Summary

Challenges

- Daunting prospect of funding thousands of PC upgrades

- Underpowered network with insufficient throughput

- Need to support 28 locations, 20,000 students, 2,500 staff

- Growing bring-your-own-device (BYOD) and IP multicast demands

Value Created

- Dramatic Improvements in network performance, speed-of-deployment, and management functionality

- IPTV and streaming applications delivered via new IP multicast capabilities

- Considerable dollar savings anticipated with shift from printed textbooks to newly-enabled online curriculum materials

- Device authentication, consistent policy application, and comprehensive reporting for wired and wireless systems

Solutions, Technologies, and Products

- Extreme Fabric Connect

- Virtual Services Platform 9000 Series

- Virtual Services Platform 8000 Series

- Virtual Services Platform 4000 Series

- Ethernet Routing Switches 4850

- Identity Engines Ignition® Server in High Availability

- Identity Engines Ignition® Guest Manager

- Identity Engines Ignition® Access Portal

Texas School District Embraces Extreme Networks Infrastructure to Enable 21st-Century Learning Models

Pearland, Texas—When the Pearland Independent School District (ISD) administration wanted to update their district-wide PC operating system to Microsoft Windows 7, they faced the prospect of upgrading 12,000 desktop computers across 28 locations.

The IT group and district management teams considered various options, and narrowed them down to two: replacing all legacy computers with new Microsoft Windows 7 PCs; or embracing a Virtual Desktop Infrastructure (VDI) strategy, which would accelerate Microsoft Windows 7 adoption and also allow replacement of computers and other devices on an end-of-life basis. Ultimately, it was determined that the VDI approach would consume the least in terms of precious IT resources and deliver the most in terms of return on investment.

In consultation with the Extreme account team and the Extreme channel partner, Layer 3 Communications, the District drilled into what the implications of a VDI strategy were for its network. Greg Bartay, Director of Technology, comments, "We were actually very pleased with the Extreme network that we had been running for several years because, functionally, it was a very easy product for us to use. We considered it bulletproof, and it seemed like it could run forever. However, we also realized it wasn't going to give us everything we needed to deliver a full complement of 21st-century educational capabilities.

We had no hesitation about staying with Extreme, it was simply a question of upgrading to the best overall platform for all our anticipated needs."

Pearland ISD envisioned a network environment that could deliver ample bandwidth capacity for VDI and, at the same time, safely address bring-your-own-device (BYOD) demands from students and staff. They also wanted reliable, state-of-the-art IP Multicast capabilities for delivery of IP-based television (IPTV) and other streaming applications that teachers and administrators wanted to incorporate into Pearland ISD curriculums.

In order to deliver a network that could meet these objectives, the District decided to upgrade its Core and Edge switching infrastructure, as well as deploying a foolproof method for robust BYOD support. They chose the Virtual Services Platform (VSP) 9000 for the Core of the network and VSP 4000 and 8000. Ethernet Routing Switch (ERS) 4850 products are variously deployed at the Edge. The access management solution includes the Identity Engines Ignition®Server in High Availability, Identity Engines Ignition® Guest Manager, and Identity Engines Ignition® Access Portal.

"We knew that it would take a very strong and resilient network to handle everything we planned to do with it,"Bartay states. "The particular combination of Extreme products that we chose to upgrade our network is the ideal solution to handle our needs for bandwidth, flexibility, scalability, ease of management, and enhanced network security. It enables us to run dual high-capacity 10 Gigabit links within the Campuses, and it features the Fabric Connect technology, which will enhance our use of Multicast-based applications. Most importantly, we have been comfortable historically with Extreme solutions, with the company, and with its people. We feel that everything about Extreme is very solid."

Pearland's 9-7-4 Solution

Maintaining always-on applications access for 28 separate locations is no small challenge, but it's one that the relatively small Pearland ISD team can handle with relative ease. The VSP 9000 supports mission-critical services with its hardened architecture, carrier-grade operating system, system-level health checks, and self-healing capabilities coupled with interruption-free software patching. With Fabric Connect technology the team never needs to reconfigure the network core. Moves, adds, and changes are done in real-time, with a simple end-point provisioning model that makes changes easier than ever before.

