Dell EMC PowerEdge R7525

Technical Guide

Regulatory Model: Regulatory Model: E68S
Regulatory Type: Regulatory Type: E68S001

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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Product overview

Introduction

The Dell EMC PowerEdge R7525 is a two socket, 2U rack servers that is designed to run workloads using flexible I/O and network configurations. The PowerEdge R7525 features the 2nd Gen AMD EPYC processor, supports up to 32 DIMMs, PCI Express (PCIe) Gen 4.0 enabled expansion slots, and a choice of network interface technologies to cover networking options.

The PowerEdge R7525 is designed to handle demanding workloads and applications, such as data warehouses, ecommerce, databases, and high-performance computing (HPC).

Featured technologies

The following table shows the new technologies for the PowerEdge R7525:

Table 1. New technologies

Technology	Detailed Description
AMD® Processor (SP3)	· 7 nm processor technology · AMD® Interchip global memory interconnect (xGMI) up to 64 lanes · Up to 64 cores per socket · Up to 3.8 GHz · Max TDP: 280 W
3200 MT/s DDR4 memory	· Up to 32 DIMMs · 8x DDR4 Channels per socket, 2 DIMMs per channel (2DPC) · Up to 3200 MT/s (configuration-dependent) · Supports RDIMM, LRDIMM, and 3DS DIMM
PCIe Gen and slot	· Gen 4 at 16 T/s
Flex I/O	· LOM board, 2 x 1G with BCM5720 lan controller · Rear I/O with 1 G dedicated management network port · One USB 3.0, one USB 2.0 and VGA port · OCP Mezz 3.0 · Serial port option
CPLD 1-wire	· Support payload data of front PERC, Riser, backplane and rear I/O to BIOS and IDRAC
Dedicated PERC	· Front storage module PERC with front PERC 10.4
Software RAID	· Operating system RAID/PERC S 150
iDRAC9 with Lifecycle Controller	The embedded systems management solution for Dell servers features hardware and firmware inventory and alerting, in-depth memory alerting, faster performance, a dedicated Gb port and many more features.
Wireless Management	The Quick Sync feature is an extension of NFC-based low-bandwidth interface. Quick Sync 2.0 offers feature parity with the previous versions of the NFC interface with improved user experience. To extend this Quick Sync feature to wide variety of Mobile OSs with higher data throughput, the Quick Sync 2 version replaces previous generation NFC technology with wireless at-the-box system management.
Power supply	· 60 mm / 86 mm dimension is the new PSU form factor

Technology	Detailed Description
	• Platinum Mixed Mode 800 W AC or HVDC • Platinum Mixed Mode 1400 W AC or HVDC • Platinum Mixed Mode 2400 W AC or HVDC

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System features

Product comparison

Table 2. Product comparison

Feature	PowerEdge R7525	PowerEdge R7425
Processor	Two AMD Rome (SP3) Processors	Two AMD Naples socket SP3 compatible processors
CPU Interconnect	Inter-chip global memory interconnect (xGMI-2)	AMD Socket to Socket Global Memory Interface (xGMI)
Memory	32x DDR4 RDIMM, LRDIMM, 3DS	32x DDR4 RDIMM, LRDIMM
Disk Drives	3.5-inch, 2.5-inch: 12G SAS, 6G SATA, NVMe HDD	3.5-inch, 2.5-inch: 12G SAS, 6G SATA HDD
Storage Controllers	Front PERC: H745, HBA345, H345, H840, 12G SAS HBA SW RAID: S150	Adapters: H330, H730P, H740P, H840 , HBA330, 12G SAS HBA SW RAID: S140
PCIe SSD	Up to 24x PCIe SSD	Up to 24x PCIe SSD
PCIe Slots	Up to 8 (PCIe 4.0)	Up to 8(Gen3 x16)
rNDC	2 x 1 GB	Select Network Adapter NDC: 4 x 1 GB, 4 x 10 GB, 2 x 10 GB + 2 x 1 GB, or 2 x 25 GB
OCP	Yes for OCP 3.0	Yes for OCP 2.0 Type 1: (Connector A)
USB Ports	Front: 1 x USB 2.0, 1 x iDRAC USB (Micro-AB USB) Rear: 1 x USB 3.0, 1 x USB 2.0 Internal: 1 x USB 3.0	Front: 1 x USB2.0, 1 x iDRAC USB(Micro USB) , Optional 1xUSB 3.0 front port Rear: 2 x USB3.0 Internal: 1 xUSB3.0
Rack Height	2U	2U
Power Supplies	Mixed Mode (MM) AC/HVDC (Platinum) 800 W, 1400 W, 2400 W	AC Platinum : 2400 W, 2000 W, 1600 W, 1100 W, 495 W 750 W AC Platinum: Mixed Mode HVDC (for China only), Mixed Mode AC, DC (DC for China only) 1100 W -48 V DC Gold
System Management	LC 3.x, OpenManage, QuickSync2.0, OMPC3, Digital License Key, iDRAC Direct (dedicated micro-USB port), Easy Restore	LC 3.x, OpenManage, QuickSync 2.0, Digital License Key, iDRAC9, iDRAC Direct (dedicated micro-USB port), Easy Restore, vFlash
GPU	3 x 300 W (DW) or 6 x 75 W (SW)	3 x 300 W (DW) or 6 x 150 W (SW)
Availability	Hot-plug drives, Hot-plug redundant power supplies, BOSS, IDSDM	Hot-plug drives, Hot-plug redundant power supplies, BOSS, IDSDM

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Chassis views and features

Front view of the system

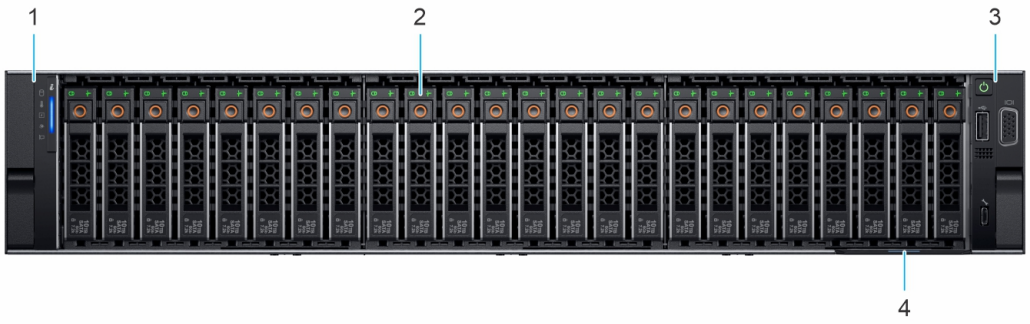

Figure 1. Front view of the 24 x 2.5-inch drive system

1. Left control panel
2. Drive (24)
3. Right control panel
4. Information tag

Figure 2. Front view of the 16 x 2.5-inch drive system

1. Left control panel
2. Drive (16)
3. Right control panel
4. Information tag

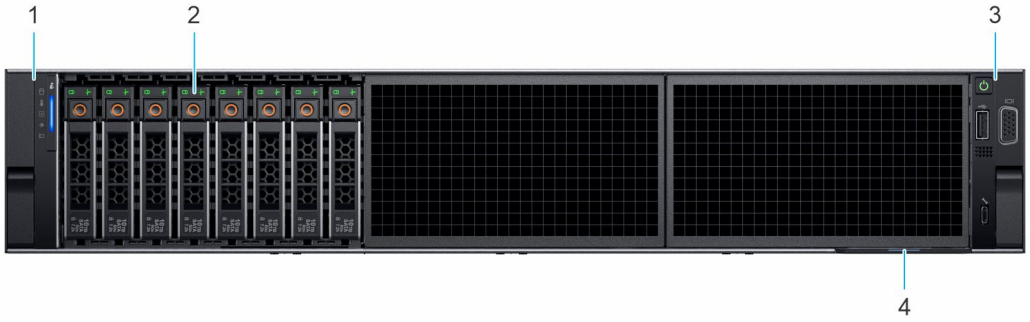

Figure 3. Front view of the 8 x 2.5-inch drive system

1. Left control panel
2. Drive (8)
3. Right control panel
4. Information tag

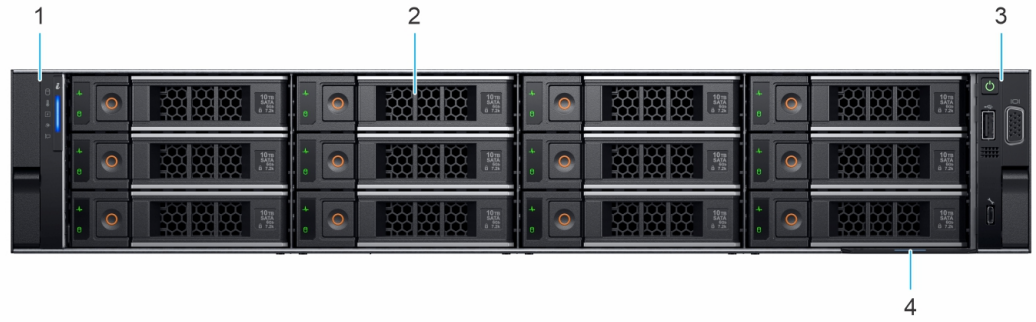

Figure 4. Front view of the 12 x 3.5-inch drive system

1. Left control panel
2. Drive (12)
3. Right control panel
4. Information tag

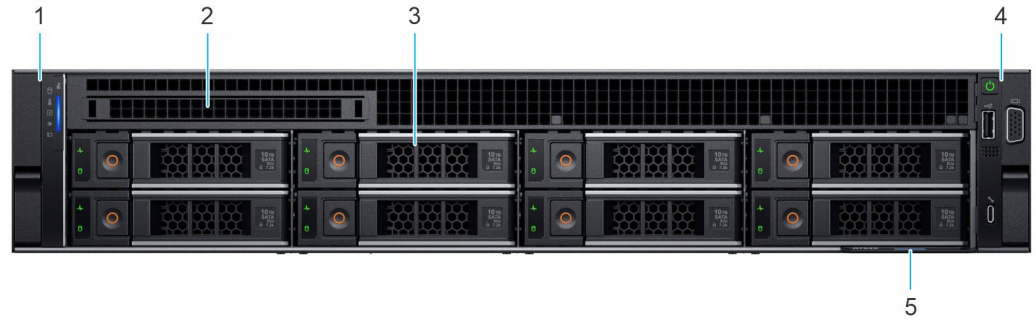

Figure 5. Front view of the 8 x 3.5-inch drive system

1. Left control panel
2. Optical Drive blank
3. Drive (8)
4. Right control panel
5. Information tag

Rear view of the system

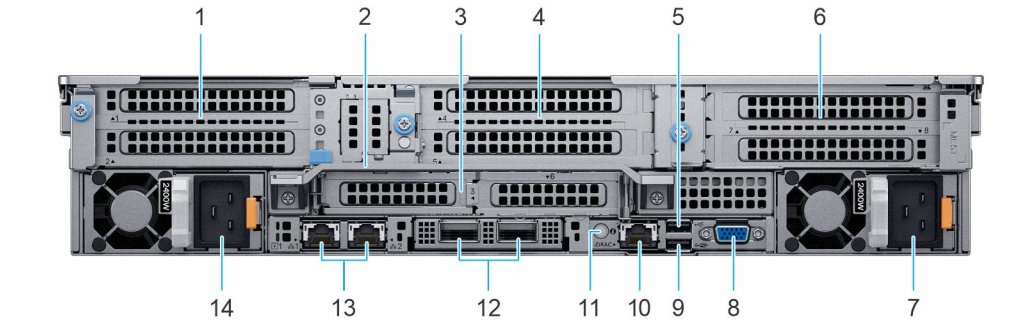

Figure 6. Rear view of the system

1. PCIe expansion card riser 1 (slot 1 and slot 2)

2. Rear Handle
3. PCIe expansion card riser 2 (slot 3 and slot 6)
4. PCIe expansion card riser 3 (slot 4 and slot 5)
5. USB 2.0 port (1)
6. PCIe expansion card riser 4 (slot 7 and slot 8)
7. Power supply unit (PSU 2)
8. VGA port
9. USB 3.0 port (1)
10. iDRAC dedicated port

    NOTE: Enables you to remotely access iDRAC.
11. System identification button
12. OCP NIC port (optional)
13. NIC port (1,2)
14. Power supply unit (PSU 1)

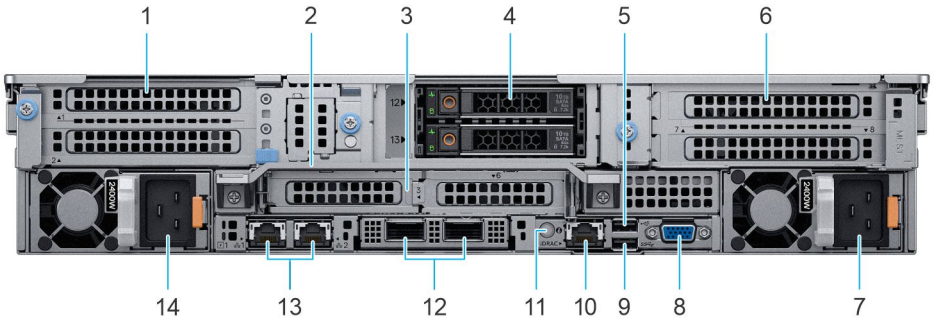

Figure 7. Rear view of the system with 2 x 2.5-inch rear drive module

1. PCIe expansion card riser 1 (slot 1 and slot 2)
2. Rear Handle
3. PCIe expansion card riser 2 (slot 3 and slot 6)
4. Rear drive module
5. USB 2.0 port (1)
6. PCIe expansion card riser 4 (slot 7 and slot 8)
7. Power supply unit (PSU 2)
8. VGA port
9. USB 3.0 port (1)
10. iDRAC dedicated port

    NOTE: Enables you to remotely access iDRAC.
11. System identification button
12. OCP NIC port (optional)
13. NIC port (1,2)
14. Power supply unit (PSU 1)

Inside the system

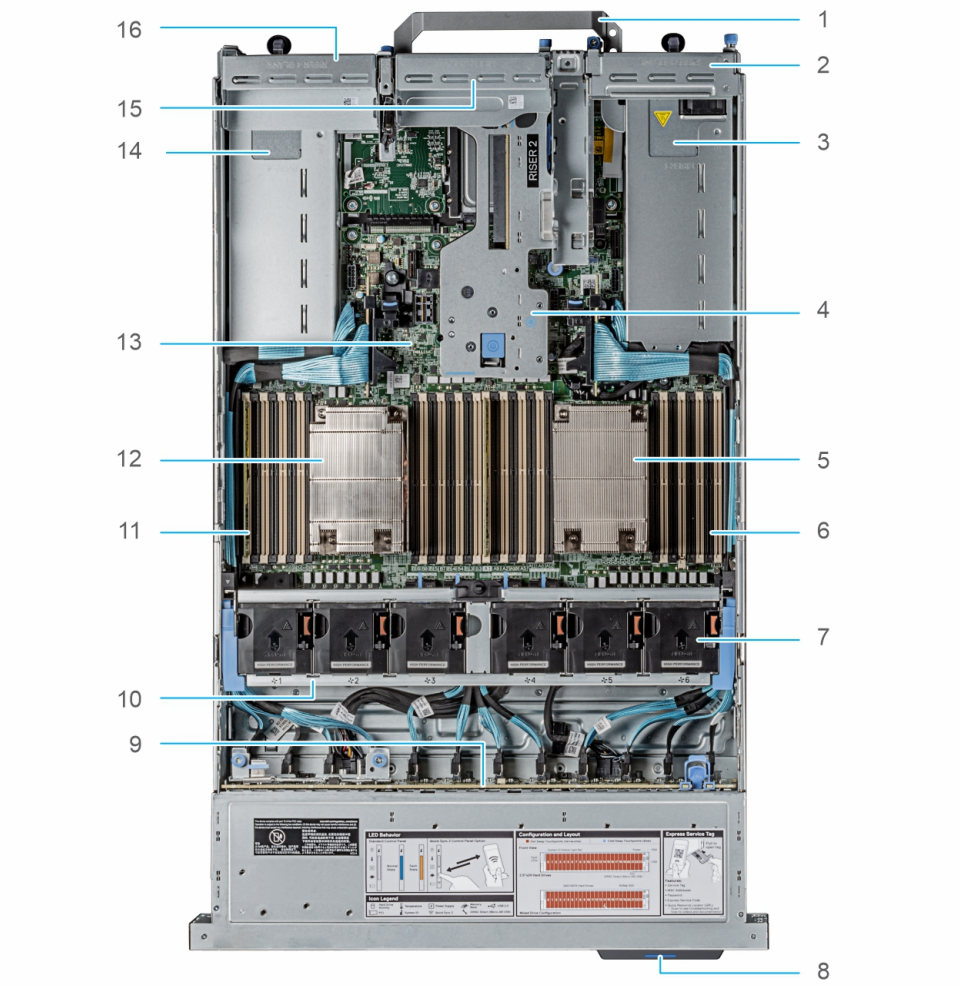

Figure 8. Inside the system

1. Handle
2. Riser 1 blank
3. Power supply unit (PSU 1)
4. Riser 2
5. Heat sink for processor 1
6. Memory DIMM socket for processor 1 (E,F,G,H)
7. Cooling fan assembly
8. Service tag
9. Drive backplane
10. Cooling fan cage assembly
11. Memory DIMM socket for processor 2 (A,B,C,D)
12. Heat sink for processor 2
13. System board
14. Power supply unit (PSU 2)
15. Riser 3 blank
16. Riser 4 blank

Quick Resource Locator for PowerEdge R7525 system

Figure 9. Quick Resource Locator for PowerEdge R7525 system

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Processor

The 2nd Generation AMD EPYC processors provide several SKUs ranging from 16 cores and up to 64 cores.

