The Cisco Borderless Network Architecture in Education

Changing the Way Education Works

At-A-Glance

The Education Landscape

Today, schools, colleges, and universities are being squeezed from two directions: lower budgets and higher expectations for educating the 21st century workforce.

Educators and school administrators are focused on providing:

- Next-generation learning, with secure mobility services and a media-rich, engaging learning environment
- Safety and security, whether physical or technological
- Administrative efficiency, with methods to increase energy savings and lower operating expenses

IT can play a critical role in supporting these efforts. Cisco delivers Borderless Networks as a way to enable you to address both educational needs and pure IT requirements. Cisco Borderless Networks is about breaking down the borders that exist in education networks that inhibit efficiency, productivity, and learning. These borders include:

- The device border encountered when students bring their consumer devices to school
- The collaboration border experienced when integrating students, faculty, staff, parents, and other members of the community into the education process
- The application borders involved in optimizing the network for next-generation teaching and learning
- The location border that inhibits anytime, anywhere learning
- The institutional borders that limit the role of the network in providing value to other parts of school facilities

Remove Device Borders in Education

The research firm In-Stat estimates that by 2011 more than 1.2 billion 802.11n wireless devices will have reached the market. Students will carry many of these devices in the form of laptops, iPhones, smartphones, and other consumer devices. Your education network must be sufficiently flexible, secure, and resilient to support such devices. You need to:

- Implement a high-performance Cisco 802.11n wireless network to support real-time collaboration, anywhere access to bandwidth-intensive applications, enhanced voice performance, and mobility tools from any Wi-Fi device.
- Help ensure that social media and other Web 2.0 traffic does not interfere with higher-priority educational traffic with the industry-leading quality of service available throughout the Cisco Borderless Network Architecture.
- Deploy a complete and flexible identification and authorization system, including identification of non-standard consumer devices, with Cisco Identity-Based Network Services, an integral part of the Cisco Borderless Network Architecture that is available across the Cisco Catalyst® Series Switches.
- Ensure that education traffic is not compromised by network outages with an architecture that provides you with end-to-end high availability across your network. Availability technologies include Cisco StackWise® Plus technology on fixed Cisco Catalyst Series Switches and Cisco Nonstop Forwarding with Stateful Switchover on Cisco modular switches and routers.
- Provide role-based protection, support a variety of remote devices and endpoints, and create a transparent user experience while enabling access and collaboration between various stakeholders.

Break Down Collaboration Borders in Education

Education is becoming a collaborative enterprise between many partners. Interschool collaborative projects are increasing. Parents are playing larger roles in their children's education. Local law enforcement is engaged in school safety and security programs. Connecting all of these widely dispersed entities to share information while protecting the school network and student privacy can be a significant challenge.

You can integrate all of these individuals and groups into your education network with the high-bandwidth wired and wireless encrypted links available in the Cisco Borderless Network Architecture. However, this integration solves only part of the problem. You must also consider security.

You can isolate user groups by function by using end-to-end network virtualization. For example, law enforcement could be given shared access to your school security network to monitor security cameras and provide security alerts to digital media systems signs. At the same time, you can keep this access completely separate from the main educational network to limit incidents of abuse or digital vandalism and to protect student privacy.

Combining multiple overlay networks on a single common infrastructure can be a powerful concept. One U.S. school district achieved savings of US$500,000 by combining its networks for voice, video, data, public address, bells, and building systems.

Eliminate Application Borders in Education

Collaborative projects with other schools, remote guest speakers, and distance learning all change the way that teachers teach and students learn. What these solutions have in common is the increasing importance of video applications. Video alone will account for 90 percent of all consumer IP traffic by 2012.

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Cisco Borderless Networks removes many of the borders to running video applications on your education network that can limit access to expertise and information. It allows you to:

- Handle high-resolution video loads with high-bandwidth 10-Gigabit Ethernet connections—including 10-Gbps uplinks on the latest generation of Cisco Catalyst 2960-S, Catalyst 3560-X, and Catalyst 3750-X Series Switches, as well as 10-Gbps line cards on the Cisco Catalyst 4500-E Series Switches.
- Optimize wide-area traffic for voice and video with high-bandwidth encrypted links, as found on the Cisco Integrated Services Routers Generation 2 (ISR G2) and Cisco ASR 1000 Series Aggregation Services Routers.
- Recognize and prioritize voice and video traffic with embedded classification technologies like Network-Based Application Recognition (NBAR).
- Improve video sharing and streaming with wide-area application optimization technologies like Cisco Wide Area Application Services (WAAS).
- Automate many portions of your network configuration with device- and traffic-aware innovations.

