

## Lesson Plan for IP Communications

**What started as a security measure became a valuable time-saving tool. Frederick County Public Schools use Cisco IP Phones to take attendance via PhoneTop™, an Extensible Markup Language (XML) IP Phone service developed by AAC Associates, Inc. With PhoneTop, schools are improving accuracy and saving one hour of administration time every day. Even the least technically inclined teachers find PhoneTop easy to use. Soon they'll be using it to issue hall passes and detention slips.**

### Background

Frederick County Public Schools in Virginia includes 10 elementary schools, three middle schools, two high schools, two special education facilities, and a career and technical facility serving approximately 11,000 students. A third high school is under construction, and an administrative building houses support staff and superintendent offices. Frederick County PS seeks to provide the highest quality, most cost-effective education possible through fruitful parent-teacher-student relationships, meaningful staff and teacher training, periodic assessments and evaluations for improvement, and the strategic use of technology for administration and teaching.

Like most public school districts, Frederick County PS makes every dollar count. Five years ago, it began a project in partnership with Adelphia Cable Communications, which built and services the wide-area network (WAN) between all 21 sites. Network Virginia, a service provider, delivers Internet access. Each site is fully wired for Ethernet with Category-5 cabling. Each classroom has at least one personal computer with Internet access. Every school

has its own Private Branch Exchange (PBX) telephone system or key exchange system, maintained under contract by a number of traditional telephony vendors.

### Challenges

Two watershed events began Frederick County's journey toward IP Communications and the advantages of converged networking. The first was a snowstorm during the winter of 2000. The morning school buses had delivered some children to school and others were in transit when the administration cancelled school for a snow day. Parents called schools to find their children, and the phones were so overtaxed that most parents got a busy signal. Worst of all, the administrators at the central office could not talk to some schools. Yet the data WAN between schools remained online during the storm.

The second event was the state-mandated security audit in 1999, which revealed that four Frederick County schools had no telephones—or any form of voice communication—from classrooms to the office. This situation posed a security concern should a teacher require immediate assistance.



The administrators discussed installing a bidirectional public address (PA) system. “They were ready to run twisted pair for a two-way speaker to every classroom, but we already had Category-5 Ethernet wiring in all the buildings,” says Robert Yost, director of Information Technology for Frederick County Public Schools. Instead, IT proposed that Frederick County PS deploy an IP Communications solution, which would take advantage of existing Ethernet wiring to save both time and money.

Since Frederick County PS already had a network based on Cisco AVVID (Architecture for Voice, Video and Integrated Data), Cisco IP Communications would be a natural addition to their existing infrastructure. While the initial proposal only had emergency communications in mind, it soon became clear that an IP Communications system enables innovative communication tools through the use of unified communications and IP Phone Services based on XML. XML is a Web technology that uses XML data tags for phone content processing. IP Communications also offers the simplicity of managing one converged data, voice, and video network instead of separate networks.

AAC Associates, a systems integrator certified with a Cisco IP Telephony Specialization, won the IP Telephony installation by proposing the development of PhoneTop, an XML IP Phone service that takes attendance, creating hall passes and detention slips, and other functionality all using Cisco IP Phones.

#### Solution

The Cisco network at Frederick County PS spans 21 sites. The data center at the administrative office has a Cisco Catalyst 4006 Switch that acts as a collapsed backbone. Internet access is provided by Network Virginia via a DS3 line into a Cisco 3750 Router. Adelphia Cable operates a Gigabit Ethernet/Fast Ethernet cable WAN through Cisco Catalyst 3550 Switches to all but one of the schools. Each school has its own Cisco Catalyst 3524 or 2924 switch in the wiring closet with 10-Mbps Ethernet to every desktop. AAC assisted Frederick County IT with installation at the first four sites; Frederick County did its own installation at two additional sites.





## XML IP Phone Services

The PhoneTop application allows faculty members to conduct a number of administrative functions. It provides an interface to the enrollment data in the existing student management system at the central administrative office. Based on an IBM Domino database engine, the application interoperates with the schools' existing IBM AS/400 server, and can operate atop any operating system such as Linux or Windows NT 2000. For cost purposes, Frederick County PS initially purchased Cisco 7910 IP Phones. To support PhoneTop deployment, it is upgrading to Cisco 7940 or 7960 models, which have an integrated LCD screen.

"The PhoneTop application is very customizable," says Doug Bowlds, vice president of Convergence Technologies at AAC Associates. "Every school takes attendance differently." Currently, Frederick County PS is using just the classroom attendance management feature, but the application can also issue hall passes, track and locate students and teachers, reserve audiovisual equipment and conference/special use rooms, post daily bulletins, events calendar, lunch menu and bus schedule, provide visitor control, support a functional phone book, provide directions to a school, and even poll users for feedback.

PhoneTop not only eases routine administrative duties, it provides additional security. It allows teachers to take attendance every period, not just once a day. Missing students whose parents have not reported them absent are identified automatically by cross checking attendance reports with the list of known absentees. An automatic dialer helps administrators contact parents and verify that a student is absent. "It cuts time over the paper methods. Now we can call parents one hour earlier," says Yost. Another security feature will be support for digital photographs to help teachers identify students, staff, and visitors.

Frederick County PS chose to deploy an attendance application on the phone instead of the classroom PC for two reasons. First, it takes an average of 90 seconds to log onto the network from a PC, while access from the phone is virtually instantaneous. Second, the phone is more secure than the PC, requiring a teacher password to access PhoneTop. "Teachers tend to log onto the network from the PC and then walk away," says Yost.

PhoneTop underwent pilot testing in June 2001 at one school. Based on user feedback, it was refined and rolled out at that school by the first day of school in August. PhoneTop will be rolled out to two more IP telephony-enabled sites by January 2003. The other IP telephony schools (including the new high school) will have PhoneTop at the start of the 2003–2004 school year. As teachers grow familiar with the attendance feature, the schools will enable additional functions such as hall passes and detention slips. Even the most "techno-phobic" teachers find PhoneTop easy to use. AAC will use the PhoneTop survey feature to gather feedback for further refinements and new features.

## Results

PhoneTop won two prestigious awards at the highly competitive, *Second Annual Innovation through Convergence Expo* in Dallas, Texas, sponsored by Cisco. These awards are:

- 2002 Best of Class Award for Developing an XML Phone Services Application for the Vertical Market K-12 Education
- 2002 Best of Class Award for Developing an XML Phone Services Application in the Category of Employee Satisfaction

Cisco IP Communications will eventually enable Frederick County PS to eliminate its older PBX and key systems in favor of a single, converged network that supports data, voice, and video that is easier to manage than separate networks. Because the IT staff manages Cisco CallManager, Frederick County PS can end its expensive

telephony maintenance contracts as it phases out its legacy phone systems. Every room in the new high school under construction will have Cisco IP Phones when it opens in Fall 2003.

But the real payoff is time saved over manual processes.

Administrative office staff no longer has to manually enter attendance data into their database. Last year, it used to take one secretary three hours each morning to process attendance reports by hand. Now it only takes one hour, gaining two hours worth of additional productivity each day. PhoneTop does most of the job by 8:15 am. This enhances security and frees valuable secretarial resources for other duties. More time savings occurs with a direct connection between the attendance database and an automatic dialer to notify parents and verify absences.



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