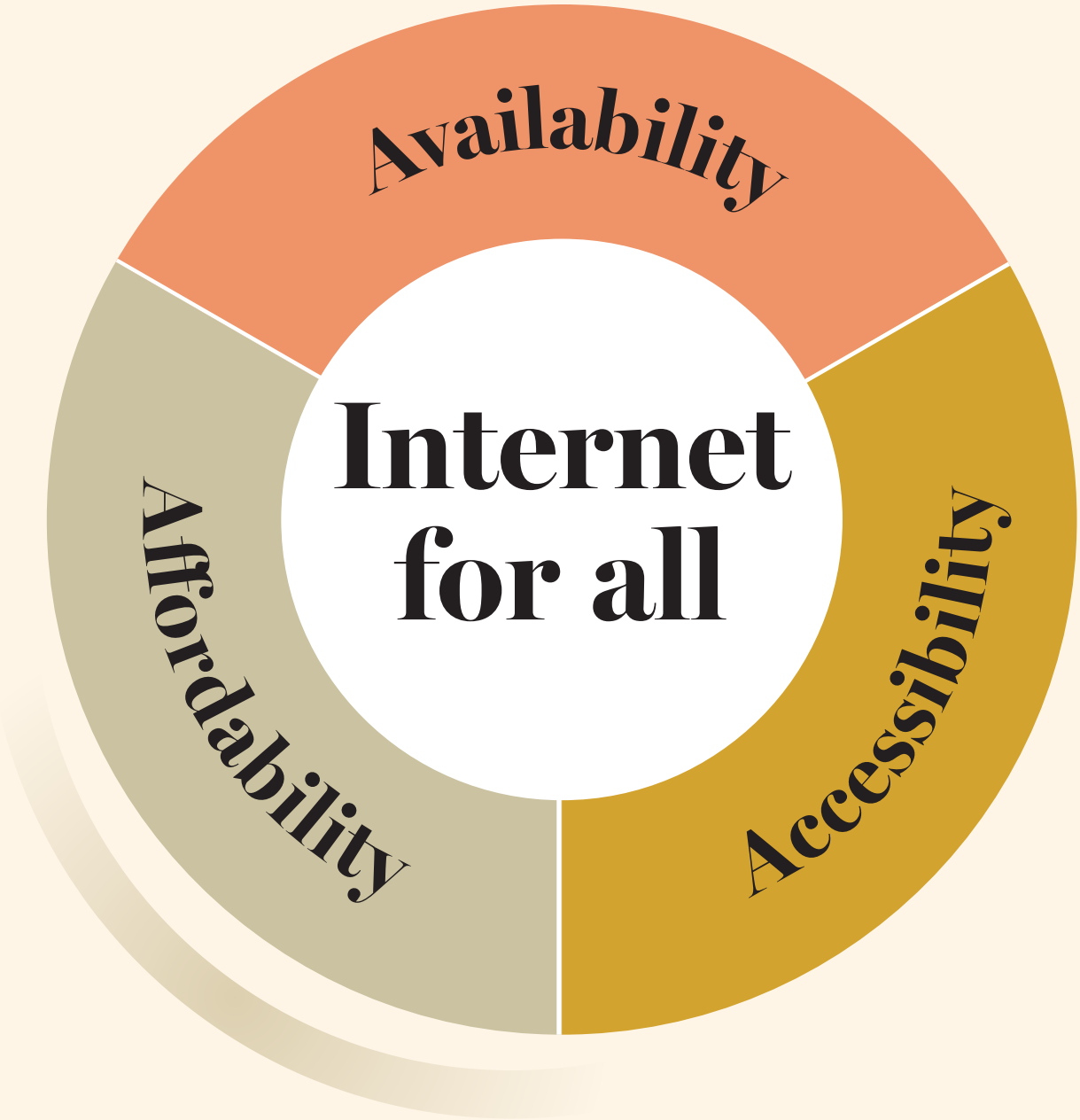
Summer 2023



Community Council Report

A report to the residents of Columbia and Walla Walla counties and the Milton-Freewater area

Community Council Study Committee

The 2022–2023 Study Committee met for 26 weeks, from Sept. 13, 2022, to March 28, 2023. The Study Management Team developed the study curriculum and met throughout the course of the study to guide the process.

Study Chair: Tobit Salazar
Study Management Team: Ruben Alvarado, Brian Berry, Kathryn Witherington
Community Research Coordinator: Laura Prado
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Study Committee: Brandon Aberle*, Punkey Adams*, Ruben Alvarado*, Michael Baird*, Brian Berry*, Michael Haight*, Kip Kelly*, Lisa Mathias*, Phillip McKeen*, Chris Nelson*, Jeff Reynolds, Arleen Rice*, Mike Rizzitiello*, Laurel Sweeney, Kathryn Witherington*, David Womack*

*Participated in the development of conclusions and recommendations

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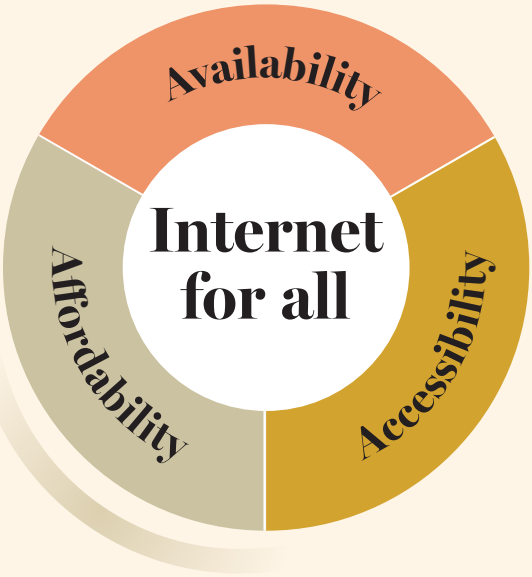
Study highlights

	Challenge	Recommended solution
Equity	Broadband internet availability varies throughout the region, and some areas have few or no options for reliable broadband internet.	Identify all gaps in broadband internet service within our region and work to address broadband internet service gaps, including public and private solutions.
Cost to build	Where cost-effective, fiber technology is considered "future proof," but the cost per mile to construct physical connections in rural and remote areas is extreme.	Encourage open-access fiber installations where reasonable, and explore alternative technologies, including fixed wireless, mobile wireless, and satellite, to reach all areas.
Financial barriers	Current fixed home broadband internet prices are unaffordable for many households in our region, and barriers to accessing broadband internet create socioeconomic inequities that exacerbate the disenfranchisement of people already experiencing systemic barriers.	Acknowledge and encourage further collaboration among organizations offering services that support broadband internet affordability; develop a public outreach campaign to encourage eligible households to apply for the Affordable Connectivity Program (ACP) by promoting it through approaches such as digital navigators, ISP outreach, multilingual information, and advocating for a simpler application process.
Language barriers	Immigrant and English-language-learner populations in our region often face additional barriers to building digital skills, obtaining internet access, and maintaining cybersecurity.	Inventory available resources, including broadband internet service providers, affordability programs, and digital literacy classes in English and Spanish and advocate for the creation of a resource guide in support of building our region's digital ecosystem.
Skill gaps	There is a vital need to bring programs for building digital skills to communities and homes that are unserved and underserved by current digital equity programs.	Explore existing programs and new opportunities that build digital skills in unserved and underserved communities, including enhancing digital navigator programs throughout the region and implementing a train-the-trainer program for teaching digital skills.



Executive summary

Reliable broadband internet is necessary for participation in society. It is critical for education, health care, business, social engagement, and more. Broadband internet connects people to the world; however, access to it is not equitable throughout our region.

For many in our region, broadband internet is either not available or not affordable. Even when it is available and affordable, users must have the digital skills to navigate the internet safely. The three pillars of broadband adoption—availability, affordability, and accessibility—are required for people to fully utilize broadband internet.

The question posed for this study asks, "How can we create universal access to affordable and reliable broadband internet in our region?" To answer this question, the Study Committee met for 26 weekly meetings, including one introductory meeting and 16 fact-finding meetings, where they heard from 32 speakers, including representatives from health care, schools, libraries, ports, service organizations, tech businesses, and internet service providers.

The Study Committee learned about topics such as broadband infrastructure, the demand for broadband applications in our region, gaps in availability, barriers to affordability and accessibility, and potential solutions. The Study Committee then spent nine weeks engaged in a consensus-based process of reviewing findings, generating conclusions and developing recommendations.

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Executive Director:
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Community Council's region includes Columbia and Walla Walla counties and the Milton-Freewater area.

Community Council regional map

Community Council is a nonpartisan, nongovernmental, diverse, and inclusive organization committed to open dialogue, solid research, consensus-building, and effective advocacy. Community Council works in Columbia County and Walla Walla County in Washington and the Milton-Freewater area in Oregon. This region represents an interdependent economic area, and the purpose of Community Council is to provide the space for people to engage in dialogue and build a sense of community. This community-building work leads to community-driven advocacy that creates a vibrant region for everyone.

Introduction

This study seeks to answer the question: "How can we create universal access to affordable and reliable broadband internet in our region?"

This study topic was chosen for a number of reasons, including the importance of adequate broadband internet for economic development, education, health care, and connecting socially, among other applications. However, broadband internet use is not equitable in our region due to unequal availability of broadband internet infrastructure, unaffordable rates for low-income households, gaps in digital literacy needed to navigate the internet, and lack of access to an internet-capable device.

To overcome the digital divide and generate positive social and economic outcomes, programs and policies are needed to address availability, affordability, and accessibility. This framework represents a recent shift in how the digital divide is understood and how policymakers seek to address it.

Availability, affordability, and accessibility

We continue to see the internet as essential and recognize the need for high-quality internet connections. The pandemic highlighted a fundamental change in how we use and depend on the internet. Advocacy among diverse community partners, such as those in industries that depend on high-speed internet access, has contributed to this shift. Programs to support broadband internet access have become more effective because they focus less on the availability of certain forms of technology and more on affordability, opportunity costs, and quality of life. Through the study process, we found three pillars necessary for internet adoption: availability, affordability, and accessibility.

Availability

Two major factors impact the availability of broadband internet service: cost and public policy. The United States has a market-based approach to internet provision. But due to the high cost of broadband internet infrastructure, it is not financially feasible for the private model to serve all geographic areas equally.

