# Mobility data-spaces, future Automotive Systems, and Edge platforms

How to improve competitiveness of EU actors in the digital transformation of the automotive/industry and mobility sector?

- Where to join forces along open platforms?
- Where to compete?

- Data-spaces: providing and using data across stakeholders

- Data-spaces initiatives in mobility:

  - **Catena-X: Network for Cross-Company Data Exchange in the Automotive Industry**

  - **German Mobility Data Space**

  - **ACEA data model: central data sharing systems promoted by EU vehicle manufacturers**

  - **Direct propriatory access to in-vehicle data by services (Tesla, …)**

 - **Existing data-bases at EU, MS, regional level (ITS, multi-modal, public data)**
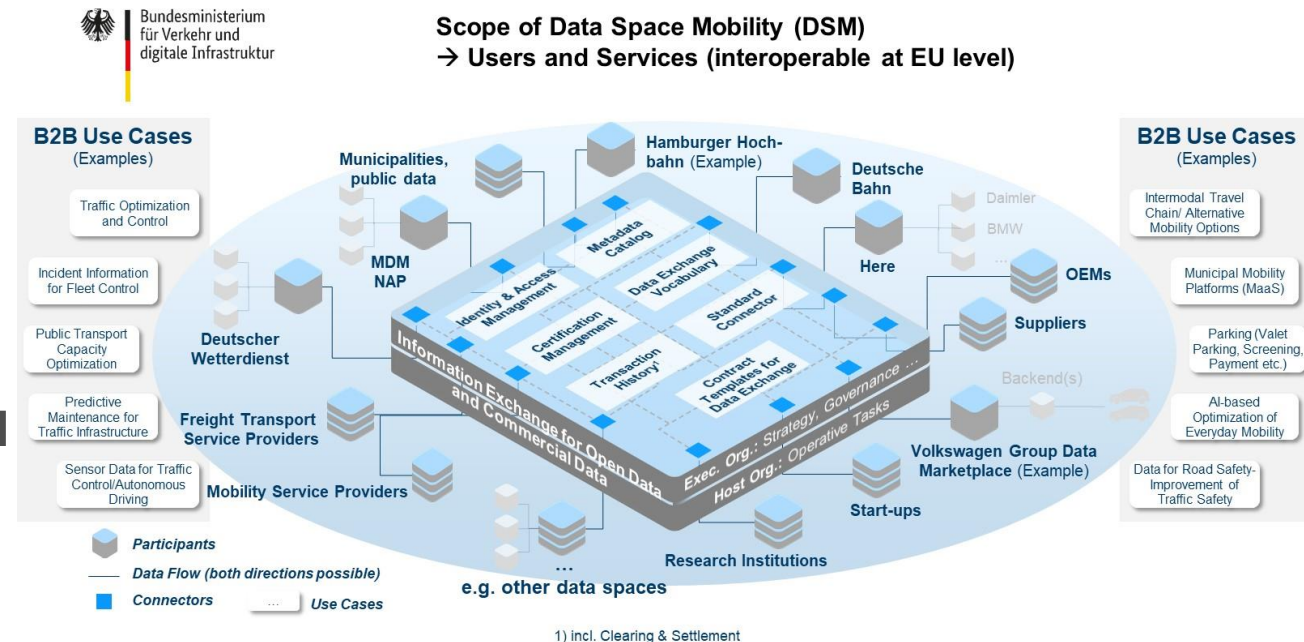
EU initiative under Digital Europe: European Mobility Data Space (8M€ in 2022)

Max Lemke, CONNECT

Cognitive V2X Infrastructure

Use case: 5G Mobile Edge Infrastructure for Autonomous vehicles

Key Technologies:

- 5G Infra: Vehicular Slicing and Edge Cloud, Indirect V2X

eMBB
uRLLC
Vehicular Slicing

5G

Edge Cloud

3.5GHz / 28GHz

RSU

V2I

V2I

V2V

V2P
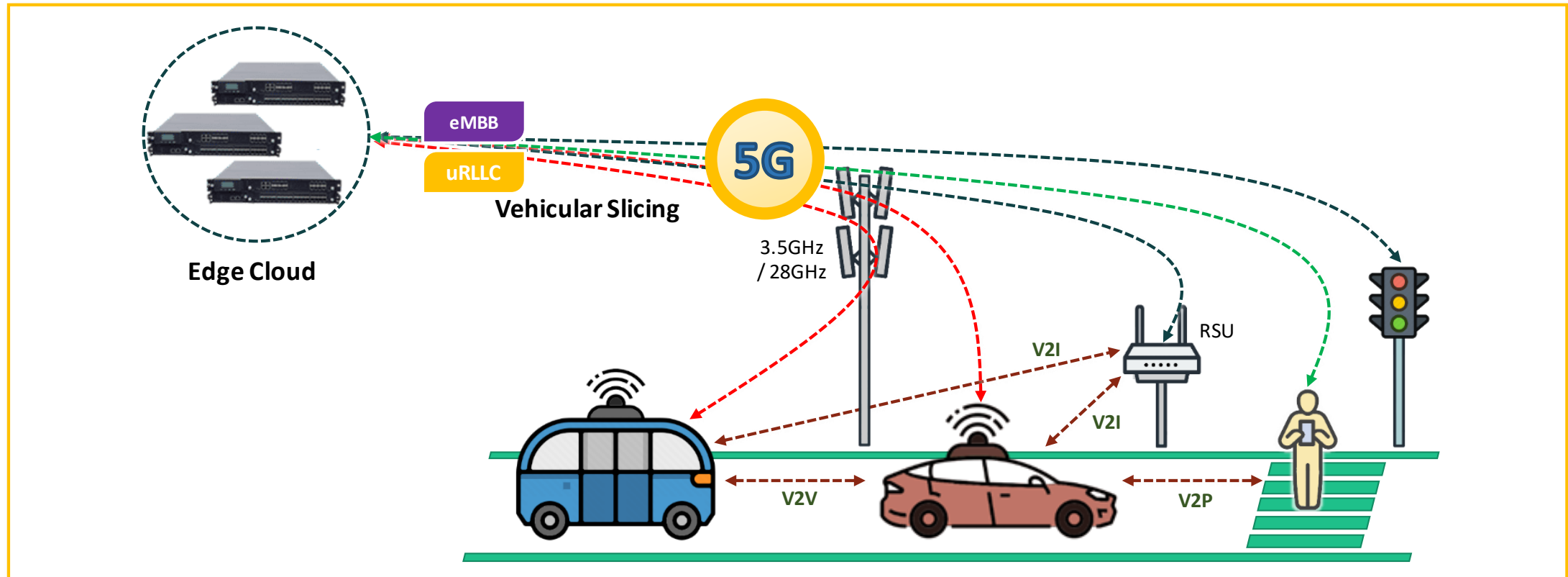
Reference: South Korean Pilot Daejeon, South Korea, https://autopilot-project.eu/

- **E-Mobility**
  - Parking & Charging
  - Green & Grid Integration

e.g. auto

Edge Cloud

- **Edge Intelligence**
  - Vehicle as a sensor
  - Intelligent roadside units
  - Integration of telematics data

Mobility Data Space

- **Next generation operating systems**
  - → connected, autonomous & green vehicles

  - → integration with EV-charging infrasturcture
    - optimise use and production of renewables
    - building services across sectors, e.g. smarthome

  - → mobility services & apps
  - → US technology leadership: Tesla, Google, …

  - → Fierce competition:
    - VW.OS, MB.OS, BMW-OS
    - TeslaOS, Apple Car OS, Bosch and MS
    - International alliances with AWS, MS, Google, Baidu, …

- **Current EU leadership**
  - → used by 90% of OEMs
  - → offering a fair market place

Trend towards the Edge and Far Edge

■ **Strong growth of DATA forecasted**

- Through Industrial IoT + Cyber Physical Systems connecting local automation islands
- Central cloud storage raising energy profile and demands for transport networks

■ **Growing need for COMPUTATION close to the data:**

- Real-time / safety for **deterministic and highly reliable automation** + control processes
- **Data security / privacy** through reducing the attack surface
- **Energy efficiency** / carbon footprint / environmental footprint
- Data Aggregation and analytics along the **Computing Continuum**

■ **Data Processing in 5 years: 20% Cloud – 80% Edge**

  ■ **A Decentralised Approach with distributed and embedded intelligence**

  ■ **A (private) 5G networks for mobile automation, AGVs and integrated logistics**

European Commission

Paradigm Shift: Cloud – Edge - IoT

Trend/Paradigm Shift: from Cloud to Edge
Bringing compute resources closer to the data

Far Edge / IoT Smart Device	⟷	Edge Cloud	⟷	Cloud / HPC Infrastructure
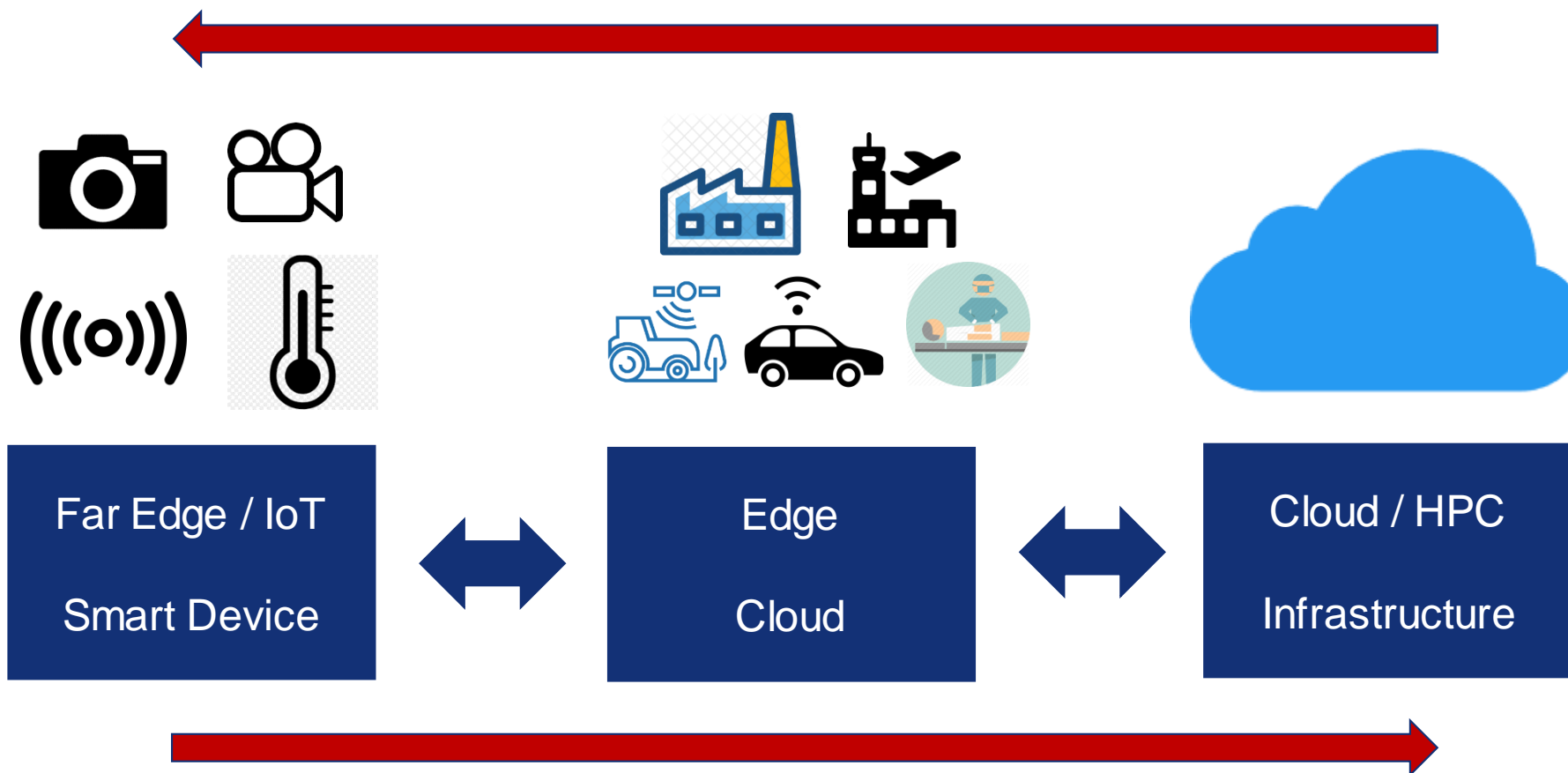
Federating far edge resources ad hoc via 5G
to provide edge-cloud resources close to the edge

