

Forschungspraxis

# Analysis and Development of a Network Slice Control Handover Scheme

Software-Defined Radio Access Network (SD-RAN) and network slicing are foreseen as promising solutions to enable programmability and flexibility for next generations 5G/6G networks. The concept of SD-RAN enables a hierarchical scheduling approach for wireless resource allocation, where each network slice is controlled by a centralized unit referred to as the SD-RAN controller.

However, a single centralized controller can often be a single point of failure. That said if a problem occurs there is no recovery for the network. Apart from such kind of failures, another important issue is the controller overload. Since the controllers are running on physical devices, they experience undesirable behavior when the load of the underlying network increases. To that end, a multi controller layer is proposed. In such a scenario, different network slices can be managed by different controllers to reduce the load and keep the system stable. Alternatively, when one controller is loaded, some of the network slice control has to be offloaded to other controller performing a type of load balancing. We refer to such problem as "vertical control handover", that we define as the handover of slices' controller towards different controllers.

The purpose of this thesis is to model and develop an optimization problem for vertical slice handover with aim at minimizing packet losses, signaling overhead, system load for the SD-RAN controller. The developed optimization problem shall be analyzed with respect to the aforementioned aspects for different system parameters as well as compared with alternative literature approaches.

## Prerequisites

- Experience with optimization problems: linear programming, convex optimizations is a plus
- Experience with programming: Python/Matlab is a plus.
- Knowledge about SDN is a plus

## Advisors

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