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QUALITY OF MOBILE SERVICE TECHNOLOGY LTE-4G

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Abstract: In this paper an introductory analysis was performed in order to review the evolution of LTE (Long Term Evolution) fourth generation (4G) implemented in Ecuador, to gain a broader understanding of this technology, especially in the quality of service currently offered, the requirements to be considered for a possible improvement or implementation in a given area of Quito. Considering conditions like market, technology and regulatory laws.

Keywords:LTE, 4G, Mobile, Spectrum, 3GPP.

Аннотация. В статье вводный анализ для того, чтобы рассмотреть эволюцию LTE (Long Term Evolution) четвертого поколения (4G), осуществляемых в Эквадоре, чтобы получить более глубокое понимание этой технологии, особенно в качество обслуживания в настоящее время, требования должны быть рассмотрены для возможного улучшения или реализации в данной области Кито (столиця Еквадору). Учитывая условия, такие как рынок, технологии и нормативных законов.

В настоящее время мобильный телефон стала незаменимой для всех, так что спрос на мобильные устройства возрастает, что делает компаний, стремящихся к развитию высокоскоростного.

Технология 4G является эволюция технологий 3G. 4G будет включать в себя доступ в Интернет и варианты передачи данных. В настоящее время, технологии 4G находится в стадии разработки в нашей стране, потому что найти только в крупных городах, и то, что все мобильные компании ищут становится скорость доступа между 100 Мбит перемещения и 1 Гбит в состоянии покоя, что не может быть достигнуто с помощью современных технологий.

4G это не технология или определенный стандарт, но это набор технологий, которые стремятся оптимизировать коммуникацию между людьми.

В Эквадоре только CNT EP является оператором, который предоставляет эту услугу для 4G-LTE сети, которая уже включена в сотовых планов. После других мобильных операторов, таких как Movistar и Claro, выполните соответствующие усилия, могут получить доступ к этой спектра для мобильного широкополосного доступа.

Ключевые слова: LTE, 4G, мобильный, Спектр, 3GPP.

1. INTRODUCTION

Currently, the cell phone has become indispensable for everyone, so the demand for mobile devices is increasing, making companies seeking a high-speed development. 4G technology is the evolution of 3G technologies, 4G would include *new Internet access and data transfer options*. Nowadays, the 4G technology is still under development in our country whereas this technology is distributed in major cities only, and what all mobile companies are looking for, is getting access speeds between 100 Mbps moving and 1Gbps at repose, that cannot be simply reached by current technologies.

4G technology is not a technology or defined standard but is a set of technologies that seek to optimize communication between people.In Ecuador only *CNT* is the operator that provides this service for 4G-LTE network that is already included in cellular plans. After the other mobile operators such as Movistar and Claro, perform the respective efforts, may access this spectrum for mobile broadband.

2. CONCEPTS

LTE TECHNOLOGY

It is the global standard developed after the third generation 3GPP for mobile broadband networks of the next generation with support of all major industries. LTE offers the capacity and speed to handle a rapid increase in data traffic [1]. LTE supports flexible wide band for operator from 1,4MHz to 20MHz, for telephone services supports data at a high speed, and includes the functionality to effective support voice over IP (VoIP).This technology (LTE), could be an important engine for the innovation in the cell phone industry that is always growing where a system that allows multimedia capabilities combine with a search engine full mobility.

4G

The abbreviation*4G*, show what is becoming the fourth generation mobile phone technology. It is totally IP-based [2], being a system and a network of networks is a combination of technologies and protocols to allow maximum throughput in all process, reaching after convergence between cable networks and wireless as well as computers, devices electrical and information technologies as well as other convergences to provide access speeds between 100 Mbps moving and 1 Gbps at repose, maintaining a point-to-point service with high security and allowingto offer services of any kind at any time. The Fig. 1 shows some technologies and compare them with *4G*.

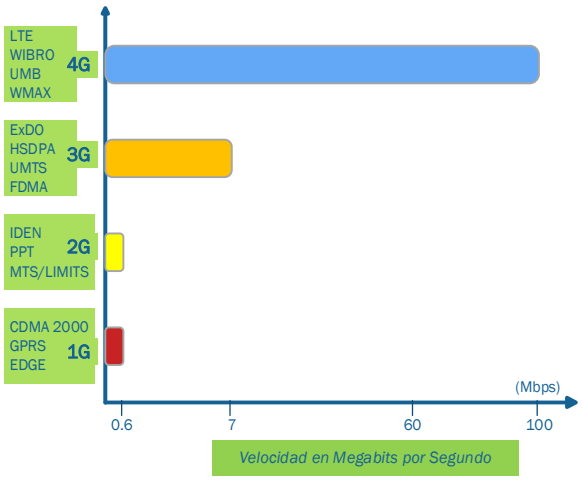

Figure 1Speeds at mobile communications [3]

This convergence of technologies arises from the necessity ofcreating a group with all different standards in use, in order to define the scope of operation of each one of them and in order to integrate all the communication options in a single device transparently to the user.

However, the objective is to ensure the quality of service and compliance of the minimum requirements for the transmission regarding multimedia messaging services, video chat, mobile TV or voice services.

3. ARCHITECTURE

The network packet for 4G networks 3GPP had been redesigned, and it is called System Architecture Evolution (SAE), which reach to interconnect various access networks that sometimes can be heterogeneous between them.

The SAE architecture have the samedesign parameters, like had its predecessors of 3GPP networks, but SAE divides Gateway Control functions (SGSN in UMTS) [4]. In the Fig. 3 the SAE scheme is shown.

