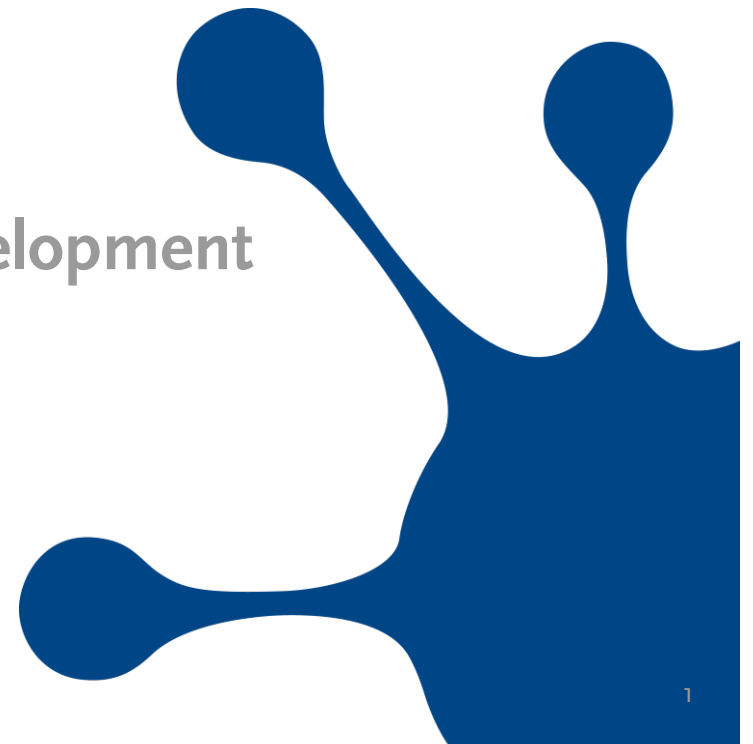


## Analysis of Query Source and Anycast

Patrik Fältström

Head of Engineering, Research and Development

Netnod



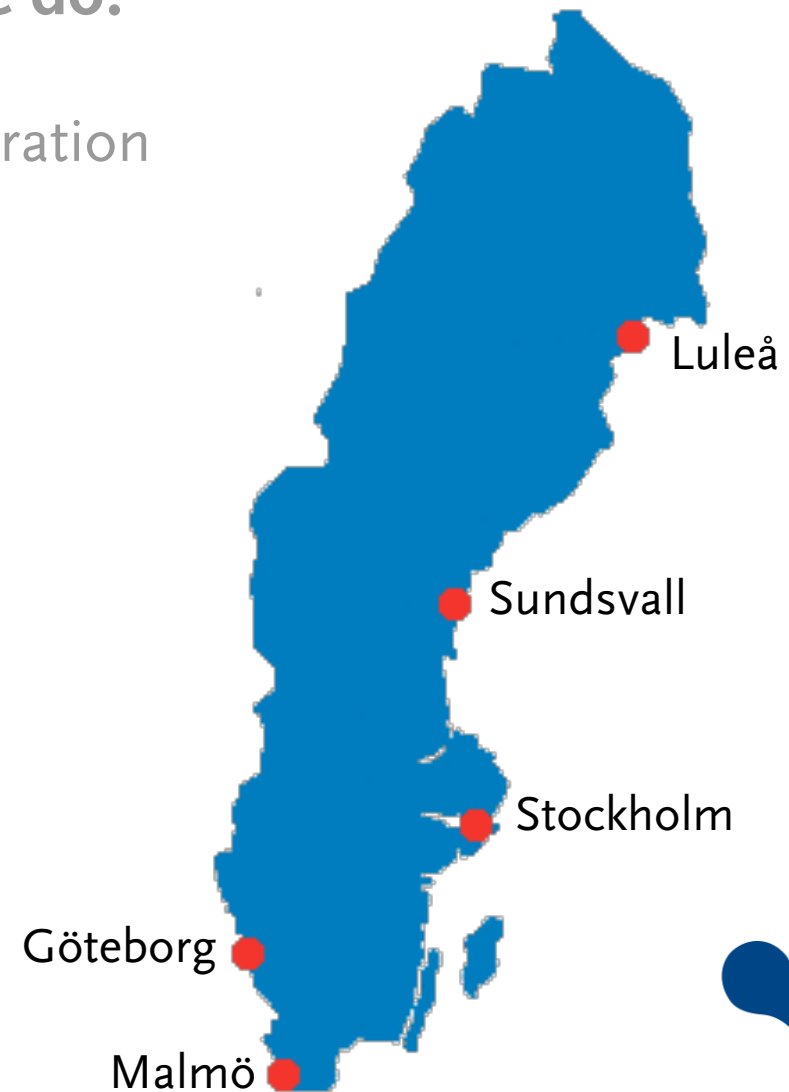
## What is Netnod, and what do we do?

By a foundation fully owned incorporation

Not for profit

Provides:

- IX in 6 locations
- DNS in 55 locations
- NTP-service in 5 locations
- Other services related to SSR



## Netnod history

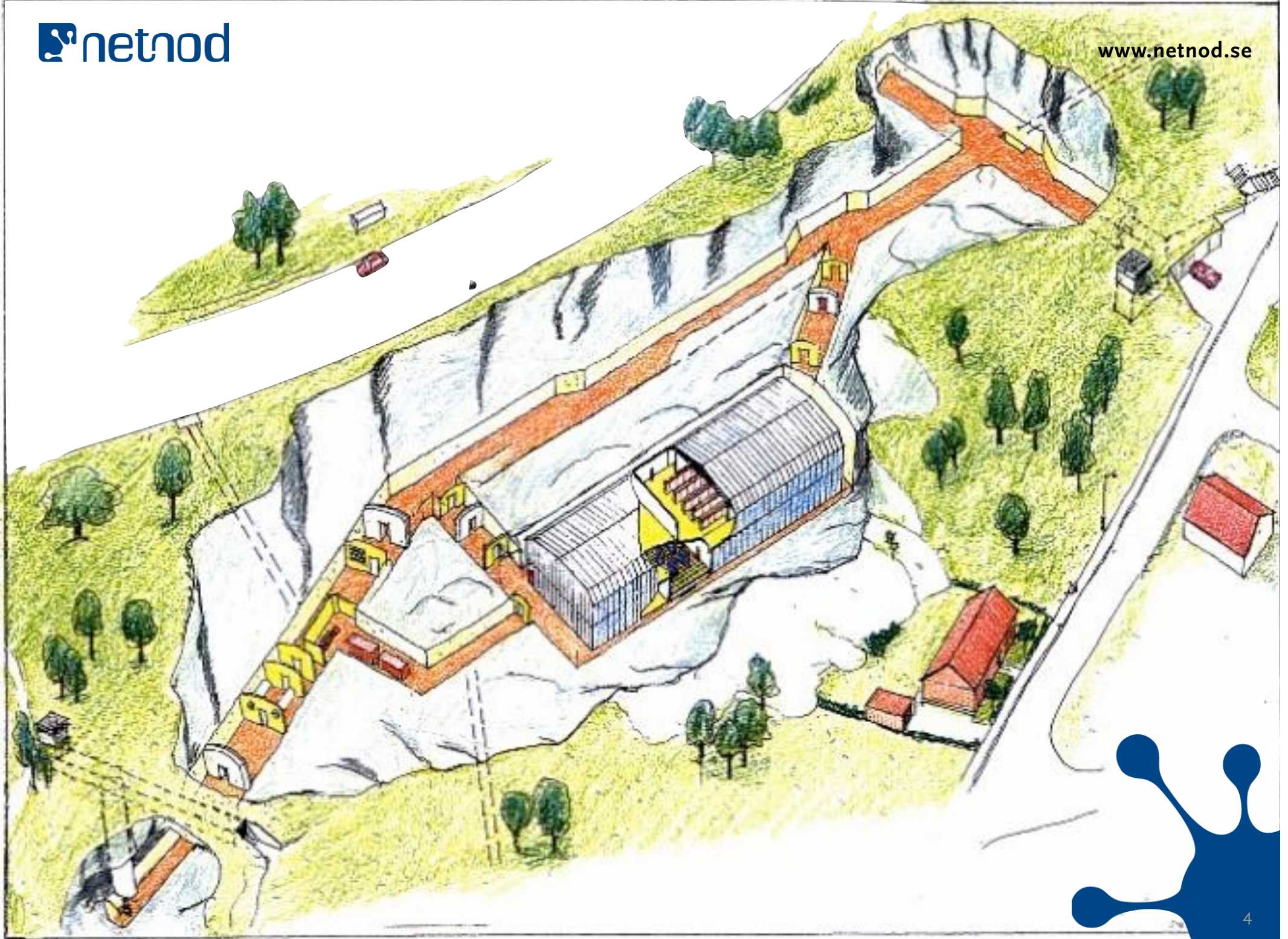
1992-1996 there was a distributed IX at Royal Institute of Technology

1996 the TU-foundation was created

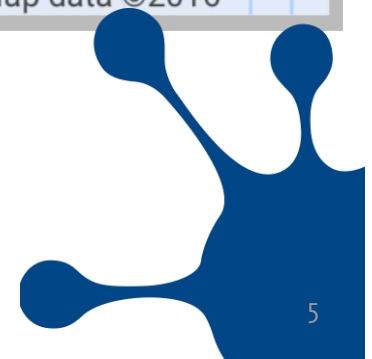
Goal was increased robustness and security

The IX was moved to bunkers in the mountains





# DNS services hosted all over the world



## Background

We did this investigation in 2012

The result was kind of scary...

- Highest number of queries to London was from Germany...
- In Oslo, there were queries from all over the place...

It was time to see whether it is better 2015



## Peering

More than 2000 BGP peers, and more than 60% with IPv6

Include route servers at larger IX:es

We are always looking for more peers!

