Flexible Infrastructure for the Development and Integration of Access / Fronthauling Solutions in Future Wireless Systems

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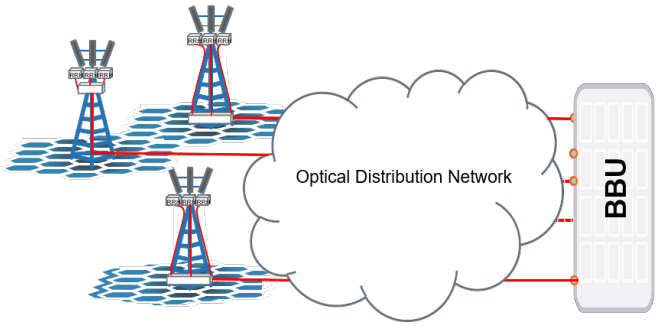
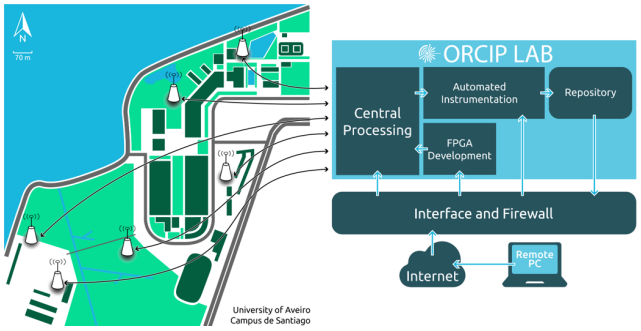
The C-RAN Concept

- Promotes the aggregation of a pool of **remote radio-heads** (RRHs) for centralized processing in a **baseband unit** (BBU).



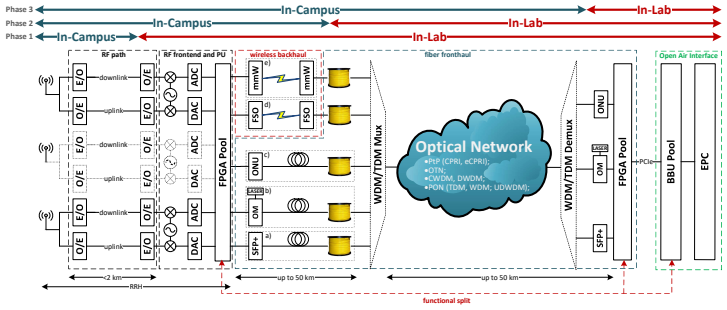
The ORCIP Deployment Plan

- Includes a set of radio heads deployed within the **University of Aveiro Campus** and connected through optical fiber to a **central laboratory**.



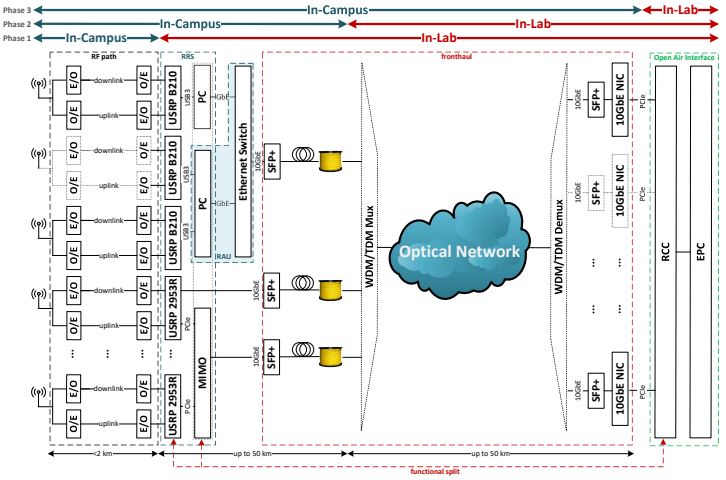
FPGA-based Testbed

- Provide support to more research-oriented developments in the physical layer, such as new **compression algorithms** and **waveforms**, new **transport protocols**;
- Longer time for test and development but **higher flexibility**.



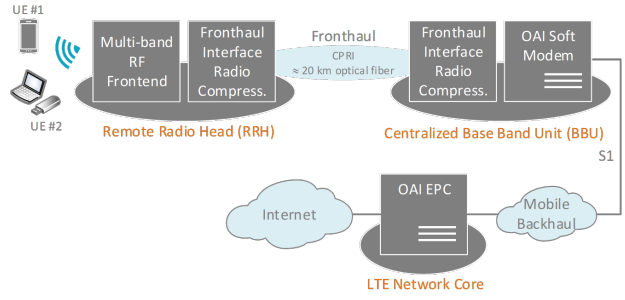
USRP-based Testbed

- For **faster assessment of commercially ready solutions**;
- Uses only commercial off-the-shelf equipment;
- **Shorter time for test and development** but lower flexibility.



A C-RAN Implementation Example

- First Demonstrator Architecture using OAI and CPRI MFH:
  `http://www.openairinterface.org/?page_id=1638`



Currently Operating Setups

- USRP B210 + BBU + EPC, without functional split and 5 MHz LTE support.
- USRP B210 + RRU + RCC + EPC, with split 7.1 and 5 MHz LTE support.
- USRP 2953R + BBU + EPC, with 10G optical interface (SFP+) and 10 MHz LTE support.
- **Next steps** include:
  - improve computational resources to enable support to higher bandwidths;
  - include an ethernet switch to aggregate several USRP B210 on a single BBU;
  - deploy the antennas in the campus using the RoF-based RF path extension.

Conclusions and Future Work

- Our proposed architectures fit the concept of a local C-RAN, where RRHs are deployed within the campus and linked through a fronthaul to a central unit located in a laboratory;
- We consider the existence of a **soft boundary** between indoor (in-lab) and outdoor (in-campus) deployments, enabled by an **RF path extension** based on **analog RoF**;
- The use of **in-house and commercially ready hardware** are separately addressed as complementary solutions for coexisting testbeds.
- **Future work** includes the development of a virtualization layer for the physical testbed, with the aim to provide remote users with seamless access to the research infrastructure.

Bibliography

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