5G PPP
The 5G Infrastructure Public Private Partnership

5GComplete

5G-COMPLETE

A unified network, Computational and stOrage resource Management framework targeting end-to-end Performance optimization for secure 5G muLti-tEchnology and multi-Tenancy Environments

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Project Overview

General information

Project Coordinator	Prof. Hercules Avramopoulos (ICCS/NTUA)
Starting date	1st of November 2019
Duration	36 months
Call (part) identifier	H2020-ICT-2019-2
Topic	ICT-20-2019-2020: 5G Long Term Evolution
Type	RIA
Project Number	871900
EU Contribution	€ 5,966,087.50

COORDINATOR

PARTNERS

Project Overview

Consortium

13 partners

7 countries

5 Universities / Research Institutes

8 Companies

2 Telecom Operators

University of BRISTOL

nubificus

ADVA Optical Networking

ihp

Alleleran

orange

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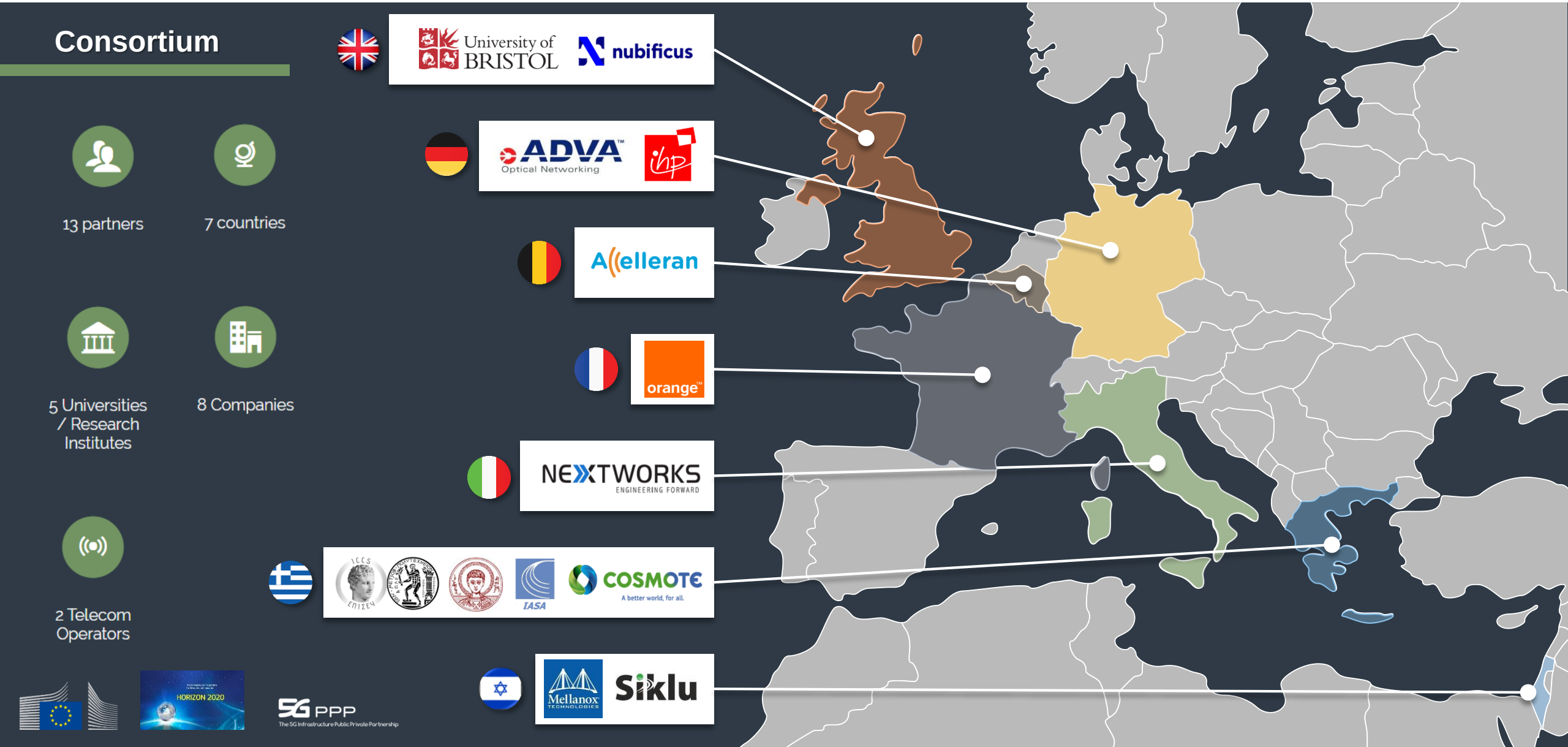


