

# Delivering Virtualization Performance for the Dynamic Data Center Running SAP Applications



Your business, your customers, and your competitors don't stand still – and neither can your technology resources. You need the best technology platforms to respond quickly and flexibly to business opportunities and challenges, rapidly adapting your strategy and execution while also minimizing your risks and costs.

Intel and VMware understand the challenges businesses have always needed to meet, as well as the new pressures surfacing in today's volatile global marketplace. Each company is the industry leader within its own market, and each offers the most advanced technology and highest expertise for creating the dynamic IT landscape that enables business transformation.

The combined expertise of VMware and Intel ensures that IT infrastructure resources for your SAP solutions are designed, manufactured and optimized to handle current and continually evolving requirements. The close partnership between Intel and VMware allows users to enjoy the performance they expect from their SAP applications whether running in virtualized environments or on dedicated physical hardware. From features such as Intel® Virtualization Technology<sup>1</sup> (Intel® VT) which provides extensive hardware assists for core virtualization functions, to VMware technologies that take advantage of Intel VT features and capabilities within the silicon, only Intel and VMware help you apply the full range of virtualization benefits to all sizes of SAP deployments.

Using Intel® Xeon® processor-based hardware and VMware® Infrastructure software to virtualize your SAP applications can help you quickly respond to customer requests, adapt to business and market changes. They also provide your business with solutions that deliver lower costs coupled with the reliability and scalability, flexibility for upgrades, and performance needed to adapt to today's business environment.

## Reliability Features Create a Solid Foundation for Virtualization

Many of the first virtualization implementations were for basic server consolidation, usually starting with test and development. Today, however, most customers are also using Intel Xeon processor-based servers and VMware Infrastructure to achieve higher availability and flexible resource management in production environments.

*Intel Xeon processor-based servers are uniquely suited to maximize consolidation while minimizing the energy consumption of your VMware virtualized SAP solutions-based environment.*

Powerful and efficient multi-core Intel Xeon processor-based servers provide new levels of performance to ensure that compute power is always available to help you easily manage the changing requirements of your SAP applications. Features such as Intel Virtualization Technology (Intel VT) FlexMigration help SAP administrators to add new resources to existing pools without having to worry about differences in processor generations.

Combining VMware® Enhanced VMotion technology with Intel VT FlexMigration allows IT managers to capture the current live state of a virtual machine and transfer it to a destination system with a different processor generation without any disruptions or downtime. Giving IT managers the ability to move guests on the fly allows companies to virtually eliminate planned downtime

and helps to readjust loads quickly based on changing workload requirements and/or data center demands. It also enables zero-downtime when upgrading to the latest generation of Intel® technology-based servers.

## A Production Proven Foundation for Your SAP Applications


Launched in 2001 and now in its third generation, VMware® ESX/ESXi™ a component of the VMware Infrastructure software suite, has been production-proven in tens of thousands of customer deployments all over the world. Other hypervisors are still version 1.0 products, unproven in production data centers and lacking core capabilities needed to deliver the reliability, scalability, and performance that customers require.

VMware® ESX is fully supported by SAP for use in production environments. Backed by dedicated support staffing, SAP and VMware provide cooperative support services and problem resolution for joint customers, so you can feel confident virtualizing your SAP solutions-based development, test, training, and production environments.

## More Cores, More Availability

Many SAP Enterprise environments – such as solutions in the SAP® Business Suite – usually are multi-tier applications that contain database, application server, and web server layers. In a typical deployment, every layer of the environment is hosted on dedicated physical systems. With VMware Infrastructure, your SAP solutions run in layers on virtual machines, simplifying your infrastructure.

Intel® processor-based systems have the compute power and memory capacity required for virtualization, as well as for handling peak workload performance. Uniquely architected for virtualization and built on the energy-efficient enhanced Intel® Core™ microarchitecture and Intel's 45nm Hi-k silicon process technology, with 6-core/65 Watt and 4-core/50 Watt processor options, Intel Xeon processor-based servers are uniquely suited to maximize consolidation while minimizing the energy consumption of your VMware virtualized SAP environment.



When you use Intel VT FlexMigration and VMware Enhanced VMotion accompanied with VMware® High Availability (HA), you're assured cost-effective high availability for SAP applications running in virtual machines. In the event of physical server failure, VMware HA automatically restarts SAP virtual machines on servers that have spare capacity, minimizing downtime and IT service disruption while eliminating the need for dedicated stand-by hardware. It provides high availability across the entire virtualized SAP environment without the cost and complexity of failover solutions that are tied to either operating systems or specific applications.

### **Upgrades Simplified and Accelerated, Deployment Time Reduced**

Virtualizing SAP applications makes it much simpler to test, configure and provision them. Virtualized servers can be provisioned and new SAP environments set up in minutes, versus the hours or even days these tasks can take with physical hardware today. This reduces the challenges SAP administrators might have in upgrading to the latest SAP solutions or deploying new generations of hardware, enabling faster utilization of servers with new performance capabilities as they become available.

