Edge Computing with oneM2M

Key enablers to realize scalable deployment of IoT systems

11 November 2024

Example Scenario

Transportation services

Public communication services

Public safety services

Tourism

Maintenance services

Commerce

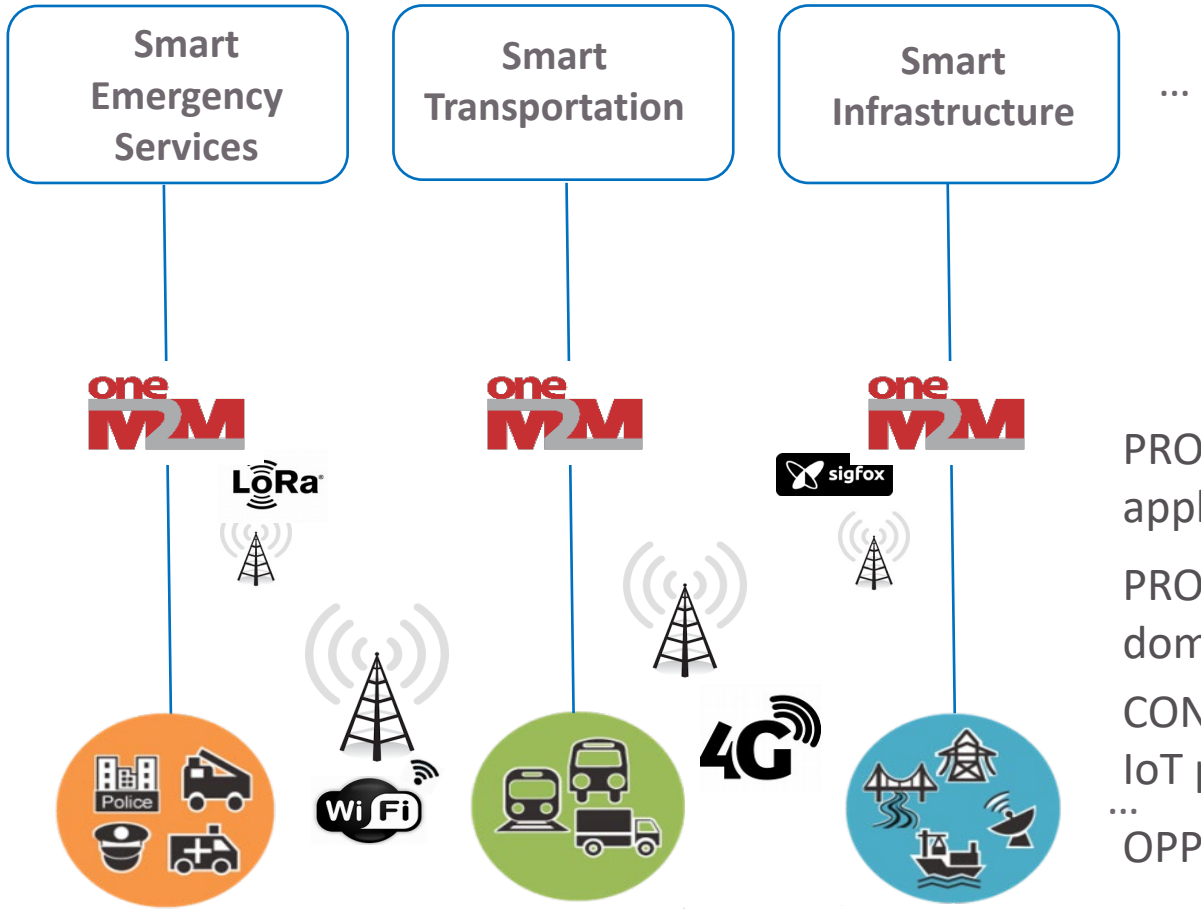
Cost effective

Scalable & reliable

Data Ownership

Interoperable

Step 1 – Start Small



- choose your data model
- implement applications
- deploy applications
- repeat for each vertical

PRO - Easy to implement; Domain expertise and devices and applications are not constrained

PRO - Less expensive than trying to force data models from different domains to be the same

