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Effective & Scalable Multicast Communication Using Modified & Secure Odmrp Over Dynamic Wireless Networks

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Abstract − **Group communications are important in Mobile Ad hoc Networks (MANETs). Multicast is an efficient method for implementing group communications. However, it is challenging to implement efficient and scalable multicast in MANET due to the difficulty in group membership management. Efficient Geographic Multicast Protocol (EGMP) uses a virtual-zone-based structure to implement scalable and efficient group membership management. A network wide zone-based bidirectional tree is constructed to achieve more efficient membership management and multicast delivery. EGMP has high packet delivery ratio, and low control overhead. But it has some delay. ODMRP gives less delay and better packet delivery it has the advantages of Usage of up-to-date and shortest routes, Maintenance and exploitation of multiple redundant paths, Scalability to a large number of nodes. SPBM gives the position based information for the packet transmission. Here the combination of these the protocol (MSODMRP) gives the high packet delivery, less delay and secure transmission.**

Index Terms— **routing, wireless networks, mobile ad hoc networks, multicast, and protocol.**

I INTRODUCTION

There are increasing interests and importance in supporting group communications over Mobile Ad Hoc Networks (MANETs). Example applications include the exchange of messages among a group of soldiers in a battlefield, communications among the firemen in a disaster area, and the support of multimedia games and teleconferences. With a one-to-many or many-to-many transmission pattern, multicast is an efficient method to realize group communications. For MANET unicast routing, geographic routing protocols have been proposed in recent years for more scalable and robust packet transmissions. The existing geographic routing protocols generally assume mobile nodes are aware of their own positions through certain positioning system (e.g., GPS), and a source can obtain the destination position through some type of location service. In, an intermediate node makes its forwarding decisions based on the destination position inserted in the packet header by the source and the positions of its one-hop neighbours learned from the periodic beaconing of the neighbours. By default, the packets are greedily forwarded to the neighbour that allows for the greatest geographic progress to the destination.

II PROTOCOL DESCRIPTION

A) Efficient Geographic Multicast Protocol (EGMP):

EGMP supports scalable and reliable membership management and multicast forwarding through a two-tier virtual zone-based structure. At the lower layer, in reference to a pre-determined virtual origin, the nodes in the network self-organize themselves into a set of zones as shown in Fig. 1, and a leader is elected in a zone to manage the local group membership. At the upper layer, the leader serves as a representative for its zone to join or leave a multicast group as required. As a result, a network-wide zone-based multicast tree is built. For efficient and reliable management and transmissions, location information will be integrated with the design and used to guide the zone construction, group membership management, multicast tree construction and maintenance, and packet forwarding. In EGMP, every node is aware of its own position through some positioning system (e.g., GPS) or other localization schemes. The forwarding of data packets and most control messages is based on the geographic unicast routing protocol GPSR. EGMP, however, does not depend on a specific geographic unicast protocol.

B) Scalable Position Based Multicast (SPBM):

The group management scheme is responsible for the dissemination of the membership information for multicast groups, so that forwarding nodes know in which direction receivers are located. The multicast forwarding algorithm is executed by a forwarding node to determine the neighbours that should receive a copy of a given multicast packet. This decision is based on the information provided by the group management scheme. The aim of the membership update mechanism is to provide each node in the ad-hoc network with an aggregated view of the position of group members. For this purpose, each node maintains a global member table containing entries for the three neighbouring squares for each level from level 0 up to level ($L>1$). In addition each node has a local member table for nodes located in the same level-0 square.

