The Cisco Service Ready Architecture for Schools

The Education Environment

The education environment is undergoing a significant transformation, with technological innovation not only employed to augment the learning process, but also to optimize school operations and heighten awareness of, and responsiveness to, safety and security issues that affect schools and their respective districts.

The education environment must be able to quickly adapt to maintain educational excellence on a global scale, keeping pace with the next-generation education environment. Technology can provide a powerful platform for the educational needs of the 21st century.

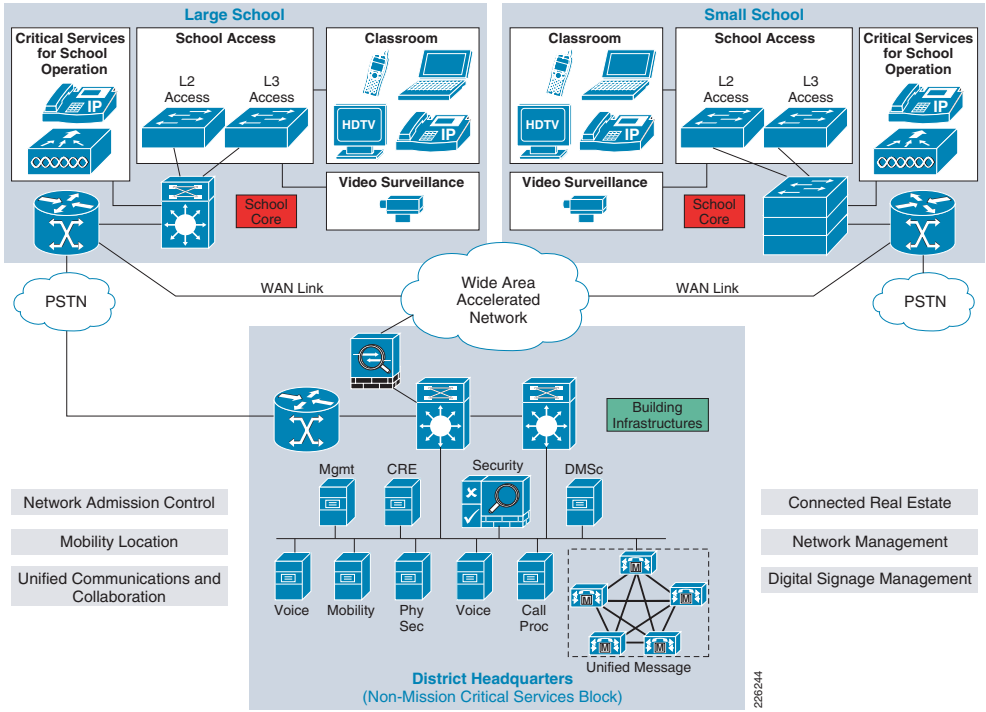
The Next Generation Network Architecture for Schools

The next generation network architecture for education environments must be built on a technical foundation that takes into consideration the current economic environment as well as other business factors impacting the education market as a whole. The fundamentals of this next generation network must:

- Allow many services to operate seamlessly over a common infrastructure
- Embed service recognition, awareness, and differentiation into all components
- Support different voice, video, and data services while ensuring availability, scalability, and security
- Adapt to network technical innovations that allow for better resiliency and the implementation of new services into the network
- Integrate these new services and technical innovations with existing network equipment, protocols, and methods of communication

Introducing the Cisco Service Ready Architecture for Schools

The Service Ready Architecture for Schools is a well designed and tested network architecture that is flexible, adaptive, and cost effective to support a wide range of educational services.



This architecture provides the ability to deliver all the services required in an enhanced learning environment, as well as the ability to collaborate with other schools, district headquarters, and entities outside the district. At the heart of the Service Ready Architecture for Schools is a robust routing and switching network.

Cisco's Service Ready Architecture for Schools Validated Designs

It is challenging to design architectures for the education environment that include technical innovations and services needed to support the classroom of the future, while also creating an excellent, safe, and secure learning environment.

Cisco is committed to making this next generation architecture a reality by providing proven, validated network designs to ease deployment of new services.

With each design, a deployment model is adopted that provides guidance on how to deploy services and technical innovations to accommodate the business and technical needs of the education environment. An architectural model for this environment is shown above.

Cisco's Service Ready Architecture for Schools adopts a mission-critical services model in which services (Unified Communications, Video Surveillance, Digital Media Systems, Mobility, and Security) are deployed and managed at the district headquarters, allowing each school to reduce the need for separate services operated and maintained by school personnel.

