What is Broadband?

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The term broadband is used to describe a range of technologies that provide high-speed internet access. Broadband commonly refers to high-speed internet access that is faster than traditional dial-up access. Unlike traditional dial-up, which requires a telephone line to connect and is not always connected, broadband access is considered "always-on," making it much more efficient to use.

The Federal Communications Commission (FCC) defines broadband by its speed: minimum download speed of 25 megabits per second (Mbps) and minimum upload speed of 3 Mbps. However, as modern internet usage has soared and our online activities consume more and more data, this definition is outdated. Investing in broadband infrastructure requires we look ahead and anticipate the speeds we will need in the future.

At a federal level, the 2021 Infrastructure Investment and Jobs Act (IIJA) acknowledges the need for a new definition of broadband. The bill sets a minimum threshold of 100 Mbps download speed and 20 Mbps upload speed for new projects to receive federal broadband funds. For the purpose of advocating for better broadband in southwestern Pennsylvania, the SWPA Connectivity Roadmap defined broadband as 100 Mbps download speed and 20 Mbps upload speed.

HOW IS BROADBAND MEASURED?

When measuring the speed of broadband, there are three main metrics that must all be adequate for internet to be considered high-speed.

BANDWIDTH is the connection's capacity for transmitting data. Broadband is like an internet highway. The higher the bandwidth, the more lanes your internet highway has and the more devices you can connect simultaneously.

SPEED is typically measured in megabits per second (Mbps), which is a measurement of the amount of data capable of being transmitted each second.

LATENCY is the time it takes for information to reach its destination related to potential delays. It is critical to applications that use live connections (i.e., Zoom, voice over internet protocol (VoIP), etc.). The effects of high latency include jittery connections and frequent pauses while connected.

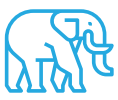
UNDERSTANDING INTERNET SPEED

Everything that we do online requires an exchange of information whether it's virtual webinars, streaming videos, social media, or online shopping.

15 Mbps
Devices: 1-2

Good for checking email, streaming music on one device, searching on Google

Time to download a 5gb movie
1 Hour



60 Mbps
Devices: 3-5

Good for streaming video on one device, video calling with Skype or FaceTime, single player online gaming

Time to download a 5gb movie
12.5 Minutes

150 Mbps
Devices: 3-5

Good for streaming HD video on a few devices, multiplayer online gaming, downloading large files

Time to download a 5gb movie
4.5 Minutes

300+ Mbps
Devices: 3-5

Good for heavy internet usage and downloads, HD streaming on multiple devices, HD multiplayer gaming

Time to download a 5gb movie
2.5 Minutes

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How Does Broadband Get to You?

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Broadband service is delivered through multiple technologies. Internet Service Providers (ISPs) typically provide fixed broadband services and mobile network carriers typically provide mobile broadband services. The service provider offers their service through an infrastructure network and typically sells this service for a fee. The most common technologies used in these infrastructure networks are shown below:

Fixed Antenna

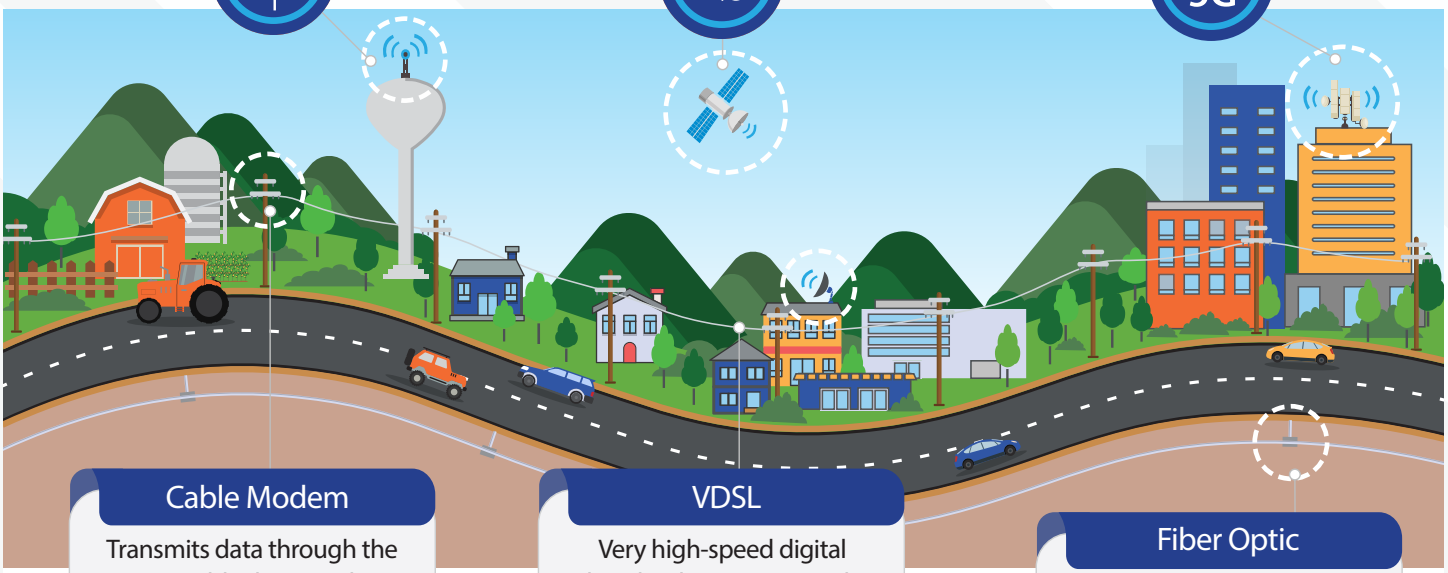
Fixed Antenna Wireless transmits data across radio waves using broadcast towers.

Satellite

Satellite transmits data from a satellite, to an antenna, and then to a router or device. Traditionally used for remote locations.

Mobile Network - 5G

Fifth generation wireless is the latest wireless technology and can be delivered by both 5G small cell antennas and large towers.



Cable Modem

Transmits data through the same cable that supplies cable television service.

VDSL

Very high-speed digital subscriber line. Transmits data over traditional telephone lines.

Fiber Optic

Transmits data through Fiber optic cables.

Barriers may occur at multiple places throughout the delivery process. Typically for an end-user to receive service, the infrastructure must reach their location, the user must purchase service from the provider, and they must have an appropriate device to receive the service.

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Broadband Benefits to My Community

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High-speed internet connectivity is a necessity in today's world. The internet is a gateway to access resources and support like never before and it is only growing. In addition to the access it provides individuals, connectivity is essential for communities to thrive from an economic standpoint. Businesses and a variety of industries rely on high-speed internet for production, manufacturing, communications and so much more. The benefits of broadband for individuals and communities are boundless.

IMPROVED EDUCATION

Now more than ever internet access is essential for education. During the COVID-19 pandemic, a **Pew Research Center survey** found that nine-in-ten U.S. parents with children in K-12 had some online instruction. Federal Communications Commission (FCC) data consistently shows that one in three households don't have broadband at home and this gap has been coined the "homework gap" as many students are assigned homework that requires online access, but they do not have reliable access at home. Ensuring broadband internet reaches every home, no matter the income level or community type, provides children and youth the opportunities and access they deserve for their education.

BETTER HEALTH

There is evidence that lack of internet access and adoption has a negative impact on health outcomes. The FCC has identified broadband access as a **social determinant of health** and has prioritized fostering digital equity to provide access to healthcare services to underserved and marginalized communities. Connected care services, whether remote patient monitoring, telehealth visits, or mobile health applications can provide cost savings for patients and better health outcomes by allowing patients to receive care when they need it, wherever they are.

MORE BUSINESS

Not only do a variety of industries rely on high-speed internet access for efficient and cost-effective operations, high-speed internet also provides entrepreneurs opportunities outside of brick-and-mortar business methods and opens the doors to e-commerce. In addition, high-speed internet provides access to a larger workforce market.

INCREASED PRODUCTIVITY

High-speed internet provides businesses the opportunity to incorporate more efficient processes, whether it's communications and marketing, optimizing production, or supply chains. Businesses also have more flexibility to offer online services, mobile applications, or e-commerce to the convenience of their customers. In addition, through broadband connectivity, business partnerships and collaborations can be virtual so the business can easily expand operations through telework approaches or contract certain aspects to assist in their growth and service delivery.

