UNICAST AND MULTICAST ROUTING PROTOCOLs FOR MANETs: A COMPARATIVE SURVEY

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ABSTRACT – A Mobile Ad-hoc Network (MANET) is a self-configuring network composed of mobile nodes without any fixed infrastructure. In a MANETs, there are no difference between a host node and a router so that all nodes can be source as well as forwarders of traffic. Moreover, all MANET components can be mobile. They provide robust communication in a variety of hostile environment, such as communication for the military or in disaster recovery situation when all infrastructures are down. A very important and necessary issue for mobile ad hoc networks is to finding the root between source and destination that is a major technical challenge due to the dynamic topology of the network. Routing protocols for MANETs could be differ depending on the application and network architecture. The efficiency of the wireless link can be increase by Multicasting through sending single copy of messages to all group members. Multicast transmission is a more effective mechanism when compared to unicasting in supporting group communication applications and hence is an important aspect of future network development. There are various routing protocols that have been proposed for MANETs, it is quiet difficult to cover all of the protocol in this survey. In this survey paper, we present typical routing protocols based on unicast or multicast routing schema selected from the class of similar approaches that can reflect the state-of-the-art of research work on mobile ad hoc network routing. Another criteria for classifying the routing protocols for Mobile Ad-hoc Networks, i.e. proactive, reactive and hybrid approaches have been later used in every of the unicast routing protocol and multicast routing protocol classification and a Characteristic difference's for typical representatives of routing protocols designed for mobile ad hoc networks.

Keywords: MANET, Multicast Routing Protocol, Unicast Routing Protocol,Multicast Routing Protocol, MZR, MPR.

I. INTRODUCTION

Wireless communication technology have been developed with two primary models one is fix infrastructure based model in which much of the nodes are mobile and connected through fixed backbone nodes using wireless medium. Another model is Mobile Ad-hoc network .Mobile Ad-Hoc Networks (MANETs) are comprised of mobile nodes (MNs) that are self-organizing and cooperative to ensure efficient and accurate packet routing between nodes (and, potentially, base stations). There are no specific routers, servers, access points for MANETs. Because of its fast and easy of deployment, robustness, and low cost, Typical MANETs applications could be find in the following areas like Military applications (i.e. a temporary network in the battlefield), Search and rescue operations, Temporary networks within meeting rooms, airports, Vehicle-to-vehicle communication in smart transportation, Personal Area Networks connecting mobile devices like mobile phones, laptops, smart watches, and other wearable computers etc. Design issue for developing a routing protocol for wireless environment with mobility is very different and more complex than those for wired network with static nodes [1]. Main problem in mobile ad hoc network are Limited bandwidth and frequently change in the topology. Although there are lots of routing protocols that can be used for unicast and multicast communication within the Mobile Ad hoc networks, it observes that any one protocol cannot fit in all the different scenarios, different topologies and traffic patterns of Mobile Ad-Hoc Networks applications. For instance, proactive routing protocols are very useful for a small-scale MANETs with high mobility, while reactive routing protocols are very useful for a large-scale, MANETs with moderate or less topology changes. Hybrid routing protocol attempts to strike balance between the two such as proactive for neighborhood, reactive for far away [22].

Apart from this multicast is another category of routing protocol in MANETs which efficiently support to the group communication with the high throughput. The use of multicasting within MANETs has many benefits. It can decrease the cost of wireless communication and increase the efficiency and throughput of the wireless link between two nodes whenever we are sending multiple copies of the same messages by accomplishment the inherent broadcasting properties of wireless transmission. In place of sending same data through multiple unicasts, multicasting decrease channel capacity consumption, sender nodes and routers processing, energy utilization ,

and data delivery delay, which are deliberate important for MANETs. If the mobile nodes in the MANET move too quickly, they have to repair to broadcast to achieve node to node communication. Every routing protocol has its advantages and disadvantages, and aims at a specific application. Finally, the expected standard for routing protocols in the Mobile Ad-Hoc Networks is very likely to combine some of the most competitory schemes. Thus the goal for a routing protocol is to minimize its control traffic overhead while at the same time, it should be capable of rapidly to link failure and addition caused by node movements [4]. In this review paper we present typical routing protocols based on unicast or multicast routing schema selected from the class of similar approaches that can reflect the state-of-the-art of research work on mobile ad hoc network routing. And a Characteristic Comparison for typical representation of routing protocol designed for MANETs

II. ROUTING ROTOCOL CLASSIFICATION FOR MANETS

Routing protocols typically fall under two classifications; first one is unicast Routing Protocol, second one is multicast Routing Protocol. Different routing protocols try to solve the problem of routing in mobile ad hoc network in one way or the other.

