

ANIX MEETING 2024

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# Finding the Closest Cache Servers

## A look into Albania

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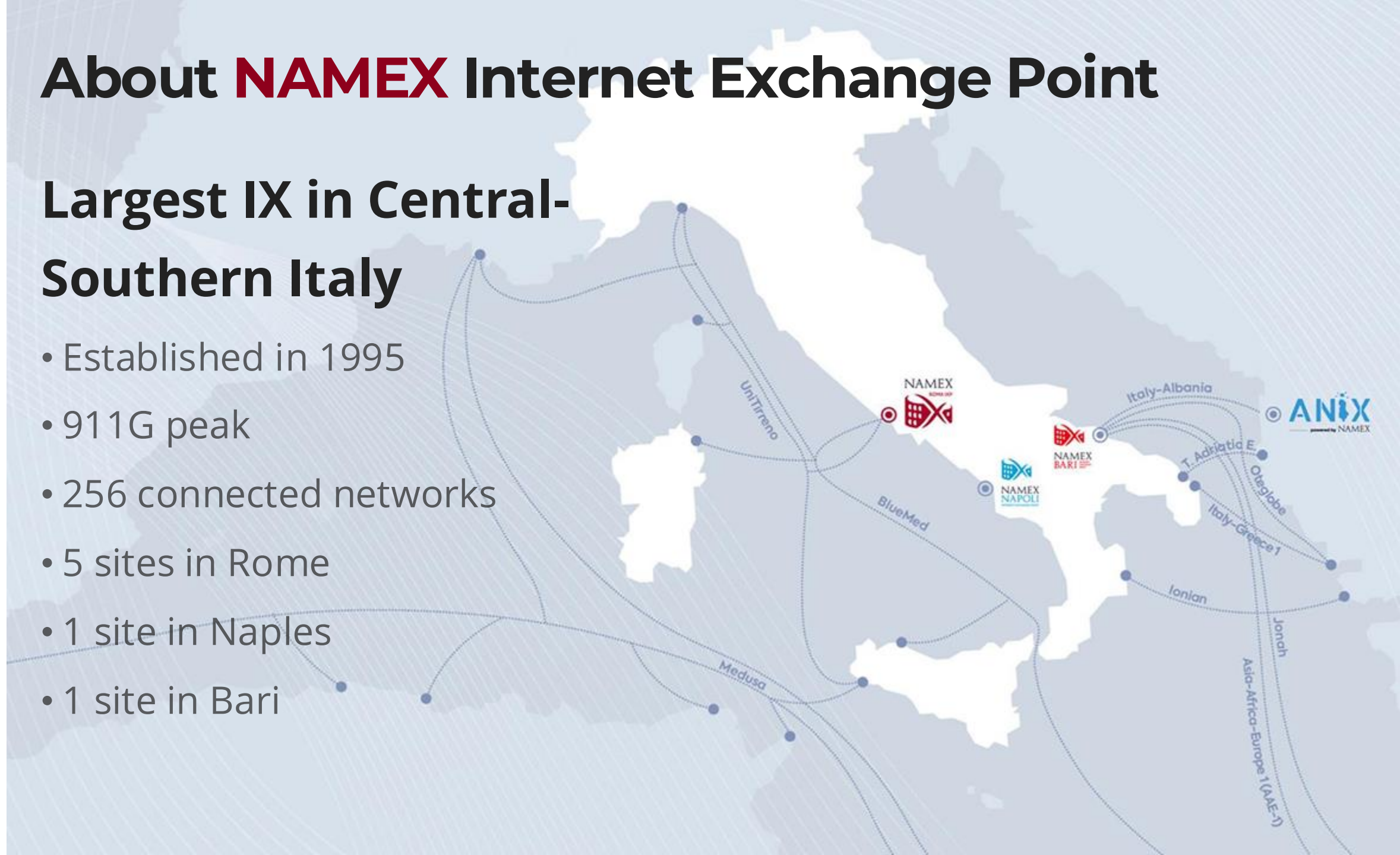
6 December 2024



# About **NAMEX** Internet Exchange Point

## Largest IX in Central-Southern Italy

- Established in 1995
- 911G peak
- 256 connected networks
- 5 sites in Rome
- 1 site in Naples
- 1 site in Bari



# ⚠ This is **Work in Progress**



- Not a scientific research
- Many things are still to be done
- We need your feedback

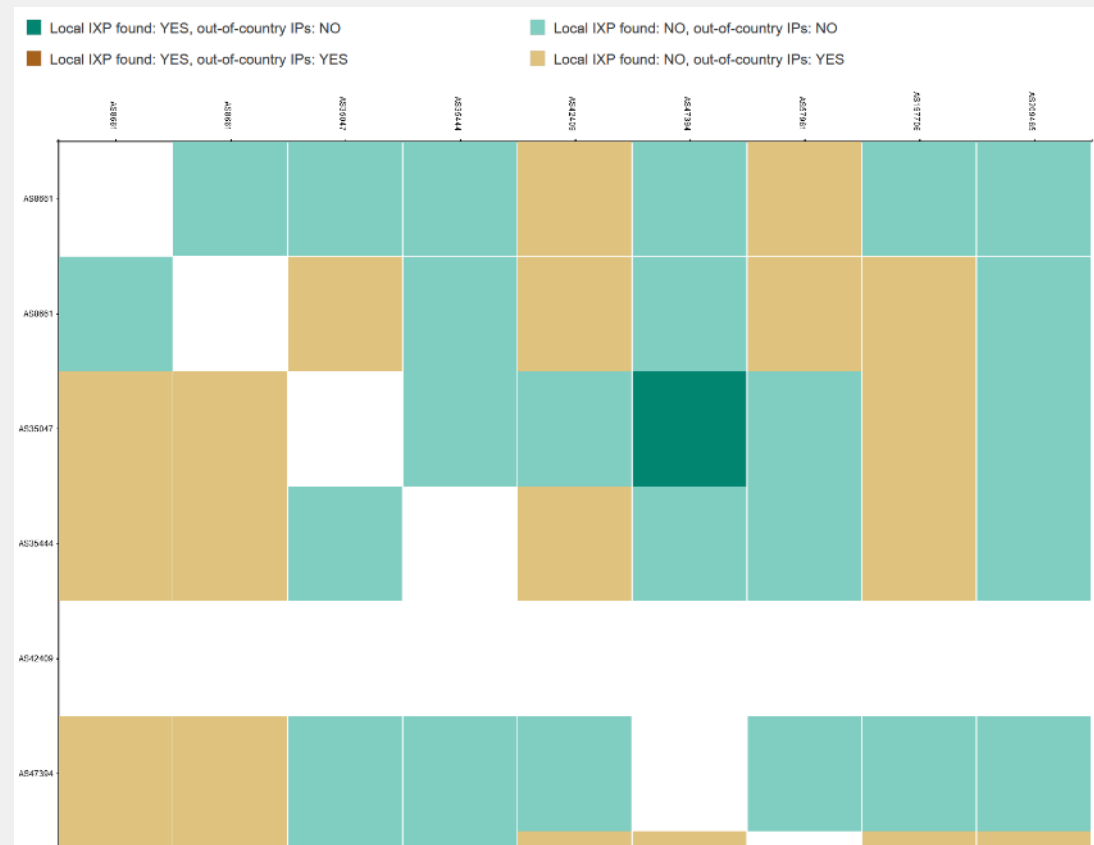
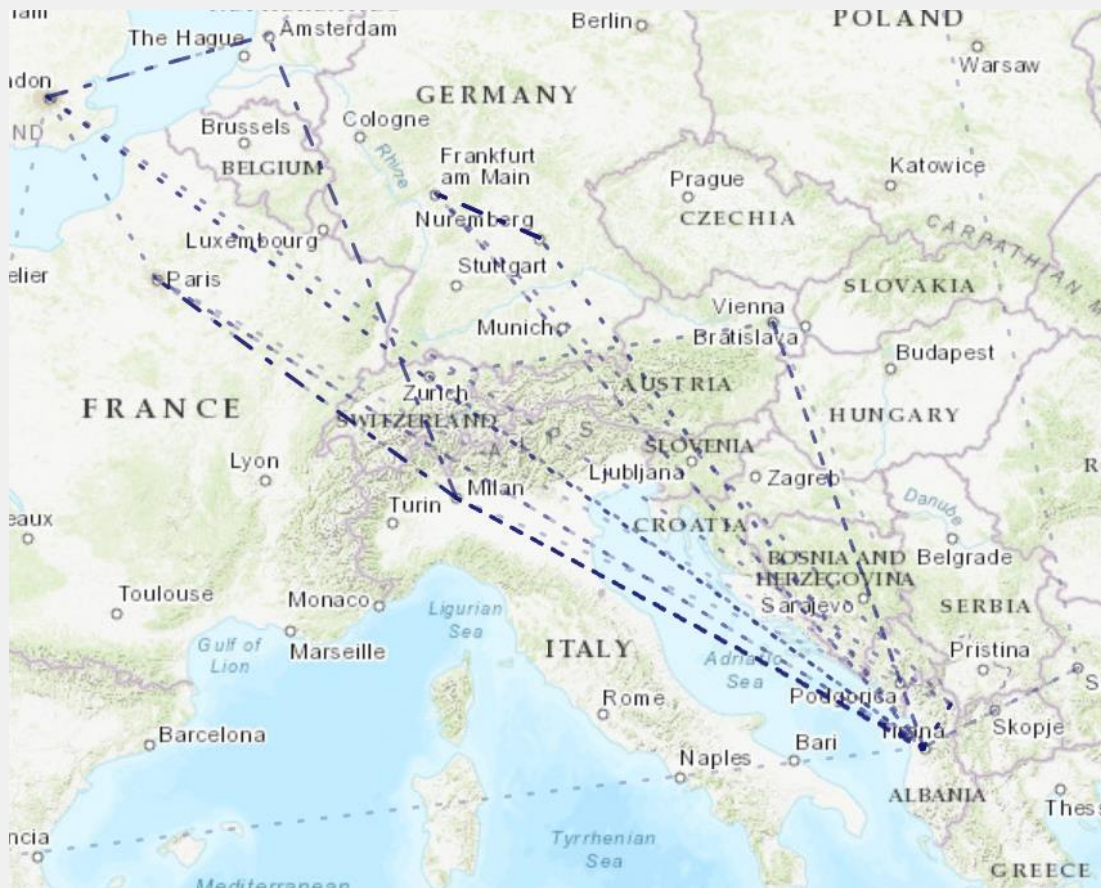
# Life at an Internet Exchange

