

IPV6 MATRIX PROJECT

Tracking IPv6 accessible content
Worldwide

<http://www.ipv6matrix.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 no chance of being used – **ever**.

Take the 1 Million most popular Web site list from alexa.com as a starting point for the domains to be tested. Add more domains later.

Test them for IPv6 connectivity

This is equivalent to testing about 7+ million hosts worldwide

Use GeoIP database to estimate real host location



MEASURING IPV6 DEPLOYMENT

Some good examples out there already

- <http://www.worldipv6launch.org/measurements/>
- <https://www.google.com/intl/en/ipv6/statistics.html>
- <http://6lab.cisco.com/stats/>
- <https://www.vyncke.org/ipv6status/>

None of them are exact science



THE IPV6 MATRIX

A tool that measures IPv6 deployment by looking for and testing DNS entries in the Alexa top 1,000,000 domain list

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

- The project now has three+ years of data



IMPROVING THE IPV6 MATRIX

In 2013/14, ISOC England acted as the 'customer' for a group of 4th year MEng students in Electronics and Computer Science at the University of Southampton

- Group Design Project (3/8ths of students' final year)
- Around 30 such projects run each year
- Very popular module with both students and industry

The ISOC customer brief was to improve the presentation of the crawler data

- And as a secondary priority to harden the crawler
- Included Open Data principles (see <http://theodi.org>)
- As part of project, crawler moved to Southampton
- Students had 10 weeks in total to solicit requirements, design and build a prototype to the customer's satisfaction



THE RESULT

A completely new visualization interface was built

- Uses data since 2010
- Gives global view, allows you to zoom in by country
- Can view any measured stats, and filter on various properties
- Can export stats in a variety of non–proprietary formats
- See <http://www.ipv6matrix.org>
- Crawls are continuing to run, and more frequently given the good IPv6 connectivity at Southampton
- Total database size 423Gb (December 2018)
- Some examples follow...



IPv6 Hosts

Dual Stack

Ping

Path

Reachability

IPv6 Domains

Domain Search

IPv6 adoption around the Globe

Date
November 2018

Info
Welcome to IPv6Matrix.org.

The IPv6Matrix is a tool to gather and visualise data on IPv6 (Internet Protocol v6) deployment and accessibility from the top one million domain names around the world, since 2010.


[More about the IPv6Matrix »](#)

The globe displays every countries' overall IPv6 adoption over time.

- Drag the globe to rotate.
- Drag the red slider to control the date.

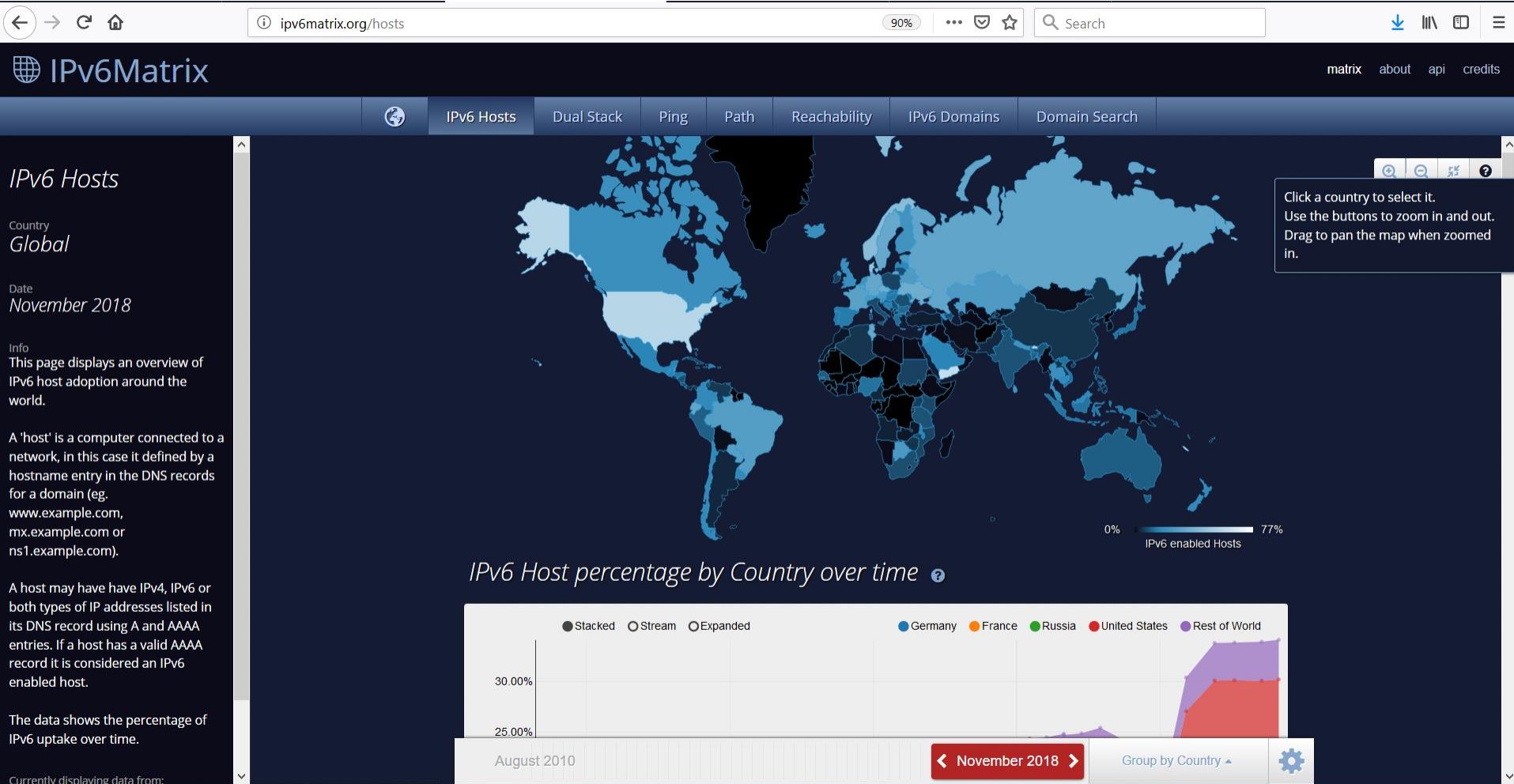
This is only the surface of over 200 Gigabytes (and counting) of collected data.

