International Journal of Advance Research in Science and Engineering
Volume No.07, Special Issue No.08, March 2018
www.ijarse.com
IJARSE
ISSN: 2319-8354

FLAT ROUTING PROTOCOL TECHNIQUES FOR MANET

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ABSTRACT

In the technological era computing network is changing its path from wired to wireless technology and the Mobile Ad-hoc Network (MANET) technology is a great part of it. From last four decades since the wireless technology invented, it has been a major immerging technology in mobile computing. With remarkable qualities of dynamic network topology, it also shows moving nodes. Mobile Ad-hoc Network (MANET) is collection of multi-bounce wireless portable nodes. It works with each other without incorporated control or set up framework. Routing in MANET is a basic task because of dynamic environment. The wireless connection in MANET is very sensitive because of moving element nature. Due to wireless technology, Mobile Ad-hoc Network (MANET) is used in Military operations, Sensor Networks, Rescue operations. To manage the moveable network nodes, there is a need of set of protocols. Flat Routing Protocol is one the most used protocol in MANET.

***Keywords*: DSDV, FSR, Flat Routing, OLSR, Proactive Protocols, Reactive Protocols.**

I INTRODUCTION

There are two type of network technology available in computing world, one is wired and second is wireless. In wired network technology each device connected physically with the help of switches, hubs etc. But in wireless network technology it is different method to connect one to another. In wireless technology data transmits with the help of radio frequency. It has no physical connection so it is highly sensitive and go down sometimes. But it is very effective for moving nodes. Mobile Ad-hoc Network (MANET) is a wireless ad-hoc network technology which can change configuration itself, it is modern wireless technologies which is used in mobile network and connect to various networks. It can be in the form of Wi-Fi, Bluetooth, cellular or satellite transmission. In Mobile Ad-hoc Network (MANET) no need for fixed infrastructure for transmits information or communication [1]. There is the nodes itself act like router and transmit data to another device. Ad-hoc Networks used in various application given below:

- Military Arena
- Sensor networks
- Rescue Operations
- Disaster Relief
- Security Operations

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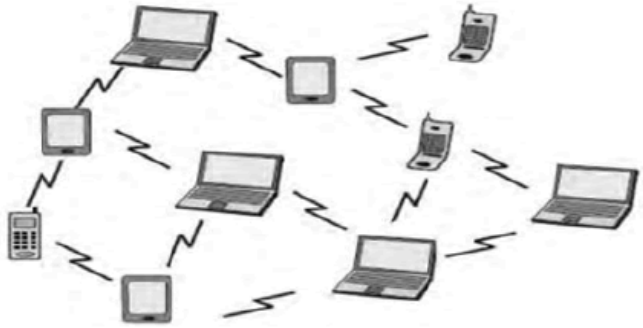

Figure 1: Mobile Ad-hoc Network (MANET)

I ROUTING PROTOCOLS IN MANET

Any type of network has some specific rules for transmit data from source to destination node. The set of rules which helps to choose the best path to transfer data one to another node easily. Mobile Ad-hoc Network (MANET) has its own routing protocols which are control the traveling data in the network and responsible to achieve the destination. Choosing routing protocols are based on the communication strategy in network used for transmitting packets from sender to receiver i.e. broadcast, unicast or multicast routing. These are classified as flat routing, hierarchical or hybrid routing and geographic position assisted routing.

