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5th GENERATION TECHNOLOGY

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ABSTARCT

5G Technology stands for fifth Generation Mobile technology. From generation 1G to 2.5G and from 3G to 5G this world of telecommunication has seen a number of improvements along with improved performance with every passing day. This paper also focuses on all preceding generations of mobile communication along with fifth generation technology. The search for new technology is always the main intention of the prime cell phone giants to out innovate their competitors. In addition, the main purpose of the fifth generation wireless networks (5G Wireless networks) is planned to design the best wireless world that is free from limitations and hindrance of the previous generations The major difference, from a user point of view, between current generations and expected 5G techniques must be something else than increased maximum throughput; other requirements include low battery consumption, more secure. So, this paper represents, , introduction to 5G technologies, why there is a need for 5G, advantages of 5G networks technology, disadvantages of 5G technology,, 5G network architecture.

I. INTRODUCTION

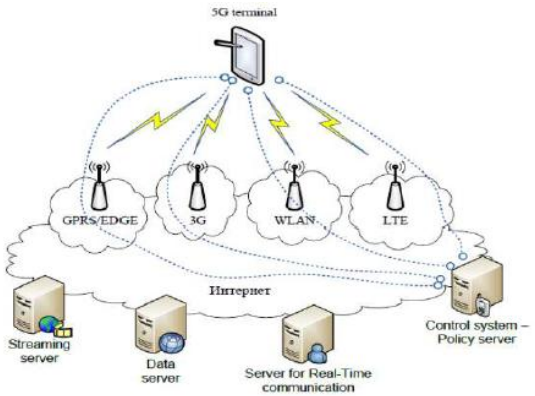
The world has seen a lot of changes in the realm of communication. Mobile wireless industry has started its technology creation, revolution and evolution since early 1970s. In the past few decades, mobile wireless technologies have experience 4 or 5 generations of technology revolution and evolution. In the present time, there are four generations in the mobile industry. These are respectively 1G- the first generation, 2G- the second generation, 3G- the third generation, and then the 4G- the forth generation,5G-the fifth second generation. This world of telecommunications has seen a number of improvements along with improved performance with every passing day. Mobile terminals include variety of interfaces, such as GSM is one, which are based on old-fashioned circuit switching, the technology that is going into its last decade of existence. These technologies (mainly cellular generations) differ from each other based on four main aspects: radio access, data rates, bandwidth and switching schemes . These differences have been noticed in previous generations (1G, 2G, 2.5G and 3G etc.)Now days different wireless and mobile technologies are present such as third generation mobile networks (UMTS- Universal Mobile Telecommunication System, cdma2000), LTE (Long Term Evolution), Wi-Fi (IEEE 802.11 wireless networks), WiMAX (IEEE 802.16 wireless and mobile networks), as well as sensor networks, or personal area networks (e.g. Bluetooth, Zig Bee). 5G technology is on its way to change the way by which most of the users access their handsets. Fifth generation technology provide facilities like camera, MP3 recording, video player, large phone memory, audio player etc. that user never imagine and for children rocking fun with Bluetooth technology and Pico nets. The 5th wireless mobile internet networks are real wireless world which shall be supported by LAS-CDMA (Large Area Synchronized Code-Division Multiple Access), OFDM (Orthogonal frequency-division multiplexing), MCCDMA (Multi-Carrier Code Division

Multiple Access), UWB (Ultra wideband), Network-LMDS (Local Multipoint Distribution Service), and IPv6.People are focusing on getting everything without spending a penny more. Keeping in mind the user's pocket, economic cell phones are introduced with maximum features. With 5G technology you can hook you mobile phone to your laptop for broadband internet access.Fifth generation technology offer very high bandwidth that user never experienced before. The Fifth generation technologies offer various new advanced features which makes it most powerful and in huge demand in the future. 5G technologies use CDMA and BDMA and millimeter wireless that enables seed is greater than 100Mbps at full mobility and higher than1Gbps at low mobility. Fifth generation should be more intelligent technology that interconnects the entire world without limits The world of universal, uninterrupted access to information, entertainment and communication will open new dimension to our lives and change our life style significantly.

