NTT DoCoMo

DoCoMo USA Labs

"Localized Mobility Management Requirements for IPv6"

draft-ietf-mobileip-lmm-requirements-01.txt   `new`

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1

Current status on LMM Requirements

- On Hold due to MIPv6 Security issues being outstanding.
- We can now move forward with LMM requirements Document is (has been) ready for last call.

What happened since last report

- London IETF:

  Design team formed to resolve <u>not well understood</u> requirements.

- New revision of ID submitted before IETF-52 (SLC). Much debate on alias. All issues resolved.

- ID updated a third time and submitted for IETF-53.

draft-ietf-mobileip-lmm-requirements-01.txt

Ready for Last Call

LMM Problem Area

Signaling Width (length)

–   Addresses latencies caused by mobility management (MM) signaling.
    For large round-trip times (RTT) between the MN and its HA or CNs
    (in order of 300-500 ms), the MM signaling is bound to introduce
    delays as well as potential packet loss in the forwarding of traffic
    through HA tunnel or between the MN and the CN.

–   Reduces packet loss as a result of the latency of MM signaling.

Amount of Signaling

–   Reduce the usage of precious radio resources.

–   Reduce the amount of signaling over the global Internet.

Scalability (1)

Since last IETF LMM Requirement Team formed to deal with if we should have requirement multi-level hierarchy.

No explicit requirement was added. However, we have listed requirements that the LMM solution must be able to scale.

Handover compatibility (2)

Support for Mobile IPv6 Handover

Since one of the primary goals of LMM is to minimize signaling during handover, an LMM solution MUST be available for the standardized Mobile IPv6 handover algorithms. LMM and the Mobile IPv6 handover algorithms MUST maintain compatibility in their signaling interactions for fulfilling complementary roles with respect to each other.
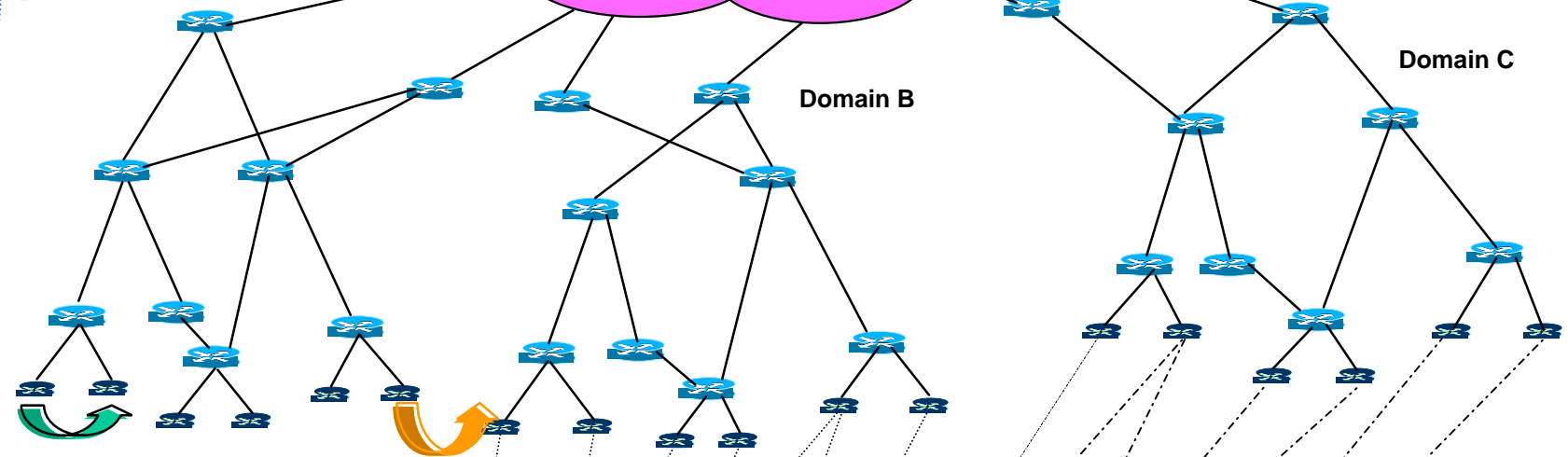
EXAMPLE 1

NTT **Do Co Mo**
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HA
Home Domain

