

ESTIMED Project Vision

oneM2M

a Horizontal Platform:
for data exchange
and interoperability across
IoT applications.

ESTIMED
Convergence
between
device/data
management
and
Edge processing

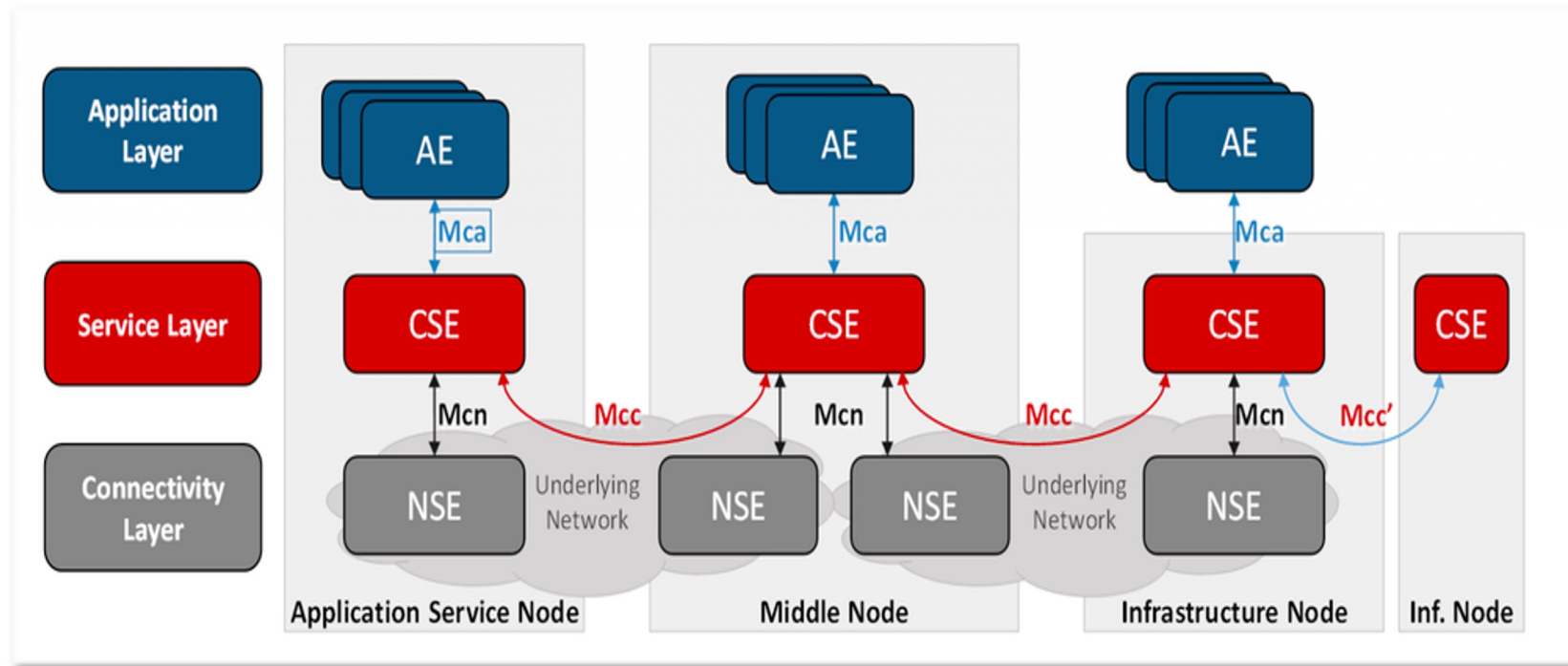
ETSI MEC

An open standardized
environment provides
computational offloading and
reduced latency for
Edge applications

This Standardized Convergence enables distributed IoT- edge integration across domains and supports scalability, interoperability and rapid deployment.