C) On-Demand Multicast Routing Protocol (ODMRP):

The protocol, termed ODMRP (On-Demand Multicast Routing Protocol), is a mesh-based, rather than a conventional tree based, multicast scheme and uses aforwarding group concept. It applies on-demand procedures to dynamically build routes and maintain multicast group membership. ODMRP is well suited for ad hoc wireless networks with mobile hosts where bandwidth is limited, topology changes frequently, and power is constrained. Multicasting has emerged as one of the most focused areas in

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the field of networking. As the technology and popularity of the Internet have grown, applications that require multicasting (e.g., video conferencing) are becoming more widespread. Another interesting recent development has been the emergence of dynamically reconfigurable wireless ad hoc networks to interconnect mobile users for applications ranging from disaster recovery to distributed collaborative computing. Limited bandwidth, constrained power, and mobility of network hosts make the multicast protocol design particularly challenging.

To overcome these limitations, we have developed the On-Demand Multicast Routing Protocol (ODMRP). ODMRP applies on-demand routing techniques to avoid channel overhead and improve scalability. It uses the concept of forwarding group a set of nodes responsible for forwarding multicast data on shortest paths between any member pairs, to build a forwarding mesh for each multicast group. Using a mesh instead of a tree, the drawbacks of multicast trees in mobile wireless networks (e.g., intermittent connectivity, traffic concentration, frequent tree reconfiguration, non-shortest path in a shared tree, etc.) are avoided. A soft state approach is taken in ODMRP to maintain multicast group members. No explicit control message is required to leave the group. We believe the reduction of channel/storage overhead and the relaxed connectivity make ODMRP more scalable for large networks and more stable for mobile wireless networks.

The advantages of ODMRP are:

1. Low channel and storage overhead
2. Usage of up-to-date and shortest routes
3. Robustness to host mobility
4. Maintenance and exploitation of multiple redundant paths
5. Scalability to a large number of nodes
6. Exploitation of the broadcast nature of wireless environments
7. Unicast routing capability

III PROPOSED SYSTEM

The existing systems have the drawback group membership management. It can be overcome by combining the three protocols EGMP, ODMRP and SPBM. EGMP manage the group membership and ODMRP will improve the packet delivery and the SPBM gives the position information for the packet delivery. The zone structure is formed virtually and the zone where a node is located can be calculated based on the position of the node and a reference origin. Reduce the topology maintenance overhead and support more reliable multicasting, an option is to make use of the position information to guide multicast routing.

In summary, our contributions in this work include:

- ❖ Making use of the position information to design a scalable virtual-zone-based scheme for efficient membership management, which allows a node to join and leave a group quickly. Geographic unicast is enhanced to handle the routing failure due to the use of estimated destination position with reference to a zone and applied for sending control and data packets between two entities so that transmissions are more robust in the dynamic environment.
- ❖ Supporting efficient location search of the multicast group members, by combining the location service with the membership management to avoid the need and overhead of using a separate location server.
- ❖ Introducing an important concept zone depth, this is efficient in guiding the tree branch building and tree structure maintenance, especially in the presence of node mobility. With nodes self-organizing into zones, zone based bi-directional-tree-based distribution paths can be built quickly for efficient multicast packet forwarding.
- ❖ Addressing the empty zone problem, this is critical in a zone-based protocol, through the adoptions of tree structure. Fig.1. shows Zone structure and multicast session example

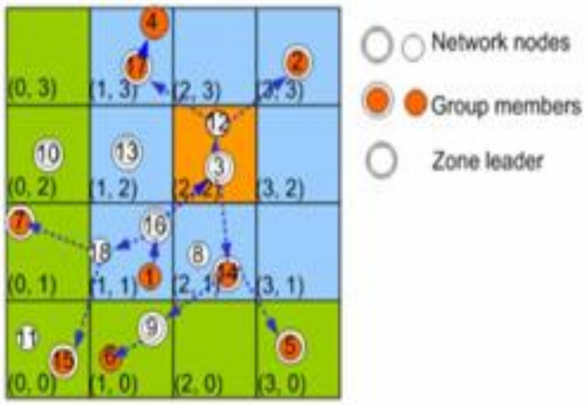

Fig.1. Zone structure and multicast session example

EGMP supports scalable and reliable membership management and multicast forwarding through a two-tier virtual zone-based structure. At the lower layer, in reference to a pre-determined virtual origin, the nodes in the network self-organize themselves into a set of zones as shown in Fig. 1, and a leader is elected in a zone to manage the local group membership. At the upper layer, the leader serves as a representative for its zone to join or leave a multicast group as required. In EGMP, the zone-structure is virtual and calculated based on a reference point. Therefore, the construction of zone structure does not depend on the shape of the network region, and it is very simple to locate and maintain a zone.

