PowerEdge R420xr

Technical Guide

The ruggedized, short depth PowerEdge R420xr 1u 2-socket server delivers a world-class enterprise experience in harsh compute environments.

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1 System overview

Introduction

The PowerEdge R420xr is an enterprise-class, short-depth, 1U 2-socket rack server ruggedized for military, telecom and other uses. R420xr is designed for harsh environments that are constrained by size, weight and power. Along with its small footprint, R420xr boasts powerful performance and scalability, hot-swappable power supplies and industry-leading management..

Ruggedized durability

The R420xr is built for demands of Military, Telecom and other harsh environments. It is capable of operation in elevated temperatures and comes with an optional filtered bezel for dusty, dirty environments. To prove its rugged nature, the R420xr has been tested to MIL-STD 810G, NEBS Level 3 and ETSI

Right-sized performance

The R420xr features the extensive performance of two Intel® Xeon® E5-2400 v2 processors. Powerful processors alone, however, are not enough to deliver balanced performance. Compute power must be combined with sufficient memory and I/O bandwidth to prevent performance bottlenecking. The R420xr complements its processors with 12 DIMM slots and two PCI Express® (PCIe) 3.0-enabled I/O slots, providing a substantial memory footprint and wide I/O bandwidth to support both memory-intensive and data-intensive applications and databases. These combined technology features are also key design requirements when supporting consolidated and virtualized environments, a role the R420xr fits well. To protect your virtualized workloads, the R420xr offers dual, redundant SD media making your hypervisors redundant and failsafe. Other reliability and availability features include up to four 2.5-inch hot-plug hard drives, both hardware and software RAID options and redundant, hot-plug power supplies. All of this performance comes in a 20" rack depth for depth contrained deployments or for easy mobility in a transit case.

Comprehensive systems management, without compromise

The Dell OpenManage™ systems management portfolio includes Integrated Dell Remote Access Controller 7 (iDRAC7) with Lifecycle Controller. This embedded feature helps IT administrators manage Dell servers in physical, virtual, local and remote environments, operating in-band or out-of-band, with or without a systems management software agent installed.

OpenManage iDRAC with Lifecycle Controller integrates and connects to leading third-party systems management solutions (such as those from Microsoft, VMware and BMC Software), so users can maintain a single point of control and capitalize on an existing systems management investment. OpenManage simplifies the lifecycle of deploying, updating, monitoring and maintaining Dell PowerEdge servers.

Technologies

Table 1 summarizes the latest technologies used in the Dell PowerEdge R420xr rack server.

Table 1. Technologies

New technology	Detailed description
Intel Xeon processor E5-2400 v2 product family	This new family of Intel processors has embedded PCIe lanes for improved I/O performance. See the Processor section for details.
Intel C600 series chipset	The Intel Platform Controller Hub (PCH) chip is implemented on the R420xr server.
1600MT/s DDR3 memory	Certain models of the Intel Xeon processor E5-2400 product family support 1600MT/s memory. The R420xr supports two DIMMs per channel at 1600MT/s with certain models. See the Memory section for details.
Next-generation PERC options	The R420xr supports the new PERC controller cards with improved functionality and faster performance. See the Storage section for details.
PERC S110 software RAID solution	This new software RAID solution supports RAID 0, 1, 5 and 10, and supports a maximum of four hot-plug SATA hard drives or SATA solid-state drives. See the Storage section for details.
iDRAC7 with Lifecycle Controller	Dell's embedded systems management solution for Dell servers features hardware and firmware inventory and alerting, in-depth memory alerting, faster performance, a dedicated gigabit port and many more features. See the Dell OpenManage systems management section for details.
Advanced power management	The R420xr supports advanced power monitoring and power capping tools that can help manage power consumption. See the Power, thermal and acoustics section for details.
Fresh Air cooling	Dell has tested and validated an integrated data center solution that enables you to operate at higher temperatures or even chiller-less. See the Power, thermal and acoustics section for details.
Failsafe hypervisors	The internal dual SD module enables Dell's unique failsafe virtualization architecture, ensuring uptime by providing failover capability for embedded hypervisors, such as VMware® vSphere® ESXi™. See the Supported virtualization for details.
Fan fault tolerance	Failure of one fan rotor is tolerated with degradation in performance through active throttling and increased fan speeds. The feature helps reduce downtime by allowing you to schedule a fan replacement within 360 hours of a fan failure.

2 System features

Compared to the Dell PowerEdge R420 server, the R420xr has a shorter rack depth, is MIL-STD-810G compliant and has a longer lifecycle. Table 2 compares some of the features of the R420xr to the R420. Table 3 lists all of the R420xr specifications.

Comparison of PowerEdge systems

The R420xr is a ruggedized, short depth PowerEdge server based off of the R420.

Table 2. Comparing the PowerEdge R420 to PowerEdge R420xr

Feature	PowerEdge R420	PowerEdge R420xr
MIL-STD-810G Compliant	**No**	**Yes**
Chassis	1U rack 24" rack depth	1U rack 20" rack depth
Processors	Intel Xeon processor E5-2400 and E5-2400 v2 product family	Intel Xeon processor E5-2400 v2 product family
Memory[1]	12 x DDR3 RDIMM and UDIMM Up to 384GB	12 x DDR3 RDIMM and UDIMM Up to 384GB
Hard drive bays (hot-plug)	Up to 4 x 3.5" cabled or hot-plug Up to 8 x 2.5" hot-plug SAS, SATA or SSD	Up to 4 x 2.5" hot-plug SSD (SATA or SAS)
RAID controller	S110, H310, H710, H710P, H810 (ext)	S110, H310, H710, H710P, H810 (ext)
PCI slots	2 PCIe 3.0 slot	2 PCIe 3.0 slots
Embedded NIC	Dual Port 1GbE LOM	Dual Port 1GbE LOM
Power supplies	350W and 550W AC	Dual Hot Plug Redundant 550W AC
Management	Dell OpenManage Lifecycle Controller 2.x	Dell OpenManage Lifecycle Controller 2.x
Remote management	iDRAC7 (Express/Enterprise)	iDRAC7 (Express/Enterprise)
Availability	Hot-plug drives Hot-plug redundant PSU Internal Dual SD support Fan Fault Tolerance ECC memory	Hot-plug drives Hot-plug redundant PSU Internal Dual SD support Fan Fault Tolerance ECC memory
Geo availability	Worldwide	Worldwide, except China and Russia
Estimated end of sales life	Q2CY15	Q2CY17

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

Specifications

Table 3 summarizes the specifications for each of the PowerEdge R420xr features. All of these features are MIL-STD-810G compliant.