HORIZON 2020

5G PPP The 5G Infrastructure Public Private Partnership

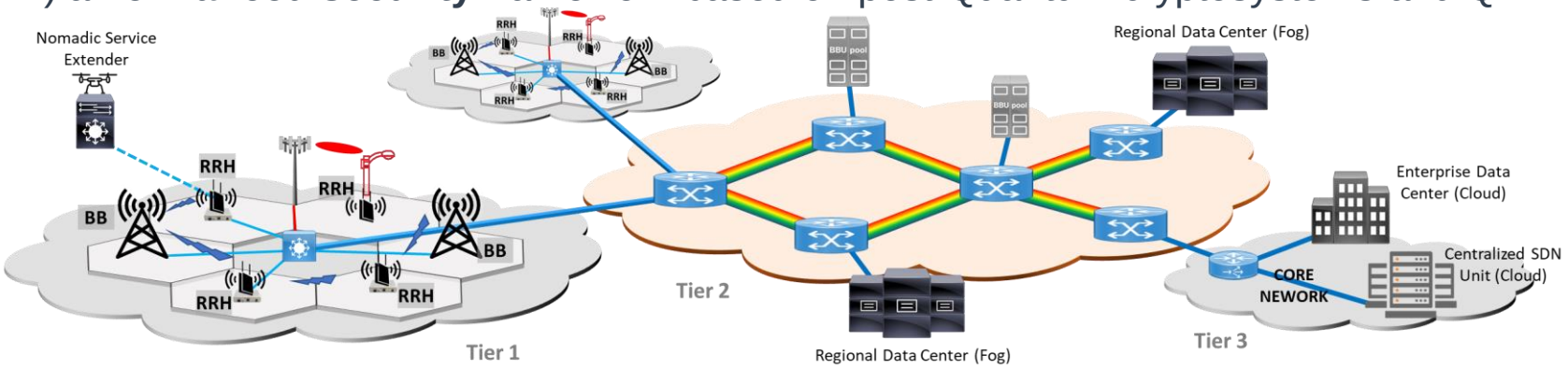
5G-Complete Project

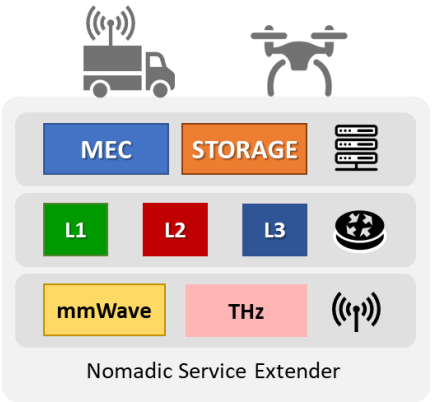
Vision / Concept

5G-COMPLETE aims to revolutionize the 5G architecture, by efficiently combining compute and storage resource functionality over a unified ultrahigh capacity converged digital/analog FiberWireless (FiWi) Radio Access Network (RAN).

5G-COMPLETE introduces and combines a series of key technologies that brings together:

- i) the **high capacity** of fiber and high-frequency radio,
- ii) the **audacity** of converged FiWi fronthauling,
- iii) the **spectral efficiency** of analog modulation and coding schemes,
- iv) the **flexibility** of mesh self-organized networks,
- v) the **efficiency** of high-speed and time-sensitive packet-switched transport,
- vi) the **rapid and cost-efficient** service deployment through unikernel technology and finally
- vii) an **enhanced security** framework based on post-Quantum cryptosystems and QKD.

