Setting the Stage for Interactive Learning with Video and Voice

Cobb County School District utilizes borderless network to deliver advanced media services.

EXECUTIVE SUMMARY

Cobb County School District

- Education
- Marietta, GA
- 14,000 employees

Challenge

- Improve application performance, availability, and manageability while preparing for video and districtwide Unified Communications

Results

- Voice and video-ready network supports advanced learning and administrative applications, improves management, enhances teacher and parent communications, and helps control costs

Solution

- Scalable fiber-based borderless network features Cisco® end-to-end network with Cisco Catalyst® switches to deliver Gigabit Ethernet to every port, wireless connectivity, and an infrastructure ready to support enterprise Unified Communications

Challenge

As the second largest school system in Georgia, the Cobb County School District is responsible for educating more than 106,000 students in a diverse, constantly changing suburban environment. The district aims to provide an academically rigorous, caring, and safe educational environment in partnership with families, students. and the community.

Communication plays a critical role in Cobb County, supporting teachers, administrators, staff, and students and the communication between teachers and parents. However, as the Cobb County School District grew, its diverse network hampered the organization's ability to support faculty and staff. Campuses had copper cabling throughout, and required multiple wiring closets at every campus with each closet costing thousands of dollars. Some schools supported mobile services and wireless networking, while others did not. The network was composed of several different types of devices from different vendors, creating performance issues and management problems.

"The stability of the network, and confidence in its availability, were not where they needed to be," says Chris Ragsdale, chief technology officer at Cobb County School District. "We experienced constant slowdowns and network accessibility issues. And because of the large number of schools we had, we needed the ability to manage the entire district network from our central data center location."

This piecemeal network infrastructure was not only unstable and difficult to manage, but could not deliver the network performance to support demanding new applications that the district planned to deploy.

"Before we engaged in this infrastructure project, the greatest amount of speed we had to any workstation was 100Mbps," says Ragsdale. "We had 10Mbps and 100Mbps WAN links between the schools, and we did not have a network foundation layer that would support any type of high end applications like video teleconferencing or distance learning."

Cobb County needed a network solution that would enable it to improve the application performance and network availability at all of its school sites, to pave the way for rich voice and video applications. The solution would have to be easy to manage, and be able to scale to support future applications when the district's needs changed.

> “Having a standardized network environment makes our operations much easier and much more efficient. It is much more feasible to deliver Gigabit Ethernet to every wired workstation, knowing that all equipment from point to point will function properly when Gigabit speeds are utilized.”
>
> **— Chris Ragsdale, Chief Technology Officer, Cobb County School District**

Results

Cobb Country School District replaced its aging network with a fiber-based architecture featuring Cisco Catalyst switches. The new borderless network allows the district to deliver advanced performance and quality of service (QoS) to accommodate rich media applications, including voice over IP (VoIP) services.

“Our latest two schools that we have built provide intercom and VoIP services, all converging over the network,” says Ragsdale. “Administrators can now have private, direct conversations into the classroom, for public safety issues and other situations. And as we prepare to deploy VoIP on a districtwide basis, we expect to see major savings in toll charges by using the network for extension dialing. Currently, an in-district phone conversation will occupy two standard telephone lines. With VoIP, that same conversation will occupy no standard phone lines and will allow more access for parents and the community.”

“The superior bandwidth and management of the network enable our video and voice applications to function as they need to,” he adds. “You don’t have to worry about a compression rate, and what types of issues the compression will throw into it. If you have the bandwidth, being able to run voice applications uncompressed makes it much more beneficial.”

Migrating to a fiber-based architecture is also enabling the district to streamline its operations, so it can save money on equipment at every campus.

“Running fiber to each classroom enabled us to eliminate 100 percent of our intermediate wiring closets, allowing us to have only one Main Distribution Facility (MDF) per school,” says Ragsdale. “That is one of the huge cost savings of this type of network. Surprisingly, the fiber-based solution is actually less expensive than a copper environment on a per-drop basis.”

With its new network in place, Cobb County is also able to enhance its data warehouse performance, to improve decision-making and save money on critical administrative applications.

“The new infrastructure lets us leverage our data warehouse much more than we have in the past, to provide data for real-time decision-making to our schools, whether it’s principals, teachers, or central office administrators,” says Ragsdale. “In one instance we were able to replace a $375,000 software licensing line item in our budget, because we can support that application in-house. We now have the network infrastructure to allow that type of creation of applications to take place.”

