

5G Mobile Technology

Nitin Sharma, Mr. Mohan Vishal Gupta Sir

¹MCA, CCSIT, Teerthanker Mahaveer University, Moradabad

². Assistant Professor, Teerthanker Mahaveer University, Moradabad

sharad84532@gmail.com

Abstract— This short paper introduces about the next generation that is 5G Technology. 5G Technology stands for fifth Generation Mobile technology. From generation 1G to 5G this world of telecommunication has seen variety of enhancements along side improved performance with each passing day. This quick revolution in mobile computing changes our day to day life that's manner we tend to work, interact, learn etc. This paper conjointly focuses on all preceding generations of mobile communication along side fifth generation technology. Fifth generation network give cheap broadband wireless property (very high speed). The paper throws lightweight on spec of fifth generation technology. presently 5G term isn't formally used. In fifth generation researches are being created on development of World Wide Wireless net (WWWW), Dynamic unintentional Wireless Networks (DAWN) and Real Wireless World. Fifth generation concentrate on (Voice Over IP) VOIP-enabled devices that user can expertise a high level of decision volume and knowledge transmission. Fifth generation technology can fulfil all of shoppers WHO invariably want advanced options in cellular phones. the most options in 5G mobile network is that user will at the same time connect with the multiple wireless technologies and might switch between them. This forthcoming mobile technology can support information processing IPv6 and flat IP.

Keywords— 5G, 5G Architecture, Evolution from 1G to 5G, Comparison of all Generations, Applications of 5G, Advantage and Disadvantage of 5G, Why 5G?

I. INTRODUCTION

Wireless communication has started in early Seventies. In next four decades, a mobile wireless technology has evolved from 1G to 5G generations.

Fifth generation technology provide terribly high information measure that user ne'er knowledgeable about before. The Fifth generation technologies provide varied new advanced options that makes it most powerful and in vast demand within the future. currently days completely different wireless and mobile technologies are gift like third generation mobile networks (UMTS- Universal Mobile telecom equipment, cdma2000), LTE (Long Term Evolution), Wi-Fi (IEEE 802.11 wireless networks), Wi-MAX (IEEE 802.16 wireless and mobile networks), furthermore as device networks, or personal space networks (e.g. Bluetooth, ZigBee).

Mobile terminals embody kind of interfaces like GSM that are supported circuit switch. All wireless and mobile networks implements all-IP principle, meaning all knowledge and signalling are transferred via scientific discipline (Internet Protocol) on network layer. generation technology offer facilities like camera, MP3 recording, video player, giant phone memory, audio player etc. that user ne'er imagine and for youngsters rocking fun with Bluetooth technology and Piconets. The fifth generation wireless mobile multimedia system web networks may be utterly wireless communication while not limitation, that makes excellent wireless universe – World Wide Wireless net (WWWW). Fifth generation is predicated on 4G technologies. The fifth wireless mobile web networks are real wireless world that shall be supported by LAS-CDMA (Large space synchronic Code-Division Multiple Access), OFDM (Orthogonal frequency-division multiplexing), MCCDMA (Multi-Carrier Code Division Multiple Access), UWB (Ultra-wideband), Network-LMDS (native Multipoint Distribution Service), and IPv6. Fifth generation technologies offers tremendous knowledge capabilities and unrestricted decision volumes and infinite knowledge broadcast along at intervals latest mobile software package. Fifth generation ought to create a vital distinction and add a lot of services and advantages to the planet over 4G. Fifth generation ought to be a lot of intelligent technology that interconnects the whole world while not limits. This generation is predicted to be discharged around 2020. the planet of universal, uninterrupted access to data, diversion and communication can open new dimension to our lives and alter our life vogue considerably.

