Idaho STEM
EcosySTEM
Webinar

Eric Forsch | Broadband Development Manager
What Do We Mean by Broadband Infrastructure?
Broadband Networks

Provider Tiers

Tier 1 - providers whose networks for 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.

Fixed Wireless
Broadband service provided between towers and customers using radio waves. Primarily found in rural areas.

Mobile Broadband
High-speed internet designed for use on-the-go with seamless connectivity from one location to another.

Satellite
Broadband service provided by satellites orbiting the earth. Satellite service can be impacted by line-of-sight and latency.

Cable
Internet provided by a cable television company over a mixed coaxial and fiber-optic network.

DSL
Digital-subscriber line (DSL) is broadband delivered over a mixed network of fiber and traditional copper phone lines.

Fiber
Fiber-optic service uses transparent glass fibers to carry data across distances. Some customers can receive fiber connections directly to their home, but fiber is also used to transport data from communities to the Internet.
Why is Broadband Such a Crucial Concern?
The Digital Divide

Availability

Adoption

Affordability
# Why Speeds Matter

## Figure 4. Application speed requirements

<table>
<thead>
<tr>
<th>Use case</th>
<th>Download requirements</th>
<th>Upload requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Videoconference – 1:1</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1080 HD</td>
<td>3.0 Mbps</td>
<td>3.8 Mbps</td>
</tr>
<tr>
<td>720 HD</td>
<td>1.2 Mbps</td>
<td>1.2 Mbps</td>
</tr>
<tr>
<td>High-quality</td>
<td>0.6 kbps</td>
<td>0.6 kbps</td>
</tr>
<tr>
<td><strong>Videoconference – Group call</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1080 HD</td>
<td>3.0 Mbps</td>
<td>3.8 Mbps</td>
</tr>
<tr>
<td>720 HD</td>
<td>1.8 Mbps</td>
<td>2.6 Mbps</td>
</tr>
<tr>
<td>High-quality</td>
<td>600 kbps</td>
<td>1.0 Mbps</td>
</tr>
<tr>
<td><strong>Streaming</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4K UHD</td>
<td>25 Mbps</td>
<td>N/A</td>
</tr>
<tr>
<td>Full HD</td>
<td>5 Mbps</td>
<td>N/A</td>
</tr>
<tr>
<td>5D quality</td>
<td>3 Mbps</td>
<td>N/A</td>
</tr>
<tr>
<td><strong>Gaming</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Competitive</td>
<td>50 Mbps</td>
<td>10 Mbps</td>
</tr>
<tr>
<td>Highly Interactive</td>
<td>25 Mbps</td>
<td>5 Mbps</td>
</tr>
<tr>
<td>Casual</td>
<td>3 Mbps</td>
<td>0.5 Mbps</td>
</tr>
</tbody>
</table>

*Sources: Deloitte analysis of suggested bandwidth requirements of streaming and videoconferencing platforms*
FCC indicates broadband is not available to ~83K people

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

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

- Less than $30,000: 57%
- $30,000–$49,999: 74%
- $50,000–$74,999: 87%
- $75,000+: 92%

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

- > 15%
- 9% - national figure
- < 1%
- No Value

- 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

<table>
<thead>
<tr>
<th></th>
<th>Men</th>
<th>Women</th>
</tr>
</thead>
<tbody>
<tr>
<td>Upper income</td>
<td>18</td>
<td>36</td>
</tr>
<tr>
<td>Middle income</td>
<td>29</td>
<td></td>
</tr>
<tr>
<td>Lower income</td>
<td></td>
<td>36</td>
</tr>
<tr>
<td>Urban</td>
<td>33</td>
<td></td>
</tr>
<tr>
<td>Suburban</td>
<td>23</td>
<td></td>
</tr>
<tr>
<td>Rural</td>
<td>30</td>
<td></td>
</tr>
</tbody>
</table>

Among home broadband users

<table>
<thead>
<tr>
<th></th>
<th>Often/sometimes have internet problems</th>
<th>Rarely/never have internet problems</th>
</tr>
</thead>
<tbody>
<tr>
<td>Men</td>
<td>21</td>
<td>36</td>
</tr>
<tr>
<td>Women</td>
<td>36</td>
<td>21</td>
</tr>
</tbody>
</table>

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.

“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 ...

<table>
<thead>
<tr>
<th></th>
<th>Upper income</th>
<th>Middle income</th>
<th>Lower income</th>
<th>U.S. parents with children whose schools were closed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Had to do their schoolwork on a cellphone</td>
<td>16</td>
<td>24</td>
<td>37</td>
<td>27</td>
</tr>
<tr>
<td>Were not able to complete their schoolwork because they did not have access to a computer at home</td>
<td>2</td>
<td>15</td>
<td>25</td>
<td>16</td>
</tr>
<tr>
<td>Had to use public Wi-Fi to finish their schoolwork because there was not a reliable internet connection at home</td>
<td>4</td>
<td>11</td>
<td>23</td>
<td>14</td>
</tr>
<tr>
<td>Encountered at least one of these obstacles</td>
<td>18</td>
<td>31</td>
<td>46</td>
<td>34</td>
</tr>
</tbody>
</table>

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.

