Chair of Network Architectures and Services
Department of Informatics
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Thesis B.Sc.

Thesis M.Sc.

Designing a Multipath Overlay

Motivation

Internet Routing limits the paths between a node and another node to the single path found via BGP. Resilience, anti-censorship, confidentiality, and other security features might require to have other paths ready in parallel, either for multipath communication with protocols like MPTCP or as alternatives on standby. In previous work we have developped a library for multipath selection over an overlay network, where details of overlay paths are known from traceroute. The graph algorithms select multiple paths with high diversity according to tunable criteria. geoDivRP is related work that works similarly but on the basis of geo-location information of routers.
What is still missing is to put these ideas into an actual overlay that uses our library. Additional protocols from geoDivRP framework from Kansas University are also interesting as candidate technology to be used in combination with our graph and path selection library. Our current approach is still based on a full mesh between all overlay nodes. The overlay design would have to reduce this to a reasonable set of neighbors for each node. Short links should be prefered, yet the overlay should not be disconnected nor have low cut between countries and continents as well.
The path selection library can also be extended with additional features like avoiding certain parts of the network. Depending on your interests the next steps taken can take slightly different directions.

Your Task

- Research on related work
- Understand the previous thesis
- Analyze requirements for a realistic overlay design
- Design an overlay concept for the relays needed by multipath solutions like our library or geoDivRP
- Implement a suitable subset of features to demonstrate the design
- Evaluate the solution

Contact

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