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Analysis of Paging in LTE IMS Network for Circuit and Packet Switch Network

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ABSTRACT

The LTE based IMS system is the system with voice over ip support . The aim of this project is to implement the real time implemenation of how the IP packet being transfer in real time sinario,capture the same packet using captureing software and make the advanced analysis of protocol involved version, header length,decoding of mac acknowldgement being used for data transfer. For this project we using python to make the connection between two nodes, and TCL -TK programming language to implement real time packet transfer, using network stimulator 2, and ubentu linux is used to implement all praposed system because it is highly secure which is the most important criteria in any communication system

Keywords : Long Term Evolution, IP Multimedia Subsystem, 3GPP

I. INTRODUCTION

LTE is IP based network, In IP based network data and signaling is transmitted using packet, all the packet have some specific packet format, header field and version, the most critical thing in capturing and analysis of packet is decoding of mac header field in order to analysed the complete header and sub header, In this project we are going to implement the two nodes one as a server and another as a client make a socket module using python scripting laungauge . We consider client as our UE in LTE system and server being considerd as a lte network. Using Network stimulator 2 we can show real time how packet getting transfer in system, tcl-tk is the scripting langauge used to create a nodes such that communication between them is possible, one thing to rember is all this setup will be done in Linux Ubentu Enviroment Decoding the acknolgment message which is getting in reply and determine the information element which is transfer in packet in LTE network

II. PRAPOSED SYSTEM

The project is entirely software based and to implement the system

SOFTWARE TOOLS

1. Python 2.7
2. Wireshark tool
3 .Network stimulator 2

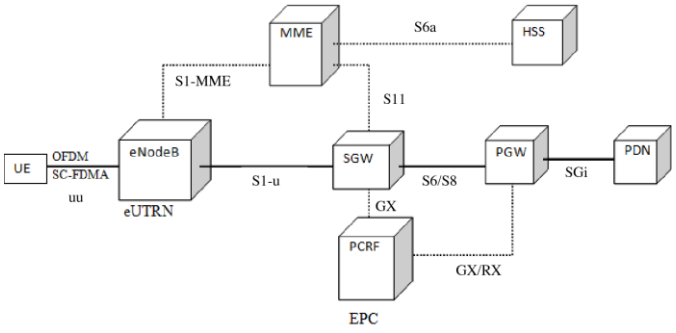

Figure 1 : System Block Diagram for Network

System block consist of
1. user equipmnt
2. evolved packet core (EPC)
3. PDN network

1. **User Equipment**

Terminal Equipment (TE) : This terminates the data streams.

Universal Integrated Circuit Card (UICC) : This is also known as the SIM card for LTE Equipment . It runs an application known as the Universal Subscriber Identity Module (USIM).

2. **Evolved packet core (EPC)**

2.1 Home Subscriber Server

The Home Subscriber Server (HSS) component has been carried forward from UMTS and GSM and is a central database that contains information about all the network operator's subscribers.

2.2 Packet Data Network

The Packet Data Network (PDN) Gateway (P-GW) communicates with the outside world ie. packet data networks PDN, using SGi interface. Each packet data network is identified by an access point name (APN). The PDN gateway has the same role as the GPRS support node (GGSN) and the serving GPRS support node (SGSN) with UMTS and GSM.

2.3 Serving Gateway

The serving gateway (S-GW) acts as a router, and forwards data between the base station and the PDN gateway.

2.4 Mobility management entity

The mobility management entity (MME) controls the high-level operation of the mobile by means of signalling messages and Home Subscriber Server (HSS).

2.5 The Policy Control and Charging Rules Function

The Policy Control and Charging Rules Function (PCRF) is a component which is not shown in the above diagram but it is responsible for policy control decision-making, as well as for controlling the flow-based charging functionalities in the Policy Control Enforcement Function (PCEF), which resides in the P-GW.

III. PRATICAL IMPLEMENTATION OF SYSTEM

1. Python Socket Module

Python 2.7 is used to create the client server communication between the two nodes, in this approch we defined one node as a server and other as client and make a connection on any port . For that we need two seprated terminal or we also use single pc with virtual support

2. NS2 stimulation using TTCN

In ns2 we make a real time implementation of two nodes, which transfer the real time data between each other, we use TTCN scripting launage to implement that as shown in fig 2

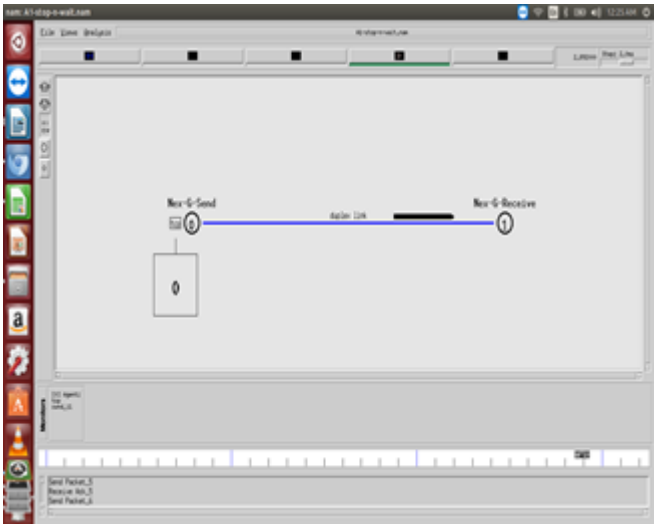

Figure 2 : NS2 Network node stimulation snapshot

3.3 Wireshark analysis

Wireshark is a protocol analyser tool used for capturing packet between the nodes, which determine the all information about transmitted packet like protocol used, version, header information, times laps, source and destination address, etc fig 3 show sample screen shot for the packet capture.

