Approaches to Distributed mobility management using Mobile IPv6 and its extensions

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Overview

- There are issues and concerns about the gateway centric approach of Mobile IP based core protocols.

- This work provides considerations on ways to alleviate anchored mobility issues with approaches that could be considered in deployment.

Reasons for DMM

- **Backhauling all traffic to a centralized GW**

- **Latency Considerations**

- **Inefficient Routing and signaling overhead**

- **Scalability and cost**

Enhancements to improve mobility

- **HMIPv6**

- **Dynamic assignment of HA**

- **Route Optimization**

Distributed mobility:

What does it imply

- Distribute functionality closer to the edge of network.
  - Line between access and core network is fading.
  - Need to rethink how mobility as a service is affected in such an evolving architecture.

- Distributed mobility
  - Does not require a mobile node to be anchored at gateway all time
  - Session continuity is on par with that as provided by anchored mobility solution.

Addressing the issues

- Not pragmatic to redesign or start over

- Consideration of what are the issues with centralized gateway architecture
  - Develop extensions to protocols
  - Considerations for deployment needs and models

Approaches using current protocols

- Much of the needed protocol requirements for distributed mobility exists

- Missing
  - System level design
  - Lack of mobility aware APIs

- Simply avoid traditional "anchored mobility" and use local (care-of) addresses for communication.
  - RFC 5014 provides means for prefix that has mobility characteristics or a prefix that is local to the current access network.

- Possible solutions in DMM should impose minimal change to MN.

Approaches using current approaches

- Allocate mobility anchors that are topologically close to the MN
  - Consideration of HMIPv6 [RFC5380]

- What might be required:
  - "chain" multiple MAP-domain to extend the micro-mobility area
  - or provide another RFC5014 like prefix type (IPV6_PREFER_SRC_MAP).
  - Mobile IPv6 + Proxy Mobile IPv6 interactions Scenario A.1 in [I-D.ietf-netlmm-mip-interactions] a similar solution.
  - Proxy Mobile IPv6 localized routing solutions [I-D.ietf-netext-pmip6-lr-ps]

Dynamic assignment of mobility anchor

- Other solutions to dynamically assign mobility anchor to MN:
    - Home Agent Switch extension to Mobile IPv6,
    - Runtime LMA assignment [I-D.ietf-netext-redirect] extension to Proxy Mobile IPv6
    - Mobile IPv4 Dynamic HA Assignment [RFC4433].

Potential future work

- Understand key concerns driving distributed mobility solution
  - Identify and analyze various approaches using existing protocols and extensions to overcome them.
- Work on generic solution for anchor relocation
- Address selection beyond RFC5014 and rapid deprecation/renumbering of prefixes.
  - This could be a new protocol work for coloring prefixes (RA/DHCPv6) and how to handle local prefix deprecation during handovers.
  - Localized mobility that does not involve signaling with gateways or "mobility signaling".

Questions/Comments?