

Broadband Delivery Methods

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Sources: FCC.gov, Science Times, Cnet.com, and Tech & Learning

The type of Internet connection plays the key role in availability, speed and performance. Below is a brief description and pros and cons of each connection type.

Digital Subscriber Line (DSL)

What is it and how does it work?

The connection to the internet runs through phone lines. Unlike dial-up however, where it would disrupt your connection with a call, you can use your internet without having to worry about an incoming call disrupting your connection. Asymmetrical (A)DSL is primarily for residential users & Symmetrical (S)DSL is typically used by businesses.

Pros: Accessible to those in rural communities. Reliable and relatively affordable.

Cons: Slow speed

Sample providers: AT&T, CenturyLink, Verizon, Frontier Communications, Windstream

Cable Internet

What is it and how does it work?

Cable Internet uses the same coaxial connections as cable TV. It is one of the most common types of Internet connections, and is often bundled with home phone service and TV packages. Most providers offer a variety of speed options.

Pros: Fast and readily available. It does not have the full speed potential and reliability of fiber optic service, but it's much more widely available. For the most part, it is one of the more affordable internet connection types.

Cons: Speed reliability can be a concern because coaxial cables are susceptible to network congestion and slowed speeds, especially during peak usage times.

Sample providers: Comcast Xfinity, Charter Spectrum, Cox Communications, Mediacom, Optimum, WOW internet.

Fiber-optic

What is it and how does it work?

The internet connection comes into the home via fiber-optic cable which uses pulses of light along thin strands of glass or plastic to transmit data. Fiber optics support speeds and reliability that are superior to other connection types. Upload speeds, which are especially important when working and learning from home, are also significantly faster with fiber-optic service.

Pros: Fast and reliable. It has been becoming more affordable over time.

Cons: Availability is limited. Laying enough fiber-optic cables to connect entire cities and regions is a huge logistical challenge. Service providers' expansion into underserved areas has been slow, and as a result, according the FCC, it is only available to around 45% of US households and primarily those in urban areas.

Sample providers: AT&T, CenturyLink, Frontier FiberOptic, Google Fiber, Verizon Filos, Ziplly Fiber

Fixed Wireless

What is it and how does it work?

Fixed wireless requires installation of a fixed receiving or antenna that picks up a signal transmitted from a nearby wireless hub. Because it requires direct line of site, to receive the strongest signal, the antenna should be placed in an area with a clear view of the sky. Although traditionally a rural internet option, fixed wireless is expanding into metro areas in which providers send signals to entire buildings such as apartment complexes.

Pros: A good option for communities that lack the resources needed for DSL. The equipment to be installed is smaller than a satellite dish, and prices are much better than satellite plans.

Cons: The connection can be distorted if there are hills, trees, buildings or other obstructions nearby. Additional towers are required.

Sample providers: AT&T, Google Fiber Webpass, Rise Broadband, Etheric Networks, Starry Internet, Unwired Broadband.

Mobile/ Cellular Internet

What is it and how does it work?

Mobile internet is mostly designed for mobile phones, but as the technology improves and speeds increase, especially with the emergence of 5G, mobile connections are becoming more practical for home internet use. A cell phone provider sends signals in all directions, (most of which are picked up by cell phones) but in the case of home internet a router receives those signals and turns them into a home connection.

Pros: Speed. As technology improves speed will increase, especially with the emergence of 5G.

Cons: Most available to those living in a city or another area with strong cellular infrastructure. For price it is likely to find only one plan options which is a flat rate for whatever speeds are available at your address.

Sample providers: AT&T, T-Mobile, Verizon

Satellite

What is it and how does it work?

Satellite internet uses a dish to connect with geostationary (remaining stationary in relation to a fixed point on the surface of the earth) satellites orbiting far overhead. If you have a clear view of the southern sky, there is a good chance that there's a satellite provider capable of delivering an internet connection to your home. A provider will have to install a satellite dish on the roof of your home or in the ground facing southward. It's best suited for those living in rural areas without access to other options, especially since bad weather and other obstructions could affect your service in ways that are beyond your control.

Pros: Because it does not rely on ground-laid infrastructure line cables, cellular towers or line-of-site antenna connections, satellite internet is the most widely available type.

Cons: Currently, satellite internet is the most expensive internet connection type. Prices range by speed and data allowances. Increased competition in the industry will likely bring prices down for the consumer. More companies are working toward getting into the market, for instance, Amazon's Project Kuiper.

Sample providers: HughesNet, Viasat, Starlink (Elon Musk).

Broadband Over Power Lines (BPL)

What is it and how does it work?

BPL is the delivery of broadband over the existing low- and medium-voltage electric power distribution network, providing internet to homes using existing electrical connections and outlets. Speeds are comparable to DSL and cable modem speeds.

Pros: Because electrical lines are installed virtually everywhere, alleviating the need to build new broadband facilities.

Cons: It is an emerging technology that is available in very limited areas.

Drones

What is it and how does it work?

A drone tethered 100-200 feet about the ground expands existing cell phone service tower internet connections. Here in Wisconsin, the Northland Pines School District used state funds to conduct a 6-month pilot of using this technology, tethering a drone 200 feet off the ground.

Pros: Provides flexibility not available with permanent structures, allowing a targeted response to the internet needs of a community.

Cons: Very new technology so not widely available.

* This is not a complete list of providers.