Dell EMC PowerEdge R840

Technical Guide

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Notes, cautions, and warnings

(i) **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.**

System overview

The Dell EMC PowerEdge R840 is 4-socket, 2U rack server designed to run complex workloads using highly scalable memory, I/O, and network options. The systems feature the Intel Xeon Scalable Processor family, up to 48 DIMMs, PCI Express (PCIe) 3.0 enabled expansion slots, and a choice of network interface technologies for rNDC. The PowerEdge R840 is a general-purpose platform capable of handling demanding workloads and applications, such as data analytics, data warehouses, ecommerce, databases, CPU virtualization, and high-performance computing (HPC).

Topics:

- Introduction
- New technologies

Introduction

The Dell EMC PowerEdge R840 is 4 socket, 2U rack server designed to run complex workloads using highly scalable memory, I/O, and network options. The system features the Intel Xeon Scalable Processor family, up to 48 DIMMs, PCI Express 3.0 enabled expansion slots, and a choice of network interface technologies for rNDC. The PowerEdge R840 is a general purpose platform capable of handling demanding workloads and applications, such as data analytics, data warehouses, ecommerce, databases, CPU virtualization, and high-performance computing.

The R840 features:

- 2nd Generation Intel Xeon Scalable Processor product family—with up to 28 cores and two threads per core
- Up to 24 channels with 6 channels per CPU and up to 48 DIMMs with 2 DIMMs per channel
- Scale capacity and performance with up to 26 2.5 inch HDDs and SSDs
- Accelerate applications with up to 2 double-width GPUs or up to 2 full-height FPGAs
- Speed data transfers with a fully integrated ultra-path interconnect across all four sockets

New technologies

The following are the new technologies featured on the PowerEdge R840:

Table 1. New technologies

New technology	Detailed description
2nd Generation Intel Xeon Scalable Processor	The processor product family has embedded PCIe lanes for improved I/O performance. For details, see the Processor section.
Intel C620 series chipset	The R840 system uses the Intel C620 chip. It is a 2 chip platform - CPU and PCH.
2933 MT/s DDR4 memory	The 2nd Generation Intel Xeon Scalable Processor product family that supports up to 2933 MT/s memory and forty eight DIMMs. The R840 system supports: - Two DIMMs per channel for single-rank and/or dual-rank DIMMs For details, see the Memory section.
Intel Optane DC persistent memory (DCPMM)	A new class of memory with same DDR4 electrical & physical constraints and close to DRAM latency - Up to 6 per CPU socket. Max 24 for 4S configuration. - 256GB, 512GB per DIMM

Table 1. New technologies (continued)

New technology	Detailed description
	• 1866, 2133, 2400, 2666 MT/s • Up to 12.28TB max, (15.36TB max with DCPMM and LDRIMM)
iDRAC9 with Lifecycle Controller	The new embedded systems management solution for the Dell EMC systems features hardware and firmware inventory and alerting, data center level power monitoring, and faster performance. For details, see the Dell EMC OpenManage systems management section.
2.5-inch PCIe SSD	Supports up to twenty four direct-attached PCIe SSD NVMes
PERC S140	This new software RAID solution supports: • RAID 0, 1, 5, and Non-RAID • SATA HDD and SSD devices only • Up to twenty four 2.5 inch hot-plug SATA HDDs or SSDs • Software RAID is through the Intel C620 chipset • Software RAID solution is supported on Linux and Windows For details, see the Storage section.
LCD bezel	The PowerEdge R840 LCD control panel is embedded in an optional front bezel for easy access and management.
Wireless Management	The Quick Sync 2 BLE/Wi-Fi module offers support for access to the iDRAC GUI, SupportAssist Collections, remote RACADM, and VNC remote console connectivity.

System features

The R840 system is a 2U 4-socket rack server. It features the 2nd Generation Intel® Xeon® Processor scalable family processors (up to 28 cores and 2 threads per core) and 48 DIMMs (supports DDR4 RDIMM/LRDIMM/NVDIMM-N/DCPMM.)

The R840 system has the following features:

● High-performance memory density with balanced I/O
● Balanced combination of processing density, high memory capacity, low power consumption, and value
● Easy life cycle manageability with innovative management tools
● Ideal for space constrained data centers

Topics:

Product comparison

Table 2. Feature comparison

Feature	PowerEdge R840	PowerEdge R830
CPU	4x 2nd Generation Intel Xeon Processor Scalable Family Gold & Platinum	4x Intel Xeon E5-4600 v4
Intel Ultra Path Interconnect (UPI)	Intel Ultra Path Interconnect (UPI)	Intel QuickPath Interconnect (QPI)
Memory	48 x DDR4 DIMM slots (only up to 12 NVDIMM or 24 DCPMM slots) ● RDIMM 3 TB ● LRDIMM 6 TB ● NVDIMM 384 GB ● DCPMM 12.28 TB (15.36 TB with LRDIMM)	48x DDR4 RDIMM, LRDIMM
Disk Drives	2.5 inch 12 Gb SAS, 6 Gb SATA	2.5 inch 12 Gb SAS, 6 Gb SATA
RAID controllers	Adapters: HBA330, H330, H350, H730P, H740P, H750, 12G SAS HBA, HBA350i, H840(ext), HBA355e (ext), SW RAID: S140	Adapters: HBA330, H330, H730, H730P, H830 (ext)
PCIe SSD	Up to 24x direct-attached PCIe SSD	N/A
PCIe Slots	Max 6 PCIe 3.0 on R840	Max 7 PCIe 3.0
rNDC	4x 1 GB, 4x 10 GB, 2x 10 GB+2x 1 GB, or 2x 25 GB	4x 1 GB, 4x 10 GB, or 2x 10 GB+2x 1 GB
USB Ports	Front: 2 ports (USB 2.0), 1 managed (micro-USB) Rear: 2 ports (USB 3.0) Internal: 1 port (USB 3.0) Optional: 1 Front port (USB 3.0) - available only on X8 backplane configuration	1 PCH (USB2.0), 1 Managed, 1 Internal (USB3.0), 2 Rear (USB3.0, USB2.0)
Rack Height	2U	2U

Table 2. Feature comparison (continued)

Feature	PowerEdge R840	PowerEdge R830
Power Supplies	• AC (Platinum): 750 W, 1100 W, 1600 W, 2000 W, 2400 W • Mix Mode: 750 W PSU (DC input for China only) • AC (Titanum): 750 W, 1600 W, 2600 W • DC: 1100 W • Mix Mode/HVDC: 750 W (for China only), 1100 W	AC: 750 W, 1100 W, 1600 W DC: 1100 W
System Management	Lifecycle Controller 3.x, OpenManage, QuickSync 2.0, OMPC3, Digital License Key, iDRAC Direct (dedicated micro-USB port), Easy Restore, vFlash	Lifecycle Controller 3.x, OpenManage, QuickSync 1.0, PM3, Digital License Key, iDRAC, iDRAC Direct(dedicated micro-USB port), Easy Restore, vFlash
Internal GPU and FPGA	Up to 2x 300 W GPUs or up to 2 FH Double-width FPGAs	N/A
Availability	Hot-plug Redundant Cooling Hot-plug Drives Hot-plug Redundant Power Supplies Boot Optimized Storage Subsystem (BOSS) IDSDM	Hot-plug Drives Hot-plug Redundant Cooling Hot-plug Redundant Power Supplies IDSDM

Technical specifications

Table 3. Technical specifications

Feature	PowerEdge R840 technical specification
Form factor	2U rack
Processor	2nd Generation Intel Xeon Scalable Processor family
Processor sockets	4 sockets
Internal interconnect	Up to 3 Intel Ultra Path Interconnect (Intel® UPI)
Chipset	Intel C620 series Chipset
Memory	48 x DDR4 DIMM slots (only up to 12 NVDIMM or 24 DCPMM slots) • RDIMM 3 TB • LRDIMM 6 TB • NVDIMM 384 GB • DCPMM 12.28 TB (15.36 TB with LRDIMM)
I/O slots	Up to 6 x PCIe Gen 3 slots
RAID controller	Internal controllers: S140, HBA 330, PERC H330P, H350, PERC H730P, PERC H740P, H750, HBA350i External controllers (RAID): H840, 12 Gbps SAS HBA, HBA355e
Internal boot	Boot Optimized Storage Subsystem (BOSS): HWRAID 2 x M.2 SSDs 240GB, 480 GB

Table 3. Technical specifications (continued)

Feature	PowerEdge R840 technical specification
	Internal Dual SD Module
Hard drives	8 x 2.5 inch SAS/SATA drives 24 x 2.5 inch SAS/SATA/NVMe drives 24 x 2.5 inch SAS/SATA/NVMe drives + 2 x 2.5 inch rear SAS/SATA
Embedded NIC	4 x 1 GB 4 x 10 GB 2 x 10 GB + 2 x 1 GB 2 x 25 GB
Power supply	Two back accessible hot pluggable PSUs 750 W AC PSU 750 W Mix Mode HVDC PSU (for China only) 750 W Mix Mode DC PSU (for China only) 1100 W AC PSU 1100 W DC PSU 1100 W Mix Mode HVDC PSU (for Japan and China only) 1600 W AC PSU 1600 W HLAC PSU 2000 W AC PSU 2400 W AC PSU 2600 W HLAC PSU
Supported operating systems	- Canonical Ubuntu® LTS - Citrix Hypervisor - Microsoft Windows Server LTSC with Hyper-V - Red Hat Enterprise Linux - SUSE Linux Enterprise Server - VMware ESXi For more information on the specific versions and additions, visit **Dell.com/ OSsupport**.
Systems management	**Dell EMC Systems management consoles and tools**: - OpenManage Enterprise - OpenManage Mobile 2.0 - OpenManage Power Manager **iDRAC License options**: - iDRAC9 - iDRAC RESTful API with Redfish - iDRAC Direct - Quick Sync 2 BLE/wireless module **Dell EMC OpenManage Integrations**: - BMC Truesight - Microsoft System Center - RedHat Ansible Modules - VMware vCenter **Dell EMC OpenManage Connections**: - IBM Tivoli Netcool/OMNIbus - IBM Tivoli Network Manager IP Edition - Micro Focus Operations Manager I - Nagios Core - Nagios XI

