## 5G-CORAL: A 5G Convergent Virtualised Radio Access Network Living at the EdgeProject name

# 5G-CORAL

## TECHNICAL AND RESEARCH CHALLENGES

5G-CORAL project leverages on the pervasiveness of edge and fog computing in the Radio Access Network (RAN) to create a unique opportunity for access convergence. This is envisioned by the means of an integrated and virtualised networking and computing solution where virtualised functions, context-aware services, and user and third-party applications are blended together to offer enhanced connectivity and better quality of experience. The proposed solution contemplates two major building blocks, namely (i) the Edge and Fog computing System (EFS) subsuming all the edge and fog computing substrate offered as a shared hosting environment for virtualised functions, services, and applications; and (ii) the Orchestration and Control System (OCS) responsible for managing and controlling the EFS, including its interworking with other (non-EFS) domains.
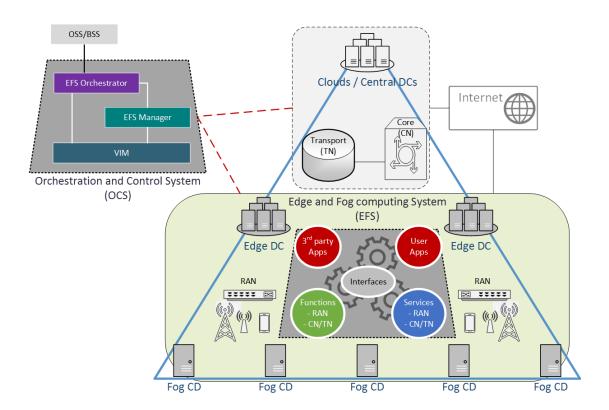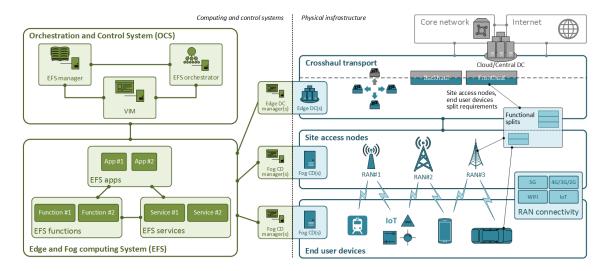


*Figure 1: 5G-CORAL concept*

*Figure 2: 5G-CORAL concept with the physical infrastructure*

## MAIN OBJECTIVES

5G-CORAL aims at delivering a convergent 5G multi-RAT access through an integrated virtualised edge and fog solution that is flexible, scalable, and interoperable with other domains including transport (fronthaul, backhaul), core and clouds. The major objectives are:

- Develop a system model that includes use cases, requirements, architecture, and business models to design and validate the 5G-CORAL solution
- Design virtualised RAN functions, services, and applications for hosting in the 5G-CORAL Edge and Fog computing System (EFS)
- Design an Orchestration and Control system (OCS) for dynamic federation and optimised allocation of 5G-CORAL EFS resources
- Integrate and demonstrate 5G-CORAL technologies in large-scale testbeds making use of facilities offered by Taiwan, and measure their KPIs
- Disseminate and contribute 5G-CORAL results into international research and innovation venues to pave the way for their successful exploitation

## USE CASES (or APPLICATIONS)

5G-CORAL project will be validated in three testbeds (i) shopping mall in Taiwan, (ii) high-speed train in Taiwan, and (iii) connected cars in Taiwan and Italy.

Shopping mall: The goal of the testbed is to verify the developed technologies in dense scenarios by allowing massive connectivity, high throughput, network and computation offloading, and to provide time critical services to the users.

High-speed train: The goal of this testbed is to verify traffic offloading in the high-mobility scenario. One anticipated goal is to provision breakout and mobility functions on the on-board Fog CDs that could potentially mitigate the burden of passengers' mobility signalling on the backhaul.

Connected cars: The goal of the connected car testbed is to demonstrate the benefits of 5G-CORAL to V2X communications supported by Fog CDs nearby or on-board the cars.

## EXPECTED IMPACT

Through the 5G-CORAL solution, several Key Performance Indicators (KPIs) can be achieved, notably an ultra-low end-to-end latency in the order of milliseconds. Moreover, new business prospects arise with new stakeholders in the value chain, notably small players owning computing and networking assets in the local service area, such as in shopping malls, airports, trains and cars.

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