

Idaho STEM EcosySTEM Webinar

Eric Forsch | Broadband Development Manager



What Do We Mean by Broadband Infrastructure?

- 
- A detailed cross-sectional diagram of a submarine cable. The diagram shows a central core of 8 strands of steel wire (3) surrounded by a thick layer of Mylar tape (2). This is encased in a polyethylene jacket (1). The entire assembly is surrounded by a thick layer of aluminium water barrier (4). The outermost layer is a thick, dark green jacket (5). The diagram is numbered 1 through 8, corresponding to the legend.
- 1 — Polyethylene
 - 2 — Mylar tape
 - 3 — Stranded steel wires
 - 4 — Aluminium water barrier
 - 5 — Polyethylene
 - 6 — Polyethylene
 - 7 — Polyethylene
 - 8 — Stranded steel wires



Broadband Networks

Provider Tiers

Tier 1 - providers whose networks form the internet backbone; deliver traffic to the entire internet through agreements with other Tier 1 providers.

Tier 2 - providers primarily focused on regional consumer and commercial service; peer with other Tier 2 networks and purchase access to Tier 1 networks.

Tier 3 - usually last mile providers; must purchase access to connect customers to the global internet.

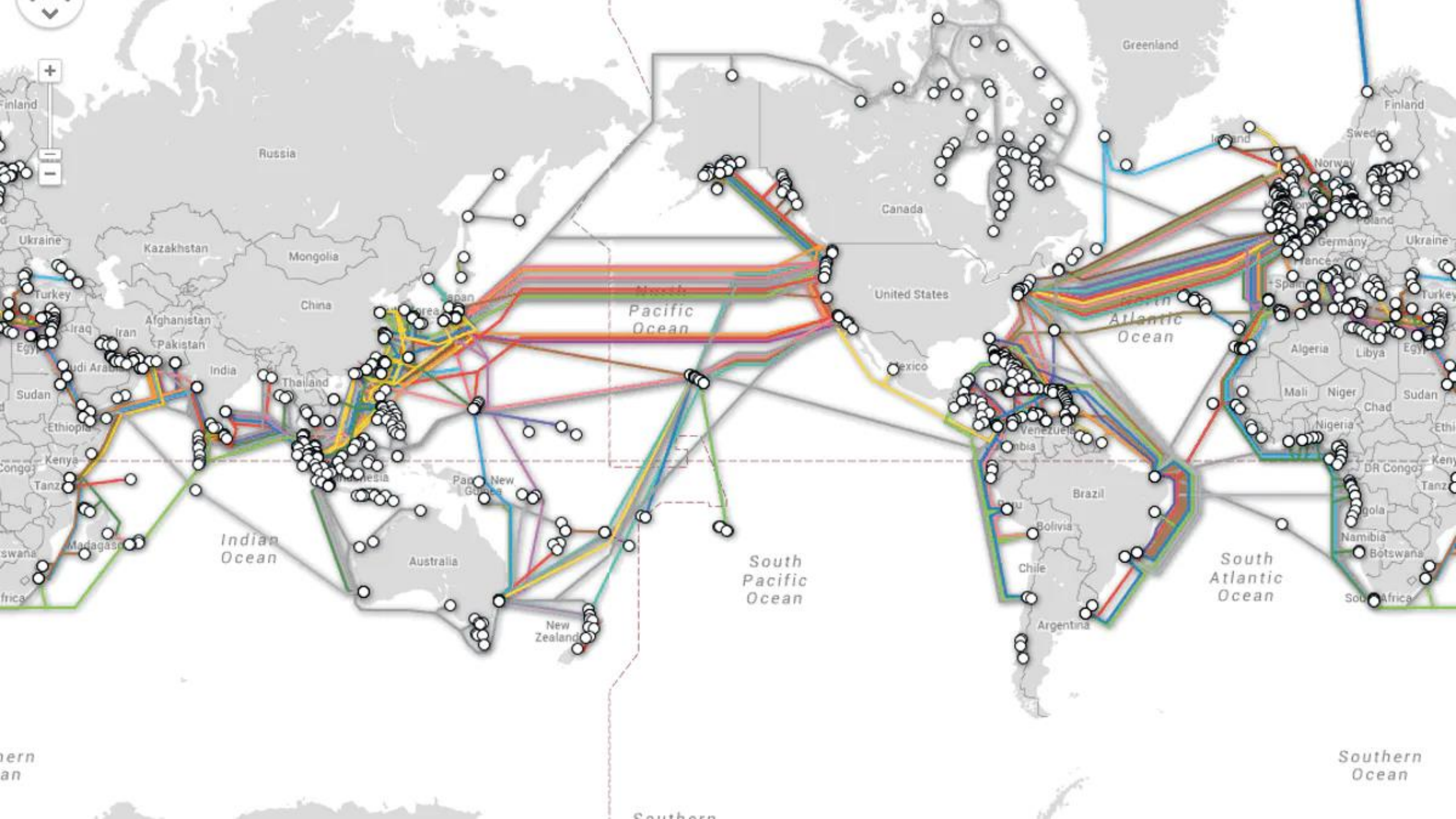
Definitions

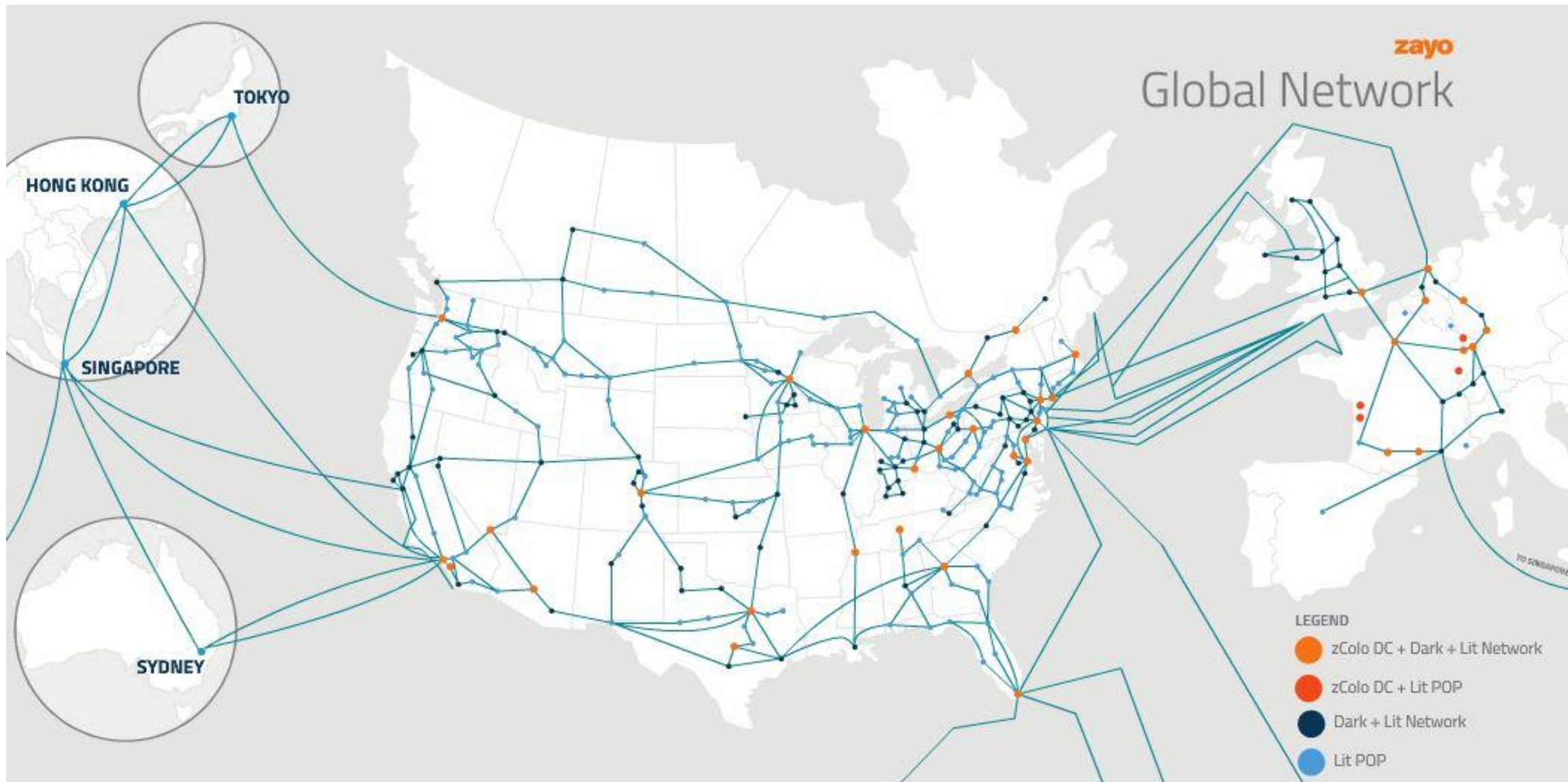
Internet backbone. Major data routes hosted by companies, governments, academic, or other networks. Think transoceanic cables. The largest providers operate Tier 1 networks.