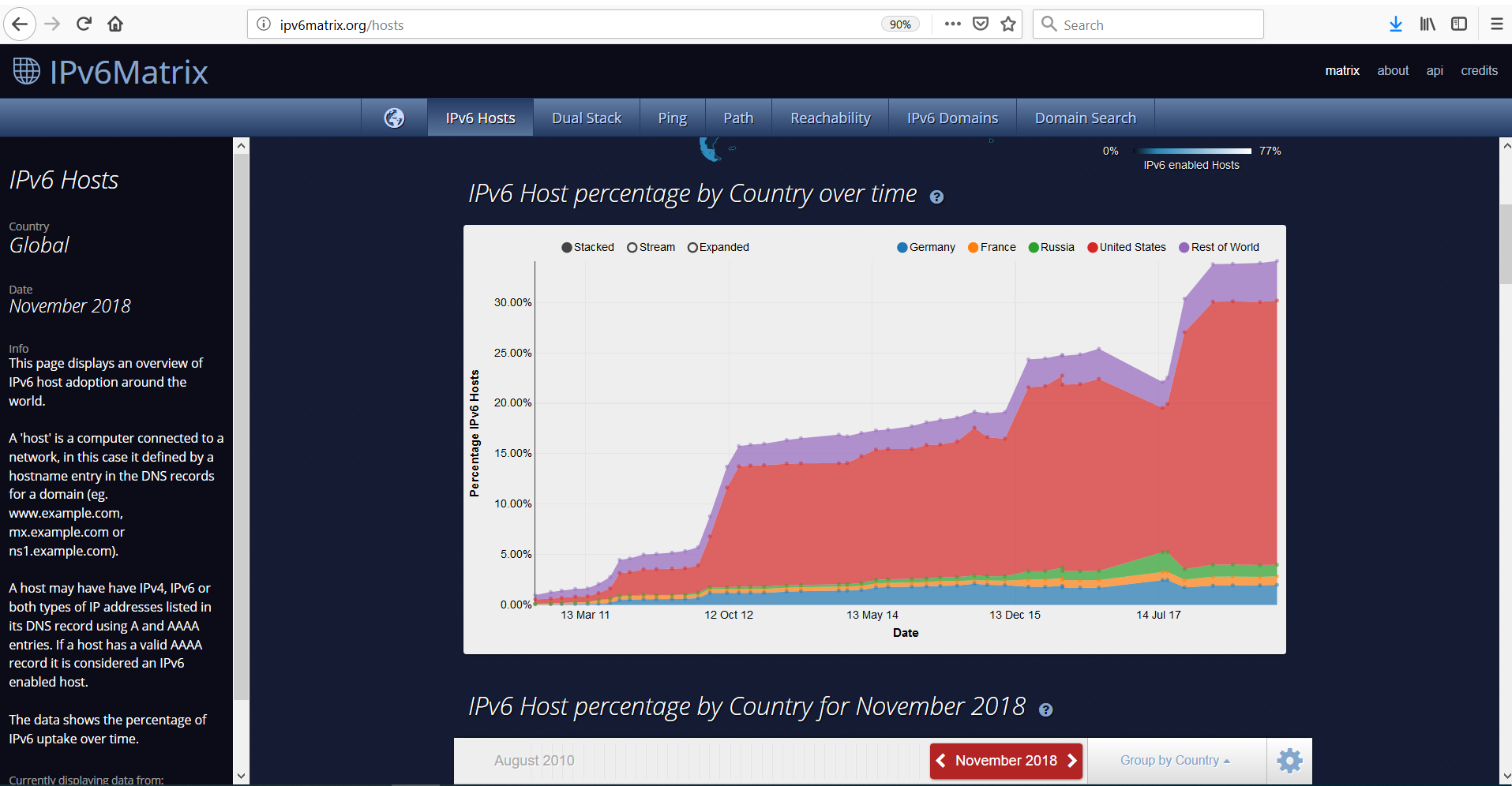


0%  77%
IPv6 enabled Hosts

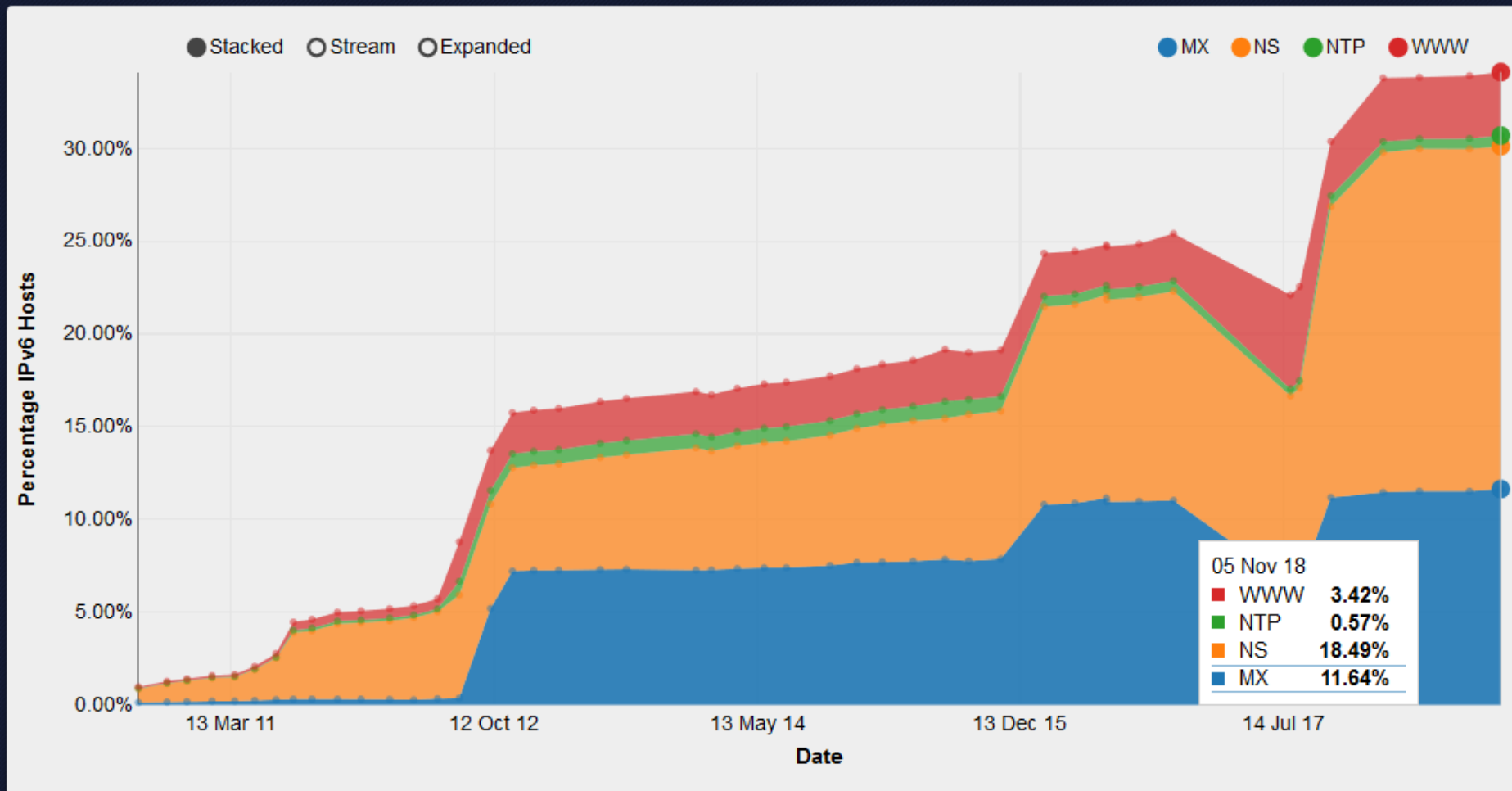