II. WHY NEED OF 5G?

- 1) It supports object-oriented database management system, voice, video, Internet, and different broadband services, more effective and a lot of enticing, and have Bidirectional, correct traffic statistics.
- 2) 5G technology offers international access and service movableness.
- 3) It offers the top quality services as a result of high error tolerance.
- 4) it's providing massive broadcasting capability up to Gigabit that supporting virtually many connections at a time.
- 5) a lot of applications combined with artificial intelligent (AI) as human life are surrounded by Artificial sensors that maybe communication with mobile phones .
- 6) 5G technology use remote management that user will retrieve and quick resolution. The uploading and downloading speed of 5Gtechnology is extremely high.
- 7) 5G technology provide high resolution for crazy cell phone user and bi-directional massive bandwidth shaping .
- 8) 5G technology provide transporter category entrance with unequalled consistence

III. EVOLUTION

Mobile communication has become a lot of well-liked in previous couple of years as a result of quick revolution in mobile technology. This revolution is as a result of terribly high increase in telecoms customers. This revolution is from 1G- the primary generation, 2G- the second generation, 3G- the third generation, then the 4G- the forth generation, 5G-the fifth second generation.

A) First Generation(1G)--

1G emerged in Eighties. It contains Analog System and popularly called cell phones. It introduces mobile technologies like Mobile communication system (MTS), Advanced Mobile communication system (AMTS), Improved Mobile phone service (IMTS), and Push to speak (PTT). It

COMPARISION CHART OF ALL GENERATIONS TECHNOLOGY-

uses analog radio emission that have frequency one hundred fifty megacycle per second, voice decision modulation is completed employing a technique referred to as Frequency-Division Multiple Access (FDMA).It has low capability, unreliable football play, poor voice links, and no security in any respect since voice calls were contend back in radio towers, creating these calls liable to unwanted eavesdropping by third parties.

B) Second Generation(2G)--

2G emerged in late Nineteen Eighties. It uses digital signals for voice transmission and has speed of sixty four kbps. It provides facility of SMS(Short Message Service) and use the information measure of thirty to two hundred rate. Next to 2G, 2.5G system uses packet switched AND circuit switched domain and supply rate up to one hundred forty four kbps. E.g. GPRS, CDMA and EDGE. eavesdropping by third parties

C) Third Generation(3G)--

It uses Wide complete Wireless Network with that clarity is inflated. the info ar sent through the technology known as Packet shift. Voice calls ar understood through Circuit shift. along side verbal communication it includes knowledge services, access to television/video, new services like international Roaming. It operates at a variety of 2100MHz and includes a in any respect since voice calls were compete back in radio towers, creating these calls prone to unwanted eavesdropping by third parties

D) Fourth Generation(4G)--

4G offers a downloading speed of 100Mbps.4G provides same feature as 3G and extra services like Multi-Media Newspapers, to watch T.V programs with a lot of clarity and send knowledge abundant quicker than previous generations. LTE (Long Term Evolution) is taken into account as 4G technology. 4G is being developed to accommodate the QoS and rate needs set by forthcoming applications like wireless broadband access.

