

## Service Differentiation in Virtual Networks for Cloud services

### Master's Thesis/Diploma Thesis

#### Motivation

Today it is very difficult to offer end-to-end quality of service (QoS) guarantees for cloud services due to the separate entities operating the cloud and communication network domains. Virtual networks can offer a solution to this problem using combined control for network and IT resources. Virtual networks are isolated abstract network slices offering an overall view of different physical domains, and hence, providing flexibility and efficiency in network design.

Cloud services have many different types, and different services have different requirements. A gaming service has maximum latency requirements of 20 ms, whereas interactive browsing can withstand 170 ms latency. The requirements of the services can be availability, latency, bandwidth, computational resources and so on. A network design without taking into account the different service requirements would lead either to too costly networks or to unsatisfied services and hence to revenue losses. Thus, the aim of this thesis is developing resilient virtual network models, which enable a cost efficient design while fulfilling the requirements of diverse cloud services.

#### Tasks

After getting familiar with network virtualization, resilience and service differentiation topics, you will provide a QoS model for cloud services in virtual networks. The next step will be enhancing the existing optimization problems to include your model. You will conclude your thesis by implementing your optimization models to the existing Java Virtual Network Simulator and evaluating their performance.

#### Requirements

Java programming skills are required.

Knowledge about optimization theory and communication networks is a plus.

#### Expected duration

6 months

#### Location

Nokia Siemens Networks, Munich, Germany

#### Contact

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