Universität Stuttgart

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

Master thesis No. 937
## Genetic algorithms for transport network control

Methods
Programming in Java
Performance Evaluation

Topics
Multi-layer networks
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. The Software-Defined Networking (SDN) paradigm enables an efficient and dynamic (re)configuration of multi-layer transport networks. Finding such a network configuration, is a complex graph optimization problem which can be solved by the use of optimization heuristics such as genetic algorithms (GA). GAs utilize concepts of naturally occurring evolution such as mutation and recombination of genetic codes to determine a solution.
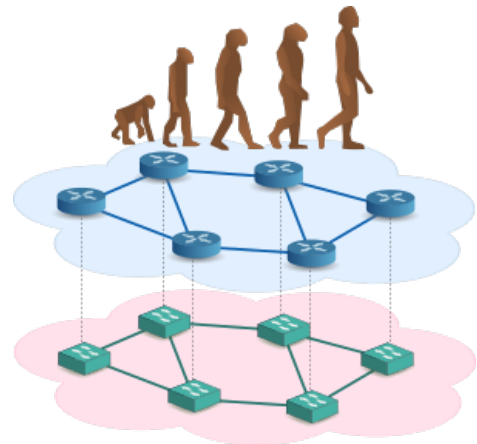
Task

In this project you will design, implement and evaluate a GA-based optimization algorithm for the dynamic reconfiguration of multi-layer networks. The algorithm will be integrated into an existing simulation tool. This project involves the following tasks:

- Familiarization with genetic algorithms

- Design of an appropriate genetic representation and corresponding evolutionary operators

- Implementation of the GA-based optimization algorithm

- Simulative evaluation of both parameterization and performance

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
Programming Experience in Java

Desirable knowledge
Kommunikationsnetze I

Contact

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