**We love local traffic  
and low latencies:  
eyeballs close to  
content**



# IXP Country Jedi: checking the path of local traffic

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# OTT/CDN Traffic at ANIX

(about) **90** %

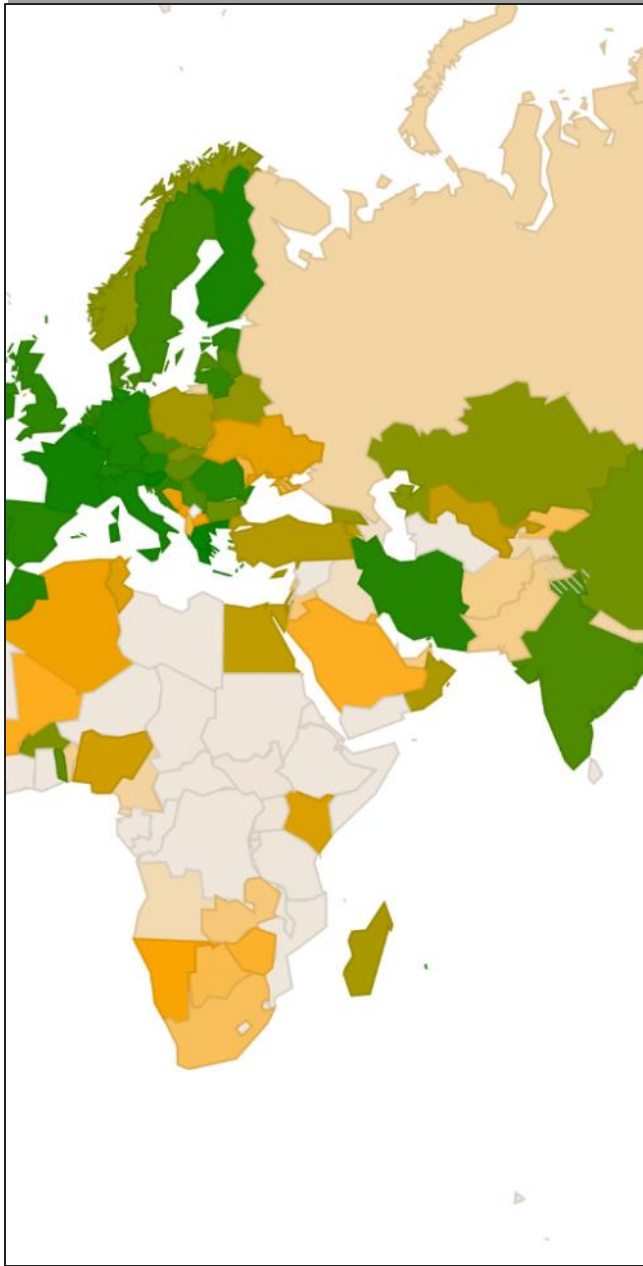
# How close is content to the eyeballs?

From what cache/server do I get my content? And how far is it?

The CDNs know, of course - but they don't publish the data

Ideally: we take some probes and traceroute to the CDNs





# Two Problems



## The algorithms

CDNs have dark magic algorithms which find the “best” cache from which to serve my content



## The probes

RIPE Atlas probes are great! But they don’t allow HTTP queries and they still lack coverage in some areas



