x DB9 Serial (with front I/O configuration)	
	1 x Dedicated BMC Ethernet port (with front I/O configuration)	
Rear ports	1 x Dedicated BMC Ethernet port	1 x USB 2.0
	1 x VGA	1 x Serial port (optional)
	2 x USB 3.1	1 x USB 3.0
		1 x Dedicated iDRAC Ethernet port
		1 x VGA (optional for liquid cooling configuration)
Internal ports	1 x USB 3.1 (optional)	1 x USB 3.0 (optional)
Slots		
PCIe	Up to 2x16 Gen5 PCIe slots	Up to three PCIe slots <ul style="list-style-type: none"> • 2 x PCIe Gen5 slots • 3 x PCIe Gen4 slots
Form factor	1U rack server	1U rack server
Dimensions and weight		
Height	42.8 mm (1.69 inches)	42.8 mm (1.69 inches)
Width	482 mm (18.98 inches)	482 mm (18.98 inches)
Depth	For cold aisle (front I/O configuration): 829.44 mm (32.66 inches) without bezel	822.88 mm (32.39 inches) with bezel

Table 2. Comparison of PowerEdge R670 CSP Edition and R660 (continued)

Feature	PowerEdge R670 CSP Edition	PowerEdge R660
	 NOTE: The front I/O configuration does not support the bezel.	
	For hot aisle (rear I/O configuration): 817.94 mm (32.20 inches) with bezel 815.14 mm (32.09 inches) without bezel	809.04 mm (31.85 inches) without bezel
Weight	20.42 Kg (45.02 pounds)	22.51 Kg (49.62 pounds)

Chassis views and features

Topics:

- System configurations - front view for PowerEdge R670 CSP Edition system
- System configurations - rear view for PowerEdge R670 CSP Edition system
- System configurations - inside view for PowerEdge R670 system
- Quick Resource Locator for PowerEdge R670 CSP Edition system
- Chassis configurations

System configurations - front view for PowerEdge R670 CSP Edition system

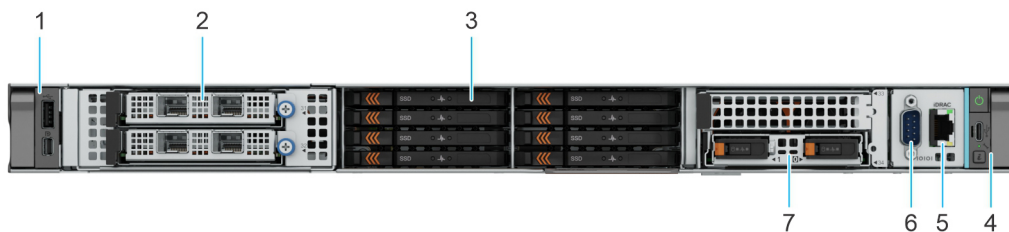


Figure 1. Front view of 8 x EDSFF E3.S drive system with front I/O configuration

Table 3. Features available on the front of the system

Item	Ports, panels, and slots	Icon	Description
1	Left control panel	N/A	Contains the USB port and Mini-Displayport. NOTE: KVM module is optional, and LCP blank is default in the left control panel.
2	Primary OCP NIC	N/A	The OCP NIC card supports OCP 3.0. The NIC ports are integrated on the OCP card which is connected to the system board. NOTE: The primary OCP NIC card shares a NIC port with the BMC.
3	Drive	N/A	Enables you to install drives that are supported on your system.
4	Right control panel	N/A	Contains the system health, system ID, power button, Type-C USB port, and the host status LED.
5	Dedicated BMC Ethernet port	N/A	Enables you to remotely access Open Server Manager.
6	Serial COM port	IOIOI	Enables you to connect a serial device to the system.
7	BOSS-N1 DC-MHS	N/A	Enables you to install the BOSS-N1 DC-MHS controller.

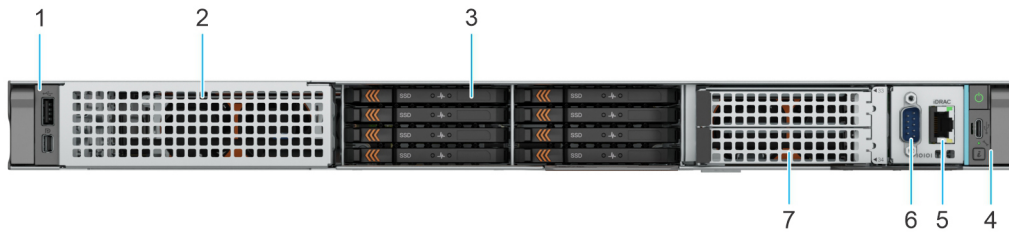


Figure 2. Front view of 8 x EDSFF E3.S drive system with rear I/O configuration

Table 4. Features available on the front of the system

Item	Ports, panels, and slots	Icon	Description
1	Left control panel	N/A	Contains the USB port and Mini-Displayport. NOTE: KVM module is optional in left control panel.
2	OCP blank	N/A	The OCP blank is installed.
3	Drive	N/A	Enables you to install drives that are supported on your system.
4	Right control panel	N/A	Contains the system health, system ID, power button, Type-C USB port, and the host status LED.
5	Dedicated BMC Ethernet port	N/A	Enables you to remotely access Open Server Manager.
6	Serial COM port	IOIOI	Enables you to connect a serial device to the system.
7	BOSS filler bracket	N/A	The BOSS filler bracket is installed.

System configurations - rear view for PowerEdge R670 CSP Edition system

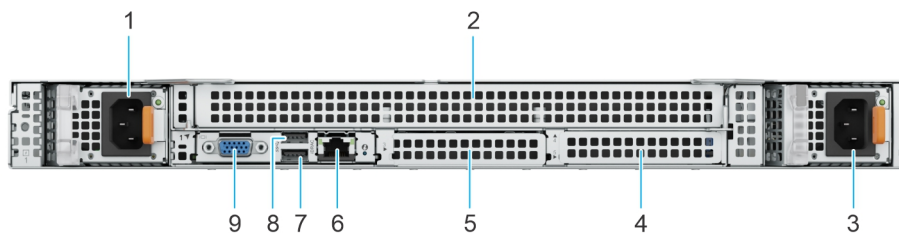






Figure 3. Rear view of the system with front I/O configuration

Table 5. Rear view of the system

Item	Ports, panels, or slots	Icon	Description
1	Power supply unit (PSU1)		PSU1 is the primary PSU of the system.
2	PCIe expansion card riser blank	N/A	In front I/O configuration PCIe expansion card riser blank is installed in PCIe expansion card riser bay.
3	Power supply unit (PSU2)		PSU2 is the secondary PSU of the system.
4	OCP NIC card filler bracket	N/A	In the front I/O configuration, an OCP filler bracket is installed in the OCP NIC card bay.

Table 5. Rear view of the system (continued)

Item	Ports, panels, or slots	Icon	Description
5	BOSS filler bracket	N/A	In the front I/O configuration, the BOSS file bracket is installed in BOSS-N1 DC-MHS bay.
6	BMC dedicated port		Enables you to remotely access Open Server Manager. When the front BMC port is connected to the network, the rear BMC port is automatically disabled
7	USB 3.0 port		The USB port is 9-pin and 3.0-compliant. This port enables you to connect USB devices to the system.
8	USB 3.0 port		The USB port is 9-pin and 3.0-compliant. This port enables you to connect USB devices to the system.
9	VGA port		Enables you to connect a display device to the system.

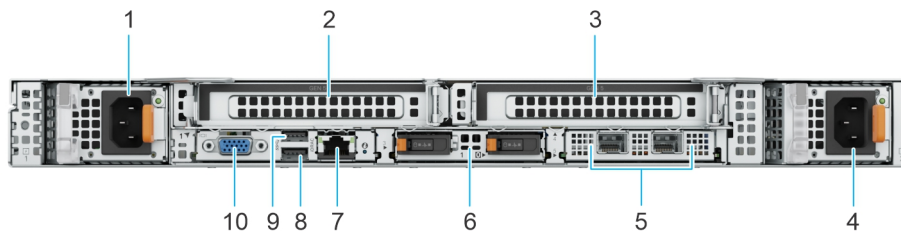








Figure 4. Rear view of the system with rear I/O configuration with riser R2b and R4b

Table 6. Rear view of the system

Item	Ports, panels, or slots	Icon	Description
1	Power supply unit (PSU1)		PSU1 is the primary PSU of the system.
2	PCIe expansion card riser 2b	N/A	The expansion card riser enables you to connect PCI Express expansion cards.
3	PCIe expansion card riser 4b	N/A	The expansion card riser enables you to connect PCI Express expansion cards.
4	Power supply unit (PSU2)		PSU2 is the secondary PSU of the system.
5	OCP NIC port	N/A	The OCP NIC card supports OCP 3.0. The NIC ports are integrated on the OCP card which is connected to the system board and also supports BMC shared NIC feature.
6	BOSS-N1 DC-MHS module	N/A	BOSS module for internal system boot.
7	BMC dedicated port		Enables you to remotely access Open Server Manager. When the front BMC port is connected to the network, the rear BMC port is automatically disabled.
8	USB 3.0 port		The USB port is 9-pin and 3.0-compliant. This port enables you to connect USB devices to the system.
9	USB 3.0 port		The USB port is 9-pin and 3.0-compliant. This port enables you to connect USB devices to the system.
10	VGA port		Enables you to connect a display device to the system.

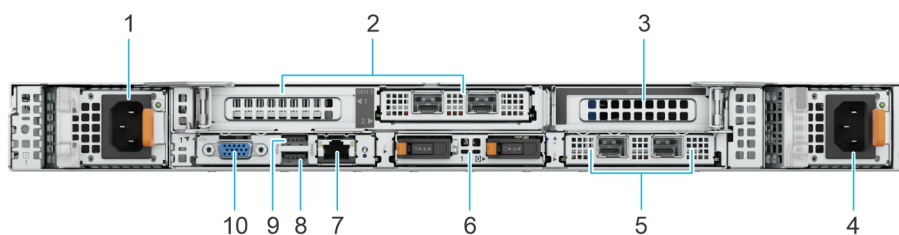








Figure 5. Rear view of the system with rear I/O configuration with riser R2f and R4a

Table 7. Rear view of the system

Item	Ports, panels, or slots	Icon	Description
1	Power supply unit (PSU1)		PSU1 is the primary PSU of the system.
2	PCIe expansion card riser 2f with OCP NIC card	N/A	The expansion card riser enables you to connect PCI Express expansion cards.
3	PCIe expansion card riser 4a	N/A	The expansion card riser enables you to connect PCI Express expansion cards.
4	Power supply unit (PSU2)		PSU2 is the secondary PSU of the system.
5	OCP NIC port	N/A	The OCP NIC card supports OCP 3.0. The NIC ports are integrated on the OCP card which is connected to the system board and also supports BMC shared NIC feature.
6	BOSS-N1 DC-MHS module	N/A	BOSS module for internal system boot.
7	BMC dedicated port		Enables you to remotely access Open Server Manager. When the front BMC port is connected to the network, the rear BMC port is automatically disabled.
8	USB 3.0 port		The USB port is 9-pin and 3.0-compliant. This port enables you to connect USB devices to the system.
9	USB 3.0 port		The USB port is 9-pin and 3.0-compliant. This port enables you to connect USB devices to the system.
10	VGA port		Enables you to connect a display device to the system.

System configurations - inside view for PowerEdge R670 system

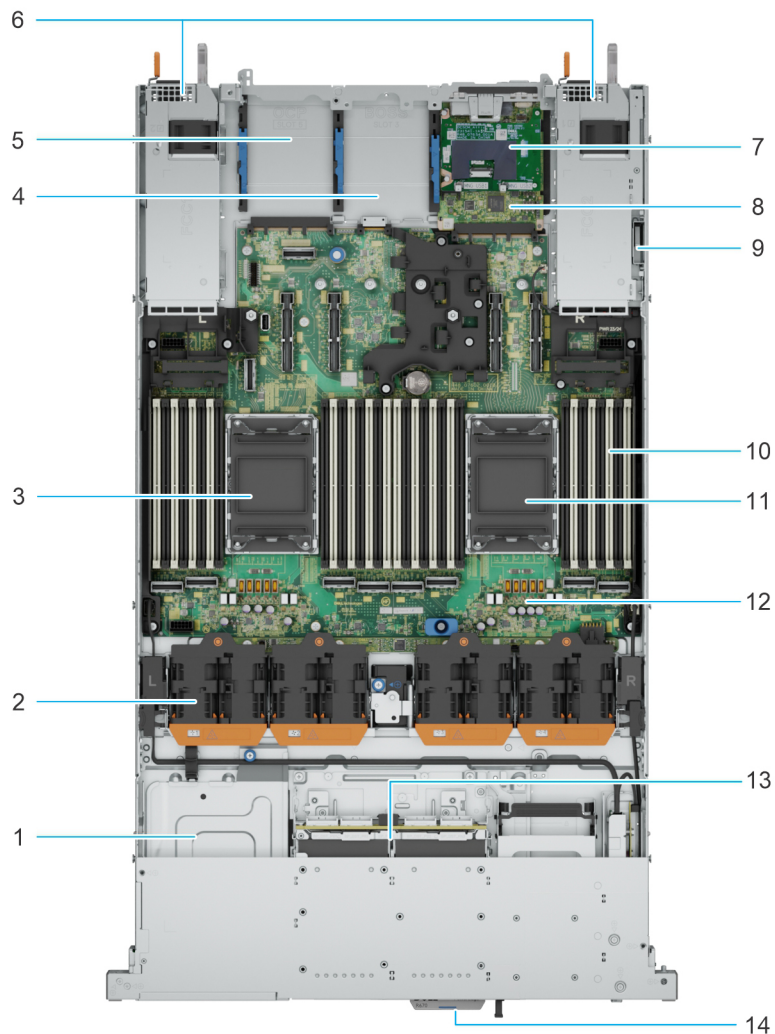


Figure 6. PowerEdge R670 system - inside the system without risers

- | | |
|--------------------------------|--------------------------------|
| 1. Front riser | 2. Cooling fans |
| 3. Dust cover for Processor 0 | 4. BOSS-N1 DC-MHS module slot |
| 5. OCP NIC card slot | 6. PSUs |
| 7. Attic board | 8. DC-SCM card |
| 9. Intrusion switch | 10. Memory module slots (DIMM) |
| 11. Dust cover for Processor 1 | 12. System board |
| 13. Backplane | 14. Express Service Tag |