Table 3. Technical specifications (continued)

Feature	PowerEdge R840 technical specification

Dimensions and weight	● Weight: 36.6kg with all 2.5 inch drives
	● Height: 86 mm — 3.3 inches
	● Width: 482.0 mm — 18.97 inches
	● Depth with bezel:
	  ○ Front bezel to rear PSU handle: 879.84 mm (34.64 inches)
	  ○ Front bezel to rear wall: 939.84 mm (37 inches)
	● Depth without bezel:
	  ○ Front bezel to rear PSU handle: 842 mm (33.14 inches)
	  ○ Front bezel to rear wall: 902 mm (35.51 inches)

Recommended support	ProSupport Plus for critical systems or ProSupport for comprehensive hardware and software support for your PowerEdge solution. Consulting and deployment offerings are also available. Contact your Dell EMC representative for more information. Availability and terms of Dell EMC Services vary by region. For more information, visit **www.Dell.com/ServiceDescriptions**.

Chassis views and features

The PowerEdge R840 is a four socket, 2U rack system that is available in three different chassis configurations:

- Eight hard drive chassis
- Twenty four hard drives chassis
- Twenty four hard drives plus 2 rear drives chassis

Topics:

- Front view of the system
- Rear view of the system
- Internal chassis view
- Security features

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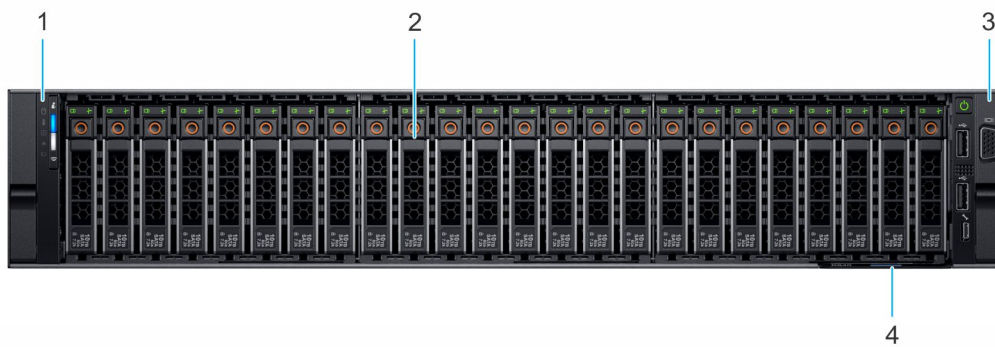
Figure 1. Front view 24 x 2.5-inch drive system

1. Left control panel
2. Drives
3. Right control panel
4. Service Tag
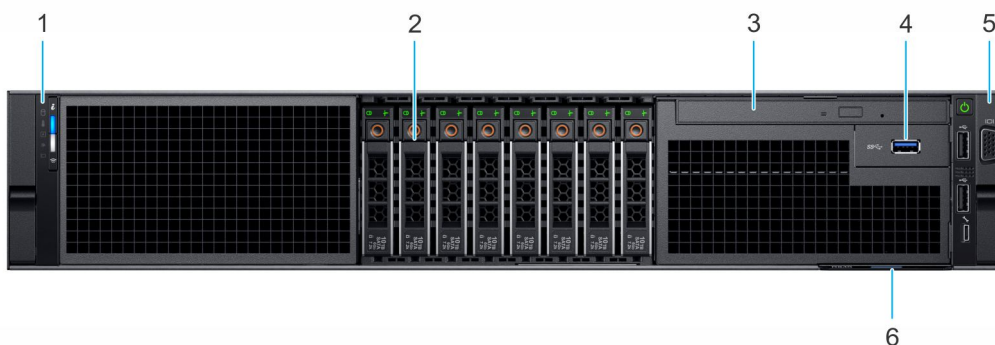
Figure 2. Front view 8 x 2.5-inch drive system

1. Left control panel
2. Drive slots
3. Optical drive (Optional)
4. USB 3.0 port (Optional)
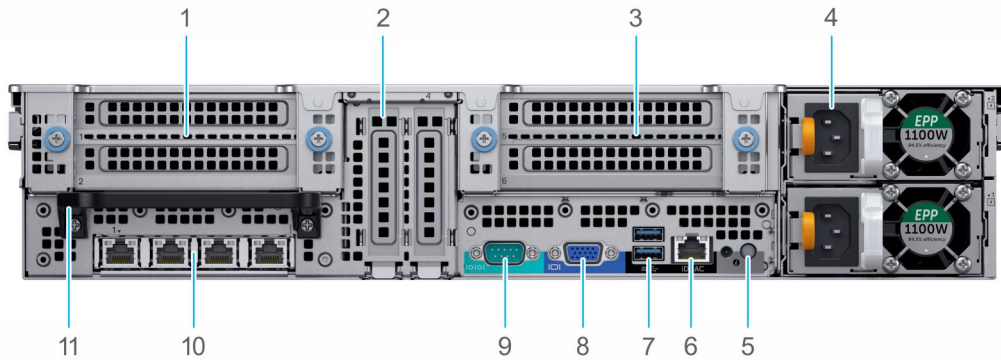5. Right control panel
6. Service Tag

Rear view of the system

Figure 3. Rear view of the 24 x 2.5-inch drive system

1. Riser 1 - Full-height PCIe expansion card (Slot 1 and 2)
2. Half-height PCIe expansion card slots located on the system board (Slot 3 and 4)
3. Riser 2 -Full-height PCIe expansion card slots (Slot 5 and 6)
4. Power supply units (2)
5. System identification button
6. iDRAC9 dedicated port
7. USB 3.0 ports (2)
8. VGA port
9. Serial port
10. NIC ports (4)
11. Rear handle

Figure 4. Rear view of the 24 x 2.5-inch + 2 x 2.5-inch (rear) drive system

1. Riser 1 - Full-height PCIe expansion card slots (Slot 1 and 2)
2. Half-height PCIe expansion card slots located on the system board (Slot 3 and 4)
3. Rear drives (2)
4. Power supply units (2)
5. System identification button
6. iDRAC9 dedicated port
7. USB 3.0 ports (2)
8. VGA port
9. Serial port
10. NIC ports (4)
11. Rear handle

Internal chassis view
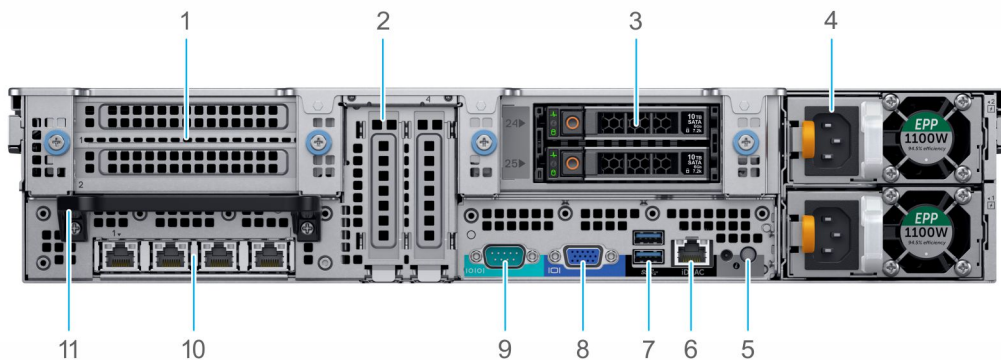
The chassis design of the PowerEdge R840 is optimized for easy access to components and for efficient cooling. The PowerEdge R840 supports up to 48 DIMMs, four processors, system board, rear drive cage, and many other components and

features. For more system views, see the Dell EMC PowerEdge R840 Installation and Service Manual at **Dell.com/Support/ Manuals**.

Figure 5. Internal chassis view without rear drive cage

1. Drive backplane
2. SAS Expander board
3. Cooling fans (6)
4. System board
5. Full-height expansion card Riser 2
6. Full-height expansion card Riser 1

