

PowerEdge C5220 Rack Server



Technical Guide



- Powered by the Intel Xeon processor E3-1200 or E3-1200 v2 product families
- Designed for hosting, CDN and web 2.0 environments
- Shared infrastructure for reduced space, power and cooling
- Eight or 12 sleds with single-socket server nodes

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1 System overview

The Dell™ PowerEdge™ C5220 server is the second in Dell's new class of servers called microservers. With eight or 12 nodes in a 3U form factor, the Power Edge C5220 microserver features right-sized performance with the single-socket Intel® Xeon® processor E3-1200 product family or E3-1200 v2 product family, Intel Core™ i3-2120 processor, Intel Pentium® processor 350, Intel C204 chipset, DDR3 ECC memory, SD card reader and dual-port embedded Gigabit Ethernet (GbE) controllers.

- 8-sled microserver features include:
 - Intel Xeon processor E3-1200 product family: Supports all microservers, including 80W and 95W thermal design power (TDP), and a mezzanine card option
 - Intel Xeon processor E3-1200 v2 product family: Supports all TDPs in the server CPU stack (except E3-1290v2) and a mezzanine card option
- 12-sled microserver features include:
 - Intel Xeon processor E3-1200 product family: Supports microservers up to 65W TDP
 - Intel Xeon processor E3-1200 v2 product family: Supports all microservers (except E3-1290 v2), including 65W TDP
- Dell PowerEdge C5000 chassis:
 - Depending on the sled version, the chassis supports up to eight or 12 individually serviceable servers.
 - Microservers can be configured differently from other servers within the same chassis.
 - All sleds and power supplies are cold-aisle serviceable.
 - Each chassis can be configured with a minimum of four sleds.
 - Empty slots are filled with blank sleds.

Key technologies

Up to eight or 12 PowerEdge C5220 microservers are featured in a PowerEdge C5000 3U form factor chassis. Powered by the Intel Xeon processor E3-1200 and E3-1200 v2 product families, the PowerEdge C5220 was developed for the demands of dedicated and virtual hosting, content delivery networks (CDN) and Web 2.0 applications.

This third-generation microserver builds on your requirement to do more with less by capturing all-important power-saving features in a highly dense architecture and right-sizing computing performance to help you to increase the revenue per square foot in your data center.

With an expanded list of features and storage options, including an optional mezzanine card to enable expansion, the PowerEdge C5220 microserver can handle a wide range of lighter weight workloads without compromising on performance for your applications.

The PowerEdge C5000 chassis' shared infrastructure is designed to help save energy, space and weight to deliver a denser microserver. By sharing power supplies, fans and cables across 12 server nodes, the PowerEdge C5000 chassis is designed to enhance energy efficiency and reduce operating costs. In addition to the 94% efficient hot-plug redundant power supplies, PowerEdge C microservers have shared high-efficiency fans.



Table 1 lists the key technologies for the PowerEdge C5220 server.

Table 1. Key technologies

Key technologies	Detailed descriptions
Intel Xeon processor E3-1200 and E3-1200 v2 product families	This new family of Intel processors has embedded PCI Express® (PCIe) lanes for improved I/O performance. See the Processor section for details.
Intel C204 series chipset	Offers new levels of cost-effective protection, performance, expanded security, virtualization and power management options.
1600MT/s DDR3 memory	The PowerEdge C5220 uses DDR3 memory, providing high performance, a high-speed memory interface capable of low-latency response, and high throughput. Supports unbuffered ECC DDR3 DIMMs (UDIMMs).
Next-generation PERC options	The PowerEdge C5220 supports the new PERC controller cards with improved functionality and faster performance. See the Storage section for details.
Advanced power management	The PowerEdge C5220 supports advanced power monitoring and power capping tools that can help manage power consumption. See the Power section for details.
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 section for details.

Product comparison

The PowerEdge C5220 is designed for customers seeking more processing power, higher memory capacity, SAS drives, hardware RAID and PCIe expansion versus the Dell PowerEdge C5125 microserver for their lightweight applications that do not require the compute horsepower of two-socket or four-socket servers. They can use these in hosting, Web 2.0 and CDN environments, and certain HPC applications. Key differentiators include:

- Ultra dense: Up to 12 one-socket servers in a 3U form factor
- Cold-aisle serviceability for servers and power supplies
- Shared infrastructure benefits such as one-sixth the amount of fans, 36% less power and a third of the power to cool compared to power and cooling for 12 1U servers
- Individually serviceable servers
- Potential for customers to grow their business with a minimum order of four sleds
- Flexibility to support different PowerEdge C5220 server configurations within the same chassis

The PowerEdge C5220 is the second in a new class of microservers. Table 2 compares the features of the PowerEdge C5220 to the PowerEdge C5125 and PowerEdge R210 II systems.



