Tech Readiness in 21st Century Schools

External Bandwidth - Clearing the First Hurdle

Quality learning resources, quality educational videos, and quality cloud-based applications are available to schools at no cost. So what do districts need to do to leverage these dynamic digital tools? The first hurdle is adequate external bandwidth.

The amount of external bandwidth a building has determines how fast information can be exchanged online. The more external bandwidth, the faster the flow. The faster the flow, the more the system can be used. Want your students and staff to be active users of a digital gradebook? It takes external bandwidth. Want to have all your students read an online version of the Gettysburg Address? It takes external bandwidth. Want to have all your students interact with a digital math curriculum? It takes external bandwidth. So how much external bandwidth does a 21st century school need?

In 2012, the State Education Technology Directors Association (SETDA) published The Broadband Imperative: Recommendations to Address K-12 Education Infrastructure Needs. This document provides excellent bandwidth guidance for states and school districts. SETDA's first recommendation and its' accompanying table are inserted below.

Recommendation 1: Move to Address K-12 Broadband Infrastructure Needs

To reach the goal of sufficient broadband access for enhanced K-12 teaching and learning and improved school operations as outlined in this report, SETDA recommends that schools and districts meet the following *minimum* bandwidth targets between now and the 2017-18 school year:

Broadband Access for Teaching, Learning, and School Operations	2014-15 School Year Target	2017-18 School Year Target
An external Internet connection to the Internet service provider (ISP)	At least 100 Mbps per 1,000 students/ staff	At least 1 Gbps per 1,000 students/staff
Internal wide area network (WAN) connections from the district to each school and among schools within the district	At least 1 Gbps per 1,000 students/staff	At least 10 Gbps per 1,000 students/staff

source: http://www.setda.org/c/document_library/get_file?folderId=353&name=DLFE-1515.pdf

It is important to note the table above outlines SETDA's **minimum** bandwidth targets. It's equally important to note these minimum targets correlate directly with PARCC's *recommended* external bandwidth specifications. Schools meeting SETDA's minimum external bandwidth guidelines have cleared the first hurdle for 21st century teaching and learning. By doing so, they have simultaneously broken through the initial technology barrier to PARCC tech readiness.

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So how does a school district strategically plan to meet the minimum SETDA bandwidth recommendations according to the timeline outlined above?

Step 1 - Find the nearest fiber optic telecommunications line and connect to it.

Connecting to a telecommunications line is commonly referred to as a "last mile" expense. These expenses are currently not funded by the federal e-rate program. Therefore connecting to the nearest fiber optic line is a non-reimbursable expense. Central School District #3 considers themselves fortunate. They are located along Highway 94 just south of the Adams Telephone Co-Operative. Their proximity to the telephone co-op and Highway 94 meant a fiber optic telecommunications line was within a few hundred feet of their door. Not only was the fiber line close, it was also owned by a local telephone co-op with an active community outreach program. Central CUSD Superintendent Mr. Martin Cook, "I believe that it's very important for school districts to continue to develop strong working relationships with their rural telephone co-ops. We have been able to effectively communicate our needs with Adams Tel and they have worked with us to help upgrade our telecommunications infrastructure. By working together we will be better able to meet the needs of our students as the need for capacity increases." Adams Telephone Co-Operative CEO Jim Broemmer went on to say, "It has been a longtime focus of our board and organization to invest in the future of the communities we serve through our area students. By working closely with our local school districts we have been able to learn what their needs are and bring forward the technologies and services to meet those needs today and into the future.

Forty miles southeast of Camp Point in Bluffs, IL, Scott-Morgan CUSD is not so fortunate. As part of the Illinois Broadband Initiative, a fiber optic telecommunications line is being installed along Interstate 72. Unfortunately, the interstate is 6 miles south of town. When Superintendent Kevin Blankenship approached their telecommunications provider to request a connection to the new fiber line, he was told it would not be feasible at this time. Mr. Blankenship, "We've always taken great pride in being at the forefront of classroom technology, but now we're stuck. We would like to go 1:1, but we can't. We want to utilize cloud computing services to reduce costs, but we can't. We want to provide distance learning opportunities for our students, but we just don't have the external bandwidth to support it."

Buildings a few hundred feet from a fiber line have little problem increasing their external bandwidth to meet SETDA's 2014-2015 targets. Buildings within ½ mile of the nearest fiber line will have to strategically plan, but should still be able to get fiber to their building to meet external bandwidth needs. Buildings like those in the Scott-Morgan CUSD are forced to be more creative.

Step 2 - If connecting to a fiber optic line is not feasible, explore a wireless backhaul solution.

A wireless telecommunications backhaul solution is similar to a satellite dish television service for households. A telecommunications dish is placed on a school building and pointed toward a comparable dish in a different location. That dish either connects to a robust internet network or relays the signal to another dish that is connected. Up front these solutions are more expensive due to the additional equipment involved. Over time additional costs are incurred due to continual maintenance and replacement of the additional equipment involved. In addition, a wireless backhaul solution may help a district meet SETDA's 2014-15 external bandwidth target, but the technology may not support expansion to the recommended levels for 2017-18 and beyond. These solutions are also less reliable due to the fact that the signal must travel unobstructed from dish to dish.

In many cases, this means a wireless backhaul solution is not feasible for a rural school district. Scott-Morgan CUSD is currently exploring a wireless backhaul solution to fulfill their bandwidth needs. It is not without difficulties, it is not without cost, and it is not without risk. However, it is most certainly worth pursuing.

Getting 21st century technology into our schools is one of the most talked about topics in education. One-to-one initiatives, iPads, Chromebooks, and wireless internet networks are continually in the news. But if our schools can't clear the first hurdle of tech readiness, quality learning resources, quality educational videos, and quality cloud-based applications will remain out of reach. That first hurdle is securing adequate external bandwidth.

Illinois school districts seeking additional information or assistance are encouraged to contact their local ISBE Learning Technology Center representative.