PoDIUM Communication View

PoDIUM Webinar
November, 30th 2023

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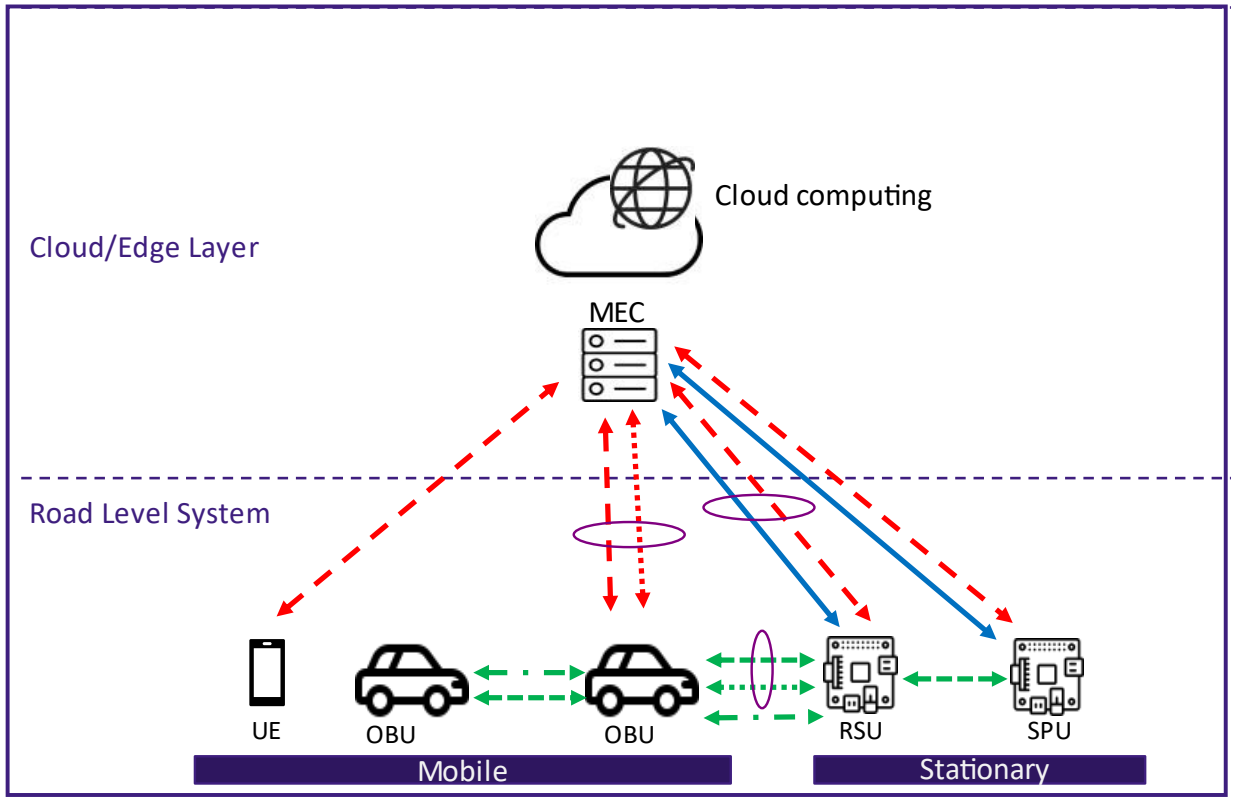
Essen, 30.11.2023

Co-funded by
the European Union

PoDiUM

Communication Architecture Overview

- Integration of mobile road-users and stationary road-side equipment via:
  - ITS-G5
  - Cellular mobile networks (5G) with cm-wave and mm-wave cells
  - Sidelink
  - 60-GHz-WiFi
  - Wired connections
- Redundancy of multi-connectivity for
  - enhanced bandwidth
  - enhanced reliability



