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Study of TORA FOR Mobile Ad-hoc NetworK

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***Abstract*— Mobile Adhoc Networks [MANETs] involve communication between various mobiles hosts which themselves act as routers and help in transmitting packets to the destination through intermediate nodes which lie within the radio transmission range of each other. Due to high level of dynamism, reliable, fast and energy efficient routing of data packets from the source to the destination is an area of great concern for researches. Science it is an infrastructure network, one cannot rely on use of access points or other infrastructure for routing, thus leaving only one option of building multi-hop routes from source to destination, where intermediate nodes act as routers. Routing in MANETs involves designing a protocol which helps using routing data packets from source to destination with minimum possible hops and minimum battery power consumption of nodes. The main purpose of this paper is to design and implement tora for manet.In this paper, results show that TORA's inability to handle rapid increases in traffic volumes. TORA performs well in networks where the volume of traffic increases gradually.**

***Keywords*—**: Ad-hoc, IMEP, MANET, OPNET, TORA.

INTRODUCTION

MANET is a collection of wireless nodes that dynamically create a wireless network among them without any infrastructure (Sheltami and Mouftah, 2003). Ad-hoc is a communication mode that allows computers to directly communication with each other without a router. In Latin, ad-hoc means "for this" meaning "for this special purpose". In ad hoc networks, nodes do not start out familiar with the topology of their networks; instead, they have to discover it. The basic idea is that a new node may announce its presence and should listen for announcements broadcast by its neighbors. Each node learns about nodes nearby and how to reach them and may announce that it, too, can reach them. Ad-hoc network can be sub-divided into two classes. In Static ad-hoc network the positions of a node may not change once it has become part of the network.. In the mobile ad hoc network, nodes can directly communicate with all the other nodes within their radio ranges; whereas nodes that not in the direct communication range use intermediate node(s) to communicate with each other. In these two situations, all the nodes that have participated in the communication the direct communication range use intermediate node(s) to communicate with each other. In these two situations, all the nodes that have participated in the communication automatically form a wireless network, therefore this kind of wireless network can be viewed as mobile ad hoc network. A Mobile Ad hoc Network (MANET) is a system of wireless mobile nodes that dynamically self-organize in arbitrary and temporary network topology

I. MANET

1.1 Introduction

A Mobile Ad hoc Network (MANET) is a system of wireless mobile nodes that dynamically self-organize in arbitrary and temporary network topologies. People and vehicles can thus be internetworked in areas without a preexisting communication infrastructure or when the use of such infrastructure requires wireless extension. In the mobile ad hoc network, nodes can directly communicate with all the other nodes within their radio ranges; whereas nodes that not in the direct communication range use intermediate node(s) to communicate with each other. In these two situations, all the nodes that have participated in the communication the direct communication range use intermediate node(s) to communicate with each other. In these two situations, all the nodes that have participated in the communication automatically form a wireless network, therefore this kind of wireless network can be viewed as mobile ad hoc network. An ad hoc routing protocol is a convention, or standard, that controls how nodes decide which way to route packets between computing devices in a mobile ad-hoc network.

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The need for mobility in wireless networks necessitated the formation of the MANET working group within The Internet Engineering Task Force (IETF) for developing consistent IP routing protocols for both static and dynamic topologies

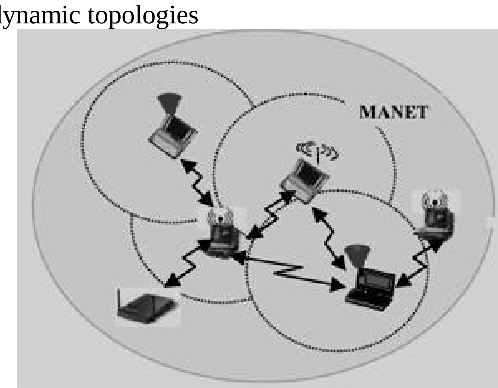

Fig.1 MANE

In a MANET, mobile nodes have the ability to accept and route traffic from their neighbors towards the destination, i.e., they act as both routers and hosts. As the network grows, and coupled with node mobility, the challenges associated with self-configuration of the network become more pronounced. More frequent connection tearing and re-associations place an energy constraint on the mobile nodes Ad hoc routing protocols are developed with mechanisms to cope with the dynamic nature of MANETs

1.2 MANET Application

The versatility of MANETs makes them ideal candidates for a wide-range array of applications. They can be used during natural disasters where there is no communication infrastructure, as an extension of service coverage such as in airport hotspots and in normal enterprise deployment. A common use of MANETs is during group communications in conferences. The key attributes that make MANETs ideal candidates for such applications are their quick self-configuration and low cost of deployment

