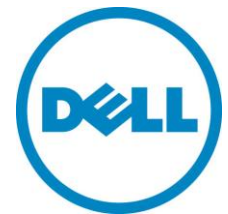# PowerEdge M910

Technical Guide

The PowerEdge M910, an ideal server for demanding applications at the core of most data centers, such as large databases, virtualization and messaging infrastructure.

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1 Product comparison

The Dell™ PowerEdge™ M-series blade servers are designed to help cut operating expenses through energy efficiency, scalability, product flexibility and efficient use of data center space.

The PowerEdge M910 provides significant performance and reliability in a scalable, full-height, four-socket blade server, allowing the deployment of large enterprise-class applications as well as the ability to support heavy virtualization or workload consolidation in maximum density.

When combined with Dell's world-class storage, management and support offerings, the result is a total enterprise solution that can help you optimize your IT environment and expenses.

Powerful performance

The PowerEdge M910 was designed to meet the needs of nearly any IT infrastructure or environment. Built with powerful Intel® Xeon® processor E7-2800, E7-4800 and E7-8800 product families or Intel Xeon processor 7500 and 6500 series, and including advanced systems management capabilities, the M910 is ideal for the demanding applications at the core of most data centers, such as large databases, virtualization and messaging infrastructure.

Memory is a critical component for performance, especially for heavy virtualization and high-end database needs. With this in mind, the PowerEdge M910 was designed with 32 DIMM slots allowing up to 1TB of ECC DDR3 RAM to be supported, allowing these memory-intensive applications to have ample resources at their disposal.

Scaling capability

Many servers may be able to take advantage of the large memory support that modern architectures provide, but only Dell offers FlexMem Bridge technology, which allows the M910 to seamlessly scale from 16GB to 1TB of DDR3 RAM in either two-socket or four-socket configurations. This patent-pending technology allows Dell to deliver a unique platform that can seamlessly scale as customer and application needs dictate, without having to "rip and replace" existing server infrastructure.

In addition to allowing significant memory and processor scaling capabilities, the compact form factor of Dell blades allows the ability to scale down the amount of space that your core application servers require. By using the PowerEdge M910, you can deploy up to eight next-generation, four-socket servers in only 10U of rack space, which is less than one-third of the space required using traditional 4U four-socket rack servers.

High reliability

With the PowerEdge M910, Dell continues its unrelenting focus on reliability. The PowerEdge M910 utilizes the redundant power, cooling and networking infrastructure provided by the Dell PowerEdge M1000e Modular Blade Enclosure. The PowerEdge M910 itself incorporates improvements and features for maximum protection against potential downtime, such as the ability to support three fully redundant fabrics per blade and the inclusion of a dual-media redundant embedded hypervisor.

The PowerEdge M910 also utilizes the Intel Xeon processor E7-2800, E7-4800 and E7-8800 product families or Intel Xeon processor 7500 and 6500 series, which are designed to automatically monitor, report and recover from hardware errors in order to maintain data integrity and keep mission-critical services online.

As with all Dell PowerEdge servers, the M910 is manufactured with our "one-touch" factory build process. This process is designed to ensure just one person is responsible for the entire server build,

resulting in greater quality control. In addition, every fully configured Dell server is tested (and retested) before it leaves the factory to ensure maximum reliability.

Product documentation is available at Dell.com/Support/Manuals. Information for the chassis can be found in the *PowerEdge M1000e Technical Guide*.

Product comparison

Table 1.   Comparison of PowerEdge M910 and R910

Feature	M910	R910
Processor	2-socket or 4-socket Intel Xeon E7-2800, E7-4800 and E7-8800 product families or Intel Xeon processor 6500 and 7500 series	4-socket Intel Xeon E7-4800 and E7-8800 product families and Intel Xeon processor 7500 series
Frontside bus	Intel QuickPath Interconnect (QPI)	Intel QuickPath Interconnect (QPI)
L3 Cache	30MB	30MB
Chipset	Intel 7510	Intel 7510
DIMMs	32 x DDR3	64 x DDR3
Form factor	Full-height blade, dual slot	4U rack
Hard drive bays	2 x 2.5" hot-plug	16 x 2.5" hot-plug
Hard drive types	SAS SSD, SATA SSD, SAS, nearline SAS	SATA SSD, SAS, nearline SAS, SATA
Availability	Hot-plug hard drives Hot-plug redundant power and cooling ECC memory Single Device Data Correction (SDDC) Support for memory demand and patrol scrubbing High availability failover cluster support	Hot-plug hard drives Hot-plug redundant power and cooling ECC memory Single Device Data Correction (SDDC) Support for memory demand and patrol scrubbing High availability failover cluster support
Integrated standard hard drive controller	PERC H200/H700 (factory installed) and PERC 6/i as custom kit	PERC H200/H700
Optional hard drive controller	H200/H700 Integrated controller (battery backup for the H700 and PERC6/i options only)	PERC H800 or 6Gbps SAS
Server management	iDRAC6 Enterprise, BMC, IPMI 2.0, Dell OpenManage™, Unified Server Configurator, Lifecycle Controller, Chassis Management Controller Chassis Management Controller (CMC) on M1000e Optional: vFlash media	iDRAC6 Express, BMC, IPMI 2.0, Dell OpenManage, Unified Server Configurator, Lifecycle Controller Optional: iDRAC6 Enterprise, vFlash media

Feature	M910	R910
Slots	4 x8 PCIe mezzanine cards	Standard: 7 PCIe 2.0 slots (2 x4, 4 x8, 1 x16) Optional: 10 PCIe 2.0 (6 x4, 4 x8) Slot5 is PCIe 1.0
NIC/LOM	4-port (4 x 1GbE) Embedded NIC Broadcom® BCM5709S	4-port (4 x 1GbE) Embedded NIC Broadcom BCM5709C, or 4-port (2 x 10Gb SFP+ and 2 x 1GbE) Embedded NIC Broadcom 57711 + Broadcom BCM5709C Optional: Various NICs available
USB	3 front, 1 internal	2 front, 2 back, 1 internal
Power supplies	See the *PowerEdge M1000e Technical Guide*	4 x 750W (Energy Smart) Or 4 x 1100W high-output)

2 Key technologies

The PowerEdge M910 implements a number of key technologies:

- Intel Xeon processor E7-2800, E7-4800 and E7-8800 product families
- Intel 7510 chipset
- FlexMem Bridge
- I/O Hub (IOH) with Intel QuickPath Architecture
- DDR3 memory
- PCI Express® (PCIe) 2.0
- Optional Redundant SD media for embedded hypervisor
- Integrated Dell Remote Access Controller 6 (iDRAC6) Express

Intel 7510 chipset

The 7510 chipset is designed to support Intel Xeon processor E7-2800, E7-4800 and E7-8800 product families, Intel Xeon processor 6500 and 7500 series 4S family, Intel QuickPath Interconnect (QPI), DDR3 memory technology and PCIe 2.0.

