POSITION OF NEIGHBOR NODE UPDATION USING MULTIPATH ROUTING IN MANET

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ABSTRACT- To develop a routing protocol and optimize routing paths in mobile ad hoc networks is the challenge process. Routing has become one of the most suitable routing strategies in wireless mobile ad hoc network mainly due to its scalability. In periodic broadcasting of beacon packet send to their neighboring nodes at a equal interval of time that beacon packet contain the nodes present location. In this process it will increase the update cost and performance of the router low. Adaptive Position Update (APU) strategy which dynamically adjusts frequency of position updates based mobility of nodes and forwarding pattern in the network. Apu is based on two principles 1) nodes whose movements are harder to predict update their positions more frequently (and vice versa)(ii) nodes closer to forwarding paths update their positions more frequently (and vice versa). We embed APU into multipath optimized link state protocol (MPOLSR), shows that APU can significantly reduce the update cost and improve the routing performance in terms of packet delivery ratio and average end-to-end delay. Results confirm that APU significantly reduces beacon overhead without having any noticeable impact on the data throughput of the network as compared to GPSR protocol. By simulation results, it is shown that the proposed approach reduces the overhead.

Index Terms: beacon, routing protocol, MPOLS,

1. INTRODUCTION

In MANET each node is free to move in a subjective way. Subsequently its fundamental for nodes to maintain update position information with the immediate neighbor. Additionally there will be incessant changes in the topology of the mobile nodes. Therefore routing protocol is required that adapts whenever topology changes. Topology based routing has been widely hailed as the most promising approach to generally scalable wireless routing. Alternatively, a function of routing is included in every mobile host and multi-hops possibly will be essential to permit one node to interact with another node over the ad hoc network owing to the restricted transmission range. There is a possibility that wireless topology of the network may get varied randomly and quickly as the routes travel arbitrarily and systemize themselves randomly. A growing number of ad hoc networking protocols and location-aware services require that mobile nodes learn the position of their neighbors Some examples of possible uses of a wireless ad-hoc network include military applications, law enforcement, emergency response efforts, commercial use, and education.

2. MULTIPATH ROUTING

The process of transmitting the data packet from source to destination via wireless medium in mobile ad hoc networks is termed as routing. It becomes the major issue in ad hoc network, as it possess exclusive configuration. In case of single path routing, a single path is utilized to transmit the packets from the source to destination. Owing to the inconsistency of the wireless infrastructure and nodes mobility, single path routing protocols causes performance degradation in mobile networks. The process of discovering multiple routes among the distinct source and single destination at the time of single route discovery corresponds to multi-path routing. In MANET prevailing issues such as scalability, security, network lifetime, etc can be handled by the multipath routing protocols. . Multipath OLSR (MP-OLSR) [9] is hybrid protocol which combines all the characteristics of reactive and proactive protocol. In this system proactive and reactive mechanism is used for routing purpose. In proactive protocol when new node is get added into the network it takes more time to converge at that time if want to send data to destination through that node then it will take more time for transmission of data. This problem is avoided by using reactive protocol instead. After path is established data is transferred from source to destination. This process is verified through APU strategy. In this paper, we propose a novel beaconing strategy for topology routing protocols called Adaptive Position Updates strategy (APU) using MPOLSR protocol.

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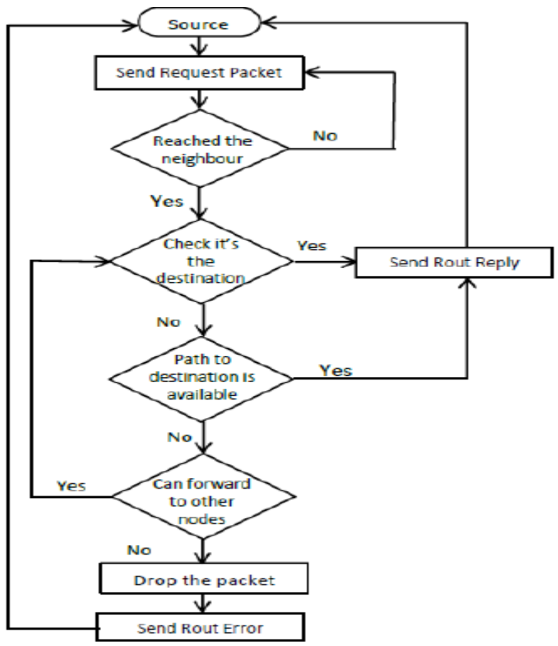

fig 1: Flowchart of Route discovery in mpolsr

3.ADAPTIVE POSITION UPDATE (APU)

