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Study of Routing in Ad hoc network

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***Abstract*—** The basic function of the any network is to perform routing of packets. Routing algorithms have to take the decision that whom to forward the packet. Number of hops are used to take the decision. Routers are generally used in wired networks and the reason is that routers are more powerful than a normal host. Router keeps the next hop for every destination on the basis of the best metric value for this purpose router maintains routing table.

***Keywords*—**CMANET,AODV,DSDSV,DSR.

I. INTRODUCTION

In ad- hoc network routing is perform by the node itself. Routing protocols perform on a node that is forced in resources such as storage, bandwidth and power supply so it must be light weighted. Routing protocol must be able to preserve the routes rapidly and with minimum transparency. Some factors are significant to assess the performance of a routing protocol in MANETs. Some of them are as follows:

1. Routing overhead: Manage messages get through bandwidth that is not accessible for data communication. Hence an efficient routing protocol is the one that does not produce control messages avoidable. In other words, routing overhead should be little.

2. Computation overhead: Complex algorithms require more processing cycles and hence it consumes more battery power. All the nodes present in the network have limited battery life so a protocol must be simple and light weight.

3. **Central Controlling Authority:** Ad- hoc networks are created on fly so due to this reason most of the times there is no any central controlling authority. Therefore it is recommended that a protocol be decentralized and distributed.

4. **Topology dependent**: As network topology is shifting with respect to time, a routing protocol must be able to set up routes rapidly with the extremely mobile nodes. The protocol should be self-governing from the current network topology.

5. Speed: On establishing routes rapidly it minimize the probability of an alter in the network topology while the route is being established. It should also minimize all the delay caused through buffering and processing, route gaining, middle nodes and, retransmission delays at the medium access control (MAC) layer.

ROUTING PROTOCOLS

Routing is one of the basic research matter in MANET that can deal with its limits like high power consumption, low bandwidth, high error rates and random travels of the node. Routing protocols for MANET can be considered in following three ways [4]:

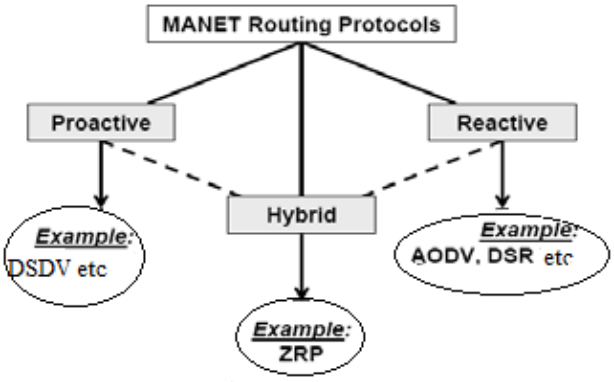

Figure 1. Classification of MANET routing protocols

Proactive (Table-Driven): RIP (Routing Information Protocol) and DV(distance-vector) are the cases of practical routing protocol. Other proactive routing protocols are OSPF (Open Shortest Path First) and link-state. Moreover all nodes have to preserve one or more one tables to store routing information and data, it also respond to changes in network topology with the help of broadcasting and propagating. On the basis of different factor, some of the already obtainable pro-active ad hoc routing protocols are: WRP (Wireless Routing Protocol, 1996), GSR (Global State Routing, 1998), FSR (Fisheye State Routing, 1999), DSDV (Destination Sequenced Distance-Vector, 1994), CGSR (Cluster head Gateway

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Switch Routing, 1997), HSR (Hierarchical State Routing, 1999), ZHLS (Zone based Hierarchical Link State,1999),STAR (Source Tree Adaptive Routing, 2000).

Reactive (Source-Initiated On-Demand Driven): These protocols forever try to abolish the conservative routing tables and as a result decrease the need for modifying these tables to track change in the network topology. When source need destination, it has to find out and set up a route by route discovery process, it maintain it by some form of route maintenance process until either the route is not needed or it become out-of-the-way, and now finally rip down it by route deletion procedure. Some of the obtainable re-active routing protocols are [9,10].DSR (Dynamic Source Routing, 1996), ABR (Associativity Based Routing, 1996), TORA (Temporally-Ordered Routing Algorithm, 1997), SSR (Signal Stability Routing, 1997), PAR (Power-Aware Routing,1998), LAR (Location Aided Routing, 1998), CBR (Cluster Based Routing, 1999), AODV (ad hoc On-Demand Distance Vector Routing, 1999). Routes are obtainable with the consumption of signaling transfer and power in pro-active routing protocols ,but on the other hand, re-active protocols are more competent at signaling and power consumption then pro-active, due to this reason re-active protocols undergo longer delay while doing route discovery. Both pro-active and re-active of routing protocols have been civilizing to be more scalable, safe, and to hold higher QoS.

