

# 5G WIRELESS TECHNOLOGY

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**Fig:1**

## I.ABSTRACT:

The abbreviation of 5G is Fifth Generation Mobile Technology. From the generation 1G to 5G, the field of telecommunications has experienced many advancement,as well as the performance get enhanced day by days. This rapid transformation in mobile computing alters our daily lives in terms of how we work, interact, and learn. In addition, it concentrates on all previous generations of mobile communication technology, as well as fifth generation technology. 5G network gives low-cost wireless communication with very high speed. The study sheds light on fifth-generation network design. the word "5G" is still unavailable for use. The research for 5G is being conducted on the development of the World Wide Wireless Web, Dynamic Adhoc Wireless Networks, and Real Wireless World.

## II.INTRODUCTION:

Early in the 1970s, wireless communication first appeared. Mobile technology get developed from 1G to 5G over the following four decades.

Using fifth generation technology, consumers can take advantage of very high bandwidth for the first time. The fifth generation of technologies offers a number of novel, features like cutting-edge, making it potent and high demand for future. The third generation of mobile networks, Universal Mobile Telecommunication System, CDMA2000, Long Term Evolution, IEEE 802.11 wireless networks, IEEE 802.16 wireless and mobile networks, as well as sensor networks or personal area networks (such as Bluetooth, ZigBee), are all currently available. Several circuit switching-based interfaces, like GSM, are present in mobile terminals.

Wireless and mobile networks use the IP concept, which mandates that all data and signals must be sent through the layer called network layer using IP.The fifth generation of technology offers features that users could never have imagined, such as cameras, MP3 players, video recorders, big phone memory, audio players, and rocking fun for kids with Piconets and Bluetooth.The 5G

of wireless mobile internet networks allows for limitless wireless communication, creating the World Wide Wireless Web's ideal wireless real world . The fourth generation uses 4G technology. Large Area Synchronized Code-Division Multiple Access, Orthogonal Frequency-Division Multiplexing, Multi-Carrier Code Division Multiple Access, Ultra-wideband, Network-Local Multipoint Distribution Service, and IPv6 are necessary for the fifth wireless mobile internet networks. With the recent mobile OS, fifth generation technologies offer enormous data capabilities, unlimited calls, and boundless data broadcast.

**III.COMPARISION OF 4G AND 5G:**

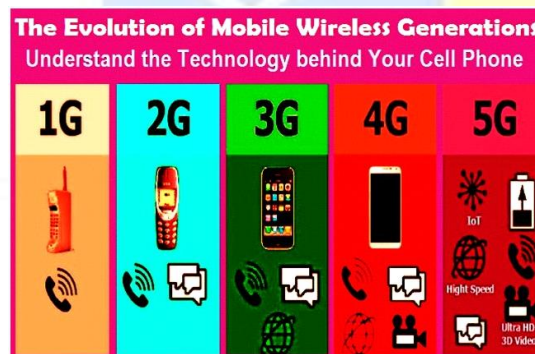
Should dramatically improve thing and bring additional services and advantages to the world.The technology of the 5G want to be more developed and its global connectivity should be limitless.Around 2020 is when this generation is expected to be introduced. The fifth generation of technology must be more sophisticated and boundless in its worldwide has connectivity.The fifth generation of technology must be more sophisticated and boundless in its worldwide connectivity.This generation is anticipated to appear around the year of 2020.



*Fig: Wireless Communication System*

**Fig2:wireless communication system**

**EVOLUTION OF WIRELESS TECHNOLOGIES:**



**Fig3:**

In last few years due to fast revolution in mobile technology,the mobile communication become more popular.The revolution is started because the telecoms customers increase.This revolution is from 1G, 2G,3G,4G and then 5G.

**A. First Generation(1G)**

First Generation emerged in 1980s. It contains Analog System and popularly known as cell phones. It introduces mobile technologies such as Mobile Telephone System (MTS), Advanced Mobile Telephone System (AMTS), Improved Mobile Telephone Service (IMTS), and Push to Talk (PTT). It uses analog radio signal which have such frequency 150 MHz, voice call modulation is done using a technique called Frequency-Division Multiple Access (FDMA). It has low capacity, unreliable handoff, poor voice links, and no security at all since voice calls were played back in radio towers, making these calls susceptible to unwanted eavesdropping by third parties.

