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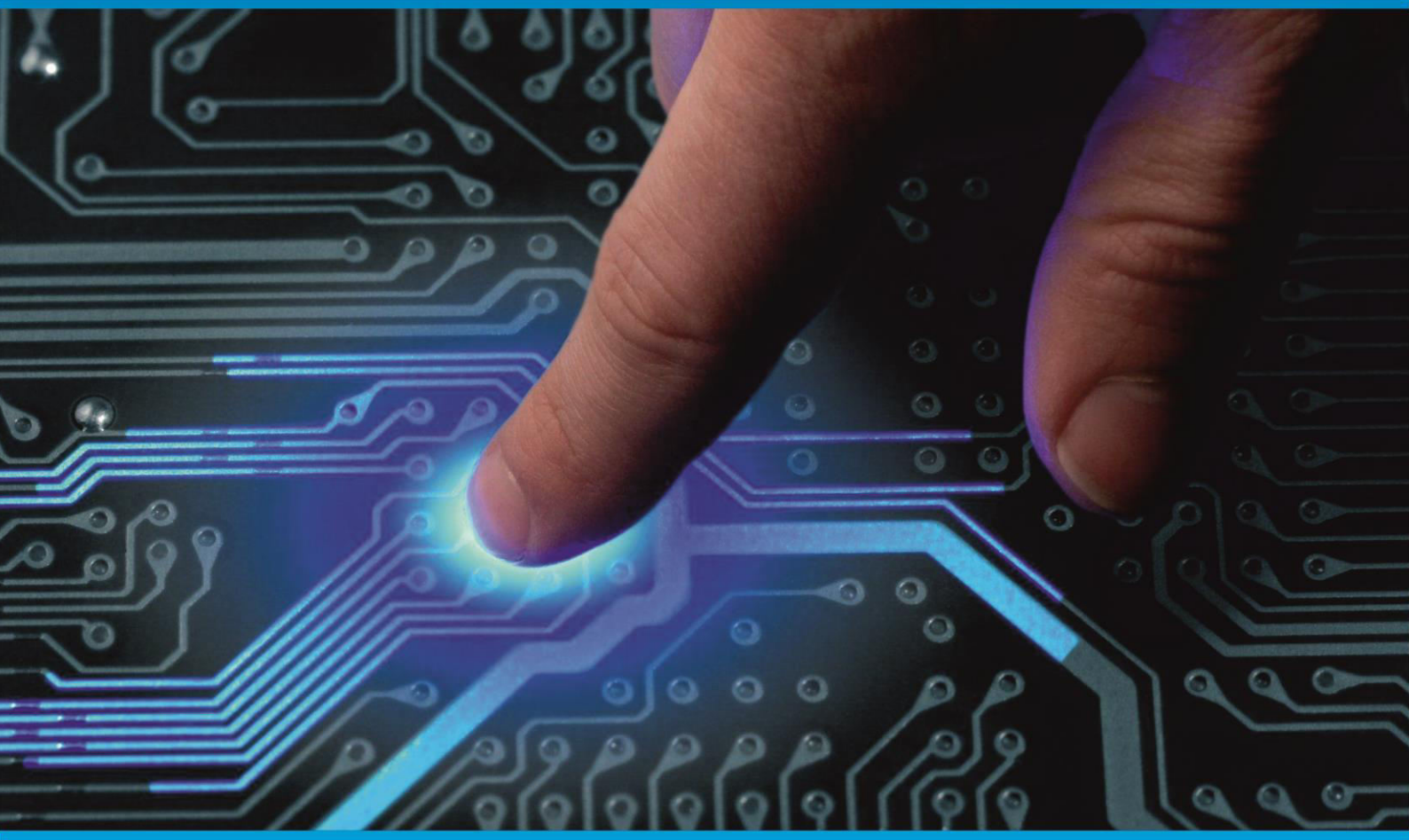

