

UC-CITIES-1 Connected and Sensing city

Aveiro Testbed

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6G-Path



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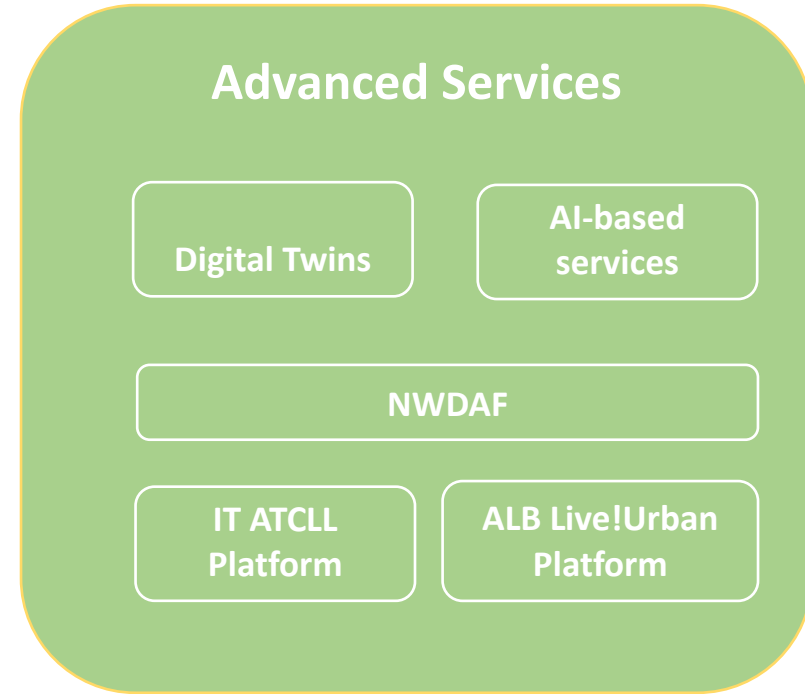
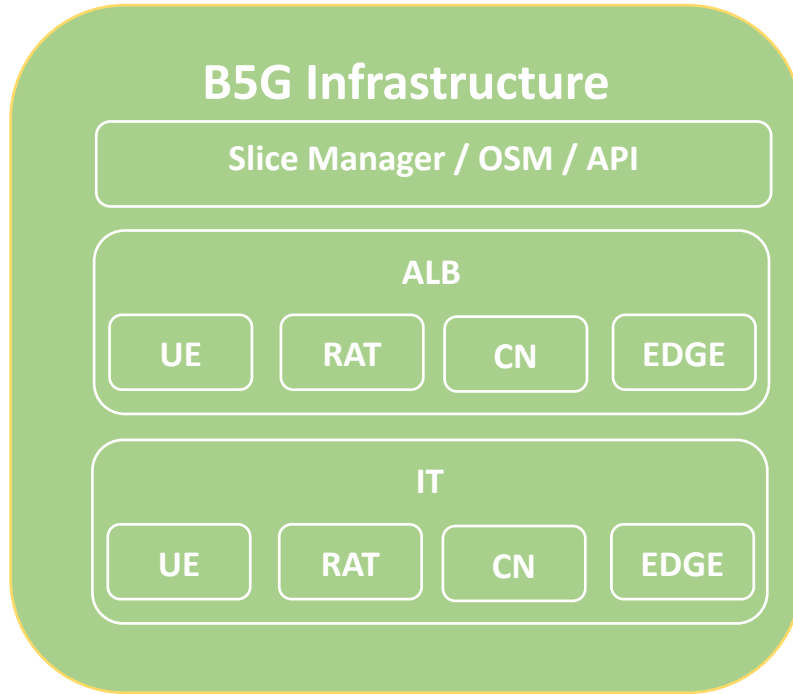
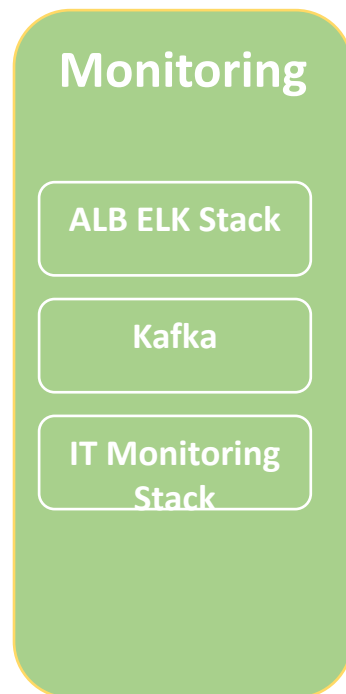
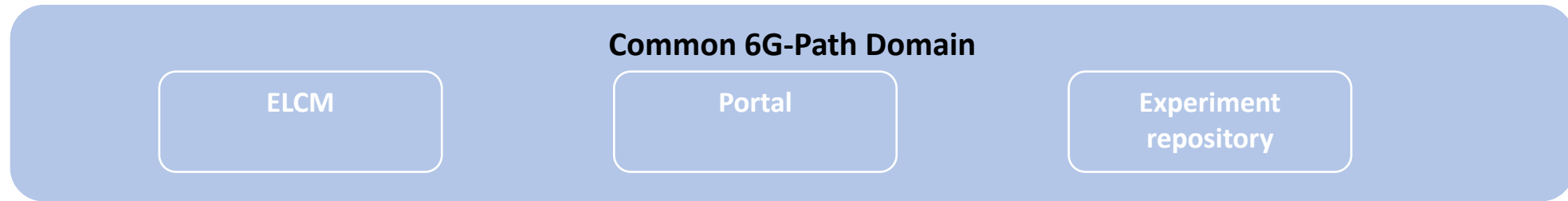
Pilot Description & Validation and Evaluation Target

