PowerEdge C6105 Rack Server

Technical Guide

- Maximize performance—per-watt-per-cost
- 8-core/35-watt processors
- Shared infrastructure can use less space, power and cooling
- Service individual independent nodes to help increase uptime

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1 System overview

The Dell™ PowerEdge™ C6105 is an ultra-dense 2U server that can support up to four independent 2-socket (2S) servers. Each independent server features single or dual AMD Opteron™ 4100 series, 4200 series and 4300 series 4-core, 6-core or 8-core processors, SR5670 chipset with SP5100 for I/O connectivity, DDR3 memory, DIMM thermal sensors, PCI Express® (PCIe) 2.0, dual-port embedded Gigabit Ethernet (GbE) controllers, and the integrated Intelligent Platform Management Interface (IPMI) 2.0 baseboard management controller (BMC) with a dedicated RJ45 connection.

New technologies

The AMD Opteron 4100, 4200 and 4300 series microprocessors, part of the AMD Opteron 4000 series platform, are designed specifically for power-efficient and cost-optimized server applications. These processors feature 4-core, 6-core, or 8-core processing to maximize performance-per-watt at the best cost for data center infrastructures and highly dense deployments. The 2S server also features an energy-efficient (EE) power band that delivers eight cores of performance at only 32W TDP, as well as two 16-bit lanes of AMD HyperTransport™ 3.0 Technology links for peak bandwidth of 25GB/second per link between processors and I/O.

With AMD Opteron 4000 processors, the PowerEdge C6105 server offers performance at a lower power, scalability without compromise, and a platform upgrade path with the planned next-generation processor. For more information, see the Processor section.

Product comparison

Table 1 compares the features of the PowerEdge C6105 to the PowerEdge R415 and R515.

Table 1. Comparison of PowerEdge C6105, R415 and R515

Specification	PowerEdge C6105	PowerEdge R415	PowerEdge R515 (8 and 12 hard drive bays)
Processors	AMD Opteron 4100, 4200 and 4300 series	AMD Opteron 4100, 4200 and 4300 series	AMD Opteron 4100, 4200 and 4300 series
Front side bus	1x HT-3 at 5.2GT/s	1x HT-3 at 5.2GT/s	1x HT-3 at 5.2GT/s
Sockets	2	2	2
Cores	4, 6 and 8	4, 6 and 8	4, 6 and 8
L3 cache	Up to 8MB	Up to 8MB	Up to 8MB
Chipset	AMD SR5670	AMD SR5670	AMD SR5670
DIMMs	12 x DDR3 RDIMM, LV RDDR3 1333MT/s	8 x DDR3 UDIMM, RDIMM, LV RDDR3 1333/1600MT/s	8 x DDR3 UDIMM, RDIMM, LV RDDR3 1333/1600MT/s
Memory	Up to 192GB	Up to 256GB	Up to 256GB

Specification	PowerEdge C6105	PowerEdge R415	PowerEdge R515 (8 and 12 hard drive bays)
Hard drive bays	12 x 3.5" (equally split between servers) or 24 x 2.5" (equally split between servers)	4 x 3.5" or 2.5" Cabled or hot-plug options available	8 x 3.5" or 2.5" 12 x 3.5" or 2.5" + 2 x 2.5" internal cabled hard drives
Hard drive types	SATA, SSD, SAS, Nearline SAS	SATA, SSD, SAS, Nearline SAS	SATA, SSD, SAS, Nearline SAS
External drive bay	None	1 for slim ODD	1 for slim ODD
Embedded hard drive controller	Chipset-based SATA	Chipset-based SATA	Chipset-based SATA
Optional storage controller	LSI® 2008 Mezzanine, LSI 9260-8i, LSI 9265-8i	SAS 6/iR Modular PERC S300 PERC H200 PERC H700 PERC H800	SAS 6/iR Modular PERC S300 PERC H200 PERC H700 PERC H800
Availability	Hot-plug hard drives Redundant power supplies	Hot-plug hard drives Redundant power supplies Quad-pack LED Diagnostic LCD with hot-plug hard drive chassis Memory mirroring	Hot-plug hard drives Redundant power supplies Quad-pack LED Diagnostic LCD with hot-plug hard drive chassis Memory mirroring
Systems management	BMC, IPMI 2,0 compliant	BMC, IPMI 2.0 compliant Dell OpenManage™ optional iDRAC6 Express iDRAC6 Enterprise vFlash	BMC, IPMI 2.0 compliant Dell OpenManage optional iDRAC6 Express iDRAC6 Enterprise vFlash
I/O slots	1 x PCIe x16 2.0 + 1 x PCIe x8 2.0 (mezzanine)	1 x PCIe x16 (true x16, 2.0) full-height, half-length	3 x PCIe +1 x storage or 1 x PCIe + 1 x storage (for GPGPU)
NIC/LOM	2 x GbE LOM Optional: Various NIC available	2 x GbE LOM Optional: Various NIC available	2 x GbE Intel® LOM Optional: Various NIC available
Power supplies	Hot-plug redundant 1100W (80+ Gold) Auto Ranging (100–240V) Redundant, 1400W (80+ Platinum) (240V)	Non-redundant 480W (80+ Bronze) Optional redundant, 500W (80+ Silver) Auto Ranging (100–240V)	Hot-plug redundant 750W (80+ Gold) Auto Ranging (100–240V)

Specification	PowerEdge C6105	PowerEdge R415	PowerEdge R515 (8 and 12 hard drive bays)
USB	2	6	6
Fans	Non-redundant, non-hot-pluggable	Non-redundant, non-hot-pluggable	Non-redundant, non-hot-pluggable
Form factor	2U rack	1U rack	2U rack
Dimension	3.45 x 17.6 x 29.47 (in) 87.6 x 448 x 750.1 (mm)	1.69 x 17.09 x 24.69 (in) 43.0 x 434.0 x 627.1 (mm)	3.42 x 17.53 x 26.17 (in) 86.7 x 445.2 x 664.6 (mm)
Weight	Max: 74.2lb (33.67Kg)	Max: 35.02lb (15.9Kg)	Max: 63.8lb (29.0Kg)

Specifications

Table 2 summarizes the product features for the PowerEdge C6105 rack server. For the latest information on supported features, visit Dell.com/PowerEdgeC.

