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Legal Disclaimers and Copyright

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Performance tests and ratings are measured using specific computer systems and/or components and reflect the approximate performance of Intel products as measured by those tests. Any difference in system hardware or software design or configuration may affect actual performance. Buyers should consult other sources of information to evaluate the performance of systems or components they are considering purchasing. For more information on performance tests and on the performance of Intel products, go to: http://www.intel.com/performance/resources/benchmark_limitations.htm. Intel does not control or audit the design or implementation of third party benchmarks or web sites referenced in this document. Intel encourages all of its customers to visit the referenced web sites or others where similar performance benchmarks are reported and confirm whether the referenced benchmarks are accurate and reflect performance of systems available for purchase. Relative performance is calculated by assigning a baseline value of 1.0 to one benchmark result, and then dividing the actual benchmark result for the baseline platform into each of the specific benchmark results of each of the other platforms, and assigning them a relative performance number that correlates with the performance improvements reported.

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Intel processor numbers are not a measure of performance. Processor numbers differentiate features within each processor series, not across different processor sequences. See http://www.intel.com/products/processor_number for details. Intel products are not intended for use in medical, life saving, 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. (E5-4600 Performance Gain) Up to 1.88x higher performance claim is based on Intel internal assessment compared with Intel® Xeon® processor E5-2600 product family using Server-side Java* SPECjbb*2005 benchmark. Source: Intel SSG TR#1228. Baseline 2-socket populated Intel® C606 Chipset-based customer reference server using two Intel® Xeon® processors E5-2680 (8C, 20M Cache, 2.7GHz, 8.0GT/s Intel QPI), 32GB memory (8x 4GB DDR3-1600 DIMMs), Microsoft Windows Server* 2008R2 Enterprise Edition, Oracle HotSpot* 64-bit Server VM build 20,0-v11 using Java* SE RE 1.6.0 Update 25. Score: 1,418,557 bops. New 4-socket populated Intel® C606 Chipset-based customer reference server with four Intel® Xeon® processors E5-4650 (8C, 20M Cache, 2.7GHz, 8.0GT/s Intel QPI), 128GB memory (16x 8GB DDR3-1600 DIMMs), Microsoft Windows Server* 2008R2 Enterprise Edition, Oracle HotSpot* 64-bit Server VM build 20,0-v11 using Java* SE RE 1.6.0 Update 25. Score: 2,663,768 bops.

2. (E5-4600 TCO) 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. 2- to 4-Socket TCO Configuration Details and Assumptions—2S Intel® Xeon® processor E5-2609 (4C, 2.4 GHz) vs. 4S Intel® Xeon® processor E5-4607 (6C, 2.2 GHz): System memory = 256 GB memory configuration for both system, OS = MS Windows* 2008 R2 Enterprise Edition; no additional SW application or licensing costs included. 4-Year TCO savings of up to 52% based on Intel estimates by comparing 100 2S Intel® Xeon® processor E5-2609-based servers with 32 4S Intel® Xeon® processor E5-4607-based servers that provide equivalent total server performance using Intel estimates of SPECint*_rate_base2006. The 4-year TCO savings based on: Intel estimate of server acquisition cost of $619,900 (100 servers at $6,199 each) for the 2S vs $ 347,936 (32 servers at $10,873 each) for the 4S. 68 fewer servers in the data center results in server maintenance savings of $34,000 ($125 per server/year), infrastructure (network, rack/floor space and utility) savings of $88,941 ($327 per server/year) and OS license savings of $271,932 ($999 per server/year).

3. (E5-4600 Flexibility) Intel internal assessment comparing the Intel® Xeon® processor E5-4600 product family with the Intel® Xeon® processor E5-2600 product family.

5. (FTC Disclaimer) 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.

6. (Integrated I/O) Intel measurements of average time for an I/O device read to local system memory under idle conditions. Improvement compares Intel® Xeon® processor E5-2600 product family (230 ns) vs. Intel® Xeon® processor 5500 series (340 ns). Baseline Configuration: Green City system with two Intel® Xeon processor E5520 (2.26GHz, 4C), 12GB memory @ 1333, C-States Disabled, Turbo Disabled, SMT Disabled, Rubicon* PCIe* 2.0 x8. New Configuration: Meridian system with two Intel® Xeon processor E5-2665 (C0 stepping, 2.4GHz, 8C), 32GB memory @1600 MHz, C-States Enabled, Turbo Enabled. The measurements were taken with a LeCroy* PCIe* protocol analyzer using Intel internal Rubicon (PCIe* 2.0) and Florin (PCIe* 3.0) test cards running under Windows* 2008 R2 w/SP1.

