

ACCESS

for All Students

The state of K-12 broadband in Wisconsin schools | *Bill Herman*

School is still the primary place where education happens. But to support their learning, students have to be seamlessly and continuously connected to the world's resources where they are located: on the Internet.

Almost everyone in education recognizes that fast access to the Internet has become a lifeline for students. Textbooks, magazines, and journals are moving from shelves into the cloud. Widespread learning tools such as Google Apps are available only in the cloud.

Building an environment that provides this connection is not easy or cheap. The needs of a classroom are unusual, where you may need as many as 100 connections in every room. In effect, schools are called upon to develop wireless environments more robust than most businesses provide. In turn, states are called upon to bring fast, affordable, high-volume Internet access into every school.

What is the state of access to the Internet in education in Wisconsin today? Are schools receiving bandwidth sufficient to meet exploding demand? Are their internal networks capable of distributing Internet

traffic to all corners of the building, all of the time, reliably, and fast? The answer is, unfortunately, not yet. This is true not just in Wisconsin, but across the entire country.

■ Bandwidth and Network

Two major components are needed to bring high-quality access to every student. The first is high bandwidth with a highly reliable connection from the Internet to the school. The second is a robust network within the school, to distribute Internet traffic to students and staff throughout the building, whenever it is needed. Recognized standards have emerged to measure both components.



Beginning in 2017, every school should provide 1 Mbps to every person in the building.

Benchmarks for the amount of bandwidth that needs to be delivered to schools have been adopted by leading educational organizations, the Federal Communications Commission (FCC), and the Department of Public Instruction (DPI). From 2014-17, every school should provide 100 Kbps to every person in the building. Beginning in 2017, every school should provide 1 Mbps — 10 times as much — to every person in the building. This jump in bandwidth recognizes growing needs for education.

The effects of the 2017 retargeting of bandwidth is shown in *Fig. 1*. Existing bandwidth are by and large sufficient across Wisconsin schools under the current standard. In 2017, if school broadband supply remains where it is,

Internet access will be inadequate at most schools in the state.

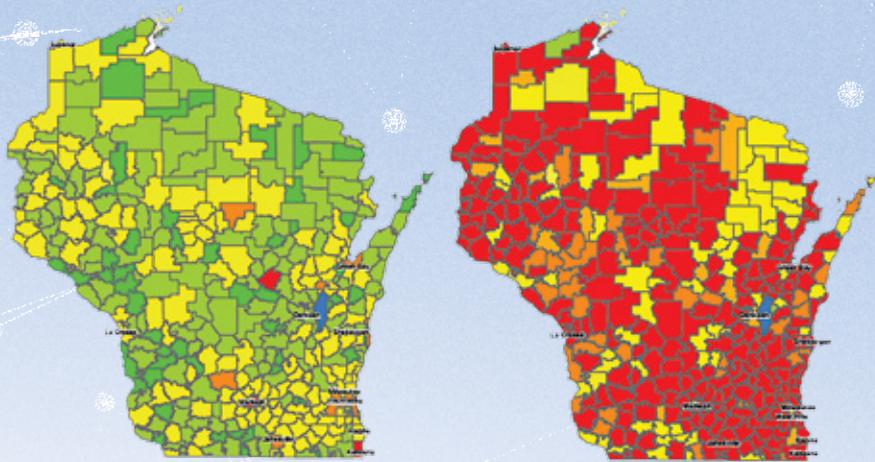


Fig. 1 **2017 Retargeting**

The Connectivity Health Report shows many districts had met bandwidth benchmarks in 2014 (green). However, this standard will be inadequate by 2017 in most school districts (red).

Source: Wisconsin Department of Public Instruction, mapping by Wisconsin Department of Administration

Statutory and pricing constraints on BadgerNet, the state K-12 network, have limited the amount of bandwidth available to Wisconsin schools. By statute, BadgerNet subsidies provided by TEACH Wisconsin — a program administered within the Department of Administration (DOA) — have been available only to a single school in each district. However, all schools now need a high bandwidth Internet connection. Compounding this, the rates for current BadgerNet service were established in 2011, when bandwidth was far more expensive than today.

Both factors have limited affordable bandwidth for Wisconsin schools.

