5G-DIVE

EDGE INTELLIGENCE FOR VERTICAL EXPERIMENTATION

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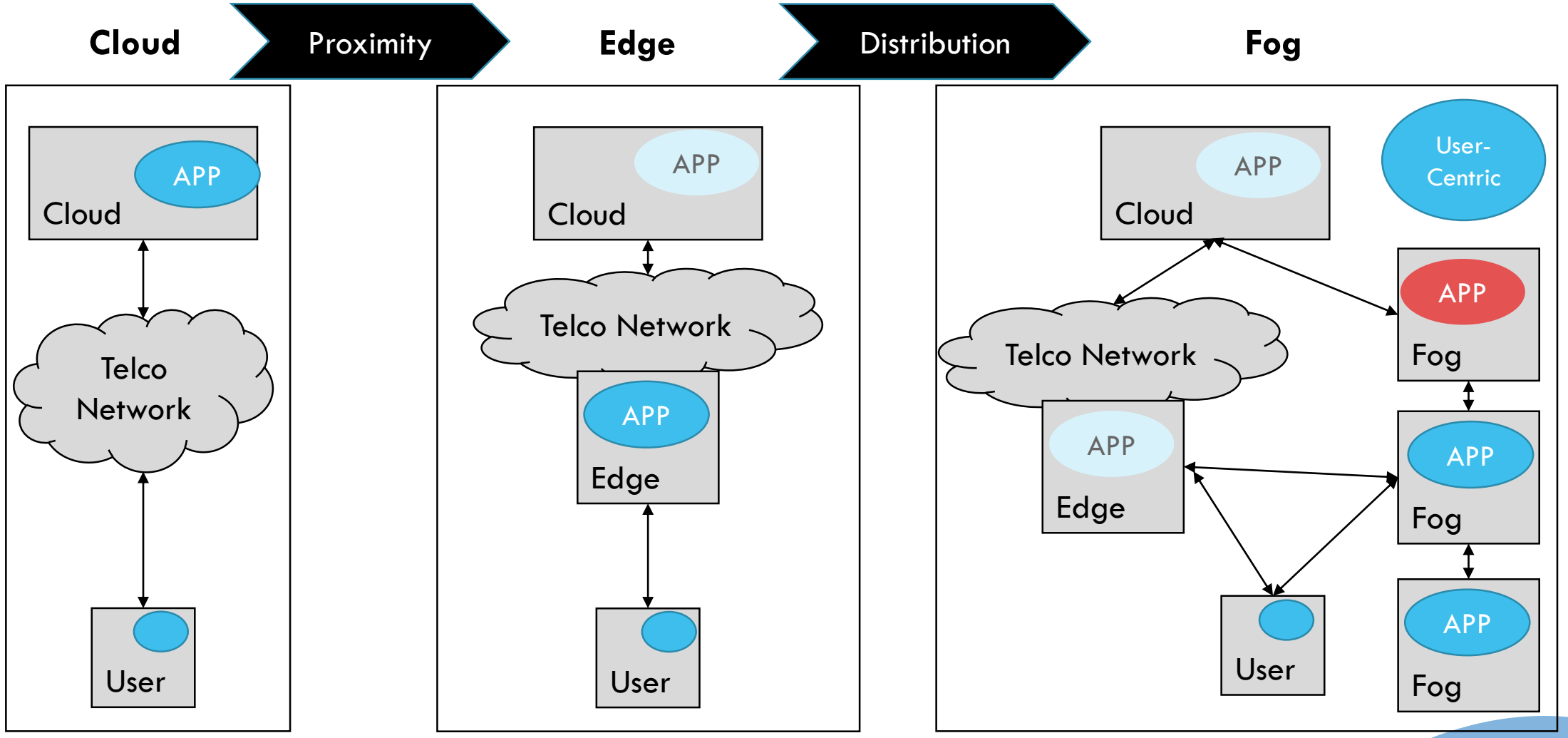
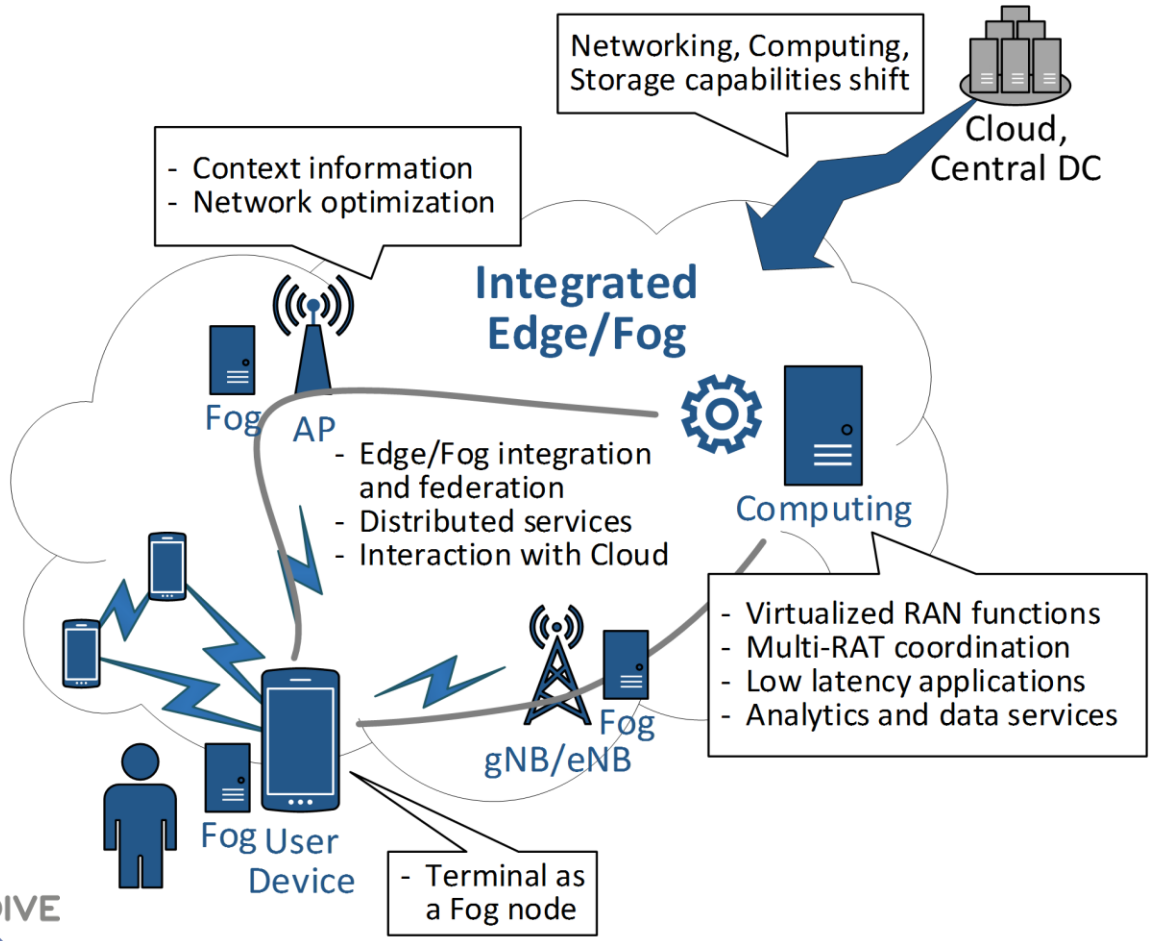
Introduction – The Cloud, Edge and Fog



