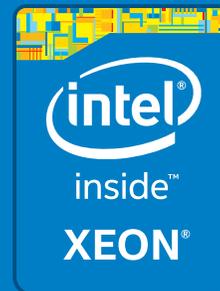April 2014

Intel® Xeon® Processor E3-1200 v3 Product Family

A Versatile Platform to Meet a Range of Business Needs

Small business needs are becoming increasingly sophisticated. Applications that help automate design or iterate financial scenarios are becoming more demanding. Because of these needs, entry-level servers and workstations are becoming foundational to many businesses. At the same time, IT organizations are facing increasing demands for hardware, space, and energy efficiency. Specific solutions for data center graphics and lightweight scale-out workloads are emerging as additional ways to control costs while delivering application-optimized solutions. Meet the latest Intel® Xeon® processor E3-1200 v3 product family-based platforms—a smart investment for a range of business needs.

In addition to gains in CPU performance, CPU performance per watt, and graphics performance, Intel Xeon processor E3-1200 v3 product family-based platforms offer fast access to data, security, and proven reliability for a range of business needs. Explore the expanded product line to discover new options for microservers and data center graphics, in addition to traditional entry-level server and workstation applications.

SMALL BUSINESS SERVERS

No matter what the size of your business, the value of your data is enormous. Keep it accessible and better protected at all times with an affordable Intel Xeon processor E3-1200 v3 product family-based server.

Protect your customer, inventory, and financial records with a server that delivers the security features and reliability of an all-day, all-night workhorse. Implementing a powerful server is also a smart investment in growth. You'll gain the power to adopt new business-class applications and tools that can help you increase sales and improve margins. A server based on the Intel Xeon processor E3-1200 v3 product family lets you access your information faster and respond to customers sooner from any device on your network.

Learn more about this smart investment in your small business >

ENTRY-LEVEL WORKSTATIONS

Step up to the performance and visuals demanded by professional-grade CAD or media and entertainment applications. With Intel Xeon processor E3-1200 v3 product family-based workstations, you'll find the capabilities that get designers, engineers, and animators started.

Accelerate exploration of complex data with the graphics performance of Intel HD Graphics P4600. Improve the integrity and uptime of design data with ECC memory technology. And with Intel vPro™ technology, you can make sure your workstations are as secure and manageable as any PC in your organization's fleet.[1, 2]

