Mobility in IPV6 with Cross Layer Fast Hand over Mechanism

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ABSTRACT

To accomplish user's diverse constraints various wireless base technologies are created. IP based network is one of them because of its tremendous results its demand is increasing day by day. The viable illustration of IP based network is IEEE 802.16e standard i.e. WiMAX which proves itself as the most promising technology for the upcoming generation.MAC layer protocol and physical layer between mobile and base station is defined by the current standard MIPv6 protocol is introduced to provide mobility to IPv6 Internet.MIPv6 allows movement of mobile nodes between two subnets accomplished with reliable ongoing communication. In this paper we are introducing basics of MIPV6 and its cross layer handover mechanism.

Keywords: MIPV6, MIPV4, WI MAX,IP IPV6

1. INTRODUCTION

MIPV6 connects an MN's identifier to locator with the help of home agent present in the network. When the attachment point of MN is changed in newly visited network a new locator gets arise and is registered by the HA.[4] But when MN carries out recurrent handover in a local region quite far away from the HA then it takes time to register HA leading to handover latency. [1] [2] [4]

To overcome this problem it is necessary to separate micro mobility i.e. handover occurring in a particular region from a macro mobility i.e. handover occurring across region. The required macro mobility is managed by the MIPv6 which reduces the problem of handover latency as now it is not necessary to inform HA and correspondent node about the handover.

HMIPv6 is prominently known as a simple and efficient micro mobility scheme In its network complete process of micro mobility is controlled by a mobility anchor point working as a HA. Figure 1 depicts that an access router set is managed by a particular MAP to establish a region. Management of different ARs by an MAP is known as regional size. A new HA and MAP is registered when MN moves to a new region. But if movement is within a particular region then only MAP is registered. MAP captures all the MN located packets and channels them towards itself.HMIPv6 evade failure point by deploying MAP in large amount.

With the help of HMIPv6 MIPv6 performance gets improved because of having shielded MN's micro mobility from HA and CN. Lets evaluate can the same performance be achieve in all the situations. We know handover latency is less in HMIPv6 in contrast to MIPv6.But this latency is obtained at the cost of two things. One is double registration where both regional as well as home registration is require when MN wander across the region. Double registration means increased latency. Second is prolonged packet delivery time. It is because of excavating the MN's destined packets by MAP leading to prolonged processing delay of a packet. If these things overcome the profit then HMIPv6 cannot perform well as compare to MIPv6. [3] [4]

Regional size and MAP are the crucial parameters of HMIPv6.More are the load possessed by MAP greater is the processing time of the packet. Similarly small is the regional size more regular is the MN's macro mobility providing recurrent double registration. Large regional size means more traffic on MAP leading to prolonged delay in packet processing time and latency.

Both HMIPv6 and MIPv6 have different span. Minimization of overall Registration and packet delivery latency are something interesting to see in them.

Choice of regional size and MAP is something again fascinating in both of the protocols.

To study these interesting features a new scheme called optimal choice of mobility management is introduced in this paper. The word optimal choice means selection of best regional size and MAP in case of HMIPv6 selection of best protocol among these on the basis of MN's service characteristics and mobility. To study the addressing for making the hierarchical structure of the network.

For achieving our aim a model is also proposed to study both protocols in the terms of packet delivery latency and average overall registration [3] .Markov model is studied to see the effect of regional size on the cost of both the protocols. Further to calculate MN's mobility because of its movement in different directions. An algorithm is also introduced for selecting the best regional size and MAP when HMIPv6 performs well after seeing that same regional size the absolute and relative cost of HMIPv6 in contrast to MIPv6.

2. THEORETICAL VIEW

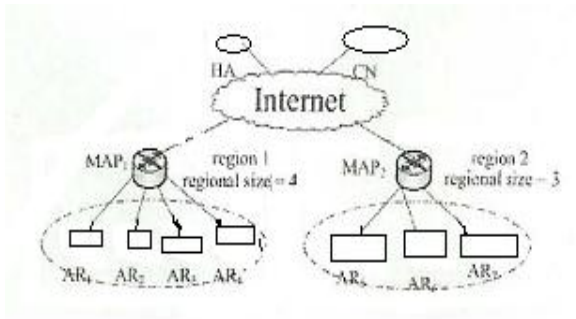
Designing unified mobility management technique for upcoming generation is a major challenge. Moreover to attain global roaming between existing networks is also difficult task. In present times several seconds are optimize by the handover process that proves it worthless for time base applications like video streaming and VOIP. Thus a handover having limited delay is desire to accomplish aim of unified mobility management.