CON - no sharing of data between siloes (no different than any other IoT platform)

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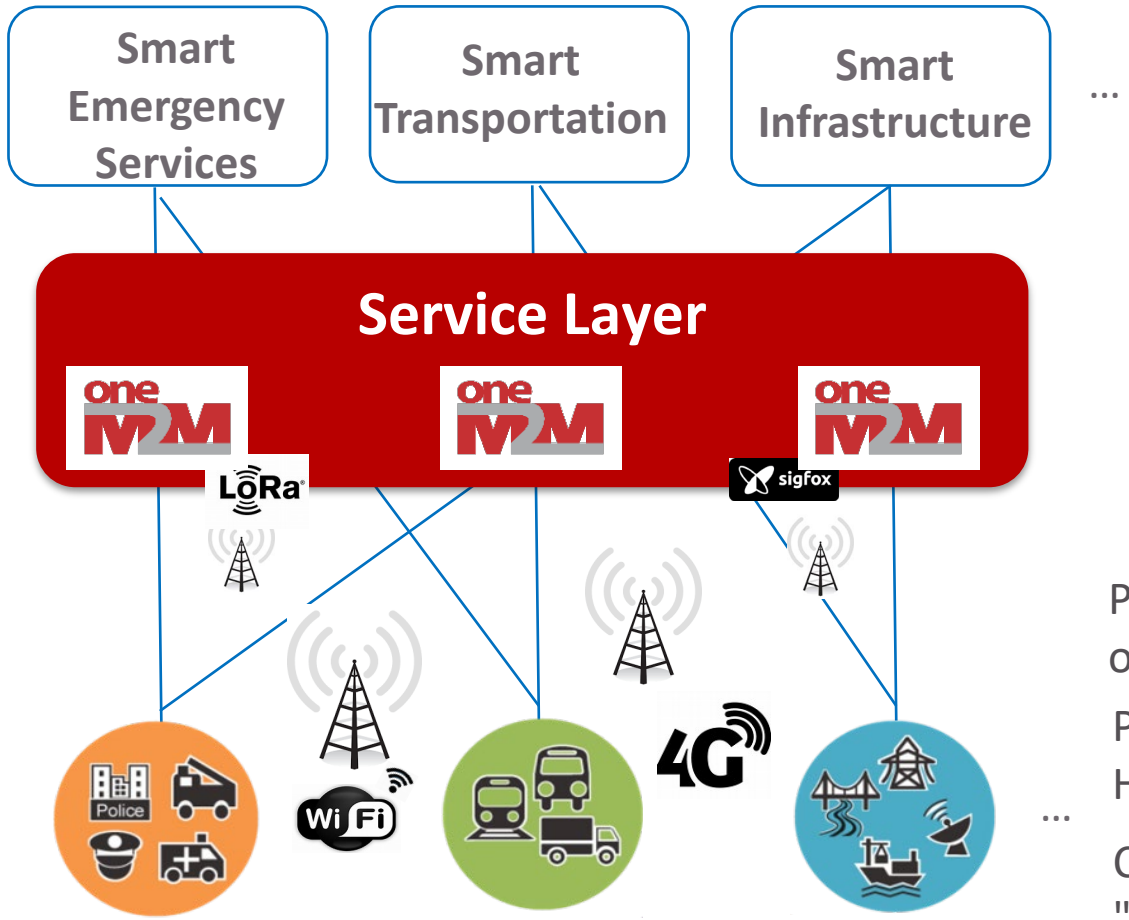
OPPORTUNITY - collaborate on the data models when it is easy to do.

Step 2 – Federate CSEs



- Simple API to connect oneM2M CSEs
- Grant desired Access to remote applications
- Share Data

PRO - Siloed data is controlled by the "owner“ who can choose to share or NOT with very fine granularity

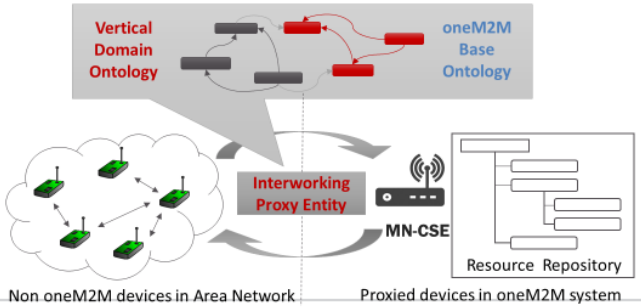
PRO - Can share data to a remote CSE to keep network traffic low on Host CSE, while still controlling access

CON - data models may be different; foreign applications may not "understand“. This may make discovery and use of data difficult.

