

# Mobile Ad-Hoc Networks Routing Protocol and its Challenges: - A Survey

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## ABSTRACT

MANET is collection of mobile nodes that can able to communicate with each other. Mobile nodes main purpose is to communicate and sharing the information over the network. As we know that MANET providing the support of real time application and multimedia application which can requires various aspects. These aspects are end to end delay, jitter and energy and bandwidth. This paper mainly presents the overview of the quality of service routing protocols. This study of the quality of service protocols are which having current issues and challenges in the mobile ad hoc network.

## Keywords

Mobile Ad Hoc Networks, QoS, Routing

## 1. INTRODUCTION

Mobile Ad Hoc Network is no cartelized fixed infrastructure for controlling the network. The nodes are having their ability to sharing the information over the network. As we know that mobile nodes can easily communicate and move randomly. In the MANET routing is the main concerns these days. Routing is which can help to sharing the information with the mobile nodes. The nodes can freely move to each other and communication itself [1]. Routing is the core part of Mobile Ad Hoc Network. There are various routing protocol available for the communication purpose such as DSR, AODV protocol, Temporally Ordered Routing Algorithm (TORA). These routing protocol is changing their communication behavior and able to communicate with the mobile nodes. Each protocol represents describe the communication path and maintain routes on best path service. For communication purpose it is not sufficient to find only source to destination path. They have also depends upon some parameters to communication and maintain the network [2].

The Routing Protocols are which having their own functionalities in past years. Most routing protocol is the extension of best effort routing protocol. The MANET can be differentiating into three categories proactive, reactive and hybrid. [3] Proactive protocol all the network nodes maintain their information (routing) and update the information during time intervals. MANET which is providing the quality of service feature that can give the service to any specific application. Mainly mobile Ad Hoc network can improve their nodes performance to get a better and suitable communication with node to node packet delivery.

Mobile Ad Hoc Network can helpful for communication without any help of fixed structure based network. It is self-configuring scenarios which can support multi hop wireless networks where network structure can change dynamically. This is only and only with the help of network nodes. Nodes availability is the major part of communication. Nodes should present during the communication time. According the network nodes availability the route can be decided. Online

and Offline nodes can be rectify during the communication cycle.

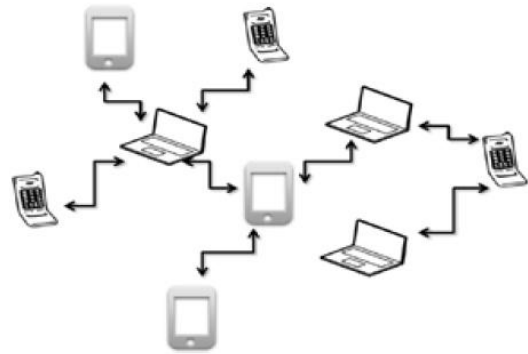


Figure1.1: Mobile Ad Hoc Network

Quality of Service which is implemented in the various layers which mainly concern with the sharing the information and get better quality of service. In the MANET various metrics such as bandwidth, delay, node availability. Routing in MANET is the mainly consideration about the each node statistics performance. The path can decided to travel the destination node by performing a specific task. Based on Quality of Service can get better communication link and reliability with each node [4]. The network nodes depend which packet is going to travel to the destination path. The path information is necessary for the communication purpose. Using the source and destination paths may be varies the quality of service parameters. Before implementing the node to node delivery it varies the protocol behavior and implementation scenarios. The use of protocol either it can use proactive or reactive protocols it depends the purpose of communication which is matter in quality of service criteria [5].

The rest of the paper is which describing the Routing Protocols. Section three which describing their challenges of MANET Section four describes multiple metrics QoS routing protocols. Section five concludes our review.

## 2. ROUTING PROTOCOLS

There are various types of routing protocols which is helpful for the communication [6]. It is categorized into three phase a) Table Driven b) Reactive c) Hybrid Protocol

### 2.1 Table- Driven Approaches

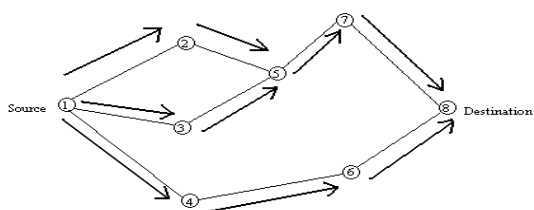
Table driven routing protocol is up to date which give routing information to node to node in the existing network. This protocol is which needs to maintain routing information and updates their network scenarios.

### 2.1.1 Destination Sequenced Distance Vector (DSDV)

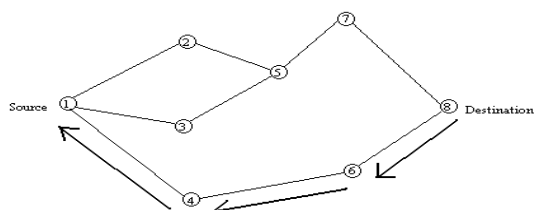
Destination Sequenced Distance Vector routing protocol on the classical distributed Bellman—Ford routing algorithm. In this routing protocol mobile network maintaining their routing table information. In this system every node which can assigning a sequence number for communication purpose. Routing table update on the periodically which maintain the network reliability. DSDV mainly use two types of route packet. The first packet is full dump which is used to transmitted information. And the second packet is incremental packets which are mainly used to relay the information [7].

### 2.1.2 Wireless Routing Protocol (WRP)

In this routing protocol nodes can know their neighbors from the receipt of acknowledgments. For example if node not sends a packet it must send the HELLO message within a specific time period to ensure the communication.



(a) Propagation of Route Request (RREQ) Packet



(b) Path taken by the Route Reply (RREP) Packet

Figure: 2.1.2 Wireless Routing Protocol

### 2.1.3 Cluster Switch Gateway Routing (CSGR)

This protocol is a table driven routing protocol where every node is combined into clusters and cluster has a cluster head. This Cluster representation is in the form of hierarchy. Mainly cluster routing provides channel access, bandwidth allocation [8].

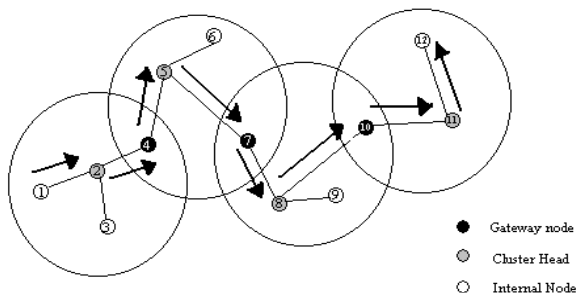


Figure: 2.1.3 Cluster Switch Gateway Routing (CSGR)

### 2.1.4 Source Tree Adaptive Routing (STAR)

[9] STAR is proactive routing protocol that is not require periodic routing updates. STAR is mainly maintaining the path information, using the network nodes path for checking the valid links.

## 2.2 On Demand Driven Reactive

This routing techniques routes only when the desire by the source node. For example when source node require a route for a destination it initialize their route discovery process in the network [10].

### 2.2.1 Ad Hoc on -Demand Distance Vector Routing (AODV)

The AODV which describes the improvement version of DSDV which minimize the required routes on-demand basis. In this scheme when node send a message to some particular destination it creates a path discovery process [11]. It can broadcast (RREQ) packet to their neighbors.

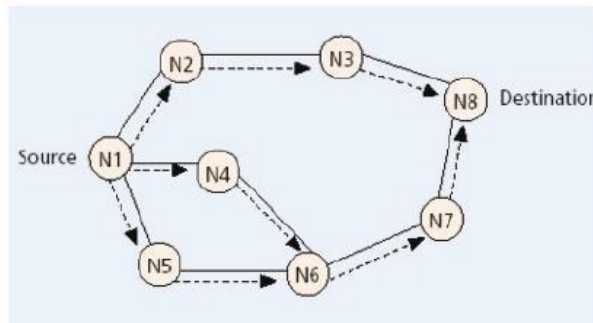


Figure: 2.2.1 Ad Hoc on Demand Distance Vector Routing (AODV)

### 2.2.2 Dynamic Source Routing (DSR)

The DSR protocol which contains the source routes and network node entries of route cache are continuously updated. The DSR mainly having two phases a) route discovery b) route maintains [12].

### 2.2.3 Temporally Ordered Routing Algorithm (TORA)

It is source initiated which provides multiple routes for the desire source and destination communication channels. The main functionalities of the TORA is to control messages to very small set of nodes which is topology dynamically change. [13] There are mainly works on three phases a) route creation b) route maintenance c) route erasure.

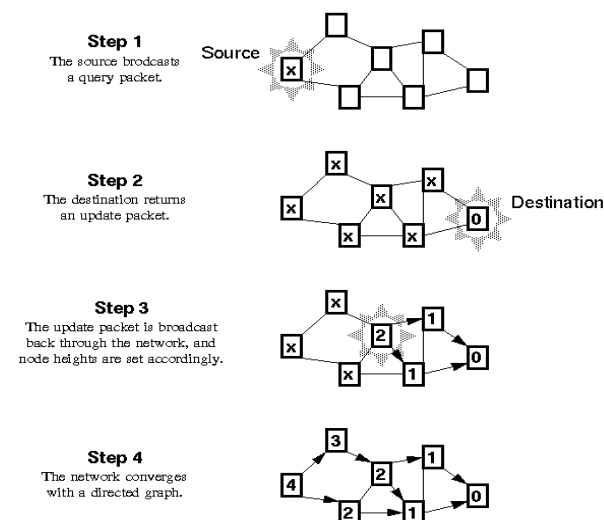


Figure: 2.2.3 Temporally Ordered Routing Algorithm (TORA)

## 2.3 Hybrid Routing

The hybrid routing only consist the Zone Routing Protocol (ZRP).

### 2.3.1 Zone Routing Protocol

This protocol with the combination of on demand and proactive routing protocol. The routing zone is just like clusters and their cluster heads within the specific zone table driven based protocol is used which implies the routes updates which is performed in within the node. If the destination node outside the zone it will be implemented on demand routing based protocols [15].

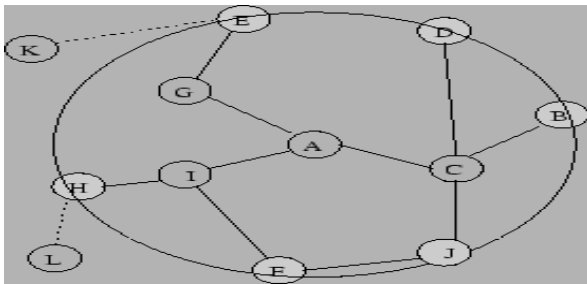


Figure: 2.3.1 Zone Routing Protocol

## 3. MANET CHALLENGES

### A. Unavailability of the Infrastructure

Ad Hoc Network which operates their nodes independently of any type of infrastructure. This will not permanent boundary in the mobile ad hoc network [16].

### B) Lack of Centralized Monitoring Channel

There is lack of centralized monitoring channel which makes the threats of the network. It is hard to handle this large scale ad hoc network. There are common problem in ad hoc network such as transmission failures and packet dropping problem [17].

### C) Reliability and Security

Ad Hoc Network which having problem with the security aspects. It could be either vulnerabilities of wireless connection. At another end reliability problem due to restricted wireless transmission range, data transmission errors.

### D) Less Transmission Quality

The number of less communication is in ad hoc network which can loss high rate data. This could be degradation of the network performance.

### E) Changing the Network Topology

Nodes can freely move in their infrastructure. The network topology can randomly have no restriction to one end to another end node. This could change the topology in unpredictable manner which is degrading the level of communication [18].

### F) Power Consumption

Mobile nodes in the ad hoc network which is depend upon the battery. Device can use only power based source which is maintain the portability of the device. MANET need to optimize this resource which nodes can communicate with large time based communication channel.

### G) TCP Performance

TCP is relies on measuring the RTT and packet loss in the network. TCP is unable to presence of mobility and network congestion. Mobility by nodes connection can result in packet loss which having their long RTT (Round Trip Time) [19].

Table: III MANET Issues

Layering	MANET Issues
Application	Detecting the virus and worms.
Transport	Authentication
Network	Protection
Data Link	MAC Protocol Protection
Physical	Dos Attack

## 4. QOS ROUTING PROTOCOLS METRICS

### 4.1 Bandwidth and Delay

In the Qos Routing metrics which includes bandwidth and delay constrained in the path problems exists in the MANET. In this the packets are trying to deliver the messages successfully but the low bandwidth and delay may loss the packet performance. Every node can perform end to end information [20].

The bandwidth and delay constraints are further implemented in the fuzzy logic which can control the maximum number of path discovery.

By performing the quality of service the nodes packets can be flexible the service requirement. In this various types of modification [21] [22].

### Metrics Table:

Protocol	Qos Metrics
AODV	Delay and Bandwidth
DSR	Delay

Mainly AODV and DSR Protocol which are having the delay and bandwidth quality of service metrics. According to this we may chance of dropping or loss the network packets in MANET [23].

## 5. CONCLUSION

The majority of work in the paper mainly focuses on their proactive and reactive and hybrid protocols. There are various types of protocol which is difficult to choose the routing protocol it may varies into their different salutations. Qos of service use different metrics. There are still lots of MANET challenges exists in present scenarios which need to be rectify it.

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