



IP mobility based solutions

draft-bernardos-dmm-cmip-01

draft-bernardos-dmm-pmip-03

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Where are we in the DMM ocean?



- Too many ways of categorize our solutions
 - IP mobility based solutions
 - Re-use (P)MIPv6 signaling
 - Network-based and client-based
 - PMIPv6-based solution, no support required on the host
 - MIPv6-based solution, some support required on the host
 - Access network anchoring (Alper's categorization)
 - Anchoring IP address within the access network using IP-in-IP tunneling

We extend existing IP mobility protocols

- Client Mobile IP (host) based



- Fabio Giust, Antonio de la Oliva, Carlos J. Bernardos, “*Flat Access and Mobility Architecture: an IPv6 Distributed Client Mobility Management Solution*”, 3rd IEEE International Workshop on Mobility Management in the Networks of the Future World (Mobiworld 2011) at INFOCOM 11

- [draft-bernardos-dmm-cmip-01](#)

- Proxy Mobile IP (network) based



- Fabio Giust, Carlos J. Bernardos, Antonio de la Oliva, “*Analytic Evaluation and Experimental Validation of a Network-based IPv6 Distributed Mobility Management Solution*”, IEEE Transactions on Mobile Computing, available online

- [draft-bernardos-dmm-pmip-03](#)

Client-based DMM solution



- Flat Access and Mobility Architecture (FAMA)
- Re-uses existing approaches
 - Mobile IPv6: RFC 6275
 - Authorizing MIPv6 BU with CGAs: draft-laganier-mext-cga
- Mobility management pushed to the edge of the network
 - The HA is deployed at the access router level

