IOSR Journal of Computer Engineering (IOSR-JCE)
e-ISSN: 2278-0661,p-ISSN: 2278-8727, Volume 20, Issue 6, Ver. II (Nov - Dec 2018), PP 75-84
www.iosrjournals.org

LTE Performance over Wimax in Term of Network Applications: An Implementation on E-Administration System

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Abstract: *Today's application are based on the network as the main communication mediums for interconnecting between its peers. From this term, the importance of the network increased rapidly as the raise of technology and applications taken place. In this paper, we produce a theoretical and practical aspects of modern communication networks in term of e administration systems. The e- administration systems have entered in almost every modern governmental and private sectors to serve the conversion from paper systems to the automotive systems. From this point of view, the constructing of this paper is taken the 4G LTE and the WIMAX communication networks under the scope with analytical results for the implementation of the e-administration in both of the networks. As each networks delivered a different performance when running e-administration application, a performance measurements and comparison must be made in order to state which network is better for modern e administration systems. The comparison between 4G LTE and WIMAX stated in details in this paper as the term of e -administration need to be clarified from the network point of view.*
Keywords: *LTE , WiMax , 4G , Wireless , E-administration*

Date of Submission: 07-12-2018 Date of acceptance: 22-12-2018

I. Introduction

Over the past few years, the need to make the Internet part of the mobile phone system has increased. Because of this development, telecom companies have been strongly encouraged to seek new ways of mobile communications. The goal was to provide high technology that could provide a wide range of service with high mobility capability. In addition, this frame will increase the overall capacity of the system, reduce the delay, obtain better spectral capacity and better performance of the cellular communication process. [1] The LTE and WiMAX architecture has been optimized to support fast data traffic. Compared with the wide-area architecture of the wide area, WiMAX and LTE provide improved response time and reliability based on the intellectual property backbone. [2] LTE and WiMAX were formalized in early 2000 through 3GPP and WiMAX, respectively, both using OFDM technology, And because there are many advantages such as simplicity of implementation, scalability and flexible use of available frequency spectrum [3]The current peak data rate using WiMAX 802.16e is lower than LTE relelease 8 but WiMAX 802.16m is similar to LTE-Advanced (version 10). In the current format, LTE is supported by large telecommunications companies and international standard bodies while WiMAX is supported by IEEE and computer companies but the important thing in WiMAX is the decline of support from telecom operators for various reasons[4] .

II. Long Term Evolution (LTE) Overview

Long Term Evolution (LTE) Is the 4G wireless broadband technology developed by the 3GPP, an industrial business group. LTE has been able to connect quickly to the Internet, a complete technology that uses mobile broadband services for mobile data transmission devices. The multimedia broadcast multicast service (MBMS) will soon be used. Wireless operators are expanding their LTE networks significantly to take advantage of additional efficiency, low noise and increased portability. [5] LTE provides up to 50 Mbps uplink speed and up to 100 MbpS Bandwidth for LTE networks is scalable from 1.25 MHz to 20 MHz. This will meet the requirements of the various network operations with different bandwidth allocations and also allow different services to be provided to operators by spectrum. LTE also offers improved spectral efficiency in 3G and 4G networks, allowing more data and voice services to be transmitted over a given bandwidth. [6]. LTE technology used OFDMA technology and MIMO technology [7] Table 1 summarizes key performance requirements [8]

Table 1. Summary of key performance requirement targets for LTE[8]

Metric	Requirement
Mobility support	Up to 500kmph but optimized for low speeds from 0 to 15kmph
User plane latency	< 5ms
Control plane latency	<100ms (from idle to active)
Control plane capacity	> 200 users per cell (for 5MHz spectrum)
Coverage	5-100km with slight degradation after 30km
Peak data rate	DL: 100Mbps & UL: 50Mbps (for 20MHz spectrum)
Spectrum flexibility	1.25, 2.5, 5, 10, 15, and 20MHz

A. LTE properties

LTE design targets are the following [9]:

1. Support peak data rates up to 100 Mbps in the downlink and 50 Mbps in the uplink in a bandwidth of 20 MHz or, equivalently,
2. Load speed up to 5 bps / Hz and 2.5 bps / Hz, respectively. The baseline takes into account two antennas in the downlink user equipment and one antenna in the uplink user equipment.
3. Uplink for uplink users and uplink links per MHz at 5% of CDF and 2 to 3 times 6 of HSPA.
4. The average downlink connection speed to the user per MHz was 3 to 4 times HSDPA version 6 was released. The uplink rate of the user data transfer rate per MHz, 2 to 3 times the release of the enhanced version.
5. Spectrum efficiency 3 to 4 times launch in the downlink and 2 to 3 times launch in the uplink
6. Mobility up to 350 km/h.
7. Flexible spectrum and smooth coexistence with previous techniques and reduced complexity and total system cost.

B. LTE general structure

LTE can describe the main aspects of the LTE network shown in Figure 1:

1. **E-UTRA (Evolved UMTS Terrestrial Radio Access Network)**: A network of base stations called nodeB (eNodeB) where there is no centralized controller with intelligence distributed between eNodeBs. ENodeB is responsible for the management of radio resources (RRM), ie resource allocation and traffic according to QoS. This node has an important role in MM actions (navigation management).[10]
2. **Mobility Management Entity (MME)** is the main control node for the LTE access network, It is in charge for idle mode User Equipment (UE) tracking and paging procedure with retransmissions. MME involved in the bearer activation/deactivation process and is also in charge for selecting the S-GW for a UE at the early attach and at time of intra- LTE handover involving Core Network (CN) node relocation. It is in charge for authenticating the user. The MME also supports the control plane function for mobility between LTE and 2G/3G access networks with the S3 interface terminating at the MME from the SGSN. Lastly, the MME also ends the S6a interface on the way to the home HSS for roaming UEs [11].
3. **SGW (Serving Gateway)** : Specifies routes and routes user data packets, while also serving as a carrier to the user level during inter-eNodeB deliveries and as an indicator of mobility between LTE and other 3GPP technologies such as the S4 interface and traffic between 2G / 3G and PGW. For idle user equipment, the SGW terminates the downlink data connection and performs the relay when the down link data reaches the UE. It manages and stores UE contexts, for example, IP carrier service parameters, internal network routing information. It also repeats the user's movement if the project is intercepted [12].
4. **PGW (PDN Portal):** The PDN port represents the exit point in the TTI system, specifying the external packet data and entering the incoming data. The UE may have the ability to connect synchronously with more than one PGW to access multiple PDNs. PGW executes packet filtering for each user, support and test support, as well as an anchor to navigate between 3GPP and 3G technologies[11]
5. **HSS (Home Subscriber Server):** HSS is a central database that contains user-specific and subscription information. HSS functions include functions such as mobility management, call support, session creation, user authentication and access authorization[13] The HSS is responsible of storing and updating data related to user subscription such as [14]:

a. User addressing and identification numbers.
b. User profile.
c. Network authentication and authorization information such as path ciphering and integrity protection

6. **Policy of Charging Rule Function (PCRF):** It is the function of policy control in addition to the flow of flow control decisions. PCEF, meaning that it controls the implementation of policies and shipping

implemented in the gateway that provides the service, which imposes simplification and quality of service for individual IP expenditure.[5][15]

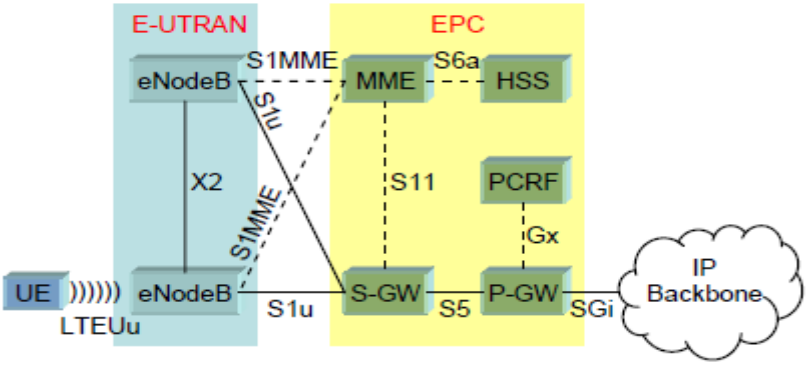

Figure 1: LTE architecture[10]

