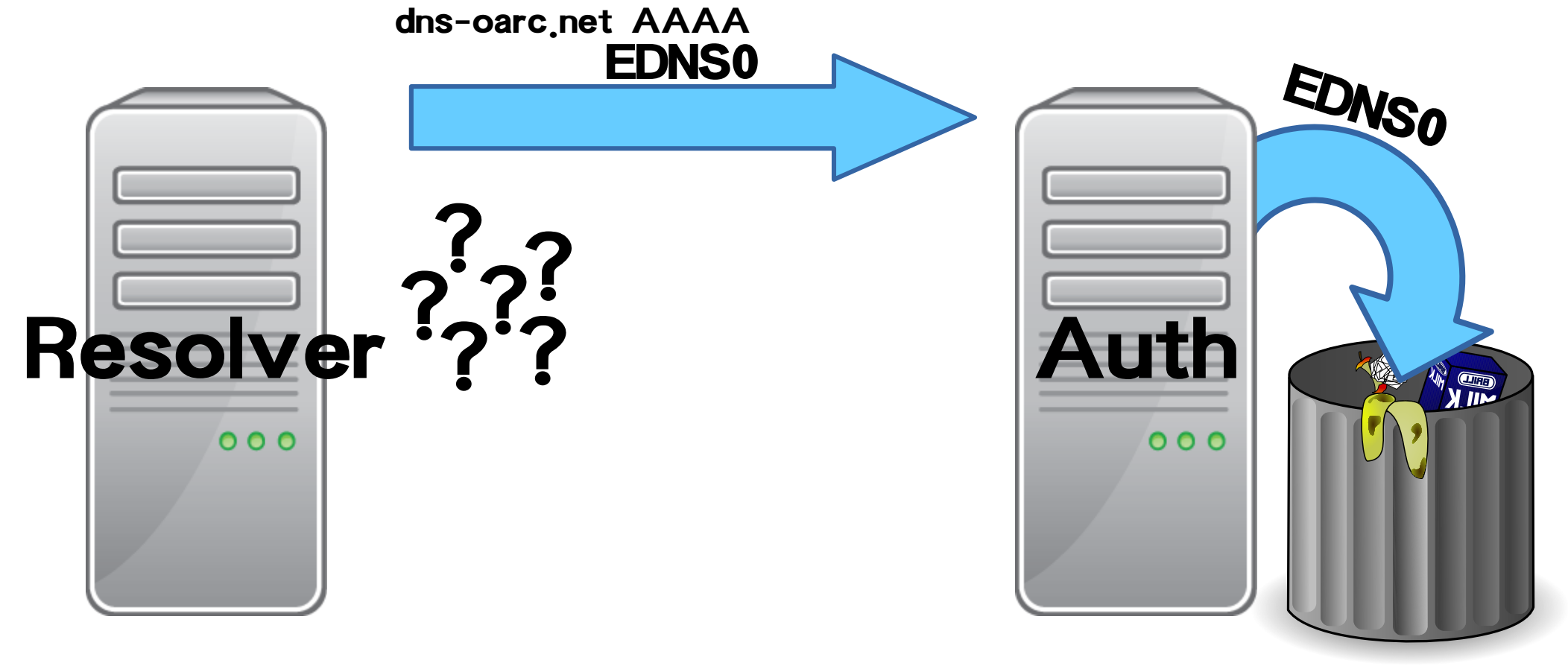
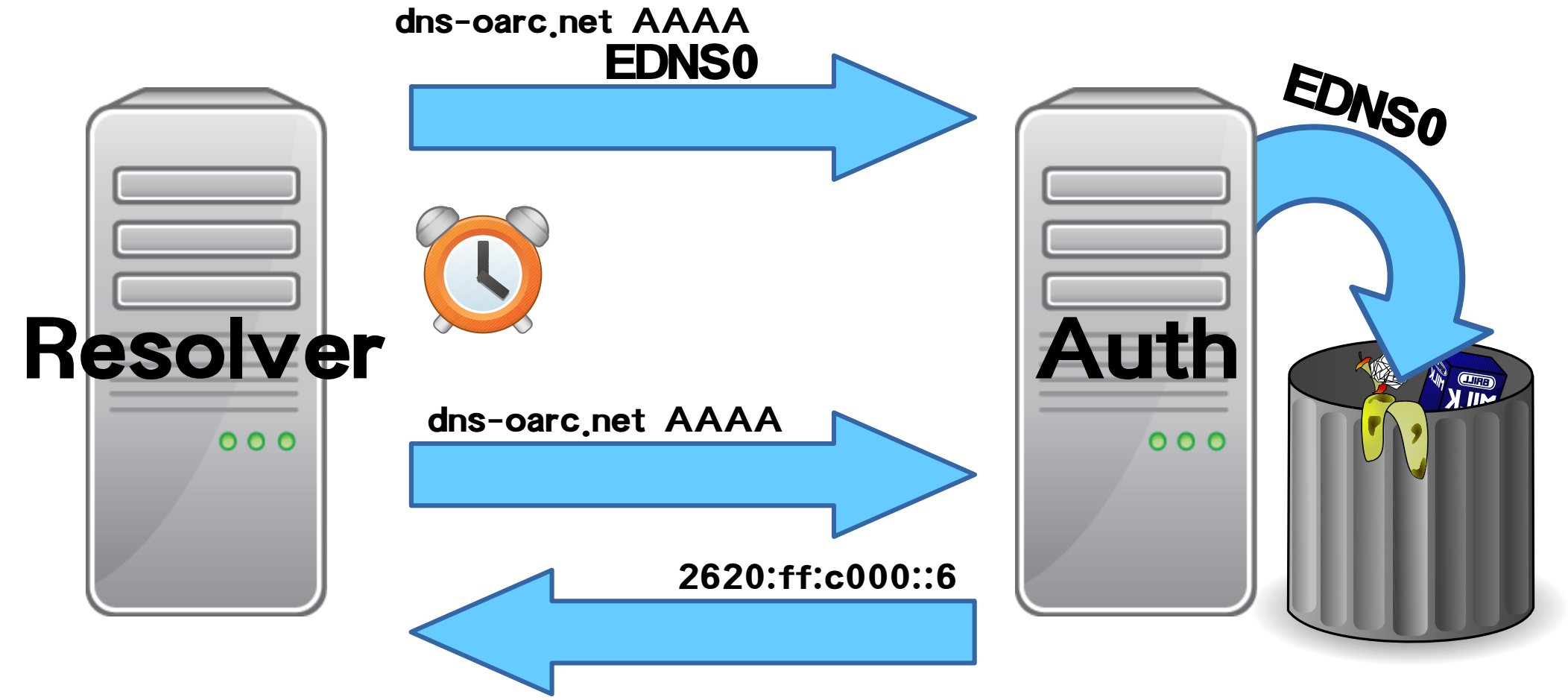
Seeing the effects of
DNS Flag Day in action
Moritz Müller - SIDN Labs
Taejoong Chung - Rochester Institute of Technologie
Willem Toorop - NLnet Labs