Hybrid Protocols: Hybrid routing protocols [11, 12] aggregates a set of nodes into zone in the network topology. Then, the network is partition into zones and proactive move toward is used inside each zone to uphold routing information. For routing packets involving dissimilar zones and area, the hasty move toward is used. Consequently, in hybrid schemes, a route to a purpose belonging to the same zone is recognized with no any delay, while a route discovery and a route maintenance procedure wants destination that are in other zones. The zone routing protocol (ZRP) and zone-based hierarchical link state (ZHLS) routing protocol give a compromise on scalability matter in relation to the frequency of end-to-end association, more over the total number of nodes, and the frequency of topology change. These protocols can offer a better exchange between communication above your head and delay, but this exchange is related to the size of a zone and the dynamics of a zone. Thus, the cross move toward is suitable alternative for routing in a large network. At network layer, routing protocols are helpful to get way for transmission of packets. The advantage of a routing protocol can be analyze from side to side metrics-both qualitative and quantitative with which it is appropriate. Both metrics must be self-governing of any routing protocol. Some of the attractive qualitative property of MANET are distributed process, Loop-freedom, Demand-based operation, Pro-active operation, Security, Sleep period operation and unidirectional link support.

Each node behave as a host as well as a router in ad hoc networks. Moreover due to small size and very limited power supply a node of the mobile ad-hoc network has partial storage capacity and computing power. Thus it is important that a routing algorithm have to be glow in terms of processing and storage needs. Node can go away the path while it is being used to bring the data packets. A routing protocol must make sure that those packets which are leftover will deliver another time. As we know that each router preserve their routing table ,the size of this table increase the storage and processing requirement when the size of the network is large. Routing protocols also undergo from routing loops which results wastage of bandwidth. There are two types of routing protocols for ad hoc networks: table-driven protocol and on-demand routing protocol. Table driven protocols calculate and preserve a path for every node in the network and they are proactive in nature, whereas on-demand routing protocols establish path only when required. On-demand protocols save other resources such as bandwidth to respond. The on-demand routing protocols exchange routing information only when it is necessary. The Destination Sequence Distance Vector (DSDV) routing procedure is a table-driven protocol whereas Dynamic Source Routing (DSR) and Ad-hoc On demand Distance Vector (AODV) are on-demand steering protocols.

Table Driven Routing

Destination Sequence Distance Vector is the most commonly used table driven routing protocol in MANETs.

Destination Sequence Distance Vector (DSDV) algorithm: In sequence Distance Vector routing algorithm succession number in the routing table is used. A node which initiate a packet generate will generate a sequence number and also include this sequence number in the packet for others so that they know its sequence number. A node having an entry for another node also stores its sequence number. If the link is suitable then it stores an even sequence number where as stores odd number for a out of order link, due to this reason a node always generate an even sequence number for itself.

On-Demand Routing: The major job of the on demand routing protocols are to make route request for distribution a packet when a node wants to converse with an additional node. After sending route request it is broadcast to last nodes and a node having a path to arrive at that destination reply with a route reply.

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Dynamic Source Routing (DSR) Algorithm: The Dynamic Source Routing protocol is an on demand routing protocol for ad hoc networks. Here we assume that the links which are using for communication are uni-directional in environment. This protocol works in two phases: the route discovery phase and the route maintenance phase. When a node needs to communicate with another node in the network, it checks its route cache. If a path is available it sends the data packets on that path otherwise it will start route discover. Here in route detection Route Request packets are broadcasted to its neighbours, and neighbours additional broadcasts the request to their next neighbours. Each node on the path adds its id to the request packet.

If the node itself is given in the list then it discards the packet for keep away from routing Loops, if an middle node has a path to reach at purpose, it right away sends reply to the Source node hold record list of total path to reach at purpose. But if the node is not in the list because it has no path to the destination, it forwards the request to its neighbours until the request packet reaches at the destination. After receiving the Route Request packet purpose checks its route cache, if it finds a path for the node which is initiator node, it sends Route Reply small package through this trail an copying the record catalogue of the path from the direct Request small package that has been sent. Otherwise, when it does not find any trail in its route cache, it generate one more route ask for for source and piggyback Route Reply to the maker node in this Route Request. Path detection complete by attainment Route Reply to the inventor. To uphold the path each node broadcasts a HELLO communication to its Neighbours in sure gap. DSR saves bandwidth by establish the route on request but on the other hand it wilds bandwidth in storing the whole path in the ask for packet and as well as in the reply packet.

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