Topics:

Processor features

The key features of the AMD EPYC Rome processor are:

- Support up to 64 cores
- Up to 8 channels with 2 DIMMs per channel (DPC) per processor and 32 DIMMs in total
- Supports RDIMM, LRDIMM, NVDIMM-N, 3DS DIMM DDR4 with ECC up to 3200 MT/s
- Integrated PCI Express Gen 4 for improved bandwidth and connectivity
- Up to 128 lanes per processor.

Single processor configuration

The system is designed such that a single processor placed in the processor 1 socket functions normally. Processor and memory blanks that are associated with processor 2 are required to be populated for thermal reasons. The system will not boot if only the processor 2 socket is populated.

only Riser 1 is functional with single processor configuration.

Processor restrictions

The following are AMD EPYC processor restrictions:

- The RTC/COMS is build in the processor. Therefore, removing or reinstalling processor 1 will cause the RTC/COMS to be lost.
- AMD does not support early boot. There is no error message when there is no memory populating in the system.

Supported processors

Table 3. Supported processor for the PowerEdge R7525

Processor model number	Base frequency in GHz	Cores/Threads	TDP in W	L3 Cache in MB	Max DDR frquency (1 DPC) MHz
7742	2.25	64/128	225	256	3200
7702	2.00	64/128	200	256	3200
7662	2.0	64/128	225	256	3200
7642	2.30	48/96	225	256	3200
7552	2.20	48/96	200	192	3200
7532	2.40	32/64	200	256	3200
7542	2.90	32/64	225	128	3200
7502	2.50	32/64	180	128	3200
7452	2.35	32/64	155	128	3200

Processor model number	Base frequency in GHz	Cores/Threads	TDP in W	L3 Cache in MB	Max DDR frquency (1 DPC) MHz
7402	2.80	24/48	180	128	3200
7352	2.30	24/48	155	128	3200
7302	3.00	16/32	155	128	3200
7262	3.20	8/16	155	128	3200
7282	2.80	16/32	120	64	3200
7272	2.90	12/24	120	64	3200
7H12	2.60	64/128	280	256	3200

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Memory

The PowerEdge R7525 system supports up to 32 DIMMS, 4 TB of memory, and speeds up to 3200MT/s.

The R7525 support registered (RDIMMs) and load reduced DIMMs (LRDIMMs) which use a buffer to reduce memory loading and provide greater density, allowing for the maximum platform memory capacity. Unbuffered DIMMs (UDIMMs) are not supported.

Topics:

Supported memory

The following table lists the memory technologies that are supported by the R7525:

Table 4. Memory technology comparison

Feature	R7525(DDR4)
DIMM type	RDIMM
	LRDIMM
Transfer speed	3200 MT/s
	2933 MT/s
Voltage	1.2 V

The following table shows the supported DIMMs for the PowerEdge R7525:

Table 5. Supported DIMMs for the PowerEdge R7525

DIMM Speed(MT/s)	DIMM Type	DIMM Capacity(GB)	Ranks per DIMM	Data Width	DIMM Voltage (V)	Maximum RAM
3200	RDIMM	8	1	8	1.2	256 GB
3200	RDIMM	16	2	8	1.2	512 GB
3200	RDIMM	32	2	4	1.2	1 TB
3200	RDIMM	64	2	4	1.2	2 TB
2666	LRDIMM	128	8	4	1.2	4 TB
3200	LRDIMM	128	4	4	1.2	4 TB

Memory speed

Table 6. Supported memory matrix

DIMM type	Rank	Capacity	DIMM rated voltage and speed	AMD EPYC™ processor	
				1 DIMM per channel (1DPC)	2 DIMMs per channel (2DPC)
RDIMM	1R	8 GB	DDR4 (1.2V), 3200 MT/s	3200 MT/s	2933 MT/s
	2R	16 GB, 32 GB, 64 GB	DDR4 (1.2V), 3200 MT/s	3200 MT/s	2933 MT/s

LRDIMM	8R	128 GB	DDR4 (1.2V), 2666 MT/s	2666 MT/s	2666 MT/s

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Storage

The PowerEdge R7525 supports the following drive configurations:

- 8 x 3.5-inch backplane configuration with support up to 8 SAS/SATA drives
- 8 x 2.5-inch backplane configuration with support up to 8 NVMe drives
- 12 x 3.5-inch backplane configuration with support up to 12 SAS/SATA drives
- 16 x 2.5-inch backplane configuration with support up to 16 SAS/SATA drives
- 24 x 2.5-inch backplane configuration with support up to 24 SAS/SATA/NVMe drives
- 2 x 2.5-inch backplane configuration with support up to 2 rear SAS/SATA drives

Topics:

Storage controllers

Dell EMC RAID controller options offer performance improvements, including the Mini PERC solution. Mini PERC provides a base RAID HW controller without consuming a PCIe slot by using a small form factor and high density connector to the base planar.

The following table shows the supported storage controllers for the PowerEdge R7525:

Table 7. Supported storage controllers

Performance level	Description
Entry	S150 (SATA, NVMe) Software RAID SATA
Value	HBA345 (internal), 12Gbps SAS HBA (external) H345, 12 Gbps SAS HBA (external)
Value Performance	H745
Premium Performance	H840

Supported drives

Table 8. Supported drives - SAS and SATA or SSD

Form Factor	Type	Speed	Rotational Speed	Capacities
2.5-inch	SAS	12 Gb	10 K	300 GB, 600 GB, 1.2 TB, 1.8 TB, 1.2 TB (SED/FIPS), 2.4 TB, 2.4 TB (SED/FIPS)
	SATA	6 Gb	7.2 K	1 TB, 2 TB
	SATA SSD (M.2)	6 Gb	N/A	120 GB, 240 GB
	SAS SSD	12 Gb	N/A	400 GB, 800 GB, 960 GB, 1.633 TB, 1.92 TB, 3.2 TB, 3.840 TB, 1.92 TB (SED/FIPS)

Form Factor	Type	Speed	Rotational Speed	Capacities
	SATA SSD	6 Gb	N/A	120 GB, 200 GB, 240 GB, 300 GB, 400 GB, 480 GB, 800 GB, 960 GB, 1.2 TB, 1.6 TB, 1.92 TB, 3.84 TB
	SAS	12 Gb	15 K	300 GB, 600 GB, 900 GB
	SAS	12 Gb	7.2 K	1 TB, 2 TB, 4 TB, 6 TB, 8 TB, 10 TB, 2 TB (SED/FIPS)
3.5-inch	SATA	6 Gb	7.2 K	1 TB, 2 TB, 4 TB, 6 TB, 8 TB, 10 TB
	SAS	12 Gb	7.2 K	1 TB, 2 TB, 4 TB, 8 TB, 10 TB, 4 TB (SED FIPS),8 TB (SED FIPS)

Table 9. Supported NVMe SSDs

Description
SSDR,1.6,NVMEPCIE,2.5,PM1725B
SSDR,6.4,NVMEPCIE,2.5,PM1725B
CRD,CTL,NVME,1.6,HHHL,PM1725B
SSDR,3.2,NVMEPCIE,2.5,PM1725B
SSDR,12.8,NVMEPCIE,2.5,PM1725B
CRD,CTL,NVME,3.2,HHHL,PM1725B
CRD,CTL,NVME,6.4,HHHL,PM1725B
SSDR,960GB,NVMEPCIE,2.5,CD5
SSDR,3.84TB,NVMEPCIE,2.5,CD5

External drives

The following table shows the supported external storage for the PowerEdge R7525:

Table 10. Supported external storage

Device Type	Description
External Tape	Supports connection to external USB tape products
NAS/IDM appliance software	Supports NAS software stack
JBOD	Supports connection to 12Gb MD-series JBODs

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Networking and PCIe

The PowerEdge R7525 system supports two Network Interface Controller (NIC) ports embedded on the LOM card.

The PowerEdge R7525 system also supports OCP NIC port integrated on the optional OCP card.

Table 11. NIC port specification

Feature	Specifications
LOM card	1 GB x 2
OCP card (OCP 3.0)	1 GbE x 4, 10 GbE x 2, 25 GbE x 2, 25 GbE x 4, 50 GbE x 2, 100 GbE x 2

Topics:

- Expansion cards and slots

Expansion cards and slots

The PowerEdge R7525 supports PCI express (PCIe) generation 4 expansion cards that can be installed on the system board using expansion card risers.

PCIe expansion card risers

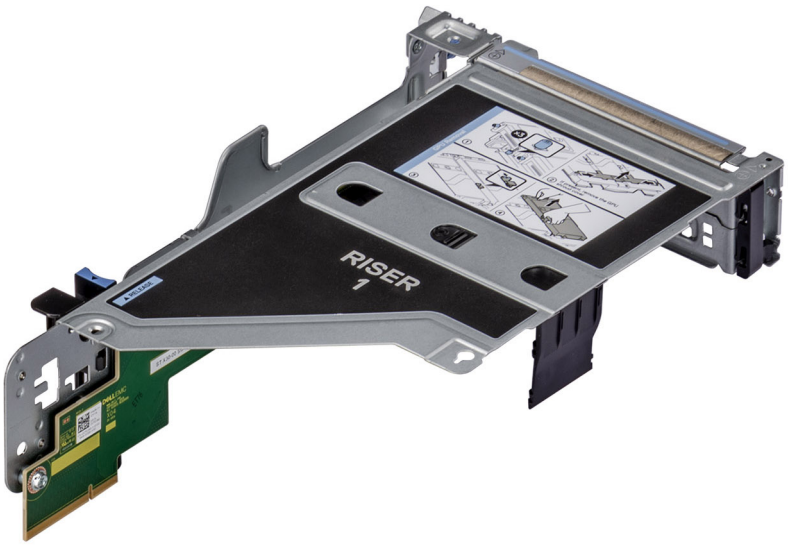

Figure 10. Slot 1 - Riser 1

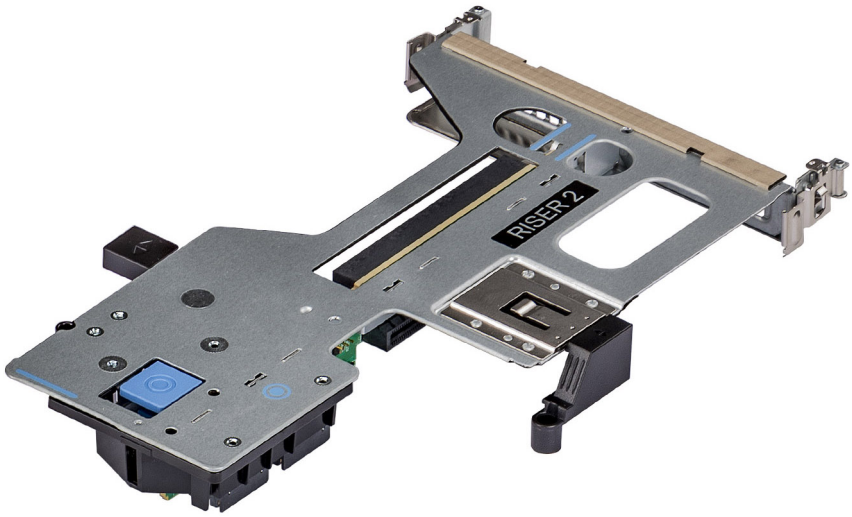

Figure 11. Slot 1 and 2 - Riser 2

Figure 12. Slot 3 - Riser 3

Figure 13. Slot 2 - Riser 4

The PowerEdge 7525 system supports up to four PCI express (PCIe) Gen 4 expansion cards.

