GRADUATE SCHOOL AND RESEARCH CENTER IN DIGITAL SCIENCE

OpenAirInterface Road Ahead

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OpenAirInterface Software Alliance (OSA)

- **Missions**
  - EU-founded initiative to promote development and community around OpenAirInterface (5G RAN/Core) and Mosaic5G (Controllers/Edge) software packages
  - Reference software implementation for 3GPP RAN/CORE including O-RAN/SCF interfaces
  - Software integrity and community-based testing
  - Promote license and collaboration model within 3GPP ecosystem and related initiatives (6G-IA, SNS JU, IPCEI, SLICES-RI, PAWR, Linux Foundation, ONF, etc.)

- **Endowment fund**
  - EU-based (FR) donation platform
  - Strong collaboration with US-based initiative OpenAirX-labs (OAX)
    – ICT-21 EMPOWER Project played a pivotal role in creating this collaboration
    – Many joint technology demonstrations, training/support initiatives, researcher mobility

OpenAirInterface Software Alliance (OSA) Today

- **Current strategic members (12+)**

Returning Mid 2022 !

Expected Mid 2022

- **Donations (2022) :**
  - ➤ ~2,3 Meuro expected in 2022
  - ➤ Currently funding 11+ people full time at OSA Fond de Dotation, main EU-baesd sub-contractors/freelance developers

- **Main developers today**
  - ➤ EURECOM, OSA, Fraunhofer, Allbesmart, OAX, Firecell, Fujitsu, OpenCells, Meta, many individuals

- **Creation of project groups to accelerate development of**
  - ➤ 5G RAN
  - ➤ 5G core network
  - ➤ MOSAIC5G

Running National/H2020 Projects

- **Engage5G (France Relance) FR follow-up of 5G-EVE (H2020 ICT-17)**
  - Cloud-native 5G infrastructure
  - Interconnection with Orange Chatillon/Romania/Poland/Rennes and B<>COM
  - EURECOM/Orange : O-RAN elements (CU/DU, RIC) for fully disaggregated testbed between Sophia Antipolis/Chatillon/Rennes, ONAP orchestration from Orange-PL

- **5G!Drones, 5G-Victori (H2020 ICT-19)**
  - Use-cases (5G SA demo from 5G!DRONES use-case)
  - Outdoor OAI + AW2S 5G SA testing by Orange-RO in Bucharest

- **5G-RECORDS, Affordable5G (H2020 ICT-42), IntelIIoT (H2020 ICT-56)**
  - Explicit OpenRAN integration with EU partners (Accelleran and others)

- **SLICES-SC (H2020 INFRAIA-02)**
  - Stimulate EU academic community on OpenRAN tools and platforms

- **5G-Opera (France Relance, appel Franco-Allemand)**
  - Integration with EU OpenRAN players : Industry 4.0 Private5G objective (AW2S, Kalray, B<>COM, Fraunhofer)

