



5G **Everything you Need to Know**

The next generation of mobile data services has arrived in the UK. The fifth iteration of the technology - or 5G, as it's better known - started to be rolled out in the UK during Summer 2019 and is set to have a transformational impact on how consumers and businesses stay connected wherever they are.



5G: The Next Generation

Mobile services are an indispensable part of how any firm does business today, and the arrival of 5G will create a huge number of opportunities for improved productivity and new services.

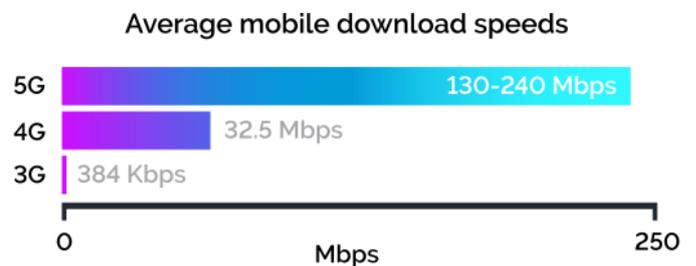
However, while the previous generation was mainly notable for offering a speed increase from 3G, which was comparable to moving from copper internet connections to fibre broadband, 5G is much more than this. 4G offered the ability to download large files and stream video on the morning commute, but 5G could change how we interact with the world forever

How Does 5G Compare to Existing Services?

One of the headline benefits of 5G compared to existing 4G services is the speed increase. Current 4G services typically offer download speeds of around 30Mbps, with a maximum of 100Mbps. But 5G, on the other hand, is

expected to offer average download speeds of up to 240Mbps, and potentially reach up to 10Gbps in the future without the need for major infrastructure upgrades.¹

However, the speed improvement is just one of the many upgrades that 5G can offer over 3G and 4G technologies.



When Can I Get It?

The rollout of 5G is expanding all the time, and all four of the UK's major mobile network operators - O2, Vodafone, EE and Three - have plans to cover as much of the UK as possible in the coming years. In the earliest days, initial rollouts were restricted to the major cities. Indeed, London, Edinburgh, Cardiff and Belfast were all among the first locations in the country to gain access to commercial 5G networks, but the pace of the deployment is expected to pick up fast.

Efforts are also being made to ensure the technology is not restricted only to urban areas, as was often the case with 4G. Instead, rural areas should become a much bigger focus for 5G in the coming years, with the performance on offer set to make it a viable alternative to the slow fixed-line broadband services that are still prevalent in more remote parts of the UK.

“5G is going to revolutionise the way people and businesses use mobile connectivity, unlocking huge possibilities for our economy and society.”

***–Mark Evans, CEO,
Telefonica UK²***



Revolution, Not Evolution

Many people may view the move from 4G to 5G similarly to the shift from 3G to 4G, but this would be to seriously underestimate the potential power of 5G. Whereas the previous generation offered an evolution in the capabilities of mobile services, what 5G offers is nothing short of a complete revolution in how businesses and consumers interact with the wider world, wherever they are and whatever they want to do.

The Factors Driving 5G

This may seem optimistic, but 5G has several factors in its favour that make it much more than just another step up in speed. While this will certainly be a major factor for many users, it's just one of several benefits that businesses stand to enjoy in the coming years.

Speed

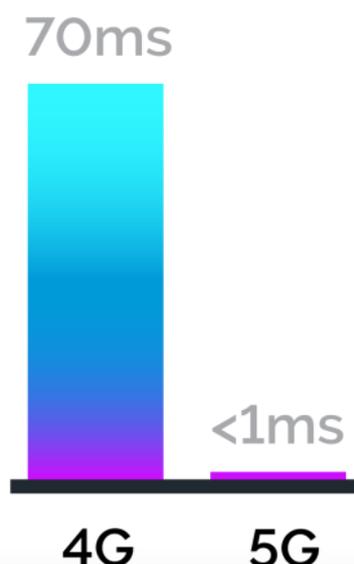
Initial 5G services are set to be around ten times faster than 4G, but they could potentially offer multi-gigabit speeds in the coming years. This could completely eliminate waiting for downloads, with even the largest files and high-definition streaming available almost instantly.

