# Framingham Public School District

## Deploying an Innovative Wireless Network that Surpassed the Expectations of the IT Team and Changed the Way Faculty and Students Use Technology

### Challenges

- Needed to upgrade aging network infrastructure as well as PCs
- Budgets were tight and running new cabling through buildings was cost prohibitive
- Was in search of an easy-to-manage WLAN that would provide network access for personal devices brought to campus as well as school-owned PCs
- Wanted to avoid a controller-based wireless LAN architecture due to cost, bottlenecking and reliability issues

### Results

- School administrators can use handheld devices to quickly access student information, and students can use handhelds for classroom participation
- Using HiveAP network mesh capabilities, and managing the network using HiveManager NMS
- Segmented the campus Wi-Fi network using different Service Set Identifier (SSIDs), WPA2 encryption and restricted IP ranges
- Plans include making make more applications available for wireless Web access

Like most school districts today – in fact, like most organizations – the Framingham (MA) public school district needs to stretch its budget and make its it investments matter. After less than a year on the job at the district, director of technology Adam Seldow was well aware of this as he assessed the aging network infrastructure and PCs upon which the school's students, teachers, and community relied.

"We needed to upgrade our network infrastructure, but budget was tight. Just running new cabling through our buildings would have been cost prohibitive," Seldow says. "And there's no way we could have afforded to purchase new notebooks for all of our 1,800 teachers at once," he says.

That's when Seldow and the district's IT team began to consider what would prove to be a solution to both its long-term network

upgrade challenges and its need to enable teachers to work with updated systems.

"We decided we would model ourselves like universities do. We started working on a budget that would enable network access for people to use the devices they already own," Seldow says. "If they brought them into the school, we would embrace their systems and support them the best we could, while preserving our network's safety and security."

The best way to get there, the district decided, was to move wireless.

### Wireless LAN Evaluation: Costly Surprises

"The cost to upgrade our physical network was prohibitive, especially our old buildings. The cable runs alone would cost up to $400 a drop," he says. Not only would wireless infrastructure be more cost-effective, it also would help bridge the budget gap for new systems for faculty and provide a safe way for students to access the Internet. Utilizing mobile devices, students were bypassing the district's content filtering, and the IT team wanted to provide safer access. "Also, by providing wireless LAN access, our faculty, if they chose, could utilize their own notebooks on the wireless network for work," Seldow says.

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> **—Adam Seldow, Ed.D.**
> Director of Technology, Framingham Public School District

Great idea; unfortunately, many of the wireless LAN vendors the school investigated offered products that seemed expensive and difficult to manage. "We didn't want a lot of moving parts, such as having to set up a RADIUS server. Instead, we looked for an alternative that could use direct Active Directory integration with the Access Point (AP). In addition, we didn't want to worry about a wireless network controller that had a limit on the number of access points that could be associated with it," he says. For instance, one option the district evaluated had a 250 Access Point limit for each wireless controller. "If we went to 251, we'd have to buy another controller and pay all of the associated license costs," he adds.

## Secure Infrastructure, Lower Cost, Greater Resiliency

Following their careful evaluation, the IT team selected an innovative new class of wireless infrastructure from Aerohive Networks, Inc. built on its Cooperative Control Wireless LAN (WLAN) architecture. The technology combines an enterprise-class access point with a suite of cooperative control protocols and functions that delivers the full benefits associated with controller-based wireless LANs – but without the additional burden and cost of hardware controllers or an overlay network. Through the Cooperative Control WLAN architecture, the intelligence typically found within wireless network controllers is embedded within what Aerohive calls HiveAPs.

This design makes it possible for multiple HiveAPs to self-organize into groups, dubbed "hives," that share control information between HiveAPs to provide functions such as fast layer 2/layer 3 roaming, cooperative RF management, as well as security and mesh networking. That's how Aerohive's Cooperative Control WLAN architecture provides all of the benefits of a controller, yet is easier to deploy and expand. It's also more reliable and more deployable at a lower cost with higher performance than traditional wireless LANs. 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 systems.

Management of the network is provided through Aerohive's HiveManager NMS. HiveManager 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 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.

## Rapid Deployment

"Because of the ease of installation and configuration, Aerohive quickly exceeded our expectations. It was straightforward to learn and fast to deploy. Once we got it running we felt very comfortable," Seldow says. "It's proven itself to be easy to manage, and fast. We don't have to do much to manage it, and we routinely get wireless connection speeds of up to 115 to 120 Mbps (mega bits per second)." Within five days, with the aid of Aerohive engineers, Seldow had the district's 440,000 square foot high school fully connected.

The students and faculty immediately embraced their new wireless access. On the very first day, 140 of 200 high school teachers accessed the wireless network with their laptops, while many students also used the safer, content-filtered wireless LAN for Internet access. "We created scripts so people could quickly join the wireless network with the groups and access rights appropriate to them, and as a result, the network instantly lit up with use the first day," Seldow says. Teachers were using their iPhones to take class attendance, and there were notebooks in use throughout the school. "Days after it was deployed, it was as if the network had always been there. It solved an immediate need for everyone," he says.

It goes without saying that the security of the student, faculty, and school administrative data is critical. For that, Seldow segmented the WLAN using different Service Set Identifier (SSIDs), WPA2 encryption, and restricted IP ranges. "We are leveraging the use of the SSIDs and using HiveManager in the same fashion we would use a firewall," Seldow explains. For instance, local police have access to their own, protected network segment, as do the faculty, students, and community guests.

Seldow also appreciates the resiliency provided by the HiveAP network mesh capabilities. "If one HiveAP loses a connection, they'll instantly mesh off of a nearby AP. This has worked so well that we didn't even know a network connection was down at one point because we had perfect wireless access in the area," he says.

## Ready for Future Growth

Moving forward, Seldow plans to make more applications available for wireless Web access, and rely less on internal networks. "Now teachers can logon through a secure web portal and access certain applications and folders we make available online. When they're on the internal wireless network, they can access internal folders and applications that we don't offer over the Web," he says.

The IT team will continue using its Aerohive wireless network to make student life more productive while helping to preserve the district's budget. For example, school administrators – using a handheld phone or device – now can quickly access student information whenever needed anywhere on school premises. Also, students can use their cell phones as feedback devices for classroom participation. Such classroom "clickers" often cost thousands of dollars. And the Aerohive network, because it provides such strong and reliable connection, soon will be used to supplement the district's upcoming voice-over IP telephony effort. "We already have this network in place, and we are going to leverage this wireless technology as much as possible," Seldow says. "We're only at the beginning."