Proxy Mobile Ipv6 with Transient Binding for Support of Multihoming

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ABSTRACT
This document specifies the problems of multihoming[1]and solutions of multihoming provided by the transient Binding.[2] Transient Binding is a mechanism applicable to the mobile node's inter-MAG handover while using a single interface or different interfaces. This paper proposes an improvement in the Proxy Mobile IPv6.The extension of Proxy Mobile IPv6 with transient binding will support multihoming and optimizes the handover.In this paper the concepts of transient binding basics like tunnel management, registration and handover concepts are focused based on multihoming environment. In the transient binding m-PBU(modified Proxy Binding Update) is continuously and simultaneously stores and update the address scheme of m-LMA(Local Mobility Anchor)[2].Here the address auto configuration concept and its terminology t in transient Binding is mainly support for the multihoming. Also this mechanism efficiently supports the uplink and downlink packets between mobile nodes, so it avoids superfluous packet forwarding delay and packet loss.

Keywords
Keywords-PMIPv6, transient binding, multi-homing, m-LMA, u-BCE, m_MAG, handover

1. INTRODUCTION
Generally In the wireless communication the handover latency packet loss and multihoming environment these are somewhat challenging concepts in wireless communication

Proxy Mobile IPv6 (PMIPv6) is a protocol for building a common and access technology independent of mobile core networks, accommodating various access technologies such as WiMAX, 3GPP, 3GPP2 and WLAN based access architectures. The extension of Proxy Mobile IPv6 with transient binding will support multihoming and optimizes the handover. Here the handover problem in multihoming is reduced by transient binding by using modified Local Mobility Anchor (m-LMA) with its updated Binding Cache Entry (u-BCE).

Proxy mobile IPv6 is a network based mobility management protocol. It is a protocol for building a common and access technology independent of mobile core networks. Proxy Mobile IPv6 is the only network-based mobility management protocol standardized by IETF [4].

The MN, MAG-old and MAG-new as are the first entities involved in the handover in PMIPv6 domain.(i.e in IP address). Then the Mobility Access Gateway enumerate the link in their access using advertisement. In the hand over the MN establishes connection to the new network with Router solicitation [18]. In this case if the network in single home is always not possible. But this document accept is aspect with the transient of Binding of PMIPv6

In the mobile wireless network environment the travel of the network protocol must follow the COA of the MN (Mobile Node).There are more than one type of network interfaces are present in the wireless network environment. From this core environment the MN follow the COA. The transient binding mechanism will support this environment. In the transient binding transient binding cache entry is used to optimize the handover performance for both single and double.[2]

Proxy Mobile IPv6 service and get back the names. Service resource records (SRV RR) defined in [RFC2782] enable the servers like local mobility anchors to publish information about their services in the DNS database in terms of SRV RRs. Some local mobility anchors may be designated as primary servers and others as backup servers. [4]

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[2]

One of the primary issues for mobile networking is the multi-homing, in which MN has multiple network interfaces, e.g., WLAN and 3G network [1]. However, it is noted that the current PMIPv6 was originally designed without consideration of multi-homing. This paper proposes an extensive handover scheme of PMIPv6 with transient binding for multi-homing and mobility support, in which the PMIPv6 Local Mobility Anchor (LMA) will update its binding cache entry (u-BCE) and bind address of the data packets both to the Previous-Mobile Access Gateway (P-MAG) and modified Mobile Access Gateway (m-MAG) toward MN, when MN is in the handover region.

