

IPV6 MATRIX PROJECT

Tracking IPv6 accessible content
Worldwide

<http://www.ipv6matrix.org>

Dr. Tim Chown, Jisc – Tim.Chown@jisc.ac.uk

for Olivier MJ Crépin-Leblond, Internet Society UK (<https://isoc-e.org/>)
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IPV6 MATRIX PROJECT

ISOC England was awarded a Community Grants Programme award in November 2009

Design and implementation of an “IPv6 Crawler,” software on a computer that crawls through the DNS at regular intervals in order to detect and test:

- IPv6 DNS servers
- IPv6 compliant Web servers
- IPv6 compliant SMTP mailers
- IPv6 compliant NTP servers.



PROJECT RATIONALE

Today, more than 95% of Internet traffic is generated by a small number of data sources – i.e. the world's busiest Web Sites

Without IPv6 accessible content, IPv6 has less chance of being used.

Data is sourced by querying the DNS records of the top 1 million domains as rated by Majestic Million. Add more domains later.

Test them for IPv6 connectivity: Web, Mail, Time and Name servers listed in those records.

Further processing: geolocation, ping and path comparison between IPv4 and v6 hosts; comparable reachability of v4 and v6 services.

This is equivalent to testing about 7+ million hosts worldwide



MEASURING IPV6 DEPLOYMENT

Some good examples out there already

- <https://pulse.internetsociety.org/>
- <https://www.google.com/intl/en/ipv6/statistics.html>
- <http://6lab.cisco.com/stats/>
- <https://www.vyncke.org/ipv6status/>
- https://mrp.net/ipv6_survey/
- <https://stats.labs.apnic.net/ipv6>

None of them are exact science



THE IPV6 MATRIX

Initial 'crawler' code was developed by ISOC England in conjunction with Nile University in 2009/10

- Started crawling the domains, with basic display mechanisms

Due to Arab Spring, the crawler moved to Telehouse (2012)

ISOC England – Student-Led Crawler Project (2013/14)

4th-year MEng students at University of Southampton Part of a major Group Design Project (3/8 of final year grade)

Project brief:

-  Improve crawler data presentation
-  Enhance crawler robustness
-  Apply Open Data principles (theodi.org)