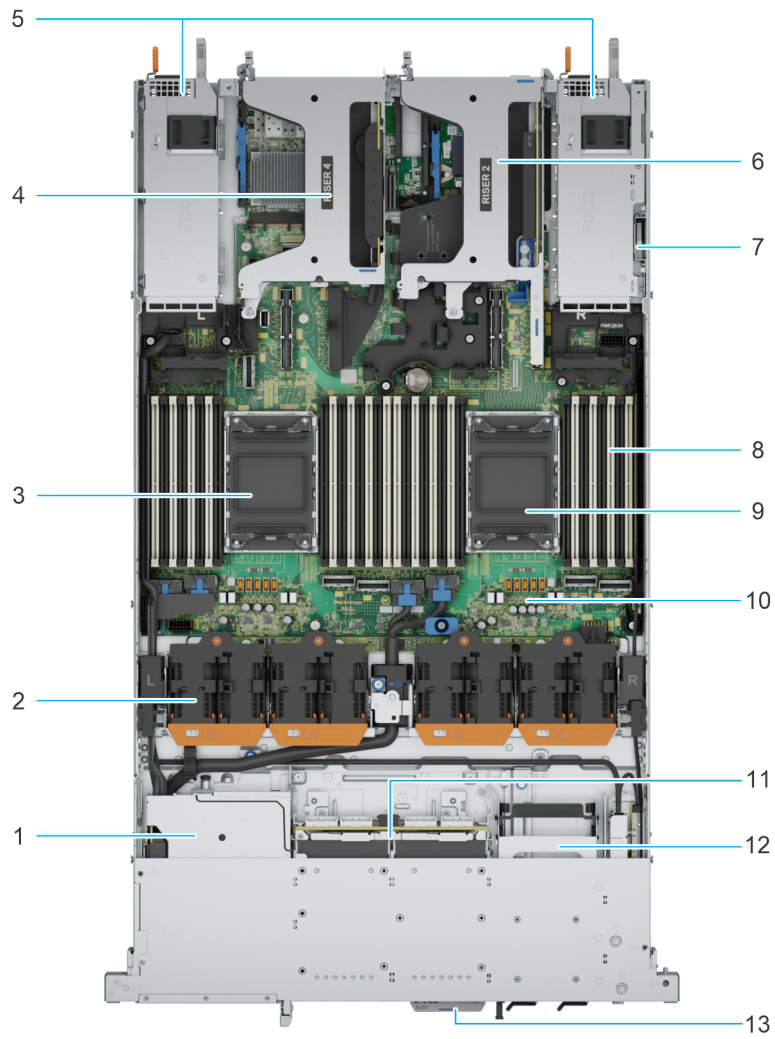


Figure 7. PowerEdge R670 system - inside the system with risers

- | | |
|-------------------------------|-------------------------------|
| 1. Front riser | 2. Cooling fans |
| 3. Dust cover for Processor 0 | 4. Riser 4 |
| 5. PSUs | 6. Riser 2 |
| 7. Intrusion switch | 8. Memory module slots (DIMM) |
| 9. Dust cover for Processor 1 | 10. System board |
| 11. Backplane | 12. BOSS-N1 DC-MHS module |
| 13. Express Service Tag | |

Quick Resource Locator for PowerEdge R670 CSP Edition system

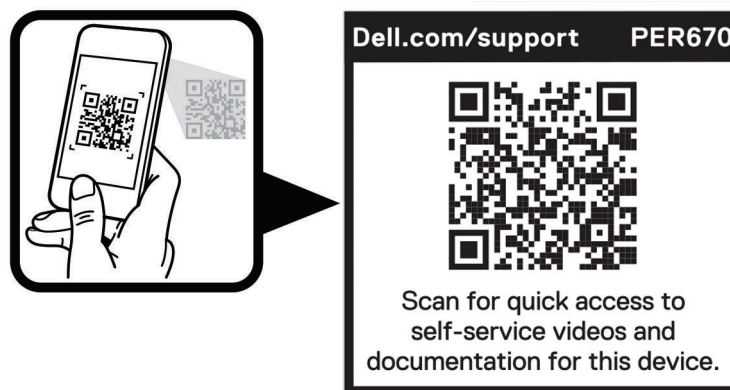


Figure 8. Quick Resource Locator for PowerEdge R670 CSP Edition system

Chassis configurations

The PowerEdge™ R670 CSP Edition system supports:

- Up to 8 x EDSFF E3.S Gen5 NVMe (SSD) drives

Processor

Topics:

- [Processor features](#)

Processor features

The Intel® Xeon® 6 series processor stack consists entirely of efficiency cores (E-Cores), providing ultra-high core counts optimized for Cloud Service Providers and HPC server applications. The Intel® Xeon® 6700E offers improved performance per watt, boosted performance per rack, upgraded memory speeds, enhanced I/O, expanded UPI speeds, and added software extension security.

The following lists the features and functions that are in the Intel® Xeon® 6700E Processor offering:

- High core counts with up to 144 cores with up to 330W TDP
- Enhanced DDR5 memory with speed up to 6400 MT/s in one DIMM per channel (1DPC) and 5200 MT/s in two DIMM per channel (2DPC)
- Faster UPI 2.0 with up to four Intel Ultra Path Interconnect (Intel® UPI) at up to 24 GT/s, increasing multi-socket bandwidth
- PCIe 5.0 with up to 88 lanes
- Security features leveraging Software Guard Extensions (SGX) for Application Isolation .

Supported processors

The following table shows the Intel Xeon 6 Processors SKUs that are supported on the R670 CSP Edition.

Table 8. Intel Xeon 6 Processors supported in R670 CSP Edition

Processor	Clock Speed (GHz)	Cache (M)	UPI (GT/s)	Cores	Threads	Turbo	Memory Speed (MT/s)	Memory Capacity	TDP
6780E	2.2	108	24	144	144	Turbo	6400	1 TB	330 W
6766E	1.9	108	24	144	144	Turbo	6400	1 TB	250 W
6756E	1.8	96	24	128	128	Turbo	6400	1 TB	225 W
6746E	2	96	24	112	112	Turbo	6400	1 TB	250 W
6740E	2.4	96	24	96	96	Turbo	6400	1 TB	250 W
6710E	2.4	96	24	64	64	Turbo	6400	1 TB	205 W

 **NOTE:** Mixing the processors is not supported.

Memory subsystem

Topics:

- Supported memory
- System memory guidelines

Supported memory

Table 9. Memory technology comparison


Feature	PowerEdge R670 CSP Edition (DDR5)
DIMM type	RDIMM
Transfer speed	6400MT/s(1DPC), 5200MT/s (2DPC)  NOTE: Maximum DIMM transfer speed support dependent on CPU SKU and DIMM population
Voltage	1.1 V

Table 10. Supported DIMMs

DIMM PN	Rated DIMM Speed (MT/s)	DIMM Type	DIMM Capacity (GB)	Ranks per DIMM	Data Width	DIMM Volts (V)
G9PYX	6400	RDIMM	32	2	x8	1.1
N66RP	6400	RDIMM	64	2	x4	1.1

System memory guidelines

The PowerEdge R670 CSP Edition system supports DDR5 registered DIMMs (RDIMMs).

Your system memory is organized into eight channels per processor (two memory sockets per channel), 16 memory sockets per processor and 32 memory sockets per system.

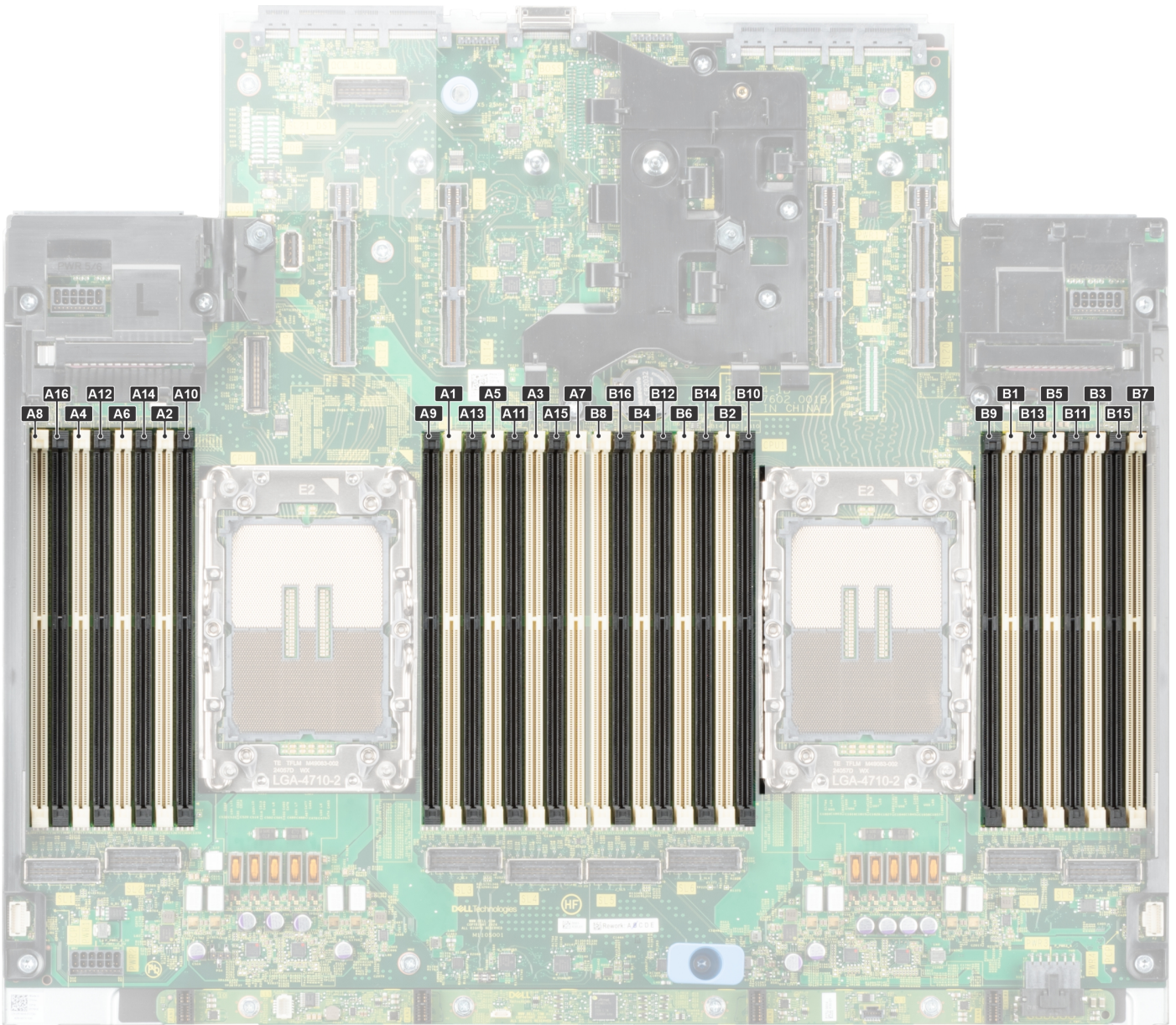


Figure 9. Memory channels

Memory channels are organized as follows:

Table 11. Memory channels


Processor	Channel A	Channel B	Channel C	Channel D	Channel E	Channel F	Channel G	Channel H
Processor 0	Slots A1 and A9	Slots A5 and A13	Slots A3 and A11	Slots A7 and A15	Slots A2 and A10	Slots A6 and A14	Slots A4 and A12	Slots A8 and A16
Processor 1	Slots B1 and B9	Slots B5 and B13	Slots B3 and B11	Slots B7 and B15	Slots B2 and B10	Slots B6 and B14	Slots B4 and B12	Slots B8 and B16


Table 12. Supported memory matrix

DIMM type	Rank	Capacity	DIMM rated voltage and speed	Operating Speed	
				1 DIMM per channel (DPC)	2 DIMM per channel (DPC)
RDIMM	2 R	32 GB	DDR5 (1.1 V), 6400 MT/s	Up to 6400 MT/s	N/A

Table 12. Supported memory matrix (continued)

DIMM type	Rank	Capacity	DIMM rated voltage and speed	Operating Speed	
				1 DIMM per channel (DPC)	2 DIMM per channel (DPC)
	2 R	64 GB	DDR5 (1.1 V), 6400 MT/s	Up to 6400 MT/s	Up to 5200 MT/s

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

 **NOTE:** 32 GB is only supported in one DIMM per channel.

Storage

Topics:

- [Storage controllers](#)
- [Supported Drives](#)
- [Internal storage configuration](#)

Storage controllers

Storage controllers are not supported in this RTS.

Supported Drives

The table that is shown below lists the internal drives that are supported in R670 CSP Edition. See Agile for the latest SDL.

Table 13. Supported drives

Form Factor	Type	Speed	Rotational Speed	Capacities
EDSFF E3.S	DC NVMe	Gen5	SSD	1.6 TB, 3.2 TB, 1.92 TB, 3.84 TB
EDSFF E3.S	NVMe	Gen5	SSD	3.2 TB, 6.4 TB, 3.84 TB, 7.68 TB, 15.36 TB

Internal storage configuration

R670 available internal storage configurations:

- 8 x EDSFF E3.S (Gen5 NVMe Direct)

Networking

Topics:

- [Overview](#)
- [OCP 3.0 support](#)

Overview

PowerEdge offers a wide variety of options to get information moving to and from our servers. Industry best technologies are chosen and these adapters are rigorously validated for worry-free, fully supported use in Dell servers.

OCP 3.0 support

Table 14. OCP 3.0 feature list

Feature	OCP 3.0
Form factor	SFF
PCIe Gen	Gen5
Max PCIe width	x8, x16 (For Rear I/O configuration additional OCP cable is required)
Max number of ports	4
Port type	SFP28/QSFP56
Max port speed	25 GbE, 100 GbE (For Rear I/O configuration additional OCP cable is required)
NC-SI	Yes
SNAPI	Yes
WoL	Yes
Power consumption	15 W–35 W

OCP is also supported in front of the system for some configurations, called the Floating OCP Paddle Card (FLOP). Additionally, the Front I/O OCP supports both internal latch and thumbscrew versions, providing flexibility in installation and maintenance.

Supported OCP cards

Table 15. Supported OCP cards

Form factor	Vendor	Port type	Port speed	Port count
OCP 3.0	Mellanox	QSFP56	25 GbE	2
	Broadcom	QSFP56	25 GbE	4
	Mellanox	QSFP56	100 GbE	2
	Broadcom	QSFP56	100 GbE	2

OCP NIC 3.0 vs 2.0

Table 16. OCP 3.0 and 2.0 NIC comparison

Form Factor	OCP 2.0 (LOM Mezz)	OCP 3.0	Notes
PCIe Gen	Gen3	Gen5	Supported OCP3 is SFF (small form factor).
Max PCIe Lanes	Up to x16	Up to x16	See server slot priority matrix.
Shared LOM	Yes	Yes	Only OCP on slot 10 (rear IO) and slot 38 (front IO) can support BMC port redirect as shared NIC.
Aux Power	Yes	Yes	Used for Shared LOM

PCIe subsystem

Topics:

- PCIe risers

PCIe risers

Shown below are the riser offerings for the platform.

