Dell EMC PowerEdge R740xd2 Technical Guide

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Product overview

Introduction

The Dell EMC PowerEdge R740xd2 helps you plan for future growth with large internal storage and cost-efficient drive capacities. Deliver two-socket compute performance with flash and fast networking options to meet streaming demands. Simplify management of large data sets with automated administration and front-serviceable drives. The R740xd2 lets you keep your data safely on-premise with built-in security, even as you scale capacity.

The R740xd2 is Dell EMC's latest 2-socket, 2U rack server designed to run data-heavy workloads using scalable memory, I/O, and network options. The systems feature the 2nd Generation Intel® Xeon® Processor Scalable Family, up to 16 DIMMs, PCIe 3.0 enabled expansion slots, and a choice of OCP technologies.

New technologies

The following table shows new technologies incorporated in the PowerEdge R740xd2:

Table 1. New technologies

Technology	Detailed Description
2nd Generation Intel® Xeon® Processor Scalable Family	The 2nd Generation Intel® Xeon® processor scalable family has advanced features that deliver exceptional performance and value. See the processors section for more information .
Intel® C621 Chipset Series	The R740xd2 incorporates the Intel® Platform Controller Hub (PCH) chip. See the chipset section for more information.
2666 MT/s DDR4 Memory	The Intel® Xeon® processor scalable family support 2666 MT/s memory. The R740xd2 supports two DIMMs per channel at 2666 MT/s with these processors. See the memory section for more information.
iDRAC9 w/ Lifecycle Controller	The embedded systems management solution for Dell EMC Servers features hardware and firmware inventory and alerting, in- depth memory alerting, faster performance, a dedicated gigabit port and many more features.

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Product features

Product specifications

The following table shows the technical specifications of the PowerEdge R740xd2:

Table 2. Product Specifications

Features	Specifications
Form Factor	2U
Scalability (Sockets)	2 sockets
Processors	2nd Generation Intel® Xeon® Scalable processor server CPU
Processor TDP	Up to 140W
Processor Cores	Up to 22
Chipset	Intel® C621 chipset
VGA	Embedded in BMC (integrated VGA chip)
Memory technology	8GB/16GB/32GB/64GB DDR4
DIMMs per socket (total DIMMs)	16 DIMM slots
DIMM Type	RDIMM
Memory Bandwidth	2666 MT/s
PCIe slots	Up to 5 x Gen3 slots (3 x16 + 2 x4)
PCIe Gen	Gen 3
Power supplies	• Platinum: 750W or 1100W • HVDC: 750W or 1100W hot plug power supplies with full redundancy option • Mixed mode: 750W AC and DC • 6 fans with N +1 redundancy
USB Front	2 x USB 2.0 : Micro USB iDRAC x1 + 1 x USB 2.0
USB Rear	2 x USB 3.0
USB Internal	1 x USB 3.0
Serial Port	Yes
Video	Yes, 1x standard VGA (Rear)
SATA ports (from PCH)	Up to 12 SATA ports. 2 rear drives onboard SATA Support
Disk Drives	• 3.5" hard disk drives/2.5" SSD drives with 3.5" carrier, hot pluggable • Front drive bays: Up to 24 x 3.5” SAS/ SATA (HDD) max 384TB, or up 16 x 3.5” SAS/ SATA (HDD) plus up to 8 x 2.5” SAS (SSD) max 317.44TB • Rear drive bays: Up to 2 x 3.5” SAS SATA (HDD) max 32TB or up to 2 x 2.5” SAS (SSD) drives max 15.36TB
Storage controllers	• Internal Controllers: PERC H730P, H330 • Software RAID (SWRAID): S140 • Boot Optimized Storage Subsystem: HWRAID 2 x M.2 SSDs, 240GB or 480GB • 12Gbps SAS HBAs (non-RAID): Internal - HBA330
Optical Drive	Optional external USB DVD-ROM

Features	Specifications
Embedded Management (Remote)	iDRAC9 with Lifecycle Controller
Systems Management	OpenManage, iDRAC

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Chassis views and features

Front view of the system

Figure 1. Front view of 24 x 3.5-inch drive system

1. Left control panel
2. Drives (12)
3. Right control panel
4. Right release latch
5. Left release latch

Rear view of the system

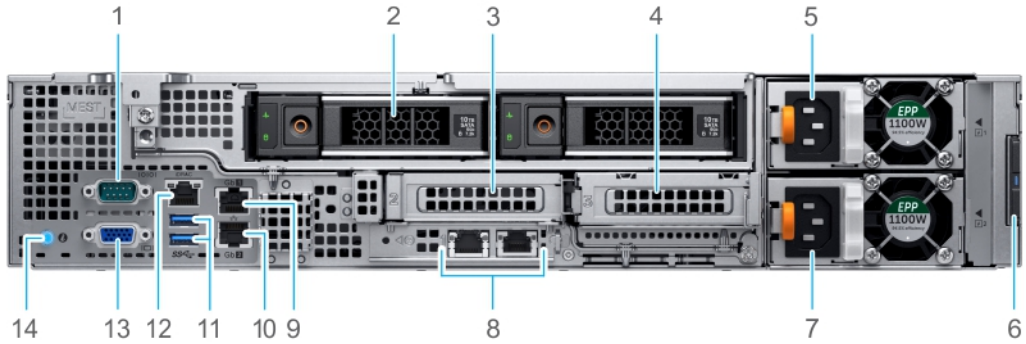

Figure 2. Back panel features of 2 x 3.5-inch (rear) drive system with low-profile risers

1. Serial port
2. Drives (2)
3. Low-profile riser 1 (slot 2)
4. Low-profile riser 2 (slot 3)
5. Power supply unit (PSU 1)
6. Information tag
7. Power supply unit (PSU 2)
8. LOM ethernet port (2)
9. Ethernet port (Gb1)
10. Ethernet port (Gb2)
11. USB 3.0 port (2)
12. iDRAC9 dedicated network port
13. VGA port
14. System identification button

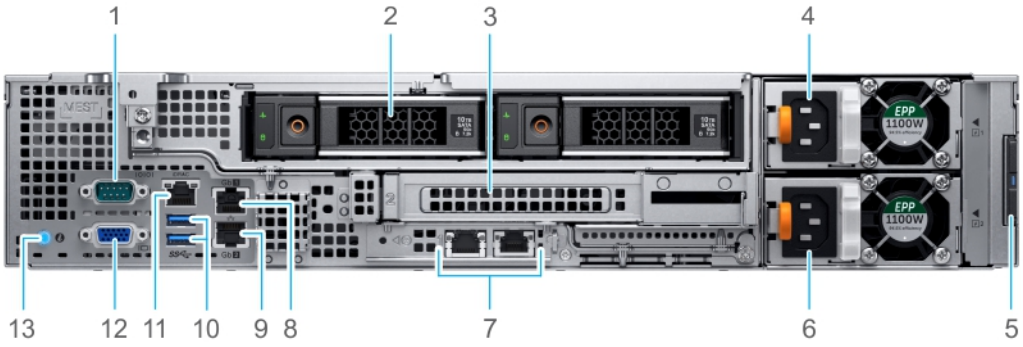

Figure 3. Back panel features of 2 x 3.5-inch (rear) drive system with full-height riser

