A Powerful Foundation for Virtual Environments and Cloud Computing Infrastructure

Virtualize any workload and create a more flexible and secure data center with VMware vSphere* 5.1 and the Intel® Xeon® processor E5-2600 product family.

Brilliantly Versatile For Business

IT organizations are tasked to do more with less: support more users, a wider variety of devices and more data with fewer resources. With Intel® Xeon® processor E5-2600 product family-based platforms running VMware vSphere* 5.1 you can virtualize any workload in your data center and create a more flexible, resilient, and secure computing environment to support diverse business-critical demands more effectively and at lower total cost.

The Intel® Xeon® processor E5-2600 product family is the heart of a flexible and efficient data center infrastructure. It is designed to deliver the best combination of performance, built-in capabilities, and cost-effectiveness. The Intel Xeon processor E5-2600 product family offers more capabilities for a next-generation data center with more cores, more memory, more integration, and more bandwidth. Servers based on these processors deliver high performance across the full range of business applications, and include a variety of unique, built-in features that help to improve performance, efficiency, and security in virtualized data centers.

VMware vSphere* 5.1 is the industry-leading virtualization platform for building cloud infrastructures that let you run business-critical applications with confidence and respond faster to your business, maximizing the value of these powerful Intel® processor-based servers. This latest version provides enhancements in scalability, availability, and security. You can virtualize even your most complex workloads, migrate your virtual machines and data more easily and reliably, and protect your virtualized infrastructure more effectively from downtime and digital threats. You can also create a unified, enterprise-class, 10 Gigabit Ethernet fabric to support your move toward a fully optimized private cloud environment.
The Intel Xeon processor E5-2600 product family and VMware vSphere 5.1 allow you to:

- **Strengthen security and compliance** by establishing trusted platforms across your data center and by protecting data and applications with virtualization-aware security technologies and fast, low-overhead data encryption.

- **Reduce IT costs** by consolidating workloads onto a small number of Intel Xeon processor E5-2600 product family-based servers and moving to a single, converged 10 Gigabit Ethernet network. You can increase server utilization from 5-15 percent to as much as 60-80 percent1 and greatly reduce your adapter, switch, and cabling requirements.

- **Optimize performance and power efficiency** across a broad range of business applications to solve your most complex problems and reduce your operational costs.

- **Ensure always-on IT** with highly reliable servers and simple, fully automated health monitoring, failover, and disaster recovery. VMware vMotion* offers live migration with no need for shared storage, so you can eliminate even planned downtime by moving workloads to different servers for hardware maintenance.

- **Improve application quality** by testing new applications, upgrades, and patches in pre-production virtual machine “sandbox” staging environments. You can clone your production environment almost instantly to ensure realistic testing so you can avoid software problems that might otherwise cause critical business applications to fail.

**Streamline Your Data Center**

The Intel Xeon processor E5-2600 product family and VMware vSphere 5.1 allow you to consolidate your infrastructure, simplify operations, and accelerate new deployments, so you can support your business more effectively.

- **Improve performance for your most time-sensitive applications.** Today’s increasingly dense, virtualized infrastructure places heavy demands on server I/O subsystems. Intel® Integrated I/O in the Intel Xeon processor E5 family reduces I/O latency by up to 30 percent2 and supports the latest PCIe* 3.0 specification, which can double I/O bandwidth.3 Intel® Data Direct I/O Technology (Intel® DDIO) further reduces latency by transferring data directly from storage to cache to eliminate unneeded trips to main system memory. With support for up to 1 million I/O operations per second, VMware vSphere 5.1 helps to ensure these improvements translate directly into higher application throughput and faster response times.

- **Simplify your data center with a unified 10 Gigabit Ethernet fabric.** With Intel® Ethernet 10 Gigabit Converged Network Adapters and VMware vSphere 5.1, you can consolidate your server and storage traffic onto a single, high-bandwidth fabric to reduce costs, improve flexibility, and simplify growth. Enhancements to the VMware vSphere Distributed Switch (VDS) make it easier to maintain the health and resilience of your network. The combined platform also supports multiple I/O virtualization technologies and flexible adapter teaming to help you provide fast, scalable, and highly available network connectivity that is easily tailored to address diverse and demanding requirements. (New support for the PCI-SIG Single-Root I/O Virtualization (SR-IOV) specification adds another option that is ideal for some I/O-intensive applications, particularly those with small packets and particularly low-latency requirements.)

- **Increase storage performance, scalability, and efficiency.** Intel Xeon processors help to accelerate storage performance, with integrated support for non-transparent bridging, which enables faster data transfers between systems, and accelerated RAID for protecting your data more effectively and at a lower cost. Intel® Solid State Drives add to these advantages by providing substantially faster performance than traditional hard drives, with higher reliability and lower power consumption. You can also improve storage performance and efficiency with new features in VMware vSphere 5.1, including Storage Distributed Resource Scheduling (DRS) for automated storage optimization and Profile-Driven Storage for ensuring that storage assignments match virtual machine workload requirements during provisioning and migrations.

