IASGYAN
PREDICT THE UNPREDICTABLE
An initiative of APTI PLUS

5G The fifth-generation wireless system (or 5G) is now the next generation of wireless communication systems.

Previous Generations

1G: 1G: analog telecommunications standard introduced in the1970s for voice communications. It used FM and FDMA and a bandwidth of 30 kHz. Issues are poor voice quality, poor battery quality, and large phone size.

2G: 2G: digital standard, circuit switched technology introduced in 1980s. It used CDMA, GSM, TDMA technologies.

2.5G: 2.5G/2.75G: 2.5G introduced a new packet-switching technique that was more efficient than 2G. 2.75Gprovided a theoretical threefold speed increase. Both were not defined formally as wireless standards.

3G: 3G: used Code Division Multiple Access Technique (CDMA). It used technologies such as W-CDMA and HSPA (high speed packet access). It provided IP connectivity for real-time and non-real-time services.

4G: 4G: may be regarded as the extension of 3G but with afaster Internet connection, more bandwidth, and a lower latency. WiMAX and LTE (Long-Term Evolution), claim to be about 5 times faster than 3G services.

5G

Will consist of cells divided into sectors and send data through radio waves.

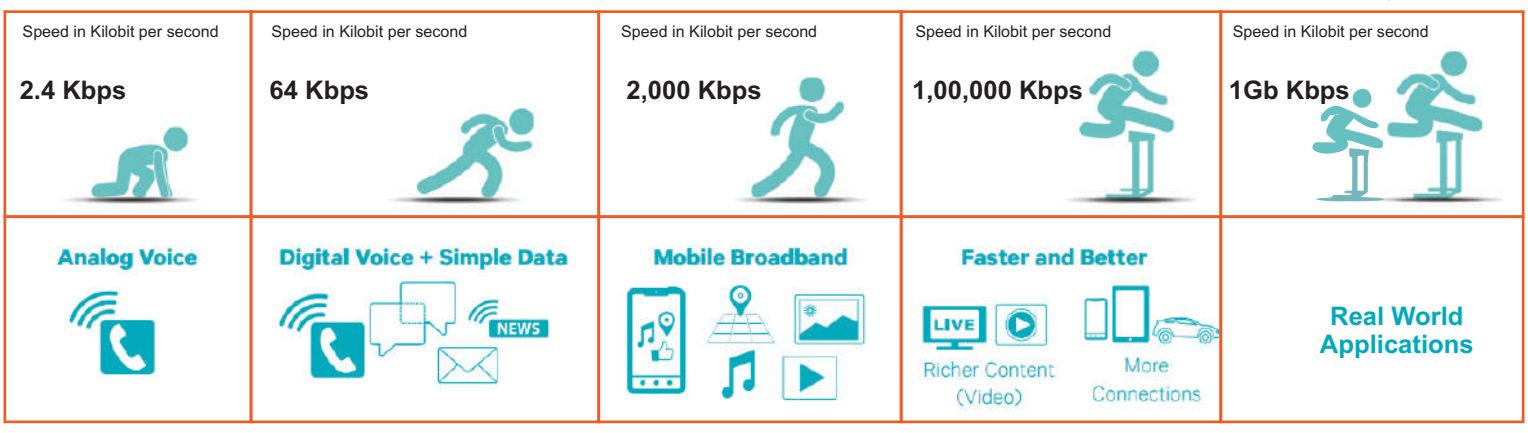
May transmit data over the unlicensed frequencies currently used for Wi-Fi.

Will provide gigabit-per-second data rates anytime, anywhere.

Every mobile phone will have an IPv6 address depending on the location and network being used.

Utilizes user-centric network concept WWWW instead of operator- centric (3G) or service-centric (4G).

Architecture will be device-centric, distributed, programmable, and cloud-based



Potential applications

Unified global standard for all

Network availability anywhere anytime

Wireless cloud-based office/multiple-person video conferencing

Smart surgery and remote medical examination

Virtual reality/augmented reality/tactile Internet

Blockchain

Autonomous driving/connected cars

Smart gird

3D and ultra HD videos

Mobile security

Major technologies enabling 5G include

- Device-to-device (D2D) Communication
- Machine-to-machine (M2M) Communication
- Multiple-input-multiple-output (MIMO) technology mmWave communication, ultra-dense network (UDN), all-spectrum access (ASA), OFDM (orthogonal frequency division multiplexing), and Internet of things.

Benefits

Faster speed: 10 times higher with 4G

Shorter delays: 5G should reduce latency (the time between cause and effect

Increased connectivity: more people will be able to communicate at the same time.

Excellent capability to support both software and consultancy.

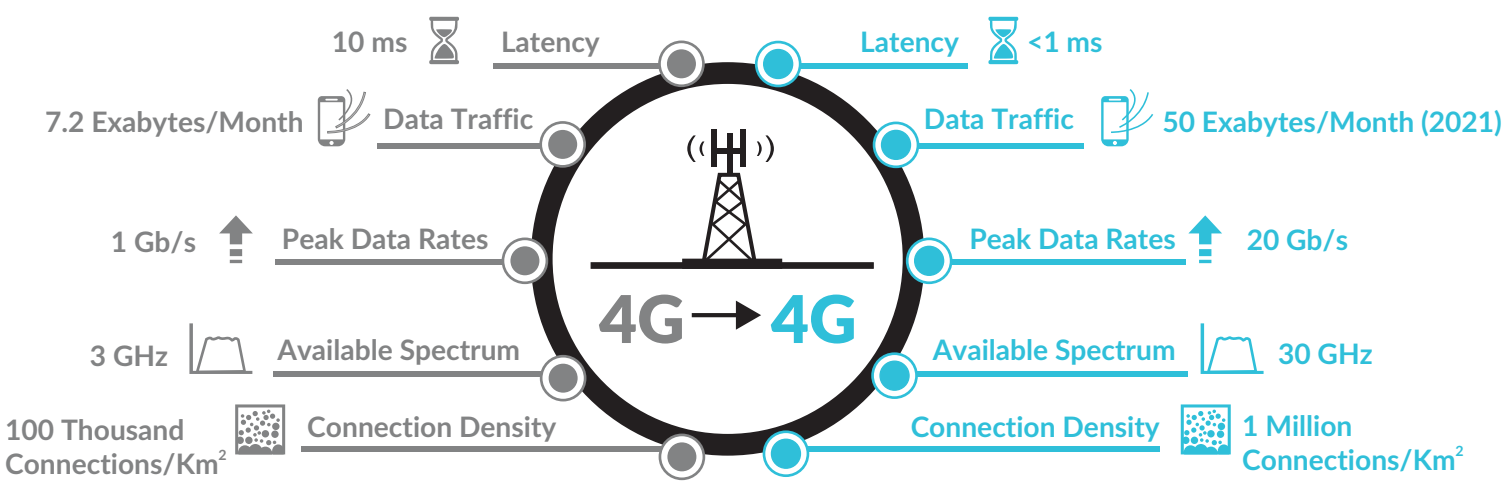
High data rate at the edge of the cell and better coverage area.

It has low battery consumption.

High data rates, 1- 10 Gbps connections to end points, 1 millisecond end-to-end round trip delay

High throughput, improved spectrum efficiency, better mobility support, and high connection density

Comparing 4G and 5G



Challenges

Challenges faced with the new technologies enabling 5G, integration of this technology to provide services in different application scenarios.

High projected cost and that it is incompatible with the previous generations.

Physical objects block 5G signals easier than 4G, and, even when unobstructed, 5G signals do not carry as far.This means that more towers are needed to support a comprehensive network.

Usage and popularization of 5G-capable phones and devices.