August 2010

◀ November 2018 ▶

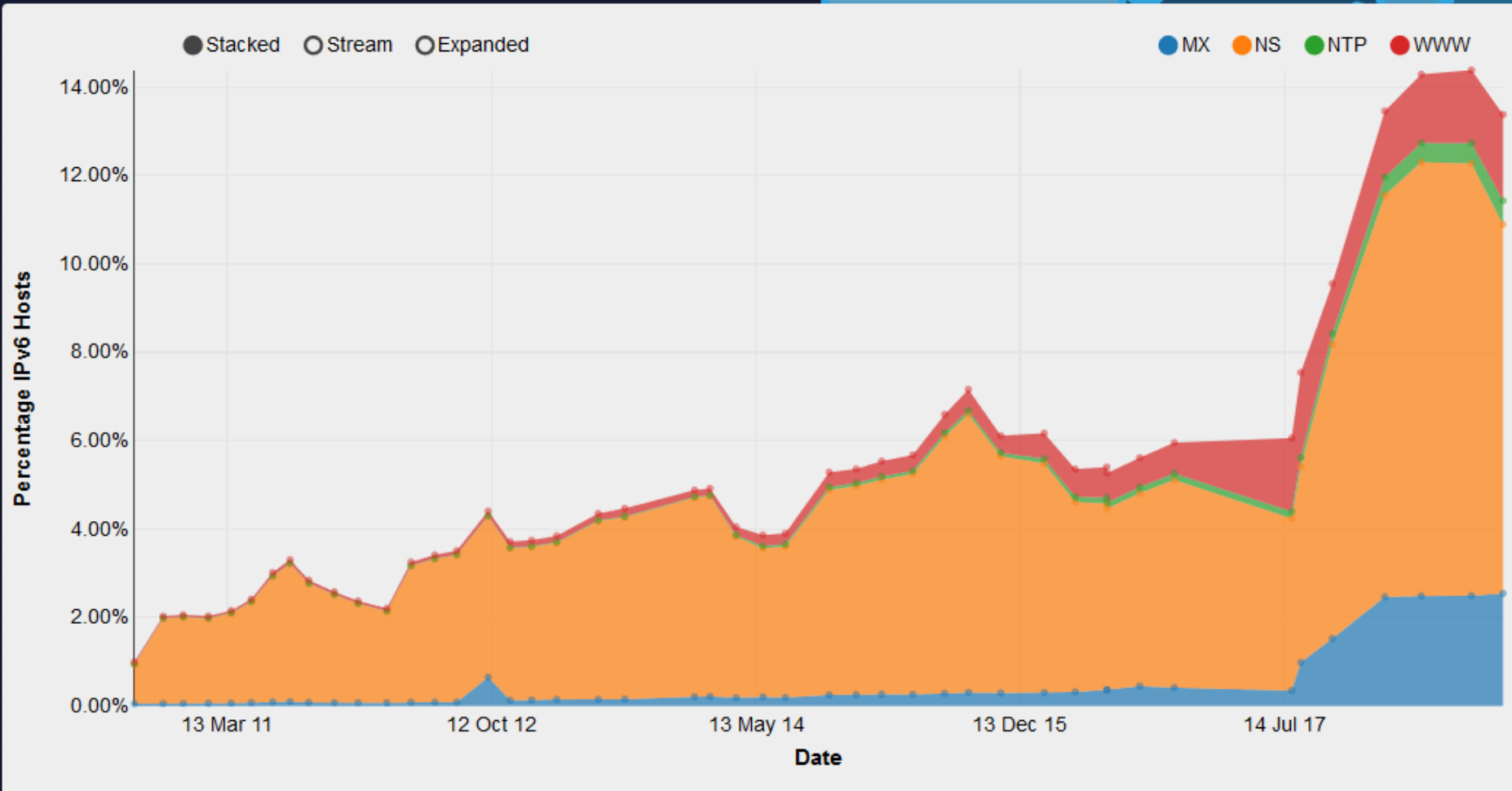