Intel processors

Key features of the Intel Xeon processor E7-2800, E7-4800 and E7-8800 product families include:

- Up to ten cores per processor
- Up to 30MB shared L3 cache
- 32nm process technology
- Intel Trusted Execution Technology (TXT) and AESNI (AES New Instructions)
- RAS DDDC (Double Device Data Correct)
- Intel HyperThreading (2 threads/core)

Key features of the Intel Xeon processor 6500 and 7500 series include:

- Up to eight cores per processor
- Four full-width, bidirectional point-to-point Intel QuickPath Interconnect (QPI) links at 6.4GT/s
- Four Intel Scalable Memory Interconnects (SMI) at 6.4 GT/s
- Socket: LS, LGA 1567 package
- No termination required for non-populated processors (must populate processor socket one first)
- 64-byte cache line size
- RISC/CISC hybrid architecture
- Compatible with existing x86 code base
- Optimized for 32-bit code
- MMX™ support
- Execute Disable Bit
- Intel Wide Dynamic Execution (Executes up to four instructions per clock cycle)
- Simultaneous Multi-Threading (SMT) capability (2 threads/core)

- Support for CPU Turbo Mode on certain SKUs (Increases processor frequency if operating below thermal, power and current limits)
- Streaming SIMD (Single Instruction, Multiple Data) Extension 4
- Intel 64 Technology
- Intel VT-x and VT-d Technology for virtualization support
- Enhanced Intel SpeedStep® Technology
- Demand-based switching for active processor power management as well as support for ACPI P-states, C-states, and T-states

FlexMem Bridge

The PowerEdge M910 also introduces a new, Dell patent-pending technology that allows flexibility in processor and memory scalability — FlexMem Bridge. The FlexMem Bridge allows the full amount of addressable DIMMs on four-socket systems with Intel Xeon processor E7-2800, E7-4800 and E7-8800 product families and Intel Xeon processor 7500 and 6500 series to be accessed, even when only two of the processors are in place, in a completely passive solution (no active components).

I/O Hub (IOH) with Intel QuickPath Architecture

The Intel QuickPath Architecture consists of serial point-to-point interconnects for the processors and the system IOH. The M910 has a total of eight QuickPath Interconnects (QPI) lines: six links connecting the processors and two links connection processors 1 and 2 with the IOH.

DDR3 memory

The M910 uses DDR3 memory, which provides a high-performance, high-speed memory interface capable of low latency response and high throughput. The M910 supports registered ECC DDR3 DIMMs (RDIMMs).

The DDR3 memory interface consists of eight Intel callable memory buffers (SMBs), each of which has two DDR3 memory channels. Each channel supports up to two RDIMMs for single-, dual- and quad-rank. By limiting the M910 to two DIMMs per DDR channel, the system can support quad-rank DIMMs at 1067MT/s.

PCIe 2.0

PCIe is a serial point-to-point interconnect for I/O devices. PCIe 2.0 doubles the signaling bit rate of each lane from 2.5Gbps to 5Gbps. Each of the PCIe 2.0 ports is backwards-compatible with 1.0 transfer rates.

Internal redundant SD module

The internal SD module is dedicated for an SD Flash Card with embedded Hypervisor for virtualization. The SD Flash Card contains a bootable OS image for virtualized platforms.

The persistent storage solution on the M910 allows for redundant SD cards.

iDRAC6 Express

The iDRAC6 Express feature set is a managed persistent storage space for server provisioning data. It consists of 1GB flash and vFlash (an optional externally accessible SD card). vFlash offers the hot-plug portability and increased storage capacity benefits of SD while still being managed by the system.

3 System information

The PowerEdge M910 is an innovative blade design that allows scaling from two to four sockets (no single- or three-socket support) based on Intel four-socket enhanced processors, RAM and management while still taking advantage of the M1000e chassis architecture. Along with the M1000e chassis, the PowerEdge M910 server leads the industry in high speed, redundant I/O throughput and power efficiency with more RAM slots in the two-socket space.

Product features summary

Table 2 lists a summary of features for the PowerEdge M910. For the latest information on supported features, visit Dell.com/PowerEdge.

<p align="center">Table 2.   Product features</p>

Feature	PowerEdge M910
Processors	Eight-core Intel Xeon processor 7500 and 6500 series Ten-core Intel Xeon processor E7-2800, E7-4800 and E7-8800 product families
Chipset	Intel 7510
Memory[1]	Up to 1TB (32 DIMM slots): 2GB/4GB/8GB/16GB/32GB ECC DDR3 up to 1333MT/s
Drive bays	Two 2.5" SSD or SAS hot-plug drives
Storage[1]	**Hot-plug hard drive options:** 2.5" SAS SSD, SATA SSD, SAS (15K, 10K), nearline SAS (7.2K) **Maximum internal storage:** Up to 2.4TB per blade with 2 x 2.5" SAS (10K) 1.2TB hard drives **External storage:** For information about Dell external storage options, visit Dell.com/Storage.
RAID controller options	PERC H200 Modular (6Gbps) PERC H700 Modular (6Gbps) with 512MB battery-backed cache
I/O mezzanine card options	Fully populated mezzanine card slots and switch modules will yield three highly available, redundant I/O fabrics per blade. **1GbE and 10GbE:** Broadcom dual-port GbE with TOE (BCM-5709S) Intel quad-port GbE Broadcom quad-port GbE (BCM-5709S) Intel dual-port 10GbE Broadcom dual-port 10GbE (BCM-57711) **Enhanced 10GbE & Converged Network Adapters (CEE/DCB):** Intel dual-port enhanced 10GbE (FCoE Ready for Future Enablement) Emulex® dual-port converged network adapter (OCM10102-F-M) — Supports CEE/DCB 10GbE + FCoE QLogic® dual-port converged network adapter (QME8142) — Supports CEE/DCB 10GbE and FCoE QLogic dual-port converged network adapter (QME8242-k) — Supports 10GbE and NPAR Brocade® BR1741M-k dual-port mezzanine CNA **Fibre channel:** QLogic dual-port FC8 fibre channel host bus adapter (HBA) (QME2572)

Feature	PowerEdge M910
	Emulex dual-port FC8 fibre channel HBA (LPe1205-M)
	Emulex 8 or 4 Gbps fibre channel pass-through module
	QLogic dual-port FC16 fibre channel HBA (QME2662)
	Emulex dual-port FC16 fibre channel HBA (LPm16002B-D)
	InfiniBand®:
	Mellanox® dual-port ConnectX® quad data rate (QDR) InfiniBand
	Mellanox dual-port ConnectX-3 fourteen data rate (FDR10) 40Gb
Operating systems	Microsoft® Windows Server® 2012
	Microsoft Windows Server 2012 R2 (includes Hyper-V®)
	Microsoft Windows Server 2008 x86/x64 SP2 (x64 includes Hyper-V)
	Microsoft Windows Server 2008 R2 x64 SP1 (includes Hyper-V)
	Microsoft Windows® HPC Server 2008
	Novell® SUSE® Linux® Enterprise Server 11 SP3
	Red Hat® Enterprise Linux
	Oracle® Solaris™
	Virtualization options:
	Citrix® XenServer®
	Microsoft Hyper-V, a server role in Microsoft Windows Server operating systems
	Red Hat Enterprise Virtualization®
	VMware® vSphere® ESXi™
	For more information on the specific versions and additions, visit Dell.com/OSsupport.
Featured database applications	Microsoft SQL Server® solutions (see Dell.com/SQL)
	Oracle database solutions (see Dell.com/Oracle)
Power supply	Supplied by Dell PowerEdge M1000e Blade Chassis
Video	Matrox® G200eW with 8MB memory
Systems management	Dell OpenManage
	BMC, IPMI 2.0 compliant
	Unified Server Configurator
	Lifecycle Controller
	iDRAC6 Enterprise with optional vFlash media
	Remote Management: iDRAC6 Enterprise with optional vFlash media
	Microsoft System Center Essential (SCE) 2010 v2
Embedded hypervisor	Optional dual-media redundant hypervisor

[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.

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

4 Mechanical

The M910 is a full height blade server that requires a M1000e chassis (shown in Figure 1) to operate.

