



DEDICAT 6G

Dynamic Coverage Extension And
Distributed Intelligence For Human
Centric Applications With Assured
Security, Privacy And Trust: From 5G To 6G

Focus on Architecture

François CARREZ (PhD)
(University of Surrey/6G Innovation Centre)

email: f.carrez@surrey.ac.uk

THIS PROJECT IS PART OF THE 5G PUBLIC AND
PRIVATE PARTNERSHIP

5G PPP WWW.5G-PPP.EU

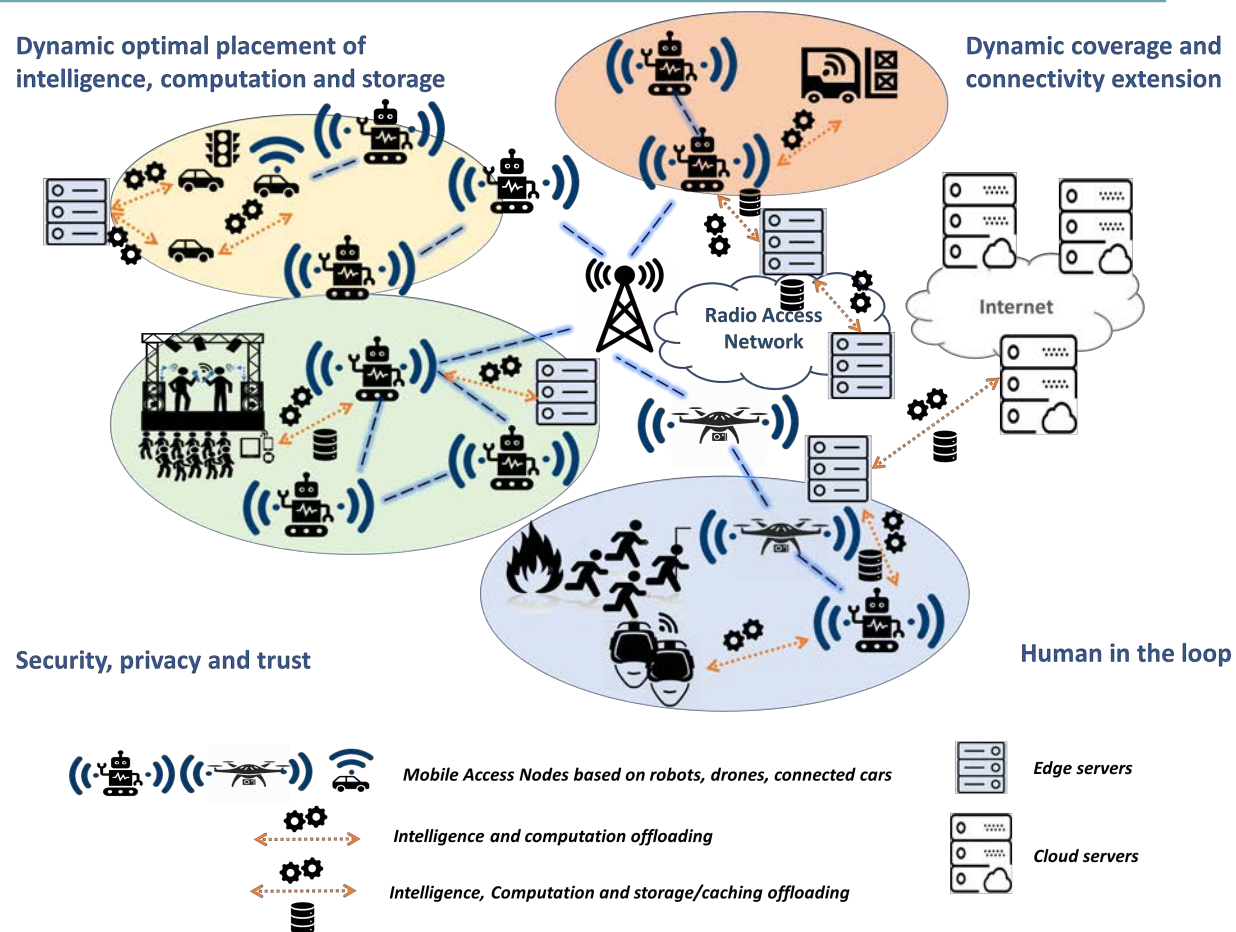


The DEDICAT 6G project has received funding from the European Union's Horizon 2020 Research and Innovation Programme under Grant Agreement No 101016499

DEDICAT 6G - Challenges and vision

Transform Beyond 5G networks into a smart connectivity platform that is dependable/resilient, highly adaptive, ultra-fast, green for supporting securely innovative, human-centric applications.