II. 5G TECHNOLGY

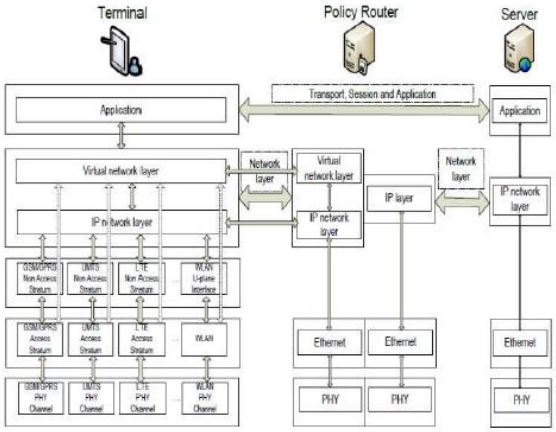
5G network is very fast and reliable. The concept of hand held devices is going to be revolutionized with the advent of 5G. Now all the services and applications are going to be accessed by single IP as telephony, gaming and many other multimedia applications. As it is not a new thing in market and there are millions of users all over the world who have experienced the wireless services wireless technology. It is not easy for them to shrink from using this new 5G network technology. There is only need to make it accessible so that a common man can easily afford the profitable packs offered by the companies so that 5G network could hold the authentic place. There is need to win the customer trust to build fair long term relation to make a reliable position in the telecommunication field. To complete with the preceding wireless technologies in the market 5G network has to tender something reliable something more pioneering. All the features like telephony, camera, mp3 player, are coming in new mobile phone models. 4G is providing all these utility in mobile phone. By seeing the features of 4G one can gets a rough idea about what 5G Networks could offer. There is messenger, photo gallery, and multimedia applications that are also going to be the part of 5G. There would be no difference between a PC and a mobile phone rather both would act vice versa. Although 5G is not scheduled for launch until 2020, some manufacturers are already incorporating elements of the coming standard's specifications into their products.

III. ARCHITECTURE



The system model that proposes design of network architecture for 5G mobile systems, which is all-IP based model for wireless and mobile networks interoperability. The system consists of a user terminal (which has a crucial role in the new architecture) and a number of independent, autonomous radio access technologies. Within each of the terminals, each of the radio access technologies is seen as the IP link to the outside Internet world. However, there should be different radio interface for each Radio Access Technology (RAT) in the mobile terminal. For an example, if we want to have access to four different RATs, we need to have four different access - specific interfaces in the mobile terminal, and to have all of them active at the same time, with aim to have this architecture to be functional.

The first two OSI levels (data-link and physical levels) are defining the radio access technologies through which is provided access to the Internet with more or less QoS support mechanisms, which is further dependent upon the access technology (e.g., 3G and WiMAX have explicit QoS support, while WLAN has not) . Then, over the OSI-1 and OSI-2 layers is the network layer, and this layer is IP (Internet Proto col) in today's communication world, either IPv4 or IPv6, regardless of the radio access technology.



The purpose of IP is to ensure enough control data (in IP header) for proper routing of IP packets belonging to a certain application connections - sessions between client applications and servers somewhere on the Internet. Routing of packets should be carried out in accordance with established policies of the user.

IV. CAMPARISON

- **First generation, 1G:** These phones were analogue and were the first mobile or cellular phones to be used. Although revolutionary in their time they offered very low levels of spectrum efficiency and security.
- **Second generation, 2G:** These were based around digital technology and offered much better spectrum efficiency, security and new features such as text messages and low data rate communications.
- **Third generation, 3G:** The aim of this technology was to provide high speed data. The original technology was enhanced to allow data up to 14 Mbps and more.
- **Fourth generation, 4G:** This was an all-IP based technology capable of providing data rates up to 1 Gbps.
- **Fifth generation, 5G:** This is a high speed, high capacity 5G technology providing large broadcasting of data in Gbps.

V. 5G SPECIFICATIONS

SPECIFICATION ON 5G WIRELESS PERFORMANCE	
PARAMETER	PERFORMANCE
Network capacity	10 000 times capacity of current network
Peak data rate	10 Gbps
Cell edge data rate	100 Mbps
Latency	< 1 mS
Bandwidth	Possibly 1-2 GHZ

VI. CURRENT RESEARCH

There are several key areas that are being investigated by research organizations

- **Millimeter**-Wave technologies: Using frequencies much higher in the frequency spectrum opens up more spectrum and also provides the possibility of having much wide channel bandwidth - possibly 1 - 2 GHz.
- **Duplex methods:** There are several candidate forms of duplex that are being considered. Currently systems use either frequency division duplex, FDD or time division duplex, TDD. New possibilities are opening up for 5G including flexible duplex, where the time or frequencies allocated are variable according toth e load in either direction or a new scheme called division free duplex or single channel full duplex.
- **Massive MIMO*:*** Although MIMO is being used in many applications from LTE to Wi-Fi, etc, the numbers of antennas is fairly limited -. Using microwave frequencies opens up the possibility of using many tens of antennas on a single equipment becomes a real possibility because of the antenna sizes and spacing in terms of a wavelength.
- **Dense networks** Reducing the size of cells provides a much more overall effective use of the available spectrum. Techniques to ensure that small cells in the macro-network and deployed as femtocells can operate satisfactorily are required.