Listing the assumptions that our work is built upon: (1) all nodes are aware of their own position and velocity, (2) all links are bidirectional, (3) the beacon updates includes current location and velocity of the nodes, and (4)data packets can piggyback position and velocity updates and all one-hop neighbors operate in the promiscuous mode and hence can overhear the data packet. Neighbors which are outside the communication range of nodes are not considered for data forwarding. Subsequently beacon play the important role in building the local topology.APU adapts the beacon update intervals to the mobility of the nodes and the amount of data being forwarded in the neighborhood of the nodes. APU uses two basic principles 1) nodes which are frequently changing its position are updated frequently 2) nodes which are in forwarding path are updated.

A. Mobility Prediction (MP) Rule

This rule adapts the beacon generation rate to the mobility of nodes. Nodes which contains highly mobile need to frequently update their neighbors since their locations are changing dynamically. At the same time, nodes which move slowly do not need to send frequent updates.

Goal of the MP rule is to send the next beacon update from node i when the error between the predicted location is greater than an acceptable value. To achieve this, node i, has to track its own predicted location in its neighbors node N(i).

$$X_p^i = X_l^i + (T_c - T_l) * V_x^i$$

$$Y_p^i = Y_l^i + (T_c - T_l) * V_y^i$$

We use a simple location prediction scheme based on the physics of motion to track a nodes current location., In our discussion we assume that the nodes are located in a two-dimensional coordinate system with the location indicated by the x and y coordinates. It refers to the location X and velocity information that was broadcast in the previous beacon from node i. Node i uses mobility prediction scheme to keep track of its predicted location among its neighbors. Let, denote the actual location of node I Then node i computes the deviation as follows:

$$D_{devi}^i = \sqrt{(X_a^i - X_p^i)^2 + (Y_a^i - Y_p^i)^2}$$

If the deviation is greater than a certain threshold, know as the Acceptable Error Range (AER), it acts as a trigger for node i to broadcast its current location and velocity as a new beacon node. Threshold of AER is an important parameter that can affect the performance of the APU scheme.

B. On-Demand Learning (ODL) Rule

The MP rule solely may not be sufficient for maintaining an accurate local topology. In the worst-case, assuming no other nodes were in the nearby range, the data packets would not be transmitted at all here To maintain a more accurate local topology devise a mechanism in those regions of the network . This is precisely On-Demand Learning (ODL) rule aims to achieves this. As the name suggests, a node broadcasts beacons packet on-demand, i.e. in response to data forwarding node that occur in activities involve the vicinity of that node. According to this rule, whenever a node overhears a data transmission from a new neighbor, it broadcasts a beacon as a response. Node waits for a small random time interval before responding with the

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beacon to prevent collisions with other beacon .In addition, since the data packet contains the location of the final destination, any node that overhears data packet also checks its current location and determines if the destination is within its transmission range. If so, the destination node is added to the list of nodes neighbor if it is not added. Note that, this particular check incurs turns to zero cost, i.e., no beacons need to be transmitted.

