Universität Stuttgart

INSTITUT FÜR
KOMMUNIKATIONSNETZE
UND RECHNERSYSTEME
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Master thesis No. 1018

Modeling of Inter-Data Center Network Traffic

Methods
Programming in Java
Traffic modeling

Topics
Optical networks
Internet traffic

Background

Data centers are physical facilities that host and share critical applications and data usually belonging to a particular company (e.g. Google, Amazon, etc.). Data centers are and will continue to become even more important in the near future since cloud computing will continue to thrive, fog computing is gaining attention and big data will become even bigger. Thus, the effect of data centers in the computer networks needs to be thoroughly investigated.

In the telecommunications field, traffic modeling is a constant challenge. The goal is to develop a model to describe the network traffic, such as it is as realistic as possible. Such attempts started with Poisson models and continue up untill today with new models being developed.

One more specific field that hasn't still gained enough attention is the attempt to model the traffic between data centers in an optical network. Such traffic presents properties different from the normal peer-to-peer core network traffic: it is highly unpredictable, most of the time it is non-linear, it is characterized by elephant flows, etc.

Problem Description

In this thesis, you are called to make a deep literature investigation for modern traffic models that can apply to inter-data center traffic. This information must then be summarised and comprehensively structured. Later you will need to suggest a model for the inter-data center traffic, programmatically implement it and also validate it. In other words, the steps are:

- Conduct literature research and extract needed information
- Develop an inter-data center traffic model
- Programmatically integrate your model in an IKR Java tool, that will be given
- Evaluate your model

Acquired Knowledge

Through this thesis, you will get familiar with traffic patterns in optical networks and more especially with traffic between data centers. You will understand the usefulness of data centers in modern optical networks and you will learn to extract useful and targeted information out of scientific papers. Moreover, you will have an insight into the modern inner workings of an optical network and gain experience with using a Java tool as it is being developed by IKR.

Requirements
Communication Networks Architecture and Design

Desirable knowledge
Programming Experience in Java
Kommunikationsnetze I

Contact

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