NGI

iNGENIOUS

Next-Generation IoT Solutions for the Universal Supply Chain

iNGENIOUS USE CASES AND CROSS-LAYER ARCHITECTURE

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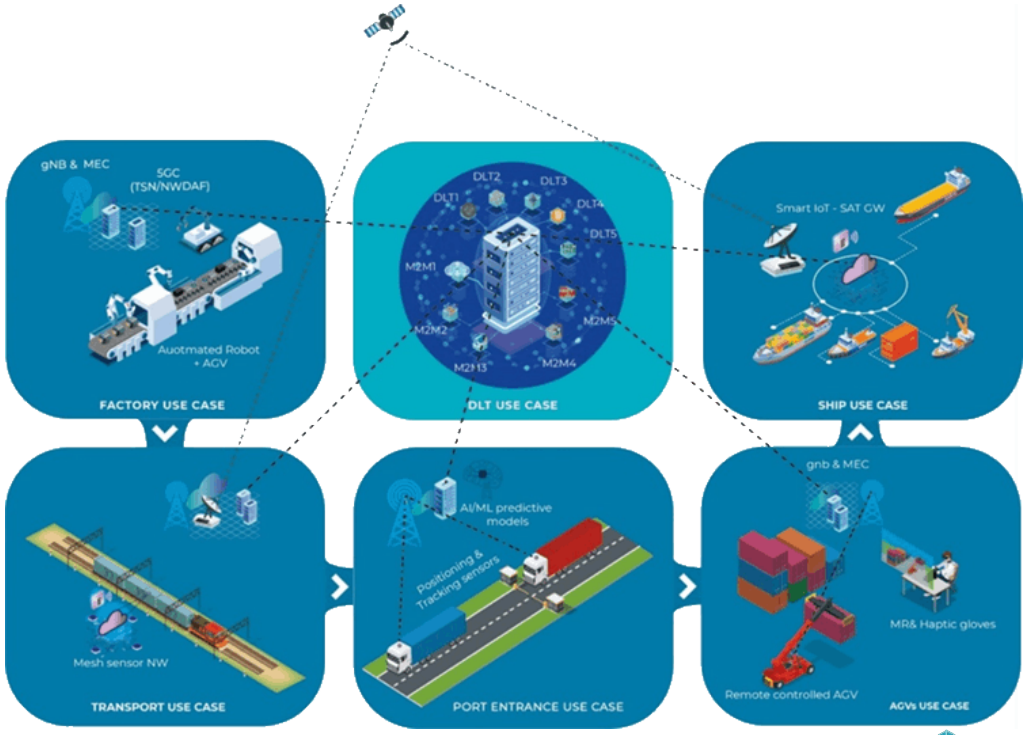
NEXTWORKS
HEADING THE FUTURE

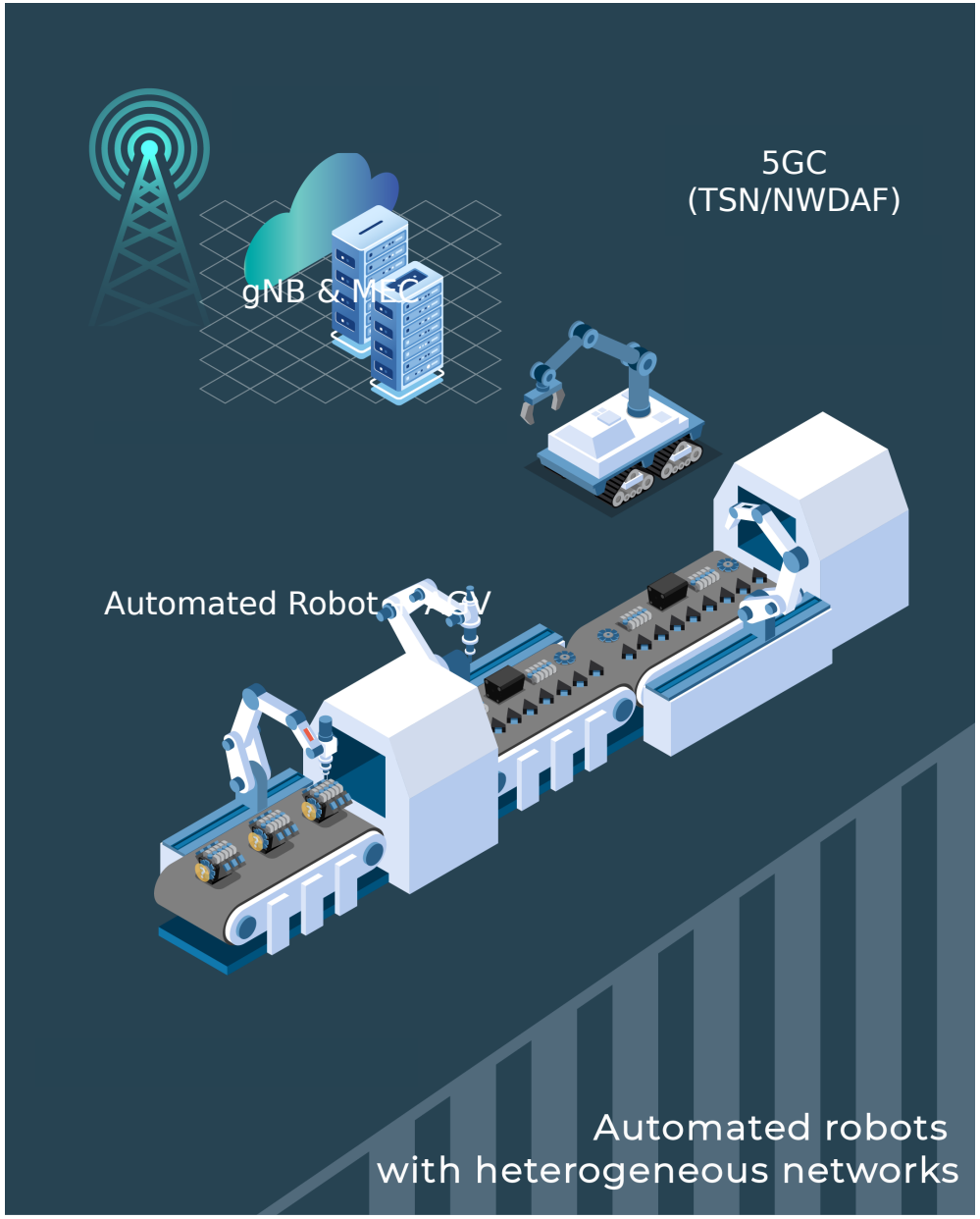
INGENIOUS PROJECT

Details can be found in our deliverables at ingenious-iot.eu

> ***iNGENIOUS will design and evaluate the NG-IoT solution**, with a particular emphasis on 5G and the development of Edge and Cloud computing extensions for IoT in addition to providing smart networking and data management solutions with AI/ML*

- **6 use cases** for the supply chain management:
  - ***Next Generation Automation***: Automated robots, Improved driver's safety with tactile services.
  - ***Advanced asset tracking***: platforms health monitoring, SAT-IoT inter-modal asset tracking
  - ***Smart data management***: AI/ML predictive models, DLT-trusted & interoperable platforms
- Large-scale **PoC** solutions will be experimentally **validated** in one **factory**, one **ship** and two **ports**
- 30 months project – 8 M€
  - October 2020 – March 2023