➡ Yes, we do have an open peering policy

Email: [peering@netnod.se](mailto:peering@netnod.se)

Info: <http://as8674.peeringdb.com>



## Analysis of query src

Based on src IPv4 / IPv6 address

Looking at 10 largest AS:es per site

Economy represented based on RIR information

Based on snapshot in april 2015

Absolutely not 100% correct, but somewhat ok representation





## Some observations

Most nodes behave as expected

5.6% IPv6

1.5% RFC1918 addresses, which should not be there

➔ 8.15% in Mumbai, 1.11% in Paris

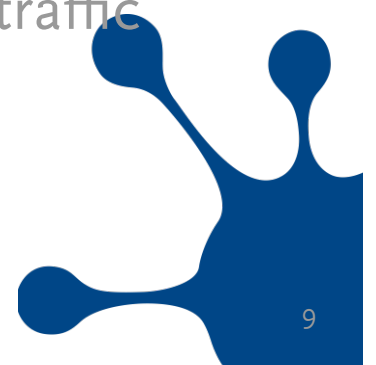
Some IX:es see traffic from places far away, very odd routing

Nodes with a lot of transit get traffic from more diverse locations

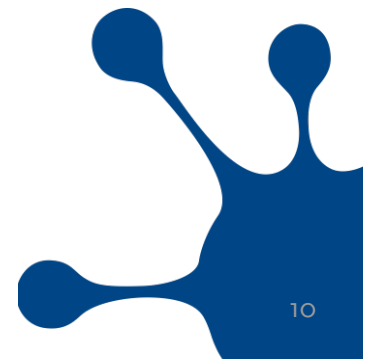
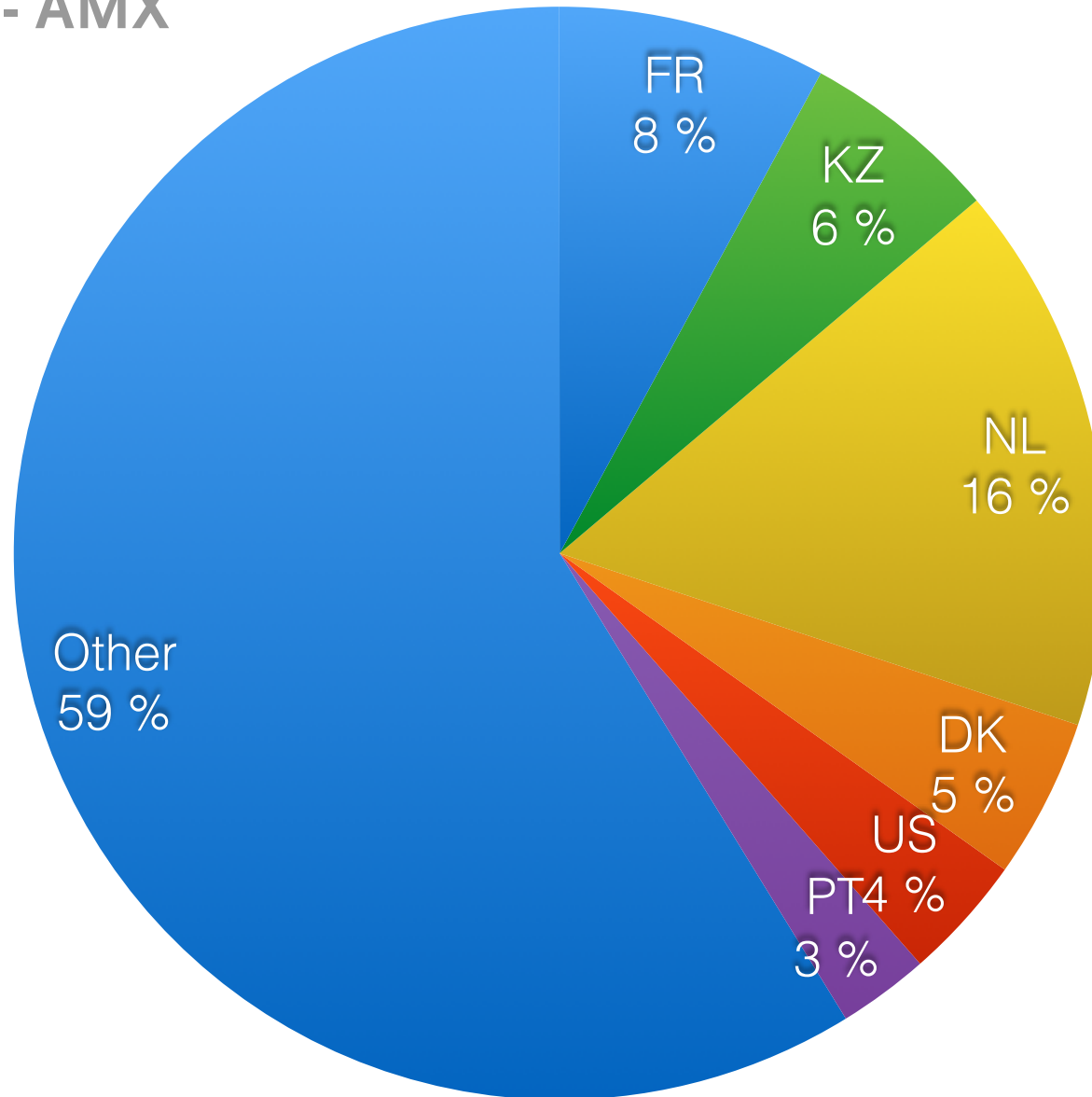
Smaller (and national) IX:es have higher percentage of local traffic

Global eyeball providers are clearly visible at some IX:es

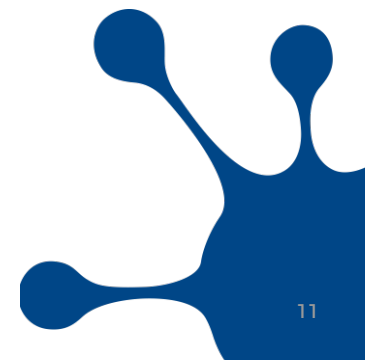
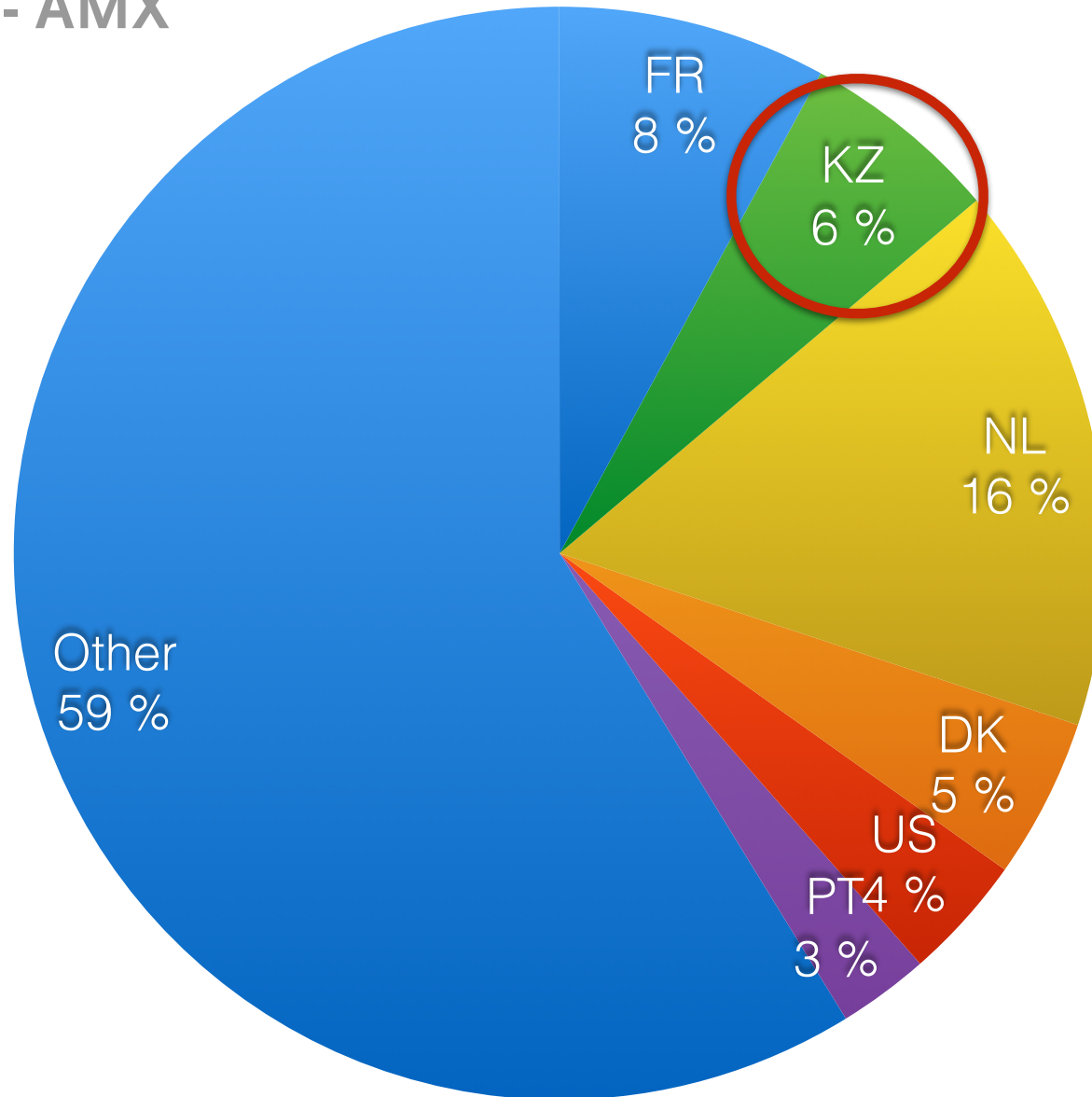
*Result seems to be better today than 2012*



