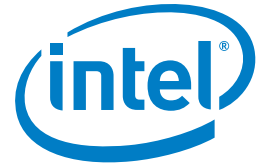


CASE STUDY

Intel® Xeon® processor 5500 series
Enterprise Server
Performance: Data-Intensive Computing



Skating to Peak Performance

National Stock Exchange moves its NSX BLADE trading platform to the Intel® Xeon® processor and boosts speed by 25 percent

For electronic stock exchanges, trading platforms are the family jewels—a primary means of differentiation in the marketplace and the focus of countless hours of work and innovation. Exchanges think long and hard before migrating them to a new processor architecture—but sometimes the performance advantages of a new processor are too compelling to resist. When the National Stock Exchange, Inc. (NSX®) premiered its NSX BLADE® trading platform in 2006, it ran on non-Intel-based infrastructure. Now, NSX is shifting to the Intel® Xeon® processor 5570 and, by its own estimate, is gaining end-to-end speed-ups of 20 percent to 25 percent and higher.



“We are experiencing significant benefits in performance, uptime, stability, and headroom that will enable NSX to continue to be the most innovative exchange from a service availability perspective and the exchange with the lowest latency.”

– Saro Jahani
Chief Information Officer
National Stock Exchange, Inc.

CHALLENGES

- **Latency, stability, growth.** NSX needs high-performance, extremely reliable infrastructure to support efficient, low-latency trading on its NSX BLADE platform. With trading volumes soaring, scalability is also a priority.

SOLUTIONS

- **Intel Xeon processor 5570.** NSX is moving its BLADE trading platform to Sun* and HP* blade servers based on dual-socket Intel Xeon processors 5500 series with 47 GB of RAM, Intel® PRO Gigabit server adapters, and Red Hat* Enterprise Linux* 5.4.
- **Intel® tools and expertise.** NSX used Intel® compilers and software tools to optimize performance. Intel technologists offered tips ranging from testbed design to card and driver settings.

IMPACT

- **20 to 25 percent performance increases.** NSX states that the combination of hardware, software, and teamwork generated end-to-end latency improvements of 20 to 25 percent and higher. Those results help NSX grow its business by delivering exceptional trading performance.
- **Headroom for growth.** With increased performance, NSX can handle more customers, higher trade volumes, and steeper peaks of market activity. The new infrastructure also reduces floorspace requirements and mitigates power constraints, enabling NSX to cut overhead costs and generate savings for customers while handling continued business expansion.

Continuing Innovation

NSX prides itself on innovation. In 1980, its forerunner, the Cincinnati Stock Exchange, became the first all-electronic stock exchange in the U.S., and NSX has continued a string of breakthroughs that increase the efficiency and cost-effectiveness of the trading environment.

NSX BLADE is central to that success. An automated order-matching platform, NSX BLADE was built from the ground up to meet rigorous requirements for

speed, price, and service. BLADE provides sub-millisecond turnaround times on order matches, and supports the pricing structure and transparency that help distinguish NSX among its competitors.

In 2009, NSX's non-Intel-based infrastructure needed to be refreshed, and NSX wanted to raise the bar on performance and reliability. After exploring a variety of servers, NSX decided on the Intel Xeon processor 5500 series.



Intel® software tools helped NSX obtain peak performance.

"Performance is always our top priority, and obviously, the availability of our platform is extremely critical, so the deciding factors were performance and stability," said NSX CIO Saro Jahani. "We also have the usual cost concerns related to footprint, heat, and electrical consumption. Blade servers, based on the Intel Xeon processor, have offered significant benefits in all respects."

Multidimensional Performance

Along with the processor itself, NSX liked the breadth of the Intel offering, including Intel PRO Gigabit network interface chips (NICs) and the broad suite of application development and tuning tools. "We are strong advocates of Intel NICs in the 1G space, particularly for latency-sensitive applications," said Jahani. "There are also some unique performance-tweaking capabilities with the Intel® platforms."

Jahani's team has used the Intel® C/C++ Compiler, Intel® Threading Building Blocks, and Intel® VTune™ Performance Analyzer, and takes advantage of tuning Red Hat and Intel to optimize the performance of the Red Hat Enterprise Linux Release* kernel on the Intel Xeon processor. To further enhance performance, Intel technology experts worked with NSX on such varied tasks as tuning NIC settings and creating a rigorous testbed for the trading platform.

The combination is delivering multidimensional benefits. "Higher CPU clock speeds and faster memory access give us lower application-processing latency," said Jahani. "The higher number of CPU sockets and cores lets us increase concurrency and overall application responsiveness. We gain host-to-host network latency via improved network interface hardware, driver, and configurations."

It all adds up to impressive speed. "We have performed a series of component and end-to-end integration tests of our applications on the new system, and the results show at least a 20 to 25 percent improvement," Jahani said.

Those results translate to faster trades for customers, with greater potential to lock in prices at the point of maximum profit. They also help NSX reduce energy consumption and increase per-host process density. Jahani reports a significant increase in excess capacity on Intel Xeon processor 5570-based servers, effectively double that of the previous platform. The higher density allows for "exchange in a box" deployment, increases scalability, and offers a smooth growth path for NSX.

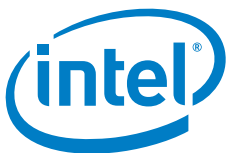
SPOTLIGHT ON THE NATIONAL STOCK EXCHANGE

Based in New Jersey and Chicago, NSX is the cost-effective provider of exchange services, committed to aligning its interests with those of its customers. Acknowledged for its proven high-performance, low-latency technology, NSX is also a recognized resource for Exchange-Traded Fund (ETF) data. For more information on NSX, visit www.nsx.com.

Having made the move to the Intel Xeon processor, NSX is eager to benefit from Intel's product roadmap. "We are extremely interested in evaluating the significant architectural gains available in the Intel® Xeon® processor 5600 series, particularly around further advances in density, server consolidation, and virtualization," said Jahani. "We expect the benefits in footprint and energy savings to be very significant."

Performance: Data-intensive computing. Support the most demanding business data processing.

Find a solution that is right for your organization. Contact your Intel representative or visit the Reference Room at www.intel.com/references.



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