PowerEdge M520

Technical Guide

A feature-rich, two-socket, half-height blade server, the PowerEdge M520 delivers an extraordinary balance of value and performance for mainstream business applications.

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Table of contents

Tables

Figures

1 System Overview

Introduction

Enjoy excellent performance and exceptional value with the Dell™ PowerEdge™ M520 system's well-balanced processing capabilities and memory capacity in a compact half-height blade form factor. With up to 20 processor cores and up to 12 DIMMs of RAM, the scalability and performance of the M520 makes it a natural fit for general business applications such as email and databases, as well as mid-tier virtual environments.

Achieve business continuity

Ensure maximum uptime with the fully redundant M-series power, cooling and networking infrastructure, designed to provide the stability and resiliency our customers demand for enterprise-class deployments. The M520 system's design matches Dell's commitment to reliability, with features such as multiple hardware RAID choices and our unique failsafe virtualization technology, which uses redundant SD media to provide failover capabilities for embedded hypervisors.

Simplified 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.

The PowerEdge M-series blade server line

Implement the right combination of features and performance scalability with the PowerEdge M-series blade servers, which can handle tough workloads in a data center of any size. In addition to the world-class management features provided in all PowerEdge servers, the M520 also takes advantage of the capabilities of the Dell PowerEdge M1000e's Chassis Management Controller (CMC). The CMC allows M-series blades to be managed individually or as groups, in single or multiple chassis, and within a data center or in multiple geographically dispersed locations around the globe without requiring an agent or additional hardware. PowerEdge M-series blade servers use the redundant power, cooling and networking infrastructure provided by the M1000e blade enclosure, which is exceptionally easy to deploy and manage and maximizes power and cooling efficiency.

New technologies

A number of new technologies are featured on the PowerEdge M520 system, as shown in Table 1.

Table 1. New technologies

New technology	Detailed description
Intel® Xeon® processor E5-2400 and E5-2400 v2 product families	This new family of Intel processors works with the Intel C602 chipset and has embedded PCI Express® (PCIe) lanes for improved I/O performance. See the Processors section for details.
Intel C602 series chipset	The Intel Platform Controller Hub (PCH) chip is implemented on the M520.
Next-generation PERC options	The M520 supports new Dell 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 and 1. See the Storage section for details.
iDRAC7 with Lifecycle Controller	The new embedded system 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 Systems management section for details.
Advanced power management	The M520 supports advanced power monitoring and power capping tools that can help manage power consumption in the data center.
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™.
Dell 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.

2 System features

The new half-height M520 has more memory, processor cores and networking options than ever before. Features include the new family of Intel Xeon ES-2400 processors, DDR3 memory, PCIe 3.0, dual internal SD module and the Dell next-generation iDRAC solution known as iDRAC7 Enterprise with Lifecycle Controller.

Comparison of PowerEdge systems

Table 2 compares the features of the Dell PowerEdge M520 system with the features of similar current- and previous-generation PowerEdge systems. For the latest information on supported features, visit Dell.com/PowerEdge.

Table 2. Comparison of PowerEdge M520, M620 and R420

Feature	PowerEdge M520	PowerEdge M620	PowerEdge R420
Chassis; enclosure	Half-height blade; PowerEdge M1000e Blade Enclosure	Half-height blade; PowerEdge M1000e Blade Enclosure	1U rack
Processors	Intel Xeon processor E5-2400 and E5-2400 v2 product families	Intel Xeon processor E5-2600 and E5-2600v2 product families	Intel Xeon processor E5-2400 and E5-2400 v2 product families
Internal interconnect	Intel QuickPath Interconnect	Intel QuickPath Interconnect	Intel QuickPath Interconnect
Memory	12 x DDR3 RDIMM and UDIMM	24 x DDR3 RDIMM, UDIMM and LRDIMM	12 x DDR3 RDIMM
Hard drive bays (hot plug)	2 x 2.5"	2 x 2.5"	4 x 3.5" 8 x 2.5"
Embedded NIC	2 x 1GbE dual-port LOM	Dual Port Select Network Adapter, 3 options of 2 x 10GbE	1 x 1GbE dual-port LOM
RAID	S110, H310, H710, H710P	S110, H310, H710, H710P	S110, H310, H710, H710P, H810
Express Flash drives	Not supported	Up to 2	Not supported
I/O slots	2 x PCIe 2.0 x8 mezzanine card slots	2 x PCIe 3.0 x8 mezzanine card slots	2 PCIe 3.0

Feature	PowerEdge M520	PowerEdge M620	PowerEdge R420
Optional SD port	Yes (redundant hypervisor + vFlash media)	Yes (redundant hypervisor + vFlash media)	Yes (redundant hypervisor + vFlash media)
Dell OpenManage Systems Management	OpenManage Essentials OMSA Agent OpenManage Power Center (requires iDRAC7 Enterprise with Lifecycle Controller) CMC 4.x (available with the M1000e Modular Blade Enclosure) OpenManage Integrations and Connections iDRAC7 Express for Blades with Lifecycle Controller (standard option)	OpenManage Essentials OMSA Agent OpenManage Power Center (requires iDRAC7 Enterprise with Lifecycle Controller) CMC 4.x (available with the M1000e Modular Blade Enclosure) OpenManage Integrations and Connections iDRAC7 Express for Blades with Lifecycle Controller (standard option)	OpenManage Essentials OMSA Agent OpenManage Power Center (requires iDRAC7 Enterprise with Lifecycle Controller) OpenManage Integrations and Connections iDRAC7 Express with Lifecycle Controller (standard option)

Specifications

Table 3 lists the technical specifications for the PowerEdge M520 blade server. For the latest information on supported features, visit Dell.com/PowerEdge.

