**Available Online at www.ijcsmc.com**

**International Journal of Computer Science and Mobile Computing**

**A Monthly Journal of Computer Science and Information Technology**

**ISSN 2320–088X**

*IJCSMC, Vol. 3, Issue. 6, June 2014, pg.907 – 912*

**RESEARCH ARTICLE**

# Different QoS Based TORA Reactive Routing Protocol using OPNET 14.5

**Priyanka Dahiya[1], Manoj[2], Kuldeep Vats[3], Kamini Jaswal[4]**

M.Tech, Department of Computer Science and Engg, SGT Institute of Engineering and Technology, Gurgaon, Haryana, India[1]
pd9791@gmail.com [1]
Assistant Professor, Department of Computer Science and Engg, SGT Institute of Engineering and Technology, Gurgaon, Haryana, India [2]
manojsarasyiya@gmail.com [2]
M.Tech, Department of Computer Science and Engg, Sonipat, Haryana, India [3]
kuldeepvats@yahoo.com [3]
Assistant Professor, Department of Electronics and Communication, South Point Institute of Engineering and Technology, Sonepat, Haryana, India [4]
Kamini.jaswal@gmail.com [4]

***Abstract- MANET consists of mobile nodes which exchange information dynamically among them over wireless links. The most important element of MANET is Routing Protocols which are needed to handle dynamic communication and also find route so as to deliver data packets to the correct destination. Performance of routing protocols is an important issue because of dynamic nature of MANET. In this paper performance of TORA routing protocols is evaluated for FTP based application traffic on IEEE 802.11b WLAN Standard and one Mbps data rate. The network performance is evaluated by using OPNET simulator based on various quantitative metrics- Network Load, Throughput, Delay, upload and Download response time and Media Access Delay by varying physical characteristics and number of nodes.***

***Keywords: MANET, Reactive Protocol, TORA, OPNET, WLAN***

## I. INTRODUCTION

A Mobile Ad-hoc Network (MANET) is a set of wireless mobile nodes forming a dynamic and infrastructure less network. Thus it is also known to be a Self-configuring network formed with wireless connections using a set of wireless mobile nodes. Nodes can communicate with each other without any centralized authority or base stations that could manage the communication in the network. In MANET there is no physical connection between the mobile nodes so they follow the hop-to-hop method to forward the packets and communicate with any other mobile node in the network. In MANETs, every node acts as a router, client and host as well and its topology is dynamic as nodes join the network whenever there is need to transmit the data and leave the network when transmission gets over [1][2]. Thus the nodes are independent to move freely in the network and organize themselves

 

according to the transmission requirements. For this reason the network topology of MANET is not static as it tends to change rapidly. For a communication of any two nodes, the destination node must lies within the radio range of the source node that wants to initiate the communication.
According to the researches in past years, various routing protocols for MANET have been proposed to improve the routing performance and reliability. Some of the promising MANET routing protocols among them are classified into three different categories according to their functionality.

1. Reactive protocols.
2. Proactive protocols.
3. Hybrid protocols.

The hierarchy of these protocols is shown below in the figure 1.

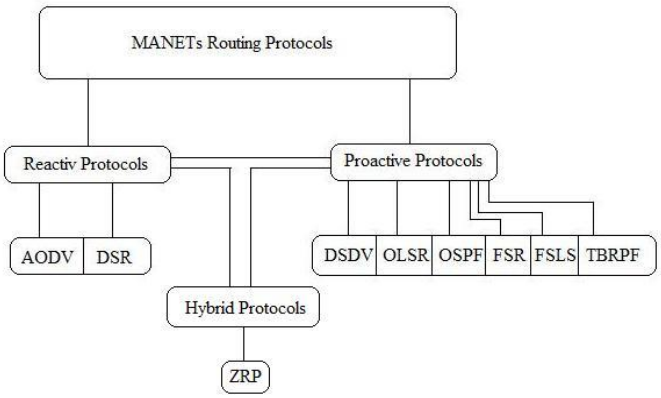


Fig. 1 MANETs Routing Protocols

In our paper, focus is on the reactive protocols of MANET only which are discussed further.

## II. REACTIVE OR ONDEMAND PROTOCOLS

Reactive protocols are also known as on demand driven reactive protocols [3]. The fact they are known as reactive protocols implies that they do not initiate route discovery by themselves, until they are requested to find a route [4]. Thus these protocols setup routes when demanded. When a node wants to communicate with another node in the network, and the source node does not have a route to the node it wants to communicate with, reactive routing protocols will establish a route for the source to destination node.

