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## Motivation

In the context of CAM and the automotive sector, where seamless communication, rapid decision-making, and robust reliability are critical ENVELOPE bridges the gap between 5G network capabilities and automotive application demands, enabling service-level programmability and real-world testing.

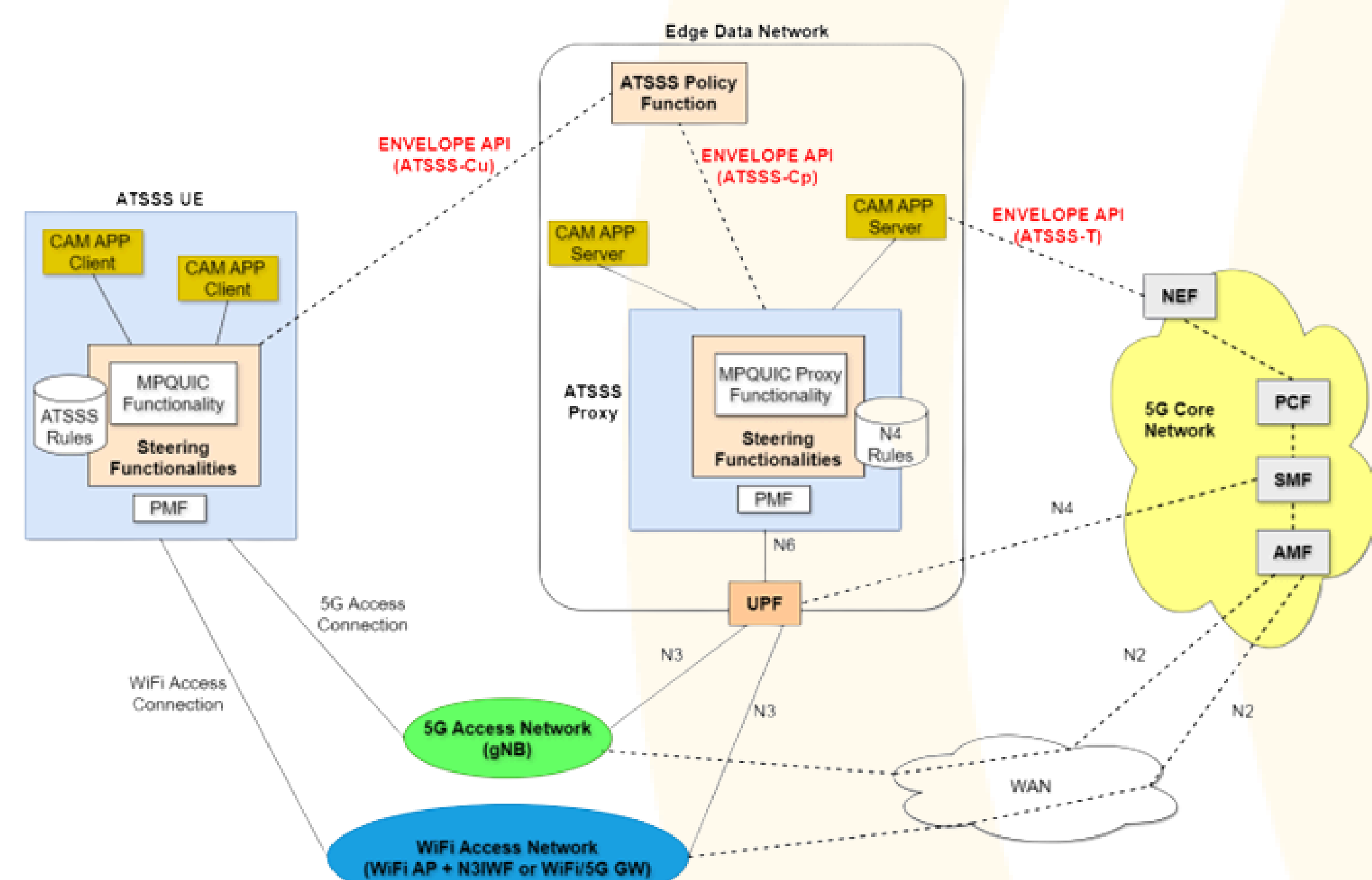
Key Challenges:

- Aligning fast-evolving B5G features with automotive workflows
- Few large-scale trials exist to prove feasibility and performance

With the global telecom API market on the rise, ENVELOPE demonstrates how 5G exposure can power next-generation CAM services.

