DELL EMC

Technical Guide

Dell EMC PowerEdge MX840c

A full-featured, storage-rich, flexible 4-socket compute sled that is ideal for database-driven mission critical applications, performance workloads, and dense virtualization. The following material introduces new technologies and features and is an instructional aid and online reference for the Dell EMC PowerEdge MX840c.

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Product overview

The PowerEdge MX portfolio delivers a fully managed, high performance system that will free up valuable IT resources and personnel so you can focus on innovation. Break free from the bounds of technology silos and routine, daily and time consuming operational management to realize your IT and digital business transformations.

PowerEdge MX, a unified, high performance kinetic infrastructure, provides the agility, resiliency and efficiency to optimize a wide variety of traditional and new, emerging data center workloads and applications. With its kinetic architecture and agile management the MX portfolio dynamically configures compute, storage and fabric, increases team effectiveness and accelerates operations. Its responsive design delivers the innovation and longevity customers of all sizes need for their IT and digital business transformations. The PowerEdge MX ecosystem consists of a new chassis infrastructure, compute sleds, fabric switches, and a storage sled, all managed by OpenManage Enterprise-Modular Edition.

Introduction

Designed for Dell EMC's PowerEdge MX kinetic infrastructure ecosystem, the PowerEdge MX840c server, with dense compute, exceptionally large memory capacity, and expandable storage subsystem, delivers the flexibility and agility needed in today's demanding, software-defined data centers. This full-featured, storage-rich, flexible 4-socket compute sled is ideal for database-driven mission critical applications, performance workloads, and dense virtualization.

New Technologies

The following table shows the new technologies available on the PowerEdge MX840c:

Table 1. New technologies

Technologies	Description
Intel® Xeon Processor Scalable Family	• Up to 28 cores • Intel® Ultra Path Interconnect (UPI), up to 10.4 GT/s, with up to 2 links between sockets. • Integrated PCIe Gen3 48 lanes/socket
Intel® C628 chipset	• Intel® Platform Controller Hub (PCH) • Optional Intel® QuickAssist Technology (QAT)
DDR4 memory	MX840c supports three DIMM types: • RDIMM: Registered DIMM – Provides for higher capacity options and advanced RAS features. • LRDIMM: Load Reduced DIMM – Provides maximum capacity but higher power consumption. • NVDIMM: Non-Volatile DIMM – Provides a persistent memory solution with NAND and DRAM that maintains data in power loss, system crash, or normal shutdown. This solution requires a battery as a power source for an AC loss condition. • 6 DDR4 channels per socket, 2 DIMMs per channel (2DPC) • Up to 2666MT/s (depending on configuration) NVDIMM-N, RDIMM and LRDIMM support.

Technologies	Description
iDRAC with Lifecycle Controller	Works in conjunction with OpenManage Enterprise – Modular, embedded systems management solution for Dell EMC servers features hardware and firmware inventory and alerting, faster performance and many more features.

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System features

Product comparison

The following table shows the comparison between the PowerEdge MX840c (designed for PowerEdge MX7000 chassis) and PowerEdge M830/FC830 (designed for PowerEdge M1000e/VRTX and FX2/FX2S chassis) modular server:

Table 2. Comparison table

Feature	PowerEdge MX840c	PowerEdge M830/FC830
Processor	• Two or four Intel® Xeon Scalable Processors • Up to 28 cores per socket • Max TDP: 205W	• Two or four Intel® Xeon® E5-4600 v4 Processors • Up to 22 cores per socket • Max TDP: 135 W
Chipset	• Intel® C628 • Optional Intel® QuickAssist Technology (QAT)	• Intel® C610
Memory	• 48 DIMM slots • 12 slots enabled for NVDIMM-N • Maximum capacity (RDIMM): 1.5TB • Maximum capacity (LRDIMM): 6TB • Maximum capacity (NVDIMM-N): 192GB	• 48 DIMM sockets • Maximum capacity: 3TB
Storage Controllers	• S140 Software RAID • RAID HBA330 MX • H730P MX Performance RAID, 2GB NV cache • H745P MX Performance RAID, internal and external drive connect, 8GB NV cache • HBA330 MX mini-mezz, HBA, external drive connect, no cache	• S130 Software RAID • H330 Entry/Value RAID, no cache • H730 Value RAID, 1GB NV cache • H730P Performance RAID, 2GB NV cache
Drive Support	• 2.5-inch 12Gb SAS • 2.5-inch 6Gb SATA • 2.5-inch NVMe	• 2.5-inch 12Gb SAS • 2.5-inch 6Gb SATA • 2.5-inch NVMe • 1.8-inch SAS
Drive Backplanes	• 8 x 2.5-inch SAS/SATA/NVMe • 6 x 2.5-inch SAS/SATA/NVMe for NVDIMM implementations	• 4 x 2.5-inch SAS • 4 x 2.5-inch SATA • 2 x 2.5-inch SATA + 2 x 2.5-inch NVMe • 12 x 1.8-inch SAS
Internal Boot	• Choice of BOSS (Boot Optimized Storage Subsystem) or IDSDM (Internal Dual SD Module)	• IDSDM (Internal Dual SD Module)
I/O Slots	• Four PCIe 3.0 x16 Mezz slots (Fabric A and B)	• Two bNDC (Ethernet) • Four PCIe 3.0 x8 Mezz slots (M1000e) • Four PCIe 2.0 x8 switch mezz (VRTX)

Feature	PowerEdge MX840c	PowerEdge M830/FC830
	• Two PCIe 3.0 x16 Mini-mezz slot (Fabric C)	• PCIe adapter for FX2S enablement (FX2)
USB	• One internal USB 3.0 port • One external USB 3.0 port • One USB 2.0 management port to iDRAC • One USB 3.0 + USB 2.0 port for IDSDM	• One external USB 3.0 port • One external USB 2.0 port • One internal USB port
Video	• Integrated VGA controller in iDRAC • VGA over LAN • 4Gb DDR4 shared with iDRAC application memory	• Integrated VGA controller in iDRAC • VGA over LAN • 2Gb DDR3 shared with iDRAC application memory
Management	• iDRAC9	• iDRAC8
Security	• Optional TPM 1.2/2.0 • Cryptographically signed firmware • Silicon Root of Trust • Secure Boot • System Lockdown • System Erase	• Optional TPM 1.2
Fans	• In chassis	• In chassis
Power Supplies	• Power provided by chassis	• Power provided by chassis
Chassis	• MX7000	• M830: M1000e / VRTX • FC830: FX2 / FX2S

Specifications

Table 3. Technical specifications

Feature	Specifications
Form factor	• Double-wide, full-height compute sled
Processor	• Intel® Xeon Scalable Processor family
Processor sockets	• 4 sockets
Internal interconnect	• Intel® Ultra Path Interconnect (UPI) up to 10.4GT/s with up to two links between sockets
Chipset	• Intel® C628 • Optional Intel® QuickAssist Technology (QAT)
Memory	• Supports RDIMM, LRDIMM, and NVDIMM-N • DDR4 2400 MT/s and 2666 MT/s • 8GB, 16GB, 32GB, 64GB, and 128GB • Minimum 8GB per module • 6TB (LRDIMM) or 1.5TB (RDIMM) maximum RAM • Support up to 192GB NVDIMM
Drive support	• 2.5-inch 12Gb SAS • 2.5-inch 6Gb SATA

Feature	Specifications
	• 2.5-inch NVMe
Drive backplanes	• 8 x 2.5-inch SAS/SATA/NVMe (universal backplane) • 6 x 2.5-inch SAS/SATA/NVMe (universal BP) for NVDIMM implementations
RAID controller	• S140 (SATA and NVMe) • HBA3330 MX • PERC H730F MX • PERC H745P MX • PERC HBA330 mini-mezzanine card
Mezzanine slots	• Four PCIe 3.0 x16 Mezz slots (Fabric A and B). • Two PCIe 3.0 x16 Mini-mezz slot (Fabric C).
Video	• Integrated VGA controller in iDRAC, VGA over LAN • 4Gb DDR4 shared with iDRAC application memory
Internal boot options	Choice of BOSS (Boot Optimized Storage Subsystem) or IDSDM (Internal Dual SD Module)
USB	• One internal and one external USB 3.0 port
Trusted Platform Module	TPM 1.2, TPM 2.0
Systems management	• Systems management: IPMI 2.0 compliant: – Dell EMC OpenManage Enterprise-Modular – Dell EMC OpenManage Mobile • Remote management: – iDRAC9 with Lifecycle Controller – iDRAC9 Express (standard) – iDRAC9 Enterprise (upgrade)

3

Chassis view and features

Front view of the sled

The front view displays the features available on the front of the sled.