Table 3. Technical specifications

Feature	Technical specification
Form factor; enclosure	Half-height blade; Dell PowerEdge M1000e Blade Enclosure
Processors	Intel Xeon processor E5-2400 and E5-2400 v2 product families
Internal interconnect	2 Intel QuickPath Interconnect (QPI) links: 6.4GT/s, 7.2GT/s, 8.0GT/s
Cache	2.5MB per core; core options: 4, 6, 8, 10
Memory[1]	Up to 384GB (12 DIMM slots): 2GB/4GB/8GB/16GB/32GB DDR3 up to 1600MT/s
Chipset	Intel C602
Video	Integrated Matrox® G200
Primary storage	**Hot-plug hard drive options**: Up to two 2.5" SATA HDD/SSD or SAS HDD/SSD **External storage:** For information about Dell external storage options, visit Dell.com/Storage

Feature	Technical specification
USB ports	2 front, 1 internal (with optional RIPS card)
NIC/LOM	2 Broadcom 5720 1Gb dual-port LOMs (4 x 1Gb ports)
I/O mezzanine card options	**1Gb/10Gb Adapters:** Broadcom® 5719 Serdes 4P 1Gb Intel I350 Serdes 4P 1Gb Broadcom 57810S-k 2P 10Gb Intel X520-x/k 2P 10Gb Qlogic® QME8262-k 2P 10Gb Brocade® BR1741M-k 2P 10Gb Mellanox® ConnectX®-3 dual-port 10GbE KR blade **InfiniBand™:** Mellanox ConnectX-3 Dual Port FDR10 40Gb Mellanox ConnectX-3 Dual Port QDR 40Gb **Fibre channel:** QLogic QME2572 2P 8Gb Emulex® LPe1205-M 2P 8Gb
I/O slots	Fully populated mezzanine card slots and switch modules yields three redundant I/O fabrics per blade
RAID controller	**Internal controllers:** PERC S110 (software RAID) PERC H310 PERC H710 PERC H710P
Power supplies and fans	Supplied by M1000e blade enclosure
Dell OpenManage Systems Management (Agent-free or with OpenManage Server Administrator (OMSA Agent)	• OpenManage Essentials • OMSA Agent • OpenManage Power Center (requires iDRAC7 Enterprise with Lifecycle Controller) • CMC 4.x (available with the M1000e Modular Blade Enclosure) • OpenManage Integrations and Connections: — OpenManage Integration Suite for Microsoft® System Center — OpenManage Integration for VMware vCenter™ — Connections for HP® Operations Manager, IBM® Tivoli® Netcool® and CA Network and Systems Management • iDRAC7 Express for Blades with Lifecycle Controller (standard option) — Upgrade to iDRAC7 Enterprise with Lifecycle Controller — Upgrade to 8GB vFlash media or 16GB vFlash media for iDRAC7 Enterprise with Lifecycle Controller — Trial evaluation available for IDRAC7 Enterprise with Lifecycle Controller

Feature	Technical specification
Operating systems	Microsoft Windows Server® 2012 Microsoft Windows Server 2012 R2 (includes Hyper-V®) Microsoft Windows Server 2008 R2 SP1, x64 (includes Hyper-V) Novell® SUSE® Linux® Enterprise Server Red Hat® Enterprise Linux **Virtualization options:** Citrix® XenServer® Red Hat Enterprise Virtualization® VMware vSphere ESXi For more information on the specific versions and additions, visit Dell.com/OSsupport.
Embedded hypervisor	Two internal SD cards dedicated for hypervisor, or One dedicated for vFlash media support

For more information about the Dell blade solution, see the *PowerEdge M1000e Technical Guide* or the *PowerEdge M1000e Blade Chassis Spec Sheet*.

[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.

3 Module views and features

The Dell PowerEdge M520 implements a new module design that supports up to 12 DIMMS and two processors. The M520 is a half-height blade server that requires a PowerEdge M1000e chassis to operate. The M520 occupies one slot vertically in the M1000e for a maximum of 16 blade servers in one M1000e chassis. The M520 can be mixed with other existing Dell blades of half-height and full-height form factors.

The following sections provide external and internal views of the system and describe the module features. For more detailed information on features and descriptions for the M520, see the *Dell PowerEdge M520 Systems Owner's Manual* on Dell.com/Support/Manuals.

Module views

Figure 1, shows that the M520 module supports up to two front-accessible, hot-plug hard drives and two USB ports.

Figure 1. M520 front view

The chassis design of the M520 is optimized for easy access to components and for airflow for effective and efficient cooling. Figure 2 shows the M1000e chassis enclosure populated with M520 modules.

Figure 2. M1000e chassis enclosure with M520 blades

The M520 module shown in Figure 3 supports up to 12 DIMMS, two processors and many other features described in this guide.

Figure 3. M520 internal module view

For additional system views, see the *Dell PowerEdge M520 Systems Owner's Manual* on Dell.com/Support/Manuals.

Module features

Table 4 lists the modules features for the M520 system. For additional information on these features, see the *Dell PowerEdge M520 Systems Owner's Manual* on Dell.com/Support/Manuals.