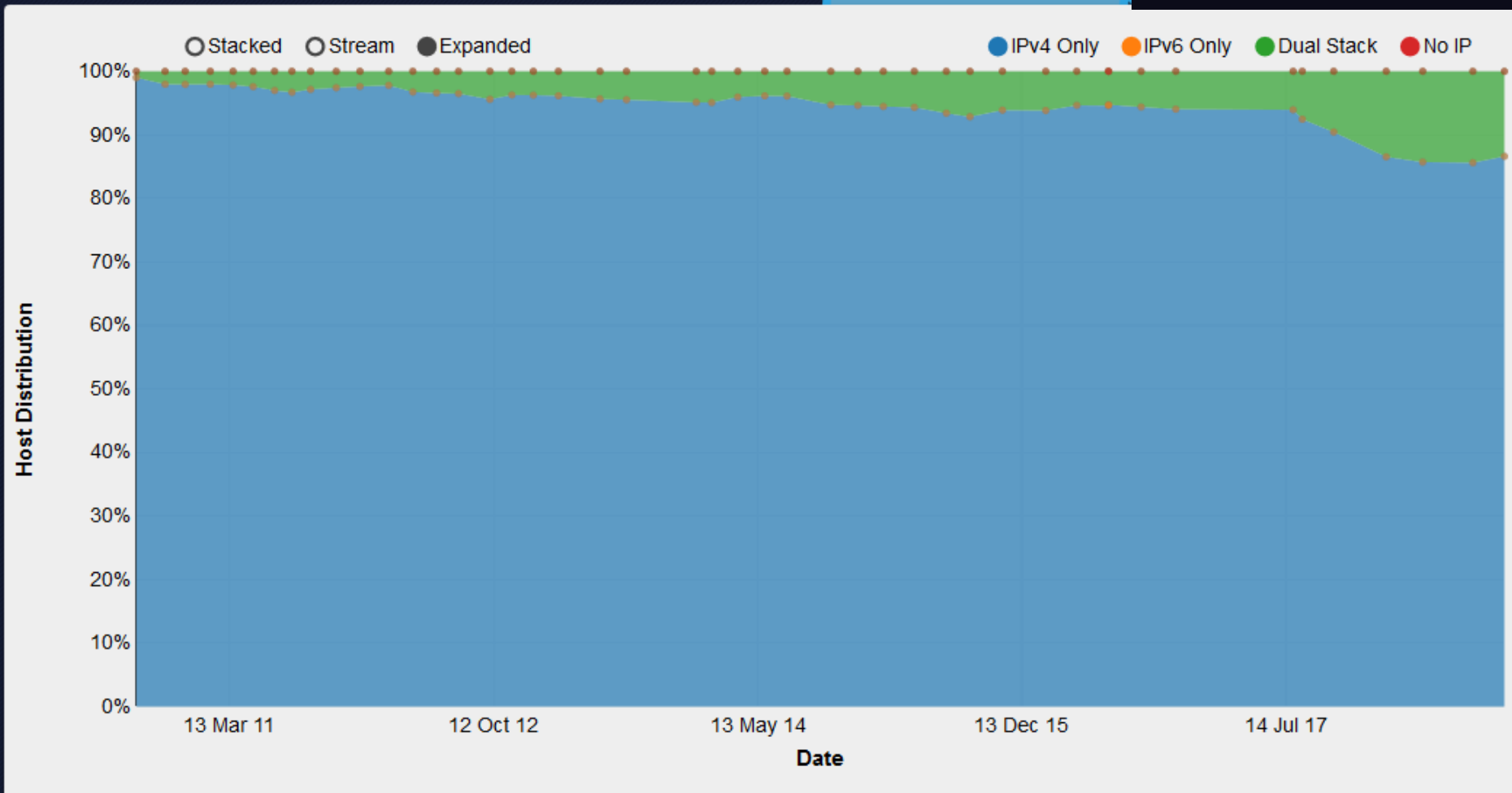
IPv6 Host percentage by Service Type over time ?



