Dell EMC PowerEdge R640

Ideal balance of density and scalability. Get scalable computing and storage in a 1U, 2-socket platform with an ideal mix of performance, cost and density for most data centers. The following documentation is designed as both an instructional aid and online reference material for the Dell EMC PowerEdge R640 rack server. The material introduces new technologies and features specific to the PowerEdge R640.

Notes, cautions, and warnings

NOTE: A NOTE indicates important information that helps you make better use of your product.

CAUTION: A CAUTION indicates either potential damage to hardware or loss of data and tells you how to avoid the problem.

WARNING: A WARNING indicates a potential for property damage, personal injury, or death.

Contents

System overview

The Dell EMC PowerEdge R640 is the ideal dual-socket, 1U platform for dense scale-out data center computing. The R640 combines density, performance and scalability to optimize application performance and data center density.

Introduction

The PowerEdge R640 is a general purpose platform expandable up to 3TB of memory, up to twelve 2.5 inch drives, and flexible I/O options. The R640 can handle demanding workloads such as virtualization, dense private cloud, High Performance Computing (HPC) and software-defined storage.

The R640 features:

- Intel Xeon Scalable Processor product family (with up to 28 cores and two threads per core)
- Up to six DDR4 memory channels with two DIMMs per channel per CPU and 24 DIMMs (supports DDR4 RDIMM/LRDIMM/ NVDIMM-N)
- PCI Express® (PCIe) 3.0 enabled expansion slots (with up to 48 lanes per CPU)
- Networking technologies, such as Ethernet, Infiniband, OCP, OPA

New technologies

The following are the new technologies featured on the PowerEdge R640:

Table 1. New technologies

New technology	Detailed description
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 R640 system uses the Intel Lewisburg chip. It is a 2 chip platform - CPU and PCH.
2666 MT/s DDR4 memory	The Intel Xeon Scalable Processor product family that supports 2666 MT/s memory and twenty-four 288-pin DIMMs. The R640 system supports: • Two DIMMs per channel for single-rank and/or dual-rank DIMMs • One or two DIMMs per channel for quad-rank DIMMs For details, see the Memory section.
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 eight CPU Direct Attach PCIe SSD

New technology	Detailed description
PERC S140	This new software RAID solution supports: • RAID 0, 1, 5, and Non-RAID • SATA HDD and SSD devices only • Up to eight 2.5-inch hot-plug SATA HDDs or SSDs • Software RAID is through the Intel Lewisburg chipset • Software RAID solution is supported on Linux and Windows For details, see the Storage section.
LCD bezel	The PowerEdge R640 LCD control panel is embedded in the front bezel for easy access and management.

System features

Compared to previous generations, the PowerEdge R640 offers faster processing power and advanced system management.

The R640 system is a powerhouse 2S/1U rack system, which emphasizes performance and reliability in areas such as virtualization, power, thermal and systems management, and usability. It is designed for mid-size to large data centers that require high memory capacity and performance.

The R640 system consists of the planar subsystem with control panel, SAS backplane, storage card, riser card, VGA port, Storage Enclosure Processor (SEP) (4 x HDD back plane, eight HDD back plane and 2 x rear back plane), expander—10 HDD system. It is a two-chip platform (CPU and PCH) because this family of processors includes an Integrated Memory Controller (IMC) and Integrated I/O (IIO) (such as PCI Express and DMI3) on a single silicon die.

Product comparison

Table 2. Feature comparison

Feature	PowerEdge R640	PowerEdge R630
Processors	Intel Xeon Scalable Processor Family	Intel® Xeon processor E5-2600 v3 (Haswell) or E5- 2600 v4 (Broadwell)
Chipset	Intel C620	Intel C610
Memory	24x DDR4 RDIMM/LR-DIMM 12x NVDIMM + 12 x RDIMM	24x DDR4 RDIMM/LR-DIMM
Chassis	Storage design modularity • 4 Hard Drive Chassis • 8 Hard Drive Chassis • 10 Hard Drive Chassis	Three individual chassis for three SKU • 8 Hard Drive Chassis • 10 Hard Drive Chassis • 24 Hard Drive Chassis
Disk Drives	• Front drive bays: Up to 10 x 2.5 inch SAS/SATA (HDD/SSD) with up to 8 NVMe SSD 58TB (maximum) or up to 4 x 3.5 inch SAS/SATA HDD 48TB (maximum) • Rear drive bays: Up to 2 x 2.5 inch SAS/SATA (HDD/SSD), NVMe SSD 12TB (maximum)	• 8 x 2.5 inch SAS/SATA or SATA only • 10 x2.5 inch SAS/SATA or SAS/SATA/NVMe (NVMe up to 4) • 24 x 1.8 inch SATA (single PERC or dual PERCs)
PCIe SSD	Up to 8x CPU Direct Attach PCIe SSD	Up to 4x PCIe SSD from PCIe bridge card
RAID Controller	S140, HBA330, H330, H730, H730P, H740P, H840P, 12Gbps SAS HBA(External)	S130, H330, H730, H730P, H830 (External) Support for 2 internal RAID controllers for x24 SSD configuration only
LCD Module	LCD module option in bezel	LCD by default in base x8 chassis, not available on x10 and x24 chassis.
Backplane	• 8 x 2.5 inch SATA/SAS	• 8 x 2.5 inch SAS/SATA

Feature	PowerEdge R640	PowerEdge R630
	• 4 x 3.5 inch SATA/SAS	• 10 x 2.5 inch SAS/SATA • 10 x 2.5 inch SAS/SATA/PCIe SSD • 24 x 1.8 inch SATA
Riser	Up to 2 riser connectors (left/right)	Up to 3 riser connectors (left/center/right)
PCIe Slots	Up to 3x PCIe Gen3 (x16/x16/x16)	Up to 3x PCIe Gen3 (x16/x8/x16)
Embedded NIC	• Broadcom 1G 4 x RJ45 • Broadcom 2 x 1G RJ45 + 2 x 10G SFP + • Broadcom 2x 1G RJ45 + 2 x 10G RJ45 • Intel 1G 4 x RJ45 • Intel 2 x 1G RJ45 + 2 x 10G RJ45	• Broadcom 5730 Base-T • Intel 1350 Base-T • Broadcom 57800 SFP+ • Broadcom 57800 Base-T • Intel X540 Base-T
Power Supplies	• 495 W AC Platinum • 750 W AC Platinum • 750 W AC Titanium • 750 W Mixed Mode HVDC Gold (for China only) • 1100 W DC • 1100 W Mixed Mode HVDC Platinum (for China and Japan only) • 1100 W AC Platinum • 1600 W Platinum	• 495 W AC • 750 W AC • 1100 W AC • 1100 W DC
Remote Management	iDRAC9	iDRAC8
TPM	TPM China, TPM1.2, TPM2.0	TPM China, TPM1.2, TPM2.0
USB 3.0 Hub board	Extra USB3.0 connector to front plane	None
iDRAC Direct front port	Micro USB	USB type A
Fan	Up to eight FAN support. (1X6 type)	Up to seven FAN support (2X3 type)
IDSDM Module	Internal Dual SD Module (IDSDM) and vFlash	Internal Dual SD Module (IDSDM)
BOSS Module	M.2 SATA interface	None
PERC	Mini-PERC 10	Mini-PERC 9
NVDIMM Battery	External 12 V power bank for NVDIMM used	None
ODD/TBU	ODD via NPIO	TBU and ODD via 7-pin connectors
On board PCH SATA Connectors	4x NPIOs	2x Mini SAS_HDs

Technical specifications

Table 3. Technical specifications

Feature	PowerEdge R640 technical specification
Form factor	1U rack
Processor	Intel Xeon Processor Scalable Family

Feature	PowerEdge R640 technical specification
Processor sockets	2 sockets
Internal interconnect	Up to 3 Intel Ultra Path Interconnect (Intel® UPI); up to 11.2 GT/s
Chipset	Intel C620 series Chipset
Memory	Up to 3 TB—24 DIMM slots: 8 GB, 16 GB, 32 GB, 64 GB, 128 GB DDR4 up to 2666 MT/s Supports DDR4 RDIMM/LRDIMM/NVDIMM-N
I/O slots	Up to 3 x PCIeGen slots plus a dedicated PERC and rNDC slot
RAID controller	Internal controllers: PERC S140 (SW RAID SATA), PERC H330, PERC H730, PERC H730P, PERC H740P Internal HBA (RAID): PERC HBA330 External HBA—non-RAID: 12 Gb/s SAS HBA
Hard drives	• 4 x 3.5 inch SAS/SATA • 8 x 2.5 inch SAS/SATA • 8 x 2.5 inch SATA only—PCH SATA • 10 x 2.5 inch SAS/SATA
Accelerators	Up to 1 Intel Arria® 10 GX FPGA
Embedded NIC	Supports four Network Interface Controller (NIC) ports on the back panel, which are available in the following configurations: • Broadcom 1G 4 x RJ45 • Broadcom 2 x 1G RJ45 + 2 x 10G SFP+ • Broadcom 2 x 1G RJ45 + 2 x 10G RJ45 • Intel 1G 4 x RJ45 • Intel 2 x 1G RJ45 + 2 x 10G RJ45 NOTE: You can install up to six PCIe add-on NIC cards.
Power supply	Dual, hot-plug, redundant, and high-efficiency power supply units: • 495 W, 750 W, 1100 W, and 1600 W Platinum • 750 W Titanium • 1100 W - (48 - 60) VDC • 750 W 240 HVDC
Availability	• Cluster support • ECC memory • Hot-plug hard drives • Hot-plug, redundant cooling • Hot-plug, redundant power • IDSDM Module • Single Device Data Correction (SDDC) • Spare Rank • Support for high availability, and virtualization • Proactive systems management alerts
Operating systems	• Canonical Ubuntu LTS