C. LTE Applications

There are several applications of 4G LTE that involve in many life sectors. The main applications of LTE lies in the telecommunication sector where LTE take a huge advantage towards enhancing the network performance. LTE applications in the network sector can be summarized as follows:

1- **Internet of Things (IoT)**: IoT is one of the most important technologies that shape the technology of the future. This technique is based on the connection of all electronic and electrical devices to the Internet so that the world becomes more connected to each other. All future networks are focused on targeting the IoT sector, which is a measure of the success of future networks. When the LTE was developed, the IoT was targeted as the first LTE application because IoT needed a high bandwidth for the transmission of data between it and the servers of this service. The LTE network and its many characteristics are commensurate with the large data size required by these IoT applications LTE has reduced the time it takes for IoT devices to start sending a request until it is received by the servers. It also increased the productivity of the IoT as it met all its bandwidth and high speed transmission requirements. [16]

2- **Wideband cellular mobile communication**: due to its wideband, speed, and capacity the LTE network used for mobile communication. The connection between the mobile nodes and network base stations require from the service network to be as flexible as possible to handle mobility. LTE offers a high-end flexibility in dealing with mobile communication due to the infrastructure and its ability to handle such a communication. [17]

3- **Voice over Internet Protocol (VoIP):** One of the most important applications of LTE is VoIP. This is a feature of modern networks. It is also a challenge. The use of VoIP requires the network to have a large bandwidth because of the volume of data transmitted through the carrier medium and process. Converts audio to digital signals which is originally analogue data and this process in turn is considered a challenge for networks because the volume of data transmission is larger than normal because the recipient and receiver are connected at the same time. All this requires the network to be able to accommodate such a large amount of data efficiently and because of the proliferation of applications that use VoIP LTE network has become an urgent need for the management of VoIP applications quickly, efficiently and without problems. [18]

4- **Interactive Media:** Interactive media and the process of dealing with their applications is one of the most important problems facing networks, which delay the network due to the large volume of data required by these applications. Interactive applications use large volumes of data because most of their data takes the visual form, which in turn consumes transmission speed and many network resources. This is an urgent requirement to use the LTE network to manage these applications. The interactive applications are very widespread such as video games and interactive applications in smart phones and smart screens that contain RFID applications and the movement of user or voice, they use artificial intelligence techniques to do this work and therefore the LTE network solved the problems faced by these applications through its ability to manage the size Data transfer and the right way of transmission, as well as reduce the network latency caused by these applications. [19]

III. Worldwide Interoperability for Microwave Access(WIMAX)

It is standard technology by IEEE. IEEE has released a series of standards, the IEEE 802.16 standards series, which began in 2000, which refer to providing access to urban area data called the MAN wireless standards. The first series in the series that was truly implemented was IEEE 802.16d in 2004. This standard referred to the provision of high-speed, high-speed wireless data to fixed users, making it a true rival for DSL

providers and cable data providers. Making IEEE 802.16e in 2005. [20] made the basis to what is well-known as Mobile WiMAX, or WiMAX R1.0. Recently, IEEE 802.16m.It was standardized in March, 2011, considered for WiMAX Release 2.0. Release 2.0 offers many folds higher data rates than Release 1.0 and was recently formally known as 4G in 2012 . 4G technologies shall satisfy the IMT-Advanced of the ITU , pointing at peak data rates in the order of 1 Gbps for low mobility users and 100 Mbps for high mobility users on the downlink to provide advanced services and applications [20].

A. Wimax properties

WiMAX transport systems provide scalability in both network architecture and wireless access technology, with the added flexibility of preferred network deployment and service offerings. There are some important features that WiMAX Mobile supports in the following [8].

