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Challenges and Benefits in 4G Wireless Networks

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Abstract

The fourth generation of wireless communications based on the Internet Protocol, which allows us quick and smooth access to the Internet and provides a wide range of services in roaming networks. 4G also faced a range of challenges, such as roaming, security and services integrated between different networks. In this paper we will discuss the benefits and challenges faced by the 4G.

Keywords: *Challenges in 4G, Benefits of 4G, Mobile Station.*

I. Introduction

The 4G technology provides very high data transfer rate as it enabled the user to access a great deal of information from different places of the world in a short time. 4G technology also worked to improve audio/video streaming quality for the user.

Turnout has become an increasingly large multimedia audio, image and video as the mobile systems become more flexible in handling of Laptops as it allows the user access to the largest amount of information and little effort is easy.

The benefits of 4G

1. **Quicker Connections Speeds:** The most important benefits of the 4G he has increased the data transfer rate which is causing it to ease user access to information of various kinds image voice plus video conferencing with high-speed and quality of technology, where there have been some suffering in the side of multimedia in terms of quality of service in the 3G.

2. **Improved In-Building Coverage:** Of the big difficulties faced by previous generations are the factors that affect the signal and difficult to penetrate buildings and these factors greatly affect in the quality of the signal and weaken significantly. 4G was able to solve this problem and work to reduce the factors of influence on the quality especially in 800MHz band.

3. **Enhanced Performance:** 4G has increased download speed , it was doubled more than five times compared to the 3G. 4G also have much greater capacity and efficiency compared to 3G. For example, one crippling issue for early smartphone users on 3G data networks was less about the amount of data being sent and more about the amount of signaling traffic generated by the air interface. The signal load unbalanced 3G cells and bogged them down.

The Challenges in Integrating 4g Wireless Systems

A. Mobile Station

1. **Multimode User Terminal:** 4G worked on the reduction of operating costs, because the 4G have capability to operate in several networks. This also led to reduce the consumption of energy used in the operation of the network.

2. **Discovery of Wireless System:** 4G networks always correspond, to that the mobile station processes the various signals it receives to contact service provider. As each service provider has its own protocol used differs from other service providers protocols .One solution to solve this part is called "System initiated discoveries". This mechanism enables the user to automatic download programs via wireless. Another way to solve this problem overlay networks. In this way, is to connect the end user to different networks through overlay networks.

3. **Selection of wireless System:** We can find a way to enable service providers to allow their resources with each other to minimize the effort that you use mobile station in the process of signals it receives to choose its service provider. But that will highlight the other challenges such as involves precise understanding of the supported service types, system data rates, QoS , dialing costs, and user preferences[2] .

B. System Challenges

1. Terminal Mobility

Terminal mobility has two goals: Location management and handoff management. Location management contains all the information inside of handling for roaming Terminals management between the master cell and the current cell such as QoS capabilities. On the other IPv6 mobile have a IP address in the master network and when it moves away it becomes invalid and new network giving it a new IP address called (a care-of address).[4]

2. QoS Support and Network Infrastructure

Existing wireless systems can be mentioned into two kinds: non-IP-based and IP-based. Always non-IP-based systems are highly optimized for voice delivery (eg. cdma2000, and UMTS). On the other hand, IP-based systems are always optimized for data services (e.g., 802.11 wireless fidelity and Hiper LAN). In 4G wireless environments, the problem in integrating these 2 systems becomes apparent. research challenges such as QoS guarantee for end-to-end services need to be addressed, though they are by no suggests that easy to tackle, especially when time-sensitive or multimedia applications are considered.

C. Service

1. Service and Charge

To manage and store the customers' accounting information from multiple service providers, also, to bill the customers with simple but detailed information has become much more complicated with 4G networks. This can be mainly due to 4G networks are heterogeneous and the frequent interaction of service providers. Various billing and accounting frameworks are being proposed to achieve this goal. The research community addressed this concern and proposed several frameworks to handle the customers' billing and user account information [6, 7].

2. Personal mobility is a concern in mobility management

Personal mobility concentrates on the movement of users instead of users' terminals, and involves the availability of personal communications and customized operating environments to provide seamless personal mobility to users without modifying the existing servers in heterogeneous systems. Once there is a video message addressed to the mobile user, however where the user is found or what kind of terminal is being used, the message will be sent to the user correctly. a personalized operative environment, on the other hand, may be a service that enables adaptable service shows (in order fit the capabilities of the terminals in use in spite of network types).

II. Conclusion

In this paper we addressed the challenges faced by the 4G of wireless communications and

represented in three major aspects of a mobile station, service and system. We discussed the benefits as well as the problems that faced previous generations in wireless communications that has been finding solutions and developing technologies in previous generations.

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