

K-12 Education

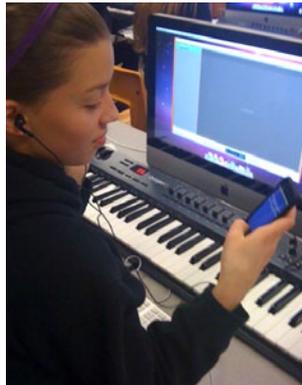


Huge School District Takes Students and Teachers into an Untethered 21st Century with Ruckus Wireless

Like many school districts, St. Vrain Valley (30 miles north of Denver) was under pressure to bring a 21st century learning experience to its students. Wi-Fi was an integral part in making this happen.

As more and more wireless-only smart devices were proliferating their 45 schools by both teachers and students, St. Vrain was unable to adequately support them. The existing wireless network was a patchwork of disparate Wi-Fi products that provided neither the coverage nor the stability to adequately support all the essential Web-based learning applications. Moreover, user and teacher expectations for an untethered and ubiquitous wireless experience at school was growing - and growing fast.

A Cisco shop, St. Vrain had sprinkled Cisco access points (APs) in a handful of schools around the district but needed to take a more comprehensive and strategic approach to delivering high-capacity, high speed Wi-Fi services for different user groups.



St. Vrain Valley School District has deployed one of the largest and most advanced Wi-Fi networks serving 45 K-12 schools across 411 square miles in northern Colorado.

"It became pretty clear that a reliable Wi-Fi service at all of our schools was the key to transforming and improving both the teaching and learning experience," said Joseph McBreen, Chief Information Officer at St. Vrain Valley School District. "But this was a huge task to undertake given the size of our school district, the budget available and limited amount of IT resources we have."

Servicing 13 communities spread across 411 square miles, St. Vrain operates 45 schools that consume over 3.7 million square feet of space. St. Vrain's computing environment consists of approximately 10,000 networked devices: one-third MAC (OSX), PC (Windows 7) and thin clients (CITRIX). In addition, St. Vrain supports hundreds of Apple iPads and iPhones.



30 miles north of Denver
411 square miles
26 elementary, 10 middle, 9 high schools
51 buildings (3.8 million square feet)
27,000 students, 4,000+ staff
10,000 network devices, 3,500 laptops
5 field techs, 2 network techs
650+ Ruckus ZoneFlex access points
34+ Ruckus ZoneDirector controllers

St. Vrain uses Citrix ZenApp to deliver a Windows desktop to teachers and staff. The thin client is used for basic back office applications from word processing to email. Other applications used over Wi-Fi include Google apps, student information systems (Infinite Campus), learning management (Moodle), guest access, and in the future, IP video streaming, VoIP, and point-to-point/multipoint Wi-Fi (5GHz) for long-range connections to the schools.

Convening technology review committee, St. Vrain began a rigorous evaluation process of potential wireless systems that included all the leading WLAN suppliers. St. Vrain's

DISTRICT OVERVIEW

Thirty miles north of Denver, St. Vrain Valley is one of the largest school districts in Colorado. With over 26,000 students and 4,000 staff, St. Vrain serves 13 communities with 45 elementary, middle and high schools. St. Vrain has one of the largest and most advanced Wi-Fi deployments in the country.

REQUIREMENTS

- Dual-band 802.11n
- Strong/stable client connectivity
- Support for wide range of MAC, PC, thin clients, iPads, iPhones, etc.
- High-capacity support for large numbers of concurrent clients
- Simple and centralized management
- Support for streaming multimedia
- Low latency, low packet loss
- Simple configuration and deployment
- Uninterrupted roaming
- Seamless integration with existing backend authentication servers

SOLUTION

- 657+ ZoneFlex 7962 / 7363 dual-band 802.11n access points
- 28 ZoneDirector 1000 controllers
- 6 ZoneDirector 3000 controllers
- FlexMaster Wi-Fi management system

BENEFITS

- Simple installation
- Proven support for 75+ concurrent clients on a single AP
- Seamless failover of APs
- Centralized district-wide management from FlexMaster
- Seamless integration with existing AD authentication
- Rock-solid performance and client connectivity





"We'd never seen wireless behave like this. It was simply astounding."

More reliable Wi-Fi is enabling applications that wired networks just can't.

As a result, smarter Wi-Fi is transforming the learning and teaching experience for the 21st century school."

Joe McBreen
Chief Information Officer
St. Vrain Valley
School District

key requirements included strong client connectivity, multimedia support, dealing with a high volume concurrent clients, simple configuration and deployment, remotely monitoring, management and reporting and the ability to adapt to the changing conditions and client orientations.

