Innovation Projects 2016

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5G-Crosshaul Project

ETSI MEC IEG #17
Madrid, 17th-18th of March, 2016

Telefónica I+D / GCTO Unit
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5G-Crosshaul motivation and objectives

Motivation

- Operators looking for mechanisms to reduce CAPEX/OPEX in an scenario with reduced ARPU and increased needs in terms of infrastructure
- C-RAN as initial trigger for an effective way of reducing cost of deployment but it poses several challenges for 5G:
  - Point to point links between RRUs and BBUs, 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)
  - Deployment of new services and technologies (e.g., MEC)

Objectives

01 Developing an adaptive, sharable, cost-efficient 5G transport network solution integrating the fronthaul and backhaul segments of the network

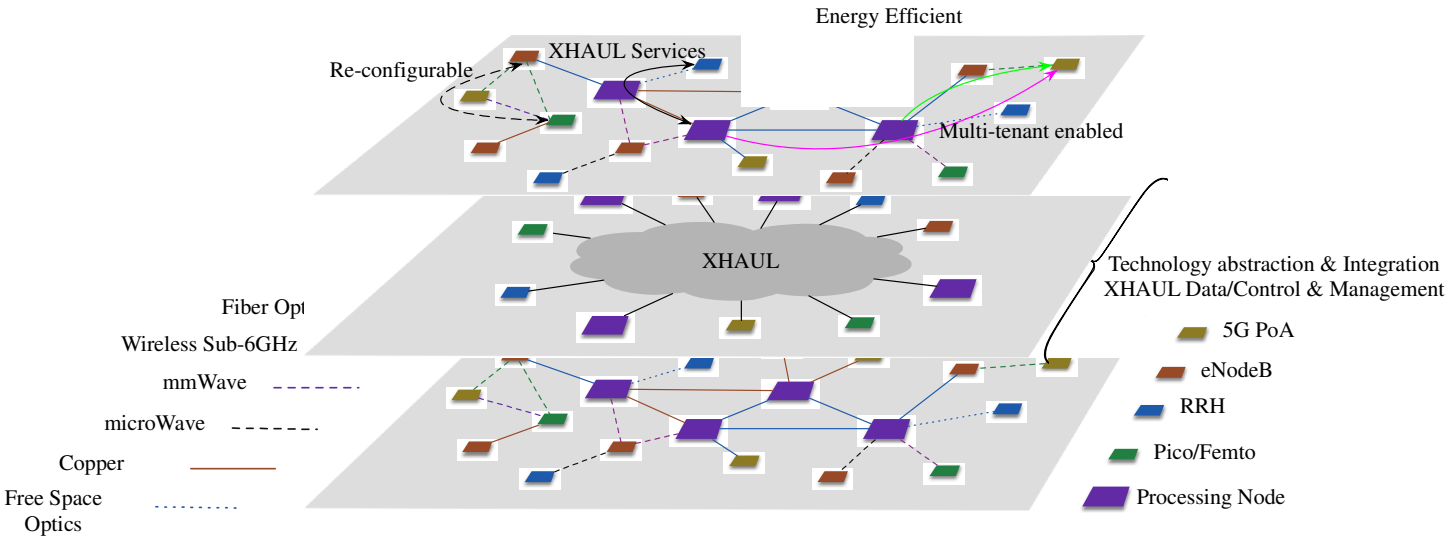
02 Flexibly interconnect distributed 5G radio access and core network functions. Deployment of new services on top of a cloud-alike infrastructure leveraging on multi-tenancy

03 Enabling system-wide optimization of QoS and energy usage as well as network-aware application development

5G-Crosshaul description

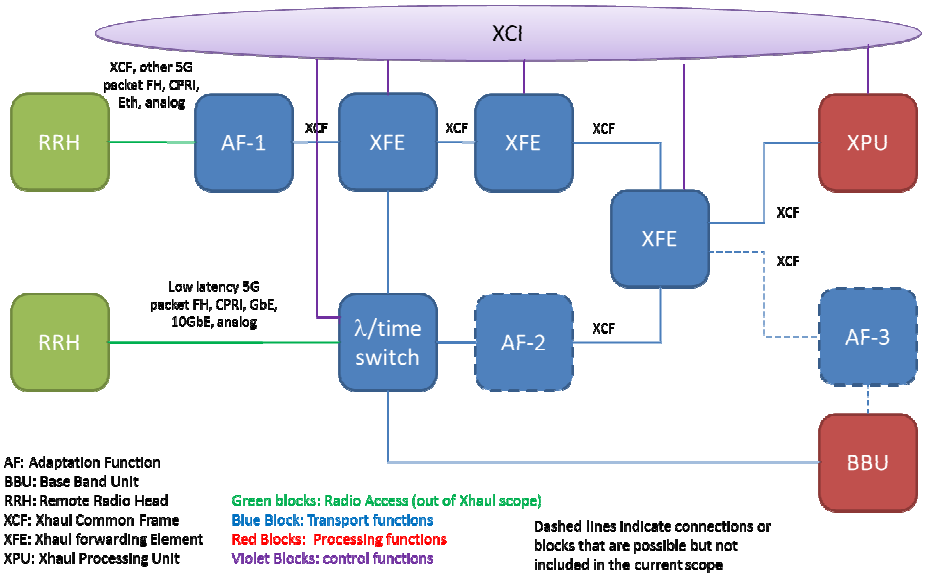
- 5G-Crosshaul aims at developing an adaptive, sharable, cost-efficient 5G transport network solution integrating the fronthaul and backhaul segments of the network.
- This transport network will flexibly interconnect distributed 5G radio access and core network functions, hosted on in-network cloud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

