Education SUPERHIGHWAY

Minnesota On-site Visit

August 2015

Contents

- **Mission & purpose**

- **Goals & State of the Nation**

- **Challenges & potential solutions:**

  - Common barriers

  - Roles that states can play

  - How EducationSuperHighway supports states

- **Preliminary MN data**

- **Next steps**

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About EducationSuperHighway
Non-profit, non-partisan organization

Our Mission: To upgrade the Internet access in every public school classroom in America so that all students can take advantage of the promise of digital learning

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Our strategy

Phase 1
2012-2013

BUILD AWARENESS

Make school connectivity a national priority

Phase 2
2013-2014

SECURE RESOURCES

Ensure schools have the resources they need to upgrade

Phase 3
2014 & beyond

ACCELERATE UPGRADES

Work with states and districts to catalyze action and upgrade all schools

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Our funders

The Bill and Melinda Gates Foundation

Startup: Education

The Leona M. and Harry B. Helmsley Charitable Trust

Timothy and Michele Barakett Foundation

Draper Richards Kaplan Foundation

Devon and Pete Briger

The Learning Accelerator

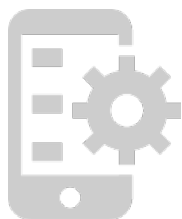Philip and Alicia Hammarskjold

The A.L. Mailman Foundation

Hank and Bonnie Miller Family

Leeds Family Foundation

Maverick Capital Foundation

Sappi Ideas that Matter
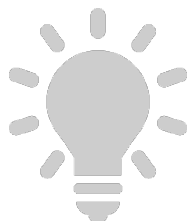
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Digital learning is transforming education

A teacher checks for student understanding and **adjusts lessons in real time** using an instant quizzing application

School of One sites in New York **build a personalized learning experience** for math students leading to gains 1.5 times the national average
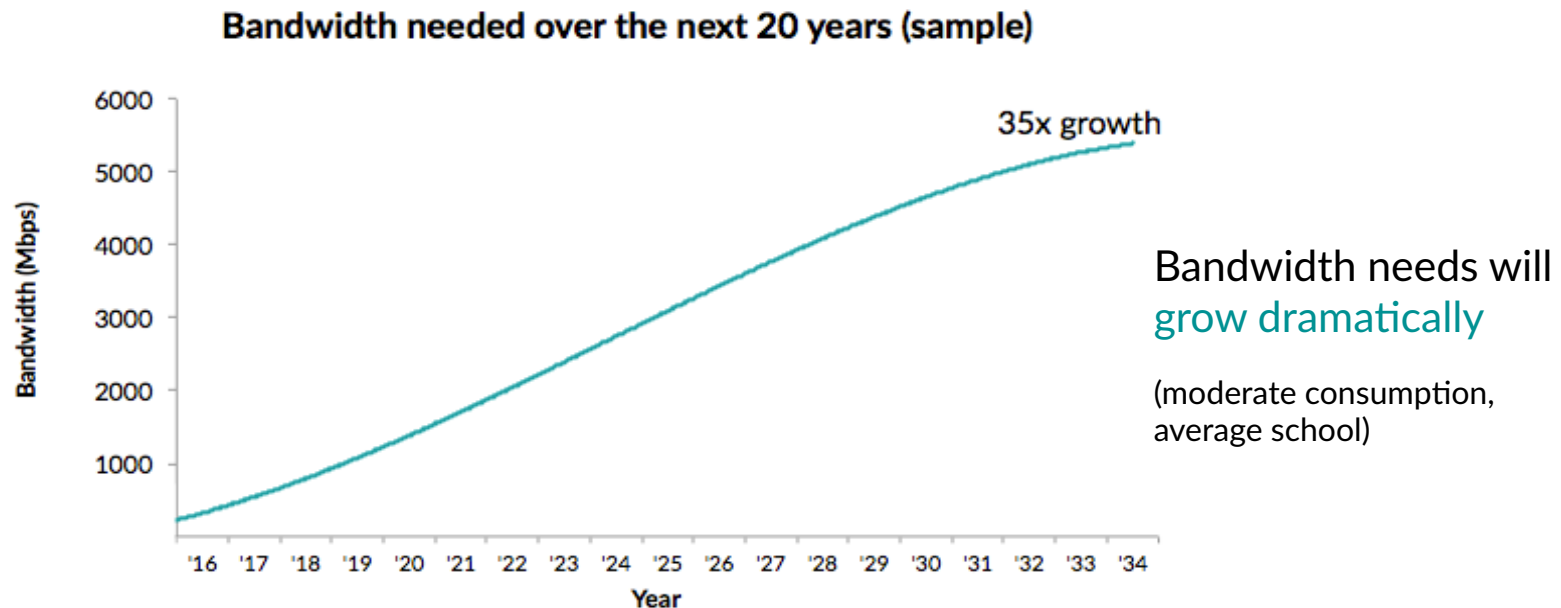
Students in rural communities now have **access to Advanced Placement** classes through online courses

Clintondale Community Schools (MI) **"flipped" their 9th grade classrooms** and saw increased test scores and graduation rates

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High speed broadband is a prerequisite

- Fiber to every school
- Wi-Fi to every classroom
- Connectivity that districts can afford

Bandwidth needed over the next 20 years (sample)

Bandwidth needs will
grow dramatically

(moderate consumption,
average school)

State of the nation

40 MILLION STUDENTS lack broadband for digital learning.

That's 2 out of every 3 schools.

Outlook is much worse if you consider the rapid growth
of school bandwidth demand over the next 3 - 5 years.

Source: EducationSuperHighway SchoolSpeedTest, 850,000 tests nationwide

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2018 digital learning readiness goals

| INTERNET ACCESS 1 Mbps per student	TRANSPORT 1 Gbps per school	Wi-Fi / LAN 1:1 in every classroom
Do districts buy enough Internet access to support their schools?	Do schools have fast enough connections to their district hub?	Are classrooms well equipped with Wi-Fi?
Nationally, 99% of districts are NOT achieving 1 Mbps per student		76% of schools are NOT able to support 1:1

Internet — District office — Schools — Classrooms

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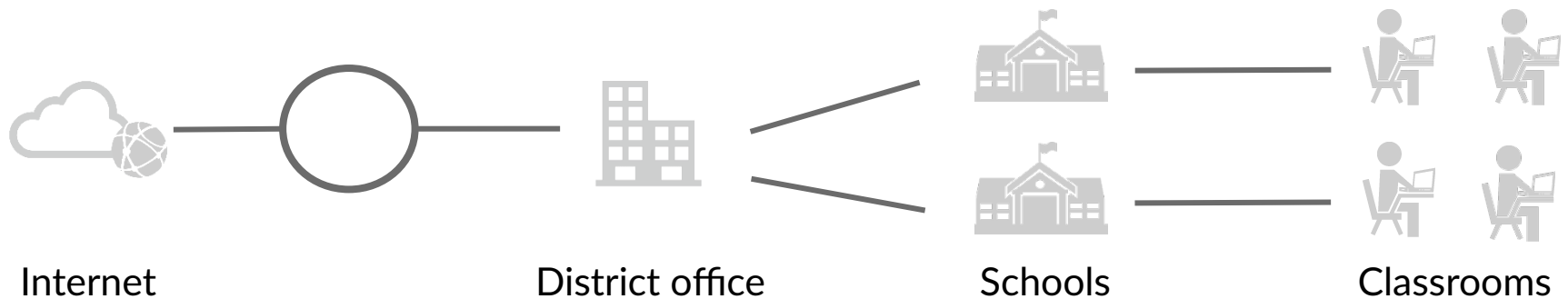
Common barriers to high-speed connectivity

Fiber access
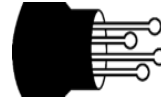
Affordability

Awareness and prioritization

Technical and procurement expertise

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States play a critical role in the solution

Pennsylvania: Created a $60M grant program for aggregation, which resulted in a 900% increase in school bandwidth statewide

Utah: Provides $17M in annual funding to deliver 1 Gbps connections to K-12 schools

North Carolina: Commissioned a study that laid the foundation for a statewide K-12 network serving over 99% of the schools in the state with fiber connectivity

Nebraska: Built a state network in that serves 99% of public school districts

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Our services to support states

Organize and Catalyze

Connectivity Report

- Report on the current state of K-12 connectivity
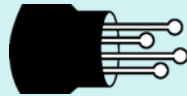
- Identify high-impact actions that states can take to accelerate upgrades

Today's focus

Close the Fiber Gap

Fiber Consulting Program

- Work with state partners and providers to close the fiber gap

- Identify options, create strategies, and implement solutions for all schools that do not have fiber

- Incorporate fiber program into long-term state connectivity plans

Make Informed Decisions

State Education & Support

- Improve affordability through district-level data transparency

- Facilitate regional procurement collaboration among districts

- Provide coaching on service provider negotiations

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District tools and resources

Improve Transparency	Upgrade School Wi-Fi	Increase Knowledge
Compare & Connect K-12	Wi-Fi Buyer's Guide	Network Essentials for Superintendents

- Improve affordability through transparency with a K-12 broadband pricing portal