Table 2. Technical specifications

Feature	PowerEdge C6105 technical specifications
Chassis	2U rack mount
Servers per chassis	Up to 4x 2-socket servers
Processor	AMD Opteron 4100, 4200, and 4300 series processors
Processor sockets	Up to four 2-socket servers
Front side bus	1x HT-3 at 5.2GT/s
Number of cores	4, 6 or 8
L2/L3 cache	Up to 16MB
Chipset	AMD SR5670
Memory	Up to 192GB (12 DIMMs): 2GB/4GB/8GB/16GB DDR3 RDIMM (1333MT/s 1.35V); 2GB/4GB UDIMM (1333MT/s 1.35V)

Feature	PowerEdge C6105 technical specifications
Drive bays and hard drive types	Up to 24 x 2.5-inch or 12 x 3.5-inch hard drive options 2.5" SAS (15K): 146GB, 300GB 2.5" SAS (10K): 300GB, 600GB, 900GB, 1.2TB 2.5" NL SAS (7.2K): 500GB, 1TB 2.5" SATA II (7.2K): 250GB, 500GB, 1TB 2.5" SATA SSD (MLC): 120GB, 160GB, 240GB, 300GB, 480GB 2.5" SATA SSD (eMLC): 100GB, 200GB, 400GB 3.5" SAS 6Gb (15K): 300GB, 450GB, 600GB 3.5" SATA (7.2K): 500GB, 1TB, 2TB, 3TB, 4TB 3.5" NL SAS (7.2K): 1TB, 2TB, 3TB, 4TB
Connectivity	2 embedded Intel Kawela™ 82576 1 GbE network interface card
I/O slots	1 PCIe x8 mezzanine card slot and x16 riser slot **Optional:** Mellanox® ConnectX®-2 40Gbps dual-port QDR InfiniBand® adapter Mellanox ConnectX dual-port InfiniBand mezzanine card Intel 82559 dual-port 10GbE SFP+ mezzanine card Dell host interface card (HIC) adapter QLogic® single-port QDR QLE7340 adapter Intel 1GbE ET quad-port adapter
Drive controller	AMD SP5100
RAID controller	LSI 2008 6Gb SAS mezzanine (optional) LSI 9260-8i add-in RAID controller (optional) LSI 9265-8i add-in RAID controller (optional)
Power supply	Dual hot-plug redundant high-efficiency 1100W/1400W power supplies
Fans	Shared non-redundant cooling with 4 x 80 mm speed fans detectable with PWM control
Server management	BMC, IPMI 2.0 compliant
Remote management	Embedded BMC with IPMI 2.0 support with 1 x 10/100 Mbps RJ45 connector
USB	2 external ports
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 Red Hat® Enterprise Linux **Optional embedded hypervisors:** Citrix® XenServer® Microsoft Hyper-V, a server role in Microsoft Windows Server operating systems VMware® vSphere® ESXi™

Feature	PowerEdge C6105 technical specifications
Services (Availability varies by region. Please contact your sales representative for details.)	Infrastructure consulting services Rack integration (U.S. only, not available in China) Onsite deployment Basic support, ProSupport for IT 4-hour support Keep your hard drive Enterprise wide contract Specialized onsite services

2 Chassis views and features

The Dell PowerEdge C6105 will lead the PowerEdge portfolio in key areas of differentiation, primarily:

- Ultra density: four independent 2S servers in a 2U form factor
- Up to 12 x 3.5-inch or 24 x 2.5-inch hot swap drives in a 2U form factor
- Redundant hot-plug power supply for limited configurations
- Serviceable nodes; ability to service one node while others are running
- All four system boards are hot-pluggable
- Up to 192GB of memory with 12 DDR3 slots

Front views

The PowerEdge C6105 is a 2U rack-mounted chassis that can support one to four independent server nodes. The PowerEdge C6105 chassis is available in two versions: One supports 12 x 3.5-inch SAS/SATA drives; the other supports up to 24 x 2.5-inch SAS/SATA drives. The chassis also ships in either four-node or two-node configurations.

