

# 5G X Crosshaul

*the integrated fronthaul/backhaul*



## SDN in the H2020 5G-Crosshaul project

Antonio de la Oliva, UC3M

# 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

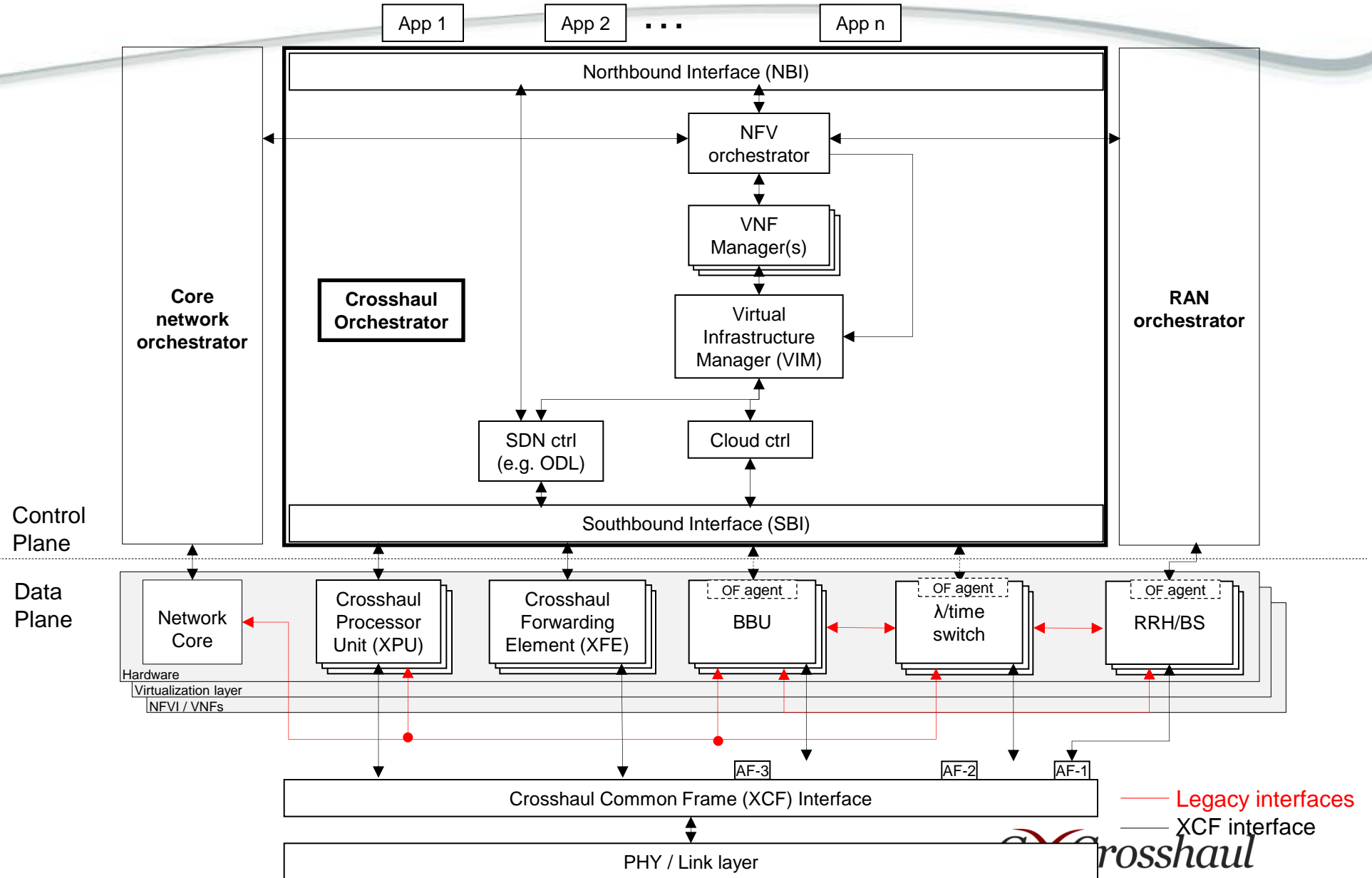
# Motivation

- 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@ $\ll 1$ ms





# Crosshaul Control Infrastructure



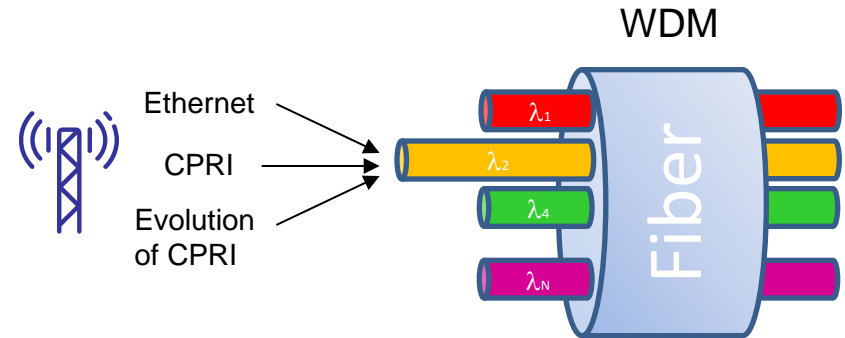
# SDN Open Gaps

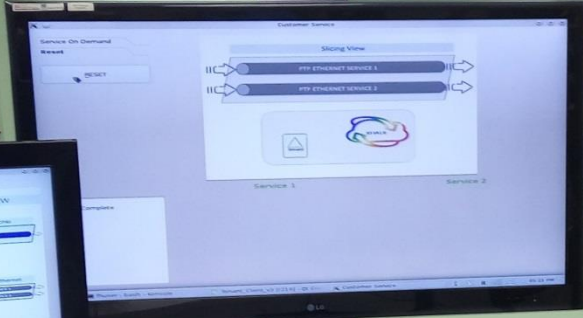
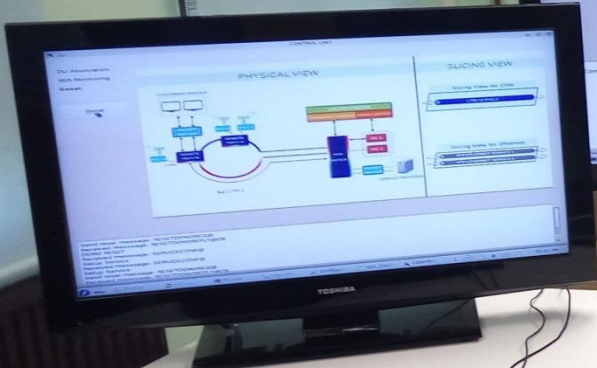
- Several OpenFlow extensions are needed to support our vision:
  - Support of PBB encapsulation/decapsulation and management
  - Support of Queue management, with TSN (IEEE 802.1CM) properties
  - Extended control over optical/uWave/mmWave technologies
  - Hierarchical SDN control
  - Multi-tenancy
- XCI requires further exploration of SDN/NFV integration
  - How are we controlling holistically the Networking+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 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>



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