Building a Wireless Future
Kaneland School District 302 outfits its new middle school with an 802.11n wireless network that meets its goals of functionality and durability.

As construction wrapped up last summer on Kaneland School District 302’s brand new middle school (located in Sugar Grove, Ill.), Tim Wolf and his staff hustled to complete the IT infrastructure they built from the ground up. As they planned and installed hardware and software in the new building, they were thinking far beyond the first day of the current school year, says Wolf, Kaneland’s director of technology.

“With funding for a new building, we had the money now and we wanted to do things right so that the technology would last for many years,” he says. “With everything, especially the wireless piece, we were looking to get something that was both robust and the latest technology, because anything we implement will be in the building seven to 10 years.”

Wolf and his staff selected HP ProCurve switches to create the network backbone at Kaneland Harter Middle School. The district also installed an 802.11n wireless LAN from Aruba Networks in the new building.

In addition to six fixed computer labs and several desktop computers in each classroom, three carts of notebooks are available for classroom use over the wireless network. Administrators and technicians are also equipped with Wi-Fi phones that allow staff to maintain VoIP call connections as they move around the school, Wolf says.

**Wonderful Wireless**
The wireless aspects of the technology implementation are especially important because they help teachers and students engage quickly in the work at hand, says Principal Richard Burchell.

“The ease and flexibility of wireless is wonderful,” Burchell says. “The staff loves being able to wheel in the carts and get started. I had been actively pushing for wireless at the old building. When you build a new school it’s a one-time shot to get the most up-to-date technology — but it also has to be reliable, expandable and you’ve got to get a lot of life out of it.”

Wolf and his team installed the Aruba 802.11n wireless network in the new school after evaluating products and services from several manufacturers. Aruba offered the attractive combination of cutting-edge technology from a well-known manufacturer that was likely to be around to provide support and upgrades, says Systems Administrator Travis Peterson.

The Aruba system also allowed for easy integration with Microsoft Active Directory for authentication, a crucial selection criterion for Kaneland.

Scalability was also an important consideration, as the district plans to extend wireless technology to the other five schools in the district, which serves about 3,850 students from nine communities in Kane County. An outdated 802.11g Wi-Fi network in Kaneland High School (which also houses the district’s administrative offices) provided the only wireless access in the district before the new middle school was finished, Wolf says.

Minimizing potential headaches that could be caused by the future expansion of wireless in the district was important, Peterson says.

“That old system in the high school will be replaced by the Aruba technology. And when we add wireless to the other buildings, the settings will just transfer over,” he says. “People with laptops will be able to move from site to site in the district with no difference in their login or experience. This will be a foundation for wireless in the entire district.”

When the Kaneland IT staff was comparing wireless products, centralized management of the network was also a key feature on their checklist, Wolf says. An Aruba MMC 3400 Multiservice Mobility Controller serves as the hub of the wireless network, bringing together configuration, monitoring and management capabilities.
Additionally, the mobility controller acts as a security gateway that can be deployed for identity authentication and access control of both wired and wireless users on the network, and to enforce network policies.

“Right now, with the Aruba system at the middle school network, there’s one easy, single point of management,” Wolf says. “Once we get district-wide wireless, we’ll have one place to manage it. We won’t have to be doing it from each individual building.”

**Meeting Deadlines**

Time pressures on the rollout of the IT infrastructure and user hardware and software for the new school increased significantly when construction on the building finished a little behind schedule, Wolf says.

“We basically had about five days in the third week of August to get all the technology in the building implemented,” he says. “We were running around like crazy. The Aruba system being so easy to configure and install helped out a lot.”

The manufacturer provided an installation specialist to assist with the wireless implementation. The installer helped Kaneland’s IT staff mount 51 Aruba 125 wireless access points, which provide increased network throughput speeds and range because they are based on 802.11n. Installation of the access points was as simple as placing them and connecting them to power, Peterson says.

“When you plug the access point into the network it’s automatically configured and shows up on the controller,” he says. “There were no bad surprises. The only thing unexpected was how easy it was.”

**Integrating With the Network**

The wireless technology was, of course, only part of the IT installation at the new middle school building. The district purchased 514 desktop computers, 100 notebooks, 80 classroom printers and about 15 high-end laser printers for computer labs in the building.

In addition to the computers and printers, all the Harter Middle School classrooms were equipped with PolyVision Eno interactive whiteboards, visual presenters, projectors and the wireless IP phones. Supporting the user technology, the HP network backbone, consisting of ProCurve switches with 10Gig-E transceiver modules and HP Intelligent Edge PoE (Power over Ethernet), meshed with the Aruba wireless products flawlessly, says Wolf.

“Integration of the wired and wireless networks was absolutely seamless, even though the technology was from different vendors,” he says.

**Proving Its Worth**

While budget was certainly a consideration as Kaneland made IT purchases for the new school, the Aruba technology was not the least expensive option the district looked at. The final selection was made because of the features and support it offered, Wolf says.

