
IT organizations are virtualizing mission-critical workloads at an increasing rate as they discover that the benefits of virtualization are even more compelling when applied to their most important business applications. VMware vSphere* 5.1 running on the Intel® Xeon® processor E7 product family provide the scalable performance, high availability, and strong security you need to virtualize any workload, so you can enhance service levels, accelerate time to market, and deliver higher value to your business at lower total cost.

The Intel® Xeon® processor E7 product family is designed specifically for the heavy demands of mission-critical applications, with extensive compute resources and advanced support for high availability and security. It delivers up to 40 percent higher performance¹ than the previous-generation Intel Xeon processor 7500 series to provide faster response times for enterprise workloads. Additional improvements in data integrity, platform reliability, and security provide an even more robust foundation for hosting sensitive business data and applications on virtual infrastructure.

VMware vSphere* 5.1 adds to these advantages by providing the leading virtualization platform for running mission-critical applications and delivering major improvements in virtual machine and network scalability, security, and data protection. Together with the Intel Xeon processor E7 family, it provides the ideal IT infrastructure for hosting the full range of enterprise applications on scalable, reliable, secure, and highly flexible data center infrastructure.
With VMware vSphere 5.1 and the Intel Xeon processor E7 family, you can extend the benefits of virtualization, large-scale consolidation, and dynamic workload management across all your applications to achieve data center efficiencies that have never before been possible using affordable, industry-standard servers. This industry-leading virtualization platform provides:

- **Rock-solid support for mission-critical computing needs** with mainframe-inspired high-availability features, plus dial-up control of service levels through policy-based resource guarantees, advanced error recovery, health monitoring and diagnostics, and automated virtual machine failover across LANs and WANs.

- **A strong foundation for security and compliance** with the ability to maintain trusted platforms across the data center, while protecting applications and data with virtualization-aware security technologies and fast, low-overhead data encryption.

- **Scalable performance** with four-socket, eight-socket and larger physical servers running virtual machines with up to 64 virtual CPUs and 1 TB of RAM.

- **Unified 10 Gigabit networking** so you can reduce costs and simplify growth by consolidating server and storage traffic onto a single, high-bandwidth, low-latency network.

- **High consolidation ratios** to drive down data center space, power, and cooling requirements, reduce related maintenance costs, and improve the utilization of network and storage ports.

- **Scalable data center management** with the ability to monitor and control up to 4,000 virtual machines per cluster, while managing up to 1,000 physical hosts and 10,000 virtual machines from a single VMware vCenter® Server console.

### Achieve High Availability and Disaster Recovery Cost-Effectively

As you virtualize and consolidate critical workloads, you need systems and solutions you can count on to maintain uninterrupted service. The Intel Xeon processor E7 family provides extraordinary server reliability and data protection, with automatic detection, correction, and containment of errors and integrated recovery and failover mechanisms for memory and I/O links. It also supports Machine Check Architecture (MCA) Recovery. In combination with VMware vSphere, MCA Recovery enables automatic recovery from many errors that would have caused fatal system or virtual machine crashes in earlier platforms. Leading server manufacturers build on this foundation to provide highly resilient systems with built-in redundancy and advanced manageability features designed specifically for mission-critical environments.

VMware vSphere complements these hardware capabilities by providing fully automated control of workloads, virtual machine resource allocations, and service levels. VMware Enhanced vMotion® and Intel® Virtualization Technology FlexMigration provide a proven, enterprise-ready live migration solution that works with or without shared storage and supports a complete array of high-availability and disaster-recovery solutions.

- **VMware High Availability** monitors and restarts virtual machines on servers with spare capacity to minimize downtime and IT service disruption.

- **VMware Fault Tolerance** delivers even higher availability by providing fully mirrored operation to completely eliminate data loss and service disruptions.

- **VMware vCenter Site Recovery Manager** allows you to automate failover for an entire data center. It is far simpler and more cost-effective than traditional disaster-recovery solutions. It is also more reliable, since it eliminates error-prone manual processes and is easily tested without disrupting the production environment.

Enhancements in VMware vSphere 5.1 help to extend enterprise-class high availability even more effectively across your infrastructure. VMware vSphere Data Protection enables automated backups of virtual machine data with no need for agents and with built-in deduplication to reduce your storage costs. VMware vSphere Replication 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.

VMware vSphere 5.1 also supports network failover and load balancing through adapter teaming, with I/O controls for network and storage traffic to address quality of service (QoS) requirements. Improvements to the VMware vSphere Distributed Switch provide additional support for always-on networking, through automated health checking, configuration backup and restore, and simple roll back and recovery of entire virtual networks.

### Establish Stronger Security and Compliance

Intel and VMware provide uniquely powerful support for security and compliance in today’s dynamic virtual data centers and clouds.

- **Intel® Trusted Execution Technology (Intel® TXT) and VMware vSphere APIs** can automatically measure hypervisor software at launch and verify it against validated measurements stored in the tamperproof Trusted Platform Module (TPM). Instead of playing catch-up with ever-evolving vulnerabilities, this strategy helps to ensure your platforms always boot into known good states, 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. With this foundation, sensitive and business-critical workloads can be deployed—and migrated—with greater confidence.
• **Intel® Advanced Encryption Standard New Instructions**

(Intel® AES-NI) accelerates the most compute-intensive steps of AES algorithms to significantly reduce the performance penalties of encryption. Supported in the VMware ESXi kernel, AES-NI accelerates encryption by up to 10 times \(^5,6\) so you can encrypt sensitive data and communications throughout your data center without slowing application performance or driving up costs.

