

High-Performance Juniper Infrastructure Enables 1:1 Learning at Union County Schools

Summary

Company:

Union County (N.C.) Public Schools

Industry:

Education

Challenges:

Refresh and secure the school district's network to support a 1:1 learning initiative with more than 22,000 netbooks

Selection Criteria:

A high-performance, reliable, and secure network with low total cost of ownership

Network Solution:

- EX4500, EX4200, and EX3300 Ethernet Switches
- MX240 3D Universal Edge Router
- SRX1400 Services Gateway
- IDP8200 Intrusion Detection and Prevention Appliance
- MAG4610 Junos Pulse Gateway with SSL VPN
- STRM2500 Security Threat Response Manager

Results:

- Supported a 1:1 learning initiative with 24,000 netbooks
- Stopped a large DDoS attack and protected IT resources
- Built a high-performance, secure network for schools and data center
- Improved network performance and lowered TCO



Union County Public Schools (UCPS), located in the Charlotte, N.C. metropolitan area, serves more than 46,000 people, including 42,000 K-12 students and 4,500 teachers and staff. Union County is one of the 20 fastest growing counties in the country, with people flocking to the area for a blend of suburban and rural living and the county's highly rated schools.¹

Challenge

UCPS introduced 22,597 Lenovo Chromebooks as the final stages of the district-wide 1:1 program in grades 6-12. When every student has a netbook in hand, teachers can better engage learners with interactive digital curricula and move away from outdated textbooks. Students can learn at their own pace, and assessments can be done online.

The school district needed to upgrade its network and security to meet the unyielding demands of tens of thousands of students and teachers with netbooks. The existing network was already running at more than 60 percent utilization. "We were putting 22,597 Chromebooks on the network, and we needed more bandwidth," says Tony Burrus, chief technology officer for UCPS.

"After an onsite demonstration, testing and peer recommendations, we were impressed not only by the product performance capabilities but also Juniper's support services."

Tony Burrus, CTO, Union County Public Schools

¹"Living in Union County," Union County Government, August 2013. <http://www.co.union.nc.us/LivingHere.aspx>

Selection Criteria

UCPS needed a high-performance, reliable, and secure network infrastructure to support the demands of digital learners. The network had to support at least one device per student and faculty member—and deliver the capacity required to maintain operations when tens of thousands of students tried to stream video all at once. Security had to be stringent to protect students from inappropriate content, ensure the integrity of the school district's administrative and academic systems, and meet federal and state regulatory compliance requirements.

After meeting with Juniper executives at a conference, Burrus agreed to evaluate Juniper Networks® EX Series Ethernet Switches alongside the district's existing switches as a potential solution for the district's new network infrastructure. It also evaluated the Juniper Networks IDP8200 Intrusion Detection and Prevention Appliance as part of its security defenses. After a thorough review, the Juniper solution passed the test with flying colors, delivering a lower total cost of ownership and superior performance.

"After an onsite demonstration, testing and peer recommendations, we were impressed not only by the product performance capabilities but also Juniper's support services," says Burrus. "We wanted to ensure the support team would be ready to help whenever issues or trouble arose."

Solution

The 1:1 learning program, which spans from elementary to high school, is an important part of Union County's strategic goal to develop high achieving and globally competitive students. "This summer, we provisioned 22,597 Chromebooks, put 8,952 machines in surplus, and re-imaged everything else," says Burrus.

UCPS installed Juniper Networks EX4500 and EX4200 Ethernet Switches in its schools, data center, and repair depot. The high-performance, highly available EX Series switches are carrier-class solutions for branch offices, campuses, and data centers. Both the EX4500 and EX4200 support Juniper's unique Virtual Chassis technology, which enables multiple interconnected switches to operate and be managed as a single, logical device, consolidating switch layers to reduce management overhead and deliver operational efficiency, business continuity, and network agility. With the new Juniper infrastructure, UCPS increased its network bandwidth tenfold and doubled its Internet connection. Juniper Networks MX240 3D Universal Edge Router delivers high-performance, reliable connectivity between the schools and administrative offices, as well as for the Internet connection.

The district uses the Juniper Networks SRX1400 Services Gateway to provide high-performance network security and to support fast, secure, and highly available operations.

Faculty and staff can gain secure access to their key applications and information wherever they are. Juniper Networks MAG Series Junos Pulse Gateways with SSL VPN enable policy-driven security enforcement and provide authorized users with safe, secure remote access. The MAG Series gateways integrate with the district's authentication servers and interoperate with SRX Series gateways, EX Series switches, and any 802.1X device for dynamic security policy enforcement.

Results

Just weeks after installing the new Juniper switches, UCPS was hit by a distributed denial-of-service (DDoS) attack. The attack, which appeared to come from external sources, was bombarding the school's Web server with 15 million hits every five minutes.

Fortunately, in the upgrade of its network, UCPS installed the IDP8200, which is designed to identify malicious activity, log information about such activities, attempt to block or stop attacks, and report on them.

UCPS was still learning how to use and optimize its new network when the attacks were launched. That's when it became clear to Burrus that the district was in dire need of help. "We called Juniper at 9 p.m. in search of much-needed high-level support, as we had been under attack for a week, and the system was starting to melt down," he says. "By 7 a.m. the next morning, we had a Juniper engineer onsite and senior representatives online."

The Juniper team worked diligently to block the attacks and fine-tune the rules on the IDP8200 device to ensure that malicious traffic was blocked while legitimate traffic was allowed. It also replaced the district's legacy firewall with the SRX1400 Services Gateway to better protect the perimeter.

In all, Burrus estimates that it took two weeks to get the situation fully under control. Each time the school system adjusted its network security, the attacker would shift targets. "The Juniper team stayed with us until the job was done, and the attack stopped," says Burrus.

The move to Juniper was made with careful consideration, and Burrus has no regrets. Having a single Juniper Networks Junos® operating system across switching, routing, and security has helped the school district lower TCO and simplify maintenance and training. "At first it was scary going from Cisco to Juniper," says Burrus. "The network engineers had to learn a new operating system, but once they saw how easy it was to use, they were happy. Junos OS is simple and straightforward."

"Juniper has helped us build the best network to support 1:1 learning for our students," says Burrus. "The Juniper relationship is good. I can call any of the local Juniper people here and bounce ideas off them and ask what we need to do to make it happen."

Next Steps and Lessons Learned

Prior to the DDoS attack, UCPS was already on a path to implement stronger security, but the sustained assault accelerated that plan. Without the Juniper security in place, the school might not have known about the attacks until the network went into full meltdown. One lesson learned was simply that “infrastructure is everything,” says Burrus.

For More Information

To find out more about Juniper Networks products and solutions, please visit www.juniper.net.

About Juniper Networks

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