Media and entertainment animators, artists, and editors looking to accelerate nonlinear editing or test select special effects— such as blur and motion filters— can work with greater efficiency. Imaging experts are supported by advanced features, access to OpenCL* acceleration, and fast processing performance. Your software benefits because the Intel Xeon processor E3-1200 v3 product family has been certified on and optimized for a wide range of third-party ISV applications.
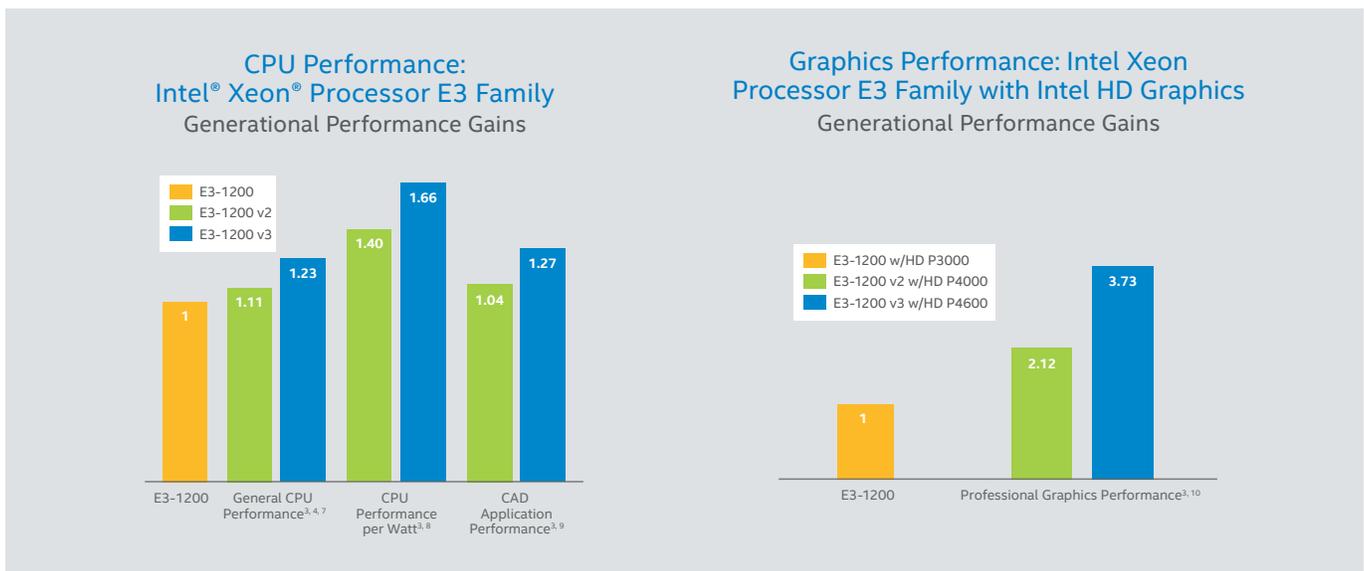
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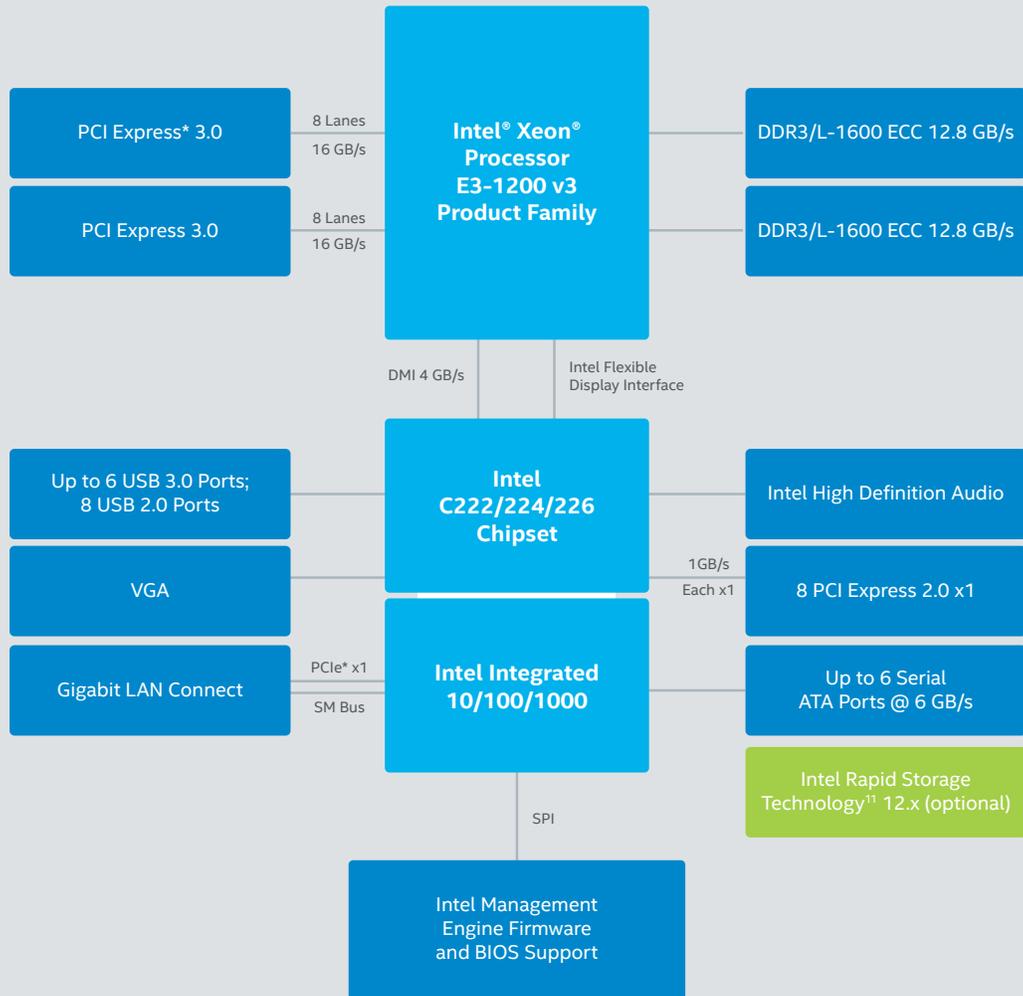
MICROSERVERS

To achieve optimal performance per watt for specific lightweight scale-out workloads, look no further than an energy-efficient microserver based on the Intel Xeon processor E3-1200 v3 product family.

