Dell PowerEdge C6525

Technical Guide

Contents

Product overview

Introduction

The Dell EMC PowerEdge C6525 is the latest 2U/4N server offering designed to run high-performance computing (HPC) and hyperscale workloads utilizing high core counts, flexible I/O options, and low latency network options. The PowerEdge C6525 feature the 2nd Generation AMD® EPYC™ processors, up to 16 DIMMs per node, PCI Express® (PCIe) 4.0, and a choice of network interface technologies to cover networking options. The PowerEdge C6525 is a compute-centric platform capable of handling demanding workloads and applications, such as hyperscale/webtech and high-performance computing (HPC), including research and digital manufacturing.

New technologies

The following table shows the new technologies available on the PowerEdge C6525:

Table 1. New technologies

New Technologies	Description
2nd Generation AMD® EPYC™ High-Performance Zen 2 Based Server SOCs	Consult the Processor section for specific details. • 7 nm processor technology • AMD® Socket to Socket Global Memory Interface (xGMI & xGMI2) links • Up to 64 cores per socket • 1.4GHz base, 64C_128T for Socket Up to 2.0 GHz • Max TDP: 225W • Mismatched SKUs in a 2S configuration not allowed
3200 MT/s DDR4 Memory	Select SKUs of the 2nd Generation AMD EPYC™ processors support 3200 MT/s memory. C6525 supports one DIMMs per channel at 3200 MT/s with these processors. Consult the Memory section for additional speed/population details. • 8x DDR4 Channels per socket, 1 DIMMs per channel (1DPC) • Up to 3200 MT/s (configuration-dependent) • RDIMMs up to 64GB & LRDIMMs up to 256GB supported
OCP 3.0 card	Support standard OCP 3.0 SFF with PCIe Gen4 X16
PCI-Express 4.0	Support up to PCIe Gen 4 X16
TPM	Supports TPM2.0

System features

Product comparison

The table below shows the comparison between the PowerEdge C6526 and the C6420:

Table 2. Product comparison table

Feature	C6525	C6420
CPU	2 x 2nd Generation AMD® EPYC™ processor SP3 per node (Support for up to 2 x 225 W processors)	2 x Intel® Xeon® Scalable processor per node (Support for up to 2 x 205 W processors)
CPU Interconnect	GMI: 13.3 GT/s, xGMI: 16 GT/s	UPI 2.0
Memory	• DDR4: Up to 16 x RDIMMs, LRDIMMs • NVDIMM: No	• DDR4: Up to 16 x RDIMMs • Apache Pass: No • NVDIMM: No
Disk Drives	• Front: 24 x 2.5 -inch (4x6) or 12 x 3.5 -inch options • Internal: Internal M.2 options are 240GB and 480GB • Mid/rear: N/A • Bandwidth: 12Gb/6Gb SAS/SATA; PCIe Gen3 NVMe	• Front: 24 x 2.5 -inch or 12 x 3.5 -inch options. • Internal : Micro SD slot (SATA DOM) or 1.8 -inch SSD option • Mid/rear: N/A • Bandwidth: 6Gb/6Gb SAS/SATA
Storage Controllers	• HW RAID: PERC 10.4 port for H745, H345, HBA345 • Chipset SATA/SW RAID: Yes	HW RAID: PERC 9 over riser slot, LSI 2008 over mezz Chipset SATA/SW RAID: Yes
PCIe SSD	Yes (On PCIe riser)	Yes (On PCIe riser)
PCIe Slots	• Slot 1: PCIe Gen4 X16 with Riser 1A (CPU1) • Slot 2: PCIe Gen4 X16 with Riser 2A (CPU2) • Slot 3: OCP3.0 SFF, PCIe Gen4 X16. (CPU1) • Slot 4: M.2, PCIe Gen4 X16. (CPU1/2)	1 Gen3 HH/HL slot x16, 1 DCS MEZZ slot x8
MicroSD	Yes (On PCIe riser)	Yes (On PCIe riser)
rNDC	Single port 1 GbE LOM option	Dual port 10Gbe SFP+ LOM
OCP	OCP 3.0 SFF X 16 slot	OCP 2.0 X 16 MEZZ slot
USB Ports	• 1 x USB 3.0	• 1 x USB 3.0 • 1 x USB 2.0 (internal)
Rack Height	2U	2U
Power Supplies	• Hot plug hard drives • Power supplies: • 2x1600W • 2x2000W, AC, or DC • 2x2400W	Hot plug PSUs
System Management	iDRAC9 with BMC+ (includes virtual console/media), and Enterprise options	iDRAC9 with LC; Express, Enterprise
iDRAC Direct	MicroUSB Type AB	MicroUSB Type AB

Chassis views and features

Front view of the Dell EMC PowerEdge C6525
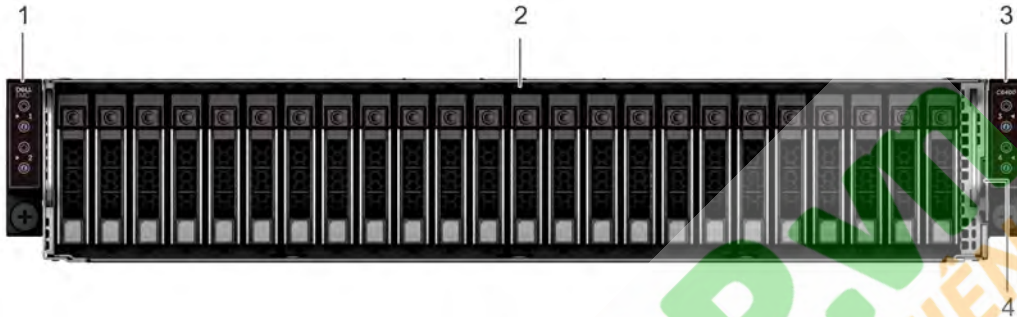
Figure 1. Front view of the chassis with 24 x 2.5-inch drives

1. Left control panel
2. Drive bay
3. Right control panel
4. Information tag
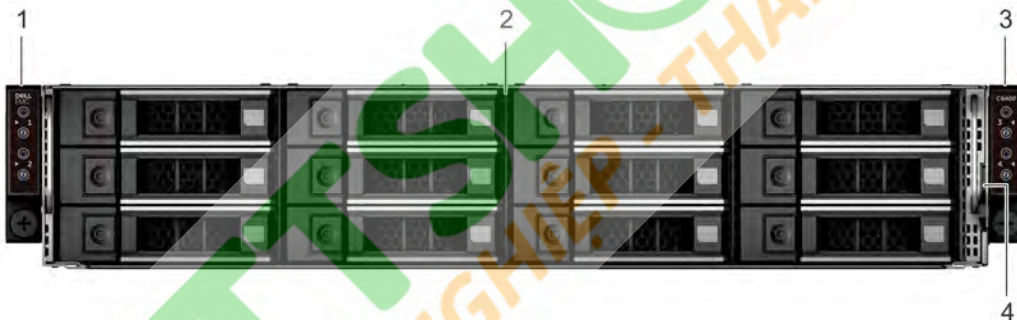
Figure 2. Front view of the chassis with 12 x 3.5-inch drives