Figure 1. PowerEdge C6105 front view with 2.5-inch hard drives

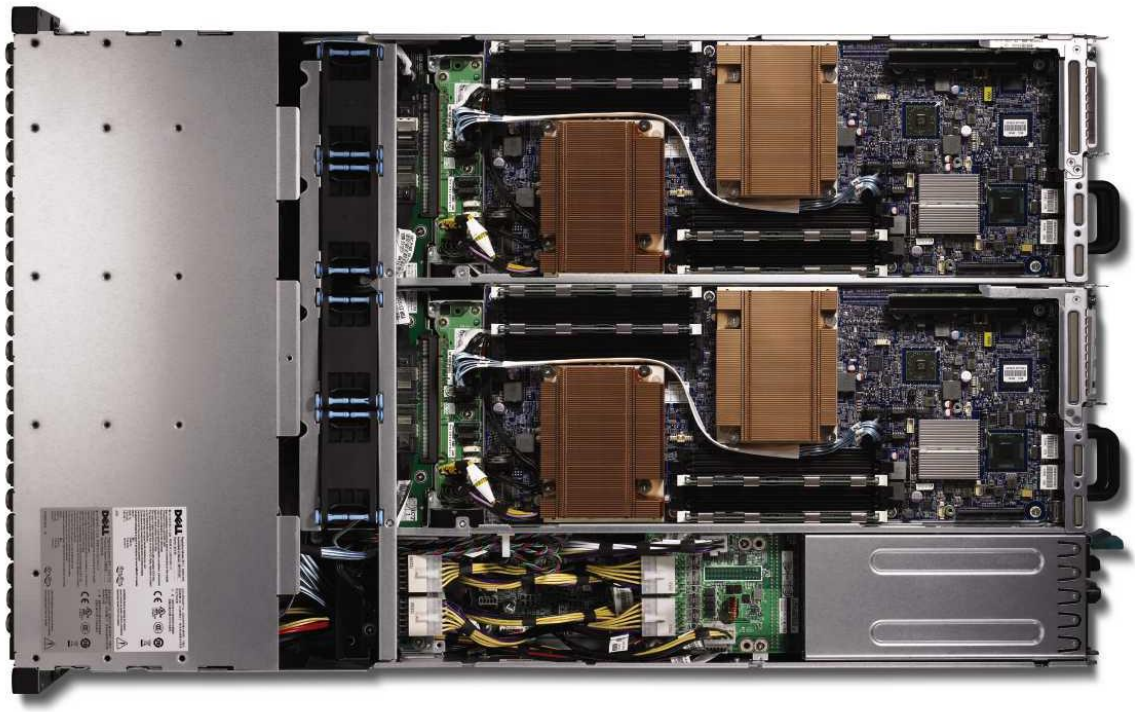
Figure 2. PowerEdge C6105 front view with 3.5-inch hard drives

Back view

Figure 3. PowerEdge C6105 back view

Internal view

Figure 4. PowerEdge C6105 internal view



Chassis features

Table 3 lists the features on the PowerEdge C6105 rack server. For additional information, see the *Dell PowerEdge C6105 Systems Hardware Owner's Manual* on Dell.com/Support/Manuals.

Table 3. PowerEdge C6105 features

Feature	Description
Power indicator	Indicates the system power is on
System identification indicator	Used to locate a particular system within a chassis
Hard drives	Up to 12 hot-plug 3.5-inch hard drives Up to 24 hot-plug 2.5-inch hard drives
Drive cover	Covers the system's front-loading hard drives
Power supplies	1100W or 1400W
Thermal sensor	Monitors the inlet ambient temperature
NIC connectors	Embedded 10/100/1000 NIC connectors
NIC link/activity indicator	Indicates network activity and status
Serial port	Connects a serial device to the system
VGA port	Connects a VGA display to the system
BMC management port	Dedicated management port
USB ports	Connect USB devices to the system; ports are USB 2.0-compliant

3 Processor

AMD Opteron 4100, 4200 and 4300 series processors, part of the AMD Opteron 4000 series platform, offer the world's lowest power-per-core server processor, setting the foundation for cloud workloads and affordability for mainstream infrastructure servers. AMD power-efficient server processor designs are the first to break the six watt per core barrier. Compared to previous generations, these designs allow customers to double the number of servers within the same power budget.

Processor features

Features of the AMD Opteron 4200/4300 series include:

- 32nm process technology
- Eight "Piledriver" processor cores (256b FPU)
- New ISA extensions
- Up to 16MB combined L2 + L3 cache
- Two DDR3 memory channels supporting RDIMM and UDIMM
- Two HyperTransport technology 3.0 links up to 6.4GT/s
- Advanced Platform Management Link (APML) for system management
- Increased frequency
- Four to eight cores per processor
- Same thermal support as previous generations
- Supports 12 DIMMs in 2-socket servers such as the PowerEdge C6105
- New "Piledriver" per clock instructions
- Increased performance and power efficiency versus previous 4200 series processors
- Compatible with C32 socket; requires a BIOS update

Table 4. AMD Opteron 4000 series processor features

	Feature	Function	Benefits
AMD-P 2.0	Advanced Platform Management Link (APML)	Provides an interface for processor and systems management monitoring and controlling of system resources (in APML-enabled platforms); comprised of the Remote Power Management Interface (RPMI) and the precision thermal monitor	RPMI in APML enabled platforms: • Ability to monitor and control platform power consumption through p-state limits • Access to processor identification and health Precision thermal monitor: • Accurate information about processor thermals to closely monitor power/cooling and proactively alert the BMC • Early notification helps save time and money by providing intelligence to more effectively monitor power and thermals to optimize cooling solutions in an IT data center

	Feature	Function	Benefits
	Link Width PowerCap	Power efficiency capability (manually enabled thru BIOS) that changes all 16-bit links to 8-bit links	Helps improve performance-per-watt
	AMD CoolSpeed Technology	Reduces p-states when a temperature limit is reached	• Server can continue to operate if processor's thermal environment exceeds safe operational limits • Offers platform providers the ability to safely reduce system fan speeds, which helps deliver greater platform efficiency
	C1E	An active sleep state invoked when all processor cores are idle	Delivers additional power savings (up to 10W for 2-processor servers) depending on system configuration, such as when the Northbridge and HyperTransport technology links are powered down and cores are at idle
	LV-DDR3 support	Lower memory voltage of 1.35V versus standard voltage memory of 1.5V	Helps reduce overall memory power consumption
	Ultra-low power platform	Specialized ultra-low power platforms are great for cloud/dense environments	Cooperative designs for specialized and ultra-low power platform provide power efficiency beyond just the processor
Direct Connect Architecture 2.0	Up to DDR3-1333 (1.333GHz) memory support	Provides higher peak throughput than earlier memory technologies	Enables improved overall system performance and investment protection compared to earlier technologies
	HyperTransport technology HT Assist	Helps increase coherent memory bandwidth and reduce latency in multi-node systems by reducing cache probe traffic between cores	Reduces the amount of cache probe bus traffic, enhancing a server's efficiency and scalability
	HyperTransport 3.0 technology (HT3)	Provides superior system bandwidth between processors and I/O, increasing interconnect rate from 2GT/s with HT1 in previous generations up to a maximum 6.4GT/s with HT3	Helps improves overall system balance and scalability
	Cache and core count	Choice of 4- or 6-core processors, with each core having its own L1 and L2 caches, and a shared 6MB L3 cache	Infrastructure designed to accommodate either single- or dual-socket servers providing server scalability from 4 cores to 12 cores per server platform