Table 3. Technical specifications

Feature	PowerEdge R420xr technical specification
Form factor	1U rack 20" rack depth
Processors	Intel Xeon processor E5-2470 v2, E5-2450 v2, E5-2430L v2, E5-2430 v2 or E5-2407 v2
Processor sockets	2 sockets
Internal interconnect	Intel QuickPath Interconnect (QPI) link: 6.4GT/s, 7.2GT/s, 8.0GT/s
Cache	2.5MB per core with core options of 4, 6 or 8
Chipset	Intel C602
Memory	Up to 384GB (12 DIMM slots): 4GB/8GB/16GB/32GB[1] DDR3 up to 1600MT/s
PCIe slots	**2 PCIe slots** With 2 processors: • 1 x16 slot with x16 bandwidth, 3.0, half-height, half-length • 1 x16 slot with x16 bandwidth, 3.0, full-height, half-length With 1 processor: • 1 x8 slot with x4 bandwidth, 2.0, half-height, half-length • 1 x16 slot with x16 bandwidth, 3.0, full-height, half-length
RAID controller	**Internal controllers:** PERC S110 (SW RAID) PERC H310 PERC H710 PERC H710P **External HBAs (RAID):** PERC H810 **External HBAs (non-RAID):** 6Gbps SAS HBA
Hard drives	Up to four 2.5" hot-plug SSD (SATA or SAS)
Embedded NIC	Broadcom® 5720 Dual Port 1GbE LOM
I/O adapter options	**1Gb Ethernet**: Broadcom 5720 Dual Port 1Gb NIC[1] Broadcom 5719 Quad Port 1Gb NIC Intel I350 Dual Port 1Gb stand-up adapter Intel I350 Quad Port 1Gb stand-up adapter **10Gb Ethernet**: Intel X520 Dual Port 10Gb DA/SFP+ server adapter Intel X540 Dual Port 10Gb Base-T adapter[1] QLogic® QLE8262 Dual Port 10Gb DA/SFP+[1] **FC8/FC4 HBA**: QLogic QLE2562 8Gb Dual Port FC HBA[1]
Power supply	Dual redundant 550W AC power supply

Feature	PowerEdge R420xr technical specification
Availability	High-efficiency, hot-plug redundant power supplies; hot-plug hard drives; TPM; dual-internal SD support; fan fault tolerance; optional bezel; information tag; ECC memory; extended power range; ENERGY STAR® compliant
Remote Management	• Basic management (standard option) — Upgrade to iDRAC7 with Lifecycle Controller (Express or Enterprise) — Upgrade to 8GB vFlash media or 16GB vFlash media for iDRAC7 Enterprise with Lifecycle Controller
Dell OpenManage Systems Management (Agent-free or with OMSA agent)	• OpenManage Essentials • OpenManage Mobile • OpenManage Power Center (requires iDRAC7 Enterprise with Lifecycle Controller) • 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
Rack support options	• Rugged sliding rails for use in transit cases or standard • ReadyRails static rails for tool-less mounting in four-post racks with square or unthreaded round holes or tooled mounting in four-post threaded and two-post (Telecom) racks
Operating systems	Microsoft® Windows Server® 2012 (embedded option available) Microsoft Windows® Server® 2012 R2 Microsoft Windows Server 2008 R2 (embedded option available) Microsoft Windows Server 2008 R2 SP1 (embedded option available) Novell® SUSE® Linux Enterprise Server (embedded option available) Red Hat® Enterprise Linux® (embedded option available) **Virtualization options (available on Dell-branded systems):** Citrix® XenServer® VMware vSphere including ESXi™ Red Hat Enterprise Virtualization® For more information on the specific versions and additions, visit Dell.com/OSsupport.
Harsh environment testing	Military Standard 810G tested for temperature, shock, vibration and altitude NEBS level 3 and ETSI tested
Branding options	Dell-branded and OEM-ready options available

[1]Not all features were tested for NEBS level 3 and ETSI compliance. These features were not NEBS Level 3 and ETSI tested.

3 Chassis views and features

The Dell PowerEdge R420xr is a 1U, 2-socket rack server, available Dell branded or unbranded. For additional system views and features, see the *Dell PowerEdge R420xr Systems Owner's Manual* on Dell.com/Support/Manuals.

Chassis views

Figure 1 shows the features on the front of the R420xr chassis including four 2.5-inch hard drives, control panel, USB connectors, and many other components and features described in this guide.

Figure 1. Front view without bezel

Figure 2 shows the optional locking bezel on the front of the R420xr chassis.

Figure 2. Front view with bezel

Figure 3 shows the features on the back panel of the R420xr including USB connectors, Ethernet connectors, serial connector, video connector, PCIe slots, power supplies and many other components and features described in this guide.

Figure 3. Back view

The chassis design of the R420xr is optimized for space constrained and/or harsh environments, and easy access to components and for airflow for effective and efficient cooling. The R420xr supports up to 12 DIMMs, two processors, hot-plug redundant power supplies and many other components and features described in this guide.

Figure 4. Internal view

Chassis features

Table 4 lists the features on the R420xr chassis. For additional information, see the *Dell PowerEdge R420xr Systems Owner's Manual* on Dell.com/Support/Manuals.

Table 4. Chassis features

Feature	Description
Power button	ACPI-compliant power button with an integrated green power LED
Front bezel	Covers the system's front-loading hard drives, includes a washable/replaceable filter
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 drives	Up to four 2.5-inch drives
USB connectors	Connects USB devices to the server
Information tag	Slide-out label panel for recording system information
Video connector	Connects a monitor to the server

Feature	Description
LCD panel and buttons	Displays system ID, status information and system error messages; two navigation buttons to scroll through the menu on the LCD and one select button
Power supply units	Supplies power to the server
Power supply indicators	Indicates whether server has power
NIC indicators	Indicates network activity and status
PCIe slots	Connects PCIe expansion cards to the server
Ethernet connectors	Connects integrated 10/100/1000 NICs to the server
Serial connector	Connects a serial device to the server
iDRAC7 Enterprise port	Dedicated management port for optional iDRAC Ports card

Front control panel

The R420 control panel is located on the front of the chassis as shown in Figure 5. For more information about the LCD control panel, see the *Dell PowerEdge R420 Systems Owner's Manual* on Dell.com/Support/Manuals.

Figure 5. LCD control panel

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 retention	The top cover is retained with two self-retaining thumb screws.
Bezel	An optional metal, filtered bezel is mounted to the chassis front to provide protection in harsh environments. System status is viewable on the LCD screen when the bezel is installed.
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. No TPM version is available for China or Russia.
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 Processor

The Dell PowerEdge R420xr features the Intel Xeon processor E5-2400 v2 product family, which offers 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.

For more information on the Intel Xeon processor E5-2400 v2 product family, visit Intel.com.

Supported processors

Table 6 lists the Intel Xeon processors supported by the PowerEdge R420xr.

Table 6. Supported processors

Model	Speed	TDP	Cache	Cores/ threads	QPI	Max memory speed	Turbo
E5-2470 v2	2.4GHz	95W	25MB	10C/12T	8.0GT/s	1600MT/s	Yes
E5-2450 v2	2.5GHz	95W	20MB	8/8	8.0GT/s	1600MT/s	Yes
E5-2430L v2	2.4GHz	60W	15MB	6/12	7.2GT/s	1600MT/s	Yes
E5-2430 v2	2.5GHz	80W	15MB	6/12	7.2GT/s	1600MT/s	Yes
E5-2407 v2	2.4GHz	80W	10MB	4/4	6.4GT/s	1333MT/s	N/A

For information on processor installation and configuration, see the *Dell PowerEdge R420xr Systems Owner's Manual* on Dell.com/Support/Manuals.

Chipset

The Intel C602 chipset is implemented on the PowerEdge R420xr. For more information, visit Intel.com.

5 Memory

The large memory footprint of the Dell PowerEdge R420xr offers greater capacities, higher frequencies and more flexibility. The R420xr supports up to 384GB of memory (12 DIMM slots) and speeds of up to 1600MT/s, providing high performance in a variety of applications. The new reliability, availability, serviceability (RAS) features like memory mirroring and sparing help you increase your uptime and reduce data loss. RAS aids in the rapid and accurate diagnosis of faults that require service, increasing your memory reliability.

Supported memory

The R420xr supports the memory technologies shown in Table 7.