- Support the efficient use of new E-rate funds with the Wi-Fi Buyer's Guide

- Help district leaders kick off and lead upgrades with Network Essentials for Superintendents

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Contents

- Mission & purpose
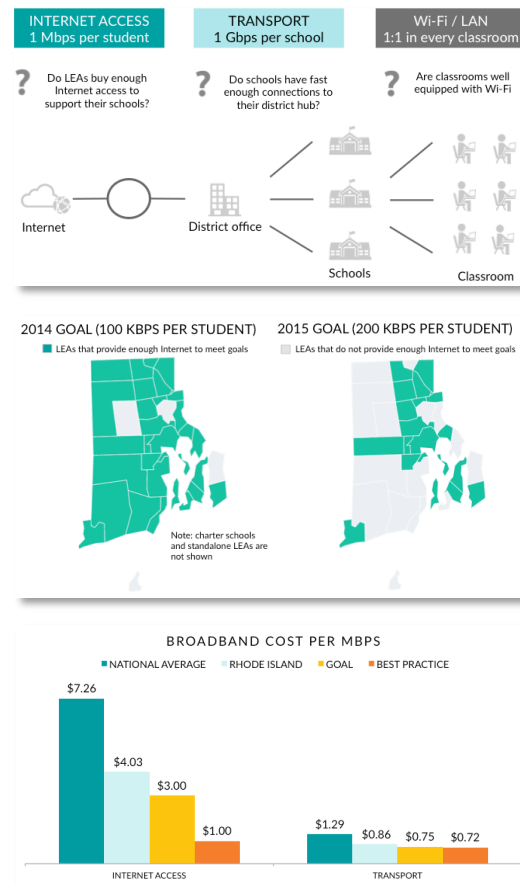
- Goals & State of the Nation

- Challenges & potential solutions:

- **Preliminary MN data**

  - **Status**

  - **Early findings**

  - **Open questions**

- Next steps

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The Connectivity Report

It is a **data-driven report** on K-12 connectivity that helps states:

- Connect all schools to fiber

- Increase bandwidth

- Optimize broadband procurement

Quantitative and qualitative data sources

Consolidated view of K-12 connectivity in your state

E-rate	ESH Resources	Discussions	State Resources
• Item 21	• State of the States • Compare & Connect	• State leaders • Districts • Providers • Other stakeholders	• Existing data • State surveys
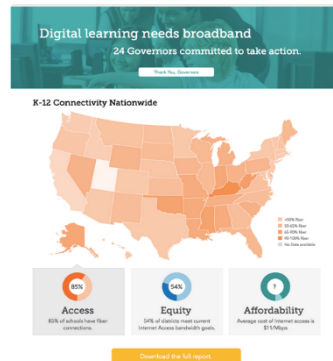
Connectivity Report process

Typical process spans 2-4 months (depending on resources)

	Collect/Input	Clarify	Analyze	Share

Collect and clarify data

WE ARE HERE

On-site visit, phone discussions, research and analysis

Complete and deliver the Connectivity Report

ESH	State

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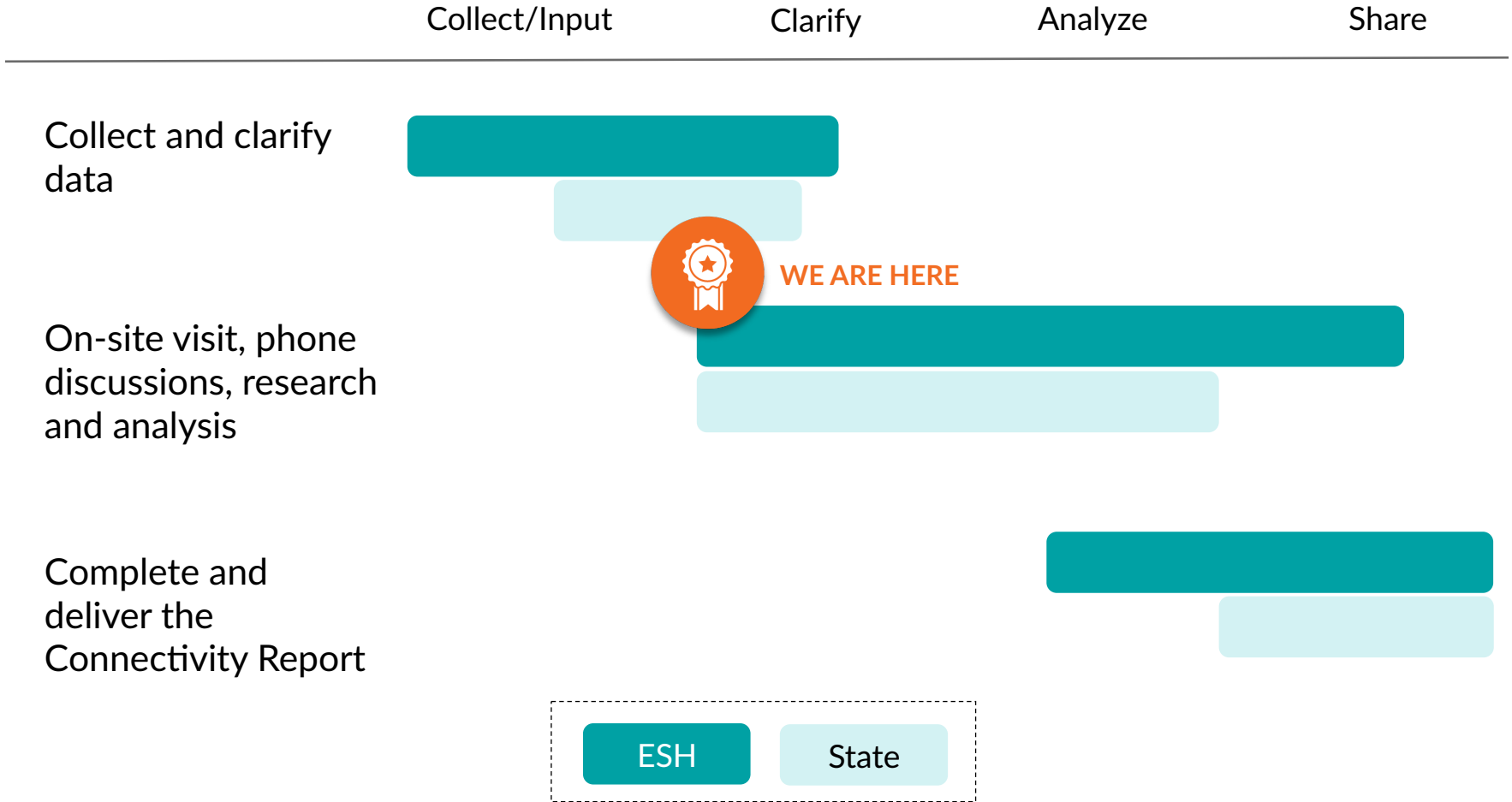
MN data collection and clarification

1) **Collect:** Bring 2015-16 E-rate data into our database

2) **Input:** Scan data with internal software tools to flag line items that need further verification

3) **Categorize:** Organize E-rate data by school/district purpose

4) **Clarify:** Reach out to district contacts to verify/clarify data; prioritize by size and locale to report on a representative sample

5) **Analyze**: Combine quantitative findings with qualitative context

6) **Follow-up**: Identify open questions and suggested next steps

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MN data collection status

Clean sample size, as of 8/10/15:

- 161 (~50%) districts represented

- 651 (~33%) schools represented

- 242,000 (~30%) students represented

Need to clean:

- ~5% more for reliable affordability data

- ~40-50% more for reliable fiber access data

What is the status of MN's broadband infrastructure?

Where are the bottlenecks, if any?

INTERNET ACCESS 1 Mbps per student	TRANSPORT 1 Gbps per school	Wi-Fi / LAN 1:1 in every classroom
Do districts buy enough Internet access to support their schools?	Do schools have fast enough connections to their district hub?	Are classrooms well equipped with Wi-Fi?

Internet   District office   Schools   Classrooms

Minnesota's K-12 Connectivity Goals

Open questions

- What are Minnesota's K-12 connectivity goals?

- Have these goals been publicly stated? Would schools benefit from such direction?