You



Your  
IP Address



Proxy Server



Proxy  
IP Address



Internet

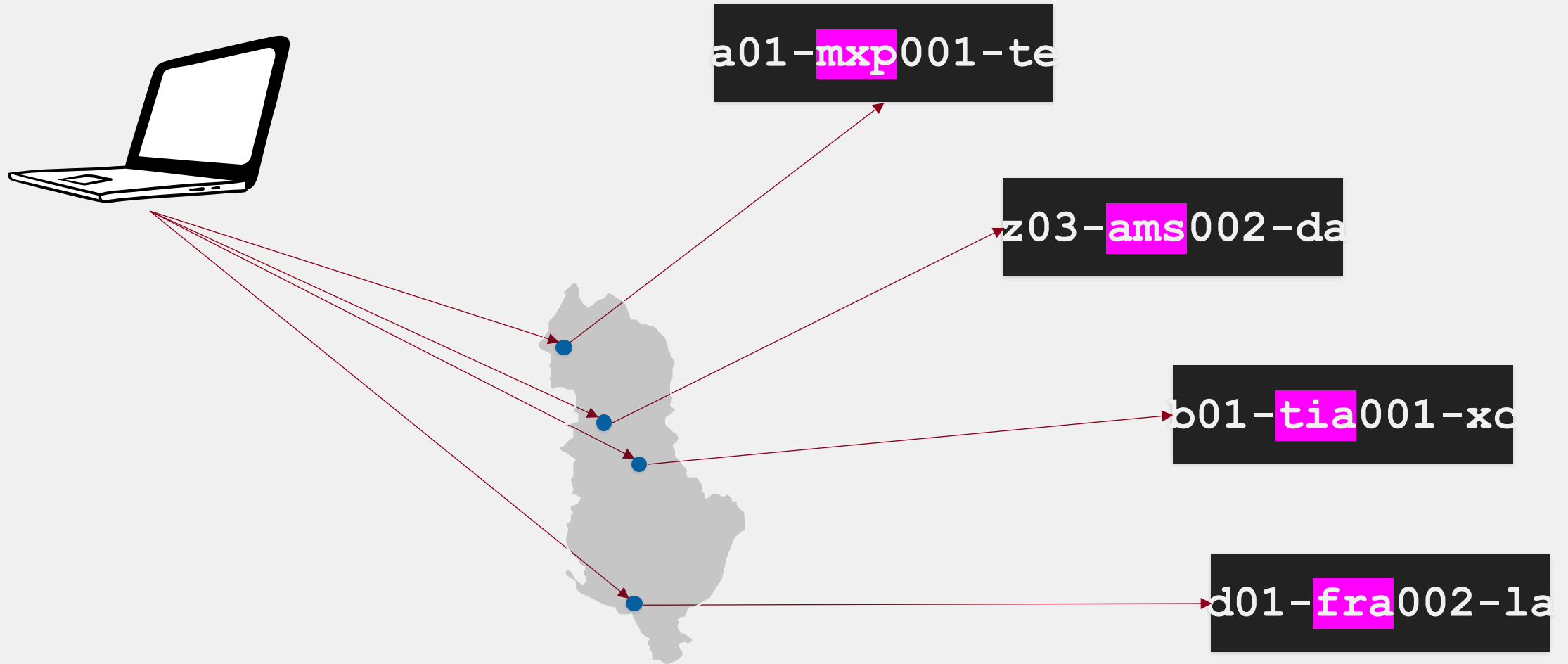


## One solution: **proxy services**

Proxy services have hundreds / thousands of proxies in each country

Web content served by CDNs often includes a string identifying the location of the cache

# Obtaining the CDN location through an HTTP query



# Our Methodology



## Data collection

We downloaded specific webpages with content indicating the location of the CDN servers, from all ASes in different countries (Cloudflare, Google, Netflix, Amazon and Fastly)



## Analysis

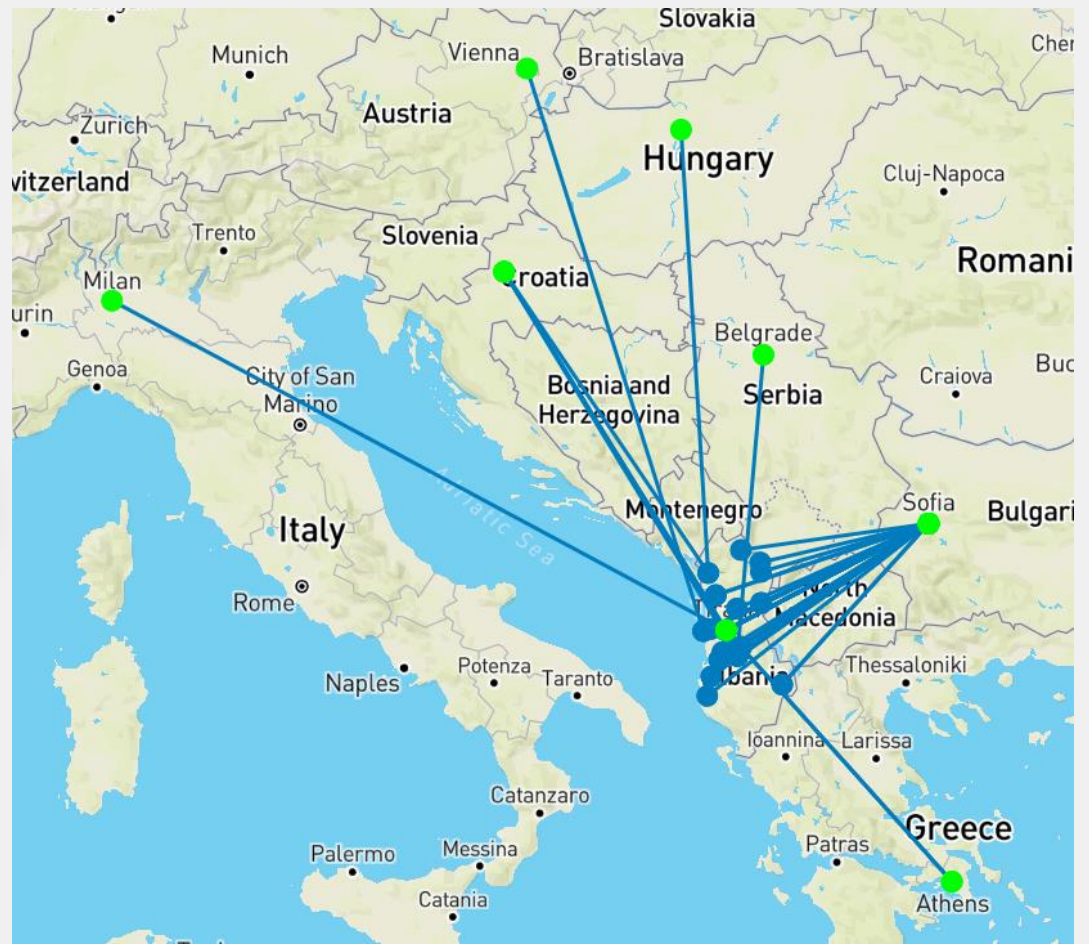
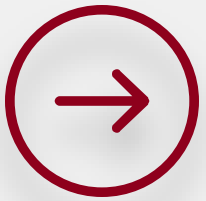
We checked what share of the population in a country is covered by each cache (using APNIC customer population)



## Visualization

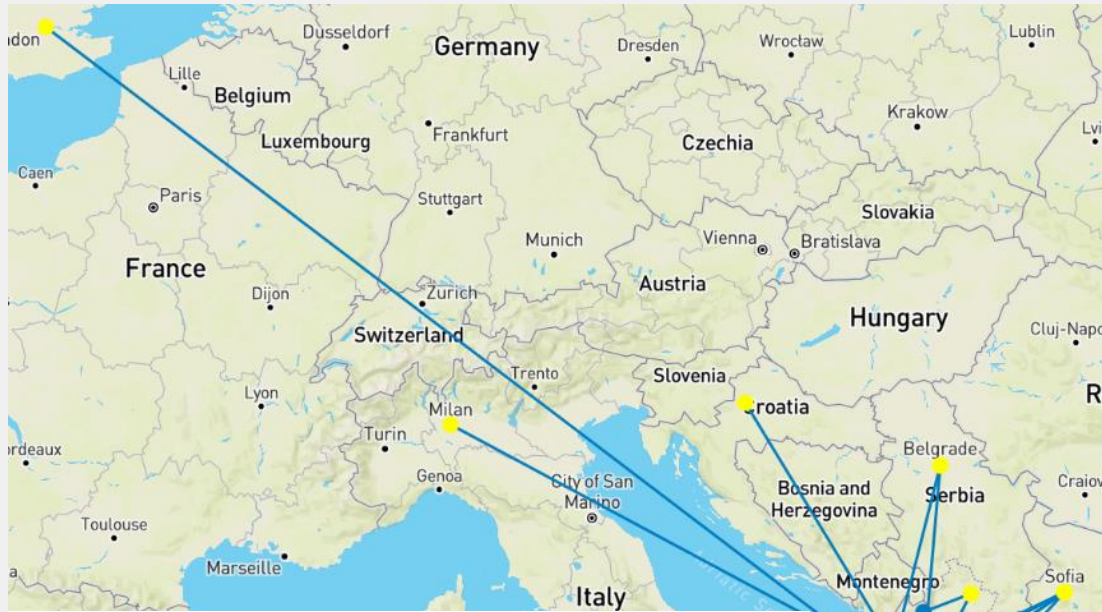
We created maps of the links between “proxy probes” and the caches

