Multicasting Routing Protocol in MANET: A Survey

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Abstract- A mobile ad hoc network (MANET) is an eternally self-designing, infrastructure-less network of mobile devices connected wirelessly. Due to dynamic nature of the network, routing is the major challenge of Mobile ad hoc network. Multicasting can efficiently support data transmissions and it is suitable for MANET. Multicasting routing protocol leads to improve the consumption of bandwidth and improving the efficiency. This paper explains the optimized routing protocols with multicasting. It deals with deployment considerations and routing mechanisms.

I. INTRODUCTION

A mobile ad hoc network (MANET) is a collection of mobile nodes which establish a network spontaneously and communicate over a shared wireless channel without any infrastructure. In MANET [1], collection of mobile nodes may dynamically vary the topological structure. The nodes are inconstantly connected with each other and formed an arbitrary topology. It is said to be infrastructure less as it does not have any central node, wires or fixed base stations. A MANET is also referred as multi-hop connection.

Fig.1: Mobile ad hoc network

- The mobile nodes are free to turn casually.
- Each node can act as both router and host.
- There is no existence of fixed infrastructure.
- Quickly installation with least possible user intervention.

II. MANET CHALLENGES

Mobile nodes have the ability to senses, compute and communicate like static nodes. The dynamic nature of MANET leads to their benefits, but also creates technical challenges due to some factors as given:

- Potentially frequent network partitions.
- Security mechanisms.
- Routing.
- Restricted wireless transmission range.
- Resource availability.
- Mobility-induced route changes.
- Internet access mechanisms.
- Self-configuring networks requires an address allocation mechanism.
- Resource availability.
- No predefined boundary.

III. MULTICASTING ROUTING PROTOCOL

Sends a message for such a huge group is known as multicasting and its routing algorithm is said to be a multicast routing [2]. Multicasting needs a group management.

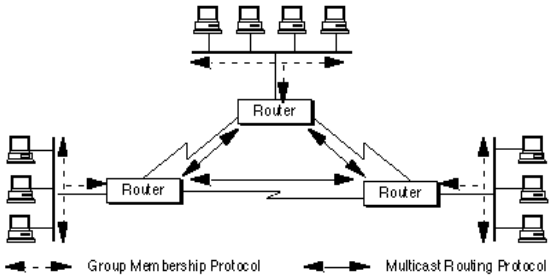

Fig.2: Multicasting routing protocol

We have some ways which we needed to create and destroy groups, and processes are allowed to join and leave groups. Routing protocol specifies how to communicate with the help of routers. It shares information among intermediate nodes then with the whole network. It helps to search shortest route from source to destination. Multicasting routing is the process in which determined the distributions.

IV. MANET ROUTING PROTOCOLS

MANET routing protocol are basically, categorized into three main parts. Proactive (Table driven), Reactive (On demand) and Hybrid routing protocol.

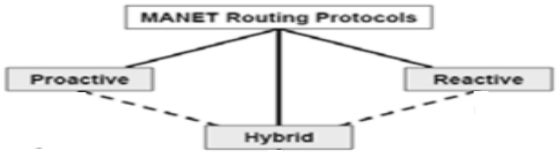

Fig.3: MANET Routing Protocol

A. PROACTIVE ROUTING PROTOCOL

Proactive routing protocols [3] are also known as table driven routing protocols. The routes are updated without a break and when a node wants to route packets to another node, it uses an previously available route. These protocols maintain routes to all the possible destinations even a few of the routes may not be required. All the nodes in the network maintain tables of routes.

- Traditional distributed the shortest-path protocols.
- Maintain routes between every host pair at all the times.
- Based on a periodic updates; and the high routing overhead.

B. REACTIVE ROUTING PROTOCOL

It is also said to be On Demand routing protocol [4]. Without communication it does not maintain the routing information or routing activity at the network nodes. It means that creates the routes only when desired by the source node. A node hopes for send a packet from the another node and then the protocol finds for the route and an on-demand manner and it established the connection in order to convey and accepts from the packet. In this, the source node admits the route discovery phase. This protocol is also called as source routing protocols.

- Determine the routes if and only when required.
- Source begins the route discovery.

C. HYBRID ROUTING PROTOCOL.

This type of protocols combines the advantages of reactive and proactive routing. Hybrid routing protocol [5] is also called balanced hybrid routing protocol. HRP features are as follows:

- Requires less memory and processing power than LSRP.
- Integrates reactive and proactive routing advantages.
- Serves activated nodes via reactive flooding.