- **Dynamic distribution of intelligence and computation** for reduced energy and resource consumption
- **Dynamic coverage and connectivity extension** in support of digital inclusion
 - *support service continuity also in more "remote" areas*
- **Enhanced security, privacy and trust**
- **Human in the loop**

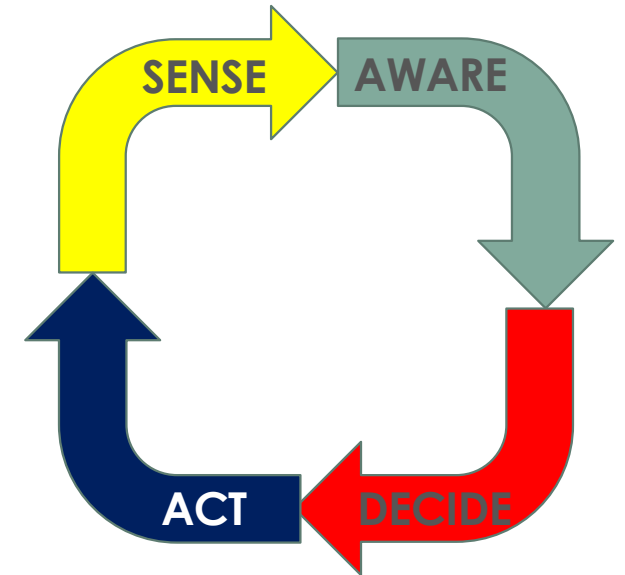


Use cases for CE & ID

- Scenario for Coverage Extension
 - *CEaaS request from a vertical (includes basic ID too by default)*
 - *Network Optimization*
 - *5G Equipment failure,...*
- Scenario for dynamic Intelligence Distribution
 - *Complement to CEaaS*
 - *IDaaS request from a vertical*
- Real-life scenario: social-event, natural disasters, smart warehousing/highways ... (more detail in WP6 presentation)
- Coverage Extension:
 - *based on the use of UAVs (autonomous swarm of drones), MTVs (connected car), AGVs like robots (warehouse, response to disaster) but could also include stationary/mobile airships*
 - *Relies on and Implements the IAB concepts (cf 3GPP 38.401 §6 and Ericsson online paper for a quick introduction)*