Feature	PowerEdge R640 technical specification
	• Citrix XenServer
	• Microsoft Windows Server with HyperV
	• 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	**Systems management**: IPMI 2.0 compliant; Dell EMC OpenManage Essentials; Dell OpenManage Enterprise; Dell EMC OpenManage Mobile; Dell EMC OpenManage Power Center
	Remote management: iDRAC9 with Lifecycle Controller, iDRAC9 Express (default), iDRAC9 Enterprise (upgrade); 8 GB vFlash media (upgrade), 16 GB vFlash media (upgrade) iDRAC Quick Sync
	Dell EMC OpenManage Integrations: Dell EMC OpenManage Integration Suite for Microsoft® System Center, Dell EMC OpenManage Integration for VMware® vCenter™
	Dell EMC OpenManage Connections: HP Operations Manager, IBM Tivoli® Netcool®, and CA Network and Systems Management, Dell EMC OpenManage Plug-in for Oracle® Database Manager
Dimensions and weight	• Height: 42.8 mm—1.68 inches
	• Width: 434.0 mm—17.08 inches
	• Max depth:
	– 757.75mm-29.83 inches, for the 8 x 2.5-inch front bay drive configuration.
	– 808.51mm-31.83 inches for the 4 x 3.5-inch or 10 x 2.5-inch front bay drive configurations (plus up to 2 rear drives).
Recommended support	Dell EMC ProSupport Plus for critical systems or Dell EMC ProSupport for premium 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 Dell EMC.com/ServiceDescriptions.

Chassis views and features

The PowerEdge R640 is a two socket, 1U rack system that is available in three different chassis configurations:

- Four hard drive chassis
- Eight hard drive chassis
- 10 hard drive chassis

Front panel view and features

The PowerEdge R640 provides three chassis options: 4 x 3.5-inch, 8 x 2.5-inch, or 10 x 2.5-inch drives.

Figure 1. Front view 4 x 3.5-inch drive chassis

Figure 2. Front view 8 x 2.5-inch drive chassis

Figure 3. Front view 10 x 2.5-inch drive chassis

Back panel view and features

The back panel of a PowerEdge system contains access to I/O connectors for both embedded and add-in devices, including networking, video, serial, USB, system ID, and system management access ports. Most add-in PCI cards are accessible through the back panel. It is also the default location for power supply units (PSU), including the points for AC/DC connections.

The PowerEdge R640 system provides four backplane options:

- 4 x 3.5 inch SATA/SAS
- 8 x 2.5 inch SATA/SAS

The images below illustrate the types of backplanes supported on PowerEdge R640:
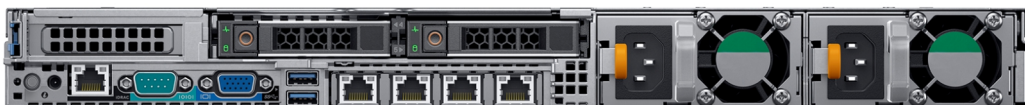
Figure 4. Back panel view of 2 x 2.5 inch hard drives with 1 PCIe expansion slot
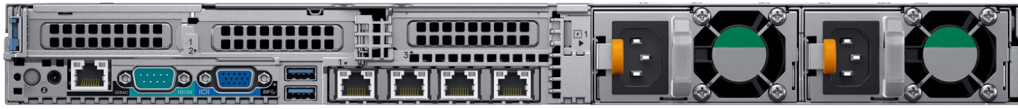
Figure 5. Back panel view of system with 3 PCIe expansion slots
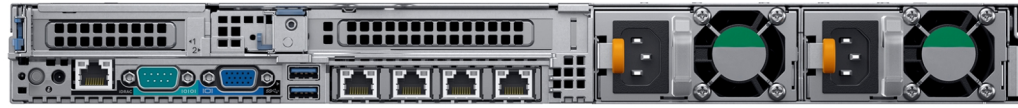
Figure 6. Back panel view of system with 2 PCIe expansion slots

Internal chassis view

The chassis design of the PowerEdge R640 is optimized for easy access to components and for efficient cooling. The PowerEdge R640 supports up to 24 DIMMs, two processors, hot-plug redundant fans, system board and hard drive bays, and many other components and features. For more system views, see the Dell EMC PowerEdge R640 Installation and Service Manual at Dell.com/ Support/Manuals.
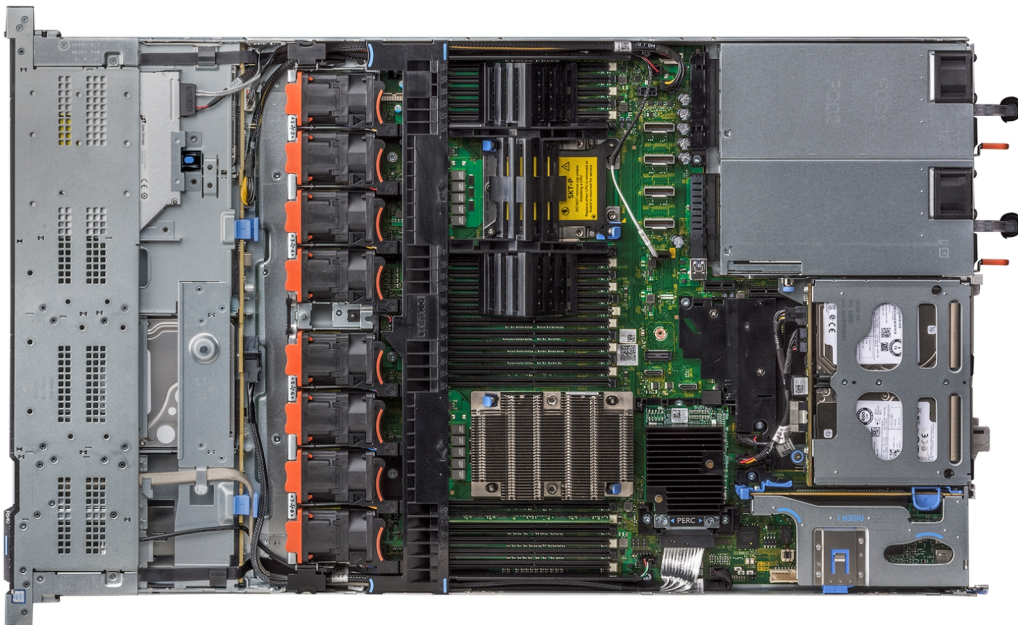
Figure 7. Internal chassis view - 1 PCIe expansion riser
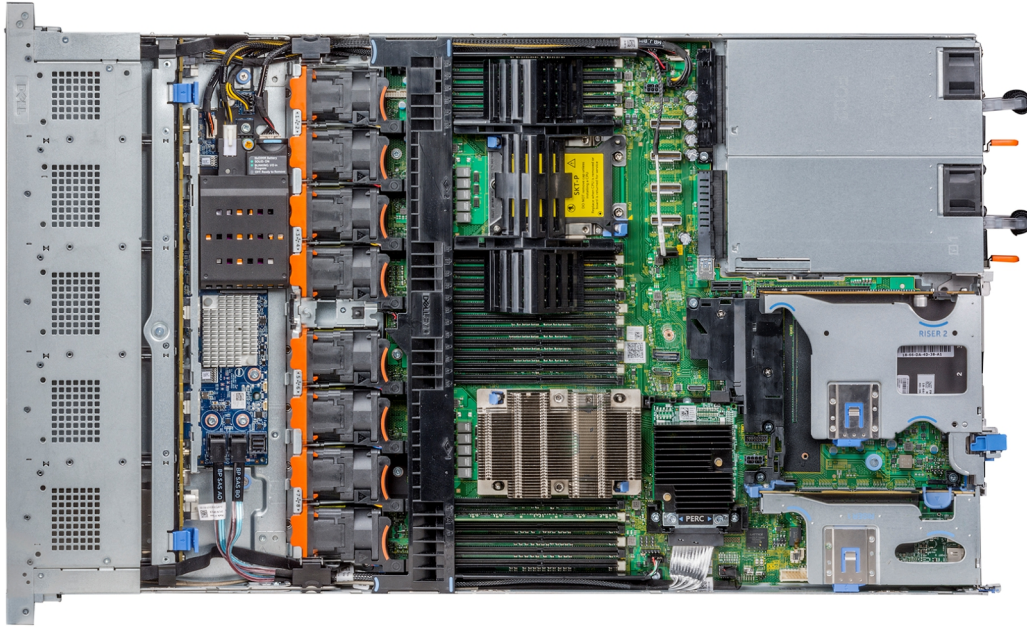
Figure 8. Internal chassis view - 2 PCIe expansion risers
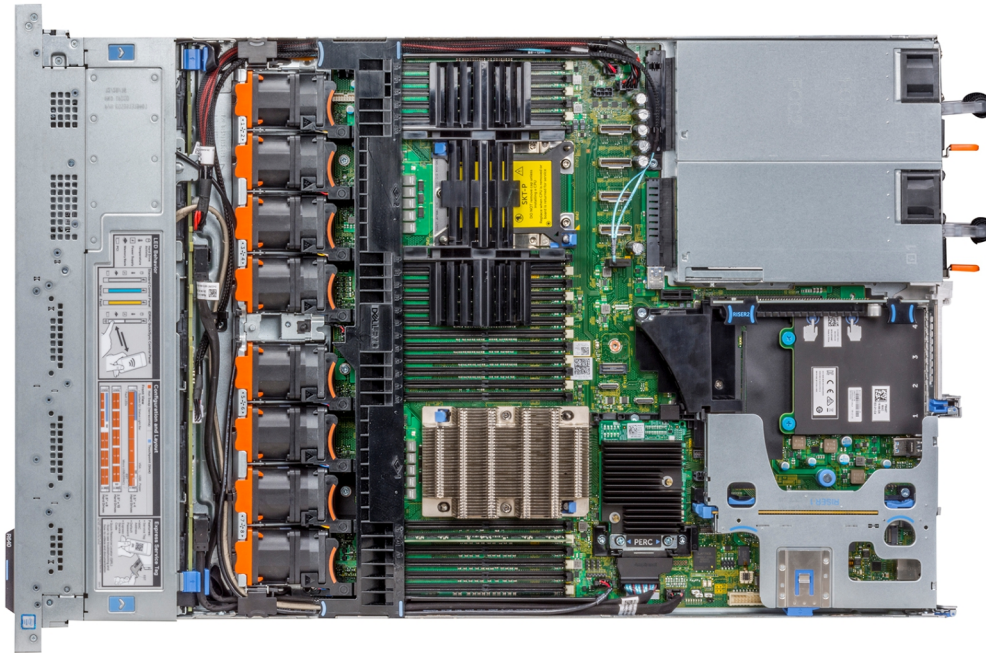
Figure 9. Internal chassis view - 3 PCIe expansion risers

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

Security feature	Description
	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.