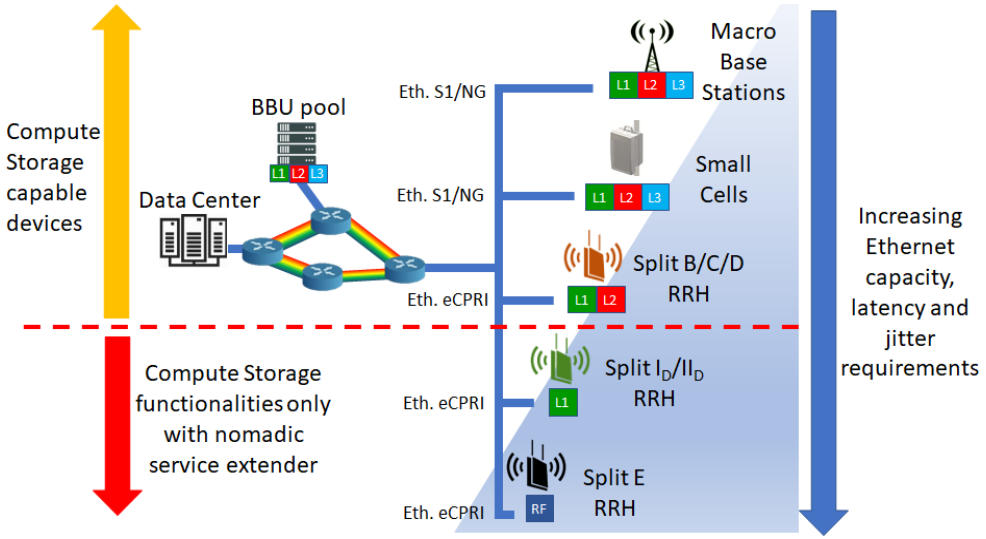




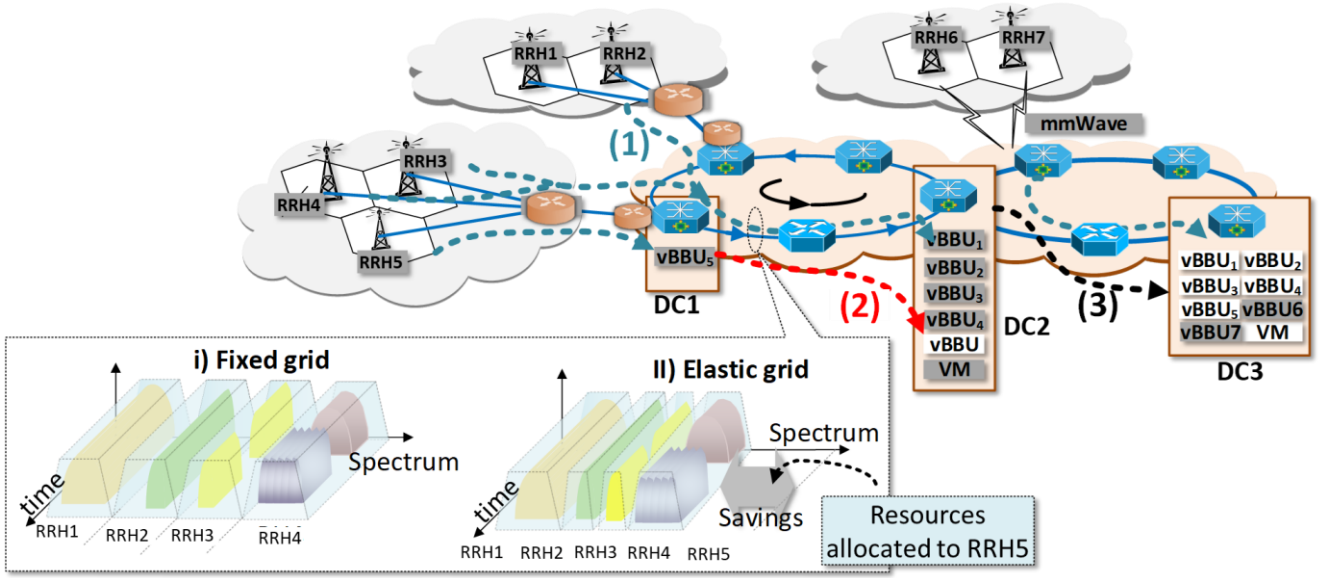
Project Objectives

5G-COMPLETE will:

- Architect a **low-latency**, **high energy efficiency**, **high-capacity** and **flexible** 5G network.
  - *Deploy and evaluate a complete end-to-end Computing/Storage/RAN architecture capable of interconnecting all possible combinations of envisioned functional splits, while providing compute and storage service points placement along all three Edge/Fog/Cloud tiers.*



