

Dell EMC PowerEdge T440

Technical Guide

Notes, cautions, and warnings

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

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

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

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List of Figures.....	5
List of Tables.....	6
1 System overview.....	8
Introduction.....	8
New technologies.....	8
2 System features.....	10
Product comparison.....	10
3 Chassis views and features.....	12
Front panel view and features.....	13
Back view of the system.....	14
Internal chassis view.....	16
Security features.....	17
4 Processors.....	18
Processor features.....	18
Supported processors.....	18
Chipset.....	19
5 Memory.....	21
Memory population guidelines.....	22
6 Storage.....	23
IDSDM or vFlash card.....	24
Boot Optimized Storage Subsystem (BOSS).....	24
Optical drives.....	24
7 Video.....	25
8 Networking and PCIe.....	26
PCIe expansion cards.....	26
9 Power, Thermal, and Acoustics.....	28
Power consumption and energy efficiency.....	28
Thermal and Acoustics.....	29
Power supply units.....	29
Acoustical design.....	29
10 Rack rails.....	31

11 Dell EMC OpenManage systems management.....	32
Server and Chassis Managers.....	33
Dell EMC consoles.....	33
Automation Enablers.....	33
Integration with third-party consoles.....	33
Connections for third-party consoles.....	33
Dell EMC Update Utilities.....	33
Dell resources.....	33
12 Appendix A. Additional specifications.....	35
PSU specifications.....	35
System dimensions.....	36
Chassis weight.....	37
Environmental specifications.....	37
Video specifications.....	39
USB ports.....	39
13 Appendix B. Standards compliance.....	40
14 Appendix C Additional resources.....	41
15 Appendix D. Support and deployment services	42
ProDeploy Enterprise Suite and Residency Services.....	42
ProDeploy Plus.....	42
ProDeploy.....	42
Basic Deployment.....	42
ProSupport Enterprise Suite.....	43
ProSupport Plus.....	43
ProSupport.....	43
ProSupport One for Data Center.....	44
Support Technologies.....	44
Additional professional services.....	45
Dell Education Services.....	45
Dell EMC Global Infrastructure Consulting Services.....	45
Dell EMC Managed Services.....	45

List of Figures

Figure 1. Front panel view of a 8 x 3.5-inch hot swappable drive system.....	13
Figure 2. Back view of the system with optional redundant cooling fan.....	15
Figure 3. Supported configurations for a PowerEdge T440 system.....	16
Figure 4. Dell EMC OpenManage Portfolio.....	32
Figure 5. Details the dimensions of the PowerEdge T440 system.....	36
Figure 6. ProDeploy Enterprise Suite capabilities.....	42
Figure 7. ProSupport Enterprise Suite.....	43
Figure 8. ProSupport One for Data Center model.....	44
Figure 9. SupportAssist model.....	44

List of Tables

Table 1. New technologies.....	8
Table 2. Feature comparison.....	10
Table 3. Front panel features	13
Table 4. Back view of the system features and description.....	15
Table 5. Security features.....	17
Table 6. Supported processors for PowerEdge T440	18
Table 7. Memory technologies.....	21
Table 8. DIMM performance details.....	21
Table 9. Supported RAS features.....	22
Table 10. PERC series controller offerings.....	23
Table 11. Supported drives—SAS and SATA.....	23
Table 12. Video specifications.....	25
Table 13. PCIe expansion card riser configurations for PowerEdge T440.....	26
Table 14. Optional add-in PCIe expansion cards for PowerEdge T440.....	26
Table 15. Power tools and technologies.....	28
Table 16. Acoustical performance.....	29
Table 17. Acoustical performance: Idle/operating at 25°C ambient.....	30
Table 18. Acoustical performance: Idle at 28°C ambient.....	30
Table 19. Acoustical performance: Max. loading at 35°C ambient.....	30
Table 20. Dell resources.....	33
Table 21. PSU specifications.....	35

Table 22. Dimensions of PowerEdge T440 system.....	36
Table 23. Chassis weight.....	37
Table 24. Temperature specifications.....	37
Table 25. Relative humidity specifications.....	37
Table 26. Maximum vibration specifications.....	37
Table 27. Maximum shock specifications.....	37
Table 28. Maximum altitude specifications.....	37
Table 29. Operating temperature de-rating specifications.....	38
Table 30. Standard operating temperature specifications.....	38
Table 31. Expanded operating temperature specifications.....	38
Table 32. Particulate contamination specifications.....	38
Table 33. Gaseous contamination specifications.....	39
Table 34. Video specifications.....	39
Table 35. USB specifications.....	39
Table 36. Industry standard documents.....	40
Table 37. Additional resources.....	41

System overview

The Dell EMC PowerEdge T440 tower server delivers powerful 2-socket performance, expandability and quiet operations to your small-to mid-sized business (SMB) and remote office/branch office (ROBO) sites. The T440 brings you flexibility with a rackable tower form factor, short 22-inch depth and quiet acoustics that are right for your office or data center.

The PowerEdge T440 is an excellent fit for a wide range of office workloads, including work group collaboration and productivity applications, mail and messaging, file and print serving, and web serving.

Topics:

- [Introduction](#)
- [New technologies](#)

Introduction

The PowerEdge T440 is Dell EMC's latest 2-socket, rackable tower (5U rack) server is a powerful general-purpose platform capable of handling demanding workloads and applications. In addition, the T440 also provides extraordinary storage capacity options, making it well-suited for data-intensive applications that require greater storage, while not sacrificing I/O performance.

The systems feature the 2nd Generation Intel® Xeon® Processor Scalable family with up to 16 DIMMs, PCI Express® (PCIe) 3.0 enabled expansion slots.

Very large internal storage capacity for this class of server - up to 8 x 3.5 -inch HDD or 16 x 2.5 -inch HDD - allows storage inside the chassis, eliminating the need to acquire, cable, power and manage an external storage device.

Virtualization-ready with up to 2 powerful processors, large memory capacity (16 DDR4 DIMMs) and 5 PCIe Gen3 I/O slots for data transfer, and Failsafe Hypervisor protection.

Simplified, intuitive systems management that saves time, save money, and reduces potential for error.

The T440's primary emphasis is SMB & Retail/remote office usage in a non-datacenter environment that provides a lighter workload platform than the T640 tower server. It is a replacement of the previous generation Dell EMC PowerEdge T430 tower server.

The T440 is an ideal solution for:

- Small and Medium Business
- Offices of small- to medium Public organizations
- ROBO of large enterprises and organizations
- Data centers of SMB, Enterprises and Public organizations

New technologies

The following are the new technologies featured on the PowerEdge T440:

Table 1. New technologies

New technology	Detailed description
2nd Generation Intel® Xeon Scalable Processor	<p>The processor product family has embedded PCIe lanes for improved I/O performance.</p> <ul style="list-style-type: none"> • 14nm process technology • Intel® Ultra Path Interconnect (UPI) • Up to 16 cores • Up to 3.8 GHz • Max TDP: 125W
Intel C621 series chipset	Intel Platform Controller Hub (PCH).

New technology

2666 MT/s DDR4 memory

iDRAC9 with Lifecycle Controller

Detailed description

- Support up to 16 DIMMs
- Speed of up to 2666 MT/s depending on the CPU.
- Support flexible memory configuration of 8GB to 768 GB in balanced memory configuration. Up to 1 TB maximum in an unbalanced memory configuration.
- CPU1 support up to 10 DIMMs
- CPU2 support upto 6 DIMMs

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.

System features

Compared to previous generations, the PowerEdge T440 offers faster processing power and advanced system management.

