# Aether community meeting - CPqD

Daniel Lazkani Feferman, Nov/2022

## Agenda

- Who we are?
- Our projects
  - OpenRAN @Brasil
  - PLAT5GBR
- Lessons learned
- Demo

# CPqD


**897**
COLLABORATORS

**352**
NATIONAL PATENT PROCESSES

**172**
INTERNATIONAL PATENT PROCESSES

**2 SPIN-OFFS**

TRÓPICO (WIRELESS AND DATA NETWORKS)
PADTEC (OPTICAL COMMUNICATIONS)

- **Founded in 1976** as the R&D branch of Telebrás (public national telecom operator)
- After the **privatization process in 1998** it became a **private not-for-profit foundation**
- Largest ICT R&D Program in Latin America
- Revenues of R$ 229 mi (~ €37 mi) in 2019
- Presence in all telecom operators in Brazil and some in Latin America (OSS Suite)
- Certified labs for compliance testing according to local regulations
- Host of a TIP Community Lab
- Brazilian branch of the BRICS Institute for Future Networks Initiative
- Deep knowledge of the local regulatory framework and market structure

# CPqD


Areas of knowledge

- Cognitive Computing
- Advanced Computing
- Wireless Communications
- Optical Communications
- Data Networks
- Sensor Systems
- Power Systems
- Embedded Electronics
- Information and Communication Security

# Our projects

openRAN BRASIL

Plataforma 5G BR

cpqd

RNP

ORGANIZAÇÃO SOCIAL DO MCTI

cpqd

# Brazilian National Research and Education Network

RNP
ORGANIZAÇÃO SOCIAL DO MCTI
Educação, Pesquisa e Inovação em Rede

## Who we are

We are an advanced national network for higher education, research and innovation. In 1992, we helped bringing the internet to Brazil and we continue promoting innovative use of Information and Communication Technologies, driving science and education for all.

## Global connectivity

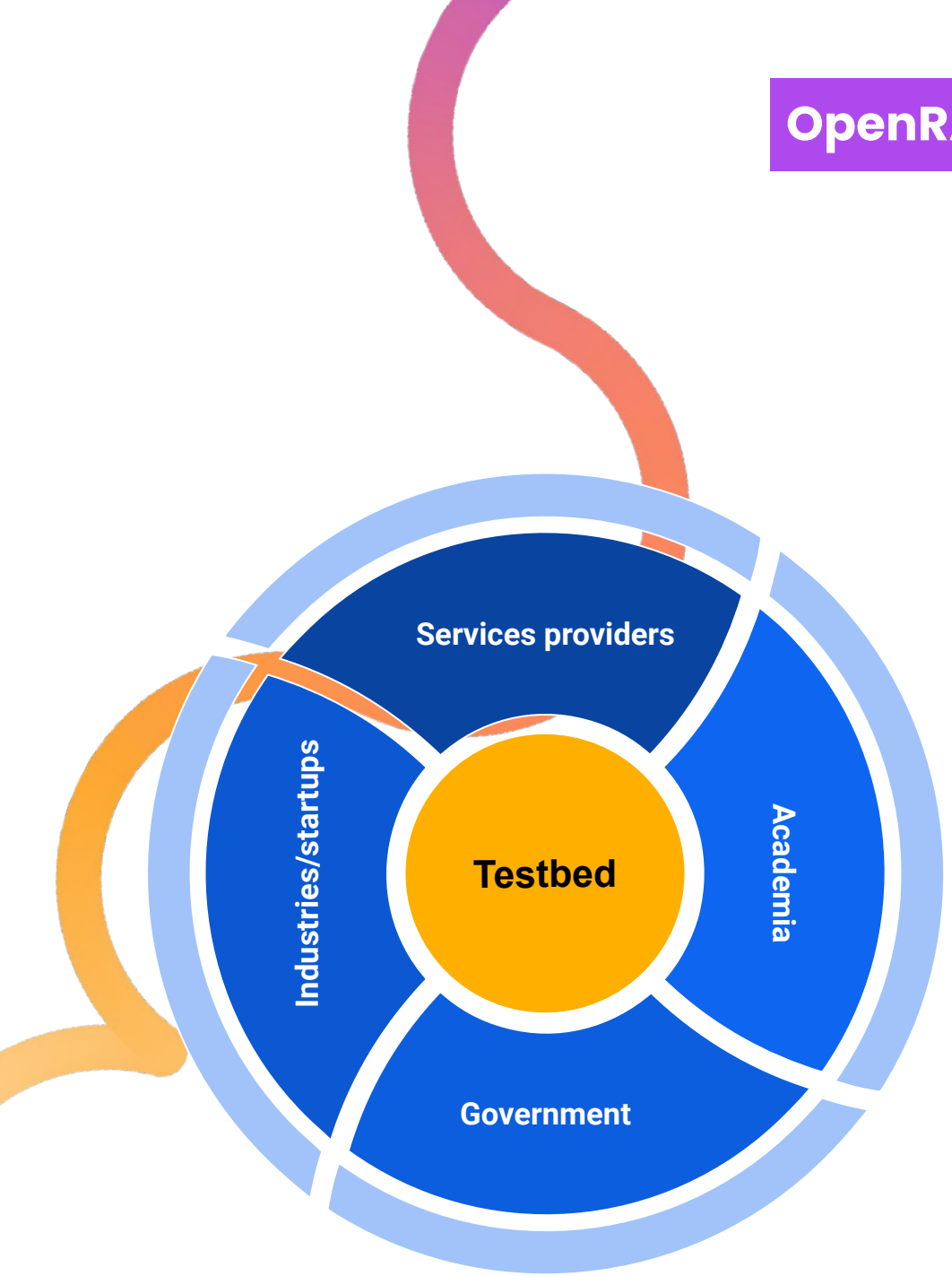
We are connected to other international academic networks by direct connections with South America, North America and Europe.