Client-based solution. Entities

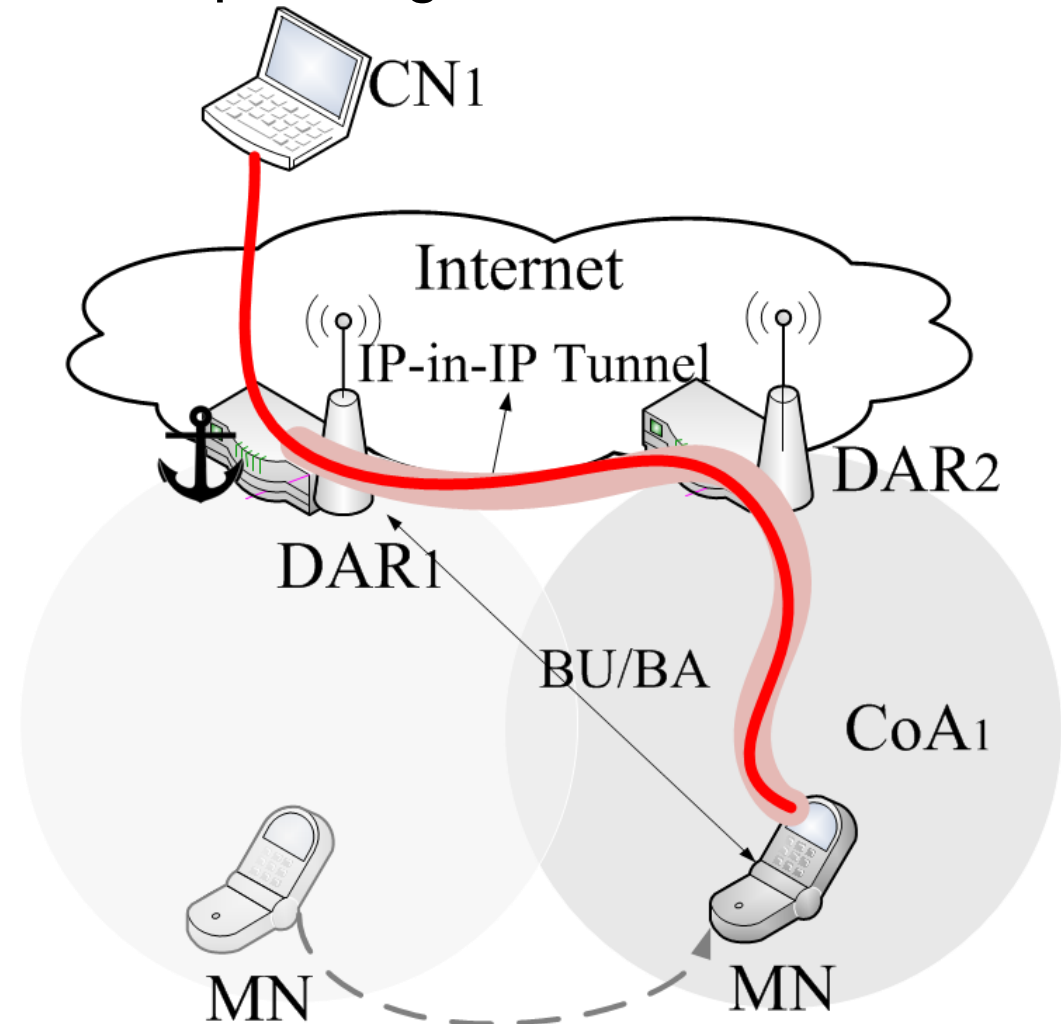
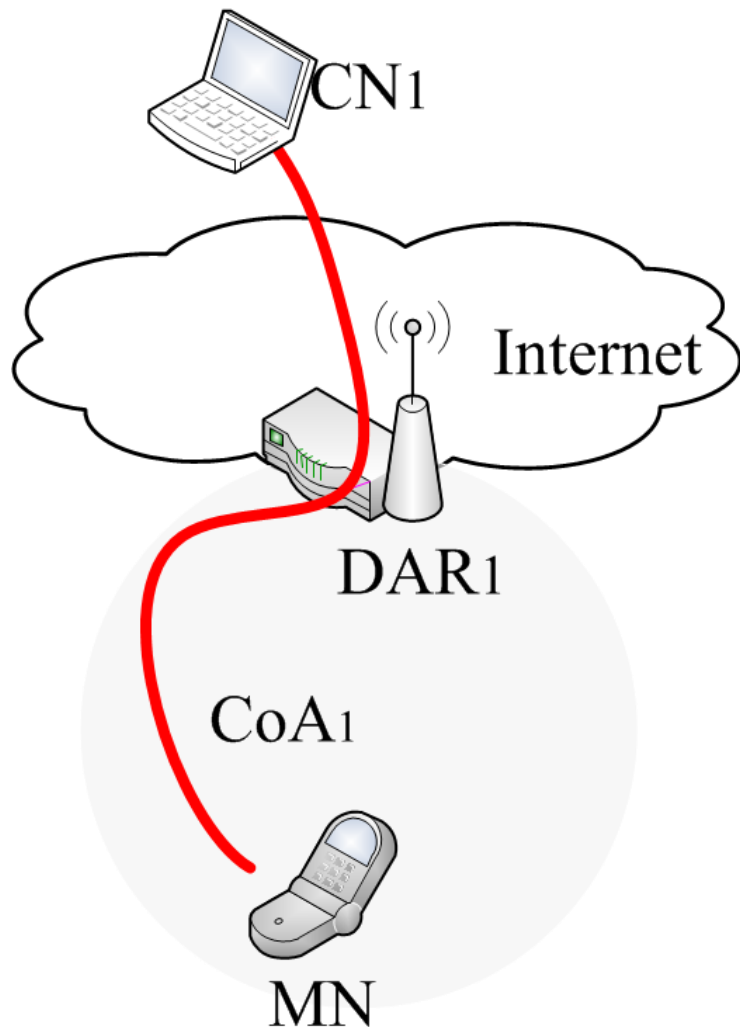


- Distributed Anchor Router (DAR)
 - Deployed in the MN's default gateway
 - First hop router
 - It assigns a topologically valid address to MNs
 - An on-link MN can send/receive traffic using the address from the DAR
 - DAR forwards such packets as a plain router
 - A DAR anchors the address it assigned when the MN is not on-link (HA role)
 - The MN's address is reachable through a bi-directional IP tunnel

Client-based solution. Operations (I)



