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Enhance the Performance of Proxy Mobile Ipv6 using Extended Label Switching

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ABSTRACT

In the current communication technology Proxy Mobile IPv6 is mobility is the recent Mobility Management protocol. It is independent of mobile core network. It is a protocol integrates various access technologies such as WiMAX, Wifi, 3GPP. The binding mechanism of Proxy Mobile IPv6 ties the Mobility Access Gateway (LMA) with single or different interfaces. This proposed Extended Label Switching (ELS) network improves the performance with respect to reduce handover latency and packet loss. This proposed mechanism act as an between uplink and downlink packets between mobile nodes. By this mechanism it PMIPv6 avoids superfluous packet forwarding and packet loss.

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INTRODUCTION

In the network communication, the internet protocols exploit distinct tag to detect the IP address for identifying node location and packet delivery throughout the network. When more than one IP addresses involved it was difficult to detect he peer node. The existing Internet Protocols (IP Version 4) have (RFC 791, 1981)] common mechanisms (IETF, 2010; Network Working Group, 2000; Network Working Group April 2008)Generally mobility management protocols (IP version 6) (IETF) represented as next generation protocols. The mobility management protocols have two types. One is host based and other is network based. The MIPv6, Fast mobile IPv6 (IETF, 2011), and Hierarchical Mobile Ipv6 (IETF, 2010) are host based protocols. These protocols mechanism requires host to participate in the signalling flow. The main drawback of the host based IP protocols were lack in handover and reduce energy level of the packets due to the involvement of the host participation.According to the PMIPv6 base specification, an LMA updates a mobile node's (MN's) Binding Cache Entry (BCE) and switches the forwarding tunnel after receiving a Proxy Binding Update (PBU) message from the mobile node's new MAG (n-MAG). At the same time, the LMA disables the forwarding entry towards the mobile node's previous MAG (p-MAG). In case of an inter-technology handover, the mobile node's handover target interface must be configured according to the Router Advertisement being sent by the n-MAG (Network Working Group, 2008) Fig.1 explains this concept.

In proxy mobile IPv6 the LMA updates a mobile node Binding Cache Entry(BCE) and switches the forwarding tunnel after receiving a Proxy Binding Update(PBU) message from the mobile nodes new message (MAG_2). At the same time LMA disables the forwarding entry towards the mobile node previous message (MAG_1). In case of an inter technology handover target interface must be configured according to the router Advertisement being sent by the MAG_2 (IETF, 2011). Fig.2 explains this concept. There are other mechanisms used in PMIPv6 (Zhao Liang, 2009; Rosario, G., 2009) to reduce the handover delay.

This proposed paper improves the performance based on two methods. First method based on reducing the delay during re-establishment of connection during the handover when the node moves from one region to other region. Second method based on reducing the over head problem of the data packet when the interface changed.

II.Related Work:

2.1 Proxy Mobile IPv6:

Proxy mobile IPv6 is a network mobility management protocol which does not require the participation of mobile node during the signalling between the edge routers i.e. LMA and MAG. Maintaining the mobile nodes communication towards MAG in the major responsibility of LMA.

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Initiating the registration of binding between LMA and MAG is the responsibility of the MAG. When the new link is detected by IPv6 protocol it sends a Router Solicitation (RS) message to the routers which are connected by the concern link. According to the responsibility of MAG it creates a communication between LMA and MAG. When the router receives the RS message the LMA updates the mobile nodes connectivity i.e., handover procedure and the create a binding cache Entry(BCE) which have the Home Network Prefix (HNP) i.e. the new attachment of mobile node. The paper (Network Working Group, 2007) explains the Auto address configuration method.

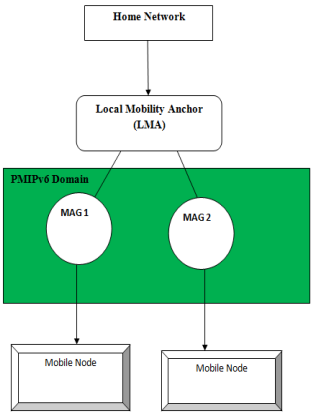

Fig. 1: Local Mobility Anchor in PMIPv6.

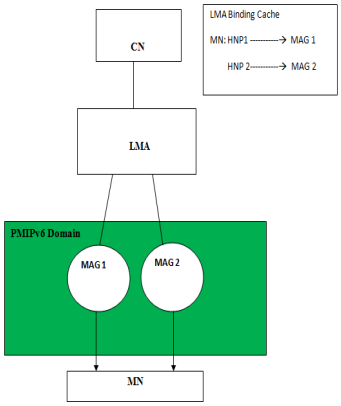

Fig. 2: Scenario of Proxy Mobile IPv6 with Different Interfaces.