**Gain Powerful Performance with Flexible Features**

Intel Xeon processor E5-2600 product family-based servers are the heart of a next-generation data center with a range of performance advancements that can help to solve your most complex problems. These powerful servers offer:

- **Better application responsiveness,** with up to 80 percent performance gains over previous-generation Intel Xeon processor-based servers.4

- **Even higher gains for many technical and high-performance computing (HPC) applications.** Intel® Advanced Vector Extensions (Intel® AVX) can double the performance for floating-point operations5 to significantly reduce compute times and deliver faster results.

- **Computing power when you need it.** New Intel® Turbo Boost Technology 2.06 adapts to spikes in your workload, providing up to two times more performance upside than the previous-generation turbo technology.7

VMware vSphere 5.1 helps translate these silicon-based technologies into higher performance across your virtual infrastructure. It delivers near-native performance for applications running in virtual machines, with up to twice the scalability of the previous version of VMware vSphere. A single virtual machine can now be configured with up to 64 virtual CPUs and 1 TB of memory.
Create a More Efficient and Resilient Data Center

VMware vSphere 5.1 running on Intel Xeon processor E5-2600 product family-based servers provides the scalable capacity you need to consolidate large numbers of applications and heavy workloads on each server, so you can continue to simplify your computing environment and reduce your capital and operating expenses.

- **Higher consolidation ratios** give you better utilization and increased data center flexibility. Up to 16 high-performance cores per two-socket server deliver exceptional performance for multiple virtual machines running simultaneously. Intel® Hyper-Threading Technology® doubles the number of execution threads per core to further increase parallelism and throughput. Intel® QuickPath Technology, an integrated memory controller, Intel Integrated I/O, and 20 MB of last-level cache help to eliminate potential memory and I/O bottlenecks that might otherwise slow virtualized performance as your workloads grow. VMware vSphere builds on these features with industry-leading support for dynamic resource allocation, memory compression, and memory over-commit, all of which can help you run more virtual machines per server with consistent and highly reliable performance.

- **Improved utilization and higher availability** deliver increased efficiency and reliability. VMware Enhanced vMotion and Intel® Virtualization Technology FlexMigration provide a proven live migration solution for moving workloads without downtime among current and future Intel Xeon processor-based servers. With VMware vSphere 5.1, live migration no longer requires shared storage, so it provides even more flexible and affordable support for extending failover, load balancing, and disaster recovery protection across all your applications and workloads.

VMware High Availability monitors and restarts virtual machines on servers that have spare capacity. This cost-effective, automated solution minimizes downtime and IT service disruption, while eliminating the need for dedicated stand-by hardware. VMware Fault Tolerance takes high availability to the next level, by providing fully mirrored operation with continuous availability to eliminate even the smallest IT service disruption. It provides zero down time, zero data-loss protection without the cost or complexity of alternative solutions. VMware vCenter® Site Recovery Manager allows you to automate failover for all your systems and workloads. It is not only far simpler and more cost-effective than traditional disaster-recovery solutions, but also more reliable, since it eliminates error-prone manual processes and is easily tested without disrupting your production environment.

VMware vSphere 5.1 enhances these benefits with vSphere Data Protection, which enables automated backups of virtual machine data with no need for agents and with built-in deduplication to reduce your storage costs. VMware vSphere 5.1 also includes vSphere Replication, which supports efficient, array-agnostic virtual machine replication over LANs and WANs. Together, these technologies enable quick, simple backup and recovery with the ability to restore entire virtual machines or individual files.

Lower Your Costs Through Automated Power Management

Intel and VMware technologies not only improve your application response times, but also help you operate more cost-effectively with features that help you maximize energy efficiency throughout your data center.

- **Better power efficiency per server.** Intel® Power Tuning Technology uses on-board sensors to give you greater control over power and thermal levels across the system. Intel® Intelligent Power Technology automatically regulates power consumption to combine industry-leading energy efficiency with intelligent performance that adapts to your workloads. You get up to 50 percent more performance per watt with servers based on the Intel Xeon processor E5-2600 product family compared with previous-generation servers.

- **Decrease your costs even further with intelligent performance.** Virtualizing and consolidating your systems and applications is one of the most effective ways to simplify your computing environment, reduce your hardware costs, and drive down your space, power and management requirements. VMware vSphere takes advantage of Intel Intelligent Power Technology to further reduce power consumption at the system level, by consolidating workloads onto as few cores as possible. VMware Distributed Power Management (DPM) provides similar control at a higher level. It automatically redistributes virtual machines onto a smaller number of servers when workloads are light and shuts down the unneeded systems. You benefit from a greener computing environment and lower utility bills.

