



CASE STUDY K-12 Schools

Fairfax County Public Schools drives operational efficiency with Aruba

Already one of the largest and most respected school districts in the country, Fairfax County Public Schools (FCPS) has an even more ambitious mission – to be a global leader in education. Because technology plays a critical role in completing that mission, the district’s IT department has a similarly bold vision: to be the premier information and technology services provider for education with an efficient and effective model for client-centered services.

“Our goal is not simply to provide students with occasional access to computer labs or to the Internet for research. It is to create a connected community where technology is available where and when you need it and is appropriate to your needs,” said Neal Shelton, FCPS network engineering supervisor.

“Now that our teachers have incorporated these new tools and techniques into their day-to-day classroom activities, our network has truly become mission critical,” Shelton added.

Steady growth since early adoption of wireless

FCPS was one of the first districts in the country to recognize that incorporating laptop computers and new technology in the classroom would require a large-scale wireless LAN (WLAN).



Since installing its first access points (APs) in 2002, the FCPS has seen its WLAN grow to include more than 238 schools and learning centers with over 10,000 APs. The WLAN now accommodates 49,000 users – 80% of whom are students – and 1.1 million sessions each school day.

Students and faculty use a wide variety of

client devices. Approximately 29% of users access the network with mobile devices, and 26% with Apple products, from laptop computers to iPads and iPhones.

Service quality drives management operations solution

Network engineers at FCPS were quick to recognize that they needed a specialized management operations solution to control a WLAN of that scale.

“The IT department is service-oriented,” said Shelton. “We need to make sure the network is running properly at all times and that students and faculty have a reliable connection, irrespective of the underlying infrastructure.”

This focus on service quality led FCPS to purchase and implement the Aruba AirWave Management Suite™. AirWave provides visibility into user behavior, centralized wired and wireless management, and ease of use that is unachievable with the element management systems from other vendors.



Network Size

- 238 schools and learning centers across 395 square miles
- Average of 27,000 concurrent users
- 49,000 unique users, 1.1 million sessions per day
- 240 multi-vendor mobility controllers and approximately 10,000 APs

Infrastructure Mixture

- Aruba 6000 and 3000 Mobility Controllers
- Aruba high-performance 802.11n APs
- Cisco APs
- Aruba AirWave Management Suite

Smooth transition to a new network architecture

When FCPS installed Aruba AirWave, the WLAN infrastructure consisted solely of fat APs from Cisco. Nonetheless, FCPS network engineers were pleased with AirWave's ability to manage multiple brands and generations of APs from the same console.

"The AirWave multivendor management capabilities align with our service-oriented, vendor-neutral strategy," said Matt Fry, senior network engineer. "Having a management solution that supports multiple vendors enables us to choose the best technologies for our needs without replacing or upgrading our infrastructure."

Multivendor management permits a more affordable, incremental approach to upgrades. This is especially important for school districts like FCPS since technology refresh cycles are always subject to the availability of school funding. In that type of environment, maintaining flexibility is critically important.

The wisdom of this approach was illustrated in subsequent WLAN rollout phases when FCPS deployed Cisco lightweight APs and controllers and then switched to Aruba as it migrated to higher-performance 802.11n.

"AirWave ensures that we can effectively manage service quality for our users," said Fry. "Using separate consoles for the different solutions would have been an operational nightmare. With AirWave, we can see and control the entire network in one place."

Aruba brings value and simplicity

In the Aruba products, FCPS found solutions that provide great value and reliability in the dynamic environment of a school campus.

"Aruba offers by far the best wireless equipment on the market today," said Shelton. "Our team has adopted a slogan – *It just works.*"

FCPS deployed Aruba 802.11n APs in its first school in 2008. There are now 22 sites that rely solely on the Aruba WLAN infrastructure and the district continues to expand the deployment as funding permits.

According to Shelton, Aruba's high availability features, including n+1 redundancy and seamless failover, reduce downtime and increase network reliability for the district. By centralizing configuration and troubleshooting at the district's main site, Aruba's master Mobility Controller architecture saves both time and resources since personnel no longer have to make trips to local sites throughout Fairfax County.

"With Aruba, bringing up a new site is far less cumbersome and time-consuming," Shelton noted. "In a matter of hours, our engineering team recently upgraded the largest secondary school in the mid-Atlantic with pervasive advanced wireless using more than 160 Aruba AP-105 access points."

For access control, FCPS leverages Aruba's Policy Enforcement Firewall (PEF), which enforces wired and wireless access policies that specify who may access the network— students, faculty, administrators and guests – as well as how and when. Aruba's ability to limit bandwidth by SSIDs allows the district to manage service quality for critical education tasks.

In addition, Aruba's RFProtect™ Wireless Intrusion Protection module is instrumental in preventing students from accidentally associating with unsecured networks from nearby residences or businesses.

"Neighbor APs are always an issue at our campuses," Shelton said. "The Aruba RFProtect Wireless Intrusion Protection module keeps the student population on our network, where we know they are secure."

Finally, FCPS relies on Aruba's Adaptive Radio Management (ARM) technology to minimize RF interference and ensure high availability. ARM optimizes Wi-Fi client behavior and automatically ensures that APs stay clear of interference, resulting in a more reliable, higher performance WLAN infrastructure.

"On campus, we have the whole gamut of 2.4-GHz devices – Bluetooth, microwave ovens, and more," said Shelton. "ARM lets us push everything to a cleaner spectrum without us having to think about it at all."

Faster troubleshooting adds up to substantial savings

AirWave's easy-to-use interface, along with the graphical view afforded by AirWave VisualRF™, provide FCPS with a view of every user and device connected to the network for faster remote diagnostics and troubleshooting.

"We depend on AirWave statistics," Shelton said. "We monitor all of aspects of the environment and track concurrent users, unique users, sessions, and devices on a daily basis. And if we need to, with a few clicks of the mouse, we can drill down to see individual users – where they are located, how strong a signal they're receiving, how much bandwidth they're using, and more."

That level of visibility is key to resolving problems quickly.

"Problems that previously took hours to resolve now take minutes" said Shelton. "With AirWave alone, we have realized a substantial savings over the years through operational efficiency, reduced downtime and consolidating our toolsets."

Partnering with Aruba and planning for success

AirWave also improved the district's planning capabilities.

"We always have a snapshot of where we are today and where we want to go tomorrow," said Shelton. "We chart everything and make decisions by looking at historical data going back over the last five years. All of this critical data is easily accessible from AirWave."

"Aruba has become not just a supplier but a true partner," Shelton continued. "Aruba knows that our mission is to be a global leader in education and technology and the people at Aruba have made it their mission to help us achieve that goal. The significant advantages of Aruba's infrastructure and the operational efficiency driven by AirWave add up to a solution that has become part of the fabric of our institution."

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Organization Overview

Fairfax County Public Schools is the largest public school system in the Baltimore-Washington metropolitan area and in Virginia, and the 12th largest school system in the nation. Students in grades pre-K-12 are offered a diverse, high quality curriculum. The district is a recognized leader in the use of technology in its instructional and administrative programs.

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Neal Shelton

*Network Engineering Supervisor
Fairfax County Public Schools*



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