

Comparison of MANET Routing Protocol-A Review

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Abstract: Mobile adhoc network is a collection of wireless mobile hosts forming a temporary network without the aid of any standalone infrastructure or centralized administration. MANET routing algorithm is necessary to find specific routes between source and destination. The primary goal of any adhoc network routing protocol is to meet the challenges of the dynamically changing topology and establish an efficient route between any two nodes with minimum delay and routing overheads. Therefore, it is difficult to determine which protocol performs best under a number of different scenarios. The aim of this paper is to compare various routing protocols qualitatively.

Keywords: AODV, DSR, DSDV, CGSR, WRP, MANET.

I. Introduction:

Adhoc wireless network is a collection of two or more devices with wireless communication and networking capability. A wireless device can be different forms (for example: palmtop, laptop, internet mobile phone etc). The MANETs are autonomously self organized and self configuring networks without infrastructure support. In such networks since node mobility is very high the network may experience frequent topology changes, making routing a challenging task in mobile Adhoc networks. Mobility and absence of any fixed infrastructure make MANETs very attractive for various applications like students using laptop to participate in an interactive lecture, business associates sharing information during a conference, search and rescue operation, emergency services, entertainment, sensor networks and commercial environments.

MANETs can be developed quickly at a very low cost and can be easily managed. In the future there is no doubt that we will have more and more adhoc networks in which routing is one of the critical issues. Need of routing algorithm arises whenever a packet needs to be transmitted to a node via a number of different nodes. Section 2 describes the classification of MANET protocols, section 3 compares the various protocols qualitatively and section 4 gives the conclusion and future scope. [1, 2]

II. Classification Of Routing Protocol:

2.1 Table driven routing protocol: It is also known as proactive routing protocol. In this protocol each and every node maintains complete information about network topology by continuously evaluating routes to all the nodes and these table driven routing protocols attempt to maintain consistent, up-to-date routing information from each node to every node in the network.

2.2 On-demand routing protocol: It is also known as source initiated and reactive routing protocol. This type of routing creates routes only when desired by the source node. When a node requires a route to a destination, it initiates a route discovery process within the network. This process is completed once a route is found or all possible route permutations have been examined. Once a route has been discovered and established, it is maintained by some form of route maintenance procedure until either the destination becomes inaccessible along every path from the source or the route is no longer desired.

2.3 Hybrid routing protocol: Hybrid routing protocols use both methods of proactive and reactive protocols. In these protocols proactive operations are restricted to small domains whereas reactive protocols are used for locating nodes outside those domains. [1, 2, 7] Comparison of these is given in table 1

TABLE 1: Comparison of Table driven, On demand and Hybrid Protocols [3, 4, 9]

S.no	Parameters	Table driven (Proactive) routing protocol	On-demand (Reactive) routing protocol	Hybrid routing protocol
1	Network structure	Flat and hierarchical	Flat	Flat and hierarchical
2	Topology dissemination	Periodical	On-demand	Both
3	Storage requirements	High	Usually lower than proactive	Medium
4	Route formation delay	Minimum	Maximum	Medium
5	Route availability	Always available	Available when needed	Routes are available in intra zone
6	Communication overhead	High	Low	Medium
7	Types of protocols	DSDV, CGSR, WRP, GRP, GSR etc.	AODV, DSR, TORA, ABR, SSR etc.	ZRP, WARP

III. Comparison of various protocols:

Comparison of various protocols such as DSDV, CSGR, WRP, AODV and DSR is given in table 2:[1,2,4,5,6,7,8,9]

TABLE 2: Comparison of DSDV, CSGR, WRP, AODV and DSR Protocols

S.No	Parameters	DSDV	CSGR	WRP	AODV	DSR
1	Protocol type	Destination sequence distance vector	Cluster switch gateway routing	Wireless routing protocol	Adhoc on demand distance vector routing	Dynamic source routing
2	Routing approaches	Proactive	Proactive	Proactive	Reactive	Reactive
3	Routing structure	Flat structure	Hierarchical Structure	Flat structure	Flat structure	Flat structure
4	Route selection	Link state	Shortest path	Shortest path	Shortest and updated path	Shortest and updated path
5	Route	Single route	Single and multiple route	Single route	Multiple route	Multiple route
6	Routing table	Each node maintain a complete address to each destination	Two table 1.Routing table 2.Cluster member table	Four tables 1.Distance table 2.Routing table 3.Link cost table 4.message retransmission list	Each node maintain a route table in which next hop routing information for destination node is stored	Route cache Full route to destination
7	Route maintenance	Each node in the mobile network maintains a routing table in which all the routes to possible destination with non-partitioned network and number of hops to each destination are recorded	Each node maintains a routing table which is used to determine the next hop to reach the destination.	Routing node maintains the distance and second to last hop information for each destination in the wireless network.	Every node maintains two counters Sequence no and broadcast ID.	Two different processes: 1.Hop by hop acknowledgement at the data link layer 2.End to end acknowledgement
8	Source routing	It has no source routing .	No may be possible.	It has no source routing.	It has no source routing.	It has possible source routing.
9	Hello message required	Yes	Yes	Yes	Yes	No
10	Operation of protocols	Routing information is always available, whether the source node require a route or not because each node in the mobile network maintains a routing table.	Mobile nodes are grouped into cluster and each cluster has cluster head and cluster head to gateway routing approach to move traffic from source to destination. Gateway nodes are communication range of two or more cluster head.	In WRP, routing nodes communicate the distance and second to last hop information for each destination in wireless network and it belong to path finding algorithm.	1.RREQ broadcast 2.RREP Propagation 3.RERR message	1.RREQ broadcast 2.RREP Propagation 3.RERR message
11	Advantages	1.Loop free 2. Shortest path to every destination is chosen.	1.Cluster head can control a group of adhoc hosts. 2. Cluster provide a framework for code separations, channel access, routing, bandwidth allocation.	1. Avoid the count to infinity problems by forcing each node to perform consistency checks. 2. Routing information is accurate, mobile send updates messages periodically to their neighbors.	1.Adaptable to high dynamic topology. 2. loop free 3 AODV has higher bandwidth efficiency because of lesser overheads	1.Support Multipath routing
12	Limitation	1.High overhead 2.It doesn't support multipath routing	1. If a cluster head is changing frequently and nodes will be spending a lot of time converging to a cluster head.	1. More overheads are required due to 'hello' messages.	1.Scalability problems due to large delay 2.AODV takes more time to build the routing table.	1 Scalability problems due to source routing and flooding. 2. Being a reactive protocol DSR suffers from high route discovery latency.

IV. Conclusion and Future Scope:

Mobile adhoc network is decentralized, selforganized, anytime, anywhere networks and provide cheap communication. In this paper classification of routing protocols on the basis of routing information updates mechanism, is discussed and comparative analysis of mobile Adhoc networks routing protocol like: DSDV, CGSR, WRP, AODV and DSR is done. Each protocol has its own advantages and disadvantages and it's well suited for particular situations. However because of their advantages, wireless Adhoc networks are becoming more and more prevalent in the world. So lot of research can be done in routing protocols of MANET.

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