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Key drivers: affordability, fiber and Wi-Fi

Preliminary findings

AFFORDABILITY

- Internet access costs are above national target pricing

FIBER

- Recent E-rate changes and coordinated state action could help ensure all schools are connected to fiber

WI-FI

- There may be an opportunity to aggregate Wi-Fi/LAN purchasing across the state and reduce costs dramatically

Sources: 2015-16 E-rate Item 21 data

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Internet access costs are higher than target

- Internet access costs appear to be higher than price target for most bandwidth intervals

- Transport (WAN) prices appear to be very close to target pricing

Preliminary Data

Internet access costs exceed target

Low bandwidth Internet connections are much costlier per Mbps

AFFORDABILITY

Average Internet access cost per Mbps per month

$441

$10

$12

$10

$12

Target Cost: $3

$2

| 1.5 (31) | 10 (27) | 50 (28) | 100 (70) | 200 (39) | 1,000 (19) |

Preliminary Data

Sources: 2015-16 E-rate Item 21 data; n = # of circuits

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Transport (WAN) costs are close to target

Average monthly WAN cost per
1 Gbps circuit per month

MN Mean (31)	MN Median (31)	Target
$871	$750	$750
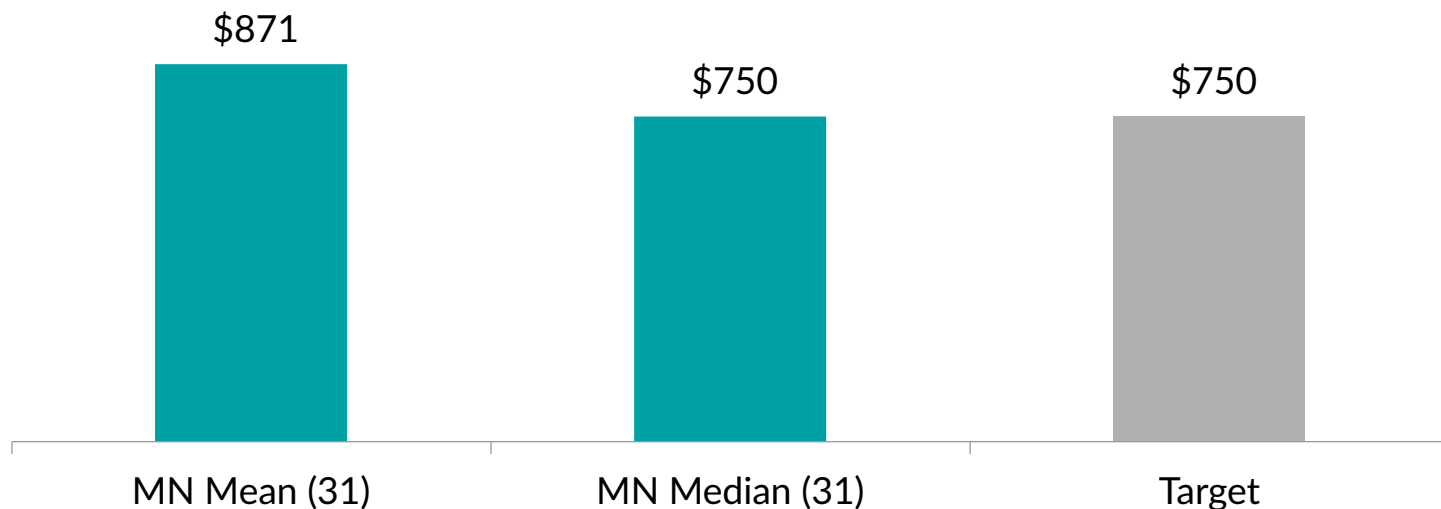
Preliminary Data

Sources: 2015-16 E-rate Item 21 data; n = # of circuits

Affordability: Open questions

Open questions

- Is there an appetite or need for statewide aggregation that makes sense for Minnesota schools and districts?

- What aggregation purchasing capabilities does the state have that could help schools/districts/consortia?

- Is the state interested in providing network support services for districts or is the current solution ideal?

More data is needed to determine fiber need

FIBER

- To identify precise fiber need, MN needs reliable data from as close to 100% of schools as possible...but does MN need precise data to act?

- Most school and districts will need to be on fiber to meet 2018 goals

- ESH suggests connecting all schools to fiber or an equivalent as soon as possible

Sources: 2015-16 E-rate Item 21 data

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Most schools will need fiber to meet 2018 goals

FIBER

Percent of schools ideally on service type by goal year (national)

■ Legacy/DSL ■ Cable ■ Fiber

Estimated Actual	2014 Goals	2018 Goals
72%	83%	98%

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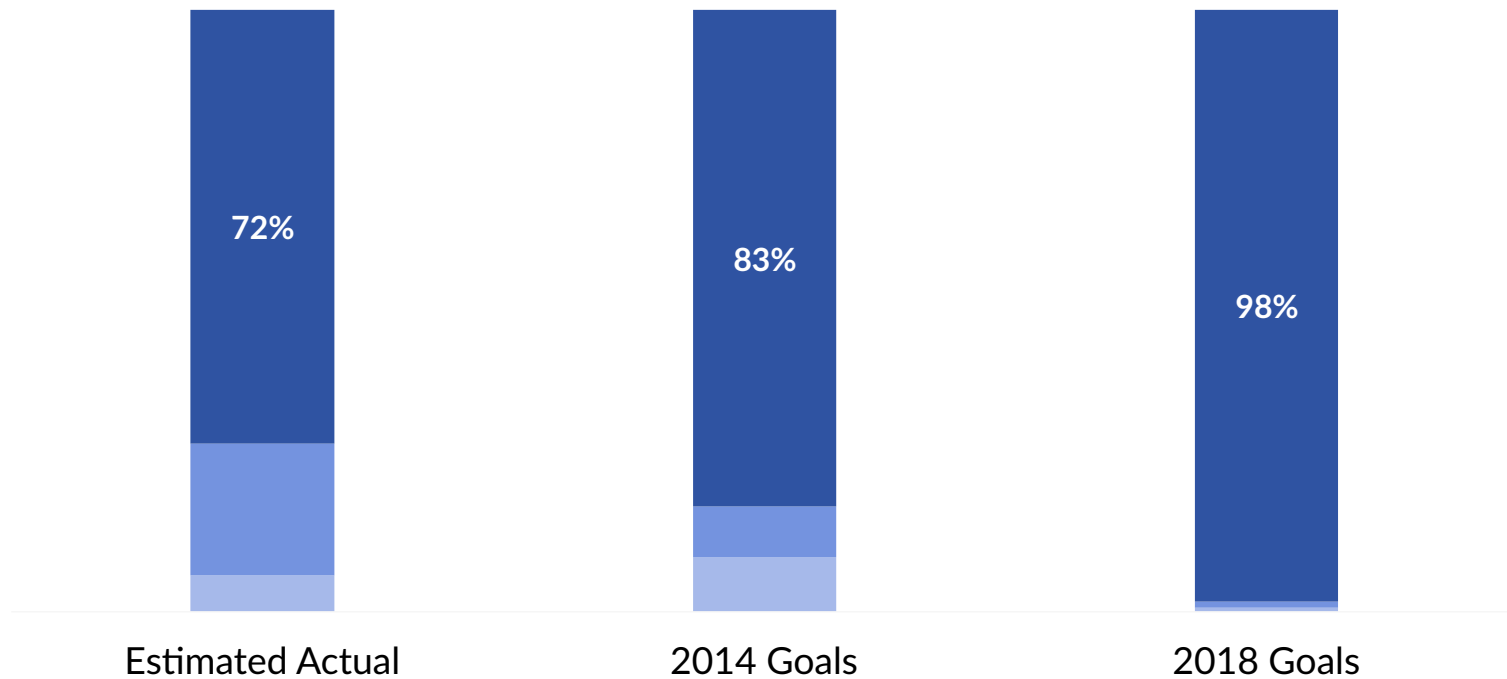
Unprecedented federal funding opportunity

For the next four years, self-provisioned fiber will qualify for E-rate funding FIBER if it is the most cost effective option - this creates a huge opportunity for the state and vendors to build fiber to schools

Specific E-rate changes include:

• Fiber construction cost can be charged to E-rate in one fiscal year

• Non-discounted portion of fiber construction is not capped and can be paid over four years

• Up to 10% match of state funding

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How E-rate can support getting fiber to schools

FIBER

Example: Sample School District wants to procure a fiber connection to one of their schools currently on a T-1 connection. The district is quoted $100,000 for a fiber build. How much money would this fiber project cost the district?

Fiber build quote from vendor		$100,000
E-rate reimbursement rate	70%	$70,000
Total cost to Sample SD	30%	$30,000

Sample Data

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E-rate match for state contribution

Example: Sample School District wants to procure a fiber connection to one of their schools currently on a T-1 connection. The district is quoted $100,000 for a fiber build. How much money would this fiber project cost the district?

Fiber build quote from vendor		$100,000
E-rate reimbursement rate	70%	$70,000
State contribution	10%	$10,000
Bonus E-rate match	10%	$10,000
Total cost to Sample SD	10%	$10,000

Sample Data

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Fiber access: Open questions

Open questions

- Is the state interested in further or continued financial support for fiber builds to schools?

  - Is the current amount enough?

  - If not financially, what is the state willing/able to do to support fiber expansion?

- Who in the state can help coach schools who need to upgrade to fiber?

- Which service providers would be most inclined/able to bring fiber to rural parts of the state?