Crawler infrastructure relocated to Southampton

Students had 10 weeks to gather requirements and deliver a working prototype

Module highly regarded by students and industry; ~30 projects run annually

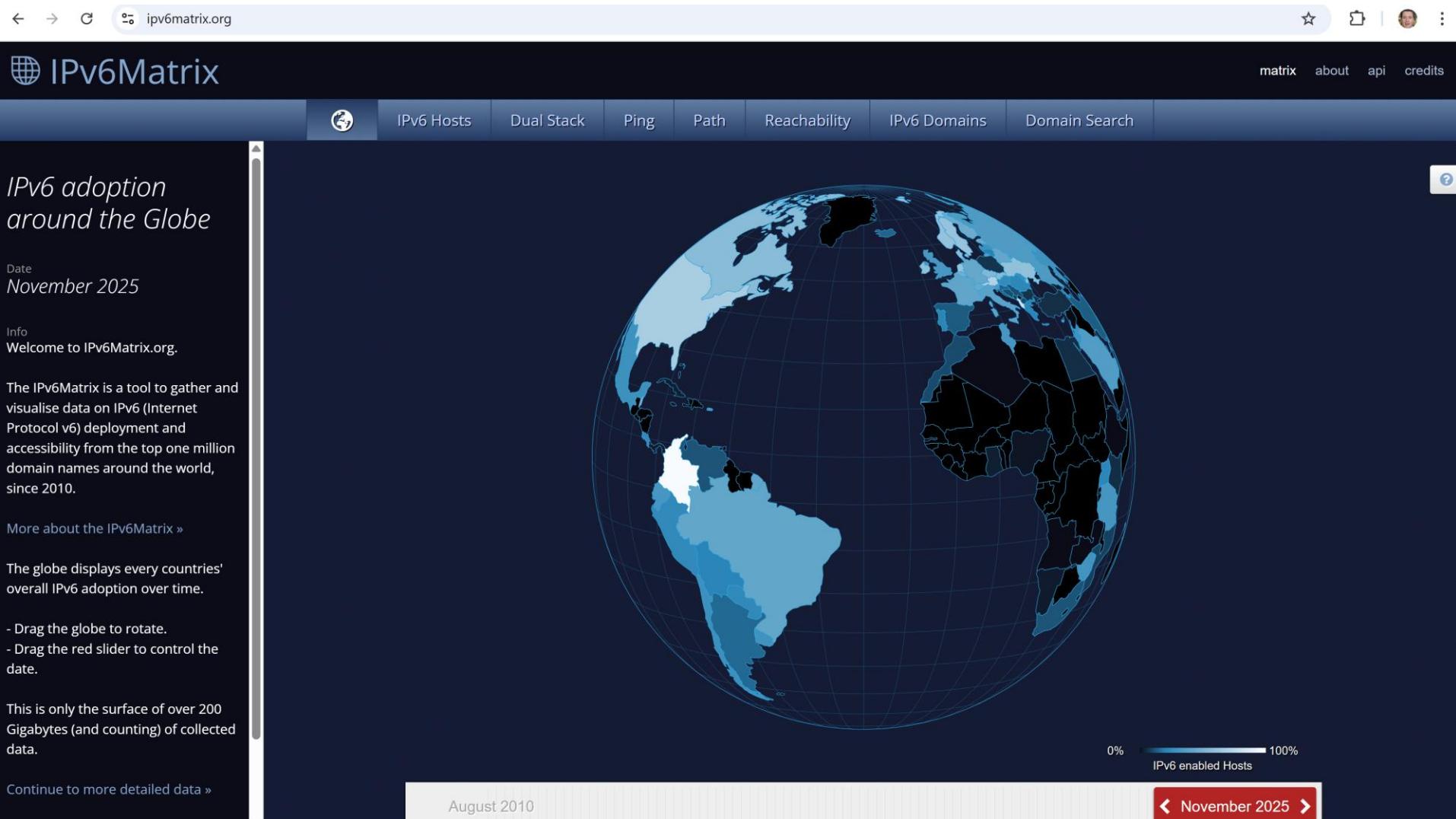


EVOLVING THE IPV6 MATRIX

The project was migrated to virtual hosting in 2021

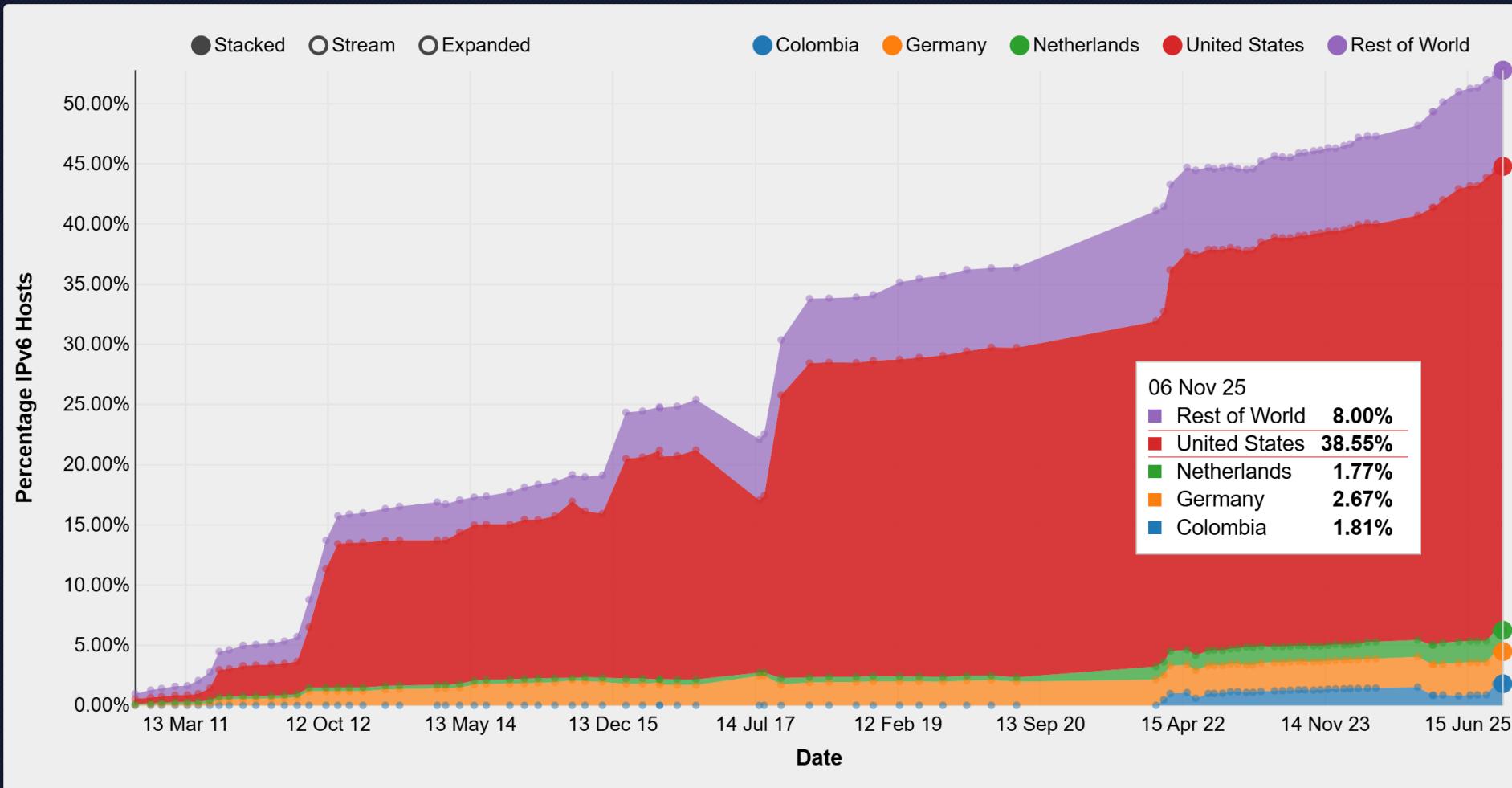
- Uses data since 2010
- New, more efficient Crawler re-written from scratch
- Updated Web interface
- Hosting provided pro-bono by **Mythic Beasts** (thank you!)
- Can export stats in a variety of non-proprietary formats
- See <http://www.ipv6matrix.org>
- Crawls are continuing to run on a monthly basis
- Total database size 750 Gb (November 2025)
- Some results follow...