Building out broadband internet infrastructure is expensive because of the required technologies and the cost per mile to reach remote, unserved locations and pockets of unconnected and underserved areas among connected areas. While the private model is most common, alternative ownership models shift away from traditional for-profit providers to cooperatives, public utilities, and other entities that are not in the private sector.

Affordability

The pandemic revealed that many households in our community do not have connections or do not have sufficient connections. Though the availability of broadband internet infrastructure is critical, research suggests financial concerns make low-income households much less likely to have internet service. In other words, income often matters more than location.

Research has also found that paying for internet service can create a cost burden for low-income households. During the pandemic, some households spent less for essential goods—in particular food, clothing, and health care—in order to maintain their internet subscriptions for essential use, such as telework and online education.

Accessibility

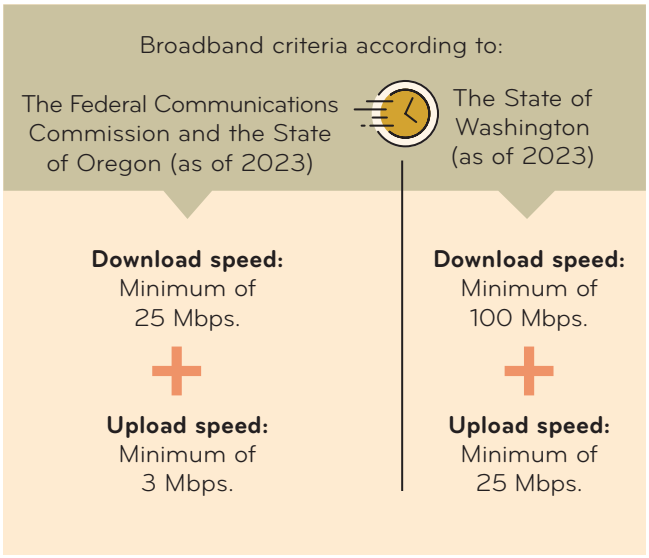
Lastly, available and affordable broadband internet needs to be accessible to people. The concept of accessibility includes three elements: the knowledge, the skills, and the tools to use technology and to navigate the internet safely and responsibly.

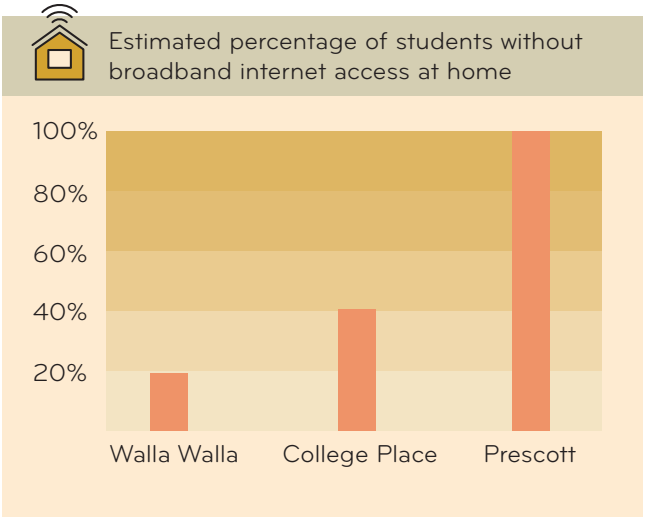
Knowledge and skills fall under the umbrella of digital literacy, which is the ability to use information and communication technology (ICT) confidently for work, leisure, learning, and communication. It also includes having the foundational understanding to learn new skills and navigate new systems. Tools include the physical devices and hardware needed to get online, such as modems, computers, or smartphones.

This study acknowledges that there are some people who are reluctant to embrace the internet for their own reasons. In the context of this study, accessibility refers to resources that allow people the option to use the internet if they so choose.

Availability

Availability refers to the infrastructure required to use broadband internet at the speeds necessary to meet the increasing demands for internet use, such as videoconferencing, streaming, or browsing online for multiple devices in a home or business. This section considers the mismatch between the demand and the availability of broadband internet services throughout our region, as well as the existing technologies and costs to build infrastructure, current local and state responses, and the known timelines around funding and implementation of infrastructure build-outs.





Information was reported by the speakers representing the Walla Walla, College Place, and Prescott school districts.

What is broadband internet?

Broadband internet is defined by a measurement of the threshold of download and upload speeds on an internet connection. Currently, the Federal Communications Commission (FCC) defines broadband internet as speeds at a minimum of 25 megabits per second (Mbps) download (the rate at which digital data is transferred from the internet to a local device) and 3 Mbps upload (the rate at which digital data is transferred from a local device to the internet) (25/3 Mbps). As of 2023, Oregon uses the FCC definition of broadband internet, and Washington defines broadband internet as speeds at a minimum of 100/25 Mbps.

The definition of broadband internet is important—it establishes the criteria for funding. Because broadband internet is defined by speed, any internet service that meets this criterion is considered broadband internet. Broadband internet technologies can include fiber-optic, cable, DSL, fixed wireless, and satellite. Fiber-optic is the current industry standard because it is considered "future proof," in that it will have the capacity to meet demand for decades.

Demand for broadband internet

The unmet need for broadband internet service exists to varying degrees throughout our region, which became even more apparent during the pandemic. Local school districts administered surveys to students, and respondents identified that broadband internet was not available in at least some of the students' homes. In Walla Walla, the percentage of students without broadband internet access was 20%, compared with 40% of students in College Place and 100% of students in Prescott.

It is important to note that a student's lack of broadband internet is not always an issue of availability, but there is a strong correlation between the percentage of students without access and the availability of the service.

Who needs broadband internet?

Even in places where broadband internet is available, it might not be as fast or reliable as people need it to be. For example, in Columbia County, the Rural Library District found that patrons had internet at home but chose to come to the library for faster internet access. The library increased its bandwidth and added outside access points so that additional patrons could park outside the library and connect to free Wi-Fi from their vehicles.

In response to the lack of availability of broadband internet service, many organizations developed creative solutions to address the problem, particularly during the pandemic. For unserved and underserved areas, school districts around the region provided mobile hotspots to their students. Some libraries loaned mobile hotspots to patrons with varying degrees of adoption. The Columbia County Rural Library District had a waiting list for mobile hotspots, and the library received funding to purchase more hotspots and subscriptions to meet the demand. Mobile hotspots are limited by the availability of mobile data service, though, and remote areas struggled to get service via mobile hotspots.

Another sector that benefits from broadband internet access is agriculture. To compete, farmers must be efficient. The new frontier of efficiency is internet-connected precision agriculture. There are different levels of broadband service for different applications. For example, Innov8.ag focuses on precision data components and uses sensors requiring a low level of connectivity that can be measured in kilobits per second. However, for farmers to access and use data in their farming applications, Mbps is imperative.

Beyond the technological applications, many farm areas do not have basic cell service or internet connectivity for communication. With approximately 12.3% of the workforce employed in agriculture, there is a real need for connectivity. Agricultural businesses and workers need broadband internet to communicate with one another, with business partners, with their families and potentially with emergency personnel.

> Federal funding is often tied to data from the FCC regarding unserved and underserved areas.

Existing and pending infrastructure

Federal funding is often tied to data from the FCC regarding unserved and underserved areas. The 2018 FCC National Broadband Map data was limited due to the way data was collected and organized. The FCC required internet service providers (ISPs) to submit coverage by census block, but coverage by a single ISP can vary within the census block. Because of this discrepancy, the map would often overestimate broadband internet coverage.

The FCC released a new map in December 2022 that worked to be more precise, allowing the public to look up specific addresses to see which ISPs serve that address. The map site provides mechanisms for individuals to conduct speed tests at their address and submit corrections as appropriate. Speakers emphasized the importance of this process to understand where the gaps in broadband internet coverage are and to secure federal funding that relies on the FCC map.

Columbia County is underserved for broadband internet. According to researchers at Washington State University (WSU), the entire county has five internet service providers advertising speeds that meet the federal definition of broadband internet, which is insufficient for households that have multiple devices or are conducting data-intensive activities such as video conferencing. The Port of Columbia is in the middle of an infrastructure build-out that will provide dark-fiber infrastructure for ISPs to lease.

Port of Columbia

The Port of Columbia chose to invest in broadband internet in response to the lack of service and a recognized need for broadband internet as an economic driver. The Port received a $2 million grant from the Community Economic Revitalization Board (CERB) in 2021 to build a middle mile and last mile network.

The network will pass by 1,287 homes and businesses in Dayton, Port industrial properties, Blue Mountain Station and the fire station. The grant required a $500,000 match that is made up from a number of local philanthropic donations and public funds.

Within this system, the Port will own the fiber that runs to the premises. Internet service providers (ISPs) will pay $20 per month per subscriber to lease space on fiber-optic cables. ISPs will need to install equipment at both ends of the fiber—at the premises and at the co-location center—to provide service. The infrastructure will support speeds up to or in excess of 1 gigabit per second (Gbps) symmetrical.

Infrastructure options

The various categories of technologies that can be used to increase internet access include wired technologies, such as fiber-optic cables and digital subscriber line (DSL) connections; fixed wireless technologies, which use radio waves to transmit data from a fixed location, such as a tower or antenna, to a receiver on the ground; and satellite technologies, which involve the use of satellites in space to provide internet connectivity to remote areas.

Each of these technologies has its own unique advantages and limitations, depending on factors such as geographical location, population density, and infrastructure availability. In order to increase broadband internet access in all areas, it's important to consider a variety of broadband infrastructure options and to be creative in finding nontraditional solutions.

The standard approach that resource speakers pointed to most frequently was fiber-optic technology. Speakers generally agreed that the quality of service and the capacity of fiber-optic cables makes this technology "future proof." Fiber-optic technology depends on interconnected networks that include a backbone network of fiber lines connecting communities, a middle mile network that distributes fiber-optic lines throughout a community, and last mile connections that connect individual homes and businesses to the middle mile network.

It was also noted by several speakers that fiber-optic lines have high up-front costs, especially in rural and remote areas. According to a resource speaker from Morrow County, Oregon, it will cost $60 million to serve 1,400 residents. In rural Columbia County, it is expected to cost $23,000 per premises, compared with $2,000 per premises in Dayton, where the population density is higher.

