An Efficient Protocol for LTE Network Performance and Control under 5G Wireless Communication Applications

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Abstract: The key benefits of LTE are its ability to carry all types of voice, video and data traffic. However, most of the developments in deployment of LTE have been focused towards providing faster data access, and voice standards are still immature. This paper presents LTE simulation based on the protocol. An on demand multicast routing protocol is proposed, where firstly define all parameters and develop algorithm which can achieve desired result. The work is upheld by broad recreation comes about which show the adequacy of the proposed techniques in finding a close ideal arrangement. ODMRP protocol find best configuration for network model and it reduces cost of RSU.

IndexTerms **–** Protocol, Delay, Throughput, ODMRP, Packet, LTE.

I. INTRODUCTION

LTE stands for Long Term Evolution. It is a registered trademark owned by ETSI (European Telecommunications Standards Institute) for the wireless data communications technology and a development of the GSM/UMTS standards. However, other nations and companies do play an active role in the LTE project. The goal of LTE was to increase the capacity and speed of wireless data networks using new DSP (digital signal processing) techniques and modulations that were developed around the turn of the millennium. A further goal was the redesign and simplification of the network architecture to an IP-based system with significantly reduced transfer latency compared to the 3G architecture. The LTE wireless interface is incompatible with 2G and 3G networks, so that it must be operated on a separate radio spectrum.

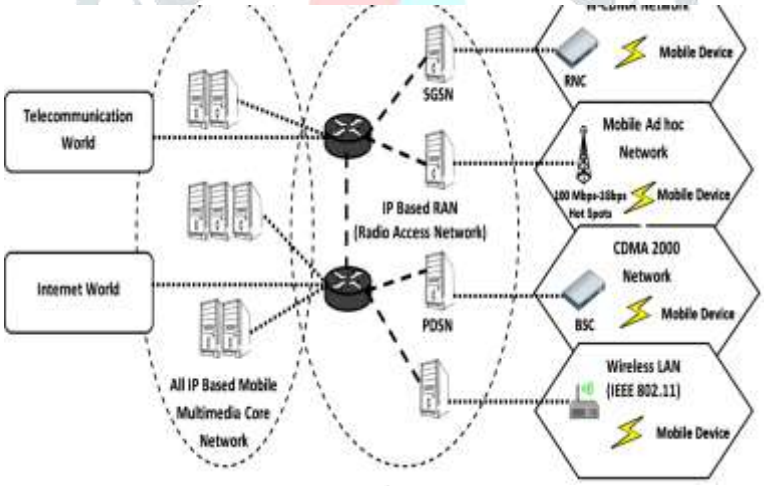

Figure 1: Architectural view of 4G [11]

Software-defined networking (SDN) technology is an approach to network management that enables dynamic, programmatically efficient network configuration in order to improve network performance and monitoring making it more like cloud computing than traditional network management. SDN is meant to address the fact that the static architecture of traditional networks is decentralized and complex while current networks require more flexibility and easy troubleshooting. SDN attempts to centralize network intelligence in one network component by disassociating the forwarding process of network packets (data plane) from the routing process (control plane). The control plane consists of one or more controllers which are considered as the brain of SDN network where the whole intelligence is incorporated. However, the intelligence centralization has its own drawbacks when it comes to security, scalability and elasticity and this is the main issue of SDN.

The goal of present work is to show LTE simulation based on the protocol. In the present work, an on demand multicast routing protocol is presented which at first define all parameters and develop algorithm which can achieve desired result. The work is upheld by broad recreation comes about which show the adequacy of the proposed techniques in finding a close ideal arrangement. Using ODMRP protocol is best configuration for network model and due to it reduces cost of RSU.

II. BACKGROUND

It is distinguished issue of low parcel conveyance proportion, more normal end to end delay and all the more directing overhead. With the web and computerized innovation obscuring the limits between substance, correspondence, and media writes, nowadays

you're similarly prone to tune into a show, motion picture, or network show on your cell phone, as you are to get a similar occasion on radio, at a silver screen, or through your home diversion framework.

This progress may seem consistent, yet in the background, there are distinctive methods of transmission at work, and diverse difficulties which should be met by the source, course, and recipient of every transmission. In this article, we'll be looking into the foremost strategies utilized as a part of transmitting data and flags in the computerized time of systems administration and interchanges.

A unicast transmission is a balanced correspondence that goes from a solitary source to a solitary recipient or goal. One of the least complex regular cases of unicast transmission would be a telephone call between two individuals.