5G-CORAL Project Mission

Target an integrated virtualized solution deep into the RAN offering distributed data services for various applications



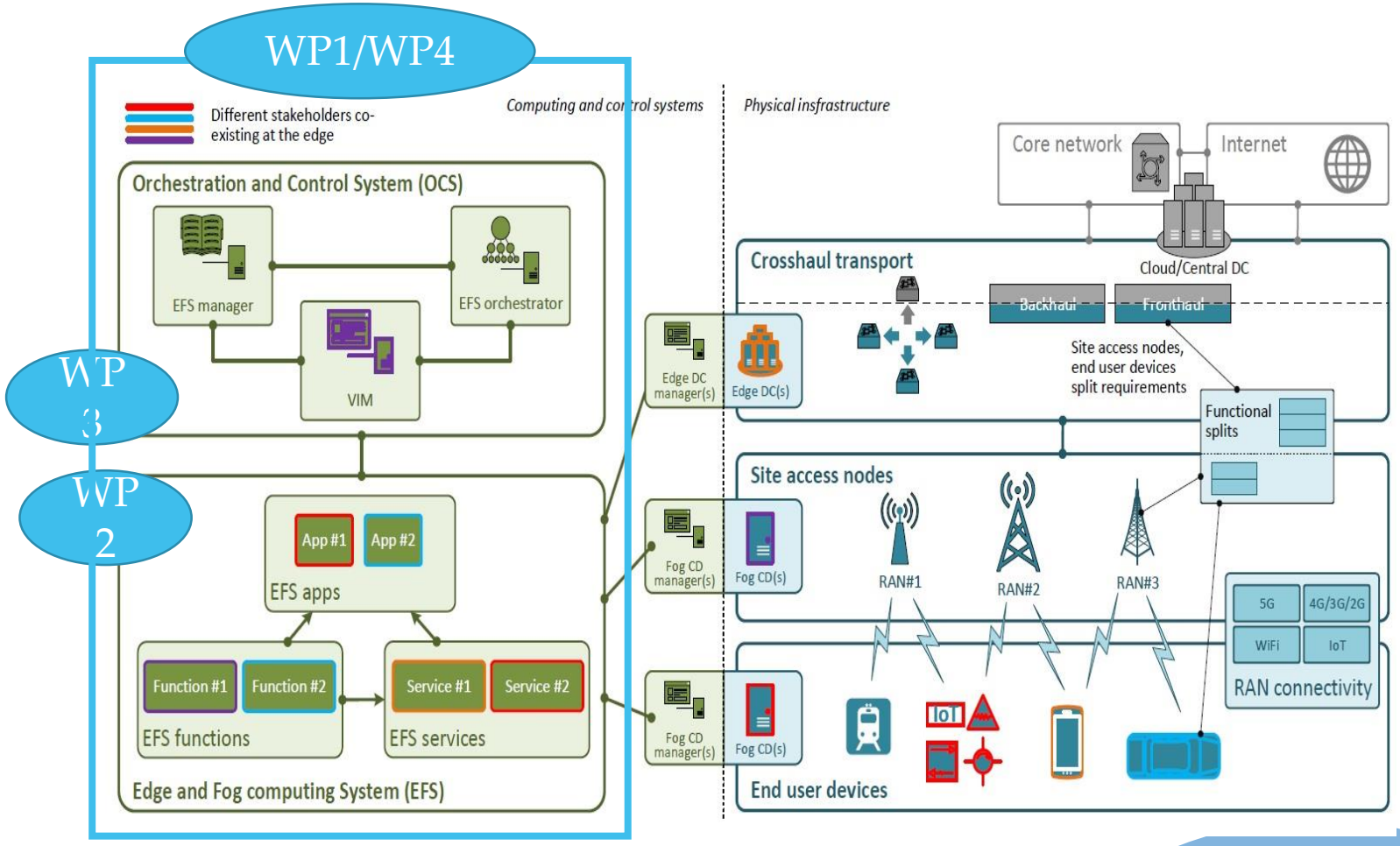
Mission: To develop the framework for an **integrated virtualized Edge/Fog solution** and demonstrate its value proposition for various use cases

Solution Building Blocks

Builds on two sub-systems, the EFS (Edge and Fog computing System) and the OCS (Orchestration and Control System)

OCS: A logical system for composing, controlling, managing, orchestrating, and federating one or more EFS(s). An OCS may interact with other OCS domains