Table 2. Comparison of PowerEdge R210 II, C5125 and C5220

Specification	PowerEdge R210 II	PowerEdge C5125	PowerEdge C5220
Chassis	1U rack	3U rack with up to 12 microservers	3U rack with up to 12 microservers
Processors	Intel Xeon E3-1200 and Intel Xeon E3-1200 v2 product families Intel Core i3-2100 series Intel Pentium processor G600 and G800 series Intel Celeron® processor G400 and G500 series	AMD Phenom™ II X4 AMD Athlon™ II X4 and X2	Intel Xeon E3-1200 and Intel Xeon E3-1200 v2 product families Intel Core i3-1220 Pentium 350
Front side bus (FSB)	N/A	N/A	N/A
Memory¹	4 x 1GB/2GB/4GB/8GB DDR3 1333MT/s 4 x 2GB/4GB/8GB DDR3 1600MT/s UDIMM ECC	4 x 2GB/4GB DDR3 1333MT/s UDIMM ECC	4 DIMM slots for up to 32GB 2GB/4GB/8GB DDR3 ECC UDIMM (1600MT/s 1.35V and 1.5V; 1333MT/s 1.35V)
Hard drive bays	2x 3.5" or 4x 2.5" SATA, SDD, NL SAS, SAS	2x 3.5" or 4x 2.5" SATA	2x 3.5" or 4x 2.5" SATA, SSD, NL SAS, SAS
External drive bay	1 slimline optical drive	None	None
Embedded hard drive controller	Onboard C202 (embedded SW RAID)	SP5100 onboard	Onboard C204 (embedded SW RAID)
RAID controller	Depending on controller: RAID 0, 1, 5, 10	None	Intel C204: 0, 1, 5, 10 LSI® 2008 SAS: 0, 1, 1E, 10
Optional storage controller	Non-RAID: 6Gbps SAS HBA RAID: PERC S100 (SW RAID) PERC S300 (SW RAID) PERC H200 PERC H800	None	RAID: LSI 2008 (8-sled form factor only)
Express Flash drives	N/A	N/A	N/A
PCIe slots	1 x PCIe x16	None	1 x8 mezzanine (8-sled form factor)
Embedded NIC	1x Broadcom® 1GbE 5716C LOM	2x Intel 1GbE 82576EB LOM	2x Intel 1GbE 82580DB LOM



Specification	PowerEdge R210 II	PowerEdge C5125	PowerEdge C5220
Power supplies	Single power supply 250W	N+1 redundant hot-pluggable platinum 1400W	1+1 redundant hot-pluggable platinum 1400W
Fans	3 system fans non-redundant non-hot-pluggable	2 x 60 mm (sleds)/ 2 x 60 (PSUs) non-redundant non-hot-pluggable	2 x 60 mm (sleds)/ 2 x 60 (PSUs) non-redundant non-hot-pluggable
Systems Management	BMC, IPMI 2.0 compliant, full Dell OpenManage™ suite Optional: iDRAC6 Express, iDRAC6 Enterprise, vFlash media	BMC, IPMI 2.0 compliant	BMC, IPMI 2.0 compliant

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

²For 8-sled form factor only. 1600MT/s VLP DIMMs available in Q2 FY13.

Specifications

Table 3 summarizes the product features for the PowerEdge C5220. For the latest information on supported features for the PowerEdge C5220, visit Dell.com/PowerEdgeC.

Table 3. Technical specifications

Feature	PowerEdge C5220 technical specification
Form factor	3U rack mount chassis supporting 12 sleds
Sled types	Double-wide supporting up to 8 sleds Single-side supporting up to 12 sleds
Processors	1-socket, 2 or 4 cores per processor Intel Xeon E3-1200 and E3-1200 v2, Intel Core i3-2120, and Intel Pentium 350
Processor sockets	Up to 12 2-core or 4-core processors in a single PowerEdge C5000 chassis
Internal interconnect	2 Intel QuickPath Interconnect (QPI) links: 6.4GT/s, 7.2GT/s, 8.0GT/s
Cache	Up to 20MB with L3 cache; core options: 2, 4, 6, 8
L2/L3 cache	Intel Core i3-2120 and Intel E3-1220L L2/L3 cache: 3MB Intel E3-12xx L2/L3 cache: 8MB
Chipset	Intel C204
Memory	4 DIMM slots for up to 32GB: 2GB/4GB/8GB; 1600MT/s 1.35V and 1.5V; 1333MT/s 1.35V



Feature	PowerEdge C5220 technical specification
I/O slots	1 x8 PCIe mezzanine card slot (only available on the 8-sled version) Intel 82580DB dual-port 1GbE adapter (optional) Intel X540-AT2 dual-port 10GbE Base-T (mezzanine option)
Drive controller	Onboard Intel C204 or LSI 2008 SAS (mezzanine option)
RAID controller	Intel C204 RAID: 0, 1, 5, 10, LSI 2008 SAS RAID: 0, 1, 1E, 10
Hard drives (hot-plug)	Drive bay options: Up to 4 x 2.5" or up to 2 x 3.5" Hard drive options: 2.5" SATA (7.2K): 500GB, 1TB 2.5" SAS (10K): 300GB, 600GB, 900GB, 1.2TB 2.5" SAS (15K): 146GB, 300GB 2.5" SSD (eMLC): 100GB, 200GB, 400GB 2.5" SATA SSD (MLC): 120GB, 160GB, 240GB, 300GB, 480GB 3.5" SATA (7.2K): 500GB, 1TB, 2TB, 3TB, 4TB 3.5" NL SAS (7.2K): 1TB, 2TB, 3TB, 4TB 3.5" SAS (15K): 450GB, 600GB
Embedded Network Adapter	2x Intel 1GbE 82580DB
I/O adapter options	x8 PCIe mezzanine card slot (only available on the 8-sled version) Intel 82580DB dual-port 1GbE adapter (optional) Intel X540-AT2 dual-port 10GbE Base-T (mezzanine option)
Operating systems	Microsoft® Windows Server® 2012 Microsoft Windows Server 2012 R2 (includes Hyper-V®) Microsoft Windows Server 2008 R2 Enterprise x64 SP1 (includes Hyper-V) Microsoft Windows® HPC Server 2008 R2 x64 SP1 Novell® SUSE® Linux® Enterprise Server 11 SP1 Red Hat® Enterprise Linux Virtualization options: Citrix® XenServer® Microsoft Hyper-V, a server role in Microsoft Windows Server operating systems VMware® vSphere® ESXi™
Power supplies	Two hot-plug redundant platinum 1400W power supplies
USB	Option: Y cable featuring 2x USB ports
Fans	N+1 redundant cooling with 6 x 120 mm for the sleds and 2 x 60 mm for the PSUs. Fan speeds are detectable with PWM control.
Server management	Embedded BMC with IPMI 2.0 support with 1 x 1GbE RJ45 connector on the chassis (dedicated) or the 1 x 1GbE port (shared) on the individual sled
Rack support	ReadyRails™ static rails for tool-less mounting with a PowerEdge C5000 rail kit. Mounted in 4-post racks with square or unthreaded round holes in a 19-inch EIA-310-E compliant rack including all Dell 42xx and 24xx racks. Note: APC racks are also supported.



