Chair of Network Architectures and Services
Department of Informatics
Technical University of Munich

Thesis M.Sc.

Structural Analysis of Internet Measurmenet Anomalies

Motivation

When conducting Internet scans, no response from a scanned host should be unexpected. Misconfiguration of services, even to the scale of companies and institutions, are common. Our chair is maintaining a so called *hitlist* since 2018 [1], which collects and scans IPv6 addresses from various sources. Within these scans, too, certain anomalies are to be expected. Since those might even be of interest for other scientists who base their research on our hitlist, we did not filter our scan results until we found a very strong bias towards a distinct type of DNS responses. [2] This type of anomaly introduced such a strong bias, that over 99.81% of responses had to be filtered in order for the hitlist to accurately represent the IPv6 Internet. The main goal of this thesis is to analyze the origin of such large-scale anomalies in a structured way, in order to strengthen future Internet research against biases from such anomalies.

Your Task

- Familiarize yourself with our DNS dataset from IPv6 scans
- Identify the cause of the anomalies in our datasets
- Implement Internet scans and conduct them with us if necessary
- Transfer your findings from the IPv6 data to IPv4

References

[1] https://www.net.in.tum.de/fileadmin/bibtex/publications/papers/gasser2018clusters.
[2] https://www.net.in.tum.de/fileadmin/bibtex/publications/papers/zirngibl2022rustyclu

Requirements

Good network programming skills, preferably in Python. Good understanding of Internet routing, Autonomous Systems, prefixes, protocols, optimally also of DNS.

Contact

Lion Steger stegerl@net.in.tum.de
Johannes Zirngibl zirngibl@net.in.tum.de