Table 12. Expansion card riser configurations

Expansion card riser	PCIe slots	Processor connection	Height	Length	Slot width
Riser 1	Slot 1	Processor 1	Full Height	Half Length	x8
					x16
	Slot 2				x8
					x16
Riser 2	Slot 3	Processor 1	Low Profile	Half Length	x16
	Slot 6	Processor 2			
Riser 3	Slot 4	Processor 2	Full Height	Half Length	x8
					x8
	Slot 5				x16
Riser 4	Slot 7	Processor 2	Full Height	Half Length	x8
					x16
					x8
	Slot 8				x16

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

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

Table 13. Configuration 0 - No riser

Card type	Slot priority	Maximum number of cards
Broadcom (OCP: 25 Gb)	Internal Slot	1

Card type	Slot priority	Maximum number of cards
QLogic (OCP: 25 Gb)	Internal Slot	1
Mellanox (OCP: 25 Gb)	Internal Slot	1
SolarFlare (OCP: 25 Gb)	Internal Slot	1
Intel (OCP: 25 Gb)	Internal Slot	1
Intel (OCP: 10 Gb)	Internal Slot	1
Broadcom (OCP: 10 Gb)	Internal Slot	1
QLogic (OCP: 10 Gb)	Internal Slot	1
Broadcom (OCP: 1 Gb)	Internal Slot	1
Intel (OCP: 1 Gb)	Internal Slot	1

Table 14. Configuration 1: R1B

Card type	Slot priority	Maximum number of cards
Intel (NIC: 25 Gb)	1,2	2
SolarFlare (NIC: 25 Gb)	1,2	2
Broadcom (NIC: 25 Gb)	1,2	2
QLogic (NIC: 25 Gb)	1,2	2
Emulex (HBA: FC32)	1,2	2
QLogic (HBA: FC32)	1,2	2
Emulex (HBA: FC16)	1,2	2
QLogic (HBA: FC16)	1,2	2
Intel (NIC: 10 Gb)	1,2	2
Broadcom (NIC: 10 Gb)	1,2	2
QLogic (NIC: 10 Gb)	1,2	2
Intel (NIC: 1 Gb)	1,2	2
Broadcom (NIC: 1 Gb)	1,2	2
Samsung (PCIE SSD)	1,2	1
Intel (PCIE SSD)	1,2	1
Dell PERC Adapter	1,2	2
Dell BOSS Adapter	1,2	1
Dell Front PERC	Internal Slot	1
Mellanox (OCP: 100 Gb)	Internal Slot	1
Mellanox (OCP: 50 Gb)	Internal Slot	1
Broadcom (OCP: 25 Gb)	Internal Slot	1
QLogic (OCP: 25 Gb)	Internal Slot	1
Mellanox (OCP: 25 Gb)	Internal Slot	1

Card type	Slot priority	Maximum number of cards
SolarFlare (OCP: 25 Gb)	Internal Slot	1
Intel (OCP: 25 Gb)	Internal Slot	1
Intel (OCP: 10 Gb)	Internal Slot	1
Broadcom (OCP: 10 Gb)	Internal Slot	1
QLogic (OCP: 10 Gb)	Internal Slot	1
Broadcom (OCP: 1 Gb)	Internal Slot	1
Intel (OCP: 1 Gb)	Internal Slot	1

Table 15. Configuration 2: R1B+ R4B

Card type	Slot priority	Maximum number of cards
Inventec (Serial)	8	1
Dell BOSS Adapter	1, 2, 7, 8	1
Dell PERC Adapter	2	1
Intel (NIC: 25 Gb)	1, 2, 7	3
Mellanox (NIC: 25 Gb)	1, 2, 3	3
SolarFlare (NIC: 25 Gb)	1, 2, 7	3
Broadcom (NIC: 25 Gb)	1, 2, 7	3
QLogic (NIC: 25 Gb)	1, 2, 7	3
Emulex (HBA: FC32)	1, 2, 7	3
QLogic (HBA: FC32)	1, 2, 7	3
Emulex (HBA: FC16)	1, 2, 7	3
QLogic (HBA: FC16)	1, 2, 7	3
Intel (NIC: 10 Gb)	1, 2, 7	3
Broadcom (NIC: 10 Gb)	1, 2, 7	3
QLogic (NIC: 10 Gb)	1, 2, 7	3
Intel (NIC: 10 Gb)	1, 2, 7	3
Intel (NIC: 1 Gb)	1, 2, 7	3
Broadcom (NIC: 1 Gb)	1, 2, 7	3
Dell PERC Adapter	1, 2, 7, 8	3
Samsung (PCIe SSD)	1, 2, 7, 8	3
Intel (PCIe SSD)	1, 2, 7, 8	3
Dell Front PERC	Internal Slot	1
Broadcom (OCP: 25 Gb)	Internal Slot	1
QLogic (OCP: 25 Gb)	Internal Slot	1
Mellanox (OCP: 25 Gb)	Internal Slot	1
SolarFlare (OCP: 25 Gb)	Internal Slot	1

Card type	Slot priority	Maximum number of cards
Intel (OCP: 25 Gb)	Internal Slot	1
Intel (OCP: 10 Gb)	Internal Slot	1
Broadcom (OCP: 10 Gb)	Internal Slot	1
QLogic (OCP: 10 Gb)	Internal Slot	1
Broadcom (OCP: 1 Gb)	Internal Slot	1
Intel (OCP: 1 Gb)	Internal Slot	1

Table 16. Configuration 3: R1A + R2A + R3A + R4A

Card type	Slot priority	Maximum number of cards
Inventec (Serial)	4	1
NVIDIA (GPU - Low Profile)	3, 6	2
NVIDIA (GPU - Full Height)	2, 5, 7	3
Xilinx (Accelerators - FPGAs - Full Height)	2, 5, 7	3
Inventec (BOSS - Full Height)	2, 5, 7	1
Inventec (BOSS - Low Profile)	3, 6	1
Dell PERC Adapter	3	1
Mellanox (NIC: 100 Gb - Full Height)	2, 5, 7	3
Mellanox (NIC: 100 Gb - Low Profile)	3, 6	2
Intel (NIC: 25 Gb - Full Height)	2, 5, 7	3
Intel (NIC: 25 Gb - Low Profile)	3, 6	2
Mellanox (NIC: 25 Gb - Full Height)	2, 5, 7	3
Mellanox (NIC: 25 Gb - Low Profile)	3, 6	2
SolarFlare (NIC: 25 Gb - Full Height)	2, 5, 7	3
SolarFlare (NIC: 25 Gb - Low Profile)	3, 6	2
Broadcom (NIC: 25 Gb - Full Height)	2, 5, 7	3
Broadcom (NIC: 25 Gb - Low Profile)	3, 6	2
QLogic (NIC: 25 Gb - Full Height)	2, 5, 7	3
QLogic (NIC: 25 Gb - Low Profile)	3, 6	2
Emulex (HBA: FC32 - Full Height)	2, 5, 7	3
Emulex (HBA: FC32 - Low Profile)	3, 6	2
QLogic (HBA: FC32 - Full Height)	2, 5, 7	3
QLogic (HBA: FC32 - Low Profile)	3, 6	2
Emulex (HBA: FC16 - Full Height)	2, 5, 7	3
Emulex (HBA: FC16 - Low Profile)	3, 6	2
QLogic (HBA: FC16 - Full Height)	2, 5, 7	3
QLogic (HBA: FC16 - Low Profile)	3, 6	2
Intel (NIC: 10 Gb - Full Height)	2, 5, 7	3

Card type	Slot priority	Maximum number of cards
Intel (NIC: 10 Gb - Low Profile)	3, 6	2
Broadcom (NIC: 10 Gb - Full Height)	2, 5, 7	3
Broadcom (NIC: 10 Gb - Low Profile)	3, 6	2
QLogic (NIC: 10 Gb - Full Height)	2, 5, 7	3
QLogic (NIC: 10 Gb - Low Profile)	3, 6	2
Intel (NIC: 10 Gb - Full Height)	2, 5, 7	3
Intel (NIC: 10 Gb - Low Profile)	3, 6	2
Intel (NIC: 1 Gb - Full Height)	2, 5, 7	3
Intel (NIC: 1 Gb - Low Profile)	3, 6	2
Broadcom (NIC: 1 Gb - Full Height)	2, 5, 7	3
Broadcom (NIC: 1 Gb - Low Profile)	3, 6	2
Mellanox (NIC: HDR100 VPI - Full Height)	2, 5, 7	3
Mellanox (NIC: HDR100 VPI - Low Profile)	3, 6	2
Mellanox (NIC:HDR VPI - Full Height)	2, 5, 7	3
Mellanox (NIC:HDR VPI - Low Profile)	3, 6	2
Foxconn (External adapter - Full Height)	2, 5, 7	3
Foxconn (External adapter - Low Profile)	3, 6	2
Samsung (PCIe SSD)	2, 5, 7 , 3, 6	1
Intel (PCIe SSD)	2, 5, 7 , 3, 6	1
Dell Front PERC	Internal Slot	1
Broadcom (OCP: 25 Gb)	Internal Slot	1
QLogic (OCP: 25 Gb)	Internal Slot	1
Mellanox (OCP: 25 Gb)	Internal Slot	1
SolarFlare (OCP: 25 Gb)	Internal Slot	1
Intel (OCP: 25 Gb)	Internal Slot	1
Intel (OCP: 10 Gb)	Internal Slot	1
Broadcom (OCP: 10 Gb)	Internal Slot	1
QLogic (OCP: 10 Gb)	Internal Slot	1
Broadcom (OCP: 1 Gb)	Internal Slot	1
Intel (OCP: 1 Gb)	Internal Slot	1

Table 17. Configuration 4: R1B + R2A + R3B + R4B

Card type	Slot priority	Maximum number of cards
Inventec (Serial)	4, 8	1
Inventec (BOSS - Full Height)	4, 5, 1, 2, 7, 8	1
Inventec (BOSS - Low Profile)	3, 6	1

Card type	Slot priority	Maximum number of cards
Dell PERC Adapter	3, 2	1
Mellanox (NIC: 100 Gb - Low Profile)	3, 6	2
Intel (NIC: 25 Gb - Full Height)	4, 5, 1, 2, 7	5
Intel (NIC: 25 Gb - Low Profile)	3, 6	2
Mellanox (NIC: 25 Gb - Low Profile)	3, 6	2
SolarFlare (NIC: 25 Gb - Full Height)	4, 5, 1, 2, 7	5
SolarFlare (NIC: 25 Gb - Low Profile)	3, 6	2
Broadcom (NIC: 25 Gb - Full Height)	4, 5, 1, 2, 7	5
Broadcom (NIC: 25 Gb - Low Profile)	3, 6	2
QLogic (NIC: 25 Gb - Full Height)	4, 5, 1, 2, 7	5
QLogic (NIC: 25 Gb - Low Profile)	3, 6	2
Emulex (HBA: FC32 - Full Height)	4, 5, 1, 2, 7	5
Emulex (HBA: FC32 - Low Profile)	3, 6	2
QLogic (HBA: FC32 - Full Height)	4, 5, 1, 2, 7	5
QLogic (HBA: FC32 - Low Profile)	3, 6	2
Emulex (HBA: FC16 - Full Height)	4, 5, 1, 2, 7	5
Emulex (HBA: FC16 - Low Profile)	3, 6	2
QLogic (HBA: FC16 - Full Height)	4, 5, 1, 2, 7	5
QLogic (HBA: FC16 - Low Profile)	3, 6	2
Intel (NIC: 10 Gb - Full Height)	4, 5, 1, 2, 7	5
Intel (NIC: 10 Gb - Low Profile)	3, 6	2
Broadcom (NIC: 10 Gb - Full Height)	4, 5, 1, 2, 7	5
Broadcom (NIC: 10 Gb - Low Profile)	3, 6	2
QLogic (NIC: 10 Gb - Full Height)	4, 5, 1, 2, 7	5
QLogic (NIC: 10 Gb - Low Profile)	3, 6	2
Intel (NIC: 10 Gb - Full Height)	4, 5, 1, 2, 7	5
Intel (NIC: 10 Gb - Low Profile)	3, 6	2
Intel (NIC: 1 Gb - Full Height)	4, 5, 1, 2, 7	5
Intel (NIC: 1 Gb - Low Profile)	3, 6	2
Broadcom (NIC: 1 Gb - Full Height)	4, 5, 1, 2, 7	5
Broadcom (NIC: 1 Gb - Low Profile)	3, 6	2
Mellanox (NIC: HDR100 VPI - Low Profile)	3, 6	2
Mellanox (NIC:HDR VPI - Low Profile)	3, 6	2
Foxconn (External adapter - Full Height)	4, 5, 1, 2, 7	5
Foxconn (External adapter - Low Profile)	3, 6	2
Samsung (PCIe SSD)	3, 6, 4, 5, 1, 2, 7, 8	1
Intel (PCIe SSD)	3, 6, 4, 5, 1, 2, 7, 8	1
Dell Front PERC	Internal Slot	1

Card type	Slot priority	Maximum number of cards
Broadcom (OCP: 25 Gb)	Internal Slot	1
QLogic (OCP: 25 Gb)	Internal Slot	1
Mellanox (OCP: 25 Gb)	Internal Slot	1
SolarFlare (OCP: 25 Gb)	Internal Slot	1
Intel (OCP: 25 Gb)	Internal Slot	1
Intel (OCP: 10 Gb)	Internal Slot	1
Broadcom (OCP: 10 Gb)	Internal Slot	1
QLogic (OCP: 10 Gb)	Internal Slot	1
Broadcom (OCP: 1 Gb)	Internal Slot	1
Intel (OCP: 1 Gb)	Internal Slot	1

Table 18. Configuration 5: R1B + R2B + R3A + R4B

Card type	Slot priority	Maximum number of cards
Inventec (Serial)	4, 8	1
Inventec (BOSS - Full Height)	1, 2, 5, 7, 8	1
Dell PERC Adapter	2	1
Mellanox (NIC: 100 Gb - Full Height)	5	1
Mellanox (NIC: 100 Gb - Low Profile)	3, 6	2
Intel (NIC: 25 Gb - Full Height)	1, 2, 5, 7	4
Mellanox (NIC: 25 Gb - Full Height)	1, 2, 5, 7	4
Mellanox (NIC: 25 Gb - Low Profile)	3, 6	2
SolarFlare (NIC: 25 Gb - Full Height)	1, 2, 5, 7	4
Broadcom (NIC: 25 Gb - Full Height)	1, 2, 5, 7	4
Broadcom (NIC: 25 Gb - Low Profile)	3, 6	2
QLogic (NIC: 25 Gb - Full Height)	1, 2, 5, 7	4
Emulex (HBA: FC32 - Full Height)	1, 2, 5, 7	4
QLogic (HBA: FC32 - Full Height)	1, 2, 5, 7	4
Emulex (HBA: FC16 - Full Height)	1, 2, 5, 7	4
QLogic (HBA: FC16 - Full Height)	1, 2, 5, 7	4
Intel (NIC: 10 Gb - Full Height)	1, 2, 5, 7	4
Broadcom (NIC: 10 Gb - Full Height)	1, 2, 5, 7	4
QLogic (NIC: 10 Gb - Full Height)	1, 2, 5, 7	4
Intel (NIC: 10 Gb - Full Height)	1, 2, 5, 7	4
Intel (NIC: 1 Gb - Full Height)	1, 2, 5, 7	4
Broadcom (NIC: 1 Gb - Full Height)	1, 2, 5, 7	4
Mellanox (NIC: HDR100 VPI - Full Height)	5	2

Card type	Slot priority	Maximum number of cards
Mellanox (NIC: HDR100 VPI - Low Profile)	3, 6	2
Mellanox (NIC:HDR VPI - Full Height)	5	1
Mellanox (NIC:HDR VPI - Low Profile)	3, 6	2
Foxconn (External adapter - Full Height)	1, 2, 5, 7	4
Foxconn (External adapter - Low Profile)	3, 6	2
Samsung (PCIe SSD)	1, 2, 5, 7, 8	1
Intel (PCIe SSD)	1, 2, 5, 7, 8	1
Dell Front PERC	Internal Slot	1
Broadcom (OCP: 25 Gb)	Internal Slot	1
QLogic (OCP: 25 Gb)	Internal Slot	1
Mellanox (OCP: 25 Gb)	Internal Slot	1
SolarFlare (OCP: 25 Gb)	Internal Slot	1
Intel (OCP: 25 Gb)	Internal Slot	1
Intel (OCP: 10 Gb)	Internal Slot	1
Broadcom (OCP: 10 Gb)	Internal Slot	1
QLogic (OCP: 10 Gb)	Internal Slot	1
Broadcom (OCP: 1 Gb)	Internal Slot	1
Intel (OCP: 1 Gb)	Internal Slot	1

Table 19. Configuration 6: R1C + R2A + R3A + R4C

Card type	Slot priority	Maximum number of cards
Inventec (Serial)	4, 8	1
NVIDIA (GPU - Low Profile)	3, 6	2
NVIDIA (GPU - Full Height)	1, 2, 5, 7, 8	5
Inventec (BOSS - Full Height)	1, 2, 5, 7, 8	1
Inventec (BOSS - Low Profile)	3, 6	1
Dell PERC Adapter	3	1
Mellanox (NIC: 100 Gb - Full Height)	1, 2, 5, 7, 8	4
Mellanox (NIC: 100 Gb - Low Profile)	3, 6	2
Intel (NIC: 25 Gb - Full Height)	1, 2, 5, 7, 8	4
Intel (NIC: 25 Gb - Low Profile)	3, 6	2
Mellanox (NIC: 25 Gb - Full Height)	1, 2, 5, 7, 8	4
Mellanox (NIC: 25 Gb - Low Profile)	3, 6	2
SolarFlare (NIC: 25 Gb - Full Height)	1, 2, 5, 7, 8	4
SolarFlare (NIC: 25 Gb - Low Profile)	3, 6	2
Broadcom (NIC: 25 Gb - Full Height)	1, 2, 5, 7, 8	4

