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Three for the Price of One

How Schenectady City School District Installed a New High-Speed Data Network, and Got a Phone System and Video for Free

It seems every school in the country is in a mad dash to upgrade its computing facilities-- the government, parents, teachers-- and of course, the children-- demand the best, they argue, to keep our kids competitive. But all these computer and network upgrades carry a hefty price tag. Schenectady City School District in Schenectady, New York found a way to give its schools the best data network possible while getting a powerful new phone system at the same time. With the new network in place, Schenectady has excess capacity and an easily expandable phone system that will last them well into the middle of the 21st century.

Schenectady, like most K-12 districts, had little in the way of data network infrastructure when it began to research its system upgrade. Individual computer classrooms or labs existed. Some of the administration buildings had small local area networks. Few of the buildings were connected in a network. The district knew they'd need to do two things with the upgrade: First, wire every classroom and office with a good, high-capacity network, and second, wire all of Schenectady's schools and administration buildings together.

"We had to make sure, as long as we were investing in this kind of an upgrade, that we would have a system that could handle growth," said John Falco, assistant superintendent. "Internet access, video instruction, computer graphics and animation will all put a strain on the system. This upgrade had to allow for added capacity and future network uses."

The network integrator selected to handle the district-wide network installation was New England Systems, a firm that specializes in K-12 computer networks. "The educational demands are a large aspect of any installation such as this," said Brian Hogan, president of New England Systems. "But the business aspects of the district must also be addressed. Schenectady needed to insure that its network would have ample capacity and security for both purposes."

New England Systems recommended that Schenectady install a widely used network technology called ATM, short for asynchronous transfer mode. Two factors led to installing this technology: it was fast enough to handle all type of data-- from simple email to full motion video, and it allowed Schenectady to add a new phone system, connecting all the schools and buildings, at the same time, on the same network.

"ATM, at a much higher density, is the technology used by the major phone companies to carry phone, data and even video traffic," explained Mr. Falco. "It has the capacity we needed to insure we'd have a network that we wouldn't easily outgrow.

Adding phones

Schenectady had been paying nearly $40 per month plus usage charges on a per phone basis at the school. This is typical of Centrex services for school districts. "When you're spread among 17 buildings, as we are, the only way to get phone services-- until now-- was either to buy expensive PBX systems

for each location or to rent Centrex from the telephone company. Then we found out about Sphere Communications," said Mr. Falco.

“Sphericall is based on mature, industry-wide standards,” said Kurt Jacobs, product manager at Sphere. “Its network architecture makes it an economical, flexible and easy-to-expand phone system that does not suffer from the hardware growth limitations of conventional PBXs or the ongoing operational costs of Centrex lines.”

Sphere Communications offers an ATM-based phone system that uses the phone company quality of the ATM network to carry voice traffic. In essence, Schenectady would use the same set of wires to carry Internet, business data and voice traffic, saving thousands on just the cabling alone. Another key benefit of the Sphere system was the ability to own and expand the system, as the district wanted. The average per-seat purchase cost was only about $600--after which the district owned the entire system. "Upgrades are as simple as adding another network computer on the system," explained Mr. Hogan. Simple off-the-shelf phones from any electronics store plug right into the Sphere system. The system also gives users connected to the network powerful computer-telephony capabilities. "You can control the phone on your desk with a simple computer program on your desktop computer," explained Hogan. "For example, when a call comes in, the system will pop up a window on your computer giving you the caller ID and a simple directory structure. You can drag the incoming call to another extension or to your voice mailbox if you don't wish to take that call."

The system has many other computer-powered features, and according to Mr. Falco will be a great productivity enhancement for the administrative staff in the district. "And added to that, the system allows every teacher to have a phone on his or her desk with individual extensions and special access codes to prevent unauthorized use. This will make it much easier for parent-teacher and teacher-to-teacher communication."

Video Ready

Schenectady's classrooms are also video ready, thanks to ATM. The high-speed network makes carrying video as simple as adding a software application. "Here again, if we'd taken a less capable computer network approach, we'd have to go back and add TV cabling as well, which would increase the upgrade cost." With the ATM network, just as with the Sphere phone system, Schenectady gets video capability "thrown in." "And traditional TV cabling wouldn't give us the capability to do video conferencing," added Mr. Falco. “That’s a prime advantage of using ATM networks for both schools and in many leading businesses today.”

The Schenectady System

All 17 of Schenectady school district buildings are connected by a large (622 MBPS) ATM ring of fiber optic cable, rented and installed by the local cable provider, TCI Cable. The district's main administration building holds the vast majority of the network's computer file servers, making management more efficient. The network servers run Microsoft Windows and host the phone system, Internet access, education applications as well as the district's business applications. "The key to keeping long-term maintenance costs down is centralizing the management," added Hogan. “Each specific task has its own server right now. For example, Internet access is confined to an Internet server. Here again, isolating tasks to individual servers will help in long-term maintenance and trouble-shooting. “

Schenectady, once its entire upgrade is finished, will have over 1,000 phones, 3,000 client PCs and over 30 file servers installed. Every classroom will have computer, phone and video connections, all from the same base network.

eRate to the Rescue
As if the cost savings gained by combing voice, video and data on one network weren't enough, Schenectady was able to apply for government funding under the eRate plan. The network-- phone system and all-- complies with the guidelines and received funding.
The Sphere system and entire ATM infrastructure also offer the best data/voice transport for the money, allowing for easy future expansion of the system.

"By leveraging the huge capacity and quality of ATM, we're able to deliver more, for less," said Brian Hogan. "And the system will handle the traffic with ease. Adding more phones and more PCs will be an incremental cost-- not a costly overhaul."

So there is such a thing as a free lunch-- or at least "nearly" free video or phone systems -- if you tackle computer system upgrades the right way.

Project Update

The case study above was originally published by both Marconi and Sphere Communications just a year after the beginning of the Schenectady Project. But the real test of any telecommunications system is how it performs over its' lifespan.

Over 8 years since the project began, Schenectady is still utilizing the same systems as originally deployed. The original ATM backbone is still in place, guaranteeing clear calls while students view bandwidth intensive streaming video. Schenectady schools had the foresight to install a system which grew with their needs, avoiding a costly network overhaul.

All of the original Sphere components are still in place and newer versions of software have enabled IP phones and a host of other features. The Sphere system is primarily a software based system. As the system grew, Schenectady was able to simply upgrade to newer versions of Sphericall software on their own standard PC servers rather than replacing expensive proprietary PBX devices.

Schenectady also produces its own television programming, which is broadcast to the community across the local cable television network. The entire production is recorded, edited and produced and finally transmitted utilizing the district's network and server infrastructure.

Utilizing Vbrick systems products, up to 12 channels of live video, as well as a virtually unlimited quantity of stored video is available to students and staff at any time.

"Good, cheap, or quick" goes the adage, "pick any two". With proper planning and budgeting, Schenectady Schools got all three.