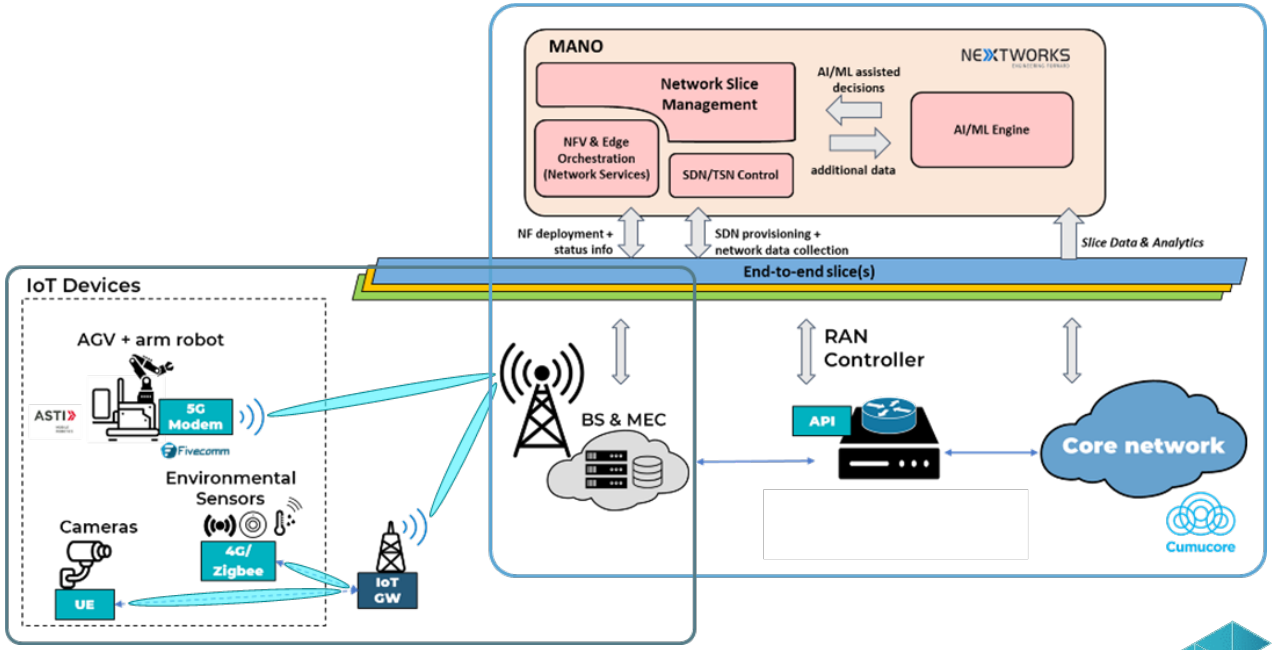
Factory Use Case

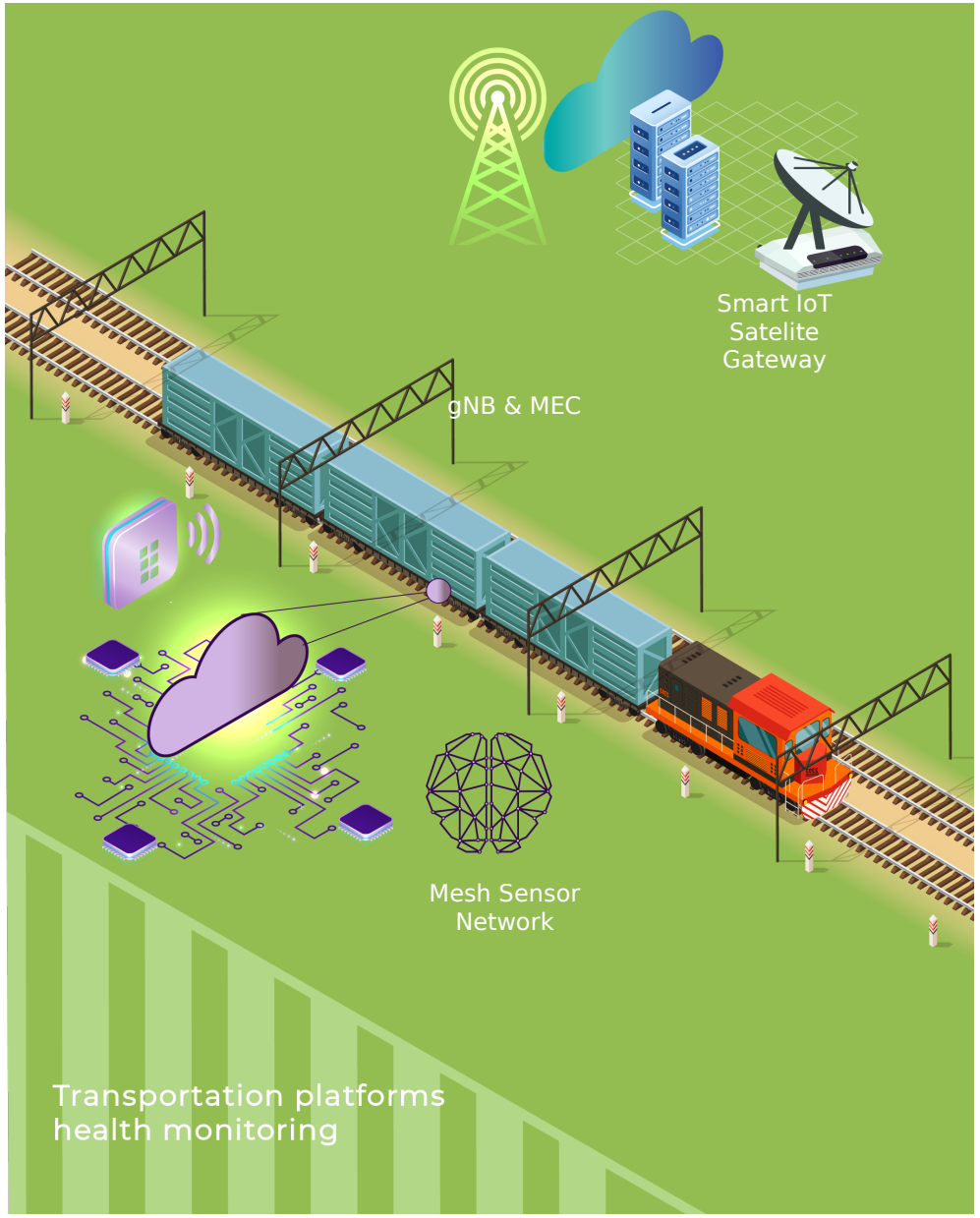
Smart robots in a factory environment

- Equipped with sensing and computational power
- Context-aware
- Operate cooperatively to perform complicated tasks
- Interact with humans in close proximity

