
A Literature Survey of Routing Protocols in MANET

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Abstract: *Mobile ad-hoc network is a promising research area with sensible application. Dynamic and reliable protocols are necessary in MANETs, as they have no infrastructure and their Network topology keep changing continuously. There are different types of protocols for the routing in MANET. In this paper we concentrate on the three popular algorithms Optimized Link State Routing (OLSR), Destination Sequenced Distance Vector Routing (DSDV), Ad-hoc On-Demand Distance Vector Routing (AODV) and Multi Path Multicast Routing Protocol for Provisioning QoS in MANET's. We are also making a review of comparison among DSDV, OLSR and AODV routing protocols in different network scenario.*

Keywords: *OLSR, MANETs, Quality of Service, and routing protocol.*

1. INTRODUCTION

An ad hoc mobile network is a compilation of mobile nodes that are enthusiastically and without rhyme or reason situated in such a method that the interconnections between nodes are able to change on a frequent basis [1]. In order to make easy communication inside a network, a routing protocol plays an important role. It helps in finding routes between nodes. The major objective of an ad hoc network routing protocol is to give an efficient route association between a pair of nodes so that messages strength will be brought in a convenient process [2]. Route construction should be complete with a minimum number of overheads and bandwidth utilization.

Quality of service (QoS) is a significant thought in networking, but it is also an important challenge. QoS is more complicated to assurance in MANETs than in other type of networks, since the wireless bandwidth is shared between neighboring nodes and the network topology change as the nodes move about. This requires wide association between the nodes, jointly to make the routes and to secure the possessions necessary to supply QoS [3] [4]. With the widespread application of MANETs in a lot of domains, the suitable QoS metrics should be use, such as bandwidth, delay, packet loss rate and cost for multicast routing. QoS in multicasting routing protocols faces the challenge of delivering data to destinations during multi-hop routes in the occurrence of topology change [5], [6].

In recent development, mediator technology is creating its way, as a new paradigm in the area of artificial intelligence and computing which facilitate complicated software development with features like flexibility, adaptability and efficiency. [7] Mediator is the autonomous programs activate on an agent stage of a host. The mediator uses their own information base to attain the specific goal without disturbing the activities of the host. The mobile agents are easy packets, which move around the network and gather valuable information such as node id, link latency, congestion level etc. as they visit dissimilar nodes. The information carried also make a comparison in DSR and AODV based on different network scenarios [2].

2. TYPES OF ROUTING

Static routing - Static routing is completed by the administrator manually to forward the info packets within the network and it's permanent. No other administrator will modify this setting. These static routers are organized by the administrator, by adding new entries in routing table. In this routing the routes are stationary and never changes when the network is reconfigured.

Dynamic Routing - Dynamic routing is mechanically done by the selection of router. It will detect the traffic on any route depending upon the routing table. Dynamic routing permits the routers to grasp concerning the networks and also

the attention grabbing issue is to feature this data in their routing tables. In dynamic routing the routers exchange the routing data if there's some amendment within the topology. Exchanging data between these dynamic routers learn to grasp concerning the new routes and networks. Dynamic routing is more versatile than static routing. Dynamic routing has the aptitude to beat the overload traffic. Dynamic routing uses completely different methods to forward the info packets [8].

3. CLASSIFICATION OF ROUTING PROTOCOLS

Routing protocols - There are many sorts of routing protocols for wireless networks. These routing protocols are categorized as reactive or proactive routing protocols. The wireless routing protocols that have each proactive and reactive properties, is named as hybrid routing protocols. In these sorts of protocols the communication is done when the supply node requests to speak with the opposite node [9]. Reactive MANET Protocols area unit largely fitted to nodes with high quality or nodes that transmit information seldom. There are some reactive routing protocols that we are going to contemplate here. These reactive routing protocols embody AODV and DSR.

Reactive Routing Protocols - Reactive routing protocols are known as on-demand routing protocols. These routing protocols are created as they are required and also the routes are already designed. These routes are not inheritable by causing route requests through the network. Disadvantage of this algorithmic program is that it offers high latency in looking a network.

