

Learning from your Peers: 802.11n Wi-Fi for K-12 without the Headaches

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Introductions



Moderator:

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Tech & Learning Custom Projects

Speakers



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About Aerohive

Aerohive unleashes the potential of enterprise Wi-Fi, enabling customers to stop buying copper, to move applications to the air, and to maximize workforce productivity. The company's award-winning cooperative control architecture eliminates costly controllers, saving money and providing unprecedented resiliency, up to 10X better application performance, and an opportunity to start small and expand without limitations.

Agenda

- Wi-Fi Drivers and Challenges
- Pender County Schools Case Study
- Framingham Public Schools Case Study
- Additional Wi-Fi Deployment Requirements

Wi-Fi Drivers/Challenges in K-12

- **Drivers for Wi-Fi**

- 1:1 Laptop programs
- Fixing or replacing cart solutions
- Online testing
- Temporary Networks & Portable classrooms
- Eliminating the “Digital Divide”
- Textbook costs – anything that can be done to reduce this

- **Historical Issues with School Wi-Fi**

- Performance & reliability – Wi-Fi issues disrupts classes or online testing
- Coverage – Hard to wire locations plus portable classrooms
- Capacity – Unable to run multiple classrooms or carts on one AP
- Ease of Management – Solutions typically lacked central or policy-based mgmt
- Cost – High operational cost and poor scalability for full coverage across districts

Polling Question #1

- What is the current state of your wireless network?
 - a. No wireless network deployed at all
 - b. Ad hoc deployments of “consumer-grade” access points (ex: D-Link, Apple Airports, Linksys)
 - c. School or district wide deployment of a/b/g
 - d. Evaluating or have upgraded to 802.11n

Polling Question #2

- What types of initiatives do you have in place that require a resilient wireless network?
 - a. 1:1 computing
 - b. Mobile cart solutions
 - c. Online testing
 - d. Gaming instruction
 - e. All of the above



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Case Study: Pender County

- **The Challenge**

- 8,400 students, 1,200 employees and 16 schools
- Looking to create a modern learning environment
- Wireless network running wasn't the latest generation
- Required an high performance 802.11n solution that was easy to use, reliable, and cost effective.



Drivers for a New Solution

- Looking to create a modern learning environment
 - Use of technology to incorporate new learning vehicles
 - Looking to move to a 1:1 computing model, deploying lots of clients running bandwidth intensive educational apps
 - Dimension-M, SIMs, YouTube etc
- Original wireless network was 'b' only
 - 'b' network with 11MB maximum data rates could not run bandwidth intensive gaming applications
 - Needed an upgrade to an 802.11n performance level solution

Comparing Wireless Solutions

- Upgraded the high school to a traditional controller-based 802.11n solution
 - Needed a technical expert to manage
 - Didn't just run by itself
 - Felt there needed to be something better out there
- Found the controller-less Aerohive solution
 - First evaluated and then deployed a second 802.11n school
- Ran the two schools in parallel comparing:
 - Ease of deploying and managing
 - Level of complexity
 - Reliability and redundancy requirements

The Choice: Controller-less

- Ease of use & management
 - Plug it in and it works
- Cost-effective
 - No controllers
 - No additional costs for redundancy
- Greater reliability
 - Running bandwidth intensive applications over the wireless network with minimal downtime
- Segmented network – guest and internal

“The solution was so cost effective, I was able to move my schools to an 802.11n wireless network about a year ahead of what we planned.”