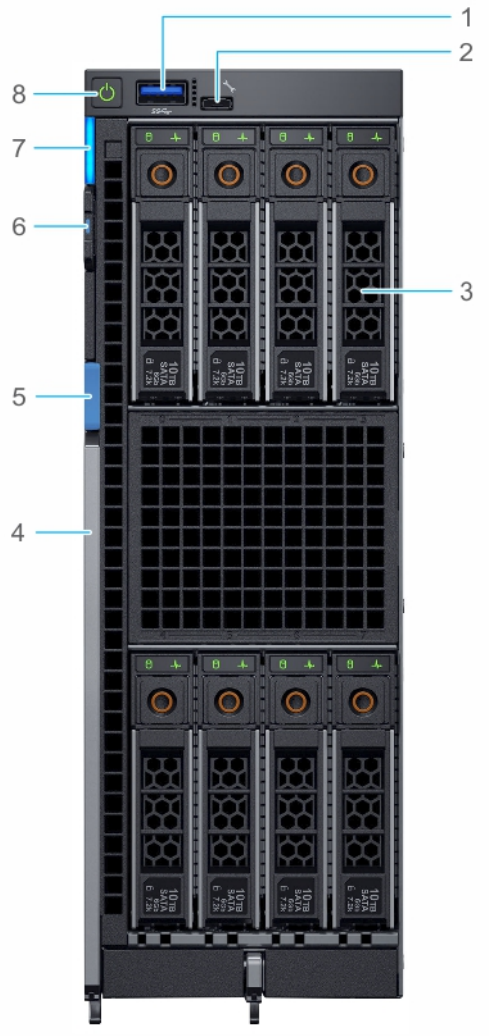

Figure 1. Front view of the sled

1. USB 3.0 port
2. iDRAC Direct (Micro-AB USB) port
3. Drives
4. Release lever
5. Lever button
6. Information tag
7. System ID and status LED indicator
8. Power button

Internal system view

The PowerEdge MX840c has been designed fo easy access to components for efficient cooling. The MX840c supports up to two processors, 48 DIMMs, four mezzanine cards, and two mini-mezzanine cards.

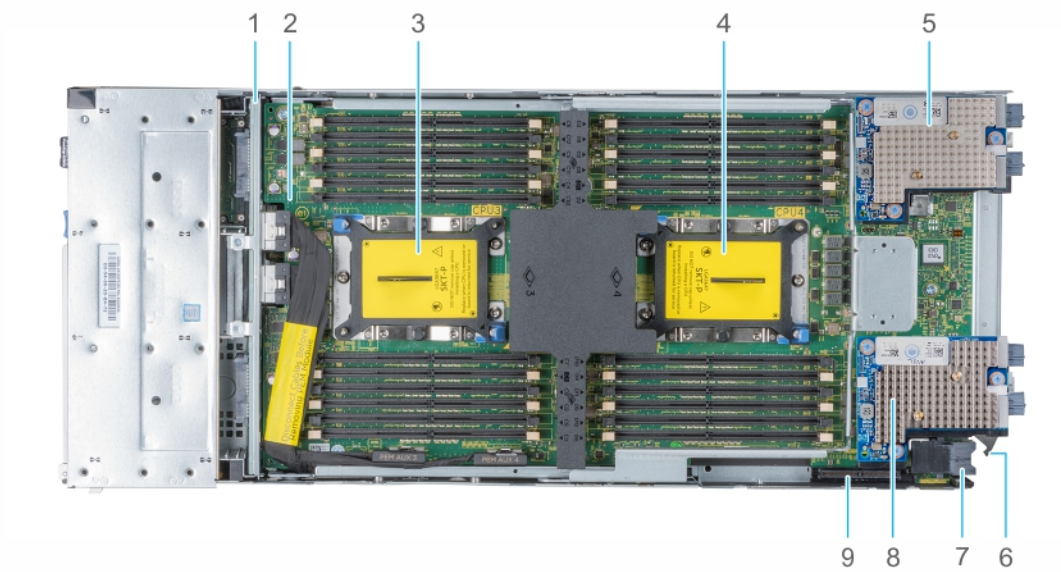

Figure 2. Inside the sled with PEM

1. Backplane
2. Processor expansion module (PEM) board
3. Processor 3 socket
4. Processor 4 socket
5. Mezzanine card (Fabric A2 card)
6. Rotational guiding hook
7. Power connector
8. Mezzanine card (Fabric B2 card)
9. Mini Mezzanine card (Fabric C2 card) connector

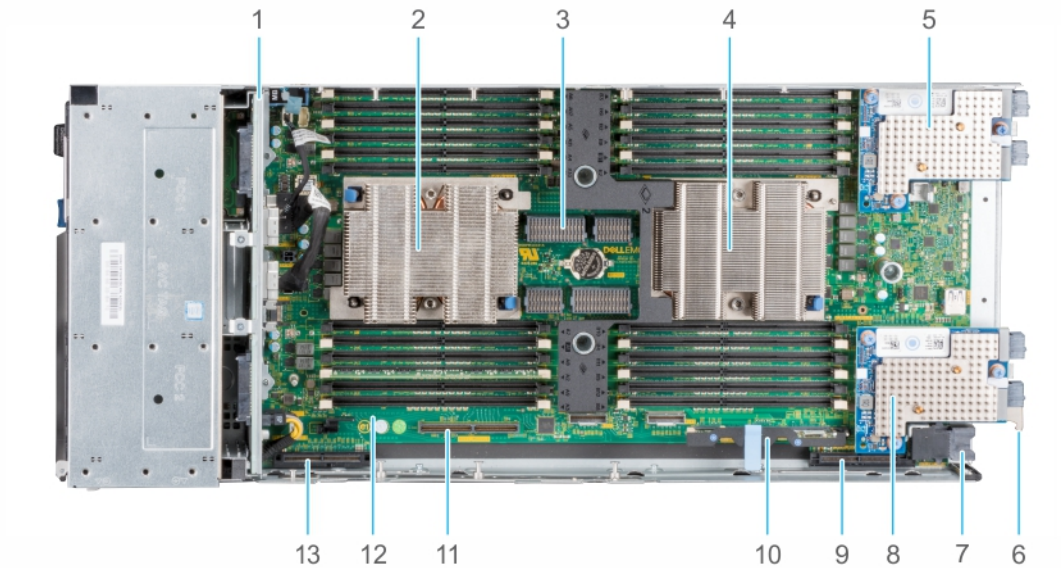

Figure 3. Inside the sled with system board

1. Backplane
2. Processor 1 socket

3. PEM connector
4. Processor 2 socket
5. Mezzanine card (Fabric A1 card)
6. Rotational guiding hook
7. Power connector
8. Mezzanine card (Fabric B1 card)
9. Mini Mezzanine card (Fabric C1 card) connector
10. iDRAC card
11. IDSDM/BOSS module connector
12. System board
13. PERC card connector

Locating the Service Tag of your system

The System Information Tab contains the system's unique Express Service Code and Service Tag. This information is used by Dell EMC to identify system configuration, warranty terms, and to route support calls to the appropriate personnel. A Quick Resource Locator (QRL) label on the System Information Tab links to a web page that shows the exact factory configuration and specific warranty purchased.