The T440 system is a powerhouse 2S/5U tower system, which emphasizes performance and reliability in areas such as virtualization, power, thermal and systems management, and usability. It is designed for SMB and ROBO sites that require a balance of capacity and performance.

Topics:

- [Product comparison](#)

Product comparison

Table 2. Feature comparison

5U Tower Feature	PowerEdge T430	PowerEdge T440
Processors	Intel® Xeon® Processor E5- 2600 v4	Second-Generation Intel® Xeon® Processor Scalable Family
Chipset	Intel C610	Intel C621
Memory	Up to 12x (8+4) DDR4 RDIMMs	Up to 16x DDR4 RDIMMs (10+6)
Storage	Front: <ul style="list-style-type: none"> • 4 or 8 x 3.5 -inch or • 16 x 2.5 -inch • Optional optical drive Internal: <ul style="list-style-type: none"> • IDSDM Bandwidth: <ul style="list-style-type: none"> • 12 Gb SAS/6Gb SATA 	Front: <ul style="list-style-type: none"> • 4 or 8 x 3.5 -inch or • 16 x 2.5 -inch • Optional optical drive Internal: <ul style="list-style-type: none"> • IDSDM + vFlash or • BOSS (2 internal M.2) Bandwidth: <ul style="list-style-type: none"> • 12 Gb SAS/6Gb SATA
PCIe slots	Up to 4 x PCIe Gen3 + up to 2 x PCIe Gen2 + dedicated PERC slot	Up to 5 X PCIe Gen3
GPU support	2x DW 300 W GPU tested	1x DW 300 W GPU supported 150 W
Storage Controller	<ul style="list-style-type: none"> • S130, H330, H730, H730P, H810/H830 (ext) • Chipset SATA/SW RAID: Yes 	<ul style="list-style-type: none"> • S140, H330P, H730P, HBA330, H740P, H840, and 12 Gbps Ext SAS HBA • Chipset SATA/SW RAID: Yes
Embedded NIC	2x 1 GbE (LOM : BCM5720)	2x 1 GbE (LOM : BCM5720)
Power Supplies	<ul style="list-style-type: none"> • 495 W AC Platinum • 750 W AC Platinum • 750 W AC Titanium • 1100 W AC Platinum • 1600 W Platinum 	<ul style="list-style-type: none"> • 495 W AC Platinum • 750 W AC Platinum • 750 W AC Titanium • 1100 W AC Platinum
Remote Management	iDRAC8	iDRAC9
TPM	TPM China, TPM1.2, TPM2.0	TPM China, TPM1.2, TPM2.0
iDRAC port	Micro USB	Dedicated port (RJ45)

5U Tower Feature	PowerEdge T430	PowerEdge T440
Fan	Up to two fans supported <ul style="list-style-type: none"> Internal Fan (1X4 type) External Fan (1X5 type) 	Up to two fans supported <ul style="list-style-type: none"> Internal Fan (1X4 type) External Fan (1X5 type)
Standard rear ports	<ul style="list-style-type: none"> 2 x RJ45 1GE LAN ports Rear system ID button CMA external LED jack iDRAC Enterprise Port (RJ45 port) Two USBs (1xUSB2.0, 1xUSB3.0) DB-15 VGA; DB-9 Serial; VFlash socket 	<ul style="list-style-type: none"> 2 x RJ45 1GE LAN ports Rear system ID button iDRAC Enterprise Port (RJ45 port) Six USBs (4XUSB2.0 ; 2XUSB3.0)

Chassis views and features

The PowerEdge T440 is a two socket, 5U tower system that is available in three different chassis configurations:

- 4 hard drive chassis
- 8 hard drive chassis
- 16 hard drive chassis

Topics:

- [Front panel view and features](#)
- [Back view of the system](#)
- [Internal chassis view](#)
- [Security features](#)

Front panel view and features

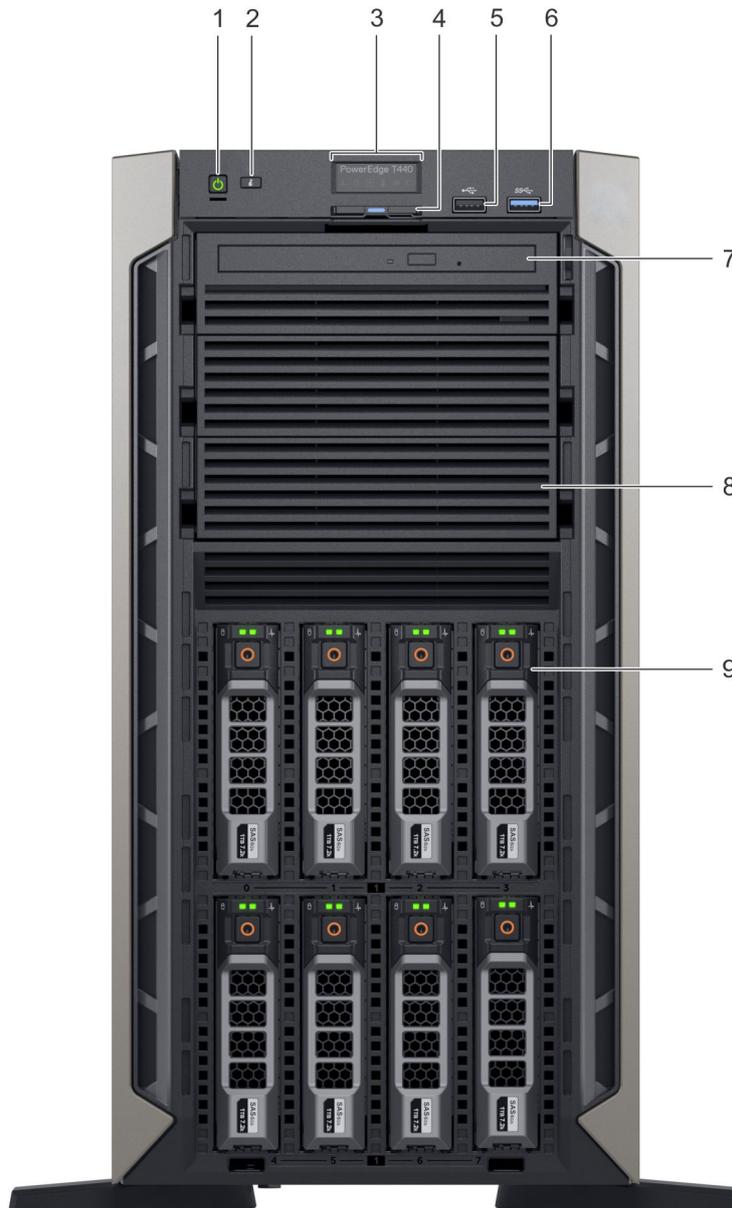


Figure 1. Front panel view of a 8 x 3.5-inch hot swappable drive system

Table 3. Front panel features

Item	Components - Indicator, Button, or Connector	Icon	Description
1	Power button		Indicates if the system is turned on or off. Press the power button to manually turn on or off the system. NOTE: Press the power button to gracefully shut down an ACPI-compliant operating system.
2	System identification button		The System Identification (ID) button is available on the front and back of the systems. Press the button to identify a system in a rack by turning on the system ID button. You can also use the system ID button to reset iDRAC and to access BIOS using the step through mode.

