Technische Universität München, Department of Informatics

Chair for Network Architectures and Services
Prof. Dr.-Ing. Georg Carle

Thesis B.Sc.

Thesis M.Sc.

Comparing IPv4 and IPv6 hosts and paths in the Internet

Motivation

Most services that have deployed IPv6 run it in parallel to IPv4. This creates seemingly unrelated infrastructures for IPv4 and IPv6. However, we expect those two infrastructures to be tightly coupled. A study [1] has introduced the concept of siblings, which are pairs of IPv4 and IPv6 addresses that offer the same service. As an example, `net.in.tum.de` resolves to `131.159.15.49` as an A record and `2001:4ca0:2001:13:250:56ff:fe9d:955` as an AAAA record. The same study suggests that up to 50% of such siblings are being run on the same hardware in a so-called dual-stack approach. The aim of this thesis is to further investigate finding siblings, fingerprinting techniques and path comparisons to conduct host matching.

Approach

In a first step, a sizeable sibling list is to be created. This step can significantly leverage prior work conducted at the chair as well as related work [2,3].

In a second step, these siblings are to be compared through analysing and comparing the paths as well as fingerprinting the end nodes to learn about the underlying hardware (see [1]).

In a third step, the results are to be evaluated and classified into e.g. confirmed, falsified or unknown status siblings.

[1] *R. Beverly and A. Berger*: Server Siblings: Identifying Shared IPv4/IPv6 Infrastructure Via Active Fingerprinting, *Passive and Active Measurement, Springer, 2015*

[2] *A. Berger et al.*, Internet nameserver IPv4 and IPv6 address relationships, *IMC'13*

[3] *Zhou et al.*, Hopcount and E2E delay: IPv6 versus IPv4, *Passive and Active Network Measurement, Springer, 2005*

Methods

High-volume DNS lookups, traceroute, host/port scanning, fingerprinting

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