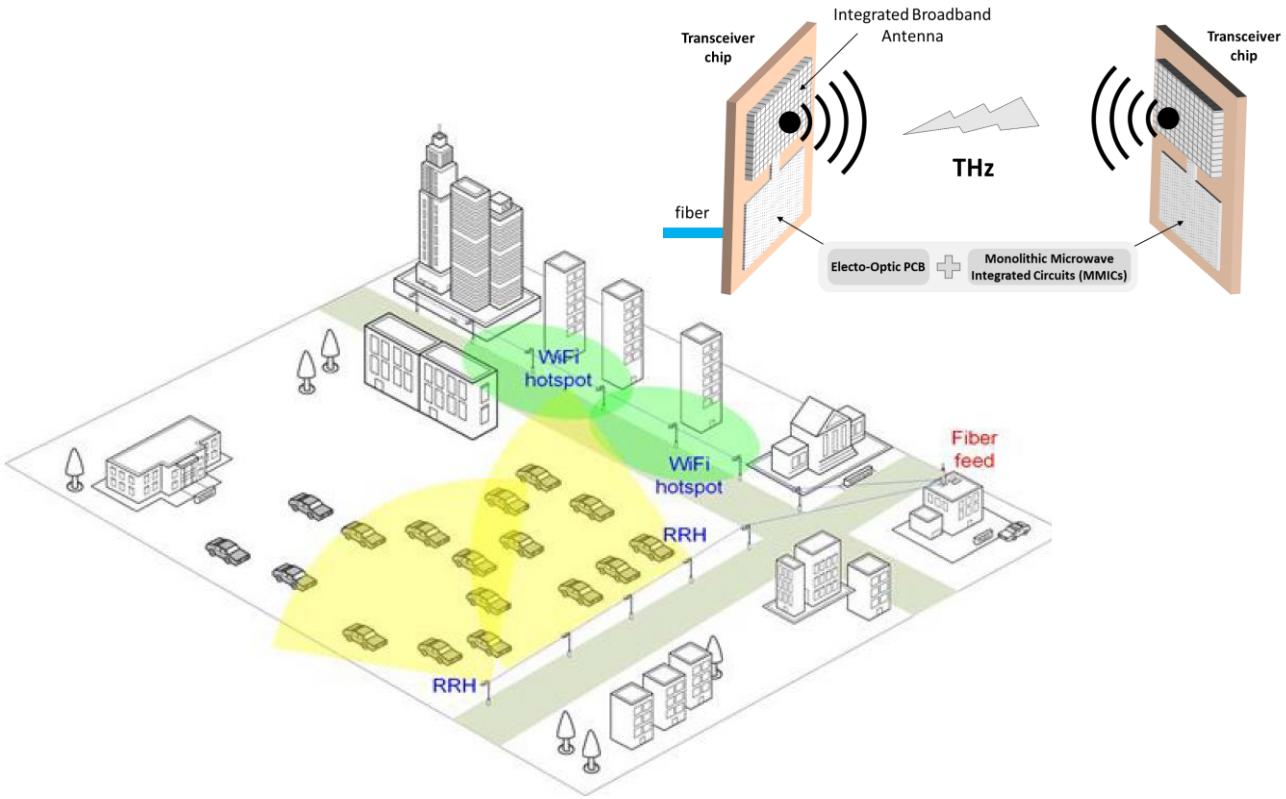
- Develop a **delay time-sensitive and elastic optical bandwidth framework** for converged network/ computational/storage architectures



