

Chapter 6: Chapter 6: Proxy MIPv6 (PMIPv6) "Network-based" Localized Mobility Management

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Why Network-based ?

- Host-based MIPv4/v6 has not been yet deployed that much.
 - Why host-based MIP is not deployed yet?
 - Too heavy specification for a small terminal
 - RFC 3344 (MIPv4): 99 pages
 - RFC 3775 (MIPv6): 165 pages
 - Battery problem
 - Waste of air resource
 - No Stable MIPv4/v6 stack executed in Microsoft Windows OS



PMIPv6

- IETF NETLMM WG
- Internet Draft
 - "Proxy Mobile IPv6,"
 - draft-ietf-netlmm-proxymip6-00.txt (2007)
- GOAL
 - This protocol is for providing mobility support to any IPv6 host within a restricted and topologically localized portion of the network and without requiring the host to participate in any mobility related signaling.



Technical Background

• Host-based vs. Network-based Mobility





Proxy MIPv6 Overview



Proxy Care-of Address (Proxy-CoA)

- Proxy-CoA is the global address configured on the egress interface of the mobile access gateway and is the transport endpoint of the tunnel between the local mobility anchor and the mobile access gateway.
- The local mobility anchor views this address as the Care-of Address of the mobile node and registers it in the Binding Cache entry for that mobile node.



Mobile Node's Home Address (MN-HoA)

- MN-HoA is an address from a mobile node's home network prefix.
- The mobile node will be able to use this address as long as it is attached to the access network that is in the scope of that Proxy Mobile IPv6 domain.



Proxy MIPv6 Overview

- No host stack change for IP mobility
- Avoiding tunneling overhead over the air
- Re-use of Mobile IPv6
 - PMIPv6 is based on Mobile IPv6 [RFC3775]
- Only supports Per-MN-Prefix model
 - Unique home network prefix assigned for each MN.
 - The prefix follows the MN.



Overall Procedures

- 1. MN moves and attaches to an access router
- 2. After authentication, MAG (access router) identifies MN
- 3. MAG obtains MN's profile containing the Home Address ..etc
- 4. MAG sends the Proxy Binding Update to LMA on behalf of MN
- 5. MAG receives the Proxy Binding Ack. from LMA
- 6. MAG sends Router Advertisements containing MN's home network prefix
 - Stateless Case: MN will still configure (or maintain) the same as its home address.
 - Stateful Case: the network will ensure that it always gets its home address.



Proxy MIPv6 Overview





- Proxy Registration
 - LMA needs to understand the Proxy Registration.





- Tunnel Management
 - LMA-MAG tunnel is a shared tunnel among many MNs.
 - 1:1 relation → m:1 relation
 - One tunnel is associated to multiple MNs' Binding Caches.
 - Life-time of a tunnel should not be dependent on the life time of any single BCE.
- LMA's Prefix-based Routing
 - LMA will add prefix routes to MN's home network prefix over the tunnel.



- MAG Operation
 - It emulates the home link for each MN.
 - After the access authentication, MAG will obtain MN's profile which contains:
 - MN's home address
 - MN's home network prefix
 - LMA address ..etc.
 - It establishes a IPv6/IPv6 tunnel with the LMA.
 - All the packets from MN are reverse tunneled to its LMA
 - All the packets from the tunnel are routed to MN.
- Router Advertisement should be UNICASTed to an MN
 - It will contain MN's Home Network Prefix (MN-HNP)



- MN Operation
 - Any MN is just a IPv6 host with its protocol operation consistent with the base IPv6 specification.
 - All aspects of Neighbor Discovery Protocol will not change.
 - When MN attaches to a new AR, it receives a Router Advertisement message from the AR with its home prefix.
 - Throughout the PMIP domain, MN using DHCP procedure or in stateless address configuration mode, will obtain the same home address.



- Data Transport
 - LMA-MAG Tunneling/Reverse Tunneling