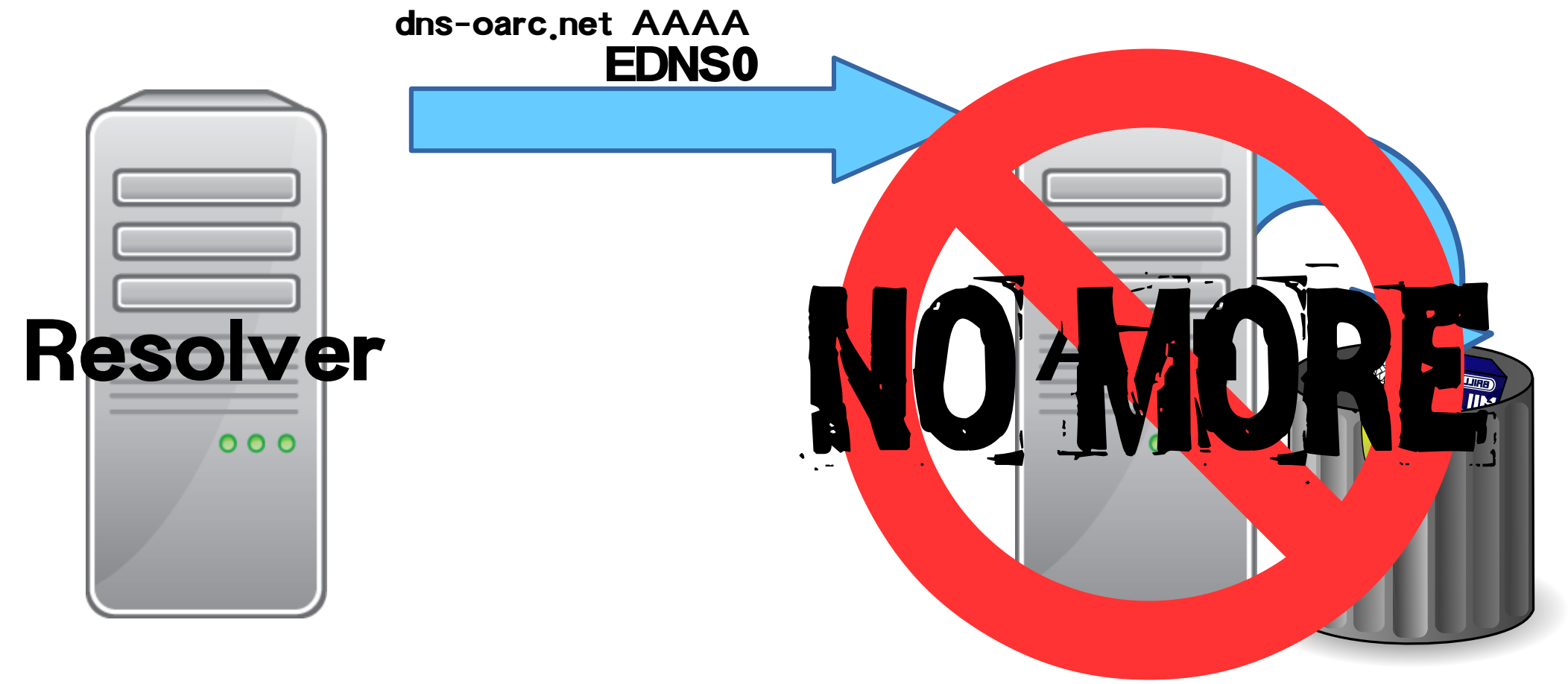
The issue

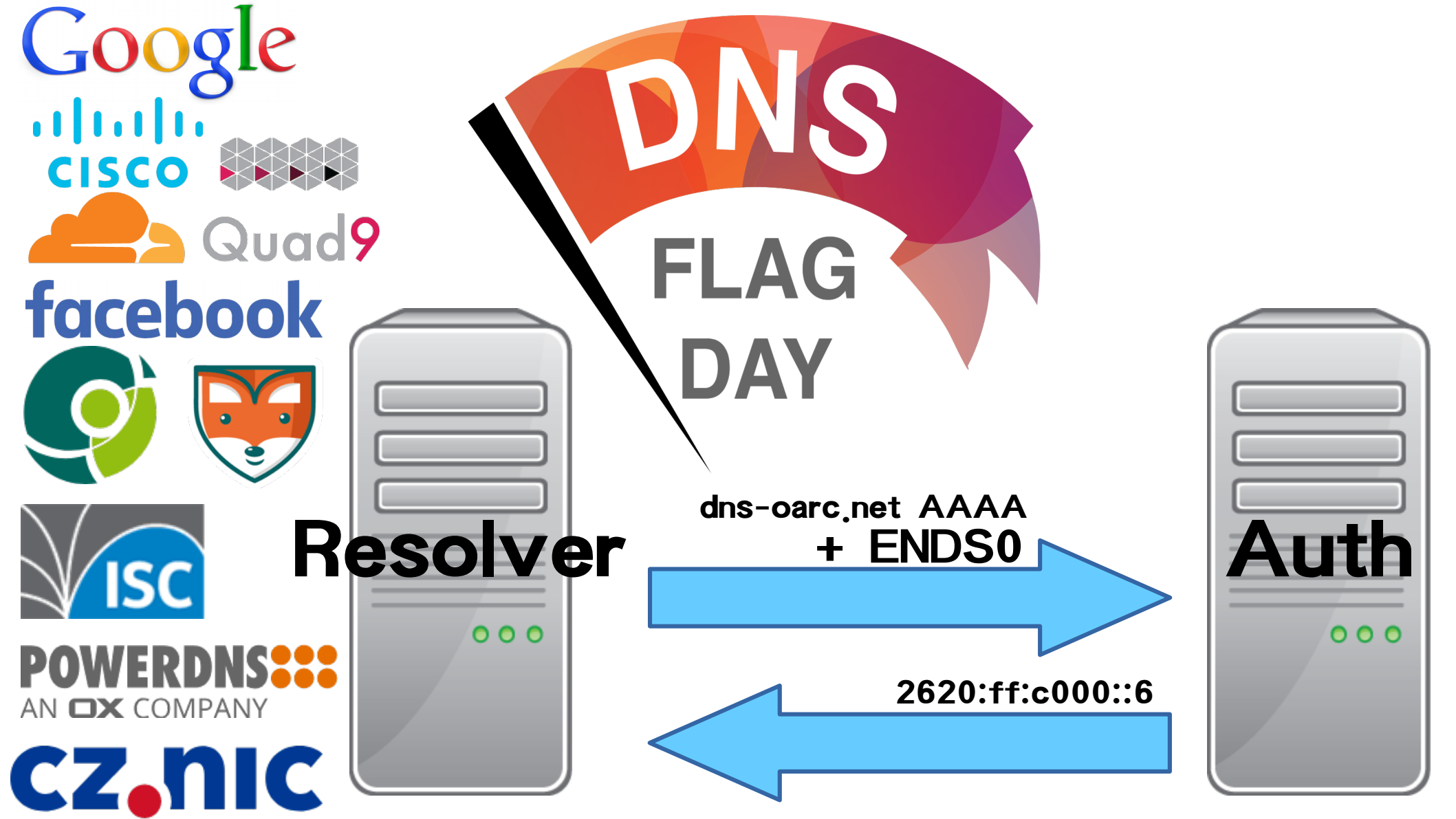


The issue


dns-oarc.net AAAA
EDNS0
Resolver
Auth
EDNS0
dns-oarc.net AAAA
2620:ff:c000::6

The issue




Google
cisco
Quad9
facebook
ISC
POWERDNS
AN OX COMPANY
cz.nic
DNS
FLAG
DAY
Resolver
dns-oarc.net AAAA
+ ENDS0
2620:ff:c000::6
Auth

DNS flag day

- First announced - March 9, 2018
- Lots of measurements of authoritative
- Lots of outreach
- Lots of authoritatives fixed
- Lots of middle boxes fixed

