

# Ethernet Communication Interface Testing Tool

Abhishek Reddy Chinni<sup>1</sup>, Sreepada Sai RaviTejabhishek<sup>2</sup>, V. Subba Ramaiah<sup>3</sup>

**Abstract**—Various subsystems work together in a weapon system. These systems work together for the optimal result. Most Weapon systems have multiple subsystems. Multiple messages share across multiple subsystems. Some messages are very time critical. Messages may miss/drop/alter. But it is not easy to identify manually. And there are no specific tools available to detect this, which potentially make the software unpredictable and crash. So this paper aims at development of a tool which acts as an intermediate between the two subsystems and helps in detection of any fault messages. This tool also tests the behavior of the receiver system, when a fault message is received. So, here we initially write some test cases through which the behavior of the receiver is observed. The tool which is developed performs five functions to test the communication which is stated below:

1. Drop the packets
2. Send Out of sequence messages
3. Flooding of messages
4. Sending delay messages
5. Packet altering or mangling

This project tests the Point-to-Point communication which is done using UDP connected via Ethernet.

**Index Terms**—Ethernet, UDP.

## I. INTRODUCTION

Ethernet is a system of computer networking technologies for LANs. Systems communicating using Ethernet will divide the data into set of pieces called frames. Every frame consists of source and destination addresses and error checking information to so that damaged data can be identified and retransmitted. According to OSI model, Ethernet provides services till Data link layer. But the messages that are transmitted over Ethernet may miss or drop or alter. This Ethernet communication interface testing tool will act as an intermediate between subsystems which helps in identifying fault messages.

We use Ethereal software for this purpose. The functions of this software includes

- Discovering how various protocols work.
- Examining the differences in the uses of various networking devices.

*Manuscript Received Oct 2013,  
Abhishek Reddy Chinni, Department Of Computer Science and Engineering  
MGIT, JNTU, Hyderabad, India,*

*Sreepada Sai Ravitejabhishek, Department Of Computer Science and  
Engineering, MGIT, JNTU, Hyderabad, India,.*

*V. Subba Ramaiah, Sr. Assistant Professor, Department Of CSE, MGIT,  
JNTU, Hyderabad, India.*

- Debugging problems in the communication network.
- Finding out how traffic is re-routed because of a problem in the network.
- Identifying communication and security loopholes.

## II. MOTIVATION

The motivation for us to go ahead with the research work is to understand and grasp computer networking concepts. These kinds of tools are very useful for daily learners and also promote self-motivation among learners. The primary motivation for us to use Ethereal is in its applicability and relevance of the experiments to the student's daily tasks and activities like web browsing, emailing, banking, online shopping etc. We as clients can see in detail how our communication requests are composed and transmitted to servers, and how the servers in turn fulfill our requests. One particular project that increases student knowledge and understanding is the capture and observation of their own passwords in clear text using File Transfer Protocol (FTP) and TEL type Network protocol (Telnet). This project proves the importance of using secure protocols such as secure FTP (SFTP) and Secure Shell (SSH) protocols where encryption is used final version, after your paper has been accepted, prepare it in two-column format, including figures and tables.

## III. MODULES IN THE SYSTEM

The various modules in the system are

- 1) Client
- 2) Server
- 3) Network Interfacing tool

### A. Client

This module sends the request and waits for the response. It establishes a UDP session with server before sending the messages.

The command used for this is

```
# gcc -o usend uclstrsend.c  
# ./usend 10.66.18.11
```

This is a normal scenario, but when Network Interface Tool should act it between the following statements should be used  
#route add -net 10.66.18.0 dev eht0 gw 10.66.18.161  
# Route add -host 10.66.18.0 dev eht0 gw 10.66.18.161  
It just sends some messages to server

**B. Server**

The server system receives the modified message and sends a response to that message without knowing that the actual message has been modified by the network interface tool. Therefore the message which is being sent from the server system as a response to the client system is again captured by the network interface tool and is modified and sent to the client system.

Before that, even server establishes a UDP session with client before sending the messages.

The command used for this is

```
# gcc -o user2 udpserverStructRx.c
# ./user2 1500
```

This is a normal scenario, but when Network Interface Tool should act it between the following statements should be used  
 #route add -net 10.66.18.0 dev eht0 gw 10.66.18.11  
 # route add -host 10.66.18.0 dev eht0 gw 10.66.18.11  
 It just sends some messages to server.

