Hierarchical Mobile IPv6 (HMIPv6) Mobility Management RFC 5380

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IPv6 & Mobility Background

- Mobile IPv6 allows a Mobile Node (MN) to move while maintaining reachability, however:
  - Mobile nodes send binding updates (BU) every time they move between access routers (AR)
  - Mobile nodes incur latency equivalent to 0.5-1.5 RTTs for each BU
  - Can incur additional delays if utilizing route optimization
  - Can disrupt the performance of higher layer protocols
  - Messaging limits scalability.

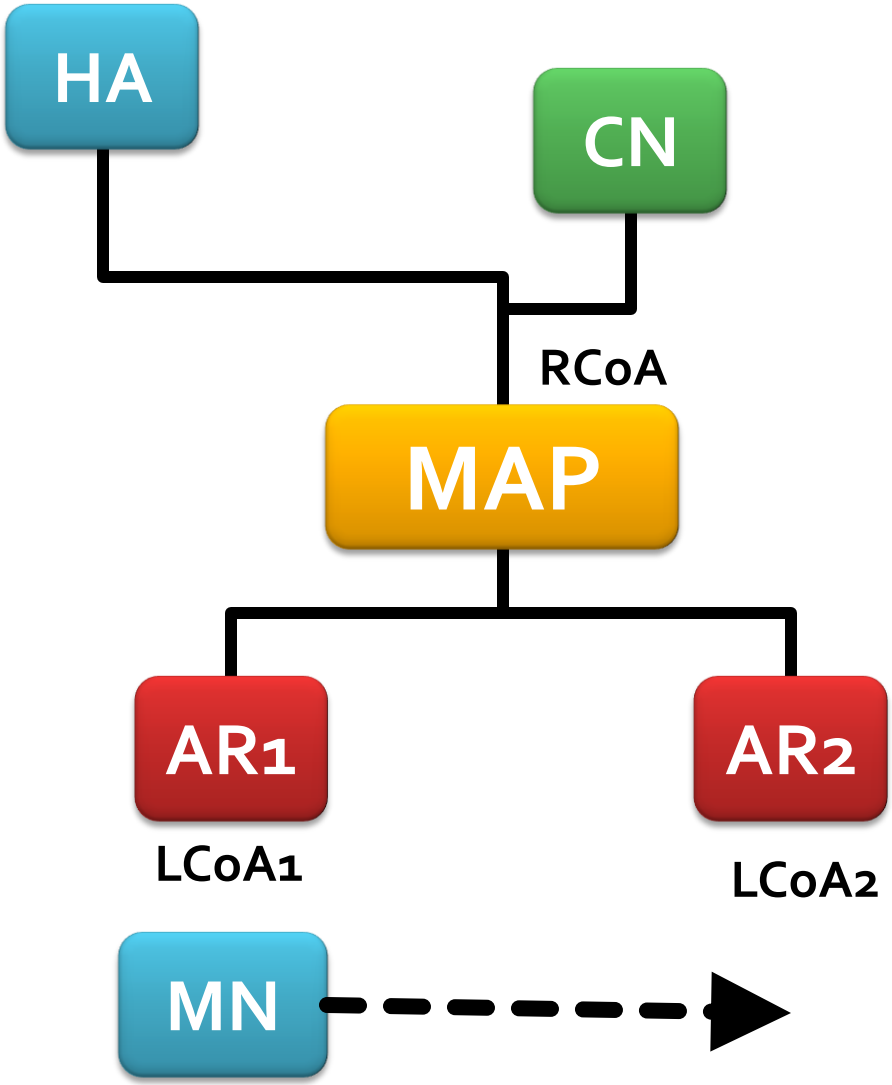
Hierarchical Mobile IPv6

- Introduces new mobility node , Mobility Anchor Point (MAP).
  - Acts a "local" home agent
- Extension of MIPv6 protocol. MN can choose to use basic MIPv6 or MAP.
- Limits Mobile IPv6 signaling
  - Local mobility only requires 1 BU to MAP.
- Hides local mobility (below MAP) from HA and CNs.

Key Terminology

- Regional Care-of-Address (RCoA)
  - Address allocated by MAP to the MN.
- On-Link Care-of-Address
  - Configured on MN interface based on prefix advertised by default router. (MIP CoA)
- Local Binding Update
  - MN BU to the MAP to establish RCoA to LCoA binding.
- MAP Domain
  - Domain managed by one or many local MAPs.

HMIPv6 Architecture



MAPs and MAP Discovery

- MAP global address obtained from AR Route Advertisements (RA), known as MAP Discovery.
  - RA includes MAP distance, preference, lifetime info.
- If MN detects mobility (generally through RAs) , it will attempt to detect MAP domain changes.
  - If there is a change, the MN must inform its HA and CNs appropriately via BU.

Protocol Operation

- MNs maintain two local addresses RCoA and LCoA.
  - RCoA formed by combining MN interface ID and MAP subnet prefix.
- Mobile Node Operation
  - After obtaining CoAs, MN performs local BU with MAP.
  - MAP responds with BA.
  - MN registers RCoA with HA through BU
    - Can also send similar upates to CNs.
  - HA responds with BA.

Protocol Operation (cont.)

- MN Operations (cont.)
  - Intra-MAP Domain Mobility
    - MN provides BU with its new LCoA
  - Inter-MAP Domain Mobility
    - MN provides BU with it new LCoA
    - Perform MAP discovery in new MAP Domain
- MAP Operations
  - Acts as local HA
  - Intercepts packets destined for RCoA using Proxy Neighbor Discovery.

HMIPv6 Optimizations & Features

- MN can utilize multiple MAPs, balancing CN BU across MAPs.
- MN can use RCoA as a source address for short-term communication.
- MN can hide its location by utilizing the RCoA as the source address.