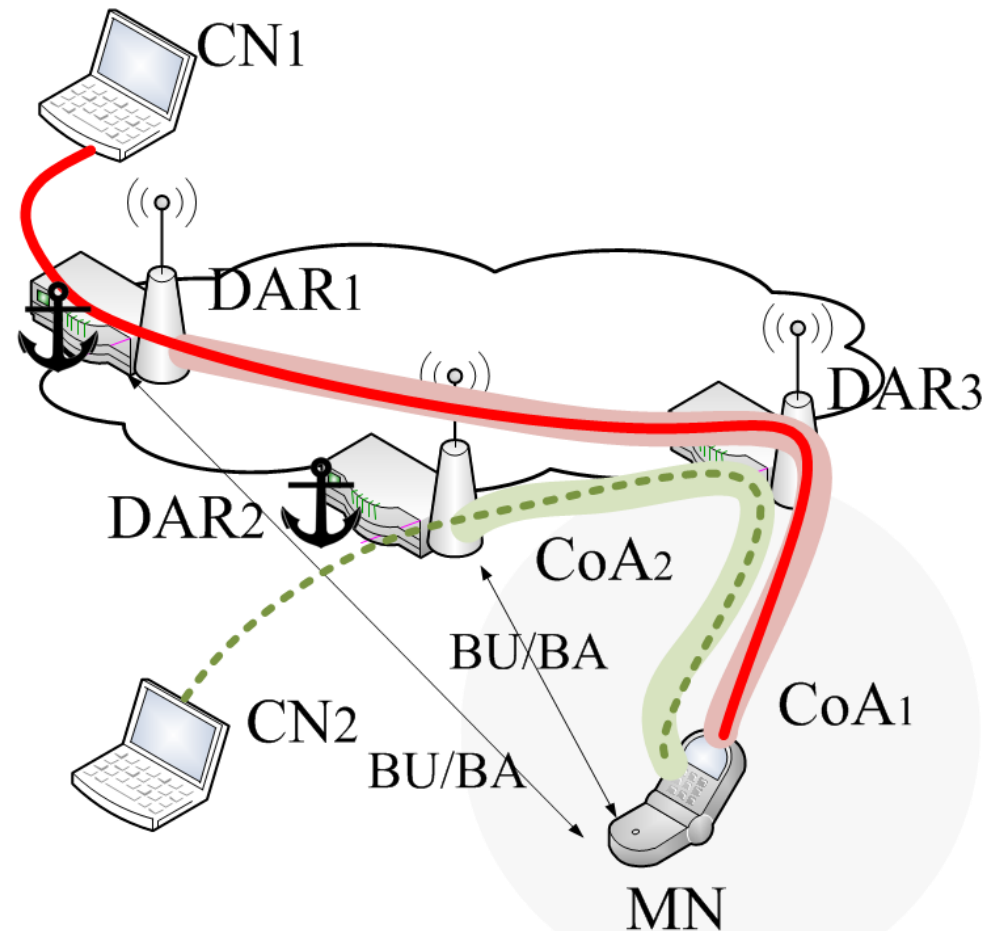
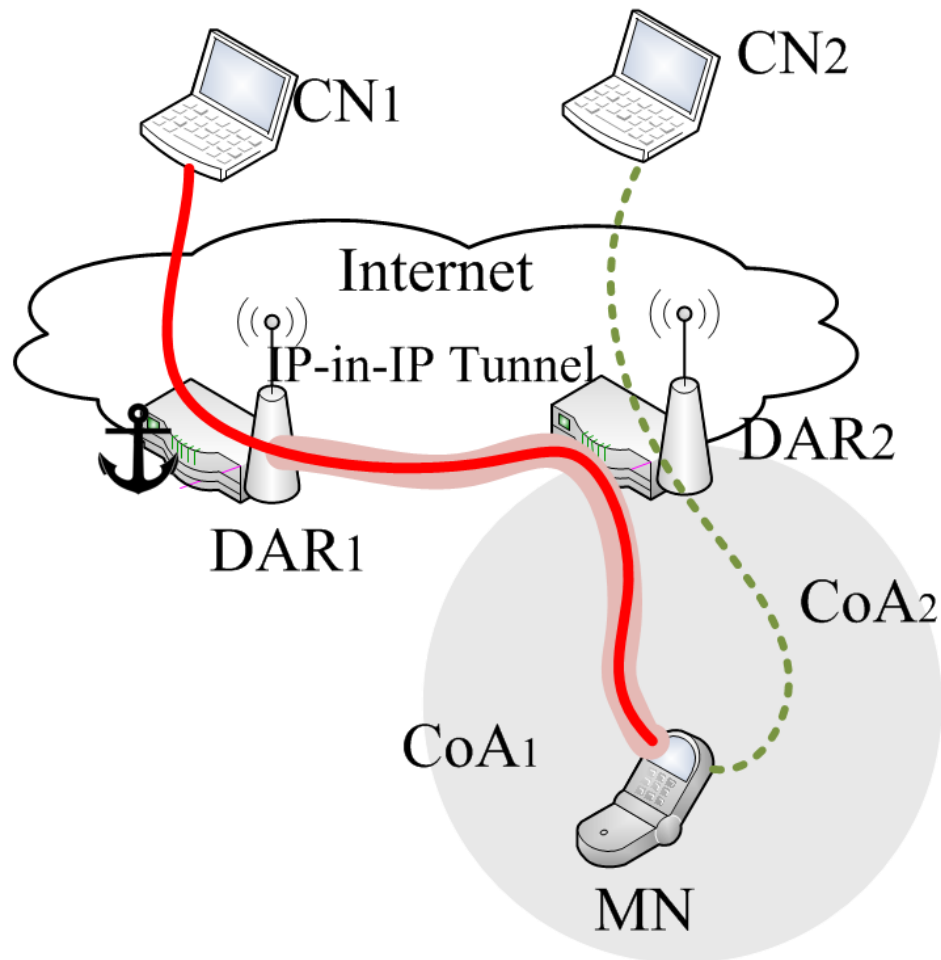
- When the MN moves to a new DAR, it can keep the old address reachability by notifying the corresponding DAR with a BU