Card type	Slot priority	Maximum number of cards
Broadcom (NIC: 25 Gb - Low Profile)	3, 6	2
QLogic (NIC: 25 Gb - Full Height)	1, 2, 5, 7, 8	4
QLogic (NIC: 25 Gb - Low Profile)	3, 6	2
Emulex (HBA: FC32 - Full Height)	1, 2, 5, 7, 8	4
Emulex (HBA: FC32 - Low Profile)	3, 6	2
QLogic (HBA: FC32 - Full Height)	1, 2, 5, 7, 8	4
QLogic (HBA: FC32 - Low Profile)	3, 6	2
Emulex (HBA: FC16 - Full Height)	1, 2, 5, 7, 8	4
Emulex (HBA: FC16 - Low Profile)	3, 6	2
QLogic (HBA: FC16 - Full Height)	1, 2, 5, 7, 8	4
QLogic (HBA: FC16 - Low Profile)	3, 6	2
Intel (NIC: 10 Gb - Full Height)	1, 2, 5, 7, 8	4
Intel (NIC: 10 Gb - Low Profile)	3, 6	2
Broadcom (NIC: 10 Gb - Full Height)	1, 2, 5, 7, 8	4
Broadcom (NIC: 10 Gb - Low Profile)	3, 6	2
QLogic (NIC: 10 Gb - Full Height)	1, 2, 5, 7, 8	4
QLogic (NIC: 10 Gb - Low Profile)	3, 6	2
Intel (NIC: 10 Gb - Full Height)	1, 2, 5, 7, 8	4
Intel (NIC: 10 Gb - Low Profile)	3, 6	2
Intel (NIC: 1 Gb - Full Height)	1, 2, 5, 7, 8	4
Intel (NIC: 1 Gb - Low Profile)	3, 6	2
Broadcom (NIC: 1 Gb - Full Height)	1, 2, 5, 7, 8	4
Broadcom (NIC: 1 Gb - Low Profile)	3, 6	2
Mellanox (NIC: HDR100 VPI - Full Height)	1, 2, 5, 7, 8	4
Mellanox (NIC: HDR100 VPI - Low Profile)	3, 6	2
Mellanox (NIC:HDR VPI - Full Height)	1, 2, 5, 7, 8	4
Mellanox (NIC:HDR VPI - Low Profile)	3, 6	2
Foxconn (External adapter - Full Height)	1, 2, 5, 7, 8	4
Foxconn (External adapter - Low Profile)	3, 6	2
Samsung (PCIe SSD)	1, 2, 5, 7, 8, 3, 6	1
Intel (PCIe SSD)	1, 2, 5, 7, 8, 3, 6	1
Dell Front PERC	Internal Slot	1
Broadcom (OCP: 25 Gb)	Internal Slot	1
QLogic (OCP: 25 Gb)	Internal Slot	1
Mellanox (OCP: 25 Gb)	Internal Slot	1
SolarFlare (OCP: 25 Gb)	Internal Slot	1

Card type	Slot priority	Maximum number of cards
Intel (OCP: 25 Gb)	Internal Slot	1
Intel (OCP: 10 Gb)	Internal Slot	1
Broadcom (OCP: 10 Gb)	Internal Slot	1
QLogic (OCP: 10 Gb)	Internal Slot	1
Broadcom (OCP: 1 Gb)	Internal Slot	1
Intel (OCP: 1 Gb)	Internal Slot	1

Table 20. Configuration 7: R1D + R2A + R3B + R4D

Card type	Slot priority	Maximum number of cards
Inventec (Serial)	4, 8	1
Inventec (BOSS - Full Height)	4, 5	2
Inventec (BOSS - Low Profile)	3, 6	1
Mellanox (NIC: 100 Gb - Low Profile)	3, 6	2
Intel (NIC: 25 Gb - Full Height)	4, 5	2
Intel (NIC: 25 Gb - Low Profile)	3, 6	2
Mellanox (NIC: 25 Gb - Full Height)	4, 5	2
Mellanox (NIC: 25 Gb - Low Profile)	3, 6	2
SolarFlare (NIC: 25 Gb - Full Height)	4, 5	2
SolarFlare (NIC: 25 Gb - Low Profile)	3, 6	2
Broadcom (NIC: 25 Gb - Full Height)	4, 5	2
Broadcom (NIC: 25 Gb - Low Profile)	3, 6	2
QLogic (NIC: 25 Gb - Full Height)	4, 5	2
QLogic (NIC: 25 Gb - Low Profile)	3, 6	2
Emulex (HBA: FC32 - Full Height)	4, 5	2
Emulex (HBA: FC32 - Low Profile)	3, 6	2
QLogic (HBA: FC32 - Full Height)	4, 5	2
QLogic (HBA: FC32 - Low Profile)	3, 6	2
Emulex (HBA: FC16 - Full Height)	4, 5	2
Emulex (HBA: FC16 - Low Profile)	3, 6	2
QLogic (HBA: FC16 - Full Height)	4, 5	2
QLogic (HBA: FC16 - Low Profile)	3, 6	2
Intel (NIC: 10 Gb - Full Height)	4, 5	2
Intel (NIC: 10 Gb - Low Profile)	3, 6	2
Broadcom (NIC: 10 Gb - Full Height)	4, 5	2
Broadcom (NIC: 10 Gb - Low Profile)	3, 6	2
QLogic (NIC: 10 Gb - Full Height)	4, 5	2
QLogic (NIC: 10 Gb - Low Profile)	3, 6	2

Card type	Slot priority	Maximum number of cards
Intel (NIC: 10 Gb - Full Height)	4, 5	2
Intel (NIC: 10 Gb - Low Profile)	3, 6	2
Intel (NIC: 1 Gb - Full Height)	4, 5	2
Intel (NIC: 1 Gb - Low Profile)	3, 6	2
Broadcom (NIC: 1 Gb - Full Height)	4, 5	2
Broadcom (NIC: 1 Gb - Low Profile)	3, 6	2
Mellanox (NIC: HDR100 VPI - Low Profile)	3, 6	2
Mellanox (NIC:HDR VPI - Low Profile)	3, 6	2
Foxconn (External adapter - Full Height)	4, 5	2
Foxconn (External adapter - Low Profile)	3, 6	2
Samsung (PCIe SSD)	3, 6, 4, 5	1
Intel (PCIe SSD)	3, 6, 4, 5	1
Broadcom (OCP: 25 Gb)	Internal Slot	1
QLogic (OCP: 25 Gb)	Internal Slot	1
Mellanox (OCP: 25 Gb)	Internal Slot	1
SolarFlare (OCP: 25 Gb)	Internal Slot	1
Intel (OCP: 25 Gb)	Internal Slot	1
Intel (OCP: 10 Gb)	Internal Slot	1
Broadcom (OCP: 10 Gb)	Internal Slot	1
QLogic (OCP: 10 Gb)	Internal Slot	1
Broadcom (OCP: 1 Gb)	Internal Slot	1
Intel (OCP: 1 Gb)	Internal Slot	1

Table 21. Configuration 8: R1A + R2A + R4A

Card type	Slot priority	Maximum number of cards
Inventec (Serial)	8	1
Inventec (BOSS - Full Height)	2, 7	1
Inventec (BOSS - Low Profile)	3, 6	1
Dell PERC Adapter	3	1
Mellanox (NIC: 100 Gb - Full Height)	2, 7	2
Mellanox (NIC: 100 Gb - Low Profile)	3, 6	2
Intel (NIC: 25 Gb - Full Height)	2, 7	2
Intel (NIC: 25 Gb - Low Profile)	3, 6	2
Mellanox (NIC: 25 Gb - Full Height)	2, 7	2
Mellanox (NIC: 25 Gb - Low Profile)	3, 6	2
SolarFlare (NIC: 25 Gb - Full Height)	2, 7	2

Card type	Slot priority	Maximum number of cards
SolarFlare (NIC: 25 Gb - Low Profile)	3, 6	2
Broadcom (NIC: 25 Gb - Full Height)	2, 7	2
Broadcom (NIC: 25 Gb - Low Profile)	3, 6	2
QLogic (NIC: 25 Gb - Full Height)	2, 7	2
QLogic (NIC: 25 Gb - Low Profile)	3, 6	2
Emulex (HBA: FC32 - Full Height)	2, 7	2
Emulex (HBA: FC32 - Low Profile)	3, 6	2
QLogic (HBA: FC32 - Full Height)	2, 7	2
QLogic (HBA: FC32 - Low Profile)	3, 6	2
Emulex (HBA: FC16 - Full Height)	2, 7	2
Emulex (HBA: FC16 - Low Profile)	3, 6	2
QLogic (HBA: FC16 - Full Height)	2, 7	2
QLogic (HBA: FC16 - Low Profile)	3, 6	2
Intel (NIC: 10 Gb - Full Height)	2, 7	2
Intel (NIC: 10 Gb - Low Profile)	3, 6	2
Broadcom (NIC: 10 Gb - Full Height)	2, 7	2
Broadcom (NIC: 10 Gb - Low Profile)	3, 6	2
QLogic (NIC: 10 Gb - Full Height)	2, 7	2
QLogic (NIC: 10 Gb - Low Profile)	3, 6	2
Intel (NIC: 10 Gb - Full Height)	2, 7	2
Intel (NIC: 10 Gb - Low Profile)	3, 6	2
Intel (NIC: 1 Gb - Full Height)	2, 7	2
Intel (NIC: 1 Gb - Low Profile)	3, 6	2
Broadcom (NIC: 1 Gb - Full Height)	2, 7	2
Broadcom (NIC: 1 Gb - Low Profile)	3, 6	2
Mellanox (NIC: HDR100 VPI - Full Height)	2, 7	2
Mellanox (NIC: HDR100 VPI - Low Profile)	3, 6	2
Mellanox (NIC:HDR VPI - Full Height)	2, 7	2
Mellanox (NIC:HDR VPI - Low Profile)	3, 6	2
Foxconn (External adapter - Full Height)	2, 7	2
Foxconn (External adapter - Low Profile)	3, 6	2
Samsung (PCIe SSD)	2, 7, 3, 6	1
Intel (PCIe SSD)	2, 7, 3, 6	1
Broadcom (OCP: 25 Gb)	Internal Slot	1
QLogic (OCP: 25 Gb)	Internal Slot	1
Mellanox (OCP: 25 Gb)	Internal Slot	1
SolarFlare (OCP: 25 Gb)	Internal Slot	1

Card type	Slot priority	Maximum number of cards
Intel (OCP: 25 Gb)	Internal Slot	1
Intel (OCP: 10 Gb)	Internal Slot	1
Broadcom (OCP: 10 Gb)	Internal Slot	1
QLogic (OCP: 10 Gb)	Internal Slot	1
Broadcom (OCP: 1 Gb)	Internal Slot	1
Intel (OCP: 1 Gb)	Internal Slot	1

Table 22. Configuration 9: R1B + R2A + R4B

Card type	Slot priority	Maximum number of cards
Inventec (Serial)	8	1
Inventec (BOSS - Full Height)	1, 2, 7, 8	2
Inventec (BOSS - Low Profile)	3, 6	1
Dell PERC Adapter	3, 2	1
Mellanox (NIC: 100 Gb - Low Profile)	3, 6	2
Intel (NIC: 25 Gb - Full Height)	1, 2, 7	3
Intel (NIC: 25 Gb - Low Profile)	3, 6	2
Mellanox (NIC: 25 Gb - Full Height)	1, 2, 7	3
Mellanox (NIC: 25 Gb - Low Profile)	3, 6	2
SolarFlare (NIC: 25 Gb - Full Height)	1, 2, 7	3
SolarFlare (NIC: 25 Gb - Low Profile)	3, 6	2
Broadcom (NIC: 25 Gb - Full Height)	1, 2, 7	3
Broadcom (NIC: 25 Gb - Low Profile)	3, 6	2
QLogic (NIC: 25 Gb - Full Height)	1, 2, 7	3
QLogic (NIC: 25 Gb - Low Profile)	3, 6	2
Emulex (HBA: FC32 - Full Height)	1, 2, 7	3
Emulex (HBA: FC32 - Low Profile)	3, 6	2
QLogic (HBA: FC32 - Full Height)	1, 2, 7	3
QLogic (HBA: FC32 - Low Profile)	3, 6	2
Emulex (HBA: FC16 - Full Height)	1, 2, 7	3
Emulex (HBA: FC16 - Low Profile)	3, 6	2
QLogic (HBA: FC16 - Full Height)	1, 2, 7	3
QLogic (HBA: FC16 - Low Profile)	3, 6	2
Intel (NIC: 10 Gb - Full Height)	1, 2, 7	3
Intel (NIC: 10 Gb - Low Profile)	3, 6	2
Broadcom (NIC: 10 Gb - Full Height)	1, 2, 7	3
Broadcom (NIC: 10 Gb - Low Profile)	3, 6	2
QLogic (NIC: 10 Gb - Full Height)	1, 2, 7	3

Card type	Slot priority	Maximum number of cards
QLogic (NIC: 10 Gb - Low Profile)	3, 6	2
Intel (NIC: 10 Gb - Full Height)	1, 2, 7	3
Intel (NIC: 10 Gb - Low Profile)	3, 6	2
Intel (NIC: 1 Gb - Full Height)	1, 2, 7	3
Intel (NIC: 1 Gb - Low Profile)	3, 6	2
Broadcom (NIC: 1 Gb - Full Height)	1, 2, 7	3
Broadcom (NIC: 1 Gb - Low Profile)	3, 6	2
Mellanox (NIC: HDR100 VPI - Low Profile)	3, 6	2
Mellanox (NIC:HDR VPI - Low Profile)	3, 6	2
Foxconn (External adapter - Full Height)	1, 2, 7	3
Foxconn (External adapter - Low Profile)	3, 6	2
Samsung (PCIe SSD)	3, 6, 1, 2, 7, 8	1
Intel (PCIe SSD)	3, 6, 1, 2, 7, 8	1
Broadcom (OCP: 25 Gb)	Internal Slot	1
QLogic (OCP: 25 Gb)	Internal Slot	1
Mellanox (OCP: 25 Gb)	Internal Slot	1
SolarFlare (OCP: 25 Gb)	Internal Slot	1
Intel (OCP: 25 Gb)	Internal Slot	1
Intel (OCP: 10 Gb)	Internal Slot	1
Broadcom (OCP: 10 Gb)	Internal Slot	1
QLogic (OCP: 10 Gb)	Internal Slot	1
Broadcom (OCP: 1 Gb)	Internal Slot	1
Intel (OCP: 1 Gb)	Internal Slot	1

8

Power, thermal, and acoustics

Power

The PowerEdge R7525 system has an extensive collection of sensors that automatically track thermal activity, and helps to regulate temperature and reduce server noise and power consumption.

