



CASE STUDY

Keeping Holiday Cash Registers Humming Across Expanding Store Footprint with Secure SD-WAN and SD-Branch Solutions

The largest family owned and operated specialty gift business in the northeastern U.S., The Paper Store is thriving, both online and in its brick-and-mortar operations. More than 4,000 employees currently work at nearly 90 stores across six states, and in the company’s 500,000-square-foot distribution center in Leominster, Massachusetts.

New stores are opening frequently, keeping the company’s seven-person IT team very busy. When Director of IT Alex Fuchs joined the company two years ago, he immediately saw that the network—and the security infrastructure that protected it—needed a major overhaul to enable the team to support the growing business.

The Path To SD-Branch and SD-WAN

“For many years, product cost—not resilience or performance—had been the main decision criterion in selecting technology,” Fuchs says. “Our legacy routers and switches were widely dispersed, and we had to have a third party perform network management and design.” Ironically, those services came at a premium price.

One way Fuchs was able to reduce complexity and rationalize costs was to consolidate security and networking functions into fewer appliances. That led him to a software-defined branch (SD-Branch) approach, including next-generation firewalls (NGFWs), secure in-store Ethernet switching, and wireless access, with software-defined wide-area networking (SD-WAN) at the edge, enabling optimal utilization of all available WAN links. The solution wasn’t obvious from the beginning, though. “We were initially looking for an NGFW,” Fuchs says, referring to a Level 4-7 appliance that would include intrusion prevention system (IPS) anti-malware, web filtering, and secure sockets layer/transport layer security (SSL/TLS) inspection.

The IT team tested NGFWs from its legacy networking provider as well as other offerings, including the Fortinet FortiGate appliance. “The FortiGate firewall turned out to be the right solution for what we were trying to do,” Fuchs asserts. “The fact that Fortinet also offered the entire threat protection stack and the ease of management from a single pane of glass only amplified the reasons why we wanted to make the switch.”

The migration to SD-Branch opened up new opportunities for improvements on the WAN side as well. For example, they were able to eliminate their dedicated Voice-over-IP



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Details

Customer: The Paper Store

Industry: Retail

Location: Headquarters in Acton, Massachusetts

Business Impact

- Maximize revenues in peak sales seasons by ensuring availability of transaction processing systems
- Total cost savings of \$1 million on network management, monitoring services, and equipment leases

(VoIP) routers. “Our VoIP provider wanted us to have a completely separate segmented network for phones that all looped back to their proprietary VoIP router,” Fuchs explains. “They had us connect the phones directly through PoE [Power-over-Ethernet] injectors to the coupled ports on that router, which from our perspective introduced another point of failure. With Fortinet’s integrated Secure SD-WAN solution, we could avoid using the dedicated VoIP routers—saving \$500 in every store—and we could manage the VoIP connections directly through the FortiGate appliances.”

In considering both the SD-Branch and the SD-WAN solutions, Fuchs points to their proof-of-concept experience as a key factor in their decisions: “We had a Fortinet solutions architect come out to help us get our proof-of-concept tests up and running. When we inadvertently misconfigured something, that same architect came down the next morning at 6:00 a.m. and helped us sort it out. Just having that outside perspective was helpful, and we were able to find the issue very quickly. It has been smooth sailing ever since.”

According to the IT operations manager, Kenneth Guild, “Being able to provide us the support we needed to quickly and effectively learn about the products and to stand them up was just huge for us.”

Fortinet Secure SD-WAN Expands Connectivity Options

Leveraging Fortinet Secure SD-WAN enables The Paper Store to make optimal use of whatever WAN connectivity options they have at each location, as Fuchs explains: “We have T1, coax, or common carrier at all the sites—some Metro-E, some fiber—but always a public connection with a site-to-site VPN [virtual private network] tunnel. It was really important that the FortiGate appliance natively supports LTE connectivity via USB or the FortiExtender so we could add circuits to the stores in the case of a carrier outage. It has also expanded our available bandwidth at least sixfold. We’ve nearly eliminated our 1.5 Mbps T1 circuits. Now our slowest connection is 10 Mbps.”

Fuchs adds that he was happy to discover that with FortiGate in place, implementing SD-WAN was almost effortless: “We realized the FortiGate provides all these additional features as part of the combined licensing, and all we had to do was add FortiExtender to achieve SD-WAN.”