“The Internet and the Pandemic”

Pew Research Center
Grant Funding
IDAH0 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 FUND 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
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 100/20 Mbps.
- Target unserved (25/3 Mbps) 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
# Staffing Patterns

## Telecommunications in United States

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<tr>
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<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>49-2022</td>
<td>Telecommunications Equipment Installers and Repairers, Except Line Installers</td>
<td>150,366</td>
<td>127,861</td>
<td>-22,505</td>
<td>-14%</td>
<td>5.8</td>
<td>$29.38</td>
<td>Postsecondary nondegree award</td>
<td>None</td>
<td>Moderate-term on-the-job training</td>
</tr>
<tr>
<td>49-2052</td>
<td>Telecommunications Line Installers and Repairers</td>
<td>68,515</td>
<td>76,980</td>
<td>8,465</td>
<td>12%</td>
<td>9.3</td>
<td>$20.06</td>
<td>High school diploma or equivalent</td>
<td>None</td>
<td>Long-term on-the-job training</td>
</tr>
<tr>
<td>41-3091</td>
<td>Sales Representatives, Services, Except Advertising, Insurance, Financial Services, and Travel</td>
<td>68,366</td>
<td>61,982</td>
<td>-6,384</td>
<td>-9%</td>
<td>8.8</td>
<td>$28.12</td>
<td>High school diploma or equivalent</td>
<td>None</td>
<td>Moderate-term on-the-job training</td>
</tr>
<tr>
<td>43-4051</td>
<td>Customer Service Representatives</td>
<td>70,181</td>
<td>61,751</td>
<td>-8,430</td>
<td>-12%</td>
<td>8.8</td>
<td>$17.22</td>
<td>High school diploma or equivalent</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>17-2072</td>
<td>Electronics Engineers, Except Computer</td>
<td>24,712</td>
<td>23,954</td>
<td>-758</td>
<td>-3%</td>
<td>3.4</td>
<td>$51.09</td>
<td>Bachelor’s degree</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>15-1256</td>
<td>Software Developers and Software Quality Assurance Analysts and Testers</td>
<td>30,322</td>
<td>22,814</td>
<td>-7,508</td>
<td>-25%</td>
<td>3.2</td>
<td>$52.79</td>
<td>Bachelor’s degree</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>13-1198</td>
<td>Project Management Specialists and Business Operations Specialists, All Other</td>
<td>25,931</td>
<td>22,692</td>
<td>-3,239</td>
<td>-12%</td>
<td>3.2</td>
<td>$37.16</td>
<td>Bachelor’s degree</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>15-1231</td>
<td>Computer Network Support Specialists</td>
<td>24,613</td>
<td>22,674</td>
<td>-1,939</td>
<td>-8%</td>
<td>3.2</td>
<td>$31.45</td>
<td>Associate’s degree</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>15-1241</td>
<td>Computer Network Architects</td>
<td>17,944</td>
<td>16,385</td>
<td>-1,559</td>
<td>-9%</td>
<td>2.3</td>
<td>$55.96</td>
<td>Bachelor’s degree</td>
<td>5 years or more</td>
<td>None</td>
</tr>
<tr>
<td>15-1232</td>
<td>Computer User Support Specialists</td>
<td>14,635</td>
<td>13,465</td>
<td>-1,170</td>
<td>-8%</td>
<td>1.9</td>
<td>$25.22</td>
<td>Some college, no degree</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>15-1244</td>
<td>Network and Computer Systems Administrators</td>
<td>15,314</td>
<td>13,102</td>
<td>-2,212</td>
<td>-14%</td>
<td>1.9</td>
<td>$40.66</td>
<td>Bachelor’s degree</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>49-1011</td>
<td>First-Line Supervisors of Mechanics, Installers, and Repairers</td>
<td>12,544</td>
<td>12,965</td>
<td>421</td>
<td>3%</td>
<td>1.8</td>
<td>$33.74</td>
<td>High school diploma or equivalent</td>
<td>None</td>
<td>Less than 5 years</td>
</tr>
<tr>
<td>41-1012</td>
<td>First-Line Supervisors of Non-Retail Sales Workers</td>
<td>9,962</td>
<td>10,523</td>
<td>561</td>
<td>6%</td>
<td>1.5</td>
<td>$34.02</td>
<td>High school diploma or equivalent</td>
<td>None</td>
<td>Less than 5 years</td>
</tr>
</tbody>
</table>
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.
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 libraries, schools, and other public venues.
Questions?