PowerEdge R730 and R730xd

Technical Guide

Exceptionally flexible and scalable 2-socket, 2U rack servers delivering high-performance processing and a broad range of workload-optimized local storage options

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1 System overview

Introduction

The Dell PowerEdge R730 is a general-purpose platform with highly expandable memory (up to 768GB) and impressive I/O capabilities to match. The R730 can readily handle very demanding workloads, such as data warehouses, e-commerce, virtual desktop infrastructure (VDI), databases and high-performance computing (HPC). In addition to the R730's capabilities, the R730xd offers extraordinary storage capacity, making it well suited for data-intensive applications that require storage and I/O performance, like medical imaging and email servers.

Deliver peak performance

Drive peak compute performance across a variety of workloads with the Intel® Xeon® processor E5-2600 v3 product family and state-of-the-art DDR4 memory. Boost data access for applications with up to 16 x 12Gb/s SAS drives and high-performance dual RAID. Take advantage of advanced accelerators and GPUs to maximize performance in HPC, VDI and imaging environments.

Discover greater versatility

With 24 DIMMs of high-capacity, low-power DDR4 memory, 7 PCI Express® (PCIe) 3.0 expansion slots and highly scalable local storage, the R730 is extremely flexible. Create a dense, resource-rich virtualization environment with up to 16 x 2.5" drives. Combine that with the R730's GPU capability to save infrastructure costs and consolidate management operations in a scalable and centralized virtual desktop environment. The GPU option also makes the R730 an excellent choice as a midrange medical imaging solution.

Maximize operational efficiency

PowerEdge servers let you construct and manage highly efficient infrastructures for data centers and small businesses. Accelerate time-to-production with automated deployment processes that use fewer manual steps and reduce the potential for error. Improve IT productivity with innovative-at-the-server management tools like iDRAC Direct and iDRAC Quick Sync to deliver in-depth system health status and speed deployment. Optimize data center energy usage with improved performance-per-watt and more granular control of power and cooling.

Innovative management with intelligent automation

The Dell OpenManage systems management portfolio includes innovative solutions that simplify and automate essential server lifecycle management tasks — making IT operations more efficient and Dell servers the most productive, reliable and cost effective. Leveraging the incomparable agent-free capabilities of the PowerEdge embedded Integrated Dell Remote Access Controller (iDRAC) with Lifecycle Controller technology, server deployment, configuration and updates are streamlined across the OpenManage portfolio and through integration with third-party management solutions.

Monitoring and control of Dell and third-party data center hardware is provided by OpenManage Essentials and with anytime, anywhere mobile access, through OpenManage Mobile. OpenManage Essentials now also delivers Server Configuration Management capabilities that automate one-to-many PowerEdge bare-metal server and operating system deployments, quick and consistent replication of configurations and ensure compliance to a predefined baseline with automated drift detection.

New technologies

Table 1 lists the new technologies featured on the PowerEdge R730 and R730xd systems.

Table 1. New technologies

New technologies	Detailed descriptions
Intel Xeon Processor E5-2600 v3 product family	The Intel Xeon Processor E5-2600 v3 product has advanced features that deliver exceptional performance and value. See the Processors section for details.
Intel C610 series chipset	The R730 and R730xd servers use the Intel Platform Controller Hub (PCH) chip.
2133MT/s DDR4 memory	Certain models of E5-2600 v3 processors support 2133MT/s memory. The R730 and R730xd support three DIMMs per channel at 1866MT/s with these processors. See the Memory section for details.
Next-generation PERC options	The R730 and R730xd support new Dell PowerEdge RAID Controller (PERC) cards with improved functionality and faster performance. See the Storage section for details.
PERC S130	This new software RAID solution supports RAID 0, 1, 5 and 10 and supports a maximum of eight hot-plug SATA hard disk drives (HDD) or solid-state drives (SSD). See the Storage section for details.
iDRAC8 with Lifecycle Controller	The new embedded systems management solution for Dell servers features hardware and firmware inventory and alerting, data center level power monitoring, faster performance and many more features. See the Dell OpenManage systems management section for details.
iDRAC Quick Sync	This is a new at-the-box management solution that allows mobile devices to sync with the PowerEdge server by touching an Android mobile device against the Quick Sync hardware located in the bezel to gather system information including system status and logs. The mobile application also allows the user to make changes to the system configuration.
iDRAC Direct	Allows direct access to the iDRAC through the special front USB port using any portable device with a browser. An A-to-A USB cable is required.
Failsafe hypervisors	The internal dual SD module (IDSDM) enables Dell's unique Failsafe Virtualization architecture, ensuring uptime by providing failover capability for embedded hypervisors, such as VMware® vSphere® ESXi™.
Dell Fresh Air 2.0	Dell has tested and validated select 13th generation PowerEdge servers that operate at higher temperatures helping you reduce your hours of economization or even go chiller-less. See the Power, thermal and acoustics section for details.
12Gb/s SAS	SAS-3 doubles the interface bandwidth from the previous generation at 12Gb/s. SAS-3 addresses signal quality through transmitter training, which gives one of the receiver device's key interconnects, its PHY, the ability to modify the settings of the transmitter device's PHY.
6Gb/s SATA	SATA 3.0 runs with a native transfer rate of 6Gb/s, and taking 8b/10b encoding into account, the maximum uncoded transfer rate is 4.8Gb/s (600MB/s). The theoretical burst throughput of SATA 3.0 is double that of SATA 2.0.

New technologies	Detailed descriptions
Next-generation Express Flash drives	Dell Express Flash PCIe SSDs provide fast performance without requiring processor resources or capturing DRAM. The R730xd with the 24 x 3.5" backplane configuration supports up to 4 Express Flash PCIe SSDs. The R730 does not support Express Flash PCIe SSDs.
1.8" SSD	The application of 1.8" form factor SATA SSD has been expanded from the PowerEdge M420 half-height blade to rack servers. These SSDs provide a high spindle count fast cache layer for tiered storage applications.
USB 3.0	USB 3.0 can operate in both USB 2.0 and USB 3.0 speed modes. USB 3.0 driver is required to control USB device in USB 3.0 speed mode.

2 System features

Compared to the previous generation of Dell PowerEdge servers, the R730 and R730xd have more drive bay options, more PCIe slots, next-generation RAID controllers and advanced system management.

Comparison of PowerEdge systems

Table 2 compares some of the features of the R730 and R730xd and the R720 and R720xd systems.

Table 2. Comparison of PowerEdge R720/R720xd and R730/R730xd

Feature	PowerEdge R720/R720xd	PowerEdge R730/R730xd
Chassis	2U rack	2U rack
Processors	Intel Xeon processor E5-2600 v2 product family	Intel Xeon processor E5-2600 v3 product family
Internal interconnect	Intel QuickPath Interconnect (QPI)	Intel QPI
Memory[1]	24 x DDR3 RDIMM, UDIMM, and LRDIMM Up to 768GB	24 x DDR4 RDIMM and LRDIMM Up to 768GB
Disk drives	R720: Up to 16 x 2.5" or 8 x 3.5" 6Gb SAS, 3Gb SATA R720xd: Up to 26 x 2.5" SAS SSD, SATA SSD, SAS, NL-SAS, SATA, SAS 512n or 12 x 3.5" SAS, NL-SAS, SATA + 2 x 2.5" drives	R730: Up to 16 x 2.5" HDD: SAS, SATA, NL-SAS; SSD: 12Gb SAS, 6Gb SATA Up to 8 x 3.5" HDD: SATA, NL-SAS; SSD: 12Gb SAS, 6Gb SATA R730xd: Up to 24 x 2.5" + 2 x 2.5" HDD: SAS, SATA, NL-SAS; SSD: 12Gb SAS, 6Gb SATA, up to 4 NVMe Express Flash PCIe Up to 16 x 3.5" + 2 x 2.5" HDD: SAS, SATA, NL-SAS; SSD: 12Gb SAS, 6Gb SATA
RAID controller	PERC S110 (software RAID), H310, H710, H710P, H810 (external); support for 2 internal RAID controllers	PERC S130 (software RAID), H330, H730, H730P, H830 (external); support for 2 internal RAID controllers
PCI slots	Max 7 + 1 x PCIe 3.0/6 + 1 x PCIe 3.0	Max 7 + 1 x PCIe 3.0/6 + 1 x PCIe 3.0 option to eliminate Riser 1
Embedded NICs	Select Network Adapter NDC 4 x 1GbE, 2 x 10GbE	Select Network Adapter NDC 4 x 1GbE, 2 x 10GbE, 4 x 10GbE
USB	USB 2.0	USB 3.0 (back and internal ports only)

Feature	PowerEdge R720/R720xd	PowerEdge R730/R730xd
Power supplies	Hot-plug, redundant power supply units: 495W AC, 750W AC, 750W AC/DC mixed mode, 1100W AC, 1100W DC	Hot-plug, redundant power supply units: 495W AC, 750W AC, 750W AC/DC mixed mode[2], 1100W AC, 1100W DC
Power efficiency 80 PLUS® certification	Titanium and Platinum	Titanium and Platinum
Dell OpenManage Systems Management	OpenManage Essentials Dell Management Console IT Assistant OMSA Agent OpenManage Power Center (requires iDRAC7 Enterprise with Lifecycle Controller) OpenManage Integrations and Connections iDRAC7 Express with Lifecycle Controller (standard option)	OpenManage Essentials Dell Management Console OMSA Agent OpenManage Power Center (requires iDRAC8 Enterprise with Lifecycle Controller) OpenManage Integrations and Connections iDRAC8 Express with Lifecycle Controller (standard option)
Internal GPU	2 x 300W (double-wide) or 4 x 150W (single-wide) Not supported on R720xd	2 x 300W (double-wide) or 4 x 150W (single-wide) Not supported on R730xd
Availability	Hot-plug drives Hot-plug redundant cooling Hot-plug redundant PSUs IDSDM support	Hot-plug drives Hot-plug redundant cooling Hot-plug redundant PSUs IDSDM support (next generation)

[1]GB means 1 billion bytes and TB means 1 trillion bytes; actual capacity varies with preloaded material and operating environment and will be less.
[2]750W mixed mode PSU available only in China.

Specifications

Table 3 lists the technical specifications for the PowerEdge R730 and R730xd systems. For the latest information on supported features, visit the R730 and R730xd pages on Dell.com.

Table 3. Technical specifications

Feature	Specification
Form factor	2U rack
Processors	Intel Xeon processor E5-2600 v3 product family
Processor sockets	2 sockets
Internal interconnect	2 Intel QPI links; 6.4GT/s; 7.2GT/s; 8.0GT/s
Cache	2.5MB per core; core options: 2, 4, 6, 8, 10, 12, 14, 16, 18

Feature	Specification	
Chipset	Intel C610	
Memory	Up to 768GB[1] (24 DIMM slots): 4GB/8GB/16GB/32GB DDR4 up to 2133MT/s	
PCIe slots	**R730:** Up to 7 PCIe 3.0 slots plus dedicated PERC slot	**R730xd:** Up to 6 PCIe 3.0 slots plus dedicated PERC slot
RAID controller	**Internal controllers:** PERC S130 (software RAID; R730 only) PERC H330 PERC H730 PERC H730P	**External HBAs (RAID):** PERC H830 **External HBAs (non-RAID):** 12Gb/s SAS HBA
Drives	**R730 internal hard drive bay and hot-plug backplane:** Up to 16 x 2.5" HDD: SAS, SATA, NL-SAS; SSD: SAS, SATA Up to 8 x 3.5" HDD: SAS, SATA, NL-SAS; SSD: SAS, SATA **R730xd internal hard drive bay and hot-plug backplane:** Up to 16 x 3.5" SAS, SATA, NL-SAS, SSD + 2 x 2.5" drives Up to 18 x 1.8" SAS, SATA, NL-SAS, SSD drives + 8 x 3.5" SAS, SATA, NL-SAS, SSD drives, + 2 x 2.5" HDD Up to 26 x 2.5" SAS, SATA, NL-SAS, SSD, PCIe SSD drives	
Maximum internal storage	**R730:** Up to 29TB using 16 x 2.5" 1.8TB SAS hard drives Up to 48TB using 8 x 3.5" 6TB NL-SAS hard drives **R730xd:** Up to 31.9TB using 18 x 1.8" 960GB SATA SSD + 8 x 3.5" 1.8TB SAS HDD Up to 43.2TB using 24 x 2.5" 1.8TB SAS HDD + 2 x 2.5" 1.8TB SAS HDD Up to 99.6TB using 12 x 3.5" 6TB NL-SAS HDD or SSD + 4 x 3.5" 6TB SAS + 2 x 2.5" 1.8TB SAS HDD or SSD	
Embedded NIC	4 x 1GbE, 2 x 10+2GbE, 4 x 10GbE NDC	
Power supply	750W AC (Titanium[2]); 495W, 750W or 1100W AC (Platinum[2]); 1100W DC	
Availability	ECC memory, hot-plug hard drives, hot-plug redundant cooling, hot-plug redundant power, IDSDM, single device data correction (SDDC), spare rank, tool-less chassis, support for high availability clustering and virtualization, proactive systems management alerts, iDRAC8 with Lifecycle Controller	
Systems management	**Systems management:** IPMI 2.0 compliant; Dell OpenManage Essentials; Dell OpenManage Mobile; Dell OpenManage Power Center **Remote management:** iDRAC8 with Lifecycle Controller, iDRAC8 Express (default), iDRAC8 Enterprise (upgrade) 8GB vFlash media (upgrade), 16GB vFlash media (upgrade) iDRAC Quick Sync	**Dell OpenManage Integrations:** • Dell OpenManage Integration Suite for Microsoft® System Center • Dell OpenManage Integration for VMware® vCenter™ **Dell OpenManage Connections:** • HP Operations Manager, IBM Tivoli® Netcool® and CA Network and Systems Management • Dell OpenManage Plug-in for Oracle® Database Manager

Feature	Specification	
Rack support	• ReadyRails™ sliding rails for tool-less mounting in 4-post racks with square or unthreaded round holes or tooled mounting in 4-post threaded hole racks, with support for optional tool-less cable management arm • ReadyRails static rails for tool-less mounting in 4-post racks with square or unthreaded round holes or tooled mounting in 4-post threaded and 2-post (Telco) racks	
Operating systems	Microsoft® Windows Server® 2008 R2 Microsoft Windows Server 2012 Microsoft Windows Server 2012 R2 Novell® SUSE® Linux Enterprise Server Red Hat® Enterprise Linux® VMware® ESX®	Virtualization options: Microsoft Windows Server 2012 R2 with Hyper-V Citrix® XenServer® VMware vSphere ESXi For more information on the specific versions and additions, visit Dell.com/OSsupport.
OEM-ready version available	From bezel to BIOS to packaging, your servers can look and feel as if they were designed and built by you. For more information, visit Dell.com/OEM.	
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 today for more information. Availability and terms of Dell Services vary by region. For more information, visit Dell.com/Service.	

