OGÓLNOPOLSKA SIEĆ EDUKACYJNA

NASK

POLAND CREATES DIGITAL EQUITY WITH FREE INTERNET FOR 5 MILLION STUDENTS

Summary

Company:
OSE, Poland's Nationwide Education Network

Industry:
Education

Business Challenges:
Ensure inclusive and equitable quality education for rural and urban students across Poland.

Technology Solution:
- *MX10003 and MX960 Universal Routing Platforms*
- *QFX10000 and QFX5100 Switches*
- *EX4300 and EX3300 Ethernet Switches*
- *SRX4600 and SRX320 Services Gateways*
- *Junos fusion for provider edge*
- *Junos Space Connectivity Services Director*

Business Results:
- *Delivered fast, safe, reliable, and free Internet access to 23,000 primary and secondary schools that educate 5 million students*
- *Protected students and teachers from inappropriate content*
- *Streamlined operations for the IP core and aggregation networks*
- *Built a foundation for increased use of video learning*

In 1991, NASK (Naukowa i Akademicka Siec Komputerowa or Research and Academic Computer Network) connected Poland to the Internet. Today, the organization is breaking down the digital divide that prevents Polish children living in villages and towns from achieving their full academic potential. NASK manages Poland's Nationwide Education Network (OSE), which is bringing fast, safe, and free Internet access to more than 5 million students and teachers using Juniper routing for the core and aggregation networks.

"We are providing Internet connectivity and security services to all primary and secondary schools in Poland," says Michal Mroczek, the architect of OSE and a senior network engineer at NASK.

Like many countries, Poland has a rural/urban digital divide. About 40 percent of people, including roughly 1.5 million children, live in rural areas—small towns, tiny hamlets, and remote farms. OSE aims to give these students equal digital footing for the future.

"In the big cities of Poland, Internet connectivity is good," Mroczek says. "Our focus is on the small towns and villages where schools may have poor Internet access or none at all."

NASK has deployed 100 Mbps Internet to 15,000 Polish schools, and all 23,000 schools across the country will be connected by the end of 2020. Beyond broadband Internet, OSE also will support students and teachers with access to content and curriculum to advance digital learning practices.

Since the OSE network buildout began, bandwidth consumption at schools has doubled.

"When we started two years ago, a single school consumed about 5 Mbps of Internet bandwidth," Mroczek says. "Now, a school consumes 10 Mbps. If you give students and teachers more Internet bandwidth, they will use more."

"Juniper has presented solutions for the core and aggregation networks for OSE, which met all our requirements."

- Michal Mroczek, architect of OSE and senior network engineer, NASK

Delivering Digital Equity in the Classroom

OTo deliver 100 Mbps connectivity to 23,000 schools and 5 million students, NASK needed a reliable, stable network with strong security. As with any network of national size and scale, simplified operations was critical.

NASK has deep experience in operating carrier-class networks. In addition to running OSE, NASK provides information and communications technology (ICT) services to business, academic, and government customers in Poland. The organization also oversees the .pl domain registration and operates Poland's national cybersecurity response team.

NASK chose Juniper Networks for OSE's core and aggregation networks.

"Juniper has presented solutions for the core and aggregation networks for OSE, which met all our requirements," Mroczek says.

OSE is designed to deliver on a terabit scale. The network spans all of Poland and is organized into three central and 16 regional nodes.

"The total traffic on the network is quite large," Mroczek says. "With an average of 100 Mbps for each school, we have designed the network to accommodate more than 1 Tbps."

"Juniper provides very sophisticated traffic engineering capabilities that we need to provide security services to schools."

- Michal Mroczek, architect of OSE and senior network engineer, NASK

OSE uses Juniper Networks® MX10003 Universal Routing Platform for the core network and Juniper Networks MX960 Universal Routing Platform for aggregation. With Juniper's routing platforms, NASK will easily meet future demands for performance that scales with services. Junos® fusion for provider edge helps NASK overcome the physical limitations of optical by delegating low-speed optical interfaces to a cost-appropriate switch, virtually expanding connectivity to thousands of ports from a single MX Series router.

OSE connects to commercial ISPs at the provider edge to deliver the last mile of connectivity to schools. OSE uses Juniper Networks EX4300 Ethernet Switch and EX3300 Ethernet Switch for connections at the edge.

