5G (5TH GENERATION MOBILE NETWORK)

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DEPT: INFORMATION TECHNOLOGY

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What is 5G?

- 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 virtually everyone and everything together including machines, objects, and devices.

- 5G wireless technology is meant to deliver higher multi-Gbps peak data speeds, ultra low latency, more reliability, massive network capacity, increased availability, and a more uniform user experience to more users. Higher performance and improved efficiency empower new user experiences and connects new industries.

Who invented 5G?

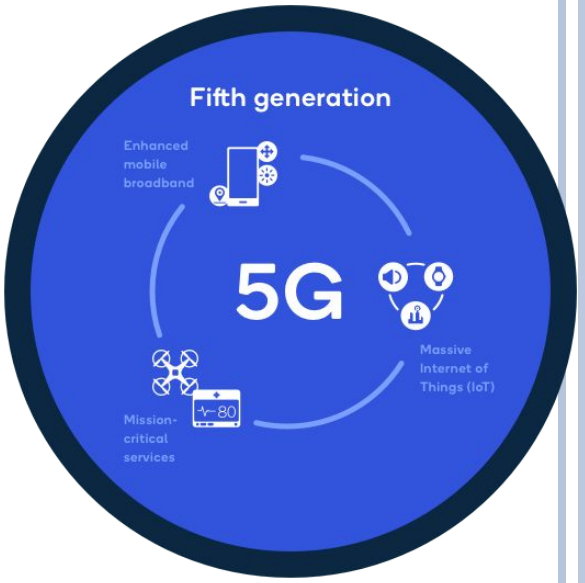
- No one company or person owns 5G, but there are several companies within the mobile ecosystem that are contributing to bringing 5G to life. Companies like Qualcomm, Cisco Systems, Samsung etc. have played a major role in inventing the many foundational technologies that drive the industry forward and make up 5G, the next wireless standard.

What underlying technologies make up 5G?

- 5G is based on OFDM (Orthogonal frequency-division multiplexing), a method of modulating a digital signal across several different channels to reduce interference. 5G uses 5G NR air interface alongside OFDM principles. 5G also uses wider bandwidth technologies such as sub-6 GHz and mmWave.
- Like 4G LTE, 5G OFDM operates based on the same mobile networking principles. However, the new 5G NR air interface can further enhance OFDM to deliver a much higher degree of flexibility and scalability. This could provide more 5G access to more people and things for a variety of different use cases.
- 5G will bring wider bandwidths by expanding the usage of spectrum resources, from sub-3 GHz used in 4G to 100 GHz and beyond. 5G can operate in both lower bands (e.g., sub-6 GHz) as well as mmWave (e.g., 24 GHz and up), which will bring extreme capacity, multi-Gbps throughput, and low latency.

What are the differences between the previous generations of mobile networks and 5G?

- The previous generations of mobile networks are 1G, 2G, 3G, and 4G.
  I. **First generation - 1G**
  1980s: 1G delivered analog voice.
  II. **Second generation - 2G**
  Early 1990s: 2G introduced digital voice (e.g. CDMA-Code Division Multiple Access).
  III. **Third generation - 3G**
  Early 2000s: 3G brought mobile data (e.g. CDMA2000).
  IV. **Fourth generation - 4G LTE**
  2010s: 4G LTE ushered in the era of mobile broadband.



- 5G is a unified, more capable air interface. It has been designed with an extended capacity to enable next-generation user experiences, empower new deployment models and deliver new services.
- With high speeds, superior reliability and negligible latency, 5G will expand the mobile ecosystem into new realms. 5G will impact every industry, making safer transportation, remote healthcare, precision agriculture, digitized logistics — and more

How and when will 5G affect the global economy?

- 5G will be driving global growth.
  - $13.2 Trillion dollars of global economic output
  - 22.3 Million new jobs created
  - $2.1 Trillion dollars in GDP growth

- 5G's full economic effect will likely be realized across the globe by 2035—supporting a wide range of industries and potentially enabling up to $13.2 trillion worth of goods and services. This impact is much greater than previous network generations

How fast is 5G?

- 5G is designed to deliver peak data rates up to 20 Gbps based on IMT-2020 requirements. Qualcomm Technologies' flagship 5G solutions, the Qualcomm® Snapdragon™ X55 and Snapdragon X60 Modem-RF Systems have achieved up to 7.5 Gbps in downlink peak data rates.
- But 5G is about more than just how fast it is. In addition to higher peak data rates, 5G is designed to provide much more network capacity by expanding into new spectrum, such as mmWave.
- 5G can also deliver much lower latency for a more immediate response and can provide an overall more uniform user experience so that the data rates stay consistently high—even when users are moving around

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Thank you