[1]GB means 1 billion bytes and TB means 1 trillion bytes; actual capacity varies with preloaded material and operating environment and will be less.

[2]80 PLUS certification

3 Chassis views and features

The following sections provide external and internal views of the Dell PowerEdge R730 and R730xd systems and describe the chassis features. For detailed information on features and descriptions for these systems, see the *Dell PowerEdge R730 and R730xd Owner's Manual* on Dell.com/Support/Manuals.

Chassis views

The R730 and R730xd are available in several chassis options with varying numbers of drive bays.

Note: A chassis cannot be reconfigured or upgraded after point of purchase.

R730 front views

The R730 supports up to 16 x 2.5" or up to 8 x 3.5" front-accessible, hot-plug hard drives that are secured by a removable front bezel. Other front-panel features include an interactive LCD control panel, USB management port/iDRAC Direct, a video connector and a vFlash media card slot.

Figure 1. R730 front view (2.5" chassis with bezel)

Figure 2. R730 front view (2.5" chassis without bezel)

R730xd front views

The R730xd supports up to 24 x 2.5", 12 x 3.5", or 8 x 3.5" plus 18 x 1.8" front-accessible, hot-plug drives that are secured by a removable front bezel. Other front-panel features include an LED control panel, USB management port/iDRAC Direct and video connector.

Figure 3. R730xd front view (8 x 3.5" plus 18 x 1.8" with bezel)

Figure 4. R730xd front view (8 x 3.5" plus 18 x 1.8" without bezel)

R730 back view

The R730 back panel includes PSUs, Ethernet connectors, PCIe slots and many other features described in this guide.

Figure 5. R730 back view

R730xd back view

In addition to the R730 back-panel features, the R730xd includes 2 optional 2.5" hot-plug drives in the back of the system.

Figure 6. R730xd back view

Internal chassis views

The chassis design of the R730 and R730xd is optimized for easy access to components and for airflow for effective and efficient cooling. The R730 and R730xd support up to 24 DIMMs, 2 processors, hot-plug redundant fans, and many other components and features described in this guide.

Figure 7. R730 internal chassis view

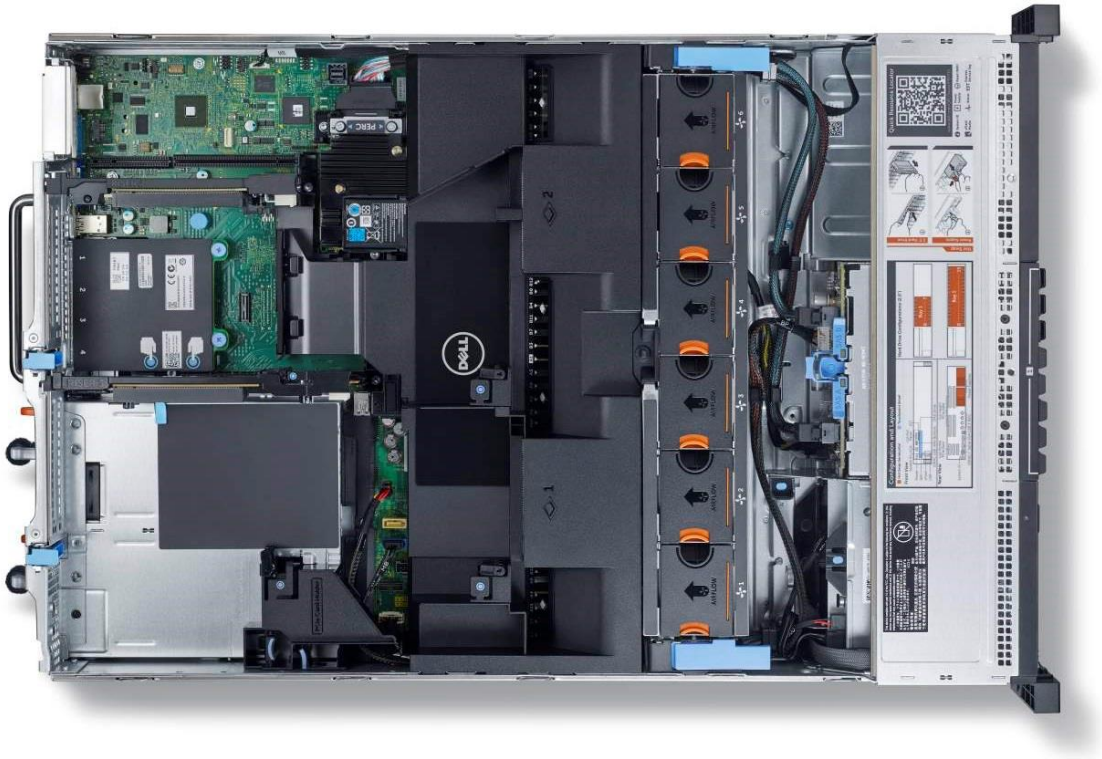
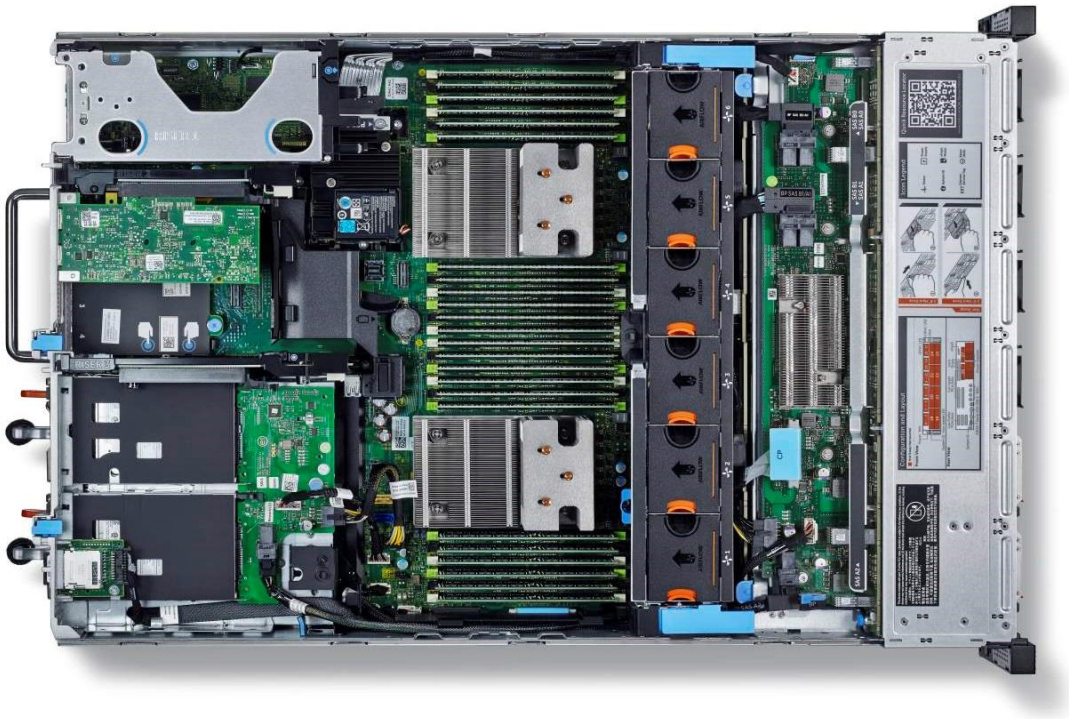


Figure 8. R730xd internal chassis view



For additional system views, see the *Dell PowerEdge R730 and R730xd Owner's Manual* on Dell.com/Support/Manuals.

Chassis features

Table 4 lists the chassis features for the R730 and R730xd systems. For additional information on these features, see the *Dell PowerEdge R730 and R730xd Owner's Manual* on Dell.com/Support/Manuals.

Table 4. Chassis features

Feature	Description
Power button and indicator	ACPI-complaint power button with an integrated green power LED
Front bezel	Covers the system's front-loading hard drives; can be locked to prevent hard drives from being removed
NMI button	Recessed non-maskable interrupt (NMI) button used to troubleshoot software and device driver errors; use only if directed to do so by qualified support personnel or by the operating system's documentation
System identification button	Buttons on the back and front of a system to help identify the unit in a data center environment
Hard drive activity LEDs	Indicate the status and activity of the hard drives
USB connectors	R730: 2 front, 2 back, and 1 internal R730xd: 1 front, 2 back, and 1 internal

Feature	Description
vFlash media reader	Supports 1 vFlash media card (the R730 slot is located in the front of the system and the R730x slot is located in the back); functionality is activated only when iDRAC8 Enterprise is enabled
Video connector	Connects a monitor to the system
LCD control panel	Provides user access to buttons, display, and I/O interfaces (R730 only)
LED panel	Indicates the status of system conditions (R730xd only)
Hard drives	Front-accessible, hot-plug hard drives plus 2 optional back-accessible hot-plug hard drives (R730xd only)
Optical drive (optional)	The R730 supports one optional slimline SATA DVD-ROM drive or DVD+/-RW drive; R730xd does not support an internal optical drive
System identification panel	Slide-out label panel for system information
Serial connector	Connects a serial device to the system and for console redirect
iDRAC8 Enterprise port	Dedicated management port for optional iDRAC8 Enterprise
PCIe expansion card slots	The R730 supports up to 7 PCIe expansion cards; R730xd supports up to 6 PCIe expansion cards
Ethernet connectors	Choice of network connectors through Select Network Adapter family
Power supply units	Up to two back-accessible, hot-plug power supplies
Power supply indicators	Indicate whether system has power
NIC indicators	Indicate network activity and status
Quick Resource Locator (QRL)	Scan the code on the chassis with smartphone app for additional information and resources including videos, reference materials, service tag information and Dell contact information; scan the code on the information tag for information specific to the server

LCD control panel (R730)

The R730 system control panel is located on the front of the chassis to provide user access to buttons, display, and I/O interfaces. For more information on the R730 LCD control panel, see the *Dell PowerEdge R730 and R730xd Owner's Manual* on Dell.com/Support/Manuals.

Figure 9. R730 LCD control panel

LED panel (R730xd)

The R730xd LED panel is located on the front of the chassis to indicate the status of system conditions. For more information on the R730xd LED panel, see the *Dell PowerEdge R730 and R730xd Owner's Manual* on Dell.com/Support/Manuals.

Figure 10. R730xd LED panel

Quick Resource Locator

The QRL is a model-specific Quick Response code located on the server chassis as shown in Figure 11.

Figure 11. QRL on chassis

The QRL on the pull-out information (luggage) tag provides information specific to the server by service tag.

Figure 12. QRL on information tag

Use a smartphone to access the Dell QRL app to learn more about the server such as:

- View step-by-step videos, including overviews of system internals and externals, as well as detailed, concise, task-oriented videos and installation wizards

- Locate reference materials, including searchable owner's manual content, LCD diagnostics, and an electrical overview
- Look up your service tag so you can quickly gain access to your specific hardware configuration info and warranty information
- Contact Dell directly (by link) to get in touch with technical support and sales teams and provide feedback to Dell

Figure 13. Accessing a QRL

These codes provide an easy way to retrieve the critical support information you need when you need it, making you more efficient and effective in managing your hardware.

Security features

The latest generation of PowerEdge servers has the features listed in Table 5 to help ensure the security of your data center.

Table 5. Security features

Security feature	Description
Cover latch	A tooled latch is integrated in the top cover to secure it to the rack chassis.
Bezel	A standard bezel is an optional metal bezel mounted to the chassis front and shows the Dell ID. A lock on the bezel protects unauthorized access to hard drives. NFC bezel enables the iDRAC QuickSync management function for managing the server from the front using an NFC-capable device and the free Dell OpenManage Mobile App (currently Android only). Available only from the factory and not supported after purchase of sale. See the Dell iDRAC Quick Sync Tech Guide for more information.
TPM	The Trusted Platform Module (TPM) is used to generate/store keys, protect/authenticate passwords, and create/store digital certificates. It also supports the Intel Xeon TXT functionality. TPM can also be used to enable the BitLocker™ hard drive encryption feature in Windows Server 2008. TPM 1.2 is supported.
Power-off security	BIOS has the ability to disable the power button function.
Intrusion alert	An internal switch is used to detect chassis intrusion.
Secure mode	BIOS has the ability to enter a secure boot mode through system setup. This mode includes the option to lock out the power and NMI switches on the control panel or set up a system password.

4 Processors

The Dell PowerEdge R730 and R730xd feature the Intel Xeon processor E5-2600 v3 product family, offering an ideal combination of performance, power efficiency, and cost. These processors provide high performance no matter what your constraint is — floor space, power, or budget — and on workloads that range from the most complicated scientific exploration to crucial web-serving and infrastructure applications. In addition to providing raw performance gains, improved I/O is also made possible with Intel Integrated I/O, which can reduce latency by adding more lanes and doubling bandwidth. This helps to reduce network and storage bottlenecks, unleashing the processor's performance capabilities.