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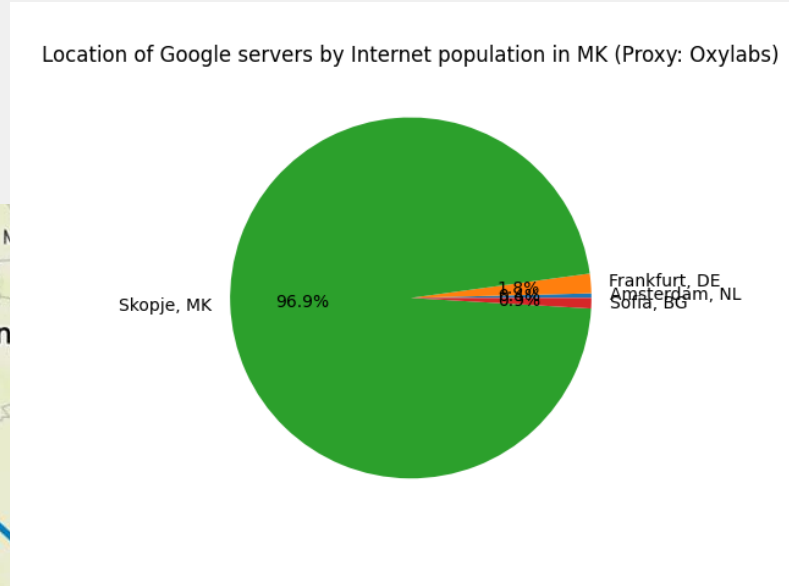
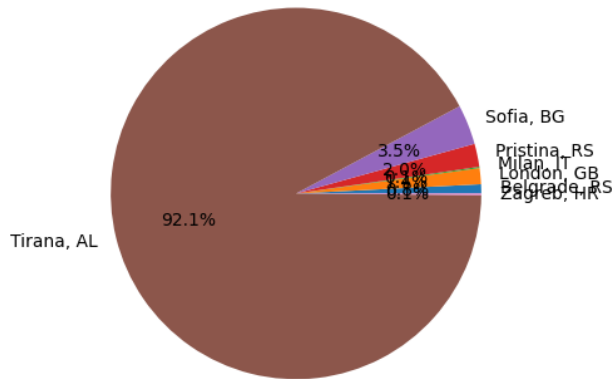


# Albania and North Macedonia: Google

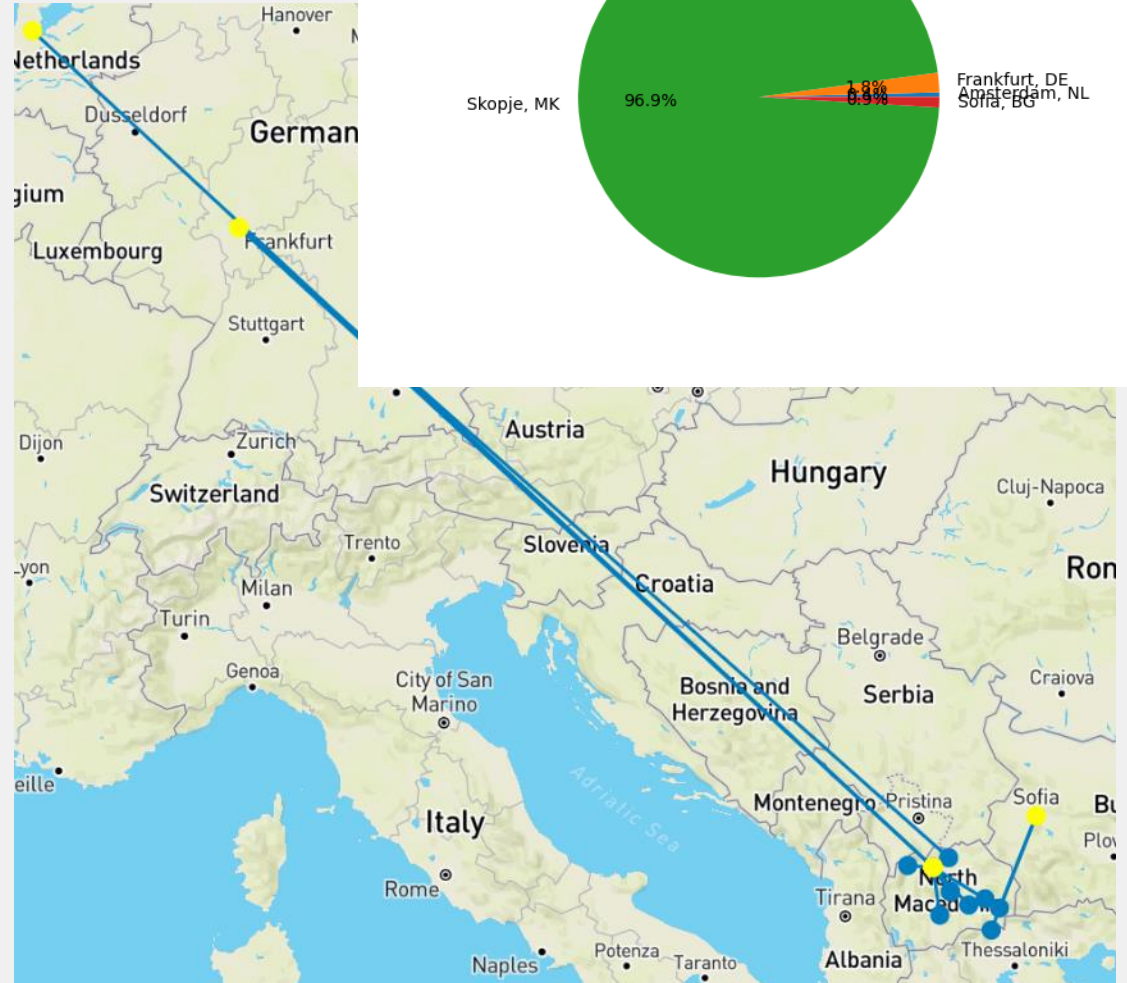
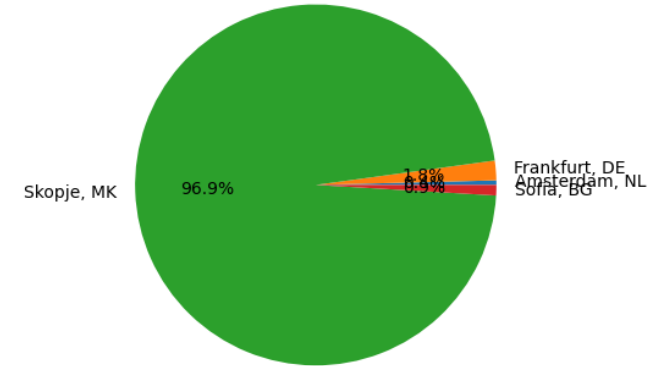
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Location of Google servers by Internet population in AL (Proxy: Oxylabs)