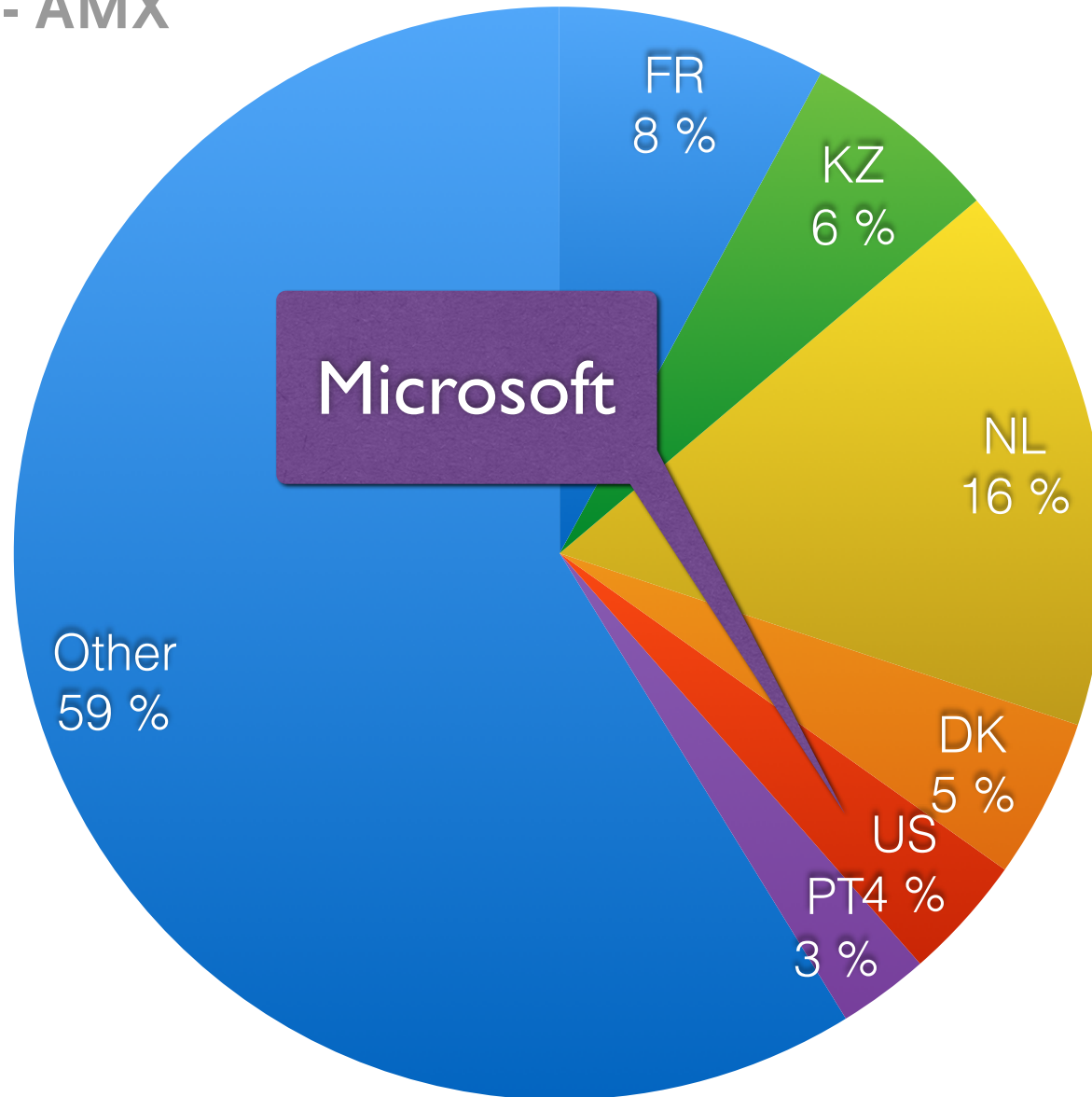
## Amsterdam - AMX



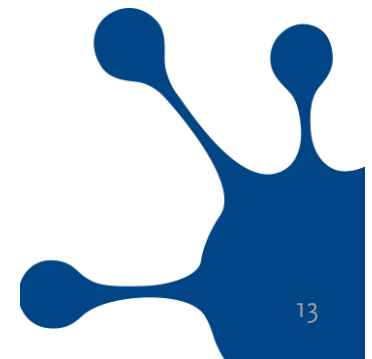
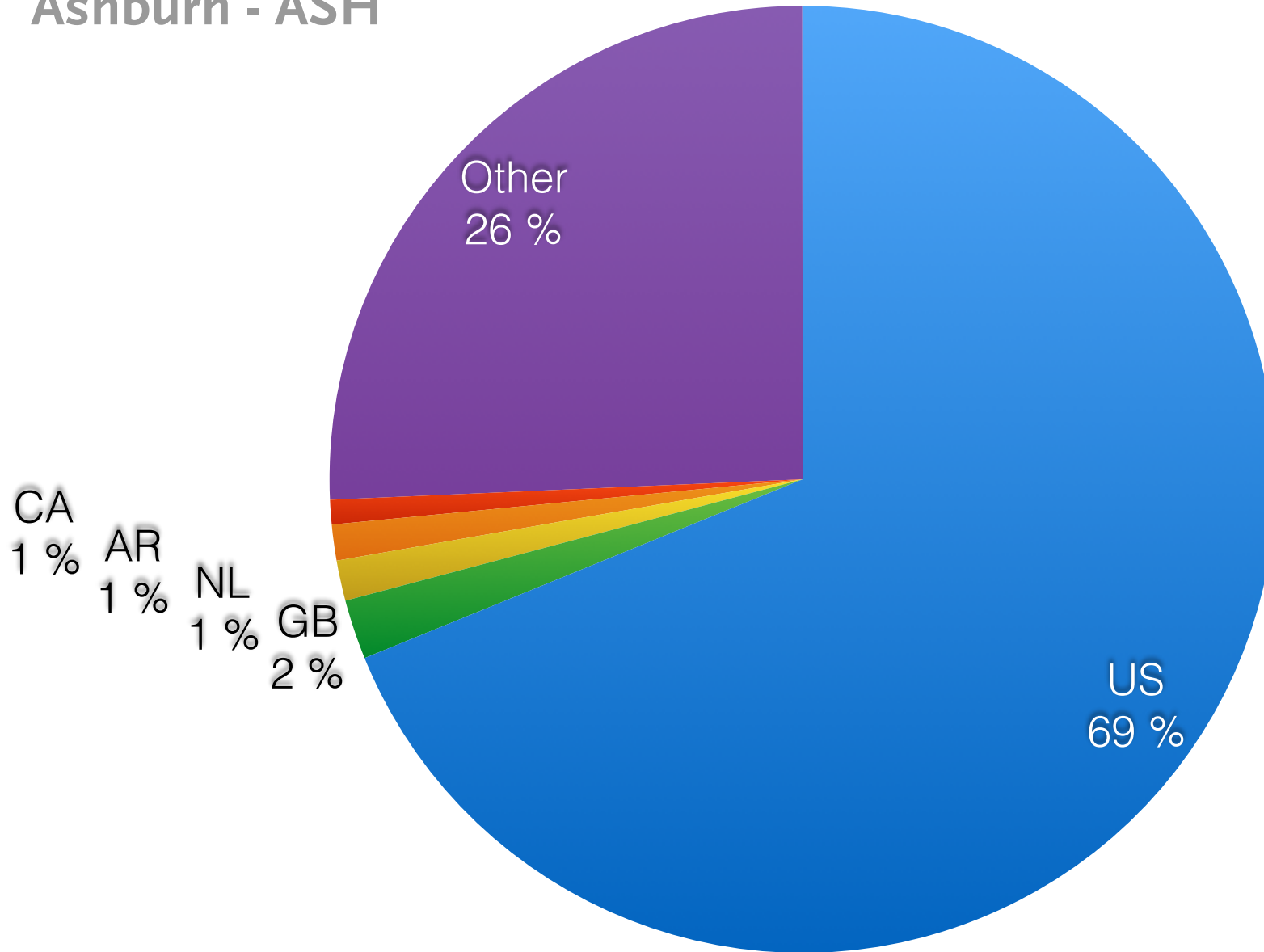
# Amsterdam - AMX



