Universität Stuttgart

INSTITUT FÜR KOMMUNIKATIONSNETZE UND RECHNERSYSTEME
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Master thesis No. 1074

Design and Implementation of an Intent-Driven Framework on Top of a Software-Defined Networking Controller

Methods
Software design
Prototype implementation

Topics
Software-defined networking
Intent-based networking
IP-Optical networks

Background

Intent-driven software-defined networking (SDN) for IP-optical networks automates and improves network management. By translating high-level business intents, like "ensure low-latency connectivity", into specific configurations, it seamlessly coordinates the IP and optical layers across different administrative domains. This unified control accelerates service provisioning, improves resource utilization, and enhances network resilience, all while reducing operational costs and the potential for human error.

Problem Description

MINDFul.jl is an open source Framework for Intent-driven Multi-Domain Network coordination that aims to research coordination algorithms. Previous efforts have coupled MINDFul.jl with TeraFlowSDN, a state-of-the-art open source SDN controller. Within this work, you are asked to integrate industry use cases into MINDFul.jl and produce a user-friendly intent-driven operating application. More specifically, you will need to:

- get familiar with Intent-Based Networking (IBN) and Software-Defined Networking (SDN)
- get familiar with MINDFul.jl and TeraFlowSDN
- get familiar with equipment and use cases from industry partners
- design and implement an application using MINDFul.jl to control industry networks
- conduct functional evaluation

Acquired Knowledge and Skills

With this work, you will get an insight into the current network trends of SDN and IBN. Moreover, you will gain experience with IP-Optical network operation and the scientific programming language Julia.

Contact

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