

Intelligent Infrastructure from Oracle and Intel

Build enterprise solutions with Oracle software, running on hardware it has been optimized for—the latest Intel® Xeon® processors. High optimization for intelligent performance, automated energy efficiency, and flexible virtualization capabilities of Intel Xeon processors put your business ahead of the curve.



Today's businesses have to push the envelope just to stay competitive, and they depend on their IT infrastructure to deliver raw power while being able to turn on a dime and drive down costs every day. They need to reinvent themselves continually while also staying firmly grounded in top-tier technology they can depend on for the long haul. Oracle and Intel deliver the combination of rapid innovation and long-standing expertise that defines progress in the computing industry. They also inspire trust in the excellence of their joint solutions.

- **Intelligent performance.** Oracle software works with the hardware platform to deliver higher throughput on demand with real-time adjustments to processor frequency and Intel® Hyper-Threading Technology.
- **Automated energy efficiency.** Solution stacks dynamically tune power consumption on a per-core basis to the lowest level available while still meeting performance requirements.
- **Flexible virtualization.** High consolidation ratios are complemented by the ability to extend virtualization pools to include multiple generations of server platforms.

The collaborative engineering relationship between the two companies stretches back decades. Oracle develops its products with upcoming generations of pre-release Intel-based servers in the lab, and by the time customers deploy the solutions in their own environments, they get a fine-tuned solution stack built of components that were born to work together.

"Our customers are really pleased with the price-performance they see from the combination of Oracle and Intel. Oracle software brings great ROI and Intel provides hardware that is the price-performance leader. That combination is a really effective solution for our customers."

- Adam Messinger, Vice President,
Development, Oracle Fusion Middleware

Intelligent Performance Automatically Scales Up to Handle Peak Workloads

Take the traditional performance leadership of Oracle solutions on Intel® architecture to a new level by hosting them on servers based on the Intel® Xeon® processor 5500 series. Intel® QuickPath Technology, the basis of a brand new platform architecture, features platform innovations that dramatically change the game for enterprise computing customers.

To maximize throughput, the platform optimizes performance according to real-time workload demands. Up to four cores support as many as eight software threads per processor, and a generous L3 cache of up to 8 MB accelerates data sharing between cores.

The Oracle JRockit* Java* Virtual Machine has been optimized for stellar performance on Intel architecture over many years. With the addition of Oracle JRockit to Oracle Fusion* Middleware, that performance provides even more impact to customers, in the form of greater responsiveness and robustness at the solution level.

“Our breakthrough Intel® Xeon® processor microarchitecture will extend Intel’s leadership in performance per watt even further. The combination of Oracle and Intel optimizing their solutions will... bring new capabilities to Oracle and Intel customers.”

- Tom Kilroy, Vice President and General Manager, Intel Digital Enterprise Group

Intel® Server Performance Features	Real-World Benefits to Oracle Customers
Intel® QuickPath Interconnects: Direct CPU-to-CPU and CPU-to-chipset bandwidth supporting up to 6.4 gigatransfers per second, as much as to 2.2x higher than predecessors	Faster data movement, calculations, and queries, as well as faster local and remote memory access
Integrated memory controllers: DDR-3 memory connects locally to each processor, improving latency	Higher performance on memory-intensive computations
Intel® Turbo Boost Technology: Increases operating frequency on demand according to software needs	Headroom when it matters most, such as usage peaks during the day and batch data reconciliation at night
Intel® Hyper-Threading Technology: Up to 16 software threads per platform	Enhances performance on highly threaded workloads

The product teams for every part of the Oracle solution stack are in constant contact with their colleagues at Intel, providing each other with the engineering assistance and insight that drive early co-validation of emerging solutions. Customers reap the rewards of that relationship every day:

- Dramatic performance gains mean more transactions per server
- Energy-efficient performance lowers overall power requirements and related costs
- IT has plenty of headroom in reserve for usage peaks
- Very favorable compute cost per transaction protects the bottom line

DRIVE UP CONSOLIDATION RATIOS FOR ADDED SAVINGS

Virtualize enterprise workloads using the Intel® Xeon® processor 5500 series to achieve high consolidation ratios relative to single-core processors. The reduction in the required number of servers saves on floor space requirements and dramatically reduces energy costs.