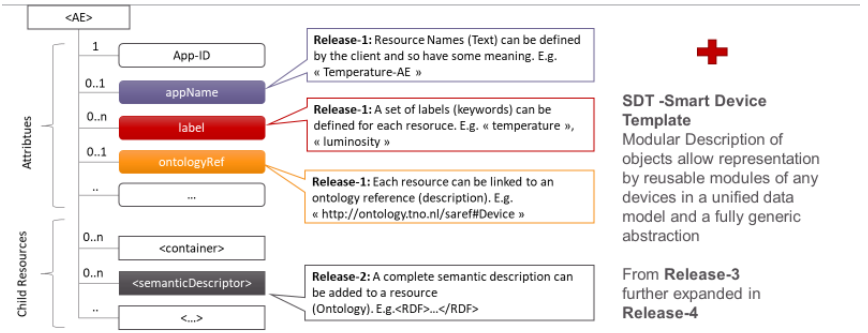
Data model interoperability: Semantics

Generic interworking using semantic

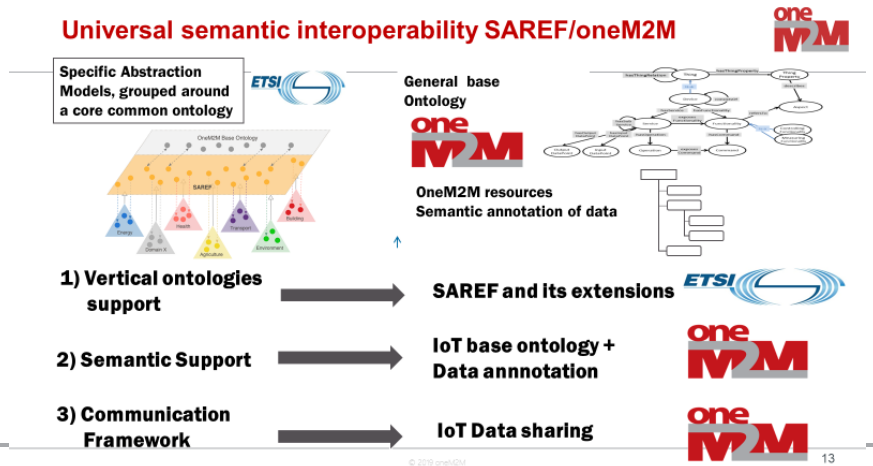
- Non oneM2M devices are described using the oneM2M base ontology + domain specific extensions.
- The Interworking Proxy Entity translates the ontology instance to resources on the CSE based on pre-defined instantiation rules.



