

# Comparative Study of Reactive Routing Protocols for MANETs

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**Abstract:-** An ad hoc wireless network consists of a set of hosts (mobile nodes) which are connected together by wireless links. It doesn't have a centralized server or associate arbiter. It's a system that works on an individual basis connecting with wireless links victimization mobile routers. Because of the infrastructure less network each mobile node moves freely with the impulsive direction with no warranted path. Routing in MANET could be a challenge because of the quality of Nodes and lack of server. So a routing protocol is important to possess associate economical communication between nodes in numerous network things that area unit heavily loaded at some purpose. A comparative study is formed on however there active protocols (on-demand) that have the potentiality to deliver the packets during a massive unintended network perform best in these varied things.

**Keywords—** Mobile Ad Hoc Network (MANET), Routing Protocols, AODV, DSR, TORA, LMR.

## I. INTRODUCTION

The mobile ad hoc networks (MANET) square measure cluster of mobile nodes that type a network severally and square measure connected through wireless links. Variety of routing protocols square measure developed to assist within the maintenance of route mechanism for the mobile nodes in order that they'll communicate with alternative nodes in MANET. The most aim of the protocols is to seek out the most effective possible and reliable path. Each node behaves sort of a router.

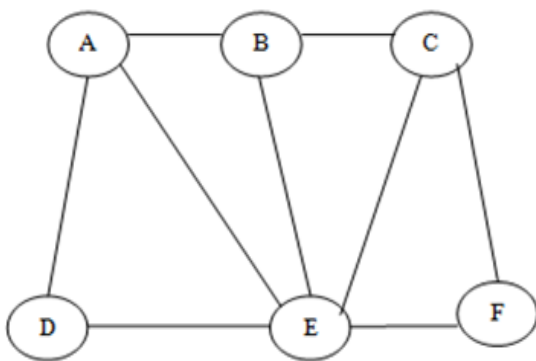


Fig. 1. MANET.

### A. A Portion of the Components of MANET are

- MANET can be shaped with no presence of foundation.
- It is dynamic topology.
- Each hub helps in steering packets.
- Less power and physical security.

### B. Attacks on MANET

There are two kinds of attacks specifically passive and active. The common area unit Passive attacks that area unit eavesdropping and revealing of data. Active attacks area unit those which deny the service, modification of information by viruses, Trojans and worms. the opposite security problems embrace attacks that make inaccurate routing info and diverting network traffic so creating routing inefficient. There are many ways to forestall these attacks by victimization the conventional authentication and secret writing technique and also AN intrusion detection system. Due to quality and openness, mobile unintended networks area unit prone to security threats.

## II. ROUTING PROTOCOLS

It has been the constant attention of investigator that helped them to develop several routing protocols which can be classified into 3 varieties (fig1) proactive, reactive and hybrid (combination of proactive and reactive).

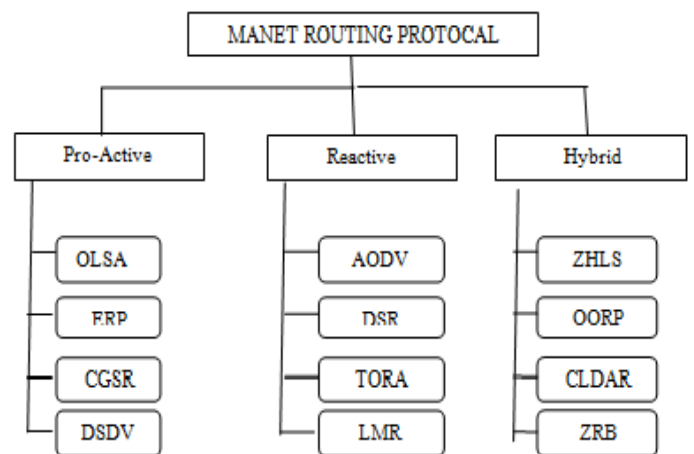


Fig. 2. MANET Routing Protocols.

If a node is assessed to be slow then the pro-active protocol are going to be used else the reactive protocol is applied. Routing protocols for MANET has been evaluated primarily based on their performance Metrics.

#### A. Turnout and Delivery Ratio.Pro-Active Routing Protocols (Table Form)

Every node endlessly acquires the routing data which is keep within the routing tables. These tables take issue according to the data propagated through all the nodes within the network. Flooding mechanism is employed typically to discover and update routes. The table is updated by 2 kinds particularly, periodic update and triggered update. They generate additional traffic as a result of the constant change routing tables and also the increase in nodes. The routing protocol like Link State Routing (LSR) protocol (open shortest path first) and also the Distance Vector Routing Protocol (Bellman-Ford algorithm) don't seem to be appropriate to be utilized in mobile setting. Destination Sequenced Distance Vector routing protocol (DSDV) and Wireless routing protocols were planned to eliminate Investigating to time and process issues of the distributed Bellman- Ford rule.

#### B. Reactiverouting Protocols (on-Demand)

They discover and maintain the route table by the newest topology as and once required. Route search is required for every new destination thus the communication overhead is reduced at the expense of delay to look the route.They're classified as supply routing (data packet headers, carry the path) and hop by hop routing (intermediate nodes will increase that causes route failure). Flooding strategy is employed to get the route to its destination. This discovery packet is named the Route Request (RREQ) packet and also the mechanism is named Route Discovery. The destination replies with a Route Reply (RREP) packet. The protocols are:

- Ad hoc On-demand Distance Vector Routing (AODV)
- Dynamic supply Routing (DSR).
- Location motor-assisted Routing (LAR).
- Temporally Ordered outing rule (TORA)

#### C. Hybrid Routing P Rotocols.

This has each the proactive and reactive options. It is used when there's increase of nodes. This minimizes the delay and over head caused by pro-active and reactive. They are best better-known for his or her measurability of victimization few nodes within the routing and topology discovery. Zone Routing Protocol (ZRP), Zone-based hierarchical link state protocol (ZHLS) is associate example of the hybrid routing protocols. The main concept of hybrid is reactive may be utilized in international network and pr-active could also be used at the Node's native purpose.

### III. REACTIVE ROUTING PROTOCOLS (ONDEMAND)

This encompasses nice potential to offer smart data regarding the delivery n massive unexpected network. The simplest half is these protocols are utilized in route discover only the route is determined and initiates a route discovery. They are the most well-known routing rule for mobile computation for its low information measure. They are simple to get rid of the overload on pro-active protocols. On-demand protocols have the potentials to succeed in the high levels of measurability in ad hoc networks. To realize the measurability the route discovery is formed at the particular time required, so reducing the routing overhead. The on demand protocols takes place in 2 steps:

- Route Discovery
- Route Maintenance

When a node has to send a knowledge however the present route is not accessible then the route discovery is initiated were the RREQ is shipped from the supply node through the network till it reaches the destination until the active route is found and a reply(RREP) is shipped back victimization blind flooding.

#### A. AODV (AD HOC on-Demand Vector)

ADOV builds request through route request and route request question. The various forms of management messages for route maintenance in ADOV are as follows:

##### a). RREQ

Route request message is transmitted by a node that initiates a route to a node. This protocol uses the ring technique once flooding the messages. Every RREQ carries a time to measure (TTL) worth that states for the way several hops this message ought to be forwarded. This worth is about to a predefined worth at the primary transmission and raised at retransmissions.

##### b). RREP

A route reply message is shipped back to the supply from where the RREQ is shipped, if the receiver is that his node victimization the requested address or it's the proper route to the requested address. The rationale one will send the message back, is that each route forwarding a RREQ caches a route back to the creator D.

##### c). RERR

The link standing of next hops in active routes is monitored by the node. Once there's a link break in a vigorous route, a RERR message is shipped to give notice alternative nodes of the loss. In order to change this news automatically, each node keeps a ``previous list'', containing the information processing address of every of

its neighbors that are doubtless to use it for its next hop towards every destination.

From then on top of Fig3, AODV Route if node R needs to initiate traffic to node W that there's no direct route. The printed is flooded to all or any the nodes. Once W receives the request it sends the reply to R by the cached entries in T and U. The Nodes that receive the packet updates the knowledge from the source node and sets backward 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 the number for the destination of which the source node is aware. A node receiving the RREQ could send a route reply RREP, if it's either the destination or if it's a route to the destination with corresponding sequence range larger than or adequate that contained within the REQ.

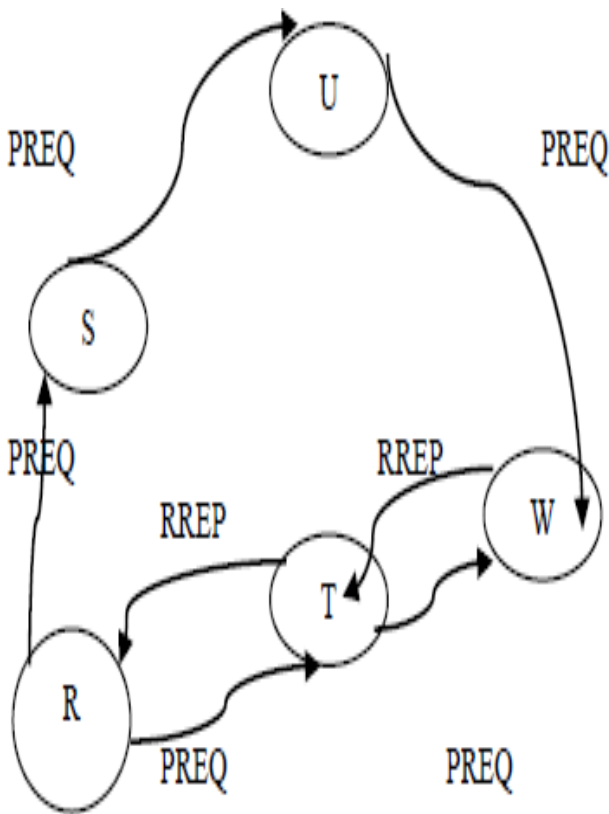


Fig.3. AODV Route.

**B. DSR (Dynamic Source Routing)**

It uses the supply routing rather than hoping on the routing table at every intermediate device. It accumulates each address from the supply to the destination throughout route discovery. To avoid long ways or giant addresses the Dynamic supply routing permits the packet to be passed through hop-by-hop basis.

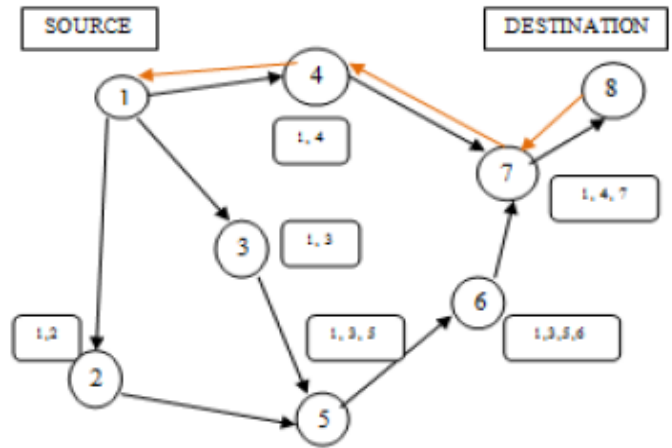


Fig. 4 DSR protocol.

From then on top of fig4 To see the DSR functioning, the source broadcasts the packet with the knowledge of supply address, destination address, request id and also the path. If the packet is seen before by the host it's discarded, else the route finds for the route caches and searches for the destination, if not found it adds its info into the packet and rebroadcasts. If the route is found within the route cache it send a reply to the supply with the assistance of the route cache or route discovery.

*a). Advantages*

- There is no got to flood the route table sporadically as it uses a reactive approach.
- It establishes a route only required.
- The intermediate node uses the route cache to cut back overhead.

*b). Disadvantages*

- The Route mechanism doesn't provide answer once a link is tamed between.
- The delay in affiliation setup is far when put next to a table driven protocol.
- The performance decreases because the quality will increase.

*C. TORA (Temporally Ordered Routing Protocol)*

It is fabricated Vincent Park and M. Scott Corson, mainly to function in a very multi hop network. It uses associate degree discretionary parameter to work out the direction of the link between the two nodes. It builds a directed acyclic graph (DAG). There are several routes however it's not necessary that it ought to be the shortest. TORA encompasses a distinctive feature of maintaining the multiple routes Until the destination, so the character of topology doesn't want a reaction for it. The 3 functions of TORA square measure:

- Route Maintenance,
- Route Erasure

To initiate a route a question packet is distributed until it reaches the destination or until it reaches the node that routes to the destination then receives associate degree UPDATE which provides the height of the destination node. Throughout the course of journey if it's found that the route isn't correct it mechanically changes its height.

*D. LMR (Low Based Multipath Routing)*

The sensors that square measure wireless consists of a really giant number of nodes that job at a really low rate and require a world distinctive id, that square measure high-ticket. These networks square measure information centered; routing to and fro to the node is not needed. LMR will work with completely different information central routing protocols. It's designed to use the native info to make disjoint methods to guard the trail that's operating. In this flooding overhead is reduced by schemes utilized by the routers. This uses the reversal algorithmic rule. It addresses the issue through the partitioning the network thro erase mechanism. This algorithmic rule is nice for dense network.

*a). Advantages*

- Flooding overhead is reduced.
- With only one flooding it Will realize Several segments or disjoint path to guard the operating path.

*b). Disadvantages*

- In this topology, the trail that's operating could block all the attainable disjoint methods.

**IV. PROTOCOL COMPARISON**

The Below table summarizes the theoretical analyses and the properties.

| PROTOCOL COMPARISON  |               |   |                                  |
|----------------------|---------------|---|----------------------------------|
| Protocols/properties | AODV          | DSR   | TORA                             |
| Multiple routes      | Yes           | No  | No                               |
| Broadcasting         | Full          | Full  | Local                            |
| Route metric method  | Shortest Path | Shortest path or next route cache available | Shortest path or next available. |
| Route maintained     | Route table   | Route cache                                 | Route table                      |
| Update information   | Route error   | Route Error                                 | Node's Height                    |
| Storage capacity     | O(E)          | O(E)  | O(Dd*A)                          |
| Topology             | Full          | Full  | Reduced                          |
| Complexity           | O2D           | O2D   | O2D                              |

Table 1. Protocol Comparison

Every routing protocol has their own deserves and demerits. No is healthier than the opposite. Each of them works during a special method.

**V. CONCLUSION**

Many researchers square measure developing new MANET protocols by scrutiny and up the present ones. MANET routing protocols once simulations square measure standardized. In this paper, we tend to mention the varied reactive routing protocols comparing their performance and properties. The most common use mobile unplanned routing protocols square measure AODV, DSR and TORA. On demand routing, the protocols square measure determined once they square measure required. With the increasing use of wireless devices, AODV keeps square measure the solid state in its routing table because it has to track and do changes according to the route. It keeps a neighborhood route discovery. in keeping with the analysis created, AODV has output with rock bottom delay. Therefore it's higher than the opposite routing protocols.

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