1. Serial port
2. Drive (2)
3. Full-height riser slot (slot 2)
4. Power supply unit (PSU 1)
5. Information tag
6. Power supply unit (PSU 2)
7. LOM ethernet port (2)
8. Ethernet port (Gb1)
9. Ethernet port (Gb2)
10. USB 3.0 port (2)
11. iDRAC9 dedicated network port
12. VGA port
13. System identification button

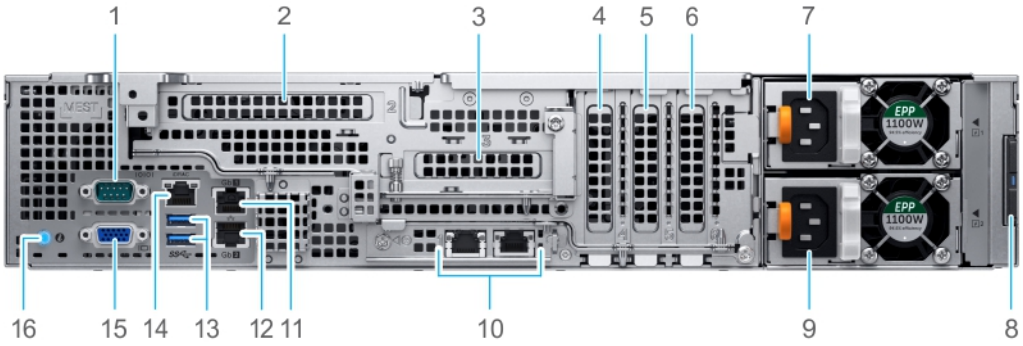

Figure 4. Back panel features of system with butterfly riser

1. Serial port
2. Butterfly riser full-height (slot 2)
3. Butterfly riser low-profile (slot 3)
4. Low-profile PCIe expansion card (slot 4)
5. Low-profile PCIe expansion card (slot 5)
6. Low-profile PCIe expansion card (slot 6)
7. Power supply unit (PSU 1)
8. Information tag
9. Power supply unit (PSU 2)
10. LOM ethernet port (2)
11. Ethernet port (Gb1)
12. Ethernet port (Gb2)
13. USB 3.0 port (2)
14. iDRAC9 dedicated network port
15. VGA port
16. System identification button

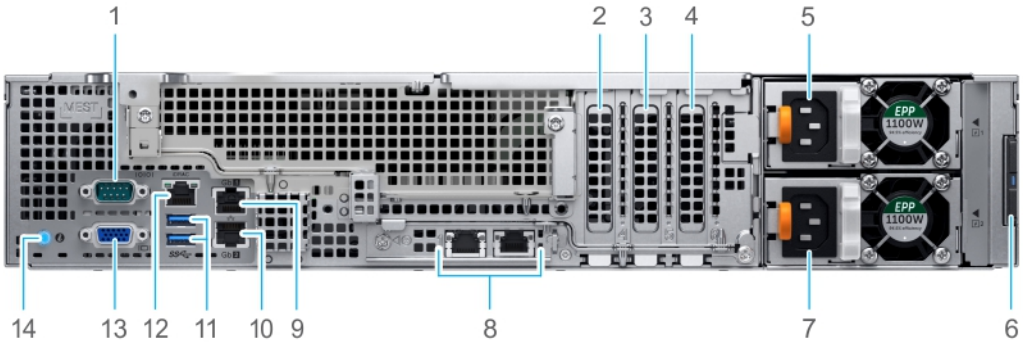

Figure 5. Back panel features of system without risers

1. Serial port
2. Low-profile PCIe expansion card (slot 4)
3. Low-profile PCIe expansion card (slot 5)
4. Low-profile PCIe expansion card (slot 6)
5. Power supply unit (PSU 1)
6. Information tag
7. Power supply unit (PSU 2)
8. LOM ethernet port (2)
9. Ethernet port (Gb1)
10. Ethernet port (Gb2)
11. USB 3.0 port (2)
12. iDRAC9 dedicated network port
13. VGA port
14. System identification button

