

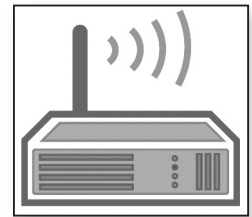
Understanding Internet Speed

How to Avoid False Expectations and Prevent Unnecessary Broadband Bottlenecks

This article shows you how to:

- Understand why advertised Internet speeds can cause confusion
- Check the broadband speed you're actually achieving
- Avoid bottlenecks in your broadband connection

What do Internet users and racing drivers have in common? Quite simply, they both want to go as quickly as possible, and they get annoyed if something is slowing them down! If you mention your poor Internet speed to friends, you'll probably hear all sorts of theories as to what's causing the problem, but in many cases they're based on misunderstandings and misconceptions. In this article, I'll explain the most common myths surrounding Internet speeds.



Contents:

Myth 1: Transfer Speed is All that Matters	U 537/2
Myth 2: The Advertised Speed is the Speed You'll Get	U 537/6
Myth 3: Your Network/Wi-Fi Speed is Too Slow	U 537/9
Myth 4: Your Router Has No Effect on Your Speed	U 537/10
Myth 5: Your PC's Speed Doesn't Affect Your Internet Speed	U 537/10

Myth 1: Transfer Speed is All that Matters

When the Internet is busy, everyone travels slowly



What's the point of a five-lane motorway if you find yourself stuck in rush-hour traffic every time you use it? If a lot of people are out and about, traffic jams soon build up and everyone's crawling along at a snail's pace – and it's just the same for Internet traffic. Whatever speed your broadband tariff promises, a variety of things can slow you down.

Transfer speed

So what is 'transfer speed' exactly? Technically speaking, it's the speed at which a particular amount of data passes from one computer to another in a given period of time (usually a second). In the case of the Internet, this is data that arrives at your PC from an Internet server.

What's being transferred?

The 'data' in question is the text on web pages, along with the pictures, sounds and videos they contain. Likewise, the email messages you collect, files you download, and updates you receive for your software and for Windows itself all consist of data. Conversely, you're transferring data whenever you send email messages, share photos or videos from your own PC on a website, or complete and submit a form on a web page.

 Plusnet Fixed Price Unlimited Broadband			
10Mb average* speed	unlimited downloads	18 month contract	£18.99 p/m no setup cost Price details
 TalkTalk Fixed Price Unlimited Superfast Fibre			
67Mb average* speed	unlimited downloads	18 month contract	£26.00 p/m no setup cost Price details

The smallest unit of computer data is called a 'bit', and although nothing much in computing is measured in bits (we use larger measures such as the byte, which is 8 bits, the kilobyte and the megabyte) data transfer speeds are still measured in bits per second, often shortened to 'bps'. Since bits are such tiny measures, and data can always be transferred at speeds of millions of bits per second, Internet Service Providers (ISPs) measure Internet speeds in 'megabits per second' (Mbps).

ISPs have a tendency to make things a little confusing. Although 'Mbps' is a perfectly acceptable abbreviation for 'megabits per second', ISPs often shorten it further to just 'Mb', which might lead you to believe you're being offered a speed of this many megabytes per second. The difference between 'MB' for megabytes and 'Mb' for megabits is an important one: since there are 8 bits in a byte, a transfer speed of 8 Mbps is equivalent to 1 megabyte per second.

The speed advertised by an ISP for a broadband tariff is an average, achieved by 50% of customers on that tariff. You might never actually achieve that speed yourself, and there are several reasons why not:

Your telephone line slows you down

Most of us have broadband connections that use the old-fashioned copper telephone lines designed for phone calls, and they don't cope well with our vast volumes of Internet data. The further you live from your local telephone exchange (or, more precisely, the longer the stretch of cable between your home and the exchange), the slower data will travel along it.

The exception to this is if you've been able to upgrade to the latest fibre-optic technology known as Fibre To The Cabinet (FTTC). This gives you a connection that's super-fast as far as the green telephone cabinet down

Speed is measured in megabits per second (Mbps or just Mb)



A quoted average speed

The length of your telephone line



the street from your home; there's still copper cable between that cabinet and your home, but as it's a much shorter stretch, your speed shouldn't degrade too much.

The length of the telephone line is only part of it, albeit a major part. There are also potential problems with technical aspects like poor signal-to-noise ratio, shared lines between several homes, and the quality of your home's telephone wiring, and they can have a huge impact on your broadband speed.

