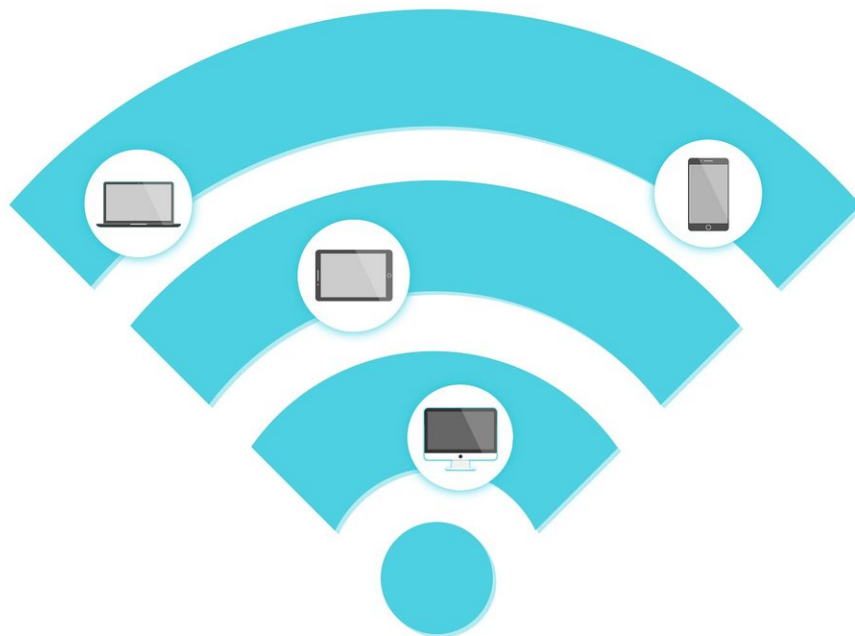


How to boost your WiFi performance when everyone's at home

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Credit: CC0 Public Domain

Mom is Zooming for a work meeting. Dad's on Netflix. And Junior is gunning down bad guys on one screen while streaming his biology class on another. As the COVID era drags on, can there possibly be enough

bandwidth for all?

In the interest of household harmony, we present the Inquirer's official low-stress, plain-English guide to getting the most out of your Internet connection.

Yes, you can upgrade your service plan or your equipment, but that can be pricey.

First try these low- or no-cost tips, which we assembled with the help of wireless communications expert Kapil Dandekar, a professor of electrical and computer engineering at Drexel University.

He explained how to tell if you're really getting the speeds that Verizon or Comcast promises, why that wavy little WiFi icon may not mean what it seems, and above all, where to place that nifty little box with the blinking lights: the router. (Short version: beware of metal filing cabinets.)

Let us pause to acknowledge that this is a problem of privilege. Plenty of people cannot work from home. And many do not have high-end broadband connections. All the more reason to make the most of what you've got.

Internet speed is typically measured in Mbps—megabits per second. It includes two numbers: download speed (the rate at which data can enter your house) and upload speed (how fast you can transmit). Some service plans are asymmetrical, with higher speeds for download than upload, which is fine for most applications.

But in the videoconferencing era, with users receiving and transmitting video at the same time, a good upload speed becomes more important, Dandekar said.

How much capacity you need depends on how many [household members](#) are online at any one time, and what they are doing. With four devices running "high-demand" programs at once, a download speed of at least 25 Mbps is recommended by the Federal Communications Commission. (Also look for low numbers in something called latency: a measure of lag time in handling the signal. Too high, and videos may look glitchy. For regular streaming, less than 100 milliseconds should be fine.)

To check your current speed, use an app or web site that measures it in real time, such as www.speedtest.net. This can be done from a desktop that is directly wired to the Internet, in which case you are measuring the speed straight out of the cable. Or it can be done further "downstream" on a phone or tablet, meaning that you are measuring the rate of data transfer through the cable and the WiFi signal.

If the [speed](#) is well below what the [service provider](#) advertises, the issue could be anywhere along the chain: provider, cables, router, or even the device itself. Let's start with the router.

A router converts your incoming data stream into radio waves and beams them throughout the home, like a sprinkler distributing water from a hose, Dandekar said. And like a sprinkler, the router should be in a good spot.

"If you place it in the wrong part of your house," he said, "you will be overwatering parts of your lawn and other parts will go dry."

The greater the distance and the more walls in between the router and end user, the weaker the signal.

Try to place the device in the middle of all possible spaces where you want people to have access. In a two-story dwelling, that could be on top of a high bookcase on the first floor, or maybe near the floor of the

second story. In a three-story dwelling, experiment with different locations on the second floor.

If the device has adjustable antennas, try aiming them in different directions to improve performance.

And never put your router on or next to a large metal object such as a filing cabinet. Metal is death to a WiFi signal.

So how come you have poor Internet performance on a phone or other wireless device, despite what looks like a healthy WiFi signal?

Don't be fooled. The WiFi icon—those little concentric arcs in the shape of a slice of pizza—reflects only how well the signal is traveling from the router to your device. It has little to do with the signal going into the device from Verizon or another provider.

It may seem almost too obvious to consider, but check that the cable is in good shape and is securely plugged into the back of the router. And make sure it is not pinched underneath a piece of furniture. One Philly-area Twitter user noticed last year that household internet performance suffered every time a roommate's boyfriend slept over. It turned out the cable ran beneath one of the legs on his side of the bed. Problem solved.

And don't forget software updates. Install the latest to get the most out of your phone, laptop. Routers need updates, too, though if it's the kind you rent from your internet service providers, updates may happen automatically.

Says Drexel's Dandekar:

"The chain is only as strong as its weakest link."

When all else fails, it may be time to spend some money. That could include buying a new router, though anything less than five years old should be OK, Dandekar said.

Another option is to buy a device called an extender or repeater, which receives the WiFi signal from the router and generates a copy of it. The cheapest versions cost less than \$50, but check product reviews. You may get what you pay for. Extenders should be plugged into a electrical socket midway between the [router](#) and the farthest point at which the user wants to extend the signal.

One wrinkle: the signal emanating from the extender will have a different network name. You need to enter that name into your phone (on an iPhone, look under "Settings") along with the name of the original network, assuming you want to switch back and forth.

A fancier option is something called a mesh network, which consists of a multiple access points working together collaboratively, all under one network name, Dandekar said.

Above all, take a deep breath and remember that pandemic life is hard on many. Internet access is a linchpin of modern existence. But it does not have to be a source of strife.

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