

INTERCONTINENTALEXCHANGE'S NEW NETWORK MEETS THE STRINGENT REQUIREMENTS OF FINANCIAL TRADING

Summary

Company: IntercontinentalExchange

Industry: Financial Services

Challenge: Continuously improve the scale, performance, and efficiency of its trading systems and global exchange.

Selection Criteria: High-performance, highly reliable, and ultra low latency network infrastructure.

Network Solution:

- MX Series 3D Universal Edge Routers
- M Series Multiservice Edge Routers
- EX Series Ethernet Switches

Results:

- Delivered fast, consistent trading times, with ultra low latency
- Delivered carrier-class reliability
- Improved operational efficiencies

IntercontinentalExchange (ICE) operates leading regulated exchanges, trading platforms, and clearing houses serving global markets for agricultural, credit, currency, emissions, energy, and equity index markets. ICE operates three futures exchanges. ICE Futures Europe hosts trading in half the world's crude and refined oil futures contracts traded daily. ICE Futures U.S. lists agricultural, currency, and Russell Index futures and options; and ICE Futures Canada lists agricultural futures and options. ICE also provides trade execution, processing, and clearing services for over-the-counter (OTC) energy and credit derivatives markets. ICE is headquartered in Atlanta, with offices in New York, London, Chicago, Winnipeg, Calgary, Houston, and Singapore.

In 2011, ICE surpassed \$1.3 billion in revenues. Its futures exchanges traded more than 381 million contracts annually, and its OTC energy markets traded more than 415 million contracts. ICE leads the futures industry in achieving sub-millisecond average round-trip transaction times.

Challenges

The ICE electronic trading platform is a flexible, efficient, and secure commodities trading system, and ICE examines every aspect of its platforms to hone overall trading time. To do this, it is critical to know how much each element in the network is contributing to overall transaction time. The faster that ICE can execute transactions, the closer the exchange can get to zero-latency trading. Providing a consistent user experience across clients with carrier-class reliability and reducing network latency are key competitive advantages.

Selection Criteria

ICE strives to continuously improve the scale, performance, and efficiency of its trading systems while delivering consistent, predictable performance. ICE looks to Juniper Networks as its strategic trading infrastructure provider to assist in every way possible.

"Consistency is the biggest thing," says Chad Myers, senior network architect at ICE. "Delivery from end-to-end should always be the same so that our internal transaction time is consistent across our client firms."

ICE was building out a new data center to support its next-generation trading platform. The company considered the industry's leading data center routers and switches, including those products from its previous network provider.

The decision to move to Juniper Networks was based on Juniper's understanding of ICE's most critical requirements, the operational simplicity of Juniper Networks® Junos® operating system, and the performance, carrier-class reliability, and scalability of the Juniper Networks MX Series 3D Universal Edge Routers and EX Series Ethernet Switches.

Solution

The Juniper Networks deployment at ICE has grown steadily over time. Driven by a need for higher performance and greater Ethernet port density in its data centers, ICE most recently deployed the Juniper Networks MX960 3D Universal Edge Router in the network core. ICE also uses a variety of M Series Multiservice Edge Routers in its global data centers. ICE uses EX Series Ethernet Switches in its data centers as part of the trading systems and for access switching in its offices.

"We've had nothing but good experiences with the Juniper routing gear as well as Juniper's support," says Myers.

ICE uses a two-tier network architecture (see Figure 1) for its global exchanges and trading platforms to improve scalability, reliability, and fault isolation, as well as to gain operational efficiencies. MX960 routers are used in the WAN and to connect client-facing systems. The Juniper Networks EX8208 Ethernet Switch connects the server silos in the data distribution tier.

MX Series routers provide maximum scale and intelligent service delivery capabilities. MX Series routers deliver Junos OS routing features without compromising performance. This means that ICE can turn on advanced features such as low latency multicast, with minimal impact to routing performance.

Downtime and lost transactions mean lost revenue to an exchange, and this makes reliability and consistent performance critical. ICE takes advantage of the many high availability capabilities of Juniper routers and switches to ensure a consistent

client experience. For instance, MX Series and M Series routers deliver carrier-class reliability and high availability features, including graceful restart, nonstop routing, fast reroute, and unified in-service software upgrade (unified ISSU).

ICE leverages the low latency multicast capabilities of Juniper's routers and switches to synchronize information between its internal trading engines and client-facing systems. ICE also uses a low latency multicast feed for client initiatives on the front end of its systems. With Junos OS running across MX Series, M Series, and EX Series products, the multicast feature set is consistent regardless of platform, and that consistency improves operational efficiency.

Myers appreciates the consistency of Junos OS, which makes its infrastructure more flexible, easier to configure, and simpler to manage. "Junos operating system is wonderful to work with," he says.

He is a big fan of using scripting and templates to speed configuration of the routers and switches. "Junos OS has made configurations more consistent, and much easier to work with. It has also eliminated errors," said Myers.

ICE makes extensive use of firewall filters, on the MX Series, M Series, and EX Series, to protect their network. Using rate-limiting, in conjunction with firewall filters, helps protect the Routing Engine from denial-of-service attacks.

"Juniper's MX Series firewall filters are much easier to work with than the access control lists on our previous routers," says Myers.