Some of the notations to be used are:

- ❖ Zone : The network terrain is divided into square zones as shown in Fig. 1.
- ❖ r : Zone size, the length of a side of the zone square. The zone size is set to $r \leq r_t/\sqrt{2}$, where r_t is the transmission range of the mobile nodes.
- ❖ Zone ID: The identification of a zone. A node can calculate its zone ID (a, b) from its position coordinates (x, y) as: a =[x-x0/r]; b=[y-y0/ r], where (x0, y0) is the position of the virtual origin, which can be a known reference location or determined at network setup time.

- A zone is virtual and formulated in reference to the virtual origin. For simplicity, we assume the entire zone IDs is positive.
- Zone center: For a zone with ID (a,b), the position of its center (x_c, y_c) can be calculated as: $x_c = x_0 +(a + 0.5)* r$; $y_c= y_0+(b+ 0.5)* r$. A packet destined to a zone will be forwarded toward the center of the zone.
- zLdr: Zone leader. A zLdr is elected in each zone for managing the local zone group membership and taking part in the upper tier multicast routing.
- Tree zone: The zones on the multicast tree. The tree zones are responsible for the multicast packet forwarding. A tree zone may have group members or just help forward the multicast packets for zones with members.
- Root zone: The zone where the root of the multicast tree is located.
- Zone depth: The depth of a zone is used to reflect its distance to the root zone. For a zone with ID (a, b), its depth is depth = max ($|a_0 - a|$, $|b_0 - b|$); where (a_0, b_0) is the root-zone ID. For example, in Fig. 1, the root zone has depth zero, the eight zones immediately surrounding the root zone have depth one, and the outer seven zones have depth two.

A) Zone-supported geographic forwarding:

For scalability and reliability, the centre of the destination zone is used as the landmark for sending a packet to the group members in the zone although there may be no node located at the centre position. This, however, may result in the failure of geographic forwarding. For example in Fig. 1, node 7 is the only node in zone (0, 1), while node 18 in zone (1, 1) is closest to the centre of zone (0, 1). When node 16 sends a packet to zone (0, 1) with its centre as the destination, the underlying geographic unicast protocol (for example, GPSR) will forward the packet to node 18 greedily as it is closer to the destination. As node 18 cannot find a neighbour closer to the centre of zone (0, 1) than itself, the perimeter mode may be used to continue the forwarding. This still cannot guarantee the packet to arrive at node 7, as the destination is a virtual reference point. Such a problem is neglected by the previous geographic protocols that use a region as destination. To avoid this problem, we introduce a zone forwarding mode in EGMP when the underlying geographic forwarding fails. Only when the zone mode also fails, the packet will be dropped. Distances of different zones to the destination zone, the node can calculate the distance value dis(a;b) of a zone (a,b) to the destination zone (adst; bdst) as: $dis(a,b) = (a - a_{dst})2 + (b - b_{dst})2$. A zone with a smaller dis value is closer to the destination zone.

B) Modules:

- Architecture model
- Source side information
- Zone construction
- Zone election
- Packet allocation
- Multicast construction
- Multicast packet delivery
- Multicast route

- Cost analysis
- Performance evaluation

C) Modules description:

Architecture model & Source side information:

1.Neighbour table generation:

For efficient management of states in a zone, a leader is elected with minimum overhead. As a node employs periodic BEACON broadcast to distribute its position in the underneath geographic unicast routing to facilitate leader election and reduce overhead, EGMP simply inserts in the BEACON message a flag indicating whether the sender is a zone leader. A broadcast message will be received by all the nodes in the zone. To reduce the beaconing overhead, instead of using fixed-interval beaconing, the beaconing interval for the underneath unicast protocol will be adaptive. A non-leader node will send a beacon every period of $Intval_{max}$ or when it moves to a new zone. A zone leader has to send out a beacon every period of $Intval_{min}$ to announce its leadership role. A node constructs its neighbour table without extra signalling. When receiving a beacon from a neighbour, a node records the node ID, position and flag contained in the message in its neighbour table. Table 1 shows the neighbour table of node 18 in Fig. 1.

