

BUYER CASE STUDY

New York Stock Exchange Chooses Juniper for Next-Generation Datacenters

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IDC OPINION

NYSE Euronext's business success is tied directly to its ability to complete trades as fast as possible for clients across multiple financial markets and geographies. The decision to choose a new datacenter network vendor to support a next-generation trading network involved considerable due diligence. In conversations with NYSE Euronext executives, the following factors were significant contributors to the decision to name Juniper Networks as the primary network switch supplier:

- The ability to interact directly and easily with Juniper engineering staff to solve particularly difficult challenges
- The experience gleaned from using Juniper routers in the NYSE Euronext wide area network for the past six years
- Trust in the stability, reliability, and performance of JUNOS, along with the change control benefits of a consistent operating system across multiple network devices
- Faith in the ability to use Juniper gear to break from a traditional three-tier datacenter network to a two-tier architecture that the New York Stock Exchange (NYSE) determined was the only way to meet aggressive latency targets

IN THIS BUYER CASE STUDY

This IDC Buyer Case Study examines the decision of NYSE Euronext to choose Juniper Networks as the primary supplier for the company's datacenter Ethernet switching and routing needs.

SITUATION OVERVIEW

The NYSE Euronext corporation operates multiple securities exchanges, most notably Euronext and the New York Stock Exchange. It has grown significantly over the past five years through rising trading volumes and the acquisition of multiple exchanges. These changes and industry shifts to electronic trading necessitate the building of two new datacenters in North America and Europe, scheduled to come online in 2010. The merged companies had a mix of network equipment from Cisco and Nortel in the campus and datacenter networks. A Juniper-based WAN architecture used in North America has already been duplicated in Europe.

On the business front, NYSE CEO Duncan Niederauer commented that historically, the trading floor and offices at 11 Wall Street in New York City were viewed as the company's greatest asset. By the end of 2010, 11 Wall Street will be the company's third most important asset after the two new datacenters in New Jersey and London. In addition, the role of an exchange is likely to evolve significantly over the 15- to 20-year life span of a datacenter, requiring planning to assume levels of scale and speed we can barely imagine today.

Organization Overview

NYSE Euronext's capacity demands are smaller than large Web operations in scale but have few peers in terms of latency and resiliency. These demands require server, storage, network, and application engineers to work together to build the fastest trading platform in the world. This collaboration required establishing common goals, in this case, focused on latency commitments. The team reported the goals could not have been achieved without significant live interaction to be sure all team members understood not only the goals and limitations each would face but also the personalities and priorities that can only be driven through numerous live interactions.

Challenges and Solution

Traders of financial instruments prefer exchanges where a trade is most likely to execute in the manner the trader expects. As the time between when an order is placed and when it is fulfilled increases, the potential for the market to move and the exchange to deliver an unexpected outcome also increase. Furthermore, not only must average trades perform with very low latency, but all trades must perform well, and deliver minimal, or ideally, no performance outliers. Achieving a tight standard deviation or reducing jitter on trading performance regardless of market conditions is just as important as executing millions of trades flawlessly.

Latency is the adage of a CIO who can describe the distance light travels in one nanosecond. (Answer: one foot.) Trading latencies today are no longer measured in milliseconds, but rather in microseconds. The bulk of NYSE network traffic loads are within the 5,000 plus, largely not virtualized servers, and then the exchange broadcasts millions of market data messages a second to customers over multicast. For the next-generation trading platform, the near-term challenge is a goal of dropping trading latencies from 150 microseconds to 50 microseconds.

Every hop in a network introduces latency. A traditional datacenter network consists of three tiers: a network access tier, a traffic aggregation tier, and a core switching tier. The NYSE determined the only way to achieve the new latency targets will be to use a two-tier architecture that removes the traffic aggregation tier. The advantages of removing the aggregation layer are often focused on removing the complexity and cost of aggregation switches. In this case, while cost is a factor, the NYSE found Juniper enables both a latency improvement and a reduction in the total number of devices in the environment.

IDC notes that a two-tier, next-generation network will not be deployed as a Layer 2 network. While the inner datacenter traffic needs to exhibit the performance characteristics of a Layer 2 network, a full Layer 2 network is too unstable for use by

large-scale datacenters including both the NYSE and several operators of cloud services networks IDC has interviewed recently. The challenge of inner datacenter network traffic is a balance between achieving the performance of one Layer 2 hop while maintaining control and stability across more servers and connections than a flat Layer 2 network can reliably support. While there are several vendors and datacenters using Layer 3 routing to achieve this stability, the NYSE's decision to choose its long-time WAN routing partner, Juniper, for switching is a significant validation of Juniper's strategy.

Results

NYSE repeatedly stressed the value of the engineering partnership and relationship the company has built with Juniper. The investments NYSE is making in its network with Juniper are priced roughly in line with competitors. Juniper, however, was selected for its ability to meet near-term latency goals and because it is flexible enough to evolve as the role of an exchange changes over the next 10 years.

From semaphore flag networks delivering a message to Philadelphia in 43 minutes to a 100G Ciena fiber wide area transport network to 10G two-tier datacenter networks, the NYSE had held the mantle as a premier exchange by constantly adopting new and more efficient communications technologies. Over the next year, as the NYSE makes the leap from trading on 11 Wall Street to becoming increasingly reliant on electronic trading, it will rely on a Juniper network.

ESSENTIAL GUIDANCE

The NYSE and other electronic trading platforms have rather unique requirements when it comes to latency. In other regards, however, businesses that can draw a direct link between financial performance and network performance will likely find common ground with the traffic profiles the NYSE must support. The value of a two-tier datacenter network, in terms of a smaller hardware footprint, has been discussed for some time. Now that the NYSE has determined a two-tier network not only suits its demands but is the only way to achieve its business goals, other organizations building highly stressed networks should evaluate the architecture as well. It demonstrates that new suppliers in the datacenter, such as Juniper, have an opportunity to support the new datacenter architecture emerging.

Juniper's Ethernet switching business strategy has been to cater to the needs of "high-performance networks" with the datacenter network as a key battleground to serve as a disruptive technology supplier. The NYSE win is a key validation of that strategy. As Juniper's switching and datacenter businesses grow, Juniper will have to find ways of ensuring customers like the NYSE continue to have access to top talent within Juniper.

Advice for End Users

Although the NYSE is a relatively unique example of a datacenter network deployment (given its singular metric of latency), the underlying benefits of this installation are applicable to other enterprise environments. End users should seek

answers to the following questions to help them comprehensively evaluate the network infrastructure technology within their datacenter environments:

- ☒ What applications/servers are at the site(s), and what are the availability and latency requirements of these applications?
- ☒ Are there any server virtualization projects under way/what are the planned use cases for server virtualization?
- ☒ What is the installed network technology for server and storage access?
- ☒ Who are the key suppliers of datacenter switch technology? And what features and functions do their products support that help IT meet specific business requirements?
- ☒ Can the vendor provide reference accounts with similar environments?
- ☒ How does the vendor's technology map into any overall datacenter initiatives?

LEARN MORE

Related Research

- ☒ *Worldwide Ethernet Switch 1Q09 Market Share Update* (IDC #218729, June 2009)
- ☒ *Datacenter Network Customer Requirements* (IDC #217999, April 2009)
- ☒ *A New Name on the Enterprise Networks Short List: Juniper* (IDC #cUS21066308, February 2008)

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