Table 7. Memory technologies supported

Feature	UDIMM	RDIMM
Register	No	Yes
Buffer	No	No
Frequencies*	800, 1066, 1333 or 1600MT/s	800, 1066, 1333 or 1600MT/s
Ranks supported	1 or 2	1, 2 or 4
Capacity per DIMM	4 or 8GB	4, 8, 16 or 32GB
Maximum DIMMs per channel	2	2
DRAM technology	x8	x4 or x8
Temperature sensor	Yes	Yes
Error Correction Code (ECC)	Yes	Yes
Single Device Disable Code (SDDC)	Yes (with advanced ECC mode)	Yes
Address parity	Yes	Yes

*Although the R420xr supports DIMM speeds of 800MT/s and 1066MT/s, you can only purchase this system with DIMM speeds of 1333MT/s and 1600MT/s.

The R420xr supports the DIMMs listed in Table 8. For the latest information on supported memory, visit Dell.com/PowerEdge.

Table 8. DIMMs supported

Capacity (GB)	Speed (MT/s)	Type	Ranks per DIMM	Data width	SDDC support	Voltage
4	1600	UDIMM	1	x8	Advanced ECC	1.35
4	1600	RDIMM	1	x8	Advanced ECC	1.35
4	1600	RDIMM	2	x8	Advanced ECC	1.35
8	1600	RDIMM	1	x4	All modes	1.35
16	1600	RDIMM	2	x4	All modes	1.35
32	1333	RDIMM	4	x4	All modes	1.35

Memory configurations

Flexible memory configurations are supported on the R420xr, ranging from capacities of 4GB to 384GB. The system supports up to six DIMMs per processor (up to 12 DIMMs in a two-processor configuration). The R420xr has three memory channels per processor, with each channel supporting up to two DIMMs.

The R420xr supports 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 can be used in a system. UDIMMs and RDIMMs cannot be mixed.

The following additional memory population guidelines apply to the R420xr:

- Up to two quad-rank (QR), dual-rank (DR) or single-rank (SR) DIMMs may be populated per channel.
- DIMMs must be installed in each channel, starting with the DIMM farthest from the processor.
- DIMMs should be installed with largest rank count to smallest. For example, if DR DIMMS are mixed with SR DIMMs, DR DIMMS should be placed in the lowest DIMM slots, followed by the SR DIMMs.

For more information on memory configuration, see the *Dell PowerEdge R420xr Systems Owner's Manual* on Dell.com/Support/Manuals.

Memory speed

The R420xr supports memory speeds of 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 memory is also determined by the maximum speed supported by the processor, the speed settings in the BIOS, and the operating voltage of the system.

Table 9 lists memory configuration and performance details for the R420xr based on the population of the number and type of DIMMs per memory channel.

Table 9. Memory speed capabilities

DIMM type	DIMM 0	DIMM 1	Number of DIMMs	Speed (MT/s)			
				800*	1066*	1333	1600
UDIMM	SR		1	•	•	•	•
	DR		1	•	•	•	•
	SR	SR	2	•	•	•	•
	SR	DR	2	•	•	•	•
	DR	DR	2	•	•	•	•
RDIMM	SR		1	•	•	•	•
	DR		1	•	•	•	•
	QR		1	•	•	•	
	SR	SR	2	•	•	•	•
	SR	DR	2	•	•	•	•
	DR	DR	2	•	•	•	•
	QR	SR	2	•	•		
	QR	DR	2	•	•		
	QR	QR	2	•	•		

*Although the R420xr supports DIMM speeds of 800MT/s and 1066MT/s, you can only purchase this system with DIMM speeds of 1333MT/s and 1600MT/s.

Memory RAS features

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 that require service. Table 10 describes the RAS features supported on the R420xr.

Table 10. 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.
Memory sparing (rank)	Memory sparing allocates one rank per channel as a spare. If excessive correctable errors occur in a rank or channel, it is moved to the spare area while the operating system is running to prevent the error from causing an uncorrectable failure.
Memory thermal throttling	This feature helps to optimize power and performance and can also be used to prevent DIMMs from overheating.

For information on memory mirroring and sparing configurations, see the *Dell PowerEdge R420xr Systems Owner's Manual* on Dell.com/Support/Manuals.

6 Storage

The Dell PowerEdge R420xr supports internal and external storage options and controllers, different drive types, and different chassis configurations for a varied number of drives.

Internal storage

R420xr has supports a 4 x 2.5-inch drive-bay option.

Supported drives

The R420xr supports up to four 2.5-inch solid-state drives. Table 11 lists more information about these drives.

Table 11. Supported hard drives

Form factor	Type	Capacities
2.5"	SAS SSD, Read Intensive MLC	200GB, 400GB, 800GB, 1.6TB
	SATA SSD, Read Intensive MLC	120GB, 160GB, 240GB, 300GB, 480GB, 960GB
	SATA SSD, Value MLC	100GB, 200GB, 400GB, 800GB

External storage

External storage for the R420xr is available through optional HBAs for SAS and iSCSI. For more information, see Dell.com/Storage.

Storage controllers

Dell provides highly capable RAID options for you to ensure that your data remains safe. Dell's RAID controller options offer impressive performance improvements, including the following features:

- FastPath™ I/O: This feature can help accelerate performance when operating on SSDs.
- Split mirror: This function allows you to break mirrored disk connection in order to quickly replace a drive.
- Physical disk power management (Dimmer Switch™): This feature allows for power control of spare or idle drives, which can save energy and operating expenses.

Supported RAID controllers

The R420xr supports the PERC 8 (PowerEdge RAID Controller) family of cards offer high I/O performance for database applications and streaming digital media environments. The internal RAID controllers have a dedicated connection to the system board.

The default PERC for the R420xr is a mini-type PERC. The R420xr also supports a software RAID solution that supports RAID 0, 1, 5 and 10. The R420xr supports the PERC cards listed in Table 12. For more information about the latest PERC offerings, see Dell.com/PERC.

Table 12. Supported RAID controllers

Controller	Description	Features	RAID modes supported	Form factor	Usage model
PERC H810 External	8-port, external and 6Gp/s PCIe RAID controller	Includes 1GB NV DDR3 cache, premium performance and feature set, security SED/EKMS, and SSD as cache	0, 1, 10, 5, 50, 6, 60	Adapter	Premium performance
PERC H710P Internal	8-port, internal 6Gb/s PCIe RAID controller	Includes 1GB NV DDR3 cache, premium performance and feature set, security SED/EKMS, and SSD as cache	0, 1, 10, 5, 6	Integrated mini-type	Premium performance
PERC H710 Internal	8-port, internal 6Gb/s PCIe RAID controller	Includes 512MB NV DDR3 cache, advanced feature set, security SED/EKMS	0, 1, 10, 5, 6	Integrated mini-type	Performance
PERC H310 Internal	8-port, internal 6Gb/s PCIe RAID	Supports hot-plug drives, expansion, pass-through	0, 1, 10, 5	Integrated mini-type	Value
PERC S110 Software RAID	3Gb/s SATA software RAID controller that supports up to 4 physical disks or 8 virtual disks	Supports up to 4 hot-plug SATA drives, no expansion, Microsoft Windows only	0, 1, 5, 10	System board-embedded SATA	Entry-level

Table 13 lists the storage matrix for the R420xr hard drives, backplanes and Dell PERC cards.

Table 13. Hard-drive backplane options

Backplane options	Controller	Drive types
4 x 2.5" hot-plug	PERC H310[1], H710[1], H710P[1]	2.5" SSD

[1]Mini-type PERC

Optical drive

The R420 supports external USB optical drives.

Tape drive

The R420xr does not support internal tape drives.

