Dell PowerEdge FC640

Technical Guide

DELLEMC

Notes, cautions, and warnings

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

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

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

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System Overview

FC640 is an impressively powerful 2-socket, half-width modular architecture system with emphasis on delivering flexibility, high performance and best in class compute density.

Figure 1. Dell EMC PowerEdge FC640

Topics:

·   Introduction
·   New technologies

Introduction

The PowerEdge FC640 is a half-width, 2-sockets sled with highly expandable memory - up to 2TB with dual processors, and impressive I/O capabilities to match. The FC640 targeted to support dense-virtualized environment, such as : Big Data analysis, Enterprise Resource Planning (ERP) or Customer Relationship Management (CRM) computing ,Software-defined storage (SDS), databases and High Performance Computing (HPC).

The FC640 features:

·   Second Generation Intel® Xeon® Scalable processor family (with up to 28 cores and two threads per core)
·   Up to six channels with two DIMMs per channel per CPU(on channel "0" and "3" only)
·   Up to sixteen DDR4 RDIMM or LRDIMM
·   PCI Express® (PCIe) 3.0 enabled expansion slots (with up to 48 lanes per CPU)
·   Internal cards support, such as bNDC daughter cards, Mezz cards, miniPERC cards, IDSDM and BOSS card

New technologies

The following are the new technologies featured on the PowerEdge FC640:

Table 1. New technologies

New technology	Detailed description
Intel Xeon Scalable processor Family processors	The Intel Xeon Scalable processor family has advanced features that deliver exceptional performance and value. For details, see the Processor section.
Intel C621 series chipset	The FC640 systems incorporates the Intel Platform Controller Hub (PCH) chip.

New technology	Detailed description
2933 MT/s DDR4 memory	The Second Generation Intel Xeon Scalable processor family supports 2933 MT/s memory. The FC640 supports two DIMMs per channel at 2933 MT/s with these processors. For details, see the Memory section.
iDRAC9 with Lifecycle Controller	The new embedded systems management solution for the Dell EMC systems features hardware and firmware inventory and alerting, data center level power monitoring, and faster performance. For details, see the Dell EMC OpenManage systems management section
Next-generation PERC options	The PowerEdge FC640 support new PowerEdge RAID Controller (PERC) cards with improved functionality and faster performance. See the Storage section.

System features

Compared to previous generations, the PowerEdge FC640 offers faster processing power and advanced system management.

With powerful processors, dense in size and highly scalable I/O capabilities, the PowerEdge FC640 excels at running applications for midsize and large businesses, like enterprise resource planning and customer relationship management. Combining exceptional performance and functional flexibility, the FC640 is also ideal for large databases or substantial virtualization environments.

The FC640 system consists of the planar subsystem with bNDC cards, Mezz cards, Universal Backplane for SATA/SAS/PCIe storage controller card (PERC), IDSDM, USB, USB MicroAB with rSPI card. It is a two-chip platform (CPU and PCH) because this family of processors includes an Integrated Memory Controller (IMC) and Integrated I/O (IIO) (such as PCI Express and DMI2) on a single silicon die.

Topics:

- Product comparison
- Technical specifications

Product comparison

Table 2. General comparison

Feature	PowerEdge FC630	PowerEdge FC640
Form factor	Half height blade	Half height blade
CPU	• 2 socket Intel Haswell EP	• 2 socket Intel Processor
Memory	• 24x DDR4 RDIMM and LRDIMM	• 16x DDR4 RDIMM and LRDIMM
Hard drives	• 2.5-inch-12 GB SAS/SATA • 1.8-inch-6 GB SATA	• 12 GB SAS and 6 GB SATA

Backplane	• 2.5-inch hard drive:
	  • SATA only from chipset
	  • SAS/SATA from PERC
	  • PCIe SSD from PCIe Exterder Module
	• 1.8-inch hard drive:
	  • uSATA from chipset
	  • uSATA from PERC
		• 2.5-inch hard drive:
		  • SAS only from PERC
		  • SAS/NVMe-SAS from PERC/PCIe from CPU2
		  • SATA/NVMe-SATA from chipset/PCIe from CPU2

Storage controller	• Hardware RAID: H330, H730, H730P • Software RAID: PERC S130	• Hardware RAID: H330, H730P, BOSS-M.2 SATA • Software RAID: PERC S140
PCIe SSD	Yes	Yes-NVMe
Communications	• bNDC: 4x1 GbE, 2x10 GbE, 4x10GbE	• bNDC: 4x1 GbE, 2x10 GbE, 4x10 GbE
System management	• iDRAC8 Express/Enterprise • Lifecycle Controller 3.0	• iDRAC9 Express/Enterprise • Lifecycle Controller 3.x
Heat sink type	• 68 mm width for 24 DIMMs • 86 mm width for 20 DIMMs	• CPU1 heat sink: 100 x 108 x 24 mm • CPU2 heat sink: 86.7 x 108 x 24 mm
TPM	TPM Modular-FIPS TPM 1.2	TPM Modular-TPM 1.2 FIPS, TPM 2.0 FIPS, TPM 2.0 China

Technical specifications

Table 3. Technical specifications

Feature	PowerEdge FC640 technical specification
Form factor	Half-width sled
Processor	Second Generation Intel Xeon Scalable Processor Family.
Processor sockets	2 sockets
Internal interconnect	Up to 2 Intel Ultra Path Interconnect (Intel UPI); up to 10.4 GT/s
Chipset	Intel C621 series Chipset
Memory	Up to 2TB—16 DIMM slots: 8 GB, 16 GB, 32 GB, 64 GB, 128 GB DDR4 up to 2933 MT/s Supports DDR4 RDIMM/LRDIMM
I/O slots	Up to 2 x PCIeGen 3 slots for Mezz card plus dedicated miniPERC, BOSS card and bNDC slot
RAID controller	Internal controllers: PERC S140 (SW RAID SATA), PERC H330, PERC H730P
Hard drives	2 x 2.5 inch SAS/SATA/PCIe SSD
Embedded NIC	Supports one blade Network Daughter Card (bNDC) card which are available in the following configurations: • 10GbE QLogic 57810 DP • 10GbE QLogic 57840 QP • 1GbE QLogic QP • 10GbE Intel X520 DP • 1GbE Intel QP • 10GbE Intel X710 DP • 10GbE Intel X710 QP
Power supply	• 1600W • 2000W • 2400W
Availability	• Cluster support • ECC memory • Hot-plug hard drives • IDSDM Module • Single Device Data Correction (SDDC) • Spare Rank • Support for high availability, and virtualization • Proactive systems management alerts • Tool-less chassis
Supported operating systems	• Microsoft Windows Server 2012 R2 • Microsoft Windows Server 2016 • SUSE Linux Enterprise Server 12 SP2 x86_64 • Red Hat Enterprise Linux 6.9 Server x86_64 • Red Hat Enterprise Linux 7.4 Server x86_64 • Canonical Ubuntu 16.04 LTS **Virtualization options**: • VMware vSphere ESXi 6.5 U3 • VMware vSphere ESXi 6.0 U3