2 Chassis views and features

The Dell PowerEdge C5220 is a 3U rack microserver chassis that is available in two versions:

- One supports up to eight double-wide sleds
- One supports up to 12 single-wide sleds

A PowerEdge C5220 system consists of the PowerEdge C5000 enclosure and an optional number of PowerEdge C5220 compute sleds.

Front views

The features on the front of the PowerEdge C5220 include a VGA/USB connector, NIC LAN ports, power button and service tag.

Figure 1. Front view with 12 sleds in a PowerEdge C5000 chassis



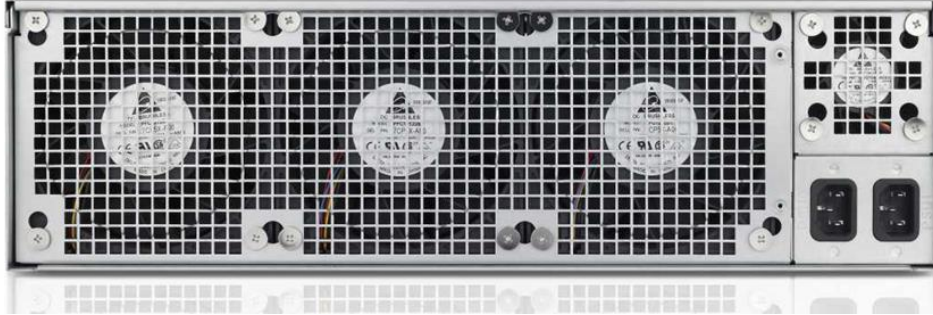
Figure 2. Front view with eight sleds in a PowerEdge C5000 chassis



Back view

The features on the front of the PowerEdge C5220 include two fan cages, six main fans, two secondary fans, and power sockets.

Figure 3. Back view with four server nodes



Internal view

Figure 4 is the internal view of the PowerEdge C5000 with PowerEdge C5220 servers.

Figure 4. Internal view of the PowerEdge C5000 with PowerEdge C5220 servers



Chassis features

Table 4 lists the features on the PowerEdge C5220 chassis. For additional information on the chassis features, see the *Dell PowerEdge C5220 Systems Hardware Owner's Manual* on Dell.com/Support/Manuals.

Table 4. Chassis features

Feature	Description
VGA/USG connector	Custom port with custom Y cable
NIC LAN ports	10/100/1GbE NIC LAN
1Gb LAN	LAN for system management



Feature	Description
Sleds	Optional sled configurations, up to 8 or up to 12
Power button	On/Off button for sled
Network activity LED	Indicates active when blinking green
Network link LED	Indicates link established when green
Power supply indicators LEDs	Green indicates normal operation and amber indicates fault
Power sockets 1 and 2	Power socket connectors for PSU1 and PSU2 (back panel)
Fans	Six-fan grill for sleds and two-fan grill for PSUs (back panel)

Compute sled options

The Power Edge C5220 offers individually serviceable 12-sled and 8-sled options.

Figure 5 shows a side view of the 12-sled, single-width form factor. This sled option supports up to two 3.5-inch (shown in this figure) or four 2.5-inch hot-plug hard drives, four DIMM slots, and one single-socket processor with up to 65-watt TDP support.

Figure 5. Side view of 12-sled configuration

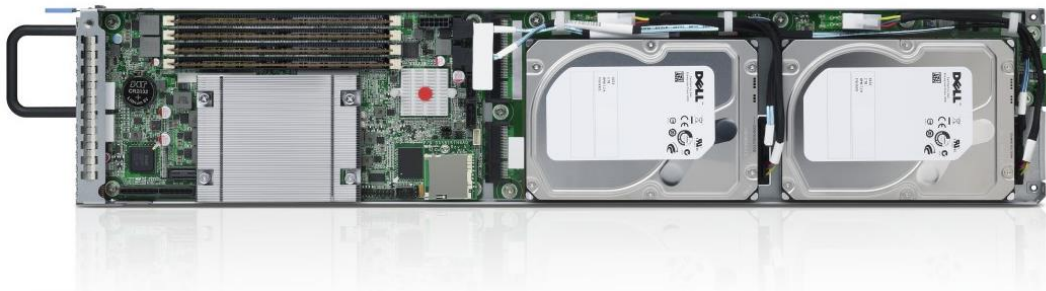


Figure 6 shows a side view of the 8-sled, double-width form factor. This sled option supports up to two 3.5-inch or four 2.5-inch (shown in this figure) hot-plug hard drives, four DIMM slots, one single-socket processor with up to 80-watt or 95-watt TDP support, and optional mezzanine card. For information about add-in card options and connectors, see the Storage section.

Figure 6. Side view of 8-sled configuration



Fans

The PowerEdge C5000 chassis has two 60 mm PSU fans and six 120 mm sled fans. As shown in Figure 7, both of these fan banks are located at the rear of the chassis behind the chassis midplane. Fans are N+1 non-redundant and are not hot-pluggable.

