McDonogh School brings its voice communications into the next generation with an advanced VoIP system.

While many K-12 schools have struggled to find the budget and technical expertise needed to implement cutting-edge data networks, McDonogh School, a private institution with 1,299 day and boarding students in Owings Mills, Md., has long been ahead of the digital curve.

The 141-year-old institution has a robust wired Cisco fiber optic network that provides up to 10-gigabit data speeds within and between the school’s 20-plus buildings, and an 802.11 Wi-Fi network provides broad coverage throughout the 800-acre campus, including outdoor areas like student quads and playgrounds.

Unfortunately, when it came to the more traditional and considerably less complicated area of telephone communications, McDonogh’s technological edge came up short — and was negatively impacting campus life.

In the late 1990s, officials had invested in a used analog private branch exchange (PBX) telephone system, which promised better and more sophisticated calling features, such as automated connections to internal extensions.

That investment, says John W. “Jack” Hardcastle, director of technology and a McDonogh alumnus, has enabled the school to put mobile learning devices in the hands of all students and create digital classrooms.

“The ease of use and the reliability of our new telephone system is hard to overstate,” says Hardcastle. “We don’t get folks calling us anymore saying, ‘I’m having problems using my phone or I’ve lost voicemails.’ It’s easy to use and easy to manage. Everyone loves it.”

That includes Virginia Olcerst, assistant to headmaster Charles Britton and a 16-year employee at McDonogh. “One of the real advantages is that I can do almost all of my dialing and transferring and other tasks from my computer screen — it’s point and click,” she says. “Plus, the system saves the call history, so if a message is ever misplaced or someone miswrites a phone number, we can go back and find that number. It’s made organization and communication just a little bit easier.”

The solution? Leverage the cutting-edge network investments they’d already made to bring their telephone system into the 21st century. Last summer, McDonogh’s technology team replaced the old PBX with a campus-wide Voice Over Internet Protocol (VoIP) system from ShoreTel. With this, all voice communication runs over the school’s lightning-fast Cisco data network, and the telephony service is completely managed and maintained by the school’s four-person IT team.

“In addition, because it is digital, the voice system can be integrated with different parts of the school’s information systems. “Every time we had a lightning storm, the system would go down and we wouldn’t be able to make or receive calls until we got our repair guy out here to fix it,” explains Hardcastle, who recalls that on more than one occasion the campus was without any phone service for several days. “And it was all essentially because the system had become obsolete and was also running over some very old copper wiring.”

The new system worked just fine — except when it didn’t, which in recent years happened to be so often that the school had to put a local telephone repair contractor on annual retainer.

McDonogh’s technology team knew they wanted a voice system that would be highly reliable, easy to manage and within their budget. They also wanted to gain unified voicemail capabilities, which would automatically forward voicemail messages to users’ email accounts.

Unified voicemail is just one product of many that can be obtained within a more robust unified communications (UC) platform. UC runs over a VoIP network but is also able to integrate voice and email with other real-time digital communication services, such as video conferencing, instant messaging, presence, call control and speech recognition, to provide a consistent user interface and experience across different applications and different devices.

To ensure that they got exactly what they wanted, but didn’t end up paying...
for advanced UC extras that they had no intention of ever using, McDonogh officials enlisted the help of CDW-G, which has strong relationships with all the major providers within the VoIP industry.

“When we gave CDW-G our list of requirements, they were able to narrow the list from 15 to four companies and really helped us navigate the different technologies and the different terminologies that the providers use for the same features, so we could compare apples to apples,” Hardcastle explains. “CDW-G really came through for us on getting exactly the feature list that we needed.”

CDW-G soon set up demonstrations with the different vendors so Hardcastle’s team could get a hands-on view of the different solutions in action. “We put everything to the test,” Hardcastle recalls. “We were able to put our hands on the phone, pick them up, practice making calls, practice transferring calls. We also spent a lot of time looking at the infrastructure behind the phone system.”

Building Out Redundancy

In the end, the McDonogh IT team chose to implement the ShoreTel VoIP solution based on one pivotal factor: its highly flexible, redundant nature. Many VoIP solutions put the system administration and call control capabilities on a single, dedicated server, but ShoreTel offers a distributed topology, such that the system is controlled using two or more servers, which can be either virtual or physical. To avoid the cost of new hardware and to provide even more flexibility, McDonogh’s IT team chose to install the system on virtualized servers already running in the school’s data center. All of this went a long way toward ensuring the 100 percent uptime that the school wanted. “Redundancy is really built into the ShoreTel solution because you don’t have a single point of failure,” explains Ernie Wong, UC solution architect for CDW-G. “McDonogh’s system design also included N+1 redundancy in the unlikely event that one of the ShoreTel switches would fail. It generates an alert to the IT team and a spare ShoreTel switch that’s ready and able to immediately take over to keep voice service up and running without user knowledge or manual intervention.”