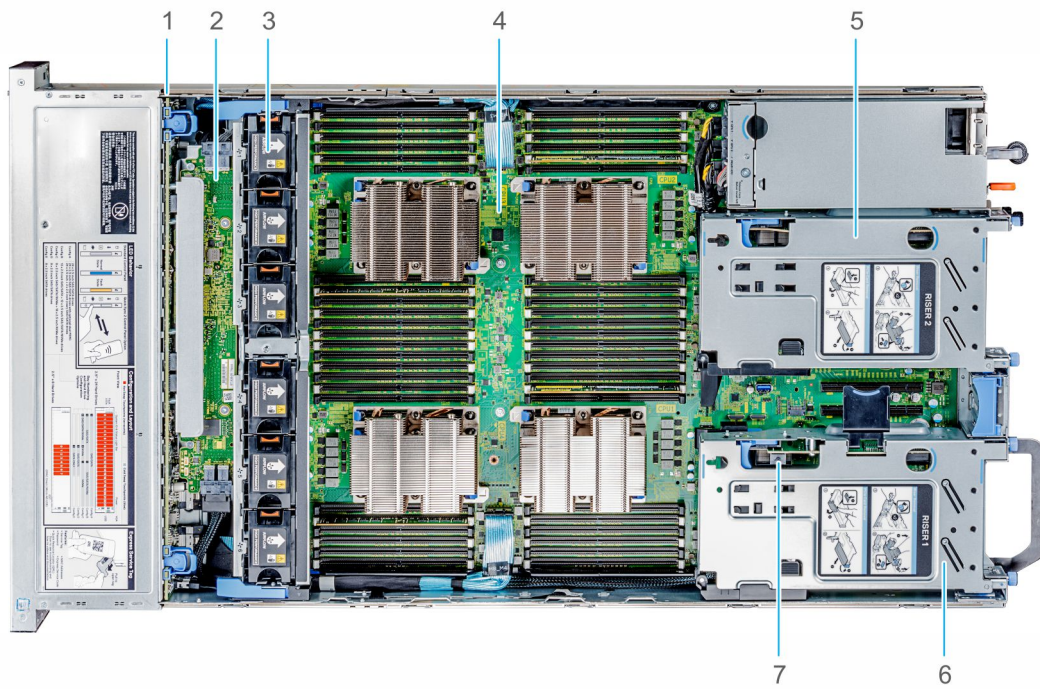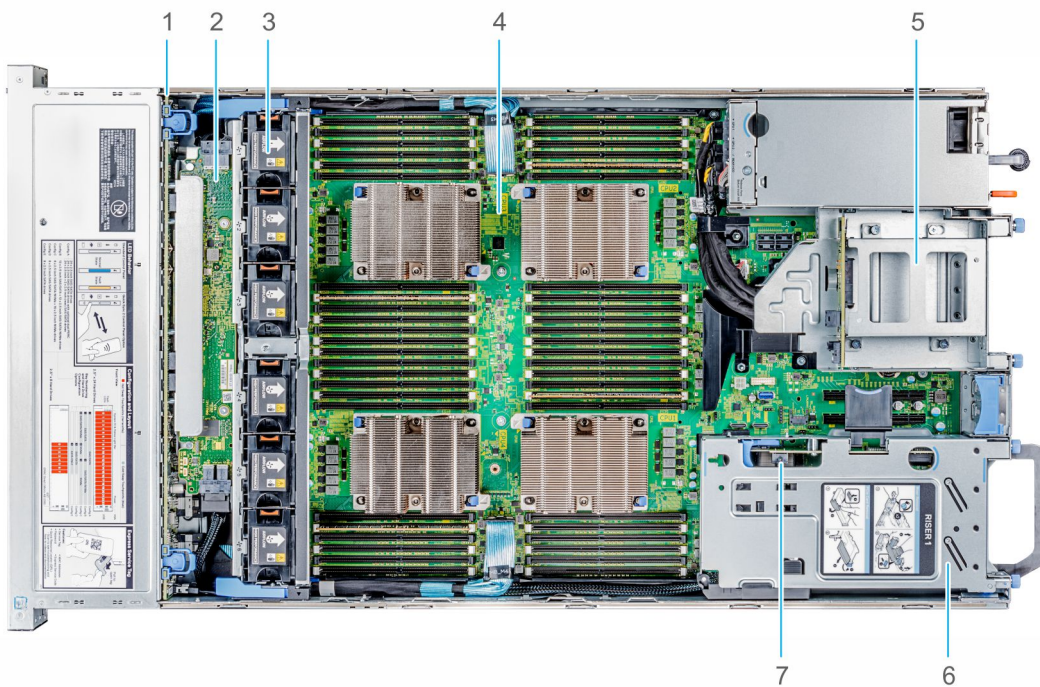**Figure 6. Internal chassis view with rear drive cage**

1. Drive backplane
2. SAS Expander board

3. Cooling fans (6)   4. System board
5. Drive cage (rear)   6. Full-height expansion card Riser 1

Security features

The latest generation of PowerEdge servers has the features listed in the table to help ensure the security of your data center.

Table 4. Security features

Security feature	Description
Cover latch	A tooled latch is integrated in the top cover to secure it to the system.
Bezel	A standard bezel is an optional metal bezel mounted to the chassis front. A lock on the bezel protects unauthorized access to hard drives. The Quick Sync NFC bezel enables the iDRAC QuickSync management function for managing the server from the front using an NFC-capable device and the free Dell EMC OpenManage Mobile App (currently Android only). Available only from the factory and not supported after point of sale.
TPM	The Trusted Platform Module (TPM) is used to generate/store keys, protect/authenticate passwords, and create/store digital certificates.
Power-off security	BIOS has the ability to disable the power button function.
Intrusion alert	An internal switch is used to detect chassis intrusion
Secure Boot mode	BIOS has the ability to enter a secure boot mode through system setup. This mode includes the option to lock out the power switches on the control panel or set up a system password.

Processors

The PowerEdge R840 server features the exceptional performance, value, and power efficiency of the 2nd Generation Intel Xeon Scalable Processor. These processors can provide high performance no matter what your constraint—floor space, power, or budget—and on workloads that range from the most complicated scientific exploration to crucial web-serving and infrastructure applications. In addition to providing raw performance gains, improved I/O is also made possible with Intel Integrated I/O, which can reduce latency by adding more lanes and doubling bandwidth. This helps to reduce network and storage bottlenecks, which improves the processor performance capabilities.

Topics:

- Processor features
- Supported processors
- Chipset

Processor features

The 2nd Generation Intel Xeon Processor Scalable Family provides the foundation for a powerful data center platform. The key features are as follows:

- Higher Per-Core Performance: Up to 28 cores, delivery high performance and scalability for compute-intensive workloads across compute, storage and network usages. 2nd Generation Intel Xeon Processors can offer even greater core or frequencies, or both.
- Large Memory Bandwidth/Capacity: Six memory channels and up to 6 DCPMMs per socket of Intel Optane DC persistent memory for data-centric workloads on select processors
- AI capability: Intel Deep Learning Boost drives inferencing for vector neural networks right in your CPU.
- 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, and 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.

Supported processors

Table 5. Supported processors for the PowerEdge R840

Intel SKU	SKU type	Stepping	Speed (GHz)	Cache (MB)	Cores	Max memory speed (MT/s)	TDP (W)
5122	Gold	XCC	3.6	16.5	4	2666	105
5115	Gold	XCC	2.4	14	10	2666	85
5117	Gold	XCC	2.0	19.25	14	2666	105
5118	Gold	XCC	2.3	16	12	2666	105
5120	Gold	XCC	2.2	14	12	2666	105
5222	Gold	XCC	3.8	16.5	4	2933	105
5220	Gold	XCC	2.2	24.75	18	2666	125
5218	Gold	XCC	2.3	22	16	2666	105
6126	Gold	XCC	2.6	19.25	12	2666	125

Table 5. Supported processors for the PowerEdge R840 (continued)

Intel SKU	SKU type	Stepping	Speed (GHz)	Cache (MB)	Cores	Max memory speed (MT/s)	TDP (W)
6132	Gold	XCC	2.6	19.25	14	2666	135
6130	Gold	XCC	2.1	22	16	2666	125
6142	Gold	XCC	2.6	22	16	2666	150
6138	Gold	XCC	2.0	27.5	20	2666	125
6136	Gold	XCC	3.0	24.75	12	2666	150
6140M	Gold	NA	2.3	1.5 TB	18	2666	140
6140	Gold	XCC	2.3	24.75	18	2666	140
6150	Gold	XCC	2.7	24.75	18	2666	165
6148	Gold	XCC	2.4	27.5	20	2666	150
6142M	Gold	NA	2.6	1.5 TB	16	2666	150
6154	Gold	XCC	3.0	24.75	18	2666	200
6134M	Gold	NA	3.2	24.75	8	2666	130
6134	Gold	XCC	3.2	24.75	8	2666	130
6128	Gold	NA	3.4	19.25 MB	6	2666	115
6152	Gold	XCC	2.1	30.25	22	2666	140
6144	Gold	NA	3.6	24.75 MB	8	2666	165
6146	Gold	NA	3.4	24.75 MB	12	2666	165
6262V	Gold	XCC	1.9	33	24	2400	135
6254	Gold	XCC	3.1	NA	18	2933	200
6252	Gold	XCC	2.1	NA	24	2933	150
6252N	Gold	XCC	2.3	1.49	24	2933	150
6248	Gold	XCC	2.5	27.5	20	2933	150
6246	Gold	XCC	3.6	24.75	12	2933	165
6244	Gold	XCC	3.7	24.75	8	2933	150
6242	Gold	XCC	2.8	22	16	2933	150
6240	Gold	XCC	2.6	24.75	18	2933	150
6240 M	Gold	XCC	2.6	NA	18	2933	150
6240L	Gold	XCC	2.6	NA	18	2933	150
6238	Gold	XCC	2.1	30.25	22	2933	140
6238 M	Gold	XCC	2.1	NA	22	2933	140
6238L	Gold	XCC	2.1	NA	22	2933	140
6234	Gold	XCC	3.3	24.75	8	2933	130
6230	Gold	XCC	2.1	NA	20	2933	125
6230N	Gold	NA	2.3*	NA	20	2933	125
6222V	Gold	XCC	1.8	27.5	20	2400	115

Table 5. Supported processors for the PowerEdge R840 (continued)