Processor features

The new Intel Xeon processor E5-2600 v3 product family not only adds new features, but also improves upon many features of the predecessor Intel Xeon processor E5-2600 v2 product family, including:

- Up to 18 execution cores per processor
- Each core supports two threads for up to 36 threads per processor
- 46-bit physical addressing and 48-bit virtual addressing
- 1GB large page support
- 32kB instruction and 32kB data first-level cache (L1) for each core
- 256kB shared instruction/data mid-level cache (L2) for each core
- Up to 35MB last level cache (LLC) shared among all cores: up to 2.5MB per core
- Two QPI links up to 9.6GT/s
- Four DMI2 lanes
- 40 PCIe 3.0 links capable of 8.0GT/s
- Socket R, 2011-land FCLGA10 package
- No termination required for non-populated CPU (must populate CPU socket 1 first)
- Integrated 4-channel DDR4 memory controller (not all processors support 2133MT/s memory)
- 64 byte cache line size
- Execute Disable Bit
- Support for CPU Turbo Mode
- Increases CPU frequency if operating below thermal, power, and current limits
- Streaming SIMD (Single Instruction, Multiple Data) Intel Advanced Vector Extensions (Intel AVX)
- Intel 64 Technology
- Intel VT-x and VT-d Technology for virtualization support
- Enhanced Intel SpeedStep Technology
- Demand-based switching for active CPU power management as well as support for ACPI P-States, C-States, and T-States

For more information on the Intel Xeon processor E5-2600 v3 product family, visit Intel.com.

Supported processors

The R730 and R730xd support up to two processors with up to 18 cores per processor. Table 6 lists the Intel Xeon processors supported by the PowerEdge R730 and R730xd. For the latest information on supported processors, visit the R730 and R730xd pages on Dell.com.

Table 6. Supported processors

Model	Speed	Cache	QPI	Max memory speed	Cores/ Threads	Turbo	TDP
E5-2699 v3	2.3GHz	45M	9.6GT/s	2133	18/36	Turbo	145W
E5-2698 v3	2.3GHz	40M	9.6GT/s	2133	16/32	Turbo	135W
E5-2697 v3	2.6GHz	35M	9.6GT/s	2133	14/28	Turbo	145W
E5-2695 v3	2.3GHz	35M	9.6GT/s	2133	14/28	Turbo	120W
E5-2690 v3	2.6GHz	30M	9.6GT/s	2133	12/24	Turbo	135W
E5-2683 v3	2.0GHz	35M	9.6GT/s	2133	14/28	Turbo	120W
E5-2680 v3	2.5GHz	30M	9.6GT/s	2133	12/24	Turbo	120W
E5-2670 v3	2.3GHz	30M	9.6GT/s	2133	12/24	Turbo	120W
E5-2660 v3	2.6GHz	25M	9.6GT/s	2133	10/20	Turbo	105W
E5-2650 v3	2.3GHz	25M	9.6GT/s	2133	10/20	Turbo	105W
E5-2640 v3	2.6GHz	20M	8.0GT/s	1866	8/16	Turbo	90W
E5-2630 v3	2.4GHz	20M	8.0GT/s	1866	8/16	Turbo	85W
E5-2620 v3	2.4GHz	15M	8.0GT/s	1866	6/12	Turbo	85W
E5-2609 v3	1.9GHz	15M	4.0GT/s	1600	6/6	NA	85W
E5-2603 v3	1.6GHz	15M	4.0GT/s	1600	6/6	NA	85W
E5-2687W v3*	3.1GHz	25M	9.6GT/s	1866	10/20	Turbo	160W
E5-2650L v3	1.8GHz	30M	9.6GT/s	2133	12/24	Turbo	65W
E5-2630L v3	1.8GHz	20M	8.0GT/s	1866	8/16	Turbo	55W
E5-2667 v3	3.2GHz	20M	9.6GT/s	2133	8/16	Turbo	135W
E5-2643 v3	3.4GHz	20M	9.6GT/s	2133	6/12	Turbo	135W
E5-2637 v3	3.5GHz	15M	9.6GT/s	2133	4/8	Turbo	135W
E5-2623 v3	3.0GHz	10M	8.0GT/s	1866	4/8	Turbo	105W

*Not supported on the R730xd

For information on processor installation and configuration, see the *Dell PowerEdge R730 and R730xd Owner's Manual* on Dell.com/Support/Manuals.

GPU support

The R730 supports GPU technology, which can provide accelerated performance for a variety of applications, including VDI and HPC implementations.

Note: GPU support is limited to compute and co-processing only; external video out is not supported.

The R730xd does not support internal or external GPUs.

Internal GPU support

The R730 supports two 300W, full-length, double-wide GPUs or up to four 150W, full-length, single-wide GPUs. Each GPU can support up to 6GB of dedicated GDDR5 memory. Active cooled GPU cards not supported. The GPUs are installed on the PCIe x16 3.0 interfaces available on riser 2 and GPU-optional riser 3. A system must have the optional riser 3 with a single x16 slot to support two double-wide GPUs. A standard riser 3 is required to support 3 or 4 single-wide GPUs.

Because GPUs demand high power, each GPU has up to two power connectors for power delivery. The GPU enablement kit is required for internal GPU installation. The kit contains the power cables and other items to enable GPU support on the R730 chassis.

Internal CPU cooling restriction

Due to the high power consumption of GPUs, there is an ambient temperature restriction of 30°C maximum system inlet temperature to ensure adequate system cooling the R730 has one or more GPUs installed. Note that this temperature is less than the standard environmental specification of 35°C.

Other GPU restrictions

The following GPU restrictions for the R730 are enforced by the order validator:

- Requires two processors
- Processors must be 120W or less
- Maximum of two double-wide GPUs (since they take up two slots)
- Maximum of four single-wide GPUs
- All GPUs must be same type and model
- GPUs require a redundant 1100W power supply and GPU enablement kit
- Two double-wide GPUs require the optional riser 3 with a single x16 slot
- Four single-wide GPUs cannot occupy optional riser 3 with a single x16 slot
- Must have 1U heatsinks and solid PCIe blanks
- Tape backup not supported

External GPU support

The R730 and R730xd cannot connect to the PowerEdge C410x.

Supported GPUs

For a list of supported GPUs, see Table 7 and Dell.com/PowerEdge/GPU.

Table 7. Supported GPUs

Type	Adapter
GPU	Intel Xeon Phi™ 5110P coprocessor
	Intel Xeon Phi 7120P coprocessor
	Intel Xeon Phi 3120P coprocessor
	NVIDIA K40
	NVIDIA M20
	NVIDIA K10
	NVIDIA GRID™ K1
	NVIDIA GRID K2
	AMD S7000 FirePro
	AMD S9050 FirePro

Chipset

The PowerEdge R730 and R730xd servers use the Intel C610 chipset. For more information, visit Intel.com.

5 Memory

More memory options are available than ever before with the Dell PowerEdge R730 and R730xd — greater capacities, higher frequencies, and more flexibility. The R730 and R730xd support up to 768GB of memory (24 DIMMs) and speeds up to 2133MT/s (2 DIMMs per channel), providing high performance in a variety of applications. High memory density means there is no compromise when it comes to virtualization. 64GB DIMMs will be available immediately post-RTS and will expand the memory footprint to 1.5TB.

Increase your uptime and reduce data loss due to Dell's focus on reliability, availability, and serviceability (RAS) features. RAS aids in the rapid and accurate diagnosis of faults which require service, increasing your memory reliability. System uptime is reinforced with RAS features like memory mirroring, sparing, and many others.

The R730 and R730xd support both registered and load reduced DIMMs (LRDIMMs), which use a buffer to reduce memory loading and provide greater density, allowing for the maximum platform memory capacity. Unbuffered DIMMs (UDIMMs) are not supported.

Supported memory

Table 8 lists the memory technologies supported by the R730 and R730xd.

Table 8. Memory technologies supported

Feature	RDIMM	LRDIMM
Register	Yes	Yes
Buffer	No	Yes
Frequencies	Up to 2133MT/s	Up to 2133MT/s
Ranks supported	Single or dual rank	Quad rank
Capacity per DIMM	4, 8, 16, or 32GB	32GB
Maximum DIMMs per channel	3	3
DRAM technology	x4 or x8	x4
Temperature sensor	Yes	Yes
Error Correction Code (ECC)	Yes	Yes
Single Device Disable Code (SDDC)	Yes	Yes
Address parity	Yes	Yes

Table 9 lists the DIMMs supported on the R730 and R730xd. For the latest information on supported memory, visit the R730 and R730xd pages on Dell.com.

Table 9. DIMMs supported

DIMM capacity	DIMM speed	DIMM type	Ranks per DIMM	Data width	SDDC support	Voltage
4	2133	RDIMM	1	x8	Advanced ECC	1.2
8	2133	RDIMM	2	x8	Advanced ECC	1.2
16	2133	RDIMM	2	x4	All modes	1.2
32	2133	LRDIMM	4	x4	All modes	1.2

DIMM speed

The R730/R730xd support memory speeds of 2133MT/s, 1600MT/s, 1333MT/s, 1066MT/s and 800MT/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, the systems run at the highest speed for the channel with the lowest DIMM voltage and speed. The operating speed of the DIMM is also determined by the maximum speed supported by the processor, the speed settings in the BIOS, and the operating voltage of the system. Not all processors support 2133MT/s memory speed.

Table 10. Memory configuration and performance

DIMM type	DIMM ranking	Capacity	DIMM rated voltage, speed	1 DPC	2 DPC	3 DPC
RDIMM	1R and 2R	4GB, 8GB, 16GB	DDR4 (1.2V), 2133MT/s	2133MT/s	2133MT/s	1866MT/s
LRDIMM	4R	32GB	DDR4 (1.2V), 2133MT/s	2133MT/s	2133MT/s	1866MT/s

Memory configurations

The R730/R730xd support flexible memory configurations ranging from capacities of 4GB to 768GB. The system supports up to 12 DIMMs per processor (up to 24 DIMMs in a dual-processor configuration). The R730/R730xd have four memory channels per processor, with each channel supporting up to three DIMMs.

Both systems support a flexible memory configuration, according to these basic 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, either RDIMM or LRDIMM.

Memory population guidelines

The following memory population guidelines apply to the R730 and R730xd:

- Can mix DIMMs with x4 and x8 data widths
- Can mix DIMMs with different capacities
  - Population rules require the largest capacity DIMM be placed first
  - Maximum of two different capacity DIMMs allowed in a system
- Can mix DIMMs with different ranks; maximum of two different rank DIMMs allowed in a system

Table 11. Memory populations and operating frequencies

DIMM type	DIMM populated per channel	Operating frequency (MT/s)	Maximum DIMM ranks per channel
RDIMM	1	2133, 1866,1600, 1333	Dual rank or single rank
	2		
	3	1866, 1600, 1333	
LRDIMM	1	2133, 1866, 1600, 1333	Quad rank
	2		
	3	1866, 1600, 1333	

For more information on memory configuration and population, see the *Dell PowerEdge R730 and R730xd Owner's Manual* on Dell.com/Support/Manuals.

Memory RAS features

Reliability, availability, and serviceability (RAS) features help keep the system online and operational without significant impact to performance, and can decrease data loss and crashing due to errors. RAS aids in rapid, accurate diagnosis of faults which require service. Table 12 describes the memory RAS features supported on the R730 and R730xd.

Table 12. Memory 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	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.
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: intra-socket	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 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.

Feature	Description
Memory sparing (rank)	Memory sparing allocates one rank per channel as a spare. If excessive correctable errors occur in a rank or channel, they are moved to the spare area while the operating system is running to prevent the errors from causing an uncorrectable failure.
Memory thermal throttling	This feature helps to optimize power/performance and can also be used to prevent DIMMs from overheating.

For information on memory mirroring and sparing configurations, see the *Dell PowerEdge R730 and R730xd Owner's Manual* on Dell.com/Support/Manuals. Memory RAID is not supported.

6 Storage

The Dell PowerEdge R730 and R730xd provide storage expandability that allows you to adapt to your workload and operational demands. With comprehensive storage options, the R730 and R730xd offer various drive types, internal and external storage controllers, and different chassis and backplanes for varied numbers of drives.

Features such as Express Flash PCIe SSDs and DAS Cache provide vastly accelerated performance over previous technologies. Dell Express Flash drives use PCIe lanes to connect directly to the processor and chipset and are easily accessible through a hot-plug drive bay (R730xd only; R730 does not support Express Flash drives).

Internal storage

The R730 and R730xd are available in hot-plug backplane options listed in Table 13. Note that the backplane option must be selected at point of purchase and cannot be changed or upgraded later.

Table 13. Internal storage options

Server	Storage options	Storage controller options
R730	8 or 16 x 2.5" SATA, SAS, NL-SAS HDDs; SATA, SAS SSDs	PERC H330, H730, H730P
	8 x 3.5" SATA, NL-SAS HDDs	PERC H130, H330, H730, H730P
R730xd[1]	18 x 1.8" SATA SSDs + 8 x 3.5" SATA, NL-SAS HDDs	PERC H330, H730, H730P
	24 x 2.5" SAS, SATA, NL-SAS HDDs, and SATA, SAS SSDs, with or without optional flex bay: 2 x 2.5" SAS, SATA, NL-SAS HDDs, and SATA, SAS SSDs	PERC H330, H730, H730P
	12 or 16 x 3.5" SATA, NL-SAS HDDs with or without optional flex bay: 2 x 2.5" SAS, SATA, NL-SAS HDDs, and SATA, SAS SSDs	PERC H330, H730, H730P

[1]Back-accessible 2.5" drives are optional depending on configuration.

Supported drives

Table 14 lists the internal drives supported by the R730 and R730xd. For the latest information on supported hard drives, visit the R730 and R730xd pages on Dell.com.