Inside the system

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

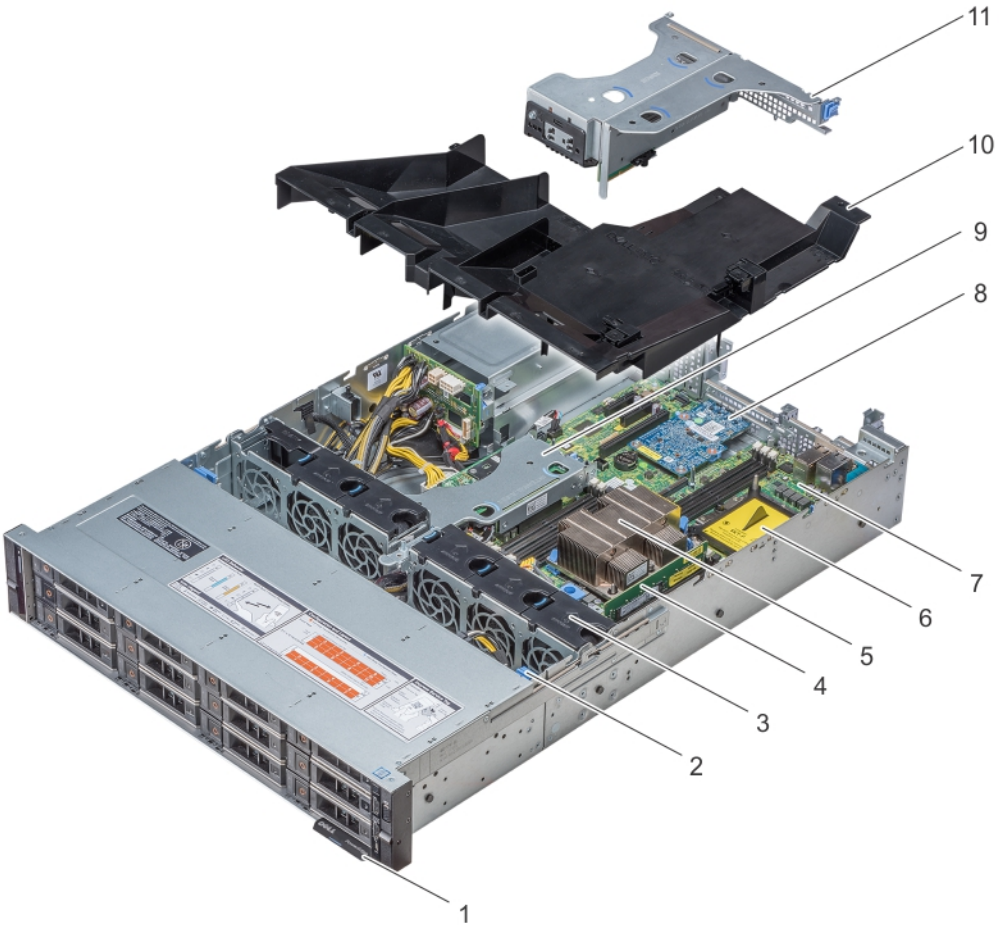

Figure 6. Inside the system without rear drive cage

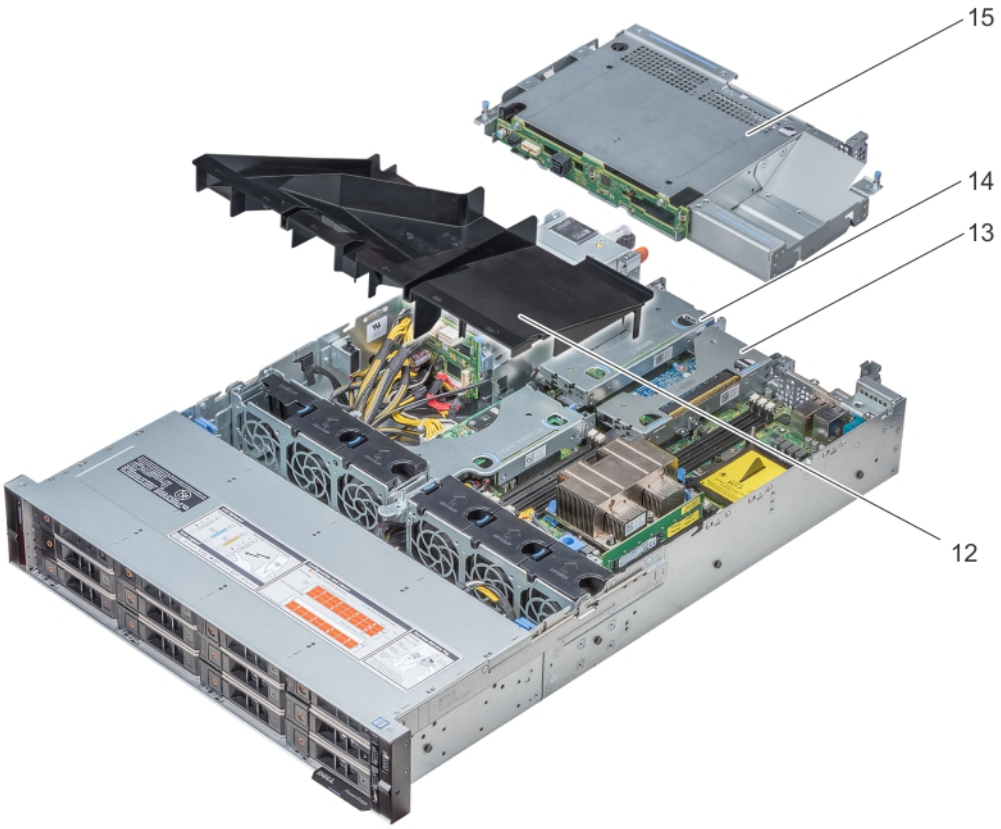

Figure 7. Inside the system with rear drive cage

1. Information tag
2. Drive backplane
3. Cooling fans
4. Memory module
5. CPU 1
6. CPU 2 socket
7. System board
8. LOM riser card
9. Internal PERC riser
10. Air shroud
11. Butterfly riser
12. Air shroud (24 x 3.5 inch + 2 x 3.5 inch rear hard drive system)
13. Low profile riser right
14. Low profile riser left
15. Drive cage (rear)

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Processor

Topics:

Processor features

The 2nd Generation Intel Xeon Processor Scalable Family provides the foundation for a powerful datacenter platform. It is the most advanced compute core featuring a new core micro architecture optimized to accelerate a wide range of compute workloads. The key features are as follows:

- **Higher Per-Core Performance**: Up to 28 cores (22 cores with R740xd2), delivery high performance and scalability for compute-intensive workloads across compute, storage & network usages. 2nd Generation Intel Xeon Scalable Processors can offer even greater core or frequencies, or both.
- **Greater Memory Bandwidth/Capacity**: 50% increased memory bandwidth and capacity. 6 memory channels vs. 4 memory channels of previous generation for memory intensive workloads.
- **Expanded I/O**: 48 lanes of PCIe 3.0 bandwidth and throughput for demanding I/O-intensive workloads.
- **Intel Ultra Path Interconnect (UPI)**: Up to three Intel UPI channels increase scalability of the platform to as many as eight sockets, as well as improves inter-CPU bandwidth for I/O intensive workloads.
- **Intel Advanced Vector Extensions 512 (Intel AVX-512)** with a single AVX512 fused multiply add (FMA) execution units. SKUs which support Advanced RAS enable a 2nd FMA execution unit.
- **Security without Compromise**: Near-zero encryption overhead enables higher performance on all secure data transactions with enhanced hardware mitigation.
- **Intel Deep Learning Boost**: Accelerate data-intensive workloads within the CPU with inferencing capabilities.

Supported processors

Table 3. Supported Processors for R740xd2 (including 1st and 2nd Generation Intel Xeon Scalable processors)

Medal	Processor	Frequency (GHz)	Cores	Cache (M)	UPI (GT/s)	Turbo	TDP (W)
Gold	6230	2.1	20	27.5	10.4	Y	125
Gold	6226	2.7	12	19.25	10.4	Y	125
Gold	6152	2.1	22	30	10.4	Y	140
Gold	6140	2.3	18	25	10.4	Y	140
Gold	6130	2.1	16	22	10.4	Y	125
Gold	5220	2.2	18	24.75	10.4	Y	125
Gold	5218R	2.1	20	27.5	10.4	Y	125
Gold	5218	2.3	16	22	10.4	Y	105
Gold	5217	3	8	11	10.4	Y	115
Gold	5215	2.5	10	13.75	10.4	Y	85
Gold	5120	2.2	14	19	10.4	Y	105
Gold	5118	2.3	12	16	10.4	Y	105
Gold	5117	2.0	14	16	10.4	Y	105

