

Beginners Guide To Downtime



connect365
Future Proof Communications

DOWNTIME, HEARD ABOUT IT?

We talk a lot about the internet 'running slow' or 'going down' but few of us actually know what is happening in those situations.

In order to help you get to grips with the issue of downtime, this guide aims to explain what the most common internet problems are, why they happen, and how to avoid them.

Infrastructure

Before looking at the issue of downtime and the internet problems your business may experience, it is important to understand a little about the infrastructure that makes the internet work.

Bandwidth

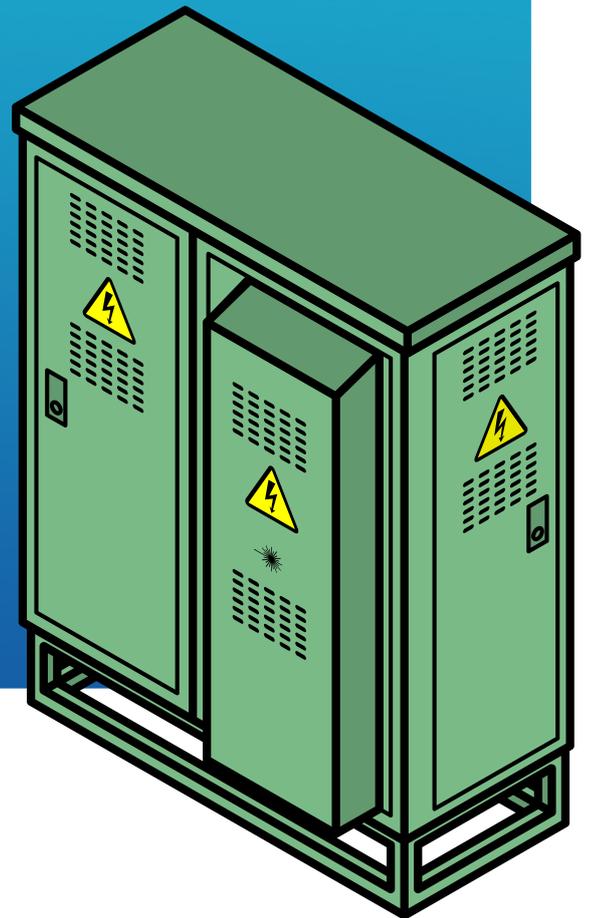
Bandwidth is essentially the capacity that your internet system has to download or upload information. If you try to upload/download a lot of information at once, you will have less capacity - or bandwidth available - than when you only do one thing at once.

It is possible to increase or decrease the amount of bandwidth you have available by getting a different type of internet cable/connection.

Download Speed

All businesses or homes with an internet connection are connected to an 'exchange', this is usually via a green metal cabinet in the street, which transfers the data from the office or a house's own internet cable to the shared infrastructure that we all use.

The type of cable used to connect your home to the cabinet, and its distance from the cabinet, will affect how fast your download/upload speed is.



COMMON PROBLEMS

There are three key common problems which can affect your business' internet speed and make it difficult to use.

1. Downtime

Rather than being an intermittent problem, downtime refers to a complete loss of internet connection.

You will recognise it when you try visiting a webpage and an error message appears on your internet browser with a message like "Windows explorer has stopped working." You will not be able to send or receive emails or use VoIP phones.

2. Latency

Latency is the most common problem businesses are likely to encounter. It refers to the speed of your internet connection and how fast or slow information is downloaded. 'Low latency' means your system processes information quickly, whereas 'high latency' refers to there being delays.

