k.root-servers.net
by
RIPE NCC

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RIPE NCC

Who is talking: Daniel Karrenberg

- **1980s**: helped build Internet in Europe
  - GUUG, EUUG, EUnet, Ebone, IXes, RIPE, ...

- **1990s**: helped build RIPE NCC
  - 1st CEO: 1992-2000

- **2000s**: Chief Scientist & Public Service
  - Trustee of the Internet Society, IETF, ...

- **2010s**: Chief Scientist
  - Interests: Internet measurements, stability, trust & identity in the Internet, ...

What DNS Root Name Servers Do

Tell where are

once every

What DNS Root Name Servers Do

Attack Mitigation

Diversity

12 Professional Operators / 13 Independent Operations

# DDoS Mitigation

Over-provisioning:

Not to scale !

DNS Root Name Server Locations

Legend

99 Multiple instances

K Single instance

POWERED BY Google

Map data ©2012 MapLink, Tele Atlas - Terms of Use

DNS Root Name Server Locations

Closest Root Server as seen by RIPE Atlas
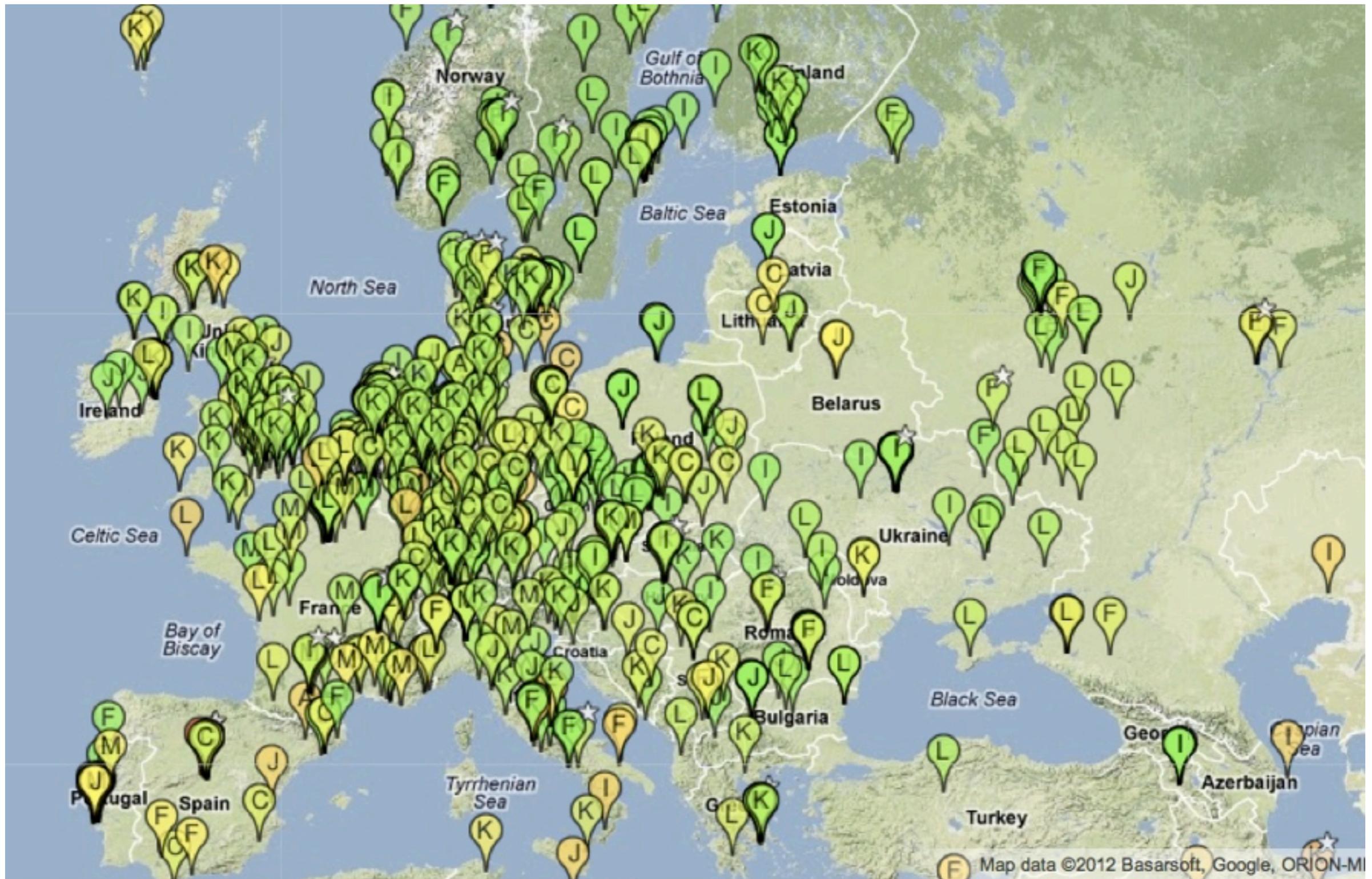
2012-02-20 05:02:01 UTC.

