Sluggish downloads, lagging video calls: Tips for the remote worker to tame technology

Allison Kirsop, Peter Kirsop

Scientific Writers Ltd., The Beacon, Hunterfield Road, Gorebridge, Edinburgh, UK

Correspondence to:

Allison Kirsop
a.kirsop@scientific-writers.com

Abstract

What are the various broadband options to consider when working from home and how can you ensure you're getting the best from yours? Broadband failures can mean a headache for your clients and you risk looking unprofessional, so having a backup system is vital to continue providing the high-quality service your clients deserve. This article covers what you need to know about IT to either run a successful business from home or work remotely for someone else. If you've ever wondered why your system seems to run faster on some days than others, some simple checks and changes to your broadband service will allow you to cope with anything the IT gremlins throw at you.

Optimising your home internet service is one of the most important considerations for freelance medical writers or employees who now work from home. If you want to build lasting collaborative relationships with your clients or employers, you need to be reliable. Life events happen to everyone but telling clients or colleagues you can't meet your agreed-upon deadline because you have IT problems may not be met with much sympathy. However, learning how to optimise your internet service isn't easy when it's not your area of strength (or interest, let's be honest!). We just want it to work! This short article will hopefully provide you with some guidance on what you can do before calling in the expensive telecoms engineer.

What service do you choose?

The first consideration is the service that you have coming into the property as this will be the limiting factor in the performance of your internet service. The incoming signal is fed to a hub, sometimes referred to as a router, which then connects to your computer and other devices. The minimum speed you need for general office work and video calls is around 10 megabytes per second, but at this minimum level you may struggle if anyone else in your property is using the connection at the same time – important if you have gamers in your family or others streaming video at the same time as you are trying to have a video call.

Connecting the signal to your computer: Ethernet cable or Wi-Fi?

Connecting by Ethernet cable

Cable is the better option and the most reliable and secure way to connect your computer to the hub. You have a direct connection between your computer and the internet giving you the highest speeds and cannot be intercepted by another user. The cable, referred to as Ethernet (traditional technology for connecting devices), plugs into the hub at one end and

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There are three different ways of bringing the internet into your property.

1 The most common method is via your telephone line (Figure 1A). Optical fibre is run to a cabinet – fibre to the cabinet (FTTC) – which will then serve several properties. There will be a small dongle (a micro filter or splitter) plugged into your telephone socket into which the hub and telephone are plugged. The telephone line is by far the most common way to access the internet with speeds of up to 40 or 50 megabytes per second. To get the best speed, it's important to use the master phone socket for the hub, the socket nearest to where the phone line enters the premises. Avoid the use of extension sockets or cables as this will slow the connection due to signal loss in the extension cable. This method is reasonably reliable, but the speed can vary depending on the time of day due to loading from other users in your area.

2 The second method, and by far the best and most reliable, is via fibre cable access to the property, or residential fibre to the premises (FTTP) – where a fibre optic cable is brought into the property (Figure 1B). Rather than delivered via the telephone line, the internet signal is brought in by optical fibre with speeds of at least 100 megabytes per second. FTTP is not available globally yet, but coverage is steadily increasing as more areas acquire the infrastructure. It is worth checking to see if FTTP is coming to your area soon. If so, be careful not to tie yourself into a long-term contract with an internet provider who only offers FTTC as you will not be able to upgrade until that contract ends. FTTP costs more than FTTC, certainly at the time of preparing this article, but it's a worthy investment to ensure reliability and speed of service. A speed of
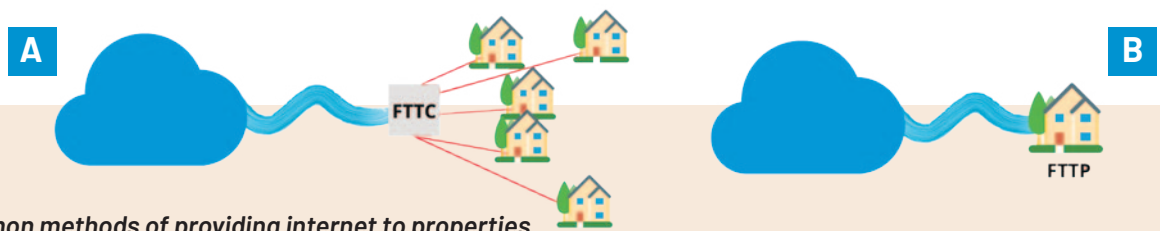
Figure 1. Common methods of providing internet to properties
(A) Fibre to the cabinet (FTTC) and via telephone lines to several properties. (B) Fibre to the premises (FTTP) direct from the cloud.

1000 megabytes per second (1000 megabytes = 1 gigabyte) is also possible with this method, although anything >100 megabytes per second is only worth the extra cost if you have multiple users on your network.

