PMIPv6 – MIPv6 interactions
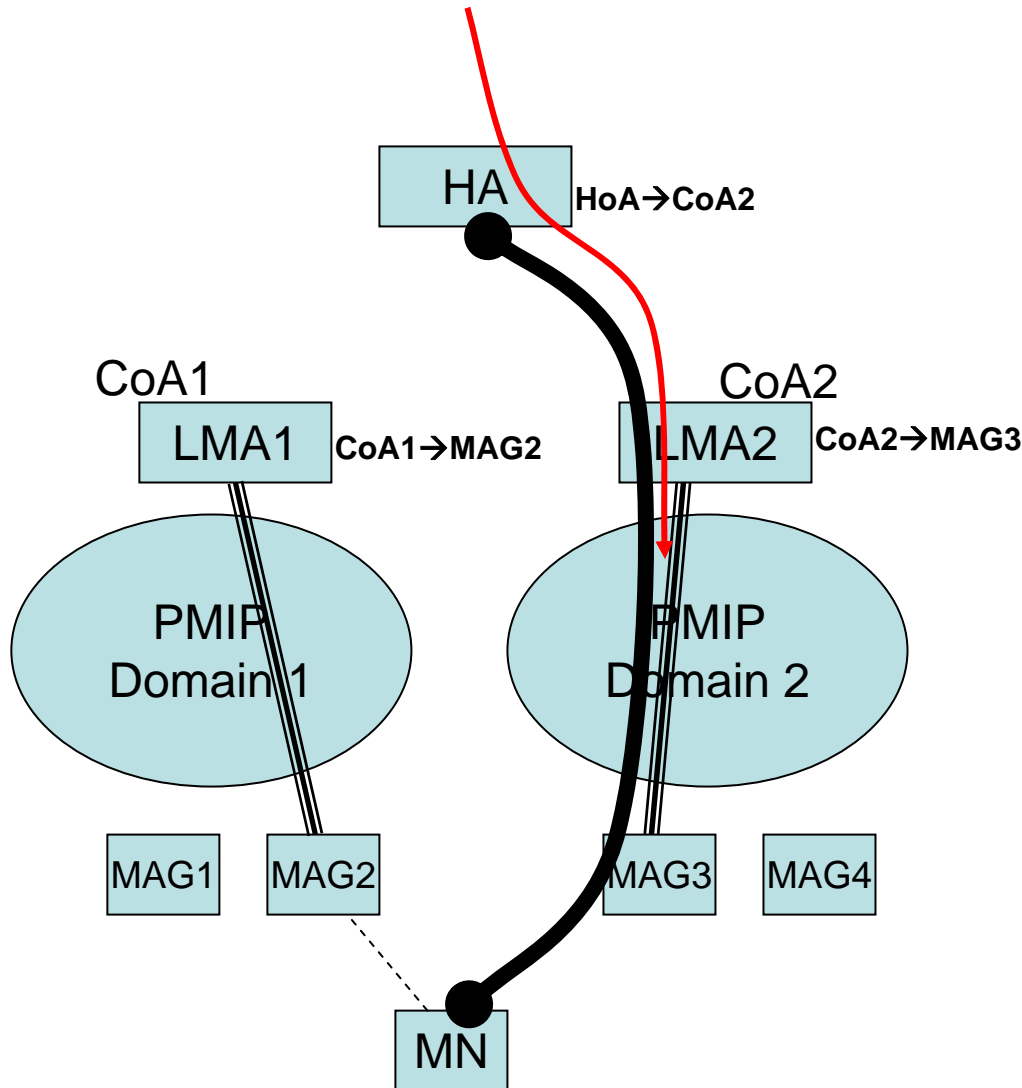## To break or not to break multi-homing?

George Tsirtsis

IETF 72

Contents

- Premise:
  - Logically Separate BCEs are good
  - BCE overwriting is bad
- Why?
  - Logically Separate BCEs work
 - BCE overwriting breaks multihoming

Scenario A

HA   HoA→CoA2

CoA1

LMA1   CoA1→MAG2

CoA2

LMA2   CoA2→MAG3

PMIP Domain 1

PMIP Domain 2

MAG1   MAG2   MAG3   MAG4

MN

- Scenario A has always been thought of as "trivial"
  - MN gets a stable IPaddr from each PMIP domain
  - This is used as a CoA to the MIP binding
- Observe this:
  - LMA1 may have a binding CoA1→ MAG2, but this does not affect the binding in the HA.
  - The LMA1 binding is not "exercised", unless the MN binds in HoA to CoA1
- *HA and LMA binding caches are independent.*
- *MN can be multi-homed or not between PMIP domains*