1. Left control panel
2. Drive bay
3. Right control panel
4. Information tag

Rear view of the Dell EMC PowerEdge C6525
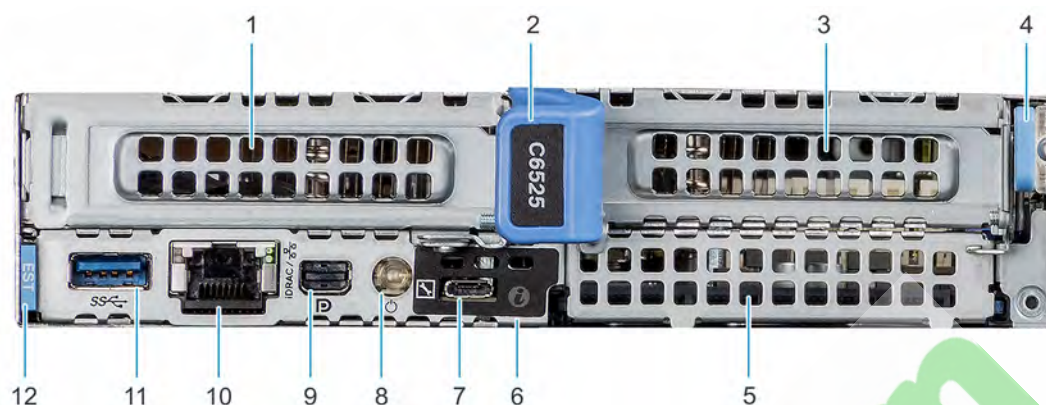
Figure 3. Rear view of the C6525

1. PCIe expansion card riser 1
3. PCIe expansion card riser 2
5. OCP 3.0 SFF card slot
7. iDRAC Direct micro USB port
9. Mini display port
11. USB 3.0 port

2. Sled release handle
4. Sled release lock
6. System identification LED
8. Sled power button
10. iDRAC or NIC port
12. EST tag

Inside view of the sled

The inside view of the PowerEdge C6525 sled:
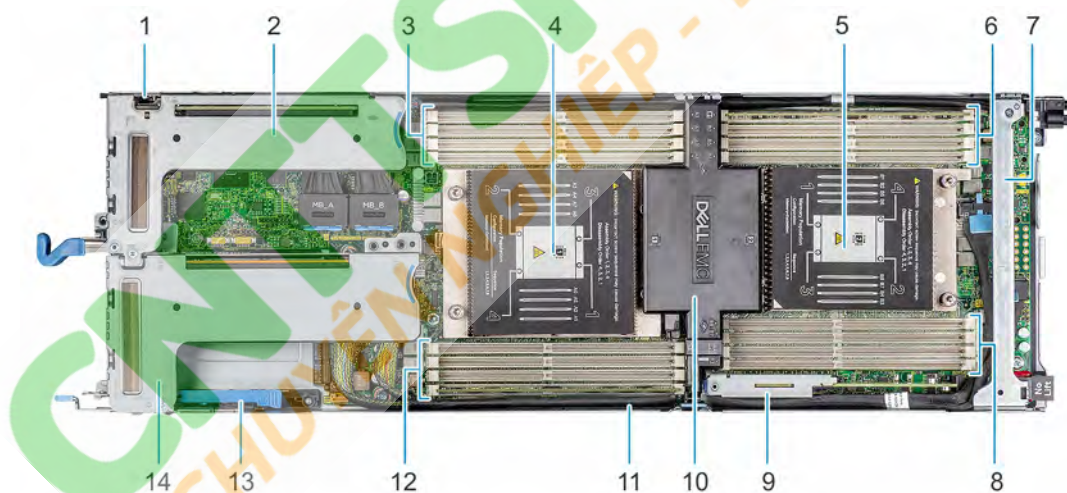
Figure 4. Inside view of the PowerEdge C6525 sled

1. uSD card slot
3. Memory module sockets for CPU 1
5. Processor socket 2
7. Support bracket
9. M.2 riser

> (i) **NOTE: Supports M.2 SATA riser / BOSS card S1V5**

11. Riser 2 cable
13. OCP card slot

2. Expansion card riser 1
4. Processor socket 1
6. Memory module sockets for CPU 2
8. Memory module sockets for CPU 2
10. Air shroud

12. Memory module sockets for CPU 1
14. Expansion card riser 2

Processor

Processor features

The following list highlights the features of the 2nd Generation AMD® EPYC™ processors:

- Compute:
    - Up to 64 AMD Zen x86 cores (128 threads)
    - 512 KB L2 cache per core (32 MB total L2 cache)
    - 256 MB total L3 cache
    - Platform Processor
        - Secure Boot
        - Crypto Coprocessor
- Memory:
    - 8 channel DDR4 with ECC up to 3200 MT/s
    - RDIMM, LRDIMM
    - 1 DIMM/channel
    - Memory capacity 128 GB/channel
- Integrated I/O:
    - Coherent links for 2-socket configurations
    - Links can be reconfigured as 64 lanes of PCIe® in one-socket configuration
    - Up to 128 lanes of PCI Express Gen 4
- 16 lanes switchable with SATA
- Server Controller Hub (USB, UART, SPI, LPC, I2C, etc.)

The following tables shows the processor configurations available for the PowerEdge C6525:

Table 3. Single socket configuration

Configuration	Single CPU
CPU	1 x 2nd Generation AMD® EPYC™ processor per node (Support for up to 1 x 225W processors)
Memory	DDR4: Up to 8 x RDIMMs,LRDIMMs
Disk drives	2.5 -inch HDD BP/ 3.5 -inch HDD BP/ 2.5 -inch NVMe HDD BP options. Internal: Micro SD slot(Riser 1A support only), M.2 boot
Storage Controllers	HW RAID: PERC 10.5 port for H745,H345, HBA345), Chipset SATA/SW RAID: Yes
PCIeSSD	Yes (On PCIe riser)

Table 4. Dual socket configuration

Configuration	Dual CPU
CPU	2 x 2nd Generation AMD® EPYC™ processor(Support for up to 1 x 225W procs)
Memory	DDR4: Up to 16 x RDIMMs, LRDIMMs
Disk drives	Front:2.5 -inch HDD BP/ 3.5 -inch HDD BP/ 2.5 -inch NVMe HDD BP options. Internal: Micro SD slot(Riser 1A support only), M.2 boot
Storage Controllers	HW RAID: PERC 10.5 port for H745,H345, HBA345), ChipsetSATA/SW RAID: Yes

Configuration	Dual CPU
PCIeSSD	Yes (On PCIe riser)

Supported processors

Table 5. Supported processors for the PowerEdge C6525

Processor	Frequency (GHz)	Cores	Cache (MB)	TDP (W)
7742	2.25	64	256	225
7702	2.0	64	256	200
7542	2.9	32	128	225
7502	2.5	32	128	180
7402	2.8	24	128	180
7452	2.2	32	128	155
7352	2.3	24	128	155
7302	3.0	16	128	155
7262	3.2	8	128	155

Memory

The PowerEdge C6525 supports memory speeds of 3200 MT/s, 2933 MT/s, 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 runs at the same speed and voltage. By default, this speed is the highest speed that is supported by the CPU and the DIMMs. For example, both DIMMs and CPUs must be capable of running at 3200 MT/s in order for memory to run at 3200 MT/s (specific CPU/DIMM configuration required). The operating speed of the memory is also determined by the maximum speed that is supported by the processor, the speed settings in the BIOS, and the operating voltage of the system.