Closest Root Server as seen by RIPE Atlas
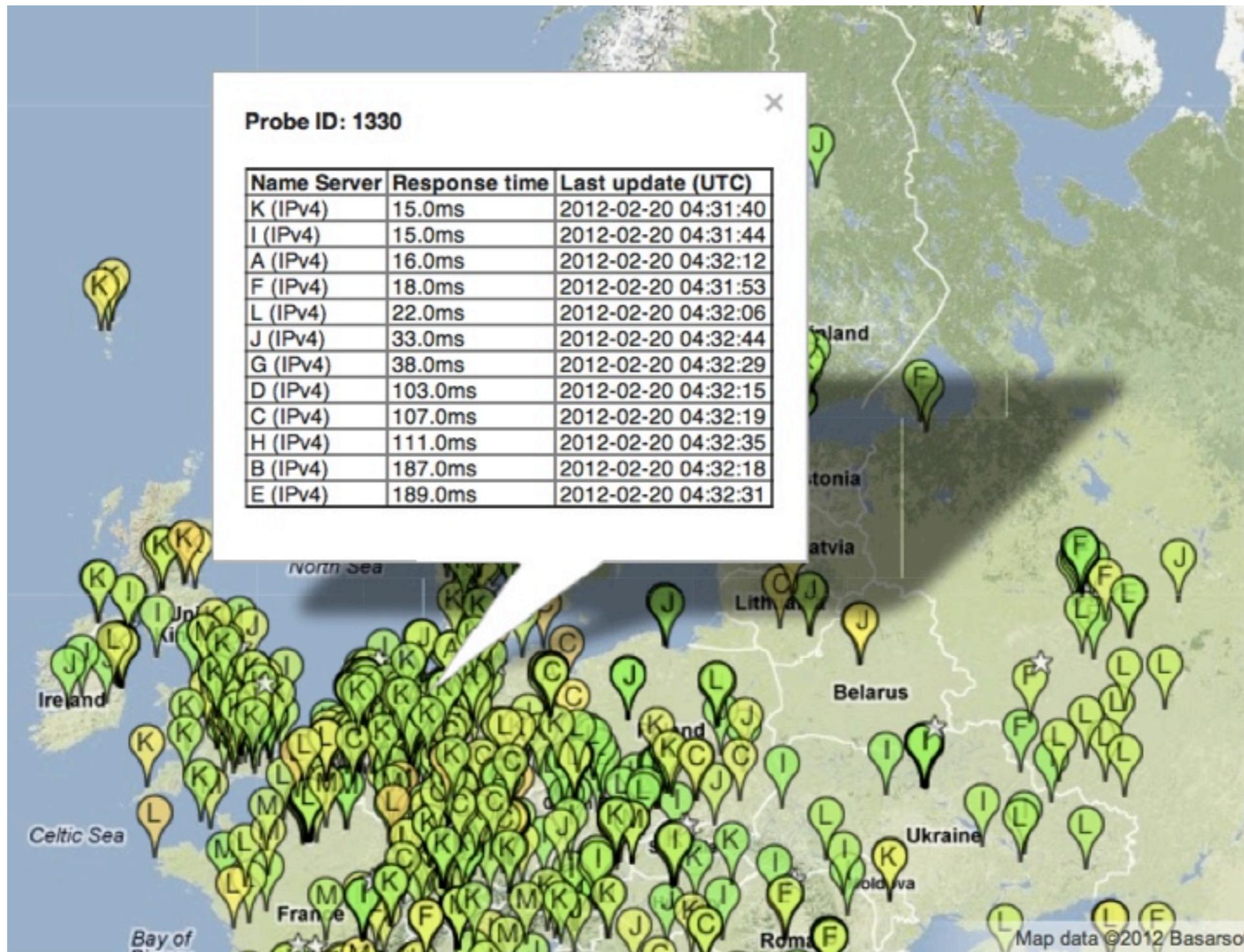
k.root-servers.net: Locations

