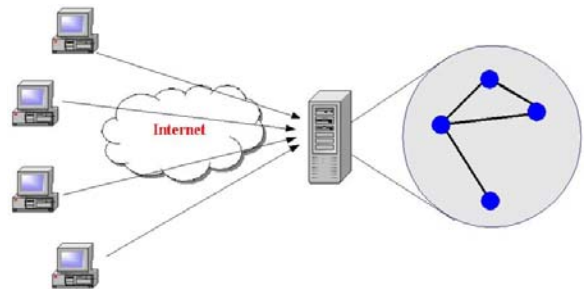


Semester/Diploma/Master Thesis “Enhancing a VPN-based Network Emulator”

Implementation of networking algorithms and applications is a difficult task. The distributed nature of these programs makes it hard to test their correct behavior on one single machine as communication between peers cannot be modeled easily. Consequently, testbeds are required to evaluate such systems. Unfortunately, setting up whole networks consisting of numerous machines is often not reasonable, computers being expensive and “real” networks being difficult to control (e.g. to reproduce a certain network traffic). A solution to overcome the problem of controllability while maintaining a high degree of realism are network emulation tools. Network emulators use a combination of simulation and real networks to provide a testing environment. Genuine code can be run on connected clients (as in a real network) but the user has full control over the network topology and the message flow (as in a simulator).

In a previous thesis a network emulator based on VPN (Virtual Private Network) technology was implemented. All network nodes—possibly several running on one computer—communicate by means of a VPN connection. The central VPN server (running on a Suse Linux machine) controls the emulated network using a firewall (iptables), several Java programs, and some Perl scripts.



While the system works well in its current state, further enhancements are necessary to obtain more realistic emulation results. Further theses might cover aspects like:

- Addition of artificial link delay
- Traffic shaping on links
- Additional packet drop models (e.g. according to link congestion)
- Automated distribution and execution of programs on clients
- Collection and evaluation of information about the traffic in the network
- ...

If you are interested in this topic, feel free to make an appointment to get more information.

Skills

- Advanced Linux knowledge
- Good Java programming skills
- Basic knowledge of Perl is a plus

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