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Review on 5G Technology

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ABSTRACT: 5G Technology stands for fifth Generation Mobile technology. From the generation 1 G to 2.5 G and from 3 G to 5 G this world of telecommunication has seen a variety of improvements along side improved performance with the every passing day. This very fast revolution in mobile computing changes our day-to-day life. That's the way we work, interact, learn etc. The 5th generation technology that paper is also focused on all previous generations of mobile communication along with 5th generation technology. 5th generation network provide broadband wireless connectivity. The paper throws light on specification of 5th generation technology. Currently 5thG term is not officially used. In 5th generation researches are being made on development of World Wide Wireless Web (WWWW), Dynamic Ad Hoc Wireless Networks (DAWN) and Real Wireless World. 5th generation specializing in (Voice over IP) VOIP enabled devices that users will be experiencing a high level of call volume and data transmission. The 5G technology will fulfill all the wants of consumers who want advanced features in cellular phones. The main features in 5G mobile network is that user can simultaneously hook up with the multiple wireless technologies and may switch between them. The imminent mobile technology will support IPv6 and flat IP. it will offer the services like Documentation, supporting electronic transactions (e-Payments, e-transactions) etc.

KEYWORDS: 5g technology, Evolution of 5g technology, advantages and disadvantages of 5g technology

I. INTRODUCTION

5G is the 5th generation mobile network. 5th generation Technology is a new global wireless standard communication system after 1Generation, 2Generation, 3Generation, and 4Generation networks. 5G enables a new kind of network that is connect virtually everyone and everything is together including machines, objects, and devices Beyond speed improvement, the technology is expected to an massive 5G Internet of things where networks can serve communication needs for billions of connected devices, with the right trade-offs between speed, latency, and cost. offers an extremely low latency rate in 5G technology , the delay between sender and receiver the sending and receiving of information. , we go down to 1 millisecond(1ms) with 5G, From 200 milliseconds for 4G. The 5th generation technology features and its usability are beyond the expectation of a normal human being. With its ultra-high speed, it is potential enough to change the meaning of a cell phone usability. The full rollout of the 5G network will provide the much-needed communications infrastructure 5th generation technology manufacturers can create AVs to the masses. , and again, it would not be possible without the reliability and real-time data sharing that 5G enables. This may be the biggest breakthrough of all. Can be called real wireless communication system world Has incredible transmission communication speed Concept is only in theory not in real.

II. BRIEF IDEA ABOUT 5G

1 CURRENT STATUS OF 5G?

The European Telecommunications Standards Institute is formulating 5G global technology standards, which are likely to be formalized by 2019.Telecom companies like Nokia, Ericsson, NTT DoCoMo, Samsung, Huawei and Fujitsu are driving the bulk of the 5G-related innovations

2 PEOPLE WILL BE ABLE TO EXPERIENCE WITH 5G.

5G networks are likely to be unrolled commercially between 2020 and 2025. If the global standards are finalized by 2019, the earliest commercial deployments could happen by 2020.HOW AND WHEN WILL 5G AFTER THE

3 GLOBAL ECONOMY

- $13.2 Trillion dollars of global economic output
- 22.3 Million new jobs created
- $2.1 Trillion dollars in GDP growth

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The development requirements of the new 5G network also are expanding beyond the normal mobile networking players to industries like the automotive industry. The study also revealed that the 5G value could alone support up to 22.3 million jobs or quite one job for every person in Beijing, China. It defines that there will be many emerging and new applications that will still be defined in the future.

III. EVOLUTION FROM 1G TO 5G

1G;- 1st GENERATION

- 1G refers to 1st generation of mobile telecommunication network technology
- it's developed in 1980s and completed in early 1990s.
- It provides a speed up to 2.4kbps.
- It is based on analog system.
- It allows user to form call in one country.
- it's low capacity, unreliable handoff, poor voice links ,

and no security in the least since voice calls were played back in radio towers, making these calls vulnerable to unwanted eavesdropping by third parties. By 1984, NTT had unrolled 1G to hide the entire of Japan. However, 1G technology suffered from a variety of drawbacks. Coverage was poor and sound quality was low. There was no roaming between various operators and, as different systems operated on different frequency ranges, there was no compatibility between systems. Worse of all, calls weren't encrypted, so anyone with a radio scanner could drop by on a call.

