5G-EPICENTRE

5G ExPerimentation Infrastructure hosting Cloud-nativE Netapps for public proTection and disaster RElief

Konstantinos C. Apostolakis
Foundation for Research & Technology Hellas (FORTH)
Technical Manager, 5G-EPICENTRE

This project has received funding from the European Union's Horizon 2020 research and innovation programme under the Grant Agreement No 101016521

Introduction

- PPDR community will move to Broadband-enabled services in the coming years, facilitating adoption of video, AI, AR/VR, etc.
- ITU considers LTE-Advanced systems and 5G a mission critical (MC) PPDR technology able to address needs of MC intelligence (voice, data, video)
- 5G-enabled digitalization revenues for ICT players in the public safety market will increase as a result of widespread 5G adoption
- Wider exploitation of the field by the ICT industries that are going to invest in PPDR domain
- 5G-EPICENTRE: open, federated 5G end-to-end experimentation platform specifically tailored to the needs of PPDR software solutions.

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Project Factsheet

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Topic

ICT-41-2020 - 5G PPP – 5G innovations for verticals with third party services

Coordinator

Mr. Jean-Michel Duquerrois
AIRBUS DS SLC (ADS)

Project partners

AIRBUS, Forthnet, altice labs, Fraunhofer HHI, FORTH Institute of Computer Science, Universidad de Málaga, CTTC, istella, ONESOURCE Consultoria Informática Lda., iq, nemergent solutions, eBOS, ATHONET, RedZinc, Opto Precision, YOUBIQUO, ORama VR

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5G-EPICENTRE provisions

- Allow SMEs and developers a lower entry barrier to the PPDR market, enabling them to build-up and experiment with their solutions in a cost effective way.
- Accommodate open access to 5G networks' resources, acting as an open source repository for PPDR 5G Network Applications (NetApps).
- Provide sufficient resources to cover the entire range of the 3 ITU-defined service types (i.e. eMBB, mMTC and URLLC).
- Deliver secure interoperability capabilities.

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5G-EPICENTRE key takeaways

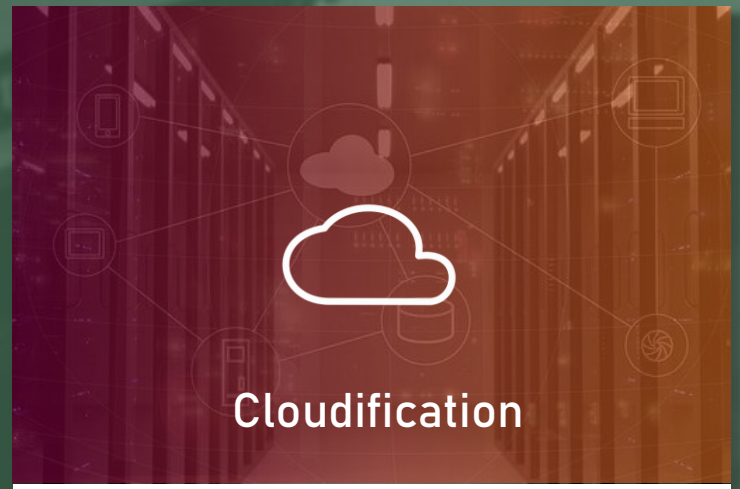
Over the course of three years, the 5G-EPICENTRE consortium partners will achieve several key objectives towards provision of an open, federated, end-to-end experimentation facility.

Federation

Federating multiple constituent 5G platforms evolved under previous 5G PPP Phase 2 and 3 projects into an advanced, user-friendly, zero-touch orchestration single point of control.

Openness

Implementing a repository of network functions (V/CNFs) and applications (NetApps) to address requirements pertaining to the most common PPDR experimentation environments.



Cloudification

Working towards the cloud-native transformation of both facilities and network functions in support of the transformational technologies, such as Multi-access Edge Computing (MEC).

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5G-EPICENTRE Objectives

- To build an **end-to-end 5G experimentation platform** specifically tailored to the needs of the **public safety and emergency response** market players.
- To **pilot 5G systems in PPDR-based trials**, successfully demonstrating 5G-EPICENTRE onboarded apps as a crucial accompaniment to public safety MC communications technologies.
- To cultivate a **'5G Experiments as a Service'** model, enabling developers and SMEs to experiment with PPDR applications in **parameterized, easily repeatable, and shareable environments**.
- To facilitate automation, continuous deployment and MEC supported by **containerized network functions**, so as to **reduce service creation time and time-to-market** for 5G solutions.
- To leverage AI for achieving **cognitive experiment coordination and lifecycle management**, including **dynamic 5G slicing, application awareness and insightful ML-driven analytics**.
- To implement **impact-driven dissemination, standardisation and exploitation**.

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Federated infrastructure

5G-EPICENTRE brings together four geographically dispersed, end-to-end private 5G platforms, which support key 5G KPIs, as well as allow cross-site orchestration and experimentation for PPDR solution vendors to validate NetApps reliant upon those KPIs.

5GENESIS

Málaga

Funded under the 5GENESIS project for indoor and outdoor 5G scenarios, hosted by UMA.