7. (PCIe 3.0) 8 GT/s and 128b/130b encoding in PCIe 3.0 specification enables double the interconnect bandwidth over the PCIe 2.0 specification. Source: http://www.pcisig.com/specifications/pciexpress/.

8. (AVX Performance) Source: Performance comparison using Linpack benchmark. Baseline score of 159.4 based on Intel internal measurements as of 5 December 2011 using a Supermicro* X8DTN+ system with two Intel® Xeon® processor X5690, Turbo Enabled, EIST Enabled, Hyper-Threading Enabled, 48 GB RAM, Red Hat* Enterprise Linux Server 6.1 beta for x86_6. New score of 347.7 based on Intel internal measurements using an Intel® Rose City platform with two Intel® Xeon® processor E5-2690, Turbo Enabled or Disabled, EIST Enabled, Hyper-Threading Enabled, 64 GB RAM, Red Hat* Enterprise Linux Server 6.1 beta for x86_6.

9. (E3 New Generation Performance) Source: Performance comparison based on processor generationto-generation geometric mean of SPECint*_rate_base2006,SPECfp*_rate_base2006, STREAM and Linpack benchmark results.

For the SPECCPU2006 v1.2 ic12.1.09oct2011 on Linux x86_64 comparison: Baseline and Score on Benchmark: Intel® C206 based Qual Platform with one Intel® Xeon® Processor E3-1280 (8M Cache, 3.50 GHz, D2-stepping), EIST-enabled, Turbo Boost-enabled, Hyper-Threading-enabled, 16GB memory (2x8GB DDR3-1333 ECC UDIMM), 160GB SATA 7200RPM HDD, Red Hat* Enterprise Linux Server 6.2 with kernel: 2.6.32-220.el6.x86_64. Compiler version: 12.1.0.225 of Intel C++ Studio XE and Intel Fortran. Source: Intel internal testing as of Feb 2012. Score: SPECint_rate_base2006=172,,SPECfp_rate_base2006=118. New Configuration and Score on Benchmark: Intel® C206 Qual Platform with one Intel® Xeon® Processor E3-1280V2 (8M Cache, 3.60 GHz, E0 stepping), EIST-enabled, Turbo Boostenabled, Hyper-Threading-Enabled, 16GB memory (2x 8GB DDR3-1600 ECC UDIMM), 160GB SATA 7200RPM HDD, Red Hat* Enterprise Linux Server 6.2 with kernel: 2.6.32-220.el6.x86_64. Compiler version: 12.1.0.225 of Intel C++ Studio XE and Intel Fortran. Source: Intel internal testing as of Feb 2012. Score: SPECint_rate_base2006=190, SPECfp_rate_base2006=135.

For the Stream_omp v5.4 at N=80,000,000 on Linux x86_64 comparison: Baseline and Score on Benchmark: Intel® C206 chipset with one Intel® Xeon® Processor E3-1280 (Quad-Core, 3.5GHz, 8MB L3 cache), EIST-enabled, Turbo Boost-enabled, Hyper-Threading-Disabled, 16GB memory (2x 8GB DDR3-1333 Unbuffered ECC), 160GB SATA 7200RPM HDD, Red Hat* Enterprise Linux Server 6.2 with 2.6.32-220.el6.x86_64 kernel. Source: Intel internal testing as of Mar 2012. Score of Triad: 18,629 MB/s. New Configuration and Score on Benchmark: Intel® C206 chipset with one Intel® Xeon® Processor E3-1280 v2 (Quad-Core, 3.6GHz, 8MB L3 cache, E0-stepping), EIST-enabled, Turbo Boost-enabled, Hyper-Threading-disabled, 16GB memory (2x 8GB DDR3-1600 unbuffered ECC), 160GB SATA 7200RPM HDD, Red Hat* Enterprise Linux Server 6.2 with 2.6.32-220.el6.x86_64 kernel. Source: Intel internal testing as of Feb 2012. Score of Triad: 22,531 MB/s.

