

FREEDOM INTERNET – GUIDE TO INTERNET SPEEDS

Internet service is all about speed. With all the talk about megabits per second (Mbps), gigabits, DSL, Wi-Fi, copper, fiber, radio and broadband, it's easy to feel overwhelmed. That's why we've provided this easy-to-follow guide for everything you need to know about Internet speed. We'll break it all down for you.

What is Internet speed and why is it important?

Think of Internet speed like water pressure, it's all about how much volume is moving in a given amount of time. Computers connected to the Internet transfer information to each other in electronic packets. A packet is simply a unit of data. Think of it as a drop of water. Just as more water pressure will deliver more drops of water in a shorter amount of time, a faster Internet connection will deliver more packets in a shorter amount of time but just like a water hose, the type, size and physical capacity of the Internet connection makes a difference to how much data can pass.

The volume of data transferred through a connection in a given amount of time is your connection's Internet speed.

For example, you could technically wash your hair with water barely trickling out of the showerhead but having enough pressure to quickly rinse the shampoo out makes all the difference. As far as Internet speed goes, you could technically stream a video by watching one or two frames at a time and then waiting for it to buffer for a few minutes, but nobody wants to do that.

How much speed do you need?

Knowing your Internet speed and how it compares to recommendations from Internet-based services, like Netflix and Hulu, can help you get the most out of your connection. For example, you need a minimum download speed of 3 Megabits per second to watch a single video stream in clear, standard definition (SD). The best Internet speed for HD streaming is 5Mbps, and if you go all the way up to 4K streaming, or ultra HD, your bandwidth should start at 25Mbps.

Different households can have drastically different Internet needs. A single person who uses the Internet only to access social media won't need as much Internet speed as a family of five streaming Netflix in every room.

Let's take a look at some Internet speeds and what you can do with them:

Internet Speeds (Up and Down)	Works Best For:
0–5 Mbps	<ul style="list-style-type: none"> • Checking email • Streaming music or SD video on one device • Searching a web browser (ie. Google)
5–40 Mbps	<ul style="list-style-type: none"> • Streaming HD video on one device • Video calling with Skype, Teams or FaceTime • Online gaming for one device
40–100 Mbps	<ul style="list-style-type: none"> • Streaming HD video on a multiple devices • Multiplayer online gaming • Downloading large files
100–500 Mbps	<ul style="list-style-type: none"> • Streaming video in UHD on multiple screens • Downloading multiple large files simultaneously • Gaming online for multiple players & devices
500–1,000+ Mbps	<ul style="list-style-type: none"> • Doing all the above and almost anything!

Upload speed vs. download speed

Download speed is the speed at which information travels from the Internet to your Internet-connected device. For example, if you open the Facebook app on your phone, your download speed would determine how long it takes to load your feed.

Upload speed is the opposite. It is the speed at which information travels from your Internet-connected device to the Internet. So, if you post to your Facebook timeline, your upload speed would determine how long it takes your post to get to the Facebook server for all your friends to see.

Upload speed, download speed, and your Internet activities

With most Internet plans, download speeds are much faster than upload speeds. This makes sense because consumers generally download much more information than they upload. Streaming videos or music, reading a blog post, or scrolling through your Instagram feed are all activities that don't really need upload bandwidth once they're initiated.

Upload speeds become much more important for interactive applications. While some common interactive applications, like online gaming and video chat, are better with decent upload speeds, most consumer Internet services provide enough upload speed to handle these things without many issues.

Upload speeds are also critical in corporate settings. Sharing large files can require a lot of upload speed as well.

If you need to send an image to a client for approval, you'll want good upload speed. That's especially important if you have multiple people doing this same thing at the same time since everyone on the same network shares Internet bandwidth. Also, if you make HD videos or any other type of large file and need to upload them to a server or cloud, your upload speed will come into play.

Of bits and bytes

Internet speed is a measure of the rate at which information is transferred from one place on the Internet to another. That measurement can be expressed in several ways, but the first step to understanding it is to understand the units of electronic information.

Bits per second

When computers send information over the Internet, that information is in bits or bytes. The bits or bytes take time to reach their destination. That time is measured in seconds. So, Internet speeds are measured by identifying how many bits are transferred in one second, hence bits per second. (bps)

Because the bits are so small, the number transferred in a single second is almost always well over 1,000 (kilo). The common practice is to express those large numbers using the metric-based prefixes:

- kilo for 1,000
- mega for 1 million
- giga for 1 billion

Putting this all together, Internet speeds can be measured in several different ways as well.

- kilobits per second (Kbps) – If your Internet is measured in Kbps it might be quite slow.
- megabits per second (Mbps) – Mbps is the general standard used to Measure Internet Speeds.
- gigabits per second (Gbps) – If you have an Internet speed measure in Gbps, WOW you're fast! But you may be paying for more than you need.