Figure 1.   M1000e chassis front view

The M910 occupies two slots in the M1000e rack chassis for a maximum of eight blades in one M1000e chassis. It can be mixed with other existing Dell blades and is designed to mix with possible future half-height, double-wide and full-height, double-wide blades. Some highlights include:

- Support for RAID
- Support for persistent storage (internal USB connector and two external SD card slots)

Refer to the *PowerEdge M1000e Technical Guide* for information on fans, power and power supply, racks, security and other chassis information.

Module dimensions and weight

Height: 38.5 cm (15.2 in)

Width: 5 cm (2 in)

Depth: 48.6 cm (19.2 in)

Weight: 13.1 kg (29 lb) maximum configuration

Internal module

Figure 2 shows a view of the internal module. See the Opening and Closing the Blade section of the Installing Blade Components chapter in the *Dell PowerEdge Modular Systems Hardware Owner's Manual* on Dell.com/Support/Manuals for more information.
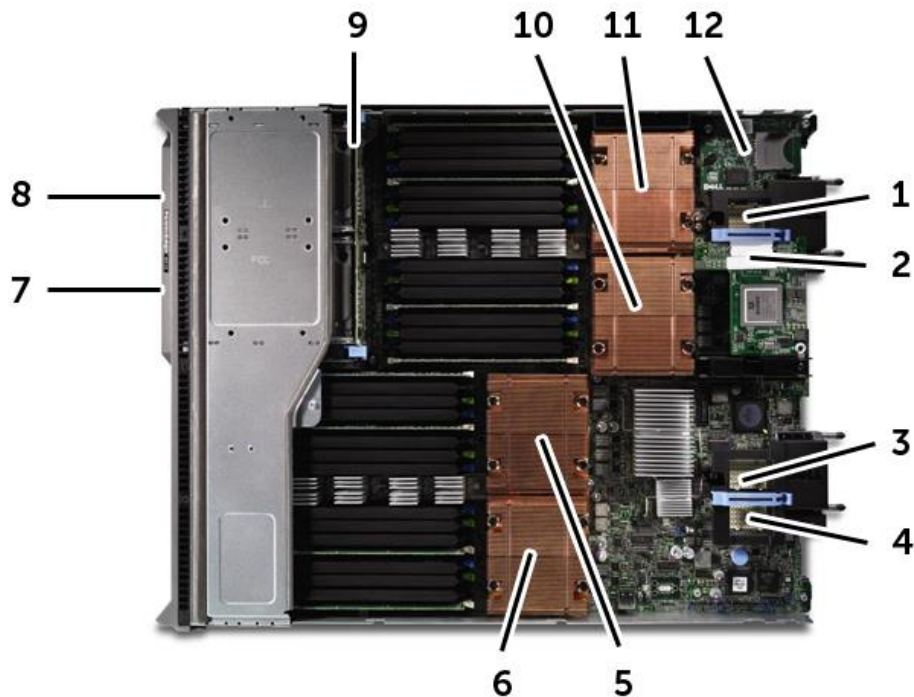
1) Optional Mezzanine Card 1 - Fabric C
2) Optional Mezzanine Card 2 - Fabric B
3) Optional Mezzanine Card 3 - Fabric C
4) Optional Mezzanine Card 4 - Fabric B
5) Processor CPU2 and Heat Sink
6) Processor CPU4 and Heat Sink

7) Hard Drive 1
8) Hard Drive 0
9) Hard Drive Backplane
10) Processor CPU1 and Heat Sink
11) Processor CPU3 and Heat Sink
12) iDRAC Enterprise Card

Figure 2.   Internal module view

Security

Configurable client IP address range for clients connecting to iDRAC6.

Cover latch

The blade module includes a latch for the cover. See the Opening and Closing the Blade section of the Installing Blade Components chapter in the *Dell PowerEdge Modular Systems Hardware Owner's Manual* on Dell.com/Support/Manuals for more information.

TPM (Trusted Platform Module)

The TPM is used to generate/store keys, protect/authenticate passwords and create/store digital certificates. TPM can also be used to enable the BitLocker™ hard drive encryption feature in Windows Server 2008. TPM is enabled through a BIOS option and uses HMAC-SHA1-160 for binding. TCM is available in China.

Power off security

Through the CMC, the front USBs and power button can be disabled so as to not allow any control of the system from the front of the blade.

USB key

The M910 supports the following USB devices:

- DVD (bootable; requires two USB ports)
- USB key (bootable)
- Keyboard (only one USB keyboard is supported)
- Mouse (only one USB mouse is supported)

Battery

A replaceable coin cell CR2032 3V battery is mounted on the planar to provide backup power for the Real-Time Clock and CMOS RAM on the ICH9 chip.

Field replaceable units (FRU)

The planar contains a serial EEPROM to contain FRU information including Dell part number, part revision level and serial number.

5 Power, thermal and acoustics

Table 3 lists the environmental specifications for the PowerEdge M910.

Table 3.   Environmental specifications

Temperature	
Operating	10° to 35°C (50° to 95°F) with a maximum temperature gradation of 10° per hour NOTE: For altitudes above 2950 feet, the maximum operating temperature is derated 1°F/500 ft
Storage	−40° to 65°C (−40° 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% (non-condensing) with a maximum humidity gradation of 10% per hour
Maximum vibration	
Operating	0.26Grms at 5−350Hz in operational orientations
Storage	1.54Grms at 10−250Hz in all orientations
Maximum shock	
Operating	Half sine shock in all operational orientations of 31G +/− 5% with a pulse duration of 2.6 ms +/− 10%
Storage	Half sine shock on all six sides of 71G +/− 5% with a pulse duration of 2 ms +/− 10%
Altitude	
Operating	−15.2 m to 3048 m (−50 ft to 10,000 ft) Note: For altitudes above 2950 ft, the maximum temperature is derated 1°F/550 ft
Storage	−16 m to 10,600 m (−50 ft to 35,000 ft)
Airborne contaminant level	
Class G1 or lower as defined by ISA-S71.04-1985 (G1 maximum corrosive contaminant levels measured at ≤ 50% relative humidity)	

Acoustics

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, such as whistles, hums, etc. One of the sound quality metrics in the Dell specification is prominence ratio of a tone, as listed in the table below.

Acoustical performance of typical configuration: When installed in the M1000e blade chassis, typical configuration (shown in Table 4) of M910 blade results in the following idle acoustical performance in 23±2°C ambient:

$$LwA-UL = 8.1 \text{ bels and no prominent tones}$$

Table 4.   Typical configuration used in acoustical testing

Chassis	Description	Quantity
Blade	M910	4
Slots populated	1, 2, 3, 4	
Power supply	2300-W	6
Blanks	Blank modules	8
System Fans	M1000e fan	9
Blade internals	**Description**	**Quantity**
CPU	Intel Xeon processor 7500 series 105W	2
DIMM	4GB DDR3	24
Mezz Cards	Dual-port Broadcom 5709	4
HDD	SAS 2.5" 146GB, 10krpm	2

Definitions:

- **Standby:** AC power is connected to power supply units but system is not turned on.
- **Idle:** Reference ISO 7779 (1999) definition 3.1.7; system is running in its OS but no other specific activity.
- **Stressed processor:** An operating mode per ISO 7779 (1999) definition 3.1.6. The software SPECPower_ssj2008 is utilized to stress the processors. SPECPower is set to 50 percent loading.
- **LwA−UL:** The upper limit sound power level (LwA) calculated per section 4.4.2 of ISO 9296 (1988) and measured in accordance to ISO 7779 (1999).
- **LpA:** Average bystander A-Weighted sound pressure level. The system is placed in a rack with its bottom at 25 cm from the floor. The acoustic transducers are at the four bystander positions, ref ISO 7779 (1999) Section 8.6.2.
- **Prominent tone:** Criteria of D.5 and D.8 of ECMA-74 9th ed. (2005) are followed to determine if discrete tones are prominent. The system is placed in a rack with its bottom at 75 cm from the floor. The acoustic transducer is at front bystander position, ref ISO 7779 (1999) Section 8.6.2.