Network

- End-to-end network slice provisioning in 5G network





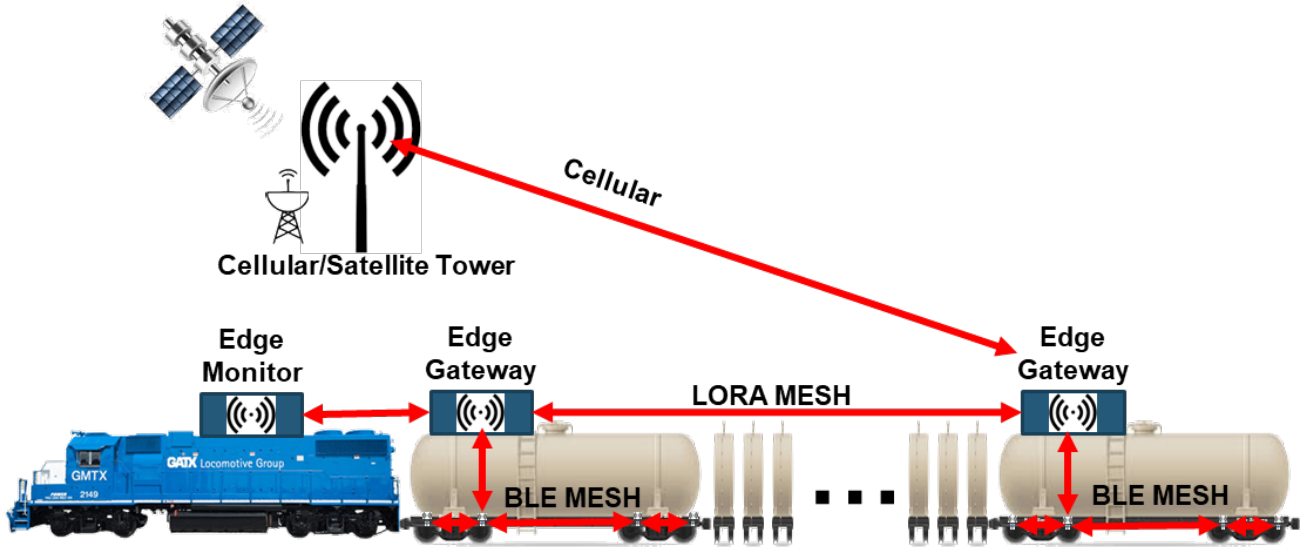
Transport Use Case

Rail transportation health monitoring - IoT sensors look for defects in rail cars

- Modular Tiled Secure Communication Platform (Security)
- Low-Power Edge Computing (Long Lifetime)
- Passive Edge Sensing (Always ON)
- Edge Novelty Detection (Learning)

Network

- Cellular and Satellite transport networks



Inter-modal asset tracking via IoT and satellite technology

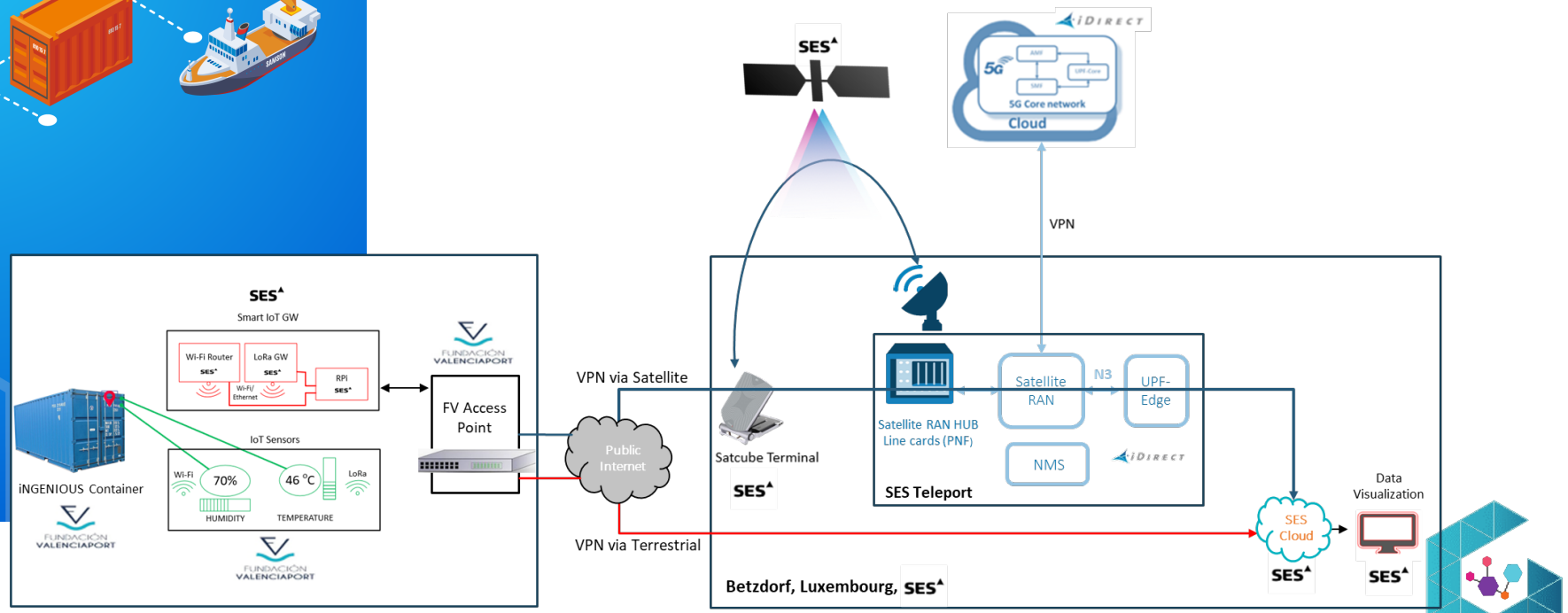
Ship Use Case

Smart IoT Gateway with IoT sensors to monitor shipping containers (temperature, shocks, opened, etc.)

- Interoperability between heterogeneous IoT devices
- Visualization of data in real-time conditions
- Asset tracking and monitoring from the originating point to final destination

Network

- Cellular and Satellite transport networks



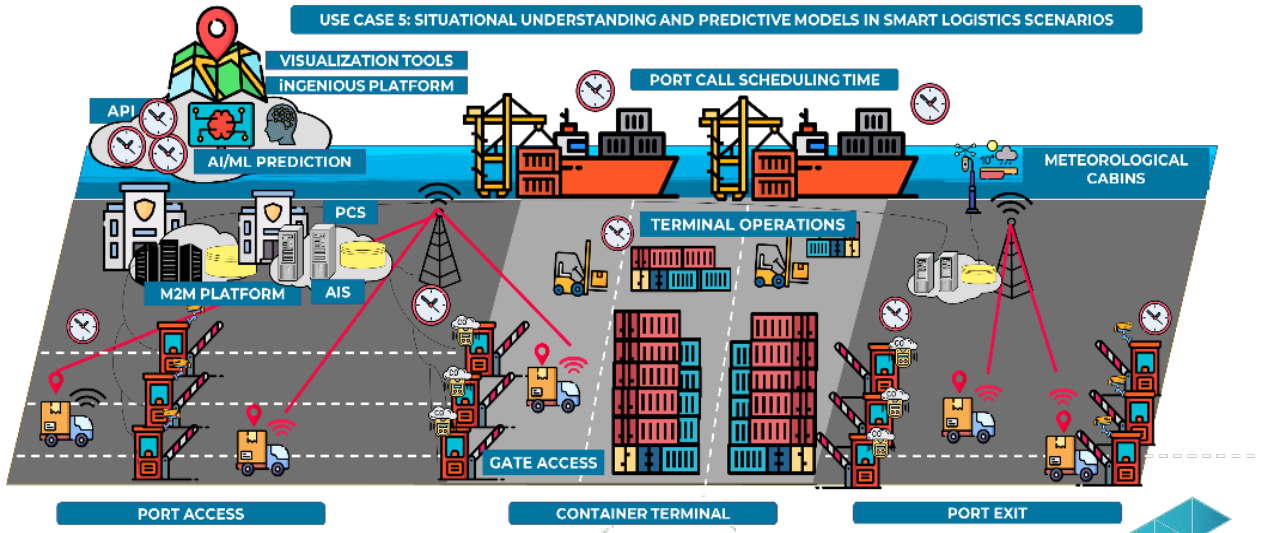
Port Entrance Use Case

Situational understanding of events in maritime ports and terminals to optimize truck turnaround times

