# VoIP – What's it all about?

A whitepaper produced by i7 Technologies Limited supporting the VOIPFAST Product range.

The traditional method of communication between two people was via copper wires, the people speaking would talk into a microphone which created small electrical signals which were then amplified and sent over copper wires to the recipient who had a loudspeaker that would take these electrical signals and turn them back into sound.
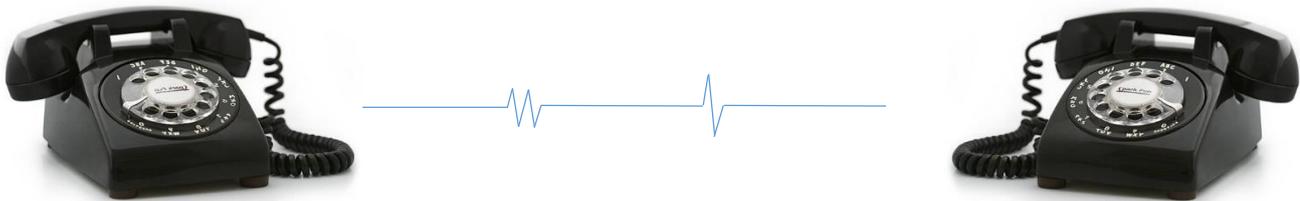

This method of communicating has been very reliable which is attested by the simple fact that this type of communication over copper pairs of wires has been around since its invention in 1876.

Obviously there have been significant changes in the design and operation, however the basic principle of electrical signals travelling over copper wires is still the most common method, it is just the signals that are changing.

With the advent of digital technology and particularly the internet, it was only a matter of time before the use of the networking techniques created for computers was applied to telephony as it has many superior qualities including the ability to automatically route around problems, and the very low cost to the end user of this type of data transfer.

From a technical perspective, the only change from the traditional telephone techniques is the use of some clever electronics to turn the electrical signals created by the microphone to a digital signal consisting of ones and zeros and then at the other end a reverse process to allow the transmission to be heard.

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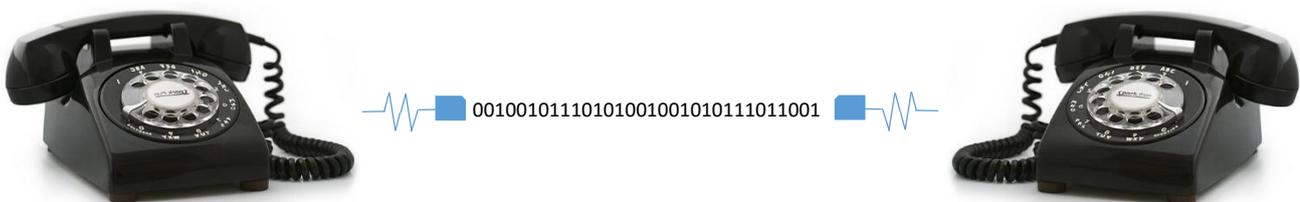
The use of these Analog to Digital (A/D) and Digital to Analogue (D/A) convertors means that the signals can be sent over any digital network, private, public, internet or encrypted allowing the creation of a powerful, expandable and reliable global system, this is VoIP or **V**oice **o**ver **I**nternet **P**rotocol.

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So now we have this ability to transfer voice over the Internet (the usual form of VoIP) the major advantage of the service can easily be seen as you will I am sure know that you can see a website located in New York or Sydney at no extra cost or significantly slower than one in the next room.

So the first major advantage to you the user is **COST** (of lack of it!)

When you use VoIP, the costs involved are that of your connection(s) to the internet and any Data quantity charges. If you are calling another phone on your VoIP system or any associated system then as long as you are within your data usage allowance for your internet connection you will not be paying anything for the "call" as your telephone is acting in the same way as your computer connecting to another, all you are doing is sending the digital information containing the words you have spoken.

To make it clear:

1. Get an "unlimited" business broadband service
2. Put all users onto a VoIP phone so you stay "inside" the digital network
3. Avoid making calls to old style numbers by using VoIP Apps for your Mobile Phone and using a softphone on your computer.

Lower costs are the major reason that most people convert to VoIP telephony, however there are many more advantages on a technical and service level.

It is possible to add (and remove) VoIP services on a monthly basis so the second advantage I am going to call **FLEXIBILITY**.

A very good example of the flexibility of a VoIP system would be a sales operation who bring in temporary staff for a particular campaign, but the campaign may only be running for 4 weeks. In this case, the company can purchase VoIP connections (these are called "seats") for a month just to use for the campaign, they are then removed so you are only paying for what you are actually using. Because every line in the old copper system required a pair of wires, these had to be manually connected and disconnected to support the service levels and it was too expensive to setup and remove them, consequently in the copper systems, there was usually a minimum contract length (usually 12 months).