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Federal Wi-Fi funding support is available

- $84 million of potential Category 2 funding for MN over 5 years ($150 / student)

- Of that amount, Minnesota used $14 million in 2015-16 and 4% of E-rate applicants used the full amount for their district

- Category 2 funding can be used for infrastructure equipment and tools needed to upgrade Wi-Fi

Sources: 2015-16 E-rate Item 21 data

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E-rate purchasing opportunity for Wi-Fi upgrades

WI-FI

Example: Category 2 funding for wireless access points (WAPs)

Cost per WAP (est.):	$500
Student count in MN (NCES data):	845,404
WAPs needed for all MN classrooms:	33,816 (~25 per class)
Total cost to provide WAPs for all classrooms:	$16,908,080
Minnesota Category 2 discount rate:	~69%

Total cost to Minnesota: **~$5.24 M**

Sample Data

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Aggregate purchasing lowers Wi-Fi costs further

WI-FI

Example: Category 2 funding for an aggregated purchase of WAPs

Cost per WAPs in aggregate (est.):	$250 (50% less)
Student count in MN (NCES data):	845,404
WAPs needed for all MN classrooms:	33,816 (~25 per class)
Total cost to provide WAPs for all classrooms:	$8,454,040
Minnesota Category 2 discount rate:	~69%

Total cost to Minnesota: ~$2.62M

Sample Data

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Wi-Fi/LAN: Open questions

WI-FI

Open questions

- Does the state have any school or district Wi-Fi/LAN data?

- Is the state interested in coordinating an aggregate Wi-Fi purchase, reimbursing districts directly or supporting another way?

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Key stakeholders for successful broadband projects

- **Champion**: desires to act on K-12 connectivity and can convene key stakeholders

- **Education Lead:** knows academic wants/needs of schools

- **Technical Lead**: knows technical broadband networks and providers

- **Coordinator:** manages the day-to-day operational activities and maintains project momentum

- [**Policy Lead**: can navigates the political aspects, if necessary]

- **Working group:** other stakeholders that would like to stay informed of – and can help propel – progress

Next steps

① Clarify roles ———————————————————— MN

② Clarify data with "missing" school districts ———— ESH MN

③ Plan and conduct check-ins and individual
   discussions with working group members
   to work through open questions ———————— ESH MN

④ Finalize Connectivity Report ———————————— ESH

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Appendix

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MN has taken action on K-12 connectivity

- 31 districts (6%) representing 107,622 (13%) students have signed the Future Ready pledge

- In 2010, the MN legislature set a goal for universal access to high speed broadband throughout the state by 2015

- Telecommunications Access Equity Aid Program provides financial assistance to support Internet access, video and telecom services

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Bandwidth use-case profiles

Individual Classroom Technology Use

- Basic network infrastructure for the school is in place; additional classroom use is typically approved by staff and curriculum development.
- Sufficient infrastructure and devices exist to facilitate basic and media-rich assessments or classroom use, but not all classrooms at the same time.

Moderate Bandwidth

1 Access Point per 1.5 Classrooms

100 Kbps per student Internet bandwidth

Everyday 1:1 Campus-wide Technology Use

- Technology is widely available; most students interact with a computing device most school days.
- All teachers have basic digital literacy.
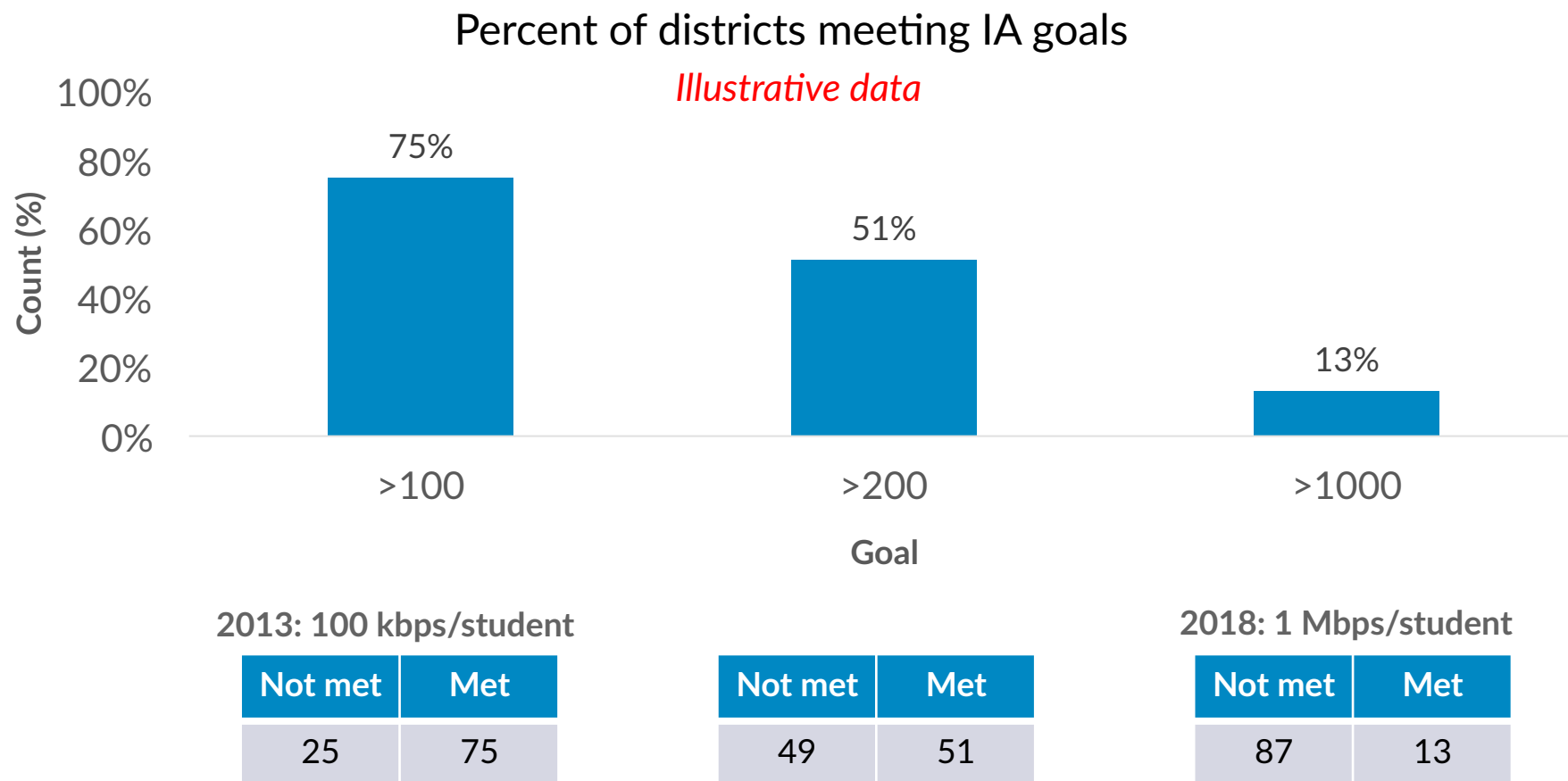- Digital curriculum, but not necessarily rich media, is a major part of one or more subject areas.
- Teachers and students expect the Internet to be available when they need it.

High Bandwidth

1.2 Access Points per Classroom

1 Mbps per student Internet bandwidth

Media-rich Blended Learning Technology Use

- Every student has a technology-enabled learning experience during the school day.
- Video and other rich media are used as a crucial part of the everyday learning experience.
- Instruction would not be productive if the Internet were unavailable for a day.

Very High Bandwidth

1.2 Access Points per Classroom

1+ Mbps per student Internet bandwidth

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Are districts meeting Internet Access goals?

ILLUSTRATIVE view of how to measure progress towards goals

Percent of districts meeting IA goals
Illustrative data

2013: 100 kbps/student

Not met	Met
25	75

Not met	Met
49	51

2018: 1 Mbps/student

Not met	Met
87	13

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Which districts are NOT meeting 2014 IA goals?

ILLUSTRATIVE view of how to measure progress towards IA goals

Districts with <100 Kbps per student

Mostly small districts in rural areas and small towns

Locale/Size	Tiny	Small	Medium	Large	Mega
Rural	--	10%	2%	--	--
Small Town	1%	7%	2%	--	--
Suburban	--	--	1%	4%	--
Urban	3%	--	--	1%	--

Illustrative data

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Which districts are NOT meeting 2018 IA goals?

ILLUSTRATIVE view of how to measure progress towards IA goals

Districts with <1 Mbps per student

*Mostly urban, single school districts & and small districts in rural areas*

Locale/Size	Tiny	Small	Medium	Large	Mega
Rural	6%	33%	3%	--	--
Small Town	1%	14%	5%	--	--
Suburban	6%	5%	2%	8%	--
Urban	21%	3%	--	2%	1%

Illustrative data

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Are schools meeting WAN goals?