Latency

Reducing latency is another major benefit of 5G. This may not be noticeable to the average consumer watching Netflix on the train, but for many businesses, it is likely to be crucial. With 4G, expected latency can be as high as 70ms, but with 5G, this is reduced to just 1ms.

This could allow firms to run the most important real-time operations such as factory automation using a 5G network, without having to

5G vs 4G Latency



worry about lag affecting the performance of critical applications.

Capacity

One of the biggest problems with current 4G services is the slowdown when multiple users want to connect at once - as anyone who's tried to access it at a concert or sports event will know. But 5G offers much greater bandwidth that allows hundreds, if not thousands, of simultaneous connections with no impact on speed - something that will be vital as more devices come to depend on mobile connectivity in the future.

Flexibility

Business users can also take advantage of the flexibility of 5G with techniques such as network slicing. This allows users to carve out a private virtual network within their infrastructure to ensure that specialised, mission-critical functions have their own dedicated network that offers greater control and customisation to meet specific needs.

The results of this could be huge. For instance, one analysis by Barclays from 2019 estimated that by 2025, the use of 5G could increase revenues for UK businesses by as much as £15.7 billion a year, while by 2030, it may boost the overall economy by more than 1.5 per cent.³

The possibilities for 5G could be endless. But it's still early days for the technology, so it could be the case that the most transformative solutions for this connectivity are something we haven't even yet imagined.

The Possibilities Opened up by the Technology



While it's possible to simply use 5G networks as a faster, more reliable mobile data option, this will not make the best use of the technology. Instead, the main case for 5G will be how it opens up a wide range of new innovations and solutions businesses can use to transform how they operate.

The Next Stage of the Internet of Things

The Internet of Things, or IoT, has been one of the most-hyped tech innovations of the last few years. Essentially covering any internet-connected device that has a specific task - from smart speakers and home assistants to environmental sensors and connected cars, these gadgets will be gathering huge amounts of data in the coming years. Some forecasts suggest there may be as many as **41.6 billion IoT devices in use by 2025, generating almost 80 zettabytes of data a year.**⁴

With many of these transmitting this data via mobile networks, 5G will likely be the only solution to ensure these solutions can work effectively in such crowded environments. This connectivity will therefore enable many new applications for IoT.

For instance, it allows for instantaneous machine-to-machine communications in factories and warehousing, to keep everything running smoothly and anticipate problems before they happen. Or it can ensure the next generation of connected, autonomous vehicles are safer by enabling them to communicate with each other on the roads.

Enabling AR and VR

One technology that is expected to be in high demand in the coming years is augmented reality (AR) and full virtual reality (VR). Until now, these have mostly been restricted to fixed connections because real-time streaming in 360 degrees is too data-intensive for existing mobile networks.

5G removes this barrier. On the consumer side, this could open up a new generation of entertainment, such as full 360-degree streaming of sports or concerts. But it has a wide range of other uses, from education and training to providing hands-free information to factory floor workers. It could even be used to hold virtual meetings as a more immersive alternative to traditional teleconferencing.



Supplementing Fixed and Temporary Broadband

Another use for 5G will be in supporting, or even replacing, traditional fixed-line broadband networks. In many cases, the speed, latency and reliability offered by 5G may exceed what's currently available with the most commonly available ADSL and fibre broadband technologies, which offer average download speeds of around 11Mbps and 36Mbps respectively.

It could be especially useful for businesses in areas where the fastest full-fibre broadband does not yet reach. In these locations, a 5G router can be installed to effectively provide Wi-Fi coverage to users that can offer a much faster service than would be possible with fixed-line broadband, and would be significantly cheaper and faster than deploying new cabling infrastructure.

Elsewhere, 5G could also be invaluable for locations such as construction sites and other non-permanent projects, as it would be far easier to install than other temporary solutions, as well as offering much greater flexibility and speed than 4G or satellite-based solutions.



How 5G is Transforming the Business Environment

Even though 5G is still in its relative infancy, trials of the technology have been taking place over the past year or so, and they have already shown how a variety of different sectors may be able to apply the technology to their specific needs.