II.TORA

2.1Temporally Ordered Routing Algorithm

(TORA) (Park and Corson, 1997a; 1997b) is a distributed protocol designed to be highly adaptive so it can operate in a dynamic network. For a given destination, TORA uses a somewhat arbitrary "height" parameter to determine the direction of a link between any two nodes. As a consequence of this multiple routes are often present for a given destination, but none of them are necessarily the shortest route The TORA routing protocol is based on the LMR protocol. It uses similar link reversal and route repair procedure as in LMR and also the creation of a DAGs, which is similar to the query/reply process used in LMR. Therefore, it also has the same benefits as LMR. The advantage of TORA is that it has reduced the far-reaching control messages to a set of neighboring nodes, where the topology change has occurred. Another advantage of TORA is that it also supports multicasting; however this is not incorporated into its basic operation. TORA can be used in conjunction with Lightweight Adaptive Multicast Algorithm (LAM) to provide multicasting. TORA as its name suggest, is a routing algorithm. It is mainly used in MANETs to enhance scalability. TORA is layered over Internet MANET Encapsulation Protocol (IMEP). This is to ensure reliability in the delivery of control messages and notifications about link status.

Advantages: TORA supports multiple routes. It retains multiple route possibilities for a single source/destination pair. Bandwidth is conserved because of the fever route rebuilding. TORA also supports multicasts

Disadvantages: TORA'S reliance on synchronized clocks limits in applicability. If the external time source fails, the algorithm ceases to operate. Also route rebuilding may not occur as quickly due to oscillations. During this period this can lead to lengthy delays while for the new routes to be determined.

2.2 IMEP (Internet MANET Encapsulation protocol)

TORA is layered over Internet MANET Encapsulation Protocol (IMEP). This is to ensure reliability in the delivery of control messages and notifications about link status. IMEP is a protocol designed to support the operation of many routing protocols in ad-hoc networks.The idea is to have a common general protocol that all routing protocols can make use of fig 5. It incorporates identification, interface, identification and addressing. IMEPs main purpose is to improve overall performance by reducing the number of control messages and to put common functionality into account.many common features that upper layer protocols may need. IMEP provides an architecture for MANET router.

III. PERFORMANCE PARAMETERS

In my simulation study, implementation is made using following parameters:. Throughput is the total number of packets received by the destination. End to End Delay is the average end to end delay of data packets from senders to receivers. Media Access Delay is the media transfer delay for multimedia and real time traffics' data Packets from senders to receivers.Packet delivery ratio (PDR) is ratio between the number of packets received by the TCP sink at the final destination and number of packets generated by the traffic sources. Moreover, it is the ratio of the number of data packets received by the destination node to the number of data packets sent by the source mobile node.

3.1 Packet Delivery Ratio

Packet Delivery Ratio (PDR) is the ratio between the number of packets transmitted by a traffic source and the number of packets received by a traffic sink. It measures the loss rate as seen by transport protocols and as such, it characterises both the correctness and efficiency of ad hoc routing protocols. It represents the maximum throughput that the network can achieve. A high packet delivery ratio is desired in a network.

3.2 Packet End-to-End Delay

The packet end-to-end delay is the average time that packets take to traverse the network. This is the time from the generation of the packet by the sender up to their reception at the destination's application layer and is expressed in seconds. It therefore includes all the delays in the network such as buffer queues, transmission time and delays induced by routing activities and MAC control exchanges.

3.3 Media Access Delay

Media Access Delay is the media transfer delay for multimedia and real time traffics' data ackets from senders to receivers.

IV.RESULT S

4.1 Packet Delivery Ratio

TORA delivered the highest number of packets with low speed and low number of traffic sources. However, this rapidly degraded from about 60% to about 44% when the number of sources increased to 20. TORA had the least packet delivery ratio when the nodes had a speed increses with low number of traffic source. This increased as the number of nodes increased to 20

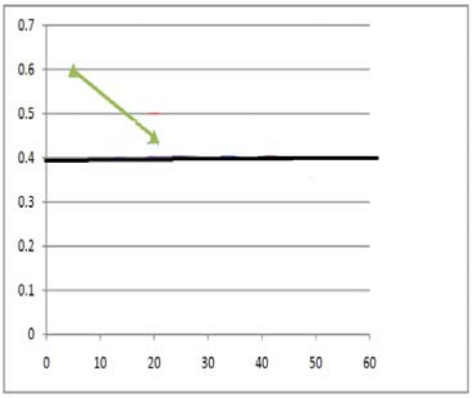

Fig 2 Packet Delivery Ratio

4.2 Packet End-to-End Delay

Figure 3 show the average packet end-to-end delay characteristics of the tora protocol.

In smaller networks with five traffic sources, we observe that TORA outperforms at speeds10m/s. On the other hand, when nodes increased to 20, TORA suffers a significant degradation in its end-to-end delay. One reason for the degradation in the end-to-end delay of TORA at higher number of nodes is attributed to its route discovery process.

