Arizona School District Pioneers Technology in Education and Relies on Robust Solution from Aerohive

Challenges

- Provide a resilient network for growing district with 1:1 environment
- Move away from costly controller-based architecture
- Enable more robust features for guest and student networks
- Plan effectively for future Wi-Fi needs without high costs of entry

Results

- Robust and reliable network across all 18 schools
- Flexible network features from Aerohive enable greater control and visibility
- Rock solid wireless foundation gives teachers creative license and encourages seamless use of technology
- Features from Aerohive allow IT team to offer enhanced services

About Vail School District

The Vail School District, located southeast of Tucson near the eastern border of Pima County, lies in the heart of the Southern Arizona's Sonoran Desert Valley. The District first opened in 1903 with a one-room schoolhouse, and its expansion did not fully begin to ramp up until 20 years ago when it grew from two schools to the 18 schools it administers today. The historical ranching and mining community has become a highly desirable location for suburban families in the greater Tucson area.

The District's 18 schools include four charter schools, a blended learning center and an online homeschool partnership with over 12,000 students in grades K-12 with over 1,700 employees. The District is proudly home to Empire High School, founded in 2005 as the first public one to one high school in the United States with all wireless device technology and fully digital curriculum.

The District has won numerous awards and gained national attention and notoriety for its use of technology in education. In addition, it was recognized by the Arizona Department of Education as the top-performing school district for two years in a row.

The Challenge

Vail School District is way ahead of the national curve for technology adoption in education. The District is now on its fourth generation of wireless infrastructure and first deployed a consumer-class Wi-Fi in 2001. Every school in the district has been a 1:1 student to device

environment for over 10 years. Almost five years ago, the District installed Wi-Fi on school buses so students could work while in transit. The *New York Times* covered the technology innovations at the District and word got out all around the globe. There is no exception a small school district in Arizona has set a high standard for integrating technology in education.

Matt Federoff, CIO for the Vail School District, points out that in the early days of Wi-Fi the expectation was to only have all adults on a wireless network. Then expectations began to transition to having everybody on the network, and today a wireless architecture must accommodate 'everybody, everywhere'. The challenge for the District has been to keep ahead of user expectations, and to recognize that users will always want more of it, in more locations, with more bandwidth and more reliability.

In 2005, the District implemented a Cisco wireless infrastructure for a broader and more comprehensive deployment. The District began to look at upgrading its Cisco architecture when it realized a controller-based solution was not going to sustain its network demands going forward. The management platform was clumsy and awkward and the controller was limited in its capabilities. Arizona is often plagued by violent thunderstorms and losing equipment is a fact of life. The mounting additional costs for licensing fees, firmware updates and costly spare equipment drove the District to consider an alternative for better resiliency and network management.

"The weak link is the controller itself, which is very expensive and a single point of failure," Federoff says. "If that dies, we're done. You buy the 50-station or 100-station controller and that's what you've got. If you didn't buy big enough, you have to throw that one away and buy another, which is as much as a full-time first-year teacher."

The District grew at a rapid rate, adding 15 schools in 12 years, the fastest growing school district in Southern Arizona. The District is overall textbook free in all K-12 classrooms with pervasive digital instruction, so it is an understatement that the network architecture mandated superior quality.

The Solution

The Vail School District explored vendor options, including Xirrus, Juniper, Ruckus and Meraki. After determining to move away from a controller-based solution, the District was impressed by the Aerohive solution. The District especially liked that Aerohive allowed for very low cost of entry with low capital expenditures so it can start out small and add on as required.

The Vail School District could teach a thing or two to any educational institution looking to implement technology in education. The District has been a BYOD environment for over five years. Ten years ago, Empire High School opened with little to no printed materials. While many districts are just now transitioning to an environment like Empire, Federoff counsels many schools to think outside the box, and to think beyond simply putting a device in students' hands.

"Devices come and go, but IT professionals in education need to put the most effort into things that aren't necessarily very sexy but are terribly capable, like the backbone and foundation of the network itself," explains Matt Federoff, CIO. "If we're taking away printed materials and using a device as the primary way of delivering instruction, then you must back it up with rock solid infrastructure, like the solution offered from Aerohive."

Case in point is found at Empire High School. When the school broke ground in 2005, it used the Apple MacBook, then five years later switched to HP netbooks, a year later switched back to MacBooks, and this past fall, the freshman class received Google Chromebooks. Looking beyond the device forces educators to consider what will enable student success for the long term. And Vail School District knows the most critical piece to that puzzle is found in a reliable network infrastructure.