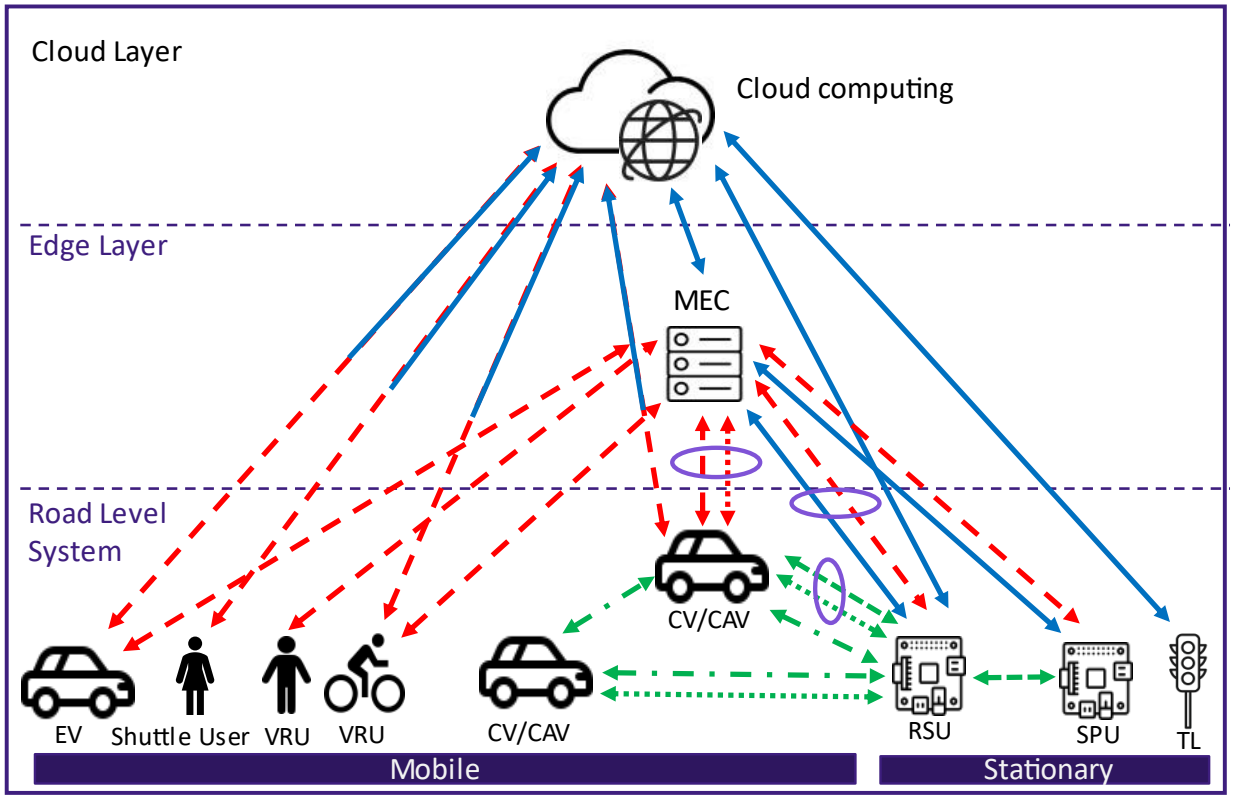
Communication technologies:

- Wired
- Cellular
  - cm-Wave
  - mm-Wave
- Ad-hoc
  - 60GHz WLAN
  - ITS-G5
  - SL (PC5)
- Multi-connectivity
- UE={EV, VRU, Shuttle user}

Platform Communication Architecture: A detailed view

Representation segregated into

- **Levels of Communication**
- **Communication Technologies**
- **Types of Communication**



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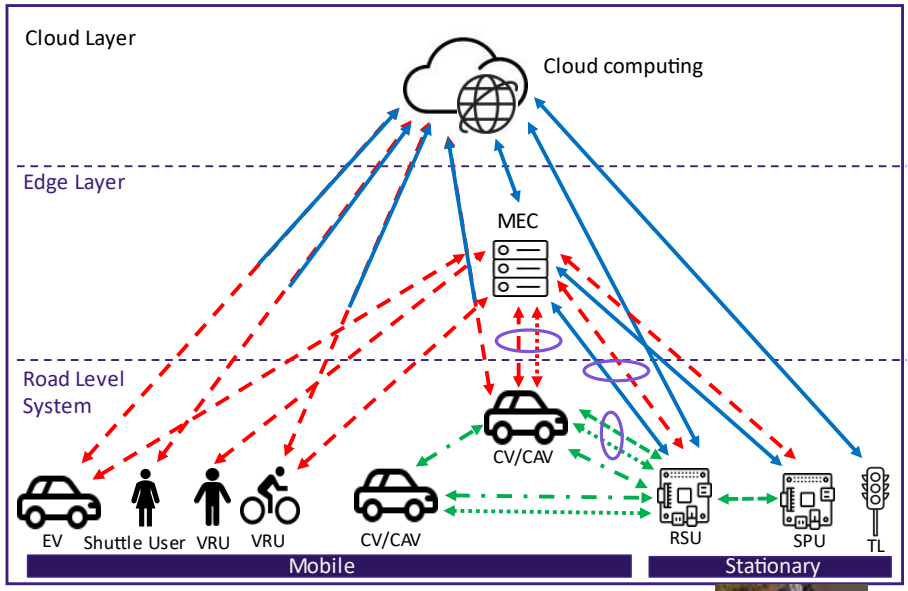
Levels of Communication