	Feature	Function	Benefits
AMD Virtualization™ (AMD-V™) technology Features	I/O Virtualization	Supports I/O level virtualization, which provides direct control of devices by a VM (enabled by the SR5690/SR5670/SR5650 chipsets)	• Improved I/O performance within a virtual machine • Enables an I/O device to be directly assigned to a virtual machine (VM) • Improved security through VM address isolation.
	AMD Extended Migration	AMD Extended Migration allows you to safely migrate a VM between various AMD64 processor revisions	Provides unprecedented flexibility in deploying, maintaining and upgrading servers in live migration environments based on AMD64 processors

Supported processors

The PowerEdge C6105 rack server supports up to two four-socket servers featuring the AMD Opteron 4100, 4200 or 4300 series processors. The PowerEdge C6105 supports the processors listed in Table 5. For the latest information on supported processors, visit Dell.com/PowerEdgeC.

Table 5. Supported processors

Model	Speed	Power	L3 cache	Core	System bus speed MT/s
4164EE	1.8GHz	35W	6M	6	2000
4162EE	1.7GHz	35W	6M	6	2000
4176HE	2.4GHz	65W	6M	6	6400
4174HE	2.3GHz	65W	6M	6	6400
4170HE	2.1GHz	65W	6M	6	6400
4184	2.8GHz	95W	6M	6	6400
4180	2.6GHz	95W	6M	6	6400
4130	2.6GHz	95W	6M	4	6400
4122	2.2GHz	95W	6M	4	6400
4256EE	1.6GHz	35W	8M	8	6400
4228HE	2.8GHz	65W	8M	6	6400
4230HE	2.9GHz	65W	8M	6	6400
4274HE	2.5GHz	65W	8M	8	6400
4276HE	2.6GHz	65W	8M	8	6400
4310EE	2.2GHz	35W	4M	4	6400
4332HE	3.0Hz	65W	8M	6	6400

Model	Speed	Power	L3 cache	Core	System bus speed MT/s
4376HE	2.6GHz	65W	8M	8	6400
4334	3.1GHz	95W	8M	6	6400
4386	3.1GHz	95W	8M	8	6400

Table 6. AMD Opteron 4000 series processor generation comparison

Processor	AMD Opteron 4100 series	AMD Opteron 4200 series	AMD Opteron 4300 series
Socket	Socket C32	Socket C32	Socket C32
Core	4 or 6 cores	6 or 8 cores	4, 6 or 8 cores
ACP	95W, 65W, 35W	95W, 65W, 35W	95W, 65W, 35W
Core boost	No	Yes (all-core and partial-core boost states)	Yes (all-core and partial-core boost states)
Virtualization	Enhanced AMD-V IOMMU	AMD-V with Flush by ASID, Hypervisor Clean Bits, Decode Assist, TSC Scaling	AMD-V with Flush by ASID, Hypervisor Clean Bits, Decode Assist, TSC Scaling
Power Efficiency	Enhanced AMD PowerNow!™ CoolCore™ Technology CoolSpeed, C1E	Enhanced AMD PowerNow! CoolCore Technology CoolSpeed, C1E, C6	Enhanced AMD PowerNow! CoolCore Technology CoolSpeed, C1E, C6
Reliability/Availability	ECC	ECC	ECC
Manageability	APML	APML	APML
Memory	Dual channel R/UDDR3 667/800/1066/1333MT/s LV DIMM support	HT Assist (AKA Probe Filter) Quad Channel U/DDR3 and LV (1.35V and 1.25V) RDDR3800/1066/1333/1600/1866MT/s	HT Assist (AKA Probe Filter) Quad Channel U/DDR3 and LV (1.35V and 1.25V) RDDR3800/1066/1333/1600/1866MT/s
HyperTransport	2x HT1 or 2x HT3 (HT 3.0) Up to 25.6GB/s at 6.4GT/s* per link	2x HT1 or 2x HT3 (HT 3.0) Up to 25.6GB/s at 6.4GT/s* per link	2x HT1 or 2x HT3 (HT 3.0) Up to 25.6GB/s at 6.4GT/s* per link
I/O	PCIe 2.0 Up to 42 lanes with 11 controllers	PCIe 2.0 Up to 42 lanes with 11 controllers	PCIe 2.0 Up to 42 lanes with 11 controllers
Cache	512KB L2 (per core) 6MB L3 (per socket)	1MB L2 (per core) 8MB L3 (per socket)	1MB L2 (per core) 8MB L3 (per socket)
Chipset	AMD SR56x0 Family with AMD-Vi AMD SP5100	AMD SR56x0 Family with AMD-Vi AMD SP5100	AMD SR56x0 Family with AMD-Vi AMD SP5100
Process	45nm	32nm	32nm

Note: Although the PowerEdge C6105 supports DIMM speeds of 800MT/s and 1066MT/s, you can purchase this system only with DIMM speeds of 1333MT/s on Dell.com/PowerEdgeC.

Processor configurations

The PowerEdge C6105 supports single- or dual-processor configurations. All processors must match in all configurations.

