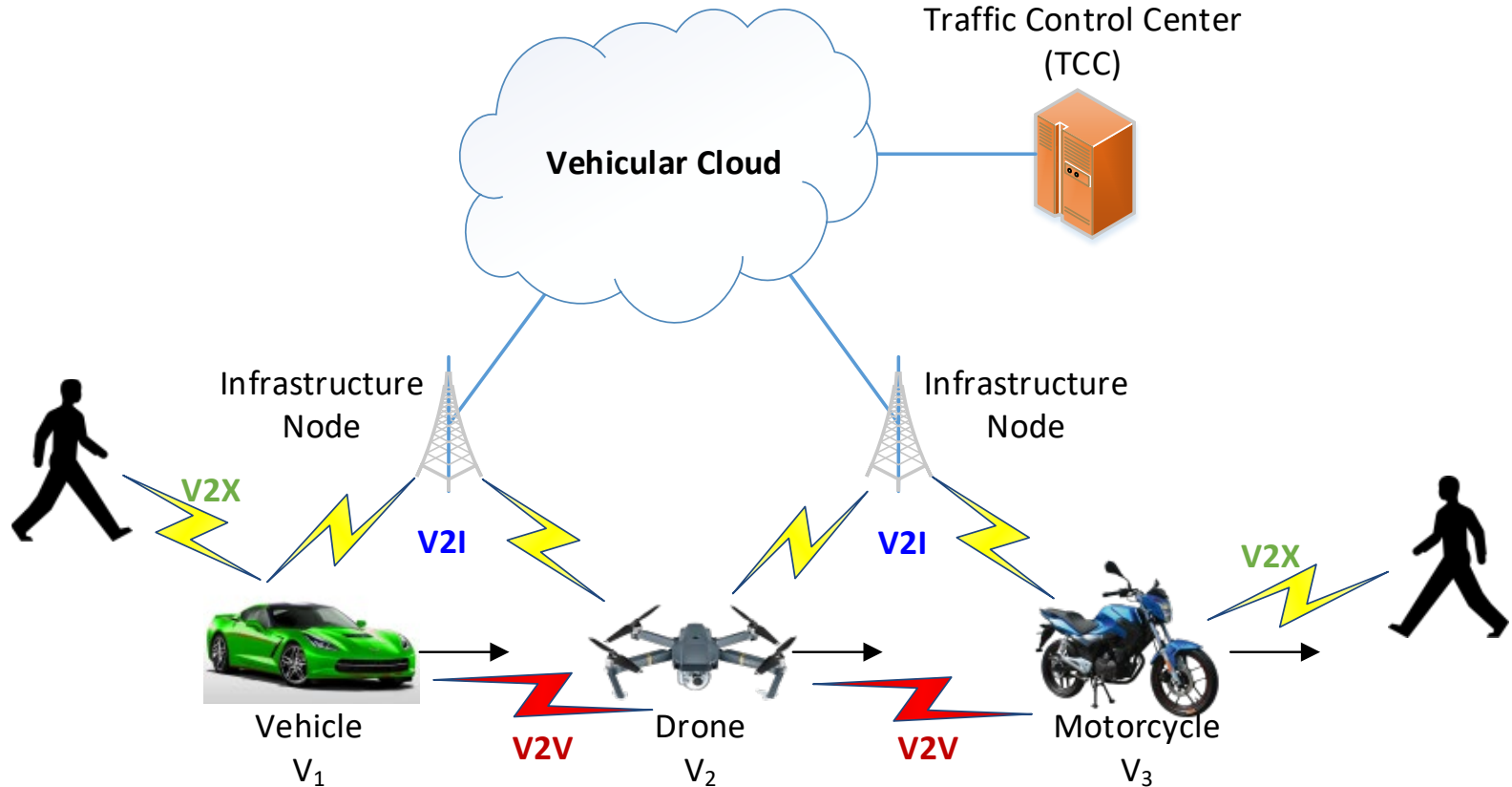# IETF-115 IPMON Side Meeting

IPMON BoF Chartering

**November 9, 2022**
London

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Vehicular Network Architecture for IPMON

IPMON Architecture: Components

- Traffic Control Center

  ➢ A Control Entity that makes decisions for various services for moving objects with information from the moving objects.