7 Networking and PCIe

The Dell PowerEdge R420xr offers balanced, scalable I/O capabilities, including integrated PCIe 3.0 capable expansion slots. The R420xr supports up to two PCIe slots.

Embedded NIC controller

The R420xr system board has one embedded NIC controller. The Broadcom 5720 Gigabit NIC chip is connected to the platform controller hub through a PCIe 2.0 x2 link.

The Broadcom 5720 is a 14th generation 10/100/1000 Base-T Ethernet LAN controller solution suitable for high-performance server applications. The Broadcom 5720 combines dual triple-speed IEEE 802.3 compliant Media Access Controllers (MACs) with dual 10/100/1000 Ethernet transceivers (PHYs), selectable individually per port, a network controller-sideband interface (NC-SI), and an on-chip memory buffer in a single device. The device provides a PCIe 2.1-compliant interface, which operates at 5GT/s or 2.5GT/s x2 link width.

PCIe expansion

The R420xr provides expanded PCIe slot capability, made possible by the 24 PCIe lanes available from each processor in the system. Dell designed the R420xr to be PCIe 3.0-compliant in order to take full advantage of the processor capabilities.

PCIe slots

PCIe connectivity is integrated with the processor in that the number of processors in a system impacts the number of PCIe slots and the bandwidth of each PCIe slot. Table 14 lists the slot configurations for the R420xr.

Table 14. PCIe slot configurations

	One processor	Two processors
PCIe slot 1	PCIe x8 connector with x4 bandwidth; half-length, half-height, 2.0 (from PCH)	PCIe x16 connector with x16 bandwidth; half-length, half-height, 3.0 (from CPU2)
PCIe slot 2	PCIe x16 connector with x16 bandwidth; half-length, full-height, 3.0 (from CPU1)	PCIe x16 connector with x16 bandwidth; half-length, full-height, 3.0 (from CPU1)
Storage slot	Storage slot for PERCs H310, H710, or H710P	Storage slot for PERCs H310, H710, or H710P

PCIe expansion cards

The R420xr supports a variety of PCIe expansion cards. Table 15 lists the supported add-in NICs and HBAs for the R420XR.

Table 15. Supported NICs and HBAs

Type	Adapter
1Gb/10Gb NICs	Broadcom 5720 2x1Gb
	Broadcom 5719 4x1Gb
	Intel I350 2x1Gb
	Intel I350 4x1Gb
	Intel X520 2x10Gb SFP+
	Intel X540 2x10Gb Base-T
	QLogic® QLE8262 2x10Gb SFP+
FC4/FC8 HBAs	QLogic QLE2562 8Gb

GPU and HIC cards

The R420xr has limited support for external graphics processing unit (GPU) technology and interface card solutions through the PowerEdge C410x series 3U external PCIe through a hardware interface card (HIC). An external GPU is available through certified factory installation (CFI) or field upgrade only.

8 Power, thermal and acoustics

Lower overall system-level power draw is a result of breakthrough system design. The Dell PowerEdge R420xr server maximizes performance per watt through a combination of power and cooling, energy-efficient technologies and tools. Additionally, the PowerEdge R420xr has an extensive collection of sensors that automatically track thermal activity, which helps regulate temperature thereby reducing server noise and power consumption.

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 center space. Table 16 lists the tools and technologies Dell offers to help you achieve your data center goals by lowering power consumption and increasing energy efficiency.

Table 16. Power tools and technologies

Feature	Description
Power supply unit (PSU) portfolio (redundant PSU only)	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	**Dell Energy Smart Solution Advisor (ESSA)** is a tool that helps you determine the most efficient configuration possible. With ESSA, you can calculate the power consumption of your hardware, power infrastructure and storage. ESSA can help you determine exactly how much power your server will use at a given workload. Learn more at Dell.com/ESSA.
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 (hot-plug PSU only)	PSU power monitoring improvements include: • Dell's power monitoring accuracy is currently 1%, whereas the industry standard is 5% • More accurate reporting of power • Better performance under a power cap
Power capping (hot-plug PSU only)	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 (redundant PSU only)	**iDRAC7 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.

Feature	Description
Active power management	**Intel Node Manager:** Dell offers a complete power management solution comprised of Intel Node Manager accessed through Dell iDRAC7 Enterprise and OpenManage Power Center that allows policy-based management of power and thermals at the individual server, rack, and data center level. Intel Node Manager is an embedded technology that provides individual server-level power reporting and power limiting functionality. **Hot spare** reduces power consumption of redundant power supplies. **Thermal control of fan speed** optimizes the thermal settings for your environment to reduce fan consumption and lower system power consumption. **Idle power** enables Dell servers to run as efficiently when idle as when at full workload.
Dell Fresh Air cooling (dual PSUs are required)	With the thermal design and reliability of Dell products, you can have the capability to operate at excursion-based temperatures beyond the industry standard of 35°C (95°F) up to 45°C (113°F) for excursionary periods of time and up to a 26°C dew point at 90% relative humidity; without impacting your availability model. Find additional information at Dell.com/FreshAir.
Rack infrastructure	Dell offers some of the industry's highest-efficiency power infrastructure solutions, including: • Power distribution units • Uninterruptible power supplies • Energy Smart containment rack enclosures

For more information about power and cooling, go to Dell.com/PowerAndCooling and Power.com/PowerCenter.

Power supply units

Energy Smart power supplies (hot-plug PSUs only) 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 R420xr power supply subsystem consists of one non-redundant or up to two hot-plug AC-DC power supplies. The power supply provides +3.3V/5V/12V and +12Vaux for non-redundant design and provides 12V and 12Vaux for redundant design. There are several voltage regulators in the system to supply different voltage levels needed by different logic devices. The redundant power supplies are managed through a PMBus interface.

The following power supply options are available for the R420xr:

- 550W AC, hot-plug redundant

Figure 6 shows a 550W power supply unit extended from the R420xr chassis.

Figure 6. 550W power supply unit

The PowerEdge R420xr supports two AC PSUs with 1 + 1 redundancy, auto-sensing and auto-switching capability.

Dell PSUs have achieved efficiency levels as shown in Table 17.

Table 17. Power supply efficiency

Form factor	Output	Class	Efficiency targets by load			
			10%	20%	50%	100%
Redundant	550W AC	Platinum	82.0%	90.0%	94.0%	91.0%

Thermal and acoustics

Optimized thermal management makes the PowerEdge R420xr cool and quiet. Benefiting from smart cooling fan speed control, the R420xr can keep both high performance and good acoustics across a wide range of ambient temperatures from 10°C to 35°C (50°F to 95°F) (see Table 25).

Thermal design

The thermal design of the PowerEdge R420xr reflects the following:

- **Multiple sensors are monitored for thermal feedback control:** The PowerEdge R420xr dynamically controls system cooling fan speed based on responses from component temperature sensors, including processors, hard disk drives, DIMMs, storage cards and the inlet ambient temperature. Thermal control detects and responds to hardware configuration. Thermal management adjusts cooling according to what the system really needs, and draws lower fan power draw and generates lower acoustical noise levels than servers without such controls.
- **User-configurable settings:** An R420xr thermal control design target is to minimize the contribution of fan power to overall system power. However, with the understanding and realization that every customer has a unique set of circumstances or expectations of the system, in this generation of servers, we are introducing limited user-configurable settings in

the iDRAC7 BIOS setup screen. For more information, see the *Dell PowerEdge R420xr Systems Owner's Manual* on Dell.com/Support/Manuals and "Advanced Thermal Control: Optimizing across Environments and Power Goals" on Dell.com/PowerEdge.