VII. OTHER 5G CONCEPTS

There are many new concepts that are being investigated and developed for the new 5th generation mobile system. Some of these include:

- **Pervasive networks *:*** This technology being considered for 5G cellular systems is where a user can concurrently be connected to several wireless access technologies and seamlessly move between them.
- **Group cooperative relay:** This is a technique that is being considered to make the high data rates available over a wider area of the cell. Currently data rates fall towards the cell edge where interference levels are higher and signal levels lower.
- **Cognitive radio technology:** If cognitive radio technology was used for 5th generation, 5G cellular systems, then it would enable the user equipment / handset to look at the radio landscape in which it is

located and choose the optimum radio access network, modulation scheme and other parameters to configure itself to gain the best connection and optimum performance.

- **Wireless mesh networking and dynamic ad-hoc networking:** With the variety of different access schemes it will be possible to link to others nearby to provide ad-hoc wireless networks for much speedier data flows.
- **Smart antennas:** Another major element of any 5G cellular system will be that of smart antennas. Using these it will be possible to alter the beam direction to enable more direct communications and limit interference and increase overall cell capacity.

VIII. DISADVANTAGES

hough, 5G technology is researched and conceptualized to solve all radio signal problems and hardship of mobile world, but because of some security reason and lack of technological advancement in most of the geographic regions, it has following shortcomings −

- Technology is still under process and research on its viability is going on.
- The speed, this technology is claiming seems difficult to achieve (in future, it might be) because of the incompetent technological support in most parts of the world.
- Many of the old devices would not be competent to 5G, hence, all of them need to be replaced with new one — expensive deal.
- Developing infrastructure needs high cost.
- Security and privacy issue yet to be solved.

IX. ADVANTAGES

- High resolution and bi-directional large bandwidth shaping.
- Technology to gather all networks on one platform.
- More effective and efficient.
- Technology to facilitate subscriber supervision tools for the quick action.
- Most likely, will provide a huge broadcasting data (in Gigabit), which will support more than 60,000 connections.
- Easily manageable with the previous generations.
- Technological sound to support heterogeneous services (including private network).
- Possible to provide uniform, uninterrupted, and consistent connectivity across the world.

X. WHY IS 5G REQUIRED?

The major difference, from a user point of view, between current generations and expected 5G techniques must be something else than increased maximum throughput; other requirements include: •Lower outage probability; better coverage and high data rates available at cell edge. •Lower battery consumption.

•Multiple concurrent data transfer paths. •Around 1Gbps data rate in mobility.
•More secure; better cognitive radio/SDR Security.
•Higher system level spectral efficiency.
•World Wide wireless web (WWWW).
•More applications combined with artificial intelligent (AI) as human life will be surrounded by artificial sensors which could be communicating with mobile phones. Not harmful to human health.
•Cheaper traffic fees due to low infra structure deployment costs.

XI. FUTURE SCOPE

5G network technology will reveal a new era in mobile communication technology. 5^{th} generation technology is designed to provide incredible and remarkable data capabilities, unhindered call volumes, and immeasurable data broadcast within the latest mobile operating system5G technology offer high resolution for crazy cell phone user. 5G technology will provide supper and perfect utilization of cellular communication in future. We can monitor any place of the world from anywhere, observe space and watch TV channels at HD clarity in our mobile phones without any interruption. There will be exciting amusement unbelievable services. The 5G mobile phones will be a tablet PC and amazing. Many mobile embedded technologies will evolve.

XII. CONCLUSION

In this paper we have surveyed 5G technology for mobile communication. The 5G technology is designed as an open platform on different layers, from the physical layer up to the application. The 5G mobile technology will be implemented at the end of the current decade A new revolution of 5G technology is about to begin because 5G technology going to give tough completion to normal computer and laptops whose marketplace value will be affected. There are lots of improvements from 1G, 2G, 3G, and 4G to 5G in the world of mobile communication. The new coming 5G technology is available in the market at inexpensive rates, high peak expectations and much reliability than its foregoing technologies It is expected that the initial Internet philosophy of keeping the network simple as possible, and giving more functionalities to the end nodes, will become reality in the future generation of mobile networks, here referred to as 5G.Fifth generation technologies offers tremendous data capabilities and unrestricted call volumes and infinite data broadcast together within latest mobile operating system. Fifth generation should make an important difference and add more services and benefits to the world over 4G.

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