Table 14. Supported drives

Form factor	Type	Speed (RPM)	Capacities
3.5"	SATA (6Gb)	7.2K	1TB, 2TB, 4TB, 6TB, 8TB
	SATA (3Gb)	7.2K	500GB
	NL-SAS (6Gb)	7.2K	1TB, 2TB, 4TB*, 6TB*, 8TB
2.5"	SAS (6Gb)	10K	300GB, 600GB, 1.2TB*, 1.8TB*
	SAS (6Gb)	15K	300GB, 600GB*
	SATA (6Gb)	7.2K	250GB, 500GB, 1TB
	NL-SAS (6Gb)	7.2K	500GB, 1TB*, 2TB*
	SATA SSD (mixed use, 6Gb)	N/A	100GB, 200GB, 400GB, 800GB
	SATA SSD (read intensive, 6Gb)	N/A	480GB, 960GB, 19.2TB
	SATA SSD (SSD boot, 6Gb)	N/A	60GB, 120GB
	SAS SSD (write intensive, 12Gb)	N/A	200GB, 400GB, 800GB
	SAS SSD (mixed use, 12Gb)	N/A	200GB, 400GB, 800GB, 1.6TB
	SAS SSD (read intensive, 12Gb)	N/A	800GB, 1.6TB
	PCIe SSD	N/A	500GB, 800GB
1.8" (R730xd)	SATA SSD (mix use, 6Gb)	N/A	100GB, 200GB, 400GB
	SATA SSD (read intensive, 6Gb)	N/A	480GB, 960GB
	SATA SSD (SSD boot, 6Gb)	N/A	60GB, 120GB

*SED available

Express Flash drives

Express Flash drives use PCIe and SSD technologies to provide performance, scalability and optimal serviceability. Accelerated performance with high IOPS is made possible without requiring processor resources or capturing DRAM. Also, Express Flash drives use a standardized 2.5" hot-plug form factor, which saves critical PCIe slot space by moving drives from the back to the front of the system, and allows a common management process for all drives.

The PowerEdge R730xd has an option to support up to four hot-plug Express Flash PCIe SSDs in the 2.5" chassis. The R730 does not support Express Flash drives.

External storage

The R730 and R730xd support the external storage devices types listed in Table 15. For more storage information, see Dell.com/Storage.

Table 15. External storage options

Device type	Description
iSCSI and FC SAN	Dell Storage PS6610 Series Dell EqualLogic™ PS6100/PS6210/PS6500/PS6510 Series Dell EqualLogic PS4100/PS4210 Series Dell EqualLogic PS-M4110 Series Dell Storage SCv2000 Series Dell Storage SC4020 Dell Compellent™ SC8000 Dell PowerVault™ MD3 iSCSI SAN Dell PowerVault MD3 Fibre Channel SAN
DAS	Dell Storage MD1400 Series Dell PowerVault MD3 SAS
NAS options	Dell Compellent FS8600 (with SC Series) Dell EqualLogic FS76x0 (with PS Series)
Windows NAS appliances	Dell PowerVault NX400 Dell Storage NX3230 Dell Storage NX3330
Data protection solutions	DR Series DL4000, DL1000 AppAssure vRanger NetVault
Tape options	TL1000, TL2000, TL4000, ML6000 Series

PowerEdge RAID Controllers

Dell PowerEdge RAID Controller (PERC) cards provide enhanced performance, increased reliability and fault tolerance, and simplified management for a powerful, easy-to-manage way to create a robust infrastructure and help maximize server uptime. The new line, PERC9, cards feature:

- PCIe 3.0 support and 12Gb/s SAS host interface
- Significantly increased IOPS performance and throughput performance capability
- Capable of RAID as well as non-RAID operations
- FastPath™ I/O for accelerating performance when operating on SSDs
- Split Mirror function for breaking mirrored disk connection to quickly replace a drive
- Dimmer Switch™ for power control of spare or idle drives to save energy and operating expenses

The base RAID controller in the R730 and R730xd is the miniPERC, which provides a base RAID hardware controller without consuming a PCIe slot by using a small form factor and high-density connector to the base planar. The secondary RAID controller is limited to the H730P low-profile PCIe controller. In two-controller systems, both controllers must be the H730P.

The R730 and R730xd support the PERC cards listed in Table 16. For more information about the latest PERC offerings, see Dell.com/PERC.

Table 16. Supported RAID controllers

Controller	Features	RAID modes supported	Form factor	Solution
PERC H830	• External 8-port 12Gb/s SAS • Supports up to 255 SAS HDDs or SSDs • 2GB 1866MT/s DDR3 SDRAM non-volatile cache	0, 1, 10, 5, 50, 6, 60	Adapter	Performance-hungry external storage environments
PERC H730P	• Internal 8-port 12Gb/s PCIe RAID controller • Supports up to 255 3Gb/s, 6Gb/s and 12Gb/s SAS or SATA HDDs or SSDs • 2GB 1866MT/s DDR3 SDRAM non-volatile cache	0, 1, 10, 5, 50, 6, 60	Mini and Adapter	Premium performance for significant performance gains
PERC H730	• Internal 8-port 12Gb/s PCIe RAID controller • Supports up to 255 3Gb/s, 6Gb/s and 12Gb/s SAS or SATA HDDs or SSDs • 1GB 1866MT/s DDR3 SDRAM non-volatile cache	0, 1, 10, 5, 50, 6, 60	Mini and Adapter	Value/performance RAID and non-RAID for high-density servers and workstations
PERC H330	• Internal 8-port 12Gb/s PCIe RAID controller • Supports 3Gb/s, 6Gb/s and 12Gb/s SAS and 3Gb/s and 6Gb/s SATA HDDs or SSDs	0, 1, 10, 5, 50	Mini and Adapter	Low cost, entry RAID and non-RAID for high-density servers and workstations
PERC S130	• Software RAID controller • Supports up to 8 6Gb/s SATA HDDs and SSD • Only available on the 8-drive 2.5" configuration • Currently supports only Microsoft Windows operating systems	0, 1, 5, 10	System board-embedded SATA	Software

Internal persistent storage

The R730 and R730xd offer two types of persistent storage: Lifecycle Controller (LC 3.0) and Internal Dual SD Module (IDSDM). A vFlash option is available with iDRAC8 Enterprise.

Lifecycle Controller 3.0

For more information on LC 3.0, visit http://en.community.dell.com/techcenter/systems-management/w/wiki/4126.dell-lifecycle-controller-integration-for-configuration-manager.

Internal Dual SD Module

The IDSDM card provides the following major functions:

- Dual SD interface is maintained in a mirrored configuration (primary and secondary SD)
- Provides full RAID1 functionality
- Dual SD cards are not required; the module can operate with only one card but will provide no redundancy
- Enables support for Secure Digital eXtended Capacity (SDXC) cards
- USB interface to host system
- I2C interface to host system and onboard EEPROM for out-of-band status reporting
- Onboard LEDs show status of each SD card
- A BIOS Setup Redundancy setting supports Mirror Mode or Disabled

Table 17. IDSDM new features

New feature	Description
Support for RAID and Data Integrity	When RAID is enabled, writes to IDSDM will perform write operation to both SD cards simultaneously Ensures data integrity during power loss conditions
Support for USB 3.0 (higher bandwidth)	If USB 3.0 is disabled, or an error on USB 3.0 is detected, IDSDM will revert to USB 2.0
User-prioritized SD slots	User-defined primary SD slot for IDSDM; if RAID is enabled, content of primary SD card will be mirrored on secondary SD card
Bad Block management	Prevents a single bad sector from causing an SD card to fail
No more BIOS halt during rebuild	IDSDM does not require the BIOS to halt during POST and wait for the rebuild to complete; rebuild happens in the background and is much faster as compare than the previous generation
Enhanced support for mismatched SD cards	Functionality of primary SD card is not compromised if the secondary SD card has a different speed or lower storage Mismatch check will only happen if the IDSDM is operating in RAID mode Only secondary SD card will be placed in mismatch state; if the secondary card does not match the speed or have lower storage capacity than the primary card, the secondary card will be placed in the Mismatch state
Enhanced support for write-protected SD cards	Write-protected SD cards are treated as read-only; if at least one card is write-protected and RAID is enabled, IDSDM will operate in the degraded RAID state, and RAID will automatically be disabled if both cards are write-protected
Seamless SD card assignments	IDSDM will bring secondary SD card online and will make it primary if for some reason primary SD card fails

New feature	Description
	If RAID is enabled, there will be no compromise in functionality however, system will notify user of degraded RAID status
Enriched error reporting	New errors have been implemented to help root cause a failure. Failures will be in iDRAC logs Multiple failures can be now recorded and logged
Mass erase for enhanced security	Mass erase options are provided in IDSDM; enabling this register will clean up all the data preset on SD cards
UHS-1 SD card support	Next-generation support

Optical drives

The PowerEdge R730 supports one of the following internal optical drive options:

- DVD-ROM
- DVD+RW

The R730xd does not support an internal optical drive.

Tape drives

The R730 supports the Dell PowerVault RD1000 internal backup device on the 2.5" chassis only. Internal tape drives are not supported on the R730, and the R730xd does not support any internal backup device.

7 Networking and PCIe

The Dell PowerEdge R730 and R730xd offer balanced, scalable I/O capabilities, including integrated PCIe 3.0-capable expansion slots. Dell Select Network Adapters, Dell's network daughter cards, let you 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 lets you share and manage bandwidth on 10GbE connections.

Select Network Adapters

The Select Network Adapter family includes flexible LAN on motherboard (LOM) card options for the Dell PowerEdge servers. The Select Network Adapter form factor delivers the value of LOM integration with the system, including BIOS integration and shared port for manageability, while providing the flexibility of a modular card.

The R730 and R730xd support one custom NDC, as part of the Select Network Adapter family, to house the complete LOM subsystem. The R730 and R730xd support NDC options including a selection of 1GbE and 10GbE port cards, such as 1000BASE-T, 10GBASE-T and 10Gb SFP+.

Figure 14. Rack network daughter card (NDC)

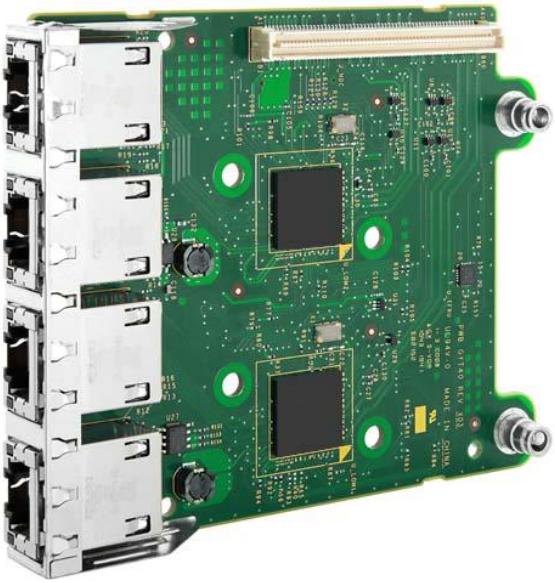


Table 18 lists the available Select Network Adapter options and supported features for the R730 and R730xd.

Table 18. Supported Select Network Adapter options and features

Features	Broadcom 5720 BASE-T (default)	Intel I350 BASE-T	QLogic 57800 DA/SFP+	QLogic 57800 BASE-T	Intel I350/X540 BASE-T	Intel I350/X520 2 x 1Gb BT + 2 x 10Gb SFP+	QLogic 57840S SFP+	Intel I350/X710 2x1Gb BT + 2 x 10Gb SFP+	Intel 4 x 10G x710 SFP+
Number of ports	4 x 1Gb	4 x 1Gb	2 x 1Gb + 2 x 10Gb	2 x 1Gb + 2 x 10Gb	2 x 1Gb + 2 x 10Gb	2 x 1Gb + 2 x 10Gb	4 x 10Gb	2 x 1Gb + 2 x 10Gb	4 x 10Gb
Link types	1000BASE-T	1000BASE-T	1GBASE-T, 10GBSFP+, DCA/SR	1GBASE-T, 10GBBASE-T	1GBASE-T, 10GBBASE-T	1GBASE-T, 10GBSFP+, DCA/SR	10GBASE-T, SFP+, DCA/SR	1GBASE-T, 10GBSFP+, DCA/SR	10GBASE-T, SFP+, DCA/SR
TCP Chimnet (TOE)	Not supported	Not supported	Supported	Supported	Supported	Supported	Supported	Supported	Supported
ISCSI HBA full offload	Not supported	Not supported	Supported*	Supported*	Supported*	Supported*	Supported	Post RTS	Post RTS
FCoE HBA full offload	Not supported	Not supported	Supported*	Supported*	Supported*	Supported*	Supported	Post RTS	Post RTS
FCoE boot (boot from SAN)	Not supported	Not supported	Supported*	Supported*	Supported*	Supported*	Supported	Post RTS	Post RTS
NetQueue/ VMQ IOV	Not supported	Not supported	Supported	Supported	Supported	Supported	Supported	Supported	Supported
SR-IOV	Not supported	Not supported	Supported	Supported	Supported	Supported	Supported	Supported	Supported
NIC partitioning (NPAR)	Not supported	Not supported	Supported	Supported	Supported	Supported	Supported	Supported	Supported
VNTag/VEB	Not supported	Not supported	Supported	Supported	Supported	Supported	Supported	Supported	Supported

*10GbE ports only

System management integration

With R730 and R730xd, the job of deploying, updating, monitoring, and maintaining the Select Network Adapters is fast and easy. System management integration features include the following:

- Pre-boot: Use the Dell Lifecycle Controller graphical user interface (GUI) to set configuration such as bandwidth allocation or firmware revision level
- Post-boot: Agent-free out-of-band or high-speed in-band connection over LOM through the Operating System/BMC pass-through feature for sensory information
- Automation of firmware and driver version deployment upon component replacement
- Automatic monitoring of NIC status and notification on SNMP traps

- Local or remote reconfiguration of any NIC, physical or virtual
- PXE boot enabled on all LOM and NDCs for ease of use
- Boot from SAN (iSCSI, FCoE) configuration for networking devices through the Lifecycle Controller GUI

PCIe expansion

For information on card installation, requirements, and slot priorities, see the *PowerEdge R730 and R730xd Owner's Manual* on Dell.com/Support/Manuals.