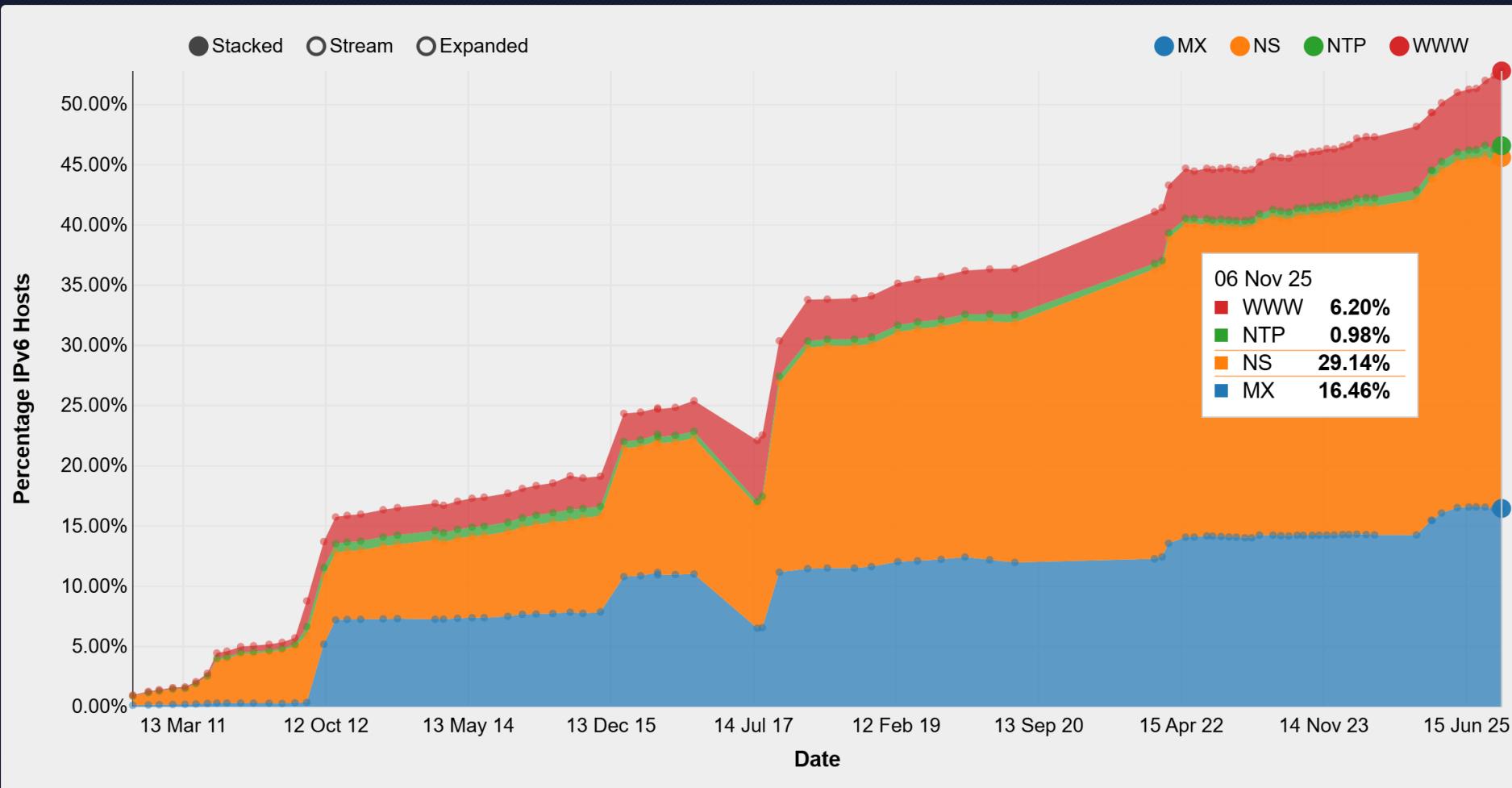




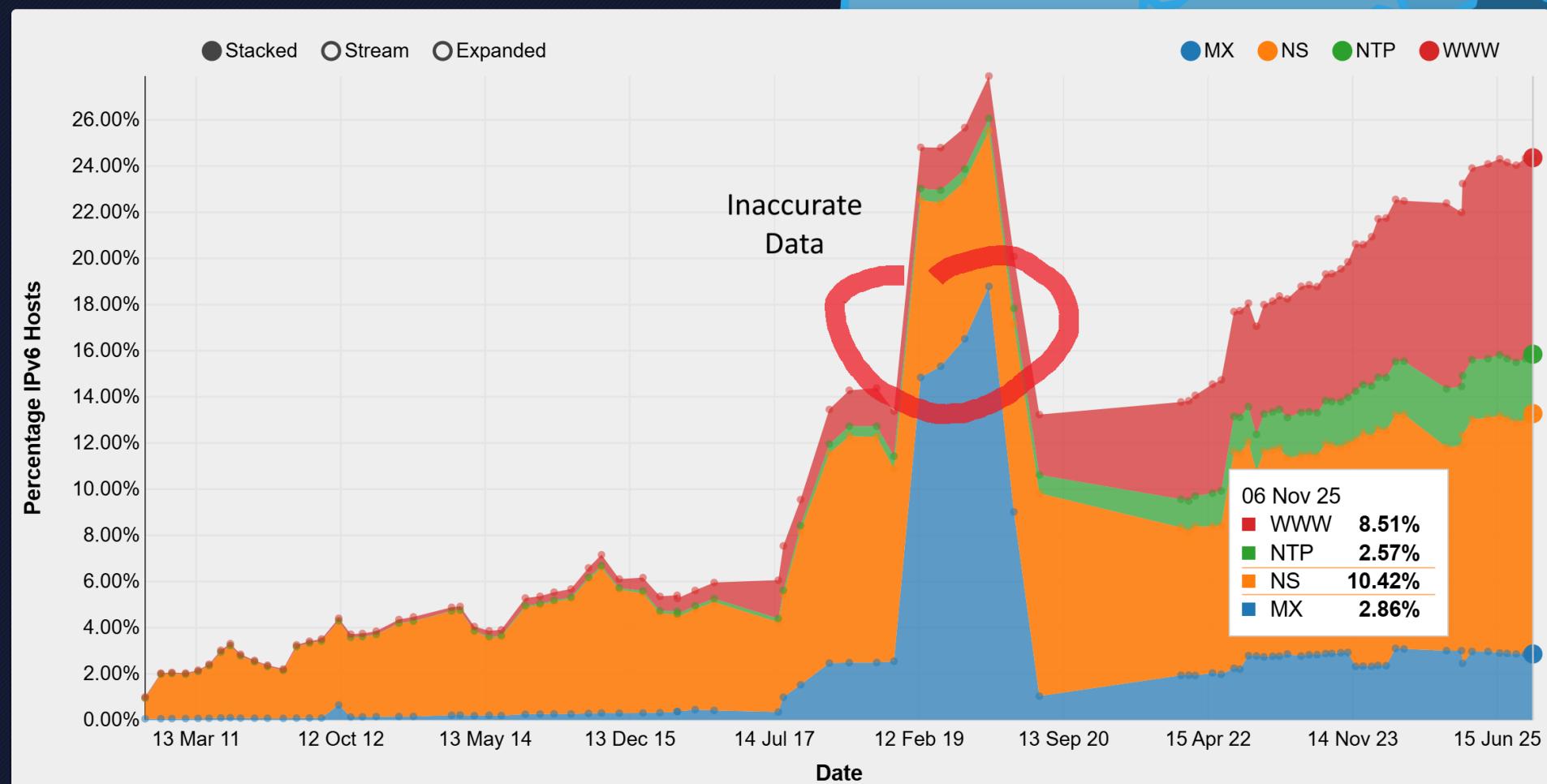
IPv6 Host percentage by Country over time ?