Scenario A+
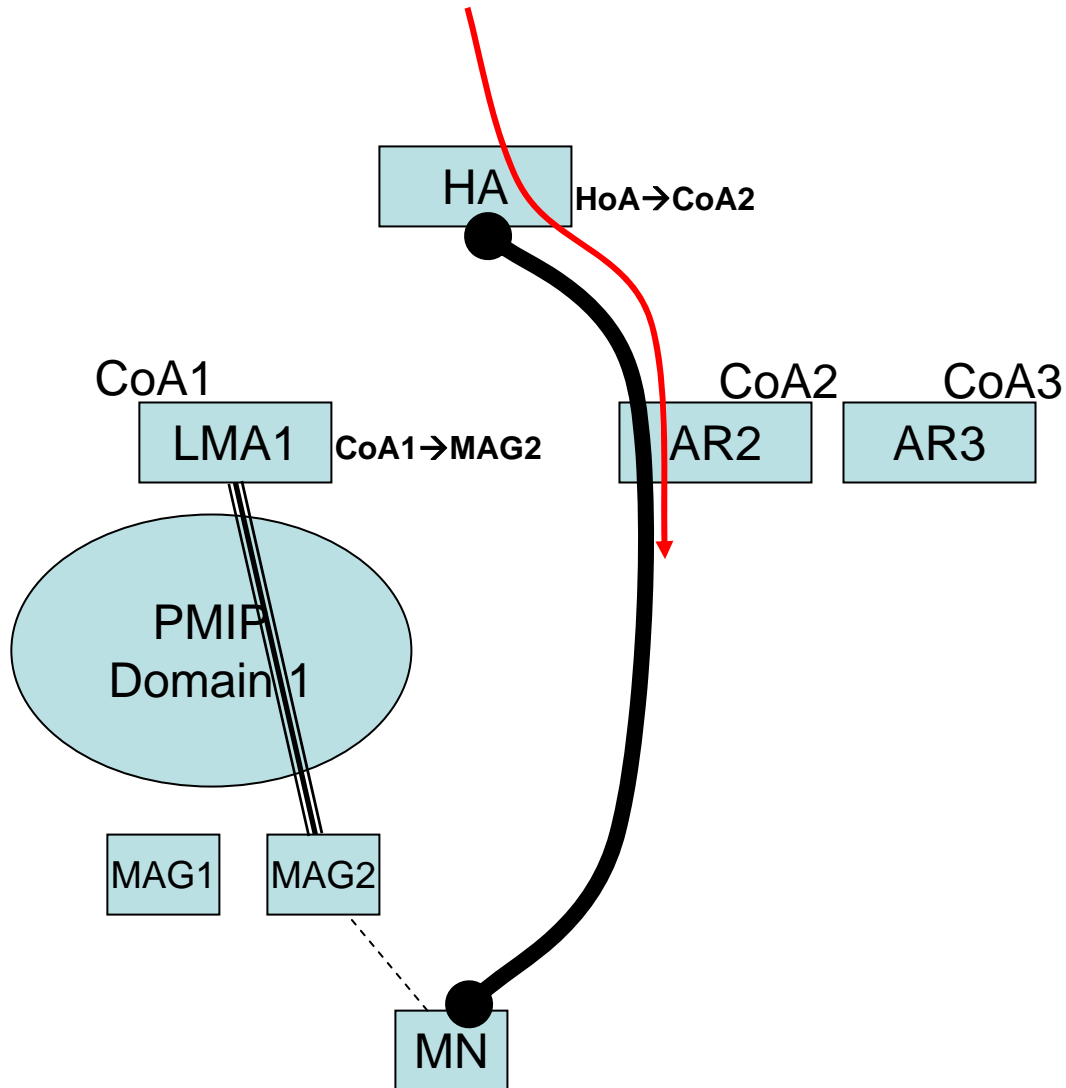
- From HA perspective PMIP and non-PMIP domains look identical
- MN always seems to be connected to an AR providing the CoA
  - in PMIP this is the LMA,
  - in non-PMIP it is a regular AR
- *Again HA and LMA bindings are independent and do not affect each other*
- *MN can be multi-homed or not between PMIP and non-PMIP domains*

