



Simulation and Emulation of Computer Networks

Motivation

Network protocols and algorithms are usually evaluated and tested in simulations before the software is deployed in large test beds or in the real network since the deployment of software on distributed networks and the performance measurements are challenging tasks. However, the quality and the outcome of the simulation affect the development decisions of the protocol designer. Therefore, the behavior of the simulation should reflect the behavior of the real network in terms of bandwidth, delay, jitter, packet loss, and availability. In this thesis you will develop a simulation tool which is based on measurements from PlanetLab which is a worldwide research network. You will be provided with a large data set that will allow you to model the links/paths in the network. Finally, you will compare your simulation results with measurements from the PlanetLab. Depending on the type of the thesis (BA or MA) we will adjust the complexity.

Your Task

Your task consists of the following steps.

- 1) Evaluate and visualize the measurements
- 2) Write the basic simulation components
- 3) Simulate parts of the PlanetLab and calibrate your simulation
- 4) Compare the results from the simulation with the measurements
- 5) Implement a packet capturing interface for hardware-in-the-loop simulations



PlanetLab - Europe



PlanetLab - Worldwide

Depending on the project's scope, the tasks will be more (MA) or less in depth (BA)

Requirements

Previous knowledge of network communication issues and computer networks is useful but not required since you will be provided with the corresponding information and tutorials.

Keywords

**Emulation, Simulation,
Network, Measurement, Testbed**