1. Quality of service (QoS) is designed to service and service type requests for mobile broadband requirements. These QoS devices manage UL and DL directives and support two-way traffic such as VoIP. Mobile QoS WiMAX networks with multiple service delivery features, low data response time, and ultra-accuracy.
2. MIMO antenna systems along with flexible sub-channelization schemes, and Advanced Coding and Modulation allow high connection accessibility that provide peak data rates up to 63 Mbps and 28 Mbps in downlink and uplink correspondingly.
3. Based on the security structures of the fixed WiMAX standard, the mobile WiMAX specification presents a number of enhancements.
4. The spectrum resources for wireless broadband worldwide not usually uniform in their allocations. Mobile WiMAX technology is designed to be able to measure to operate in various channels from 1.25 to 20 MHz with compliance with various global requirements as efforts lead to long-term spectrum coordination .
5. Mobile WiMAX offers improved handover systems with latencies less than 50 ms to guarantee real-time applications for e xample VoIP achieve without service degradation. Flexible key management schemes ensure that security is maintained throughout handover. Furthermore, Interworking between WiMAX and traditional cellular networks is a basic to the achievement of mobile WiMAX and its adoption by established mobile operators. Mobile WiMAX is designed to provide mobility applications up to 160 km/h.

B. Architecture for WiMAX network

The WiMAX network architecture depends on the entire IP model. The WiMAX community has identified an architectural reference model where WiMAX can be connected to an IP-based core network, typically chosen by network operators serving as Internet service providers, otherwise WiMAX Base provides seamless integration capabilities. With other types of structures as with packet-switched mobile packets [21]

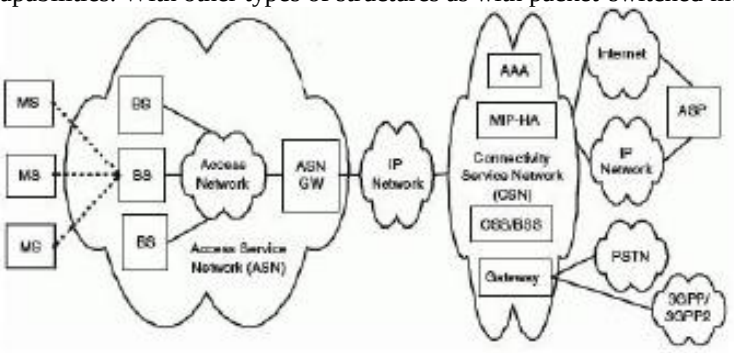

Figure 2: Architecture of WiMAX component[21]

C. APPLICATIONS OF WIMAX/MOBILE WIMAX

WiMAX can be used for following targets .[1]

1. **ATM**: can help banks on the WiMAX installation of ATM low cost in rural and suburban areas to expand its business
2. **Online gaming:** WiMAX can be used to offer universal and faster online gaming in both the rural and urban areas.
3. **Multimedia communication:** The high capability of WiMAX allows it to offer multimedia services, for example video conferencing to subscribers in a more flexible and suitable way (access anytime, anyplace).
4. **Medical applications:** Medical applications can similarly take the advantage of WiMAX, like through WiMAX one can share uninterruptedly patient's vital signs from a remote location to central hospital and might can take an instant reply.

5. **Vehicular data and voice:** WiMAX can help fleet owners, logistic providers, and brokers to find their vehicles on a real-time basis.
6. **Sensor networks:** WiMAX can also play a major role in Sensor Networks. It can be useful for checking humidity, temperature, air quality and others too. It can also be helpful at the time of emergencies when wired networks are not able to work.

D. LTE performance over Wi-Max

of which are 4G networks. This section reviews the main differences and what distinguishes the LTE network from the WiMAX network. Each network has advantages and disadvantages that differ from other types. This is the case for the two networks. Since the search is focused on the LTE network, it is necessary to know the characteristics of this network that distinguish them from other networks compared to those networks.[1]

There are many aspects of comparison between the two networks in order to be clear the importance of each network and its characteristics Table 2 shows the most important characteristics through which to know which networks are better in the case of applications of E-Administration.