In the given figure1.1 the LMA is updated with Proxy Binding (i.e now the LMA is activated as m-LMA. The PBA (Proxy Binding Update) is received now MN changes its COA (Care –Of –Address) i.e new-COA. This is called as automatic address configuration

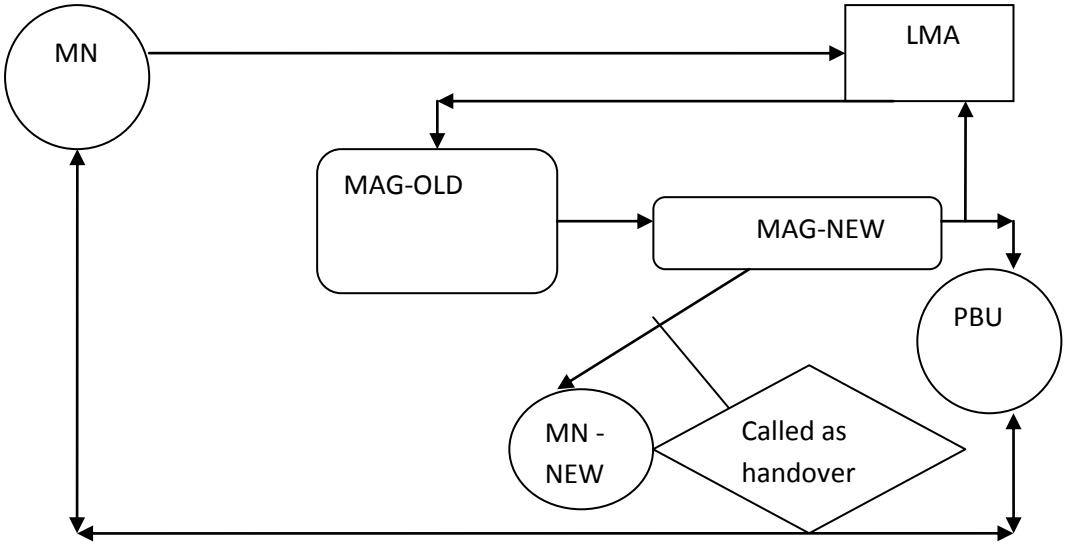

Figure1.1 General Message Passing of PMIPv6

The same message passing in PMIPv6 is not support for the multihoming. But with Transient Binding support this is possible for the Multihoming.

2. SUPPORTOF MULTIHOMING USING PROXY MOBILEIPv6

When a network is connected to the more than one ISP (Inter Service Provider) is called as multihoming. If the network is connected to the more than one network means the mobility of the network must have robustness (i.e the network interface connection point of various platforms) Each interface must attach to the various networks. So the protocol i.e PMIPv6 must concentrate the aspects oof 1.LMA, 2.DNS compatibility,3. Packet Filtering, 4. Redundancy, 5.load sharing,6. Policy Constraints, 7. Scalability, 8. Transport , 9.Layer survivability. The concepts of 1to 9 is satisfied by the Proxy Mobile IPv6(PMPIPv6)[12,13,14,15,16,17]

2.1 Problems In Multi_Homing

In PMIPv6 protocol, when one of the interfaces undergoes handoff, the other interface might still be attached to the same access router. For example, due to the coverage area differences, the mobile node may change its access router for the WLAN interface while the access router of its 3G interface remains unchanged. If the mobile node suddenly loses connection to the network via the WLAN interface, according to standard PMIPv6 operation, the mobile node needs to trigger vertical handoff at the 3G MAG so as to maintain session continuity via its cellular interface. However, in some cases of disconnection, the mobile node may not have enough time to trigger vertical handoff at 3G MAG without suffering packet loss. Furthermore, according to PMIPv6 protocol, prefixes cannot be dynamically assigned to a connected interface and the mobile node may not be able to transfer the prefix tied to the interface that suddenly loses connection to a connected interface by simply using the HI value of "2" in the handoff PBU.[3]

2.1.1 The Configuration of Multi _Homing not support for middle boxes

The Proxy Mobile Internet Protocol version 6 (PMIPv6) [7] supports three different multi-homing operations. Firstly, a mobile node (MN) can receive home network prefix (es) via a certain interface and all assigned prefixes are managed under a single mobility session. Secondly, the mobile node is able to attach multiple interfaces to the PMIPv6 domain and receive different home network prefixes via each interface. Hence, the mobile node is able to communicate using all interfaces. Thirdly, the mobile node is able to perform flow mobility tied to all prefixes of an existing interface to a newly attached interface. However, these multi-homing operations need further enhancements either to increase their efficiency in operations or to be applicable to different deployment scenarios. This memo highlights such multi-homing enhancements required, the need for such enhancements, and where applicable, the possible solution approaches [7].