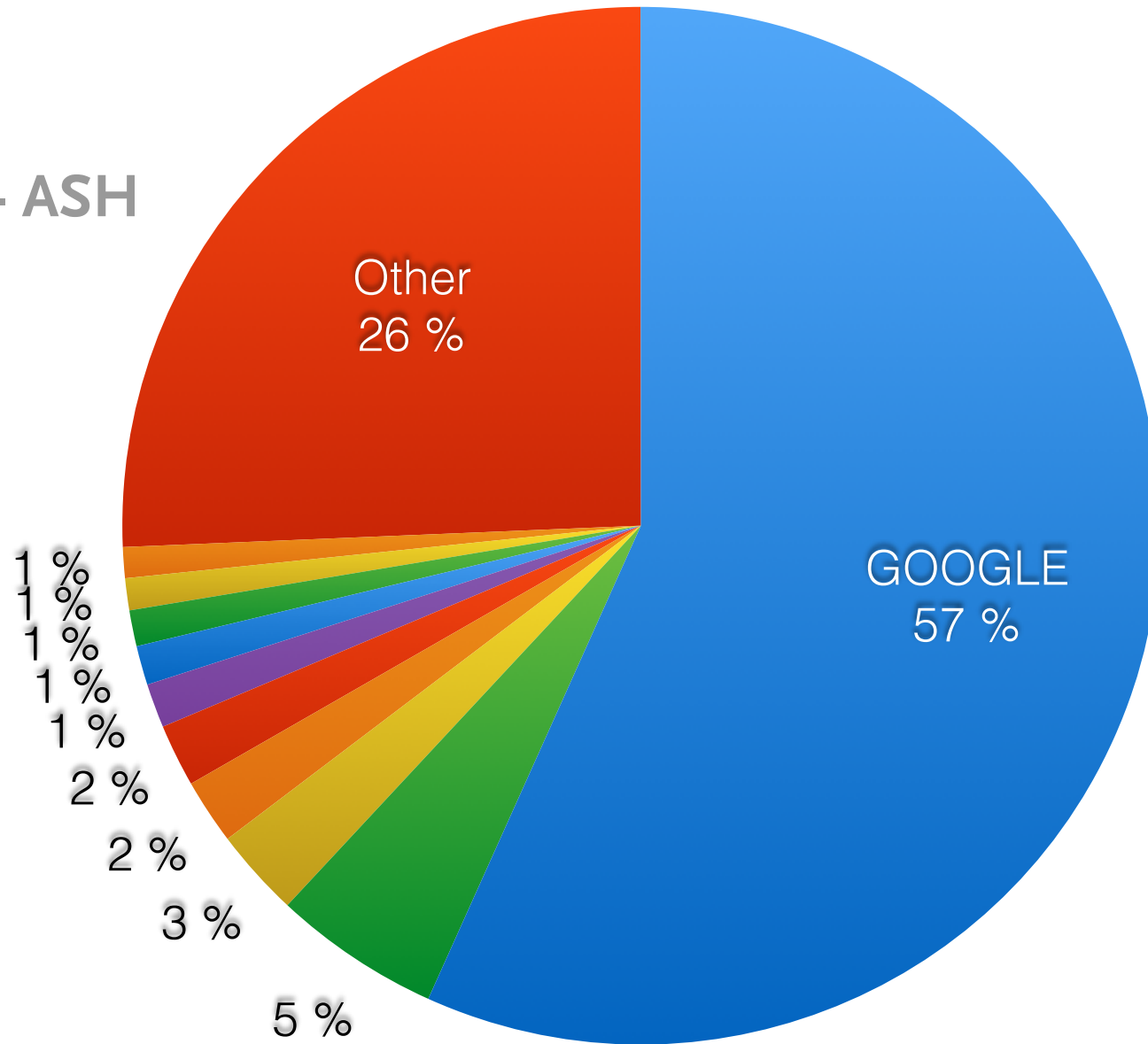
# Amsterdam - AMX



### Ashburn - ASH



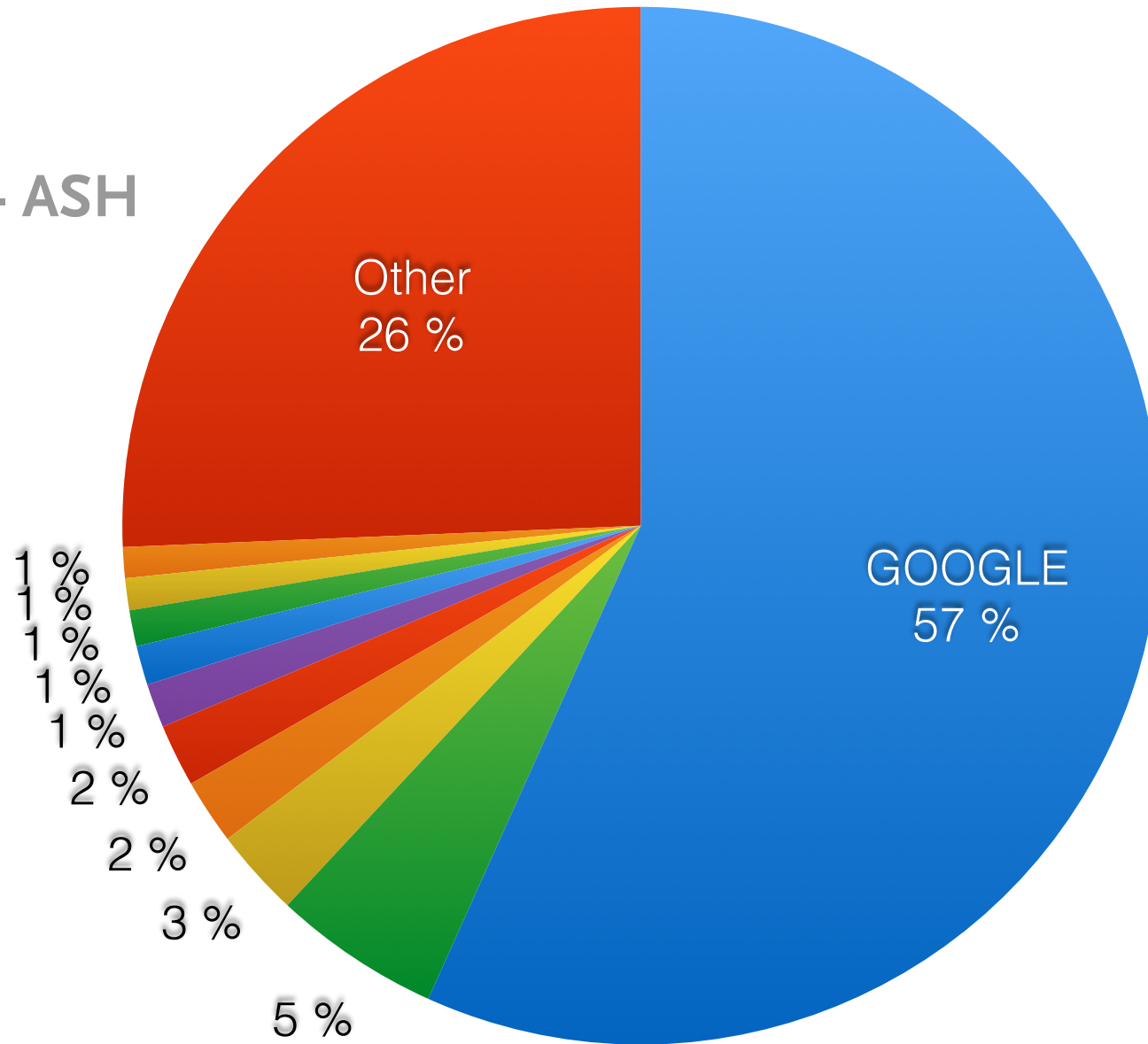
Ashburn - ASH



- GOOGLE
- CABLE-NET
- EDGECAST
- BSKYB
- AMAZON
- KPN
- Telecom Argentina
- Comcast
- Cox
- Bell Canada
- Other



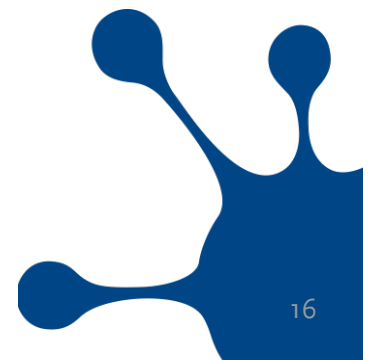
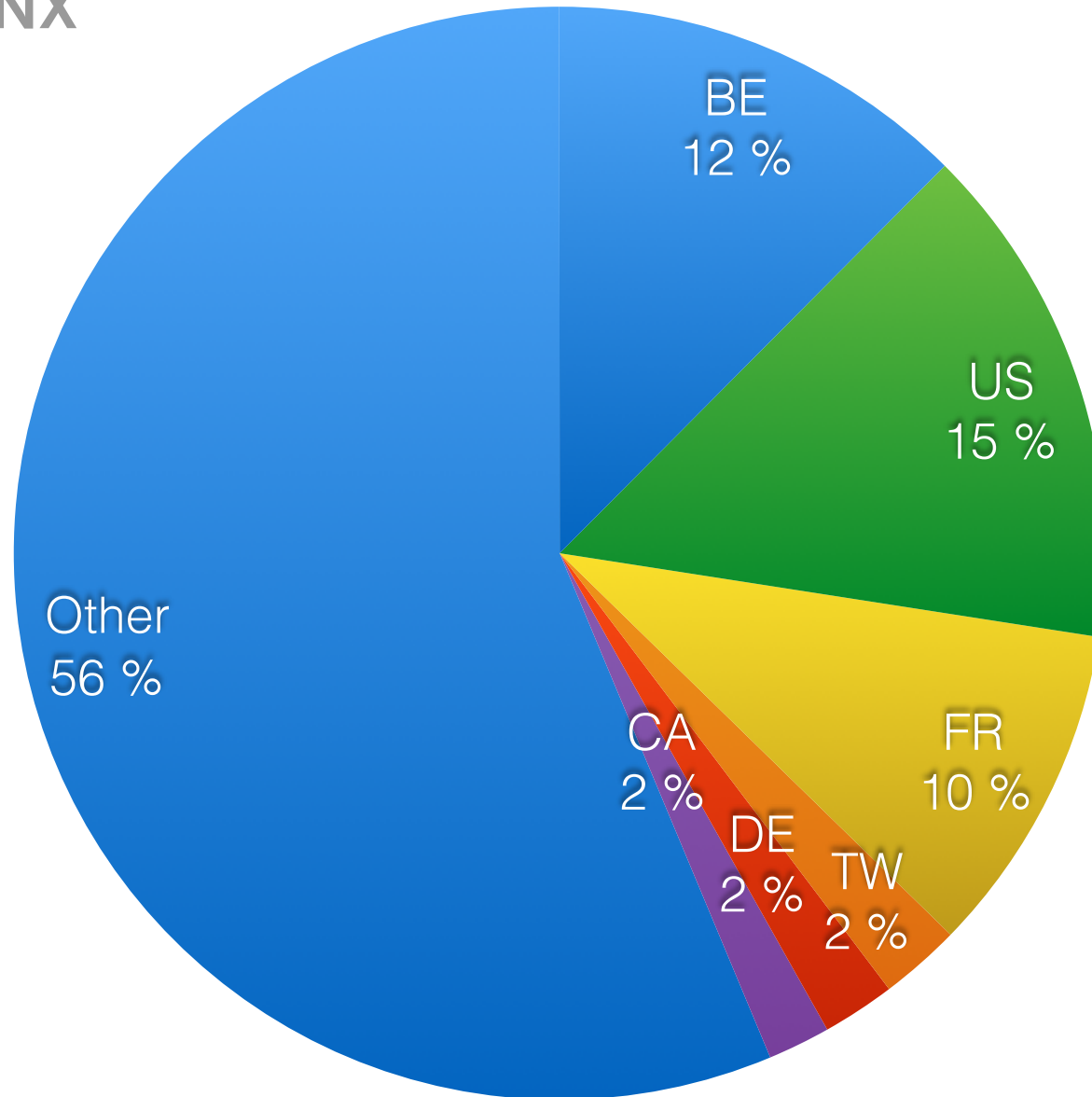
### Ashburn - ASH



- GOOGLE
- CABLE-NET
- EDGECAST
- BSKYB
- AMAZON
- KPN
- Telecom Argentina
- Comcast
- Cox
- Bell Canada
- Other