Processors

The PowerEdge R640 server features the exceptional performance, value, and power efficiency of the Intel Xeon Scalable Processor. These processors 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.

Processor features

The new processor family is the next generation core architecture with improved Instructions per Cycle (IPC) and other architectural improvements.

The Intel Xeon Scalable Processor family not only adds new features, but also improves upon many features of the predecessor Intel Xeon processor E5-2600 v4 product family, including:

· Virtual address space of 48 bits and a physical address space of 46 bits
· Intel Hyper-Threading Technology (Intel® HT Technology) when enabled allow each core to support two threads
· First-Level Cache (FLC) 64 KB total. The FLC is composed of a 32 KB ICU (Instruction Cache) and 32 KB DCU—Data Cache
· MB MidLevel Cache (MLC) per core (noninclusive with the LLC)
· Intel® Advanced Vector Extensions 512 (Intel® AVX-512) with a single AVX512 fused multiply-add (FMA) execution units. Processors which support Advanced RAS enable a second FMA execution unit.

Supported processors

Table 5. Supported processors for PowerEdge R640

Model	Intel SKU	SKU type	Speed(GHz)	Cache(MB)	QPI—GT/s	Max Memory Speed—MT/s	Cores	Turbo	TDP
Intel Xeon Scalable Processor	3106	Bronze	1.7	24.75	9.6	2133	8	No Turbo	85 W
Intel Xeon Scalable Processor	3104	Bronze	1.7	19.25	9.6	2133	6	No Turbo	85 W
Intel Xeon Scalable Processor	6148	Gold	2.4	27.5	10.4	2400	20	Turbo	150 W
Intel Xeon Scalable Processor	6154	Gold	3	24.75	10.4	2400	18	Turbo	200 W
Intel Xeon Scalable Processor	6150	Gold	2.7	24.75	10.4	2400	18	Turbo	165 W
Intel Xeon Scalable Processor	6142	Gold	2.6	22	10.4	2400	16	Turbo	150 W
Intel Xeon Scalable Processor	6132	Gold	2.6	19.25	10.4	2400	14	Turbo	140 W

Model	Intel SKU	SKU type	Speed(GHz)	Cache(MB)	QPI—GT/s	Max Memory Speed—MT/s	Cores	Turbo	TDP
Intel Xeon Scalable Processor	6136	Gold	3	24.75	10.4	2400	12	Turbo	150 W
Intel Xeon Scalable Processor	6126	Gold	2.6	19.25	10.4	2400	12	Turbo	125 W
Intel Xeon Scalable Processor	6134	Gold	3.2	24.75	10.4	2400	8	Turbo	130 W
Intel Xeon Scalable Processor	6128	Gold	3.4	19.25	10.4	2400	6	Turbo	115 W
Intel Xeon Scalable Processor	5122	Gold	3.6	16.5	10.4	2400	4	Turbo	105 W
Intel Xeon Scalable Processor	6152	Gold	2.1	30.25	10.4	2400	22	Turbo	140 W
Intel Xeon Scalable Processor	6138	Gold	2	27.5	10.4	2400	20	Turbo	125 W
Intel Xeon Scalable Processor	6140	Gold	2.3	24.75	10.4	2400	18	Turbo	140 W
Intel Xeon Scalable Processor	6130	Gold	2.1	22	10.4	2400	16	Turbo	125 W
Intel Xeon Scalable Processor	5120	Gold	2.2	19.25	10.4	2400	14	Turbo	105 W
Intel Xeon Scalable Processor	5118	Gold	2.3	16.5	10.4	2400	12	Turbo	105 W
Intel Xeon Scalable Processor	5115	Gold	2.4	13.75	10.4	2400	10	Turbo	85 W
Intel Xeon Scalable Processor	8180	Platinum	2.5	38.5	10.4	2666	28	Turbo	205 W
Intel Xeon Scalable Processor	8168	Platinum	2.7	33	10.4	2666	24	Turbo	205 W
Intel Xeon Scalable Processor	8158	Platinum	3	24.75	10.4	2666	12	Turbo	150 W
Intel Xeon Scalable Processor	8156	Platinum	3.6	16.5	10.4	2666	4	Turbo	105 W
Intel Xeon Scalable Processor	8176	Platinum	2.1	22	10.4	2666	16	Turbo	120 W
Intel Xeon Scalable Processor	8170	Platinum	2.1	35.75	10.4	2666	26	Turbo	165 W
Intel Xeon Scalable Processor	8164	Platinum	2	35.75	10.4	2666	26	Turbo	150 W
Intel Xeon Scalable Processor	8160	Platinum	2.1	33	10.4	2666	24	Turbo	150 W

Model	Intel SKU	SKU type	Speed(GHz)	Cache(MB)	QPI—GT/s	Max Memory Speed—MT/s	Cores	Turbo	TDP
Intel Xeon Scalable Processor	8153	Platinum	2	22	10.4	2666	16	Turbo	125 W
Intel Xeon Scalable Processor	4116	Silver	2.1	16.5	9.6	2400	12	Turbo	85 W
Intel Xeon Scalable Processor	4114	Silver	2.2	13.75	9.6	2400	10	Turbo	85 W
Intel Xeon Scalable Processor	4112	Silver	2.6	16.5	9.6	2400	4	Turbo	85 W
Intel Xeon Scalable Processor	4110	Silver	2.1	24.75	9.6	2400	8	Turbo	85 W
Intel Xeon Scalable Processor	4108	Silver	1.8	24.75	9.6	2400	8	Turbo	85 W

Processor configurations

The PowerEdge R640 supports up to two processors and up to 28 cores per processor.

Single CPU configuration

The PowerEdge R640 functions normally if there only a single processor placed in the CPU1 socket. However, CPU and memory blanks associated with CPU2 are required to be populated to maintain thermal efficiency. The system will not boot if only CPU2 socket is populated. With single CPU configuration, Riser 1 (1A/1B/1C/1D) card and Riser 2B is operational.

Processor installation

For processor installation instructions, see the Dell EMC PowerEdge R640 Installation and Service Manual at Dell.com/Support/Manuals.

Chipset

The PowerEdge R640 systems use the Intel C620 chipset, which provides extensive I/O support.

The functions and capabilities of the Intel C620 chipset 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
- Enhanced Serial Peripheral Interface
- Flexible I/O - Allows some high-speed I/O signals to be configured as the PCIe root ports, the PCIe uplink for use with certain PCH, 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
- 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® QuickAssist Technology
- Intel® Trace Hub for debug

For more information, visit Intel.com

Memory

The PowerEdge R640 supports up to 1536 GB (RDIMM) or 3 TB (LRDIMMs) of memory (24 DIMMs), and at speeds up to 2666 MT/s, providing high performance in various applications. High memory density ensures that there is no compromise in virtualization.

The PowerEdge R640 supports both registered DIMMs (RDIMM) and load-reduced DIMMs (LRDIMMs), which use a buffer to reduce memory loading and provide greater density, allowing for the maximum platform memory capacity.

> 📝 NOTE: Mixing of DIMM types is not supported - either the platform is populated with all RDIMMs, or all LRDIMMs. Maximum two types of DIMMs allowed per system and only NVDIMM-Ns and RDIMMs are supported. NVDIMM-Ns are only supported on CPU 1 and CPU 2, that is, six per CPU with a total of 12. RDIMM with LRDIMM and LRDIMM with NVDIMM-N cannot be mixed.

The system supports:

- Up to six channels with two DPC and total 24 DIMMs
- DDR4 RDIMM/LRDIMM/NVDIMM-N
- Only registered ECC DDR4 DIMMs
- DDR4 speeds up to 2666 MT/s

DIMMs supported

Table 6. Memory technologies

Feature	RDIMM	LRDIMM	NVDIMM-N
Register	Yes	Yes	Yes
Buffer	No	Yes	No
Frequencies	Up to 2666 MT/s	Up to 2666 MT/s	Up to 2666 MT/s
Ranks supported	Single or dual rank	Quad rank	Single rank
Capacity per DIMM	4 GB, 8 GB, 16 GB, 32 GB or 64 GB	32 GB or 128 GB	16 GB
Maximum DIMMs per channel	2	1, 2	1x NVDIMM-N for each channel Or Combined 2x (NVDIMM-N +RDIMM) for each channel
DRAM technology	x4 or x8	x4	x4
Temperature sensor	Yes	Yes	Yes
Error Correction Code (ECC)	Yes	Yes	Yes
Single Device Disable Code (SDDC)	Yes	Yes	Yes
Address parity	Yes	Yes	Yes

Memory configurations

The PowerEdge R640 systems support flexible memory configurations ranging from capacities of 8 GB (minimum), to 3 TB (maximum). The PowerEdge R640 supports up to 12 DIMMs per processor—up to 24 DIMMs in a dual-processor configuration. Each system has six memory channels per processor, with each channel supporting up to two DIMMs.