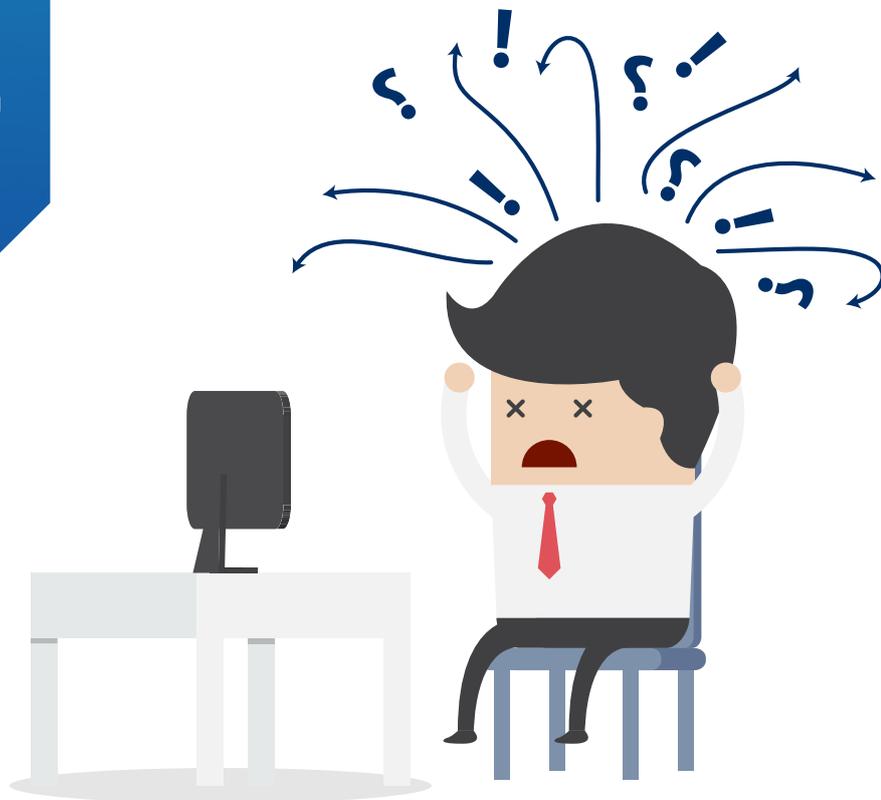
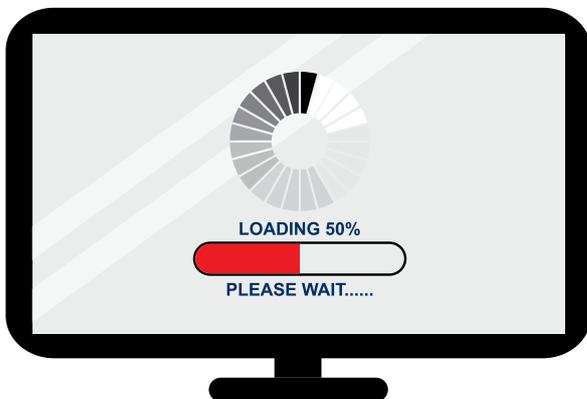
You will recognise it when webpages take a long time to load, emails take a long time to be sent or received, or you start to see error messages like "Connection timed out".

3. Jitter

Jitter refers to computer data being received out of sync. You will recognise it when streaming a video or when video conferencing and the picture and sound aren't coordinated, or bits of the video are missed out. If using VoIP, you would recognise it as an echo on the line.

4. Packet Loss

This refers to lost data, which happens when the network is congested. You will recognise it when watching a video or video conferencing and the picture is scrambled, appears pixelated, lacks definition or is blurred.



THE CAUSES

Downtime, latency, jitter and packet loss can all either be caused by a solitary issue or, as is more common, by a combinations of factors.

The factors that can affect your business' connectivity and performance are roughly split into internal and external factors - internal factors being what your business can control, and external factors being what you cannot.

Think of it as...

A car. Your car can only carry so much so if you overfill it with passengers and luggage it will become overburdened and run slower. If you buy a bigger car or van it will be able to carry more passengers and luggage without being overburdened and slowing down.

INTERNAL - INADEQUATE BANDWIDTH

This is essentially when you are overburdening the system you have. If you try to do too much at once you use up all the bandwidth you have available, and are subsequently likely to experience problems with latency, jitter and packet loss.

This can be a short term problem if, for instance, you have three members of staff all trying to stream a video simultaneously, or long term if you have too many staff using the system, or a small number of staff regularly downloading/ uploading large files or streaming videos.