*With the agility to address disaster recovery and real-time workload balancing, the Intel Xeon processor-based servers are specifically built to be your virtualization standard.*

VMware software also allows you to take snapshots that capture the state of the virtual machine memory, operating system, the SAP kernel, the SAP code, and the data. These snapshots capture the state of a virtual machine prior to applying and testing changes to SAP code or the operating system. In case of unsuccessful tests, you can roll back the SAP virtual machine to a known good state in minutes, allowing more tests cycles in a shorter time window.

### **Easy Rollback Ensures Uptime**

VMware Snapshot technology can also reduce the downtime of your production environments during the patch process. Snapshots allow you to perform a fast rollback to the pre-patch state, providing worst-case insurance that your SAP solutions-based environment can be brought back quickly to a functional state, limiting any potential downside to the business.

### **Deployment Across Multiple Generations of Servers**

Intel VT tools allow IT managers to build one compatible group of platforms for live migration across all of their Intel Core microarchitecture-based servers including 2-socket Intel® Xeon® processor 5000<sup>A</sup> sequence-based servers and the scalable 4-socket Intel® Xeon® processor 7000<sup>A</sup> sequence. And with VMware Enhanced VMotion, which allows you to move running virtual machines from one Intel Core microarchitecture-based server to another – with no impact to end users, you gain unprecedented flexibility and availability for your data center. This allows you to expand your capabilities smoothly and cost effectively, as well as utilize the best available resources for your SAP deployments.

At the SAP Co-Innovation Lab, an SAP test landscape was built including an SAP® NetWeaver Portal, an SAP NetWeaver Composite Environment and an SAP® ERP solution. VMware ESX was used as the virtualization infrastructure for this landscape. With VMware Enhanced VMotion and Intel VT FlexMigration technology, it was possible to move this landscape between Intel Xeon processor-based servers running different CPU generations without any application downtime.

## Robust Performance for Your Data Center

Whether your goal is to deploy more virtual machines, or ensure high availability of your SAP applications along with the agility to address disaster recovery and real-time workload balancing, the Intel Xeon processor-based servers are specifically built to be your virtualization standard.

With up to 24 cores on a 4-socket system and 16 MB of shared L3 cache per processor,<sup>2</sup> you have the performance and headroom to consolidate your SAP deployments optimally. With Intel Virtualization Technology FlexMigration, you can easily move workloads across multiple generations of Intel Xeon processor-based servers without disrupting services, all while providing the responsiveness needed to handle peak application loads, including delivering up to 36 percent better performance on SAP applications.<sup>3</sup>

Additionally, Intel Virtualization Technology (Intel VT) for Directed I/O (Intel® VT-d) provides unique innovations including Virtual Machine Device Queues (VMDq) that, when combined with VMware's NetQueue, offload routine I/O tasks to network silicon to free up more CPU cycles for applications and delivers over 2x throughput gains on 10 GbE.<sup>4</sup>

## A Dynamic, Responsive Infrastructure for SAP Deployments and More

SAP solutions are at the heart of your business, providing rich business functionality; Intel and VMware provide the infrastructure that drives tangible benefits for both your business and IT organization. With Intel and VMware technologies underlying your IT landscape, infrastructure and application teams are empowered to do their work more efficiently and with fewer administrative headaches.

VMware and Intel continue to combine their expertise and innovative ideas to ensure all infrastructure resources are designed, manufactured and optimized to handle evolving data center requirements. They collaborate continually to introduce ground-breaking hardware and software enhancements and to give you the availability, reliability, flexibility and performance you need to compete in an on-demand world.

For more information, visit [www.vmware.com/sap](http://www.vmware.com/sap)



vmware®



Building the Foundation of Virtualization

<sup>2</sup>Intel processor numbers are not a measure of performance. Processor numbers differentiate features within each processor family, not across different processor families. See [www.intel.com/products/processor\\_number](http://www.intel.com/products/processor_number) for details.

<sup>3</sup>Intel Virtualization Technology requires a computer system with a processor, chipset, BIOS, virtual machine monitor (VMM), and applications enabled for virtualization technology. Functionality, performance or other virtualization technology benefits will vary depending on hardware and software configurations. Virtualization technology-enabled BIOS and VMM applications are currently in development.

<sup>2</sup>On Intel Xeon processor 7000 sequence.

<sup>3</sup>ERP performance claim based on SAP-SD\* benchmark results September 2008; For more information, see [http://www.intel.com/performance/server/xeon\\_mp/server.htm?iid=perf\\_server\\_lhn+mp\\_server](http://www.intel.com/performance/server/xeon_mp/server.htm?iid=perf_server_lhn+mp_server)

<sup>4</sup>Chinni, Shefali and Radhakrishna Hiremane, "Virtual Machine Device Queues," Intel White Paper, 2007.

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