

5G-PICTURE Project: Converged 5G Fronthaul/ Backhaul Infrastructure based on Dis-Aggregated RAN

Presenter: Ioanna Mesogiti

Senior R&D Engineer, MBA, MSc

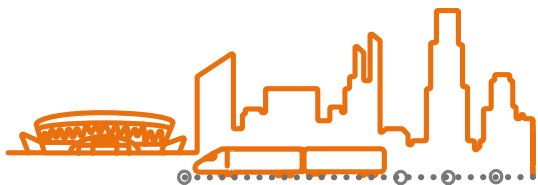
COSMOTE - Mobile Telecommunications S.A.

R&D Projects Department - Fixed & Mobile

Wednesday 25 October 2017
Athens, Divani Caravel

Contents

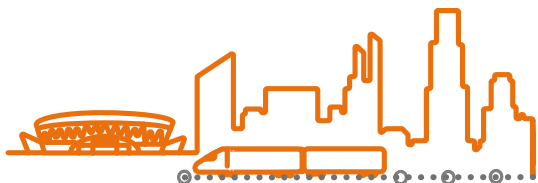
- Project Overview
- Main Objectives
- Concept
- Key Enablers
- Physical Network Infrastructure
- Positioning of 5G-PICTURE in 5G-PPP model
- Validation & Demonstrations



Project Overview

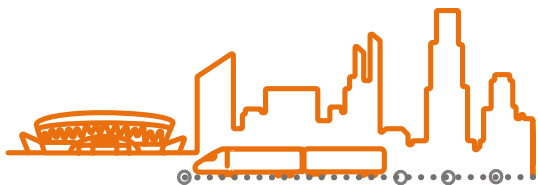
- **Area of Activity:** H2020
- **Period:** 1/July/2017 – 30/June/2020
- **Coordinator:** IHP - Innovations for High Performance Microelectronics
- **Partners:**
 - Universities (4x)
 - Research Institutes (4x)
 - SMEs (3x)
 - Operators (3x)
 - Industry Partners (5x)

Partners



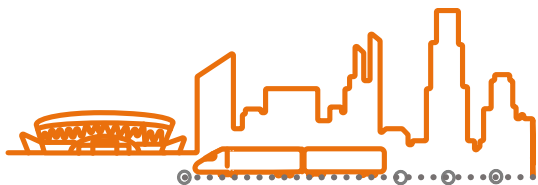
5G-PICTURE Main Objectives

- **5G-PICTURE** aims to deliver an **integrated, scalable and open 5G infrastructure**, supporting a variety of **operational** and **end-user services** for both **ICT** and **"vertical" industries**.
- To this end, 5G-PICTURE will deliver:
 - a **converged fronthaul (FH) and backhaul (BH) infrastructure**
 - **integrating advanced wireless and novel optical network solutions**, and
 - **flexibly mixing-and-matching network, compute and storage resources** thus enabling the provisioning of any service.



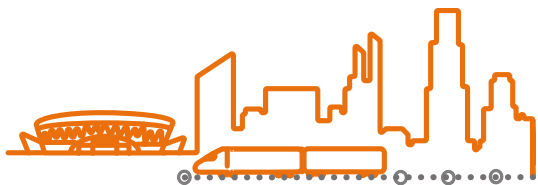
Concept

- 5G-PICTURE infrastructure will **interconnect a large number of “disaggregated” compute/storage and network elements in a common infrastructure**, based on the novel concept of **Disaggregated-Radio Access Networks (DA-RANs)** shifting from the traditional RAN and recent C-RAN approaches.
- DA-RAN is a novel concept adopting the notion of “Resource disaggregation” which allows **decoupling of HW and SW components creating a common “pool of resources”** that can be independently selected and allocated on demand.
- These HW and SW components form the basic set of building blocks that, in principle, can be independently combined to compose any infrastructure service.
- Due to its modular approach, disaggregation offers **increased flexibility, enhanced scalability, upgradability and sustainability** potential that are particularly relevant to 5G environments.

