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TECH TRENDS

10G Ethernet Explosion

With streaming video, VoIP and other bandwidth-intensive applications becoming commonplace, schools are looking to upgrade their networks.

By Karen D. Schwartz

A decade ago, Calhoun County Independent School District had a state-of-the-art network that served its students and faculty well. At the time, the 1G Ethernet network provided enough bandwidth and power to manage the district's eight schools in Port Lavaca, Texas.

But over time, the district's needs changed. By 2009, the network was limping along. Like most school districts today, Calhoun County ISD needed to support more bandwidth-hungry applications — everything from streaming video in the classroom to the state-mandated tests that students take online.

The options were clear: either add a few 1G modules and aggregate them or upgrade to 10G in one decisive push. Because the district had also planned a major data center overhaul, Marcus Martinez, Calhoun's technology coordinator, decided to go for it.

"By moving to 10G, we are really positioning ourselves for the future," Martinez says, noting the school district's increasing use of high-end video and web-based applications. "We wanted to build a solid infrastructure for a future deployment of VoIP, and this gives us the basis to do that."

Technology Coordinator Marcus Martinez rolled out 10G Ethernet switches to position Calhoun County Independent School District for the future.

Photo: Mark Greenberg

Network Makeover

Last year, in concert with its overhaul that centralized the school district's data center, Calhoun County ISD moved from a decade-old network to a 10G network comprising two HP ProCurve 5406 chassis with 10G blades at the two largest schools, along with one HP ProCurve 3500yl edge switch at each of the six other schools. The two 5406 chassis are connected via single-mode fiber with an HP ProCurve 10G X2-CX4 transceiver at each end. The edge switches connect to the central location via single-mode fiber and tie into the chassis.

Martinez says that since the upgrade started, he has noticed a significant increase in speed; once it is complete later this year, he expects even more speed gains. This will pave the way for another big project: the addition of an HP ProCurve MSM765zl Mobility Controller and wireless access points, which will create hotspots on all campuses for better administration of state-mandated online testing for students.

70% to 90%
The forecasted rate of growth for 10G Ethernet switch ports through 2013
Source: Infonetics Research

Calhoun County ISD's move to 10G was a smart decision, given the trajectory of the technology and the price point, says Robin Layland of Layland Consulting.

"10G has come down in cost enough that it makes more sense than adding gigabytes one at a time," he says. "And the world is moving to 10G, so it makes sense to move in that direction."

Other school districts are doing the same thing for many of the same reasons. On the other side of Texas, the IT staff at Tornillo Independent School District replaced an aging 1G network with a more modern, easier-to-manage 10G network.

The district, which has five schools, moved to a D-Link-based 10G network in 2006, consisting of a DXS-3350SR 48-port

stackable switch with four combo ports, dual 10G stacking ports and uplink modules.

"Our older network was really starting to show its age," says Carlos Garcia, the school district's technology coordinator. "We were moving to more and more web-based teaching tools, and students were experiencing a lot of problems with wait times."

Along with these network problems, the IT staff knew the school district would be adopting more bandwidth-intensive applications over time, including many with streaming video. These factors, plus plans to install IP-based security cameras and move to VoIP, made moving to a faster network attractive.

Because the school district had already applied for E-rate funding (federal funds that enable eligible schools to purchase modern telecommunications and information services), the timing was right for an upgrade.

Among other infrastructure projects, the district has installed nearly 100 AXIS 210 and 207 network surveillance cameras and adopted more digital media in the classroom, and the system continues to improve. This year, the district plans to upgrade its D-Link access points to the DGS-3650 48-port stackable L3 switches with two 10G slots each to continue improving speed and manageability.

The Tornillo district placed second in the National School Boards Association's Center for Digital Education survey, which examines how IT is applied in schools. "A lot of what we've been able to accomplish can be attributed to our 10G network," Garcia says.

Faster and Better

Even smaller schools have moved to 10G networks. Kings Ridge Christian School, a K–12 school in Alpharetta, Ga., with about 650 students, deployed a trunked, redundant 10G Ethernet network three years ago when it moved to its new location. The three buildings on the campus are connected by a series of Brocade switches, anchored by two of Brocade's FastIron SuperX 10G-capable switches and five FastIron edge switches.

The school is making headway toward its goal of being at the forefront of K–12 technology. It is completely wireless, and its students and teachers use Windows-based tablet computers in the classroom. It also has an array of web-based applications and streaming video that require significant bandwidth, which the 10G network provides.

"We have almost doubled the bandwidth we're using internally on campus from last year to this year, so having that 10G backbone is extremely important to us," says Douglas Whitley, director of technology for the school.

All of this begs the question: With bandwidth use at schools going nowhere but up, is 10G Ethernet enough? After all, 40G and even 100G will be widely available in a few years.

A 10G deployment is plenty, consultant Layland says. "The standards for 40G and 100G aren't even hammered out yet. And once they are, those technologies will be extremely expensive for a few years," he continues. "10 is the right move for now."

Biggest Bandwidth Hogs

No longer do students rely on a brick-and-mortar library and pencil-and-paper exercises to learn. They now tap an array of bandwidth-hungry applications that are prompting many schools to move to 10G Ethernet. Some of the biggest resource drains on networks include:

- Streaming video, interactive video conferencing and multimedia applications that make learning more relevant;
- Voice over IP, which uses the Internet instead of standard phone lines for voice communication;
- Distance learning, which allows students who live far away or are too ill to attend school to connect to classes and resources;
- Graphics- and bandwidth-intensive applications, such as Adobe Photoshop and Macromedia Studio MX suite, CorelDRAW Graphics Suite and Autodesk AutoCAD computer-aided design;
- Online test-taking, assessment and secure data submission.

Photo: DigitaZoo/Corbis/Jupiter Images