

A Case Study on Fifth Generation Mobile Technology

E. Kanniga and Saurav Kumar

Abstract--- *The idea about 1g, 2g, 3g, and as of now all far flung industry is occupied with the institutionalization of the fourth technology (4G) cell systems. The 4G concept have officially moved to the institutionalization level, we must begin to take a shot on the constructing squares of the 5G remote systems. 5G Technology represents 5th Generation of Mobile innovation. From age 1G to two.5G and from 3G to 5G this universe of media transmission has visible numerous improvements alongside superior execution as time passes. This quick disillusioned in versatile registering changes our everyday existence that is way we paintings, collaborate, study and a few more. The big difference, from a consumer attitude, between modern a long time and anticipated 5G structures should be something extraordinary than elevated maximum extreme throughput; specific conditions incorporate low battery usage, steadily at ease. We allude to this paper likewise centers round each unmarried going earlier than age of flexible correspondence alongside fifth era innovation. Fifth technology arranges give slight broadband far flung availability (speedy). The paper without in addition ado depicts the device layout of fifth generation innovation. In 5th generation explores are being made on development of numerous new advances like World Wide Wireless Web (WWWW), Dynamic Adhoc Wireless Networks (DAWN) and Real Wireless World. Fifth technology middle around (Voice Over IP) VOIP-empowered devices that consumer will come across an ordinary country of name quantity and statistics transmission. Fifth generation innovation will fulfill every one of the requirements of clients who dependably need propelled consists of in mobile phones. The principle consists of in 5G flexible system is that patron can at the equal time interface with the various faraway improvements and can transfer among them. This inevitable flexible innovation will bolster IPv6 and level IP. Fifth generation innovation will provide the administrations like Documentation, helping electronic exchanges (e-Payments, e-exchanges) and so forth.*

Keywords--- *0G, 1G, 2G, 3G, 4G, 5G, Evolution from 0G to 5G.*

I. INTRODUCTION

Remote correspondence has begun in mid 1970s. In next four decades, a versatile remote innovation has developed from 1G to 5G ages. The present mobile phones have everything. Today telephones have everything going from the littlest size, biggest telephone memory, speed dialing, video player, sound player, and camera, etc. As of late with the advancement of Pico nets and Bluetooth innovation information sharing has turned into a Fifth era innovation. And furthermore it offer high transfer speed that client never experienced. The Fifth era innovations offer different new propelled highlights which makes it most dominant and in immense interest later on. Presently days distinctive remote and versatile advancements are available, for example, third era portable systems (UMTS-

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Universal Mobile Telecommunication System, cdma2000), LTE (Long Term Evolution),

WiFi (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, ZigBee). Mobile terminals include variety of interfaces like GSM which are based on circuit switching. All wireless and mobile networks implements all-IP principle, that means all data and signaling will be transferred via IP (Internet Protocol) on network layer. The fifth generation wireless mobile multimedia internet networks can be completely wireless communication without limitation, which makes perfect wireless real world – World Wide Wireless Web (WWW). Fifth generation is based on 4G technologies. 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. 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. Fifth generation should be more intelligent technology that interconnects the entire world without limits. This generation is expected to be released around 2020. 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. EVALUATION OF MOBILE TECHNOLOGY

Classical 0G

Remote phone began with what you may call 0G . 0G utilized recurrence division various access or (FDMA).The first 0G framework was called MTS (cell phone system),came about in 1946 by chime Telephone .essentially connected the versatile and the remote correspondence to the phone framework. What’s more, it additionally utilized PTT (Push to Talk), IMTS (Improved Mobile Telephone Service), AMTS (Advanced Mobile Telephone System), OLT (Norwegian for Offending Landmobile Telephone). After 0G our innovation created step by step and 1G,2G 3G ,4G,and future 5G come .