Figure 7. PowerEdge C5000 fans



For more information, see the *Dell PowerEdge C5220 Systems Hardware Owner's Manual* on Dell.com/Support/Manuals.



3 Processor

The PowerEdge C5220 features the new Intel Xeon processor E3-1200 v2 product family, as well as the Intel Xeon processor E3-1200 product family, the Intel Core i3-2120 processor and the Intel Pentium processor 350. The processors feature two or four cores, support for 32GB memory and significant performance improvement (up to 20 percent) over the previous generation.

The processor uses the 1155 LGA package that plugs into the H2 socket. Each PowerEdge C5220 supports only one processor per sled.

Processor features

The new Intel Xeon processor E3-1200 v2 product family adds the following features:

- Built on 22nm process
- Support for 1600MT/s memory
- Lower TDPs with the previously 80W E3-1200 processors, now 69W with the E3-1200 v2 (lowest TDP is now 17W with the E3-1220L v2)

The Intel Xeon E3-1200 product family features include:

- Intel Microarchitecture with industry-leading Intel silicon technology (32 nm Hi-k process technology)
 - Large on die-cache:
 - > Up to 8MB LLC on Quad Core
 - > Up to 3MB LLC on Dual Core
 - Reduced transistor gate leakage
- Intel Turbo Boost Technology 2.0, which automatically adjusts processor performance based on current workload
 - Quicker transitions to and from processor sleep states improve energy efficiency
- Integrated memory controller (IMC) with two channels of DDR3 memory for 1333MT/s support
- Intel Hyper-Threading Technology for more efficient use of processor resources and improved application performance
 - Four cores/eight threads
 - Two cores/four threads
- Intel AES New Instructions (Intel AES-NI) to accelerate data encryption and decryption
- Support for ECC memory
- Low-power CPU options as low as 20TDP

For more information on the Intel Xeon, Core and Pentium processor families, visit Intel.com.

Supported processors

The PowerEdge C5220 supports a single, two- or four-core processor. Table 5, Table 6 and Table 7 list the processors that the PowerEdge C5220 supports. For the latest information on supported processors, visit Dell.com/PowerEdgeC.



Table 5. Supported processors — Intel Xeon E3-1200

Model	Clock speed	Maximum TDP	Cache	Cores	QPI speed	Memory support	Turbo
E3-1280*	3.5GHz	95W	8MB	4/8	3.9GT/s	1333MT/s	Yes
E3-1270*	3.4GHz	80W	8MB	4/8	3.8GT/s	1333MT/s	Yes
E3-1260L	2.4GHz	45W	8MB	4/8	3.3GT/s	1333MT/s	Yes
E3-1240*	3.3GHz	80W	8MB	4/8	3.7GT/s	1333MT/s	Yes
E3-1230*	3.2GHz	80W	8MB	4/8	3.6GT/s	1333MT/s	Yes
E3-1220L	2.2GHz	20W	3MB	2/4	3.4GT/s	1333MT/s	Yes
E3-1220*	3.1GHz	80W	8MB	4/4	3.4GT/s	1333MT/s	Yes

*Indicates processors that are only available with the 8-sled form factor. All other processors are available on both sleds.

Table 6. Supported processors — Intel Xeon E3-1200 v2

Model	Clock speed	Maximum TDP	Cache	Cores	QPI speed	Memory support	Turbo
E3-1280v2	3.6GHz	69W	8MB	4/8	4.0GT/s	1333/1600MT/s	Yes
E3-1270v2	3.5GHz	69W	8MB	4/8	3.8GT/s	1333/1600MT/s	Yes
E3-1265Lv2	2.5GHz	45W	8MB	4/8	3.5GT/s	1333/1600MT/s	Yes
E3-1240v2	3.4GHz	69W	8MB	4/8	3.8GT/s	1333/1600MT/s	Yes
E3-1230v2	3.3GHz	69W	8MB	4/8	3.7GT/s	1333/1600MT/s	Yes
E3-1220Lv2	2.3GHz	17W	3MB	2/4	3.5GT/s	1333/1600MT/s	Yes
E3-1220v2	3.1GHz	69W	8MB	4/4	3.5GT/s	1333/1600MT/s	Yes

Table 7. Supported processors — Intel Core i3-2120 and Intel Pentium 350

Model	Clock speed	Maximum TDP	Cache	Cores	QPI speed	Maximum memory speed	Turbo
Intel Core i3-2120	3.3GHz	65W	3MB	2/4	N/A	1333MT/s	No
Intel Pentium 350	1.2GHz	15W	3MB	2/4	N/A	1333MT/s	No

For information on processor installation and configuration, see the *Dell PowerEdge C5220 Systems Hardware Owner's Manual* on Dell.com/Support/Manuals.

GPU support

GPUs are not supported in the PowerEdge C5220.

Chipset

The Intel C204 chipset is implemented on the PowerEdge C5220. For more information, visit Intel.com.



4 Memory

The PowerEdge C5220 uses DDR3 memory to provide a high-performance, high-speed memory interface capable of low latency response and high throughput. The PowerEdge C5220 uses DDR3 memory, providing high performance, a high-speed memory interface capable of low-latency response, and high throughput. The PowerEdge C5220 supports unbuffered ECC DDR3 DIMMs (UDIMMs) only.

Each server contains four memory sockets for the single processor. The DDR3 memory interface is organized into four DIMM slots, with up to two UDIMMs per channel in two configurations:

- 12-sled version: PowerEdge C5220 supports 2GB, 4GB and 8GB very low profile (VLP) UDIMMs operating at 1333MT/s and 1600MT/s.
- 8-sled version: PowerEdge C5220 supports 2GB, 4GB and 8GB regular form factor UDIMMs operating at 1333MT/s and 1600MT/s.