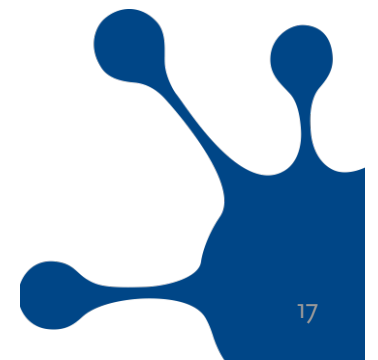
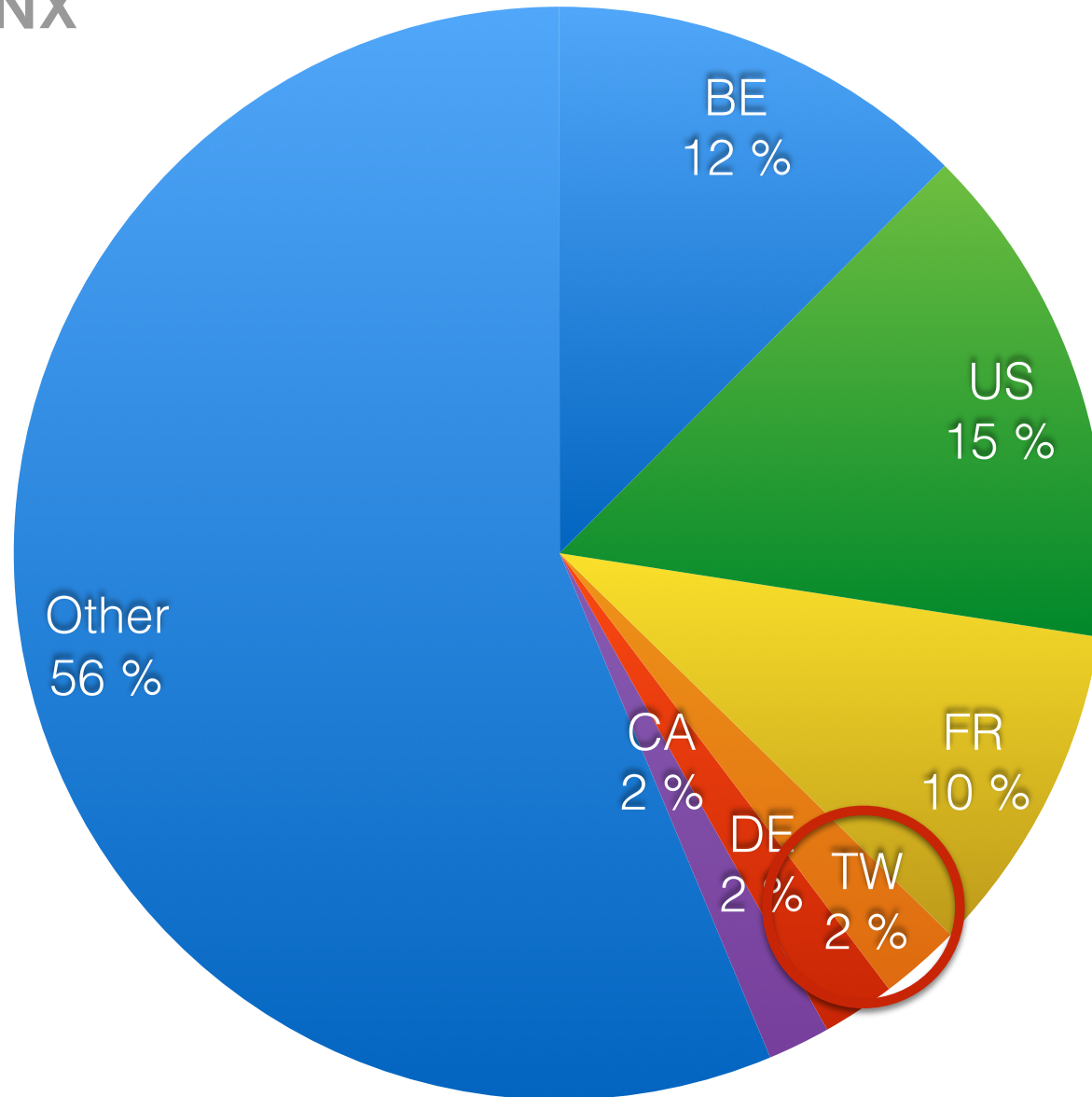


## Brussels - BNX

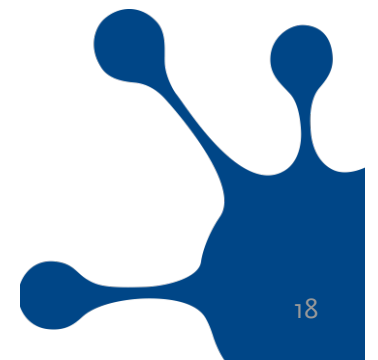
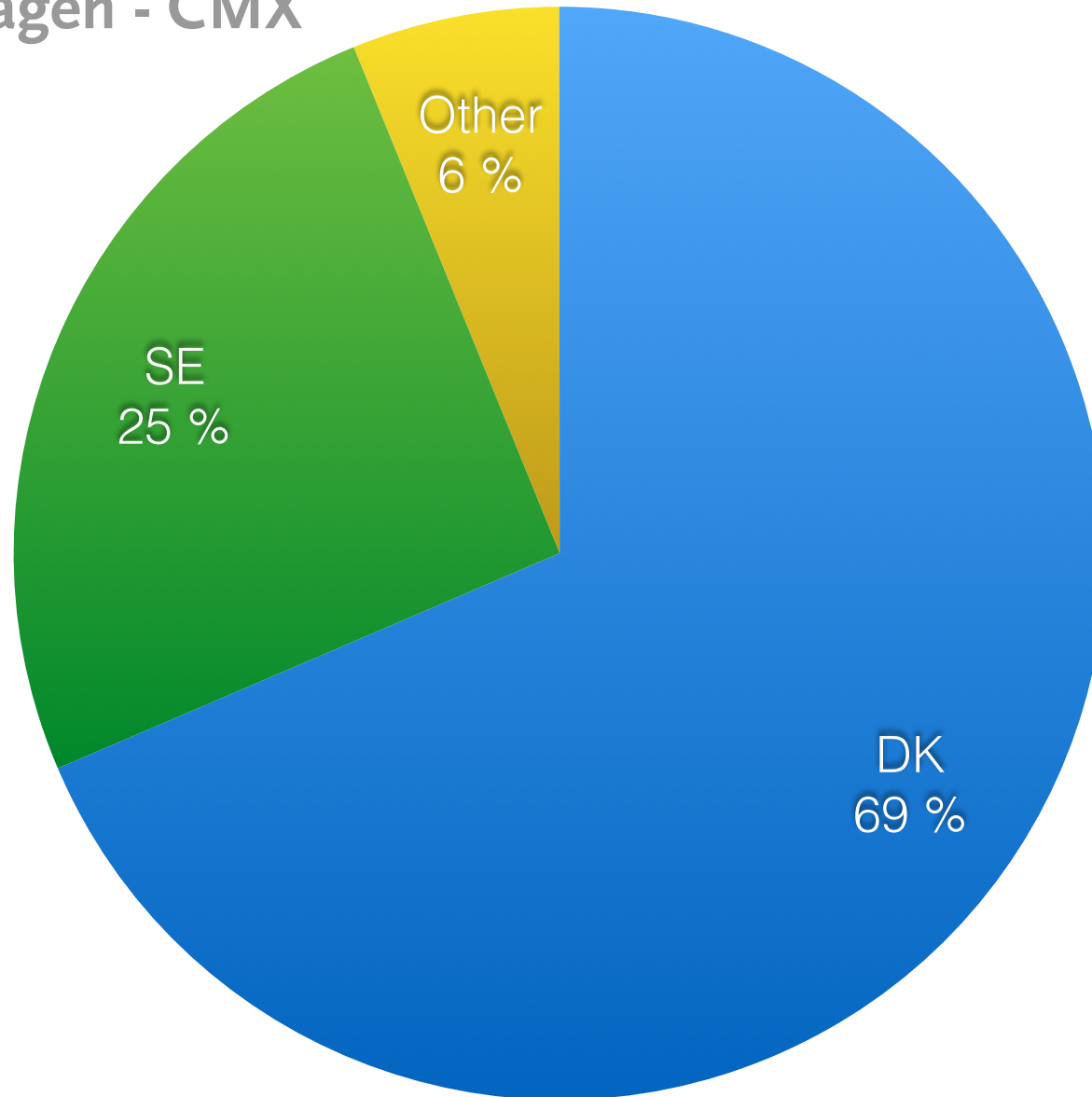




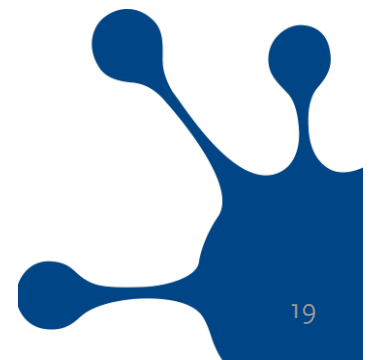
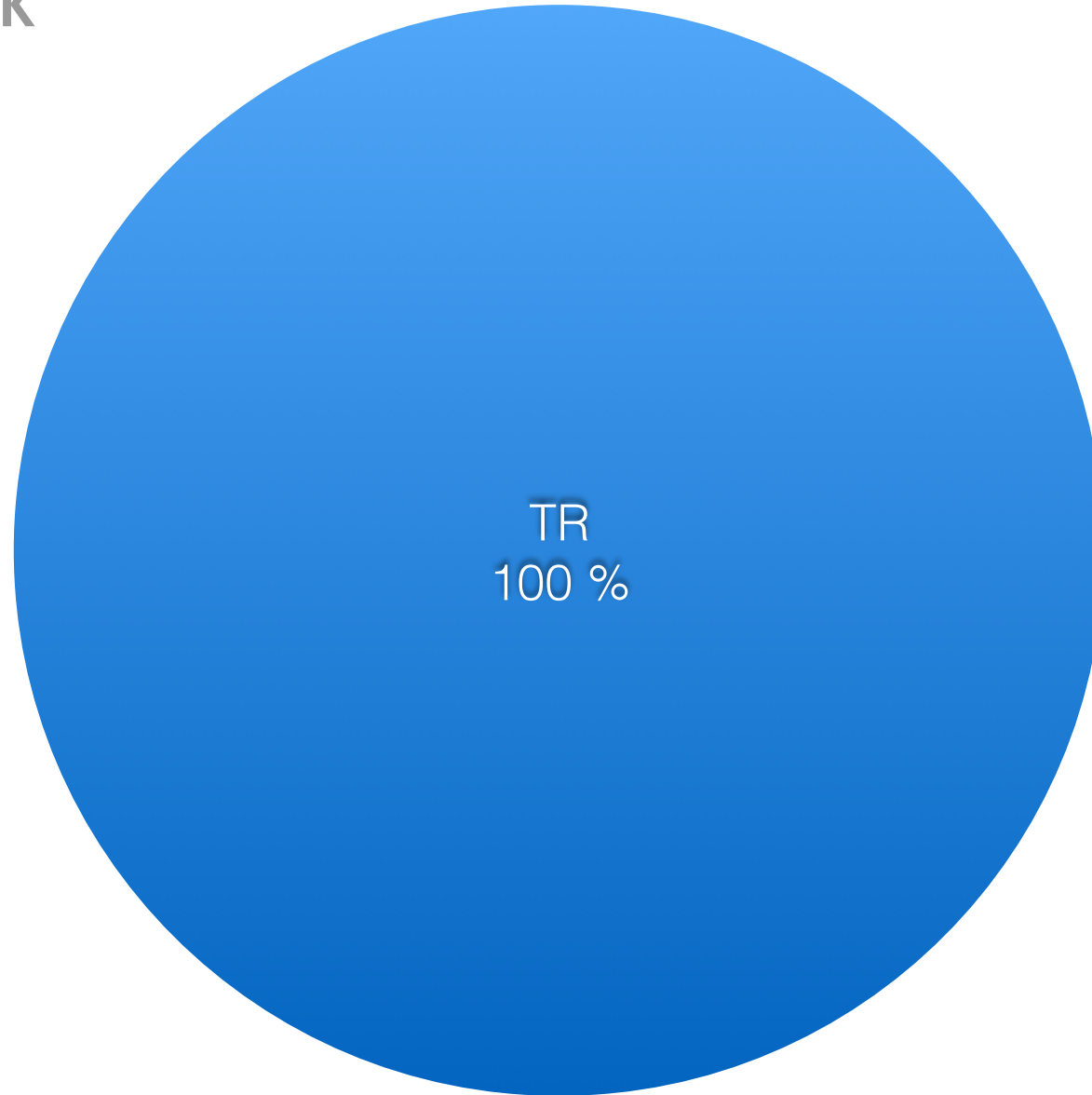
# Brussels - BNX