Topics:

· Supported memory
· Memory speed

Supported memory

The table below list the supported DIMMs for the PowerEdge C6525:

Table 6. Supported DIMMs

DIMM speed (MHz)	DIMM type	DIMM capacity (GB)	Ranks per DIMM	Data width	DIMM volts (V)
3200	RDIMM	8	1	x8	1.2
3200	RDIMM	16	2	x8	1.2
3200	RDIMM	32	2	x4	1.2
3200	RDIMM	64	2	x4	1.2
2666	LRDIMM	128	8	x4	1.2

Memory speed

The PowerEdge C6525 supports memory speeds of 3200 MT/s, 2933 MT/s, 2667 MT/s, 2400 MT/s, 2133 MT/s, and 1866MT/s depending on the DIMM types installed and the configuration. All memory on all processors and channels run at the same speed and voltage. By default, this speed will be the highest speed supported by the CPU and the DIMMs. For example both DIMMs and CPUs must be capable of running at 3200 MT/s in order for memory to run at 3200 MT/s (specific CPU / DIMM configuration required). 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.

Table 7. Memory configuration and performance details

DIMM type	DIMM ranking	Capacity (GB)	DIMM rated voltage, Speed	2nd Generation AMD® EPYC™ processors
				1 DPC
RDIMM	1R / 2R	8GB, 16GB, 32GB, 64GB	DDR4 (1.2V), 3200MHz	D: 3200
LRDIMM	2S4R	128GB	DDR4 (1.2V), 2666MHz	D: 2666

Storage

The PowerEdge C6525 enables multiple storage configurations to tune the system configuration for a wide variety of workloads. The C6400 chassis is available in the following configuration types:

- No hard drives in a No-Backplane Configuration
- 24 x 2.5 -inch Direct backplane configuration with up to six SAS/SATA drives per C6525 node
- 24 x 2.5 -inch NVMe backplane configuration with up to six drives per C6525 node out of which 2 drives can be NVMe drives
- 12 x 3.5 -inch Direct backplane configuration with up to 3 SAS/SATA drives per C6525 node

Topics:

- Supported drives
- Storage controllers
- Optical drives

Supported drives

The following table list the supported drives by the PowerEdge C6525:

Table 8. Supported hard drives

Form factor	Interface	Speed	Capacities
2.5 -inch	SATA SSD	6GB	240GB, 480GB
	SAS SSD	12GB	400GB, 480GB, 600GB, 800GB, 900GB, 960GB, 1.8TB, 1.9TB, 2.4TB
3.5 -inch	SATA HDD	6GB	4TB, 8TB, 12TB
	SAS HDD	12GB	2TB, 4TB, 8TB, 12TB

Storage controllers

The PowerEdge C6525 supports the on-board chipset SATA controller as well as a range of PERC storage controllers. The PERC H345/H745, and the HBA345 are available in a PCIe form factor.

Table 9. Supported storage controllers

Storage controller	Models
Storage controllers	PERC H345, PERC H745, HBA 345
Integrated storage controllers	S150

Optical drives

The PowerEdge C6400 chassis does not support optical drives. If needed, any external USB 3.0 compliant drive can be used, although no specific vendors have been qualified.

Networking and PCIe

The PowerEdge C6525 is installed with one Broadcom BCM54210S-Gigabit Ethernet controller as an independent Ethernet interface device.

The following table list the supported OCP 3.0 NIC Cards for the PowerEdge C6525:

Table 10. Supported PCIe cards

Form Factor	Type	Speed	Vendor
PCIe LP	NIC	1GbE	Intel
PCIe LP	NIC	10GbE	Intel
PCIe LP	NIC	1GBE	Broadcom
PCIe LP	NIC	25GbE	Broadcom
PCIe LP	NIC	10GbE	Broadcom
PCIe LP	NIC	10GbE	QLogic
PCIe LP	NIC	25GbE	QLogic
PCIe LP	NIC	HDR100 VPI	Mellanox
PCIe LP	NIC	25GbE	Mellanox

The following table list the supported OCP 3.0 NIC cards for the PowerEdge C6525:

Table 11. Supported OCP 3.0 NIC cards

Form Factor	Type	Speed	Vendor
SFF	NIC	10GbE	BROADCOM
SFF	NIC	1GbE	BROADCOM
SFF	NIC	10GbE	BROADCOM
SFF	NIC	25GbE	BROADCOM
SFF	NIC	25GbE	BROADCOM
SFF	NIC	10GbE	QLogic
SFF	NIC	10GbE	QLogic
SFF	NIC	25GbE	QLogic
SFF	NIC	10GbE	QLogic
SFF	NIC	10GbE	QLogic
SFF	NIC	25GbE	MELLANOX
SFF	NIC	100GbE	MELLANOX
SFF	NIC	10GbE	INTEL
SFF	NIC	1GbE	INTEL
SFF	NIC	10GbE	INTEL
SFF	NIC	10GbE	INTEL
SFF	NIC	10GbE	INTEL
SFF	NIC	25GbE	SolarFlare
SFF	NIC	25GbE	SolarFlare

Direct contact liquid cooling sled

Thermal management of the platform helps deliver high performance with the right amount of cooling to components, while maintaining the lowest fan speeds possible. This is done across a wide range of ambient temperatures from 20°C to 35°C (68°F to 95°F) and to extended ambient temperature ranges (see Environmental Specifications). The benefits to you are lower fan power consumption (lower server system power and data center power consumption) and greater acoustical versatility. The platform is quiet enough to be used in an office environment in typical and minimum configurations.

Direct contact liquid cooling offers multiple advantages over air cooling:

- Improves overall data center Power Utilization Efficiency (PUE)
- Improves power efficiency of servers and eliminates need for costly cooling infrastructure such as chillers and CRAC units, thus lowering overall cost and improving TCO.
- Improves life of IT infrastructure

Liquid cooled sled

A PowerEdge C6525 Sled can be configured from the factory to use Liquid Cooling instead of Air Cooling. Processor Thermal Configuration Option can be configured in the ordering tools to select Direct Liquid Cooling. CPU Cold Plates are installed in the factory and the system is shipped with cold plates that are installed in each sled, with each sled placed in the chassis. Dell EMC provides support and warranty for Cold Plates.