Table 4. Module features

Feature	Description
USB connectors	Two front-accessible USB connectors
Status indicator	Indicator for M520 power status
Hard drives	Two front-accessible, hot-plug, 2.5-inch hard drives; see the Storage section for details
Hard drive activity LEDs	Indicate the status and activity of the hard drives
Blade handle release button	Release button on the front handle of the blade server
USB key	Internal USB connector for a USB flash memory key that can be used as a boot device, security key or mass storage device
Trusted Platform Module (TPM)	TPM is used to generate/store keys, protect/authenticate passwords and create/store digital certificates; it also supports the Intel Xeon TXT functionality.
Quick Resource Locator (QRL)	This code on the module can be scanned by a smartphone application to access information about the server.

LCD control panel

The M1000e chassis enclosure LCD control panel is located on the front of the M1000e chassis to provide user access to buttons, display and I/O interfaces. For more information on the M1000e LCD control panel, see the *Dell PowerEdge Enclosure Owner's Manual* on Dell.com/Support/Manuals.

Quick Resource Locator

Dell PowerEdge 12th-generation servers feature a Quick Resource Locator (QRL) — a model-specific Quick Response (QR) code (shown in Figure 4) that is located on the server. Use your smartphone to access the Dell QRL application to learn more about the server.

Figure 4. QRL code located on module

This QRL code allows you to:

- 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

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.

M1000e chassis enclosure features

For more information on the M1000e chassis enclosure features, see the *Dell PowerEdge Enclosure Owner's Manual* on Dell.com/Support/Manuals.

4 Processors

The Dell PowerEdge M520 system features the Intel Xeon processor E5-2400 and E5-2400 v2 product families, which offer an ideal combination of performance, power efficiency and cost. Featuring 10-core processing to maximize performance and performance per watt for data center infrastructures and highly dense deployments, E5-2400 v2 processors provide high performance no matter your constraint — floor space, power or budget — and handle workloads that range from the most complicated scientific exploration to crucial web-serving and infrastructure applications. In addition to providing raw performance gains, Intel's integrated I/O can reduce latency by adding more lanes and doubling bandwidth, which helps to reduce network and storage bottlenecks and unleash the processor's performance capabilities.

Processor features

The Intel Xeon processor E5-2400 v2 product family is designed specifically for servers and workstation applications. A summary of what's new and improved includes the following:

- Up to 10 cores per processor and 64-byte cache line size
- Intel Integrated I/O supporting up to 24 lanes of PCIe 3.0, which can reduce latency
- Faster connections provided throughout the system with support for DDR3 1600MT/s memory and up to 8.0GT/s QPI
- Intel Data Direct I/O (DDIO) allowing I/O traffic to skip the main system memory and be directed straight to the processor cache, which can provide a significant reduction in latency as well as allowing memory to remain in a low-power state
- Intel Advanced Vector Extensions offering up to double the floating-point operations per clock cycle by doubling the length of registers, which can be useful for addressing very complex problems or dealing with large-number calculations that are integral to many technical, financial and scientific computing problems
- Intel Turbo Boost Technology 2.0 delivering up to double the boost of the previous-generation turbo technology
- Continued improvements to both Intel TXT and AES-NI helping to better protect systems and data.
- Enhanced Intel SpeedStep® Technology

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

Supported processors

The M520 supports up to two processors with up to 10 cores per processor. Table 5 lists the Intel Xeon processors supported by the PowerEdge M520. For the latest information on supported processors, visit Dell.com/PowerEdge.

Table 5. Supported processors

Model	Speed	Cache	QPI	Cores	Turbo	TDP
E5-2470 v2	2.4GHz	25M	8.0GT/s	10	Yes	95W
E5-2470	2.3GHz	20M	8.0GT/s	8	Yes	95W
E5-2450L v2	1.7GHz	25M	8.0GT/s	10	Yes	60W
E5-2450L	1.8GHz	20M	8.0GT/s	8	Yes	70W
E5-2450 v2	2.5GHz	20M	8.0GT/s	8	Yes	95W
E5-2450	2.1GHz	20M	8.0GT/s	8	Yes	95W
E5-2440 v2	1.9GHz	20M	7.2GT/s	8	Yes	95W
E5-2440	2.4GHz	15M	7.2GT/s	6	Yes	95W
E5-2430L v2	2.4GHz	15M	7.2GT/s	6	Yes	60W
E5-2430L	2.0GHz	15M	7.2GT/s	6	Yes	60W
E5-2430 v2	2.5GHz	15M	7.2GT/s	6	Yes	80W
E5-2430	2.2GHz	15M	7.2GT/s	6	Yes	95W
E5-2420 v2	2.2GHz	15M	7.2GT/s	6	Yes	80W
E5-2420	1.9GHz	15M	7.2GT/s	6	Yes	95W
E5-2407 v2	2.4GHz	10M	6.4GT/s	4	No	80W
E5-2407	2.2GHz	10M	6.4GT/s	4	No	80W
E5-2403 v2	1.8GHz	10M	6.4GT/s	4	No	80W
E5-2403	1.8GHz	10M	6.4GT/s	4	No	80W

For information on processor installation and configuration, see the *Dell PowerEdge M520 Systems Owner's Manual* on Dell.com/Support/Manuals.

Chipset

The Intel C602 chipset is implemented on the PowerEdge M520. For more information, visit Intel.com.

5 Memory

More memory options are available than ever before with the Dell PowerEdge M520 — greater capacities, higher frequencies and more flexibility. The M520 supports up to 384GB of memory (using 12 DIMMs) and speeds up to 1600MT/s, providing high performance in a variety of applications. High memory density means there is no compromise when it comes to virtualization.

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

Supported memory

Table 6 lists the memory technologies supported by the M520.