In processing terms, unicast transmission is the most well-known technique for data exchange which happens on systems. Activity as floods of information bundles normally moves from a solitary host, (for example, a web server) to a solitary endpoint, (for example, a customer application, PC, or program).

Despite the fact that a unicast transmission is point to point, a similar data might be passed from the source hub to any number of different hubs on the system, in a progression of coordinated interchanges. An imitation of every parcel in the information stream goes to each host on the system that solicitations it.

All the more in fact, unicast transmission utilizes Web Convention or IP arrangement strategies, for example, transmission control convention (TCP) and client datagram convention (UDP). These are session-based conventions which enable a correspondence to be set up, finished, and ended as a solitary task. A unicast transmission is sent to a solitary hub on the system, which is recognized by a remarkable 64-bit address.

Unicast transmission has been being used for quite a while, with settled conventions and simple to convey strategies. Surely understood and confided in applications, for example, http, smtp, ftp and telnet all utilization the unicast standard and utilize the TCP transport convention. On a system, transmission happens from host to have, which can diminish the activity load on a Neighborhood (LAN), in general. In the event that a system gadget is called upon to make an impression on different hubs, it needs to send numerous unicast messages, each routed to a particular gadget. This initially requires the sender to know the correct IP address of every goal gadget. Each unicast customer that interfaces with the host server goes through some system transfer speed. In the event that various customers are included, this may present scaling issues the extent that system and server assets are concerned. The issue turns out to be considerably more articulated if numerous hosts are transmitting by means of unicast to numerous recipients, in the meantime.

A communicate transmission at the same time transmits a similar data to all hubs on a system. To guarantee that communicate achieves all "corners", the transmission may must be revived or handed-off at specific focuses. TV signals sent from an open system to watchers the nation over or globe are a straightforward case of communicate transmission.

CHALLENGES

- Favorable circumstances
- Very performing system.
- No costly framework must be introduced
- Utilization of unlicensed recurrence range
- Snappy circulation of data around sender
- No single purpose of disappointment.
- All system substances might be portable extremely unique topology
- System capacities must have high level of versatility
- No focal elements ⇒ activity in totally dispersed way.
- RADIOS FOR Impromptu

III. PROPOSED METHODOLOGY

The main contributions of this paper can be summarized as follows – To Measure the simulation performance namely throughput, packet delivery ratio and end to end delay. Simulated in MATLAB and performance analysis results will be more reliable.

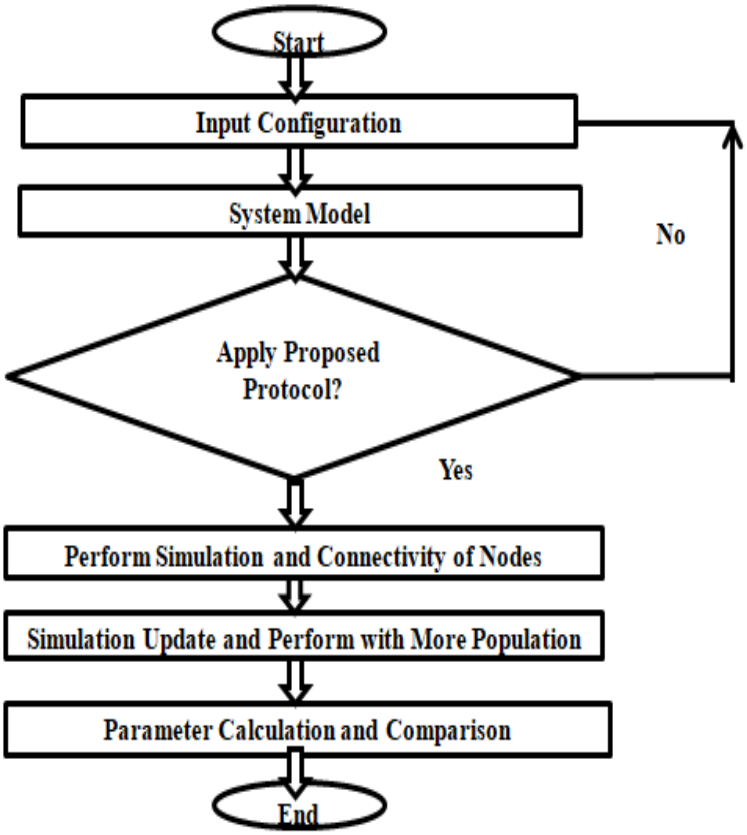

Figure 2: Flow Chart

1. NODE-TO-NODE (N2N)

It is a car innovation intended to enable vehicles to "talk" to each other. N2N interchanges shape a remote specially appointed system on the streets. Such systems are additionally alluded to as Mobile specially appointed systems, MANETs. The frameworks will utilize an area of the 5.9 GHz band put aside by the Unified States Congress, the unlicensed recurrence additionally utilized by WiFi. The US N2N standard, regularly known as WAVE ("Remote Access for Mobile Conditions"), expands upon the lower-level IEEE 802.11p standard, as right on time as 2004.