The PowerEdge C6105 uses only 3.5-inch hard drives with limited configurations and 140W AMD Opteron processors.

Processor installation

For information on processor installation, see the *Dell PowerEdge C6105 Systems Hardware Owner's Manual* on Dell.com/Support/Manuals.

Chipset

The PowerEdge C6105 uses the AMD SR5670 chipset. For more information, visit AMD.com.

4 Memory

The PowerEdge C6105 uses DDR3 memory to provide a high-performance, high-speed memory interface capable of low-latency response and high throughput. The PowerEdge C6105 supports registered ECC DDR3 DIMMs (RDIMM) and unbuffered DIMMs (UDIMM); standard-voltage and low-voltage DIMMs available. The PowerEdge C6105 does not support ultra-low-voltage (1.25V) memory or 1600MT/s memory.

The PowerEdge C6105 contains 12 memory sockets split into two sets of six sockets, one set per each processor. Each six-socket set is organized into two channels of three memory sockets per channel.

Supported memory

The DDR3 memory interface consists of two channels, with up to three DIMMs per channel for dual rank. The interface uses 4GB, 8GB and 16GB RDIMMs, or 2GB and 4GB UDIMMs. The memory mode depends on how the memory is populated in the system.

Note: AMD Opteron processors 4130 and 4122 do not support low-voltage DDR3 or C1E.

The PowerEdge C6105 supports the DIMMs listed in Table 7. For the latest information on supported memory, visit Dell.com/PowerEdgeC.

Table 7. DIMMs supported

Capacity (GB)	Speed (MT/s)	Type	Ranks per DIMM	Voltage
2	1333	UDIMM	2	1.35
4	1333	UDIMM	2	1.35
4	1333	RDIMM	2	1.35
8	1333	RDIMM	2	1.35
16	1066	RDIMM	4	1.35
16	1333	RDIMM	2	1.35

Memory configurations

The PowerEdge C6105 server supports flexible memory configurations ranging from capacities of 2GB to 192GB and up to 12 DIMM slots. The C6105 has two memory channels per processor, with each channel supporting up to three DIMMs.

The PowerEdge C6105 supports a flexible memory configuration according to these basic rules:

- Speed: If DIMMs of different speeds are mixed, all channels across all processors operate at the slowest DIMM's common frequency.
- DIMM type: Only one type of DIMM is allowed per system. UDIMM and RDIMM cannot be mixed.

For more information on memory configuration, see the *Dell PowerEdge C6105 Systems Hardware Owner's Manual* on Dell.com/Support/Manuals.

Memory speed

The PowerEdge C6105 supports up to 1333MT/s memory performance. The memory frequency is determined by a variety of inputs, including the speed of the DIMMs. The configuration of the DIMMs affects the speed of the processor.

Table 8 lists the memory population guidelines for the PowerEdge C6105 based on the population of the number and type of DIMMs per memory channel.

Note: Although the PowerEdge C6105 supports DIMM speeds of 800MT/s and 1066MT/s, you can purchase this system only with DIMM speeds of 1333MT/s on Dell.com/PowerEdgeC.

Table 8. Memory population guidelines

DIMM type	DIMM 1	DIMM 2	DIMM 3	Maximum GB/channel	Maximum speed (MT/s) for 1.35V DIMMs
UDIMM	SR or DR		Empty	8GB	1333
	SR		SR	8GB	1333
	DR		SR or DR	16GB	1066
RDIMM	SR or DR	Empty	Empty	16GB	1333
	SR	Empty	SR	8GB	1333
	SR	SR	SR	12GB	800
	DR	Empty	SR or DR	32GB	1066
	Empty	QR	Empty	32GB	800
	DR	SR or DR	SR or DR	48GB	800
	SR or DR	QR	Empty	48GB	800
	SR or DR	QR	SR or DR	64GB	667

5 Storage

Each server node can have up to a maximum of six hard drives, depending on the number of independent server nodes and drive type (3.5-inch or 2.5-inch) installed in each PowerEdge C6105 chassis. To accommodate the supported drive options, the PowerEdge C6105 has one backplane type for 12 x 3.5-inch drives and one for 24 x 2.5-inch drives. These drive slots are divided equally across two independent mid-planes with dedicated power and controller connections for each of the four nodes. All drive slots are hot-swap capable, and each Serial Attached SCSI (SAS) or Serial ATA (SATA) slot has an LED indicator to indicate drive status and health.

Note: Mixing SAS and SATA drives is not supported.

Internal storage

The PowerEdge C6105 system supports up to 12 hard disk drives per server node depending on the number of installed nodes (2-4) and drive type (2.5-inch or 3.5-inch). The PowerEdge 6105 supports the following hard drive types and configurations:

- 7.2K, 10K and 15K RPM 2.5-inch and 3.5-inch SAS drives
- Support for 5.4K and 7.2K RPM Enterprise 2.5-inch and 3.5-inch SATA

Note: Hard drives must use the PowerEdge C6105 specific drive carrier; this drive carrier is not shared with any other PowerEdge platforms, or other PowerEdge C platforms such as the C1100 and C2100.

- The following per-node, hard disk drive configurations for a four-node solution:
  - Up to 3 x 3.5-inch SATA
  - Up to 3 x 3.5-inch SAS
  - Up to 6 x 2.5-inch SATA
  - Up to 6 x 2.5-inch SAS
  - Up to 6 x 2.5-inch SSD
- The following per-node, hard disk drive configurations for a two-node solution:
  - Up to 6 x 3.5-inch SATA
  - Up to 6 x 3.5-inch SAS
  - Up to 12 x 2.5-inch SATA
  - Up to 12 x 2.5-inch SAS
  - Up to 12 x 2.5-inch SSD

Supported hard drives

Table 9 lists the hard drive options for the PowerEdge C6105 rack server. For additional information, see Dell.com/PowerEdgeC.

