

Thesis
B.Sc.

Thesis
M.Sc.

An Informed Path Selection Overlay

Motivation

Internet Routing limits the paths between a node and another node to the single path found via BGP. Resilience, 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 stand-by. In previous work we have developed a tool to collect traceroutes between the overlay nodes and a tool based on graph database to select multiple paths according to certain features. The most important feature is the diversity of the resulting paths. With diversity we mean that as little as possible links are used by multiple or even all of the parallel paths.

This path selection can operate on a full mesh between all overlay nodes, which for small multipath overlays might be sufficient. However, it seems desirable to make the overlay concept more scalable by reducing the number of edges in the overlay. The idea is to use the overlay nodes as neighbors that have the shortest distance to a node in the underlay. As a consequence, the overlay structure more closely represents the underlying Internet structure, and the hope is that diverse routes become planable. The previous thesis has shown that this kind of path selection can improve diversity in Internet-like artificial graphs (from CAIDA) and a measurement on globally distributed nodes at universities (PlanetLab).

Your Task

- Research on related work
- Understand the previous thesis
- Generate an overlay approach
- Allow path selection on this overlay, preferable utilizing some VPN technology

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