For the Intel Optimized SMP LINPACK 10.3.4 on Linux x86_64 comparison: Baseline Configuration and Score on Benchmark: Intel® C206 chipset with one Intel® Xeon® Processor E3-1280 (Quad-Core, 3.5GHz, 8MB L3 cache), EIST-enabled, Turbo Boost-enabled, Hyper-Threading-disabled, 8GB memory (2x 4GB DDR3-1333 Unbuffered ECC), 160GB SATA 7200RPM HDD, Red Hat* Enterprise Linux Server 5.5 for x86_64 with kernel 2.6.35.10. Source: Intel internal testing as of Dec 2010. Score : 99.61 GFlops. New Configuration and Score on Benchmark: Intel® C206 chipset with one Intel® Xeon® Processor E3-1280 v2 (Quad-Core, 3.6GHz, 8MB L3 cache, E0-stepping), EIST-enabled, Turbo Boostenabled, Hyper-Threading-disabled, 16GB memory (2x 8GB DDR3-1600 unbuffered ECC), 160GB SATA 7200RPM HDD, Red Hat* Enterprise Linux Server 6.2 with 2.6.32-220.el6.x86_64 kernel. Source: Intel internal testing as of Feb 2012. Score: 107.38 GFlops

10. (Turbo Requirements) 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 PC manufacturer. Performance varies depending on hardware, software, and system configuration. For more information, visit http://www.intel.com/go/turbo.

11. (Turbo Boost 2.0 Performance) Source: Performance comparison using SPECint*_rate_base2006 benchmark with turbo enabled and disabled. Baseline scores of 393 (turbo enabled) and 376 (turbo disabled) based on Intel internal measured estimates as of 5 December 2011 using a Supermicro* X8DTN+ system with two Intel® Xeon® processor X5690, Turbo Enabled or Disabled, EIST Enabled, Hyper-Threading Enabled, 48 GB RAM, Intel® Compiler 12.0, Red Hat* Enterprise Linux Server 6.1 beta for x86_6. New scores of 659 (turbo enabled) and 594 (turbo disabled) based on Intel internal measured estimates using an Intel® Rose City platform with two Intel® Xeon® processor E5-2680, Turbo Enabled or Disabled, EIST Enabled, Hyper-Threading Enabled, 64 GB RAM, Intel® Compiler 12.1, Red Hat* Enterprise Linux Server 6.1 beta for x86_6.

12. (AES-NI Performance) Source: testing with Oracle Database Enterprise Edition 11.2.0.2 with Transparent Data Encryption (TDE) AES-256 shows as much as a 10x speedup when inserting one million rows 30 times into an empty table on the Intel® Xeon processor X5680 (3.33 GHz, 36 MB RAM) using Intel IPP routines, compared with the Intel® Xeon® processor X5560 (2.93 GHz, 36 MB RAM) without Intel IPP.

13. (Node Manager) 40% increase in density per published proof of concept http://communities.intel.com/docs/DOC-4212.

14. (Energy Efficient Performance–Technical Computing) Source: Performance comparison using SPECfp*_rate_base2006 benchmark results at the same TDP. Baseline score of 271 on prior generation 2S Intel® Xeon® processor X5690 (130W) based platform and new score of 469 on 2S Intel® Xeon® processor E5-2680 (130W) based platform are based on the best publications to www.spec.org as of 6 March 2012. For details, please see: http://www.spec.org/cpu2006/results/res2012q1/cpu2006-20111219-19195.html and http://www.spec.org/cpu2006/results/res2012q1/cpu2006-20120213-19495.html.

15. (Intel® TXT) No computer system can provide absolute security under all conditions. Intel® Trusted Execution Technology (Intel® TXT) requires a computer with Intel® Virtualization Technology, an Intel TXT-enabled processor, chipset, BIOS, Authenticated Code Modules and an Intel TXT-compatible measured launched environment (MLE). Intel TXT also requires the system to contain a TPM v1.s. For more information, visit www.intel.com/go/inteltxt.

16. (AES-NI Requirements) Intel ® AES-NI requires a computer system with an AES-NI enabled processor, as well as non-Intel software to execute the instructions in the correct sequence. AES-NI is available on Intel® Xeon® processors, Intel® Core™ i5-600 Desktop Processor Series, Intel® Core™ i7-600 Mobile Processor Series, and Intel® Core™ i5-500 Mobile Processor Series. For availability, consult your reseller or system manufacturer. For more information, see http://www.intel.com/content/www/us/en/architecture-and-technology/advanced-encryption-standard--aes-/data-protection-aes-generaltechnology.html.

