RIPE NCC
RIPE NETWORK COORDINATION CENTRE

Update on the Why and How of IPv6 Deployment

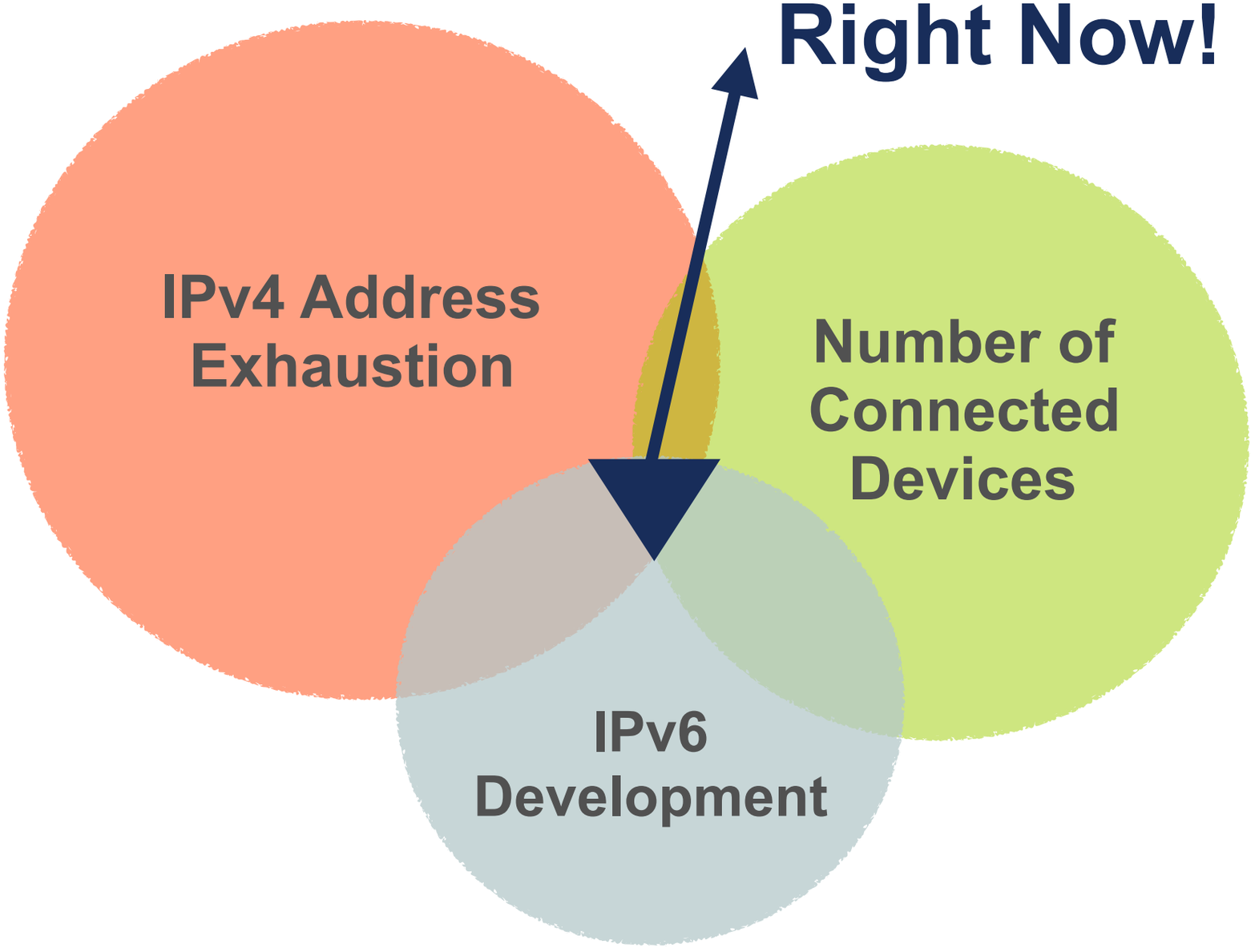
Alvaro Vives | 12 October 2016 | RONOG 3 / ION

About the RIPE NCC

- Main task: Managing Internet Numeric Resources (ASNs and IPs) in our region
- Maintain the RIPE database, and in general work for the good of the Internet
- Independent, not-for-profit, bottom-up membership organisation

Why IPv6?

IPv6 Is Happening Right Now!

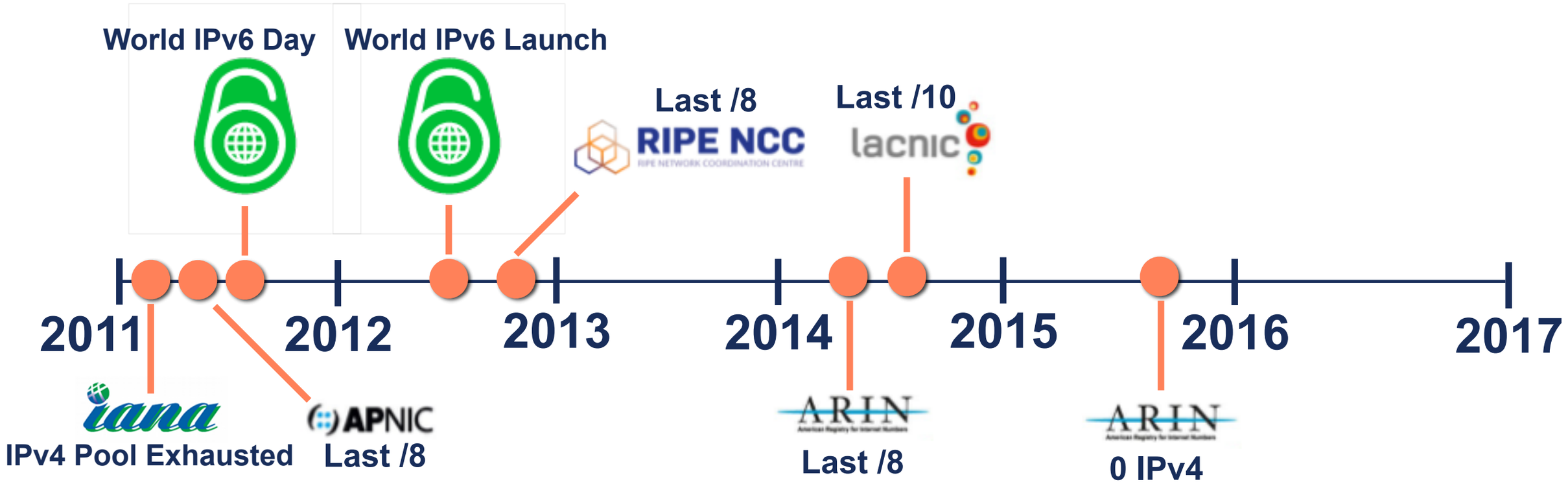


How: Things to take into account (1)

- Happening at **different speeds**:
  - Fixed vs. mobile
  - Region / Country
  - Type of network / business
  - Vendors (HW & SW)
- **Different ways of measuring**
  - Addresses & BGP
  - DNS & Availability of the services
  - IPv6 traffic on networks, IXPs or CDNs
  - IPv6 capable clients

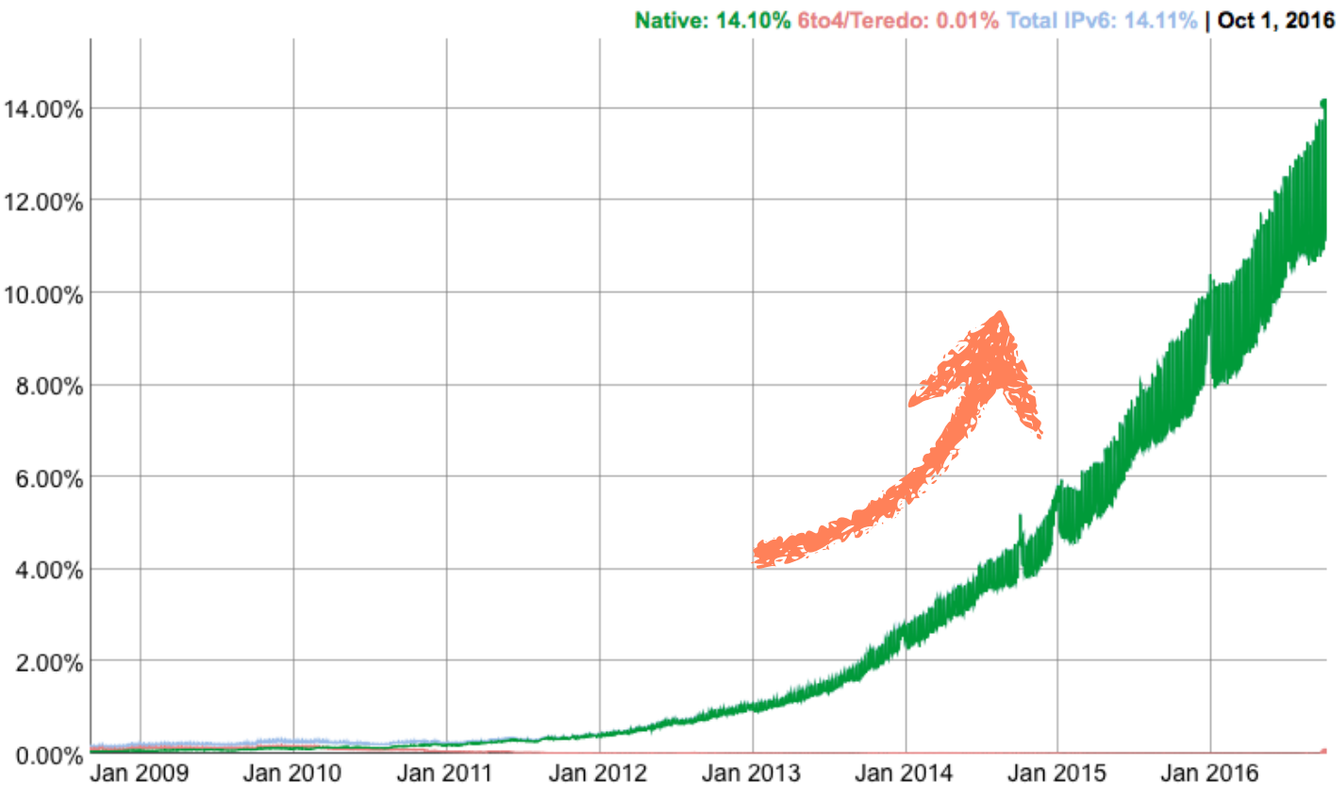
How: Things to take into account (2)