A Modern Learning Environment

- An access point deployed for every other classroom
 - Designed the network for 1:1 computing
 - Set-up to easily plug in additional APs
- Tremendous use of the wireless network for educational/teaching purposes with no issues
- Bandwidth intensive applications smoothly running over the wireless network
 - DimensionM multiplayer educational Math games
 - SIMs used for character creation & English essays
 - Video poetry over YouTube
 - Whiteboards, projectors, cameras, portable tablet slates, quiz response systems, and smart phones



Future Applications

- Deploying the remainder of the schools by year end
- Additional games over Wi-Fi with multiple classrooms playing simultaneously
- Voice over Wi-Fi





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Case Study: Framingham Schools

- **The Challenge**

- 8,300 students, 1,600 staff, and 15 schools in the district
- Aging network infrastructure and PCs that the district relied on
- Still needed to modernize and deliver modern learning environment



The Drivers to go Wireless

- Limited IT budget but needed a network upgrade
 - Cost prohibitive to upgrade the physical network
- Could not purchase new laptops for faculty
- Decided to model ourselves like Universities
 - Enable access for devices users already owned
 - Needed to preserve the network's safety & security
 - A move to wireless was the answer

Evaluation Phase

- Evaluated multiple wireless LAN vendors
 - Many were difficult to manage
 - Required a great deal of configuration
 - Didn't want a lot of moving parts, such as having to set up a RADIUS infrastructure
 - Many were expensive and didn't scale
 - Controller costs
 - Per AP cost of controllers
 - Controller capacity limits could force the purchase of an additional controller for just one AP
 - Feature Licensing
 - Required additional controllers for redundancy

The Solution: Aerohive

- Secure infrastructure
 - Students can't bypass content filtering
- Lower cost
 - No controller costs
 - No additional license fees
- Network segmentation
 - Using SSIDs, WPA2 encryption, and restricted IP ranges
- Resiliency of mesh capabilities
 - If an AP loses a connection, failover to another AP



Easy to Deploy & Manage

- Initial deployment at the high school – the most demanding group on the wireless network
 - Within 5 days had the district's 440,000 sq. ft. high school fully connected
 - First day, 140 of 200 high school teachers accessed the wireless network with their laptops



Ready for Future Growth

- Teachers accessing internal applications and folders
- Students using smart phones as clickers and feedback devices
- Voice over Wi-Fi





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Get the Most from 1:1

- **Moving to higher laptop densities requires a better wireless solution**
 - High performance and capacity
 - Speed, Density, QoS, Impact of slow clients
 - Cost effective whole school or district solution
 - Easy to fill coverage gaps
 - Option to mesh hard to wire locations
 - Ability to scale – can you just add another AP!
 - Easy to use and powerful management



Fixing Carts & Replacing APs

- **Making carts work better or replacing them with 1:1 programs**
 - Carts are used to share a “classroom’s worth” of laptops amongst classes
 - Consumer grade equipment like Linksys, and Dlink are used and typically show the following issues:
 - Unable to support more than about 15 clients reliably
 - Weak security & segmentation
 - Poor connectivity & performance
 - Lack enterprise features
 - Hard to manage



Mobile / Portable Classrooms

- **Connecting the portable classroom**

- If you have AC power, automatically build a mesh connection back to campus
- With the “left over” Ethernet port you can
 - Add a printer
 - Create a bridge and use a switch
 - Even add a cash register



