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Survey Paper on DSDV and AODV Routing Protocol of MANET

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***Abstract*- Mobile ad hoc network is also known as MANET. MANET is a collection of wireless device which dynamically form a network topology without any pre-existing network infrastructure. In MANET, mobile node can move freely from one place to another and thus network topology is kept changing every time because of self-organization and self-configuration. In MANET, nodes can communicate with each other without any centralized devices and they will be able to exchange information between themself. All nodes act as router between itself to receive packet and forward to itss destination. In order to facilitate nodes to communicate each other in network, they use Routing Protocol. The main purpose of Routing protocol is to facilitate communicate between nodes and to forward packet to destination accurately. There are difference types of Routing protocol used in MANET some of them are DSDV and AODV which will be discussed.**

Keywords- MANET, DSDV, AODV

I. INTRODUCTION

With rapidly gown of technologies in this generation networking become more demanding for organization depend in business. Depend on the size of organization and resources. Suppose if resources are small they will need small network like LAN but if resource is large they will need large network it will consist complex network along with server. Computer network consists of collection of hardware and software. Thus, if computer network want to communicate each other for sharing resources they will have to establish connection first between them. After connection successful establish they will be able to share resources within network. Therefore computer on network they need physical wire for connection like telephone wire, cable etc. There are many network computer base on which parameter they use during communicate each other [2]. There are two type of network [8].

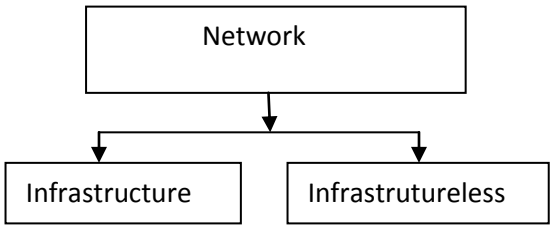

Fig.1 Classification of network

- *Infrastructure network*

Infrastructure network are fixed. The bridges in this network are known as base station. Here the Base stations are fixed. In this network, all node are move while communicate each other. While node travel from one range of base station into another base station then Handoff or Handover it occur from old base station to new station

Fig.2 Infrastructure

- Infrastructureless

Infrastructureless or ad hoc network base stations are not fixed. In this network all mobile nodes they will move from one place to another place while communicate. All nodes in this network are self-configure and self organization and they will act as router. They will receiver packet from other node and forward to destination through intermediate nodes. All nodes in this network they had to discover own route for deliver packets.

Fig.3 Infrastureless

Mobile Ad hoc Network is a self configuration and dynamic network topology. Each of the nodes in MANET they are independent each other and move freely from different location to another. MANET topology is dynamic but topology always kept changing every time because nodes are moving from one direction to another direction in this case is very difficult to predict the topology [2]. Each of the nodes in MANET open environment and connected each other through wireless where nodes can join network and leave network anytime. Each of the nodes in MANET they should be able to detect the presence other node in network so that it will make to facilitate the communication to different node and sharing resources. Each of the nodes in the network will act as router. They will be able to receiver packet from other node and send the packet to destination through intermediate node to reach to the destination. Thus, while sending packing they will find shortest path to destination base on cost function available in routes of nodes [1].

MANET is also known as Autonomous because is self-configuration and automatically form network without any fixed infrastructure or centralized. Every node in MANET they are independent and move freely from one position to another. Thus, every time node changes location then network topology will effect. Node are communicate each other do not use any physical devices like any wire cable but instead they use wireless for transmitter and receiver. With help of intermediate node will be enable the node to reach to destination. In MANET, node will broadcast for route to send packet and find the shortest path to reach to destination and also node update routing table. Whenever node find the path its will start sending packet to desire destination [10]. With help of routing protocol it will make easy for the node to identify shortest path. Some of routing protocol we will discuss in this paper.

II. CLASSIFICATION OF ROUTING PROTOCOL IN MANET

The following figure it shown the different type of routing protocol in MANETs:-

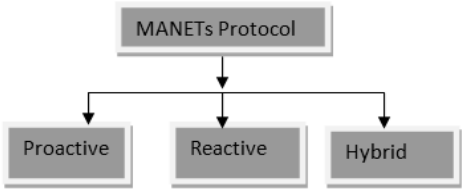

Fig.4 MANET protocol

A. Proactive protocol

Proactive routing protocol is also known as Table driven protocol. In this Proactive routing protocol each and every node should maintain information of all nodes in network if it not required also. If any changes make in network topology then a very nodes should update table for latest changes of topology. Thus if topology keep changes frequently so that cost of maintaining network it to high and if it low it might not use. So, Proactive Routing Protocol is not suitable for large network because a very time network change a very node they has to update for very entry of node in table so that is become complicated [5,9]. Whenever node required route to reach to destination route should be able immediately [6]. There are different types of protocol well known in Proactive Routing Protocol such as DSDV, DBF, GSR, WRP and ZRP