This use case relies on a **smart city platform**, consisting of different types of vehicles (some of them being autonomous), people, and sensors around the city, such as environmental and mobility sensors (e.g., video cameras, radars, lidars), all being connected and sending real-time information. This platform will serve as base to the subset of scenarios

- In a use case of **high-distribution video on the move**, we consider the scenario where people are travelling around while watching high-quality video. The video coding and video distribution services are proactively orchestrated in the new points of access of the people before they arrive, so no video disruption is foreseen. The data of the vehicles, people, of the mobility and network will give information on the prediction of both mobility and network quality, providing a prediction of the needs of the services, in terms of quality and location, to travel with their users.
- In a use case of **traffic avoidance**, we consider the scenario of a city digital twin facilitating simulations of the traffic helping making decisions based on real time information and simulated events presenting data in 2D and 3D formats.
- In a use case of **enhanced city services**, AI is used to provide better services to citizens, such as detecting stolen cars, badly parked vehicles, cars parked in the carriageway, and control of shared areas, to improve the quality of life in the urban spaces. This use case will also include specific services to attend emergency scenarios (eg. ambulances).

The use cases are supported by IT and ALB joint testbed at Aveiro city.

Pilot Description & Validation and Evaluation Target

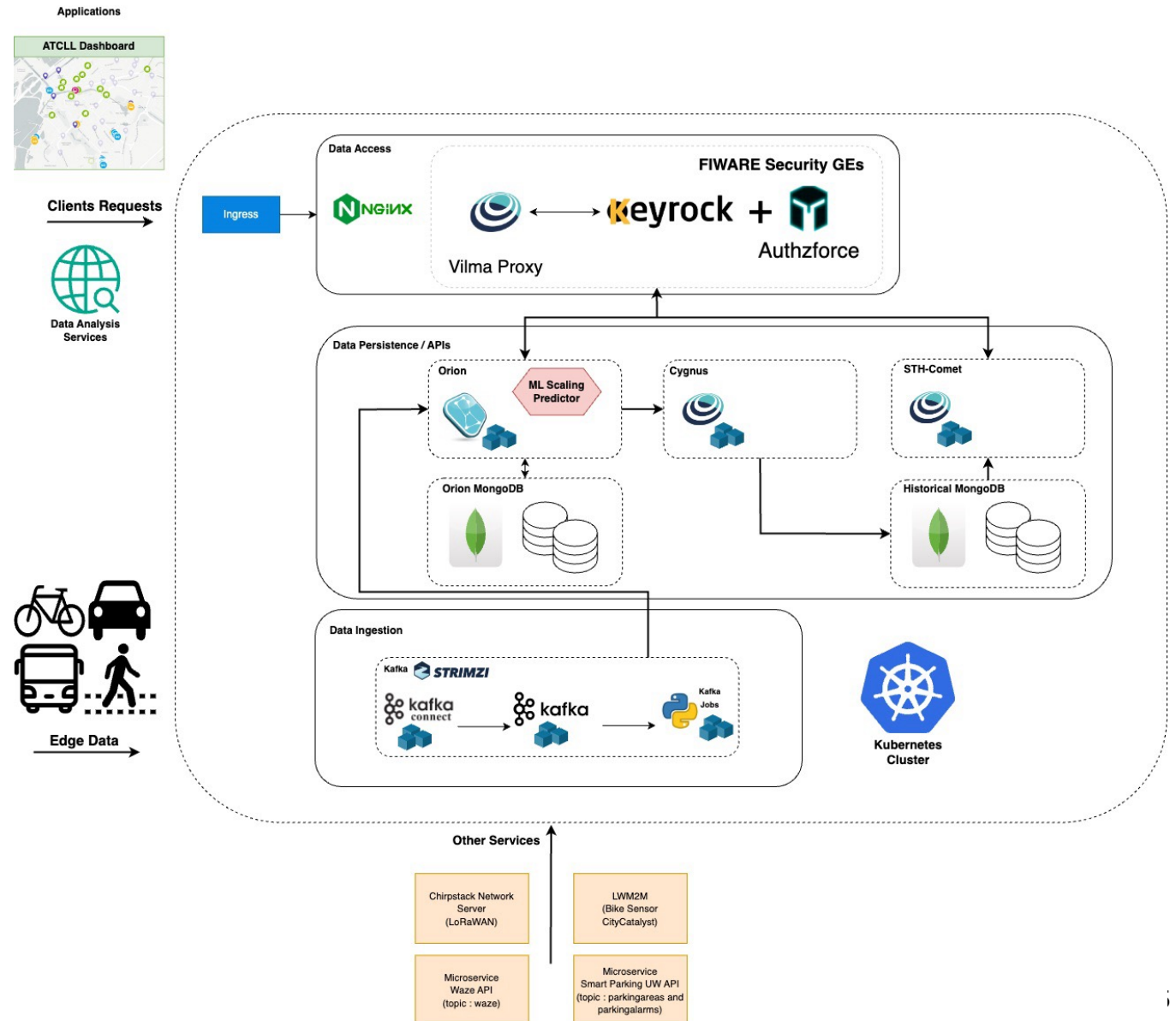


Utilization of 6G Advanced Features (IT)



IT - Data platform

- Smart data models (NGSIv2)
- Third-parties access to mobility and environment data
 - Orion (context broker)
 - API (historical data)
- Scalable platform to support edge data and third-party data sources
- Kubernetes-based
- Monitoring, predictors and operators for auto-scaling of replicas for the different services
 - Kafka, Orion, MongoDB, ...