ILLUSTRATIVE view of how to measure progress towards WAN goals

Circuits Meeting/Not Meeting WAN Goals

Illustrative data

Goal: 1 Gbps per school
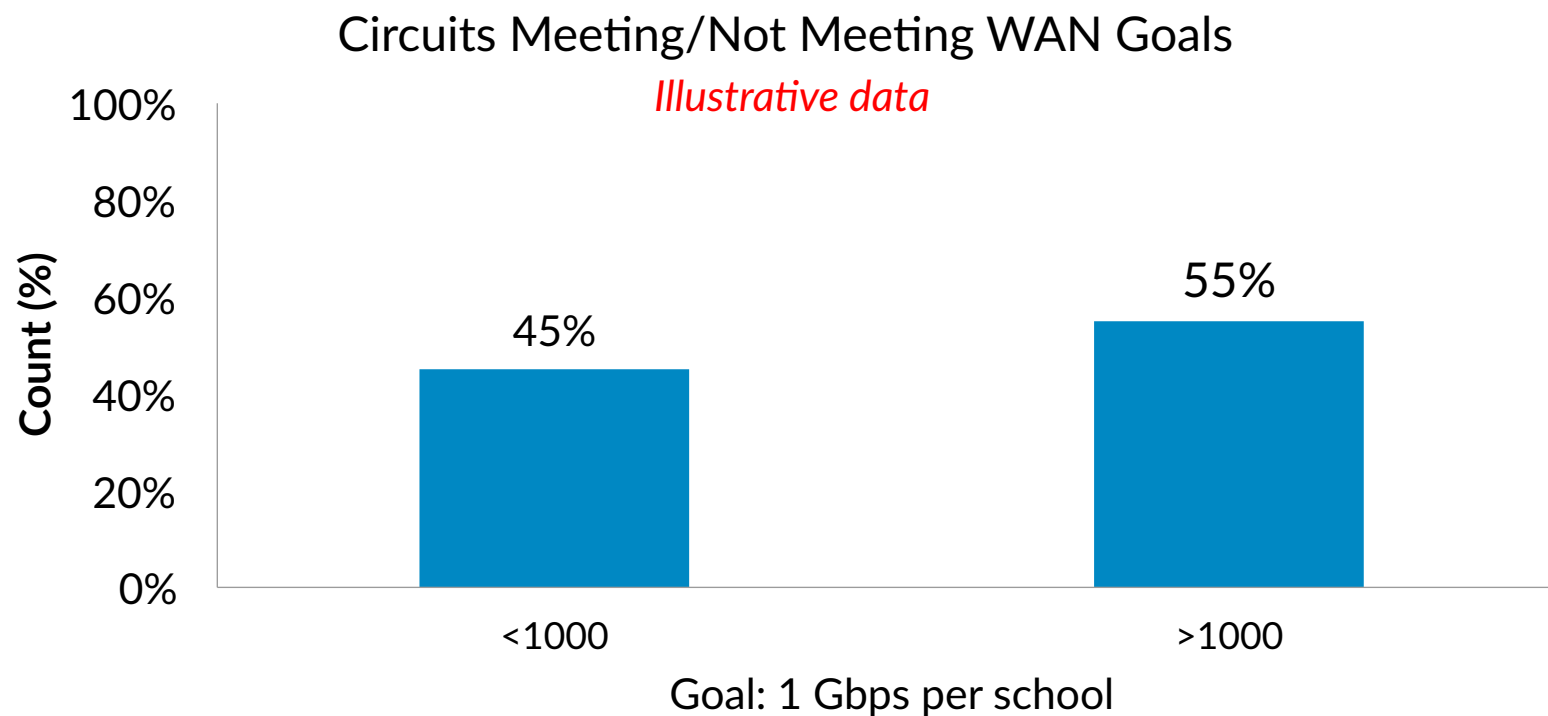
What schools are NOT meeting WAN goals?

ILLUSTRATIVE view of how to measure progress towards WAN goals

Districts with <1 Gbps circuit per school

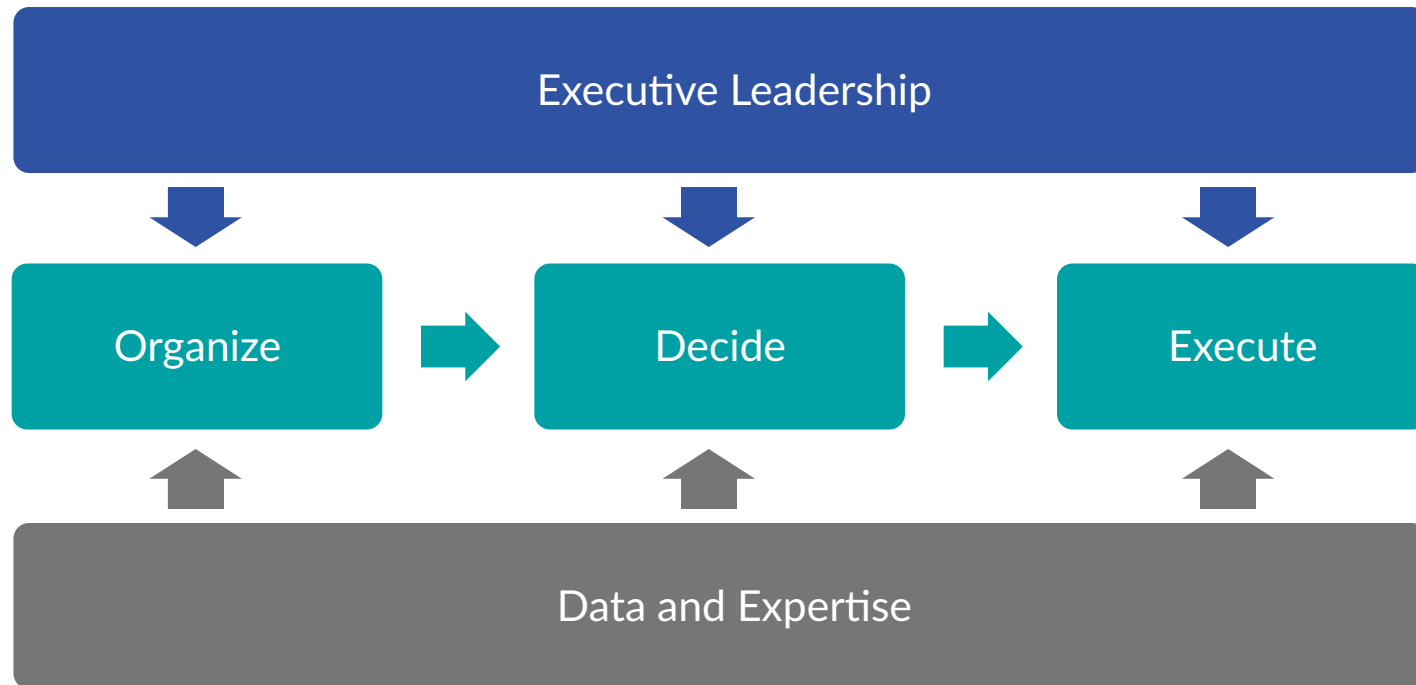*Mostly small districts in rural areas, and medium districts in small towns*

Locale/Size	Tiny	Small	Medium	Large	Mega	Unknown
Rural	4%	70%	20%	--	--	--
Small Town	--	32%	55%	--	--	--
Suburban	10%	11%	29%	15%	--	4%
Urban	11%	2%	--	3%	72%	--

Illustrative data

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Cases of State Action

Leadership and data create conditions for success

Executive Leadership

Organize → Decide → Execute

Data and Expertise

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Case: Upgrading Arkansas' K-12 network

In 2014, ESH partnered with the Arkansas Governor's Office and the Department of Education

- Our analysis found that 35% of Arkansas schools fell below the 100 Kbps per student required to adequately support digital learning today

- The state upgraded Arkansas Public School Computer Network's (APSCN) speed to 200 Kbps per student—more than 40 times its prior speed of 5 Kbps per student, for roughly the same cost.

- The majority of Arkansas' 276 school districts and cooperatives will be connected to higher speeds within the next year, and all but two by July 2017

Fort Smith schools first in Arkansas connected to new broadband network

Submitted by The City Wire Staff on Wed, 07/15/2015 - 6:04pm
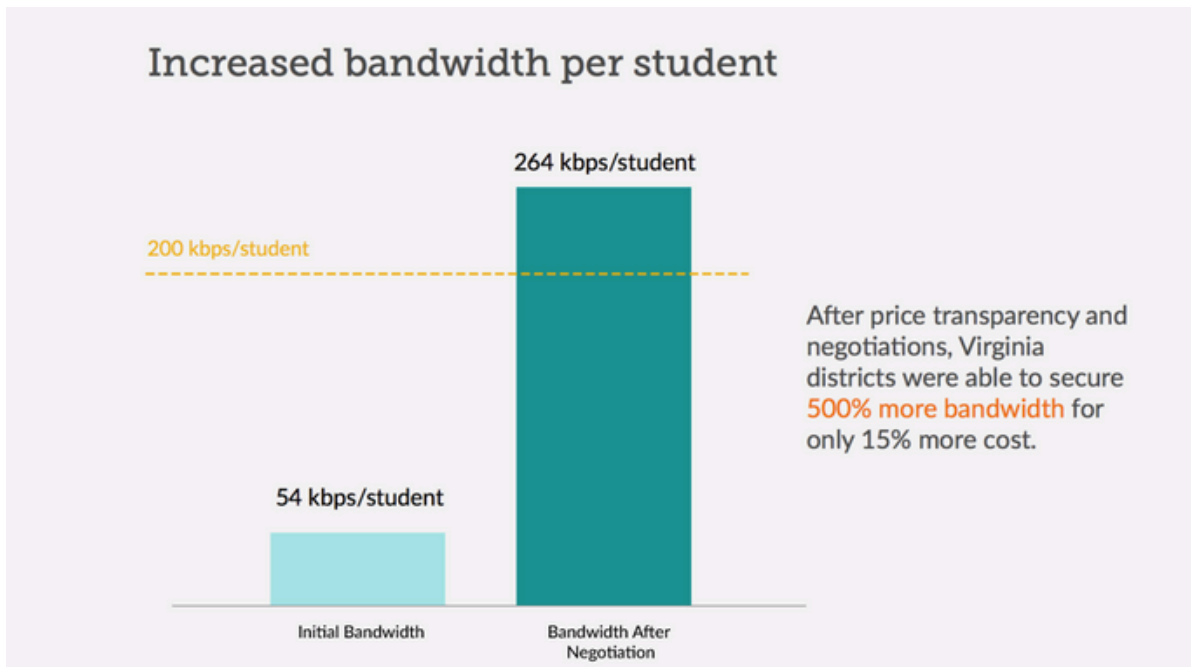
story by Aric Mitchell, special to The City Wire
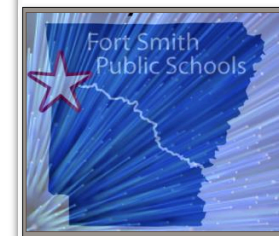
The Fort Smith School District became the first in the state of Arkansas to acquire a new upgraded, high-speed, fiber-optic broadband network 40 times faster than what other schools throughout the state are capable of achieving.