Feature	PowerEdge FC640 technical specification
	• Citrix XenServer 7.1 • Citrix XenServer 7.2 For more information on the specific versions and additions, visit Dell.com/OSsupport.
Systems management	**Dell EMC Systems management consoles and tools**: • OpenManage Enterprise. • OpenManage Mobile with Quick Sync 2 • OpenManage Power Center • Repository Manager **iDRAC License options**: • iDRAC9 Basic (default) • iDRAC9 Express (upgrade) • iDRAC9 Enterprise (upgrade) • vFlash with 16 GB micro SD card (upgrade) **Dell EMC OpenManage Integrations** : • Dell OpenManage Integration Suite for Microsoft® System Center • Dell OpenManage Integration for VMware® vCenter™ • BMC Software (available from BMC) **Dell EMC OpenManage Connections**: • HPE Operations Manager I (OMi) • Nagios Core and Nagios XI
Dimensions and weight	• Height: 40.3 mm—1.58 inches • Width: 211.0 mm—8.30 inches • Depth: 535.8 mm—21.06 inches (handle closed) • Maximum weight: 6.4kg
Recommended support	Dell ProSupport Plus for critical systems or Dell ProSupport for premium hardware and software support for your PowerEdge solution. Consulting and deployment offerings are also available. Contact your Dell representative for more information. Availability and terms of Dell Services vary by region. For more information, visit Dell.com/ ServiceDescriptions.

Chassis views and features

The PowerEdge FC640 is a two socket, half-width FX2 platform sled system with 2 x front accessible SATA/SAS/PCIe SSD hard drives.

Topics:

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

Front view of the system

The front view displays the features available on the front of the system.
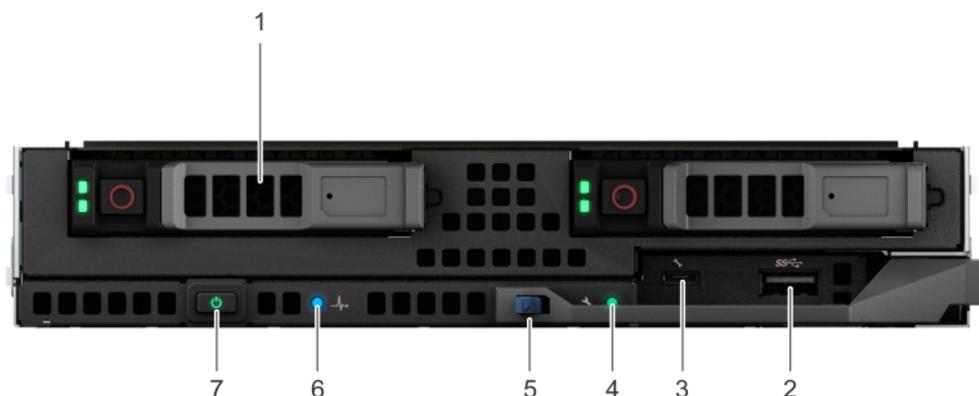
Figure 2. Front view of the system

Table 4. Features available on the front of the system

Item	Ports, panels, and components	Icon	Description
1	Hard drive/SSD	N/A	2.5 inch hard drive/SSDs are supported. For more information, see the Technical specifications section.
2	USB port	SS⟿	The USB port is USB 3.0 compliant.
3	iDRAC Direct port	🔧	The iDRAC Direct port is micro USB 2.0-compliant. This port enables you to access the iDRAC Direct features. For more information, see the iDRAC User's Guide at **Dell.com/idracmanuals**.
4	iDRAC Direct LED indicator	N/A	The iDRAC Direct LED indicator lights up to indicate that the iDRAC Direct port is actively connected to a device. For more information, see the iDRAC Direct LED indicator codes section.
5	System handle release button	N/A	Enables you to unlock the system from the enclosure.
6.	Status indicator	〰	Provides information about the status of the system. For more information, see the Health status indicator section.

Item	Ports, panels, and components	Icon	Description
7	Power button	⏻	Indicates if the system is turned on or off. Press the power button to manually turn on or off the system.
			(i) **NOTE: To gracefully shut down an ACPI-compliant operating system, press the power button.**

Internal chassis view

The chassis design of the PowerEdge FC640 is optimized for easy access to components and for efficient cooling. The PowerEdge FC640 supports up to 16 DIMMs, two processors, system board and many other components and features. For more system views, see the Dell PowerEdge FC640 Owner's Manual at Dell.com/Support/Manuals.
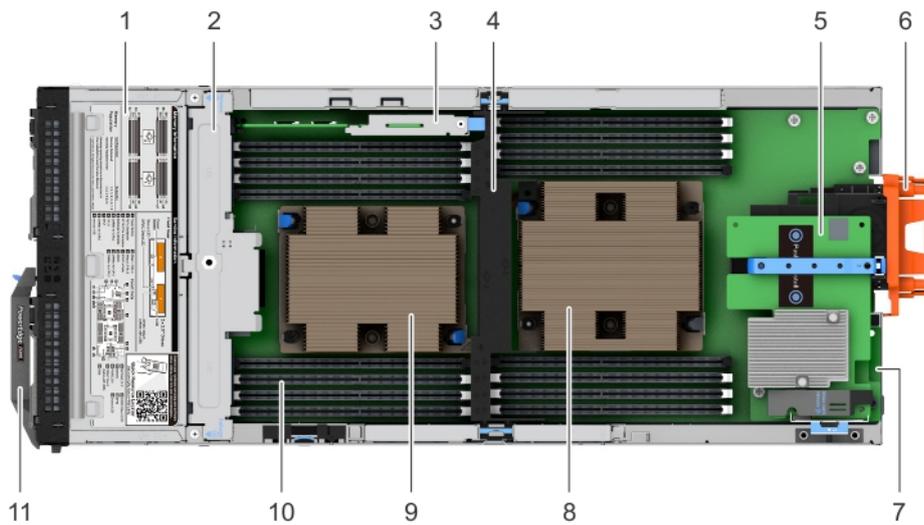
Figure 3. Inside the system

