srsRAN Project

Deployable Open-Source RAN Solutions

FOSDEM 2024
Sunday February 4th, Brussels, Belgium

Andre Puschmann
andre@srs.io

SRSRAN PROJECT

FOSDEM 2024
Brussels / 3 & 4 February 2024

Outline

- **Demystifying 4G and 5G Repositories**
- srsRAN Project ORAN-native CU/DU
- Demo

github.com/srsRAN

srsRAN

Open Source 4G/5G from Software Radio Systems (SRS)

207 followers https://www.srsran.com @srsranproject info@srs.io

Pinned

Customize pins

srsRAN_4G Public

Open source SDR 4G software suite from Software Radio Systems (SRS) https://docs.srsran.com/projects/4g

C++ 3.2k 1.1k

srsRAN_Project Public

Open source O-RAN 5G CU/DU solution from Software Radio Systems (SRS) https://docs.srsran.com/projects/project

C++ 265 75

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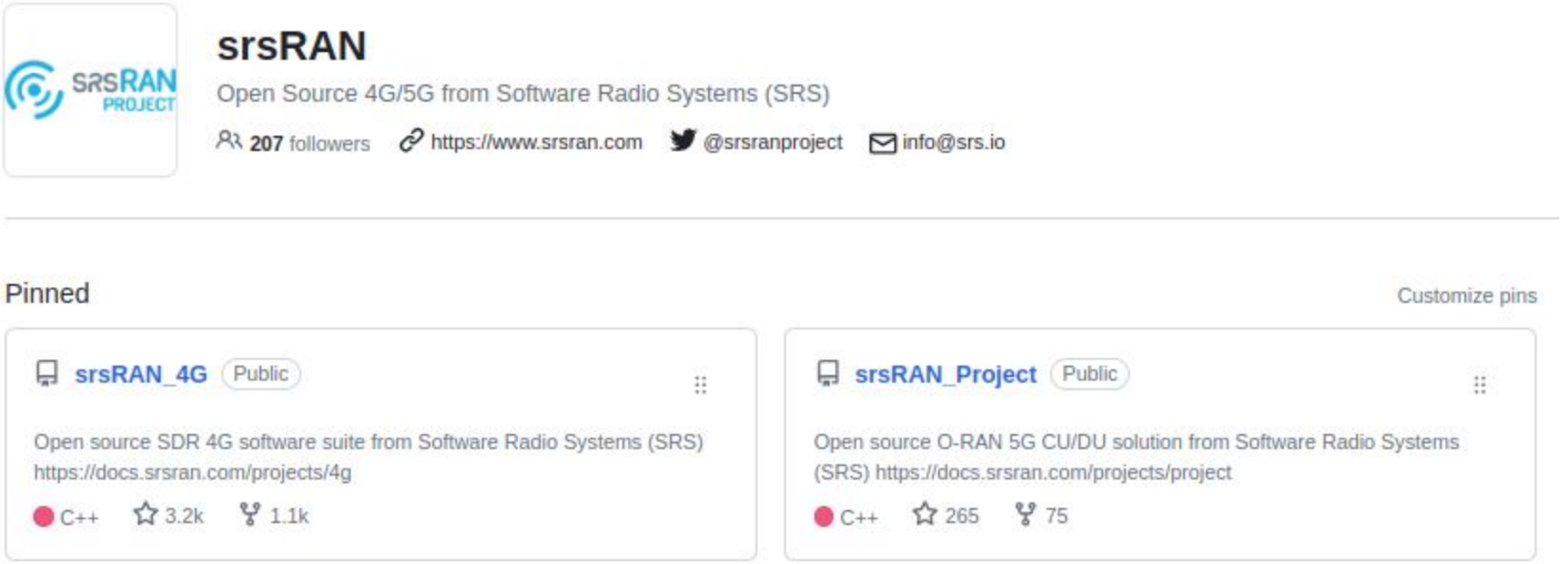
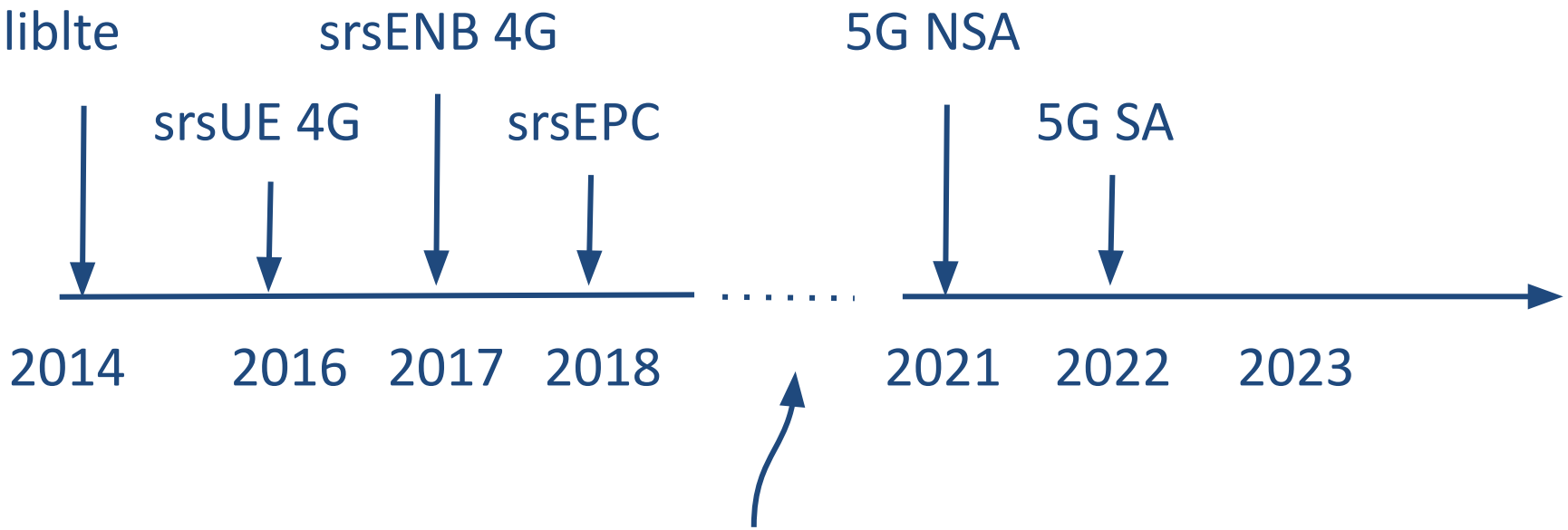
github.com/srsRAN



