

Brocade Higher Education Solutions

HIGHLIGHTS

- Future readies your network, using SDN OpenFlow 1.3 and multivendor OpenDaylight Controller.
- Effortlessly increases capacity using Scale-Out Networking. No up-front chassis investment required.
- Upgrades bandwidth with no physical infrastructure change using a software upgrade license.
- Prevents vendor lock-in with products developed using Open Standards.
- Acquires the latest features and products easily, using subscription OPEX-based financing.

Innovating the Higher Education Campus Network with Purpose-Built Upgradability

Higher education is an important catalyst to improving an individual's or community's quality of life. The network can be an integral part of that catalytic process. There are many trends that are motivating institutions of higher education to upgrade their network infrastructure, including:

- Supporting the proliferation of BYOD
- Meeting the demands of research
- Transitioning to a digital curriculum and e-learning
- Improving collaboration with social media

One of the biggest trends in higher education is the proliferation of mobile devices. Texas A&M, for example, reported in their 2013 IT Annual Report a record-breaking 21 percent increase in their wireless usage, with 74,878 unique users in a 24-hour period, up from 61,736 unique users from the prior year. It is becoming more common to see up to seven different types of BYOD devices: laptop, smart phone, PC, tablet, Webcam, WiFi-enabled camera, and video game console.

Online learning has proliferated, with video-rich content substantially increasing network bandwidth requirements. For example, the University of New Mexico reported that the usage of Lynda.com (extensive portfolio of video courses) by educators increased 34 percent to 7,000 courses viewed, in their 2014 Annual

Report. Texas A&M's transitioned to eCampus, the next-generation learning management system powered by Blackboard Learn. In Fall Semester 2013, 85 percent of students (45,472 students) used eCampus for at least one course.

Collaboration technology fuels additional bandwidth requirements, as many are video-based. As an example, Texas A&M's new TTVN WebMeeting provides enterprise online Webconferencing and collaboration services. During the first semester of use, over 5,000 users enrolled for the new service.

Social media apps have also increased demand on the network, and is eclipsing all other modes of communication for the student population. Usage of social media in higher education has evolved into creative uses for course

management or increasing classroom engagement with backchanneling, where students participate in class discussion by submitting real-time comments, questions, or polling.

The rich combination of trends in higher education is increasing demands on the network, motivating many universities and colleges to upgrade their campus infrastructure.

Upgrading the network of higher education institutions can be very challenging and disruptive, especially when the infrastructures are large and complex, and the resources are limited.

Upgrading the Network for Years of Innovation and Longevity

Brocade has developed purpose-built features, products, and architectures for easier upgradability. Foremost is the Brocade® HyperEdge® Architecture, which employs three key design principles for upgrading and simplifying the network to achieve better business agility and operational efficiency:

1. **Consolidated management:** Reduces unnecessary network layers to create large HyperEdge management domains that eliminate individual switch touch points to ease maintenance time and costs.
2. **Shared network services:** Allows premium and entry-level switches that share a common HyperEdge management domain to share advanced Layer 2 and Layer 3 services to achieve lower price-per-port functionality.

3. **Scale-out networking:** Integrates high-performance, fixed-form factor switches to create a single logical device independent of physical location by scaling ports when and where needed across the campus. There are numerous features to improve upgradability at the port, switch, services, or network levels. A feature like Ports-on-Demand is an example of lengthening switch longevity, with increasing 1 GbE to 10 GbE port capacity with a software license, without changing the physical infrastructure involved.

The New IP will further enable higher education institutions to see more longevity with their network investments. The New IP is based on open-source software, commodity hardware, and automated provisioning. Security is built in from the start, interoperability is achieved through open APIs, the institution is at the center of the ecosystem, and innovation happens at the speed of business.

Brocade supports the Software-Defined Networking (SDN) OpenFlow protocol, which provides communication between an OpenFlow controller and an OpenFlow-enabled switch. Moreover, Brocade has uniquely delivered OpenFlow in a true hybrid port mode, where traditional Layer 2 and Layer 3 and OpenFlow forwarding can operate on the same port.