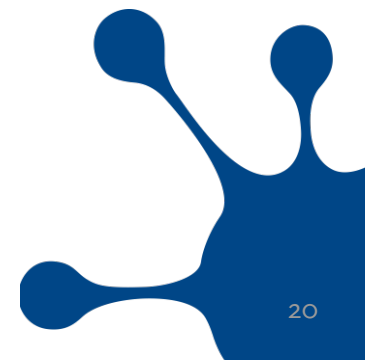
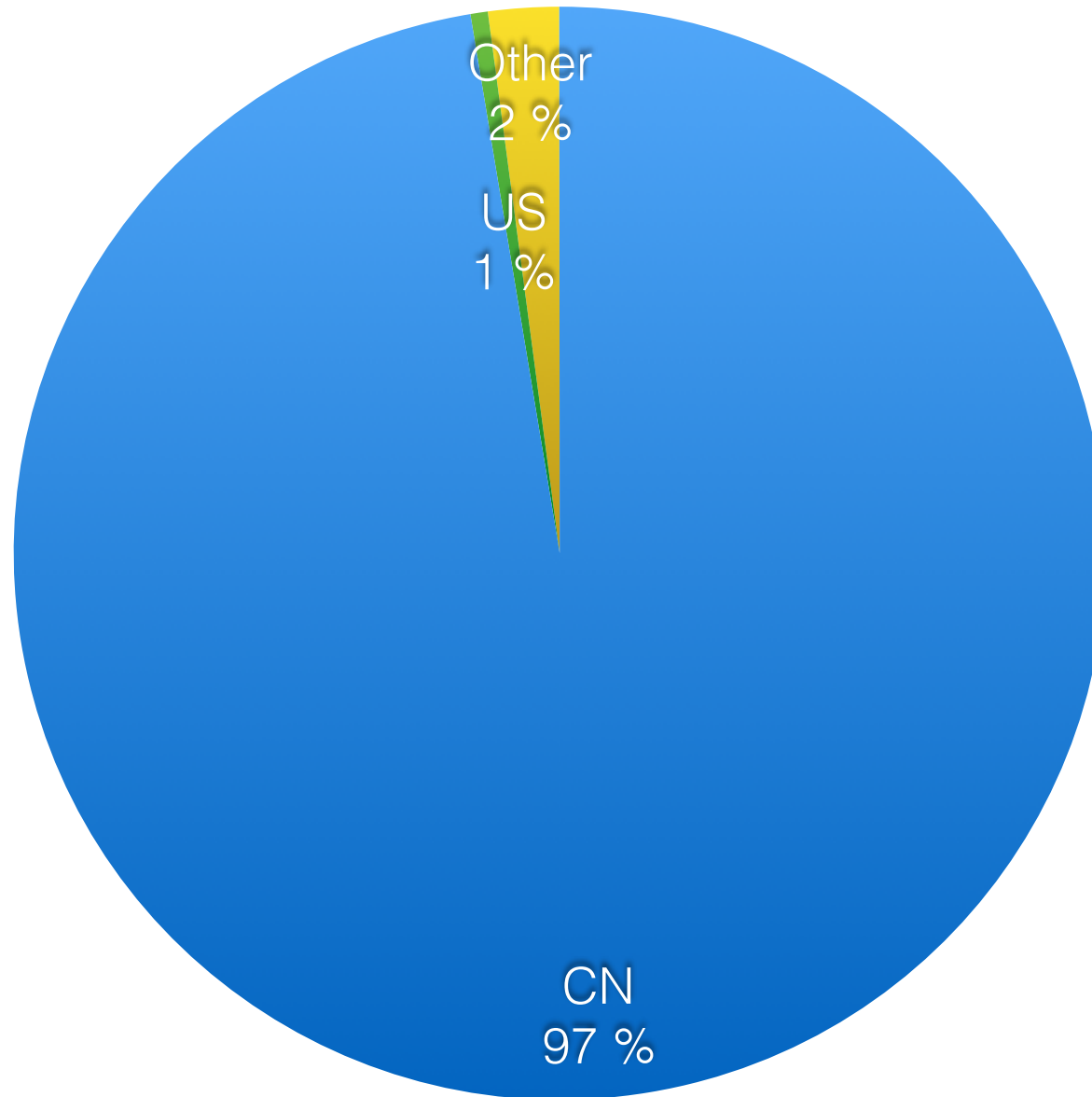
## Malmö/Copenhagen - CMX



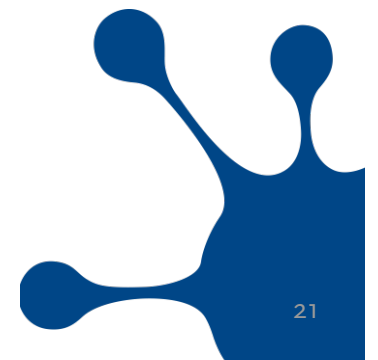
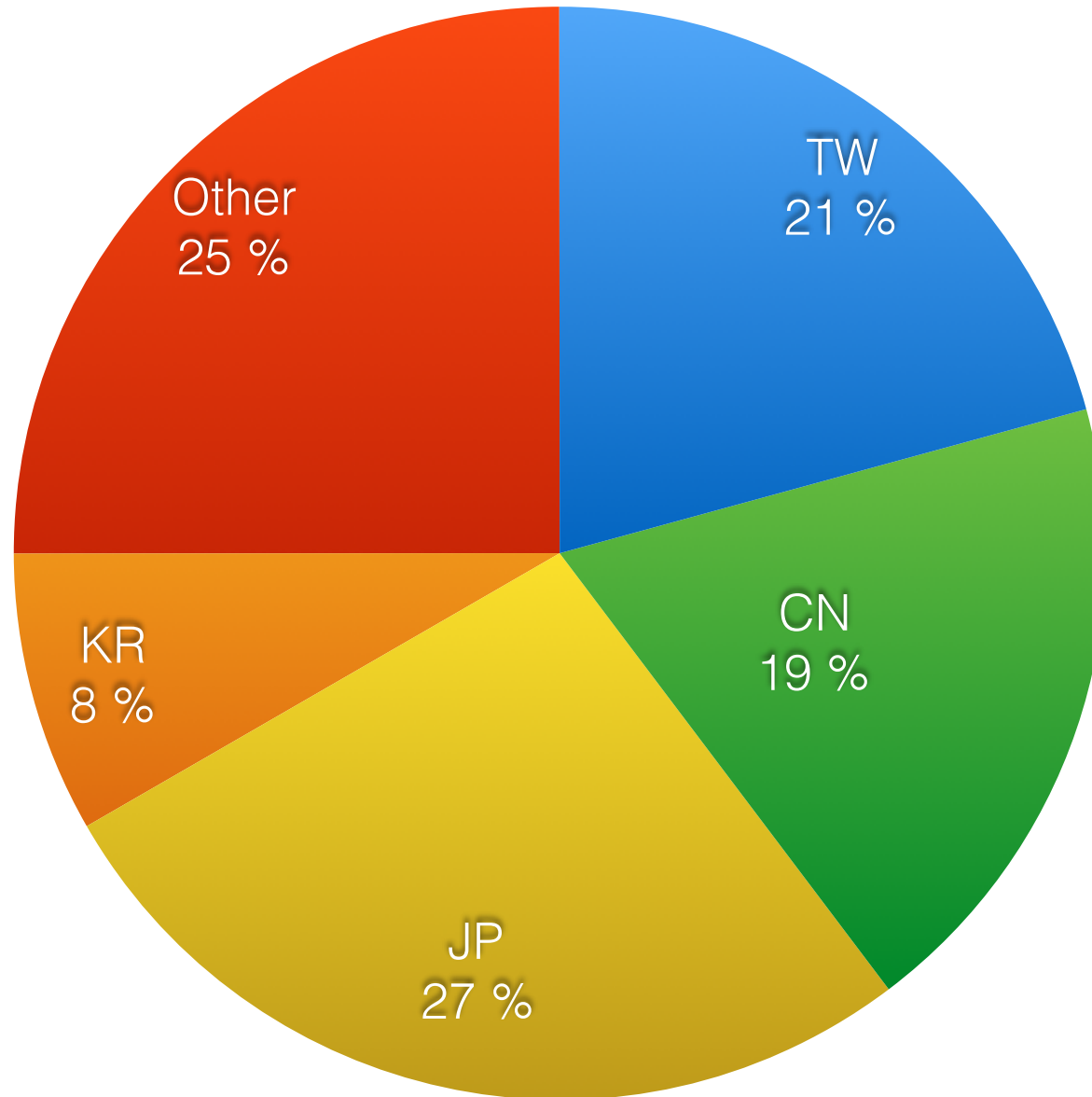
## Ankara - ANK