The District now has up to 7,000 users on its network, with approximately 4,000 devices. The District uses Aerohive AP120, AP320 and AP170 access points across its campus locations, including the Aerohive AP170 in outdoor commons areas for uninterrupted access. The District utilizes HiveManager Online for cloud-based network management and policy control.

The District has multiple networks in place for students, staff and guests. The flexibility and features of the Aerohive solution enable the IT team to manage the network easily, but with much more control than it previously had. If students break online user agreements, they are then relegated to the 'no-fun filter', resulting in only being allowed on a network that has access to educational resources, without social media or entertainment options during lunch times or after school. The regular student network takes advantage of Aerohive features, enabling access to Facebook during lunch, for example, and shutting networks off during non-school hours.

Going from three schools and just over 2000 students, to 18 schools and over 12,000 students today made it imperative that the network infrastructure could easily scale and be managed remotely. The 18 schools are connected through a metro area network and the guest network is managed remotely through HiveManager Online.

The Results

Since implementing wireless, moving to BYOD, and a 1:1 classroom environment, the District has not only seen enormous change, but also enormous benefit.

Aerohive's controller-less solution has reduced capital expenditures and allows the District to scale and grow as needed, easily adding access points, without heavy expenses for additional controllers, or other costs associated with licensing fees.

As a result of the District deploying wireless and moving away from printed materials, the monetary savings have been tremendous. In 2006, the District spent $51.00 per student in printed materials. Four years later, it reduced that spending to just $9.00 per student.

Having a resilient and robust Wi-Fi in place is essential when you are a 1:1 environment. The District recognizes part of its success is based on using technology in an organic fashion. For example, kindergarten through fifth grade students use iPod Touch devices. When observing students, the device becomes just like markers or glue, or any other tool a student may use to complete work. "Our success is not found in an app or software, it's a mindset that starts with having rock solid connectivity", Federoff explains. "You can't build a house without the concrete, and the foundation is the most important. I cannot underestimate the importance of the value of good infrastructure like Aerohive delivers."

When the Vail School District opted to move to all-digital classroom environments and pervasive Wi-Fi, the key question asked was 'What do we want the students to learn?'. The answer to that question came through the creation of a proprietary open source content repository, called Beyond Textbooks, used in all District schools and in 87 partner districts across the state of Arizona. This repository is driven by peer affirmation and teacher contribution, and today contains over 25,000 digital resources uploaded through the network by educators themselves. Teachers access content from Beyond Textbooks frequently, and as a just in time resource, it is integral to lesson plans. Having a robust wireless network in place from Aerohive is absolutely crucial in an environment that relies on few printed materials and a repository like Beyond Textbooks for core teaching curriculum.

Users expect the network to be available anywhere and everywhere. Mobile carts are used in schools for transporting devices. Classrooms are equipped with tables instead of desks to provide room for notebooks and other devices. Digital projectors are also found in each classroom. Apple TVs will be used exclusively at a new school opening this fall, "and the District hopes to use Bonjour Gateway from Aerohive in the near future.

In addition, the flexible features from Aerohive enable the IT team to say 'yes' more often than the default answer of 'no'. If guests or groups come to campus, a network can open up for their use, with settings and security set up remotely. Teachers have no limitations in what they can offer in classroom settings.

"It never hurts to put more investment into wireless infrastructure, it will always pay off," states Federoff. "Aerohive has demonstrated it understands the importance of a solid network architecture, that is essential for Vail School District. We have a sacred obligation to support our teachers and 'have their back digitally' and Aerohive enables us to do just that."

Wireless Roots Run Deep

Many school districts turn to Vail for insight and direction. Matt Federoff emphasizes that the most important consideration is the architecture, the backbone of a network. The Vail School District has its roots as an agricultural community, and so it's not a stretch that Federoff compares the wireless network to a fertile field.

Good connectivity on campus will always be presumed. What the Vail School District recognizes, and has done, is to first clear the land, fence and plow the ground, and then hand off a fertile field to a teacher and let them get to work. Federoff implores, "You can have the most creative and bright teachers, but they can't plant on rocky ground. Aerohive has enabled us to leverage the power of wireless technology, and with a stable and reliable network in place, there is no limit to the ideas our teachers can implement."