Poznan Supercomputing and Networking Center (PSNC) Deploys High-Performance MPLS Platform to Create "Internet of the Future"

Summary

Company:
Poznan Supercomputing and Networking Center (PSNC)

Industry:
Science and Education

Challenges:
- Provide scientific institutions all over Poland with access to an innovative and secure network infrastructure
- Build an "Internet of the future" that will enable Polish institutions to operate internationally
- Improve research effectiveness

Selection Criteria:
PSNC conducted rigorous tests on proposed solutions from three vendors and concluded that Juniper met all of its technical requirements, was the only vendor to pass its interface performance test, and offered by far the best price for its community of users.

Network Solution:
- MX Series 3D Universal Edge Routers
- Junos Space Route Insight
- Junos operating system

Results:
- Provided high broadband bandwidth to connected institutions
- Increased scalability to connect additional institutions to the network
- Improved network reliability
- Developed new services, including applications-on-demand, bandwidth-on-demand, and live 3D video streaming of surgical procedures

Laying a Strong Foundation

As the leader of a consortium of all academic metropolitan area networks (MANs) and high-performance computing centers in Poland, PSNC is playing a key role in developing and integrating an information infrastructure for science, research, and education within Poland and internationally. Over the past 20 years, PSNC has been building the physical fiber-optic infrastructure to support the development of MANs within Poland's 21 major cities, then connecting the cities with more than 7,000 km of fiber-optic cabling. However, PSNC's aging network equipment wasn't able to keep up, and PSNC had to modernize its network equipment to harness the potential provided by its modern broadband infrastructure.

PSNC operates Poland's domestic fiber-optic network, PIONIER, as well as the academic MAN for the city of Poznan, one of the country's largest cities with a population of 600,000, including 140,000 students, making it a truly academic city.

Playing on the World Stage

PSNC was formed by the Polish Ministry of Science to develop a research IT infrastructure that would connect university campuses, institutes of science, research organizations, and public bodies across the country. It is the backbone of the Polish education and research community, providing a huge range of multifunctional services, including high-performance computing, file archiving, internet and network services such as e-mail, teleconferencing, and Web hosting, databases, software distribution and service, as well as specialized services such as multimedia laboratories.

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Artur Binczewski, *Head of Network Department, PSNC*

It is critical for Poland's researchers to be able to play on the international research stage and partner on international research projects funded by EU research initiatives such as Horizon 2020, now and in the future. They also need to address requirements set out in the Seventh Framework Program for Research and Technological Development (FP7) for Internet of the Future. Furthermore, they need to conform to standards set by pan-European networks (such as Geant) and international bodies to ensure that they can operate at these levels.

The existing network equipment was not able to realize the potential of PSNC's fiber-optic infrastructure, and they were unable to offer "broadband to all." "We wanted to build an MPLS backbone that would increase the bandwidth and throughput of each MAN and provide dynamic virtual connections and dedicated channels that could be used on demand by universities and scientific institutions, to support a range of national and international projects," explains Artur Binczewski, head of the network department at PSNC. "Our overriding goal was to improve research effectiveness. We also needed to support advanced applications and technologies such as 4K 3D video streaming to facilitate groundbreaking new service offerings like live transmission of surgical procedures."

Selection Criteria

Having secured an EU-funded grant from the Polish Ministry of Science, available for initiatives that support the research community, PSNC embarked on project NEWMAN, a public tender to procure 500 next-generation routers in support of a national project to deploy an MPLS IP platform across all 21 MANs and PIONIER.

Three companies competed for the contract. "As it was a public procurement, we conducted rigorous tests on all of the proposed solutions and produced a 600 page report on each vendor," says Binczewski. The contract was won by Juniper Networks for a number of reasons as he explains: "Juniper Networks won the contract as its MX Series Universal Edge Routers met all of our technical requirements, including Layer 2, Layer 3, MPLS, and virtual private LAN service (VPLS) functionality tests, and was the only vendor to pass our interface performance test, while offering by far the best price for our community."

Solution

Advanced MPLS services

PSNC deployed a new MPLS platform based on Juniper Networks® MX Series 3D Universal Edge Routers, including the MX80 3D Universal Edge Router at the access layer, and MX480 and MX960 3D Universal Edge Routers at the core. "Most of the MX Series routers are working as the MPLS transport layer,

and we are creating some MPLS virtual private networks (VPNs) to support specific projects or initiatives, or to connect several campuses within the same university," comments Robert Pekal, deputy manager of PSNC's network department.

The network now includes more than 21,000 1 GbE ports and 4,000 10 GbE ports and provides a backbone with 100 Gigabit capability, delivering scalability for the future and the foundation for a move towards Generalized MPLS (GMPLS). The Juniper platform supports the most advanced MPLS services, including traffic engineering, fast reroute, automatic bandwidth adjustment, Metro Ethernet Framework (MEF) E-Line, E-Tree, and E-LAN, next-generation Layer 3 VPN, carrier-of-carriers VPNs, and seamless MPLS.

The national PIONIER network can now support bandwidth-on-demand to provide dynamic and efficient network connectivity as well as applications-on-demand, where MANs and network users can request the use of a virtual machine or dedicated application. PSNC now provides access to large-scale live and on-demand high quality multimedia streams over broadband IP networks, enabling it to support advanced medical innovations such as live transmission of surgical procedures using 4K/16K high-definition 3D video. It can also create virtual connections on demand between remote research teams.

Juniper Networks Junos® operating system is enabling the PSNC teams to use multicast and IPv6 to provide more services. And Juniper Networks Junos Space Route Insight is being used by the PSNC Network Operations Center to provide real-time visibility to dynamic routing operations.

Internet of the future

Poland's research community now has an "Internet of the Future" that has the scope and scale to connect additional scientific institutions to the MANs and for the connected institutions to use higher broadband links.

"The new Juniper Networks infrastructure will make PSNC's metropolitan area networks and the high-performance computing centers much more reliable and able to maintain the highest standards of research network infrastructure," Binczewski says, "making it possible for connected scientific institutions to access and send information that will enable them to play on the world research stage."

The Juniper equipment also provides security of investment with a five-year warranty and software upgrade. "Our agreement with Juniper Networks has given us a very modern infrastructure that will allow us to address all of the future requirements of our research community," concludes Binczewski.

For More Information

To find out more about Juniper Networks products and solutions, please 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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