Thermal

The M910 thermal solution includes:

- Optimized airflow impedance for individual blade and chassis level airflow balancing
- Custom air baffling directs airflow through the components to maintain proper cooling
- Custom-designed heat sinks maintain CPU, IOH and Intel 7500 chip temperatures within thermal design targets
- Highly Optimized Fan Control Algorithm such as the following:
  - Base fan speeds are a function of hardware configuration and ambient temperature to minimize airflow for a given environment
  - PID control algorithms are used for both CPU and DIMMs to maintain appropriate thermal margin
  - Double refresh switching allows for DIMM temperature excursions up to 95°C while maintaining performance and thermal design targets as follows:
    - The M910 thermal algorithm monitors the thermal sensor on each DIMM to maintain DIMM temperatures below the typical 85°C specification in normal operating conditions.
    - Under extreme operating conditions, the thermal algorithm can switch the DIMMs into Double Refresh mode allowing an additional 10°C of thermal headroom. In Double Refresh mode, DIMMs are allowed to operate as high as 95°C.

Power efficiency

One of the main features of blade servers is enhanced power efficiency. The PowerEdge M910 achieves higher power efficiency by implementing the following features:

- User-configurable power options via the M1000e CMC
- Improved power budgeting
- Voltage regulator efficiency improvements
- CPU VR dynamic phase shedding
- Switching regulators instead of linear regulators
- Closed loop thermal throttling
- Use of DDR3 memory (lower voltage compared to DDR2)
- Memory VR static phase shedding
- BIOS Power/Performance options page
- Active Power Controller (BIOS-based CPU P-state manager)
- Ability to throttle memory
- Ability to disable a CPU core
- Ability to turn off embedded NICs or PCIe lanes when not being used
- Energy Smart components at the M1000e chassis level to selectively enable more computing performance with less power consumption

6 Processors

The Intel Xeon processor E7-2800, E7-4800 and E7-8800 product families and the Intel Xeon processor 6500 and 7500 series are designed specifically for servers and workstation applications. The processors feature quad-core processing to maximize performance and performance/watt for data center infrastructures and highly dense deployments. These processors also feature Intel Core™ microarchitecture and Intel 64 architecture for flexibility in 64-bit and 32-bit applications and operating systems. The Intel Xeon processor E7-2800, E7-4800 and E7-8800 product families and the Intel Xeon processor 6500 and 7500 series support all streaming SIMD extensions (including SSE2, SSE3 and SSE4) and Intel 64 instruction.

The Intel Xeon processor 6500 and 7500 series 4S (expandable processors) use a 1567-pins Land Grid Array (LGA1567) package that plugs into a surface-mount socket. The M910 provides support for two or four processors.

Table 5.   Processor cache sizes (Package LGA1567)

Cache	Size
L1 cache size	32KB instruction (32KB data)
L2 cache size	1.5MB or 2MB
L3 cache size	12MB, 18MB or 24MB (shared)

Features

Key features of the Intel Xeon processor E7-2800, E7-4800 and E7-8800 product families include:

- Up to ten cores per processor
- Four point-to-point QuickPath Interconnect links at 6.4GT/s
- 32nm process technology
- Intel HyperThreading (two threads/core)
- Up to 30MB shared L3 cache
- Intel Trusted Execution Technology (TXT) and AESNI (AES New Instructions)
- RAS DDDC (Double Device Data Correct)

Key features of the Intel Xeon processor 6500 and 7500 series include:

- Up to eight cores per socket
- Up to 24MB shared L3 cache
- 45nm process technology
- Four full-width, bidirectional point-to-point Intel QuickPath Interconnect (Intel QPI) links at 6.4 GT/s
- Support for 95W, 105W and 130W processors
- Four Intel Scalable Memory Interconnects (Intel SMI) at 6.4GT/s
- Socket: LS, LGA 1567 package
- No termination required for non-populated processors (must populate processor socket 1 first)
- Integrated Intel QuickPath DDR3 memory controller
- 64-byte cache line size

- RISC/CISC hybrid architecture
- Compatible with existing x86 code base
- Optimized for 32-bit code
- MMX support
- Execute Disable Bit
- Intel Wide Dynamic Execution
- Executes up to four instructions per clock cycle
- Simultaneous Multi-Threading (SMT) capability (2 threads/core)
- Support for CPU Turbo Mode (on certain models)
- Increases processor frequency if operating below thermal, power and current limits
- Streaming SIMD (Single Instruction, Multiple Data) Extension 4
- Intel 64 Technology
- Intel VT-x and VT-d Technology for virtualization support
- Enhanced Intel SpeedStep Technology
- Demand-based switching for active processor power management as well as support for ACPI P-states, C-states and T-states

Supported processors

For the most up-to-date information on supported processors, visit Dell.com/PowerEdge.

Table 6.   Supported Intel Xeon processor E7-8800 product family

Model	Speed	TDP power	Cache	Cores	QPI speed
E7-8867L	2.13GHz	105W	30M	10	6.4GT/s
E7-8837	2.66GHz	130W	24M	8	6.4GT/s

Table 7.   Supported Intel Xeon processor E7-4800 product family

Model	Speed	TDP power	Cache	Cores	QPI speed
E7-4830	2.13GHz	105W	24M	8	6.4GT/s
E7-4820	2.00GHz	105W	18M	8	5.86GT/s
E7-4807	1.86GHz	95W	18M	8	4.80GT/s

Table 8.   Supported Intel Xeon processor E7-2800 product family

Model	Speed	TDP power	Cache	Cores	QPI speed
E7-2870	2.40GHz	130W	30M	10	6.4GT/s
E7-2860	2.26GHz	130W	24M	10	6.4GT/s
E7-2850	2.00GHz	130W	24M	10	6.4GT/s
E7-2830	2.13GHz	105W	24M	8	6.4GT/s
E7-2820	2.00GHz	105W	18M	8	5.86GT/s
E7-2803	1.73GHz	105W	18M	6	4.80GT/s

Table 9.   Supported Intel Xeon Processor 6500 and 7500 series

Model	Speed	TDP power	Cache	Cores	QPI speed
X7560	2.26GHz	130W	24M	8	6.4GT/s
X7542	2.66GHz	130W	18M	6	5.86GT/s
X6550	2.00GHz	130W	18M	8	6.4GT/s
E7540	2.00GHz	105W	18M	6	6.4GT/s
E6540	2.00GHz	105W	18M	6	6.4GT/s
E7530	1.86GHz	105W	12M	6	5.86GT/s
E6510	1.73GHz	105W	12M	4	4.8GT/s
L7555	1.86GHz	95W	24M	8	5.86GT/s
L7545	1.86GHz	95W	18M	6	5.86GT/s
E7520	1.86GHz	95W	18M	4	4.8GT/s

Processor configurations

The PowerEdge M910 is designed to support either a two-processor configuration with FlexMem Bridge or a four-processor configuration. In either configuration, all I/O and memory is available in the system. While not formally supported, single processor configurations with a processor installed in CPU1 will allow the system to boot for diagnostic purposes.

The Intel Xeon E7-2800 product family and Intel Xeon processor 6500 series are for two-socket configurations only and cannot be upgraded to four-socket configurations.

