



Intel, Sun Microsystems and GigaSpaces

A Scalable, Cost-Effective Stack for Highly Concurrent Financial Services Applications



Case Study

Intel® Xeon® Processor
E7460

Financial firms are under tremendous pressure to become more flexible and cost effective in their IT operations. They need to drive application performance up, cost of ownership down, and enable business units to bring new product offerings to the market faster than ever before. These organizations often struggle to meet the most extreme low latency and high throughput requirements for legacy and new applications. Now more than ever, they expect their vendors to help them achieve these goals.

Intel, Sun and GigaSpaces have partnered to offer an optimized hardware and middleware stack, targeted at the unique needs of banks, capital market firms, insurance companies and other financial institutions. The combined platform includes the Sun Fire® x4450 server with Intel® Xeon® processor E7460 with six cores per CPU running Solaris® 10 and Sun Java® Hot Spot VM using GigaSpaces eXtreme Application Platform (XAP)® as the middleware.

The platform was tested with highly concurrent risk management, real-time analytics and online applications, typical with financial services companies. Tuning was performed at the networking, OS, JVM, and middleware layers to deliver very scalable behavior with very low, deterministic latency.

Struggling To Close the Gap Between the Applications and the Hardware

While multi-core is clearly helping enterprises reduce operating costs, complexity and footprint in the data center, a big chunk of the CPU utilization is left on the table – at least until the software can fully utilize multi-core processors.

Application managers, developers and architects are asked to reduce application development costs and shorten time-to-market of new products and services. They want to quickly leverage the parallel processing capabilities of the underlying multi-core hardware in the most cost-efficient manner.

As an IT manager, you recognize the gap is widening between the power of your hardware and the ability of your legacy architecture to take advantage of it. You may be running legacy applications on four or six core machines, but you're not using all the cores. Most likely you're thinking: "How can we improve efficiency, performance and scalability and get the most out of our hardware investment without having to totally redesign our applications?"



“With GigaSpaces technology and Solaris 10 running on Sun’s latest Intel-based servers, latency sensitive applications scale just as well as on a scalable SMP machine, while enjoying all the benefits of a distributed grid architecture.”

– Sunil Mathew, Director, Industry Solutions and Architecture, Global Financial Services Industry Group at GigaSpaces

Write Once, Scale Anywhere

GigaSpaces XAP is an application server built to scale that provides you a way to see your entire set of computers as one single, simple runtime environment in which both your processes and your data can reside, enabling predictable improvement of application performance while you increase the volume of data, transactions, and number of users, with no real need to re-engineer.

GigaSpaces XAP also provides SLA-driven application monitoring and provisioning. If your application is responding too slowly, XAP will automatically distribute it to new cluster nodes. This means that you can not only predict performance at all times, but you get the benefits of a platform that is both resilient and self-healing. If a server fails, you won’t even lose an in-progress transaction.

Optimizing to Drive Faster Speed

Intel is delivering specific optimizations in its latest six-core processors, driving lower latency and performance from the CPU and memory layer. GigaSpaces XAP enables applications to run optimized on multiple cores, taking into account advances in Java’s concurrency and threading APIs, and shielding application developers from the need to handle concurrency while building distributed applications.

Developers can leverage the parallel processing capabilities of the six-core Intel Xeon processor based platforms without the need for writing multi-threaded code, saving significant development time and complexity. This allows developers to focus on what truly adds value to their enterprise: their unique business logic.

The Intel-Sun Advantage

The Sun Fire X4450 server is a fast, small and eco-friendly four-socket, 24-way x86 server among top tier vendors. In addition, the Sun Fire X4450 server offers outstanding value in terms of performance, density and power efficiency and runs Solaris, Linux, Windows and VMware.

The Intel Xeon 7400 series featuring six-core CPU coupled with Sun’s leading servers delivers a robust solution for financial institutions.