The announcement was made at a "flip the switch" event on

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Case: Power of Transparency in VA

In 2015, ESH partnered with a consortium of 15 districts in VA to increase broadband cost transparency

- ESH worked with districts to collect and analyze Internet pricing data and speeds to understand connectivity

- Five districts received 5x more bandwidth for only 15% more cost, allowing all five to meet a connectivity level of >200 kbps per student

Increased bandwidth per student

264 kbps/student

200 kbps/student

After price transparency and negotiations, Virginia districts were able to secure 500% more bandwidth for only 15% more cost.

54 kbps/student

Initial Bandwidth   Bandwidth After Negotiation

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State Network Example: Network Nebraska

PROBLEM

- Regional distance learning networks had outdated infrastructure
- The networks lobbied the state to intervene on their behalf

Fractured regional networks

Out-of-date infrastructure

SOLUTION

- Formed the Distance Education Enhancement Task Force
- K12 partnered with higher-ed to support the state backbone
- Postalized district membership fees ($236/mo) fund the network

OUTCOME

- Single, sustainable K-20 network funded by affordable membership fees

$1/Mbps Internet access

100% district participation (July 2015)

99% fiber (2015)

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Funding Example: Pennsylvania's E-Fund

PROBLEM

- Fractured district purchasing resulting in:
  - High costs
  - Low bandwidth
  - Poor equity

54 Mbps average district b/w $486/Mbps average IA   40% fiber

SOLUTION

- Service providers paid into the E-Fund in exchange for relaxed regulatory guidelines ($60M over 6 years)
- Established grant program that incentivized district cooperation (E-Fund)

OUTCOME

- Intermediary units formed regional networks to receive E-Fund money
- Regional networks interconnected to form a state backbone (PAIUNet)

Bandwidth up 534% $1/Mbps state IA   83% fiber (2012)

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Aggregation Example: Mississippi's State Master Contract

PROBLEM

- Proliferation of T1 circuits across the state
  - Costly for districts
  - Incompatible technologies

Slow T1 connections   Costly services   Incompatible technologies

SOLUTION

- State negotiated a master contract with a single provider for broadband services
- Contract allows for pricing renegotiation every 18 months

OUTCOME

- Postalized rates across the state are some of the lowest in the nation
  - High Value
  - High Equity

80% district participation $726 for 1 Gbps transport throughout the state   97% fiber (2015)

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State WiFi Example: Rhode Island's Wireless Classroom Initiative

PROBLEM

- Realized that wireless infrastructure was a necessary component for implementing digital learning, but many schools in the state lacked the funding and/or expertise to upgrade their equipment

Lack of expertise at districts

Not affordable for districts

SOLUTION

- Secured $20M through a state bond for the Wireless Classroom Initiative
- Paid for 3 competitive site surveys and proposals at every school by qualified vendors
- Assisted districts with vendor selection and funded all upgrades

OUTCOME

- All classrooms in the state have digital-learning-ready WiFi access by summer 2015

1 Gbps WiFi in all classrooms

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Fiber Build Example: California's BIIG Grant Program

PROBLEM

- Some schools lacked funding and expertise needed to upgrade and maintain Internet connectivity
- Field test of CA's online assessment program exposed a subset of schools that lacked adequate digital learning infrastructure

Out-of-date infrastructure   Not affordable for districts

SOLUTION

- Governor Brown created a one-time $27M fund to upgrade broadband infrastructure
- Schools were qualified based on need
- The state executed an RFP on behalf of qualified sites to connect to the state network

OUTCOME

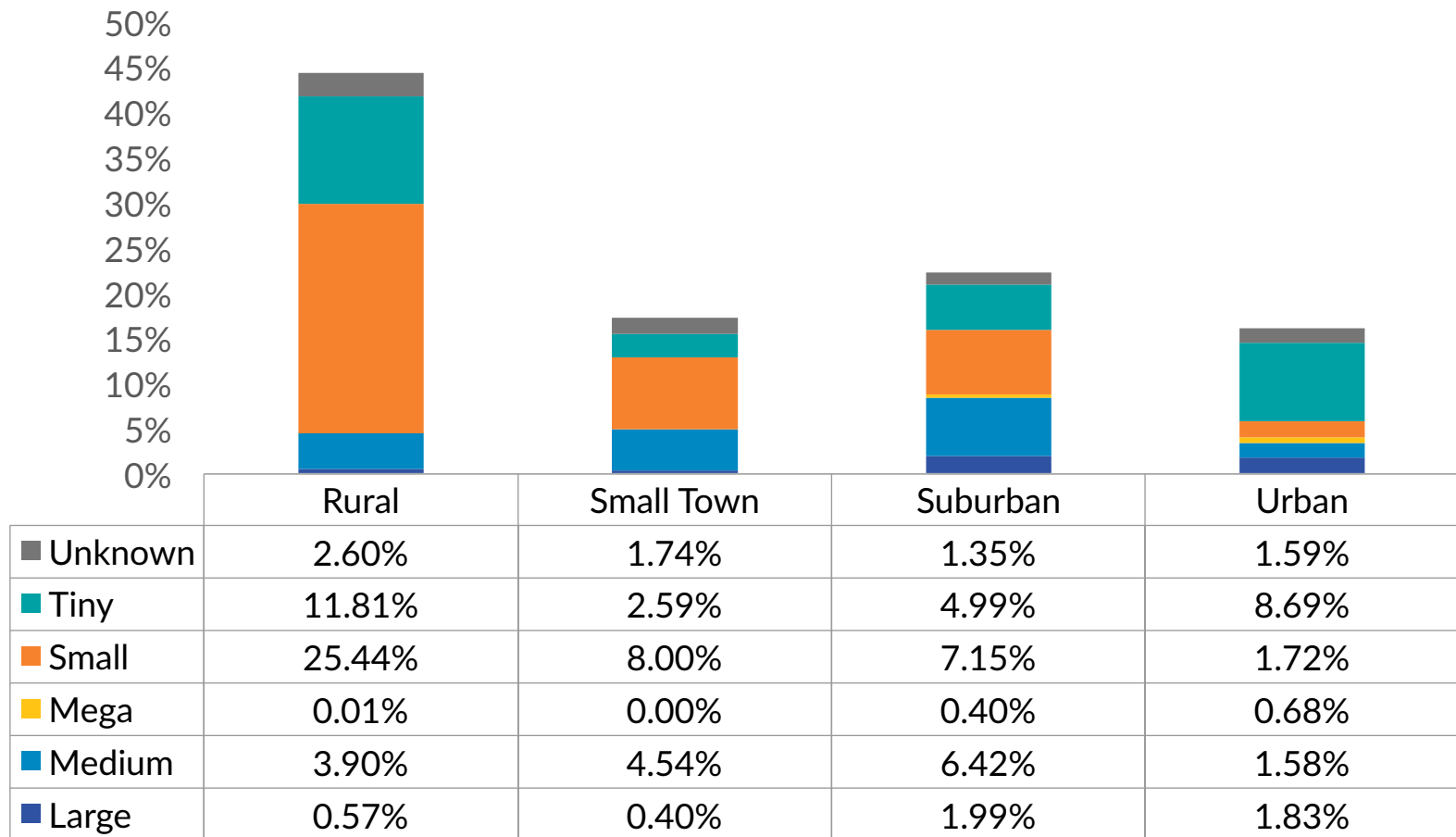- Schools involved in the program have scalable Internet connections to California's statewide network

90% of grant sites upgraded to 1 Gbps or greater   95% of grant sites connected to fiber

Locale and district sizes (national)