**C. Network Interfacing Tool**

This is the main module which performs all the different operations like alter, delete and this is the tool which can find the behavior of the weapon system, if subsystems messages across network are unpredictable and to generate failure Test cases /corrupted messages.

The message which is created and by the client server and is being sent to the server system is captured by the network interface tool (NIT). The captured message is stored and can be modified as follows:

- Drop
- Alter
- Delay
- Out Of Sequence

The message is captured and stored. Therefore the message can either undergoes drop, alter, delay or out of sequence and is been modified and then it is been transmitted to the server system.

**IV. SYSTEM DESIGN**

Use either SI (MKS) the system design can be broadly classified into two types

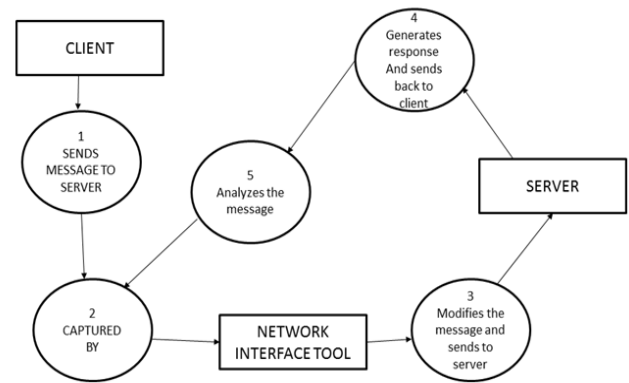
- 1) Data Flow Diagrams
- 2) UML Diagrams

**A. Data Flow Diagrams**

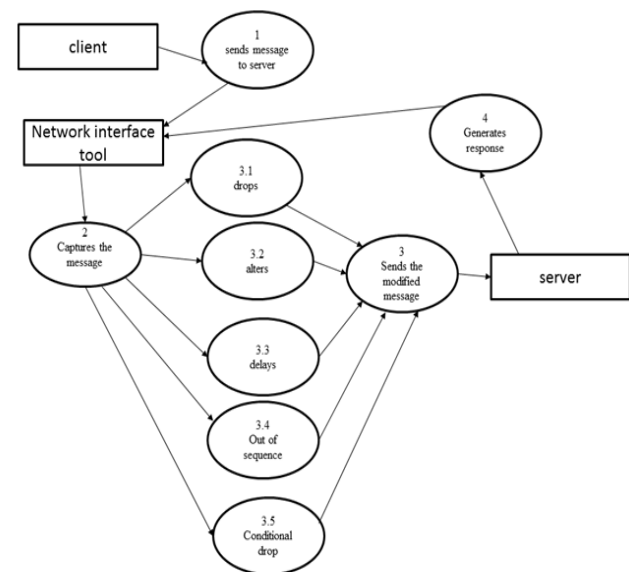
Data flow diagram portrays the flow of information in a system. It primarily concerns with the kind of data which is input to the system, the kind of data which is stored and the kind of data which is output to the system. It has nothing to do with the time processing of the system.



**Fig.4.1 Data flow Diagram**



**Fig.4.2 Data flow Diagram**



**Fig.4.3 Data flow Diagram**

**B. UML Diagrams**

Unified Modeling Language (UML) is probably the most widely known and used notation for object-oriented methods. The Unified Modeling Language (UML) is a standard language for writing software blueprints. The UML helps in visualization, specification, construction and documentation of the artifacts. A Unified Modeling Language is a language whose vocabulary and rules focus on the conceptual and the physical representation of a system.

**i. Use case Diagrams**

The use case diagram is used to identify the primary elements and processes that form the system. The primary elements are termed as “actors” and the processes are called as “use cases.”