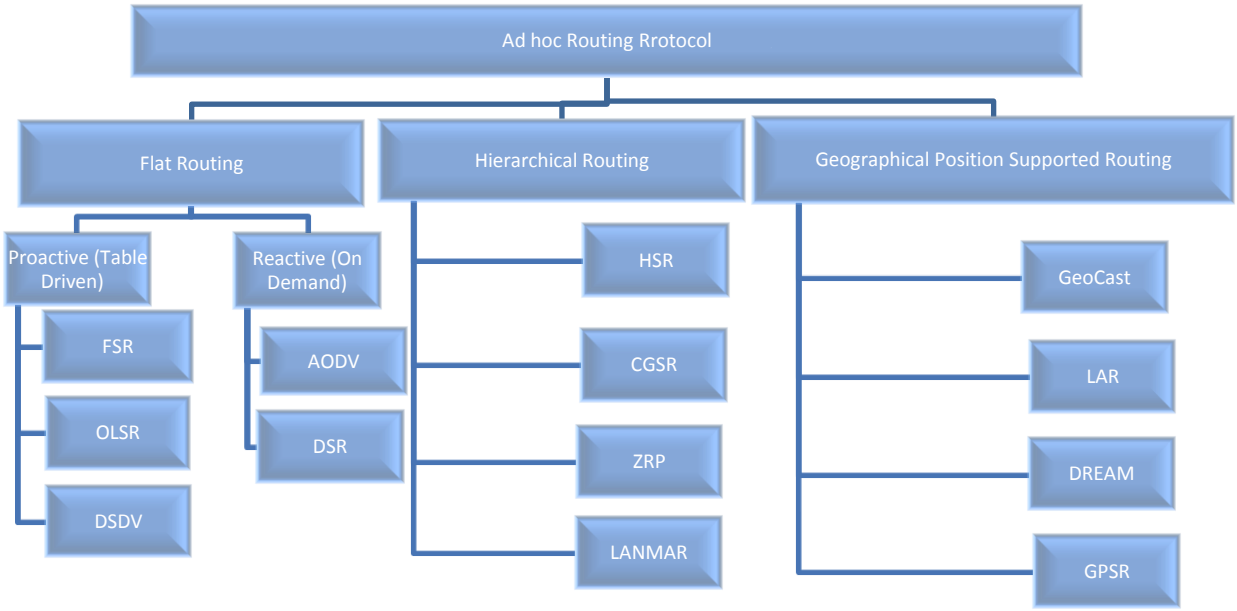

Figure 2: Ad-hoc Routing Protocol

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II FLAT ROUTING

The routing table of MANET represents flat routing has individual Identity of each network. It has no network structure or subnet for sending or receiving data packets. Flat routing search the best rout hop by hop to the destination by any path without any effort to manage the network or its traffic. All the router settings in flat routing protocol on a flat geometric plane. Routing Information routing (RIP) is a good example of flat routing protocol. The routing protocols divided in FSR, FSLR, OLSR, DSDV, AODV and DSR. Flat routing protocols are two types based on demand routing.

- Proactive Routing (Table Driven) Protocol.
- Reactive Routing (On Demand) Protocol.

a) Proactive Routing (Table Driven) Protocol

In proactive routing protocol each node regularly updates routing information and maintains one or more routing tables in network. Because of this it called Table Driven routing protocol. Routes information is kept in the routing tables and is time to time updated as the network topology change [2]. If there is any change in the network topology, each node sends broadcast massage to the network. It maintaining update information of network and tolerate additional overhead cost. FSR , OLSR and DSDV are some Proactive Routing Protocols.

i. FSR (Fisheye State Routing)

FSR (Fisheye State Routing) is a proactive routing protocol. It provides an implicit hierarchical routing structure. FSR organize well to large network size and keeps overhead low without compromising route computation accuracy when the destination node is near. The accuracy of routing in FSR is similar with an ideal Link State scheme.

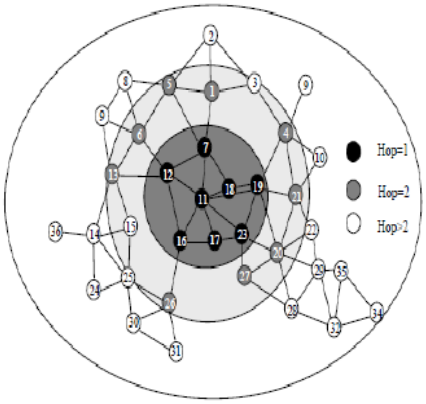
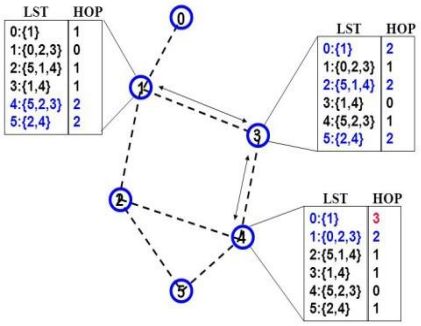