Table 2: The Performance of LTE over WiMAX [1] [22]

Properties	**WiMAX**	**LTE**
Download Data Rate	46 Mbps	173 Mbps
Upload Data Rate	4 Mbps	58 Mbps
Cell Capacity	16 concurrent user/cell/MHz	24 concurrent user/cell/MHz
Voice Over IP	Supported	Supported
Max Coverage Range	30 km	100 km
Process Scheduling	Fast scheduling	Effective and multiplexing

Table 2 shows the most important differences and it is clear that the LTE network is more powerful and effective than the network of the future is in terms of efficiency and ability outweigh the WiMAX network and that future applications require high speed of transmission and this is provided by both networks that the speed of transport within the LTE network is very large compared If the technologies used in both networks are compared, it will be noticed that LTE technologies are in line with the great development of applications in scientific and practical life.[1][22]

In terms of response time between networks, latency is the most important factor determining the speed of response between the senders of the request until the request. This is the time that data takes from issuing a request until data is returned. The most important factors that determine the efficiency of the network and its competition with other networks. In this respect, the WiMAX network has a latency of about 30 milliseconds, while the latency time of LTE is much lower because the data transfer speed is so high that the time it takes to reach its goal is 5 milliseconds. [23] Moreover, the LTE network is better than the WiMAX network in terms of its support for VoIP applications, which is the basis for all future applications, while the two networks support VoIP. The LTE network is better than the WiMAX network. [24]

WiMAX is one of the greatest broadly used broadband technologies currently in the world. WiMAX system carries broadband services in an inexpensive way both to enterprise and residential customers. WiMAX an alternate to wire technologies like Digital Subscriber Line (DSL), T1/E1, cable modems is a wireless version based on Ethernet standards. Additional, WiMAX is an industry organization molded by leading equipment and component corporations for compatibility and interoperability of wireless broadband access system confirms to IEEE 802.16. WiMAX operates similar to Wi-Fi but it offers better distance coverage, high speed then Wi-Fi and can accommodate a large no of users. WiMAX can offer it services in an area hard for wired connections to reach and also overcome the limitations the wired networks. WiMAX formed in April 2001, operates in the frequency range of 10-66 GHz under IEEE 802.16 specifications, supports up to 40Mbps [25]. Though, WiMAX technology has some disadvantages for example low bit rate for long distance, low speed of connectivity, low coverage area, security problem and so forth. In order to overcome network coverage limitation of WiMAX and problem of connectivity, we search for new technology. According to the International Telecommunication Union (ITU), the future of mobile phone connectivity now lies in the hands of 4G technologies. The fourth generation (4G) will offer access to wide range of telecommunication services including advanced mobile services, supported by mobile and fixed networks, which are progressively packet based, along with a support for low to high mobility applications and extensive range of data rates .Long Term Evolution (LTE) technology is one of the most promising representatives of 4G wireless systems. LTE can operate in new and more complex spectrum arrangements. Orthogonal Frequency Division Multiple Access (OFDMA) is very much useful for LTE (4G) technology to overcome WiMAX limitation [26].

Both WiMAX and LTE have grown to become evolutionary frameworks that based on the similar core wireless and network technologies. [27] Numerous of the changes can be viewed as specializations upon that

core theme WiMAX has its roots in the wireless broadband access industry which had used a hodge-podge of non-standard technologies. LTE (Long Term Evolution) is a wireless broadband technology planned to provide roaming Internet access through cell phones and handheld devices. Since LTE offers important enhancements over older cellular communication standards, some refer to it as a Fourth Generation (4G) technology along with WiMax. With its architecture based on Internet Protocol (IP) distinct numerous other cellular Internet protocols, Long Term Evolution supports browsing Web sites, VoIP and other IP-based services well [27].

