srsRAN Project
Deployable Open-Source RAN Solutions

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Outline

- Demystifying 4G and 5G Repositories
- srsRAN Project ORAN-native CU/DU
- Demo
srsRAN
Open Source 4G/5G from Software Radio Systems (SRS)

Pinned

- **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

github.com/srsRAN
github.com/srsRAN

Who’s doing 4G and/or 5G?
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)
5G NSA
5G SA

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

liblте
srsUE 4G
srsENB 4G
srsEPC

2014  2016  2017  2018

5G NSA
5G SA

2021  2022  2023
5G NSA

5G SA

5G CU/DU

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
Outline

- Demystifying 4G and 5G Repositories
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- Demo
- Complete
- Portable
- Performant
- Flexible
- Interoperable
- Open
Mainline Features

● Available now:
  ○ 100 MHz TDD, 50 MHz 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

Get it all on docs.srsran.com
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- Demo
Demo - Complex ORAN Reality

PTP grandmaster

Open5GS

srsRAN gNB

s-plane

s-plane

c/u-plane

s&s
Demo - Complex ORAN Reality
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/
Demo - Live
Thanks

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