- **Fan fault tolerance:** The R420xr allows continuous operation with a motor failure in the system. The base configuration of the R420xr has five fans. An additional fan is needed when using a second processor. The fault tolerance feature allows one motor fan to fail at a time, allowing a fan replacement within 360 hours of a fan failure.
- **Environmental specifications:** The optimized thermal management makes the R420xr reliable under a wide range of operating environments as shown in the environmental specifications in Table 25.

Acoustical design

The acoustical design of the PowerEdge R420xr reflects the following:

- **Versatility:** The PowerEdge R420xr saves you power draw in the data center, but it also is quiet enough for the office environment in typical and minimum configurations. Compare the values for LpA in Table 18 for these configurations, and note that they are lower than ambient measurements of typical office environments.
- **Adherence to Dell's high sound quality standards:** Sound quality is different from sound power level and sound pressure level in that it describes how humans respond to annoyances in sound, like whistles and hums. One of the sound quality metrics in the Dell specification is prominence ratio of a tone, which is listed in Table 18.
- **Noise ramp and descent during bootup from power off:** Fan speeds and noise levels ramp during the boot process (from power off to power on) in order to add a layer of protection for component cooling in the case that the system were not to boot properly. To keep bootup as quiet as possible, the fan speed reached during bootup is limited to about half of full speed.
- **Noise level dependencies:** If acoustics is important to you, you may want to make the following configuration choices and settings for the PowerEdge R420xr for quieter operation:

— In the BIOS, select the power-optimized DAPC rather than performance-optimized for the system thermal profile
— Turn hot spare feature off in PSU

However, some components cause significant but not necessarily intuitive increases in loudness when they are installed in the R420XR. Contributors to acoustical output can include:

— More than one processor
— PERC H710 mini, PERC H710P mini, or PERC H810

Table 18 details the acoustical performance for the R420xr.

Table 18. Acoustical performance

Configuration (23 ± 2°C ambient)	CPUs	Hard drives	Power supply unit	Memory	PCI card/HDD controller	Operating mode	L_{WA}-UL[1] (bels)	L_{pA}[2] (dBA)	Prominent tones[3]
Typical x4 hot-plug HDD chassis	2 (95W)	3 x 2.5" 800GB SATA SSD	2 x 550W	6 x 4GB 1600Hz	1 x Dual Port 1GbE NIC 1 x PERC H310 mini	Idle[4]	5.1	32	None
						Stress[5]	5.1	33	None
Feature-rich x4 hot-plug HDD chassis	2 (95W)	4 x 2.5" 800GB SAS SSD	2 x 550W	8 x 8GB 1600Hz	1 x Quad Port 10GbE NIC 1 x PERC H710 mini	Idle[4]	5.2	32	None
						Stress[5]	5.5	33	None

[1] L_{WA}-UL is the upper limit sound power levels (L_{WA}) calculated per section 4.4.1 of ISO 9296 (1988) and measured in accordance to ISO 7779 (2010).

[2] L_{pA} is the average bystander position A-weighted sound pressure level calculated per section 4.3 of ISO 9296 (1988) and measured in accordance with ISO 7779 (2010). The system is placed within a rack enclosure (base of system is 75 cm above floor).

[3] Prominent tone: Criteria of D.6 and D.11 of ECMA-74 11th ed. (2010) are followed to determine if discrete tones are prominent. The system is placed inside rack in 75 cm height and acoustic transducer, binaural head, is at front bystander position, ref ISO 7779 (2010) Section 8.6.2.

[4] Idle: Reference ISO 7779 (2010) definition 3.1.7; system is running in its operating system but no other specific activity.

[5] Stress: An operating mode per ISO 7779 (2010) definition 3.1.6. The software SPECPower at 50% is activated to stress the processors and DIMM.

For more information on Dell's acoustical design, see the Dell Enterprise Acoustics white paper.

9 Rack rails

The static ReadyRail for the Dell PowerEdge R420xr provides tool-less support for four-post racks with square or unthreaded round mounting holes. The R420xr is available with optional rugged sliding rails for applications in high vibration and shock environments. Both rail systems also support tooled mounting in four-post threaded racks, and the static rails support tooled mounting in two-post (Telco) racks as well for added versatility.

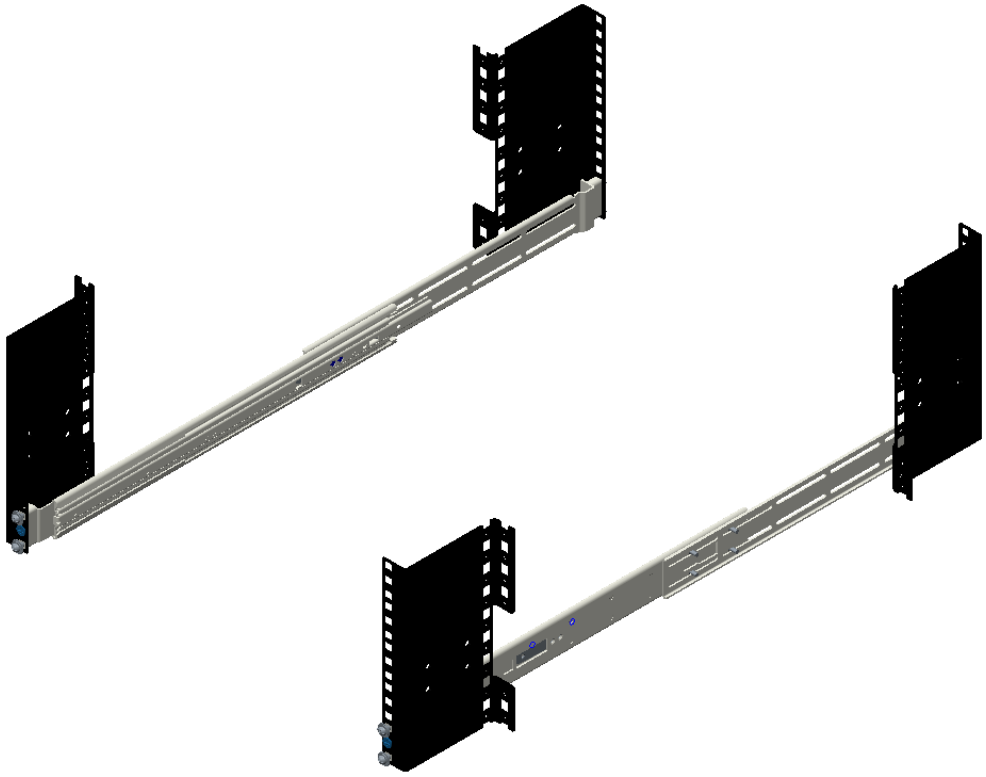
The sliding rails for the R420xr offer support for threaded hole racks with the ReadyRails II mounting interface.

Sliding and static rail systems

The R420xr supports both sliding rails and static rails. Both rails have a new slim rail design that supports the wide system chassis.

Rugged sliding rails include an adjusting bracket which allows rails length to be adjusted for different depth racks. The sliding rail system allows you to fully extend the server out the rack for easy access for service. Figure 7 shows the sliding rails.

Figure 7. Rugged sliding rail



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

Table 19 lists the rack types that the R420xr supports.