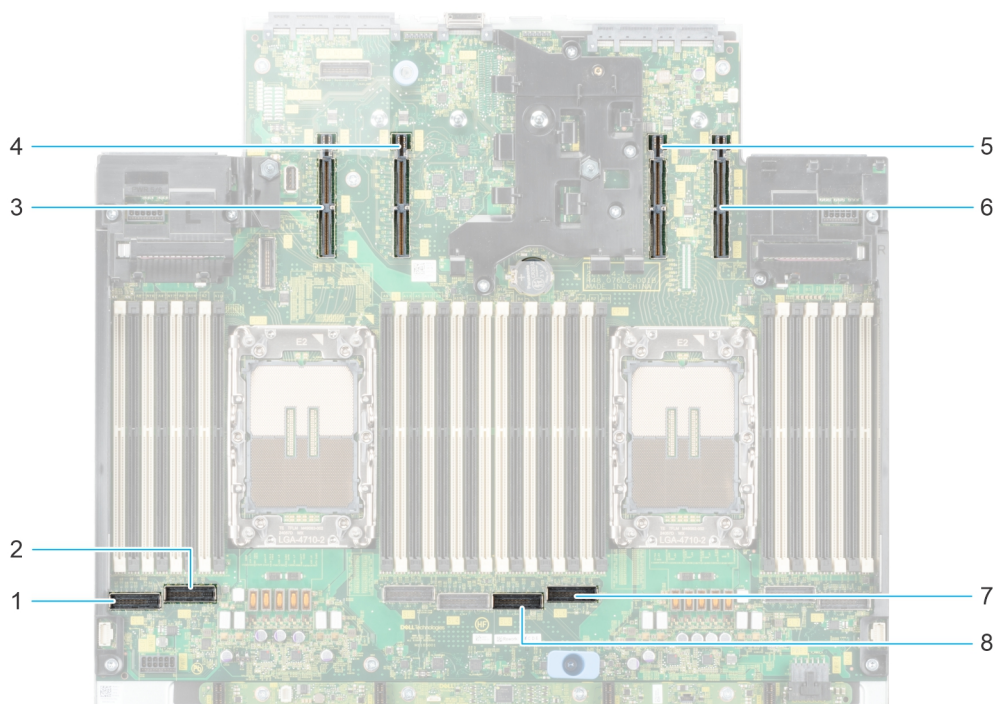


Figure 10. Expansion card riser slot connectors

1. Front riser SL connector (RF1a/ RF1b)
2. Front riser SL connector (RF1a/ RF1b)
3. Riser 4 slot
4. Riser 4 slot (R4a, R4b)
5. Riser 2 slot
6. Riser 2 slot (R2f, R2b)
7. Front riser SL connector (RF1a/ RF1b)
8. Front riser SL connector (RF1a/ RF1b)

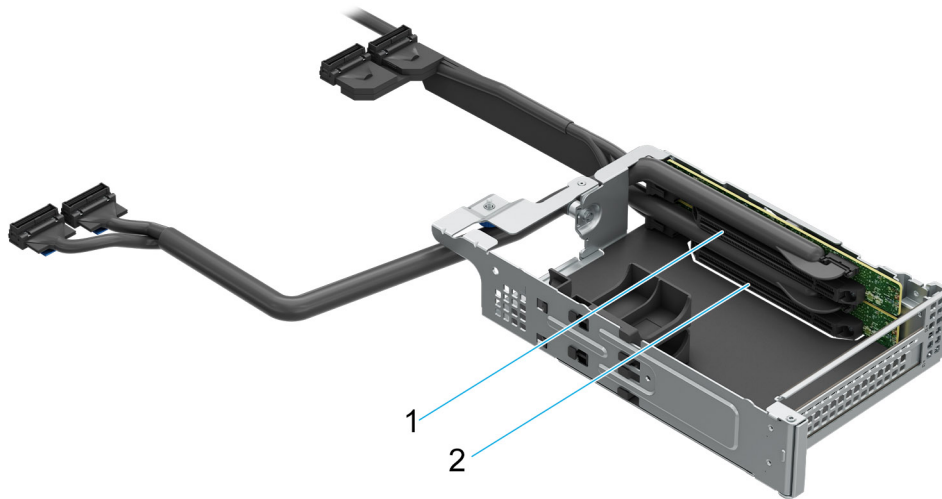


Figure 11. Front Riser 1a (RF1a)

1. Slot 1
2. Slot 2

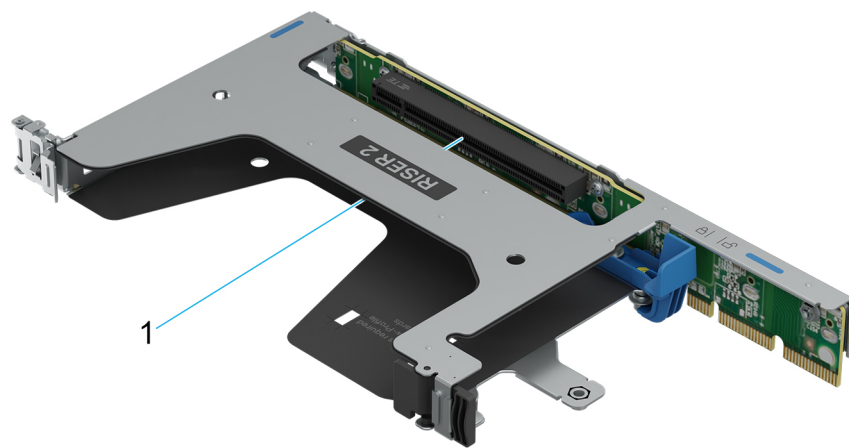


Figure 12. Riser 2 (R2b)

1. Slot 1

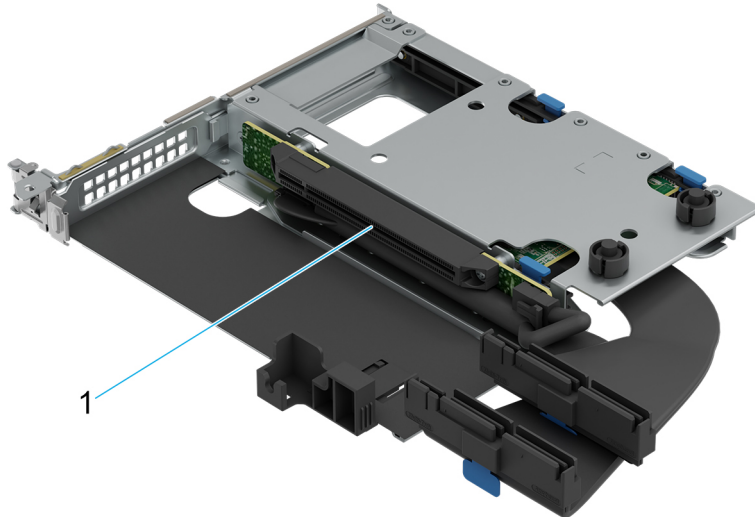


Figure 13. Riser 2 (R2f)

- 1. Slot 1

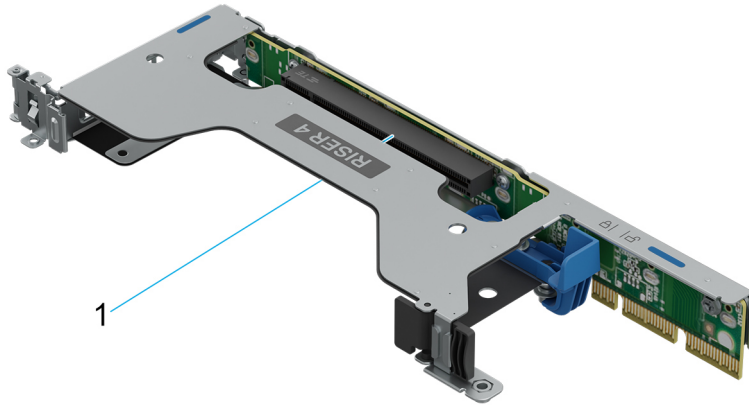


Figure 14. Riser 4 (R4a)

- 1. Slot 1

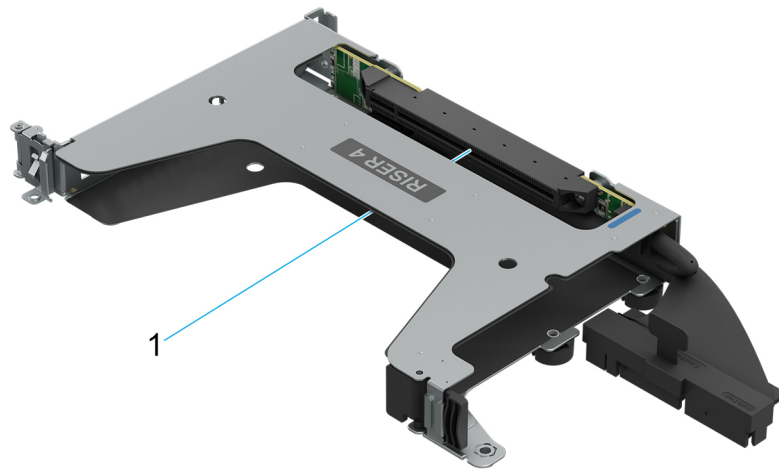


Figure 15. Riser 4 (R4b)

1. Slot 1

Table 17. PCIe Riser Configurations

Config No.	Riser configuration	No. of Processors	PERC type supported	Rear storage possible
1	RF1a	2	N/A	No
2	RF1b	2	N/A	No
5	R2b+R4b	2	N/A	No
6	R2f+R4a	2	N/A	No

Power, thermal, and acoustics

PowerEdge servers have an extensive collection of sensors that automatically track thermal activity, which helps to regulate temperature by reducing server noise and power consumption. The table below lists the tools and technologies Dell offers to lower power consumption and increase energy efficiency.

Topics:

- [Power](#)
- [Thermal](#)
- [Acoustics](#)

Power

Table 18. Power tools and technologies

Feature	Description
Power Supply Units(PSU) portfolio	Dell's PSU portfolio includes intelligent features such as dynamically optimizing efficiency while maintaining availability and redundancy. Find additional information in the Power supply units section.
Tools for right sizing	Enterprise Infrastructure Planning Tool (EIPT) is a tool that can help you determine the most efficient configuration possible. With Dell's EIPT, you can calculate the power consumption of your hardware, power infrastructure, and storage at a given workload. Learn more at Dell EIPT .
Industry Compliance	Dell's servers are compliant with all relevant industry certifications and guide lines, including 80 PLUS, Climate Savers and ENERGY STAR.
Power monitoring accuracy	PSU power monitoring improvements include: <ul style="list-style-type: none"> • Dell's power monitoring accuracy is currently 1%, whereas the industry standard is 5% • More accurate reporting of power
Rack infrastructure	Dell offers some of the industry's highest-efficiency power infrastructure solutions, including: <ul style="list-style-type: none"> • Power distribution units (PDUs) • Uninterruptible power supplies (UPSs) • Energy Smart containment rack enclosures • AC Blind Mate Find additional information at: Power and Cooling

Power Supply Units

Energy Smart power supplies have intelligent features, such as the ability to dynamically optimize efficiency while maintaining availability and redundancy. Also featured are enhanced power-consumption reduction technologies, such as high-efficiency power conversion and advanced thermal-management techniques, and embedded power-management features, including high-accuracy power monitoring. The table below shows the power supply unit options that are available for the R670 CSP Edition.

Table 19. R670 CSP Edition PSU specifications

PSU	Class	Heat dissipation (maximum) (BTU/hr)	Frequency (Hz)	AC Voltage			DC Voltage			Current (A)
				200—240 V	100—120 V	277 V	240 V	- (48—60) V	336 V	
800 W mixed mode	Platinum	3000	50/60	800 W	800 W	N/A	N/A	N/A	N/A	9.2—4.5
	N/A	3000	N/A	N/A	N/A	N/A	800 W	N/A	N/A	3.7
1100 W mixed mode	Platinum	4100	50/60	1100 W	1050 W	N/A	N/A	N/A	N/A	12—6.1
	N/A	4100	N/A	N/A	N/A	N/A	1100 W	N/A	N/A	5.1
1500 W mixed mode	Titanium	5625	50/60	1500 W	1050 W	N/A	N/A	N/A	N/A	12.1—8.2
	N/A	5625	N/A	N/A	N/A	N/A	1500 W	N/A	N/A	6.8

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 16. PSU power cords

Table 20. PSU power cords

Form factor	Output	Power cord
60 mm	800 W Mixed Mode	C13
	1100 W Mixed Mode	C13
	1500 W Mixed Mode	C13

Thermal

PowerEdge servers have an extensive collection of sensors that automatically track thermal activity, which helps regulate temperature thereby reducing server noise and power consumption.

Thermal design

Thermal management of the platform helps deliver high performance with the right amount of cooling to components, while maintaining the lowest fan speeds possible. This is done across a wide range of ambient temperatures from 10°C to 35°C (50°F to 95°F) and to extended ambient temperature ranges.

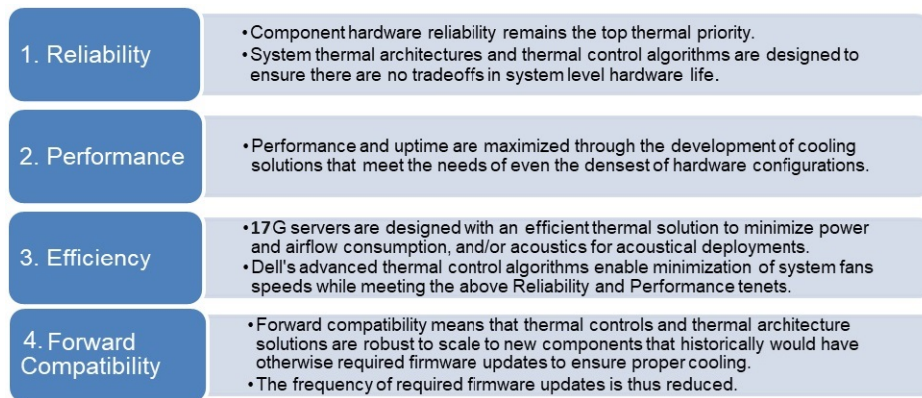


Figure 17. Thermal design characteristics

The thermal design of the PowerEdge R670 CSP Edition reflects the following:

- Optimized thermal design: The system layout is architected for optimum thermal design.
- System component placement and layout are designed to provide maximum airflow coverage to critical components with minimum expense of fan power.
- Comprehensive thermal management: The thermal control system regulates the fan speed based on several different responses from all system-component temperature sensors, and inventory for system configurations. Temperature monitoring includes components such as processors, DIMMs, chipset, the inlet air ambient, hard disk drives, and OCP.
- Open and closed loop thermal fan speed control: Open loop thermal control uses system configuration to determine fan speed based on inlet air ambient temperature. Closed loop thermal control method uses feedback temperatures to dynamically determine proper fan speeds.
- User-configurable settings: With the understanding and realization that every customer has unique set of circumstances or expectations from the system. For more information, see the Dell PowerEdge R670 CSP Edition Installation and Service Manual at [PowerEdge Manuals](#) and “Advanced Thermal Control: Optimizing across Environments and Power Goals” on Dell.com.
- Cooling redundancy: The R670 CSP allows N+1 fan redundancy, allowing continuous operation with one fan failure in the system.
- Environmental Specifications: The optimized thermal management makes the R670 CSP reliable under a wide range of operating environments.

Acoustics

Acoustical configurations of R670 CSP Edition

Dell PowerEdge R670 CSP Edition is a rack-mount server whose acoustic output ranges from levels appropriate for data centers. The acoustical performance is provided for Front I/O Configuration and details are provided in the Configuration Tested Table below; acoustical performance data for this configuration is included in the Acoustical Experience Table below.

Table 21. R670 CSP Edition configuration tested for acoustical experience

Configuration	Front I/O configuration
System fan type	High Performance Silver
CPU	2 x Intel 6740E 250W
Memory	16 x 32GB RDIMM DDR5
HDD/SSD	8xE3 1.92T
BP	8x E3 BP
PERC	None
BOSS	17G BOSS
Flash Drives	Hynix 480G

Table 21. R670 CSP Edition configuration tested for acoustical experience (continued)

Configuration	Front I/O configuration
OCP	None
PSU	2x 1100W
Bezel	Yes
PCIe 1	-
PCIe 2	-
PCIe 3	-

Table 22. Acoustical experience of R670 CSP Edition configuration

Configuration	Front I/O configuration	
Acoustical Performance: Idle/ Operating @ 25°C Ambient		
L _{wA,m} (B)	Idle ⁽⁴⁾	6.9
	Operating/ Customer usage operating ⁽⁵⁾⁽⁶⁾	6.9
K _v (B)	Idle ⁽⁴⁾	0.4
	Operating/ Customer usage operating ⁽⁵⁾⁽⁶⁾	0.4
L _{pA,m} (dB)	Idle ⁽⁴⁾	53
	Operating/ Customer usage operating ⁽⁵⁾⁽⁶⁾	53
Prominent discrete tones ⁽³⁾		Prominence ratio < 15 dB
Acoustical Performance: Idle @ 28°C Ambient		
L _{wA,m} ⁽¹⁾ (B)		7.1
K _v (B)		0.4
L _{pA,m} ⁽²⁾ (dB)		57
Acoustical Performance: Max. loading @ 35°C Ambient		
L _{wA,m} ⁽¹⁾ (B)		7.5
K _v (B)		0.4
L _{pA,m} ⁽²⁾ (dB)		60

⁽¹⁾L_{wA, m}: The declared mean A-weighted sound power level (L_{wA}) is calculated per section 5.2 of ISO 9296 (2017) with data collected using the methods that are described in ISO 7779 (2010). Engineering data presented here may not be fully compliant with the ISO 7779 declaration requirement.

