

rDNS WALKING FOR IPV6 HITLIST CREATION

Background

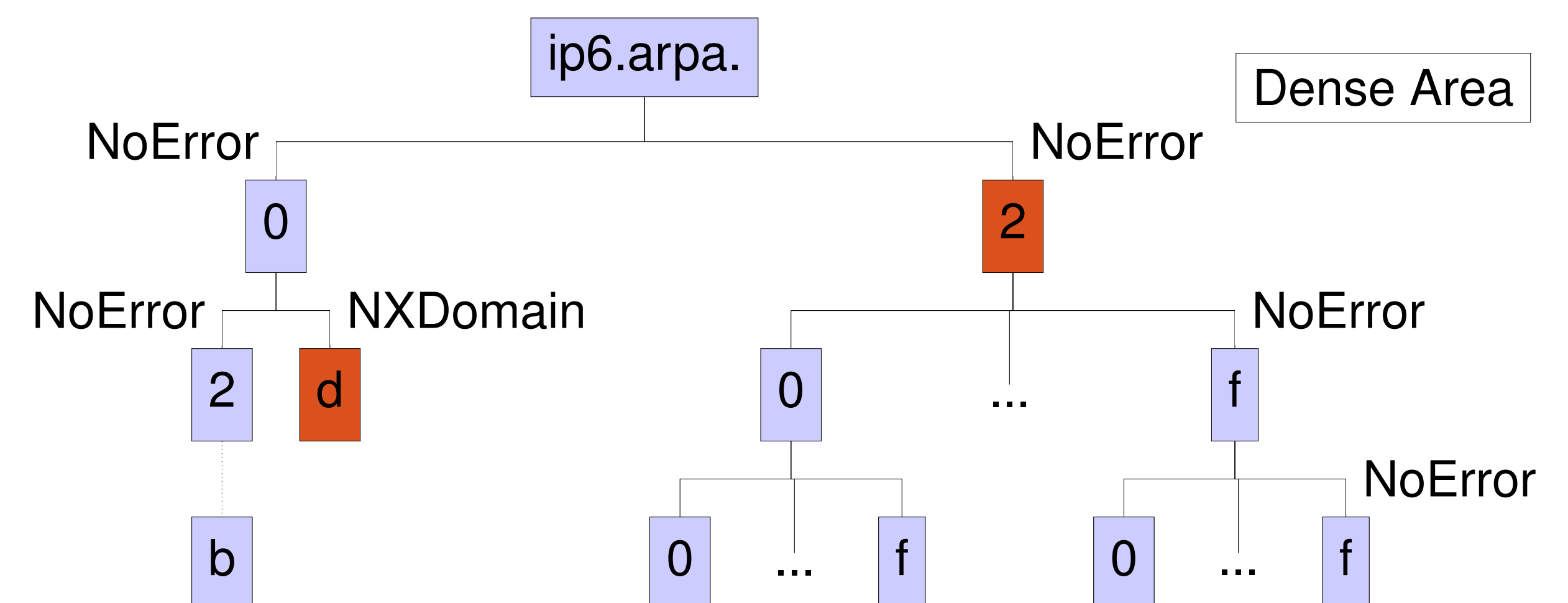
IPv6 Hitlists:

- ▶ Address space too large (2^{128})
- ▶ Good list of responsive addresses required
 - Deterministic
 - Unbiased

Reverse DNS:

- ▶ Part of DNS
 - Address $\xrightarrow{\text{PTR}}$ Domain
- ▶ Addresses represented as subdomains of ip6.arpa.
 - 1080::8:800:200c:417a
 - a.7.1.4.c.0.0.2.0.0.8.0.8.0.8.0.1.ip6.arpa.

rDNS Walking



- ▶ NXDomain: Neither the domain nor any subdomain exists [1]
- ▶ Dense Area:
 - NoError replies to all queries
 - Infeasible by itself

GoDNS Extension

Problems:

- ▶ Nameservers might be inconsistent
- ▶ Small set of nameservers responsible for rDNS