Table 1: The neighbour table of node 18 in Fig. 1.

NodeID	Position	Flag	Zone ID
16	(x_{16}, y_{16})	1	(1, 1)
1	(x_1, y_1)	0	(1, 1)
7	(x_7, y_7)	1	(0, 1)
13	(x_{13}, y_{13})	1	(1, 2)

2. Zone construction & Zone election:

A zone leader is elected through the cooperation of nodes and maintained consistently in a zone. When a node appears in the network, it sends out a beacon announcing its existence. Then it waits for an Intvalmax period for the beacons from other nodes. Every Intvalmin a node will check its neighbour table and determine its zone leader under different cases:

1) The neighbour table contains no other nodes in the same zone; it will announce itself as the leader.

2) The flags of all the nodes in the same zone are unset, which means that no node in the zone has announced the leadership role. If the node is closer to the zone canter than other nodes, it will announce its leadership role through a beacon message with the leader flag set.

3) More than one node in the same zone have their leader flags set, the one with the highest node ID is elected.

4) Only one of the nodes in the zone has its flag set, and then the node with the flag set is the leader.

3. Packet Allocation & Multicast Construction:

Here we simulated 30 CBR traffic flows with each flow sent at 8 Kbps between a randomly chosen source and a non-empty zone. A packet is considered to be successfully delivered if it is received by any node in the destination zone. When the destination is a zone, the zone canter is a better estimation of the destination position than the closest point in the destined zone. As the estimated closest point in the destined zone could be very close to the zone border, compared to the zone canter, it is more likely for an out-of-zone node to be closer to the estimated point and become the forwarder than an intra-zone node. Hence, the forwarder may have a higher chance of dropping the packet when not able to find a next-hop node closer to the destination for forwarding the packet. The simulation results confirm that using zone forwarding mode can help reduce the number of undelivered packets.

a) Multicast group join: When a node M wants to join the multicast group G, if it is not a leader node, it sends a JOIN REQ (M, PosM, G, fMoldg) message to its zLdr, carrying its address, position, and group to join. If a zLdr receives a JOIN REQ message or wants to join G itself, it begins the leader joining procedure as shown in Fig.2. If the JOIN REQ message is received from a member M of the same zone, the zLdr adds M to the downstream node list of its multicast table. If the message is from another zone, it will compare the depth of the requesting zone and that of its own zone. If its zone depth is smaller, i.e., its zone is closer to the root zone than the requesting zone, it will add the requesting zone to its downstream zone list, otherwise, it simply continues forwarding the JOIN REQ message towards the root zone.

b) Multicast group leave: When a member M wants to leave G, it sends a LEAVE (M,G) message to its zone leader. On receiving a LEAVE message, the leader removes the source of the LEAVE message from its downstream node list or zone list depending on whether the message is sent from an intra-zone node or a downstream zone. Besides removing a branch through explicit LEAVE, a leader will remove a node from its downstream list if it does not receive the beacon from the node exceeding 2*Intervalmax. If it's downstream zone list and node list of G are both empty and it is not a member of G either, the leader sends a LEAVE (zoneID, G) message to its upstream zone. Through the leave process, the unused branches are removed from the multicast tree.

