



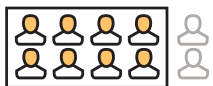
Behind the Device:

The Infrastructure You Need for a Successful K-12 Digital Transformation

Memo: It's Not All About the Device

At Goffstown School District, located in a suburb outside Manchester, N.H., all teachers have a laptop; there are multiple mobile and fixed labs in each school; and all buildings can accommodate students bringing up to 2 to 3 devices each. How does this district ensure its 3,000 students across 5 schools have access to such a technology-rich environment? Ask Director of Information Technology Gary Girolimon and the answer is simple: plan and implement a robust back-end infrastructure to accommodate demands now and in the future before starting any digital initiative.

A recent survey found 8 in 10 students use laptops or other devices daily at school for school-related work.



Goffstown is like many other K-12 schools across the country where personalized learning is ubiquitous (100 percent of education leader respondents to a CDE survey said they planned on implementing personalized learning) and 1:1 and BYOD initiatives are the norm. A 2015 Pearson Mobile Device Survey found 8 in 10 students use laptops or other devices daily at school for school-related work.

As districts are inundated with devices, it's easy to make them the center of a digital initiative. However, as Goffstown knows, it's wise to look

beyond the device. For these initiatives to be successful, schools and districts need to design and implement a holistic back-end infrastructure and follow other important best practices.

The Pitfalls of Not Being Prepared

Whether schools provide Web-enabled devices or students bring their own, the back-end infrastructure must support the increased demand for Internet connectivity. Schools must also have policies in place to address security, privacy and other issues that inevitably arise as staff, students and teachers spend more time online. Schools should implement these best practices well before a technology rollout.

Los Angeles Unified School District (LAUSD) has become a poster child for what can go wrong when proper planning is not in place. The district's plan to buy roughly 700,000 iPads for students and teachers in an ambitious \$1.3 billion effort ended in summer 2014 amid software glitches, concerns about the contract bidding process and questions of whether the district's infrastructure could be upgraded in time for the rollout.

LAUSD is far from alone. Many districts have faced similar issues. Leaders at Burlington High School in Massachusetts overlooked students' personal devices when planning its network. The glut of devices made the network slow or inaccessible for all classrooms in high-traffic areas, such as near the cafeteria. Other schools are plagued by piecemeal systems of switches, routers and other hardware cobbled together to handle the increases in network demands. With this approach, districts can risk network outages, face security

vulnerabilities and suffer storage shortages — all which frustrates students and teachers and negatively impacts learning.

“[Before our network upgrade] we had a mishmash of all sorts of different products that we more or less just put together over the years as needs arose,” says Goffstown School District’s Girolimon. “We must have had switches from at least half a dozen different vendors.”

Planning an Infrastructure for Today and Tomorrow

To truly provide the level of connectivity necessary for advanced digital initiatives and avoid network slowdowns and outages, infrastructure considerations should be pervasive throughout the planning process. Administrators and IT professionals should also anticipate future needs when

MAXIMIZING YOUR E-RATE INVESTMENT

Making the upgrades outlined in this paper requires an investment of both time and money for many districts with dated infrastructures. E-rate funding is one way schools can help offset the costs and maximize their investment in wired and wireless networks to create a holistic infrastructure capable of meeting their 21st-century digital needs. E-rate discounts can range from 20 to 85 percent of the cost for equipment and services, allowing districts to stretch their technology budgets.¹

E-rate Eligible Broadband Internal Connections

- ✓ Access points used in a local area network (LAN) or wireless local area network (WLAN) environment (such as wireless access points)
- ✓ Antennas, cabling, connectors and related components used for internal broadband connections
- ✓ Caching
- ✓ Firewall services and components separate from basic firewall protection provided as a standard component of a vendor’s Internet access service
- ✓ Switches
- ✓ Routers
- ✓ Racks
- ✓ Uninterruptible Power Supply (UPS)/battery backup
- ✓ Wireless controller systems
- ✓ Software supporting the components on this list used to distribute high-speed broadband throughout school buildings and libraries

“[The faster school-to-school connection speeds] are going to be an incredible game changer for us in terms of performance and hardware consolidation. It’s going to be the largest paradigm shift that we’ve had in our district technology since I’ve been here, and it’s our new NETGEAR infrastructure that makes this possible.”

– Gary Girolimon, Director of Information Technology, Goffstown School District

upgrading both wired and wireless networks. Goffstown took several successful steps when creating a seamless back-end infrastructure that other districts can replicate.

Before the upgrade, the hodgepodge of hardware at Goffstown meant maintaining the system was complex and the district wasn’t able to take full advantage of their recent upgrade to a faster wireless infrastructure. Dated switches in the wired network slowed connection speeds even when the wireless network had additional capacity. District leaders knew a change was needed, so they authorized an upgrade in the wired network infrastructure from 1 Gigabit to 10 Gigabits, bringing both wired and wireless access up to speeds that would meet the district’s long-term technology needs with one streamlined system. Here’s how the district got there.