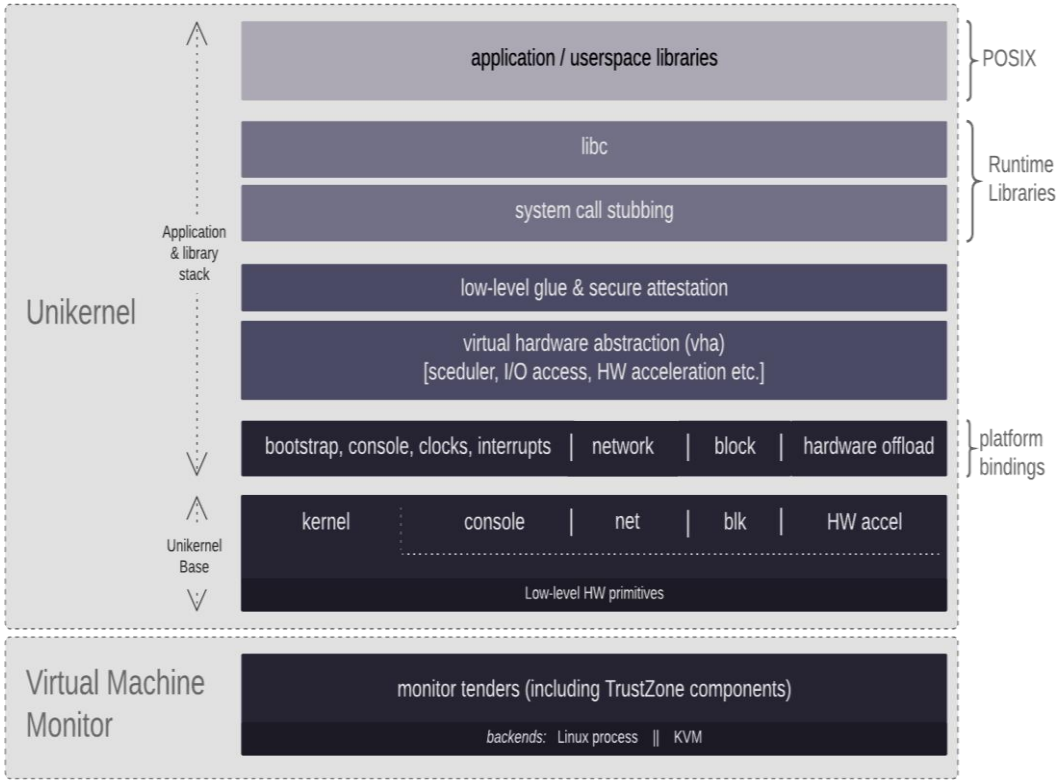
Project Objectives

5G-COMPLETE will:

› Develop a **mmWave point-to-multipoint (PtMP) mesh node** (SDN compatible) and an integrated **THz transceiver** to enhance functionality and capacity at the network's edge.



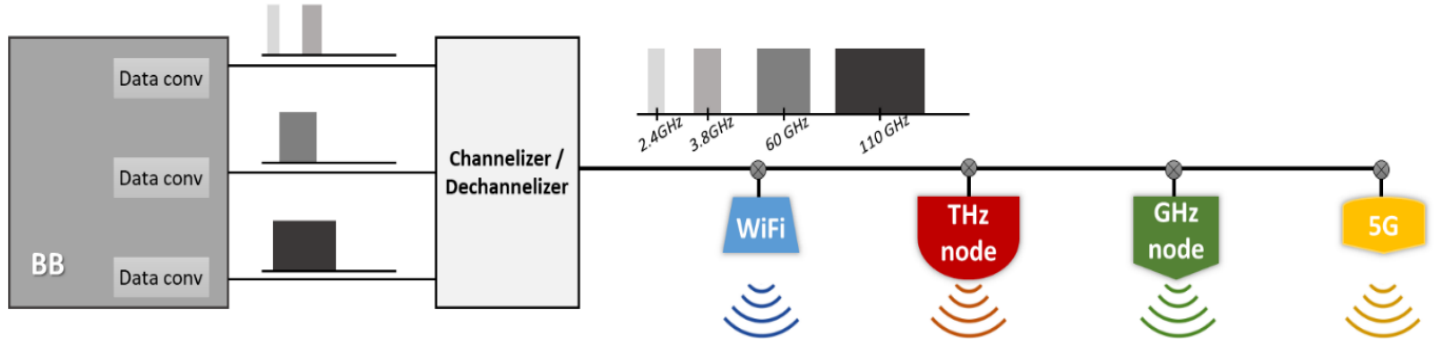
› Deploy **serverless computing paradigms at the edge for** low latency services.