Cisco Borderless Networks is designed with video and medianet in mind, and removes the constraints of time, distance, and bandwidth that can restrict access to expertise or information.

End Location Borders in Education

In the new education environment, users are mobile and they need to access information in hallways, cafeterias, outdoors, or in their dormitory rooms.

In addition, the physical locations of high-value school assets need to be tracked. This tracking not only saves faculty and staff time when trying to locate shared assets, but also provides protection against loss or theft.

Physical location is a network border that can be resolved by a full-featured, reliable, and secure mobility solution.

Some of the services that the Cisco Borderless Networks provides to enable mobility include:

- Make it easier to provide high speed wireless through the Cisco Unified Wireless Network which supports the IEEE 802.11n standard and delivers increased bandwidth and reliability to all wireless devices.
- Deploy access points easily and cost-effectively, even where running traditional power connections is impractical, by using Power over Ethernet provided by the Cisco Catalyst Series Switches.
- Securely deliver real-time, accurate, actionable information to personnel in any location through the high-performance, reliable, and secure routing platforms such as the Cisco ASR 1000 Series.
- Implement the location services necessary for asset tracking, emergency services, and network security with the Cisco Mobility Services Engine.
- Unify and simplify the school's wired and wireless networks with integrated services like those provided on the Cisco Catalyst 6500 Series/7600 Series Wireless Services Module (WiSM).

The secure, reliable, and transparent mobility services enabled by Cisco Borderless Networks help increase staff, faculty, and student productivity while reducing costs.

Reduce Institutional Borders in Education

Like many organizations, your school is probably concerned about rising energy costs. Cisco Borderless Networks blurs the traditional border between facilities management and network IT operations, allowing for greater cooperation—especially in the area of energy management.

You can intelligently measure, report, and reduce energy consumption of devices across your entire school to optimize power delivery and reduce energy costs using Cisco EnergyWise.

The most recent enhancements to Cisco EnergyWise expand its sphere of control to include Power over Ethernet devices (IP phones, wireless access points, and IP surveillance cameras) as well as PCs and laptops. The next phase of Cisco EnergyWise will further expand its influence to extend to facilities integration (lights; elevators; and heating, ventilation, and air conditioning [HVAC]) though tighter integration with the Cisco Networked Building Mediator.

Using the ubiquity and intelligence of the network to provide a more sustainable and cost-effective facility is an excellent way for you to demonstrate the business value of network IT to the rest of your school.

What Are the Benefits of a Cisco Borderless Network Architecture?

The Cisco Borderless Network Architecture provides the underpinning for all Cisco solutions. It uses the power of the network to provide:

- A consistent policy architecture across staff, faculty, students, and guests
- Transparent mobility with location services for anytime, anywhere learning and asset tracking

- Security for devices both on the local network and across cloud services, providing collaboration with guest lecturers, law enforcement, and distance learning while maintaining student privacy
- Sustainability and reduced energy costs for efficient and cost-effective school operation
- Optimized application performance for video and Web 2.0 services, providing a more engaging learning environment
- Policy-based access control and identity-aware networking to enable access and collaboration while protecting business-critical applications
- Compliance with current and future educational regulatory requirements

Why Cisco Borderless Network Architecture?

In addition to the technology benefits already cited, some additional benefits of adopting a Cisco Borderless Network Architecture include:

- **Relevance:** Cisco works with leading education and technology partners to deliver innovative education solutions.
- **Operations:** Cisco delivers well-tested, thoroughly documented solutions that reduce time to deployment and help you lower systems integration costs.
- **Professional and Support Services** encourage borderless network innovation for education by taking an architectural approach to delivering IT-based solutions. Services from Cisco and our partners provide planning, design, and implementation services, as well as award-winning technical services and optimization, so that your education network is robust, secure, and helps you to meet industry and regulatory compliance requirements, while also supporting collaboration needs and sustainability goals and lowering operating costs.

Additional Resources

The Cisco Borderless Network Architecture:
http://www.cisco.com/go/borderless.

Cisco Solutions for Education:
http://www.cisco.com/go/education.

Cisco Professional and Support Services:
http://www.cisco.com/go/services.

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