- Monitor values in time
- Compare with IPv4
- Correlation with specific events

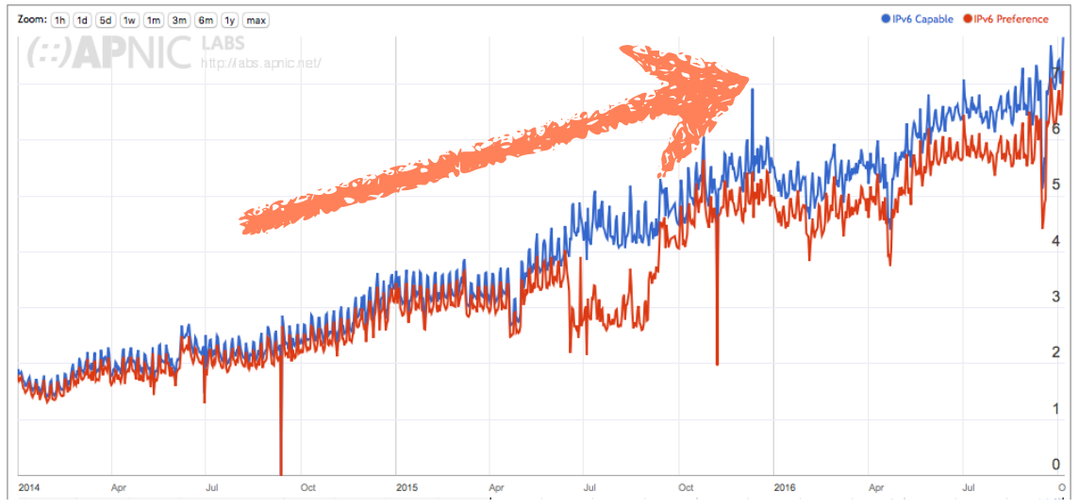


How: Globally (1)

- Overall growth is pretty high

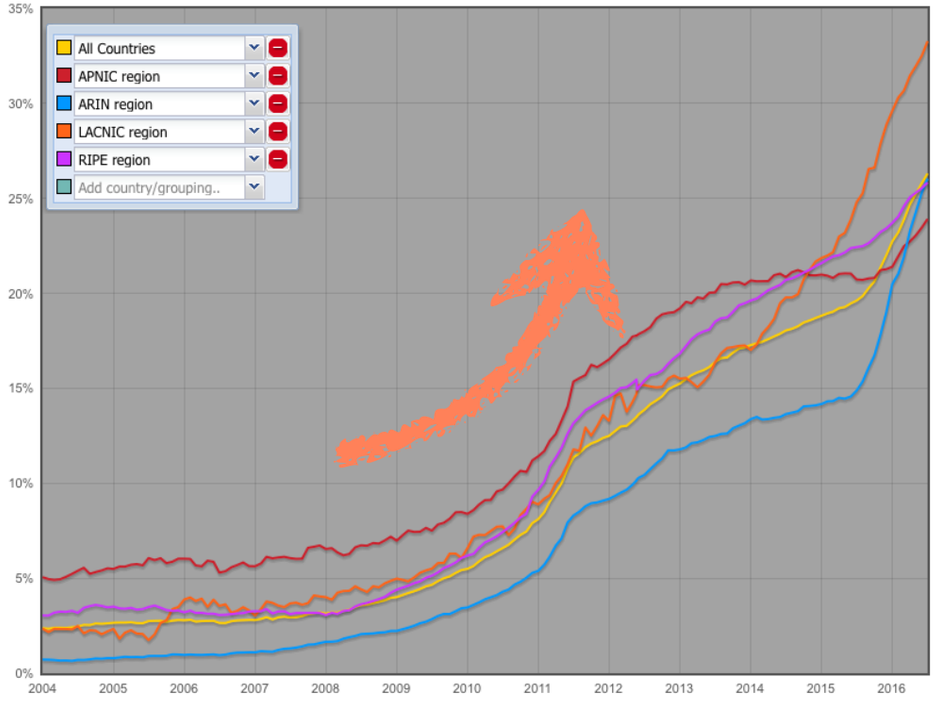


http://www.google.com/ipv6/



Region	IPv6 Capable	IPv6 Preferred	Samples
World	6.65%	5.91%	615,410,692

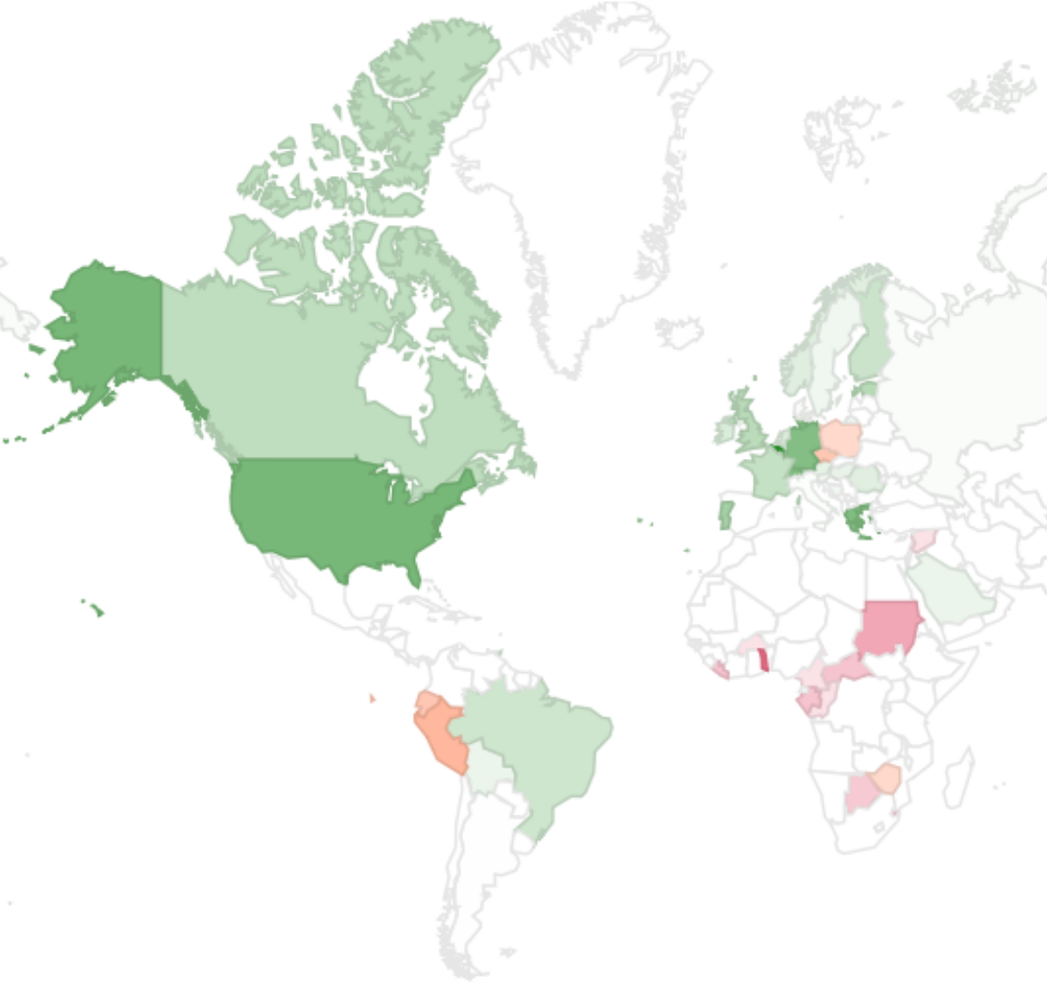
http://stats.labs.apnic.net/ipv6

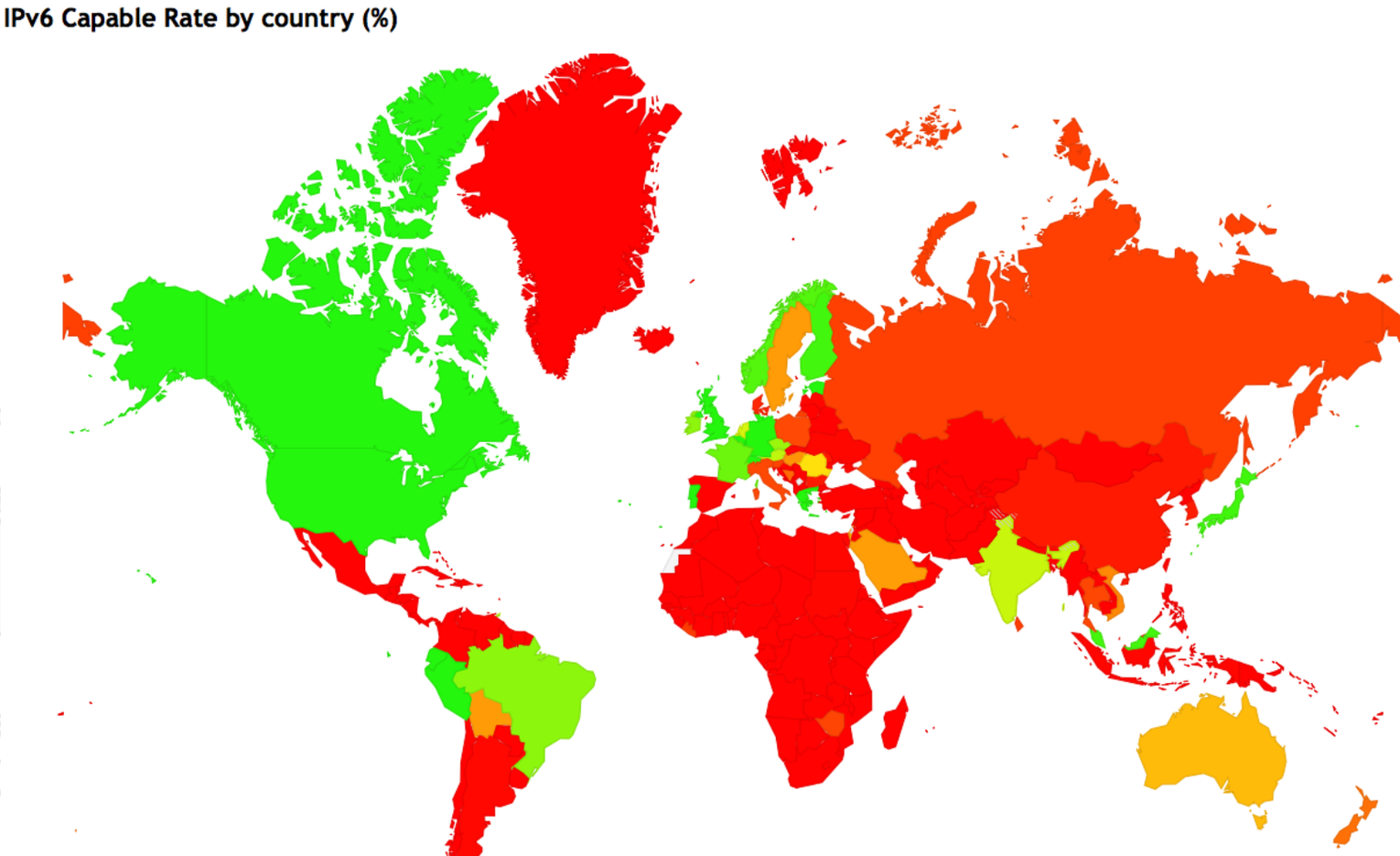


http://v6asns.ripe.net

How: Globally (2)