Table 9. Supported hard drives on the PowerEdge C6105

Form factor	Type	Speed (RPM)	Capacities
3.5"	SATA	7.2K	500GB, 1TB, 2TB, 3TB, 4TB
	Nearline SAS (6Gb)	7.2K	1TB, 2TB, 3TB, 4TB
	SAS (6Gb)	15K	300GB, 450GB, 600GB
2.5"	SATA	7.2K	250GB, 500GB, 1TB
	Nearline SAS (6Gb)	7.2K	500GB, 1TB
	SAS (6Gb)	10K	300GB, 600GB, 900GB, 1.2TB
	SAS (6Gb)	15K	146GB, 300GB
	SATA SSD (MLC)	NA	120GB, 160GB, 240GB, 300GB, 480GB
	SATA SSD (eMLC)	NA	100GB, 200GB, 400GB

RAID configurations

The PowerEdge C6105 supports RAID configurations, but only as a user-configurable option. See the available RAID options in Table 10.

Table 10. RAID support

Controller	Supported RAID levels
Embedded SP5100 SATA Controller	None
LSI 2008 mezzanine	RAID 0,1, 10
LSI MegaRAID SAS 9260-8i SGL PCIe card	RAID 0, 1, 5, 6, 10, 50, 60
LSI MegaRAID SAS 9265-8i SGL PCIe card	RAID 0, 1, 5, 6, 10, 50, 60

Storage controllers

LSI 9260-8i PCIe card

The PowerEdge C6105 supports the LSI 9260-8i for customers who need higher performance SAS drives, but do not require higher-end resiliency features such as battery backup for NVRAM. Other features include:

- Storage controller: LSI MegaRAID SAS 9260-8i
- Maximum quantity of storage devices: Six hard drives
- RAID level: RAID 0, 1, 5 and 6

- RAID spans: 10, 50 and 60
- Device type: PCIe add-in controller
- PCI Interface: PCIe 2.0 x8 lanes
- SAS interface type: Two MiniSAS SFF-8087 x4 connectors
- SAS interfaces transfer rate: Up to 6Gbps per port
- Max ambient when this card is installed is 30°C

LSI 9265-8i PCIe card

The PowerEdge C6105 supports the LSI 9265-8i if you need high performance SAS drives and higher RAID levels with battery backed cache. Other features include:

- Storage controller: LSI MegaRAID SAS 9265-8i

  Note: The LSI9265-8i card with the PowerEdge C6105 server supports only the latest revision motherboard (AMD 4300 series, 95W processor supported).
- Maximum quantity of storage devices: Six hard drives
- RAID level: RAID 0, 1, 5 and 6
- RAID spans: 10, 50 and 60
- Device type: PCIe add-in controller
- PCI Interface: PCIe 2.0 x8 lanes
- SAS interface type: Two MiniSAS SFF-8087 x4 connectors
- SAS interfaces transfer rate: Up to 6Gbpsecond per port
- Max ambient when this card is installed is 30°C

Table 11 lists the features for the RAID support.

Table 11. Detailed RAID support

	Product	Usage	Slot	PCI connector	PCI bracket	I/O connector	RAID	Battery backup unit
SAS HBA SAS/SATA	LSI 9265-8i SGL	Internal backplane storage RAID (HDD, SDD)	PCIe slot	x8	Yes	2 mini-SAS x4	RAID 0, 1, 5, 6, 10, 50, 60	Yes
	LSI 2008 mezzanine card	Internal backplane storage (HDD, SDD)	Mezzanine connector	x8	N/A	1 mini-SAS x4 + 2 SAS	RAID 0, 1, 10	N/A

Optical drive

The PowerEdge C6105 chassis does not support optical drives. If needed, any external USB 2.0-compliant drive can be used, although no specific vendors have been qualified.

Tape drive

The PowerEdge C6105 chassis does not support an internal tape drive. External storage peripherals are not directly validated with PowerEdge C6105, but customers can use any supported network-based storage options validated with our network and fabric card matrix.

6 Networking and I/O

For the latest information on PowerEdge C6105 supported cards, visit Dell.com/PowerEdgeC.

Embedded NICs/LAN on motherboard (LOM)

The PowerEdge C6105 has a single Intel 82576 dual-port GbE controller installed on its system board as an independent Ethernet interface device. From a board perspective, the LOM refers to this controller. Other features include:

- x4 PCIe 2.0 capable interface
- 2.8W maximum power
- 64KB packet buffer
- NC-SI (network controller-sideband interface) connection for shared manageability connection with the BMC
- Wake-on-LAN (WOL)
- PXE 2.0 remote boot
- iSCSI boot
- IPv4 and IPv6 support
- VMDq support (8 VMs)
- PCI-SIG single root I/O virtualization (direct assignment)
- Queues per port: 16 TX queues and 16 RX queues
- Supports teaming

I/O slots

The PowerEdge C6105 supports two PCIe expansion options:

- One PCIe riser with a single x16 PCIe 2.0 slot
  - Support for half-height/half-length (6.6-inch max length) PCIe cards
- One x8 PCIe mezzanine daughtercard slot for RAID, networking or fabric options

Note: The PowerEdge C6105 does not support hot-plugging PCIe cards.

For information on card installation, requirements, and slot priorities, see the *Dell PowerEdge C6105 Systems Hardware Owner's Manual* on Dell.com/Support/Manuals.

Table 12 lists the supported mezzanine and add-in cards.

