Networking II

Proposed Projects

Prof. F. Granelli
University of Trento, Italy
fabrizio.granelli@unitn.it granelli-lab.org

Project Proposals

- Course projects should be performed by max 3 students in a group
- Project delivery will be performed through a demo + powerpoint description on how the project was developed
- The entire group must be present at the project delivery
- Folder for project assignment:
- https://docs.google.com/spreadsheets/d/1S3zP-GC5VmXEdZM8Ply_KVwQKG5qKMzEkqEwpgtJfCk/edit?usp=sharing

GRANELLI Lab
Researching the Internet of the Future

Connecting SDN Slices in ComNetsEmu

- GOAL: to implement a network slicing approach to enable a third RYU SDN controller to deploy a OVSwitch to interconnect 2 slices with different controllers
- To define two separate slides (even across different networks) and then to interconnect them
- Multi-domain slice interconnection

Morphing network slices

- GOAL: to enable RYU SDN controller to build network slices and dynamically modify their topology
- To consider that each network node might host «services», that in this case will be represented by virtual switches/routers
- The SDN controller will not only slice but re-program connectivity within the slice

GRANELLI Lab
Researching the Internet of the Future

Network Slice Setup Optimization

- GOAL: to enable RYU SDN controller to slice the network and then to dynamically re-allocate services in order to maintain desired QoS
- Example 1: migrate a server to maximize throughput via northbound script
- Example 2: migrate a server to minimize delay via northbound script

GRANELLI Lab
Researching the Internet of the Future

Integrating 4G/5G RAN in Comnetsemu

- GOAL: to integrate in comnetsemu VM a mobile cellular RAN
- Some reference software include: UERANSIM, srsLTE
- Integration can be performed by dockerizing the new components, or connecting comnetsemu VM with another VM/docker (external integration) providing the related python scripts

Configuring RAN Slicing

- GOAL: starting from an existing software (e.g. https://github.com/wnlUc3m/srsLTE_eNB_slicing) to define a RAN controller capable of adapting the capacity of the RAN slices
- Two major issues:
- How to estimate the capacity of the slices (wireless link is time-variant)?
- How to re-assign flexibly the capacity?

GRANELLI Lab
Researching the Internet of the Future

Performance analysis of RRH/BBU Splitting solutions

- GOAL: to select one splitting software (e.g. https://github.com/oocran/vbbu) and test the system operation and performance in different setups
- Practically, the goal is to study what happens if we vary the RRH-BBU link delay/jitter and the available capacity

GRANELLI Lab
Researching the Internet of the Future

Experimenting MEC & 5G via Simulation

- GOAL: To configure and run different scenarios using the Simu5G simulator
- http://simu5g.org

GRANELLI Lab
Researching the Internet of the Future

Testing 5G OpenUPF

- GOAL: To analyze the performance of 5GOpenUFP package
- https://github.com/5GOpenUPF/openupf
- Check available functionalities
- Integrate it within 5GCore (open5gs, others)

GRANELLI Lab
Researching the Internet of the Future

Experimenting with Free5GC + UERANSIM

- GOAL: To replicate the example scenario and then deploy additional scenarios
- https://github.com/s5uishida/free5gc_ueransim_sample_config

Networking II

Proposed Projects

Prof. F. Granelli
University of Trento, Italy
fabrizio.granelli@unitn.it granelli-lab.org