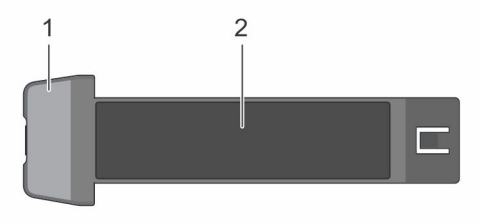

Figure 4. Locating Service Tag of your system

1. Information tag
2. Service tag

4

Processor

Processor features

The Intel® Xeon Scalable Processor family is the next generation core architecture with improved Instructions per Cycle (IPC) and other architectural improvements.

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

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

Supported processors

The PowerEdge MX840c supports up to four processors and up to 28 cores per processor. The following table shows the list of standard processors offered for the PowerEdge MX840c:

Table 4. Supported processors

Model	Cores	Frequency	Cache	UPI	Max memory speed	Max memory/ socket	TDP
Intel® Xeon® Platinum 8180M Processor	28	2.50 GHz	38.5 MB L3	10.4 GT/s	2666 MT/s	1.5TB	205W
Intel® Xeon® Platinum 8180 Processor	28	2.50 GHz	38.5 MB L3	10.4 GT/s	2666 MT/s	768GB	205W
Intel® Xeon® Platinum 8176M Processor	28	2.10 GHz	38.5 MB L3	10.4 GT/s	2666 MT/s	1.5TB	165W
Intel® Xeon® Platinum 8176 Processor	28	2.10 GHz	38.5 MB L3	10.4 GT/s	2666 MT/s	768GB	165W
Intel® Xeon® Platinum 8168 Processor	24	2.70 GHz	33.0 MB L3	10.4 GT/s	2666 MT/s	768GB	205W
Intel® Xeon® Platinum 8160M Processor	24	2.10 GHz	33.0 MB L3	10.4 GT/s	2666 MT/s	1.5TB	150W
Intel® Xeon® Platinum 8160 Processor	28	2.10 GHz	33.0 MB L3	10.4 GT/s	2666 MT/s	768GB	150W
Intel® Xeon® Platinum 8156 Processor	4	3.60 GHz	16.5 MB L3	10.4 GT/s	2666 MT/s	768GB	105W
Intel® Xeon® Gold 6154 Processor	18	3.00 GHz	24.75 MB L3	10.4 GT/s	2666 MT/s	768GB	200W

Model	Cores	Frequency	Cache	UPI	Max memory speed	Max memory/ socket	TDP
Intel® Xeon® Gold 6152 Processor	22	2.10 GHz	30.25 MB L3	10.4 GT/s	2666 MT/s	768GB	140W
Intel® Xeon® Gold 6148 Processor	20	2.40 GHz	27.5 MB L3	10.4 GT/s	2666 MT/s	768GB	150W
Intel® Xeon® Gold 6146 Processor	12	3.20 GHz	24.75 MB L3	10.4 GT/s	2666 MT/s	768GB	165W
Intel® Xeon® Gold 6144 Processor	8	3.50 GHz	24.75 MB L3	10.4 GT/s	2666 MT/s	768GB	150W
Intel® Xeon® Gold 6134 Processor	8	3.20 GHz	24.75 MB L3	10.4 GT/s	2666 MT/s	768GB	130W
Intel® Xeon® Gold 6130 Processor	16	2.10 GHz	22 MB L3	10.4 GT/s	2666 MT/s	768GB	125W
Intel® Xeon® Gold 5122 Processor	4	3.60 GHz	16.5 MB L3	10.4 GT/s	2666 MT/s	768GB	105W
Intel® Xeon® Gold 5120 Processor	14	2.20 GHz	19.25 MB L3	10.4 GT/s	2666 MT/s	768GB	105W
Intel® Xeon® Gold 5118 Processor	12	2.30 GHz	16.5 MB L3	10.4 GT/s	2666 MT/s	768GB	105W
Intel® Xeon® Gold 5117 Processor	14	2.00 GHz	19.25 MB L3	10.4 GT/s	2666 MT/s	768GB	105W

Chipset

The PowerEdge MX840c systems use the Intel® C628 chipset that provides extensive I/O support. Functions and capabilities include:

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

- Supports Intel® Virtualization Technology for Directed I/O
- Supports Intel® Trusted Execution Technology
- JTAG Boundary Scan support
- Intel® QuickAssist Technology
- Intel® Trace Hub for debug

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Memory

The PowerEdge MX840c supports up to 48 DIMMs, with up to 6TB of memory and speeds up to 2666MT/s. The MX840c supports registered (RDIMMs) and load reduced DIMMs (LRDIMMs) which use a buffer to reduce memory loading and provide greater density, allowing for the maximum performance memory capacity. Unbuffered DIMMs (UDIMMs) are not supported.

Supported memory

The table below lists the memory technologies supported by the PowerEdge MX840c:

Feature	MX840c (DDR4)
DIMM Type	RDIMM, NVDIMM-N, LRDIMM
Transfer Speed	2666 MT/s, 2400 MT/s
Voltage	1.2V (DDR4)

The table below shows the supported DIMMs for the PowerEdge MX840c:

Table 5. Supported DIMMs

DIMM type	DIMM speed (MT/s)	DIMM capacity (GB)	Ranks per DIMM	Data width	DIMM voltage
RDIMM	2666	8	1	x8	1.2V
RDIMM	2666	16	2	x8	1.2V
RDIMM	2666	32	2	x4	1.2V
LRDIMM	2666	64	4	x4	1.2V
LRDIMM	2666	128	8	x4	1.2V
NVDIMM	2666	16	1	x4	1.2V

Memory speed

The MX840c support memory speeds of 2666 MT/s and 2400 MT/s depending on the processor installed. All memory at the same voltage. By default, this speed will be the highest common supported speed between the CPUs and DIMMs. The operating speed of the memory is also determined by the maximum speed supported by the processor, the speed settings, and the operating voltage of the system that are in the BIOS.

The table below lists the memory configuration and performance details for the PowerEdge MX840c, based on the quantity and type of DIMMs per memory channel:

Table 6. Memory configuration and performance details

DIMM type	DIMM ranking	Capacity	DIMM rated voltage, speed	Intel Xeon Scalable Processor Family	
				1 DPC	2 DPC
RDIMM	1R / 2R	8GB, 16GB, 32GB	DDR4 (1.2V), 2666 MT/s	D: 2666	D: 2666
LRDIMM	4R / 8R	64GB, 128GB	DDR4 (1.2V), 2666 MT/s	D: 2666	D: 2666

Memory configurations

The PowerEdge MX840c servers support flexible memory configurations ranging from capacities of 8GB (minimum) to 6.14 TB (maximum). The PowerEdge MX840c supports up to 12 DIMMs per processor (up to 48 DIMMs in a quad- processor configuration). Each server has 6 memory channels per processor, with each channel supporting up to 2 DIMMs.

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

- Speed: If DIMMs of different speeds are mixed, all channels across all processors operate at the slowest DIMM's common frequency.
- DIMM type: Only one type of DIMM is allowed per system: RDIMM, or LRDIMM. These types 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.
- Mixing of DIMMs with different ranks are allowed:
  - Maximum of two different rank DIMMs allowed in a system.