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At the same time, the VSP 8000 adds a Distributed Top-of-Rack capability that boosts the performance of applications, significantly improves service agility, and leverages Extreme Fabric Connect to deliver network-wide virtualization. The District can employ a building-block approach to realize extreme flexibility, with no hard-and-fast topology constraints. Substantial capital savings can be realized through the unique hardware architecture.

Finally, the VSP 4000 extends the Fabric Connect technology to the individual Campuses with full-featured network virtualization capabilities in a cost-effective 1/10 Gigabit platform. This Fabric Connect device can support multiple services without introducing multiple complex protocols – including Layer 2 services that extend VLANs across the private cloud, Layer 3 services that interconnect and extend VRFs, native routing for access to shared services, and shortcut routing for direct Layer 3 connectivity. With sub-second recoveries for all services, VSP 4000 makes network issues transparent to users

Bartay says, "What we have today is a very solid, high-performance network that we built as our backbone, and then everything else is laid on top of that. With the proven VSP 9000, our redundancy all resides in one chassis instead of the traditional two. We are running dual 10 Gigabit links out to the Campuses, and there's absolutely no degradation in our performance. In fact, we're seeing an amazing amount of throughput, and the network is running very fast – so fast, in fact, that we receive calls from users who have noticed the increase in network speed."

"From an operational perspective," he adds, "this is a very elegant solution for managing a network of 24 Campuses and four satellite facilities, serving over 20,000 students and approximately 2500 staff members. It meets the critical goal of helping us manage and streamline what we do to meet the needs of all our stakeholders."

Operational Advantages

With the Fabric Connect technology from Extreme, the IT team has been able to eliminate complex protocol overlays and cumbersome hop-by-hop provisioning practices. Services need now be configured only at the Edge of the network, protecting the network Core from change and errors. Moves, adds, and changes can be implemented on demand without introducing risk. These are critical business improvements for a growing school district with limited support staff due to recent budget constraints.

One numeric measurement provides an example of the speed achieved with the new system. According to Bartay, before installing the VSP 9000 and ERS 4850 Switches, there were anywhere from 50 to 100 re-tries during VDI login. Now, VDI logins experience zero to five re-tries, on average. "We still have a long way to go to really tap into the full potential of everything we have," Bartay comments. "However, the re-try improvement is a dramatic indicator of the kind of enhancements we can expect to be able to document in other critical areas of performance."

IP Multicasting capabilities represent one of the most important aspects of the new network deployment for the District. Bartay says that it will enable the streaming of Discovery Education™ and IPTV, both of which are going to become significant curriculum elements throughout the district, based on requests and recommendations from the teaching staff.

Extreme has fully integrated IP Multicast into the Fabric Connect technology as part of its extended implementation of the Shortest Path Bridging (SPB) standard. SPB is the next-generation control protocol for Ethernet and has been jointly standardized by both the IEEE and the IETF. The advantage of Fabric Connect with integrated Multicast support over traditional approaches is the absolute simplicity in provisioning, deploying, maintaining, and scaling the solution. Because there is only one control plane protocol for all traffic types and services, network convergence is sub-second, even in the event of network failures. Conventional solutions that rely on layers of interdependent protocols suffer from this burden of complexity and interoperability; convergence may require tens of seconds or even minutes. The fully integrated approach championed by Extreme delivers reduced operational costs and increased uptime performance, scalability, and security.

Educational Benefits

"All of these operational improvements revolve around pushing our curriculum delivery well into the 21st century, doing more and more things online," comments Bartay. "For us, it's an evolutionary process in which we encourage the educators to tell us what they need and how we can support them. We also provide ideas about what's possible, so they can vet new technologies in the classroom, to see if they are worth pursuing. It's a give-and-take approach that holds tremendous potential for the future."

The District is now actively involved in the adoption of online textbooks and other materials, primarily because they engage students on an interactive basis. Online materials can be updated rapidly versus print media.