ICE closely monitors its network to gain visibility into the end-to-end performance. ICE likes having the ability to monitor interface

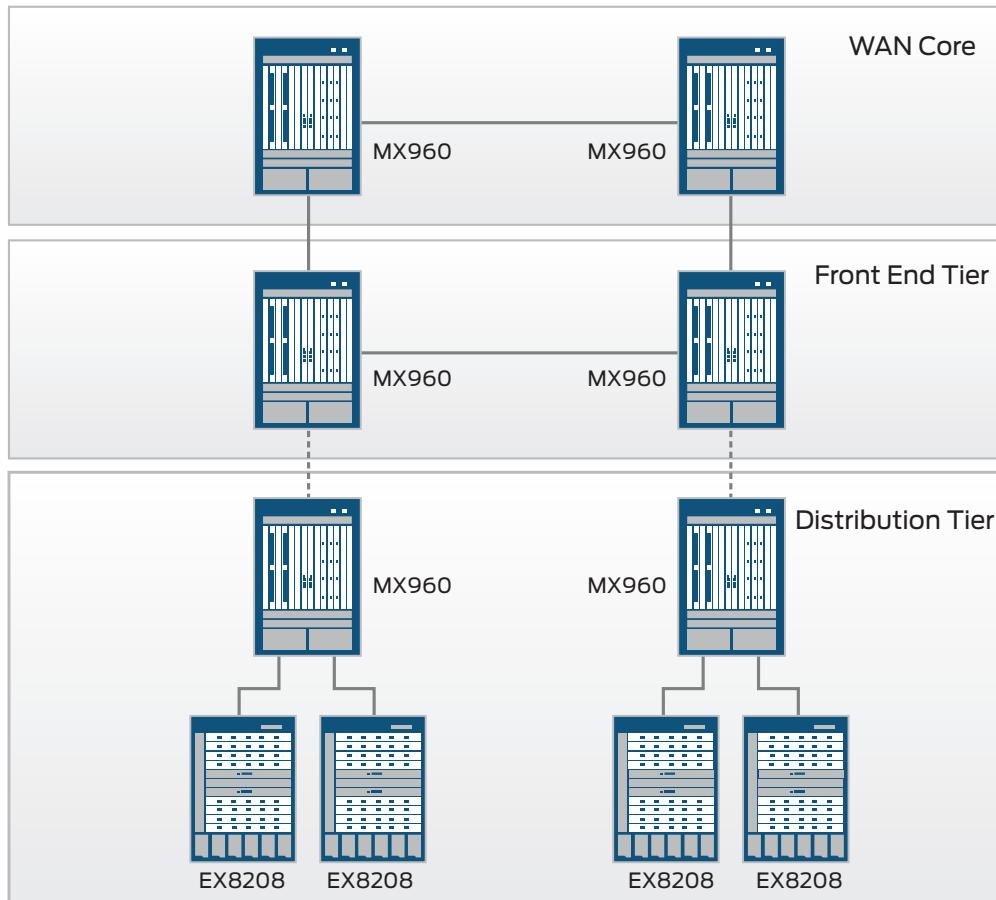


Figure 1: ICE's efficient two-tier network, using MX Series routers, improves operational efficiencies and reduces costs.

statistics on the Juniper routers in real time, which contributes to a consistent user experience among its clients. ICE chose the modular Juniper Networks EX8200 line of Ethernet switches for its data centers because of port density, scalability, and high availability. ICE uses the EX8208 Ethernet Switch, as well as the EX8216 Ethernet Switch.

ICE branch offices use the compact Juniper Networks EX4200 line of Ethernet switches for access switching in the ICE offices. With Juniper's Virtual Chassis technology, up to 10 switches can be interconnected to create a single logical device, which simplifies system operations, maintenance, and troubleshooting.

"We've had nothing but good experiences with the Juniper routing gear as well as Juniper's support."

Chad Myers,
Senior Network Architect, IntercontinentalExchange

Results

The new network at ICE has achieved consistent, highly reliable performance and ultra low latency. "Fairness to customers is the most important thing," says Myers. "If execution times are consistent, all customers are affected the same way. Whatever we do, we can't do something for one customer that's not done for others."

The internal transaction time across the network is sub-millisecond, and the new network has helped ICE shave off 10 to 15 microseconds. "We gained consistency," says Myers. "It's significantly more predictable; and that's a benefit of the two-tier architecture. Before, the performance between systems varied, with some faster while others were slower."

ICE has been pleased with its new network. "The Juniper systems have been highly reliable and high performing," says Myers. "They have been excellent."

The relationship with a strategic technology partner goes well beyond the product itself. ICE relies on Juniper Care Plus, an advanced service that provides a high level of personalization and keeps the network at optimum readiness through high touch support, direct access to senior engineers, and proactive

automation tools to help automate and simplify the network.

"The level of support with Juniper is something we could not get anywhere else," says Myers. "The support was a big reason we continued the deployment." In particular, Myers likes having a dedicated service manager who understands their business and can advocate for them. "Having Juniper's advanced level services proved to be worth it in the first year," says Myers.

Next Steps and Lessons Learned

As ICE continues to push the performance envelope for its trading clientele around the world, the network architecture team continues to investigate new ways to hone performance. Myers is eager to learn more about Juniper Networks QFabric™ system. "The design of consolidating the storage and data networks with a highly reliable, high-performance fabric is something that I was looking at implementing with InfiniBand," says Myers. "I'm interested in learning more from the Juniper engineering team about Juniper Networks QFabric architecture."

For More Information

To find out more about Juniper Networks products and solutions, visit www.juniper.net.

About Juniper Networks

Juniper Networks is in the business of network innovation. From devices to data centers, from consumers to cloud providers, Juniper Networks delivers the software, silicon and systems that transform the experience and economics of networking. The company serves customers and partners worldwide. Additional information can be found at www.juniper.net.

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