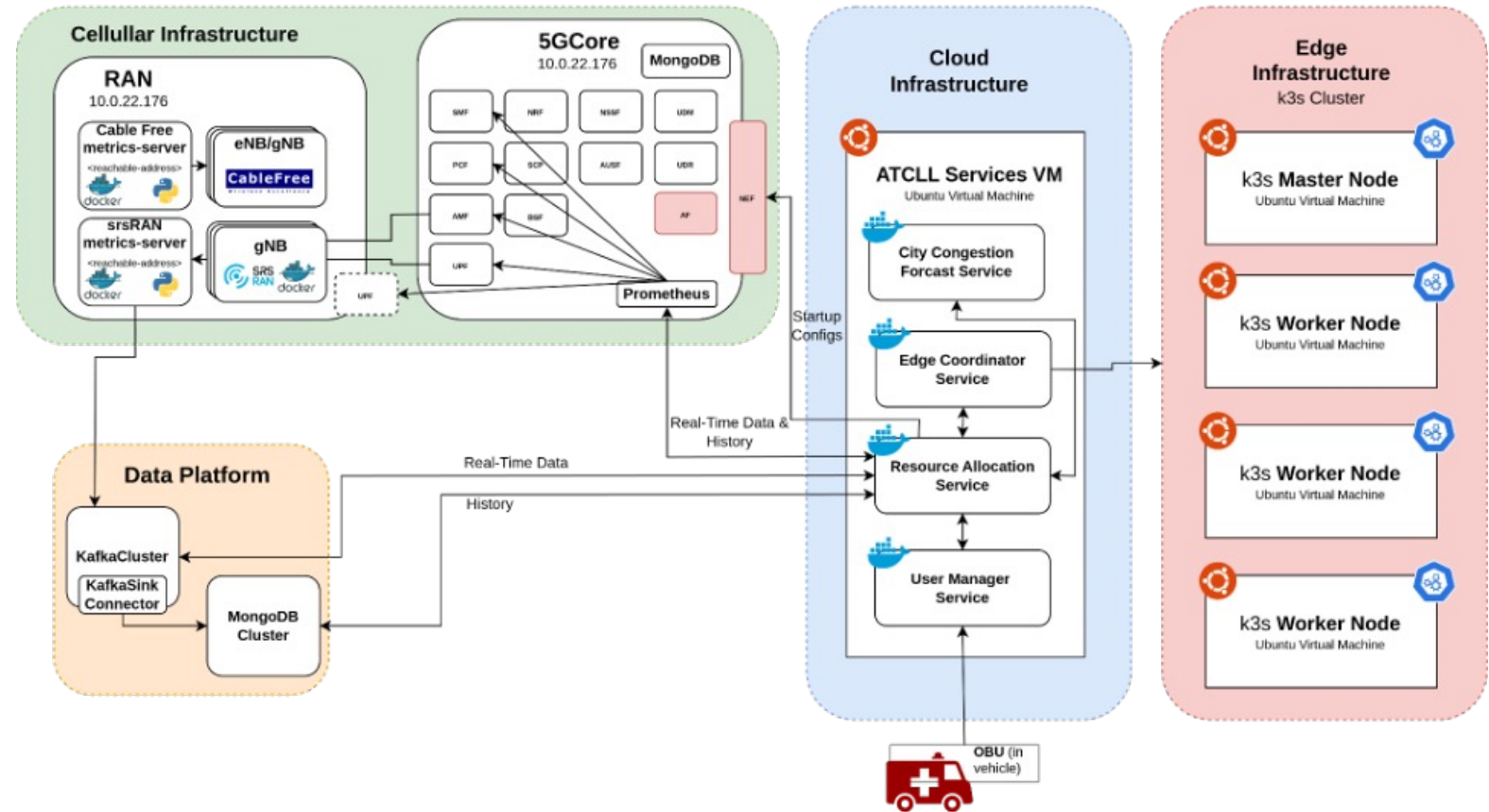




Utilization of 6G Advanced Features (IT)