This proves handover is a most important parameter to study in MAC layer of IP based networks. It has been seen from previous study [1, 2] that handover should employ both IP as well as MAC layer. To reduce handover latency deploying information of link layer is quite an interesting parameter to study. Another protocol named (FMIPv6) fast mobile IPv6 is introduced. When MN roam towards another subnet this protocol allows MN to identify at L3 and help to collect all information of newly assigned access routers while being in connection with old subnet [3]. In [4] IETF draft implementing FMIPv6 is discussed. In this procedure a tunnel linking IP layer of target BS and serving BS is establish to reduce the time require to transmit packets to BS before completion of handover procedure.

Service disruption time gets reduce with the use of link layer information. In spite of this MN has to register with CN and HA whenever it roams among IP subnets especially in L3 handover. In WiMAX the regular MIP registration process increases network load and influence handover latency due to large coverage area of BS.

In this case of hierarchical structure of HMIPv6 [5] helps in reducing handover latency. It deploys fast handover having characteristics of both HMIPv6 and FMIPv6.This handover proves itself good in micro mobility [6] by introducing mobility anchor point in HMIPv6.Now MN don't have to register when it roams around uniform MAP domain thus reducing handover latency and signal payload. But F-HMIPv6 do not provide solution for macro mobility

HMIPv6 fast macromobility handover [7] is useful in macro mobility but MN still face registration delay for both new HA and MAP. A new handover mechanism i.e. cross layer handover (CLFH) is discussed. CLFH is good for both macro and micro mobility. In CLFH to enhance the speed of handover MIP registration is done in advance. Further to decrease handover delay of L2 network re-entry process is also improve.



3. PREVIOUS RESEARCH

IN [3], [2], [7], [4], [8], [5], [6], [10], [11], [12], [13] management schemes of micro mobility for improving the MIP performance have been discussed. A mailbox based scheme is discussed in [3] that employ a management solution based on foreign agent. In [4] for a regional MIP network an adjustment among packet tunneling and location update is discussed along with regional size .FA is employed in [3, 4] for management function.

For cellular network micro mobility management architecture is studied .In the architecture MA is selected by MN in line with the loads. In [7] fast handover is used for the intra domain mobility of the 4G network. In [8] a cellular architecture based MIP network is discussed. It solves the problem of optimized location area by using the concept of paging traffic. The architecture discussed in [7], [6] ,[8] are used in personal communication system. These papers prove that PCS is geographic oriented while internet is spatial oriented.

HMIPv6 proves itself ads a good paradigm for micro mobility management.HMIPv6 adopts MAP in large amount for a domain. It utilizes utmost MAP for consistent registrations. But the utmost MAP I s not suitable in the case of less mobility rate because of different features of MN.

To solve the problem occurring in low mobility MAP selection algorithm is used involving the feature of distance and velocity to MAP. In this algorithm MAP is used in form of a tree structure. To reorganize the network load a high level MAP is used in [10]. Exponential moving average method to estimate load transition is discussed in [11].Regional size and MAP selection are the two important parameters to study for evaluating the network's performance. All the discussed architectures or procedures either improvise the prevailing micro mobility management schemes or introduce new mechanisms. We discuss about the ways to minimize the packet delivery cost and registration for MIPv6 and HMIPv6. It is seen that HMIPv6 and MIPv6 are the advanced schemes for mobility management especially in the industrial field. They both have their own span with distinct performances.IPv6 mobility management is improvised with the use of balanced features of both of them. In [14] [15] [16] different parameters affecting the network performance of HMIPv6 and MIPv6 are studied. A model to dissect the application arena of HMIPv6 and MIPv6 is discussed.

A. Proposed Work

Cross Layer Fast Handover network model along with its handover procedure is discussed in this part of paper.

