



## Comparing IPv4 and IPv6 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 conduct IPv4 and IPv6 path measurements towards such sibling pairs and compare the resulting paths.



### Approach

- Traceroute a set of known sibling pairs
- Compare paths and form Sibling candidates from these paths
- Apply Sibling detection techniques to evaluate sibling status of IPv4/IPv6 routers
- Develop a set of path comparison metrics and evaluate the collected paths against these

[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

Traceroute, Host Fingerprinting, Path Evaluation

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