IV. Introduction to E-Administration

There is no universally accepted definition of E-administration between specialists and researchers in academics. Different terms have been used among specialists in different considerations when mentioning to e-administration. Some specialists refer to it as smart administration or administration of the future. It is a dynamic system employed by leaders to increase productivity E-administration has also been defined as a process planned to advance administrative services using a variety of electronic means [28]

E-Administration, or electronic administration, is the number of processes that is applied in an office or agency to convert the paper processes into electronic processes that can be very well controlled and supervised by the management. E-Administration is a tool to be used to decrease the quantity of paper used in an office and to increase productivity, security, performance, and over all actions and tasks of a specific office. E-Administration objective is to present total transparency and accountability leading to better e-Governance within any organization in any nation. Government organizations make use of e- Administration to better perform where the public accountability is of special Concern[29]

There are five benefits to E-administration and they are: cheaper, more, quicker, better and productive : [28]

1. Cheaper: E-administration produces the equivalent outputs at lower aggregate costs
2. More: E-administration produces more outputs at the same aggregate costs
3. Quicker: E-administration produces the same outputs at the same aggregate costs in less time
4. Better: E-administration produces the same outputs at the same aggregate costs yet to a higher quality standard.
5. Productive: E-administration producing outputs.

A. Practical aspects of e-administration

The European Commission intended to present 20 basic electronic services in the Europe Action Plan and, in terms of e-government development, 12 for citizens and 8 for the business sector. Electronic services for citizens are delivered in the activities that follow:[30]

1. Registry books,
2. Arranging appointments for medical examination.
3. Construction permits,
4. Social Security,
5. Access to library,
6. Applying for education,
7. Personal documents,
8. Taxation,
9. Change of address,
10. Car registration,

The following electronic services are intended to be presented into the economic sector:[30]

1. Corporate income taxes,
2. Environmental permits
3. Contributions for employees,
4. R egistration of companies,
5. Value-added tax,
6. Customs declaration,

B. LTE system for E-Administration

The main focus of this research is the process of using LTE in the E-Administration and how to plan and implement the appropriate strategy for this purpose. Because of the many advantages of the LTE network, which has entered into many applications, programs and systems, E-Administration is an important field in which it is necessary to use the best possible communication technology. Because the LTE is the most powerful 4G network, it is the right choice to fly high in the E-Administration field. In order to achieve this special purpose, the E-Administration must be compatible with the LTE network environment. This requires that all applications and programs within the system are compatible to send and receive data through this network.

There are applications that allow partial communication in some parts of the application. Finally, there are applications that allow total communication and total data transfer with the servers unconditionally and this is what should be It has applications in the E-Administration for compatibility with the LTE network. Most applications operating in a network environment are Web-based, that is, they work within the browser [31]. They have the ability to perform their tasks within the network and in a unified environment that enables nodes in the network to communicate in a chain. A web application is defined as the application that can be implemented in a browser so that it has a unified environment for its use in more than one place, which has the ability to participate in most of the system processes. Modern E-Administration systems rely almost entirely on web applications because Web applications have the ability to operate within

a network environment while at the same time serving more than one user because of their location within the server [32].

Web applications are located within the server. The user of the system open the browser and request the program's page by typing the IP of the page or Domain Name Server (DNS) of the application to send the request to the server. The server analyzes the request and identifies which page is returned to the requesting user to return the contents of the page to the user's browser and display the data inside. This connection architecture is called Client-Server [33]. This method of communication is the same in the Internet environment that in the Internet environment (opened network environment) requires the page from the time of request until it returns to the user a long time compared to the closed environment of networks. This is one of the most important features of the LTE network in the E-Administration because of the high speed of sending the request until the page is received from the server (estimated in milliseconds). As for the rest of the networks, the difference at this time is higher than the LTE network.

With respect to LTE, the system is fully dependent on web applications to communicate with servers. The request is sent to the base station in the LTE network, which in turn processes the request by directing the request to the system's MMU, which is responsible for checking the request whether it is within the network coverage area. The MMU addresses the server by checking the IP address or DNS coming from the user's message and the server in turn responds to the MMU whether the page exists or not in the server's storage units [34]. The server then sends the information about the presence of the page to the MMU, which in turn examines the server response. If the server returns that the page does not exist within the network coverage (ie within the networked server), it returns a message to the user telling them that this page is not within the requested IP address. In the case of a page on the server, the MMU sends another request to the server in order to transfer the contents of the page in a message on the Packet format in order to display it in the user's browser. The MMU sends the contents of the page or the page does not exist through the SGW of the LTE network. Figure 3 shows a general structure of E-Administration scenario using 4G LTE network.