Evolution of semantic in oneM2M

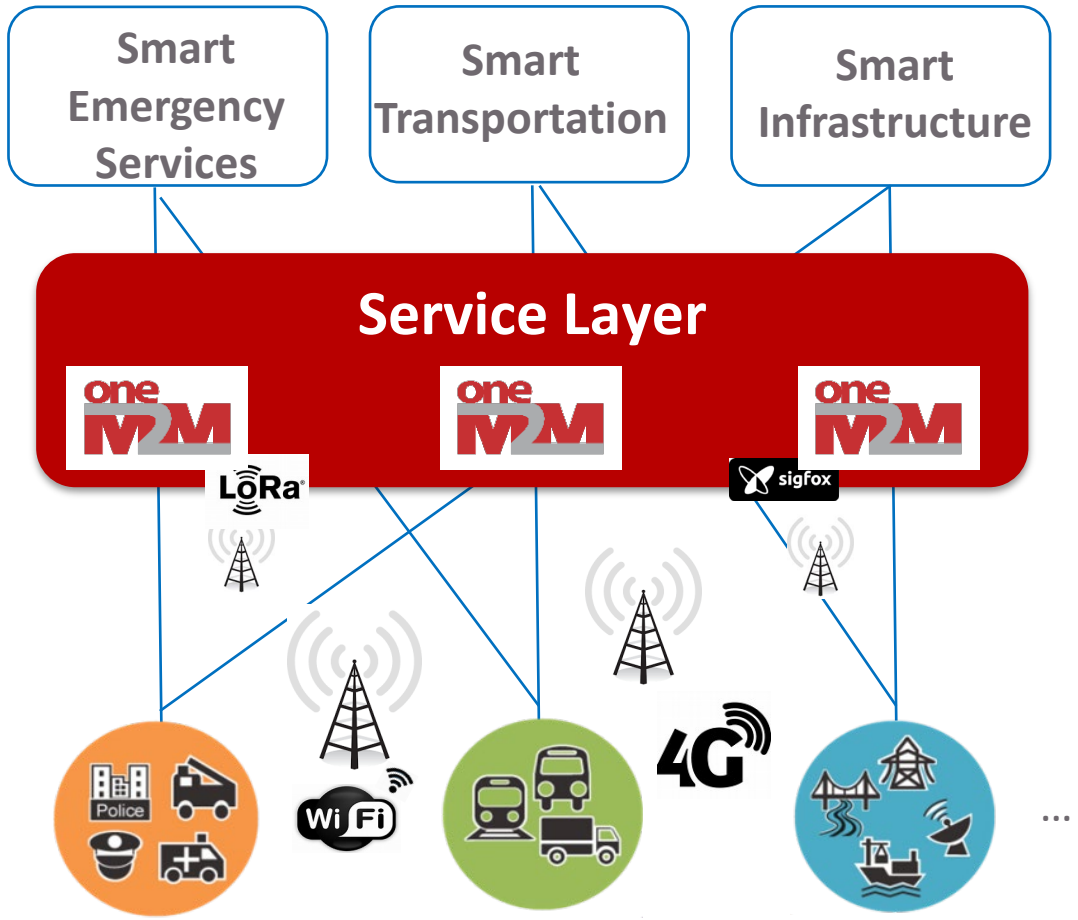


Universal semantic interoperability SAREF/oneM2M



Advanced Semantic Discovery in Release 5