Table 23. Power tools and technologies

Feature	Description
PSU portfolio	Dell EMC's PSU portfolio includes intelligent features such as dynamically optimizing power usage while maintaining availability and redundancy.
Industry compliance	Dell EMC's servers are compliant with all relevant industry certifications and guidelines, including 80 PLUS, Climate Savers, and ENERGY STAR.
Power monitoring accuracy	PSU power monitoring improvements include: • Power monitoring accuracy of 1%, lower than the industry standard of 5% • Higher power reporting accuracy • Better performance under a power cap
Power capping	Use Dell EMC systems management software to set your system power cap to limit the output of a PSU and reduce system power consumption.
Systems management	iDRAC Enterprise provides server level management that monitors, reports, and controls power consumption at the processor, memory, and system level. Dell OpenManage Power Center delivers group power management at the rack, row, and data center level for servers, power distribution units, and uninterruptible power supplies.
Active power management	Node Manager is an embedded technology that provides individual server- level power reporting and power limiting functionality. Hot spare technology reduces consumption of redundant power supplies.
Fresh air cooling	See dell.com/fresh-air-cooling
Rack infrastructure	Dell EMC offers some of the industry's highest efficiency power infrastructure solutions, including: • Power distribution units (PDUs) • Uninterruptible power supplies (UPSs) • Energy Smart containment rack enclosures For additional information see: http://content.dell.com/us/en/enterprise/ power- and-cooling- technologies- components- rack- infrastructure.aspx.

Thermal

The 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.

The thermal design of the PowerEdge R7525 reflects the following:

- Optimized thermal design: architecture built into the system layout.
- System component placement and layout are designed to provide maximum airflow coverage to critical components with minimum expense of fan power.
- Comprehensive thermal management achieved by regulating the fan speed based on several different responses from all system component temperature sensors, as well as inventory for system configurations. Temperature monitoring includes components such as processors, DIMMs, chipset, the inlet air ambient, hard disk drives, and LOM riser.

- Open and closed loop thermal fan 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 in the iDRAC BIOS setup screen.

Cooling N+1 fan redundancy allows continuous operation with one fan failure in the system.

Acoustics

The PowerEdge R7525 is a rack-mount server appropriate for attended data center environment. However, lower acoustical output is attainable with proper hardware or software configurations. For example, the minimum configuration of R7525 is quiet enough for typical office environment.

Table 24. PowerEdgeR7525 acoustical performance

Configuration	Entry / Minimum	Volume / Typical	GPU	No Backplane	NVMe box	Volume / Typical 3
Acoustical Category	Category 1	Category 2	Category 5	Category 3	Category 5	Category 5
CPU	1 x 120 W	2 x 180 W	2 x 180 W	2 x 180 W	2 x 225 W	2 x 120 W
Memory	8 x 8 GB RDIMM	8 x 8 GB RDIMM	8 x 8 GB RDIMM	8 x 8 GB RDIMM	8 x 32GB RDIMM	16 x 16 GB RDIMM
Storage cofiguration: Front, Internal , Rear, PCIe	8 x 3.5-inch	16 x 2.5-inch	16 x 2.5-inch	0 hard drives	24 x 2.5-inch NVMe	12 x 3.5-inch + Rear 2 x 2.5-inch
Cards	H345	H745	H740	H745	100 GB PCI	H745
	OCP 2 x 10 G	2-port 25 GB	GPU Double-Wides	2-port 25 GB	OCP 2 x 25 G	1-port 10 GB
	LOM Down, 1-GB	OCP 1025 G	OCP 2 x 25 GB	OCP 1025 G	M.2	OCP 1025 G
		M.2	M.2	M.2	LOM Down, 1-GB	M.2
		LOM Down, 1-GB	LOM Down, 1-GB	LOM Down, 1-GB		LOM Down, 1-GB

The acoustical design of the PowerEdge R7525 reflects the following:

- Versatility—The PowerEdge R7525 has a reduced power draw in the data center. It is also quiet enough for office environment in typical and minimum configurations.
- High sound quality standards—Sound quality is different from sound power level and sound pressure level in that it describes how humans respond to sound annoyance such as whistles and hums. One of the sound quality metrics in the Dell specifications is the prominence ratio of a tone.
- Noise ramp and descent at boot from power-off—Fan speeds and noise levels ramp during the boot process (from power off to power on) to add a layer of protection to component cooling in when the system is not able to boot properly. To keep the boot process as quiet as possible, the fan speed reached during boot is limited to about half of full speed.
- Noise level dependencies—If acoustics are important to you, then you should consider several configuration choices and settings:
  - For lower acoustical output, use a few lower rotational speed SATA hard drives, nearline SAS hard drives, or non- rotational devices such as SSDs. 15 k hard drives generate more acoustic noise than lower rotational speed hard drives. Also, noise increases with number of hard drives.
  - Fan speeds and noise may increase from baseline factory configurations when certain profiles are changed by the user, or system configurations are updated. The following is a list of items that impact fan speeds and acoustical output:
    - iDRAC9 BIOS settings—Performance Per Watt, DAPC or operating system, may be quieter than Performance or Dense Configuration **(iDRAC Settings > Thermal > Max. Exhaust Temperature or Fan speed offset).**
    - The quantity and type of PCIe cards installed—This affects overall system acoustics. Installation of more than two PCIe cards results in an increase in overall system acoustics.
    - Using a GPU card—GPU card results in an increase in overall system acoustics.
    - PCIe controller-based SSD drives—Drives such as express flash drives and Fusion IO cards require greater airflow for cooling, and result in higher noise levels

- Systems with an H330 PERC—This configuration may be quieter than configurations with an H740P PERC with battery backup. However, higher noise levels result when a system is configured as non-RAID.
- Hot spare feature of power supply unit—In the system default setting, the hot spare feature is disabled. Acoustical output from the power supplies is lowest in this setting.

9

Supported operating systems

The following are the primary operating systems supported on R7525:

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

For more information on the specific versions and additions, see https://www.dell.com/support/home/Drivers/SupportedOS/poweredge-r7525

10

Dell EMC OpenManage systems management

Whether your IT environment consists of a few servers or a few thousand servers, Dell EMC OpenManage systems management solutions provide comprehensive management features for evolving IT environments. OpenManage is based on open standards, and provides both agent-based and agent-free server life-cycle management functionality for Dell EMC PowerEdge servers. OpenManage solutions help you automate and streamline essential hardware management tasks.

Start with a firm foundation for efficient hardware management using OpenManage tools, utilities, and management consoles. OpenManage systems management solutions consist of a combination of embedded management features and software products that help you automate and simplify the entire server life cycle: deploy, update, monitor, and maintain. OpenManage solutions are innovatively designed for simplicity and ease of use to help you reduce complexity, save time, achieve efficiency, control costs, and empower productivity. OpenManage centers on efficient management of server life cycle.

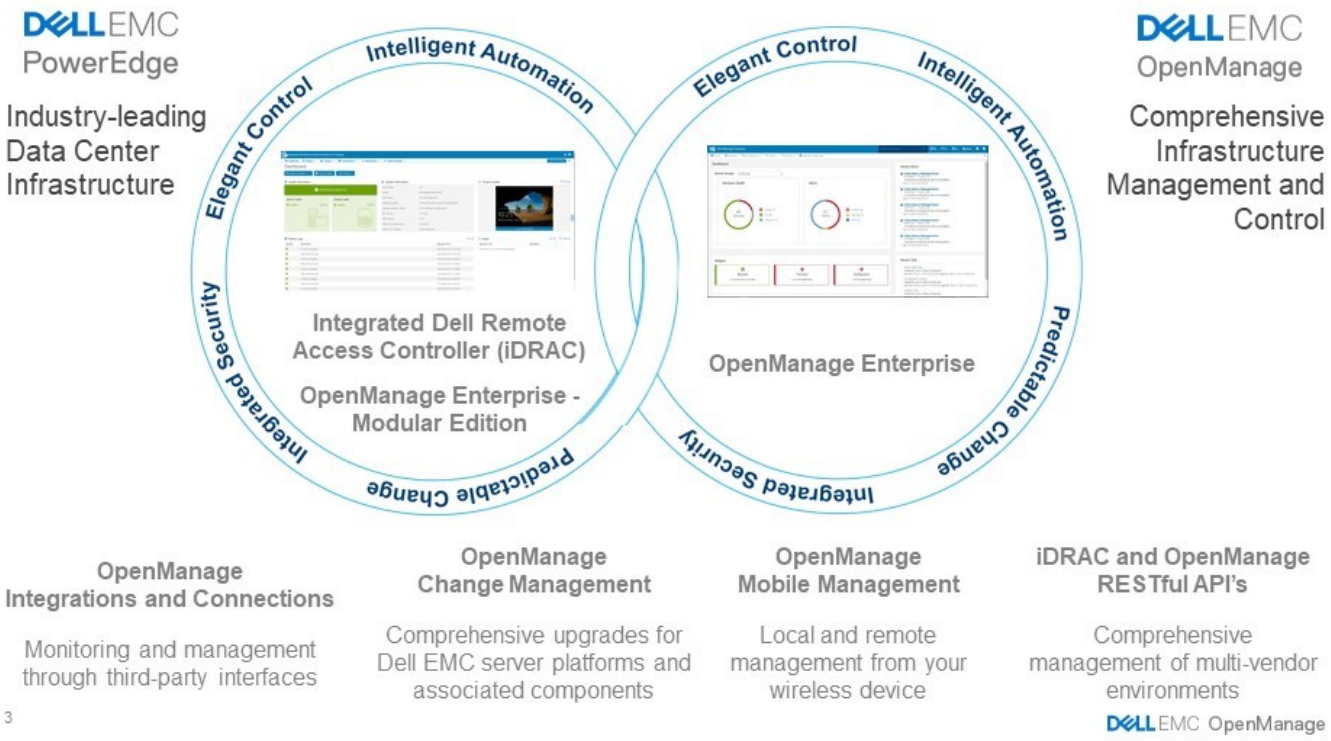

Figure 14. Server lifecycle management operations

Topics:

- iDRAC9 with Lifecycle Controller
- Agent-free management
- Agent-based management
- Dell EMC consoles
- Dell EMC OpenManage systems management tools, utilities, and protocols
- Integration with third-party consoles
- OpenManage connections with third-party consoles

iDRAC9 with Lifecycle Controller

The Integrated Dell Remote Access Controller 9 (iDRAC9) with Lifecycle Controller, the embedded intelligence of every Dell EMC PowerEdge new generation server, helps you manage Dell EMC servers agent-free or with a systems management agent, within physical,

virtual, local, and remote environments. iDRAC9 alerts you of server issues, enables remote server management, and reduces the need to physically go to the server. iDRAC9 with Lifecycle Controller is part of Dell EMC comprehensive OpenManage portfolio and works as a stand-alone or with other components such as OpenManage Essentials, OpenManage Mobile, OpenManage Power Center, Chassis Management Controller, and OpenManage Integrations for Microsoft, VMware, and BMC consoles to simplify, automate, and streamline IT operations.

Dell EMC BMC and iDRAC9 feature comparison

iDRAC9 Enterprise is available for the system. Dell EMC also offers BMC. A detailed feature comparison for Dell EMC BMC and iDRAC9 Enterprise is shown in the following table.

Table 25. Feature comparison for Dell EMC BMC and iDRAC9 Enterprise

Feature	Dell EMC BMC	iDRAC9 Enterprise
Interfaces/Standards		
IPMI 2.0	Yes	Yes
DCMI 1.5	Yes	Yes
Web-based UI	Yes	Yes
Racadm command line (local and remote)	Yes	Yes
SMASH-CLP (SSH-only)	Yes	Yes
Telnet	Yes	Yes
SSH	Yes	Yes
WSMAN	Yes	Yes
RedFish API	Yes	Yes
Network Time Protocol	Yes	Yes
Connectivity		
Shared NIC	Yes	Yes
Dedicated NIC (with Ports card)	Yes	Yes
VLAN tagging	Yes	Yes
IPv4	Yes	Yes
IPv6	Yes	Yes
DHCP	Yes	Yes
Dynamic DNS	Yes	Yes
Operating system pass-through	Yes	Yes
Security		
Role-based authority	Yes	Yes
Local users	Yes	Yes
SSL encryption	Yes	Yes
IP blocking	Yes	Yes
Directory services (AD and LDAP)	No	Yes
Two-factor authentication	No	Yes
Single sign-on	No	Yes
PK authentication	Yes	Yes
New generation: Configuration Lockdown	No	Yes
New generation: System Erase of internal storage devices	Yes	Yes
Remote presence		

Feature	Dell EMC BMC	iDRAC9 Enterprise
Power control	Yes	Yes
Boot control	Yes	Yes
Serial-over-LAN	Yes	Yes
Virtual media	Yes	Yes
Virtual folders	No	Yes
Remote file share	No	Yes
Virtual console	Yes for single user	Yes
VNC connection to operating system	No	Yes
Quality/bandwidth control	No	Yes
Virtual console collaboration (6 users)	No	Yes
Virtual console chat	No	Yes
Power and thermal		
Real-time power meter	Yes	Yes
Power thresholds and alerts	Yes	Yes
Real-time power graphing	Yes	Yes
Historical power counters	Yes	Yes
Power capping	Yes	Yes
Power Center integration	Yes	Yes
Temperature monitoring	Yes	Yes
Temperature graphing	Yes	Yes
Health monitoring		
Full agent-free monitoring	Yes	Yes
Predictive failure monitoring	Yes	Yes
SNMPv1, v2, and v3 traps and gets	Yes	Yes
Email Alerting	Yes	Yes
Configurable thresholds	Yes	Yes
Fan monitoring	Yes	Yes
Power supply monitoring	Yes	Yes
Memory monitoring	Yes	Yes
CPU monitoring	Yes	Yes
RAID monitoring for PERC	Yes	Yes
NIC monitoring	Yes	Yes
HD monitoring including JBOD enclosure	Yes	Yes
Out of band performance monitoring	No	Yes
Update		
Remote agent-free update	Yes	Yes
Embedded update tools	No	Yes
Sync with repository for scheduled updates	No	Yes
Autoupdate	No	Yes
Deployment and configuration		

Feature	Dell EMC BMC	iDRAC9 Enterprise
Embedded operating deployment tools	No	Yes
Embedded configuration tools	No	Yes
AutoDiscovery	No	Yes
Remote operating system deployment for vMedia	No	Yes
Embedded driver pack	Yes	Yes
Full configuration inventory	Yes	Yes
Inventory export	Yes	Yes
Remote configuration	Yes	Yes
Zero touch configuration	No	Yes
System retire and repurpose	Yes	Yes
New generation: iDRAC Connection View	No	Yes
New generation: BIOS configuration page in iDRAC UI	Yes	Yes
Diagnostics, service, and logging		
Embedded diagnostic tools	Yes	Yes
Part replacement	No	Yes
Server configuration backup	Yes	Yes
Server configuration restore	Yes	Yes
Easy restore for system configuration, including USB and rSPI	Yes	Yes
Health LED only	Yes	Yes
New generation: Quick Sync 2.0	No	NA
New generation: iDRAC Direct 2.0 with micro USB port on rear	Yes	Yes
iDRAC Service Module (iSM)	Yes	Yes
Embedded Tech Support Report	Yes	Yes
Crash screen capture	No	Yes
Crash video capture, requires iSM or OMSA	No	Yes
Boot capture	No	Yes
Manual reset for iDRAC	Yes	Yes
Virtual NMI	Yes	Yes
Operating system watchdog (requires iSM or OMSA)	Yes	Yes
System event log	Yes	Yes
Lifecycle log	Yes	Yes
Work notes	Yes	Yes
Remote syslog	No	Yes
License management	Yes	Yes

Agent-free management

As Dell EMC PowerEdge servers have embedded server life-cycle management, often, there is no need to install an OpenManage systems management software agent into the operating system of a Dell EMC PowerEdge server. This greatly simplifies and streamlines the management footprint.

Agent-based management

Most systems management solutions require pieces of software, called agents, to be installed on each node to be managed within the IT environment. Also, the same agent is often used as a local interface into hardware health. It may be accessed remotely as a management interface, typically referred to as a one-to-one interface. For customers that continue to use agent-based solutions, Dell EMC provides OpenManage Server Administrator.