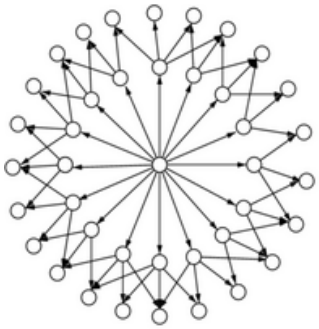
Figure 3: FSR (Fisheye State Routing)

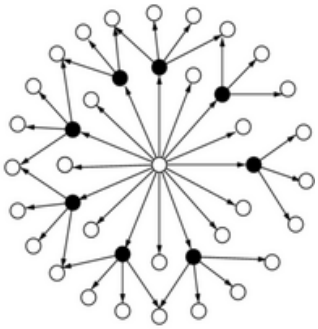


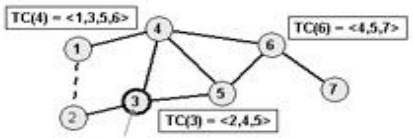
Message Reduction in FSR

ii. OLSR (Optimized Link State Routing)

OLSR operate as proactive routing protocol and an optimization of classical link state protocol. The OLSR protocol at each node discovers 2-hop neighbor information using Hello massage. In link state routing the massage transmit by each node, so the massage received by nodes more than one time. This stage is responsible for data flooding. To improve the link state protocol and optimizes it with the help of multipoint relays (MPR). In OLSR that nodes which is selected as MPR, are responsible for control flooded traffic into the entire network. These have responsibility to transmit data to 2-hop neighbor when declaring link state information in the network. MRP reduce the number of transmission and set short path for broadcast packets.







Dest	Next	Hops
1	4	2
2	2	1
4	4	1
5	5	1
6	4 (5)	2
7	4 (5)	3

Figure 4: LSR Normal Flooding OSLR MPR Flooding OLSR Routing Table

iii. DSDV(Destination-Sequenced Distance Vector)

DSDV (Destination-Sequenced Distance Vector) is upgrade version of Bellman-Ford routing algorithm. It is based on Routing Information Protocol (RIP) which engages the hop count as a routing metric. DSDV protocol adds a new attribute and sequence number to each route table entry of the conventional RIP. Entry of new sequence node network choose different path that prevent node from routing loop. It addresses the long-lived loops and counting to infinity problems of the traditional distance-vector routing protocols.

Destination	Next Hope	Metric	Sequence No.
1	1	1	123
2	0	0	518
3	3	1	312
4	4	1	188
5	4	2	212

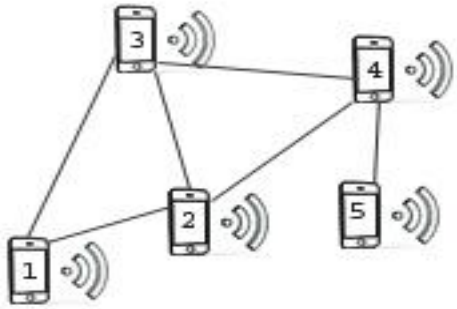


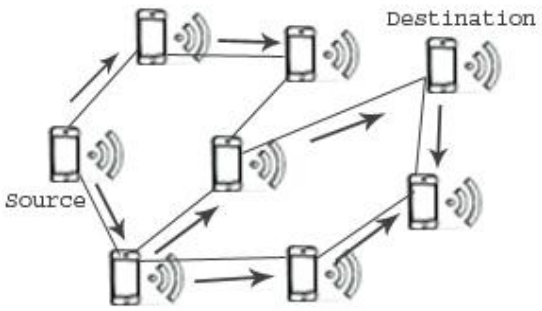
Figure 5: DSDV Routing Table Node 2

b) Reactive Routing (On Demand) Protocol.

