Universität Stuttgart

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

Master thesis No. 1033

Dimensioning a German Train IP-Optical Network with Integer Linear Programming

Methods
Network dimensioning
Programming

Topics
Multi-layer networks

Background

Network operators are confronting continuously increasing QoS (Quality of Service) requirements. The need for Internet bandwidth and low latency is getting more demanding. Thus, network operators must make appropriate network equipment upgrades to serve the user traffic. A german train IP-Optical network faces similar challenges. The network operators of a railway company must stand up to the challenge of the rising traffic requested from the passengers. They must develop a mechanism to quantify the nature of the new needed equipment (i.e. dimensioning) while leveraging the current advances in the Coherent Pluggable Transceivers (CPT) modules.

Problem Description

In the context of this thesis, you are called to model and solve the dimensioning problem for a train IP-Optical network using Integer Linear Programming (ILP). More specifically, the thesis consists of the following steps:

- literature research on RMSA (Routing, Modulation and Spectrum Assignment) and CPT market
- adaptation of a given ILP model to the current scenario
- parametric study
- evaluation and visualization

Acquired Knowledge and Skills

In this thesis you will enrich your knowledge of IP-optical networks and ILP, a general methodology to find optimum solutions to linear problems. You will get an insight into core networking, network services, and modern challenges. Finally, you will learn how to run a parametric sweep simulation and evaluate the results.

Requirements
Communication Networks Architecture and Design
Programming Experience

Desirable knowledge
Julia Programming
Kommunikationsnetze I

Contact

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