Enjoy increased node density and improved I/O performance, ideal for lightweight scale-out workloads such as low-end dedicated hosting, simple front-end web, and basic content delivery. Minimize frustrations with capabilities such as x86 compatibility, virtualization support, and integrated security. Get up to 6.0x greater performance per SSI rack as compared to a rack of 1U servers, while also leveraging the existing IA software ecosystem.[3, 4, 5, 6] You will be able to scale your infrastructure to meet growing operational needs in a simple and affordable way.

Learn more about this smart microserver investment >

CPU Performance:
Intel® Xeon® Processor E3 Family
Generational Performance Gains

- E3-1200
- E3-1200 v2
- E3-1200 v3

E3-1200	General CPU Performance[3, 4, 7]	CPU Performance per Watt[3, 8]	CAD Application Performance[3, 9]
1	1.11 / 1.23	1.40 / 1.66	1.04 / 1.27

Graphics Performance: Intel Xeon
Processor E3 Family with Intel HD Graphics
Generational Performance Gains

- E3-1200 w/HD P3000
- E3-1200 v2 w/HD P4000
- E3-1200 v3 w/HD P4600

E3-1200	Professional Graphics Performance[3, 10]
1	2.12 / 3.73

Typical Intel® Xeon® Processor E3 Platform Configuration

PCI Express* 3.0	8 Lanes / 16 GB/s	**Intel® Xeon® Processor E3-1200 v3 Product Family**
PCI Express 3.0	8 Lanes / 16 GB/s	

- DDR3/L-1600 ECC 12.8 GB/s
- DDR3/L-1600 ECC 12.8 GB/s

DMI 4 GB/s — Intel Flexible Display Interface

Intel C222/224/226 Chipset

- Up to 6 USB 3.0 Ports; 8 USB 2.0 Ports
- VGA
- Gigabit LAN Connect — PCIe* x1 / SM Bus

Intel Integrated 10/100/1000

1GB/s Each x1

- Intel High Definition Audio
- 8 PCI Express 2.0 x1
- Up to 6 Serial ATA Ports @ 6 GB/s
- Intel Rapid Storage Technology[11] 12.x (optional)

SPI

Intel Management Engine Firmware and BIOS Support

Features may vary depending on processor and chipset SKUs.

DATA CENTER GRAPHICS

Media service providers require transcode solutions with cost-efficient, dense designs that can deliver high-quality images. A data center graphics server based on the Intel Xeon processor E3-1200 v3 product family does just that. Now you can support more concurrent media transcodes per rack than some discrete graphics solutions, lowering your total cost of ownership while enabling smoother content on demand, live broadcasting, or videoconferencing.

Whether you host desktops and workstations remotely or deliver gaming online in the cloud, the graphics performance of Intel HD Graphics P4700 can provide the rich visual experiences end users seek. At the same time, you'll benefit from more energy-efficient performance that enables greater density of games or users.

Learn more about this smart investment in data center graphics >

Intel® Xeon® Processor E3-1200 v3 Product Family Overview

Features	Benefits
Intel® Xeon® Processor E3-1200 v3 product family	Server-class performance, reliability, and security at entry-level price points • Accelerate your business growth with up to 44% better energy-efficient performance than the first generation of Intel Xeon processor E3 1200 family-based servers[3, 4, 8]
Haswell microarchitecture	Enhanced energy efficiency and performance • Intel's industry-leading 22nm 3-D Tri-Gate transistor technology