1. drive cage
2. drive backplane
3. 2 x IDSDM or 2 x M.2 card
4. cooling shroud
5. mezzanine card (fabric C)
6. I/O connector cover
7. Network Daughter Card
8. heat sink (CPU1)
9. heat sink (CPU2)
10. memory module (16)
11. system handle

Security features

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

Table 5. Security features

Security feature	Description
Cover latch	A tooled latch is integrated in the side cover to secure it to the rack chassis.
TPM	The Trusted Platform Module (TPM) is used to generate/store keys, protect/authenticate passwords, and create/store digital certificates. TPM 1.2 is supported.
Power-off security	BIOS has the ability to disable the power button function.

Processors

The Dell EMC PowerEdge FC640 features the Second Generation Intel Xeon Scalable processor family which offers versatility across diverse workloads. These processors are designed for next-generation data centers running on, software defined infrastructure supercharged for efficiency, performance, and agile services delivery across cloud-native and traditional applications. The Intel Xeon Scalable processor family support workloads for cloud, high-performance computing, networking, and also storage for data centers.

Processor features

The Second Generation Intel Xeon Scalable processor family is the next generation core architecture with improved Instructions per Cycle (IPC) and other architectural improvements. It 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 allows each core to support two threads.
- First Level Cache (FLC) 64 KB total. The FLC is comprised of a 32 KB IC(Instruction Cache) and 32 KB DC(Data Cache)
- MBsystem board Mid-Level Cache (MLC) per core (non-inclusive 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 2nd FMA execution unit.

Topics:

- Supported Processors
- Chipset

Supported Processors

Table 6. Supported Processors for FC640

Intel SKU	SKU type	Stepping	Speed(GHz)	Cache(MB)	QPI (GT/s)	Max Memory Speed(MT/s)	Cores	Turbo	TDP (W)
8276M	Platinum	XCC	2.2	38.5	10.4	2933	28	Yes	165
8276	Platinum	XCC	2.2	38.5	10.4	2933	28	Yes	165
8260M	Platinum	XCC	2.4	35.75	10.4	2933	24	Yes	165
8260	Platinum	XCC	2.4	35.75	10.4	2933	24	Yes	165
8176	Platinum	XCC	2.1	38	10.4	2667	28	Yes	165
8160M	Platinum	XCC	2.1	33	10.4	2667	24	Yes	150
8160	Platinum	XCC	2.1	33	10.4	2667	24	Yes	150
6252	Gold	XCC	2.1	35.75	10.4	2933	24	Yes	150
6248R*	Gold	XCC	3.0	35.75	10.4	2933	24	Yes	205
6248	Gold	XCC	2.5	27.5	10.4	2933	20	Yes	150
6246R*	Gold	XCC	3.4	35.75	10.4	2933	16	Yes	205
6246	Gold	XCC	3.3	24.75	10.4	2933	12	Yes	165
6244	Gold	XCC	3.6	24.75	10.4	2933	8	Yes	150
6242R*	Gold	XCC	3.1	35.75	10.4	2933	20	Yes	205
6242	Gold	XCC	2.8	22	10.4	2933	16	Yes	150

Intel SKU	SKU type	Stepping	Speed(GHz)	Cache(MB)	QPI (GT/s)	Max Memory Speed(MT/s)	Cores	Turbo	TDP (W)
6240	Gold	XCC	2.6	24.75	10.4	2933	18	Yes	150
6240R	Gold	XCC	2.4	35.75	10.4	2933	24	Yes	165
6240M	Gold	XCC	2.6	24.75	10.4	2933	18	Yes	150
6238	Gold	XCC	2.1	30.25	10.4	2933	22	Yes	140
6238R	Gold	XCC	2.2	38.5	10.4	2933	28	Yes	165
6238M	Gold	XCC	2.1	30.25	10.4	2933	22	Yes	140
6234	Gold	XCC	3.3	24.75	10.4	2933	8	Yes	130
6230	Gold	XCC	2.1	27.5	10.4	2933	20	Yes	125
6230R	Gold	XCC	2.1	35.75	10.4	2933	26	Yes	150
6230N	Gold	XCC	2.3	27.5	10.4	2933	20	Yes	125
6226	Gold	XCC	2.7	19.25	10.4	2933	12	Yes	125
6226R	Gold	XCC	2.9	22	10.4	2933	16	Yes	150
6222V	Gold	XCC	1.8	27.5	10.4	2400	20	Yes	115
6212U	Gold	XCC	2.4	35.75	NA	2933	24	Yes	165
6210U	Gold	XCC	2.5	27.5	NA	2933	20	Yes	150
6208U	Gold	XCC	2.9	22	10.4	2933	16	Yes	150
6152	Gold	XCC	2.1	30	10.4	2667	22	Yes	140
6150	Gold	XCC	2.7	25	10.4	2667	18	Yes	165
6148	Gold	XCC	2.4	27	10.4	2667	20	Yes	150
6142	Gold	XCC	2.6	22	10.4	2667	16	Yes	150
6140M	Gold	XCC	2.3	25	10.4	2667	18	Yes	140
6140	Gold	XCC	2.3	24.75	10.4	2667	18	Yes	140
6138	Gold	XCC	2.0	27	10.4	2667	20	Yes	125
6136	Gold	XCC	3.0	24.75	10.4	2667	12	Yes	150
6134M	Gold	XCC	3.2	24.75	10.4	2667	8	Yes	130
6134	Gold	XCC	3.2	24.75	10.4	2667	8	Yes	130
6132	Gold	XCC	2.6	19	10.4	2667	14	Yes	140
6130	Gold	XCC	2.1	22	10.4	2667	16	Yes	125
6128	Gold	XCC	3.4	19.25	10.4	2667	6	Yes	115
6126	Gold	XCC	2.6	19.25	10.4	2667	12	Yes	125
5222	Gold	XCC	3.8	16.5	10.4	2933	4	Yes	105
5220	Gold	HCC	2.2	24.75	10.4	2667	18	Yes	125
5220R	Gold	XCC	2.2	35.75	10.4	2666	24	Yes	150
5220S	Gold	XCC	2.7	24.75	10.4	2667	18	Yes	125
5218	Gold	XCC	2.3	22	10.4	2667	16	Yes	125
5218R	Gold	XCC	2.1	27.5	10.4	2666	20	Yes	125
5218N	Gold	XCC	2.3	22	10.4	2667	16	Yes	110
5217	Gold	HCC	3.0	11	10.4	2667	8	Yes	115
5215	Gold	HCC	2.5	16.5	10.4	2667	10	Yes	85