- **Measure resolver uptake after DNS flag day**

Already DNS flag day ready

- BIND since 9.13.7 - 2019-02-27
- Unbound since 1.9.0 - 2019-02-05
- Knot since always
- PowerDNS seemed already ready too…

flagday.rootcanary.net

End user perspective

	Distinct Resolvers	Distinct ASes
RIPE	19,063	3,587

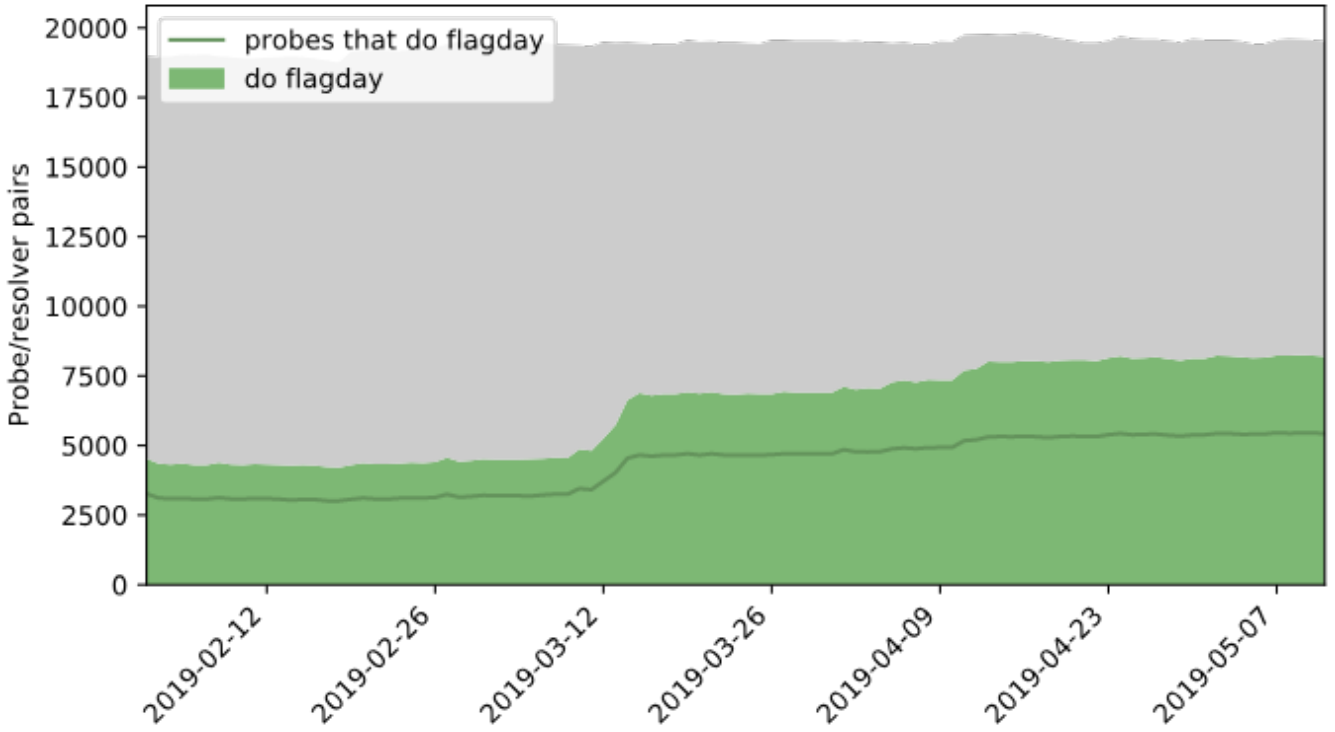
Measurement period:
2019-02-01 – 2019-05-08