Unicast routing protocols are divided into proactive, reactive and hybrid routing protocols, and the multicast routing protocol are divided into proactive, reactive, and hybrid routing protocol. Figure. 1 gives a classification on routing protocol is based on unicast and multicast routing protocol. Proactive routing that means route available immediately. Reactive routing that means discovers the route when needed. And hybrid routing that means combination of both, such as proactive for neighborhood, reactive for far away.

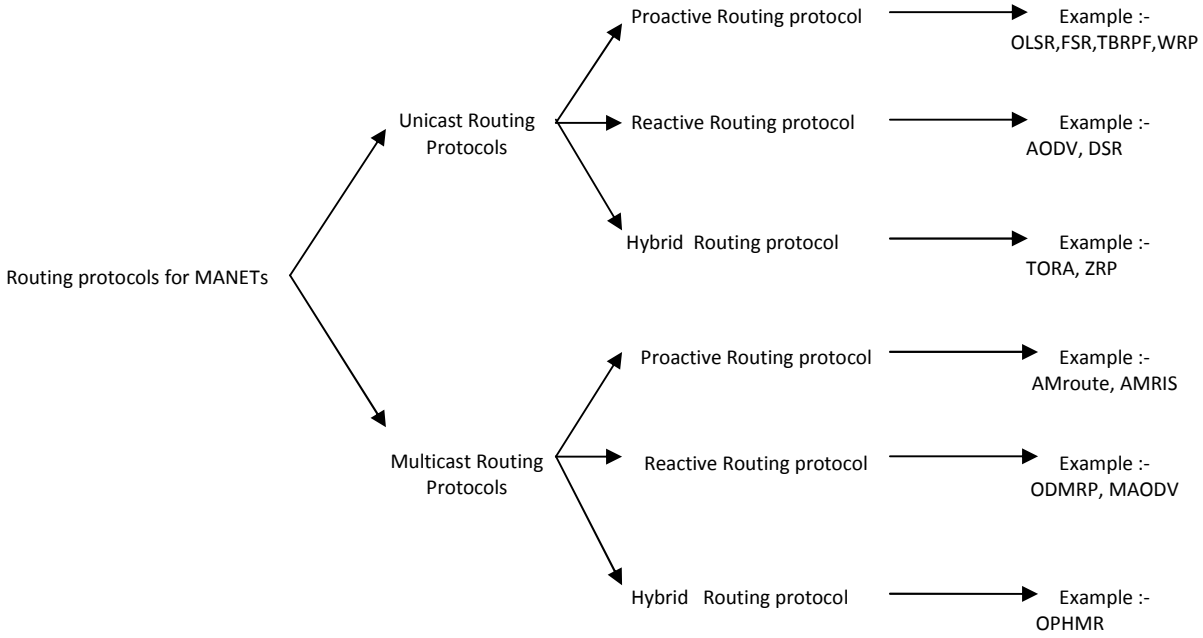

FIGURE 1: Classification on routing Protocols for MANETs

III. UNICAST ROUTING PROTOCOLs

Most applications in the MANET are based upon unicast communication. Thus, the most basic operation in the IP layer of the MANET is to successfully transmit data packets from one source to one destination. The forwarding procedure is very simple in itself: with the routing table, the relay node just uses the destination address in the data packet to look it up in the routing table. If the longest matching destination address is found in the table, the packet is sent to the corresponding next hop. The problem that arises is how the routing table is built in the nodes in the MANET [1]. Figure 2 shows the unicast process. In the unicast routing one separate copy sends to each receiver from the source node. Data packet is replicated at the sender node and then delivered to each destination node. By this process we can easily see that bandwidth is consumed by the redundant data packets. Many application uses the unicast routing protocol

depending upon the need of the application. There are proactive, reactive and hybrid routing protocol in unicast routing for Mobile distributed networks.