Middle mile. The physical network that links the backbone to local internet networks, often called last-mile networks. In some communities, the middle mile may connect community anchor institutions to each other, enabling them to share applications, infrastructure, and other resources.

Last mile. The part of a telecommunications network that connects the local provider to the residential or small-business customer.

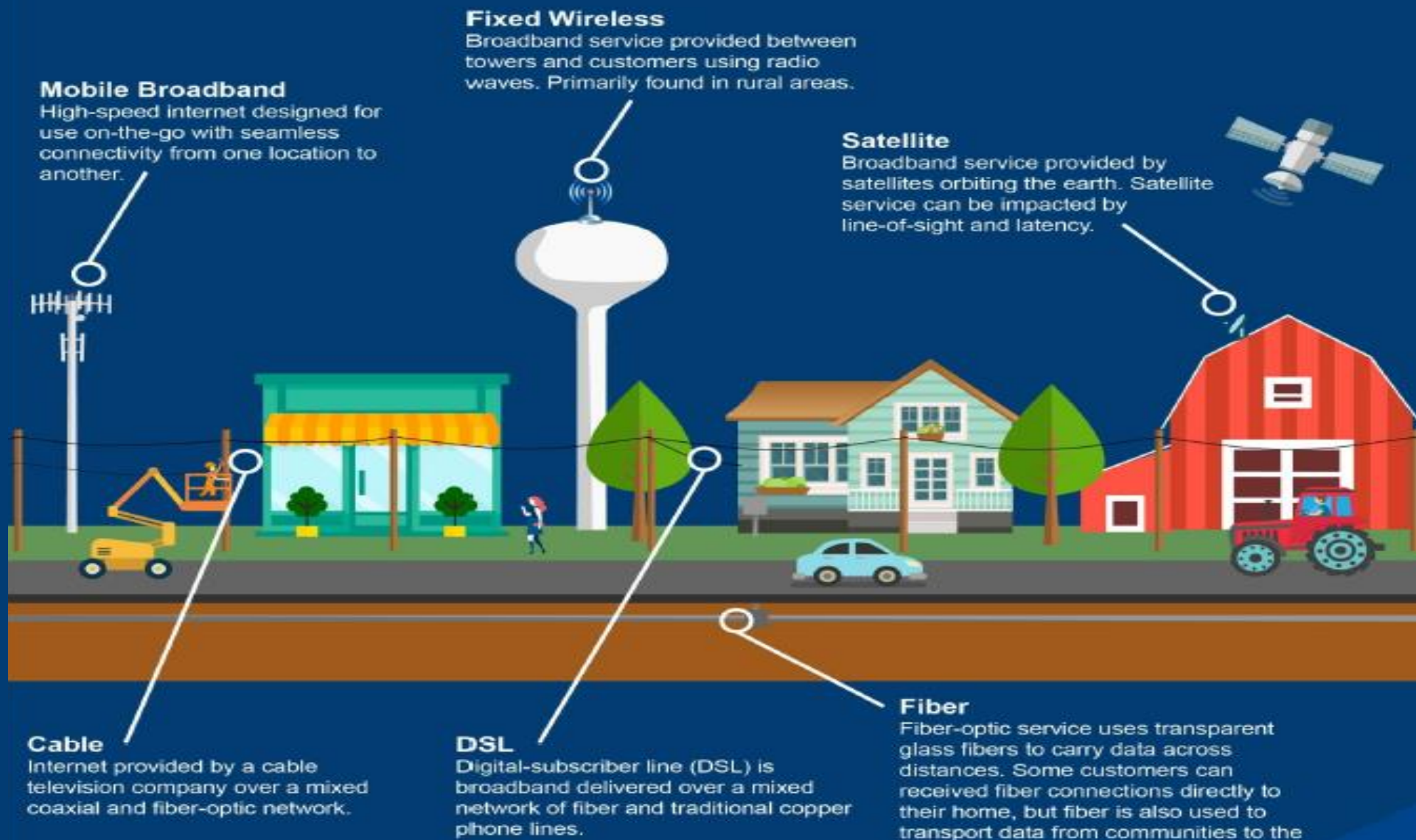
“Last” last mile. Line extensions, multi-family units, and reliability.





WHAT IS BROADBAND?

In its simplest form, the term broadband refers to high-speed internet access that is always on and faster than dial-up. However, as demand for faster and faster internet speeds has increased, so too has the speed definition of broadband. Currently, the Federal Communications Commission defines broadband as an internet connection with a download speed of 25 Megabits per second and an upload speed of 3 Megabits per second. Fixed, terrestrial broadband is high-speed data transmission to homes and businesses that is designed for permanent, stationary use and includes fiber, cable, DSL, and fixed wireless technologies.