Medal	Processor	Frequency (GHz)	Cores	Cache (M)	UPI (GT/s)	Turbo	TDP (W)
Gold	5115	2.4	10	14	10.4	Y	85
Silver	4216	2.1	16	22	9.6	Y	100
Silver	4215	2.5	8	11	9.6	Y	85
Silver	4214	2.2	12	16.5	9.6	Y	85
Silver	4214R	2.4	12	16.5	9.6	Y	100
Silver	4210	2.2	10	13.75	9.6	Y	85
Silver	4210R	2.4	10	13.75	9.6	Y	100
Silver	4116	2.1	12	16	9.6	Y	85
Silver	4114	2.2	10	14	9.6	Y	85
Silver	4110	2.1	8	11	9.6	Y	85
Bronze	3206R	1.9	8	11	9.6	N	85
Bronze	3204	1.9	6	8.25	9.6	N	85
Bronze	3104	1.7	6	8	9.6	N	85

- The system works optimally with the processor installed in the processor 1 socket only.
- The system does not POST if only processor 2 is installed.
- With single processor configuration, only the right low profile riser functions

Chipset

The following lists the features of the Intel C621 chipset:

- ACPI Power Management Logic Support, Revision 4.0a
- PCI Express* Base Specification Revision 3.0
- Integrated Serial ATA host controller, supports data transfer rates of up to 6 Gb/s on all ports.
- xHCI USB controller with SuperSpeed USB 3.0 ports
- Direct Media Interface
- Serial Peripheral Interface
- Enhanced Serial Peripheral Interface
- Flexible I/O-Allows some high speed I/O signals to be configured as PCIe* root ports, PCIe* uplink for use with certain PCH SKUs, SATA (and sSATA), or USB 3.0
- General Purpose Input Output (GPIO)
- Low Pin Count interface, interrupt controller, and timer functions
- System Management Bus Specification Version 2.0
- Integrated Clock Controller / Real Time Clock Controller
- Intel® High Definition Audio and Intel® Smart Sound Technology
- Integrated 10/1 Gb Ethernet
- Integrated 10/100/1000 Mbps Ethernet MAC
- Supports Intel® Rapid Storage Technology Enterprise
- Supports Intel® Active Management Technology and Server Platform Services
- Supports Intel® Virtualization Technology for Directed I/O
- Supports Intel® Trusted Execution Technology
- JTAG Boundary Scan support
- Intel® Trace Hub for debug

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Memory

The PowerEdge R740xd2 supports up to 16 DIMMs, with up to 1024 GB of memory and speeds of up to 2666 MT/s.

Supported memory

The table below lists the memory technologies supported by the PowerEdge R740xd2:

Table 4. Supported memory technologies

Features	Description
DIMM types	RDIMM
Transfer speed	2666 MT/s
	2400 MT/s
	2133 MT/s
	1866 MT/s
Voltage	1.2 V (DDR4)

Memory speed

The PowerEdge R740xd2 support memory speeds of 2666MT/s, 2400MT/s, 2133MT/s, and 1866MT/s depending on the DIMM types installed and the configuration. All memory on all processors and channels run at the same speed and voltage. By default, this speed will be the highest common supported speed between the CPUs and DIMMs. The operating speed of the memory is also determined by the maximum speed supported by the processor, speed settings in BIOS, and operating voltage of the system.

The following table lists the memory configuration and performance details based on the quantity and type of DIMMs per memory channel:

Table 5. DIMM performance details

DIMM type	DIMM ranking	Capacity	DIMM rated voltage, speed
RDIMM	1R / 2R	8GB, 16GB, 32GB, 64GB	DDR4 (1.2V), 2666

NOTE: 64 GB DIMM is supported with 2nd Generation Intel Xeon scalable processors.

Memory configurations

The PowerEdge R740xd2 servers support flexible memory configurations ranging from capacities of 8GB(minimum) to 1024GB(maximum). CPU1 support up to 10 DIMMs sand CPU2 support up to 6 DIMMs.

Both systems support a flexible memory configuration, according to the following population rules:

- Speed: If DIMMs of different speeds are mixed, all channels across all processors operate at the slowest DIMM's common frequency.
- DIMM type: Only one type of DIMM is allowed per system: RDIMM.
- DIMMs with different data widths (x4 and x8) can be mixed.
- Can mix DIMMs with different capacities.
  - Population rules require the largest capacity DIMM be placed first (slot A1 populated first, then A2, and so on. The second CPU mirrors the first CPU population).
  - Maximum of two different capacity DIMMs allowed in a system
- Can mix DIMMs with different ranks.
  - Maximum of two different rank DIMMs allowed in a system

Memory RAS features

Reliability, Availability, and Serviceability (RAS) features help keep the system online and operational without significant impact to performance and can decrease data loss and crashing due to errors. RAS aids in rapid, accurate diagnosis of faults which require service.

The following table describes the memory RAS features supported on the PowerEdge R740xd2:

Table 6. Memory RAS features

Feature	Description
Dense configuration optimized profile	Increased memory reliability can be a result from this selectable platform profile that adjusts parameters to reduce faults regarding refresh rates, speed, temperature and voltage
Memory demand and patrol scrubbing	Demand scrubbing is the ability to write corrected data back to the memory once a correctable error is detected on a read transaction. Patrol scrubbing proactively searches the system memory, repairing correctable errors.
Recovery from single DRAM device failure (SDDC)	Recovery from Single DRAM Device Failure (SDDC) provides error checking and correction that protects against any single memory chip failure as well as multi-bit errors from any portion of a single memory chip.
Failed DIMM isolation	This feature provides the ability to identify a specific failing DIMM channel pair, thereby enabling the user to replace only the failed DIMM pair.
Memory mirroring	Memory mirroring is a method of keeping a duplicate (secondary or mirrored) copy of the contents of memory as a redundant backup for use if the primary intra-socket memory fails. The mirrored copy of the memory is stored in memory of the same processor socket.
Memory address parity protection	This feature provides the ability to detect transient errors on the address lines of the DDR channel.
Memory sparing (rank)	Memory sparing allocates one rank per channel as a spare. If excessive correctable errors occur in a rank or channel, they are moved to the spare area while the operating system is running to prevent the errors from causing an uncorrectable failure.
Memory thermal throttling	This feature helps to optimize power/performance and can also be used to prevent DIMMs from overheating.

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Storage

The chassis design for the PowerEdge R740xd2 supports four different storage configurations with max 24, or 26 drive options depending on the rear drive option selected. The following table shows the storage options available:

Table 7. Storage options

Configuration	Details	Topology comment
Config 0	24x 3.5-inch, (12+12 Single PERC)	No rear drives to allow for max number of PCIe slots
Config 1	24x3.5-inch + 2x3.5-inch (12+12+2 Single PERC)	All drives on a single controller for max capacity on data drives
Config 2	24x3.5-inch and 2x3.5-inch SATA (12+12 PERC with rear 2 CS SATA drives)	Supports SATA drives in the rear for boot or as a hot tier (2.5-inch SATA SSDs would have to be hosted in a 3.5-inch carrier)
Config 3	24x3.5-inch and 2x3.5-inch (12+12 1st PERC and 2x3.5-inch 2nd PERC)	Front 24 drives on Mini PERC controller, rear two drives on adapter PERC controller. Rear drives for boot or as a hot tier (2.5-inch SATA SSDs would have to be hosted in a 3.5-inch carrier).