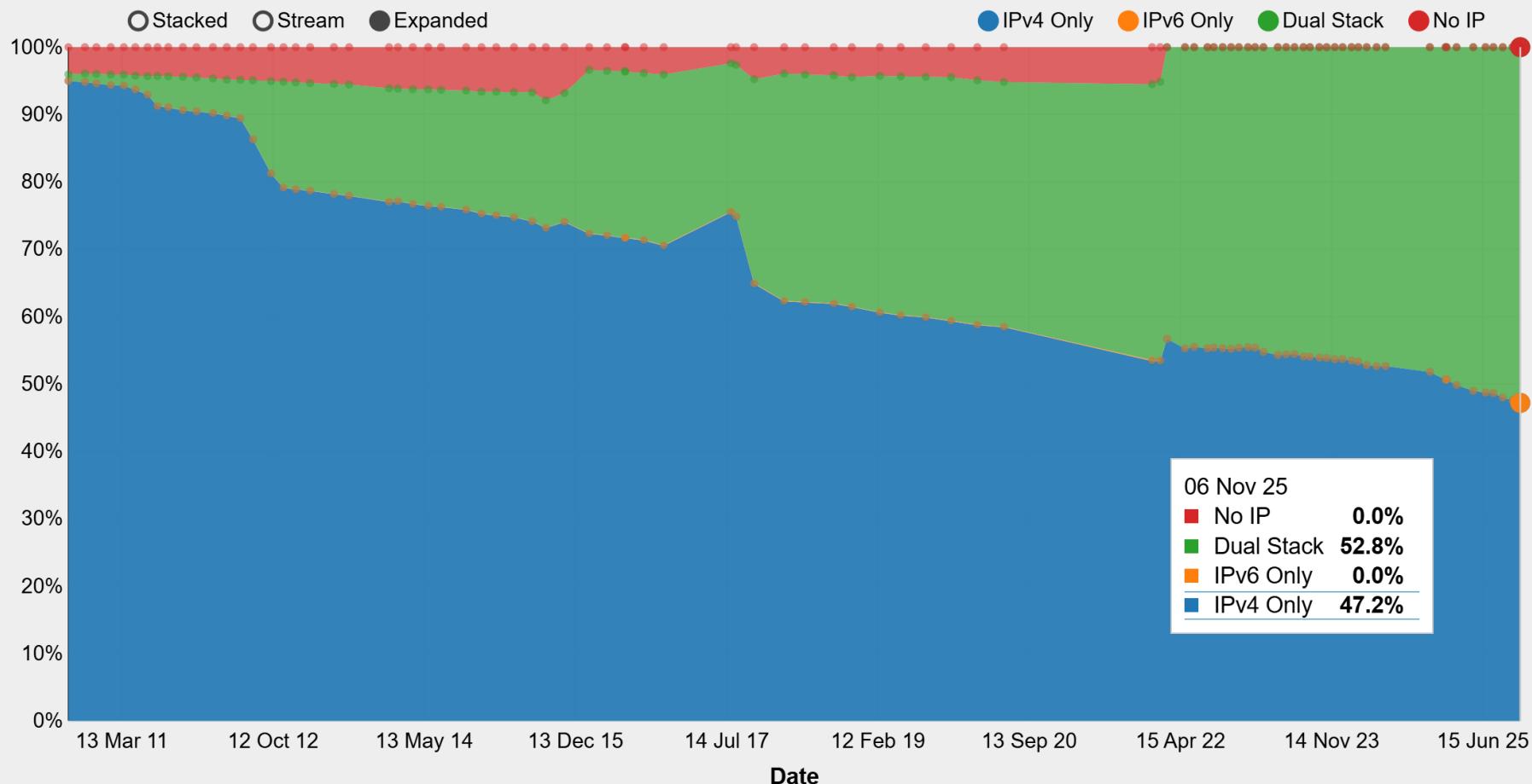


IPv6 Host percentage by Service Type over time ?