**B. Second Generation(2G)**

Late in the 1980s, 2G first appeared. It transmits voice using digital signals at a speed of 64 kbps. It uses a bandwidth of 30 to 200 KHz and offers SMS (Short Message Service) functionality. A data rate of up to 144 kbps is provided by the 2.5G system, which is used in place of the 2G network. such as GPRS, CDMA, and EDGE

**C. Third Generation(3G)**

It utilises a broad brand of wireless network that improves clarity. The technology known as packet switching is used to send the data. Through Circuit Switching, voice calls are also understood. Data services, access to television/video, and new services like global roaming are also included along with spoken communication. It has a frequency band of 2100 MHz, a bandwidth of 15-20 MHz, and is utilised for high-speed internet and video chatting. Wide Band Voice Channel, used by 3G, reduces the world to the size of a small hamlet since it allows users to send and receive messages from others anywhere in the world.

**D. Fourth Generation(4G)**

4G offers a downloading speed of 100Mbps. 4G provides same feature as 3G and additional services like Multi-Media Newspapers, to watch T.V programs with more clarity and send Data much faster than previous generations. LTE (Long Term Evolution) is considered as 4G technology. 4G is being developed to accommodate the QoS and rate requirements set by forthcoming applications like wireless broadband access, Multimedia Messaging Service (MMS), video chat, mobile TV, HDTV content, Digital Video Broadcasting (DVB), minimal services like voice and data, and other services that utilize bandwidth.

**LITERATURE SURVEY:**

5G Technology stands for fifth Generation Mobile technology. From generation 1G to 2.5 G and from 3G to 5G this world of telecommunication has seen a number of improvements along with improved performance with every passing day. This fast revolution in mobile computing changes our day to day life that is way we work, interact, learn etc. This paper also focuses on all preceding generations of mobile communication along with fifth generation technology. Fifth generation network provide affordable broadband wireless connectivity (very high speed). The paper throws light on network architecture of fifth generation technology. Currently 5G term is not officially used. In fifth generation researches are being made on development of World Wide Wireless Web (WWWW), Dynamic Adhoc Wireless Networks (DAWN) and Real Wireless World. Fifth generation focus on (Voice Over IP) VOIP-enabled devices that user will



experience a high level of call volume and data transmission. Fifth generation technology will fulfill all the requirements of customers who always want advanced features in cellular phones. The main features in 5G mobile network is that user can simultaneously connect to the multiple wireless technologies and can switch between them. This forthcoming mobile technology will support IPv6 and flat IP. Fifth generation technology will offer the services like Documentation, supporting electronic transactions (e-Payments, e-transactions) etc

#### IV.MATERIAL & METHODS:

##### A.5G ARCHITECTURE:



**Fig4:**

Fifth generation mobile systems model is all-IP based model for wireless and mobile networks interoperability. The All-IP Network (AIPN) is capable to fulfill increasing demands of the cellular communications market. It is a common platform for all radio access technologies. The AIPN uses packet switching and its continuous evolution provides optimized performance and cost. In fifth generation Network Architecture consist of a user terminal has (which has a crucial role in the new architecture) and a number of independent, autonomous radio access technologies (RAT). In 5G Network Architecture all IP based mobile applications and services such as Mobile portals, Mobile commerce, Mobile health care, Mobile government, Mobile banking and others, are offered via Cloud Computing Resources (CCR). Cloud computing is a model for convenient on-demand network access to configurable computing resources (e.g., networks, servers, storage, applications, and services). Cloud computing allows consumers to use applications without installation and access their personal data at any computer with internet access. CCR links the Reconfigurable Multi Technology Core (RMTc) with remote reconfiguration linked to Reconfiguration Data models are data from RRD (RDM). Dealing with the proliferation of multiple radio access technologies is an RMTc's principal problem. The foundation is an All IP Platform-based convergence of radio, cloud computing, and nanotechnology. Based on network conditions and/or user needs, Core alters its communication functionalities. In addition to 802.11x WLAN and 802.16x WMAN, RMTc is connected to a variety of radio access technologies, ranging from 2G/GERAN through 3G/UTRAN and 4G/EUTRAN. Additional standards, like IS/95, EV-DO, CDMA2000, etc., are also supported. Both the terminal and the RMTc can choose from a variety of access systems thanks to interoperability process-criteria and processes.

