4th Generation Networks: Emphasizing Wireless Network Services - The Techno Savvy World

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***Abstract* – Networks are the most important thinks and facet in today's world. Fourth generation networks are the most contemporary network platform responsible for the reliable and transport data delivery. Before the 4th generation networks 3rd generation networks are considered as important which depends on both circuit switching and packet switching strategies. The 3G is actually introduced with new value added subject/ services rather than only speed and higher bandwidth. Due to various problems of the 3G networks the 4G networks are emerged during the last of the decade. The 4th Generation network provides so much speed and bandwidth but it needs adequate infrastructure and finance. Today many developing countries as like developed countries introducing 4th generation networks and its wider facilities.**

Keywords: **4th Generation Networks, Communication Systems, 3rd Generation Networks, Networks and Speed, CDMA, GSM, Packet Switching**

I. Introduction

Networks are the integral part of our life. For so many reasons the new and new type of generation of network are emerged. The 3G was first started in Japan by the NIT DOCOMO and then started with WCDMA in Europe where as in USA 3G Comes with CDMA 2000. The 4th Generation Networks are with high usability and global roaming, multimedia support and personalized [13]. The 4th generation networks are applicable in virtual education systems, virtual banking, online banking. It is also helpful for the GPS and telemedicine. The 4th generation networks also facilitate with the better and robust security. The failure or disadvantage of 3G was a result of 4G [09].

II. Objectives

The main aim and objective of this study which includes:

i. To know about the 3G and other generation networks in brief manner;

ii. To learn the basic feature of 3G including its disadvantages;

iii. To know about the basic of 4G including the main reason for launching it;

iv. To learn the main advantage of 4G and its requirement;

v. To know about the application of 4G network.

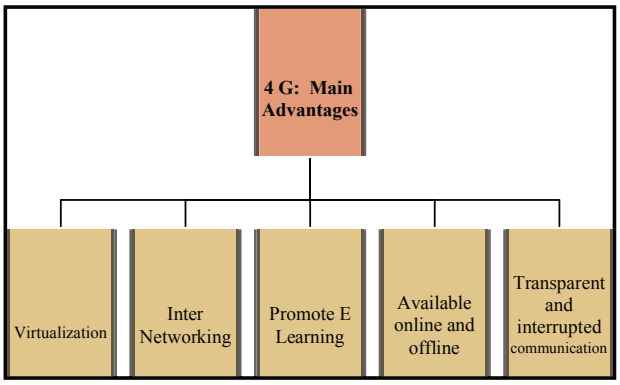

Fig. 1 The Main requirement of AG Networks

III. Generation of Networks

The generation of Networks is about the new age and style of Networking and communication comes with new factors. After the invention of networks and communication till now various generations were come [13]. The first recognized is a 1G or first generation network which is based on analog technology and launched during the 1980's. After 1G the 2 G was come with the higher speed and broad width due to the benefit of the analog to digital communication. During the late of 1980's the 2G was emerged. 2G was based on GSM and with 2G the concept of SIM Card also emerged. The main access technologies of 2G are CDMA and GSM.

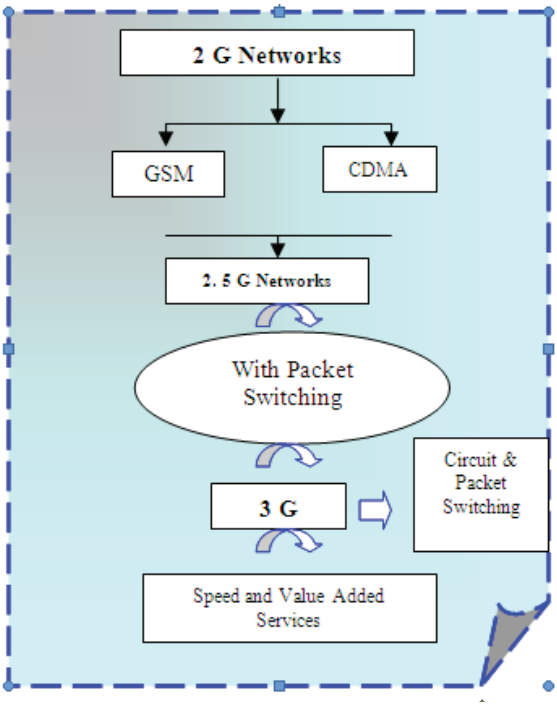

Fig. 2 From 2G to 3G at a glance

The disadvantage of 2G brought the facility of 2.5G which mainly deals with packet switching. This is a kind of networks where internet and mobile communication is possible [09, 10, 13].