Strengthen Security and Compliance To Protect Your Business

Intel and VMware provide uniquely powerful support for security and compliance in today’s dynamic data centers and clouds. With Intel® Trusted Execution Technology11 (Intel® TXT) and VMware vSphere APIs, hypervisor software can be measured at launch and verified against validated measurements stored in the Trusted Platform Module (TPM). Instead of playing catch-up with ever-evolving vulnerabilities, this strategy helps to ensure your platforms always boot into a known good state, so you can be sure they have not been tampered with, either by misconfiguration or attack. This trusted-platform technology is supported by more than a dozen leading security and compliance vendors and can provide fundamental enhancements to your governance, risk, and compliance (GRC) environment.
Other security technologies integrated into the Intel Xeon processor E5-2600 product family include Supervisor Mode Execution Protection, which helps to protect against sophisticated escalation of privilege attacks, and Intel® Advanced Encryption Standard New Instructions (Intel® AES-NI), which enables fast, low-overhead encryption. Supported in the VMware ESXi kernel, Intel AES-NI accelerates encryption by up to 10 times so you can encrypt sensitive data and communications throughout your data center without slowing application performance or driving up costs.

VMware vSphere builds on this strong security foundation with advanced capabilities that make it easy to establish and maintain secure configurations, including automated patch management for physical hosts and virtual machines, offloaded virus protection for simplified low-overhead protection, and quick cloning of production environments for testing patches and upgrades in realistic environments.

A Smooth Path to a Hybrid Cloud

VMware and Intel are committed to delivering advanced cloud computing functionality to businesses today, while also helping them establish an interoperable foundation for integrating with current and future public clouds. Intel Xeon processor-based servers provide a high-performing, scalable, energy-efficient hardware platform for public and private cloud servers, and the VMware vSphere platform helps to ensure broad software compatibility with diverse cloud solutions. Built-in storage APIs and the VMware vCloud® application-programming interface (API) provide the foundation you need to run business-critical applications with confidence in hybrid cloud environments.

You can take advantage of this industry-leading virtualization platform today to deploy advanced cloud computing functionality for your business. It will help you deliver better and more reliable service, improved productivity, and reduced costs. It will also provide you with an interoperable foundation that keeps your options open as cloud computing models continue to evolve.

For more information on Intel® Xeon® Processor E5 Family: www.intel.com/content/www/us/enprocessors/xeon/xeon-processor-5000-sequence.html

For more information on VMware vSphere*: 5.1: www.vmware.com/products/datacenter-virtualization/vsphere/overview.html

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, configurations, software, components, and options. Any change to any of the factors in any of the tests may result in the test not being comparable to another test. 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. Performance tests and ratings are measured using specific computer systems and 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, visit www.intel.com/performanceresources/limits.htm.


The measurements of average time for an I/O device to local system memory under idle conditions. Improvement compares Xeon processor E5530 (2.26 GHz, 4C), 12GB memory @ 1333, C-States Disabled, Turbo Disabled, SMT Disabled, Rubicon® PCIe® 2.0 x 2. New Configuration: Intel Xeon Chipset-based system with two Intel® Xeon processor E5520 (2.26 GHz, 4C), 4G memory @ 1333, C-States Enabled, Turbo Enabled. The measurements were taken with a LeCroy® PCI® analyzer using Intel internal Rubicon® (PCIe® 2.0) and Florn PCIe 3.0 test cards running under Windows® 2008 R2 w/iPP.


11 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/hydro.

12 Source: Performance comparison using SPECint_rate_base2006 benchmark with turbo enabled and disabled. Baseline scores of 599 (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 X5650, 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® Xeon® Chipset-based platform with two Intel® Xeon® processor E5-2690, 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.

13 Requires an Intel® HT Technology enabled system, check with your PC manufacturer. Performance will vary depending on the specific hardware and software used. Not available on Intel® Core® i5-750. For more information including details on which processors support HT Technology, visit http://www.intel.com/go/hyperthreading.

14 Intel® Intelligent Power Technology requires a computer system with an enabled Intel® processor, chipset, BIOS and for some features, an operating system enabled for it. Functionality or other benefits may vary depending on hardware implementation and may require a BIOS and/or operating system update. Please check with your system vendor for details.


16 No computer system can provide absolute security under all conditions. Intel® Trusted Execution Technology (Intel® TXT) requires a computer system with Intel® Virtualization Technology, an Intel TXT-enabled processor, chipset, BIOS, Authenticicated Code Modules and an Intel TXT-compatible measured launched environment (MLE). Intel TXT also requires the system to contain a TPM v1.1. For more information, visit www.intel.com/technology/security

17 Intel® AES-NI requires a computer system with an enabled Intel® processor, as well as an Intel® software to execute the instructions in the correct sequence. AES-NI is available on Intel® Core® i5-600 Desktop Processor Series, Intel® Core® i7-600 Mobile Processor Series, and Intel® Core® i5-600 Mobile Processor Series. For availability, consult your reseller or system manufacturer. For more information, see http://software.intel.com/us/articles/intel-advanced-encryption-standard-instructions-aes-ni.html

18 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 X5690 (3.33 GHz, 36 MB RAM) using Intel® IPP routines, compared to the Intel® Xeon® processor X5560 (2.93 GHz, 36 MB RAM) without Intel® IPP.

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