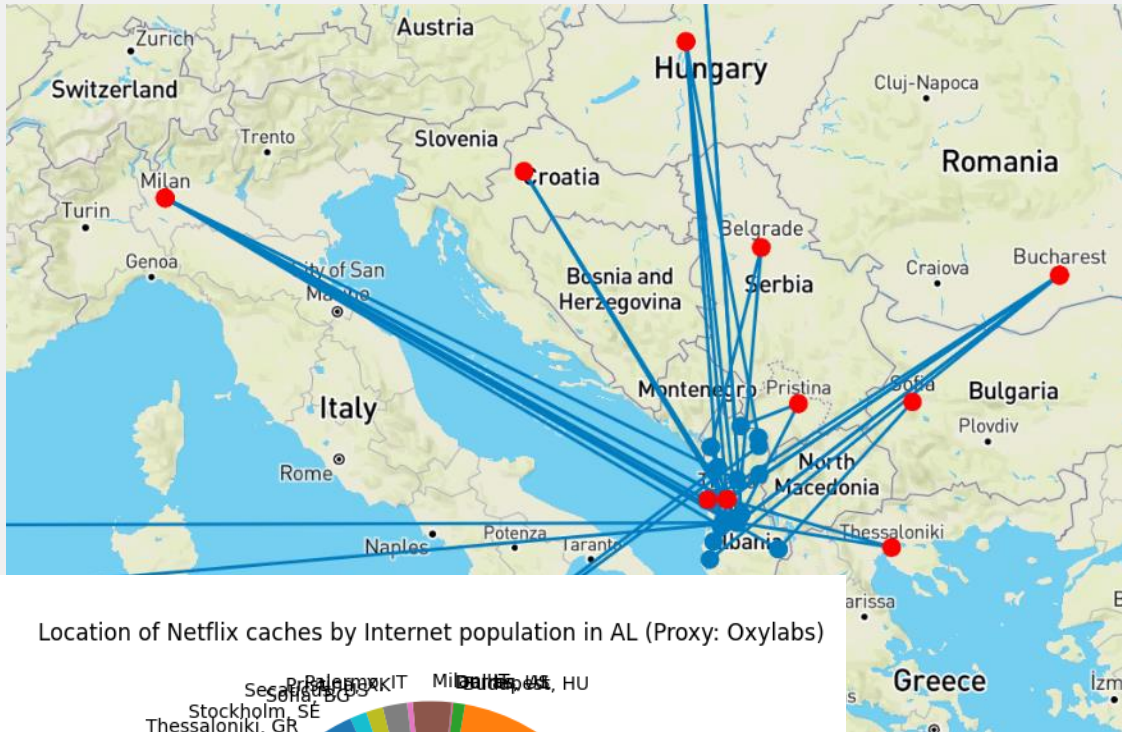


Location of Google servers by Internet population in MK (Proxy: Oxylabs)

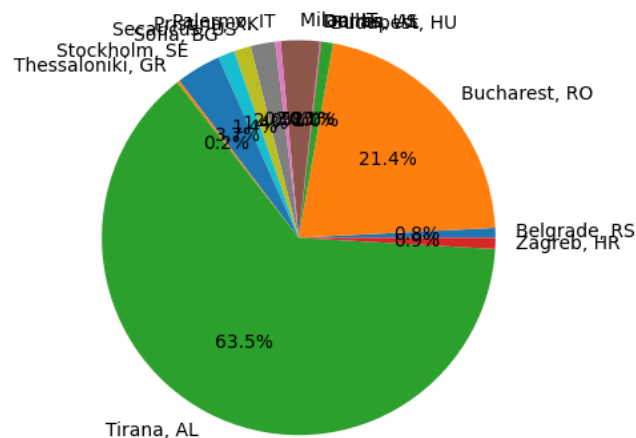


# Albania and North Macedonia: Netflix

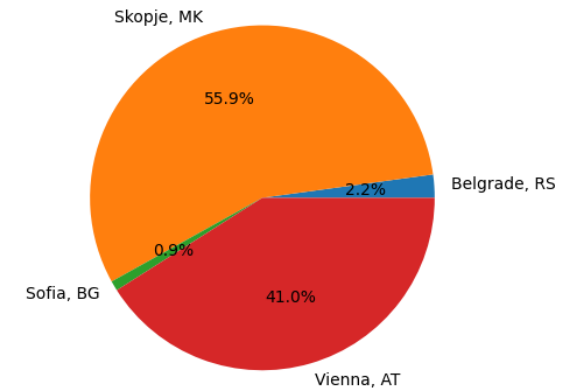
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Location of Netflix caches by Internet population in AL (Proxy: Oxylabs)

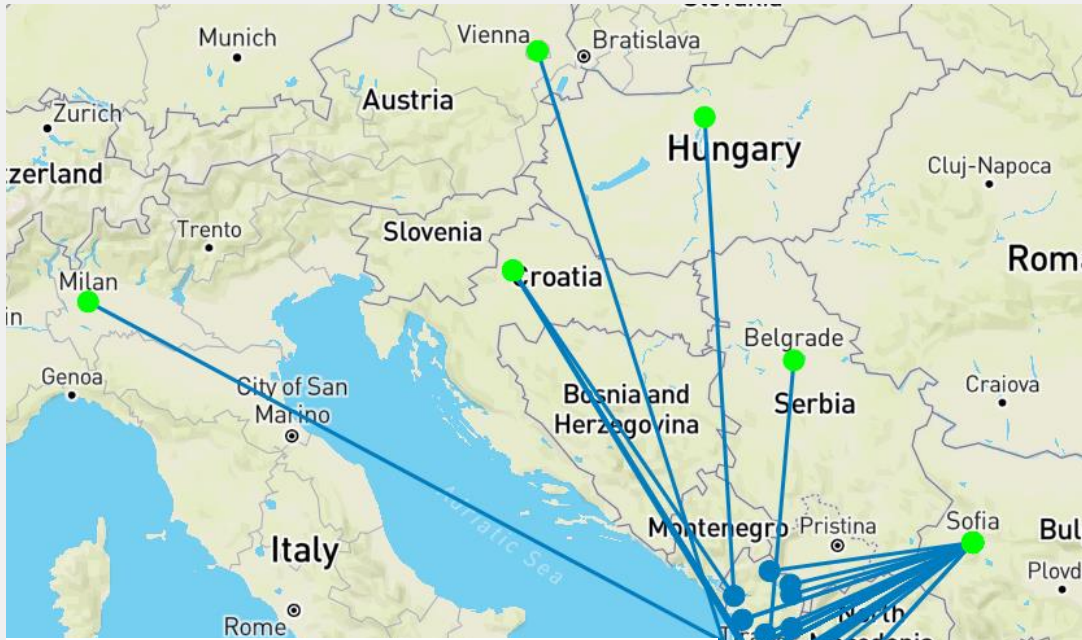


Location of Netflix caches by Internet population in MK (Proxy: Oxylabs)

