Building Collaborative Platform for Driving Innovation

Customer Case Study

Swiss university deploys next-generation education and research environment.

EXECUTIVE SUMMARY

Customer Name: Swiss Federal Institute of Technology Zurich

Industry: Education

Location: Switzerland

Number of Employees: 27,000 staff and students

Challenge

- Create highly available, secure network that facilitates collaboration
- Help ensure IT model is aligned to support competitive advantage and growth for next 10 years

Solution

- Cisco Unified Data Center architecture and Nexus platform optimize resources spread across data centers connected by MPLS-enabled campus network

Results

- Reduce risk, cost, and time-to-market for researchers
- Deliver a Network which can handle the growth of research Data.
- Platform for growth and attracting talented students and staff

Challenge

Swiss Federal Institute of Technology Zurich (ETH) Zurich accelerates innovation. It is the largest science and technology institution in Switzerland and is at the heart of global challenges such as climate change, world food supply, and human health issues. Regularly ranked among the world's best international universities, ETH Zurich is acknowledged as a center of excellence in engineering, architecture, mathematics, natural sciences, system-oriented sciences, and management and social sciences. With some 413 professors and 17,000 students, many of whom are doctorate candidates, ETH Zurich is the study, research, and work place for 80 nationalities.

The university's Cisco-based network is a key enabler, not just for delivering connected education on the campus, but also for supporting virtual learning and global collaboration with other academic and research institutions, for example, by linking to SWITCH, the Swiss National Research and Education Network.

The end goal is to use IP networking and collaboration tools to improve student success rates, while also shortening research and development (R&D) cycles, thereby speeding time-to-benefits realization and knowledge transfer to businesses and the wider community.

Although relatively small in size, the IT team at ETH Zurich plays a pivotal role in this process. As well as maximizing network uptime, they are always looking to take the best that technology has to offer. In 2004, the university was one of the first Cisco customers to introduce Multiprotocol Label Switching (MPLS) in a campus environment with Cisco Catalyst® 6500 Series Switches, a technology that today is still crucial to the university's ongoing success. MPLS was used to build an open and collaborative platform that is securely partitioned into over 170 VPNs, in turn protecting sensitive data, for example, relating to drug trials, patient records, and confidential research.

Keen to take advantage of recent technological advances, the IT team decided to step back and plan the next phase of its transformational strategy. "Our role is that of an internal service provider operating a multitenant environment," says Derk-Jan Valenkamp, network manager for ETH Zurich. "Some of our customers want to be open to the Internet, and others need a closed network environment. MPLS caters for all requirements and eliminates the need to build and manage security profiles on an individual basis. However, it was becoming harder to negotiate maintenance windows, so we needed to find a way of increasing the agility and availability of our MPLS platform."

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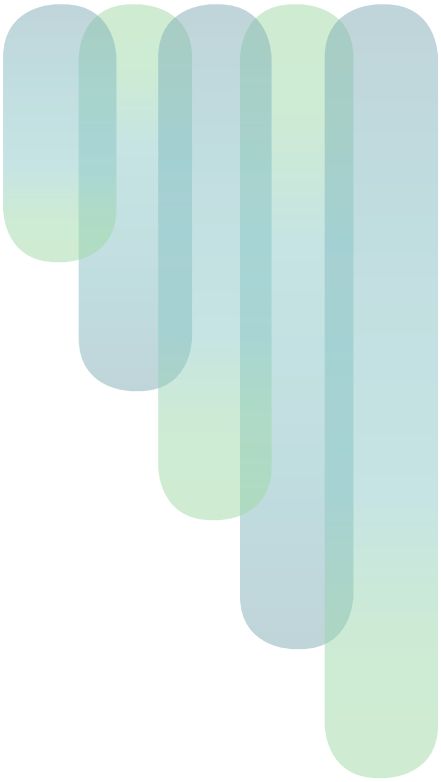
Derk-Jan Valenkamp
Network Manager
Swiss Federal Institute of Technology Zurich



Solution

The university wanted to create a network that would be compatible with future versions, and capable of scaling to 100 Gigabit for optimizing HDTV imaging and supercomputing models. The university was also interested in seizing new opportunities for interoperability and convergence. As well as preparing for IPv6 and Fibre Channel over Ethernet (FCoE), ETH Zurich intended to use the network for controlling building management systems and delivering valuable power and carbon savings.

After careful consideration, the university chose a solution based on the Cisco Nexus® switching platforms, a key component within Cisco® Unified Data Center, a framework and architecture for reducing risk and accelerating data center transformation.