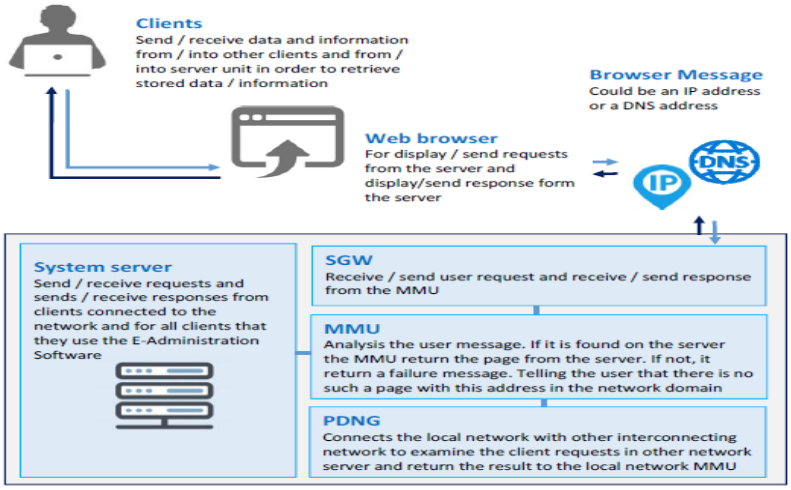

Figure 3: E-Administration using 4G LTE [35]

C. System Implementation

The actual simulation of the system and the presentation of the visual data of the system were implemented by the use of the ICS Telecom program, which simulates the work of networks and the planning of these networks through a sophisticated graphical environment that allows the addition of many features to the system. Using this environment, six scenarios have been drawn up to obtain the results in all cases for the LTE network. These results were distributed in the areas of the Iraqi capital Baghdad, specifically the areas of colleges in Mustansiriya University in order to know all the cases facing the network during the course of work.

In each of these six scenarios, consideration was given to the coverage obtained by the system from this condition, as well as the signal strength, interference and possible interference in such cases. The best coverage was also obtained using the LTE network to connect the colleges at Mustansiriya University.

1 . Experiment 1 (composite Coverage)

Composite coverage is an experiment conducted in the ICS program in order to know the effect of the broadcast equipment on each other, what is the expected effect of the use of the transmission and receiving equipment of the LTE network, since the transmission and receiving devices operate according to specific frequencies that overlap between them during work. Figure 4 shows the composite coverage of ICS Telecom. Details of coverage composite area is listed below the figure.

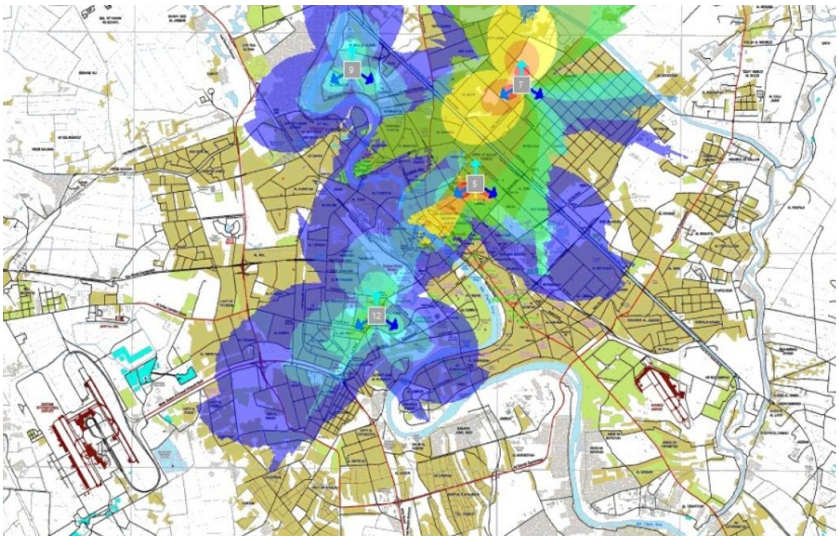

Figure 4: Composed Coverage Experiment of LTE

Table 3 shows the results of composed coverage experiment according to the distance from the base stations that specify the signal strength and coverage area. According to the visual area represented in the map where each color have a certain coverage power ration presented in decibel mele wat (dBm) and the value of calculating the signal composed per meter (dBuV)

