A Proposal For Improving Route Optimization In Proxy Mobile IPv6

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***Abstract*: MIPv4 (Mobile Internet Protocol version 4), in which the main problem is triangular routing. Mobile node able to deliver packets to a corresponding node directly through foreign agent but when corresponding node sends packet to the mobile node packet comes to foreign agent via home agent then it comes to mobile node. This asymmetry is called triangle routing. It leads to many attendant problems, namely the increment of impact of possible network partitions, load on the network and delay in delivering packets. The next generation IPv6 is designed to overcome this kind of problem (triangle routing). To solve the triangle routing problems different route optimization schemes are used which exclude the inefficient routing paths by creating the shortest routing path. These are Light Weight Route optimization scheme & enhanced light weight route optimization scheme. I have taken End to end delay and Packet delivery fraction, Performance metrics to compare these two schemes by using NS-2 simulations. End to end delay includes all possible delays caused by buffering, retransmission delay & propagation & transfer times of data packets. Packet delivery fraction is the ratio of the data packets delivered to the destinations to those generated by the sources. By using these parameters I have found that enhanced light weight route optimization scheme performance is better than Light Weight Route optimization scheme.**

Keywords: Route Optimization Schemes, Performance Result

I. INTRODUCTION

As the growth of wireless network technology dimension for accessing mobile network has been increased dramatically. Mobile Internet Protocol version6 is a mobility protocol standardized by the Internet Engineering Task Force (IETF). In Mobile Internet Protocol version6, communications are maintained even though the mobile node (MN) moves from its home network to foreign network. This is because that the MN sends Binding Update (BU) message to its Home Agent (HA) located in the HN to inform the location information whenever the MN hands off (move) to other networks. The Mobile Nodes in the Internet, it requires that the MNs maintain mobility related information and create own mobility signaling message. In other words, the MNs that has limited processing power, battery, and memory resource. To overcome such limitations, IETF has proposed Proxy Mobile IPv6 (PMIPv6) protocol. In PMIPv6, the MN's mobility is guaranteed by the newly proposed network entities such as the local mobility anchor (LMA) and the mobile access gateway (MAG). PMIPv6 causes the triangle routing problem that causes inefficient routing path. In order to establish the efficient routing paths, three different Routing Optimization (RO) schemes have been introduced. To solve the triangle routing problems three different route optimization schemes are used which exclude the inefficient routing paths by creating the shortest routing path The RO schemes using correspondent information (CI) message. These are Liebsch's Route optimization scheme, Light Weight Route optimization scheme & enhanced light weight route optimization scheme. In this paper I have compare Light Weight Route optimization scheme & enhanced light weight route optimization scheme by using NS-2 simulations.

II.THE RO SCHEMES

Light Weight Route Optimization Scheme (LWRO)

In Light Weight Route Optimization Scheme Local Mobility Anchor and Mobile Access Gateway are used. To establish the Route Optimization path between the Mobile Node's we use Local Mobility Anchor and Mobile Access Gateway. In it Mobile Node1 connected to Mobile Access Gateway and the Mobile Node2 connected to Mobile Access Gateway2. The packets from the Mobile Node1 to the Mobile Node2 are passing through the Local Mobility Anchor [7]. When the Local Mobility Anchor received the packet, it knows the path for the packets to the Mobile Access Gateway2, but at the same time, it also sends a corresponding Binding Update to Mobile Access Gateway2. The Mobile Access Gateway1 receives the corresponding Binding

Acknowledgment. Now packet is send from Mobile Access Gateway2 to Mobile Node1. Thus packets from the MN1 destined to the MN2 get intercepted by the Mobile Access Gateway1 and are forwarded to the Mobile Access Gateway2, instead of being forwarded to the Local Mobility Anchor.

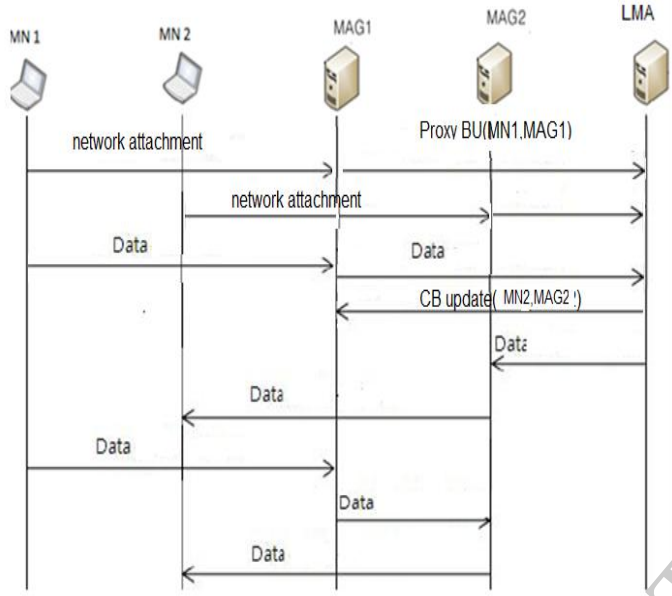

Fig 1 Data flow in Light Weight RO Scheme

Enhance Light Weight Route Optimization Scheme (ELWRO)