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Expanding My Digital Knowledge

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It is more important than ever to feel comfortable using a computer and leveraging internet resources to keep you informed, connect you with friends and family, and to benefit from and participate in many services that are available online. In addition to helping with everyday needs, computer skills are becoming increasingly essential for schoolwork and to join and advance in the workforce.

There are a lot of wonderful resources and programs available in communities to help you gain the necessary skills to use the internet safely and confidently for your healthcare, school, or work needs. Some of the resources or programs are available at no cost, while others do have a fee associated.

Check out the resources below to help you on your way to increased digital knowledge! This is not an exhaustive list. Community partners, libraries and nonprofits are working every day to provide new courses and opportunities, so please be sure to reach out to your community organizations to see if there are classes available to you!

RESOURCES

FOR DEVICES

- Computer Reach – Digital Literacy & Refurbished Equipment

DIGITAL LEARNING SOURCES

- State Library of Pennsylvania - PA Online Learning
- Goodwill Community Foundation - Technology Tutorials
- Public Library Association - Digital Learn Courses

ALLEGHENY COUNTY

- **Carnegie Library Events:** Digital Skills
- **Literacy Pittsburgh:** Classes & Tutoring
- **McKeesport:** Anna Middleton White Computer Classes
- **Allegheny County PA CareerLink®:** Computer Skills Workshop and Training
- **Goodwill Southwestern Pennsylvania:** Digital Tools Boot Camp
- **Community College of Allegheny:** Career & Training Programs
- **Dormont Public Library:** Individual Computer Classes
- **Shaler North Hills Library:** Technology Assistance and Training
- **Whitehall Public Library:** Tech Help: Virtual Tech Clinics
- **Northern Tier Library:** Technology Help - Computer Classes
- **South Park Township Library:** Computer Classes

ARMSTRONG COUNTY

- **Career T.R.A.C.K:** Basic Computer Skills
- **Armstrong County PA CareerLink®:** Computer Skills Workshop and Training
- **Armstrong Center for Community Learning:** Workforce Development
- **Armstrong County Library:** Digital Resources

BEAVER COUNTY

- **Community College of Beaver County:** Computer & Technology Courses
- **Beaver County PA CareerLink®:** Computer Skills Workshop and Training
- **BF Jones Memorial Library:** Computer Training

BUTLER COUNTY

- **Career T.R.A.C.K:** Basic Computer Skills
- **Butler County PA CareerLink®:** Computer Skills Workshop and Training
- **Robin's Home:** Basic Computer Classes
- **Butler County Community College – Continuing Education:** Computer & Technology
- **Cranberry Senior Center:** Computer Classes
- **Evans City Library:** Technology help by appointment only

FAYETTE COUNTY

- **Fayette County PA CareerLink®:** Computer Skills Workshop and Training

GREENE COUNTY

- **Blueprints:** Computer Basics
- **Greene County PA CareerLink®:** Computer Skills Workshop and Training
- **Eva K Bowlby Library:** Google Training

INDIANA COUNTY

- **Career T.R.A.C.K:** Basic Computer Skills
- **Indiana County Technology Center:** Basic Computer Skills Suite
- **Indiana University of Pennsylvania:** Computer Literacy

LAWRENCE COUNTY

- **Lawrence County Learning Center:** Digital Literacy
- **Lawrence County PA CareerLink®:** Computer Skills Workshop and Training

WASHINGTON COUNTY

- **Blueprints:** Computer Basics
- **Washington County PA CareerLink®:** Digital Literacy Workshops

WESTMORELAND COUNTY

- **Westmoreland County PA CareerLink:** Computer Skills Workshop and Training
- **Westmoreland County Community College:** Workforce Development

COMMON INTERNET TERMS & MEANINGS

Bandwidth: The volume of information that can be sent over a connection in a measured amount of time.

Broadband: The term broadband commonly refers to high-speed internet access that is always on and faster than traditional DSL or dial-up access. Broadband is delivered through multiple technologies, like fiber optic cables, fixed antenna, satellite, mobile, and cable modem.

