

San Leandro Unified School District



EXECUTIVE SUMMARY

Challenge

Build a smart, high-performance network that supports 21st-century learning into the next decade without disrupting teaching and learning.

Solution

- Brocade ICX 7450 Switches in campus IDF's with 40 GbE uplinks to MDFs
- Brocade ICX 7750 Switches in district MDFs for core and aggregation
- Brocade Network Advisor

Results

- Replaced the network at one campus with zero impact and achieved better stability and performance
- Implemented a highly scalable network foundation offering 40 GbE today with plug-and-play migration to 100 GbE at a price that fits the school district's budget
- Achieved high investment protection for the next decade

How One School District is Making Technology Invisible

The San Leandro Unified School District is dedicated to providing a comprehensive, innovative educational program to all of its students. The district employs 450 teachers and serves 8800 students across eight elementary schools, two middle schools, one high school, and one alternative high school. It also serves 5000 adult students in its adult school. However, the district's technology needed to catch up with the times in order to provide a modern learning environment. When Superintendent Dr. Michael McLaughlin arrived in the district, he encountered an antiquated infrastructure with poor performance, a sub-par wireless network, and a lack of focus on integrating curriculum with technology.

"These are tools and skills that students need today," said McLaughlin. "If they don't understand technology, we're failing them. It goes way beyond simply having student laptops and online testing. We want to get to the point where the technology isn't talked about, where you don't have to worry about the network or WiFi in the background. In fact, I want to get us to a point where technology is not part of my strategic plan."

Requirements For a New Infrastructure

For the San Leandro School district, the first step forward was putting an infrastructure in place that could support everything required for 21st-century learning. The existing network was built on 10/100 Mbps switches and low-speed OM1 fiber connections. It was unable to deliver the performance needed today to support 1:1 learning or high numbers of concurrent users, much less future requirements. In addition, the school planned to connect to the city's new fiber loop, but without high-speed connectivity across the district, the benefits of that connection couldn't be realized.

McLaughlin and the school board had obtained funding for a new infrastructure, but it was a one-time proposition. The

district could not afford to go back and ask for more money every year or two. The new network technology had to work for the next decade.

"Cost was definitely a concern," said Ryan Choate, Chief Technology Officer at San Leandro Unified School District. "We wanted to make sure that the devices we purchased were modular, scalable, and supported over the long term without having to pay extra for firmware upgrades."

Scalability was critical. Rob Mangewala, Director of Technology, Assessment Research and Evaluation, wanted to position the district to be able to scale to easily support 10-GbE connections to the city's fiber loop as well as between all district sites.

WHY BROCADE

“When this project is complete, this will be a plug-and-play district. We can put anything on the network we need, because the infrastructure can handle as much as a hospital or large enterprise network. We can now take advantage of the great curriculum that’s out there and best of all, we can prepare our students for the work opportunities waiting for technology-savvy people.”

— Dr. Michael McLaughlin, Superintendent at San Leandro Unified School District

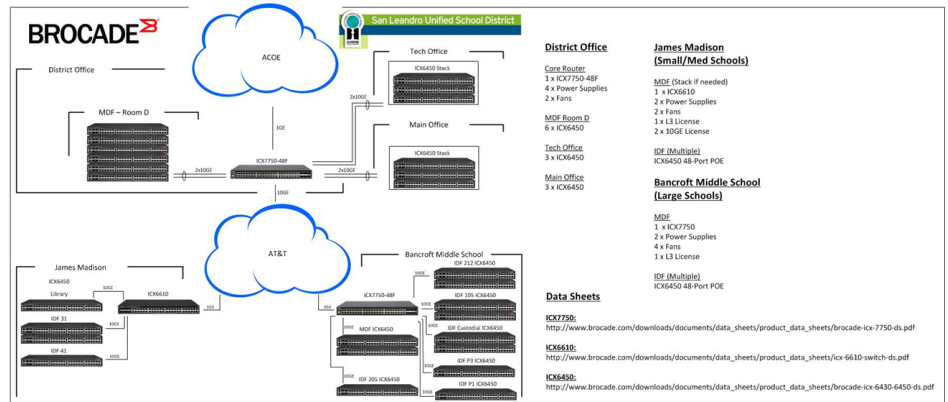


Figure 1. San Leandro School District New End-to-End Network Design

“Our first requirement for network switches was 10 GbE capability,” said Choate. “But as I started evaluating our options, I didn’t want to have to replace the network in five years to upgrade to 100 GbE if we need that capacity. We also required Power over Ethernet for our wireless network.”

Maximum Flexibility and Value

San Leandro Schools evaluated a number of vendor proposals, with cost weighted as 30 percent of the decision. As they analyzed their options, the advantages of Brocade® solutions caught their eye.

“I was absolutely impressed with Brocade’s modularity,” said Choate. “That opened my eyes to see that we could far exceed our initial requirement and cost-effectively deploy 40 GbE today because of your design. And Brocade doesn’t restrict firmware upgrades—that was a huge deciding factor, because many manufacturers don’t allow firmware upgrades without paying for support.”

Mangewala added, “Brocade was the only vendor that could offer a 40GbE solution today at a price that other vendors were asking for a 10GbE solution.”