Intel SKU	SKU type	Stepping	Speed(GHz)	Cache(MB)	QPI (GT/s)	Max Memory Speed(MT/s)	Cores	Turbo	TDP (W)
5215M	Gold	HCC	2.5	13.75	10.4	2667	10	Yes	85
5122	Gold	XCC	3.6	16.5	10.4	2667	4	Yes	105
5120	Gold	HCC	2.2	19.25	10.4	2667	14	Yes	105
5118	Gold	HCC	2.3	16.5	10.4	2667	12	Yes	105
4216	Gold	HCC	2.1	22	9.6	2400	16	Yes	100
4215	Gold	HCC	2.5	11	9.6	2400	8	Yes	85
4215R	Silver	HCC	3.2	11	9.6	2400	8	Yes	130
4214	Silver	HCC	2.2	16.5	9.6	2400	12	Yes	85
4214R	Silver	HCC	2.4	16.5	9.6	2400	12	Yes	100
4210	Silver	LCC	2.2	13.75	9.6	2400	10	Yes	85
4210R	Silver	LCC	2.4	13.75	9.6	2400	10	Yes	100
4208	Silver	LCC	2.1	11	9.6	2400	8	Yes	85
4116	Silver	HCC	2.1	16	9.6	2400	12	Yes	85
4114	Silver	LCC	2.2	14	9.6	2400	10	Yes	85
4112	Silver	LCC	2.6	8.25	9.6	2400	4	Yes	85
4110	Silver	LCC	2.1	11	9.6	2400	8	Yes	85
4108	Silver	LCC	1.8	11	9.6	2400	8	Yes	85
3206R	Bronze	LCC	1.9	11	9.6	2133	8	No	85
3204	Bronze	LCC	1.9	8.25	9.6	2133	6	No	85
3106	Bronze	LCC	1.7	11	9.6	2133	8	No	85
3104	Bronze	LCC	1.7	8	9.6	2133	6	No	85

(i) **NOTE:** * **Available in 1H 2020**

Chipset

The DELL EMC PowerEdge FC640 use the Intel C620 series chipset (PCH) 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 super speed USB 3.0 ports
- Direct Media Interface
- Enhanced Serial Peripheral Interface
- Flexible I/O - Allows some high-speed I/O signals to be configured as 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 or Real-Time Clock Controller
- Intel High Definition Audio and Intel Smart Sound Technology
- Integrated 10/100/1000 Mbps Ethernet MAC
- Supports Intel Rapid Storage Technology Enterprise
- Supports Intel Active Management Technology and Server Platform Services
- Supports Intel Virtualization Technology for Directed I/O

- Supports Intel Trusted Execution Technology
- JTAG Boundary Scan support
- Intel Trace Hub for debug

For more information, go to Intel.com

System memory

The FC640 supports DDR4 registered DIMMs (RDIMMs) and load reduced DIMMs (LRDIMMs). System memory holds the instructions that are executed by the processor.

ⓘ **NOTE: MT/s indicates DIMM speed in MegaTransfers per second.**

Memory bus will operate at 2933 MT/s or 2666 MT/s or 2400 MT/s frequency depending on the following factors:

- DIMM type (RDIMM or LRDIMM)
- Number of DIMMs populated per channel
- System profile selected (for example, Performance Optimized, or Custom)
- Maximum supported DIMM frequency of the processors

The FC640 system contains 16 memory sockets split into two sets of 8 sockets, one set per processor. Each 8-socket set is organized into six channels.

Supported Memory

Table 7. Memory technologies supported by the PowerEdge

Feature	M640/FC640 (DDR4)
DIMM Type	RDIMM LRDIMM
Transfer Speed	• 2933 MT/s • 2666 MT/s • 2400 MT/s
Voltage	1.2V (DDR4)

Table 8. Supported memory

DIMM Speed	DIMM Type	DIMM Capacity (GB)	Ranks per DIMM	Data Width	SDDC Support	DIMM Volts
2933 MT/s	RDIMM	8	1	x8	Advanced ECC	1.2
2933 MT/s	RDIMM	16	2	x8	Advanced ECC	1.2
2933 MT/s	RDIMM	32	2	x4	All Modes	1.2
2933 MT/s	LRDIMM	64	4	x4	All Modes	1.2

Memory speed

The FC640 support memory speeds of 2933 MT/s,2666 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 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 in the BIOS, and the operating voltage of the system.

Table 9. DIMM 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), 2933	2933 MT/s	2933 MT/s

DIMM type	DIMM ranking	Capacity	DIMM rated voltage, speed	Intel Xeon scalable processor family	
				1 DPC	2 DPC
LRDIMM	4R	64GB, 128GB	DDR4 (1.2V), 2933	2933 MT/s	2933 MT/s

Topics:

General memory module installation guidelines

Memory Configurations

ⓘ **NOTE: Memory configurations that fail to observe these guidelines can prevent system from booting, stop responding during memory configuration, or operating with reduced memory.**

The FC640 system support flexible memory configurations ranging from capacities of 8 GB to 2 TB. The FC640 supports up to 8 DIMMs per processor and up to total 16 DIMMs in a dual processor configuration. The FC640 system supports memory configuration according to the following population rules:

- Speed: If memory modules with different speeds are installed, they operate at the speed of the slowest installed memory module(s) or slower depending on the system DIMM configuration.
- DIMM type: Only one type of DIMM is allowed per system: RDIMM, or LRDIMM. RDIMMs and LRDIMMs must not be mixed in a same system.
- Mixing DIMMs with different rank is supported with condition of not more than two different ranks of DIMMs can be installed in a system.
- DIMMs with different data widths can be mixed. DIMMs with x4 and x8 data widths are supported and mixing is allowed.
- When mixing memory modules with different capacities,
    - Populate the sockets with highest capacity memory modules first. For example, 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

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.