Because many of the services are centrally located within the district office, rather than within each school, high network availability must be maintained. However the architecture also employs the use of resilient application service features to maintain mission-critical services (such as IP Telephony, Safety and Security, etc.) within the school in the event of a network failure.

The service model of the Service Ready Architecture for Schools allows school districts to control costs, pool technical talent, and manage network services to offer a highly resilient, scalable, secure, and flexible network for the 21st century school.

Core Elements of the Cisco Service Ready Architecture for Schools

This architecture utilizes key technologies that address the safety and security, connected real estate, and multi-service requirements of the modern educational network. The architecture is constructed to allow these technologies to work seamlessly together.

- High Availability—The high availability technologies used in the Service Ready Architecture for Schools allow network equipment to mitigate the effects of unplanned link or network failures by using information about the typology of the infrastructure to immediately re-route network traffic, without having to re-learn (reconvert) the network. These technologies allow critical services such as voice and video to remain unaffected by network outages.
- Single-Fabric Multi-Service—This technology lets the network administrator have many different services or networks share the same infrastructure, yet maintain logically separate networks. As multiple services operate over a single infrastructure, it is important to manage traffic based on the service being used. In the education environment this is particularly important as schools struggle with allowing students to access the same network used for grading systems, security, and phone service.
- Differentiated Services—Certain network services demand more from the network than others. For example, voice communications do not work if parts of the conversation drop out. Video conferencing is not useful if the picture freezes. Additionally, a teacher using the network to enter grades should take precedence over a student surfing the Web. Finally, if traffic threatens to overwhelm the network, the network should be able to determine which traffic has priority. The ability to understand, mark, shape, and limit traffic is embedded into the Service Ready Architecture for Schools.
- Layer 2/Layer 3 Demarcation Benefits—Employing a hybrid access layer design allows the network administrator to leverage an existing Layer 2 network while giving them the flexibility to implement a routed access layer. Moving the Layer 2/Layer 3 demarcation point to the access switch allows the network administrator to prevent loops without multiple complex Layer 2 technologies, such as spanning tree protocol. Additionally, it provides high availability and eases network troubleshooting and management by leveraging well-known Layer 3 troubleshooting tools and technologies.

Services of the Cisco Service Ready Architecture for Schools

The adoption of IP technology has changed the learning environment. Networks are no longer used solely to provide data communication between computers. IP technology extends beyond the data network and is used extensively for voice and video. Services that are a part of the Service Ready Architecture for Schools include:

- Unified Communications (UC) includes many different forms of IP-based communications such as wired and wireless voice and video, voicemail and E-mail messaging, and instant messaging, all integrated together. There are additional features, such as Presence, which allow others to see if you are available or busy and how you want to communicate. UC fully integrates into emergency communications centers, as well as rich-media collaboration tools for Web and video conferencing.
- IP-Based Video Surveillance is a suite of products that allow a school to integrate new IP technologies into existing video surveillance systems to expand the reach of the video system beyond the operator's desk to anyone in the organization with network access. It also allows intelligence to be added to the video surveillance system using video analytics to alert officials when something occurs that violates pre-set rules, such as identifying someone loitering or leaving a package. The video content is stored on digital media that can reside locally at the school or within the district office and can be reviewed by anyone with appropriate network access.
- Digital Media Systems-Digital Signage is a centrally controlled system that allows schools to leverage existing networks to deliver video content to digital signs. These signs can be used to display simple content, such as the menu of the day, or act as information boards in the event of an emergency.
- Cisco's Mobility services include centrally controlled wireless access to the network for computers, phones, and other mobility devices that may be inside or outside of the school; they can also detect invalid wireless devices that may impact the network. Location-based services also allow schools to track the location of tagged school assets.
- Security includes traditional security services such as firewalls, remote access, E-mail, and Web content filtering, as well as intrusion detection and prevention systems. Additional security technologies address identity-based centralized network admission control with policy enforcement, guest access networks, mobility security, and the logical separation of network traffic.

  These security services overlay all other technologies to create a secure architecture to prevent unauthorized access or use of the network.

Summary

Cisco is committed to the education environment and understands the complex factors that impact the continual operation of critical network services. As the role of the network becomes more crucial to the operation of the school district due to the essential services that utilize it, it is important for an architecture to address this growing network complexity and criticality. The Cisco Validated Service Ready Architecture for Schools assists in the evolution of the education network; it addresses current network service requirements while building a foundation ready for the addition of future network services.

To learn more about the Service Ready Architecture for Schools, visit http://www.cisco.com/go/education.