PCIe slots

The R730 and R730xd provide greatly expanded PCIe slot capability over their predecessor servers. This is made possible by the 40 PCIe lanes available from each processor in the system. Two processors are required in the system to enable all PCIe slots. The R730 and R730xd have been designed to be PCIe 3.0 compliant in order to take full advantage of the processor capabilities. Table 19 details the R730 and R730xd PCIe slots.

Table 19. PCIe expansion slots

System	R730	R730xd
Slots[1]	7	6
Slot types	One x16 full-length, full-height Three x8 full-length, full-height Three x8 half-length, half-height	Two x16 full-length, full-height One x8 full-length, full-height Three x8 half-length, half-height

[1]In a single-processor configuration, slots 1–4 are not usable.

Table 20 shows the slot mapping for the R730 and R730xd PCIe slots.

Table 20. PCIe slot mapping

Riser	Slot number	Form factor	Controlling CPU	Slot electrical bandwidth and physical connector	Power
Right riser 1	1	Low profile	CPU2	PCIe 3.0 x8 (x16 connector)	25W
Right riser 1	2	Low profile	CPU2	PCIe 3.0 x8 (x16 connector)	25W
Right riser 1	3	Low profile	CPU2	PCIe 3.0 x8 (x16 connector)	25W
Center riser 2	4	Full height	CPU2	PCIe 3.0 x16 (x16 connector)	75W
Center riser 2	5	Full height	CPU1	PCIe 3.0 x8 (x16 connector)	75W
Left riser 3	6	Full height	CPU1	PCIe 3.0 x8 (x16 connector)	75W
Left riser 3	7	Full height	CPU1	PCIe 3.0 x8 (x16 connector)	75W

Riser	Slot number	Form factor	Controlling CPU	Slot electrical bandwidth and physical connector	Power
Left riser 3 alternative	6	Full height	CPU1	PCIe 3.0 x16 (x16 connector)	75W

PCIe cards

The R730 and R730xd support a variety of PCIe expansion cards. Table 21 lists the supported add-in NICs and HBAs for the R730 and R730xd.

Table 21. Optional add-in PCIe expansion cards

Type	Adapter
NIC	Broadcom® 5719 quad-port 1Gb NIC
	Broadcom 5720 dual-port 1Gb NIC
	QLogic® 57810 dual-port 10Gb BASE-T network adapter
	Intel Ethernet I350 dual-port 1Gb server adapter
	Intel Ethernet I350 quad-port 1Gb server adapter
	Intel Ethernet X540 dual-port 10GBASE-T server adapter
	Emulex® OCe14102-N1-D dual-port SFP+ 2 x 10Gb NIC
	Mellanox® ConnectX®-3 dual-port 10Gb Direct Attach/SFP+ server network adapter
	Mellanox ConnectX-3 dual-port 40Gb Direct Attach/QSFP server network adapter
	Mellanox ConnectX-3 single-port FDR VPI
HBA	Emulex LPe12000 single-port 8Gb FC HBA
	Emulex LPe12002 dual-port 8Gb FC HBA
	Emulex LPe16000B single-port 16Gb FC HBA
	Emulex LPe16002B dual-port 16Gb FC HBA, PCIe
	QLogic QLE2560 single-port 8Gb FC HBA, PCIe x8
	QLogic QLE2562 dual-port 8Gb FC HBA, PCIe x8
	QLogic QLE2660 single-port 16Gb FC HBA, PCIe x8
	QLogic QLE2662 dual-port 16Gb FC HBA, PCIe x8
CNA	Emulex OneConnect OCe14102-U1-D dual-port PCIe 10GbE CNA
	Emulex OneConnect OCm14104-U1-D, 4-port 10GbE SFP+ CNA, rNDC
	Intel Ethernet X520 dual-port SFP+/DA server adapter CNA

Type	Adapter
	Intel Ethernet X540 dual-port 10GBASE-T server adapter CNA
	Intel X710 2x10GE SFP+/DA
	Intel X710 4x10GE SFP+/DA
	QLogic 57810S 2x10GE SFP+/DA CNA
	QLogic 57810S 2x10GE 10BASE-T CNA

For the latest information on supported PCIe expansion cards for the R730 and R730xd, visit the R730 and R730xd pages on Dell.com. For more information on server network adapters, visit http://www.dell.com/us/business/p/networking-cards.

8 Power, thermal and acoustics

Lower overall system-level power draw is a result of Dell's breakthrough system design. PowerEdge servers aim to maximize performance-per-watt through a combination of energy efficient technologies, optimized thermal designs and intelligent fan control algorithms. The PowerEdge R730/R730xd fan control algorithms use an extensive array of sensors that automatically monitor power and thermal activity to minimize fan speeds based on system cooling requirements, reducing the power required for cooling.

Power consumption and energy efficiency

With the rise in the cost of energy coupled with increasing data center density, Dell provides tools and technologies to help you realize greater performance with less energy cost and waste. More efficient data center usage can reduce costs by slowing the need for additional data center space. Table 22 lists the tools and technologies Dell offers to help you achieve your data center goals by lowering power consumption and increasing energy efficiency.

Table 22. Power tools and technologies

Feature	Description
Power supply units (PSU) portfolio	Dell's PSU portfolio includes intelligent features such as dynamically optimizing efficiency while maintaining availability and redundancy. Find additional information in the Power supply units section.
Tools for right-sizing	Energy Smart Solution Advisor (ESSA) is a tool that helps IT professionals plan and tune their computer and infrastructure equipment for maximum efficiency by calculating the hardware power consumption, power infrastructure and storage. Learn more at Dell.com/calc.
Industry compliance	Dell's servers are compliant with all relevant industry certifications and guidelines, including 80 PLUS, Climate Savers and ENERGY STAR.
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's systems management to set the power cap limit for your systems to limit the output of a PSU and reduce system power consumption. Dell is the first hardware vendor to leverage Intel Node Manager for circuit-breaker fast capping.
Systems management	iDRAC8 Enterprise provides server-level management that monitors, reports and controls power consumption at the processor, memory and system level. Dell OpenManage Power Center delivers group power management at the rack, row and data center level for servers, power distribution units and uninterruptible power supplies.
Dell Fresh Air 2.0	With the thermal design and reliability of Dell products, certain configurations of Dell 13th generation servers have the capability to operate at temperatures beyond the industry standard of 35°C (95°F). The supported configurations that meet Dell Fresh Air 2.0 specifications can operate continuously at 40°C (104°F) and up to 45°C (113°F) for excursionary periods of time and up to a 29°C dew point at 90% relative humidity without impacting your availability model. Find additional information at Dell.com/FreshAir.

Feature	Description
Active power management	**Dell Active Power Controller (DAPC)** provides operating system-agnostic power-management capability designed to save you money by lowering the system-level power draw at times of low utilization. **Intel Node Manager** is an embedded technology that provides individual server-level power reporting and power limiting functionality. Dell offers a complete power management solution comprised of Intel Node Manager accessed through Dell iDRAC8 Enterprise and OpenManage Power Center that allows policy-based management of power and thermals at the individual server, rack and data center level. **Hot Spare** improves the operating PSU efficiency, thereby reducing overall power consumption. **Thermal Control of Fan Speed** optimizes the thermal settings for your environment to reduce fan consumption and lower system power consumption. **Idle Power** enables Dell servers to run as efficiently when idle as when at full workload.

Find additional information at Dell.com/PowerCenter.

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 PowerEdge R730 and R730xd support up to two AC or DC power supplies with 1 + 1 redundancy, auto sensing and auto-switching capability. The PowerEdge R730 and R730xd support the power supply units listed in Table 23. The 750W AC/DC mixed-mode PSU is available only in China. For additional power supply specifications, see Table 32.

Table 23. Power supply units and efficiency

Form factor	Output	Class	Efficiency targets by load			
			10%	20%	50%	100%
Redundant 86mm	495W AC	Platinum	82.0%	90.0%	94.0%	91.0%
	750W AC	Titanium	90.0%	94.0%	96.0%	91.0%
	750W AC	Platinum	82.0%	90.0%	94.0%	91.0%
	1100W AC	Platinum	89.0%	93.0%	94.5%	92.0%
	1100W DC	N/A	80.0%	88.0%	91.0%	88.0%
	750W AC/DC*	Platinum	82.0%	90.0%	94.0%	91.0%

*Available only in China.

Thermal and acoustics

The R730 and R730xd 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 for lower total system power and data center power consumption.

Thermal design

The thermal design of the PowerEdge R730 and R730xd 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, hard disk drives, NDC and GPU.
- 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 iDRAC8 BIOS setup screen. For more information, see the *Dell PowerEdge R730 and R730xd Owner's Manual* on Dell.com/Support/Manuals and "Advanced Thermal Control: Optimizing across Environments and Power Goals" on Dell.com.
- Cooling redundancy: The R730 and R730xd allow N+1 fan redundancy, allowing continuous operation with one fan failure in the system.

Acoustical design

Dell 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 references a number of psychoacoustical metrics and thresholds in delivering to it. Tone prominence is one such metric. Sound power and sound pressure levels increase with greater populations or higher utilization, while sound quality remains good even as the frequency content changes. A reference for comparison to sound pressure levels for familiar noise sources is given in Table 24. An extensive description of Dell Enterprise acoustical design and metrics is available in the Dell Enterprise Acoustics white paper.

Table 24. Acoustical reference points and output comparisons

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

Acoustical performance data for the R730

Consciously designed to scale with configuration and usage, sound from the PowerEdge R730 in minimal configuration is sufficiently quiet to be masked in open office layout environments. The R730 meets Dell's sound quality requirements.

- Minimally configured[1] 2.5" chassis in 23 ± 2 °C ambient
  - Idle[3]: LwA-UL[4] = 4.7 bels; LpA[5]= 28 dBA; No prominent tones[6]
  - Operating[3]: LwA-UL[4] = 5.3 bels; LpA[5]= 33 dBA; No prominent tones[6]
- Typically configured[2] 3.5" chassis in 23 ± 2 °C ambient
  - Idle[3]: LwA-UL[4] = 4.7 bels; LpA[5]= 28 dBA; No prominent tones[6]
  - Operating[3]: LwA-UL[4] = 5.3 bels; LpA[5]= 33 dBA; No prominent tones[6]
- Typically configured[2] 2.5" chassis in 23 ± 2 °C ambient
  - Idle[3]: LwA-UL[4] = 4.7 bels; LpA[5]= 28 dBA; No prominent tones[6]
  - Operating[3]: LwA-UL[4] = 5.8 bels; LpA[5]= 39 dBA; No prominent tones[6]

1. Minimum configuration means 1 x 85W-6C CPU (Intel E5-2609 v3), 1 x 4GB DIMM, 1 x Client SSD, 1 x 495W PSU, no PCI cards, and 6 system fans.
2. Typical configuration means:
   - For 3.5" chassis: 2 x 105W-10C CPU (Intel E5-2660 v3), 8 x 8GB DIMM, 6 x 3.5" SATA HDD, 2 x 750W PSU, 1 x H730 miniPERC, 1 x Intel 1GbE NDC card, 1 x 1GbE NIC card, and 6 system fans.
   - For 2.5" chassis: 2 x 105W-10C CPU (Intel E5-2660 v3), 8 x 8GB DIMM, 8 x 2.5" 10K SAS HDD, 2 x 750W PSU, 1 x H730 miniPERC, 1 x H830 external PERC, 1 x Intel 1GbE NDC card, 1 x 1GbE NIC card, and 6 system fans.
3. Idle means the state in which the product is doing nothing but running OS; values for Operating are the maximum of acoustical output for active HDDs or active CPUs.
4. LwA – UL is the upper limit sound power levels (LwA) calculated per section 4.4.1 of ISO9296 (1988) and measured in accordance with ISO7779 (2010).
5. LpA is the average bystander position A-weighted sound pressure level calculated per section 4.3 of ISO9296 (1988) and measured in accordance with ISO7779 (2010). The system is placed in a 24U rack enclosure, 25 cm above reflective floor.
6. Prominent tone: Criteria of D.6 and D.11 of ECMA-74 12th ed. (2012) are followed to determine if discrete tones are prominent. The system is placed in center of ISO7779 table and acoustic transducer is at front standing operator position, ref ISO7779 (2010 Section 8.6.1, Position P1).

Acoustical dependencies for the R730

- System thermal profile selected in BIOS: The system default setting is "Power Optimized (DAPC)", which is in general a lower fan speed and noise level. If "Performance optimized" is selected, the fan speed/noise level will increase.

- CPU power:
  - Configurations with "low-power" CPUs (which have lower temperature limits than standard CPUs), such as an Intel Xeon E5-2650L v3 or E52630L v3 at 65W CPU, under moderate or heavy utilization, will be about twice as loud as typical configurations.
  - Configurations increase in loudness as CPU power increases from that in typical configurations.
- Types of storage devices:
  - HDDs
    - Lower speed HDDs (such as 7.2K RPM SATA, 10K RPM SAS) are generally quieter than 15K RPM SAS drives.
    - Loudness increases with the following progression of drives: SATA (2.5" or 3.5"), 2.5" 10K, 2.5" 15K, 3.5" 15K.
  - SSDs
    - SSDs are not themselves audible.
    - However, a configuration with PCIe SSD requires more airflow for cooling and will be significantly louder than a typical configuration. Under highly-stressed condition, the sound power levels may go up to 7.0 bels.
- Quantity of HDDs: Acoustics related to the HDD itself (read/write noise) increases with the number of HDDs installed.
- GPGPU cards: A configuration with any GPGPU card will be significantly louder (about twice as loud) than the typical configuration.