Choosing ShoreTel, which Hardcastle calls “pure VoIP,” and also deciding to switch to a new telephone provider with a
K-12 SCHOOLS ARE INCREASINGLY ADOPTING A VOICE OVER IP (VoIP) SOLUTION BECAUSE OF ITS PROMISED BENEFITS.

According to Polly Gifford, owner of Education Partners Solution and a consultant to the Consortium for School Networking’s (CoSN’s) Smart Education Networks by Design (SEND) initiative, most schools she deals with have or are planning a move to VoIP in order to take advantage of unified communications features that consolidate multiple tools, including voice, instant messaging, video and interactive platforms.

To gain the most from VoIP and UC features, organizations must do their research and take into consideration how an enterprise voice system will impact operational requirements and the network infrastructure and how training will be conducted. “Voice is a mission-critical service and should be implemented as such,” Gifford says.

In the end, she says, the potential benefits fully outweigh any challenges, including the following:

• More functionality
• The ability to move to a transformed, technology-rich learning environment
• Increased school/parent communication
• Potential to lower long-term costs
• Greater access to E-Rate funding

more advanced IP-enabled voice network offered even greater redundancy. If the VoIP system ever did experience a total fail, calls can be re-routed through the school’s primary Internet connection via fiber optics out to the telephone network or through the backup Internet connection, which runs over a fixed, wireless satellite dish located on the roof of the school’s athletic center.

“In order to totally lose our phone service now, we’d have to lose both of those Internet connections or we’d have to lose some significant portion of our ShoreTel network, which isn’t very likely at all,” Hardcastle states.

The primary phone system is made up of approximately 400 ShoreTel VoIP telephones, which plug into the existing data network infrastructure, along with four ShoreTel S5-220T1 voice switches and one SGT1K voice switch.

To round out the solution, McDonogh purchased a ShoreTel S5-24A voice switch, which allows the school to leverage the existing analog wiring for fax machines, and a ShoreTel Mobility Client. The latter can be installed on the mobile phones and tablets of administrators or other staff members who travel frequently but still want to make and receive calls from their McDonogh campus extension.

The ShoreTel solution also comes with ShoreTel Director, a Windows-based management console that allows the technology team to virtually add and change user extensions, program call menus, set up advanced call routing features and manage the unified voicemail feature. In addition, it alerts the IT team immediately of any infrastructure fails. “If there’s a problem on voice switch 3, it lets us know and we can take that switch offline and bring up switch 4 to handle the extra calls while repairing...
switch 3,” Hardcastle explains. McDonogh and CDW-G lined up a ShoreTel engineer to come out in June 2013. Within a few days, he was able to set up the new phone system, train the McDonogh staff and work out any bugs.

**All the Right Benefits**

Nearly one year later, McDonogh’s new VoIP telephone system has provided the school with a trifecta of positives: perfect reliability, greater usability and cost savings. Despite having to weather several actual storms over the past year, McDonogh staff and students have never once lost telephone communication, for example. What’s more, the new network provides built-in life-safety capabilities. If a 911 emergency call is made anywhere on campus, the VoIP system immediately notes the extension number and call location and sends an email notification to about 15 different people, including the switchboard operator and those in security, the campus infirmary, maintenance and IT. “Our communication and response is going to be as effective as possible because no time is wasted,” Hardcastle says.

Although users required some training and have had to adjust to a slightly different process, they’ve been extremely happy with the new system. Staff receive voicemails immediately in their email inbox, and thanks to the aforementioned ShoreTel Mobility Client that extends the VoIP system to mobile devices, administrators can take office calls even when they’re traveling or out and about on school grounds.

What’s more, McDonogh gained all these benefits while also saving money. Immediately after installing the VoIP system, the IT team was also able to cancel the retainer agreement with the school’s telephone repair contractor, saving an immediate outlay of $32,000 per year.

In the end, the new VoIP system delivered on all of the promises of a next-generation solution: ease of management, ease of use and a lower total cost of ownership. “It’s really allowed us to consolidate infrastructure, increase reliability and usability and really stop spending money twice,” says Hardcastle. “We couldn’t be happier.”

**VOICE IN THE CLOUD**

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