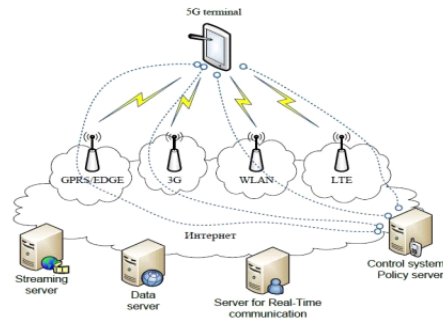


Fig: 5G Network Architecture

**Fig5: network architecture**

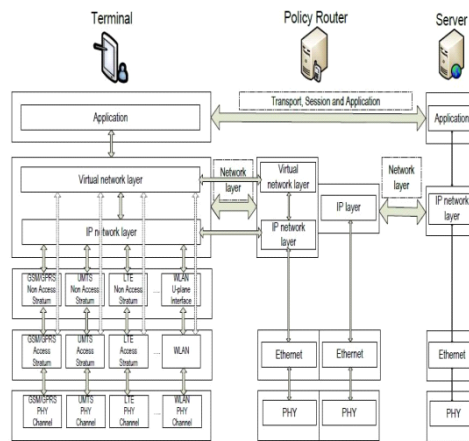
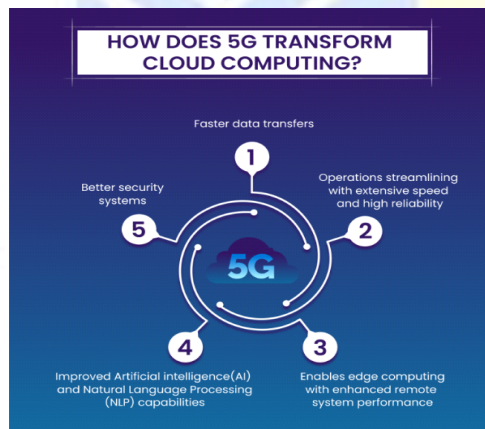


Fig: Proposed Architecture of 5G

**Fig6: proposed architecture of 5g**

**B.CLOUD COMPUTING:**



**Fig7**

According to a definition from, "Cloud computing is a model for enabling universal, practical, on-demand network access to a shared pool of configurable computing resources (e.g., networks, servers, storage, applications, and services) that can be quickly provisioned and released with little management effort or service provider interaction. In light of this, cloud computing is a technology that to maintain data and applications, use the internet and a central remote server.

This central remote server in 5G networks might be a content provider. Using applications without installing them, consumers and businesses can access their personal files from any computer with an internet connection thanks to cloud computing. The same idea will be used to multi-core technology when a user attempts to use cloud computing to access his private account with a major content provider.

### **C.QUALITY OF SERVICE(QoS):**

The Next Generation Networks (NGN) include support features for data and control transfer, as well as features for services and application support. A fundamental control activity for delivering quality of service is traffic measurement. Also, the highest Quality of Service was used in the creation of the 5G communication infrastructure (QoS). A network's capacity to handle additional network performance factors including latency, error rate, and uptime is referred to as Quality of Service (QoS). Controlling and managing network resources by assigning priorities to particular data kinds (video, audio, and files) on the network are further aspects of quality of service. Network traffic produced for video on demand, IPTV, VoIP, streaming media, videoconferencing, and online gaming is the only traffic to which QoS is applied.

Prioritizing networks with dedicated bandwidth, regulated jitter, reduced latency, and enhanced loss characteristics is the main objective of quality of service. The fundamental building blocks for upcoming business applications across campus, wide area, and service provider networks are provided by its technologies. For the implementation of basic QoS, the following three elements are essential:

- Methods for identifying and tagging network elements to coordinate QoS end-to-end.
- QoS for just one network component.
- QoS management, policy, and accounting features for managing and controlling end-to-end traffic on a network.

### **D.WHY 5G?:**



**Fig8:**



- It supports interactive multimedia, audio, video, Internet, and other broadband services, making them more efficient and appealing.
  - It also has very high speed, high capacity, and low cost per bit.
  - It also has bi-directional, accurate traffic statistics.
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- 5G technology provides portable services and global access.
  - Due to its high mistake tolerance, it provides high-quality services.
  - It offers high-speed broadcasting up to gigabit, enabling nearly 65,000 simultaneous connections.
  - As artificial sensors that could communicate with mobile phones will surround human existence, there will be more applications combining AI.
    - Remote administration is used in 5G technology so that users can get better and faster solutions.
    - The 5G technology has a very fast upload and download speed.
    - 5G technology offers bi-directional large bandwidth shaping and high resolution for crazy mobile phone users.
    - Transporter-class gateways with unmatched consistency are offered by 5G technology.

#### E.UPCOMING OF 6G:



#### V.CONCLUSION:

Higher data rates and the all-IP concept are on the horizon for wireless and mobile networks. Each year, mobile terminals get better processing capabilities, more onboard memory, and extended battery life for the same applications. The newest technologies, including cognitive radio, SDR, nanotechnology, cloud computing, and All IP Platform, are included in 5G. In the upcoming generation of mobile networks, referred to as 5G, it is anticipated that the original

Internet philosophy of keeping the network as simple as possible and providing more functionalities to the end nodes will become reality.

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