Acoustical performance data for the R730xd

The PowerEdge R730xd acoustics are appropriate for open office layout in typical configurations but are low enough for an office environment in minimum configuration. The R730xd meets Dell's sound quality requirements.

- Minimally configured[1] 2.5" chassis in 23 ± 2 °C ambient
  - Idle[3]: LwA-UL[4] = 5.1 bels; LpA[5]= 31 dBA; No prominent tones[6]
  - Operating[3]: LwA-UL[4] = 5.2 bels; LpA[5]= 32 dBA; No prominent tones[6]
- Typically configured[2] 3.5" chassis in 23 ± 2 °C ambient
  - Idle[3]: LwA-UL[4] = 5.1 bels; LpA[5]= 32 dBA; No prominent tones[6]
  - Operating[3]: LwA-UL[4] = 6.1 bels; LpA[5]= 43 dBA; No prominent tones[6]
- Typically configured[2] 2.5" chassis in 23 ± 2 °C ambient
  - Idle[3]: LwA-UL[4] = 5.1 bels; LpA[5]= 32 dBA; No prominent tones[6]
  - Operating[3]: LwA-UL[4] = 6.2 bels; LpA[5]= 41 dBA; No prominent tones[6]

1. Minimum configuration means 1 x 85W-6C CPU (Intel E5-2609 v3), 1 x 4GB DIMM, 1 x Client SSD, 1 x 495W PSU, no PCI cards, and 6 system fans.
2. Typical configuration means
   - For 3.5" chassis: 2 x 85W-8C CPU (Intel E5-2630 v3), 8 x 8GB DIMM, 10 x 3.5" SATA HDD, 2 x 750W PSU, 1 x H730 miniPERC, 1 x Intel 1GbE NDC card, and 6 system fans.
   - For 2.5" chassis: 2 x 85W-8C CPU (Intel E5-2630 v3), 8 x 8GB DIMM, 12 x 2.5" 10K SAS HDD, 2 x 750W PSU, 1 x H730 miniPERC, 1 x Intel 1GbE NDC card, 1 x 1GbE NIC card, and 6 system fans.
3. Idle means the state in which the product is doing nothing but running OS; values for Operating are the maximum of acoustical output for active HDDs or active CPUs.
4. LwA – UL is the upper limit sound power levels (LwA) calculated per section 4.4.1 of ISO9296 (1988) and measured in accordance to ISO7779 (2010).
5. LpA is the average bystander position A-weighted sound pressure level calculated per section 4.3 of ISO9296 (1988) and measured in accordance with ISO7779 (2010). The system is placed in a 24U rack enclosure, 25 cm above reflective floor.
6. Prominent tone: Criteria of D.6 and D.11 of ECMA-74 12th ed. (2012) are followed to determine if discrete tones are prominent. The system is placed in center of ISO7779 table and acoustic transducer is at front standing operator position, ref ISO7779 (2010 Section 8.6.1, Position P1).

Acoustical dependencies for the R730xd

- Chassis types: The idle fan speeds and acoustics generally depend on chassis types – shown as below from the quietest to the loudest:
  - 24 x 2.5" chassis
  - 12 x 3.5" chassis
  - 8 x 3.5" + 18 x 1.8" SSD chassis
- System thermal profile selected in BIOS: The system default setting is "Power Optimized (DAPC)", which is in general lower fan speed/ noise level. If "Performance optimized" is selected, the fan speed/ noise level will become higher.
- CPU power:
  - Configurations with "low-power" CPUs (which have lower temperature limits than standard CPUs), such as an Intel Xeon E5-2650L v3 or E52630L v3 at 65W CPU, under moderate or heavy utilization, will be about twice as loud as typical configurations.
  - Configurations increase in loudness as CPU power increases from that in typical configurations.
- Types of storage devices:
  - HDDs
    - Lower speed HDDs (such as 7.2K RPM SATA, 10K RPM SAS) are generally quieter than 15K RPM SAS drives.
    - Loudness increases with the following progression of drives: SATA (2.5" or 3.5"), 2.5" 10K, 2.5" 15K, 3.5" 15K.
  - SSDs
    - SSDs are not themselves audible.
    - However, a configuration with PCIe SSD requires more airflow for cooling and will be significantly louder than a typical configuration. Under highly-stressed condition, the sound power levels may go up to 7.0 bels.
- Quantity of HDDs and SSDs: For the following reasons, higher acoustics accompanies increase in quantity of HDDs.
  - Airflow needs and acoustics increase with the number of drives. For example, an R730xd 3.5" configuration with 16 drives will be about 50% louder in idle condition than one with four drives (6.2 bels vs. 5.6 bels).
  - Acoustics related to the HDD itself (read/write noise) increases with the number of HDDs installed.

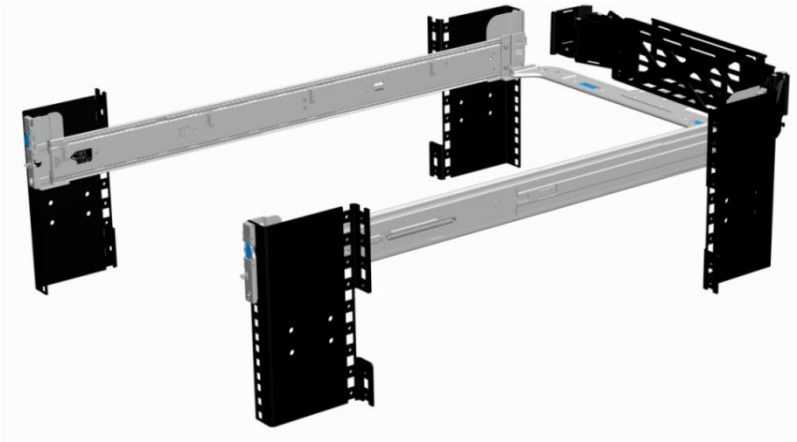
9 Rack rail systems

The rack rail systems for the Dell PowerEdge R730 and R730xd provide tool-less support for 4-post racks with square or unthreaded round mounting holes. The R730 and R730xd also support tooled mounting in 4-post threaded racks and static rail tooled mounting in 2-post (Telco) racks for added versatility.

Sliding and static rail systems

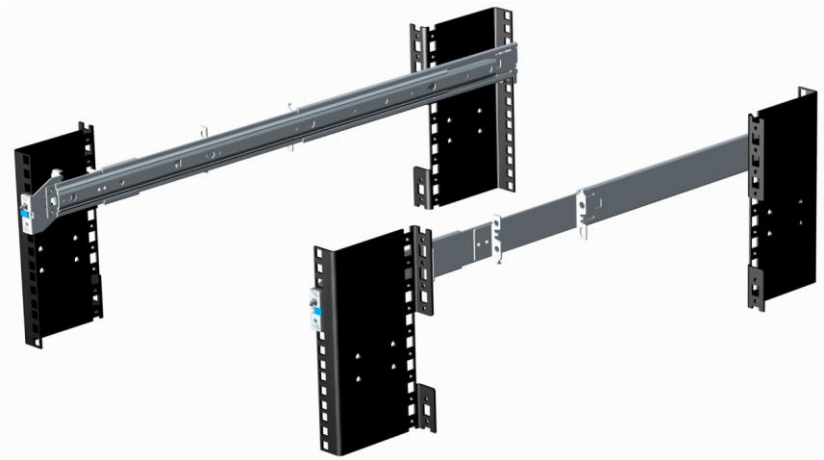
The sliding rails for the R730 and R730xd offer native support for threaded hole racks via the ReadyRails II mounting interface. The rails ship in the tool-less mounting configuration but can be converted to the tooled configuration very quickly and easily. With the sliding rails, you can fully extend a system out of the rack for servicing. Rails are available with or without the optional cable management arm (CMA). Figure 15 shows sliding rails with CMA.

Figure 15. Sliding rails with optional CMA



The static rails (shown in Figure 16) support a wider variety of racks than the sliding rails, but do not support serviceability in the rack and are not compatible with the CMA.

Figure 16. Static rails



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

Table 25 lists the rack rail systems that the R730 and R730xd support.

Table 25. Supported rack rail system

System	Rail identifier	Mounting interface	Rail type	Rack types supported				
				4-post			2-post	
				Square	Round	Thread	Flush	Center
R730/R730xd	B6	ReadyRails II	Sliding	✓	✓	✓	X	X
	B4	ReadyRails	Static	✓	✓	✓	✓	✓

For detailed information about rail dimensions, see the Rack rail specifications section in Appendix A. For more information on installing the R730 or R730xd in a rack, see the *Rack Installation Instructions* on Dell.com/Support/Manuals.

Cable management arm

The optional CMA can be mounted on either the left or right side of the sliding rails without the use of tools for fast and easy deployment. The optional CMA organizes and secures the cords and cables exiting the back of the server and unfolds to allow the server to extend out of the rack without having to detach the cables. Some key features of the CMA include:

- Large U-shaped baskets to support dense cable loads
- Open vent pattern for optimal airflow
- Ability to be mounted on either side
- Use of hook-and-loop straps rather than plastic tie wraps to eliminate the risk of cable damage during cycling
- Low-profile fixed tray to both support and retain the CMA in its fully closed position
- Ability to mount the CMA and tray without the use of tools, due to snap-in designs

10 Operating systems and virtualization

The Dell PowerEdge R730 and R730xd support a wide range of industry-standard operating systems and virtualization software.

Supported operating systems

Table 26 lists the primary operating systems supported on the R730 and R730xd. For the latest information on supported operating systems, see Dell.com/OSsupport.

Table 26. Operating system support

Operating System	Platform	Edition	IDSDM support
Microsoft Windows Server 2012 R2	X64	Standard Datacenter	Yes
Microsoft Windows Server 2012	x64	Standard Datacenter	Yes
Microsoft Windows Server 2008 R2 SP1	x64	Standard Enterprise Datacenter	Yes
Red Hat Enterprise Linux 7.0	x64	N/A	No
Red Hat Enterprise Linux 6.5	x64	N/A	No
SUSE Linux Enterprise Server 12	x64	N/A	No
SUSE Linux Enterprise Server 11 SP3	x64	N/A	No

Supported virtualization

One of the key features for virtualization on the R730 and R730xd is the support for a failsafe hypervisor. By running the hypervisor on an optional SD card and installing a backup copy on the other mirrored SD card, you can protect against hardware failure and maximize virtualization uptime. Table 27 highlights the virtualization support for the R730 and R730xd. For the latest information on supported hypervisors, see Dell.com/OSsupport.

Table 27. Virtualization support

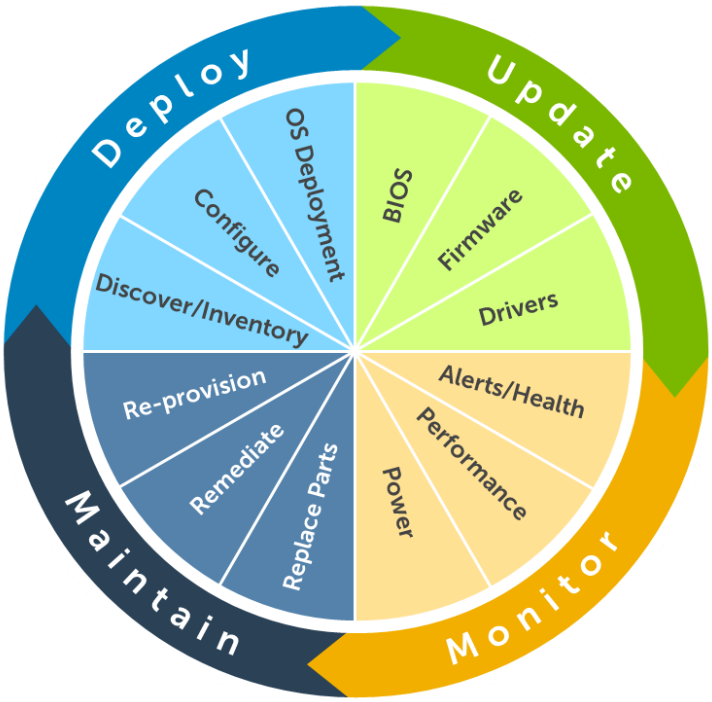
Operating systems		Install version	IDSDM support
Microsoft	Windows Server 2012 R2 with Hyper-V	N/A	Yes
VMware	vSphere v5.1, v5.5	ESXi	Yes
Citrix	XenServer 6.2 SP1	N/A	Yes

11 Dell OpenManage systems management

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

Start with a firm foundation for efficient hardware management using OpenManage tools, utilities and management consoles. OpenManage systems management solutions consist of a combination of embedded management features and software products that help you automate and simplify the entire server lifecycle: deploy, update, monitor and maintain as shown in Table 15. OpenManage solutions are innovatively designed for simplicity and ease of use to help you reduce complexity, save time, achieve efficiency, control costs and empower productivity. As shown in Figure 17, OpenManage centers around efficient management of server lifecycle.

Figure 17. Server lifecycle management operations



OpenManage systems management portfolio

The Dell OpenManage systems management portfolio includes powerful hardware and software management tools and consoles designed to simplify and automate the most frequently performed server management tasks. The OpenManage portfolio includes the following items.

iDRAC8 with Lifecycle Controller

The Integrated Dell Remote Access Controller 8 (iDRAC8) with Lifecycle Controller, the embedded intelligence of every Dell PowerEdge 13th generation server, helps you manage Dell servers agent-free or with a systems management agent, within physical, virtual, local and remote environments. iDRAC8 alerts server issues, enables remote server management and reduces the need to physically visit the server. iDRAC8 with Lifecycle Controller is part of Dell's comprehensive OpenManage

portfolio and works as a stand-alone or in conjunction with other components such as OpenManage Essentials, OpenManage Mobile, OpenManage Power Center, Chassis Management Controller, and OpenManage Integrations for Microsoft, VMware and BMC consoles to simplify, automate and streamline IT operations.