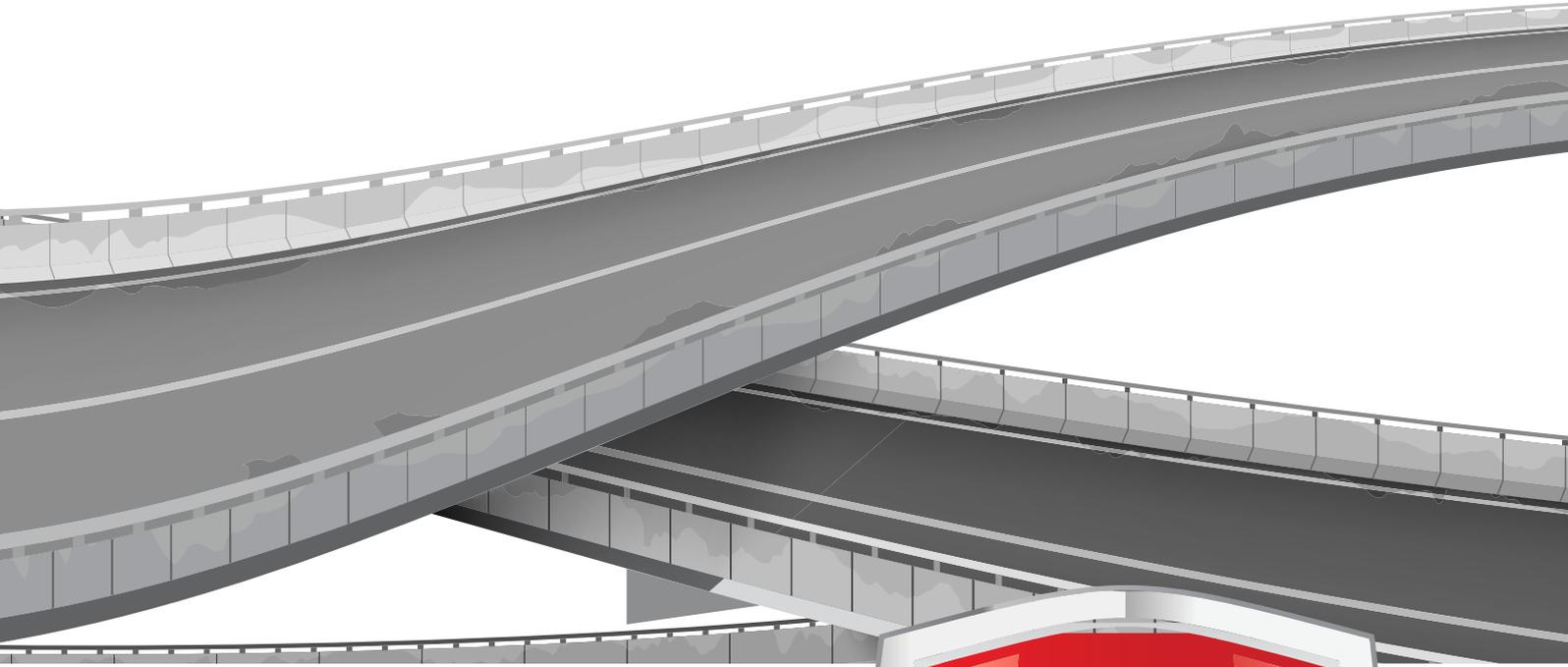


INTERNAL - DOWNLOAD/ UPLOAD VOLUMES

If too many people are all using bandwidth at once, the system will become under strain and will slow down in an effort to support all of the activities at once. However, some activities (e.g. streaming a video, video conferencing) use more bandwidth than others and will drain all of the available bandwidth capacity, leaving users unable to use the internet.