c) Multicast session initiation and termination: When a multicast session G is initiated, the first source node S (or a separate group initiator) announces the existence of G by flooding a message NEW SESSION (G; zoneIDS) into the whole network. The message carries G and the ID of the zone where S is located, which is used as the initial root zone ID of group G. When a node M receives this message and is interested in G, it will join G using the process described in the next subsection. A multicast group member will keep a membership table with an entry (G; root zID; isAcked), where G is a group of which the node is a member, root zID is the root-zone ID and isAcked is a flag indicating whether the node is on the corresponding multicast tree. A zone leader (zLdr) maintains a multicast table. When a zLdr receives the NEW SESSION message, it will record the group ID and the root-zone ID in its multicast table. Table 2 is an example of one entry in the multicast table of node 16 in Fig. 1. The table contains the group ID, root-zone ID, upstream zone ID, downstream zone list and downstream node list. To end a session G, S floods a message END SESSION (G). When receiving this message, the nodes will remove all the information about G from their membership tables and multicast tables.

Table 2: The entry of group *G* in multicast table of node 16

group ID	*G*
root-zone ID	(2, 2)
upstream zone ID	(2, 2)
downstream zone list	(0, 1), (0, 0)
downstream node list	1

4. Multicast packet delivery:

a) Packet sending from the source: After the multicast tree is constructed, all the sources of the group could send packets to the tree and the packets will be forwarded along the tree. In most tree-based multicast protocols, a data source needs to send the packets initially to the root of the tree. A source node is also a member of the multicast group and will join the multicast tree. For example, in Fig. 1, source node 1 sends the packets to its leader node 16, which will send the packets to its upstream zone (2, 2) and its downstream zones (0, 1) and (0, 0), but not to the downstream node 1 which is the incoming node. When the packets are received by leader node 3 of the root zone, it continues forwarding the packets to its downstream zones (1, 3), (3, 3), (2, 1) except the incoming zone (1, 1). The arrows in the figure indicate the directions of the packet flows.

b) Multicast data forwarding: In this protocol, only zLdrs maintain the multicast table, and the member zones normally cannot be reached within one hop from the source. When a node N has a multicast packet to forward to a list of destinations (D_1, D_2, D_3,…), it decides the next hop node towards each destination (for a zone, its canter is used) using the geographic forwarding strategy. After deciding the next hop nodes, N inserts the list of next hop nodes and the destinations associated with each next hop node in the packet header. An example list is (N_1: D_1; D_3; N_2: D_2 ;…), where N_1 is the next hop node for the destinations D1 and D3, and N2 is the next hop node for D_2. Then N broadcasts the packet promiscuously (for reliability and efficiency).

5.Multicast route:

a) Moving between different zones: When a member node moves to a new zone, it must rejoin the multicast tree through the new leader. When a leader is moving away from its current zone, it must handover its multicast table to the new leader in the zone, so that all the downstream zones and nodes will remain connected to the multicast tree. Whenever a node M moves into a new zone, it will rejoin a multicast

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group G by sending a JOIN REQ message to its new leader. During this joining process, to reduce the packet loss, whenever the node broadcasts a BEACON message to update its information to the nodes in the new zone, it also unicasts a copy of the message to the leader of its previous zone to update its position.

b) Dealing with empty zones: A zone may be partitioned into multiple clusters due to fading and signal blocking. A zone may become empty when all the nodes move away. In EGMP, if a tree zone becomes empty, the multicast tree will be adjusted correspondingly to keep the multicast tree connected. Because of the importance of the root zone, we will treat it differently. When a leader is moving away from a non-root tree-zone and the zone is becoming empty, it will send its multicast table to its upstream zone. The upstream zone leader will then takes over all its downstream zones, and delete this requesting zone from its downstream zone list. The new upstream zone needs to send JOIN REPLY messages to all the newly added downstream zones to notify them the change. When receiving the JOIN REPLY messages, these downstream zones will change their upstream zone ID accordingly.