2.1.2 Dynamic mobility session between Interfaces

When mobile node travels in anew interface the new Mobile Access Gateway (m-MAG) sets the handoff option to the new interface. But previously all the prefixes attached interfaces are transferred to the new interface. ,the binding cache entry for the new interface is updated. But some prefixes assigned to one interface transferred to already connected interface not to the new interface.[1]

2.1.3 Representation of same HNP's across multiple interface

PMIPv6 protocol operation is such that different home network prefixes are assigned to different interfaces of the mobile node. PMIPv6 does not support selectively using the same home network prefix across multiple interfaces of the mobile node[1] .

2.1.4 Problem of Adding Prefixes to The Stable Interface Through Unstable Interface

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interface remains unchanged. If the mobile node suddenly loses connection to the network via the WLAN interface, according to standard PMIPv6 operation, the mobile node needs to trigger vertical handoff at the 3G MAG so as to maintain session continuity via its cellular interface. However, in some cases of disconnection, the mobile node may not have enough time to trigger vertical handoff at 3G MAG without suffering packet loss [1].

2.1.5 Problem of Attaching Interfaces to a Single MAG

The PMIPv6 protocol supports simultaneous attachment to PMIPv6 network via multiple interfaces of a mobile node but with the assumption that each of the interfaces is attached to different mobile access gateways. However, in some deployment scenarios, a mobile access gateway may be handling different access technology types and may results in the mobile node attaching to the same mobile access gateway via multiple interfaces. If the Proxy-CoA in the binding cache entry matches the source address of the binding cache entry update request, considerations associated with binding lifetime extension (No handoff) MUST be applied. Thus it is clear that the PMIPv6 protocol does not handle inter technology handoff where the mobile node is connected simultaneously to the same mobile access gateway.In addition, since the same mobile access gateway will be sending multiple PBU messages for the same mobile node, it will be desirable if these can be combined into one PBU message[1].

3. NEEED OF TRANSIENT BINDING FOR THE MULTIHOMING

To overcome the problems of multihoming [1] specified in 2.1.1 to 2.1.5 will be rectified by transient binding[2] of PMIPv6

The required enhancements to PMIPv6 protocol with respect to multi-homing support are described in three main sections. The first main section describes the enhancement required with respect to the ability to dynamically create mobility sessions associated with an interface. The second main section describes dynamically modifying the set of prefixes allocated to an interface, either by adding new prefixes or by transferring some or subset of prefixes from one interface to another. The draft [8] highlights a solution to achieve such flow movement tied to subset of prefixes. The third main section describes multi-homing enhancement needed to use the same home network prefix(es) across multiple interfaces to achieve benefits such as load sharing, load balancing, aggregated bandwidth and flow based routing. The drafts [9] and [10] highlights a solution for the usage of same home network prefix(es) across multiple interfaces.

3.1. Solutions of Multi_Homing Problem with Transient Binding

Solution of 2.1.1 and 2.1.2

The use of a transient BCE during an MN's handover splits into an initiation phase and a phase turning the transient BCE into an active BCE. Figure 2 illustrates the procedure to enter and leave a transient BCE during an MN's handover. As a result of the MN's attachment at the nMAG, the first PBU from the MN's nMAG can turn the MN's BCE at the LMA and the nMAG into transient state by including a Transient Binding option. The LMA enters the nMAG as a further forwarding entry to the MN's BCE without deleting the existing forwarding entry and marks the BCE state as 'transient'. Alternatively, in case the nMAG does not include a Transient Binding option, the LMA can make the decision to use a transient BCE during an MN's handover and notify the nMAG about this decision by adding a Transient Binding option in the PBA.After receiving the PBA, the nMAG enters the MN's data, such as the assigned IPv6 prefix(es), into its Binding Update List (BUL) and marks the MN's binding with the LMA as 'transient', which serves as an indication to the nMAG that the transient BCE needs to be turned into an active BCE. During the transient state, the LMA accepts uplink packets from both MAGs, the pMAG and the nMAG, for forwarding.To benefit from the still available downlink path from pMAG to MN, the LMA forwards downlink packets towards the pMAG until the transient BCE is turned into an active BCE.