Step 3 – Add Semantic annotations

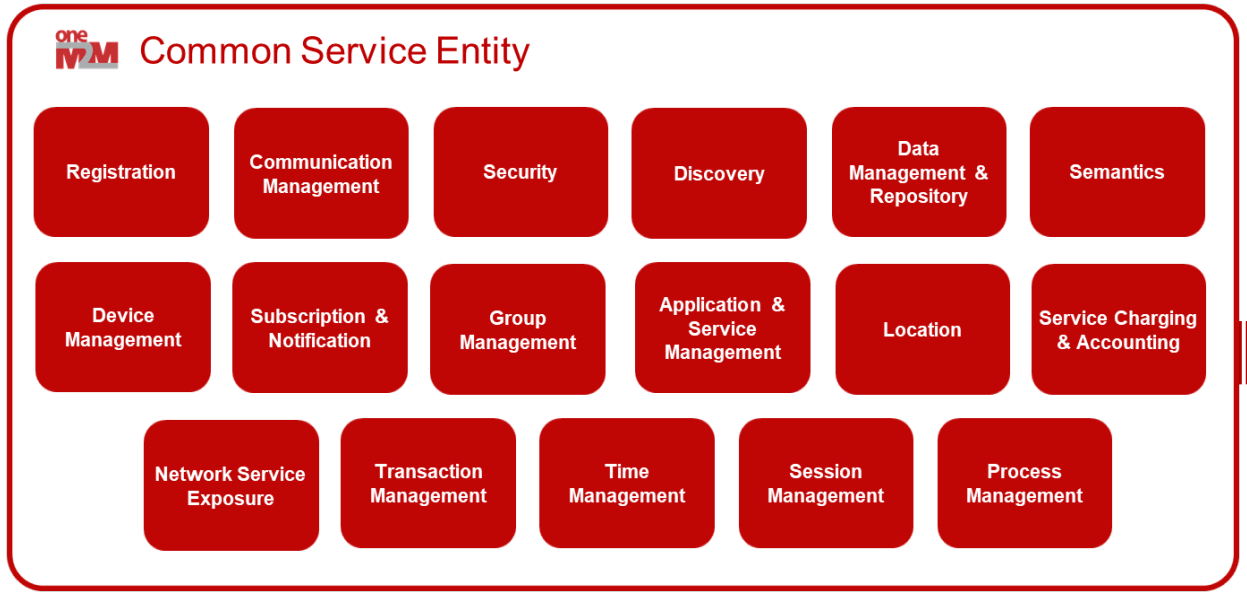


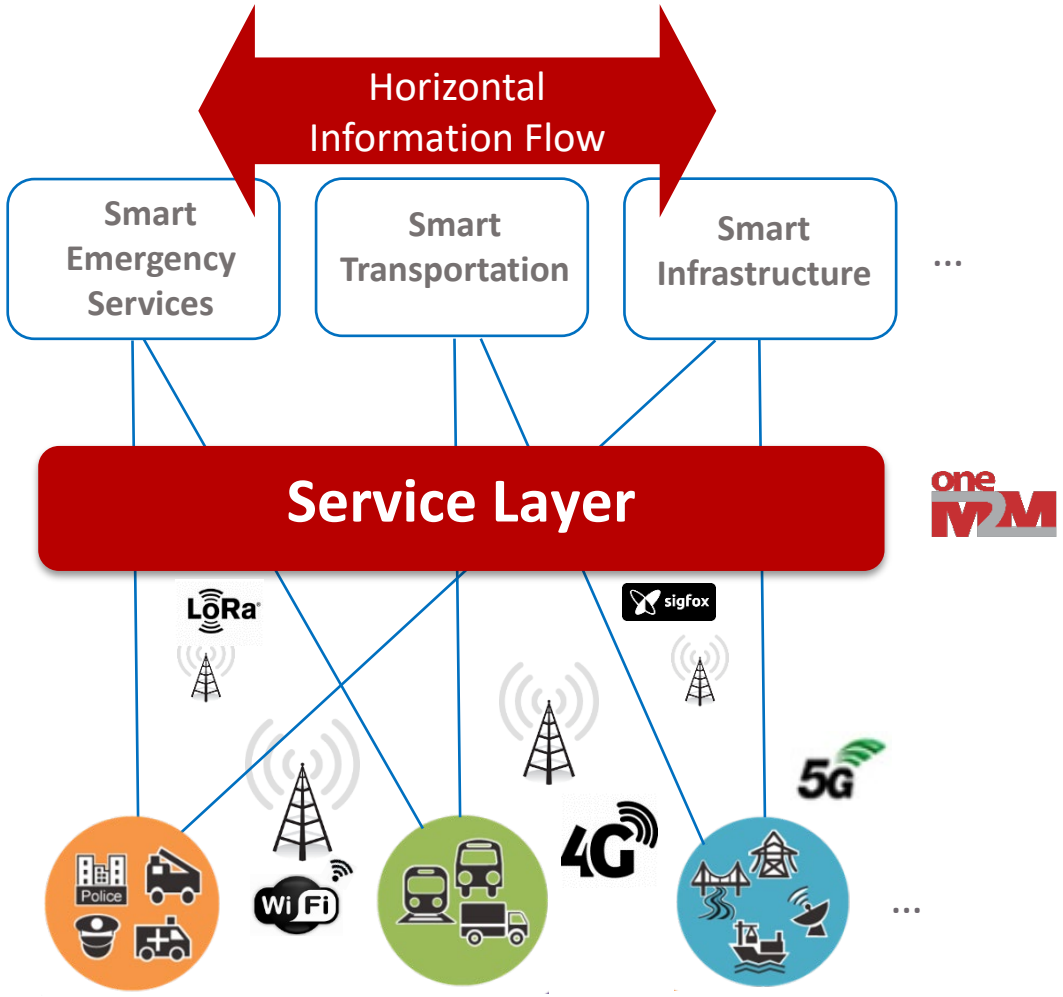
- Add semantic context to data models
- Use Advance Semantic Discovery features

