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BASICS OF 5G TECHNOLOGY AND ITS EVOLUTION

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Abstract - *This paper focuses on the basics of the 5G mobile technology. Its architecture advantages, disadvantages, and features. The comparison of all the generations of mobile technologies has also been discussed in this paper.5G allows users to connect to multiple technologies simultaneously and even switch between them. 5G is abbreviated for Fifth Generation and it allows users within large bandwidth.*

***Key Words*: 5G, Comparison of all generations, 5G architecture**

1.INTRODUCTION

Fifth generation wireless network(5G) are the next proposed telecommunication standard beyond the current 4G standard. 5G technology offers a large bandwidth to the users which has not yet been experienced. It also has many advanced features which make it demanding and a lot powerful in the near future. The different technologies prevailing presently are 3G, LTE(Long Term Evolution), UMTS, Wi-Fi. The 5G technology is based on 4G technology and is supported by MCCDMA(Multi-Carrier Code Division Multiple Access), OFDM(Orthogonal Frequency Division Multiplexing), UWB(Ultra Wide Band) and IPv6.

1.1 Evolution of Wireless Technologies

With the increase in the telecom customers the need to increase the capacity of the mobile networks became necessary. Starting from 1G in 1980s, 2G in 1990s, 3G in 2000s, 4G in 2010s and now 5G, the technologies are advancing and are more and more smart. The below given table shows the comparison of all the generations.

1G technology was based on analog system and was known as AMPS-Advanced Mobile Phone System, but had a limited capacity, poor data communications.

2G technology was based on digital system and used TDMA(for GSM) and CDMA. 2G technology offered services like e-mails and SMS with a low radio power.

3G technology converges the 2G system into global system with features like enhanced multimedia, e-mails, pager, fax, web browsing.

The basic concept of 4G is demonstrated in Fig.1. Using 4G the user can access the information and data anytime anywhere with a good connection. 4G is based on OFDM as it provides better communication quality and is more impervious to the fading and multipath delay.

The table shown below shows the comparison of 1G to 5G

CONTENT	1G	2G	3G	4G	5G
START	1970	1990	2004	NOW	SOON (2020)
DATA BW	2kbps	64kbps	2Mbps	1Gbps	>1Gbps
MULTIPLEX	FDMA	TDMA	CDMA	CDMA	CDMA
SWITCHING	CIRCUIT	CIRCUIT	PACKET	ALL PACKET	ALL PACKET
CORE NETWORK	PSTN	PSTN	PACKET N/W	INTERNET	INTERNET

Table 1: Comparison of 1G to 5G

2. 5G ARCHITECTURE

The 5G mobile system is based on all-IP model which is a common platform for radio access technologies. The network architecture of 5G consists of a user terminal and a number of autonomous radio access technologies. Fig.1 and Fig.2 show the network architecture of 5g and the proposed architecture of 5G respectively.

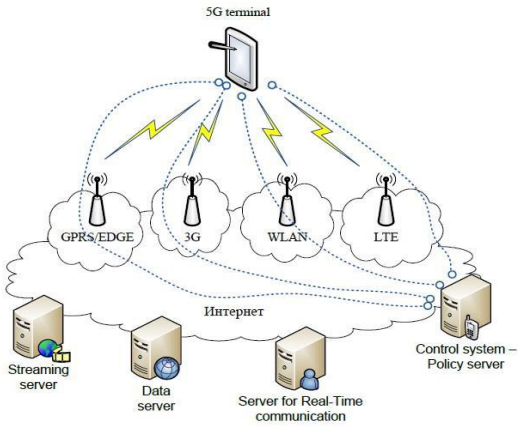

Fig-1: 5G Architecture

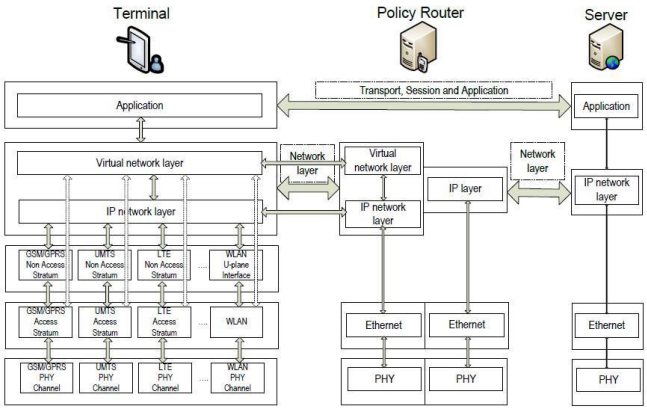

Fig-2: Proposed Architecture of 5G

3. CONCEPTS OF 5G

- 5G offers high resolution to the users.
- It provides high speed, capacity and low cost per bit.
- It offers global access.
- 5G offers transporter class gateway with unparalleled consistency.
- It has high error tolerance thus offers high quality services.
- It supports interactive media, video, internet.
- It provides high uploading and downloading speed to the users.
- It provides large broadcasting of data in Gigabits.
- It also supports virtual private network.

3. CONCLUSIONS

The development of mobile networks is going towards high data rates. This paper shows the advancements and improvements in the wireless technologies with the evolution in it. 5G includes the latest technologies like cognitive radio, all-Ip based model.

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