- But if we see it by region/country…





Region	IPv6 Capable	IPv6 Preferred	Samples
World	6.65%	5.91%	615,410,692
Americas	17.86%	16.51%	121,285,400
Europe	10.66%	10.06%	97,257,768
Oceania	6.38%	5.93%	4,932,773
Asia	2.61%	1.91%	327,539,874
Africa	0.04%	0.03%	64,394,682

www.google.com/ipv6/

http://stats.labs.apnic.net/ipv6

How: Europe (1)

- We have big differences between countries

Belgium
IPv6 Adoption: **46.56%**
Latency / impact: **10ms / 0.01%**

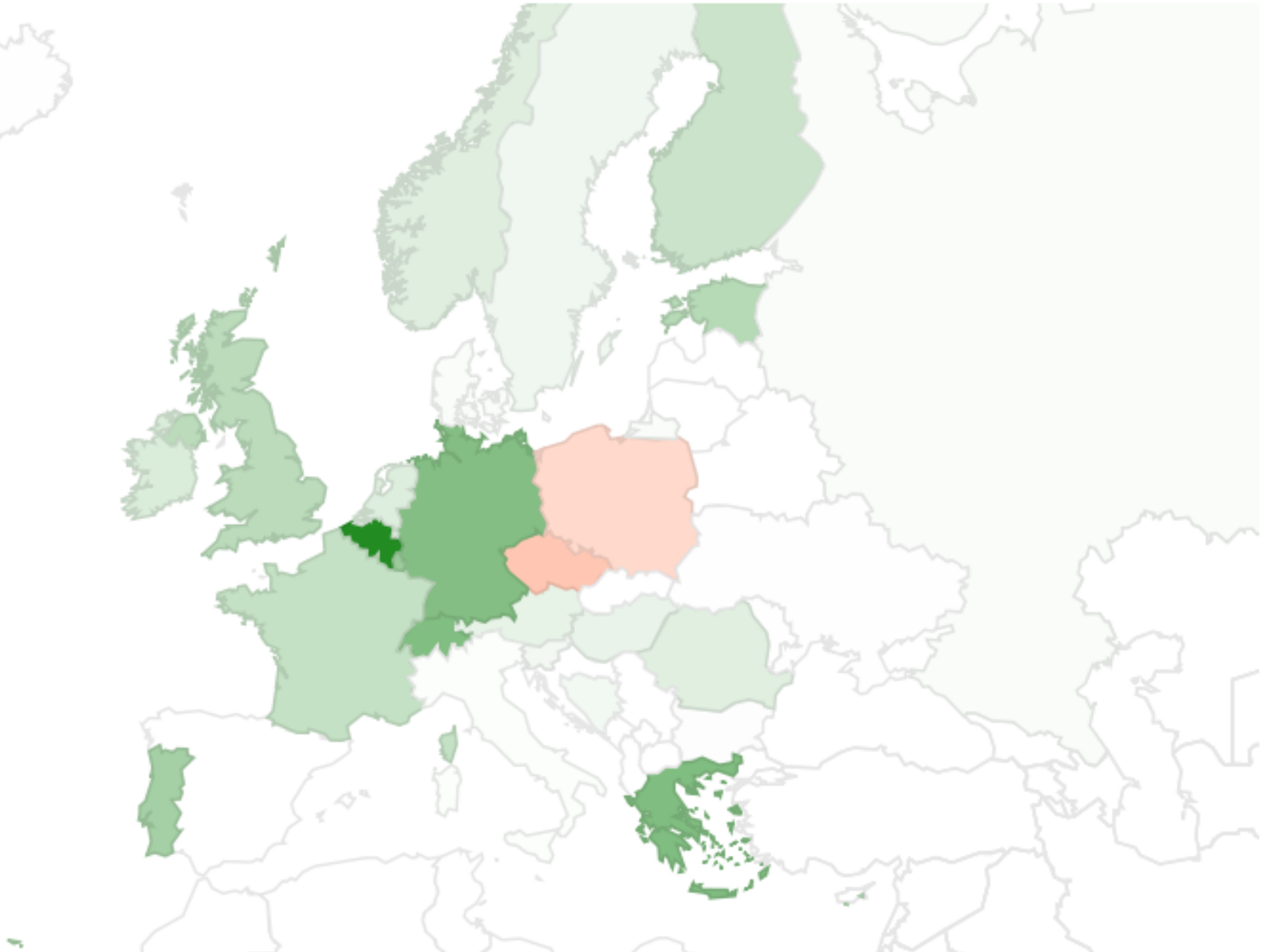
Greece
IPv6 Adoption: **26.61%**
Latency / impact: **-40ms / -0.01%**

Switzerland
IPv6 Adoption: **26.25%**
Latency / impact: **10ms / 0%**

Germany
IPv6 Adoption: **26.01%**
Latency / impact: **10ms / -0.01%**

Portugal
IPv6 Adoption: **18.87%**
Latency / impact: **0ms / -0.01%**

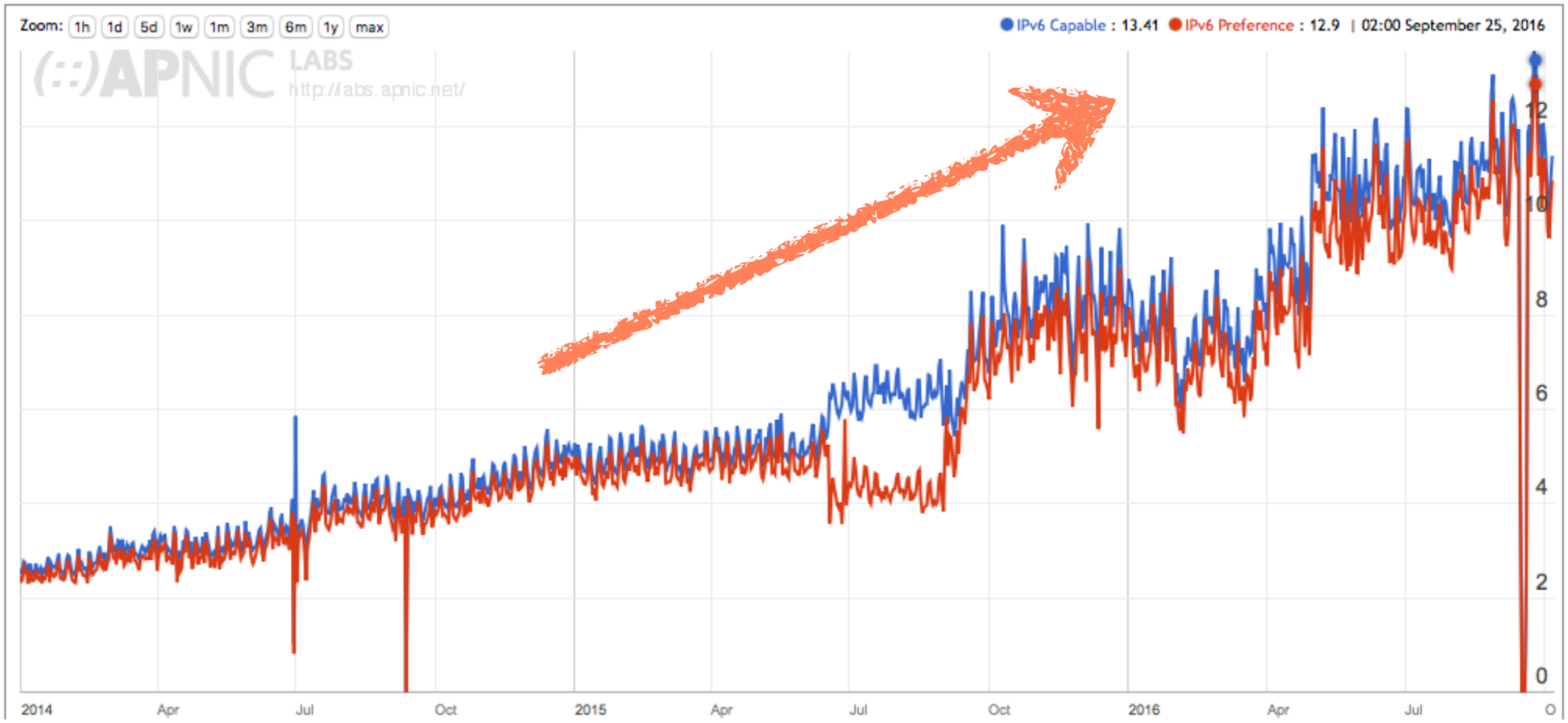
Romania
IPv6 Adoption: **6.4%**
Latency / impact: **-20ms / 0%**



www.google.com/ipv6/

How: Europe (2)

