A comprehensive Study on the utility and importance of light based communication system

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Abstract—**light based communication system is the backbone of the future of the communication system Present Paper is an extensive need based study of the light based communication System, which is not the essence of the time but also rising the utility and had opened a new space and flora of the new area's of research.. In this paper utility and the application of the proposed system has been discussed.**

Key Words: Li-Fi, Wi-Fi, Light based communication system, 1G to 5G, TCP/IP

I. INTRODUCTION

MAGIC and mania of the Wireless Technology has made the great revolution in the world. Now a day, Wireless technology has become the backbone of communication and information technology. Today, Research and Development has unturned astonishing mysteries of the entire universe. The magic of wireless applications make this world as a town. From farm to college, business to industry, earth to space, from sea to ground all around the world we are using internet and Wi-Fi. Tremendous researches in all spheres of science have undoubtedly made man his own boss. The surprising Wireless technology that has transformed our lives in many ways is one of such inventions. Until very recently, we needed a computer wired to a port, to get online. Surprisingly, wired telephones are becoming a thing of past. Our mobile phones have bagged places in our lives for a wide variety of services ranging from banking, to all service sectors like even to check ticket availability at a Cinema Hall, and many more. This technology revolves around the transfer of information over a distance without the use of enhanced electrical conductors or "wires". And, Wireless networking refers to any kind of networking that does not involve cables. As a result, a lot of saving of manpower, material and revenue.

This magnificent technology of mobile communication and Mobility computing is the network-access paradigm of the future. It is estimated that the network protocols designed in the future will be 4G defined over an entirely packet-switched network with digital network elements, high bandwidth and built-in network security. The bandwidth provided will be 100Mbps for stationary objects and 20 Mbps while in motion. These 4G wireless networks will support global roaming and service portability across multiple wireless and mobile networks, for example from a cellular network to a satellite-based network to a high-bandwidth wireless LAN. TCP

The protocol deals with high bit error rate by implementing split connections with local fast retransmissions. It uses Zero Window Advertisement to accomplish smooth handover under inter-wireless cell mobility. Several other methods have been proposed to overcome TCP-over-wireless faults including split-TCP connection, triple-acknowledgements and acknowledgment caching. Each of these methods improves the efficiency of TCP by improving a single fault aspect, while our proposal combines compatible improvements into an efficient and reliable protocol.

II. MAIN OBJECT OF THE RESEARCH (STUDY)

This synopsis would throw ample light on the various aspects of wireless technologies ranging from its types, its model and scope, the challenges that might come forward while implementing them, the use and present deployment of 4G technologies and its future predictions.

Earlier research has used computer simulation for estimating wireless network dependability. This work introduces a new methodology for constructing and testing a neural network model to assess wireless network dependability.

III. LITERATURE STUDY

J. Kim and I. Lee (2015): The WiFi advancement considers higher frequencies with new range to reach multi-Gbps crest information rates (WiGig (www.wigig.com) at 60 GHz) inside and to serve various clients in parallel. While the IEEE 802.11ad (WiGig) remote neighborhood (WLAN) usage are starting to achieve the customer advertise in tri-band items (2.4 GHz, 5 GHz, and 60 GHz), optical remote interchanges (OWC) frameworks, and particularly in view of the unmistakable light correspondences (VLC) innovation, additionally called LiFi, offer double usefulness to transmit information on the force of optical sources (lighting simultaneous with information correspondence).

V. Jungnickel, K. Manolakis, W. Zirwas, B. Panzner, V. Braun, M. Lossow, M. Sternad, R. Apelfröjd and T.

Svensson(2014): portrays a coordinated design for 5G versatile systems that incorporates SCs and upgraded WiFi as the primary scaling component for remote limit. In any case, and particularly in thick organizations, the maintainable execution of WiFi can be lessened, as the bearer sense numerous entrance with crash evasion (CSMA/CA) enables just a single connection to be dynamic without a moment's delay as it is to some degree arbitrary, request driven and not generally reasonable. For instance, the primary client distinguishing an unused channel is permitted to begin transmission, free of its channel quality.

W. Guo, Q. Li, H. Yu and J. Liu (2015): LiFi-empowered indoor illuminators (lights) can be demonstrated as optical SCs (O-SCs) in a HetNet, where a three-layer organize shaped by RF macrocells, RF-SCs, and O-SCs are conveyed. Offloading movement to the most confined and directional LiFi is relied upon to improve the execution of a solitary WiFi AP or over numerous WiFi APs. Other than rapid activity offloading with consistent availability, the proposed Li+WiFi framework additionally offers new fascinating elements, for example, upgraded security in O-SC and enhanced indoor situating.

IV. MOTIVATION

The extensive study and the limitations of the exhaustive channel capacity May compelled to think about the alternatives of the need and demand of the wireless network availability. The followings figure 1 to figure 3 showing the global demand of mobile network , devices and connections.

