

# srsLTE Project Update

How the year went and what's up next

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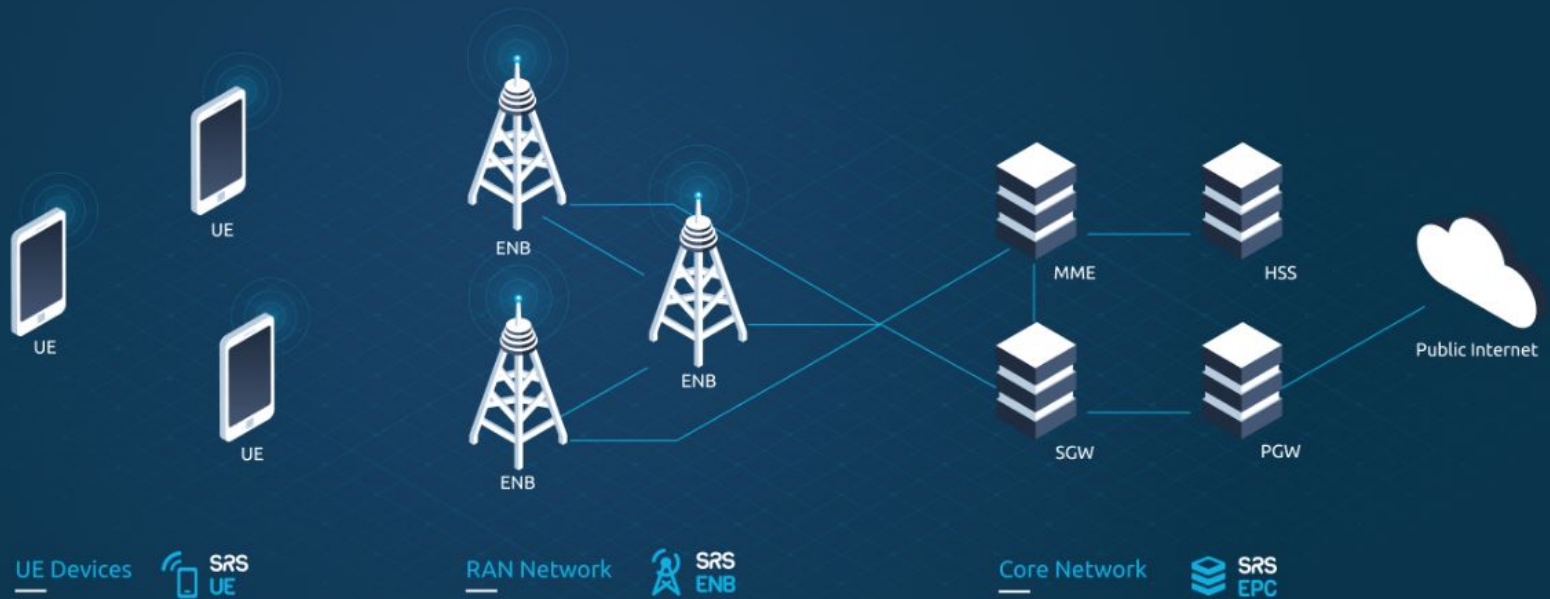


Free Software Radio devroom @ FOSDEM 2021  
2021\_02\_07

[www.softwareradiosystems.com](http://www.softwareradiosystems.com)

# Full E2E Open-Source 4G/5G!

Our complete LTE software suite



[www.srslte.com](http://www.srslte.com)

## GSMA Mobile Security Hall of Fame



	CVD#	Name	Organisation & Link
CVD-2020	0040	Nitya Lakshmanan Nishant Budhdev Mun Choon Chan Jun Han	National University of Singapore
		Min Suk Kang	KAIST
CVD-2020	0035	Guancheng Li Zhengyi Shang	Tencent Security Xuanwu Lab
CVD-2019	0030	David Rupprecht Katharina Kohls Thorsten Holz	Ruhr University Bochum
		Christina Pöpper	NYU Abu Dhabi
CVD-2019	0029	Syed Rafiul Hussain Mitziu Echeverria Imtiaz Karim Omar Chowdhury Elisa Bertino	Purdue University University of Iowa Purdue University University of Iowa Purdue University
CVD-2019	0026	Cathal Mc Daid	AdaptiveMobile Security <a href="https://www.adaptivemobile.com">https://www.adaptivemobile.com</a>
CVD-2019	0024	David Rupprecht Christina Pöpper Thorsten Holz	Ruhr University Bochum, Germany and New York University Abu Dhabi
CVD-2019	0018	Altaf Shaik	Technical University of Berlin <a href="https://www.isti.tu-berlin.de/security_in_telecommunications">https://www.isti.tu-berlin.de/security_in_telecommunications</a>
		Ravishankar Borgaonkar	SINTEF Digital <a href="https://www.sintef.no/en/all-employees/employee/?empld=7616">https://www.sintef.no/en/all-employees/employee/?empld=7616</a>