AODV- In AODV the network is silent till an association is required. At that time the network node that desires an association broadcasts asking for association. Alternative AODV nodes forward this message, and record the node that they detected it from, making associate degree explosion of temporary routes back to the indigent node. This protocol is employed for MANET and Wireless network, if two nodes want to ascertain an association in an advert hoc network then AODV is accountable to change them to create a multi-hop route. Ad hoc routing protocol (AODV) uses Destination Sequence Numbers (DSN) to avoid numeration to eternity that's why it is loop free. This can be the characteristic of this formula. Once a node send request to a destination, it sends its DSNs in conjunction with all routing data. The intermediate nodes forward the RREQ message to the neighbor nodes and record the address of those nodes in their routing cache [10].

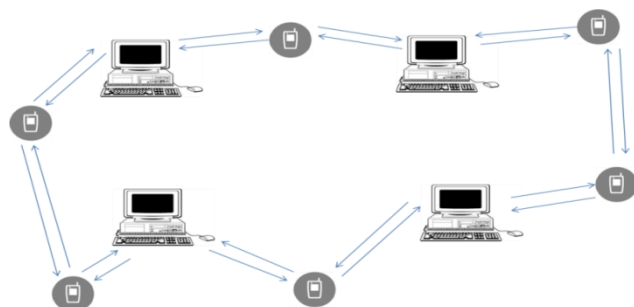


Fig 1: node sending RREQ message

DSR-Dynamic supply Routing (DSR) may be a routing protocol for wireless mesh networks. It is the same as AODV in this it forms a route on-demand once a transmission laptop requests one. However, it uses supply routing rather than hoping on the routing table at every intermediate device. The DSR network is completely self-organizing and self-configuring [10]. The protocols is simply compose of two mechanisms i.e. route discovery and route maintenance. within the case if the message do not reach to the destination then the node that received the RREQ packet can look that antecedently a route used for the precise destination or not. The DSR often updates its route cache for the sake of latest offered simple routes. If some new offered routes were found the node can directs the packet to it route. The packet needs to realize the route direction. Therefore the info regarding the route was set within the packet to succeed in its destination from its sender [11].

DSDV - It is customized from the traditional Routing information Protocol (RIP) to circumstantial networks routing. It adds a brand new attribute, sequence variety, to every route table entry of the traditional RIP. DSDV is associate degree adaptation of classical distance vector routing protocol to accidental networks. In DSDV, two types of update packets are available. One is the routing table that contains a whole list of addresses of all alternative nodes within the network. The opposite contains the setting time knowledge for every destination node. It is accustomed to verify the time for update promotion [11]. The routing updates and packets between nodes rely on these tables. Along with every node's location it contains the next hop, route metric, destination sequence range, etc. Route updates square measure broadcasted sporadically or scheduled PRN within the networks. Routes square measure invariably elite with

later sequence range. If the sequence numbers square measure identical, the route with smallest metric are going to be elite. These criteria guarantee loop-free routes, however they conjointly induce routes fluctuation. It is expected additional studies on the issues of DSDV as refer in the previous section. In contrast with Bellman-Ford routing, QoS with DSDV routing has substantial improvement among the routing results, however it is expected that additional researches together with multi-path routing, QoS multicasting in DSDV and accidental networks [12][13]. Several enhancements of DSDV are developed. Hopefully, these fresh planned protocols are going to be used [14].

Proactive Routing Protocols -The routing data regarding all the other nodes is maintained by the each and every node in the network. Routing Table consistency is maintained by transmitting routing information periodically throughout the network. In proactive routing protocols the route is already available because of the up-to-date consistency of routing table. There are several pros and cons of proactive routing protocols. One among its advantage is that the nodes will simply get routing data, and it simply starts a session.