2. ODMRP

In remote systems administration, On-Request Multicast Steering Convention is a convention for directing multicast and unicast movement all through Impromptu remote work systems. ODMRP makes courses on request, as opposed to proactively making courses as OLSR does. These experiences a course securing delay, in spite of the fact that it lessens arrange movement all in all. To help lessen the issue of this postponement, a few executions send the primary information parcel alongside the course disclosure bundle.

There are two estimation situations in this work-

(i) The first is estimation of throughput, drop and deferral of correspondence between V to V.

(ii) Second one is estimation of throughput, parcel drop and postponement of correspondence between V to RSU. In MATLAB we outline the MANET topology with 2 RSUs and 5-500 vehicles (autos).

Out and about Services – it is additionally imagined that future transportation thruway would be one that is "data driven" and "remotely empowered". When one drives out and about, MANETs can assist the driver with discovering administrations (shops, corner stores, and so on) on that road, and even be informed of any deal going ahead right then and there. Drivers can likewise book a silver screen ticket while driving their way to the films.

MANETs can utilize any remote systems administration innovation as their premise. The most noticeable are short range radio technologies(p118) like WLAN (either standard Wi-Fi or ZigBee). Also, cell advancements or LTE can be utilized for VANETs.The most recent innovation for this remote systems administration is visible light communication [VLC].

Before the execution of MANETs on the streets, practical recreations of MANETs utilizing a blend of Urban Versatility reenactment and System reproduction is are important. Commonly open source test system like SUMO (which handles street movement reenactment) is joined with a system test system like NetSim (TETCOS), to contemplate the execution of MANETs.

Real institutionalization of MANET convention stacks is occurring in the U.S., in Europe, and in Japan, comparing to their strength in the car industry.

IV. SIMULATION AND RESULT

1. Inter-Node Communication

In inter-node communication, vehicles need only be concerned with activity on the road ahead and not behind.

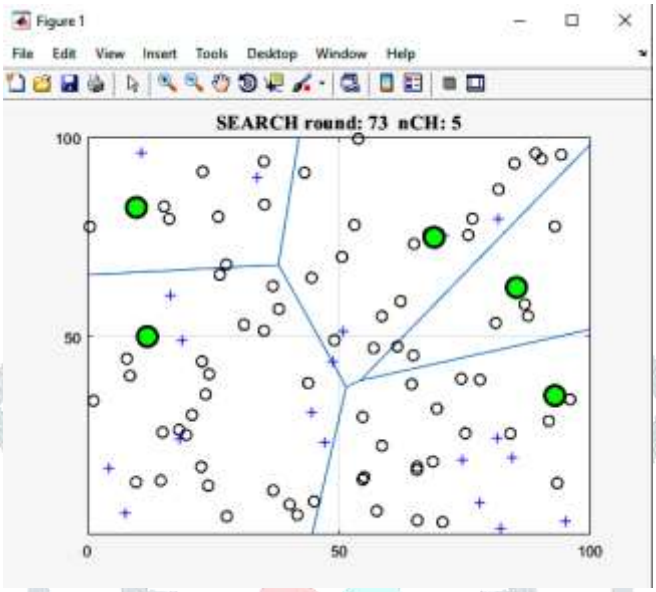

Figure 3: Simulation of N2N

2. N2N Update

In the second simulation, two node is expected to be reachable each other in the different RSU coverage. Here N2I or N2RSU communication which has 2 RSU is designed and they communicate with the entire node. The roadside units may be placed every kilometer or less, enabling high data rates to be maintained in heavy traffic.