Item	Components - Indicator, Button, or Connector	Icon	Description
3	Status LED indicator panel	N/A	Indicate the status of the system. For more information, see the Status LED indicators section.
4	Information tag	N/A	The Information tag is a slide-out label panel that contains system information such as Service Tag, NIC, MAC address, and so on. If you have opted for the secure default access to iDRAC, the Information tag also contains the iDRAC secure default password.
5	USB port 2.0		The USB ports are 4-pin, 2.0-compliant. These ports enable you to connect USB devices to the system.
6	USB port 3.0		The USB port is USB 3.0 compliant.
7	Optical drive bay	N/A	Enable you to install drives that are supported on your system. For more information about drives, see the Technical specifications section.
8	Drive slot	N/A	Enables you to install TBUs for 8x and 16x backplane configurations, or drive blank in the empty drive slot to maintain proper system cooling.
9	Physical drives	N/A	3.5 inch drives and 2.5 inch drives/SSDs.

Back view of the system

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 connections.

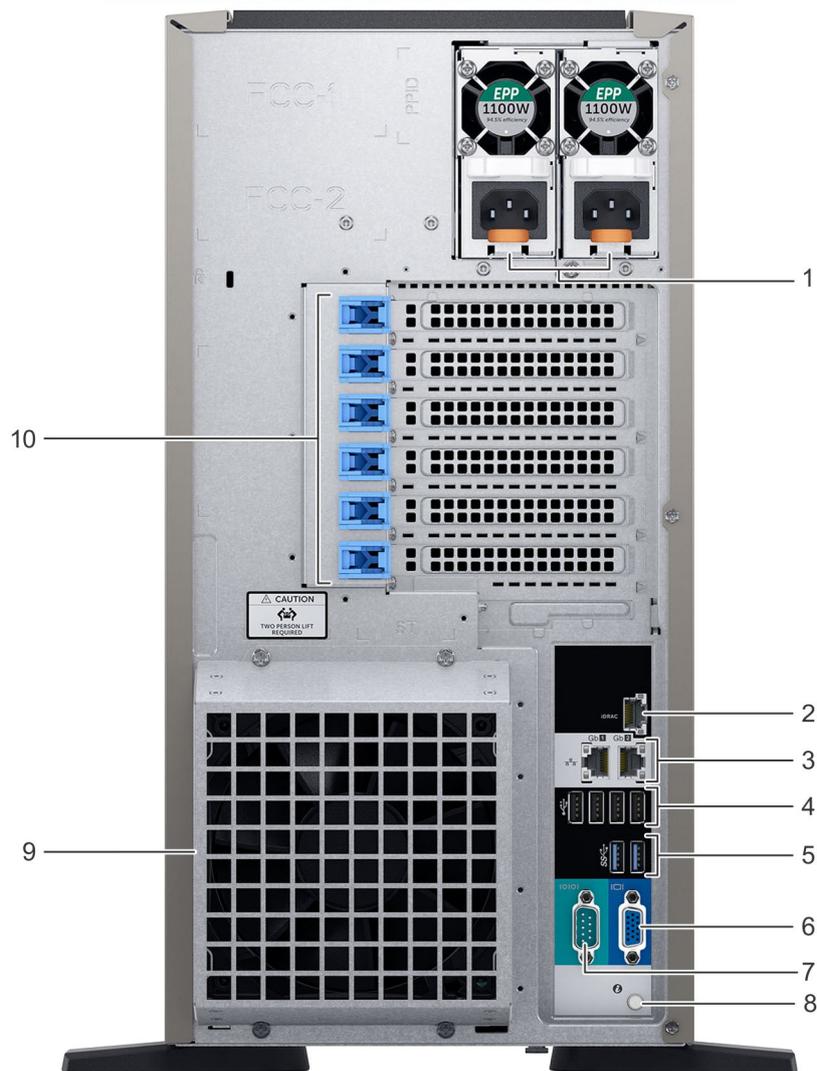


Figure 2. Back view of the system with optional redundant cooling fan

Table 4. Back view of the system features and description

Item	Ports, panels, or slots	Icon	Description
1	Power supply unit (2)	N/A	For more information about the PSU configurations, see the Technical Specifications section
2	iDRAC9 Enterprise port		Enables you to remotely access iDRAC. For more information, see the iDRAC User's Guide at www.dell.com/poweredgemanuals .
3	NIC port (2)		The NIC ports are integrated on the system board provide network connectivity. For more information about the supported configurations, see the Technical specifications section.
4	USB 2.0 port (4)		The USB ports are 4-pin, 2.0-compliant. These ports enable you to connect USB devices to the system.
5	USB 3.0 port (2)		The USB ports are 9-pin and 3.0-compliant. These ports enable you to connect USB devices to the system.
6	VGA port		Enables you to connect a display device to the system. For more information, see the Technical specifications section.

Item	Ports, panels, or slots	Icon	Description
7	Serial port	ⓂⓂⓂⓂ	Enables you to connect a serial device to the system. For more information, see the Technical specifications section.
8	System identification button	ⓘ	The System Identification (ID) button is available on the front and back of the systems. Press the button to identify a system in a rack by turning on the system ID button. You can also use the system ID button to reset iDRAC and to access BIOS using the step through mode.
9	External cooling fan (optional)	N/A	Enables you to connect an optional redundant cooling fan.
10	PCIe expansion card slot	N/A	The expansion slot(s) enable you to connect PCI Express expansion cards. For more information on the expansion cards that are supported on your system, see the Expansion card guidelines.

Internal chassis view

The chassis design of the PowerEdge T440 is optimized for easy access to components and for efficient cooling. The PowerEdge T440 supports up to 16 DIMMs, two processors, system fans, system board and hard drive bays, and many other components and features. For more system views, see the Dell EMC PowerEdge T440 Installation and Service Manual at Dell.com/Support/Manuals.