	Rural	Small Town	Suburban	Urban
■ Unknown	2.60%	1.74%	1.35%	1.59%
■ Tiny	11.81%	2.59%	4.99%	8.69%
■ Small	25.44%	8.00%	7.15%	1.72%
■ Mega	0.01%	0.00%	0.40%	0.68%
■ Medium	3.90%	4.54%	6.42%	1.58%
■ Large	0.57%	0.40%	1.99%	1.83%

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Locale and district sizes (Minnesota)

	Rural	Small Town	Suburban	Urban
■ Tiny	5.59%	0.62%	4.35%	15.53%
■ Small	46.58%	7.45%	4.97%	2.48%
■ Medium	1.24%	3.11%	2.48%	0.00%
■ Large	0.00%	0.00%	3.11%	2.48%

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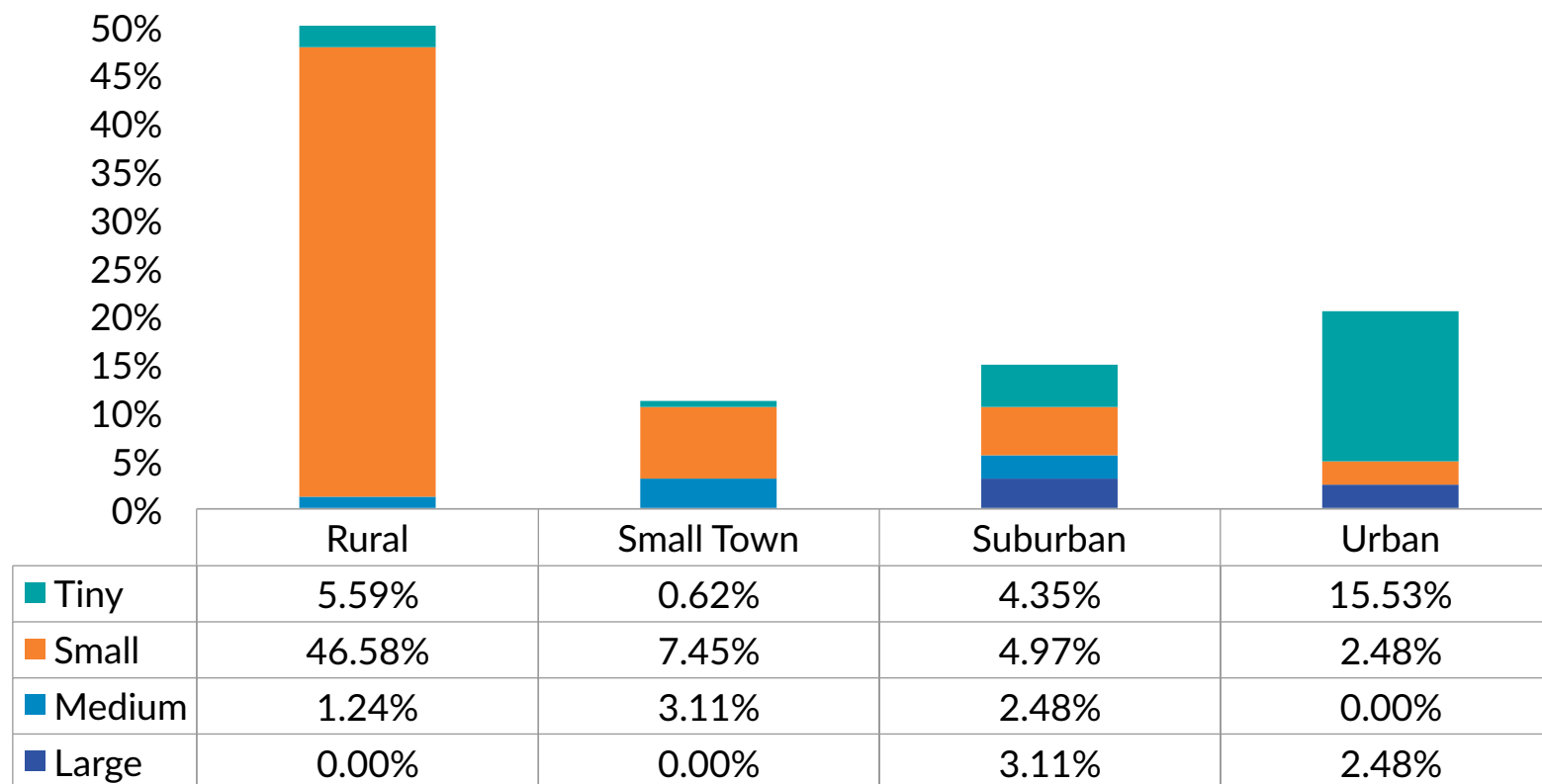
Locale and district sizes (comparison)

National

	Rural	Small Town	Suburban	Urban
■ Unknown	2.60%	1.74%	1.35%	1.59%
■ Tiny	11.81%	2.59%	4.99%	8.69%
■ Small	25.44%	8.00%	7.15%	1.72%
■ Mega	0.01%	0.00%	0.40%	0.68%
■ Medium	3.90%	4.54%	6.42%	1.58%
■ Large	0.57%	0.40%	1.99%	1.83%

Minnesota

|	Rural	Small Town	Suburban	Urban
■ Tiny	5.59%	0.62%	4.35%	15.53%
■ Small	46.58%	7.45%	4.97%	2.48%
■ Medium	1.24%	3.11%	2.48%	0.00%
■ Large	0.00%	0.00%	3.11%	2.48%

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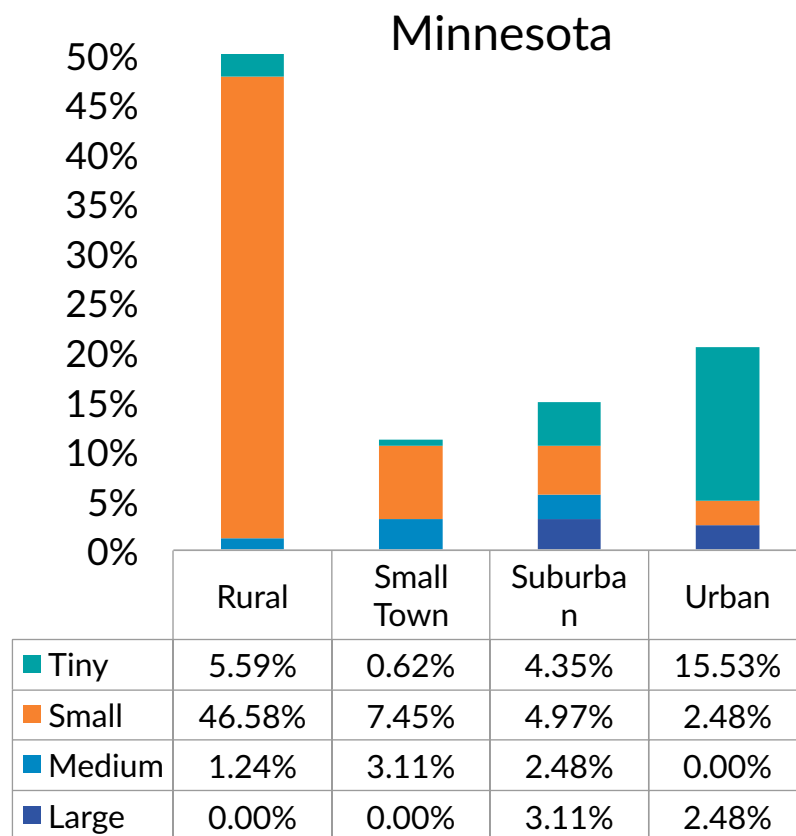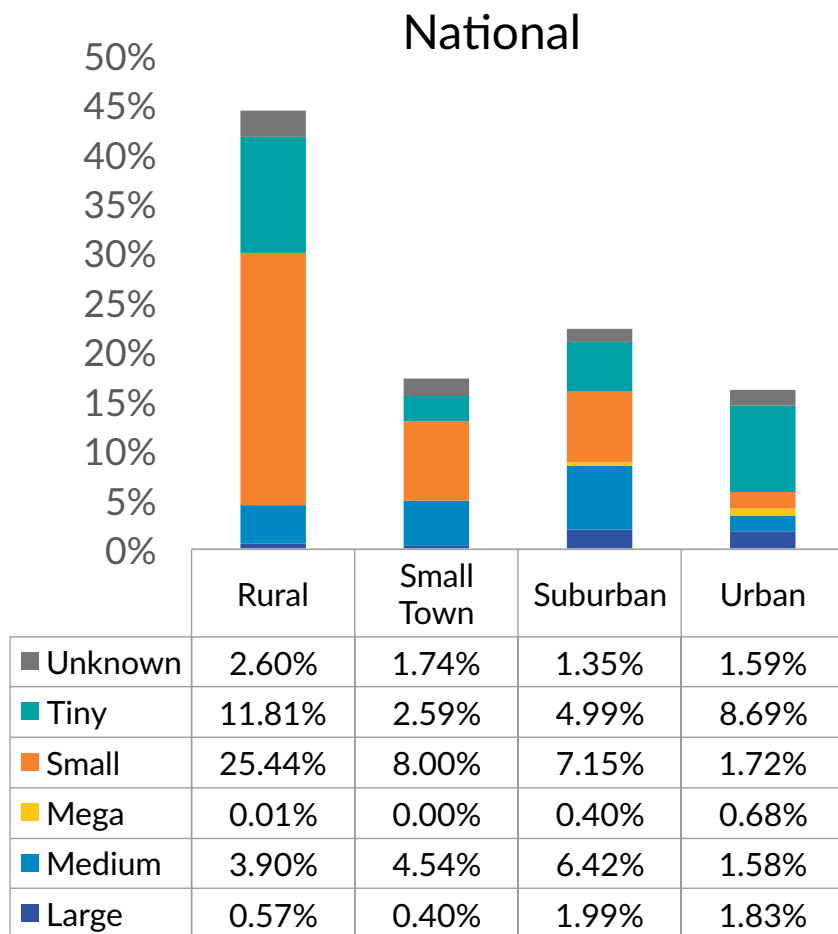
Existing data shows district and CAI connectivity