Speakers generally agreed that the quality of service and the capacity of fiber-optic cables makes this technology "future proof."

Wireless options for broadband internet infrastructure are generally divided into fixed and mobile categories. Fixed wireless internet connections rely on radio waves broadcast from towers to receivers installed on the user's property. Mobile wireless connections are either mobile Wi-Fi hotspots or cellular networks.

Mobile wireless connections can be delivered in either long-term evolution (LTE) or 5G technology. 5G technology is newer than LTE (4G) and not as widely available. Speakers indicated that because the technology is designed with small cells that cover a relatively short distance, 5G is better suited to users in denser areas than 4G, which has a larger coverage area. Wireless options are less expensive to deploy in rural and remote areas, but they require a line of sight that is not operable in areas with steep hills or dense vegetation. Alternatively, people in some areas have purchased or partnered with other organizations to create private networks that provide internet service for members or beneficiaries of their organization, such as a school district in Southern California that created a private LTE network for its students.

At the last mile, there are many opportunities available for public and private

Deployment technologies

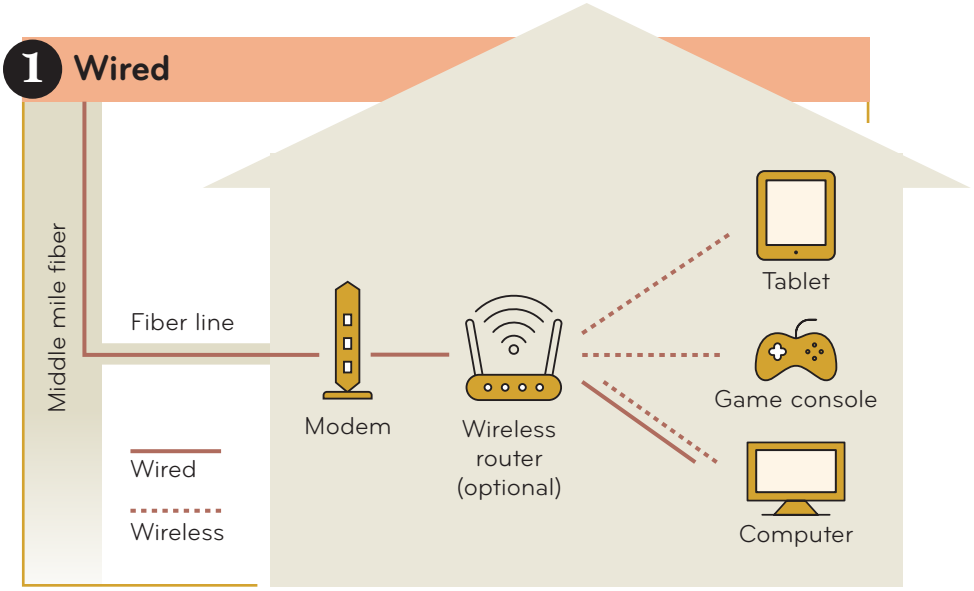
	Wired	Fixed wireless	Mobile wireless	Satellite
Ownership models	Public municipal and public utility district (PUD) Open-access network Public/private partnerships Private ownership	Private ownership	Private ownership Private LTE	Private ownership
Quality of service	Highly reliable connection	Relies on line-of-sight technology, which decreases internet connection reliability Provides internet access to a set location for multiple devices	Relies on line-of-sight technology, which decreases internet connection reliability Consumers are able to access the internet wherever there is cell service	Relies on line-of-sight technology, which decreases internet connection reliability
Cost	Consumer pricing varies based on ownership model More cost-effective to deploy in densely populated areas	Private network pricing depends on location, market competition, and type of service provided	Private network pricing depends on location, market competition, and type of service provided Private LTE installation costs between $10,000 and $20,000	High cost for installation and high monthly service fee
Geography	Difficult geology and topography may obstruct deployment	Best as an alternative to wired connection in less densely populated areas where vegetation is limited and topography is relatively flat	Best as an alternative to wired connection in less densely populated areas where vegetation is limited and topography is relatively flat Necessary for mobile internet use when connection to a wired or fixed wireless connection is unavailable	Best for areas of extreme remoteness where wireless and wired connections are not available

entities to participate in broadband internet provision. Broadband internet systems have three different components: network ownership, network operation, and service provision. These components may all be conducted by the same organization or by three separate entities. Each model can be distinguished by the quality of service, pricing, and reliability provided to the consumer. Each technology is differentiated based on its performance, availability, and efficiency in different geographic locations, topographies, and population densities.

This section is not an exhaustive list of all possible broadband internet technologies and ownership models. Our speakers focused on the options they felt were most relevant to our region, and that guided what is included in this section.

4 internet deployment technologies

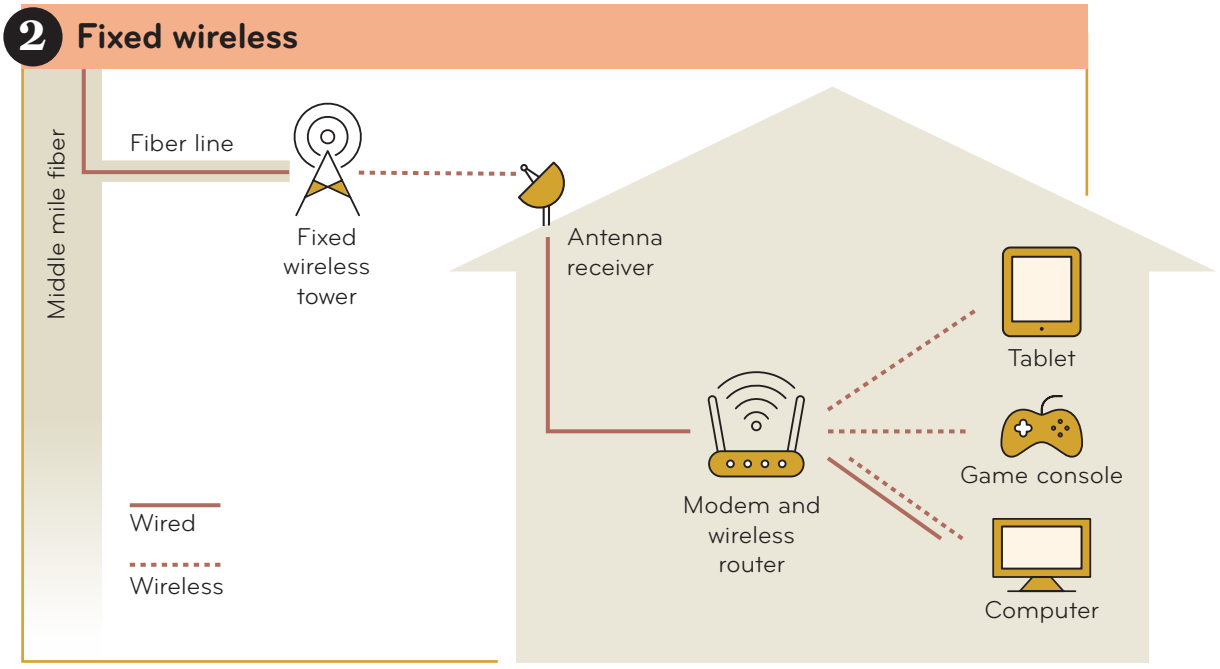
1 Wired



What is the difference between a modem and a router?

A modem connects your home network to your ISP. A router allows all of your wired and wireless devices to use that internet connection and connect with each other.

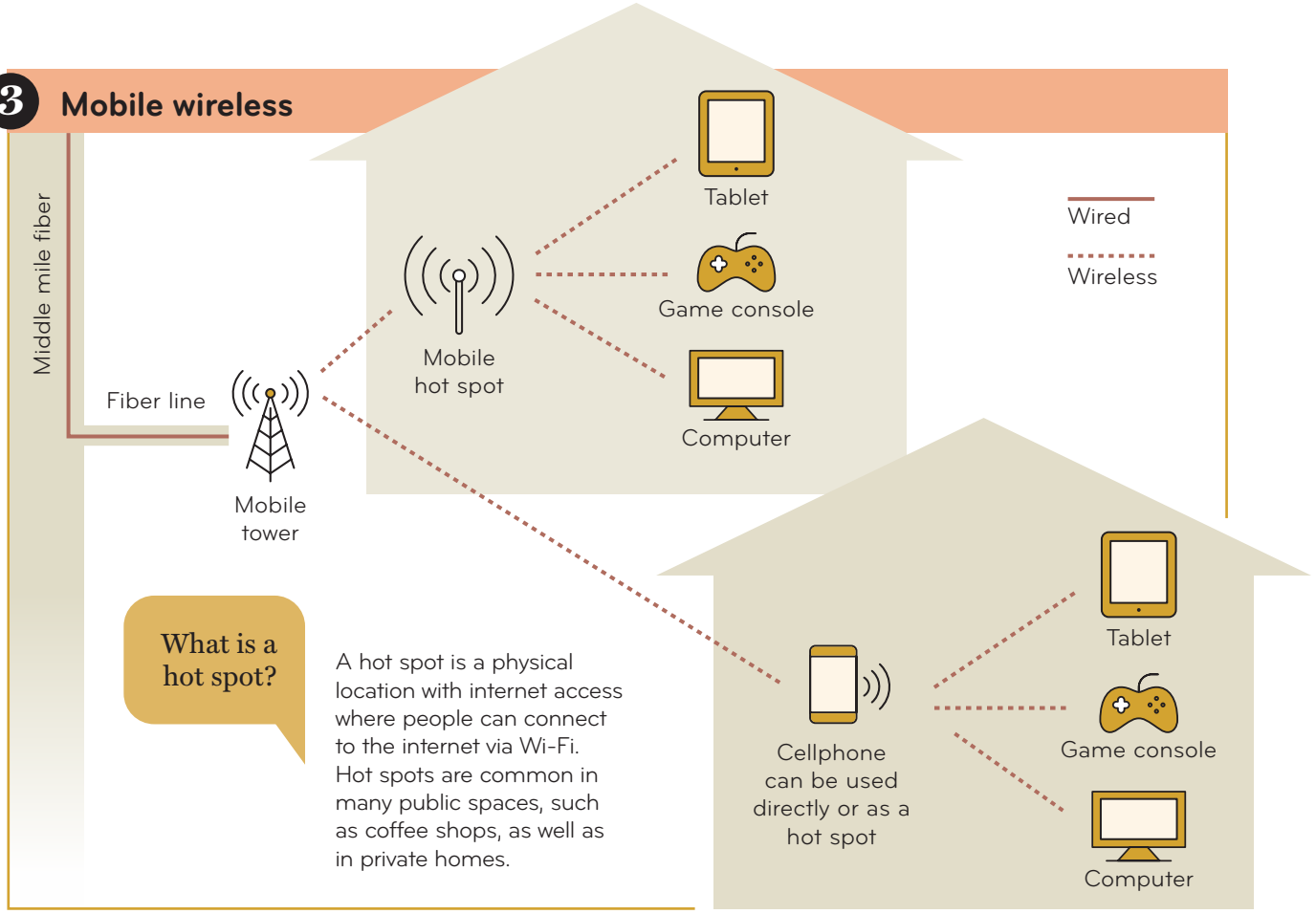
2 Fixed wireless



What is a middle mile fiber?