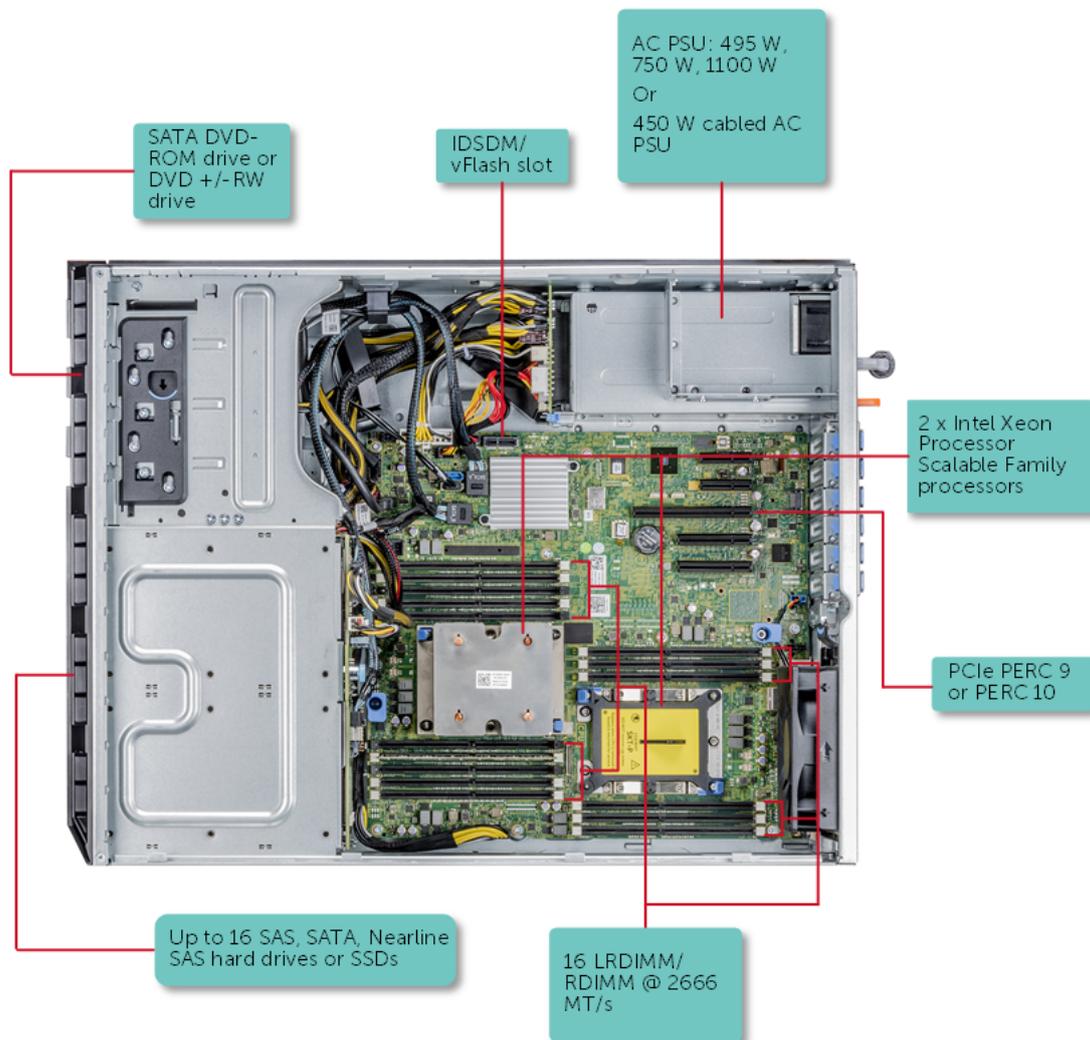


Figure 3. Supported configurations for a PowerEdge T440 system

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 5. 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.
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 T440 server features the exceptional performance, value, and power efficiency of the 2nd Generation 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.

Topics:

- [Processor features](#)
- [Supported processors](#)
- [Chipset](#)

Processor features

The Intel Xeon Processor Scalable Family provides the foundation for a powerful datacenter platform. The key features are as follows:

- Up to 28 cores with Intel® HT Technology (2 threads/core)
- Intel® Turbo Boost technology (excludes Bronze processors)
- Between 70W-205W TDP
- 1TB/socket memory capacity on all standard 2nd generation processors.
- 2TB/socket memory capacity on selected 2nd generation processors designated by "M"
- Socket P
- 14nm process Technology
- Rebalanced Cache Hierarchy: 1.375MB Last level Cache/core
- 2S, 4S, 8S scalable (note: 4xxx (Silver) & 3xxx (Bronze) do not support 4S or 8S platforms)
- Support for Intel AVX-512
- Intel® Ultra Path Interconnect (UPI) with bandwidth up to 10.4GT/s
- 6 Channels DDR4 per CU RDIMM, LRDIMM
- 2133, 2400, 2666 speeds at 2 DIMMs per Channel; no 3 Dimms per channel support
- MPX (Memory Protection Extensions) support
- Up to 48 PCIe lanes per CPU with x16, x8 & x4 Bifurcation support
- PCI Express 3.0 (2.5, 5.0, 8.0 GT/s)
- Separate Reference with Independent Spread Spectrum Clocking (SRIS)
- MCTP Scaling
- Per Core P-State (PCPS)
- Uncore Frequency Scaling (UFS)
- Energy Efficient Turbo (EET)
- On die PMAX detection

Supported processors

Table 6. Supported processors for PowerEdge T440

Medal	Processor	Frequency (GHz)	Cores/Threads	Cache (M)	UPI (GT/s)	Turbo	TDP (W)
Gold	6258R	2.7	28	38.5	10.4	Y	205
Gold	6248R	3.0	24	35.75	10.4	Y	205
Gold	6246R	3.4	16	22	10.4	Y	205
Gold	6242R	3.1	20	27.5	10.4	Y	205

Medal	Processor	Frequency (GHz)	Cores/Threads	Cache (M)	UPI (GT/s)	Turbo	TDP (W)
Gold	6240R	2.4	24	35.75	10.4	Y	165
Gold	6238R	2.2	28	38.5	10.4	Y	165
Gold	6230R	2.1	26	35.75	10.4	Y	150
Gold	6226R	2.9	16	22	10.4	Y	150
Gold	6208U	2.9	16	22	NA	Y	150
Gold	5222	3.8	4/8	16.5	10.4	Y	105
Gold	5220R	2.2	24	35.75	10.4	Y	150
Gold	5218R	2.1	20	27.5	10.4	Y	125
Gold	5215	2.5	10/20	13.75	10.4	Y	85
Gold	5122	3.6	4/8	16.5	10.4	Y	105
Gold	5120	2.2	14/28	19	10.4	Y	105
Gold	5118	2.3	12/24	16	10.4	Y	105
Silver	4216	2.1	16/32	22.0	9.6	Y	100
Silver	4215R	3.2	8	11	9.6	Y	130
Silver	4215	2.5	8/16	11.0	9.6	Y	85
Silver	4214R	2.4	12	16.5	9.6	Y	100
Silver	4214	2.2	12/24	16.5	9.6	Y	85
Silver	4210R	2.4	10	13.75	9.6	Y	100
Silver	4210	2.2	10/20	13.75	9.6	Y	85
Silver	4208	2.1	8/16	11.0	9.6	Y	85
Silver	4116	2.1	12/24	16	9.6	Y	85
Silver	4114	2.2	10/20	14	9.6	Y	85
Silver	4112	2.6	4/24	8.25	9.6	Y	85
Silver	4110	2.1	8/16	11	9.6	Y	85
Silver	4108	1.8	8/16	11	9.6	Y	85
Bronze	3206 R	1.9	8	11	9.6	N	85
Bronze	3206	1.9	8	11	9.6	N	85
Bronze	3204	1.9	6/6	8.25	9.6	N	85
Bronze	3106	1.7	8/8	11	9.6	N	85
Bronze	3104	1.7	6/6	8	9.6	N	85

Chipset

The following list the features provided by the Intel® C621 chipset:

- ACPI Power Management Logic Support, Revision 4.0a
- PCI Express* Base Specification Revision 3.0
- Integrated Serial ATA host controller, supports data transfer rates of up to 6 Gb/s on all ports.
- xHCI USB controller with SuperSpeed USB 3.0 ports
- Direct Media Interface
- Serial Peripheral Interface
- Enhanced Serial Peripheral Interface
- Flexible I/O-Allows some high-speed I/O signals to be configured as PCIe* root ports, PCIe* uplink for use with certain PCH SKUs, SATA (and sSATA), or USB 3.0.

- General Purpose Input Output (GPIO)
- Low Pin Count interface, interrupt controller, and timer functions
- System Management Bus Specification, Version 2.0
- Integrated Clock Controller/Real-Time Clock Controller
- Intel® High Definition Audio and Intel® Smart Sound Technology
- Integrated 10/1 Gb Ethernet
- Integrated 10/100/1000 Mbps Ethernet MAC
- Supports Intel® Rapid Storage Technology Enterprise
- Supports Intel® Active Management Technology and Server Platform Services
- Supports Intel® Virtualization Technology for Directed I/O
- Supports Intel® Trusted Execution Technology
- JTAG Boundary Scan support
- Intel® Trace Hub for debug

Memory

The PowerEdge T440 supports up to 1TB of memory with 16 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 T440 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.

The system supports:

- Up to six channels with two DPC and total 16 DIMMs
- DDR4 RDIMM/LRDIMM
- Only registered ECC DDR4 DIMMs
- DDR4 speeds up to 2666 MT/s

DIMMs supported

Table 7. Memory technologies

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

Memory speed

The memory offerings for the PowerEdge T440 are based on the double-data rate type 4 (DDR4) which operates at 1.2 volts.