RELIABILITY AND SECURITY TO PROTECT YOUR BUSINESS

Support for error-correcting code (ECC) memory	Better data integrity and system reliability through automatic data correction
Intel Rapid Storage Technology enterprise 3.x[11] (Intel RSTe) [for servers]	Uninterrupted operation and quick data recovery in the event of a hard drive failure • Supports latest server operating systems (OSes), including Red Hat* and SUSE* Linux* OSes
Intel Rapid Storage Technology 12.x[11] (Intel RST) [for workstations]	Uninterrupted operation and quick data recovery in the event of a hard drive failure • Dynamic storage acceleration—dynamically adjusts system power state policies based on I/O loading conditions and power profile
Intel Data Protection Technology (with Advanced Encryption Standard New Instructions[12] [AES-NI])	Improves security by encrypting data—without slowing response times
Intel Data Protection Technology (with Secure Key[12])	Enhances security and performance for a wide range of security applications • Enables faster, higher-quality cryptographic keys and certificates
Intel Platform Protection Technology (with BIOS Guard[13])	Protects your system from malware and denial-of-service (DoS) attacks
Intel Platform Protection Technology (with OS Guard[13])	Improves security by strengthening malware protection • Provides hardware-based protection for your server operating system
Intel Platform Protection Technology (with Trusted Execution Technology[13] [TXT])	Protects your business by increasing security against many digital threats • Helps to ensure that the system launches into a known good state
USB Blocker [for servers]	Improves security and productivity • Helps prevent malware and unauthorized data transfers by blocking classes of devices while enforcing company policies and allowing flexibility to white-list specific devices

RESPONSIVE PERFORMANCE TO GROW YOUR BUSINESS

Intel Advanced Vector Extensions 2[14] (Intel AVX2)	Significant performance benefit for developers of imaging, video editing, modeling, and simulation applications
Intel Turbo Boost Technology 2.0[15]	Higher performance when you need it most • Accelerates processor and graphics performance for peak loads
Intel Hyper-Threading Technology[16] (Intel HT Technology)	Faster performance for many demanding business applications • Thread-level parallelism benefits multi-threaded and concurrently running applications
PCI Express* 3.0 ports	Extra capacity and flexibility for storage and networking connections • Up to double the I/O bandwidth of prior-generation PCIe* 2.0[3, 4, 17]
Serial ATA 3.0 (SATA 3.0)	Faster data access, system startups, and application load times • Doubles data throughput versus previous generation for faster hard drive performance[3, 4, 18]
Intel Virtualization Technology[19] (Intel VT) for IA-32 and Intel 64 (Intel® VT-x)	Faster performance for core virtualization processes • Improves application performance, live migration, provisioning, dynamic load balancing, and disaster recovery
Intel Virtualization Technology[19] (Intel VT) for Directed I/O (Intel® VT-d)	Built-in hardware support for I/O virtualization • Improves I/O performance, increases system reliability, and provides enhanced memory protection
Intel® Pro Wireless Display [for workstations]	Provides complete collaboration solution with flexibility for small businesses • High-quality wireless audio and video experience with award-winning ease of use and security

ENERGY EFFICIENCY AND MANAGEABILITY

Range of CPU options	Matches performance versus energy efficiency to maximize total value • Choice of 84W/82W/80W/65W/45W/25W/13W processor SKUs
Intel Node Manager (Intel® NM)	Hosts more and heavier workloads per server while guarding against server overheating • Lets you dynamically monitor and limit server power consumption
Intel Active Management Technology[20] (Intel AMT) [for small business servers]	Flexible local and remote management for troubleshooting, repair, and maintenance to increase reliability and uptime • Secure, out-of-band access, even for failed power states or a crashed OS

Intel® Xeon® Processor E3-1200 v3 Product Family SKU List

Processor Number△	CPU Cores	Graphics Cores	Speed	L3 Cache	Intel Turbo Boost Technology 2.0	Intel HT Technology	Intel HD Graphics P4600**	Intel HD Graphics P4700**	Power
STANDARD SERVER AND WORKSTATION SKUs									
Intel® Xeon® processor E3-1281 v3	4	0	3.70 GHz	8 MB	•	•			82 W
Intel Xeon processor E3-1276 v3	4	2	3.60 GHz	8 MB	•	•	•		84 W
Intel Xeon processor E3-1271 v3	4	0	3.60 GHz	8 MB	•	•			80 W
Intel Xeon processor E3-1246 v3	4	2	3.50 GHz	8 MB	•	•	•		84 W
Intel Xeon processor E3-1241 v3	4	0	3.50 GHz	8 MB	•	•			80 W
Intel Xeon processor E3-1231 v3	4	0	3.40 GHz	8 MB	•	•			80 W
Intel Xeon processor E3-1226 v3	4	2	3.30 GHz	8 MB	•		•		84 W
Intel Xeon processor E3-1220 v3	4	0	3.10 GHz	8 MB	•				80 W
LOW-POWER SKUs									
Intel Xeon processor E3-1275L v3	4	1	2.70 GHz	8 MB	•	•			45 W
Intel Xeon processor E3-1240L v3	4	0	2.00 GHz	8 MB	•	•			25 W
Intel Xeon processor E3-1220L v3	2	0	1.10 GHz	4 MB	•	•			13 W
DATA CENTER GRAPHICS SKUs									
Intel Xeon processor E3-1286 v3	4	2	3.70 GHz	8 MB	•	•		•	84 W
Intel Xeon processor E3-1286L v3	4	2	3.20 GHz	8 MB	•	•		•	65 W

