University of Tsukuba Positions Itself for Next-Generation Services with Fast and Flexible Connectivity

Summary

Company:
University of Tsukuba

Industry:
Education

Business Challenge:
- Core network was outdated and unable to support new technologies
- Difficulty in managing core switches in two separate locations
- Complexity of managing isolated systems that were added to the network over time

Technology Solution:
- EX3300 Ethernet Switch
- EX4200 Ethernet Switch
- MX480 Universal Edge Router
- Junos operating system

Business Results:
- Consolidated core switches in a single location without compromising coverage
- Reduced administrative load and support costs by consolidating access switches
- Provided support for (SINET5), next-generation cloud-based services, and smart devices
- Simplified management and operations with Junos OS

The University of Tsukuba was established in 1973 with the aim of transforming university education in Japan and making it open to all. Its spacious Tsukuba campus, located in Tsukuba Science City, covers a total area of 257 ha. The university also has a Tokyo campus located in Bunkyo-ku, at the site of the former Tokyo University of Education.

The university's various schools, colleges, research centers, and student dormitories are connected by a core network that is used for the students' education and research, as well as the work of the university staff. It is managed by the Academic Computing and Communications Center, which functions as the university's Internet service provider, providing external links and technical support to ensure that the network infrastructure is stable and can support the university's 20,000 users including students, university staff, and researchers.

Business Challenge

The University of Tsukuba had core switches installed at two locations to create a network that could cover its vast campus. However, after eight years, the aging equipment needed an upgrade to keep up with the latest technologies and services.
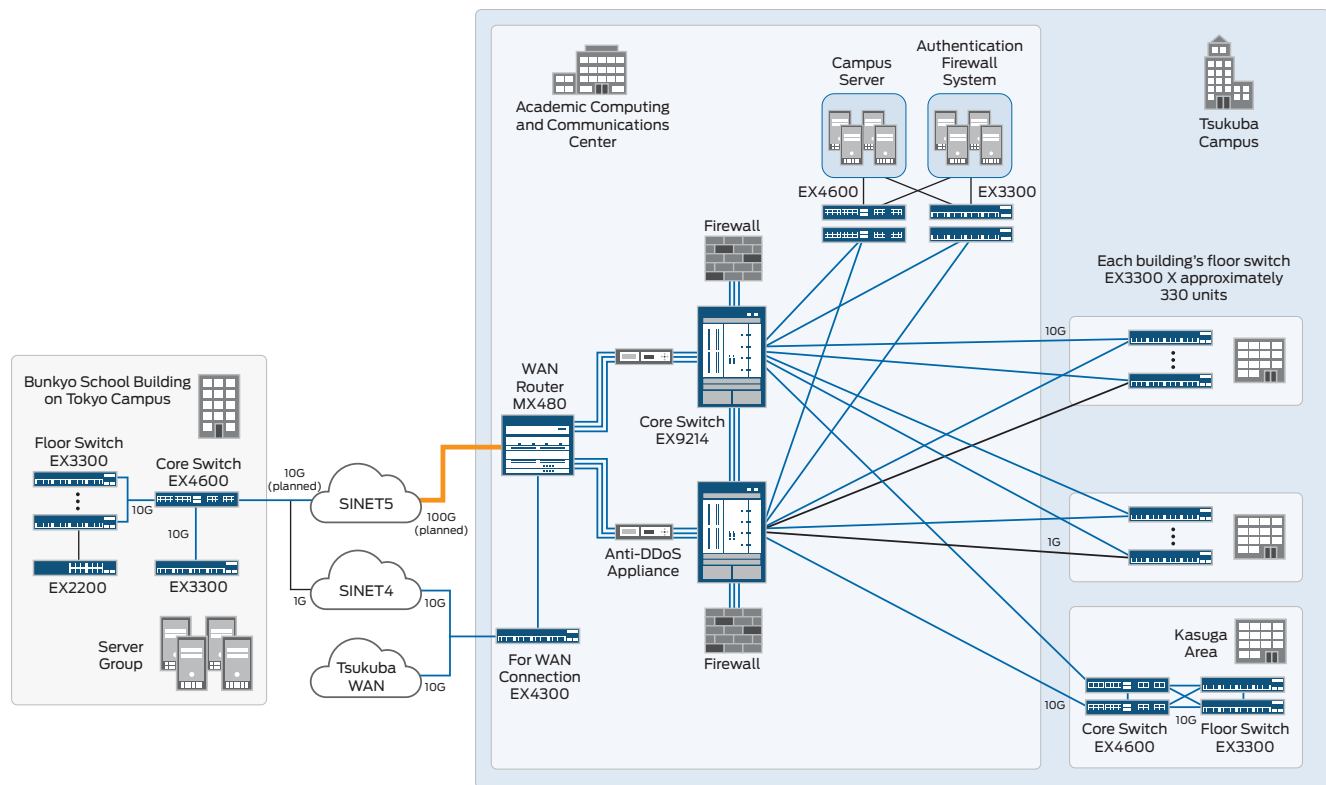
"Our ICT framework was old, with infrastructure and systems added over time by teaching staff and technicians," says Associate Professor Akira Sato from the Network Research and Development Department, Academic Computing and Communications Center. This led to the creation of individual systems that were difficult and costly to manage and hindered the university's ability to move fast in keeping with a real-time digital campus.