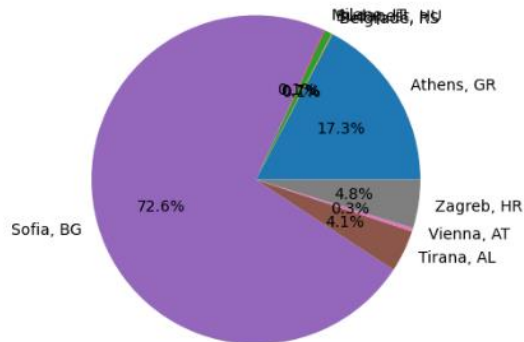


# Albania and North Macedonia: Cloudflare

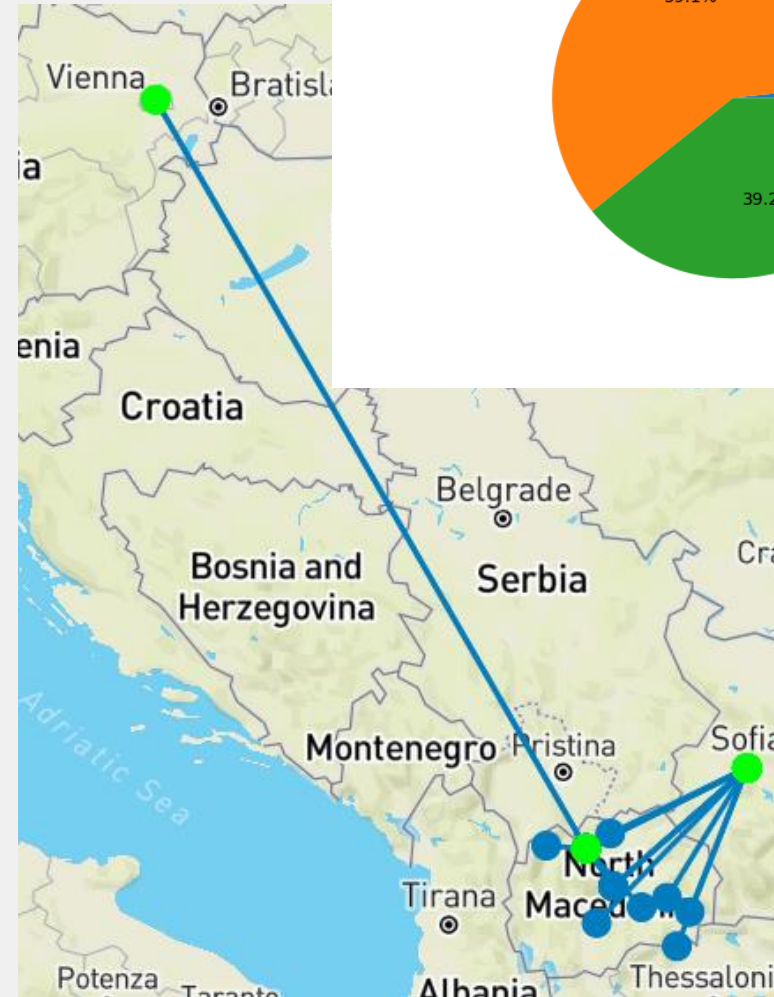
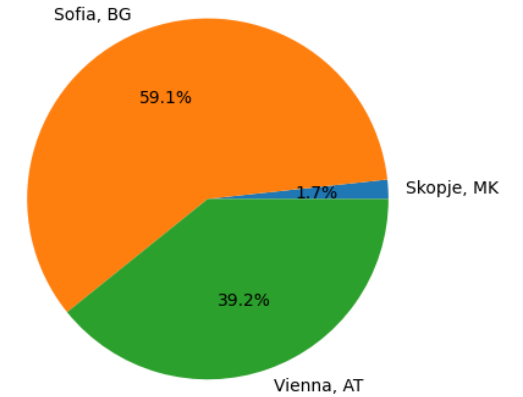
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Location of Cloudflare servers by Internet population in AL (Proxy: Oxylabs)

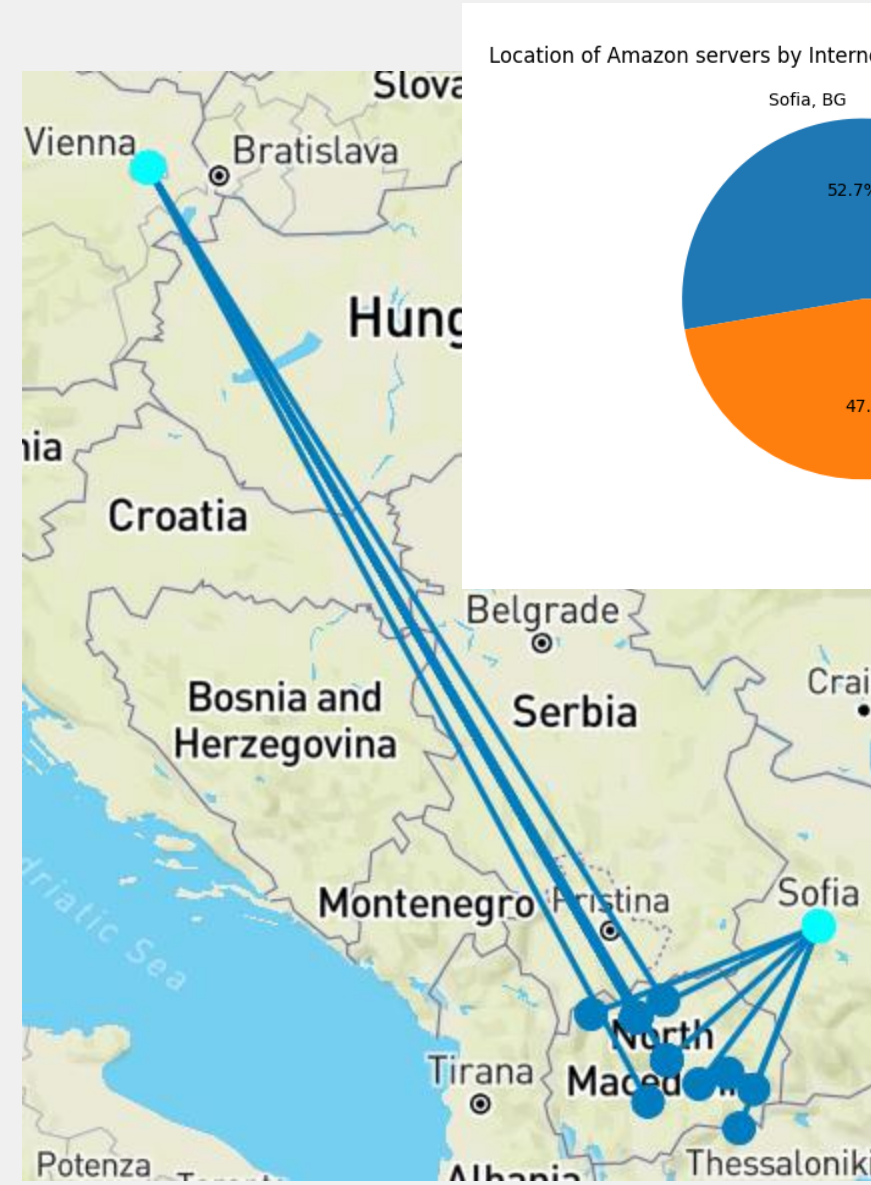
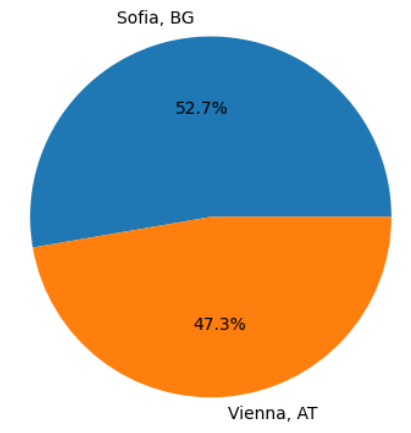
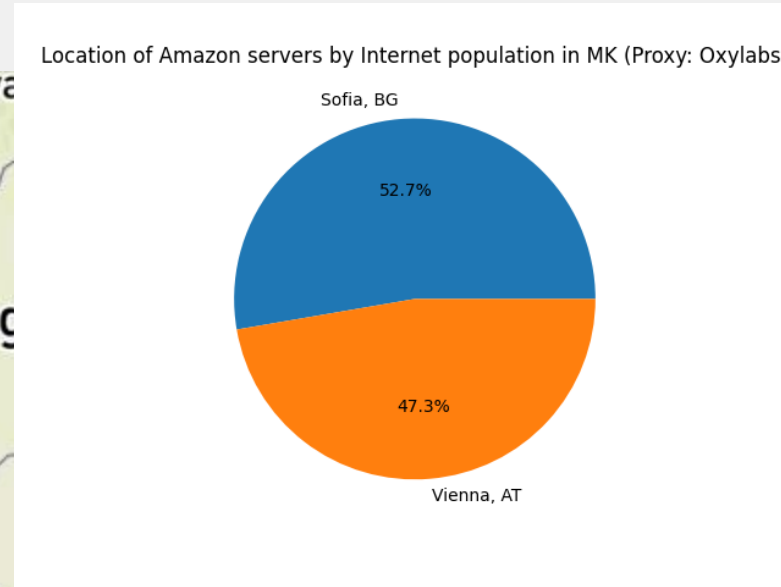
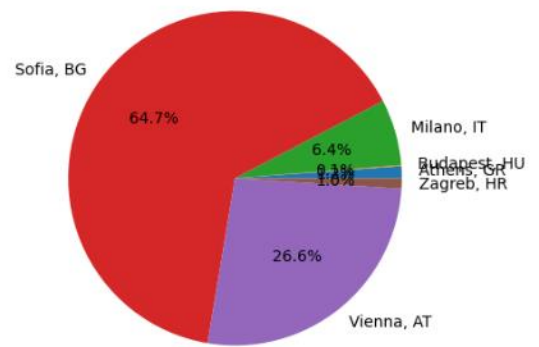
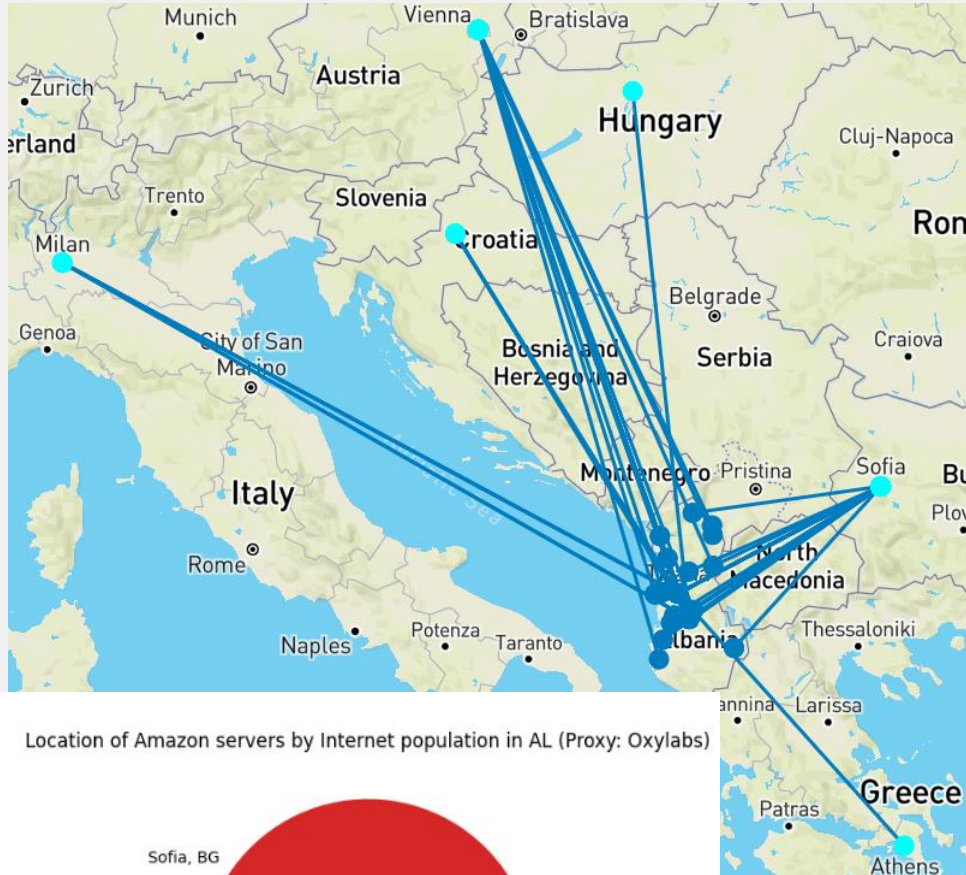