**Intel HD Graphics P4600 requires the latest-version Intel Graphics Driver, Intel C226 chipset, and Intel Xeon processor E3-1226 v3, E3-1246 v3, or E3-1276 v3 to enable workstation application optimizations. Intel HD Graphics P4700 requires the latest-version Intel Graphics Driver, Intel C226 chipset, and Intel Xeon processor E3-1286 v3 or E3-1286L v3 to enable workstation and data center graphics application optimizations. Optimized Intel HD Graphics P4600 and P4700 are only available on select models of the Intel Xeon processor E3 family. To learn more about Intel Xeon processors for workstations, visit intel.com/go/workstation. To learn more about Intel Xeon processors for data center graphics, visit intel.com/datacentergraphics.

Intel® C220 Series Chipset

Chipset	Intel HD Graphics	Intel AMT 9.0	Intel Node Manager	PCI EXPRESS* PORTS		USB 3.0 Ports	USB 2.0 Ports	SATA PORTS		Intel Rapid Storage Technology	LAN
				Gen 3 PCH	Gen 2 PCH			6 GB/s	3 GB/s		
Intel® C226	•	•	•	16	8†	6†	8	6†		•	Integrated MAC
Intel C224			•	16	8	4	8	4	2	•	Integrated MAC
Intel C222				16	8	2	8	2	4	•	Integrated MAC

†Port counts are dependent on how I/O flexibility is configured between PCIe*, SATA 6G, and USB 3.0 for a total of 18 ports. Intel C226 will support SATA 1.5/3/6GB/s. Intel Anti-Theft Technology is not supported on any SKU of the Intel C220 series chipset.

For more information on the Intel Xeon processor E3-1200 v3 product family, visit intel.com/xeone3.

Endnotes

Δ Intel processor numbers are not a measure of performance. Processor numbers differentiate features within each processor series, not across different processor sequences. See intel.com/products/processor_number for details. Intel products are not intended for use in medical, lifesaving, life sustaining, critical control, or safety systems, or in nuclear facility applications. All dates and products specified are for planning purposes only and are subject to change without notice.

1. No computer system can provide absolute security under all conditions. Built-in security features available on select Intel Core™ processors may require additional software, hardware, services, and/or an Internet connection. Results may vary depending upon configuration. Consult your system manufacturer for more details. For more information, visit intel.com/technology/security.

2. Intel vPro technology is sophisticated and requires setup and activation. Availability of features and results will depend upon the setup and configuration of your hardware, software, and IT environment. To learn more, visit intel.com/technology/vpro.

3. Software and workloads used in performance tests may have been optimized for performance only on Intel microprocessors. Performance tests such as SYSmark* and MobileMark* are measured using specific computer systems, components, software, operations, and functions. Any change to any of those factors may cause the results to vary. You should consult other information and performance tests to assist you in fully evaluating your contemplated purchases, including the performance of that product when combined with other products.

4. Results have been estimated based on internal Intel analysis and are provided for informational purposes only. Any difference in system hardware or software design or configuration may affect actual performance.

5. Intel does not control or audit the design or implementation of third-party benchmark data or websites referenced in this document. Intel encourages all of its customers to visit the referenced web sites or others where similar performance benchmark data are reported and confirm whether the referenced benchmark data are accurate and reflect performance of systems available for purchase.

6. Baseline rack configuration: Intel Xeon processor E3-1220L v2. Maximum number of nodes, 42U rack: 41 1U server + 1 x 1U 48 port GbE Ethernet switch. Performance per node/rack: Best published SPECint*_rate_base2006 score of 87.3 as of April 15, 2013. Source: spec.org/cpu2006/results/res2012q2/cpu2006-20120522-22320.html. Total performance 41 servers = 3,579.3.