Memory RAS features

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

The table below describes the memory RAS features supported on the PowerEdge MX840c:

Feature	Description
Dense configuration optimized profile	Increased memory reliability can be a result from this selectable platform profile that adjusts parameters to reduce faults regarding refresh rates, speed, temperature and voltage
Memory demand and patrol scrubbing	Demand scrubbing is the ability to write corrected data back to the memory once a correctable error is detected on a read transaction. Patrol scrubbing proactively searches the system memory, repairing correctable errors.
Recovery from single DRAM device failure (SDDC)	Recovery from Single DRAM Device Failure (SDDC) provides error checking and correction that protects against any single memory chip failure as well as multi- bit errors from any portion of a single memory chip.

Feature	Description
Failed DIMM isolation	This feature provides the ability to identify a specific failing DIMM channel pair, thereby enabling the user to replace only the failed DIMM pair.
Memory mirroring	Memory mirroring is a method of keeping a duplicate (secondary or mirrored) copy of the contents of memory as a redundant backup for use if the primary intra-socket memory fails. The mirrored copy of the memory is stored in memory of the same processor socket.
Memory address parity protection	This feature provides the ability to detect transient errors on the address lines of the DDR channel.
Memory sparing (rank)	Memory sparing allocates one rank per channel as a spare. If excessive correctable errors occur in a rank or channel, they are moved to the spare area while the operating system is running to prevent the errors from causing an uncorrectable failure.
Memory thermal throttling	This feature helps to optimize power/performance and can also be used to prevent DIMMs from overheating.

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Storage

With a variety of storage controllers and drive types, the PowerEdge MX840c provides expandability that allows you to tailor your storage to match your workload and operational demands. Options include boot devices, a portfolio of PERC controllers and HBAs, SAS and SATA hard drives and SSDs, and NVMe SSDs.

Supported hard drives

The MX840c supports up to eight 2.5-inch, hot-swappable SAS, SATA hard drives, SSDs, or PCIe NVMe drives. The drives are supplied in a hot-swappable drive carrier and connect to the system board or RAID controller through the backplane.

NOTE: When NVDIMMs are installed in the MX840c, the available 2.5-inch drive bays are reduced to 6 to accommodate the battery needed to protect the DIMMs during a power loss.

RAID controller

PERC provides a base RAID HW controller without consuming a PCIe slot by using a small form factor and high density connector to the base planar.

The following table shows the PERC offerings for the PowerEdge MX840c:

RAID controllers	Interface Support	Cache Memory Size	RAID Levels	RAID Support	MX840c Max Drives Supported	
S140 Software RAID	6Gb/s SATA NVMe	No Cache	0,1,5,10	Software RAID	8	Internal drive support
HBA330 MX	12Gb/s SAS 6Gb/s SATA	No Cache	No RAID Pass-Thru Only	No RAID SAS HBA	8	Internal drive support
H730P MX	12Gb/s SAS 6Gb/s SATA	2GB NV	0,1,5,6,10,50,60	Hardware RAID	8	Internal drive support
H745P MX	12Gb/s SAS 6Gb/s SATA	8GB NV	0,1,5,6,10,50,60	Hardware RAID	8 internal, 96 from MX5016s storage sled	For use with both internal drives and MX5016s storage sled
HBA330 mini-mezz	12Gb/s SAS	No Cache	No RAID Pass-Through Only	No RAID SAS HBA	96	For use with MX5016s storage sled

Internal Dual SD Module (IDSDM)

The PowerEdge MX840c supports an optional Internal Dual SD module (IDSDM). The IDSDM module supports two microSD cards which are available in capacities of 16GB, 32GB, and 64GB. There are two dip switches on the IDSDM module for write-protection. One IDSDM card slot is dedicated for redundancy.

The IDSDM shares the same location as the BOSS-S1 module and connects using a Dell EMC-proprietary PCIe x1 slot that uses a USB interface to the host.

NOTE: The PowerEdge MX840c supports either the optional IDSDM or the BOSS S-1 module but cannot support both simultaneously.

The intended use of IDSDM is to support hypervisor boot: a minimal OS that primarily resides in memory and does not depend on the IDSDM heavily for I/O. Writes should be minimized as the SD media can wear out.

The IDSDM card provides the following features:

- Full RAID-1 functionality
- Enables support for Secure Digital eXtended Capacity (SDXC) cards
- USB interface to the host system
- I2C interface to the host system and onboard EEPROM for out-of-band status reporting
- Dual card operation - maintains a mirrored configuration by using SD cards in both the slots and provides redundancy
- In addition to the redundancy setting, a separate BIOS setup option exists for IDSDM port enable or disable

It is recommended that customers use Dell EMC branded microSD cards associated with the IDSDM configured systems.

vFlash

vFlash is a dedicated microSD card on the iDRAC module and is connected to and controlled by iDRAC. It emulates USB flash storage to the operating system (OS), but its contents can be updated remotely through the iDRAC network. Some applications of vFlash include:

- Backup and restore the platform in case you need to replace the motherboard.
- Download a custom image and instruct the BIOS to boot to it.
- Store data for the local OS user.

vFlash microSD cards are available in 16GB capacities. It is recommended that customers use Dell EMC branded microSD cards associated with the iDRAC module.

Boot Optimized Storage Solution (BOSS)

BOSS is a simple RAID solution card designed specifically for booting the system's operating system, which supports up to two 6 Gbps M.2 SATA drives. This card has a x8 connector using PCIe gen 2.0 x2 lanes, available only in the low-profile and half-height form factor.

The following table shows the specifications for the BOSS module:

Feature	BOSS-S1 Card
RAID Levels	RAID 1
Support for NON-RAID disks	Yes (supports up to two disks)
Stripe Size	64K
Battery Back Unit	No
Non-Volatile Cache	No
VC Cache Function	No Cache - Write through only
Maximum number of virtual disks	1
Maximum number of virtual disks per disk group	1
Maximum number of drives supported	2

Feature	BOSS-S1 Card
Drive Type	6Gbps M.2 SATA SSDs
PCIe Support	Gen 2
Disk Cache Policy	Drive Default
TRIM	Non-RAID Disk mode only

Management applications for the BOSS-S1 controller

The management applications enable you to manage and configure the RAID system, create and manage the disk group, and provide online maintenance. The management applications for BOSS card include:

- **Unified Extensible Firmware Interface (UEFI) RAID Configuration Utility** - Storage management application integrated into the System BIOS (F2).
- **Dell EMC OpenManage Storage Management** - Enables you to perform controller and enclosure functions for all the supported the RAID controllers and enclosures from a single graphical or command-line interface. For more information, see the Dell EMC OpenManage Storage Management User's Guide

BOSS features

The BOSS card support the following features:

- Fast initialization
- SMART Info
- Auto-Rebuild
- Non-RAID migration
- TRIM (Non-RAID PD)

NOTE: For the most up-to-date and detailed information, please visit www.dell.com/PERC

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Networking and PCIe

The following mezzanine and mini mezzanine cards are supported on the MX840c:

Device	Fabric	Ports	Max Port Speed	Supported Fabric Slots
Intel® XXV710 Dual Port 25GbE Mezz Ethernet Adapter	Ethernet	2	25Gb	Fabric A, Fabric B
QLogic 41232 Dual Port 25GbE Ethernet Mezz Adapter	Ethernet	2	25Gb	Fabric A, Fabric B
QLogic 41262 Dual Port 25GbE Storage Offload Ethernet Mezz Adapter	Ethernet (CNA)	2	25Gb	Fabric A, Fabric B
Mellanox ConnectX-4 LX Dual Port 25GbE Ethernet Mezz Adapter	Ethernet	2	25Gb	Fabric A, Fabric B
Emulex LPm31002 Dual Port FC16 Mini-Mezz Adapter	Fibre Channel	2	16Gb	Fabric C
Emulex LPm32002 Dual Port FC32 Mini-Mezz Adapter	Fibre Channel	2	32Gb	Fabric C
QLogic 2692 Dual Port FC16 Mini-Mezz Adapter	Fibre Channel	2	16Gb	Fabric C
QLogic 2742 Dual Port FC32 Mini-Mezz Adapter	Fibre Channel	2	32Gb	Fabric C
Dell EMC PERC HBA330 MX Mini-Mezz Adapter	SAS	2	12Gb	Fabric C1

Mezzanine card slots

- Four PCIe Gen3 x16 mezzanine card slots (Fabric A and Fabric B)
- Two PCIe Gen3 x16 mini-mezzanine card slots (Fabric C)

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Power, thermal, and acoustics

Power

Lower overall system-level power draw is a result of Dell EMC's breakthrough system design. PowerEdge servers maximize performance per watt through a combination of power and cooling, energy efficient technologies, and Dell EMC PowerEdge 14G tools. Additionally, PowerEdge servers have an extensive collection of sensors that automatically track thermal activity, which helps regulate temperature thereby reducing server noise and power consumption. Dell EMC Enterprise Infrastructure Planning Tool is a power planning tool that is now available as a standalone executable and will support PSU sizing in addition to workload estimates. EPIT is located at

www.dell.com/calc

The MX840c obtains power from the MX7000 chassis which contains the power supplies. For detailed information about chassis power please consult the MX7000 Technical Guide.

Thermal

PowerEdge servers have an extensive collection of sensors that automatically track thermal activity, which helps regulate temperature thereby reducing server noise and power consumption. The sensors in the MX840c interact with the chassis management services module which regulates fan speed. All fans which cool the MX840c are contained in the MX7000 chassis.

Thermal management of PowerEdge MX840c delivers high performance for the right amount of cooling to 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 (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.

Table 7. Thermal restrictions matrix

Ambient support	25°C	30°C	35°C	40°C-45°C Expanded operating temperature
Processor	No restriction	No restriction	No restriction	No support for 165 W processors and above
DIMM	No restriction	No restriction	No restriction	No support for NVDIMM
Drive	No restriction	No restriction	No restriction	No support for NVMe drive
Card	No restriction	No restriction	No restriction	No support for card power above 30 W

Acoustics

For detailed information about acoustics please consult the MX7000 technical guide.

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Supported operating systems

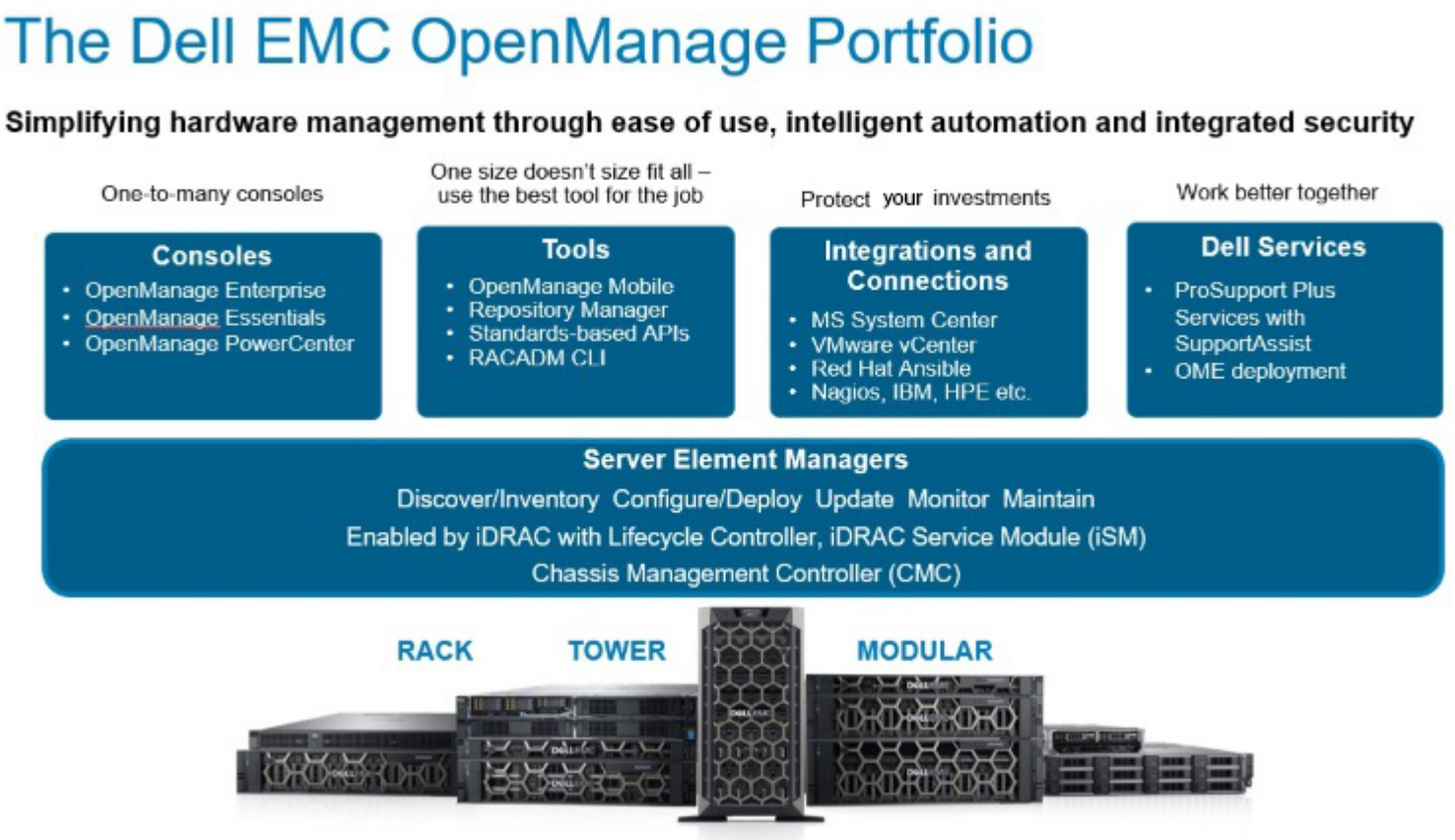
The Dell EMC PowerEdge MX840c sled supports the following operating systems:

- Citrix XenServer
- Microsoft Windows Server with Hyper-V
- Red Hat Enterprise Linux
- SuSE Linux Enterprise Server
- Ubuntu
- VMWare ESXi

For more information about the specific versions and editions, go to www.dell.com/ossupport

OpenManage systems management

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



iDRAC with Lifecycle controller

The integrated Dell Remote Access Controller (iDRAC) with Lifecycle Controller provides embedded management in every Dell EMC PowerEdge server. It provides functionality that helps you deploy, update, monitor and maintain Dell EMC PowerEdge servers with or without a systems management software agent, and because it is embedded, iDRAC doesn't need an operating system or hypervisor to start working. This agent-free operation means that with OpenManage technology, your new server is ready to deploy a new OS or accept new settings without installing extra software. And with powerful, easy-to-use, remote management and configuration options, iDRAC with Lifecycle Controller can alert you when an issue occurs, no matter where you are.

iDRAC features and comparison

The MX840c supports the following iDRAC licenses Express (default) and Enterprise (upgrade).