Table 19. Supported rack types

Product	Rail identifier	Mounting interface	Rail type	Rack types supported				
				4-post			2-post	
				Square	Round	Thread	Flush	Center
R420xr	n/a	Rugged rails	Sliding	✓	✓	✓	x	X
	A8	ReadyRails	Static	✓	✓	✓	✓	✓

Other key factors governing proper rail selection include the spacing between the front and rear mounting flanges of the rack, the type and location of any equipment mounted in the back of the rack, such as power distribution units, and the overall depth of the rack. Due to their reduced complexity and lack of need for CMA support, the static rails offer a greater adjustability range and a smaller overall mounting footprint than the sliding rails.

For detailed information about static and sliding rails, see the Rack rail specifications section in Appendix A. For more information on installing the R420xr in a rack, see the *Rack Installation Instructions* on Dell.com/Support/Manuals.

10 Operating systems and virtualization

The Dell PowerEdge R420xr supports a wide range of industry-standard operating systems with both standard and embedded options.

Supported operating systems

Table 20 lists the primary operating systems supported on the R420xr.

Table 20. Primary operating system support

Operating system
Red Hat Enterprise Linux
SUSE Linux Enterprise Server
Microsoft Windows Server 2012 R2
Microsoft Windows Server 2012
Microsoft Windows Server 2008 R2 with SP1
Microsoft Windows Server 2008 SP2

11 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.

The advanced management capabilities of Dell OpenManage also integrates into offerings from other popular systems management solutions that you may already use, making Dell platforms easy to manage and deploy in any IT environment. This ensures your IT services are available when your business needs them. If you have already standardized on offerings from industry leaders, such as BMC Software, Microsoft, Symantec™, VMware or other vendors, you can leverage OpenManage integration and connections developed to use with your existing systems management framework to efficiently manage Dell servers, storage, business-client PCs and network devices.

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. 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.

Systems management solutions

Dell systems management solutions include a wide variety of tools, products, and services that enable you to leverage an existing systems management framework. As shown in Figure 8, Dell systems management solutions are centered around OpenManage server management, featuring iDRAC with Lifecycle Controller.

Figure 8. Dell systems management solutions

OpenManage systems management

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

iDRAC7 with Lifecycle Controller

The Integrated Dell Remote Access Controller 7 (iDRAC7) with Lifecycle Controller is the heart of the second generation of Dell PowerEdge server embedded management functionality. In addition to enabling agent-free management, iDRAC7 with Lifecycle Controller provides remote access to the system — whether or not there is a functioning operating system running on the server. These embedded features improve all aspects of a typical server lifecycle. Table 21 describes the functions and benefits of iDRAC7 with Lifecycle Controller.

Table 21. iDRAC7 with Lifecycle Controller functions and benefits

Feature	Function	Benefit
Out of band (OOB)	iDRAC7 offers real-time OOB discovery, inventory, deployment monitoring, alerting and updates for servers and internal storage	Manage servers independent of the OS type or status — even if an OS is not installed
Single code base	All server types have the same embedded management hardware and firmware	Simplified and consistent maintenance across server platforms
Dedicated GigE port (PowerEdge rack and tower systems)	GbE replaces 10/100 on predecessor iDRAC6	Fast throughput for better performance; compatibility with setup for switches
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 iDRAC7 Enterprise	Allows for use of a non-Dell SD card
Enhanced power management	Integration with Intel Node Manager provides data center level power monitoring and capping (requires iDRAC7 Enterprise)	Fine tune data center power policies, capping and usage; report on historical power usage by rack, row or room using Power Center Manager (new)

Feature	Function	Benefit
Electronic licensing	Upgrades to iDRAC7 Express or iDRAC7 Enterprise by software licensing key and license portal (may require installation of hardware option for 300–500 series servers)	If iDRAC7 Express or iDRAC7 Enterprise is ordered during initial point of sale, license key is installed. If Basic Management is ordered during initial point of sale, customer must request a license key through the Dell Licensing Portal. For most server models, embedded server management and electronic licensing enables feature enhancements that do not require installation of additional hardware or system downtime.

Feature comparison

The systems management default for the R420xr is basic management with an upgrade option for iDRAC7 Express or iDRAC7 Enterprise. A detailed feature comparison of basic management, iDRAC7 Express and iDRAC7 Enterprise is shown in Table 22.

Table 22. Feature comparison for basic management, iDRAC7 Express and iDRAC7 Enterprise

Feature (function)	Basic management	iDRAC7 Express	iDRAC7 Enterprise
Local configuration with Lifecycle Controller GUI	•	•	•
IPMI 2.0	•	•	•
Embedded diagnostics	•	•	•
Local OS install	•	•	•
Local updates	•	•	•
Driver pack	•	•	•
Shared NIC (LOM)[1]	•	•	•
Remote update	•[2]	•	•
Power control	•[2]	•	•
Power monitoring		•	•
Encryption		•	•
IPv6		•	•
Auto-discovery		•	•
Auto-recovery		•	•
Web GUI		•	•
Remote CLI		•	•
Local/SSH CLI		•	•

Feature (function)	Basic management	iDRAC7 Express	iDRAC7 Enterprise
Serial redirection		•	•
Remote config		•	•
Email alerts		•	•
SNMP alerts		•	•
Comprehensive monitoring		•	•
Crash screen capture[3]		•	•
Dedicated NIC 1Gbps (100MB in iDRAC6)			•[4]
Part replacement			•
Backup and restore configurations			•
Virtual console (4 user)			•
Virtual console chat			•
Support for customer supplied SD cards for vFlash media			•
Virtual flash partitions			•
Virtual media			•
Virtual folders			•
Remote file share			•
Crash video playback			•
Boot record/playback			•
Power capping			•
Enterprise group power management			•
Directory services (AD, LDAP)			•
PK authentication			•
Two-factor authentication[4]			•

[1]Rack and tower systems only
[2]Feature available with IPMI, not web GUI
[3]Requires OMSA agent on target server
[4]Uses Microsoft ActiveX® on Internet Explorer® only

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 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 graphical user interface (GUI). It can also be used to view system configuration, inventory, health and performance.

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.

Dell OpenManage 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 consoles, depending upon your needs, including the following:

- **Dell OpenManage Essentials**: OpenManage Essentials (OME) 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 Dell Networking 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.

OpenManage systems management tools and utilities

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

- **Dell Repository Manager:** The Dell Repository Manager (RM) is a standalone 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 OpenManage Server Update Utility:** The Dell Server Update Utility (SUU) is a DVD-based application for identifying and applying BIOS and firmware updates to your Dell PowerEdge servers.
- **Dell OpenManage Systems Build and Update Utility:** The Dell System Build and Update Utility (SBUU) provides one-to-one and one-to-many deployment and single-server update capabilities in the pre-operating system environment.
- **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 iDRAC7.
- **IPMITool:** IPMITool includes scriptable console application programs used to control and manage remote systems using the IPMI version 1.5 and later protocol.

OpenManage Integration with third-party consoles

Dell OpenManage integrates iDRAC with Lifecycle Controller functionality with several leading third-party consoles, including Microsoft System Center, VMware vCenter and BMC Software BladeLogic and ProactiveNet Performance Management.

Microsoft System Center offers management of applications, services, physical resources, hypervisors, software defined networks, configuration and automation in a single comprehensive platform. For customers with existing investments in MS System Center, Dell offers the OpenManage Integration Suite for Microsoft System Center, a portfolio of software tools that streamline and optimize the efficiency and effectiveness of managing Dell hardware with System Center.