Topics:

Drives

The Dell EMC PowerEdge R740xd2 system supports:

- Up to 24 x 3.5-inch (SATA or Nearline SAS drives) front accessible drives in slots 0 through 23.
- Up to 2 x 3.5-inch (SATA or Nearline SAS drives) rear accessible drives in slots 24 through 25.
- Up to 8 x 2.5-inch (SAS, SATA SSDs) front accessible drives placement rule must install SSD at slot 23 first and backward end at slot 16.

  NOTE: 2.5-inch drives in 3.5-inch carriers are supported for SAS, and SATA SSD drives.

The following table list the support hard drives for the PowerEdge R740xd2.

Table 8. Supported HDD and SSD

Form factor	Type	Speed	Rotational speed	Capacities
2.5"	SATA/SSD	6Gb	NA	240GB, 400GB, 480GB, 800GB, 960GB, 1600GB, 1920GB, 3840GB
2.5"	SATA/SSD	12Gb	NA	400GB, 480GB, 800GB, 960GB, 1600GB, 1920GB, 3840GB, 7.68TB 1920GB (SED FIPS)
3.5"	SATA/SSD	6Gb	7.2K	1TB, 2TB, 4TB, 8TB, 12TB, 14TB, 16TB
3.5"	SATA/SSD	12Gb	7.2K	2TB, 4TB, 4TB (SED FIPS), 8TB, 8TB (SED FIPS) 12TB, 12TB (SED FIPS)

NOTE: Visit dell.com/support for the latest supported drives.

Storage controller specifications

The PowerEdge R740xd2 system supports the following controller cards.

Table 9. Dell EMC PowerEdge R740xd2 system controller cards

Internal controllers	External controllers	Software RAID
• PERC H730P mini • PERC HBA330 mini • PERC H330	• 12 Gbps SAS HBA • PERC H840	• S140 (SATA) - software RAID SATA

Internal Dual SD Module (IDSDM)

The Internal Dual SD Module (IDSDM) and vFlash card are combined into a single card module in the latest PowerEdge systems. The following are options available for PowerEdge R740xd2 systems:

- vFlash only
- IDSDM only
- vFlash and IDSDM

NOTE: The IDSDM only option is available with vFlash hardware and requires an iDRAC Enterprise license to enable the feature.

The IDSDM with vFlash module is installed in a Dell-proprietary PCIe x1 slot using a USB 3.0 interface as the host. In this generation of servers, the IDSDM and vFlash card features microSD in place of an SD card The supported capacities for the IDSDM microSD cards are 16/32/64 GB while for vFlash the capacity is limited to 16 GB only. The write-protect switch is built on the IDSDM with vFlash module.

Boot Optimized Storage Subsystem (BOSS)

BOSS is offered as a means of booting 14G servers to a full OS when:

- A solution such as IDSDM may be desired, but the target OS is a full OS (not just a hypervisor)
- The user does not wish to trade off standard hot plug drive slots for OS install
- A separate hardware RAID is required for OS boot so that data drives can be in Passthrough mode with an HBA

BOSS is a PCIe card located at the rear of the system to support up to two 80mm or 110mm M.2 SATA or PCIe x1 devices.

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External storage

Table 10. External storage

Device Type	Description
External Tape	Supports connection to external SAS or FC tape products
NAS/IDM appliance Software	Supports NAS software stack
JBOD	Supports connection to 12Gb MD-series JBODs
External RD1000	Supports external USB RD1000 drive

Topics:

Optical drive

The R740xd2 supports on the following external optical drive options.

- DVD-ROM

Tape drive

The PowerEdge R740xd2 do not support internal tape drives. However, external tape backup devices will be supported. The list below shows the supported external tape drives:

- External RD1000 USB
- External LTO-5, LTO-6, and LTO-7 6 Gb SAS tape drives
- 114X rack mount chassis with LTO-5, LTO-6, and LTO-7 6 Gb SAS tape drives
- TL1000 with LTO-5, LTO-6, and LTO-7 6 Gb SAS tape drives
- TL2000 with LTO-5, LTO-6, and LTO-7 6 Gb SAS and 8Gb FC tape drives
- TL4000 with LTO-5, LTO-6, and LTO-7 6 Gb SAS and 8Gb FC tape drives
- ML6000 with LTO-5, LTO-6, and LTO-7 6 Gb SAS and 8Gb FC tape drives

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Networking and PCIe

The following lists the supported LOM for the PowerEdge R740xd2:

- 2x1GbE
- 2x10GbE
- 2x10GbE SFP+
- 2x16GbE SFP+
- 2x25GbE SFP28

The following list the supported PCIe slots:

- Slot-6: PCie Gen3 x4 from PCH
- Slot-5: PCie Gen3 x4 from CPU1
- Slot-4: PCie Gen3 x16 from CPU2 (left riser : slot 3)
- Slot-3: PCIe Gen3 x8 from CPU1 (Right riser: riser 1 slot)
- Slot-2: PCIe Gen3 x8 (or x16) from CPU1 (Right riser: riser 1 slot)
- Slot-1: LOM riser connector A x8 from CPU1.
- Internal PERC Slot: PCie Gen3 x8 from CPU1

9

Power, thermal, and acoustics

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 following table shows the available power supplies for the PowerEdge R740xd2:

Table 11. Power supply units

Wattage	Frequency	Voltage	Class	Heat dissipation
750W- Mixed mode	50/60 Hz	100-240 V AC, autoranging	Platinum	2902 BTU/hr/
	NA	240 V DC, autoranging	Platinum (For China only)	2902 BTU/hr/
750W- Mixed mode HVDC (For China only	50/60 Hz	100-240 V AC, autoranging	Platinum	2902 BTU/hr/
	NA	240 V DC, autoranging	Platinum	2902 BTU/hr/
750W- WRAC	50/60Hz	115/230 V AC	Platinum	2891 BTU/hr
750W HVDC/WRAC	NA	240 V DC	Platinum	2902 BTU/hr
1100W WRAC	50/60Hz	115/230 VAC	Platinum	4100 BTU/hr
1100W HVDC/WRAC	NA	380 V DC	Platinum	4100 BTU/hr

The PowerEdge R740xd2 supports up to 2 AC or DC power supplies with 1+1 redundancy, auto sensing, and auto-switching capability.