Who's doing 4G and/or 5G?

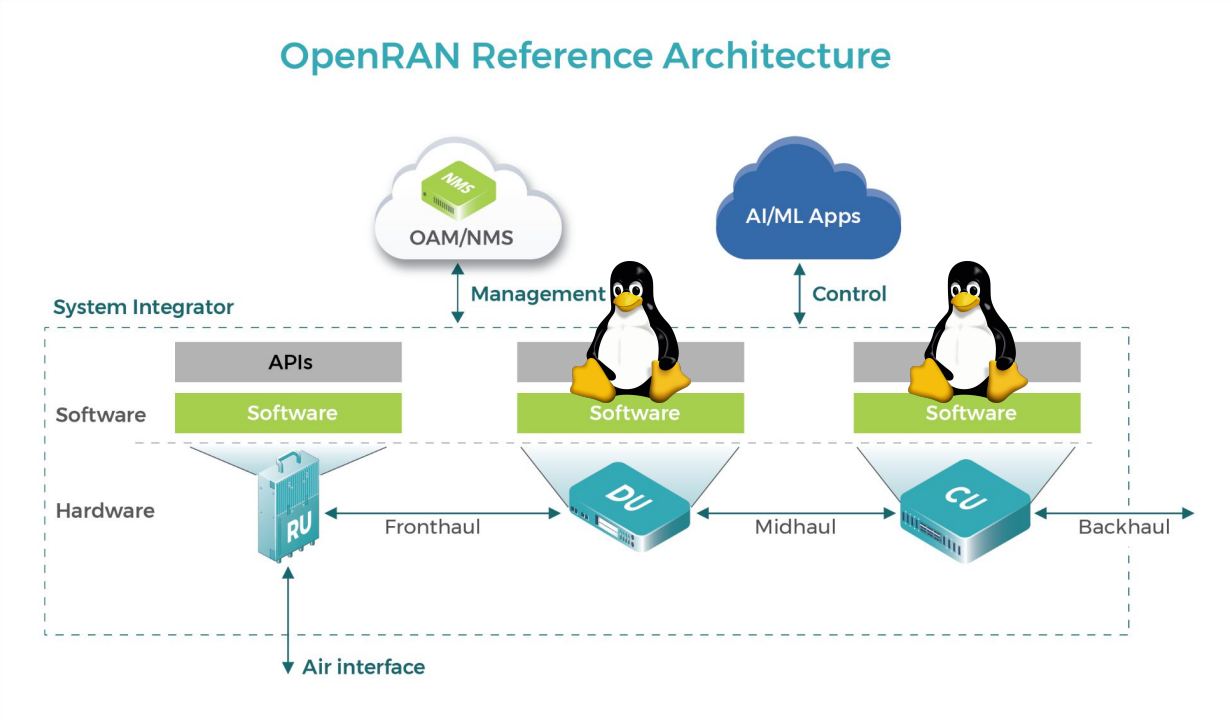
github.com/srsRAN

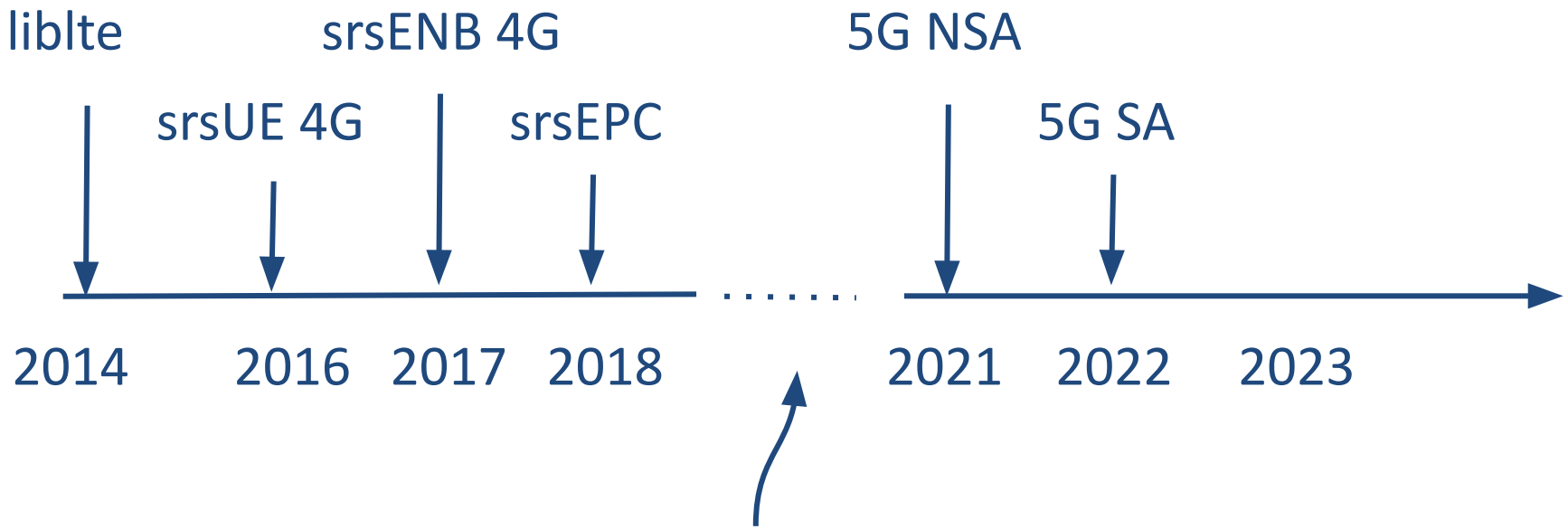


UE/eNB hardening
(but also Carrier Aggregation,
eMBMS, MIMO, etc)

Open RAN

- Initiated by operators to open interfaces for RAN components
- Interop between components from different vendors
  ⟶ Long-term lower costs and avoid vendor-lock in