The life expectancy of the new fiber-based architecture is expected to be much longer than the district’s previous network, which will provide additional budget savings over the long term.

“We were impressed by the sustainability of the cable,” says Ragsdale. “For 25 years, this cable is under warranty. And with only one cable per classroom, if we have a fiber cut or damaged, we can simply re-pull the drop using our internal team of four people.”

Improving network administration was a key objective of the network upgrade, so the District deployed the CiscoWorks LAN Management Solution (LMS), which offers centralized management to simplify configuration, administration, monitoring, and troubleshooting.

“Having the new network infrastructure in place lets us manage our network from a single point,” says Ragsdale. “We no longer have to have someone go to every single workstation each time we need to push out application updates, snapshots, new drivers, and so on. We are able to do that now from a central location.”

Solution

Ragsdale and his team deployed a complete network solution for the entire school district, based on Cisco Catalyst 6509 Series Switches in the MDF and Catalyst 2960 Compact Switches in the classroom. The intelligent Catalyst 6509 Series is a versatile device that addresses the requirements of a borderless network. It delivers the high level of available bandwidth needed to deliver video traffic, as well as hardware-accelerated QoS policies and queuing methodologies. The switch also supports end-to-end network virtualization to provide traffic isolation at Layer 2 and Layer 3. Its modular architecture offers flexible design options, and enables Cobb County to upgrade its network to a fiber-based backbone.

“The fiber-based infrastructure was a non-negotiable requirement for us,” says Ragsdale. “The backbone switch at every school is a Cisco Catalyst 6509, and the blades in those backbone switches are fiber. We do have one copper RJ-45 module installed as well for servers and various other connections.”

Each multimode fiber backbone switch connects to Cisco Catalyst 2960 Compact Switches that reside in each classroom. These fixed-configuration, standalone switches provide high-speed connectivity to on-campus workstations. Designed for demanding applications, they can support hardware-based QoS with no performance degradation.

“The Cisco Catalyst 2960 Compact Switches in the classroom take fiber in and give me seven ports of copper,” says Ragsdale. “So I can still utilize inexpensive copper patch cables and integrated copper NICs in the workstations, and have a fiber backbone going back to the single MDF.”

To enable faculty and staff to connect and enjoy flexible wireless networking on campus, Ragsdale and his team utilize Cisco Aironet Wireless Access Points and Controllers.

“We provide each of our teachers with a laptop equipped with wireless access,” says Ragsdale. “Instructors utilize them every day for applications like the electronic grade book, which allows teachers to enter grade and attendance information in real time. They can also use their wireless laptops for e-mail—a critical form of communication between teachers and parents.”

With its most important applications running over the network, Cobb County needs to be sure that its infrastructure remains up and running smoothly. The district safeguards its network with Cisco SMARTnet® services, which provide around-the-clock, global access to the Cisco Technical Assistance Center, rapid hardware replacement, and extensive online support resources. Standardizing to a Cisco environment has also enabled the district to stock spare parts for quick replacement in the event of a device failure.

“We keep an entire populated switch chassis on hand, and if we need a blade, power supply or another component, we have simple and quick access, which helps minimize downtime for the schools,” says Ragsdale.

Next Steps

As deployment of the new network architecture nears completion, Cobb County is rapidly taking steps to take advantage of new rich media applications that would have been impossible just a few months ago.

“We are in the process of testing streaming video,” says Ragsdale. “As part of our 21st Century Classroom project, we are considering running educational video programming from our local cable company over the network, to an overhead projector in every classroom in the district.”

Cobb County is also planning to use videoconferencing to extend access to its staff training programs, while saving time and money on travel.

“We can use streaming video to deliver pre-recorded professional development content via the network, as well as live classes with an instructor broadcasting from one location,” says Ragsdale.

With the superior bandwidth and performance provided by the new network infrastructure, Ragsdale is confident that the network will be able to deliver the performance that Cobb County needs, well into the future.

“Having a standardized network environment makes our operations much easier and much more efficient. It is much more feasible to deliver Gigabit Ethernet to every wired workstation, knowing that all equipment from point to point will function properly when Gigabit speeds are utilized.”

For More Information

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