The T440 supports memory speeds of 2666 MT/s, 2400 MT/s, 2133 MT/s, and 1866 MT/s depending on the DIMM types installed and the configuration. All memory on all processors and channels run at the same speed and voltage. By default, this speed will be the highest speed supported by the CPU and the DIMMs. For example both DIMMs and CPUs must be capable of running at 2666 MT/s in order for memory to run at 2666 MT/s (specific CPU / DIMM configuration required). CPU SKUs in the Platinum category support up to 2666 MT/s memory speed while CPU SKUs in Gold and Silver category support up to 2400 MT/s memory speed. The operating speed of the memory is also determined by the maximum speed supported by the processor, the speed settings in the BIOS, and the operating voltage of the system.

The following table list the memory configuration and performance for the PowerEdge T440:

Table 8. DIMM performance details

DIMM type	DIMM ranking	Capacity	DIMM rated voltage, speed
RDIMM	1R/2R	8GB, 16GB, and 32GB	DDR4 (1.2v), 2666
LRDIMM	4R/8R	64GB	DDR4 (1.2v), 2666

Topics:

- [Memory population guidelines](#)

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 RDIMMs are supported. RDIMM with LRDIMM 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 T440 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 9. 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.
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 T440 Installation and Service Manual at Dell.com/Support/Manuals.

Storage

The PowerEdge T440 provides scalable storage that allows you to adapt to your workload and operational requirements. With comprehensive storage options, the PowerEdge T440 offers various internal and external storage controllers, drive types, and different chassis and backplanes for varied numbers of drives. Features such as 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 T440, are a high-end offering that drives Input/Output Operations Per Second (IOPs) performance and enhance the SSD performance.

NOTE: Onboard SATA ports (S140) are not accessible if mini PERC is installed.

Table 10. PERC series controller offerings

Performance Level	Controller and Description
Entry	S140-Software RAID SATA
Value	H330 internal, 12 Gb SAS HBA-external
Value performance	H730P
Premium performance	H740P and H840

Supported drives

Table 11. Supported drives—SAS and SATA

Form Factor	Type	Speed	Rotational Speed	Capacities
2.5-inch	SATA SSD	6 Gb	N/A	120 GB Boot, 240 GB Boot, 240 GB, 400 GB, 480 GB, 800 GB, 960 GB, 1600GB, 1920 GB, 3200 GB, 3840 GB,7680 GB
2.5-inch	SAS SSD	12 Gb	N/A	400 GB, 480 GB, 800 GB, 960 GB, 1600 GB, 1920 GB, 3840 GB
2.5-inch	SATA	6 Gb	7.2 K	1 TB, 2 TB
2.5-inch	SAS	12 Gb	7.2 K	1 TB, 2 TB
2.5-inch	SAS	12 Gb	10 K	600 GB, 1.2 TB, 1.2 TB FIPS SED, 1.8 TB, 2.4 TB, 2.4 TB FIPS SED
2.5-inch	SAS	12 Gb	15 K	300 GB, 600 GB, 900 GB
3.5-inch	SATA	6 Gb	7.2 K	1 TB, 2 TB, 4 TB, 8 TB, 10 TB, 12 TB,14 TB, 16 TB
3.5-inch	SAS	12 Gb	7.2 K	2 TB, 4 TB, 8 TB, 10 TB, 12 TB, 16 TB, 4TB FIPS SED, 8 TB FIPS SED, 12 TB FIPS SED

Topics:

- [IDSDM or vFlash card](#)
- [Boot Optimized Storage Subsystem \(BOSS\)](#)
- [Optical drives](#)

IDSDM or vFlash card

In the PowerEdge T440 system, the IDSMD module contains the Internal Dual SD Module (IDSMD) and vFlash card that are combined into a single card module. The following are options available for PowerEdge T440 system:

- vflash only
- IDSMD only
- vflash + IDSMD

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

The IDSMD 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 T440 systems, the IDSMD and vFlash card size changes from SD to microSD and the supported capacity for IDSMD 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 IDSMD module.

Boot Optimized Storage Subsystem (BOSS)

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

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

The HW RAID BOSS card is a RAID controller with a limited feature set that presents M.2 SATA-only SSDs as either Non-RAID disks or a single RAID1 volume.

Boot Optimized Storage Subsystem (BOSS)

BOSS is offered as a means of booting servers to a full OS in the following scenarios:

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

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

NOTE: BOSS drives are not hot-plug capable.

Optical drives

The PowerEdge T440 supports one of the following internal optical drive options:

- DVD-ROM
- DVD

Video

The Video Graphic Array (VGA) port enables you to connect the system to a VGA display. The T440 system supports one 15-pin VGA port at the back of the system.

Table 12. Video specifications

Resolution	Refresh Rate	Rear Panel	Front Panel
1024 x 768	60 Hz	Yes	Yes
1280 x 800	60 Hz	Yes	Yes
1280 x 1024	60 Hz	Yes	Yes
1360 x 768	60 Hz	Yes	Yes
1440 x 900	60 Hz	Yes	Yes
1600 x 900	60 Hz	Yes	Yes
1600 x 1200	60 Hz	Yes	Yes
1680 x 1050	60 Hz	Yes	Yes
1920 x 1080	60 Hz	Yes	Yes
1920 x 1200	60 Hz	Yes	Yes

Networking and PCIe

The PowerEdge T440 offers 2 x 10GbE LOMs.

Topics:

- [PCIe expansion cards](#)

PCIe expansion cards

The PowerEdge T440 system has one standard PCIe connector and four Speededge connectors.

PCIe expansion card riser configurations

Table 13. PCIe expansion card riser configurations for PowerEdge T440

PCIe slots	Height	Length	Link
Slot 1	Full height	Half length	x4
Slot 2	Full height	Half length	x4
Slot 3	Full height	Full length	x16
Slot 4	Full height	Half length	x8
Slot 5	Full height	Half length	x8

PCIe expansion cards

Table 14. Optional add-in PCIe expansion cards for PowerEdge T440

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® 10GbBase-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
	• 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+	
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

Type	Adapter
CNA	· 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
	· QLogic: QLE8152 HBA (10 GbE – 2 Port, PCIe Gen 2) – FCoE
	· Emulex: OCE10102FM HBA (10 GbE – 2 Port, PCIe Gen 2) - FCoE
	· Emulex: OCE10102IM HBA (10 GbE – 2 Port, PCIe Gen 2 – iSCSI) - iSCSI
	· Broadcom 57711 NIC (10 GbE - 2 Port, PCIe Gen2) – iSOE
	· Intel® DT (10 GbE – 2 Port, PCIe Gen 2) – FCoE
	· Intel® DT (10 GbE – 2 Port, PCIe Gen 2) – FCoE

For the latest information on all supported add-in PCIe expansion cards for the PowerEdge T440, visit the PowerEdge T440 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.