"We were really taking a 10-year view," says Valenkamp. "Cisco's architectural approach ticked all the boxes. The Nexus chassis should be able to grow to 100 Gigabit or more. We had a practical path for reducing complexity and cost with FCoE. And, by introducing the In-Service Software Upgrade feature, we could increase network availability and, ultimately, customer satisfaction."

In addition to In-Service Software Upgrade, ETH Zurich is able to take advantage of highly scalable distributed implementation of Bidirectional Forwarding Detection (BFD) on Cisco Nexus 7000 Series Switches for fast failure detection. BFD helps to reduce network convergence time and, therefore, increase availability.

The solution connects together a distributed data center consisting of seven server rooms, campus access areas, and data center areas within one fully redundant end-to-end architecture. The design comprises 22 Cisco Nexus 2000 Series Fabric Extenders, 10 Cisco Nexus 5000 Series Switches, and 12 Cisco Nexus 7000 Series Switches.

Results

ETH Zurich is a great example of how network transformation can positively affect innovation. "Our customers expect exceptionally high-bandwidth and low latency application performance," says Valenkamp. "For example, there could be electronic microscopes or complex algorithms running over the network. Downtime is not an option. If there is a break in connectivity, the customer may have to restart experiments, which adds expense and delay to the whole R&D process. Thanks to the Cisco Nexus, those concerns have disappeared."

In a typical year, research conducted by ETH Zurich will lead to 80 new patent applications, while also creating employment opportunities with spin-off companies. Having a fast, highly available campus network will help to speed up the innovation process: research and testing can be conducted quicker; results can be shared and validated faster; patents applied for sooner; and product development completed earlier.

From a marketing standpoint, the university has once again differentiated itself and is set to continue its impressive record of attracting the most talented people. Moreover, ETH Zurich is strongly placed to build education around the needs of students and teachers, for example, by maximizing video and mobility solutions to extend learning beyond the classroom.

Efficiency of IT operations has increased significantly. "Although it is too early to measure the reduction in total cost of ownership, our IT environment is less resource hungry and easier to manage," says Valenkamp. Routine maintenance tasks can be completed without affecting network uptime.

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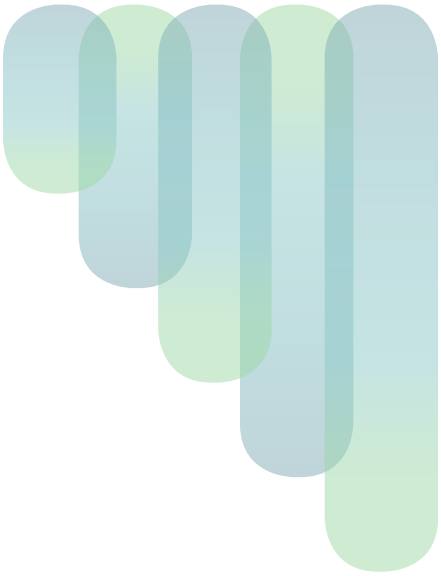

Running MPLS on the Cisco Nexus 7000 Series Switch also addresses key multitenant requirements within the campus network. The university offers IPv4, IPv4 MDT (multicast distribution tree), and IPv6 domains for each of its 170 VPNs.

Security has also improved. By removing the need to agree on scheduled downtime, the university's IT team can complete software and security upgrades more frequently, thereby reducing potential risk to the network.

The Cisco Nexus platform opens up exciting new opportunities. By taking advantage of the Cisco virtual device context (VDC) capability, the university plans to increase virtualization, in turn consolidating network devices and power consumption by a 3:1 ratio.

"The aim is to reduce complexity and costs further still by collapsing three (MPLS P/PE, Fusion, and Internet gateway) routers within a single virtual router at key points within the campus network," says Valenkamp.

ETH Zürich is also considering Locator ID Separation Protocol (LISP) and Overlay Transport Virtualization (OTV), two other Cisco Nexus "leap-frogging" features, as a way of boosting business continuity and enabling vMotion between separate server room domains.

Environmental impact is another key area of focus. The university is currently using the network to manage air conditioning and door entry systems. The next target for this bold strategy is to explore how its distributed data center approach could be leveraged to heat buildings from the waste heat generated by IT equipment.

For More Information

Further details about the Cisco Unified Data Center are available at; www.cisco.com/go/datacenter

For more information about Cisco Nexus Series Switches, please visit: www.cisco.com/go/nexus

Product List

Data Center

- Cisco Nexus 5000 and 7000 Series Switches

Americas Headquarters
Cisco Systems, Inc.
San Jose, CA

Asia Pacific Headquarters
Cisco Systems (USA) Pte. Ltd.
Singapore

Europe Headquarters
Cisco Systems International BV Amsterdam,
The Netherlands

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