17. (Energy Efficient Performance—Enterprise) Source: Performance comparison using single-node SPECpower_ssj*2008 benchmark results. Baseline result of 3,329 ssj*_ops/watt on prior generation 2S Intel® Xeon® Processor X5675 platform based on best published score to www.spec.org as of 6 March 2012. New result of 5,032 ssj*_ops/watt based on best submitted, self-published result as of 6 March 2012. For additional details, please see: http://www.spec.org/power_ssj2008/results/res2011q4/power_ssj2008-20110713-00386.html and http://ts.fujitsu.com/rl/products/SPECpower_ssj2008.RX300S7_E5-2660_2P/ssj.0004-main.html.

18. (E7 New Generation Performance) Up to 40% generational compute-intensive throughput claim based

on SPECint*_rate_base2006 benchmark comparing next generation Intel® Xeon® processor E7-4870 (30M cache, 2.40GHz, 6.40GT/s Intel® QPI, codenamed Westmere-EX) scoring 1,010 (includes Intel Compiler XE2011 improvements accounting for about 11% of the performance boost) to X7560 (24M cache, 2.26GHz, 6.40GT/s Intel QPI, formerly codenamed Nehalem-EX) scoring 723 (Intel Compiler 11.1). Source: Intel SSG TR#1131.
19. (E7 Transaction Improvement) Up to 4.3x scaling transaction improvement claim based on internal OLTP benchmark comparing next generation Intel® Xeon® processor E7-4870 (30M cache, 2.40GHz, 6.40GT/s Intel® QPI, codenamed Westmere-EX) scoring 2.7M transactions (leading database vendor) to X7460 (16M cache, 2.66GHz, 1066MHz FSB, formerly codenamed Dunnington) scoring 634K transactions. Source: Intel SSG TR#1120.
20. (E7 TCO) Up to 29:1 server consolidation performance with as low as 8 months payback claim estimated based on comparison between 4S MP Intel® Xeon® processor 3.33Ghz (single-core with Intel® HyperThreading Technology, 8M cache, 800MHz FSB, formerly code named Potomac) and 4S Intel® Xeon® processor E7-4870 (30M cache, 2.40GHz, 6.4GT/s Intel® QPI, code named Westmere-EX) based servers. Calculation includes analysis based on performance, power, cooling, electricity rates, operating system annual license costs, and estimated server costs. This assumes 42U racks, $0.10 per kWh, cooling costs are 2x the server power consumption costs, operating system license cost of $900/year per server, per server cost of $36,000 based on estimated list prices, and estimated server utilization rates. All dollar figures are approximate. SPECint*_rate_base2006 performance and power results are measured for Intel® Xeon® processor E7-4870 and Intel Xeon processor 3.33GHz based servers. Platform power was measured during the steady state window of the benchmark run and at idle. Performance gain compared with baseline was 29x (truncated).
• Baseline platform (measured score of 33.8): Intel server with four Intel® Xeon® MP CPU 3.3Ghz (single core w/HT, 1MB L2, 8MB L3) processors, 16GB memory (8x2GB DDR2-400), 1 hard drive, 1 power supply, Microsoft Windows Server* 2008 Enterprise x64 Edition R2 operating system, Intel Compiler 11 built SPECcpu* 2006 November 2009 binaries.