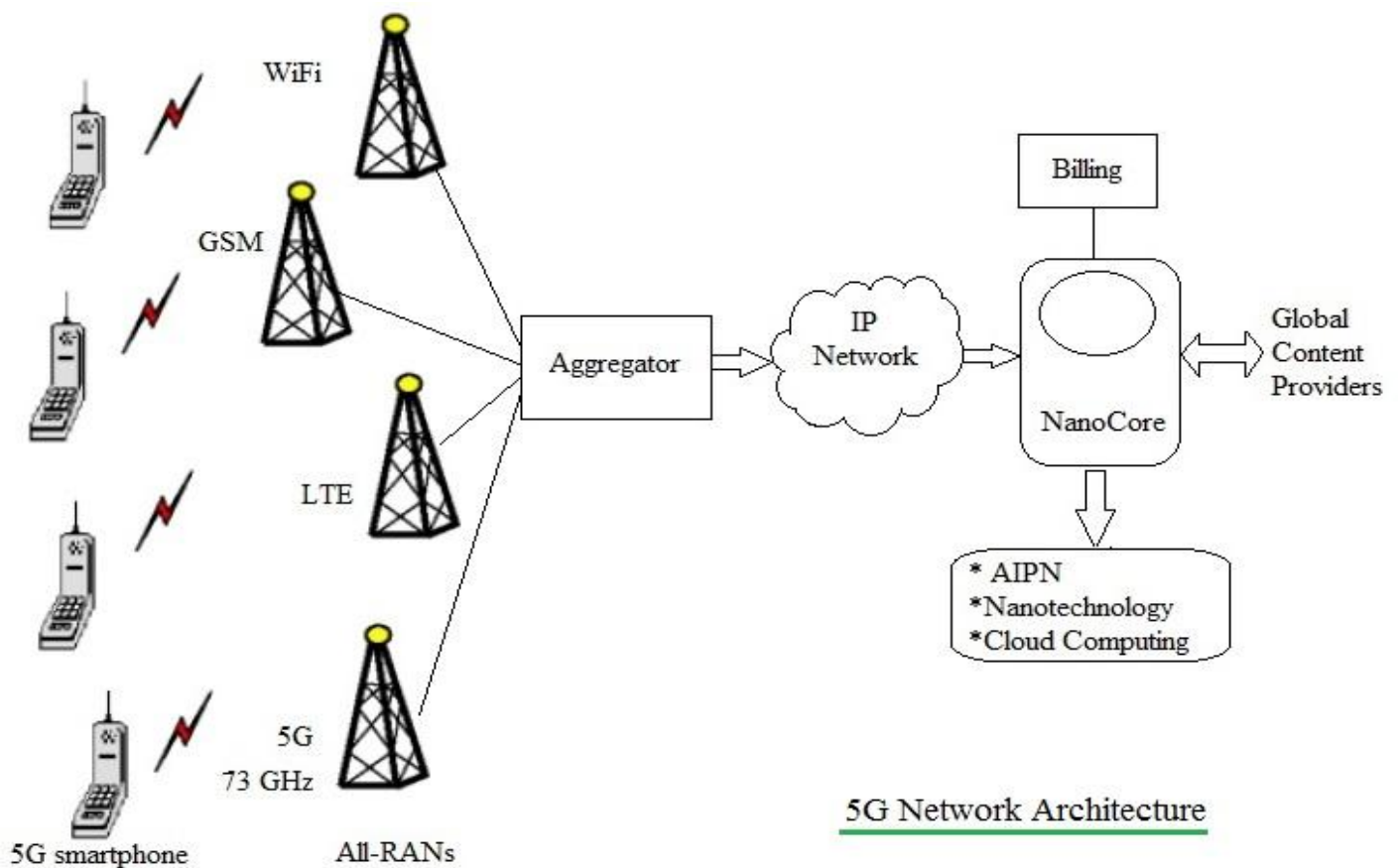
| Generation→ Features↓ | 1G | 2G | 3G | 4G | 5G |
|--------------------------|---|---|---|---|--|
| Deployment | 1970 – 1980 | 1990 - 2001 | 2001-2010 | 2011 | 2015-20 onwards |
| Data Rates | 2kbps | 14.4-64kbps | 2Mbps | 200 Mbps to 1 Gbps | 1Gbps and higher |
| Technology | Analog Cellular Technology | Digital Cellular Technology: Digital narrow band circuit data Packet data | Digital Broadband Packet data: CDMA 2000 EVDO UMTS EDGE | Digital Broadband Packet data: WiMax LTE Wi-Fi | www Unified IP seamless combination of broadband LAN PAN MAN WLAN |
| Service | Analog voice service No data service | Digital voice with higher clarity SMS, MMS Higher capacity packetized data | Enhanced audio video streaming video conferencing support Web browsing at higher speeds IPTV support | Enhanced audio, video streaming IP telephony HD mobile TV | Dynamic Information access, Wearable devices with AI Capabilities |
| Multiplexing Switching | FDMA | TDMA, CDMA | CDMA | CDMA | CDMA |
| Core Network | PSTN | PSTN | Packet N/W | Internet | Internet |
| Standards | MTS AMTS IMTS | 2G:GSM 2.5:GPRS 2.75:EDGE | IMT-2000 3.5G-HSDPA 3.75G:HSUPA | Single unified standard LTE, WiMAX | Single unified standard |
| WEB Standard | | www | www(IPv4) | www (IPv4) | www (IPv6) |
| Handoff | Horizontal only | Horizontal only | Horizontal & Vertical | Horizontal & Vertical | Horizontal & Vertical |
| Shortfalls | Low capacity, Unreliable handoff, Poor voice links, Less secure | Digital signals were reliant on location & proximity, required strong digital signals to help mobile phones | Need to accommodate higher network capacity | Being deployed | Yet to be implemented |