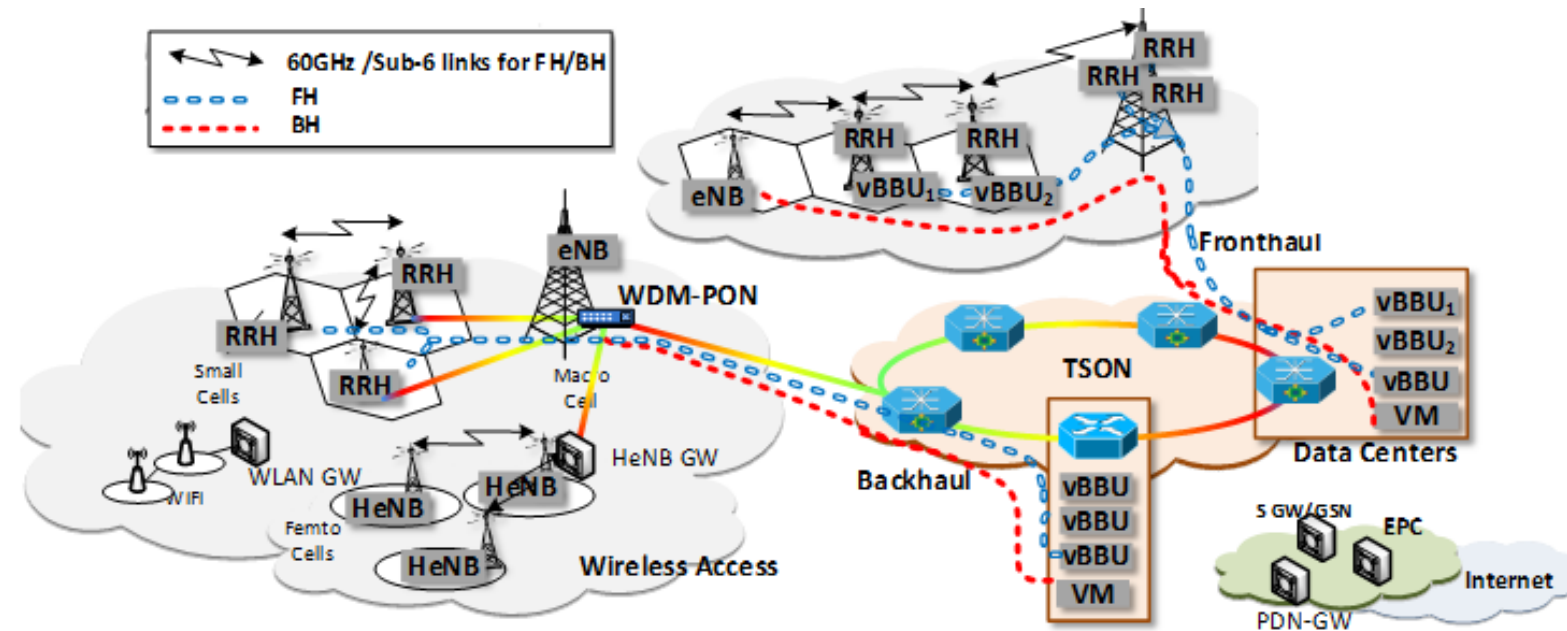


Key enablers

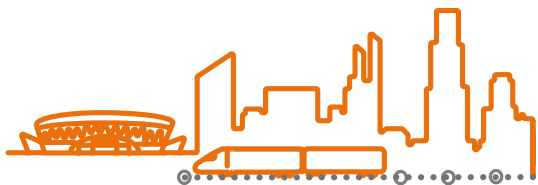
- Key enablers for the 5G-PICTURE concept are:
 - **Network softwarization**, migrating from the conventional closed networking model to an open reference platform, and
 - **HW programmability**, where HW is configured directly by network functions, to provide the required performance
 - **High Capacity Wireless Network technologies** offering up to 100Gbps.
 - **Network hierarchy** to support hierarchical compute & storage structures.
 - **Slicing** and **service chaining** to facilitate optimised **multi-tenancy operation**.



Physical Network Infrastructure



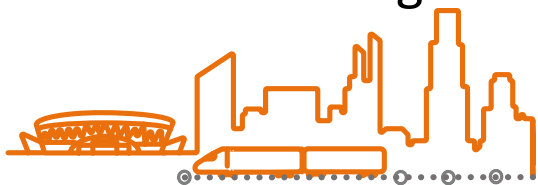
- Wireless Network:
 - Dense layer of small cells providing capacity, and macro cells to ensure ubiquitous coverage.
 - Small cells can be BH to the macro-cell site either using mm-Wave/ sub-6 technologies or using a hybrid optical network platform.
 - Incorporation of massive MIMO schemes for high capacity links.



