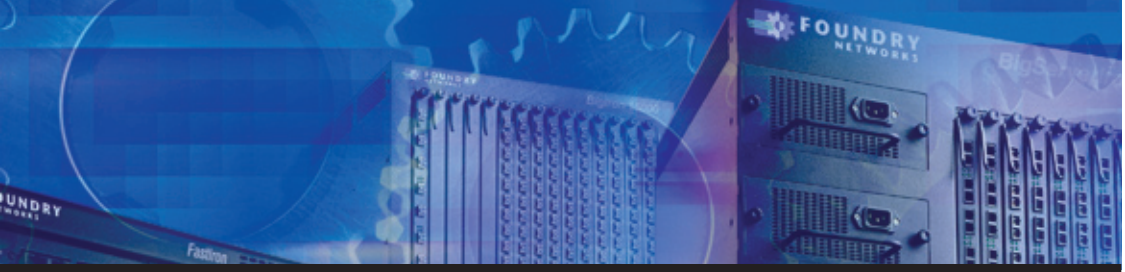

Case Study: The Amsterdam Internet Exchange (AMS-IX)

Foundry Helps World's Largest Public Internet Exchange Reach Historic Milestone

Summary

As the world's largest public Internet exchange, the Amsterdam Internet Exchange (AMS-IX) connects more than 250 ISPs and carriers worldwide. Its members include all major Dutch ISPs as well as providers from many other countries such as the United States, the United Kingdom, Germany, Belgium, and the Scandinavia countries.

Among its members, AMS-IX counts small and large ISPs, international carriers, mobile operators, content providers, VoIP providers, application providers, Web hosts, and other related businesses.

This neutral, independent, not-for-profit company operates one of the largest Internet hubs anywhere and provides high-quality, non-blocking professional peering services for all types of IP traffic, including voice, data, and video.

In addition, AMS-IX hosts the first mobile peering points worldwide, the Global GPRS Roaming Exchange (GRX) and the Mobile Data Exchange (MDX), as well as solutions for broadcasting with the multicast peering service.

Objective

All of these sophisticated services mean AMS-IX has a serious need for speed and traffic capacity. Also, the company absolutely has to have the ability to increase its switching capacity to accommodate large amounts of traffic. Due to the international nature of its members, AMS-IX experiences heavy traffic at all times of the day and night.

AMS-IX's average peak-traffic growth over the last four years has increased 100 percent per year, essentially doubling year-over-year. In December 2006, the monthly volume of traffic carried by AMS-IX increased three percent to 1.5 petabytes a day, which is equivalent to approximately 1,500 terabytes.

This considerable amount of traffic led to AMS-IX's search for a networking solution that could handle massive amounts of switching volume and a rising demand for high bandwidth interfaces.

Solution

To accommodate its continued traffic growth and protect its infrastructure investment, AMS-IX determined that the performance, application convergence capabilities, consistent non-stop operation, and scalability of the Foundry BigIron RX-16 10 Gigabit Ethernet (10GbE) switch made it the best available solution for its demanding throughput and scalability requirements.

The BigIron RX Series of Layer 2/Layer 3 switches are an designed for the rigorous demands of high-performance computing environments, Internet Exchanges, and ISPs where non-blocking, high-density Ethernet switches are needed.

AMS-IX provides services to its members from four independent co-locations in Amsterdam. All four co-locations are using Foundry BigIron switches in a double-star topology. To accommodate the increased overall switching volume and demand for high bandwidth interfaces, AMS-IX added the BigIron RX-16 Ethernet switches to two of its four locations. Each BigIron RX-16 has a switching capacity of up to 1.536 terabits per second and will ultimately be configured with 64 10GbE ports interconnecting the edge switches as well as providing 10GbE member connections.

www.ams-ix.net

Industry

Internet Service Provider

Company Description

Amsterdam Internet Exchange (AMS-IX), a neutral, independent and not-for-profit company, is the world's largest public Internet exchange, supporting more than 250 ISP, carriers, mobile operators, content providers, and application providers from the Netherlands and a number of other countries.