Reactive routing is known as on demand routing protocol in mobile ad-hoc routing protocol. It is bandwidth efficient routing protocol for MANET. It has two main function of routing, first is Route Discovery which is responsible for discover new route when needed. The second is Route Maintenance. The main function of Route Maintenance is detection of link break and repair of existing route. With the help of Route Discovery functions Reactive Routing become more bandwidth efficient and the route maintenance give a opportunity to resolve the link failure in the network. It attempts to minimize the routing overhead and find an alternate route skipping this broken link.

i. AODV (Ad Hoc On-Demand Distance Vector)

AODV is a reactive routing protocol that means it establishes route to destination on demand only. Ad Hoc On-Demand Distance Vector support both unicast and multicast routing. It defines Route Requests (RREQ), Route Replies (RREP) and Route Errors (RERR) message types. Route Requests messages are used to start the route finding process and Route replies used to finalize the selected route in the network. If any link breakage in an active route, the Route Error massage notify the network.



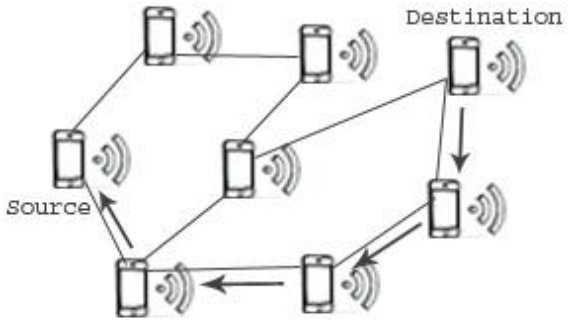


Figure 6: Route Requests (RREQ) Broadcast **Route Replies (RREP) Path Forwarding**

ii. DSR (Dynamic Source Routing Protocol)

The Dynamic Source Routing Protocol (DSR) is an efficient routing protocol designed for use in multi-hop wireless ad hoc networks of MANET. It gives the power to network to completely self-organizing and self-configuring without any network infrastructure or administrator. The version of DSR uses explicit source routing in which each data packet sent carries in its header the complete, ordered list of nodes through which the packet will pass. The explicit source routing allows the sender to select and supports the use of multiple routes to any destination (example, for load balancing), and allows a simple guarantee that the routes used are loop-free.

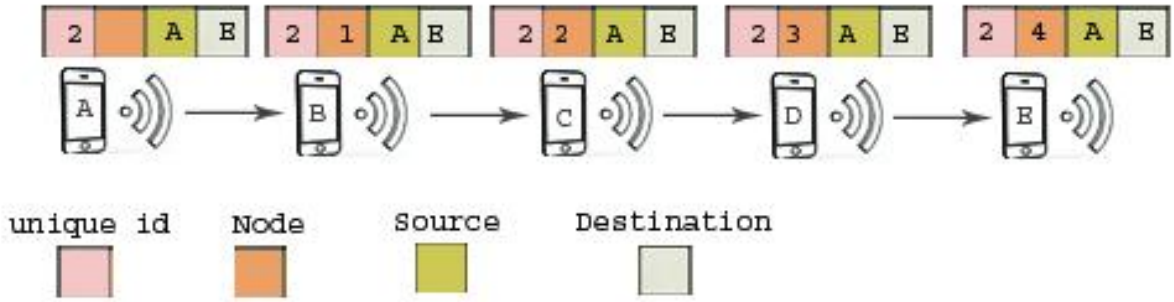


Figure 7: DSR Routing Table

CONCLUSION

This paper reveals that working of Flat routing protocol in MANET. It divided into two categories mainly, Proactive Routing (Table Driven) Protocol and Reactive Routing (On Demand) Protocol. Both have some unique features and some limitations. Flat routing works well in Mobile Ad-hoc network sometimes. Flat routing protocol is a network communication protocol implemented by routers in which all routers are each other's peers.The results showed that the performance of the two reactive protocols (DSR and AODV) was better than DSDV. The overall performance of DSR was better than the other two protocols except in the case of end to end delay.

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