The CoolIT Systems cold plates, which are designed for use with AMD, are passive CPU Cooling solutions that are managed by centralized pumping architectures. These passive cold plate assemblies replace heat sinks and are purpose-designed to accommodate the PowerEdge C6525 compute sleds. For PowerEdge C6525 DCLC solution, the cold plates are sold and supported by Dell EMC.

Rack manifolds

Coolant tubes come out of each sled and connect to a manifold unit. Made with reliable stainless steel and 100% nondrip quick disconnects, Rack Manifolds can be arranged horizontally or vertically for a manual connection at the front or back of the rack. For the PowerEdge C6525 DCLC solution, the manifolds are sold (over S&P) and supported by CoolIT or Authorized Service Provider.

CoolIT Systems reliable stainless steel Manifolds employ dry-break, quick disconnect technology in horizontal or vertical chassis. Key benefits include:

- Easy installation
- Simple connection and disconnection
- Servers are hot-swappable.
- 100% dry-break quick disconnects.
- Flexible in size and orientation
- Color coded for hot (red) and cold (blue)

Rack Manifolds for liquid cooled solution can be ordered over S&P. Usually, a custom SKU is offered by CoolIT to match the customer requirements.

Heat exchangers

While Server Modules and Manifold Modules are installed with each system and are local to the rack, the appropriate heat rejection method may vary. CoolIT Systems Rack DCLC product line offers various Heat Exchange Modules depending on load requirements and availability of facility water, including CHx (Liquid-to-Liquid), AHx (Liquid-to-Air) and custom options.

For the PowerEdge C6525 DCLC solution, the heat exchangers are sold (over S&P) and supported by CoolIT or Authorized Service Provider. CoolIT has multiple options for heat exchangers that can be ordered over S&P.

- CHx20: A top of the rack, air to liquid exchanger. Supports about 20 kW of cooling capacity per rack (not validated by Dell; custom solution with CoolIT).
- CHx40: A 2U, rackmount solution which manages a single rack. Supports 40 kW cooling capacity per rack.
- CHx80: A 4U, rackmount solution which manages a single rack. Supports up to 100 kW cooling capacity per rack.

- CHx650: A stand-alone solution which manages a network of rack servers. Supports 40 kW+ cooling capacity.

Besides providing cooling for multiple racks, the CHx650 also minimizes the points where facility water needs to be connected to, hence simplifying overall data center design and lowering data center labor costs needed to accommodate facility water connections.

CoolIT services and support

CoolIT offers consulting, installation, and support services for the DCLC solution. Support, warranty, and installation service will directly be quoted by CoolIT on manifolds and heat exchangers. Contact CoolIT to get quotes on their services and warranty. CoolIT can be engaged for presales support over email address: dell_salessupport@coolitsystems.com.

Power supplies, thermal, and acoustics

Power supplies

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 table below shows the power supply unit options that are available for the platform.

The table below shows the supported power supplies for the PowerEdge C6525:

Table 12. Supported power supplies

Wattage	Frequency	Voltage	Class
1600 W	50/60	100~240	PLATINUM
2000 W	50/60	100~240	PLATINUM
2400 W	50/60	100~240	PLATINUM

The following table shows the highline and lowline ratings:

Table 13. Highline and lowline ratings

Feature	1600W_AC	2000W_AC	2000W_DC	2400W_AC
Peak Power (Highline)	264 V (1600 W)	264 V (2000 W)	288 V (2000 W)	264 V (2400 W)
Highline	180 V (1600 W)	180 V (2000 W)	180 V (2000 W)	180 V (2400 W)
Peak Power (Lowline)	169 V (800 W)	169 V (1000 W)	NA	168 V (1400 W)
Lowline	90 V (800 W)	90 V (1000 W)	NA	90 V (1400 W)
Highline 240 VDC	NA	NA	Support	NA

Thermal

The following tables illustrates key restrictions on ambient temperature, peripherals based on which CPU is configured in the system. All inlet temperatures provided below are in continuous degrees centigrade.

Table 14. 2.5 -inch direct / 2.5 -inch NVMe dual socket air cooled

2.5 -inch direct / 2.5 -inch NVMe

CPU	TDP	Cores	24x HDDs	16x HDDs	8x HDDs	4x HDDs	No BP
7742	225	64	Not Supported	Not Supported	Not Supported	Not Supported	20°C
7702	200	64	20°C	20 °C	25°C	25°C	30°C
7542	225	32	Not Supported	Not Supported	Not Supported	Not Supported	30°C
7502	180	32	20°C	20°C	25°C	25°C	30°C
7402	180	24	20°C	20°C	25°C	25°C	30°C
7452	155	32	25°C	25°C	25°C	25°C	30°C
7352	155	24	25°C	25°C	25°C	25°C	30°C
7302	155	16	25°C	25°C	25°C	25°C	30°C
7262	155	8	25°C	25°C	25°C	25°C	30°C

Table 15. 3.5 -inch direct dual socket air cooled

3.5 -inch direct

CPU	TDP	Cores	12x HDDs	8x HDDs	4x HDDs
7742	225	64	Not Supported	Not Supported	Not Supported
7702	200	64	Not Supported	Not Supported	Not Supported
7542	225	32	Not Supported	Not Supported	Not Supported
7502	180	32	Not Supported	Not Supported	Not Supported
7402	180	24	Not Supported	Not Supported	Not Supported
7452	155	32	Not Supported	Not Supported	Not Supported
7352	155	24	Not Supported	Not Supported	Not Supported
7302	155	16	Not Supported	Not Supported	Not Supported
7262	155	8	Not Supported	Not Supported	Not Supported

ⓘ **NOTE:**

- **85°C Optics Transceiver is required for OCP cards.**
- **Additional thermal restriction required for:**
  - **128GB LRDIMMs (lower specified temp by 5°C)**
  - **GPU configuration.**

Table 16. 2.5 -inch direct / 2.5 -inch NVMe dual socket liquid cooled

2.5 -inch direct / 2.5 -inch NVMe

CPU	TDP	Cores	24x HDDs	16x HDDs	8x HDDs	4x HDDs	No BP
7742	225	64	35°C	35°C	35°C	35°C	35°C
7702	200	64	35°C	35°C	35°C	35°C	35°C
7542	225	32	35°C	35°C	35°C	35°C	35°C
7502	180	32	35°C	35°C	35°C	35°C	35°C
7402	180	24	35°C	35°C	35°C	35°C	35°C
7452	155	32	35°C	35°C	35°C	35°C	35°C
7352	155	24	35°C	35°C	35°C	35°C	35°C
7302	155	16	35°C	35°C	35°C	35°C	35°C
7262	155	8	35°C	35°C	35°C	35°C	35°C

