IPv6 Neighbor Discovery for IP-Based Vehicular Networks

(draft-jeong-ipwave-vehicular-neighbor-discovery-06)

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Jaehoon Paul Jeong, Yiwen Chris Shen, and Zhong Xiang

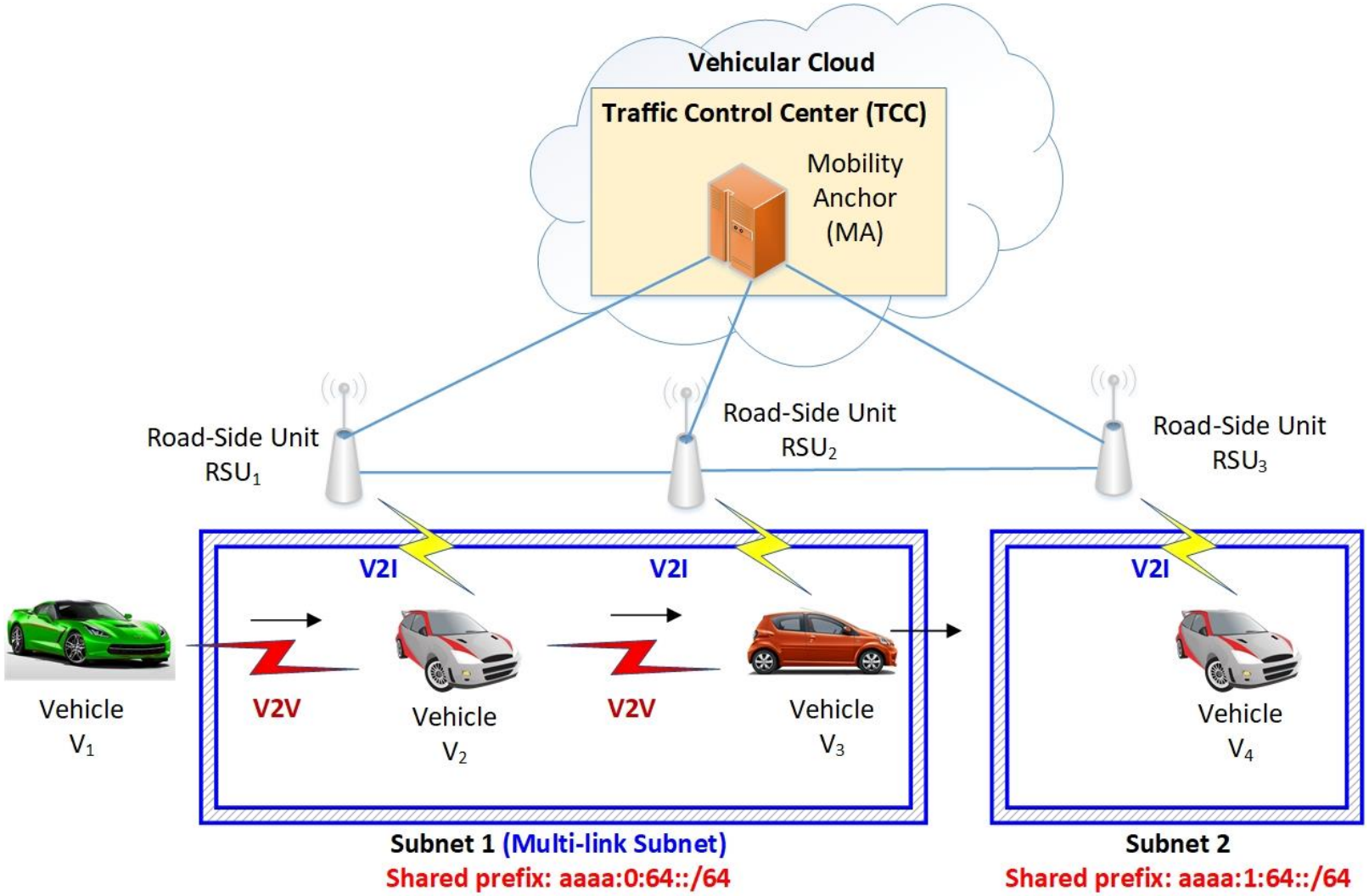
Sungkyunkwan University

Introduction

- Motivation of Vehicular Neighbor Discovery (VND)
  - This is a candidate for IPv6 ND in IP-based vehicular networks according to IPWAVE Problem Statement Document [draft-ietf-ipwave-vehicular-networking-08]

- Subjects of This Draft
  - Definition of Link Model for Vehicular Wireless Link
  - ND Optimization with Multihop DAD
  - Proactive Handover with VND in Mobility Management
  - MAC Address Pseudonym Handing with VND

Vehicular Network Architecture



Vehicular Network Architecture
for V2I and V2V Networking

Vehicular Neighbor Discovery (1/2)

- Infrastructure-Based Address Registration
  - It avoids multicast storm for energy and wireless channel conservation.
  - Vehicles create their Neighbor Cache Entry in a serving RSU to maintain registration.

