Aerohive NETWORKS

Pender County School District

North Carolina School District Boosts Students' Performance by Running Apple Devices over Aerohive Wi-Fi

Challenges

- Required a wireless LAN architecture to support its use of Apple Mobile devices
- Needed to upgrade its Wi-Fi to 802.11n from 802.11abg to support a full range of learning applications
- Needed a wireless LAN architecture that would resolve issues with reliability
- Needed reliable, scalable, cost-effective Wi-Fi system that is also easy to manage

Results

- Liked how easy Aerohive was to set up and manage, as well as the WLAN's performance
- To segment its Aerohive wireless networks, the district created two wireless SSIDs (Service Set IDentifiers), both secured with WPA-PSK and segmented into separate virtual wireless LANs.
- One VLAN is used by managed PCs, which must be authenticated to the content filtering system via LDAP. The alternative SSID network is for non-Windows devices such as iPods and some smartphones.
- Surpassed performance and resiliency of competing wireless vendors without having to install expensive multiple hardware controllers throughout the district

Pender County schools strive to provide innovative and creative learning opportunities that motivate students to succeed in today's increasingly competitive world. Nestled within a diverse set of suburban and rural communities in North Carolina, the district's seven elementary schools, five middle schools, three high schools, and an early college high school educate more than 8,400 students every year.

For Pender County, a crucial part of that educational experience is the technology and educational applications it provides its students. It is for this reason Apple products – iPod touch devices, iPads, MacBooks and applications – have become an integral component of the teaching and learning experience in Pender County. Finding a wireless LAN that would meet its high-tech emphasis became a priority. For a number of years, the county relied on a wireless 802.11abg LAN for that experience. However, going forward, the wireless LAN would need to support a full range of new demanding applications the school wanted to use. Those included student-produced video and graphically intensive educational games running throughout the district on Apple devices. For that, officials chose the performance made possible by the 802.11n standard.

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> CTO, Pender County Schools

The network would also have to be reliable, scalable, cost-effective, and easy to manage, explains Landon Scism, CTO at Pender County Schools.

Two Significant Wireless LAN Pilots: One Clear Winner

Scism wanted to be sure the district made the best decision for its investment. However, the first wireless LAN they deployed proved unable to meet any of the criteria they set. The equipment, from a well-known manufacturer, not only was costly and difficult to configure, but it also kept breaking down. "We had serious issues with the Access Points (APs). They required a specialist to set them up and to keep them running," Scism says.

"We were not about to deploy that equipment throughout the district," he explains, "and we knew we had to find a better way." It was during the search and market evaluation that he learned of Aerohive Networks Inc. and its innovative wireless LAN architecture, known as Cooperative Control. "We immediately liked what we heard and brought in a handful of APs to experiment and see how well the system performed," Scism says. "We quickly decided that we would conduct a formal Aerohive pilot."

The chosen pilot site was at one of the district's middle schools that is a heavy user of Apple mobile devices such as iPod touch devices and iPads and graphics-heavy educational games. At the time of the trial, hundreds of Apple devices and Netbooks were in place. "We pushed the Aerohive wireless LAN as much as we could," recalls Scism. "We pushed it with traffic that would have crashed the trial network from the other vendor. We didn't have any problems at all. Aerohive handled everything we threw at it," he says.

And, for the next few months, Scism kept pushing the Aerohive network hard. "We were very impressed with how easy it was to set up and manage, as well as its performance," he adds. "Also key for us was the fact that it didn't require a technical specialist to install and manage the Aerohive devices."

Aerohive's Cooperative Control technology combines an enterprise-class access point, known as a HiveAP, with a suite of cooperative control protocols and functions that bring all of the benefits of controller-based architectures but without the cost and complexity of traditional controllers or overlay networks. This design makes it possible for multiple HiveAPs to self-organize into groups, called "hives," that share control information and provide functions such as fast/secure layer 2/layer 3 roaming, cooperative RF management, and security and mesh networking. Unlike controller-based networks that create a single point of failure, HiveAPs work together to recover from hardware and system failures without requiring redundant systems.

After its thorough and lengthy evaluation, Pender County decided to standardize its wireless LAN deployment with Aerohive.