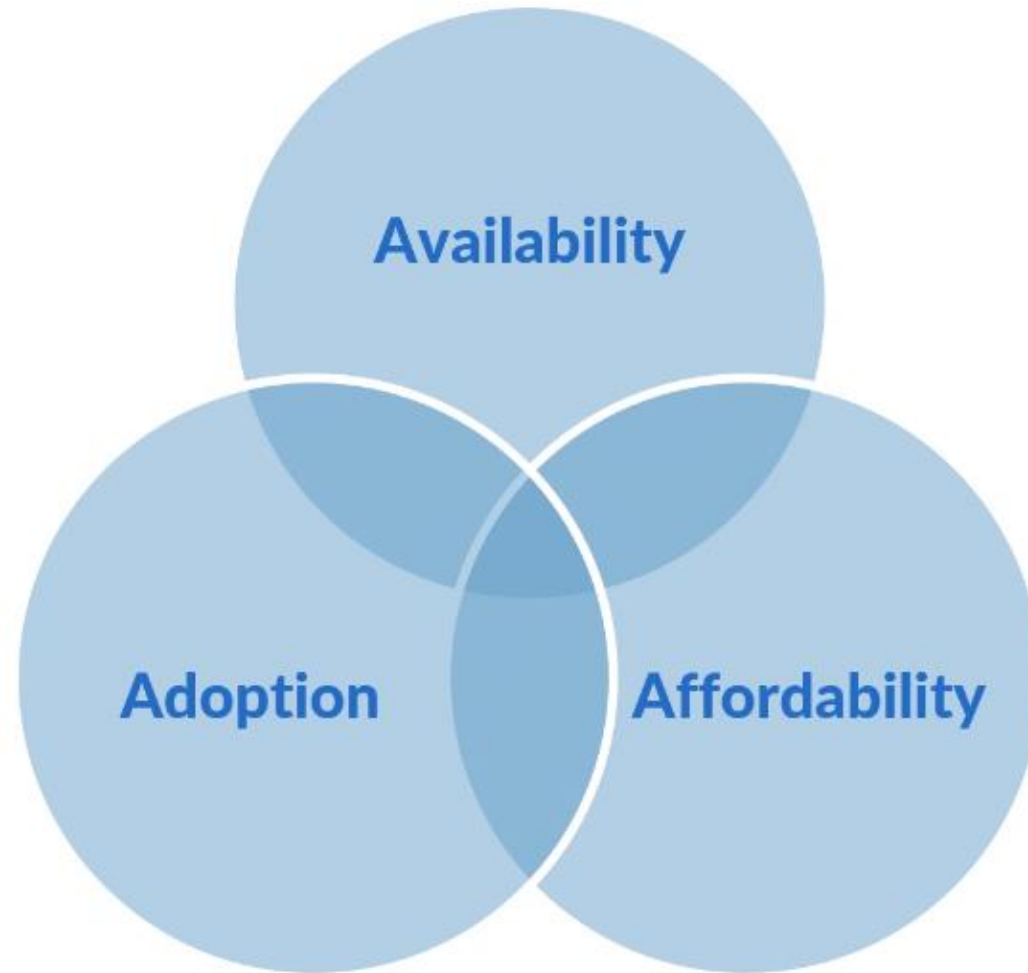






**Why is Broadband Such
a Crucial Concern?**

The Digital Divide



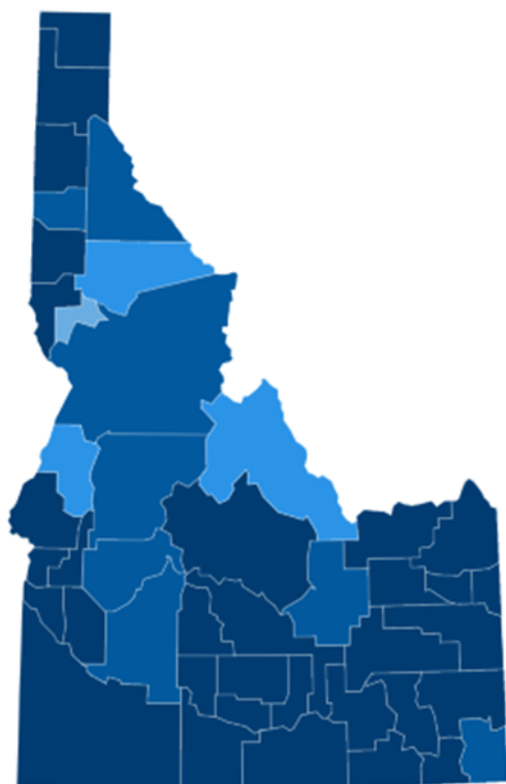
Why Speeds Matter

Figure 4. Application speed requirements

Use case		Download requirements	Upload requirements
Videoconference – 1:1	1080 HD	3.0 Mbps	3.8 Mbps
	720 HD	1.2 Mbps	1.2 Mbps
	High-quality	0.6 kbps	0.6 kbps
Videoconference – Group call	1080 HD	3.0 Mbps	3.8 Mbps
	720 HD	1.8 Mbps	2.6 Mbps
	High-quality	600 kbps	1.0 Mbps
Streaming	4K UHD	25 Mbps	N/A
	Full HD	5 Mbps	N/A
	SD quality	3 Mbps	N/A
Gaming	Competitive	50 Mbps	10 Mbps
	Highly interactive	25 Mbps	5 Mbps
	Casual	3 Mbps	0.5 Mbps

Sources: Deloitte analysis of suggested bandwidth requirements of streaming and videoconferencing platforms

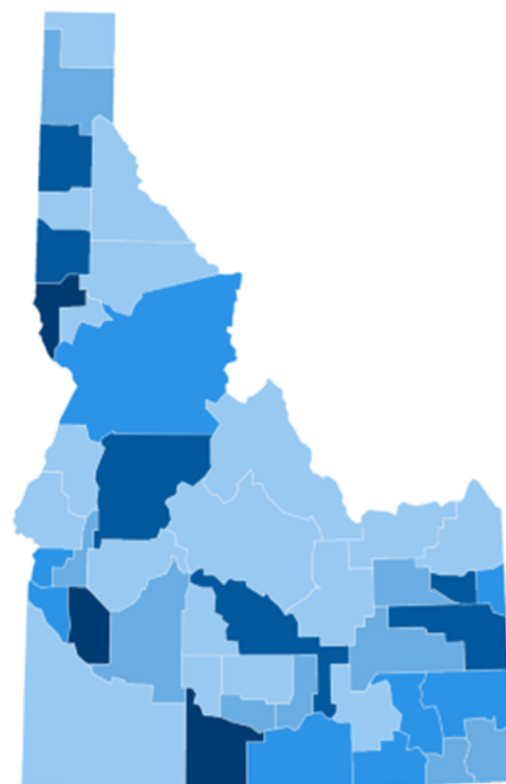
FCC indicates broadband is not available to
~83K people



FCC broadband
availability* 0% >0 to 20% >20% to 40% >40% to 60% >60% to 80% >80% to 100%

* FCC Broadband has or "could" provide greater than or equal to 25 Mbps / 3 Mbps

Microsoft data indicates ~669K people do not
use the internet at broadband speeds



Broadband
usage** 0% >0 to 20% >20% to 40% >40% to 60% >60% to 80% >80% to 100%

** Broadband speeds greater than or equal to 25 Mbps

Sources: FCC Fourteenth Broadband report based on form 477 data from December 2019 and Microsoft data from October 2020
To assist with additional broadband mapping analysis data has been made downloadable [here](#). Learn more in this [GitHub repository](#).

Home Broadband Connection by Income

% of U.S. adults who say they have a broadband connection at home, by annual household income



Layers

☒ Ookla Median Download Speed

☐ 100 m Bins

☐ 500 m Bins

☒ States

☒ Counties

- ☐ Below 10 Mbps
- ☐ 10 - 25 Mbps
- ☐ 25 - 50 Mbps
- ☐ 50 - 100 Mbps
- ☐ Above 100 Mbps
- ☐ No Data

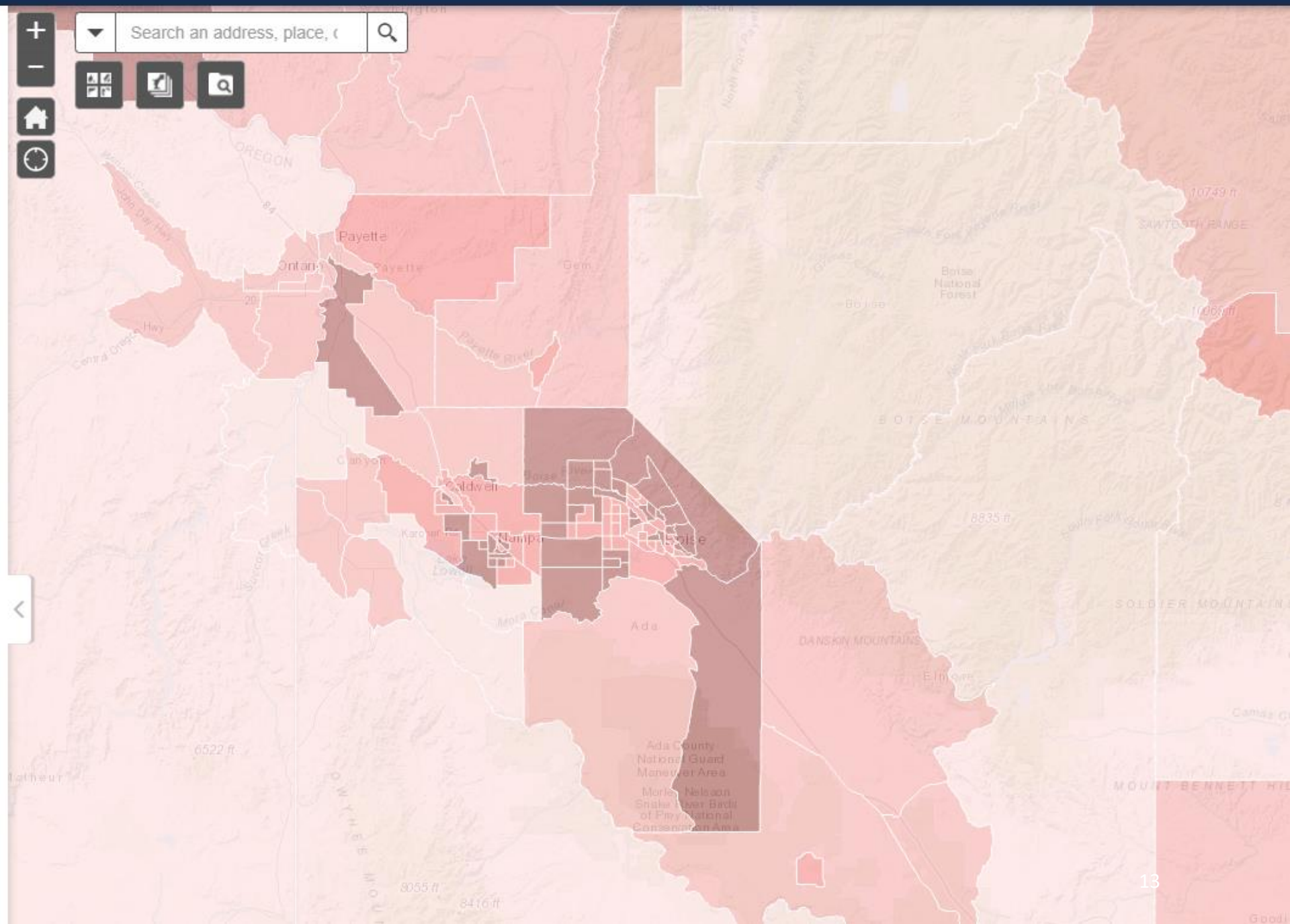
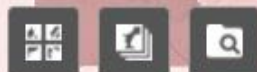
☒ Tracts