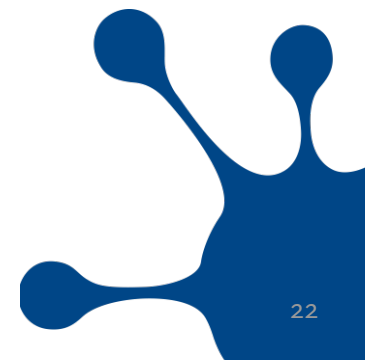
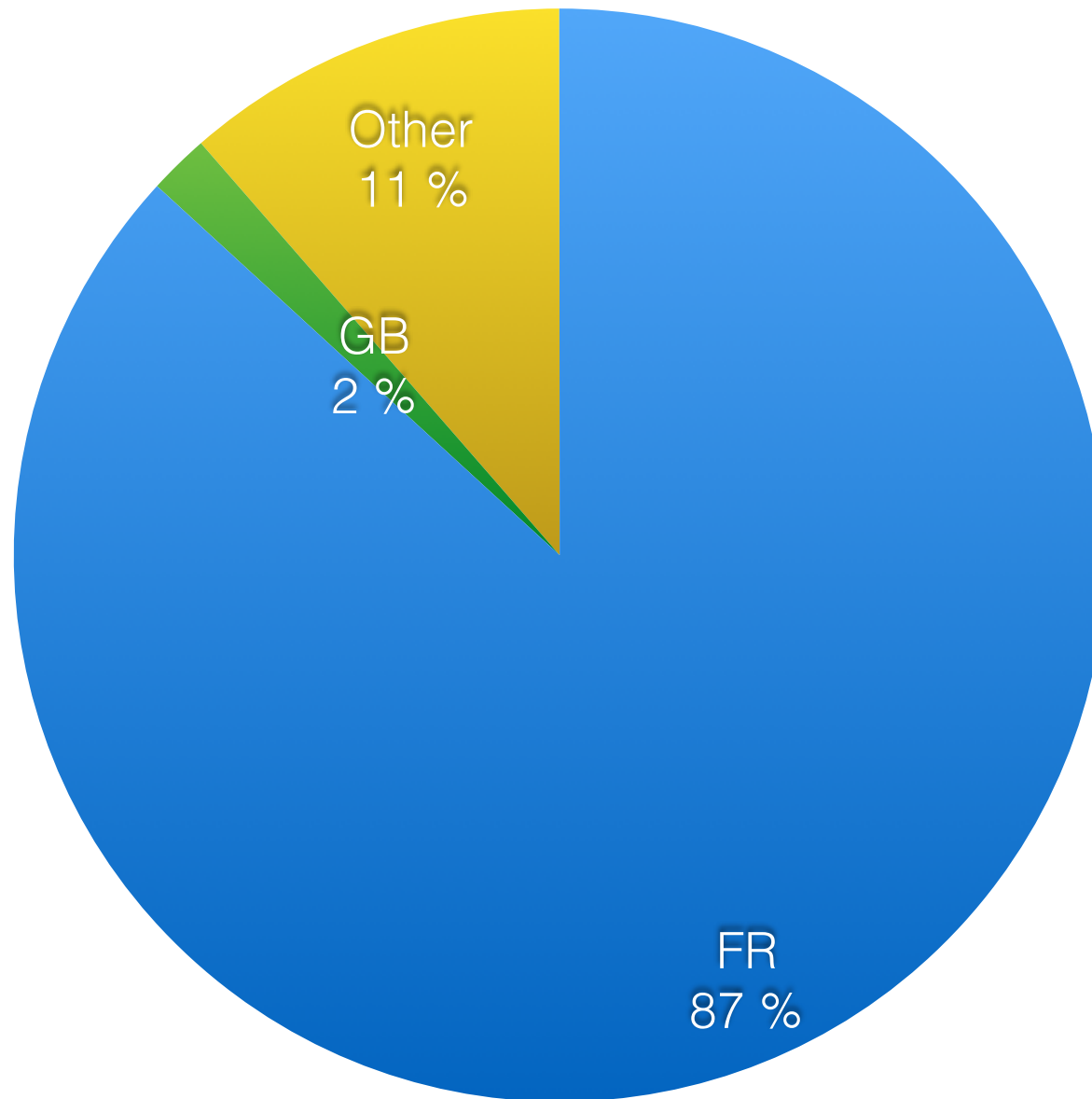
## Beijing - BEI



# Tokyo - TPP

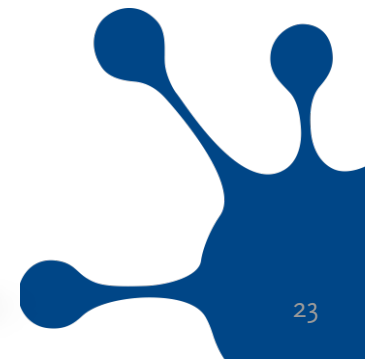
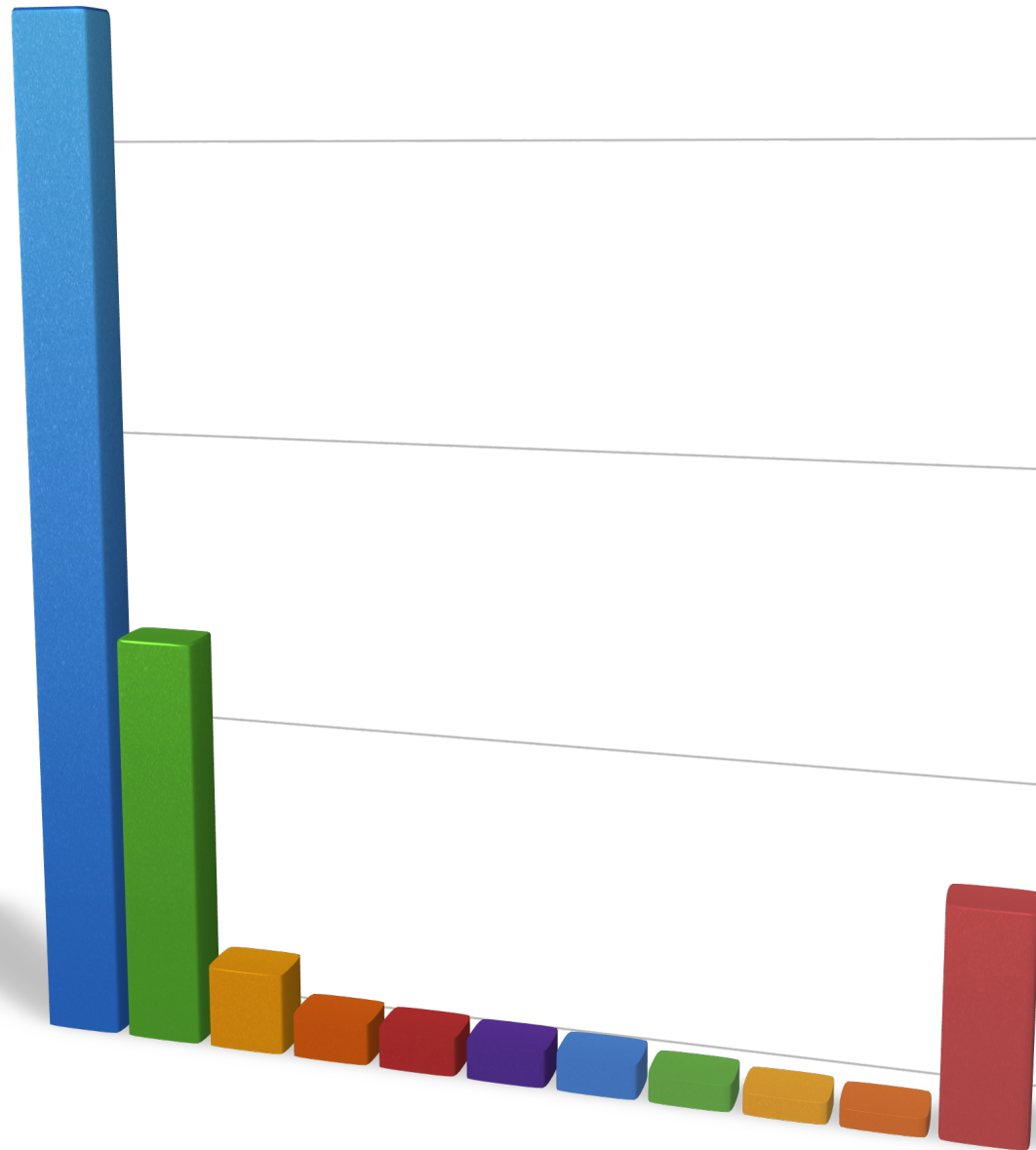


## Paris - PAR

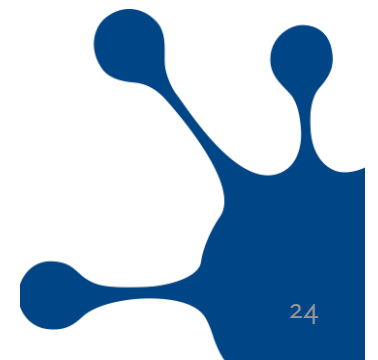
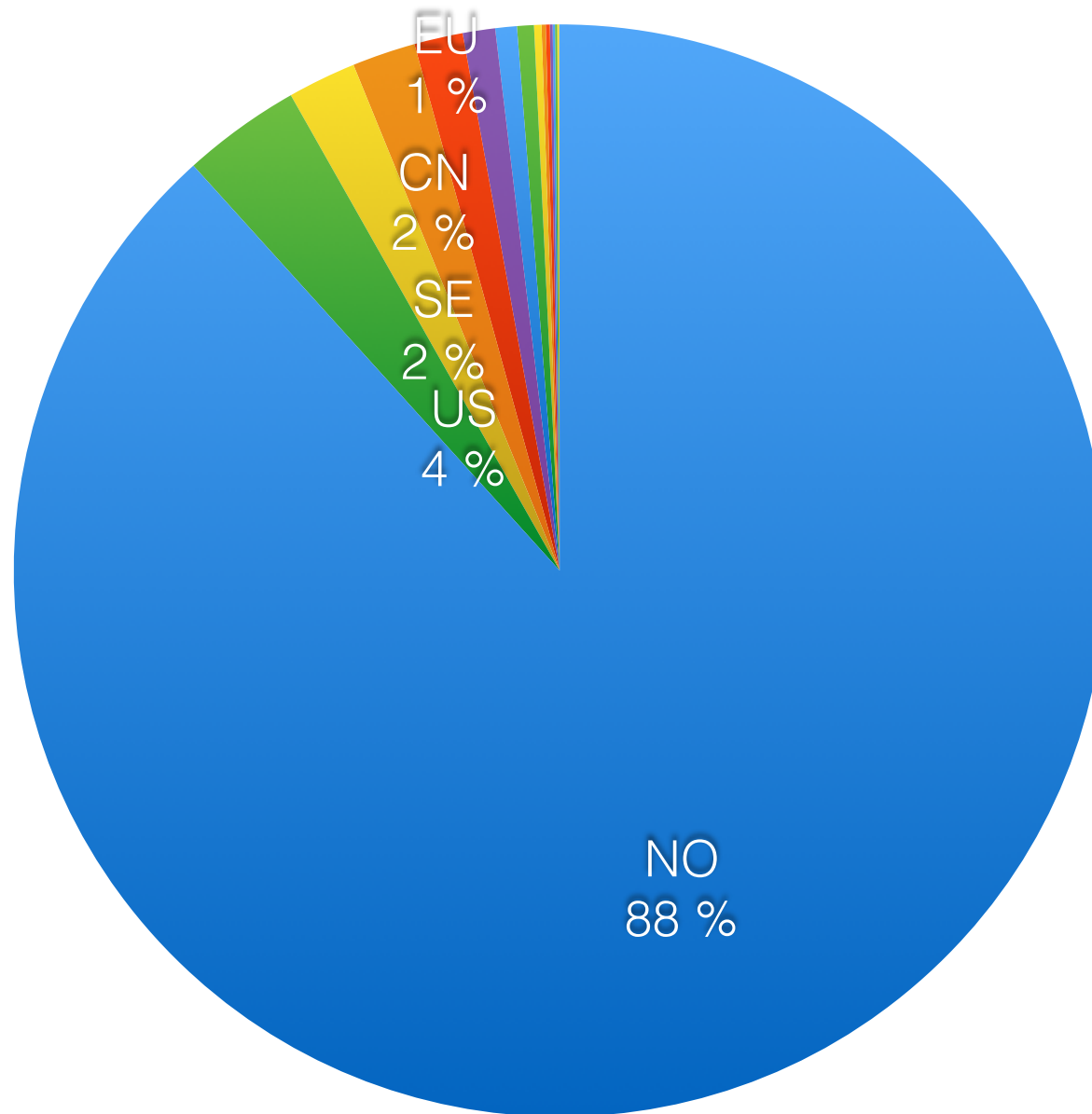