- **Connected Minnesota Survey of Districts (2013)**
  - **~37% districts > 100 mbps connections; ~40% < 100 mbps**
  - **Mostly fiber (~67%) and fixed wireless (~9%) connections**
  - Compiled on MN K-12 school connectivity through METN regions in 2013
  - District level connectivity speed and technology
  - Self-reported survey data, (also using FL speed test site)
  - 251 of 328 LEAs responded to the survey (77%)

- **NTIA SBI Data on CAIs (June 2014)**
  - Collected for ARRA SBI program
  - Queried for locations where a provider had reported gig service
  - 3,267 CAIs categorized as K-12 (2,018 schools in MN, according to 2015 DOE)
  - Includes districts, schools, private, charter, etc.

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Broadband Data Collection - 2013

Line Speeds by District
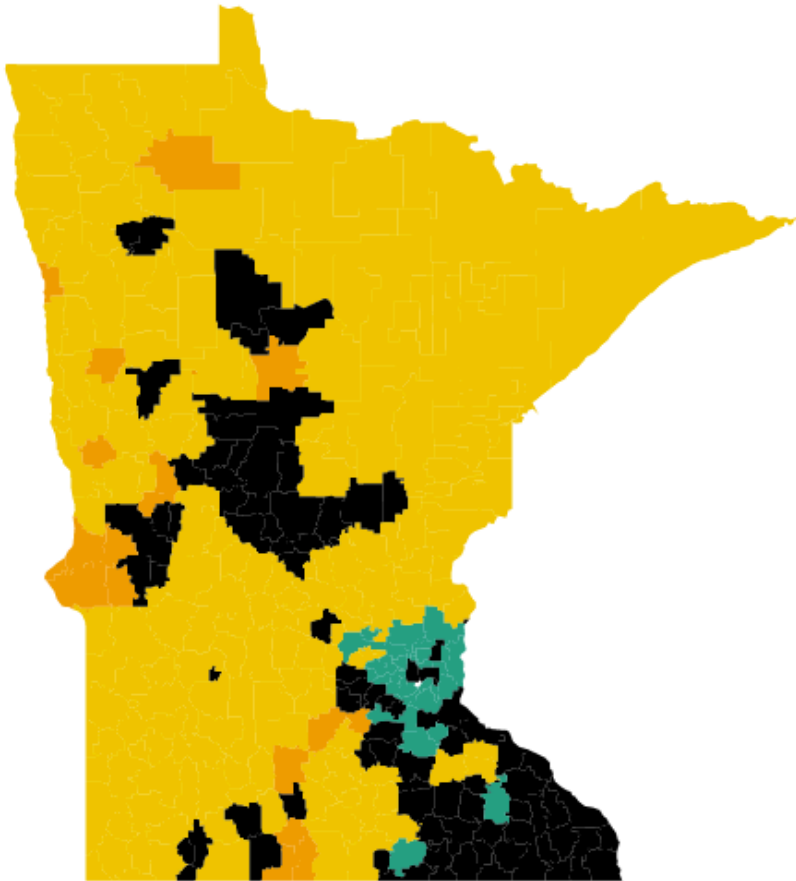
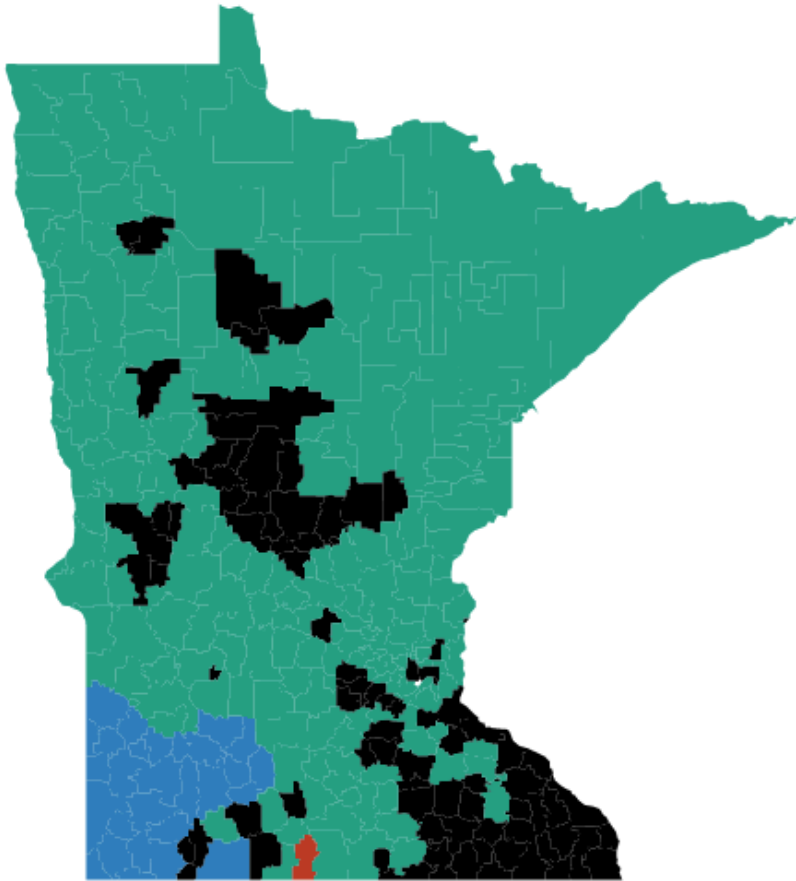| Speed	n	%	Color
Less than or equal to 200 kbps	0	0%	Red
>= 200 kbps, < 768 kbps	0	0%	
>=768 kbps, < 1.5 mbps	0	0%	
>= 1.5 mbps, < 3 mbps	1	0.40%	Orange
>= 3 mbps, < 6 mbps	1	0.40%	
>= 6 mbps, <10 mbps	2	0.80%	
>= 10 mbps, < 25 mbps	15	6.0%	
>=25 mbps, <50 mbps	38	15.1%	Yellow
>= 50 mbps, < 100 mbps	73	29.0%	
>= 100 mbps, < 1 gbps	83	33.1%	
>= 1 gbps	38	15.1%	Green
Unreported	77		Black

Source: Connected MN Broadband Data from 2013 (K-12 districts only)

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MN Statewide Data

Broadband Data Collection - 2013

Line Technologies by District

Line Technology	n	%	Color
Other Copper Wireline	1	0.40%	Red
Fiber	221	88.1%	Green
Fixed Wireless - Licensed	29	11.6%	Blue
Unreported	77		Black

Source: Connected MN Broadband Data from 2013 (K-12 districts only)

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K-12 CAI by line speed

Broadband Data Collection - 2014

Line Speed	n	%
Greater than or equal to 768 kbps and less than 1.5 mbps	15	1.6%
Greater than or equal to 1.5 mbps and less than 3 mbps	79	8.7%
Greater than or equal to 3 mbps and less than 6 mbps	78	8.6%
Greater than or equal to 6 mbps and less than 10 mbps	113	12.4%
Greater than or equal to 10 mbps and less than 25 mbps	318	34.9%
Greater than or equal to 25 mbps and less than 50 mbps	45	4.9%
Greater than or equal to 50 mbps and less than 100 mbps	93	10.2%
Greater than or equal to 100 mbps and less than 1 gbps	126	13.8%
Greater than or equal to 1 gbps	45	4.9%
Total reported	**912**	**100%**
Unknown	*2,355*	

Source: October, 2014 NTIA SBI data

K-12 CAI by technology

Broadband Data Collection - 2014

Line Technology	n	%
Optical Carrier/Fiber to the End User	752	74.6%
Other Copper Wireline	112	11.1%
Terrestrial Fixed Wireless - Licensed	56	5.6%
Cable Modem - Other	51	5.1%
Asymmetric xDSL	32	3.2%
Satellite	3	0.3%
Cable Modem - DOCSIS 3.1	1	0.1%
Terrestrial Mobile Wireless	1	0.1%
Total reported	**1,008**	**100%**
Unknown	*2,259*	

Source: October, 2014 NTIA SBI data

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