**THE NEW LANDSCAPE OF DATA
WAREHOUSING: 10X PERFORMANCE GAINS**

HP Oracle Exadata* Storage Server increases the performance of data warehouse queries by 10x or more with an extraordinary combination of hardware based on Intel® Xeon® processors and smart storage software by Oracle. The innovative system delivers massive parallel data paths and minimizes data movement through higher bandwidth connections, resulting in extremely fast query processing for your large data warehouse.

Learn more at www.oracle.com/exadata.



**Automated Energy Efficiency
Tunes Power Consumption in
Real Time to Cut Costs**

Decrease operating costs and effectively meet green computing goals with Oracle solutions on Intel® platforms. These solution stacks dynamically put processor and memory resources into the lowest available power state suitable to meet the demands of the workload. Intel® Intelligent Power Technology reduces overall energy consumption, improving return on investment.

The high level of optimization built into Oracle software for Intel Xeon processors means they run very efficiently, taking as much advantage as possible of the hardware’s groundbreaking energy efficiency. As a result, customers get an integrated approach to addressing the increasingly severe energy-cost challenges they face.

Co-engineering between Oracle and Intel helps to ensure that joint solutions take maximum advantage of the core energy efficiency of the platform, as well as innovative features such as those described above. A proof of concept is underway to demonstrate how Intel® Intelligent Power Technology Node Manager and Intel® Data Center Manager node and group power-limiting capabilities are used to right-size server power consumption, increase server density, and ride through power and thermal exceptions. Customers realize both strategic and tactical advantages that carry through well into the future:

- Higher efficiency decreases power consumption and cooling requirements
- Handling larger workloads while lowering operating costs speeds up return on investment
- Demonstrated lower power requirements help organizations meet green computing goals

Intel® Intelligent Power Technology Features	Real-World Benefits to Oracle Customers
Automated low-power states: Automatic changes among more operating power states with lower latency than predecessors	Real-time optimization of power consumption, for lower power bills
Integrated power gates: Allows processor cores to be powered down and up individually, with lower idle power than predecessors	Granular control over power usage without rebooting
Integrated memory controllers: Efficiently places memory in a low power state when idle, saving energy	Reduced energy requirements during low-demand periods

Flexible Virtualization Optimizes Consolidation and Pools Together New and Old Servers

Drive up the value of virtualization in your enterprise using Oracle VM server virtualization on Intel Xeon processor-based servers. Oracle and Intel have built the basis for a better virtualized data center by enabling high virtualization performance, as well as flexible virtual machine migration among multiple generations of servers.

With Oracle VM, you can create a single virtualization pool using both older and newer servers based on Intel Xeon processors, even though that hardware has different instruction set architectures. In addition, these solutions feature I/O and connectivity optimizations that greatly accelerate and simplify virtual machine migration.

Next-Generation Intel® Virtualization Technology ¹ Features	Real-World Benefits to Oracle Customers
<p>Intel Virtualization Technology FlexMigration:² Enables live migration within virtualization pools constructed of both new and older servers</p>	<p>Increased efficiency in larger virtualization pools, as well as investment protection for existing infrastructure</p>
<p>Intel Virtualization Technology for Directed I/O:³ Allows a virtual machine to have exclusive access to an I/O device, without emulated device drivers</p>	<p>Less performance overhead speeds up data movement for demanding workloads</p>
<p>Intel Virtualization Technology for Connectivity: Allows more efficient sharing of network connectivity among virtual workloads</p>	<p>Improved overall scalability and flexibility of virtualized infrastructure</p>

High performance and full-featured live virtual machine migration are the basis for advanced virtualization capabilities such as dynamic load balancing, high availability, and disaster recovery. Organizations that deploy Oracle VM on the latest Intel Xeon processor-based servers are rewarded with state-of-the-art virtualization:

- High consolidation ratios mean fewer servers can support larger workloads
- Powering up fewer servers on average provides lower total cost of ownership
- More comprehensive virtualization capabilities improve efficiency, scalability, and dependability

Take the Next Step

Oracle-based solutions built on Intel® Xeon® processor 5500 series-based servers deliver an intelligent foundation for the future of business computing.

Learn more about Intel® Xeon® processors: www.intel.com/xeon

Learn more about Oracle products and services: www.oracle.com/products

¹ 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.

² Backward compatibility for live virtual machine migration also exists with current dual-core Intel® microarchitecture products (Intel® Xeon® processor 5100 series and Intel® Xeon® processor 3000 series) and forward compatibility with future dual- and multi-core processors. Contact your preferred VMM vendor for support requirements.

³ Requires operating system and VMM support.