CN
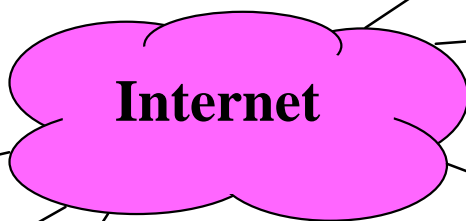
FMIP + LMM is used within a domain

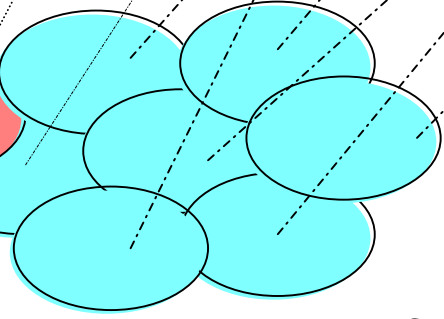MIP + FMIP is used beween domains

Internet

Domain A

Domain B

Domain C

FMIP + LMM

MIP + FMIP

Micro-mobility domain A

Micro-mobility domain B

Micro-mobility domain C

7

EXAMPLE 2

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HA
Home Domain

■ MIP + LMM (BETH) used within a domain

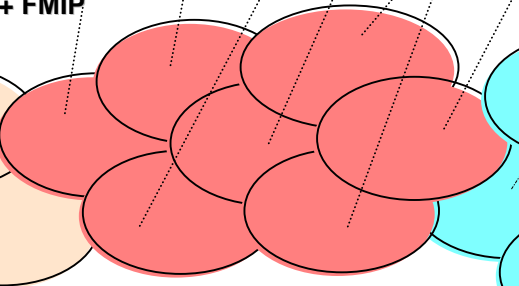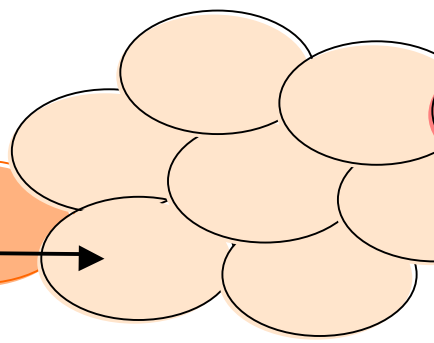■ MIP + FMIP is used beween domains

CN

Internet

Domain A

Domain B

Domain C

MIP + LMM (BETH)