Positioning of 5G-PICTURE in 5G-PPP model

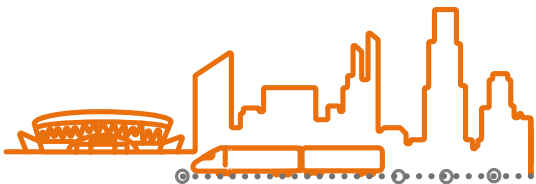
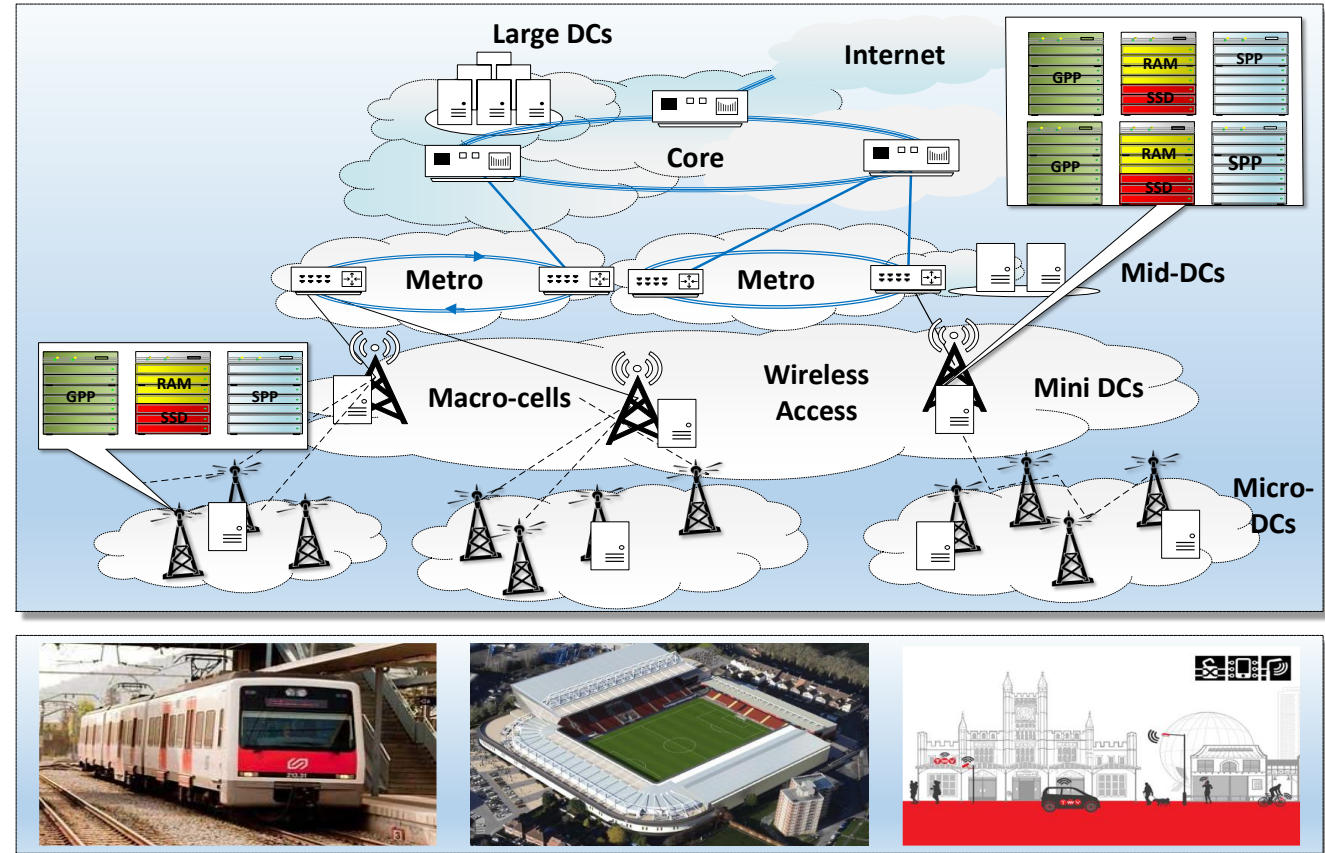


- 5G-PICTURE addresses all 3 Strands of 5G-PPP pre-structured model:
- **Radio network architecture and technologies:** focusing on a new state-of-the-art mmWave wireless mesh technology supporting wireless links which can potentially reach 100 Gbps. Massive MIMO, mmWave (60 GHz) and Sub-6 GHz technologies will be further exploited.
- **High capacity elastic optical networks:** focusing on next-generation elastic optical networks, including research on switching nodes with enhanced flexibility, software-programmable transceivers that are integrated through a control plane.
- **Software networks:** focusing on disaggregation of Network and Compute resources:
 - Having distributed compute resources to accommodate VNFs.
 - Mixing and matching of resources to efficiently support services



Validation & Demonstrations

- To be demonstrated in 3 testbeds representing ICT and vertical industry use cases:
 - Converged FH and BH services in a smart city testbed (city of Bristol, UK)
 - Seamless service provisioning and mobility management in high speeds in a 5G railway experimental testbed (Barcelona, Spain)
 - Media services in large venues with ultra high density appearing occasionally - stadium testbed supporting large venues (Bristol, UK)



5G-PICTURE

Thanks for your attention!

5G-PICTURE Project

Project Coordinator:

Eckhard Grass (grass@ihp-microelectronics.com)

Technical Manager:

Anna Tzanakaki (Anna.Tzanakaki@bristol.ac.uk)

Project Website:

<http://www.5g-picture-project.eu/index.html>

Twitter:

https://twitter.com/5G_PICTURE