Scenario C (away from home)
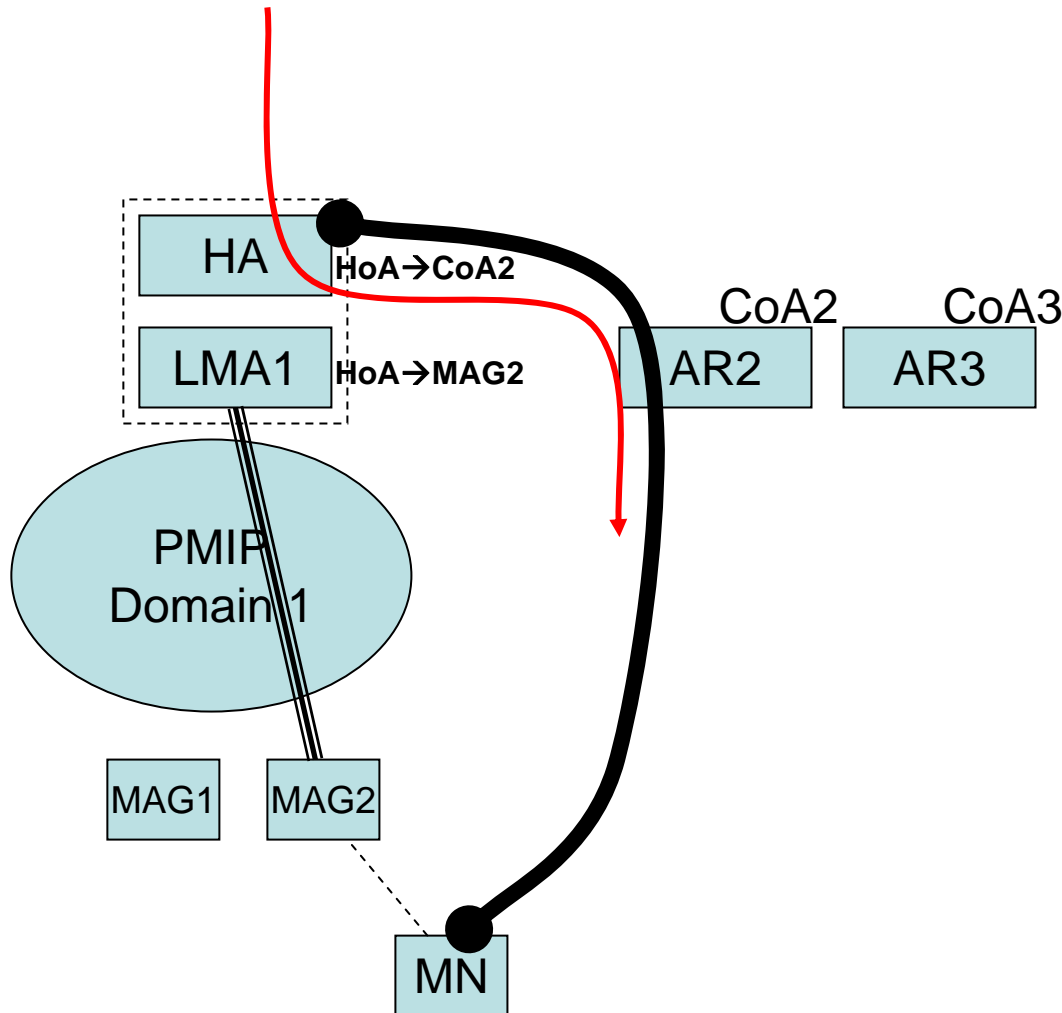
- MIP "home link" = a PMIP Domain
- LMA and HA MUST coordinate for HoA allocation
  - The IPAddr allocated by the LMA must become the MN's HoA in the HA
- Binding Caches MUST NOT be coordinate
  - Packets first hit HA's binding cache.
    - If there is an entry the packet is redirected.
    - If there is no entry (the MN has deregistered MIP) the packet is forwarded to the LMA
  - Packet then hits the LMA's binding cache
    - Assuming the MN has a link to the PMIP domain, the LMA will forward it to the appropriate MAG

Scenario C (at home)