Table 28 describes the functions and benefits of iDRAC8 with Lifecycle Controller. For more information on iDRAC8 with Lifecycle Controller, see the "Introducing iDRAC8 with Lifecycle Controller for Dell 13th Generation PowerEdge Servers" white paper and visit http://en.community.dell.com/techcenter/systems-management/w/wiki/3204#usefulLinks.

Table 28. iDRAC8 with Lifecycle Controller functions and benefits

Feature	Function	Benefit
Out-of-band (OOB)	iDRAC8 offers real-time OOB discovery, inventory, deployment monitoring, alerting and updates for servers, factory-installed peripherals and internal storage	Manage servers independently from hypervisor/OS type or status. Allows for bare-metal deployment and monitoring.
Email alerts	Simplified, more informative, and expanded coverage than previous versions of iDRAC	More detail allows IT administrators to be more efficient in diagnosing and remediating an issue; alerts include a direct, embedded URL in the email notification to further speed resolution
vFlash media	Enabled with iDRAC8 Enterprise, vFlash or virtual flash allows the user to store CD, floppy and hard drive images directly on the iDRAC8. Users can store emergency boot images, diagnostic tools, or anything else that can fit in a 4GB partition. Users can create up to 16 partitions.	Administrators can use virtual flash to house a persistent image for future general or emergency use without relying on network resources or the constant presence of a client as with Virtual Media. Content can be stored permanently on vFlash or can be deleted and added as necessary. This is ideal for customers with slow bandwidth connections to the DRAC.
Enhanced power management	Integration with Intel Node Manager provides data-center level power monitoring and capping (requires iDRAC8 Enterprise)	Fine tune data center power policies, capping and usage. Report on historical power usage by rack, row or room using Power Center Manager.
Electronic licensing	Upgrades to iDRAC8 Express or iDRAC8 Enterprise by software licensing key and license portal	Digital licenses are installed at the Dell factory; free 30-day trial versions are available. Dell uses a license management portal versus paper-based licenses, which simplifies license management. For most server models, embedded server management and electronic licensing enables feature enhancements that do not require installation of additional hardware or system downtime.

iDRAC8 feature comparison

iDRAC8 Enterprise is available for the PowerEdge R730 and R730xd. Dell also offers iDRAC8 Express. A detailed feature comparison for iDRAC8 Enterprise and iDRAC8 Express is shown in Table 29.

Table 29. Feature comparison for iDRAC8 Express and Enterprise

Feature (function)	iDRAC8 Express	iDRAC8 Enterprise
Interfaces/Standards		
IPMI 2.0	✓	✓
DCMI 1.5	✓	✓
Web-based GUI	✓	✓
RACADM command line (local/remote)	✓	✓
SMASH-CLP (SSH-only)	✓	✓
Telnet	✓	✓
SSH	✓	✓
WSMAN	✓	✓
Network Time Protocol	✓	✓
Connectivity		
Shared NIC	✓	✓
Dedicated NIC	✓	✓
VLAN tagging	✓	✓
IPv4	✓	✓
IPv6	✓	✓
DHCP	✓	✓
Dynamic DNS	✓	✓
OS pass-through	✓	✓
Front panel USB	✓	✓
Security		
Role-based authority	✓	✓
Local users	✓	✓
SSL encryption	✓	✓
IP blocking	✓	✓
Directory services (AD, LDAP)		✓
Two-factor authentication		✓
Single sign-on		✓
PK authentication	✓	✓
Remote presence		
Power control	✓	✓
Boot control	✓	✓
Serial-over-LAN	✓	✓
Virtual Media		✓
Virtual Folders		✓
Remote File Share		✓
Virtual Console		✓

Feature (function)	iDRAC8 Express	iDRAC8 Enterprise
VNC connection to OS		✓
Quality/bandwidth control		✓
Virtual Console collaboration (6 users)		✓
Virtual Console chat		✓
Virtual Flash partitions		✓[1]
Power and thermal		
Real-time power meter	✓	✓
Power thresholds and alerts	✓	✓
Real-time power graphing	✓	✓
Historical power counters	✓	✓
Power capping		✓
Power Center integration		✓
Temperature monitoring	✓	✓
Temperature graphing	✓	✓
Health monitoring		
Full agent-free monitoring	✓	✓
Predictive failure monitoring	✓	✓
SNMPv1, v2, and v3 (traps and gets)	✓	✓
Email alerting	✓	✓
Configurable thresholds	✓	✓
Fan monitoring	✓	✓
Power supply monitoring	✓	✓
Memory monitoring	✓	✓
CPU monitoring	✓	✓
RAID monitoring	✓	✓
NIC monitoring	✓	✓
HD monitoring (enclosure)	✓	✓
Out-of-band performance monitoring		✓
Update		
Remote agent-free update	✓	✓
Embedded update tools	✓	✓
Sync with repository (scheduled updates)		✓
Auto-update		✓
Deployment and configuration		
Embedded OS deployment tools	✓	✓
Embedded configuration tools	✓	✓
Auto-discovery	✓	✓
Remote OS deployment	✓	✓
Embedded driver pack	✓	✓
Full configuration inventory	✓	✓
Inventory export	✓	✓
Remote configuration	✓	✓

Feature (function)	iDRAC8 Express	iDRAC8 Enterprise
Zerotouch configuration		✓
System retire/repurpose	✓	✓
Diagnostics, service and logging		
Embedded diagnostic tools	✓	✓
Part replacement	✓	✓
Server configuration backup		✓
Server configuration restore	✓	✓
Easy restore (system configuration)	✓	✓
Health LED/LCD	✓	✓
Quick Sync (require NFC bezel)	✓	✓
iDRAC Direct (front USB management port)	✓	✓
iDRAC Service Module (iSM)	✓	✓
Embedded tech support report	✓	✓
Crash screen capture	✓	✓
Crash video capture		✓
Boot capture		✓
Manual reset for iDRAC	✓	✓
Virtual NMI	✓	✓
OS watchdog	✓	✓
Embedded health report	✓	✓
System event log	✓	✓
Lifecycle log	✓	✓
Work notes	✓	✓
Remote syslog		✓
License management	✓	✓

[1]Requires vFlash SD card media

Agent-free management

Because Dell PowerEdge servers have embedded server lifecycle management, in many cases, there is no need to install an OpenManage systems management software agent into the operating system of a Dell 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 provides OpenManage Server Administrator.

OpenManage Server Administrator

The Dell OpenManage Server Administrator (OMSA) agent gives you a comprehensive, one-to-one systems management solution for both local and remote servers and their storage. OMSA can help simplify single-server monitoring with a secure command-line interface (CLI) or Web-based

management GUI. It can also be used to view system configuration, inventory, health, and performance.

iDRAC Service Module

The iDRAC Service Module (iSM) is a lightweight optional software application that can be installed on Dell PowerEdge server (12th generation or later). The iSM complements iDRAC interfaces – GUI, RACADM CLI, and Web Service Management (WSMAN) with additional monitoring data. You can configure the features on the supported operating system depending on the features to be installed and the unique integration needs in a work environment.

Dell consoles

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

- **Dell OpenManage Essentials**—OpenManage Essentials (OME) is a systems management console that provides a comprehensive view of Dell systems, devices, and components in an enterprise network. It is used to monitor Dell PowerEdge servers, EqualLogic and PowerVault storage, and PowerConnect™ switches; to update and configure Dell servers; and to create asset reports. OpenManage Essentials also communicates health status alerts for Dell servers, storage, and network devices to the Dell KACE™ K1000 service desk. OpenManage Essentials is available as a no-charge software download from Dell.com/Support. When connected through OME, you can use Dell OpenManage Mobile (OMM) to securely perform a subset of data center monitoring and remediation tasks from a mobile device.
- **OpenManage Power Center**—Dell's power management solution, the Dell 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

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

- **Dell Repository Manager**—The Dell 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 Update Packages**—The Dell Update Packages (DUP) is a self-contained executable in a standard package format that updates a software element on a Dell server such as the BIOS, a driver, firmware and other software updates.
- **Dell OpenManage Deployment Toolkit**—The Dell OpenManage Deployment Toolkit (DTK) is a CLI-based tool that includes a set of utilities for configuring and deploying Dell 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 iDRAC8.
- **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'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.

Integration with third-party consoles

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

- **OpenManage Integration Suite for Microsoft System Center**—This suite helps you further streamline, automate and simplify your most essential IT management tasks. For more information, visit http://www.dell.com/learn/us/en/04/solutions/dcsm-microsoft-system-center.
- **OpenManage Integration for VMware vCenter**—This plug-in allows IT administrators to monitor, provision, and manage the physical PowerEdge server hardware and firmware from a dedicated Dell menu accessed through the VMware vCenter console using the same role-based access control model as vCenter, combining physical server management. For more information, visit http://www.dell.com/learn/us/en/04/virtualization/management-plug-in-for-vmware-vcenter.
- **BMC Software**—Dell and BMC Software work together to simplify IT by ensuring tight integration between Dell server, storage, and network management functionality and the BMC Software process and data center automation products.

OpenManage Connections with third-party consoles

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

- OpenManage Connection for Nagios
- OpenManage Connection for Oracle
- OpenManage Connections for HP
- OpenManage Connections for IBM
- OpenManage Connection for CA

For more information on these OpenManage Connections, visit http://www.dell.com/learn/us/en/04/solutions/dcsm-partner-consoles.

Dell server management operations

Dell OpenManage systems management is centered on automating the server management lifecycle—deploy, update, monitor, and maintain. To manage an infrastructure properly and efficiently, you must perform all of these functions easily and quickly. iDRAC8 with Lifecycle Controller technology provides you with these intelligent capabilities embedded within the server infrastructure. This allows you to invest more time and energy on business improvements and less on maintenance. Figure 18 illustrates the various operations that can be performed during the server's lifecycle.

Figure 18. Systems management server lifecycle

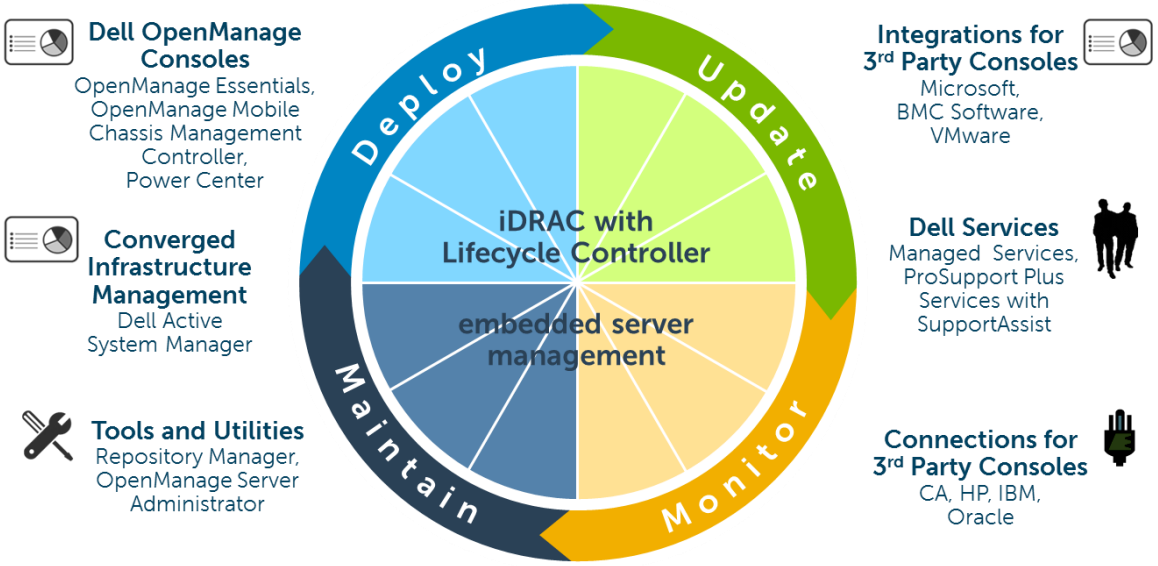


Table 30 lists the products that are available for one-to-one and one-to-many operations, and when they are used in the server's lifecycle:

Table 30. One-to-one and one-to-many operations

Operation	One-to-one	One-to-many
Deploy	• Lifecycle Controller GUI • DTK	• OpenManage Integration for VMware vCenter • OpenManage Integration for BMC BladeLogic • OpenManage Integration for Microsoft System Center Configuration Manager
Update	• iDRAC8 with Lifecycle Controller • Repository Manager • DUP • SUU • OpenManage Integration for VMware vCenter	• Dell OpenManage Essentials • OpenManage Integration for Microsoft System Center Configuration Manager
Monitor	• iDRAC8 with Lifecycle Controller • OMSA	• Dell OpenManage Essentials • Dell OpenManage Power Center • OpenManage Integration for VMware vCenter • OpenManage Integration for Microsoft System Center Operations Manager
Maintain	• iDRAC8 with Lifecycle Controller • IPMI	• Lifecycle Controller Remote Services Remediate and replace parts: • OpenManage Integration for Microsoft System Center Virtual Machine Manager (SCVMM) • Server Pro Management Pack and Lifecycle Controller Integration (DLCI)

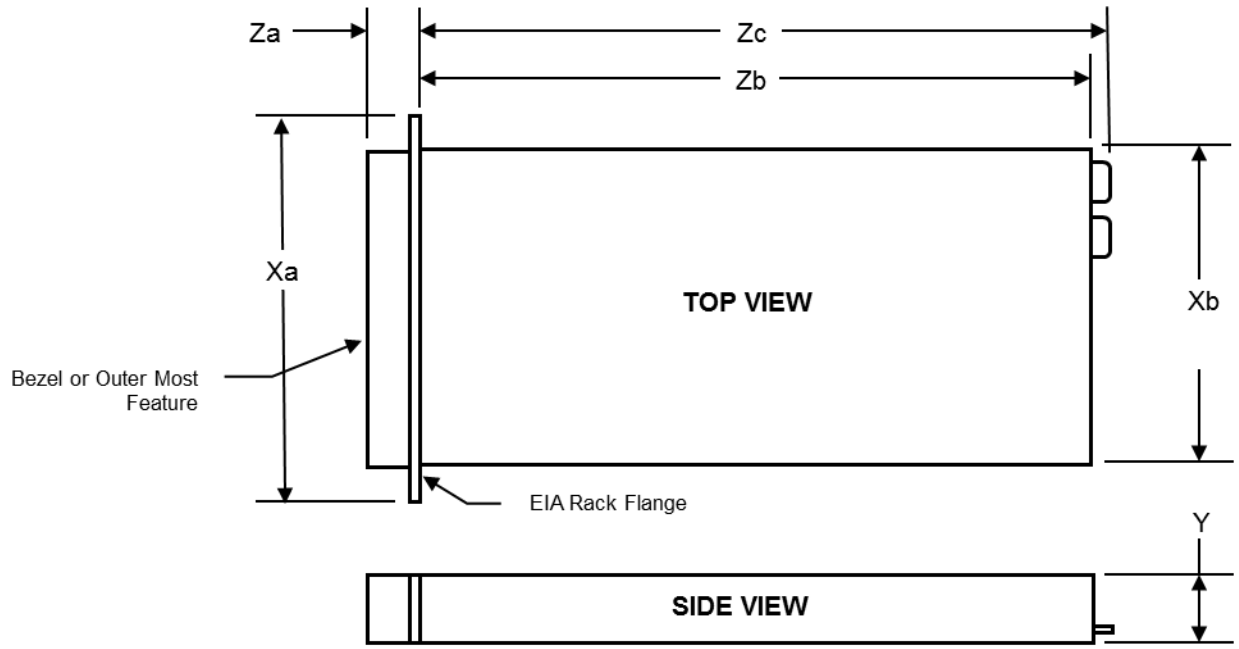
For additional detailed information on Dell's systems management portfolio, visit Dell.com/OpenManage.