V. AODV

AODV stands for Ad hoc on-demand distance vector. It is designed for the wireless and mobile ad hoc networks. AODV [6] is a very easy, well organized and systematic effective routing protocol for Mobile Ad-hoc Networks which do not have fixed topology. This protocol is like any other on-demand routing protocol which facilitates a smooth adaptation that are changes in the link conditions. In case when a link fails, messages are sent only to the affected nodes. With this information, it enables the affected nodes invalidate all the routes through the failed link. AODV has low memory overhead.

- AODV is a packet routing protocol designed for use in MANET.
- Intended for networks that may contain thousands of nodes.
- The one of the class is demand-driven protocol.
- UDP is the transport layer protocol.

All node maintains a routing table that contains information about reaching destination node.

a. RREQ in AODV

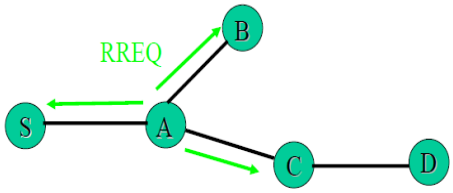

Fig.4: RREQ in AODV

1. Node S needs s route to D.
2. Creates a Route Request (RREQ).
3. Node S broadcasts RREQ [7] to neighbors.
4. Node A receives RREQ.
   - It has no routes to D.
5. Node C receives RREQ.
   - Makes a reverse route entry for S.
   - It has a route to D.

b. RREP in AODV

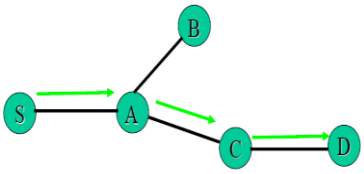

Fig.5: RREP in AODV

1. Node C creates route reply (RREP).
2. Node A receives RREP [8].
   - Make a forward route entry to D.
3. Node S receives RREP.
4. Sends data packet on route to Destination.

VI. LITERATURE SURVEY

Neelam Sharma et.al (2016) have proposed that Designing of Reliable and Optimized Multicast Routing Protocols in MANETS. The authors [9] favorably have been able to address the several issues that are related to MANET, especially Multicasting routing protocol. In this paper, authors propose optimized routing protocols with multicasting. It deals with receiver behavior, deployment considerations and Routing mechanisms.

LI Xut et.al (2014) introduced that Mobile Ad hoc Networks play an important role in emergency communications where

network needs to be constructed temporarily and quickly. [10]Since the nodes move undirected, routing protocols must be highly responsible and capable to the guarantee successful packet delivery. Based on the data delivery structure, most of the existing multicast routing protocols can be classified into two folders: tree-based and mesh-based.

Harpreet Kaur et.al (2014), "To propose a novel technique to reduce link failure problem in MANET",[11] In this paper they proposed an enhanced AODV protocol is used. The techniques will follow only the path which has the highest signal strength. The header part is added in RREQ message which helps to find out the destination from source which is needed. Destination nodes check the vicinity of the adjacent nodes and those nodes further checks the vicinity of their adjacent nodes. After that source find out the average of the path. The path which has the maximum average value is selected as the final path. This work will help to reduce the problem of link failure and packet lost problem.

Lei Chen and Wendi B. Heinzelman (2007) explained QOS-Based Multicast Routing Protocols: Most of conventional multicast[12] routing protocols are designed for minimizing data traffic or minimizing the average hops number for delivery a packet in the network. When QOS is considered, some protocols may be unsatisfactory or impractical due to the lack of resource, the excessive computation overhead, the lack of knowledge about the global network state or the excessive message processing overhead.

Shiman Mohseni et.al (2010) have proposed "Study of reactive and proactive routing protocols in MANET", [13]In this paper there described several routing schemes for MANET. These schemes is provided according to routing strategy proactive reactive (i.e., Table-driven and on-demand). Finally, possible challenges facing mobile wireless networks are identified. The routing schemes have reduced the routing overhead by localizing update message propagation.

Tomar et.al (2009) have proposed an algorithm for selective flooding in place of broadcasting based on AODV algorithm. The proposed [14] algorithm reduces the routing packet overhead. In the second phase, an improving on AODV that was presented and applied. This correction solves the low bandwidth problem in ad hoc networks through with an increase and delay. The overall performance of the network is improved in terms of throughput and delivery rate, which was the objective of the proposed modification.

VII. PROPOSED WORK

1. Implement multicasting approach for path establishment in mobile ad hoc networks.
2. To Implement proposed approaches for reactive and proactive routing protocols and compare with existing approach in terms of various parameters.

VIII. CONCLUSION

This paper covers the concept of multicasting, multicasting routing protocols in MANET. It also covers the design of reliable and optimized multicast routing protocols .Analysis of reliable and optimized multicast routing protocols is based on the parameters like packet delivery ratio, latency control overhead. Implementation of optimized multicasting routing protocols in a simulated environment is the future scope.

IX. REFERENCES

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