Connectivity: The ability to link to and communicate with other computer systems, electronic devices, software, or the internet.

Connectivity Opportunity Areas: Locations that are unserved and underserved with poor mobile and fixed broadband service speeds.

Digital Equity: A goal to ensure that everyone has equal access to technology tools, computers, and the internet and has the knowledge and skills to use them effectively.

Digital Navigator: Digital navigators are trained staff who work with residents on digital literacy including home connectivity and how to search for or apply for jobs and critical services.

Download Speed: The rate that data or information can be received by a user's computer or device from the internet.

Mbps: Megabits per second are units of measurement that generally refers to upload and download speeds to measure the file size of data transferred per second over a channel and are used to show how fast a network or internet connection is.

Mesh Network: Technology to provide seamless wireless via multiple mesh nodes, or Wi-Fi extenders, that work together to route data to and from users.

Network: A system that connects two or more computing devices for transmitting or sharing information.

Served: Locations that have access to high-speed internet as it is currently defined by the FCC is 25 Mbps download/3 Mbps upload.

Small Cell Technology: Wireless transmitters and receivers (pizza-box sized) designed to provide network coverage to smaller areas. It strengthens coverage and data transfer speeds where devices might otherwise compete for bandwidth. 5G is built on small cell technology.

Underserved: Locations where internet service is at or above the FCC threshold but with no access to broadband service at speeds 100 Mbps download and 20 Mbps upload.

Unserved: Locations with no access to internet service at speeds that meet the FCC threshold of 25 Mbps download and 3 Mbps upload, meaning the internet connection is slow and unreliable or nonexistent.

Upload Speed: The rate that data or information is transferred from a user's computer or device to the internet.

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About the Connectivity Roadmap

The Southwestern Pennsylvania Commission (SPC), in collaboration with Allies for Children, Metro21 and Traffic21 at Carnegie Mellon University, and a diverse, regional coalition of stakeholders, recognized the need for a regional Connectivity Roadmap to identify and guide the deployment of high-speed connectivity programs and projects throughout southwestern Pennsylvania.

Currently, many areas within the 10-county region lack adequate high-speed internet access and equipment that are essential for residents to better connect to jobs, education, and health care, and to attract new business. The regional Connectivity Roadmap provides a guide for building a more comprehensive and equitable broadband network that will help people connect to opportunity.

The southwestern Pennsylvania region will collaborate to invest efficiently and equitably in high-speed internet networks and programs that are AVAILABLE, ACCESSIBLE, and AFFORDABLE to all to ensure our region is connected and thriving socially and economically.

Rapid changes to broadband technology and policy create an evolving landscape of opportunities and partners for achieving all the goals for a connected future. The Regional Vision is composed of 12 overarching goals that includes strategies to achieve each specific goal to provide equitable connectivity across the 10 counties and the City of Pittsburgh. Meeting the 100/20 Mbps speed threshold will require extensive investment over time.

Rather than identify a comprehensive set of future projects that may quickly become obsolete in this changing landscape, the Connectivity Roadmap provides several tools to guide the selection of projects as priorities shift.

The Project Identification Decision Tree guides decision-making through the steps needed to meet a given need, according to the existing conditions and type of need.

The Measures of Effectiveness rate and weight projects according to an extensive set of metrics that include technical and equitable qualifications.

Fourteen initial projects have been prepared to illustrate priority infrastructure improvements that meet the needs of each county, by starting first with areas that are unserved.

The Connectivity Roadmap not only identifies regional goals, and how to identify projects, but also provides recommendations and next steps for SPC, county and city leadership, and other partners to improve broadband infrastructure, tools, and skills across southwestern Pennsylvania.

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A Regional Vision and Strategic Goals

The Connectivity Roadmap was guided by a public survey, county interviews, workshops with regional providers, nonprofits, local and state government leaders, industry experts, and community organizations; and best practices. Out of all the collectively shared and discussed ideas, major themes emerged as primary community-backed goals. These **12 REGIONAL GOALS** for Connectivity include comprehensive strategies to advance the Regional Vision.