Legend

- K (red) — Global node
- K (blue) — Local node
- K (red with star) — IPv6 enabled node

Local Nodes: Budapest, HU · Milan, IT · Helsinki, FI · Reykjavik, IS · Poznan, PL · Geneva, CH · Delhi, IN · Athens, GR · Doha, QA · Novosibirsk, RU · Abu Dhabi, AE · Brisbane, AU · Dar es Salaam, TZ

k-root: Instance seen by RIPE Atlas

k-root: Instance seen by RIPE Atlas
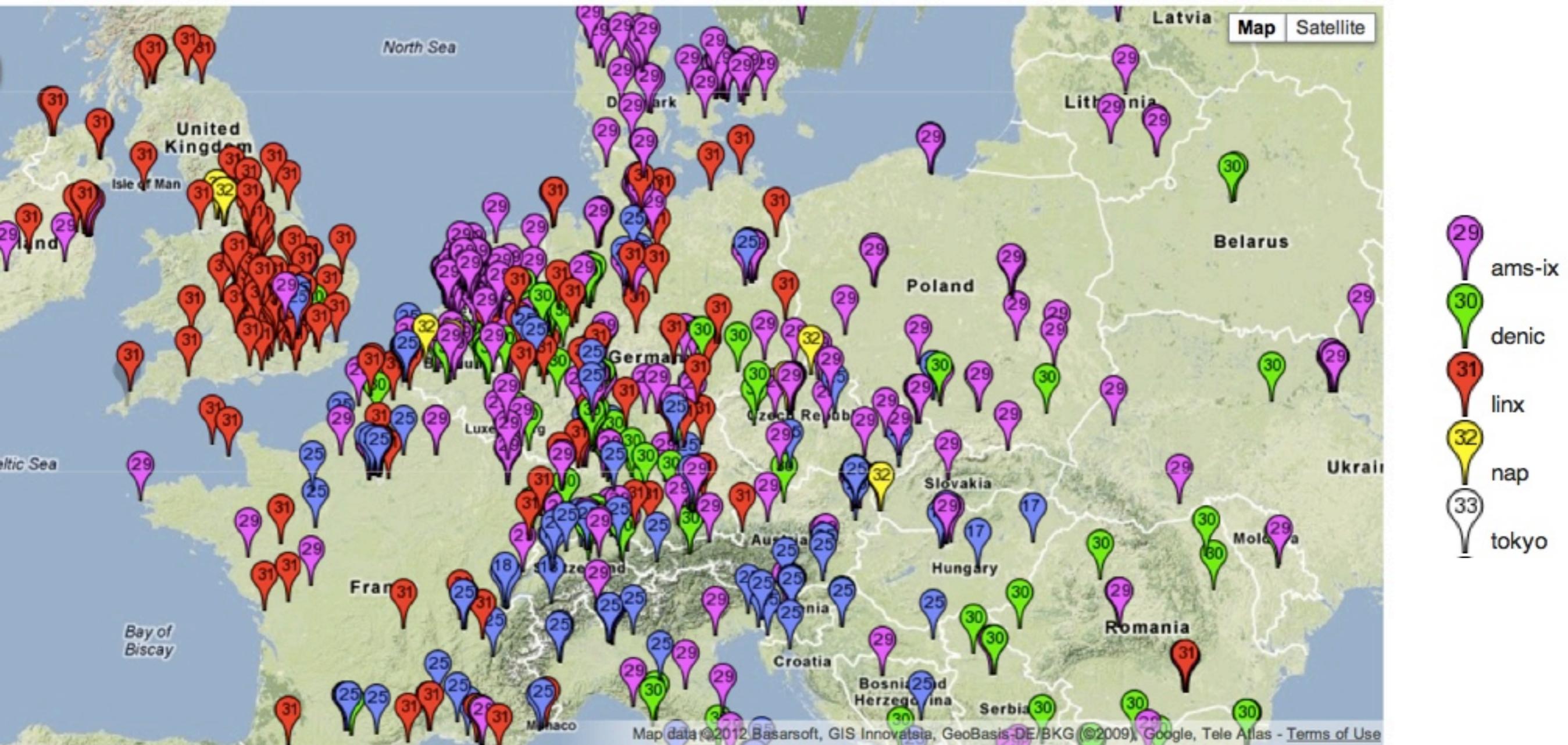
k.root-servers.net: TLDs Queried

