

5G Technologies

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ABSTRACT

5G technologies will change the way most high-bandwidth users access their phones. With 5G pushed over a VOIP-enabled device, people will experience a level of call volume and data transmission never experienced before. 5G technology is offering the services in Product Engineering, Documentation, supporting electronic transactions (e-Payments, e-transactions) etc. As the customer becomes more and more aware of the mobile phone technology, he or she will look for a decent package all together, including all the advanced features a cellular phone can have. Hence the search for new technology is always the main motive of the leading cell phone giants to out innovate their competitors. Recently apple has produced shivers all around the electronic world by launching its new handset, the I-phone. Features that are getting embedded in such a small piece of electronics are huge.

The 5g design is based on user-centric mobile environment with many wireless and mobile technologies on the ground. In heterogeneous wireless environment changes in all, either new or older wireless technologies, is not possible, so each solution towards the next generation mobile and wireless networks should be implemented in the service stratum, while the radio access technologies belong to the transport stratum regarding the Next Generation Networks approach. In the proposed design, the user terminal has possibility to change the Radio Access Technology - RAT based on certain criteria. For the purpose of transparent change of the RATs by the mobile terminal, we introduce so-called Policy-Router as node in the core network, which establishes IP tunnels to the mobile terminal via different available RATs to the terminal. The selection of the RAT is performed by the mobile terminal by using the proposed user agent for multi-criteria decision making based on the experience from the performance measurements performed by the mobile terminal

I. INTRODUCTION

The world has seen a lot of changes in the realm of communication. Today we no more use landlines. Everyone possesses a mobile phone that functions

24X7. Our handsets not only keep us connected with the world at large but also serve the purpose of entertainment gadget. From 1G to 2.5G and from 3G to 5G this world of telecommunications has seen a

number of improvement along with improved performance with every passing day.

The 5th generation is envisaged to be a complete network for wireless mobile internet, which has the capability to offer services for accommodating the application potential requirements without suffering the quality. The ultimate goal of 5G is to design a real wireless world, that is free from obstacles of the earlier generations.

5G technology will change the manner in which cellular plans are offered worldwide. A new revolution is about to begin. The global cell phone is around the corner. The global mobile phone will hit the localities who can call and access from one country to another's local phone with this new technology. The way in which people are communicating will altogether upgrade. The utilization of this gadget will surely move a step ahead with improved and accessible connectivity around the world. Your office will shrink into your handset with this cell phone that is going to resemble PDA (personal digital assistant) of twenty first century. 5G technology has a bright future because it can handle best technologies and offer priceless handset to their customers. May be in coming days 5G technology takes over the world market. 5G Technologies have an extraordinary capability to support Software and Consultancy. The Router and switch technology used in 5G network providing high connectivity. The 5G technology distributes internet access to nodes within the building and can be deployed with union of wired or wireless network connections. The current trend of 5G technology has a glowing future.

1.1 DEFINITION

5G Wireless System is a complete wireless communication with almost no limitation; somehow people called it REAL wireless world. But till present day 5G wireless system concept is only theory and not real, so it is not applicable for use.

5G (5th generation mobile networks or 5th generation wireless systems) is a technology used in

research papers and projects to denote the next major phase of mobile telecommunication standards beyond 4G. 5G is not officially used for any specification or official document yet made public by telecommunication companies or standardization bodies. New standard releases beyond 4G are in progress by standardization bodies, but are at this time not considered as new mobile generations but under the 4G umbrella. The implementation of standards under a 5G umbrella would likely be around the year of 2020.

1.2 PROPERTIES

- Worldwide cellular phone: Phone calls in any country can be done easily like a local phone call.
- Extraordinary data capabilities: Data capabilities of the 5G system is much higher than other generation so you can store more number of data with less problem in storing them.
- High connectivity: Connectivity speed of 5G is almost 25 Mbps.
- More power features in hand held phones: You'll have all features of PDA laptops in your mobile phone, which makes it more powerful.
- Large phone memory, more dialing speed, more clarity in audio video.

II. EVOLUTION FROM 1G TO 5G EVOLUTION

2.1 1ST GENERATION

First Generation wireless technology (1G) is the original analog (An analog or analogue signal is any continuous signal for which the time varying feature (variable) of the signal is a representation of some other time varying quantity), voice-only cellular telephone standard, developed in the 1980s. The prominent ones among 1G system were advanced mobile phone system (AMPS), Nordic mobile telephone (NMT), and total access communication system (TACS).



