A Survey of Reactive, Proactive and Hybrid Routing Protocols in MANET: A Review

Harjeet Kaur, Varsha Sahni, Dr. Manju Bala

CSE Department
CT group of Institutions
Jalandhar

Abstract-**An ad-hoc network (MANET) is set of different types of mobile node. MANET is mobile so they utilize wireless connection to attach with network. MANET can be deployed at low cost in variety of application. In MANET different types of routing protocols have been recommended. These protocols can be classified into three main categories reactive (on-demand), proactive (table-driven) and hybrid routing protocols namely AODV, OLSR and ZRP [1] [2] [3]. This paper focus on the survey of reactive, proactive and hybrid routing protocols like AODV, OLSR and ZRP.**
Keywords: **MANET, AODV, OLSR, ZRP.**

I. INTRODUCTION

A MANET is a type of ad- hoc network that can change locations and configure itself on the fly. MANET can be a model Wi-Fi connection, or another standard, like a cellular or satellite transmission. MANET has many applications like military, communication, conference meeting, automated battlefield, creating virtual classrooms and in sensor network. The main feature of MANET restoring and self organizing and transmission through multiple hopes.
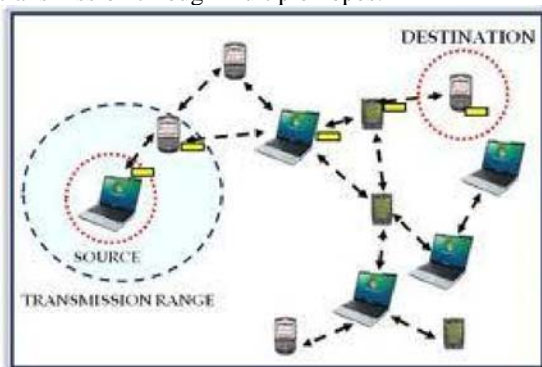

Figure1: MANET WORKING [15]

Topology because nodes are self managed without any pre existing structure. MANET has different characteristics bandwidth constraint and limited physical security. MANET used routing protocols for sending data source to destination [1] [2] [3].

II. ROUTING IN MANET

In Ad-hoc networks require multi-hop routing and all nodes can potentially contribute in the routing protocols. Routing protocols are organized as:
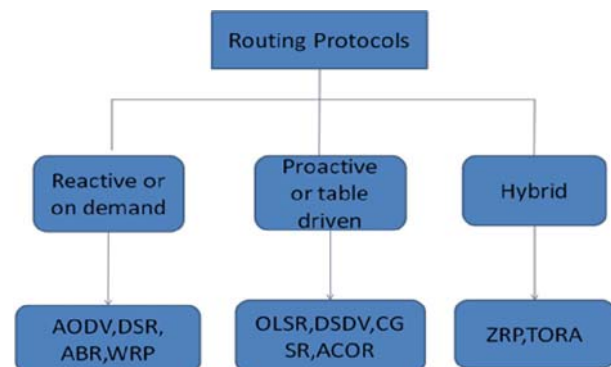

Figure 2: sorting of routing protocols

2.1. REACTIVE ROUTING PROTOCOLS

Reactive or on-demand routing protocols route is Discover when needed. Reactive protocols tend to decrease the control traffic messages overhead at the cost of increased latency in discover a new routes. Source initiated route discovery in reactive routing protocols and less delay. In reactive protocols there is no need of distribution of information. It consumes bandwidth when transfer data source to destination. Reactive Protocols are AODV (ad-hoc on demand distance vector), DSR (distance vector routing) and ABR (Associatively Based Routing) protocols [1] [4] [6].
MANET is also called Mesh network. It is high adaptable and rapidly deployable network. MANET has a dynamic

2.1.1 AODV

AODV stand for Ad-hoc On-Demand Distance Vector Routing .AODV is meaning that it establishes a route to a destination only on demand.AODV is capable of both unicast, broadcast and multicast routing.AODV have some join feature of DSR and AODV.AODV avoids the counting-to-infinity problem of other distance-vector protocols by using sequence numbers on route updates. AODV reacts relatively quickly to the topological changes in the network and updating only the hosts that may be affected by the change, using the RREQ message. Hello messages, be dependable for the route maintenance, are also imperfect so that they do not create unnecessary overhead in the network. The RREQ and RREP messages are responsible for the route discovery.

Advantages
▶ The AODV protocol is basically flat routing protocol so it does not require any inner organizational method to

handle the routing process.
- In AODV routes established on demand and that destination sequence numbers are applied for find the latest route to the destination.
- The connection setup delay is lower.
- The AODV protocols are a loop free and avoid the counting to infinity problem.
- At most one route per destination maintain at each node [7] [8] [9].

Disadvantages
- It can lead to heavy control overhead.
- In AODV unnecessary bandwidth consumption.

2.2 PROACTIVE OR TABLE DRIVEN

In Proactive routing protocols every node store information in the form of tables and when any type of change accrue in network topology need to update these tables according to update. The node swaps topology information so they have route information any time when required. There is no route discovery delay associated with finding a new route. In proactive routing fixed cost generate, as normally greater than that of a reactive protocols. Proactive protocols Traditional distributed shortest-path protocols Based on periodic updates high routing overhead. Proactive routing protocols are DSDV (destination sequenced demand vector), OLSR (optimized link state routing protocols) [1] [4] [6].

2.2.1 OLSR

Optimized Link State routing protocol is a proactive link-state routing protocol, which uses hello and topology control (TC) messages to discover and then disseminate link state information throughout the mobile ad-hoc network. Individual nodes utilize this topology information to work out next hop destinations for all nodes in the network using shortest hop forwarding paths.

Being a proactive protocol, routes to all destinations within the network are known and maintain before using it. Having the routes available within the standard routing table can be useful for some systems and network applications as there is no route discovery delay associated with finding a new route. The routing operating cost generates, although commonly greater than that of a reactive protocol and does not increase with the number of routes being created. Being a link-state protocol, OLSR requires a reasonably large amount of bandwidth and CPU power to compute optimal paths inside the network.

MESSAGE
OLSR makes use of "Hello" messages to find its one hop neighbors and its two hop neighbors through their responses.
OLSR uses two kinds of the control messages: Hello and Topology Control (TC). Hello messages are used for finding the information about the link status and the host's neighbors'. by the Hello message the Multipoint Relay (MPR) Selector set is construct which describe which neighbors' has preferred this host to work as MPR and as of this information the host be able to evaluate its individual rest of the MPRs. the Hello messages are sent simply single hop

away but the TC messages are broadcasted throughout the whole network. TC messages are use for distribution information about personal advertised neighbors which includes least the MPR Selector list. The TC messages be broadcast occasionally and only the MPR hosts can forward the TC messages [10] [11].
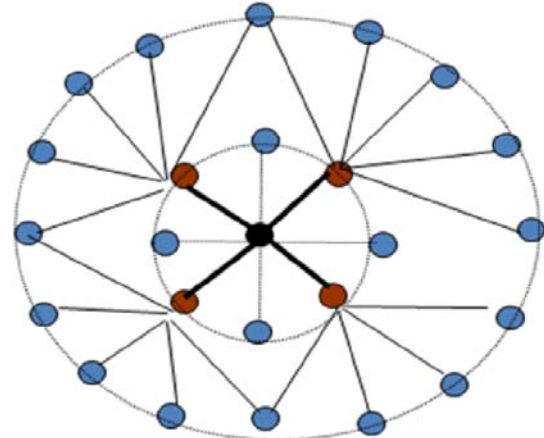

Figure 3: OLSR Multipoint Relay

2.2.2 OLSR version 2

OLSRv2 is at present being developed inside the IETF. It maintains several of the key skin of the unique includes MPR selection and distribution. Key difference is the flexibility and modular design using collective components: packet format packet, and neighborhood invention protocol NHDP. These components are being planned to be frequent among next creation IETF MANET protocols. Difference in the managing of several address and interface enable nodes is also there between OLSR and OLSRv2.

Advantages
- OLSR is moreover a flat routing protocol. It does not need central administrative system to handle its routing process.
- The proactive quality of the OLSR protocol that it provides all the routing Information to all participated hosts in the network.
- OLSR protocol does not need that the link is reliable for the control messages, since the messages are sent at regular intervals and the delivery does not have to be in order.

Disadvantages
- However, as a drawback OLSR protocol desires that each host periodic sends the updated topology information throughout the whole network, this raise the protocols bandwidth usage.
- OLSR requires a reasonably large amount of bandwidth and CPU power to compute optimal paths inside the network [10] [11].

2.3 HYBRID ROUTING PROTOCOLS

Hybrid routing protocols combination of both reactive and

proactive routing protocols. It was proposed to reduce the control overhead of proactive routing protocols and also decrease the latency caused by route discovery in reactive routing protocols. Hybrid routing protocols are ZRP (Zone routing protocol) and TORA (Temporarily Ordered Routing Algorithm) [4] [5] [6].
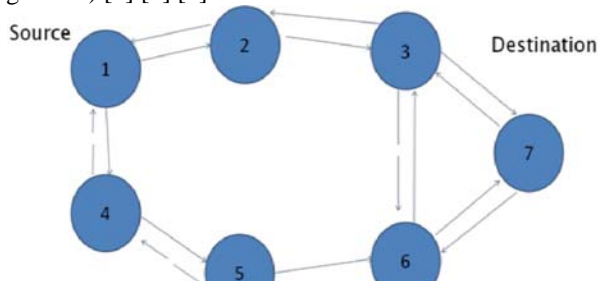

Figure 4: Routing in AODV

2.3.2 *ZRP*

ZRP was planned to decrease the control overhead of proactive routing protocols and discovery in reactive routing protocols and also decrease the latency caused by route.
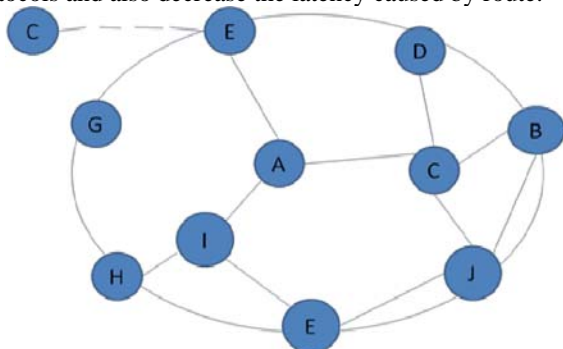

Figure 5 Neighbors' of ZRP

It can be safely being assumed that most communication takes place between the node close to each other.ZRP provide framework to other protocols. The behaviour of ZRP is adaptive.ZRP based on the Zone, these are local neighbors each node within have many overlapping zones and each zone may be have dissimilar size.ZRP consists of several component, these component together give the benefits of ZRP.Each component work independently to give the efficient result.Components of ZRP are:

➢   IARP Intrazone Routing Protocol
➢   IERP Interzone Routing Protocol
➢   BRP Boardercast resolution protocol

IARP is first component of ZRP.IARP is used to communicate with the interior node inside the zone.if network topology change node may change rapidly.it allow for only local route.

IERP is global reactive component of ZRP. It used reactive approach to communicate with nodes in outside the zone. It changes the way route discovery handled. Route queries issued by IERP when request for the route issue.

BRP is used to direct the route request initiated by global reactive IERP.It is used to maximize efficiency and increase disused queries [12] [13] [14].

III. CONCLUSION

In the study of reactive, proactive and hybrid routing protocols, the main feature of AODV less connection delay and loop free and In OLSR routes to every destination inside the network are known and maintain before use. There is no route discovery delay associated with finding a new route in OLSR and ZRP provide framework to other routing protocols And each component of ZRP works independently to give efficient result.

IV. FUTURE WORK

In future, the performances evaluation of reactive proactive and hybrid protocols like AODV, OLSR and ZRP under different attacks can be evaluated by using different type of parameters and different security mechanism is developed to prevent routing protocols from the different type of attacks.

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