Nearly Effortless Installation, Unparalleled Performance

That proved to be a winning decision. To segment its Aerohive wireless networks, the district created two wireless SSIDs (Service Set IDentifiers), both secured with WPA-PSK and segmented into separate virtual wireless LANs. One virtual wireless LAN is for use by all of the managed PCs, and to gain access, those PCs must be authenticated to the content filtering system via LDAP (Lightweight Directory Access Protocol). The alternative SSID network is for those non-Windows devices that can't authenticate through LDAP, such as iPods and some smartphones. Because Aerohive natively supports RADIUS (Remote Authentication Dial-In User Service) services, once the Aerohive installation is complete, the district will move to RADIUS authentication integrated with Active Directory.

Because the district relies so heavily on both Internet access and graphics-intensive educational games running on Apple devices, the exceptional network performance provided by Aerohive certainly was welcomed. For example, one of the mathematical games the district utilizes, DimensionM, is an extremely graphical algebra and pre-algebra learning tool. Students also use the popular game The SIMS to create and compare characters and compose English essays. English poetry lessons include students reciting poetry while they digitally video-record themselves and publish the video on YouTube for class discussions. "We are really pushing the limits with gaming over a wireless connection. The network requirements for the graphics alone are just tremendous," Scism says. "We have two classrooms full of children playing educational games simultaneously on one access point, and Aerohive has worked absolutely wonderfully."

Obtaining that level of performance and resiliency with the competing wireless LAN architecture would have been much more costly, as we would have had to install multiple hardware controllers throughout the district. Fortunately, one Aerohive access point is all that is required to handle all of the traffic required by two classrooms. "Aerohive has been so much more cost-effective that we can afford to finish our wireless LAN objectives by the end of this year," he says.

Those objectives include bringing wireless access to the remaining schools in the district. "When we trialed the other wireless LAN, it was just a constant battle to keep up and running," Scism says. Thankfully, the Aerohive architecture provided all of the performance, resiliency, and security needed. "It has worked just wonderfully," he says.

Results

Since fully deploying its Aerohive WLAN, Pender County has issued about 400 iPod touch devices and about 200 iPads (to date, but the number keeps rising) for use in its K-8 classrooms and by administrators. More significantly, the district has witnessed use of the technology which has shown a profound impact.

Teachers are required to use technology in their classrooms – Apple devices are an option. However, rollout rate of the Apple devices has experienced a viral effect, with use of iPod touch devices as a learning tool among teachers exploding exponentially.

"Initially there were only one or two teachers using iPod touch devices as an integrated technology in their curriculum," says Scism, explaining that number eventually rose to 36 teachers using the technology in their classrooms everyday. The district then held workshops in which this core group of 36 tech-savvy teachers held classes to teach their peers how to use the technology themselves. "This year 150 of 600 teachers in our district are using Apple technology daily in the classroom, and this is because they saw their peers using it and felt inclined to follow suit."

Scism uses the SIMS game as an example illustrating Apple in action in the classroom. Each child is required to create a SIMS character using the application running on an iPod touch. They plug in different physical and personality attributes to build their character, and then trade devices with another student. Each student is then required to explore and write about the SIMS character in the device they've been handed. In doing so, they are honing their writing and comprehension skills... and having fun while doing it.

The kids enjoy themselves so much they barely notice they are engaged in an essay-writing assignment, says Scism. "Some quotes are, 'this is the greatest class ever." and 'I love my English class."

As proof in the pudding, one Pender County schools has already seen impressive gains in attendance and testing scores because of the use of Apple products in conjunction with Aerohive's wireless solution.

The school has tried lots of things over several years to rectify its problems, says Scism, but once the school brought in the Apple devices, the kids were ecstatic. They would play on an iPod touch for 20- 30 minutes, for example, and then write poetry without resisting like they normally would.

"When they get to explore instructionally on an iPod touch and an iPad at school, the students are using the same methods they use in their lives outside school," says Scism. "Initially, these were at-risk kids, who became so interested in what they were doing they didn't realize they were actually working and learning. They wanted to come to class, they wanted to listen to teachers and they enjoyed what they were doing."

Prior to deploying Apple devices, the school was experiencing 78 percent proficient in math testing scores. Today that school holds strong with an 89 percent proficient score in math. "That's an 11 percent gain in two years, which is significant," says Scism. "It shows that the strategy to change teachers using Apple technology along with Aerohive's WLAN in the classroom is having a major impact on learning, and that kind of success is the number one priority for our schools."

Aerohive™ NETWORKS

Contact us today to learn how your organization can benefit from an Aerohive wireless LAN architecture.

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