Your ISP slows you down

*Your ISP's servers
may be busy*

While you're using the Internet, you're connected to your ISP's servers, and the data you receive passes through those servers on its way to you. At particularly busy times, and/or if your ISP has taken on more customers than its servers can really cope with (as some of the cheapest ISPs tend to do), the data may be coming to you at a crawl as your ISP's systems try to cope with the number of users currently online.

The Internet itself slows you down

*Your PC requests
data from an
Internet server*

Everything you request from the Internet – such as a web page – resides on a server somewhere in the world, and it has to make its way to you via a chain of computers. The Internet is designed in a clever way that ensures data should always find a route to you, even if one of the computers in the chain is overworked or is suddenly switched off.

*The website you're
visiting may be
overloaded*

However, there are two computers that inescapably have to be part of this chain. One is your ISP's computer, mentioned above, and the other is the server that contains the data you're requesting. If that server is overrun with requests, it has to divide its attention between all those visitors, sending small amounts of data to each in turn.

You're most likely to notice this effect when you're downloading a large file. If you watch the transfer speed indicated by your web browser, you may see that the file is downloading in fits and starts – data arrives for a few seconds and then everything comes to a halt for a while before the next chunk arrives – and this is usually because the server is trying to provide data to a large number of users at once.



The important point to remember about Internet speeds is that, however fast your connection, you can't possibly receive data any faster than it's being sent to you! Just like on a motorway, it's the slowest that sets the pace: when one big truck is overtaking another, even the Ferrari driver has to dawdle along behind.

If data is sent slowly, it arrives slowly!

The upload speed is slower than the download speed

One common complaint from Internet users is that, while download speeds are fast enough, it takes ages to send an email message containing picture attachments, or to share pictures or videos on a social-networking website.

In fact, this is the normal behaviour of ADSL broadband connections – the typical, non-fibre type of connection. ADSL is designed to provide good download speeds, but much slower 'upload' (sending) speeds. ISPs usually advertise their upload speed in much smaller letters (or perhaps only in the small print that no-one ever reads), so you might easily assume you'd be sending data at the same speed you receive it.

The difference between sending and receiving

The upload speed is generally between a tenth and a twentieth of the download speed, so it may well take you more than ten times as long to send someone an email message containing a photo than it takes for you to receive one they've sent to you.

Upload speed is usually much slower

Myth 2: The Advertised Speed is the Speed You'll Get

What are you really getting?

Until recently, ISPs were allowed to advertise the speeds of their broadband packages using the magic words 'up to'. They'd pick the fastest speed that could theoretically be achieved, fooling you into expecting this immense speed when you actually managed less than a quarter of it. Now they've been forced to quote a more realistic average: you may do better, but you still may do worse.

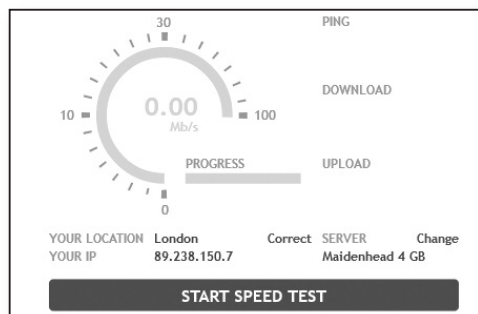
Measure your connection speed

So, how can you check what transfer speed you are actually getting? Well, there's no way to put exact figures on it, but there are Internet-based services that can give you a good approximation. If you carry out a number of speed tests at different times of day, and on different days of the week, and average the results, you can get a good idea of your Internet speed – certainly good enough to tell whether it's markedly less than what you're paying for.

Before running a test, close your email program and any other programs that are sending or receiving Internet data, or that may start to do so unexpectedly. Next, follow these steps to carry out a speed test:



1. Start your web browser and make your way to this address: www.broadbandspeedchecker.co.uk.



- Click the **Start Speed Test** button and then wait a minute or so as the website tests your speed. It does this by downloading some data to your PC first and monitoring the speed at which it's received, and then uploading the same data and calculating your upload speed.
- When the tests are complete you'll see a table showing the download and upload speeds you achieved, both measured in Mb/s (megabits per second). The upload speed might be of interest, but it's the download speed that chiefly concerns you.

Start the test

Check the download speed

Ping	Download	Upload
18 ms	36.87 Mb/s	13.02 Mb/s
M247 Ltd	Expecting a different result? Tell us	
	M247 Ltd	
89.238.150.7	Not your provider?	