Captured:  
2021/01/16

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January 2021:

5/7 CVD in 2019/20

&gt; 200 research papers

Captured:  
2021/01/16

# Agenda

- Highlights of 2020
- Sneak Preview for 2021
- Test and Quality Assurance

# srsLTE Release Highlights in 2020

- 20.04(.2)
  - Carrier Aggregation in srsENB
  - Complete Sidelink PHY layer (all transmission modes)
  - Complete NB-IoT PHY downlink signals
  - New S1AP packing/unpacking library
- 20.10(.1)
  - Mobility (Intra-eNB and S1) in srsENB
  - New logging framework
  - Non-blocking/decoupled PHY layer
  - QAM256 support
  - Initial NR PHY layer and stack components

# srsLTE Release Highlights in 2020

- Docs, docs, docs
- Updated troubleshooting sections for all apps
- New application notes
  - COTS handset testing
  - Handover with GNU Radio
- ..

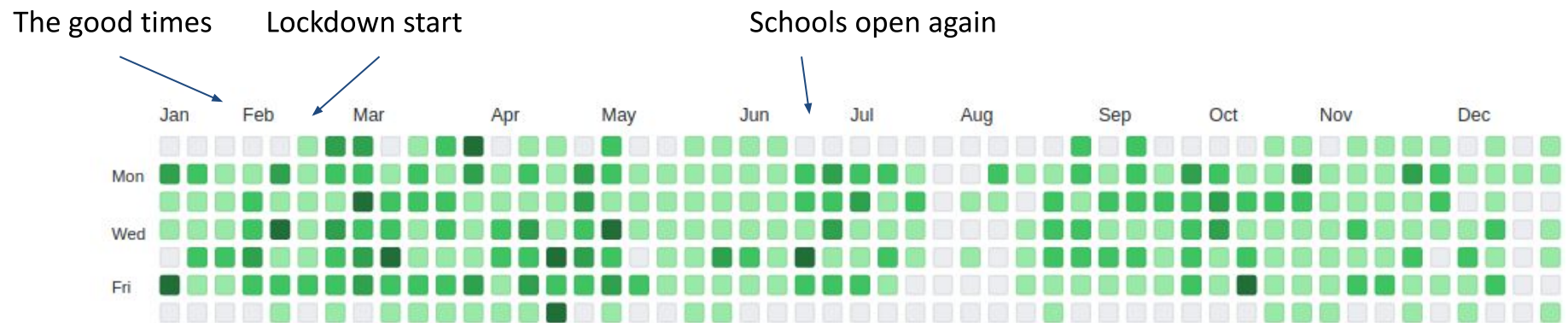
Visit: [docs.srslte.com](https://docs.srslte.com)

# 4G Carrier Aggregation Demo



# COVID-19 Impact

- Deep remote-working philosophy
- 2 successful releases
- Random developer with kids
  - Productivity reduced
  - Weekends disappeared



# Upcoming srsLTE Features in 2021

*carrier grade*  
**4G ENB**

**5G NSA UE**

**5G NSA gNB**

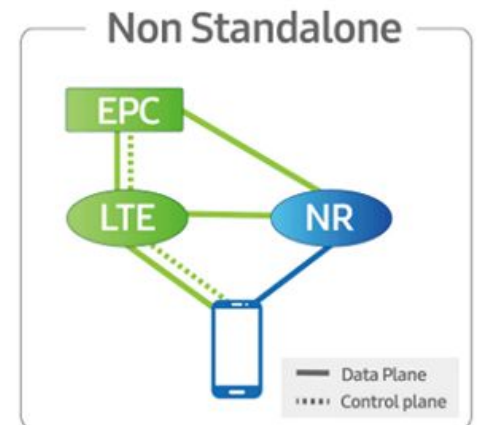
# Towards a Carrier Grade RAN

- Maturity, robustness and stability
- High-performance, multi-UE
  - New proportional-fair scheduler with frequency selective scheduling
- Quality-of-Service
- Uplink Power-Control
- Network management and operation
  - Advanced KPIs: per-cell and per-user statistics
  - Error-handling, notifications, alarms, etc.

