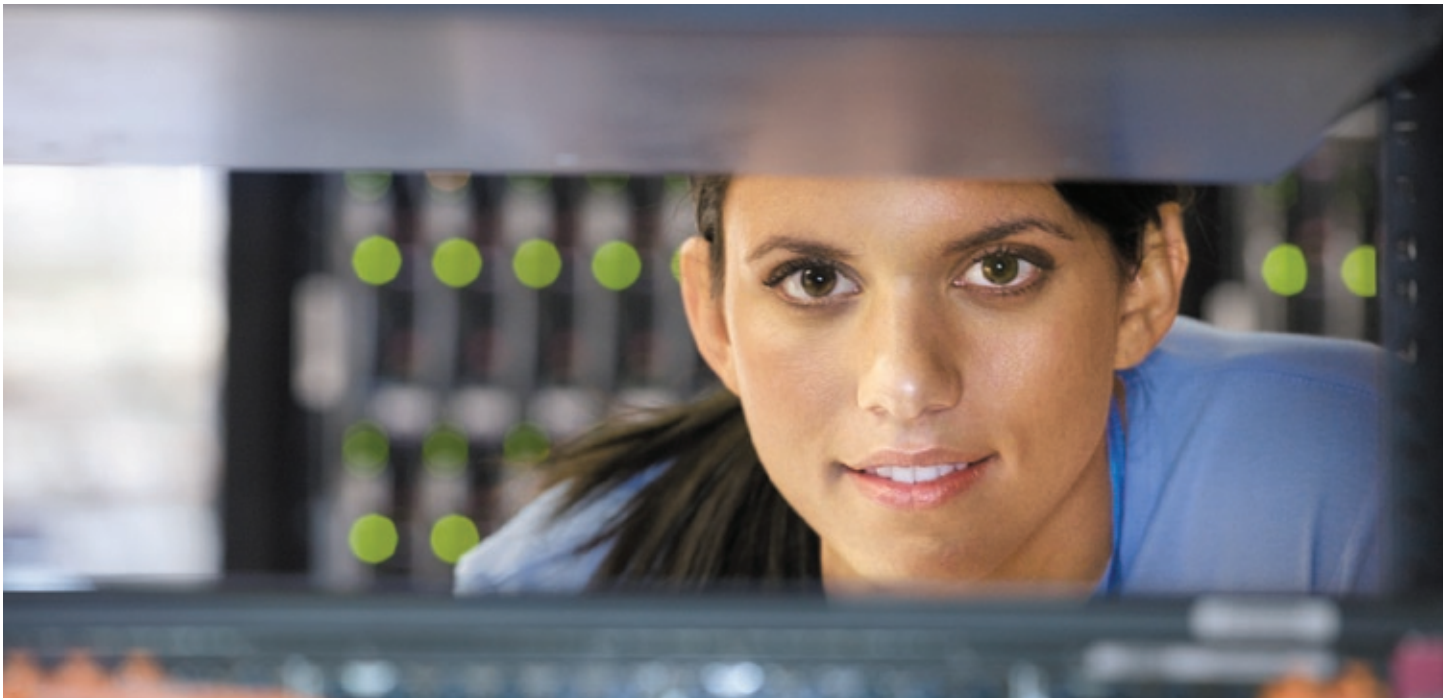


Choosing the Best Servers for Virtualization

Following four basic principles can help maximize your returns



Whether you are deploying virtualization for the first time or looking to increase the value of your existing solution, choosing the right hardware is as important as choosing the right virtualization software. The servers you deploy today will impact your consolidation ratios, your total cost of ownership, the performance and availability of your business applications, and the flexibility and efficiency of your data center. The wrong choices will not only diminish your returns, but may also limit your future options as you seek to expand your virtualized environment.

By adhering to four basic principles, you can maximize the value of virtualization in your data center, both now and in the future.



Select Servers that are Designed for Virtualization

Virtualization software can create substantial performance overhead that increases application latencies and reduces available capacity for consolidation. Intel® Xeon® processor-based servers address this challenge with Intel® Virtualization Technology¹ (Intel® VT), which provides hardware assists for core virtualization functions across the entire server platform, including processors, chipsets and I/O devices. These technologies have been developed in conjunction with key virtualization software vendors to deliver high value in real-world environments.

All Intel Xeon processor-based servers support Intel VT to help you:

- 1. Achieve better application performance and higher consolidation ratios:** Virtualization overhead is reduced and processor, memory and I/O resources are shared more efficiently among virtual machines. This is one reason Intel Xeon processor-based servers deliver industry-leading virtualization performance.²
- 2. Refresh your data center:** By enabling higher consolidation ratios and delivering leading performance per watt, Intel Xeon processor-based servers help to reduce space, power and cooling requirements. In addition, Intel® Virtualization Technology for Directed I/O allows you to share network and SAN ports more efficiently to avoid costly and unnecessary capital improvements.
- 3. Deploy virtualization with greater confidence:** By providing a better hardware foundation for virtualization, Intel Xeon processor-based servers help to improve interoperability among diverse operating systems, operating system versions and applications.