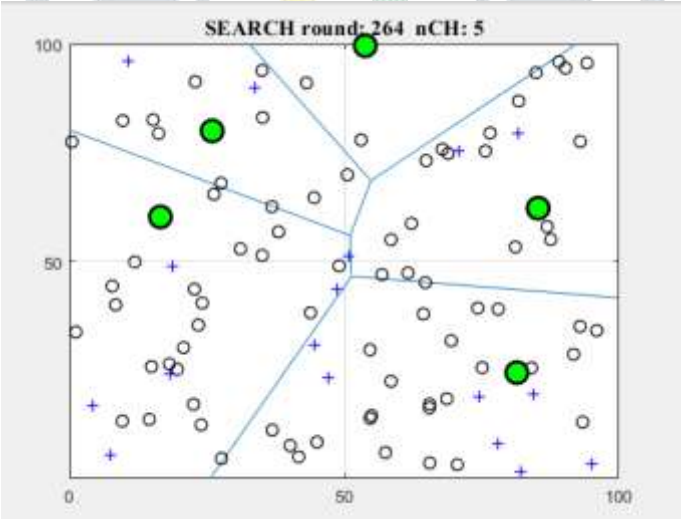

Figure 4: Simulation update of N2N

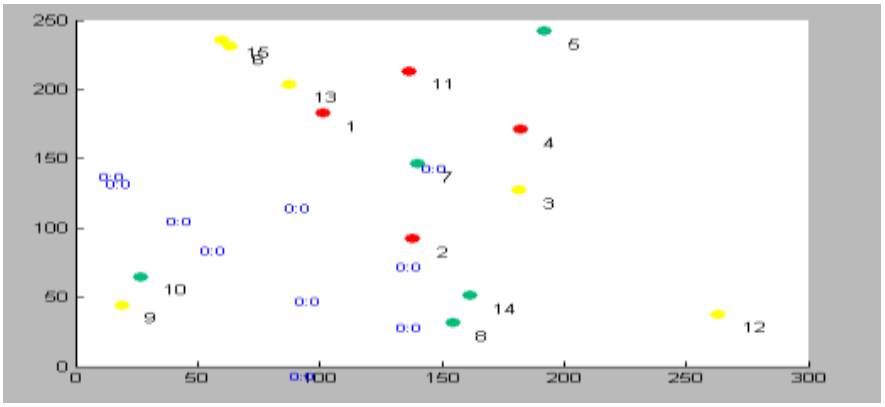

Figure 5: Initializing simulation

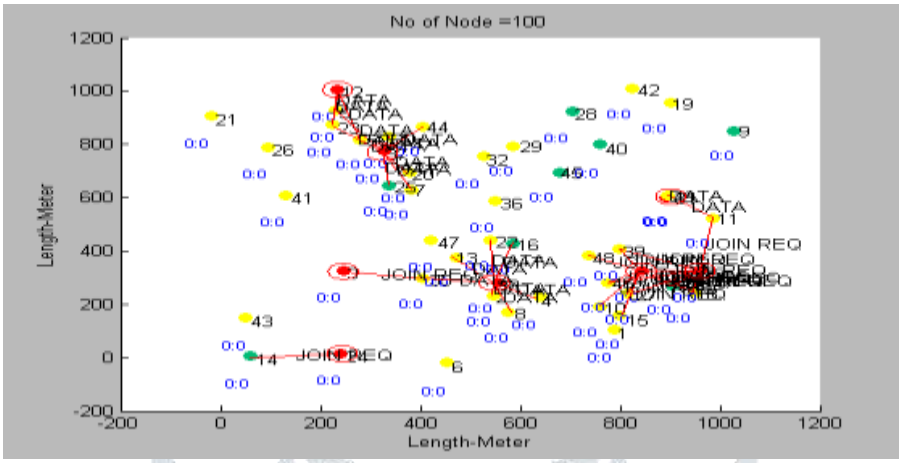

Figure 6: Simulation of LTE using ODMRP

Table-1: Simulation parameters

Software	MATLAB 9.4.0.813654 (R2018a)
System Environment	Windows 10
Time	100 ms to 1000 ms
Population size	100
Primary user	30-70
Secondary user	20-60
Protocol	ODMRP

Table 1 show the parameters list like software requirement, time, protocol, users etc., which included in simulation duration.

Table-2 Simulation Result

Sr No.	Parameter	Proposed Work
1	Packet Delivery Ratio	3.2 %
2	Average End To End Delay	0-0.001 ms
4	Simulation Time	42 sec
5	Throughput Performance	6800 Kbps
6	Node Speed	14 meter/Sec
7	Packet Size	1024 Bytes

Table-3: Comparison of Previous and proposed work

Sr No.	Parameter	Previous work	Proposed Work
1	Latency	100 ms	32ms
2	Throughput Performance	5000Kbps	6800 Kbps
4	End to End delay	125ms	42 ms