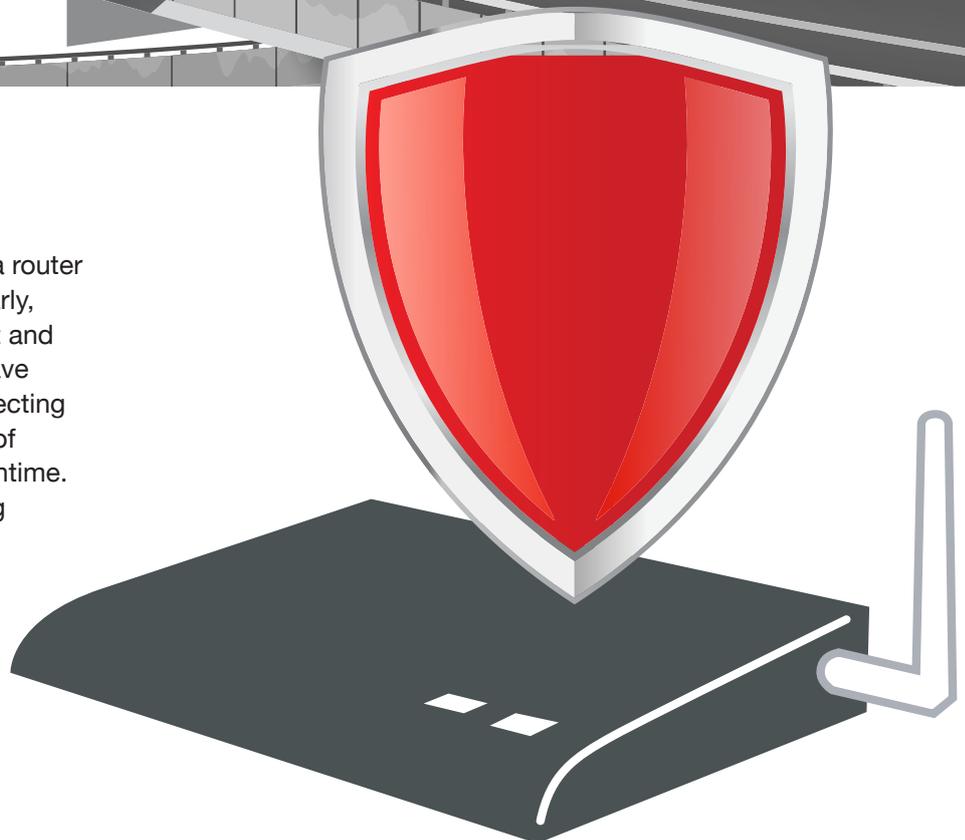
Think of it as...

A motorway. When there are lots of cars on a motorway, it becomes congested and you are likely to slow down. However, the same can also happen on a practically empty motorway if one large, slow vehicle, such as an articulated lorry, overtakes another large, slow vehicle, as there effectively becomes a queue for all other vehicles to pass both bigger ones, and again, the traffic flow will slow down.



INTERNAL - EQUIPMENT

It is easy to overlook the age of quality of a router and its potential to cause problems. Similarly, insufficient WiFi routers will often cause hit and miss connectivity. Overzealous firewalls have been known to cause problems with connecting to the internet. These can cause a variety of problems but usually tend to result in downtime. Replacing them can often resolve recurring problems instantly.



EXTERNAL - CONTENTION RATIO/PEAK TIME

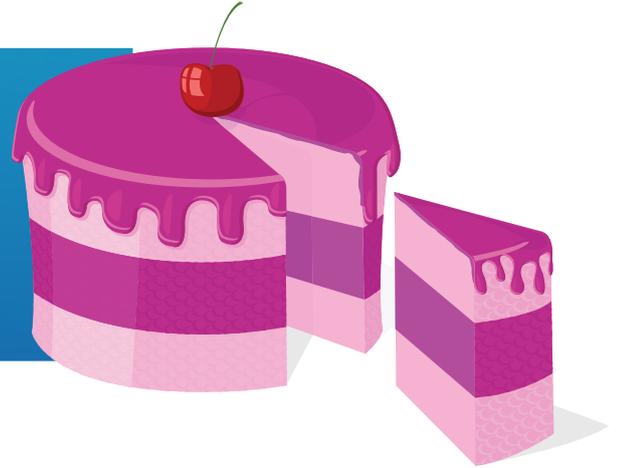
Apart from the individual cable going from your business or home to the exchange, the internet is a shared infrastructure. The more people that use that infrastructure at once, the more under strain it is and the slower the speed will become.

This is both a local and global issue. Locally, a problem is likely to occur between the exchange and your local cabinet if your local area has too many users using the internet at once, as the system becomes overburdened. In fact, many internet providers will regulate the speeds their users can reach, called throttling, to ensure that some users do not have very fast speeds resulting in others subsequently having very slow speeds.

On a wider scale, there are certain times when you can expect peak internet usage worldwide and therefore a slowing down of the internet as the infrastructure is overloaded. At 3.30PM (GMT), for instance, schoolchildren in the UK will arrive home and begin streaming videos or games, simultaneously people in the USA will be beginning work (9AM local time) and checking their emails, whilst businesspeople in the UK will still be at work.

Think of it as...