Memory population guidelines

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

- Speed: If DIMMs of different speeds are mixed, all channels across all processors operate at the common frequency of the slowest DIMM.
- DIMM type: Maximum two types of DIMMs allowed per system and only NVDIMM-Ns and RDIMMs are supported. RDIMM with LRDIMM and LRDIMM with NVDIMM-N cannot be mixed.
- DIMMs with different data widths can be mixed. For 14G, DIMMs with x4 and x8 data widths are supported and mixing is allowed.
- 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

For more information on memory configuration and population, see the Dell EMC PowerEdge R640 Installation and Service Manual at Dell.com/Support/Manuals.

Memory RAS features

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

Table 7. Supported 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 scans the system memory, detecting and repairing correctable errors.
Recovery from Single Device Data Correction (SDDC)	Single Device Data Correction provides error checking and correction that protects against any single memory chip failure and multi-bit errors from any portion of a single memory chip.
Failed DIMM isolation	This feature helps identify a specific failing DIMM channel pair, 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 intrasocket memory fails. The mirrored copy of the memory is stored in memory of the same processor socket.
Memory address parity protection	This feature helps detect transient errors on the address lines of the DDR channel.

Feature	Description
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.

For information on memory mirroring and sparing configurations, see the Dell EMC PowerEdge R640 Installation and Service Manual at Dell.com/Support/Manuals.

Storage

The PowerEdge R640 provides scalable storage that allows you to adapt to your workload and operational requirements. With comprehensive storage options, the PowerEdge R640 offers 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, PERC H740p, and H840 RAID controllers provide vastly accelerated performance compared to the previous technologies.

Storage controllers

The new PERC Controller offerings is a heavy leverage of previous generation PERC family. The Value Performance level controllers, carried-over from previous generation to PowerEdge R640, are a high-end offering that drives Input/Output Operations Per Second (IOPs) performance and enhance the SSD performance.

> ✎ NOTE: On-board SATA ports (S140) are not accessible if mini PERC is installed.

Table 8. PERC series controller offerings

Performance Level	Controller and Description
Entry	S140—SATA, NVMe
	(SW RAID) SATA, NVMe
Value	HBA330—Internal, 12 Gbps SAS HBA—External
	H330, 12 Gbps SAS HBA—External
Value Performance	H730P
Premium Performance	H740P, H840

Supported drives

Table 9. Supported drives - SAS and SATA

Form Factor	Type	Speed	Rotational Speed	Capacities
2.5 inches	SATA, SSD	6 Gb	N/A	240 GB, 400 GB, 480 GB, 800 GB, 960 GB, 1.6 GB, 1.9 GB, 3.2 GB, 3.8 GB
	SATA	6 Gb	7.2 K	1 TB, 2 TB
	SAS	12 Gb	7.2 K	1 TB, 2 TB, 2 TB—SED FIPS
	SAS, SSD	12 Gb	N/A	400 GB, 480 GB, 800 GB, 960 GB, 1.6 GB, 1.9 GB, 3.8 GB, 800 GB(SED FIPS), 1.6 GB —SED FIPS
	SAS	12 Gb	10 K	300 GB, 600 GB, 1.2 TB, 1.8 TB, 2.4 TB, 1.2 TB(SED FIPS), 2.4 TB—SED FIPS

Form Factor	Type	Speed	Rotational Speed	Capacities
	SAS	12 Gb	15 K	300 GB, 600 GB, 900 GB, 900 GB—SED FIPS
3.5 inches	SATA	6 Gb	7.2 K	1 TB, 2 TB, 4 TB, 8 TB, 10 TB, 12 TB
	SAS	12 Gb	7.2 K	1 TB, 2 TB, 4 TB, 8 TB, 10 TB, 4 TB (SED FIPS), 8 TB—SED FIPS

Table 10. Supported drives - NVMe SSD

NVMe SSD drives description
800 GB 2.5-inch Device
1.6 TB 2.5-inch Device
3.2 TB 2.5-inch Device
KIT, CRD, NVM, 1.6, HHHL, PM1725
KIT, CRD, CTL, NVME, PM1725
KIT, CRD, NVM, 3.2, HHHL, PM1725

External storage

PowerEdge R640 supports the external storage device types listed in the table below.

Table 11. External storage

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

IDSDM or vFlash card

In the PowerEdge R640 system, the IDSDM module contains the Internal Dual SD Module (IDSDM) and vFlash card that are combined into a single card module. The following are options available for PowerEdge R640 system:

- vflash only
- IDSDM only
- vflash + IDSDM

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

The IDSDM with vFlash module has a dedicated slot at the back of the system chassis. This is a Dell EMC-proprietary PCIe x1 slot that uses a USB 3.0 interface to host. In the PowerEdge R640 systems, the IDSDM and vFlash card size changes from SD to microSD and the supported capacity for IDSDM microSD cards are 16 GB, 32 GB, or 64 GB, while for vFlash the capacity is 16 GB only. The write-protect switch is built onboard on the IDSDM module.

Optical drives

The PowerEdge R640 supports one of the following internal optical drive options:

- DVD-ROM
- DVD+ROM

Tape drives

The R640 does not support internal tape drives, however, external tape backup devices are supported.

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 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 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 8 Gb FC tape drives
- ML6000 with LTO-5, LTO-6, 6 Gb SAS tape drives
- ML6000 with LTO-5, LTO-6, LTO-7 8 Gb FC tape drives

Networking and PCIe

The PowerEdge R640 offers balanced, scalable I/O capabilities, including integrated PCIe 3.0-capable expansion slots. Dell EMC Network Daughter Cards allow you to choose the right network fabric without using up a valuable PCI slot. You can pick the speed, technology, vendor, and other options, such as switch-independent partitioning, which allows you to share and manage bandwidth on 10 GbE connections.

PCIe expansion cards

The PowerEdge R640 system has one standard PCIe connector and four Speededge connectors.

The PowerEdge R640 system has the following four riser cards:

- Right Riser 1A - One x16 PCIe Gen3 for low-profile cards on left side and one x16 PCIe Gen3 for low-profile card on right side – connected to CPU1—Top and bottom
- Right Riser 1B - One x16 PCIe Gen3 for low-profile card on left side – connected to CPU1—Top and bottom
- Left Riser 2A - One x16 PCIe Gen3 for low-profile cards - connected to CPU2.
- Left Riser 2B - One x16 PCIe Gen3 for full-height cards, may be used for full-height 3/4 length PCIe cards - connected to CPU2.

With all the risers, the PowerEdge R640 system board provides one x8 PCIe Gen3 slot for dedicated storage controller card connected to the CPU1 and one x8 PCIe Gen3 slot for dedicated NDC connected to the CPU1.

PCIe expansion card riser configurations

Table 12. PCIe expansion card riser configurations for PowerEdge R640

Expansion card riser	PCIe slots on the riser	Height	Length	Link
Riser 1A	Slot 2	Low Profile	Half Length	x16
	Slot 1	Low Profile	Half Length	x16
Riser 1B	Slot 1	Low Profile	Half Length	x16
Riser 2A	Slot 3	Low Profile	Half Length	x16
Riser 2B	Slot 2	Full Height	3/4 Length	x16

PCIe expansion cards

Table 13. Optional add-in PCIe expansion cards for PowerEdge R640

Type	Adapter
NIC	• Intel PRO/1000 PT Dual Port Server Adapter, Gigabit, Copper, PCI-E x4 • Intel PRO/1000 VT Quad Port Server Adapter, Gigabit, Copper, PCI-E x4 • Intel 10GBase-T Copper Single Port NIC, PCI-E x8 • Intel Single Port Server Adapter, 10 Gigabit, SR Optical, PCI-E x8 • Broadcom® BMC57710 10Base-T Cooper Single Port NIC, PCI-E x8 • Broadcom® BMC5709C IPV6 Gigabit Copper Dual Port NIC with TOE and iSCSI Offload, PCI-E x4 • Broadcom® BMC5709C IPV6 Gigabit Copper Dual Port NIC with TOE, PCI-E x4