Objective

- Deploy a switching solution to accommodate growing volumes of traffic in a high-availability environment
- Design a system to handle very high rates of throughput
- Maintain operational costs

Solution

- Each of AMS-IX's four co-locations features Foundry BigIron RX-16 10 Gigabit Ethernet switches configured in a double-star topology
- Each BigIron RX-16 has a switching capacity of up to 1.536 terabits per second and will ultimately be configured with 64 10GbE ports interconnecting the edge switches
- sFlow technology in the Foundry devices captures network traffic statistics

Results

- The new switched architecture enabled AMS-IX to reach the historical milestone of hitting 230Gbps of throughput
- The ease of migration to the Foundry BigIron switches and Foundry's excellent customer service and support contributed to the deployment's success
- Members can connect to the AMS-IX infrastructure at any of the four co-locations at 10Mbit/sec, 100Mbit/sec, 1Gbit/sec, 10Gbit/sec or aggregated 10Gbit/sec
- Members can upgrade bandwidth connections easily and quickly to accommodate traffic increases
- AMX-IX increases customer satisfaction by passing on cost savings gained from the BigIron RX-16
- AMS-IX can monitor network traffic and gain network visibility with the built-in sFlow in the BigIron RX-16

In addition to increased bandwidth capacity, the BigIron RX will support sensitive, real-time traffic such as voice, video conferencing, and webinars. Because these contemporary applications demand network reliability, LINX requires advanced routing technology that supports hitless failover.

Results

AMS-IX's ability to scale its network and respond to customer bandwidth demands has separated the Internet Exchange from its competitors, bringing it worldwide recognition. The provider has managed tremendous traffic increases while still accommodating customers' demands for higher bandwidth. All while maintaining reliable network uptime and exceptional service levels.

Much of AMS-IX success can be credited to the performance and technical innovations in the BigIron RX Series. AMX-IX can easily support customers' requests for 10GbE due to the BigIron RX capacity. AMS-IX was the world's first IXP to offer 10GbE customer ports and has connected multiple customers with aggregated 10Gbps connections, effectively providing 20 and 30 Gbps connections. Large volume users, particularly ISPs, continue to request the increasing densities of 10GbE ports that AMS-IX can offer using the BigIron RX Series.

"As we look to answer the growing demand for 10 Gigabit Ethernet connections and to servicing our members beyond the 100 Gbps milestone, we have turned to Foundry Networks. Foundry has provided us one of the most robust, technically advanced and highest performing switching solutions available," says Henk Steenman, chief technical officer of AMS-IX.

The BigIron RX Series has been so cost-effective that AMS-IX can pass its cost savings on to its customers. These customers are responding to the lower cost and exceptional service by renewing contracts and requesting additional ports. All of which contribute to an encouraging bottom line at AMS-IX.

AMS-IX customers are extremely appreciative of the network's reliability and uptime. The BigIron switches can support AMS-IX's high-availability requirements with its redundant and hot-pluggable hardware, hitless software upgrades, and graceful BGB and OSPF restart. The AMS-IX topology has two hub and spoke arrangements. The two core switches run Virtual Switch Redundancy Protocol (VSRP) to define the active hub/spoke and to automatically fail over to the other.

To monitor and analyze network activity, AMS-IX relies on the built-in sFlow technology in Foundry switches. sFlow is an open-standard traffic analysis protocol that captures traffic statistics from the Foundry devices by taking time-based sampling of counters and packet-based sampling of Ethernet frames. AMS-IX uses the counter samples to gather real-time traffic statistics and packet-based sampling to analyze the exchange's traffic. This sampling technology of the packets is key to AMS-IX being able to achieve it massive throughput.

The BigIron deployment has been instrumental in helping AMS-IX reach a critical juncture in Internet traffic throughput. "AMS-IX hit a historical milestone in November 2006 when traffic flowing across our infrastructure exceeded 200Gbps," says Steenman.

Reaching this landmark has helped move AMS-IX to the leadership position in peering services. Steenman also points to the simplicity of moving to the BigIron deployment as a major plus for his company. "The ease of migration between Foundry products to support this growth, combined with the service and support received by Foundry Networks has been a vital factor in our success."

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> — Henk Steenman
> Chief Technical Officer
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Foundry Networks

Foundry Networks, Inc. (Nasdaq: FDRY) is a leading provider of high-performance enterprise and service provider switching, routing and Web traffic management solutions including Layer 2/3 LAN switches, Layer 3 Backbone switches, Layer 4–7 Web switches, wireless LAN and access points, access routers and Metro routers. Foundry's 10,000 customers include the world's premier ISPs, Metro service providers, and enterprises including e-commerce sites, universities, entertainment, healthcare, government, financial, and manufacturing companies. For more information about the company and its products, call 1.888.TURBOLAN or visit www.foundrynetworks.com.

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