Architecture – General principle

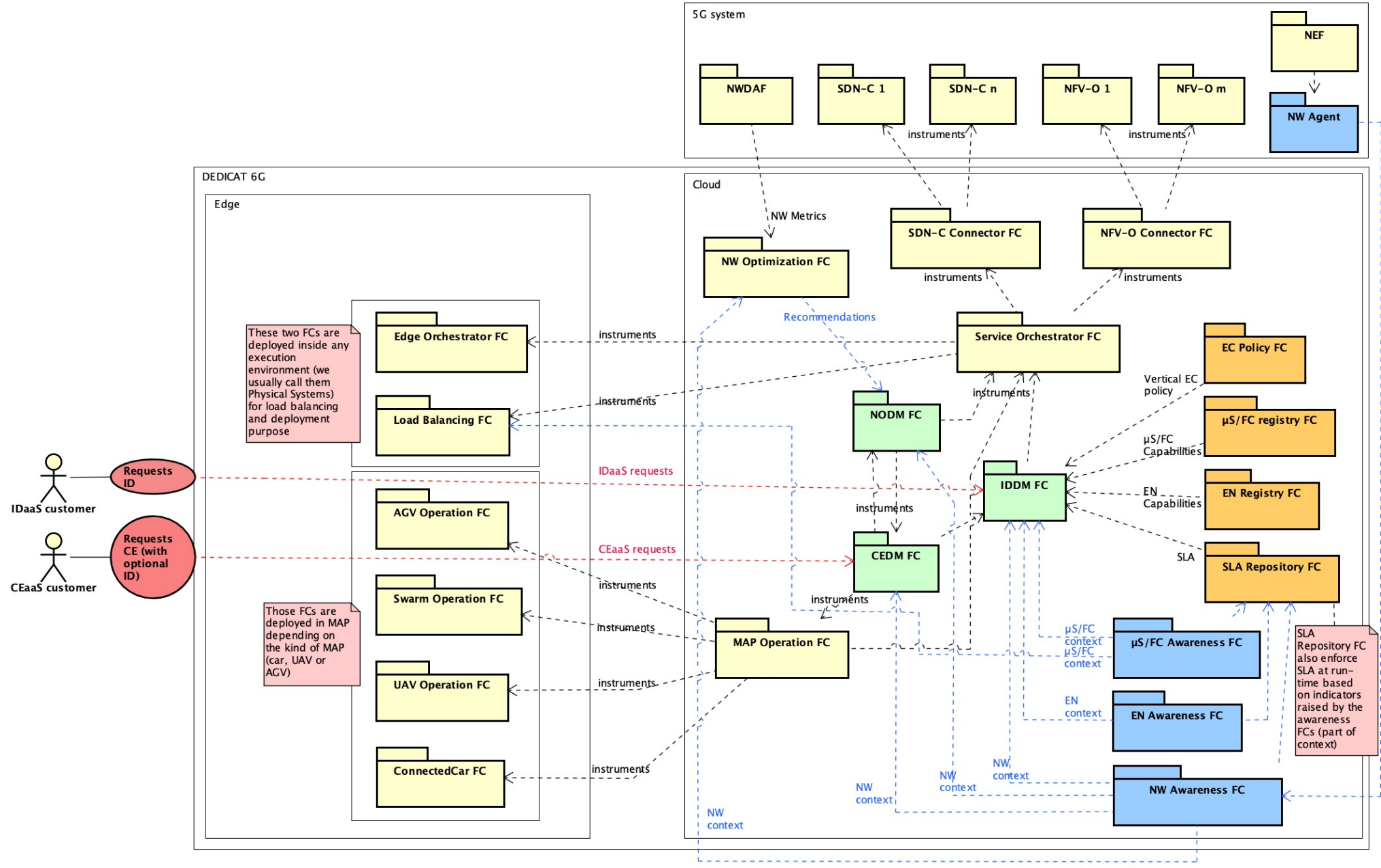
- The Functional model follows the Sense → Awareness → Analyze & Decide → Act loop paradigm
 - “Sensing”: scattered (EN, μ S/FC, MAP, UE, NW) agents get raw data and provide information about EN resources, μ S/FC run-time info, UE/{MAP,BS} association, networking status,... (Status Agent FC)
 - “Awareness”: build contexts up from agent information (Awareness FC)
 - “Analyze & Decide”: issues decision based on contexts (CEDM, NODM, IDDM FCs)
 - “Act”: Implement decision taken by decision-making (quite many..)
- but also provides side mechanisms for:
 - SLA enforcement and off-line network optimization (based on NWDAF data in particular)
 - IDaaS & CEaaS (explicit service requests)