Table 3: Composed Coverage Results

Color	dBuV / m	dBm	Signal Strength
	103	-40	Weak
	115	-28	Weak
	91	-52	Medium
	79	-64	Good
	73	-70	Good
	61	-82	Strong
	55	-88	Strong

2. Experiment 2 (Simultaneous Coverage)

Simultaneous Coverage experiment was carried out within the ICS program for the network status determination when two towers are simultaneously broadcast in the same area as in the state of covering the same area by two transmission towers and at the same time they transmit and receive from the network. The ICS system was highlighted in order to extract the relative numbers of the simultaneous coverage process and their effect on the transmission and reception in general in the LTE network. The result is shown in figure 5.

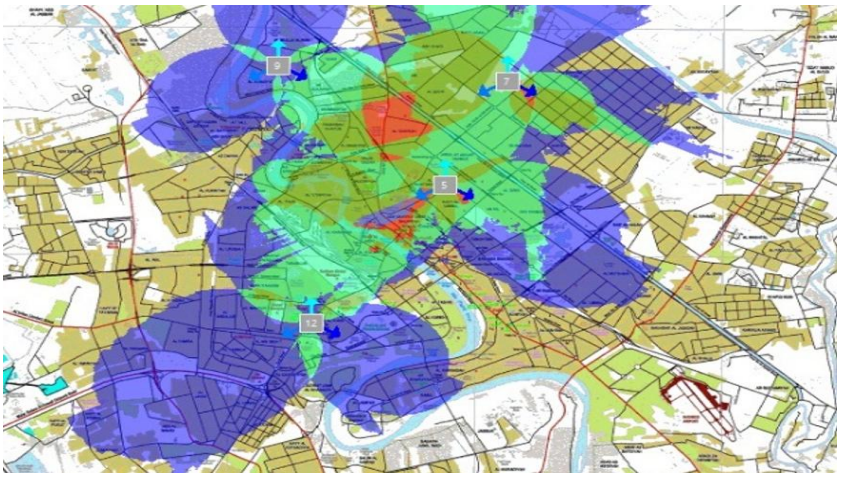

Figure 5: Simultaneous Coverage Experiment of LTE

Very Low Simultaneous

High Simultaneous

Low Simultaneous

Table 4 illustrates the results of the Simultaneous coverage in the LTE system were the results takes the form of percentage values where the green level gets the lowest simultaneous meanwhile the red zone gets the highest Simultaneous.

Table 4 : Simultaneous Coverage Results

Color	Percentage	Simultaneous
	32	High
	29	Medium
	26	Fair
	20	low
	17	low
	11	low
	8	Extremely low

The threshold between the Simultaneous in the broadcast is strong or not and according to the results in Table 4.a is the yellow region, which is more than once the central region within the visual results of the ICS, the areas of the ultraviolet and blue are less synchronized and therefore the synchronization of the transmitter Is a negative factor of signal strength because Simultaneous reduces signal strength to segments and thus reduces the ability of users to receive signal at high quality without interference of data.

V. Conclusion

A reliable and applicable project was achieved by planning and programming some of the algorithms for obtaining E-administration network applied for Al-Mustansiriya university colleges . Planning was done by using ICS telecom the most powerful planning tool offer its various operations and precies . we do the implementation tests and requirement for having the best coverage , low interference , power transmission , user coverage and best location , with the consideration of earth topology . After making very systematic planning, design and implementation of the new communication technology, an effective results were registered and issues were maintained in order to improve the experience of e-administration implementation over modern communication networks .

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