- Multihop Duplicate Address Detection
  - It eliminates redundant address configuration when vehicles pass by RSUs belonging to the same multi-link subnet.
  - Neighbor Cache and DAD Table are maintained by each RSU and an MA, respectively.

Vehicular Neighbor Discovery (2/2)

- Prefix Discovery
  - It rapidly finds the prefix information of an internal network in a vehicle or an RSU.
  - Two nodes in two different internal networks can communicate with each other.

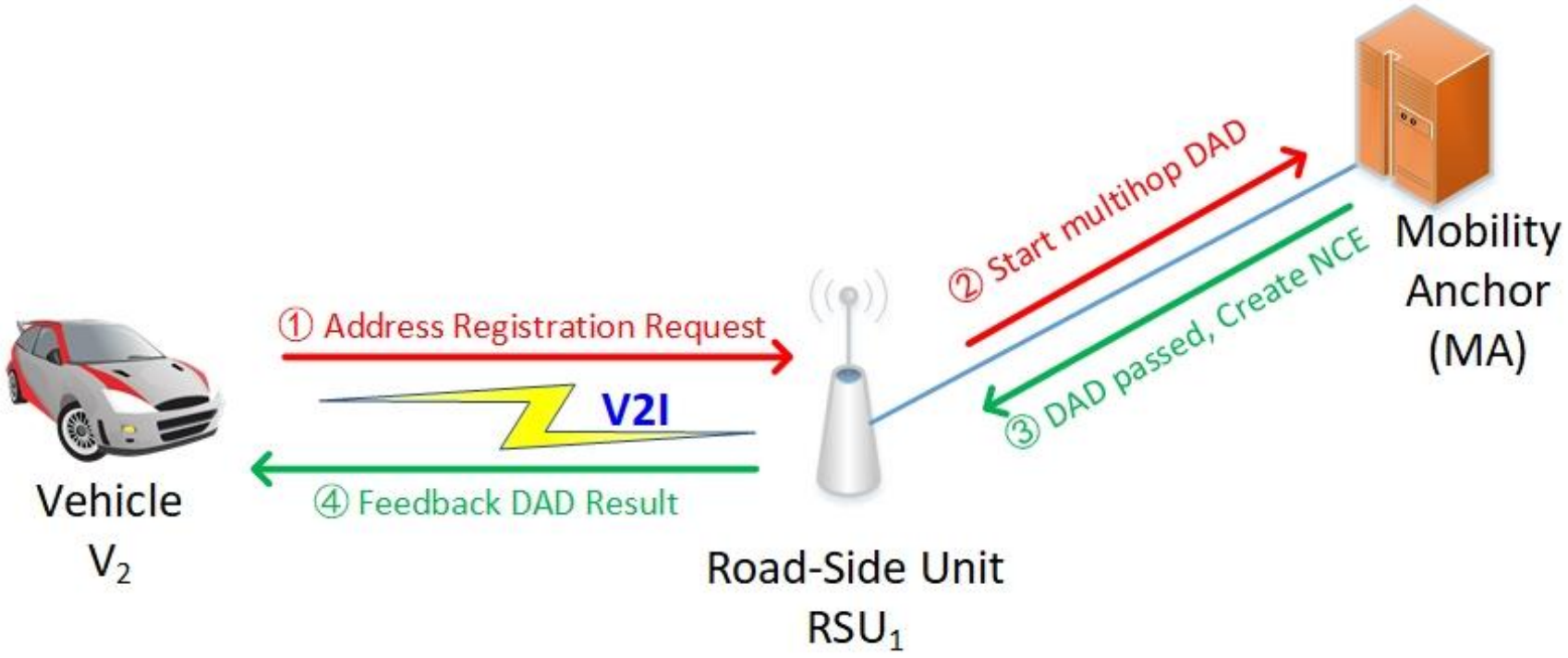
- Service Discovery
  - It rapidly finds the service information of an internal network in a vehicle or an RSU.
  - A client in an internal network can contact a required server in another internal network.

Update from -05 Version

- Major Changes from -05
  - In Section 4.1, a Shared-Prefix model is introduced for prefix assignment specified in this document.
  - In Section 4.3, design goals are refined including the cancellation of Neighbor Unreachable Detection.
  - In Section 5.1, the Vehicular Network Architecture is updated on subnet division and V2V communication.
  - In Section 7, a new scenario is added to facilitate vehicles outside the coverage of RSU to do Address Registration and DAD via a relay vehicle.
  - In Section 8, a simplified mobility management in vehicle handoff for adjacent RSUs is supplemented based on the original proposal.