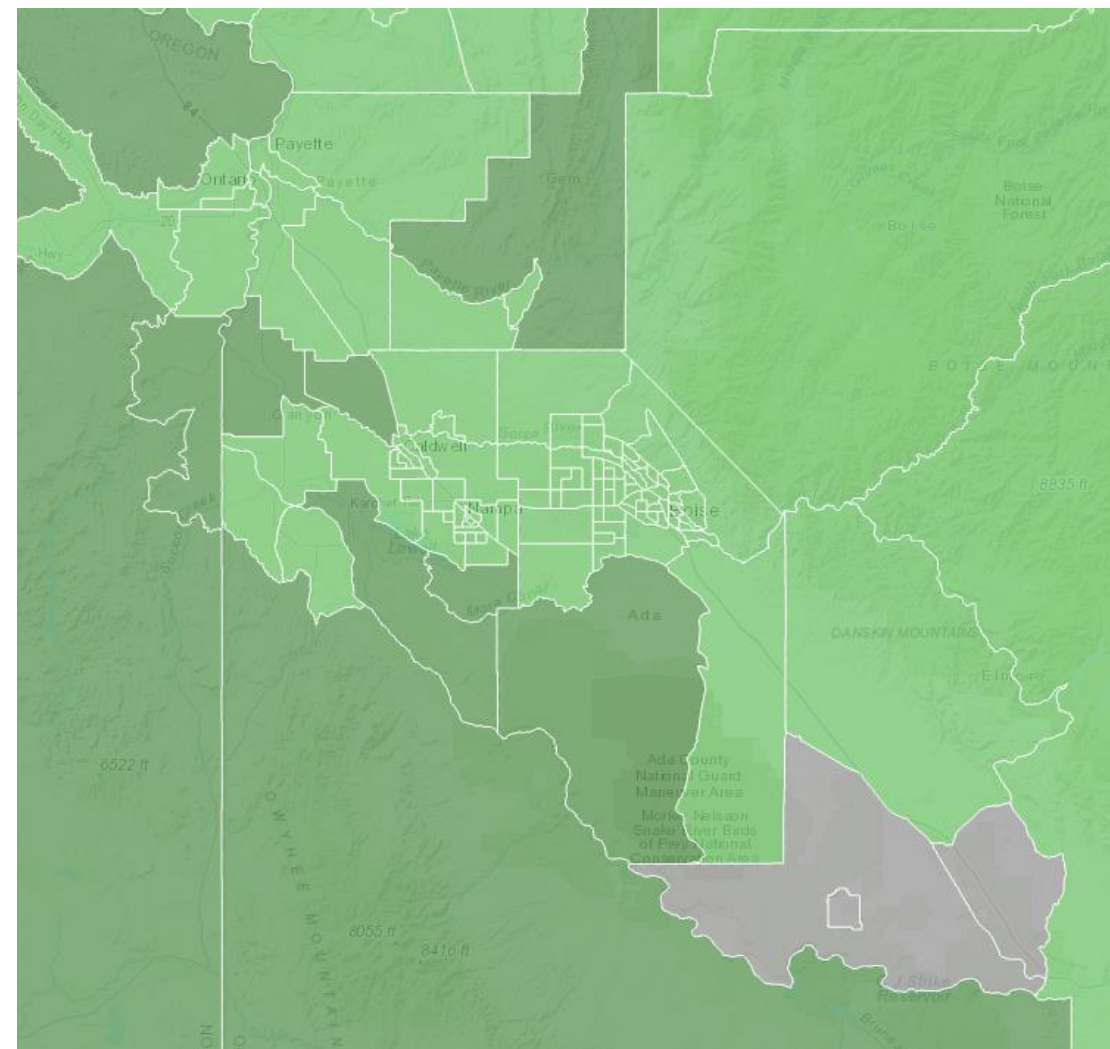
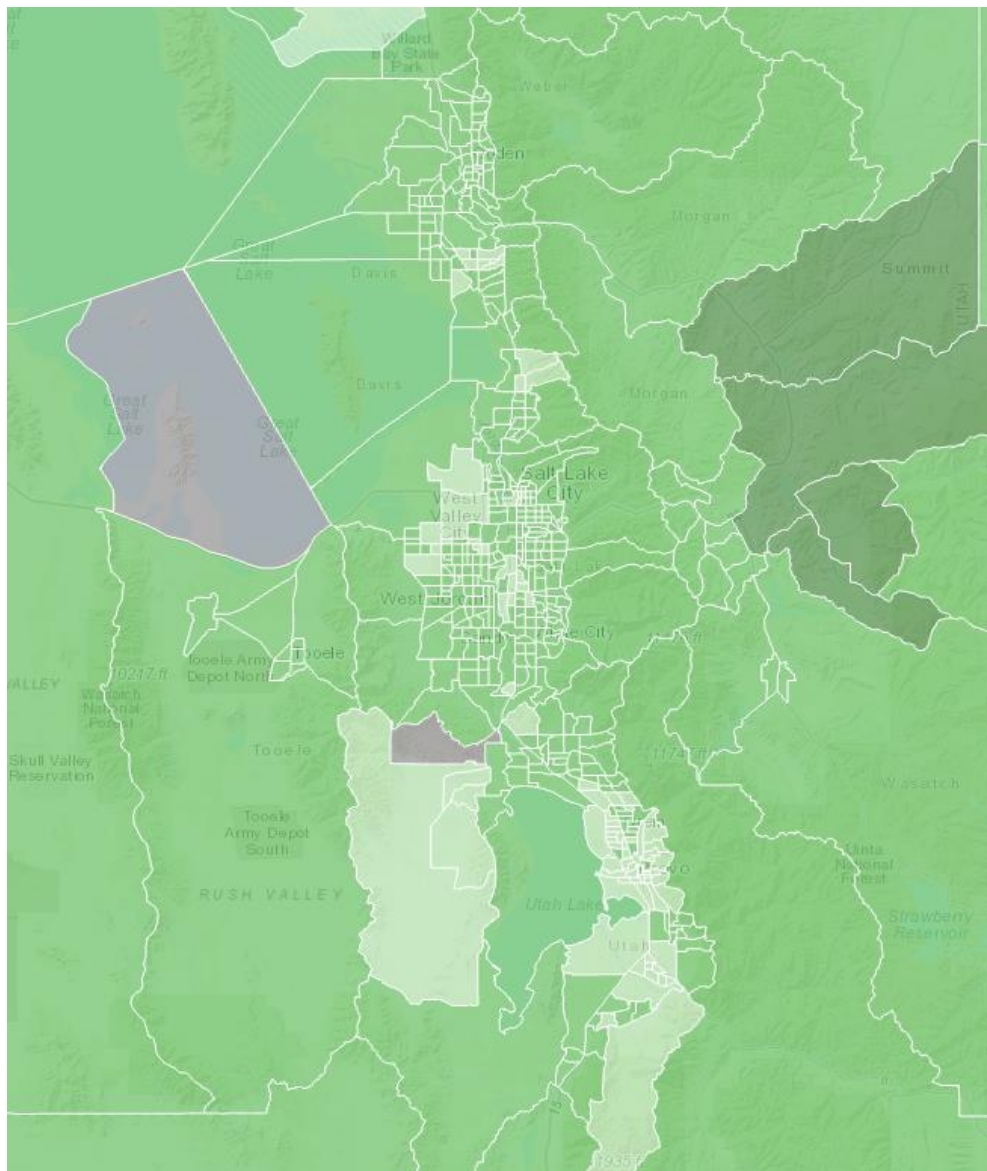
☒ Block Groups