Remember not to read too much into a single use of the speed test as results can vary for all sorts of reasons. However, if you've run tests over a number of days (and at different times of the day) and your speeds are consistently much slower than the speed you're paying for, it's well worth getting in touch with your ISP. They can run more comprehensive tests (usually while you're on the phone to them) and, if appropriate, raise the issue with your telephone company or switch you to a more appropriate tariff.



Whatever the speed of your connection, you'll get the best from it by trying to use the Internet when others are not. The evening rush, when everyone gets home from work or school and jumps online, causes speeds to drop considerably; wait until late at night or first thing in the morning and you may well find you're able to download up to 50% faster.

Quickest times to use the Internet

Check the speed you should be achieving

Not an exact science

To be fair to ISPs, they can't help the way the ADSL system works, or the fact that all this data has to trundle down elderly cables designed for telephone calls. It's not easy to tell in advance what impact all this will have on your expected speed.

You should be able to find an expected speed

However, ISPs do now have to provide a means for you to find out roughly what speed you can expect to achieve. If you're thinking of changing provider (or switching tariffs with your existing provider), you should see a link to check your expected speed before committing yourself.

If you'd like to check this now, an easy way of doing so is to visit this address:

www.uswitch.com/broadband/postcode_checker

Check by entering your postcode

Type your postcode into the obvious box at the top of the page and click **Check** and you'll arrive at something like the result pictured below:

The screenshot shows a web interface titled "Broadband postcode checker". Below the title, it says "Compare broadband deals at **BD1 2AA**" with a link "Change postcode". There are two main boxes: "Non-fibre broadband" and "Fibre broadband". Each box contains a checkmark icon and text indicating the speed: "Up to **17Mb** (Estimated 7.5Mb)" for non-fibre and "Up to **67Mb**" for fibre.

- The **Non-fibre broadband** box shows your expected speed for ordinary ADSL broadband (it's the 'Estimated' figure in brackets that matters).
- If the faster FTTC broadband is available where you live, you'll see an expected speed for this type of connection in the **Fibre broadband** box.

Myth 3: Your Network/Wi-Fi Speed is Too Slow

It's only in very rare cases that your Internet access is being slowed down by the speed of your computer's network card or your wireless (Wi-Fi) connection. There are two possible cases in which this could occur:

This is rarely true

- If your PC is connected to the Internet via a slow 10-megabit Ethernet connection, and you also have an ADSL connection that's supposed to achieve at least 16 Mbps.
- If your wireless network uses the outdated 802.11b or 802.11g standards and you have an expected ADSL speed of over 16 Mbps.

In all other cases, your network connection speed will always be considerably quicker than that of your broadband, so it can't be causing a bottleneck.

That said, if your PC is connected to your network via Wi-Fi, you may not be getting as great a speed as you could. There's an awful lot that can interfere with Wi-Fi signals. If you're able to connect a network cable between your PC and your router instead, you may well find you achieve a significant boost in speed. (Of course, whether that boost is a useful one still depends hugely on whether the Internet services you use are trying to deliver data to you at these greater speeds!)

But a cable connection should be faster than Wi-Fi

A related issue that can have a real impact on your broadband speed is switching off (or unplugging) your router or broadband modem when you're not using it. These devices are intended to remain plugged into the mains and connected permanently. Otherwise, the technical wizardry at your telephone exchange assumes the speed is too great for your modem to maintain a reliable connection, and it begins dropping your speed in an attempt to fix the problem.



Myth 4: Your Router Has No Effect on Your Speed

Old ADSL modem and a faster tariff

Is your ADSL modem or router getting a bit old? And do you have a fast broadband connection, such as 16 Mbps or more? If so, it's possible that your old router can't handle the transfer speed of your Internet connection. You need a router that supports the more recent ADSL2 and ADSL2+ standards and their increased speed.

ISPs usually send you a fast modem

In many cases, when you sign up for one of these faster broadband packages, your ISP will send you an ADSL modem or (more likely) combined modem/router that supports the fast transfer rates, and it's important to either use this router or check the manual of your current router to ensure its maximum transfer rate is at least that of your connection.

Myth 5: Your PC's Speed Doesn't Affect Your Internet Speed

A sluggish PC will cause a bottleneck

Wrong! As our Internet connection speeds have increased over the years, the size and complexity of web pages has grown too, and many web pages are teeming with images, flashy animations, videos and sounds, all of which can take their toll on the PC's performance: the computer's graphics card, processor, memory and hard drive all take the strain.

An old PC, particularly one that's short on memory (RAM) or running out of free space on its hard drive, could struggle to meet the demands of displaying modern web pages. As a result, the speed at which the PC requests new data will drop, meaning that the data necessarily also arrives much more slowly.