Power per node: Max power consumption of one Intel Xeon processor E3-1220L v2 on an Intel C206–based platform using SPECpower_ssj2008*, EIST Enabled, Turbo Boost Enabled, 8 GB memory (2 x 4 GB DDR3-1600 UDIMM), 64G 3 GB/s SATA SSD, Windows* 2008 R2 SP1. Java* SE Runtime Environment (build 1.6.0_30-b12), Java HotSpot 64-Bit Server VM (build 20.5-b03, mixed mode). Source: TR1276, Intel internal testing as of March 2012. Score: ssj_ops@100%: 195,006, Power@100%: 51.3W, Active idle power: 26.4.

Power per rack: 2.3 kW total. 1U switch = 240W, 41 1U server nodes = 2103W. New microserver configuration: Intel Xeon processor E3-1240L v3. Maximum number of nodes: SSI rack = 12 3U chassis with 144 nodes + 3 x 1U 48 port GbE switches.

Performance per node/rack: Supermicro* 813M-3 with one Intel Xeon processor E3-1240L v3 (8M Cache, 1.8 GHz, C0 stepping), EIST Enabled, Turbo Boost enabled, Hyper-Threading (Intel HT) technology enabled, 16 GB memory (2 x 8 GB DDR3-1600 ECC UDIMM), 500 GB SATA 7200RPM HDD, Red Hat* Enterprise Linux* Server 6.5. Compiler version: 14.0 of Intel C++ Studio XE and Intel Fortran. Source: Intel internal testing as of April 2014. Score: SPECint_rate_base2006 of 151, 144 nodes = 21,744.

Power per node: Based on Intel estimates of 32W per node with one Intel Xeon processor E3-1240L v3 node, EIST Enabled, Turbo Boost Enabled, 8 GB memory (2 x 4 GB DDR3-1600 UDIMM), 1 x SSD, assuming shared cooling resources and shared power supplies.

Power per rack: 5.3kW total. 3 x 1U switches at 240W per switch = 720W, 144 nodes at 32W per node = 5,328W.

7. SPEC* CPU2006 as of April 2014:

Baseline configuration: IBM System x3100 M4 with one Intel Xeon processor E3-1280 (quad-core, 3.5 GHz, 8M cache), Intel HT Technology enabled, 16 GB memory (4 x 4GB DDR3-1333 ECC UDIMM), 250 GB 7,200 RPM SATAIII HDD, Red Hat Enterprise Linux Server Release 6.1 Kernel 2.6.32-131.0.15.el6.x86_64, Intel C++ Compiler XE for applications running on IA-32 and Intel 64 12.1.0.225 Build 20110803. Source: spec.org/cpu2006/results/res2011q3/cpu2006-20110908-18542.html. Scores: SPECint_rate_base2006 = 178.

Previous configuration: Fujitsu* CELSIUS* C620 with one Intel Xeon processor E3-1280 v2 (quad-core, 3.6 GHz, 8M cache), Intel HT Technology enabled, 16 GB memory (4 x 4 GB DDR3-1600 ECC UDIMM), 500 GB 7,200 RPM SATAIII HDD, Red Hat Enterprise Linux Server release 6.2, 2.6.32-220.el6.x86_64. C/C++: Version 12.1.3.293 of Intel C++ Studio XE for Linux. Source: spec.org/cpu2006/results/res2012q3/cpu2006-20120813-24186.html. Scores: SPECint_rate_base2006 = 199.

New configuration: Supermicro 813M-3 server with one Intel Xeon processor E3-1281 v3 (quad-core, 3.7 GHz, 8M cache), Intel HT Technology enabled, 16 GB memory (4 x 4 GB DDR3- 1600 ECC UDIMM), Intel 530 SSD, Red Hat Enterprise Linux Server release 6.4 (Santiago) 2.6.32-358.el6.x86_64. C/C++: Version 14.0.0.080 of Intel C++ Studio XE for Linux. Source: Intel internal estimated measurements, April 2014. SPECint_rate_base2006 = 219.

8. SPECpower_ssj2008 as of April 2014:

Baseline configuration: Fujitsu PRIMERGY* TX 120 S3* with one Intel Xeon processor E3-1260L (quad-core, 2.4 GHz, 8 MB L3 cache), Turbo Boost Disabled, Hyper-Threading Enabled, 8 GB (2 x 4 GB DDR3-1333 ECC DIMM), 64 GB SATA SSD, Windows 2008 R2 SP1, Java SE Runtime Environment (build 1.6.0_25), Java HotSpot 64-Bit Server VM (version 1.6.0_25). Source: http://spec.org/power_ssj2008/results/res2011q2/power_ssj2008-20110531-00379.html. SPECpower_ssj2008 ssj_ops/Watt: 4,697.