c) Handling multiple clusters per zone: When there is severe shadowing/fading or a hill/building that prevents the radio communication between nodes in a zone, the nodes in the same zone may form multiple clusters, where the two clusters are not connected in the zone although they are connected through some nodes outside the zone. In this case, two nodes in different clusters can communicate with each other by using unicasting because they are connected on the network topology graph, but an intra-zone flooding message initiated in one cluster may not reach other clusters. This problem is also a key problem for zone-based protocols. When the leader of a cluster changes, if the cluster is on-tree, the new leader sends a JOIN REQ message to its upstream zone immediately this also carries the old leader's address.

d) Tree branch maintenance: To detect the disconnection of tree-branches in time, if there are no multicast packets or messages to deliver for a period of Intvalactive, the leader of a tree-zone will send an ACTIVE message to its downstream nodes and zones to announce the activity of the multicast branches. The message is sent through multicast to multiple downstream entities. When a member node or a tree-zone fails to receive any packets or messages from its leader or upstream zone up to a period of 2 * Intvalactive, it assumes that it loses the connection to the multicast tree and restarts a joining process.

e) Route Optimization: Sometimes a zone leader may receive duplicate multicast packets from different upstream zones. For example, as described in the above subsection, when failing to receive any data packets or ACTIVE messages from the upstream zone for a period of time, a tree-zone will start a rejoining process. However, it is possible that the packet and message were lost due to collisions, so the old upstream zone is still active after the rejoining process, and duplicate packets will be forwarded by two upstream zones to the tree-zone. In this case, the one closer to the root zone will be kept as the upstream zone. If the two upstream zones have the same distances to the root zone, one of them is randomly selected.

6.Cost analysis:

The per node cost of the protocol, which is defined as the average number of control messages transmitted by each node per second. The cost of the overall protocol consists of the following three components: zone building and geographic routing, tree construction, and tree maintenance.

a) Cost for zone building and geographic routing:

The zone is virtual and determined by each node based on its position and the reference origin, without the need of extra signalling messages. The leader information is distributed with a flag inserted in the beacon messages of the underlying geographic unicast routing protocol.

b) Cost for tree construction:

The tree construction process is associated with the multicast session initiation and termination, and the member joining and leaving the multicast tree. The per node cost of multicast tree construction is with respect to the network size and the group size. To analyze the cost for the joining and leaving process, we consider the worst case that all the zones need to join the multicast tree and become tree zone and all the members to join the tree are not zone leaders. The distance between an upstream and a downstream zone leader is shorter than $2\sqrt{2}r+r_t$, where r_t is the transmission range. Therefore, the cost for multicast tree construction is:

$Cost_{tree} = Cost_{init\ end} + Cost_{join} + Cost_{reply} + Cost_{leave}$

This indicates that the per-node control overhead involved in multicast tree construction remains relatively constant with respect to network size and group size.

c) Cost for tree maintenance:

The cost involved in multicast tree maintenance include the handling of zone crossing of multicast members, the tree reconstruction when there is an empty zone, and the tree branch maintenance. Assume that a node keeps the same moving direction in a zone. The average moving distance of the mobile nodes in a zone is $\Pi r/4$. The per node cost of multicast tree maintenance is with respect to the network size and the group size. $Cost_{emptyzone} = Cost\ t_{reeZone} + Cost_{rootZone}$ The cost for tree branch maintenance should be also less than the cost of joining process with frequency 1/Intvalactive.

7.Performance evaluation:

a) Packet delivery ratio: The ratio of the number of packets received and the number of packets expected to receive.

b) Normalized control overhead: The total number of control message transmissions divided by the total number of received data packets. Each forwarding of the control message was counted as one transmission.

c) Normalized data packet transmission overhead: The ratio of the total number of data packet transmissions and the number of received data packets.

d) Joining delay: The average time interval between a member joining a group and its first receiving of the data packet from that group. To obtain the joining delay, the simulations were rerun with the same settings except that all the members joined groups after the source began sending data packets.

e) Multicast efficiency: It defined as the number of data packets delivered to multicast receivers over the number of total data packets forwarded. Higher value implies better performance.

