Universität Stuttgart

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

Master thesis No. 977

Implementation and Evaluation of a Software-Defined Networking Testbed

Methods
Prototype implementation
Programming in Java

Topics
Network control
Multi-layer networks
Communication 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 operation of communication networks. Therefore, a current research topic at the IKR explores methods for the reconfiguration of multi-layer transport networks using the SDN paradigm.

Task

The typical SDN architecture consists of various switches, an SDN controller and a high-level network application. The reconfiguration methods that are developed at the IKR form such a network application. In order to test the methods an SDN testbed consisting of an SDN controller and switches is required. One possibility of realizing such a testbed is the use of a software emulator that can be run in a virtual machine. In this project you will set up such a testbed using existing software frameworks. Furthermore, you will develop and implement an interface between the IKR application and the SDN controller. Finally, you will evaluate the whole setup using different test scenarios.

Acquired Knowledge and Skills

You will acquire a detailed understanding of software-defined networking and its application. 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
Communication Networks II

Contact

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