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

Table 8. iDRAC feature comparison

Features	iDRAC8 Basic	iDRAC9 Basic	iDRAC8 Express	iDRAC9 Express	iDRAC8 Express for Blades	iDRAC9 Express for Blades	iDRAC8 Enterprise	iDRAC9 Enterprise
Interface/Standards								
Redfish	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
IPMI 2.0	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
DCMI 1.5	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Web-based GUI	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Racadm command line—local/remote	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
SMASH-CLP—SSH-only	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Telnet	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
SSH	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Serial redirection	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
WSMAN	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Network Time Protocol	No	No	Yes	Yes	Yes	Yes	Yes	Yes
Connectivity								
Shared NIC	Yes	Yes	Yes	Yes	N/A	N/A	Yes	Yes
Dedicated NIC	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
VLAN tagging	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
IPv4	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
IPv6	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
DHCP (new default; no static IP)	Yes	**Yes**	Yes	**Yes**	Yes	**Yes**	Yes	**Yes**
DHCP with Zero Touch	No	No	No	No	No	No	No	**Yes**
Dynamic DNS	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
OS pass-through	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
iDRAC Direct-Front panel USB	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Connection View	No	**Yes**	No	**Yes**	No	**Yes**	No	**Yes**
NFS v4	No	**Yes**	No	**Yes**	No	**Yes**	No	**Yes**
NTLM v1 and NTLM v2	No	**Yes**	No	**Yes**	No	**Yes**	No	**Yes**
Security								
Role-based authority	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Local users	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
SSL encryption	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
IP blocking	No	No	Yes	Yes	Yes	Yes	Yes	Yes

Features	iDRAC8 Basic	iDRAC9 Basic	iDRAC8 Express	iDRAC9 Express	iDRAC8 Express for Blades	iDRAC9 Express for Blades	iDRAC8 Enterprise	iDRAC9 Enterprise
Directory services—AD, LDAP	No	No	No	No	No	No	Yes	Yes
Two-factor authentication	No	No	No	No	No	No	Yes	Yes
Single sign-on	No	No	No	No	No	No	Yes	Yes
PK authentication	No	No	Yes	Yes	Yes	Yes	Yes	Yes
FIPS 140-2	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Secure UEFI boot-certificate management	No	**Yes**	No	**Yes**	No	**Yes**	No	**Yes**
Lock down mode	No		No	No	No	No	No	**Yes**
Unique iDRAC default password	No	**Yes**	No	**Yes**	No	**Yes**	No	**Yes**
Customizable Security Policy Banner-login page	No	**Yes**	No	**Yes**	No	**Yes**	No	**Yes**
Quick Sync 2.0-optional auth for read operations	No	**Yes**	No	**Yes**	No	**Yes**	No	**Yes**
Quick Sync 2.0-add mobile device number to LCL	No	**Yes**	No	**Yes**	No	**Yes**	No	**Yes**
Remote Presence								
Power control	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Boot control	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Serial-over-LAN	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Virtual Media	No	No	No	No	Yes	Yes	Yes	Yes
Virtual Folders	No	No	No	No	No	No	Yes	Yes
Remote File Share	No	No	No	No	No	No	Yes	Yes
Virtual Console	No	No	No	No	Yes	Yes	Yes	Yes
HTML5 access to virtual console	No	No	No	No	Yes	Yes	Yes	Yes
VNC connection to OS	No	No	No	No	No	No	Yes	Yes
Quality/bandwidth control	No	No	No	No	No	No	Yes	Yes
Virtual Console collaboration—6 users	No	No	No	No	No	No	Yes	Yes
Virtual Console chat	No	No	No	No	No	No	Yes	Yes
Virtual Flash partitions	No	No	No	No	No	No	Yes	Yes
Group manager	No	No	No	No	No	No	No	**Yes**
HTTP/HTTPS support along with NFS/CIFS	No	**Yes**	No	**Yes**	No	**Yes**	No	Yes
Power and Thermal								

Features	iDRAC8 Basic	iDRAC9 Basic	iDRAC8 Express	iDRAC9 Express	iDRAC8 Express for Blades	iDRAC9 Express for Blades	iDRAC8 Enterprise	iDRAC9 Enterprise
Real-time power meter	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Power thresholds & alerts	No	No	Yes	Yes	Yes	Yes	Yes	Yes
Real-time power graphing	No	No	Yes	Yes	Yes	Yes	Yes	Yes
Historical power counters	No	No	Yes	Yes	Yes	Yes	Yes	Yes
Power capping	No	No	No	No	No	No	Yes	Yes
Power Center integration	No	No	No	No	No	No	Yes	Yes
Temperature monitoring	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Temperature graphing	No	No	Yes	Yes	Yes	Yes	Yes	Yes
Health Monitoring								
Predictive failure monitoring	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
SNMPv1, v2 and v3—traps and gets	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Email alerting	No	No	Yes	Yes	Yes	Yes	Yes	Yes
Configurable thresholds	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Fan monitoring	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Power Supply monitoring	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Memory monitoring	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
CPU monitoring	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
RAID monitoring	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
NIC monitoring	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
HD monitoring—enclosure	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Out of Band Performance Monitoring	No	No	No	No	No	No	Yes	Yes
Alerts for excessive SSD wear	No	**Yes**	No	**Yes**	No	**Yes**	No	**Yes**
Customizable settings for Exhaust Temperature	No	**Yes**	No	**Yes**	No	**Yes**	No	**Yes**
Update								
Remote agent-free update	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Embedded update tools	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sync with repository—scheduled updates	No	No	No	No	No	No	Yes	Yes
Auto update	No	No	No	No	No	No	Yes	Yes
Improved PSU firmware updates	No	**Yes**	No	**Yes**	No	**Yes**	No	**Yes**
Deployment and Configuration								

Features	iDRAC8 Basic	iDRAC9 Basic	iDRAC8 Express	iDRAC9 Express	iDRAC8 Express for Blades	iDRAC9 Express for Blades	iDRAC8 Enterprise	iDRAC9 Enterprise
Local configuration via F10	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Embedded OS deployment tools	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Embedded configuration tools	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
AutoDiscovery	No	No	Yes	Yes	Yes	Yes	Yes	Yes
Remote OS deployment	No	No	Yes	Yes	Yes	Yes	Yes	Yes
Embedded driver pack	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Full configuration inventory	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Inventory export	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Remote configuration	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Zerotouch configuration	No	No	No	No	No	No	Yes	Yes
System Retire/Repurpose	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Server Configuration Profile in GUI	No	**Yes**	No	**Yes**	No	**Yes**	No	**Yes**
Diagnostics, Service and Logging								
Embedded diagnostic tools	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Part Replacement	No	No	Yes	Yes	Yes	Yes	Yes	Yes
Server Configuration Backup	No	No	No	No	No	No	Yes	Yes
Server Configuration Restore	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Easy Restore—system configuration	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Easy Restore Auto Timeout	No	**Yes**	No	**Yes**	No	**Yes**	No	**Yes**
LED health status indicator	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
LCD screen—iDRAC9 requires optional bezel	**Yes**	**Yes**	**Yes**	**Yes**	N/A	N/A	**Yes**	**Yes**
Quick Sync—require NFC bezel (13 G only)	Yes	No	Yes	No	N/A	No	Yes	No
Quick Sync 2.0—requires BLE/WiFi hardware	No	**Yes**	No	**Yes**	No	N/A	No	**Yes**
iDRAC Direct—front USB mgmt port	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
iDRAC Service Module (iSM) embedded	No	**Yes**	No	**Yes**	No	**Yes**	No	**Yes**