Multicast Efficiency= total received packets / total forwarded packets

f) Member table: Each multicast receiver stores the source information in the Member Table. For each multicast group the node is participating in, the source ID and the time when the last JOIN REQUEST is received from the source is recorded. If no JOIN REQUEST is received from a source within the refresh period, that entry is removed from the Member Table.

g) Forwarding group table: When a node is a forwarding group node of the multicast group, it maintains the group information in the Forwarding Group Table. The multicast group ID and the time when the node was last refreshed are recorded.

IV SIMULATION RESULTS

A) Average power conservation Vs Time:

The performance of average power conservation of ODMRP, MSODMRP & SODMRP is shown in the graph. MODMRP is the modified on demand multicast routing protocol and SODMRP is the secure on demand multicast routing protocol. Compared to ODMRP and MSODMRP, SODMRP is more secure and will give the more data delivery and less delay. The moving speed of nodes is uniformly set between the minimum and maximum speed values which are set as 1 m/s and 20 m/s, respectively. IEEE 802.11b was used as the MAC layer protocol. Fig 2 shows the simulation results of Average power conservation Vs Time.

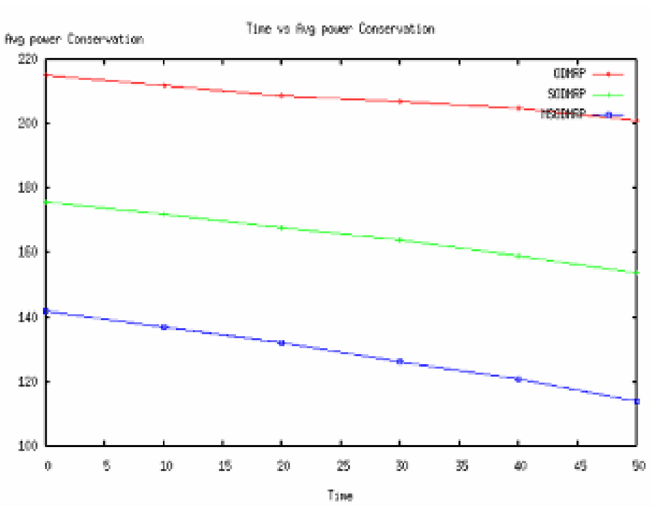

Fig. 2: Average power conservation Vs Time

B) Speed Vs Delivery ratio:

In ODMRP, the mesh structure is built on the source's demand, and a source sends out a JOIN QUERY message periodically to refresh the mesh structure. If the nodes want to join a group, they need to wait until the next mesh refreshing period. The refreshing interval is set as 3 seconds. Fig 3 shows the simulation results of Speed Vs Delivery ratio.

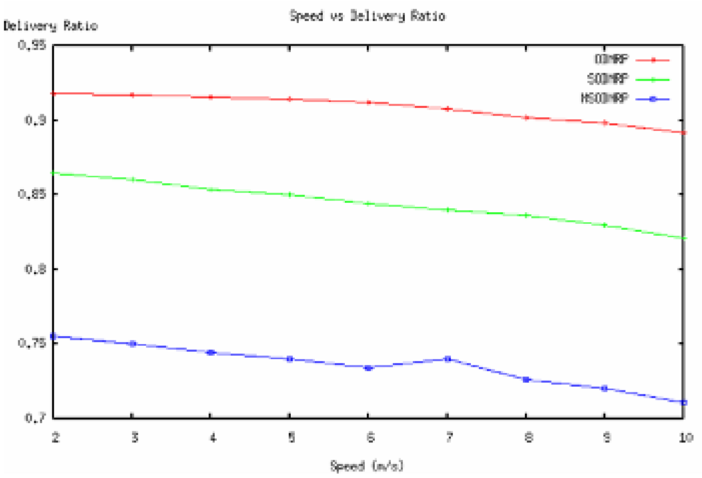

Fig.3: Speed Vs Delivery ratio

C) Byte sent byte delivered Vs Speed:

Using SODMRP we can receive the more number of data. It is critical and challenging for a multicast routing protocol to maintain a good performance in the presence of node mobility in an ad hoc network. We evaluate the protocol performance by varying maximum moving speed from 5 to 40 m/s. Fig 4 shows the simulation results of Byte sent byte delivered Vs Speed.