Table 12. Supported mezzanine and add-in cards

Card type	Interface
LSI 2008 6-port SAS	Mezzanine slot
Intel 82559 dual-port 10GbE (SFP+)	Mezzanine slot
Mellanox ConnectX-2 dual-port QDR InfiniBand	Mezzanine slot
Mellanox ConnectX dual-port InfiniBand	Mezzanine slot

Card type	Interface
QLogic single-port QDR InfiniBand QLE7340	Riser slot
LSI 9260-8i	Riser slot
LSI 9265-8i	Riser slot
Intel 1Gb ET quad-port	Riser slot
Dell X410 HIC adapter	Riser slot

NIC cards

Table 13 lists the supported NIC add-in cards.

Table 13. Supported NIC add-in cards

Card type	Interface
Intel 82559 dual-port 10GbE, PCIe x8	PCIe 8x mezzanine slot
Intel Gb ET quad-port 1GbE	Add-in x16 riser

Intel 82559 dual-port 10GbE NIC card

The Intel 82559 (SFP+) fast Ethernet controller with an integrated 10/100Mbps physical layer device is Intel's leading solution for PCI board LAN designs. The Intel 82559 is designed to use in NICs, LOM designs, embedded systems, and networking system products. The Intel 82559 combines a low-power, small package design, which is ideal for environments with power and space constraints.

Intel Gb ET quad-port 1GbE NIC card

The Intel Gb ET quad-port 1GbE NIC card has the following features:

- Two Intel NH82546GB Gigabit controllers
- Remote management support
- IEEE 802.3ab compatibility
- Support for most network operating systems
- Auto-sensing self-configuring 10/100/1000Mbps performance

PCI card dimensions

The PowerEdge C6105 server nodes accept half-height/half-length and low profile PCIe add-in card options.

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

Table 14. Power tools and technologies

Feature	Description
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 PSU Advisor can help you choose the best, most efficient PSU for your workload. Learn more at Dell.com/ESSA.
Industry compliance	The PowerEdge C6105 is compliant with industry certification 80 PLUS.
Power monitoring accuracy	Power supply unit monitoring improvements include: • Dell's power monitoring accuracy is currently 1%, whereas the industry standard is 5% • More accurate reporting of power • Better performance under a power cap
Active power management	**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.
Power capping	Use Dell's systems management to set the power cap limit for your systems to limit the output of a PSU and reduce system power consumption.
Dell 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.

Find additional power tool and technology information at Dell.com/PowerAndCooling and Dell.com/PowerCenter.

Power supplies

The base redundant system consists of two hot-plug power supplies in a 1+1 configuration available at 1100W and 1400W. Dell PSUs have achieved Platinum efficiency levels as shown in Table 15.

Table 15. Power supply efficiency

Form factor	Output	Class	Efficiency targets by load			
			10%	20%	50%	100%
Redundant 86 mm	1400W AC	Platinum+	89.0%	93.0%	94.5%	92.0%
	1100W AC	Gold	N/A	88.0%	92.0%	88.0%

System power supply throttling feature

The PowerEdge C6105 supports a power supply throttling feature that protects the system if power consumption exceeds the maximum for the supply (either 1400W or 1100W). In configurations where power consumption is greater than the maximum, redundancy is lost, and the PowerEdge C6105 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 C6105 rack kit. The components consist of a static rail system; there is no support for cable management arms.

The static rails for four-post racks include:

- Support for tool-less installation in 19-inch EIA-310-E compliant square or unthreaded round hole four-post racks, including all Dell 42xx and 24xx racks (APC racks are also supported)
- Rail depth: 602 mm
- Square-hole and round-hole rack adjustment range: 582 mm–822 mm

9 Operating systems and virtualization

The Dell PowerEdge C6105 supports a wide range of industry standard operating systems and virtualization software.

Supported operating systems

The PowerEdge C6105 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 SP3
- Red Hat Enterprise Linux 6.4

Supported virtualization

The PowerEdge C6105 supports the following virtualization hypervisors:

- Citrix XenServer 6.1
- Microsoft Hyper-V, a server role in Microsoft Windows Server operating systems
- VMware vSphere ESXi 5.5

10 Systems management

Systems management for the PowerEdge C6105 is through third-party solutions only. There is no Dell OpenManage support for server management at this time.

Embedded server management

The PowerEdge C6105 supports BMCs that comply with IPMI v2.0. The PowerEdge C6105 BMC provides the following features for managing the server remotely or in data center lights-out environments:

- Views of hardware sensors (temperature, voltage, presence, error)
- Error alerts (server reset, critical sensor values and others) using email traps, paging and more
- Option to share embedded NIC Ethernet ports
- WSMan CLI/SMASH CLP
- IPMI 2.0 monitoring and management functionality
- Server reset, reboot and power-on/off/cycle
- Remote KVM-over-IP console support for up to three simultaneous users

Appendix A. Additional specifications and options

System dimensions

Figure 5 details the dimensions of the PowerEdge C6105.