☒ Blocks



Search an address, place, c





Cost Comparison between Salt Lake City and Boise

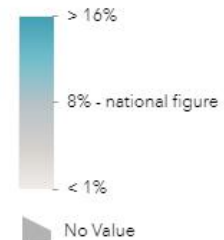


Layers

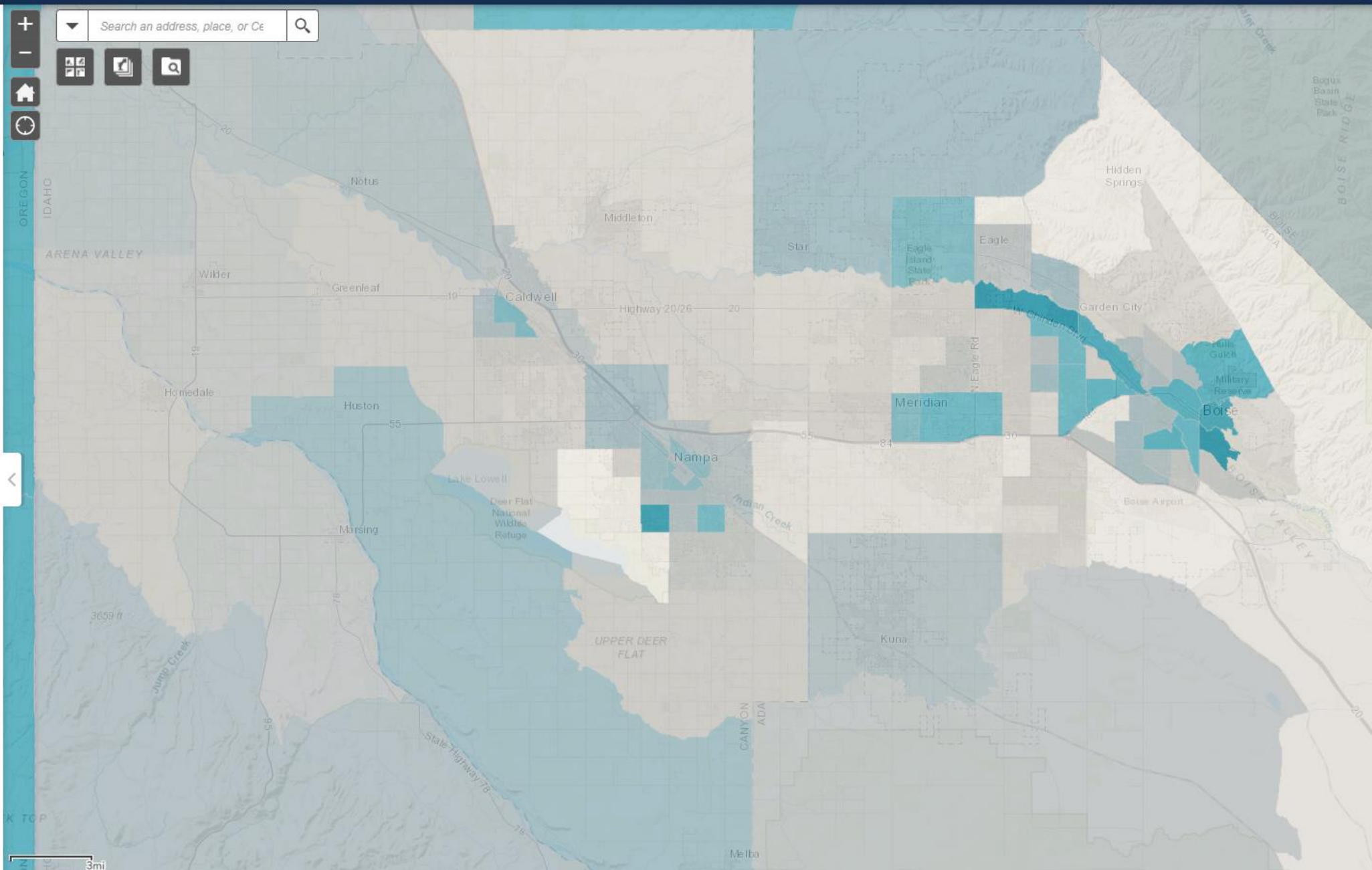
- ☒ ACS Internet Access by Education Variables - Boundaries - State ...
- ☒ ACS Internet Access by Education Variables - Boundaries - County ...
- ☒ ACS Internet Access by Education Variables - Boundaries - Tract ...



Percent of Population 25 Years and Over who are High School Graduates (Includes Equivalency) or Have Some College or Associate's Degree in Households that Have No Computer

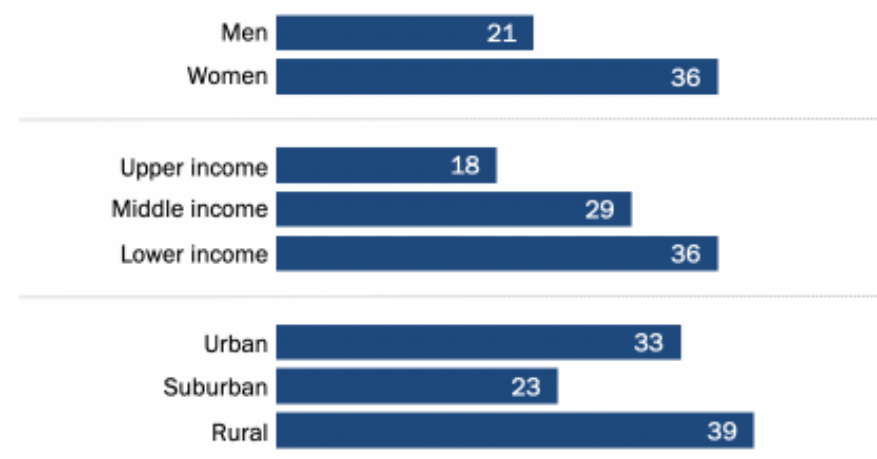


- ☐ Households With No Computer Available ...
- ☐ Households with No Smartphone ACS 2018 ...
- ☐ Households with a Smartphone Only ACS 2017 - Households with a Smartphone Only (%) ...
- ☐ FCC Maximum Advertised Download Speed ...



Mothers, parents with lower incomes more likely than fathers and those with higher incomes to have trouble helping their children with tech for online learning

Among parents whose K-12 children have had some online instruction since the beginning of the coronavirus outbreak, % who say it has been **very** or **somewhat difficult** to help their children use technology and the internet for online instruction



Among home broadband users



Note: "Parents with K-12 children" refers to those who said they were the parent or guardian of any children who were enrolled in elementary, middle or high school and who lived in their household. "Some online instruction" refers to children having had any online instruction – whether this was fully online or a mix of online and in-person – since the beginning of the coronavirus outbreak in February 2020. "Have internet problems" refers to experiencing any problems with the speed, reliability or quality of their high-speed internet connection at home in a way that makes it hard to do the things they need to do online. Family income tiers are based on adjusted 2019 earnings. Those who did not give an answer are not shown.

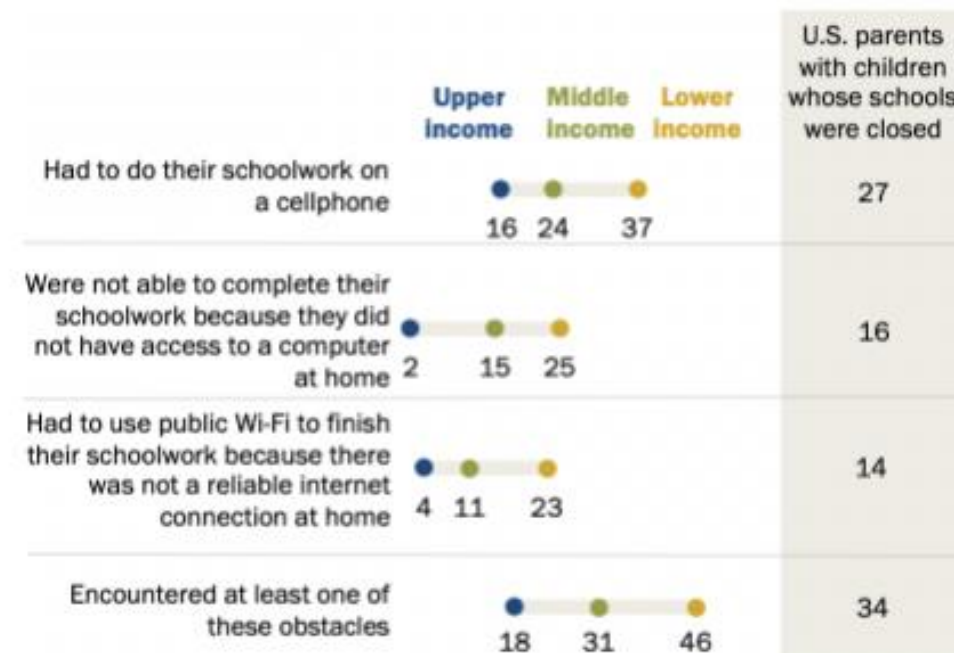
Source: Survey of U.S. adults conducted April 12-18, 2021.

"The Internet and the Pandemic"

PEW RESEARCH CENTER

Parents with lower incomes more likely than parents with higher incomes to say their children have faced tech-related schoolwork challenges in the pandemic

Among parents with children whose K-12 schools were closed at some point due to the coronavirus outbreak, % who say that, since the beginning of the outbreak in February 2020, their children ever ...



Note: "Parents with children whose (K-12) schools were closed" refers to those who said they were the parent or guardian of any children who were enrolled in elementary, middle or high school and who lived in their household; and who said that their children's schools closed due to the coronavirus outbreak at any point since the beginning of the outbreak in February 2020. Family income tiers are based on adjusted 2019 earnings. Those who did not give an answer are not shown.

Source: Survey of U.S. adults conducted April 12-18, 2021.