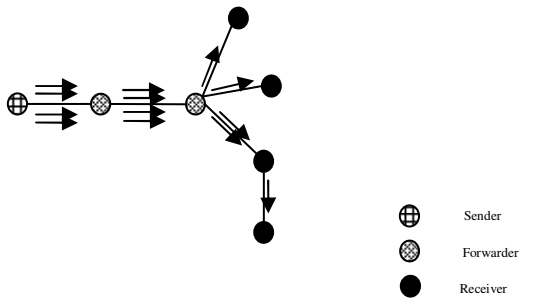

FIGURE 2: Unicast: Data Packet is replicated at the sender

A. Proactive Unicast Routing Protocols

Traditional routing protocols such as Optimized link state routing protocol (OLSR), The Fisheye State Routing (FSR), And Topology Broadcast Based on Reverse-Path Forwarding Routing Protocol (TBRPF) are proactive unicast routing protocols. Periodic broadcast of network topology updates (e.g., distance vector or link state information) is necessary to compute the shortest path from the source to every destination, which consumes a lot of bandwidth. Although they are widely used in the Internet backbone. They cannot be used in the MANET directly

because of the differences between the hardwired network and the MANET. In Table 1 gives the Characteristic comparison of proactive Unicast Routing Protocol.

1. *Optimized Link State Routing Protocol (OLSR)*

Optimized link state routing protocol (OLSR) [5] is a proactive (table-driven) routing protocol for MANETs. A route between source to destination is available immediately when needed. OLSR is based on the link-state algorithm. Conventionally, all wireless nodes flood neighbor information in a link-state protocol, but not in OLSR node. It is advertise information only about links with neighbor who is in its multipoint relay selector set. Its reduce size of control packets reduces flooding by using only multipoint relay nodes to send information in the network and reduce number of control packets by reducing duplicate transmission. This protocol does not expect reliable transfer, since updates are sent periodically. OLSR used hop-by-hop routing. Routes are based on dynamic table entries maintained at intermediate nodes. The protocol is design to work in distributed manner and thus does not depend up on the central entity. The protocols thus support a nodal mobility that can be traced through its local control message, which depends up on the frequency of these messages. Advantage of OLSR is having the routes available within the standard routing table can be useful for some systems and network applications as there is no route discovery delay associated with finding a new route. Bigger overhead and need more power are main disadvantage of this protocol.

2. *Fisheye State Routing Protocol (FSR)*

The Fisheye State Routing (FSR) [12] is a table driven unicast routing protocol for Mobile Ad hoc Networks based on Link State routing algorithm in effect with reduced overhead to keep network topology information. As showed in its name, FSR utilizes a function similar to a fish eye. The eyes of fishes catch the pixels near the focal with high detail, and the detail decreases as the distance from the focal point increases. Similar to fish eyes, FSR maintains the accurate distance and path quality information about the immediate neighboring nodes, and progressively reduces detail as the distance increases. Advantage of this protocol is that it has potentiality to support multiple-path routing and QoS routing but disadvantage of FSR is that it has high storage complexity.

3. *Topology Broadcast Based on Reverse-Path Forwarding Routing Protocol (TBRPF)*

Topology Broadcast Based on Reverse-Path Forwarding Routing Protocol (TBRPF) was proposed in [11]. TBRPF aims at the Mobile Ad hoc Network with at most several hundreds of mobile nodes or high mobility of nodes. Every node in the wireless network keeps partial global topology information. When a node needs the shortest path to every other node, a minimum spanning tree rooted at itself is computed using modified Dijkstra's algorithm. TBRPF transmits only the differences between the previous network state and the current network state. Therefore, routing messages are smaller, and can therefore be sent more frequently. This means that nodes' routing tables are more up-to-date.