2.2. Multi protocol Label Switching (MPLS):

Multiprotocol Label Switching is the massive technique used in the core networking (Alcatel-Lucent, 2010). In the MPLS each packets are bounded with Label which have the path description of the node from source to destination. This label attachment is called as Label Switched Path (LSP) (Network Working Group, 2001).The significant entities of MPLS are Label Edge Routers (LER) and Label Switch Routers (LSR). In the MPLS LER is placed at the edge of its concern network. Assigning a label to the incoming data packets and eradicate the label of the same data packet while leaving from the concern network is the major responsibility of the LER. Providing appropriate out link the incoming packet is the major responsibility of the LSR.

III. Proposed Work:

This section explains the improvement the PMIPv6 with ELS. It shows the reformation of MPLS with LSP tunnel.

3.1 Proposed Architecture of PMIPv6 with ELS:

The given fig.3a represents the proposed system scenario which describes the flow of the mobile node from source to destination. The both MAG1 and MAG2 enters into LSP tunnel and their current state is represented as modified MAG (m-MAG1,m-MAG2 and that determines the changed route of Local mobility Anchor.

In this proposed system the flow of the signal is similar to the standard of PMIPv6 .In this proposed system the MPLS with ELS with PMIPv6 architecture is modified in the aspect of tunnelling mechanism. Here the ELS use LSP tunnel instead of IP-in_IP tunnel. Fig.3b explains the signalling flow of the proposed system. In this proposed system the

mobile node attach to the network which sends RS message. The proxy binding Registration (PBR) and Proxy Binding update (PBU) is done by MAG. Then the LMA updates the Binding cache Entry (BCE) which has MN-identifier. Then the HNP is assigned by Neighbour Discovery method (Network Working Group, 2007).

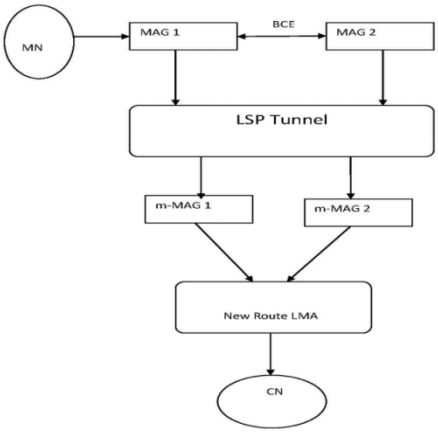

Fig. 3(a): Network Scenario of Proposed System.

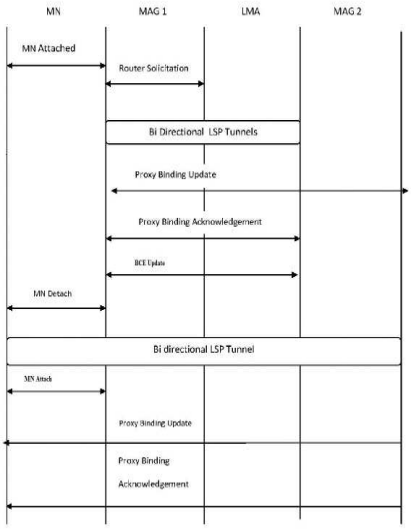

Fig. 3(b): The Signalling flow of the proposed system.

3.2. Hand over Analysis of the Proposed System:

Hand over signalling consists of
i) MAG1 sending to MAG2
ii) MAG2 sending Ack to MAG1
iii) MAG2 sending PBU to LMA
iv) MAG2 receiving PBA from LMA
v) MAG2 sender Router solicitation with the prefix to MN

In this proposed system localized routing signalling is not have any messages. So the signalling cost and over head is reduced.

$D = TD_{MN\text{-}AP} + TD_{MN\text{-}MAG} + TD_{MAGs} + TD_{DP}$ ------3.1

Transmission delay of this proposed system is calculated as

$TD_{MN\text{-}MAG} = TD_{MN\text{-}MAG1} +$
$TD_{MN\text{-}MAG}$ ---------- 3.2

Table 3.1: System Notations and its Descriptions.

Table 3.1 represents the System Notation used in the Proposed System.

IV. Simulation And Result:

In order to analyze the proposed technique it is compared with PMIPv6 and MPLS/PMIPv6. The Network Simulator NS-2) is used for the simulation (Liz, Wenbing Yao, 2009). The Table 4.1 represents test simulation parameters.

4.1. Result Analysis

According to the test simulation the proposed technique provides the better result i.e., reduce handover delay when the number of hops increased. The fig.4 shows the simulation result.