Table 17. 3.5 -inch direct dual socket liquid cooled

3.5 -inch direct

CPU	TDP	Cores	12x HDDs	8x HDDs	4x HDDs
7742	225	64	35°C	35°C	35°C
7702	200	64	35°C	35°C	35°C
7542	225	32	35°C	35°C	35°C
7502	180	32	35°C	35°C	35°C
7402	180	24	35°C	35°C	35°C
7452	155	32	35°C	35°C	35°C
7352	155	24	35°C	35°C	35°C
7302	155	16	35°C	35°C	35°C
7262	155	8	35°C	35°C	35°C

> ⓘ **NOTE: Additional thermal restriction is required for:**
>
> - **128GB LRDIMMs (lower specified temp by 5°C)**
> - **GPU configuration**

Table 18. 2.5 -inch direct / 2.5 -inch NVMe single socket air cooled

2.5 -inch direct / 2.5 -inch NVMe

CPU	TDP	Cores	24x HDDs	16x HDDs	8x HDDs	4x HDDs	No BP
7742	225	64	30°C	30°C	30°C	35°C	35°C
7702	200	64	35°C	35°C	35°C	35°C	35°C
7542	225	32	30°C	30°C	30°C	35°C	35°C
7502	180	32	35°C	35°C	35°C	35°C	35°C
7402	180	24	35°C	35°C	35°C	35°C	35°C
7452	155	32	35°C	35°C	35°C	35°C	35°C
7352	155	24	35°C	35°C	35°C	35°C	35°C
7302	155	16	35°C	35°C	35°C	35°C	35°C
7262	155	8	35°C	35°C	35°C	35°C	35°C

Table 19. 3.5 -inch direct single socket air cooled

3.5 -inch direct

CPU	TDP	Cores	12x HDDs	8x HDDs	4x HDDs
7742	225	64	20°C	25°C	25°C
7702	200	64	25°C	35°C	35°C
7542	225	32	20°C	35°C	35°C
7502	180	32	25°C	35°C	35°C
7402	180	24	25°C	35°C	35°C
7452	155	32	30°C	35°C	35°C
7352	155	24	30°C	35°C	35°C
7302	155	16	30°C	35°C	35°C
7262	155	8	30°C	35°C	35°C

Acoustics

The PowerEdge C6525 is required to adhere to the acoustical Category 5 through Category 6. Hardware configurations that correspond to the categories will be specified in C6400 chassis. The following documents outline Dell EMC Acoustical Engineering testing procedures and general acoustical requirements:

- Dell Enterprise Acoustical Specifications and Test Procedures, AC0142 (Rev.A06), AC0158 (Rev.A02), & AC0159 (Rev.A01)
- Configuration Specification Document (DELL P/N: ENG0019829)
- Fan Part Specifications (SPEC,FAN,THRM,ELEC,ACTC,"C6400", 60x56mm, Rev.X03)
- PTAVS, that is, PSU Thermal, Acoustical, and Vibration Specification for the PSU
- 2N563 (Rev.A06), fan qualification process
- M7506 (Rev.A01) fan stand-alone test procedure
- P8832 (Rev.A03) PSU stand-alone test procedure

Category 5 Unattended data center - The phrase "unattended data center" is used to mean a space in which many (from tens to 1000 s) of Enterprise products are deployed together, its own heating and cooling systems condition the space, and operators or service person of equipment enter only to deploy, service, or decommission equipment. Hearing protection or hearing monitoring programs may be expected (per government or company guidelines) in these areas. Examples in this category include monolithic rack products.

Category 6 Data center modular/modular enclosure - Applies to blade for or a blade enclosure itself. One underlying assumption is that blade enclosures are deployed in unattended data centers (see description in Category 5). If the parties responsible for selection of product acoustical specification category determine that a specific blade or blade enclosure will be deployed in a more stringent acoustical environment, then specific configurations, capabilities, and/or user ships must be requested in formal documentation so that features to support the more restrictive performance may be designed as appropriate.

Supported Operating systems

The following is the list of supported operating systems for the PowerEdge C6525:

- RedHat Enterprise Linux 7.6 Server x86_64
- RedHat Enterprise Linux 8.0 Server x86_64
- Novell SuSE Linux Enterprise Server 11 (with PLDP) SP4 x86_64
- Novell SuSE Linux Enterprise Server 12 SP2 x86_64
- Microsoft Windows Server 2019
- Ubuntu 16.04 LTS
- VMWare vSphere 2016 U1 (ESXi 6.5 U1)
- VMWare vSphere 2015 U3 (ESXi 6.0 U3)

Dell EMC OpenManage systems management

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

Start with a firm foundation for efficient hardware management using OpenManage tools, utilities, and management consoles. OpenManage systems management solutions consist of a combination of embedded management features and software products that help you automate and simplify the entire server life cycle: deploy, update, monitor, and maintain. OpenManage solutions are innovatively designed for simplicity and ease of use to help you reduce complexity, save time, achieve efficiency, control costs, and empower productivity. OpenManage centers on efficient management of server life cycle.
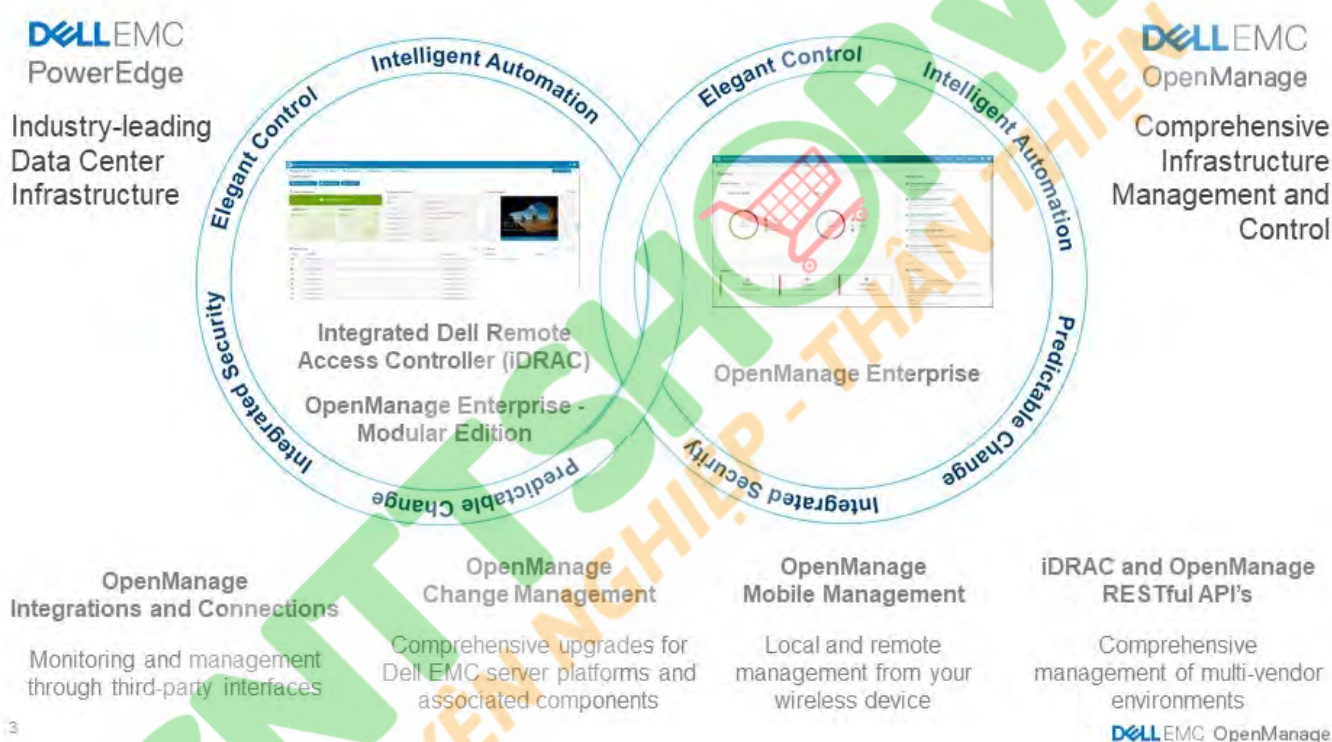
Figure 5. Server lifecycle management operations