	OLSR	FSR	TBRPF
Scope	Large and dense MANETs	Large scale MANETs with high mobility	MANETs with hundreds of nodes and high mobility
Organization Of the network	Flat	Hierarchical	Flat
Neighbor Detection method	Periodical HELLO messages	Periodical link state updates	Differential HELLO messages
Optimized Broadcast	Multipoint relaying	Combined with neighbor Detection	Combined with HELLO messages
Broadcast Information	MPR selector list	Link state update	(Partial) Spanning tree
Route freshness	Up-to-date	Maybe not up-to-date	Up-to-date

TABLE 1: Characteristic of Proactive Unicast Routing Protocol

B. Reactive Unicast Routing Protocols

Due to the frequently changing topology of the Mobile Ad hoc Network, the global topology information stored at each node needs to be updated frequently, which consumes lots of bandwidth. However, this consumption sometimes is a waste of bandwidth, because the link state updates received expire before the route between itself and another node is needed. To minimizing the wastage of bandwidth, the concept of On Demand or reactive routing protocol is proposed in [13].In On Demand protocols; the routing is divided into the following two steps: first one is route discovery and second one is route maintenance. The most distinctive On Demand unicast routing protocols are Dynamic Source Routing (DSR) protocol, Ad Hoc On-demand Distance Vector Routing (AODV) protocol and Temporally Ordered Routing Algorithm etc. In Table 2 gives the Characteristic comparison of Reactive Unicast Routing Protocols.

1. Dynamic Source Routing Protocol (DSR)

Dynamic Source Routing (DSR) [2] is an On Demand unicast routing protocol that utilizes source routing algorithm. In source routing algorithm, each data packet contains complete routing information to reach its dissemination. Additionally, in DSR each node uses caching technology to maintain route information that it has discovered. For example, the intermediate nodes cache the route towards the destination and backward to the source. Furthermore, because the data packet contains the source route in the header, the overhearing nodes are able to cache the route in its routing cache.

2. Ad Hoc On-demand Distance Vector Routing Protocol (AODV)

The Ad Hoc On-demand Distance Vector Routing (AODV) protocol [3] is a reactive unicast routing protocol for mobile ad hoc networks. As a reactive routing protocol, AODV only needs to maintain the routing information about the active paths. In AODV, routing information is maintained in routing tables at nodes. Every mobile node keeps a next-hop routing table, which contains the destinations to which it currently has a route. A routing table entry expires if it has not been used or reactivated for a pre-specified expiration time. Moreover, AODV adopts the destination sequence number technique used by DSDV in an on-demand way.

3. Temporally Ordered Routing Algorithm

Temporally Ordered Routing Algorithm (TORA) [16, 17] is a On Demand routing algorithm based on the concept of link reversal. This Routing protocol improves the partial link reversal method by detecting partitions and stopping non-productive link reversals. TORA can be used for highly dynamic mobile ad hoc networks. TORA has three basic steps: route creation, route maintenance and route erasure. In TORA the DAG provides the capability that many nodes can send packets to a given destination and guarantees that all routes are loop-free. Because of node mobility the DAG in TORA may be disconnected. So, route maintenance step is an very important part of TORA. This routing protocol has the unique feature that control messages are localized into a small set of nodes near the topology changes occurred.

	DSR	AODV	TORA
Updating of Destination at	Source	Source	Neighbors
Multicast Capability	No	Yes	No
Control Hello Message Requirement	No	No	Yes
Design Structure	Flat	Flat	Flat
Unidirectional link	Yes	No	Yes
Multiple Route	Yes	Yes	Yes

TABLE 2: Characteristic of Reactive Unicast Routing Protocol

C. *Hybrid Unicast Routing Protocols*

Hybrid routing protocol attempts to discover balance between the two such as proactive for neighborhood, reactive for far away. Based on proactive and reactive routing protocols, some hybrid routing protocols are proposed to combine their advantages. The most distinctive hybrid routing protocol is Zone Routing Protocol.

1. *Zone Routing Protocol (ZRP)*

Zone Routing Protocol (ZRP) [4] is a hybrid routing protocol for mobile ad hoc networks. The hybrid protocols are proposed to reduce the control overhead of proactive routing approaches and decrease the latency caused by route search operations in reactive routing approaches. Zone Routing Protocol (ZRP) [4] is a framework of hybrid routing protocol suites, which is made up the following modules: First one is Intra-zone Routing Protocol, second one is Inter-zone Routing Protocol, and last one is Bordercast Resolution Protocol.