Topics:

- [Power consumption and energy efficiency](#)
- [Thermal and Acoustics](#)
- [Power supply units](#)
- [Acoustical design](#)

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 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	<p>Energy Smart Solution Advisor (ESSA) is a tool that can help you determine the most efficient configuration possible. With Dell's ESSA, you can calculate the power consumption of your hardware, power infrastructure, and storage.</p> <p>ESSA can help you determine exactly how much power your server will use at a given workload, and the PSU Advisor can help you choose the best, most efficient PSU for your workload. Smart Data Center Assessment is a Dell Services offering that uses infrastructure and thermal analysis to help maximize system efficiency.</p>
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	<p>PSU power monitoring improvements include:</p> <ul style="list-style-type: none"> • 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	<p>Dell EMC's servers are compliant with all relevant industry certifications and guidelines, including 80 PLUS, Climate Savers, and ENERGY STAR.</p> <p>Dell OpenManage Power Center delivers group power management at the rack, row, and data center level for servers, power distribution units, and uninterruptible power supplies.</p>
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 comprised of Intel Node Manager accessed through Dell iDRAC9 Enterprise and OpenManage Power Center that allows policy-based management of power and thermals

Feature	Description
	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: <ul style="list-style-type: none"> • Power distribution units (PDUs) • Uninterruptible power supplies (UPSs) • Energy smart containment rack enclosures

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 psychoacoustical 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 performance

Configuration	Volume	Margin Rich
CPU Type	Intel Xeon Silver 4116	Intel Xeon Gold 5120
CPU TDP	85 W	105 W
CPU Quantity	2	2
Memory Type	8GB, 2666MHz, DDR4	16GB, 2666MHz, DDR4
DIMM Quantity	4	8
Backplane Type	3.5" x 8	2.5" x 16
SYSTEM Fan Quantity	1	2
HDD Type	3.5" SATA 7.2k	2.5" 15K SAS
HDD Quantity	4	8

Configuration	Volume	Margin Rich
PSU Type	750 W	1100 W
PSU Quantity	2	2
PCI 1	PERC H330	PERC H730P
PCI 2	Quadport	2x 10GB NIC
PCI 3	-	-
PCI 4	-	-

Table 17. Acoustical performance: Idle/operating at 25°C ambient

Configuration	Volume	Margin Rich
LwA-UL (Bels)	Idle	4.5
	Operating	5.1
LpA (dBA)	Idle	30
	Operating	35

Table 18. Acoustical performance: Idle at 28°C ambient

Configuration	Volume	Margin Rich
LwA-UL (Bels)	4.7	5.4
LpA (dBA)	32	38

Table 19. Acoustical performance: Max. loading at 35°C ambient

Configuration	Volume	Margin Rich
LwA-UL (Bels)	6.3	6.8
LpA (dBA)	48	53

Rack rails

The T440 is a rack-capable tower server. When customers select rack mode chassis, T440 will support the optional sliding rail. The sliding rail system for the T440 provides tool-less support for racks with square or untreaded round mounting holes including all generations of Dell racks. The sliding rails for the T440 offers native support for threaded hole racks via the ReadyRails II mounting interface. The rails ship in the tool-less mounting configuration but can be converted to the tooled configuration very quickly and easily. An optional cable management arm (CMA) can be mounted on either the left or right side of the rails without the use of tools for fast and easy deployment.

Dell EMC OpenManage systems management

Dell EMC OpenManage Portfolio

Simplifying hardware management through ease of use and automation

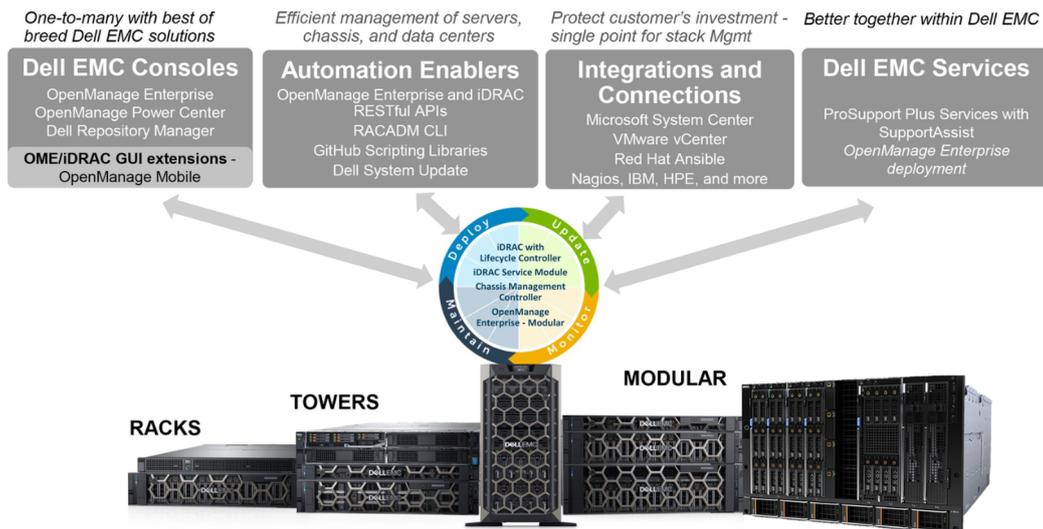


Figure 4. Dell EMC OpenManage Portfolio

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)
- iDRAC Service Module (iSM)

Dell EMC consoles

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

Automation Enablers

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

Integration with third-party consoles

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

Connections for third-party consoles

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

Dell EMC Update Utilities

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

Dell resources

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

Table 20. Dell resources

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

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

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

Appendix A. Additional specifications

Topics:

- [PSU specifications](#)
- [System dimensions](#)
- [Environmental specifications](#)
- [Video specifications](#)
- [USB ports](#)

PSU specifications

PowerEdge T440 support that up to 2 AC or DC power supplies with 1+1 redundancy, auto sensing and auto-switching capability. The PowerEdge T440 system supports the following AC redundant power supply units (PSU).

Table 21. PSU specifications

PSU	Class	Heat dissipation (maximum)	Frequency	Voltage
1100 W AC	Platinum	4100 BTU/hr	50/60 Hz	100–240 V AC, autoranging
750 W AC	Platinum	2891 BTU/hr	50/60 Hz	100–240 V AC, autoranging
750 W AC (Mixed Mode)	Platinum	2891 BTU/hr	50/60 Hz	100-240Vac/10-5A
495 W AC	Platinum	1908 BTU/hr	50/60 Hz	100–240 V AC, autoranging
450 W AC	Bronze	7871 BTU/hr	50/60 Hz	100–240 V AC, cabled PSU

NOTE: If a system with AC 1100 W PSUs operate at low line 100-120 Vac, then the power rating per PSU is derated to 1050 W.

