Harrisonburg City Public Schools

School System Extends Reliable, Centrally-Managed WLAN throughout the District with Cooperative Control Solution from Aerohive

Challenges

- Consumer-grade wireless access points were unreliable and difficult to manage
- Needed more pervasive wireless coverage
- Mobile labs were unreliable due to congestion and human error, which resulted in lost classroom time
- Needed a WLAN that was resilient, centrally administered, easy to manage, secure and cost-effective.

Results

- Access points mounted on carts were replaced with HiveAPs
- Network was divided into four SSIDs, which were set up for teachers, students, guests and librarians. Data is protected using WPA2
- Aerohive HiveManager provides centralized configuration and monitoring, and simplifies provisioning for system-wide policy management
- Aerohive has provided the school district with a highly resilient wireless network that's both easy to manage and cost-effective

Harrisonburg City Public Schools, located in Virginia's scenic Shenandoah Valley, serves 4400 students kindergarten through 12th grade with a faculty of approximately 750. The school system has ten facilities including a high school, two middle schools, five elementary schools, a special education center, and an administrative office.

Supported by an assortment of Netgear and Apple wireless access points, the school system provided laptop-equipped teaching staff with mobile access to the Internet and educational and student management applications. Each school also had one or two mobile labs (carts equipped with 15 to 25 laptops and a wireless access point) for student use in the classroom. In this demanding environment, however, the consumer-grade wireless access points-unreliable and difficult to manage-were simply not up to the task.

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>
> **—Dwayne Hottinger**
> Network Administrator, Harrisonburg City Public Schools

The Challenge

Maintaining adequate wireless coverage was a continual battle. Placed on a shelf, a table, or the floor in a classroom, access points were easily moved, unplugged, or even stolen. Without central management, there was no way to know a problem existed until a user complained.

The mobile labs also proved challenging. Teachers had to plug the cart-mounted access point into both power and the network. Forgetting the network connection caused laptops to come up without network access. Rebooting resulted in valuable classroom time being lost. And even when properly connected, a full complement of clients on a single access point created performance issues. The school system began placing two access points on each cart, but overlapping channels led to even more problems.

The school system also had to deal with power issues, particularly at the Thomas Harrison Middle School where outages were a nearly daily occurrence, stealing valuable instruction time while mobile devices rebooted once the power came back on.

The wave of issues with the wireless network came to a head in mid 2008 when almost 40 of the system's Netgear access points failed within a brief period of time, reverting to their factory configurations with security features disabled. "There was no encryption. Anybody

could connect to our network," says Dwayne Hottinger, network administrator for the Harrisonburg Public Schools. "I had to remove those access points." Hottinger was also spending increasing amounts of time at the Thomas Harrison Middle School dealing with coverage issues.

Hottinger approached the Division Technology Committee at their monthly meeting with an ultimatum. "Either we find a wireless system that works, or we don't have a wireless system at all." The Committee agreed that a future without wireless was not an option.

Hottinger formed a task force to consider a replacement for the legacy wireless system. The new WLAN had to be resilient, centrally administered, easy to manage, secure, and cost-effective.

Considering the Alternatives

The Task Force evaluated wireless solutions from Cisco, Xirrus, Alcatel, Trapeze, and Aerohive. Hottinger found most of them to be complicated to manage, lacking the resiliency he was looking for, and costly. "Although the base price of Aerohive wasn't the lowest, when all the features were considered, Aerohive was the most cost effective," says Hottinger. "After weighing the pros and cons of the different solutions, the committee chose Aerohive unanimously."

Cooperative Control Wireless LAN Solution

The Aerohive solution stood out from the other products with its cooperative control access points (HiveAPs) running 802.11n technology that didn't require network controllers or overlay networks. Software in the HiveAPs enabled them to self organize into groups called Hives. Unlike controller-based solutions where there is a single point of failure, HiveAPs worked together to recover from component failures without the need to deploy redundant systems.

Wireless mesh connections could create redundant paths between access points, enabling the WLAN to route around wired network failures ensuring no single point of failure within the wireless or the wired infrastructure. The result was enterprise-class network management and security without the cost, performance, and availability issues associated with controller deployments. "Integrated meshing at no cost was a big selling point with Aerohive," says Hottinger. "Nobody else had that."

Deployment

Harrisonburg City Public Schools purchased 85 HiveAPs through Computerware, a long-time supplier to the school system. Deployment began during Easter break week. Over the following four months, about 40 access points were installed at the High School, 25 at the Thomas Harrison Middle School, and 20 at Keister Elementary. Aerohive's smart PoE support eliminated the need to run electrical cable to the access points. "I can pull CAT-5, but I would have needed a licensed electrician for electricity," says Hottinger. "PoE is great."

Access points mounted on carts were replaced with HiveAPs mounted safely out of reach in the ceilings of classrooms. Teachers no longer have to plug access points into network jacks. The connection came up as soon as students turned on their laptops. And the HiveAPs easily supported multiple cart loads of laptops simultaneously without performance degradation.

Because confidential student data travels over the wireless network, Hottinger divided the network into four SSIDs. One SSID provides faculty with secure access to the student management system from Century Consultants and to other applications. Data is protected using WPA2. The single faculty SSID covers the entire district to accommodate teachers who move from school to school on a regular basis.

Another SSID is used for a catalog system called Destiny that enables librarians to check books in and out with wireless scanners and do inventory twice a year. Finally, a guest wireless SSID enables non-faculty to access the Internet via a captive Web portal secured by the stateful inspection firewall built into every HiveAP.

Centralized Network Management

After resiliency, the top criteria for Hottinger were ease of deployment and management. With just a limited amount of assistance from Aerohive Support, the Network Administrator was able to deploy the solution himself leveraging a single Aerohive HiveManager that provides centralized configuration and monitoring and simplifies provisioning for system-wide policy management. "When HiveAPs are plugged in, the HiveManager discovers them automatically and uploads the configuration. In a matter of minutes I have an access point installed and working. It was just that simple."

Managing the HiveAPs is equally simple for Hottinger. "If someone reports an issue, I can look at the HiveManager, see where they are connected, review the log files, view the topology, determine where I need to add or move a HiveAP for better coverage."

What's Next?

With Phase One nearly completed, Hottinger plans to deploy HiveAPs at two more schools this year, and the remaining two schools next year.

Like many schools systems, Harrisonburg has responded to student safety issues with surveillance cameras to monitor activities. When additional cameras are needed, the school system may support them over the wireless LAN. "Aerohive has given us a highly resilient wireless network that's both easy to manage and cost-effective, with the capabilities to meet our needs far into the future," says Hottinger.