Road Level

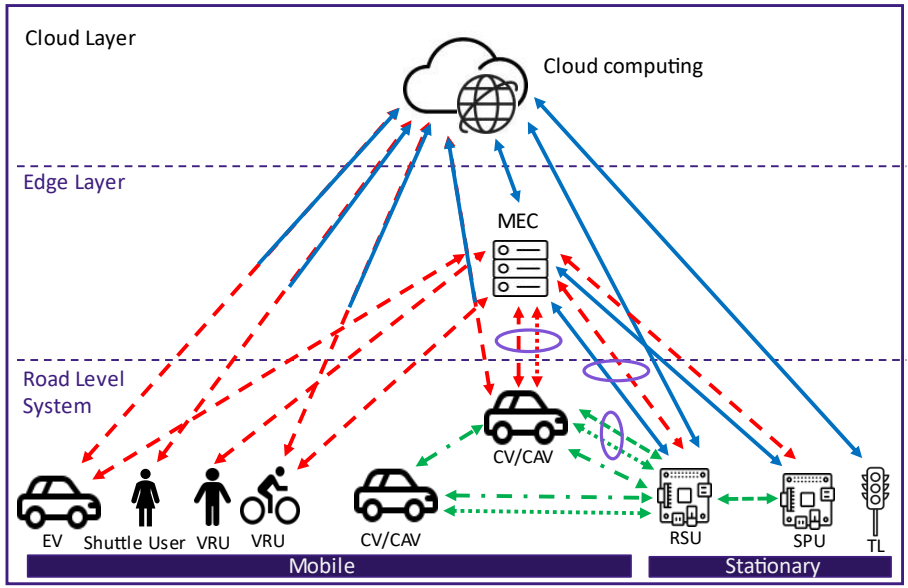
- User Equipment (UE) (cm-Wave communication)
- On-Board Unit (OBU) (cm-Wave, optionally mm-Wave)
- Road Side Unit (RSU)
- Sensor Processing Units (SPU)

Cloud/Edge Level

- Multi-access Edge Computing
- Cloud Computing



Communication Technologies



Cellular network communication

- 5G cm-Wave (FR1)
- 5G mm-Wave (FR2)

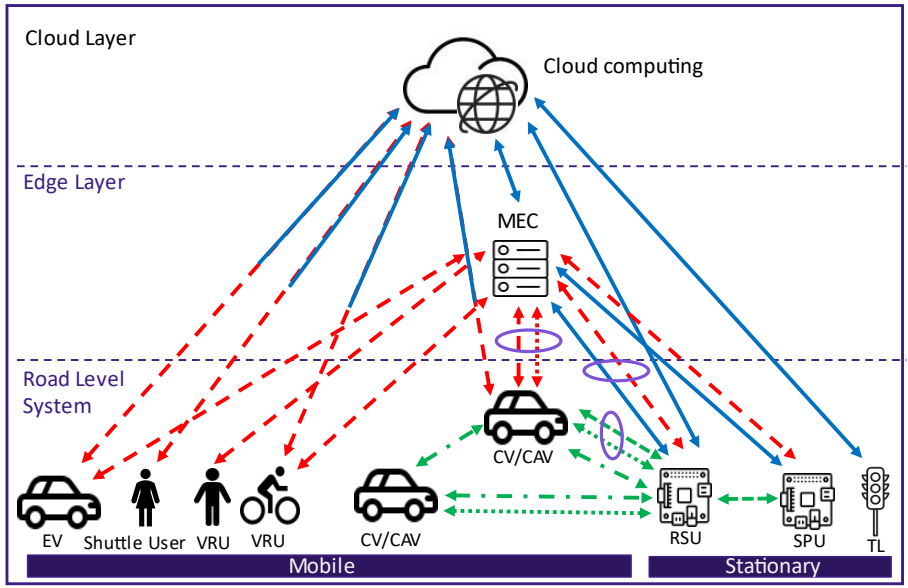
Ad-hoc wireless network communication (restricted local comm.)