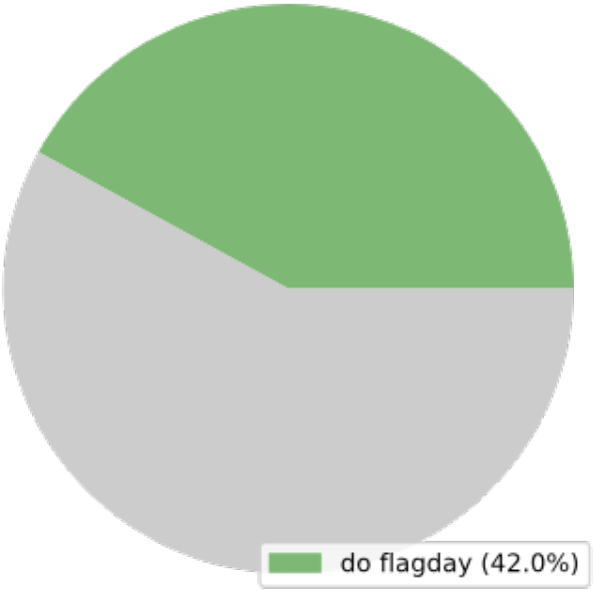
±15% **already DNS flag day ready**

2019-01-28

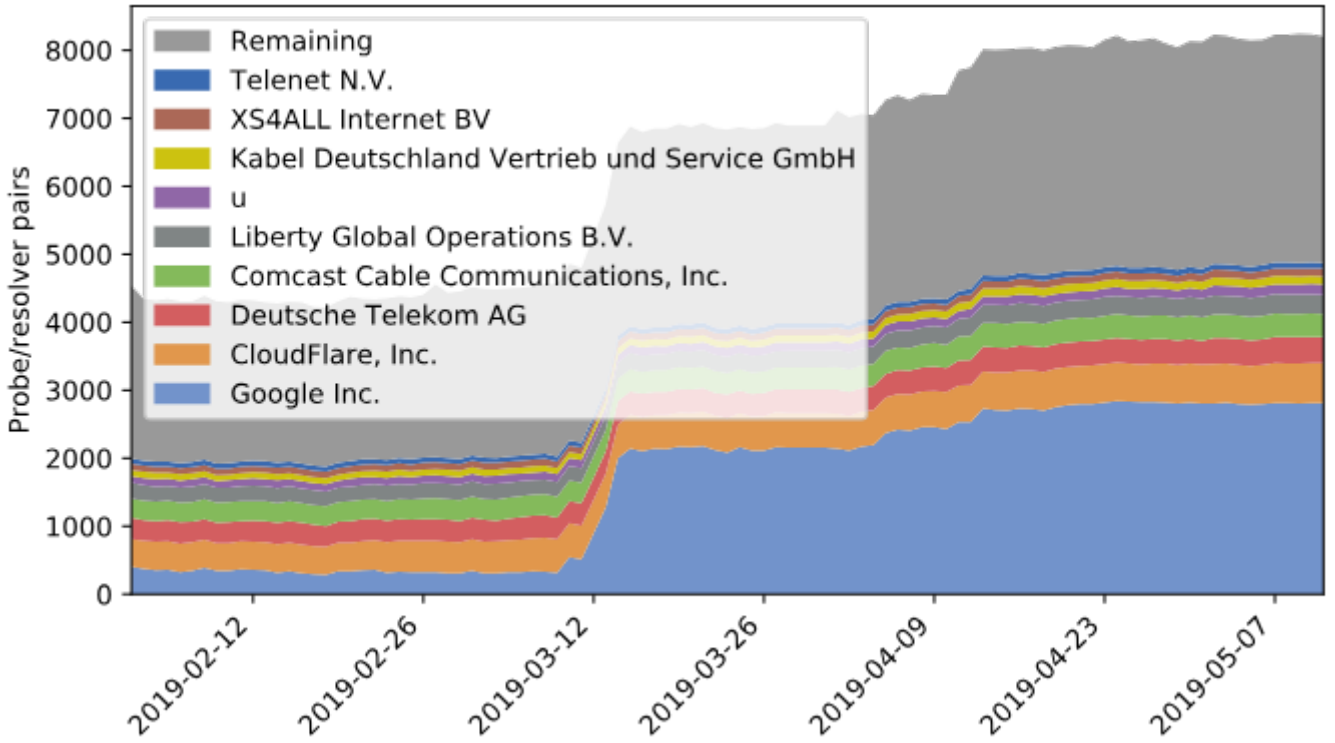
`flagday.rootcanary.net`

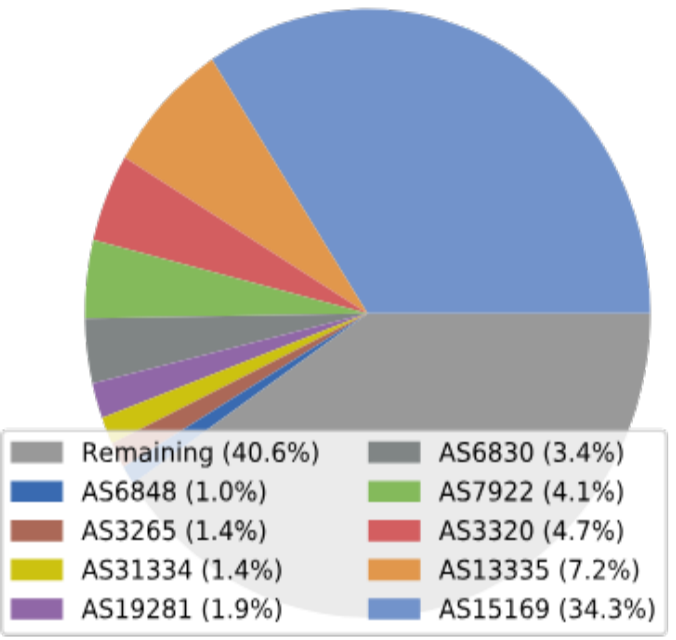
End user perspective RIPE Atlas



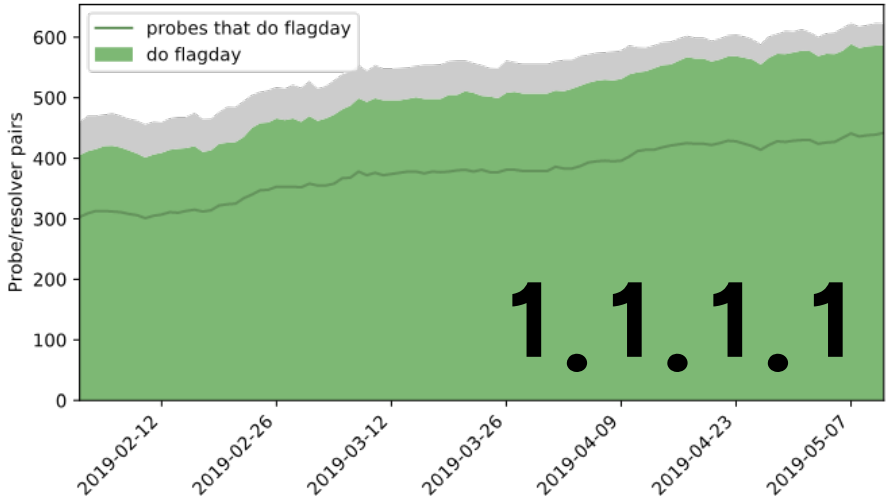


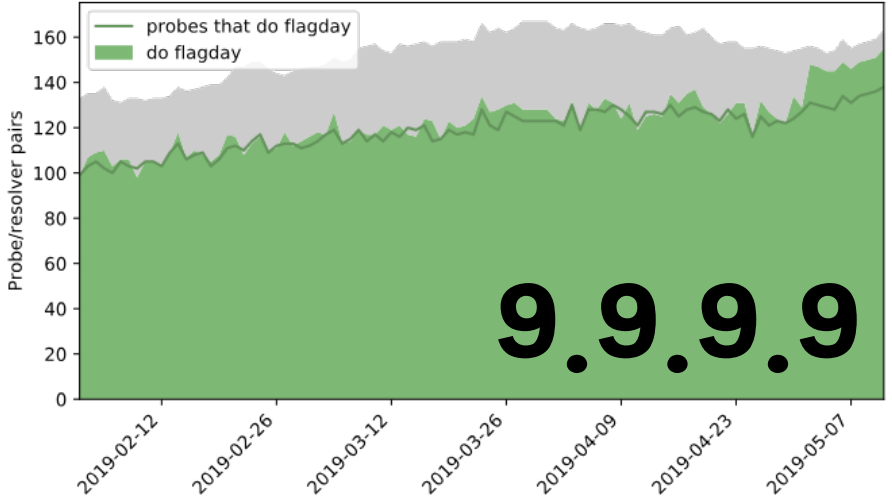
End user perspective RIPE Atlas

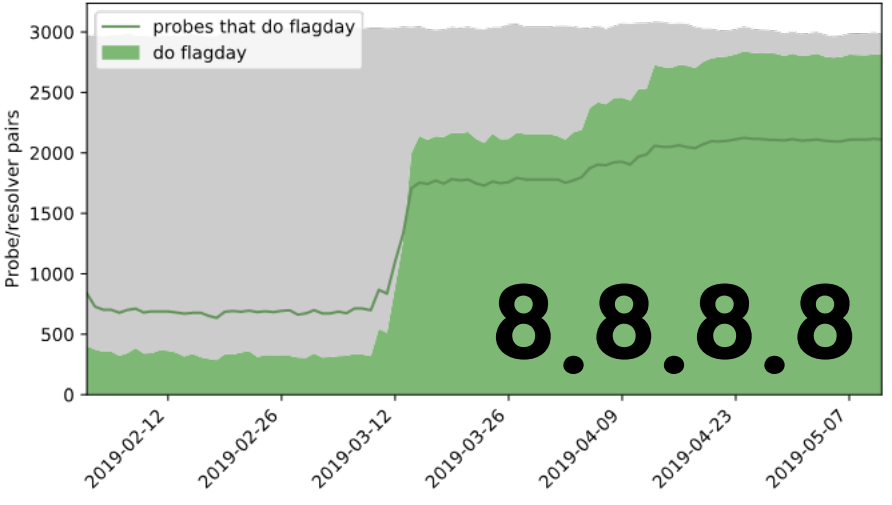




End user perspective RIPE Atlas







Authoritative perspective

	Distinct Upstream IPs	Distinct Upstream ASes
RIPE	62,191	3,824
Luminati	101,386	8,272
Open Resolvers	226,563	17,125
Total	284,635	19,320

`*.flagday.rootcanary.net`

Measurement period:
2019-02-01 – 2019-05-08

Authoritative perspective

- For each unique QNAME:
  - if all queries with EDNS:
    All IPs <= STRICT
  - elif at least one query without EDNS0:
    All IPS <= PERMISSIVE