Dell OpenManage Integration Suite for Microsoft System Center includes:

- **Dell Server Management Pack Suite for Microsoft System Center Operations Manager (SCOM):** This suite of server management packs enables several functions through System Center Operations Manager, including in-band discovery and monitoring of racks and towers, out-of-band discovery and monitoring through iDRAC with Lifecycle Controller, as well as performance and advanced monitoring.
- **Dell Lifecycle Controller Integration (DLCI) for Microsoft System Center Configuration Manager (SCCM):** This pack contains Dell Lifecycle Controller Integration (DLCI), which integrates OpenManage functions in SCCM to manage the Dell PowerEdge servers, including auto-discovery, operating system deployment and configuration of hardware elements, (RAID, NIC, BIOS, iDRAC), OS and hypervisor agnostic updates, firmware management and system viewer utilities.
- **Dell Server PRO Management Pack with PRO-Tips for Microsoft System Center Virtual Machine Manager (SCVMM):** This pack integrates Dell PowerEdge server knowledge with Microsoft System Center 2012 Virtual Machine Manager (SCVMM) and Operations Manager (SCOM). Dell Server PRO Management Pack provides effective management of Dell physical servers that host virtual workloads running on Microsoft Windows Server Hyper-V by monitoring the health of the host system and enabling recommendations and remedial actions (PRO-Tips) when a compromised system is identified.
- **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. IT Administrators use the same role-based, access-control model within vCenter to combine physical and virtual server management.
- **BMC Software:** BMC offers best-in-class integration of OpenManage iDRAC with Lifecycle Controller technology within select BMC Enterprise Systems Management (ESM) portfolio products.

OpenManage connections with third-party consoles

Dell OpenManage Connections are designed specifically for monitoring Dell server and storage platforms within infrastructures managed by HP Operations Manager, IBM Tivoli Netcool/OMNIbus or Computer Associates (CA) Network and Systems Management (NSM). OpenManage Connections improve operational efficiency and flexibility in managing Dell hardware in large heterogeneous data center environments.

- **Dell OpenManage Connection for Computer Associates Network and Systems Management:** This connection allows you to monitor PowerEdge servers and PowerVault storage arrays from within the Computer Associates Network and Systems Management (CA NSM) console.

- **Dell OpenManage Connection for HP Operations Manager:** This connection enables several functions through HP Operations Manager, including auto-grouping, SNMP trap reception, global health monitoring, and a context-sensitive launch of OpenManage Server Administrator.
- **Dell OpenManage Connection for IBM Tivoli Netcool/OMNIBus:** This connection provides event monitoring capabilities to monitor Dell PowerEdge servers and Dell EqualLogic systems. It allows event monitoring, automatic event correlation and launching device consoles from the Netcool/OMNIbus console.

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. iDRAC7 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 9 illustrates the various operations that can be performed during the server's lifecycle.

Figure 9. Systems management server lifecycle

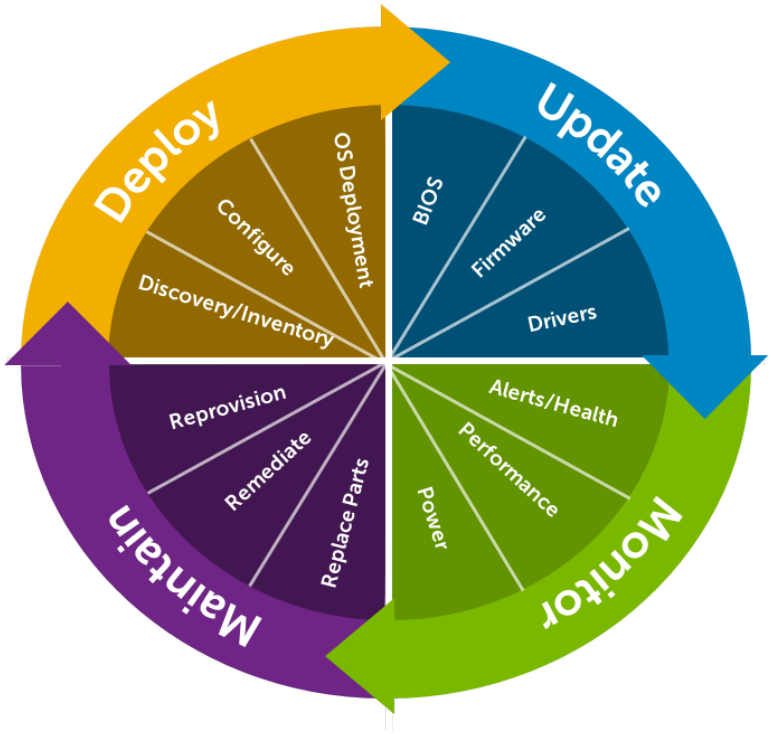


Table 23 lists the products that are available for one-to-one and one-to-many operations, and when they are used in the server's lifecycle.

Table 23. One-to-one and one-to-many operations

Operation	One-to-one	One-to-many	
Deploy	• iDRAC7 with LifeCycle Controller GUI • DTK • SBUU	• Symantec Deployment Server • OpenManage Integration for VMware vCenter • KACE K1000 Appliance • Lifecycle Controller Remote Services • BMC BladeLogic integration with Lifecycle Controller	• Dell Server Deployment Pack (DSDP) for Microsoft System Center Configuration Manager and Dell Lifecycle Controller Integration (DLCI) for Microsoft System Center Configuration Manager
Update	• iDRAC7 with LifeCycle Controller • Repository Manager • DUP • SUU • SBUU • OpenManage Integration for VMware vCenter	• Dell OpenManage Essentials • Lifecycle Controller Remote Services	• Dell Update Catalogs for Microsoft System Center Configuration Manager • Dell Lifecycle Controller Integration (DLCI) for Microsoft System Center Configuration Manager
Monitor	• iDRAC7 with LifeCycle Controller • OMSA	• Dell OpenManage Essentials • BMC ProactiveNet Performance Management Integration with Lifecycle Controller • Dell OpenManage Power Center	• Dell Management Plug-in for VMware vCenter • BMC ProactiveNet Performance Management Integration with Lifecycle Controller • Dell Server Management Pack Suite for Microsoft System Center Operations Manager (SCOM)
Maintain	• IPMI • iDRAC7 with Lifecycle Controller GUI	• Lifecycle Controller Remote Services	Remediate: • Dell Server PRO Management Pack for Microsoft System Center Virtual Machine Manager (SCVMM) Replace parts: • Dell Lifecycle Controller Integration (DLCI) for Microsoft System Center Configuration Manager