Table 6. Memory technologies supported

Feature	UDIMM	RDIMM
Register	No	Yes
Buffer	No	No
Frequencies*	1600MT/s	1333 or 1600MT/s
Ranks supported	2	1, 2 or 4
Capacity per DIMM	4GB	2, 4, 8, 16 or 32GB
Maximum DIMMs per channel	2	3
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 M520 supports DIMM speeds lower than 1333MT/s, you can purchase this system with DIMM speeds of 1333MT/s and 1600MT/s only on Dell.com/PowerEdge.

Table 7 lists the DIMMs that are supported on the M520. For the latest information on supported memory, visit Dell.com/PowerEdge.

Table 7. DIMMs supported

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

Memory configurations

The M520 server supports flexible memory configurations ranging from capacities of 2GB to 384GB, and up to 6 DIMMs per processor (up to 12 DIMMs in a dual-processor configuration). Each processor has 3 memory channels, with each channel supporting up to 2 DIMMs.

Flexible memory configuration

The M520 supports a flexible memory configuration, according to the following 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: UDIMM or RDIMM. These types cannot be mixed.

The following additional memory-population guidelines also apply to the M520:

- Up to two quad-rank (QR) DIMMs and up to three 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 and population, see the *Dell PowerEdge M520 Systems Owner's Manual* on Dell.com/Support/Manuals.

Memory speed

The M520 server supports memory speeds of up to 1600MT/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 system runs 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. The loading within a channel significantly affects memory speed.

Table 8 lists the memory configuration and performance details for the M520, based on the population of the number and type of DIMMs per memory channel.

- Green boxes are defaults for performance per watt.
- White boxes (with lower voltage) can save power but will run at slower speeds.
- White boxes (with higher voltage) can be custom configured in the BIOS.

Table 8. Memory speed capabilities

DIMM type	DIMM rank	DIMM-rated voltage and speed	Intel Xeon processor E5-2400 and E5-2400 v2 product families DIMMs per channel (DPC)			
			1 DPC		2 DPC	
			1.35V	1.5V	1.35V	1.5V
RDIMM	1R/2R	DDR3L (1.5V) 1600MT/s	**1600**	1600	**1600**	1600
RDIMM	1R/2R	DDR3L (1.35V/1.5V) 1333MT/s	**1333**	1333	**1333**	1333
UDIMM	1R/2R	DDR3L (1.35V/1.5V) 1600MT/s	**1600**	1600	**1600**	1600
RDIMM	4R	DDR3L (1.35V/1.5V) 1333MT/s	1066	**1333**	**1066**	1066
LRDIMM	4R	DDR3L (1.35V/1.5V) 1333MT/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 which require service. Table 9 describes the memory RAS features supported on the M520.

Table 9. 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 (SDDC)	Recovery from Single DRAM Device Failure (SDDC) provides error checking and correction that protects against any single memory chip failure as well as multi-bit errors from any portion of a single memory chip.
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, 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 M520 Systems Owner's Manual* on Dell.com/Support/Manuals. Memory RAID is not supported.

6 Storage

The Dell PowerEdge M520 system provides comprehensive and wider offerings of internal storage options, including several drive types and storage controllers to choose from. The M520 supports up to 1.2TB of internal storage.

To reduce complexity and provide manageable solutions to meet customer needs, the M520 supports three versions of the PowerEdge RAID Controllers (PERCs).

Internal storage

The M520 is available in two different hard-drive backplane options that support up to two 2.5-inch SAS or SATA hard drives Table 10 lists the options for backplanes, hard-drive controllers and drive types for the M520.

Table 10. Hard drive backplane options

Backplane	Controller	Drive types
SATA	System board-embedded SATA	SATA SSD/HDD
SAS	PERC H310, H710, H710P	SAS SSD/HDD, SATA SSD/HDD

Supported hard drives

Table 11 lists the internal hard drives supported by the M520. For the latest information on supported hard drives, visit Dell.com/PowerEdge.

Table 11. Supported hard drives

Form factor	Type	Speed (RPM)	Capacities
2.5"	SATA (3Gb)	7.2K	250GB, 500GB, 1TB
	Nearline SAS (6Gb)	7.2K	500GB, 1TB
	SAS (6Gb)	10K	300GB, 600GB, 900GB, 1.2TB
	SAS (6Gb)	15K	146GB, 300GB
	SAS SSD (SLC, 6Gb)	N/A	100GB, 200GB, 400GB
	SATA SSD (eMLC, 3Gb)	N/A	100GB, 200GB, 400GB, 800GB

Storage controllers

Dell provides highly capable RAID options to ensure your data remains safe. Dell's RAID controller options offer impressive performance improvements.

Supported RAID controllers

The newest line of PowerEdge RAID Controllers (PERCs) offers high I/O performance for a variety of uses, including database applications and streaming digital media environments. The internal RAID controllers have a dedicated connection to the system board.

PERC H710P

The PERC H710P is an eight-port, internal, 6Gbps PCIe RAID controller (mini form factor) with 1GB DDR3 non-volatile (NV) cache.

PERC H710

The PERC H710 is an eight-port, internal, 6Gbps PCIe RAID controller (mini form factor) with 512MB DDR3 NV cache.

PERC H310

The PERC H310 is an eight-port, internal, 6Gbps PCIe RAID controller (mini form factor) that is a low-cost, entry-level RAID solution.

For more information about the latest PERC offerings, see Dell.com/PERC.

RAID controller feature support

Table 12 lists the features supported by the RAID controller options on the M520.