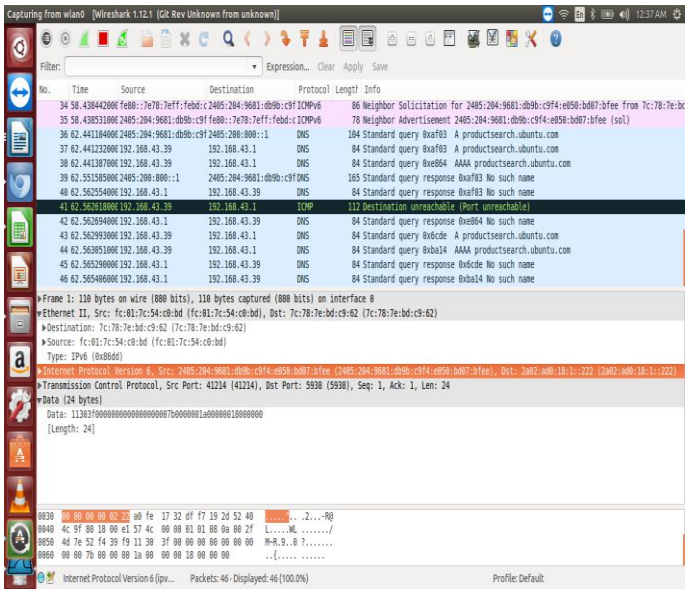

Figure 3 : wireshark capture IP packet analysis

IV. EXPERIMENTAL RESULT

As see in fig the packet is captured in Wireshark tool we analysed the various field in Wireshark software we got source & destination of packet and protocol Used, IP version, byte length, header field, header data, As you see the capture packet complete analysis with all information source. At the end we got mac acknowdgment which is in hexadecimal format which is decode into binary field and from that we get the actual field of information

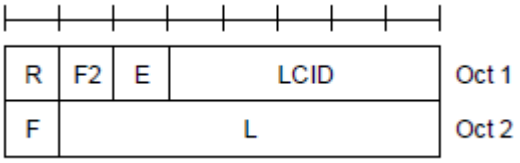

Figure 4 : MAC Header

For example we take one sample captured field

UL-SCH : 20 06 1F 5F 09 72 43 FE 56 00 00 00 00 .....

UL-SCH : 03 45 00 00 3C 33 63 00 00 80 01 00 00 00 00 .

Let me convert the first byte into binary format as follows :

03 = 00000011

Let's rearrange these bits according to MAC PDU diagram as follow

* Bit 0 = R field = 0
* Bit 1 = R field = 0
* Bit 2 = E field = 0.

This means that this header does not have any other fields following this field and it the next byte is the start byte of MAC SDU or MAC CE or Padding'.

* Bit 3~7 = LCID field = 11 in Binary = 3 in decimal. This means the logical channel number for this PDU is '3'.

This is the end of analysis. All the remaining part is user data

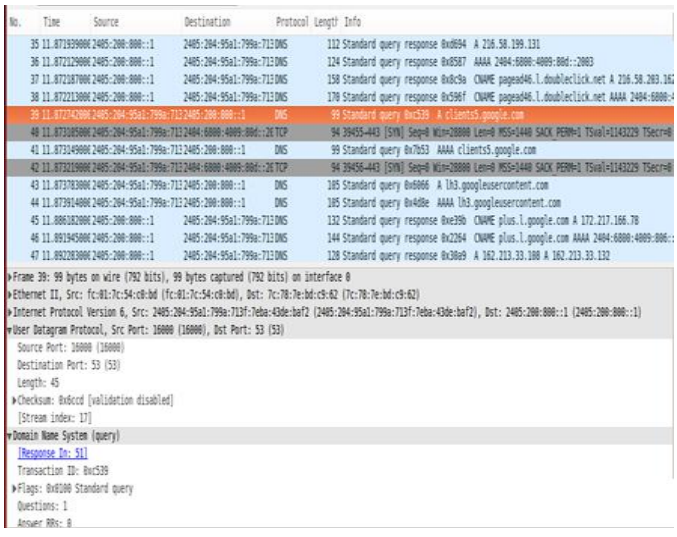

Figure 4 : Wirshark analysis capture snapshot

V. CONCLUSIONS

In this Project we noticed that the message that we trasmitted in network and acknowledge that we

recived in feedback from network is contain some field which identify the packet in network, paging message in network is usd to awake the client for upcoming message from network

VI. REFERENCES

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