oneM2M provides a horizontal service layer that standardizes IoT data management across devices and platforms

oneM2M Architectural Overview



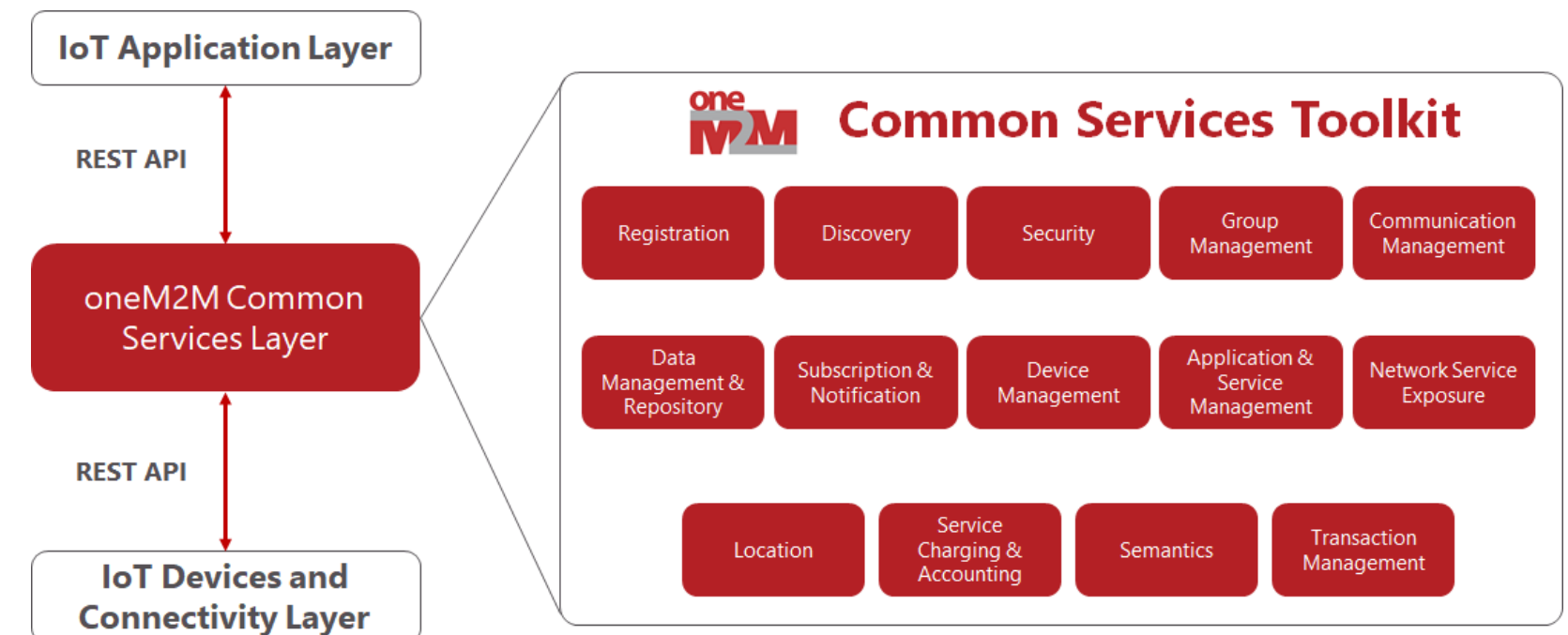
Architectural Entities

- ❑ Common Services Entity (CSE): Common IoT service functions.
- ❑ Application Entity (AE): Application logic.
- ❑ Interworking Proxy AE (IPE): Interfaces with external systems.
- ❑ Network Services Entity (NSE): Provides networking services
- ❑ Node: a physical or virtualized server or device.

oneM2M Node Types

- ❑ **IN**: Infrastructure Node (cloud / server, hosts IN-CSE).
- ❑ **ASN**: Application Service Node (AE + ASN-CSE).
- ❑ **MN**: Middle Node (MN-CSE + optional AEs, edge/gateway).
- ❑ **ADN**: Application Dedicated Node (only AE, no CSE).
- ❑ **NoDN**: Non-oneM2M Node (legacy / external IoT tech).