Manufacturing and Logistics

Among the most prominent users of 5G is expected to be the manufacturing and logistics sectors. Indeed, in 2019, the UK government pumped £40 million into trials for firms in these areas to demonstrate its potential.⁵ In these sectors, key use cases include the creation of 'smart factories', where every operation is monitored in real-time with sensors and location tracking tools to streamline supply chains and boost efficiency, as well as automation of key processes.

Healthcare

The ability to collect data quickly and easily from anywhere is also vital in the healthcare sector for solutions such as patient monitoring. But it can also usher in a new era of telemedicine, enabling doctors to interact much more easily

through videoconferencing, or even perform surgery remotely. According to O2, 5G could free up 1.1 million GP hours by facilitating tele-health video conferencing and real-time remote health monitoring.⁶

In the UK, trials have been taking place in Liverpool with the creation of a 'smart room' and 'smart house' testbed which simulate a hospital room and a patient's home respectively. Both spaces are specifically adapted and fitted with smart sensors, virtual reality and telehealth solutions, all connected with high-speed 5G technology.⁷



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Education

The education sector has also been trialling 5G connectivity everywhere from primary schools to universities. In practice, this can allow applications ranging from simply downloading educational resources such as high-definition videos more quickly to supporting distance learning.

It can also enable the use of augmented and virtual reality in training scenarios across a range of industries, allowing trainers to expand beyond pre-programmed scenarios and develop new situations that can be processed and executed in real time.

Utilities

Improving the efficiency of the energy sector is a top priority at the moment, and 5G promises a transformative solution for this sector. In particular, its ability to collect and transmit data from thousands of individual sensors in real-time, with no latency or slowdowns, gives energy and water firms tremendous power to adjust their services, boost efficiency and tackle climate change.

In the UK, for example, O2 is working with Northumbrian Water Group to assess how 5G smart sensors can proactively monitor water quality and detect and reduce leaks to cut water waste. The company is also using 5G-enabled AR headsets to connect field engineers to skilled experts, allowing real-time support where instructions and manuals can be overlaid in the field engineer's AR vision.

A key theme through many of these deployments is the opportunities offered by faster access to data at any time, wherever a user is located. In a world that's increasingly digital-dependent, with almost all activities managed from centralised locations - whether this is a specialist control room or just a smartphone - 5G will be the key to ensuring every gadget remains connected in a hugely crowded wireless environment.

How Businesses Can Make the Most of 5G

For businesses, however, there is more to making the most of 5G capabilities than simply upgrading their mobile services to new tariffs. If enterprises want to take full advantage of the capabilities of this technology, they should look to team up with a specialist communications partner that can give them the bespoke services they will need.

While all four of the UK's major mobile networks now have 5G services available, companies that opt to sign contracts with these providers directly or via high-street retailers may find their options are somewhat limited. While these networks will be able to offer the latest 5G-ready smartphones and tariffs, when it comes to developing more advanced solutions, a more personal touch will be required.



As 5G services are likely to be highly tailored and unique to every business, this flexibility will be highly important to many users as they develop their own strategies.

