



5G Wireless Technology

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ABSTRACT:

5G Technology stands for 5th generation mobile technology. 5G denote the next major phase of mobile telecommunication standards beyond the upcoming 4G standards. 5G technology will change the way most high bandwidth users access their phones. [1]

Introduction:

Mobile networks, which have a 40-year history that parallels the Internet's, have undergone significant change. The first two generations supported voice and then text, Today, the industry is at 4G (supporting data rates typically measured in the few megabits-per-second) and transitioning to 5G, with the promise of a tenfold increase in data rates. 5G is expected to provide support for immersive user interfaces.[2]



If we look back, we will find that every next decade, one generation is advancing in the field of mobile technology. Starting from the First Generation (1G) in 1980s, Second Generation (2G) in 1990s, Third Generation (3G) in 2000s, **Fourth Generation (4G)** in 2010s, and now Fifth Generation (5G), we are advancing towards more and more sophisticated and smarter technology.[6]



How does 5G Wireless Technology Work?

There are basically 2 main components in the 5G Wireless Technology systems i.e. the Radio Access Network and the Core Network.



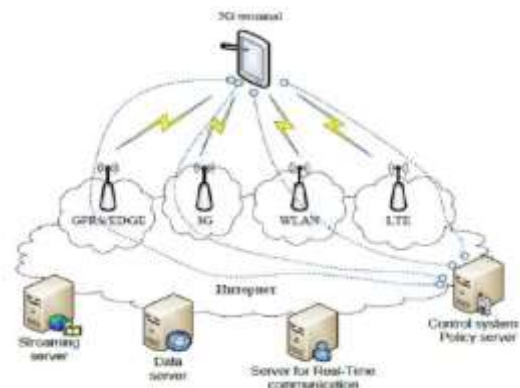
1. Radio Access Network:

The Radio Access Network mainly includes 5G **Small Cells** and **Macro Cells** that form the crux of 5G Wireless Technology as well as the systems that connect the mobile devices to the Core Network. The 5G Small Cells are located in big clusters because the millimeter wave spectrum (that 5G uses for insanely high speeds!) can only travel over short distances. These Small Cells complement the Macro Cells that are used to provide more wide-area coverage.

2. Core Network:

The Core Network manages all the data and internet connections for the 5G Wireless Technology. And a big advantage of the 5G Core Network is that it can integrate with the internet much more efficiently and it also provides additional services like *cloud-based services*, *distributed servers* that improve response times, etc. [3]

Architecture of 5G:



The system comprising of a main user terminal and then a number of independent and autonomous radio access technologies. Each of the radio technologies is considered as the IP link for the outside internet world. The IP technology is designed exclusively to ensure sufficient control data for appropriate routing of IP packets related to a certain application connections i.e. sessions between client applications and servers somewhere on the Internet.

5G vs. 4G: Key differences

Each generation of cellular technology differs in its data transmission speed and encoding methods, which require end users to upgrade their hardware. 4G can support up to 2 Gbps and is slowly continuing to improve in speeds. 4G featured speeds up to 500 times faster than 3G. 5G can be up to 100 times faster than 4G. One of the main differences between 4G and 5G is the level of latency, of which 5G will have much less. 5G will use orthogonal frequency-division multiplexing ([OFDM](#)) encoding, similar to 4G LTE. 4G, however, will use 20 MHz channels, bonded together at 160 MHz. 5G will be up to between 100 and 800 MHz channels, which requires larger blocks of airwaves than 4G. [5]

Advantages of 5G technology:

The main advantages of the 5G are a greater speed in the transmissions, a lower latency and therefore greater capacity of remote execution, a greater number of connected devices and the possibility of implementing virtual networks (network slicing), providing more adjusted connectivity to concrete needs.

Conclusion:

5G will be able to sustainably satisfy the requirement of the 1000-time traffic growth. 5G will provide users with fiber-like access data rate and “zero” latency user experience. 5G will be capable of connecting 100 billion devices. 5G will be able to deliver a consistent experience across a variety of scenarios including the cases of ultra-high traffic volume density, ultra-high connection density, and ultra-high mobility. 5G will also be able to provide intelligent optimization based on services and users awareness and will improve energy and cost efficiency by over a hundred of times, enabling us all to realize the vision of 5G, “information a finger away, everything in touch.”[4]

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