

# An Investigation into the Evolution of Wireless Mobile Technologies and their Impact on Communication

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*The data traffic through mobile devices has grown exponentially and as a result internet is transforming itself to be based on mobile networks. Mobile devices which have been conventionally using third and fourth generation technologies have started choosing Wi-Fi as an alternative for coping with the increasing data traffic. However, simultaneous access of these technologies will improve the performance of mobile devices. Wi-Fi offloading is the solution for the future growth of the mobile broadband data traffic in deployed long term evolution [LTE] and Wi-Fi is an alternative access network technology.*

**Keywords:** Wireless Fidelity (Wi-Fi), long term evolution [LTE].

## 1. INTRODUCTION

A network is nothing but two or more computers that are linked together. A wireless network is also a network that can be set by using the radio signal frequency to communicate with network devices and computers. Sometimes, a wireless network is also referred to as Wi-Fi network or WLAN. A wireless network is a network that refers to any type of computer network which is not connected through any kind of cable. In other words, any kind of network that does not involve cables is known as the wireless network [1]. Traditionally, people connected computers together with the use of various physical medium such as coaxial cable or phone wire. Recently, they are connecting their computers by using the wireless technology. Wireless networking is a concept that helps the telecommunications networks and business people to save the cost of cables for networking. The wireless network allows one to connect computers anywhere without the wires. There are two main components in wireless network and they are wireless clients and wireless router or access point [2].

## 2. EVOLUTION OF MOBILE TECHNOLOGIES

According to Berg, Taylor and Harper, telecommunication has been a fastest developing industry in the past few years. And the concentration of communication is transforming from voice-centric to data-centric communication offering entire communication package instead of several technologies and appliances [3]. Past 20 years have viewed many inventions in several mobile communication technologies and it looks that it will develop vastly in upcoming years. As with several technologies, advancement in wireless communication exists mainly through a steady evolution process. The 3G network is also

developed gradually from basic mobile communication and each step of its evolution (1G, 2G) have played essential roles.

The Figure 1 shows the Evolution of Mobile Technology.

## Evolution of mobile

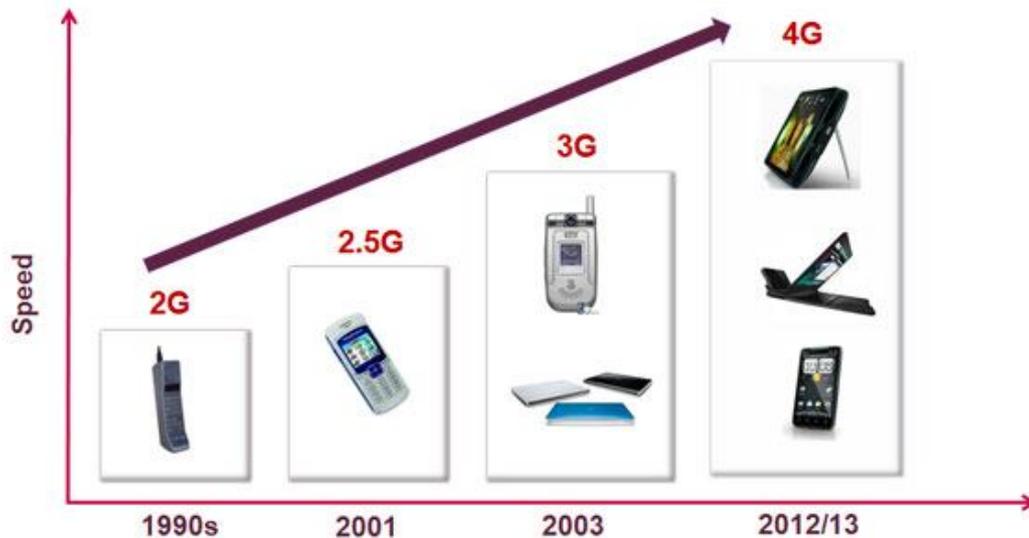


Fig. 1: Evolution of Mobile Technology

### 2.1. 1G: First Generation Mobile Phones

The First Generation or 1G mobile networks were introduced in 1970s. These systems were known as cellular, which was further reduced by the term "cell", due to the process by which the signals were provided off between towers. The signals of cell phone were based on transmission of analog system and first generation appliances were less costly and heavy comparatively than former appliances. Some of the most familiar standards unfolded for First Generation systems were Total Access Communication Systems, Nordic Mobile Telephone and Advanced Mobile Phone Systems. The global market of mobile phone developed from 30 to 50% annually with the existence of first generation network, and many subscribers worldwide attained approximately 20 million by 1990 [4].