Most Popular TLDs Queried
From Feb 13, 2012, 00:00:00 To Feb 19, 2012, 23:05:37 UTC

Mean Query Rate (q/s)

Legend:
- Other
- ANY
- A6
- SRV
- AAAA
- MX
- PTR
- SOA
- CNAME
- NS
- A
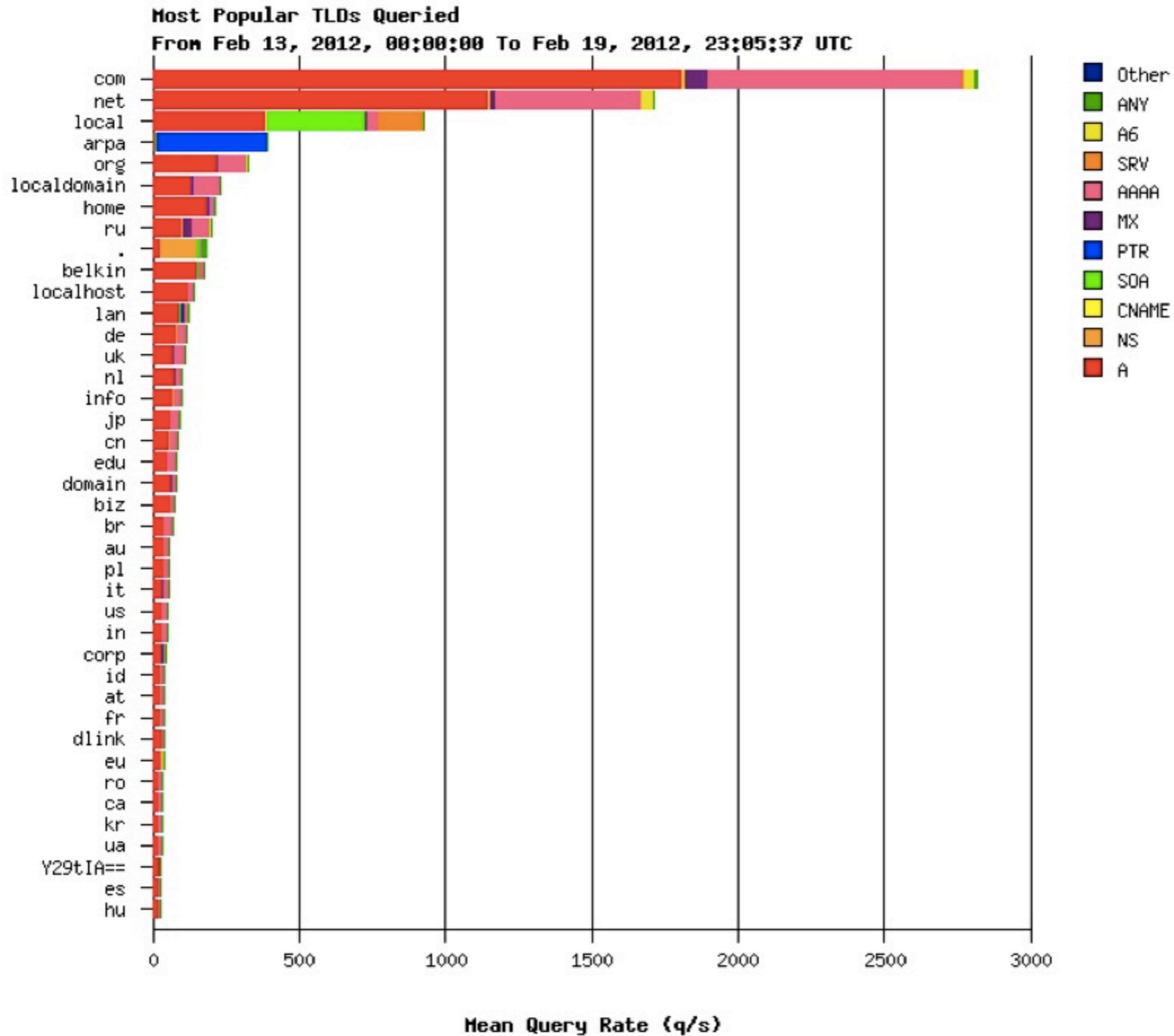
k.root-servers.net: Query Load