Dell EMC consoles

The central console in a systems management solution is often referred to as the one-to-many console. The central console provides a rapid view and insight into the overall health of all systems in the IT environment. The Dell EMC systems management portfolio includes several powerful consoles from which to choose depending on your requirements, including the following:

Dell EMC OpenManage Enterprise

Dell EMC OpenManage Enterprise is an intuitive infrastructure management console. Designed to take the complexity out of IT infrastructure management, it delivers better results with less time and fewer steps. OpenManage Enterprise helps IT professionals balance time and energy between complex IT infrastructure and business goals.

Simplify

- Robust, intuitive management capabilities regardless of form factor
- OpenManage Enterprise reduces learning time with a HTML5 UI that includes an elastic search engine. It goes to critical information and tasks easier and quicker. The automatable processes, templates, and policies can be created and edited using a simple menu-driven interface.

Unify

- One-to-many management from a single console—Built for scale
- OpenManage Enterprise supports up to 8,000 devices regardless of form factors. It supports Dell EMC PowerEdge racks, towers, and modular servers. It also monitors and creates alerts for third-party devices or PowerVault MD and ME Storage systems.

Automated

- Automated IT processes for greater efficiency
- From discovery to retirement, activities can be managed in the same console. In minutes, devices can be deployed automatically with templates based on service tags or node IDs.

Secure

- Designed for security throughout the infrastructure life cycle
- Security is always the top priority. To protect your infrastructure, OpenManage Enterprise detects drift from a user-defined configuration template, alerts users, and remediates misconfigurations based on presetup policies.

For more information, see the Dell OpenManage Enterprise page.

OpenManage Mobile

OpenManage Mobile (OMM) is a software application that enables secure monitoring and management of PowerEdge servers remotely or at-the-server. With OpenManage Mobile, IT Administrators can securely perform several data center monitoring and remediation tasks using an Android or iOS mobile device. The OpenManage Mobile app is available as a free software download from the Apple Store and the Google Play Store.

OMM can also monitor and manage PowerEdge servers through an OpenManage Essentials console or by directly accessing the server's iDRAC.

The OpenManage Essentials console can be accessed through OpenManage Mobile over a secure IP network. This allows you to monitor all devices that are managed by OpenManage Essentials such as Dell EMC servers, storage, networking, firewall, and supported third party devices.

Key features of OpenManage Mobile when connected through OpenManage Essentials console:

- Connect to multiple servers which have OME installed, from a single mobile device.

- Connect to multiple servers individually through the iDRAC interface.
- Receive critical alert notifications on your mobile device as they arrive into your OpenManage Essentials management console.
- Acknowledge, forward, and delete alerts from your mobile device.
- Browse through device details, firmware inventory, and event logs of individual systems.
- Perform several server management functions such as power-on, power cycle, reboot, and shutdown from the mobile application.

Key Features of OpenManage Mobile when connected through iDRAC:

- Connect to any previous generation PowerEdge servers remotely.
- Assign IP address, change credentials, and update common BIOS attributes for bare metal configuration.
- Configure one server manually, or multiple servers simultaneously through a template.
- Browse server details, health status, hardware and firmware inventory, networking details, and system event or LC logs. Share this information easily with other IT Administrators.
- Access SupportAssist reports, Last Crash screen and video for both previous and current generation PowerEdge servers.
- Access virtual console and reduce the need for crash carts.
- Power on, shut down, or reboot your server from anywhere.
- Run any RACADM command.

OpenManage Enterprise Power Manager

OpenManage Enterprise Power Manager is a plugin for OpenManage Enterprise V3.2 and later. Power Manager provides monitoring and management at a one to many levels of server power and thermal. The features of Power Manager are:

- Measure and manage power consumption and monitors thermal readings—OME Power Manager provides greater insight into a data center's energy usage through detailed measurement of energy consumption throughout a data center. Power Manager gives administrators the ability to measure and manage the power consumption of up to 3,000 servers and track both short-term and long-term historical data.
- Create and implement multiple usage policies—Power Managers simplifies implementation of power policies across a data center. When it is used with the previous generation or later versions of the PowerEdge servers, OpenManage Enterprise Advanced license, and an iDRAC Enterprise license, administrators can control power consumption to each row, rack, or group of PE servers. Also, administrators can create reports on energy usage and thermal readings on a group-by-group basis.
- Reduce consumption during low-load hours—Power Manager helps administrators to save power by allowing management of a server room according to business needs. Power Manager allows administrators to implement policies that reduce the power consumption when the demand on the systems is lower. It can also assign maximum power to the servers that run the most important applications.

For more information, see OpenManage Enterprise Power Manager User's Guide.

Dell EMC OpenManage systems management tools, utilities, and protocols

Dell EMC OpenManage systems management tools and utilities consist of the following:

Dell EMC Repository Manager

Dell EMC Repository Manager (DRM) is an application that helps you to:

- Identify the updates that are relevant to the systems in your data center
- Identify and notify you when updates are available
- Package the updates into different deployment formats

To automate the creation of baseline repositories, DRM provides advanced integration capabilities with iDRAC/Lifecycle controller, OpenManage Essentials, Chassis Management Controller, OpenManage Integration for VMware vCenter and OpenManage Integration for Microsoft System Center (OMIMSSC). Also, DRM packages updates into custom catalogs that can be used for deployment.

Dell EMC Repository Manager can create the following deployment tools:

- Custom catalogs
- Lightweight deployment pack
- Bootable Linux ISO
- Custom Server Update Utility (SUU)

For more information, see Dell EMC Repository Manager user's guide available at Dell.com/support/manuals.

Dell Update Packages

Dell Update Packages (DUPs) are self-contained executables supported by Microsoft Windows or Linux that update a component on a server and applications like OMSA, iSM, and DSET.

DUPs can be executed in UI or in CLI mode.

For more information, see the Dell EMC Update Packages user's guide available at www.delltechcenter.com/DSU.

Dell Remote Access Controller Administration (RACADM) CLI

The RACADM command-line utility provides a scriptable interface to perform inventory, configuration, update, and health status check of PowerEdge servers. RACADM operates in multiple modes.

- Local—supports running RACADM commands from the managed server's operating system
- SSH or Telnet—known as Firmware RACADM; is accessible by logging in to iDRAC using SSH or Telnet
- Remote—supports running RACADM commands from a remote management station such as a laptop or desktop

RACADM is supported by the iDRAC with Lifecycle Controller and by the Chassis Management Controller of the M1000e, VRTX and FX2 modular systems. Local and Remote RACADM is supported on Windows Server, Windows clients, and on Red Hat, SuSe, and Ubuntu Linux.

For more information, see the RACADM Command Line reference guide for iDRAC and CMC available at Dell.com/support/manuals.

iDRAC with Lifecycle Controller Embedded Management APIs

iDRAC with Lifecycle Controller provides a range of standards-based applications programming interfaces (APIs) that enable scalable and automated management of PowerEdge servers. Standard systems management APIs have been developed by organizations such as the Institute of Electrical and Electronics Engineers (IEEE) and Distributed Management Task Force (DMTF). These APIs are widely used by commercial systems management products and by custom programs and scripts developed by IT staff to automate management functions such as discovery, inventory, health status checking, configuration, update, and power management. The APIs supported by iDRAC with Lifecycle Controller include:

- **Redfish**—In 2015, the DMTF Scalable Platforms Management Forum (SPMF) published Redfish, an open industry-standard specification and schema designed to meet the needs of IT administrators for simple, modern, and secure management of scalable platform hardware. Dell is a key contributor to the Redfish standard, acting as co-chair of the SPMF, promoting the benefits of Redfish, and working to deliver those benefits within industry-leading systems management solutions. Redfish is a next-generation management standard using a data model representation inside a hypermedia RESTful interface. The data model is defined in terms of a standard, machine-readable schema, with the payload of the messages expressed in JSON and the OData v4 protocol.
- **WSMan**—The Web Services For Management (WSMan) API, first published by the DMTF in 2008, is the most mature and robust API provided by iDRAC with Lifecycle Controller. WSMan uses a Simple Object Access Protocol (SOAP) with data modeled using the Common Information Model. WSMan provides interoperability between management applications and managed resources, and identifies a core set of web service specifications and usage requirements that expose a common set of operations central to all systems management.
- **IPMI**—The Intelligent Platform Management Interface (IPMI) is a message-based, hardware-level interface specification that can operate over both LAN and serial interfaces. IPMI is supported broadly by server vendors, systems management solutions, and open source software.
- **SNMP**—The Simple Network Management Protocol (SNMP) helps in standardizing the management of network devices. SNMP allows commercial management consoles created for monitoring network switches and routers to also monitor X86 severs. SNMP is primarily used to deliver event messages to alert administrators of problems on their systems but can also be used to discover, inventory and configure servers.

To assist automating system management tasks and simplify API integration, Dell provides PowerShell and Python libraries and script examples using the WSMan interface. The iDRAC with Lifecycle Controller pages of Dell Techcenter offer a library of technical white papers detailing the use of the embedded management APIs. For more information, see delltechcenter.com/iDRAC and delltechcenter.com/LC.

Integration with third-party consoles

Dell EMC OpenManage provides integration with several leading third-party consoles, including:

OpenManage Integration Suite for Microsoft System Center

The combination of Dell OpenManage Integration Suite and Microsoft System Center simplifies and enhances deployment, configuration, monitoring and updating of Dell servers and storage in physical and virtual environments. Our agent-free and agent-based plug-ins deliver a unique level of integration and efficiency when managing Dell hardware within a System Center environment.

The OpenManage Integration Suite for Microsoft System Center includes: Dell Server and Storage Management Packs for System Center Operations Manager (SCOM), Dell Server Deployment Packs and Update Catalogs for System Center Configuration Manager (SCCM), and tools for optimizing management of Dell PowerEdge servers in virtual environments using System Center Virtual Machine Manager (SCVMM).

OpenManage Integration for VMware vCenter

The OpenManage Integration for VMware vCenter (OMIVV) allows you to monitor, provision, and manage PowerEdge server hardware and firmware. You can perform these tasks through a dedicated Dell menu that can be accessed directly through the VMware vCenter console. OMIVV also allows granular control and reporting for the hardware environment using the same role-based access control model as vCenter. The OpenManage Management Pack for vRealize Operations Manager is available with OMIVV version 4.0 and later. This helps to checking hardware health and alerting into vRealize operations, which also includes dashboard and reporting on the server environment.

Use the following features to manage and monitor Dell hardware within the virtualized environment:

- Alerting and monitoring environment for servers and chassis
- Monitoring and reporting for servers and chassis
- Updating firmware on servers
- Deploying enhanced options

For more information, see delltechcenter.com/omivv.

NOTE: The Dell EMC Repository Manager integrates with OpenManage Integration for VMware vCenter. The Dell EMC Repository Manager provides advanced functionality, simplifies the discovery, and deployment of new updates.

BMC Software

Dell EMC and BMC Software work together to simplify IT by ensuring tight integration between Dell EMC server, storage, and network management functionality and the BMC Software process and data center automation products.

OpenManage connections with third-party consoles

Dell EMC OpenManage Connections simplifies adding support for third-party devices, so you can continue to use your existing management tools while easily adding Dell EMC server systems to your IT environment. Integrate new systems at your own pace. Manage new Dell EMC servers and storage with your legacy management tools, while extending the useful life of your existing resources. With OpenManage Connections you can add monitoring and troubleshooting of Dell EMC assets to your IT infrastructure.

- OpenManage Connection for Nagios Core and Nagios XI
- OpenManage Connection for HPE Operations Manager i (OMi)

For more information on these OpenManage Connections, visit Dell.com/openmanage.

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Dell Technologies Services

Dell Technologies Services include a wide, customizable range of service choices to simplify the assessment, design, implementation, management and maintenance of IT environments and to help you transition from platform to platform. Depending on your current business requirements and the level of service right for you, we provide factory, on-site, remote, modular, and specialized services that fit your needs and budget. We'll help with a little or a lot—your choice—and provide access to our global resources.

For more information, see DellEMC.com/Services.

Topics:

ProDeploy Enterprise Suite and Residency Services

ProDeploy Enterprise Suite gets your server out of the box and into optimized production—fast. Our elite deployment engineers with broad and deep experience utilizing best-in-class processes along with our established global scale can help you around the clock and around the globe. From simple to the most complex server installations and software integration, we take the guess work and risk out of deploying your new server technology.

		Basic Deployment	ProDeploy	ProDeploy Plus
Pre-deployment	Single point of contact for project management		●	In-region
	Site readiness review		●	●
	Implementation planning		●	●
	Technology Service Manager (TSM) engagement for ProSupport Plus entitled devices			●
Deployment	Deployment service hours	Business hours	24x7	24x7
	Onsite hardware installation*	●	●	●
	Packaging materials disposal	●	●	●
	Install and configure system software		●	Onsite
	Project documentation with knowledge transfer		●	●
Post-deployment	Deployment verification		●	●
	Configuration data transfer to Dell EMC technical support		●	●
	30-days of post-deployment configuration assistance			●
	Training credits for Dell EMC Education Services			●

Figure 15. ProDeploy Enterprise Suite capabilities

NOTE: Hardware installation not applicable on selected software products.

ProDeploy Plus

From beginning to end, ProDeploy Plus provides the skill and scale needed to successfully execute demanding deployments in today's complex IT environments. Certified Dell EMC experts start with extensive environmental assessments and detailed migration planning and recommendations. Software installation includes set up of most versions of Dell EMC SupportAssist and OpenManage system management utilities. Post-deployment configuration assistance, testing, and product orientation services are also available.

ProDeploy

ProDeploy provides full service installation and configuration of both server hardware and system software by certified deployment engineers including set up of leading operating systems and hypervisors as well as most versions of Dell EMC SupportAssist and OpenManage system management utilities. To prepare for the deployment, we conduct a site readiness review and implementation planning exercise. System testing, validation, and full project documentation with knowledge transfer complete the process.

Basic Deployment

Basic Deployment delivers worry-free professional installation by experienced technicians who know Dell EMC servers inside and out.