Table 12. RAID controller feature support

Feature	PERC option			
	S110	H310	H710	H710P
Software RAID stack	✓			
iMR firmware stack		✓		
MR firmware stack			✓	✓
SSD support	✓	✓	✓	✓
SATA backplane	✓			
SAS backplane		✓	✓	✓
SATA hard drives	✓	✓[1]	✓[1]	✓[1]
SAS hard drives		✓	✓	✓
Un-configured hard drive support (non-RAID	✓	✓		
RAID 0	✓	✓	✓	✓
RAID 1	✓	✓	✓	✓
DDR3 cache (512MB)			✓	
DDR3 cache (1GB)				✓
Non-volatile cache option			✓	✓
Microsoft Windows support	✓	✓	✓	✓
Linux support		✓	✓	✓
Virtualization support		✓	✓	✓
Mini form factor		✓	✓	✓
Embedded on system board	✓	N/A	N/A	N/A

Feature	PERC option			
	S110	H310	H710	H710P
PCIe 2.0		✓	✓[2]	✓[2]
Local support for self-encrypting drive (SED)		✓		✓
UEFI browser	✓	✓	✓	✓
Hll	✓	✓	✓	✓

[1]Supports SATA hard drives through the SAS backplane

[2]Supports only PCIe 2.0 with compatible PCIe 3.0 silicon availability

7 Networking and mezzanine cards

The Dell PowerEdge M520 system supports two embedded Broadcom 5720 Dual Port 1Gb LOMs for a total of four 1Gb ports.

The M520 also offers balanced, scalable I/O capabilities, including integrated PCIe 3.0 capable mezzanine card slots. Installation of mezzanine cards requires an M1000e I/O module (IOM) of the same fabric technology to be installed in the corresponding fabric slot of the mezzanine to support data flow through that fabric or slot.

System management integration

With the M520 system, the job of deploying, updating and monitoring 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 re-configuration 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.

Mezzanine cards

The M520 provides two PCIe 3.0 mezzanine connectors for add-in cards. The M520 has been designed to be PCIe 3.0 compliant in order to take full advantage of the processor capabilities. Table 13 lists the supported mezzanine cards for the M520.

Table 13. Supported mezzanine cards

Type	Adapter
1Gb/10Gb Adapters	Broadcom 5719 Serdes 4P 1Gb
	Intel I350 Serdes 4P 1Gb
	Qlogic QME8262-k 2P 10Gb
	Brocade BR1741M-k 2P 10Gb
	Broadcom 57810S-k 2P 10Gb
	Intel X520-x/k 2P 10Gb
	Mellanox ConnectX-3 dual-port 10GbE KR blade

Type	Adapter
Fibre channel	QLogic QME2572 2P 8Gb
	Emulex LPe1205-M 2P 8Gb
InfiniBand	Mellanox QDR CX-3 40Gb
	Mellanox FDR10 CX-3 40Gb

For the latest information on supported mezzanine cards for the M520, visit Dell.com/PowerEdge.

8 Power, thermal and acoustics

Lower overall system-level power draw is a result of Dell's breakthrough system design. The PowerEdge M520 blade server and M1000e chassis enclosure maximize performance per watt through a combination of power and cooling, energy efficient technologies and tools. Additionally, the M520 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 data center space. Table 14 lists the tools and technologies Dell offers to help you achieve your data center goals by lowering power consumption and increasing energy efficiency.

Table 14. 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.
Tools for right-sizing	**Energy Smart Solution Advisor (ESSA)** is a tool that helps you determine the most efficient configuration possible. With Dell's 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, and the PSU Advisor can help you choose the best, most efficient PSU for your 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	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	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	**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.
Active power management	**Intel Node Manager** is an embedded technology that provides individual server-level power reporting and power limiting functionality. Dell offers a

Feature	Description
	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. **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	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 Find additional information at Dell.com/RackInfrastructure.

Find additional information at Dell.com/PowerAndCooling and Dell.com/PowerCenter.

Power supply units

The M1000e chassis enclosure provides power and cooling for the M520 blade server. For information on the M1000e power supply units, see the *PowerEdge M1000e Technical Guide* on Dell.com/PowerEdge.

Thermal and acoustics

Optimized thermal management keeps fan speeds in the PowerEdge M520 as low as possible, contributing to quiet operation and ensuring proper component cooling.

Thermal design

The thermal design of the PowerEdge M520 reflects the following:

- **Comprehensive thermal management:** The PowerEdge M520 dynamically controls system cooling fan speed, based on responses from critical sensors that monitor the temperature of several components, including:
  - Processors
  - DIMMs
  - System inlet ambient
  - Mezzanine card

  Thermal control also 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 those without such controls.

- **Environmental specifications:** The optimized thermal management makes the PowerEdge M520 reliable under a wide range of operating environments as shown in Table 23. When operating above 30°C ambient, performance impacts may be seen. For more information see the *Dell PowerEdge M520 Systems Owner's Manual* on Dell.com/Support/Manuals.