Location of Cloudflare servers by Internet population in MK (Proxy: Oxylabs)



# Albania and North Macedonia: Amazon

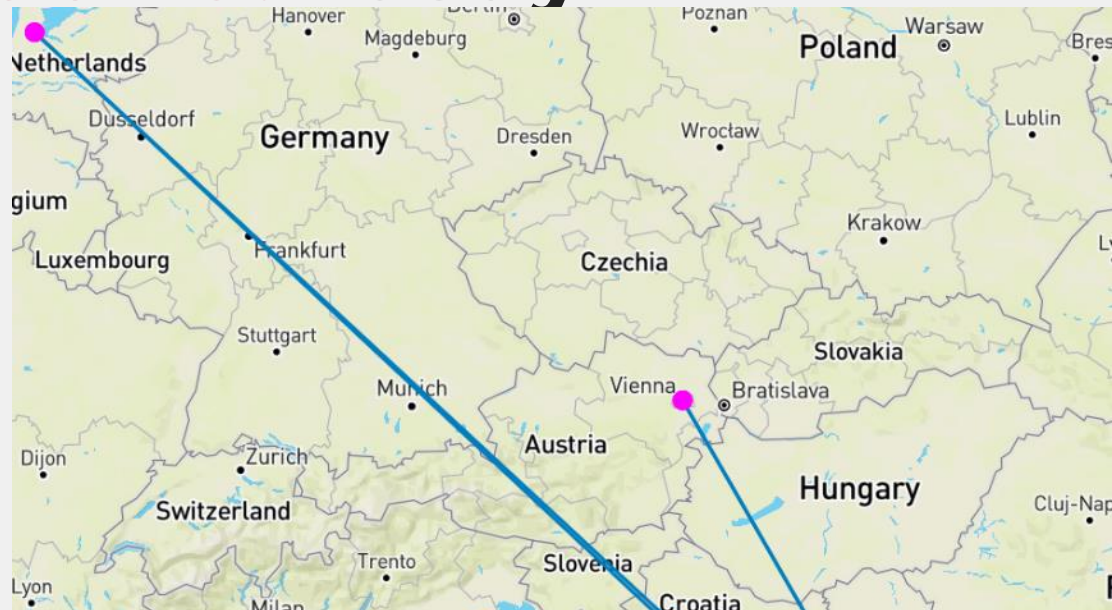
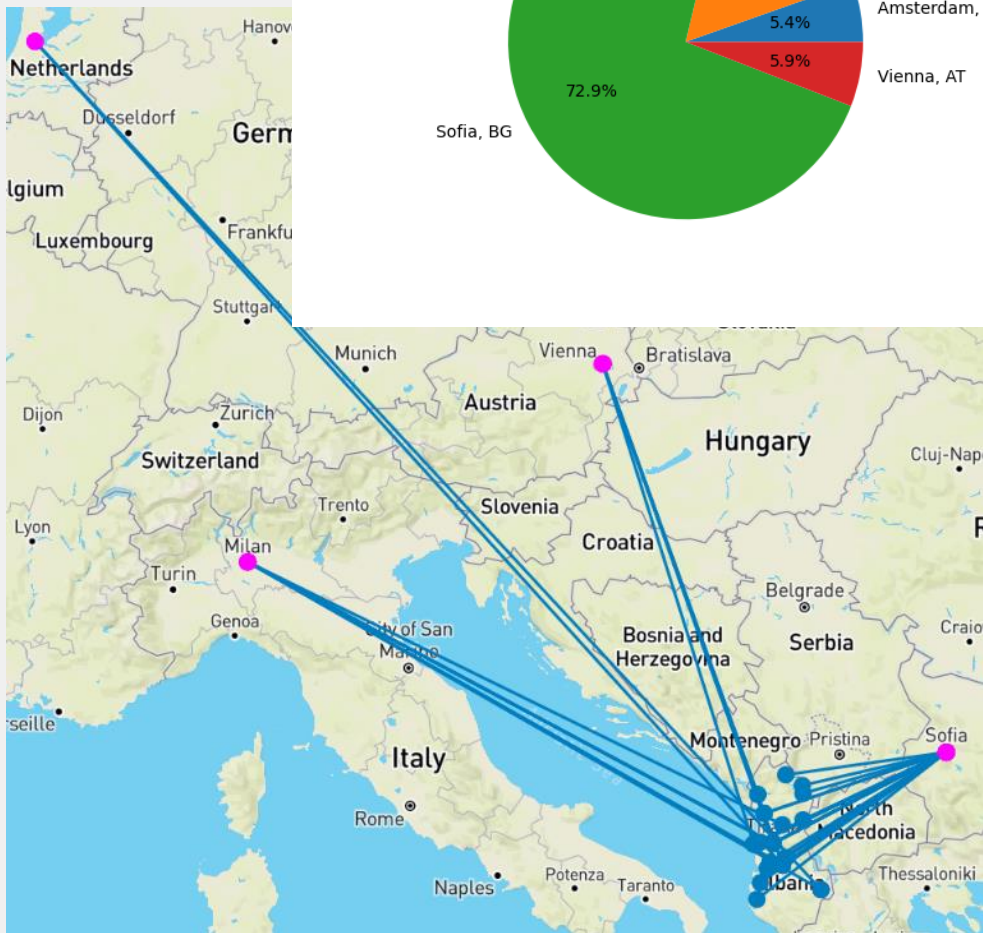
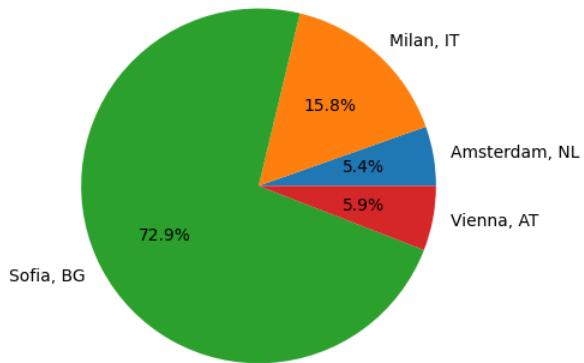
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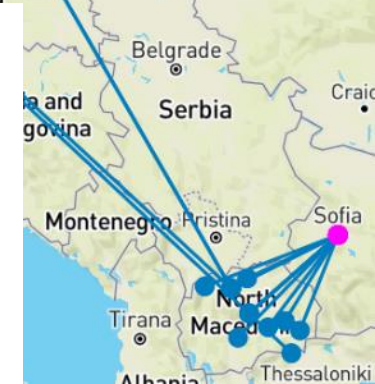
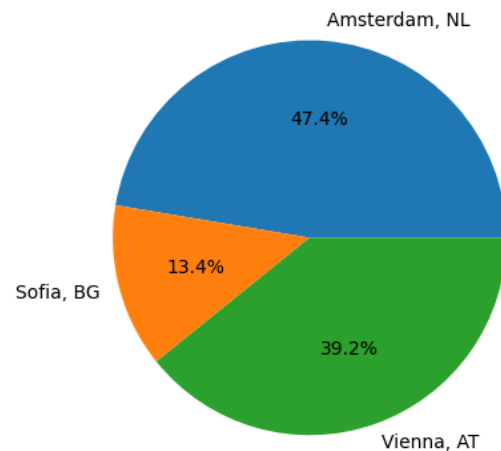