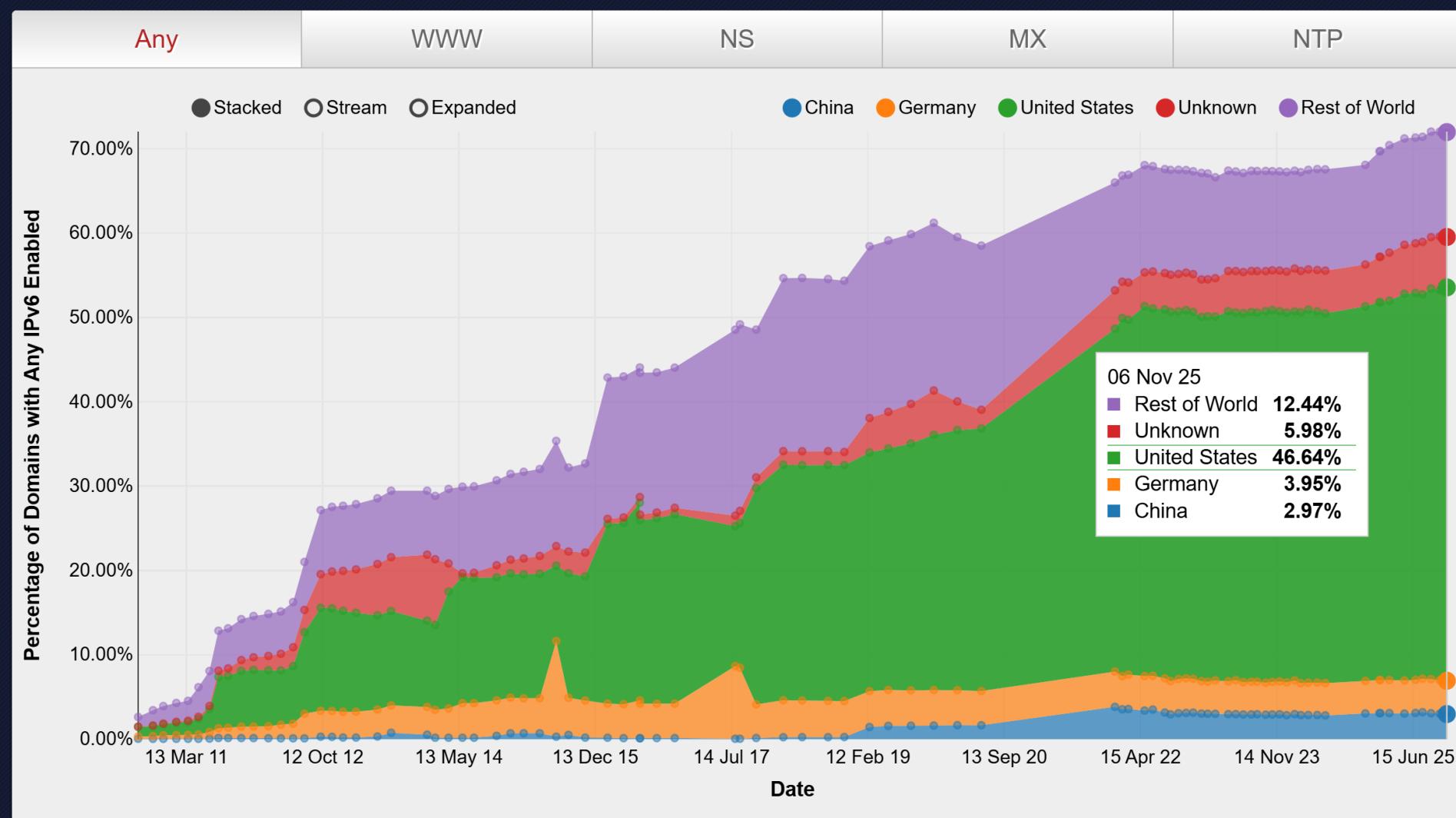


IPv6 Host percentage by Service Type over time ?