# 1st FOSS 5G NSA UE

- Initial 5G NSA support
- Compatible and tested with Amarisoft
- Selected set of supported config parameters, e.g.
  - Same bandwidth for LTE anchor and NR carrier
- 5G-NR PHY layer for x86
  - Focus on downlink channel processing (with required UL bits)
  - AVX2-optimized NR coding (but unoptimized threading)
- L2/L3 features
  - Full attach to 5G eNB/gNB/core
  - Data traffic over Secondary Cell group (SCG) bearer for NR

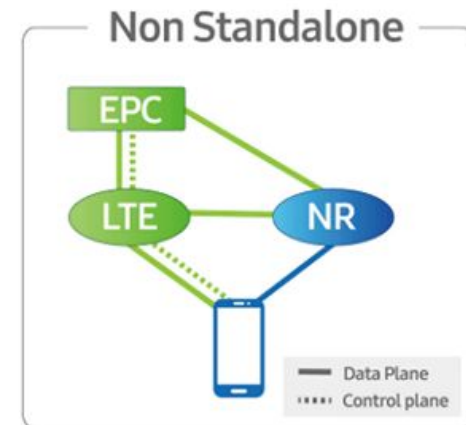
**Initially available in srsLTE 21.04!**



# 5G NSA {e/g}NB

- Initial 5G NSA support for the eNB
- Compatible and tested with srsUE and open5gs
- Selected set of supported configuration parameters
  - replication of the UE features
- Core-side features:
  - Attach to NSA-enhanced core
- RAN-side features:
  - Single, multi-RAT binary with LTE and NR cells (short-cut interfaces)
  - Basic UE capability and measurement handling
  - Data traffic over Secondary Cell group (SCG) bearer for NR

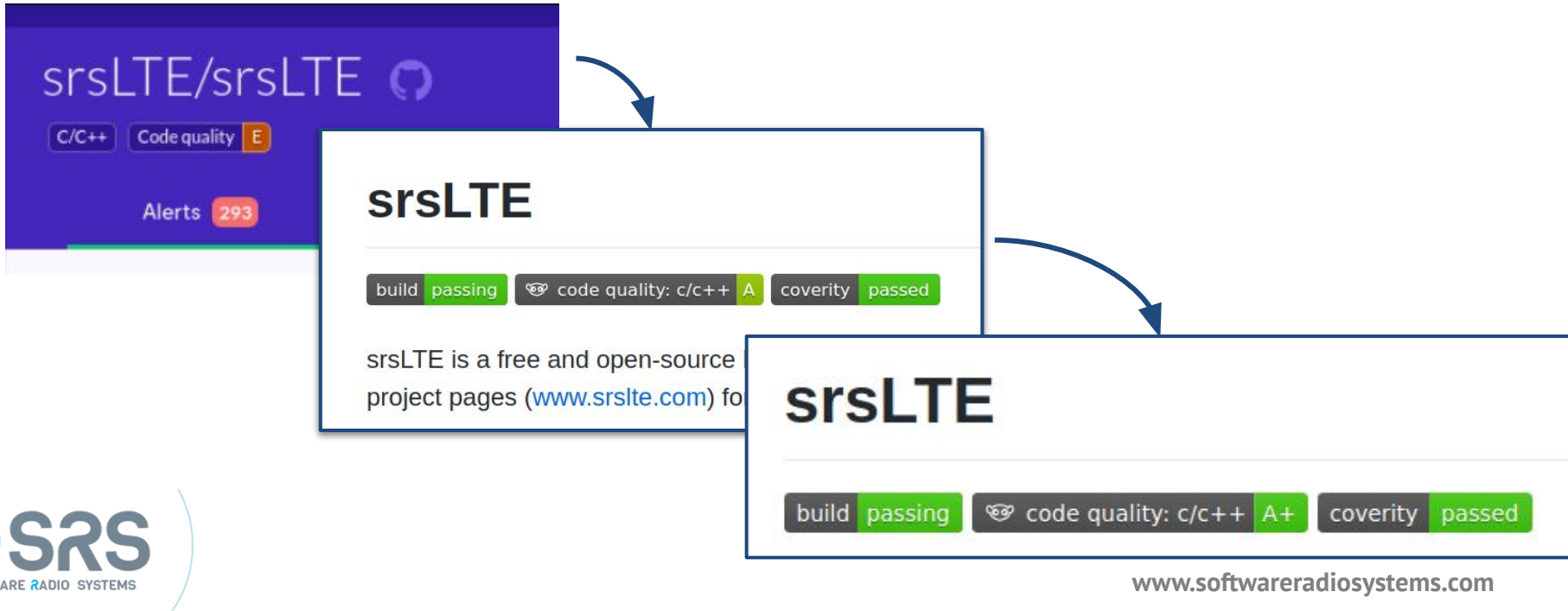
**Initially available in srsLTE 21.10!**



# Quality Assurance

# Continuous Integration

- The journey continues
- ~900 unit tests
- Builds for x86-64, ARM{32,64}, PPC64



# RF Continuous Integration (RFCI)

- In-house testbed orchestrated with OsmoGSMTester [1]
- Controlled end-to-end system tests with complex scenarios
  - Mobility, Carrier Aggregation, etc.
- External RF hardware control
- RF and no-RF (ZMQ+GR) based
  - COTS SDR (USRPs, Lime, Blade)
  - Android COTS handsets
  - Customer HW

[1] <https://osmocom.org/projects/osmo-gsm-tester>





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Thanks!

SRS

SOFTWARE RADIO SYSTEMS

*We're (still) hiring!*

# See you at FOSDEM 2022

