



# What factors affect connection speeds?

Getting fast, reliable Wi-Fi in our home networks is essential. We connect more devices than ever to Wi-Fi, including smart phones, tablets, laptops and a growing list of smart devices. And we use them 24/7 for everything from video streaming and social media sharing to home automation and monitoring.

But sometimes it seems like we're not getting the speeds we should be, such as when it seems to take forever to upload our holiday photos to a photo sharing site, or when Netflix freezes just when we're getting to the best part of the movie. And while it's possible that there's something wrong with your Wi-Fi setup or your Internet connection, there are other factors you should consider first before calling your service provider's Help Desk.

## How much speed do I need?

The first thing to understand about Internet speeds is that certain minimum speeds are needed to enjoy different types of online activities. Video streaming is the best example of this. The better the video quality, the faster your Internet speed needs to be to enjoy it.

Streaming companies typically publish minimum speeds for the different levels of video quality: standard definition (SD), high definition (HD) and ultra high-definition/4K. Netflix provides its customers with these recommendations<sup>1</sup>:

Video Quality	Resolution	Netflix Recommends
SD	480p	3 Mbps
HD	720p – 1080p	5 Mbps
Ultra/4K	above 4,000p	25 Mbps

Other streaming companies, such as Hulu, make similar recommendations<sup>2</sup>. Keep in mind that these are minimum values, which means that even a slightly faster Internet package than the one recommended by your streaming service would likely give you better video performance.

<sup>1</sup> Netflix, "Internet Connection Speed Recommendations"

<sup>2</sup> Hulu, "Internet Speed Recommendations"



So, before you call your service provider Help Desk to complain that there's a problem with your Internet service, you need to do two things. First, make sure you've purchased an Internet package that's fast enough to meet your needs for streaming services and when using multiple connected devices at the same time. And second, check to make sure that the device you're using to connect to the Internet is capable of supporting the speeds being provided by your ISP.

### Is your device slowing things down?

The device you're using to connect to the Internet could be limiting your speed. Apple and Android-based smart phones and tablets have maximum Wi-Fi speeds that they are capable of supporting. If you connect using a smart phone that's more than three years old, you may not get an accurate picture of the download and upload speeds you're getting in your home.

There are way too many devices to provide a comprehensive list here, but the first thing you should do is determine which Wi-Fi standard your device supports. If it's three or more years old, it likely supports the 802.11b, 802.11a/g, or 802.11n standard. If it's a new device, it likely supports the 802.11ac or 802.11ax (also known as 'Wi-Fi 6') standard. The next section provides details on the maximum speed supported by each of these Wi-Fi standards.

### Is your router slowing things down?

Another factor that could be slowing down your speed is your router, especially if your router is three or more years old. The Wi-Fi industry is constantly updating its technology to provide users with better performance, so new routers simply work better. They're faster and provide more reliable connections. Here's a list of the maximum speed supported by each current Wi-Fi standard, assuming ideal network conditions<sup>3</sup>:

- **802.11b – 11 Mbps**
- **802.11a/g – 54 Mbps**
- **802.11n – 150 Mbps**
- **802.11ac – 866.7 Mbps**
- **802.11ax (Wi-Fi 6) – 2+ Gbps**

Note that these speeds represent the maximum speed you can get in theory based on the different Wi-Fi standards. These speeds are not typically achievable in real-world conditions as Wi-Fi signals are affected by obstacles in your home (e.g., large mirrors and concrete walls) as well as other devices in your home that might be transmitting wireless signals (e.g., baby monitors, cordless phones, etc.).

Bottom line: if you're using an old router, it may not be capable of providing the maximum speed supported by your Internet package. If this is the case, contact your service provider Help Desk and ask them to provide you with the latest Wi-Fi router.

<sup>3</sup> Data taken from Juniper Networks, Understanding the IEEE 802.11 Standard for Wireless Networks