- There is a linear constant growth

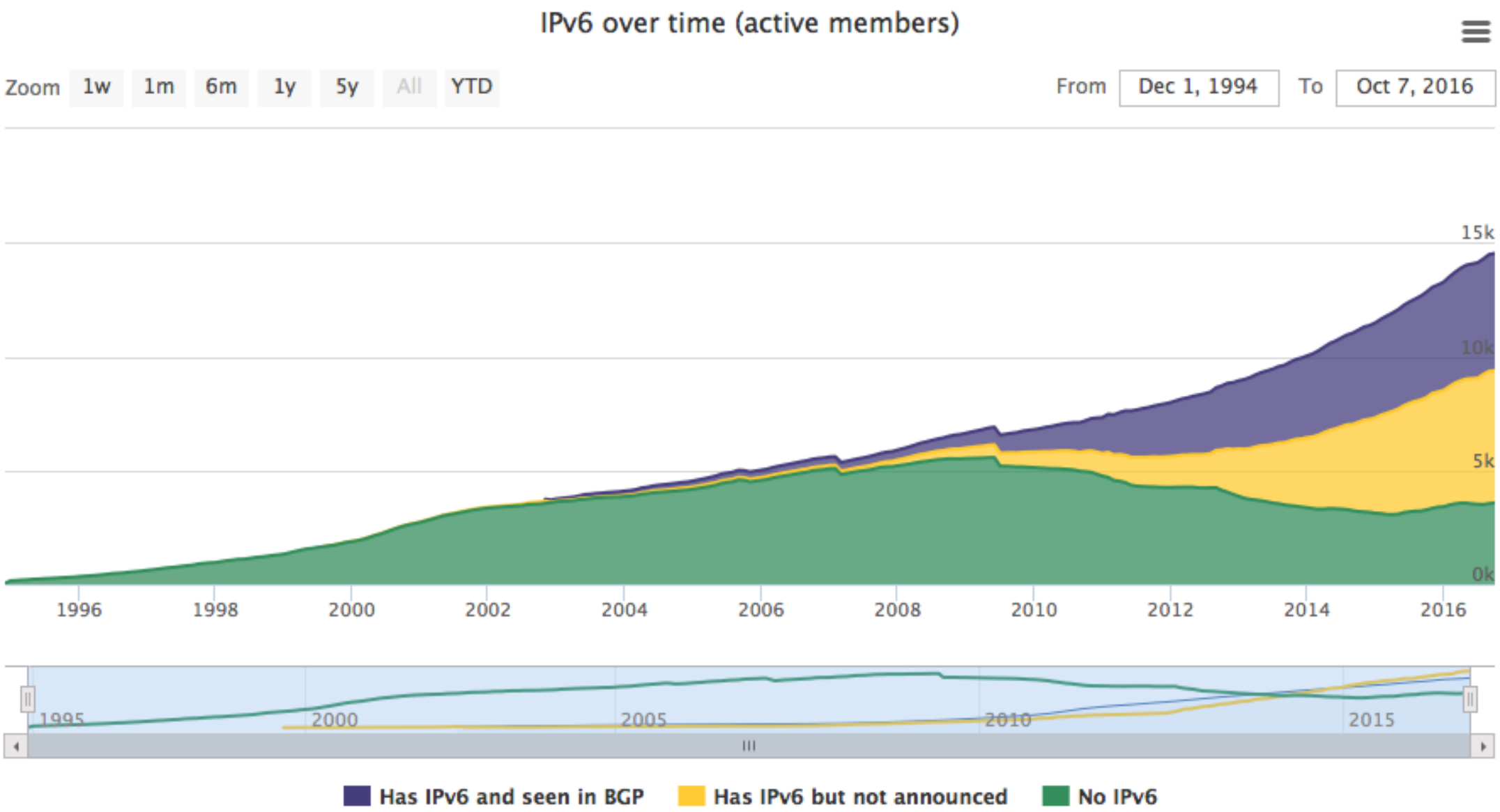


SubRegion	IPv6 Capable	IPv6 Preferred	Samples
Western Europe, Europe	21.39%	20.07%	30,273,956
Northern Europe, Europe	14.60%	13.80%	17,117,270
Southern Europe, Europe	3.74%	3.63%	18,115,080
Eastern Europe, Europe	2.25%	2.16%	31,751,323

http://stats.labs.apnic.net/ipv6

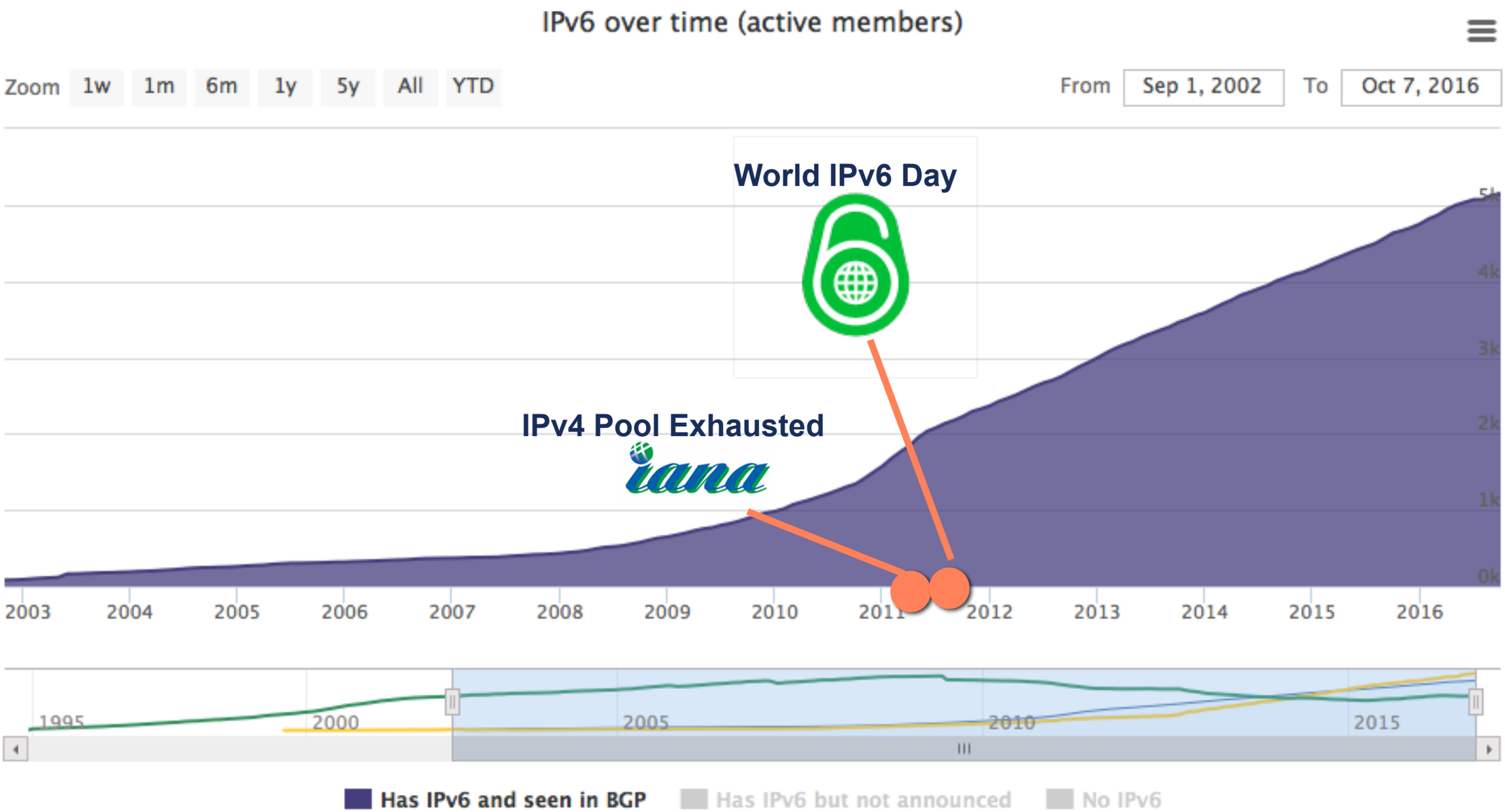
How: Europe (3)

- RIPE NCC LIR's: IPv6 resources



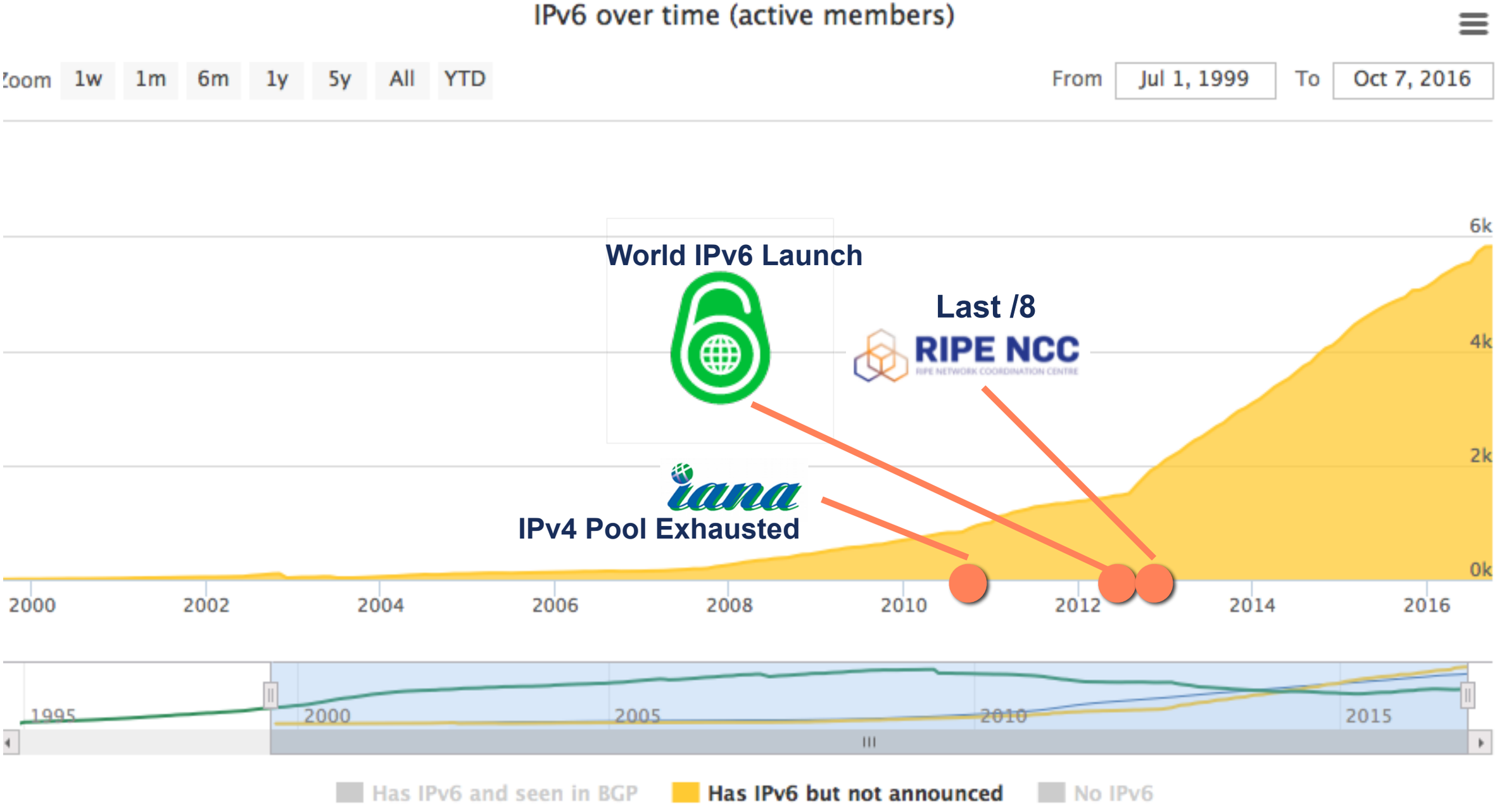
How: Europe (4)