Previous configuration: Fujitsu PRIMERGY TX120 S3p* with one Intel Xeon processor E3-1265L v2 (8M Cache, 2.5 GHz), Hyper-Threading Enabled, 8 GB (2 x 4 GB DDR3-1600 ECC DIMM), 6 GB/s SATA SSD, Windows 2008 R2 SP1, Oracle Corporation Oracle* Java HotSpot 64-Bit Server VM on Windows, version 1.6.0_31. Source: spec.org/power_ssj2008/results/res2012q2/power_ssj2008-20120511-00463.html. SPECpower_ssj2008 ssj_ops/Watt: 6,109.

New configuration: Fujitsu PRIMERGY TX140 S2* with one Intel Xeon processor E3-1265L v3 (8M Cache, 2.5 GHz), Hyper-Threading Enabled, 8 GB (2 x 4 GB DDR3-1600 ECC DIMM), 250 GB HDD 2.5-inch SATA, Windows 2008 R2 SP1, IBM* J9 VM (build 2.6, JRE 1.7.0), Windows Server* 2008 R2 amd64-64 20120322_106209 (JIT enabled, AOT enabled). Source: spec.org/power_ssj2008/results/res2013q4/power_ssj2008-20130906-00627.html. SPECpower_ssj2008 ssj_ops/Watt: 6,797.

9. SPECapc* for SolidWorks* 2013 as of April 2014:

CAD application performance based on SPECapc for SolidWorks 2013 CPU composite.

Baseline configuration: Intel C206 chipset-based Intel Xeon workstation platform with one Intel Xeon processor E3-1275 (quad-core, 3.4 GHz, 8M cache), ASNBCPT1.86C.0085.P00 July 5, 2012, Intel Hyper Threading Technology (Intel® HT Technology) best configuration, 8 GB memory (2 x 4 GB DDR3-1333 ECC UDIMM), Intel HD Graphics P3000 with driver 2455, 2 TB 7,200 RPM SATAIII HDD (WD2000FYYZ), Windows 7 Service Pack 1. Source: Intel internal testing as of April 2013.

Previous configuration: Intel C216 chipset-based Intel Xeon workstation platform with one Intel Xeon processor E3-1275 v2 (quad-core, 3.5 GHz, 8M cache), ACRVMBY1.86C.0096.P00 September 9, 2012, Intel HT Technology best configuration, 8 GB memory (2 x 4 GB DDR3-1600 ECC UDIMM), Intel HD Graphics P4000 with driver 2712, 2 TB 7,200 RPM SATAIII HDD (WD2000FYYZ), Windows 7 Service Pack 1. Source: Intel internal testing as of April 2013.

New configuration: Intel C226 chipset-based Intel Xeon workstation platform with one Intel Xeon processor E3-1276 v3 (quad-core, 3.6 GHz, 8M cache), BDW-E1R1.86C.0064. R01.1402210557, Intel HT Technology best configuration, 8 GB memory (4 x 4 GB DDR3- 1600 ECC UDIMM), Intel HD Graphics P4600/4700 with driver 3496, Intel 530 SSD, Windows 7 Service Pack 1. Source: Intel internal testing as of April 2014.

10. SPECviewperf* 11 as of April 2014:

Baseline configuration: Intel C206 chipset-based Intel Xeon workstation platform with one Intel Xeon processor E3-1275 (quad-core, 3.4 GHz, 8M cache), ASNBCPT1.86C.0085.P00 July 5, 2012, Intel HT Technology best configuration, 8 GB memory (2 x 4 GB DDR3-1333 ECC UDIMM), Intel HD Graphics P3000 with driver 2455, 2 TB 7,200 RPM SATAIII HDD (WD2000FYYZ), Windows 7 Service Pack 1. Source: Intel internal testing as of April 2013, SPECviewperf 11, geomean of seven workloads (ensight-04, lightwave-01, maya-03, proe-05, sw-02, tcvis-02, snx-01).