| 800 | + than 4 million | + than 100 GB/s |
|---|---|---|
| connected organizations | users | connection speed |

## Points of Presence

The infrastructure of Rede Ipê encompasses 27 Points of Presence (PoPs), one in each state, in addition to branches to serve 1522 campuses and units of education, research and health institutions throughout the country, benefiting millions of users.

# OpenRAN @Brasil




- A platform to research, develop and test new technologies and use cases
  - ex: 5G applications
- **State-of-the-art** technologies
  - ex: Open RAN, SDN, 5G, etc
- **Learning** environment
  - ex: how to operate new cloud paradigm and automate telco world
- **Lab** used for new technologies validation
  - ex: multi-domain orchestration, *xAPPs (RIC), applications, etc*
- Space to **promote** the development of Open RAN solutions through 5G applications

# PLAT5GBR

Development of end-to-end 5G network technologies, targeting private network markets, and small and medium providers.

A 5G system considering different technologies. Examples: virtualization, automation, orchestration, MEC, RIC, OSS/BSS, etc

We are currently in the first phase of 5G deployment, focused only on increasing data rates (eMBB). There are many challenges and opportunities for the effective rollout of 5G in massive IoT (mMTC) and critical communications (URLLC).

# PLAT5GBR

Development of 5G core and RAN through virtualization and disaggregation. Integration with an RU (Radio Unit) compatible with open architectures (TIP, O-RAN Alliance)

Development of the services and infrastructure automation platform aimed at, among other objectives, the creation, control and monitoring of network slices in 5G networks.

Integration into a Proof of Concept (PoC) for private networks and ISP's markets, integrating all developed functionalities (vRAN, Core, NFV, SDN, MEC, OSS/BSS)