One Down, 16 to Go

The school district designed its end-to-end network based on Brocade ICX® 7450 and Brocade ICX 7750 Switches. Both types of switches provide enterprise-class performance and scalability, 40 GbE uplinks, plus market-leading stacking density for “pay-as-you-grow” flexibility. The Brocade ICX 7450 Switch offers three modular slots that can accept a variety of optional port modules. A total of 12x1/10 GbE SFP/SFP+, 12x10GBASE-T, or 3x40 GbE QSFP+ ports can be added to each Brocade ICX 7450 Switch for great versatility. Brocade ICX 7450 Switches also support auto-configuration for plug-and-play deployment. Auto-configuration automates switch deployment by retrieving configuration files directly from servers.

Brocade ICX 7750 Switches deliver high 10/40 GbE port density, suitable for robust aggregation and core solutions in a stackable form factor at a fraction of the cost of a traditional chassis. They deliver wire-speed, non-blocking performance across all ports to support latency-sensitive applications like real-time voice and video streaming and Virtual Desktop Infrastructure (VDI). Features such as

hitless stacking failover, redundant power supplies and fans, and redundant staking links deliver high availability to keep the school districts' classrooms and labs operating smoothly. The Brocade ICX 7750 Switches are deployed in MDFs in the district office and on large school campuses. Brocade ICX 7450 Switches are deployed and stacked in IDF's at the Tech Office, Main Office, and all schools.

As luck would have it, an aging switch failed at the district's Korematsu ninth-grade campus, offering the perfect opportunity for the first Brocade deployment. The existing proprietary infrastructure at this campus included a routing intersection, which required redistributing traffic. The campus also ran a number of demanding applications, including voice, paging, and point-of-sale systems.

"With the flexibility and extended capability of Brocade, we transparently bridged that issue and extended the Korematsu network into the existing network without any problems or reengineering," said Choate. "The change was completely uneventful. All of the applications worked flawlessly—in fact, they worked faster with the Brocade switches."

The Korematsu campus has been in production for approximately six months and also serving DHCP for all clients on the school's network. The rest of the new Brocade network will be fully implemented across the entire district in time for the 2015-2016 school year.

"I wanted to make sure that Brocade was going to work successfully," said McLaughlin. "The Korematsu campus is by far the most stable, fastest network segment in our entire district. We've been very pleased."

Fast, Fast, Fast

The new Brocade infrastructure will make the San Leandro Unified School District the fastest district in Alameda County, and the team believes that it will be among the top 10 fastest school district networks in the country. The new network is also fiber-ready, because the Brocade ICX 7750 Switches handle core and aggregation tasks with ease. When the City of San Leandro's fiber loop is completed, the Brocade ICX 7750 Switches will give the school district a high-speed on-ramp to resources that will be available through the city's fiber network.

No Fear of the Future

"We wanted to position the district where we could bring our internal network up to 100 GbE in the future," said Choate. "We expect to run 10 GbE point-to-point network connections between every district site back to the district office, and then out at 10 gigs through the county office."

Stacked Brocade ICX 7450 Switches at IDF's look like a single device to the network. Today, 40 GbE uplinks can be added to a stack of Brocade ICX 7450 Switches—there is no need to purchase additional switches or product families.

"Today, most adults walk around with three devices in their pocket," said Dr. Rosanna Mucetti, Deputy Superintendent for San Leandro Unified School District. "Students will too. Right now, they already have their cell phones and Chromebooks in the classroom. It's just a matter of time. For us, it's not only just being able to support one device for every student, it's being able to support up to three devices for every person in the school district. Now we can."



Bringing Teachers Online

The district already has begun to integrate technology more deeply into the curriculum. All teachers now have MacBook Pro laptops with Windows and Macintosh operating systems installed. Teachers can work in the environment in which they are most comfortable and this flexibility enables greater success with technology integration in the classroom.

New Levels of Efficiency and Productivity

"A critical benefit is going to be efficiency in the classroom and in our workplace," said McLaughlin. "Yes, we're about education, but we also have a workforce. If we're being inefficient, it means that dollars must come out of the classroom and are not available for students."

Student productivity is expected to increase dramatically. For example, the district has launched a new theater and a multimedia academy, where students are shooting and performing full video production. They generate enormous digital video files and must copy these files to the server to save them for the next class period. To date, it takes most of the period to copy files, and even then, frequently it runs into the next class

period. The new network with 40 GbE speed will greatly accelerate productivity, making these kinds of tasks what they should be—simple. And, in the process, give students back time to explore, learn, and create.

Unmatched Investment Protection

“When we can pay as we grow and not have to throw away equipment just because we need to upgrade, that’s huge investment protection,” said Choate. “With Brocade, we buy one device. It’s completely aligned with our goals and resources.”

The district is also positioned to take advantage of Software-Defined Networking (SDN) if desired. Today it has a virtualized server environment, and when high-speed fiber becomes available, Choate can see SDN as a possibility.

The Brocade ICX 7450 and Brocade ICX 7750 Switches already support the OpenFlow 1.3 protocol, which offers one more measure of investment protection.

Next Steps

The school district expects to complete the deployment during the summer of 2015, and is simultaneously working on connecting to the city’s fiber loop.

“When this project is complete, this will be a plug-and-play district,” said McLaughlin. “We can put anything on the network we need, because the infrastructure can handle as much as a hospital or large enterprise network. We can now take advantage of the great curriculum that’s out there and best of all, we can prepare our students for the work opportunities waiting for technology-savvy people.”

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