ZRP refers to the locally proactive routing component as the Intra-zone Routing Protocol (IARP). The globally reactive routing component is named Inter-zone Routing Protocol (IERP). IERP and IARP are not specific routing protocols. Instead, IARP is a family of limited-depth, proactive link-state routing protocols. IARP maintains routing information for nodes that are within the routing zone of the node. Correspondingly, IERP is a family of reactive routing protocols that offer enhanced route discovery and route maintenance services based on local connectivity monitored by IARP [14] [15].

IV. MULTICAST ROUTING PROTOCOLs

Although multicast transmission has not been widely deployed in the current MANETs, it will become very important in multimedia communications in the near future. To send a same data packet to multiple receivers in the MANET simultaneously, the simplest method is to

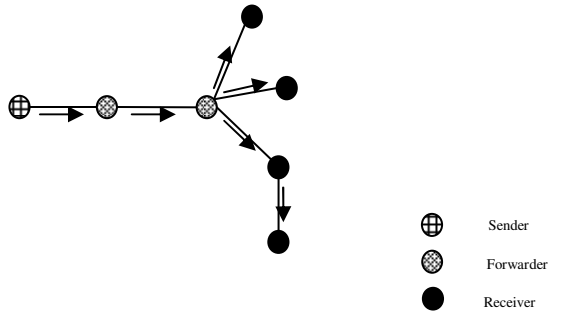

FIGURE 3: Multicast: Data packet replicated by the network

broadcast the data packets. However, broadcast consumes considerable bandwidth and power, which should be avoided as much as possible [7] [6]. Multicast can be use for save the bandwidth while transmitting same data packets to multiple receivers .Figure 3 shows the multicast process, data packet is replicated by the network.There have been many multicast routing protocols proposed for MANET. They could be divided into three groups: first one is proactive multicast, second one is reactive multicast and last one is hybrid multicast routing protocol.

A. *Proactive Multicast Routing Protocols*

Conventional routing protocols such as Ad-hoc Multicast Routing *(*AMRoute), Core-Assisted Mesh Protocol (CAMP) and Ad-hoc Multicast Routing Protocol Utilizing Increasing id-numbers *(*AMRIS) are proactive multicast routing protocols. Periodic broadcast of network topology updates are needed to compute the shortest path from the source to every destination, which consumes a lot of bandwidth. In Table 3 gives the Characteristic comparison of proactive Multicast Routing Protocol.

1. *Ad-hoc Multicast Routing (AMRoute)*

Ad-hoc Multicast Routing (AMRoute) [6] is a tree based multicast routing protocol for mobile ad hoc networks. AMRoute creates a multicast shared-tree over mesh. AMRoute relies on the existence of an underlying unicast routing protocol. AMRoute has two key phases: mesh creation and tree creation. This protocol can be used for networks in which only a set of nodes supports AMRoute routing function. It is only one logical core in the multicast tree, which is responsible for group member maintenance and multicast tree creation. In this routing protocol builds a user- multicast tree, in which only the group members are included; because non-members are not included in the tree, the links in the tree are virtual links. In other words, they are in fact multi-hop IP-in-IP tunnels and AMRoute depends on the underlying unicast routing protocol to deal with network dynamics, although it has no privilege for unicast routing protocols.

AMRoute creates an efficient and robust shared tree for each group. It helps keep the multicast delivery tree unchanged with changes of network topology, as long as paths between tree members and core nodes exist via mesh links. When mobility is present, AMRoute suffers from loop formation, creates nonoptimal trees, and requires higher overhead to assign a new core. Also, AMRoute suffers from a single point of failure of the core node [23].