3 The third method is via the "mobile Wi-Fi" (MiFi) device and is best considered as a back-up if your internet service goes down, as well as being useful for travelling. The device connects to the mobile phone network to access the internet. If you have a strong mobile phone signal on your provider's network, then this method can work well. However, speeds are usually limited and can vary depending on the time of day due to the number of users on the network. Also, the amount of data you can download may be capped. Of course, a mobile phone can be used as a hotspot and although this works reasonably well, the speeds are not as good as those achieved with a dedicated Mi-Fi device. Using your phone as a hotspot will also drain your phone battery quickly.

your computer at the other. If your laptop does not have an Ethernet port, it may be possible to buy an adapter.

There are usually at least two sockets on the hub for this and will be marked LAN (local area network). The socket type is RJ45 on both your hub and computer and will look like the image shown in Figure 2.

Ethernet cables are cheap and widely available for purchase. The cables can be up to 100 m long without incurring loss of speed. As well as conventional round cable, flat profile cable is also available for running under carpets or doors; this is preferable for the home office.

The downside of Ethernet is that you must route the cable through your property. This is time consuming and, if you are unlucky, may require drilling holes through walls. If you are moving from one house to another, it's a good idea to get this done before you move in, and certainly before any carpets or floors are laid.

An alternative is available if it is not practical to run an Ethernet cable throughout your home. You can buy power line adapters (Figure 3), which use the electricity cables between sockets to carry the signals. You connect an Ethernet cable between your hub and one adapter, and your computer to another adapter, both plugged into convenient sockets. You can use as many of these as you need so if you have more than one computer, or printer or scanner, you can use an extra adapter for each one.

Once you connect your computer with Ethernet it should work straight away with no config-uration required. If you need to connect more than one computer, printer, or scanner to a single Ethernet cable from the hub, this is easily done using a switch (Figure 4). The switch enables multiple devices to be connected, but it's recom-mended to buy a 1GB switch or better to maintain best speeds. There are some older models around that may be slower than your internet connection.

Connecting by Wi-Fi

If running an Ethernet cable is not possible in your home then you will need to use Wi-Fi, which is, of course, required for tablets, phones and devices that do not have Ethernet ports. Although not as fast or reliable as Ethernet, with care, good performance is possible.

The hub will have a Wi-Fi network, which will be on 2.4 GHz, and if the hub is relatively new a second network on 5 GHz. If your device offers a choice when connecting, choose 5 GHz as this is a faster network, although the signal will not travel through walls as well as 2.4 GHz. The 2.4 GHz frequency has a greater range but is slower. In either case, if your Wi-Fi signal on the device shows less than full strength, then performance will suffer. The thickness of your property's walls will significantly affect the Wi-Fi signal.

You can buy Wi-Fi boosters (Figure 5) to help improve signal strength; however, how they receive and transmit data also reduces your speed so it's a trade-off. These plug-in devices are easy to set up, and ideally should be placed roughly halfway between your hub and where you need reliable Wi-Fi coverage.

Checking your internet speed and performance

Once you have everything connected and working properly, you should check your internet speed and performance using a speed test tool. A good example is the browser-based Speedtest by Okla, available at https://www.speedtest.net/ (Figure 6). There is no need to log in or create an account and when you access the page you should see a GO button as shown in Figure 6A.

At the bottom of the page, you will see your network provider, your IP address and which server is to be used for the test. No changes need to be made here and you simply click GO and

> As a rule of thumb, if you are getting around 70% of the promised speed you are doing well.

wait for the test to finish, which takes around 30 seconds.

The download speed will have a maximum value of the speed claimed by your internet service provider although this is rarely achieved, particularly if you are using Wi-Fi. As a rule of thumb, if you are getting around 70% of the promised speed you are doing well.

The upload speed will always be lower and may be as little as 10% of the download speed on a domestic service. In Figure 6B, the numbers represent a more than adequate speed for the home office with a minimum 10 Mbps for download and 2 Mbps for upload speeds. Gamers look for the lowest "ping" value possible – the example shown is perfect for the gamers in your home.

If your reported speed is much lower than expected when you are using Ethernet direct to the hub, you should first restart the hub. If that doesn't help, you need to contact your internet service provider as the issue will be with your service.

If your reported speed is low when using Wi-Fi, try again using a device very close to the hub. If this improves the speed, the issue is caused by either Wi-Fi signal strength or interference. Signal strength is easy to check – if you don't get full Wi-Fi bars on your device, either add a Wi-Fi booster or move the hub closer to where you work.

Selecting the optimum channel

Interference to the signal is trickier to check as it is caused by interference from networks in neighbouring premises. This can be particularly troublesome if you live in an apartment with many neighbours.