IT - RAN and 5G Core metrics

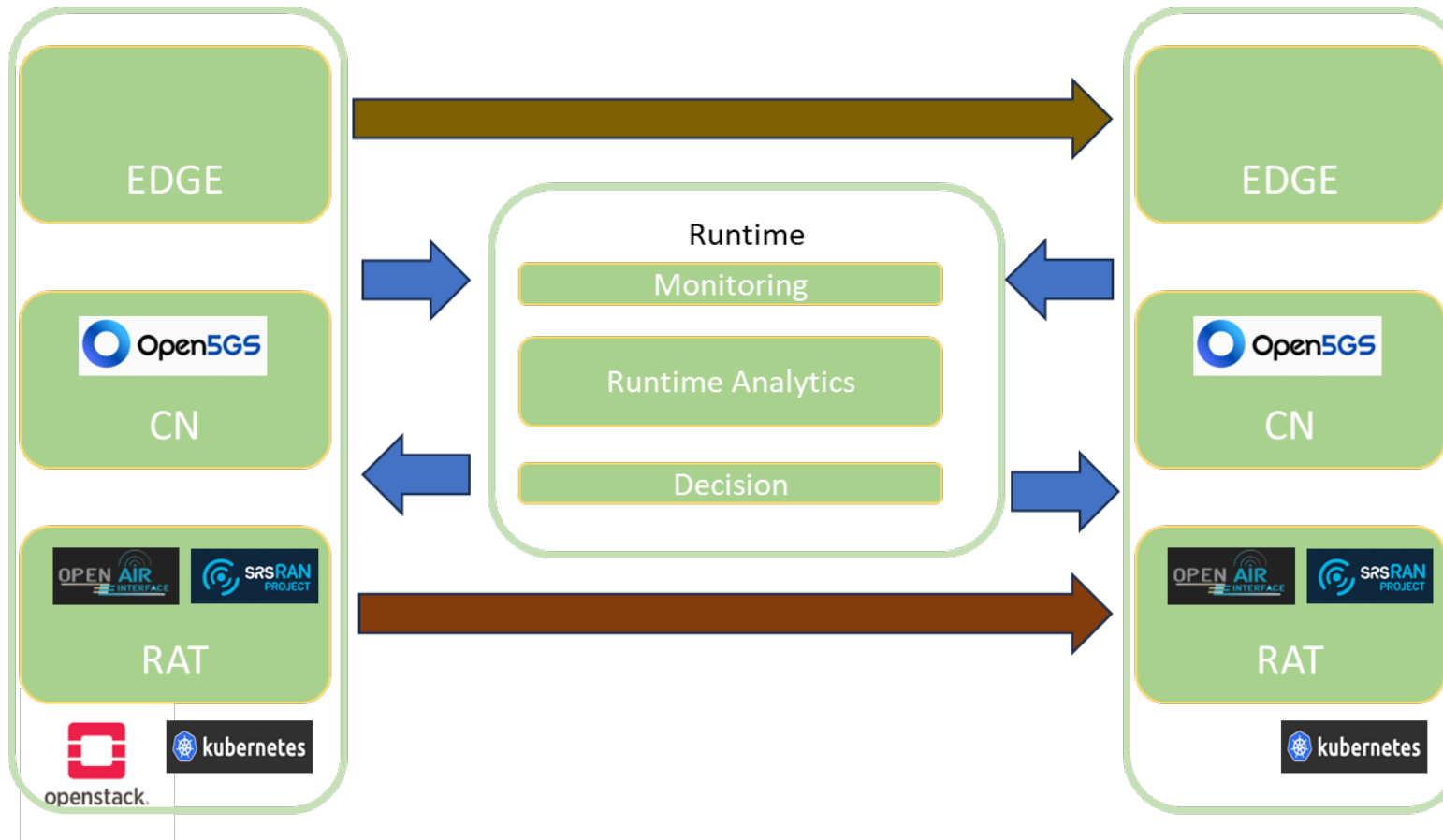
- Multiple technologies associated with 5G systems
 - Multiple RAN technologies, different formats for the same data
 - 5G performance status data can help improving the performance of these platforms
- IT Cellular Infrastructure
 - Open 5GS
 - srsRAN and CableFree
- Core metrics
 - Default Prometheus server that contains default metrics from various core functions



Pilot Planned Setups & Roadmap



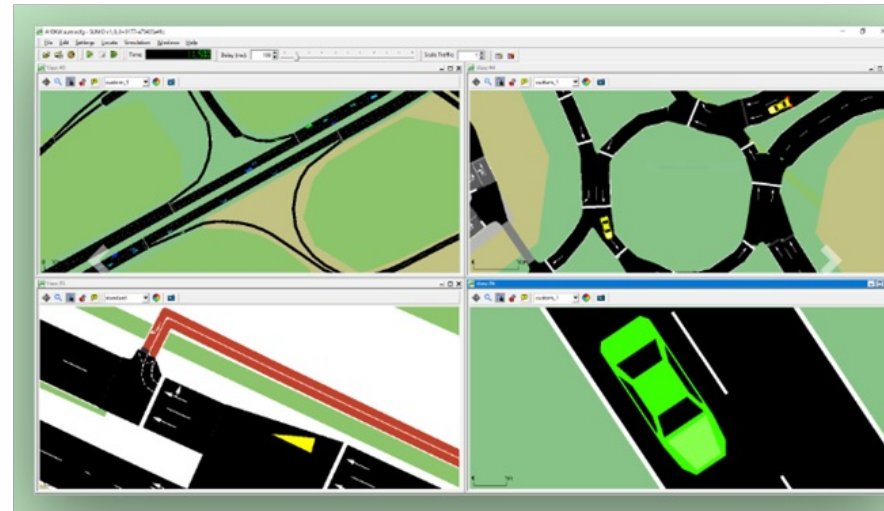
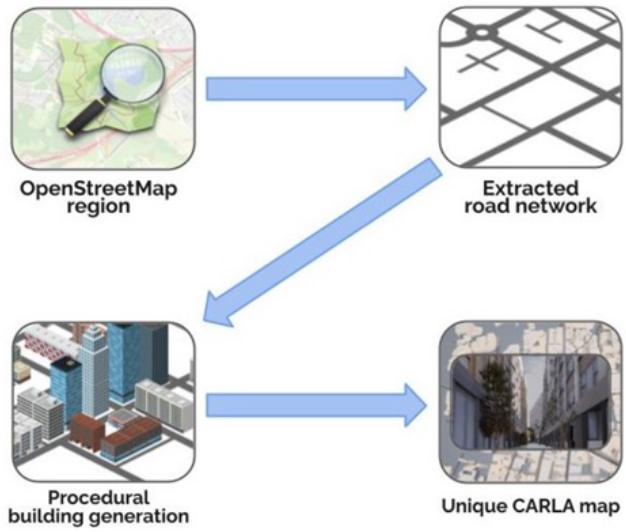
Use case High-distribution video on the move



- Dynamic Exchange of intra network slices
- Developing ML algorithms to support intra and inter network and edge handovers
- Developing control plane signalling to ensure a smooth transition
- **Roaming between private and public networks (IT and ALB 5G cores)**

