Upper Grand District School Board Enables 21st-Century Teaching and Learning with Secure SD-WAN Initiative

The impact of technological innovation is ubiquitous. With arguably one of the greatest potentials for positive change, the world of education is embracing many of the same tools and resources that are transforming the commercial world. However, one of the biggest obstacles, especially in the K-12 sector, is the absence of a network infrastructure capable of supporting the teaching and learning requirements of the 21st century.

Recognizing the criticality of scalable, high-speed internet connectivity, the Ministry of Education in Ontario, Canada, launched a multiyear program to modernize broadband services for its schools. The program's goal is to enable a cost-effective, secure, and scalable infrastructure with an initial target bandwidth of 1 Mbps per student.

Education in an Online World

Located in central Ontario, the Upper Grand District School Board (UGDSB) was selected as a pilot board in the province's initiative to elevate its networking capabilities. With 65 elementary schools, 11 high schools, and covering 1,600 square miles, UGDSB's 3,000 dedicated teaching and support staff serve approximately 34,000 students.

One of the challenges faced by the school board is delivering the necessary bandwidth in a manner that is both equitable and secure. The complexity of protecting the web-based activities of students and staff is further compounded by the proliferation of board-owned desktops, laptops, Chromebooks, iPads, and other smart devices within the school environment. Further adding to this complexity is the need to support the board's bring-your-own-device (BYOD) policy for both students and educators.

Laying the Foundation

A project team comprised of board and Ministry of Education personnel was formed to provide strategic and technical guidance for the broadband modernization program. John McCormick, associate chief information officer for UGDSB, volunteered to be a member of the project team. One of the first activities of the team was to conduct a survey to understand the network situations of school boards across the province.

All the school boards responded to the survey, and the resulting data was analyzed. McCormick notes, "The results of the survey quickly confirmed our suspicions that a

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Details

Customer: Upper Grand District School Board
Industry: Education
Location: Ontario, Canada

Business Impact

- Modernization of WAN and internet infrastructure via SD-WAN implementation across a huge geographic area

- Significantly improved schools' internet capacity and applications performance within existing operational cost structure

- Simplified management, deployment, and improved operational efficiency

- Ability to perform detailed SSL inspection with NGFW

- Enhanced levels of security and reduced attack surface

- Flexibility to accommodate advanced teaching and learning techniques

major overhaul of the school boards' infrastructure, which was primarily based on an MPLS [multiprotocol label switching] architecture, was needed. We took the opportunity to evaluate new approaches and technologies, including SD-WAN architecture."

Software-defined wide-area networking (SD-WAN) is gaining popularity with organizations like UGDSB that need to scale their internet capabilities. A benefit of SD-WAN is the ability to aggregate different transport technologies—including fiber, cable, and wireless—to effectively provide sufficient capacity. SD-WAN topologies offer increased scalability, flexibility, simplicity, and cost savings in comparison to the legacy MPLS-related architectures.

At UGDSB, the lack of cost-effective internet capacity led to restrictions on which applications could be used. Some students and staff countered these restrictions by using virtual private network (VPN) clients and/or moving to secure sockets layer (SSL)-encrypted traffic. "Using our FortiAnalyzer we observed the increasing trend towards SSL-encrypted content," McCormick says, "and we anticipated that this type of traffic would hit at least 80% of our total volumes sometime in the next 20 to 24 months." Having visibility into SSL traffic became one of the UGDSB's security requirements.

Time for Homework

The broadband modernization technical team evaluated a shortlist of leading vendors of SD-WAN technologies based on information from a number of sources, including data from Gartner Magic Quadrant reports. McCormick worked with long-time advisor Integra Data Systems, a leading supplier of technology solutions to Ontario's K-12 education system and recent recipient of the prestigious Fortinet Enhanced Technology Partner of the Year award, to procure the FortiGate equipment for the evaluation.

The vendors' equipment was evaluated based on both SD-WAN and security-related criteria developed by the team. This process provided valuable insight into the capabilities of the prospective solutions, including the ability to aggregate transport capacity, behaviors when a link failed, and recovery from the interruption when a link was restored. A request for proposal (RFP) was issued by the Ontario Education Collaborative Marketplace (OECM) based on the evaluation criteria and experience of the technical project team. Contracts were awarded to several resellers and manufacturers. The region's school boards were able to pick the solution that best fit their needs and were invited to leverage the RFP award as a procurement vehicle.

Top of the Class

McCormick recalls, "When it came time for UGDSB to decide on its SD-WAN solution, we compared the Fortinet FortiGate next-generation firewall [NGFW] with another option from a manufacturer with whom we also do business. We chose the FortiGate enterprise solution for several reasons, including SSL inspection capabilities, throughput, deployment flexibility, and internal staff expertise."

He continues, "Many vendors approach the SD-WAN space from a network-centric standpoint but Fortinet takes a security-first perspective and combines it with strong network capabilities. In our environment, it's imperative for us to protect student and staff personal information and Fortinet's stronger security play was another key factor in our decision process."

UGDSB deploys FortiGate NGFWs at each school to provide perimeter protection and utilizes a high-availability pair of FortiGate appliances at the board's primary data center. "By design, Fortinet Secure SD-WAN architecture requires security to move to the perimeter where the school is connecting to the internet," McCormick states. "Deploying FortiGate NGFWs at each school protects the school from vulnerabilities."

To complement the FortiGate deployments, the school board also uses the Fortinet FortiManager centralized management platform and FortiAnalyzer logging and reporting solutions. "The FortiManager solution's single-pane-of-glass interface makes deploying and managing FortiGate devices anywhere in the environment much more efficient," explains McCormick. "The ability to centrally manage and push out templates to all of our facilities gives us significant operational savings and is a huge advantage when responding to a security incident."

He adds, "FortiAnalyzer gives us an enterprise view of what's happening across our network, and provides a context that you can't get from individual appliances alone."

Solutions

- Fortinet Secure SD-WAN
- FortiGate
- FortiManager
- FortiAnalyzer

Partner

- Integra Data Systems

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UGDSB's Fortinet solutions are integral components of the Fortinet Security Fabric, an architecture that supports the rapid exchange of threat intelligence between Fortinet devices and other vendors' products. The Security Fabric facilitates coordinated protection across the school board's entire infrastructure without impacting performance or increasing management overhead.

Leading by Example

UGDSB has deployed more than 14,000 Chromebooks in its schools, and as a result, the board has one of the highest ratios of Chromebooks per student in Canada. McCormick elaborates: "Because some students are allowed to take the devices home, we're excited to be exploring the Fortinet FortiClient for Chromebooks product, which provides the ability to enforce our security policies even when the children are not connected to the school network; this may be extremely valuable to us. FortiClient can also help protect the Chromebooks we have provided in public libraries for children in the more rural areas, where cost-effective internet services are not as readily available."

McCormick notes, "The Fortinet FortiGate, FortiManager, and FortiAnalyzer solutions have provided a solid network foundation that has helped us meet the Ministry's broadband modernization project objectives and provides a secure, scalable, and manageable platform to address our dynamic network needs."

He concludes, "Working with Integra Data Systems has enabled us to select and efficiently deploy the right solutions. Fortinet understands the unique challenges we're facing in education to deliver meaningful learning opportunities to students while maintaining the necessary levels of security. Our relationship has been very solid and we're happy to call both Integra Data Systems and Fortinet our partners."

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