• New platform (measured score of 1,010): Intel internal reference server with four Intel® Xeon® processor E7-4870 (30M cache, 2.40GHz, 6.40GT/s Intel® QPI), 128GB memory (64x 2GB QR DDR3-1333), 1 hard drive, 3 power supplies, using SUSE* Linux Enterprise Server 11 operating system, Intel Compiler XE2011 built SPECcpu* 2006 January 2011 binaries.
21. (E7 VM Performance) Up to 25% better virtual machine performance claim based on SPECvirt_sc2010 benchmark comparing next generation Intel® Xeon® processor E7-4870 (30M cache, 2.40GHz, 6.40GT/s Intel® QPI, codenamed Westmere-EX) scoring 2,540 @ 162VMs to X7560 (24M cache, 2.26GHz, 6.40GT/s Intel QPI, formerly codenamed Nehalem-EX) scoring 2,024 @ 126VMs. Source: Intel SSG TR#1118.
22. (Virtualization Performance) World-record virtualization performance claim based on all published VMmark* 1.x results on http://www.ideasinternational.com/Benchmark-Top-Ten/VMmark-1-x. Topranked Fujitsu PRIMERGY* RX600 S5 uses four Intel® Xeon® processor X7560 (24M cache, 2.26GHz, 6.40GT/s Intel QPI).
24. (E5 New Generation Performance) Source: Performance comparison using SPECfp*_rate_base2006 benchmark results. Baseline score of 271 on prior generation 2S Intel® Xeon® processor X5690 based platform and new score of 495 on 2S Intel® Xeon® processor E5-2690 based platform are based on the best published results as of 6 March 2012. For details, please see: http://www.spec.org/cpu2006/results/res2012q1/cpu2006-20111219-19195.html and http://docs.ts.fujitsu.com/dl.aspx?id=3ebb6ef4-8b13-4c5f-962a-a7c48f1e00dd.
25. (AVX Performance) Source: Performance comparison using Linpack benchmark. Based on Intel internal measurements as of 4 August 2011 using a Supermicro* X8DTN+ system with two Intel® Xeon® processor X5690, Turbo Enabled or Disabled, EIST Enabled, Hyper-Threading Enabled, 48 GB RAM, Red Hat* Enterprise Linux Server 6.1 beta for x86_6. New score of Y 350.3 based on Intel internal measurements using an Intel® Rose City platform with two Intel® Xeon® processor E5-2690, Turbo Enabled or Disabled, EIST Enabled, Hyper-Threading Enabled, 64 GB RAM, Red Hat* Enterprise Linux Server 6.1 beta for x86_6.
26. (Cache) Maximum preprocessor cache is 12MB for Intel® Xeon® processor 5600 series and 20MB for Intel® Xeon® processor E5-2600 product family.
28. (Rapid Storage) For more information on Intel® Rapid Storage Technology, visit http://www.intel.com/p/en_US/support/highlights/chpsts/imsm.
29. (Turbo Boost) Requires a system with Intel® Turbo Boost Technology capability. Intel Turbo Boost Technology 2.0 is the next generation of Turbo Boost Technology and is only available on select Intel® processors. Consult your PC manufacturer. Performance varies depending on hardware, software, and system configuration. For more information, visit http://www.intel.com/go/turbo.
30. (PCI) Intel® Xeon® processor 3600 series supports 36 PCIe Gen2 lanes vs. Intel® Xeon® processor E5-1600 product family which supports 48 PCI Gen3 lanes.
31. (vPro) Intel® vPro™ Technology is sophisticated and requires setup and configuration. Availability of features and results will depend upon the setup and configuration of your hardware, software, and IT environment. To learn more about the breadth of security features, visit http://www.intel.com/technology/vpro.
32. (HD Graphics) Intel® HD P4000 introduces 4 additional execution units going from 8 in the Intel® HD P3000 to 12 in the Intel HD P4000. Optimized Intel® HD Graphics P4000 only available on select models of the Intel® Xeon processor E3-1200 v2 product family. For more information, visit http://www.intel.com/content/www/us/en/architecture-and-technology/hd-graphics/hd-graphicsdeveloper.html.
33. (Hyper-Threading) Requires an Intel® Hyper-Threading Technology-enabled system, consult with your PC manufacturer. Performance will vary depending on the specific hardware and software used. Not available on all Intel® processors. For more information, including details on which processors support Intel HT Technology, visit http://www.intel.com/go/ht.
34. (Built-in Security) 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 PC manufacturer for more details. For more information visit www.intel.com/technology/security.

