PHILADELPHIA STOCK EXCHANGE TRADES UP TO HIGH-PERFORMANCE NETWORKING INFRASTRUCTURE

Summary

Industry: Financial Services

Challenges: To evolve to a total electronic trading environment to respond to competitive pressures while ensuring optimal application performance, minimal latency, and compliance with governmental regulations (Regulation NMS).

Network Solution: Augment existing network with the addition of virtual data centers near the metropolitan New York financial district leveraging Juniper's infrastructure solutions to provide unparalleled performance and speed for mission-critical, real-time financial trading applications.

Results:

- Network resiliency increases availability of real-time, mission-critical applications.
- Single infrastructure drives down total cost of ownership (TCO).
- Management simplicity reduces training and frees up IT resources for greater business flexibility.
- Proven infrastructure, coupled with operational simplicity, allows quick response to competitive and regulatory pressures.
- Hardware-based security enables maximum performance and reduced business risk.

As the first securities exchange in the United States, the tradition of innovation that has characterized the Philadelphia Stock Exchange (PHLX) has carried on throughout the years as the Exchange evolves to meet the ever-changing needs of the investment community. In addition to being the first organized exchange in the U.S., the PHLX can proudly boast a long list of other "firsts" that have had an equally significant impact on the securities industry, including being the first U.S. securities exchange to enter cyberspace with its own site on the World Wide Web.

Challenges

In order to remain competitive and continue building upon the Exchange's innovative use of technology, the PHLX wanted to move to an electronic model that would enable it to capture increased trading volume as traders look to alternate platforms to execute trades. An electronic model places significant demands on the network delivering the applications, and the opportunity losses due to inadequate network and application performance can be huge. In addition, the PHLX wanted to be able to disseminate real-time market data, report quotes and trades faster to the national markets, while continually meeting the demands for increased capacity to keep up with exponential growth of the industry's real-time quote feeds. This meant that the PHLX network undergo changes to meet the evolving nature of the financial markets and create competitive leverage. The new network would have to deliver the business speed necessary to meet competitive requirements while supporting business flexibility and reducing business risk.

Prior to upgrading to a Juniper Networks® solution, the PHLX relied on a single data center that was augmented by regional and national-based carrier services. In order to support an electronic trading model, an expanded network needed to be in place. This would put the applications closer to the traders in the metropolitan New York area, thereby ensuring reduced application latency and network performance interruptions.

Selection Criteria

With the implementation of Reg NMS, a revised set of market structure rules designed to achieve efficient, competitive, fair, and orderly markets, the widespread use of technology has resulted in increased competition and order volume. While compliance with Reg NMS is synonymous with infrastructure capable of delivering high-speed performance, the ability to deliver high application availability and network uptime can actually become a competitive differentiator. The Exchange's benchmark target was to provide quality of execution reports for equity transactions in less than 5 milliseconds, end-to-end round-trip time from its new all-electronic equity trading platform, PHLX XLE.

Solution

The PHLX decided to expand its network capabilities by augmenting its existing single data center with additional sites closer to traders in the metropolitan New York area. The resulting network would allow the Exchange to connect to member firms in common locations while providing for highly reliable and efficient execution of orders and market data.

The foundation of the new network design is an optical infrastructure with fiber running from the primary Philadelphia location to locations in New Jersey and New York's financial district. The new network design utilizes Juniper Networks M320 Multiservice Edge Routers connected in a full mesh topology with multiple parallel Gigabit Ethernet links residing over a DWDM network configured as a logically meshed MPLS backbone.

> **"The Exchange believes in building carrier-class enterprise infrastructure capable of delivering five nines performance. The nature of our business and the needs of our customers demand unparalleled network resiliency and security, without sacrificing the management and maintenance simplicity our IT staff requires."**
>
> Frank Ziegler
> Vice President, Philadelphia Stock Exchange

"MPLS was the logical solution to meet our business and networking needs," says Ziegler. "Because this was a considerable endeavor, and because the new network would be the foundation for the Exchange's future, we wanted to work with the leader in MPLS solutions. That's why we turned to Juniper Networks."

The new Juniper Networks-based infrastructure enables the Exchange to consolidate multiple services in a single, common environment without sacrificing performance, security, or scalability. In fact, the Juniper solution helps the Exchange segment and secure traffic without impacting throughput. In addition, the Juniper Networks solution provides superior multicast support with the ability to segregate different kinds of network traffic.

"Juniper has virtual logical routing capabilities for a common regional infrastructure that can separate different services on a single network," notes Ziegler. "We can ensure that the applications that are the very heart of the Exchange itself achieve maximum uptime – and that's vital when our customers are making split-second decisions and have a choice of electronic platforms on which to execute trades."

In an environment where large volumes of financial trading data are exchanged, the built-in security provided by Juniper's infrastructure solution, where all processing is hardware-based, was also a major selling point. And with the Juniper Networks Junos® operating system, the Exchange can identify network issues before they affect application performance and, ultimately, customer satisfaction. With Junos OS' modular, standards-based design, the Exchange is assured of superior resiliency and stability with reduced complexity.

The PHLX also relies on Juniper's professional services expertise to ensure that the design, implementation, and ongoing operation of the new infrastructure met the Exchange's current and future network requirements. The Professional Services team worked closely with Exchange IT staff to develop an on-site lab in Philadelphia and a core team that will be Juniper certified.

Results

"The new reroute capabilities of our Juniper-based MPLS solution will drive down costs by reducing the optics required for a network of this nature," explains Ziegler. "With the new design, half of the regional optic network will not be sitting there in insurance mode, and because we don't have to maintain multiple, separate infrastructures, the Juniper solution drives down our total cost of ownership."

Because the PHLX was working with a compressed timeline, execution was key. Working with Juniper Networks Professional Services has enabled the Exchange to meet aggressive timelines for the cut over to the new network. The PHLX has also invested in Juniper education and training for IT staff to ensure the ongoing knowledge necessary to continue taking advantage of all the benefits the new network offers.

"The support of Juniper's Professional Services organization, coupled with the inherent simplicity of the platform, gives us tremendous management and maintenance flexibility," says Ziegler. "The modular code base of Junos OS provides the ability to quickly correct software anomalies, and the simplicity of the operating system allows us to leverage intermediate talent to speed turn-up."

In addition, the ability to create a common security policy and apply it across the entire infrastructure not only saves time for IT staff, it also ensures that network resources are consistently and appropriately protected.

Concludes Ziegler, "At the end of the day, our new Juniper infrastructure solution will facilitate the full electronic trading of equities; futures, and options; enable us to create and disseminate our own market data feeds; and allow the Exchange to publish market feeds to the major players. This is more than simply a new network – it's the foundation upon which we're meeting our customers' needs and building the Exchange of the future."

About Juniper Networks

Juniper Networks, Inc. is the leader in high-performance networking. Juniper offers a high-performance network infrastructure that creates a responsive and trusted environment for accelerating the deployment of services and applications over a single network. This fuels high-performance businesses. Additional information can be found at **www.juniper.net.**

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3520216-002-EN April 2010

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