The middle mile refers to the midsection of the infrastructure needed to enable internet connectivity for homes and businesses. Middle mile fibers are high-capacity fiber-optic lines that carry large amounts of data at high speeds over long distances between local networks and global internet networks.

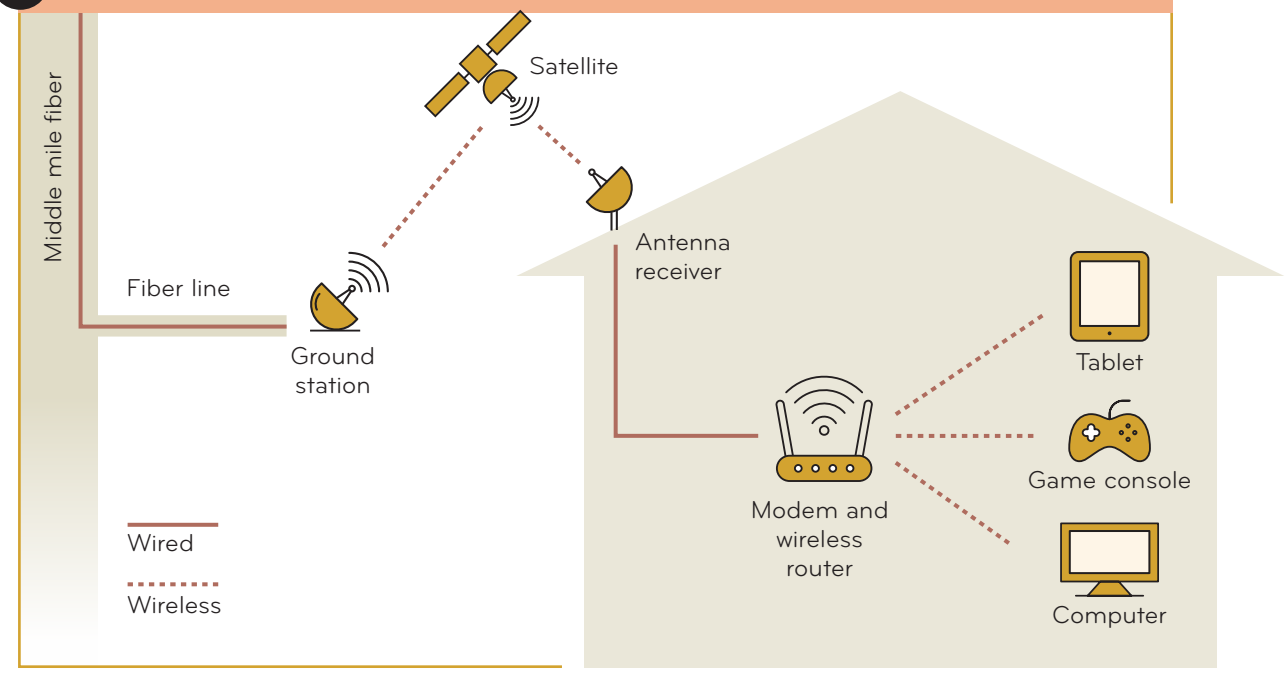
3 Mobile wireless



What is a hot spot?

A hot spot is a physical location with internet access where people can connect to the internet via Wi-Fi. Hot spots are common in many public spaces, such as coffee shops, as well as in private homes.

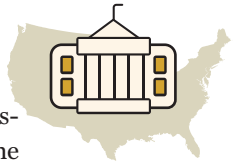
4 Satellite



Federal, state, and local infrastructure response

Nationally, the response to the need for broadband internet has been slow. Prior to the pandemic, broadband internet issues were largely left to the private sector. While there was some public investment and advocacy for broadband internet in rural and remote areas, the pandemic highlighted gaps in service, making broadband internet a priority for federal and state policies and investments.

Federal



Significant funds are being disbursed to address the digital divide. The American Rescue Plan Act of 2021 allocated $10 billion for capital projects and $350 billion for state and local projects. The Bipartisan Infrastructure Law of 2021 allocated $42.5 billion for state broadband internet programs and $23 billion for digital equity. These programs designated funding for states to distribute to localities, relying upon local leadership and accountability. The funds are to be used to support universal coverage, affordability, fiber, community engagement, and digital literacy.

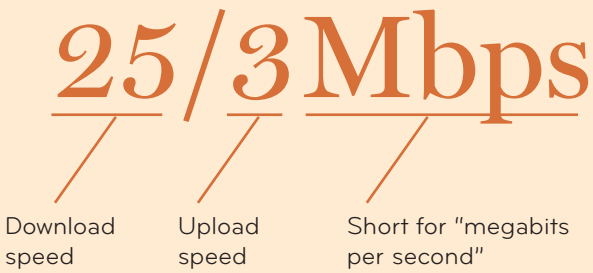
There are 13 government departments and agencies that manage over 100 federal programs related to broadband internet access. These include programs for infrastructure to increase the availability of broadband internet and adoption of broadband internet to decrease the digital divide. There are diverse sources of funding to support a variety of projects that incorporate a broadband internet component, such as telehealth, economic development, and distance learning.

The broadband internet funding program talked about most by resource speakers is the Broadband Equity, Access and Deployment (BEAD) grant program. In this program, states will compete for $42.45 billion to fund broadband internet infrastructure deployment. Each state will then make its own program for funding to counties, tribes, and local governments, following the general guidelines specified by the National Telecommunications and Information Administration (NTIA).

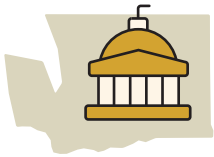
The FCC National Broadband Map discussed in the "Existing and pending infrastructure" section will be one tool used to determine eligibility for unserved and underserved areas under the NTIA's guidelines, which highlights the importance of the map's accuracy.

REMINDER

Dissection of a broadband internet speed phrase



State of Washington



The State acknowledges that the lack of broadband internet availability is a widespread problem experienced to some degree throughout all 39 counties. There are multiple parties working to address this. One legislative change provides new authority to port districts, public utility districts (PUDs) and municipalities to provide broadband internet service. As a result, there is increased funding available to extend broadband internet to unserved and underserved areas through the Community Economic Revitalization Board (CERB).

Washington State has set the following broadband internet goals:

- 25/3 Mbps for everyone in the State by 2024.
- 1/1 Gbps for all anchor institutions, such as schools, libraries, and hospitals, by 2026.
- 150/150 Mbps for all residences and businesses by 2028.

The State is asking everyone to conduct speed tests so that the unserved and underserved areas identified on the FCC National Broadband Map can be confirmed.

The State is also preparing for the federal BEAD program and providing $8 million to support broadband action teams (BATs) throughout the State with

Morrow County

In Morrow County, the broadband action team (BAT) is bringing together all community partners, including ISPs, health care entities, governments, and schools. Making sure that Morrow County's needs are heard elsewhere requires assembling many voices and ensuring that the community knows these projects are important. One of the BAT's first activities was to create a shared narrative about the importance of broadband internet.

Maintaining political neutrality is very important to solving the broadband internet issue. Since the BAT is unencumbered by affiliation, it can remain neutral and refocus conversations on the shared narrative.

The BAT has completed a feasibility study for fiber, created an infrastructure map, promoted the Affordable Connectivity Program in English and Spanish through a local filmmaker, and identified free digital literacy programs to help build computer skills. This work is ongoing.

support from the WSU Extension Office, Northwest Open Access Network (NoaNet), and Petrichor Broadband, all of which are publicly funded to provide this support. WSU Extension is tasked with working directly with local BATs to facilitate the flow of information from BATs to the Washington State Broadband Office (WSBO). NoaNet functions as a consultant and is working on developing infrastructure maps for planning purposes and responding to the FCC's National Broadband Map. It is important that we provide local information that verifies the maps that NoaNet is working on.

Three million dollars in funding for digital equity planning support from the State will be available for the 39 counties and 29 tribes in Washington. In order to access BEAD funding, the State is gathering information from counties and tribes.

State of Oregon

According to a resource speaker, the State of Oregon's approach to addressing broadband internet is to work directly with the public through the Oregon Broadband Office, rather than through an intermediary like WSU. The Oregon Broadband Office formed an advisory board made up of representatives from cities, counties, and tribes; providers; and community partners from around the State. Oregon is promoting its own review of the FCC's National Broadband Map, available on the Oregon Broadband Office's website, with instructions for individuals to submit their own speed tests to compare with and confirm the FCC's data.

Local response

Speakers emphasized the need for a swift and comprehensive response from local entities. One key strategy that we have heard repeatedly is the need for multiple BATs in our region. The purpose of a BAT is to advocate for broadband internet to communicate needs and solutions with the WSBO and to access state and federal funding to support public investment in broadband internet solutions. One function of the BAT is to create a five-year strategic plan for broadband internet deployment. Resource speakers stressed that the digital equity plan that focuses on affordability and adoption of broadband internet will be just as important as the strategic plan.

Columbia and Walla Walla counties have each formed their own BAT, consisting of elected officials and community partners, to make significant headway in addressing the need for broadband internet locally. By working together to address issues, such as permitting challenges, acquiring funding, managing timelines, and balancing

While there was some public investment and advocacy for broadband internet in rural and remote areas, the pandemic highlighted gaps in service, making broadband internet a priority for federal and state policies and investments.

public and private interests, we are at a greater advantage than working alone. A BAT allows each county to advocate for broadband interests with a unified voice. According to resource speakers, sources of funding in Washington are dependent on the creation of a BAT.