Type	Adapter
	• Broadcom® NetXtreme® II 57711 Dual Port Direct Attach 10 Gb Ethernet PCI-Express Network Interface Card with TOE and iSCSI Offload
	• Intel® Gigabit ET Dual Port Server Adapter
	• Intel® Gigabit ET Quad Port Server Adapter
	• Broadcom 10 GbE NIC, Broadcom Dual Port 10 GbE SFP+
	• Mellanox ConnectX-3, Single Port, VPI FDR, QSFP+ Adapter, Low Profile
	• Mellanox ConnectX-3 Pro Dual Port 10 GbE SFP+ PCIE Adapter, Full Height
	• Mellanox ConnectX-3 Pro Dual Port 10 GbE SFP+ PCIE Adapter, Low Profile
	• Mellanox ConnectX-3 Pro Dual Port 40 GbE QSFP+ PCIE Adapter, Full Height
	• Mellanox ConnectX-3 Pro Dual Port 40 GbE QSFP+ PCIE Adapter, Low Profile
	• Mellanox ConnectX-4 Single Port, EDR, VPI QSFP28 Full Height Network Adapter
	• Mellanox ConnectX-4 Single Port, EDR, VPI QSFP28 Low Profile Adapter
	• Mellanox ConnectX-4 Dual Port, EDR, VPI QSFP28 Full Height Network Adapter
	• Mellanox ConnectX-4 Dual Port, EDR, VPI QSFP28 Low Profile Adapter
	• Mellanox ConnectX-4 Lx Dual Port 25GbE DA/SFP Network Adapter
	• Mellanox ConnectX-4 Lx Dual Port 25GbE DA/SFP Network Adapter, Low Profile
	• Mellanox ConnectX-4 Dual Port 100GbE QSFP28 PCIe Adapter, Full Height
	• Mellanox ConnectX-4 Dual Port 100GbE QSFP28 PCIe Adapter, Low Profile
HBA	• QLogic® QLE 2462 FC4 Dual Port 4 Gbps Fiber Channel HBA
	• QLogic® QLE 220 FC4 Single Port 4 Gbps Fiber Channel HBA
	• QLogic® QLE 2460 FC4 Single Port 4 Gbps Fiber Channel HBA
	• QLogic® QLE 2562 FC8 Dual-channel HBA, PCI-E Gen 2 x4
	• QLogic® QLE 2560 FC8 Single-channel HBA, PCI-E Gen 2 x4
	• Emulex® LPe-1150 FC4 Single Port 4 Gbps Fiber Channel HBA, PCI-E x4
	• Emulex® LPe-11002 FC4 Dual Port 4 Gbps Fiber Channel HBA, PCI-E x4
	• Emulex® LPe-12000, FC8 Single Port 4 Gbps Fiber Channel HBA, PCI-E Gen 2 x4
	• Emulex® LPe-12002, FC8 Dual Port 4 Gbps Fiber Channel HBA, PCI-E Gen 2 x4
CNA	• QLogic: QLE8152 HBA (10 GbE – 2 Port, PCIe Gen 2) – FCoE—Thunder Mountain Q
	• Emulex: OCE10102FM HBA (10 GbE – 2 Port, PCIe Gen 2) - FCoE—Thunder Mountain E
	• Emulex: OCE10102IM HBA (10 GbE – 2 Port, PCIe Gen 2 – iSCSI) - iSCSI—Thunder Mountain E
	• Broadcom 57711 NIC (10 GbE - 2 Port, PCIe Gen2) – iSOE—Punisher
	• Intel DT (10 GbE – 2 Port, PCIe Gen 2) – FCoE—Spring Fountain
	• Intel DT (10 GbE – 2 Port, PCIe Gen 2) – FCoE—Iron Pond

For the latest information on all supported add-in PCIe expansion cards for the PowerEdge R640, visit the PowerEdge R640 page at Dell.com.

For more information on server network adapters, visit www.dell.com/us/business/p/networking-cards.

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.

Power consumption and energy efficiency

With the rise in the cost of energy 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 14. 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. For more information, see the *Power supply units* section.
Tools for right-sizing	Enterprise Infrastructure Planning Tool (EIPT) is a tool that helps you plan and tune your computer and infrastructure equipment for maximum efficiency by calculating hardware power consumption, power infrastructure and storage. Learn more at Dell.com/calc.
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 systems management tools such as OpenManage Power Center and iDRAC9 with an Enterprise license can be used to set a power limit for your server. This limits the output of a PSU and reduce system power consumption and help in constrained power situations.
Systems management	The integrated Dell Remote Access Controller 9 (iDRAC9) with Lifecycle Controller is embedded within every Dell EMC PowerEdge™ server and provides functionality that helps IT administrators deploy, update, monitor, and maintain servers with no need for any additional software to be installed. iDRAC functions regardless of operating system or hypervisor presence because from a pre-OS or bare-metal state, iDRAC is ready to work because it is embedded within each server from the factory.
Active power management	Dell EMC offers a complete power management solution accessed through the iDRAC9 with Enterprise licensing and OpenManage Power Center to implement policy-based management of power and thermal levels at the individual system, rack, or data center level. Hot spares reduce 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.

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.

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.

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 15. 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 rail offerings for the R640 system consist of two types of rails—sliding and static.

The sliding rails allow the system to be fully extended out of the rack for service. They are available with or without the optional cable management arm (CMA).
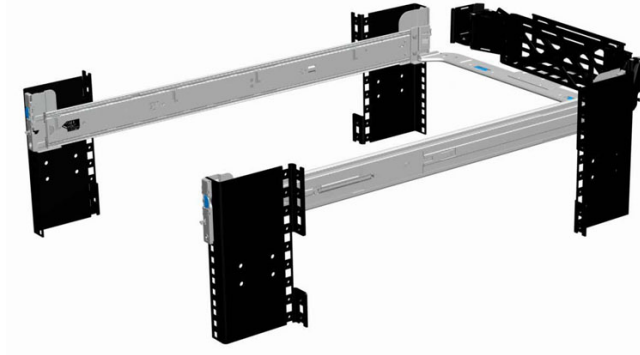
Figure 10. Sliding rails

The static rails support a wider variety of racks than the sliding rails. However, they do not support serviceability in the rack and are thus not compatible with the CMA.
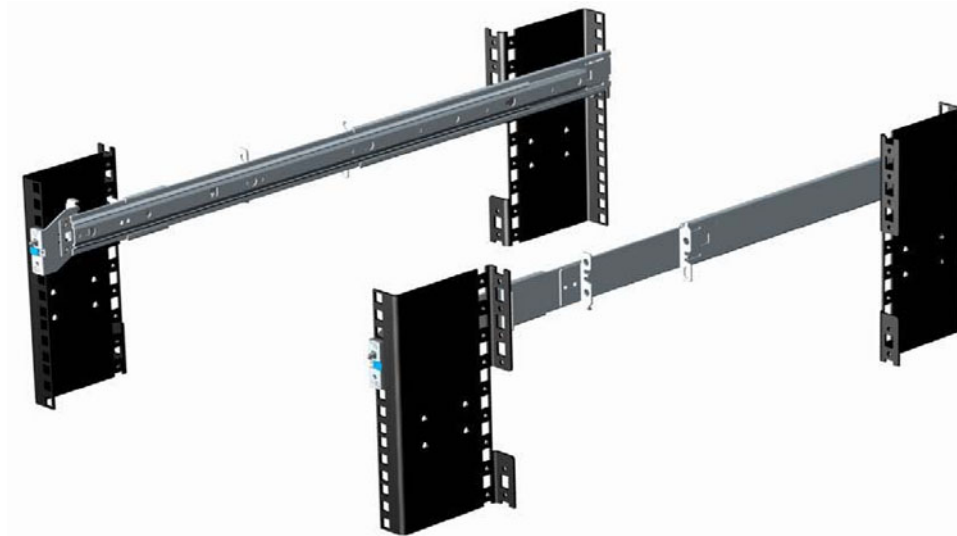
Figure 11. Static rails

One key factor in selecting the proper rails is identifying the type of rack in which they are installed. Both the sliding rails and the static rails support tool-less mounting in 19 inch-wide, EIA-310-E-compliant square hole and unthreaded round hole 4-post racks. Both also support tooled mounting in threaded hole 4-post racks, but only the static rails, as the more universal solution, support mounting in 2-post (Telco) racks.

Table 16. Static and sliding rails

Sliding and static rail								
Product	Rail identifier	Mounting interface	Rail type	Rack types supported				
				4-Post			2-Post	
				Square	Round	Thread	Flush	Center
R640	B6	ReadyRails II	Sliding	√	√	√	X	X
	B4	ReadyRails	Static	√	√	√	√	√

Screws are not included in either kit as threaded racks are offered with various thread designations. Users must therefore provide their own screws when mounting the rails in threaded racks.

> **NOTE: Screw head diameter for the sliding rails must be 10 mm or less.**

Other key factors governing proper rail selection include the following:

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

The static rails offer a greater adjustability range and a smaller overall mounting footprint than the sliding rails. This is because of their reduced complexity and lack of need for CMA support.

Table 17. Static rails adjustability

Product	Rail identifier	Rail type	Rail adjustable range (mm) Rack types supported						Rail depth—mm	
			Square		Round		Threaded		Without CMA	With CMA
			Min	Max	Min	Max	Min	Max		
R640	B6	Sliding	630	883	616	876	630	897	714	845
	B4	Static	608	879	594	872	604	890	622	N/A

The adjustment range of the rails is a function of the type of rack in which they are being mounted. The Min/Max values listed above represent the allowable distance between the front and rear mounting flanges in the rack. Rail depth without the CMA represents the minimum depth of the rail with the outer CMA brackets removed (if applicable) as measured from the front mounting flanges of the rack.

Dell EMC OpenManage systems management

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

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

The Dell EMC OpenManage Portfolio

Simplifying hardware management through ease of use, intelligent automation and integrated security

One-to-many consoles

Consoles
- OpenManage Enterprise
- OpenManage Essentials
- OpenManage PowerCenter

One size doesn't size fit all – use the best tool for the job

Tools
- OpenManage Mobile
- Repository Manager
- Standards-based APIs
- RACADM CLI

Protect your investments

Integrations and Connections
- MS System Center
- VMware vCenter
- Red Hat Ansible
- Nagios, IBM, HPE etc.