Table 10. Supported RAS features

Feature	Description
Dense configuration optimized profile	Increased memory reliability can be a result from this selectable platform profile that adjusts parameters to reduce faults regarding refresh rates, speed, temperature, and voltage
Memory demand and patrol scrubbing	Demand scrubbing is the ability to write corrected data back to the memory once a correctable error is detected on a read transaction. Patrol scrubbing proactively 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 and multi bit errors from any portion of a single memory chip.
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

Feature	Description
	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.

Storage

The PowerEdge FC640 provides scalable storage that allows you to adapt to your workload and operational requirements. With comprehensive storage options, the PowerEdge FC640 offers various internal and external storage controllers, drive types, and different chassis and backplanes for varied numbers of drives. Features such as Express Flash PCIe SSDs, PERC H730p and H330 RAID controllers provide vastly accelerated performance compared to the previous technologies.

Storage controllers

The new PERC Controller offerings is a heavy leverage of previous generation PERC family. The Value Performance level controllers, carried-over from previous generation to PowerEdge FC640, are a high-end offering that drives Input/Output Operations Per Second (IOPs) performance and enhance the SSD performance.

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

Table 11. PERC series controller offerings

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

Supported drives

The PowerEdge FC640 system supports up to 2 x 2.5" SATA/ SAS/PCIe SSD hard disk drives. Mixing SAS/SATA drive is not supported

Topics:

- IDSDM with vFlash card
- Optical drives
- Tape Drives
- Boot Optimized Storage Subsystem (BOSS)

IDSDM with vFlash card

The Internal Dual SD Module (IDSDM) and vFlash card are combined into a single card module in the latest PowerEdge systems. The following are options available for PowerEdge FC640 systems:

- vFlash only
- IDSDM only
- vFlash and IDSDM

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

The IDSDM with vFlash module is installed in a Dell-proprietary PCIe x1 slot using a USB 3.0 interface as the host. In 14 Gen servers, the IDSDM and vFlash card features microSD in place of an SD card The supported capacities for the IDSDM microSD cards are 16/32/64 GB while for vFlash the capacity is limited to 16 GB only. The write-protect switch is built on the IDSDM with vFlash module.

Optical drives

The PowerEdge FC640 does not support internal optical drive.

Tape Drives

The PowerEdge FC640supports RD1000 tape drive externally.

Boot Optimized Storage Subsystem (BOSS)

The BOSS is offered as a means of booting FC640 systems to a full OS mode when:

- The target OS is a full OS and not a hypervisor (a Hypervisor may be best supported by the IDSDM)
- The user does not wish to trade off standard hot plug drive slots for OS install

The hardware based RAID BOSS is a RAID controller with a limited feature set for the purpose of boot up to a full OS drive. The BOSS RAID controller presents M.2 SATA-only Solid State drives (SSD) as either Non-RAID disks or a single RAID1 volume configuration.
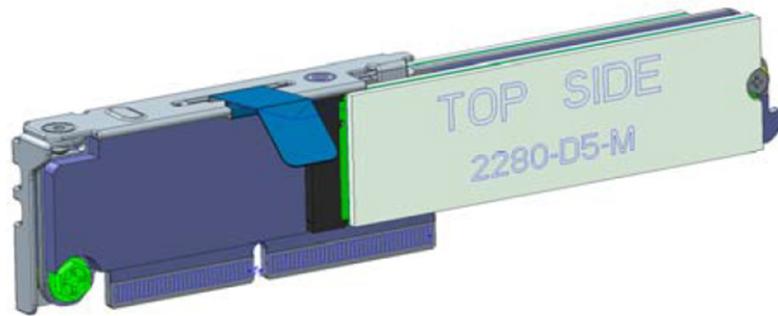

Figure 4. Boot Optimized Storage Subsystem (BOSS)

Table 12. BOSS RAID controller features

Function/Feature	Supported
Stripe size supported	64k
Configuration (HII)	Yes
Full initialization	No
Fast initialization	Yes
	(i) NOTE: Performed on virtual disk creation by default.
Background initialization	No
RAID0	No
RAID1	Yes
Single non-RAID	Yes
Dual non-RAID	Yes
Degraded RAID1 and non-RAID	No
Foreign import	Yes
Consistency check	No
Patrol read	No
Load balance	N/A
Rebuild	Yes

Function/Feature	Supported
	(i) **NOTE: Manually triggered in Human Interface Infrastructure(HII) or via Marvell Command Line Interface (CLI).**
Auto-rebuild	Yes (i) **NOTE: Auto Rebuild will occur at power up only if there is a surviving native virtual disk and another physical disk is present at power up.**
Hot spare	No
Change rebuild priority/rate	No
Virtual disk write back/ read ahead cache	No (i) **NOTE: No controller cache.**
Battery support	N/A (i) **NOTE: No battery.**
Non-RAID disk cache policy	Yes (i) **NOTE: OS controlled/Device defaults.**
SMART Info	Yes (i) **NOTE: Can be pulled by Marvell CLI.**
Physical disk hot swap	No
Virtual disk expansion	No
Virtual disk slicing	No
Virtual disk migration	Yes (i) **NOTE: On new controller, virtual disk must be Imported from HII before presented to OS.**
Split mirror	No (i) **NOTE: System required to shutdown and migrate one physical disk to another system and continue rebuild.**
Non-RAID migration	Yes
BIOS configuration utility (Ctrl-M)	No
Add on driver for data path (OS device driver)	No (i) **NOTE: Console Windows driver or Linux library is required for management purposes only.**
4K native drive support	No
TRIM and UNMAP virtual disk	No
TRIM and UNMAP Non-RAID physical disk	Yes
Self-encrypting drives(SED) support	No
Cryptographic erase (sanitize)	Yes (i) **NOTE: If drive supports SANITIZE Crypto Erase. No other encryption support from controller or drive.**

Networking and PCIe

The Blade Network Daughter Card (NDC) is a custom form factor card that contains a complete network interface card (NIC) subsystem.