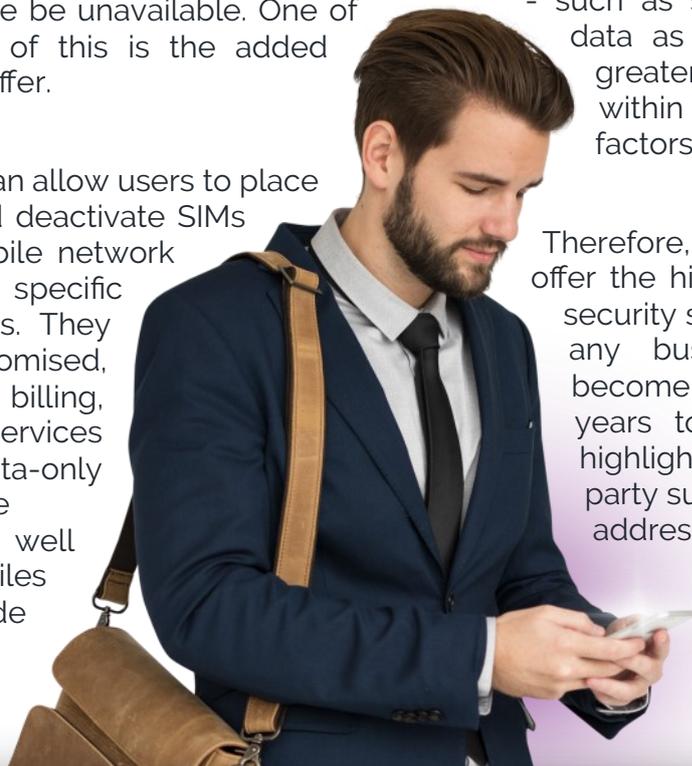
Addressing the Security Considerations

Another issue to consider is the security of any 5G deployments a company has. With these services set to underpin almost every aspect of how companies operate in the coming years, they will inevitably attract the attention of hackers. The consequences of this could be wide-ranging, from the theft of confidential data to potentially even disrupting applications like autonomous cars.

Creating the Flexibility Firms Need

Because communications providers (CPs) can take a more hands-on approach to their customers than the big networks, they can offer a range of enhancements and extras that would otherwise be unavailable. One of the major benefits of this is the added flexibility that is on offer.

For instance, a CP can allow users to place bars or activate and deactivate SIMs directly on the mobile network to respond to the specific needs of customers. They can also offer customised, bespoke tariffs and billing, including services designed for data-only machine-to-machine communications as well as business mobiles that will also include voice requirements.



A study by the European Commission (EC) concluded the emergence of 5G "will increase the overall attack surface and the number of potential entry points for attackers".⁸ In particular, it cited the increased use of functionality at the edges of networks - such as sensors that can process data as it is generated - and a greater reliance on software within 5G networks as risk factors.

Therefore, having a partner that can offer the highest grade of enterprise security solutions will be a must for any business that expects to become dependent on 5G in the years to come. Indeed, the EC highlighted the critical role third-party suppliers will have as vital in addressing these risks.

The Future of Your Business

Although 5G is still a very new offering, and there remains a lot of uncertainty surrounding it, it's clear that businesses can't afford to ignore it if they want to be competitive in the coming years.

O2, for instance, has forecast that the arrival of 5G will lead to productivity savings of around £6 billion, as well as enabling a new generation of smart cities and leading to more efficient homes and businesses.⁹ Therefore, it warned firms that don't embrace this will very quickly find themselves left behind.

Cost Savings Offered by 5G⁹

£890 million

Reduction in social care costs through telehealth

£440 million

In lost productivity regained through predictive maintenance on the UK's rail network

£91 million

Saved through the adoption of smart LED street lighting

£450

A year saved for every household through better energy efficiency and reduced waste

5G is about much more than just faster data services on your smartphone - it's the key to everything enterprises will do in the coming years. Therefore, it's essential that you get a head-start on this technology and look for an experienced communications provider to help you navigate the rollout and identify how it can help your business.

Contact

Contact Arrow and find out about your options with 5G:

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¹5G.co.uk, <https://5g.co.uk/guides/what-is-5g/>

²O2, <https://news.o2.co.uk/2019/10/17/o2-switches-on-5g-with-unlimited-data-flexible-plans-and-no-premium/>

³Barclays, 5G: A transformative technology, <https://www.barclayscorporate.com/content/dam/barclayscorporate-com/documents/insights/innovation/5g-a-transformative-technology.pdf>

⁴IDC, <https://www.businesswire.com/news/home/20190618005012/en/Growth-Connected-IoT-Devices-Expected-Generate-79.4ZB>

⁵DCMS, <https://www.gov.uk/guidance/industrial-5g-testbeds-trials-manufacturing-and-logistics-sectors-projects>

⁶O2, The value of 5G for cities and communities, <https://news.o2.co.uk/press-release/upgrade-uk-cities-now-miss-productivity-savings-6-billion-year-5g-o2/>

⁷Royal Liverpool and Broadgreen University Hospitals, <https://www.rlbuht.nhs.uk/news/liverpool-showcases-latest-nhs-digital-technologies-to-support-patients/>

⁸European Commission, https://ec.europa.eu/newsroom/dae/document.cfm?doc_id=62132

⁹O2, The value of 5G for cities and communities, <https://news.o2.co.uk/press-release/upgrade-uk-cities-now-miss-productivity-savings-6-billion-year-5g-o2/>