Fitzharrys School

Secondary School Leverages Wireless Mesh and Unique Authentication to Modernise Campus WLAN with Aerohive 802.11n Solution

Challenges

- Autonomous wireless access points (APs) could not keep up with growing demands
- Needed a wireless network that could handle an upgrade to the 802.11n protocol, and also from Wired Equivalency Protocol (WEP) to the more secure Wi-Fi Protected Access (WPA)
- Needed to improve reliability – APs constantly failed due to too much congestion on the campus Wi-Fi network
- Needed to a centrally managed wireless LAN architecture

Results

- Provided wireless coverage in outlying buildings using Aerohive's wireless mesh capability.
- Aerohive's controller-less Cooperative Control eliminated the single point of failure problem, making the system more reliable.
- Divided the Wi-Fi wireless network into three SSIDs for student, teacher and guest access; Aerohive also providing support for WPA and the latest 802.11n wireless protocol
- Using HiveManager to centralize configuration and monitoring, and also to simplify provisioning for system-wide policy management

Fitzharrys Secondary School, located in Abingdon, Oxfordshire, UK, has been educating students from ages 11 to 18 for over half a century. The campus, which serves nearly 900 students, consists of six large buildings, a smaller building with two classrooms, and a sport hall.

Computers have long been an important element of the curriculum at Fitzharrys. Several computer labs house PCs plugged into an Ethernet LAN. To augment these fixed devices, the school maintains 3 mobile trolleys with 16 laptops each, that can be wheeled into any classroom and distributed to students. Teachers also use laptops to register attendance each morning, and sixth form (Grade 12) students often bring their own laptops to school. To provide these mobile laptop users with access to the school's application server and the Internet, Fitzharrys deployed a campus-wide Wi-Fi network in 2003.

> "Since we deployed Aerohive, we don't get complaints [about the WLAN] anymore."
>
> **—Mike Markham**
> Network Manager, Fitzharrys School

Wireless Technology Showing Its Age

For the first year or two, autonomous wireless access points proved adequate. But over time, the consumer-grade technology could no longer keep up with growing demands. One of the first serious issues occurred when Mike Markham, Fitzharrys' Network Manager, attempted to upgrade the wireless network from Wired Equivalency Protocol (WEP) to the more secure Wi-Fi Protected Access (WPA). Immediately, the wireless bridges connecting the small two-classroom building and the sport hall lost their connection and could not be made to support the new security application. "We needed the security of WPA, but we couldn't justify the expense of running cable out to those two remote buildings."

The legacy wireless equipment fell short in other ways. "When 30 or more students turned on their trolley laptops at the same time, the access points often fell over because they couldn't handle the surge of traffic," says Mr. Markham. "We even added a portable access point to accompany the trolley, but that didn't cut the mustard either."

The most vocal complaints came from teachers who relied on the wireless network to report daily attendance each morning. A loss of connectivity meant taking attendance the old fashioned way with paper and pencil and handing it in physically.

No less an issue, changes or updates to the network had to be made on each individual autonomous access point, one at a time. It became clear to Mr. Markham that the school needed a new wireless solution.

Finding the Right Solution

Mr. Markham, Mr. Mayhew, the IT Technician, and Mr. Gosling, the Deputy Head to the School, collaborated to identify a set of criteria for a new wireless solution. Supporting new technology, such as WPA and 802.11n, was key, as was the ability to provide wireless coverage in the two outlying buildings without running cable. Centralized management was also high on the list. Above all, the new system had to be reliable. After evaluating proposals from Motorola, Aruba, Meru, and Aerohive, the decision to go with Aerohive was an easy one to make.

Cooperative Control Architecture for Reliability

During his evaluation process, Mr. Markham quickly recognized a critical difference between Aerohive and the other suppliers. All the others required a controller to manage the access points, which created a single point of failure. "If the controller dies, the network dies along with it."

In contrast, Aerohive's cooperative control access points (HiveAPs) require no network controllers or overlay networks. Instead, software in the HiveAPs enables them to self organize into groups called Hives. The result is enterprise-class network management and security without the cost, performance, and availability issues associated with controller deployments. Cooperative control eliminates the single point of failure, making the system more reliable. It also provides increased perfomance by eliminating bottlenecks inherent in a controller-based system.

Mesh-enabled Coverage

The challenge of providing wireless coverage in the two outlying buildings was met with Aerohive's wireless mesh capability. The feature can establish a wireless mesh connection between neighbouring HiveAPs using the second radio in the HiveAP. No costly cabling between buildings is needed. "Meshing was a feature many of the other companies didn't offer," says Mr. Markham.

Fitzharrys deployed the HiveAPs in August 2009. Mr. Markham and Mr. Mayhew removed the old access points, and Aerohive's partner Lan3 installed the new access points. To meet the needs of different users, Mr. Markham divided the wireless network into three SSIDs.

One SSID serves the sixth form students who bring their own laptops to school. Aerohive's unique Private Pre Shared Key (PSK) feature allows Mr. Markham to assign a separate PSK key to each student allowing for individual monitoring and revocation purposes. "It gives us an easy way to be accountable for students," says Mr. Markham. Another SSID, also using Private PSK, gives teachers mobile access to the same services and applications they would have if plugged into an Ethernet jack. And the third SSID enables guests to access the Internet when they are on campus. Aerohive's ability to schedule wireless access enables the networks to be automatically shut off after-hours.

Managing with Ease

Aerohive delivers a huge advancement over the old autonomous access points, which weren't very manageable. The HiveManager provides centralized configuration and monitoring and simplifies provisioning for system-wide policy management. "Our IT Technician attended the training class, but I can update access points and perform some other tasks. It's very intuitive," says Mr. Markham.

Reliability and performance of the HiveAPs have been excellent. "We would have outages and complaints from users all the time with the old access points. Since we deployed Aerohive, we don't get complaints anymore." The HiveAPs easily handle the strain of 30 or more trolley laptops logging on simultaneously.

Meeting Future Needs

Mr. Markham and Mr. Gosling wanted a wireless solution that would meet the school's needs today and for years to come. Aerohive provided that with support for features like WPA and the latest wireless protocol, 802.11n. Aerohive also provide updates for both the HiveManager and HiveAPs, allowing for a constantly up to date technology.

Another feature that caught Mr. Markham's eye was Aerohive's Dynamic Airtime Scheduling, which dramatically improves wireless LAN performance by measuring each client's instantaneous data rate and airtime use and scheduling airtime based on IT-specified policies. It ensures that fast clients, such as 802.11n clients, aren't slowed down by lower-speed clients, and it can enforce IT-specified policies to ensure that critical applications and users receive adequate airtime. "That will be beneficial to us as we push out more and more 'n' clients."