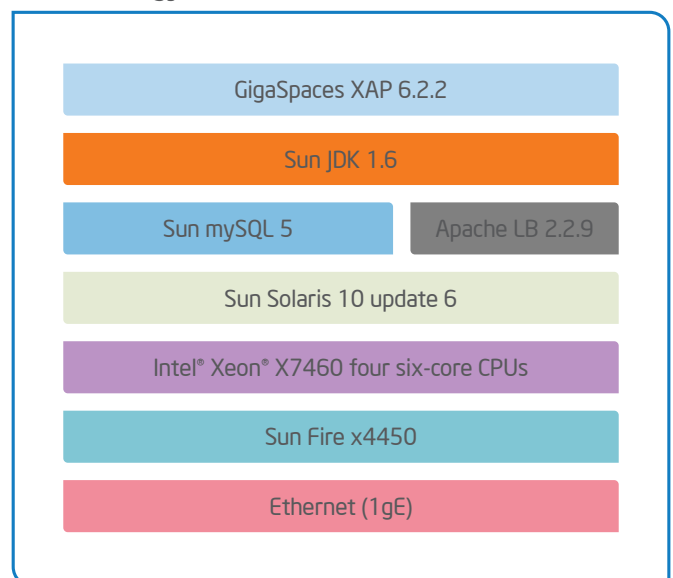
Sun and Intel have developed a strategic alliance to bring innovative new solutions to financial institutions based on Intel Xeon processors. Powered by Intel, Sun offers fast, cutting-edge technology solutions to address customer needs for future business growth.

Top Performance, Scalability and Latency

A set of tests and optimizations were conducted on the Sun Fire x4450 with Intel Xeon 7460 processors, with six cores per CPU running Solaris 10 and Sun Java Hot Spot VM using GigaSpaces XAP as the middleware.

“This benchmark underlines how technology partners can work together to innovate and drive real performance and total cost of ownership benefits for our clients,” said Nigel Woodward, Global Director, Financial Services for Intel. “All banks are looking to understand their risks and exposures within a couple of hours, and real-time is the ultimate objective. These benchmarks demonstrate that customers can cost-effectively perform full risk simulations for their trading portfolios in minutes instead of hours, and pre-trade what-ifs in milliseconds.”

Technology Stack Under Test





The tests performed by Gigaspaces measured computational performance of a risk management system as processors and nodes were added to the grid. Using GigaSpaces XAP, the load of performing the calculations was distributed across an increasing number of compute nodes, and the overall time to calculate the scenarios fell linearly as additional nodes were added dynamically without any modifications to the application.

In addition to the risk management benchmark, the tests also included a mix of high throughput scenarios typical in real-time analytics and online financial services applications.

The results showed that having four fast CPUs with six cores allows applications to scale up with latency of sub one millisecond and throughput of 1.8 million reads per second and 1.1 million writes per second under a transactional, highly concurrent workload.