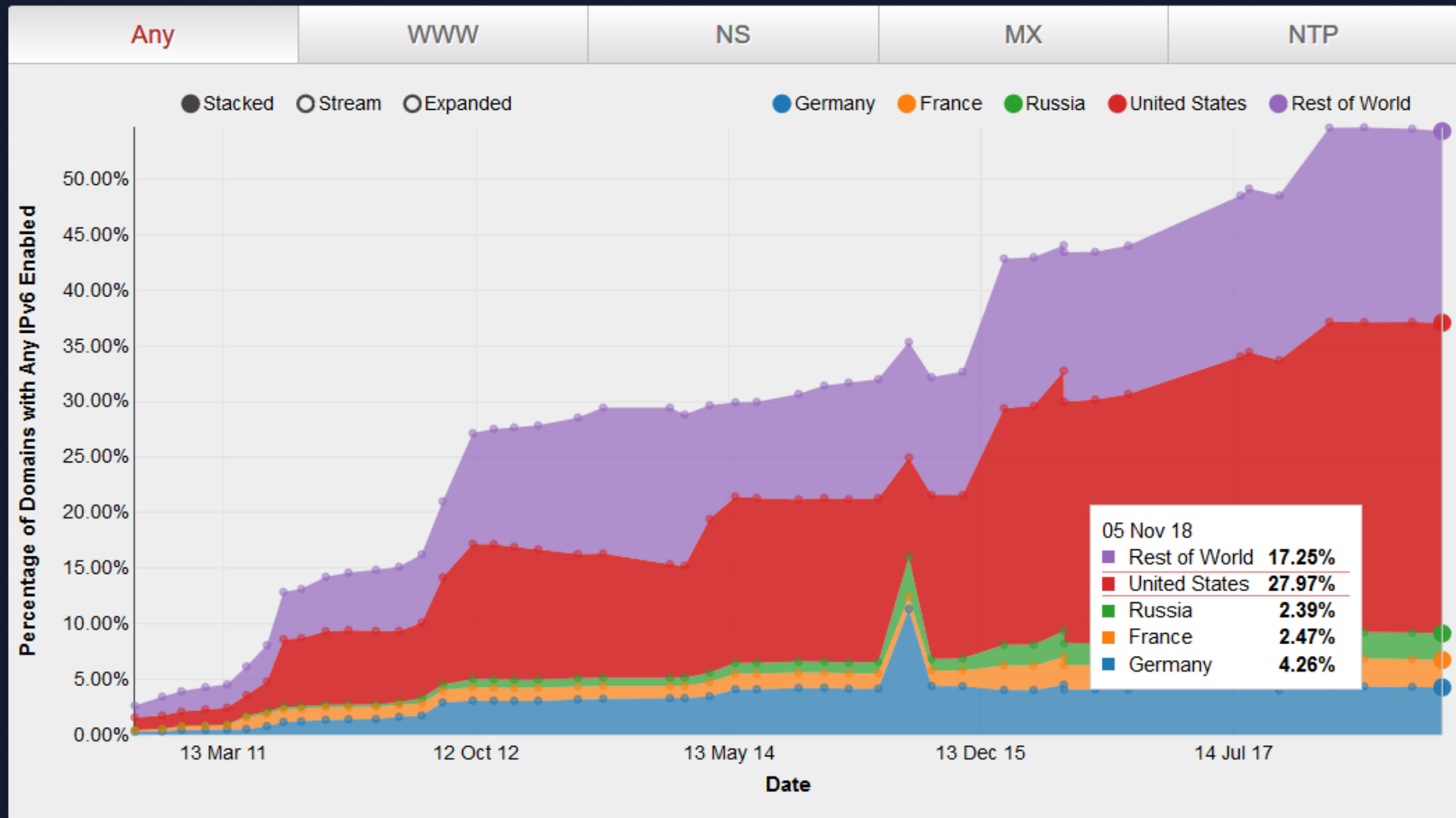
IPv6 Host percentage by Service Type over time