- Developed in 1980s completed in early 1990s
- Based on analog system
- Speed up to 2.4 kbps
- AMPS (Advance Mobile Phone System) was launched by the US it was the 1G mobile system
- Allows user to make voice calls in 1 country

2.2 2ND GENERATION

2G (or 2-G) is short for second-generation wireless telephone technology. Second generation 2G cellular telecom networks were commercially launched on the GSM standard in Finland in 1991. 2G network allows for much greater penetration intensity. 2G technologies enabled the various mobile phone networks to provide the services such as text messages, picture messages and MMS (Multi Media Messages). 2G technology is more efficient. 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. GSM technology was the first one to help establish international roaming. This enabled the mobile subscribers to use their mobile phone connections in many different countries of the worlds is based on digital signals, unlike 1G technologies which were used to transfer analogue signals. GSM has enabled the users to make use of the short message services (SMS) to any mobile network at any time. MS is a cheap and easy way to send a message to anyone, other than the voice call or conference. This technology is beneficial to both the network operators and the ultimate users at the same time.

In comparison to 1G's analog signals, 2G's digital signals are very reliant on location and proximity. If a 2G handset made a call far away from a cell tower, the digital signal may not be enough to reach it. While a call made from a 1G handset had generally poor quality than that of a 2G handset, it survived longer distances

- This is due to the analog signal having a smooth curve compared to the digital signal, which had a jagged, angular curve. As conditions worsen, the quality of a call made from a 1G handset would gradually worsen, but a call made from a 2G handset would fail completely.

- Developed in late 1980s completed in late 1990s
- Based on digital system
- Speed up to 64 kbps
- Services such are digital voice SMS with more clarity

2G are the handsets we are using today, with 2.5G having more capabilities.

2.3 3RD GENERATION

International Mobile Telecommunications-2000 (IMT-2000), better known as 3G or 3rd Gen-eration, 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. 3G mobile technologies proffers more advanced services to mobile users. The spectral efficiency of 3G technology is better than 2G technologies. Spectral efficiency is the measurement of rate of information transfer over any communication system. 3G is also known as IMT-2000.



- Developed between late 1990s early 2000s until present day
- 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)
- Transmission speed from 125 kbps to 2 Mbps
- Superior voice quality
- Good clarity in video conference
- Data are sent through technology called packet switching
- Voice calls are interpreted using circuit switching
- Fast Communication, Internet, Mobile T.V, E-mail, PDA, information surfing, on-line shopping/ banking, Multi Media Messaging Service (MMS), 3D gaming, Multi-Gaming etc.
- Global roaming

2.4 4TH GENERATION

4G refers to the fourth generation of cellular wireless standards. It is a successor to 3G and 2G families of

standards. The fourth generation (4G) is a conceptual framework and a discussion point to address future needs of a high speed wireless network that can transmit multimedia and data to and interface with wire-line backbone network perfectly just raised in 2002. The speeds of 4G can theoretically be promised up to 1Gbps.

Some of the applications of 4G 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. Tele-medicine a medical provider monitors or provides advice to the potentially isolated subscriber. 5. 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. 6. Mobile ultra-broadband (gigabit speed) access and multi-carrier transmission.

- Developed in 2010
- Faster more reliable
- Speed up to 100 Mbps
- Both cellular and broadband multimedia services everywhere
- High performance
- Easy global roaming
- Low cost



2.5 5TH GENERATION

5G Technology stands for 5th Generation Mobile technology. 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. The gigantic array of innovative technology being built into new cell phones is stunning. 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. 5G technology including camera, MP3 recording, video player, large phone memory, dialing speed, audio player and much more you never imagine. Next major phase of mobile telecommunication wireless system
- 10 times more capacity than others
- Expected speed up to 1 Gbps
- Faster reliable than 4G
- Lower cost than previous generations



III. CONCLUSION

It is high time that India should strengthen the domestic telecommunication manufacturing market to enable local industries to capture both domestic as well as global market.

An” intelligence-first” approach will need to be adopted by Telecom providers for managing core networks as an important business investment.

This technology helps to promotes stronger links between people working in different fields creation future concepts of mobile communication, internet services, cloud computing, all pie network nanotechnology.

IV. REFERENCES

- [1]. www.ieeexplore.ieee.org
- [2]. www.google.com
- [3]. Wikipedia.org