Keeping Students Safe on the Internet

"Juniper provides very sophisticated traffic engineering capabilities that we need to provide security services to schools," Mroczek says.

The Junos® operating system, which delivers advanced routing, switching, and security, is designed for high availability and fine-grained network traffic controls. Juniper's sophisticated traffic engineering makes more efficient use of long-haul fibers, controlling how traffic is routed and classifying critical and regular traffic on a per-path basis. Advanced traffic engineering controls make it easier to deliver a fast, safe, and reliable Internet experience to the schools.

To protect children from inappropriate content and other cyber threats, Internet traffic from each school is redirected to an OSE security scrubbing center. There, traffic is decrypted, inspected, and, if the content is deemed inappropriate or malicious, it is automatically blocked. Otherwise, traffic is sent back to the students or teachers at the school.

To meet classroom expectations, scrubbing of Internet traffic needs to be high performance. However, regional data centers aren't always located near rural schools, making latency a potential issue. The scrubbing centers use Ethernet VPN/Virtual Extensible LAN (EVPN/VXLAN) for the overlay network architecture, which enables efficient Layer 2/Layer 3 network connectivity with greater scale, simplicity, and agility.

"We redirect traffic using EVPN so we can take traffic from a regional POP to a central location, sending the traffic to the security scrubbing center," Mroczek says. "The magic is that it remembers which network the traffic came from so we can send the traffic back to the right school."

OSE leverages Juniper Networks QFX Series Switches for the data centers and scrubbing centers. It uses the Juniper Networks QFX10000 line of Switches for the core and spine networks, and the QFX5100 line of Switches for its leaf and access switching. QFX Series switches deliver unparalleled scalability, density, and flexibility for the most stringent data center demands.

Network Operations at Scale

"A Juniper network is easy to operate," Mroczek says.

Junos OS is open and programmable, enabling automated operations with streamlined precision. Locations can be connected using zero-touch deployment, and configuration templates ensure consistent application. In addition, Junos Space® Connectivity Services Director enables the network engineering team to quickly design, provision, and deliver IP/MPLS, carrier-grade Ethernet, and packet-optical across the network.

"Without automation, providing managed services to 23,000 schools is impossible," Mroczek says. "Automation makes it easy to configure the network and keep it consistent."

Empowering Students Everywhere to Thrive

"At NASK, we are very proud of our work to bring Internet access to students in small villages and towns," Mroczek says. "When people live in a small village, the nearest cinema may be 60 kilometers away, and they don't have the same access to cultural and academic opportunities as students in cities like Warsaw or Gdansk. Internet access creates a better future for kids in these remote areas."

Broadband Internet opens educational vistas for more students. Polish schoolchildren already rank highly in math, science, and reading comprehension, according to the latest PISA international rankings, and student performance rose in the 2019 international assessment.

Fast, free Internet benefits not only children and their families, but also the wider community. Local governments and schools can work with other educational partners around the world. Citizens are more digitally connected and more aware of the potential cyber dangers, making them savvy citizens of an increasingly digital world.

Ready for Growth

Looking ahead, Mroczek envisions upgrading OSE to 400 Gbps in the next few years, driven by the growing adoption of video in digital learning. Today, university professors broadcast lessons to high schools in the Krakow area, and the program will be expanded across the country in 2021.

Fortunately, a Juniper network is easy to scale as digital learning grows and evolves.

"When we are ready to upgrade the network to 400 Gbps, we won't need to replace the MX960 routers. We can just replace the interfaces," Mroczek says. "With Juniper, moving to 400 gig will be easy."

With a Juniper network, Poland has a solid foundation to create educational opportunities for children, whether they live on the edge of the forest or in the middle of a big city.

For More Information

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

About Juniper Networks

Juniper Networks brings simplicity to networking with products, solutions and services that connect the world. Through engineering innovation, we remove the constraints and complexities of networking in the cloud era to solve the toughest challenges our customers and partners face daily. At Juniper Networks, we believe that the network is a resource for sharing knowledge and human advancement that changes the world. We are committed to imagining groundbreaking ways to deliver automated, scalable and secure networks to move at the speed of business.

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