	Distinct Upstream IPs	Distinct Upstream ASes
Total	284,635	19,320

`*.flagday.rootcanary.net`

Measurement period:
2019-02-01 – 2019-05-08

Authoritative perspective

>20% already DNS flag day ready

2019-01-31

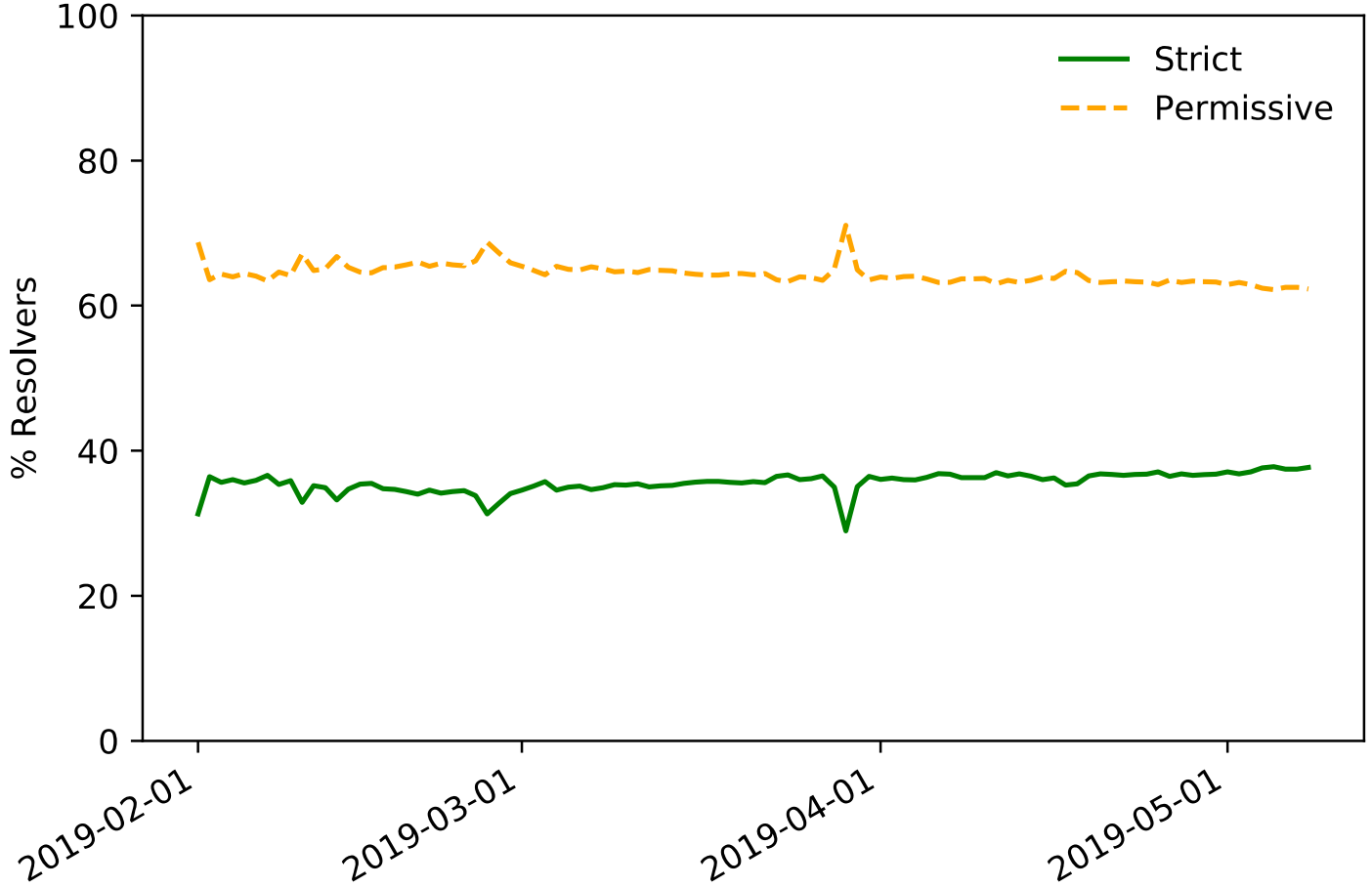
	Distinct Upstream IPs	Distinct Upstream ASes
Total	284,635	19,320