- Largely based on 3GPP specs, e.g. Central Unit (CU) - Distributed Unit (DU) splits, SmallCellForum (SCF), e.g. FAPI, and own interfaces, e.g. Open Front Haul to Radio Unit (RU)





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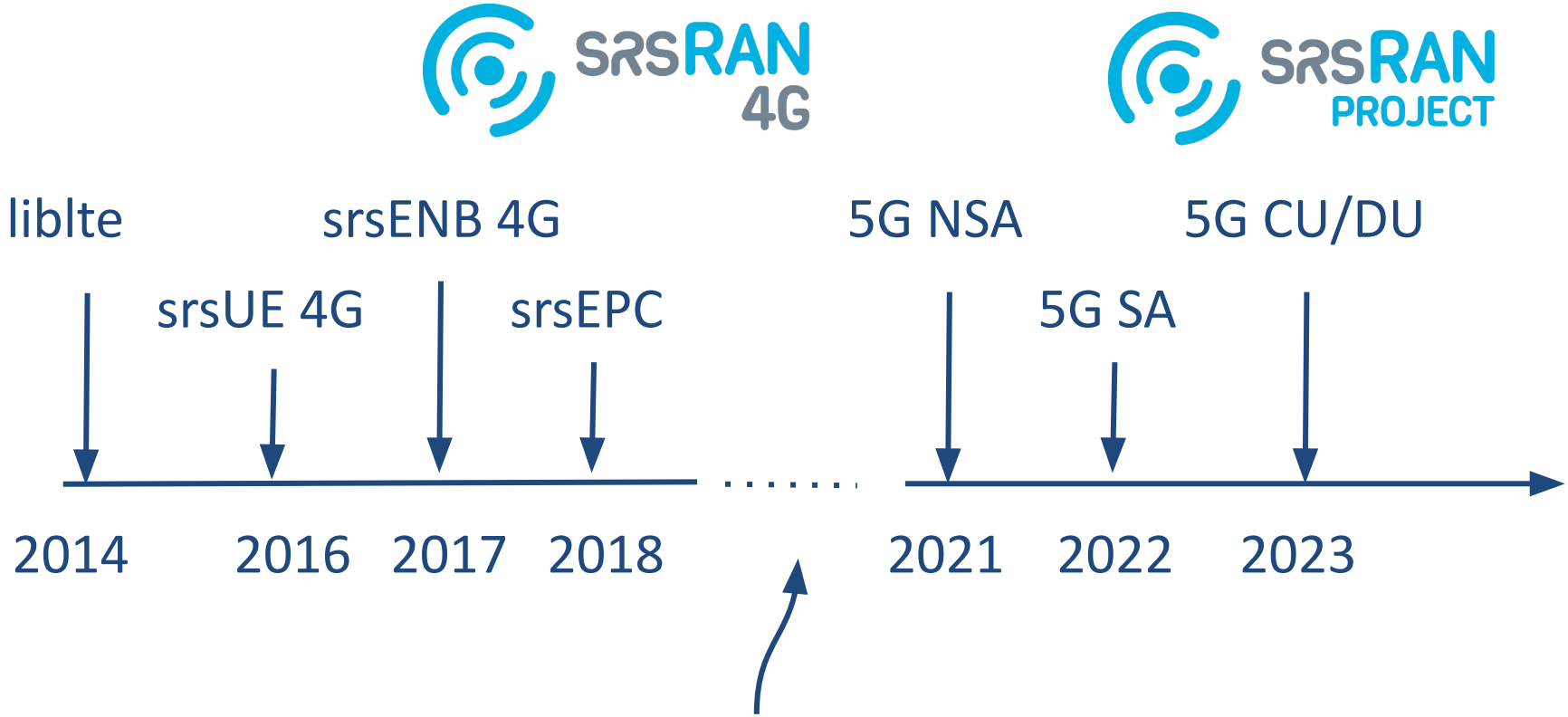
liblte
srsENB 4G
5G NSA
5G CU/DU
srsUE 4G
srsEPC
5G SA
2014
2016
2017
2018
2021
2022
2023
UE/eNB hardening
(but also Carrier Aggregation,
eMBMS, MIMO, etc)