Further assigned IPv6 prefix(es) in PMIPv6 protocol, pref

During a dual radio handover, an MN can receive downlink packets via its previous interface; during a single radio handover, the late path switch supports re-using available forwarding mechanisms in the radio access network.

Decisions about the classification of an MN's BCE as transient during a handover can be made either by the nMAG or the LMA. Detailed mechanisms showing how an nMAG or an LMA finds out to use a transient BCE procedure are out of scope of this document [2].

Solution of 2.1.4 and 2.1.5

The use of a transient BCE requires temporary maintenance of two forwarding entries in the MN's BCE at the LMA, one referring to the MN's pMAG and the other referring to its nMAG. Forwarding entries are represented according to [RFC5213] and comprise the interface identifier of the associated tunnel interface towards each MAG, as well as the associated access technology information.

Each forwarding entry is assigned a forwarding rule to admit and control forwarding of uplink and downlink traffic to and from the associated MAG. Hence, according to this specification, a forwarding entry can have either a rule that allows only forwarding of uplink traffic from the associated MAG, or a rule that allows bidirectional forwarding from and to the associated MAG. At any time, only one of the two forwarding entries can have a bi-directional forwarding rule. The interface identifier and access technology type info can be taken from the PBU received at the LMA and linked to each forwarding entry accordingly.

MAGs should maintain the status of an MN's binding and the lifetime associated with a transient BCE at the LMA in their binding update list[2].