System dimensions

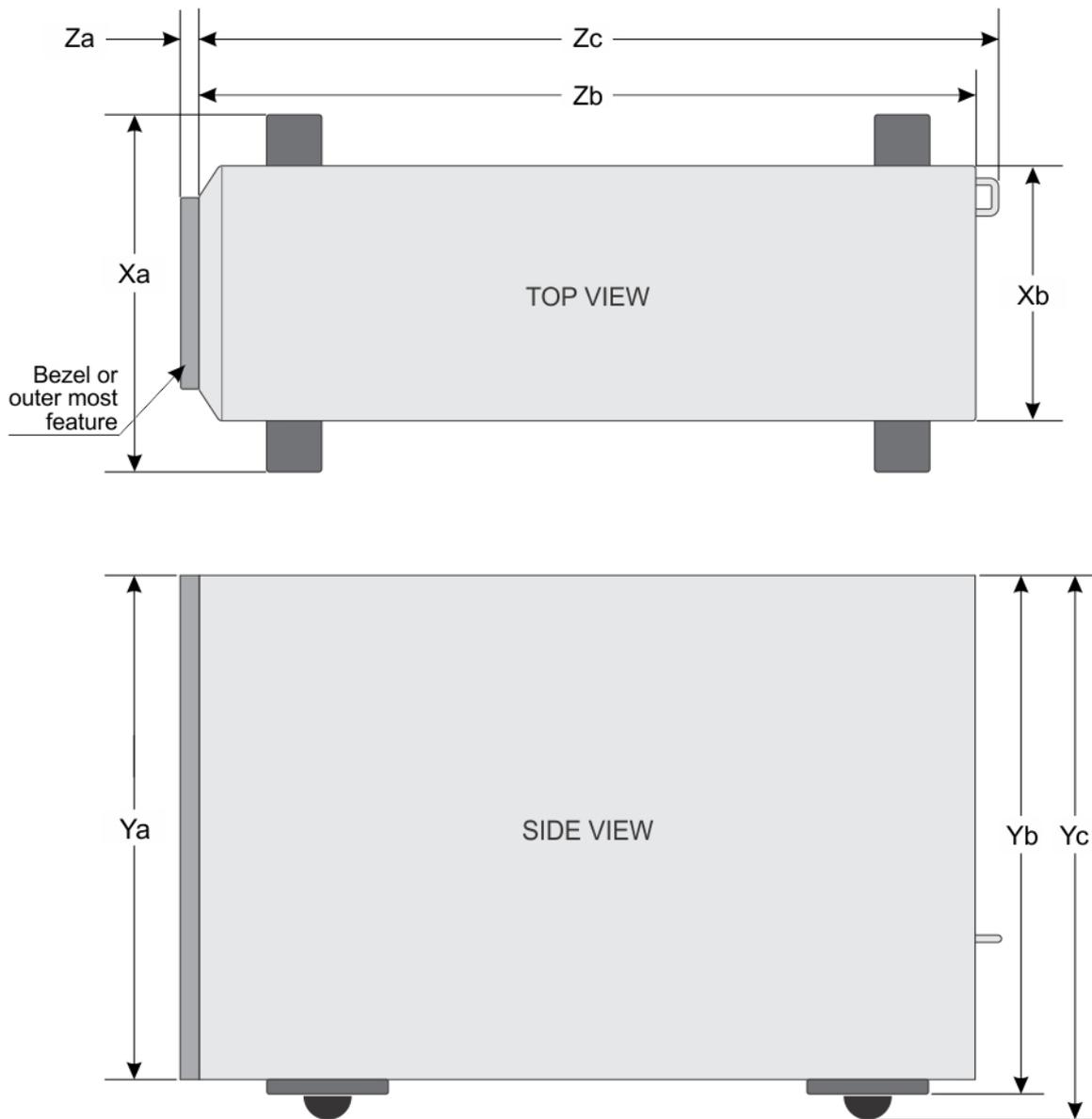


Figure 5. Details the dimensions of the PowerEdge T440 system

Table 22. Dimensions of PowerEdge T440 system

Xa	Xb	Ya	Yb	Yc	Za	Zb	Zc
218 mm (8.58 in)	307.9 mm (12.12 in)	430.3 mm (16.94 in)	464.362 mm (18.28 in)	471.333 mm (17.37 in)	(with bezel) 37.065 mm (1.45 in)	538.4 mm (21.19 in)	573.636 mm (22.58 in)
					(without bezel) 21.165 mm (0.83 in)		

Chassis weight

Table 23. Chassis weight

System configuration	Maximum weight
4 x 3.5 inch drive system	23.9 Kg (52.69 lb)
8 x 3.5 inch drive system	29.5 Kg (65.03 lb)
16 x 2.5 inch drive system	27.7 Kg (61.06 lb)

Environmental specifications

The table below shows the environmental specifications for the PowerEdge T440. For additional information refer to dell.com/environmental_datasheets

Table 24. Temperature specifications

Temperature	Specifications
Storage	-40°C to 65°C (-40°F to 149°F)
Continuous operation(for altitude less than 950m or 3117ft)	10°C to 35°C (50°F to 95°F) with no direct sunlight on the equipment
Maximum temperature gradient (operating and storage)	20°C/h (68°F/h)

Table 25. Relative humidity specifications

Relative Humidity	Specifications
Storage	5% to 95% RH with 33°C (91°F) maximum dew point. Atmosphere must be non-condensing at all times.
Operating	10% to 80% relative humidity with 29°C (84.2°F) maximum dew point.

Table 26. Maximum vibration specifications

Maximum vibration	Specifications
Operating	0.26Grms at 5Hz to 350Hz (all three axes)
Storage	1.88Grms at 10Hz to 500Hz for 15min (all six sides tested)

Table 27. Maximum shock specifications

Maximum shock	Specifications
Operating	Six consecutively executed shock pulses in the positive and negative x, y, and z axes of 6G for up to 11ms
Storage	Six consecutively executed shock pulses in the positive and negative x, y, and z axes (one pulse on each side of the system) of 71 G for up to 2 ms.

Table 28. Maximum altitude specifications

Maximum altitude	Specifications
Operating	3048m (10,000 ft)
Storage	12,000m (39,370 ft)

Table 29. Operating temperature de-rating specifications

Operating temperature de-rating	Specifications
Up to 35°C (95°F)	Maximum temperature is reduced by 1°C/300 m (1°F/547 ft) above 950 m (3,117 ft).
35°C to 40°C (95°F to 104°F)	Maximum temperature is reduced by 1°C/175 m (1°F/319 ft) above 950 m (3,117 ft).
40°C to 45°C (104°F to 113°F)	Maximum temperature is reduced by 1°C/125 m (1°F/228 ft) above 950 m (3,117 ft).

Table 30. Standard operating temperature specifications

Standard operating temperature	Specifications
Continuous operation (for altitude less than 950m or 3117ft)	10°C to 35°C (50°F to 95°F) with no direct sunlight on the equipment.

Table 31. Expanded operating temperature specifications

Expanded operating temperature	Specifications
Continuous operation	<p>5°C to 40°C at 5% to 85% RH with 29°C dew point.</p> <p>NOTE:</p> <p>Outside the standard operating temperature (10°C to 35°C), the system can operate continuously in temperatures as low as 5°C and as high as 40°C.</p> <p>For temperatures between 35°C and 40°C, de- rate maximum allowable temperature by 1°C per 175 m above 950 m (1°F per 319 ft).</p>
≤ 1% of annual operating hours	<p>-5°C to 45°C at 5% to 90% RH with 29°C dew point.</p> <p>NOTE:</p> <p>Outside the standard operating temperature (10°C to 35°C), the system can operate down to -5°C or up to 45°C for a maximum of 1% of its annual operating hours.</p> <p>For temperatures between 40°C and 45°C, de- rate maximum allowable temperature by 1°C per 125 m above 950 m (1°F per 228 ft).</p>

Table 32. Particulate contamination specifications

Particulate contamination	Specifications
Air filtration	<p>Data center air filtration as defined by ISO Class 8 per ISO 14644-1 with a 95% upper confidence limit.</p> <p>NOTE: This condition applies to data center environments only. Air filtration requirements do not apply to IT equipment designed to be used outside a data center, in environments such as an office or factory floor.</p> <p>NOTE: Air entering the data center must have MERV11 or MERV13 filtration.</p>
Conductive dust	<p>Air must be free of conductive dust zinc whiskers, or other conductive particles.</p> <p>NOTE: This condition applies to data center and non-data center environments.</p>
Corrosive dust	<ul style="list-style-type: none"> Air must be free of corrosive dust.

Particulate contamination

Specifications

- Residual dust present in the air must have a deliquescent point less than 60% relative humidity.

NOTE: This condition applies to data center and non-data center environments.

Table 33. Gaseous contamination specifications

Gaseous contamination

Specification

Copper coupon corrosion rate

<300A/month per class G1 as defines by ANSI/ISA71.04-1985

Silver coupon corrosion rate

<200A/month as defined by ASHRAE TC9.9

Video specifications

The PowerEdge T440 system supports the Integrate Matrox G200 graphics card with iDRAC9. The following table lists the video technical specifications:

Table 34. Video specifications

Resolution	Refresh rate	Horizontal frequency	Pixel clock	Rear panel	Front panel	DVO DisplayPort
1024 x 768	60 Hz	48.4 kHz	65.0 MHz	Yes	Yes	Yes
1280 x 800	60 Hz	49.7 kHz	83.5 MHz	Yes	Yes	Yes
1280 x 1024	60 Hz	64.0 kHz	108.0 MHz	Yes	Yes	Yes
1360 x 768	60 Hz	47.71 kHz	85.5 MHz	Yes	Yes	Yes
1440 x 900	60 Hz	55.9 kHz	106.5 MHz	Yes	Yes	Yes
1600 x 900	60 Hz	55.54 kHz	97.75 MHz	Yes	Yes	Yes
1600 x 1200	60 Hz	75.0 kHz	162.0 MHz	Yes	Yes	Yes
1680 x 1050	60 Hz	64.7 kHz	119.0 MHz	Yes	Yes	Yes
1920 x 1080	60 Hz	67.158 kHz	173.0 MHz	Yes	No	No
1920 x 1200	60 Hz	74.556 kHz	193.25 MHz	Yes	No	No

USB ports

The table provides information about the supported USB port specifications.