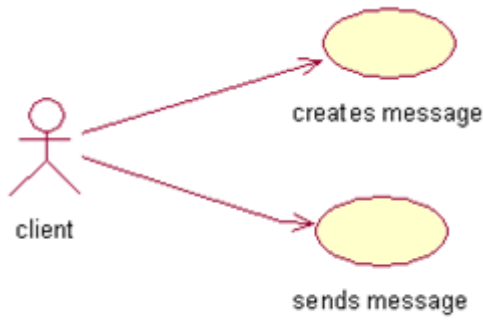


Fig.4.4 Use Case Diagram

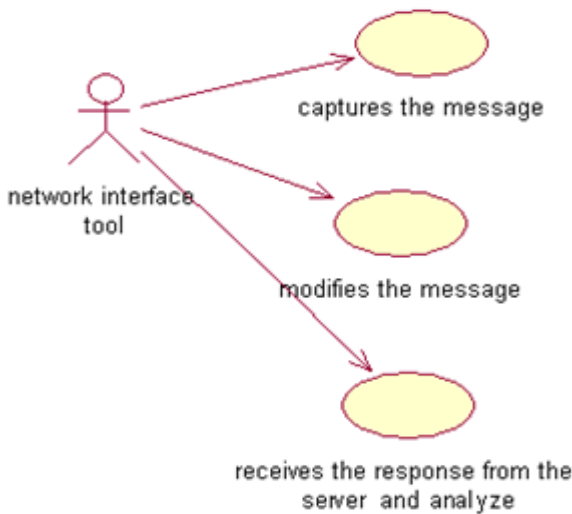


Fig.4.5 Use Case Diagram

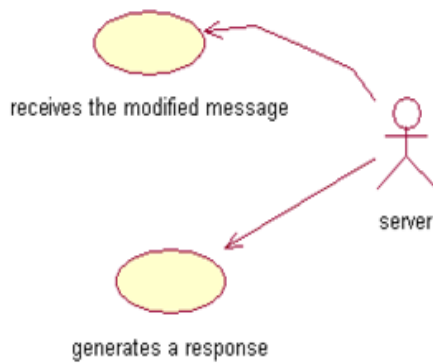


Fig.4.6 Use Case Diagram

ii. *Sequence Diagram*  
 A Sequence diagram in a unified modeling language depicts how the processes operate with one another and the order in which they operate.

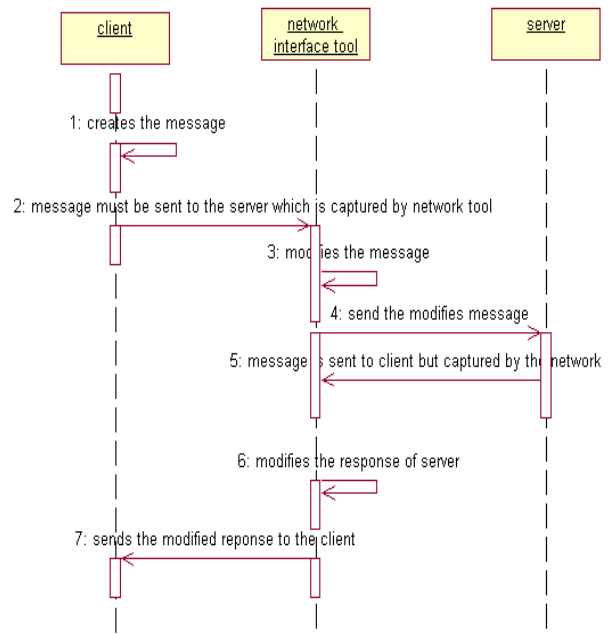


Fig.4.7 Sequence Diagram

iii. *Activity Diagram*

An activity diagram portrays the overall flow of control of the system. It models both computational and organizational processes.

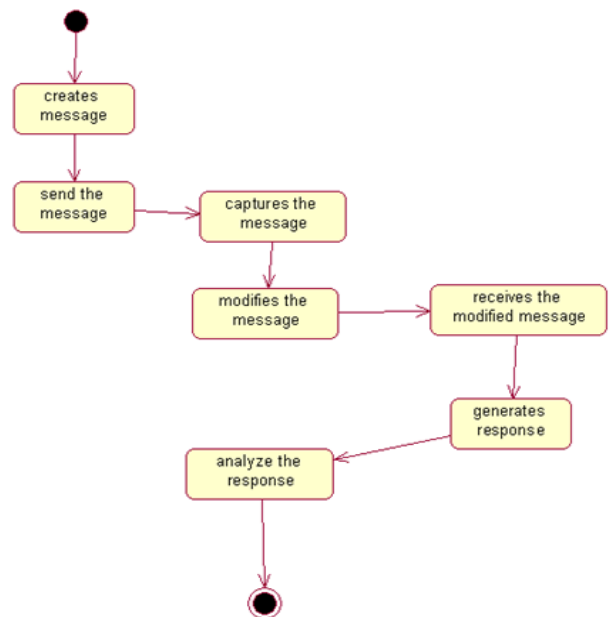


Fig.4.8 Sequence Diagram

V. ARCHITECTURE OF THE TOOL

The architecture of the Ethernet communication interface testing tool is divided into two phases. They are Test Setup Diagram and Functionalities.