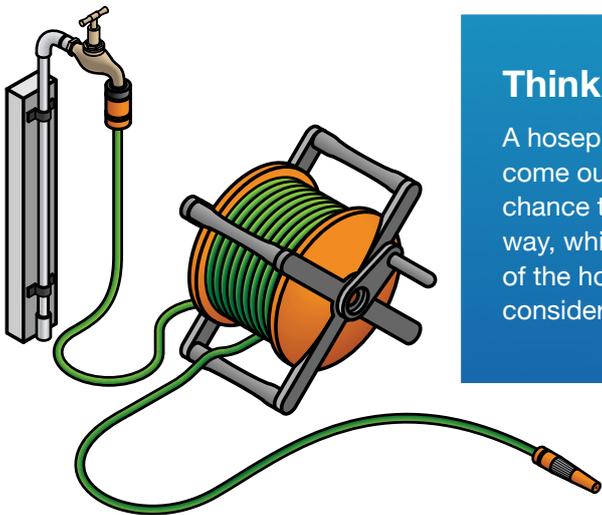
A birthday cake. When it is shared between a small number of people, each person will get a large equal piece, but if a large number of people want a slice then each person will get a much smaller piece, as it must be shared equally.



EXTERNAL - GEOGRAPHY

In an ideal world, everyone would have exactly the same quality of communications infrastructure. Unfortunately this is not the case, and those who live in particularly remote or rural areas are unlikely to have the same infrastructure as those living in a city. This is because the cost to upgrade infrastructure is expensive and in less built up areas it is even more expensive. However, even in cities, there will be certain areas that suffer from slow download speeds and high contention ratios.

There are a number of websites that can estimate your download/upload speed by calculating the property's distance from the exchange, but this is likely to reveal a 'best case' scenario, and not necessarily your actual download/upload speed.



Think of it as...

A hosepipe. The longer the hosepipe is, the longer it will take the water to come out once you switch the tap on. Similarly, the longer it is, the more chance there is of it becoming damaged leading to leakages along the way, which reduce the amount of water that actually reaches the nozzle of the hosepipe. Estimated upload/download speeds cannot take into consideration leaks or kinks in the pipe, only the length of it.

EXTERNAL - THIRD PARTY ISSUES

There are hundreds of third-party-related incidents that could occur and damage the internet infrastructure and subsequently disrupt your internet connection.

The most common tend to be damage as a result of road or building works, which can result in the accidental slicing of internet cables, though problems can also be caused by fires, and flooding - the list is endless.



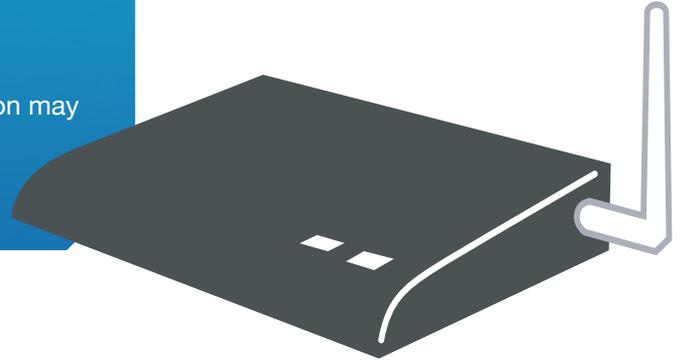
TACKLING CONNECTIVITY PROBLEMS

As connectivity problems could be caused by internal or external issues or a combination of both, it can be difficult to diagnose exactly what the exact cause of an internet problem is.

If you experience complete downtime, and have no internet connection at all, there are two steps you can take.

1. Check your router

If you have a faulty router, restarting it by switching it off and on may solve the problem. If it does, a new router may be required to prevent recurring problems.



2. Call your internet provider

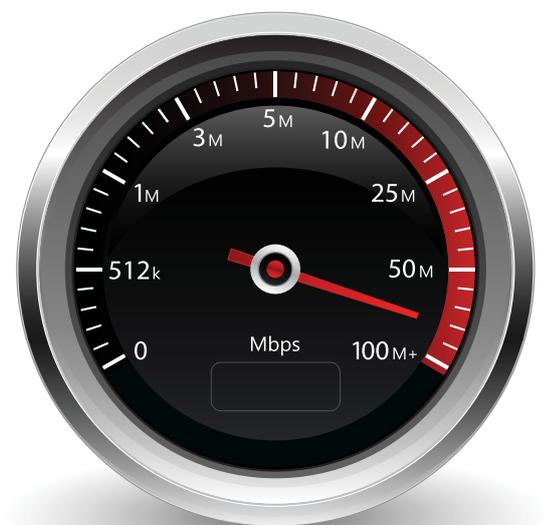
Your internet provider may be aware of a third party issue affecting your connection, and should be able to advise you if that is the case.