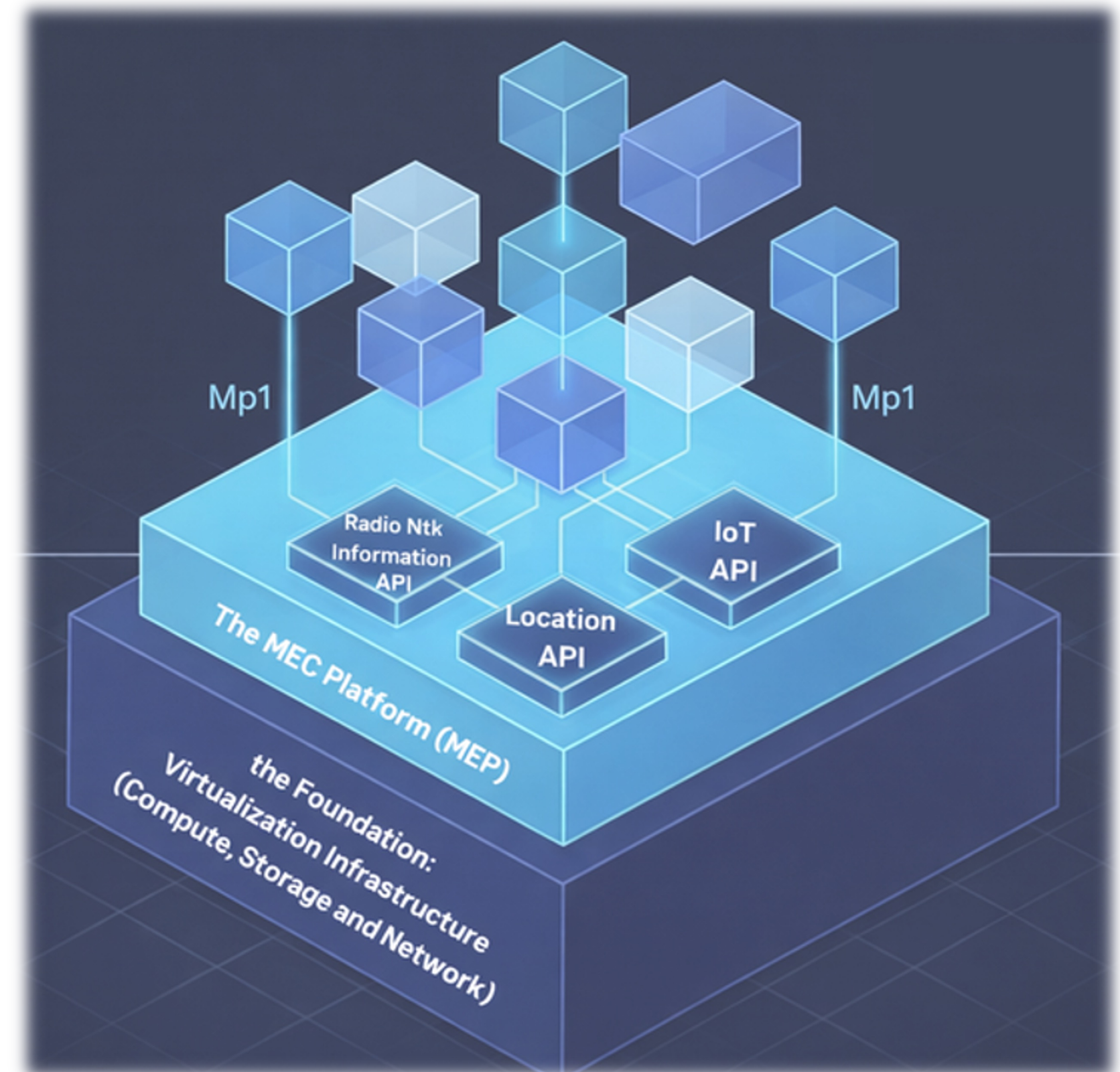
Common data and connectivity Services developers call while building IoT systems.