"Our biggest concern was the connection to the client," said Eric Merrill, network technician at St. Vrain. "New smart handheld devices are not like laptops. These devices often have weak Wi-Fi implementations. So when the orientation of the devices change, the users experiences wild swings in performance. We wanted Wi-Fi technology that could adapt to such changes."

After an exhaustive evaluation, St. Vrain began testing the Ruckus ZoneFlex system. "Our main objective was to break the product and see where and when those breaks occurred," said McBreen. "But we had some problems."

For the testing, St. Vrain selected a location not friendly to RF signals within one of its middle schools. The location was a science lab surrounded by metal materials that inhibited signal propagation and electrical equipment that raised the noise floor - making it difficult for any Wi-Fi AP to send and receive.

St. Vrain started by placing 30 802.11n Mac laptops in a classroom and running through a battery of association, users authentication and performance tests. Once completed, St. Vrain began streaming 1-2 Mbps video data streams simultaneously from each laptop.

ST. VRAIN LESSONS LEARNED

- 1. Perform extensive site surveys**
Vendors will tell you they are not necessarily needed but they are. Perform them ASAP prior to any large-scale deployment.
- 2. Get network drops done quickly**
Especially important in areas where there might be environmental concerns such as asbestos, special materials, ceilings, etc.
- 3. Use meshing wherever you can**
Plug in mesh nodes in areas where you can't cable. It's easy and fast, saving time and money.
- 4. Test, test, and test again**
Put as much pressure as possible on your vendor's product to see if it lives up to the marketing hype. Get as many clients as possible to stream video and access you most important applications, use multimedia content for testing.
- 5. Use 5GHz 802.11n bridges**
These links can be extended 6 miles or more at 50 to 75 Mbps to save thousands of dollars on monthly bandwidth costs from fixed broadband connections to schools.
- 6. Choose distributed forwarding**
Reduce latency and simplify deployment by selecting WLAN controllers that don't require all traffic to be funnelled through a central controller.



ABOVE: Silver Creek High School (left) and Westview Middle School are among St. Vrain's 45 schools that now enjoy a ubiquitous 802.11n network to support a wide range of applications from Google Docs to Infinite Campus, Moodle to (soon) IPTV - all over smarter Wi-Fi.



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“Despite vendor rhetoric, the only way to really evaluate wireless performance and usability is to test it - so we did.

With Ruckus, not only did we see demonstrable better range, performance and client density, we didn't have to run all our traffic through a centralized controller.

Many vendors will tell you they support distributed forwarding but, when push comes to shove, they don't recommend it.

Ruckus did and it made things so much easier.

And we like easy.”

Eric Merrill
Network Technician

St. Vrain Valley
School District

Unable to bring the dual-band AP down, St. Vrain network technicians turned 30 more Dell laptops on and began pulling video streams.

“We had 60 concurrent devices streaming video from two classrooms and couldn't break this thing so we began pulling out iPhones, iPads... anything we could get a hold of to make it fail,” said McBreen. “Ultimately we had 78 devices pulling traffic off a single AP, and it wouldn't fail. That's when we knew we'd made the right decision.”



St. Vrain selected 3dB Networks as its strategic partner and integrator. 3dB Networks began performing site surveys, configuring the network and installing APs. Once deployed, Ruckus APs automatically configure over the network, thereby reducing deployment cost and time

St. Vrain wanted discrete wireless LANs in each school but all managed as a complete system using Ruckus FlexMaster, a centralized Wi-Fi

management system. 3dB Networks began deploying ZoneDirector 1000s and 3000s across the schools to manage hundreds of ZoneFlex APs.

By the end of the project, 3dB Network will have deployed approximately 1000, dual-band 802.11n APs to cover all 51 locations. The schools also planning to utilize point-to-point 802.11n (5GHz) bridges to provide high-capacity broadband connections into select locations. This will eliminate recurring monthly costs from expensive fixed line broadband connections.

In August of 2011, St. Vrain plans to roll out, district-wide, IP-based video content (IPTV) over Wi-Fi using MediaCAST, an on-demand learning platform. The Ruckus ZoneFlex system uniquely support IP-based unicast and multicast video through its adaptive antenna array combined with a sophisticated QoS engine that automatically classifies and prioritizes traffic.

“With a rock-solid Wi-Fi infrastructure in place, we can now get creative and focus on delivering more applications and content to teachers and students everywhere,” concluded McBreen.

RIGHT:
In stress tests, St. Vrain used 60 Mac and Dell 802.11n-equipped laptops in different rooms to concurrently stream Flash-based video through a single, dual-band Ruckus ZoneFlex 7962 within one of their most challenging RF environments.

Technicians were able to test up to 78 simultaneous devices active on a single AP without a hiccup before running out of more devices to use.