Note: Only E3-1200 v2 series processors support a speed of 1600MT/s.

Supported memory

Table 8 lists the DIMMs supported by the PowerEdge C5220. For the latest information on supported memory, visit Dell.com/PowerEdgeC.

Table 8. DIMMs supported

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

Memory configurations

For more information on memory configuration, see the *Dell PowerEdge C5220 Systems Hardware Owner's Manual* on Dell.com/Support/Manuals.

Memory speed

The PowerEdge C5220 supports memory speeds of 1600MT/s or 1333MT/s depending on the DIMM types installed and the configuration. All memory on all processors and channels run at the same speed and voltage. By default, the systems run at the highest speed for the channel with the lowest DIMM voltage and speed. The operating speed of the memory is also determined by the maximum speed supported by the processor, the speed settings in the BIOS, and the operating voltage of the system.

Although the PowerEdge C5220 supports DIMM speeds of 1066MT/s, you can only purchase these systems with DIMM speeds of 1333MT/s and 1600MT/s on Dell.com/PowerEdgeC.



5 Storage

Each PowerEdge C5220 8-sled and 12-sled microserver can support a maximum of four 2.5-inch SATA/SSD/SAS or two 3.5-inch SATA/SAS drives. The drives are not hot-pluggable as they are embedded on each sled. Depending on which form factor of drive is used, the following hard drive boards are installed in the individual sleds:

- 2.5-inch hard drives boards plug directly into the sled with the SATA onboard connectors. Each 2.5-inch drive is supported by a metal bracket that sits between the hard drive and the sled.
- 3.5-inch hard drives using a hard drive board require the cables to connect to the PowerEdge C5220 system board SATA connectors.

In addition, the PowerEdge C5220 has an SD slot located on the PCIe riser for loading an embedded hypervisor.

PowerEdge C5220 SD card reader

The PCIe risers on the PowerEdge C5220 include an SD card reader slot. Cards installed in this slot can be used for storing an embedded hypervisor.

PowerEdge C5220 hard drive cable routing

- When using the 3.5-inch hard-drive board, the hard drives require hard drive cables to connect to the PowerEdge C5220 MB SATA connectors.
- The connector on the system board side provides an electrical connection for hard drive board. The PowerEdge C5220 uses the PCIe x8 and PCIe x4 connectors on the system board side to route both I/O signals (STA, LAN and sideband signal) and power rails from the hard drives.

Internal storage

The PowerEdge C5220 supports up to four hard drives per server node depending on the number of installed nodes (2–4) and the backplane type (2.5-inch direct, 2.5-inch expander or 3.5-inch expander).

- Support for 7.2K, 10K and 15K RPM 2.5-inch and 3.5-inch SAS drives
- Support for 7.2K RPM Enterprise 2.5-inch and 3.5-inch SATA drives

Table 9 lists PowerEdge C5220 hard drive options. For additional information, see Dell.com/PowerEdgeC.

Table 9. Supported hard drives

Form factor	Type	Speed (rpm)	Capacities
3.5"	SATA (3Gb)	7.2K	500GB, 1TB, 2TB, 3TB, 4TB
	SAS (6Gb)	15K	450GB, 600GB
	Nearline SAS (6Gb) (requires the LSI 2008 SAS controller)	7.2K	1TB, 2TB, 3TB, 4TB



Form factor	Type	Speed (rpm)	Capacities
2.5"	SATA (3Gb)	7.2K	500GB, 1TB
	SAS (6Gb)	10K	300GB, 600GB, 900GB, 1.2TB
	SAS (6Gb)	15K	146GB, 300GB
	SATA SSD	MLC*	120GB, 160GB, 240GB, 300GB, 480GB
	SATA SSD	(eMLC)	100GB, 200GB, 400GB

*Multi-level cell flash memory

RAID configurations

The PowerEdge C5220 supports RAID configurations, but only as a user-configurable option. See the available RAID options listed in Table 10.

Table 10. RAID support

Controller	Supported RAID levels
Embedded Intel C204 chipset-based SATA¹	RAID 0, 1, 5, 10
LSI 2008 mezzanine at 3Gbps²	RAID 0, 1, 1E, 10

¹ When using Intel Software RAID with RHEL 6.x, it will work only when "Legacy Mode" is selected in the BIOS. It is the default setting. If the setting is changed to UEFI, Intel Software RAID is not supported by Red Hat 6.x.

² Optionally available for only the 8-sled form factor.

Storage controllers

The PowerEdge C5220 features only the Intel C204 as the onboard SATA controller. With the eight-sled version, the PowerEdge C5220 can also support the LSI 2008 mezzanine card.

Onboard controller (Intel C204)

The embedded controller is included in the Intel C204 chipset.

- Supported protocols: SATA only
- Intel VT-d extensions
- Cache: None
- Battery: None
- RAID level: RAID 0, 1, 5
- RAID spans: 10
- Device Type: Onboard controller
- PCI Interface: x4 DMI
- Ports: 4
- DMI 2.0 x4
- USB: 2.0
- Node Manager and DCMI options
- Integrated MAC



LSI 2008 mezzanine card

The PowerEdge C5220 supports an internal LSI 2008 mezzanine as an expansion card that plugs into a dedicated mezzanine connector (PCIe x8 2.0). It is a SAS/SATA adapter with full support for the 3.5-inch and 2.5-inch hard drive integrated RAID support, and 6Gb SAS using LSI 2008 processors. It features two internal x4 mini-SAS ports.