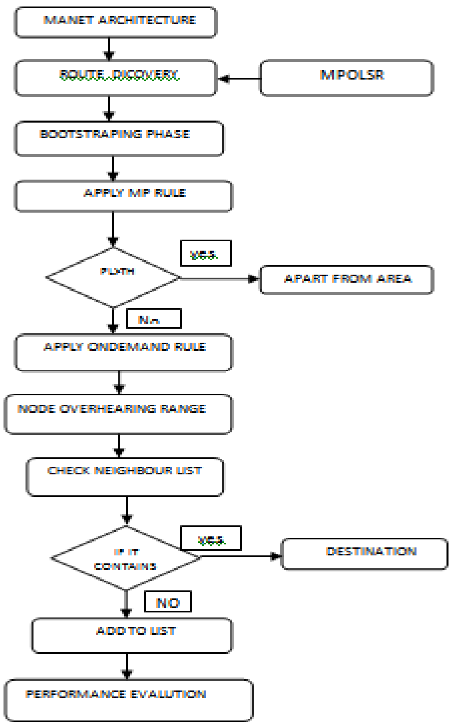

Fig 2: Overall dataflow diagram for APU

The ODL rule allows active nodes that are involved in data forwarding to enrich their local topology beyond the basic set. In other words, a rich neighbor list is maintained at the high traffic load. This list is maintained only at the active nodes and is built reactively in response to the network traffic. All inactive nodes simply maintain the basic neighbor list.

ODL ensures the nodes involved in data forwarding are highly mobile, alternate routes could be easily established without incurring additional delays In essence, ODL aims at improving the accuracy of topology along the routing path from the source to the destination, for each traffic flow in network.

4.PERFORMANCE EVALUATION

The metrics have been chosen in order to evaluate the routing protocols. The following three metrics capture the most basic overall performance of Routing protocols studied in this paper 1) Packet delivery Ratio is the defined as number of packets successfully transmitted between source and destination Fig 3a shown increases ratio as compared to periodic beaconing. As in existing denote periodic update of interval in all metrics

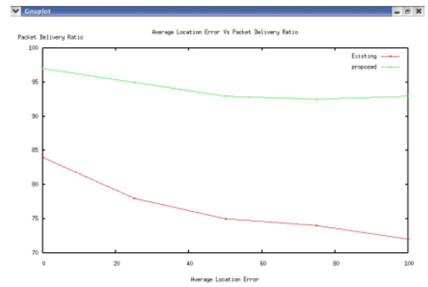

Fig 3a packet delivery ratio

2) Average End-to-End delay of data packets (E2E Delay).The end-to-end delay is defined as time between the point in time the source want to send a packet and the moment the packet reaches it destination. in Fig 3b decrease the delay while performing in MPOLSR protocol.

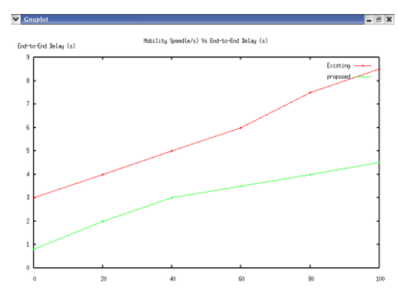

Fig 3b End to End delay

3)Beacon overhead is evaluated depends on sending and receiving beacon packet fig 3c shown that it decrease the overhead as compare in existing periodic method.

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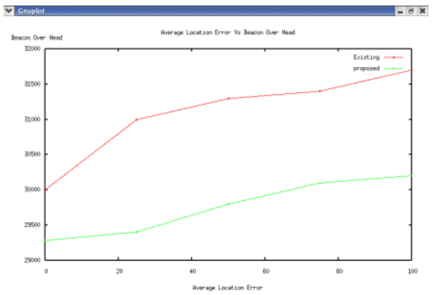

Fig 3c Beacon overhead

4 .CONCLUSION

In this paper, we have identified the need to adapt the beacon update policy employed in topology routing protocols to the node mobility and the traffic load Adaptive Position Update (APU) strategy evaluate these. The MP rule uses mobility prediction to estimate the accuracy of the location estimate and adapts the beacon update interval accordingly, instead of using periodic beaconing update. The ODL rule allows nodes with the data forwarding path to maintain an accurate view of the local topology by exchanging beacons in response to data packets overhead from new neighbors. Adaptive Position Update Scheme for dynamically adjust the frequency for beacon update by using MPOLSR protocol as compared to existing routing protocol.

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