Deployment of Existing Mobility Protocols in DMM Scenario

draft-liu-dmm-practice-of-deployment-00
draft-chan-dmm-framework-gap-analysis-05
What is the “Best current practice of DMM”? 

• In the charter:
  - Practices: Document practices for the deployment of existing mobility protocols in a distributed mobility management environment.

• It means:
  - How to deploy existing mobility protocol in DMM scenario to solve DMM problem?
  - What degree the DMM problem could be solved?
Motivation of this “practice draft”

• Many solutions have been proposed in DMM WG, but before defining any new DMM protocol, it is a good approach to investigate first whether it is feasible to deploy current IP mobility protocol in DMM scenario in a way that can meet the requirement of DMM.

• This document discusses the way of the deployment of current IP mobility protocol in DMM scenario and analyses the gaps between this approach and the DMM requirement.
Client-based mobility deployment in DMM scenario

- Deploy HA in the access router level.
- MN always select the nearest HA.
- Newly initiated flow go though the new HA.
- Previous flow go though the previous HA.
Analysis

- Partly solve the DMM problem
  - Routing is optimal for the newly initiated flow
  - Routing is still not optimal for the previous established flow

- Other gaps
  - Prefix management of the terminal
  - Source address selection of the terminal
    - draft-liu-dmm-dynamic-anchor-discussion-00
    - draft-liu-dmm-address-selection-00
    - draft-liu-dmm-mobility-api-00
Network-based mobility deployment in DMM scenario

- Deploy LMA/MAG together in the access router level
- MN always select the nearest LMA.
- Newly initiated flow go though the new LMA.
- Previous flow go though the previous LMA.
Network-based mobility deployment in DMM scenario (cont.)

• Analysis
  – Partly solve the DMM problem
    • Routing is optimal for the newly initiated flow
    • Routing is still not optimal for the previous established flow
  – Other gaps
    • Prefix management of the terminal
    • Source address selection of the terminal
      – draft-liu-dmm-dynamic-anchor-discussion-00
      – draft-liu-dmm-address-selection-00
      – draft-liu-dmm-mobility-api-00
Current practice in 3GPP

- In 3GPP specification, S2a/S2b/S2c could be based on IP mobility protocol.

- S2a: Trust access; PMIP/GTP
- S2b: Un-trusted network based; PMIP/GTP
- S2c: Un-trusted client based.
The LIPA scenario in 3GPP

**Scope of Local IP Access**
- Logical connection for mobile operator IP traffic
- Residential/enterprise IP Network
- UE

**Connections**
- IP traffic to mobile operator’s CN
- Local IP traffic
- Mobile operator’s core

**Elements**
- UE (User Equipment)
- H(e)NB (Home (Enhanced) Node B)
- Residential/enterprise IP Network
- Mobile operator’s core

**Logical Connections**
- Logical connection for mobile operator IP traffic
- Scope of Local IP access
The LIPA mobility problem

- DMM kind of solution is needed to support Inter L-GW handover
• Q&A?
Unified view through Reconfiguration of existing functions

3 Basic Internet Functions
• 1. The Internet allocates IPv6 network prefixes or IPv4 addresses to a host.
• 2. The Internet manages information needed for routing by maintaining a database (DNS) and exchanging routing information between routers.
• 3. Router forwards packets using appropriate information in the routing table.

3 Basic Mobility Management Functions
• 1. Session identifier allocation (e.g., HoA)
• 2. Location management (LM) (e.g., binding HoA to CoA)
• 3. Mobility routing (MR)
Existing MIPv6 functions

<table>
<thead>
<tr>
<th>Existing protocols first</th>
<th>Compatibility</th>
<th>IPv6 deployment</th>
<th>Security considerations</th>
<th>Distributed deployment</th>
<th>Upper layer transparency when needed</th>
<th>Route optimization</th>
</tr>
</thead>
<tbody>
<tr>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>N</td>
<td>N</td>
<td>N</td>
</tr>
</tbody>
</table>

Net1

allocate P1::/64

LM1

Net2

allocate P2::/64

Net3

allocate P3::/64

Allocate P1::/mn<->P3::/mn

P1::/mn

(HoA11)

Move

Mobility client

P1::/mn

P3::/mn

(HoA11)

(IP31)

P2::/cn

(IP21)
functions

<table>
<thead>
<tr>
<th></th>
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<th>Route optimization</th>
</tr>
</thead>
<tbody>
<tr>
<td>P1::/mn&lt;--&gt;P3::/mn</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>N</td>
<td>N</td>
</tr>
<tr>
<td>P1::/64</td>
<td>Allocate</td>
<td></td>
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<tr>
<td>P2::/64</td>
<td>Allocate</td>
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<td></td>
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</tr>
<tr>
<td>P3::/64</td>
<td>Allocate</td>
<td></td>
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<td></td>
<td></td>
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</tr>
<tr>
<td>(HoA11)</td>
<td>Mobility client</td>
<td>(HoA11)</td>
<td>(IP31)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>P1::/mn</td>
<td>Allocate</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>P2::/cn (IP21)</td>
<td>Allocate</td>
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Redistribute MIP and PMIP functions in DMM scenario

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<tr>
<td>Y</td>
<td>Y (supports above)</td>
<td>Y</td>
<td>Y (LM-MR in different networks)</td>
<td>Y</td>
<td>N</td>
<td>N</td>
</tr>
</tbody>
</table>

Net1
- Allocate P1::/64
  - Net1
  - P1::/mn\(\rightarrow\)P3::/mr3
  - MR1
  - P1::/mn\(\rightarrow\)P3::/mn
  - P1::/mn
  - (HoA11)

Net3
- Allocate P3::/64
  - Net3
  - P3::/mr3
  - MR3
  - P1::/mn\(\rightarrow\)P3::/mn
  - P3::/mr3
  - P3::/ar
  - (IP31)

Net2
- Allocate P2::/64
  - Net2
  - P2::/cn
  - IP21
- Mobility client
  - P1::/mn
  - P3::/mn

Existing protocols first: Y
Compatibility: Y (supports above)
IPv6 deployment: Y
Security considerations: Y (LM-MR in different networks)
Distributed deployment: Y
Upper layer transparency when needed: N
Route optimization: N