Bandwidth

While "bandwidth" and "Internet speed" are often used interchangeably, they actually refer to two different aspects of Internet service. Internet speed is the measure of how fast information is transferred, while bandwidth refers to the capacity of an individual Internet connection. So, if your Internet connection has a bandwidth of 5 Mbps, your speed would only be that fast if it's operating at full capacity.

Several factors can slow your Internet speed from reaching its full bandwidth, but a connection's bandwidth will always cap how fast it can transmit information over the Internet. This is why Internet service providers list their Internet services with speeds "up to" a given speed. They aren't really advertising the speeds of their services; they're advertising the bandwidth of their

connections by informing you of the highest speed those connections are capable of transmitting. They do this because there are a multitude of factors that can impact your experience that they just can't control, things like the age of your device, distance from an access point, browser setting just to name a few.

Latency

Latency is the time required for a signal to travel from one computer to another computer on the network and back. In terms of Internet service, latency usually means the time required for a signal to travel to the Internet service provider's (ISP's) server and back.

Latency is often referred to using different terms, including delay, ping, ping rate and lag. People use these interchangeably, but they actually mean different things:

- **Latency** is the time it takes for a signal to make a round-trip journey from your computer to the ISP and back.
- **Ping rate** is the measure of latency, usually in milliseconds.
- A **ping** is the signal sent to test latency.
- **Lag** is a result of latency.

Whatever you choose to call it, the lower the number the better. High ping, or high latency, results in longer wait times when information uploads to or downloads from the Internet.

Satellite Internet has high latency because the signal must travel to a satellite orbiting the earth and back in order to reach the ISP's server. This distance is much farther and takes more time than land-based Internet connections. Traveling from the satellite to Earth takes more time, leading to higher latency. Radio and fibre services have often been tagged as having the lowest latency but this all just depends on what two implementations you are measuring.

Broadband

The term "broadband" has largely been replaced by "high-speed Internet" but this carries the same false equivalency as referring to "bandwidth" as "Internet speed."

As Internet connection technology improved, particularly in the 1990s, it allowed the transmission of information over a much larger variety of frequencies. Thus, the term "broadband" was used to describe this wide (broad) range of frequencies (bands).

So, what are the different types of Internet?

Types of Internet and how they affect your speed:

Internet connections come in five basic types:

Dial-up – There's not much of this around anymore and as for speed it just doesn't have it.

Satellite – Used only in limited application and mostly in very remote areas. Faster than dial up but not made to support consumer HD video requirements. You may need to get used to buffering.

DSL (as in ADSL or VDSL) – This is broadband and some of these services can deliver pretty good speeds. Check how close the service is delivered to your home as this distance impact the performance significantly.

Cable - Cable Internet is delivered using the same cabling your TV may have used in the past. It is a broadband service and can deliver some real speeds.

Fiber – By now we've all heard about fibre Internet. Fibre has become a common "cabling" system in new offices, and some apartments but a lot of Fiber services still use a copper connection. Fibre is fast and generally has low latency or delay but every fibre service is different and the speeds and pricing you can get depend on how it's implemented. Talk to your neighbour about how theirs work because more often than not different Internet Service Providers actually use the SAME fibre network and so may not be any better than yours.

Radio – Radio has been around since the beginning. Radio frequencies have carried voice and data for ages. It can travel long distances and has extremely low latency, or delay. Service providers, like Freedom Internet, often use Radio to carry Internet Services where fibre and other access types can't get to. The speeds Radio networks can deliver are measured in Gigabits per second (Gbps) so there are extremely fast.

Wi-Fi and home networking

To this point, this article has focused on the connection between the Internet and your home or business. This section focuses on your home network.

Wi-Fi is a term for a specific configuration of router hardware and controls that allows for wireless transmission of information.

When this technology was developed, industry leaders wanted to give it a name that would help it gain popularity. They chose the term "Wi-Fi" basically because it was catchy. Now, some people use "Wi-Fi" and "Internet" interchangeably, however, THEY ARE NOT THE SAME.

Your home Wi-Fi network will also impact your Internet speed. The more devices on your network using the Internet at the same time, the more bandwidth you will need.

Many Internet service providers offer Wi-Fi networking as an option. If you want to get the most out of your Internet service, we highly recommend this option. You can have your ISP's installation technician set up your home Wi-Fi network for you

Routers and modems

Your modem is the gateway between your home network and the greater Internet. Your router is the switchboard for all the different connections among the devices on your network.

The equipment you get from your ISP is usually sufficient for basic Internet usage and supplied or supported by the Internet Service Providers to work best with their service.

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