Wireless 5g: One More Revolutionary Step Towards Glorifying Internet

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Abstract

5-G stands for 5th generation. An upcoming technology in India which promises high speed and consistent internet. It might be available in India in 2019.Rapid increase in use of internet has put many demands which are beyond the reach of 4g like improved data rate, decreased latency, less power consumption and better quality of service. To meet these measures a revolutionary step must be taken in the form of 5g.Our paper presents a comparative based study on 5g applications. 5g is expected to revolutionize the internet much more than Jio's 4g did. Users will experience high valued fast and powerful technology like never before. 5g technology will have extraordinary data capabilities and will have ability to tie together unrestricted call volumes and infinite data broadcast within latest mobile operating system. 5g technology will take over world market easily in coming days. 5g technology will have an extraordinary capacity to support soft wares and consultancy. It will have endless benefits. It will help in visualization of universe, galaxies, planets and extra celestial bodies. It will take all delivery service out of business prospect.5g technology will be providing large broadcasting of data in gigabit. It will enhance many medical procedures.

Now we all know there's always another face of any coin.5g technology will have some disadvantages too. Since 5g services are likely to run on ultra-high spectrum bands which travels shorter distance compared with lower bands, they will be more suited to enhance indoor coverage.5g technology will have higher frequency waves which could be blocked by buildings and might lose intensity over distance so it will be a tough challenge and will require large investments.

In conclusion, despite of some problems, 5g technology will be an innovation for mobile industry and will definitely change people's life.

1. Introduction

5G is a future technology next to 4G.It promises to overcome the traffic issue on networks doubling annually that 4G failed to overcome. It provides high speed, high capacity and faster data transmission than that of previous generation.

5G is exported to be the next game changer in ICT. This latest upgrade in cellular technology promises to meet the need for fastest internet speed better security and the ability to accommodate billions of

converted devices in the coming year. And it's almost have, 5G will be rolled out in most countries by 2020.

2. Researches on 5G: Top 5 academic institution leading in 5G research

(i) University of texes Austin:-Professor Robert heath and his graduate students at Texas university have conducted extensive research into mm wave which is important to demonstrate the viability of the technology of 50% system important issues facing the adoption of mm wave communication include blockages system coverage, sensitivity to interference and artenna arrays.

(ii) University of California: Martin casado and Nick Mc Keown at Calofornia University played an important role in developing the software defined networking (SDN) and Network functioning virtualization (NFV) which are the two pillar leading upto 5G.

(iii) Technique University Dreselen (TU dresen): Opened in September 2014, the 6G lab Germany brings to gather 20 professor from TU Dresden and 500 scientist. It focubes on developing wireless and networking system, tactile internet application, silicone system and mobile edge control these research will help to control robot system by Just touch.

(iv) University of survey (England):A year ago the university of survey welcome a £5m investment to support future 5G growth, recognizing the university flagship project, it focus on IOT (internet of things) smart cities and future internet technology of the university is also researching on 5G radio and network technology over time.

(v) New York University (Brookyn): Founded in 2012 as one of the world first academic research centre to combine wireless engineering, computing and medical application NYU wireless is led by founder professor. Theodore Rappaort. It is an influential contributor in the FCC proceeding on 5G and the use of spectrum band above 24 GHz for mobile radio service.

3. Working of 5G

5G is the 5th generation of mobile network a significant evolution of today's 4G LTE networks 5G is being designed to meet the very large growth in data and connectivity of today's modern society. In an order to understand the working of 5G we first need to understand how a mobile works. So, the two main component of mobile network is `Radio access network and core network.'

Radio access network

Consist of various small cells towers marts and dedicated in-building and home system that connect mobile users and wireless device to the main core network. Small cells will be major feature of 5G network particularly at the new millimeter wave (mm wave) frequencies where the connection range is very short to provide a continues connection small cells will be distributed in clusters depending a where users require connection which will complement the macro network that provides wide area network.