Work better together

Dell Services
- ProSupport Plus Services with SupportAssist
- OME deployment

Server Element Managers

Discover/Inventory Configure/Deploy Update Monitor Maintain

Enabled by iDRAC with Lifecycle Controller, iDRAC Service Module (iSM)

Chassis Management Controller (CMC)

RACK   TOWER   MODULAR

Figure 12. Server lifecycle management operations

OpenManage systems management

The Dell EMC OpenManage systems management portfolio includes powerful hardware and software management tools and consoles. OpenManage simplifies the lifecycle of deploying, updating, monitoring and maintaining your Dell EMC PowerEdge servers.

iDRAC with Lifecycle controller

The integrated Dell Remote Access Controller 9 (iDRAC9) with Lifecycle Controller is embedded within every Dell EMC PowerEdge server and provides functionality that helps IT administrators deploy, update, monitor, and maintain servers with no need for any additional software to be installed. iDRAC functions regardless of operating system or hypervisor presence because from a pre-OS or bare-metal state, iDRAC is ready to work because it is embedded within each server from the factory.

iDRAC features and comparison

The R640 supports the following iDRAC licenses – Basic (default), Express (upgrade) and Enterprise (upgrade).

> NOTE: The features listed in bold in the below table are new for iDRAC9.

Table 18. iDRAC feature comparison

Features	iDRAC8 Basic	iDRAC9 Basic	iDRAC8 Express	iDRAC9 Express	iDRAC8 Express for Blades	iDRAC9 Express for Blades	iDRAC8 Enterprise	iDRAC9 Enterprise
Interface/Standards								
Redfish	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
IPMI 2.0	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
DCMI 1.5	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Web-based GUI	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Racadm command line— local/remote	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
SMASH-CLP—SSH-only	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Telnet	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
SSH	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Serial redirection	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
WSMAN	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Network Time Protocol	No	No	Yes	Yes	Yes	Yes	Yes	Yes
Connectivity								
Shared NIC	Yes	Yes	Yes	Yes	N/A	N/A	Yes	Yes
Dedicated NIC	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
VLAN tagging	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
IPv4	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
IPv6	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
DHCP (new default; no static IP)	Yes	**Yes**	Yes	**Yes**	Yes	**Yes**	Yes	**Yes**
DHCP with Zero Touch	No	No	No	No	No	No	No	**Yes**
Dynamic DNS	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
OS pass-through	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Features	iDRAC8 Basic	iDRAC9 Basic	iDRAC8 Express	iDRAC9 Express	iDRAC8 Express for Blades	iDRAC9 Express for Blades	iDRAC8 Enterprise	iDRAC9 Enterprise
iDRAC Direct-Front panel USB	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Connection View	No	**Yes**	No	**Yes**	No	**Yes**	No	**Yes**
NFS v4	No	**Yes**	No	**Yes**	No	**Yes**	No	**Yes**
NTLM v1 and NTLM v2	No	**Yes**	No	**Yes**	No	**Yes**	No	**Yes**
Security								
Role-based authority	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Local users	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
SSL encryption	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
IP blocking	No	No	Yes	Yes	Yes	Yes	Yes	Yes
Directory services—AD, LDAP	No	No	No	No	No	No	Yes	Yes
Two-factor authentication	No	No	No	No	No	No	Yes	Yes
Single sign-on	No	No	No	No	No	No	Yes	Yes
PK authentication	No	No	Yes	Yes	Yes	Yes	Yes	Yes
FIPS 140-2	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Secure UEFI boot-certificate management	No	**Yes**	No	**Yes**	No	**Yes**	No	**Yes**
Lock down mode	No		No	No	No	No	No	**Yes**
Unique iDRAC default password	No	**Yes**	No	**Yes**	No	**Yes**	No	**Yes**
Customizable Security Policy Banner-login page	No	**Yes**	No	**Yes**	No	**Yes**	No	**Yes**
Quick Sync 2.0-optional auth for read operations	No	**Yes**	No	**Yes**	No	**Yes**	No	**Yes**
Quick Sync 2.0-add mobile device number to LCL	No	**Yes**	No	**Yes**	No	**Yes**	No	**Yes**
Remote Presence								
Power control	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Boot control	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Serial-over-LAN	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Virtual Media	No	No	No	No	Yes	Yes	Yes	Yes
Virtual Folders	No	No	No	No	No	No	Yes	Yes
Remote File Share	No	No	No	No	No	No	Yes	Yes
Virtual Console	No	No	No	No	Yes	Yes	Yes	Yes
HTML5 access to virtual console	No	No	No	No	Yes	Yes	Yes	Yes

Features	iDRAC8 Basic	iDRAC9 Basic	iDRAC8 Express	iDRAC9 Express	iDRAC8 Express for Blades	iDRAC9 Express for Blades	iDRAC8 Enterprise	iDRAC9 Enterprise
VNC connection to OS	No	No	No	No	No	No	Yes	Yes
Quality/bandwidth control	No	No	No	No	No	No	Yes	Yes
Virtual Console collaboration—6 users	No	No	No	No	No	No	Yes	Yes
Virtual Console chat	No	No	No	No	No	No	Yes	Yes
Virtual Flash partitions	No	No	No	No	No	No	Yes	Yes
Group manager	No	No	No	No	No	No	No	**Yes**
HTTP/HTTPS support along with NFS/CIFS	No	**Yes**	No	**Yes**	No	**Yes**	No	Yes
Power and Thermal								
Real-time power meter	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Power thresholds & alerts	No	No	Yes	Yes	Yes	Yes	Yes	Yes
Real-time power graphing	No	No	Yes	Yes	Yes	Yes	Yes	Yes
Historical power counters	No	No	Yes	Yes	Yes	Yes	Yes	Yes
Power capping	No	No	No	No	No	No	Yes	Yes
Power Center integration	No	No	No	No	No	No	Yes	Yes
Temperature monitoring	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Temperature graphing	No	No	Yes	Yes	Yes	Yes	Yes	Yes
Health Monitoring								
Predictive failure monitoring	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
SNMPv1, v2 and v3—traps and gets	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Email alerting	No	No	Yes	Yes	Yes	Yes	Yes	Yes
Configurable thresholds	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Fan monitoring	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Power Supply monitoring	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Memory monitoring	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
CPU monitoring	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
RAID monitoring	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
NIC monitoring	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
HD monitoring—enclosure	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Out of Band Performance Monitoring	No	No	No	No	No	No	Yes	Yes
Alerts for excessive SSD wear	No	**Yes**	No	**Yes**	No	**Yes**	No	**Yes**

Features	iDRAC8 Basic	iDRAC9 Basic	iDRAC8 Express	iDRAC9 Express	iDRAC8 Express for Blades	iDRAC9 Express for Blades	iDRAC8 Enterprise	iDRAC9 Enterprise
Customizable settings for Exhaust Temperature	No	**Yes**	No	**Yes**	No	**Yes**	No	**Yes**
Update								
Remote agent-free update	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Embedded update tools	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sync with repository—scheduled updates	No	No	No	No	No	No	Yes	Yes
Auto update	No	No	No	No	No	No	Yes	Yes
Improved PSU firmware updates	No	**Yes**	No	**Yes**	No	**Yes**	No	**Yes**
Deployment and Configuration								
Local configuration via F10	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Embedded OS deployment tools	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Embedded configuration tools	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
AutoDiscovery	No	No	Yes	Yes	Yes	Yes	Yes	Yes
Remote OS deployment	No	No	Yes	Yes	Yes	Yes	Yes	Yes
Embedded driver pack	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Full configuration inventory	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Inventory export	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Remote configuration	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Zerotouch configuration	No	No	No	No	No	No	Yes	Yes
System Retire/Repurpose	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Server Configuration Profile in GUI	No	**Yes**	No	**Yes**	No	**Yes**	No	**Yes**
Diagnostics, Service and Logging								
Embedded diagnostic tools	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Part Replacement	No	No	Yes	Yes	Yes	Yes	Yes	Yes
Server Configuration Backup	No	No	No	No	No	No	Yes	Yes
Server Configuration Restore	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Easy Restore—system configuration	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Easy Restore Auto Timeout	No	**Yes**	No	**Yes**	No	**Yes**	No	**Yes**

Features	iDRAC8 Basic	iDRAC9 Basic	iDRAC8 Express	iDRAC9 Express	iDRAC8 Express for Blades	iDRAC9 Express for Blades	iDRAC8 Enterprise	iDRAC9 Enterprise
LED health status indicator	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
LCD screen—iDRAC9 requires optional bezel	**Yes**	**Yes**	**Yes**	**Yes**	N/A	N/A	**Yes**	**Yes**
Quick Sync—require NFC bezel (13 G only)	Yes	No	Yes	No	N/A	No	Yes	No
Quick Sync 2.0—requires BLE/WiFi hardware	No	**Yes**	No	**Yes**	No	N/A	No	**Yes**
iDRAC Direct—front USB mgmt port	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
iDRAC Service Module (iSM) embedded	No	**Yes**	No	**Yes**	No	**Yes**	No	**Yes**
iSM to inband alert forwarding to consoles	No	**Yes**	No	**Yes**	No	**Yes**	No	**Yes**
Crash screen capture	No	No	Yes	Yes	Yes	Yes	Yes	Yes
Crash video capture	No	No	No	No	No	No	Yes	Yes
Boot capture	No	No	No	No	No	No	Yes	Yes
Manual reset for iDRAC— LCD ID button	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Remote reset for iDRAC— requires iSM	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Virtual NMI	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
OS watchdog	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
SupportAssist Report— embedded	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
System Event Log	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Lifecycle Log	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Enhanced logging in the Lifecycle controller log	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Work notes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Remote Syslog	No	No	No	No	No	No	Yes	Yes
License management	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Improved customer experience								
iDRAC -Faster processor, more memory	No	**Yes**	No	**Yes**	No	**Yes**	No	**Yes**
GUI rendered in HTML5	No	**Yes**	No	**Yes**	No	**Yes**	No	**Yes**
Add BIOS configuration to iDRAC GUI	No	**Yes**	No	**Yes**	No	**Yes**	No	**Yes**