At the same time, there was a need to upgrade the university's core network to support the new SINET5 deployment (Science Information NETwork). SINET is an information and communication network connecting universities and research institutions throughout Japan, and was being upgraded from 10 Gbps to 100 Gbps.

These factors led Tsukuba to look into a major revamp of its network infrastructure in 2015.

"The solution from Juniper Networks is highly reliable and durable, and provides a high-performance, flexible infrastructure."

Akira Sato, Associate Professor, Network Research and Development Department, Academic Computing and Communications Center, University of Tsukuba

Technology Solution

One of the first things that Tsukuba did was to review the distribution of its core switches over two locations. The massive earthquake which struck east Japan in March 2011 led to the recognition that it was difficult and expensive to provide electricity to core switches in two locations. Operationally, maintaining switches at separate locations was also very cumbersome.

Tsukuba decided that the new network required high-performance core switches located at a single location. In evaluating the various networking options, Sato placed high emphasis on reliability and equipment durability. This was because network troubleshooting and maintenance could be difficult, with over 400 network elements distributed across the vast campus. The university also wanted an open, flexible, and secure network which would serve as the foundation for success in the digital world.

The university had previously used Juniper Networks® M120 Multiservice Edge Routers and "we were particularly impressed by the reliability," Sato says. The equipment did not break down or cause any problem despite many years of use. Based on this experience, Tsukuba selected a Juniper solution for its new network infrastructure.

Sato's own experience with Juniper Networks EX4200 Ethernet Switch in his research added to his confidence in Juniper's products. He was especially impressed with the Juniper Networks Junos® operating system, describing it as "an interesting OS fit for a researcher, with its easy-to-use interface and attention to detail."

In rolling out the new network, the university made use of existing communication tunnels running below the campus, which helped lower deployment costs. The Juniper Networks EX3300 Series Ethernet Switch and MX480 3D Universal Edge Router were installed across the campus. The core switches from the two locations were then consolidated into two sets of EX9214 Ethernet Switches to cover the whole of the university, including its Tokyo campus.

"We are also looking forward to Juniper Networks expanded security portfolio, as we are considering revamping our authentication infrastructure."

Akira Sato, Associate Professor, Network Research and Development Department, Academic Computing and Communications Center, University of Tsukuba

Business Results

With the upgrade of its network infrastructure, Tsukuba not only delivers the high-performance and reliable connectivity needed to support its students and researchers in their academic and research work, it is also able to address network management issues and position itself to meet future connectivity needs. "The solution from Juniper Networks is highly reliable and durable, and provides a high-performance, flexible infrastructure," Sato says.

The EX Series' Virtual Chassis technology enables the university to consolidate access switches at the building level to reduce the number of logical units that have to be managed. This is a huge advantage, as there are many buildings in the campus with access switches placed on each floor. This new architecture

has reduced the administrative load and related support costs. The EX9200 line of Ethernet switches also delivers the high performance and flexibility required to support the implementation of zone-based firewalls. This allows the network to be easily managed at the subnet level.

Performance-wise, the network easily handles the enormous amount of data generated in research collaborations such as the University of Tsukuba's work with the University of Tokyo and the High Energy Accelerator Research Organization. It also supports the university's planned move from the 10 Gbps link to the existing SINET4, to a 100 Gbps connection for SINET5 that is currently being developed.

The Junos operating system also makes it easier for administrators to manage the network. Sato's network operations staff found Junos OS to be very intuitive to use. "In particular, its commit-based configuration is amazing. It can be checked beforehand, and immediately rolled back if any issues occur. I am very thankful that it can be operated with such peace of mind," Sato says.

The ease of management also enables the university to respond to change at a moment's notice and drive rapid business evolution from within the data center. With a simple, open, and smart network in place, the university is able to build a strategic digital platform from which it can deploy changes quickly and smoothly, with fewer risks and lower costs.

Future plans

With the growing use of smartphones and cloud services, there will be a demand for higher network speeds. The new MX480 routers were selected as a future-proof platform to address this growth. "We want to expand the Wi-Fi infrastructure to accommodate smart devices. We are also looking forward to Juniper Networks expanded security portfolio, as we are considering revamping our authentication infrastructure."

"As a researcher, too, the network opens up many possibilities for advanced studies and testing. We have built an extremely capable network," Sato says.

For More Information

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

About Juniper Networks

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Corporate and Sales Headquarters

Juniper Networks, Inc.

1133 Innovation Way

Sunnyvale, CA 94089 USA

Phone: 888.JUNIPER (888.586.4737)

or +1.408.745.2000

Fax: +1.408.745.2100

www.juniper.net

APAC and EMEA Headquarters

Juniper Networks International B.V.

Boeing Avenue 240

1119 PZ Schiphol-Rijk

Amsterdam, The Netherlands

Phone: +31.0.207.125.700

Fax: +31.0.207.125.701

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