⁽²⁾L_{pA, m}: The declared mean A-weighted emission sound pressure level is at the bystander position per section 5.3 of ISO 9296 (2017) and measured using methods that are described in ISO 7779 (2010). The system is placed in a 24U rack enclosure, 25 cm above a reflective floor. Engineering data presented here may not be fully compliant with the ISO 7779 declaration requirement.

⁽³⁾Prominent tones: Criteria of Annex D of ECMA-74 and the Prominence Ratio method of ECMA-418 are followed to determine if discrete tones are prominent and to report them, if so.

⁽⁴⁾Idle mode: The steady-state condition in which the server is energized but not operating any intended function.

⁽⁵⁾Operating mode: The maximum of the steady state acoustical output at 50% of CPU TDP or active storage drives for the respective sections of Annex C of ECMA-74.

⁽⁶⁾ Customer Usage Operating mode: The operating mode is represented by the maximum of the steady state acoustical output at 25%~30% of CPU TDP, 2.5%~10% IOPs load, and >80% GPU load as the components showed in the above configurations.

Rack, rails, and cable management

Topics:

- [Rails and cable management information](#)

Rails and cable management information

The rail offerings for the PowerEdge R670 CSP Edition consist of two general types: sliding and static. The cable management offerings consist of an optional cable management arm (CMA) and an optional strain relief bar (SRB).

See the *Enterprise Systems Rail Sizing and Rack Compatibility Matrix* available at [rail-rack matrix](#) for information regarding:

- Specific details about rail types.
- Rail adjustability ranges for various rack mounting flange types.
- Rail depth with and without cable management accessories.
- Rack types that are supported for various rack mounting flange types.

Key factors governing proper rail selection include the following:

- Spacing between the front and rear mounting flanges of the rack.
- Type and location of any equipment that is mounted in the back of the rack such as power distribution units (PDUs).
- Overall depth of the rack.

Sliding rails features summary

The sliding rails allow the system to be fully extended out of the rack for service. There are two types of sliding rails available, ReadyRails II sliding rails and Stab-in/Drop-in sliding rails. The sliding rails are available with or without the optional cable management arm (CMA) or strain relief bar (SRB).

A15 ReadyRails sliding rails for 4-post racks

- Supports drop-in installation of the chassis to the rails.
- Support for tool-less installation in 19" EIA-310-E compliant square or unthreaded round hole 4-post racks including all generations of the Dell racks.
- Support for tooled installation in 19" EIA-310-E compliant threaded hole 4-post racks.
- Support full extension of the system out of the rack to allow serviceability of key internal components.
- Support for optional strain relief bar (SRB).
- Support for an optional cable management arm (CMA).

i **NOTE:** For situations where CMA support is not required, the outer CMA mounting brackets can be uninstalled from the sliding rails. This reduces the overall length of the rails and eliminates the potential interference with rear-mounted PDUs or the rear rack door.



Figure 18. Sliding rails with optional CMA



Figure 19. Sliding rails with optional SRB

A16 Stab-in/Drop-in sliding rails for 4-post racks

- Supports drop-in or stab-in installation of the chassis to the rails.
- Support for tool-less installation in 19" EIA-310-E compliant square, unthreaded round hole racks including all generations of the Dell racks. Also supports tool-less installation in threaded round hole 4-post racks.
- Support for tool-less installation in Dell EMC Titan or Titan-D racks.
- Support full extension of the system out of the rack to allow serviceability of key internal components.
- Support for an optional cable management arm (CMA).
- Support for optional strain relief bar (SRB).

i NOTE: For situations where CMA support is not required, the outer CMA mounting brackets can be uninstalled from the sliding rails. This reduces the overall length of the rails and eliminates the potential interference with rear-mounted PDUs or the rear rack door.

Scan the QRL code for the documentation and trouble-shooting information regarding the installation procedures for Drop-in/Stab-in rail types.



Figure 20. Quick resource locator for combo rails

A14 static rails summary

The static rails offer a greater adjustability range and a smaller overall mounting footprint than the sliding rails because of their reduced complexity and lack of need for CMA support. The static rails support a wider variety of racks than the sliding rails. However, they do not support serviceability in the rack and are thus not compatible with the CMA. The static rails are also not compatible with SRB.



Figure 21. Static rails

Static rails features summary

Static rails for 4-post and 2-post racks:

- Supports Stab-in installation of the chassis to the rails.
- Support tool-less installation in 19" EIA-310-E compliant square or unthreaded round hole 4-post racks including all generations of Dell racks.
- Support tooled installation in 19" EIA-310-E compliant threaded hole 4-post and 2-post racks.
- Support for tooled installation in Dell EMC Titan or Titan-D rack.

i NOTE:

- Screws are not included with the static rail kit since racks are offered with various thread types. The screws are provided for mounting static rails in racks with threaded mounting flanges.
- Screw head diameter should be 10 mm or less.

2-Post racks installation

If installing to 2-Post (Telco) racks, the ReadyRails II static rails (A14) must be used. Sliding rails support mounting in 4-post racks only.



Figure 22. Static rails in 2-post center mount configuration

Installation in the Dell EMC Titan or Titan-D racks

For tool-less installation in Titan or Titan-D racks, the Stab-in/Drop-in sliding rails (A16) must be used. This rail collapses down sufficiently to fit in the rack with mounting flanges that are spaced about 24 inches apart from front to back. The Stab-in/Drop-in sliding rail allows bezels of the servers and storage systems to be aligned when installed in these racks. For tooled installation, Stab-in Static rails (A14) must be used for bezel alignment with storage systems.

Rack Installation

Drop-in design means that the system is installed vertically into the rails by inserting the standoffs on the sides of the system into the J-slots in the inner rail members with the rails in the fully extended position. The recommended method of installation is to first insert the rear standoffs on the system into the rear J-slots on the rails to free up a hand and then rotate the system down into the remaining J-slots while using the free hand to hold the rail against the side of the system.

Stab-in design means that the inner (chassis) rail members must first be attached to the sides of the system and then inserted into the outer (cabinet) members installed in the rack.

Installing the system into the rack (option A: Drop-In)

1. Pull the inner rails out of the rack until they lock into place.

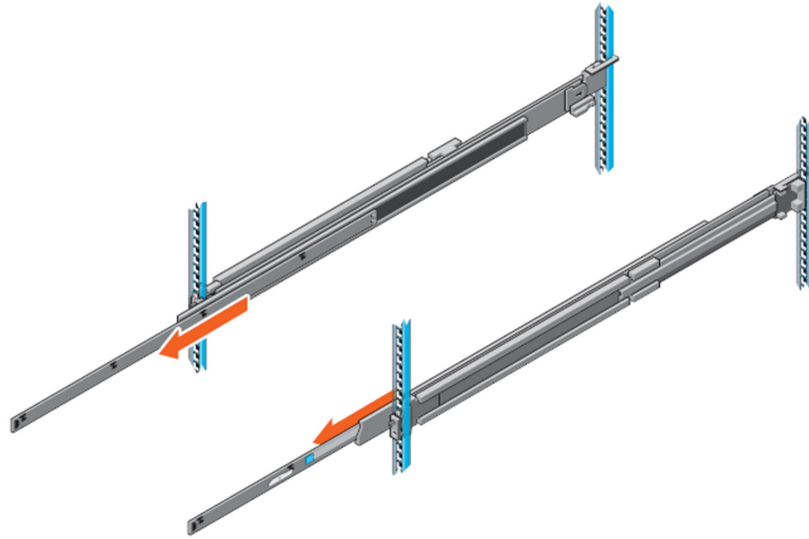


Figure 23. Pull out inner rail

2. Locate the rear rail standoff on each side of the system and lower them into the rear J-slots on the slide assemblies.
3. Rotate the system downward until all the rail standoffs are seated in the J-slots.

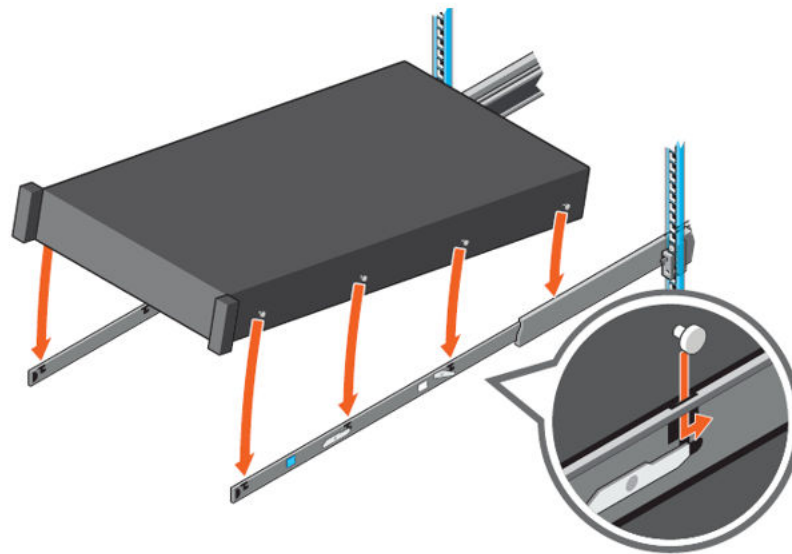


Figure 24. Rail standoffs seated in J-slots

4. Push the system inward until the lock levers click into place.
5. Pull the blue side release lock tabs forward or backward on both rails and slide the system into the rack until the system is in the rack.

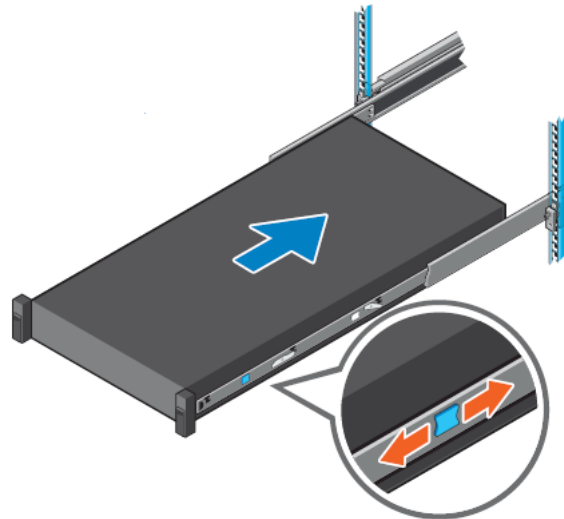


Figure 25. Slide system into the rack

Installing the system into the rack (option B: Stab-In)

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

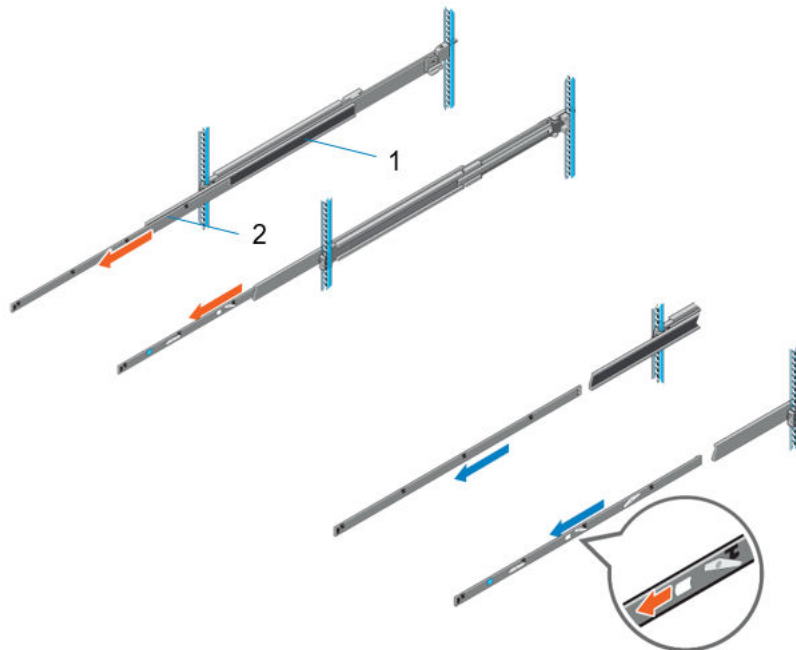


Figure 26. Pull out the intermediate rail

Table 23. Rail component label

Number	Component
1	Intermediate rail
2	Inner rail

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

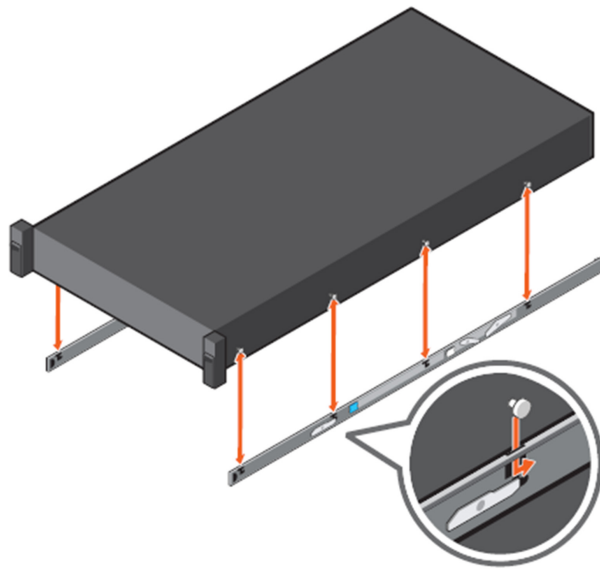


Figure 27. Attach the inner rails to the system

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

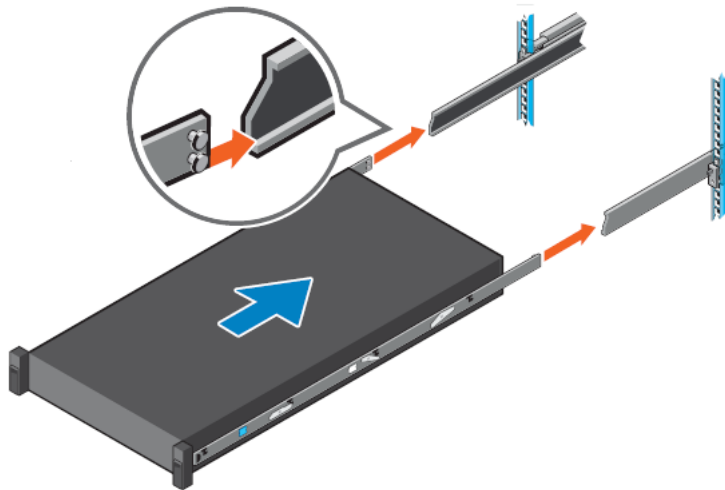


Figure 28. Install system into the extended rails

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

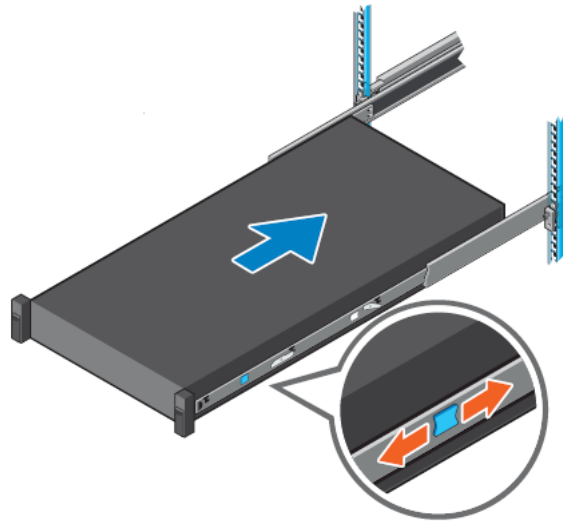


Figure 29. Slide system into the rack

A28 Blind Mate Power Rail features summary

These rails are compatible with the R670 CSP Cold-Aisle-Service (front I/O) Configuration.