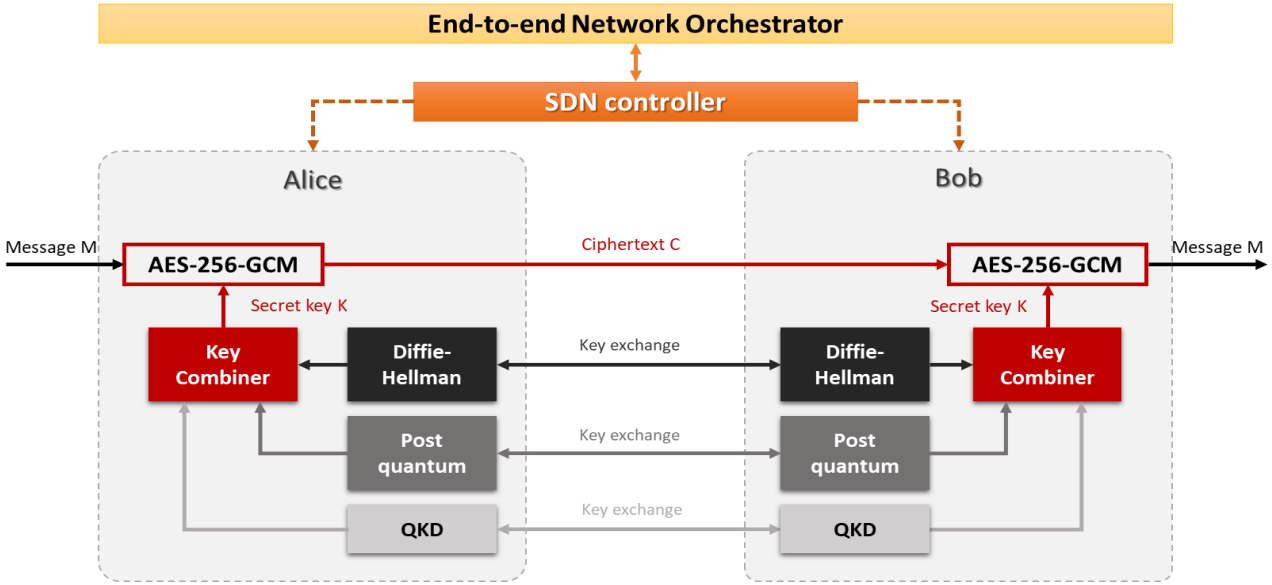


Project Objectives

5G-COMPLETE will:

› Develop **an advanced DSP platform** to increase optical layer connectivity bandwidth and support up to THz frequencies baseband processing in a mutli-technology radio environment



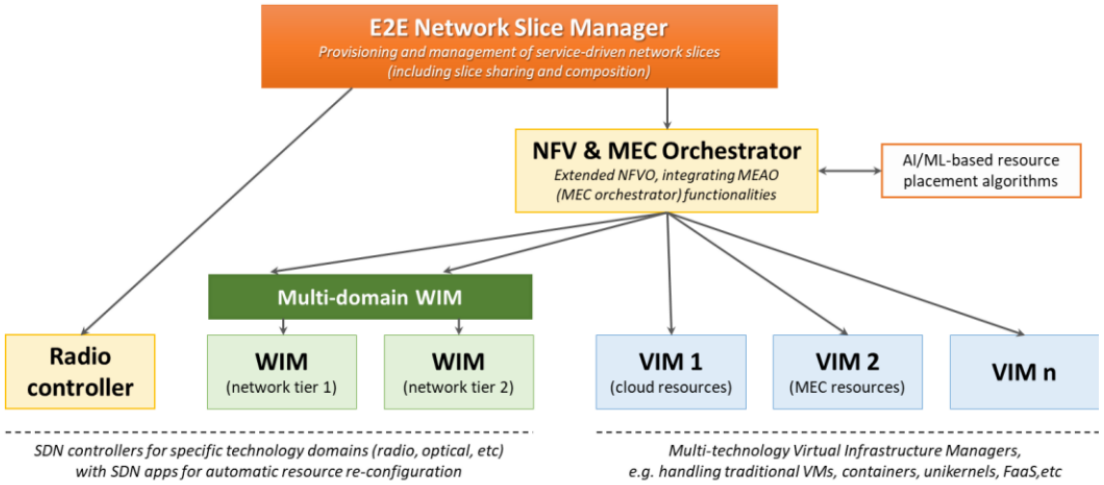


› Develop and demonstrate a **toolbox of hardware and software solutions** to support trusted deployment of critical workloads across the host systems.

Project Objectives

5G-COMPLETE will:

› Develop an **end-to-end 5G network slicing management** and **orchestration framework** to dynamically reconfigure a multi-technology network at service runtime.