# Paris - PAR

- RENATER
- COMPLETEL
- ALTITUDETELECOM
- IP SLA
- FIRSTHEBERG
- RMI-FITECH
- EASYNET
- JUSSIEU
- PARISSUD
- CEG-HOSTING
- Other

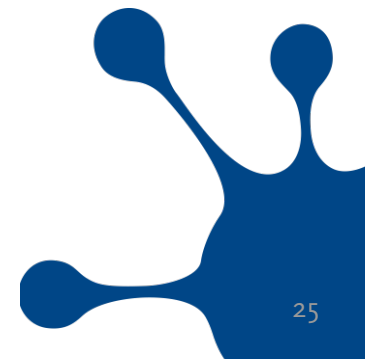
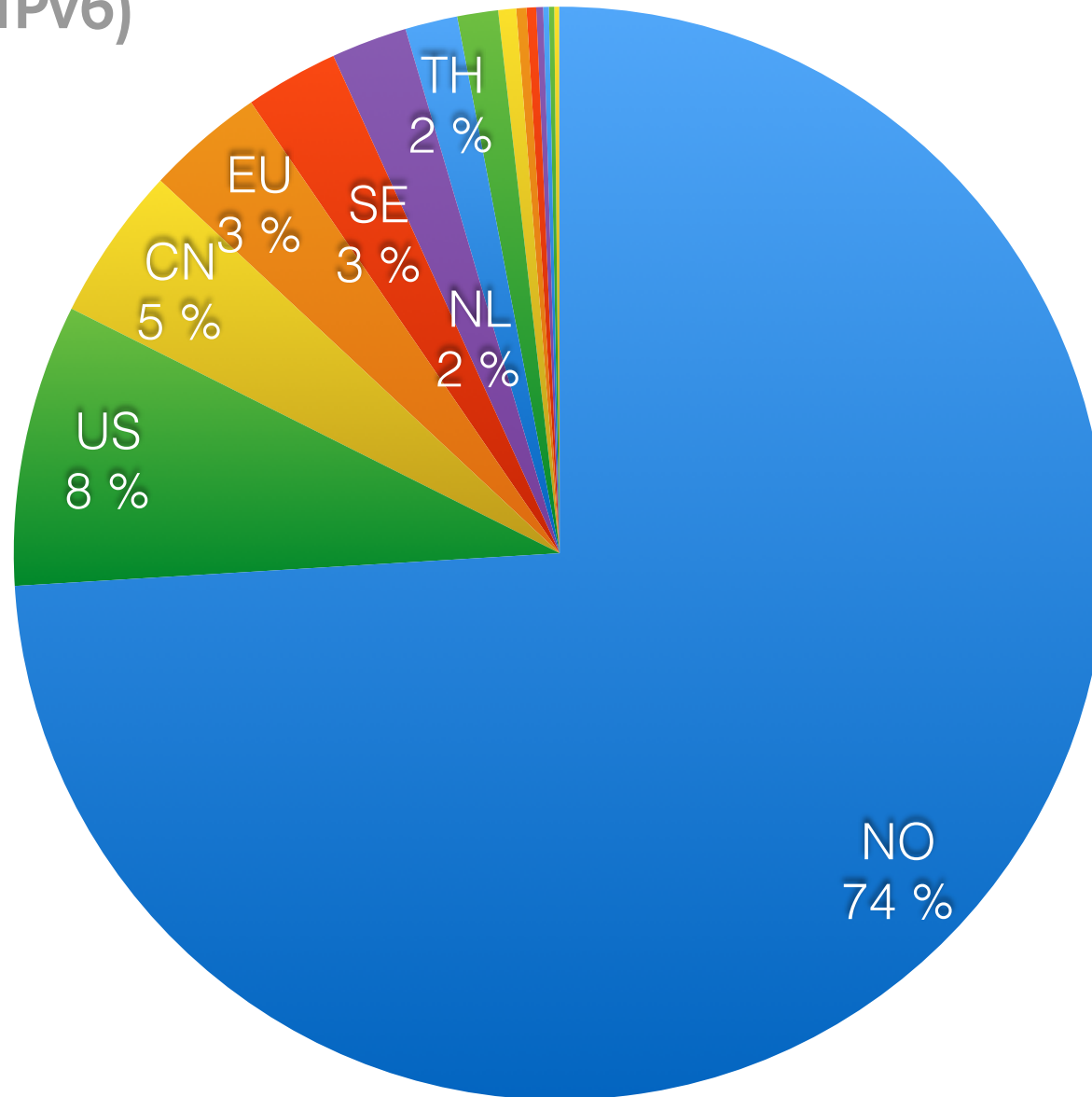


# Oslo - NIX

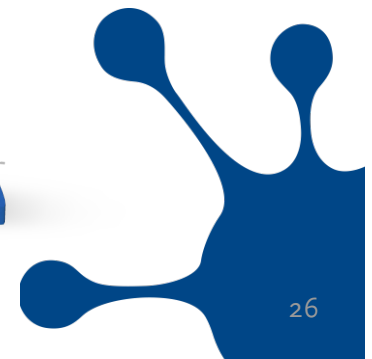
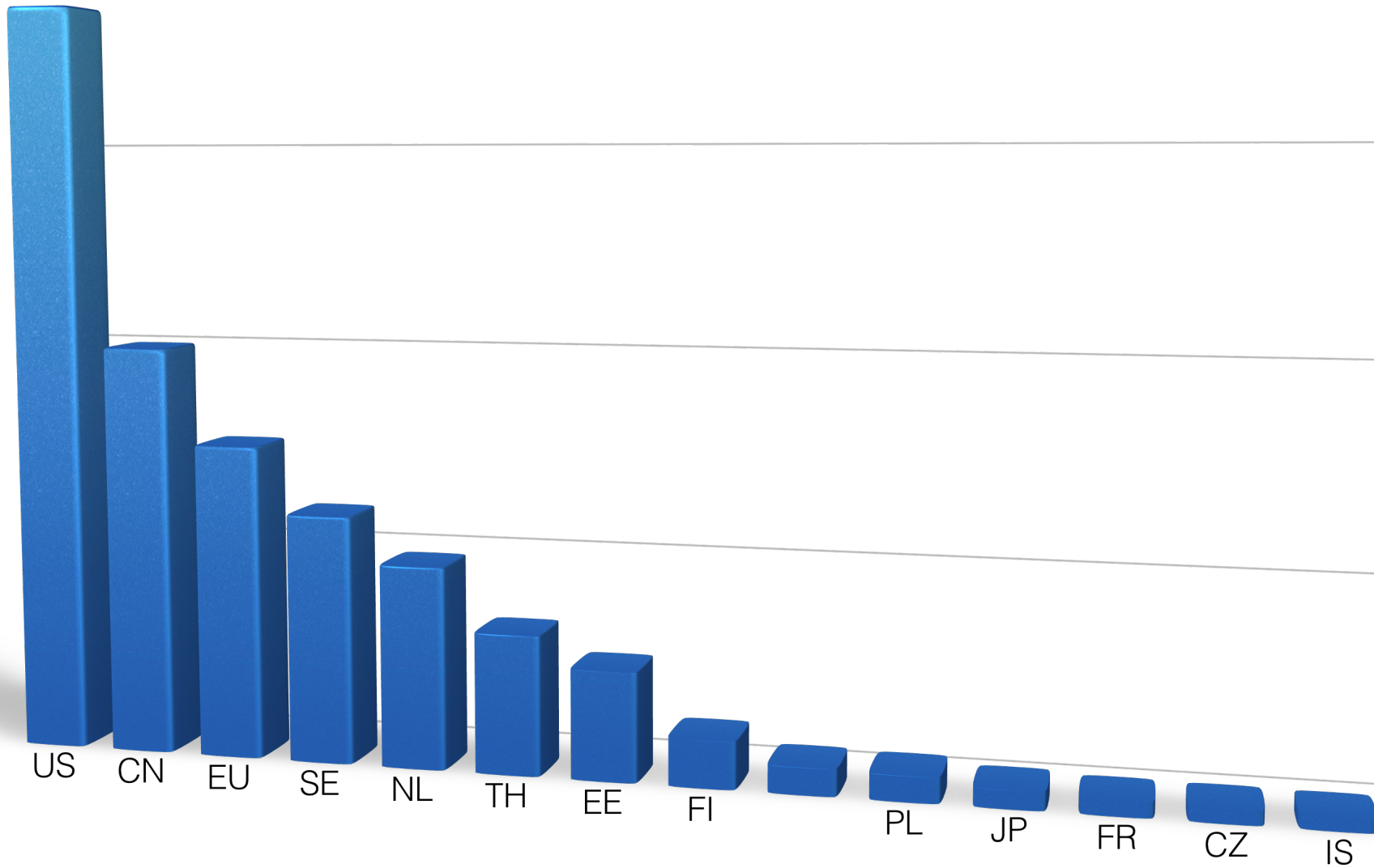




# Oslo - NIX (IPv6)



# Oslo - NIX (IPv6) Without NO



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**Netnod**

**[paf@netnod.se](mailto:paf@netnod.se)**