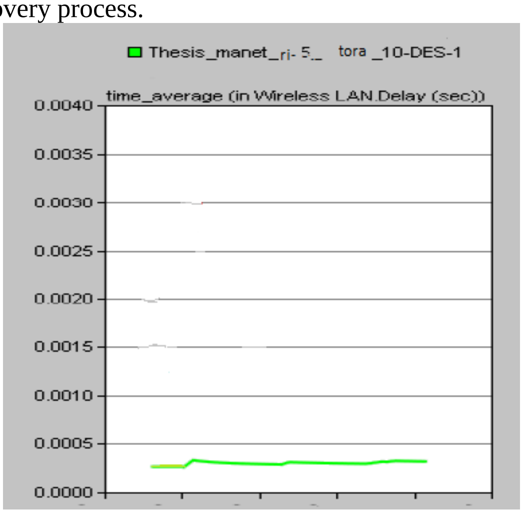

Fig 3 End-to-end delay – 5 sources at 10m/s

TORA had high delay in the high traffic network, and mobility did not have an effect on the delay. In the case of lower number of nodes and high speed where TORA outperforms. When the number of nodes increased to 20, TORA suffers a significant degradation in its end-to-end delay. One reason for the degradation in the end-to-end delay of TORA at higher number of nodes is attributed to its route discovery process.

4.3 Media Access delay

Media Access Delay is the media transfer delay for multimedia and real time traffics' data ackets from senders to receivers .From the experimental results we conclude that increase in the number of nodes will cause increase in media access delay and network load

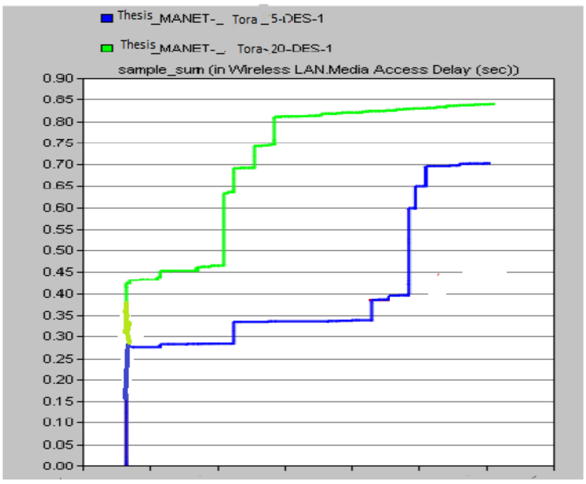

Fig 4 Media Access Delay

V .CONCLUSION

From the experimental results we conclude that increase in the number of nodes will cause increase in media access delay and network load Temporally Ordered Routing Algorithm (TORA) be a resource initiated on-demand routing protocol that utilize a link reversal algorithm and present a loop gratis multi-path routes to node's destinations. TORA organizes every node to one-hop local topology information along with a ability to distinguish partitions . TORA is anticipated to manage in a extremely dynamic mobile networking atmosphere. The designing perception of TORA is the locality of organizing messages to a extremely small set of nodes due to the occurrence In this research, we used HTTP traffic with all the sources sending traffic to a common destination. Due to the use of HTTP, the packet delivery ratios for all the protocols in the scenarios considered was about 60%. This demonstrated the non-suitability of using HTTP with the current protocol. Factors considered in this research affecting the performance of ad hoc protocols are speed and network load. Network load has a profound effect on the performance whereas speed affects the performance only in some instances.TORA does not offer an overall superiority except in low load networks with low-speed mobility where it had the highest packet delivery ratio. In small network size TORA can perform batter, but when network size increases node TORA's performance decreases

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REFERENCES

[1] Prabu et al., International Journal of Advanced Research in Computer Science and Software Engineering 2 (9), September-2012, pp. 388-39

[2] .Park, V.D. and M.S. Corson, 1997a. A highly adaptive distributed routing algorithm for mobile wireless networks. Proceedings of the 16th Annual Joint Conference of the IEEE Computer and Communications Societies, Apr. 9-11, IEEE Computer Society, Washington DC., USA., pp: 1-9

[3] Park, V.D. and M.S. Corson, 1997b. Temporally ordered routing algorithm.

[4] Vincent D. Park and M. Scott Corson. "Temporally-Ordered Routing Algorithm (TORA) Functional specification". Internet-Draft, draft - ietfmanet - TORA-spec- 04.txt, July 2001

[5] D. Kiwior and L. Lam, “Routing Protocol Performance over Intermittent Links” Military Communications Conference, MILCOM, IEEE, 2007, pp. 1 – 8
[6] S. Demers and L. Kant, “MANETs: Performance Analysis and Management”, Military Communications Conference, MILCOM, 2006, pp.1 – 7
[7] A. Zahary, A. Ayesh, “Analytical study to detect threshold number of efficient routes in multipath AODV extensions”, proceedings of International Conference of Computer Engineering & Systems, ICCES, 2007, pp. 95 – 100
[8] Mohammad Naserian, Kemal E. Tepe and Mohammed Tarique, “Routing overhead analysis for reactive routing protocols in wireless ad hoc networks,” IEEE Conference on Wireless And Mobile Computing, Networking And Communications, WiMob, 2005, pp. 87 – 92