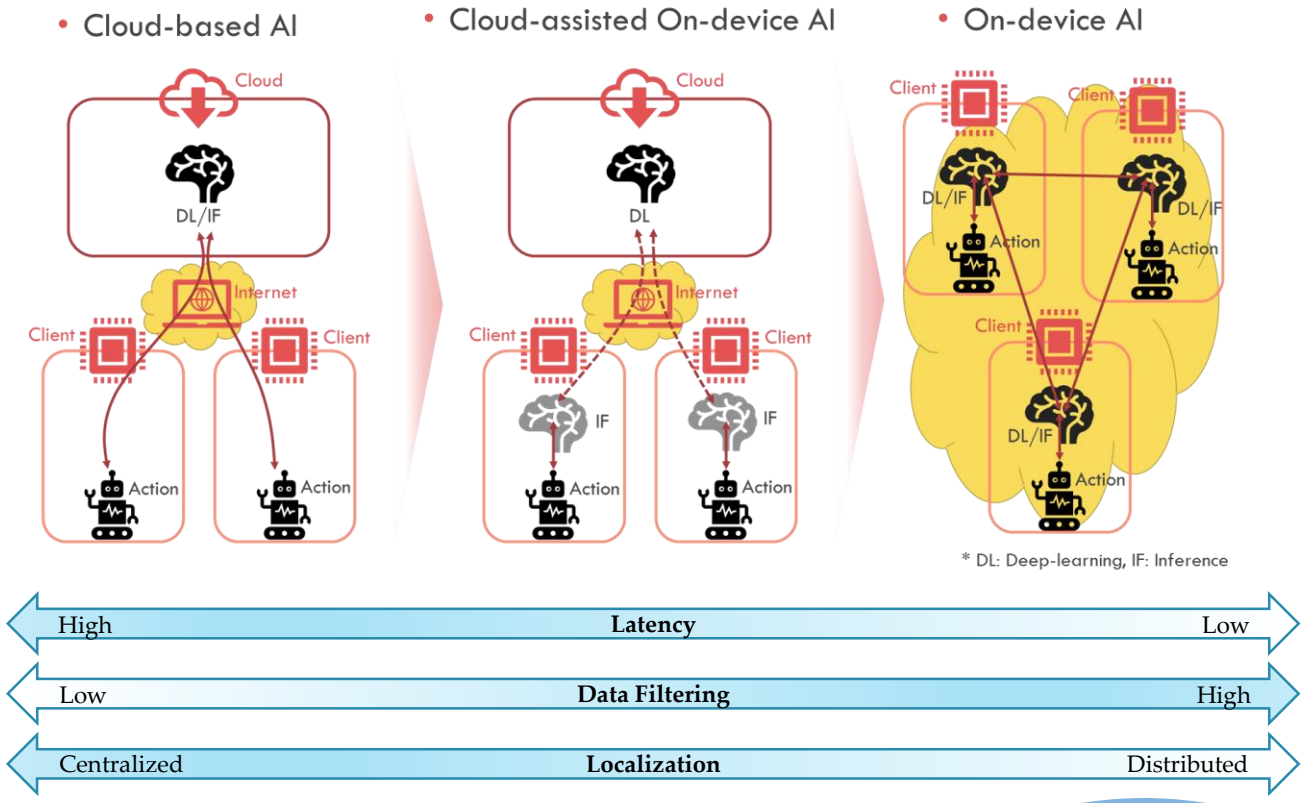
EFS: A logical system providing service platforms, functions and applications on top of Edge and Fog resources. It may interact with other EFS domains



5G-DIVE Vision

The computing fabric is no longer only centralized in the cloud but pervasively distributed through the Edge and Fog, opening new possibilities to the integration of intelligence located closely to the user.

- There is a diverse set of terminal types which all have computing capabilities ready to be harvesting
- Edge and Fog are complementary, and jointly together will define the computing substrate of next generation radio access networks
- Distributing AI towards edge and fog devices will allow more tuned automation and dynamic adaptation



Artificial Intelligence / Machine Learning

- AI will bring smart automation and (almost) zero touch configurations into computer networks
  - Instead of programming step-by-step instructions, you express what you want to achieve!
- Analyse and mining a big amount of data in order to infer valuable and enhanced knowledge from it
  - Forecasting / prediction of events
  - Finding hidden patterns
  - Detect anomalies and security breaches
  - Detect and identify objects
- Learn behaviours by trial and error

Vertical Pilots – Industry 4.0

Digital Twin Apps

Provides a virtual replica of a robot or of a part of a production line.

The 5G network coverage will be deployed to enable real-time visibility and remote insights into robot status and performance without having to directly operate on the physical machine.

Requires **eMBB** and **URLLC** for the on-time delivery of the information of the sensors to the virtual twin and for the interaction with the digital model.

Facilitates assessing the concepts of remote control, monitoring for preventive maintenance, and safety.

Connected Worker Augmented Zero Defect Manufacturing (ZDM) Decision Support System (DSS)

Explores the capabilities of Fog/MEC/Cloud multi-tier Edge to address this local processing and visualization of geometric features for manufactured parts.

Deploys in the Fog devices (e.g., video cameras), algorithms able to detect characteristic patterns for defects in the production.

Requires **eMBB** for the interaction with the platform for reinforced learning and **URLLC** for processing of results in the Fog devices.

ZDM techniques may potentially reduce scrap by 100%, and predict form and/or welding errors.

Vertical Pilots – Autonomous Drone Scout

Drone Fleet Navigation

Improves current Drone product portfolio, enabling a better piloting of the Drone swarm.

- Providing intelligence in the Drones

Requires **eMBB** and **URLLC** for the on-time delivery of the information of the sensors to the edge data centre for drone interaction.

Enables new Drone-based services:

- delivery, inspection and monitoring, scouting, Aerial Imaging, and precision agriculture on large scale.

Intelligent processing of images in the Drones

Enables the deployment of intelligent functions in the Drones and its cooperation with the different tiers of the 5G-DIVE platform.

Requires **eMBB** and **URLLC** for the on-time delivery of the information of the Drone.

More automation in the scouting processes, creating a new value chain of services which can be used to provide more services to the customers.

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