Several resource speakers encouraged the seeking of creative solutions. They recommended allocating some dollars to push through the challenges of providing connectivity in areas that cannot be served by the most commonly effective solutions. An example in Snohomish County is the 5G Open Innovation Lab, a global innovation ecosystem that seeks to help entrepreneurs in a variety of industries. Its pilot program brought 5G to agricultural lands to help farmers access resources for data collection and application. The purpose is to significantly increase efficiency in the agricultural sector, particularly for permanent crops like orchards. This level of data collection and analysis requires fast, consistent broadband internet access that was previously unavailable.

Timeline

Infrastructure deployment takes a multi-year commitment to complete the planning, financing, and construction. Morrow County and the Port of Columbia have been working on their projects for several years already. There are many possible reasons for the amount of time it takes to implement broadband internet, including involving community partners, securing funding, and dealing with supply chain and demand issues for the actual construction of the network.

A CASE STUDY

Infrastructure deployment of a fiber network

When the city of Anacortes created its own fiber network, the timeline from stating the need for broadband internet to deploying the pilot project was about six years.

2014 — Identifying the problem
Mayor identifies lack of broadband internet as a significant issue.

2015 — Community outreach
Anacortes meets with ISPs about expanding service in the city.

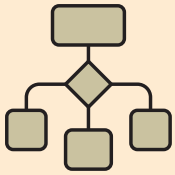
2016 — Using community resources
City deploys fiber conduit among municipal water and wastewater systems.

2017 — Designing fiber backbone
City retains NoaNet to design the fiber middle mile network.

2018 — Seeking partnerships
City issues a request for proposals (RFP) from private businesses to operate a city-owned fiber network.

2019 — Funding the pilot project
City deploys its middle mile fiber, develops policies, hires staff, and hires contractors. Funds for the pilot project are drawn from the city's reserves.

2020 — Installation
Installation of fiber to the premises begins.



Affordability

Affordability is one of the three pillars of broadband internet adoption, and it is a significant barrier to internet use for households across the United States. According to data from the Pew Research Center, 45% of low-income households say that the monthly cost is too high, and it's the number one reason that they do not go online at home.

While some people choose not to access the internet because it is not relevant to them, research shows that the most significant barrier is affordability.

Affordability in our region

Broadband internet affordability affects low- and moderate-income populations more than households earning at or above the median household income. Resource speakers concluded that many low- and moderate-income households do not have the financial resources to afford a device and broadband internet service. In our region, about one quarter of the households earn less than $35,000 per year, meaning these homes earn less than half of the area family income (AFI) in all jurisdictions. The breakdown of data by county is listed at right.

Area family income by county

	Walla Walla County	Columbia County	Milton-Freewater (Umatilla County)
Median household income	$63,686	$64,688	$51,485
Percent of households with annual incomes under $35,000	26%	27%	19%

U.S. Census Bureau, 2021 American Community Survey 5-Year Estimates

Resource speakers from local school districts provided a unique perspective on affordability based on their experiences during the pandemic and the transition back to in-person school. They reported an estimated 25% of families in some areas are not able to pay their utility bills every month and rotate which bills are paid. To facilitate low-income families' ability to adopt broadband internet, the cost must be as low as $0 to $25 per month to be affordable. They also noted that unless broadband internet service is free and easy to obtain, it is not likely to be adopted by unserved and underserved populations. A resource speaker stated that minority and low-income students will be systemically left behind as a result of the lack of broadband access.

To facilitate low-income families' ability to adopt broadband internet, the cost must be as low as $0 to $25 per month to be affordable.

Balancing affordability for all

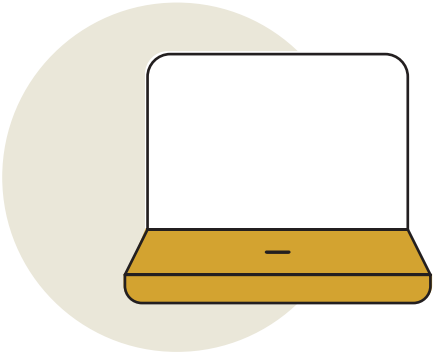
For the traditional private-ownership model, a broadband internet network is a business plan. ISPs must balance consumer costs to increase their take rate (the percentage of potential subscribers who are offered the service and actually do subscribe) and generate returns on their investments for ongoing maintenance and profit. The take rate for Access Fiber, the municipally owned ISP in Anacortes, Washington, had to be at least 35% to be viable at the price points offered and to sustain the investment.

Generally, the price for internet service at the same speeds tends to go down over time, and higher speeds are made available at higher price points. If private ISPs do not have a high enough take rate or if their services are priced too low, they would not be able to reinvest in infrastructure maintenance or upgrades and would not survive in the market.

Other barriers to affordability

The Pew Research Center data also shows that 37% of surveyed households indicated that the cost of a computer was a barrier to broadband internet adoption. A further complication is that most households would prefer more than one computer to meet their obligations, especially considering employment and educational needs. Device affordability must be considered in addition to broadband internet subscription costs.

The Pew Research Center data also shows that 37% of surveyed households indicated that the cost of a computer was a barrier to broadband internet adoption.



Resource speakers recommended creating innovative solutions to make broadband internet widely available and affordable and to advocate for policies that increase internet affordability, such as net neutrality.

Making the internet affordable

Resource speakers suggested different approaches to reducing the cost of broadband internet to consumers. One program that was repeatedly discussed is the Affordable Connectivity Program (ACP), which is a federal subsidy paid on behalf of qualifying consumers directly to ISPs to reduce the cost of broadband internet service for low-income households.

Because this is a federal program that most ISPs participate in, the ACP is widely available. Resource speakers did note that the ACP can be confusing or difficult to access, and that because it collects personal information, some consumers might be reluctant to complete application forms. In addition, there is no permanent funding for this program, so it is not guaranteed to be available long-term.

Resource speakers noted that increasing competition among service providers brings down the costs for services and is a staple of the affordability model in Columbia County's open-access approach. They also suggested creating private LTE networks to serve small pockets of people in low-income areas where broadband internet is unavailable or unaffordable to people.

Accessibility

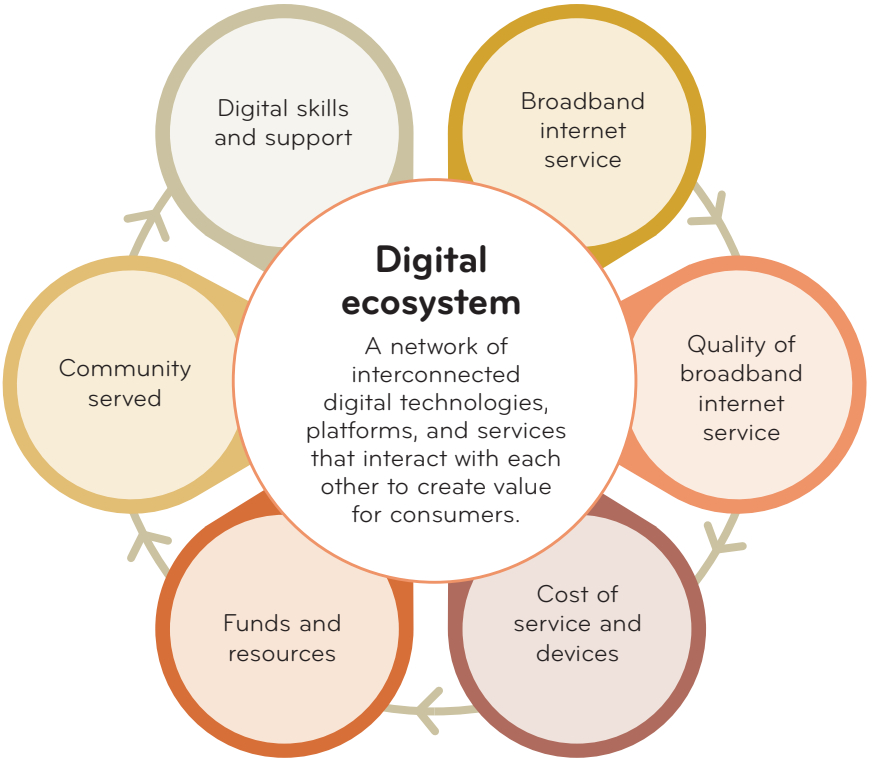
The third pillar of broadband internet adoption is accessibility. In the context of this study, accessibility refers to the proficiency in digital literacy and the nonfinancial resources available to households that lead to adoption and full utilization of broadband internet services. This section looks at accessibility through the lens of digital equity; the specific populations affected by inequities, according to resource speakers; and other considerations, such as phone data, cybersecurity, and digital skills.

Digital equity

Digital equity considers which individuals and communities have the information technology capacity needed for full participation in our society, democracy, and economy. Many subpopulations are potentially affected. The Workforce Innovation and Opportunity Act identifies 15 priority populations that could be disproportionately affected:

1. Displaced homemakers
2. English language learners
3. Formerly incarcerated people
4. Homeless individuals
5. Native Americans, Alaska Natives and Hawaiians
6. Individuals with disabilities
7. Individuals within two years of exhausted Temporary Assistance for Needy Families (TANF) eligibility
8. Long-term unemployed people
9. Low-income individuals
10. Migrant/seasonal farmworkers
11. Older individuals
12. Single parents and pregnant women
13. Veterans
14. Youth in or formerly in foster care
15. Other

As the categories listed above indicate, digital inequities for some people tend to overlap with social inequities.



According to resource speakers, broadband internet solutions should include an understanding of the full socio-technical ecosystem of people's digital needs.

Socio-technical ecosystems have general foundations but must be tailored for a specific demographic context. Communities can create socio-technical ecosystems that build on existing digital skills and knowledge and center on individual needs.

To respond to digital inequities, resource speakers recommend that local planning be as inclusive as possible of those marginalized populations. In addition, digital equity does not have to be addressed in a vacuum separate and apart from other infrastructure and availability projects. Researchers and organizations working in this field indicate that communities can address cognitive and technical skills and other inequities to build capacity in the absence of physical broadband internet access.

