IETF DMM WG
Mobility Exposure and Selection WT Report

Alper Yegin, on behalf of the WT
IETF 91

Exposure and Selection

DMM WG Charter:

"Exposing mobility state to mobile nodes and network nodes: define solutions that allow, for example, mobile nodes to select either a care-of address or a home address depending on an application' mobility needs. In order to enable this functionality, the network-side control functions and other networking nodes must also be able to exchange appropriate control information, as well as to the mobile nodes and their applications."

Conference Calls

- Call#1
  - Oct 23, 2014
  - Attendees: Fred, Danny, Jouni, Xinpeng, Anthony, John K., Byoung-Jo "J", Alper
  - Notes:http://yegin.org/NGmobility/DMM_WG_Exposure_Selection_WT-Call1.pptx
- Call#2
  - Nov 6, 2014
  - Attendees: Danny, Pierrick, Sri, Byoung-Jo "J", Alper
  - Notes: http://yegin.org/NGmobility/DMM_WG_Exposure_Selection_WT-Call2-r1.pptx

Principles

- Different types of source addresses:
  - Fixed IP address:
    - A stable IP address that does not change (practically) at all
    - Example: A home address anchored on a centralized HA
    - Used by mobile server app that publishes its IP address in DNS, etc.
  - Sustained IP address:
    - A stable IP address that does not change until the flows using the address terminate
    - Example: An IP address temporarily anchored on the access router
    - Used by Skype call, VPN, live video streaming, etc.
  - Nomadic IP address:
    - An IP address that cannot be maintained when MN moves off-link
    - Example: An IP address allocated by a typical/basic WiFi hotspot
    - Used by DNS client, IM client, apps using MPTCP, etc.
- A new attribute for IP addresses: Mobility support type
- Each data flow needs to be bound to an IP address according to its mobility characteristic
  - Source address "selection"

Work Items

#1. Describe how IP address type is communicated between the apps and IP stack on the MN.

- Source address selection based on IP address type

#2. Describe how IP address type information is conveyed from network to MN.

#3. Describe how a required type of IP address is dynamically configured, when one is not already available on the MN.

#4. Describe how MN decides between IP-layer and other layer-based mobility support (e.g., MPTCP, SIP, app-layer) to apply on a given data flow

Item#1

- RFC 5014: IPv6 Socket API for Source Address Selection
- RFC already defined 2 relevant flags:
  - IPV6_PREFER_SRC_HOME
  - IPV6_PREFER_SRC_COA
- Not sufficient, as we need to distinguish among 3 different types
  - Fixed IP Address
  - Sustained IP Address
  - Nomadic IP Address
- Also, solution must trigger IP address allocation attempt if the requested type IP address is not already configured:
  - Item#3: "Describe how a required type of IP address is dynamically configured, when one is not already available on the MN"
- Need extensions to RFC 5014

Item#1

- IP address can change its type
  - Nomadic→ Sustained: possible, but may not be available on all networks
    - Alternative: Network can provide another IP address when the MN needs a sustained IP address
    - Changing type on the same IP address may pose efficiency issues, system may be better off providing a second IP address
  - Sustained → Fixed: possible (but may not be very efficient)
    - Same for Nomadic → Fixed
- Backward compatibility, needs guideline
  - Legacy MN w/o API support
  - Legacy apps w/o API support
  - Legacy network w/o address type support

Item#1

- Network protocols to configure IP address of desired type are independent of the API between the apps and IP stack on the MN
  - Support for 3 address types can be implemented by various DMM proposals that are being discussed in DMM WG
- 2 relevant drafts:
  - http://tools.ietf.org/html/draft-liu-dmm-mobility-api-02 (http://www.ietf.org/proceedings/88/slides/slides-88-dmm-8.pdf)
  - https://datatracker.ietf.org/doc/draft-yegin-dmm-ondemand-mobility/ (http://www.ietf.org/proceedings/90/slides/slides-90-dmm-6.pdf)
- Next step:
  - WT to study proposals and discuss

Items #2/#3

#2. Describe how IP address type is conveyed from network to MN.

#3. Describe how a required type of IP address is dynamically configured, when one is not already available on the MN.

- https://tools.ietf.org/html/draft-ietf-mif-mpvd-id-00
- https://tools.ietf.org/html/draft-ietf-mif-mpvd-dhcp-support-00
- http://tools.ietf.org/html/draft-ietf-mif-mpvd-ndp-support-00

- Next steps:
  - Identify principles
  - Study proposals

Item #4

- e2e data flow continuity can be accomplished at various layers:
  - IP-layer (e.g., MIP, PMIP)
  - Transport-layer (e.g., SCTP, MPTCP)
  - Application-layer (e.g., SIP, or proprietary)
- Mobility protocols at different layers may be applied to each data flow, depending on applicability/availability.
  - "Selection" needed for determining which protocol to apply on a given e2e data flow.
  - This selection is outside the scope of DMM. DMM only cares about IP-layer mobility.

Item #4

- Regardless of/in addition to other layer mobility, IP layer mobility may be used.
- Item #4: Describe how MN decides between IP-layer and other layer mobility solutions (e.g., MPTCP, SIP, app-layer) to apply on a given flow

- http://tools.ietf.org/html/draft-yegin-ip-mobility-orchestrator-00 (http://www.ietf.org/proceedings/90/slides/slides-90-dmm-7.pdf)

- Next step: Needs more discussion

Questions/Comments?