2G :- 2'nd GENERATION

- 2G refers to 2nd generation of mobile telecommunication network system
- it had been developed in late 1980s and completed in late 1990s.
- it's supported digital system.
- It provides a speed of up to 80 kbps.
- 2nd generation mobile technology provides services like voice and sms with more clarity.

Cell phones received their first major upgrade once they went from 1G to 2G. The radio signals employed by 1G networks are analog, while 2G networks are digital . Main motive of this generation was to supply a secure and reliable channel . The 2nd generation implemented the concept of Code-division multiple access and GSM . Provided small data service like sms and mms. Second generation 2G cellular telecom networks were commercially launched on the GSM standard in Finland by Radiolinja (now a neighborhood of Elisa Oyj) in 1991[1]. 2G capabilities are achieved by allowing multiple users on one channel via multiplexing.

3G:- 3Rd GENERATION

NTT DoCoMo launched the first commercial 3rd generation network on 1-10- 2001, using the WCDMA technology. bandwidth of 3G network is 128 Kbps for mobile stations, and a few of Mbps for fixed applications. this trend in 3rd generation mobile network systems is to support the high bit rate data services at the downlink via High Speed Downlink Packet Access (HSDPA) This generation set the standards for several of the wireless technology we've come to know and love. Web browsing search, email, searching contents, video download, images download, picture sharing and other Smartphone technology were introduced within the third generation. The 3G standard utilises a replacement technology called UMTS as its core specification - Universal Mobile Telecommunications System. supported a gaggle of standards used for mobile devices and mobile telecommunications use services and networks that suits the International Mobile Telecommunications-2000 (IMT-2000) specifications by the International Telecommunication Union.

4G:- 4'th GENERATION

- It was developed in the year 2010.
- It is faster and more reliable.
- It provides speed up to 100mbps.
- 4th generation provides high performance faster uploading and downloading speed.
- 4th generation is easy provides roaming as compared to 3G.

4G may be a very different technology as compared to 3G and was made possible practically only due to the advancements within the technology within the last 10 years. Its purpose is to supply speed , top quality and high speed to users while improving security and data services, multimedia and internet over IP. The key technologies made this possible are Multiple Input Multiple Output and OFDM Orthogonal Frequency Division Multiplexing. The maximum speed of a 4G network when the device is moving is 110 Mbps or 1.5 Gbps for low mobility communication

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like when stationary or walking, latency reduced from around 350ms to but 150ms, significantly lower congestion. When 4G became available, it had been simply a touch faster than 3G. 4G isn't an equivalent as 4G LTE which is extremely on the brink of meeting the standards of the standards. To download a replacement game or stream a television program in HD, you'll roll in the hay without buffering .

Newer generations of phones are usually designed to be backward-compatible , so a 4G phone can communicate through a 3G or maybe 2G network. All carriers seem to agree that OFDM is one among the chief indicators that a service is often legitimately marketed as being 4G. There are a big amount of infrastructure changes needed to be implemented by service providers so as to provide voice calls in GSM , UMTS and CDMA2000 are circuit switched, so adoption of LTE, carriers need to re-engineer their voice call network[2]. And again, we have the fractional parts: 4.6G and 4.10G marking the transition of LTE in the stage called LTE Advanced Pro getting us MIMO, more D2D on the IMT-2020 and the requirements of 5G

5G :- 5'th GENERATION

- 5G is next phase of mobile telecommunication & wireless system.
- 5G technology is more faster than the 4G technology.
- expect the speed of 5g is 1gbps.
- Lower cost than the previous version.
- 5G expected to come around the year 2018.