HPC deployments require specialist that understand that cutting edge is yesterday's news. Dell EMC deploys the world's fastest systems and understands the nuances that make them perform. ProDeploy for HPC provides:

- Global team of dedicated HPC specialists
- Proven track record, thousands of successful HPC deployments
- Design validation, bench marking and production orientation

Learn more at http:/DellEMC.com/HPC-Services

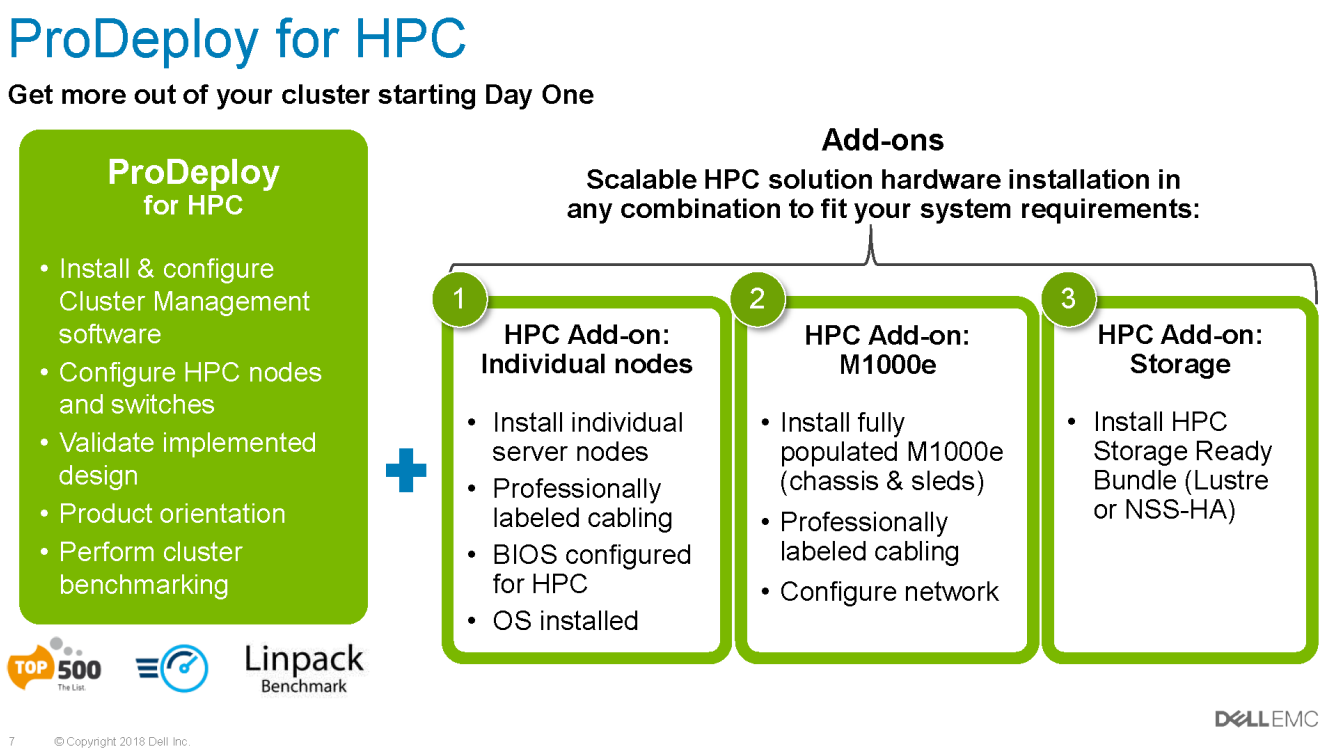

Figure 16. ProDeploy for HPC

Server Configuration Services

With Rack Integration and other Server Configuration Services, you save time by receiving your systems racked, cabled, tested, and ready to integrate into the data center. Dell EMC staff pre-configure RAID, BIOS and iDRAC settings, install system images, and even install third-party hardware and software.

For more information, see Server Configuration Services.

Residency Services

Residency Services helps customers transition to new capabilities quickly with the assistance of on-site or remote Dell EMC experts whose priorities and time you control. Residency experts can provide post implementation management and knowledge transfer related to a new technology acquisition or day-to-day operational management of the IT infrastructure.

Remote Consulting Services

When you are in the final stages of your PowerEdge server implementation, you can rely on Dell EMC Remote Consulting Services, and our certified technical experts to help you optimize your configuration with best practices for your software, virtualization, server, storage, networking, and systems management.

Data Migration Service

Protect your business and data with our single point of contact to manage your data migration project. Your project manager will work with our experienced team of experts to create a plan using industry-leading tools and proven processes based on global best practices to migrate your existing files and data so your business system get up and running quickly and smoothly.

ProSupport Enterprise Suite

Dell EMC ProSupport Services, we help you keep operations running smoothly, so you can focus on running your business. We will help you maintain peak performance and availability of your most essential workloads. Dell EMC ProSupport is a suite of support services that enable you to build the solution that is right for your organization. For HPC, Dell EMC provides solution-aware support including access to dedicated HPC solution experts to help manage the complexities of supporting a multiple-vendor cluster.

Choose support models based on how you use technology and where you want to allocate resources. From the desktop to the data center, address everyday IT challenges, such as unplanned downtime, mission-critical needs, data and asset protection, support planning, resource allocation, software application management and more. Optimize your IT resources by choosing the right support model.

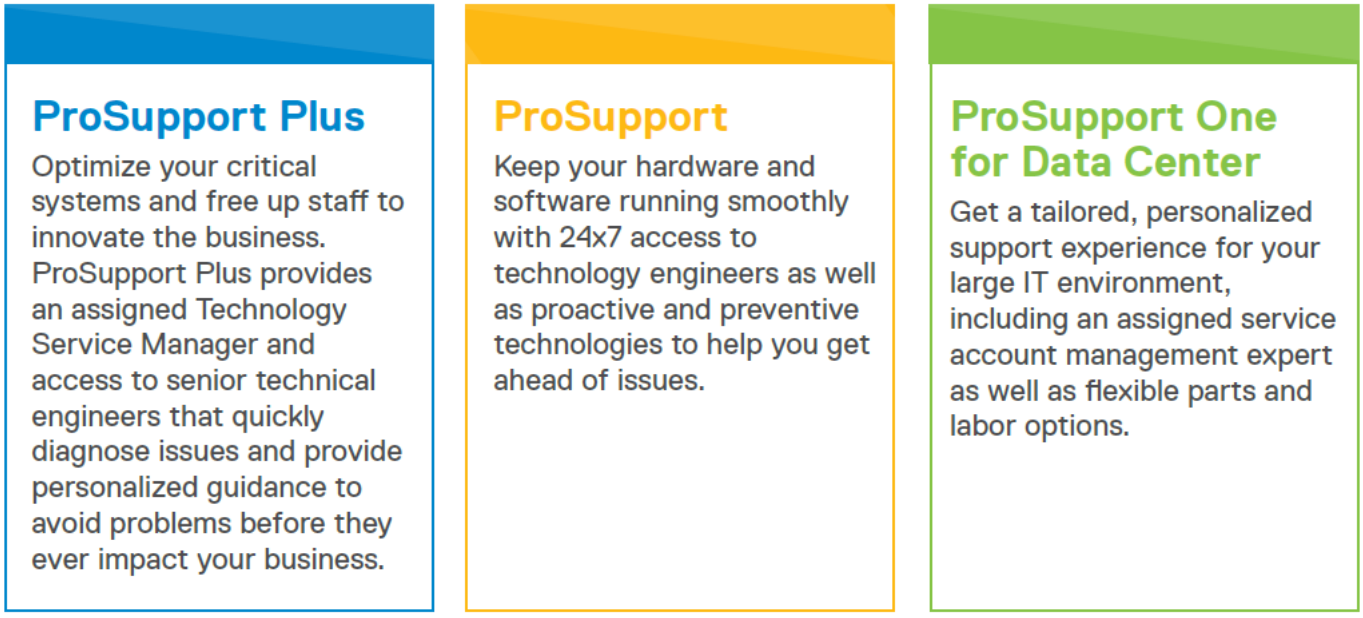

Figure 17. ProSupport Enterprise Suite

ProSupport Plus

When you purchase your PowerEdge server, we recommend ProSupport Plus, our proactive and preventative support service for your business-critical systems. ProSupport Plus provides you with all the benefits of ProSupport, plus the following:

- An assigned Technology Service Manager who knows your business and your environment
- Access to senior ProSupport engineers for faster issue resolution of issues
- Personalized, preventive recommendations based on analysis of support trends and best practices from across the Dell EMC customer base to reduce support issues and improve performance
- Predictive analysis for issue prevention and optimization enabled by SupportAssist
- Proactive monitoring, issue detection, notification, and automated case creation for accelerated issue resolution enabled by SupportAssist
- On-demand reporting and analytics-based recommendations enabled by SupportAssist and TechDirect

ProSupport

Our ProSupport service offers highly trained experts around the clock and around the globe to address your IT needs. We help minimize disruptions and maximize availability of PowerEdge server workloads with:

- 24 x 7 x 365 access to certified hardware and software experts
- Hypervisor and operating system support
- Consistent level of support available for Dell EMC hardware, software, and solutions
- Onsite parts and labor response options including next-business-day or four-hour-mission-critical
- A single point of accountability for any eligible third-party software

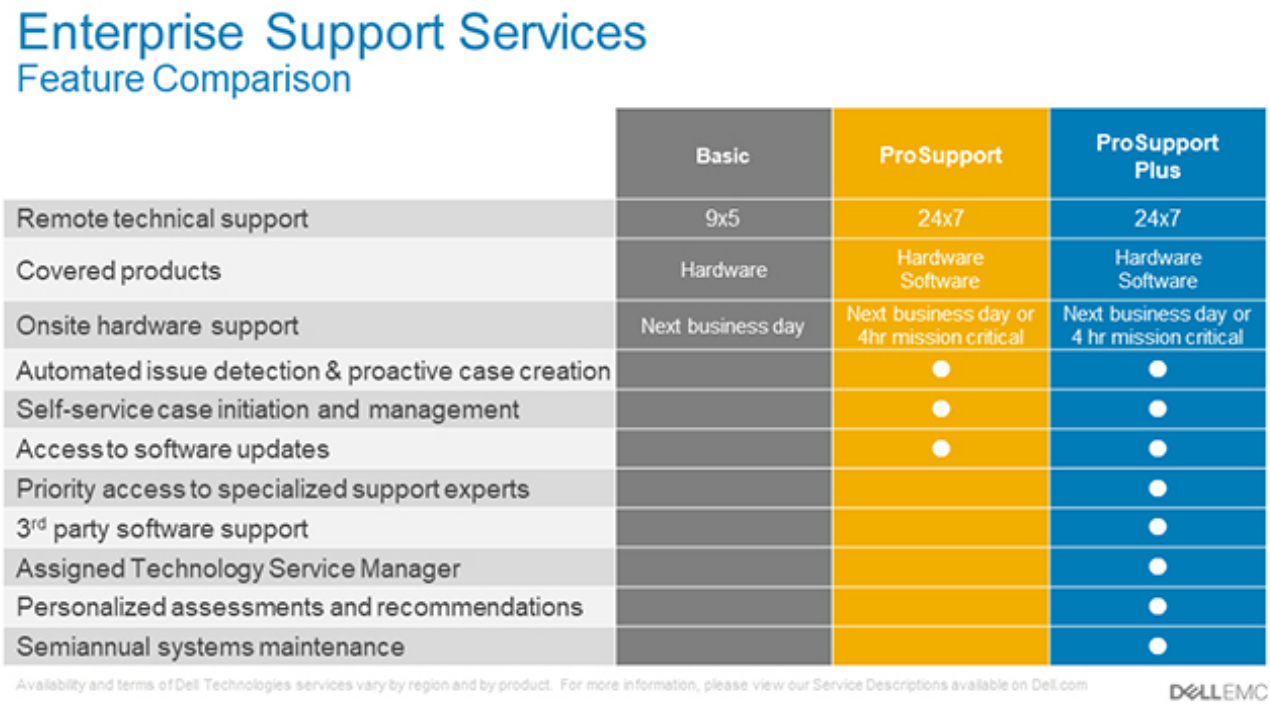

Figure 18. Dell EMC Enterprise Support model

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. This offering is built on standard ProSupport components that leverage our global scale but are tailored to your company's needs. While not for everyone, this service option offers a truly unique solution for Dell EMC's largest customers with the most complex environments.

- Team of assigned Technology Services Managers with remote, on-site options
- Assigned ProSupport One technical and field engineers who are trained on your environment and configurations
- On-demand reporting and analytics-based recommendations enabled by SupportAssist and TechDirect
- Flexible on-site support and parts options that fit your operational model
- A tailored support plan and training for your operations staff

ProSupport for HPC

The ProSupport for HPC provides solution-aware support including:

- Access to senior HPC experts
- Advanced HPC cluster assistance: performance, interoperability & configuration
- Enhanced HPC solution level end-to-end support
- Remote pre-support engagement with HPC Specialists during ProDeploy implementation

Learn more at DellEMC.com/HPC-Services.

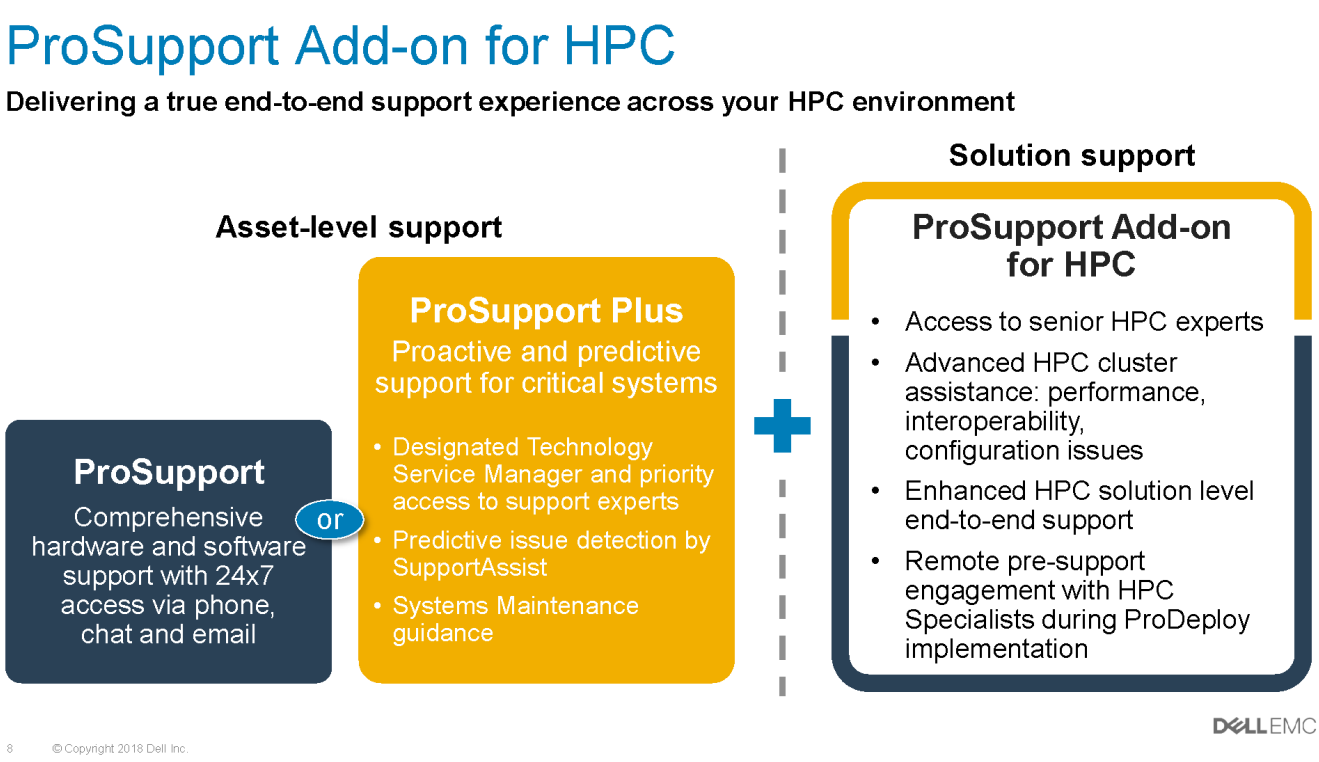

Figure 19. Prosupport for HPC

Support Technologies

Powering your support experience with predictive, data-driven technologies.

SupportAssist

The best time to solve a problem is before it happens. The automated proactive and predictive technology SupportAssist helps reduce steps and time to resolution, often detecting issues before they become a crisis. Benefits include:

- Value—SupportAssist is available to all customers at no additional charge
- Improve productivity—replace manual, high-effort routines with automated support
- Accelerate time to resolution—receive issue alerts, automatic case creation, and proactive contact from Dell EMC experts
- Gain insight and control—optimize enterprise devices with on-demand ProSupport Plus reporting in TechDirect, and get predictive issue detection before the problem starts

NOTE: SupportAssist is included with all support plans, but features vary based on service level agreement.

