



AUTOPILOT

The role of IoT interoperability in Smart Mobility

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AUTOPILOT project information



5 Large Scale Pilots on IoT are funded by the European Commission

- AUTOPILOT is the Pilot about Connected and Automated Driving
- 3 Years Innovation Action: 01/01/2017 – 31/12/2019
- 44 beneficiaries – coordinator: Francois Fischer, ERTICO
- Project costs: 25 m€ - EU contribution: 20 m€
- European Commission: DG CONNECT unit E.4 – IoT / H.2 Smart Mobility & living / A.1 Robotics & Artificial Intelligence

The 5 Large scale pilots are cross coordinated and supported by 2 CSA:

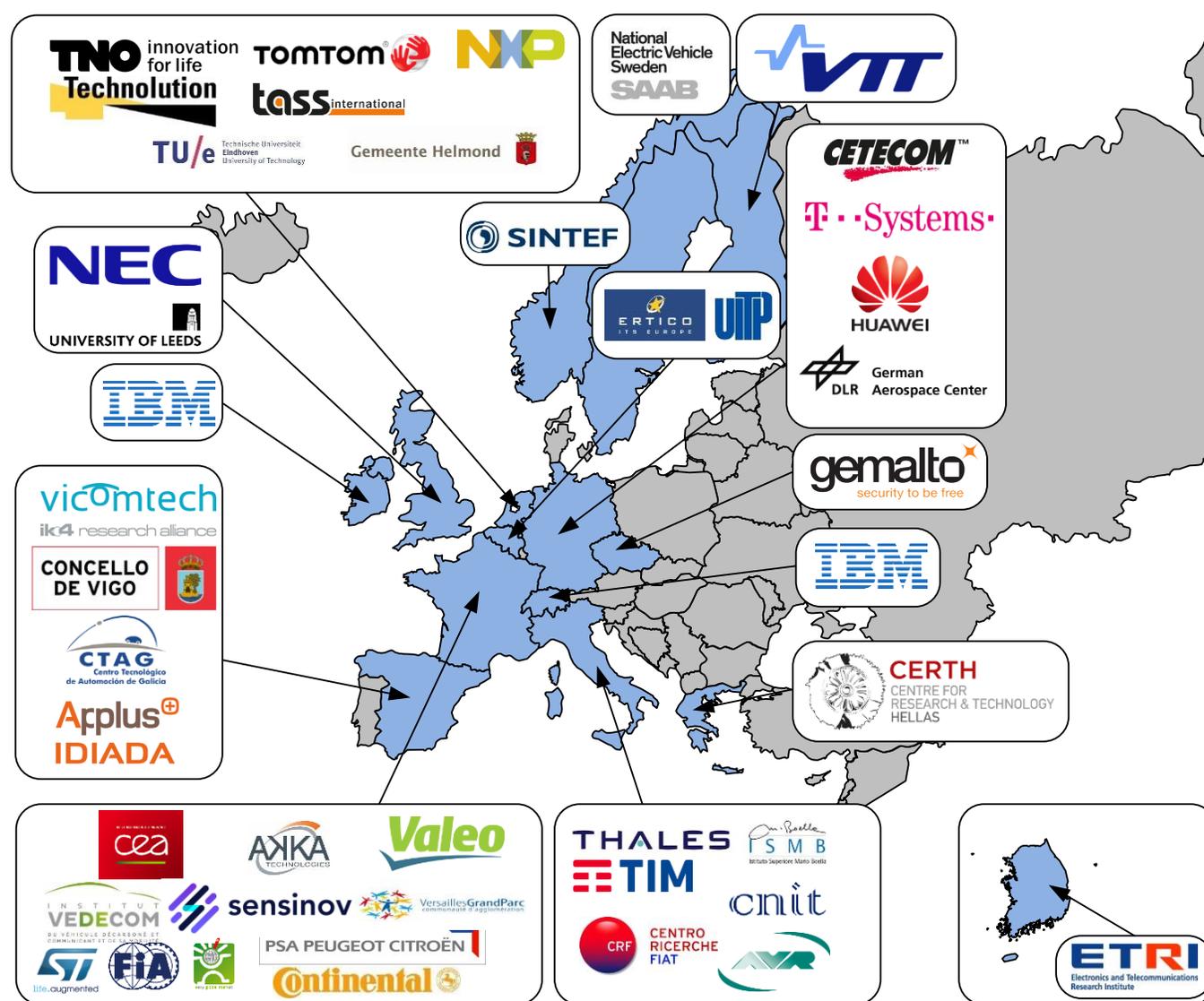
CREATE-IoT (create-iot.eu)



U4IoT (www.u4iot.eu)



Consortium



Objectives

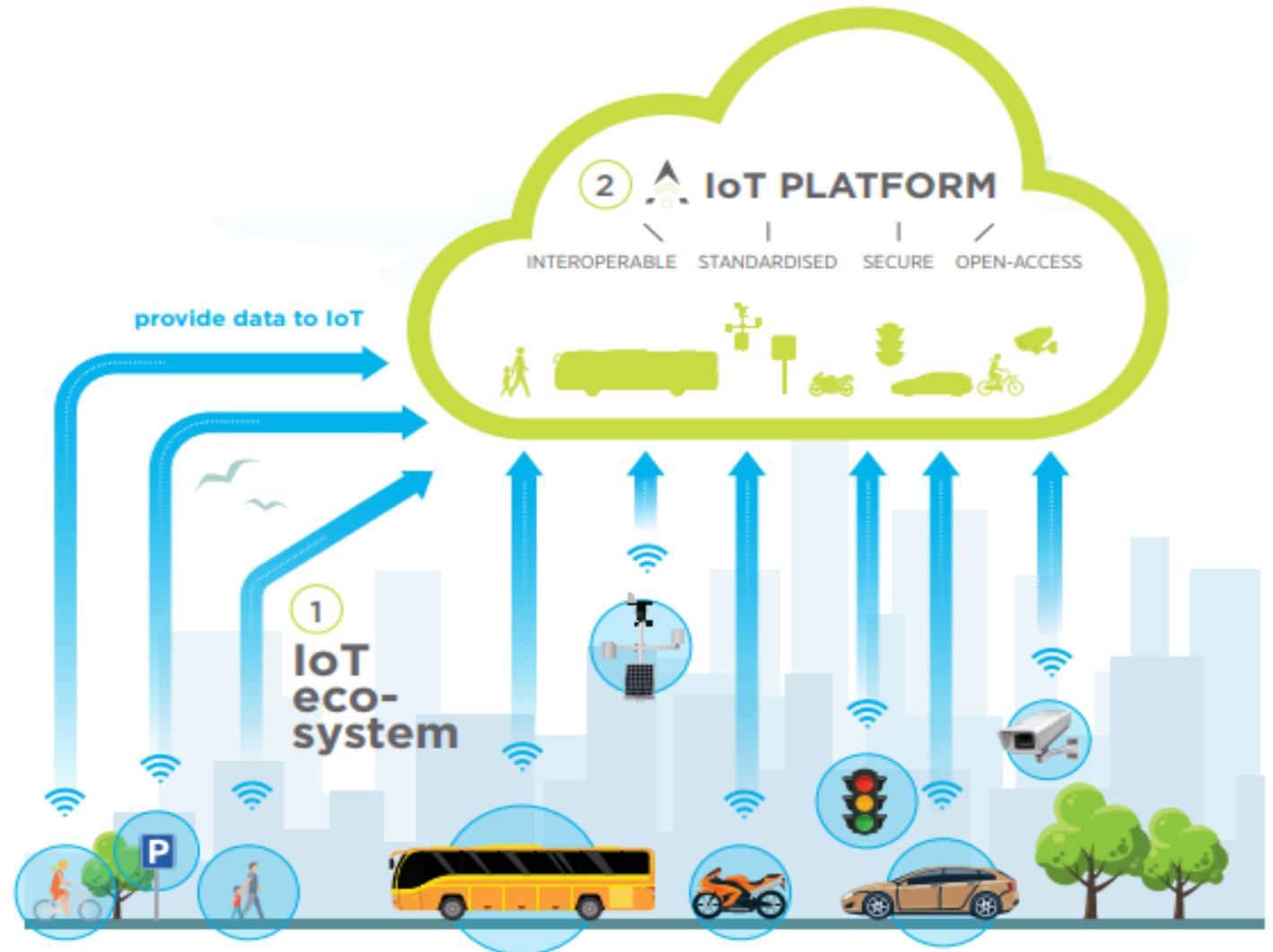
Merging automotive and IoT technologies to move
Automated Driving towards a new dimension

- Enhance the driving environment perception with “IoT enabled” sensors
- Foster innovation in automotive, IoT and mobility services
- Contribute to the development of IoT Standardisation and eco-system
- Use and evaluate advanced V2X connectivity technologies
- Involve Users, Public Services, Business Players to assess the IoT socio-economic benefits for Mobility

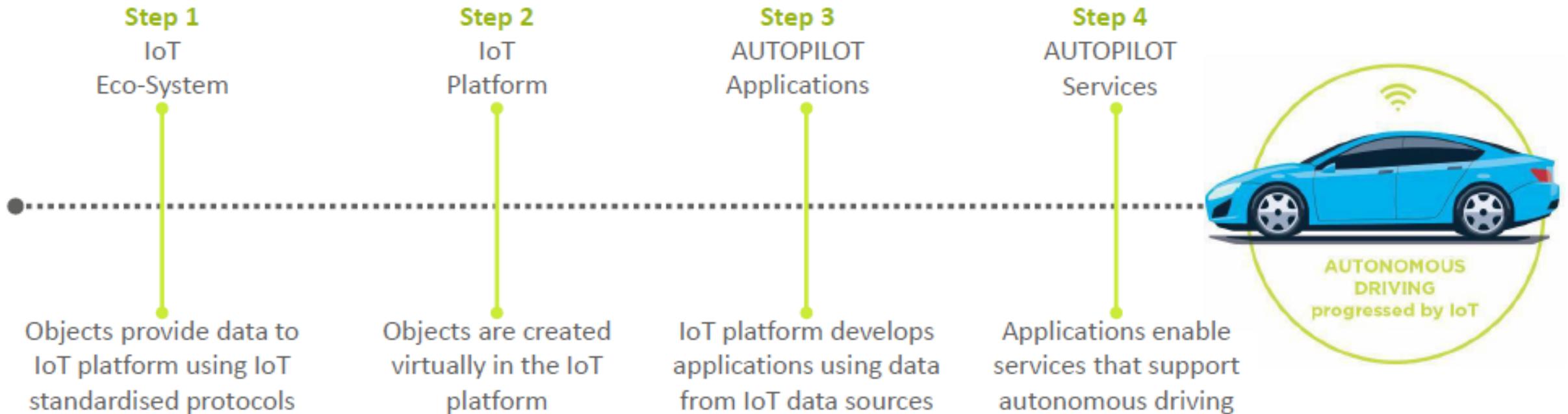


Overview

- **IoT Eco-system** of objects of the physical world, which are capable of being identified and integrated into communication networks.
- **IoT Platform** interconnecting things based on existing and evolving interoperable information and communication technologies.



Approch



Driving modes and new services

Driving Modes



Urban driving



Highway pilot



Platooning



Automated valet parking



Real time car sharing

IoT enabled Services



Vulnerable Road User sensing



Automated driving route optimisation



Driverless car rebalancing



HD maps for automated driving vehicles



6th sense driving



Dynamic eHorizon

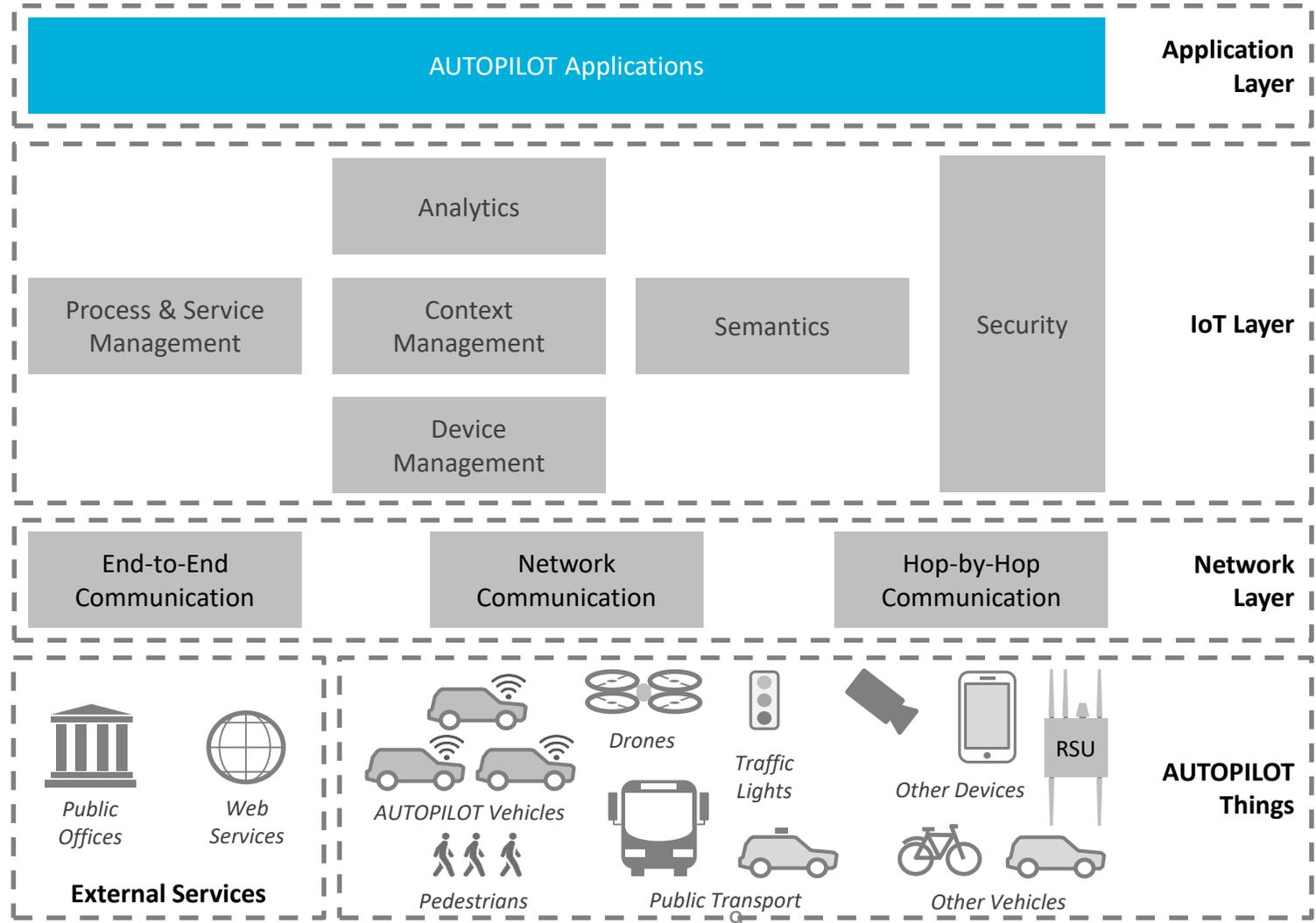
Pilot sites approach

1. Provide common methodology pilot test activities
2. Prepare all pilot sites for test activities (adaptation and authorization)
3. Complete pilot tests and collect data for evaluation



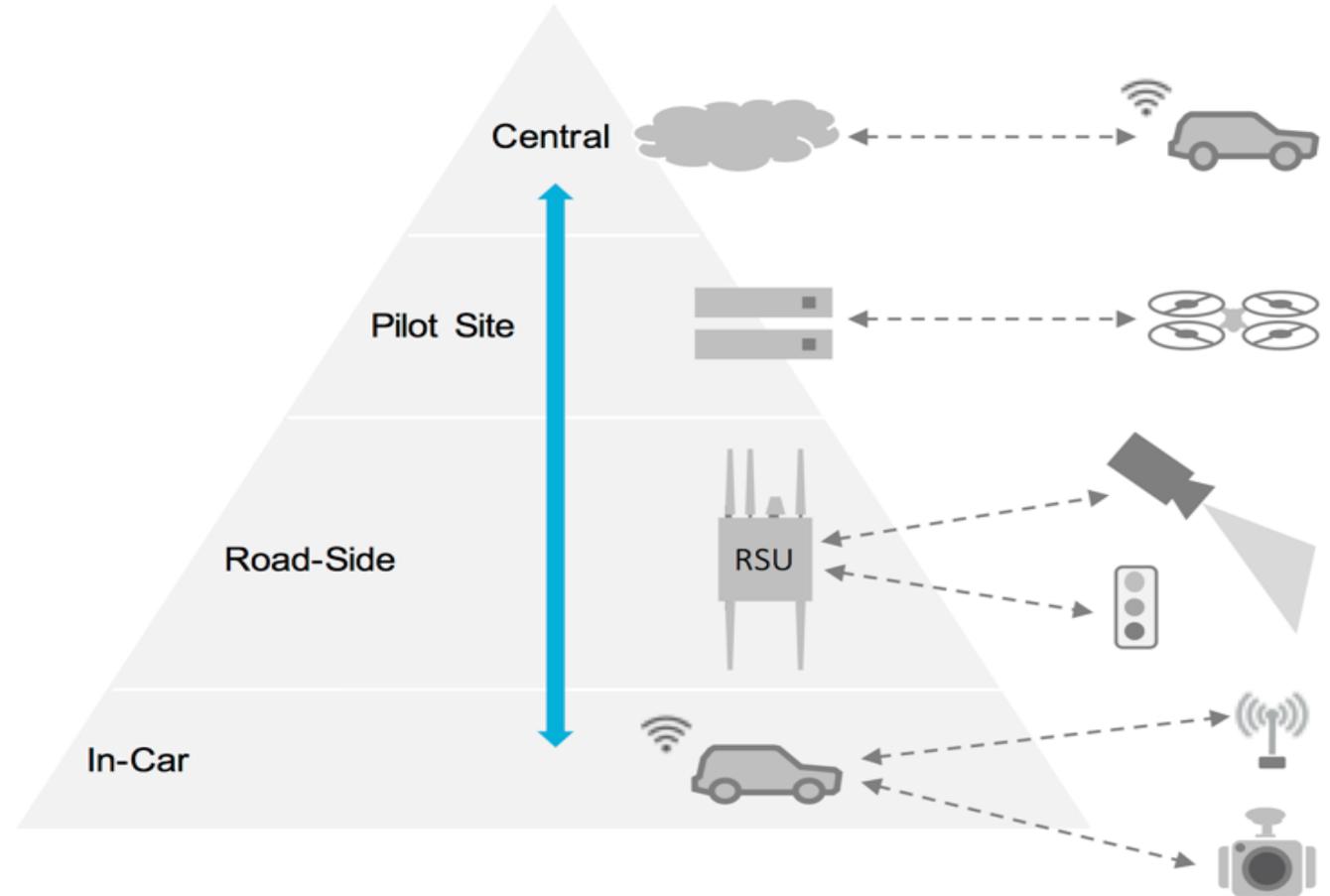
IoT functional architecture

- **Things Layer:** Includes the AUTOPILOT "things" and external services provided by public offices or private web services.
- **Network Layer:** Enables communication throughout the IoT ecosystem.
- **IoT Layer:** Enables the IoT functionality through a set of IoT building blocks.
- **Application Layer:** Contains services that leverage the AUTOPILOT IoT (drivers, car sharing customers, etc.).



Federated IoT Platforms

- Several layers of IoT platforms deployed on a variety of physical infrastructures starting from the in-car to cloud-based IoT platform.
- Data may flow from any level to any level as required by the use cases.
- At a given level, data may be processed to generate new information that may be published to an IoT platform at another layer.

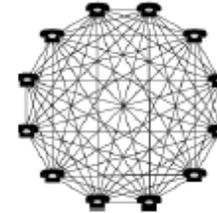
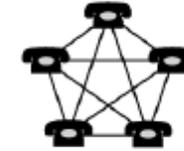


IoT vertical domain fragmentation



- The current marketplace is extremely fragmented, which has increased the R&D cost in each specific domain.
- Many vertical IoT solutions have been designed independently and separately for different applications, which impedes large-scale M2M deployment.

Point-to-point
Integrations
don't scale



Creating new
integrations is
unpredictable

Monocultures
lock you in

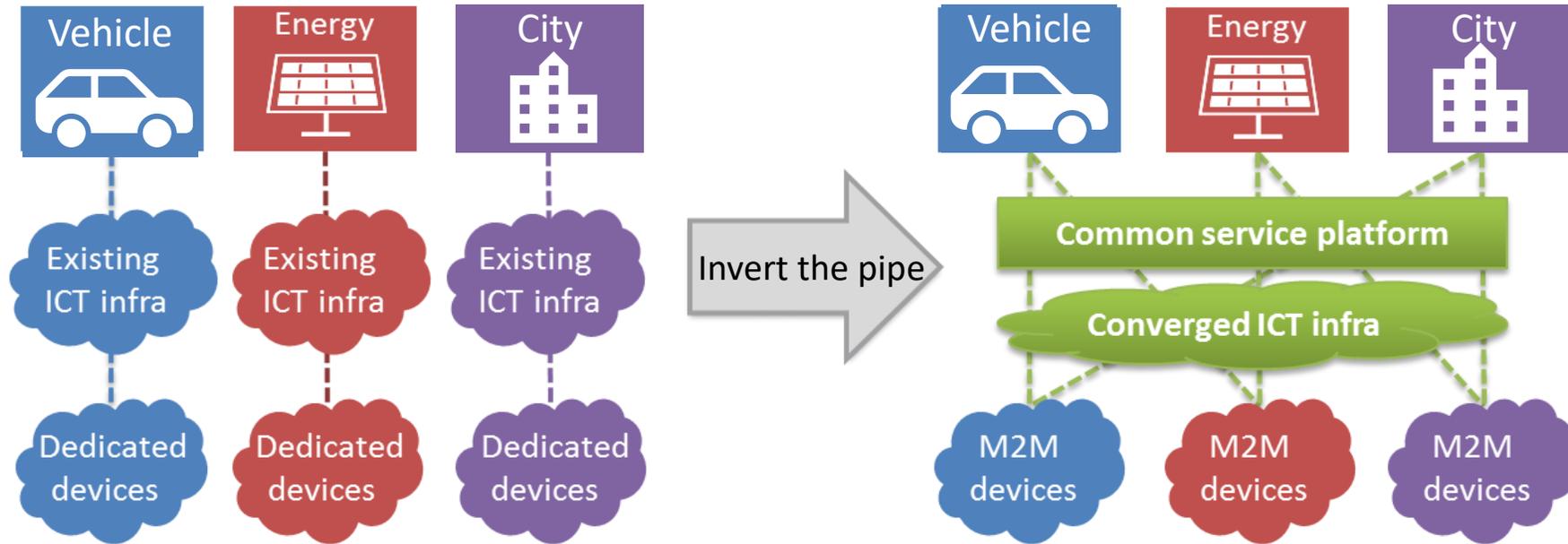


Past choices
restrict present
action and
future vision

Source: CRYSTAL project/Philips



IoT cross-domain interoperability

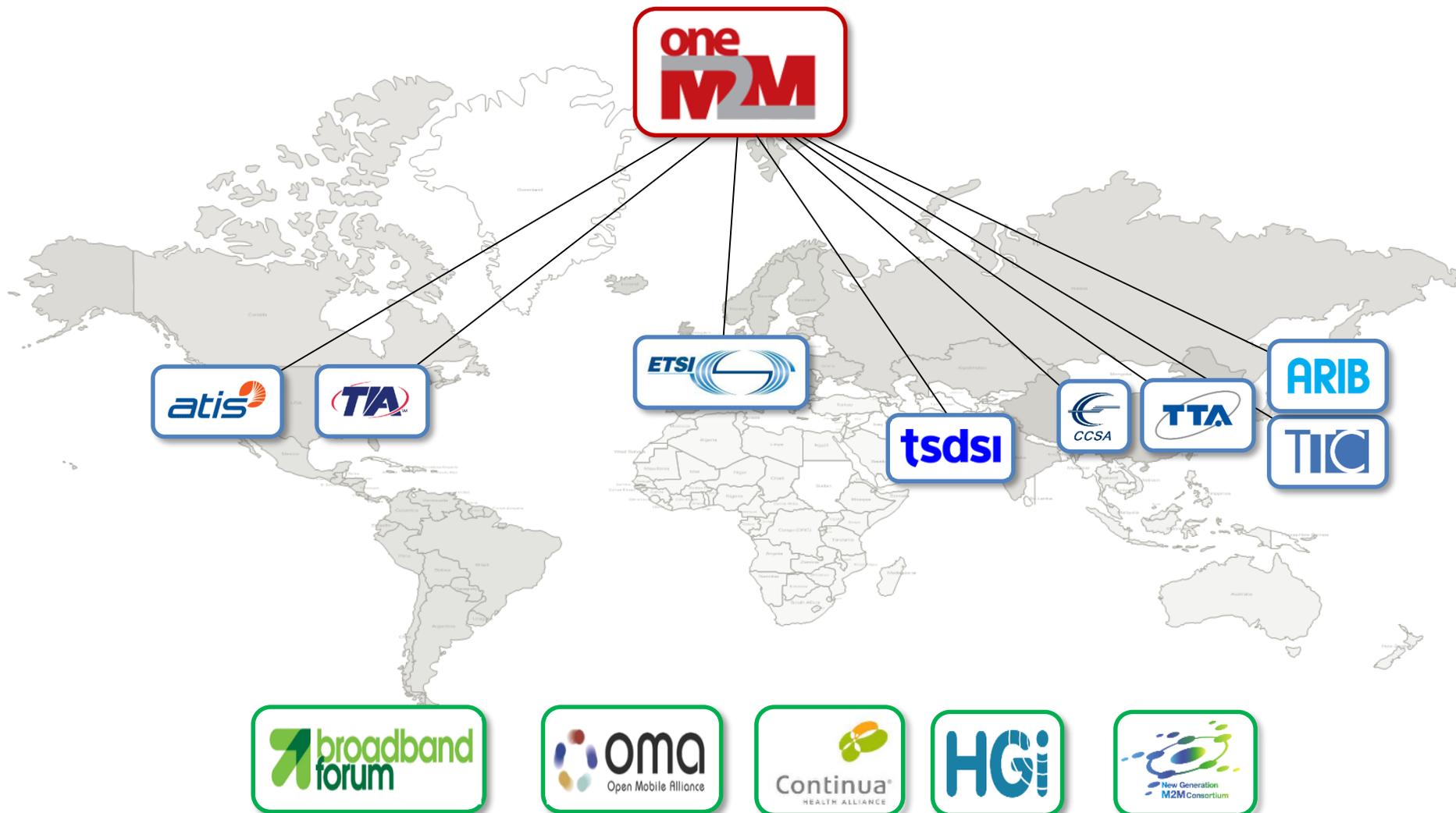


- Highly fragmented market with small vendor-specific applications.
- Reinventing the wheel: Same services developed again and again.
- Each silo contains its own technologies without interop.

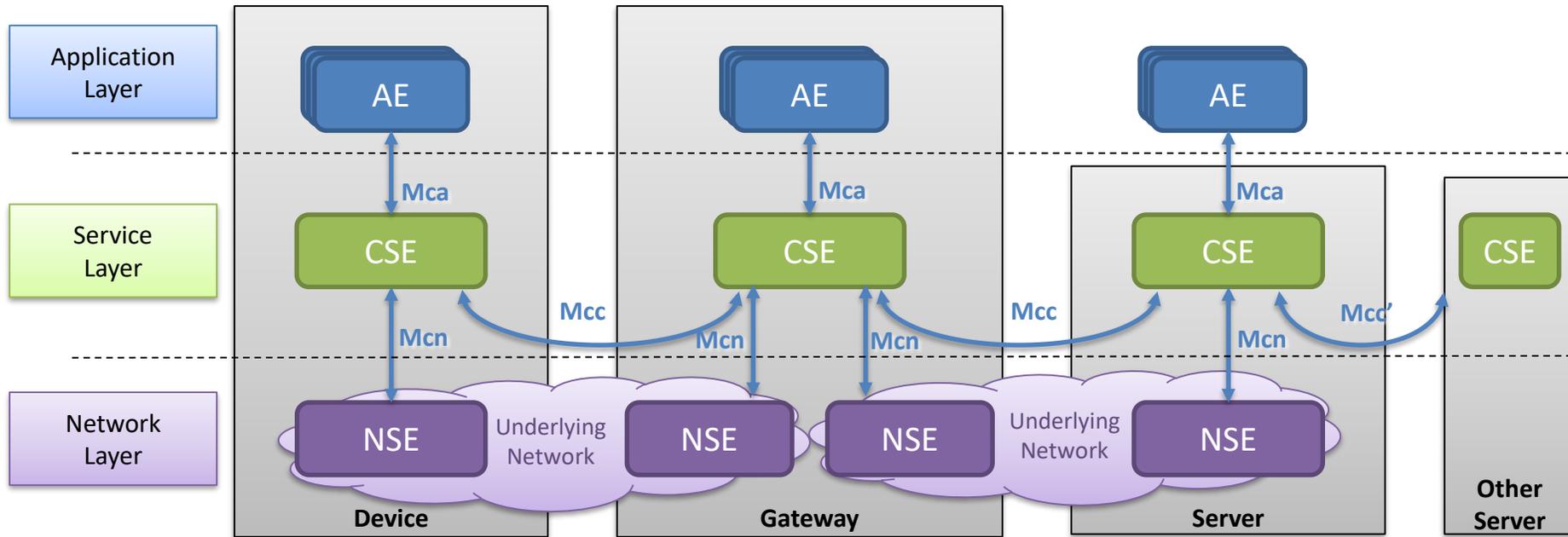
- End-to-end platform: common service capabilities layer.
- Interoperability at the level of communications and data.
- Seamless interaction between heterogeneous applications and devices.



oneM2M standards



oneM2M high level architecture

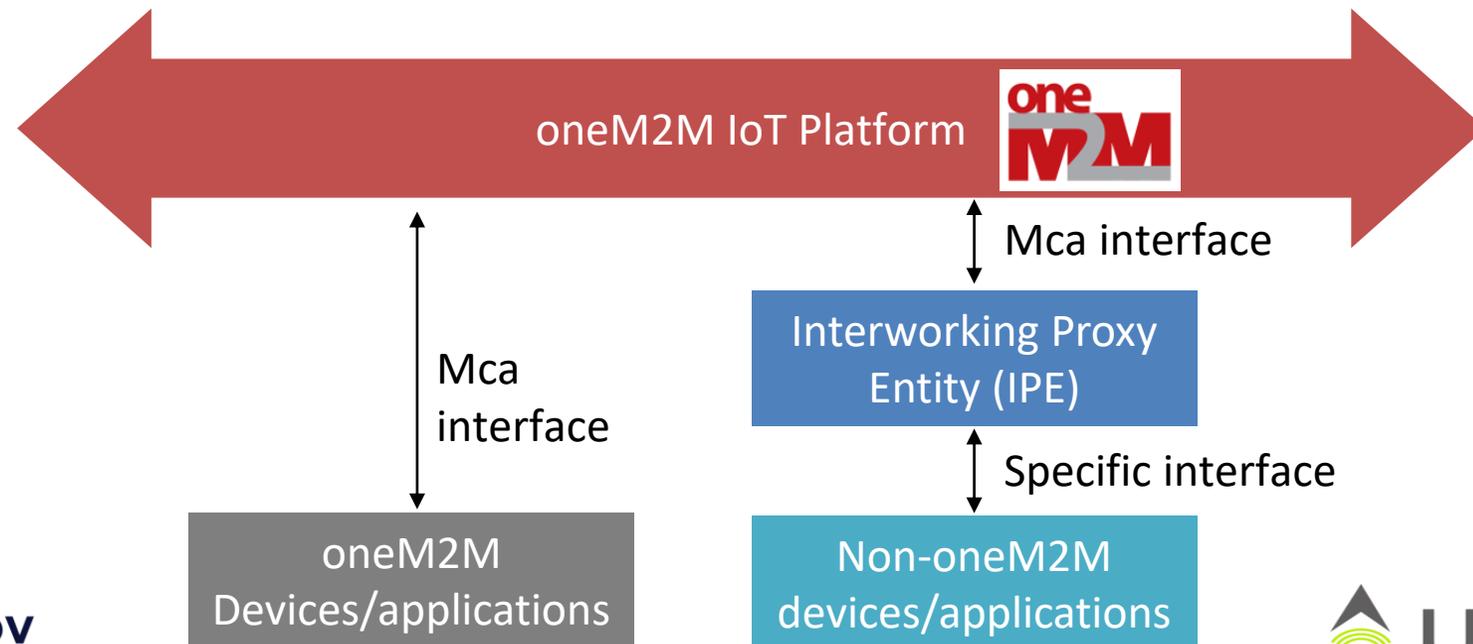


Entities: AE (Application Entity), CSE (Common Services Entity) and NSE (Network Services Entity)

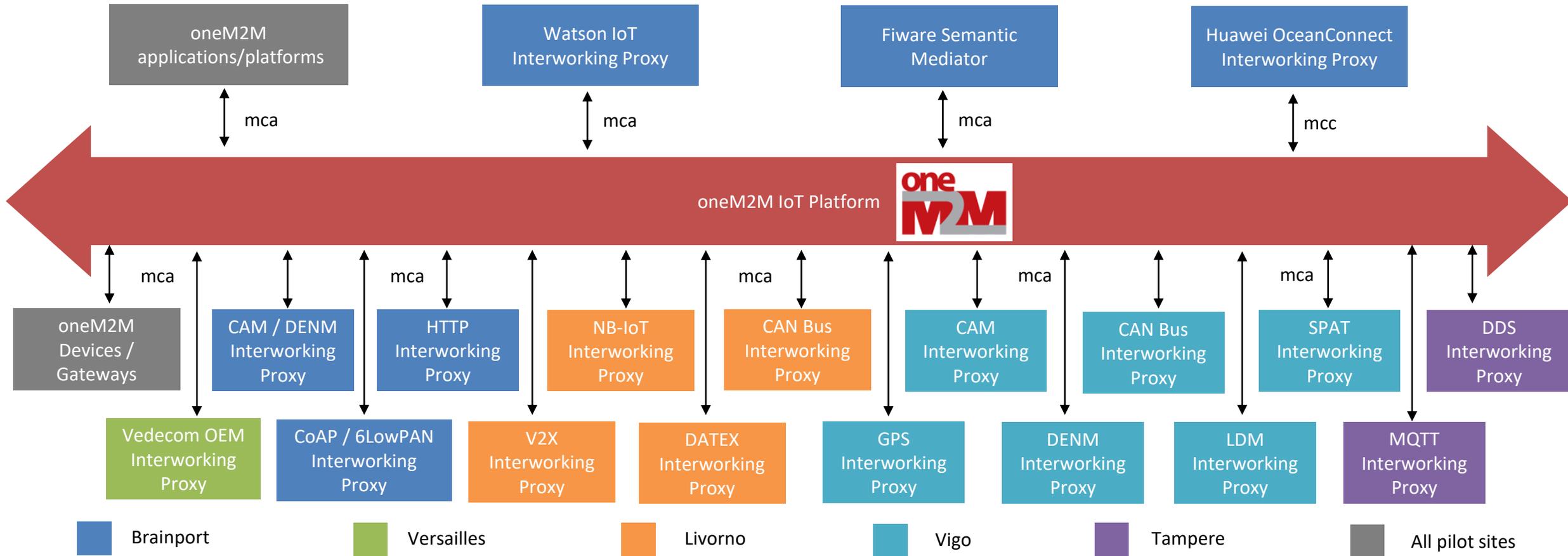
Reference Point: One or more interfaces - Mca, Mcn, Mcc and Mcc'

oneM2M interworking approaches

- The oneM2M standard defines two approaches to connect oneM2M and non-oneM2M devices/applications into the IoT platform:
 - **Native oneM2M devices/applications:** can interact directly with the oneM2M platform using the MCA interface.
 - **Non-oneM2M devices/applications:** A dedicated Interworking Proxy Entity (IPE) shall be developed and deployed for this purpose. The IPE provides interworking between oneM2M platform and specific IoT device/application technologies or protocols.