Smartphone use

Home broadband internet access is an important component of addressing digital equity. Phone use, particularly smartphones with data plans, is a significant pathway for online participation and sometimes the only source of broadband internet access for low-income households. For example, resource speakers from local school districts reported that some parents said they had a device and an internet connection through a smartphone and a data plan, but they had no other fixed internet connections available for multiple devices for their school-age children.

Of the 300 constituents surveyed by Hacienda CDC, 67% accessed the internet only by a phone shared by multiple people in the home. Research also shows that people tend to primarily use their phones, even if they have computers or other devices. Phones are convenient, portable, and often the first or the most prevalent internet device available. With that in mind, resource speakers pointed out that it is important for digital messaging to be accessible on various types of phones and that digital skill-building include smartphone use.

Digital skills

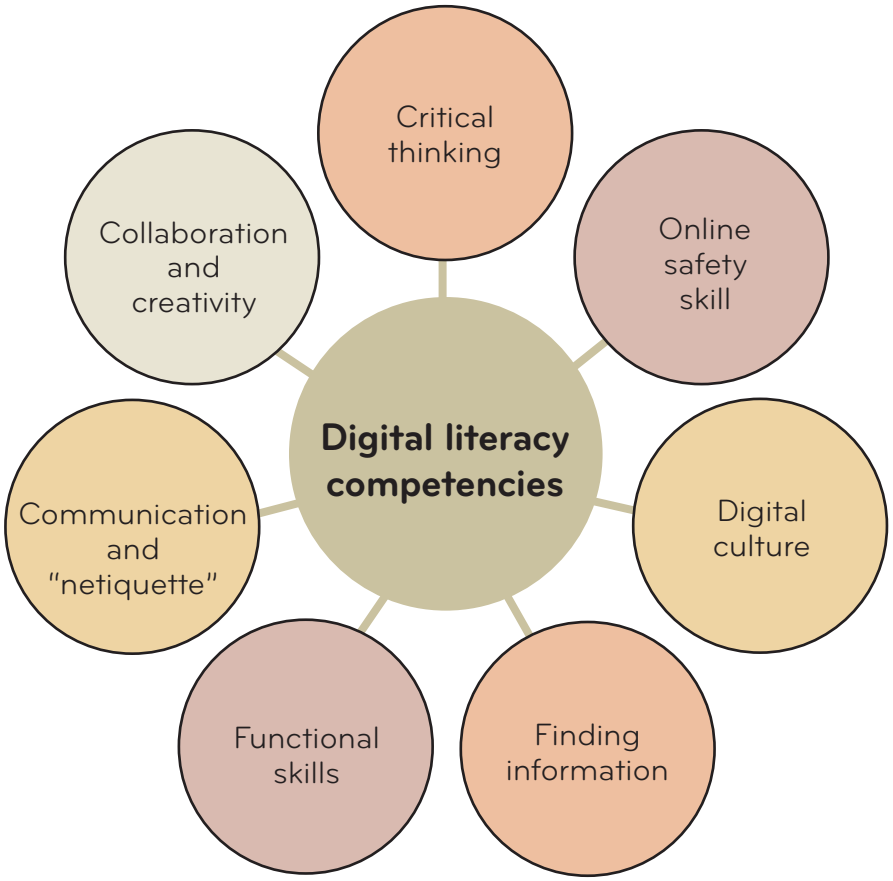
People's understanding of what broadband internet access means varies. Lack of access contributes to the lack of digital skills. Getting internet service to all households is the first step to digital skills. The second step is providing digital literacy education. As one speaker stated, just because you have the road does not mean you have a car or know how to drive it. In other words, having access to broadband internet does not mean that people have devices or know how to use them.

According to a resource speaker, people who received hot spots during the

Hacienda CDC

Nonprofit organizations like Hacienda CDC in Portland, Oregon, have taken steps to address digital literacy. Through a partnership with Verizon, Hacienda CDC created three free neighborhood learning centers that provide broadband internet access, teach digital skills in English and Spanish, and provide one-on-one basic support.

The Hacienda CDC model's sites are in neighborhoods that are underserved, making them more accessible to residents. As it is an organization primarily dedicated to affordable housing, the learning centers represent a pivot from its usual projects. The lesson from Hacienda CDC is to be flexible and creative with solving problems.



Digital skills education is needed to fill a variety of gaps among different populations.

pandemic knew how to do some things, like search YouTube, but did not know how to do other things, like use Zoom. People often learn digital skills outside of a classroom structure and have gaps in their knowledge as a result. To guide people to resources to fill knowledge gaps, digital literacy researchers recommend inventorying and grouping skills into categories.

Digital skills education is needed to fill a variety of gaps among different populations. There is a need for in-person services and digital navigation, which refers to someone guiding another individual on how to use a device, technology, or digital resource. The Goodwill Connect Program in our region is one example of an organization providing digital navigators to help guide their clients in using the technology; for example, to apply for jobs or services through online portals.

Other training opportunities include implementing a train-the-trainers program for volunteers and family members to conduct training for others (helping older individuals learn how to use their devices, for instance) and also incorporate household appliance digital control use as part of digital literacy efforts.

Cybersecurity

Cybersecurity is a concern for many people, particularly vulnerable populations such as seniors, though individuals under the age of 35 can be vulnerable to attack due to general overconfidence in their security.

Cybersecurity has three parts: confidentiality, integrity, and availability. Confidentiality is the protection of a person's private data. Integrity is the prevention of unauthorized users from modifying or deleting personal data. Availability is the access by users to their own data. All of these are critical to balancing security with practical, real-world applications.

Between 2016 and 2021, the Federal Bureau of Investigation (FBI) reported an average of 552,000 complaints of cyberattacks per year, totaling $18.7 billion in total losses. In 2021 alone, the FBI received 847,376 complaints, which was a 7% increase from 2020. Phishing-style attacks represented, by far, the largest percentage of total attacks. These attacks are often automated through the sending of fraudulent links, voice messages, texts, and websites. Small businesses are the number one target for cyberattacks and consisted of 43% of all data breaches, according to a 2019 Verizon report.

To protect consumers, corporations use a defense-in-depth (DiD) security strategy, which provides layers of protection throughout a computer network to safeguard the confidentiality, integrity, and availability of the data within the network. These layers include firewalls, data encryption, and device hardening, which is a group of protocols that limits access and protects individual devices within a network. Device hardening is also important for average users.

The "Internet of Things" (the collective network of connected devices and the technology that facilitates communication between devices and cloud computing, as well as between the devices themselves) will become a significant future cybersecurity risk. As devices age, the technical support for the software and hardware that controls them and communicates with other devices will diminish, creating vulnerabilities that cybersecurity attacks can exploit. All devices are subject to this life cycle, meaning older devices need to continually be replaced as support for them wanes, creating inequity for lower-income households to regularly replace devices.

Populations affected

Resource speakers discussed several populations that are affected by the digital divide. While there are some overlaps between these populations and Workforce Innovation and Opportunity Act-identified groups, the populations listed below are specific to our region.

Workforce

Two of the largest employment sectors in the area are agriculture and retail trade, which are generally lower-wage industries. Higher-wage jobs tend to require some type of formalized training, certification, or degree. Goodwill Industries is one of many organizations working to enhance digital skills related to workforce development by offering a variety of programs to address gaps in digital literacy. The general public, including job seekers and people with disabilities, can use Goodwill's Education Connection Center, located in College Place, which serves our region.

One sector identified by resource speakers as facing staff shortages is information technology (IT), including jobs such as network operators and geographic information system mapping

> Getting internet service to all households is the first step to digital skills. The second step is providing digital literacy education.

professionals. In addition, the region has a large small-business community, many of which are unlikely to have their own tech support on staff and need to contract such services but face a shortage of IT services. This workforce shortage presents a potential complication to implementing digital literacy programs and an opportunity to seek creative solutions to close the gap.

Immigrant and English-language-learner communities

According to 2022 estimates from the U.S. Census Bureau, immigrants from Latin America, Europe, and Asia make up about 9% of the total population in our region. The region is home to 14,171 people who speak a language other than English at home, and 44% of them speak English "less than very well."

English comprehension is a barrier to learning new skills, as many digital literacy programs are offered only in English. Resource speakers told us some individuals might also be cautious or reluctant to share personal information on application forms for programs or services based on their immigration status.

Youth

It is generally assumed that younger generations that grew up with technology, the so-called digital natives, know how to use technology. The most vulnerable populations to cybersecurity attacks are populations over the age of 75 and, surprisingly, under the age of 35. Digital natives also often lack office-related digital skills and soft skills for employment, such as a work ethic, communication, teamwork, and problem-solving.

During the pandemic, technology became the primary conduit of learning and school communication with parents, which created a dependence of parents on their children that is unlikely to recede. Virtual learning was neither effective nor equitable for many students.

There are barriers to digital learning besides digital access. For example, some households are not conducive to digital learning due to cultural divides, disruptive households, poverty, language barriers, homelessness or transience, inadequate bandwidth for specific geographic areas, gaps in digital literacy, or parents' or guardians' choices.

Rural population

Several resource speakers presented information about the digital divide in rural and remote areas, specifically the unavailability of broadband internet service. Rural libraries are working to counteract gaps in broadband internet availability by offering various remedial services.

During the pandemic, technology became the primary conduit of learning and school communication with parents, which created a dependence of parents on their children that is unlikely to recede.

For example, the Walla Walla County Rural Library District (WWCRLD), serving all of Walla Walla County outside the city of Walla Walla, offers free Wi-Fi access and mobile hotspots, but usage is at a much lower rate than at the Columbia County Rural Library District (CCRLD). WWCRLD also offers a rural bookmobile with a mobile hot spot to reach remote locations and attends events to promote library usage. The bookmobile service uses a flexible, adaptive visit schedule to be more responsive to emerging needs and events.

The pandemic changed usage patterns at the WWCRLD. The number of current patron visits are about equal or slightly more than in 2019, but computer usage in the library district is significantly less. Until August 2020, Wi-Fi users were counted visually, but newer technology allows the library to measure the number of individual users (by device) who access Wi-Fi and the extent of repeated use. New data shows that Wi-Fi usage was significantly underestimated. People who use technology at the WWCRLD generally fall into three categories:

Columbia County Rural Library District (CCRLD)

The CCRLD faced a growing demand for mobile hot spots since the pandemic started. In 2021, the demand for mobile hot spots was consistently wait-listed. The CCRLD was successful in obtaining funding to purchase more hot spots for checkout.