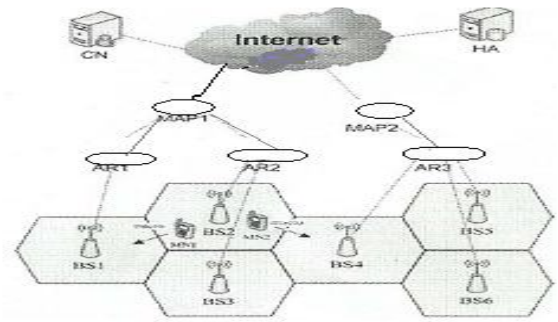


Fig. 1. Network structure

The model of CLFH is based on HMIPv6 architecture. Both inter and intra handover are present in CLFH. In case of intra handover MN roaming occur between subnets of a particular MAP domain. Figure 2 shows the intra handover i.e. MN1 handover between BS2 and BS1.While in case of inter handover roaming occur between subnets of a distinct MAP domain which is shown in figure 2 i.e. handover fromBS2 to BS4. Similar to HMIPv6, MN has regional CoA, two CoA and on-link CoA. When both MN and CN communicate with each other, CN transmit data packets to MN's RCoA and MAP further forward them to MN's LCoA. In case of intra handover for the existing MAP domain MN alter its LCoA. But in case of inter handover MN develop a new LCoA and RCoA and carry out registration procedure for both HA and new MAP.

B. Cross Layer Fast Handover Mechanism For Hmipv6

Figure 3 and 4 depicts the complete procedure for both inter and intra MAP handover. In this anchor point is shifted from old AR to MAP while maintaining the functionality of fast handover. To get the optimum performance four triggers of L2 are utilized for link switch, new link detected, link up and link handover impend. Complete handover is grouped in three parts handover preparation, handover execution and network topology acquisition.

The network topology acquisition is same for both inter and intra handover process. Firstly an MOB_NBR-ADV message is transmitted periodically by BS to MS. While MS on going towards the periphery of BS scan along with neighboring BS to select the pursuit for handover emphasizing the channel information. Scanning procedure helps in allocating a new BS. After scanning MN triggers NLD to acknowledge the detection of a new link. Due to this MS comes to know about the position of the next AR. By exchanging router solicitation for Rt . So l Pr (proxy) as well as proxy router advertisement message for p AR MN gets to know about new AR.

MS transmit MOB_MSHO-REQ message to BS depicting more than one BS at the time of handover. BS transmits an acknowledgment MOB_BSHO-RSP message for selecting a BS. MN of L2 triggers LHI for L3 to inform that handover procedure decision is taken for execution. Figure 3 depicts the case of intra handover case where MN employs BS network prefix for allocating a new LCoA and initialize handover by transmitting FLBU i.e. fast local BU message to MAP.

Handover acknowledgment and initiation messages are transferred between AR (new) and MAP for establishing a temporary tunnel and use DAD procedure for testing new Local. After establishing the tunnel (FLBACK) fast local binding acknowledgment is transmitted my MAP to MN. Now the packets which have to be transmitted to MN start forwarding to AR (new) by the tunnel. Figure 4 represents inter handover, in this handover scheme MN defines both n L CoA and n R CoA .Once the addresses are defined FBU messages are transmitted to p MAP from MN to initialize the handover mechanism .p MAP also transfer HACK and HI to n MAP and n AR for verifying the validity of both n R CoA and n L CoA using DAD procedure. A temporary tunnel is established between n AR and p MAP. After the tunnel formation FBACK is returned by map to MN. Forward packets are transferred to AR along with MN. After receiving a FBACK message again LSW trigger is originated for L2 thereby L3 handover preparation is done After handover preparation ,handover execution comes where MOB-HO-IND message is at once transmitted by the L2 of the MN. The link is moved to BS for beginning network re-entry process. After the completion of network re-entry process (FNA) fast neighbor advertisement messages are transferred by L3 of the MN to the new AR .Now buffered packet are transmitted to MN by new AR. Thus extra registration process is not involved in the intra MAP handover Generally in case of inter handover MIP registration id done by MN. In this mechanism registration is done simultaneously along with re-entry procedures thereby decreasing the handover latency. In case of re-entry process LBA and LBU messages are shared between n MAP and p MAP allowing MN to be with both new RCoA and LCoA. MN’s new R CoA with new CN and HA is registered by the map using BA and BU messages. Figure 4 shows that after the completion of MIP registration and network re-entry process the handover process gets completed and both CN and MN communicate with each other.

4. CONCLUSION

MIPV6 is improvement over MIPV4.In this paper we studied basic features of MIPV6 and HMIPV6 and cross layer mechanism its related work which initially introduced. Various mobile node related to this mechanism and MAP selection procedure .network model research work about cross layer fast hand over mechanism

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