### 2.1 TORA (Temporally Ordered Routing Algorithm)

TORA is also an on-demand reactive routing protocol. Its main objective is to limit control message propagation in the highly dynamic mobile computing environment. Each node has to initiate a query when it needs to send data to a particular destination thus TORA is a source-initiated routing protocol. TORA mainly performs three tasks and uses three kinds of messages to perform these tasks:
**a) Route creation:** Set up a route from a source to a destination using QRY message.
**b) Route maintenance:** Maintenance of the route during data transfer using UPD message. UPD message is used both for creating and maintaining the routes.
**c) Route erasure:** Disconnecting the route when there is no data to transfer using CLR message.

 

## III. SIMULATION MODEL

This paper represents two scenarios of 20 and 30 mobile nodes which are simulated for 1 hour by taking Reactive routing Protocols DSR and TORA and compared for evaluating the better performance between the two protocols using few QoS.
All the simulations are conducted using discrete event simulation software known as OPNET Modeler, which is just one of several tools provided from the OPNET Technologies suite. In order to undertake the experimental evaluation, the most recently available version, namely the OPNET Modeler 14.5 has been adopted in our study [7].

## IV. PARAMETERS SETUP

The parameters that have been used in the following experiments are summarized in following tables.

Table1. Wireless parameter values

| | |
|---|---|
| WLAN MAC Address | Auto assigned |
| BSS identifier | Auto assigned |
| Physical characteristics | Direct Sequence(802.11b) |
| DATA rate | 1 Mbps |
| Transmit power(W) | 0.005 |
| Packet reception power threshold | -95 |
| Short retry limit | 7 |
| Long retry limit | 4 |
| AP beacon interval(sec) | 0.02 |
| Maximum receiver lifetime(sec) | 0.5 |
| Buffer size(bits) | 2560000 |
| Simulation time | 1 hour |
| Memory used | 70 Mb |

Table2. TORA parameter values.

| Parameter | Value |
|---|---|
| Mode of operation | On-demand |
| OPT transmit internal(sec) | 300 |
| IP packet discard timeout(sec) | 10 |

## V. SIMULATION RESULTS

The simulation results from OPNET Modeler 14.5 with respect TORA routing protocols using FTP in different scenario are shown further graphically in figures (2 - 8).

 

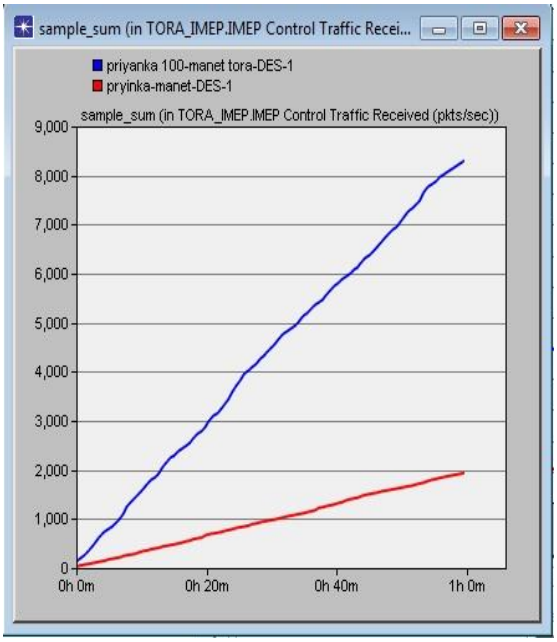


Fig 2 Control traffic received with TORA

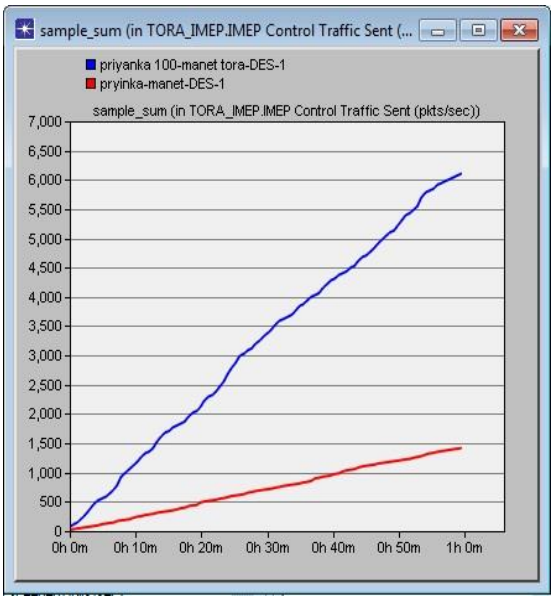


Fig 3 Control traffic sent with TORA.

