On Demand Mobility Management
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Mobile IP

- Provides a persistent IP address (HoA) to MN
  - Cost: HA CAPEX/OPEX, triangular routing latency

- All applications on the MN subjected to same treatment all the time

- But not all apps really need that!
  - Typical client app does not need persistent IP address
  - Higher-layer solutions (e.g., MPTCP, SIP or app-mobility) are more efficient and may serve session continuity needs, when available

Approach

- Let the applications indicate their need, and IP stack engage IP-layer mobility accordingly

Types of IP Addresses
(with respect to IP-layer mobility management)

Type	Belongs to prefix managed by:	Persistency	Supports IP address reachability?	Supports IP session continuity?
Home Network Anchored Address	Centrally-located Home Agent	Fixed all the time	Yes	Yes
Access Network Anchored Address	Serving or previous Access Router	Released after IP session(s) terminate	No	Yes
Unanchored Address	Serving Access Router	Released upon IP handover	No	No

RFC 5014

- "IPv6 Socket API for Source Address Selection"
- Defines IPV6_ADDR_PREFERENCES socket flags to influence source address selection
  - IPV6_PREFER_SRC_HOME
  - IPV6_PREFER_SRC_COA
- Not sufficient because
  - Home vs. CoA distinction not sufficient to capture 3 different types of IP addresses
  - Selects among available addresses, but on-demand configuration is needed too
    - Example use: Never configure the rarely-used Home Network Anchored Address until it's requested by an app.
    - Indication of "Prefer(ence)" is not sufficient, we need "require(ment)"

Solution

- New IPV6_ADDR_PREFERENCES flags
  - IPV6_REQUIRE_HOME_ANCHORED
  - IPV6_REQUIRE_ACCESS_ANCHORED
  - IPV6_REQUIRE_UNANCHORED
- Works with "IPv6 Socket API for Source Address Selection (RFC 5014)" framework
- If the requested type is not already configured, then the IP stack attempts to dynamically configure one

Policy

- Following are policy matters:
  - The type of IP addresses configured on the host at the boot time.
  - Permission to grant various types of IP addresses to a requesting application.
  - Determination of a default address type when an application does not use the API.

Questions and comments?