Library users also use internet connectivity at the library to complete job applications, go to job interviews over Zoom, conduct Department of Social and Health Services (DSHS) interviews, take certified nursing assistant (CNA) and food worker card exams, schedule telehealth appointments, and take exams proctored by library staff.

1. Those who want it but cannot afford it or access it at home.
2. Those who do not want it in their homes but need to use it occasionally.
3. Those who seek enrichment, such as faster internet speeds, socialization, or expanded services.

The technological assistance provided by the library includes printing, faxing, and email for library users who do not have these tools at home or are less comfortable with technology.

Senior citizens

The senior population (individuals ages 65 and over) in the region is disproportionately higher compared to more urban areas. In Columbia County, the senior population per capita is approaching double the state average. Seniors are typically considered to be reluctant to embrace technology, but resource speakers noted that the upcoming generations of seniors are more digitally literate than previous generations.

According to the Pew Research Center, 58% of adults 65 and older have in-home broadband internet, compared with 73% of adults ages 18 to 64. From 2013 to 2016, there was a large increase in the number of seniors who owned smartphones. Technology adoption is more limited among seniors who are older than 75 years. Internet use and home broadband internet adoption are highest among seniors who are younger, wealthier, and better educated.

Despite the trends toward greater broadband internet usage, there is still a significant senior population that needs help bridging the digital divide. Resource speakers noted that seniors who are without a strong technological background need training on their own computers in their homes to better utilize these resources. Some seniors who are still seeking employment need digital workforce skills. Others lack confidence online and are concerned about cybersecurity attacks. Attempts to address these concerns must be balanced and nuanced.

The Walla Walla Senior Center provided tablets to seniors in the GrandPad Program as a way to help them connect to one another and their families during the pandemic. However, the tablets had protections placed on them to lower cybersecurity risks, which were deemed too restrictive and decreased functionality, making the tablets frustrating to use.

Telehealth services

The use of telehealth (the provision of health care remotely by means of telecommunications technology) has increased since the pandemic, and broadband internet access has been critical. Telehealth is traditionally considered to be client-to-provider but also includes hospital-to-provider, health devices, and smart-home assistance where internet-enabled appliances and devices can be automatically controlled remotely using a network device. In the client-to-provider model, the client logs in remotely for a visit with their provider. Telehealth provides value and benefit for consumers and providers through savings on travel and access to specialists who were previously unavailable.

The most commonly used form of telehealth is between local providers and specialists. Local doctors can connect to specialists not available locally via telehealth to provide more specialized, streamlined patient care, especially in emergency cases. This form of telehealth can also close gaps in services. For example, some specialties can be difficult to secure in rural settings, such as cardiology, neurology, or hematology. Provider-to-provider telehealth services allow hospitals and clinics to obtain diagnostic or consult services. The provider-to-provider model requires the use of reliable broadband internet to share diagnostic images and converse on secure video calls.

Provider-to-patient teleheath refers to remote appointments with a doctor or mental health therapist. According to a resource speaker, Medicare and Medicaid began covering provider-to-patient telehealth services during the pandemic, but it is not guaranteed to continue coverage in the future.

The third form of telehealth is high-tech health devices that collect and report patient data for providers. Some devices can allow remote monitoring for providers, which allows for more day-to-day flexibility for patients. These devices could be further enhanced with high-speed internet and video interaction.

The last form of telehealth is the support devices that assist people outside a hospital or health care facility. Smart-home-assisted technologies have the potential to provide more security and connection for homebound people if they are connected through broadband internet. Virtual home assistance, such as Alexa Together or Google Home, is a useful tool for an aging population and might help them stay longer in their homes. Although they are useful, these services require the purchase of a device, broadband internet and a monthly subscription, which can make it cost-prohibitive for seniors and people with disabilities who live in low-income households.

Similarly, voice care programs (medical alert systems that provide access to medical emergency services 24 hours a day, 7 days a week), such as Life Alert, require cellular access or Wi-Fi, which might not be available in rural or remote areas or be too expensive. Insurance or government payers may find it financially advantageous to fund broadband internet and virtual home assistance programs to keep people in their homes instead of higher-cost care facilities.

Conclusions

1. The digital divide is poorly understood in our region, which includes Columbia and Walla Walla counties and the Milton-Freewater area.

2. Broadband internet must be provided at the speeds necessary to meet current and future demands for internet use, particularly in education, health services, and businesses, including agriculture.

3. Broadband internet availability varies throughout the region, and some areas have few or no options for reliable broadband internet.

4. Where cost-effective, fiber technology is considered a "future proof" method of broadband provision due to its high capacity and quality of service.

5. The cost per mile to construct physical connections in rural and remote areas is extreme and might necessitate other additions or partnerships.

6. It takes creative, flexible solutions to serve our region's many rural and remote areas.

7. The market-based ownership model does not meet the needs of all of the population in our region, because some areas are not profitable for private internet service providers (ISPs).

8. It is vital for Broadband Action Teams (BATs) to engage in both the five-year strategic plan and the digital equity plan.

9. To receive funding, BATs must coordinate a unified local response through Washington State's existing structures. Not creating a BAT represents a missed opportunity for funding.

10. To take advantage of a unique window of funding and interest opportunities, BATs must be active and involve key community partners.

11. Because federal funding is tied to Federal Communications Commission (FCC) map data, it is imperative to ensure that the map accurately reflects our local need for broadband internet.

12. Designating broadband internet as a utility could dramatically expand coverage to unserved and underserved communities.

13. Broadband internet is a necessary tool for economic development.

14. Internet access is increasingly important for participation in modern life, and those in our region who experience financial barriers of utilizing broadband internet are left behind.

15. Current fixed home broadband internet prices are unaffordable for approximately a quarter of the households in our region—those that earn less than $35,000 annually.

16. Barriers to accessing broadband internet create socioeconomic inequities that exacerbate the disenfranchisement of people already experiencing systemic barriers.

17. Broadband internet affordability is the most direct way to increase broadband internet adoption among low-income households.

18. We need to explore several sustainable solutions to lower internet costs for consumers.

19. Competitive ISP markets have been shown to lower consumer costs.

20. Public policy and public investment at all levels of government are needed to lower the cost of broadband internet infrastructure deployment, which can have a cascading effect in lowering the cost of broadband internet for the consumer.

21. The design of broadband affordability programs must be better tailored toward their target populations to ensure utilization.

22. Device affordability must be considered in addition to broadband internet subscription costs. Furthermore, technical support for devices diminishes as they age, necessitating replacement, which exacerbates inequities for low-income households.

23. Telehealth, as a broad category of services, is an important tool to help seniors and people with disabilities maintain their independence and improve their quality of life.

24. Our region is isolated from major metropolitan areas and uses telehealth services to support some specialties not available in our region.

25. Telehealth provides value and benefit for consumers and providers through savings on travel.

26. Supporting provider-to-provider telehealth services helps to fill skill gaps in our region.

27. Confidentiality and integrity of data is integral to maintaining cybersecurity.

28. Strong personal cybersecurity reduces risk and protects local networks and other people online.

29. Frequent device hardware and software updates are required to minimize cybersecurity risk.

30. Aging devices present a heightened cybersecurity risk, necessitating replacement, which leaves low-income households disproportionately more vulnerable to cyberattacks.

31. Regional staff shortages in the information technology (IT) sector escalate the need for building digital skills in small businesses, which make up 43% of cyberattack targets.

32. Train-the-trainer programs can expand the capacity for building digital skills in the community.

33. Coordinating efforts between the many different organizations working to address digital literacy could reduce gaps and the duplication of services.

34. Immigrant and English-language-learner populations in our region often face additional barriers to building digital skills, obtaining internet access, and maintaining cybersecurity.

35. Targeted digital navigation and digital literacy education efforts are needed to meet the gaps in digital competencies and technical skill levels of different populations.

36. There is a vital need to bring programs for building digital skills to communities and homes that are unserved and underserved by current digital equity programs.

37. Digital navigators serve an immediate need to help guide people in using technology when they need assistance in completing specific technical tasks.

38. To drive internet adoption and digital skills growth, we need to ensure that everyone who wants to get online has the tools, resources, and skills to do so safely.

39. Achieving digital equity requires building a comprehensive socio-technical ecosystem.

40. Smartphone use must be considered in digital equity efforts, because many people primarily or solely access the internet via smartphones.

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>
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Recommendations

1. Conduct community outreach and education regarding the critical need for available, affordable, and accessible broadband internet, such as marketing through different partners and providing information in different languages.

2. Create an outreach campaign to encourage community members to participate in internet speed tests to confirm or correct the Federal Communications Commission (FCC) Broadband Map.

3. Identify all gaps in broadband internet service within our region, which includes Columbia and Walla Walla counties and the Milton-Freewater area.

4. Work to address broadband internet service gaps within our region, including public and private solutions.

5. Advocate for new and continued funding to serve all areas in our region until all needs are met.

6. Conduct community outreach and education to raise awareness of all categories of broadband internet, including wired, fixed wireless, mobile wireless, and satellite.

7. Encourage open-access fiber installations, allowing internet service providers (ISPs) to lease and deliver broadband internet without duplication of network investments and installations.

8. Advocate for local jurisdictions to adopt policies and procedures to require conduit installation in larger development and public works projects.

9. Advocate for public entities to encourage private developers to install conduits in public rights of way during projects.

10. Provide opportunities for community partners to identify and collaborate on creative solutions for broadband internet availability, affordability, and accessibility.

11. Acknowledge, and encourage further, collaboration among organizations offering services that support broadband internet affordability and accessibility.

12. Support and encourage Broadband Action Teams (BATs) and equivalents to access continued public and private investment.

13. Explore having broadband internet classified as a utility.

14. Inventory available resources, including broadband internet service providers, affordability programs, and digital literacy classes in English and Spanish and advocate for the creation of a resource guide in support of building our region's digital ecosystem.

15. Identify and work to address affordability and digital literacy gaps in our region.

16. Develop a public outreach campaign to encourage eligible households to apply for the Affordable Connectivity Program (ACP) by promoting it through approaches such as digital navigators, ISP outreach, and multilingual information and by advocating for a simpler application process.