Features	iDRAC8 Basic	iDRAC9 Basic	iDRAC8 Express	iDRAC9 Express	iDRAC8 Express for Blades	iDRAC9 Express for Blades	iDRAC8 Enterprise	iDRAC9 Enterprise
iSM to inband alert forwarding to consoles	No	**Yes**	No	**Yes**	No	**Yes**	No	**Yes**
Crash screen capture	No	No	Yes	Yes	Yes	Yes	Yes	Yes
Crash video capture	No	No	No	No	No	No	Yes	Yes
Boot capture	No	No	No	No	No	No	Yes	Yes
Manual reset for iDRAC—LCD ID button	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Remote reset for iDRAC—requires iSM	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Virtual NMI	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
OS watchdog	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
SupportAssist Report—embedded	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
System Event Log	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Lifecycle Log	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Enhanced logging in the Lifecycle controller log	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Work notes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Remote Syslog	No	No	No	No	No	No	Yes	Yes
License management	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Improved customer experience								
iDRAC -Faster processor, more memory	No	**Yes**	No	**Yes**	No	**Yes**	No	**Yes**
GUI rendered in HTML5	No	**Yes**	No	**Yes**	No	**Yes**	No	**Yes**
Add BIOS configuration to iDRAC GUI	No	**Yes**	No	**Yes**	No	**Yes**	No	**Yes**
iDRAC support for SW RAID licensing	No	**Yes**	No	**Yes**	No	**Yes**	No	**Yes**

Agent-free management

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

Agent-based management

Most systems management solutions require pieces of software, called agents, to be installed on each node in order to be managed within the IT environment. Additionally, the same agent is often used as a local interface into the hardware health and may be

accessed remotely as a management interface, typically referred to as a one-to-one interface. For customers that continue to use agent-based solutions, Dell EMC provides OpenManage Server Administrator.

OpenManage console

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

- **OpenManage Enterprise-Modular Edition** - OpenManage Enterprise - Modular Edition (OME - Modular) is the systems management software that runs on the Dell EMC PowerEdge MX-series chassis. OME-Modular shares a common code base with OpenManage Enterprise, delivering an agile, reliable and comprehensive platform to manage PowerEdge MX servers, storage and networking. OME-Modular boosts services delivery and restores IT agility for growing businesses. A unified web and RESTful API interface manages all nodes including compute, storage, and networking. This helps reduce costs, learning curve, and consolidates multiple tools for ease of access and monitoring. Simplified administration helps deploy and monitor at scale, from one to many chassis, with support for remote management. The agile and intelligent automation of OME - Modular helps enable faster hardware deployments and reduces repetitive tasks for accelerated life cycle management. Some of the key features of OME-Modular include:
  - Shares the same code base as OpenManage Enterprise making it easy for customers to move from one console to the other – or utilize both
  - Capability to manage servers across multiple MX-series chassis
  - Fast deployment with automatic chassis and node discovery
  - Comprehensive RESTful API to automate multiple tasks and integrate with third-party tools
  - Touchscreen display and OpenManage Mobile support for easy access
  - Expanded management across all PowerEdge servers with OpenManage Enterprise
  - Easily extend management into VMware vCenter and Microsoft System Center environments as well as others including Ansible, with Dell EMC Connections and Integrations
- **Dell EMC OpenManage Essentials**—OpenManage Essentials (OME) is a systems management console that provides a comprehensive view of Dell EMC systems, devices, and components in an enterprise network. OpenManage Essentials is available as a no-charge software download from Dell.com/Support. When connected through OME, you can use Dell EMC OpenManage Mobile (OMM) to securely perform a subset of data center monitoring and remediation tasks from a mobile device.
- **OpenManage Power Center**—Dell EMC's power management solution, the Dell EMC OpenManage Power Center (OMPC) management console, provides increased visibility to power consumption, anomalies, and utilization through fine-grained instrumentation. This enables increased control, improved rack density, faster response times, greater accuracy, and broader decision-making intelligence than would otherwise be possible. When used with a suitably licensed PowerEdge server (with a Dell iDRAC Enterprise license), OMPC leverages Intel Node Manager technology for platform-level power reporting and capping of Intel chipsets. Power Center then communicates with iDRAC to provide node, rack, row or data-center level aggregation of power-management data, as well as execution of control policy — making it easy for IT professionals to identify areas to gain efficiencies and cut wasteful costs.

OpenManage systems management tools, utilities and protocols

OpenManage systems management tools and utilities consist of the following:

- **Dell EMC Repository Manager:** The Dell EMC Repository Manager (RM) is a stand-alone GUI-based productivity tool that helps simplify the process of managing downloads and baseline BIOS, firmware and driver updates. Repository Manager can create deployment disks as well as create and manage customized repositories.
- **Dell EMC Update Packages:** The Dell EMC Update Packages (DUP) is a self-contained executable in a standard package format that updates a software element on a Dell EMC server such as the BIOS, a driver, firmware and other software updates.
- **Dell EMC OpenManage Deployment Toolkit:** The Dell EMC OpenManage Deployment Toolkit (DTK) is a CLI-based tool that includes a set of utilities for configuring and deploying Dell EMC PowerEdge systems, and can be used to build scripted, unattended OS installations to deploy large numbers of servers in a reliable fashion.
- **RACADM:** The RACADM command-line utility provides a scriptable interface that allows you to locally or remotely configure iDRAC7.
- **IPMITool:** IPMITool includes scriptable console application programs used to control and manage remote systems using the IPMI version 1.5 and later protocol.

- **Web Services for Management (WSMAN):** WSMAN is a SOAP-XML–based protocol for exchanging system management information. Dell EMC's implementation provides remote management capabilities through a secure and standards-based Web Services–Management (WS-MAN) interface to PowerEdge servers and blade server node chassis.

OpenManage Integrations

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

- Dell EMC Deployment Pack for Microsoft System Center Configuration Manager
- Dell EMC PRO Management Pack for Microsoft System Center Virtual Machine Manager (SCVMM)
- Dell EMC Management Pack Suite for Microsoft System Center Operations Manager
- Lifecycle Controller Integration for Microsoft System Center Virtual Machine Manager
- Lifecycle Controller Integrationi for Microsoft System Center Configuration Manager
- OpenManage Integration for VMware vCenter
- BMC Software
- BMC TrueSight Server Automation
- BMC TrueSight Operations Management
- OpenManage Ansible Modules

OpenManage Connections

With OpenManage Connections, you can extract rich information about the health and behavior of Dell EMC servers and storage to more effectively monitor, manage and troubleshoot Dell EMC systems in multi-vendor hardware, OS, hypervisor and Open Source environments.

- Dell EMC OpenManage Micro Focus Operations Manager|Operations Connector
- IBM
  - OpenManage Connection for IBM Tivoli Netcool/OMNIbus (ITNO)
  - OpenManage Connection for IBM Tivoli Network Manager (ITNM) IP Edition
- Nagios
  - OpenManage Plug-in for Nagios Core
  - OpenManage Plug-in for Nagios XI