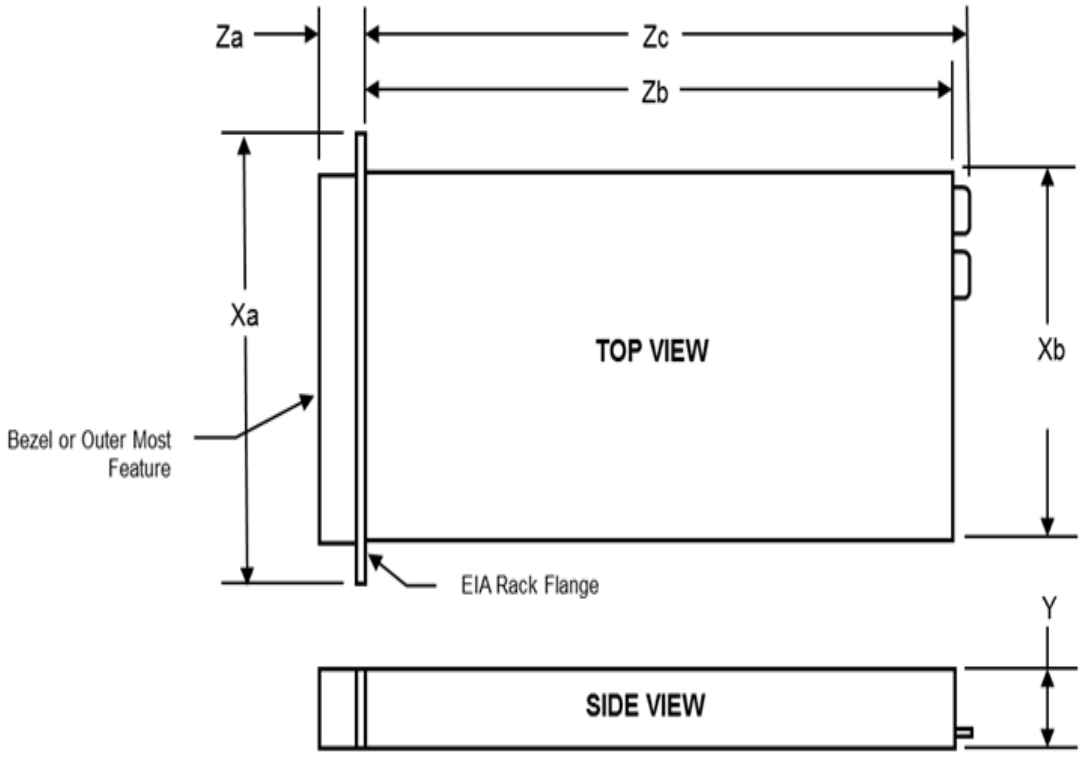
For additional detailed information on Dell's systems management portfolio, see the *Dell OpenManage Systems Management Overview Guide* on Dell.com/Support/Manuals.

Appendix A. Additional specifications

Chassis dimensions and weight

Figure 10 details the dimensions of the Dell PowerEdge R420xr chassis.

Figure 10. System dimensions



Xa	Xb	Y	Za with bezel	Za without bezel[1]	Zb[2]	Zc
458.3mm	434.0mm	42.4mm	42.3mm	31.0mm	508.0mm	545.7mm

[1]This dimension is measured to the captive screw
[2]Zb goes to the nominal back wall external surface where the system board I/O connectors are located.

The R420xr chassis at maximum configuration is 19.9 kg (43.87 lb).

Video specifications

The Dell PowerEdge R420xr iDRAC incorporates an integrated video subsystem. The graphics controller is the 2D Matrox® G200. The video frame buffer (16MB) is contained within the iDRAC RAM (256MB) device.

The R420xr system supports the 2D graphics video modes listed in Table 24.

Table 24. Supported video modes

Resolution	Refresh rate (Hz)	Color depth (bit)

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

Environmental specifications

Table 25 details the environmental specifications for the R420xr. For additional information about environmental measurements for specific system configurations, see Dell.com/environmental_datasheets.

Table 25. Environmental specifications

Temperature and Humidity	
Operating	5°C to 45°C (41°F to 113°F) 45°C continuous operation 50°C (122°F) excursion for up to 8 hours
Non-operating	–40°C to 65°C (-40°F to 149°F)
Relative Humidity	5% to 95% at a maximum wet bulb temperature of 33°C (91°F); atmosphere must be non-condensing at all times
Vibration	
Operating	0.00220783 g2/Hz at 10-500 Hz (overall 1.04_{Grms}), 1 hour per axis MIL-STD-810G, Method 514.6, Figure 514.6D-9
Non-operating	Vertical: 5-500 Hz at 1.04_{Grms}, Transverse: 5-500 Hz at 0.204_{Grms}, Longitudinal: 5-500 Hz at 0.740_{Grms}, 1 hour per axis MIL-STD-810G, Method 514.6, Figure 514.6, Procedure I, Category 4, Figure 514.6C-1 (US highway truck vibration),
Shock	
Operating	40G, 11 ms, saw tooth, 3 shocks, +/- per axis MIL-STD-810G, Method 516.6, Procedure I
Non-operating	40G, 11 ms, saw tooth, 3 shocks, +/- per axis MIL-STD-810G, Method 516.6, Procedure V
Packaged	36” all 6 sides and 1 corner MIL-STD-810G, Method 516.6, Procedure IV,
Altitude	
Operating	15,000ft (4572m) for 1 hour after stabilization MIL-STD-810G, Method 500.5, Procedure II
Non-operating	40,000ft (12,192m) for 1 hour after stabilization MIL-STD-810G, Method 500.5, Procedure I, (Storage, Air transport)
Airborne contaminant level	
Class G1 or lower as defined by ISA-S71.04-1985	

Power supply specifications

Table 26 lists power supply specifications for the PowerEdge R420xr.

Table 26. Power supply specifications

Specification	Redundant 550W
Current consumption	7.4–3.7A
Supply voltage	100–240VAC[1]
Frequency	50/60Hz
Heat dissipation (BTU/hr max)	2133
Maximum inrush current[2]	55A

[1]Auto-ranging
[2]Under typical line conditions and over the entire system ambient operating range, the inrush current may reach 55A per power supply for 10ms or less.

Rack rail specifications

Table 27 lists the spacing dimensions for the R420xr sliding and static rails.

Table 27. Rail adjustability range

Product	Rail identifier	Rail type	Rail adjustability range (mm)						Rail depth (mm)	
			Square		Round		Threaded		without CMA	with CMA
			Min	Max	Min	Max	Min	Max		
R420xr	n/a	Rugged Sliding	494	757	496	759	496	759	n/a	n/a
	A8	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 min-max 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 rails 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 R420xr. These ports are USB 2.0 compliant.

Appendix B. Standards compliance

The Dell PowerEdge R420xr conforms to the industry standards listed in Table 28.

Table 28. Industry standards documentation

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
DDR3 Memory DDR3 SDRAM Specification, Rev. 3A	jedec.org/download/search/JESD79-3C.pdf
LPC Low Pin Count Interface Specification, Rev. 1.1	developer.intel.com/design/chipsets/industry/lpc.htm
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	trustedcomputinggroup.org
UEFI Unified Extensible Firmware Interface Specification, v2.1	uefi.org/specs
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 29 provides a list of documents and websites that provide for more information on the Dell PowerEdge R420xr.

Table 29. Additional resources

Resource	Description of contents	Location
Dell PowerEdge R420xr Systems Owner's Manual	This manual, available in PDF format, provides information on the following: • 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
Dell PowerEdge R420xr Getting Started Guide	This guide, printed and shipped with the system, is also available in PDF format on the Dell.com with detailed information about: • Initial setup steps • Key system features • Technical specifications	Dell.com/Support/Manuals
Rack Installation Instructions	This printed document is provided with the rack kits and provides instructions for installing the server in a rack.	Dell.com/Support/Manuals
Information Update	This document, printed and shipped with the system, provides information on system updates. It is also available in PDF format on Dell.com.	Dell.com/Support/Manuals
System Information Label	The system information label documents the system board layout and system jumper settings. Text is minimized due to space limitations and translation considerations. The label size is standardized across platforms.	Inside the system chassis cover
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 R420xr processors and chipset.	Intel.com
Dell PowerEdge RAID controllers	Provides more information about Dell PERCs.	Dell.com/PERC
Power distribution	Provides help selecting a rack-based power distribution	DellPDU.com

Resource	Description of contents	Location
unit	unit.	
Uninterruptible power supply	Provides help selecting an uninterruptible power supply model.	DellUPS.com
Volatility information	Contact your Dell sales representative.	Dell.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.	dell.com/downloads/global/products/pedge/en/acoustical-education-dell-enterprise-white-paper.pdf

Appendix D. System board block diagram

Figure 11. R420xr system board block diagram