

Reactive and Proactive Routing Protocols Review Analysis Based on working Mechanism

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ABSTRACT

Routing is the process of finding the best path for traffic in a network, or across multiple networks. The role of routing is similar to the road map for a hotel. In both cases, we need to deliver messages at proper location and in an appropriate way. Routing in wireless Ad hoc networks is a two step process: First find the route between Source and Destination and second is data packet transmission. Routing protocols for traditional wired networks cannot be directly applied to MANETs because of their limitations and characteristics such as dynamic topology, limited bandwidth, unpredictable link capacity and energy constrained. Numerous routing protocols for MANETs have been proposed in the recent past for discovering and maintaining routes. Routing finds suitable paths between source and destination nodes pairs, possibly consisting of a number of intermediate nodes. Depending on the underlying communication model, routing protocol can be distinguished as unicast, multicast, and broadcast routing. In this Review paper authors are going to Review all the aspect of MANET Protocols . in future authors will perform the execution of video ,voice On different MANET Routing Protocol like AODV, OLSR & TORA with the help of OPNET simulator.

Keywords:

MANET,AODV,OLSR,TORA,ROUTING.

A MANET is a group of mobile Nodes which shares a wireless channel even with decentralized control or without having established communication backbone. MANET is an individual glance system of mobile devices which are connected by ad hoc wireless links. All nodes, in the system cooperate in order to rectified route

packets in multi-hop forwarding mode with effect of the unexpected mobility of Node the Network

topology might change constantly. Ad-hoc means “for one specific purpose” MANETs get this definition as they are formed when needed. All available nodes are known to other nodes within range. The whole collection of nodes is interconnected in many different styles. Ad hoc Networks are made and used as exactly in variant environments. Routing is one of the main problems of Networking to deliver data from one to the other node. Wireless ad-hoc Networks are also known Mobile ad-hoc multihop Networks without predetermined topology or central control. This is because MANETs can be categorized as a dynamic, multihop, potentially rapid changing topology. The objective of such Networks is to provide communication abilities to areas with limitations or not having existing communication infrastructures. A MANET is usually built having mobile nodes using wireless communications. It adopts a peer-to-peer multihop routing rather than static Network infrastructure for Network connectivity.



Figure 1.1 Mobile Ad-hoc wireless Network

1 AODV (The Ad hoc On Demand Distance Vector) AODV uses sequence numbers to ensure the freshness of routes. It is loop-free, self-starting,

and scales to large numbers of mobile nodes. AODV build routes using a route request / route reply query cycle. When a source node desires a route to a destination for which it does not already have a route, it broadcasts a route request (RREQ) packet across the Network. Nodes receiving this packet update their information for the source node and set up backwards pointers to the source node in the route tables. In addition to the source node's IP address, current sequence number, and broadcast ID, the RREQ also contains the most recent sequence number for the destination of which the source node is aware. A node receiving the RREQ may send a route reply (RREP) if it is either the destination or if it has a route to the destination with corresponding sequence number greater than or equal to that contained in the RREQ. If this is the case, it unicasts a RREP back to the source. Otherwise, it rebroadcasts the RREQ. Nodes keep track of the RREQ's source IP address and broadcast ID. If they receive a RREQ which they have already processed, they discard the RREQ and do not forward it's the RREP propagates back to the source, nodes set up forward pointers to the destination. Once the source node receives the RREP, it may begin to forward data packets to the destination. If the source later receives a RREP containing a greater sequence number or contains the same sequence number with a smaller hop count, it may update its routing information for that destination and begin using the better route.

As long as the route remains active, it will continue to be maintained. A route is considered active as long as there are data packets periodically travelling from the source to the destination along that path. Once the source stops sending data packets, the links will time out and eventually be deleted from the intermediate node routing tables. If a link break occurs while the route is active, the node upstream of the break propagates a route error (RERR) message to the source node to inform it of the now unreachable destination(s). After receiving the RERR, if the source node still desires the route, it can reinitiate route discovery.

2 OLSR (Optimized Link State Routing)

It is a proactive routing protocol and is also called as table driven protocol because it permanently stores and updates its routing table. OLSR keeps track of routing table in order to provide a route if

needed. OLSR can be implemented in any ad-hoc Network. Due to its nature OLSR is called as proactive routing protocol. Multipoint relay (MPR) nodes are shown in the given figure 1.6 all the nodes in the Network do not broadcast the route packets. Just Multipoint Relay (MPR) nodes broadcast route packets. These MPR nodes can be selected in the neighbor of source node. Each node in the Network keeps a list of MPR nodes. This MPR selector is obtained from hello packets sending between in neighbor nodes. These routes are built before any source node intends to send a message to a specified destination. Each and every node in the Network keeps a routing table. This is the reason the routing overhead for OLSR is minimum than other reactive routing protocols and it provide a Shortest.

