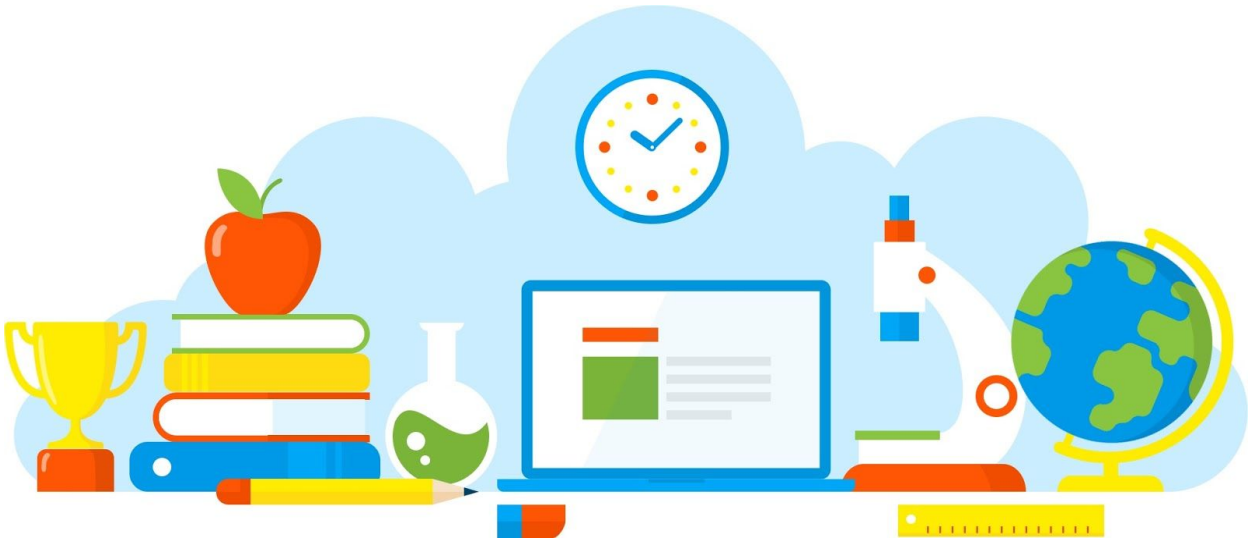

Evolution from 1G to 5G

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Introduction

Mobile radio telephones were introduced for military communications in the early 20th century. Car based telephones were first used in 1946. This system used a single channel for transmission . It was a half duplex system. It emerged as “push to talk” in the 1950s. To enable full duplex communication IMTS (Improved Mobile Telephone System) was introduced in the 1960s. It used 2 channels, one for receiving and another for sending.

By the 1970s private companies started developing their own systems to evolve the existing system further. Some of these companies are AMPS (Analog Mobile Phone System) in America, TACS (Total Access Communication System) and NMT (Nordic Mobile Telephone) in parts of Europe and J-TACS in Japan.

1G

Independently developed systems then are called First Generation communication systems. It was introduced in 1982 by Bell Labs and popularly known as Advanced Mobile Communication System (AMPS).The key idea was to divide geographical locations into cells. Each cell was served by a base station so that frequency reuse can be implemented. As a result support 5 to 10 times more users that IMTS. Major concern for the first generation was weak security on air interface ., full analogue mode of communication and no roaming.

Now to implement roaming individual organisation started working under 1 umbrella European telecommunication standard institute (ETSI) and developed 2nd generation system.

2G

Second generation cellular telecom networks commercially launched in 1991 in Finland based on GSM standards it could deliver data at the rate of upto 9.6 kbps. Three primary benefits of 2G networks over their predecessors where, phone conversations when now digitally encrypted, it was significantly more efficient on the spectrum and allowed far greater mobile phone penetration level. 2Gintroduce data services for mobile, starting

with SMS text messages. Further to achieve higher data rate, GSM carrier started developing a service call general packet radio service GPRS. This system overlaid a packet switching network on the existing circuit-switched GSM network. GPRS could transmit data at upto 160 kbps. The phase after GPRS is called Enhanced Data Rate for GSM Evolution (EDGE). It introduced 8-PSK modulation and could deliver data at upto 500kbps using the same GPRS infrastructure.

3G

This was a big revolution in terms of technological advancement for network and data transmission. 3G had and has speed capabilities of up to 2 mbps. It enabled smartphones to provide faster communication, send/receive large emails and texts, provide fast web browsing, video streaming and more security amongst others. It was widely based on CDMA2000 (Code-division multiple access) and EDGE technologies. Now you might wonder why EDGE? Well, because EDGE was so advanced it was able to provide enough capabilities to be considered as 3G. CDMA2000, on the other hand, operated on similar key concepts but did it better. It enabled multiple channels to communicate at one same thus improvising on the over speed and connectivity.

4G

The 4G standard sets several requirements for mobile networks including mandating the use of Internet Protocol (IP) for data traffic and minimum data rates of 100 Mbps which was a huge jump from the 2 mbps for 3G.

It is not much to do with the technology it uses but rather than the requirements set forth by the International Telecommunication Union's Radiocommunication Sector (ITU-R). These standards are known as International Mobile Telecommunications-Advanced (IMT-Advanced). The list of standards is quite complicated and thus were a barrier in fast adoption of the 4G spectrum.

Soon after 4G, 4G LTE was introduced. LTE stands for Long Term Evolution and it isn't as much a technology as it is the path followed to achieve 4G speeds. It was a complete redesign and simplification of 3G network architecture, resulting in a significant reduction in transfer latency and thus, increasing efficiency and speeds on the network.

5G

It is still quite in its early stages and the technology likely to appear in the market only by 2020 at the earliest. Goals for future 5G include significantly faster speeds (a minimum of 1 Gbps and perhaps up to 10 Gbps) plus lower power requirements to better support huge numbers of new Internet of Things (IoT) devices. It will have capabilities to provide faster dialing speeds, multiple device connectivity, higher data speeds just to name a few.