- Multiple data sources [Port Community Systems, M2M platforms, Gate Access Systems]
- Artificial Intelligence algorithms to optimize and predict truck turnaround time

Network

- Commercial GSM and NB-IoT coverage



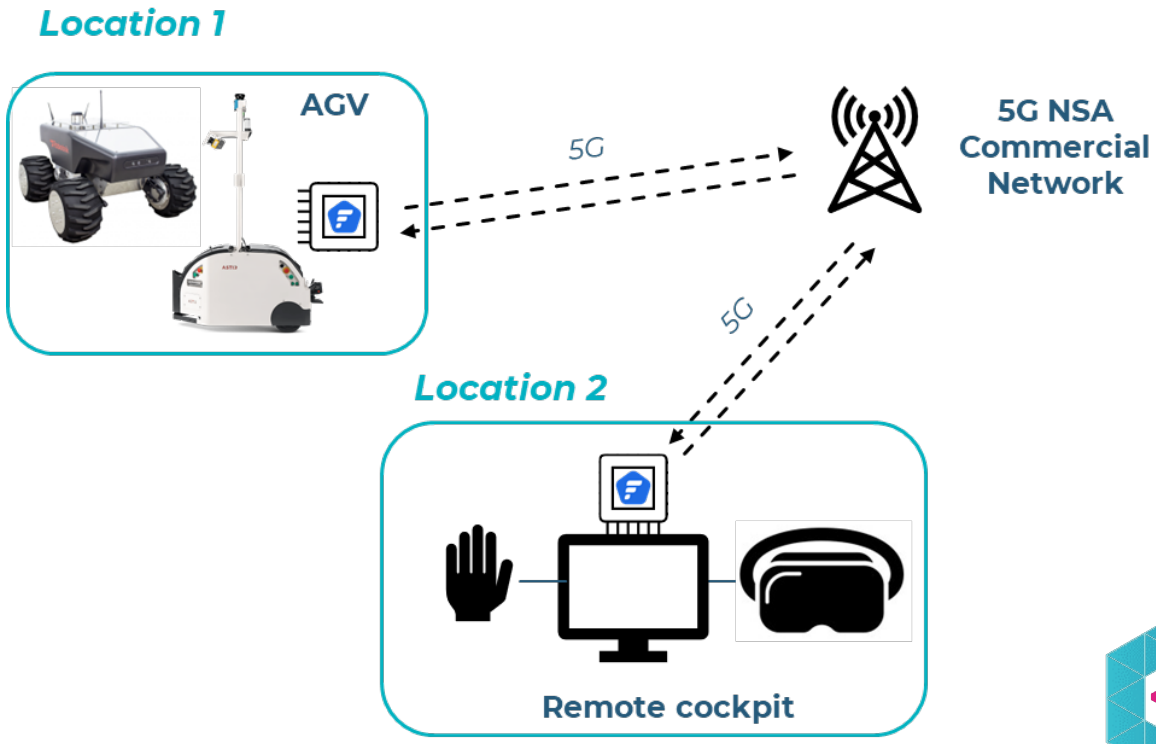
AGV Use Case

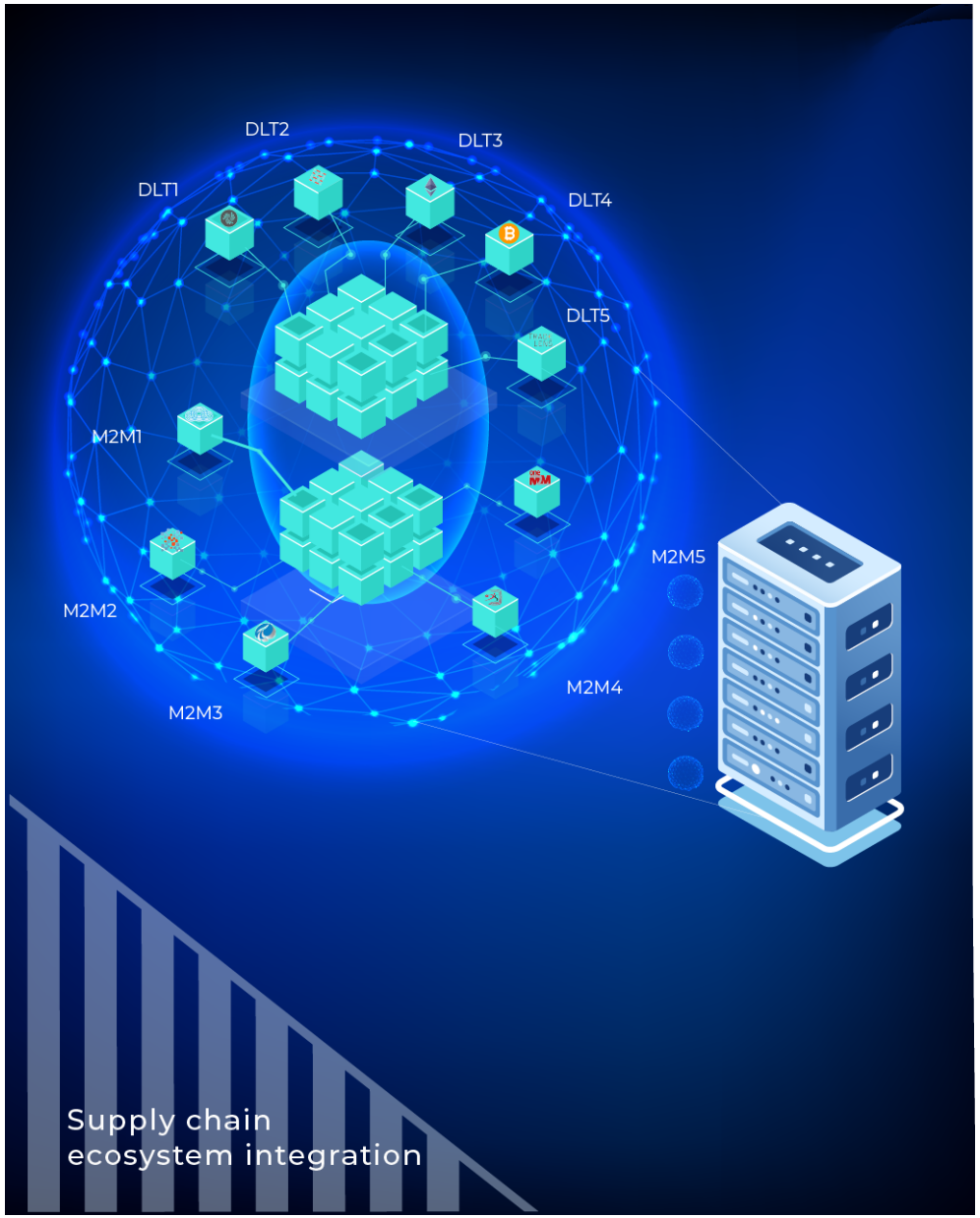
Improve drivers' safety with mixed reality and haptic solutions for remote control of vehicles

- AGVs remotely controlled with 5G and haptic gloves
- Mixed reality for an immersive experience