# Albania and North Macedonia: Fastly

Location of Fastly caches by Internet population in AL (Proxy: Oxylabs)



Location of Fastly caches by Internet population in MK (Proxy: Oxylabs)



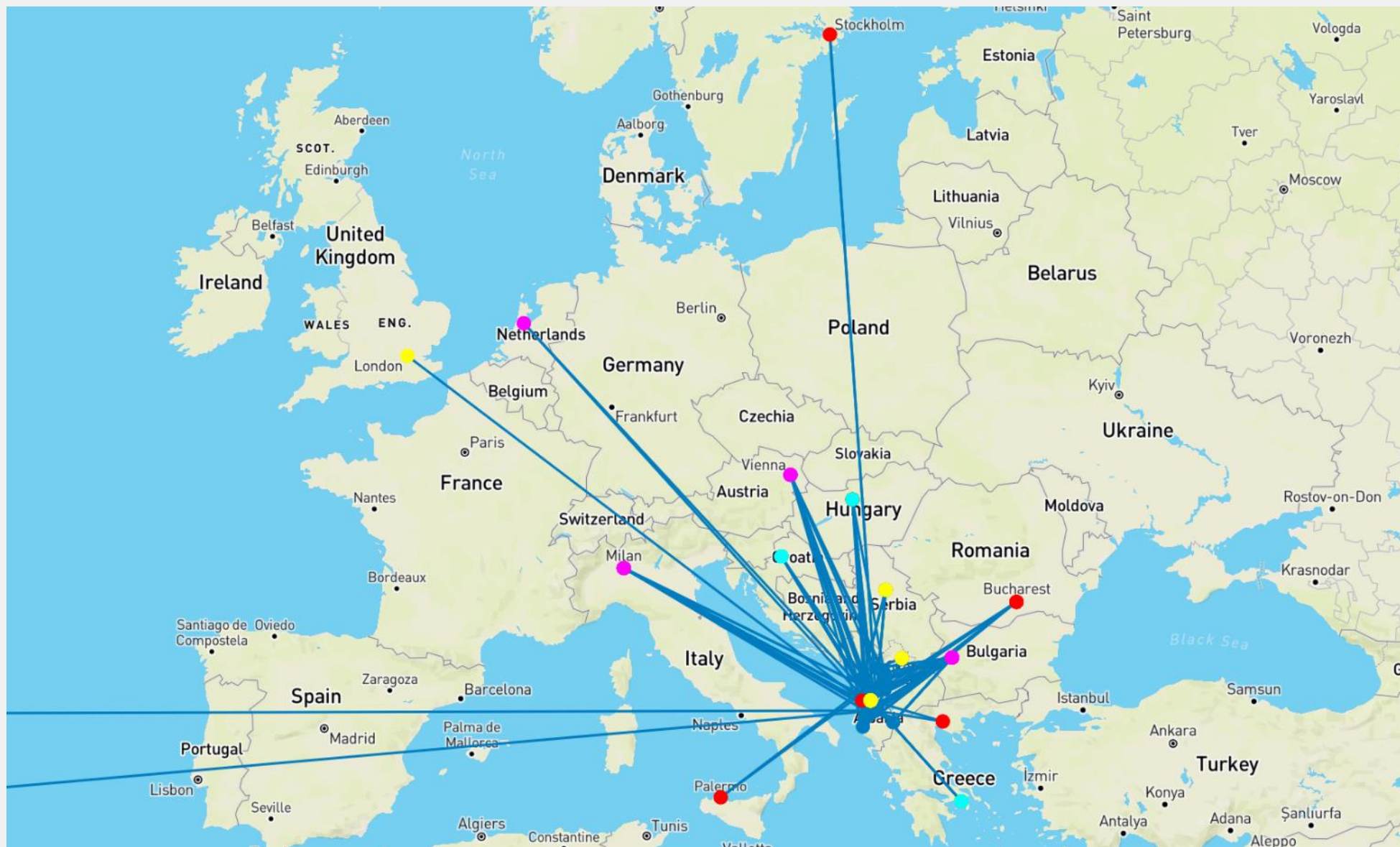
# A lot more **work** to be done

- Analyze other CDNs/OTTs
- Distinguish between ISP caches and IXP caches
- Integrate DNS analysis: do results vary if the DNS resolver changes?
- When the server name is not explicit: emulate a browser inspector
- Establish some measure of the distance between the client and the server
  - AS distance
  - Traceroute (e.g. through SOCKS5 where available)
- Look specifically at some services (e.g. cloud)

Feedback and suggestions welcome!

# Ask me for a demo

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# Q&A

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