Create a Scalable Pool of Virtualized Server Resources

Organizations are increasingly consolidating applications onto server resource pools, which provide exceptional flexibility for optimizing resource utilization. Virtual machines running live applications can be moved easily from one physical server to another within the pool – with no application downtime. This enables very efficient workload balancing, server maintenance, high availability solutions and disaster recovery, which can deliver dramatic improvements in IT service levels at surprisingly low cost.

Importantly, live migration is only possible among compatible servers. Intel addresses this requirement with Intel® VT FlexMigration, which enables live migration of virtual machines across multiple generations of Intel Xeon processor-based servers. Given the enormous community of vendors delivering Intel Xeon processor-based servers, this gives you unmatched flexibility for deploying best-fit servers both now and in the future, while maintaining live migration support across all your systems.

Size Your Servers to Maximize Your Returns

Intel Xeon processor-based servers provide best-in-class performance and energy efficiency across a wide range of configurations, from small two-socket servers to scalable systems with up to 16 processors (96 cores). All these systems support Intel VT, so you can choose the best server for specific requirements and still maintain optimal performance and live migration support.

Which Intel Xeon processor-based servers deliver the best value for virtualization? It depends on your goals and requirements.

For Most Virtualization Scenarios

Use four-socket or larger Intel® Xeon® processor 7400 series-based servers

These larger servers offer important advantages in virtualized environments.

- **Higher Consolidation Ratios:** A single four-socket Intel Xeon processor 7400 series-based server provides up to three times as many cores as a fully configured two-socket server (24 cores versus 8 cores). It also provides up to 256 GB of memory, roughly double the capacity of the smaller server. This can be valuable, since memory capacity is an important consideration for optimizing consolidation ratios in most environments.
- **Enhanced Availability:** Uninterrupted uptime becomes even more important as you consolidate more applications per server. Four-socket and larger Intel Xeon processor-based servers provide superior reliability, availability and serviceability (RAS) capabilities, through redundant and hot plug components (fans, power supplies, etc.) and other system-level features.
- **Better Support for Business-Critical Applications:** With larger servers, you can assign more processors, memory and I/O per virtual machine without oversubscribing resources. This helps to provide better and more predictable performance for multiple, demanding applications running on the same server (see the sidebar, Consolidating Business-Critical Applications).
- **Superior Business and IT Agility:** Larger servers provide more headroom for new deployments, growing workloads and unexpected workload spikes.

For Infrastructure Consolidation Projects

Use two-socket Intel® Xeon® processor 5500 series-based servers

For infrastructure consolidation projects, two-socket servers based on the Intel Xeon processor 5500 series can deliver better value. As Intel's most recent server processor generation, this processor family delivers industry-leading performance and energy-efficiency per core, along with massive increases in system bandwidth, so it can improve application performance and maximize returns in many scenarios. However, since the Intel Xeon processor 7400 series provides two more cores per processor and supports larger memory configurations, it is likely to deliver better performance as consolidation ratios increase. In general, choose two-socket Intel Xeon processor 5500 series-based servers if you want maximum performance and value for a relatively small number of virtual machines.



Consolidating Business-Critical Applications

When the Intel IT organization wanted to virtualize and consolidate approximately 100 instances of the company's core Enterprise Resource Planning (ERP) application, the solution architects looked closely at the relative advantages of two-socket and four-socket servers. Based on their evaluation, either server platform would meet service-level requirements. The key difference was in consolidation ratios.

- **Two-socket servers based on the Intel Xeon processor 5500 series** enabled four-to-one consolidation ratios.
- **Four-socket servers based on the Intel Xeon processor 7400 series** enabled twelve-to-one consolidation ratios. This resulted in an estimated 24 percent lower cost per virtual machine, while freeing up data center space, power and cooling resources.



Time Your Server Refreshes to Optimize Total Value

The latest Intel Xeon processor-based servers increase virtualization performance by a factor of two compared with previous-generation servers, and by a factor of nine compared with older, single-core processor-based systems.³ Even organizations that have already implemented server virtualization are likely to see dramatic cost savings and a quick return on investment as they transition to these powerful new servers. To estimate the potential value of a server refresh in your current environment, use the Intel ROI Estimator at www.intel.com/technology/virtualization/server/index.htm.

Future Intel Xeon processor-based servers will continue to ramp up virtualization performance and value through more and faster cores per processor, increased energy-efficiency, enhanced Intel Virtualization Technology, additional RAS features and support for larger memory capacities and increased I/O bandwidth. By tracking these advances, you can time your server refreshes to optimize your returns with each refresh. In the process, you can build an increasingly powerful, agile and cost-effective computing infrastructure for growing your business.

Intel processor numbers are not a measure of performance. Processor numbers differentiate features within each processor series, not across different processor sequences. See www.intel.com/products/processor_number for details.

¹ Intel® Virtualization Technology requires a computer system with an enabled Intel® processor, BIOS, virtual machine monitor (VMM) and, for some uses, certain platform software enabled for it. Functionality, performance or other benefits will vary depending on hardware and software configurations and may require a BIOS update. Software applications may not be compatible with all operating systems. Please check with your application vendor.

² View the latest performance benchmarks at: <http://www.intel.com/performance/server/xeon/virtualization.htm>.

³ Performance comparisons are based on measured SPECjbb2005* benchmark results (Intel Corporation Feb 2009).

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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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