If two PSUs are present during POST, a comparison is made between the wattage capacities of the PSUs. In the event that the PSU wattages don't match, the larger of the two PSU's is enabled. Also, there is a PSU mismatch warning displayed in BIOS, iDRAC, or on the System LCD.

If a second PSU is added at run-time, in order for that particular PSU to be enabled, the wattage capacity of the first PSU must equal the second PSU. Otherwise, the PSU will be flagged as unmatched in iDRAC and the second PSU will not be enabled.

Power supply efficiency

Dell EMC power supplies have achieved Platinum and Titanium efficiency levels as shown in the table below:

Table 12. PSU efficiency levels

Form factor	Output	Class	10%	20%	50%	100%
Redundant 86 mm	750W AC	Platinum	82.00%	90.00%	94.00%	91.00%
	1100W AC	Platinum	89.00%	93.00%	94.50%	92.00%
	1100W AC 380V	Platinum	90.00%	93.50%	95.00%	93.00%
	750W HVDC	Platinum	82.00%	90.00%	94.00%	91.00%

NOTE: 750W & 1100W HVDC power supplies are only available in China

Thermal

The system's thermal management delivers high performance through optimized cooling of components at the lowest fan speeds across a wide range of ambient temperatures from 10°C to 30°C (50°F to 86°F) and to extended ambient temperature ranges. These optimizations result in lower fan power consumption which translate to lower system power and data center power consumption.

Thermal design

The thermal design of the system 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 minimal expense of fan power.
- **Comprehensive thermal management**: The thermal control system regulates the system fan speeds based on feedback from system component temperature sensors, as well as for system inventory and subsystem power draw. Temperature monitoring includes components such as processors, DIMMs, chipset, system inlet air temperature and hard disk drives.
- **Open and closed loop fan speed control**: Open loop fan control uses system configuration to determine fan speed based on system inlet air temperature. Closed loop thermal control uses temperature feedback to dynamically adjust fan speeds based on system activity and cooling requirements.
- **User-configurable settings**: With the understanding and realization that every customer has a unique set of circumstances or expectations from the system, in this generation of servers, we have introduced limited user-configurable settings in the iDRAC9 BIOS setup screen. For more information, see the Dell EMC PowerEdge system Installation and Service Manual on Dell.com/ Support/ Manuals and "Advanced Thermal Control: Optimizing across Environments and Power Goals" on Dell.com.
- **Cooling redundancy**: The system allows N+1 fan redundancy, allowing continuous operation with one fan failure in the system.

Acoustical design

Dell EMC focuses on sound quality in addition to sound power level and sound pressure level. Sound quality describes how disturbing or pleasing a sound is interpreted, and Dell EMC references a number of psychacoustical metrics and thresholds in delivering to it. Tone prominence is one such metric. Sound power and sound pressure levels increase with greater populations or higher utilization, while sound quality remains good even as the frequency content changes. A reference for comparison to sound pressure levels for familiar noise sources is given in the following table. An extensive description of Dell EMC Enterprise acoustical design and metrics is available in the Dell Enterprise Acoustics white paper.

Table 13. Acoustical reference points and output comparisons

Value measured at your ears		Equivalent familiar noise experience
LpA, dBA, re 20 µPa	**Loudness, sones**	
90	80	Loud concert
75	39	Data center, vacuum cleaner, voice must be elevated to be heard
60	10	Conversation levels
45	4	Whispering, open office layout, normal living room
35	2	Quiet office
30	1	Quiet library
20	0	Recording studio

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Supported Operating Systems

The following is the supported operating systems for the PowerEdge R740xd2:

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

For specifications and interoperability details, See dell.com/OSsupport.

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Dell EMC OpenManage systems management

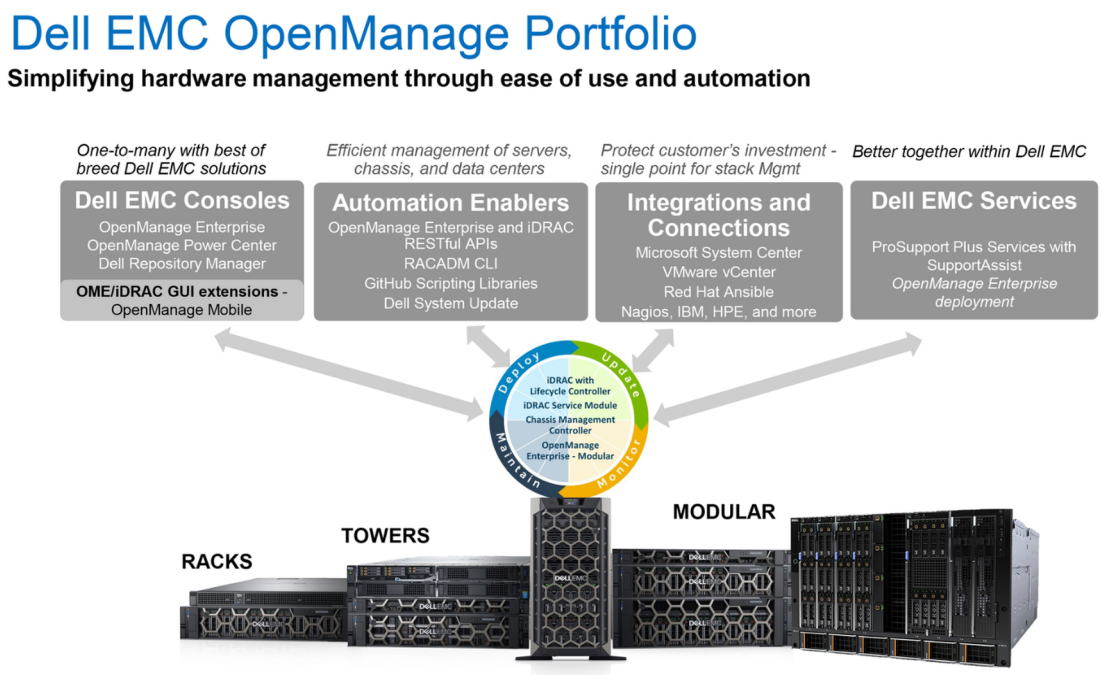

Figure 8. Dell EMC OpenManage Portfolio

Dell EMC delivers management solutions that help IT Administrators effectively deploy, update, monitor, and manage IT assets. OpenManage solutions and tools enable you to quickly respond to problems by helping them to manage Dell EMC servers effectively and efficiently; in physical, virtual, local, and remote environments, operating in-band, and out-of-band (agent-free). The OpenManage portfolio includes innovative embedded management tools such as the integrated Dell Remote Access Controller (iDRAC), Chassis Management Controller and Consoles like OpenManage Enterprise, OpenManage Power Manager plug in, and tools like Repository Manager.

Dell EMC has developed comprehensive systems management solutions based on open standards and has integrated with management consoles that can perform advanced management of Dell hardware. Dell EMC has connected or integrated the advanced management capabilities of Dell hardware into offerings from the industry's top systems management vendors and frameworks such as Ansible, thus making Dell EMC platforms easy to deploy, update, monitor, and manage.

The key tools for managing Dell EMC PowerEdge servers are iDRAC and the one-to-many OpenManage Enterprise console. OpenManage Enterprise helps the system administrators in complete lifecycle management of multiple generations of PowerEdge servers. Other tools such as Repository Manager, which enables simple yet comprehensive change management.

OpenManage tools integrate with systems management framework from other vendors such as VMware, Microsoft, Ansible, and ServiceNow. This enables you to use the skills of the IT staff to efficiently manage Dell EMC PowerEdge servers.

Topics:

Server and Chassis Managers

- Integrated Dell Remote Access Controller (iDRAC)
- iDRAC Service Module (iSM)

Dell EMC consoles

- Dell EMC OpenManage Enterprise
- Dell EMC Repository Manager (DRM)
- Dell EMC OpenManage Enterprise Power Manager plugin to OpenManage Enterprise
- Dell EMC OpenManage Mobile (OMM)

Automation Enablers

- OpenManage Ansible Modules
- iDRAC RESTful APIs (Redfish)
- Standards-based APIs (Python, PowerShell)
- RACADM Command Line Interface (CLI)
- GitHub Scripting Libraries

Integration with third-party consoles

- Dell EMC OpenManage Integrations with Microsoft System Center
- Dell EMC OpenManage Integration for VMware vCenter (OMIVV)
- Dell EMC OpenManage Ansible Modules
- Dell EMC OpenManage Integration with ServiceNow

Connections for third-party consoles

- Micro Focus and other HPE tools
- OpenManage Connection for IBM Tivoli
- OpenManage Plug-in for Nagios Core and XI

Dell EMC Update Utilities

- Dell System Update (DSU)
- Dell EMC Repository Manager (DRM)
- Dell EMC Update Packages (DUP)
- Dell EMC Server Update Utility (SUU)
- Dell EMC Platform Specific Bootable ISO (PSBI)

Dell resources

For additional information about white papers, videos, blogs, forums, technical material, tools, usage examples, and other information, go to the OpenManage page at www.dell.com/openmanagemanuals or the following product pages:

Table 14. Dell resources

Resource	Location
Integrated Dell Remote Access Controller (iDRAC)	www.dell.com/idracmanuals
iDRAC Service Module (iSM)	www.dell.com/support/article/sln310557
OpenManage Ansible Modules	www.dell.com/support/article/sln310720
OpenManage Essentials (OME)	www.dell.com/support/article/sln310714

Resource	Location
OpenManage Mobile (OMM)	www.dell.com/support/article/sln310980
OpenManage Integration for VMware vCenter (OMIVV)	www.dell.com/support/article/sln311238
OpenManage Integration for Microsoft System Center (OMIMSSC)	www.dell.com/support/article/sln312177
Dell EMC Repository Manager (DRM)	www.dell.com/support/article/sln312652
Dell EMC System Update (DSU)	www.dell.com/support/article/sln310654
Dell EMC Platform Specific Bootable ISO (PSBI)	Dell.com/support/article/sln296511
OpenManage Connections for Partner Consoles	www.dell.com/support/article/sln312320
OpenManage Enterprise Power Manager	www.dellemc.com/solutions/openmanage/power-management.htm
OpenManage Integration with ServiceNow (OMISNOW)	Dell.com/support/article/sln317784

NOTE: Features may vary by server. Please refer to the product page on www.dell.com/manuals for details.

Appendix A. Additional specifications

Chassis dimensions

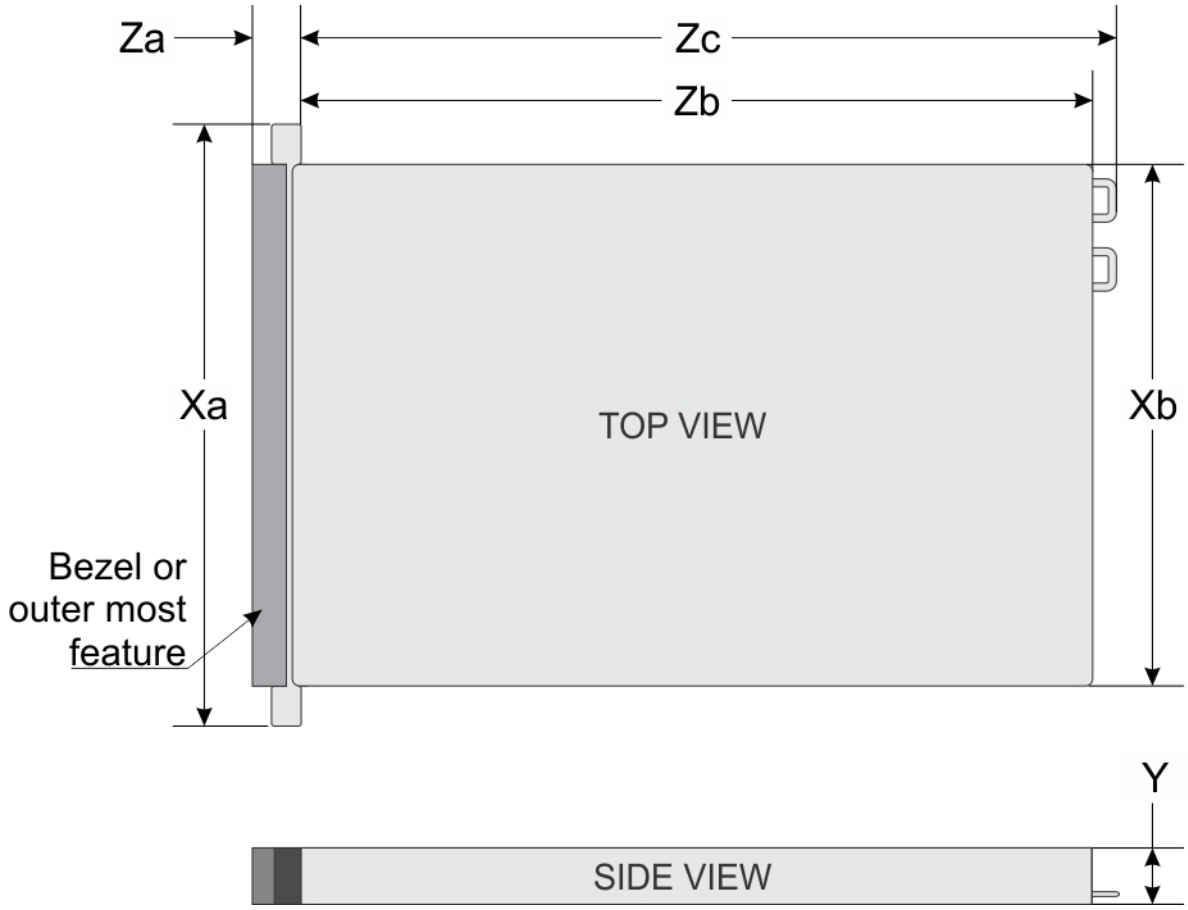

Figure 9. Chassis dimensions

Table 15. Dell EMC PowerEdge R740xd2 chassis dimensions

Xa	Xb	Y	Za	Zb*	Zc
482.0 mm (18.9 inches)	448.0 mm (17.63 inches)	86.8 mm (3.41 inches)	With bezel: 35.93 mm (1.41 inches) Without bezel: 22.0 mm (0.866 inches)	810.264 mm (31.9 inches)	844.826mm (33.260 inches)

NOTE: * - Zb refers to the nominal rear wall external surface, where the system board I/O connectors are located.