(Figure-1 Showing the global mobile device and connections growth)
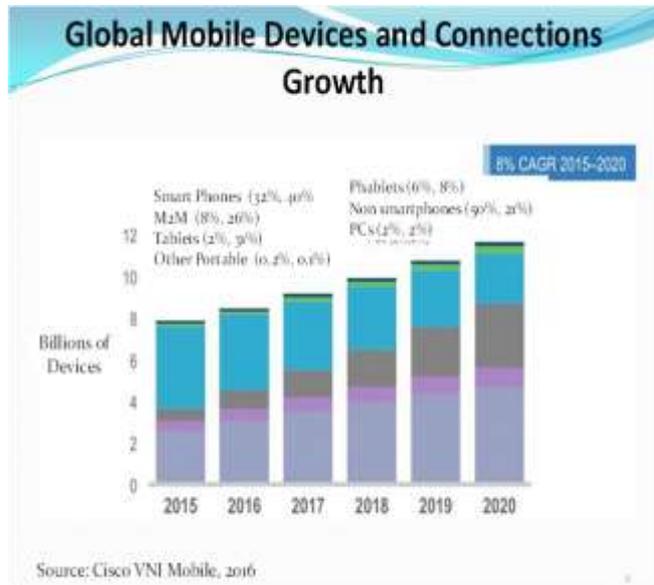
(Figure-2 Global Mobile devices and global mobile traffic)
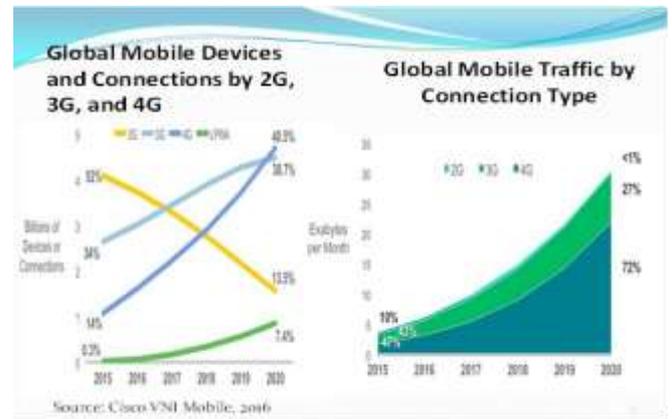
(Figure-3 showing the shortage of RF Spectrum)

V. COMPARATIVE STUDY AND FEATURES OF THE VARIOUS TOPOLOGY

Figure- 4 showing the Technical and Comparative Study Of 3G V/S 4G

VI. VARIOUS APPLICATIONS OF THE LIGHT BASED COMMUNICATION NETWORK:

6.1 AIRWAYS

Whenever we travel through airways we face the problem in communication media because the whole airways communication are performed on the basis of radio waves. To overcome this drawback on radio waves, Li-Fi using VLC is introduced. Wireless Data transfer can be enabled by using LED or LASER. The use of LED will be better if it is installing with the complete data transfer or internet transfer module to enable the passengers to connect to the web.

6.2 GREEN INFORMATION TECHNOLOGY

Green information technology means that unlike radio waves and other communication waves effects on the birds, human body etc. VLC never gives such side effects on any living thing.

6.3 UNDERWATER COMMUNICATION

Underwater ROVs, those favorite toys of treasure seekers and James Cameron, operate from large cables that supply their power and allow them to receive signals from their pilots above. ROVs work great, except when the tether isn't long enough to explore an area, or when it gets stuck on something. If their wires were cut and replaced with light — say from a submerged, high-powered lamp — then they would be much freer to explore. They could also use their headlamps to communicate with each other, processing data autonomously and referring findings periodically back to the surface, all the while obtaining their next batch of orders.

6.4 SMARTER POWER PLANTS

Wi-Fi and many other radiation types are bad for sensitive areas. Like those surrounding power plants. But power plants need fast, inter-connected data systems to monitor things like demand, grid integrity and (in nuclear plants) core temperature. The savings from proper monitoring at a single power plant can add up to hundreds of thousands of dollars. It could offer safe, abundant connectivity for all areas of these sensitive locations. Not only would this save money related to currently implemented solutions, but the draw on power plant's own reserves could be lessened if they haven't yet converted to LED lighting.

6.5 Miscellaneous fields

- Can be used in the places where it is difficult to lay the optical fiber like hospitals. In operation theatre VLC can be used for modern medical instruments.
- In traffic signals VLC can be used which will communicate with the LED lights of the cars and accident numbers can be decreased. Thousand and millions of street lamps can be transferred through VLC to transfer data.
- In aircraft VLC can be used for data transmission.
- It can be used in petroleum or chemical plants where other transmission or frequencies could be hazardously-Fi revolution
- The fastest speed previously reported was 3Gbit/s, achieved earlier this year by the Heinrich Hertz Institute in Germany. Chinese researchers also claimed this month to have produced a 150Mbp/s connection, but some experts were doubtful without seeing further proof.

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His Research work has been adjudged as outstanding work. He has submitted his 2 patents and are in process. He has also has been awarded as "Star of Asia Award " an international award, by Global achievers foundation. He has been awarded the Best Technical Director (Research) in Haryana in 2014, and Best Technical Director (Research) in Delhi 2015. He is also an expert and Master Trainer for the Teachers, empanelled by

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