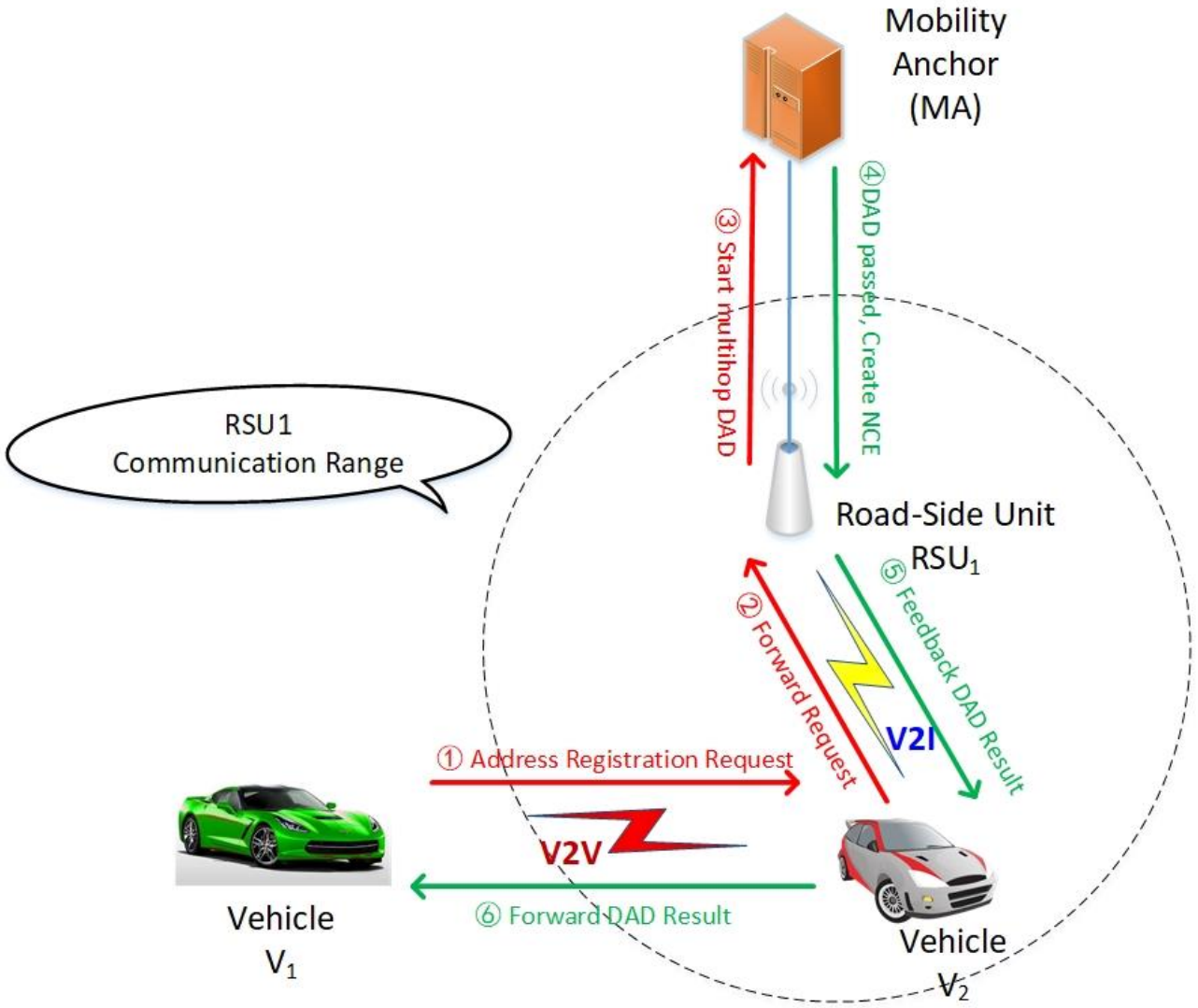
Vehicular Neighbor Discovery (1/2)

- Procedure for Address Registration & Multihop DAD



Vehicular Neighbor Discovery (2/2)

- Address Registration and DAD via a Relay Vehicle



Next Steps

- **WG Adoption Call**
  - This Vehicular ND draft is a candidate for IPv6 ND in IP-based vehicular networks according to IPWAVE Problem Statement Document:
    - [draft-ietf-ipwave-vehicular-networking-08]

- **Proof-of-Concept**
  - We proved the concept of Vehicular ND at IETF-104 Hackathon Project.
  - The Vehicular ND was implemented in a vehicular network simulator (OMNeT++, VEINS, and SUMO).