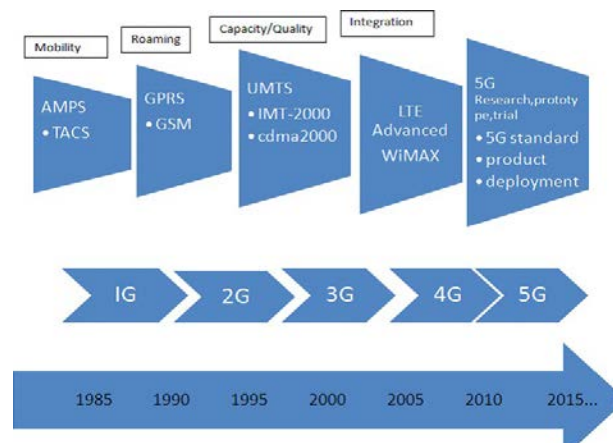


Figure 1: Mobile Cellular Network Evolution Timeline [3]

1G: GSM

1G was Introduced in 1980.the principle distinctive between then existing framework and 1G was create of cell innovation and subsequently it is otherwise called original of simple cell phone in 1G or original of remote media transmission innovation the system contain numerous phones thus same recurrence can be reused many time which result in extraordinary range use and therefore expanded the framework limit I. e. expansive number of client could be suited effectively when the GSM solidly sprung up in 1990-91 in Finland.1G was old simple framework and bolstered the first era of simple phones accelerate to 2.4kbps. Advance cell phone framework (AMPS) was first propelled by the US and is a 1G portable framework. It enables clients to make voice brings in one nation

2G

2G cellular telecom networks were commercially launched on the GSM standard in Finland by Radio linja in 1991. 2G technologies enabled the various mobile phone networks to provide the services such as text messages, picture messages and MMS (multimedia messages). 2G technology is more efficient.. It was planned for voice transmission with digital signal and the speeds up to 64kbps.2G technology holds sufficient security for both the sender and the receiver. All text messages are digitally encrypted. This digital encryption allows for the transfer of data in such a way that only the intended receiver can receive and read it. Second generation technologies are either time division multiple access (TDMA) or code division multiple access (CDMA). TDMA allows for the division of signal into time slots. CDMA allocates each user a special code to communicate over a multiplex physical channel. Different TDMA technologies are GSM, PDC, IDEN,

I.S-136. CDMA technology is IS-95. GSM has its origin from the Group special Mobile, in Europe. GSM is also stands for Global system for mobile communication. Now GSM is used in more than 212countries in the world. GSM technology was the first one to help establish international roaming. In comparison to 1G's analog signals, 2G's digital signals are very reliant on location and proximity It provides facility of SMS(Short Message Service) and use the bandwidth of 30 to 200KHz.

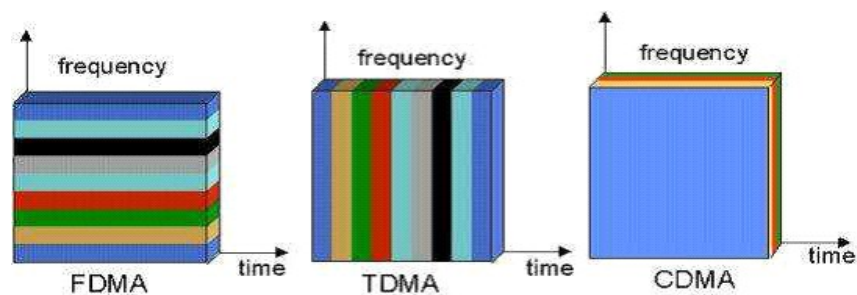


Figure 2: Multiple Access Technology[8]

5G

For that last reason(9.6Kbytes/sec doesn't allow you to browse the Net or up/download an image),Telco operators came up with the GPRS which could enable much faster communications(115Kbytes.sec), but the market decided it was still not enough compared to what they had at home 2.5G system uses packet switched and circuit switched domain and provide data rate up to 144 kbps. E.g. GPRS, CDMA and EDGE[3]

EDGE

Which is a pretty recent standard allows for downloading faster. Since mobile devices have become both a TV and a Walkman or music player, people needed to be able to watch streaming video and download mp3 files faster that's precisely what EDGE allows for and that's for the good news. The bad news is that if EDGE rock sat downloading, it's protocol is a symmetrical hence making EDGE suck at uploading i.e. broadcasting videos of yours for instance. Still an interesting achievement thanks to which data packets can effectively reach 180 kbytes/sec EDGE is now widely

