IETF-118 IPMON Side Meeting

IPMON BoF Charter

November 9, 2023
Prague

Authors: Jaehoon Paul Jeong (SKKU), Yiwen Chris Shen (SKKU), and Jung-Soo Park (ETRI)
Email: {pauljeong,chrisshen}@skku.edu, pjs@etri.re.kr

IPMON BoF Charter (1/12)

- **Introduction**
  - IPv6 Mobile Object Networking (IPMON) works on use cases of V2X (e.g., V2V, V2I, and V2P/V2D) where IPv6 is well-suited as a networking technology.
  - IPMON is used in various environments such as Highway, Urban Road Networks, Streets, Parking Lots, Urban Air Mobility (UAM), and Drone Networks.

IPMON BoF Charter (2/12)

- **Goals**
  - IPMON aims at **developing IPv6 networking protocols for Mobile Objects (MO).**
  - For this goal, IPv6-based solutions will be developed to support direct, seamless, and secure connectivity among MOs and stationary systems.
  - IPMON fills in the gap of IPv6-related standards to provide MOs with mobile communication among them and infrastructure nodes for the Internet connectivity.
  - For this, the following are needed for IPMON:

IPMON BoF Charter (3/12)

- **Goals (Con't)**

1. IPMON clarifies the IPv6 packet delivery over major wireless link technologies (e.g., 3GPP 5G V2X and IEEE 802.11bd). If IPv6 over 3GPP 5G V2X needs some modification from RFC 8691, it will be studied by this group, but the draft will be standardized by 6MAN WG.

IPMON BoF Charter (4/12)

- **Goals (Con't)**

2. IPMON lets MOs effectively configure their IPv6 addresses for both VANET and Radio Access Networks (RAN) such as 3GPP 5G V2X and IEEE 802.11-OCB/bd. An IPv6 address configured by the IPv6 address autoconfiguration for MOs should be used for both VANET and RAN.

IPMON BoF Charter (5/12)

- **Goals (Con't)**

3. IPMON needs mobility management of MOs in dynamic network topologies. While they run fast, MOs can construct Vehicular Ad-hoc Networks (VANET) and they can be intermittently connected to the Internet infrastructure via the VANET.

IPMON BoF Charter (6/12)

- **Goals (Con't)**

4. IPMON supports an optimal packet routing in a dynamic network topology. As the MOs on the road or in the air are moving fast and construct a VANET, they need to exchange data packets with an optimal packet routing in an efficient way such as V2V and V2I2V (i.e., V2I and then I2V).

IPMON BoF Charter (7/12)

- **Goals (Con't)**

5. IPMON supports secure communication among MOs or between MOs and infrastructure nodes. IPMON protects MOs from various security attacks (e.g., DDoS attacks) and fake messages (e.g., false location information). For privacy, identity information (e.g., MAC address and Vehicle Identification Number) should not be released to prevent each MO from being tracked by a hacker.

IPMON BoF Charter (8/12)

- **Goals (Con't)**

6. IPMON supports safe maneuver (driving or flying) of MOs through mobile communication among MOs. This safe maneuver requires the collaboration among MOs for physical collision avoidance.

IPMON BoF Charter (9/12)

- **Goals (Con't)**

7. IPMON supports the management of identifier and locator of mobile objects (MOs) in a secure and private manner. The separation of the identifier and locator of MOs is needed to prevent hackers from tracking the MOs in an authorized way.

IPMON BoF Charter (10/12)

- **Goals (Con't)**

8. IPMON supports the mobility management of virtual objects as MOs as well as physical objects (e.g., vehicles, UAMs, and drones) in an edge computing. For example, along highways, an autonomous vehicle delivers its video data to edge computing servers (as virtual objects) so that they can analyze the video data. These virtual objects need to move on the highways along with physical objects.

IPMON BoF Charter (11/12)

- **Program of Work**

1. IPv6 Mobile Objects (IPMON): Problem Statement and Use Cases
2. Vehicular Neighbor Discovery (VND) for Multihop IPv6 Address Autoconfiguration
3. Vehicular Mobility Management (VMM) for Proactive Mobility Support
4. Vehicular Packet Routing (VPR) with Light-Weight Routing Overhead
5. Vehicular Security and Privacy (VSP) for Mobile Objects
6. Context-Aware Navigation Protocol (CNP) for Safe Maneuver of Mobile Objects
7. Identifier and Locator Management for Mobile Objects
8. Mobility Management of Virtual Objects as well as Physical Objects

IPMON BoF Charter (12/12)

- **Milestones**
  1. July 2024: Adopt IPMON Problem Statement and Use Cases as a WG document
  2. July 2024: Adopt Vehicular Neighbor Discovery (VND) as a WG document
  3. July 2024: Adopt Vehicular Mobility Management as a WG document
  4. November 2024: Adopt Vehicular Packet Routing (VPR) as a WG document
  5. November 2024: Adopt Vehicular Security and Privacy (VSP) as a WG document
  6. March 2025: Adopt Context-Aware Navigation Protocol (CNP) as a WG document
  7. March 2025: Adopt Identifier and Locator Management for Mobile Objects as a WG document
  8. July 2025: Adopt Mobility Management of Virtual Objects as well as Physical Objects as a WG document