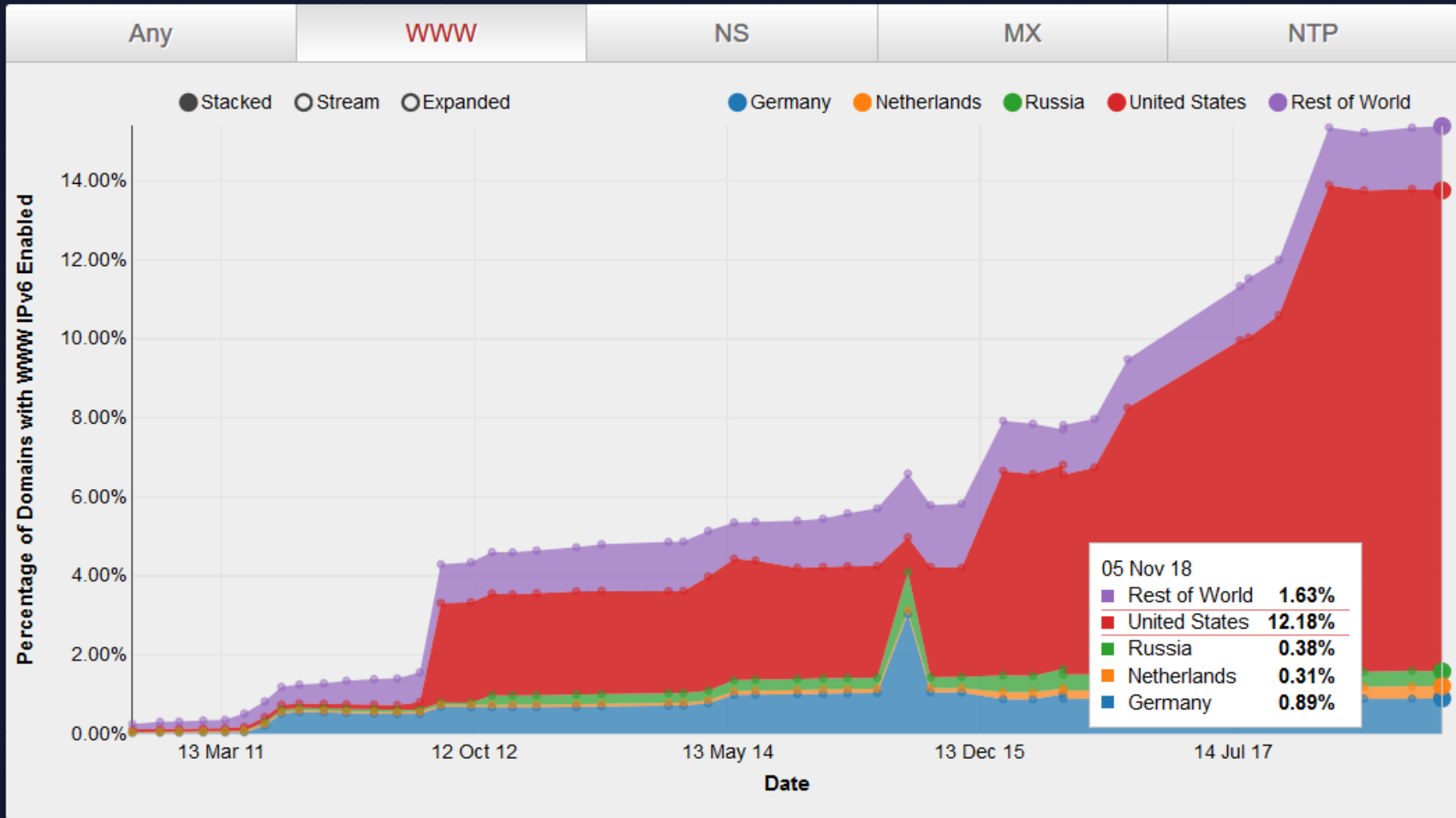
Distribution of Host types over time ?



