

Xhaul: the 5G Integrated fronthaul/backhaul

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In a nutshell

- Xhaul: the 5G Integrated fronthaul/backhaul
- EC Contribution: 7.942.521 €
- Duration: 30 Months
- Effort: 981 PMs
- Starting date: 07/01/2015
- 21 partners:
 - Coordinator: University Carlos III of Madrid
 - NEC Europe
 - Ericsson AB
 - Ericsson TI
 - ATOS
 - NOKIA
 - Interdigital Europe
 - Telefonica
 - Telecom Italia
 - Visiona
 - Eblink
 - Nextworks
 - CoreNet Dynamics
 - Telnet
 - FhG-HHI
 - CTTC
 - Create-Net
 - Politecnico di Torino
 - Lunds University
 - ITRI
 - Orange

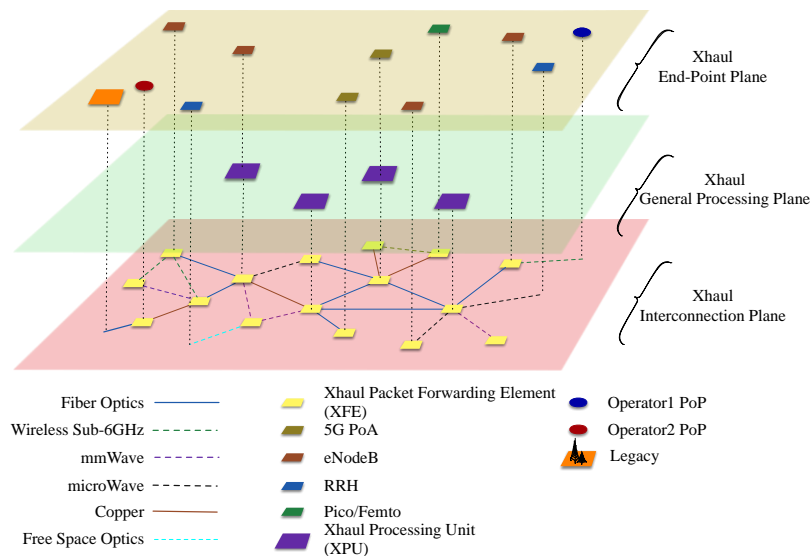
Motivation

- Operators looking for mechanisms to reduce CAPEX/OPEX in an scenario with reduced ARPU and increased needs in terms of infrastructure
- C-RAN is an effective way of reducing cost of deployment but it poses several challenges for 5G:
 - Point to point links between REs and RECs, does not allow to take advantage of cloud.
 - Two distinct and separated networks to manage, increased OPEX
 - Fiber deployments required and current technologies use too much BW for 5G (order of tens of Gbps)

Summary

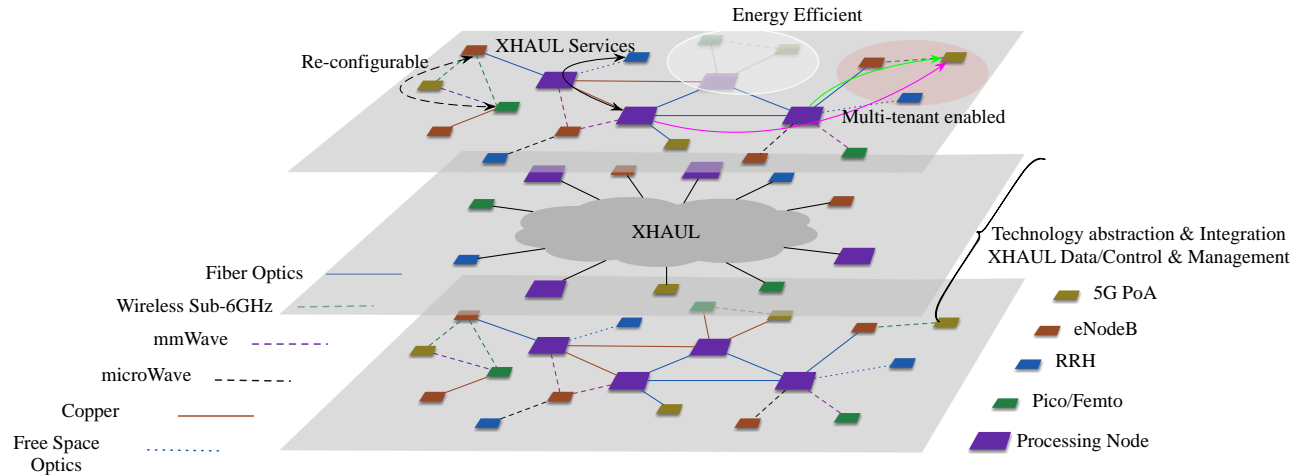
- Xhaul aims at developing an adaptive, sharable, cost-efficient 5G transport network solution integrating the fronthaul and backhaul segments of the network.
- This transport network will flexibly interconnect distributed 5G radio access and core network functions, hosted on in-network cloud nodes, through the implementation of two novel building blocks:
 - a control infrastructure using a unified, abstract network model for control plane integration (Xhaul Control Infrastructure, XCI);
 - a unified data plane encompassing innovative high-capacity transmission technologies and novel deterministic-latency switch architectures (Xhaul Packet Forwarding Element, XFE).
- Xhaul will greatly simplify network operations despite growing technological diversity. It will hence enable system-wide optimisation of Quality of Service (QoS) and energy usage as well as network-aware application development.