Standardize and integrate network hardware. After evaluating options from other vendors and testing a few in the school setting before rejecting some for cost or lack of user-friendliness, Girolimon and his team selected the NETGEAR® ProSAFE® LAN Access and Aggregation Chassis M6100 Series for the hub of the district’s network. With help from NETGEAR representatives, his team placed the M6100 at Goffstown High School, which serves as the core of the network, with fiber optic connections to a NETGEAR ProSAFE M5300 Series Managed Switch in each of the five intermediate locations. The team placed additional ProSAFE switches, connected directly to the M5300s, in the five locations as well. To tie it all together, the entire network is managed using the ProSAFE Management System (NMS300). Administering the network is much easier now that Girolimon and his team have an integrated set of hardware they can monitor using a Web-based program that alerts them to issues and allows almost instantaneous fixes in many cases.

“We have a uniform network that’s the same in all of our buildings and we can administer the network from one location using NETGEAR’s NMS300 software,” says Girolimon. “In the rare case something does go wrong, the software immediately alerts us. And, a lot of times, we are able to remedy the problem before our end users are even aware there was a glitch.”



Gary Girolimon

Boost network security. The new network has also allowed the Goffstown technology team to improve its network security. For example, Girolimon says the new switches made it possible to set up separate secured wired and wireless VLANs and devote a VLAN to the open-access network. The network for students' devices is segregated from school networks that might contain sensitive data such as grades or standardized test scores. The open network used for BYOD connections is also content filtered so students can't access inappropriate material while they're on the school's system.

"When we started talking about [an upgrade], one of the selling points for us was that we could provide an isolated open network for student-owned devices and apply content filtering to it in order to keep them safe," says Girolimon. "We can't block their private data plans, but the students, even though they know our network is content filtered, want to be on it so they are not using their data minutes [for school work]. It's a win-win for everyone."

Plan for the future. The holistic hardware system and intuitive maintenance software also mean the district tech staff can administer the system quickly without expensive external engineering support. And Goffstown will realize even more savings starting in summer 2016, when it completes installation of a dark fiber-based wide area network (WAN) between schools that will be enabled at 10 Gigabits with the optical transmitters and receivers in the new NETGEAR switches. To date, the district has been connecting its buildings with costly bandwidth purchased from the local telephone company.

The conversion to a self-managed fiber optic environment will dramatically increase connection speeds between the district's buildings, enabling them to seamlessly share data while slashing costs. Goffstown can also consolidate expensive servers and other equipment in individual schools that won't be required once the districts buildings can communicate

IMPORTANT CONSIDERATIONS AND ADVICE FOR A SUCCESSFUL INITIATIVE

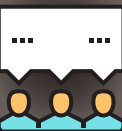
When embarking on an extensive network upgrade or introducing a digital initiative, school and district leaders should start by asking the following questions.



Has the district established a long-term vision and educational goals it hopes the technology initiative will achieve? It's important to tie technology initiatives to educational outcomes to avoid implementing technology for technology's sake. It helps to involve teachers, students, parents and the community in establishing a future vision of educational success.



Is a solid professional development plan in place? Teachers need to fully understand technological tools and initiatives to make the most of them in the classroom. That means teacher training needs to begin well in advance of any program rollout date. For example, Round Lake Area School District 116 in Illinois gave every teacher a laptop a full year before beginning its 1:1 program for students, encouraging teachers to take the computers home each day and over breaks to plan technology-rich lessons.²



How will the district communicate the plan to stakeholders, including students, staff and the community? Communication is key to receive stakeholder buy-in for technology upgrades and initiatives. Administrators and IT professionals can relay some of the benefits of technology to the community through school-based broadcasts, open-access wireless networks and more.



Will the infrastructure be able to support future needs? For instance, how many devices will students be bringing in three to five years? Girolimon says it's not uncommon for high school students to bring two or three devices to campus. He only expects that number to keep growing in the future.



How will the district roll out the initiative? Advanced planning can help streamline upgrades and prevent problems when rolling out new digital initiatives. At Goffstown, steps as simple as unpacking all the equipment and laying it out in the library helped make installation easier during its wired network upgrade. "Our whole library was kind of like a mock-up of our district network," Girolimon says. "We used patch cables and linked everything together exactly how it was going to be set up."



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faster and more efficiently. Eventually, Girolimon hopes this fiber optic network will enable the local cable access studio located in the high school to broadcast live events from all town buildings. These broadcasts will include sporting events, school performances and presentations, town meetings and even a live feed from the top of a nearby mountain, so Goffstown residents can see firsthand how tax dollars and technology translate into unique personalized learning experiences for students.

“It’s going to be an incredible game changer for us in terms of performance and hardware consolidation,” he says of the faster school-to-school connection speeds. “It’s going to be the largest paradigm shift that we’ve had in our district technology since I’ve been here, and it’s our new NETGEAR infrastructure that makes this possible.”

Conclusion: Enabling Digital Initiatives

Most teachers, students and staff don’t know or care much about the servers and switches hidden behind utility closet doors. But back-end infrastructure is an integral element of the digital transformation taking place in education today. Before districts roll out their next digital initiative, they should evaluate whether their wired and wireless networks are capable of powering those plans. Because, without the infrastructure to support them, those new tablets on students’ desks are little more than pretty – and pricey – paperweights.

Endnotes

1. https://afd34ee8b0806295b5a7-9fbee7de8d51db511b5de86d75069107.ssl.cf1.rackcdn.com/CDE15_Special_Report_Q1.pdf
2. <http://www.scholastic.com/browse/article.jsp?id=3755881>

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