ETSI MEC defines Rich set of standardized edge platform Services that developers can access via unified APIs

- ❑ Edge Platform Application Enablement, Application lifecycle, rules, and requirements management and Location API
- ❑ Radio Network Information API, Traffic Management API and Device Application Interface.
- ❑ Application Mobility Service API, WLAN Information API and Fixed Access Information API.
- ❑ V2X Information API, IoT API and Federation Enablement API.
- ❑ QoS Measurement API and Sensor Sharing API.

Services are registered, discovered, and consumed via the standardized Mp1 interface.



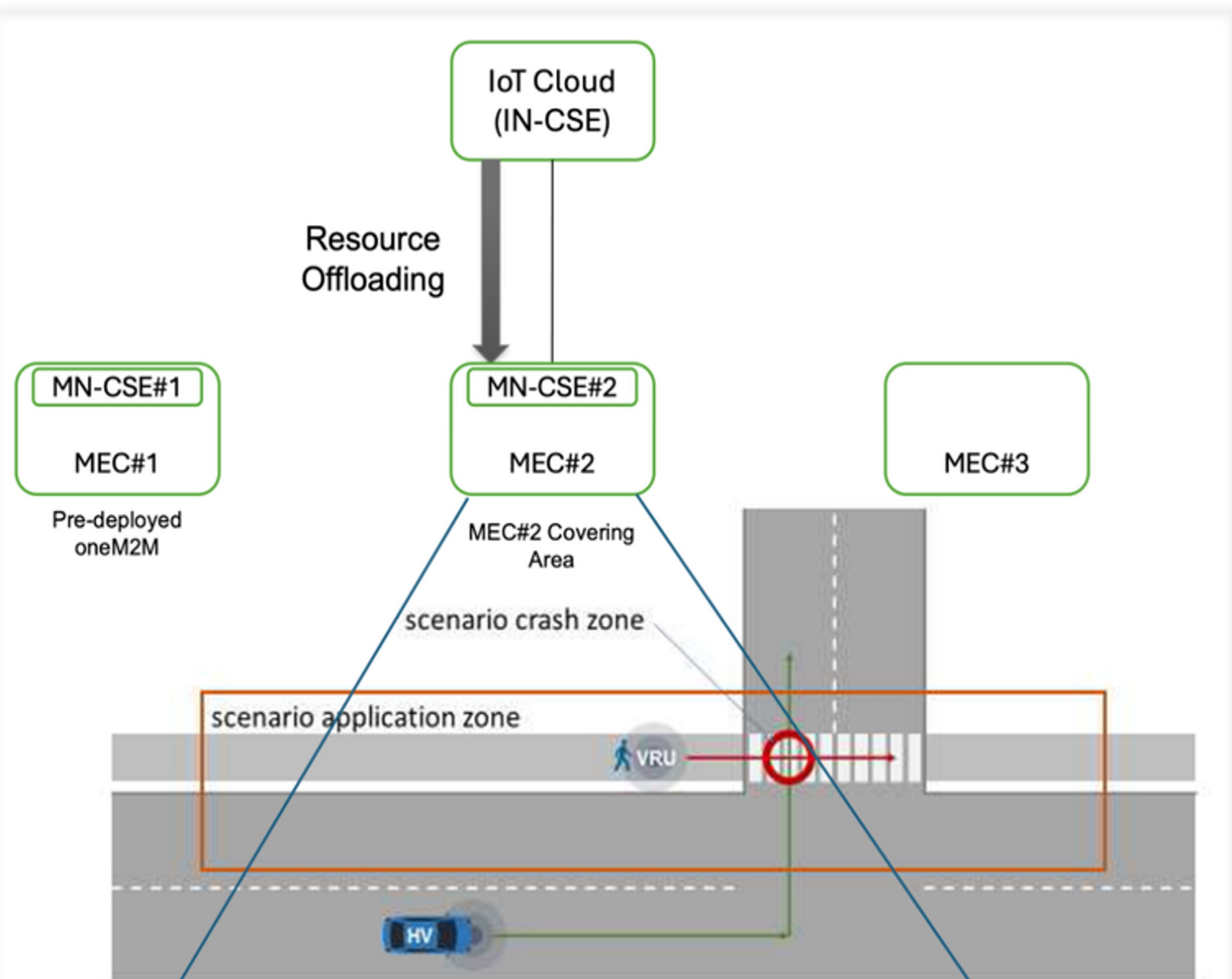
There are four deployment options for ETSI MEC and oneM2M interworking