Pilot Planned Setups & Roadmap

Use case Traffic avoidance: digital twin

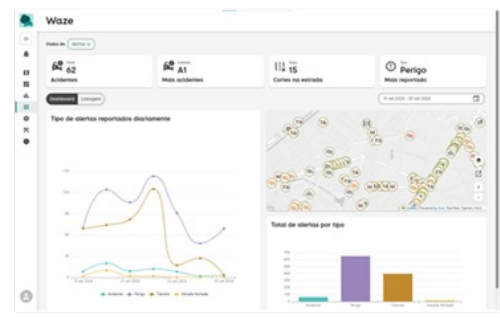
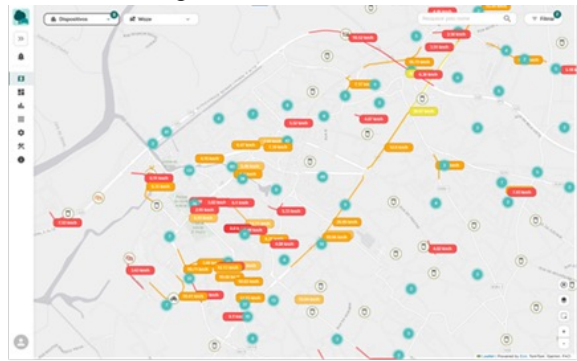


- CARLA and SUMO (Simulation of Urban Mobility) integration
- Integration of real-time information with simulated data
- Developing algorithms to avoid traffic supported by city and network data information