In Enhance Light Weight Route Optimization Scheme Local Mobility Anchor and Mobile Access Gateway are used. To establish the Route Optimization path between the Mobile Node's we use Local Mobility Anchor and Mobile Access Gateway. In ELWRO scheme in Corresponding Binding Information (CBI) message are used. In MN1 sends data packets to the MN2.First of all MN1 sends the data packets to the Mobile Access Gateway1, and then the MAG1 sends the data packets to the Local Mobility Anchor. The LMA knows the possible setup with RO. The LMA sends Corresponding Binding Information (CBI) message to the MAG1 [1] .Corresponding Binding Information (CBI) message include the MN1's address, the MN2's address, and the MAG2's address information. When the MAG1 received CBI message, then the MAG1 send Correspondent Binding Update message to the MAG2. Correspondent Binding Update message include the MN1's address, the MN2's address and the MAG1's address information The MAG2 sends Corresponding Binding Acknowledgment (CBA) message to the MAG1 for Corresponding Binding (CB). Now the packets are exchange between the MN1 and the MN2.

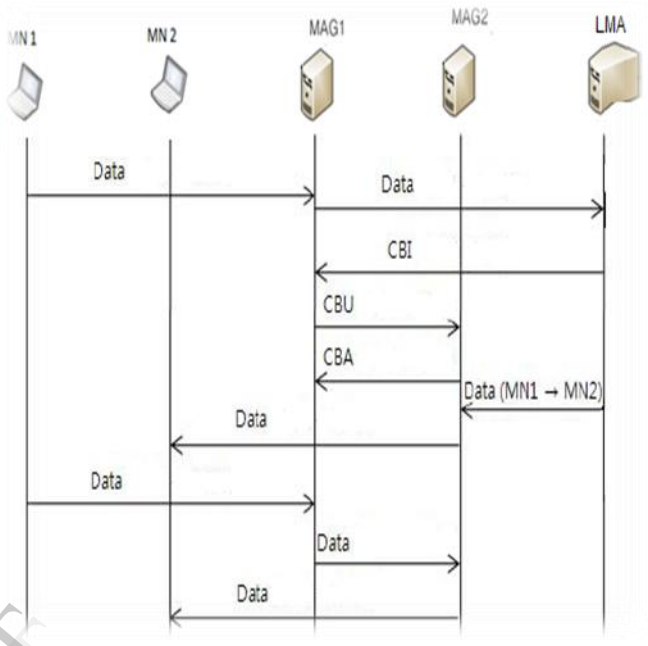

Fig 2 Data flow in Enhance Light Weight RO Scheme

III. PERFORMANCE METRICS

Performance metric for the above three scheme is given by

1) end to end delay: $\sum$ Di/Nr i= 1 to n
   Nr= no. of packets received at destination
   Di= end to end delay of packets

2) Packet Delivery Fraction: as the ratio of data packets delivered to destination to those generated by CBR source is known as packet delivery fraction

Pdf=spd/gpcbr

Spd =sent packet to destination
Gpcbr =generated packet by cbr

IV. PERFORMANCE RESULT

Packet Delivery Fraction**:** As indicated in graph the Enhanced Light Weight route optimization scheme perform better than the light weight route optimization scheme. In Enhanced Light Weight route optimization scheme packet are transmitted between CN & MN more fastly.