Queries by Node
From Feb 14, 2012, 02:05:03 To Feb 21, 2012, 02:05:03 UTC
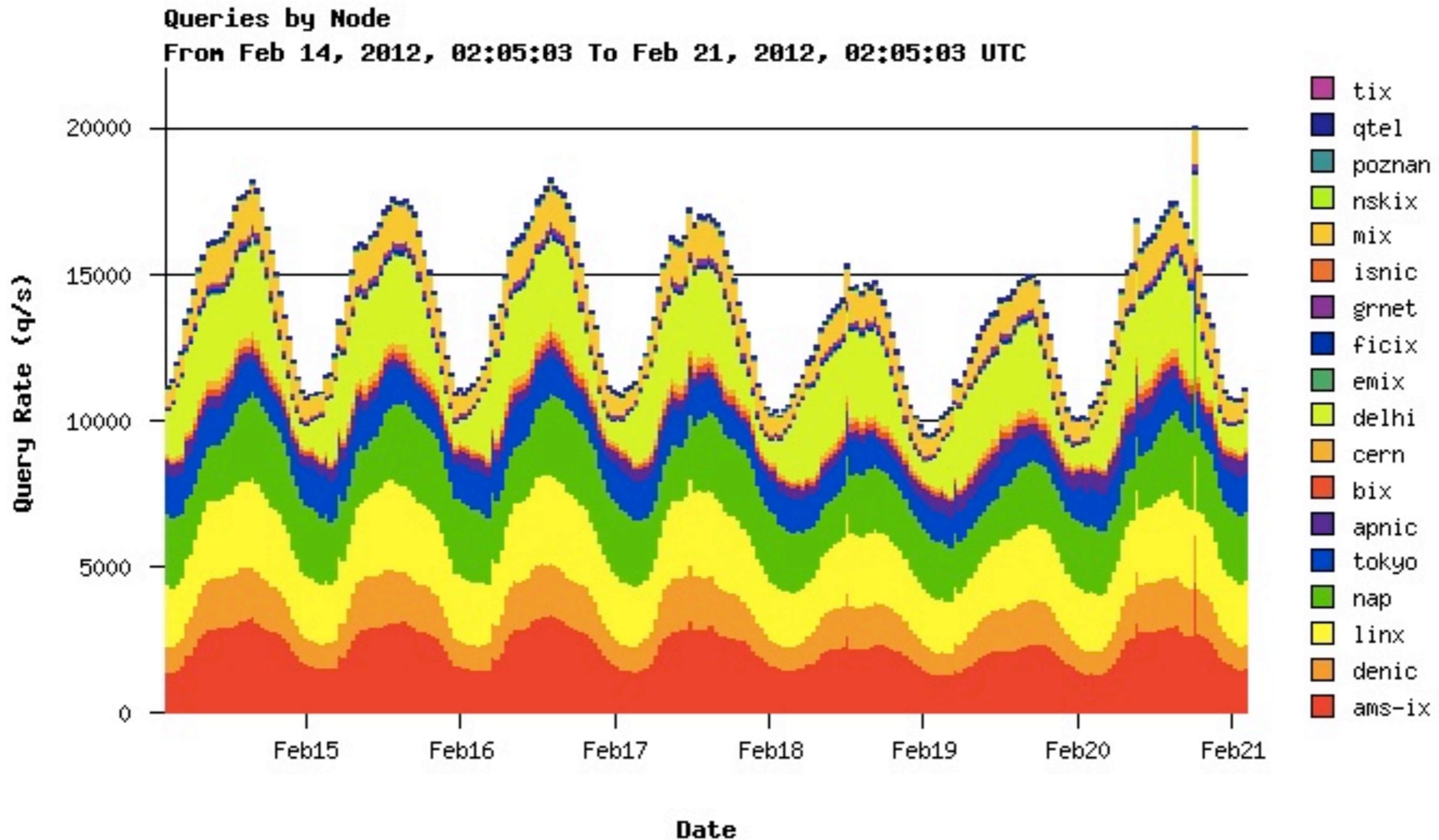