- RIPE NCC LIR's: IPv6 + BGP



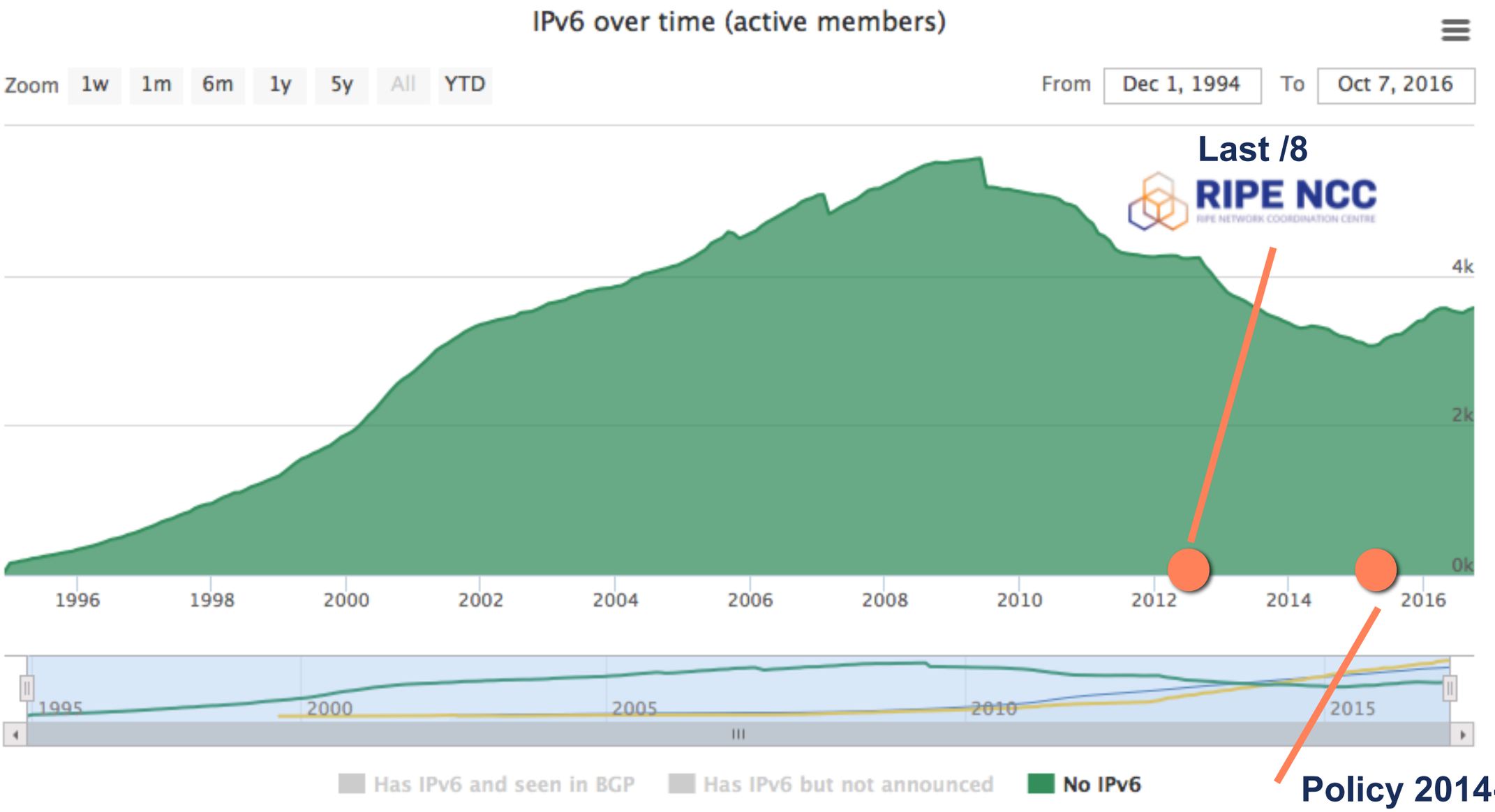
How: Europe (5)

- RIPE NCC LIR's: IPv6 + No BGP



How: Europe (6)

- RIPE NCC LIR's: No IPv6

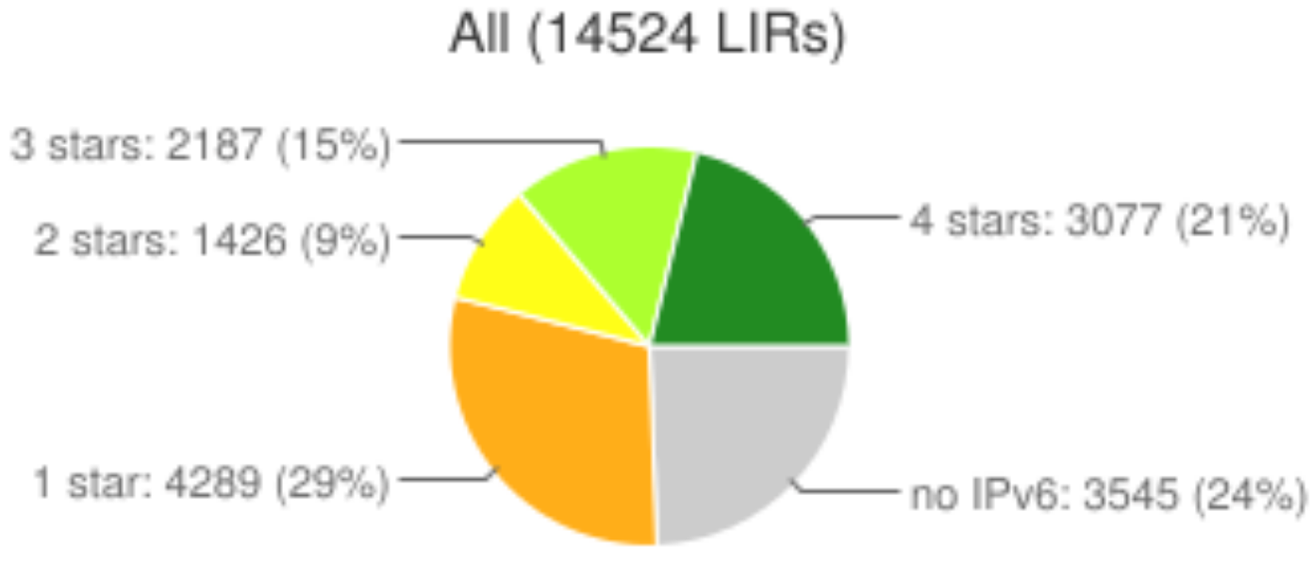


Removing IPv6 Requirement for Receiving Space from the Final /8

IPv6 RIPEness

- Rating system to measure early signs of IPv6 deployment
- 1 star if LIR has an IPv6 allocation
- 3 more stars possible if
  - Prefix is announced (visible in RIS)
  - Prefix is registered in routing registry (route6 object)
  - Reverse DNS is set up

http://ipv6ripeness.ripe.net



IPv6 RIPEness “5th Star”

- Measuring actual IPv6 deployment
  - **Content networks**: Percentage of IPv6-enabled Alexa 1M listed sites in that network, weighted by Alexa ranking
  - **Access networks**: Percentage of IPv6-enabled users from APNIC ads-measurements
  - Threshold for “5th star” has been doubled every year

Threshold	5th star LIRs
4%	7,8%
8%	6,8%
16%	5,6%
50%	3,2%

Current status at various thresholds

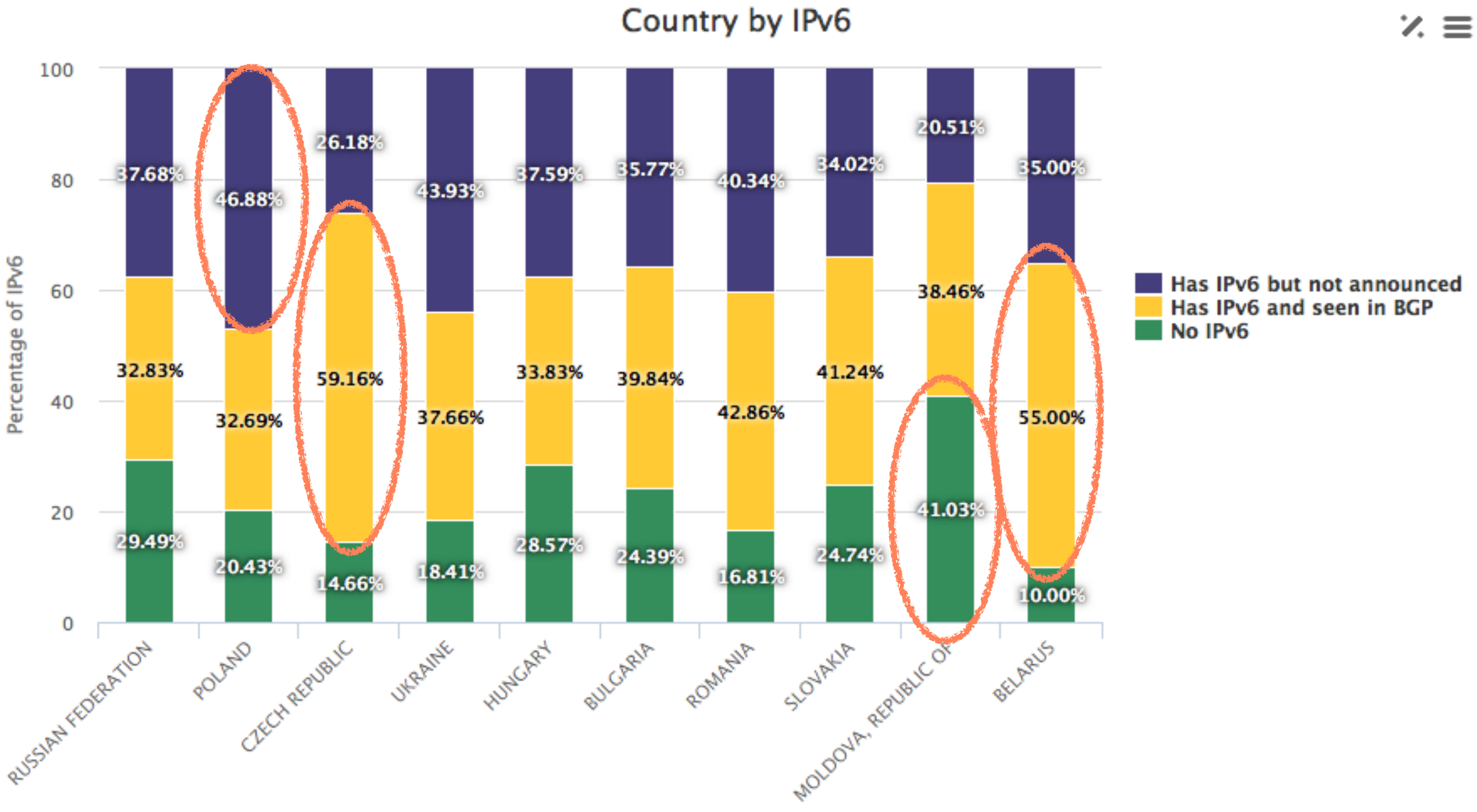
How: Eastern Europe & Romania (1)