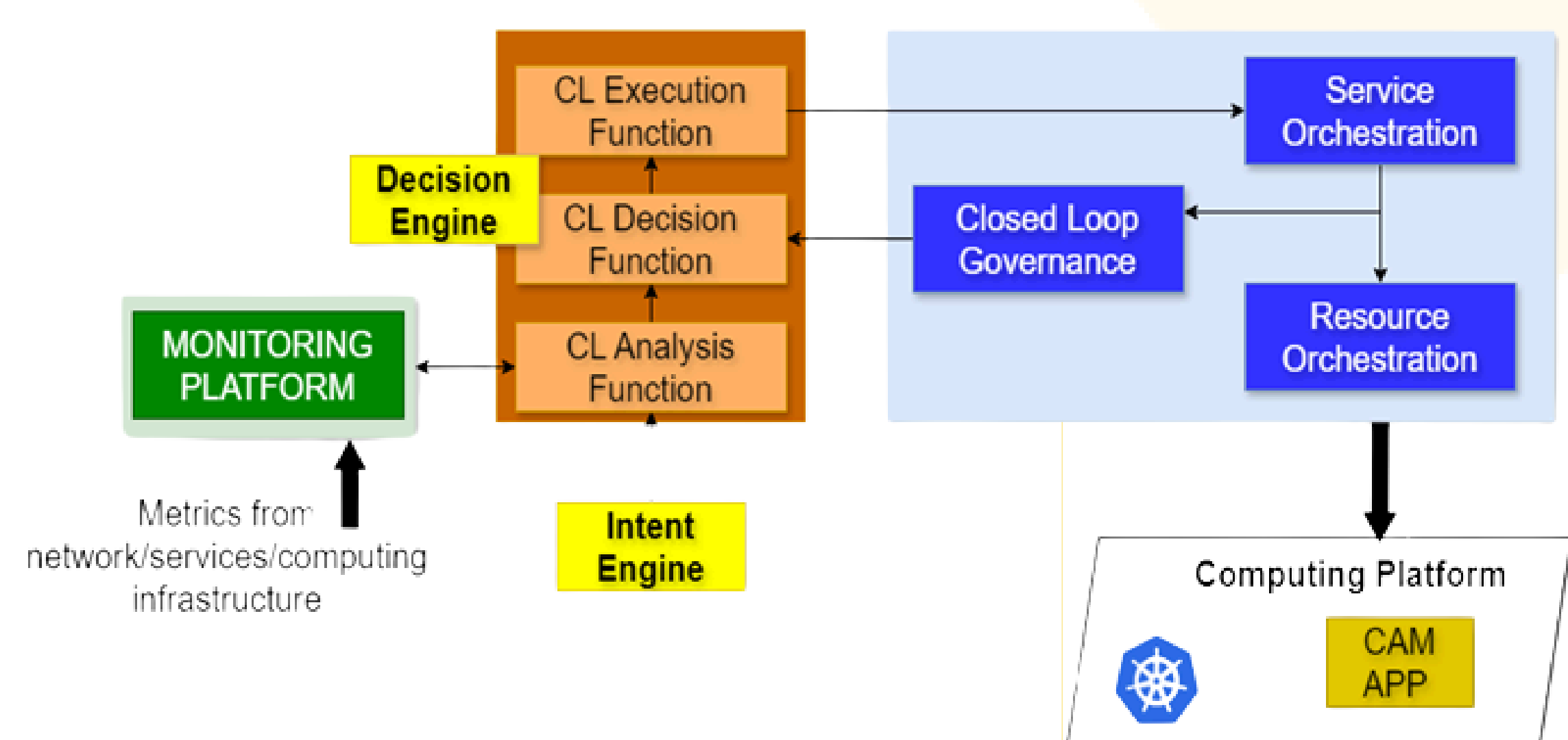
## Multi-Connectivity (ATSSS)

The ATSSS enabler introduces an over-the-top “ATSSS proxy” at the network edge that uses real-time conditions and reinforcement-learning decision logic to dynamically steer, switch, and split traffic across multiple transport paths (e.g., 5G and Wi-Fi). Vertical applications can invoke the ATSSS-T API to request multi-connectivity services, while ATSSS-Cu and ATSSS-Cp APIs allow them to retrieve tailored traffic-steering rules for user equipment and edge proxies, respectively.



## Zero Touch Management

Through an intent-based engine paired with reinforcement-learning decision agents, Zero-Touch Management translates high-level operational intents into precise network configurations without manual intervention. This framework continuously fine-tunes parameters to meet application-specific requirements, minimizing overhead and driving self-optimizing network behavior

