PMIPv6 Overview
(draft-singh-net1mm-protocol-02.txt)

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Outline

- Basic Operation
- Initial Attachment
- Inter-MAG Handoff
- Supported features
- Comparison of two architectural concepts
  - PMIP client Anchoring (standalone PMIP client)
  - PMIP client Relocation
- Summary
Basic operation

- When MN connects to MAG1 domain, PMIP client sends BU to the LMA/HA on behalf of MN
  - BU indicates the CoA acquired for the MN in the MAG1 domain
- When MN moves to MAG2 domain, PMIP client remains anchored:
  - The same PMIP client sends the new BU to the LMA/HA indicating the new CoA in the MAG2 domain
Initial Attachment

1. MN performs L2 attachment
2. Router Adv
3. Trigger (MN ID, pHoA)
4. Proxy Binding Update (MN-ID, pHOA, pCoA)
5. Proxy Binding Ack
6. Notification (PBack)

- MN performs L2 attachment
- MAG sends TRIGGER message to PMIP client after MN attaches to it.
- PMIP client sends PBU and receives PBACK from LMA
- PMIP client embeds BACK inside a NOTIFICATION message and sends that back to MAG.
- MAG creates appropriate tunnel state based upon PBACK message
Inter-MAG Handoff

1. L2 Handoff

2. Trigger (MN ID, pHoA) → 3. PBU

5. Notification (PBack) ← 4. PBACK

- MN handoffs from MAG1 to MAG2
- MAG2 sends TRIGGER message to PMIP client after MN attaches to it.
- PMIP client sends PBU and receives BACK from LMA
- PMIP client embeds PBACK inside a NOTIFICATION message and sends that back to MAG.
- MAG creates appropriate tunnel state based upon BACK message
Supported features of PMIPv6 draft

- Initial attachment
- Intra-LMD handoff
- **Separation of PMIP client and MAG functionality**
  - Standalone PMIP client
  - MAG-PMIP client interaction
  - Re-use of RFC 3775 HA as LMA
- Security association between PMIP client and LMA
- Features discussed in appendix
  - pHoA assignment by LMA under stateful and stateless address configuration
  - AAA mechanism for establishing per-MN SA
  - Context Transfer and data forwarding between MAGs for seamless handoff
  - PMIP client relocation
  - IPv4 data tunneling inside IPv6
  - Usage of per-MN prefixes
Architectural view of PMIP client

- **Standalone PMIP Client** (aka PMIP client anchoring):
  - PMIP client is allocated during initial attachment
  - PMIP client can be co-located on MAG or any centralized entity that is aware of mobility management
  - Stays anchored on the same node while mobile moves from one MAG to other

- **PMIP Client relocation**:
  - PMIP client is co-located on MAG
  - PMIP client moves with mobile node from one MAG to other during handoff
Comparison of two architectural concepts

<table>
<thead>
<tr>
<th>PMIP client Anchoring</th>
<th>PMIP client Relocation</th>
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</thead>
<tbody>
<tr>
<td>Allows standalone PMIP client</td>
<td>PMIP client moves from one MAG to other with mobile node</td>
</tr>
<tr>
<td>Supports clean separation of data forwarding (tunneling / de-tunneling) and control plane (BU/BACK) functionality</td>
<td>Not supported.</td>
</tr>
<tr>
<td>o Enables centralization of control plane and distribution of data plane</td>
<td></td>
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<tr>
<td>o Enables co-location of PMIP client on a node that is better protected than MAG (edge router) from various security attacks</td>
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<tr>
<td>o Enables co-location of PMIP client functionality on node where better mobility management triggers (e.g., L2 triggers) are available</td>
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<tr>
<td>Simplifies service management (e.g., billing) by providing single service triggering point.</td>
<td>Complicate service management due to introduction of multiple service triggering points.</td>
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| • IPSEC SA between MAG and LMA is only established during initial attachment.  
  • No need to allocate IPSEC SA during handoff |  
  • There may be need to establish IPSEC SA during handoff. |

LMA is not required to authorize MAG during every handoff. This provides following benefits:
  ❖ Less load on AAA server  
  ❖ Efficient handoff signaling  
  ❖ Seamless handoff etc.

LMA needs to authorize MAG during every handoff before processing PBU message received from a MAG. This has following downsides:
  ❖ Extra load on AAA server  
  ❖ Additional handoff signaling  
  ❖ Seamed handoff
Comparison of two architectural concepts

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| Possible to re-use RFC 3775 compliant HA as LMA. No change in MIPv6 behavior if per-MN security association is used between MN and HA. | Not possible to re-use MIPv6 compliant HA. At least some of the following modifications are required in HA behavior:  
• Time stamp extension in BU needed for resequenecing of BU messages  
• HA logic will have to be modified to ignore BU sequence number processing for PMIP BU messages  
• Additional modifications will be required in |
| Time synchronization between MAG and LMA not needed. | Time synchronization between MAG and LMA needed to enable re-sequencing of BU messages by LMA. This may be problematic if LMA and MAG are not in same domain. |
Summary

- Draft-singh describes PMIP client anchoring, but also allows PMIP client relocation as corner case.
- Draft-sgundave describes PMIP client relocation aspect.
  - Possible to enhance draft-sgundave to support PMIP client anchoring by borrowing ideas described in draft-singh.
- The basic concepts of both drafts PMIP client anchoring (e.g., standalone PMIP client) and PMIP client relocation are useful in a given deployment.
- An IETF base PMIPv6 solution that supports both PMIP client anchoring and PMIP client relocation would enhance the deployment of NETLMM solution.