

Intro to Various (Wireless) Network Tools

Gianfranco Nencioni



Networking Tools

- Wireshark:
 - Free and open-source packet analyzer
- Tcpdump
 - CLI packet analyzer
- Unix (and not only)Tools
 - ICMP-based: ping, traceroute
 - Iperf: network performance measurements
 - Netstat, nslookup, ifconfig, nmap
- PRTG
 - SNMP-based Intermediate-device performance monitoring



Networking Tools

- Cisco Packet Tracker
 - Cross-platform visual simulator



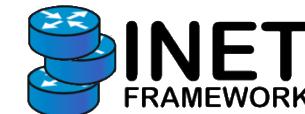
- GNS3
 - Network software emulator



- ns-3
 - Network simulator
 - App store



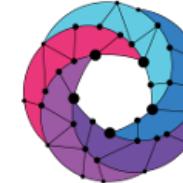
- OMNet++
 - Discrete event simulator
 - Simulation models and tools



SDN Tools

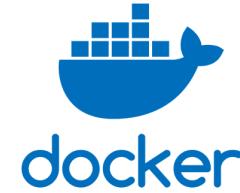
- Mininet
 - Emulator
 - <https://mininet.org/>
- ComNetsEmu
 - Based on Mininet
 - <https://www.granelli-lab.org/researches/relevant-projects/comnetsemu-sdn-nfv-emulator>
 - Possible to integrate with other 5G emulators for evaluate 5G deployment
 - Includes network slicing
 - Examples: <https://www.granelli-lab.org/researches/relevant-projects/comnetsemu-labs>
 - Video: <https://www.youtube.com/watch?v=RWXaa7sKOA0&t=1s>

NFV Tools

- NFVO (+ VNFM)
 - ETSI Open Source MANO (OSM):
<https://osm.etsi.org/>
 - OSM Ecosystem:
https://osm.etsi.org/wikipub/index.php/OSM_Ecosystem
 - VIM
 - OpenStack
 - Kubernetes
- 
- Open Source
MANO
- 
- openstack.**
- 
- kubernetes**

Virtualization Tools

- Creation of VMs
- Creation of containers
- Orchestration of VMs
- Orchestration of containers



kubernetes

MEC Tools

- ETSI MEC Ecosystem:

https://mecwiki.etsi.org/index.php?title=MEC_Ecosystem

- AdvanteEdge



- OpenNESS
(not available anymore)



Security Network Labs

- The logo for SEED LABS 2.0. It features the word "SEED" in large red and black block letters. To the right of "SEED" are three interlocking gears. Below "SEED" is the word "LABS" in a smaller, white, sans-serif font. To the right of "LABS" is a large, stylized "2.0" in white.

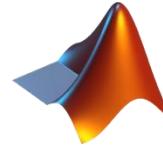
https://seedsecuritylabs.org/Labs_20.04/Networking/

- The logo for SEED RESOURCES. It features the word "SEED" in large red and black block letters. To the right of "SEED" is a graphic of two overlapping white document icons. Below "SEED" is the word "RESOURCES" in a large, white, sans-serif font. At the bottom, there is a black horizontal bar containing the words "VIDEOS, SLIDES, PROBLEMS, & LABS" in white, bold, sans-serif capital letters.