# PLAT5GBR – targets

1. Open RAN: Virtualized and Disaggregated

2. Distributed cloud architecture

3. Multi-access Edge Computing (MEC)

4. IPv6 compatibility

5. SDN centralized data centers

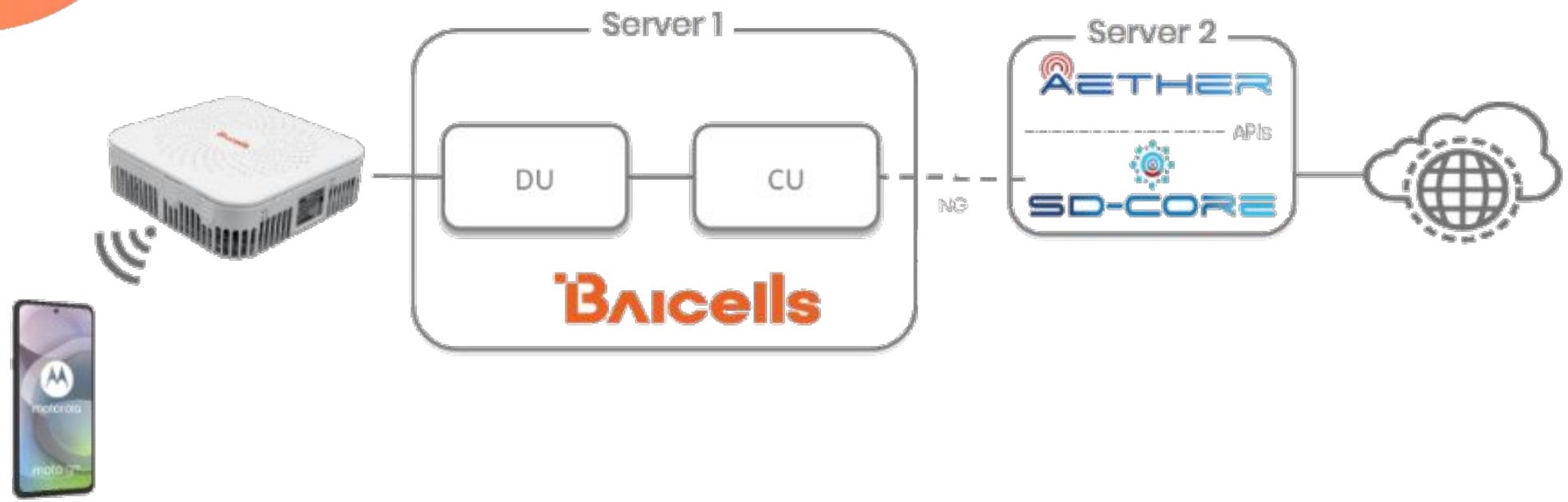
6. Simple and scalable infrastructure

7. E2E infrastructure automation

8. Unified OSS/BSS

# PLAT5GBR – setup & achievements

- Virtualized Open RAN
- High performance 5G Core with DPDK supporting multiple slices
- Using Aether as the Orchestrator

