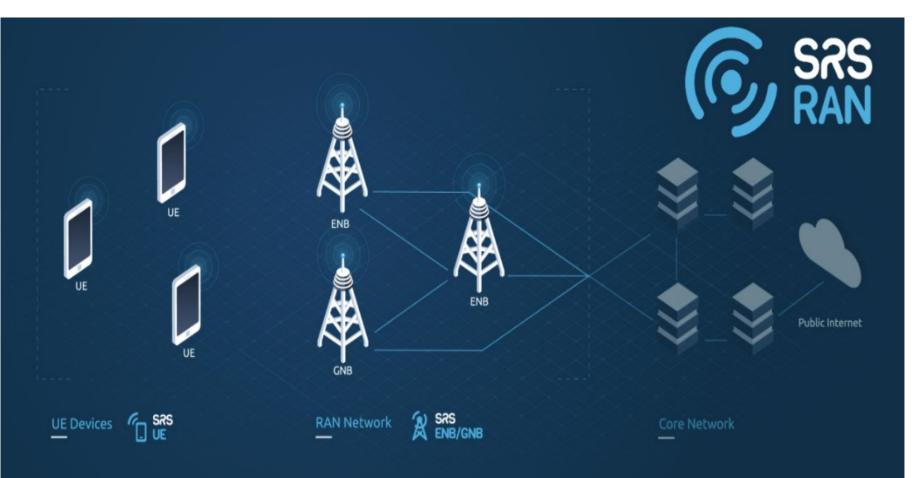
Research and Testing of 5G wireless Scheduler Algorithms

Team: sddec21-15 Members: Anh To, Bradley Norman, Haan Zilmer, Elias Zougmore Faculty Advisor: Hongwei Zhang Client: Hongwei Zhang



<u>Design Requirements</u>

Functional requirements are to ensure schedule and time allocation efficiency, ensure communication between base stations and the mobile core. The non-functional requirements are the research on 5G wireless Systems, srsRAN base code and the the documentation on srsRAN code. We have an open-source software platform (srsRAN) and test are run on testbed.

