Universität Stuttgart

**INSTITUT FÜR
KOMMUNIKATIONSNETZE
UND RECHNERSYSTEME**
Prof. Dr.-Ing. Andreas Kirstädter

Master thesis No. 930
Failover Mechanisms for Dynamic Network Operation

| **Methods**	**Topics**
Programming in Java	Multi-layer networks
Performance Evaluation	Optical networks

Background

Novel and higher-quality Internet services fuel an exponential growth of traffic in internet service providers' transport networks. This leads to a significant increase in resource demand with large variations over time thus requiring more efficient and dynamic operation of future networks. A centralized network control system as suggested by the Software-Defined Networking (SDN) paradigm enables a demand-specific and dynamic (re)configuration of transport networks, which are typically implemented as multi-layer networks. Since data losses in transport networks are undesirable, the network control system has to utilize various failover mechanisms to provide the necessary degree of reliability. These mechanisms differ in the amount of resources they require as well as the degree of reliability they render. Furthermore, the fact that the traffic demands within the network are different regarding their guaranteed quality of service has to be taken into account by the network control system when employing different mechanisms. An IKR-developed tool which serves to analyze the properties of dynamic network control systems shall be extended to include such approaches.
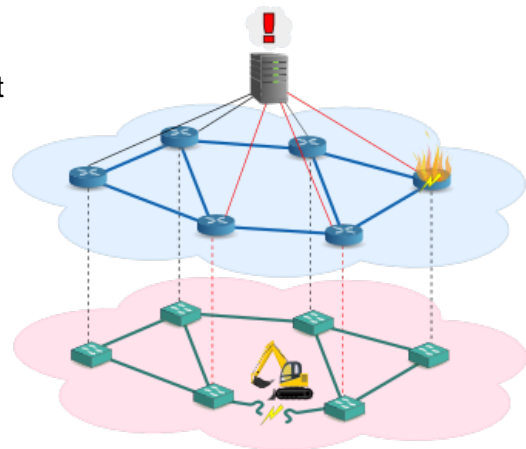
Task

In this project you will develop and analyze failover mechanisms as well as approaches to simulate and evaluate the effects of network failures. You will investigate typical failure scenarios and accordingly design and implement extensions to the simulation tool. Furthermore, you will identify and implement suitable mechanisms and evaluate these regarding their resource requirements and achievable reliability. This project involves the following tasks:

- Design and realization of approaches for the simulation of network failures

- Investigation and realization of failover mechanisms

- Simulative analysis and performance evaluation of the implemented mechanisms

Acquired Knowledge and Skills

You will learn to identify a solution approach for a specific problem in literature, to adapt and to implement it. Furthermore you learn how to evaluate a complex system through simulation. You will gain insight into multi-layer networks and heuristic algorithms. In addition, you will gain experience in using an extensive, modular, object-oriented software framework.

Requirements	**Desirable knowledge**
Programming Experience in Java	Kommunikationsnetze I

Contact

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