Network

- 5G mmW network infrastructure

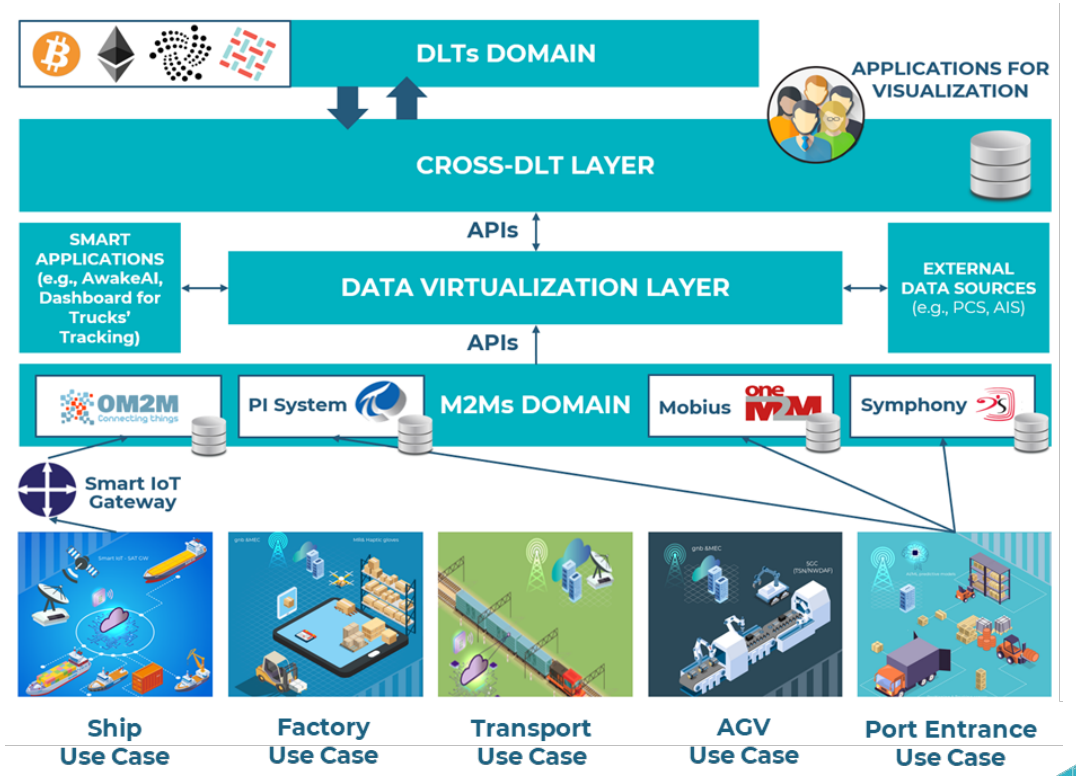




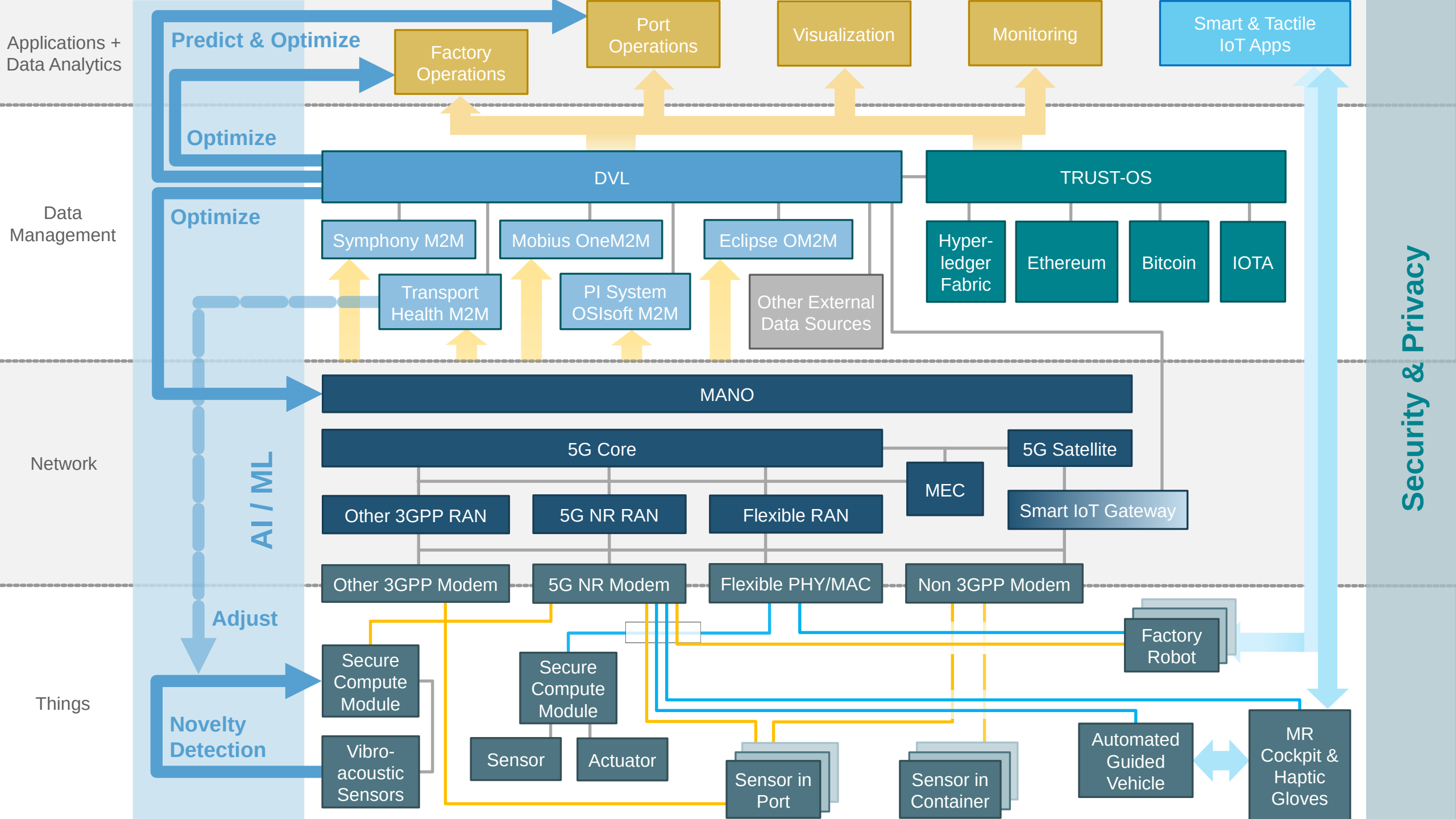
DLT Use Case

Ecosystem Integration for interoperability

- Centralized approach for data access and management
- Heterogeneous M2M platforms as data sources
- Different DLT solutions as targets