As a Secure SD-WAN solution, the FortiGate NGFW also provides a protected on-ramp to cloud services. “Pretty much everything we use at the store level is in the cloud in some shape or form,” Fuchs says. This includes the stores’ VoIP service, as well as their Kronos time and attendance, Payroll from ADP, and Aptos Point of Sale.

Simplified In-store Network with Single Management Interface

A typical store uses a branch-level FortiGate device to provide WAN edge protection as well as advanced routing for the in-store network. A FortiSwitch access switch with connected FortiAP access points (APs) provides employee Wi-Fi access. In this compact design, the firewall, switch, and router functionalities are combined into a single appliance that is tucked away in the store’s network cabinet.

Fuchs compares the solution to their previous architecture, based on multiple, discrete point products: “The legacy router was managed via SSH; the switch had its own web-based GUI; and the access points had a separate controller, which was notoriously unreliable,” he says. “With three different planes of management, there was no great way to ensure consistent configuration and deployment. Even though those devices were being managed by a service provider, there was quite a bit of investment on their end, including proprietary coding tools, to be able to manage all those different devices.”

Now, Fuchs and his team leverage FortiManager and FortiAnalyzer to manage all the branch devices and no longer need the third-party service provider for those stores that have the new architecture. “We have significantly more visibility,” he says, “so that when we have an

Business Impact (contd.)

- Sixfold increase in WAN bandwidth
- Greater visibility into, and control of, all nodes in the security infrastructure
- Faster deployment of new stores and streamlined management of outages, with significantly reduced IT staff time

Solutions

- Fortinet Secure SD-WAN
- FortiGate
- FortiGuard Security Services
- FortiCare
- FortiAP
- FortiSwitch
- FortiExtender
- FortiManager
- FortiAnalyzer

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issue with a device that might be connected to a FortiSwitch, our ability to troubleshoot that device is greatly enhanced.” Recently, when they experienced some problems with the VoIP phones at one of the stores in New York, they were able to use the log analysis in FortiAnalyzer to pinpoint the cause.

Overcoming Mall Connectivity Restrictions

One of the challenges for many retail stores is that they are inside malls or other managed real estate complexes. Property owners often restrict the number of carriers that retailers can bring into the stores—sometimes they are allowed only a single carrier at a time. So, many retailers rely on backup LTE links to ensure they always have a working connection.

To improve LTE reception for the FortiGate NGFWs housed inside metal racks, The Paper Store replaced its legacy adapters with FortiExtender devices. “We noticed an immediate improvement in throughput and signal strength,” says Fuchs. The IT team is now exploring the dual SIM capabilities within FortiExtender, which will allow stores to switch cellular providers based on connection quality and cost.

Previously, The Paper Store had leased third-party devices to provide cellular WAN connectivity to its legacy routers in the stores. “At \$300 a month plus the cost of data, those legacy devices were an expensive way to achieve LTE connectivity,” Fuchs recalls. “So, being able to buy the FortiExtender as a one-time purchase, and have it covered for five years, is pretty significant.” The Paper Store has saved an average of around \$5,000 per month, as well as avoiding the lost revenue and additional costs The Paper Store formerly incurred anytime it experienced an outage.

The Fortinet solution is also helping the retailer reduce the cost of its in-store surveillance. Every store is equipped with 14 to 20 video cameras. Previously, monitoring those cameras was a hassle, according to Fuchs. “We had to have a third party do that monitoring for us. Now, some of the new FortiSwitch appliances we purchased have been allocated specifically for the cameras. We put them on a separate VLAN [virtual local-area network]. All those cameras now get DHCP reservations from the FortiGate, so we know exactly where they are. We have eliminated the monthly third-party monitoring charge, for a cost savings of \$1,100 a month.”

WAN Outages Must Not Stop Sales

Disaster recovery (DR) is an essential component of any retail network, especially because it depends heavily on wide-area links that are not under the retailer’s control. “With our legacy solution, in case of a WAN failure, one analog phone line at the register at the front of the store had to be used to manually call in and authorize each credit card transaction,” Fuchs recalls with a shudder. “Now, we are standardizing on the FortiExtender for SD-WAN and failover capability, so that has been hugely beneficial for us. In fact, we have become so dependent of the ability of the FortiExtender to keep the stores online that we almost feel naked without it.”

The new DR capabilities were put to the test during the last holiday shopping season. “Several stores—including our highest-performing store—had some level of primary circuit failure during the month of December, a period when the company typically generates more than a quarter of its annual revenue,” Fuchs says. “With the Fortinet Secure SD-WAN solution in place, those stores stayed online and were able to assist customers with their transactions. In fact, they were not even aware of the outage.” Granted, failing over to the cellular link cost The Paper Store a premium for each of those locations. But it was a fraction of the cost of downtime—stores generate between \$10,000 to \$100,000 a day in the peak season.