36. (Virtualization) 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 http://www.intel.com/content/www/us/en/virtualization/virtualization-technology/hardware-assistvirtualization-technology.html.
37. (Identity Protection) No system can provide absolute security under all conditions. Requires an Intel® Identity Protection Technology-enabled system, including a 2nd or 3rd gen Intel® Core™ processor, enabled chipset, firmware, and software, and participating website. Consult your system manufacturer. Intel assumes no liability for lost or stolen data and/or systems or any resulting damages. For more information, visit http://www.intel.com/content/www/us/en/architecture-and-technology/identityprotection/identity-protection-technology-general.html.
38. (AES-NI) Intel® Advanced Encryption Standard–New Instructions (Intel® AES-NI) requires a computer system with an AES-NI-enabled processor, as well as non-Intel software to execute the instructions in the correct sequence. AES-NI is available on select Intel® Core™ processors. For availability, consult your system manufacturer. For more information, see http://www.intel.com/content/www/us/en/architecture-and-technology/advanced-encryption-standard--aes-/data-protection-aes-generaltechnology.html.
39. (Intel® Rapid Start Technology) Requires a select Intel® processor, Intel® software and BIOS update, and Intel® Solid-State Drive (SSD). Depending on system configuration, your results may vary. Contact your system manufacturer for more information.
42. (Intel SBA) Requires an Intel® Small Business Advantage enabled system and proper configuration. Availability of features will depend upon the setup and configuration by your PC manufacturer. Consult your system manufacturer. Visit http://www.intel.com/content/www/us/en/small-business/smallbusiness-collection.html.
43. (SBA/Security/After-hours) Requires an Intel® Small Business Advantage enabled system and a thirdparty security application pre-configured by your PC manufacturer as long as the PC is on. Certain maintenance tasks require internet access. For after-hours feature to work, the PC must be connected to AC power.
44. (Intel SBA/Data Backup) Requires an Intel® Small Business Advantage enabled system and proper configuration. Data Backup & Restore may be replaced by your PC manufacturer. Consult your system manufacturer.
45. (Intel SBA/USB Blocker) Requires an Intel® Small Business Advantage enabled system with USB Blocker and Microsoft Windows 7* or later. USB Blocker is a software-based USB device blocking solution that depends upon the device properly identifying itself. Consult your system manufacturer.
46. (Wireless Display) Requires an Intel® Wireless Display enabled PC, compatible adapter and TV. 1080p and Blu-ray* or other protected content playback only available on 2nd or 3rd gen Intel® Core™ processor-based PCs with built-in visuals enabled, a compatible adapter and media player, andsupporting Intel WiDi software and graphics driver installed. Consult your PC manufacturer. For more information, see www.intel.com/go/widi.
49. (Built-in visuals) Built-in visual features are not enabled on all PCs and optimized software may be required. Check with your system manufacturer. Learn more at http://www.intel.com/go/biv.
51. (Thunderbolt™ Technology) As compared with other PC I/O connection technologies including eSATA, USB, and IEEE 1394 Firewire*. Performance will vary depending on the specific hardware and software used. For more information go to http://www.intel.com/technology/io/thunderbolt.
52. (Intel® Smart Connect Technology) Requires a select Intel® processor, Intel® software and BIOS update, Intel® wireless adapter, and Internet connectivity. Solid state memory or drive equivalent may be required. Depending on system configuration, your results may vary. Contact your system manufacturer for more information.
53. (My WiFi) Intel® My WiFi Technology is an optional feature and requires additional software and an Intel® Centrino® wireless adapter. WiFi devices must be certified by the WiFi Alliance for 802.11b/g/a in order to connect. See www.intel.com/network/connectivity/products/wireless/mywifi.htm for more details.
55. (Quick Sync Video—3-year baseline) Video transcode claim using CyberLink* MediaEspresso 6 to render a 4-minute, 449 MB, 1920 x 1080i, 18884 Kbps, MPG2 video file for playback on an Apple* iPod* with resolution of 640 x 360, H.264, and file format of .MP4. Speedup is 4X faster on 3rd gen Intel® Core™ i5-3450 processor (desktop) and 3rd gen Intel® Core™ i5-3320M processor (laptop) compared with Intel® Core™ processor (desktop) and Intel® Core™2 Duo E8400 (desktop) and P8600 (laptop).
56. (OS Guard) No system can provide absolute security. Requires an Intel® OS Guard-enabled system with a 3rd gen Intel® Core™ vPro™ processor and an enabled operating system. Consult your system manufacturer for more information.
57. (Anti-Theft) No system can provide absolute security under all conditions. Requires an enabled chipset, BIOS, firmware, and software, and a subscription with a capable service provider. Consult your system manufacturer and service provider for availability and functionality. Intel assumes no liability for lost or stolen data and/or systems or any other damages resulting thereof. For more information, visit http://www.intel.com/content/www/us/en/architecture-and-technology/anti-theft/anti-theft-businesstechnology.html.
58. (AMT) Security features enabled by Intel® AMT require an enabled chipset, network hardware and software, and a corporate network connection. Intel AMT may not be available or certain capabilities may be limited over a host OS-based VPN or when connecting wirelessly, on battery power, sleeping, hibernating, or powered off. Setup requires configuration and may require scripting with the management console or further integration into existing security frameworks, and modifications or implementation of new business processes. For more information, see http://www.intel.com/technology/platform-technology/intel-amt/.
59. (KVM) KVM Remote Control (Keyboard, Video, Mouse) is only available with Intel® Core™ i5 vPro™ and Core™ i7 vPro™ processors with Intel® Active Management technology activated and configured and with integrated graphics active. Discrete graphics are not supported.
60. (Secure Key) No system can provide absolute security. Requires an Intel® Secure Key enabled PC with a 3rd gen Intel® Core™ vPro™ processor and software optimized to support Intel Secure Key. Consult your system manufacturer for more information.
61. (Cross Client) Cross-client claim based on lowest performance data number when comparing desktop

