



UNDERSTANDING 5G

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Just like all new technologies, there is a significant amount of misunderstanding or misconceptions that the general public has with regards to 5G. This article attempts to outline the history behind the development of 5G, in an effort to dispel these misconceptions.

1G was introduced in 1979 and it brought us the very first phone, 2G was introduced in 1991 and enabled us to text via cell phone, 3G was introduced in 1998 and brought us online, to enable us to use the internet, 4G was introduced in 2008 and it enabled the internet speed that we enjoy today. As more users started using their devices to connect with 4G for their data, the 4G network started to reach the limit of what it is capable of, and as such, 5G was introduced.

5G is the 5th generation mobile network. It is a new global wireless standard after 1G, 2G, 3G, and 4G networks. 5G enables a new kind of network that is designed to connect everyone and everything together, virtually. This includes machines, objects, and devices. In telecommunications, 5G is the fifth generation technology standard for broadband cellular networks, which cellular phone companies began deploying worldwide in 2019, and is now the successor to the 4G networks which currently provide connectivity to most current cell phones.

Since the earliest generation of mobile phones, wireless networks have operated on the same radio-frequency bands of the electromagnetic spectrum. But as more users crowd the network and demand more data than ever before, these radio wave highways become increasingly congested with cellular traffic. To compensate, cellular providers want to expand into the higher frequencies of millimetre waves.

As per Tim Childers, millimetre waves use frequencies from 30 to 300 gigahertz, which are 10 to 100 times higher than the radio waves used currently for 4G and Wi-Fi networks. They're called millimetre waves because their wavelengths vary between 1 and 10 millimetres, whereas radio waves are measured in centimetres. The higher frequency of millimetre waves may create new lanes on the communication highway, but there's one problem: Millimetre waves are easily absorbed by foliage and buildings, and therefore require more closely placed base stations. However, these stations are much smaller and require less power than traditional cell towers, and can be placed atop already existing buildings and light poles.

The smaller size of these base stations also enables another technological breakthrough for 5G: Massive MIMO. MIMO stands for multiple-input multiple-output, and refers to a configuration that takes advantage of the smaller antennas needed for millimetre waves by dramatically increasing the number of antenna ports in each base station. This means these base stations have an increased ability to serve a much higher number of users without running into issues such as overloading or slower speeds.

With all this in mind, it is clear that the fifth generation (5G) of mobile technology is emerging as a superior communication network, delivering increased speeds, coverage, and reliability. This innovative network is bringing about the reality of Internet of Things (IoT), as it is able to handle significantly more devices than previous generations. However, as with any new technology, there are some disadvantages to be considered, as noted previously, obstructions can impact connectivity, initial costs for rollout are high, rural access limitations, battery drain on devices, upload speeds do not match download speeds, and detracting from the aesthetics.

5G aims to deliver data speeds that are 10 to 100 times faster than the current 4G networks. Download speeds on the 5G networks will be in the order of gigabits per second (Gb/s), much higher than the tens of megabits per second (Mb/s) currently experienced on 4G networks. Imagine the ability to download a whole movie in under a second, that is what 5G offers.

5G is still, slowly, being introduced to some countries, whilst others have already implemented it extensively. There are still many false claims around 5G, one being that it can cause some mutation or health problems to human beings, as it used such high frequencies that have, thus far, never been used, and requires the installation of more towers. But, as the world evolves and continues to innovate and develop new technology, it is inevitable that we would keep on unlocking and exploring new untouched realities. It is vital that we work to understand these technologies and introduce them to the general public in a way that demonstrates their benefits, whilst being honest about their real disadvantages, in order to dispel untrue misconceptions and enable the improved adoption of these technologies.

References

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