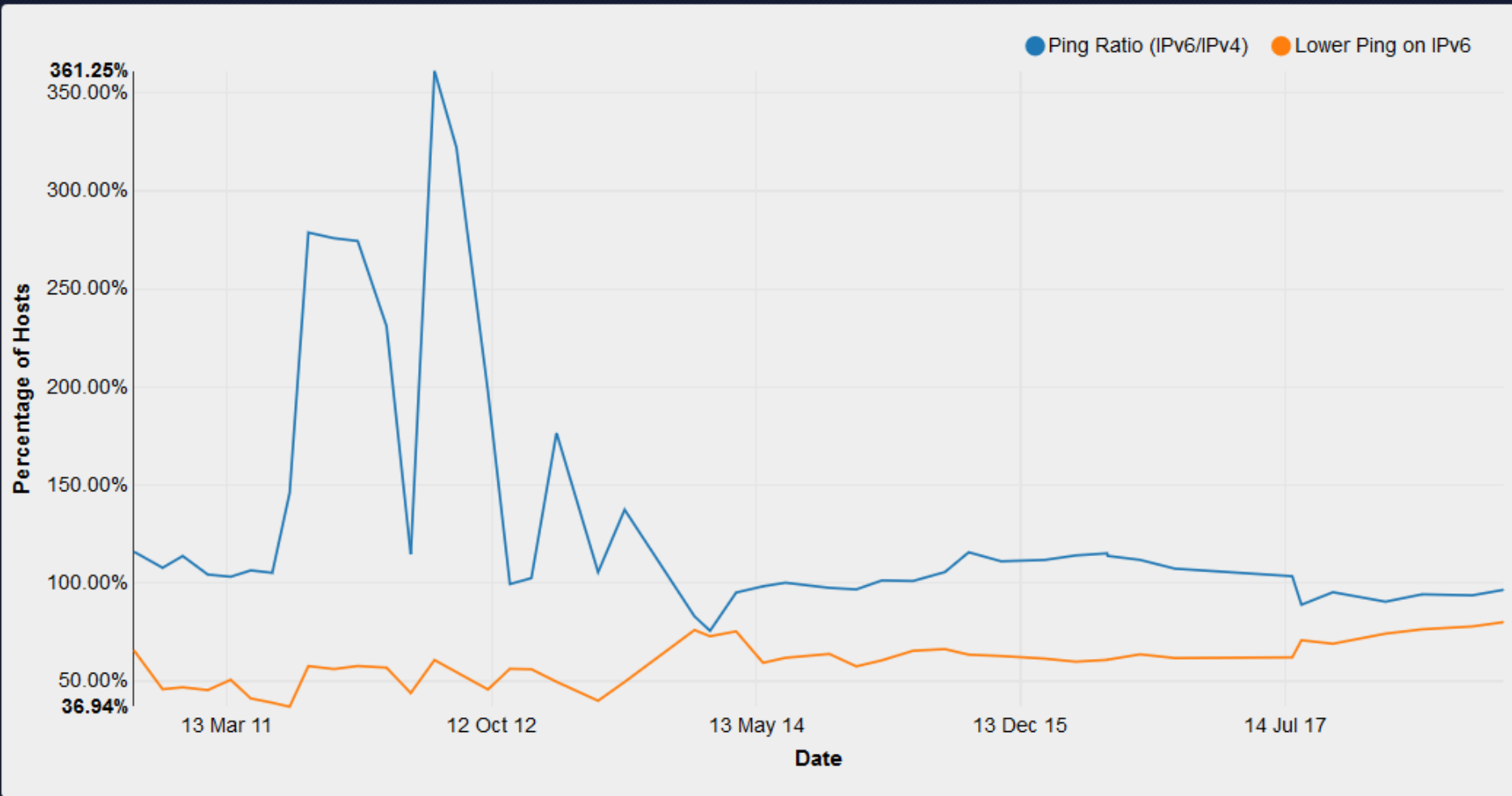
IPv6 enabled Domains by Country over time ?