PRO - Semantic descriptions can be added to data after deployment

PRO - oneM2M base ontology can make accessing data interoperable

IoT using oneM2M





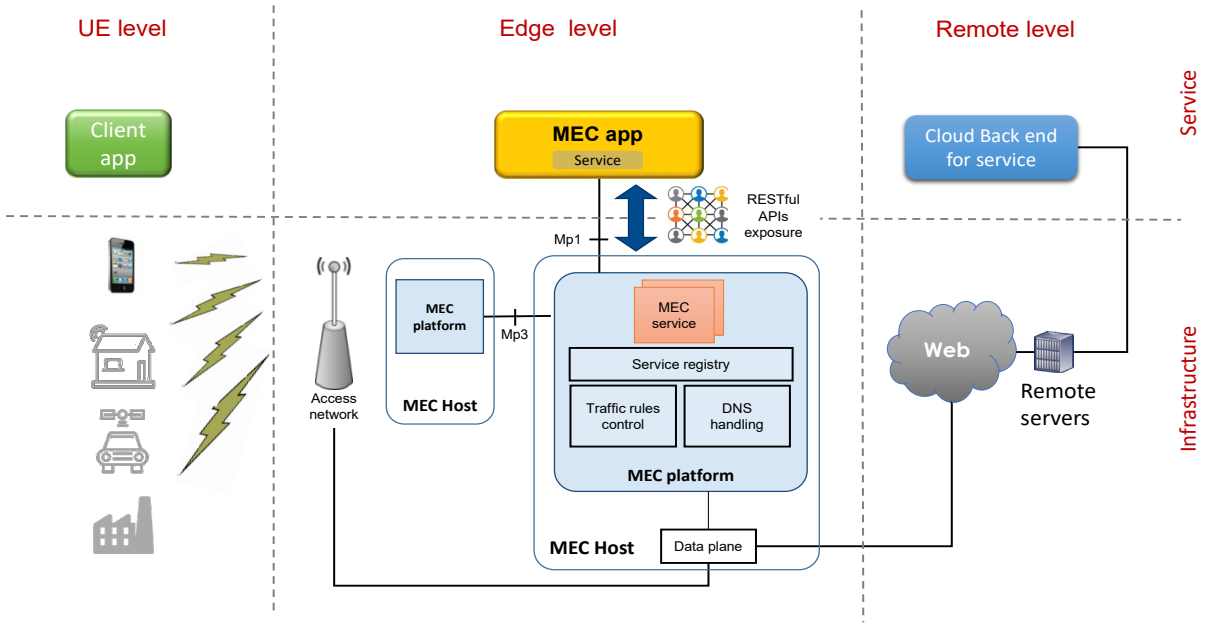
- Scalable & reliable
- Cost effective
- Interoperable
- Data Ownership

ETSI MEC – Foundation for Edge Computing

MEC offers to application developers and content providers cloud-computing capabilities and an IT service environment at the edge of the network

MEC Principles:

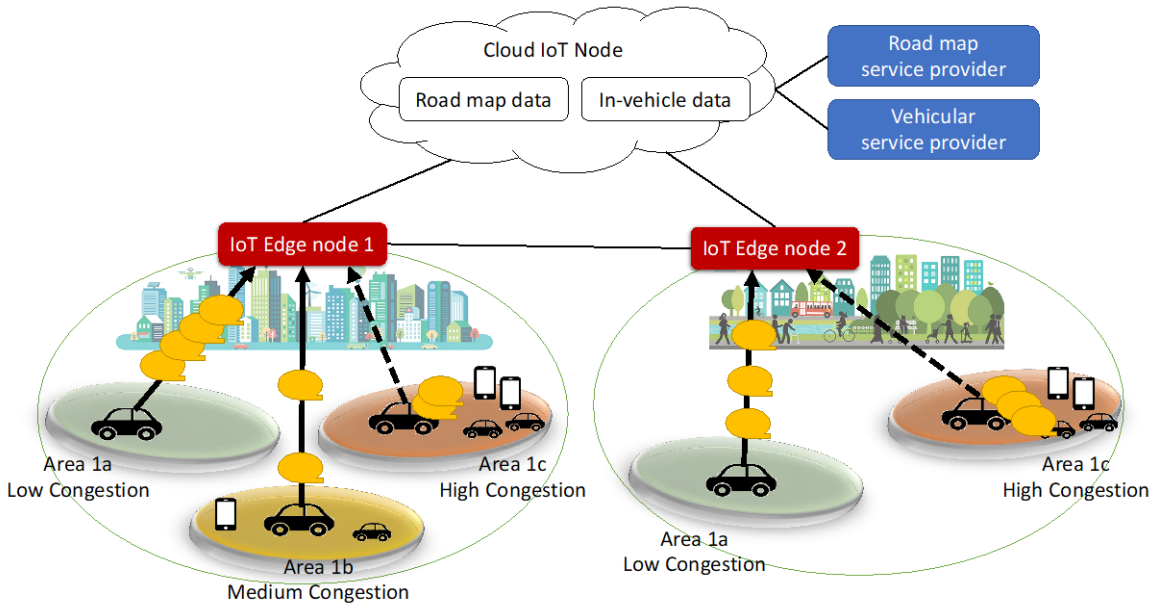
- *Open standard* → allowing multiple implementations and ensuring interoperability
- MEC exploiting ETSI *NFV framework* and definitions → enabling MEC in NFV deployments
- Alignment with *3GPP* based on fruitful collaboration of common member companies → enabling MEC in 5G
- Access-agnostic nature (as per MEC acronym - Multi-access Edge Computing) → enabling other accesses
- Addressing the needs of a wide ecosystem → enable multiple verticals (e.g., automotive, factories), federations



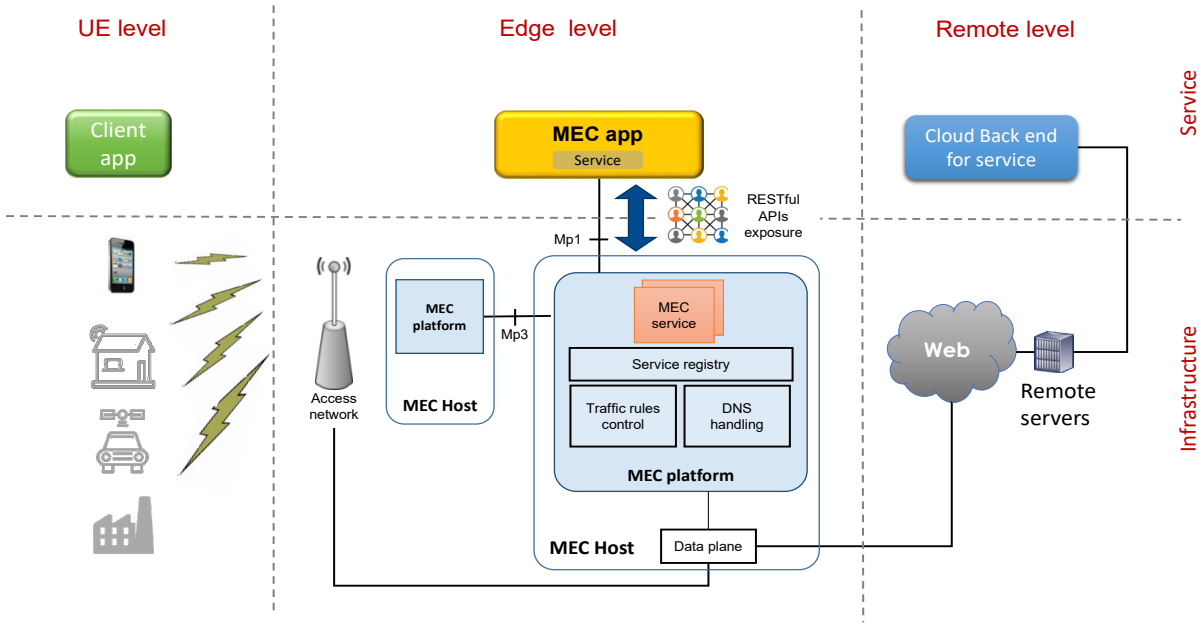
MEC is focused on *existential* questions of **applications "on the edge"**