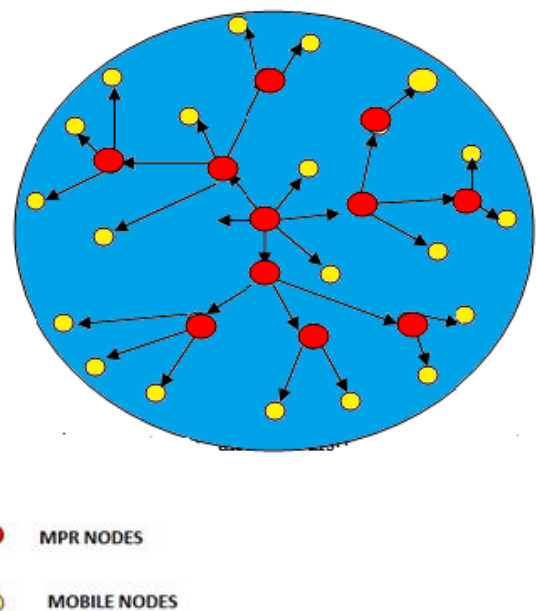


Figure 1.2 MPR node sends the TC message

Figure 1.7 shows Nodes in the Network want to send hello messages to their neighbours. These messages are sent at a predetermined interval in OLSR to determine the link status. If node A and node B are neighbours, node A send hello message to B node. If B node receives this message, we can say the link is asymmetric. If now B node sends the same hello message to A node. This is the same as first case, called asymmetric link. Now if the two way communication is possible then we can call it symmetric link, as shown in below Figure 5.5 the

hello messages contain all the neighbour information. This enables the mobile node to have a table in which it has information about all its multiple hop neighbours. A node chooses minimal number of MPR nodes, when symmetric connections are made. It broadcast topology control (TC) messages with information about link status at predetermined TC interval. TC messages also calculate the routing tables. In TC messages MPR node information are also included.

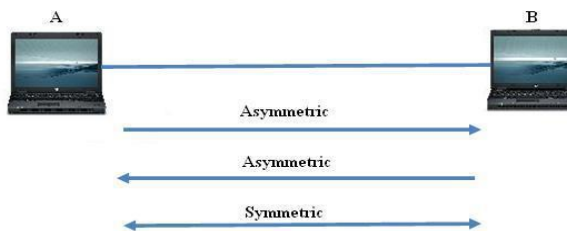


Figure 1.3 Hello messages in MANET using OLSR

OLSR protocol is a proactive protocol used in mobile ad-hoc Networks. It is often called table-driven protocol as it maintains and updates its routing table frequently. OLSR exchanges the topology information always with other nodes. Few nodes are selected as MPRs (Multi point relays). MPRs are responsible for transmission of broadcast messages during flooding and generating link state information. MPRs technique used in OLSR protocol will reduce the message overhead and even minimize the number of control messages flooded in the Network. Nodes maintain the information of neighbors and MPR's, by sending and receiving hello messages from its neighbors.

- Node A transmits the hello message to node B and then the message received by node B from node A can be called asymmetric link.
- If this hello message is retransmitted by the node B to node A then the resulting link even called as asymmetric link.
- Finally the resulted bidirectional link is known as a symmetric link.
- Symmetric link formation will help the nodes to choose MPRs.

3 TORA (Temporally Ordered Routing Algorithm) 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. All the communication of TORA is depended on following packets.

- **Query (QRY)**
- **Update (UPD)**
- **Clear (CLR)**

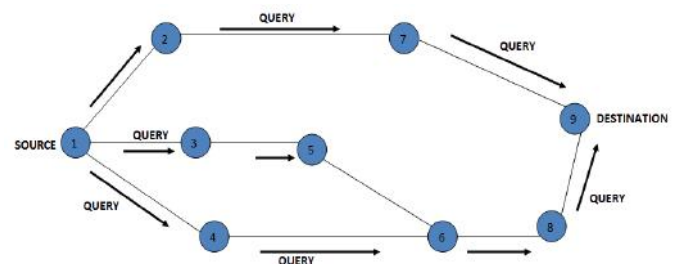


Figure : 1.4 Working of Query Packets in TORA

The QRY packet used to arrange a route and this is broadcast by source node encloses destination address via network. This QRY packet traverses MANET nodes till its destination or it arrive at centre node which keeps the destination route. The centre or destination node stops QRY packet and broadcast a UPD packet enclosing its height regarding to destination. At destination node height will be zero. Every node which obtains UPD packet puts its height to a greater value of height of neighbor node as of which it got UPD packet and so on. This is a sequence of DAG for creating routes rooted to destination in the network. The value of heights is used to control the nodes from sending packets only from downstream not from upstream. In CLR Packets when a TORA node finds link failure in network A broad cast clear packet (CLR) is flooded over the entire network to erase routes which are not valid for the destination by that node. This node will also update values in its link table accordingly.