FlexMem Bridge

In a four-processor configuration, the PowerEdge M910 uses only one memory controller per processor. This single controller connects to two memory buffers through Intel SMI links. Each memory buffer in turn connects to four DDR3 DIMMs. In a typical Intel Xeon processor 6500/7500 series configuration, only the memory buffers associated with the two populated sockets would be connected and therefore only 16 DIMMs would be accessible.

To overcome this limitation with two processors, the M910 uses the FlexMem Bridge that allows CPU1 and CPU2 to connect to the memory of their respective adjacent sockets (CPU3 and CPU4). The FlexMem Bridge provides the following:

- Two pass-through links for SMI
- One pass-through link for QPI

The pass-through SMI links connect the two installed processors to additional SMIs, therefore the processors will have the following memory attached:

- CPU1 has access to DIMMs [A1:A8] and DIMMs [C1:C8] (those normally associated with CPU3)
- CPU2 has access to DIMMs [B1:B8] and DIMMs [D1:D8] (those normally associated with CPU4)

The pass-through QPI link on the FlexMem Bridge provides increased performance for a two-processor configuration because it allows two full-bandwidth QPI links between CPU1 and CPU2 as opposed to a single link. Figure 3 depicts the interconnection between the CPU sockets as well as connections internal to the FlexMem Bridges. The FlexMem Bridges are only supported in sockets 3 and 4.
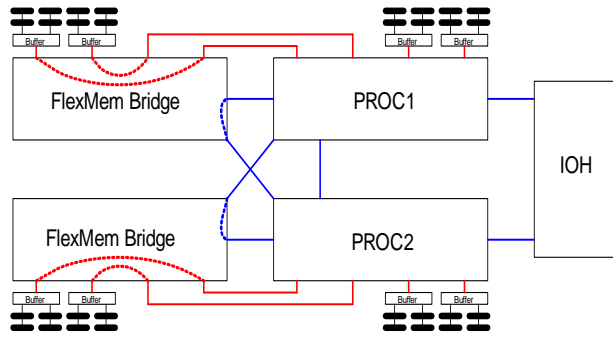
Figure 3.   Diagram of FlexMem Bridge routing

Modern processors are capable of tremendous workloads, and many types of utilization patterns such as virtualization often run into memory capacity issues well before the processors reach a saturation point. FlexMem Bridge technology was designed to assist in environments with memory intensive workloads.

To scale for future workloads in which additional processing power is needed, simply replace the FlexMem Bridge with additional processors to meet those needs.

Due to power limitations, the PowerEdge M910 only supports two 130W processors. In an upgrade for a server with two 130W processors, the processors and the heat sink must be changed to the 95W or 105W processors. If the server has only the 95W or 105W processors, processors can be swapped.

7 Memory

The PowerEdge M910 uses DDR3 memory providing a high-performance, high-speed memory interface capable of low-latency response and high throughput. The M910 supports registered ECC DDR3 DIMMs (RDIMM) only. Each DDR3 DIMM is driven by the Intel 7500 SMB. A memory buffer has two DDR3 channels. Each of these channels can support up to two DIMMs running at 1067MT/s (or slower) speeds.

The Intel 7500 SMB supports single-, dual- and quad-rank DIMMs. Up to four 2GB, 4GB, 8GB, 16GB and 32GB RDIMMs are supported per channel, for a total of up to 1TB. Across processors, DIMM populations can be different on the memory for each processor as long as the population rules for each processor socket are followed. Additionally, all processor sockets operate in the same RAS mode and are set up with the same memory timing parameters.

Four-socket platform capability (32 DIMMs):

- Up to eight DDR3 DIMMs per socket through use of up to four scalable memory buffers
- Support for up to 32GB DDR3 DIMMs
- Maximum of 1TB with 32GB DIMMs

Memory types supported:

- 1066MT/s DDR3 (800 and 1333 MT/s availability depends on OEM validation)
- RDIMM
- Single-rank (SR), dual-rank (DR), quad-rank (QR)

Actual system memory speed depends on specific processor capabilities:

- 6.4GT/s SMI link speed capable of running memory speeds up to 1066MT/s
- 5.86GT/s SMI link speed capable of running memory speeds up to 978MT/s
- 4.8GT/s SMI link speed capable of running memory speeds up to 800MT/s

DIMMs supported

If DIMMs of different speeds are mixed, all channels operate at the fastest common frequency. UDIMMs are not supported. The first DIMM slot in each channel is color-coded with white ejection tabs for ease of identification.

The M910's DIMM sockets are placed 0.40" apart, center-to-center, to provide enough space for sufficient airflow to cool stacked DIMMs. DIMMs must be installed in each channel starting with the DIMM farthest from the processor (DIMM 1). Population order is identified by silkscreen and a label. The order is dependent on the memory configuration used.

DIMM slots

For information, see the System Memory section in the Installing Blade Components chapter of the *Dell PowerEdge Modular Systems Hardware Owner's Manual* on Dell.com/Support/Manuals.

Intel 7500 SMB

The Intel 7500 SMB supports one Intel Scalable Memory Interconnect (Intel SMI), two DDR3 channels and one SMBus slave interface at 100KHz. It does not support the repeater functionality. Target package size is 19.5 mm x 24.5 mm with 0.8 mm pitch. Intel SMI supports link speeds of

4.8GT/s, 5.86GT/s and 6.4GT/s with 11 southbound lanes (nine data, one CRC and one spare) and 14 Northbound lanes (12 data, one CRC and one spare).

The DDR3 interface supports x4 and x8 single-rank, dual-rank and quad-rank RDIMMs — up to two RDIMMS per channel. Each DDR3 channel supports a maximum of eight ranks. DDR3 speeds are 800MT/s, 978MT/s, 1066MT/s and 1333MT/s. DRAM technology comes in 1Gb and 2Gb sizes. DIMM capacity is 2GB, 4GB, 8GB, 16GB or 32GB (16GB with QR DIMMS only).

Memory RAS support

The Intel Xeon processor 6500 and 7500 series supports high-availability memory modes including rank and DIMM sparing as well as memory mirroring. The M910 supports rank sparing only and mirroring as shown in Table 10.

Table 10.   Sparing and mirroring support

Sparing		Mirroring			
Type	Rules enforced	1P	2P	4P	Rules enforced
Rank	The capacity of the spare rank must be greater than that of any other rank on the channel	No support	Inter-socket (hemisphere mode enabled)	Inter-socket	32 DIMM only, Mirrored must match

Sparing

For information, see the System Memory section in the Installing Blade Components chapter of the *Dell PowerEdge Modular Systems Hardware Owner's Manual* on Dell.com/Support/Manuals.

Mirroring

For mirroring, the M910 will support two-processor/four-processor configurations with 32 DIMMs only. When mirroring is enabled, only half of the physical memory will be visible to the system software. A full copy of the memory is maintained, and in the event of an uncorrectable error, the system will switch over to the mirrored copy. In two-processor mode, the mirroring will be inter-node with hemisphere mode enabled. In this case, the memory controller (MBox) of CPU1 is mapped to the corresponding MBox of CPU2.

For four-processor configurations, the PowerEdge M910 also supports mirroring in the inter-socket mode (intra-socket is not possible in four-processor configurations because each processor has only one MBox connected to memory buffers). In this four-processor case, the memory on CPU1 is mirrored with memory on CPU3, while memory on CPU2 is mirrored with memory on CPU4.

Supported memory configurations

See the System Memory section in the Installing System Components chapter in the *Dell PowerEdge M910 Systems Hardware Owner's Manual* on Dell.com/Support/Manuals.