| Deployment Option | Pros | Cons |
|---|---|--|
| Option A: Cloud-Centric Integration | Leverages existing standards to provide edge benefits with minimal integration. | Does not fully utilize edge computing potential, the cloud remains the final endpoint for data storage and management. |
| Option B: Distributed Edge Nodes | Improves performance and processing speed by localizing interactions and preserves the separation between IoT and MEC entities. | Separation of entities on different nodes is less efficient than co-located or integrated options. |
| Option C: Co-located Edge Node | Significantly improves service quality by eliminating unnecessary data movement and redundant information exchange. | Requires both platforms to be installed and operated on the same hardware. |
| Option D: Fully Integrated / Tightly Coupled | Fully exploits MEC's direct access to data sources and multi-access networking for a comprehensive edge environment. | Has extensive integration between the two frameworks. |

ESTIMED Use Cases & Interworking Opportunities (I)

Edge offloading enables collision detection for autonomous vehicles (AV) and vulnerable road users (VRU) requiring immediate, sub-second warnings.

Vulnerable Road User Detection



The Scenario

When the AV moves into a new area, the IN-CSE quickly transfers LiDAR analysis and VRU detection to a nearby MEC MN-CSE, which gathers real-time data from local sensors and smartphones to create a current traffic situation and predict risks of possible collisions.

Edge Execution

The edge-hosted MN-CSE fuses heterogeneous data with vehicle behavior indicators (e.g., turn signals, proximity to intersections) into a unified model to predict collision risk and anticipate dangerous situations.

ESTIMED Use Cases & Interworking Opportunities (II)

Edge-enabled analytics support safe and efficient MASS (maritime autonomous surface ships) maneuvering in complex port environments.

