Industry: Education

Customer case study

Wireless network for students

RAFA Systems makes remote learning possible for students in rural school district

Highlights

- A rural school district in Western New York needed better Wi-Fi access for students to participate in remote learning
- RAFA Systems, Inc., worked with Phoenix Contact to design a wireless network at public locations throughout the district
- The new network has enough bandwidth to handle numerous students at greater distances, while also complying with federal security requirements

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Steve Smuda, operations manager at RAFA Systems

Customer profile

RAFA Systems, Inc., is a system integrator located in Cattaraugus, New York. RAFA Systems specializes in creating remote monitoring systems that provide 24/7 remote access and control for both the government and private sectors. RAFA believes in providing simple and effective asset management solutions.

Challenge: Remote learning in a rural area

RAFA Systems worked with a rural school district in Western New York that serves about five towns. During the Coronavirus lockdown in spring 2020, the school district found that only about 40 to 50 percent of the students had access to Internet at home. When the 2020-21 school year started in the fall, the school opted for remote learning, which meant about half of the students in the district needed a way to access study materials and recorded versions of their classes.

Figure 1: The FL EW-EW75000-08 radio provides IP67 outdoor wireless access points (WAP) with high-speed wireless connectivity for harsh and demanding environments.

The school's initial solution was to drive school buses around to different points in town. The buses would park for a few hours at a time at locations with public Wi-Fi access points, like fire departments, town halls, etc. The students could visit the buses in the parking lot to access the school network using MiFis from Verizon.

These networks had a limited range and bandwidth, so only a small number of students could log on at a given time. In addition, the system required significant labor, as school employees manned the buses from approximately 8 a.m. through 7 or 8 p.m., every day.

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Solution: Wireless connection and Power over Ethernet

RAFA Systems worked with the school district to install an industrial wireless network that would provide better Internet access to the students. The system needed to meet the school's strict security requirements, offer high bandwidth, and cover a larger geographic area than the original system.

Steve Smuda, operations manager at RAFA Systems, explained, "We were hopeful that there was a way to expand the Wi-Fi or Internet service out, away from the box itself, and that's how we were introduced to this system."

Jason Opferbeck, the president of RAFA Systems, has a longstanding relationship with Kyle Young, Industrial Sales Engineer at Phoenix Contact USA. They had previously worked on a remote wireless monitoring system for water/wastewater facilities, so RAFA was familiar with Phoenix Contact's wireless capabilities. Smuda said that Phoenix Contact products are "our go-to for communications."

RAFA selected the FL EW-EW75000-08 access point radio from EtherWAN for this project. The radio's Power over Ethernet (PoE) capability set it apart from others, as it only required one cable for both data and power. The all-in-one radio and antenna come in a single IP67 housing. The system also included Phoenix Contact's TC Router, an industrial 4G LTE mobile router that enables high-speed Internet connectivity via mobile networks. To ensure extra reliability, RAFA Systems wired the systems with Phoenix Contact surge protection.

"The Power over Ethernet, the surge suppressor, and the TC router are all in a NEMA 4X enclosure, but the EtherWAN antenna itself is outside the box. All electronic components are sealed inside the enclosure," Smuda explained.

The EtherWAN radio operates on 802.11ac technology, which allows a higher bandwidth. This is valuable in cases when there are a higher number of connections at one time. The radios also have a greater range than the previous solution, so students can work up to 450 feet away from the box.

The school needed IT-level security to comply with the Child Information Protection Act (CIPA).

"That was the kicker to actually being able to supply the Wi-Fi access to them, so they could lock out all the questionable material that is available on the internet. So, the network locks out any type of alcohol content, firearms, pornography, etc. – most of which is blocked out by these systems," Steve explained. "It's regulated by the federal government, and any type of internet access that a school provides is required to have this… if you're not in compliance, there are hefty fines associated with it. So, it's important to be able to provide that security level. Every unit is password-protected with the password being provided by the school. The school then provides the students with that password."

Figure 2: Phoenix Contact's TC Router, an industrial 4G LTE mobile router that enables high-speed Internet connectivity via mobile networks.

Smuda said that the school has an AT&T program that helps to meet the CIPA requirements. "The hardest part of this project was actually getting the routers programmed with the CIPA compliance through the SIM card. Kyle assisted us with some of the initial programming and then put us in touch with the gentlemen at EtherWAN, who were instrumental in helping us set up the security protocols." Smuda and another RAFA programmer, Matthew Gold, worked with AT&T and the school system to program the TC Routers on-site.

Results: Upgrade pays off

According to Smuda, the school's been happy with the results so far. He said, "The benefit to the school is the ability to have their students who work offsite complete their assignments while being able to work from home or remotely successfully."

While some other companies have provided similar public Wi-Fi systems for schools, most of them are a MiFi-based communications system that does not allow as many students to connect at once or from as great a distance from the Wi-Fi Unit.

"[The other system] doesn't provide that 400 feet range where you can have multiple kids using it from their vehicles. We've had success from 450 to 480 feet. On campus, they can be out on the

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Figure 3: RAFA Systems installed nine access points around the district, including some rural locations.

football field or in the stands by the football field, or they can work from anywhere in the parking lot. It provides access to a lot more students at any given time," Smuda said.

By October 2020, RAFA had installed nine wireless set-ups for this school district, including four on the school campus and five outliers on rural buildings.

The project helped RAFA Systems expand its expertise, by getting into "more diverse markets," said Smuda. In fact, RAFA is in communication with another school district about installing 10 similar systems for that district.

He said RAFA's confidence level in Phoenix Contact is "100 percent, both before this project and during it. We have been very happy with the relationship that we've had with Phoenix Contact. Any issues we have had with the communications products, including the TC Router, have been addressed in a timely manner. It's always been a pleasure to work toward resolving an issue because we've dealt with people that are very knowledgeable about all the products."

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