Acoustical performance

The acoustical performance of the PowerEdge M520 is reflected in Table 15. The addition of some components can cause an increase in fan speed and acoustical output. Contributors to acoustical output can include:

- The system thermal profile selected in BIOS (for example, power- or performance- optimized DAPC)
- Number of installed processors
- Population of modular, non-homogenous modular deployment
- Impedance of blanks

Table 15. M520 acoustical performance

Configuration (23 ± 2°C ambient)	CPUs	Hard drives	DIMMs	HDD controller	NDC	PCI cards	Operating mode	L_{WA}-UL[1] (bels)	L_{pA}[2] (dBA)
Minimum	1 x 80W (4 core)	1 x SATA (7.2K)	4 x 2GB	Onboard SATA	None	Any mezzanine card	Standby[3]	6.7	53
							Idle[4]	7.2	56
Typical	2 x 95W (8 core)	2 x SAS (10K)	8 x 4GB	PERC H310 (mini)	1Gb	Any mezzanine card	Standby[3]	6.8	53
							Idle[4]	7.2	56

[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 averaged A-weighted sound pressure level of four bystanders in accordance with ISO 7779 (2010) Section 8.6.2. The system is placed inside 42U rack in 25 cm height.

[3] Standby: AC power is connected to power supply units but the system is not turned on.

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

9 Operating systems and virtualization

The Dell PowerEdge M520 system supports a wide range of industry-standard operating systems and virtualization software.

Supported operating systems

Table 16 lists the operating systems supported on the M520. For the latest information on supported operating systems, see Dell.com/OSsupport.

Table 16. Primary operating system support

Operating System	Platform	Edition
Red Hat Enterprise Linux 5.8[1]	x32 x64	N/A
Red Hat Enterprise Linux 6.3[2]	x64	N/A
Red Hat Enterprise Linux for HPC Compute Node	x64	N/A
SUSE Linux Enterprise Server 11 SP3	x64	N/A
SUSE Linux Enterprise Server 10 SP4	x64	N/A
Microsoft Windows Server 2012	x64	Standard Data center
Microsoft Windows Server 2012 R2	x64 (with Microsoft Hyper-V role enabled)	Standard Data center
Microsoft Windows Server 2008 with SP2	x86	Standard Enterprise
	x64 (with Microsoft Hyper-V role enabled)	Standard Enterprise Data center
Microsoft Windows Server 2008 R2 with SP1	x64 (with Microsoft Hyper-V role enabled)	Standard Enterprise Data center HPC

[1]RHEL 5.7 is the minimum supported version. Current drop-in-box option is RHEL 5.8.
[2]RHEL 6.1 is the minimum supported version. Current factory install is RHEL 6.3.

Support of the operating systems listed in Table 17 is limited to a virtual environment as a guest operating system. Please contact the software vendor for additional support or questions about running the operating system in a virtualized environment.

Table 17. Virtual guest operating system support

Operating System	Platform	Edition
Microsoft Windows 2003 R2 with SP2	x86	Standard Enterprise
	x64 (with Microsoft Hyper-V role enabled)	Standard Enterprise Data center Web

Supported virtualization

One of the key features for virtualization on the M520 is the support for a fail-safe 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 18 highlights the virtualization support for the M520.

Table 18. Virtualization support

Operating systems		Install version	Factory options	Internal dual SD module install support
VMware	vSphere v5.0	ESXi 5.5	DIB	Yes
	vSphere v5.0 U1	ESXi 5.5	FI/DIB	Yes
	vSphere v5.1	ESXi 5.5	FI/DIB	Yes
Citrix	XenServer v6.1	N/A	DIB	No
Red Hat[1]	Enterprise Virtualization v3.1	N/A	DIB	No

FI = factory install; DIB = drop-in-box
[1]No OpenManage support; drop-in-box license registration card only

10 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.

The advanced management capabilities of Dell OpenManage also integrate 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 5, Dell systems management solutions are centered on OpenManage server management, featuring iDRAC with Lifecycle Controller.

Figure 5. 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 19 describes the functions and benefits of iDRAC7 with Lifecycle Controller.

Table 19. 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 GbE port (PowerEdge rack and tower systems)	Gigabit Ethernet (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

Feature	Function	Benefit
Electronic licensing	Upgrades to iDRAC7 Express for Blades or iDRAC7 Enterprise by software licensing key and license portal (may require installation of hardware option for 200–500 series servers)	If iDRAC7 Express for Blades 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.

iDRAC7 feature comparison

iDRAC7 Enterprise is available for the PowerEdge M520, and Dell also offers an option of iDRAC7 Express for Blades. A detailed feature comparison for iDRAC7 Enterprise and iDRAC7 Express for Blades is shown in Table 20.

Table 20. Feature comparison for iDRAC7 Enterprise and iDRAC7 Express for Blades

Feature (function)	iDRAC7 Enterprise	iDRAC7 Express for Blades
Local configuration with Lifecycle Controller GUI	•	•
IPMI 2.0	•	•
Embedded diagnostics	•	•
Local OS install	•	•
Local updates	•	•
Driver pack	•	•
Encryption	•	•
Dedicated NIC 1Gbps (100MB in iDRAC6)	•[1]	•[1]
IPv6	•	•
Auto-discovery	•	•
Auto-recovery	•	•
Web GUI	•	•
Remote CLI	•	•
Local/SSH CLI	•	•
Serial redirection	•	•

Feature (function)	iDRAC7 Enterprise	iDRAC7 Express for Blades
Remote configuration	•	•
Remote update	•	•
Email alerts	•	•
SNMP alerts	•	•
Comprehensive monitoring	•	•
Virtual console (4 user)	•	•[2]
Virtual media	•	•
Crash screen capture[3]	•	•
Power control	•	•
Power monitoring	•	•
Virtual console chat	•	
Support for customer-supplied SD cards for	•	
Virtual flash partitions	•	
Virtual folders	•	
Remote file share	•	
Crash video playback	•	
Boot record/playback	•	
Part replacement	•	
Backup and restore configurations	•	
Power capping	•	
Enterprise group power management	•	
Directory services (AD, LDAP)	•	
PK authentication	•	
Two-factor authentication[4]	•	

[1]Blade-to-chassis internal connection is 100MB; [2]Single user; [3]Requires OMSA agent on target server; [4]Uses Microsoft ActiveX® on Internet Explorer® only

Agent-based systems 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 GUI. It can also be used to view system configuration, inventory, health and performance.