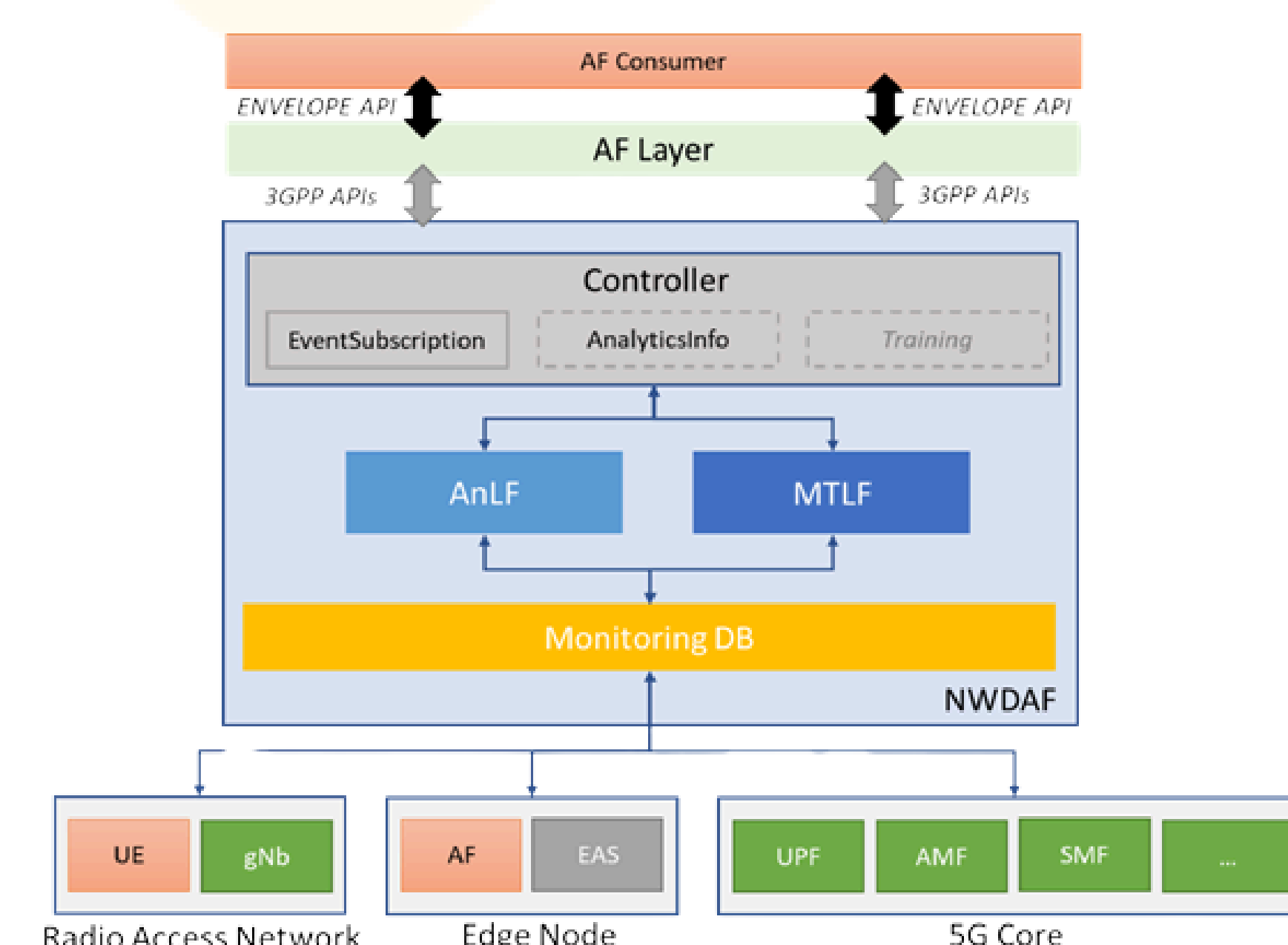


## ENVELOPE APIs for CAM

ENVELOPE API for CAM	Description
Quality on Demand (QoD)	Dynamic change of QoS profile for QoS flows of specified devices (based on port range, IP range).
Device Location (geofencing)	Geofenced event-based notification for mobility of specified devices (location reporting of cell-level events).
Performance Metrics (NWDAF)	Subscription of periodic performance metrics (e.g., throughput).
Predictive QoS (Connectivity Insights)	Prediction of throughput performance for specified devices on a cell level, using historical and live data.
Edge Cloud	Discovery and instantiation of services based on requirements for specified devices, plus traffic re-routing to the new edge.
MEC Handover	Management of application handovers between edge servers to maintain session continuity.
MEC Federation	Management of edge-server applications when UEs belong to different MNO networks
Multi-Connectivity (ATSSS)	Dynamic steering, switching, and splitting of traffic across 5G and other paths via the ATSSS-T API; ATSSS-Cu and ATSSS-Cp APIs let apps fetch tailored traffic-steering rules for UEs and edge proxies.
Zero-Touch Management	Intent-based engine with reinforcement-learning agents that translate high-level intents into automated network configurations and continuously fine-tune parameters to meet application requirements.

## Predictive Quality of Service

PQoS leverages both historical and live network measurements, feeding them into an Analytics Logical Function and a Model Training Logical Function to forecast imminent QoS changes. Applications subscribe to these forecasts via the PQoS-I API and can tune model parameters or training behaviors through the PQoS-T API, enabling proactive adaptation before performance degrades



## CAM Use Cases

### THE NETHERLANDS

- UC 1: PERIODIC VEHICLE DATA COLLECTION FOR IMPROVING DIGITAL TWIN (DT)
- UC 2: VEHICLE TESTING WITH MIXED REALITY
- UC 3: TELE-OPERATED DRIVING AIDED BY DIGITAL TWINS

### ITALY

- UC 1: ADVANCED IN-SERVICE REPORTING FOR AUTOMATED DRIVING VEHICLES
- UC 2: DYNAMIC COLLABORATIVE MAPPING FOR AUTOMATED DRIVING

### GREECE

- UC 1: MEC HANDOVER ACROSS MNOs