ETH

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A test framework to verify end point implementations

Semester thesis proposal

In the Communication Networks lecture[a] we have two practical group projects. In the first one, the students build a "mini Internet" out of virtual Quagga routers [1]. The second project focuses on the transport layer and the students program simple sender and receiver applications to transmit data using Scapy [2] – a Python-based library.

[a] https://comm-net.ethz.ch/
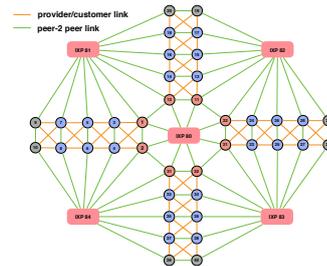
Especially for the end point implementation in the second project, we observe a variety of attempts to implement the given specifications. Different groups interpret the task description in slightly different ways which leads to connectivity problems when trying to interconnect their implementations.

Therefore, it is important to be able to automatically test and verify the different implementations given certain specifications. In fact, such a framework is not only important for our project but the Internet in general. Being able to verify properties of existing or new implementations can help preventing problems and debugging networks.

The goal of this semester thesis is the implementation of a test framework for the student project. More precisely, the work can be roughly divided into the following work packages:

- **WP1**: Theoretical research. What are properties that sender and receiver applications need to fulfill in order to work properly? How can we test and verify them?

- **WP2**: Implementation of a modular and extensible test framework to verify the sender and receiver implementations of the student project.

- **WP3**: Consider the bigger picture. Can we extend the same framework to verify end point implementations currently used in the Internet?

Depending on the student's interest, we can also shift the focus of the work to e.g. try to combine the end point implementation with the mini-Internet built in the first group project.

Requirements

- Attendance of this or last year's Communication Networks lecture.
- Basic knowledge in Python programming.

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References

[1] Quagga routing suite. `https://www.quagga.net/`.

[2] Scapy. `https://scapy.net/`.