Physical Infrastructure of Xhaul



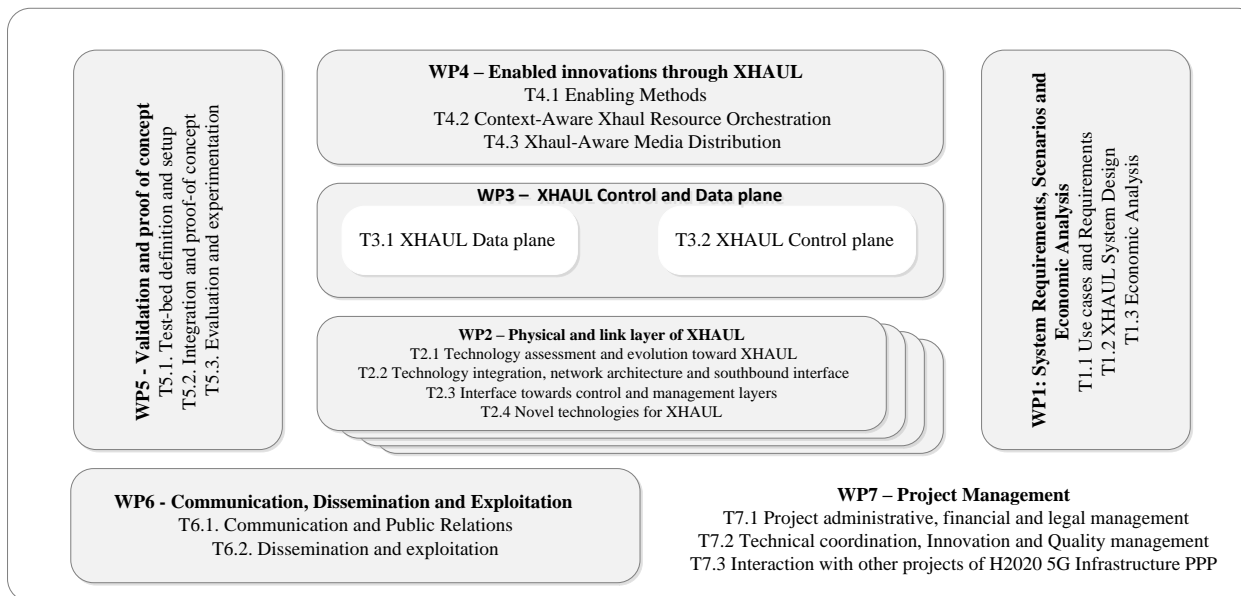
- The “Interconnection Plane” makes use of Xhaul Packet Forwarding Elements (XFE) to interconnect a broad set of novel technologies to create a packet-based network that can meet the demands of 5G networks.
- The “Xhaul General Processing Plane” shows the different Xhaul Processing Units (XPUs) that carry out the bulk of the operations in the Xhaul.
- The different functional distributions between 5GPoA and XPU relation and the different services that can be hosted in the XPUs are represented by the different connection options between the uppermost (“End-Point Plane”) and the middle layer.

Functional Architecture of Xhaul



- The middle layer represents one of the key concepts associated to Xhaul: the integration of the different technologies (including **fronthaul and backhaul**) in a common packet network based on **technology abstraction, unified framing and common data, control and management planes**.
- Finally, the upper layer presents a selection of the features offered by the Xhaul infrastructure

WP structure



- WP1: System Requirements, Scenarios and Economic Analysis (TI)
- WP2: Physical and link layer of Xhaul (TEI)
- WP3: Xhaul Control and Data Plane (NOK-N)
- WP4: Enabled Innovations through Xhaul (NEC)
- WP5: Validation and proof of Concept (FhG-HHI)
- WP6: Communication, Dissemination and Exploitation (IDCC)
- WP7: Project Management (UC3M)



Thank you!