The Dell EMC PowerEdge FC640 system supports one blade Network Daughter Card (bNDC) offer balanced and scalable network capabilities. Dell's network daughter cards, enable you to choose the right network fabric without using up a valuable PCI slot. Pick the speed, technology, vendor, and other options, such as switch independent partitioning, which enable you to share and manage bandwidth on 10GbE connections.

Topics:

- Network card options
- PCIe expansion cards
- USB Mirco-AB with rSPI Card

Network card options

The blade Network Daughter Card (bNDC)card interfaces with the FC640 through following interfaces from the system board:

- PCIe x8 Gen3 compatible link from CPU1 — can be bifurcated as two separate x4 links
- NC-SI
- I2C
- Power and Ground
- Miscellaneous control signals

The Dell EMC PowerEdge FC640 system supports one bNDC , which are available in the following configurations:

- 10GbE QLogic 57810 DP
- 10GbE QLogic 57840 QP
- 1GbE QLogic QP
- 10GbE Intel X520 DP
- 1GbE Intel QP
- 10GbE Intel X710 DP
- 10GbE Intel X710 QP

PCIe expansion cards

The PowerEdge FC640 system supports x16 Gen 3 PCIe mezzanine card, which provides an interface between the sled and the switches on the FX2s' enclosure.

The following diagram shown the PCIe mapping paths through the FX2s hardware:
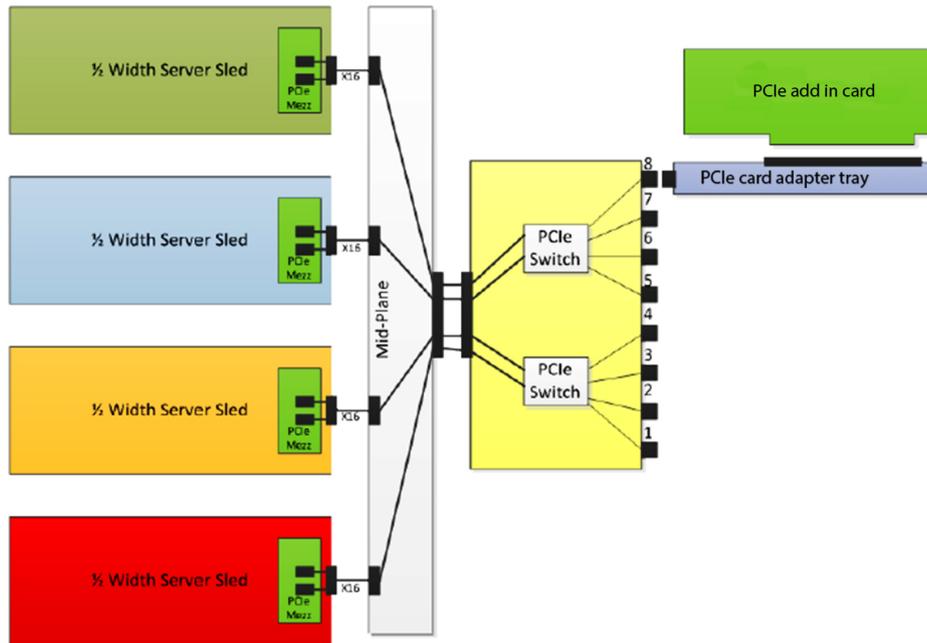
Figure 5. PCIe mezzanine card architecture

USB Mirco-AB with rSPI Card

The FC640 supports a USB Mirco-AB with rSPI card. The front accessible USB Micro-AB port is for the iDRAC management function and the Restore Serial Peripheral Interface(rSPI) is an SPI flash device to store system service tag, system configuration, or the iDRAC license information.
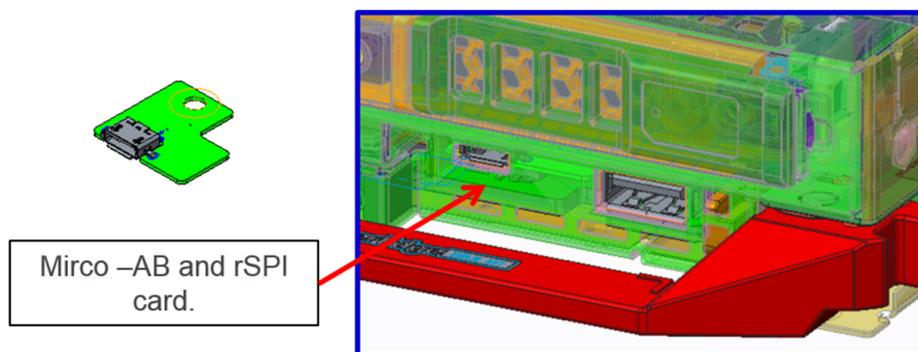

Mirco –AB and rSPI card.

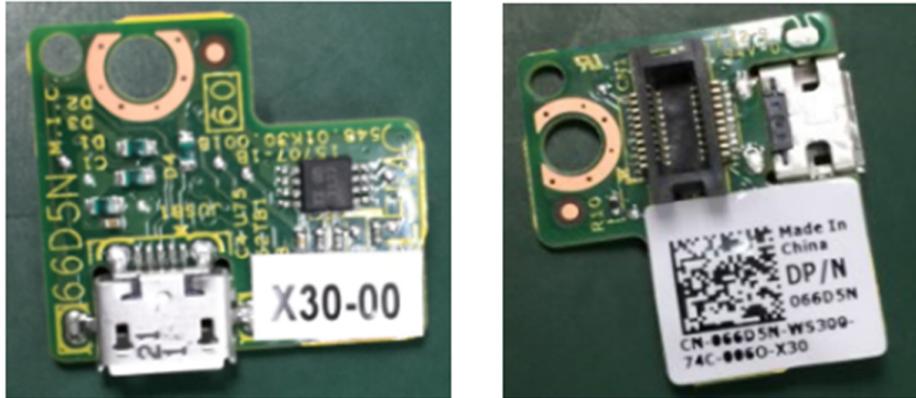**Figure 6. Front access USB Micro-AB slot**

Figure 7. USB Micro-AB with rSPI card

Power, Thermal, and Acoustics

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

Topics:

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

Power consumption and energy efficiency

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

Table 13. Power tools and technologies

Feature	Description
Power supply units (PSU) portfolio	PSU portfolio includes intelligent features such as dynamically optimizing efficiency while maintaining availability and redundancy. For more information, see the *Power supply units* section.
Tools for right-sizing	Enterprise Infrastructure Planning Tool (EIPT) is a tool that helps you plan and tune your computer and infrastructure equipment for maximum efficiency by calculating hardware power consumption, power infrastructure and storage. Learn more at Dell.com/calc.
Power monitoring accuracy	PSU power monitoring improvements include: - Power monitoring accuracy of 1%, whereas the industry standard is 5% - More accurate reporting of power - Better performance under a power cap
Power capping	Use Dell EMC systems management tools such as OpenManage Power Center and iDRAC9 with an Enterprise license can be used to set a power limit for your server. This limits the output of a PSU and reduce system power consumption and help in constrained power situations.
Systems management	The integrated Dell Remote Access Controller 9 (iDRAC9) with Lifecycle Controller is embedded within every Dell EMC PowerEdge™ server and provides functionality that helps IT administrators deploy, update, monitor, and maintain servers with no need for any additional software to be installed. iDRAC functions regardless of operating system or hypervisor presence because from a pre-OS or bare-metal state, iDRAC is ready to work because it is embedded within each server from the factory.
Active power management	Dell EMC offers a complete power management solution accessed through the iDRAC9 with Enterprise licensing and OpenManage Power Center to implement policy-based management of power and thermal levels at the individual system, rack, or data center level. Hot spares reduce power consumption of redundant power supplies. Thermal control of fan speed optimizes the thermal settings for your environment to reduce fan consumption and lower system power consumption.

Power supply units

Energy Smart power supplies have intelligent features, such as the ability to dynamically optimize efficiency while maintaining availability and redundancy. Also featured are enhanced power-consumption reduction technologies, such as high-efficiency power conversion and advanced thermal-management techniques, and embedded power-management features including high-accuracy power monitoring.

The FC640 sled system leverage the power source from PowerEdge FX2 chassis enclosure. The following power supply unit options are available for the FX2 enclosure:

2400W, 2000W, or 1600W AC power supplies in 1+1 redundant or 2+0 non-redundant configurations.

Thermal and Acoustics

The system's thermal management delivers high performance through optimized cooling of components at the lowest fan speeds across a wide range of ambient temperatures from 10°C to 35°C (50°F to 95°F) and to extended ambient temperature ranges. These optimizations result in lower fan power consumption which translate to lower system power and data center power consumption.

Thermal design

The thermal design of the system reflects the following:

- **Optimized thermal design:** The system layout is architected for optimum thermal design. System component placement and layout are designed to provide maximum airflow coverage to critical components with minimal expense of fan power.
- **Comprehensive thermal management:** The thermal control system regulates the system fan speeds based on feedback from system component temperature sensors, as well as for system inventory and subsystem power draw. Temperature monitoring includes components such as processors, DIMMs, chipset, system inlet air temperature and hard disk drives.
- **Open and closed loop fan speed control:** Open loop fan control uses system configuration to determine fan speed based on system inlet air temperature. Closed loop thermal control uses temperature feedback to dynamically adjust fan speeds based on system activity and cooling requirements.
- **User-configurable settings:** With the understanding and realization that every customer has a unique set of circumstances or expectations from the system, in this generation of servers, we have introduced limited user-configurable settings in the iDRAC9 BIOS setup screen. For more information, see the Dell EMC PowerEdge system Installation and Service Manual on Dell.com/Support/Manuals and "Advanced Thermal Control: Optimizing across Environments and Power Goals" on Dell.com.
- **Cooling redundancy:** The system allows N+1 fan redundancy, allowing continuous operation with one fan failure in the system.

Acoustical design

Dell EMC focuses on sound quality in addition to sound power level and sound pressure level. Sound quality describes how disturbing or pleasing a sound is interpreted, and Dell EMC references a number of psychacoustical metrics and thresholds in delivering to it. Tone prominence is one such metric. Sound power and sound pressure levels increase with greater populations or higher utilization, while sound quality remains good even as the frequency content changes. A reference for comparison to sound pressure levels for familiar noise sources is given in the following table. An extensive description of Dell EMC Enterprise acoustical design and metrics is available in the Dell Enterprise Acoustics white paper.

Table 14. Acoustical reference points and output comparisons

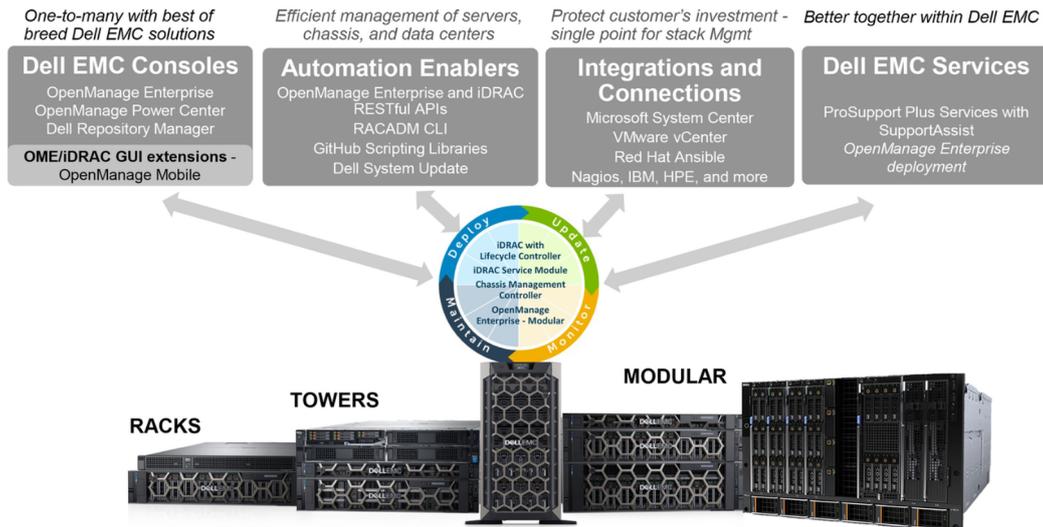| LpA, dBA, re 20 µPa	Loudness, sones	Equivalent familiar noise experience
90	80	Loud concert
75	39	Data center, vacuum cleaner, voice must be elevated to be heard
60	10	Conversation levels
45	4	Whispering, open office layout, normal living room
35	2	Quiet office
30	1	Quiet library
20	0	Recording studio

Dell EMC OpenManage systems management

Figure 8. Dell EMC OpenManage Portfolio

Dell EMC delivers management solutions that help IT Administrators effectively deploy, update, monitor, and manage IT assets. OpenManage solutions and tools enable you to quickly respond to problems by helping them to manage Dell EMC servers effectively and efficiently; in physical, virtual, local, and remote environments, operating in-band, and out-of-band (agent-free). The OpenManage portfolio includes innovative embedded management tools such as the integrated Dell Remote Access Controller (iDRAC), Chassis Management Controller and Consoles like OpenManage Enterprise, OpenManage Power Manager plug in, and tools like Repository Manager.

