

# 5G Wireless Networks

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**Abstract:** *Everybody loves speed and moreover speedy internet, so its no surprise that every major telecom in the world is working to make it even faster. Smartphones, watches, homes, and cars are increasingly requiring stable internet connections. In order to survive in the world where in every second the speed changes and where we urge for more and more technology, here comes the fifth generation technology: 5G. In future, i.e., a world beyond 4G, some of the prime objectives that need to be fulfilled are increased capacity, improved data rate, decreased latency, and quality service. To meet these demands, large scale improvement in the cellular architecture of 5G is required. This paper basically lays emphasis on the 5th generation i.e. 5G cellular network architecture and some of the essential emerging technologies that can prove fruitful in humanizing the architecture and summing the demands of users. This paper is contented with the details related to 5g with the prime focus on the massive multiple input multiple output technology and device-to-device communication (D2D). A general credible 5G cellular network architecture is being proposed with the guideline taken from the internet books and by the detailed study of the topic*

**Keywords:** 5G, cloud, D2D

## I. INTRODUCTION

The G in 5G stands for generation. and 5 is the advancement denoted through a number. Wireless phone technology technically entered with 1G, and in the early 1990s it upgraded to 2G when companies enabled people to send text messages between two cellular devices which fascinated the world. Eventually the world moved on to 3G, which imparted the liberation of making phone calls, send text messages, and browse the internet at excellent speed. 4G enhanced many of the capabilities that were made possible only with the third generation of wireless. People could browse the web at lights speed, send text messages, and can make phone calls and they could even download and upload large video files without any issues and without long waiting. Then companies added LTE, abbr. for long term evolution, to 4G connectivity. LTE became the fastest and most consistent variety of 4G and it started competing with the technologies like WiMax in the market. Both technologies resulted in similar outcomes, but it was vital to create a standard for everyone to use. LTE did just that, by making 4G technology even faster and this laid the foundation of 5G. 5G will make it easier for people to download and upload Ultra HD and 3D video. So we can say that there is advancement in the speed of living. It would be fascinating to imagine upgrading your data.

## II. The NEXT GENERATION MOBILE NETWORK

ALLIANCES defines the following pre-requisite for 5G networks:

- Increased Data rates
- 1 Gb per second simultaneously to many workers on the same office floor
- SPECTRAL efficiency more enhanced as compared to 4G
- Coverage speed

**A Sequential summary of all the generations has been given below:**

### 1) 1G

1G (or 1-G) refers to the very first generation of wireless telephone technology (mobile telecommunication). The 1st generation was announced in initial 1980s. With data rate up to 2.4kbps. The subscribers were Advanced Mobile Phone System (AMPS), Nordic Mobile Telephone (NMT), and Total Access Communication System (TACS). The setbacks

of first generation was below par capacity, reckless handoff, inferior access associations, and with no safety measures, since audio calls were accumulated and played in radio towers due to which weakness of these calls from not so needed connections.

## 2) 2G

- 2G (or 2-G) is short-term for second-generation wireless telephone technology.
- 2.5G:- It is generally a 2nd generation cellular system subscription combined with General Packet Radio Services i.e. GPRS and other amenities which doesn't commonly endow in 2G or 1G network.

## 3) 3G

Then, came the introduction of 3rd generation which was established in late 2000. It imparts the world with transmission rate up to 2Mbps. The main purpose of Third generation (3G) system was to merge high speed mobile access to services based on Internet Protocol (IP) and it was successfully accomplished.

## 4) 3.75G

Long-Term Evolution technology (LTE) and Fixed Worldwide Interoperability for Microwave Access (WiMAX) is the outlook of mobile data services. LTE and Fixed WiMAX have the potential to complement the capability of the network.

## 5) 4G

4G is the fourth generation (4th) of wireless mobile telecommunication technology, succeeding 3G and even more fascinating. A 4G system must provide capabilities defined by ITU in IMT-Advanced. 4G is generally referred as the progeny of the 3G and 2G standards. Presently, the standardization of Long Term Evolution (LTE) advanced as forthcoming 4G standards along with Mobile Worldwide Interoperability for Microwave Access commonly called WiMAX is done by 3rd generation partnership project (3GPP).

## 6) 5G

Huge consortiums of major global telecoms are already working to create worldwide values around 5G. Although most of those standards don't get solidified, experts yet expect it to be more compatible (with 4G and 3G) in addition to having some interoperability across the world. With an increment, in the demand of the users exponentially, 4G can now be easily replaced with 5G with a new advanced access technology named as Beam Division Multiple Access i.e. BDMA and or Filter Bank multi carrier abbr. as FBMC multiple access.

## III. CONCLUSION

In this paper, a comprehensive review has been done on the recital necessities of 5th Generation wireless cellular communication systems that have been dened in requisites of data rate, spectral efficiency, latency, capacity, energy efficiency, and Quality of service. In this paper, 5G wireless network architecture has been detailed along with massive MIMO technology, network function virtualization (NFV) cloud and device to device communication. In terms of better quality in future and increased data rate for the inside users and at the corresponding time reduces the pressure from the outside base station, certain short range communication technologies, like Wi-Fi, Small cell, Visible light communication (VLC) and millimeter wave communication (MWC) technologies, has been explained.

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