Intel SKU	SKU type	Stepping	Speed (GHz)	Cache (MB)	Cores	Max memory speed (MT/s)	TDP (W)
6226	Gold	XCC	2.7	19.25	12	2933	125
8160M	Platinum	NA	2.1	1.5 TB	24	2666	150
8160	Platinum	XCC	2.1	33	24	2666	150
8168	Platinum	XCC	2.7	33	24	2666	205
8170M	Platinum	NA	2.1	1.5 TB	26	2666	165
8170	Platinum	XCC	2.1	35.75	26	2666	165
8176M	Platinum	NA	2.1	NA	28	2666	165
8176	Platinum	XCC	2.1	38.5	28	2666	165
8180M	Platinum	NA	2.5	NA	28	2666	205
8180	Platinum	XCC	2.5	38.5	28	2666	205
8153	Platinum	XCC	2.0	NA	16	2666	125
8280L	Platinum	XCC	2.7	38.5	28	2933	205
8280 M	Platinum	XCC	2.7	38.5	28	2933	205
8280	Platinum	XCC	2.7	38.5	28	2933	205
8276L	Platinum	XCC	2.2	NA	28	2933	165
8276 M	Platinum	XCC	2.2	NA	28	2933	165
8276	Platinum	XCC	2.2	NA	28	2933	165
8270	Platinum	XCC	2.7	NA	26	2933	205
8268	Platinum	XCC	2.9	NA	24	2933	205
8260L	Platinum	XCC	2.4	NA	24	2933	165
8260 M	Platinum	XCC	2.4	NA	24	2933	165
8260	Platinum	XCC	2.4	NA	24	2933	165
8256	Platinum	NA	3.8	NA	4	2933	105
8253	Platinum	XCC	2.2	NA	16	2933	125

Table 6. Processor HCC SKU stack

Intel SKU	SKU type	Stepping	Speed (GHz)	Cache (MB)	Cores	Max memory speed (MT/s)	TDP (W)
5115	Gold	HCC	2.4	NA	10	2666	85
5118	Gold	HCC	2.3	NA	12	2666	105
5120	Gold	HCC	2.2	NA	14	2666	105
5218N	Gold	HCC	2.3*	NA	16	2666	105
5217	Gold	HCC	3	NA	8	2666	125
5215	Gold	HCC	2.5	NA	10	2666	85
5215M	Gold	HCC	2.6	NA	10	2666	85
5215L	Gold	HCC	2.6	NA	10	2666	85

Chipset

The PowerEdge R840 systems use the Intel chipset that provides extensive I/O support. Functions and capabilities include:

- 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 Server Platform Service firmware
- Supports Intel Virtualization Technology for Directed I/O
- Supports Intel Trusted Execution Technology
- JTAG Boundary Scan support
- Intel QuickAssist Technology
- Intel PCIe QuickAssist card
- Intel Trace Hub for debug

For more information, go to Intel.com

System memory

Each CPU has 12 memory DIMM slots. Those DIMMs are organized into six different channels so there are 2 DIMMs per channel. For best performance all memory channels should be populated with the same number of DIMMs, either 6 or 12 DIMMs per CPU.

DIMM Type

There are four different types of DIMMs.

RDIMM:

Registered DIMM - Provides for higher capacity options and advanced RAS features. It is the most commonly used DIMM type, and offers the best mix of frequency, capacity, and rank structure choices.

LRDIMM:

Load Reduced DIMM - Provides maximum capacity beyond that of an RDIMM but at a higher power consumption. Uses a buffer to reduce memory loading to a single load on all DDR signals, allowing for greater density.

DCPMM (also known as **Intel Optane DC persistent memory)**:

Provides a large memory capacity at an affordable price. Any application can take advantage of DCPMM in Memory Mode with a compatible operating system. Unlock more performance and persistency when using an application that supports App Direct Mode. DCPMM is used along with RDIMMs or LRDIMMs, and a maximum number of 6 DCPMMs can be used per CPU. This persistent memory technology does not require a battery.

NVDIMM

Non-Volatile DIMM - Provides a persistent memory solution with NAND and DRAM that maintains data in power loss, system crash, or normal shutdown. This solution requires a battery as a power source for an AC loss condition. It can be used along with RDIMMs.

Intel Optane DC Persistent Memory (DCPMM)

Intel Optane DC Persistent Memory is a new memory technology that allows customers to reach a large memory capacity at an affordable price. Also, when operating the memory in "App Direct Mode" the memory is persistent.

DCPMM comes in 3 different memory sizes, 128 GB, 256 GB, and 512 GB.

RDIMMs and LRDIMMs are used along with Intel Optane DC persistent memory. Each channel is populated with up to one DIMM of DRAM and one DIMM of DPCMM. That means that each CPU has up to 6 DIMMs of DRAM and 6 DIMMs of DCPMM. For best performance, it is recommended to have all 12 DIMMs slots per CPU populated.

Intel Optane DC persistent memory operates in two modes, Memory Mode and Application Direct Mode.

Trait	Memory Mode	App Direct Mode
Application support	Any application	Application must state that it supports "App Direct Mode"
DRAM	Used as cache and is not available as system memory.	Both DCPMM and DRAM are available as system memory.
Persistence	No	Yes

Memory Operating Modes

Performance Optimized or Optimizer Mode

Prioritizes performance and does not provide any RAS features beyond standard ECC (Error-Correcting Code).

Memory mirroring

Memory mirroring has two adjacent memory channels that are configured to write the same data to each channel. If one memory channel fails or encounters an error, the other channel continues to transmit data. It is an excellent safeguard for systems requiring uninterrupted operation, though it cuts memory capacity in half, doubles the cost per gigabyte, and can increase power consumption.

Fault resilient memory

Fault resilient memory is a Dell patented technology that works with the VMWare ESXi Hypervisor to provide a fault resilient zone that protects virtual machines from the ramifications of memory faults.

Memory sparing

Memory sparing can reduce downtime from correctable errors by allocating one rank (64-bit wide data area on a DIMM) per channel (Single Rank Spare Mode) or two ranks per channel (Multi Rank Spare Mode) as memory spares. If a correctable error occurs in a rank or channel, it is moved to the spare rank while the operating system is running. This prevents the error from causing a failure. Memory sparing reduces memory capacity by one rank per channel or two ranks per channel (depending if Single Rank or Multi Rank is selected) and can increase the cost per gigabyte.

DIMM Speed and Frequency

The following table lists the PowerEdge R840 memory speeds and CPU support:

Table 7. PowerEdge R840 memory speeds and CPU support

CPU family	DIMM type	DIMM ranking	Capacity	Speed (MT/s)
Intel Xeon Scalable	RDIMM	1R/2R	8 GB, 16 GB, and 32 GB	2666
2nd Generation Intel Xeon Scalable	RDIMM	1R	8 GB	2666
2nd Generation Intel Xeon Scalable	RDIMM	2R	16 GB, 32 GB, and 64 Gb	2933
Intel Xeon Scalable	LRDIMM	4R/8R	64 GB	2666
		4R	128 GB	2933
2nd Generation Intel Xeon Scalable	LRDIMM	8R	128 GB	2666
			256 GB	2666
2nd Generation Intel Xeon Scalable	DCPMM	N/A	128 GB, 256 GB, and 512 GB	2666
Intel Xeon Scalable or 2nd Generation Intel Xeon Scalable	NVDIMM	1R	16 GB	2666

(i) **NOTE:** The maximum ambient temperature for 256 GB LRDIMMs is 30ºC.

Storage

The Dell PowerEdge R840 offer various internal and external storage controllers, drive types and different chassis and backplanes for varied numbers of drives. Features such as Express Flash PCIe SSDs, H740P and H840 Raid controller provide vastly accelerated performance over previous technologies. Dell Express Flash drives use PCIe lanes to connect directly to the processor and chipset and are easily accessible through a hot-plug drive bay.

Hard drive

The PowerEdge R840 system supports SAS, SATA or SSD hard drives.

Supported Drives

Table 8. Supported Drives - SAS, SATA or SSD

Form Factor	Type	Speed	Rotational Speed	Capacities
2.5 inch	SATA, SSD	6 Gb	N/A	240 GB, 400 GB, 480 GB, 800 GB, 960 GB, 1600 GB, 1920 GB, 3200 GB, 3840 GB
	SATA	6 Gb	7.2K	1 TB, 2 TB
	SAS	12 Gb	7.2K	1 TB, 2 TB, 2 TB(SED FIPS)
	SAS, SSD	12 Gb	N/A	400GB, 480GB, 800GB, 960GB, 1600GB, 1920GB, 3840GB, 800GB(SED FIPS), 1600GB(SED FIPS)
	SAS	12 Gb	10K	300GB, 600GB, 1.2 TB, 1.8 TB, 2.4 TB(P-RTS), 1.2 TB(SED FIPS), 2.4 TB (SED FIPS)
	SAS	12 Gb	15K	300 GB, 600 GB, 900 GB, 900 GB (SED FIPS)

Table 9. Supported Drives - NVMe drives

Description
NVMe PM1735a 1.6TB GB 2.5" PCIe SSD
NVMe PM1735a 3.2TB GB 2.5" PCIe SSD
NVMe PM1735a 6.4TB GB 2.5" PCIe SSD
NVMe PM1735a 12.8TB GB 2.5" PCIe SSD
NVMe PM1733a 1.92TB GB 2.5" PCIe SSD
NVMe PM1733a 3.8TB GB 2.5" PCIe SSD
NVMe PM1733a 7.6TB GB 2.5" PCIe SSD
NVMe PM1733a 15.36 TB GB 2.5" PCIe SSD
Kioxia CD7 960 GB 2.5" PCIe SSD
Kioxia CD7 1.92 TB 2.5" PCIe SSD
Kioxia CD7 3.84 TB 2.5" PCIe SSD
Kioxia CD7 7.68 TB 2.5" PCIe SSD

Topics:

PERC Controller

The Dell PowerEdge RAID Controller(PERC) family of enterprise-class controllers is designed for enhanced performance, increased reliability and fault tolerance, and simplified management. It provides a powerful, easy-to-manage way to create a robust infrastructure and help maximize system uptime.

The RAID controller options offer performance improvements, including the Mini PERC solution. Mini PERC provides a base RAID hardware controller without consuming a PCIe slot by using a small form factor and high-density connector to the system board.

The premium performance PERC controller drives better IOPs and enhanced SSD performance.

