IP for V2V and V2I communications

Alexandre PETRESCU, CEA
March 14th, 2018
V2V Topology

802.11-OCB 802.11-OCB

OR

P-GW, 4G, 5G

5G-NR 5G-NR 5G-NR

IP1 IP3 IP5 IP1 IP3 IP5

IP2 IP4 IP6 IP2 IP4 IP6
V2V Requirements

• Dynamic distributed decision of 5.9GHz channel use (for 802.11-OCB).
• Establish paths linking all IP nodes.
• Distribute the address of a DNS resolver.

Potential solutions:
• Use Babel routing protocol (trialled ok on 802.11 OCB).
• Use Prefix Exchanges in IPv6 Router Advertisements (trialled ok on 802.11 OCB).
• Use DHCPv6 Prefix Delegation (trialled ok on 4G).
V2I Topology

Internet

Home Agent

IP Road-Side Unit
IP-RSU1

IP Road-Side Unit
IP-RSU2

RA1

Mouvement Detection based on signal strength measurements?
(OCB has no Beacons)

Mobile IP implemented by Mobile Router in-car
Requirements for Movement Detection in OCB mode

• Problem:
  • For Mobile IP to work in V2I mode, a movement detection procedure is needed.
  • Current movement detection procedures on Mobile Routers measure and compare signal strengths of different Beacons.
  • 802.11 OCB mode has no Beacons.

• Requirements:
  • A movement detection procedure that measures the signal strength of IP messages that can be used as ‘Beacons’.
  • The ‘Beacon’ IP messages should contain enough IP and L2 information to assist MR to decide it must change the subnet and send a Binding Update. (MAC address of IP-RSU and prefix of the link are not sufficient).