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ISE Doubles Trading Performance and Expands Offerings

The Intel® Xeon® processor E5 family helps ISE reduce trading latency and expand capacity for a second options exchange

ISE

International Securities Exchange®

> "We can process more than twice as many transactions per second with the Intel® Xeon® processor E5 family compared with the previous generation of Intel Xeon processors. As a result, we can deliver a consistent performance for customers, even during market peaks in demand."
>
> *– Rob Cornish,*
> *Chief Technology Officer,*
> *ISE*

Maintaining peak performance on an electronic options trading exchange is challenging enough. Boosting performance while preparing to open a second exchange raises the stakes, especially when your customers are attuned to responsiveness measured in microseconds. To meet these challenges, the International Securities Exchange (ISE) refreshed its infrastructure with new generations of Intel® Xeon® processors. The organization has more than doubled performance, significantly reducing trading latency. By adding processing headroom, ISE was able to launch a new options exchange while controlling costs.

Challenges
- **Reduce latency.** Minimize the latency of all transactions, even during high-volume periods, to improve competitiveness in the high-stakes world of options trading.
- **Add capacity.** Expand the existing core trading system to provide the headroom to launch a second options exchange while controlling costs.

Solution
- **HP ProLiant* servers based on the Intel® Xeon® processor E5 family.** ISE refreshed its core trading system with HP ProLiant BL460c Gen8 Server Blades equipped with the Intel Xeon processor E5 family and Intel® Ethernet Gigabit Server Adapters. A planned upgrade will include the Intel Xeon processor E5 v2 family.

Technology Results
- **Doubled throughput.** The ISE core options trading environment can process twice as many transactions per second as before.
- **Reduced latency.** Better compute performance is helping reduce latency by 10 percent. The company expects an additional 20 percent latency improvement when it moves to the Intel Xeon processor E5 v2 family.

Business Value
- **Business expansion.** With extra headroom and capacity, ISE expanded its business by launching a second options exchange.
- **Cost avoidance.** ISE is saving millions of dollars by upgrading to newer Intel Xeon processors and using a single, powerful environment for its two options exchanges.
- **Increased competitiveness.** Overall round-trip transaction times have decreased, driving improvements that put ISE ahead of competitors.

ISE has always been an innovator and leader. In 2000, the organization created the first all-electronic options exchange in the U.S., bringing transparency and efficiency to the industry. More recently, it was named "Best Options Trading Venue" by the Wall Street Letter 2014 Institutional Trading Awards.

Blazing performance is a core element of the ISE business strategy and a key consideration for ISE exchange members. "Options exchange customers expect response times in microseconds," says Rob Cornish, chief technology officer at ISE.

"We are in a competitive industry, and part of that competition is a continual race toward zero latency."

Delivering a consistently low-latency experience regardless of transaction size helps lower risk for customers and provides a competitive advantage for ISE. "We do very well with complex trading that involves multiple options legs per trade," says Cornish. "Reliably handling those large transactions is a differentiator for ISE, but requires extensive memory bandwidth and raw processing capabilities from our systems."

Intel® Xeon® processors help drive down latency

Boosting Performance with an Upgrade Initiative

In 2010, ISE began running its core exchange software on HP ProLiant blade servers powered by Intel Xeon processors. Since then, the ISE technology team has worked closely with Intel to plan refreshes. "We have a very strong relationship with Intel from a strategic planning perspective," says Cornish. "We learn about the latest enhancements in Intel chip designs and the capabilities that will be coming to the marketplace in the next 12 to 24 months."

When ISE team members saw early performance data on the Intel Xeon processor E5 family, they decided to make a change. "We knew that our trading application would benefit from the improved raw compute performance of the Intel Xeon processor E5 family," says Cornish. "Our application is also memory-intensive, so it benefits from the memory bandwidth that the Intel Xeon processor E5 family delivers."

ISE refreshed its core trading system with HP ProLiant BL460c Gen8 Server Blades equipped with the Intel Xeon processor E5 family and Intel Ethernet Gigabit Server Adapters. The blade servers run Red Hat Enterprise Linux* and the Deutsche Börse Group T7* trading solution.

Doubling Transactions per Second, Reducing Latency

The new processors are helping significantly boost trading throughput. "We can process more than twice as many transactions per second with the Intel Xeon processor E5 family compared with the previous generation of Intel Xeon processors," says Cornish. "As a result, we can deliver consistent performance for customers, even during market peaks in demand. The market makers that quote buy and sell prices can be confident that a temporary increase in trading volume will not affect their ability to send updated prices into the market."

Better processing performance also reduces latency. "With the Intel Xeon processor E5 family, we were able to reduce latency by 10 percent," says Cornish. "Customers can execute trades much more quickly and reduce risk by improving their certainty about their positions."

Supporting a New Options Exchange

The increased performance means ISE can do more work on fewer servers, which translates into additional capacity available for other uses, such as expanding the business. "The exceptional performance of the Intel Xeon processor E5 family gave us the headroom to support a second exchange," says Cornish. "We currently run the first exchange on a portion of our existing servers and use the remaining resources for our new ISE Gemini* exchange. This approach allows us to centrally manage the data and processing for both exchanges in the same environment, which is much more cost-effective than running two separate environments."

Avoiding Capital Costs

ISE is also saving capital costs by avoiding the purchase of additional hardware for the options exchange expansion. "We replaced the previous-generation processors core-for-core with the Intel Xeon processor E5 family, and gained so much headroom that we didn't need to purchase additional servers," says Cornish. "Compared with the cost of buying additional servers, we are millions of dollars ahead."

Planning the Next Intel Processor Refresh

The ISE IT team is now preparing to incorporate servers with the Intel Xeon processor E5 v2 family into the environment. "Our early results suggest that we will see a 20 percent average reduction in latency with the Intel Xeon processor E5 v2 family," says Cornish. "In some cases, we are also seeing throughput improvements of 25 percent or
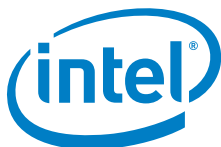
Spotlight on International Securities Exchange

The International Securities Exchange (ISE) operates two U.S. options exchanges: International Securities Exchange, LLC (ISE) and ISE Gemini, LLC (ISE Gemini). ISE delivers a superior trading experience to its member firms through its patented market structure, industry-leading technology, unique functionality for trading complex orders, and award-winning customer service.

more. That added performance will enable us to continue providing consistently great responsiveness and reduced risk for our customers while improving our company's competitive position."

As ISE continues to expand the trading environment, the company expects to add new products and services. "By building our core trading environment on Intel Xeon processors, our IT team is enabling business groups to explore new opportunities," says Cornish. "Whether they decide to offer new products, create new market segments, or add functionality, we have a strong foundation for the future."

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