Table 10. PERC controller offerings

Performance level	Controller and description
Entry	S140 (SATA, NVMe)
	SW RAID SATA
Value	HBA330 (Internal), HBA350i,12Gbps SAS HBA (External) Memory: None x8 12 Gb SAS x8 PCIe 3.0, H330, 12Gbps SAS HBA (External), HBA350, HBA355e (External) Memory: None x8 12 Gb SAS x8 PCIe 3.0
Value performance	H730P, Memory: 2 GB, NV 72-bit, 866 MHz, x8 12 Gb SAS, x8 PCIe 3.0, H750
Premium performance	H740P, Memory: 4/8 GB, NV 72-bit

IDSDM or vFlash module

The PowerEdge R840 system supports optional Internal Dual SD module (IDSDM) or vFlash module. In the latest generation of PowerEdge servers, IDSDM or vFlash module is combined into a single card module, and are available in these configurations:
- vFlash or
- vFlash and IDSDM

The IDSDM or vFlash module is located in a slot on the back of the system. The module supports three microSD cards; two cards for IDSDM and one card for vFlash. The following capacities are supported:
- IDSDM: 16 GB, 32 GB, 64 GB
- vFlash: 16 GB

ⓘ **NOTE:** There are two dip switches on the IDSDM or vFlash module for write-protection.

ⓘ **NOTE:** One IDSDM card slot is dedicated for redundancy.

ⓘ **NOTE:** Use Dell branded microSD cards associated with the IDSDM or vFlash configured systems.

Optical Drives

The PowerEdge R840 supports one of the following internal optical drive options:
- DVD-ROM
- DVD+ROM

Tape Drives

The R840 do not support internal tape drives. However, external tape backup devices will be supported on R840.

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

Boot Optimized Storage Subsystem

The Boot Optimized Storage Subsystem (BOSS) is offered as a means of booting PowerEdge systems to a full operating system mode when:
- Target operating system is a full operating system and not hypervisor that may be supported best by IDSDM
- You do not want to trade off standard hot plug drive slots for operating system install

The RAID controller on the BOSS card has limited set of features. This RAID controller presents the M.2 SATA SSDs as either a non-RAID volume or as a single RAID volume.

Networking and PCIe

The Dell EMC PowerEdge R840 offers offer balanced, scalable I/O capabilities, including integrated PCIe 3.0-capable expansion slots. Dell Select Network Adapters, Dell's network daughter cards, enable you to choose the right network fabric without using up a valuable PCI slot. Pick the speed, technology, vendor, and other options, such as switch independent partitioning, which enable you to share and manage bandwidth on 10GbE connections.

Topics:

- Network daughter card
- PCIe Risers and slots
- Expansion card installation guidelines

Network daughter card

⚠ **CAUTION: If the GPU card is installed, you cannot install the 10 GbE NDC.**

PowerEdge R840 supports up to four Network Interface Controller (NIC) ports on the back panel, which are available in the following configurations:

- Four 1 Gbps
- Four 10 Gbps
- Two 10 Gbps and two 1 Gbps
- Two 25 Gbps

PCIe Risers and slots

PowerEdge R840 supports PCI express (PCIe) generation 3 expansion cards that can be installed on the system board using expansion card risers.

PCIe Expansion card riser

The following table provides detailed information about the expansion card riser specifications:

Table 11. Expansion card riser configurations

PCIe slots on the riser	Supported expansion cards	Processor 1		Processor 2	
		x16 PCIe riser 1	x8 PCIe riser 1	x16 PCIe riser 2	x8 PCIe riser 2
PCIe Slot-1	Half Height	NA	x8	NA	NA
PCIe Slot-2	Full Height - Half Length	NA	x8	NA	NA
	Full Height - Full Length	x16	NA	NA	NA
PCIe Slot-3 (On system board)	Low Profile - Half Length	x16	x16	NA	NA
PCIe Slot-4 (On system board)	Low Profile - Half Length	x16	NA	x16	x16
PCIe Slot-5	Full Height - Half Length	NA	NA	NA	x8
PCIe Slot-6	Full Height - Full Length	NA	NA	x16	NA

Table 11. Expansion card riser configurations (continued)

PCIe slots on the riser	Supported expansion cards	Processor 1		Processor 2	
		x16 PCIe riser 1	x8 PCIe riser 1	x16 PCIe riser 2	x8 PCIe riser 2
	Full Height - Half Length	NA	NA	NA	x8

ⓘ **NOTE:** For more information on expansion card risers, see Meeseeks PCIe Configuration Tool.

Expansion card installation guidelines

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

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

Table 12. x16 PCIe riser 1+ x16 PCIe riser 2 configuration

Card type		Slot priority	Riser height	Maximum number of cards supported	Card length	Card height	Maximum PCIe width supported
25G NICs	Intel	2,6	Full height	2	Half length	Full height	x8
		3,4	Low profile	2	Half length	Low profile	x8
GPU	Nvidia	2,6	Full height	2	Full length	Full height	x16
FPGA	Intel	2,6	Full height	2	Half length	Full height	x16
PERC10/11	Dell design	3	Low profile	1	Half length	Low profile	x8
Infiniband HCA EDR	Mellanox	3,4	Low profile	2	Half length	Low profile	x16
		2,6	Full height	2	Half length	Full height	x16
100G NICs	Mellanox	3,4	Low profile	2	Half length	Low profile	x16
		2,6	Full height	2	Half length	Full height	x16
Omni-Path HFI	INTEL	3,4	Low profile	2	Half length	Low profile	x16
		2,6	Full height	2	Half length	Full height	x16
BOSS	Dell design	2,6	Full height	1	Half length	Full height	x4
		2,6	Full height	1	Half length	Full height	x8
		3,4	Low profile	1	Half length	Low profile	x4
		3,4	Low profile	1	Half length	Low profile	x8
External RAID	Dell design	3,4	Low profile	2	Half length	Low profile	x8
		2,6	Full height	2	Half length	Full height	x8
Infiniband HCA FDR	Mellanox	3,4	Low profile	2	Half length	Low profile	x8
40Gb NICs	INTEL	2,6	Full height	2	Half length	Full height	x8
		3,4	Low profile	2	Half length	Low profile	x8
FC32 HBA	Emulex	2,6	Full height	2	Half length	Full height	x8
		3,4	Low profile	2	Half length	Low profile	x8

Table 12. x16 PCIe riser 1+ x16 PCIe riser 2 configuration (continued)

Card type		Slot priority	Riser height	Maximum number of cards supported	Card length	Card height	Maximum PCIe width supported
25G NICs	Broadcom	3,4	Low profile	2	Half length	Low profile	x8
		2,6	Full height	2	Half length	Full height	x8
FC16 HBA	Emulex	2,6	Full height	2	Half length	Full height	x8
		3,4	Low profile	2	Half length	Low profile	x8
10Gb NICs		3,4	Low profile	2	Half length	Low profile	x8
		2,6	Full height	2	Half length	Full height	x8
		3,4	Low profile	2	Half length	Low profile	x4
		2,6	Full height	2	Half length	Full height	x4
FC8 HBA		3,4	Low profile	2	Half length	Low profile	x8
		2,6	Full height	2	Half length	Full height	x8
1Gb NICs		2,6	Full height	2	Half length	Full height	x1
		3,4	Low profile	2	Half length	Low profile	x1
		2,6	Full height	2	Half length	Full height	x4
		3,4	Low profile	2	Half length	Low profile	x4
Non-RAID		3,4	Low profile	2	Half length	Low profile	x8
		2,6	Full height	2	Half length	Full height	x8
NVMe PCIe SSD		3,4,2,6	Full height or Low profile	2	Half length	Full height or Low profile	x8
rNDC		Integrated Slot	None	1	None	rNDC	x8
		Integrated Slot	None	1	None	rNDC	x1
		Integrated Slot	None	1	None	rNDC	x4
10 Gb NICs	Intel	2,6	Full height or Low profile	2	Half Length	Full height or Low profile	x8
10 Gb NICs	Intel	3,4	Low profile	2	Half Length	Low profile	x8
10 Gb NICs	Intel	2,6	Full Height	2	Half Length	Full Height	x8
Non-RAID		3,4,2,6	Full Height or Low Profile	4	Half Length	Full Height	x8
25G NICs	Mellanox	2,6	Full Height	2	Half Length	Full Height	x8
25G NICs	Mellanox	3,4	Low Profile	2	Half Length	Low Profile	x8
100G NICs	Intel	3,4	Low Profile	2	Half Length	Low Profile	x8
100G NICs	Intel	2,6	Full Height	2	Half Length	Full Height	x8
100G NICs	Broadcom	3,4	Low Profile	2	Half Length	Low Profile	x8
100G NICs	Broadcom	2,6	Full Height	2	Half Length	Full Height	x8

Table 12. x16 PCIe riser 1+ x16 PCIe riser 2 configuration (continued)

Card type		Slot priority	Riser height	Maximum number of cards supported	Card length	Card height	Maximum PCIe width supported
PERC-H840 (External Raid)		2,6,3,4	Full Height or Low Profile	4	Half Length	Low Profile	x8
FC32 HBA	Emulex	2,6	Full Height	2	Half Length	Full Height	x8
FC32 HBA	Emulex	3,4	Low Profile	2	Half Length	Low Profile	x8
HBA355e	Dell design	3, 4, 2, 6	Full Height or Low Profile	2	Half Length	Low Profile	x8
100G NICs	Broadcom	3, 4	Low Profile	2	Half Length	Low Profile	x16
100G NICs	Broadcom	2, 6	Full Height	2	Half Length	Full Height	x16
100G NICs	Intel	3, 4	Low Profile	2	Half Length	Low Profile	x16
100G NICs	Intel	2, 6	Full Height	2	Half Length	Full Height	x16