MIP + FMIP
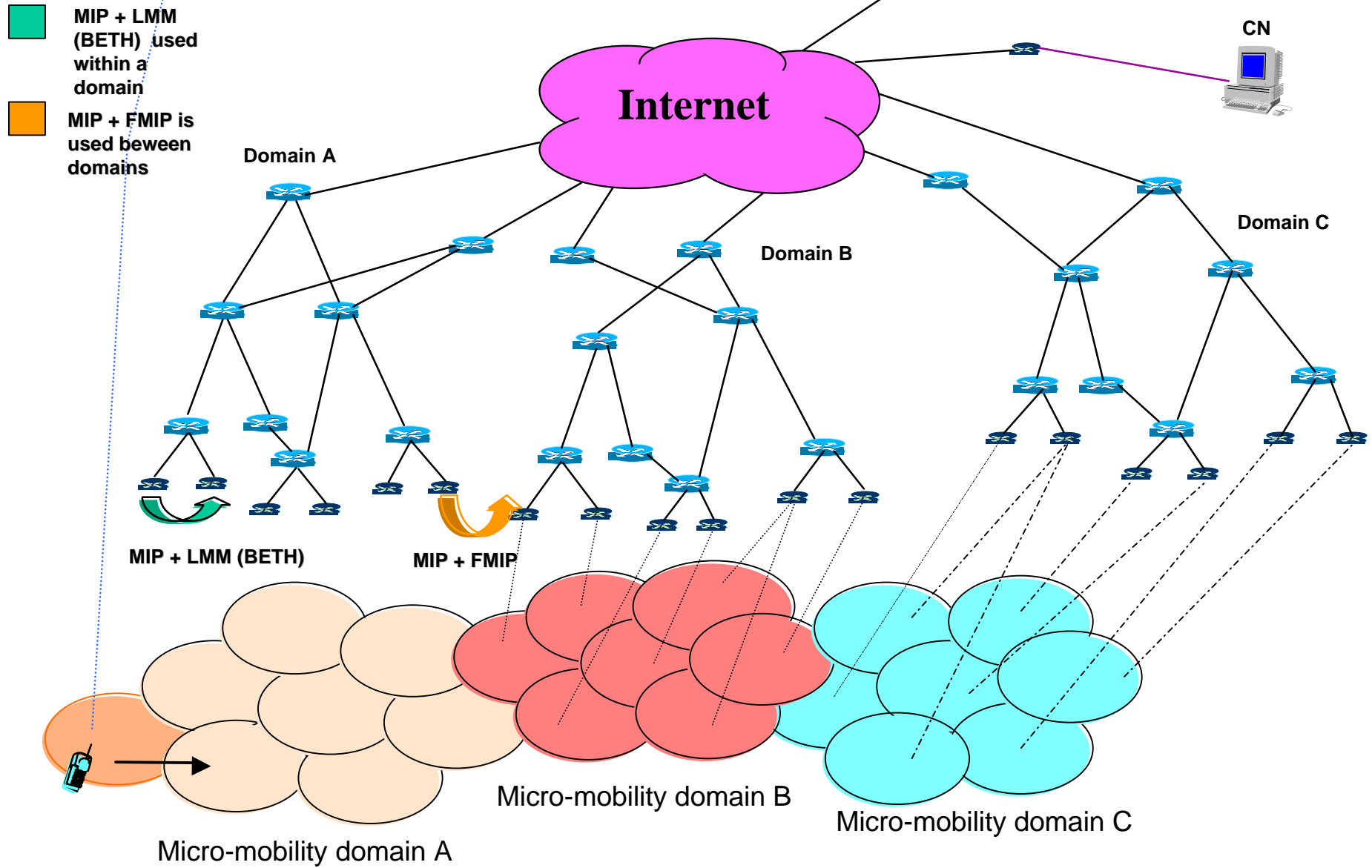
Micro-mobility domain B

Micro-mobility domain C

Micro-mobility domain A

8

Movement Detection (3)

Movement detection (across LMM domains)

Any LMM mechanism MUST contain or make use of a mechanism that provides movement detection between separate visited domains. Movement detection allows for a MN to identify that it has moved to a new LM domain, and to perform registration in the new LM domain.

Ready For Last Call

- MIP working group started to work on requirements March 2001.

- 3 drafts have been published and commented on.

- All open issues have been resolved.

- We are ready for last call.

Proposal for what's next

- Deadline provided for proposed LMM solutions.
- Working group perform analysis of how each proposed LMM solution meets solution. Analysis is documented in single ID. (would be interested in leading such an analysis).
- This document will be presented to the working group within some specified period of time.
- Based on recommendations working group consensus will be done in selection of solution(s).

Micro-Mobility Problem Statement for Mobile IPv6

Motivation

- Multiple solutions exist with various features, their mapping to the core LMM problem not fully discussed.

- Requirements were collected after the design

Micro-mobility Work in the IETF Mobile IP group

Chart schemes from recent MIP work

- FMIPv6/BETH   (access routers)

  Reduce handover latency and packet loss during handover <u>by reducing the period (gap)</u> between moving from one access router to another.

- Hierarchical LMM (HMIPv6/RegReg6/LMA)   (visited domain)

  Addresses latencies and packet loss as a result of mobility management signaling. This is done by restricting the signaling area, thereby reducing the signaling load bandwidth consumed on the Internet and local network.

14

Micro-mobility for MIPv6 Problem Area

Addresses:

- Reduced handover Latency
- Reduced Packet Loss
- Restrict the signaling Width
- Reduced the quantity of the signaling (conservation of resources)
- Increase Scalability

Shouldn't Address:
- Location Privacy (This should be independent problem space).

IRTF MM Investigation

<u>Problem Statement:</u>

- Currently, Mobile IP hides the end system mobility from the infrastructure routing protocols.

- IRTF will investigate a routing protocol at the exterior whose purpose is to allow a mobile node to retain connectivity via its current IP subnet while it moves within the scope of the micro-mobility domain.

- IRTF will investigate the limits and issues with using (a) new protocol(s) to implement per node routes to facilitate better the movement of nodes and recovery of the network in presence of failed links or routers.

<u>Why a new Protocol?</u>

- Mobile devices will become a significant portion of all Internet end nodes; thus, investigation of alternative designs merit consideration.

- Many investigators converged on solutions that propose the use of local subnet mobility routing to support micro-mobility; this approach exposes mobility of the end systems to the <u>routers</u>.

16

IRTF MM Investigation

<u>Why the IRTF and not the IETF:</u>

- The area directors overseeing the activities of the Seamoby working group and the Mobile-IP working group have raised questions about the scale of local subnet mobility routing and the potential need to introduce both another routing protocol and another mobility protocol.

- A comparison with existing mobility management and routing protocols are involved in making such an assessment both in terms of relative scalability, performance and complexity. The IRTF is the right home for such research activities.

Approaches

Mobile IPv6

| Fast Handover (inc BETH) | HMIP6 | Regreg6 | Binding Update |

Present – 2 years

Further out Research In IRTF

IP Routing at the exterior (Non-MIP based scheme)

See Phil Roberts Draft on local subnet routing

IRTF Micro-Mobility Research

- IRTF micro-mobility working group in the routing area of IRTF.

- Micro-mobility design team (closed) formed of mobility and routing people in the research community.

- John Loughney (Nokia) and Carl Williams (DoCoMo USA Labs) are co-chair of the IRTF work. Design team includes researchers from the MIND project and other research teams in micro-mobility area.

- My Proposal for a research retreat in micro-mobility. Bringing together research community work into a common forum for understanding what has been done and what is some on-going research. Expect IETF folks to participate. (Possible piggy-backing with a Mobile IP Interim meeting??).

- Working on web page with Micro-mobility research papers for sharing of efforts.