2. *Ad hoc Multicast Routing Protocol Utilizing Increasing id-numbers (AMRIS)*

AMRIS [7] is a proactive shared tree based multicast routing protocol, which is independent of the fundamental unicast routing protocol. In AMRIS, the tree maintenance procedure operates continuously and locally to ensure a node's connection to the multicast session delivery tree. In AMRIS, the tree maintenance procedure operates continuously and locally to ensure a node's connection to the multicast session delivery tree. AMRIS is an on-demand protocol that constructs a shared delivery tree to support multiple senders and receivers within a multicast session. AMRIS dynamically assigns every node (on demand) in a multicast session with an ID number known as *msm-id*. The msm-id provides a heuristic height to a node and the ranking order of msm-id numbers directs the flow of datagram in the multicast delivery tree. Every node calculates its msm-id during the initialization phase, which is initiated by a special node called S-id. Normally, the S-id is the source node if there is only one source for the session. Otherwise, the S-id is the source node that has the minimum msm-id. The S-id broadcasts a NEW_SESSION message to its neighbors. When a node wants to join the multicast session, it chooses one of its neighbors which has the smaller msm-id as its parent and send it a JOIN-REQ message. If the neighbor is in the tree (if the tree has been built), it answers with a JOIN-ACK message, which means the joining is successful; otherwise (when it is the first time to build the tree), the neighbor forwards JOIN-REQ to its own neighbors and waits for the reply, which is repeated until the JOIN-REQ arrives at an on-tree node or the source. As a result, a delivery tree rooted from the source is formed to include all the group members and some relay non-members. AMRIS repairs the broken links by performing local route repair without the need for any central controlling node, thereby reducing the control overhead.

3. *Core-Assisted Mesh protocol (CAMP)*

Core-Assisted Mesh protocol (CAMP) [18, 19] is a proactive multicast routing protocol based on shared meshes. The mesh structure provides at least one path from each source to each receiver in the multicast group.

CAMP relies on an underlying unicast protocol which can provide correct distances to all destinations within finite time. Every node maintains a Routing Table (RT) that is created by the underlying unicast routing protocol. CAMP modifies this table when a multicast group joins or leaves the network. A Multicast Routing Table (MRT) is based on the Routing Table that contains the set of known groups. Moreover, all member nodes maintain a set of caches that

contain previously seen data packet information and unacknowledged membership requests. The creation and maintenance of meshes are main parts of CAMP.

	AMRoute	AMRIS	CAMP
Structure of Multicast delivery	Tree	Tree	Mesh
Loop free	No	Yes	Yes
Dependency on Unicast routing protocol	Yes	No	Yes
Scalability	Fair	Fair	Good
Control Packet flooding	Flat	Flat	Flat
Periodic message Requirement	Yes	Yes	Yes

TABLE 3: Characteristic of Proactive Multicast Routing Protocol

B. *Reactive Multicast Routing Protocols*

Traditional routing protocols such as On-Demand Multicast Routing Protocol *(*ODMRP) and Multicast Ad-hoc on-demand Distance Vector *(*MAODV) are Reactive multicast routing protocols. Reactive routing that means discovers the route when needed. Reactive routing protocols are well suited for a large-scale, narrow-band MANET with moderate or low mobility. In Table 4 gives the Characteristic comparison of Reactive Multicast Routing Protocol.

1. *On-Demand Multicast Routing Protocol (ODMRP)*

On-Demand Multicast Routing Protocol (ODMRP) [8] is a reactive mesh based multicast routing protocol. ODMRP is not only a multicast routing protocol, but also provides unicast routing capability. The source establishes and maintains group membership and multicast mesh on demand if it needs to send data packets to the multicast group, which is somewhat similar to MAODV. A set of nodes, which is called forwarding group, participate in forwarding data packets among group members. All the states in ODMRP are soft states, which are refreshed by the control messages mentioned above or data packets, which achieves higher robustness.

ODMRP uses a forwarding group concept for multicast packet transmission, in which each multicast group G is associated with a forwarding group (FG). Nodes in FG are in charge of forwarding multicast packets of group G. In a multicast group of ODMRP, the source manages the group membership, establishes and updates the multicast routes on demand. Like reactive unicast routing protocols, ODMPR comprises two main phases: the request phase and the reply phase.

When a multicast source has a packet to send but it has no routing and group membership information, it floods a Join Request packet to the entire network. Join Request packets are member-advertising packets with piggybacked data payload. When a node receives a non-duplicate JOIN Request, it stores the upstream node ID in its routing table and rebroadcasts the packet. When the JOIN Request packet reaches a multicast receiver, the receiver refreshes or creates an entry for the source in Member Table and broadcasts JOIN TABLE packets periodically to its neighbors. When a node receives a JOIN TABLE packet, it checks each entry of the table to find out if there is an entry in the table whose next node ID field matches its ID. If there is a match, the node recognizes that it is on the path to the source, thus it is part of the forwarding group. Then it sets the FG_FLAG and broadcasts its own JOIN TABLE built upon matched entries. Consequently, each member of a forwarding group propagates the JOIN TABLE packets until the multicast source is reached via the shortest path. This process constructs (or updates) the routes from sources to receivers and builds a mesh of nodes, the forwarding group.