"The Internet and the Pandemic"

PEW RESEARCH CENTER

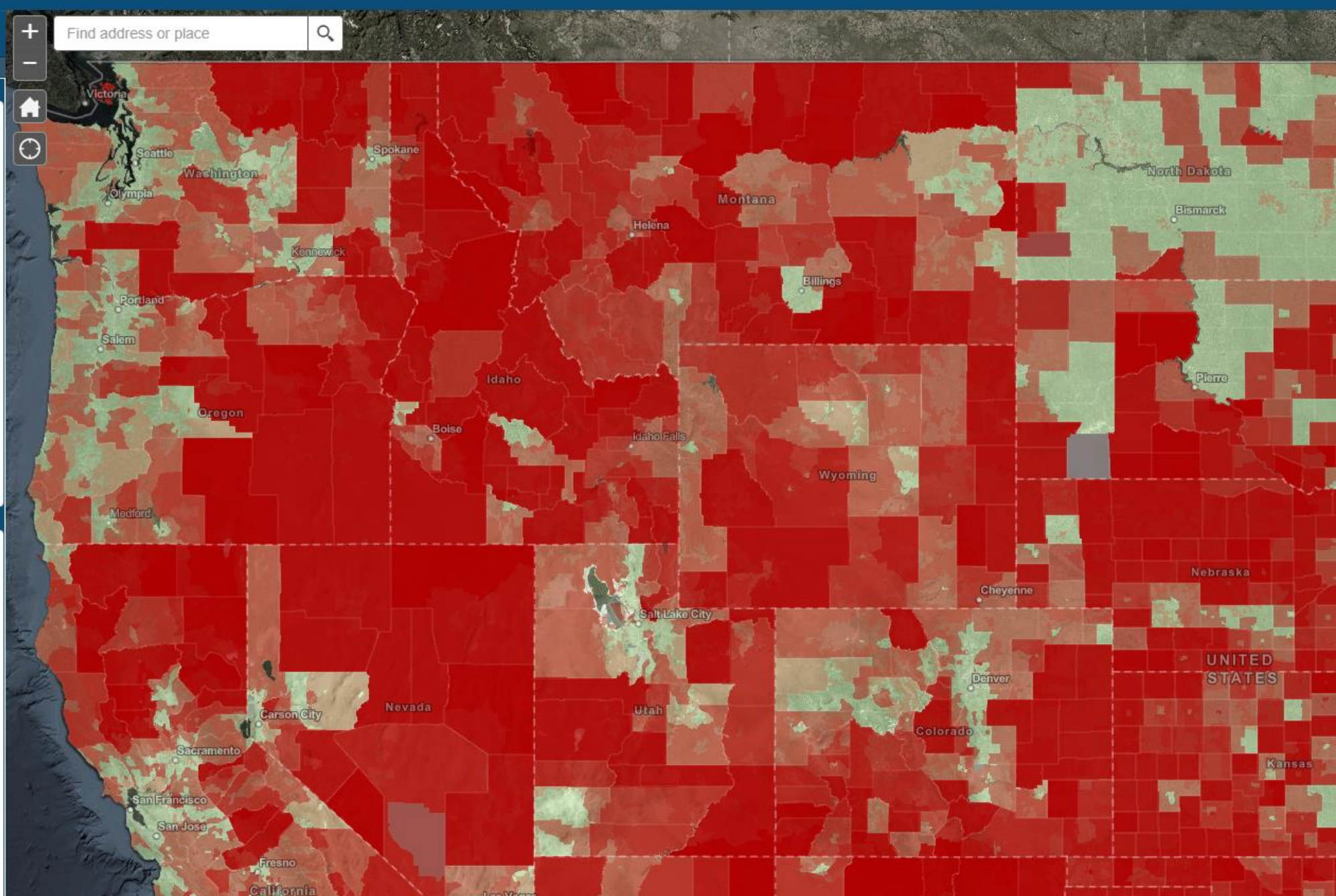
Grant Funding

Indicators of Need

- ☒ Usage - 75% or More of Devices Connect to Microsoft Updates/Services via Fixed Broadband Download Speeds below 25 Mbps (County Level) ...
- ☒ Speed Tests - M-Lab Median Speeds Fixed Broadband Below 25/3 Mbps (County Level) ...
- ☒ Speed Tests - Ookla Median Speeds Fixed Broadband Below 25/3 Mbps (Census Tract Level) ...
- ☒ American Community Survey - 25% or More of Households Report No Internet Access (Census Tract Level) ...
- ☒ American Community Survey - 25% or More of Households Report No Computer, Smartphone or Tablet (Census Tract Level) ...
- ☒ FCC Form 477 - No Provider Reports Consumer Fixed Broadband Services at 25/3 Mbps (Census Block Level) ...

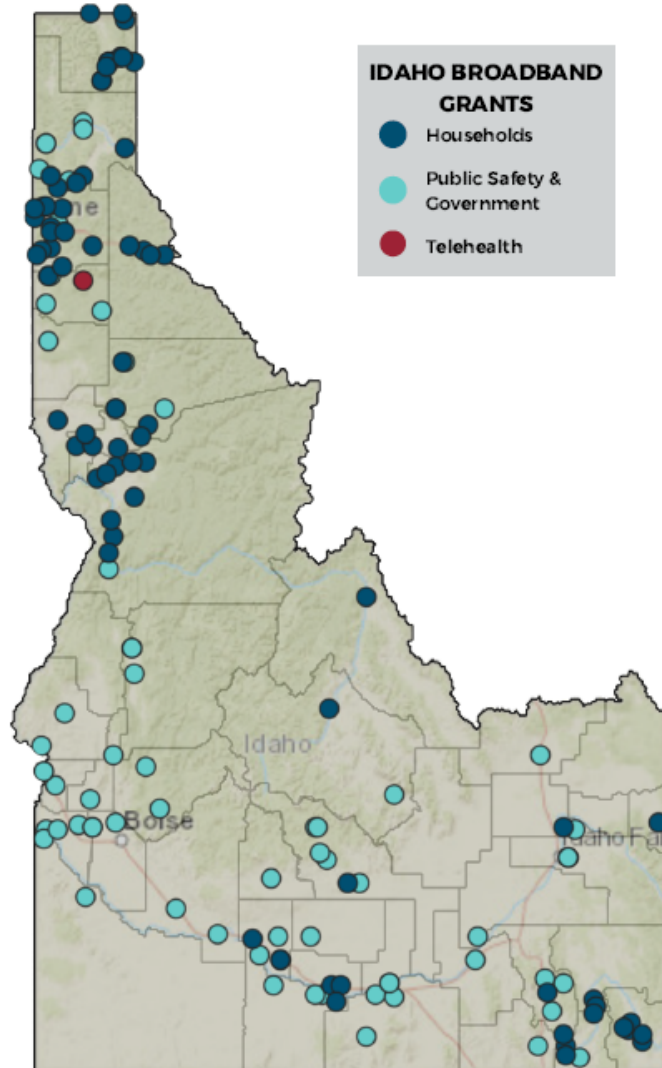
Additional Layers

- ☐ Minority Serving Institutions (NTIA MSIs) ...
- ☐ American Community Survey - High Poverty Communities 20% or More of Households Below Poverty Level (Census Tract Level) ...
- ☐ Tribal Lands (Census AIANNH) ...
- ☒ County Boundaries (Zoom Out) ...
- ☒ Tract Boundaries (Zoom In) ...
- ☒ Census Block Boundaries (Zoom In) ...





IDAHO BROADBAND GRANT PROGRAM



The Idaho Broadband Grant funded projects across Idaho, improving broadband infrastructure and service for Idaho households, businesses, libraries, healthcare clinics, hospital facilities, public safety organizations and local governments.

The Idaho Department of Commerce granted \$38,361,250 to complete 83 broadband expansion projects in Idaho through the grant.


\$38M
FUNDS
AWARDED

30,000+
HOUSEHOLDS
SERVED

147
COMMUNITIES
IMPACTED

"Our historic broadband investments mean students and families across Idaho will have the tools they need to succeed. First responders will have the connection and communication they need to do their jobs, and healthcare providers can expand their utilization of telemedicine. The benefits of these completed projects are just the beginning of many more in Idaho."

- Governor Brad Little

A photograph of four people (three women and one man) standing outdoors in front of a wooden building with a stone fireplace. They are all smiling and raising their fists in a celebratory gesture. The woman on the far left is wearing a black jacket and a blue face mask with 'SILVER STAR' written on it. The man in the center is wearing a blue sweatshirt. The woman next to him is wearing a grey turtleneck. The person on the far right is wearing a grey vest over a white shirt and a blue face mask with 'SILVER STAR' written on it. The background shows trees and a clear sky.