and mobile benchmarks. Configurations and performance test as follows:
(Mobile) Comparing pre-production 3rd generation Intel® Core™ i5-3320M Processor (4T2C, 3M cache, up to 3.20 GHz), Intel Reference Board, pre-production BIOS, Memory 8 GB (2x4 GB) Micron* PC3-12800, Hitachi* Travelstar 320 GB hard-disk drive, Intel® HD Graphics 4000, Driver pre-production 8.15.10.2616 , Chipset INF pre-production 9.3.0.1019. Intel® Core™2 Duo Processor P8600 (2T2C, 3M cache, 2.40 GHz, 1066 MHz FSB), HP* dv6, BIOS HP* vF.31, Memory 4 GB (2x2 GB) Micron* PC3-8500, Hitachi* 320 GB hard-disk drive, Mobile Intel® GM45 Chipset Family w/ integrated graphics Driver: 8.15.10.1749, Chipset INF 9.2.0.1030, Microsoft Windows* 7 Ultimate 64-bit 6.1 Build 7601
(Desktop) Comparing pre-production 3rd generation Intel® Core™ i5-3450 Processor (4T4C, 6 MB cache, 3.1GHz base up to 3.5GHz), Intel® Desktop Board DH77KC, Memory 8 GB (2x4 GB) Micron* DDR3-1600, Seagate* 1 TB, Intel® HD Graphics 2500, Driver: 8.15.10.2616 (BIOS:vSLZ7510H.86A.0033.2011.1230.1146, Chipset INF 9.3.0.1019, Intel® Core™ 2 Duo E8400 (2C2T, 3.0GHz, 6MB cache), Memory 4 GB (2x2 GB) Micron* DDR2 800 MHz, Seagate* 1TB hard-disk drive, Intel® G45, Driver: 8.15.10.2189, (BIOS:IDG4510H.86A.0135.2011.0225.1100, INF), Microsoft Windows* 7 Ultimate 64-bit 6.1 Build 7601
Business productivity claims based on SYSmark* 2012, which is the mainstream office productivity, data/financial analysis, system management, media creation, 3D modeling, and web development benchmark tool used to characterize the performance of the business client. SYSmark 2012 features user-driven workloads and usage models developed by application experts. Multitasking claims based on PCMark* 7, a hardware performance benchmark for PCs running Microsoft Windows* 7, includes a collection of various single- and multi-threaded CPU, graphics, and HDD test sets with a focus on Windows* application tests. Encryption workload consists of SiSoftware Sandra* 2011—AES256 CPU Cryptographic subtest measures CPU performance while executing AES (Advanced Encryption Standard) encryption and decryption algorithm. For more information go to http://www.intel.com/performance.
62. (vPro Benefits) Source: Intel. Results shown are from 2010/2011 Intel MSP Case Studies: Axcell Technologies, Speros, Circle Computer Resources, IT Guru, MidAmerica Computer Corporation, Green Light Business Technology, Do IT Smarter, Sabio Information Technologies, STF Consulting, Alvarez Technology Group, outsourceIT, Nex-Tech, Alpheon, Base 2, Dempsey Bluevar. http://msp.intel.com. Actual results may vary.
63. (SBA Time Saving) Intel® Core™ i5-2400s processor with Intel® Small Business Advantage, Intel® DB75EN motherboard, 8GB memory, 40GB Intel® SSD, Microsoft® Windows™ 7 Ultimate versus Intel® Core™2 Duo E8400 processor with Intel® DQ45CB motherboard, 4GB memory, 1TB 7200RPM hard drive, Microsoft® Windows™ XP Pro. Test measures time required to transfer 40GBs of data to network storage. The automated scheduling capabilities of Intel® SBA (available only with Intel® Core™ processors) complete backups after hours, eliminating work-time disruptions.
64. (SBA Energy Benefit) Disclaimer: Intel® Core™ i5-2400s processor with Intel® Small Business Advantage, Intel® DB75EN motherboard, 8GB memory, 40GB Intel® SSD, Microsoft® Windows™ 7 Ultimate versus Intel® Core™2 Duo E8400 processor with Intel® DQ45CB motherboard, 4GB memory, 1TB 7200RPM hard drive, Microsoft® Windows™ XP Pro. This usage measures the total platform power being consumed in idle and off system states. The Intel® Core™2 Duo E8400 system is left on after hours in order to complete common PC maintenance tasks. The Intel® Core™ i5-2400s with Small Business Advantage system is turned off after hours and is automatically awoken to complete maintenance tasks and subsequently turned off to conserve power.
66. (E3 AES-NI Performance) Source: Performance comparison when encrypting a 32 GB SSD. Baseline score of 14 minutes 57 seconds, the mean of 3 runs, on prior generation Intel® Xeon® processor X3480 (Quad-Core, 3.06 GHz, 8 MB L3 cache) based platform (and new score of 9 minutes 24.67 seconds, the mean of 3 runs ,on an Intel® Xeon® processor E3-1280 (Quad-Core, 3.5 GHz, 8 MB L3 cache) based platform are based on the best published results as of January 2011. For more information go to http://www.intel.com/performance.