5G-VINNI

Aveiro

Funded under 5G-VINNI, based on ALB computational & networking infrastructure.

5G-CTTC Barcelona

Barcelona

Operated by CTTC, based on C-RAN architecture, with fully virtualized 5G RAN.

5G BERLIN

Berlin

Experimental platform consisting of the latest RAN technologies, operated by HHI.

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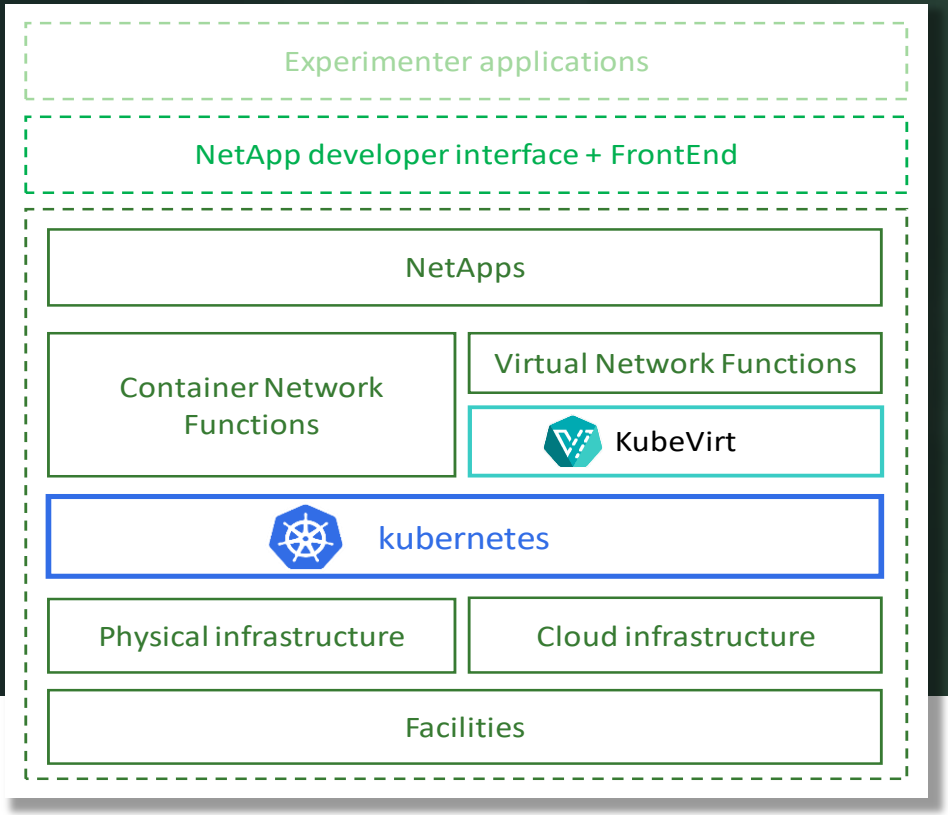

Cloud-native transformation

- Decoupling of network functions from virtual machines (VMs) toward Containerized Network Functions (CNFs).
- Container virtualization technologies (*Docker*) and orchestration tools (*Kubernetes – K8s*) ideal for implementing the proposed architectures for emerging 5G networks and addressing their requirements.
- Utilization of K8s as both VIM and VNF Manager.

Containerization of the 5GCore

Enhancement to the performance of the core network, superior experimentation infrastructure and K8s support for automated operations.

Flexible allocation among edge and centralized core

maximize amount of resources reliably executed close to the first responders, optimize the combined Cloud and MEC infrastructure.

Lightweight virtualization toward MEC

Faster instantiation, low resource utilization, platform independence and smaller footprint, delivering significant boost to mobility.

Development & sharing of CNFs via open repository

Facilitate collaborative development and lead to ground-breaking innovation along with higher-quality services for PPDR agencies.

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5G-EPICENTRE Use cases

Multimedia Mission Critical (MC) Communication and Collaboration Platform

Airbus DS SLC

Multi-agency, multi-deployment MC communications & dynamic service scaling

Nemergent Solutions

Ultra-reliable drone navigation and remote control

Fraunhofer HHI

IoT for improving first responders' situational awareness and safety

OneSource

Wearable, mobile, point-of-view, wireless video service delivery

RedZinc

Fast situational awareness and near real-time disaster mapping

OPTO Precision

Augmented Reality and AI wearable electronics for PPDR

Youbiquo

AR-assisted emergency surgical care

ORamaVR

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5G-EPICENTRE benefits

- Decrease *onboarding process delay* (OPD) as a result of containerization practices vs. booting up VMs and all their resources.
- Decrease *deployment process delay* (DPD) as a result of the smaller container footprint.
- Reduce *run-time orchestration delay* regarding runtime lifecycle MANO operations of VNFs due to automated experiment lifecycle management.
- Virtual Infrastructure Management (VIM) platforms deployed, managed, and scaled with Kubernetes automation and orchestration intelligence.
- Faster service creation time through minimal containerized network function image sizes.

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Thank you!

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