Country	IPv6 Capable	IPv6 Preferred	Samples
Czech Republic, Eastern Europe, Europe	9.41%	8.41%	999,918
Romania, Eastern Europe, Europe	6.48%	6.23%	5,307,641
Hungary, Eastern Europe, Europe	4.72%	4.59%	1,316,546
Poland, Eastern Europe, Europe	2.06%	2.00%	4,002,904
Russian Federation, Eastern Europe, Europe	1.84%	1.79%	8,088,570
Bulgaria, Eastern Europe, Europe	0.73%	0.72%	5,621,249
Republic of Moldova, Eastern Europe, Europe	0.35%	0.33%	1,402,741
Slovakia, Eastern Europe, Europe	0.28%	0.23%	274,729
Ukraine, Eastern Europe, Europe	0.21%	0.20%	7,943,345
Belarus, Eastern Europe, Europe	0.00%	0.00%	1,645,598

http://stats.labs.apnic.net/ipv6

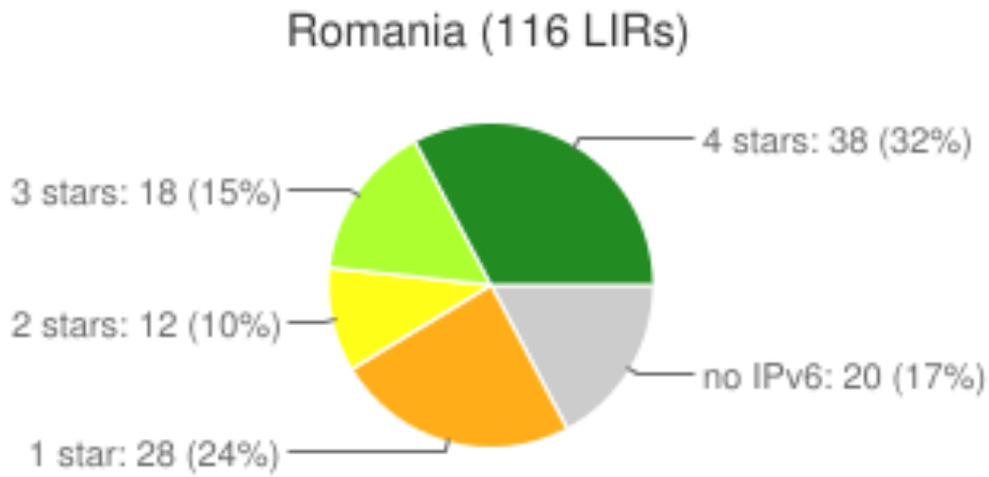
How: Eastern Europe & Romania (2)

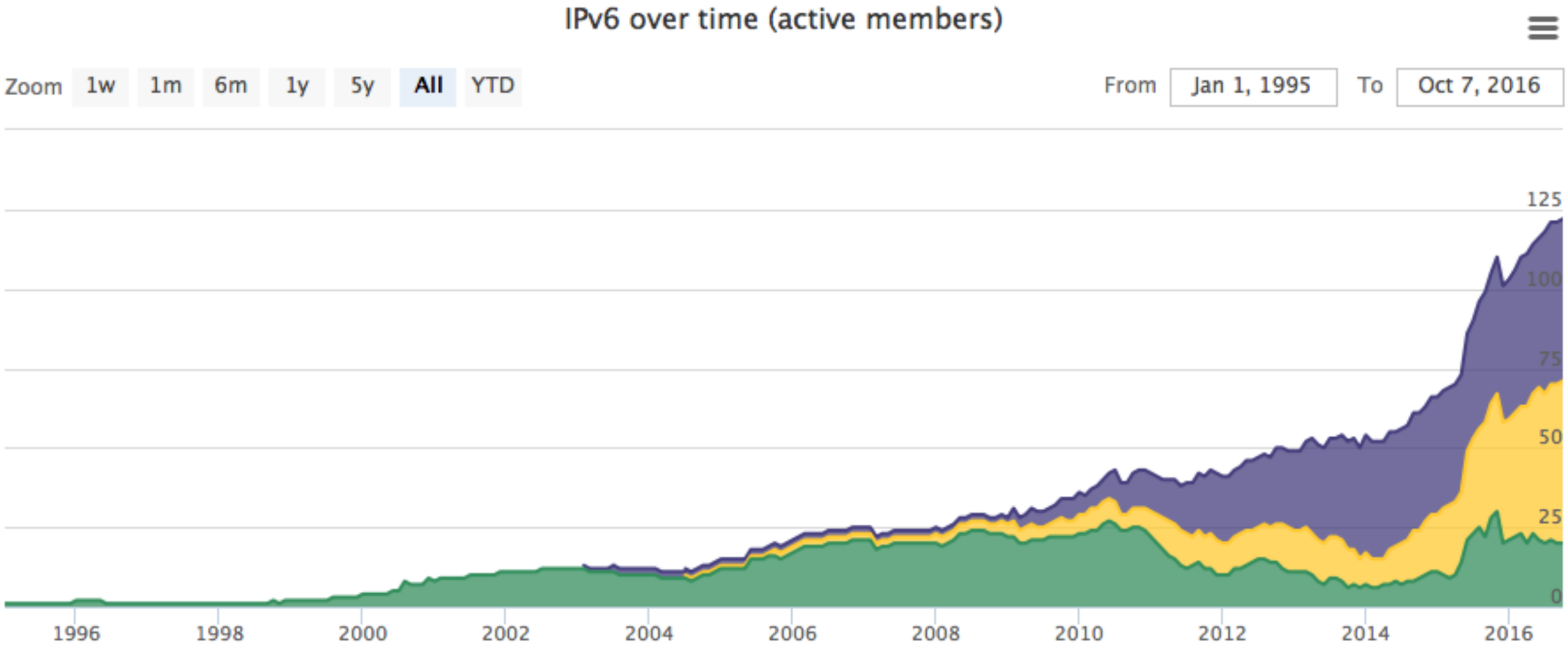
- If we look into RIPE NCC statistics



How: Romania (1)

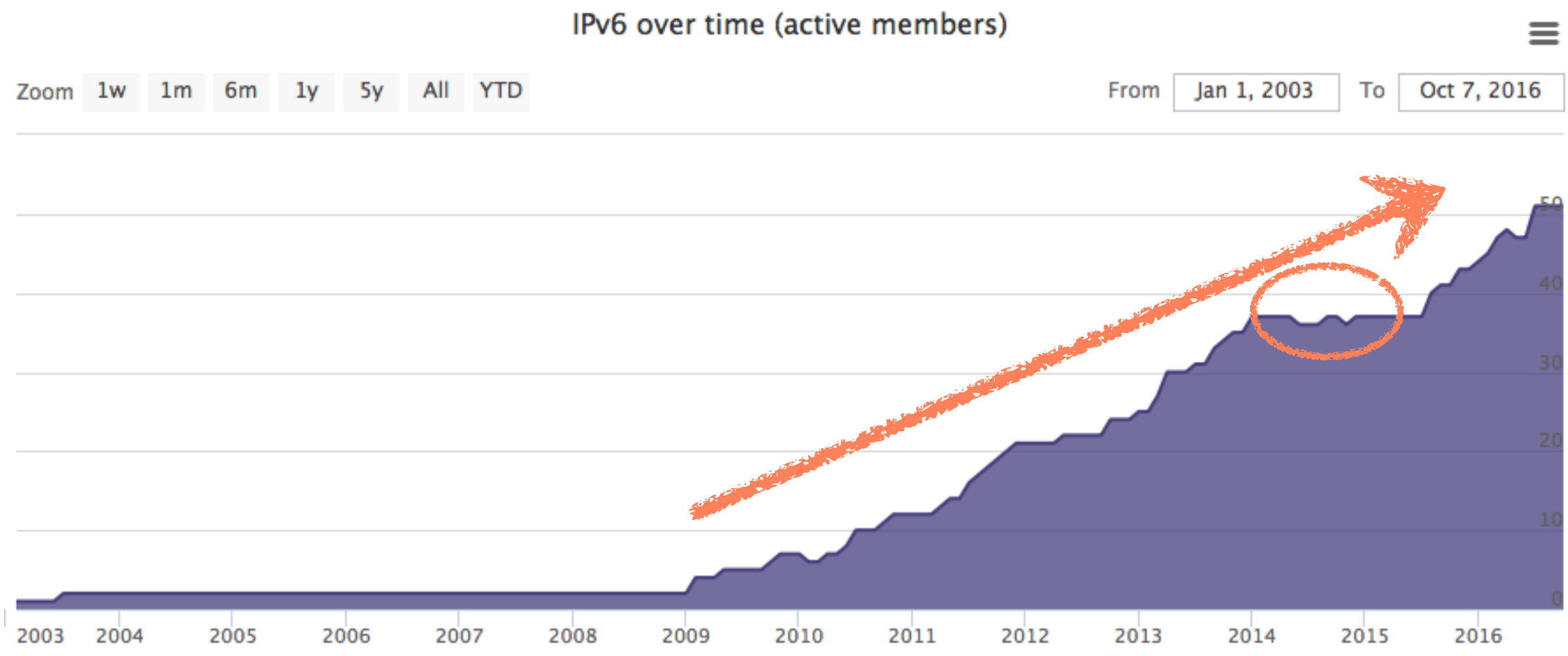
- RIPE NCC LIR - Romania





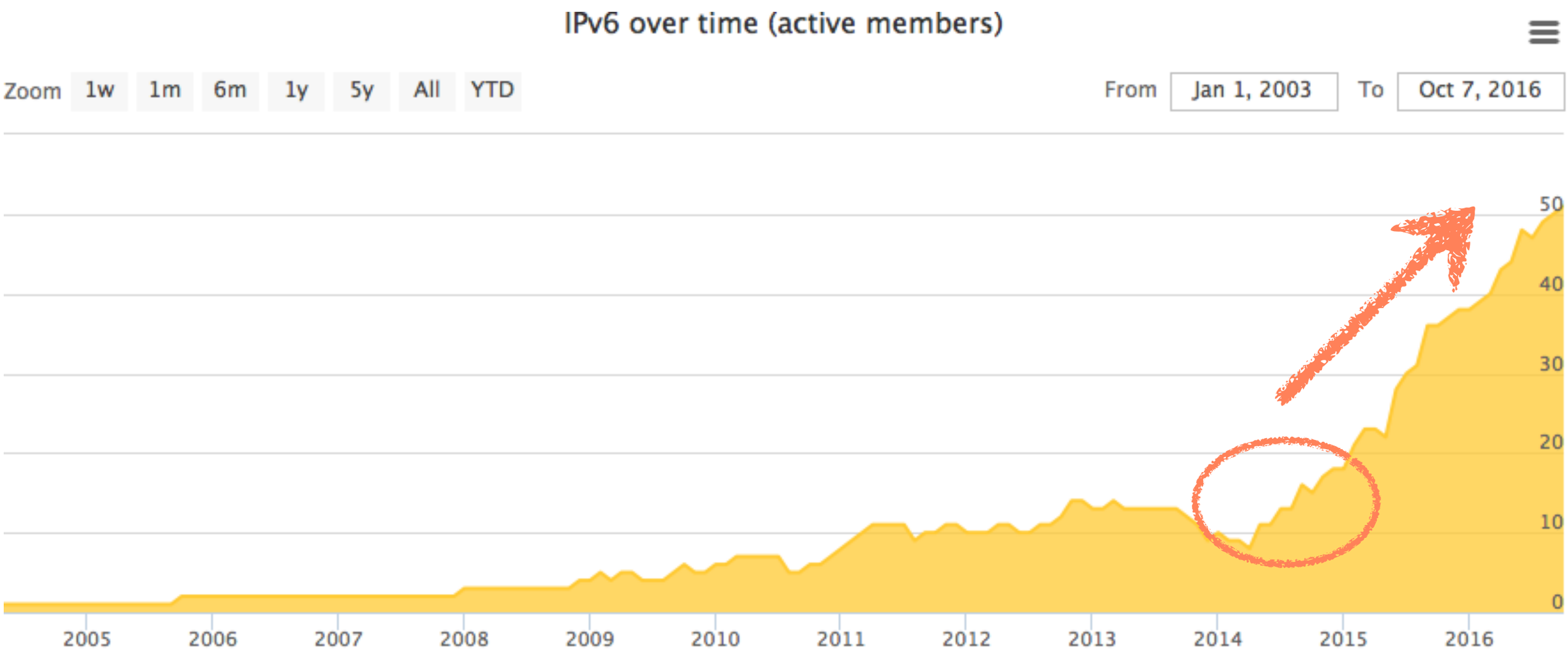
How: Romania (2)