System Notation	Description
LMA	Local Mobility Anchor
MAG 1	Previous mobility Access Gateway
MAG 2	New Mobility Access Gate way
BCE	Binding Cache Entry
u-BCE	Updated Binding Cache Entry
TD_{MN-AP}	Transmission delay between Mobile Node and Access point
$TD_{MAG-LMA}$	Transmission delay between Mobility Access Gate way and Local Mobility Anchor
TD_{AP-MN}	Transmission delay between Access point and Mobile Node
$TD_{MAG'S}$	Transmission delay between two MAG's
TD_{MN-MAG}	Transmission delay between Mobile Node and MAG
TD_{DP}	Transmission delay between data packet from source to destination

Table 4.1: Test Simulation Parameters.

System notation	Description	Units(ms)
D(IEEE 802.11)	Handover Delay	200
T(wireless and wired)	Link delay	2
T_{MAG}	Initiation time of MAG	0.2
T_{LMA}	Initiation time of LMA	0.4
T_{DP}	Packet delay	0.2

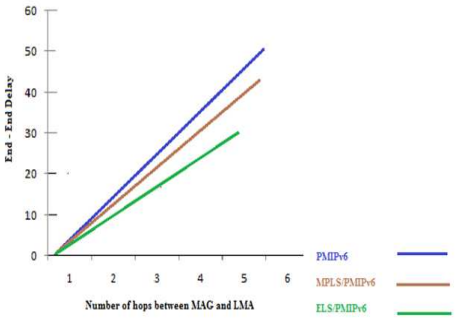

Fig. 4: Simulation results.

V. Conclusions And Future Work:

The proposed system improves the performance of PMIPv6with MPLS technique. The simulation shows the performance in the basis of handover. The hand over delay is reduced when the number of hops increased and the test simulation results shows the possibility of the real time implementation. This proposed system shows the results based on the one parameter i.e. handover. In the future the packet loss will be reduced to produce better performance

REFERENCES

RFC 791 (Request for Comments 791), 1981. Internet Protocol Darpa Internet Program Protocol Specification for Defence Advanced Research Projects Agency Information Sciences University Institute University of Southern California. California 90291.

IETF (Internet Engineering Task Force) November, 2010. *RFC (Request for Comments) 5994*: *IP Mobility Support for IPv4.* IETF Standard Track ISSN: 2070-1721. IESG (Internet Engineering Steering Group (IESG)

Network Working Group, 2000. *RFC (Request for Comments) 2794. Internet standards track protocol for the Internet community*: *Mobile IP Network Access Identifier Extension for IPv4* The Internet Society.

Network Working Group April 2008. *RFC (Request for Comments) 5177. Internet standards track protocol for the Internet community*: *Network Mobility (NEMO) Extensions for Mobile IPv4.*

IETF (Internet Engineering Task Force), 2011. *RFC (Request for Comments) 6275: Mobility Support in IPv6.* IETF Standard Track ISSN: 2070-1721. Internet Engineering Steering Group (IESG).

IETF (Internet Engineering Task Force), 2010. *RFC (Request for Comments) 5949: Fast Handovers for Proxy Mobile IPv6.* IETF Standard Track ISSN: 2070-1721. Internet Engineering Steering Group (IESG).

Network Working Group, 2008. *RFC (Request for Comments) 5380. Internet standards track protocol for the Internet community*: *Hierarchical Mobile IPv6 (HMIPv6) Mobility Management.*

Network Working Group, 2008. *RFC (Request for Comments) 5213. Internet standards track protocol for the Internet community: Proxy Mobile IPv6.*

IETF (Internet Engineering Task Force), 2011. *RFC (Request for Comments) 6058*: *Transient Binding for Proxy Mobile IPv6.* Experimental Protocol for the Internet community: ISSN: 2070-1721.

Zhao Liang, Zhang Jun, Zhang Xuejun, Li Qingbo, 2009. "A Mobility Management Based on Proxy MIPv6 and MPLS in Aeronautical Telecommunications Network". *1st International Conference on Information Science and Engineering (ICISE)*, China, 26-28.

Rosario, G., Garroppo, Stefano Giordano, Luca Tavanti, 2009. "Network-based micro-mobility in Wireless Mesh Networks: is MPLS convenient?" *Global Telecommunications Conference, GLOBECO*, USA, Nov, 30- 4

Network Working Group, 2007. *RFC (Request for Comments) 4862. Internet standards track protocol for the Internet community: IPv6 Stateless Address Auto configuration.*

Alcatel-Lucent, 2010. "Deploying IP/MPLS in Mobile Networks".

Network Working Group, 2001. *RFC (Request for Comments) 3031. Internet standards track protocol for the Internet community: Multiprotocol Label Switching Architecture.*

Network Working Group, 2007. *RFC (Request for Comments) 4861. Internet standards track protocol for the Internet community: Neighbour Discovery for IP version 6 (IPv6).*

Liz, Wenbing Yao, 2009. "Implementation Architecture of Proxy Mobile IPv6 Protocol for NS2 Simulator Software. *International Conference on Communication Software and Networks*, ICCSN, China, 27-28.