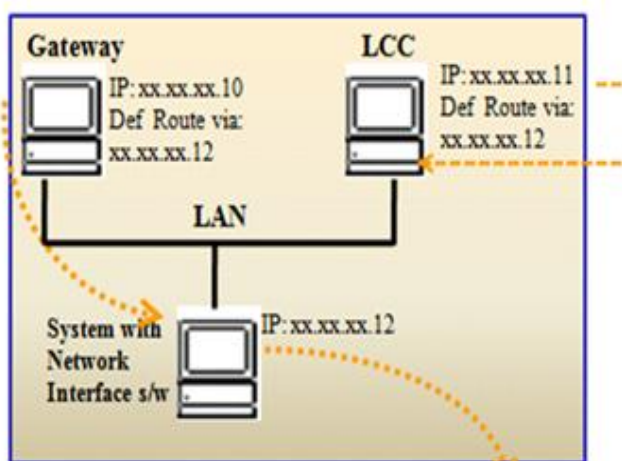


Fig.4.9 Test Setup Diagram

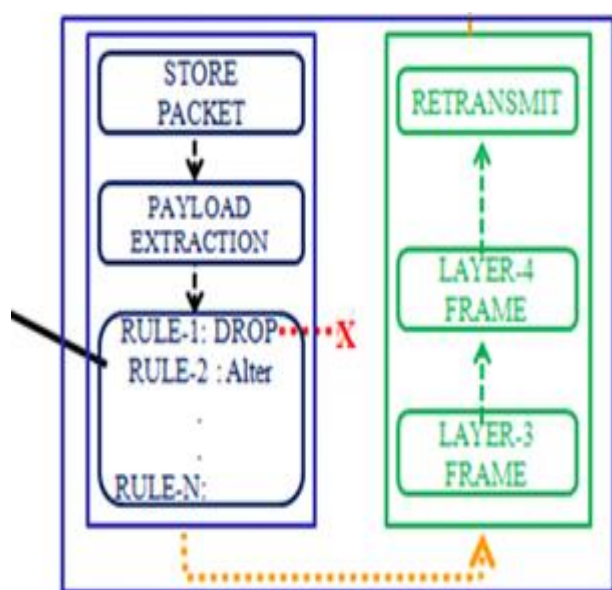


Fig.4.10 Functionalities Diagram

VI. CONCLUSION

This is a tool which is very useful in defense systems for message transferring in crucial conditions where any occurrence of congestion is not recommended. Example, the message transfer between the Radar and the Launcher. Here the message goes through the command center, which is ground system and just transfers the messages. This interface acts in between the command center and the missile sees all the messages and alters them if required. This tool has a great scope in near future, especially in defense systems where communication is required between radar and launcher.

REFERENCES

[1] Ethernet-Distributed packet switching for local computer networks by RM Metcalfe and DR Boggs.  
 [2] Dynamic source routing in ad hoc wireless networks by DB Johnson and DA Maltz.  
 [3] Data Communications and Computer Networks by Behrouz A. Forouzan.  
 [4] Computer Networks by Andrew S. Tanenbaum.  
 [5] Software Engineering by Roger S Pressman.  
 [6] The Unified Modeling Language User Guide by Grady Booch, James Rumbaugh and Ivar Jacobson, 2nd edition.

[7] Transmission of IPV6 packets over Ethernet networks by Matt Crawford.  
 [8] Performance Evaluation of Control Networks –Ethernet, ControlNet and DeviceNet by Feng Li Lian, James R Moyne and Dawn M tilbury.  
 [9] S. Chen, B. Mulgrew, and P. M. Grant, “A clustering technique for digital communications channel equalization using radial basis function networks,” *IEEE Trans. on Neural Networks*, vol. 4, pp. 570-578, July 1993.

AUTHORS



**Abhishek Reddy Chinni** is pursuing his under graduation (Bachelor of Technology) degree in CSE at MGIT, Hyderabad. His area of interests includes Computer Networks and Data Base Management Systems.



**Sreepada Sai Ravitejabhishek** is pursuing his under graduation (bachelor of Technology) degree in CSE at MGIT, Hyderabad. His area of interests includes Computer Networks and Network Security.



**Mr.V. Subba Ramaiah** received his B.Tech. degree in Computer Science and Engineering from SITAMS, JNT University, Chittoor, India, in 2002 and the M.Tech. degree in Computer Science from SIT, JNT University, Hyderabad, India, in 2007. He has been working as Senior Assistant Professor in the department of Computer Science and Engineering, Mahatma Gandhi Institute of Technology, Hyderabad. His research interests are computer Networks, Speech and Pattern recognition.