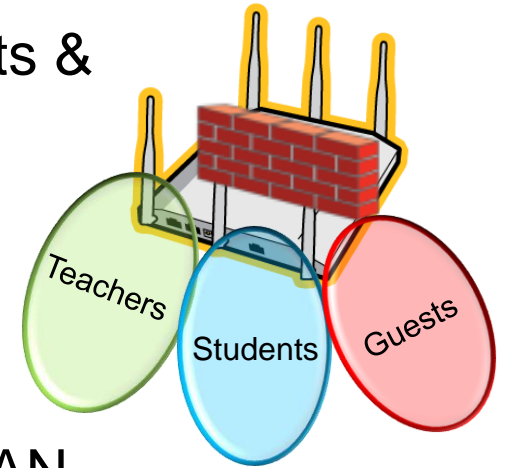
- **Connecting temporary networks**

- Sporting Pavilion
- School Fairs
- PTA meetings

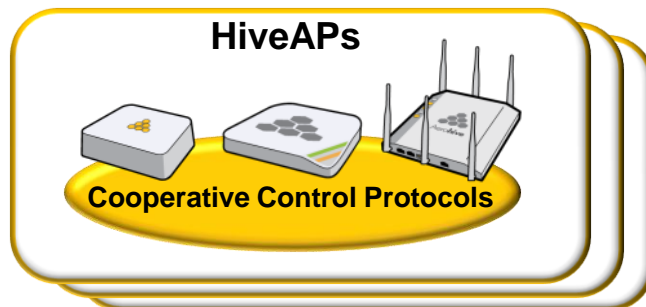
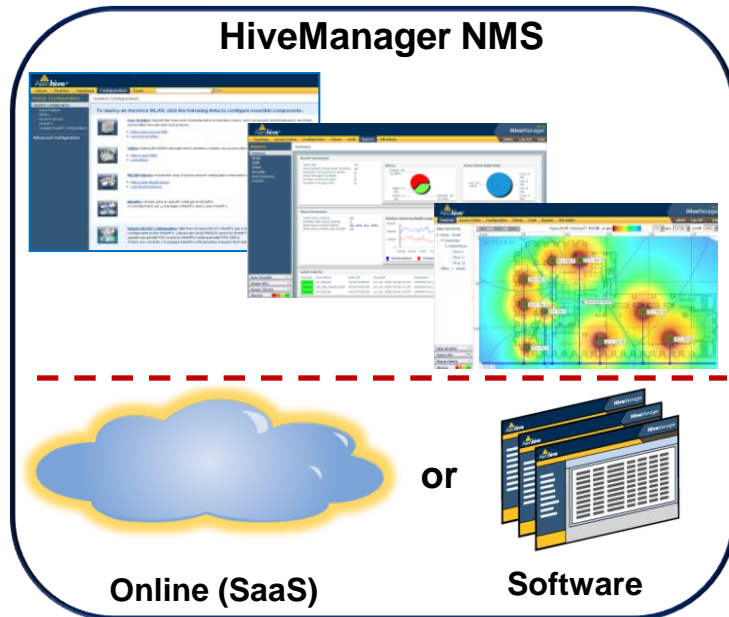


Security and Guest Networking

- Segmentation for Admin, Teachers, Students & Guests
 - Stateful Firewall, VLANs and tunneling
- Strong Authentication
 - Radius, Active Directory, LDAP and Private Preshared Keys (PPSK)
- Security/Authentication stays even if the WAN connection to HQ goes down
 - Built in RADIUS capabilities in the AP
- Easily create a guest network
 - Set up a captive Web portal on the fly
 - Brand it to build school spirit!
 - Users: Parents, Administrators & Guests



Aerohive Benefits for Education



- **Ease of Use**
 - Centralized management
 - Policy-based configuration
- **Deterministic high performance**
 - QoS and BW management
 - Immune to slow clients consuming all the airtime
 - Stable with larger numbers of clients
- **Security**
 - Advanced integrated security
 - Sophisticated policy segmentation
- **Cost Effective**
 - Scalable controller-less architecture
 - A single management system
 - APs only, deployed at each school
 - No feature licenses

Aerohive Education Deployments



Harrisonburg City Public Schools



BERKSHIRE SCHOOL



TECH & LEARNING



Today's Webinar



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Q&A and Resources

- Case Studies
 - <http://www.aerohive.com/resources/casestudy.html>
- Whitepapers
 - The Economics of Cooperative Control – Protocols are Free whitepaper -
<http://www.aerohive.com/resources/whitepapers.html#6>
- FREE Wi-Fi Planner
 - <http://www.aerohive.com/planner>
- Videos & other multimedia
 - 802.11n Video Series -
<http://www.aerohive.com/resources/multimedia.html>
 - Controller vs. Controller-less WLANs -
<http://www.aerohive.com/resources/multimedia.html#Episode1>

Thank You!

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