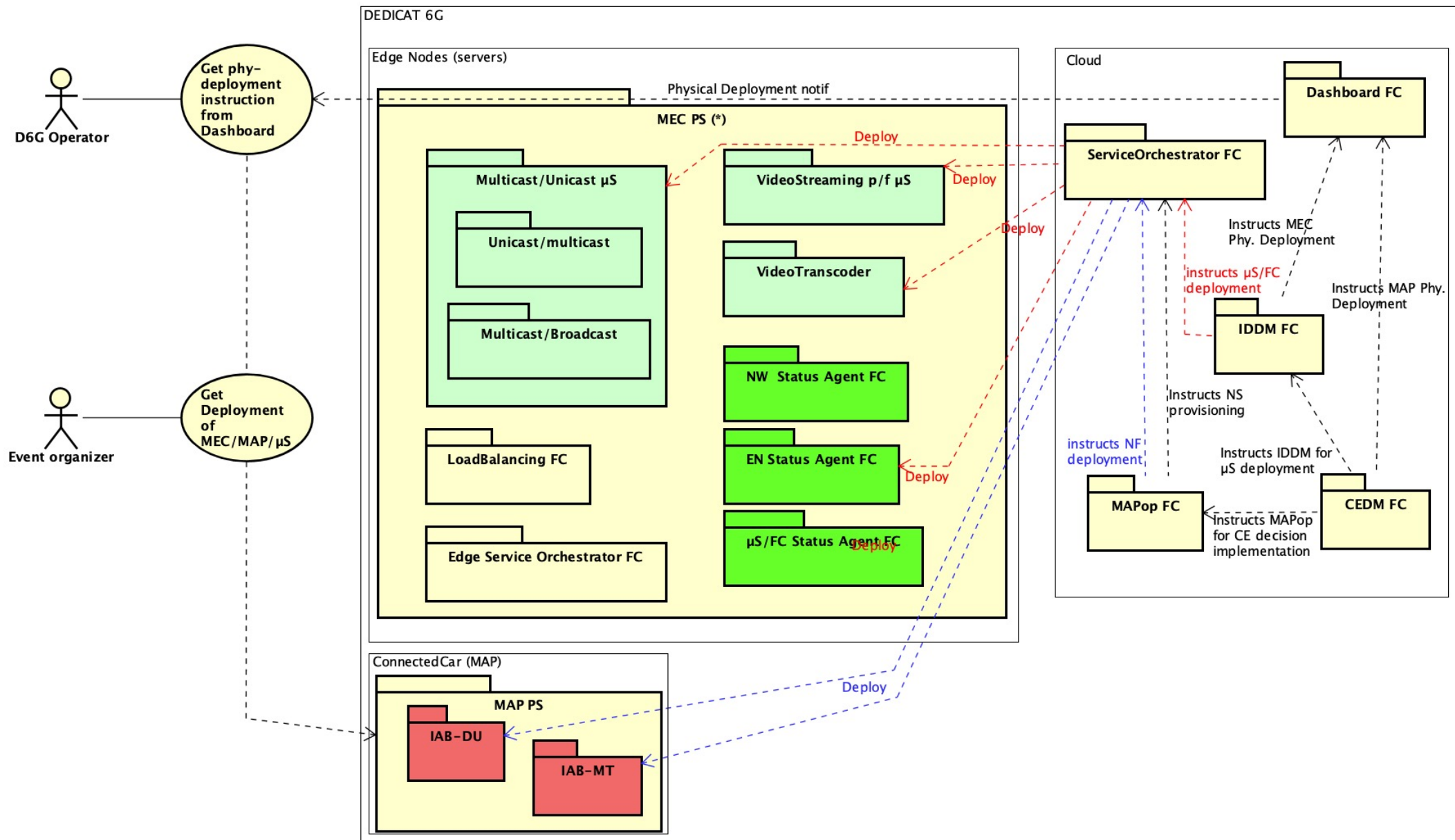


Architecture

Functional Decomposition illustrated - Cloud/Far Edge view (D6G) and 5G system (partly)