The Blind mate Power Rails are Static Rail which includes extra power pass-thru, bracket assemblies to allow for the ability to connect power, and then remove/service the R670 CSP, without needing Hot-Aisle access. These rails do not allow for hot-swapping of internal components or in-rack serviceability, and are not compatible with SRB.

- Supports Stab-in installation of the chassis to the rails
- Supports tool-less installation in 19-inch EIA-310-E compliant square or unthreaded round hole 4-post racks including all generations of Dell racks
- Supports tooled installation in 19-inch EIA-310-E compliant threaded hole 4-post racks
- Supports tooled installation in Dell Titan or Titan-D rack

NOTE:

- Screws are not included with the static rail kit since racks are offered with various thread types.
- Screw head diameter should be 10mm or less.

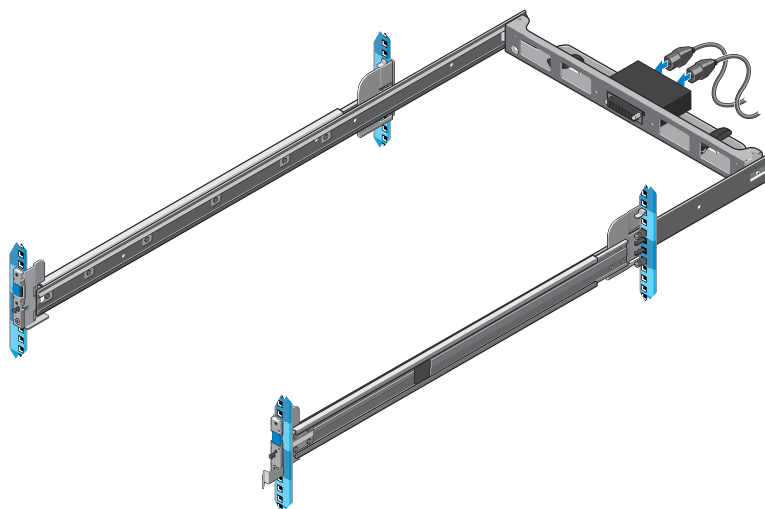
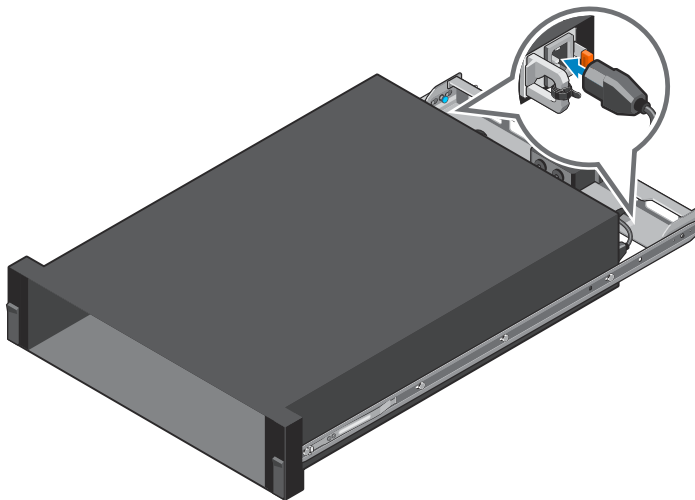
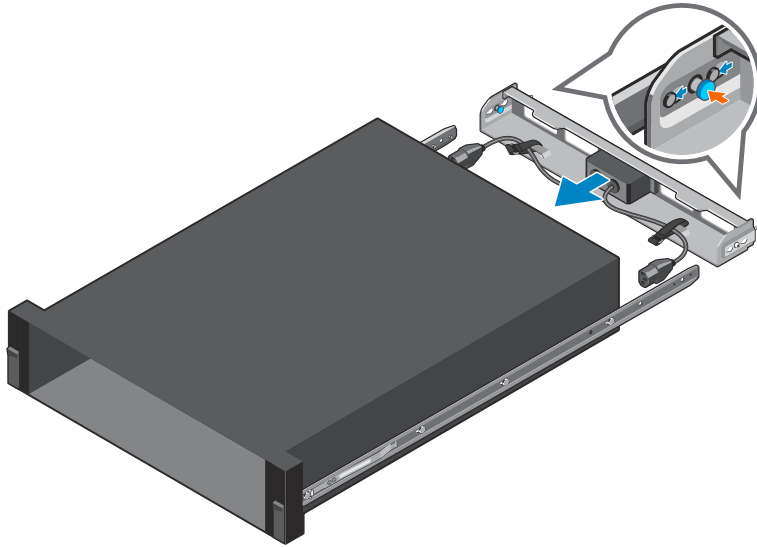


Figure 30. Blind Mate Rails, Rack cabinet members setup

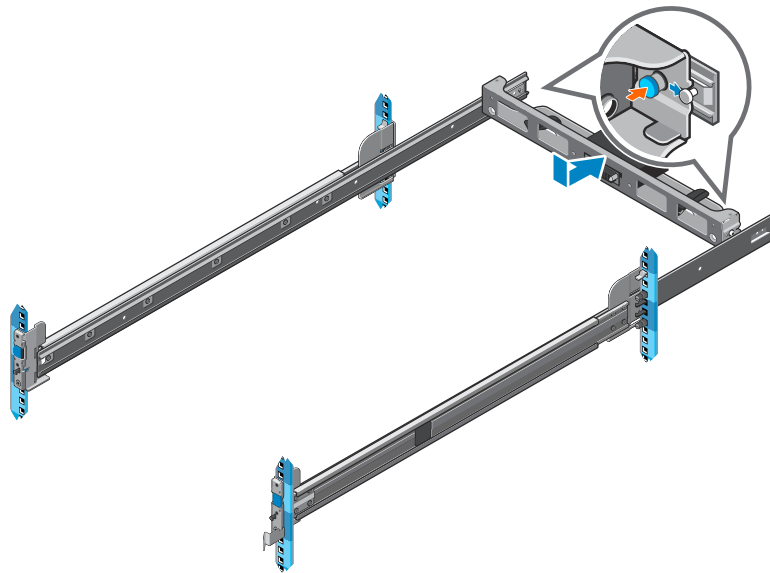
A28 Blind Mate Power Rail Power Pass-Thru Setup

The Blind Mate Power Rails require extra setup to enable the blind mate ability and cold-aisle serviceability, by installing 2 power pass-thru brackets.

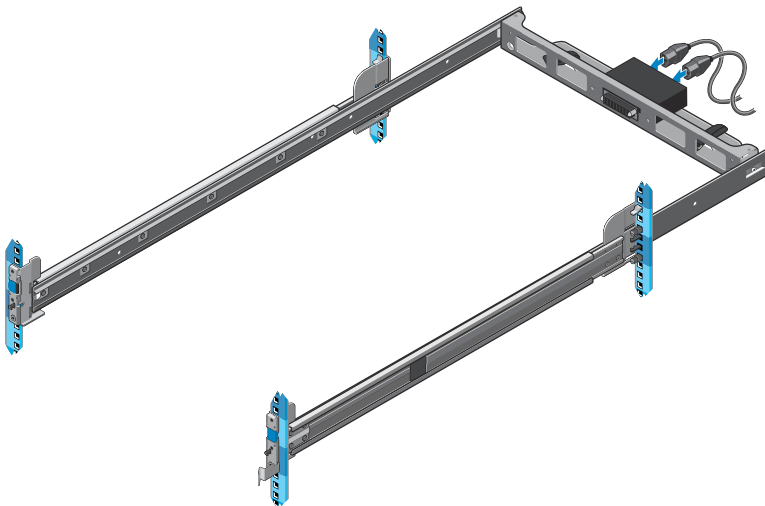
The "inner" bracket is installed behind the rear of the server, which is attached to the rail chassis members, and the cable sub-assembly will be plugged into the server PSUs as shown below:



The "outer" bracket will be installed to the rail cabinet members in the rack, after the individual cabinet members have been installed. Users plug live power to the rear cable assembly, just as they would to the server in the standard setups, as shown



below:



Installation of the server will follow the traditional Stab-in process, where the pass-thru brackets and connectors will mate as the server rack ears meet the front rack flange. Visual Indicators are present to identify Blind Mate Power setups from the Cold Aisle.

⚠ WARNING: Whenever you need to lift the system, get others to assist you. To avoid injury, do not attempt to lift the system by yourself. Get others to assist you or use a mechanical lift.

📄 NOTE: Begin installing the rails in the allotted space that is closest to the bottom of the rack enclosure.

Cable management arm (CMA)

The optional cable management arm (CMA) organizes and secures the cords and cables exiting the back of the systems. It unfolds to allow the systems to extend out of the rack without having to detach the cables. Some key features of the CMA include:

- Large U-shaped baskets to support dense cable loads.
- Open vent pattern for optimal airflow.
- Ability to mount on either side by swinging the spring-loaded brackets from one side to the other.
- Utilizes hook-and-loop straps rather than plastic tie wraps to eliminate the risk of cable damage during cycling.
- Includes a low-profile fixed tray to both support and retain the CMA in its fully closed position.
- Both the CMA and the tray mount without the use of tools by simple and intuitive snap-in designs.

The CMA can be mounted to either side of the sliding rails without the use of tools or the need for conversion. For systems with one power supply unit (PSU), it is recommended to mount on the side opposite to that of the power supply to allow easier access to it and the rear drives (if applicable) for service or replacement.

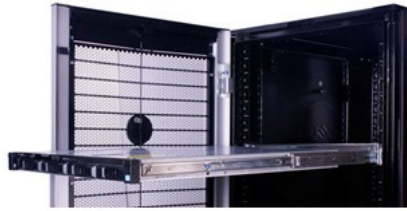


Figure 31. Sliding rails with CMA

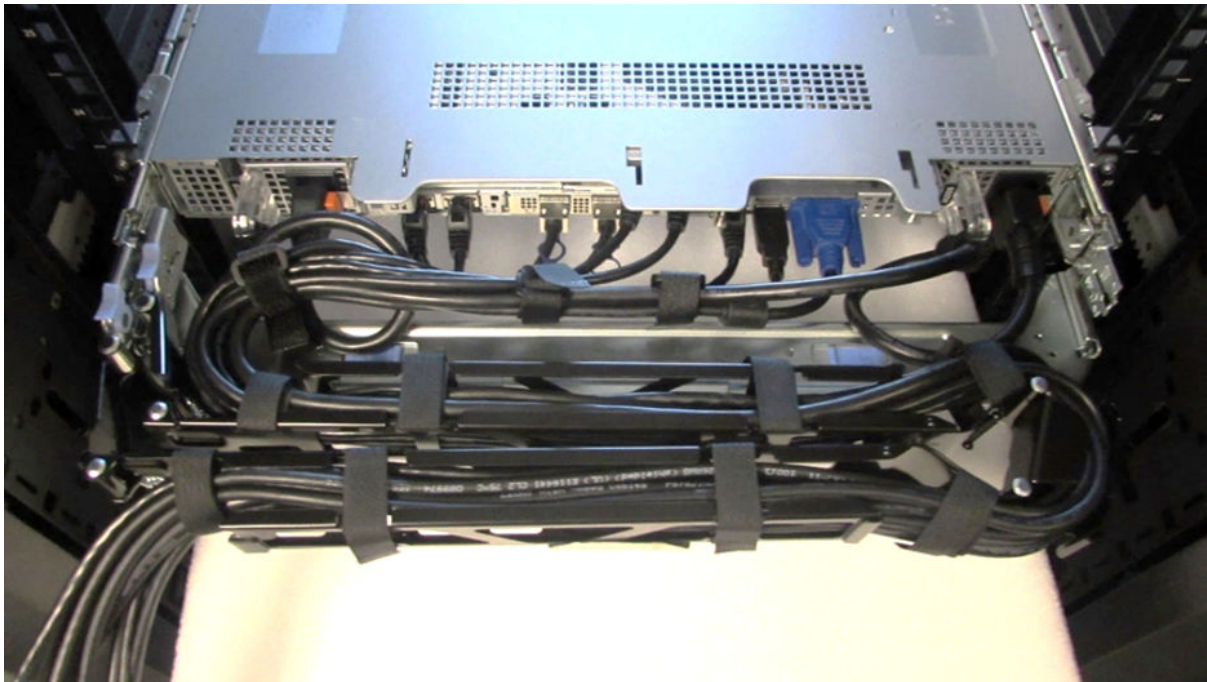


Figure 32. CMA Cabling

Strain Relief Bar (SRB)

The optional strain relief bar (SRB) for the PowerEdge R670 CSP Edition organizes and supports cable connections at the rear end of the server to avoid damage from bending.

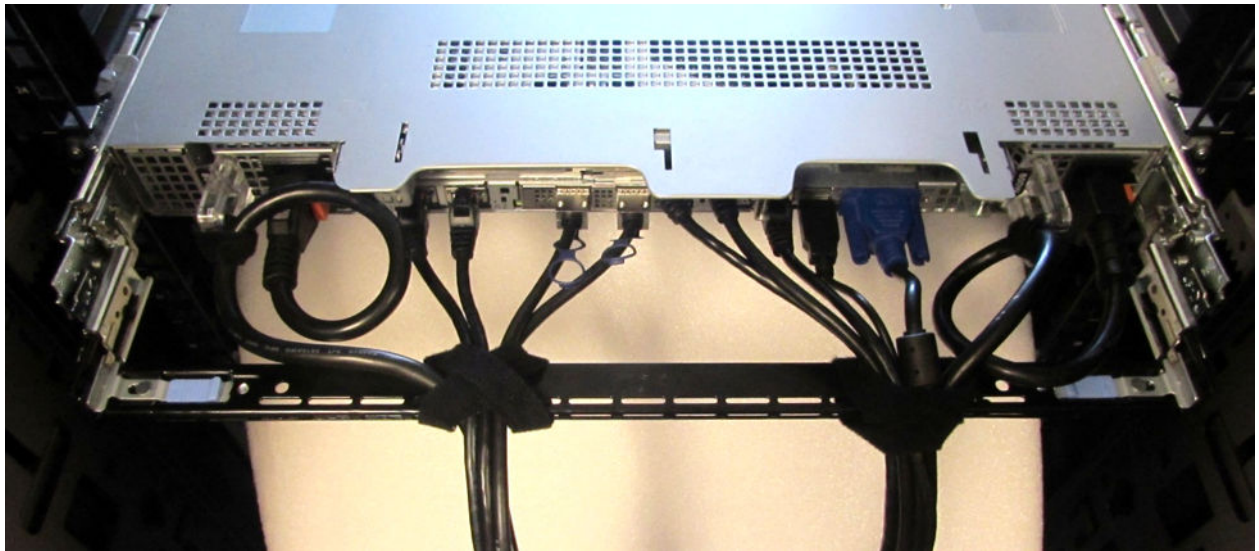


Figure 33. Cabled strain relief bar

- Tool-less attachment to the rails
- Two depth positions to accommodate various cable loads and rack depths
- Supports cable loads and controls stresses on server connectors
- Cables can be segregated into discrete purpose-specific bundles

Operating Systems and Virtualization

Topics:

- [Supported operating systems](#)

Supported operating systems

The PowerEdge R670 CSP Edition system supports the following operating systems:

- Canonical Ubuntu Server LTS
- Red Hat Enterprise Linux
- SUSE Linux Enterprise Server

For specifications and interoperability details, see Dell.com/OSsupport.