- Storage controller: LSI SAS 2008
- Supported protocols: SATA and SAS
- RAID level: RAID 0, 1, JBOD
- RAID spans: 10
- Device type: PCIe mezzanine card
- PCI interface: PCIe 2.0 x8 lanes
- Ports: 8
- Interface type: 2 MiniSAS SFF-8087 x4 connectors
- Interfaces transfer rate: Up to 3Gbps per port

Table 11. PCIe slot configuration by drive controller

Factory hard drive controller configuration	Card type	LP x8 2.0 slot
LSI 2008	Mezzanine	LP available

Optical drive

The PowerEdge C5220 does not feature an optical drive. Any external USB 2.0 compliant drive can be used if needed, only with the use of the Y cable.

The PowerEdge C5220 has a special connector for a Y cable that features two USB ports as well as a VGA connector. This is optional as a customer kit. It is not automatically included with the system.

Tape drive

The PowerEdge C5220 chassis does not support an internal tape drive.



6 Networking and I/O

For the latest information on PowerEdge C5220 supported cards, visit Dell.com/PowerEdgeC.

Embedded NIC/LAN on motherboard (LOM)

The PowerEdge C5220 has two Intel 82580DB dual-port GbE controllers installed on the system board as independent Ethernet interface devices. From a board perspective, the LOM refers to these controllers. Other features include:

- x4/x2/x1 PCIe 2.0 capable interface
- Power 2.8W (max) in dual port mode and 4.2W (max) in quad port mode
- DMA Coalescing, Smart Power Down (SPD) and Active State Power Management (ASPM)
- I/O virtualization
- Eight transmit and receive queue pairs per port
- Flexible port partitioning
- SR-IOV support
- Stateless offloads
- TCP/UDP IPv4 checksum offloads
- IPv6 support for IP/TCP and IP/UDP receive checksum offload
- Tx TCP segmentation offload
- Low latency interrupts
- Remote boot
- PXE 2.1 remote boot
- iSCSI boot
- Wake-up support
- Wake-on-LAN (WOL)
- ACPI specification v2.0c
- Magic Packet wake-up enable with unique MAC address
- IPv4 and IPv6 support
- Supports teaming

I/O slots

The PowerEdge C5220 supports one x8 PCIe 2.0 mezzanine card slot on only the 8-sled version.

- LSI 2008 SAS controller
- Intel dual-port 1GbE NIC
- Intel dual port 10GbE NIC

These cards require a linking board installation. The Intel mezzanine cards use the same linking boards and the LSI SAS mezzanine card uses a unique linking board.

Note: The 12-sled version does not support PCIe slots because of space and thermal constraints.



Table 12 lists the supported mezzanine cards.

Table 12. Supported mezzanine controller and NIC cards

Card type	Interface
LSI 2008 8-port SAS	Mezzanine slot
Intel X540-AT2 dual-port 10GbE Base-T	Mezzanine slot
Intel X540-AT2 dual-port 10GbE Base-T	Mezzanine slot

For the latest information on PowerEdge C5220 supported PCIe expansion cards, visit Dell.com/PowerEdgeC.



7 Power

Lower overall system-level power draw is a result of Dell's breakthrough system design. PowerEdge servers maximize performance per watt through a combination of power and cooling, energy efficient technologies, and tools. Additionally, PowerEdge servers have 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 13 lists the tools and technologies Dell offers to help you achieve your data center goals by lowering power consumption and increasing energy efficiency.

Table 13. Power tools and technologies

Feature	Description
Tools for right-sizing	Energy Smart Solution Advisor (ESSA) is a tool that can help 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 power supply Advisor can help you choose the best, most efficient power supply 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	Power supply power monitoring improvements include: <ul style="list-style-type: none">• Power monitoring accuracy of 1%, whereas the industry standard is 5%• More accurate reporting of power• Better performance under a power cap
Power capping	Use Dell's systems management to set the power cap limit for your systems to limit the output of a power supply and reduce system power consumption. Dell is the first hardware vendor to leverage Intel Node Manager for circuit-breaker fast capping.
Active power management	Intel Node Manager is an embedded technology that provides individual server-level power reporting and power limiting functionality. 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.



Feature	Description
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) without impacting your availability model. This solution takes into account servers, networking, storage and other infrastructure. Find additional information at Dell.com/FreshAir .
Rack infrastructure	Dell offers some of the industry's highest efficiency power infrastructure solutions, including: <ul style="list-style-type: none"> • Power distribution units (PDUs) • Uninterruptible power supplies (UPS) • 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 base redundant system consists of two hot-plug power supplies in a 1+1 configuration available at 1400W.

Table 14. Power supply efficiency

Form factor	Output	Class	Efficiency targets by load		
			20%	80%	100%
Redundant 86 mm	1400W AC	Platinum+	91.0%	91.0%	90.0%

System power supply throttling feature

The PowerEdge C5220 supports a power supply throttling feature that protects the system if power consumption exceeds the maximum for the supply (1400W). In configurations where power consumption is greater than the maximum, redundancy is lost, and the PowerEdge C5220 throttles power consumption of the two or four independent nodes to stay within the power budget. Performance is degraded in this mode but the system continues to operate. After you replace the failed power supply, redundancy is restored and all nodes resume normal operation.



8 Rack information

Rack installation components such as rails are provided with the PowerEdge C5220 rack kit. The components consist of a static rail system; there is no support for a cable management arm.

Rails

The static rails allow for tool-less installation in 19-inch EIA-310-E compliant square or unthreaded round hole four-post racks. These include all Dell 42xx and 24xx racks. (Note: APC racks are also supported.) Other specifications include:

- Rail depth: 602 mm
- Square-hole and round-hole rack adjustment range: 582–822 mm



9 Operating systems and virtualization

The Dell PowerEdge C5220 supports a wide range of industry standard operating systems and virtualization software.