Table 13. x8 PCIe riser 1 + Null riser configuration

Card type	Slot priority	Riser height	Maximum number of cards supported	Card height	Maximum PCIe width supported
PERC10/11	1,2	Full height	2	Low profile	x8
	1	Full height	1	Low profile	x8
Infiniband HCA EDR	3,4	Low profile	2	Low profile	X16
100G NICs	3,4	Low profile	2	Low profile	X16
Omni-Path HFI	3,4	Low profile	2	Low profile	x16
BOSS	1,2	Full height	1	Full height	x4
	1,2	Full height	1	Full height	x8
	3,4	Low profile	1	Low profile	x4
	3,4	Low profile	1	Low profile	x8
External RAID	3,4	Low profile	2	Low profile	x8
	1,2	Full height	2	Full height	x8
Infiniband HCA FDR	3,4	Low profile	2	Low profile	x8
40Gb NICs	1,2	Full height	2	Full height	x8
	3,4	Low profile	2	Low profile	x8
FC32 HBA	1,2	Full height	2	Full height	x8
	3,4	Low profile	2	Low profile	x8
25G NICs	3,4	Low profile	2	Low profile	x8
	1,2	Full height	2	Full height	x8
FC16 HBA	1,2	Full height	2	Full height	x8
	3,4	Low profile	2	Low profile	x8
10Gb NICs	3,4	Low profile	2	Low profile	x8
	1,2	Full height	2	Full height	x8

Table 13. x8 PCIe riser 1 + Null riser configuration (continued)

Card type	Slot priority	Riser height	Maximum number of cards supported	Card height	Maximum PCIe width supported
	3,4	Low profile	2	Low profile	x4
	1,2	Full height	2	Full height	x4
FC8 HBA	3,4	Low profile	2	Low profile	x8
	1,2	Full height	2	Full height	x8
1Gb NICs	1,2	Full height	2	Full height	x1
	3,4	Low profile	2	Low profile	x1
	1,2	Full height	2	Full height	x4
	3,4	Low profile	2	Low profile	x4
Non-RAID	3,4	Low profile	2	Low profile	x8
	1,2	Full height	2	Full height	x8
NVMe PCIe SSD	1,2,3,4	Full height or Low profile	2	Full height or Low profile	x8
rNDC	Integrated Slot	None	1	rNDC	x8
	Integrated Slot	None	1	rNDC	x1
	Integrated Slot	None	1	rNDC	x4
FC32 HBA (Emulex)	1,2	Full Height	2	Full Height	x8
FC32 HBA (Emulex)	3,4	Low profile	2	Low profile	x8
25 G NICs (Intel)	1,2	Full Height	2	Full Height	x8
25 G NICs(Broadcom)	1,2	Full Height	2	Full Height	x8
25 G NICs (Mellanox)	1,2	Full Height	2	Full Height	x8
25 G NICs (Mellanox)	3,4	Low Profile	2	Low Profile	x8
10 Gb NICs	3,4	Low Profile	2	Low Profile	x8
10 Gb NICs	1,2	Full Height	2	Full Height	x8
Non-RAID	3,4	Low Profile	2	Low Profile	x8
Non-RAID	1,2	Full Height	2	Full Height	x8
Non-RAID	1,2,3,4	Full Height or Low Profile	4	Full Height	x8
100G NICs	3,4	Low Profile	2	Low Profile	x8
External RAID	1,2	Full Height	2	Full Height	x8
External RAID	1,2,3,4	Full Height or Low Profile	4	Low Profile	x8
HBA355e	1, 2, 3, 4	Full Height or Low Profile	2	Low Profile	x8

Table 14. x8 PCIe riser 1 + x8 PCIe riser 2 configuration

Card type	Slot priority	Riser height	Maximum number of cards supported	Card length	Card height	Maximum PCIe width supported
25G NICs Intel	1,2,5,6	Full height	4	Half length	Full height	x8
	3,4	Low profile	2	Half length	Low profile	x8
PERC10	1,2	Full height	2	Half length	Low profile	x8
	1	Full height	1	Half length	Low profile	x8
PERC 11	3,4	Full height	2	Half length	Low profile	x8
	3,4	Full height	1	Half length	Low profile	x8
Infiniband HCA EDR	3,4	Low profile	2	Half length	Low profile	X16
100G NICs	3,4	Low profile	2	Half length	Low profile	X16
Omni-Path HFI	3,4	Low profile	2	Half length	Low profile	x16
BOSS	1,2,5,6	Full height	1	Half length	Full height	x4
	1,2,5,6	Full height	1	Half length	Full height	x8
	3,4	Low profile	1	Half length	Low profile	x4
	3,4	Low profile	1	Half length	Low profile	x8
External RAID	3,4	Low profile	2	Half length	Low profile	x8
	1,2,5,6	Full height	2	Half length	Full height	x8
Infiniband HCA FDR	3,4	Low profile	2	Half length	Low profile	x8
40Gb NICs	1,2,5,6	Full height	4	Half length	Full height	x8
	3,4	Low profile	2	Half length	Low profile	x8
FC32 HBA	1,2,5,6	Full height	4	Half length	Full height	x8
	3,4	Low profile	2	Half length	Low profile	x8
25G NICs	3,4	Low profile	2	Half length	Low profile	x8
	1,2,5,6	Full height	4	Half length	Full height	x8
FC16 HBA	1,2,5,6	Full height	4	Half length	Full height	x8
	3,4	Low profile	2	Half length	Low profile	x8
10Gb NICs	3,4	Low profile	2	Half length	Low profile	x8
	1,2,5,6	Full height	4	Half length	Full height	x8
	3,4	Low profile	2	Half length	Low profile	x4
	1,2,5,6	Full height	4	Half length	Full height	x4
FC8 HBA	3,4	Low profile	2	Half length	Low profile	x8
	1,2,5,6	Full height	4	Half length	Full height	x8
1Gb NICs	1,2,5,6	Full height	4	Half length	Full height	x1
	3,4	Low profile	2	Half length	Low profile	x1
	1,2,5,6	Full height	4	Half length	Full height	x4
	3,4	Low profile	2	Half length	Low profile	x4

Table 14. x8 PCIe riser 1 + x8 PCIe riser 2 configuration (continued)

Card type	Slot priority	Riser height	Maximum number of cards supported	Card length	Card height	Maximum PCIe width supported
Non-RAID	3,4	Low profile	2	Half length	Low profile	x8
	1,2,5,6	Full height	4	Half length	Full height	x8
NVMe PCIe SSD	1,2,5,6,3,4	Full height or Low profile	2	Half length	Full height or Low profile	x8
rNDC	Integrated Slot	None	1	None	rNDC	x8
	Integrated Slot	None	1	None	rNDC	x1
	Integrated Slot	None	1	None	rNDC	x4
100G NICs	Intel	Low profile	2	Half length	Low profile	x16
100G NICs	Broadcom	Low profile	2	Half length	Low profile	x16
External RAID	3,4	Low Profile	2	Half length	Low profile	x8
External RAID	1,2,5,6	Full Height	2	Half length	Full Height	x8
External RAID	1,2,5,6,3,4	Full Height or Low Profile	6	Half length	Full Height or Low profile	x8
FC32 HBA	1,2,5,6	Full Height	4	Half length	Full Height	x8
FC32 HBA	3,4	Low Profile	4	Half length	Low profile	x8
Non-RAID	3,4	Low Profile	2	HL	Low Profile	x8
Non-RAID	3,4	Low Profile	2	HL	Low Profile	x8
Non-RAID	1,2,5,6	Full Height	4	HL	Full Height	x8
Non-RAID	1,2,5,6,3,4	Full Height or Low Profile	6	HL	Full Height	x8
HBA355e	1, 2, 5, 6, 3, 4	Full Height or Low Profile	2	Half length	Low Profile	x8

Trusted platform module

The Trusted Platform Module (TPM) is used to generate and store keys, protect or authenticate passwords, and create and store digital certificates. The Intel's TXT (Trusted Execution Technology) functionality along with Microsoft's Platform Assurance feature in Windows Server 2016 is supported. TPM can also be used to enable the BitLocker hard drive encryption feature in Windows Server 2012/2016.

The TPM chip is on the Plug-in Module (PIM) and bound only to one system board.

The system board has a connector for the plug-in module, and it is factory-installed.

There are four types of TPM module options:

- No TPM
- TPM 1.2 Nuvoton FIPS-CC-TCG
- TPM 2.0 Nuvoton FIPS-CC-TCG
- TPM 2.0 NationZ

Power, Thermal, and Acoustics

The lower overall system-level power draw is a result of the breakthrough system design developed by Dell EMC. The system aims to maximize performance per watt through a combination of energy efficient technologies, optimized thermal designs and intelligent fan control algorithms. The system fan control algorithms use an extensive array of sensors that automatically monitor power and thermal activity to minimize fan speeds based on system cooling requirements, reducing the power required for cooling.

Topics:

*   Power consumption and energy efficiency
*   Power supply units
*   Thermal and Acoustics

Power consumption and energy efficiency

With the rise in the cost of energy that is coupled with increasing data center density, Dell EMC provides tools and technologies to help you realize greater performance with lower energy cost and wastage. More efficient data center usage can reduce costs by slowing the need for additional data center space. The following table lists the tools and technologies that Dell EMC offers to help you achieve your data center goals by lowering power consumption and increasing energy efficiency.