INGENIOUS ARCHITECTURE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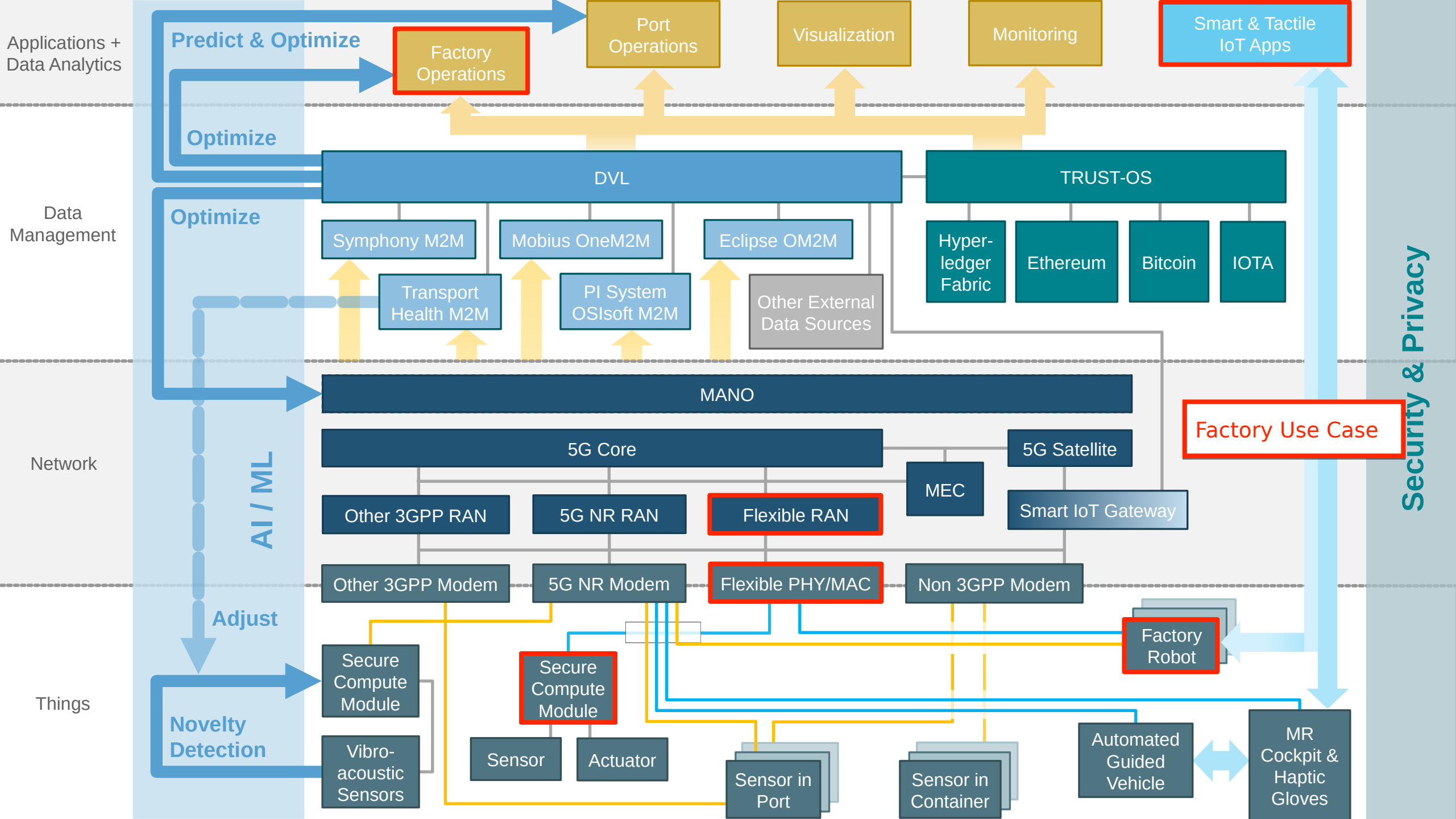
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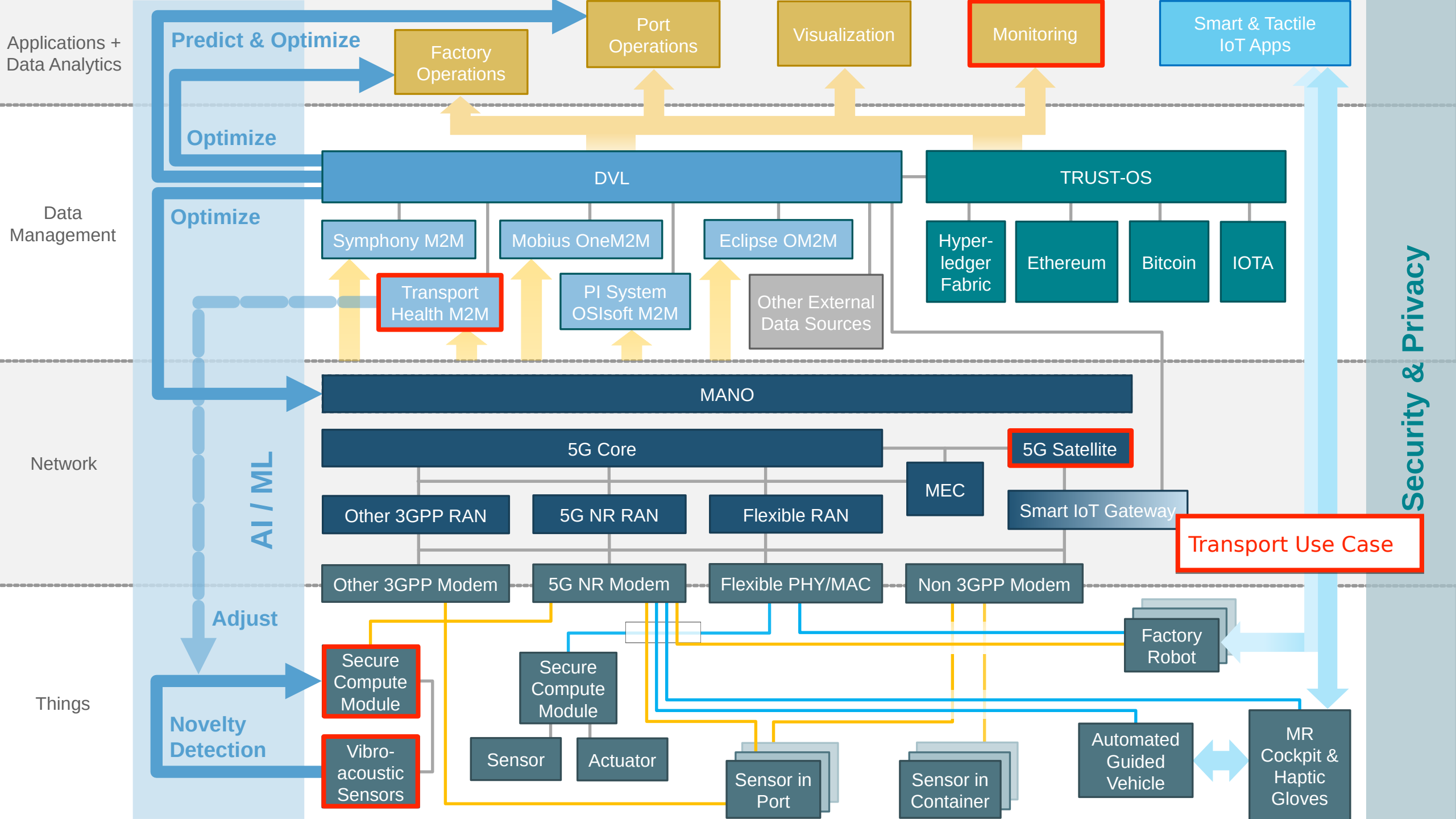
