

SDN in the H2020 5G-Crosshaul project

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Motivation

- 5G will be characterised to users by higher capacities and lower delays
 - 1000x capacity
 - E2E delays below tens of ms
- Operators looking for mechanisms to reduce CAPEX/OPEX in an scenario with reduced ARPU and increased needs in terms of infrastructure
 - While increasing performance

Motivation

- C-RAN is an effective way of reducing cost of deployment and increase performance:
 - Centralised RAN->Split radio in Radio Head and Base Band Unit
 - Radio Head samples radio signal and sends it to Base Band Unit which does the signal processing. This traffic is called fronthaul
 - The requirements of fronthaul are very tight, Gbps@<<1ms





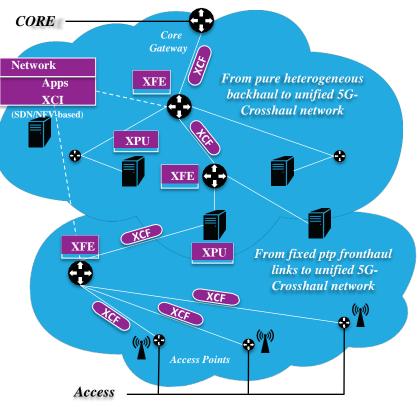


5G-Crosshaul solution building blocks

A holistic approach for converged Fronthaul and Backhaul under common SDN/NFV-based control, capable of supporting new 5G RAN architectures and performance requirements.

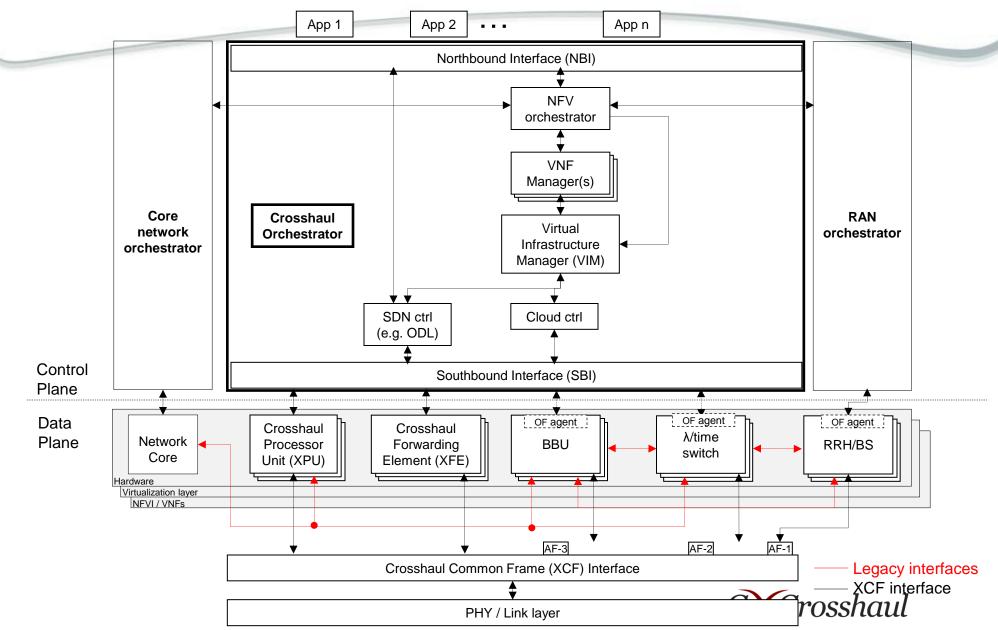
Main building blocks

- XCF Common Frame capable of transporting the mixture of Fronthaul and backhaul traffic
- XFE Forwarding Element for forwarding the traffic in the XCF format under the XCI control
- XPU Processing Unit for executing virtualized network functions (V-RAN)
- XCI Control Infrastructure that is SDN-based and NFV-enabled for executing the orchestrator's resource allocation decisions
- Novel network apps on top to achieve certain KPIs or services





Crosshaul Control Infrastructure



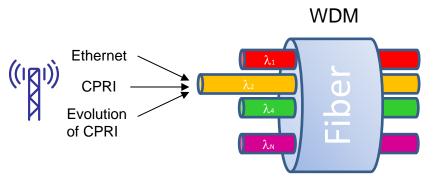
SDN Open Gaps

- Several OpenFlow extensions are needed to support our vision:
 - Support of PBB encapsulation/decapsulation and management
 - Support of Queue management, with TSN (IEEE 802.1CM) properties
 - Extended control over optical/uWave/mmWave technologies
 - Hierarchical SDN control
 - Multi-tenancy
- XCI requires further exploration of SDN/NFV integration
 - How are we controlling holistically the Netwroking+Computing resources
- We are actively pushing our ideas in different SDOs
 - ONF (Wireless Transport)
 - IEEE (IEEE 1914 family, IEEE 802.11, IEEE 802.1 family)
 - ETSI
 - 3GPP
 - ITU



XFE hybrid switch implementation Ericsson Contribution

- Ericsson presents an holistic approach to satisfy the tight requirements of CPRI and its evolution. Key features:
 - An agnostic transport that combines a ((171)) deterministic switching with the advantages of statistical multiplexing.
 - No intermediate processing nodes between radio units and baseband to minimize latency.
 - Use of WDM for efficient exploitation of fibre with realization of integrated optical switch at low cost and low energy consumption.
- Key functional blocks, made by Ericsson, are up and running in 5Tonic test bed.









Thank you!









http://5G-Crosshaul.eu



