Table 15. Power tools and technologies

Feature	Description
Power supply units (PSU) portfolio	PSU portfolio includes intelligent features such as dynamically optimizing efficiency while maintaining availability and redundancy.
Tools for right-sizing	Enterprise Infrastructure Planning Tool (EIPT) is a tool that helps you to plan and tune your computer and infrastructure equipment for maximum efficiency. EIPT helps you by calculating hardware power consumption, power infrastructure, and storage. You can learn more at Dell.com/calc
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%, whereas the industry standard is 5% • More accurate reporting of power • Better performance under a power cap
Power capping	Use Dell EMC's systems management to set the power cap limit for your systems to limit the output of a PSU and reduce system power consumption. Dell is the first hardware vendor to leverage Intel Node Manager for circuit-breaker fast capping.
Systems management	Dell EMC's servers are compliant with all relevant industry certifications and guidelines, including 80 PLUS, Climate Savers, and ENERGY STAR. Dell OpenManage Power Center delivers group power management at the rack, row, and data center level for

Table 15. Power tools and technologies (continued)

Feature	Description
	servers, power distribution units, and uninterruptible power supplies.
Active power management	Intel® Node Manager is an embedded technology that provides individual server- level power reporting and power limiting functionality. Dell offers a complete power management solution that is comprised of Intel Node Manager that is accessed through Dell iDRAC9 Enterprise and OpenManage Power Center that allows policy- based management of power and thermals at the individual server, rack, and data center level. Hot spare reduces power consumption of redundant power supplies. Thermal control of fan speed optimizes the thermal settings for your environment to reduce fan consumption and lower system power consumption. Idle power enables Dell servers to run as efficiently when idle as when at full workload.
Fresh Air cooling	FAC is supported with certain configuration limitations. With the thermal design and reliability of Dell products, you can have the capability to operate at excursion- based temperatures beyond the industry standard of 35°C (95°F) without impacting your availability model. This solution takes into account servers, networking, storage, and other infrastructure.
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

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 system supports two hot-swappable AC power supplies with 1 + 1 redundancy, auto-sensing and auto-switching capability. A single cabled AC power supply option is also available for the R840.

Thermal and Acoustics

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 35°C (50°F to 95°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 ambient, hard disk drives, NDC, and GPU.

- **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.
- **Environmental Specifications:** The optimized thermal management makes the R840 reliable under a wide range of operating environments.

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 16. 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

Rack rails

The R840 system offers Stab-in/Drop-in sliding rails.

Sliding rails features summary

Sliding rails allow the system to be fully extended out of the rack for service. A strain relief bar (SRB) is provided with each rail kit to organize and secure cables exiting the back of the server.

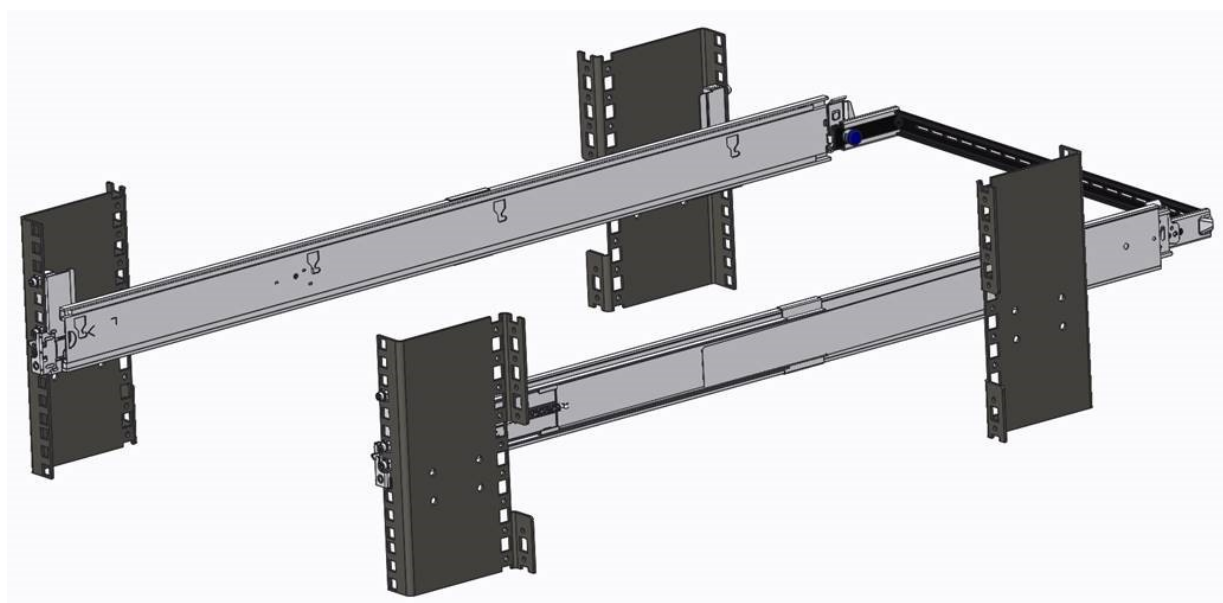ⓘ **NOTE:** The cable management arm (CMA) is not available.

Figure 7. Sliding rails with SRB

Stab-in/Drop-in sliding rails for 4-post racks (New for 14G systems)
● Supports drop-in or stab-in installation of the chassis to the rails.
● Support for tool-less installation in 19 inch EIA-310-E compliant square hole (includes all generations of the Dell racks), unthreaded round hole, and threaded hole 4-post racks.
● Required for installing R840 in a Dell EMC Titan or Titan-D rack.
● Support full extension of the system out of the rack to allow serviceability of key internal components.
● Support for strain relief bar.
● Minimum rail mounting depth without the SRB: 852 mm.
● Minimum rail mounting depth with the SRB: 904 mm.
● Square-hole rack adjustment range: 560 - 930 mm.
● Round-hole rack adjustment range: 560 - 930 mm.
● Threaded-hole rack adjustment range: 560 - 930 mm.

Strain Relief Bar

● Tool-less attachment to rails.
● Two depth positions to accommodate various cable bundle sizes and rack depths.
● Supports cable weight and controls stresses on server connectors.

- Cables can be segregated into discrete, purpose specific bundles.

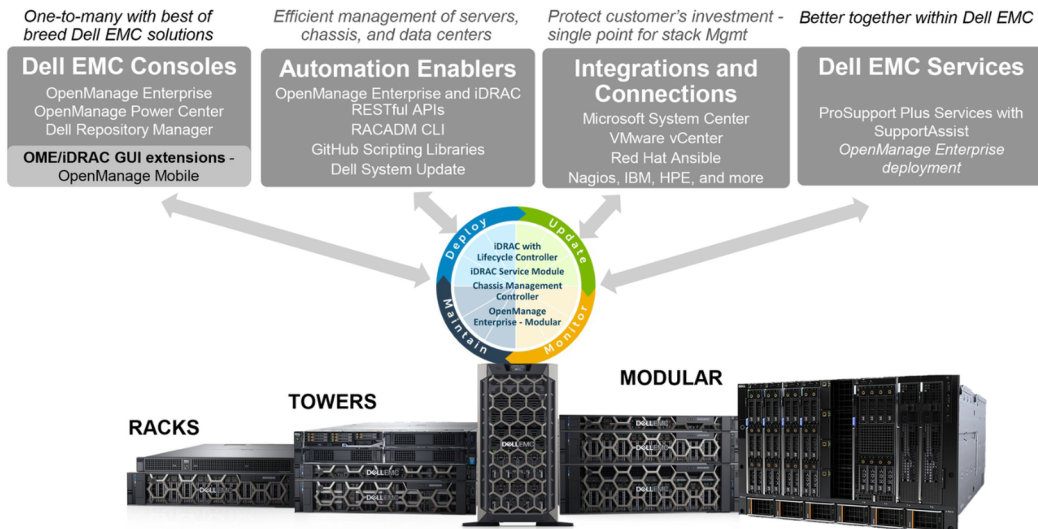# Dell EMC OpenManage systems management

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
- Dell EMC consoles
- Automation Enablers
- Integration with third-party consoles
- Connections for third-party consoles
- Dell EMC Update Utilities
- Dell resources

Server and Chassis Managers

- Integrated Dell Remote Access Controller (iDRAC)
- Dell EMC OpenManage Enterprise Modular (OME-M)
- Chassis Management Controller (CMC)
- 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 https://www.dell.com/openmanagemanuals or the following product pages:

Table 17. Dell resources

Resource	Location
Integrated Dell Remote Access Controller (iDRAC)	https://www.dell.com/idracmanuals
iDRAC Service Module (iSM)	https://www.dell.com/support/kbdoc/000178050/
OpenManage Ansible Modules	https://www.dell.com/support/kbdoc/000177308/
OpenManage Essentials (OME)	https://www.dell.com/support/kbdoc/000175879/
OpenManage Enterprise Modular	https://www.dell.com/OME-modular
OpenManage Mobile (OMM)	https://www.dell.com/support/kbdoc/000176046
OpenManage Integration for VMware vCenter (OMIVV)	https://www.dell.com/support/kbdoc/000176981/
OpenManage Integration for Microsoft System Center (OMIMSSC)	https://www.dell.com/support/kbdoc/000147399
Dell EMC Repository Manager (DRM)	https://www.dell.com/support/kbdoc/000177083
Dell EMC System Update (DSU)	https://www.dell.com/support/kbdoc/000130590
Dell EMC Platform Specific Bootable ISO (PSBI)	Dell.com/support/article/sln296511
Dell EMC Chassis Management Controller (CMC)	www.dell.com/support/article/sln311283
OpenManage Connections for Partner Consoles	https://www.dell.com/support/kbdoc/000146912
OpenManage Enterprise Power Manager	https://www.dell.com/support/kbdoc/000176254
OpenManage Integration with ServiceNow (OMISNOW)	Dell.com/support/article/sln317784

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

Appendix A. Additional specifications

The following sections contain information about additional system specifications.

Topics:

PSU specifications

PowerEdge R840 supports up to two AC or DC power supply units (PSUs).