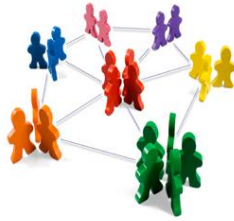
Client-based solution. Operations (II)



- The address configured at the new DAR is used for new sessions
- Old sessions are redirected through the IP tunnel

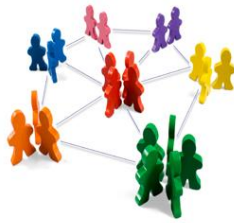


Net-based DMM solution



- Network based DMM approach
 - Based on Proxy Mobile IPv6: RFC 5213
- Mobility management pushed to the edge
 - Access router level
- Partially distributed solution: C-U split
 - Centralized control plane kind-of LMA
 - A central node stores the mobility sessions of all the MNs
 - Distributed data plane
 - Only the edge routers handle the data forwarding

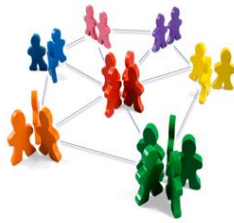
Net-based solution. Entities



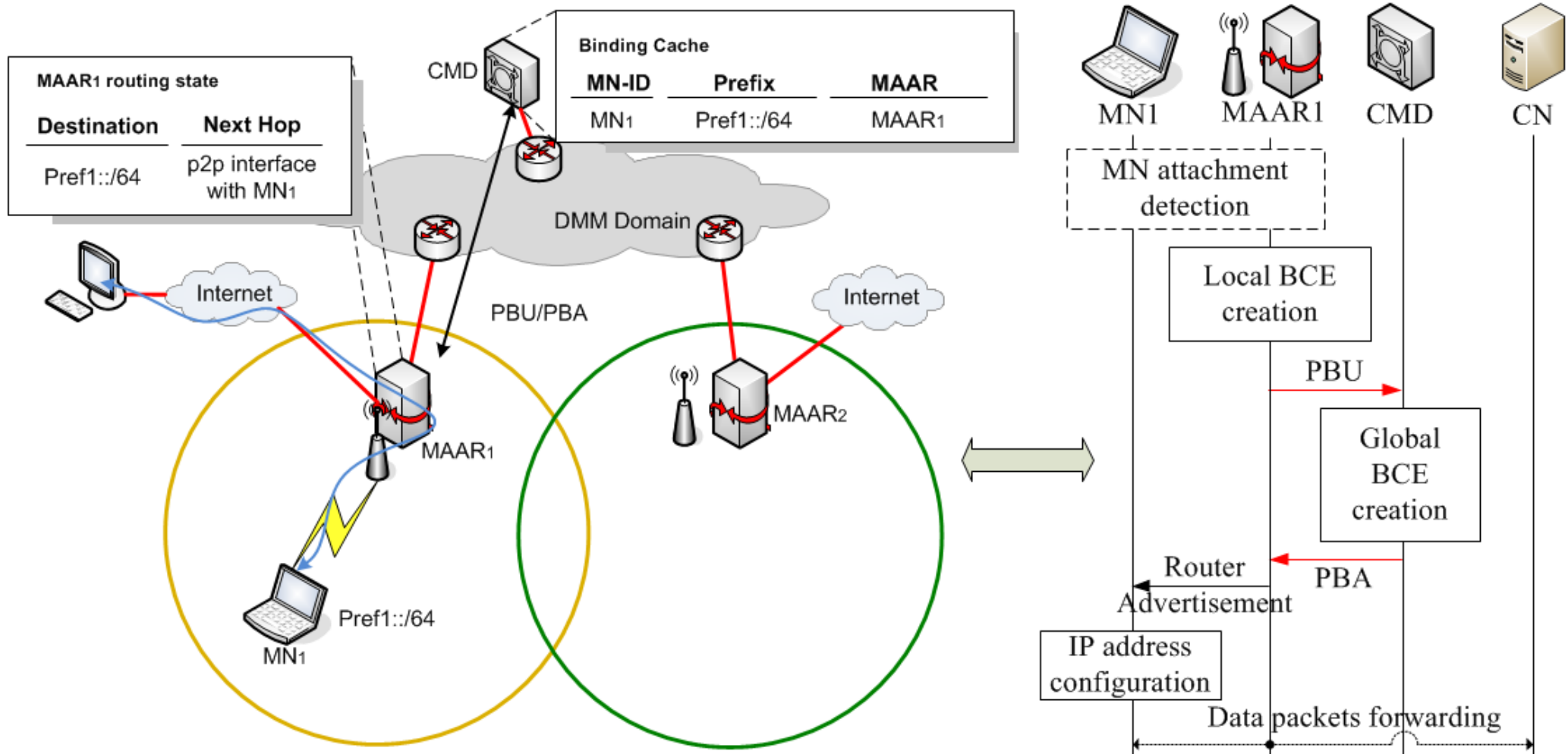
- Mobility Anchor and Access Router (MAAR)
 - One IP hop distance from the MN
 - Concentrates AR, LMA and MAG functionalities on a per-MN, per-prefix basis
 - Delegates and anchors an IP prefix to each MN attached
 - Serving MAAR (S-MAAR): MAAR which the MN is currently attached to
 - Anchor MAAR (A-MAAR): previously visited MAAR anchoring a prefix used by an active flow of the MN
 - Forwards data packets to/from IP networks
- Central Mobility Database (CMD)
 - Central node storing the BCEs of all the MNs in the domain
 - It plays the role of the LMA for the control plane
 - Not traversed by data packets

Net-based solution.

