Technische Universität München, Department of Informatics

Chair for Network Architectures and Services
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Thesis B.Sc.

Thesis M.Sc.

Measuring hidden pieces of the Internet through Looking Glasses

Motivation

Structural research of Internet architecture today heavily relies on traceroute to discover data plane paths and BGP monitors to discover control plane paths. However, many large-scale traceroute sources suffer from a too homogeneous setup, e.g. PlanetLab with the majority of hosts set up in research institutions. Through these sources, it is usually not possible to discover peer interconnects, which are solely used by 2 networks to privately exchange data. The same applies to control plane (BGP) data, for which only few global vantage points exist. The idea of this thesis is to massively extend an existing framework for conducting measurements from provider "Looking Glasses". These looking glasses are offered by most network providers (through HTTP or telnet) and offer traceroute and BGP probe functionality directly from within the provider's network. This should, combined with a suitable destination selection, uncover previously hidden paths in the Internet. One such case could be Netflix, which seems to heavily rely on 1-on-1 peerings for its traffic-heavy data connectivity. That gained data is then to be evaluated against other traceroute and BGP sources (e.g. PlanetLab, RouteViews) to answer whether Looking Glasses really offer unique path additions to other traceroute and BGP sources.

Your Task

- Scale up our Looking Glass framework to conduct traceroute and BGP-path queries through telnet and HTTP, leveraging automatic discovery
- Build target list of ASes with potentially many hidden peerings (e.g. NetFlix)
- Conduct selected measurements with this target list from both the Looking Glass infrastructure, PlanetLab, and NLNOG
- Evaluate whether the Looking Glass infrastructure significantly adds new paths to both data plane (PlanetLab traceroute measurements) and control plane (BGP data)
- Map BGP and traceroute paths to find anomalies

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