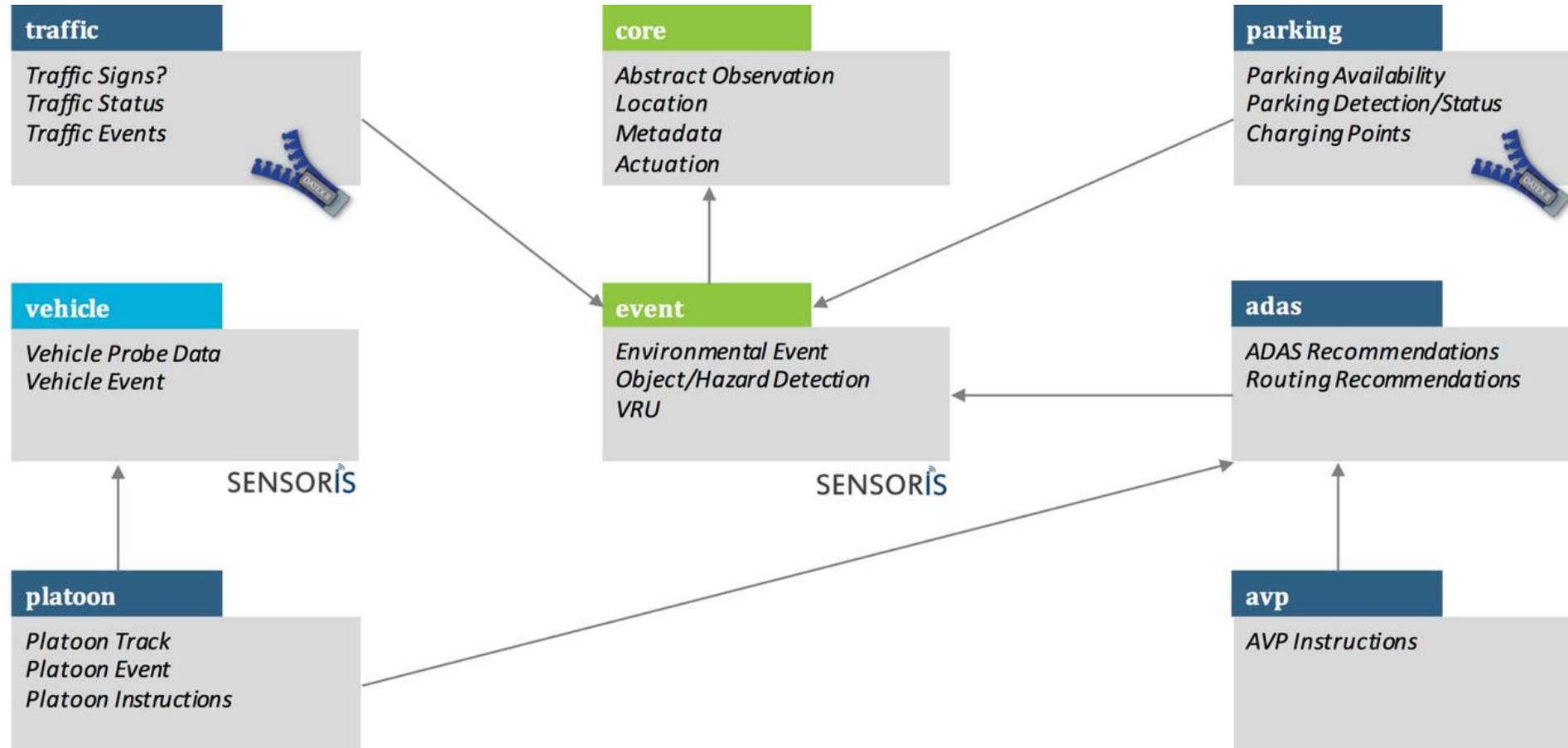


AUTOPILOT interworking components

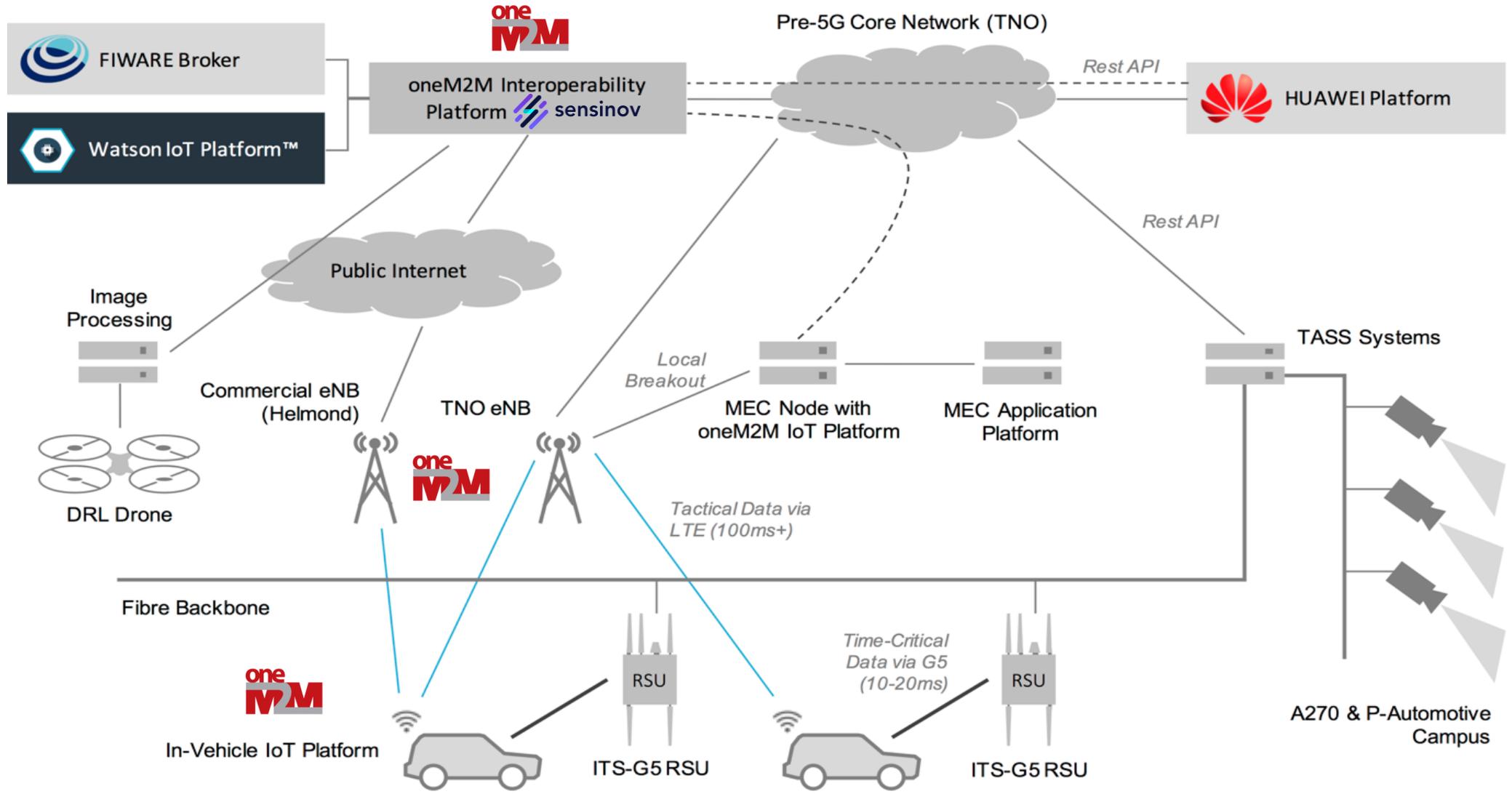


AUTOPILOT common data model

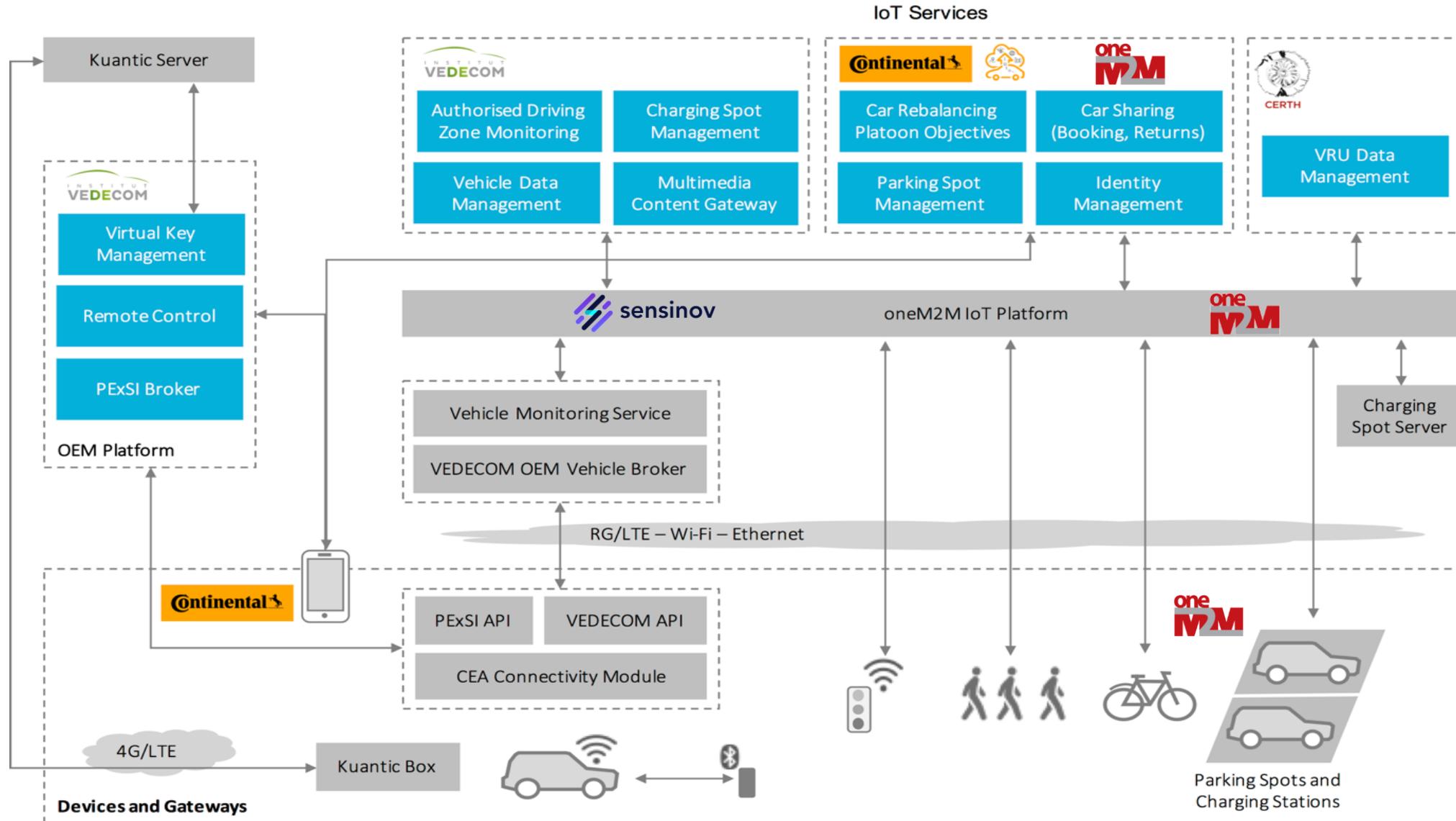
The IoT data model is split into several packages, based on different standards including SENSORIS, DATEX II, etc.



Brainport pilot site



Versailles pilot site



Putting the IoT vs. ITS debate to rest



<https://news.itu.int/putting-the-iot-vs-its-debate-to-rest>



Thank you for your attention

 www.autopilot-project.eu
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