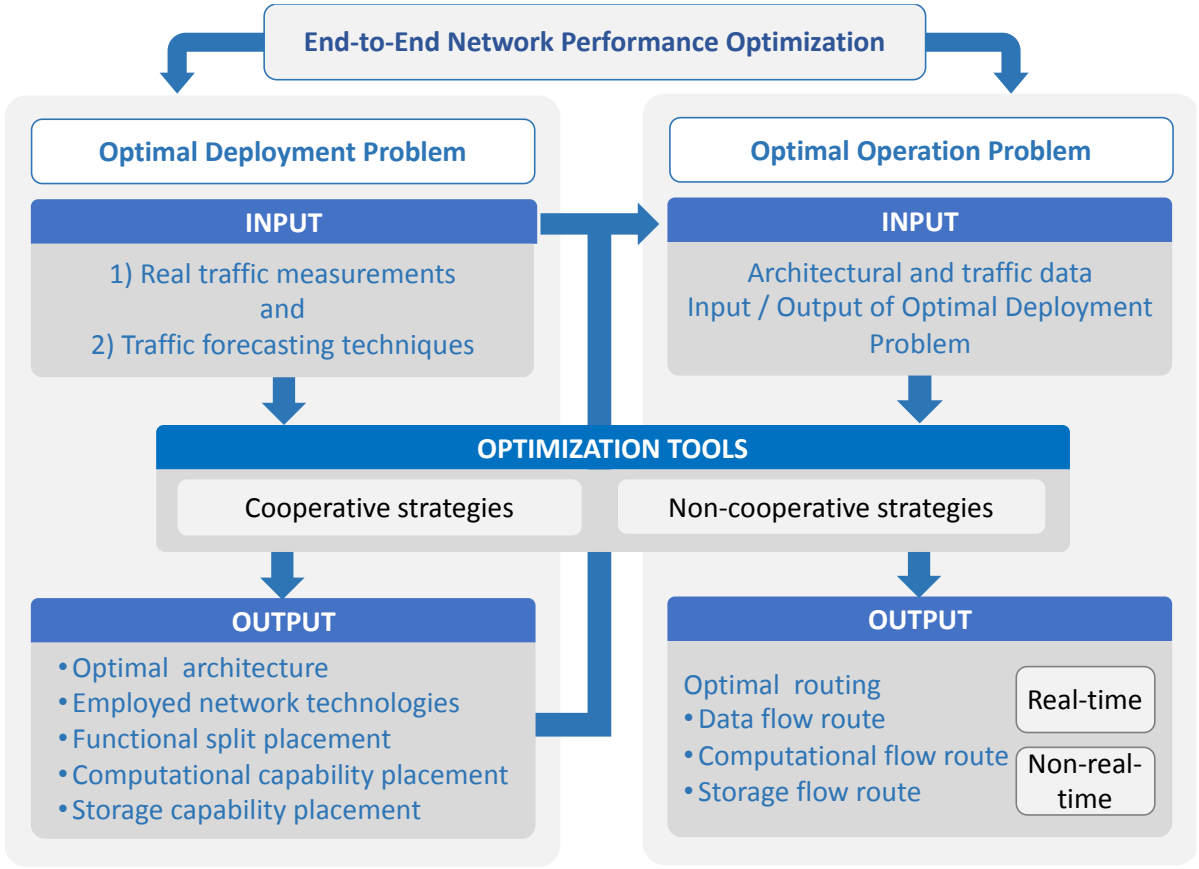
- **Network slicing management layer**
  - Develop new slice sharing strategies, addressing particular challenges related to sharing of virtual functions or network services in multi-tenancy and multi-technology environments.
  - Extend slice management to the radio segment through interaction with a radio controller.
- **Service orchestration layer**
  - Embed edge applications at the service network management.
  - Provide integrated management of centralized and edge resources offered by multi-technology VIMs, jointly with the management of multi-tier network resources.
  - Enhance the resource orchestration mechanisms with optimization algorithms leveraging also AI/ML techniques for the joint computation of “technology-aware” virtual function placement and multi-domain, multi-technology network paths.
  - Provide seamless management of multi-VIM, hybrid NFVI, integrating different kinds of virtualization technologies.

Project Objectives

5G-COMPLETE will:

› Develop joint network, computational and storage **resource allocation optimization algorithms** leveraging AI/ML techniques for efficient end-to-end network performance and self-configuration in a multi-technology and multi-tenancy environment.

- **Optimal Network Deployment**: Develop strategies targeting at the optimal architecture. Also develop traffic forecasting algorithms, being based on both offline and online tools to achieve optimal trade-offs between accuracy and complexity.
- **Optimal Network Operation**: Develop efficient resource allocation algorithms exploiting AI/ML techniques.
- **Develop efficient medium-transparent MAC protocols**, targeting at resource and energy efficiency maximization.



