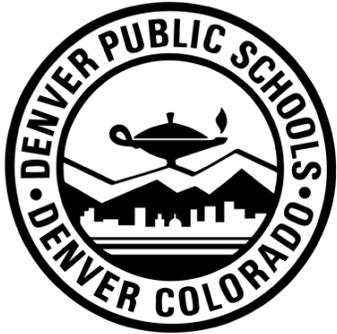


# DENVER PUBLIC SCHOOLS USES AIRWAVE WIRELESS MANAGEMENT SUITE TO OPERATE A DISTRICT-WIDE CISCO WIRELESS NETWORK



The Denver Public Schools implemented its first wireless network at Green Valley Ranch Elementary in 1999, and the network now consists of more than 2,400 wireless access points and provides pervasive coverage in 134 buildings district-wide. The network already serves a wide range of users, from students in classrooms to teachers and administrators, and the IT staff expects the user base to expand by more than 40% in the next year.

A shift in many schools from computer labs to mobile carts with laptops is contributing to this significant increase in usage. "Many schools don't have room for computer labs, and the laptop carts make it easier to incorporate technology directly into the classroom environment," said Bud Bullard, director of IT for Denver Public Schools. "With pervasive coverage available, we expect mobile computing adoption to continue to rise."

"Usage today is relatively evenly balanced between classroom and administrative users," said Bullard. "As with most businesses today, we rely heavily on a data-driven decision model. We're now encouraging all administrators and principals to purchase laptops so they can remain connected as they move from classroom to classroom, as well as throughout the district. However, some of our most common users today are nurses, psychologists, and social workers who frequently commute from school to school. Wireless connectivity makes it much easier for them to perform their jobs from anywhere in the district." While the wireless network was designed for data usage, the district is now deploying mobile voice over IP (VoIP) to allow users to make and receive calls from their listed number wherever they are working.

The wireless network is also utilized by guests ranging from short-term visitors like college recruiters, who are on campus for only a few days, to permanent tenants such as Denver Health, which operates on-site clinics in several schools. The district has configured its network to provide dedicated VLANs for wireless, and one of these is dedicated to guest usage, segregating these users and insulating the district network in the event that a guest PC is carrying a virus.

## WIRELESS NETWORK SIZE:

- More than 2,400 wireless access points across 134 buildings
- 1,000+ users

## HARDWARE:

- 2,400 Cisco 1100 series APs
- Cisco 4400 series controllers

## ARUBA PRODUCT:

- AirWave Wireless Management Suite™ from Aruba Networks

## AIRWAVE BENEFITS:

- Increased management efficiency through improved diagnostics, advanced troubleshooting, and reporting
- Greater wireless network visibility enabling the help desk to resolve problems remotely and efficiently
- Streamlined performance of routine management tasks such as updating controller configurations and software versions
- Eased network growth and evolution through support for multiple generations of technology, wireless standards and vendors

*"The single most important reason we selected the AirWave Wireless Management Suite is that it would clearly increase our efficiency through improved diagnostics, advanced troubleshooting, and reporting."*

**Bud Bullard**  
Director of IT  
Denver Public Schools



## ORGANIZATION OVERVIEW:

Widely recognized today as one of the best urban school systems in the country, Denver Public Schools serves the residents of the City and County of Denver, Colorado. Comprising 151 schools with a student enrollment of 73,018, DPS' mission is "to provide all students the opportunity to achieve the knowledge and skills necessary to become contributing citizens in our society."

With so many different types of users and applications, the wireless network has quickly become mission critical to the organization. Early on, the district IT staff used proprietary wireless management solutions provided by Cisco, its primary hardware vendor. As the need for visibility and control over the wireless network became more acute, IT identified an opportunity to upgrade its management capabilities by implementing AirWave Wireless Management Suite™ from Aruba Networks. "We spent many, many hours with other systems, so we quickly saw and understood the advantages that the AirWave software provides," said Mike Tracy, wireless network specialist for Denver Public Schools.

## CENTRALIZED MANAGEMENT AND CONTROL

While Denver Public Schools operates a large, pervasive wireless network, it has limited IT resources when compared to its peers in the corporate world. The entire networking team, which is responsible for all wired and wireless infrastructure, consists of only seven employees – and only one of these team members is able to dedicate more than half his time to supporting the WLAN and its users.

"The single most important reason we selected AirWave is that it would clearly increase our efficiency through improved diagnostics, advanced troubleshooting, and reporting," said Bullard. "User calls typically go first to our desktop support team, but wireless issues quickly got escalated to engineering. With AirWave software, we're planning to give the help desk more visibility to the wireless network, and to resolve problems remotely and more efficiently whenever they are escalated to us. With wireless usage increasing so rapidly, we needed this kind of capability to support our users with our existing staff levels," he added.

AirWave also makes routine management tasks, like updating controller configurations and software versions, more efficient. "AirWave's scheduling function is very useful. It allows us to determine exactly when we want updates to be applied or reports to be run so we can schedule these tasks when network usage is low and there will be minimum impact on performance," said Greg Birkett, manager of network services for Denver Public Schools.

## LIFECYCLE MANAGEMENT

Wireless technology has changed dramatically since the Denver Public Schools' first wireless network deployment back in 1999. Since then, the district has been through multiple generations of wireless infrastructure products, including early autonomous, or "thick," Cisco IOS access points. The district then moved to a different generation of Cisco autonomous access points. Finally, in 2004, following Cisco's acquisition of Airespace, Denver Public Schools began implementing a controller-based architecture with "thin" APs to simplify provisioning and configuration on a large network. Eventually, the district replaced or converted all its older, autonomous APs to create a more homogeneous infrastructure.

"Through that process, we learned that wireless technology changes rapidly and that it's good to be prepared for those changes when they come," said Birkett. "While we have a relatively uniform infrastructure today, we appreciate the fact that AirWave supports multiple generations of technology, multiple wireless standards, and even multiple different vendors," he added.



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