

CLASSIFICATION OF ROUTING PROTOCOLS IN MANET & THEIR PROS & CONS: A REVIEW

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ABSTRACT

Mobile ad-hoc networks (MANET) are temporary networks without any infrastructure support. In this nodes move arbitrarily and network may experience dynamic topology. There are different research aspects for MANET like routing, bandwidth consideration, power consumption, synchronization, security etc. due to the dynamic topology of ad-hoc networks routing is the most challenging issue in MANET. There are different routing protocols for different network conditions for MANET. This paper provides classification of different routing protocols and also their pros and cons.

Keywords: MANET; Routing Protocols.

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I. INTRODUCTION

MANET has gained popularity due to its certain characteristics like infrastructure less networks leads to low cost, low power consumption, and low bandwidth. MANET has dynamic topology as the nodes in the network are moving and every node in the network act both as host as well as router. These networks are also called multi-hop networks because the nodes which can not communicate directly with each other, can communicate through intermediate nodes. This type of networks is very useful at the time of natural disaster like earthquake as compared to wired networks.

II. ROUTING PROTOCOLS

A. When talking about the routing protocols for MANET, routing protocols are expected to serve the following properties [2]

- Distributed routing protocol increase reliability for MANET.
- While designing a routing protocol, unidirectional links must be considered.
- The routing protocol should be highly secure.
- The routing protocol should be energy efficient.
- A routing protocol should satisfy quality of service parameter.

Classification of routing Protocols for MANET-we can classify routing protocols in two categories: *Proactive & Reactive*.

B. Proactive routing protocol- the other name of proactive routing protocols is table driven routing protocols. In this each node in the network maintain its routing table which stores the information about network topology, whenever there is change in the network topology of the network, each node update its routing table. The examples of various proactive routing protocols are DSDV, WRP, OLSR etc. DSDV (destination sequenced distance vector) is table driven routing protocol. It is based on Distributed Bellman Ford algorithm. In this routing table of each node contains the information about the number of hopes to reach the destination. WRP (Wireless routing protocol) is the advanced version of DSDV. It maintains four types of tables:- distance table, link cost table, routing table, message retransmission table [1].OLSR(optimized link state routing) is based on link state algorithm. It performs hop by hop routing i.e. each node uses its most recent information to route a packet.

Advantages

*Routing information already present, reduce latency in the network.

*High storage capacity due to the routing tables.

Disadvantages

- *They are not suitable for large networks
- *Overhead is high
- *Cost of maintaining the network is high, if network topology changes frequently.

C. Reactive routing protocol [1] is also called on demand routing protocol. In this route is discovered when it is needed. The reactive routing protocol has two major components: *route discovery*- In this source node discover the route when it is needed. The source node contains the destination address of node and address of intermediate nodes between source and destination node. *Route maintenance*-it is done in case of route failures due to the dynamic topology of the network. The examples of reactive routing protocols are DSR, AODV, TORA etc. DSR(dynamic source routing) is based on link state algorithm. In this route is discovered when it is needed, the packet contains the information about the intermediate nodes to the destination. AODV (ad-hoc on demand distance vector) in this the packet contains the address of its neighbor rather than the complete network topology. Due to this overhead is reduced in this protocol as compared to DSR. TORA (temporally ordered routing algorithm) it is based on link reversal algorithm. It also contains two phases i.e. route establishment & route maintenance.

Advantages

- *Low routing overhead
- *Periodic updates not required

Disadvantages

- *Latency is high in the network
- *Not suitable for large networks
- *Low storage capacity

D. Hybrid routing protocol-it is a mixture of both proactive and reactive protocols. This protocol overcomes the limitations of proactive and reactive protocols like large overhead and latency. In this number of nodes in the network is divided into zones. A proactive approach is used inside the routing zone and reactive approach between routing zones. The examples of hybrid routing protocols are ZRP, SHRP etc.

Advantages

- *Suitable for large networks
- *Requires less overhead as compare to proactive routing protocols
- *Latency is low as compare to reactive routing protocol.

Disadvantages

*Increases complexity in the network.

III. CONCLUSION

This paper provides MANET routing protocols, their broad classification as proactive and reactive routing protocols and their advantages and disadvantages. The shortcomings of proactive and reactive routing protocols are overcome in hybrid routing protocols. Although there are some limitations in hybrid routing protocols. So it is difficult to choose routing protocol for MANET due to its dynamic topology. In MANET there are various aspects that need to be met like routing protocols, bandwidth consideration, power consumption, security etc.

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