Figure 5. PowerEdge C6105 chassis dimensions

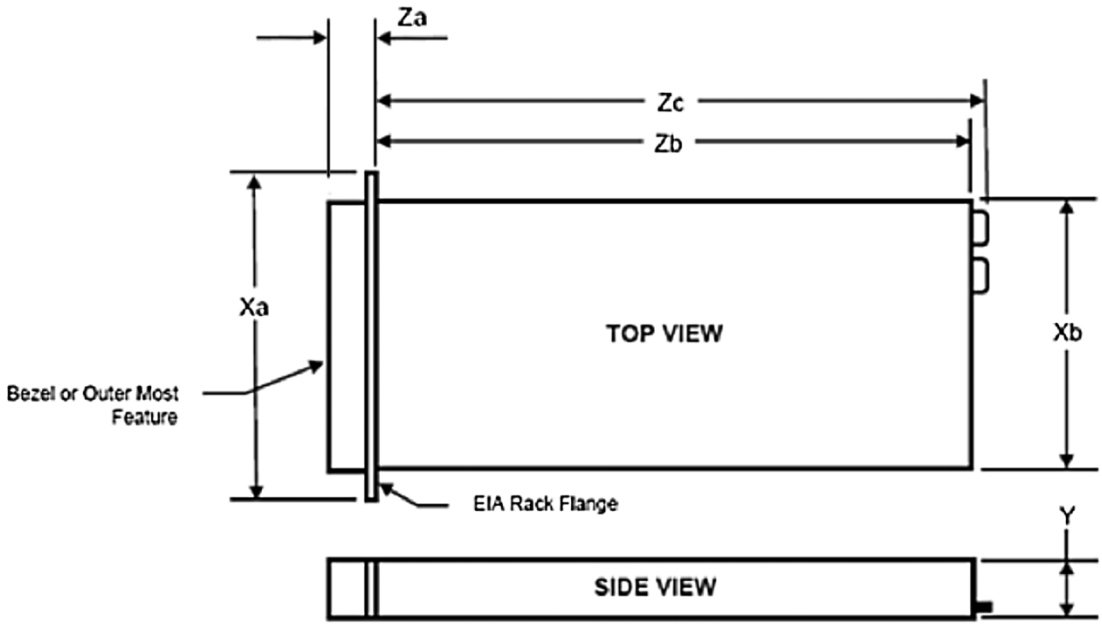


Table 16. PowerEdge C6105 chassis dimensions

Xa	Xb	Y	Za without bezel	Zb	Zc
44.8 cm	44.8 cm	8.76 cm	4.4 cm	75.01 cm	76.2 cm

System weight

Table 17 lists the weight of the PowerEdge C6105 rack server at minimum and maximum configuration.

Table 17. System weight

Maximum configuration	Minimum configuration
33.67 kg (74.2 lb)	15.11 kg (33.32 lb)

Environmental specifications

Table 18 details the environmental specifications for the PowerEdge C6105 rack server. For the most up-to-date information, see the *Dell PowerEdge C6105 Getting Started with Your System* on

Dell.com/Support/Manuals. For additional information about environmental measurements for specific system configurations, see Dell.com/environmental_datasheets.

Table 18. 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 ft
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 90% (non-condensing) with a maximum humidity gradation of 10% per hour
Maximum vibration	
Operating	0.26 Grms at 5Hz to 350Hz for 5 minutes in operational orientations
Storage	1.93 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 2ms. Six consecutively executed shock pulses in the positive and negative x, y, and z axes (one pulse on each of the system) of 27G faired square wave pulse with velocity change at 235 in/second (597 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)
Airborne contaminant level	
Class G1 or lower as defined by ISA-S71.04-1985	

Video specifications

The BMC for the PowerEdge C6105 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. Table 19 lists the supported video modes.

Table 19. 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

Resolution	Refresh Rate (Hz)	Color Depth (bit)
1280 x 1024	60	32
1600 x 1200	60	32

Power supply specifications

Table 20 lists power supply specifications for the PowerEdge C6105.

Table 20. Power supply specifications

Specification	1400W AC power supply	1100W AC power supply
Current consumption	8.6–7.2A	12.0–6.7A
Supply voltage	200–240V AC	100–240V AC (auto ranging)
Frequency	50/60Hz	50/60Hz
Heat dissipation	5432 BTU/hour maximum	4575 BTU/hour maximum
Maximum inrush current	Initial in-rush current cannot exceed 55A (peak). Secondary inrush current cannot exceed 35A (peak).	Initial in-rush current cannot exceed 55A (peak). Secondary inrush current cannot exceed 35A (peak).

USB peripherals

The PowerEdge C6105 supports the following USB 2.0-compliant devices through the two front ports:

- DVD (bootable)
- USB key (bootable)
- Keyboard (only one USB keyboard is supported)
- Mouse (only one USB mouse is supported)

Appendix B. Standards compliance

The PowerEdge C6105 rack server conforms to the industry standards listed in Table 21.

Table 21. 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 22 provides a list of documents and websites that provide for more information on the Dell PowerEdge C6105 rack server.

Table 22. Additional resources

Resource	Description of contents	Location
Dell PowerEdge C6105 Systems Hardware Owner's Manual	This manual, available in PDF format, provides the following information: • Chassis features • System Setup program • System messages • System codes and indicators • System BIOS • Remove and replace procedures • Troubleshooting • Diagnostics • Jumpers and connectors	Dell.com/Support/Manuals
Dell PowerEdge C6105 Getting Started with Your System	This guide is printed and shipped with the system, and is also available in PDF format on the Dell support site. This guide provides information on the following: • Initial setup steps • Key system features • Technical specifications	Dell.com/Support/Manuals
Dell PowerEdge 2420, 4220 and 4820 Rack Enclosures Technical Guide	This document provides details about the PowerEdge rack enclosures.	Dell.com/us/Enterprise
Rack Installation Instructions	This printed document is provided with the rack kits. The document provides the instructions for installing the server in a rack.	Dell.com/Support/Manuals
Using the Baseboard Management Controller	This document is available in PDF format on the Dell support site. This document provides information on the BMC.	Dell.com/Support/Manuals
Information Update	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.	Dell.com/Support/Manuals

Resource	Description of contents	Location
Energy Smart Solution Advisor	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.	Dell.com/ESSA
Power and cooling technologies	Provides details for improving energy efficiency in the data center.	Dell.com/PNC
Energy management	Provides information on Dell's Fresh Air cooling solutions.	Dell.com/FreshAir
Processor and chipset	Provides more information about the PowerEdge C6105 processors and chipset.	AMD.com
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.	