Previous configuration: Intel C216 chipset-based Intel Xeon workstation platform with one Intel Xeon processor E3-1275 v2 (quad-core, 3.5 GHz, 8M cache), ACRVMBY1.86C.0096.P00 September 9, 2012, Intel HT Technology best configuration, 8 GB memory (2 x 4 GB DDR3-1600 ECC UDIMM), Intel HD Graphics P4000 with driver 2712, 2 TB 7,200 RPM SATAIII HDD (WD2000FYYZ), Windows 7 Service Pack 1. Source: Intel internal testing as of April 2013, SPECviewperf 11, geomean of seven workloads (ensight-04, lightwave-01, maya-03, proe-05, sw-02, tcvis-02, snx-01).

New configuration: Intel C226 chipset-based Intel Xeon workstation platform with one Intel Xeon processor E3-1276 v3 (quad-core, 3.6 GHz, 8M cache), BDWE1R1.86C. 0064. R01.1402210557, Intel HT Technology best configuration, 8 GB memory (4 x 4 GB DDR3-1600 ECC UDIMM), Intel HD Graphics P4600/4700 with driver 3496, Intel 530 SSD, Windows 7 Service Pack 1. Source: Intel internal testing as of April 2014, SPECviewperf 11, geomean of seven workloads (ensight-04, lightwave-01, maya-03, proe-05, sw-02, tcvis-02, snx-01).

11. For more information on Intel Rapid Storage Technology, visit intel.com/p/en_US/support/highlights/chpsts/imsm.

12. No computer system can provide absolute security. Requires an enabled Intel processor and software optimized for use of the technology. Consult your system manufacturer and/or software vendor for more information.

13. No computer system can provide absolute security. Requires an enabled Intel processor, enabled chipset, firmware, and software, and may require a subscription with a capable service provider (may not be available in all countries). Intel assumes no liability for lost or stolen data and/or systems or any other damages resulting thereof. Consult your service provider for availability and functionality. For more information, visit intel.com/go/anti-theft. Consult your system manufacturer and/or software vendor for more information.

14. Intel Advanced Vector Extensions (Intel AVX), Intel AVX2, and Intel AVX-512 are designed to achieve higher throughput for certain integer and floating point operations. Due to varying processor power characteristics, utilizing AVX instructions may cause a) some parts to operate at less than the rated frequency and b) some parts with Intel Turbo Boost Technology 2.0 to not achieve any or maximum turbo frequencies. Performance varies depending on hardware, software, and system configuration, and you should consult your system manufacturer for more information. For more information on Intel Turbo Boost Technology 2.0, visit intel.com/go/turbo.

15. Requires a system with Intel Turbo Boost Technology. Intel Turbo Boost Technology and Intel Turbo Boost Technology 2.0 are only available on select Intel processors. Consult your system manufacturer. Performance varies depending on hardware, software, and system configuration. For more information, visit intel.com/go/turbo.

16. Available on select Intel Core processors. Requires an Intel HT Technology–enabled system; consult with your PC manufacturer. Performance will vary depending on the specific hardware and software used. For more information, including details on which processors support Intel HT Technology, visit intel.com/info/hyperthreading.

17. Eight gigatransfers (GT) per second and 128b/130b encoding in PCIe 3.0 specification enables double the interconnect bandwidth over the PCIe 2.0 specification. Source: pcisig.com/news_room/November_18_2010_Press_Release/.

18. The SATA 3.x specification enables double the data rate (from 3 GB/s to 6 GB/s) of that enabled by the SATA 2.x specification. Source: sata-io.org/technology/6Gbdetails.asp.

19. Intel Virtualization Technology requires a computer system with an enabled Intel processor, BIOS, and virtual machine monitor (VMM). Functionality, performance, or other benefits will vary depending on hardware and software configurations. Software applications may not be compatible with all operating systems. Consult your PC manufacturer. For more information, visit intel.com/go/virtualization.

20. Requires activation and a system with a corporate network connection, an Intel Active Management Technology (Intel AMT)–enabled chipset, and network hardware and software. For notebooks, Intel AMT may be unavailable or limited over a host operating system–based VPN, when connecting wirelessly, or when on battery power, sleeping, hibernating, or powered off. Results dependent upon hardware, setup, and configuration. For more information, visit intel.com/content/www/us/en/architecture-and-technology/intel-active-management-technology.html.

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[CM8064601467101S R151](#) [CM8064601467001S R150](#) [CM8064601467202S R153](#) [CM8064601467406S R15A](#)