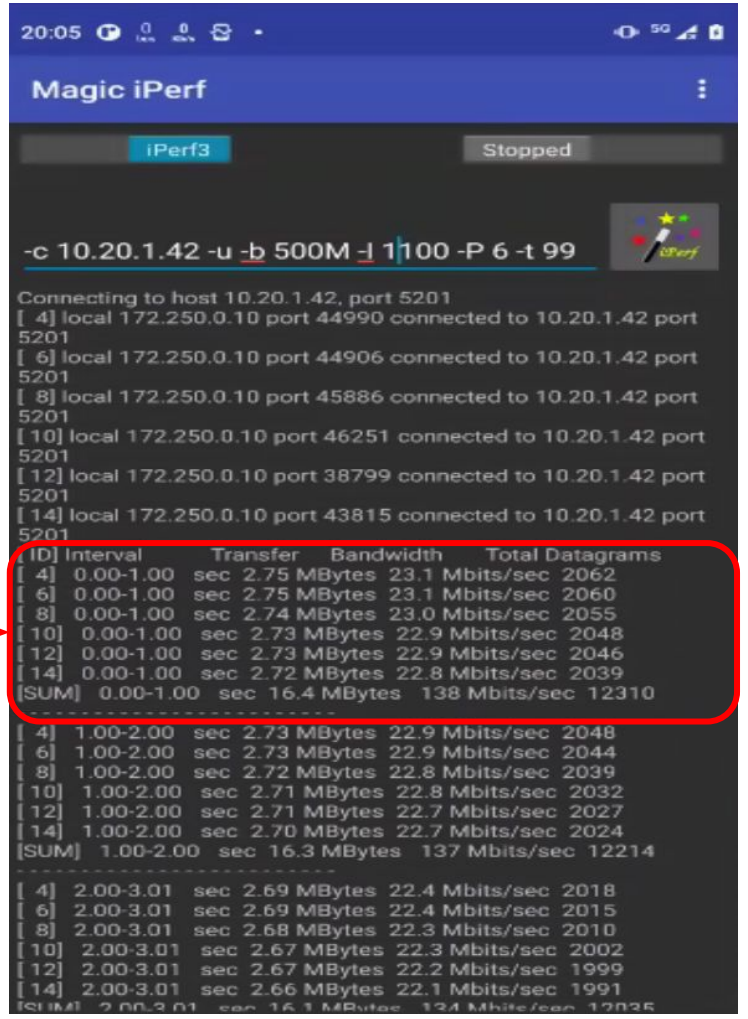


# PLAT5GBR

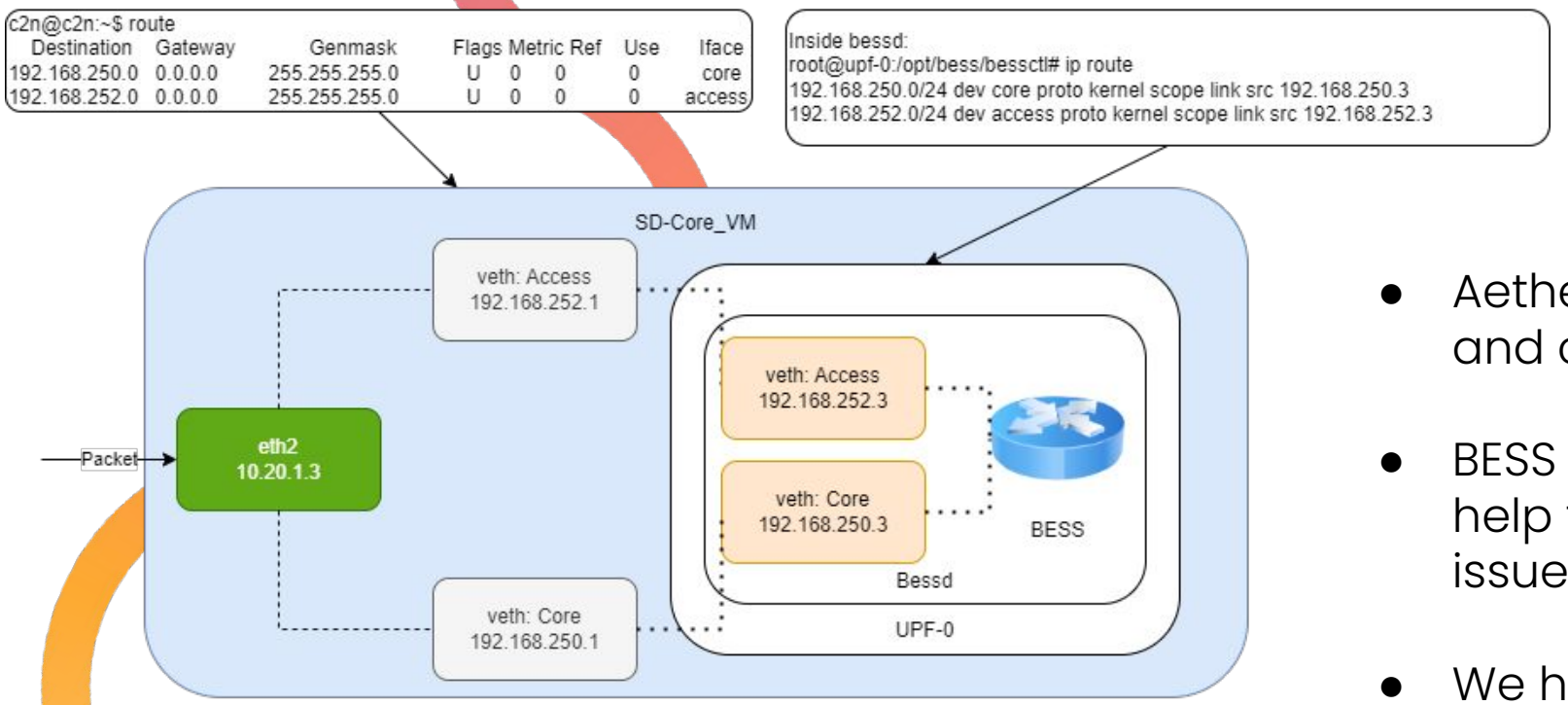

- We have done 3 validations:
  - USRP B210 (using OAI)
  - Amarisoft gNB
  - Baicells:
    - iperf3