67. (OS Guard) No system can provide absolute security. Requires an Intel® OS Guard enabled Intel® Xeon® processor E3-1200 v2 product family-based platform and an enabled operating system. Consult your system manufacturer for more information.
68. (Secure Key) No system can provide absolute security. Requires an Intel® Secure Key-enabled Intel® Xeon® processor E3-1200 v2 product-based platform and software optimized to support Intel Secure Key. Consult your system manufacturer for more information.
69. (SATA 3.0) The SATA* 3.x specification enables double the data rate (from 3GB/s to 6Gb/s) of that enabled by the SATA 2.x specification. Source http://www.sata-io.org/technology/6Gbdetails.asp.
70. (E3 Energy Efficient Performance) Source: Performance comparison using SPECpower_ssj*2008 benchmark results using Java SE Runtime Environment (build 1.6.0_30-b12), Java HotSpot 64-Bit Server VM (build 20.5-b03, mixed mode. Baseline result of 2957 ssj*_ops/watt on prior generation Intel® C206 chipset CRB platform with one Intel® Xeon ® Processor E3-1280(Quad-Core, 3.5GHz, 8MB L3 cache), Turbo Boost-disabled, Hyper-Threading-enabled, 8GB memory (2x 4GB DDR3-1333 UDIMM), 64GB SATA SSD, Windows Server2008R2 SP1. New result of 3895 ssj*_ops/watt on current generation Intel® C206 chipset CRB platform with one Intel® Xeon® Processor E3-1280v2 (Quad-core, 3.6GHz, 8MB L3 cache, E0-stepping), EIST Enabled, Turbo Boost-disabled, Hyper-Threading-enabled, 8GB memory (2x 4GB DDR3-1600 UDIMM), 64G 3Gb/s SATA SSD , Windows 2008 R2 SP. Source: Best submitted, self-published results as of March 2012.
71. (Generational Performance) Source: Performance comparison using SPECfp*_rate_ base 2006 benchmark. Based on Intel internal measured estimates using an Intel® Rose City platform with two Intel® Xeon® processor E5-2690, Turbo and EIST Enabled, with Hyper-Threading, 64 GB RAM, Red Hat* Enterprise Linux Server 6.1 beta for x86_6, Intel® Compiler 12.1. For more details, see: http://www.spec.org/cpu2006/results/res2011q1/cpu2006-20110131-14172.html.