IP mobility based solutions

draft-bernardos-dmm-cmip-01
draft-bernardos-dmm-pmip-03

Carlos J. Bernardos – Universidad Carlos III de Madrid
Antonio de la Oliva – Universidad Carlos III de Madrid
Fabio Giust – Institute IMDEA Networks & Universidad Carlos III de Madrid

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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
  - 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?

KEEP CALM AND ASK ME QUESTIONS