Agent-free systems 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.

Chassis Management Controller console for blade systems

The Dell CMC is a systems management hardware and software solution for managing multiple Dell blade chassis. The CMC is a hot-pluggable module inserted in the back of a Dell blade chassis. It provides a secure interface that enables an administrator to inventory, perform configuration and monitoring tasks, remote power on/off blades and enable alerts for events on servers and components in the blade chassis.

The CMC uses iDRAC7 with Lifecycle Controller to perform management functions, such as opening a remote console session from the CMC interface.

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 consoles, depending upon your needs, including the following:

- **Dell OpenManage Essentials** — OpenManage Essentials (OME) is a recently released 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 Dell Networking 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.

Integration with third-party consoles

Dell OpenManage easily integrates with several leading third-party consoles, including:

- **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 iDRAC7 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, iDRAC7), OS and hypervisor agnostic updates, firmware management, and system viewer utilities.
- **Dell Server PRO Management Pack for Microsoft System Center Virtual Machine Manager (SCVMM)** — This pack manages Dell physical servers and hosts of virtual machines (VMs) by using Microsoft System Center Operations Manager/System Center Essentials (SCOM/SCE) and System Center Virtual Machine Manager (SCVMM). It provides guidance for remedial actions based on alerts to best manage virtual machines and handle the impacts appropriately.
- **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.
- **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 provides connections with many third-party consoles, including:

- **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 6 illustrates the various operations that can be performed during the server's lifecycle.

Figure 6. Systems management server lifecycle

Table 21 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 21. 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 GUI • 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 GUI • OMSA	• Dell OpenManage Essentials • BMC ProactiveNet Performance Management Integration with Lifecycle Controller • Dell OpenManage Power Center	• OpenManage Integration 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

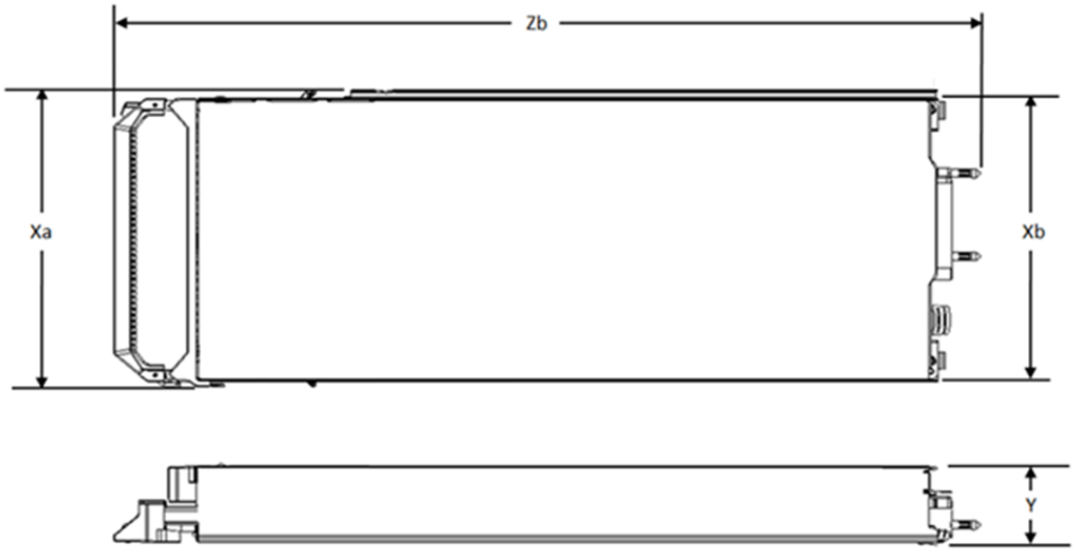
For additional detailed information on Dell's systems management portfolio, see the *Dell OpenManage Systems Management Overview Guide* on Dell.com/Support/Manuals.

Appendix A. Additional specifications

Module dimensions and weight

Figure 7 details the dimensions of the M520 module.

Figure 7. Module dimensions



Xa	Xb	Y	Zb (handle closed)	Zb (handle open)
197.92 mm	192.3 mm	50.35 mm	544.32 mm	564.9 mm

The weight of a maximum-configured M520 blade server is 5.5 kg (12.1 lb).

Video specifications

The Dell PowerEdge M520 iDRAC7 incorporates an integrated video subsystem. The graphics controller is the 2D Matrox G200. The video frame buffer (16MB) is contained within the iDRAC7 RAM (256MB) device. The M520 system supports the 2D graphics video modes in Table 22.

Table 22. 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
1280 x 1024	60, 75	8, 16, 32

Environmental specifications

For additional information about environmental measurements for specific system configurations, see Dell.com/environmental_datasheets. Table 23 details the environmental specifications for the PowerEdge M520.