Dell Systems Management

Dell delivers management solutions that help IT administrators effectively deploy, update, monitor, and manage IT assets. Dell solutions and tools enable you to quickly respond to problems by helping them to manage Dell servers efficiently; in physical, virtual, local, and remote environments; all without the need to install an agent in the operating system.

Topics:

- [Getting started with Dell Open Server Manager \(OSM\)](#)

Getting started with Dell Open Server Manager (OSM)

Open Server Manager (OSM) introduction

Cloud service and hosting providers managing large-scale data centers face many challenges accelerating their infrastructure and managing multiple systems across different vendors. Updating firmware can be challenging, even across many generations of hardware from a single vendor. The simplicity of a single, open embedded system management stack allows for scalable operations, and easier migration paths across different or newer infrastructure.

Dell Open Server Manager built on OpenBMC enables open, embedded systems management on select Dell PowerEdge cloud scale servers. Explicitly designed for Cloud Server Providers managing large-scale data centers, Dell Open Server Manager is designed, tested, and validated to securely run on select Dell PowerEdge platforms and configurations. We offer a cohesive migration path for our customers looking to adopt OpenBMC for their environments while optimizing operations and minimizing management with choices you can count on.

What is OpenBMC?

OpenBMC is an open-source BMC firmware stack that is designed to run on various infrastructures. It is a Linux Foundation project with the backing of Intel®, IBM®, Microsoft®, and Google™. OpenBMC™ aims to run the same embedded management software on all of your systems to bring consistent management across your environment. Dell Open Server Manager is Dell's implementation of OpenBMC. More information about Open Server Manager (OSM) can be found at [open-server-manager](#).

Why Dell Open Server Manager?

Dell Open Server Manager that is built on OpenBMC includes pure OpenBMC plus the security, manageability, and support that customer's expect from PowerEdge servers:

Table 24. Dell Open Server Manager

Proven Security	Lifecycle Management	Global Services & Support
Dell-signed firmware with silicon root-of-trust (RoT)	BIOS configuration via Redfish™ API	Standard Dell standard support and warranties
Root shell access disabled by default	Firmware update support via Dell Update Packages (DUP) for BIOS, backplane, BMC & power supplies (future release)	Ability to convert to/from Open Server Manager and iDRAC(future release)
Improved User Experience		

Why choose Dell Open Server Manager built on OpenBMC?

OpenBMC is designed to provide consistent systems management software across heterogeneous infrastructure. Based on upstream OpenBMC, Dell Open Server Manager enables OpenBMC to run securely on select PowerEdge servers. In doing so, this added silicon Root-of-Trust ensures that only the Dell version of OpenBMC - thoroughly tested and validated - runs seamlessly on PowerEdge servers, giving our customers the security, support, and manageability they expect.

Ensuring malicious OpenBMC firmware does not make its way onto your servers, Dell lifecycle management is also enabled to install Dell-signed firmware update packages from within Dell Open Server Manager for the BIOS, backplane, power supplies(future release), and BMC. Additionally, the ability to export OpenBMC logs into a log package for SupportAssist allows Dell to provide a full warranty and support.

Dell Open Server Manager Capabilities

Dell Open Server Manager provides many core systems management capabilities through multiple interfaces, including Redfish™, IPMI, and a web-based user interface.

- Get an overview of the system
- View event and POST code logs
- Observe hardware status and inventory, including channel firmware devices
- Access the virtual KVM with virtual media capability
- Update firmware
- Perform server power operations and configure power consumption
- Configure settings such as the date, time, network, users, sessions, and policies

Everything visible in the GUI - except for the virtual KVM and media - is accessible through Redfish.

Redfish allows you to manage the server through a RESTful API programmatically. This feature is vital for autonomous systems management.

Configuring Dell Open Server Manager

Provisioning a new server consists of three activities

- Configure the hardware
- Install an operating system
- Deploy applications and workloads

Firmware updates for other devices must be done through the operating system or with device-specific vendor tools. Dell Open Server Manager accepts the same Dell firmware update packages used by iDRAC or for the operating system; and can be downloaded from dell.com

An operating system can be installed using the virtual KVM and virtual media capability, or the server can be configured to PXE boot to deploy the operating system and applications over the network.

Appendix A: Additional specifications

Topics:

- Chassis dimensions
- System weight
- NIC port specifications
- Video specifications
- USB Ports
- PSU rating
- Environmental specifications

Chassis dimensions

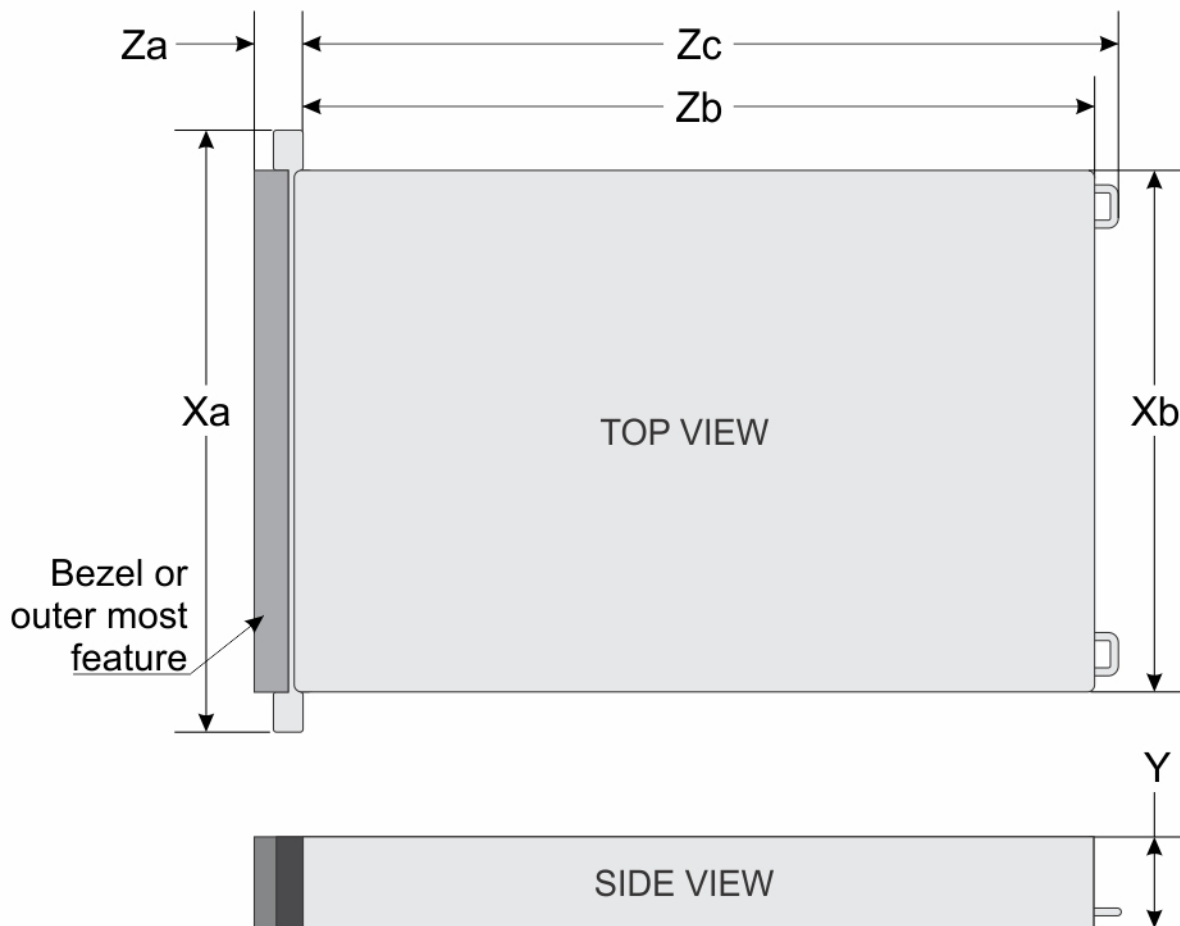


Figure 34. Chassis dimensions

Table 25. PowerEdge R670 CSP Edition chassis dimensions

Drives	Xa	Xb	Y	Za	Zb	Zc
8 drives	482.0 mm (18.98 inches)	434.0 mm (17.09 inches)	42.8 mm (1.69 inches)	43.3 mm (1.70 inches) Without bezel	750.57 mm (29.55 inches) Ear to rear wall	786.14 mm (30.95 inches) Ear to PSU handle

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

System weight

Table 26. PowerEdge R670 CSP Edition system weight

System configuration	Maximum weight (with all drives/SSDs)
8 x EDSFF E3.S	20.42 kg (45.02 pound)

Table 27. PowerEdge R670 CSP Edition weight handling recommendations

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

NIC port specifications

The PowerEdge R670 CSP Edition system supports Network Interface Controller (NIC) ports embedded on the Open Compute Project (OCP) NIC cards.

Table 28. NIC port specification for the system

Feature	Specifications
OCP NIC 3.0 card	25 GbE x 2, 25 GbE x 4, 100 GbE x 2

NOTE: The OCP NIC card is installed at the front or rear of the system, depending on the system I/O configuration.

Video specifications

The PowerEdge R670 system supports integrated Matrox G200 graphics controller with 16 MB of video frame buffer.

Table 29. Supported video resolution options

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

Table 29. Supported video resolution options (continued)

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

USB Ports

The front USB 2.0 port only supports output current up to 0.5A and can't support high power consumption devices such as CD-ROM.



Figure 35. Front USB Port

The bottom port of the rear USB connector can support USB3.1 to supply output current up to 0.9A.



Figure 36. Rear USB Port

An internal USB Type-A vertical connector on the motherboard can support a small USB key. Maximum allowable height of USB key body is specified per configuration:

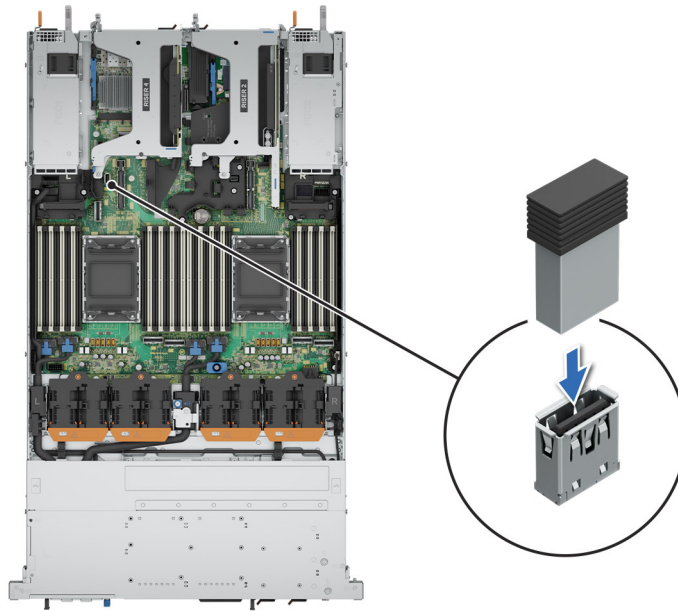


Figure 37. Internal USB Port

Table 30. Key Length limit

Configuration	Key length limit (including connector)
1U	24.19 mm

NOTE: Internal USB design is USB Key restriction, not for cable

Table 31. PowerEdge R670 CSP USB 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 (optional)	USB 3.1-compliant ports	Two	Internal USB 3.1-compliant port	One (optional)
USB 2.0 Type C port	One				

NOTE: The USB 2.0 Type C compliant port acts as dual-mode for host and BMC management port.

PSU rating

Below table lists the power capacity of the PSUs in high/low line operation mode.

Table 32. PSUs highline and lowline ratings

PSU	800 W Platinum	1100 W Platinum	1500 W Titanium
Peak Power (Highline)	1240 W	1705 W	2325 W
Highline	800 W	1100 W	1500 W
Peak Power (Lowline)	1240 W	1627 W	1627 W
Lowline	800 W	1050 W	1050 W
Highline 240 VDC	800 W	1100 W	1500 W
Highline 380 VDC	N/A	N/A	N/A

Table 32. PSUs highline and lowline ratings (continued)

PSU	800 W Platinum	1100 W Platinum	1500 W Titanium
DC-(48—60) V	N/A	N/A	N/A

The PowerEdge R670 CSP Edition supports up to two AC power supplies with 1+0 or 2+0 non-redundancy, auto-sensing, and auto switching capability.

Dell PSUs have achieved Platinum and Titanium efficiency levels as shown in the table below.

Table 33. PSU efficiency level

Efficiency Targets by Load						
Form factor	Output	Class	10%	20%	50%	100%
Redundant 60 mm	800 W Mixed mode	Platinum	N/A	90.00%	94.00%	91.00%
	1100 W Mixed mode	Platinum	N/A	90.00%	94.00%	91.00%
	1500 W Mixed mode	Titanium	90.00%	94.00%	96.00%	91.00%

Environmental specifications

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

Table 34. Continuous Operation Specifications for ASHRAE A2

Temperature	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 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 35. Maximum vibration specifications

Maximum vibration	Specifications
Operating	0.21 G _{rms} at 5 Hz to 500 Hz (all operation orientations)
Storage	1.38 G _{rms} at 7 Hz to 250 Hz for 15 minutes (all six sides tested)

Table 36. 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 restriction matrix

Table 37. Label reference

Label	Description
STD	Standard

Table 37. Label reference (continued)

Label	Description
HPR (Silver)	High performance Silver (HPR SLVR) fan
HPR (Gold)	High performance Gold (HPR GOLD) fan
HSK	Heat sink
L-Type	L-Type Heat sink
LP	Low profile
FH	Full height
EXT	Extend

Table 38. Processor and heat sink matrix

Heat sink	Processor TDP
1U EXT HSK	< 270 W
L-type HSK	≥ 270 W

NOTE: The configuration's ambient temperature is dictated by its critical component. For example, if the processor's ambient temperature is 35°C, the DIMM is 35°C, and the GPU is 30°C, the configuration's ambient temperature can only be 30°C.

NOTE: Both Front I/O and Rear I/O configurations are supported, using the same chassis.

Table 39. Thermal restriction matrix

Configuration			8 x EDSFF E3.S NVMe		Ambient temperature
Storage configuration number			C01-01		
Riser configuration			RC5, RC6	RC1, RC2	
Processor	TDP	Cores	Fan	Fan	
6710E	205 W	64	HPR SILVER	HPR SILVER	35°C
6756E	225 W	128	HPR SILVER	HPR SILVER	35°C
6740E	250 W	96	HPR SILVER	HPR SILVER	35°C
6746E	250 W	112	HPR SILVER	HPR SILVER	35°C
6766E	250 W	144	HPR SILVER	HPR SILVER	35°C
6780E	330 W	144	HPR SILVER	HPR SILVER	35°C

NOTE: No GPU or memory dependencies in initial release.

Other Restrictions

- For rear IO configurations (RC5, RC6), PCIe/OCP cards with speeds of 25Gb and above require DAC or high temp spec (85C) active optics.

Appendix B. Standards compliance

The system conforms to the following industry standards.