Idaho Broadband Advisory Board and Future Grant Funding

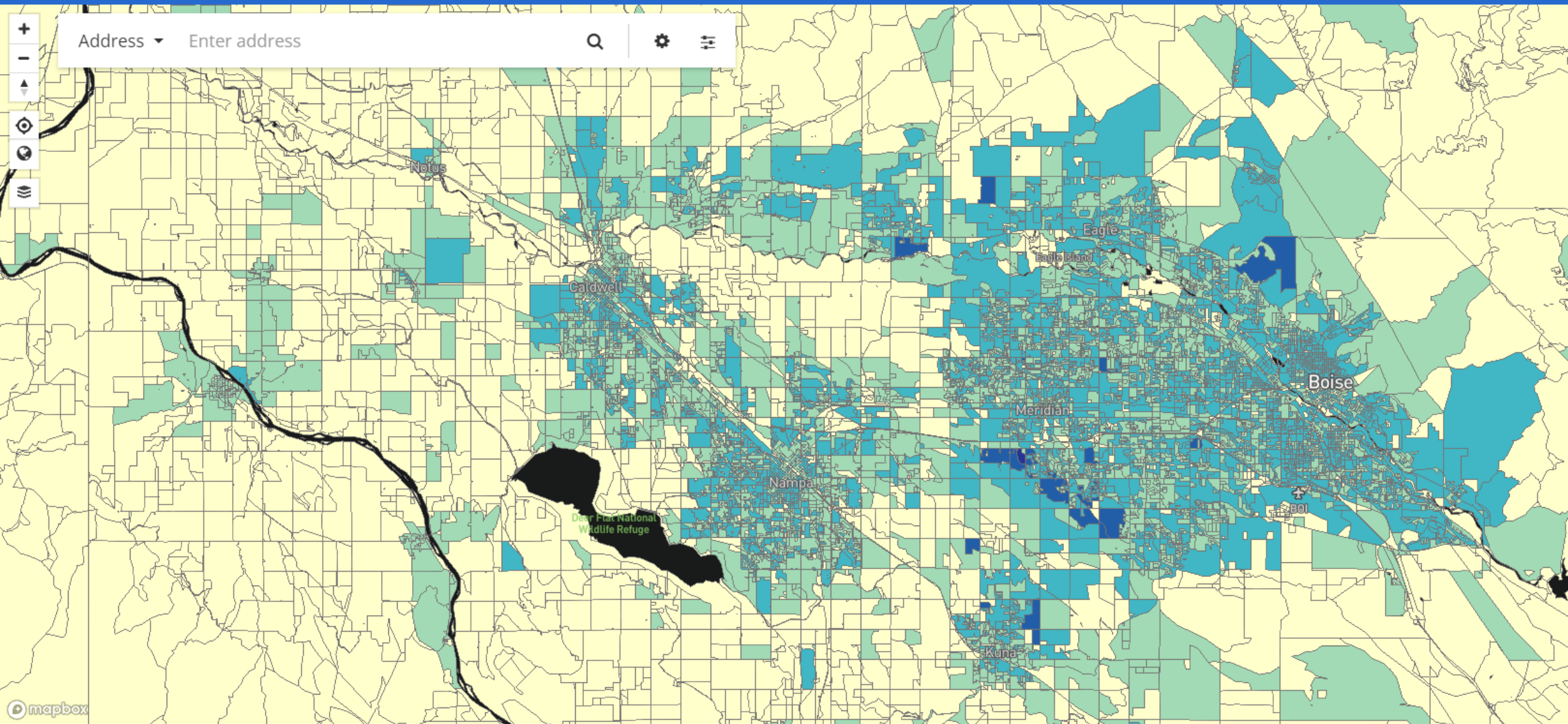
- Idaho Broadband Advisory Board formed in 2021
- \$10 million for Cares Act Grant Projects.
- Creating Statewide Broadband Plan
- \$35 million for State Grants
- Capital Projects Fund: \$118 million
- Infrastructure Bill: +\$100 million

Coronavirus State and Local Fiscal Recovery Funds (ARPA Dollars)

- Grants to Idaho Cities and Counties and State
- Idaho's Share | **\$1.19 billion**
 - Counties Receive \$346,590,252 for 44 Counties
 - Cities Receive \$233,088,607
- Make necessary investments in water, sewer, or broadband infrastructure.
- Broadband projects must deliver speeds of 100/100 Mbps or if unfeasible 100/20Mbps.
- Defines project areas as areas without wireline delivery of 25/3Mbps.
- Delivers broadband to locations/households (last mile).

Capital Projects Fund (ARPA)

- Dollars to State of Idaho for Broadband Infrastructure
- Idaho's will receive \$125 million
- Projects must provide broadband that delivers speeds of 100/100 Mbps or if that isn't feasible 100/20Mbps.
- Target unserved (25/3Mbps) areas and underserved (100/20) areas.
- Should deliver to locations/households (last mile).
- Service provider partner must provide an affordable broadband monthly plan and participate in the FCC's Emergency Broadband Benefit Program.



Infrastructure Bill

- Idaho will receive at least \$100 million
- NTIA administering and writing rules
- Underserved Speeds will be 100/20Mbps, Unserved Speeds 25/3Mbps.
- Delivery of 100/100Mbps and 100/20 Mbps for new investment.
- Must deliver to locations/households (last mile)
- 25% Match required. Communities can use ARPA funding.
- Additional Grant Dollars for Digital Divide Activities and Middle Mile.

STEM Jobs in Technology



[↶ Start Over](#)1 Industry [Clear](#) • [Save](#) • [Advanced](#) ▲

✕ Telecommunications (517)

1 Nation [Clear](#) • [Save](#) • [Advanced](#) ▲

✕ United States (0)

Timeframe

2018 ▼

to

2021 ▼

Class of Worker (Basic) [Advanced](#) ▲☒ Employees ?☒ Self-Employed ?

Staffing Patterns

Telecommunications in United States

[Save](#)[Export ▼](#)