Supported operating systems

The PowerEdge C5220 supports the following operating systems:

- Microsoft Windows Server 2012
- Microsoft Windows Server 2012 R2 (includes Hyper-V)
- Microsoft Windows Server 2008 R2 Enterprise x64 SP1 (includes Hyper-V)
- Microsoft Windows HPC Server 2008 R2 x64 SP1
- Novell SUSE Linux Enterprise Server 11 SP1
- Red Hat Enterprise Linux

Supported virtualization

The PowerEdge C5220 supports the following virtualization hypervisors:

- Citrix XenServer
- Microsoft Hyper-V, a server role in Microsoft Windows Server operating systems
- VMware vSphere ESXi



10 Systems management

Systems management for the PowerEdge C5220 is through third-party solutions only. There is no Dell OpenManage support for server management at this time.

The throughput for the various ports is:

- Chassis port upstream is 1GbE
- Chassis port downstream to each server's BMC is 10/100
- BMC shared port on each server is 10/100

Each PowerEdge C5220 server features an onboard BMC along with the AST2050, which provides iKVM capability.

Dedicated BMC management is provided with the RJ45 port on the PowerEdge C5000 chassis. Each sled is accessible.

Each server can be configured to use the dedicated port. That port has a network-like switch in the back of midplane that can talk to all the sleds BMCs. Each dedicated BMC has its own IP address.

As an alternative, shared management is supported through the bottom RJ45 port (NIC 1) on the sled itself. The default configuration for this is DHCP, so once it has an IP address, communication to the server through a browser is established.

Chassis management

There is no PowerEdge C5000 chassis management. Only basic monitoring of fans and power supplies (for example, power status and fan speed) is available. For more advanced fan and power management control, please use the server BMC. Monitoring data is read by any of the servers' BMC.

Embedded server management

The PowerEdge C5220 supports BMCs that comply with IPMI v2.0. The PowerEdge C5220 BMC provides the following features for managing the server remotely or in data center lights-out environments:

- Out-of-band monitoring and control for server management over LAN
- Dedicated NIC for remote management through network (through the RJ45 port on the PowerEdge C5000 chassis)
- FRU information report, which includes main board part number, product name, manufacturer and more
- Health status/hardware monitoring report
- Sled management, which includes power control, status report, front panel buttons and LED control
- View and clear events log
- Event notification by lighting chassis LED indicator and Platform Event Trap (PET)
- Platform Event Filtering (PEF) to take selected action for selected events, including nonmaskable interrupt (NMI)
- Watchdog and auto server restart and recovery
- Support for multisection and user and alert destination for LAN channel



Appendix A. Additional specifications and options

System dimensions

Figure 8 and Table 15 detail the dimensions of the PowerEdge C5220.

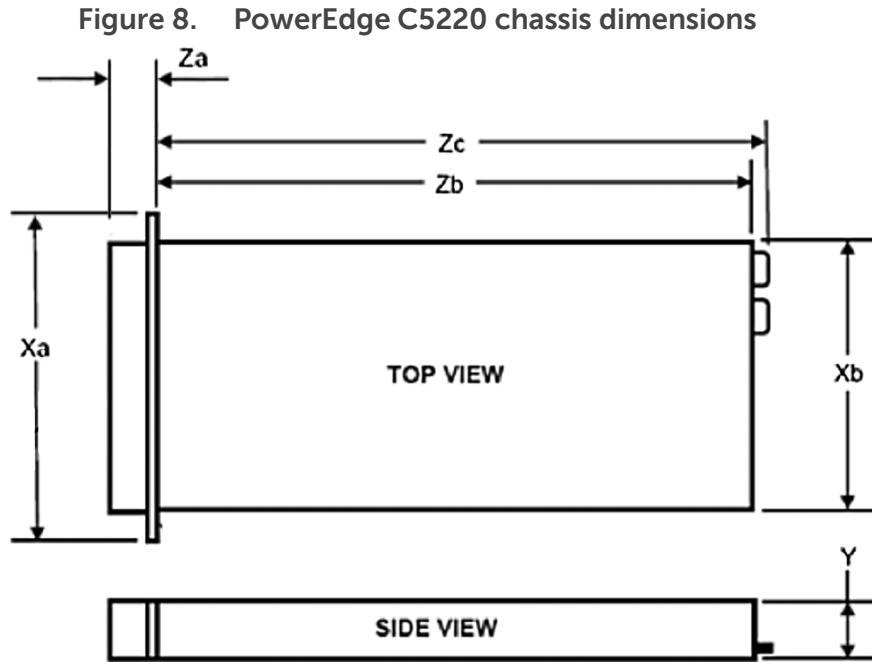


Table 15. PowerEdge C5220 chassis dimensions

Xa	Xb	Y	Zb	Zc
44.7 cm	44.8 cm	13.0 cm	75.01 cm	75.0 cm

System weight

Table 16 lists the weight of the PowerEdge C5220 rack server at minimum and maximum configuration.

Table 16. System weight

Form Factor	Maximum configuration	Minimum configuration
12-sled configuration	48.13 kg (106.11 lb)	32.02 kg (70.59 lb)
8-sled configuration	42.4 kg (93.48 lb)	27.4 kg (60.41 lb)



Environmental specifications

Table 17 details the environmental specifications for the PowerEdge C5220. For the most up-to-date information, see the *Dell PowerEdge C5220 Getting Started Guide* on Dell.com/Support/Manuals. For additional information about environmental measurements for specific system configurations, see Dell.com/environmental_datasheets.