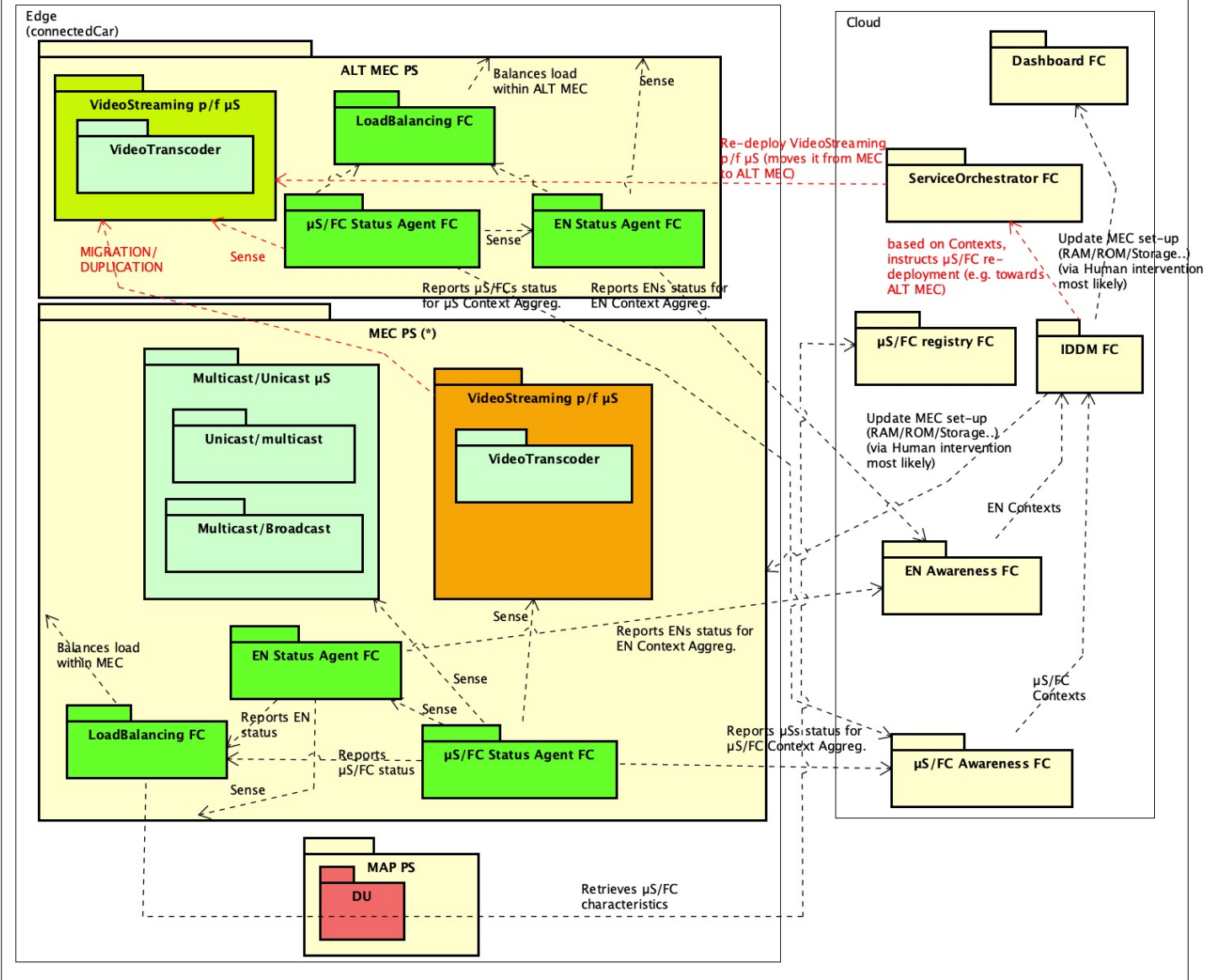




Architecture

Focus on Edge Comp. aspects