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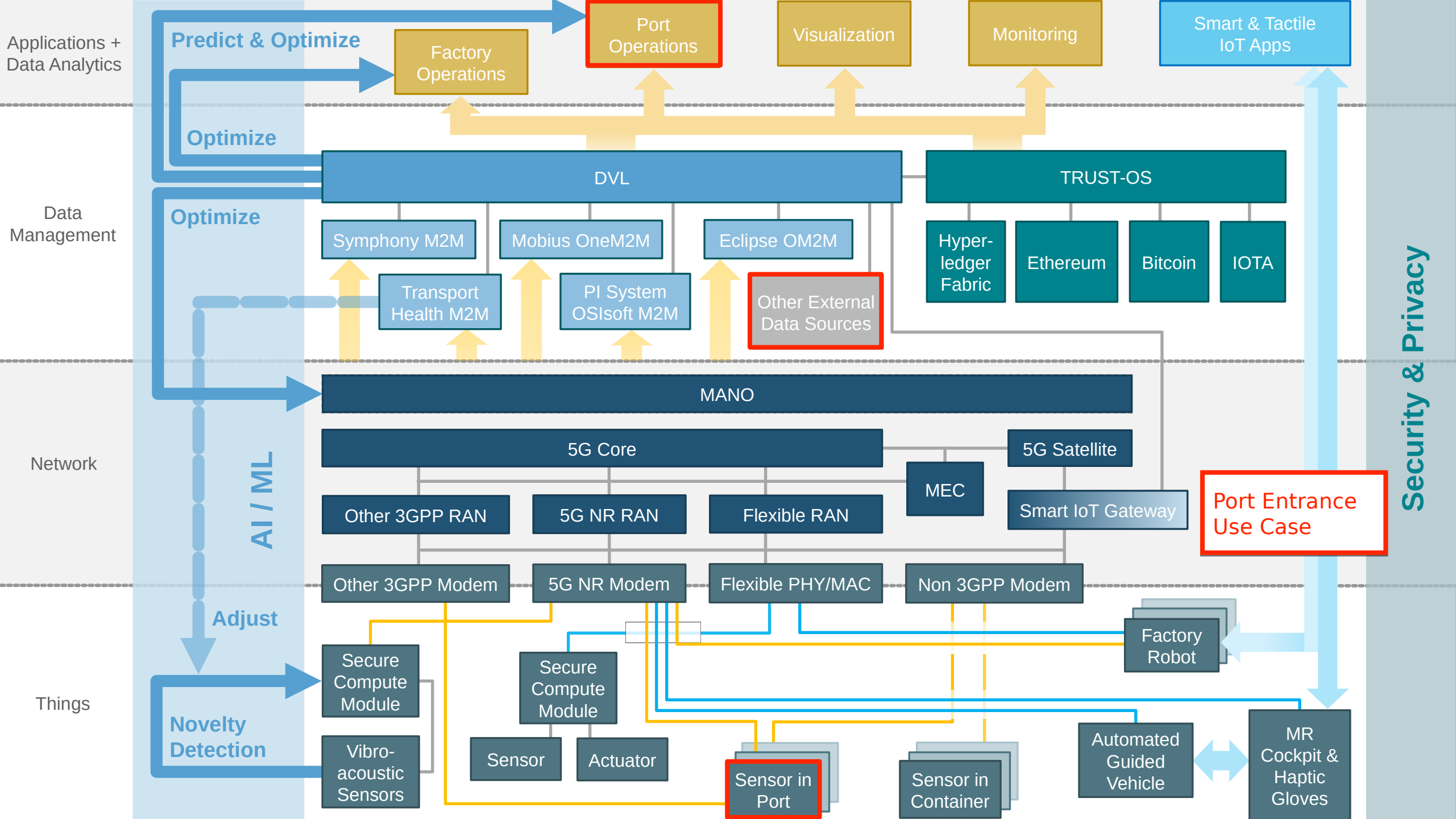
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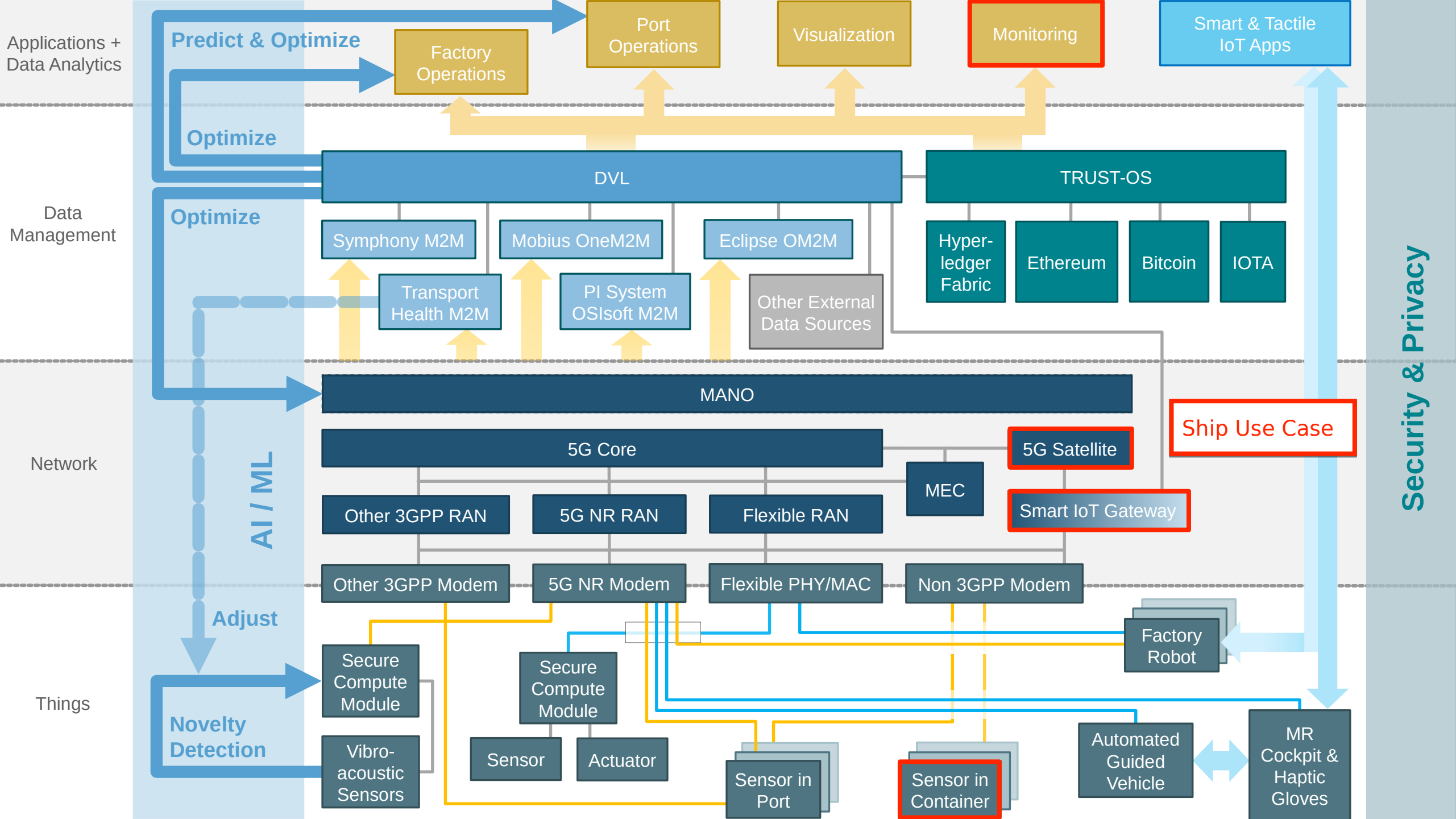