Features	iDRAC8 Basic	iDRAC9 Basic	iDRAC8 Express	iDRAC9 Express	iDRAC8 Express for Blades	iDRAC9 Express for Blades	iDRAC8 Enterprise	iDRAC9 Enterprise
iDRAC support for SW RAID licensing	No	**Yes**	No	**Yes**	No	**Yes**	No	**Yes**

Agent-free management

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

Agent-based management

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

Dell EMC consoles

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

Dell EMC OpenManage Essentials

OpenManage Essentials is the one-to-many management console for monitoring Dell HW infrastructure including server, storage and networking, as well as for lifecycle management of PowerEdge servers. It support Windows, Linux, VMware, and HyperV environments. OME provides a simple and easy interface for system administrators to maximize the uptime and health of Dell systems. It helps to

- Monitor health status and events for PowerEdge servers, EqualLogic or MD series storage, and PowerConnect and Force 10 switches.
- Provide hardware-level control and management for PowerEdge server, blade system, and internal storage arrays.
- Link and Launch element management interfaces, such as, iDRAC, CMC, EQL group manager etc
- Integrate with the following Dell solutions:

  – Dell Repository Manager : Builds customized server update baselines that OpenManage Essentials can use.
  – OpenManage Power Center : Optimize power consumption in the servers.
  – SupportAssist : Enables automatic hardware failure notification to be sent securely to Dell technical support for intelligent analysis and diagnosis to optimize availability and reduce manual intervention. This solution is available as part of Dell ProSupport and ProSupport Plus at no additional cost.
- Provide REST interface API support for 3rd Party Integration.
- Manage Server Configuration - it is a fee-based license available on Dell's 14th generation of PowerEdge servers with iDRAC Enterprise or iDRAC Express licenses. The key features include the following:

  – Configure a server or chassis using a template and deploying an operating system on the PowerEdge bare metal servers.
  – During a server operation, automatically detect and notify any server or chassis drift from a customer-defined baseline configuration.
  – Boot a system from a network-mounted ISO using iDRAC.
  – Replicate of FN-IOM and M-IOA configurations within M1000e chassis.
  – Support VLAN Management for FN-IOM and M-IOA.

- For more information, see delltechcenter.com/OME

OpenManage Mobile

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

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

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

If you are remote, you can access iDRAC over a secure IP network. If you are at-the-server, an iDRAC can be accessed directly by tapping an NFC-enabled android mobile device on a PowerEdge "Quick Sync" bezel to perform several basic bare-metal configuration tasks such as assigning an IP address, and changing server credentials or the boot order.

Key Features of OpenManage Mobile (When connected through OpenManage Essentials console):

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

Key Features of OpenManage Mobile (When connected through iDRAC):

- Connect to any 14th gen, 13th gen, or 12th gen server remotely
- Access 14th gen rack or tower server through Quick Sync 2 module.
- Assign IP address, change credentials, and update common BIOS attributes for Bare Metal Configuration
- Configure one server manually, or multiple servers simultaneously through a template.
- Browse server details, health status, hardware & firmware inventory, networking details, and System Event or LC logs. Share this information easily with other IT Administrators.
- Access SupportAssist reports, Last Crash screen and video (PowerEdge 14th gen servers)
- Access Virtual Console (and reduce the need for crash carts).
- Power On, Shut down, or Reboot your server from anywhere.
- Run any RACADM command

OpenManage Power Center

OpenManage Power Center is a one-to-many application that can read power usage and thermal readings information from Dell EMC servers, Power Distribution Units (PDU), and Uninterruptible Power Supplies (UPS). It can aggregate this information into rack, row, and room-level views. On servers with iDRAC Enterprise license, you can also cap or throttle the power consumption. You may need to set power caps to reduce the power consumption due to external events such as brownouts or failures of data-center cooling devices. You can also use power capping to safely increase the numbers of servers in a rack to match the power that is provisioned for that rack.

For more information, see OpenManage Power Center User's Guide available at **Dell.com/openmanagemanuals**.

Dell EMC OpenManage systems management tools, utilities and protocols

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

Dell EMC Repository Manager:

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

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

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

Dell EMC Repository Manager can create the following deployment tools:

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

For more information, see Dell EMC Repository Manager User's Guide available at **Dell.com/support/manuals**.

Dell Update Packages

Dell Update Packages (DUP) is a self-contained executable supported by Microsoft Windows or Linux that updates a component on a server and applications like OMSA, iSM, and DSET.

DUPs can be executed in GUI or in CLI mode.

For more information, see Dell EMC Update Packages User's Guide available at www.delltechcenter.com/DSU.

Dell Remote Access Controller Administration (RACADM) CLI

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

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

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

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

iDRAC with Lifecycle Controller Embedded Management APIs

iDRAC with Lifecycle Controller provides a range of standards-based applications programming interfaces (APIs) that enable scalable and automated management of PowerEdge servers. Standard systems management APIs have been developed by organizations such as the Institute of Electrical and Electronics Engineers (IEEE) and Distributed Management Task Force (DMTF). These APIs are

widely used by commercial systems management products and by custom programs and scripts developed by IT staff to automate management functions such as discovery, inventory, health status checking, configuration, update, and power management. The APIs supported by iDRAC with Lifecycle Controller include:

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

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

Integration with third-party consoles

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

OpenManage Integration Suite for Microsoft System Center

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

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

OpenManage Integration for VMware vCenter

The OpenManage Integration for VMware vCenter allows you to monitor, provision, and manage PowerEdge server hardware and firmware. You can perform these tasks through a dedicated Dell menu that can be accessed directly through the VMware vCenter console. OMIVV also allows granular control and reporting for the hardware environment using the same role-based access control model as vCenter. The OpenManage Management Pack for vRealize Operations Manager is available with OMIVV v4.0 onwards. This helps in checking hardware health and alerting into vRealize operations, which also includes dashboard and reporting on the server environment.

You can manage and monitor Dell hardware within the virtualized environment

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

- Deploying enhanced options

For more information, see delltechcenter.com/omivv

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

BMC Software

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

OpenManage connections with third-party consoles

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

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

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

Dell EMC server management operations

Dell EMC OpenManage systems management is centered on automating the server management lifecycle — deploy, update, monitor and maintain. To manage an infrastructure properly and efficiently, you must perform all of these functions easily and quickly. iDRAC9 with Lifecycle Controller technology provides you with these intelligent capabilities embedded within the server infrastructure. This allows you to invest more time and energy on business improvements and less on maintenance.
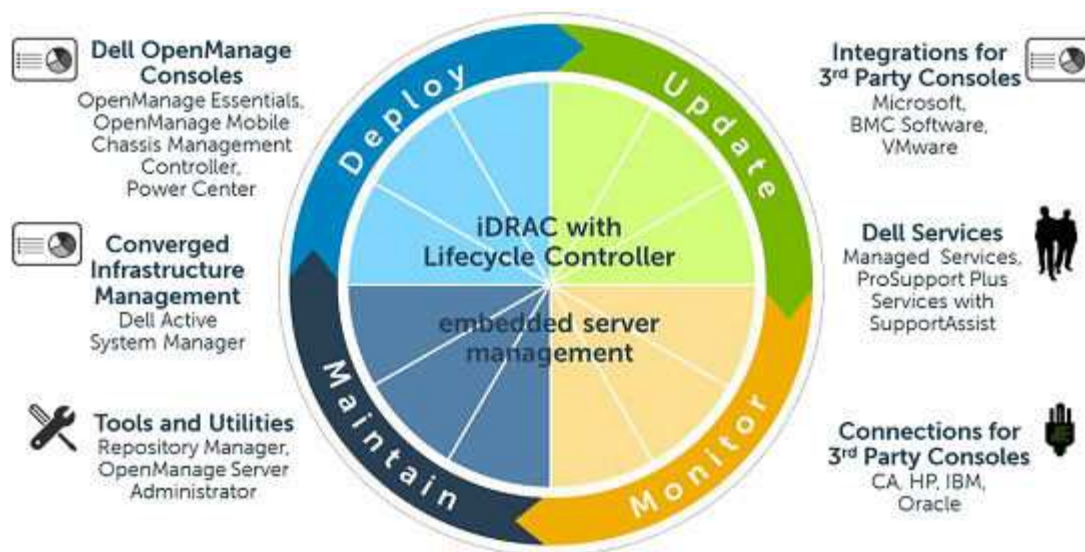

Figure 13. Systems management server lifecycle

Table 19. One-to-one and one-to-many operations

Operation	One-to-one	One-to-many
Deploy	- Lifecycle Controller GUI	- OpenManage Integration for VMware vCenter - OpenManage Integration for BMC BladeLogic

	• DTK	• OpenManage Integration for Microsoft System Center Configuration Manager
Update	• iDRAC9 with Lifecycle Controller • Repository Manager • DUP • SUU • OpenManage Integration for VMware vCenter	• Dell EMC OpenManage Essentials • OpenManage Integration for Microsoft System Center Configuration Manager
Monitor	• iDRAC9 with Lifecycle Controller • OMSA	• Dell EMC OpenManage Essentials • Dell EMC OpenManage Power Center • OpenManage Integration for VMware vCenter • OpenManage Integration for Microsoft System Center Operations Manager
Maintain	• iDRAC9 with Lifecycle Controller • IPMI	• Lifecycle Controller Remote Services Remediate and replace parts: • OpenManage Integration for Microsoft System Center Virtual Machine Manager (SCVMM) • Server Pro Management Pack and Lifecycle Controller Integration (DLCI)

For additional detailed information on Dell EMC systems management portfolio, visit Dell.com/OpenManage.