### 2.2. 2G: GPRS and GSM Networks

Pereira, Vasco and Sousa, Tiago explained that the second Generation or 2G phones unfolding Global System for Mobile (GSM) technology were introduced in the early 1990s. GSM uses digital modulation to enhance the quality of voice but the network provides reduced data service [5]. As demand drove undertaking of cell phones, second generation carriers continued to enhance transmission coverage and quality. The second

generation carriers also initiated to provide extra services, such as faxes, paging, and voicemail and text messages. The reduced services of data under second generation networks consist of MLS, HSCSD and WAP. In the late 1990s an intermediary phase, 2.5G was introduced. It uses General Packet Radio Service standard, which offers capabilities of packet-switched data to occurring Global System for Mobile networks [6]. It permits users to deliver packets as graphics-rich data. The packet switching significance increased with the development of internet protocol and internet. An example of 2.5 Generation mobile technology is the EDGE network.

### **2.3. Present 3G Networks**

The third Generation or 3G revolution permitted mobile phone customers to use video, graphics and audio applications. Over third generation it is applicable to view video telephony and view streaming videos although such tasks are constrained severely by bottlenecks of network and over-usage [7]. Third Generation or 3G phone speeds deliver up to 2 Mbps but renders only better conditions and in stationary mode. Moving at a high speed can reduce the bandwidth of 3G to a mere 145 Kbps. Schiller described that the cellular services of 3G also referred as Universal Mobile Telecommunication System, support greater rates of data and open the way to online style applications [8]. 3G technology supports both circuit and packet switched transmission of data and an individual set of standards can be used worldwide with capability over different mobile appliances. Universal Mobile Telecommunication System provides the availability of global roaming, with essential access to Internet from any place.

### **2.4. High-Speed 4G Mobile Networks**

Mishra, Ajay [9] described that the present mobile telephony generation i.e. Fourth Generation or 4G has been developed with the target of offering rates of transmission up to 20 Mbps while accommodating Quality of Service [QoS] features simultaneously [10]. Quality of Service will permit users and their telephone carrier to organize traffic according to the kind of application using their bandwidth and adjust between their various requirements of telephone at a moment's notice.

## **3. IMPACT OF LTE TECHNOLOGY IN COMMUNICATION**

Long Term Evolution [LTE] is a wireless broadband technology configured to help roaming access of internet through handheld appliances and mobile phones. Because LTE provides essential developments over older communication standards of cellular some had known it as 4G (fourth generation) technology along with Wi-Max. Ailawadi et al. [11] described that Communication has been developed greatly by the implementation of LTE in several ways. The users using these LTE technology mobile phones can access internet easily. The mobile phones equipped with LTE technology have many applications which make it simple for user to view electronic mails and answer to them with ease. The mobile phones have greater speed of internet compared to those using 3G and 4G technologies. Furthermore, it is available for users to access several applications online [11,12]. Using these technology android phones is capable to obtain various applications online with convenience. Stencil, Muller and Frank mentioned that the mobile phones has played a major role in assuring information quality. The mobile phones have a better sound system which makes the conversations

of phone clear. This assures that the user gets appropriate information [13]. Mobile phones play an essential role in assuring that people from different parts of the world are capable to communicate efficiently in a nutshell. It also supports to separate the technological bridge in terms of making possible applications in mobile phones. The phones with LTE technology have supported the users to overcome the issues which they have been facing while using third generation phones [14]. This is because LTE technology is a general development of technology and has several features as compared to third generation. The LTE technologies generally offers user with several choices to select from when it exists to use mobile phones.

#### **4. FUTURE DEMAND FOR WIRELESS TECHNOLOGIES**

The future of wireless broadband networks is the Long Term Evolution. This technology will permit wireless broadband network to provide users more of what they need, which is released mobility [15,16]. Additionally LTE will help several services and products in use now-a-days because of its backward quality to 3GPP networks. Wireless broadband network is committed wholly to LTE mobile technology and developing its wireless network. A. Ghosh, R. Ratasuk, B. Mondal, N. Mangalvedhe and T. Thomas explained that the organization participates actively in technology standards development to assure that future standards will benefit greatly to customers to that end [17]. The viability of LTE standard is assured and its future potential, having invested countless hours testing and researching fourth generation technologies to decide the best fit for its network. For these issues wireless broadband network selects Long Term Evolution as the technology to provide the next generation of mobile applications and services to its customers [18-20].

#### **5. CONCLUSION**

The network capacity must be widened in order to satisfy the rapid growth in the mobile broadband technology. To realize the need for traffic offloading, the best technology is to start with the Long Term Evolution (LTE) and it is the most advanced and widely used wireless access network technology. The migration of traffic and evolving device mix from fixed network to mobile network will bring growth rate higher.

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