8 Chipset

The PowerEdge M910 system board incorporates the Intel 7510 chipset for I/O and processor interfacing. The 7510 chipset is designed to support the Intel Xeon processor E7-8800, E7-4800 and E7-2800 product families, Intel Xeon processor 6500 and 7500 series, Intel QPI Interconnect, DDR3 memory technology and PCIe 2.0. The 7510 chipset consists of the IOH QuickPath Interconnect (QPI), Intel 7500 Scalable Memory Buffer and the ICH10 South Bridge.

Intel 7500 I/O Hub (IOH)

The PowerEdge M910 system board incorporates an Intel 7500 series IOH to provide a link between the 4S processors and the I/O components. The main components of the IOH consist of two full-width QPI links (one to each processor), 36 lanes of PCIe 2.0 and a x4 DMI link to connect directly to the ICH10 (Intel I/O Controller Hub 10) South Bridge.

IOH QuickPath Interconnect (QPI)

The QPI architecture consists of serial point-to-point interconnects for the processors and the IOH. The PowerEdge M910 has a total of four QPI links including one link connecting the processors and links connecting both processors with the IOH. Each link consists of 20 lanes (full-width) in each direction with a link speed of 6.4GT/s. An additional lane is reserved for a forwarded clock. Data is sent over the QPI links as packets.

The QPI architecture features the following four layers:

- The **Physical** layer consists of the actual connection between components. It supports Polarity Inversion and Lane Reversal for optimizing component placement and routing.
- The **Link** layer is responsible for flow control and the reliable transmission of data.
- The **Routing** layer is responsible for the routing of QPI data packets.
- Finally, the **Protocol** layer is responsible for high-level protocol communications, including the implementation of a MESIF (Modify, Exclusive, Shared, Invalid, Forward) cache coherence protocol.

PCIe 2.0

PCIe is a serial point-to-point interconnect for I/O devices. PCIe 2.0 doubles the signaling bit rate of each lane from 2.5Gbps to 5Gbps. Each of the PCIe ports is backward-compatible with 1.0 transfer rates.

Direct Media Interface

The Direct Media Interface (DMI) (previously called the Enterprise Southbridge Interface) connects the Intel 7500 Legacy IOH with the Intel I/O Controller Hub (ICH). The DMI is equivalent to an x4 PCIe 1.0 link with a transfer rate of 1Gbps in each direction.

Intel I/O Controller Hub 10

The Intel I/O Controller Hub 10 (ICH10) is a highly integrated I/O controller, supporting the following functions:

- Six x1 PCIe 1.0 ports, with the capability of combining ports 1–4 as a x4 link
- PCI Bus 32-bit Interface Rev 2.3 running at 33MT/s
- Six UHCI and two EHCI (High-Speed 2.0) USB host controllers, with up to twelve USB ports

- M910 has three external USB ports and one internal ports dedicated for UIPS/RIPS and embedded storage
- Power management interface (ACPI 3.0b compliant)
- Platform Environmental Control Interface (PECI)
- Intel Dynamic Power Mode Manager
- I/O interrupt controller
- SMBus 2.0 controller
- Low Pin Count (LPC) interface to Super I/O, Trusted Platform Module (TPM) and SuperVU
- Serial Peripheral Interface (SPI) support for up to two devices (M910 BIOS flash device is connected to the ICH10 using SPI)

PCIe mezzanine connectors

The M910 supports four PCIe 2.0 x8 mezzanine connectors. There are no restrictions on mezzanine cards in the M910 (such as size or location).

9 BIOS

The PowerEdge M910 BIOS is based on the Dell BIOS core and supports the following features:

- IA-32 Intel Xeon 7510 chipset 4S
- Simultaneous Multi-Threading (SMT)
- CPU Turbo Mode
- PCI 2.3
- Plug-and-play 1.0a
- MP (Multiprocessor) 1.4
- Boot from hard drive, optical drive, iSCSI drive, USB key and SD card
- ACPI
- Direct Media Interface (DMI)
- PXE and WOL support for on-board NICs
- Memory mirroring and sparing
- SETUP access through <F2> key at end of POST
- USB 2.0 (USB boot code is 1.1 compliant)
- F1/F2 error logging in CMOS
- Virtual KVM, CD
- UEFI (Unified Extensible Firmware Interface) 2.1 support

The PowerEdge M910 BIOS does not support the following:

- Embedded Diagnostics
- BIOS language localization
- BIOS recovery after bad flash (but can be recovered from iDRAC6 Enterprise)

Supported ACPI states

The PowerEdge M910 supports the standard ACPI states. See acpi.info/for more information.

10 Embedded Gigabit Ethernet controllers on motherboard (LOM)

Two embedded Broadcom 5709S dual-port LAN controllers are on the PowerEdge M910 system board as independent Gigabit Ethernet (GbE) interface devices. The following information details the features of the LAN devices:

- X2 PCIe 2.0 capable interface
- M910 operates this controller at 2.0 speed
- Integrated MAC and PHY
- 3072x18 Byte context memory
- 64KB receive buffer
- TOE (TCP Offload Engine)
- iSCSI controller
- NC-SI (Network Controller-Sideband Interface) connection for Flex Addressing
- Wake-On-LAN (WOL)
- PXE 2.0 remote boot
- iSCSI boot
- IPv4 and IPv6 support
- Bare metal deployment support

11 I/O Mezzanine card options

The M910 contains four PCIe 2.0 mezzanine 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/slot.

For more information, refer to the *Dell PowerEdge M1000e Technical Guide*.

Available options for all four slots include:

- Mellanox QDR ConnectX Dual-Port Quad Data Rate (QDR) InfiniBand
- Broadcom BCM57711 Dual Port KX4 MC (10G)
- Broadcom BCM5709S Dual Port SERDES
- Broadcom BCM5709S Quad Port SERDES
- Intel Dual Port 10G KX4 MC
- Intel Quad Port 1G SERDES MC
- Dual Port FC8 QLogic QME2572
- Dual Port FC8 Emulex LPe1205-M
- QLogic CNA QME8142 (Enhanced 10GbE + FCoE)
- Emulex CNA OCM20102FM (Enhanced 10GbE)
- Intel 52599 (Enhanced 10GbE)

12   Storage

Hard drives

The PowerEdge M910 supports up to two 2.5" SAS SSDs, SATA SSDs, SAS HDDs, or nearline SAS HDDs. See Table 11 for information on supported hard drives. For the most up-to-date information on supported hard drives, visit Dell.com/PowerEdge.

Table 11.   Supported hard drives

Form factor	Capacity	Speed	Type
2.5"	149GB	N/A	SAS SSD
2.5"	50GB, 100GB, 200GB, 400GB, 800GB	N/A	SATA SSD
2.5"	73GB, 146GB	15K	SAS
2.5"	146GB, 300GB, 600GB, 900GB, 1.2TB	10K	SAS
2.5"	500GB, 1TB	7.2K	nearline SAS

Hard disk drive carriers

The PowerEdge M910 supports the 11th generation 2.5" hard drive carrier. Legacy carriers are not supported on M910.

Figure 4.   2.5" HDD carrier

Empty drive bays

For the slots that are not occupied by drives, a carrier blank is provided to maintain proper cooling, to maintain a uniform appearance to the unit and to provide EMI shielding.

Diskless configuration support

The system supports diskless configuration with no storage controller (H200/PERC 7i) installed in the system. A 2.5" HDD backplane is installed in this configuration.

RAID configurations

Table 12 lists the factory-installed RAID configurations for the PowerEdge M910.