TABLE 1
COMPARISON OF ALL GENERATIONS OF MOBILE TECHNOLOGIES

IV. 5G NETWORK ARCHITECTURE

Figure-1 depicts 5G spec. As shown 5G network uses flat information science construct so completely different RANs (Radio Access Networks) will use an equivalent single Nano-core for communication. RANs supported by 5G design are GSM, GPRS/EDGE, UMTS, LTE, LTE-advanced, WiMAX, WiFi, CDMA2000, EV-DO, CDMA One, IS-95 etc. Flat information science design establishes devices exploitation symbolic names in contrast to hierarchical design wherever in traditional information science addresses are used. This design reduces variety of network components in knowledge path and therefore reduces value to larger extent. It conjointly minimizes latency.

5G mortal aggregates all the RAN traffics and route it to entranceway. 5G mortal is found at BSC/RNC place. 5G mobile terminal homes different radio interfaces for every RAT so as to produce support for all the spectrum access and wireless technologies. Another part within the 5G spec is 5G nano-core. It consists of applied science, cloud computing, All information science design. Cloud computing utilizes net also as central remote servers to take care of knowledge and applications of the users. It permits customers to use applications with none installation and access their files from any pc across the world with the utilization of net.



(Figure-1 Network Architecture of 5G)

V. FEATURES

- 5G technology supply high resolution for crazy cell phone user and bi-directional giant information measure shaping.
- The advanced request interfaces of 5G technology makes it a lot of engaging and 5G technology conjointly providing subscriber direction tools for quick action.
- The prime quality services of 5G technology supported Policy to avoid error.
- 5G technology is providing giant broadcasting of knowledge in Gigabit that supporting virtually sixty five,000 connections.
- 5G technology supply transporter category entryway with incomparable consistency.
- The traffic statistics by 5G technology makes it a lot of correct.
- Through remote management offered by 5G technology a user will bounce back and quick resolution.

VI. ADVANTAGE OF 5G TECHNOLOGY

- 5G provides information information measure of one Gbps or higher.
- 5G is globally accessible and it offered at low value.
- Education can become easier – A student sitting in any a part of world will attend the category.
- potential to find and search the missing person.
- potential, natural disaster as well as tidal wave, earthquake etc. will be detected quicker.
- Parallel multiple services, like you'll recognize weather and placement whereas talking with different person.

VII. DISADVANTAGE OF 5G TECHNOLOGY

- Technology remains beneath method and analysis on its viability goes on.
- The remote medical specialty additionally a good feature of 5G technology.

- The 5G technology is providing up to twenty five Mbps property speed.
- The 5G technology additionally support virtual non-public network.
- The new 5G technology can take all delivery service out of business prospect.
- The uploading and downloading speed of 5G technology touching the height.
- 11) Security and privacy issue nevertheless to be resolved

APPLICATIONS

- wearable device with AI capabilities.
- Pervasive(Global)networks.
- Radio resource management.
- VoIP (Voice over IP).

VIII. CONCLUSION

The development of the mobile and wireless networks goes towards higher knowledge rates and all-IP principle. Mobile terminals square measure

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- The 5G technology network giving increased and accessible property as regards to the planet.
- 5G provides dynamic info access
- helpful to domestic user.
- several of the recent devices wouldn't be competent to 5G, hence, all of them got to get replaced with new one costly deal.
- Developing infrastructure desires high price.

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