Establish Network Redundancy

A connected lifestyle requires an energy source to power the increasing number and type of devices we use. Network redundancy acknowledges that our region wishes to increase resiliency and anticipates ways to strengthen our energy grid and build redundancy into each level of the communications system.

Reframe Internet as a Public Necessity

High-speed internet is not treated as a public necessity. Landlords do not have to guarantee access to internet, public buildings do not have to provide it, and there is no governmental entity to oversee and enforce its accessibility. Broadband should be expanded into the public domain through public policy and public funding.

Expand Broadband in the Public Domain

Following up on reframing broadband as a public necessity, the Regional Vision imagines high-speed internet being made available within the public realm. Public buildings and spaces should consider providing internet as they provide light and water. Building publicly accessible internet networks will make access more equitable and affordable to all.

Invest in Expanded Infrastructure and Establish a Fiber Backbone

This Vision proposes including fiber in other infrastructure projects to maximize efficiencies in construction and maintenance and to utilize available rights-of-way. Providers and local governments can partner together along "smart corridors" to provide shared space for fiber and 5G infrastructure that multiple providers can use, creating a strong backbone of middle- mile service through each county.

Support Industry Sectors (i.e., Transportation and Agriculture)

Regional and local leaders must understand how broadband intersects with and supports efficiencies and innovation in transportation, agriculture, and other industry sectors. Broadband investments in the region also support cutting-edge technologies, robotics, and modern equipment that will enable our industries to be leaders in the nation and drive economic growth and prosperity.

Prioritize Digital Equity for All Existing and Potential Users

At the core of inclusion and literacy goals, there is a desired outcome of digital equity. Broadband access directly impacts economic mobility: resources available online connect users to greater job markets, permit flexibility to work from home, support the freedom to make individual choices about personal health and safety, and open up a variety of training and educational opportunities. Every resident who wants a better future for themselves should be able to benefit from the digital economy.

Provide Assistance to Achieve Affordable Rates

Costs for high-speed internet vary widely across southwestern Pennsylvania, even though there is little connection between the rates charged and the speed or reliability of service. If southwestern Pennsylvania truly wants to ensure that all residents have access to the tools, benefits, and opportunities available online, we need to also invest in making this access affordable to all.

Foster Digital Inclusion and Access

The prioritization of digital inclusion acknowledges the unequal dispersion of resources across the region and commits to seeking balance through future investments. Future investments should be prioritized based on how well they address gaps and inequities in access to internet service and related programs, include plans for how they will measure success, and provide sustainable funding to continue inclusive access long-term.

Expand Programs for Digital Literacy and Education

Digital literacy is an expansive topic that covers the many ways that users fail to benefit from available internet resources due to lack of skills and knowledge. The Vision for a connected southwestern Pennsylvania recognizes that having internet access is not enough – we must also invest in educating residents on how to use it through robust digital literacy programs and offerings.

Facilitate and Lead Regional Partnerships

Pairing broadband projects with existing infrastructure requires strong partnerships between different owners, systems, and service providers. If broadband is to be treated as a public utility and government assists in ensuring service, there are further partnerships to build between public and private entities. The Vision of comprehensive coverage across the region will require strong and clear partnerships that bring multiple sectors together to collaborate and share resources.

Advance Cross-Jurisdictional Policies and Legislative Change

The internet does not stop at county or state boundaries, yet these boundaries do define governmental funding and regulatory arms. Whether it is modernizing smarter land use policies that enable broadband infrastructure and new technology, streamlining multi-municipal projects, or developing clear policies for internet service providers to follow in ensuring a fair market, our region needs to continuously understand the limitations embedded in our own policies and strategically work to pursue legislative changes that enable the land use, infrastructure, and fair access outcomes desired in the Regional Vision.

Integrate Broadband Expansion into Economic Development Policies & Strategies

Southwestern Pennsylvania should anticipate and quantify the economic value of broadband investments to maximize each project's potential to spur growth in the region and to accurately portray to residents and to leaders the true value of broadband investments. Incentivizing strategic efforts to digitally connect the whole region will position the counties and the City to excel in the new and emerging economy.

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