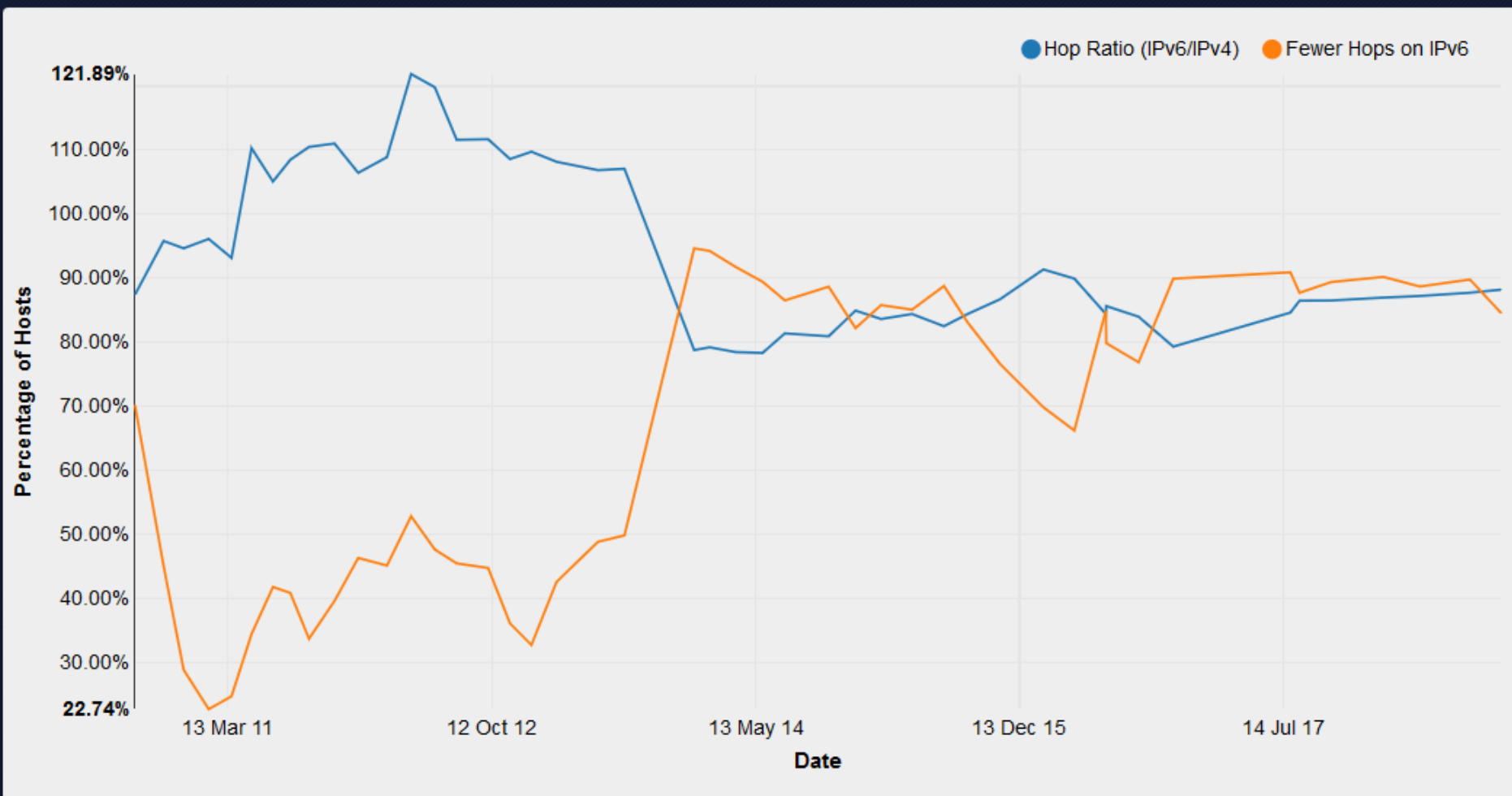
IPv6 enabled Domains by Country over time ?



Lower Ping on IPv6 and Ping Ratio over time ?



Fewer IPv6 Hops and Path Ratio over time ?



Raw Data file for WWW using comma separated values

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JSON text format

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SUMMARY / QUESTIONS

Crawler reaching its 9th year of data collection

- Need to virtualize the server in a VM environment
- Need to diversify the location of crawls

Why is there a slowdown in growth?

We need your feedback

- Send to contact@isoc-e.org



THANK YOU

Contact: ISOC England – contact@isoc-e.org