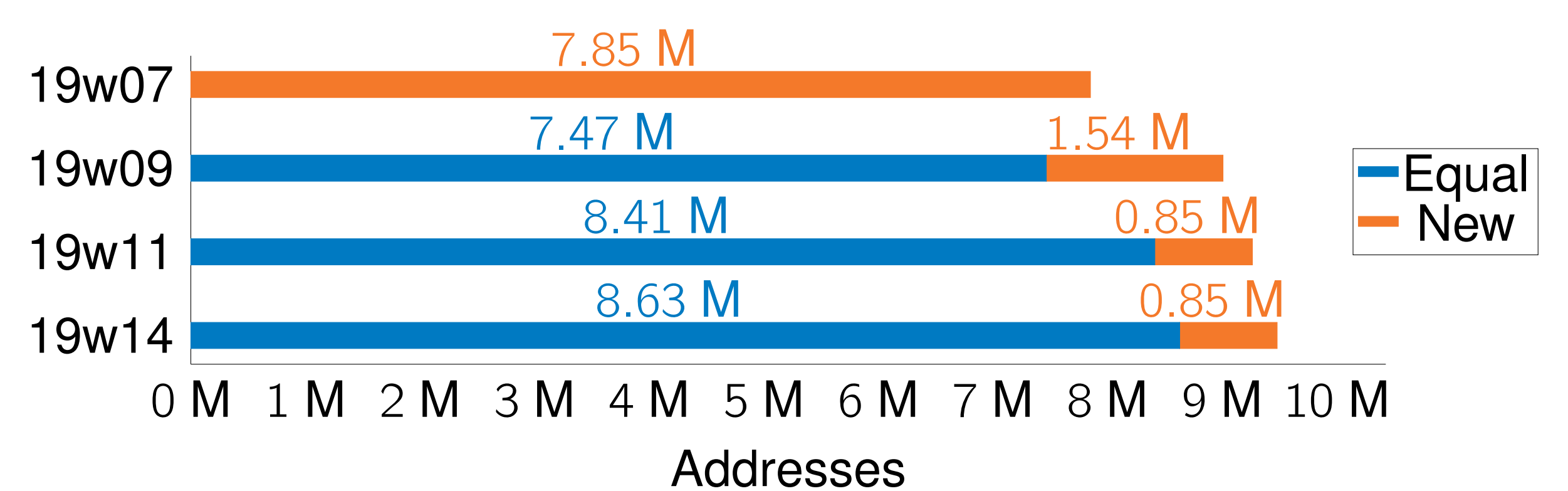
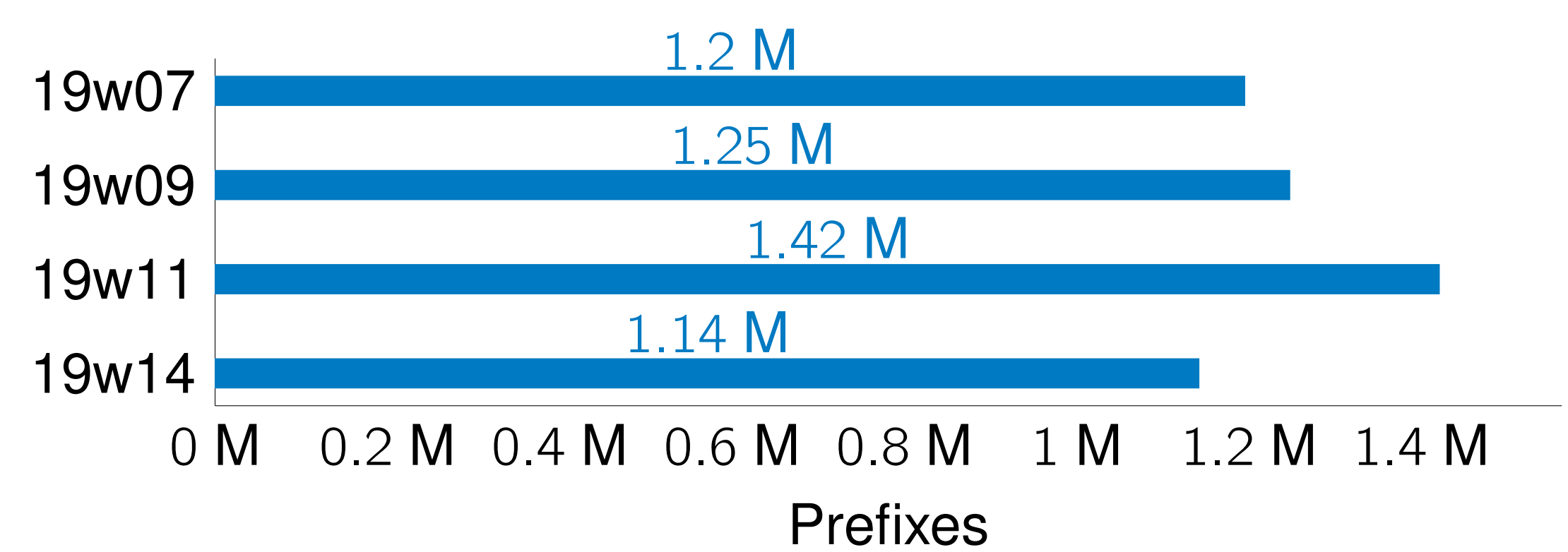
Solution: GoDNS

- ▶ Scanner developed at our Chair
- ▶ Queries all authoritative nameservers
- ▶ **Completely** resolves dependencies
- ▶ Drawback:
 - Increased amount of queries
 - Increased scan time

Experiences from Scans over several Weeks:

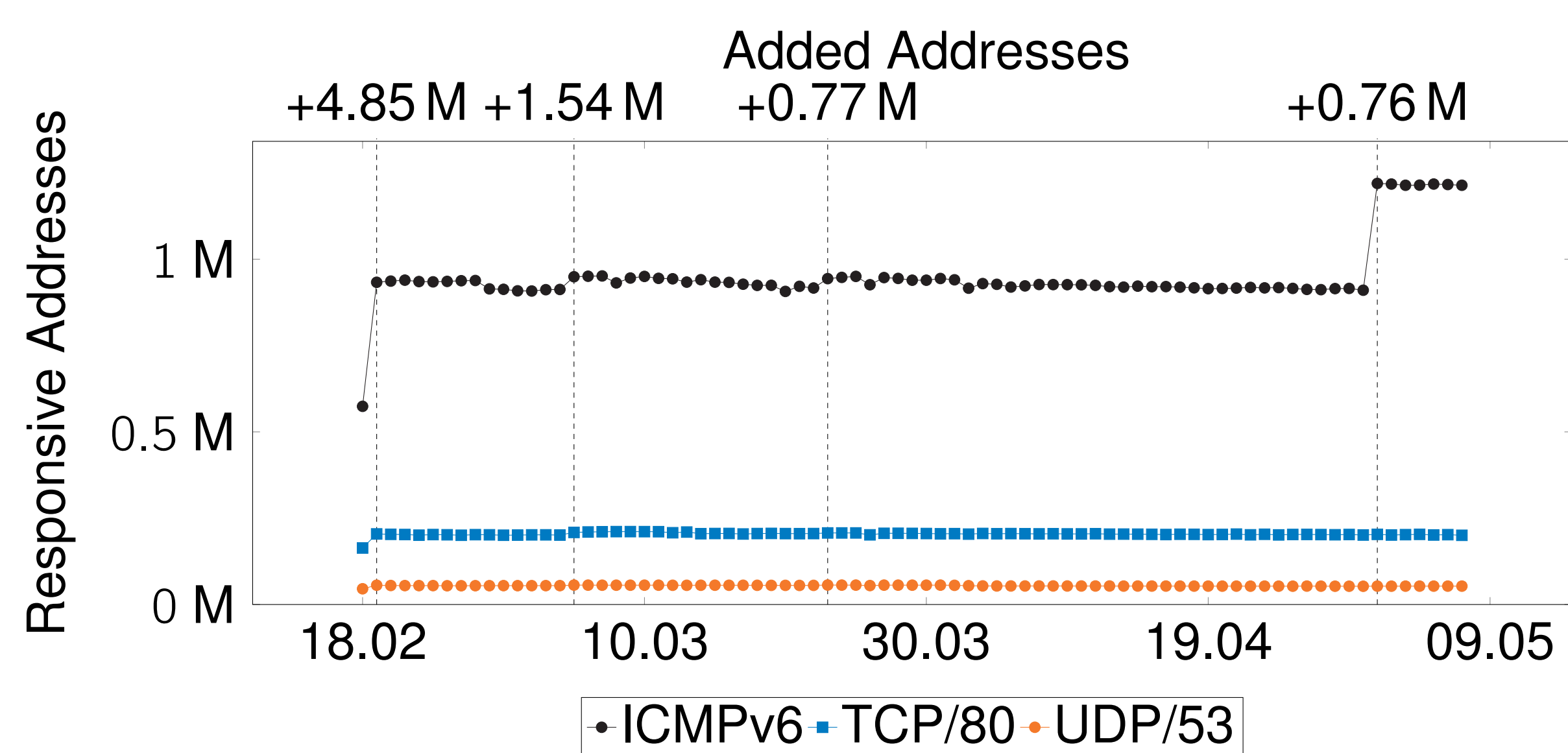
- ▶ Number of queries: 1.4 B
- ▶ Scan duration: 7 d - 9 d

Scan Results



Address Responsiveness

Measured with IPv6 Hitlist Service [3]:



Future Work

Setup Regular Pipeline

- ▶ Pipeline broke in May
- ▶ Interruption during transition from Master to Research Assistant
- ▶ Reestablished pipeline started slowly

Improve Scans

- ▶ Reduce number of queries and scan duration
- ▶ Improve stability
- ▶ Reduce output (logs + data)

[1] S. Bortzmeyer and S. Huque. NXDOMAIN: There Really Is Nothing Underneath. RFC 8020, 2016.
 [2] T. Fiebig, K. Borgolte, S. Hao, C. Kruegel, and G. Vigna. Something From Nothing (There): Collecting Global IPv6 Datasets From DNS. PAM, 2017.
 [3] O. Gasser, Q. Scheitle, P. Foremski, Q. Lone, M. Korczynski, S. D. Strowes, L. Hendriks, and G. Carle. Clusters in the Expanse: Understanding and Unbiasing IPv6 Hitlists. ACM IMC, 2018.
 [4] O. Gasser, Q. Scheitle, S. Gebhard, and G. Carle. Scanning the IPv6 Internet: Towards a Comprehensive Hitlist. TMA, 2016.
 [5] F. Gont and T. Chown. Network Reconnaissance in IPv6 Networks. RFC 7707, 2016.