Appendix A. Additional specifications

Dimensions and weight

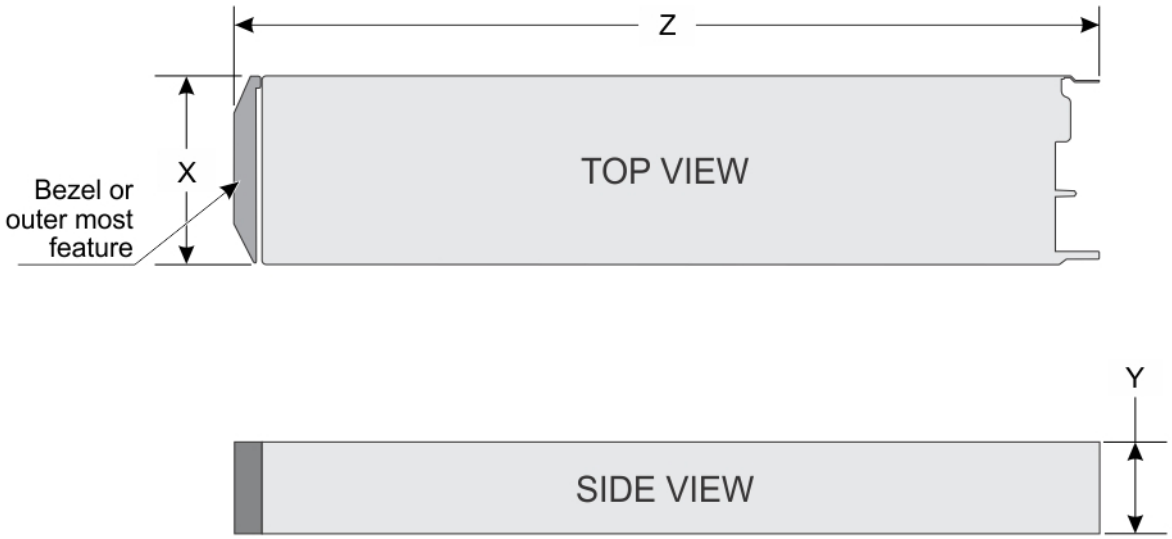


Table 9. System dimensions of the PowerEdge MX840c

X	Y	Z (handle closed)	Max weight
250.2 mm (9.85 inches)	85.5 mm (3.37 inches)	618 mm (24.33 inches)	17 kg (37.47 lbs)

Environmental specifications

NOTE: For additional information about environmental certifications, please refer to the Product Environmental Datasheet located with the Manuals & Documents on Dell.com/poweredgemanuals

Table 10. Temperature specifications

Temperature	Specifications
Storage	–40°C to 65°C (–40°F to 149°F)
Continuous operation (for altitude less than 950 m or 3117 ft)	10°C to 35°C (50°F to 95°F) with no direct sunlight on the equipment.
Fresh air	For information about fresh air, see the Expanded Operating Temperature section.
Maximum temperature gradient (operating and storage)	20°C/h (68°F/h)

Table 11. 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 12. Maximum vibration specifications

Maximum vibration	Specifications
Operating	0.26 G_{rms} at 5 Hz to 350 Hz (all operation orientations).
Storage	1.88 G_{rms} at 10 Hz to 500 Hz for 15 min (all six sides tested).

Table 13. Maximum shock specifications

Maximum shock	Specifications
Operating	Six consecutively executed shock pulses in the positive and negative x, y, and z axes of 6 G for up to 11 ms.
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 14. Maximum altitude specifications

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

Table 15. Operating temperature derating specifications

Operating temperature derating	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).

Video specifications

Table 16. Video specifications

Video type	Matrox G200 graphics controller integrated with iDRAC
Video memory	4 GB DDR4 shared with iDRAC application memory

USB ports

The PowerEdge MX840c sled supports:

- One USB 3.0-compliant port on the front of the sled

- One USB 3.0-compliant port internal port
- One USB 2.0-compliant management port to iDRAC on the front of the system

NOTE: The micro USB 2.0-compliant port on the front of the system can only be used as an iDRAC Direct management port.

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Appendix B. Standards compliance

Table 17. 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

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Appendix C. Additional resources

Table 18. 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
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.	Outside 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.	Outside the system chassis cover
Enterprise Infrastructure Planning Tool (EPIT)	The Dell EMC online EPIT enables easier and more meaningful estimates to help you determine the most efficient configuration possible. Use EPIT to calculate the power consumption of your hardware, power infrastructure, and storage.	Dell.com/calc

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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
	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 5. 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.

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.

Deployment services

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

Remote Consulting Services

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

Data Migration Service

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

ProSupport 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.

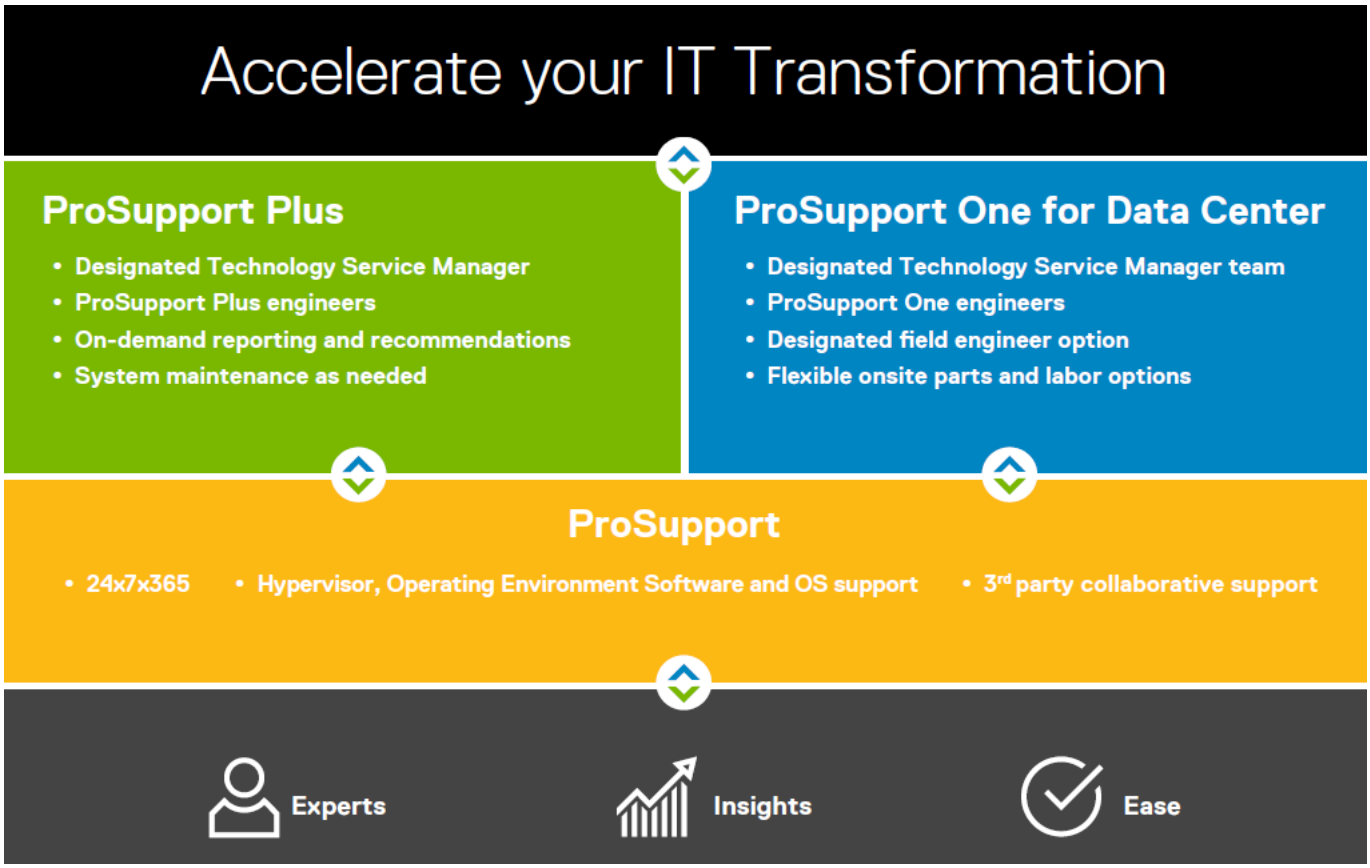

Figure 6. ProSupport Enterprise Suite

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 7. 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 8. 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.