Flexibility is also seen in the use of simple call forwarding, call answering, music on hold and call recording which can be switched on or off in seconds, but the most impressive option if what is called Fixed Mobile Convergence (FMC) which simply put makes it possible for all your desk, mobile and softphone (computer) devices to work in parallel so if you are not on one, then the system will automatically look for the next lowest cost route to get to you and try that, to the point where if configured it will call your normal mobile telephone number, a word of caution though in this final stage you are charged as you are going outside of the VoIP system to make the call to your mobile, the good news is though that if you have 3or 4G data connection and your VoIP App is running then this will be used first and this cost is no longer relevant !

We have looked at the two main drivers for businesses to move to VoIP Telephony, Cost and Flexibility however there are lots more advantages over copper connections (PSTN) and some of these I have shown below as a feature comparison.

Feature	Copper or PSTN Connections including Digital Services over PSTN	VoIP Connections
Line type	Dedicated lines	Internet connection
Bandwidth	Typical 64Kb per second	Typical 10Kb per second
Pricing	All calls are chargeable unless on a call package, international calling is much more expensive	VoIP to VoIP are free without geographic limits, call plans at much lower rates are available where VoIP to PSTN is required
Scaling	Upgrades are expensive as each require more hardware and additional lines together with bandwidth for digital.	Upgrades require hardware (unless softphones are used) and may require more bandwidth on the internet connection.
Remote Extensions	Typically, this will require dedicated lines for each extension	Simple connection to network / internet provides this option
Business Continuity	Service will usually continue to operate if run from the exchange as power is provided but if a phone system is used then this would be lost with power failure	Loss of internet connectivity will lose the service but taking a unit and connecting it to any working internet connection will restore the connection
Emergency Calling	Emergency calling is enabled and calls are automatically traceable to a specific location	Direct emergency calls are available but all VoIP numbers are required to have a location associated with them to assist with tracing, alternative methods of calling emergency (999) should be available.
Installation	Requires a telephone engineer to install every line or extension on a system	Simple installation onto an existing system does not require an engineer to attend, the user can self-install in many cases.

A typical VoIP installation consists of the following actions:

1. Check your current Internet connection (if available)

   This will tell us very simply if your current connection will handle the amount of connections that you require now and how much expansion you can expect from it.
   If the existing connection is adequate then there is nothing more to do, if not then we will check the best connection that is available to you (ADSL / ADSL2+ / FTTC / FTTP) and which will give the best value to you and your business.

2. Provide you with options for Handsets

   We have a large range of handsets and accessories that range from the simple basic desk telephone, to fully functioned touchscreen units, to DECT mobile devices, soft phones that operate through your computer and apps for your mobile.

3. Decide on numbers

   Your telephone number is essential for your business, we can arrange for your current number to be transferred to your VoIP system (this is called "porting") and in addition each VoIP line will have a direct dial number. If you need special numbers for Freephone, LowCost or specialist cherished numbers then we can give you options for all of these.

4. Determine call planning

   When a call is received, you need to decide on what happens, where will it go, do you want groups, voicemail, automatic transfer or any other of the option available to you? Although all of these can be setup and changed, we think it is important to plan out the original plan so this can be implemented from the moment that the system is plugged in.

5. Choose any call cost plan for your system

   You can select one from many call plans for your system which will allow you to make calls at set rates which will ensure that the calls you make from the system to traditional landlines in UK, Europe and USA, and UK Mobiles are at the best value.

With this information gathered we can provide you with a complete price to create the system to your specific requirements.

On your agreement to the price and configuration we then arrange for the system to be implemented for you, the hardware is purchased and preconfigured, the internet based system that controls your phones is configured to provide the call routing that you want, we arrange for the transfer of any numbers that you have.

On the day of the transfer we ensure that all the hardware is in place and ready to receive calls as soon as the port is complete

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When we have confirmed the transfer of your number we will test all equipment for incoming calls and routing, ensure that everything is as selected by you during the specification process.

So what is the difference with VOIPFAST ?

Back at the beginning of the installation process we carried out a check on your current internet connection, this is done using a number of tools and then in the background we will analyse the results and then put together a technical plan to ensure that your connection is running as fast as possible for your VoIP solution.

Talking on a VoIP system that is not working efficiently, or which is not really fast enough will mean your experience of VoIP will not be a satisfactory one, many of our competitors will just ask what your internet speed is as quoted by your internet service provider, we go much further by checking the speed during your working day when your real operational internet speed can be determined.

When we have the information, we will give you recommendations based on the results, these can include the configuration of Quality of Service (QoS) on your network hardware, recommendations of any changes to hardware to ensure the best experience, but you can be sure that any hardware changes that we recommend are backed by technical requirements to ensure your system operates as efficiently as possible.

We are happy to provide you with explanations for all recommendations, but of course you don't have to take our advice (but we will ask you to confirm that we have explained it and you understand the potential consequences of not making the required changes!).

Our aim is for you to have the best, most versatile and most adaptable telephone system that you can imagine.

Call us for more information – 01948 838232