European Commission
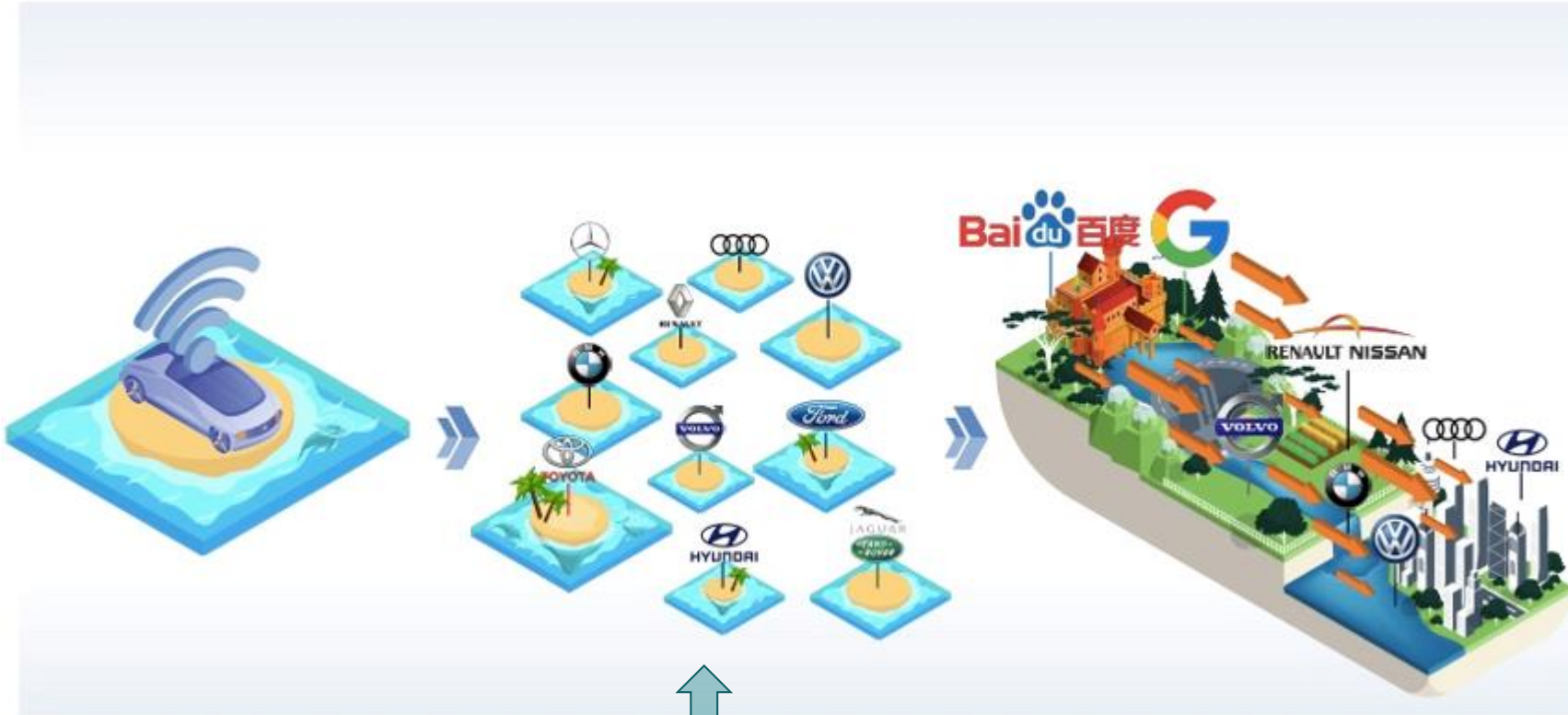
-     Use European   **Power @theEDGE**

- Respond to Commoditization of key European Industry
(scale of Data Analytics and Prediction)

- → **Foster Platforms and Services at European Scale**

From Cloud to Edge to IoT:

➢ **European platform for the Edge**

- Improve end-to-end response time

- Optimize operation of IoT systems and services

- Meta-Operating System for the Edge

- Reduce energy consumption

- Orchestration across device-edge-cloud

European Platform for the Edge

Pre-Publication WP2021-22

https://sciencebusiness.net/framework-programmes/news/horizon-europe-draft-work-programmes-leak-online

THANK YOU

Useful links:

- **European Data Strategy**:
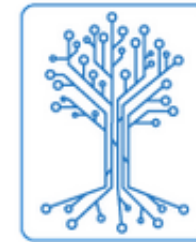 https://ec.europa.eu/digital-single-market/en/policies/building-european-data-economy

- **ARTEMIS White Paper: From IoT to SoS**:
  https://artemis-ia.eu/news/whitepaper-from-iot-to-sos.html

- **GAIA-X Initiative**:
  https://www.data-infrastructure.eu/GAIAX/

- The Alliance AIOTI: **IoT + Edge Computing Convergence**
  https://aioti.eu/news/

- NGIOT **Workshop Report EDGE** on 22/04/20201:
  → **www.NGiot.eu**

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