Appendix A. Additional specifications

Power supply specifications

The PowerEdge R640 systems support up to two AC or DC power supply units (PSUs).

Table 20. PSU specifications

PSU	Class	Heat dissipation —maximum	Frequency	Voltage	Current
495 W AC	Platinum	1908 BTU/hr	50/60 Hz	100–240 V AC, autoranging	6.5 A – 3 A
750 W AC	Platinum	2891 BTU/hr		100–240 V AC, autoranging	10 A – 5 A
750 W AC	Titanium	2843 BTU/hr		200–240 V AC, autoranging	5 A
750 W Mixed Mode HVDC— for China only	Platinum	2891 BTU/hr		100–240 V AC, autoranging	10 A – 5 A
1100 W AC	Platinum	4100 BTU/hr		100–240 V AC, autoranging	12 A – 6.5 A
1100 W Mixed Mode HVDC— for China and Japan only	Platinum	4100 BTU/hr		100–240 V AC, autoranging	12 A – 6.5 A
1600 W AC	Platinum	6000 BTU/hr		100–240 V AC, autoranging	10 A

Table 21. PSU specifications

PSU	Class	Heat dissipation— maximum	Frequency	Voltage	Current
750 W Mixed Mode HVDC—for China only	NA	2891 BTU/hr	50/60 Hz	240 V DC, autoranging	4.5 A
1100 W DC	NA	4416 BTU/hr		–(48–60) V DC, autoranging	32 A
1100 W Mixed Mode HVDC—for China and Japan only	NA	4100 BTU/hr		200–380 V DC, autoranging	6.4 A – 3.2 A

NOTE: Heat dissipation is calculated using the PSU wattage rating.

> **NOTE:** This system is also designed to connect to the IT power systems with a phase-to-phase voltage not exceeding 230 V.
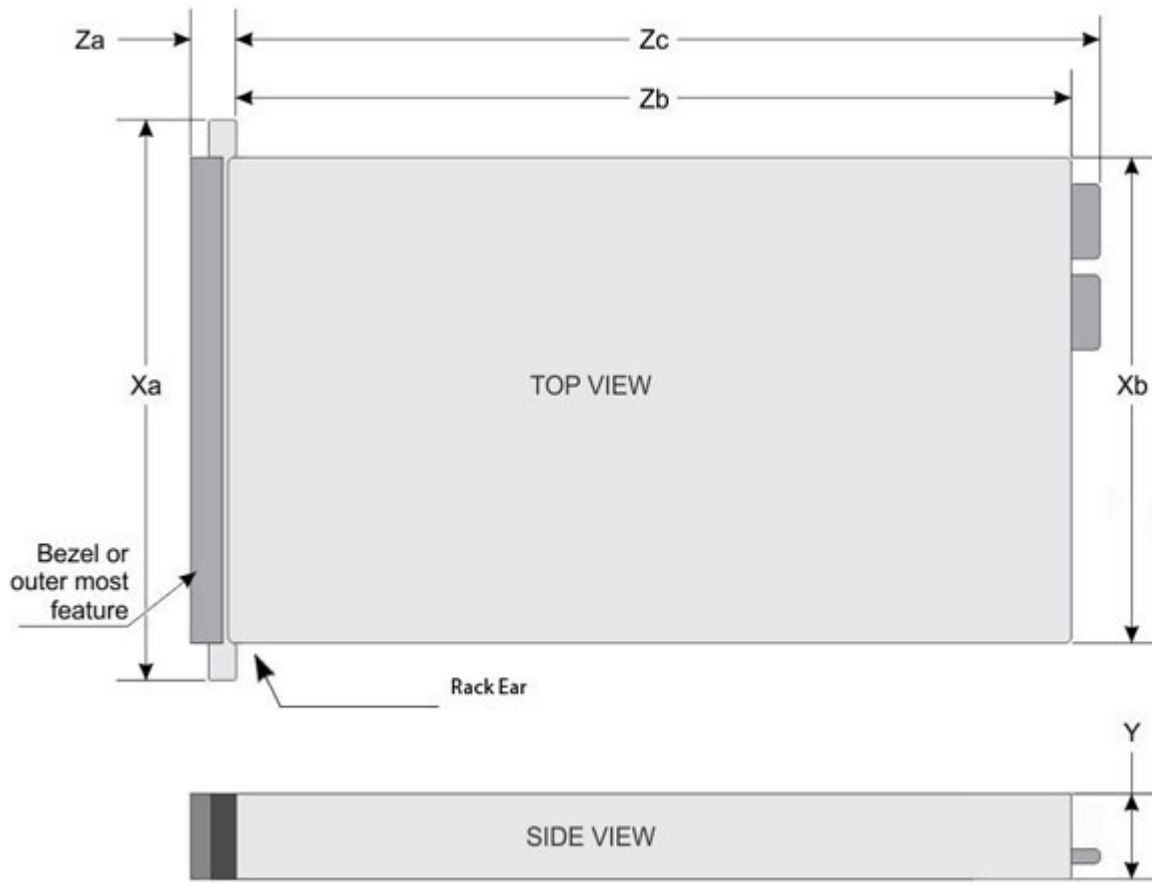
Chassis dimensions

Figure 14. Chassis dimensions for PowerEdge R640

Table 22. Dimensions

System	Xa	Xb	Y	Za—with bezel	Za—without bezel	Zb*	Zc
4 x 3.5 inches Or 10 x 2.5 inches	482.0 mm (18.97 inches)	434.0 mm (17.08 inches)	42.8 mm (1.68 inches)	35.84 mm (1.41 inches)	22.0 mm (0.87 inches)	733.82 mm (29.61 inches)	772.67 mm (30.42 inches)
8 x 2.5 inches	482.0 mm (18.97 inches)	434.0 mm (17.08 inches)	42.8 mm (1.68 inches)	35.84 mm (1.41 inches)	22.0 mm (0.87 inches)	683.05 mm (26.89 inches)	721.91 mm (28.42 inches)

Table 23. Chassis weight

Configuration	Maximum Weight
4 x 3.5 inch HDD	21.1 Kilograms
8 x 2.5 inch HDD	19.5 Kilograms
10 x 2.5 inch HDD	21.9 Kilograms

Environmental specifications

See Dell EMC PowerEdge R640 Installation and Service Manual on Dell.com/Support/Manuals for detailed environmental specifications.

Video specifications

The PowerEdge R640 systems support integrated Matrox G200eW3 graphics card with 16 MB video frame buffer.

Table 24. 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

Appendix B. Standards compliance

The system conforms to the following industry standards.

Table 25. 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 26. 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

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

Server Deployment Services

Our Server Deployment Services can maximize the value of your servers quickly using our expert server deployment engineers. With over 10,000 server deployment projects each year, we have experience, best practices, and comprehensive deployment tools to install, configure, and integrate your new solution optimally and correctly. Our deployment experts will assess your environment and understand your goals, then design and integrate your server solution for you.

Table 27. Server deployment capabilities

	Server Installation	Server Integration
Place single server in target workspace	Yes	
Rack, cable, and label servers	Yes	
Install image	Yes	
Connect to network	Yes	Yes
Test and validate connection	Yes	Yes
Install operating system		Yes
Install applications		Yes
Perform advanced configuration services		Yes
Remote configuration services		Yes
Virtualization		Yes
Converged infrastructure		Yes
Test and validate data center integration		Yes

Remote Consulting Services

When you are in the final stages of your PowerEdge server implementation, you can rely on Dell EMC Remote Consulting 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 gets up and running quickly and smoothly.

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 experts
- Collaborative support assistance with over 195 third-party vendors
- Hypervisor and operating system support
- Onsite parts and labor response options including next business day or four-hour mission critical

ProSupport Plus

When you purchase your PowerEdge server, we recommend ProSupport Plus, our proactive and preventative support for your business-critical systems. Dell EMC ProSupport Plus provides you with all the benefits of ProSupport, plus access to a dedicated Technical Account Manager and our elite ProSupport Plus engineers. ProSupport Plus gives you quick and efficient resolutions, working along with our SupportAssist technology that enables us to get ahead of issues in your environment before they become problems.

ProSupport Flex for Data Center

Dell EMC ProSupport Flex for Data Center offers flexible site-wide support for hyperscale data centers with more than 1,000 assets. Built on standard Dell EMC ProSupport components, Flex for Data Center leverages our global scale while being tailored to suit your needs. While not for everyone, it offers a flexible solution for those with large and complex environments. When you choose Dell EMC ProSupport Flex for Data Center, you will get:

- Enterprise-wide support that covers your entire data center.
- A dedicated Technical Account Manager with remote, on-site, part-time and full-time options.
- Dedicated elite ProSupport Flex technical and field engineers who are trained on your environment and configurations.
- Flexible on-site support and parts options that fit your operational model
- A tailored support plan 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[1] 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 service account management expert		●	●
Periodic assessments and recommendations		●	●
Monthly contract renewal and support history reporting		●	Monthly or Quarterly
Systems Maintenance guidance		Semiannual	Optional
Designated technical and field support teams			●

Next Business Day option available only on applicable legacy Dell products.

Figure 15. ProSupport Enterprise Suite comparison

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 16. ProSupport Enterprise Suite

Additional professional services

Dell EMC Education Services

Dell EMC 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.

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 you rapid insight into the root causes of unnecessary complexity. We seek better answers than traditional service models, and our strategy is to help you 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 you 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.