



IP Wireless Access in Vehicular Environments (IPWAVE): Problem Statement and Use Cases (draft-ietf-ipwave-vehicular-networking-08)

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Update from -07 Version

- This document (-08) is updated from
 - draft-ietf-ipwave-vehicular-networking-07
- Major Updates
 - Review of Volunteer Reviewers
 - Charlie Perkins (Done)
 - Sri Gundavelli (Done)
 - Key Work Items for IPWAVE Problem Statement
 - Neighbor Discovery (with Vehicular Link Model)
 - Mobility Management
 - Security and Privacy

Updates from -07 Version

- **Major Updates**

- Reflection of the Comments from Charlie Perkins and Sri Gundavelli on This Version.
- Section 4.1: Existing Protocols
 - The existing protocols relevant to IP vehicular networking are summarized and analyzed with pros and cons.
 - This subsection addresses the requirements for IP vehicular networking.
- Figure 1: Vehicular Network Architecture
 - A vehicular network architecture is modified to clarify a multi-link subnet consisting of vehicular wireless links.
 - It can provide efficient V2I & V2V to vehicles whose wireless interface is configured with a global IP address.

Vehicular Network Architecture

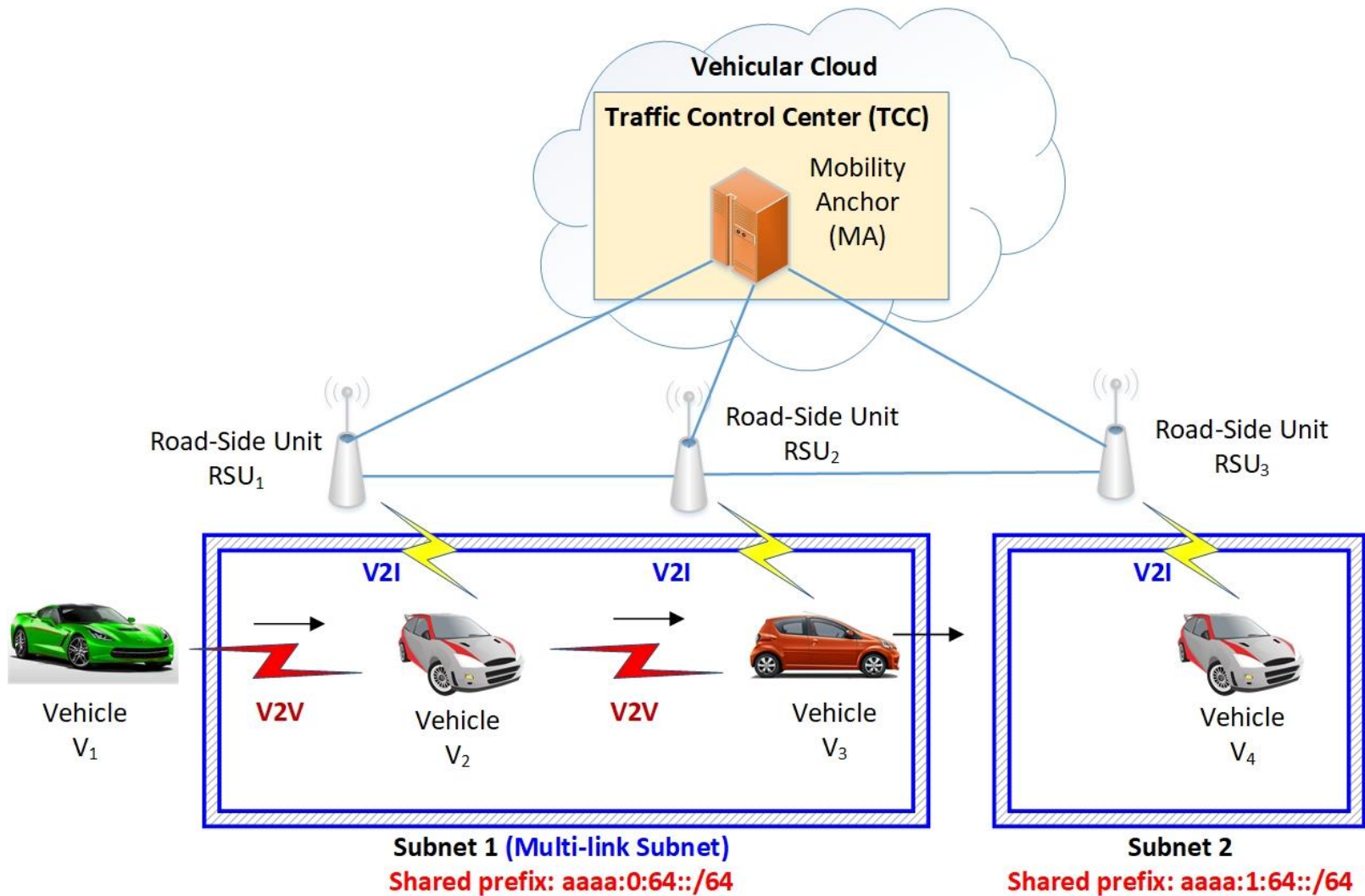


Figure 1: A **Vehicular Network Architecture** for V2I and V2V Networking

Neighbor Discovery (ND) (1/2)

- **Link Model**

- The legacy IPv6 ND protocol is not suitable for vehicular wireless links.
 - The existence of unidirectional links due to interference and different Tx power levels.
 - Unreachability between two nodes with the same prefix due to node mobility and highly dynamic topology.
 - Reachability between two nodes in a multi-link subnet having multiple wireless links with the same prefix.
- IPv6 ND should be extended to support the concept of a Vehicular Link Model in a multi-link subnet.
 - Vehicles communicate with each other via V2V and communicate with an RSU via V2I with a wireless interface configured with an IPv6 address.

Neighbor Discovery (ND) (2/2)

- **New Features for Vehicular ND (VND)**
 - Lightweight Duplicate Address Detection (DAD)
 - ND Optimization for 6LoWPAN [RFC 6775]
 - RS-trigger-unicast RA for ND control traffic reduction
 - Unicast-based **Multihop DAD** with a router
 - RSU and MA can perform the **Multihop DAD** for a vehicle [[draft-jeong-ipwave-vehicular-neighbor-discovery-06](#)].
 - A single address configuration in a multi-link subnet
 - A vehicle does not change its IP address while the handover of a vehicle in a multi-link subnet is performed between RSUs.
 - VANET-based multihop forwarding in a multi-link subnet
 - VND can play the role of routing in a connected VANET.

Next Steps

- **WG Last Call**

- This version is good enough for WGLC.
- During WGLC, we will collect feedback from IPWAVE WG and reflect it on the revision.

- **IESG Submission**

- We aim at submitting the document to the IESG before IETF-105 meeting.