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A Hybrid Evolutionary Approach of Mobile Protocol, MIPV6 and HMIPV6

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Abstract- The MIPv6 and HMIPv6 are the mobility management solutions to support the IP mobility. Although HMIPv6 is an extension of MIPv6 still there is handover latency and packet loss in HMIPv6. In the present studies a scheme is supposed to support a fast handover efficiently in hierarchical mobile IPv6 networks (HMIPv6). In HMIPv6 when a mobile node (MN) moves from a one MAP region to another, then there is a disruption of connection as well as packet loss due to long handover latency. To overcome these problems, an efficient fast handover scheme is adopted from FMIPv6 to optimize the performance of the inter-MAP handover. The handover latency for MIPv6 & HMIPv6 was compared to the proposed scheme with analytical model. By review study, we show that the proposed scheme has better performance compared to MIPv6 & HMIPv6 in terms of handover latency and packet loss.

Keywords: - MIPV4, MIPV6 and HMIPV6

1 BASIC INTRODUCTION

1.1 Mobile IPv6

Mobile IPv6 solves the challenge of mobility in case of mobile node (MN) by swiftly managing the coordination between the IP address of the Mobile network and an Internet protocol address which is assigned permanently or semi-permanently to the Mobile network. This permanent IP address is known as the Home Address of the Mobile network. The Home Address given to the mobile network is given a network prefix of link.[4] Therefore, almost all the packets which are sent to the mobile network's home address via the communicating nodes are then routed to the home link, home agent is present also called the network entity.

The home agent contains a mapping both between CoA and the Home Address. So whenever the mobile network is out in a foreign network, the binding cache entry is activated for the MN and the packets supposedly arriving for the MN are further Intercepted by the home agent and tunneled to the CoA of the MN. [6][2]

1.2 Hierarchical Mobile IPv6 (HMIPV6)

HMIPv6 acts as an intra domain mobility solution. It launches the Mobility Anchor Point (MAP) entity for all of the domains. The MAP is a router which is supposed to maintain a connection between itself and a mobile node currently belonging to its domain. When a mobile network enters a map domain receives router advertisement through the access router. These router advertisements contain vital information on local maps [3]. The network has the ability to bind its current location, LCOA along with the address on the MAP's subnet RCOA.

Whenever the point of attachment changes for a mobile network it is supposed to register the LCOA with the MAP as the global address has still not changed. This makes handover latency vastly reduced since the Binding Updates are supposed to reach the MAP only.

2 VARIOUS ISSUES IN MOBILE IP

Mobile IP is a protocol which is connectionless protocol having various issues like

1) The impact of difference in the QOS model for the two radio access network types of applications. [10]
2) How to deal with variant connection paradigms that are used in every network like WLAN is connection less whereas GPRS is connection oriented.
3) How to certify the packet routing access.
4) How to choice the best integration point when multi network is being used.

There has been a splurge in the usage of mobile communication recently. Technology integration and reasonable prices have enabled large users to adopt various technologies. The Internet Protocol is supposed to bring about the synergies between personal mobile communication and wireless computer networks.

Mobile IP is supposed to help the network layer in providing mobility support to nodes and also in a multi-access environment. Mobile IPv6 protocol is designed by the IETF in order to give mobility support to IPv6 addressable nodes also simultaneously being reachable the same address at all times. Mobile IPv6 also helps in providing mobility support at the network layer, especially to the IPv6 layer. However MIPv6 needs mobile nodes in

order to perform home network registration and an address resolution procedure. This results in long longhand off latency which might badly degrade transport protocol's effectiveness.

The IETF has brought forward a few techniques to solve these problems and hence provide fast and reliable handoff to mobile nodes these techniques provide seamless handoff to mobile nodes. It means there is no counting connection between communicating devices which are end to end connecting or communicating with each other connection type is datagram type which means data packets which are traveling through whole communicating process between the nodes are independent from each other or we can say there is no relation between them.

They are independent from each other (during travel between source host to destination host, destination host to source host) because of advantages like cost savings, ease of implementation and optimized networks, all-IP network is the next big thing. To add to the demand there has been a splurge of wireless users and ever growing demand for wireless services, the internet body IETF has launched mobility management schemes to improve IPv6 in mobility applications for ease of access to wireless subscribers.

3 FAST HANDOVERS

Fast handovers makes the layer 3 handoff in a way that data traffic can easily be moved to the mobile networks new location before it moves there. This activity results in small packet loss because of layer 3 handoff latency. Fast handover gives four entirely new message types that can be used along with MIPv6. These messages are often used between the mobile network and the AR and [3] also in the Previous access router (PAR: the router attached to the mobile network before handing off) and the new access router. Fast handover is started by the link layer triggers as it is in signal to noise ratio (SNR). Trigger at the mobile network is supposed to send Or else trigger at the transmitter a message has the link layer address. The mobile network will receive a response. In anticipation of this response the mobile network forms the COA as per the IPv6 address auto-configuration. Also at the same time, the mobile network sends a BU in order to bind its currently formed CoA as the final message before the handover is done. [6] After arrival of the fast BU from the mobile network the PAR starts sending packets to the new CoA of the mobile network. And when the mobile network moves to the PAR it transfers a Neighbor Advertisement (NA) to start flow of packets from the PAR.