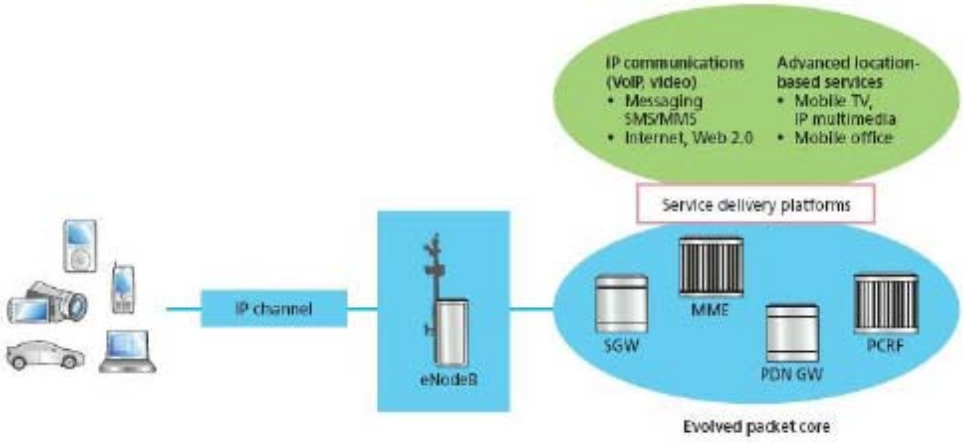

Figure 3 Scheme of SAE [5]

DESCRIPTION

MME gets customerinformation through the information stored in the HSS, after it, MME also authenticates, authorizes and selects data to send towards next processing block; SGW is a computer of user level that is controlled by the MME, it is also a point of monitoring from policies and established service connections; PGW is compared with the GGSN to the functions performed by the GGSN but also has an important role in mobility management. The PGW assign the IP addresses.

4. TECHNOLOGIES USED

Among the fundamental standards for 4G, they may include the following: WiMAX, WiBro, and 3GPP LTE and to build this network is necessary not only to integrate 2G and 3G existing technologies, among others,

but it also need to make use of new modulation schemes and antenna systems, so it will be able to permit the convergence of the wireless systems. [6]

The basic components of a 4G network are:

— Multi antenna systems.

— Software Define Radio (SDR).

— Multiple access systems such as TDMA, FDMA, CDMA and combinations thereofStandard IPv6 to support large numbers of wireless devices and ensure a better quality of service.

5. SOCIAL IMPACT

The Government, through the Ministry of Telecommunications (*Ministerio de Telecomunicaciones y Sociedad de la información*), promotes the implementation of new telecommunication services and ensure equal access to quality services [7]. As early as 2001, broadband was marked for existing operators in the target country, from the years have struggled to operate under 3G technology that have Movistar and Claro and from this year, 4G operates in CNT.Under this concept, a technological transformation broadband enabling new forms of communication, when it is introduced on the market was not ready for the technology entailed, so they had to improve the terminals to offer content and applications are sought.

As has been evolving broadband services, terminals came to converge with technology and is as well known today smartphones or smart phones have improved so that now the user has access to use applications and internet.

So the bandwidth of 3G was quite limited for these applications was for this reason that the operators are making agreements to improve this spectrum and reach all the millions of users. [8]

It should be noted that CNT is the operating current with this service LTE-4G network but coverage is only 30 % so if quality we mean, it's good for the major cities of Ambato, Cuenca, Quito, Guayaquil, but for other small provinces coverage is insufficient as the predominant telephony is clear from the great coverage you have work although 3G.

According to 4G Americas, Brazil, Chile and Colombia are the nations of Latin America in 2015 will be closer to the ideal level for 4G coverage, despite covering only 30—40 % of the 1300 MHz spectrum [9]. Uruguay and Brazil were pioneers in December 2011, which was extended as more operators were added to 4G, Colombia and Paraguay joined in 2012, followed by Chile, Ecuador and Venezuela.

Under these data, ensuring that our country has delayed the deployment of the 4G network, because the granting of the spectrum was limited to a single operator (CNT), so it is uncertain as finalize the negotiations of the other two operators to access this service.

While service quality is low, CNT not possess sufficient amount of your coverage is maximized to users all regions, though browsing speed data transmission is 10 times higher than that offered by the other two existing operators.To this solution is not alone in proposing acceptable plan data to users so that they change their operator, but made public in the coverage spectrum is there that should handle the investigations to manage and improve the baseband spectrum have a better line of sight since the geography of the country limits a bit this fact

6. CONCLUSIONS

The LTE-4G technology has speeds far superior to those currently provided by mobile operators in the country, but in the quality of service that does not even reach 50 % because it is limited to a single operator, and it has no good index of users.4G LTE technology is a key element in the evolution of mobile networks as their flat network architecture makes it the solution to the problems of capacity and connectivity, higher speeds and consolidating the use of advanced devices.

The main problem for mobile operators in the LTE deployment in Ecuador has been the allocation of the spectrum, due to the distribution market has given priority to the mobile operator NTC state to deploy 4G network to give advantage and capture more users to the attendant.

7. RECOMMENDATIONS

In order to improve the quality of mobile service technologies, could be developed in our laboratories a lot simulations and calculus, so we can better understand the problems that could arise in our country if there are not a supervision of these news technologies. Also we could see the necessity in our country for get better services and prove cell phones that could better accept these new technologies.

As we demonstrate, there is problems with the access of people to these new technologies, so would be better if Ecuador decrease the prices for access to these technologies.

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