Appendix A. Additional specifications

Chassis dimensions

Figure 19 details the dimensions of the Dell PowerEdge R730 and R730xd chassis.

Figure 19. Chassis dimensions



Xa	Xb	Y	Za (with bezel)	Za (without bezel)	Zb	Zc
482.4mm	444.0mm	87.3mm	32.0mm	18.0mm	684.0mm	723.0mm

Chassis weight

Table 31 lists the weight of the R730 and R730xd chassis at maximum configuration as well as empty of any hardware.

Table 31. Chassis weight

Configuration	R730 (2.5" chassis)	R730 (3.5" chassis)	R730xd (2.5" chassis)	R730xd (3.5" chassis)
Maximum	29.5kg (64.9lb)	29.2kg (64.3lb)	29.5kg (64.9lb)	32.5kg (71.5lb)
Empty chassis	11.7kg (25.7lb)	10.3kg (22.7lb)	11.7kg (25.7 lb)	10.3kg (22.7lb)

Power supply specifications

Table 32 lists power supply specifications for the PowerEdge R730 and R730xd.

Table 32. Power supply specifications

Specification	495W	750W	750W	1100W	1100W DC	750W AC/DC mixed mode
80 PLUS	Platinum	Platinum	Titanium	Platinum	N/A – peak efficiency: 91%	Platinum
Power factor correction	Active	Active	Active	Active	None	Active
FCC classification	Class A	Class A	Class A	Class A	Class A	Class A
Max output current	40.57A 69.0A (peak)	61.47A 104.5A (peak)	61.47A 104.5A (peak)	90.16A 153.3A (peak)	91.6A	62.5A
Input voltage range	90–264V AC 47–63Hz	90–264V AC 47–63Hz	180–264V AC 47–63Hz	90–264V AC 47–63Hz	-36V to -72V DC	90–264V AC 47–63Hz 192–288V DC
Iin for rating on safety label	6.5A–3A[1]	10.0A–5.0A[1]	5.0A[2]	12.0A–6.5A[1]	32A[3]	10.0A–5.0A[1] 4.5A
Initial in-rush current	25A (peak)	25A (peak)	25A (peak)	25A (peak)	55A (peak)	55A (peak)
Secondary in-rush current	25A (peak)	25A (peak)	25A (peak)	25A (peak)	43A (peak)	25A (peak)

[1]100-240V AC
[2]240V AC
[3]-48.0V DC
[4]240-290V DC

Environmental specifications

See *Dell PowerEdge R730 and R730xd Owner's Manual* on Dell.com/Support/Manuals for detailed environmental specifications including expanded operating temperature (Fresh Air) information.

Video specifications

The Dell PowerEdge R730 and R730xd iDRAC8 incorporates an integrated video subsystem. The graphics controller is the 2D Matrox® G200. The video frame buffer (16 MB) is contained within the iDRAC RAM (256 MB) device. The R730 and R730xd systems support the 2D graphics video modes listed in Table 33.

Table 33. Supported video modes

Resolution	Refresh Rate (Hz)	Color Depth (bit)
640 x 480	60, 70	8, 16, 32
800 x 600	60, 75, 85	8, 16, 32
1024 x 768	60, 75, 85	8, 16, 32
1152 x 864	60, 75, 85	8, 16, 32
1280 x 1024	60, 75	8, 16, 32
1440 x 900 (stretch goal)	60	8, 16, 32

Rack rail specifications

The rack rail adjustability ranges are listed in Table 34.

Table 34. Rail adjustability ranges

Server	Rail identifier	Rail type	Rail adjustability range (mm)						Rail depth (mm)	
			Square		Round		Threaded		without CMA	with CMA
			Min	Max	Min	Max	Min	Max		
R730/R730xd	B6	Sliding	676	868	662	861	676	883	714	845
	B4	Static	608	879	594	872	604	890	622	—

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

USB peripherals

USB peripherals are supported through the front and back USB ports on the R730 and R730xd. The front ports are USB 2.0 compliant and the back ports are USB 3.0 compliant.

Appendix B. Standards compliance

The R730 and R730xd systems conform to the industry standards in Table 35.

Table 35. 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
Windows Logo Windows Logo Program System and Device Requirements, v3.10	microsoft.com/whdc/winlogo/hwrequirements.mspx

Appendix C. Additional resources

Table 36 provides a list of documents and websites that provide for more information on the Dell PowerEdge R730 and R730xd.

Table 36. Additional resources

Resource	Description of contents	Location
PowerEdge R730 and R730xd Owner's 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
PowerEdge R730 and R730xd Getting Started Guide	This guide ships with the system, and is also available in PDF format on the Dell support site. 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
System Information Label	The system information label documents the system board layout and system jumper settings.	Inside the system chassis
Quick Resource Locator (QRL) code	This code 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
Information Update	This document provides updated system information and is printed and shipped with the system. It is also available in PDF format on the Dell support site.	Dell.com/Support/Manuals
Energy Smart Solution Advisor	The Dell online Energy Smart Solution Advisor (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
Power and cooling technologies	Provides details for improving energy efficiency in the data center.	Dell.com/powerandcooling

Resource	Description of contents	Location
Energy management	Provides information on Dell's Fresh Air solutions.	Dell.com/FreshAir
Operating system matrix for Dell PowerEdge systems	Provides updated information on which operating systems are available on which PowerEdge systems.	Dell.com/OSsupport
Processor and chipset	Provides more information about the R730 processors and chipset.	Intel.com
Systems management	Provides more information on how to simplify, automate and optimize IT operations.	Dell.com/OpenManage
Dell PowerEdge RAID controllers	Provides more information on Dell PERC cards.	Dell.com/PERC
Uninterruptible power supply	Provides help selecting a UPS model.	DellUPS.com
Dell Enterprise Acoustics	White paper that explores the mechanisms of, people's reaction to, language of, and Dell's work to control noise from Enterprise products.	www.dell.com/downloads/global/products/pedge/en/acoustical-education-dell-enterprise-white-paper.pdf
Volatility information	Contact your Dell Sales Representative or visit the Dell Support site.	Dell.com/Support/Manuals

Appendix D. Support and Deployment Services

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

Server Deployment Services

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

Figure 20. Server Deployment capabilities

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

In addition, we are also experts at rack integration and solutions such as High Performance Computing, Openstack and Hadoop.

Dell's Server Deployment Services help you optimize your server configurations and quickly and correctly install and integrate your solution so you can be up and running faster with minimal disruption to day-to-day business operations. Our deployment experts provide:

- Single point of project management contact from beginning to end
- Evaluation of your environment with a detailed project plan

- Optimized configurations for your workloads and user environment
- Personalized documentation and orientation

Remote Consulting Services

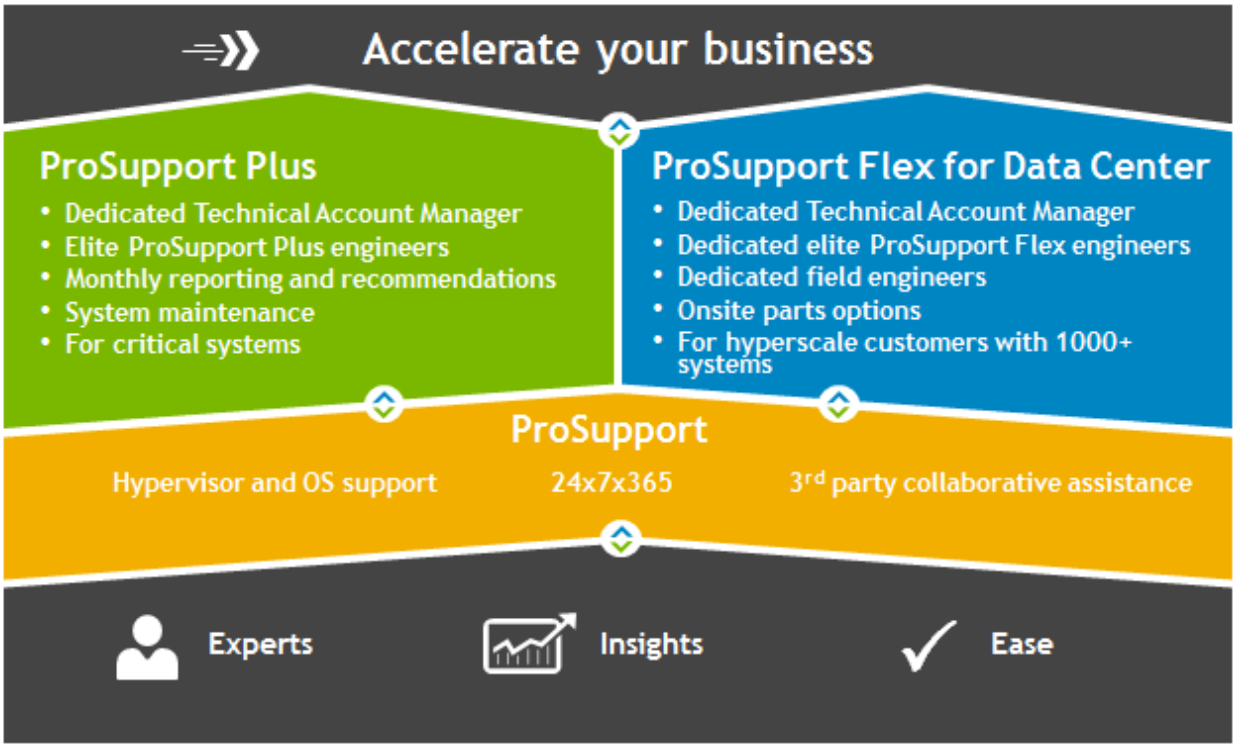
When you are in the final stages of your PowerEdge server implementation, you can rely on Dell Remote Consulting and our certified technical experts to help you optimize your configuration with best practices for your software, virtualization, server, storage, networking and systems management.

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 ProSupport Services, we can help you keep your operation running smoothly, so you can focus on running your business. We'll help you maintain peak performance and availability of your most essential workloads. Dell ProSupport is a suite of support services that enable you to build the solution that's 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 (for business-critical servers)

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

ProSupport

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

- 24x7x365 access to certified hardware experts
- Collaborative support assistance with over 195 third-party vendors
- Hypervisor and operating system support
- Onsite parts and labor response options including next business day or four-hour mission critical

ProSupport Flex for Data Center

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

- Enterprise-wide support that covers your entire data center
- A dedicated Technical Account Manager with remote, on-site, part-time and full-time options
- Dedicated elite ProSupport Flex technical and field engineers who are trained on your environment and configurations
- Flexible on-site support and parts options that fit your operational model
- A tailored support plan for your operations staff

Figure 21. ProSupport Enterprise Suite comparison

	ProSupport	ProSupport Plus	ProSupport Flex for Data Center
Technical support access	24x7	24x7	24x7
Parts and labor response	NBD or Mission Critical	NBD or Mission Critical	Flexible
TechDirect online cases and dispatch	✓	✓	✓
SupportAssist remote monitoring	✓	✓	✓
Dispatch monitoring and crisis management	✓	✓	✓
Escalation management	✓	✓	✓
Hypervisor and OS support	✓	✓	✓
Collaborative 3rd party software support	✓	✓	✓
SupportAssist proactive resolution	✓	✓	✓
Direct access to elite ProSupport Plus engineers		✓	✓
Dedicated Technical Account Manager		✓	✓
Monthly health check and performance recommendations		✓	✓
Monthly contract renewal and service history reporting		✓	✓
System maintenance (as needed)		✓	✓
Dedicated technical and field support teams			✓
Site-wide entitlement and contract			✓
Case management API			✓

Additional professional services

Dell Education Services

Dell Education Services offers 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'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 server solution. To learn more or register for a class today, visit LearnDell.com/Server.

Dell Global Infrastructure Consulting Services

Dell Global Infrastructure Consulting Services use skilled solution architects, innovative tools, automated analysis and Dell'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 Managed Services

Dell 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.