Table 23. Environmental specifications

Fresh Air: temperature, humidity, altitude de-rating	
Continuous operation	10°C to 35°C (50°F to 95°F) at 10% to 80% relative humidity with 26°C (78.8°F) maximum dew point (maximum wet bulb temperature). De-rate maximum allowable dry bulb temperature at 1°C per 300 m above 950 m (1°F per 547 ft above 3117 ft).
Expanded operation	When operating in the expanded temperature range, system performance may be impacted, and ambient temperature warnings may be reported on the LCD and in the System Event Log. **≤ 10% of annual operating hours:** 5°C to 10°C and 35°C to 40°C (with no direct sunlight on the equipment) at 5% to 85% relative humidity with 26°C dew point (maximum wet bulb temperature). Outside the standard operating temperature (10°C to 35°C), the system can operate down to 5°C or up to 40°C for a maximum of 10% of its annual operating hours. For temperatures between 35°C and 40°C (95°F to 104°F), de-rate maximum allowable dry bulb temperature by 1°C per 175 m above 950 m (1°F per 319 ft above 3117 ft). **≤ 1% of annual operating hours:** –5°C to 5°C and 40°C to 45°C (with no direct sunlight on the equipment) at 5% to 90% relative humidity with 26°C dew point (maximum wet bulb temperature). Outside the standard operating temperature (10°C to 35°C), the system can operate down to –5°C or up to 45°C for a maximum of 1% of its annual operating hours. For temperatures between 40°C and 45°C (104°F to 113°F), de-rate maximum allowable dry bulb temperature by 1°C per 125 m above 950 m (1°F per 228 ft above 3117 ft). **Expanded operation restrictions:** • Maximum 95W processor is supported. • Dell PERC H710 and H710P cards are not supported in dual-processor configurations. • When populating the blade slots in the enclosure with only PowerEdge M520 blades: — Dual-processor blade servers with PERC H310 cards cannot be mixed with single-processor blades. — To support a PERC H310 card in a dual-processor configuration, the blade slots in the M1000e enclosure must be installed with M520 blades or a combination of blade blanks and M520 blades. — The Dell PowerEdge M520 blades must be installed with 109 mm wide heat sinks. • Non Dell qualified peripheral cards and/or peripheral cards greater than 25W are not supported.
Temperature	
Operating	See Fresh Air for temperature information
Storage	–40°C to 65°C (–40°F to 149°F) with a maximum temperature gradation of 20°C per hour
Relative humidity	
Operating	See Fresh Air for relative humidity information
Storage	5% to 95% at a maximum wet bulb temperature of 33°C (91°F); atmosphere must be non-condensing at all times

Maximum vibration	
Operating	0.26 Grms at 5Hz to 350Hz for 15 minutes
Storage	1.54 Grms at 10Hz to 250Hz for 15 minutes
Maximum shock	
Operating	One shock pulse in the positive z axis (one pulse on each side of the system) of 31G for up to 2.6 ms
Storage	Six consecutively executed shock pulses in the positive and negative x, y and z axes (one pulse on each side of the system) of 71G for up to 2ms
Altitude	
Operating	–15.2 m to 3048 m (–50 ft to 10,000 ft)
Storage	–15.2 m to 12,000 m (–50 ft to 39,370 ft)
Airborne contaminant level	
Class G1 or lower as defined by ISA-S71.04-1985	

USB peripherals

USB peripherals are supported through the front USB ports, which are USB 2.0 compliant.

Appendix B. Standards compliance

The Dell PowerEdge M520 system conforms to the industry standards in Table 24.

Table 24. 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
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/specifications
USB Universal Serial Bus Specification, Rev. 2.0	usb.org/developers/docs

Standard	URL for information and specifications
Windows Logo Windows Logo Program System and Device Requirements, v3.10	microsoft.com/whdc/winlogo/hwrequirements.mspx

Appendix C. Additional resources

Table 25 provides a list of documents and websites that provide more information on the Dell PowerEdge M520 system.

Table 25. Additional resources

Resource	Description of contents	Location
Dell PowerEdge M520 Systems 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
Dell PowerEdge M1000e Enclosure Owner's Manual	This manual provides information on the PowerEdge M1000e chassis enclosure and its supported blade server modules.	Dell.com/Support/Manuals
Dell PowerEdge M1000e, M915, M910,M820, M710HD, M710, M620, M610x, M610, M520 and M420 Getting Started Guide	This guide is printed and shipped with the system, and is also available in PDF format on the Dell support site. This guide provides information on the following: • Initial setup steps • Key system features • Technical specifications	Dell.com/Support/Manuals
System Information Label	The system information label documents the system board layout and system jumper settings.	On the module
Quick Resource Locator (QRL)	This code on the chassis can be scanned by a phone application to access additional information and resources for the server, including videos, reference materials, service tag information and Dell contact information.	On the module
Information Update	This document is printed and shipped with the system, and is also available in PDF format on the Dell support site. This guide provides system update information.	Dell.com/Support/Manuals
PowerEdge M1000e Technical Guide	This guide provides detailed technical information on the M1000e chassis enclosure and its supported features.	Dell.com/PowerEdge

Resource	Description of contents	Location
Energy Smart Solution Advisor (ESSA)	The Dell online advisor console 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/ESSA
Power and cooling technologies	Provides details for improving energy efficiency in the data center.	Dell.com/PNC
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 R520 processors and chipset.	Intel.com
Dell PowerEdge RAID controllers	Provides more information on Dell PowerEdge RAID controllers (PERC).	Dell.com/PERC
Power distribution unit (PDU)	Provides help selecting a power distribution unit.	DellPDU.com
Uninterruptible power supply (UPS)	Provides help selecting an uninterruptible power supply model.	DellUPS.com
Volatility information	Contact your Dell Sales Representative.	

Appendix D. System board block diagram

Figure 8. M520 system board block diagram