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Performance Evalution Of TORA And OLSR On The Basis Of Different Node Scenarios With Opnet

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ABSTRACT

A mobile ad hoc network (MANET) is a self-configuring network of mobile devices connected by wireless links. Independent device in a MANET is used to move frequently in any direction, and therefore its changes to other links also occur as same .Backbone of any MANET is routing protocol, all the performance of network depends on routing protocol, there are many protocols are lying in MANET AODV, TORA, OSLR, DSR and many more. out of them we are taking TORA and OLSR routing protocols and in this paper, we have checked the performance for both routing protocol with the performance metric THROUGPUT, DELAY and LOAD .we have created six different scenarios, three for OLSR and three for TORA respectively. There are 2 Nodes working out of 5 Nodes, 5 Nodes working out of 5 Nodes and 1st and 5oth Nodes working out of 50 Nodes scenario. ALL the experimental work has been done on OPNET 14.5 simulators. As per resultant, we have got OLSR performance is better than TORA in 2 Nodes scenario and 5 Nodes scenario, but in 50 Nodes scenario TORA gives us better response than OLSR.

KEYWORD: OLSR, TORA, AODV, DSR, OPNET, MANET, DELAY, THROUGHPUT, LOAD.

1. INTRODUCTION

A MANET is a bunch of mobile Nodes which shares a wireless channel without having any centralized control or established communication backbone. MANET is an independent system of mobile devices that are connected by ad hoc wireless links. All nodes, in the system cooperate in order to correctly route packets in multi-hop forwarding mode Due to the unpredictable mobility of Node the network topology may change constantly. Ad hoc networks are built and used as appropriate in extremely dynamic environments.

2. TYPES OF ROUTING PROTOCOLS

MANET routing protocol working mechanism is depended on its algorithm. In MANET, there are different types of routing protocols each of them is applied according to the network circumstances.

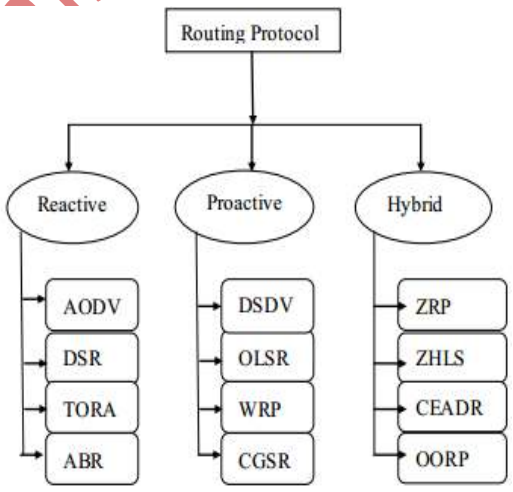

Fig 1: ROUTING PROTOCOLS

2.1 REACTIVE ROUTING PROTOCOL

Reactive routing protocol is also known as on demand routing protocol. In Reactive routing protocol, route is detected whenever it is needed, Nodes initiate route detection on demand basis. Reactive routing is also known as on-demand routing protocol till they do not maintain routing information or routing activity at the network Nodes if there is no communication. In Reactive routing protocol If a Nodes needs to send a packet to another Nodes then this protocol searches for the route in an on demand manner and therefore

establishes the connection in order to transmit and receive the packet. The route detection occurs by flooding the route request packets throughout the network. Examples of reactive routing protocols are the Ad-hoc On-demand Distance Vector routing (AODV), Location Aided Routing (LAR) and Dynamic Source Routing (DSR). Temporally-Ordered Routing Algorithm (TORA).

2.2 PROACTIVE ROUTING PROTOCOL

Proactive routing protocols maintain routes to all destinations, whether these routes are needed or not. Whenever the network topology changes it leads the changes in routing tables and updated periodically. In order to maintain correct route information, A Nodes must periodically send control messages. Resultant, proactive routing protocols may waste bandwidth till control messages are sent out unnecessarily when there is no data traffic. The main advantage of this category of protocols is that hosts can quickly obtain route information and quickly establish a session. There are some familiar proactive routing protocols such as DSDV, OLSR.