Testing Site @ EURECOM/INRIA
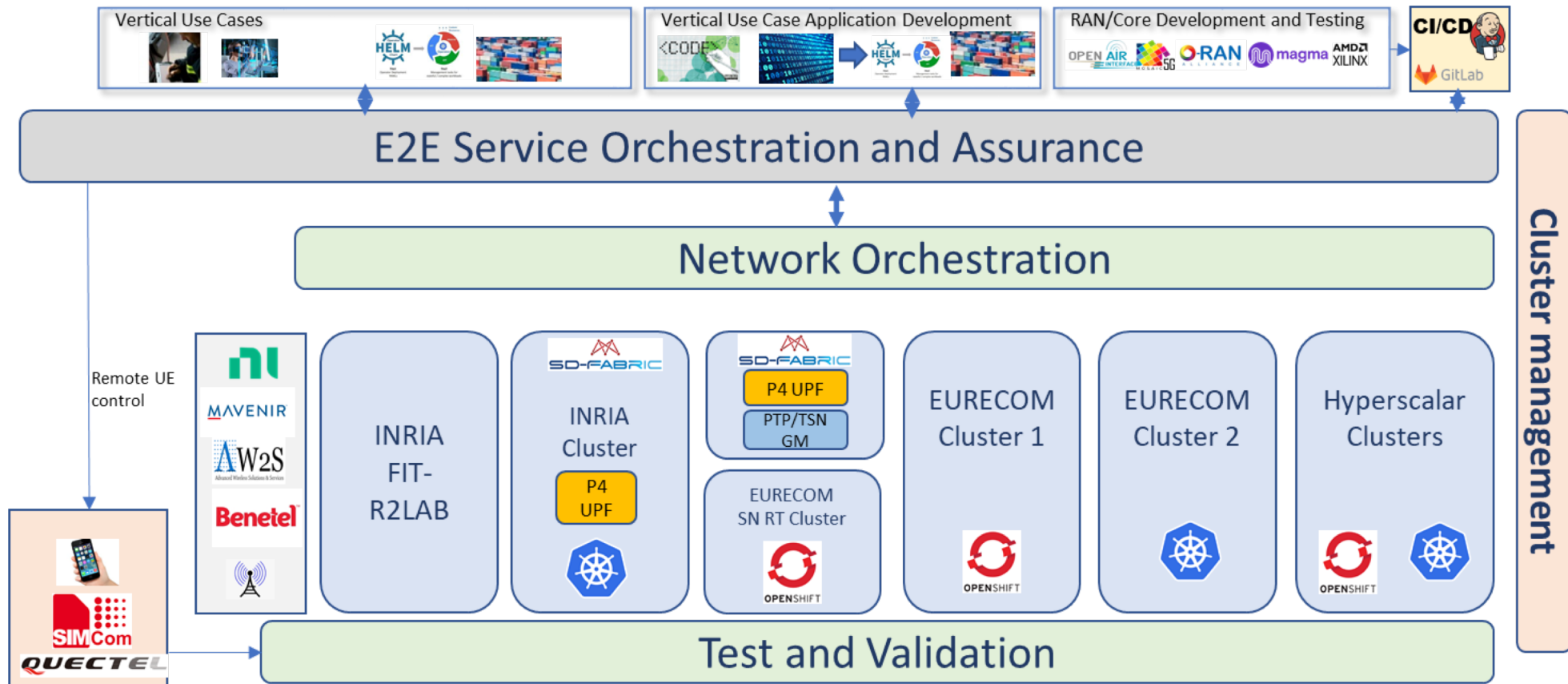
Example of OAI Open-RAN Uses (5G-RECORDS ICT-42 Project)
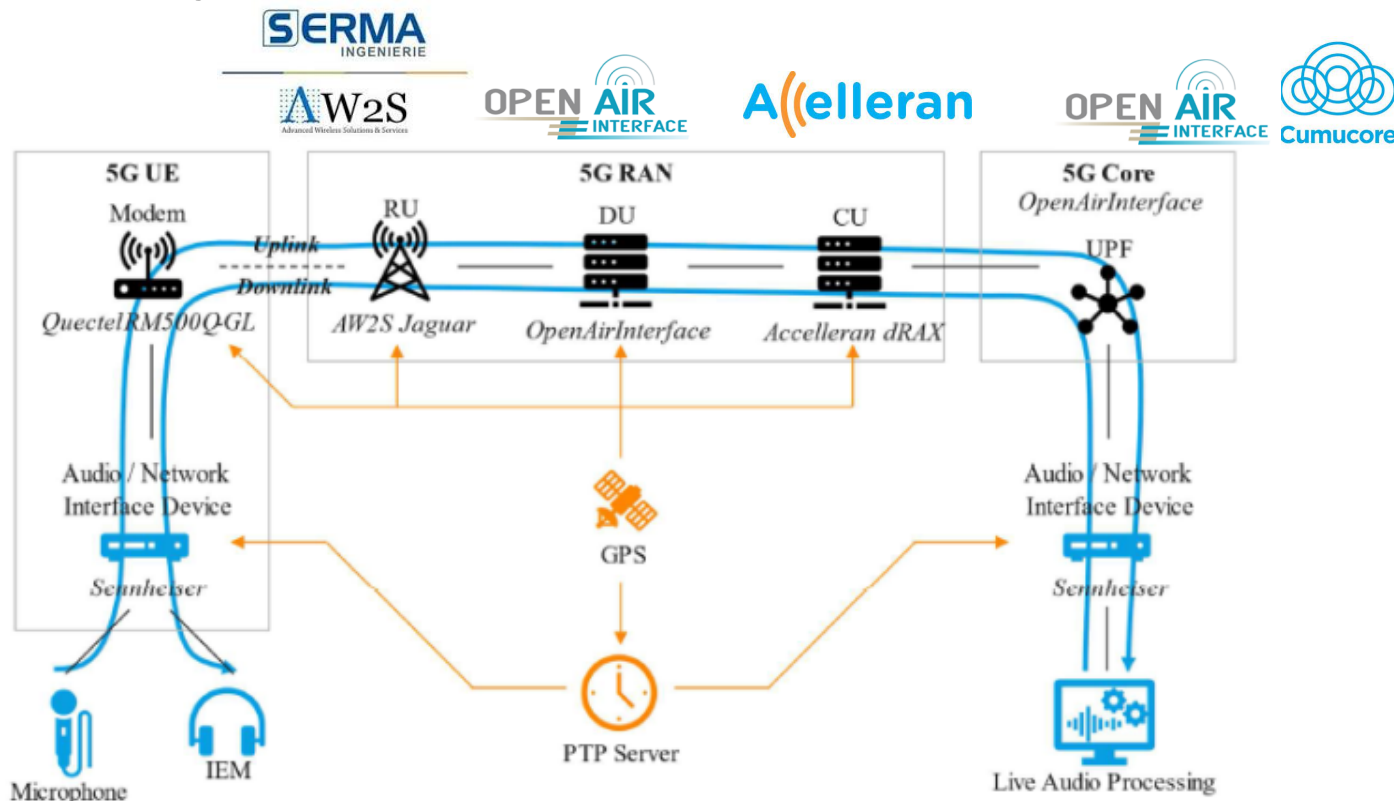
Testing Interoperability