2. *Multicast Ad-hoc On-demand Distance Vector (MAODV)*

Multicast operation of Ad-hoc On-demand Distance Vector (MAODV) [10] is a reactive tree-based multicast routing protocol. MAODV is an extension of the unicast routing protocol Ad-hoc On-demand Distance Vector (AODV). Using MAODV, all nodes in the network maintain local connectivity by broadcasting "Hello" messages with TTL set to one. Every node maintains three tables, a Routing Table (RT), a Multicast Routing Table (MRT) and a Request Table. RT stores routing information and has the same function as in AODV. In unicast routing operations, every destination has a unique sequence number. Likewise, every multicast group also has a sequence number to indicate the freshness of the multicast routing information. Thus, one and only one group leader is elected to broadcast periodical GROUP HELLO messages throughout the MANET to maintain the sequence number. The group leader is by default the first node joining the group, but could also be another node when the first node leaves the group.

The main drawbacks of MAODV are long delays and high overheads associated with fixing broken links in conditions of high mobility and traffic load. Also, it has a low packet delivery ratio in scenarios with high mobility, large numbers of members, or a high traffic load. Because of its dependence on AODV, MAODV is not flexible. Finally, it suffers from a single point of failure, which is the multicast group leader.[23]

	ODMRP	MAODV
Multicast delivery structure	Mesh	Core based tree
Loop free	Yes	Yes

Periodic messages requirement	Yes	No
Routing Hierarchy	Flat	Flat
Scalability	Fair	Fair

TABLE 4: Characteristic of Reactive Multicast Routing Protocol

C. Hybrid Multicast Routing Protocols

Traditional routing protocol such as Optimized Polymorphic Hybrid Multicast Routing Protocol (OPHMR) is the Hybrid multicast routing protocol. Hybrid routing protocol attempts to discover balance between the two such as proactive for neighborhood, reactive for far away.

1. Optimized Polymorphic Hybrid Multicast Routing Protocol (OPHMR)

This protocol [9] is invested with different operational modes that are either proactive or reactive based on a MN's power remainder, mobility level, and vicinity density level. It attempts to address the issues of power efficiency, latency, and protocol overhead in an adaptive manner. OPHMR's reactive behaviour is based on the On-Demand Multicast Routing Protocol (ODMRP). It's relatively simplistic. It generates on-demand route paths for multicast message requests. OPHMR's proactive behaviour is based on the Multicast Zone Routing (MZR) protocol. It builds a zone around each Mobile Node (in hops) and periodically sends updates within each defined zone. For added efficiency, OPHMR utilizes an optimizing scheme adapted from the Optimized Link State Routing (OLSR) protocol. It used to decrease the amount of control overhead that is produced. OPHMR is, after a very lengthy period of time, able to extend battery life and enhance the survivability of the mobile ad hoc nodes. As a result, it decreases the end-to-end delay and increases the packet delivery ratio.

V. CONCLUSION

Mobile Ad-Hoc Networks (MANETs) are comprised of mobile nodes (MNs) that are self-organizing and cooperative to ensure efficient and accurate packet routing between nodes (and, potentially, base stations). Routing is an essential component of communication protocols in mobile ad hoc networks. Routing protocols typically fall under two classifications; first one is unicast routing protocol, second one is multicast routing protocol. The design of the protocols are driven by specific goals and requirements based on respective assumptions about the network properties or application area. In this survey studied unicast and multicast routing protocols for MANETs. According to the description and comparison of their schemes. We can arrive at the conclusions: Hybrid unicast or multicast routing protocol seems to be a better candidate than pure proactive and reactive routing protocols. Many of the application use unicast protocol whereas in group communication Multicast routing gives comparatively better performance. However, its performance needs to be fully exploited and the OPHMR is a batter than another Routing Protocol because OPHMR is a hybrid multicast routing protocol. For added efficiency OPHMR utilizes an optimizing scheme through a Multipoint Relay (MPR). It used to decrease the amount of control overhead that is produced. So we can say that OPHMR is a better than another routing protocol. This paper gives the comparative study of various routing protocol for MANETs.

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