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.
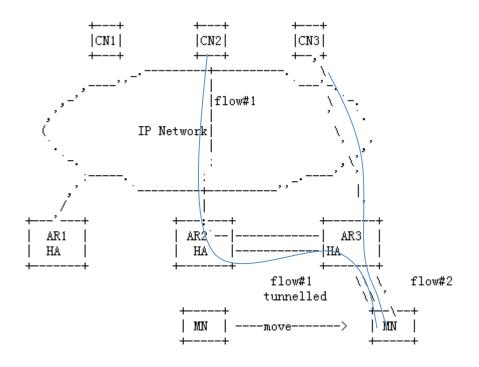
- It means:
  - How to deploy existing mobility protocol in DMM scenario to solve DMM problem?
  - What degree the DMM problem could be solved?

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

```
        +--+            +--+            +--+
        |CN1|           |CN2|           |CN3|
        +--+            +--+            +-,+
              .----------+---------.       \
         ----''          |          ---,-   \  .-.
        ,-              |flow#1         \  \ -.
       ,,               |                \   ,   ,
      (      IP Network|                \  ,  ,
       .-               |                 ,\,'
        -.       .----- |  ----------+----------, ,-'----     |
           ,           ,----------+----------'',
                       |                           |
        +--'---+       +--:---+           +------+
        | AR1  |       | AR2 --|-----------|  AR3  |
        | HA   |       | HA   |-----------|HA    |
        +------+       +------+           +------+
                        flow#1          \ \ \   flow#2
                        tunnelled        \ \ '
                +-----+                +--\--+
                | MN  | ----move------>| MN  |
                +-----+                +-----+
```
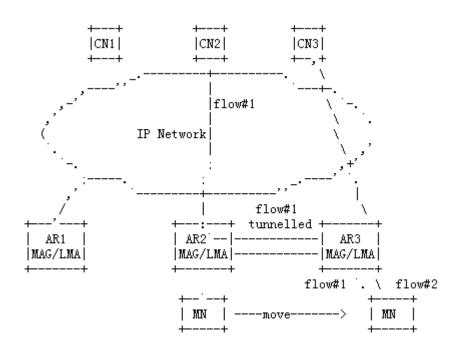
- Deploy HA in the access router level.
- MN always select the nearest HA.
- Newly initiated flow go though the new HA.
- Previous flow go though the previous HA.

Client-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

Network-based mobility deployment in DMM scenario

```
+---+            +---+            +---+
|CN1|            |CN2|            |CN3|
+---+            +---+            +-,+
       _.---------+---------.        \
    .--'',                   . --+.    \ -.
   ,'  _-          |flow#1       \   -.  .
  ,  ,'            |              \     .
 (         IP Network|             \  ,'
  .   -.            |              \ ,
   .-.    .------.   :          _.-.---.,,  .
    ,'        .---------+---------',,       |
   /          |          flow#1        \
+--'---+    +--:---+  tunnelled +-------+
| AR1  |    | AR2 --|------------| AR3   |
|MAG/LMA|   |MAG/LMA|------------|MAG/LMA|
+------+    +------+            +------+
                          flow#1 .  \  flow#2
           +- ---+                 +-----+
           | MN  | ----move------->| MN  |
           +-----+                 +-----+
```

- Deploy LMA/MAG together in the access router level
- MN always select the nearest LMA.
- Newly initiated flow go though the new LMA.
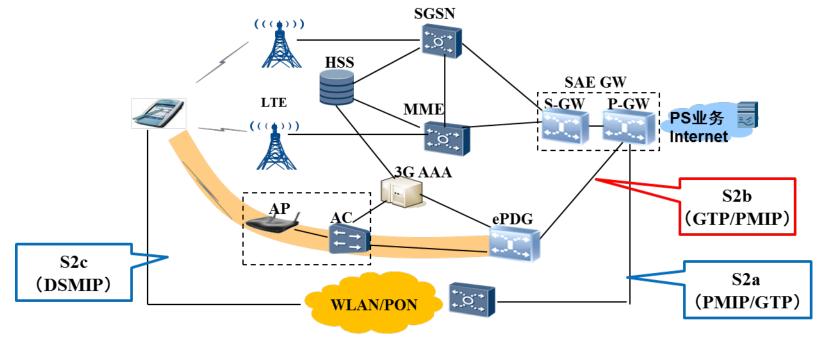- Previous flow go though the previous LMA.