Topics:

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

iDRAC9 with Lifecycle Controller

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

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

Dell EMC BMC and iDRAC9 feature comparison

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

Table 20. Feature comparison for Dell EMC BMC and iDRAC9 Enterprise

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

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

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

Agent-free management

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

Agent-based management

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

Dell EMC consoles

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

Dell EMC OpenManage Enterprise

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

Simplify

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

Unify

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

Automated

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

Secure

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

For more information, see the Dell OpenManage Enterprise page.

OpenManage Mobile

OpenManage Mobile (OMM) is a software application that enables 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 an OpenManage Essentials console or by directly accessing the server's iDRAC.

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

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

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

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

Key Features of OpenManage Mobile when connected through iDRAC:

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

OpenManage Enterprise Power Manager

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

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

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

Dell EMC OpenManage systems management tools, utilities, and protocols

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

Dell EMC Repository Manager

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

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

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

Dell EMC Repository Manager can create the following deployment tools:

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

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

Dell Update Packages

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

DUPs can be executed in UI or in CLI-mode.

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

Dell Remote Access Controller Administration (RACADM) CLI

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

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

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

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

iDRAC with Lifecycle Controller Embedded Management APIs

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

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

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

Integration with third-party consoles

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

OpenManage Integration Suite for Microsoft System Center

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

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

OpenManage Integration for VMware vCenter

The OpenManage Integration for VMware vCenter 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

(i) **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 Technologies Services

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

For more information, see DellEMC.com/Services

Topics:

- ProDeploy Enterprise Suite and Residency Services
- Remote Consulting Services
- Data Migration Service
- ProSupport Enterprise Suite
- ProSupport Plus
- ProSupport
- ProSupport One for Data Center
- ProSupport for HPC
- Support Technologies
- Education Services
- Dell Technologies Consulting Services
- Managed 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
	Project documentation with knowledge transfer		●	●
Post-deployment	Deployment verification		●	●
	Configuration data transfer to Dell EMC technical support		●	●
	30-days of post-deployment configuration assistance			●
	Training credits for Dell EMC Education Services			●

Figure 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 leading operating systems and hypervisors as well as most versions of Dell EMC SupportAssist and OpenManage system management utilities. To prepare for the deployment, we conduct a site readiness review and implementation planning. 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 by experienced technicians who know Dell EMC servers inside and out.

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

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

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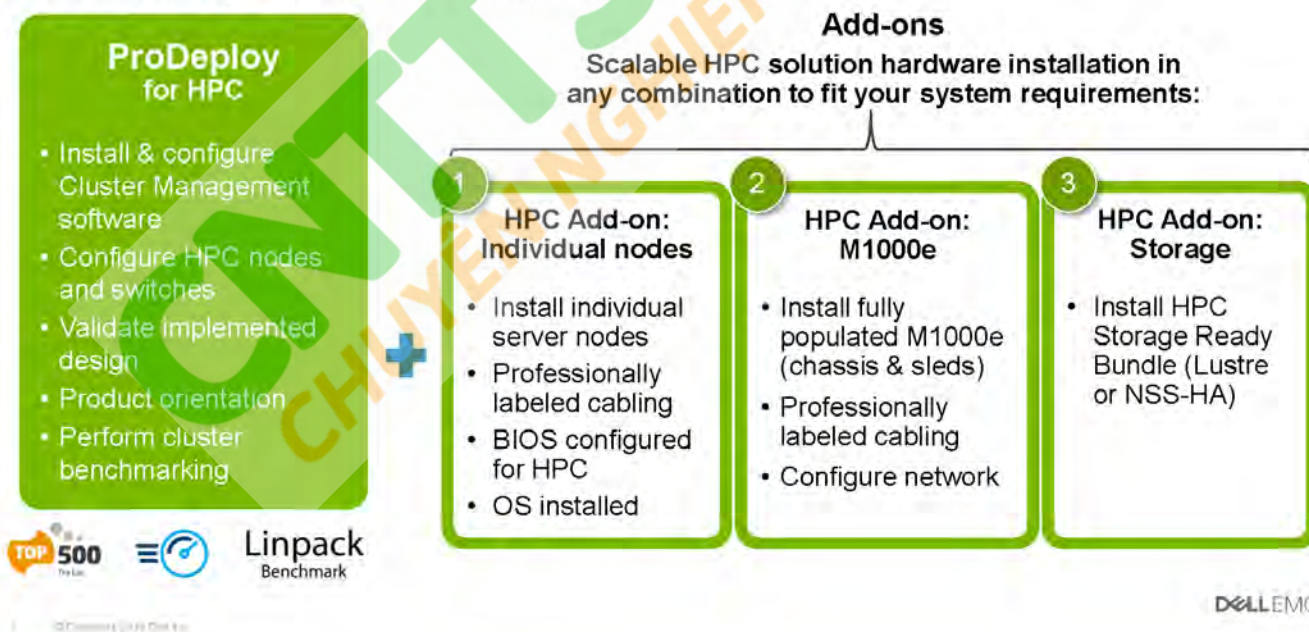
Server Configuration Services

With Rack Integration and other Server Configuration Services, you save time by receiving your systems racked, cabled, tested, and ready to integrate into the data center. Dell EMC staff pre-configure RAID, BIOS and iDRAC settings, install system images, and even install 3rd party hardware and software.

For more information, see Server Configuration Services.