k.root-servers.net: Load Distribution
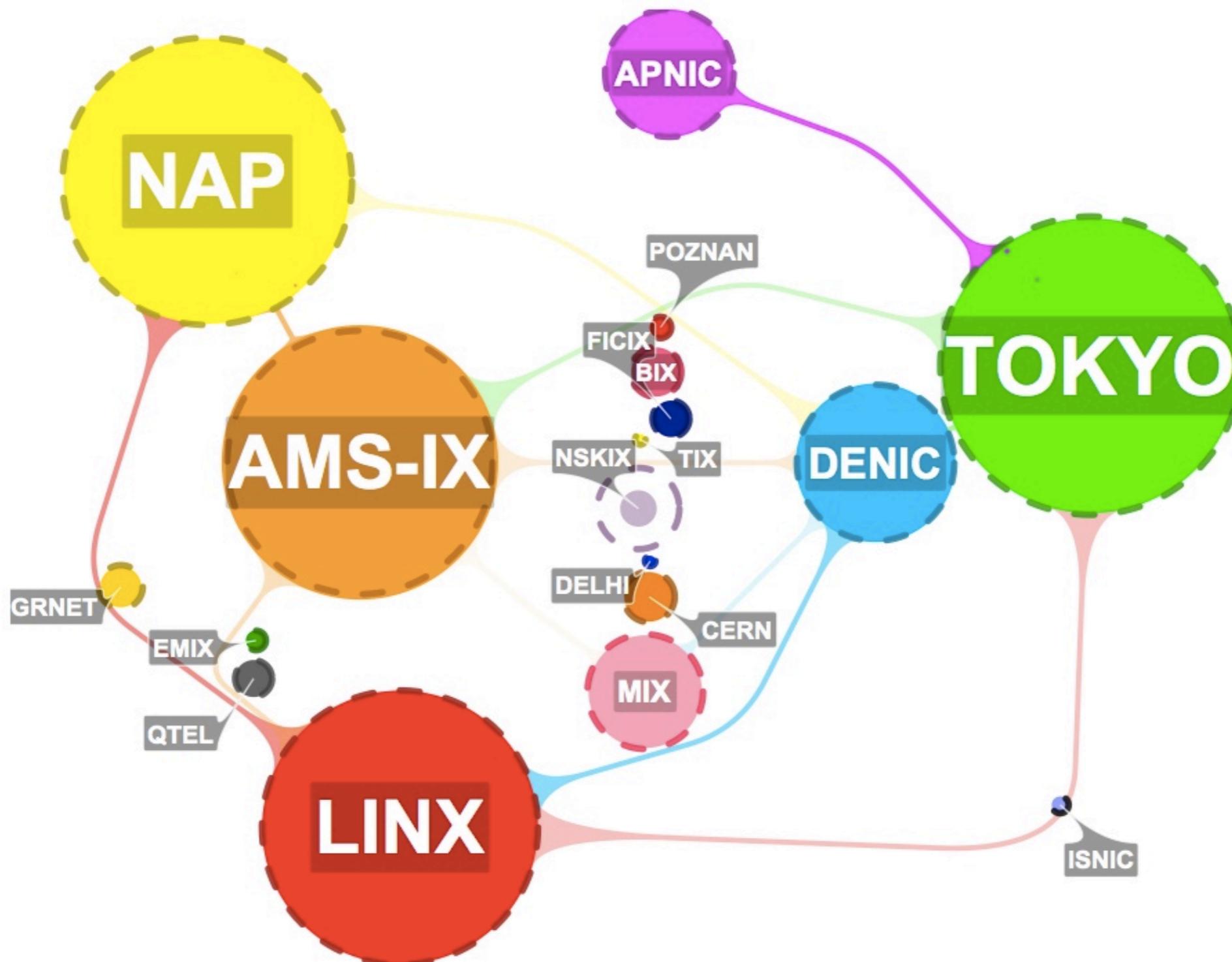
DDoS Mitigation