OLSR - OLSR protocol is an optimized link state routing protocol. The main concept of OLSR based on the use of MPR nodes i.e. multipoint relay that are selected among the first neighborhood to build best routes and traffic is reduced which is caused by the flooding of control messages in the network [15]. The Optimized Link State Routing is a proactive routing protocol and it optimizes the flow caused by messages used in the discovery of neighborhood or the control messages. The key concept of protocol is use of multipoint relays (MPR). Each node in the network selects its MPR set among its one hop neighbors to reach all its 2-hops neighbors. Only nodes selected as MPR broadcast messages concerning the links status. The main aim is thus to obtain the smallest number of MPRs i.e. reducing the number of transmission required. [16]

Neighbor Sensing-

In OLSR, the information about neighbor is gathered with "HELLO" messages and they are sent over network frequently. These "HELLO" message detect changes in neighbor nodes and related information about its immediate neighbors and 2-hop neighbors and selects neighbors according to that.

Multi Point Relay (MPR)-

The main idea of multi-point relay is to reduce the overhead of flooding message in network by reducing re-transmission in the similar region. Each node separately

selects a subset of its 1-hop neighbors as an MPR set. This subset is selected such that it covers the nodes all 2-hop neighbors in terms of radio range. The MPR Selector Set is updated frequently using "HELLO" message which are periodic in nature because neighbor nodes are dynamic in nature.

Topology Control Information-

Topology Control messages are used for the purpose of diffusion of topology and for the calculation of routing table. TC messages are sent by a node after particular time. Like "HELLO" messages with these TC messages the topological information is forwarded over the whole network topology. According to these topologies, nodes are able to calculate routing table. [16][17].

4. LITERATURE REVIEW

Routing protocols over MANET are a vital issue and many proposals have been addressed to efficiently manage topology information, to supply network measurability and to prolong network lifetime. However, few papers consider a proactive protocol to effective manage the energy consumption. OLSR presents the advantage of finding a route between two nodes within the network in a very less time, due to its proactive scheme, but it can spend a lot of resources selecting the Multi Point Relays and interchanging Topology Control information. Some papers propose a modification in the MPR selection mechanism of OLSR protocol, relay on the Willingness concept, in order to prolong the network lifetime in absence of performance losses (in terms of throughput, end-to-end delay or overhead). A comparison of an Energy-Efficient OLSR and the classical OLSR protocol is performed, experiment some different well-known energy aware metrics such as MTPR, CMMBCR and MDR. EE-OLSR outperforms MDR and classical OLSR confirms to be the better performing metric to save battery energy in a highly dense mobile network with traffic loads. The use of mobile wireless computing is increasing day by day because of the ease in working environment. Besides their use, mobile wireless networks are assumed to grow in size too. They functions in independent groups, obtaining some tens of nodes up to several hundreds of nodes. As the network size increases, it is common for the nodes to be dispersed in a larger area than the radio range of individual nodes. Under such conditions, one must use routing techniques such that the out of range nodes may communicate with each other via intermediate nodes. Problems in mobile ad-hoc networks are (a) limited bandwidth and (b) high rate of topology. Thus the

goal for a routing protocol is to minimize its control overhead.

In VEHICULAR ad hoc network (VANETs) the node is vehicle and the network is self configuring (equipped with on-board computers), parts of roadside infrastructure, sensors, and pedestrian personal devices. Now, the IEEE group is on the verge of completing the IEEE 802.11p and IEEE 1609 final drafts, called as “Standard Wireless Access in Vehicular Environments” (WAVE), particularly planned for VANETs. This technology presents the chance to develop powerful automotive systems capable of processing, gathering and sharing information. In VANETs, the high mobility of the nodes, capability of the channel, the Wi-Fi limitations in coverage, the presence of obstacles generate packet loss, network fragmentation and frequent topology changes. Thus, an excellent deal of effort is dedicated to offer new MAC access strategies and to develop efficient routing protocols. [18][19]

5. CONCLUSION

As there is large number of different kinds of routing protocols in mobile ad-hoc networks, the use of a routing protocol in mobile ad-hoc network only depends upon the factors like load, size of the network, mobility of nodes etc. In This paper the comparison of DSDV, AODV and OLSR routing protocols is done on the basis of packet management process, route selection process and energy consumption. Secure routing is one of the challenging fields. Due to the insecure and ad hoc nature of MANET, it is prone to other security attacks like worm hole, gray hole, sink-hole etc. that may lead to devastating consequences. So security attacks may be checked with respect to different attacks in MANET. New algorithms may be proposed to provide good QoS for safety and comfort applications in MANET.

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