Residency Services

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

Remote Consulting Services

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

Data Migration Service

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

ProSupport Enterprise Suite

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

Choose support models based on how you use technology and where you want to allocate resources. From the desktop to the data center, address everyday IT challenges, such as unplanned downtime, mission-critical needs, data and asset protection, support planning, resource allocation, software application management and more. Optimize your IT resources by choosing the right support model.
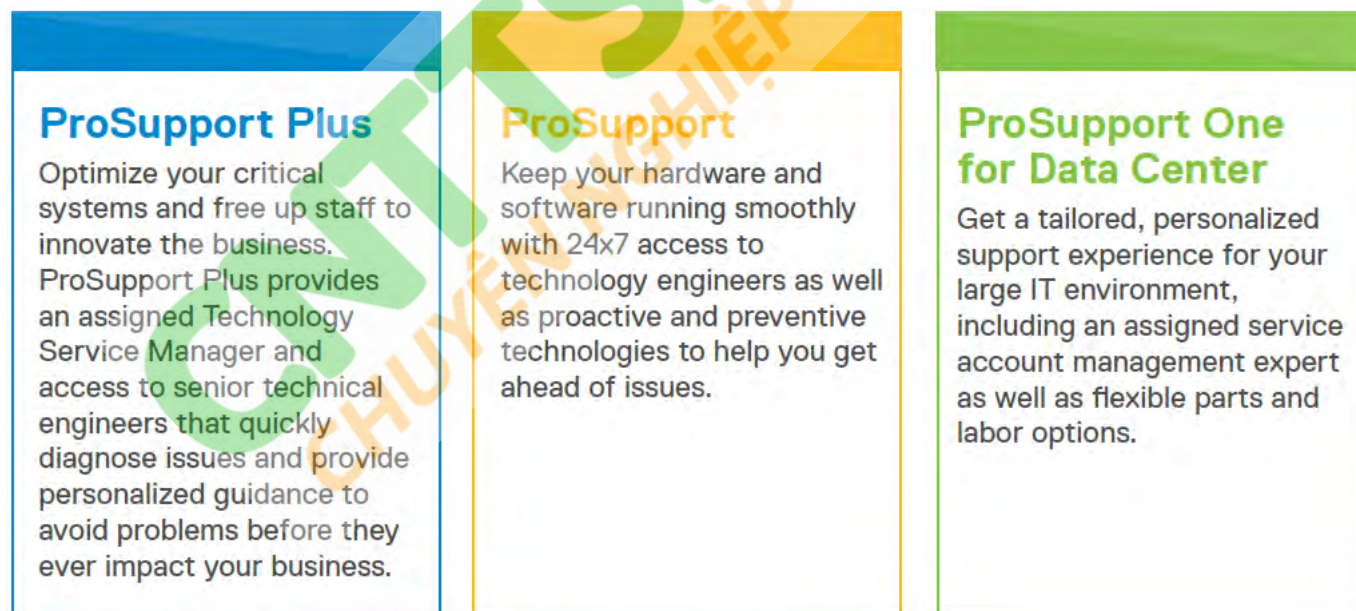
ProSupport Plus
Optimize your critical systems and free up staff to innovate the business. ProSupport Plus provides an assigned Technology Service Manager and access to senior technical engineers that quickly diagnose issues and provide personalized guidance to avoid problems before they ever impact your business.

ProSupport
Keep your hardware and software running smoothly with 24x7 access to technology engineers as well as proactive and preventive technologies to help you get ahead of issues.

ProSupport One for Data Center
Get a tailored, personalized support experience for your large IT environment, including an assigned service account management expert as well as flexible parts and labor options.

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:

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

ProSupport

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

- 24x7x365 access to certified hardware and software experts
- 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
- A single point of accountability for any eligible 3rd party software

Enterprise Support Services
Feature Comparison

	Basic	ProSupport	ProSupport Plus
Remote technical support	9x5	24x7	24x7
Covered products	Hardware	Hardware Software	Hardware Software
Onsite hardware support	Next business day	Next business day or 4hr mission critical	Next business day or 4 hr mission critical
Automated issue detection & proactive case creation		●	●
Self-service case initiation and management		●	●
Access to software updates		●	●
Priority access to specialized support experts			●
3rd party software support			●
Assigned Technology Service Manager			●
Personalized assessments and recommendations			●
Semiannual systems maintenance			●

Figure 8. Dell EMC Enterprise Support model

ProSupport One for Data Center

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

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

ProSupport for HPC

The ProSupport for HPC provides solution-aware support including:

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

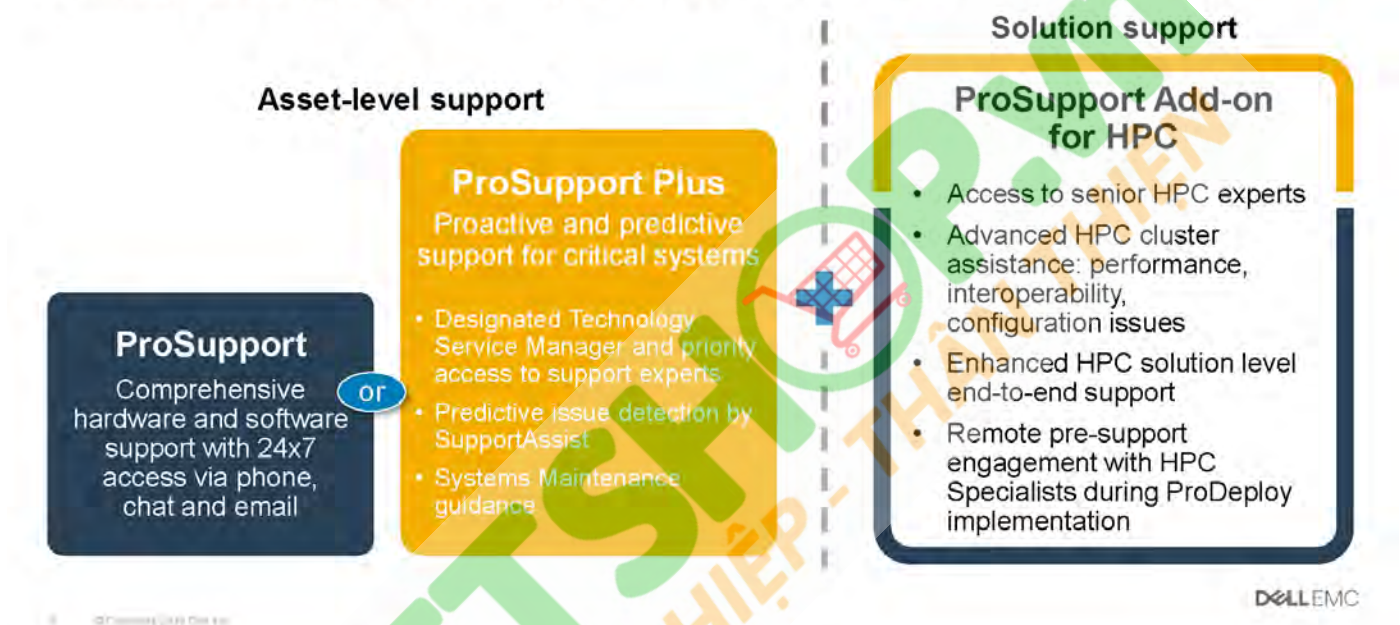Learn more at DellEMC.com/HPC-Services.