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
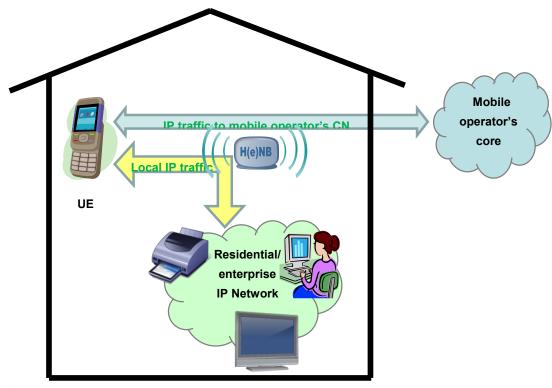   - draft-liu-dmm-mobility-api-00

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.
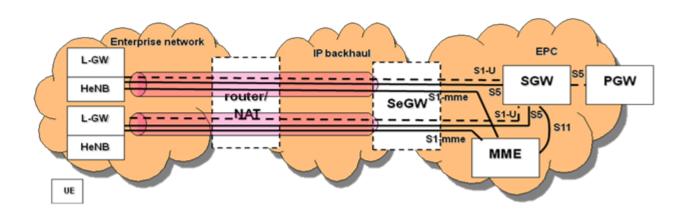
The LIPA scenario in 3GPP

IP traffic to mobile operator's CN

Mobile operator's core

Local IP traffic

H(e)NB

UE

Residential/
enterprise
IP Network

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?

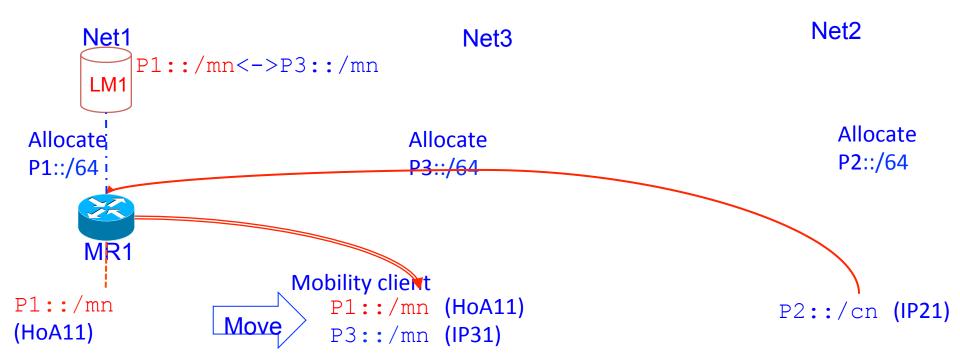# Unified view through Reconfiguration of existing functions

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)
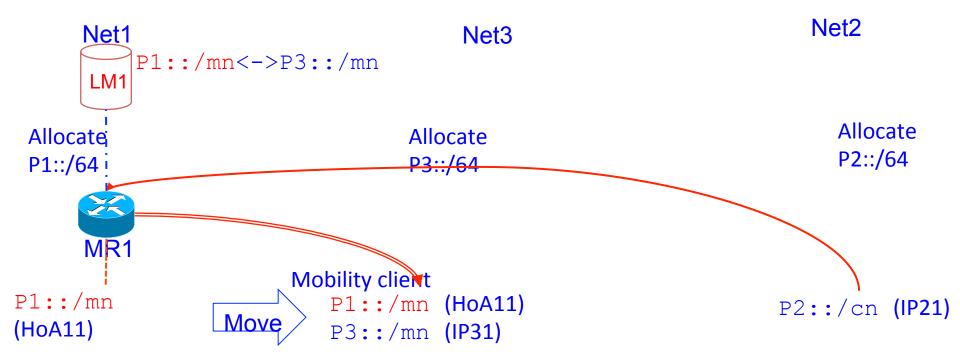
- 3. Mobility routing (MR)

Existing MIPv6 functions

Existing protocols first	Compatibility	IPv6 deployment	Security considerations	Distributed deployment	Upper layer transparency when needed	Route optimization
Y	Y	Y	Y	N	N	N

Net1

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

LM1

Net3

Net2

Allocate
P1::/64

Allocate
P3::/64

Allocate
P2::/64

MR1

Mobility client
`P1::/mn` (HoA11)
`P3::/mn` (IP31)

`P1::/mn`
(HoA11)

Move

`P2::/cn` (IP21)

Existing protocols first	Compatibility	IPv6 deployment	Security considerations	Distributed deployment	Upper layer transparency when needed	Route optimization
Y	Y	Y	Y	N	N	N

functions

Net1

Net3

Net2

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

LM1

Allocate
P1::/64

Allocate
P3::/64

Allocate
P2::/64

MR1

P1::/mn
(HoA11)

Move

Mobility client
P1::/mn (HoA11)
P3::/mn (IP31)

P2::/cn (IP21)

Redistribute MIP and PMIP functions in DMM scenario

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

Net1

LM1

`P1::/mn<->P3::/mr3`

Allocate
P1::/64

MR1

`P1::/mn`
(HoA11)

Net3

LM3

Allocate
P3::/64

`P3::/mr3`

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

MR3 `P1::/mn<->P3::/ar`

Move

Mobility client
`P1::/mn` (HoA11)
`P3::/mn` (IP31)

Mobility client
`P3::/ar` (IP31)

Net2

LM2

Allocate
P2::/64

MR2

`P2::/cn` (IP21)

Move `P1::/mn` (HoA11); `P3::/mn` (IP31)