Table 35. USB specifications

System	Front panel	Back panel
PowerEdge T440	<ul style="list-style-type: none">One USB 2.0-compliant portOne USB 3.0-compliant port	<ul style="list-style-type: none">Four USB 2.0-compliant rear portsTwo USB 3.0-compliant rear ports

Appendix B. Standards compliance

The system conforms to the following industry standards.

Table 36. 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/design/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 37. Additional resources

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

Appendix D. Support and deployment services

ProDeploy Enterprise Suite and Residency Services

ProDeploy Enterprise Suite gets your server out of the box and into optimized production - fast. Our elite deployment engineers with broad and deep experience utilizing best-in-class processes along with our established global scale can help you around the clock and around the globe. From simple to the most complex server installations and software integration, we take the guess work and risk out of deploying your new server technology. Who's better suited to implement the latest Dell EMC servers than the Dell EMC elite deployment engineers who do it every day?

		Basic Deployment	ProDeploy	ProDeploy Plus
Pre-deployment	Single point of contact for project management		•	In-region
	Site readiness review		•	•
	Implementation planning		•	•
	Technology Service Manager (TSM) engagement for ProSupport Plus entitled devices			•
Deployment	Deployment service hours	Business hours	24x7	24x7
	Onsite hardware installation*	•	•	•
	Packaging materials disposal	•	•	•
	Install and configure system software		•	Onsite
Post-deployment	Project documentation with knowledge transfer		•	•
	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 6. ProDeploy Enterprise Suite capabilities

NOTE: Hardware installation not applicable on selected software products.

ProDeploy Plus

From beginning to end, ProDeploy Plus provides the skill and scale needed to successfully execute demanding deployments in today's complex IT environments. Certified Dell EMC experts start with extensive environmental assessments and detailed migration planning and recommendations. Software installation includes set up of most versions of Dell EMC SupportAssist and OpenManage system management utilities. Post-deployment configuration assistance, testing, and product orientation help you rest easy knowing your systems have been deployed and integrated by the best.

ProDeploy

ProDeploy provides full service installation and configuration of both server hardware and system software by certified deployment engineers including set up of 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. System testing, validation and full project documentation with knowledge transfer complete the process. We focus on getting you up and running so you can focus on your business and prepare for whatever comes next.

Basic Deployment

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

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.

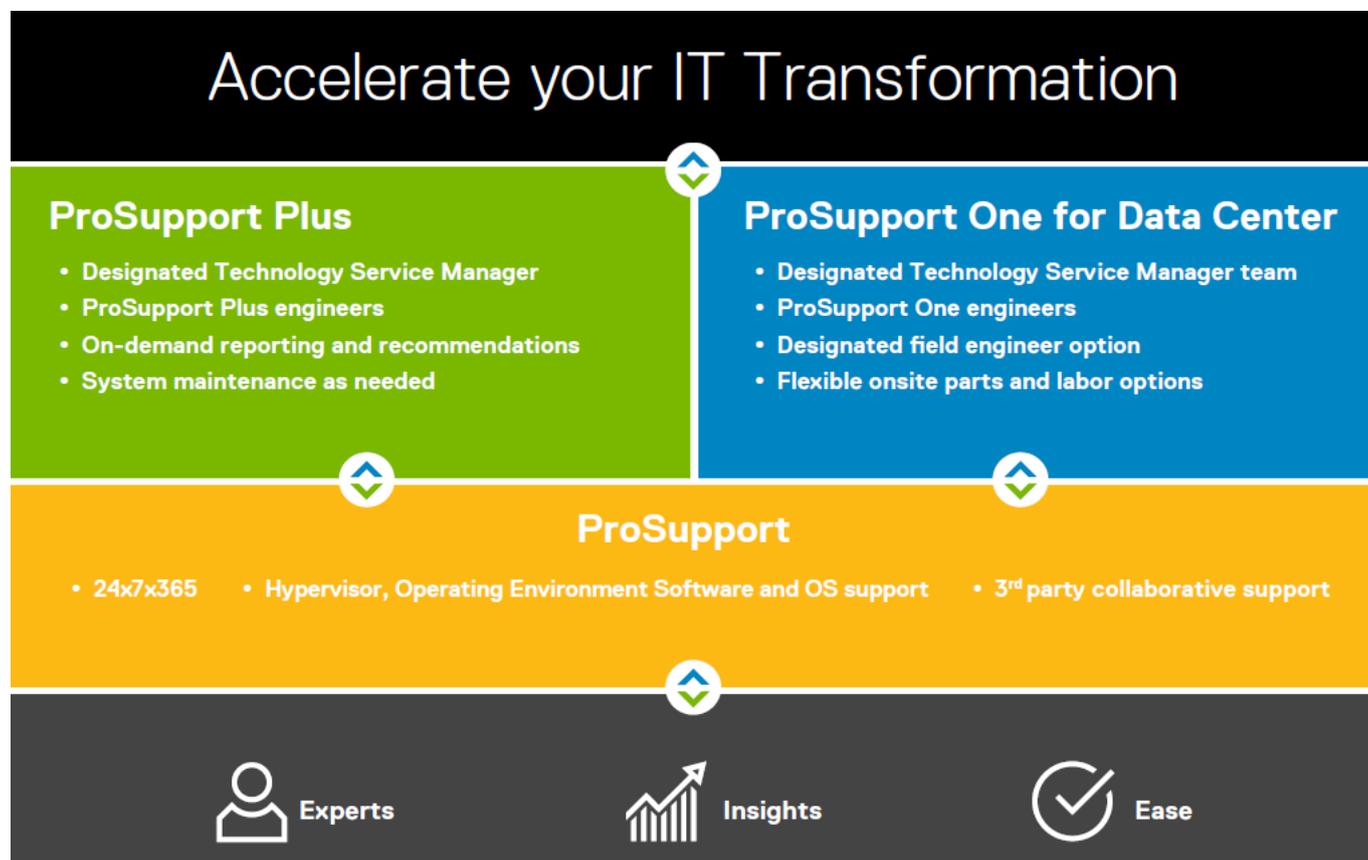


Figure 7. ProSupport Enterprise Suite

ProSupport Plus

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

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

ProSupport

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

- 24x7x365 access to certified hardware and software experts

- Collaborative 3rd party support
- Hypervisor and OS support
- Consistent level of support available for Dell EMC hardware, software and solutions
- Onsite parts and labor response options including next business day or four-hour mission critical

ProSupport One for Data Center

ProSupport One for Data Center offers flexible site-wide support for large and distributed data centers with more than 1,000 assets. This offering is built on standard ProSupport components that leverage our global scale but are tailored to your company's needs. While not for everyone, it offers a truly unique solution for Dell EMC's largest customers with the most complex environments.

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

	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 8. ProSupport One for Data Center model

Support Technologies

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

SupportAssist

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

- Value - SupportAssist is available to all customer 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 9. 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 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.