Over-provisioning:

Not to scale !

DDoS Mitigation

- Cooperation with ISPs
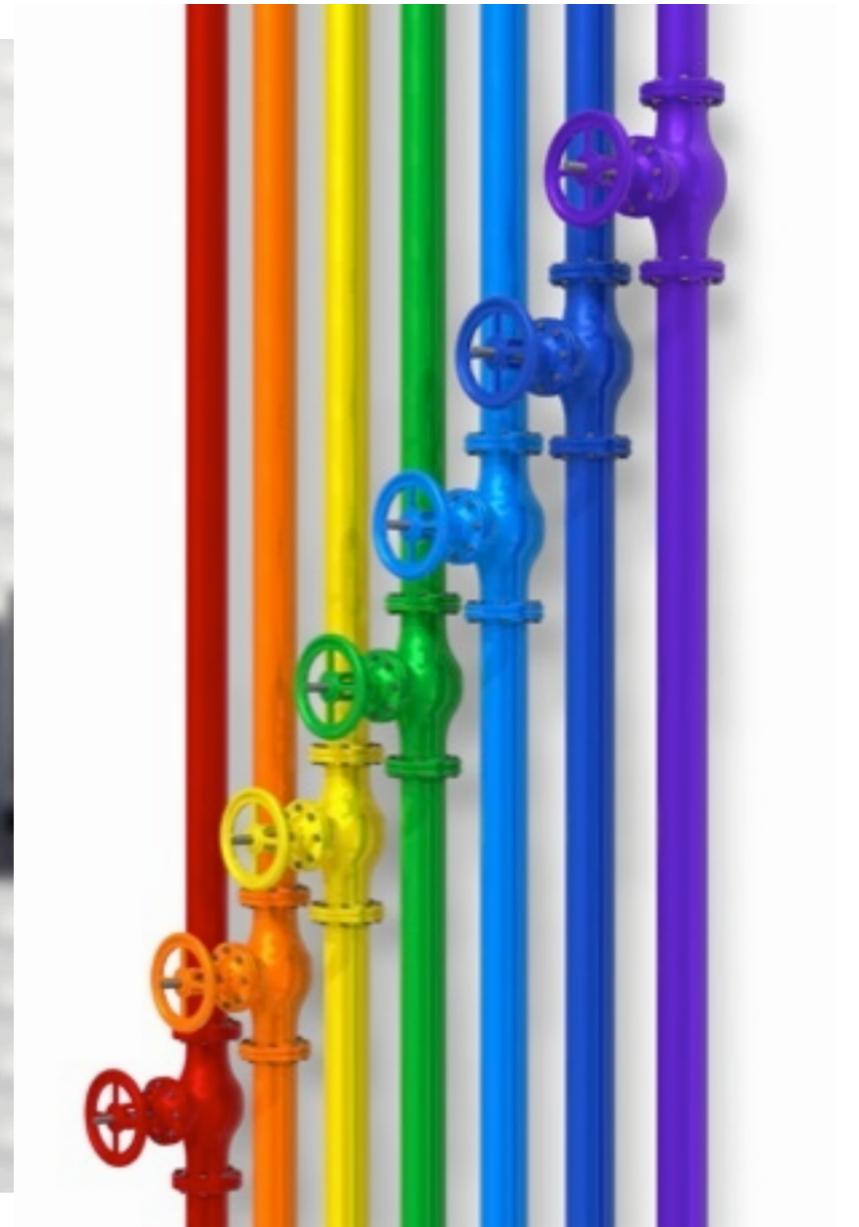
DDoS Mitigation

- Cooperation with ISPs

dnsmon

References

- **`root-servers.org`**
- **`k.root-servers.org`**
- **`k.root-servers.org/visualk`**
- **`atlas.ripe.net`**
- **`dnsmon.ripe.net`**
- **`www.isoc.org/briefings/019`**
- **`www.isoc.org/briefings/020`**
- **`labs.ripe.net`**

Questions?