Table 40. Industry standard documents

Standard	URL for information and specifications
ACPI Advance Configuration and Power Interface Specification, v6.4	ACPI
Ethernet IEEE Std 802.3-2022	IEEE Standards
MSFT WHQL Microsoft Windows Hardware Quality Labs	Windows Hardware Compatibility Program
IPMI Intelligent Platform Management Interface, v2.0	IPMI
DDR5 Memory DDR5 SDRAM Specification	DDR5 SDRAM
PCI Express PCI Express Base Specification, v5.0	PCIe specifications
PMBus Power System Management Protocol Specification, v1.2	PMBus specifications
SAS Serial Attached SCSI, 3 (SAS-3) (T10/INCITS 519)	SCSI storage interfaces
SATA Serial ATA Rev. 3.3	SATA IO
SMBIOS System Management BIOS Reference Specification, v3.3.0	DMTF SMBIOS
TPM Trusted Platform Module Specification, v1.2 and v2.0	TPM specifications
UEFI Unified Extensible Firmware Interface Specification, v2.7	UEFI specifications
PI Platform Initialization Specification, v1.7	
USB Universal Serial Bus v2.0 and SuperSpeed v3.0 (USB 3.1 Gen1)	USB document library
NVMe Express Base Specification. Revision 2.0c	NVMe specifications
NVMe Command Set Specifications	
1. NVMe Express NVMe Command Set Specification. Revision 1.1c	
2. NVMe Express Zoned Namespaces Command Set. Revision 1.0c	
3. NVMe Express® Key Value Command Set. Revision 1.0c	
NVMe Transport Specifications	
1. NVMe Express over PCIe Transport. Revision 1.0c	
2. NVMe Express RDMA Transport. Revision 1.0b	
3. NVMe Express TCP Transport. Revision 1.0c	
NVMe NVMe Express Management Interface. Revision 1.2c	
NVMe NVMe Boot Specification. Revision 1.0	

Appendix C: Additional resources

Table 41. Additional resources

Resource	Description of contents	Location
Installation and Service Manual	<p>This manual, available in PDF format, provides the following information:</p> <ul style="list-style-type: none"> • Chassis features • System Setup program • System indicator codes • System BIOS • Remove and replace procedures • Diagnostics • Jumpers and connectors 	Dell.com/Support/Manuals
Getting Started Guide	<p>This guide ships with the system, and is also available in PDF format. This guide provides the following information:</p> <ul style="list-style-type: none"> • Initial setup steps 	Dell.com/Support/Manuals
Rack Installation Guide	<p>This document ships with the rack kits, and provides instructions for installing a server in a rack.</p>	Dell.com/Support/Manuals
System Information Label	<p>The system information label documents the system board layout and system jumper settings. Text is minimized due to space limitations and translation considerations. The label size is standardized across platforms.</p>	Inside the system chassis cover
Quick Resource Locator (QRL)	<p>This code on the chassis can be scanned by a phone application to access additional information and resources for the server, including videos, reference materials, service tag information, and Dell contact information.</p>	Inside the system chassis cover
Enterprise Infrastructure Planning Tool (EIPT)	<p>The Dell online EIPT enables easier and more meaningful estimates to help you determine the most efficient configuration possible. Use EIPT to calculate the power consumption of your hardware, power infrastructure, and storage.</p>	Dell.com/calc

Appendix D: Services

Topics:

- [Why attach service contracts](#)
- [ProSupport Infrastructure Suite](#)
- [Specialty Support Services](#)
- [ProDeploy Infrastructure Suite](#)
- [Supplemental Deployment Services](#)
- [Consulting Services](#)
- [Resources](#)

Why attach service contracts

Dell PowerEdge servers include a standard hardware warranty that highlights our commitment to product quality by guaranteeing repair or replacement of defective components. While industry-leading, our warranties are limited to 1 or 3 years, depending on model, and do not cover software assistance. Call records show that failure rates for servers are roughly 1% and more commonly, customers seek Dell technical support for software related issues like configuration guidance, troubleshooting, upgrade assistance or performance tuning. Encourage customers to purchase ProSupport service contracts to supplement warranty coverage and ensure optimal support for both hardware and software. ProSupport provides a complete hardware guarantee beyond the original warranty period (up to 12 years: including seven years standard support and an additional five years of Post-Standard Support). Details of the ProSupport Suite and benefits are listed below.

ProSupport Infrastructure Suite

ProSupport Infrastructure Suite is a set of support services that enable customers to build the solution that is right for their organization. It is an industry-leading, enterprise-class support that aligns with the criticality of your systems, the complexity of your environment, and the allocation of your IT resources.

ProSupport Infrastructure Suite | Enhanced value across all offers!

	Basic Hardware Support	ProSupport for Infrastructure	ProSupport Plus for Infrastructure	Changes with August 2023 release
Technical support availability and response objective	9/5, immediate	24/7, immediate	24/7, immediate	No change
Covered products	Hardware	Hardware & Software	Hardware & Software	No change
Onsite response service level	NBD	NBD or 4-hour	4-hour	ProSupport Plus NBD is retired
ProSupport AIOps platforms	•	•	•	MyService360 and TechDirect (all offers) CloudIQ (ProSupport & ProSupport Plus)
Dell Security Advisories	•	•	•	Available on additional products
Proactive issue detection with automated case creation	•	•	•	New to Basic
Predictive hardware anomaly detection		•	•	New to ProSupport
Access to software updates		•	•	No change
CloudIQ health and cybersecurity monitoring & analytics		•	•	Enhanced features
Incident Manager for Severity 1 cases		•	•	No change
Mission Critical support			•	Enhanced features
Priority access to remote senior support engineers ¹			•	No change
Service Account Manager			•	No change
Proactive system maintenance			•	No change
Limited 3 rd party software support ²			•	No change

¹Based on availability

²Software license can be purchased through Dell or BYOL - see Service Descriptions for details.

Dell Technologies

Figure 38. ProSupport infrastructure Suite

ProSupport Plus for Infrastructure

ProSupport Plus (PSP) for Infrastructure is the ultimate solution for customers seeking preventative maintenance and optimal performance on their business-critical assets. The service caters to customers who require proactive, predictive, and personalized support for systems that manage critical business applications and workloads. When customers purchase PowerEdge servers, we recommend ProSupport Plus, our proactive and preventative support service for business-critical systems. ProSupport Plus provides all the benefits of ProSupport, including the following "Top five reasons to buy PSP".

- Service Account Manager** - a customer's #1 support advocate, ensuring they get the best possible proactive and predictive support experience
- Priority access to specialized support experts** - immediate, advanced troubleshooting from an engineer that understands Dell infrastructure solutions
- Proactive systems maintenance** - on a semi-annual basis, we will keep a customer's ProSupport Plus system(s) up to date by installing the latest firmware, BIOS, and driver updates to improve performance and availability
- Enhanced Mission Critical Support** - when critical (Severity 1) support issues happen, the customer is assured that we will do all we can to get them back up and running as quickly as possible
- 3rd party software support** - Dell is a customer's single point of accountability for any eligible 3rd party software installed on their ProSupport Plus system, whether they purchased the software from us or not.

ProSupport for Infrastructure

Comprehensive 24x7 support for hardware and software - best for production, but not critical, workloads and applications. The ProSupport service offers highly trained experts around the clock and around the globe to address IT needs. We help minimize disruptions and maximize availability of PowerEdge server workloads with:

- 24x7 support through phone, chat and online
- A central point of accountability for all hardware and software issues
- Hypervisor, operating system and application support
- Dell security advisories
- Onsite response service levels 4 hour or Next Business Day options
- Proactive issue detection with automated case creation
- Predictive hardware anomaly detection

- Incident Manager assigned for Severity 1 cases
- Collaborative third-party support
- Access to AIOps Platforms - (MyService360, TechDirect, and APEX AIOps Infrastructure Observability)
- Consistent experience regardless of where customers are located or what language they speak.

Basic Hardware Support

Provides reactive hardware support during normal business hours, excluding local national holidays. No software support or software related guidance. For improved levels of support choose ProSupport or ProSupport Plus.

Specialty Support Services

Optional specialty support services complement the ProSupport Infrastructure Suite to provide additional proficiencies that are critical for modern data center operations.

Hardware coverage add-ons to ProSupport

- **Keep Your Hard Drive (KYHD) and Keep Your Component (KYC):** Normally if a device fails under warranty, Dell replaces it using a one-for-one exchange process. KYHD / KYC gives you the option to retain your device. It provides full control of sensitive data and minimizes security risk by letting you retain possession of failed drives / components when receiving replacement parts without incurring additional cost.
- **Onsite Diagnosis Service:** Ideal for sites with non-technical staff. Dell field technician performs initial troubleshooting diagnosis onsite and transfers to Dell remote engineers to resolve the issue.
- **ProSupport Add-on for HPC:** Sold as an add-on to a ProSupport service contract, the ProSupport Add-on for HPC provides solution-aware support to cover the additional requirements that are required to maintain an HPC environment such as:
 - Access to senior HPC experts
 - Advanced HPC cluster assistance: performance, interoperability, and configuration
 - Enhanced HPC solution level end-to-end support
 - Remote pre-support engagement with HPC Specialists during ProDeploy implementation
- **ProSupport Add-on for Telco (Respond & Restore):** An add-on service designed for the top 31 TELCO customers globally, Respond & Restore provides direct access to Dell solution experts who specialize in TELCO carrier-grade support. This add-on also provides a hardware uptime guarantee, meaning if a system fails, Dell will have it installed and operational within 4 hours for Severity 1 issues. Dell incurs penalties and fees if SLAs are not met.

Supplemental Site-wide Expertise

- **Multivendor Support Service:** Support your 3rd party devices as one service plan for servers, storage and networking (includes coverage for: Broadcom, Cisco, Fujitsu, HPE, Hitachi, Huawei, IBM, Lenovo, NetApp, Oracle, Quanta, SuperMicro & others).
- **Technical Account Manager:** Designated technology lead who monitors and manages performance and configuration of specific technology sets.
- **Designated Remote Support:** Personalized support expert who manages all troubleshooting and resolution of IT assets

Services for large enterprises

- **ProSupport One for Data Center:** ProSupport One for Data Center offers flexible site-wide support for large and distributed data centers with more than 1,000 assets (combined total of server, storage, networking, etc.). This offering is built on standard ProSupport features that leverage our global scale and are tailored to specific customer needs. While not for everyone, this service option offers a truly unique solution for our largest customers with the most complex environments.
 - Team of assigned Services Account Managers with remote or onsite options
 - Assigned technical and field engineers who are trained on the customer's environment and configurations
 - On-demand reporting and recommendations enabled by ProSupport AIOps tools (MyService360, TechDirect & CloudIQ)
 - Flexible onsite support and parts options that fit their operational model

- A tailored support plan and training for their operations staff
- **Logistics Online Inventory Solution (LOIS):** Ideal for large organizations that have their own staff to support their data center. Dell offers a service called Logistics Online Inventory Solution which is an onsite parts locker that provides self-maintainers with a local inventory of common replacement components. Having access to these parts lockers allows the self-maintainer to replace a failed component immediately without delay. Each replacement part would automatically initiate a replenishment of the parts inventory that is shipped next day or delivered onsite by Dell during a regular scheduled visit (called Scheduled Onsite Service). As part of the LOIS system, customers can integrate their systems directly to Dell TechDirect using APIs to help streamline the support management process.

End-of-Life Services

- **Post Standard Support (PSS):** Extend service life beyond the initial seven years of ProSupport, adding up to five more additional years of hardware coverage
- **Data Sanitization & Data Destruction:** Renders data unrecoverable on repurposed or retired products, ensuring security of sensitive data and enabling compliance and provides NIST compliant certification.
- **Asset Recovery Services:** Recycle, resale, and disposal of hardware. Helps you securely and responsibly retire IT assets that are no longer needed while protecting both your business and the planet.

ProDeploy Infrastructure Suite

ProDeploy Infrastructure Suite provides a variety of deployment offerings to satisfy a customer's unique needs. It is made up of five sub-offers: **Configuration Services, Rack Integration, Basic Deployment, ProDeploy,** and **ProDeploy Plus.**

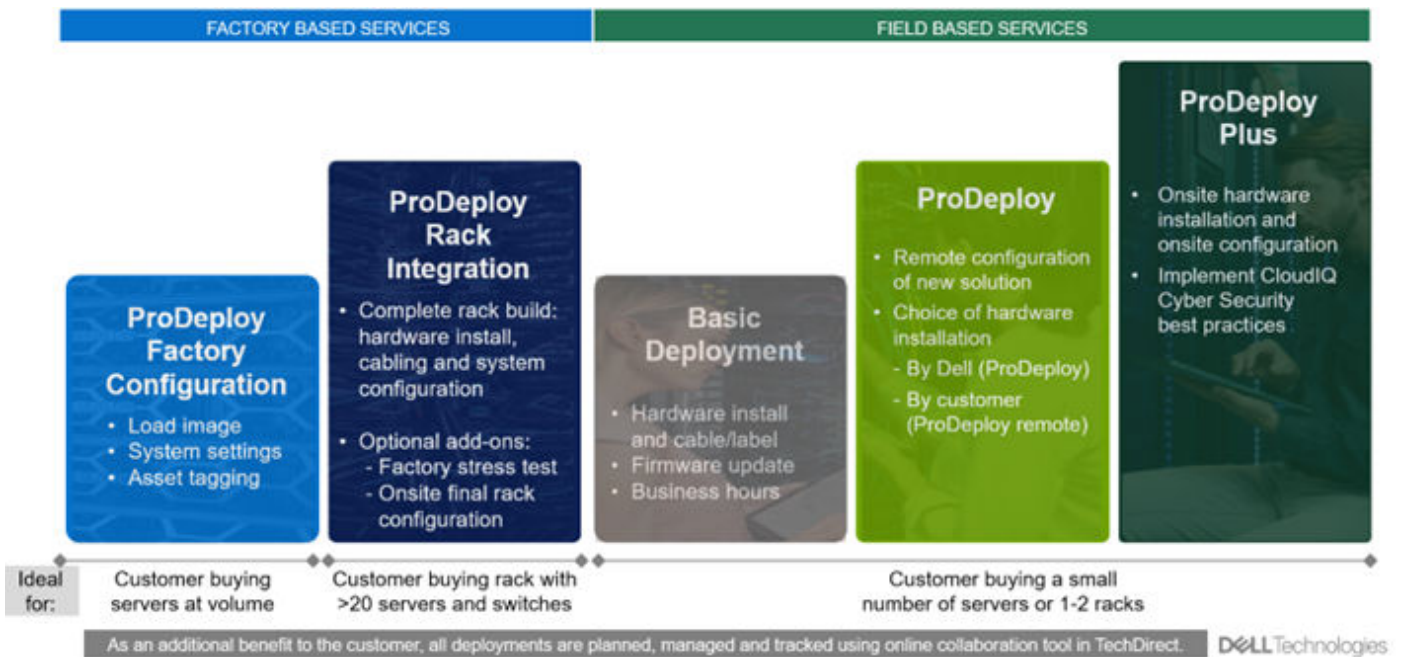


Figure 39. ProDeploy Infrastructure Suite

Factory Based Services

Pre-configured systems or complete racks, customized prior to shipping to the customer's site.

ProDeploy Factory Configuration

Ideal for customers buying servers in volume and seeking pre-configuration prior to shipping such as: custom image, system settings, and asset tagging so it arrives ready to use out of the box. Furthermore, servers are packaged and bundled to meet specific shipping and distribution requirements for each customer location to facilitate the rollout process. Once the server is

onsite , Dell can install and configure the server to the environment using any of the field-based deployment services outlined in the next section.