5G-Crosshaul – Functional view



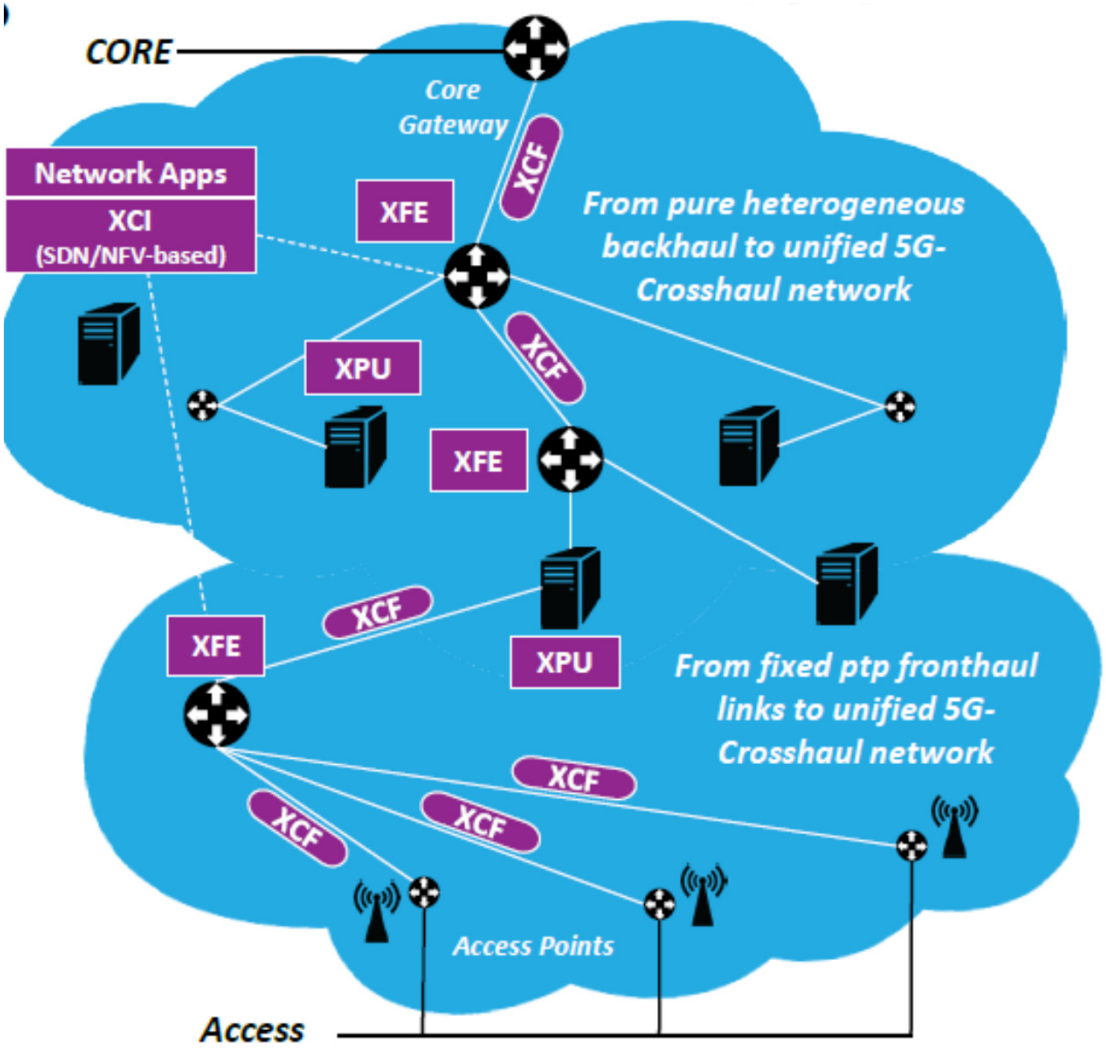
The middle layer represents one of the key concepts associated to Xhaul: the integration of the different technologies (including **fronthaul and backhaul**) in a common packet network based on **technology abstraction, unified framing and common data, control and management planes**.

Finally, the upper layer presents a selection of the features offered by the Xhaul infrastructure



(*) www.xhaul.eu

Building Blocks



5G-Crosshaul - Use cases

- Two main categories:
  - 3 “classical” use cases
    - Vehicular communications (High speed train demo)
    - Media distribution: CDNs and TV broadcasting
    - Dense urban society
  - 2 “transversal”/”functional” use case
    - Multitenant
    - Mobile edge computing

5G-Crosshaul – Project details

21 Partners:

- Operators: Orange, Telefonica, Telecom Italia
- Vendors: Ericsson AB, Ericsson TI, Nokia, NEC Europe, ATOS, Interdigital Europe
- Academia (in Europe): UC3M, FhG-HHI, Lunds University, CTTC, CREATE-NET, POLITO
- SMEs: CND, Telnet, EBlink, Visiona IP, Nextworks
- Non-European partners: ITRI (Taiwan)

Project coordinator: UC3M

Technical manager: NEC

•5TONIC lab is now part of the Sandbox environment for testing

Potential 5G-Crosshaul link with ETSI MEC

- ETSI MEC architecture fitting into XPU resources across 5G-Crosshaul areas
- ETSI MEC control complementing XCI as control element of 5G-Crosshaul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