- RIPE NCC LIR - Romania: IPv6 + BGP



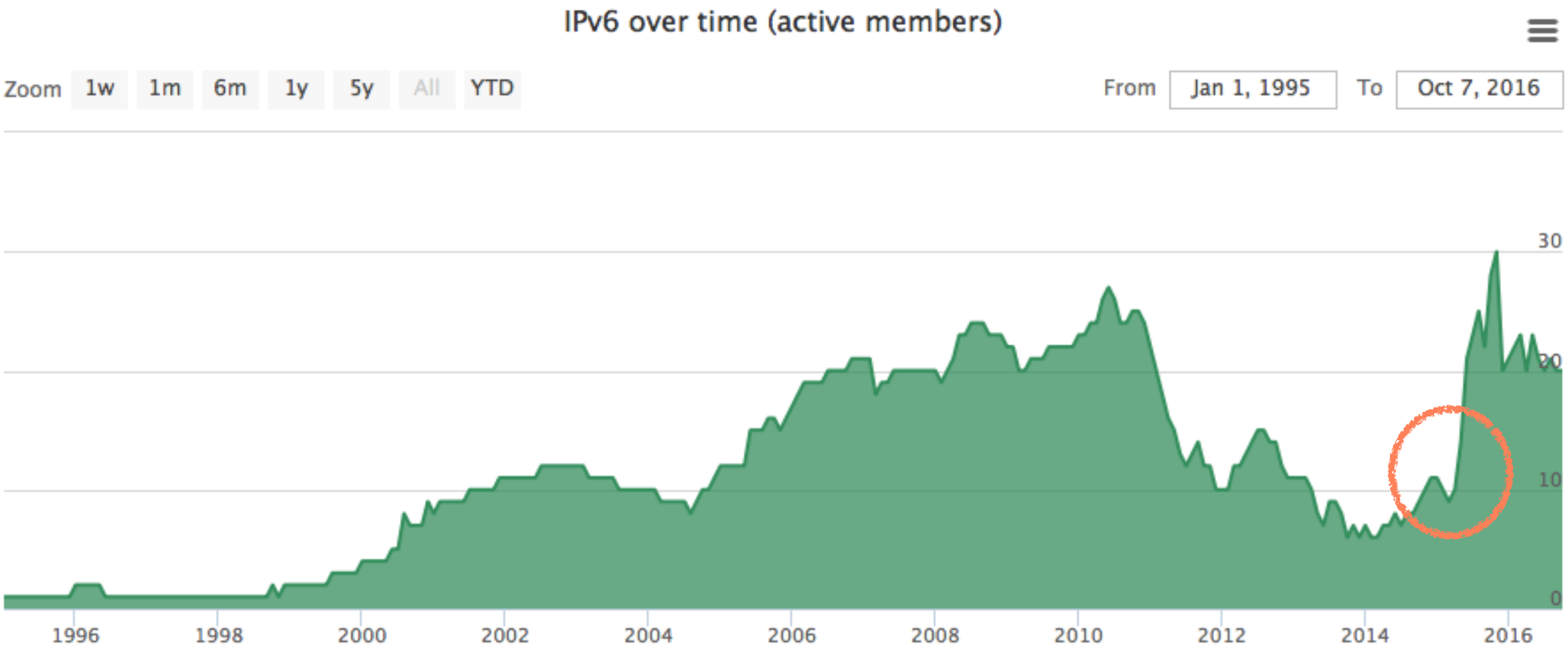
How: Romania (3)

- RIPE NCC LIR - Romania: IPv6 + No BGP

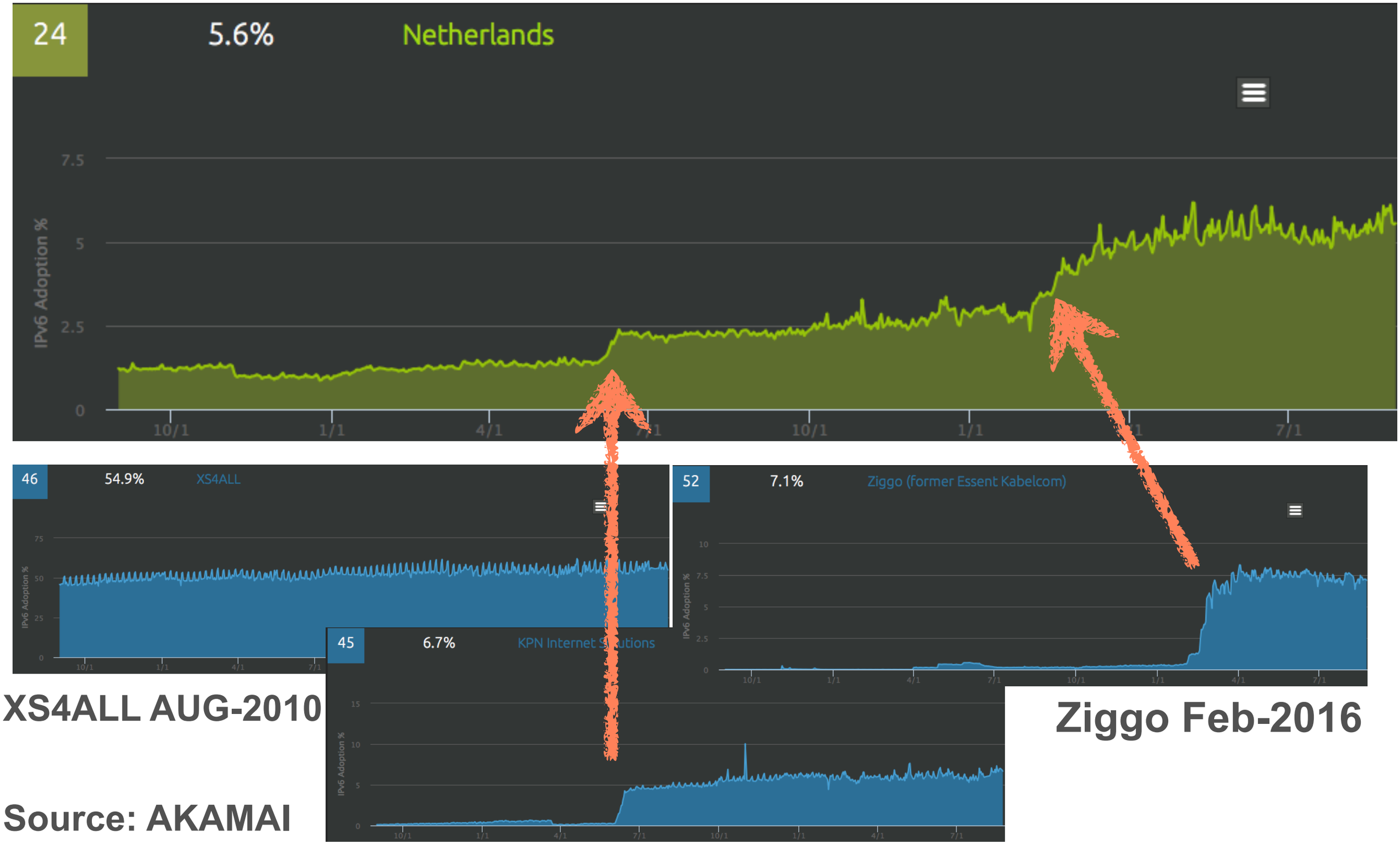


How: Romania (3)

- RIPE NCC LIR - Romania: No IPv6



What about YOU? (1)