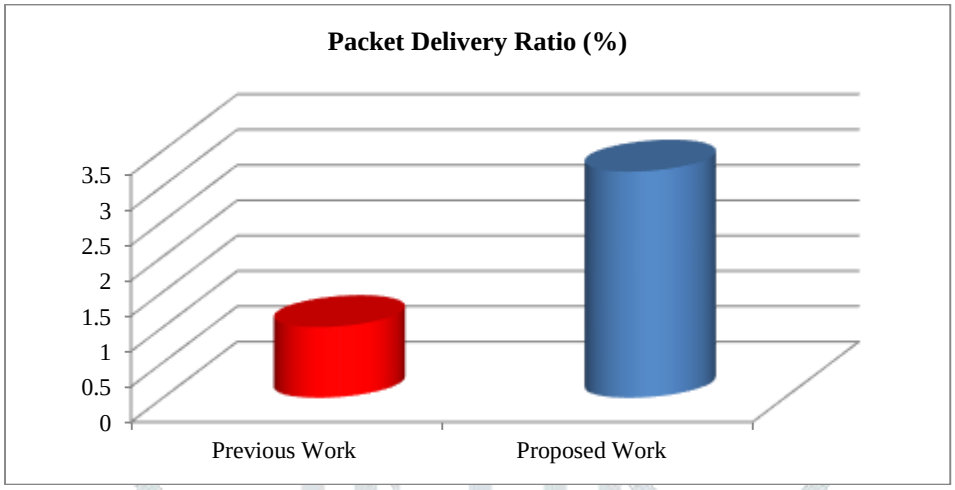

Figure 7: Packet Delivery Ratio

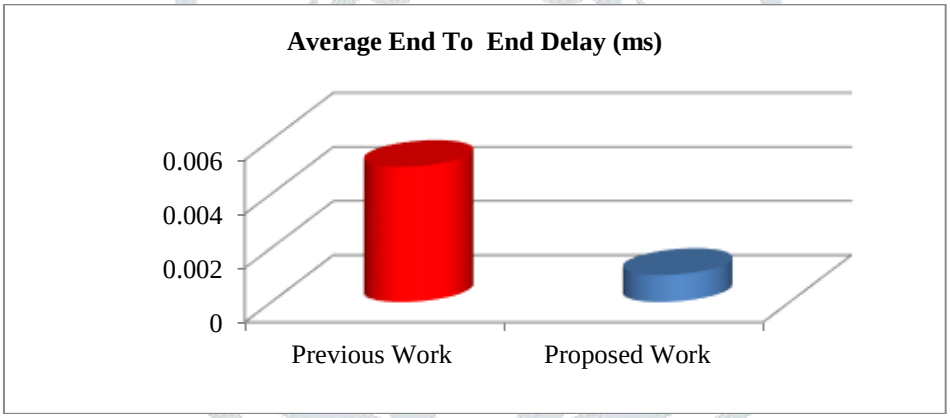

Figure 8: Average End To End Delay

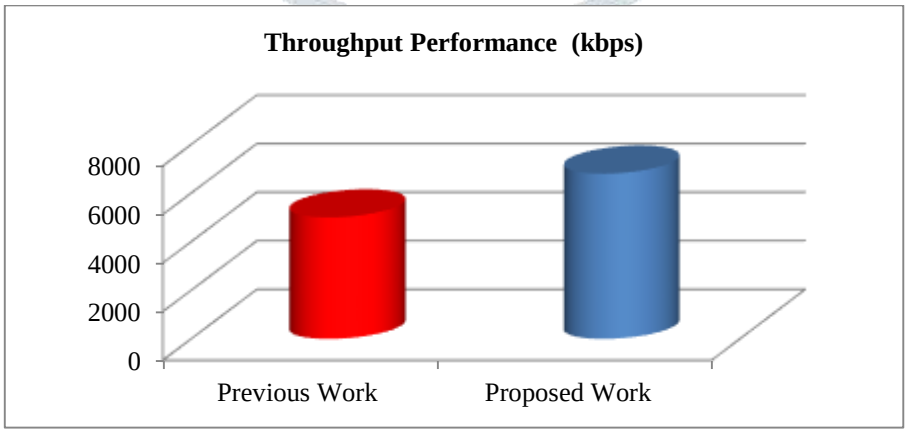

Figure 9: Throughput Performance

Figure 7, 8 and 9 are showing that proposed protocol gives significant better result than previous in Long term environment.

V. CONCLUSION

An experiment of LTE simulation has been done using MATLAB software and the performance parameters have been evaluated such as end to end delay, throughput. Performance of ODMRP is compared with MAODV and AODV Protocols in terms of the performance parameters such as packet delivery ratio, Average end to end delay and routing overhead by using MATLAB for different number of nodes (upto100). From the results it is clear that at high mobility rate ODMRP performs better in case of packet delivery ratio, Average end to end delay and routing overhead than AODV and MAODV. Hence ODMRP give better result in MATLAB environment than both AODV and MAODV.

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