From figures (2-3), we conclude that Control traffic sent and from one user to another user and received by the another users and greater in large TORA 100 nodes network and smaller in small TORA 50 nodes network where number of users is more.

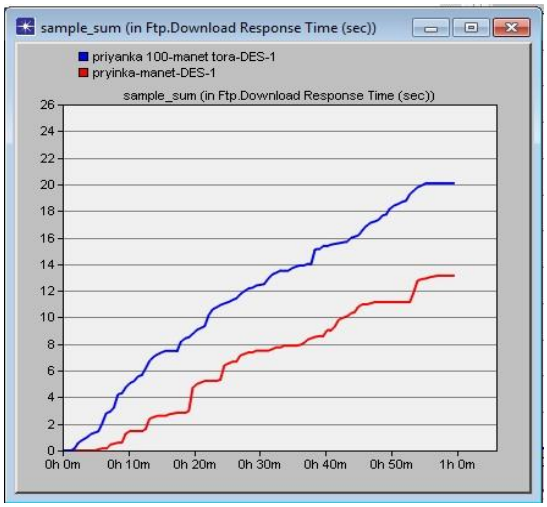


Fig 4 Download response time with FTP load.

 

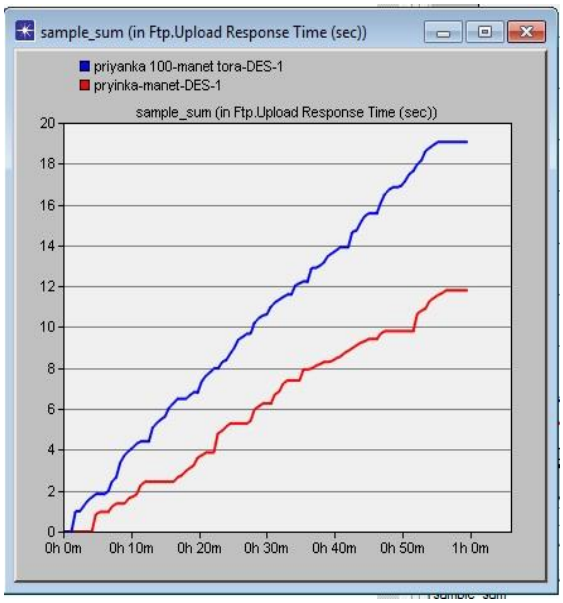


Fig 5 Upload response time with FTP load.

AS shown in figures 4 and 5, upload Received time from one user to another user and download response times by another users and greater in large TORA 100 nodes network using FTP and smaller in small TORA 100 nodes network where number of users is more in large network with TORA using FTP.

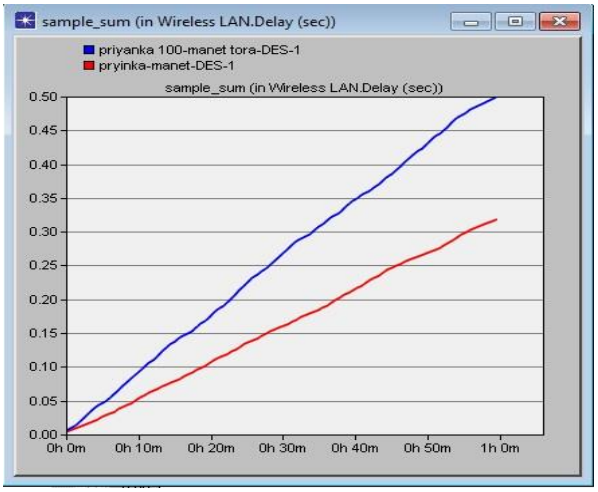


Fig 6 Delay(sec)