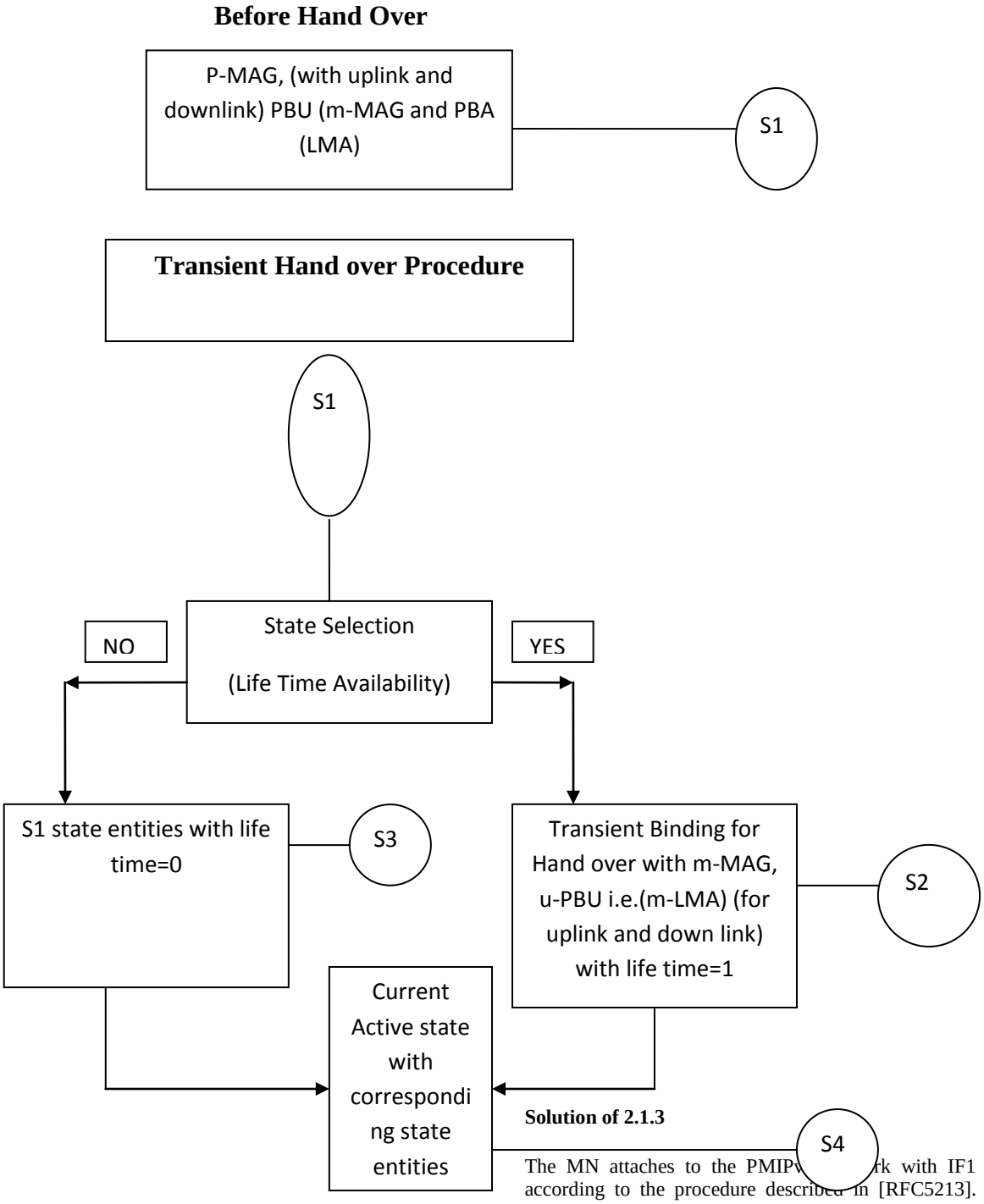

Figure 2: Possible transient forwarding states during a handover

Solution of 2.1.3

Solution of 2.1.3

The MN attaches to the PMIPv[illegible]rk with IF1 according to the procedure described in [RFC5213]. The MN starts receiving data packets then MN activates to prepare an inter-technology handover, the nMAG receives an attach indication and sends the PBU to the LMA to update the MN's point of attachment and to retrieve configuration information for the MN (e.g., HNP).The LMA is able to identify an inter-technology handover by means of processing the option coming along with the PBU sent by the nMAG. Thus, the nMAG includes the Transient Binding option in the PBU to control the transient BCE at the LMA, the LMA updates the MN's BCE according to the transient BCE specification described in this document

and marks the state of the BCE as 'transient'

4. CONCLUSION

This paper proposed an extension handover scheme of the PMIPv6 with transient binding for multi-homing and mobility, in which the PMIPv6 binding update is performed in advance and then LMA performs the binding and the data packets to the m-MAG as well as P-MAG. The LMA is extended to support the multiple Binding Cache Entry (BCE).

Multi-homing technology handle the concept handover with multiple interfaces. In that the PMIPv6 have the problem of message format which is solved by the transient binding.[2] Because of this transient binding multiple interface problem solved using automatic address configuration which is available in Proxy mobile IPv6[7].But without the transient binding the automatic address configuration provide only one PBU for that particular CoA of that MN, so the MN not able to identify the U-PBU so there is lag in the hand over, because this lag there is also pocket loss problem is arise. These draw back of the PMIPv6 is solved by the extension of multi-homing with transient binding.

This document focuses the solution of the problem of multi-homing with transient binding concept. When MN connects to the new link, it establishes a physical link connection with N-MAG (for example, radio channel assignment), which in turn triggers the establishment of a link-layer connection with the N-MAG. An IP layer connection setup may be performed at this time. This step can be a substitute for Unsolicited Neighbor Advertisement (UNA) in [11].

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