Table 12.   Factory RAID configurations

#	Hot- plug?	Min. hard drives	Max. hard drives	Configuration	Description
0	No	0	0	ZERO	Diskless Configuration, No daughtercard
1	No	1	2	ASSN	SAS drives using SAS6/IR or H200 daughtercard with no RAID
2	No	2	2	ASSR0	SAS drives using the SAS6/IR or H200 daughtercard with drives in a RAID 0 mirror
3	Yes	2	2	ASSR1	SAS drives using the SAS6/IR or H200 daughtercard with drives in a RAID 1 Stripe
4	No	2	2	ASSCBR0	SAS or Solid State drives using the PERC6 or H700 daughtercard (with battery) with drives in a RAID 0 Stripe
5	Yes	2	2	ASSCBR1	SAS or Solid State drives using the PERC6 or H700 daughtercard (with battery) with drives in a RAID 1 mirror

Storage controllers

Table 13.   Supported storage controllers

Type	Product	Usage	Number supported	Slot	I/O Con.	RAID	Battery backup
SAS HBA SAS/SATA	PERC H200 Modular	Internal backplane storage	Max. 1	Storage slot	x4 integrated mini SAS wide	0, 1, 10	No
SAS HBA SAS/SATA	PERC H700 Modular	Internal backplane storage	Max. 1	Storage slot	x4 integrated mini SAS wide	0, 1, 10	Yes

PERC H200

The PERC H200 Modular card is an expansion controller that incorporates two four-channel 6Gbps SAS IOCs for connection to SAS hard disk drives. It is designed in a form factor that allows the same card to be used in other 11G blade-server platforms.

PERC H700

The M915 also supports the PERC H700 Modular storage controller card with battery-backed cache. The PERC H700 card has its own processor with a PCIe 2.0 host interface and DDR2 memory.

SATA repeater

The M910 does not support the SATA repeater. The only SATA drives supported by M910 are the SSD drives, which are only supported off the PERC solution.

PERC 6/i

For customers who want a hardware RAID solution, the PERC 6/i is available as an optional customer kit. The PERC 6/i uses the LSI 1078 ROC (RAID on Chip) processor with a PCIe host interface and DDR2 memory. A battery is available with this card.

Optical drives

Optical drives are optional in all M910 systems and connect to the blade via the front USB interface. The following internal slim-line drives are available on the M910:

- DVD-ROM
- DVD+RW

PATA (IDE) optical drives are not supported.

13 Video

The PowerEdge M910 Integrated Dell Remote Access Controller 6 (iDRAC6) incorporates an integrated video subsystem connected to the 32-bit PCI interface of the ICH10. This logic is based on the Matrox G200. The device only supports 2D graphics.

The integrated video core shares its video memory with the iDRAC6's 128MB DDR2 application space memory. This memory is also used for the KVM buffer.

The M910 system supports the following 2D graphics video modes:

Table 14.   Supported video modes

Resolution	Refresh rate (Hz)	Color depth (bit)
640 x 480	60, 72, 75, 85	8, 16, 32
800 x 600	56, 60, 72, 75, 85	8, 16, 32
1024 x 768	60, 72, 75, 85	8, 16, 32
1152 x 864	75	8, 16, 32
1280 x 1024	60, 75, 85	8, 16
1280 x 1024	60	32

14 Rack information

For information on rack and cable accessories for the M910, see the *PowerEdge M1000e Technical Guide* and the Dell PowerEdge M1000e Rack and Cable Advisor Tool.

15 Operating systems

The PowerEdge M910 is designed to meet the MSFT WinLogo 3.0 design specifications. For the most up-to-date information, see the Operating System Support Matrix for Dell PowerEdge Systems on Dell.com.

16 Virtualization

<div align="center">

Table 15. Virtualization software

</div>

Hypervisor	Factory install	Certification
VMware ESXi 3.5U5	DIB/FI/NFI	Yes
VMware ESXi 4.0U1	DIB/FI/NFI	Yes
Windows Server 2008 R2 with Hyper-V	FI	Yes, included in Windows Server 2008 R2 WHQL process
Citrix XenServer 5.6	FI	Yes

Dell.com/Support has extensive information designed to help customers configure virtualization software with PowerEdge servers.

To configure a complete virtualization solution, another resource is the Dell Virtualization Solution Advisor on Dell.com. Dell.com/Support also has many blade-related virtualization documents, as well as a detailed list of the virtualization platforms that are supported by OpenManage.

For information about what versions of VMware software have been certified on this server, see the compatibility guide maintained by VMware.

It is possible to order the server with an SD card that does not contain ESXi.

Advanced Infrastructure Manager by Scalent

Dell Advanced Infrastructure Manager (AIM) allows IT organizations to manage networking, storage and servers (as well as server workloads) that can be dynamically reconfigured and deployed to meet the changing needs of today's data center environment. Specifically, AIM provides IT professionals the ability to:

- Combine new and existing networking, storage devices and servers into a holistic computing solution that enables dynamic allocation of resources to meet application workload requirements.
- Manage physical and virtual resources with a single solution that includes the ability to move workloads seamlessly across hardware platforms for increased availability and scalability.
- Provide virtualization-like functionality to non-virtual (physical) servers, including automated failover, dynamic load balancing and business continuity.
- Integrate existing infrastructure (networking, storage devices and servers) into an AIM solution to provide investment protection and extend the useful life of existing data center assets.
- Significantly decrease the amount of time and people required to deploy hardware and get applications up and running by providing a repeatable, scalable framework for hardware implementation using AIM. Find more information at Dell.com/AIM.

17   Systems management

Dell delivers open, flexible and integrated solutions that help you reduce the complexity of managing disparate IT assets by building comprehensive IT management solutions. Combining Dell PowerEdge Servers with a wide selection of Dell-developed management solutions gives you choice and flexibility, so you can simplify and save in environments of any size. To help you meet your server performance demands, Dell offers Dell OpenManage systems management solutions for:

- Deployment of one or many servers from a single console
- Monitoring of server and storage health and maintenance
- Update of system, operating system and application software

Dell offers IT management solutions for organizations of all sizes — priced and sized appropriately, and supported comprehensively.

Server management

A Dell Systems Management and Documentation DVD are included with the product. ISO images are also available. A brief description of available content:

- **Dell Systems Build and Update Utility:** Dell Systems Build and Update Utility assists in OS install and pre-OS hardware configuration and updates.
- **OpenManage Server Administrator:** The OpenManage Server Administrator (OMSA) tool provides a comprehensive, one-to-one systems management solution, designed for system administrators to manage systems locally and remotely on a network. OMSA allows system administrators to focus on managing their entire network by providing comprehensive one-to-one systems management.
- **Active Directory Snap-in Utility:** The Active Directory Snap-in Utility provides an extension snap-in to the Microsoft Active Directory. This allows you to manage Dell specific Active Directory objects. The Dell-specific schema class definitions and their installation are also included on the DVD.
- **Dell Systems Service Diagnostics Tools:** Dell Systems Service and Diagnostics tools deliver the latest Dell optimized drivers, utilities and operating system-based diagnostics that you can use to update your system.
- **eDocs:** The section includes files for PowerEdge systems, storage peripheral and OpenManage software.
- **Server Update Utility:** In addition to the Systems Management Tools and Documentation, customers have the option to obtain the Server Update Utility DVD. This DVD has an inventory tool for managing updates to firmware, BIOS and drivers for either Linux or Windows varieties.

Embedded server management

The PowerEdge M910 implements circuitry for the next generation of Embedded Server Management. It is Intelligent Platform Management Interface (IPMI) v2.0 compliant. The optional iDRAC (Integrated Dell Remote Access Controller) is responsible for acting as an interface between the host system and its management software and the periphery devices.

The optional upgrade to iDRAC6 provides features for managing the server remotely or in data center lights-out environments.

Advanced iDRAC features require the installation of the optional iDRAC6 Enterprise card.