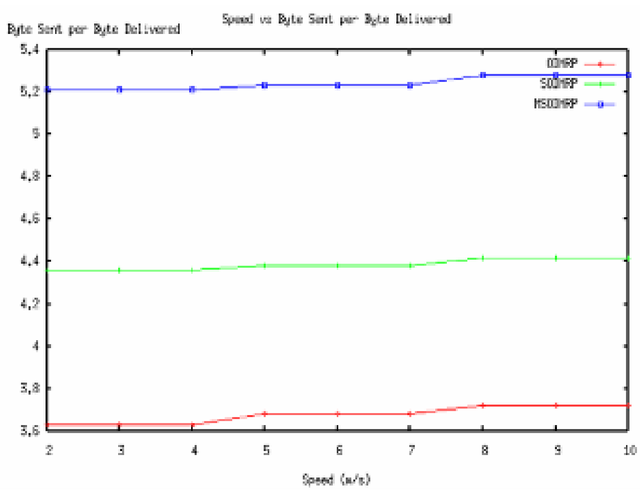

Fig. 4: Byte sent Byte delivered Vs Speed

D) Time Vs Throughput:

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By varying the time period from 0 to 50 m/s and we can analyse the through put. As the time period increases the through put also increases in MODMRP and SMODMRP. But compared to MODMRP, SMODMRP has highest through put. It delivers the 95% of data send by the source. Fig 5 shows the simulation results of Time Vs Throughput.

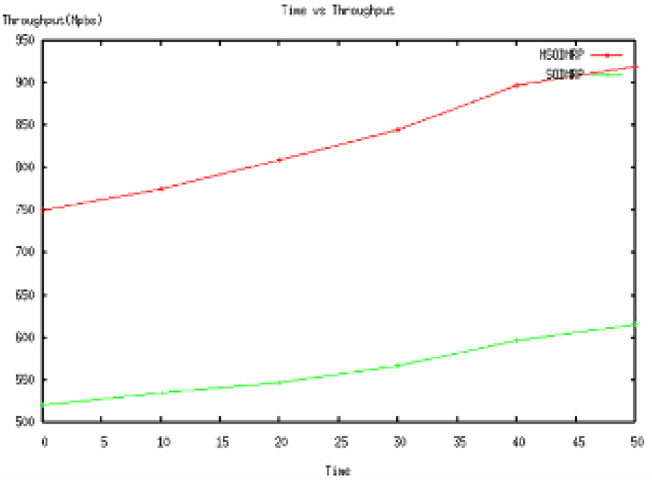

Fig.5 : Time Vs Throughput

V CONCLUSION

There is an increasing demand and a big challenge to design more scalable and reliable multicast protocol over a dynamic ad hoc network. The scalability of EGMP is achieved through a virtual-zone-based structure. A zone-based bidirectional multicast tree is built for more efficient multicast membership management band data delivery. The position information is used in the protocol to guide the zone structure building, The EGMP is used for the scalable group membership management and it will reduce the empty zone problem & improve the packet delivery ratio. EGMP gives the maintenance of tree or mesh based multicast structure over dynamic topology for large group size or network size. It is more robust and will give high packet delivery ratio even under high dynamics. SPBM uses the geographic position of nodes to provide a highly scalable group membership scheme. ODMRP will give the high packet delivery ratio, low loss. MSODMRP will give secure transmission, high delivery ratio. Compared to other multicast protocol MSODMRP gives more secure multicast transmission and high packet delivery with low loss and it will reduce the empty zone problem. Speed of transmission is more in the MSODMRP.

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