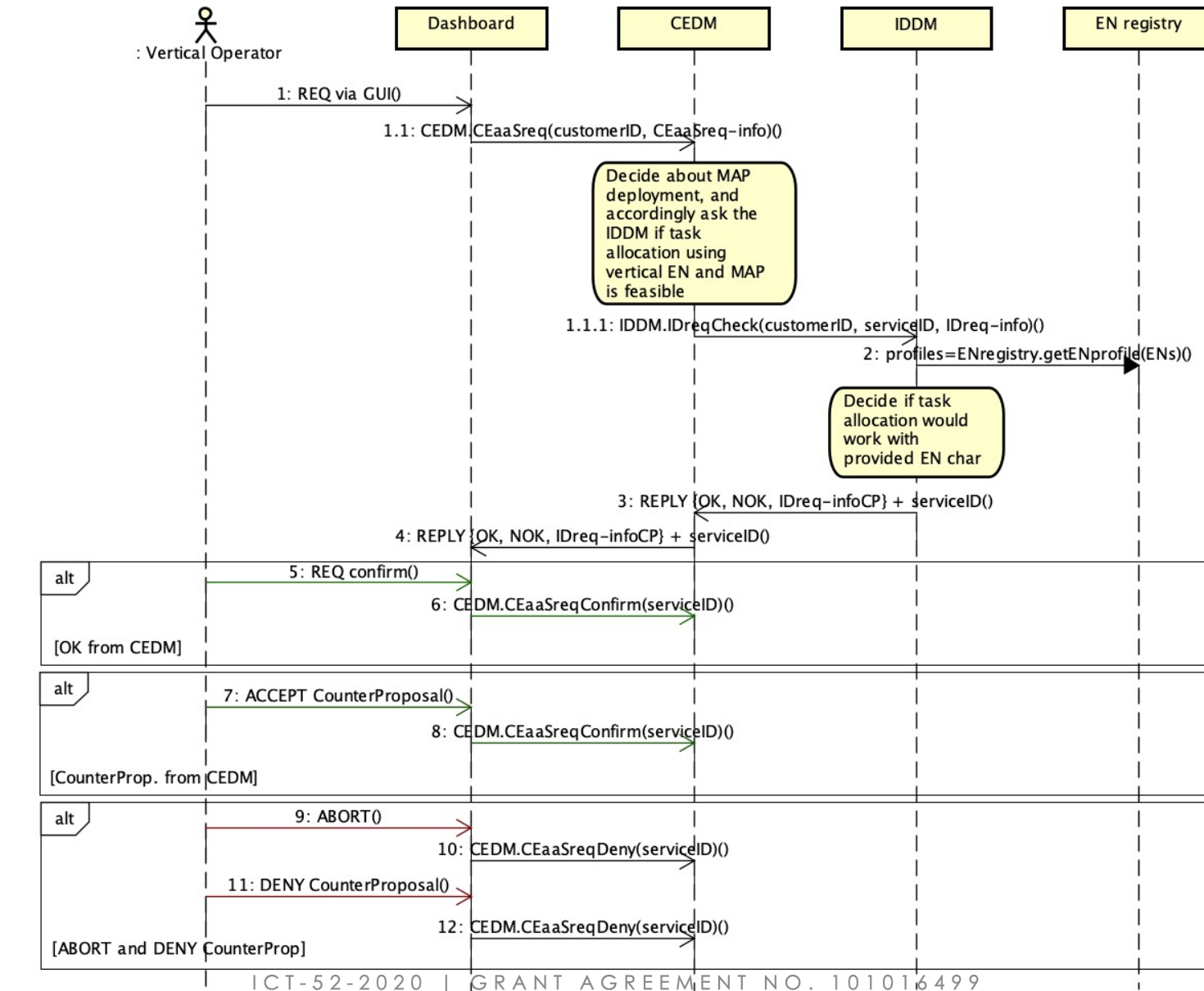
Architecture – Document Content (D2.4v2)

