

# ROUTING PROTOCOLS TERMINOLOGY AND CHALLENGES IN MANETS: A REVIEW

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MANETs (Mobile Ad-hoc Network) is not an unknown working area in recent time frame. It was intended in 70's for aiding military applications but due to working eminence this network fetched high attentions of the diverse field researchers. From its born age huge efforts have published by an assorted research communities over past decades to elaborate the distinct benefits and the challenges of this network. Development and an execution of efficient routing protocol for this network has always raises a challenge in front of this field researchers. This paper discussed the key terminology of routing, handy versions of routing protocols of MANETs and recent hitches of this network.

**Keywords:** MANETs, Static & Dynamic Routing, Routing Procedures, Ad-hoc Network.

## INTRODUCTION

In an arena of 70's, MANETs (Mobile Ad-hoc Network) was originated for military assistance. With the growing progression and the working efficiency of this type of network it has fetched an attention of other fields experts for utilizing the benefits of this network into a diverse working arena. Nowadays, it is most accepted technique within computing industry for set up a larger network, effective classrooms, meetings, casual conferences, urgent situations, danger assistance and automated arena process in hostile environments where construction of infrastructure is problematic or an expensive. Mobile Ad-Hoc Networks (Fig.1) is a self-directed and decentralized wireless system which consists with mobile nodes, host connected and communicating via a wireless link without prerequisite of any central supervision [1].

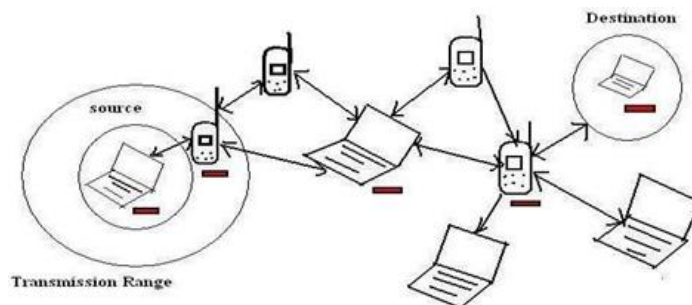


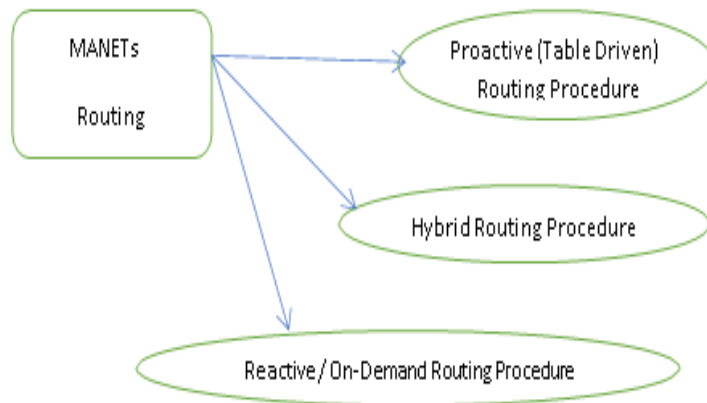
Fig. 1 Mobile Ad-hoc Network

For communication, MANETs do not require supporting infrastructure, network hosts inside a set range of node communication can transfer info packets directly or by using the multi-hop relay, forward data packets via other nodes where destination node is not present in the direct communication range of source nodes [2]. The unique characteristics and exclusive challenges of MANETs makes difficulties in efficient routing and pose challenge to design a new suit of protocols or enhance pre-existing routing sets to perform well in tricky environment of MANETs [3].

## Routing & Routing Protocols Taxonomy in MANETs

Routing is an act of moving info from a message generator to destined host. The Routing conventions of network enable the hosts to elect efficient communication paths among distinct handy option for exchanging info packets. Characteristically the routing practices of MANETs can be characterized under two behaviours, static & dynamic routing protocol [4-6].

The terminology of **static routing** wants manual efforts for router configuration and to preserves the routing info into routing table. Huge published efforts have explained that this practice is not an appropriate routing procedure for the network of manet due to need of administrative effort to uphold essential variations in to routing tables after each moderate occurrence of network take place like join or detaching process of router into the network. The practice **dynamic routing** overcome such shortcoming of static routing procedure by auto restructuring routing table info without the need of manual effort. Under this practice each routing device announce its presence in network within a set time frame by info packets which consumed by other to maintain info of network modernization, adding or detaching a routing device within the network. Since the development phase of MANETs, numerous routing procedures have been proposed by investigators [6,7]. An effort can be broadly categories under three foremost type (Fig. 2).



**Fig. 2** Routing Protocol Classes in Mobile Ad-hoc Network

- **Proactive Technique:** The routing procedure of *proactive technique* also recognized as table driven routing practice, retain info of whole joined hosts of network into a table. Practice also preserves the routes of wholly destinations and with occurrence of any changes the host share modification info to other hosts. To uphold info of truthful route network hosts must periodically direct the control messages. The high consumption of network bandwidth is key hindrance of this practice. DSDV (Destination Sequenced Distance Vector), OLSR (Optimized Link State Routing Protocol), FSR (Fisheye State Routing), STAR (source-tree adaptive routing) & WRP (Wireless Routing Protocol) are some examples of this routing procedure.
- **Reactive Technique:** To defeat an associated problems of proactive procedures alternative routing scheme has recognized with the name *reactive* or can say on-demand routing protocol was invented. This practice set up a link among communicative nodes only when any host of network desire a path to share info. With an implementation of such practice this technique reduces the consumption of network bandwidth which significantly enhance an act of network routing procedure. AODV (AdHoc On Demand Distance Vector Routing), DSR (Dynamic Source Routing) and TORA (Temporally Ordered Routing Algorithm) are some kind of routing procedure that comes underneath of this category of routing protocols.
- **Hybrid Routing Protocol:** As the name of procedure this practice has combined features of above discussed routing procedures, reactive & proactive routing protocols. Typically, this practice was invented for shrinking an amount of network overhead and delays into the procedure of route discovery. Practice divides network host into separate zones that progressively improve a routing act of networks by speedily maintain network reliability. ZRP (Zone Routing Protocol) is one best example of this practice.

Table 1 depicts the comparison among these three types of routing protocols.

**Table 1.** Proactive Vs Reactive Vs Hybrid Routing Protocol [5]

Proactive Protocols	Reactive Protocols	Hybrid Protocols
Table driven Steering structure, Whole host of network keeps number of tables to preserve routing info, thus recognized as table driven scheme.	On-demand routing scheme. This scheme not hold routing info into tables, sending information on demand.	Combine Functionality, Table Driven & on- demand routing scheme.
Minimum Delay	Higher Delay against to proactive steering practices.	Balanced Delay.
No flooding - Due to maintaining up-to-date routing info in table this scheme quickly regulate which host is active in to table.	Perform flooding process during route searching practices.	Since they acquire properties of both therefore this scheme not do the process of flooding.
Prerequisite higher bandwidth.	Prerequisite lower bandwidth.	Prerequisite medium bandwidth.
This scheme consists low latency, take less time span to transfer info from one host to another.	This scheme consists high latency, take high value time span to transfer info from one host to another.	This scheme consists moderate latency, due to contains the feature of both practices.
The amount of routing overhead is high.	The amount of routing overhead is low.	The amount of routing overhead is moderate.

## RELATED EFFORTS

In [7] investigators have analysed an act of traditional routing scheme in an environment of MANETs. According to authors they performed several of simulations with different parameters and mostly analysis the comparative performance of AODV routing

scheme with others on handed algorithms. The simulation results indicate the superiority and most suitability of AODV routing algorithm for MANETs. However, they indicate the advantage of AODV routing scheme over the other accessible approaches but also states some drawbacks of this algorithm such as routing scheme associated with high overheads, tall energy consumption in large network and use flooding process that generate the need of modification [8]. A novel approach QAS-AODV [9], to addresses an issue of energy consumption. For improving an efficacy of routing, the offered method rapidly selects an alternate node and ensures the connection of neighbour with higher energy level node, exploit that node for packet forwarding process. It also takes care of network connectivity and maintains node energy up to the threshold levels to diminish packet loss ratio. An assessment fallout has shown the success of offered procedure. In [10] to achieve more efficiency a firm version of AODV routing protocol has proposed. The approach was based on hop AODV, node mobility speed and communication state. The approach modifies the route discovery and selection process of AODV protocol based on the number of hops and use low-speed node to forwards the RREQ package in network. The approach calculates attain data packets of transitional neighbouring nodes to monitor, control and to maintain link quality. The experimental results of the approach designate its gains over traditional AODV routing algorithm in terms of improved packet transmission rate control overhead and end to end delay.

Numerous other algorithms have offered by a vast number of researchers for improving an efficacy of routing protocol [11-18]. However, the projected resolutions augment routing recital with dissimilar constraints but most of the preceding efforts deals with the discovery and upholding the correct routes info. Furthermore, foremost offered practices has supportive routing footpath that rises an amount of overheads and takes high range of bandwidths and power during the procedure of communication, dissimilar terrains presents separate challenges to route packets into highly dynamic situation of MANETs.

### **Unified Problems with Attainable Routing Protocols of MANETs**

Due to high dynamic nature of MANETs networks the network topology has frequently take a new shape that arise naïve challenges to related field investigators to implement an efficient routing algorithm for this network. Some of the prominent issues of MANETs routing protocol are

- Most of available steering procedures are effective only when network consist with the low amount of host.
- Huge offered practices utilize flooding process for implementing a path among communicative nodes thus consumes high bandwidth of network and produces high end-to-end delays.
- Proactive schemes overwhelmed with the moderate ratio of routing information.
- Technique falls under reactive routing practice often fail to determine a comprehensive track among communicative hosts due to occurrence of frequent network partition ratio.
- Most of standing techniques use flooding course to manage a link among the pair of network hosts therefore offered practices consumes high bandwidth and produces tall number of delays.
- Low scalability, where network can go from scarce to dense in a very short time.

### **CONCLUSION**

This paper swotted the features and difficulties of routing algorithms related to MANETs (Mobile Ad-hoc Network). Typically, mobile ad-hoc network (MANETs) is a stimulating form of wireless communication networks in which network topology rapidly reformed. Furthermore, consistency of mobile host based on battery power and high mobility of network host arise naïve challenges to maintain link stability and routing efficiency in such network. However, numerous routing approaches has proposed since the age of this network and continuously investigators have presents new algorithm to pick-up issues of routing in this highly dynamic and challenging environment of wireless communication but due to unique limitation of each algorithm this field is still open with high research challenges.

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