	Basic Hardware Warranty	ProSupport	ProSupport Plus
Automated issue detection and system state information collection	•	•	•
Proactive, automated case creation and notification		•	•
Predictive issue detection for failure prevention			•
Recommendation reporting available on-demand in TechDirect			•

Figure 20. SupportAssist model

Get started at Dell.com/SupportAssist

TechDirect

Boost IT team productivity when supporting Dell EMC systems. With over 1.4 million self-dispatches processed each year, TechDirect has proven its effectiveness as a support tool. You can:

- Self-dispatch replacement parts
- Request technical support
- Integrate APIs into your help desk

Or, access all your Dell EMC certification and authorization requirements. Train your staff on Dell EMC products, as TechDirect allows you to:

- Download study guides
- Schedule certification and authorization exams
- View transcripts of completed courses and exams

Register at techdirect.dell.

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 execute 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 designed to help you achieve more from your hardware investment. The curriculum delivers the information and the practical, hands-on skills that you and your team need to confidently install, configure, manage, and troubleshoot your Dell EMC servers. To learn more or register for a class today, see LearnDell.com/Server.

Dell Technologies Consulting Services

Our expert consultants help you transform faster, and quickly achieve business outcomes for the high value workloads Dell EMC PowerEdge systems can handle.

From strategy to full-scale implementation, Dell Technologies Consulting can help you determine how to execute your IT, workforce, or application transformation.

We use prescriptive approaches and proven methodologies combined with Dell Technologies' portfolio and partner ecosystem to help you achieve real business outcomes. From multi-cloud, applications, DevOps, and infrastructure transformations, to business resiliency, data center modernization, analytics, workforce collaboration, and user experiences—we're here to help.

Managed Services

Reduce the cost, complexity, and risk of managing IT. Focus your resources on digital innovation and transformation while our experts help optimize your IT operations and investment with managed services backed by guaranteed service levels.

Appendix A. Additional specifications

Chassis dimensions

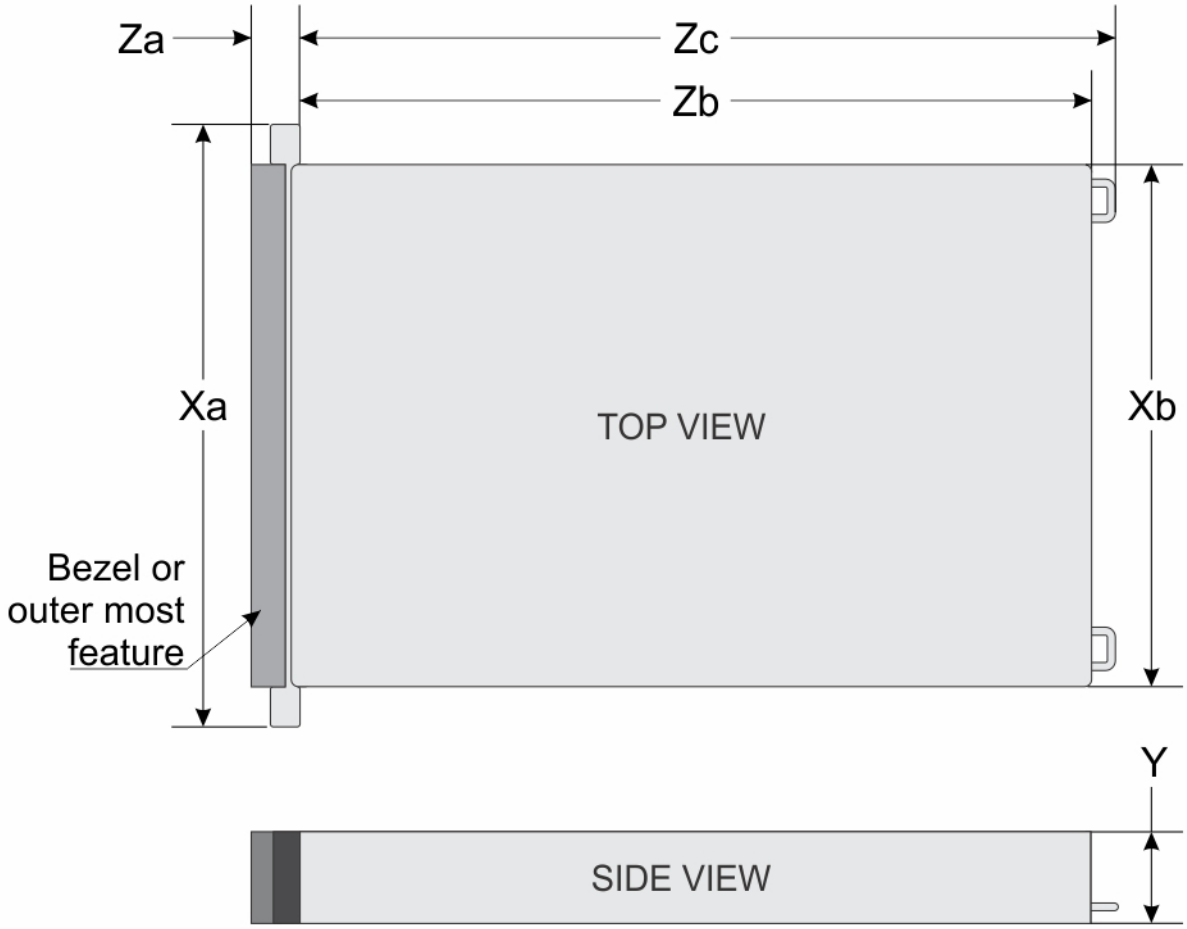

Figure 21. Chassis dimensions

Table 26. PowerEdge R7525

Drives	Xa	Xb	Y	Za	Zb	Zc
12 drives	482.0 mm (18.97 inches)	434.0 mm (17.08 inches)	86.8 mm (3.41 inches)	With bezel: 35.84 mm (1.4 inches) Without bezel: 22.0 mm (0.87 inches)	700.7 mm (27.58 inches) (Ear to rear wall)	736.29 mm (28.98 inches) (Ear to PSU handle)
24 drives	482.0 mm (18.97 inches)	434.0 mm (17.08 inches)	86.8 mm (3.41 inches)	With bezel: 35.84 mm (1.4 inches)	700.7 mm (27.58 inches) (Ear to rear wall)	736.29 mm (28.98 inches) (Ear to PSU handle)

Drives	Xa	Xb	Y	Za	Zb	Zc
				Without bezel: 22.0 mm (0.87 inches)		

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

Chassis weight

Table 27. PowerEdge R7525

System configuration	Maximum weight (with all drives/SSDs)
12 x 3.5-inch	36.3 kg (80.02 lb)
8 x 3.5-inch	33.2 kg (73.19 lb)
24 x 2.5-inch	28.6 kg (63.05 lb)
16 x 2.5-inch	26.6 kg (58.64 lb)
8 x 2.5-inch	24.6 kg (54.23 lb)

Video specifications

The PowerEdge R7525 system supports integrated Matrox G200 graphics controller with 16 MB of video frame buffer.

Table 28. Supported front 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

Table 29. Supported rear 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
1680 x 1050	60	8, 16, 32
1920 x 1080	60	8, 16, 32
1920 x 1200	60	8, 16, 32

USB ports specifications

Table 30. PowerEdge R7525 system 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	USB 3.0-compliant ports	One	Internal USB 3.0-compliant port	One
Micro-USB 2.0 compliant port	One	USB 2.0-compliant ports	One		

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

Environmental specifications

NOTE: For additional information about environmental certifications, refer to the *Product Environmental Datasheet* located with the Manuals & Documents on www.dell.com/support/home.

Table 31. Operational climatic range category A2

Temperature	Specifications
Allowable continuous operations	
Temperature ranges for altitudes <= 900 m (<= 2953 ft)	10–35°C (50–95°F) with no direct sunlight on the equipment
Humidity percent ranges (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 (33.8°F/984 Ft) above 900 m (2953 Ft)

Table 32. Operational climatic range category A3

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

Table 33. Operational climatic range category A4

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

Table 34. Shared requirements across all categories

Temperature	Specifications
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 (41°F in 15 minutes), 5°C in an hour* (41°F in an hour) for tape **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 35. Maximum vibration specifications

Maximum vibration	Specifications
Operating	0.26 G_{rms} at 5 Hz to 350 Hz (all operation orientations)
Storage	1.88 G_{rms} at 10 Hz to 500 Hz for 15 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. Thermal restriction matrix

Configuration		8 x 2.5-inch NVMe	16 x 2.5-inch SAS	16 x 2.5-inch NVMe	16 x 2.5-inch SAS + 8 x 2.5-inch NVMe	24 x 2.5-inch NVMe	8 x 3.5-inch	12 x 3.5-inch		Ambient temperature
Rear storage		No Rear Drives	No Rear Drives	No Rear Drives	No Rear Drives	No Rear Drives	No Rear Drives	No Rear Drives	2 x Rear 2.5-inch No Rear Fan	
CPU TDP/ cTDP	120 W	STD fan 1U STD HSK	STD fan 1U STD HSK	STD fan 1U STD HSK	STD fan 1U STD HSK	HPR fan 1U STD HSK	STD fan 1U STD HSK	HPR fan 1U STD HSK	HPR fan 1U STD HSK	35°C
	155 W	STD fan 1U STD HSK	STD fan 1U STD HSK	STD fan 1U STD HSK	STD fan 1U STD HSK	HPR fan 1U STD HSK	STD fan 1U STD HSK	HPR fan 1U STD HSK	HPR fan 1U STD HSK	35°C
	170 W	STD fan 1U STD HSK	STD fan 1U STD HSK	STD fan 1U STD HSK	STD fan 1U STD HSK	HPR fan 1U STD HSK	STD fan 1U STD HSK	HPR fan 1U STD HSK	HPR fan 1U STD HSK	35°C
	180 W	STD fan	STD fan	STD fan	STD fan	HPR fan	STD fan	HPR fan	HPR fan	35°C

Configuration		8 x 2.5-inch NVMe	16 x 2.5-inch SAS	16 x 2.5-inch NVMe	16 x 2.5-inch SAS + 8 x 2.5-inch NVMe	24 x 2.5-inch NVMe	8 x 3.5-inch	12 x 3.5-inch		Ambient temperature
Rear storage		No Rear Drives	No Rear Drives	No Rear Drives	No Rear Drives	No Rear Drives	No Rear Drives	No Rear Drives	2 x Rear 2.5-inch No Rear Fan	
		2U Full HSK	2U Full HSK	2U Full HSK	2U Full HSK	2U Full HSK	2U Full HSK	2U Full HSK	2U Full HSK	
	200 W	STD fan 2U Full HSK	STD fan 2U Full HSK	STD fan 2U Full HSK	STD fan 2U Full HSK	HPR fan 2U Full HSK	STD fan 2U Full HSK	HPR fan 2U Full HSK	HPR fan 2U Full HSK	35°C
	225 W	STD fan 2U Full HSK	STD fan 2U Full HSK	STD fan 2U Full HSK	STD fan 2U Full HSK	HPR fan 2U Full HSK	STD fan 2U Full HSK	HPR fan 2U Full HSK	HPR fan 2U Full HSK	35°C
	240 W	STD fan 2U Full HSK	STD fan 2U Full HSK	STD fan 2U Full HSK	STD fan 2U Full HSK	HPR fan 2U Full HSK	STD fan 2U Full HSK	HPR fan 2U Full HSK	HPR fan 2U Full HSK	35°C
	280 W	STD fan 2U Full HSK	STD fan 2U Full HSK	STD fan 2U Full HSK	STD fan 2U Full HSK	HPR fan 2U Full HSK	STD fan 2U Full HSK	HPR fan 2U Full HSK	HPR fan 2U Full HSK	30°C

NOTE: Three fan modules are required for single processor, and six fan modules are required for dual processor system.

NOTE: 280 W CPU does not support GPU.

NOTE: If the DIMM is 128 GB and above in a 12 x 3.5-inch chassis with CPU TDP/cTDP greater than 180 W, then the maximum ambient temperature supported is 30°C.

Table 38. GPU/FPGA thermal restriction matrix

Configuration (Front storage)	Fan type	Max CPU TDP/cTDP	GPU/FPGA (Ambient temperature)						
			T4	V100 (16 GB)	V100S	M10	Snow white	RTX 6000	RTX8000
8 x 2.5-inch NVMe	HPR	240 W	30°C	35°C	30°C	35°C	35°C	35°C	35°C
16 x 2.5-inch SAS	HPR	240 W	30°C	35°C	30°C	35°C	35°C	35°C	35°C
16 x 2.5-inch NVMe	VHP	240 W	30°C	35°C	30°C	35°C	35°C	35°C	35°C
16 x 2.5-inch SAS + 8 x 2.5-inch NVMe	VHP	240 W	30°C	35°C	30°C	35°C	35°C	35°C	35°C
8 x 3.5-inch SAS	HPR	240 W	30°C	35°C	30°C	35°C	35°C	35°C	35°C

NOTE: Maximum CPU TDP/cTDP for GPU/FPGA is 240 W.

NOTE: GPU is not supported in 12 x 3.5-inch hard drive and 24 x 2.5-inch NVMe configuration systems.

Table 39. Processor and heat sink matrix

Heat sink	Processor TDP
STD HSK	< 180 W
2U HPR HSK	>= 180 W
L-type HSK	Supports all TDP (system should be installed with GPU/FGPA/long PCIe cards)

NOTE: All GPU/FGPA cards require 1U L-type HSK and GPU shroud.

Table 40. Label reference

Label	Description
STD	Standard
HPR	High performance
VHP	Very high performance
HSK	Heat sink
LP	Low profile
FH	Full height

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Appendix B. Standards compliance

The system conforms to the following industry standards.

Table 41. Industry standard documents

Standard	URL for information and specifications
ACPI Advance Configuration and Power Interface Specification, v2.0c	https://uefi.org/specsandtesttools
Ethernet IEEE 802.3-2005	https://standards.ieee.org/
HDG Hardware Design Guide Version 3.0 for Microsoft Windows Server	microsoft.com/whdc/system/platform/pcdesign/desguide/serverdg.mspx
IPMI Intelligent Platform Management Interface, v2.0	intel.com/design/servers/ipmi
DDR4 Memory DDR4 SDRAM Specification	jedec.org/standards-documents/docs/jesd79-4.pdf
PCI Express PCI Express Base Specification Rev. 2.0 and 3.0	pcisig.com/specifications/pciexpress
PMBus Power System Management Protocol Specification, v1.2	http://pmbus.org/Assets/PDFS/Public/PMBus_Specification_Part_I_Rev_1-1_20070205.pdf
SAS Serial Attached SCSI, v1.1	http://www.t10.org/
SATA Serial ATA Rev. 2.6; SATA II, SATA 1.0a Extensions, Rev. 1.2	sata-io.org
SMBIOS System Management BIOS Reference Specification, v2.7	dmtf.org/standards/smbios
TPM Trusted Platform Module Specification, v1.2 and v2.0	trustedcomputinggroup.org
UEFI Unified Extensible Firmware Interface Specification, v2.1	uefi.org/specifications
USB Universal Serial Bus Specification, Rev. 2.0	usb.org/developers/docs

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Appendix C Additional resources

Table 42. Additional resources

Resource	Description of contents	Location
Installation and Service Manual	This manual, available in PDF format, provides the following information: • 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	This guide ships with the system, and is also available in PDF format. This guide provides the following information: • Initial setup steps	Dell.com/Support/Manuals
Rack Installation Guide	This document ships with the rack kits, and provides instructions for installing a server in a rack.	Dell.com/Support/Manuals
System Information Label	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.	Inside the system chassis cover
Quick Resource Locator (QRL)	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 EMC contact information.	Inside the system chassis cover
Energy Smart Solution Advisor (ESSA)	The Dell EMC online ESSA enables easier and more meaningful estimates to help you determine the most efficient configuration possible. Use ESSA to calculate the power consumption of your hardware, power infrastructure, and storage.	Dell.com/calc