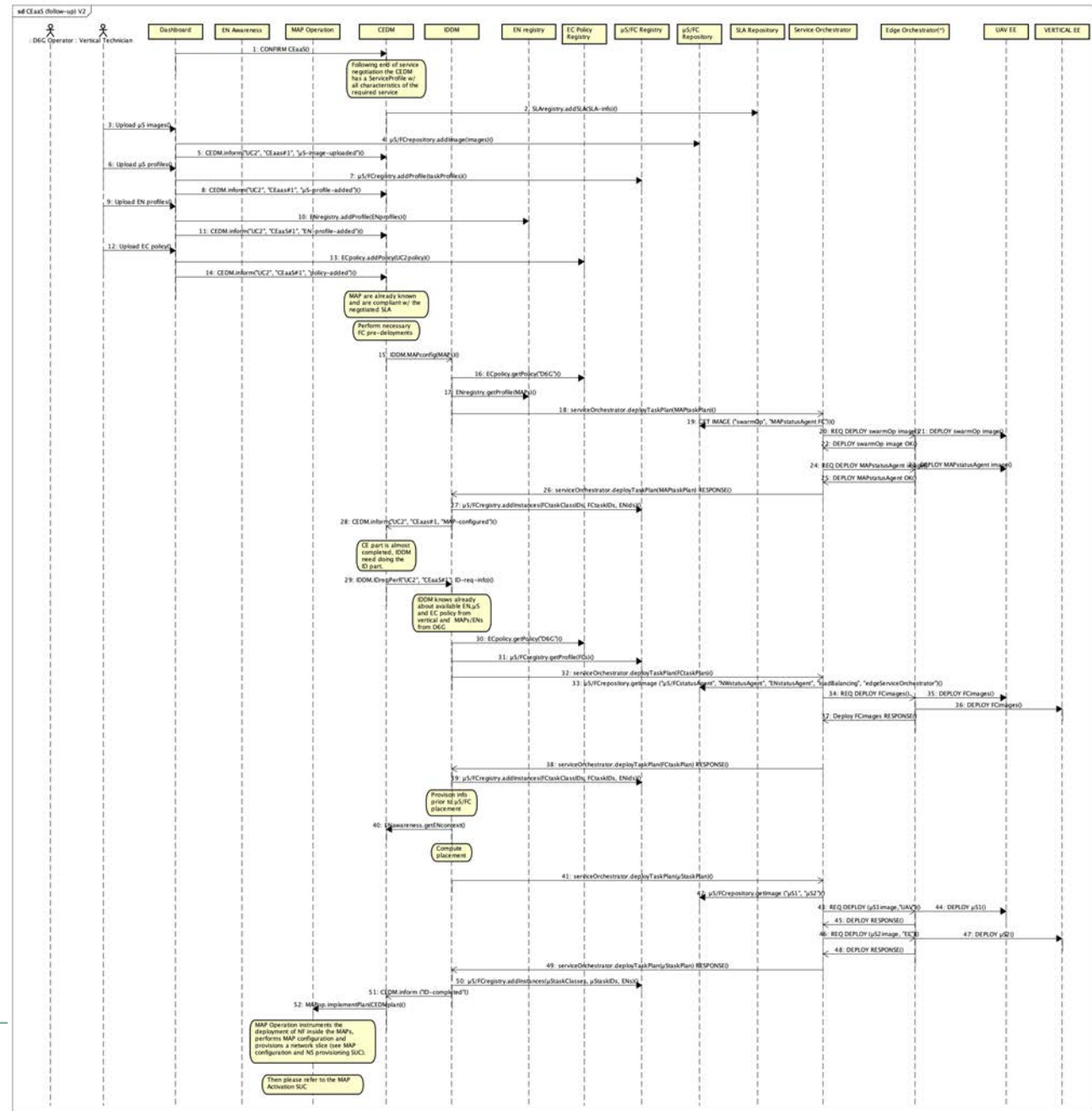
- The architecting work followed a very precise methodology (Rozanski & Woods) and provides several Views of the architecture (and Perspectives)
 - *Functional, Information, Deployment views*
 - *Content-wise:*
 - Complete functional decomposition
 - Data structure and interfaces
 - *Within D6G*
 - *Between D6G & 5G system*
 - Deployment diagrams (generic + 1/UC)
 - A comprehensive set of system use-cases (seq. diagrams)
 - *Covers Network Slicing (according to the agreed SLA) & CE via IAB concept (IAB-donor/IAB-node). Two backhauling options depending on scenario (FR1 sub 6GHz or FR2 mmwave)*