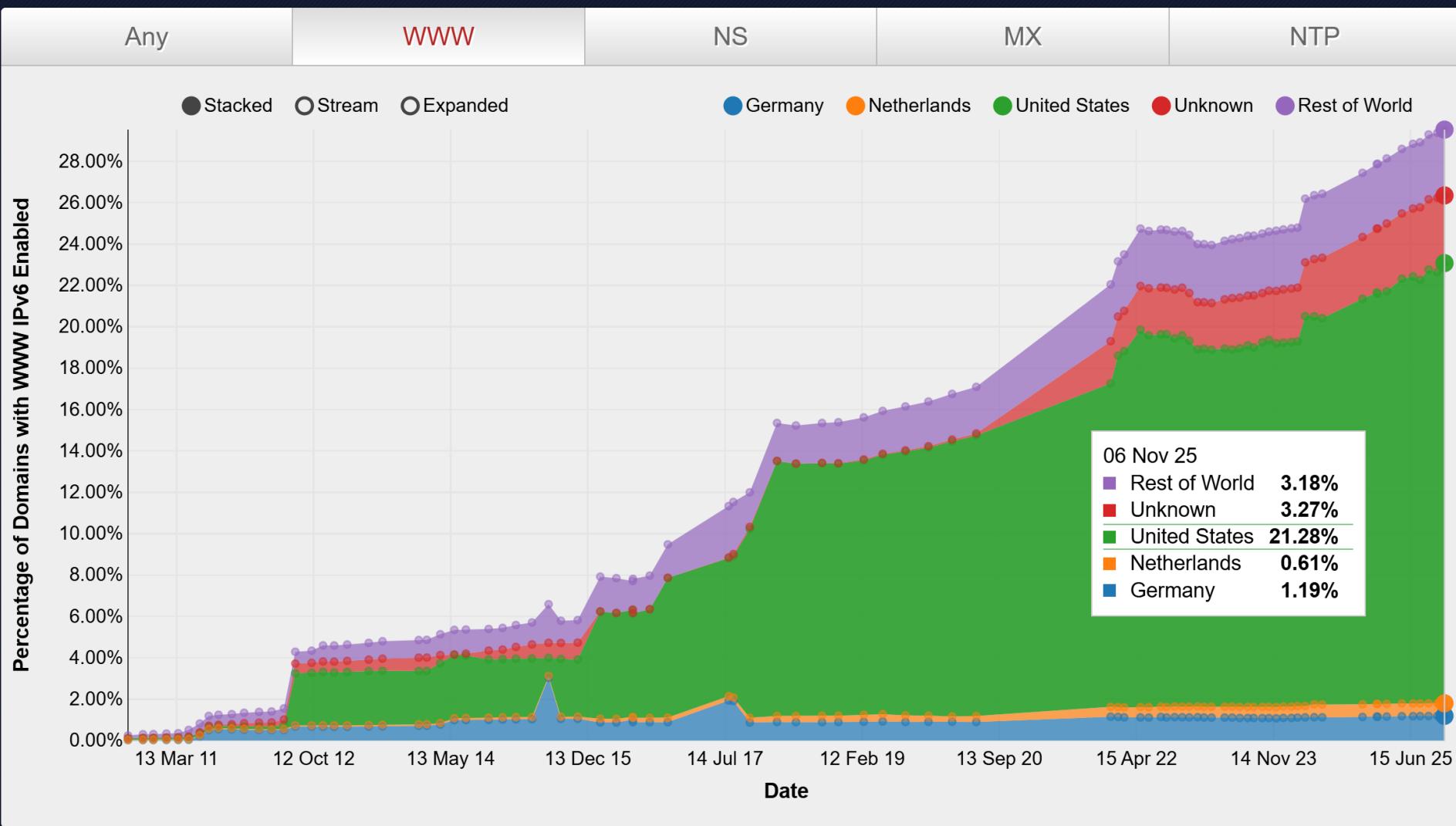


Distribution of Host types over time ?

IPv6 enabled Domains by Country over time ?



IPv6 enabled Domains by Country over time ?



Raw Data file for WWW using comma separated values

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WWW,amazon.co.uk,www.amazon.co.uk,52.85.63.210,n/a
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JSON text format

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SUMMARY / QUESTIONS

Crawler reaching its 15th year of data collection

Is there a slowdown in growth?

What else should we measure?

We need your feedback

- Send to contact@internetsociety.uk

THANK YOU

Contact: ISOC United Kingdom – contact@internetsociety.uk



mythic beasts