The advancement of 2G Networks brings 3G with the several benefits and mainly the speed bandwidth reliability and security to the network and the information storage. In 3G one user one user can directly get information or open the web page with the help of wireless broadband facility [02, 05].

IV. 3G and Its Disadvantages

3G is a 3rd generation networks which allows data transfer or speed from 144kb to 2.4MB. the 3G is also supported almost all type of entertaining facilities like video programme, Live TV, Songs,Video, 3D Games, Audio Video download, video conference and so on. The basic idea of 3G is to deploy new systems with new services instead of just provide higher bandwidth and data rate. 3G employ both the circuit switching and packet switching. The main accessible technologies of the 3G are CDMA, WCDMA and TSSDMA. But the main problem of this kind of networks is its needs continuous increasing data rate and band width to meet the multimedia requirement. It provides a seamless transparent and to mechanism. It is to some extend costly rather than service available. Limitation of the spectrum and its allocation is also an important problem ir issue. It is not accept all kind of multimedia file. Another problem according the most telecommunication expert is - it is not personalized.

V. 4G Networks

4G refers to Fourth Generation networks which mean networking ability with higher speed, bandwidth and accessibility. During the 2000's the 4G networks are emerged around the world India is not exception to this. The Airtel is the first company in India who introduce first 4G based mobile services to the Indian community. In 4G network the service is very much personalized and also multimedia supportable. 4G networks also provide the high usability and global roaming facility. Here the end user terminals most of the cases compatible with any technology, at any time and also any where in the world.

The most important features of 4G is with higher broadband and spectrum and with higher speed and allows multiple types of multimedia services which including bursting video services and streaming video services [08,12]. In 4G network bursting video is acceptable and with higher speed. This kind of multimedia requires higher memory, the benefits of 4G is that it has all the answer is yes.

VI. Advantages of 4G

Apart from speed, band width and high data and video transfer rate 4G is applicable in the following activities:

i. 4th Generation Networks system basically available all most all the time regardless of user is on site or off site;

ii. 4th Generation provides GPS and navigation facilities by which accessibility of any area of map/world is possible through geo technique;

iii. 4G promotes the virtualization of its hardware and software thus it helps in the cloud computing infrastructure;

iv. 4G also promotes the telemedicine and robotics application;

v. The GIS ,GPS and other tele-reprocessing application is possible by the 4th Generation Networks;

vi. 4G promote the e learning, online education, distance education alive including regular education[10];

vii. 4th Generation networks also help in building sophisticated information infrastructure for an organization and institution or building complete information systems.

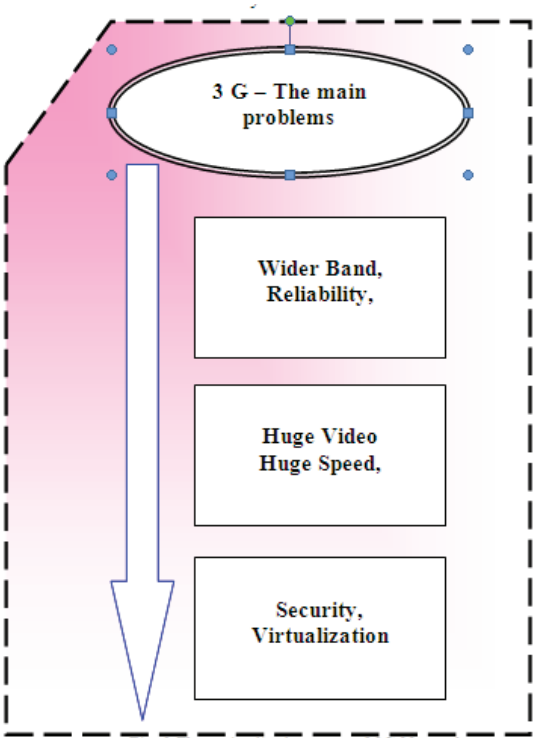

Fig. 3 The main disadvantage of 3G Networks

VII. Requirement of 4G Networks

The main requirement of 4G networks are:

- There should be higher usability and global roaming facility[13];
- The user should be able to perform all the multimedia systems and services;
- Any type of person should be able to access and handle the networks;
- The user terminals should be able to configure themselves in different modes;
- It needs multiple terminals;
- There should be adequate wireless system discovery and selection;
- Terminal mobility is another important issue where location management as well as hand off management is an important issue;
- Here we need both the horizontal and vertical hard off management;
- Security is the another important factor for the right implementation of the 4 G networks, it is essential that new security system be introduced for the 4 network;
- One of the node or port damage may create the overall damage of the network. This is applicable mainly in tree like architecture. But for 4G need the fault tolerance system.