- 60 GHz WLAN (IEEE 802.11ad)
- ITS-G5
- SL (PC5)

Wired Communication

- for the fixed parts, e.g. between RSU and MEC or to the cloud

Types of Communication



Single-Connectivity

- using only a single technology btw. end-points

Multi-Connectivity

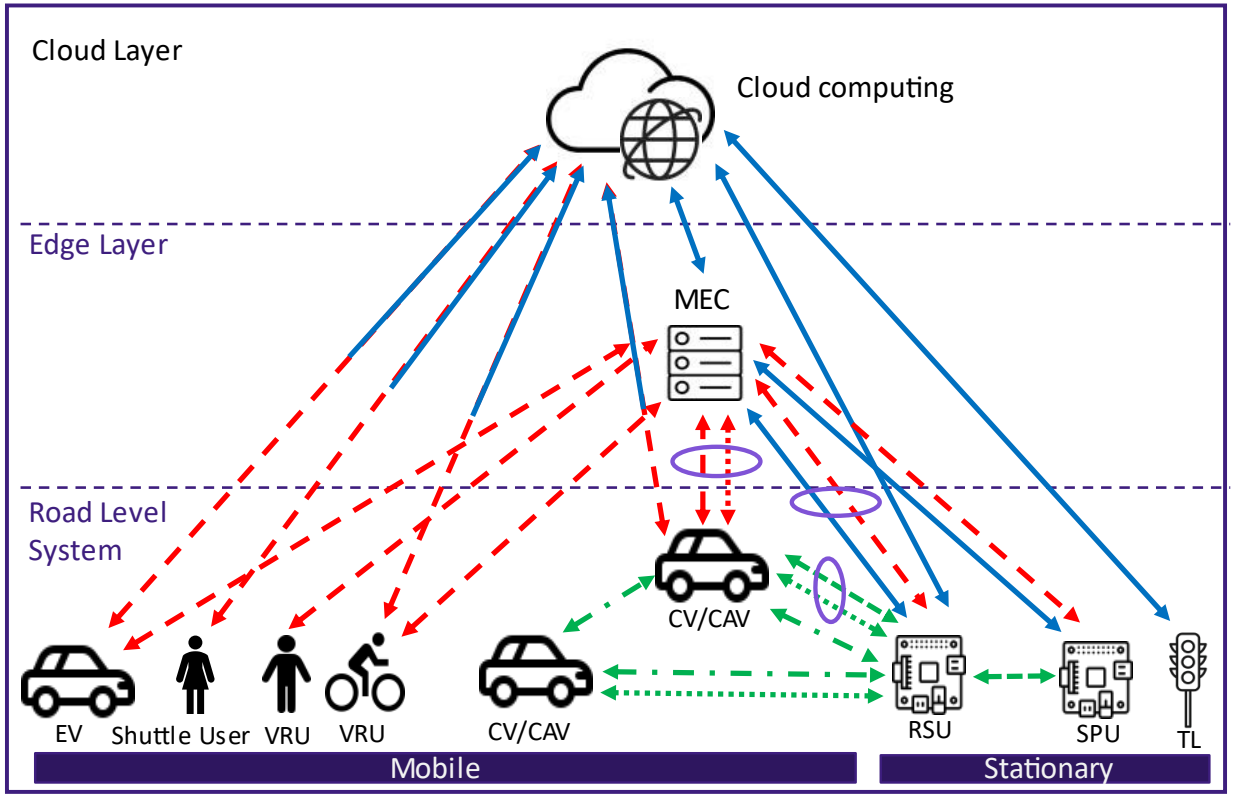
- between devices that can use multiple technologies simultaneously
- includes the ability to schedule messages and data packets over the available communication technologies
- for reliability, availability and redundancy in addition to latency reduction

Hybrid Communication

- messages are simultaneously transmitted over all available communication technologies (always duplicated)
- redundancy decoupled from message-specific criticality

Platform Communication Architecture: A granular view

- **Edge Layer applies MEC**
- **Cloud Layer (storage/compute) connectivity over the Internet**
- **OBUs deployed @**
  - CV, CAV, EV
- **UE @**
  - Vulnerable Road Users (VRU)
  - Shuttle users
- **Other Stationary comm. devices**
  - Traffic light



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Thank you!

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PoDIUM Project

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Co-funded by
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Speaker Name

Position

Company

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