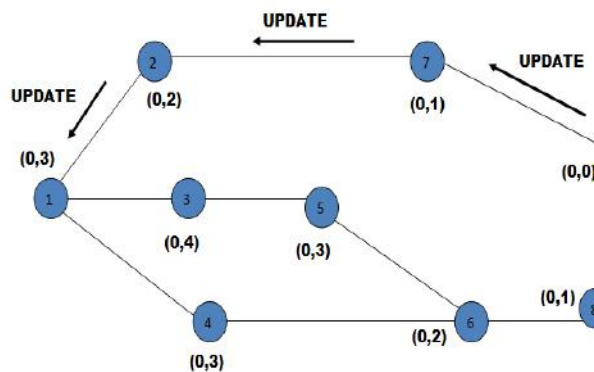


Figure 1.5 Working of Update Packets in TORA

This figure ‘Directed Acyclic Graph.’ shown that source node is ‘a’ and destination node is ‘g’, therefore all the possible routes are created by this way.

1. (a)>(b)>(f)>(g)
2. (a)>(b)>(c)>(f)>(g)
3. (a)>(c)>(f)>(g)
4. (a)>(d)>(e)>(g)

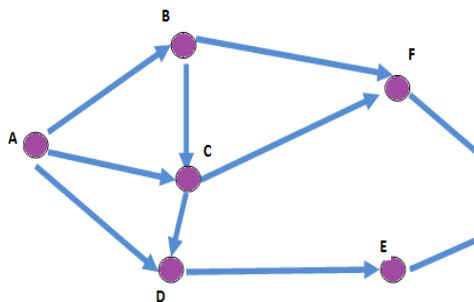


Figure 1.6: Directed Acyclic Graph for TORA

4 LITERATURE SURVEY

Nisar et al (2021) in this paper The object of performance analysis of the routing protocol in MANETs is to identify cause and effects of existing and potential problems. This work proposes testing the three most common ad hoc routing protocols Ad-hoc On-demand Distance Vector (AODV), Dynamic Source Routing (DSR) and Optimized Link State Routing Protocol (OLSR) using Optimized Network Engineering Tool (OPNET) Modeler simulations using the performance metrics of Throughput, Delay, and Network loading to find an effective routing protocol for routing. it can be concluded that OLSR is the most suitable routing protocol for MANET, based on the routing protocols suggested.

Kaur et al. (2014) In this paper the performance analysis of routing protocols AODV, DSR and OLSR protocols in MANET have been investigated. The investigation considers the impact of scalability, mobility and Network. HTTP, FTP and Email and Video Conferencing heavy traffic load on different types of routing protocols is taken. In the performance assessment throughput adopted for the whole scenarios considered. The simulation using OPNET consider different scenarios that attempt to cover all of the aspects on Network evaluation required. From this paper, In the case of throughput, the throughput of DSR is very less than that of AODV and OLSR. But, the throughput of OLSR is higher than that of the reactive routing protocols AODV, DSR; it is because the OLSR protocol is independent of the traffic and Network density compared to AODV, DSR protocols. The simulation results according to web application conclude that throughput is was highest in HTTP and lowest in video conf and Email.

Mahajan and Chopra (2013) discussed the three routing protocols (AODV, OLSR and TORA) based on OPNET simulations. Author motive was to check the performance of these three routing protocols in MANET on the above mentioned parameters. We analyzed for different reactive and proactive ad-hoc routing protocols with different mobile nodes transmitting GSM voice traffic data. Finally it is concluded that the overall performance of OLSR is better choice for small and large Networks. The performance of TORA does scale well with large and small sized Network as compared to AODV. Simulation result also showed TORA reactive routing protocol is the finest suited for MANET protocol in dense population of nodes, whereas AODV has very poor QoS in high populated node Networks with GSM voice traffic data. At the end we came to the point that the performance of routing protocols vary with Network. It is the selection of accurate routing protocols (taking into consideration the type of Network) that ultimately influence the efficiency of that Network in magnificent way. So proactive protocol OLSR outperforms in terms of throughput jitters and gets the same low delay as OLSR.

Parvathavarthini and Dhenakaran.S (2013) Authors seen a great development in the field of wireless Networks (infrastructure based)

and in the field of Mobile ad hoc Network (infrastructure less Network). In this paper a number of routing protocols for MANET, are taken which are broadly categorized as proactive and reactive and Hybrid protocols. The effort has been made on the comparative study of Reactive, Proactive and Hybrid routing protocols has been presented in the form of table. There are various shortcomings in different routing protocols and it is difficult to choose routing protocol for different situations as there is tradeoff between various protocols. There are various challenges that need to be met, so these Networks are going to have widespread use in the future.

Jasvinder and Sachdeva (2013) In this paper it was observed that when there is a larger number of nodes and more requests for guidance, it would affect the performance of the Network. Delayed removal of the Attack rate in the state of the Protocol AODV. However, the Network load conditions, and there was more impact of the malicious AODV decade. Address the issue of the second search, the discovery of the ad hoc Networks AODV is more affected by the Attack, compared with the black hole Attacks.

5 CONCLUSION

In this Review paper authors have go through all aspect of Routing Protocols Reactive as well Proactive like AODV, OLSR & TORA . Working Behavior or all three protocols has been described briefly. Some review papers also analyzed related with MANET Routing. In the future authors will implement AODV, OLSR & TORA with the help of OPNET simulator.

6.REFERENCES

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