1) DSDV

Destination Sequence Distance Vector was invented by Perkin and Bhagwat [13]. Destination Sequence Distance Vector is a proactive routing protocol and is base on Bellman algorithms with some modification are make in loop and this algorithms is base on distance vector shortest distance [11]. In this routing protocol, very nodes in network maintain all routing table for the node available in the network. All information is maintains inside routing table by all node in network. Thus, routing protocol contain all the address of destination node, sequence number of hop to reach to destination of the particular node and the sequence number of destination available node in network and new sequence number unique for broadcast to avoid for conflict [3]. Thus, whenever there a change in network topology, every node in network should update routing table to keep latest information. Routing table should update immediately so that all node know about latest information of change node in network. So, routing information should update routing table either periodically or even driven. Every node after update routing table should advertise themselves to another node of neighbor. By advertise them-selves to the other node in network they will know if any nodes in network are changes location from one place to another, by doing this the neighbor node will update routing information table about changes of node. So the advertise can be done broadcast or multicast [5]. In DSDV, there are two types for broadcast routing table can be sent, one way is called *full dump* and other way is called *incremental*. Full dump it will

sent all the information whereas increment in will carry only change part of routing table.

During update information in routing table, when the information packet sent from other node in network then receiver node will check the sequence number with sender sequence number if the sequences number of sender node is larger than receiver sequence then it will update routing table but if the sequence number is same then it will look for matrix entry and it will make compare with hop, if number of hop is less than previous entry then it will update the routing table. During update routing information the matrix is increase by one and sequence number also increase by 2. Thus, if any nodes want to join the network they will advertise themselves in network so that nodes will update routing table about new entry in network and also for the node leave the network they will update the routing information so that the other nodes in network they will get latest information or changes take place inside network.

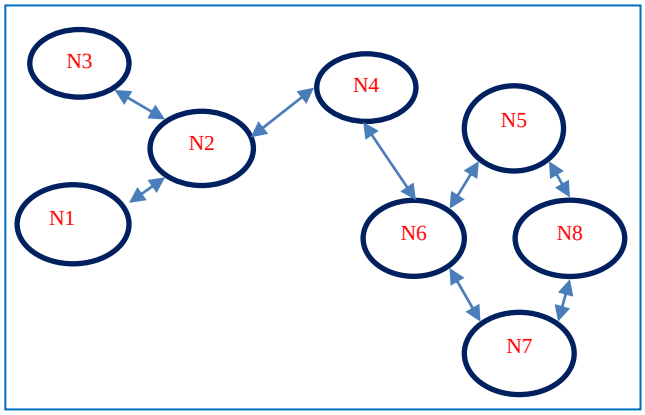

Fig.5 Nodes in MANET before movement

The above figure it shown before movement of node from one location to different location in network.

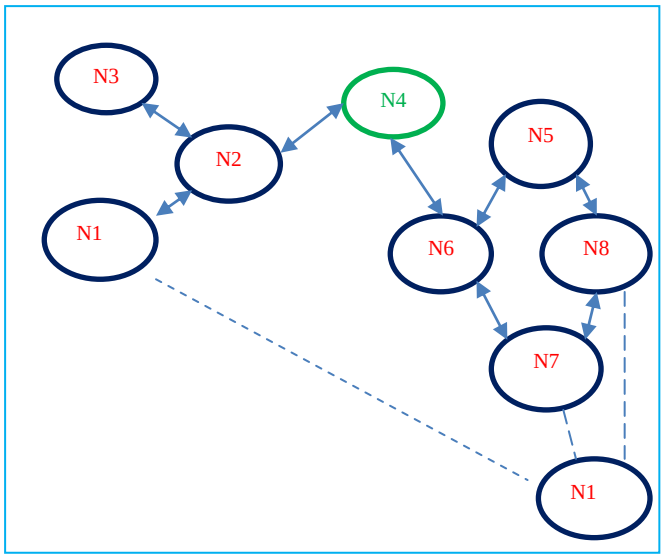

Fig.6 Movement of Nodes in MANET

The above figure it shown movement of node from one location to different location in network.

From the above figure we see it contain 8 hosts in network. We will take a look at changes of node 4 routing table with references changes of node 1. All node in network they advertise routing table to other node on network. Then, let us look routing table of Node 4 [12].