srsRAN 4G

- Deployed and maintained 4G code-base for eNB and UE
- Contains srsUE with limited 5G support
  - Only 15 kHz subcarrier spacing, not all UE procedures implemented
  - But can be attached to new gNB
- 5G gNB not recommended → For SA use new srsRAN Project gNB
- Last release: 23.11
  - Fixes for 5/10/15/20 MHz bandwidth in 5G SA mode

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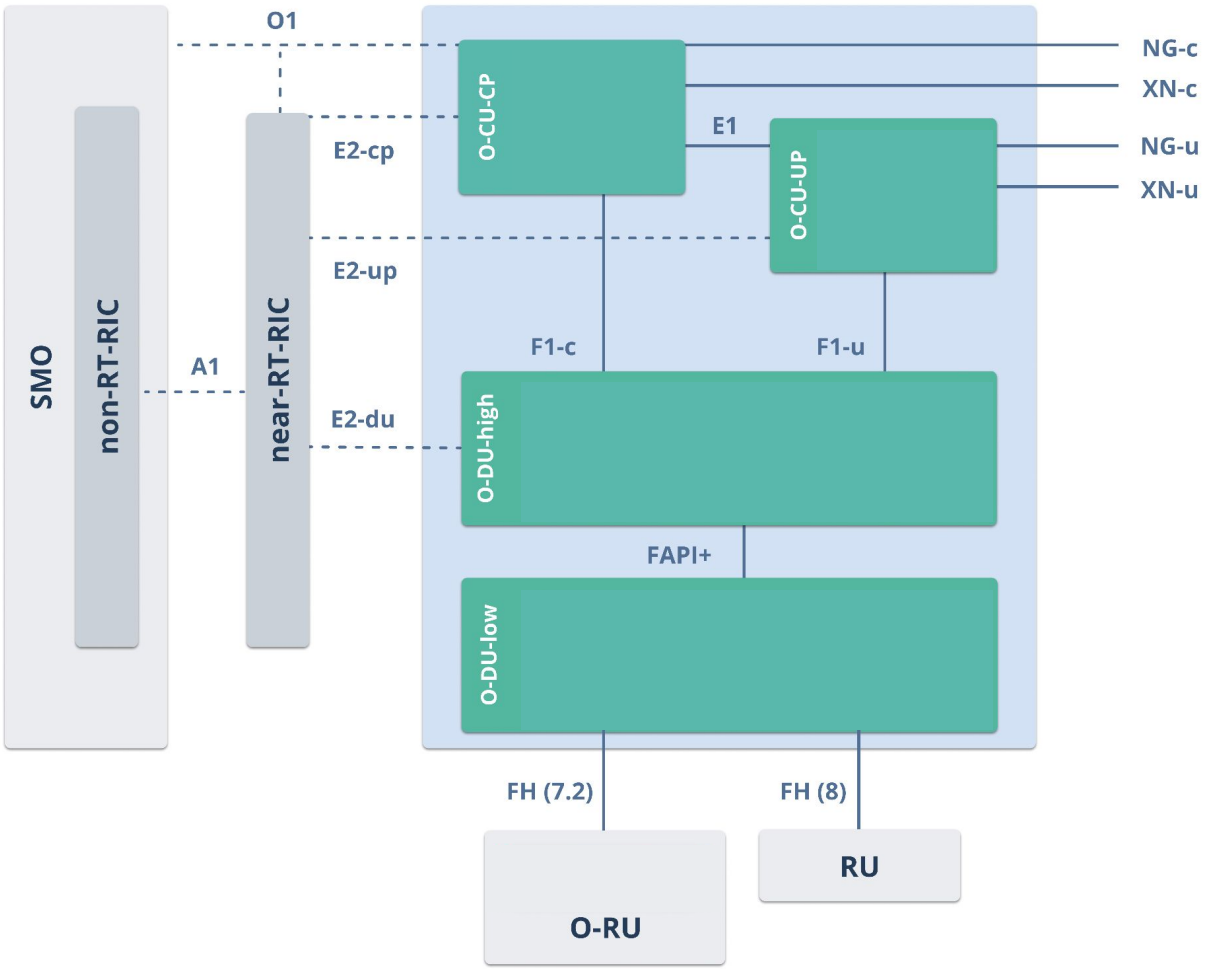
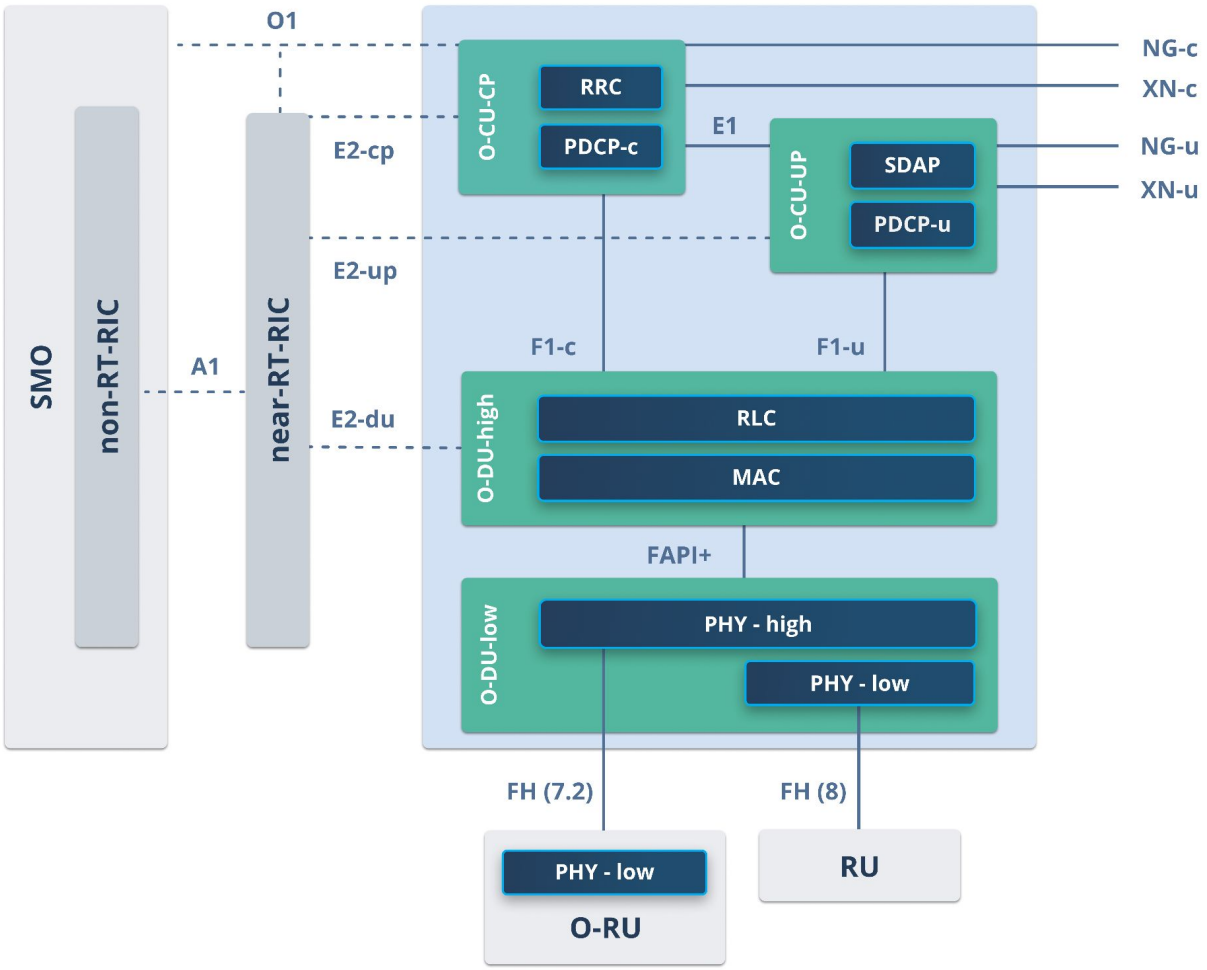