The District is actively proposing online textbook adoptions for science and math – with estimated cost savings running between 25 and 50 percent, based on various balances of online and print materials. For example, one specific elementary school math estimate showed a 37 percent cost reduction for a curriculum transition to approximately 60 percent of the materials being delivered online versus print.

Enabling Safer Mobility and a Widespread BYOD Environment

To optimize the explosion of mobility and BYOD requirements, Pearland ISD deployed the Identity Engines Ignition® Server in High Availability, Identity Engines Ignition® Guest Manager, and Identity Engines Ignition® Access Portal. The Identity Engines suite helps to ensure that all users can connect seamlessly and efficiently to their applications, regardless of where they are within range of the District facilities, when they are connecting, and on what device they are connecting.

With the Extreme single architecture and a single network protocol, the district can deliver more secure BYOD, seamless voice, and IPTV to their teachers and students on a flexible, extensible, virtualized network with the ability to manage and control three different network paths independently.

> *"Identity Engines is a phenomenal tool. It enables us to confidently open the network for mobility and to create a true BYOD environment in all our schools."*
>
> **Greg Bartay**
> **Director of Technology**
> **Pearland Independent School District**

"The administrator can easily manage where individual devices are allowed to go through an automated machine authentication process. We actually have three different network paths, based on whether the device is in our domain, whether their credentials are in the active directory, or whether they simply have guest credentials. Yet at the front end, to the user, it all appears to be one single network." says Bartay.

The Identity Engines Ignition® Server provides a central policy decision point that:

- Streamlines Access Management
- Improves Security
- Generates Reports
- Enables Network Administrators to Apply Organizational Policies
- Helps Meet Regulatory Security Compliance Standards

Identity Engines Ignition® Guest Manager controls guest and visitor network access across wired and wireless access points. It enables the administrator to apply granular authorizations so guests can access only specified network resources.

Identity Engines and the strength of the network have enhanced the district's use of their Learning Management System.

This allows students to use any kind of device in the classroom, log into the system, become interactive with each other and the teacher, collaborate on projects, and participate in a wide range of other activities at school and at home.

The District is also using iPad carts, which is something they were not able to do before. "The beauty of our network for use of iPads on campus comes from the virtualization," says Bartay. "We can provide a Microsoft Windows 7 environment – which gives us all of the functionality that we have with those suites of products – and we can also have access to all the apps forApple. So we basically merged the two technologies through virtualization, and this has really enhanced our options."

A Network Foundation for the Future

Bartay concludes, "Our main IT emphasis is on educational requirements for the School District, which call for increasingly large amounts of bandwidth, flexibility, and scalability. At the same time, we have dozens of complex administrative and operational systems that also run off the network, including video surveillance monitoring, sophisticated firewalls, security, and telecommunications."

"With so many mission-critical systems running on our Extreme network, we need to have confidence in its performance, durability, flexibility, scalability, and our security posture – and we also need to depend absolutely on the excellent ongoing support we receive from Extreme.

We feel that all of these bases are extremely well-covered now, and we truly have a network foundation for the future."

Learn More

For more information, contact your Extreme Account Manager or a member of the Extreme Partner Network program, or access other collaterals by clicking on Resource Library at www.extremenetworks.com

About Pearland Independent School District (ISD)

Located just south of Houston, Texas, Pearland ISD strives to offer a world-class education that develops every child's unique gifts and talents. The district's diverse programs challenge and equip students for future success. Special Programs services, Bilingual/ESL, Gifted and Talented (GT), and Pre-K programs are offered to students who qualify.

At the secondary level (grades 6-12), the Pre-AP/AP programs serve as the GT program in addition to a GT Academy option for students in grades 5 – 8. With the State Board of Education-approved Texas Essential Knowledge and Skills (TEKS), the entire K-12 curriculum will have real-life applications and will include the integration of technology. The district also has an extensive career and technology program that makes connections with the business community. To learn more, visit http://www.pearlandisd.org.