Table 18. PSU specifications

PSU	Class	Heat dissipation (maximum)	Frequency	Voltage	High line 200 V–240 V	Low line 100 V– 140 V	DC	Current
750 W AC	Platinum	2891 BTU/hr	50/60 Hz	100–240 V AC, autoranging	750 W	750 W	NA	10 A-5 A
750 W AC	Titanium	2843 BTU/hr	50/60 Hz	200–240 V AC, autoranging	750 W	NA	NA	5 A
750 W Mixed Mode HVDC (for China only)	Platinum	2891 BTU/hr	50/60 Hz	100–240 V AC, autoranging	750 W	750 W	NA	NA
N/A	2891 BTU/hr	N/A	240 V DC, autoranging	NA	NA	750 W	4.5 A	
750 W Mixed Mode AC	Platinum	2891 BTU/hr	50/60 Hz	100–240 V AC, autoranging	750 W	750 W	NA	10 A-5 A
750 W Mixed Mode DC (for China only)	Platinum	2891 BTU/hr	N/A	240 V DC, autoranging	750 W	NA	750 W	5 A
1100 W AC	Platinum	4100 BTU/hr	50/60 Hz	100–240 V AC, autoranging	1100 W	1050 W	NA	12 A-6.5 A
1100 W DC	N/A	4416 BTU/hr	N/A	–(48–60) V DC, autoranging	NA	NA	1100 W	32 A
1100 W Mixed Mode HVDC (for China and Japan only)	Platinum	4100 BTU/hr	50/60 Hz	100–240 V AC, autoranging	1100 W	1050 W	NA	12 A-6.5 A
	N/A	4100 BTU/hr	N/A	200–380 V DC, autoranging	NA	NA	1100 W	6.4 A-3.2 A
1600 W AC	Platinum	6000 BTU/hr	50/60 Hz	100–240 V AC, autoranging	1600 W	800 W	NA	10 A
1600 W HLAC	Titanium	5840 BTU/hr	50/60 Hz	200–240 V AC, autoranging	1600 W	NA	NA	10 A

Table 18. PSU specifications (continued)

PSU	Class	Heat dissipation (maximum)	Frequency	Voltage	High line 200 V–240 V	Low line 100 V– 140 V	DC	Current
2000 W AC	Platinum	7500 BTU/hr	50/60 Hz	100–240 V AC, autoranging	2000 W	1000 W	NA	11.5 A
2400 W AC	Platinum	9000 BTU/hr	50/60 Hz	100–240 V AC, autoranging	2400 W	1400 W	NA	16 A
2600 W HLAC	Titanium	9500 BTU/hr	50/60 Hz	200–240 V AC, autoranging	2600 W	NA	NA	15 A

(i) **NOTE:** Heat dissipation is calculated using the PSU wattage rating.

(i) **NOTE:** This system is also designed to connect to the IT power system with a phase-to-phase voltage not exceeding 240 V.

(i) **NOTE:** To supply their rated capacity, PSUs rated for 1100 W AC or 1100 W Mixed Mode HVDC and higher require high-line voltage (200–240 V AC).
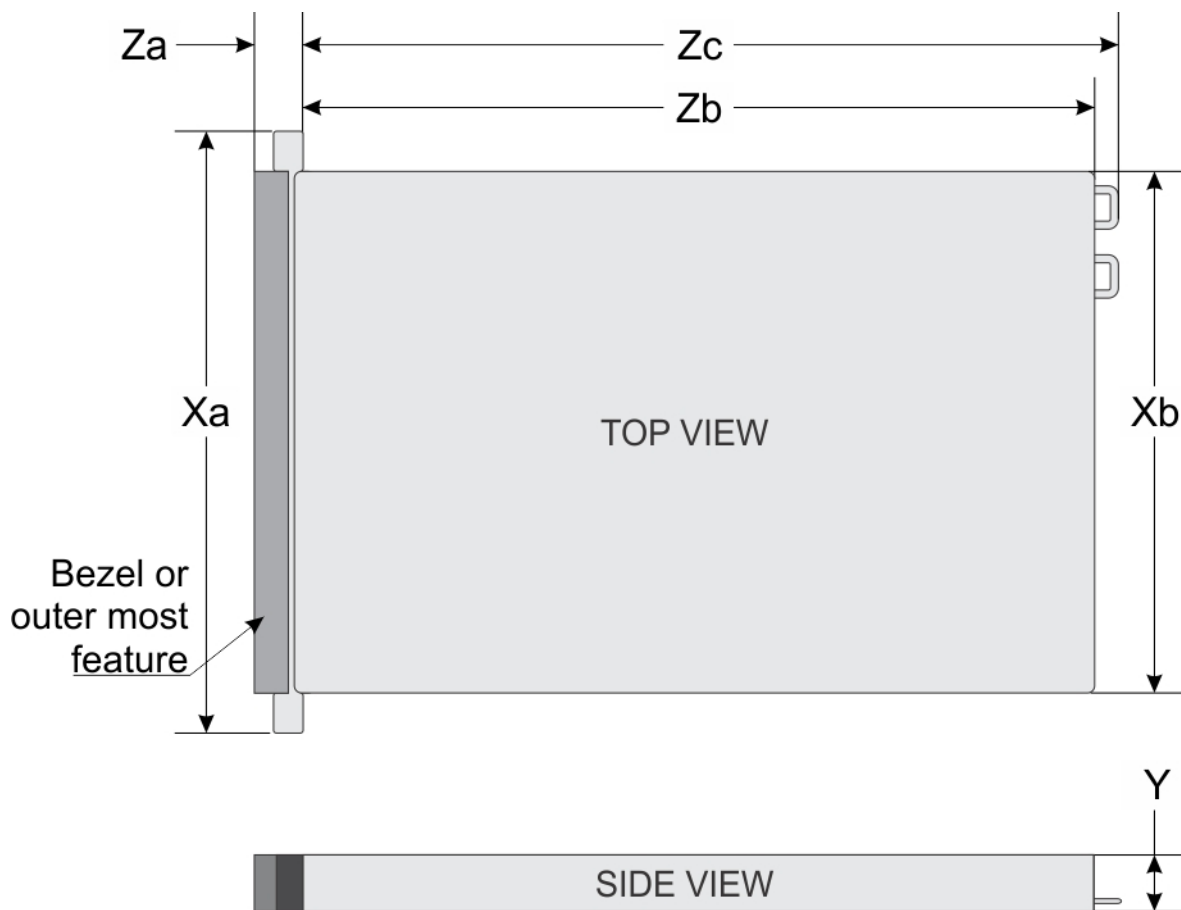
Chassis dimensions

Figure 9. Dimensions of PowerEdge R840 system

Table 19. Dimensions of PowerEdge R840 system

Xa	Xb (without brackets)	Xb (w brackets)	Y	Za (with bezel)	Za (without bezel)	Zb	Zc (with PSU handle)	Zc (with chassis rear wall handle)
482 mm (18.97 inches)	434 mm (17.08 inches)	444.0 (17.48 inches)	86.8 mm (3.41 inches)	37.84 mm (1.41 inches)	23.9 mm (0.94 inches)	812 mm (31.96 inches)	842 mm (33.14 inches)	902 mm (35.51 inches)

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

Chassis weight

The following table shows the maximum weight of the R840 system:

Table 20. Chassis weight

System	Maximum weight (with all drives/SSDs)
2.5 inch	36.6 kg (80.68 lb)

Environmental specifications

See Dell EMC PowerEdge R840 installation service manuals on Dell.com/Support for detailed environmental specifications.

Video specifications

R840 servers support the integrated Matrox G200eW3 graphics controller with 16 MB of video frame buffer.

The following table describes the supported video resolution options.

Table 21. 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 supported only in reduced blanking mode.

Appendix B. Standards compliance

Table 22. Industry standard documents

Standard	URL for information and specifications
ACPI Advance Configuration and Power Interface Specification, v2.0c	acpi.info
Ethernet IEEE 802.3-2005	standards.ieee.org/getieee802/802.3.html
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	pmbus.info/specs.html
SAS Serial Attached SCSI, v1.1	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

Appendix C Additional resources

Table 23. Additional resources

Resource	Description of contents	Location
PowerEdge R840 Installation Service Manuals	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
PowerEdge R840 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 contact information.	Inside the system chassis cover
Energy Smart Solution Advisor (ESSA)	The Dell 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

Topics:

- Dell EMC ProDeploy Enterprise Suite
- Deployment services
- Dell EMC Remote Consulting Services
- Dell EMC Data Migration Service
- ProSupport Enterprise Suite
- ProSupport Plus
- ProSupport
- ProSupport One for Data Center
- Support Technologies
- Additional professional services
- Dell Education Services
- Dell EMC Global Infrastructure Consulting Services
- Dell EMC Managed Services

Dell EMC ProDeploy Enterprise Suite

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	-	●	●
	SAM engagement for ProSupport Plus entitled devices	-	-	●
Deployment	Deployment service hours	Business hours	24x7	24x7
	Remote guidance for hardware installation or Onsite hardware installation and packaging material removal	Onsite	Remote or Onsite	Onsite
	Install and configure system software	-	Remote	Onsite
	Install support software and connect with Dell Technologies	-	●	●
	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.

Dell EMC 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.

Dell EMC 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.

Dell EMC Basic Deployment

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

Dell EMC 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.

Dell EMC 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.

Dell EMC 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 the ProSupport Enterprise Suite, 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. ProSupport Enterprise Suite 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 Services Account Manager (SAM) 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 assigned Services Account Managers (SAM) 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	ProSupport Plus	ProSupport One for Data Center
Remote technical support	24x7	24x7	24x7
Parts and labor response options	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 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. Enterprise Support feature comparison

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.