5-Digit ▼

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Keep

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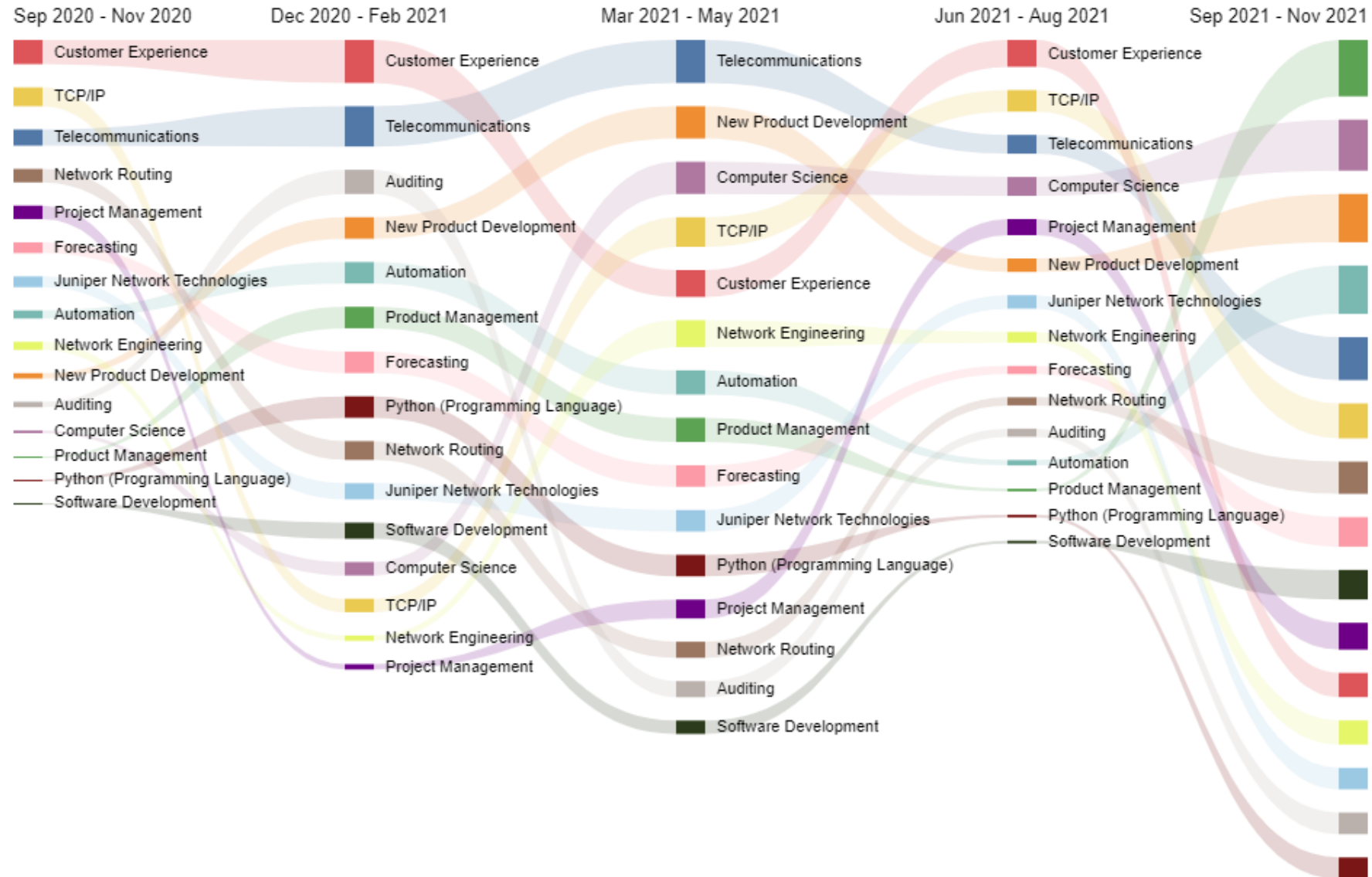
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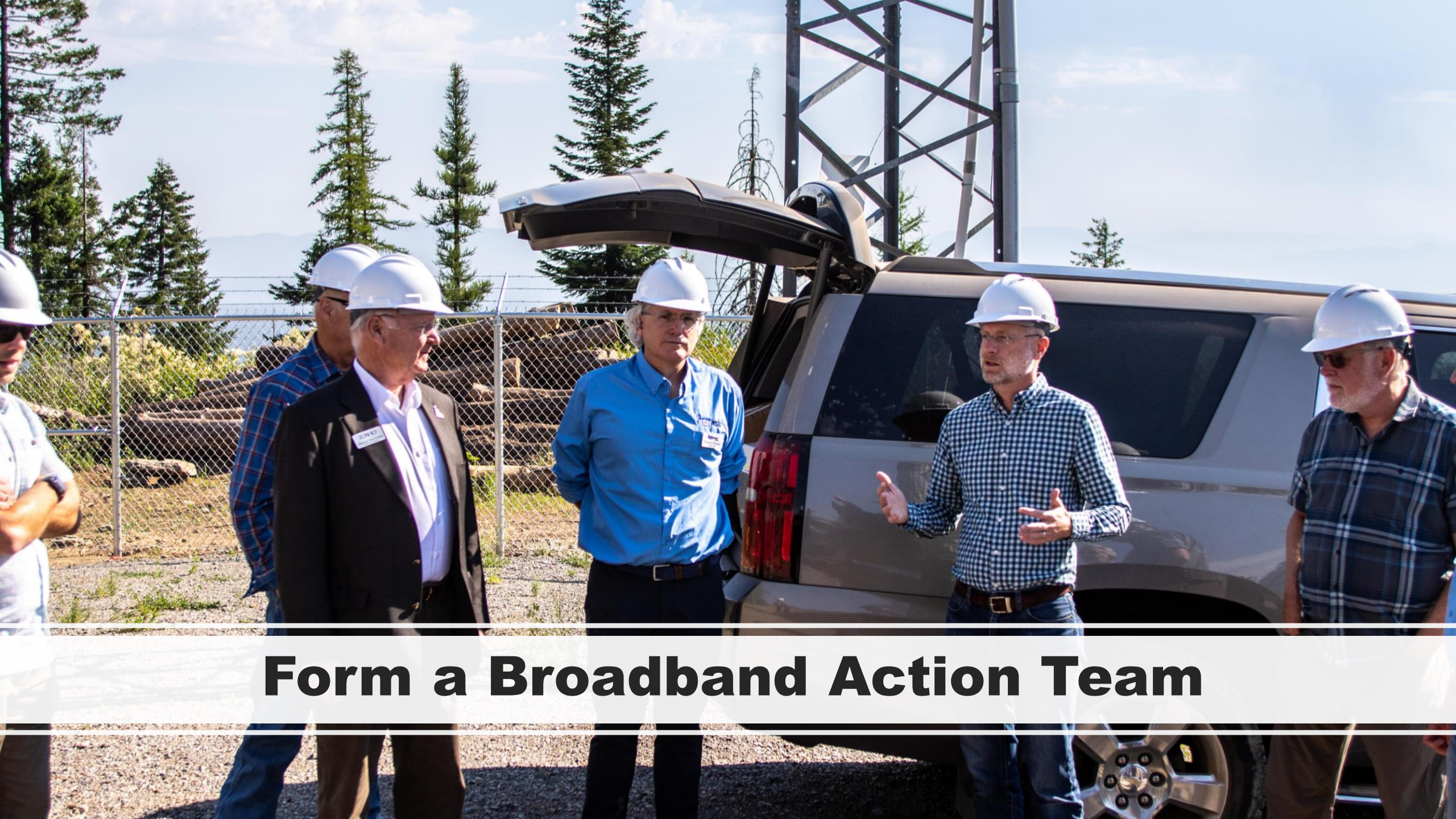
<input type="checkbox"/>	SOC	Description	Employed in Industry (2018)	Employed in Industry (2020)	Employed in Industry (2021)	Change (2018 - 2021)	% Change (2018 - 2021)	% of Total Jobs in Industry (2020)	Median Hourly Earnings	Typical Entry Level Education ?	Work Experience Required	Typical On-The-Job Training ?
<input type="checkbox"/>	49-2022	Telecommunications Equipment Installers and Repairers, Except Line Installers	158,368	127,861	125,396	-32,972	-21%	18.1%	\$29.38	Postsecondary nondegree award	None	Moderate-term on-the-job training
<input type="checkbox"/>	49-9052	Telecommunications Line Installers and Repairers	68,515	76,980	75,278	6,763	10%	10.9%	\$28.06	High school diploma or equivalent	None	Long-term on-the-job training
<input type="checkbox"/>	41-3091	Sales Representatives of Services, Except Advertising, Insurance, Financial Services, and Travel	68,365	61,982	60,302	-8,063	-12%	8.8%	\$28.12	High school diploma or equivalent	None	Moderate-term on-the-job training
<input type="checkbox"/>	43-4051	Customer Service Representatives	70,181	61,751	59,624	-10,557	-15%	8.8%	\$17.22	High school diploma or equivalent	None	Short-term on-the-job training
<input type="checkbox"/>	17-2072	Electronics Engineers, Except Computer	24,712	23,954	23,828	-884	-4%	3.4%	\$51.69	Bachelor's degree	None	None
<input type="checkbox"/>	15-1256	Software Developers and Software Quality Assurance Analysts and Testers	30,322	22,814	22,380	-7,942	-26%	3.2%	\$52.79	Bachelor's degree	None	None
<input type="checkbox"/>	13-1198	Project Management Specialists and Business Operations Specialists, All Other	25,931	22,692	22,089	-3,842	-15%	3.2%	\$37.16	Bachelor's degree	None	None
<input type="checkbox"/>	15-1231	Computer Network Support Specialists	24,613	22,674	22,008	-2,605	-11%	3.2%	\$31.45	Associate's degree	None	None
<input type="checkbox"/>	15-1241	Computer Network Architects	17,944	16,385	15,828	-2,116	-12%	2.3%	\$55.96	Bachelor's degree	5 years or more	None
<input type="checkbox"/>	15-1232	Computer User Support Specialists	14,635	13,465	13,056	-1,579	-11%	1.9%	\$25.32	Some college, no degree	None	None
<input type="checkbox"/>	15-1244	Network and Computer Systems Administrators	15,314	13,102	12,711	-2,603	-17%	1.9%	\$40.66	Bachelor's degree	None	None
<input type="checkbox"/>	49-1011	First-Line Supervisors of Mechanics, Installers, and Repairers	12,544	12,965	12,648	104	1%	1.8%	\$33.74	High school diploma or equivalent	Less than 5 years	None
<input type="checkbox"/>	41-1012	First-Line Supervisors of Non-Retail Sales Workers	9,962	10,533	10,344	382	4%	1.5%	\$34.02	High school diploma or equivalent	Less than 5 years	None

Top 15 Skills for All Job Types Sought by Charter Communications/Spectrum by Quarter

Skills help us understand not only where a company is trying to go, but how they intend to get there.



What Communities Can do Now



Form a Broadband Action Team



**Research Existing Infrastructure, Policies,
Needs, and Create a Plan**



Partner on Existing Infrastructure Projects



Leverage Federal, State, Local, Public, and Private Funding Sources





Address the Digital Divide



Resources on the Idaho Commerce Page

Additional Idaho Broadband Resources

Idaho BroadbandNow Map

Combination of data from FCC, NTIA and other sources, giving county and city statistics on broadband connectivity including pricing, providers and advertised speeds.

FCC Broadband Map

Map from the FCC showing residential broadband connectivity as reported by ISPs to the FCC. Data is reported down to the Census block level but may overstate reported service since providers may not offer service to every home in that Census block.

Idaho Broadband Task Force

Information on the Idaho Broadband Task Force, meetings, and recommendations.

Idaho Department of Transportation Dig Once Map

Idaho Department of Transportation's Dig Once Map allows communities and ISPs to take advantage of earth-moving activities to deploy conduit and fiber more effectively.

Local Highway Transportation Advisory Committee Map

Map from LHTAC showing projects in pre-design, design, bidding and construction.

Wi-Fi Locations Available to Idaho Students

Public Wi-Fi locations in Idaho reported from the Idaho Department of Education including



Questions?