The Wi-Fi system has several channels and on checking you might find your signal strength

Figure 2. RJ45 Ethernet sockets

Figure 3. Power line adapters

Figure 4. Five port gigabit Ethernet network switch
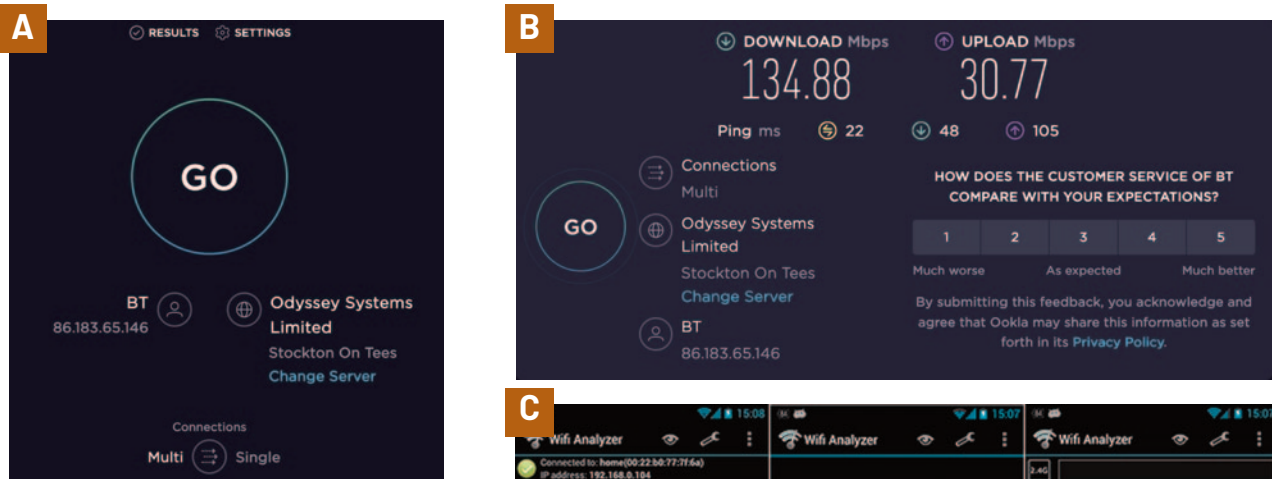

Figure 5. Wi-Fi booster

Figure 6. SPEEDTEST home page
(A) SPEEDTEST home page.
(B) Example results.
(C) Windows Wi-Fi analyser report
(https://www.netspotapp.com/wifi-analyzer)

looks good. However, if you and your neighbour are using the same channel this will cause conflict resulting in slow speeds. You can check for this problem using a Wi-Fi analyser app. These are available for Android and Windows devices, and many are free.

As a recommendation, the Windows Wi-Fi Analyser is a free and easy to use tool and works on Android as well as Windows. Once installed, run a scan and you should see a report like that shown in Figure 6C. Other options are available for MacBook users and can be found from the link provided.

The centre pane shows the signal strength and is self-explanatory – more is better. The left pane shows networks with a signal in your room and the right pane shows the channel that each network is on.

Your network should be the strongest signal that you see, and the trick is to be on a clear channel with as little overlap as possible. Remember that there are often two Wi-Fi networks, 2.4 GHz and 5 GHz. Switch between the two at the top of the right pane.

To change your channel, you will need to access your hub settings. This is done by opening a web browser and entering the hub IP address, which you should find on a sticker on the hub or in the user manual. When entering the address, note that it is a series of digits such as 192.168.0.1; do not prefix with www or https. You will also need the username and password supplied with your hub. Also, while you are in the settings, change the password to prevent hacking.

Summary

Getting the best from your internet connection can take some time and effort, but once it's optimised you will be rewarded with clear and smooth video calls, as well as speedy web browsing and downloading. Importantly, you will be confident that you can provide a professional service for your clients with no freezing images or broken audio during your calls. Remember, moving to a clear channel can make a huge difference to Wi-Fi performance and it's well worth spending some time to optimise the signal.

Disclaimer

Content is based on observations in the UK through experience only and not specialist expertise. Although similar practices are assumed in Europe, there may be some differences regarding cost and infrastructure.

Disclosures and conflicts of interest

The authors declare no conflicts of interest.

Author information

Allison Kirsop, PhD, is a medical writer and founder of Scientific Writers Ltd., UK – a boutique MedComms agency specialising in medical education and writing support for the life sciences industry.
https://scholar.google.com/citations?user=mwnrRbQAAAAJ&hl=en

Peter Kirsop, PhD, is a senior lecturer at School of Chemistry, The University of Edinburgh, UK with research interests in radical chemistry and developing new strategies for effective learning.
https://scholar.google.co.uk/citations?user=1NoqoX4AAAAJ&hl=en