3G: UMTS

The 3G (UMTS and CDMA2000) research and development project started in 1992. UMTS, Short for (Universal mobile telecommunication system) The original 3G UMTS/W-CDMA Standard provided a maximum download speed of 384 kbps. International Mobile Telecommunications-2000 (IMT-2000), better known as 3G, is a generation of standards for mobile phones and mobile telecommunications services fulfilling specifications by the International Telecommunication Union. The use of 3G technology is also able to transmit packet switch data efficiently at better and increased bandwidth. Transmission speeds from 125kbps to 2Mbps. In 2005, 3G is ready to live up to its performance in computer networking (WCDMA, WLAN and Bluetooth) and mobile devices area (cell phone and GPS). Voice calls are interpreted using circuit switching. Access to Global Roaming and Clarity in voice calls. Fast Communication, Internet, Mobile T.V, Video Conferencing, Video Calls, Multi Media Messaging Service (MMS), 3D gaming, Multi-Gaming etc. are also available with 3G phones

3.5G or 3G: HSDPA

It is theoretically 6 times faster than UMTS (upto 3.6Mbytes/sec)! Practically speaking, this would mean downloading an mp3 file would take about 30sec. instead of something like 2 minutes.

4G

The basic feature of 3G Technology is fast data transfer rates. However this feature is not currently working properly because, ITU 200 is still making decision to fix the data rates. Network authentication has won the trust of users, because the user can rely on its network as a reliable source of transferring data. . 4G is a conceptual framework and a discussion point to address future needs of a high speed wireless network. It is expected to emerge around 2010 – 2015. 4G should be able to provide very smooth global roaming ubiquitously with lower cost.

Some of the applications are:

1. Mobile TV – a provider redirects a TV channel directly to the subscriber's phone where it can be watched.
2. Video on demand – a provider sends a movie to the subscriber's phone.
3. Video conferencing – subscribers can see as well as talk to each other.
4. Location-based services – a provider sends localized weather or traffic conditions to the phone, or the phone allows the subscriber to find nearby businesses or friends
5. Mobile ultra-broadband (gigabit speed) access and multi-carrier transmission.
6. Mobile WiMAX (Worldwide Interoperability for Microwave Access)

5G

5G Technology stands for 5th Generation Mobile technology. 5G is a name used in some research papers and projects to denote the next major phase of mobile telecommunications standards beyond the upcoming 4G standards. Currently, 5G is not a term officially used for any particular specification or in any official document yet made public by telecommunication companies or standardization bodies such as 3GPP, WiMAX Forum or ITU-R. New standard releases beyond 4G are in progress by standardization bodies, but at this time are not considered as new mobile generations since implementation and rollout of systems compliant with 4G is still under way; the goals of a 5G-based telecommunications network would ideally answer the challenges that a 4G model would present once it has entered widespread use. 5G technology has changed the means to use cell phones within very high bandwidth. User never experienced ever before such a high value technology. The 5G technologies include all type of advanced features which makes 5G technology most powerful and in huge demand in near future. 5G technologies which are on hand held phone offering more power and features than at least 1000 lunar modules. A user can also hook their 5G technology cell phone with their Laptop to get broadband internet access.

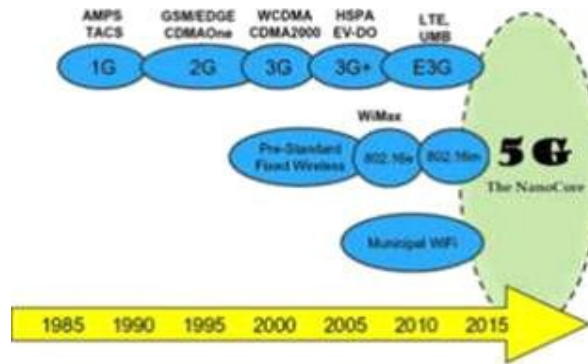


Figure 3: Evolutional changes in mobile technologies[9]

III. OBJECTIVES OF 5G

Elevated Service Quality and User Experience- Consumer expectations for mobile broadband service quality are growing in parallel with traffic complexity and increase usage. Complex and constantly evolving multi- vendor networks and services are placing considerable demands on service management. The focus shifting towards managing the delivery of high-quality services i.e., support service centric and user-centric management [1].