Table 17. Environmental specifications

Temperature	
Operating	10°C to 35°C (50°F to 95°F) with a maximum temperature gradation of 10°C per hour. Note: For altitudes above 2950 feet, the maximum operating temperature is de-rated 1°F/550 feet
Storage	–40°C to 65°C (–40°F to 149°F) with a maximum temperature gradation of 20°C per hour
Relative humidity	
Operating	20% to 80% (non-condensing) with a maximum humidity gradation of 10% per hour
Storage	5% to 95% (non-condensing)
Maximum vibration	
Operating	0.26 Grms at 5Hz to 350Hz for 5 minutes in operational orientations
Storage	1.87 Grms at 10Hz to 500Hz for 15 minutes in all orientations
Maximum shock	
Operating	One shock pulse in the positive z-axis (one pulse on each side of the system) of 31G for 2.6 ms in the operational orientation
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 2 ms. Six consecutively executed shock pulses in the positive and negative x, y and z axes (one pulse on each of the system) of 22G faired square wave pulse with velocity change at 200 in/second (508 cm/second)
Altitude	
Operating	–16 m to 3048 m (–50 ft to 10,000 ft) Note: For altitudes above 2950 feet, the maximum operating temperature is de-rated 1°F/550 ft
Storage	–16 m to 10,600 m (–50 ft to 35,000 ft) Note: For altitudes above 2950 feet, the maximum operating temperature is de-rated 1°F/550 ft
Airborne contaminant level	
Class G1 or lower as defined by ISA-S71.04-1985	



Video specifications

The baseboard management controller (BMC) for the PowerEdge C5220 incorporates an integrated video subsystem that is connected to the 32-bit PCI interface of the ICH10R. The logic is based on the ATS2050 and supports 2D graphics only. The video device output is available only as a rear video port. The integrated video core shares its video memory with the BMC's 64MB DDR2 application space memory. This memory is also used for the KVM buffer. The PowerEdge C5220 system supports the 2D graphics video modes listed in Table 18.

Table 18. 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
1600 x 1200	60	32

Power supply specifications

Table 19 lists power supply specifications for the PowerEdge C5220.

Table 19. Power supply specifications

Specification	1400W AC power supply
Current consumption	9.0A
Supply voltage	200–240VAC
Frequency	50/60Hz
Heat dissipation	463.4 BTU/hour maximum
Maximum inrush current	Initial in-rush current cannot exceed 55A (peak). Secondary inrush current cannot exceed 55A (peak).

USB peripherals

The PowerEdge C5220 has a special connector for a Y-cable that features two USB ports as well as a VGA connector. This is optional as a separately orderable customer kit.



Appendix B. Standards compliance

PowerEdge C5220 conforms to the industry standards listed in Table 20.

Table 20. 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
DDR3 Memory DDR3 SDRAM Specification, Rev. 3A	jedec.org/download/search/JESD79-3C.pdf
PCI Express PCI Express Base Specification Rev. 2.0 and 3.0	pcisig.com/specifications/pciexpress
PMBus Power System Management Protocol Specification, v1.2	pmbus.info/specs.html
SAS Serial Attached SCSI, v1.1	t10.org
SATA Serial ATA Rev. 2.6; SATA II, SATA 1.0a Extensions, Rev. 1.2	sata-io.org
SMBIOS System Management BIOS Reference Specification, v2.7	dmtf.org/standards/smbios
UEFI Unified Extensible Firmware Interface Specification, v2.1	uefi.org/specifications
USB Universal Serial Bus Specification, Rev. 2.0	usb.org/developers/docs
Windows Logo Windows Logo Program System and Device Requirements, v3.10	microsoft.com/whdc/winlogo/hwrequirements.mspx



Appendix C. Additional resources

Table 21 lists documents and websites that provide more information on the Dell PowerEdge C5220 rack server.

Table 21. Additional resources

Resource	Description of contents	Location
PowerEdge C5220 Owner's Manual	<p>This manual is provided in PDF format and provides information on the following:</p> <ul style="list-style-type: none">• Chassis features• System Setup program• System messages• System codes and indicators• System BIOS• Remove and replace procedures• Troubleshooting• Diagnostics• Jumpers and connectors	Dell.com/Support/Manuals
PowerEdge C5220 Getting Started Guide	<p>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:</p> <ul style="list-style-type: none">• Initial setup steps• Key system features• Technical specifications	Dell.com/Support/Manuals
Rack Installation Instructions	<p>This printed document is provided with the rack kits. The document provides the instructions for installing the server in a rack.</p>	Dell.com/Support/Manuals
Rack 2420, 4220 and 4820 Rack Enclosures Technical Guide	<p>This guide describes the expanded portfolio of rack enclosures and components.</p>	Dell.com/us/Enterprise
Using the Baseboard Management Controller	<p>This document is available in PDF format on the Dell support site. This document provides information on the BMC.</p>	Dell.com/Support/Manuals
Information Update	<p>This document is printed and shipped with the system, and is also available in PDF format on the Dell support site. This document provides information on system updates.</p>	Dell.com/Support/Manuals
Energy Smart Solution Advisor	<p>The Dell Energy Smart Solution Advisor (ESSA) enables easier and more meaningful estimates to help you determine the most efficient configuration possible. Use ESSA to calculate the power consumption of your hardware, power infrastructure and storage.</p>	Dell.com/ESSA



Resource	Description of contents	Location
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 cooling solutions.	Dell.com/FreshAir
Processor and chipset	Provides more information about the PowerEdge C5220 processors and chipset.	Intel.com
Dell PowerEdge RAID controllers	Provides more information about Dell PERCs.	Dell.com/PERC
Power distribution unit	Provides help selecting a rack-based power distribution unit.	DellPDU.com
Uninterruptible power supply	Provides help selecting an uninterruptible power supply model.	DellUPS.com
Volatility information	Contact your Dell sales representative.	