■ Moving Forward with BadgerNet

Today the outlook is more hopeful. Wisconsin statute now allows a TEACH-subsidized BadgerNet connection at every school building in the state. In addition, a new BadgerNet contract is under negotiation. DOA's target is a contract with pricing low enough to provide every school in the state with bandwidth that meets the FCC benchmarks at a subsidized cost of \$250/month per building. This would effectively eliminate concerns about affordable bandwidth for Wisconsin schools going into the future.

However, in the meantime, some school districts have chosen to leave BadgerNet for more affordable

TEACH Grants Available for Rural School Districts

To support the need for professional development, beginning this school year, TEACH Wisconsin will provide a total of \$1.5 million annually in grants to rural schools to pay for professional learning in educational technology. This is the first time since 2004 that TEACH money has been used to support professional learning, a recognition by the state Legislature that successful student use of technology depends on effective guidance by teachers.

For more information, visit the TEACH Wisconsin website at teach.wisconsin.gov.



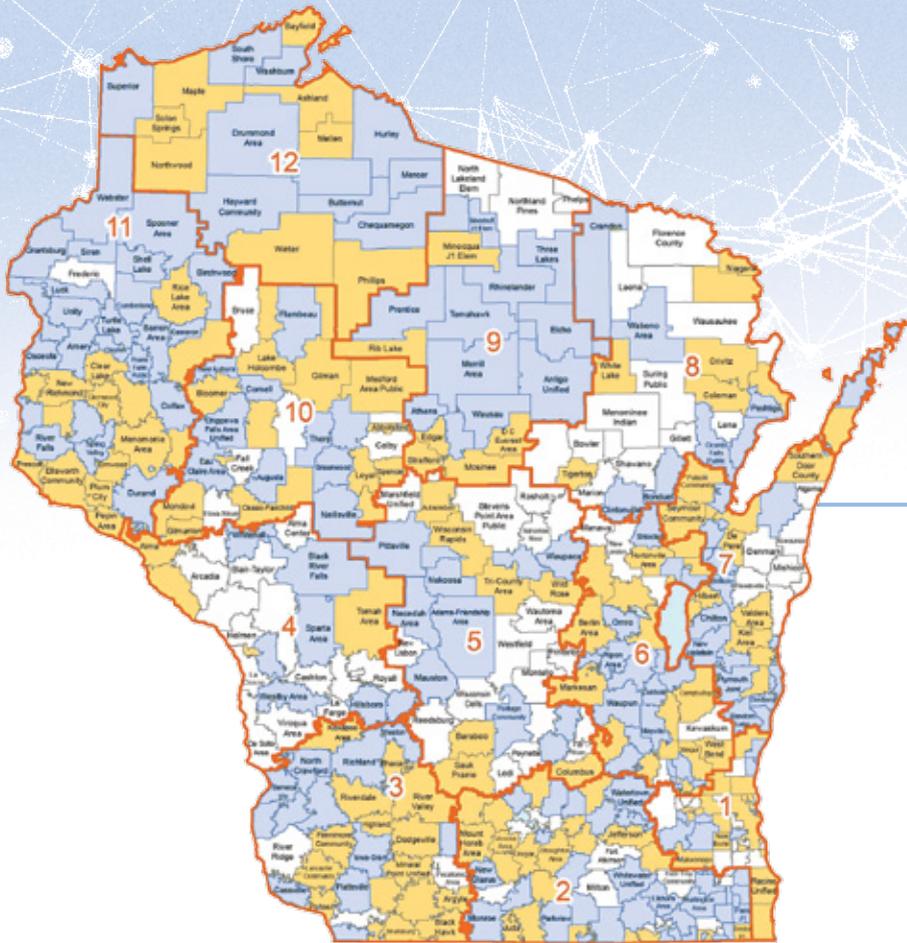


Fig.2 '1-to-1' Implementation

Data from 2014-15 shows nearly 42 percent of the public school districts have implemented a 1-to-1 program (blue). 35 percent of districts do not have a 1-to-1 program (gold), and 23 percent did not respond to the survey (white).

CESA regions shown with orange outline.
Source: Wisconsin Department of Public Instruction, 2014 Broadband and Digital Learning Survey

been created and funding has been doubled to help schools build and maintain internal networks in every school building. A major focus is on wireless or "wi-fi" connections. This school year is the first time school districts could apply for the new funding which is called "Category 2," and nearly three of every five districts in Wisconsin applied for it. DPI encourages every school district to evaluate their needs and apply for this funding as appropriate.