17. Work with digital literacy programs to promote awareness and education about available services.

18. Make devices more affordable for all ages by exploring programs such as those that:
    - Provide devices to students.
    - Offer devices to patients, depending on financial need.
    - Help low-income individuals acquire devices.

19. Assist in the replacement of devices vulnerable to cyber attacks with newer ones.

20. Inventory telehealth services in the region and explore ways to expand them.

21. Conduct public outreach and education about telehealth solutions and benefits.

22. Create community education programs on the importance of cybersecurity and trusted security tools for consumer use.

> Explore existing programs and new opportunities that build digital skills in unserved and underserved communities.

23. Explore low-barrier information technology (IT) certificate programs to address the shortage of qualified individuals and establish a pipeline of skilled workers to support small businesses and government organizations facing IT challenges.

24. Explore a train-the-trainer program for volunteers to teach digital skills.

25. Explore existing programs and new opportunities that build digital skills in unserved and underserved communities.

26. Explore ways to make digital navigators more easily accessible throughout our region.

27. Encourage entities that provide digital literacy programs to include smartphone skills development as part of their programming.

List of acronyms

ACP: Affordable Connectivity Program (see glossary)

BAT: Broadband Action Team (see glossary)

BEAD Program: Broadband Equity, Access, and Deployment Program

CISA: Cybersecurity and Infrastructure Security Agency

DSL: digital subscriber line (see glossary)

FCC: Federal Communications Commission

Gbps: gigabits per second (see glossary)

IoT: Internet of Things (see glossary)

ISP: internet service provider (see glossary)

Kbps: kilobits per second (see glossary)

LTE: long-term evolution (see glossary)

Mbps: megabits per second (see glossary)

NDIA: National Digital Inclusion Alliance

NoaNet: Northwest Open Access Network

NTIA: National Telecommunications and Information Administration

WSBO: Washington State Broadband Office

WSU Extension: Washington State University Extension

Glossary

Affordable Connectivity Program (ACP): The Affordable Connectivity Program (ACP), a benefit program of the Federal Communications Commission (FCC), provides eligible households with a discount on broadband service and connected devices needed for work, school, and health care. The benefit provides discounts of up to $30 per month toward internet service for eligible households and up to $75 per month for households on qualifying tribal lands. Eligible households can also receive a one-time discount of up to $100 to purchase a laptop, desktop computer, or tablet from participating providers if they contribute more than $10 and less than $50 toward the purchase price.

Asymmetrical: When the download speed is significantly higher than the upload speeds. For example, 25 Mbps download speed with 3 Mbps upload speed.

Backbone: The core part of a fiber-optic network that connects multiple smaller regional networks together. This would be equivalent to a highway in a road system.

Broadband: A classification of internet service defined by the measurement of download and upload speeds.

Bits per second: A common measure of data speed for computer technologies. The speed in bps is a speed that is measured in bits transmitted each second.

Cable internet: A wired internet service delivered through coaxial (TV) cables.

Dark fiber: Fiber-optic infrastructure that is currently unused.

Defense in depth: A cybersecurity approach that uses multiple layers of security for holistic protection.

Digital divide: The gulf between demographics and regions that have complete access to, and understanding of, digital technology and those that do not.

Digital ecosystem: A network of people, businesses, and systems that use technology to interact with one another.

Digital literacy: The basic skills or ability to use information and communication technology confidently, safely, and effectively for work, leisure, learning, and communication.

Digital navigator: Guides who assist community members in internet adoption and the use of devices, technologies, or digital resources.

Digital subscriber line (DSL): A wired technology that transports high-bandwidth internet service delivered through a copper telephone line to a modem.

Download speed: The rate at which digital data is transferred from the internet to a local device.

English language learner: Individuals who have limited proficiency in the English language.

Fiber optic: The technology used by internet services to transmit information as pulses of light through strands of fiber made of glass or plastic over long distances.

Fixed wireless: Technology that uses radio waves to send high-speed signals that deliver internet service to a fixed location.

Internet service provider (ISP): An entity that provides subscribers with internet access.

Internet of Things (IoT): The network of physical objects—things—that are embedded with sensors, software, and other technologies for the purpose of connecting and exchanging data with other devices and systems over the internet.

Last mile: The final leg of internet network delivery to the end user, typically delivered through wired, fixed wireless, mobile wireless, or satellite technology.

Latency: The time it takes for data to pass from one point on a network to another. It is currently not a metric used by the FCC to define broadband service; however, a latency of 100 milliseconds is considered slow by some federal agencies.

Lit fiber: Fiber-optic infrastructure that transmits data via pulses of light over cable composed of thin strands of glass or plastic to provide internet connectivity to users.

Long-term evolution (LTE): A technology for wireless broadband communication for mobile devices. It is used by phone carriers to deliver wireless data to a consumer's phone with peak transfer rates of up to 100 Mbps download and 30 Mbps upload.

Middle mile: The physical section of the fiber-optic infrastructure required to connect last mile networks to the backbone.

Mobile hot spot: A personal device's or smartphone's data connection to access cellular signals and convert them to Wi-Fi and vice versa, creating a mobile Wi-Fi network that can be shared by multiple users within about 33 feet of the device.

Modem: A device that translates digital signals produced by an internet service provider to an internet connection for a router to broadcast or an internet-capable device to connect directly.

Net neutrality: The principle that internet service providers should provide access to all sites, content, and applications at the same speed and under the same conditions without favoring or blocking any content.

Open access network: An arrangement in which multiple internet service providers can offer services over the same fiber infrastructure. The network owner, which could be a private company or public authority, builds and owns the fiber infrastructure and leases access to ISPs.

Private ownership: Telecommunications infrastructure that is financed, owned, and controlled by a private entity or individual.

Public ownership: Telecommunications infrastructure that is financed, owned, and controlled by a public authority, e.g., a city, county, public utility district, port, state, tribe, or other government authority.

Redundancy: System design in which additional or alternative components are installed within network infrastructure to ensure network availability in the case of unplanned failure of network equipment.

Router: A device that manages communication between the internet and the devices in the home that connect to the internet.

Glossary (continued)

Rural: The FCC classifies rurality into three subcategories: rural, extremely rural, and less rural. Rural is defined as areas within a core-based statistical area that do not have an urban area with a population of 25,000 or greater. Core-based statistical areas are one or more counties (or equivalents) anchored by an urban center of at least 10,000 people plus adjacent counties that are socioeconomically tied to the urban center by commuting. Extremely rural areas are entirely outside a core-based statistical area. Finally, less rural areas are defined as being within a core-based statistical area that contains an urban area with a population of 25,000 or greater but are within a specific census tract that itself does not contain any part of a place or urban area with a population of greater than 25,000.

Satellite: A specialized wireless receiver/transmitter that has been sent into space, orbiting the Earth, in order to collect information, be part of a communications system, or provide access to the internet.

Sociotechnical ecosystem: An approach to organizational or community structure that recognizes the interaction between people and technology. The term also refers to systems of human relations, technical objects, and communications processes that inhere to large, complex infrastructures.

Speed test: Also known as an internet speed test or a broadband speed test. A measure of the rate at which data is downloaded and uploaded at a specific location.

Symmetrical: When the download speed and the upload speed are equal.

Take rate: The percentage of potential subscribers who are offered the internet service and actually subscribe. This term is typically used by ISPs as a metric of business success.

Telehealth: The provision of health care remotely by means of digital information and communication technologies. This includes four broad areas: provider-to-provider, provider-to-patient, medical devices, and support devices.

Upload speed: The rate at which digital data is transferred from a local device to the internet.

Utility: A service that is used by the public, such as electricity, gas, water, or sewer service.

Wi-Fi: A wireless networking technology that provides wireless high-speed internet access to computers, smartphones, and other devices. Wi-Fi also allows devices to communicate with one another wirelessly on the same network.

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Walla Walla County Rural Library District

Julian Alexander, Hacienda CDC

Brian Berry, Walla Walla Senior Center

Justin Bradford, Prescott School District

Valarie Clark, Goodwill Industries of the Columbia

Kathryn DeWit, Pew Charitable Trust

Jennie Dickinson, Port of Columbia

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Appendix A

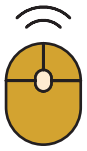
Tips for staying safe online

Online resources, such as **staysafeonline.org** and the Cybersecurity and Infrastructure Security Agency (CISA), provide useful tips for consumers with a variety of skill levels. In addition, cybersecurity speakers encouraged treating emails associated with accounts as seriously as the account itself. For example, if an email is linked to a bank account, keeping the email account secure is as important as keeping the bank account secure to avoid unauthorized access.

Passwords are also a major consideration in cybersecurity. Passwords should be complex and unique to each account. Free and paid password vault services help make accounts more accessible to users while allowing them to create complex passwords that protect their accounts. Whenever possible, cybersecurity speakers also encouraged using multifactor authentication, which is any combination of at least two of the following: something you have, something you know, and something you are.

Visit online resources for more information, such as **staysafeonline.org** and **cisa.gov**.

Here are some tips to keep in mind:



- ☑ Treat emails associated with accounts as seriously as the account itself.
- ☑ Make passwords complex and unique to each account.
- ☑ Utilize free or paid password vaults to make accounts accessible and safe.
- ☑ Enable multifactor authentication to add a secondary level of account security.
- ☑ Frequently update device hardware and software.
- ☑ Mistrust unexpected links and downloads sent by strangers.
- ☑ Back up all digital information. Use the 3-2-1 rule as a guide to backing up data. The rule is to keep at least three copies of data and store two backup copies on different storage media, with one of them located off-site.

Notes

Notes

Community partners

- Punkey Adams
- Jon & Mary Campbell
- Sharon & Larry Clinton
- Anne Haley & Jim Shepherd
- Cheri & Mark Heafy
- Val & Mary Ellen Jensen
- Susan & Robert Mastracco
- Jeff Reynolds
- Ann Schmitt
- Pat Soden, in memory of Jim Soden

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COFFEY COMMUNICATIONS

Community Council

Vision

A community where all people come together to create the future they want.

Mission

Community Council's mission is to foster a trusted gathering place where people engage in dialogue, inquiry, and advocacy to build a vibrant region for everyone.

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