

Two VOIP Case Studies from - Internet Telephony Magazine, 2006 -- edited in Jan 2007 by J. Scott

First Case Study, Nevada's Clark County

Nevada's Clark County School District (CCSD) is implementing one of the world's largest IP-PBX networks, which is designed to serve more than 27,000 faculty and administrators. This sixth largest and one of the fastest growing school systems in the United States serves nearly 268,000 students in 289 schools in the fast growing Las Vegas metropolitan area.

To have this many VOIP phones requires a tremendous amount of bandwidth. CCSD has a 1 Gigabit connection to the internet. At approximately 80K bps, this line would provide the bandwidth for 12,000 simultaneous VOIP calls. Besides the bandwidth, CCSD needed large scale systems to handle the VOIP to PSTN translations. Thus CCSD needed a vendor with proven reliability and the heavy duty environment and support to handle this call volume.

The Challenge

CCSD had several objectives, including providing a telephone in every classroom to enhance parent-teacher communication and school safety. They also wanted to leverage the existing Gigabit Ethernet wide area network (WAN) to reduce operational costs.

They wanted to increase the reliability of the network and ease administration by standardizing on an Internet Protocol (IP)-based phone system that supported digital telephony. Like many VOIP adopters, CCSD wanted to provide to their administrators, teachers, and students VOIP capabilities that are harder to get in traditional PBX/PSTN solutions.

The Solution

Verizon, an Alcatel Business Partner, assisted in the initial Alcatel OmniPCX Enterprise IP phone system installations for CCSD that will connect every classroom and administrator.

The first phase of the installation included installation in 56 schools, with an additional two to three schools being added to the phone network each week — making it one of the largest deployments of a private IP voice network in the world.

The OmniPCX Enterprise offers CCSD the flexibility it was seeking by supporting both digital and IP telephones and by providing a full feature set across networked environments. Verizon has overseen the project management and delivery of the equipment and provided the school with onsite technical expertise.

The Result

Clark County, like many other large school districts, chose to adopt VoIP because it reduces telecom costs and network management by combining voice and data networks. By leveraging the Gigabit Ethernet WAN, the district can save approximately \$1–2 million per year over expanding the phone system with Centrex.

“In fact, after the initial installation, with 56 schools up and running, the district dropped over 600 Centrex lines, saving approximately \$10,000 per month,” said Dr. Philip Brody, chief technology officer, Clark County School District, noting that, “Even though we’re tripling the number of phones, we’re significantly reducing the number of lines.”

Not only does it save them money, a few features quickly endeared the new system to users and administrators. “The teachers really like the phones in the classrooms,” according to Dr. Brody. “From a management point of view, we can do so much more remotely; we don’t always have to go out in the truck to fix things. We are also able to block calls coming into the classroom during school hours, which is a really nice feature that we can do centrally.”

Reliability and management have also been improved by networking all schools and district facilities via IP trunking on a meshed topology with redundant paths, creating a virtual telephone system with no single point of failure.

They designed their VOIP network for high reliability and it incorporates multiple backups so there is no disruption in voice services.

Using the Alcatel OmniVista 4760 network management solution, CCSD's technical team manages the VoIP network in real time from a central location. This allows them to control limited IT resources and reduce travel time.

Technicians now perform routine tasks such as moves, adds, and changes autonomously, instead of relying on external service providers.

Why Alcatel?

Alcatel was chosen because an Alcatel OmniPCX Enterprise hybrid solution offered CCSD operational savings, which was determined by a comparative ROI study by St. Louis-based Dietrich Lockard Group.

The consulting group examined five possible solutions:

- To keep growing its existing telephone system, which is a combination of PBX switches and key systems
- A Centrex-based system
- Conventional PBXs
- A pure IP system
- A hybrid system that does both conventional and IP

The last three solutions offered increased functionalities and reduced costs as a result of operating as a distributed network over the WAN. Alcatel was chosen because of its capability to support digital and IP phones, its ability to provide a full feature set over the WAN, and scalability to 400 sites.

“After reviewing these proposals, it became apparent that the Alcatel OmniPCX Enterprise was the best suited to provide the district with consistent management across all 300 locations without expensive wiring upgrades,” said Dr. Brody. “Alcatel’s dual IP/TDM architecture gives us the flexibility to deploy digital handsets in schools that already possess the cabling infrastructure to support digital phones, and deploy IP handsets where it makes most sense.”

Future Plans

The Alcatel OmniPCX Enterprise’s highly scalable architecture — the plan was to incorporate an additional; 1,500 faculty members quickly, and then expand the system to another 97 schools within a decade.

According to Dr. Brody, the district will eventually have approximately 25,000 phones. He adds that his staff plans to implement a lot of safety features that weren’t available before, including the panic button and enhanced 911, “which lets police know where in the building you’re calling from.”

Second Case Study: Tift County, GA Schools -- 2006

Tift County Schools, the board of education that serves Tifton, GA, has approximately 7,500 students that attend its 12 schools.

When the Board was considering upgrading a failing 1988 phone system, representatives approached Mitel, hoping to hear something other than, "Sorry, but you're out of luck."

The system Tift County was trying to replace consisted of 14 disparate key systems, at a monthly cost of \$3,848 for the 179 phone lines — the high school's service alone cost \$900 monthly. What's more, the service was split between two long distance carriers.

In addition to cost, which clearly was a driving motivation, the functionality of the aging system left much to be desired.

The features they had were typical of the smaller key systems installed during the 1980's. For example, transferring calls between schools was not possible with the system. An attendant was required to answer calls from both the public as well as internal staff, including other schools and the Board of Education. There was no voicemail. There was no outgoing message capability to allow for relaying information to the public regarding hours, closings, and other various announcements.

These missing features and many more are available today in most IP-PBX systems, such as the many asterisk derivatives. Even the current public domain Trixbox solutions provide all these features and many more, and the fonality.com PBXTRA system provides many more options

than those which were plaguing Tift County's beleaguered phone users.

At first, the Tift County group thought that their demands seemed to be difficult for a vendor to achieve, and yet, they were hoping for something better. They approached Mitel, and to their delight, Mitel came back with a positive response.

To Mitel, the answer was clear: The Mitel 3300 IP Communications Platform (ICP) with embedded standard unified messaging, auto-attendant, automatic call distribution (ACD) and wireless, along with more than 200 IP phones located across the district with convenient four-digit dialing would result in considerable cost savings for the school system. The 3300 ICP is a sound investment for the future, as well, since it is scalable up to 60,000 users.

Once the Tift County board found a hardware vendor, they needed to secure the IP bandwidth to carry the VOIP calls they were planning on making. To get a conservative estimate, they already knew they had 179 existing lines. Since a typical VOIP call using the G.711 codec takes approximately 80 kbps, assuming 40% utilization at peak times, they would need $179 \times .40 \times 80 \text{ kbps}$ or about 5.7 Mbps to support the VOIP needs. Thus they needed to do was to contract a local provider to get the bandwidth necessary for both the VOIP and data lines they needed.

"The board entered into a Local Service Agreement with a local carrier to provide our local service for both the VoIP PRI's and any analog fax lines we had left in place," said Tucker. "We now have a monthly BellSouth Local Service bill for our two Centrex PRI's for VoIP and the 39 analog

Centrex fax lines of \$2,600 per month. That's \$2,100 per month in savings, or \$25,200 per year. Since all of these charges are E-rate eligible, beginning in July 2006, Tift gets an 80 percent discount to the telecommunication charges. The results will be a \$520 per month Local Service or \$6,240 per year. Altogether, that's \$4,180 per month, or \$50,160 per year savings."

The cost savings, which can be labeled as significant, at the very least, will allow Tift County to recover its initial investment in less than three years, and ongoing annual savings can be used in places it is most needed — to continue to improve the students' learning environment.

Conclusions from Clarke County and Tift County

Replacing old telephony lines with modern IP solutions can do more than save money for school systems. IP solutions put cutting edge technology in the hands of the students, teachers, and parents, enabling an enhanced learning environment and increasing school safety. Enhancing school safety can be as simple as a phone in every classroom, so that response times during emergencies can be improved through school-wide, groups of schools or district-wide broadcast messaging by phone, e-mail, and paging.

These two case studies show that when school systems, such as Tift County in Georgia and Clarke County in Nevada, have implemented well thought out IP telephony systems and have realized significant cost savings. They have also implemented new telecommunications standards that distinguish them from their neighboring school systems.