Dell EMC has developed comprehensive systems management solutions based on open standards and has integrated with management consoles that can perform advanced management of Dell hardware. Dell EMC has connected or integrated the advanced management capabilities of Dell hardware into offerings from the industry's top systems management vendors and frameworks such as Ansible, thus making Dell EMC platforms easy to deploy, update, monitor, and manage.

The key tools for managing Dell EMC PowerEdge servers are iDRAC and the one-to-many OpenManage Enterprise console. OpenManage Enterprise helps the system administrators in complete lifecycle management of multiple generations of PowerEdge servers. Other tools such as Repository Manager, which enables simple yet comprehensive change management.

OpenManage tools integrate with systems management framework from other vendors such as VMware, Microsoft, Ansible, and ServiceNow. This enables you to use the skills of the IT staff to efficiently manage Dell EMC PowerEdge servers.

Topics:

- Server and Chassis Managers
- Dell EMC consoles
- Automation Enablers
- Integration with third-party consoles
- Connections for third-party consoles
- Dell EMC Update Utilities
- Dell resources

Server and Chassis Managers

- Integrated Dell Remote Access Controller (iDRAC)
- Chassis Management Controller (CMC)
- iDRAC Service Module (iSM)

Dell EMC consoles

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

Automation Enablers

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

Integration with third-party consoles

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

Connections for third-party consoles

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

Dell EMC Update Utilities

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

Dell resources

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

Table 15. Dell resources

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

Resource	Location
OpenManage Essentials (OME)	www.dell.com/support/article/sln310714
OpenManage Mobile (OMM)	www.dell.com/support/article/sln310980
OpenManage Integration for VMware vCenter (OMIVV)	www.dell.com/support/article/sln311238
OpenManage Integration for Microsoft System Center (OMIMSSC)	www.dell.com/support/article/sln312177
Dell EMC Repository Manager (DRM)	www.dell.com/support/article/sln312652
Dell EMC System Update (DSU)	www.dell.com/support/article/sln310654
Dell EMC Platform Specific Bootable ISO (PSBI)	Dell.com/support/article/sln296511
Dell EMC Chassis Management Controller (CMC)	www.dell.com/support/article/sln311283
OpenManage Connections for Partner Consoles	www.dell.com/support/article/sln312320
OpenManage Enterprise Power Manager	
OpenManage Integration with ServiceNow (OMISNOW)	Dell.com/support/article/sln317784

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

Appendix A. Additional specifications

The following sections contain information about additional system specifications.

Topics:

PSU specifications

The PowerEdge FC640 system supports the following AC redundant power supply units (PSU) in FX2 Chassis.

- 1600W (WRAC) Platinum (86mm)
- 2000W
- 2400W

System dimensions

Table 16. Dimensions of the PowerEdge FC640 system

Height	Width	Depth
40.3 mm(1.58 inches)	211.0 mm(8.30 inches)	535.8 mm (21.06 inches)

Sled weight

Table 17. Sled weight

System	Maximum weight (with all hard drives/SSDs)
FC640	6.4 kg (14.1 lb)

Environmental specifications

See Dell EMC PowerEdge FC640 installation service manuals on Dell.com/Support/Manuals for detailed environmental specifications.

Video specifications

The PowerEdge FC640 system supports integrated VGA controller in iDRAC with 4Gb DDR4 shared memory with iDRAC application.

Appendix B. Standards compliance

Table 18. 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 19. Additional resources

Resource	Description of contents	Location
PowerEdge FC640 Installation Service Manuals	This manual, available in PDF format, provides the following information: • Chassis features • System Setup program • System messages • System codes and indicators • System BIOS • Remove and replace procedures • Troubleshooting • Diagnostics • Jumpers and connectors	Dell.com/Support/Manuals
PowerEdge FC640 Getting Started Guide	This guide ships with the system, and is also available in PDF format. This guide provides the following information: • Initial setup steps • Key system features • Technical specifications	Dell.com/Support/Manuals
Rack Installation Instructions	This document ships with the rack kits, and provides instructions for installing a server in a rack.	Dell.com/Support/Manuals
Information Update	This document ships with the system, is also available in PDF format online, and provides information on system updates.	Dell.com/Support/Manuals
System Information Label	The system information label documents the system board layout and system jumper settings. Text is minimized due to space limitations and translation considerations. The label size is standardized across platforms.	Inside the system chassis cover
Quick Resource Locator (QRL)	This code on the chassis can be scanned by a phone application to access additional information and resources for the server, including videos, reference materials, service tag information, and Dell contact information.	Inside the system chassis cover
Energy Smart Solution Advisor (ESSA)	The Dell online ESSA enables easier and more meaningful estimates to help you determine the most efficient configuration possible. Use ESSA to calculate the power consumption of your hardware, power infrastructure, and storage.	Dell.com/calc

Appendix D. Support and deployment services

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 9. 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.

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 10. 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

Enterprise Support Services
Feature Comparison

	ProSupport	ProSupport Plus	ProSupport One for Data Center
Remote technical support	24x7	24x7	24x7
Onsite support	Next business day or Mission Critical	Next business day or Mission Critical	Flexible
Automated issue detection and case creation	●	●	●
Self-service case initiation and management	●	●	●
Hypervisor, Operating Environment Software and OS support	●	●	●
Priority access to specialized support experts		●	●
Designated 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 11. 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 12. 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.