ProDeploy Rack Integration

Ideal for customers seeking to build out fully integrated racks prior to shipping. These rack builds include hardware install, cabling, and full system configuration. You can also add-on a factory stress test and an optional on-site final rack configuration to complete the rack installation.

- STANDARD SKUs for Rack Integration is available in the USA only and requires:
 - 20 or more devices (R and C series servers, VxRail, and all Dell or non-Dell switches). Use Informational SKUs for Dell switches or 3rd party products
 - Shipping to contiguous USA
- USE CUSTOM QUOTE for Rack Integration scenarios that require:
 - Shipment to any country or region outside USA or shipping outside contiguous USA
 - Shipping to multiple locations
 - Racks containing less than 20 servers
 - Any rack that includes Storage

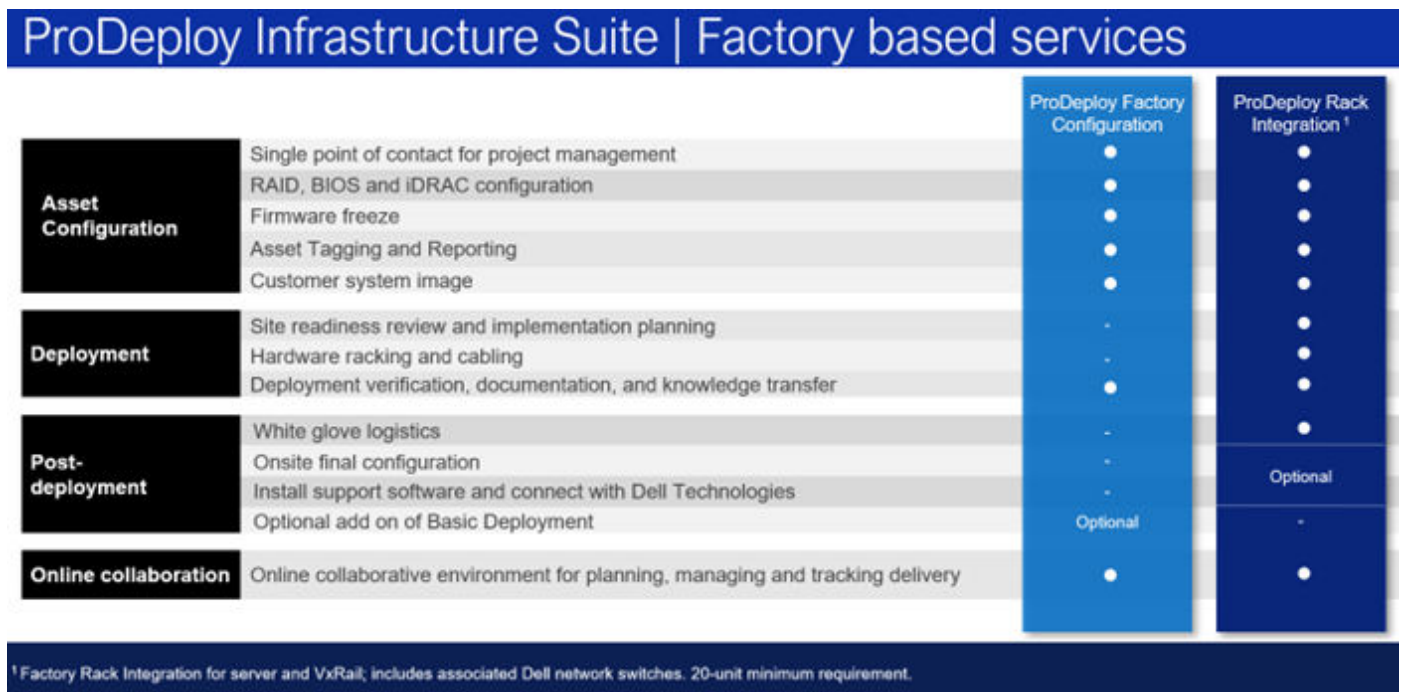


Figure 40. ProDeploy Infrastructure Suite - Factory services

Field-based Services

Put PowerEdge servers to work faster with Dell field-based deployment services. Whether we are deploying one server to one thousand – we have you covered. Dell provides versatile delivery options to fit every budget and operating model.

ProDeploy Plus

Elevate Infrastructure deployments with our most complete service from planning through onsite hardware installation and software configuration including the implementation of cybersecurity best practices. ProDeploy Plus provides the skill and scale needed to successfully execute demanding deployments in today's complex IT . The deployment starts with a site readiness review and implementation plan. Certified deployment experts perform the software configuration to include set up of leading operating systems and hypervisors. Dell will also configure PowerEdge software tools to include iDRAC and OpenManage system utilities as well as support AIOps platforms: MenvironmentsyService360, TechDirect, and CloudIQ. Unique to ProDeploy Plus, the cybersecurity implementation helps customers understand potential security risks and make recommendations for

reducing product attack surfaces. The system is tested, validated prior to completion. The customer will also receive full project documentation and knowledge transfer to complete the process.

ProDeploy

ProDeploy provides remote software configuration and choice of hardware installation (onsite or guided). ProDeploy is great for customers who are price sensitive or willing to participate in some portion of the deployment to include providing remote access to their network. The ProDeploy remote software implementation includes everything mentioned in ProDeploy Plus except it does not include the added value, cybersecurity implementation and best practices.

Basic Deployment

Basic Deployment delivers worry-free professional installation by experienced technicians. This service is often sold to Competency Enabled Partners who will have Dell do the hardware installation while they complete the software configuration. Furthermore, Basic Deployment tends to be purchased by large enterprises who have smart technical staff. These companies just need Dell to install the hardware and they will perform the software configuration. The last use case for Basic Deployment is when paired with Factory Configuration services. The servers are pre-configured in the factory and the basic deployment service will install the system into the rack to finalize the deployment.

ProDeploy Infrastructure Suite Field services		Basic Deployment	ProDeploy	ProDeploy Plus
Pre-deployment	Single point of contact for project management	-	●	In region
	Site readiness review and implementation planning	-	●	●
Deployment	Deployment service hours	Business hours	24/7	24/7
	Hardware installation options	Onsite	Onsite or guided ¹	Onsite
	System software installation and configuration options	-	Remote	Onsite
	Install connectivity software based on Secure Connect Gateway technology ²	-	●	●
	Implement CloudIQ CyberSecurity best practices and policies	-	-	●
Post-deployment	Deployment verification, documentation and knowledge transfer	-	●	●
	Configuration data transfer to Dell technical support	-	●	●
Online collaboration	Online collaborative platform in TechDirect for planning, managing and tracking delivery	-	●	●

¹ Choose from onsite hardware installation or a guided option including project specific instructions, documentation and live expert guidance
² Post deployment use for intelligent, automated support & insights

Figure 41. ProDeploy Infrastructure Suite - Field services

Supplemental Deployment Services

Additional ways to expand scope or deploy for unique scenarios.

Two Host Adder (requires PD/PDP)

Deploying new storage, compute, or networking devices may require interconnection to other servers (also called hosts). The Dell delivery team will set up four hosts per device as part of every ProDeploy service. For example, if the customer is buying two storage arrays the ProDeploy service will automatically include connectivity of four hosts each (4x2=8 total hosts per project since there are two devices). This supplemental “Two Host Adder” service provides for the configuration of additional hosts above what is already provided as part of the ProDeploy service. In many cases, customers can work with us while we set up the included hosts, so they may understand how to do the rest themselves. Always ask the customer how many hosts

are being connected and sell the host adder depending on the customer's technology skillset. Note this service applies to the connectivity of Dell devices not 3rd party devices.

Additional Deployment Services (ADT) - sold with or without PD/PDP

You can expand the scope of a ProDeploy engagement leveraging Additional Deployment Time (ADT). ADT will cover additional tasks above the normal deliverables of the ProDeploy offers. ADT can also be used as a standalone service without ProDeploy. SKUs are available for both Project Management and Technical Resource Expertise. SKUs are sold as blocks of four hours remote or eight hours onsite. The delivery team can assist in scoping the number of hours required for additional tasks.

Data Migration Services

Migrating data sets is no easy task. Our experts use proven tools and process to streamline data migrations and avoid compromising data. A customer project manager works with our experienced team of experts to create a migration plan. Data migration is part of every technology upgrade, platform change, and shift to the cloud. You can rely on Dell data migration services to perform a seamless transition.

Residency Services

Certified technical professionals act like an extension of your IT staff to enhance internal capabilities and resources and help you realize faster adoption and maximized ROI of new technology. Residency Services help customers transition to new capabilities quickly by leveraging specific technology skill sets. Residency experts can provide post implementation management and knowledge transfer that is related to a new technology acquisition or day-to-day operational management of the IT infrastructure.

- Global experts available to serve in-person (onsite) or virtual (remote)
- Engagements starting at 2 weeks with flexibility to adjust

Unique Deployment Scenarios

Custom Deployment Services

When a deployment is beyond the scope of the ProDeploy Infrastructure Suite, you can turn to the custom deployment services team to address complex implementation scenarios and unique customer requirements. The Dell custom deployment team is staffed with solution architects who assist with customer scoping calls to define the project and develop the statement of work. Custom services can handle a wide range of deployments that can be performed in the factory or onsite. All custom engagement services are requested through SFDC.

ProDeploy FLEX

ProDeploy Flex is a new service and a powerful tool for you to attach more services and improve revenue and margins. The ProDeploy Flex modular offer allows sales teams to build and better tailor services by mixing factory and field delivery options. You can also select special deployment scenarios without going to the custom order desk. FLEX is ideal for unique deployments where ProDeploy or ProDeploy Plus are not an adequate answer to the customer needs.

Key features of ProDeploy FLEX

- Build deployment quotes using modular, selectable features for both hardware and software.
- The system automatically scales pricing based on volume.
- Ideal for customers who require NativeEdge Orchestrator or edge deployments
- Ability to add deployment services to third-party networking devices

Deployment of HPC

High-Performance Computing (HPC) implementations require specialists that understand advanced feature sets. Dell deploys the world's fastest systems and understands the nuances that make them perform. HPC deployments are most often scoped as custom service engagements, however we can do smaller HPC clusters under 300 nodes using a standard ProDeploy SKU. Any standard SKU for HPC deployment will be sold as one base SKU per cluster (ProDeploy for HPC Base) along with one ProDeploy for HPC Add-on for each device in the cluster (server nodes and switches).

- Scope of ProDeploy for HPC: *Available as standard SKUs in the US and Canada. Custom Service would be required for all other regions.

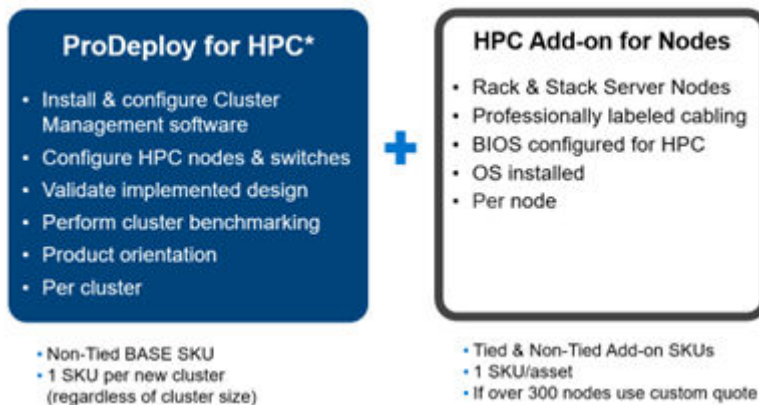


Figure 42. Standard deliverables of ProDeploy for HPC

Build HPC solutions for your unique requirements

Choose ProDeploy for HPC or Custom deploy

ProDeploy service includes configuration of most OS, cluster mgmt., networking and benchmarking



Figure 43. Visual view of HPC deployment options to include hardware and software

DAY 2 - Automation Services with Ansible

Dell solutions are built as "automation ready" with integrated APIs (Application Programming Interfaces) to allow customers to programmatically call actions on the product through code. Although Dell has published Ansible automation use cases, some customers need additional assistance with GitOps. By the end of the service, the customer will have the foundational components required to accelerate automation and understand how the programming works together: Day 1 and Day 2 use case automation scripts (ansible modules), CI/CD tool (Jenkins), and Version control (Git).


Consulting Services

Our expert consultants help customers transform faster, and quickly achieve business outcomes for the high value workloads Dell PowerEdge systems can handle. From strategy to full-scale implementation, Dell Technologies Consulting can

help determine how to perform IT, workforce, or application transformation. We use prescriptive approaches and proven methodologies that are combined with portfolio and partner ecosystem of Dell Technologies to help achieve real business outcomes. We are here to help guide your next transformation that could address multi-cloud environments, business applications, DevOps, business resiliency, data center modernization, analytics, workforce collaboration, and user experiences.

Managed Services

Some customers prefer Dell to manage the complexity and risk of daily IT operations. Dell Managed Services utilizes proactive, artificial intelligence to improve operations and modern automation. This helps customers realize desired business outcomes from their infrastructure investments. With these technologies, our experts run, update, and fine-tune customer environments. You decide the service level requirements and we provide oversight of the environment. There are two types of managed service offers. First the outsourcing model, or CAPEX model, where Dell manages customer owned assets using our people and tools. The second is the "as-a-Service" model, or OPEX model, which we call APEX. In this service, Dell owns all technology and all the management of it. Many customers will have a blend of the two management types depending on the goals of the organization.

Managed	Outsourcing or CAPEX model	APEX	as-a-Service or OPEX model
<p>We manage your technology using our people and tools.¹</p> <ul style="list-style-type: none"> • Managed detection and response* • Technology Infrastructure • End-user (PC/desktop) • Service desk operations • Cloud Managed (Pub/Private) • Office365 or Microsoft Endpoint 		<p>We own all technology so you can off-load all IT decisions.</p> <ul style="list-style-type: none"> • APEX Cloud Services • APEX Flex on Demand elastic capacity • APEX Data Center Utility pay-per-use model 	

1 – Some minimum device counts may apply. Order via: ClientManagedServices.sales@dell.com

* Managed detection and response covers the security monitoring of laptops, servers, & virtual servers. Min. 50 devices combined. No Networking or Storage-only systems [SAN/NAS]. Available in 32 countries. [Details here](#)

Figure 44. Dell Managed Services

- **Managed Detection and Response (MDR):** Dell Technologies Managed Detection and Response (MDR) is powered by Secureworks Taegis XDR software platform. MDR is a managed service that secures the customer's IT environment against malicious actors and provides remediation if and when a threat is identified. When a customer purchases MDR, they will receive the following features from our team:
 - Dell badge resources
 - Agent rollout assistance to help deploy the Secureworks Endpoint Agent.
 - 24x7 threat detection and investigation
 - Up to 40 hrs per quarter of response and active remediation activities
 - If the customer experiences a breach, we will provide up to 40 hrs per year of Cyber incident response initiation.
 - Quarterly reviews with the customer to review the data

Education Services

Build the IT skills required to influence the transformational outcomes of the business. Enable talent and empower teams with the right skills to lead and perform transformational strategy that drives competitive advantage. Leverage the training and certification required for real transformation.

Dell Technologies Education Services offers PowerEdge server training and certifications that are designed to help customers achieve more from their hardware investment. The curriculum delivers the information and the practical, firsthand skills that their team must confidently install, configure, manage, and troubleshoot Dell servers.

To learn more or register for a class today, see Education.Dell.com

Resources

Services Central: [Services for PowerEdge](#)

Sales Portal: [Services for Server Knowledge Center](#)