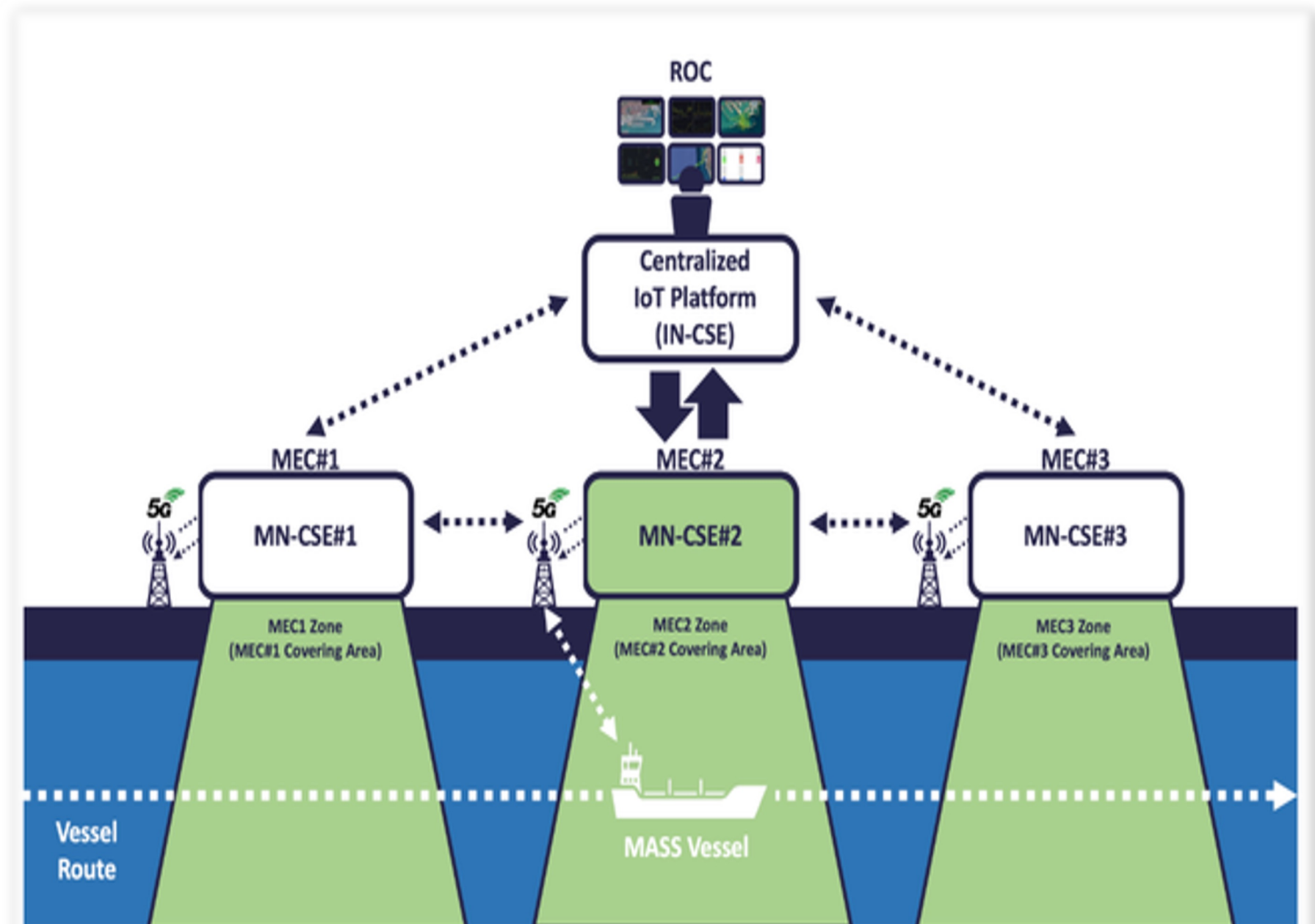
The Scenario

When a MASS approaches the port, the IN-CSE hosted in the ROC offloads time critical computational tasks to MN-CSE. The MEC platform analyzes data coming from the on-board equipment locally to generate real-time navigation warnings for safe maneuvering.

Edge Solution

In crowded and unpredictable ports moving the AI driven navigation logic to edge guarantees the ultra-low latency processing capabilities necessary for mission-critical situational awareness.

Assisted Maneuvering for MASS



Explore the technical foundations behind oneM2M and ETSI MEC convergence

D6.3 – ESTIMED White Paper

How oneM2M and ETSI MEC are combined to enable low-latency, interoperable IoT systems and key technical requirements for data synchronization and edge-cloud deployments.

D2.1 – Analysis and selection for oneM2M and MEC implementations

Comparative analysis of open-source platforms (ETSI MEC Sandbox, ACME, tinyIoT, Mobius), highlights about interoperability features and deployment options for PoC development.

D2.2 – ESTIMED Use Cases & Requirements

Technical overview of standardized integration approaches, real-world use cases, and practical recommendations for enabling advanced edge-cloud capabilities.

Documents Link: https://estimed.etsi.org/reports_specifications/