Mobility Anchor Point also known as MAP was launched into Hierarchical Mobile IPv6 (HMIPv6). MAP made use of the arithmetic which was base on distance vector. Information regarding MAP distance vector could be retrieved using the Route Advertisement [7]. Maximal distance vector MAP converted into new proxy is chosen in order to reduce the handover frequency when mobile network is in macro mobility. However very high MAP will be a challenge to communications whenever the load of MAP was getting convergent [2].If a mobile network is in macro mobility then chose the MAP which has big management so that no resources are wasted.

4 LT-TMAP IN HMIPV6

It is possible to set many MAP's in a network. So this eliminates the requirement of multilevel MAP's which might be used to improve handover capability. In Multilevel MAP's the MAP would transfer data downwards owing to the high MAP hence decreasing the delay in transmission in LT-TMAP (Licensed to Temporary Mobility Anchor Point) fast handover scheme.

By using LT-TMAP scheme hierarchy of the MAP's can be improved. A number of AR's are present in each MAP area. Whenever mobile network does micro mobility in areas like those in figure, MAP responds to every request of every AR in the area. Also with the authorization of MAP, every AR in MAP area has the ability to turn into temporary MAP (TMAP).

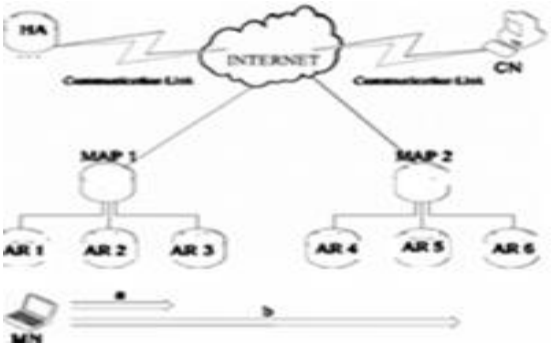

Fig.1 Micro mobility and macro mobility between different areas

After initialization of handover request by the mobile network, a regional Care of Address and an on-link Care-of Address (L CoA) is provided by MAP in case operation flux of MAP is not exceeding its load limit. Afterwards ,MAP updates the addresses binding and sends back binding acknowledgement status along with the information to AR.[3] In case operation flux of MAP overtakes its load limits MAP will send back binding acknowledgement information having errors in this AR. The highest priority AR is selected in case there are multiple handover requests from other mobile networks.

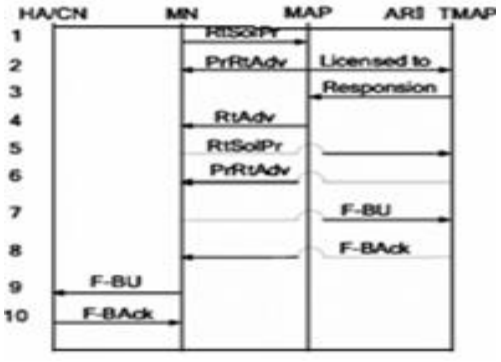

Fig.2 LT-TMAP handover process

Whenever operation flux of MAP looks to fall lower than the limits, MAP switches to TMAP which has the lowest flux in the area to let go the authorization and finally makes it into AR again. Whenever Mobile network does macro mobility under areas such figure 2, the handover process is resembles to the micro mobility in area. If the load limit is not exceeded by operation flux of MAP2, MAP2 gives a New Regional Care-of address (NR CoA) for mobile networks and also for AR4 for the micro network which recently arrived provides a new on-link Care-of Address (NL CoA).

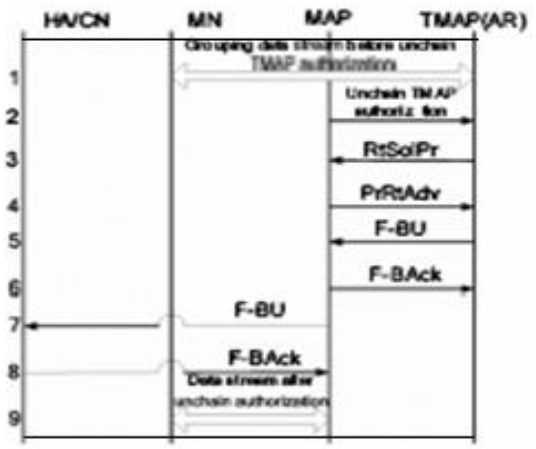

Fig. 3 TMAP unchain authorization process

And in case the limit is exceeded by the operation flux of MAP2 , MAP2 makes the top priority AR of its area into TMAP and then the priority decrease in the option, the arrived AR4 from the mobile network provides a NL CoA. This kind of scheme uses MAP resources of network in HMIPv6 more efficiently, also reduces the frequently handovers whenever mobile network moves, improves network status and capability.

5 CONCLUSION

In this paper we explained brief introduction of MIPV4, MIPV6 and HMIPV6 their field of mobile applications. MIPV6 has many advantages over MIPV4 as well as HMIPV6 has various advantages over both MIPV4 and HMIPV6. Various issues related to mobile protocols and how they resolved with different techniques are also briefly explained. Fast handover process is also being discussed by reviewing the proposed scheme for the process. It is found that LT MAP has better results of MIPv6.

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