Video specifications

The Dell EMC PowerEdge R740xd2 system supports integrated Matrox G200eW3 graphics controller with 16 MB of video frame buffer.

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

NOTE: 1920 x 1080 and 1920 x 1200 resolutions are only supported in reduced blanking mode.

USB ports specifications

Table 17. Dell EMC PowerEdge R740xd2 system USB specifications

Front		Rear		Internal	
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	Two	Internal USB 3.0-compliant port	One
Micro USB 2.0-compliant port for iDRAC Direct **NOTE: The micro USB 2.0 compliant port can only be used as an iDRAC Direct or a management port.**	One				

Environmental specifications

See Dell EMC PowerEdge R740xd2 installation service manuals on Dell.com/Support/Manuals for detailed environmental specifications.

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Appendix B. Standards compliance

The system conforms to the following industry standards.

Table 18. 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 19. 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 messages • System codes and indicators • System BIOS • Remove and replace procedures • Troubleshooting • 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 • Key system features • Technical specifications	Dell.com/Support/Manuals
Rack Installation Instructions	This document ships with the rack kits, and provides instructions for installing a server in a rack.	Dell.com/Support/Manuals
Information Update	This document ships with the system, is also available in PDF format online, and provides information on system updates.	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

Appendix D. Support and deployment services

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 10. 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.

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.

Deployment services

Deployment services details and exceptions can be found in service description documents at the Enterprise Configuration and Deployment pageon Dell.com.

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

With Dell EMC ProSupport Services, we can help you keep your operation 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. 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.

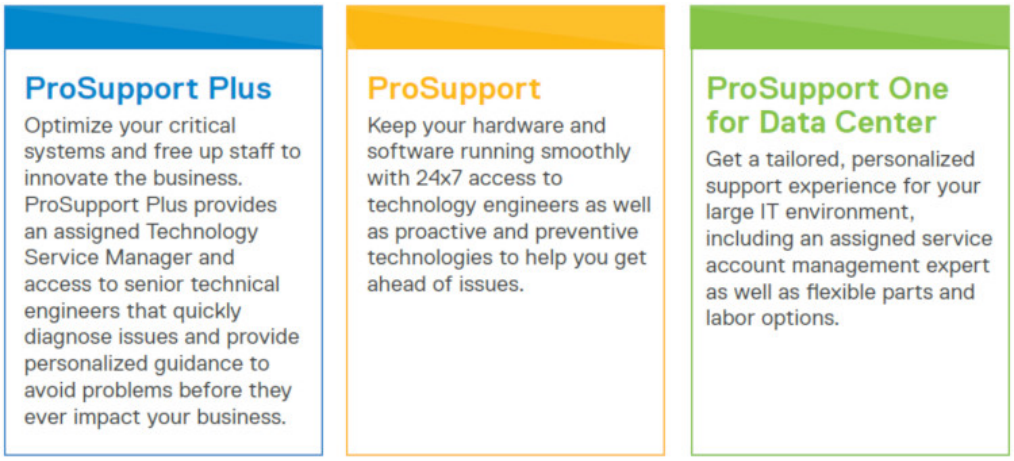

Figure 11. ProSupport Enterprise Suite

ProSupport Plus

When you purchase PowerEdge servers, we recommend ProSupport Plus, our proactive and preventative support, for business-critical systems. ProSupport Plus provides 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
- 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 will help you minimize disruptions and maximize availability of your PowerEdge server workloads with:

- 24x7x365 access to certified hardware and software experts
- Collaborative 3rd party support
- Hypervisor and OS 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

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, it offers a truly unique solution for Dell EMC's largest customers with the most complex environments.

- Team of designated Technology Services Managers with remote, on-site options
- Designated 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

Enterprise Support Services Feature Comparison	ProSupport	ProSupport Plus	ProSupport One for Data Center
Remote technical support	24x7	24x7	24x7
Onsite support	Next business day or Mission Critical	Next business day or Mission Critical	Flexible
Automated issue detection and case creation	●	●	●
Self-service case initiation and management	●	●	●
Hypervisor, Operating Environment Software and OS support	●	●	●
Priority access to specialized support experts		●	●
Designated Technology Service Manager		●	●
Personalized assessments and recommendations		●	●
On-demand support and utilization reports		●	●
Systems Maintenance guidance		Semiannual	Optional
Designated technical and field support teams			●

Figure 12. ProSupport One for Data Center model

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.

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 13. SupportAssist model

Get started at Dell.com/SupportAssist

TechDirect

Boost your IT teams 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 needs. 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.com

Additional professional services

Dell Education Services

Dell Education Services offers the PowerEdge server training courses designed to help you achieve more with your hardware investment. The curriculum is designed in conjunction with the server development team, as well as Dell EMC's technical support team, to ensure that the training delivers the information and practical, hands-on skills you and your team need to confidently manage and maintain your Dell EMC server solution. To learn more or register for a class today, visit LearnDell.com/Server.

Dell EMC Global Infrastructure Consulting Services

Dell EMC Global Infrastructure Consulting Services use skilled solution architects, innovative tools, automated analysis and Dell EMC's intellectual property to give rapid insight into the root causes of unnecessary complexity. We seek better answers than traditional service models, and our strategy is to help quickly identify high-impact, short-duration projects that deliver return on investment (ROI) and free up resources. The results are practical, action-oriented plans with specific, predictable, measurable outcomes. From data center optimization to server virtualization to systems management, our consulting services can help build a more efficient enterprise.

Dell EMC Managed Services

Dell EMC Managed Services are a modular set of lifecycle services designed to help you automate and centrally configure, deploy, and manage your day-to-day data center operations. These services extend your existing on-premise IT infrastructure with off-premise cloud services designed to better address challenges with mobility, highly distributed organizations, security, compliance, business continuity, and disaster preparedness.