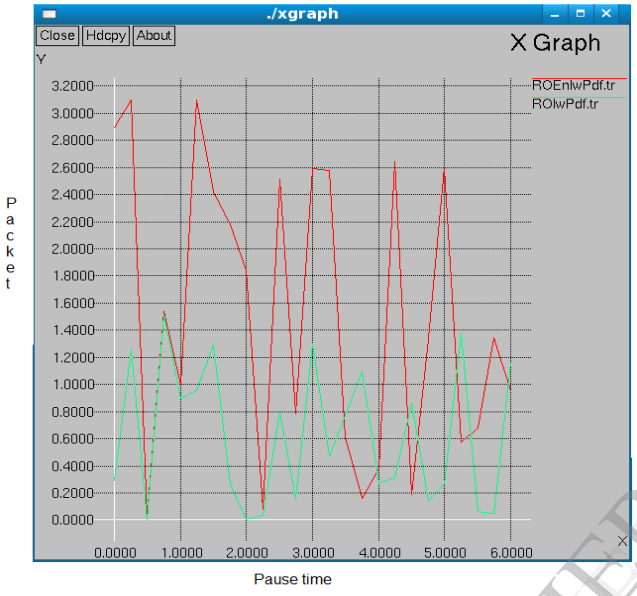

Fig 3 Packet delivery fraction comparison study graph

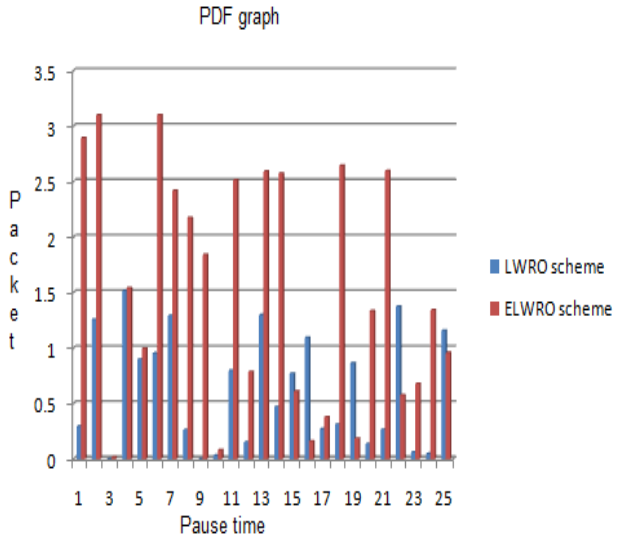

Fig 4 Packet delivery fraction graph

End to end delay graph**:** As indicated in graph the Enhanced Light Weight route optimization scheme perform better than the light weight route optimization scheme.

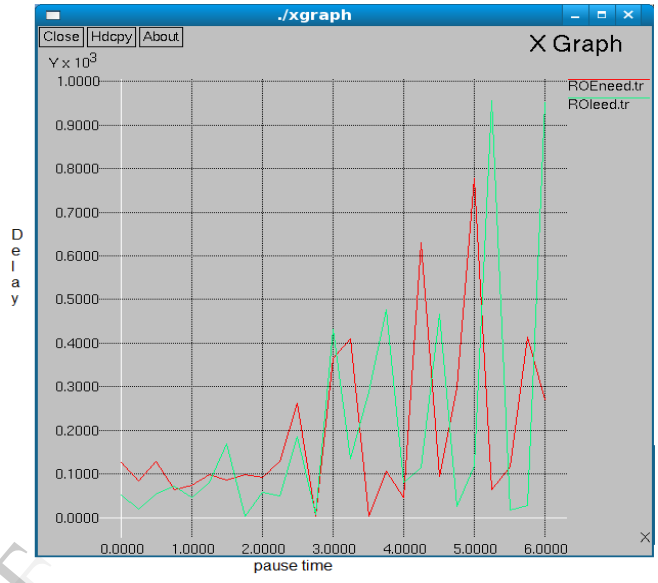

Fig 5 End to end delay comparison study graph

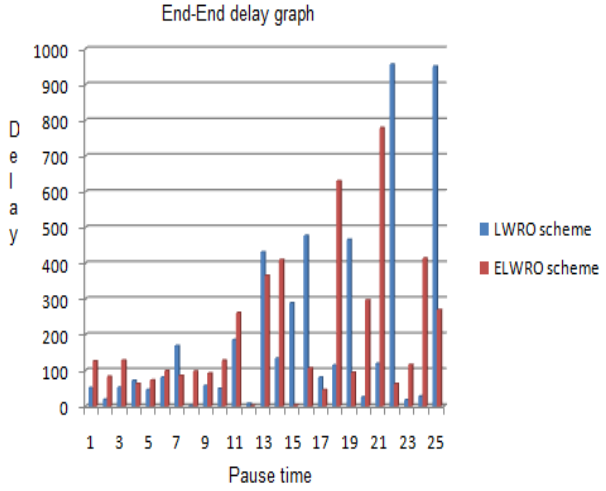

Fig 5 End to end delay comparison study graph

V. CONCLUSION

In this paper, we have introduced the operation of RO schemes that solve the triangle routing problem and provided the results of performance evaluation. The

results of Packet Delivery Fraction & end to end delay performance evaluation show that performance of ELWRO scheme is better than LWRO scheme.

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