- Vehicular Cloud

  ➢ A cloud infrastructure for vehicular networks, having compute nodes, storage nodes, and network forwarding elements (e.g., switch and router).

- Infrastructure Nodes

  ➢ Infrastructure nodes (e.g., gNodeB and IP-RSU) enable moving objects on the road being connected to the networks.

- Moving Objects

  ➢ The objects that are running on the road or sidewalks while connected to networks. Those objects share mobility information and communicate with each other and TCC.

Traffic Control Center (TCC)

Vehicular Cloud

Infrastructure Node

Infrastructure Node

V2X

V2I

V2I

V2X

Vehicle V_1

Drone V_2

Motorcycle V_3

V2V

V2V
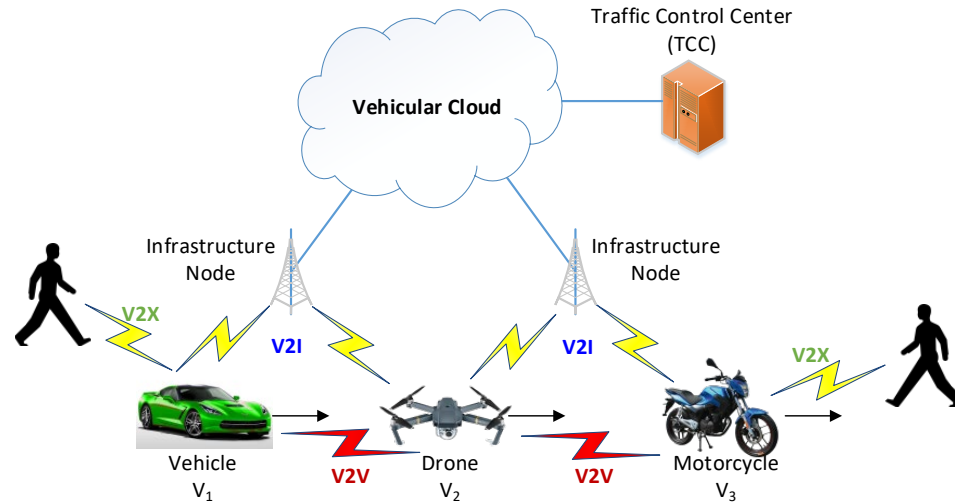
IPMON BoF Chartering (1/10)

- **Introduction**

  - IPv6 Moving 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, and Drone Networks.

IPMON BoF Chartering (2/10)

- **Goals**

  - IPMON aims at **developing networking protocols for Moving 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:

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- **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 through the collaboration between this group and 6MAN WG.

IPMON BoF Chartering (4/10)

- **Goals (Con't)**

2. IPMON lets MOs effectively configure their IPv6 addresses for both VANET and Access Networks (AN) 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 AN.

- **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.

- **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).

- **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.

- **Goals (Con't)**

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

IPMON BoF Chartering (9/10)

- **Program of Work**

1. IPv6 Packet Delivery over 5G V2X
2. Vehicular Neighbor Discovery (VND) for IPv6 Address Autoconfiguration
3. Vehicular Mobility Management (VMM)
4. Vehicular Packet Routing (VPR)
5. Vehicular Security and Privacy (VSP)
6. Vehicular Maneuver and Navigation (VMN) for Safe Driving (or Flying)

IPMON BoF Chartering (10/10)

- **Milestones**

  1. July 2023: Adopt IPv6 Packet Delivery over 5G V2X as a WG document

  2. July 2023: Adopt Vehicular Neighbor Discovery (VND) for IPv6 Address Autoconfiguration as a WG document

  3. July 2023: Adopt Vehicular Mobility Management as a WG document

  4. November 2023: Adopt Vehicular Packet Routing (VPR) as a WG document

  5. November 2023: Adopt Vehicular Security and Privacy (VSP) as a WG document

  6. November 2023: Adopt Vehicular Maneuver and Navigation (VMN) in Safe Moving (or Flying) as a WG document