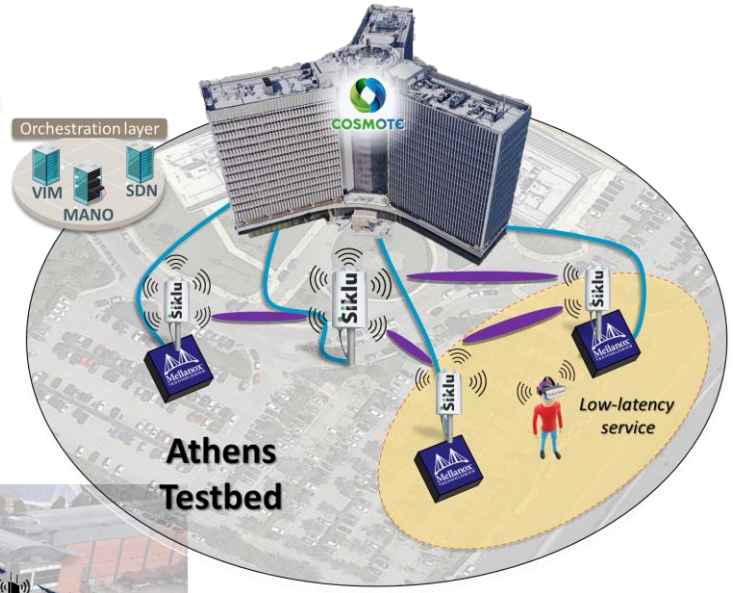
Project Objectives

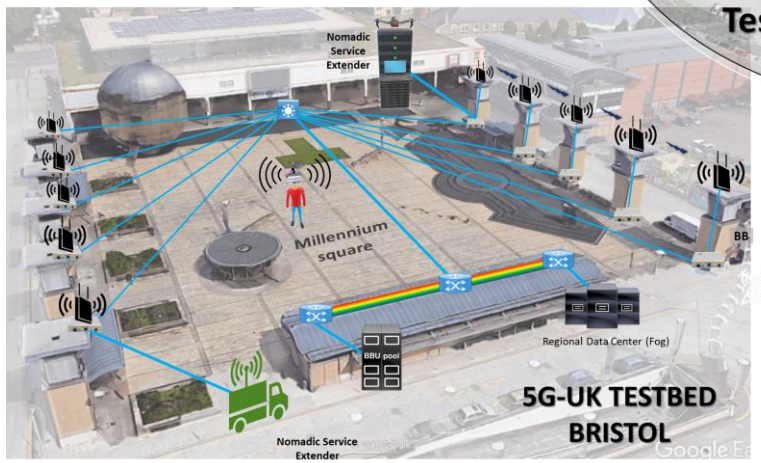
5G-COMPLETE will:

› Validate its 5G network technologies in a series of scalable **lab- and field-trial demonstrators**

Demo sites	Type	Purpose
ΕΠΙΣΕΥ ICCS	Lab scale evaluation	Integration of the developed technologies and architectures
orange™	Lab scale demonstration	Software-based control of both optical/mobile
COSMOTE IASA	Lab scale demonstration/ infrastructure slice	Energy metering applications
COSMOTE ΕΠΙΣΕΥ ICCS	Live demo/edge computing test zone	Integration of the deployed computing nodes for low-latency services
University of BRISTOL	Final field trial/ Live demonstration of 5G services	Live demonstration of 5G COMPLETE concept

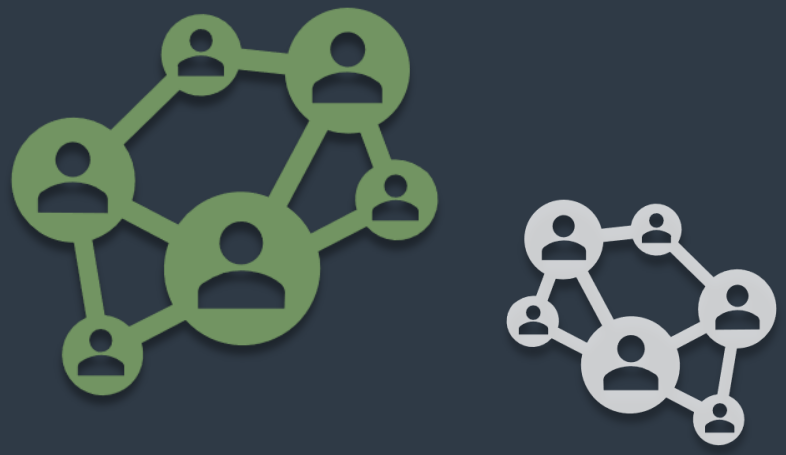
5G-COMPLETE's results will be validated in a range of scalable lab- and field-trial demonstrators in Athens (Greece), Lannion (France) and Bristol (UK).





› Deliver a holistic roadmap and business plan analysis for the cost-efficient and smooth migration into 5G networks

Project Coordination



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Thank You!

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