Lifecycle Controller and Unified Server Configurator

Embedded management is comprised of several interdependent pieces:

- Lifecycle Controller
- Unified Server Configurator
- iDRAC6
- vFlash media

Lifecycle controller powers the embedded management features. It is integrated and tamperproof storage for system-management tools and enablement utilities (firmware, drivers, etc.). It is flash partitioned to support multiple, future-use cases.

Dell Unified Server Configurator (USC) is a local 1:1 graphical user interface embedded on Lifecycle Controller that aids in local server provisioning in a pre-OS environment. For servers with iDRAC Express, the Lifecycle Controller offers OS install, platform updates, platform configuration and diagnostic capabilities. For servers without iDRAC Express, this utility has limited functionality and offers OS install and diagnostics capabilities only.

To access the Unified Server Configurator, press the <F10> key within ten seconds of the Dell logo's appearance during the system boot process. Current functionality enabled by the Unified Server Configurator includes:

Table 16.   Unified Server Configurator features and description

Feature	Description
Faster O/S installation	Drivers and the installation utility are embedded on system, so no need to scour DELL.COM.
Faster system updates	Integration with Dell support automatically directed to latest versions of the Unified Server Configurator, iDRAC, RAID, BIOS, NIC and Power Supply.
Update rollback	Ability to recover to previous "known good state" for all updatable components.
More comprehensive diagnostics	Diagnostic utilities are embedded on system.
Simplified hardware configuration	Detects RAID controller and allows user to configure virtual disk and choose virtual disk as boot device, eliminating the need to launch a separate utility. Also provides configuration for iDRAC, BIOS and NIC/LOM.

iDRAC6 Enterprise

In addition to upgrading the system with a Lifecycle Controller, iDRAC6 Enterprise offers the following key features:

- Graphical web interface
- Standard-based interfaces
- Server sensor monitoring and fault alerting
- Secure operation of remote access functions including authentication, authorization and encryption
- Power control and management with the ability to limit server power consumption and remotely control server power states

- Advanced troubleshooting capabilities
- Scripting capability with Dell's RACADM command line
- Remote video, keyboard and mouse (KVM) control with Virtual Console
- Remote media access with Virtual Media
- Dedicated network interface

Additionally, iDRAC6 can be upgraded by adding the vFlash media card. This is a 1GB Dell branded SD card that enables a persistent 256MB virtual flash partition.

A more detailed feature list for iDRAC6 and vFlash media is outlined below.

Table 17.   Features list for base management functionality, iDRAC and vFlash Media

Feature	Base management functionality	iDRAC6 Enterprise	vFlash Media
IPMI 2.0	✓	✓	✓
Web-based GUI		✓	✓
SNMP		✓	✓
WS-MAN		✓	✓
SMASH-CLP		✓	✓
RACADM command line		✓	✓
Shared/failover network modes	✓	✓	✓
IPv4	✓	✓	✓
VLAN tagging	✓	✓	✓
IPv6		✓	✓
Dynamic DNS		✓	✓
Dedicated NIC		✓	✓
Role-based authority	✓	✓	✓
Local users	✓	✓	✓
Active Directory		✓	✓
SSL encryption		✓	✓
Remote firmware update	✓	✓	✓
Server power control	✓	✓	✓
Serial-over-LAN (with proxy)	✓	✓	✓
Serial-over-LAN (no proxy)		✓	✓
Power capping		✓	✓
Last crash screen capture		✓	✓
Boot capture		✓	✓
Serial-over-LAN		✓	✓
Virtual Media		✓	✓
Virtual Console		✓	✓

Feature	Base management functionality	iDRAC6 Enterprise	vFlash Media
Virtual Console sharing		✓	✓
Virtual flash			✓
Sensor monitoring and alerting	✓	✓	✓
Real-time power monitoring		✓	✓
Real-time power graphing		✓	✓
Historical power counters		✓	✓
System event log	✓	✓	✓
RAC log		✓	✓
Trace log		✓	✓

Chassis Management Controller (CMC)

See the *PowerEdge M1000e Technical Guide*.

18 Peripherals

USB peripherals

The PowerEdge M910 provides an internal USB connector for a USB flash memory key. The USB memory key can be used as a boot device, security key, or mass storage device.

External storage

By use of the appropriate IOMs in the M1000e chassis and mezzanine card(s) in the M910 blade, the following external storage options are available:

Disk Storage Options:

- Dell/EqualLogic™ PS series
- Dell PowerVault™ NX series
- PowerVault MD3000i

Dell/EMC products:

- Dell/EMC fibre channel and/or iSCSI external storage, including Dell/EMC CX series, AX series and NS series

Appendix A. Certifications

Regulatory certifications

To find regulatory compliance certificates, visit the Product Safety, EMC and Environmental Datasheets pages on Dell.com.

Product Safety certifications

The product has been certified and bears the Mark, as applicable, of the Product Safety authorities as indicated in Table 18.

Table 18.   Product safety certifications

Country/Region	Authority or mark
Argentina	IRAM
Belarus	BELLIS
Canada	SCC
China	CNCA or CCC
Croatia	KONCAR
European Union	CE
Germany	TUV
IECEE	IECEE CB
Israel	SII
Kazakhstan	OTAN — CKT
Kenya	KEBS
Kuwait	KUCAS
Mexico	NYCE or NOM
Moldova	INSM
Nigeria	SONCAP
Norway	NEMKO
Russia	GOST
Saudi Arabia	KSA ICCP
South Africa	NRCS
Taiwan	BSMI
Ukraine	UKRTEST or UKRSERTCOMPUTER
United States	NRTL
Uzbekistan	STZ

Electromagnetic compatibility

The product has been certified and bears the Mark, as applicable, of the EMC authorities as indicated in Table 19.

Table 19.   Electromagnetic compatibility certifications

Country/Region	Authority or mark	Class
Australia/New Zealand	ACMA or C-Tick	Class A
Belarus	BELLIS	Class A
Bosnia & Herzegovina, Montenegro, Serbia	KVALITET	Class A
Canada	ICES	Class A
China	CNCA or CCC	Class A
Croatia	KONCAR	Class A
European Union	CE	Class A
Israel	SII	Class A
Japan	VCCI	Class A
Kazakhstan	OTAN — CKT	Class A
Moldova	INSM	Class A
Norway	NEMKO	Class A
Russia	GOST	Class A
South Africa	SABS	Class A
South Korea	KCC	Class A
Taiwan	BSMI	Class A
Ukraine	UKRTEST or UKRSERTCOMPUTER	Class A
United States	FCC	Class A
Uzbekistan	STZ	Class A
Vietnam	ICT	Class A

Ergonomics, acoustics and hygienics

The product has been certified and bears the Mark, as applicable, of the Ergonomics, Acoustics and Hygienics authorities as indicated in Table 20.

Table 20.   Ergonomics, acoustics and hygienics

Country/Region	Authority or mark
Belarus	BELLIS
Germany	GS
Russia	GOST

Appendix B. Industry standards

The PowerEdge M915 system conforms to the industry standards detailed in Table 21.

Table 21.   Industry standards

Standard	URL with information and specifications
ACPI Advance Configuration and Power Interface Specification, v2.0c	acpi.info
Energy Star EPA Version 1.0 of the Computer Server Specification	energystar.gov/index.cfm?c=archives.enterprise_servers
Ethernet IEEE 802.3-2005	standards.ieee.org/getieee802/802.3.html
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	pcisig.com/specifications/pciexpress
PMBus Power System Management Protocol Specification, v1.1	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, v2.6	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 with information and specifications
Windows Logo Windows Logo Program System and Device Requirements, v3.10	microsoft.com/whdc/winlogo/hwrequirements.mspx