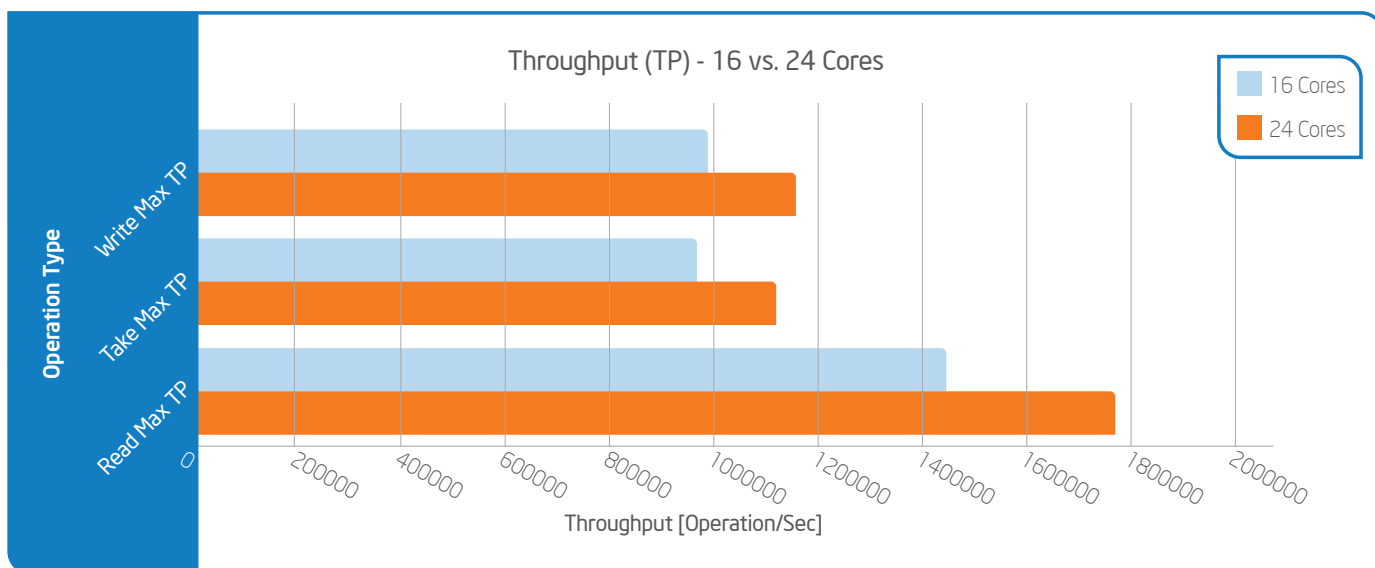
The online application tests showed capability for over 16,000 page generations per second with three web servers and a latency of less than six milliseconds over LAN. The web servers were scaled

dynamically within the GigaSpaces container, while accessing an in-memory-data-grid that was asynchronously mirrored to a MySQL Enterprise database. Solaris 10 OS and JVM 6 proved to be very stable and capable of providing a deterministic and predictable environment, even for the most demanding scenarios.

In summary, the tests have shown that the combined platform is a very scalable solution, providing both low latency and high throughput in both HPC and online application environments. Scaling out these highly concurrent applications can be done on this platform with minimal impact on the latency and deployment topology, and can be done even while the system is running.

“With GigaSpaces technology and Solaris 10 running on Sun’s latest Intel-based servers, latency sensitive applications scale just as well as on a scalable SMP machine, while enjoying all the benefits of a distributed grid architecture,” says Sunil Mathew, Director, Industry Solutions and Architecture, Global Financial Services Industry Group at GigaSpaces.

Increasing Throughput and Scalability With Intel



About GigaSpaces

GigaSpaces Technologies is a leading provider of a new generation of application platforms for Java and .Net environments that offer an alternative to traditional application-servers. The company's eXtreme Application Platform (XAP) allows businesses and developers to predictably scale systems under any peak demand, guarantee performance under any data processing load, and seamlessly leverage the economies of scale offered by virtual computing environments such as clouds and grids. XAP leverages open-source and standard development frameworks to speed new application development and simplify migration of existing systems from traditional middleware and application server technologies to new virtual computing architectures.

GigaSpaces customers include six of the world's top 10 investment banks, world-leading exchanges, market data providers, hedge funds, retail banks, leading international and US telecommunications and mobile carriers, global Web-commerce companies, five of the world's top online gaming companies, and leading Internet media organizations.

About Intel

Intel Corporation, a world leader in silicon innovation, develops technologies, products and initiatives to continually advance how people work and live. The Intel Xeon processors redefine high-volume server architecture, and deliver the features that IT managers want: energy-efficiency, lower total cost of ownership, reliability, performance, and headroom for growth. Intel is working with the financial services industry to promote low-latency solutions. To learn more visit Intel's website at <http://pip.intel.com/go/fsi>.

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Printed in USA

