

Distributed Emulation of IP Networks

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Abstract

For the development of communication services the setup of networks of sufficient size is a crucial part. Unfortunately the availability of the required equipment like routers and hosts is very limited, cost intensive and hard to manage. Also the time needed to set up and configure the devices is often time consuming and lacks flexibility. The alternatives are network simulators, tending to ignore unexpected side effects. For the implementation of new concepts or rapid prototyping both approaches are hardly convenient.

Also the implementation of a new algorithm or an application on a real device is often very complex and does not eliminate the need for a suitable testbed to evaluate the implementation. Unfortunately simulators can usually not provide test beds during development, as they lack interoperability to the real world or require own specific implementations.

The presentation shows an approach which lies between these two alternatives and allows the setup of evaluation test beds on a cluster of hosts with full interoperability to the real world. The test bed is being completely controllable by software, which is an important advantage during evaluation. So connections between routers can be established or disconnected automatically, simulating user behavior as mobility or dial up lines.

To achieve better interoperability the virtual network topologies are connected to the network layer of real hosts, which route their traffic to or through the emulated topology. This offers a great tool during the development of new devices for the real world as well as a convenient environment for the rapid implementation of new algorithms and services within the emulated topology itself.