Figure 9. Prosupport for HPC

Support Technologies

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

SupportAssist

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

- Value - SupportAssist is available to all 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 10. SupportAssist model

Get started at Dell.com/SupportAssist

TechDirect

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

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

Or, access all your Dell EMC certification and authorization 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

Education Services

Build the IT skills required to influence the transformational outcomes of the business. Enable talent and empower teams with the right skills to lead and execute transformational strategy that drives competitive advantage. Leverage the training and certification required for real transformation.

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

Dell Technologies Consulting Services

Our expert consultants help you transform faster and quickly achieve business outcomes for high value workloads being considered for the Dell EMC PowerEdge.

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

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

Managed Services

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

Appendix A. Additional specifications

Chassis dimension

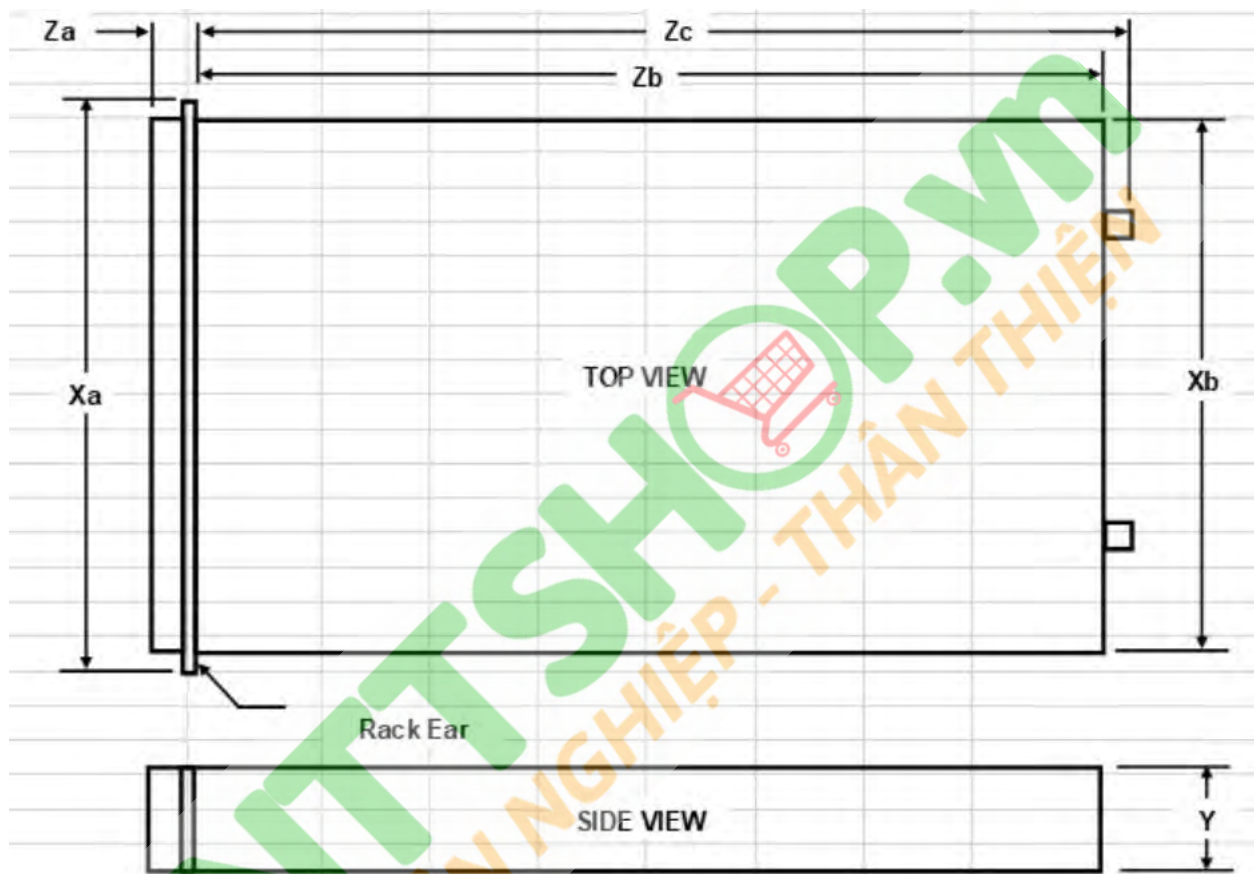This section describes the physical dimensions of the system.

Figure 11. Chassis dimension

Table 21. Chassis dimension descriptions

Chassis	Xa	Xb	Y	Za	Zb	Zc	Chassis
C6400	482.6	448	86.8	26.8	763.2	802.7	2U

Chassis weight

The following list the system weight for the PowerEdge C6525:

- 3.5 -inch HDD max weight = 47.4kg
- 2.5 -inch HDD max weight = 39.4kg
- No backplane max weight = 36.6kg

Video

The PowerEdge C6525 supports the following video resolution and refresh rates:

Table 22. Video resolution and refresh rates

Resolution	Refresh Rate	Horizontal Freq.	Pixel Clock	DVO DisplayPort
1024 x 768	60 Hz	48.4 kHz	65.0 MHz	Yes*
1280 x 800	60 Hz	49.7 kHz	83.5 MHz	Yes*
1280 x 1024	60 Hz	64.0 kH	108.0 MHz	Yes*
1360 x 768	60 Hz	47.71 kHz	85.5 MHz	Yes*
1440 x 900	60 Hz	55.9 kHz	106.5 MHz	Yes*
1600 x 900	60 Hz	55.54 kHz	97.75 MHz	Yes*
1600 x 1200	60 Hz	75.0 kHz	162.0 MHz	Yes*
1680 x 1050	60 Hz	64.7 kHz	119.0 MHz	Yes*
1920 x 1080	60 Hz (RB)	67.158 kHz	173.0 MHz	No
1920 x 1200	60 Hz (RB)	74.556 kHz	193.25 MHz	No

(i) **NOTE:**

- *DVO - DP is for investigation only, dependent on Nuvoton DVO capabilities to support up to 165MHz.Rear Panel Performance is TBD subject to final board design and losses to rear VGA connector.
- *(RB) - Reduced Blanking for Digital Displays requiring less blank time. This was introduced for Signal Integrity improvements by reducing Pixel Clock rates for VGA- Analog input devices.

Environmental specifications

Temperature specifications

The table below details the environmental specifications for the PowerEdge C6525. For additional information see dell.com/ environmental_datasheets

Table 23. 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 (i) **NOTE: Certain system configurations may require reductions in the upper temperature limits.** (i) **NOTE: The performance of the system may be impacted when operating above the upper temperature limit or with a faulty fan.**
Maximum temperature gradient (operating and storage)	20°C/h (68°F/h)

Table 24. Relative humidity

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.

Detailed specifications for Humidity, Vibration, Shock, Altitude, Temperature de-rating, Particulate and gaseous contamination, standard and extended operating specifications can be found in the C6525 Installation and Service Manual.

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