Consistent Connectivity Experience- The next wave of the Digital Society will be characterized by an ICT network's capability for immediate service availability and on-demand adaptability. An instant immediacy in mobile services will lay the foundation for a whole new set of mobile apps to proliferate and push the capabilities of communications beyond what is currently possible. Widespread adoption of M2M services will be encouraged when there would be provision of higher network capacity required for handling enormous connections[1].

Ability to Handle Disruptive Growth in Network Capacity- Server workloads are growing by 10% a year. Network bandwidth demand is growing by 35%. Storage capacity is growing by 50%. Power costs growth is 20%. Throwing more capacity at demand is not the solution; there is a need to optimize capacity in new ways. Over 1.5

billion Web pages are accessible, 450,000 iPhone apps are being accessed, over 200,000 Android apps are being used , 10,500 radio stations are existing. All drives demand for IT [1, 2].

IV. 5G MOBILE NETWORK

5G networks make use of this flat IP concept to make it easier for different RAN to upgrade in to a single NanoCore network. Our 5G network uses Nanotechnology as defensive tool for security concern that arises due to flat IP. Certainly Flat IP network is the key concept to make 5G acceptable for all kind of technologies. To meet customer demand for real-time data applications delivered over mobile broadband networks, wireless operators are turning to flat IP network architectures. Flat IP architecture provides a way to identify devices using symbolic names, unlike the hierarchical architecture such as that used in "normal" IP addresses. This is of more interest to mobile broadband network operators. With the shift to flat IP architectures, mobile operators can:

- Reduce the number of network elements in the data path to lower operations costs and capital expenditure.
- Partially decouple the cost of delivering service from the volume of data transmitted to align infrastructure capabilities with emerging application requirements.
- Minimize system latency and enable applications with a lower tolerance for delay; upcoming latency enhancements on the radio link can also be fully realized.
- Evolve radio access and packet core networks independently of each other to a greater extent than in the past, creating greater flexibility in network planning and deployment.
- Develop a flexible core network that can serve as the basis for service innovation across both mobile and generic IP access networks
- Create a platform that will enable mobile broadband operators to be competitive, from a price performance perspective, with wired networks Flat network architecture removes that voice-centric hierarchy from the network. Instead of overlaying a packet data core on the voice network, separate and much-simplified data architecture can be implemented that removes the multiple elements from the network chain.

V. FEATURES AND BENEFITS OF 5G

1. High speed, high capacity, and low cost per bit. It Support interactive multimedia, voice, streaming video, Internet, and other broadband services, more effective and more attractive, Bidirectional, accurate traffic statistics.

2. Introduction of a new radio system is possible in which different radio technologies will share the same spectrum. This can be done by finding unused spectrum and then adapting to the technology of the radio technology with which the spectrum is being shared.

3. Every mobile in a 5G network will have an IP address (IPV6) according to the location and network being used.

4. The technology is expected to support virtual private networks and advanced billing interfaces.

5. With 5G Enabled phone, you might be able to connect your phone to your laptop to get access to broadband.

6. 5G technology is providing large broadcasting of data in Giga bit which supporting almost 65,000 connections.

7. The traffic statistics by 5G technology makes it more accurate and it also support virtual private network.

VI. CONCLUSION

The development of the mobile and wireless networks is going towards higher data rates and all-IP principle. Mobile terminals are obtaining each year more processing power, more memory on board, and longer battery life for the same applications. 5g include latest technologies such as cognitive radio, SDR, nanotechnology, cloud computing and based on All IP Platform. 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.

FUTURE SCOPE

The future enhancement of Nano-core will be incredible as it combines with artificial intelligent (AI). One can be able to control his intelligent Robot using his mobile phone. Your Mobile can automatically type the message what your brain thinks. We might get a circumstance where we don't require any spectrum for communication. The Google hot trends have rated the term 6g as the 17th most searched word in the search engines. The iPod 6G comes in seven different colors and has an aluminum body which makes the body strong to withstand constant daily usage. It has a clip on design like iPod shuffle and it attached to shirt firmly. 6g technology haven't been fully revealed yet but search phrases like what is 6g mobile technology, 6g technology, 6g mobile, 6g network, 6g wiki, 6g technology ppt. are getting more familiar with new mobile technology getting evolved.

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