The next link in the chain that brings the Internet to every student is the device that he or she uses for access. As we know, schools are increasingly committed to providing their students with access to the

commercial providers in the marketplace. And now districts have a second way to establish affordable high-bandwidth connections to the Internet: dark fiber, which they can own outright or lease from the builder. A major expansion of the FCC's E-rate rules has allowed fiber construction projects to be funded by the program.

As an example, a school district with an 80 percent E-rate discount would have to pay only \$200,000 for a million dollar build — a cost that might be recovered in as little as five years when compared against the monthly cost of paying a provider for benchmark-level bandwidth. These types of projects can be complex and require considerable planning in advance. School districts would be wise to begin exploring their dark fiber options now for projects to be funded in 2017-18.

Access for Every Student

The challenge of bringing a high-bandwidth Internet connection

to every school is significant, but even when met, it is only half of the battle. The Internet must be brought not just to every school but to every student.

Here again, new E-rate rules have



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Internet whenever and wherever they need it. Providing students with laptop computers or tablets on demand is an expensive proposition for any school district, and user devices are not funded by E-rate. However, the cost of these devices is routinely dropping while their power continues to increase. Some districts have gone to referendum to exceed the revenue cap by an annual amount to cover the ongoing costs of providing their students with portable devices.

The “gold standard” that many districts around the country are aiming for is to “go 1:1” — to provide each student with a portable device. Fig. 2 shows where schools statewide stood in their implementation of 1:1 in 2015. Of course, before districts can make effective use of their investment, teachers need to be prepared to integrate the use of mobile devices into their teaching, and curriculum has to be adapted to meaningfully incorporate the use of mobile devices into student learning.

■ Access Outside School

Even in districts that have met all of the challenges described above, a critical additional piece is needed. As adults we know that if we do not have fast access to the Internet at

home, we would be cut off from both personal and work resources that we need on a daily basis. The same has become true of students. Many homework assignments cannot be completed without access to the Internet, placing students without Internet access at home at an enormous disadvantage.

Even in affluent school districts, there are students who do not have access at home due to geographic and topographic reasons. This is especially true in rural areas.

A significant remedy to this problem are two additional FCC programs. The first is the Connect America Fund, a federal program designed to make Internet access available to 95 percent of households by 2020. To give an idea of the scale of this challenge, Wisconsin providers have been given \$600,000,000 — more than half a billion dollars — to accomplish it. However, even when this access is available, it will still be challenging for many families to afford.

This challenge is being addressed by an FCC program called Lifeline. Under that program, low-income households — including those with school-age children — are eligible for a subsidy to obtain Internet access for only \$10 per month. In addition to these FCC programs, there are other efforts from commercial vendors to help meet these

goals, including the recently announced AT&T Access Program.

In Wisconsin, the Public Service Commission also offers broadband expansion grants to fill in the “hard to reach” areas of the state. The DPI is working collaboratively on innovative strategies such as putting wi-fi on school buses with UW-Madison and the Cooperative Education Services Agencies. Locally, individual school districts are also trying to achieve home access by offering “hotspots” for students to use at home.

The imperative to bring quality Internet access to every student, at school and at home, is easy to state but complex and costly to accomplish.

School leaders need continuous commitment, and school communities — not just parents of K-12 students — need to understand that good Internet access for students is crucial for their learning and growth, and for the economic health of the community. State legislators need to ensure that funding is available as Internet access is both an equity and economic development issue. School and community leaders need to make sure they are focused on learning about these issues and forging the partnerships needed to address them. ■

Bill Herman is an instructional media and technology consultant with the Department of Public Instruction.

MORE ON THE WEB

Here are some resources to help school districts provide and fund Internet connectivity in their schools.

● **Wisconsin Public Services Commission** (*psc.wi.gov*)
Broadband Maps at link.wisconsin.gov/broadband-maps

● **EducationSuperhighway.com**
A nonprofit dedicated to bring affordable high-speed Internet access to all K-12 students. *Site includes:* a portal where districts can compare their broadband deals with other districts; Wisconsin Internet access data; and *Network Essentials*, a guide for school district leaders.

