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CASE STUDY

Illinois Century Network Partners with Fortinet to Protect K-12 Broadband Connectivity

High-speed internet is absolutely vital to modern K-12 education. That may seem obvious, but a lack of broadband connectivity can have a severe impact on both student learning and school operations. To support equity in education statewide, the Illinois State Board of Education and Illinois Board of Higher Education teamed up in 2000. They developed the member-driven Illinois Century Network (ICN) to provide internet connectivity to every public K-12 school in the state, free of charge.

"It is pretty clear that students who do not have access to high-speed internet cannot participate in the modern world of rich-media, interactive content, and live interactive video sessions or streaming video," says Robin Woodsome, manager, ICN Field Operations. "For schools across the country, the new teaching models are driving a need for more bandwidth."

Administrative and other functions also suffer without high-speed connectivity. "Universities require K-12 schools to have high-speed bandwidth in order to participate in their research projects," adds Frank Walters, network architect for ICN. "Lack of broadband availability reduces students' opportunities and preparedness for university or college."

That is why, when Governor Pritzker launched Connect Illinois to expand the state's broadband capabilities in 2019, he dedicated substantial resources to upgrading the ICN network. "Governor Pritzker sees broadband connectivity as a utility, similar to electricity and water, streets and roads," explains Dale Walters, chief of network operations for the state of Illinois. "Through Connect Illinois, he provided $20 million to the Illinois Century Network, to bring broadband internet to our public K-12 education institutions."

Schools' WAN Service Must Be Secure

The ICN's infrastructure was dated, so the project focused on "upgrading to new optical networking hardware that could support speeds up to 100 Gbps," Dale Walters says. "Our goal was to build a broadband infrastructure to support the needs of K-12 public schools in every corner of the state—not only their current needs, but their needs for the next several years as well."

As the ICN team designed this new broadband network, security was a key concern. "Many school districts struggle with security," Frank Walters says. "Doing it properly is difficult and expensive, and experts are hard to find in some regions of the state. So, when we were strategizing how to get the schools the connectivity they need, we knew that we needed to provide a system that would be as secure as we could make it."

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Details

Customer: Illinois Century Network

Industry: Government

Location: Springfield, Illinois

Business Impact

- Secures broadband connectivity for schools statewide

- Adds no measurable latency to schools' internet traffic

- Minimizes total cost of ownership (TCO) for high-performance network security

- Minimizes staff time required for firewall management

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They decided to design a wide-area network (WAN) that would be a safe place for schools to communicate with one another, he adds. "And then we would have a single presentation of those K-12 schools to the internet, through the firewalls that we provide. This became top-of-mind when the COVID-19 pandemic hit, because we saw a significant uptick in both ransomware and DDoS [distributed denial-of-service] attacks on our schools."

Frank Walters emphasizes that the ICN's intention was not to provide all the security that a school or district would need. "We are not dipping into their local IT environments and trying to take over," he says. "We want to assist schools with the needs that they identify, and whether they take advantage of our services is totally optional. Some schools opt to maintain the security solutions they already have in place. But we knew that since we would be providing those last-mile circuits for them, we also needed to provide an outer layer of security."

Protecting Schools at the WAN Edge

The Illinois Century Network sought a firewall solution for the WAN edge. They had previously been standardized with a different solution, but a cost-benefit analysis brought Fortinet to the forefront. "It is always risky to step away from what you know," says Frank Walters. "But the state encouraged us to review the total cost of ownership [TCO] of each choice—not just the up-front purchase cost, but the cost of maintaining it, the cost of training, the whole ball of wax. When we started looking at the numbers, Fortinet stood out."

The state imposed a tight deadline to complete the ICN broadband infrastructure. Initially, all participating schools' internet traffic passed through the Chicago data center. The team rolled out a pair of FortiGate next-generation firewalls (NGFWs) to secure that traffic.

"We had to move quickly to meet the state deadline, so we implemented the firewalls in standalone mode," says Andre Bouravnev, network supervisor for ICN. "That is changing. We have worked closely with Fortinet engineers to determine the best configuration of the firewalls. Since the deployment, we switched to a standby-active configuration for failover. The next step is to bring a second pair of FortiGate firewalls online in Springfield."

The team is considering transitioning both NGFW pairs to active-active status, with load balancing between the two. Bouravnev reports that they will soon begin testing.

Fortinet Generates Substantial TCO Savings

The NGFWs are already exceeding expectations. "We are now providing schools with an environment that is exactly what we said it would be," says Frank Walters. "The security piece was crucial, and Fortinet was very helpful throughout the process in making sure everything was configured right for the schools."

Currently, over 200 districts representing about 1,660 schools utilize the ICN, and more than 100 of those are taking advantage of the new broadband firewall services. Others have their own firewalls at the headend where their local-area network (LAN) connects to the ICN. Whether to take this layered security approach is up to district administrators.

"This is extremely beneficial to schools in underserved parts of the state, where broadband is not readily available," Woodsome says. "Because we provide secure broadband service at no cost, we are helping those districts catch up so that they can deploy the same types of learning programs as schools in areas of the state where access is more readily available."

Solutions

- FortiGate
- FortiManager
- FortiAnalyzer

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The FortiGate NGFWs support those historically underserved schools by protecting traffic without introducing any latency. "We have done really thorough performance testing in the past few months, of different components of our network," Bouravnev reports. "We have isolated the FortiGates and have not found any delay to customer traffic going through the firewall. Everything looks really good."

For the ICN, the ability to minimize TCO while securing schools' high-performance connectivity was key. Bouravnev estimates that with the Fortinet solution, ICN will save millions of dollars in capital and operating expenses over the next five years.

Network administrators use FortiManager to streamline and centralize configuration of the FortiGate NGFWs. They also use FortiAnalyzer for reporting and analysis of security events on the network. "We are very new to Fortinet, so we are still learning to get the most out of the tools," Bouravnev says. "So far, though, we have been pleased, although the FortiGate is a fairly complex and sophisticated firewall, the GUI [graphical user interface] navigation of the firewall and the management tools is not complex. Unlike some security tools we have worked with previously, the Fortinet interface makes everything easy to find. The documentation and support are good as well."

Ultimately, Bouravnev says, the ICN team is pleased with Fortinet. "We did not need a firewall that was overly complex, and we wanted it to be easy to manage and not require a lot of staff time. At the same time, we needed a network that could perform past 100 gigs. The Fortinet solutions match our needs well."

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