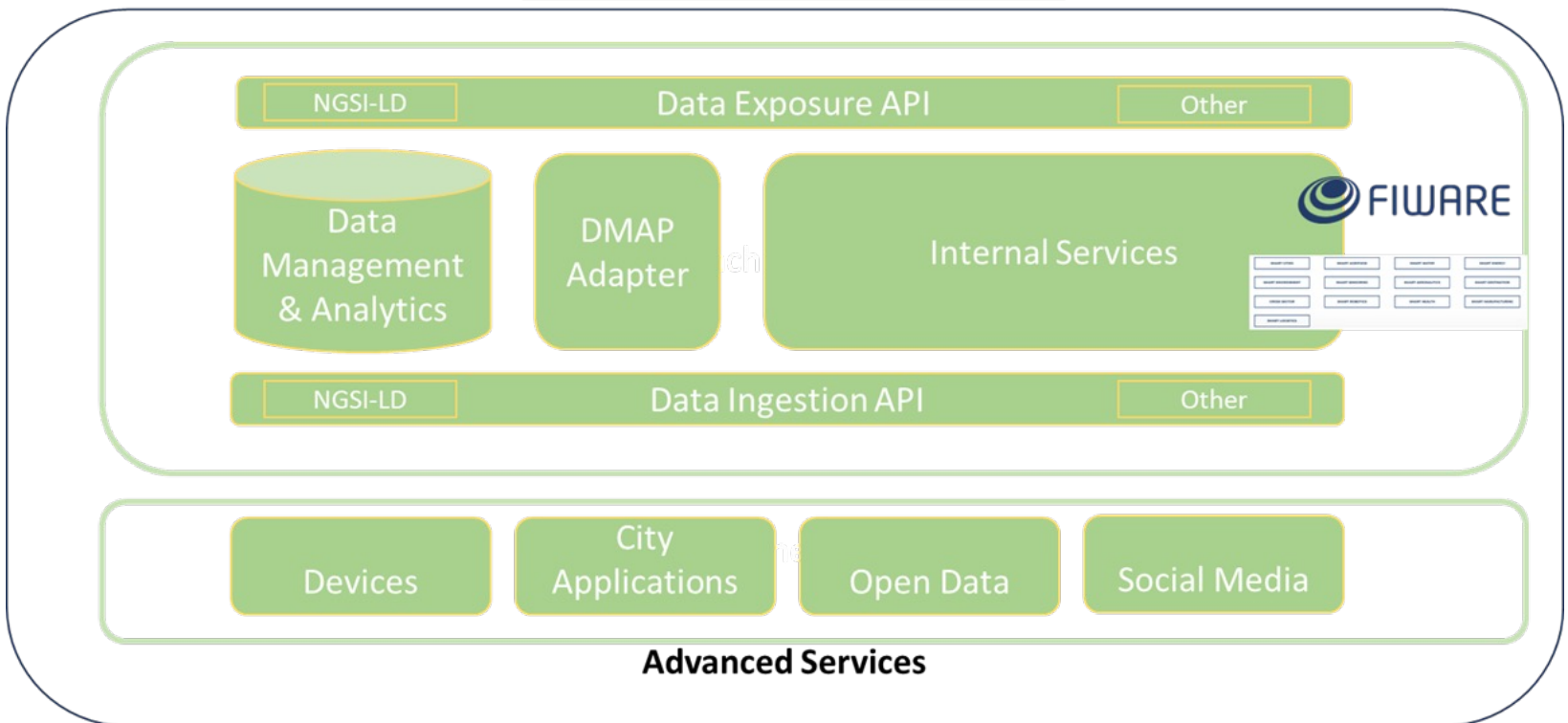


Pilot Planned Setups & Roadmap

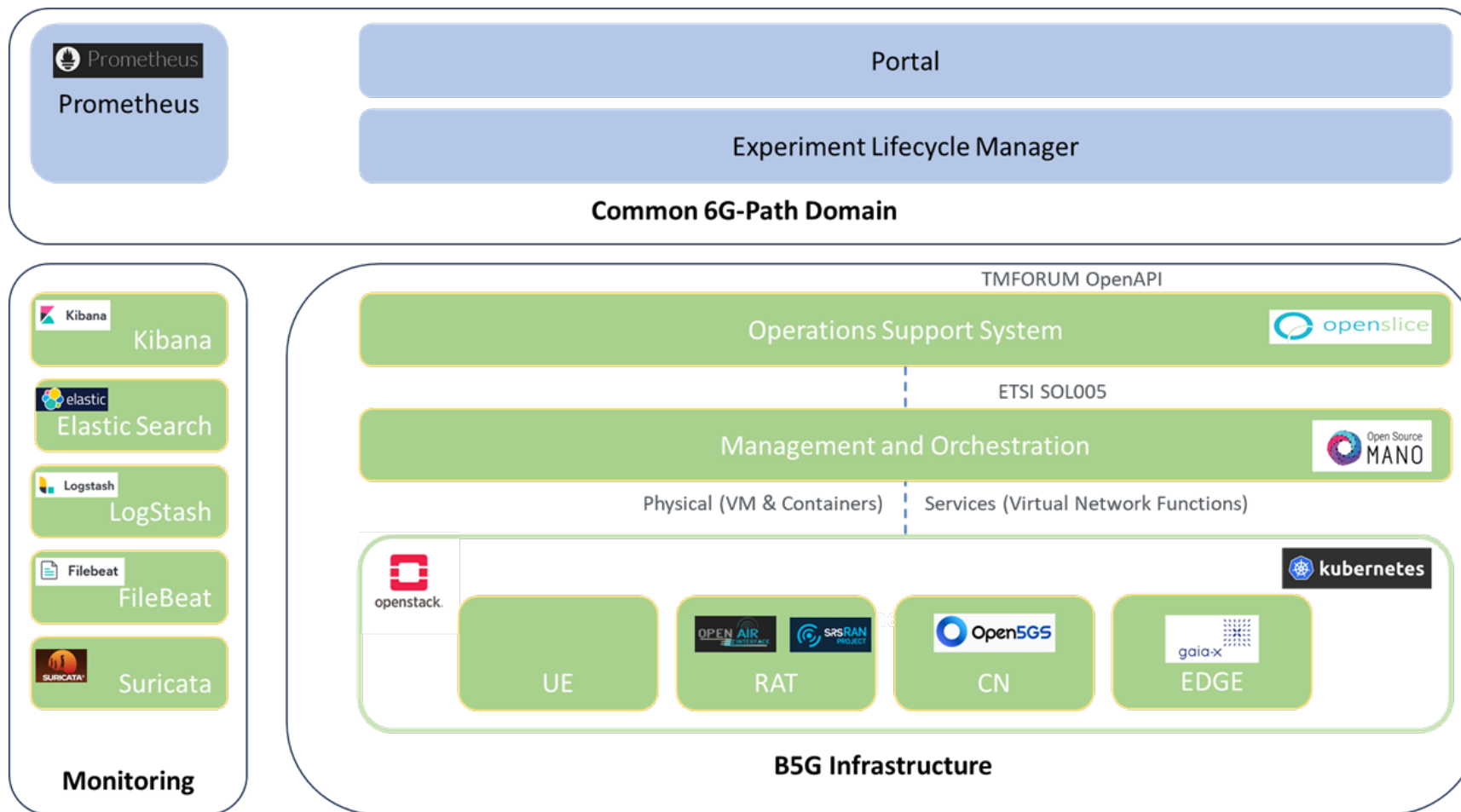
Use case Enhanced city services



- Setting up Gaia-X framework:
 - Gaia-X “enables a federated and secure data infrastructure
- Adding new Verticals:
 - AI-based services to detect city objects and events
 - Smart data models (FIWARE)
 - Emergency situations with special services