Table.1. Routing Table of NODE4

Destination	*Next hop*	*Metric*	*Sequence NO*	*Install*	*Stable data*
Node1	Node2	2	SN406_Node1	T001_Node1	Ptr1_ Node1
Node2	Node2	1	SN128_Node2	T001_Node1	Ptr1_ Node2
Node3	Node2	2	SN564_Node3	T001_Node1	Ptr1_ Node3
Node4	Node4	0	SN710_Node4	T001_Node1	Ptr1_ Node4
Node5	Node6	2	SN392_Node5	T001_Node2	Ptr1_ Node5
Node6	Node6	1	SN076_Node6	T001_Node1	Ptr1_ Node6
Node7	Node6	2	SN128_Node7	T001_Node2	Ptr1_ Node7
Node8	Node6	3	SN050_Node8	T001_Node2	Ptr1_ Node8

But, we see from figure 2 NODE1 it move from original location to different location and now become nearest to NODE7 and NODE8. Therefore, link is broken between NODE1 and NODE2 and it became infinity metric at NODE2 for NODE1. The sequence number also changes it become odd number at routing table of NODE2. So that node NODE2 will update this information and will broadcast to the neighbor. Therefore NODE7 and NODE8 have new neighbor then it will broadcast and update routing

table. So that, NODE4 will receives update information from NODE6 but NODE6 will receives two update information from difference neighbor to reach NODE1 with the same sequence number but with different matric. Now routing table of NODE4 it show below:

Table 2.Forward table of NODE4

Destination	*Metric*	*Sequence NO*
Node1	2	SN406_Node1
Node2	1	SN128_Node2
Node3	2	SN564_Node3
Node4	0	SN710_Node4
Node5	2	SN392_Node5
Node6	1	SN076_Node6
Node7	2	SN128_Node7
Node8	3	SN050_Node8

Now let us look the routing table after movement of NODE1 from original location.

Table 3.Routing Table after Movement of NODE1

Destination	*Next hop*	*Metric*	*Sequence NO*	*Install*	*Stable data*
Node1	Node2	3	SN516_Node1	T001_Node1	Ptr1_ Node1
Node2	Node2	1	SN238_Node2	T001_Node1	Ptr1_ Node
Node3	Node2	2	SN674_Node3	T001_Node1	Ptr1_ Node3
Node4	Node4	0	SN820_Node4	T001_Node1	Ptr1_ Node4
Node5	Node6	2	SN502_Node5	T001_Node2	Ptr1_ Node5
Node6	Node6	1	SN186_Node6	T001_Node1	Ptr1_ Node6
Node7	Node6	2	SN238_Node7	T001_Node2	Ptr1_ Node7
Node8	Node6	3	SN160_Node8	T001_Node2	Ptr1_ Node8

The following table it show after movement of NODE1

Table 4.Forwarding table at NODE4 after Movement of NODE1

Destination	*Metric*	*Sequence NO*
Node1	2	SN516_Node1
Node2	1	SN238_Node2
Node3	2	SN674_Node3
Node4	0	SN820_Node4
Node5	2	SN502_Node5
Node6	1	SN186_Node6
Node7	2	SN238_Node7
Node8	3	SN160_Node8

B. Reactive Protocol

Reactive protocol is also known as on demand routing protocol. In this protocol, nodes in network they do not maintain any route in advance. Whenever node required to sends information, then this routing protocol will search for route on demand and establish connection so that node able to send packet from sources to destination [4]. AODV is well known protocol in this Reactive protocol.

AODV

Ad hoc On Demand Distance Vector is also known as reactive protocol. In this routing protocol overcome the weakness of DSDV (Distance Sequence Distance Vector) because in this routing protocol node set up route on demand when node are needed to send packet but in case of DSDV node maintain route every time [10]. This routing protocol minimized the broadcast compare to DSDV because it create route base on demand. In this protocol whenever node need to send packet to destination, it will advertise route request to the neighbor node. When neighboring node receive route request it will forward to their neighbor node until it will to destination. During forwarding process, intermediate node will record the address copy of neighbor from which first copy it receiver from broadcast. This copy will save in routing table for creating reverse route [6]. If node received the same copy of route request then it will discard. For route respond it will send through reverse route create by intermediate node during route request [14]. In this protocol there are two components:

Route Discovery

Whenever node in network has packet to send to destination, node it will check for route in routing table. If route or path exists then node will use available path to send packet if path not available then node advertise request for the route [mobile]. AODV start process with Route Request (RREQ) and Route Reply (RREP). In this Route Discovery, sources node will create Route Request (RREQ) for sending packet to destination. Then, sources node will contain current sequence number, destination IP address, IP address, destination last sequence number and broad cast id. With help of IP address and broad cast ID it will help node to identify unique Request and broadcast ID will increment every request make by sources. The sources node will advertise to neighbor looking for route, if route available with neighbor then neighbor it will reply to sources node and if is not then neighboring node it will sent to neighbor node until it reach to destination. While forward process the intermediate node will save the copy in routing table. With help of this copy it will be able to create reverse path for confirm request (RREP). If node receives same copy of

request from same node then it will discard [9]. Let us look following example how Route Discovery works [8]:

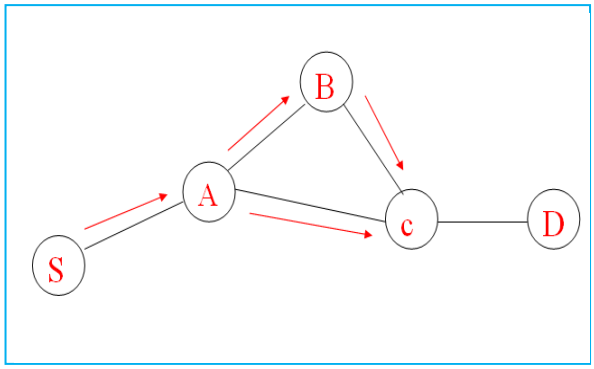

Fig.7 Sending Route Request

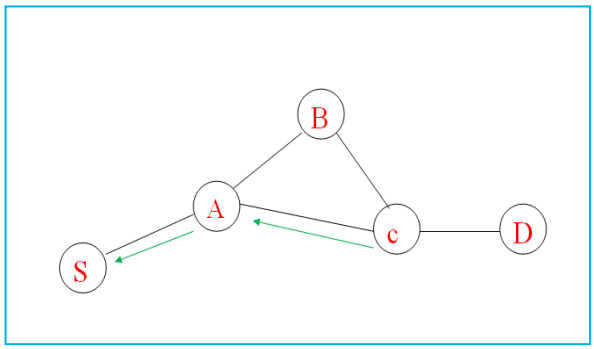

Fig.8 Route Request Respond Successfully

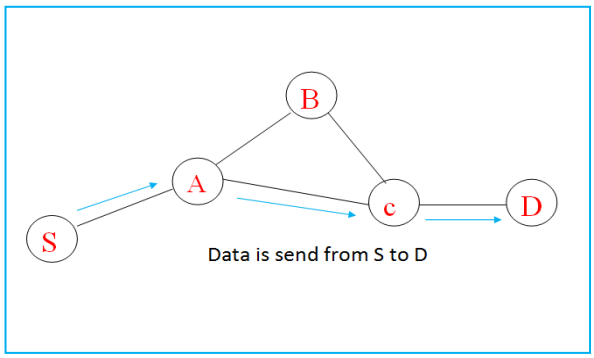

Fig.9 Data successfully deliver to destination

Route Maintenance

When node send route request from source to destination some problem is occur in between them, so that, is this case we use route Maintenance for this purpose. The route failure occurs due to many reasons like node mobility and power exhaustion. When this failure occur node will sent back error message RREP to sources node. Then, sources node will invalidate the route entry in routing table and resent it gain for route discovery [7]. The following figure is show link is broken [8]

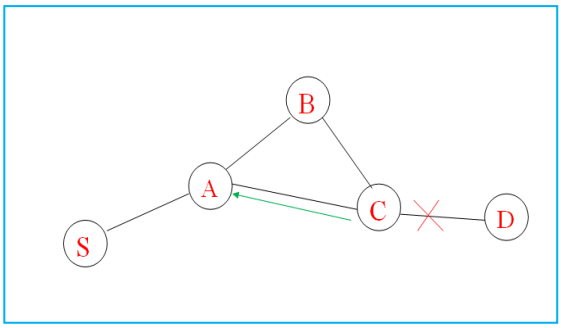

Fig.10 Route Maintenance

Hybrid Routing Protocol

Hybrid Routing Protocol is used both facilities available in Proactive and Reactive Routing Protocol. Hybrid Routing Protocol use to overcome the problem over reactive and Proactive protocol because in reactive protocol have more latency and less overhead whereas in Proactive has less latency and more overhead. Hybrid Protocol is suitable for large network it contain large number of node, where in this large network is divide into different zone. If any zone located inside they will use Reactive and outside zone they will use Proactive protocol. In this Hybrid routing Protocol, for route discover they use reactive protocol and maintenance routing table they use Proactive protocol [5].

III. CONCLUSION

In this paper we have study only two routing protocol of MANET from difference types of routing protocol. MANET can be classified into three types of protocol and they are Reactive protocol, Proactive protocol and Hybrid protocol. Proactive is also known as table driven, DSDV known as Proactive protocol whereas Reactive is also known as demand routing protocol, AODV known as Reactive protocol. These routing protocol they had their own weakness for attacker where is very difficult to detect. Maybe in future they will come up with different kind of routing protocol besides existing routing protocol and they will have more facilities compare to existing protocol then they will make more secure from different kinds of threat.

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