Platform Scalability

Automotive & Smart Transportation

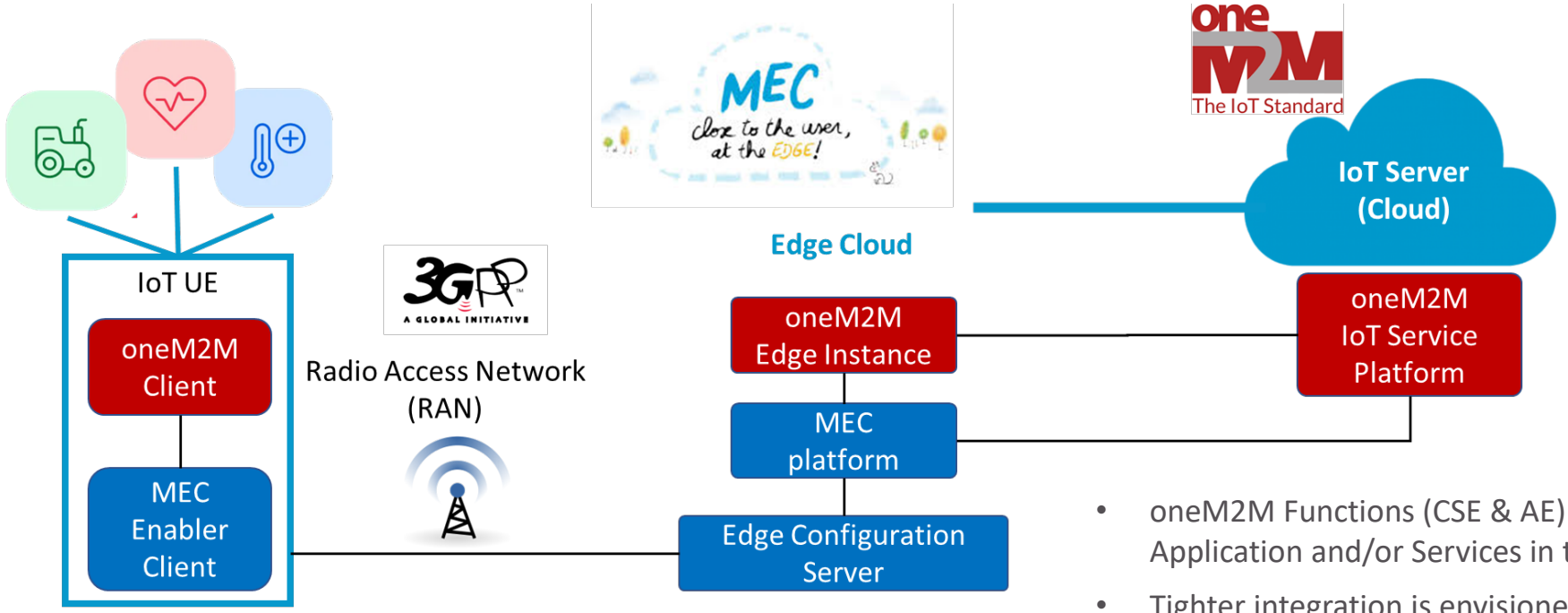


- High-precision road mapping and monitoring – collection and processing of data from vehicle and road-side sensors, including V2X information from mobile network
- Vulnerable Road User Discovery – accurate positioning and vehicle data to mitigate risks to pedestrians and cyclists



Synergized MEC & oneM2M Architecture

oneM2M and MEC Architectures are compatible, enabling the joint deployment of oneM2M nodes in MEC Systems



- oneM2M Functions (CSE & AE) are realized as MEC Application and/or Services in the MEC System
- Tighter integration is envisioned with specific “hooks” between the system to increase joint benefits