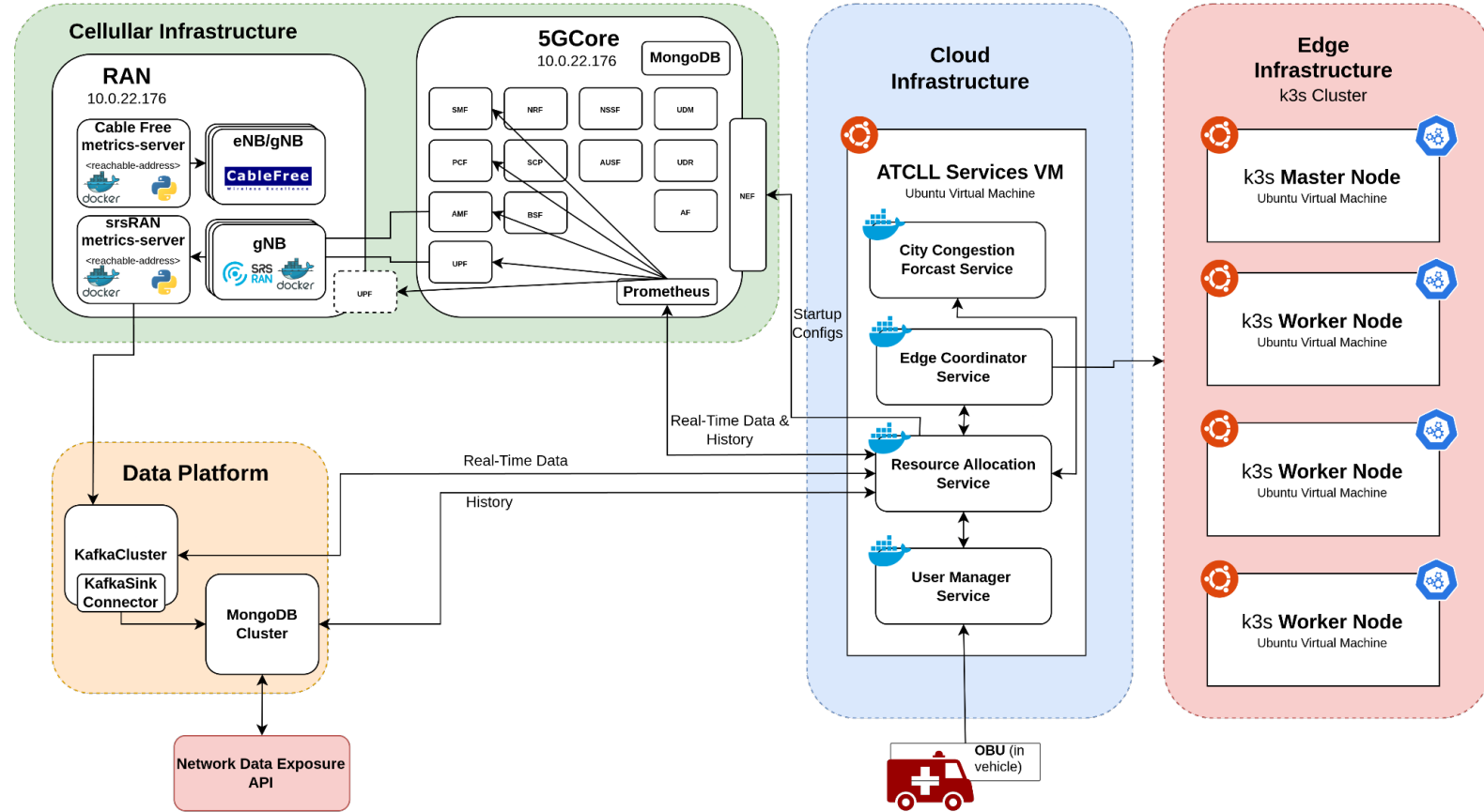
Use Case Development



Development and Extensions

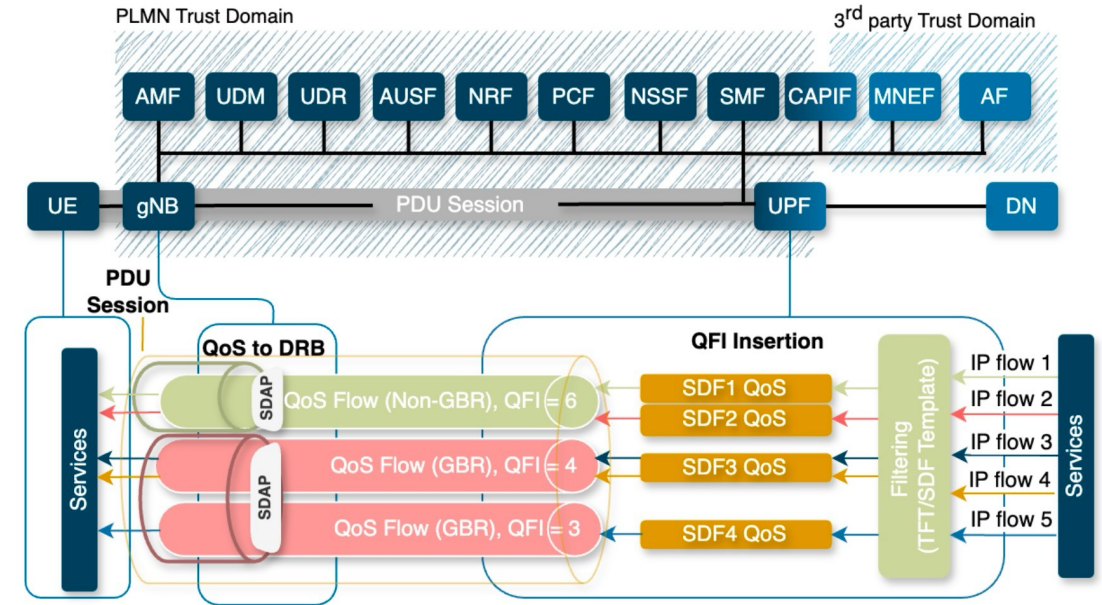
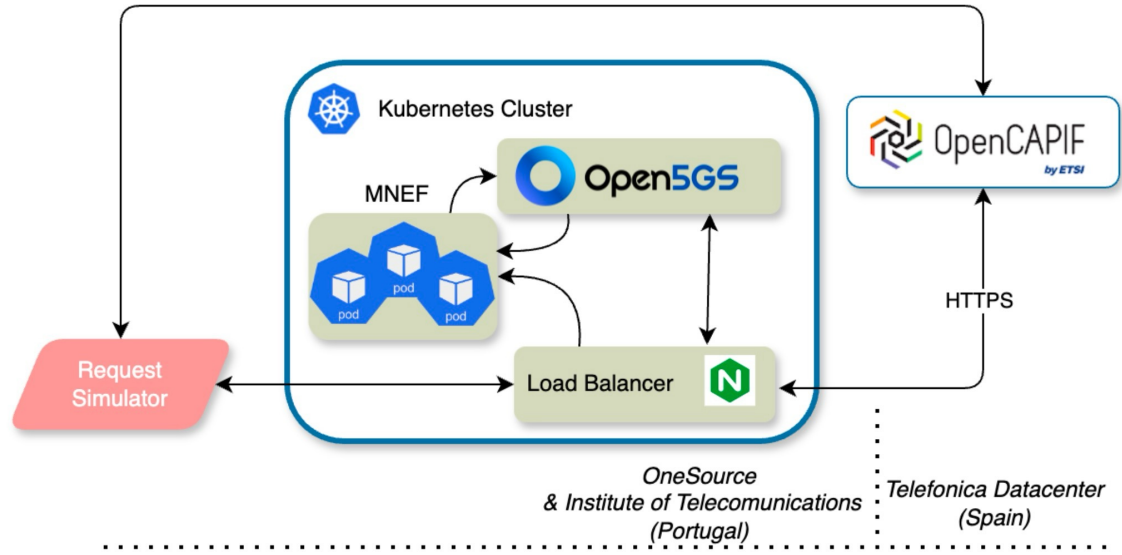
RAN and 5G Core metrics