<https://www.handsongsecurity.net/resources.html>

5G Tools

- Matlab
 - 5G Toolbox
- OMNet++
 - simu5G
- ns-3
 - 5G-LENA



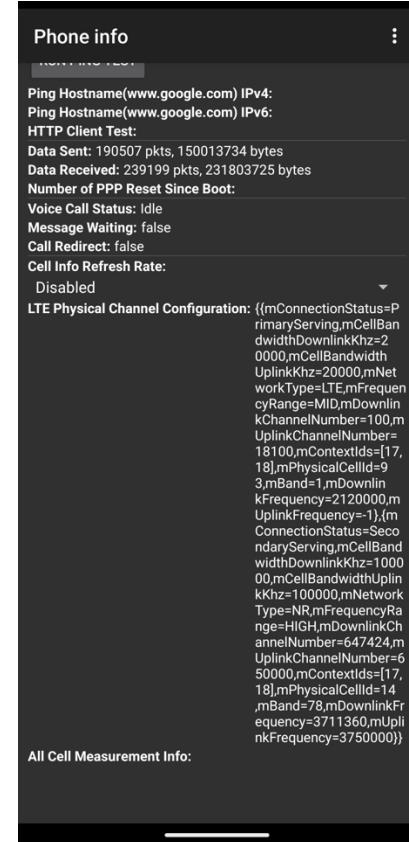
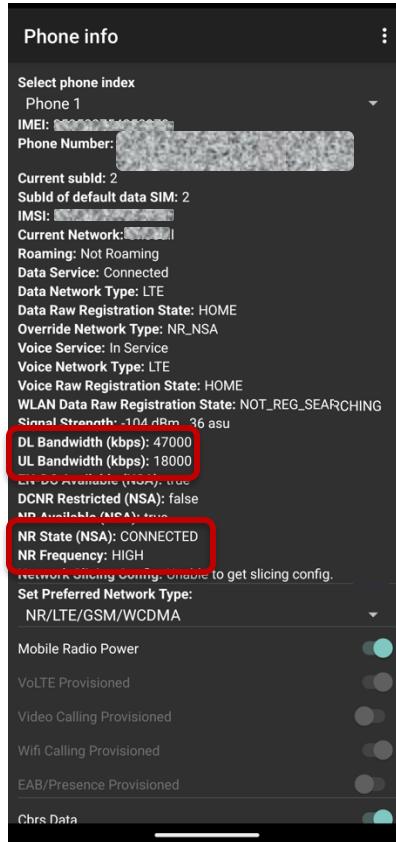
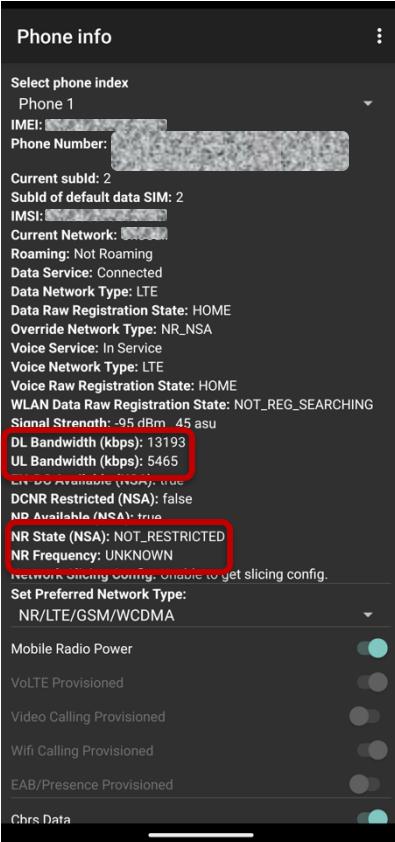
5G Tools

- OpenAirInterface 
- Ueransim 
- Open5GS 
- Info about cell connectivity: G-NetTrack, CellMapper, ...
- Or see advanced cellular settings codes on your phone:
 - **Android** *#*#4636#*#*
 - **iPhone** *3001#12345#* (*Not tested! Be careful!*)

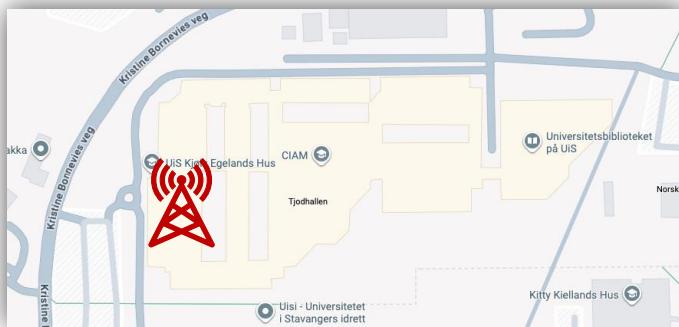
Example



University
of Stavanger



Lyse's 5G Testbed



Public 5G

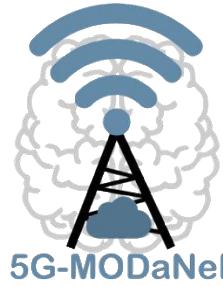
Private 5G:

- 5G Core and one Radio Unit (RU) at Innoasis
- One RU at UiS
- One at new hospital

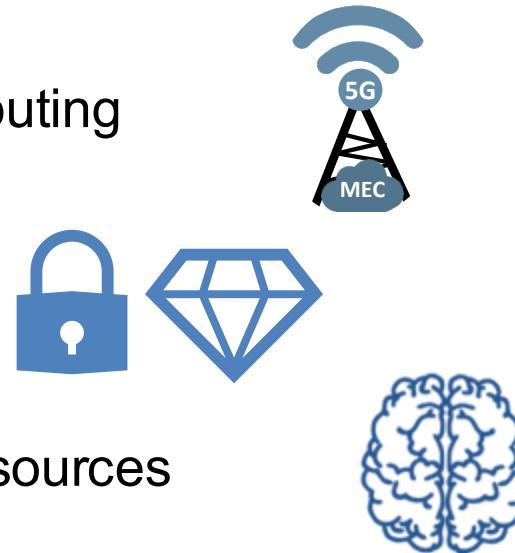


5G Project at UiS

- **5G-MODaNel**



- Funded by the Norwegian Research Council
- 5G Multi-access Edge Computing
- Security and dependability
- AI-based orchestration of resources



5G-MODaNeL Testbeds: Private 5G



5G-MODaNeL Testbeds: Edge Computing



- 3 High-Performance NUCs
- 4 Servers
 - 2 +1 with GPUs on Openstack
 - 1 with GPUs
- Carrier-grade Switch