5G is a generation currently in use development that's intended to improve on 4G. 5G promises significantly rated data faster , higher connection density, much lower latency, among other improvements. plans for 5G include device to device communication, battery consumption, and improve overall wireless coverage. The max speed of 5G is aimed toward being as fast as 35.46 Gbps , which is over 35 times faster than 4G. Key technologies to seem out for: Massive MIMO , Millimeter Wave Mobile Communications etc. Massive MIMO, millimeter wave, small cells, Li-Fi all the new technologies from the previous decade might be wont to give 10Gb/s to a user, with an unseen low latency, and allow connections for a minimum of 100 billion devices . Different estimations are made for the date of economic introduction of 5G networks. Next Generation Mobile Networks Alliance feel that 5G should be unrolled by 2020 to satisfy business and consumer demands.

IV. DATA TRANSFER ARCHITECTURE OF 5G

1. RAN

A radio access network (RAN) is a component of a mobile telecom system . It implements a Radio Access Technology. Conceptually, a computer, or any remotely controlled machine and provides reference to its core network.

2. FLAT IP NETWORK

Certainly Flat IP network is the key concept to form 5G acceptable for all quiet technologies. customers satisfy demand for real-time data applications delivered over mobile networks, wireless operators are turning to flat IP network architectures.

3. 5G NANOCORE

The 5G Nanocore may be a convergence of below mentioned technologies. These technologies have an impact on existing wireless networks which makes them into 5G.

- Nanotechnology.
- Cloud Computing.
- All IP Platform.

4. NANO TECHNOLOGY

Nanotechnology is the application of nano science to regulate processes on the manometer scale. i.e. between 0.1 and100nm.The field is additionally referred to as molecular nanotechnology(MNT). It deals with control of the structure of matter supported atom-by-atom and molecule by molecule engineering.

5. CLOUD COMPUTER

Cloud computing may be a technology that uses the web and central remote server to take care of data and applications. In the 5G network this central remote server is going to be our content provider. Cloud computing allows customers and businesses to use applications without installation and access their personal files at any computer for internet access. An equivalent concept goes to be utilized in Nanocore where the user tries to access his private account form a worldwide content provider through Nanocore in a sort of cloud.

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6. THE All-IP Network(AIPN)

The All-IP Network(AIPN) is an evolution of the 1GPP ,2GPP 3GPP 4GPP and 5GPP system to satisfy the increasing demands of the mobile telecommunications market. To meet customer demand faster for real time data delivered over mobile broadband networks, wireless operators are turning to flat IP network architectures[3].

V. HARDWARE & SOFTWARE USED IN 5G

HARDWARE USED

Uses Ultra Wideband networks with higher Bandwidth at low energy levels.
BW is of 4090 Mbps, which is very faster than today's wireless networks
Uses smart antenna
Uses CDMA (Code Division Multiple Access)

SOFTWARE USED

5G will be single unified standard of faster mobile communication network different wireless networks, including LAN technologies, LAN/WAN, WWW- World Wide Wireless Web, unified IP & seamless combination of broadband Software defined radio, encryption, flexibility, Anti-Virus

VI. ADVANTAGES & DISADVANTAGE

1. ADVANTAGES

1 Greater speed in transmissions
2 Lower latency
3 Greater number of connected devices
4 Network slicing
5 Peer-to-peer (P2P) communications

2. DISADVANTAGE

1. Obstructions can impact connectivity
2. Initial costs for rollout are high
3. Limitations of rural access.
4. Battery drain on devices.
5. Upload speed don't matches with the download speeds.
6. Detracting from the aesthetics.

VII. APPLICATIONS

1. Harnessing the Power of IoT
2. Broadband-Like Mobile Service
3. Connectivity for Edge Computing
4. Unleashing AI
5. Immersive Gaming and Virtual Reality

VIII. CONCLUSION

This book has introduced the wants for subsequent generation of mobile cellular systems and therefore the challenges to rolling out such systems. We started with an overview of the evolution of cellular systems, detailing how 2G, 3G, and 4G wireless communication were designed for person-to-person communication, improving speed and efficiency with every new generation. Following that introduction, we then discussed why 5G will be different—in terms of implementation challenges and novel enablers of 5G, like network densification , millimeter wave technology, machine-type communications , device-to device communications , and virtualization techniques. This new framework will finally lead to billions of connected devices that are projected to be deployed in the mid- and long-term while maintaining and even increasing speed and resource efficiency

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