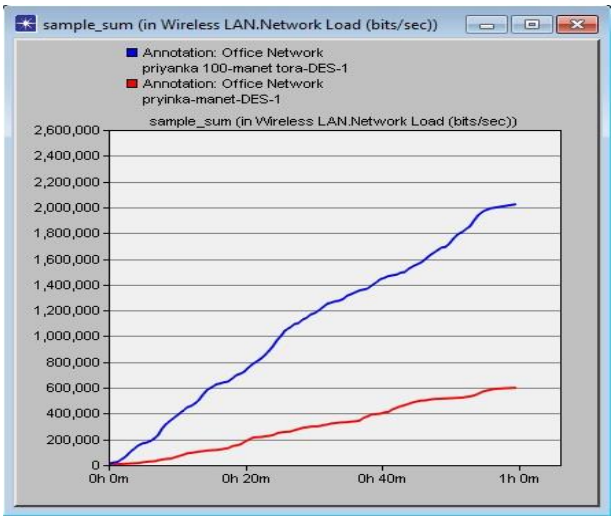


Fig 7 Network load

 

From figures 6, 7, we conclude that end to end Delay from one user to another user and Network load by the another users and greater in large with TORA 100 nodes network and smaller in small TORA 50 nodes network where number of users is more. Thus it concludes that as no. of nodes increases in a network, end to end delay, MAC delay and network load gradually increases.

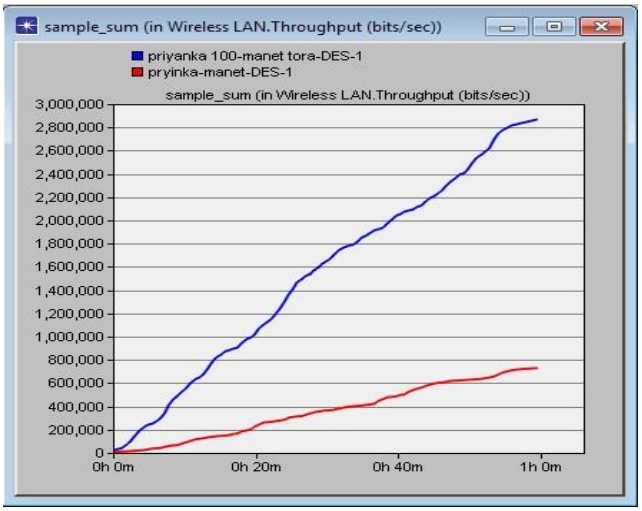


Fig 8 Throughput

From figure 8, it is clear that throughput is higher with TORA 100 nodes than that with TORA 50 nodes. Also throughput increases with the maximum no. of mobile nodes.

## VI. CONCLUSION

In this paper performance of Reactive TORA is evaluated for metrics like Network Load, Throughput, Delay, Upload and Download response time, TORA Control traffic sent and received by varying number of nodes and version of IEEE 802.11 WLAN Standard. From the above discussion we find out that TORA small network performs best in each case in terms of **Delay and Network load** and TORA large Network perform best in each case in terms of Throughput, Upload and Download Response Time, TORA Control Traffic Sent and Received are showing better results with 802.11b technology.

## REFERENCES

[1] Pankaj Palta, Sonia Goyal," Comparison of OLSR and TORA Routing Protocols Using OPNET Modeler", International Journal of Engineering Research & Technology (IJERT), Vol. 1 Issue 5, July – 2012, ISSN: 2278-0181

[2] Perkins.C.E. Ad hoc Networking, Boston, Addison Wesley (2001)

[3] Zhou, L.D. and Haas, Z.J. (1999) "*Securing Mobile ad hoc network*", IEEE Network Magazine, Vol. 8, 2, pp. 16-23.

[4] Perkins, C.E. and Royer, E.M. (1999) "*Ad-Hoc on Demand Distance Vector Routing*", Proceedings of the 2nd IEEE Workshop on Mobile Computing Systems and Applications, pp.90-100.

[5] Johnson, D.B. and Maltz, D.A. (2001) ''*DSR: The Dynamic Source Routing Protocol for Multi-Hop Wireless Ad Hoc Networks*'', Computer Science Department Carnegie Mellon University Pittsburgh, PA 15213-3891.

[6] Uzoamaka, C.O. and Ajirioghene, O.R. (2009) "*The Performance of DSR protocol for MANETs Aspect of Cache Size and Cache Expiry Time*" MEE 09:80 Master thesis BTH 2009.

[7] Opnet Technologies, Inc. "Opnet Simulator," Internet: www.opnet.com, date last viewed: 2010-05-05.

 