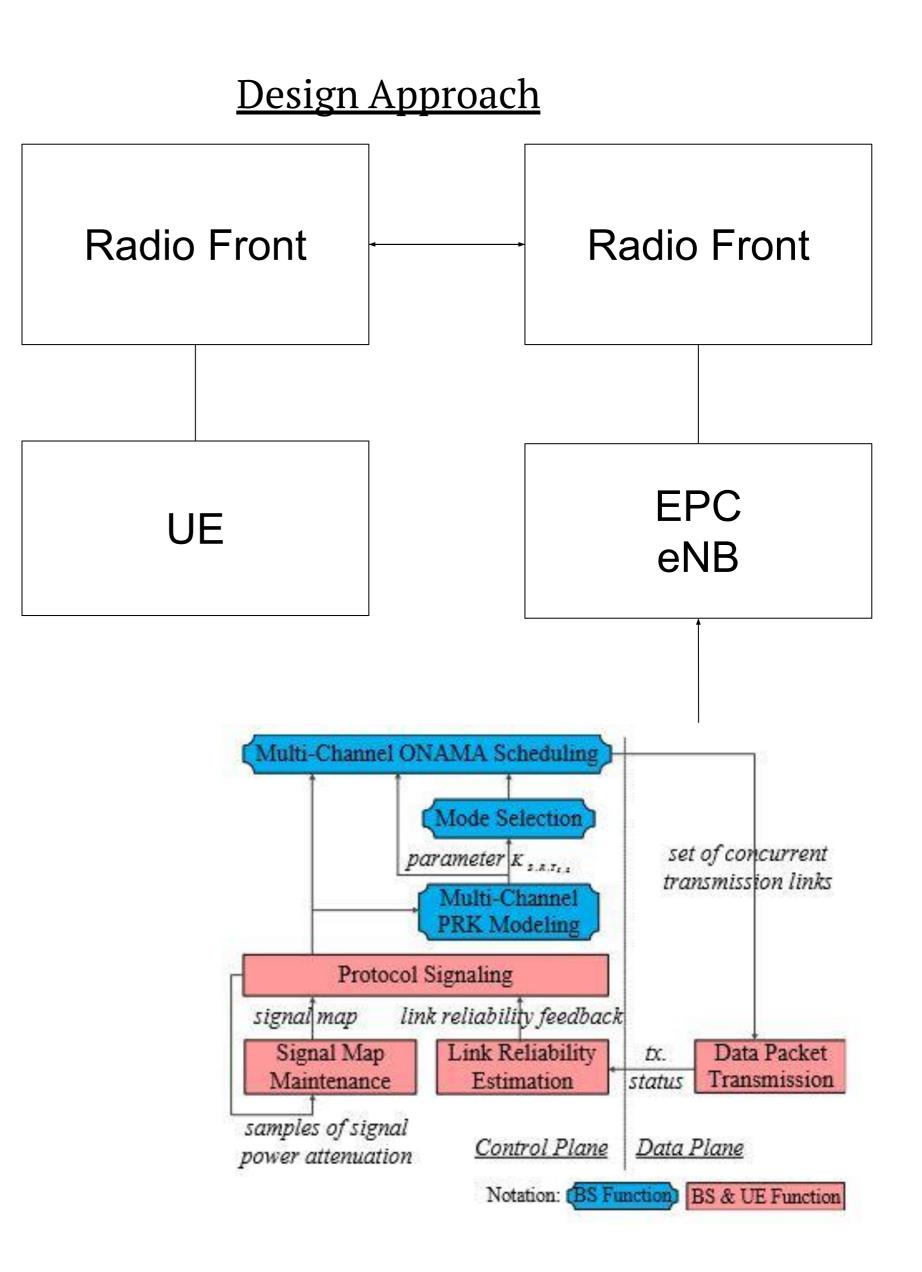
Intro/Motivation

Advancements in 5G technology have led to an increase in demand for qualified engineers with the ability to develop and prototype advanced wireless solutions. 5G wireless networks are expected to enable not only Gbps mobile connectivity but also machine-type communications for smart agriculture, connected and automated vehicles, smart grid, Industry 4.0, and AR/VR. Our project is in a research capacity, so while we will not be solving any specific problem, we will be looking into ways to improve the scheduling algorithm for 5G Systems.

<u>Intended users</u>: Undergrad Students, Graduate Students, and Professors <u>Intended uses</u>: The goal was to obtain research regarding the UCS algorithm's relative function to base scheduler functions for other researchers to use in more commercial research, however, upon not being able to reach that goal we shifted to creating documentation for future senior design groups to help them avoid the massive time sink we had go through.

Technical Details

Our project was primarily software with some hardware support towards the end. For our software resources we were using srsRAN's code base downloaded from github in the language C++. For hardware we were given 2 SDRs and 1 monitor by our faculty advisor in order to try to test our algorithm in a physical environment.



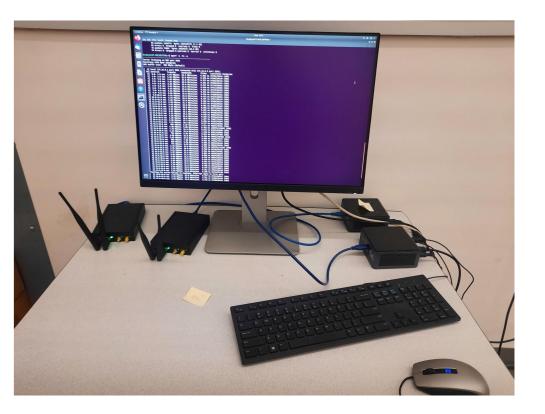
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Tooting

This diagram shows the architecture of the Unified Cellular Scheduling framework based on the status of uplink transmission as well as downlink and D2D link transmissions, the Bses and UEs estimate the communication reliability respectively

<u>Resources</u>

- 2 Radio fronts
- 2 PCs
- srsRAN code base



For the testing we needed to test for packet loss and bandwidth of both the default srsRAN with RR and PF scheduling as well as the newly implemented scheduling algorithm. To do this we installed srsRAN onto two compute nodes with two software defined radios, we then had to determine the transport layer protocol utilized by srsRAN and run an iperf command which is depicted above.

Standards

- IEEE and SESC software development standard
- Transparent on using open-source resources