If you experience latency, jitter, or packet loss there are four steps you can take, to ascertain what the most likely cause is, and what course of action you should take as a result.

1. Check your maximum speed

Your broadband line will have a maximum upload/download speed that it can reach, based on how far away it is from the exchange. It is possible to check this maximum speed online using a website such as broadband speed checker. Whilst this gives you a rough estimate, it is by no means the speed that is actually delivered to the premises. The best way to get an accurate measurement is to call an internet provider, and ask them for an exact reading of the maximum upload/download speed.

If the upload/download speed is slow (e.g. less than 5mb), your business is more likely to experience connectivity problems. You may subsequently wish to upgrade your internet connection to increase your bandwidth.



Upload Speed



8.78 Mbps

Download Speed



80.78 Mbps

2. Keep track of high bandwidth activities and their effect on your speed

Sending or receiving large files, streaming video, or video conferencing all use a large amount of bandwidth. Unless you have lots of spare bandwidth, doing any of these things is likely to have an effect on other users, slowing the internet speed down for everyone.

Depending on how many staff you have, it may be appropriate to ask staff to notify you before commencing any high bandwidth activities. This should then give you an idea of whether this is the cause of internet problems.

It will also highlight to staff that they should avoid unnecessary high bandwidth activities (e.g. streaming videos) if not directly related to work. If you discover that your staff need to undertake a lot of necessary high bandwidth activities, (e.g. video conferencing, downloading/uploading large files) you may wish to upgrade your internet connection to increase the bandwidth you have available.

3. Keep a record of when you're having internet problems

There are certain times in the day when internet use peaks around the world, and as a result, all businesses will experience a certain amount of slowing of their internet speed, so it is advisable to keep a record of the times when your internet connection runs slow.

If you regularly experience problems after 3.30 weekdays, at the weekends, or during school/bank holidays this is due to the strained capacity of the internet.

If your problems occur at peak times, you can either avoid high bandwidth activities around this time, or upgrade your internet connection to increase the bandwidth you have available.

4. Set up a bandwidth monitoring service

If your bandwidth issues are erratic, it is possible to use software, such as Highlight to check how well your connection is performing. This will enable you to see which activities are causing problems, giving you a better chance of understanding what your bandwidth needs are and giving you a better chance of solving them.



London



New York



Moscow

Glossary

BANDWIDTH

Is used to describe internet speeds. Think of a data connection as a tube and each bit of data as a grain of sand. If you pour a large amount of sand into a narrow tube, it will take a long time for the sand to flow through it. If you pour the same amount of sand through a wider tube, it will flow through much faster. The wider the tube, the more bandwidth a data connection has.

LATENCY

The speed of your network, in other words its 'delays'. 'Low latency' will have short delays and process information quickly. 'High latency' will have longer delays and process information more slowly.

CONTENTION RATIO

This simply means 'sharing'. It refers to the maximum number of businesses sharing a connection (bandwidth). If you have a contention ratio of 20:1, for example, this means you will share the connection with 19 other businesses and will get an equal proportion of the speed you signed up for. The lower the contention ratio, the better the service.

PACKET LOSS

This term describes the loss of packets of information when the network gets congested. These losses will sometimes prevent web pages from loading properly

DOWNLOAD SPEED

The rate at which data can be received via the internet. Usually the higher the download speed, the smoother actions like receiving emails and web browsing will be.

UPLOAD SPEED

Unsurprisingly, the opposite to download speed. This is the speed at which data (such as design files, photographs, and videos) is uploaded to the internet. A high upload speed is particularly important when uploading data to a website.

JITTER

Jitter causes information to arrive at its intended destination at different times. This data takes time to get back in order, so it causes slow responsiveness. Resulting in frozen images during video, or broken speech during VoIP calls or video conferencing.

VoIP

Voice over Internet Protocol (VoIP) is a method of transmitting voice calls over the internet and is much cheaper than traditional calls. Communication can be done by plugging a phone system into an internet line, or through a computer via software like Skype.

Questions? Call our expert team on 0800 011 6559