SMO
non-RT-RIC
A1
near-RT-RIC
O1
E2-cp
E2-up
E2-du
O-CU-CP
E1
O-CU-UP
NG-c
XN-c
NG-u
XN-u
F1-c
F1-u
O-DU-high
FAPI+
O-DU-low
FH (7.2)
FH (8)
O-RU
RU


SMO
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RRC
PDCP-c
E1
O-CU-UP
SDAP
PDCP-u
NG-c
XN-c
NG-u
XN-u
F1-c
F1-u
O-DU-high
RLC
MAC
FAPI+
O-DU-low
PHY - high
PHY - low
FH (7.2)
FH (8)
PHY - low
O-RU
RU

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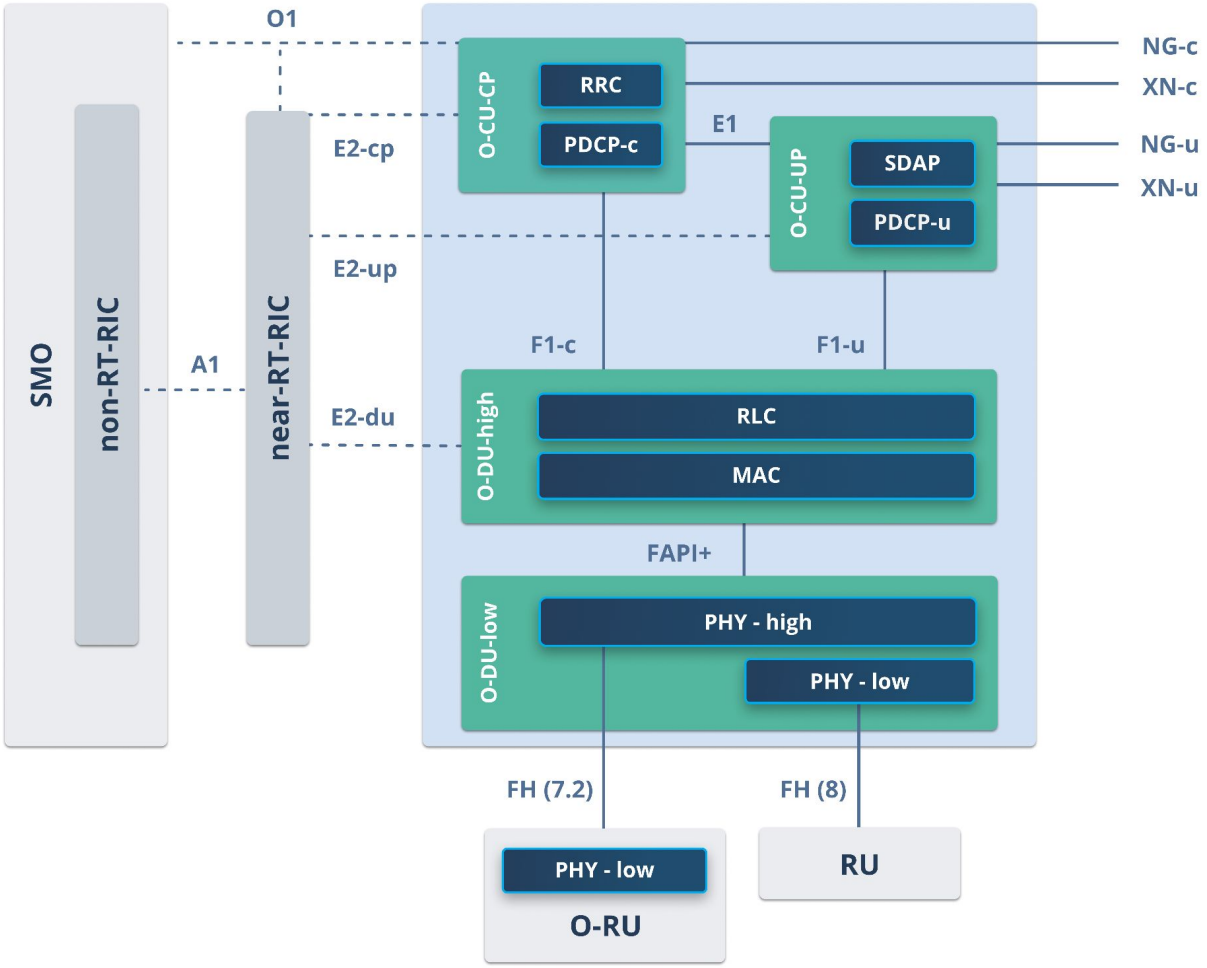


