case study

OVERVIEW

Lodi Unified School District is located in San Joaquin County, California. It encompasses the cities of Stockton and Lodi and currently has roughly 30,000 students across 7 high schools, 10 middle schools and 38 elementary schools over 350 square miles (910 km^2).

WHAT THEY NEEDED

- Higher performance, higher capacity district-wide indoor/outdoor WiFi infrastructure.
- Scalable WiFi infrastructure to support tens of thousands of Chromebooks
- Great wireless connectivity to meet mission critical testing and interactive curriculum needs
- Simplified and scalable WLAN management to support thousands of APs and tens of thousands of clients
- To reduce monthly broadband costs
- A W-Fi solution that requires little or no ongoing IT support

WHAT THEY DID

- Tripled client capacity and through-put with over 1,200 new Ruckus R700 802.11ac WiFi access points
- Increased the number of concurrent clients supported per AP while improving signal strength and wireless reliability
- Integrated new WLAN with existing iboss content filtering system
- Deployed long-range point-to-point WiFi bridges at select schools to reduce recurring broadband costs
- Quadrupled WLAN management capacity and scale with SmartZone 100 cluster

Lodi Unified School District
Educating Students for Success

K-12 Education

PLANNING FOR THE FUTURE, LODI USD MAKES THE MOVE TO 802.11AC TO COMBAT DEVICE EXPLOSION AND GROWING CAPACITY DEMANDS

When is the right time to migrate to the newest high-speed 802.11ac WiFi standard?

That's the question Lodi Unified School District (Lodi USD) needed to answer with a rising tide of wireless traffic and more powerful devices hitting its wireless network. About 35 miles south of the state capital of Sacramento, CA, Lodi USD encompasses six additional communities, covering 350 square miles with some 50 K-12 schools serving roughly 30,000 K-12 students.

Like many schools facing the same considerations, Lodi decided to begin an ambitious project to upgrade and expand its WiFi infra-structure across the entire district. The reasons for it suggest that a lot of other enterprises may make the same decision sooner rather than later as more powerful WiFi devices hit the market and more media-rich applications are used in and out of the classroom.

EXIT 485

Lodi 12 1 MILE

"We needed a unified wireless infrastructure that could give us the longest possible lifespan and headroom for new media-rich applications being run on smart mobile devices in the classroom," said Edith Holbert, network systems supervisor for Lodi Unified School District (LUSD). "You have to be prepared for whatever clients are out there today, as well as five years from today. Our move to 802.11ac is a key part of our strategy to stay ahead of this technology trend that everyone is facing."

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Lodi USD's decision to move quickly on 802.11ac was spurred by funding for its 1:1 initiative that provides each student with a mobile device such as an Apple iPad or Google Chromebook. These devices are used for essential classroom applications and tasks such as SBAC (Smarter Balanced Assessment Consortium) testing, a system of next-generation assessments aligned to the Common Core State Standards. The 1:1 initiative, phased in over three years, will bring over 30,000 devices to Lodi USD's new wireless infrastructure.

Shifting to 802.11ac provides a big increase in spectral efficiency, allowing more clients to get on and off the WiFi network at faster rates thereby boosting WLAN capacity. The higher capacity will support the continuing influx of more powerful WiFi clients especially as more devices become 802.11ac capable and used for even more intensive tasks.

"The need for higher Client density and wireless bandwidth is skyrocketing," says Dan Maclise, lead network engineer with Lodi USD's Technology Services department. "AC lets us serve two or three times more concurrent client connections at much higher data rates and stay ahead of the client technology curve. That's huge."

The new 802.11ac deployment now gives Lodi USD a unified indoor/outdoor WLAN that combines a mix of 1,900 ZoneFlex 7982, 802.11n with over 1,200 new R700 802.11ac access points (APs) to meet wireless connectivity requirements they will face. The 802.11ac also includes more powerful and scalable WLAN management with the deployment of new Ruckus SmartZone 100 WLAN controllers that will be managed as a cluster from a single interface, scaling to support 3,000 APs and 60,000 clients. Wireless traffic is tunnelled from WLAN controllers to Lodi USD's data center where iboss content filtering and other packet inspection services can be performed.

The Ruckus BeamFlex antenna, integrated into each ZoneFlex R700, consists of multiple physical elements controlled by specialized software that focuses RF signals toward each associated client, maximizing the radiated energy in some sectors and reducing it in others. The result is a dramatic improvement in the signal-to-interference-and-noise ratio (SINR), creating a cleaner, stronger signal compared to conventional enterprise APs.

"Ruckus access points simply give us stronger signal strength at longer distances while supporting much higher client densities," said Maclise. "On top of that, Ruckus gave us a range of deployment options with a rich and highly scalable management architecture at pricing that dwarfed alternatives." Maclise noted that the purpose-built design of the ZoneFlex R700 around the 802.11ac standard helped set it apart.

For some schools where broadband fiber was not feasible or cost prohibitive, Lodi USD is using Ruckus 5GHz point-to-point WiFi bridges, reducing recurring broadband costs by thousands of dollars a year. Ruckus long-range WiFi bridges are capable of delivering 100 to 150 Mbps or more of reliable wireless broadband connectivity over several miles.

ABOVE:
Lodi USD is providing tens of thousands of computing devices to students causing increased pressure for more reliable and higher density WiFi connectivity.

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> "Our move to Ruckus 802.11ac gives us the confidence that we can meet the fast changing device and application demands that are simply becoming impossible to anticipate."

Edith Holbert
Network Systems Supervisor

Lodi Unified School District

For user authentication, Lodi USD has been using Ruckus-patented dynamic pre-shared key (DPSK technology. With DPSK a unique encryption key is automatically generated and installed on each device upon successful user authentication, Each unique key is bound to the MAC address of the client within the Ruckus controller. This provides robust and simple security, effectively eliminating the need for more complex and cumbersome schemes such as 802.1X that require the administration of client supplicants and certificates on client devices.

For rich data analytics to better optimize the infrastructure and understand usage trends, Lodi USD will use Ruckus SmartCell Insight (SCI) for collecting, analyzing, parsing, and storing a myriad of WiFi traffic statistics.

"The Wi-Fi network is having a profoundly positive impact on student learning," said Holbert.

"Since upgrading our wireless infrastructure to support our scholastic software programs, we've seen demonstrable gains and growth in students previously performing below their reading level. For educators, that's really the bottom line."

ABOVE: For increased capacity and performance to support its 1:1 initiative, Lodi USD is migrating to the new 802.11ac standard with Ruckus R700 access points managed by a cluster of new SmartZone 100 WLAN controllers.

Ruckus Wireless, Inc.
350 West Java Drive
Sunnyvale, CA 94089 USA
(650) 265-4200 Ph \ (408) 738-2065 Fx

www.ruckuswireless.com