

A Bandwidth Primer

Determining how much Internet speed you need is a straightforward calculation that involves several factors. How many users will you have, what on-line activities will they engage in, how much bandwidth is necessary for those activities, and how many of those users will be using the Internet simultaneously? The hardest part may be figuring out how much bandwidth each activity actually uses. You will also have to consider the other devices in your home that connect to the Internet and how they use those connections, such as TV receivers, smart appliances and more.

Before looking at usage information, let's make sure we're clear on some terminology:

- **Streaming:** a download that isn't saved or stored anywhere on your devices – you view/listen as it continually streams from another storage location. Streaming only uses enough bandwidth to watch a video in real time – you don't have to download the whole video all at once.
- **Downloading:** the transfer of the data from one place to another. When you download a movie or a song, get email, or search and save from the web, you have a copy of the item on your device. Downloads use more bandwidth over a shorter period of time than streaming, because if your Internet speed allows it, you can download faster than you can watch.
- **Uploading:** similar to downloading; whatever you send is copied to another device or location.

How You Use Your Internet Speed

The biggest way most homeowners use bandwidth is streaming or downloading content like movies and music, but there are other key uses as well.

- A 2-hour movie is about 2 gigabytes(GB) of data. With a 4 megabytes(MB) service it would take about 75 minutes to download. By increasing your Internet speed, you simply reduce the amount of time it takes to download the content. That same movie would take half the time to download with an 8 MB connection.
- Streaming is different. To stream a movie, you need from .7 MB to 5.3 MB. High quality audio/video requires more bandwidth/speed to stream properly. Based on Netflix calculations, for the best quality streaming Hi-Definition (HD) video, you'd need more than 4 MB down. However, non-HD best quality streaming could be achieved with a 4 MB connection.
- Streaming music is far less taxing on an Internet connection as it requires about 2 MB for the highest quality audio.
- Regarding e-mail, estimates are that an average email without attachments is about 75 kilobits(KB), which is 0.075 MB, in size. An e-mail with a file attached increases by the size of the file.
- Bandwidth usage estimates for on-line gaming are around 150 MB / hour. The real culprit is the usage for updates to the games-they can exceed 100 MB for each update.
- Facebook users average about 0.03 MB when browsing the site. This increases a lot when streaming videos on the site.

Based upon this data, a 4-person household's bandwidth utilization might look something like this:

Mom	Streaming Video on Smart TV	4.00 Mbps
	Social Media	0.03 Mbps
Dad	Streaming Hi-Def Movie on Smart TV	5.30 Mbps
	Sending Email	0.08 Mbps
Teen Child	Streaming Music	2.00 Mbps
	Playing online game	0.02 Mbps
	Audio call with other players	0.30 Mbps
Middle School Age Child	Social Media	0.03 Mbps
	Skype with Friends	0.30 Mbps
	Total	12.06Mbps