- Complete
- Portable
- Performant
- Flexible
- Interoperable
- Open

Mainline Features

- Available now:
  - 100 MHz TDD, 50MHz FDD
  - 15 KHz and 30 KHz SCS (FR1)
  - MIMO 4T4R (4 layers DL, 1 UL)
  - 256-QAM DL and UL
  - All RRC procedures (including Paging, Reestablishment, Mobility)
  - All MAC procedures (excluding UL power control)
  - Split 7.2 for commercial RUs
  - Split 8 for using e.g. Ettus/NI USRPs
  - Split 6/FAPI for third-party PHY
  - E2 interface including KPM and RAN control (RC) service model
  - Deployed and tested on x86 (Intel/AMD) and ARM

- Performance:
  - 500+ UEs, 24/7 operation
  - 1500 Mbps DL, 200 Mbps UL (unaccelerated)

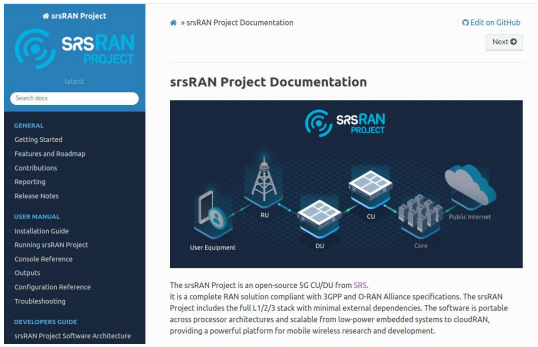
Roadmap

- Features for 24.4 Release:
  - Mobility
  - Initial O1 SMO integration
  - Initial NTN Release 17 support
  - Multi-cell support
  - CU/DU and CU-CP/CU-UP split

srsRAN User Experience and Engagement

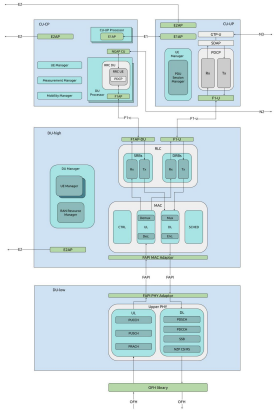
- Simplify Telco
  - Documentation
  - Developers guide
  - Testing
  - Application notes
  - Github discussions

Guides

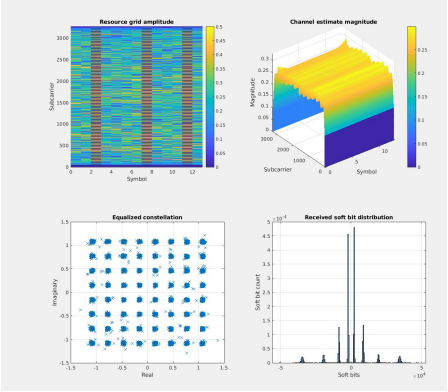


Get it all on **docs.srsran.com**

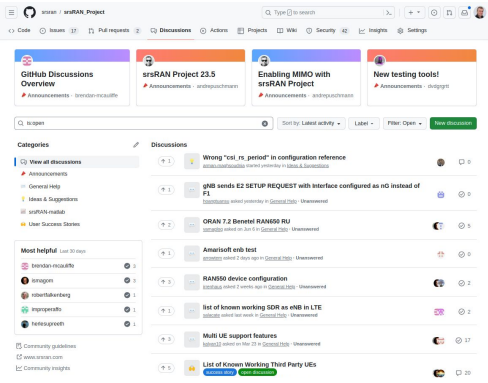
Code



Testing



Engagement



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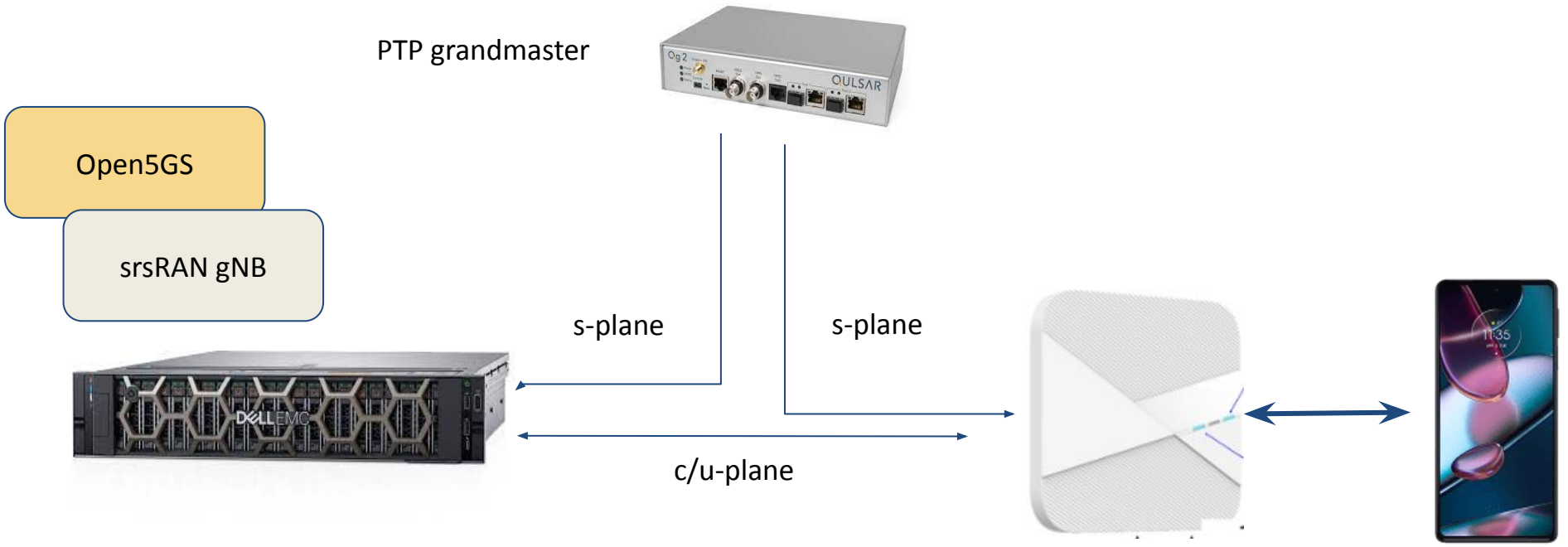
Demo - Complex ORAN Reality



Demo - Complex ORAN Reality

Open5

srsR

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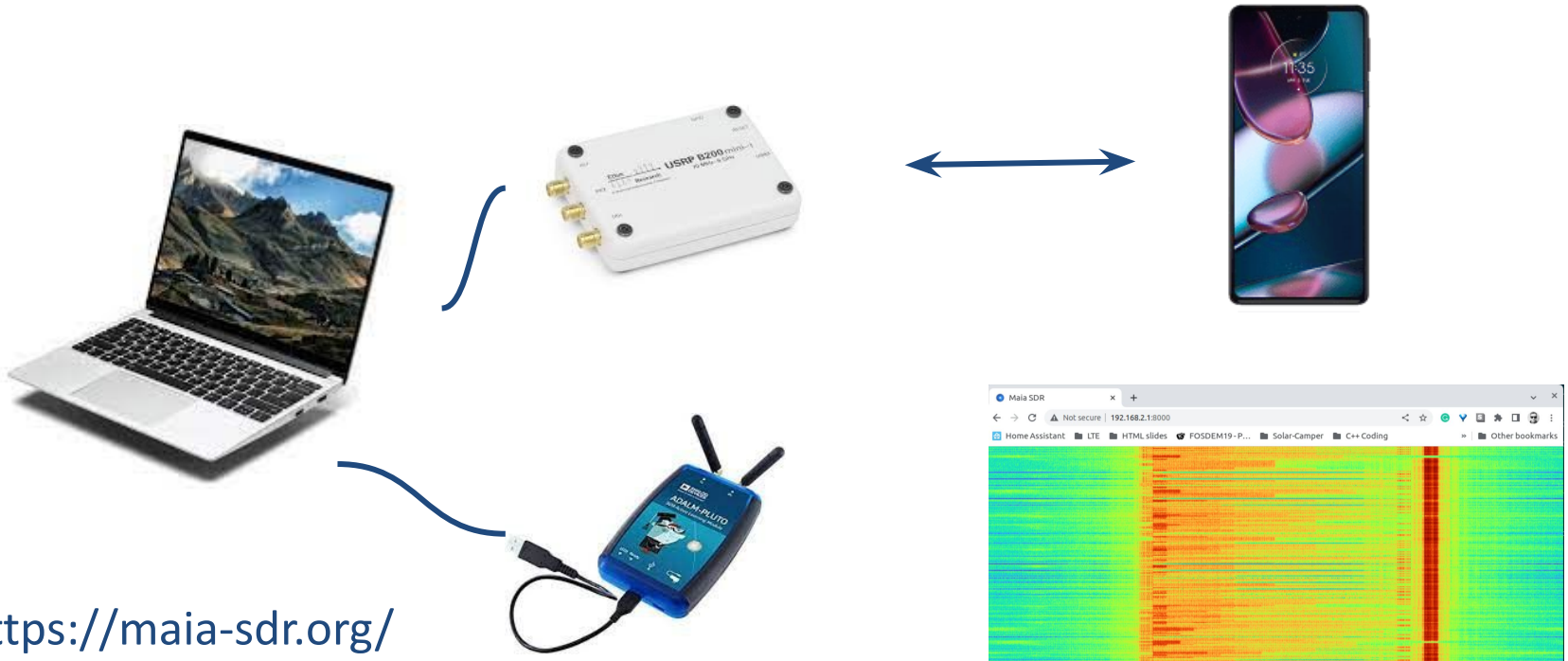
Demo - Outline

- One-command 5G network in the box
  - Docker for 5G-SA gNB, 5GC, Influx, Grafana (see appnote)
  - USRP B200mini as split-8 radio + Motorola Edge 30 Pro phone
  - PlutoSDR running MaiaSDR [1] as spectrum analyzer



[1] https://maia-sdr.org/

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Demo - Live

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Thanks

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