• **Intel® Virtualization Technology**

(Intel® VT), included in the Intel Xeon processor E7 family, helps to protect the integrity and confidentiality of data and applications by helping to maintain strong isolation among workloads running on shared infrastructure.

• **VMware vCloud Networking and Security** builds on this foundation by providing virtualization-aware application and data security that helps to improve visibility and control across the entire virtualized infrastructure. This solution integrates seamlessly with existing enterprise IT security measures, including anti-virus and anti-malware applications, to enable better-than-physical security with reduced complexity. VMware vSphere also provides advanced capabilities that make it easy to establish and maintain secure configurations, including automated patch management for physical hosts and virtual machines, and quick cloning of production environments for testing patches and upgrades in realistic environments.

**Enjoy Near-Native Performance in a Virtualized Environment**

Intel VT provides comprehensive hardware assists for core virtualization functions throughout the server platform. Working in tandem with software optimizations in VMware vSphere, this technology dramatically reduces virtualization overhead and enables near-native performance, even for I/O-intensive applications, such as large databases and transactional applications.

The combined platform provides the scalability needed to virtualize heavy workloads. VMware vSphere 5.1 doubles virtual machine scalability by providing support for up to 64 vCPUs. It also supports up to 1 TB of RAM per virtual machine, as well as up to 40 Gbps of network bandwidth and up to 1 million I/O operations per second. You can virtualize almost any workload. Intel and VMware engineers have demonstrated that a single four-socket server with the Intel Xeon processor E7-4870\(^8\) and VMware vSphere can comfortably host 12 mission-critical database applications, all running concurrently and delivering enterprise-class performance of up to 10,000 queries per hour.\(^9\)

The combined platform also supports multiple I/O virtualization technologies and flexible adapter teaming to provide fast, scalable network and storage connectivity for mission-critical workloads. New support for the PCI-SIG Single-Root I/O Virtualization (SR-IOV) specification adds another I/O virtualization option that is ideal for some I/O-intensive workloads, particularly those with small packets and exceptionally low-latency requirements.

**Magnify Your Cost Savings Through Powerful Server and Network Consolidation**

The Intel Xeon processor E7 family provides the scalable capacity needed to consolidate large numbers of applications per server, with more cores, more cache, and more memory and I/O capacity than the previous-generation Intel Xeon processor 7500 series. These processors also support Intel® Hyper-Threading Technology\(^10\) and Intel® Turbo Boost Technology\(^11\). The first doubles the number of execution threads per server. The second delivers higher performance on demand for peak workloads.

A single four-socket server provides enormous capacity for consolidation, with up to 40 cores, 80 execution threads, and 2 TB of memory. Businesses can take their consolidation ratios even higher
with eight-socket servers that provide up to 80 cores, 160 threads and 4 TB of memory. VMware vSphere 5.1 enables full utilization of these resources to support large-scale data center consolidation. It also provides industry-leading support for memory compression and memory over-commit, which help to eliminate memory bottlenecks to further increase virtual machine densities.

To address escalating network requirements as you increase infrastructure density, you can consolidate your server and storage traffic onto a unified, 10 Gigabit Ethernet fabric. Native iSCSI and Open FCoE initiators integrated into VMware vSphere enable full LAN and SAN connectivity on standard 10 Gigabit Ethernet adapters. Use the 10 Gigabit Intel® Ethernet Server Adapter X520 family to further improve performance by intelligently offloading packet processing to the adapter hardware. Then use the VMware vSphere Distributed Switch to provide centralized, enterprise-class control of your virtualized network.

Lower Your Costs Through Automated Power Management

Increasing consolidation ratios with four-socket and eight-socket Intel Xeon processor E7-family-based servers is one of the most effective ways to drive down space, power, and cooling costs in your data center. VMware vSphere takes advantage of Intel® Intelligent Power Technology to further reduce power consumption by consolidating workloads onto as few cores as possible. VMware Distributed Power Management (DPM) provides similar control at the data-center level. It automatically redistributes virtual machines onto a smaller number of servers when workloads are light and shuts down the unneeded systems to reduce total power consumption.

Now is the Time to Begin

The barriers to virtualizing mission-critical applications have largely disappeared. Seventy-five percent of VMware customers have virtualized at least one business-critical application in their production environment, and many are moving rapidly toward end-to-end data center virtualization and cloud computing. VMware vSphere 5.1 and servers based on the Intel Xeon processor E7 family provide the scalable performance, high availability, and security you need to virtualize almost any workload, so you can replace brittle, complex, and proprietary physical infrastructure with virtualized, standards-based solutions that are simpler, more flexible, more resilient, and far more cost-effective.

For more information on the Intel® Xeon® Processor E7 family:

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, 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.

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 the performance of Intel products, visit www.intel.com/products/performance/resources/limits.htm.

For example, when workloads are light, vSphere can automatically increase the frequency of one or more cores by as much as 400 MHz, shift more workloads onto the higher performing cores, which processors support HT Technology, visit http://www.intel.com/info/hyperthreading

VMware vCenter Distributed Switch to provide centralized, enterprise-class control of your virtualized network.

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 http://www.intel.com/technology/security

Distributed Switch to provide centralized, enterprise-class control of your virtualized network.

No computer system can provide absolute security under all conditions. Intel® Trusted Execution Technology (Intel® TXT) requires a computer system with an enabled Intel® Virtualization Technology, an Intel TXT-enabled processor, chipset, BIOS, and for some features, an operating system enabled for it. Functionality or other benefits will vary depending on hardware and software configurations.

For more information on VMware vSphere* 5.1: