

# Routing in Mobile Ad-Hoc Network

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**Abstract:** New age mobile Ad-Hoc network is independent system that communicate with in the system freely and randomly in self-organize manner into a temporary network that change randomly without using any fixed network infrastructure with centralized control. Most important issue for any network with dynamic topology is routing protocol design that is a major technical issue because of valuable resources that mobile device have such as limited battery power, memory, computing power, limited bandwidth. Objective behind every routing protocol is to generate stability in the dynamic network topology. In this articles a comparative study among proactive, reactive and hybrid routing protocol is conducted based on mobile Ad-Hoc network.

**Keywords:** Proactive, Reactive, Hybrid Protocols, MANET

## I INTRODUCTION

The primary goal is to setup communication between hundreds of mobile host in dynamic topology network. In simply words a mobile Ad-Hoc network is self-configuring without infrastructure network connected in wireless environment. Every node in Ad-Hoc network is free to move randomly in any manner in and out of the network thus making the network topology highly random in nature. Every node in the network take part in every communication that is take place in the network irrespective of the type of communication. Thus nodes in network will take part in packet forwarding to next node in the network irrespective of the owner of the packet. Wireless communication in networks is broadly classified in three types; Reactive, Proactive & Hybrid protocol. General representation of Ad-Hoc network is represented in figure 1 below. [1][2]

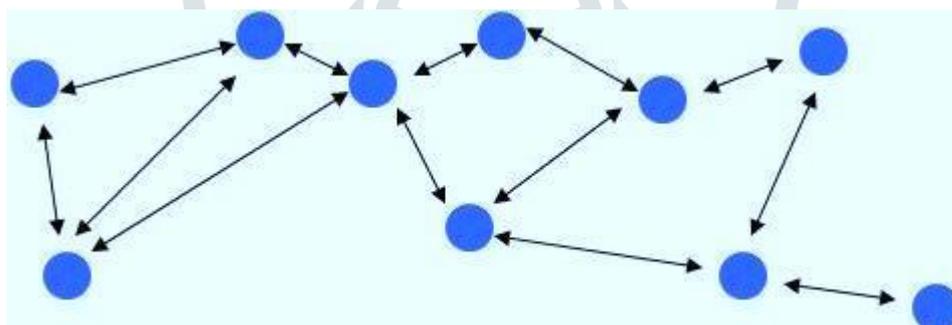


Fig 1: Ad-Hoc Network

## II LITERATURE REVIEW

In 2009, Mohammad A. Mikki, “Energy Efficient Location Aided Routing Protocol for Wireless MANETs” in this author introduce an Energy Efficient Location Aided Routing Protocol for MANETs that is based on the Location Aided Routing. [3]

In 2012, K. Ramesh Reddy, S.Venkata Raju, N.Venkatadri, “Reactive, Proactive MANET Routing Protocol Comparison” in this author compare different routing protocol. [4]

In 2012, Suresh Kumar<sup>1</sup> And Jogendra Kumar, “Comparative Analysis Of Proactive And Reactive Routing Protocols In Mobile Ad-Hoc Networks” in this author discuss proactive and reactive routing protocol for mobile Ad-Hoc network with comparison among two. [5]

In 2012, Stephen Dabideen • J. J. Garcia-Luna-Aceves, “Secure routing in MANETs using local times” in this author present a way to enhance security in routing protocols based on the relative transmission times of overhead packets. [6]

In 2014, Hadi Noureddine, Qiang Ni, Geyong Min, Hamed Al-Raweshidy, “A new link lifetime estimation method for greedy and contention-based routing in mobile ad hoc networks” in this author propose a new link lifetime prediction method for greedy and contention-based routing. [7]

## III DESIGN GOALS FOR ROUTING PROTOCOL

Routing protocol in wireless network must contain no. of characteristics. [8][9] Thus the mandatory characteristics will become the design goals in any routing protocol. Few of them are listed below:

1. Scalable to support larger network topology.
2. Distributed, no central architecture will be present.
3. Adaptive to change rapidly with movement of mobile nodes.
4. Route discovery must invoke min no. of mobile nodes.
5. Route Maintenance must ensure loop free network & optimal routes must be discovery in effective manner.

6. Routing protocol must use resources available to mobile node effectively as the resource as very valuable in nature & must not be exhausts in overhead activities.

#### IV CHALLENGES IN ROUTING PROTOCOL

With mandatory goals that must be accomplished in design of routing protocol challenges will become the integral part in design of protocol. [10][11] To fulfill the goals no. of challenges that we have to face are listed below:

1. Nature of network nodes is mobile as we are talking about protocol to work with wireless network scenario. For this nature we have to take care of the following:
  - a. Link Break Up
  - b. Network Split;
  - c. Fixed network protocol does not work.
2. Every mobile node in network contains valuable resource such as Battery, Memory, Bandwidth & Computing with this following points must be considered:
  - a. No information regarding network topology;
  - b. Node overhead must be reduced.
3. For communication purposes radio waves are used which are common for all nodes in the network communication thus following points must be kept in mind:
  - a. Collisions between data packets.

#### V ROUTING INFORMATION BASED CLASSIFICATION

Mobile Ad-Hoc Network is broadly classified into three categories based on routing information. [12] Complete classification is represented in the figure 2 below:

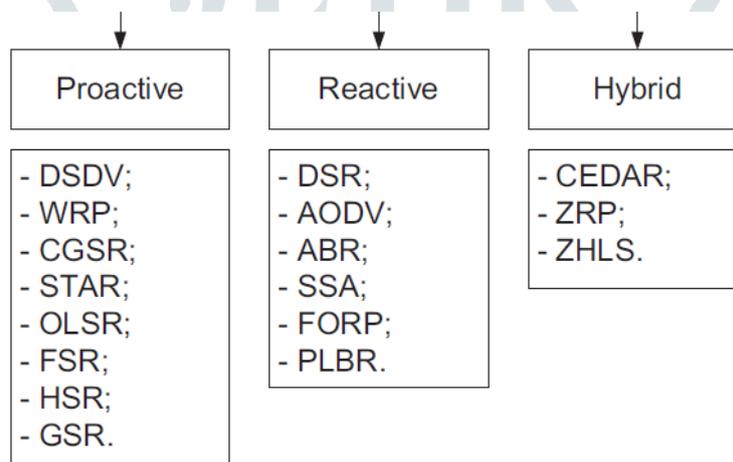


Fig 2: Routing Information Based Classification

#### VI COMPARISON BETWEEN DIFFERENT TYPES OF PROTOCOLS

Table 1 contains brief comparison between reactive, proactive and Hybrid routing protocols. [13][14]

##### Proactive routing Protocol

Advantages

1. Zero wait for routing process as all possible link routes are available

Disadvantages

1. Much high bandwidth is required.
2. Scalability is limited.
3. High storage memory consumption.

##### Reactive routing protocols

Advantages

1. Overhead is less
2. No memory needed.

Disadvantages

1. Link routes are established only on demand, no prior info available;
2. Scalability is low

##### Hybrid routing protocols

Advantages

1. Link route establishment is fast.
2. Overhead is less as compared with others protocols.

Disadvantages

1. High storage needed
2. More computation power needed.

Table 1: Comparison between Proactive, Reactive &amp; Hybrid Protocol.

	<b>Proactive</b>	<b>Hybrid</b>	<b>Reactive</b>
<b>Type</b>	Link State	Link Reversal	Distance Vector
<b>Multitasking</b>	Yes	NO	Yes
<b>Route Updating</b>	As Needed, Periodic	As Needed, Periodic	Periodic
<b>Over Head</b>	Less	Average	Average
<b>Delay</b>	Low	High	Average
<b>Path Optimality</b>	High	Low	Average

## VII CONCLUSION

With this paper performance & comparative study of reactive, proactive and hybrid protocols are conducted for mobile Ad-Hoc network broadly based on metrics such as packet delivery, path optimization, routing overhead, battery power consumption, mobility, memory available and many more. Almost all protocols performs stable with medium network traffic. Hybrid protocol performs much better in packet delivery. It is found that performance of hybrid protocol is better for dense networks.

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