The core network

Is the mobile exchange and data network that manages all the mobile voice data and internet connection for 5G the core network is being redesigned to better integrate with the internet and cloudbased service and also includes distributed servers across the network improving response time. Many advanced features of 5G including network function virtualizing and network slicing for different application and services will be managed in the core the local cloud server will provide fastest content to users movie streaming.

Networking slicing

Enables a smart way to segment the network for a particularly industry business or application e.g. emergency service could operate on a network slice independent from other users. Network functioning virtualization (NVF):- It is the ability which help to instantiate network functioning at any desired location within the operator cloud platform NVF is crucial to enable the speed efficiency and agility to support the new business application and is an important technology for 5G ready core.

5G integration with 5G

When 5G connection is established the user equipment or device will connect to both the 4G network to provide the control signalling and to the 5G network to help provide the fast data connection by adding to existing 4G capacity. High frequency communication and increased spectrum Initial frequency board for 5G are proposed around 600-700 MHz, 3-4 GHz, 26-28 GHz and 38-42 GHz while will add significantly more capacity compared to the current mobile technologies the additional spectrum and greater capacity will enable more user more data and faster connection. The increased spectrum in (mm) wave based above 30 GHz will provide localized coverage as they only operate over short we of sight.

4. What 5G will enable

5G will provide speed, low latency and connectivity to enable a new generation of application, services and business opportunities. The main application of 5G are

Massive machine to machine communication (IOI)

It involves connecting billions of devices without human intervention by using high frequency wave (mm) wave and broad spectrum. It will be useful is agriculture, manufacturing and business communication.

Low latency communication

Real time control of devices, industrial robotics, vehicle to vehicle communication and safety system, autonomous driving and super transport network. Low latency communication also opens up a new world where remote medical cave and treatment are possible.

Enhanced mobile broadband

Providing significantly faster data speeds and greater capacity keeping the world connected. New application will included fixed wireless internet access for homes. Outdoor broadcast applications without the need for broadcast vans.

For communities

5G will enable the connection of billions of device for our smart cities, smart school and smart homes, smart and safer vehicles enhance healthy cave and education and provide a super place to time.

For business and industries

5G and IOI will provide a wealth of data allowing them to gain insight into the operation like never before business will operate and make very division driven by data, innovate in agriculture smart and manufacturing paving the way for cost saving, better customer experience and long term growth. New and emerging technologies, Such as virtual and augmented reality will be accessible to everyone virtual reality provides connection that were not possible before with 5G and VR you will be able to travel to your ground.

5G benefits over 4G Sl. No. 5G

1. Peak download rate of data will be 20G/bits and upload rate will be Log G/bits. Peak download rate of data is 100 Mbps and upload rate is 50 Mbps

2. 5G will allow data Band width of 10Gbps. Data Band with 4G is2Mbps to 1Gbps

3.5G will use their technology with advanced ones like OFOM, CDMA etc. 4G uses technology like LAN, WAN, MAN unified IP.

5. Disadvantages of 5G

Following are the disadvantages of 5G
(1) It requires skilled engineers to install and maintain 5G network. Moreover 5G equipment are costly. This increase cost of 5G development and maintance phase.

(2) 5G smart phones are costly hence, it will take some time for common mar to use it.

(3) Coverage distance of 2m (indoors) and (300 meter) outdoor can be achieved due to higher. Loss at high frequency i.e. mm (wave).

(4) 5G transmission users Radio frequency of 6 GHz range radio, cell tomers and satellite communication device use radio frequency so there will be frequency Jam.

6. Conclusion

It is the fourth time in history that the world's telecommunications providers have acknowledged the need for a complete overhaul of their wireless infrastructure .This is why ever increasing array of technologies listed by 3rd generation partnership. Project as standards for wireless telecom called 5G. It is an effort to create a sustainable Industry around wireless consumption of data for all world's Telco's .One key goal of 5G is to dramatically improve quality of service and extend that quality over a broader geographic area, in order for the wireless industry to remain competitive against the onset of gigabit fibre coupled with Wi-Fi.

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