`*.flagday.rootcanary.net`

Measurement period:
2019-02-01 – 2019-05-08

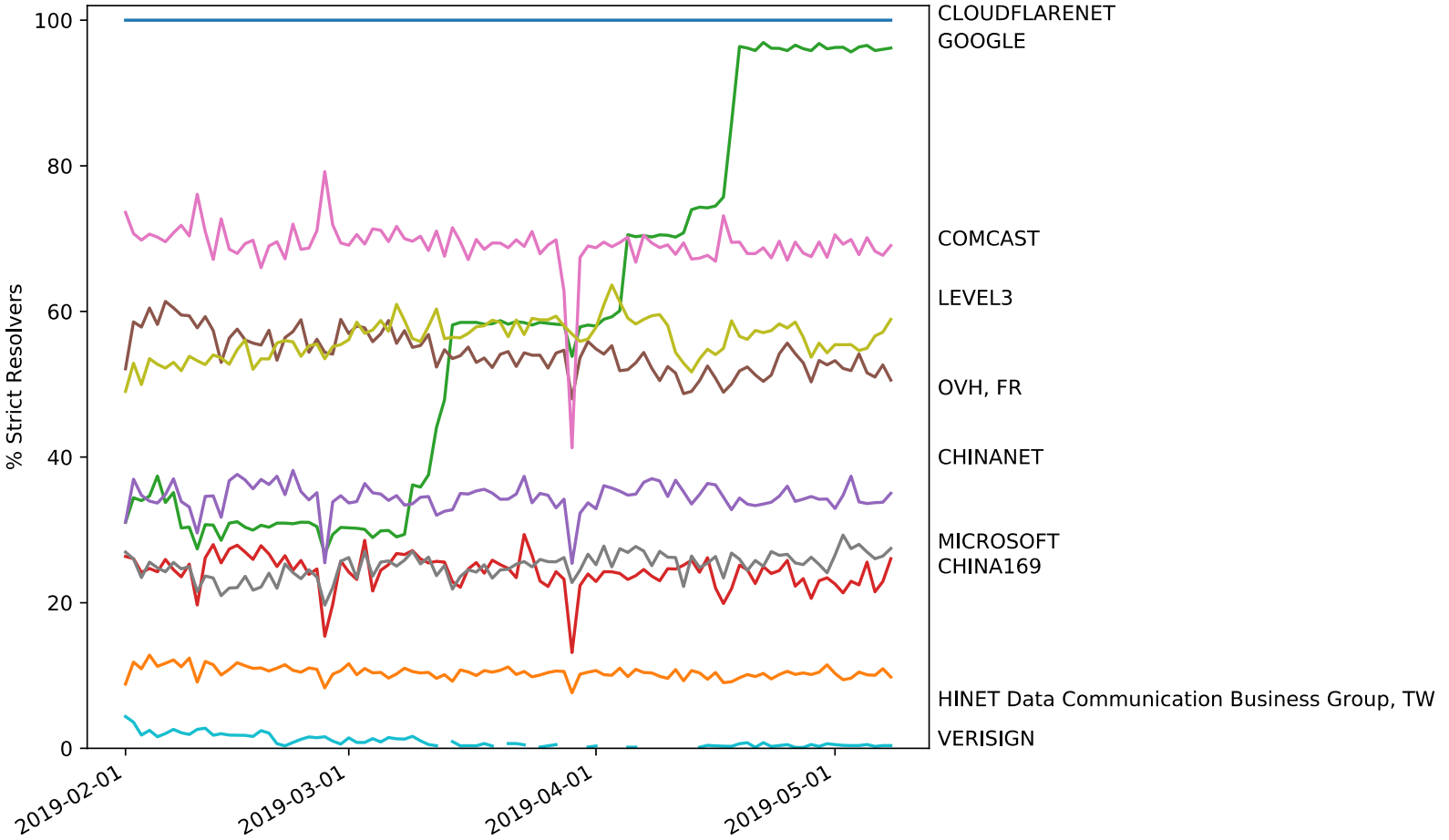
Authoritative perspective

Strict resolvers over time



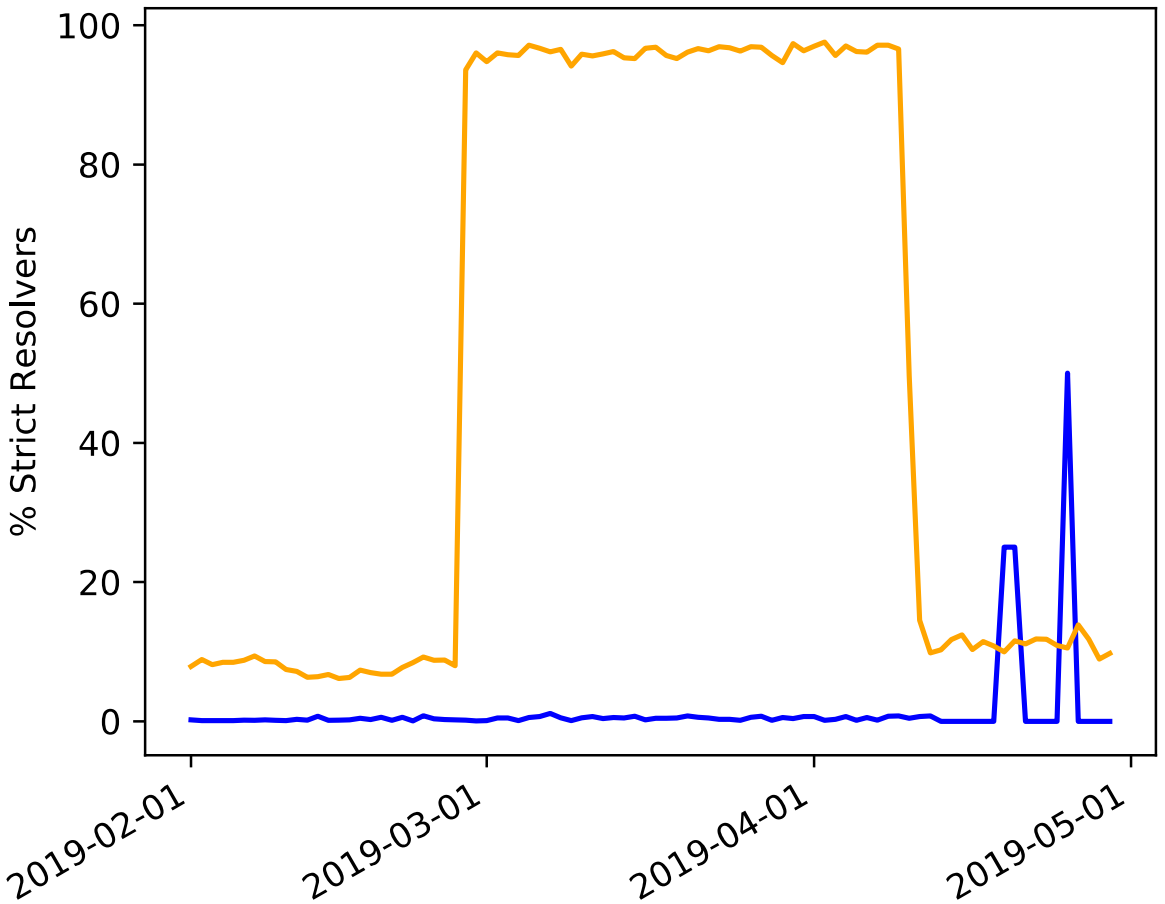
Authoritative perspective

ASes with most resolvers



Authoritative perspective

Revert



- With at least 500 queries per day on median
- Increase in ”strict” queries by at least 25% compared to the median of the 7 days before
- Decrease in strict queries to the pre-growth median

TVCaboAngola, AO

SKY SERVIÇOS DE BANDA LARGA LTDA, BR

Takeaways

- The Internet became a little better!
- If your auth dropped EDNS0, you were already in pretty bad shape!
- Besides Google (and Quad9 since May), not much happened after flag day
- Do these kind of impact measurement before outreach next time