East Brunswick School District

Controller-free Wireless LAN Architecture is a Cost-effective Choice that will Enable Straightforward Expansion of the District's New Wireless Network

Challenges

- Provide students with the computer and Wi-Fi access they need for group studies and science labs
- Find a WLAN architecture that was cost-effective
- Find a WLAN architecture that could be centrally managed
- Find a controller-less wireless networking platform to achieve Wi-Fi campus goals

Results

- Using HiveManager made it very easy to deploy HiveAPs and to apply networking policies
- HiveAPs equipped with dual-port functionality meant single cable drop could be leveraged for both wireless and wired connections
- Achieved highly-redundant, secure Wi-Fi
- Segmented network access through multiple SSIDs, which allowed different networks to be established for different uses

East Brunswick School District, located in central New Jersey, wanted to find a better way for its students to utilize computers in the classroom. Currently, most of the district's schools provide one desktop PC for each classroom, as well as a number of mobile computer carts for use throughout the schools. Those carts, which come equipped with wireless access points and a number of notebooks, make it possible for teachers to schedule computer time for groups of students.

However, with the growing demand for computer access and the amount of time teachers consumed setting up the access points, the district decided it was time to find a better way. "By wirelessly enabling the schools, we'd have more flexibility to give students the computer and network access they need for group studies and science labs," explains Tinos Rousos, senior network manager at the district.

For that goal, Rousos evaluated most of the major wireless LAN equipment makers, but found it challenging to find one that was cost-effective and could provide a wireless LAN that could be centrally managed. "Many vendors required hardware controllers that were not appropriate for our needs and would bring additional costs," says Rousos. "We wanted an architecture that could go throughout the school district without those additional costs per school."

Wireless Networking Simplified

That's why, instead of selecting one of the traditional wireless LAN equipment makers, Rousos opted for Aerohive Networks Inc.'s award-winning Cooperative Control architecture. Cooperative Control combines an enterprise-class access point, called 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 between HiveAPs to provide functions such as fast layer 2/layer 3 roaming, and cooperative RF management, as well as security and mesh networking. In addition, unlike controller-based networks that create a single point of failure, HiveAPs work together to recover from hardware and system failures without requiring redundant hardware.

> "We wanted an architecture that would operate across the district without high additional costs per school, and aerohive had proven to us that it could do exactly that."
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> **—Tinos Rousos**
> Senior Network Manager, East Brunswick School District

This wasn't East Brunswick's first encounter with Aerohive Networks, a short time before the district's broad wireless LAN effort got underway, fire had struck one of East Brunswick's elementary schools and Aerohive loaned the district a number of access points.

Trouble-free Installation

The first school to receive the new Aerohive-based wireless LAN was Hammarskjold Middle School. "The rollout went very smoothly," explains Rousos. "We conducted a number of tests on configurations and authentication services, and once that was in place, HiveManager made it very easy to apply our networking policies to the HiveAPs," he says. For the physical installation of the HiveAPs, drilling was kept to a minimum as the access points fit cleanly on existing cable panels. For classrooms, where both wireless and Ethernet were required, the district installed HiveAPs equipped with dual-port functionality so that the same cable drop could be leveraged for both wireless and wired connections.

Rousos manages the network through Aerohive's HiveManager Network Management System (NMS). HiveManager NMS enables simple policy creation, firmware upgrades, configuration updates, and centralized monitoring throughout an entire Aerohive deployment, whether building-wide, campus-wide, or global – from within a single console. Because HiveManager NMS is not actively involved in passing traffic or in making traffic forwarding decisions, it eliminates network bottlenecks and complexities of controller-based architectures, especially within distributed environments.

Highly-redundant, Secure

In addition to the ease of deployment made possible by Aerohive's controller-free architecture, Rousos appreciates the mesh network abilities of the design. Because HiveAPs become aware of each others' presence, whether connected wired or wirelessly, when neighboring HiveAPs are identified with the appropriate credentials, they can connect securely to each other.

Once the neighbor relationships have been established, HiveAPs then use cooperative control protocols to provide their seamless mobility, cooperative RF management, resiliency, and best path forwarding."With the Aerohive architecture, we know that if an AP goes down, for whatever reason, we don't lose wireless capability. The network will still run strong, and we'll still have access to all of our resources," Rousos says.

Another Aerohive feature Rousos appreciates is the ability to segment network access through multiple SSIDs, so that different networks can be established for different uses, such as administrative, student class work, and general Internet access for guests.

Also, some network resources need to be shared throughout the school while others need to be restricted. "For instance, Hammarskjold has its own video security system which runs on the school network. With a controller-based architecture, all of that traffic would have had to come across our Wide Area Network (WAN). However, with Aerohive, all of that video traffic will remain within the school's network and won't burden our WAN," he says.

The fact that Aerohive provides built-in RADIUS (Remote Authentication Dial In User Service) functionality into the HiveAPs means Aerohive integrates seamlessly into the district's Novell e-Directory for authentication. This way,the district still gains all of the benefits of a centralized directory but its authentication abilities are distributed throughout the network. "In competitor architectures, we would have had to install additional RADIUS servers to achieve the same ability," Rousos says.

Since the recent Aerohive wireless LAN installation at Hammarskjold Middle School, the district has expanded the network to include an administrative building. "I've found managing, as well as expanding, the Aerohive network to be very easy. Adding an additional five APs to the administrative building took only a couple of hours to physically place the APs and apply the same policies we designed to extend the network to an additional location," he says.

In the months ahead, Rousos plans to add more locations to the network, including the district's high schools and junior high schools. And soon the wireless LAN may provide ubiquitous access for a planned student information management system that would enable real-time attendance taking. "We are thinking about extending the network to a number of places outdoors, such as sports fields for gym class, to allow for real-time attendance. The mesh networking ability will make that a very easy thing to do," he says. "Aerohive has proven to be very dependable, easy to mange, and easy to expand. We made the right decision," Rousos says.

Following extensive fire damage to one of the district's schools, Aerohive's easily deployed and centrally managed architecture helped keep displaced students connected. Late in the afternoon of July 10, 2008, a custodial worker heard a fire alarm and witnessed smoke quickly filling a hallway within the Innes Road elementary school. Fortunately, the worker, who was not harmed, was the only person in the building at the time. Unfortunately, there was extensive fire, smoke, and water damage because of the blaze and firefighting efforts.

It soon became clear that the elementary school would not be ready for students at the start of the school year, and a temporary and suitable location would have to be identified. Thankfully, an available and then unutilized Christian school would be an ideal location. However, the school would need to be networked and quickly connected to the district's primary Wide Area Network (WAN). Tinos Rousos, senior network manager, explained that establishing a wireless LAN at the school, and connecting the school to the district's network through metro Ethernet, would be the best, most cost-effective option for them to pursue. When Aerohive heard of the district's predicament, it provided a number of APs to help see them through. "Aerohive's controllerless architecture was the perfect way for us to quickly build a resilient wireless network for our relocated students," says Rousos.