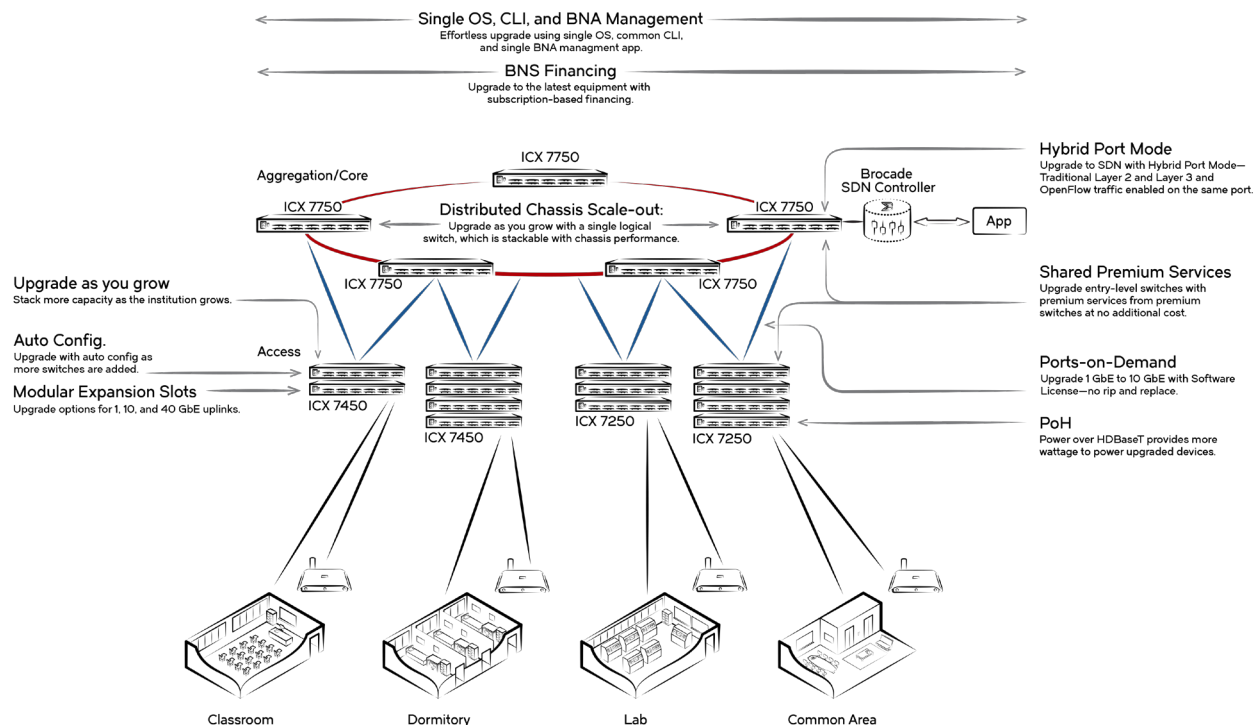


Figure 1. Examples of Purpose-Built Upgradability Features.

By innovating the industry's first multivendor OpenDaylight controller, which is an opensource SDN solution that provides granular visibility and control over network functions, Brocade has enabled comprehensive visibility into and management of the network. The controller can allow the network to detect and respond to traffic flows, and dynamically adjust them. For example, it can assist with mitigating a Denial of Service attack or increasing bandwidth for large peak flows.

Brocade provides higher education institutions with solutions with purpose-built upgradability today, enabling them to support all the increasing demands and evolving expectations of a modern education environment. Brocade also provides a future pathway to further upgradability with product and solution

development based on the New IP, helping higher education institutions meet the innovative requirements of tomorrow.

Learn More

Brocade partners with companies of all sizes to deliver innovative solutions that help organizations maximize the value of their most critical information. To learn more, visit www.brocade.com.

About Brocade

Brocade networking solutions help organizations transition smoothly to a world where applications and information reside anywhere. Innovative Ethernet and storage networking solutions for data center, campus, and service provider networks help reduce complexity and cost while enabling virtualization and cloud computing to increase business agility. Learn more at www.brocade.com.

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