Rigid metrics are not very useful for calculating return on investment in a school setting, he says. “It’s hard to judge how much a [student’s] math score improves just because it’s easier to work and study using wireless, and those are the kind of things that represent return and value in education.”

The Wi-Fi phones enabled by the wireless network are a good example of technology that has proved its worth to staff, especially since the new school building has proven to be a “cell phone killer,” Wolf says.

“With the Wi-Fi phones you can be anywhere in the building and use them, and they have extension numbers you can dial, just like any other part of the phone system,” he says. “As you move throughout the building, the Wi-Fi phone transfers seamlessly from access point to access point, so you don’t have to worry about hand-off.”

So far, there have been few maintenance issues for the wireless network, says Peterson.

“I haven’t heard much of anything in the way of complaints from the teachers so far,” says Peterson, speaking a couple months into the school year. “They either haven’t been using the laptops or they’re just working — I tend to think it’s the latter. Teachers let you know when things don’t work.”
Know What You Need
As for their advice to other schools and districts considering wireless deployments, Wolf and Peterson say the keys to a successful implementation are much the same as those for any technology investment: plenty of research, testing and making sure there is customer support for products and systems.

“You’ve got to talk to everybody and look at everything,” Peterson says. “Do your own research because you know your own situation.”

Assessing the individual school or district’s circumstances and the specific drivers of the wireless deployment are crucial (and sometimes overlooked) first steps toward implementation, says Gartner analyst Tim Zimmerman.

“It’s no surprise that planning and execution are critical, and the execution never works without a plan,” Zimmerman says. “The plan has to reflect that you understand what you need from wireless and why you need it.”

A common mistake schools often make is to focus completely on wireless coverage while not paying attention to capacity, Zimmerman says. Those institutions can end up with nominal connectivity, but not enough throughput to support the applications they want to use in some locations.

Basic concerns for any network, such as access control and segmentation to protect sensitive data from inquisitive students, need extra attention with wireless, Zimmerman says. But the most important consideration when planning a deployment is how the technology affects the educational mission.

“How is wireless going to change the way you teach and learn?” Zimmerman says. “How can it make information more available and how can people be shown how to use that new availability?”

Making the Connection
Teachers and students at Harter Middle School needed little training for the technology in the building, Wolf says. With the exception of the previously untried PolyVision whiteboards, much of the technology had been available in the old middle school, just not in each classroom.

In the old school, the notebooks on carts were wireless, but the access point was on the cart and needed to be plugged in and booted up in each new location. The wireless LAN has streamlined that process substantially, say Wolf.

“There’s training available for teachers and our students are pretty tech savvy,” Wolf says. “The ones that aren’t ask a friend and get up to speed pretty quickly.”

Principal Burchell notes that he is less concerned about students understanding how to use the technology than he is about educators knowing how to communicate their lessons more effectively with the technology.

“I’ve been doing this — education — for 20 years, and kids are a little different now in large part because of the technology around them. Their attention spans are shorter,” he says. “If you don’t teach kids in a way they’re used to receiving information, it’s harder to make a connection. Technology is what they’re used to, and it’s a great way to make the connection.”

802.11n — The Future of Wireless Arrives
The IT staff at Kaneland School District 302 has done its best to outfit the district’s new middle school with advanced technology that promises to survive and continue to help students thrive through the long refresh cycles inherent in public education. That philosophy made it easy to choose a wireless network based on 802.11n, the latest version of the Wi-Fi protocol.

“It was good timing for us,” says Director of Technology Tim Wolf. “All the features will be known as we look at expanding wireless in the district.”
Although 802.11n was not ratified by the IEEE (Institute of Electrical and Electronics Engineers) in its final form until this past fall, the Wi-Fi Alliance has been certifying wireless products based on a draft of the protocol since 2007.

Because it is backward compatible to previous versions of the basic 802.11 standard (initially introduced in 1997), the “n” iteration will coexist with 802.11a, b and g in many wireless LANs for the near future. But with increased bandwidth and significantly faster throughput, 802.11n will likely supersede previous versions, according to industry observers.

“In K-12 settings, the biggest difference will be the availability of many more multimedia presentation capabilities,” says Gartner analyst Tim Zimmerman. “N opens the door for lots of applications and for schools to be able to do things they couldn’t do before with wireless, either at all or very well, like video or digital signage.”

K-12 districts across the country, such as Kaneland, have already started adopting 802.11n. But the recent finalization of the standard should bring prices on products down, making faster and more robust wireless networks easier to fit into school budgets, Zimmerman says. Most recent client computing devices, such as notebooks, tablets, netbooks and many desktops, have 802.11n capability built in, he says.

According to Zimmerman, 802.11n is becoming the standard wireless functionality, and wireless is becoming the standard way young users expect to access computing resources.

“These kids are growing up with wireless, whether it’s at the local Starbucks or the wireless router in their homes,” Zimmerman says. “They don’t expect to be tied down by wires.”

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