Operations: initial registration



- The S-MAAR registers the MN at the CMD through a PBU/PBA handshake



Net-based solution. Operations: handover



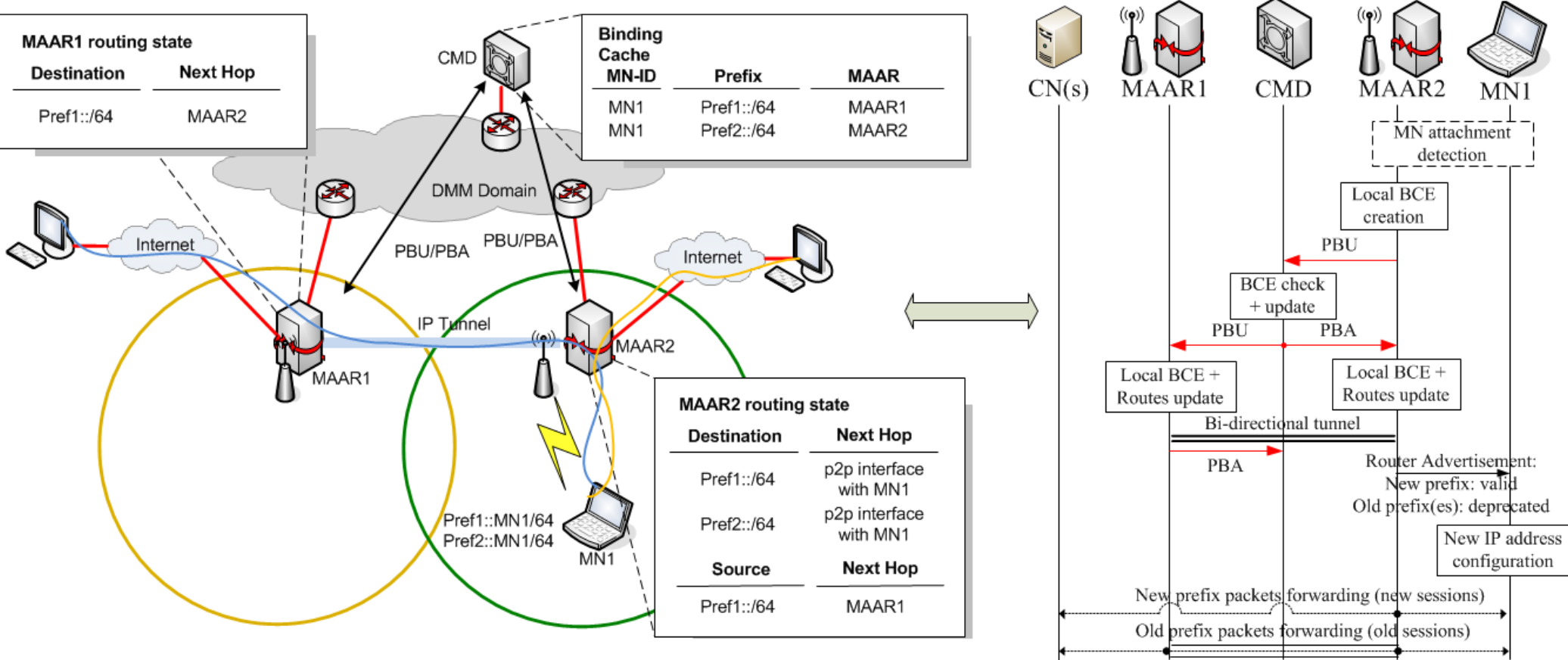
- 3 operational modes:
 - CMD as PBU/PBA relay
 - CMD as MAAR locator
 - CMD as PBU/PBA proxy
- Conceptually they are similar
 - The difference mainly consists on the message order
- We focus on the “proxy” mode
 - Already implemented

Net-based solution.

CMD as PBU/PBA proxy



- The CMD receives a PBU from the new S-MAAR announcing the MN attachment
- The CMD sends instructions to the S-MAAR and A-MAAR(s) on how to establish the proper routing configuration



Analysis against DMM requirements

- Meet DMM requirements (draft-ietf-dmm-requirements)
 - **REQ1: Distributed mobility management**
 - **REQ2: Bypassable network-layer mobility support for each application session**
 - **REQ3: IPv6 deployment**
 - **REQ4: Existing mobility protocols**
 - **REQ5: Coexistence with deployed networks/hosts and operability across different networks**
 - **REQ6: Operation and Management considerations**
 - **REQ7: Security considerations**
 - **REQ8: Multicast considerations**



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- **ODMM: Open platform for DMM solutions**
 - Web site, supporting docs & mailing lists
 - Released in January 2014
 - Platform hosting Open Source DMM implementations
 -  • Network-based DMM (MAD-PMIPv6), showcased in Paris and Berlin meetings
 -  • Client-based DMM implementation (C-DMM for MIPv6), recently added
 -  • Others?
 - Maintained and extended by the EU iJOIN project
- News and announcements
 - Subscribe to odmm@odmm.net

Questions?