    DL: 989Mbps

    UL: 138Mbps

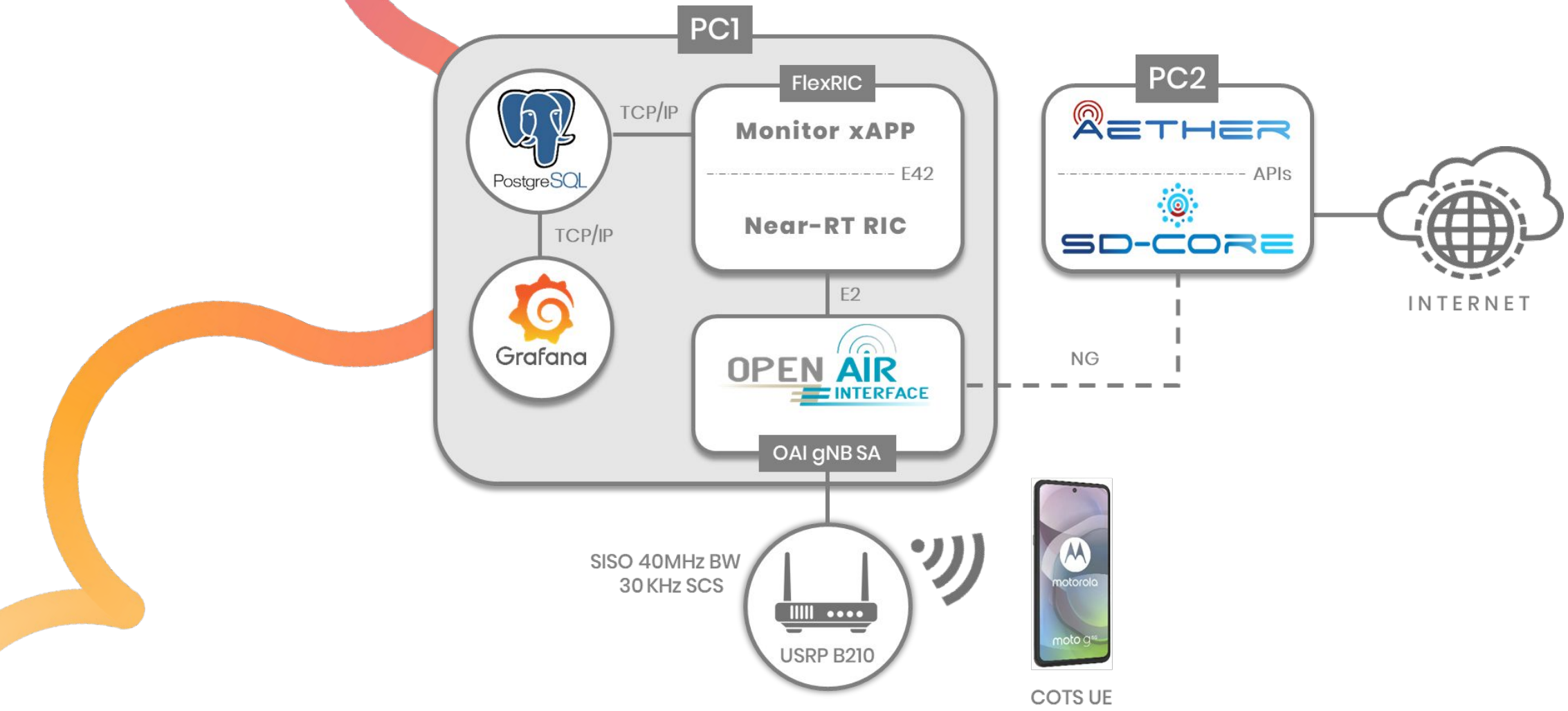


# Lessons learned




- Aether-in-a-box uses access (N3) and core (N6) macvlan interfaces
- BESS contains a GUI which can help troubleshoot connectivity issues
- We have been contributing back to the community by Identifying bugs and documentation issues

# Setup E2E Architecture



Activities scrcpy sex 17:27 pt

Trash

moto g 5G

RAN KPI debug - Dashbo

192.168.10.144:3001/d/vh_cAhI4k/ran-kpi-debug?orgId=1&refresh=5s&var-ERB_ID=35

General / RAN KPI debug

Last 5 minutes 5s


DL ?

UL ?

Aether

192.168.10.146:31194/slice 70%

AETHER

Slice

| Name (ID) | Description | Enterprise | Site | Filter | Default Behavior | QS | MBR | Device Group | SD | SST | UPF | Edit |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| AiaB Slice (aiab-vcn) | | aiab-enterprise | aiab-site | | ALLOW-ALL | 5g | ↑ 1000000000 ↓ 500000000 | aiab-device-group | 10203 | 1 | aiab-upf | |

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Throughput

Data is missing a time field

DL ?

UL ?

# Aether community meeting - CPqD

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Conecte-se ao novo

Support:

FUNTTEL

Finep
INOVAÇÃO E PESQUISA

MCTI

COM

PÁTRIA AMADA BRASIL
GOVERNO FEDERAL