VIII. Findings

The study found the following findings and they are

i. 4G is the most emerging communication network;

ii. 4G host so many benefits but some disadvantage are also important to note;

iii. It allows the various kind of data and files with multimedia facility;

iv. 4G is a speedy and IP based service.

IX. Conclusion

The main advantage or aim of the 4G should be a single universal technology based IP rather than current core technology [12]. Due to the emerging benefits and facilities especially speeds, bandwidth, multimedia support and other services the popularity of 4G is gaining day by day. The main drawback and disadvantages of 3G is the main reason for 4G network. 4G network is started or going to be starting where already various other networks and communication a system is exist. The main problem of this kind of network should be the most priority to the researcher in the field of networking. However inventing or finding new service should not be ignored.

References

[1] ITU global standard for international mobile telecommunications, IMT-Advanced, Circular letter, ITU-R March 2008.

[2] "ITU World Radiocommunication Seminar highlights future communication technologies", International Telecommunication Union. http://www.itu.int/net/pressoffice/press_releases/2010/48.aspx.

[3] "AT&T commits to LTE-Advanced deployment in 2013, Hesse and Mead unfazed". Engadget. 2011-11-08. http://www.engadget.com/2011/11/08/atandt-commits-to-lte-advanced-deployment-in-2013-hesse-and-mead/. Retrieved 2012-07-31.

[4] 62 commercial networks support DC-HSPA+, drives HSPA investments LteWorld Feb, 07, 2012

[5] J.Vilches, Everything you need to know about 4G Wireless Technology. TechSpot, April 2010.

[6] ITU-R, Report M.2134, Requirements related to technical performance for IMT-Advanced radio interface(s), Approved in Nov. 2008.

[7] Anuradha Shukla, "Super-Fast 4G Wireless Service Launching in South Korea", *Asia-Pacific Business and Technology Report*., October 2011. http://www.biztechreport.com/story/1619-super-fast-4g-wireless-service-launching-south-korea. Retrieved 2011-11-24.

[8] "Sprint announces seven new WiMAX markets, says 'Let AT&T and Verizon yak about maps and 3G coverage", Engadget. 2010-03-23. Archived from the original on 25 March 2010. http://www.engadget.com/2010/03/23/sprint-announces-seven-new-wimax-markets-says-let-atandt-and-ver/. Retrieved 2010-04-08.

[9] Paul, Prantosh Kumar, Dipak Chaterjee and Bhaskar Karn, "Cloud Computing: emphasizing its possible roles and importance in Information Systems and Centers", *in IEM/IEEE sponsored international conference proceedings (IEMCON-12). P-345-348. [indexed, abstracted in Google Scholar[USA], Cite Ceer, EBSCO]*

[10] Paul, Prantosh Kumar, Dipak Chaterjee and Bhaskar Karn, "Cloud Computing: beyond ordinary Information Transfer Cycle", *Submitted in National Conference on Computing and Systems, Dept of Computer Science, Burdwan University.* (Status- Accepted) 15 March 2010.

[11] Paul, Prantosh Kumar, B B Sarangi and Bhaskar Karn, "Cloud Computing: emphasizing its Facet, Component and Green aspect with special reference to its utilization in the Information Hub*", in National Conference on Emerging Trends in Computer Application & Management,Faculty of Computer Application and Management, AVIT (AICTE-NBA Accredited Engineering College)* Dated-24-02-12, 25-02-12. Paper published.

[12] Paul, Prantosh Kumar**,** B B Sarangi, "Information Science (IS): Emerging utilization of Computing, Technology and Management Gradients in the 21st Century". *in National Conference on Emerging Trends in Computer Application & Management,Faculty of Computer Application and Management, AVIT* (AICTE-NBA Accredited Engineering College) Dated-24-02-12, 25-02-12. Paper published.

[13] www.en.wikipedia.org