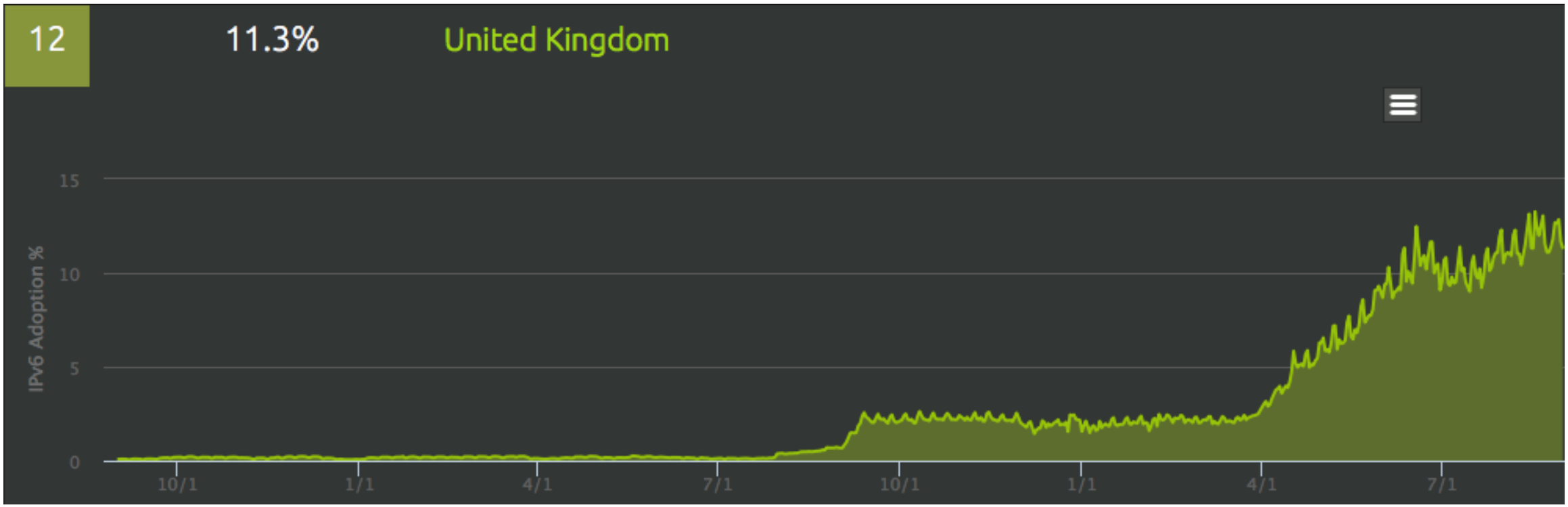
XS4ALL AUG-2010

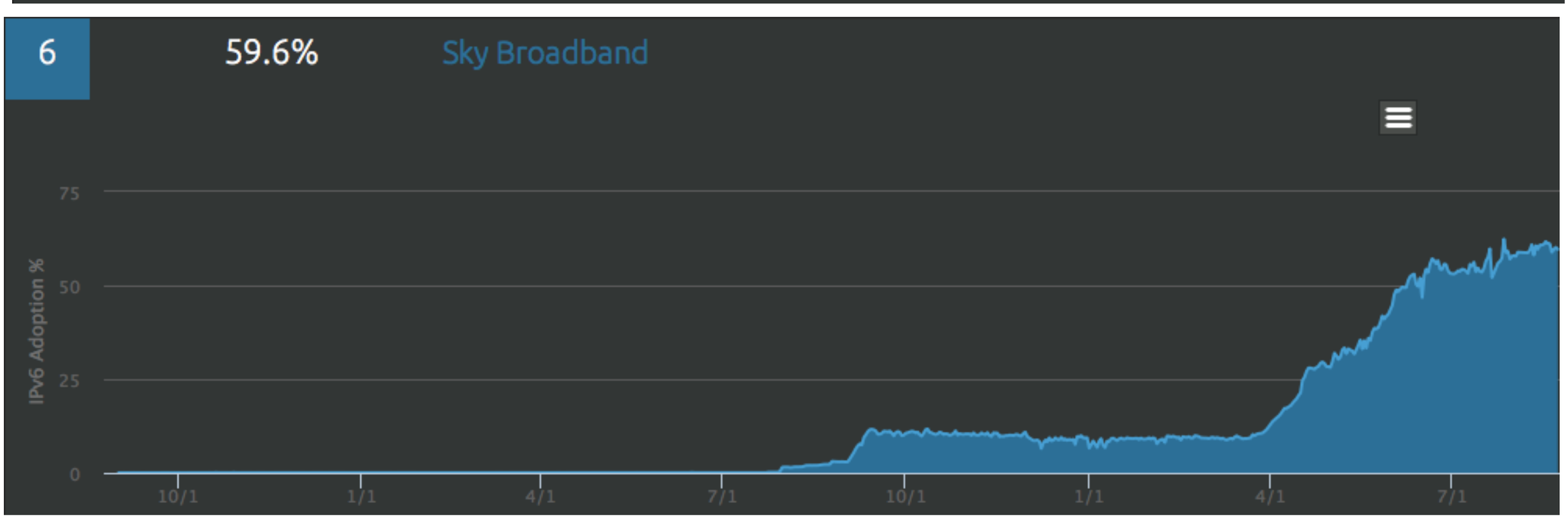
Ziggo Feb-2016

Source: AKAMAI

KPN Jun-2015

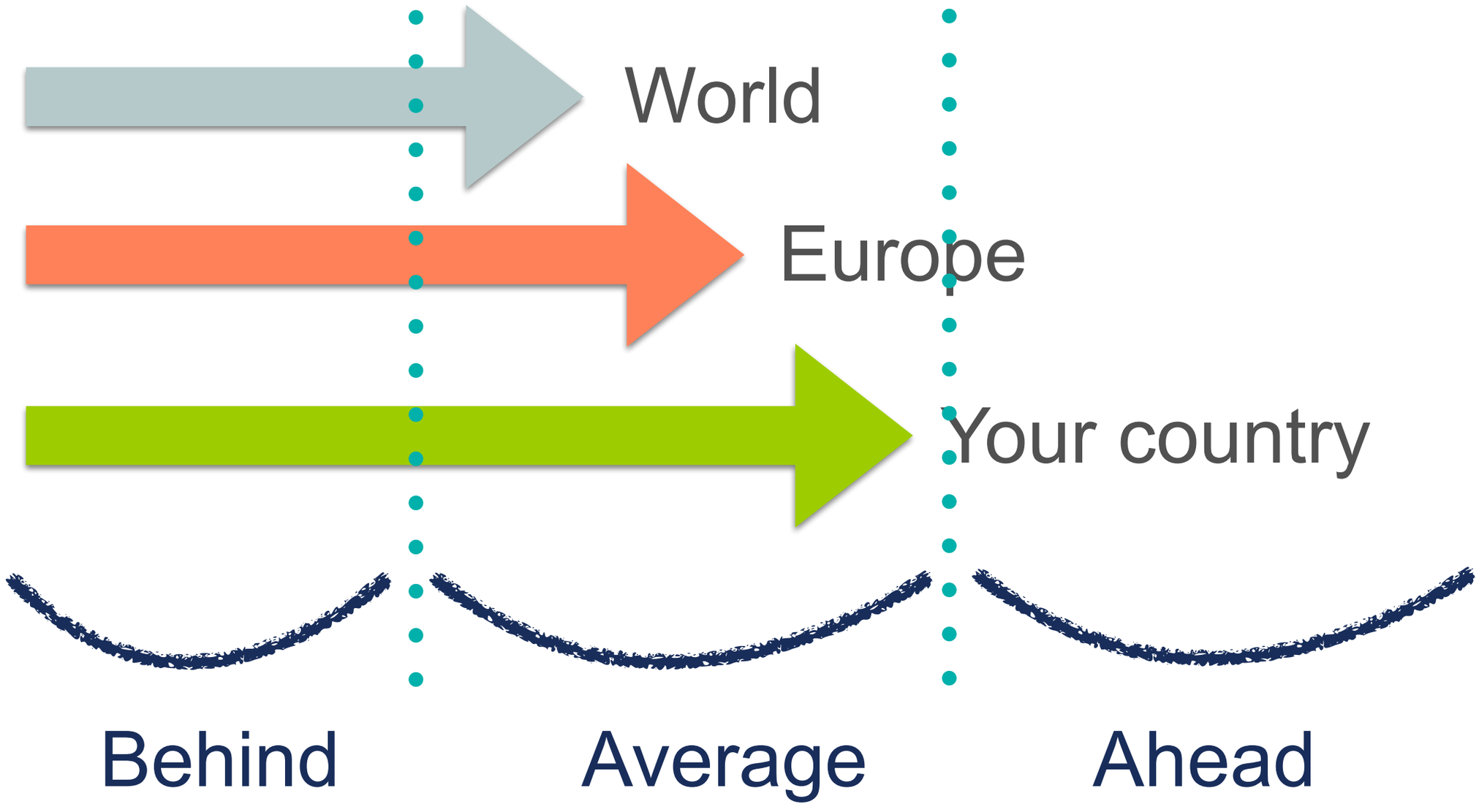
What about YOU? (2)





Source: AKAMAI **Mar-2016**

What about YOU? (3)



Summary

- IPv6 Adoption happening all around the world
- Different speeds

- You have to decide what to do about it
- Important IPv6 -> Urgent IPv6

References (1)

- APNIC IPv6 Stats: http://stats.labs.apnic.net/ipv6
- Google IPv6 Stats: www.google.com/ipv6/
- RIPEness: http://ipv6ripeness.ripe.net
- RIPE NCC - IPv6 Enabled Networks: http://v6asns.ripe.net
- RIPE NCC Statistics: https://labs.ripe.net/statistics/?tags=ipv6

References (2)

- IPv6 Deployment Aggregated Status (IPv6 networks): https://www.vyncke.org/ipv6status/prefixes.php
- AKAMAI - IPv6 Adoption Visualisation: https://www.akamai.com/us/en/our-thinking/state-of-the-internet-report/state-of-the-internet-ipv6-adoption-visualization.jsp

Questions

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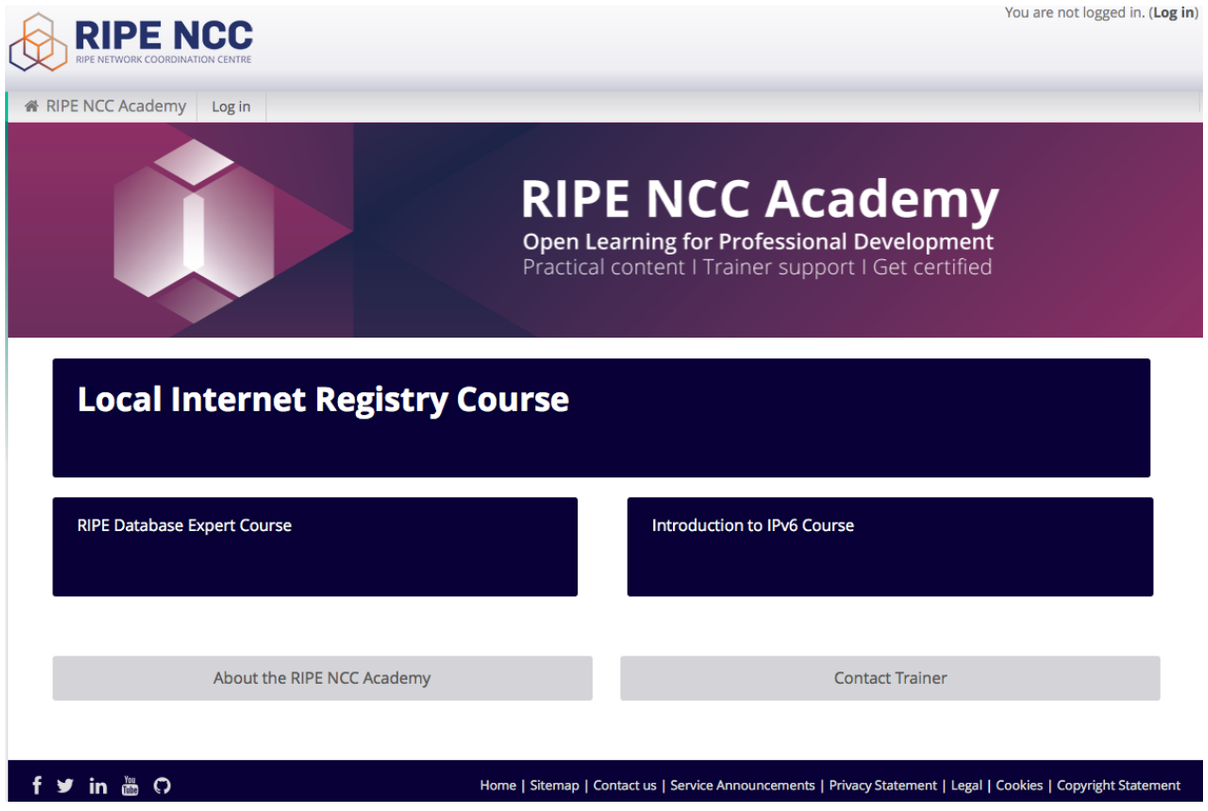
@TrainingRIPENCC

RIPE NCC Academy

- Virtual Learning Environment
- Follow online courses
- Certify your expertise



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