To better prepare for the next inevitable outage, Fuchs’s team is starting to do some rate limiting using SD-WAN policies within FortiManager. “When we lose a primary data circuit, we want to ensure that we keep only essential traffic up and running on the more costly LTE failover link,” Fuchs says. “We like the quality of service controls that the Fortinet solution provides us to be able to shut off all the noncritical traffic.”

In addition to minimizing revenue loss, Fuchs’s team also needs to avoid prolonged network troubleshooting at the stores. “With the legacy equipment, it had become a huge time sink for us,” he says. “Since we made the change to Fortinet, we no longer have to deal with many of those issues. That is why we are going full steam ahead and adopting it across the board.” Once the company has moved all its stores over to the Fortinet architecture, Fuchs anticipates that it will save about 20% in annual network management outlay.

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Relying more on wireless connectivity through the Fortinet SD-Branch solution is also making it easier for the retailer to set up new stores. “We have almost got it down to an automated provisioning system that is very reproducible,” Fuchs explains. “We will soon be able to configure a store in a box, and we will be able to light up the store exclusively on the FortiExtender. The techs can stage everything on their bench, test all the tunnels, and then palletize the entire setup and ship it out to the store. We will be able to go from having to send someone onsite for a week to build a store, to not having to send anybody. That is a significant cost savings just in and of itself. I anticipate we will be doing about 12 new stores this year.”

Reining in Support Costs

When replacing its aging infrastructure, The Paper Store needed to consider not only the price of the technology but also the ongoing cost of maintenance and replacement. “We had some very expensive support contracts and agreements just to be able to replace our legacy devices,” Fuchs says. “We had to have an incident response retainer with a third party to replace any malfunctioning routers or APs. Initially, we spent almost \$100,000 a year. And then the execution on it was very much lacking. With Fortinet, there’s total ownership. The level of support and all of these features and capabilities really drove us to Fortinet as the only viable vendor in the space that would meet our needs.” Guild concurs: “If I ever run into an issue, I’m able to reach directly out to the Fortinet support team through the site, and they are back in touch very quickly and promptly with a good response.”

After deploying the Fortinet solution, The Paper Store contracted for 24x7 FortiCare Technical Support on all of its FortiGate NGFWs, and they keep hot spares stocked. Nearly everything else has 8x5 FortiCare Support. “In areas that are truly critical, we do HA [high availability] pairing with the FortiGate firewalls to ensure that we have more resiliency,” Fuchs says.

Demonstrating PCI Compliance

Like most retailers, The Paper Store must comply with the Payment Card Industry Data Security Standard (PCI DSS). Because management of the legacy solution was outsourced, compliance audits became costly. “Remediation and compliance reporting were all billable time, and that was on top of the contract, at about \$150 an hour,” Fuchs explains. “In some cases, it took 10 to 12 hours to remediate one of those audits. With all the repeated scans, it could go back and forth for days.”

To better prepare for PCI audits and minimize remediations, The Paper Store performs quarterly PCI DSS scans of its network environment through an approved scan vendor (ASV). As Fuchs and his team started to deploy the FortiGate firewalls in the stores, they had the ASV run the initial scans in a mixed FortiGate/legacy environment. “Invariably, the scans on the legacy devices would turn up some sort of vulnerability, sometimes two or three, that needed to be addressed,” Fuchs says. “The FortiGate firewalls had nothing—absolutely nothing. From a security and risk perspective, that impressed me right off the bat.”

Extending the Security Fabric Throughout the Retail Footprint

To cover any remaining gaps in their attack surface, The Paper Store has fully adopted the Fortinet stack across its organization. “We are using FortiClient for VPN access and for PCI compliance endpoint scanning; we have deployed FortiAP wireless access point in the stores; and we are leveraging the FortiSwitch core switches in our data center,” Fuchs explains. “It has been huge to have the FortiSwitch in our data center; virtual machine (VM) restores that used to take up to 12 hours now take only 5 to 6 minutes.”

In addition to deploying technology, the IT team is keen to adopt the latest best practices in delivering network agility needed to support The Paper Store’s rapid growth. “One of our team members is really eager to get more training on SD-WAN so we can better leverage that side of the house,” Fuchs says. “We have some very excited engineers over here. They cannot wait to get their hands on more of the Fortinet solution.”

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