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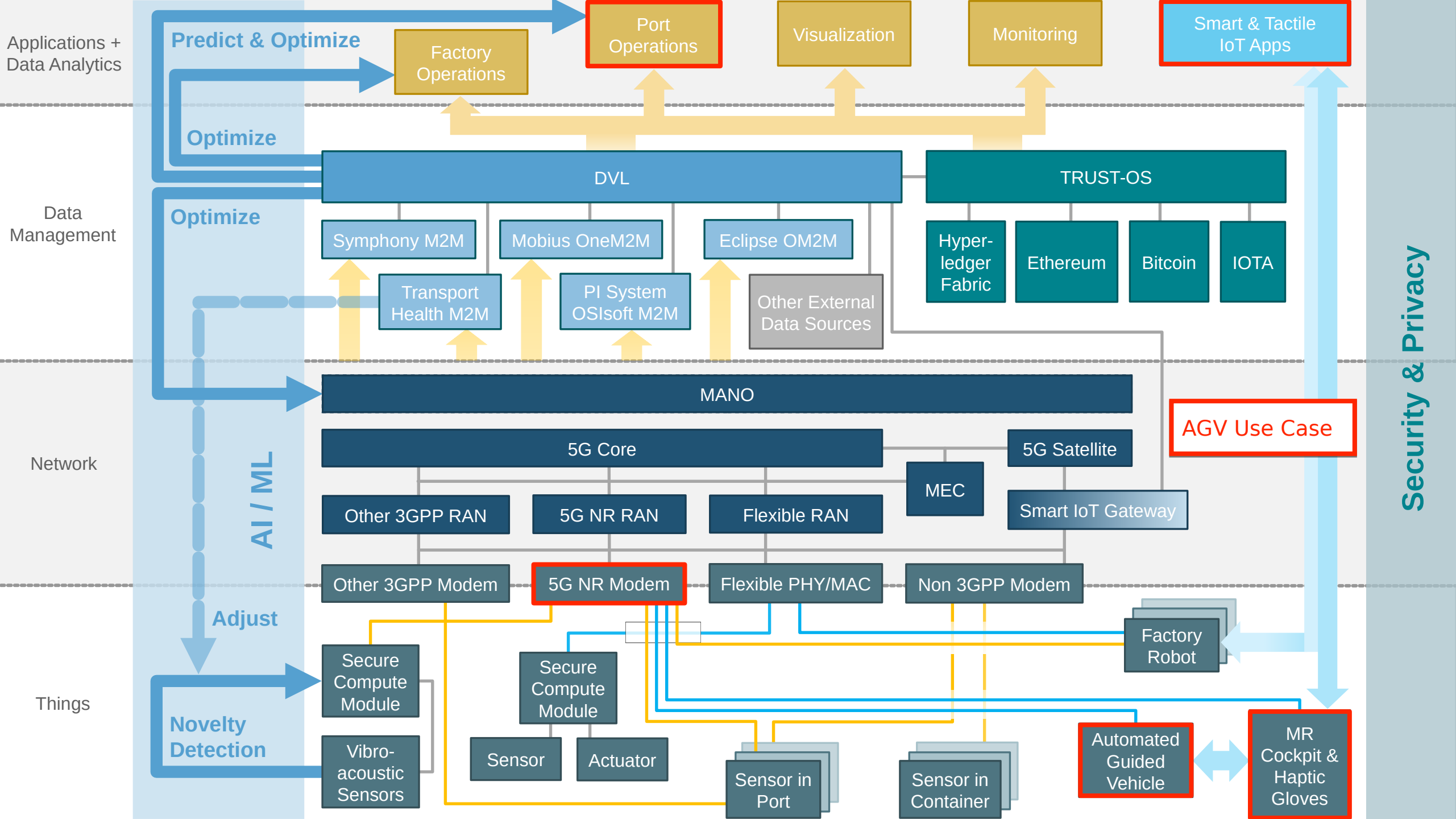
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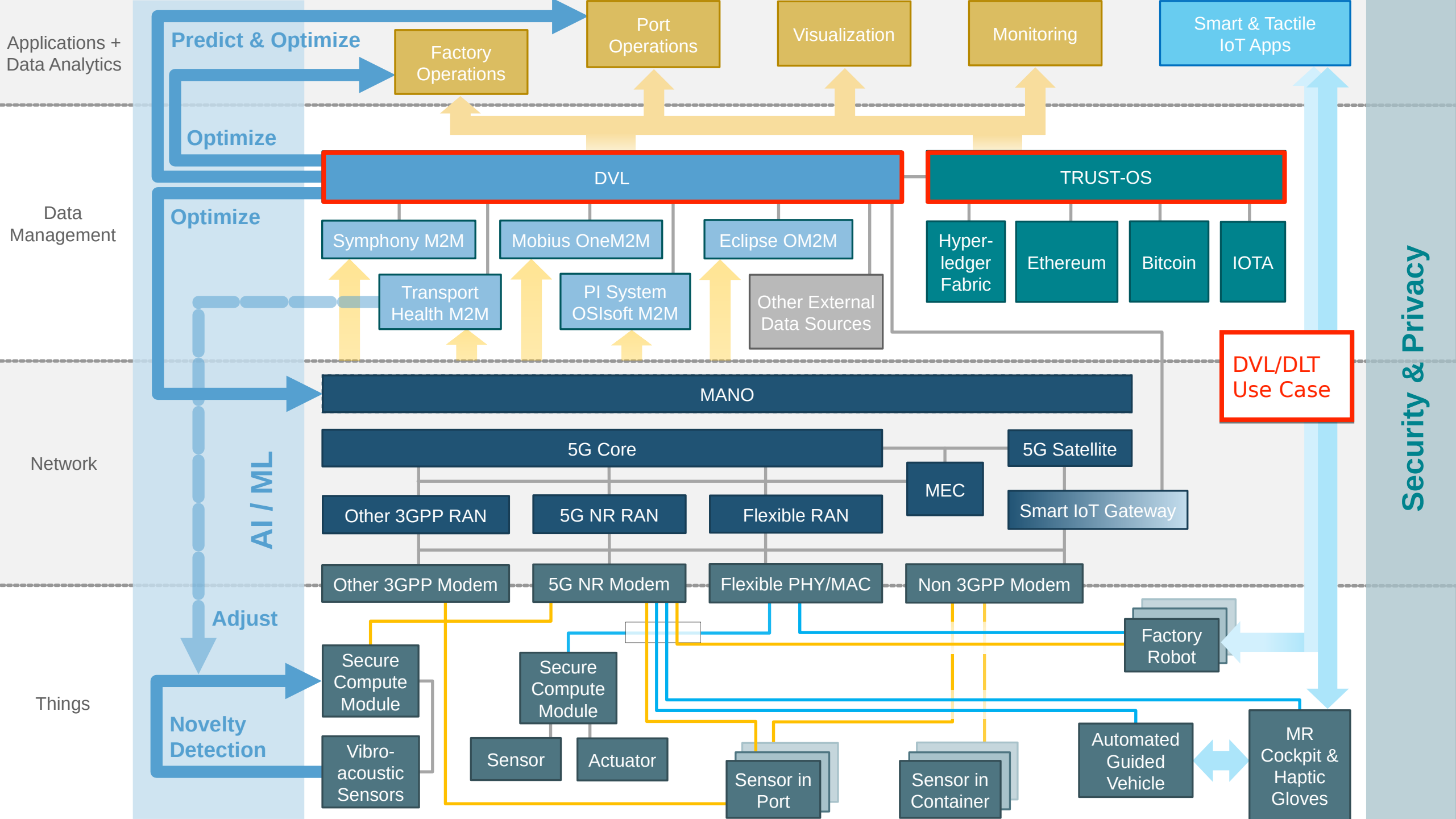
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