- Examples of RAN metrics available
 - Uplink and Downlink bitrate, error rate, available transmission channels, etc
 - Number of UEs, channel quality indicator, transmission schemes, etc
- Core metrics available
 - Event control counters of the main core functions
- Ongoing work
 - A uniform data model for network data independent of the RAN technology
 - An API to expose historical network data to third-party entities
 - **Integration with FIWARE Security Layer by Odins**



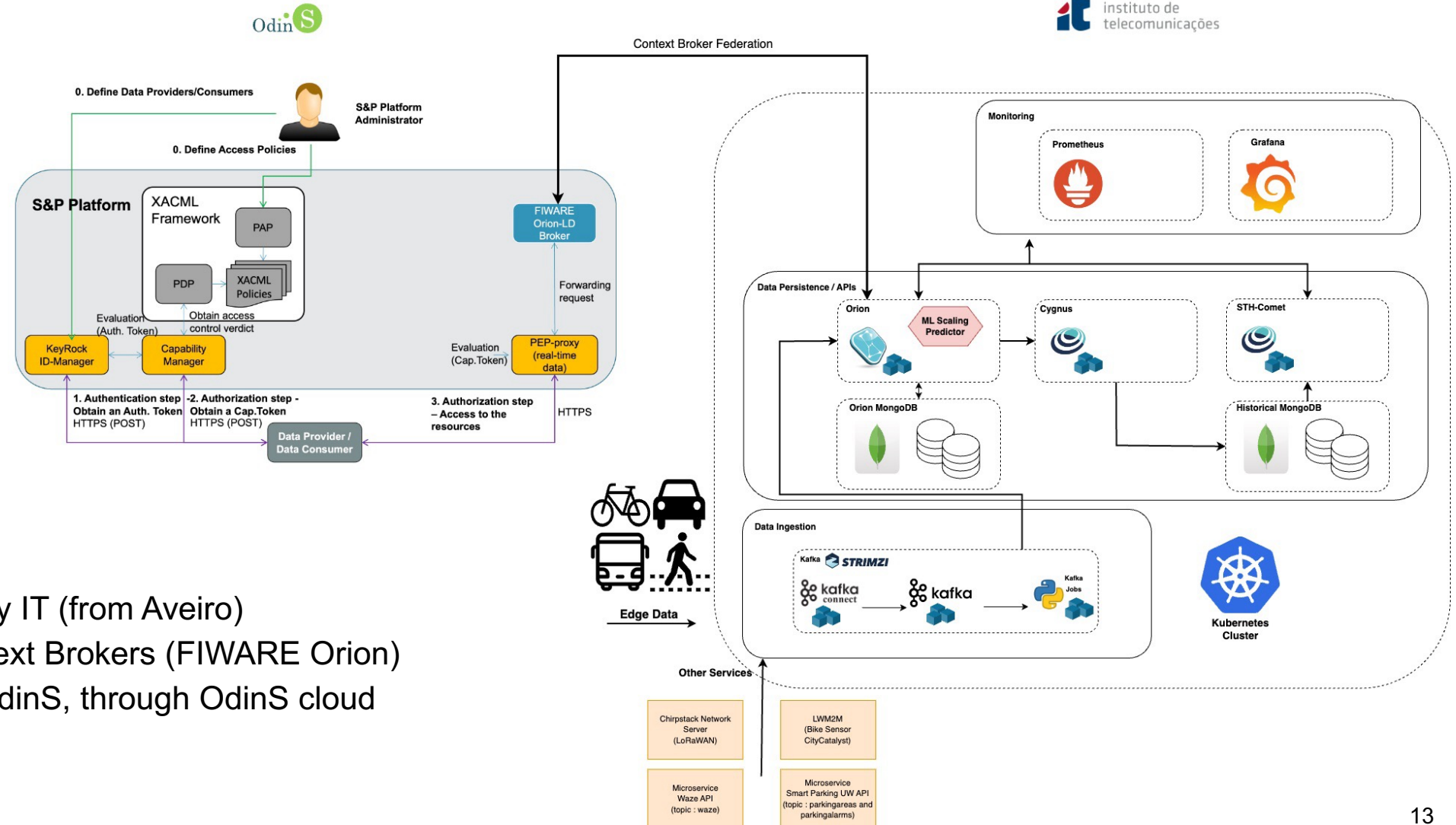
Development and Extensions

Integration with OneSource (NEF) and Telefonica (OpenCAPIF)



- Integration of the **The Microservice and Event-driven Network Exposure Function (MNEF)** by OneSource with Open5GS deployed by IT and Altice Labs in the Aveiro Testbed.
- **Interaction with OpenCAPIF:** MNEF leverages OpenCAPIF by Telefonica to expose Network Exposure Function (NEF) APIs, ensuring secure and protected data transactions.

Integration with OdinS Security Layer



- Dataset provided by IT (from Aveiro)
- Federation of Context Brokers (FIWARE Orion)
- Security layer by OdinS, through OdinS cloud