2.3 HYBRID ROUTING PROTOCOL

Hybrid Routing Protocols combines the merits of proactive and reactive routing protocols.

3. TEMPORALLY -ORDERED ROUTING ALGORITHEM (TORA)

The Temporally-Ordered Routing Algorithm (TORA) is an adaptive routing protocol for multi-hop networks. TORA is a distributed algorithm so that routers only need to maintain knowledge about their neighbors. TORA uses the concept of height associated with a certain destination to describe the routing metric used by routers. Like water flows in pipes, routers with higher heights may forward packet flows to neighbors with lower heights. In TORA, it is necessary for each Node to collect the neighbor's routers information so that it can Searches out easily and transferred all the needed packets to destination in a sequence manner.

- Loop-free routes
- Provide minimal routing functionality
- Minimize algorithm reaction
- Distributed execution
- Multipath routing

4. OPTIMIZED LINK STATE ROUTING (OLSR)

OLSR is a proactive routing protocol. OLSR defines three basic types of control messages.

4.1HELLO - HELLO messages are transmitted to all neighbors. These messages are used for neighbor sensing and MPR calculation.

4.2 TC- Topology Control messages are the link state signaling done by OLSR. This messaging is optimized in several ways using MPRs.

4.3 MID - Multiple Interface Declaration messages are transmitted by Nodes running OLSR on more than one interface. These messages list all IP addresses used by Nodes.

5. SIMULATOR

In this paper, network simulator, Optimized Network Engineering Tools (OPNET) modeler 14.5 has been used as a simulation environment. OPNET provides output in a graphical manner in such a way that can easily analyze the performance of network or any device which is being used as described earlier; we have taken TORA and OLSR protocols. Performance has been checked with various performance metrics like THOROUGPUT, DELAY and LOAD. We have created six different scenarios three for OLSR and TORA respectively with 2 Nodes working of 5 Nodes, 5 Nodes working of 5 Nodes, and 1st and 5oth Nodes working of 50 Nodes scenario. The Nodes are distributed over the office network of 100*100 meters.

6. OLSR AND TORA WITH 5 NODES WORKING SCENARIO: In this scenario only first two Nodes are working and the performance with the respective parameter of TORA and OLSR are shown below:

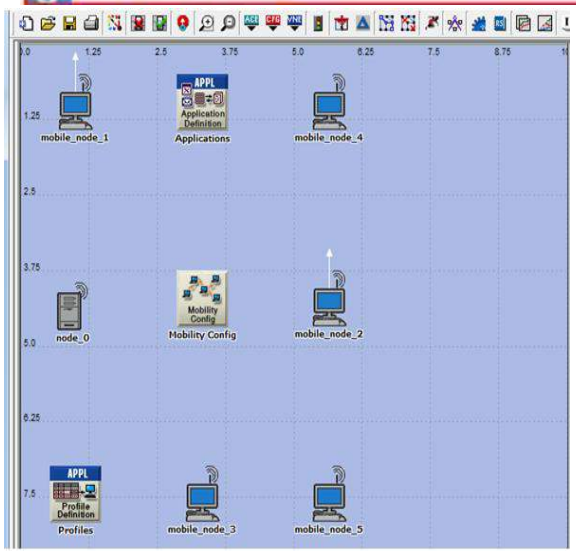

Fig 2: 2 NODES WORKING SCENARIO

6.1 WLAN DELAY: In the performance metrics WLAN DELAY, OLSR protocol is better than TORA.

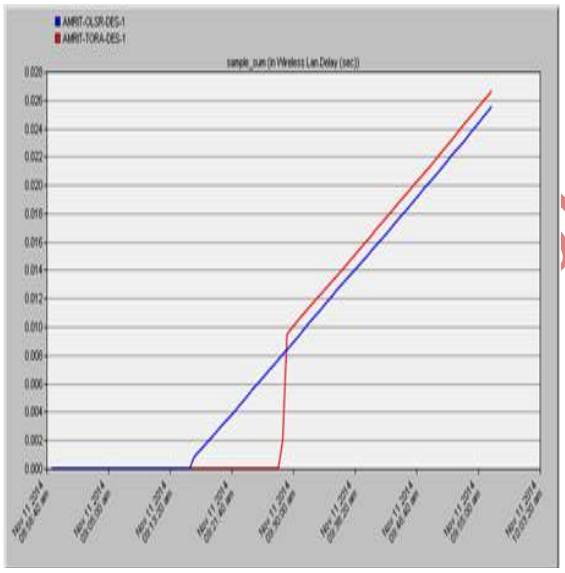

Fig 3: WLAN DELAY OF 2 NODES

6.2 **WLAN LOAD**: In the performance metrics of WLAN LOAD, OLSR LOAD is more than TORA.

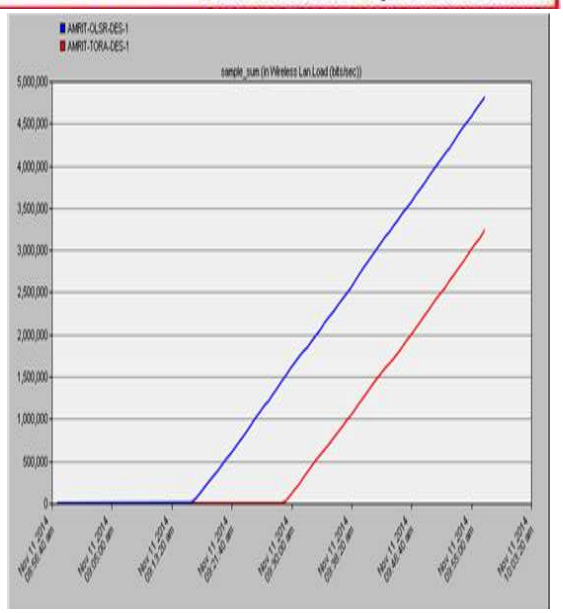

Fig 4: WLAN LOAD OF 2 NODES

6.3 WLAN THROUGHPUT: In the performance metrics of WLAN THROUGHPUT, OLSR protocol is better than TORA.

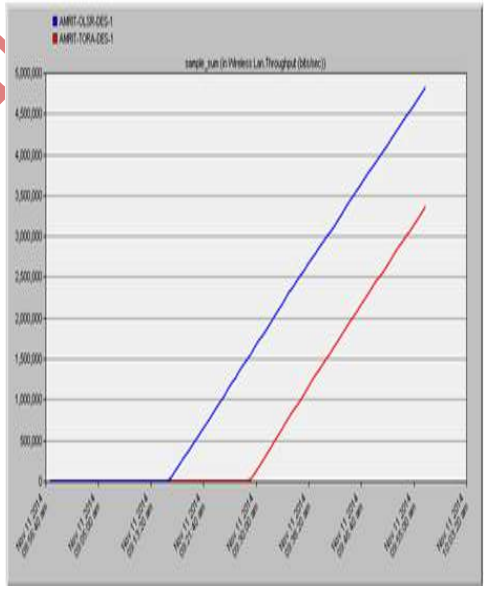

Fig 5: WLAN THROUGHPUT OF 2 NODES

7. OLSR AND TORA WITH 5 NODES WORKING SCENARIO: In this section we have created two different scenarios with OLSR and TORA. Two different scenarios are created in each scenario 5 mobile Nodes are working. Simulator timer is set to 2 hours and the performance of OLSR and TORA are:

Fig 6: 5 NODES Working Scenario

7.1 WLAN DELAY WITH 5 NODES SCENARIO: In the performance metrics of WLAN DELAY, OLSR protocol is better than TORA.

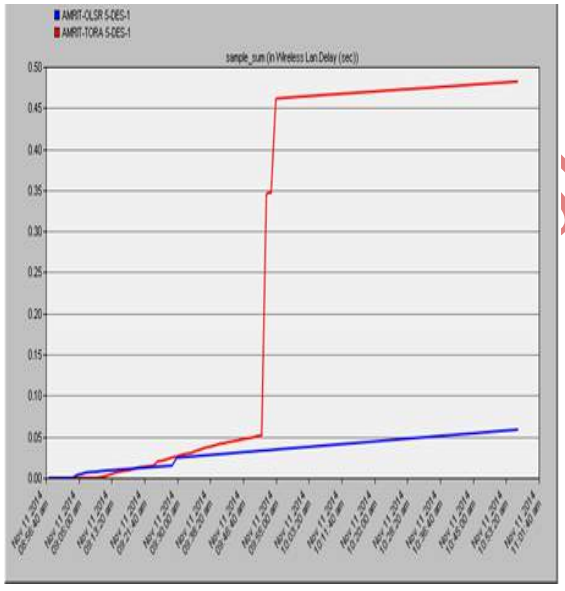

Fig 7: WLAN DELAY OF 5 NODES

7.2 WLAN LOAD: In the performance metrics of WLAN LOAD, OLSR protocol LOAD is higher than TORA.

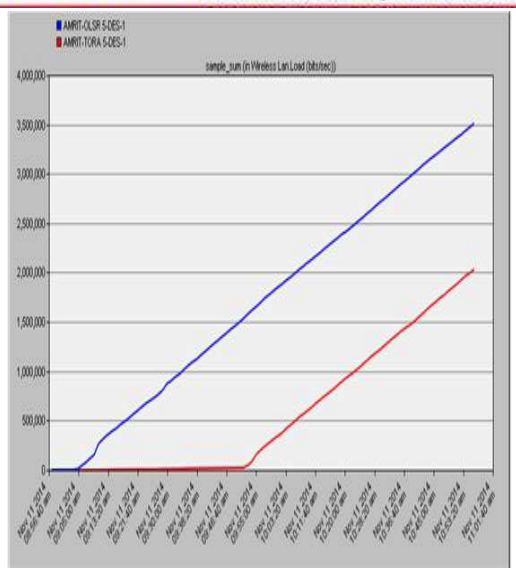

Fig 8: WLAN LOAD OF 5 NODES

7.3 WLAN THROUGHPUT: In the performance metrics of WLAN THROUGHPUT, OLSR protocol is better than TORA.

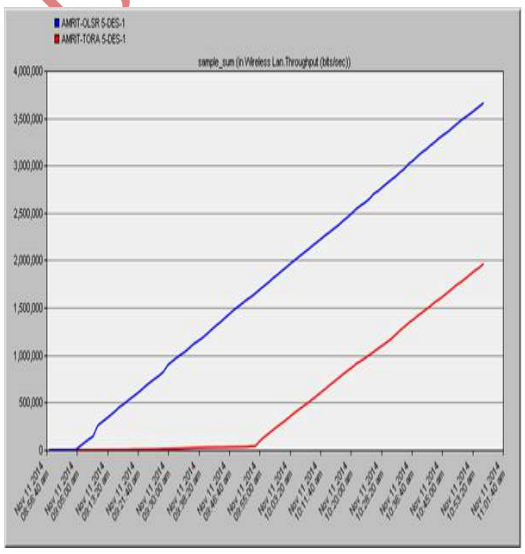

Fig 9: WLAN THROUGHPUT OF 5 NODES

8. OLSR AND TORA WITH 1st and 50th NODES WORKING SCENARIO

In this section we have created two different scenarios with OLSR and TORA. Two different scenarios are created in each scenario 1st and 50th mobile NODES are working. Simulator timer is set to 1000 seconds and the performance of OLSR and TORA are:

Fig 10: 1st and 50th NODES WORKING SCENARIO

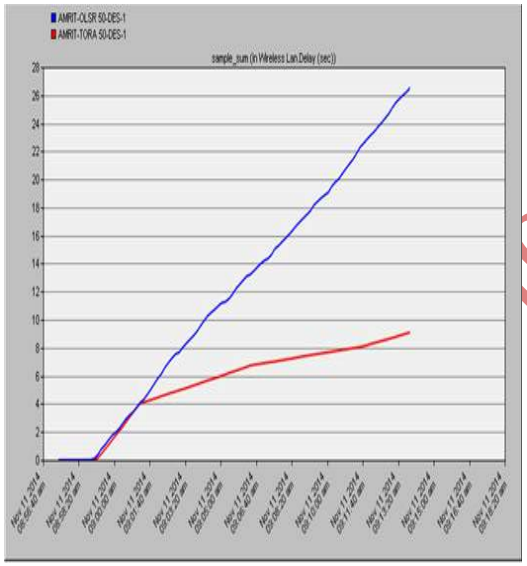

Fig 11: WLAN DELAY OF 1st and 50th NODES

8.1 WLAN DELAY WITH 50 NODES SCENARIO:

In the performance metrics of WLAN DELAY, TORA protocol is better than OLSR.

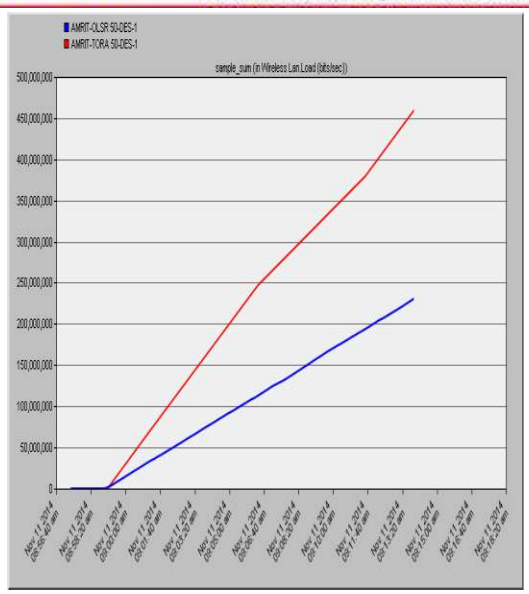

Fig 12: WLAN LOAD OF 1ST and 50th NODES

8.2 LOAD OF 50 NODES SCENARIO:

In the performance metrics of WLAN Load, TORA protocol load is higher than OLSR.

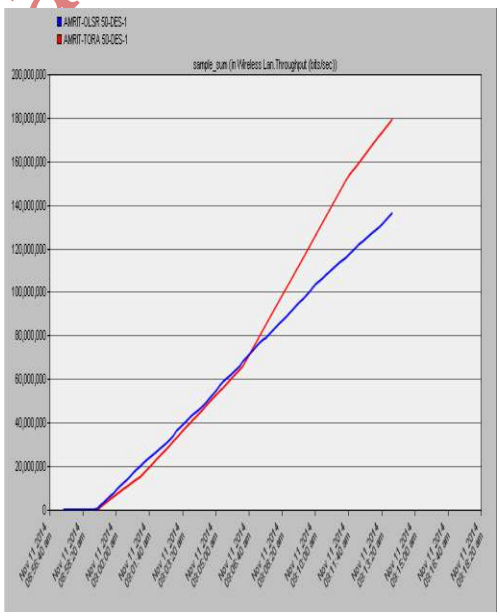

Fig 13: WLAN THROUGHPUT OF 1ST and 50th NODES

8.3 WLAN THROUGHPUT OF 50 NODES SCENARIO

In the performance metrics of WLAN THROUGHPUT , TORA protocol performance is better than OLSR .

9. CONCLUSION AND FUTURE WORK:

As per resultant, we have got various kind of result and compare on the basis of reactive and proactive routing protocol between OLSR and TORA .we have got OLSR performance is better than TORA in 2 Nodes working and 5 Nodes working scenario but in 1st and 50th Nodes working scenario TORA gives better response than OLSR .In this paper we have implemented reactive and proactive routing protocols. As per observation of these two protocols, in future we can use hybrid protocol; Security analysis for both OLSR and TORA can be done.

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