HA

LMA1 **HoA→MAG2**

CoA2 CoA3

AR2 AR3

PMIP Domain 1

MAG1 MAG2

MN
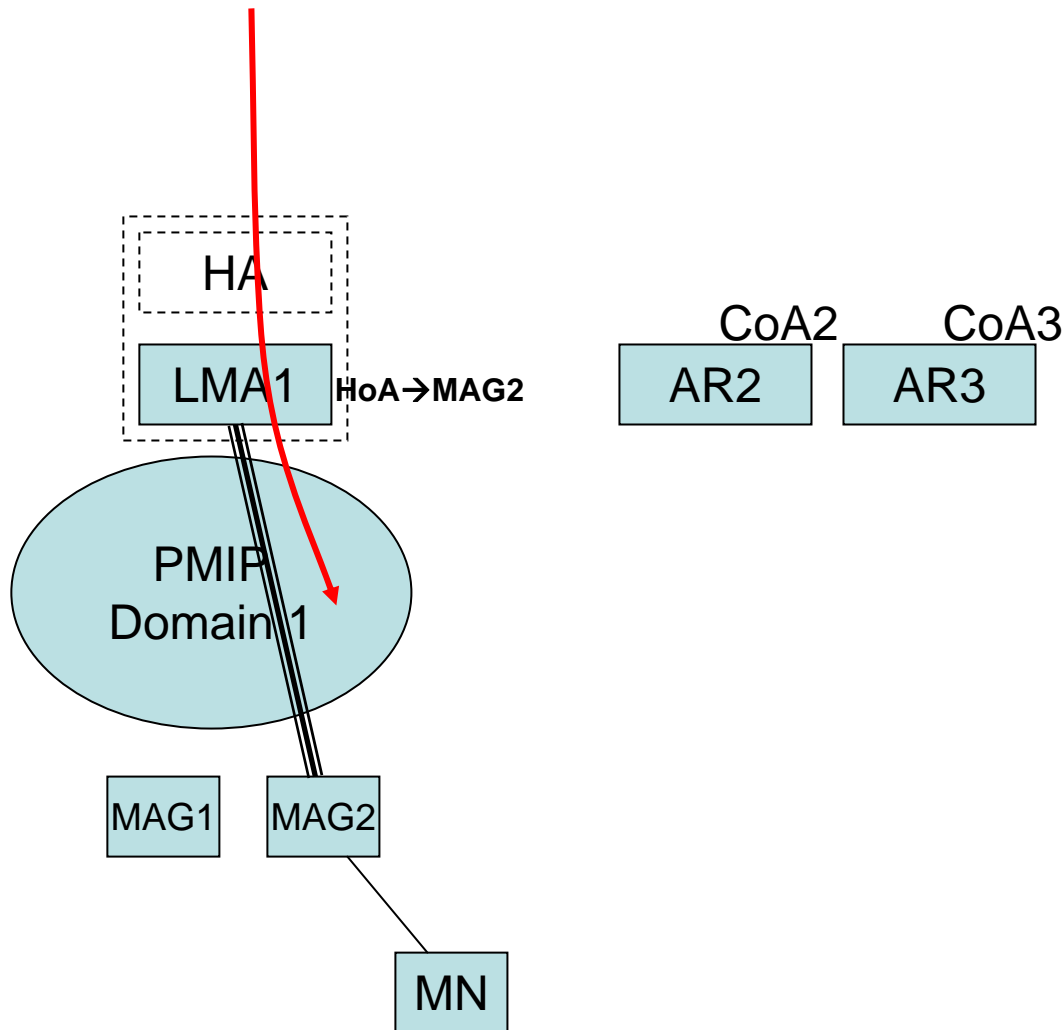
- MN can at any time connect to its home link (it does not affect routing)
  – Connecting to home link does not mean automatic deregistration from the HA.
  – Think multihoming, MCoA, Flow Bindings etc
- If MN wants its traffic to flow over the home link, it MUST deregister from the HA so packets can go straight to the LMA → MAG → MN

Implementation (non) Issue?

HA
LMA1

What's the difference?

HA/LMA
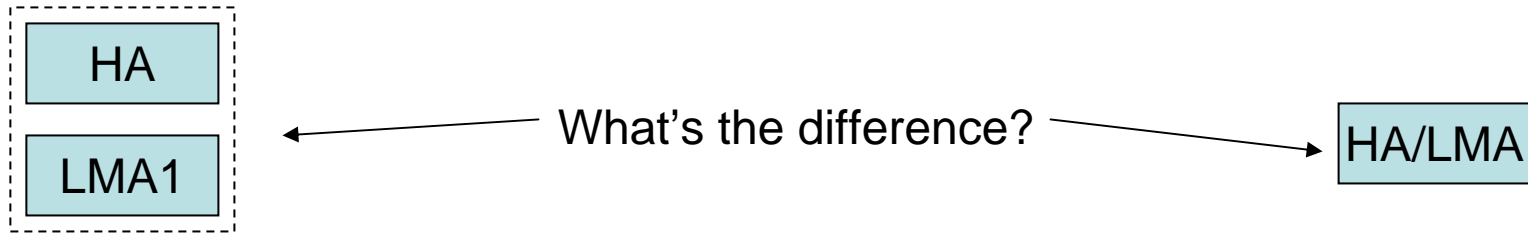
- **Logical** Separation of HA and LMA BCEs does NOT imply **physical** separation or **code** separation
    - A single BCE table can be implemented for both LMA/HA
    - HA BCEs can then be marked as such and are looked at first
    - LMA BCEs are looked at if no HA BCE matches the packet
- Implementations can do this many ways! The standard should require logical separation!

Bottom line

- **Logically Independent BCEs**
  - Works always the same way
  - Works with multihoming
  - Works with MCoA and Flow Movement

- **PMIP BCEs over-writing HA BCEs**
  - Different solutions for solution A and C
  - Breaks multihoming badly
  - Breaks MCoA and Flow Movement