Figure 2: Disaggregated 5G Rel. 15 testbed for evaluation of technical performances in the context of professional live audio production

Targets for OAI-based OpenRAN

- **Fully *open-source code* solution**

- **Interoperable over 3GPP and O-RAN interfaces for disaggregated RAN**

- **Reference solution for interoperability testing**
  - OAI as plug-in replacement for Intel FlexRAN, Radisys L2 currently used in many O-RAN deployments
  - M5G solutions for new NRT/RT-RIC, xAPPS
  - Testing with 3rd party developers of CU/DU (already with Accelleran)
  - Full O-RAN FHI compliance (7.2 interface)
    - Testing with Mavenir, Foxconn, STL and soon AW2S

Where we're going 2022

- Improvements in the OAI software performance so that OAI can deliver high-speed 5G performances, i.e., > 500 Mbit/s DL, > 200 Mbit/s UL

- Enhancements in the quality of OpenAirInterface's 5G software, including adding missing features such as multi-DU support, support for large numbers of user terminals (UE), and testing, to enable OAI to serve the variety of use cases of our community and industrial partners

- Demonstrate interoperability with other manufacturers' equipment through several openRAN interfaces (O-RAN etc.) e.g., F1, (n)FAPI and 7.2 fronthaul

- Completion of remaining 3GPP functional blocks in OAI 5G CN software, addition of advanced functions such as mobility and slicing, and building components to facilitate deployment

- Develop and release the components of MOSAIC5G (FlexRIC, FlexCN and Trirematics) and demonstrate its working to make OAI AI/ML ready for 5G systems and beyond

- Taking charge of MAGMA-TESTING

- Planning and roadmapping for 6G and xG in OpenAirInterface

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Where we plan to be going 2023

- **Important initiatives through France Relance/IPCEI**
  - Stimulate French/EU ecosystem around OAI
  - French/EU Initiatives considering OpenRAN components from OAI alongside industry solutions.
    - bring the quality of the software up to industrial closed OpenRAN (!) solutions
  - Trials of OAI/AW2S RAN on the French territory
    - Test viability of community-based software components and EU-based radio solutions for rural deployments

- **Testing and Prototyping**
  - UE prototyping platforms for 5G-advanced/6G (with Nokia)
  - Continue TTCN-3 integration for UE protocol testing (with Sequans/Firecell)

- **Integration in SNS JU**
  - New computing architectures
    - OAI on RISC-V
    - HW accelerators on cloud fabric
  - Kickstart of SLICES-RI Telco components
  - 6G technologies through Stream-B/C

- **New O-RAN xG initiatives**

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Conclusions

- **OAI is gaining a lot of traction on both ends of the Atlantic**
  - Primary user-base outside of EU is in the USA
  - Need to increase *development-community* in USA
  - Elements are in place thanks to EMPOWER

- **2022 is a critical year for OAI on the road to 6G**
  - 6G architecture studies
  - SNS JU
  - IPCEI
  - O-RAN interoperability / O-RAN xG

- **EU support is on the rise**

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OAI : open-source solutions for 3GPP RAN,Core and RIC/Edge

1999-2004 Wireless3G4Free
First projects RNRT (with FT R+D).

2005 OpenAirInterface MIMO/OFDM (pre-4G)
Use in EU projects (Thales) and ANR (Orange)

2008 4G Standard
Realigning OpenAirInterface for LTE

2012-13 First 4G Interoperability
COTS R8 Ues
ALU (Nokia) LTEBOX EPC
Ericsson Commercial EPC

2014 Creation of OAI Software Alliance
2016 Creation of Mosaic5G

2017 OAI License

HORIZON 2020
LE PROGRAMME DE RECHERCHE ET D'INNOVATION DE L'UNION EUROPÉENNE
5G EVE

Cloud-Native
kubernetes

5G interoperability 2020 NSA, 2021 SA

O-RAN ALLIANCE interoperability 2021 E2, 2022 FHI

2015-16 Strategic Members

2018

2019

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