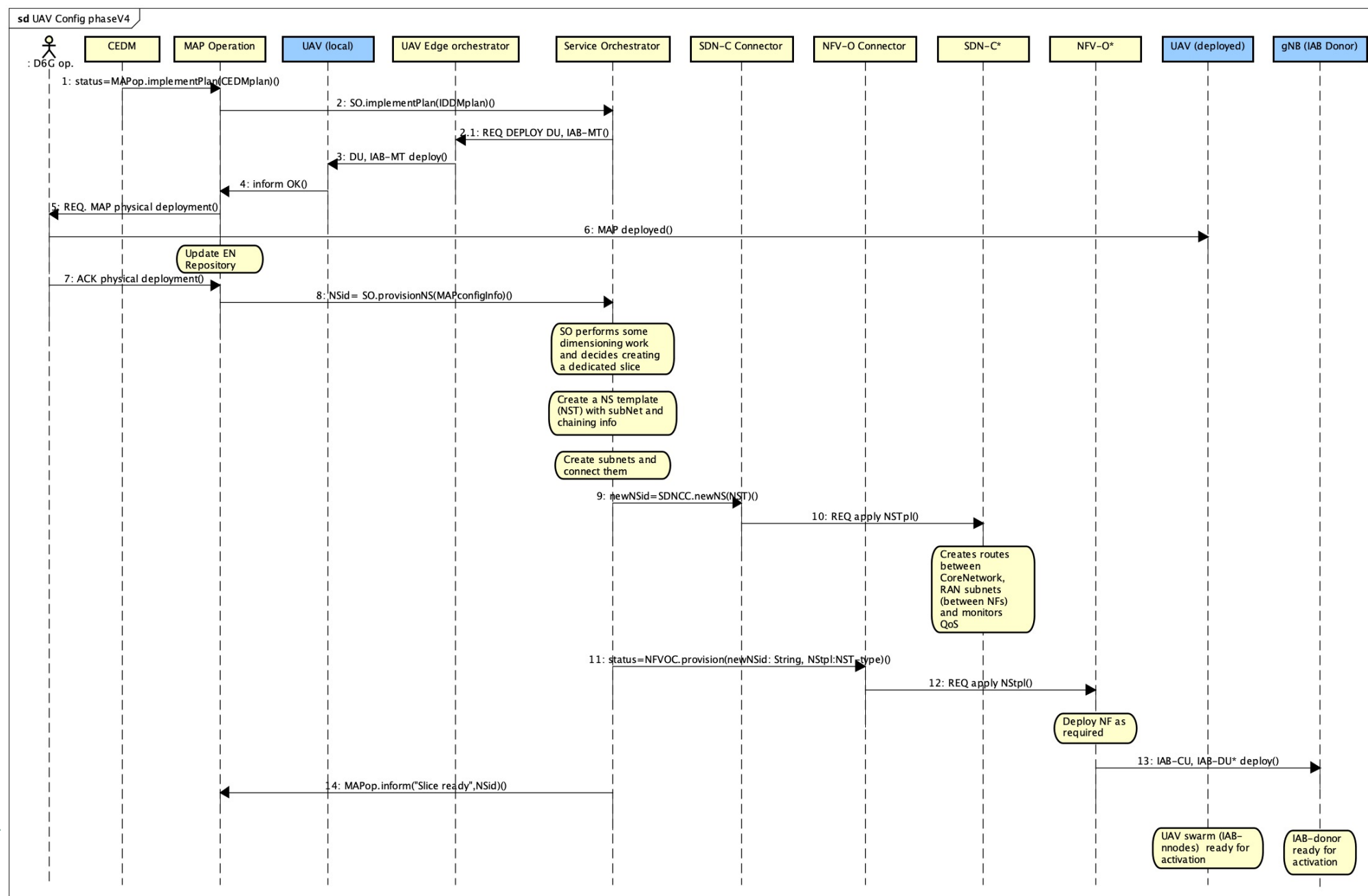
Architecture

System Use Cases

A few examples of sequence diagrams



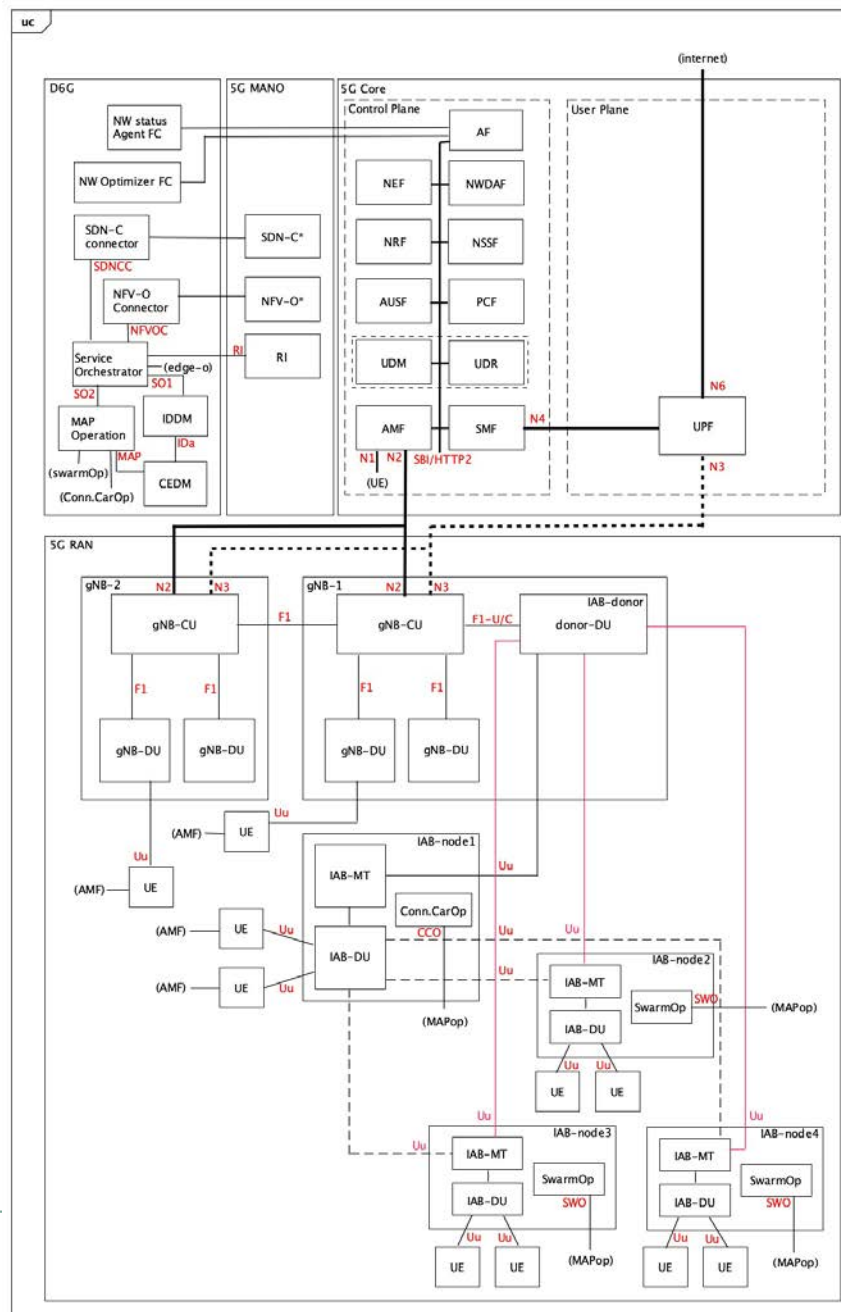




Architecture

3GPP-compliant overall architecture







DEDICAT 6G

Thank you!



<https://decicat6g.eu/>

