IPv6 Deployment Survey

Based on responses from the RIPE community during June 2009

Maarten Botterman

RIPE 59, Lisbon, 6 October 2009

Why IPv6 Deployment Monitoring?

- The Internet has become a fundamental infrastructure, worldwide, for economic and social activity, and its usage continues to grow exponentially:
    - More users
    - New applications (eg mobile, RFID etc)

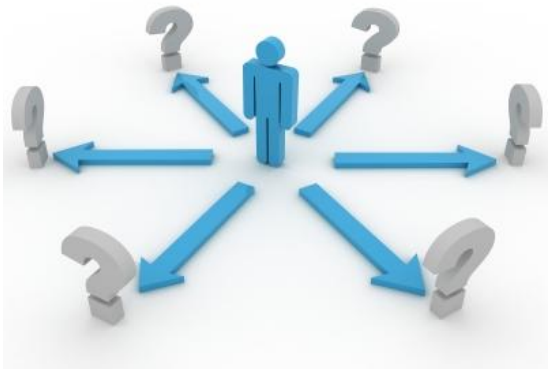
- The transition from IPv4 to IPv6 is the only sustainable option, in the long run.
- A smooth transition requires understanding the challenges, and a timely start.

European IPv6 Action Plan

May 2008

ADVANCING THE INTERNET: Action Plan for the deployment of Internet Protocol version 6 (IPv6) in Europe

- Preparing for the growth in Internet usage and for future innovation
- Maintaining Europe's competitiveness



- So … what can be done?

http://www.ipv6.eu/admin/bildbank/uploads/Documents/Commision/COM_.pdf

Basically, it's simple

- The European Commission and Europe's Member States are committed to support a smooth transition towards IPv6, for clear public interest reasons
- … and think a significant step should be done by 2010
  - Public sector procurement
  - Monitoring security and privacy implications

- Yet the IPv6 transition will be driven by the Internet community
  - Providers
  - Users

Therefore this proposition was made to the RIPE community

- *How about making sure the European Commission knows what could be done, usefully, to help ensure that smooth transition?*

  - Really understand the scope of the problem
  - Identify the bottlenecks
  - Propose useful steps to support the transition

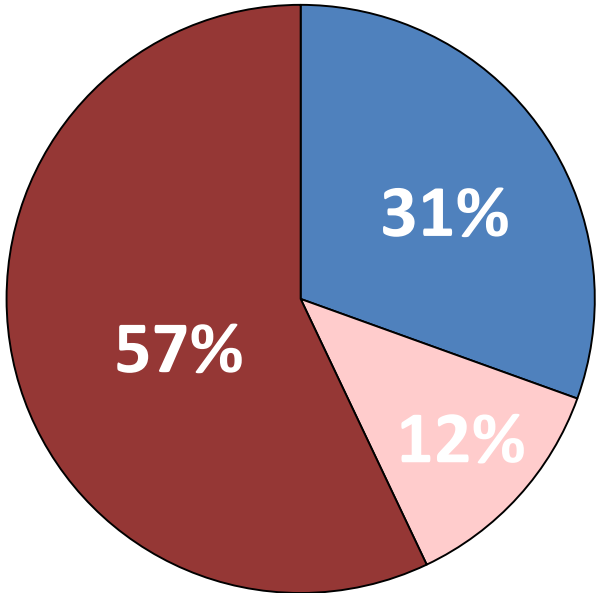
IPv6 Deployment Monitoring project: putting the facts on the table

- Measuring:
  - deployment in EU countries (% end users)
    These are source address based on passive measurements
  - availability (% IPv6 web-based services)
  - differences between IPv4 and IPv6 performance
    These are measurements on quality of service
- Information gathering:
  - Global sources
  - Key informant interviews
  - IPv6 Survey

What about the survey ?

- Aim is to establish the best possible comprehensive view of present IPv6 penetration and future plans of IPv6 deployment
- Best way to establish this is to ask the Internet providers and users, basically: the RIPE participants
- ARIN carried out such a survey with its members in March 2008, a starting point for the currently proposed survey
  - Survey was prepared and carried out by TNO/GNKS in close collaboration with RIPE NCC
  - Survey was kept short, and focused on essentials
  - Privacy is guaranteed
- APNIC carried out the same survey during September 2009
  - *courtesy of APNIC we are able to compare some of the results, already in this presentation!*

Response to questionnaire



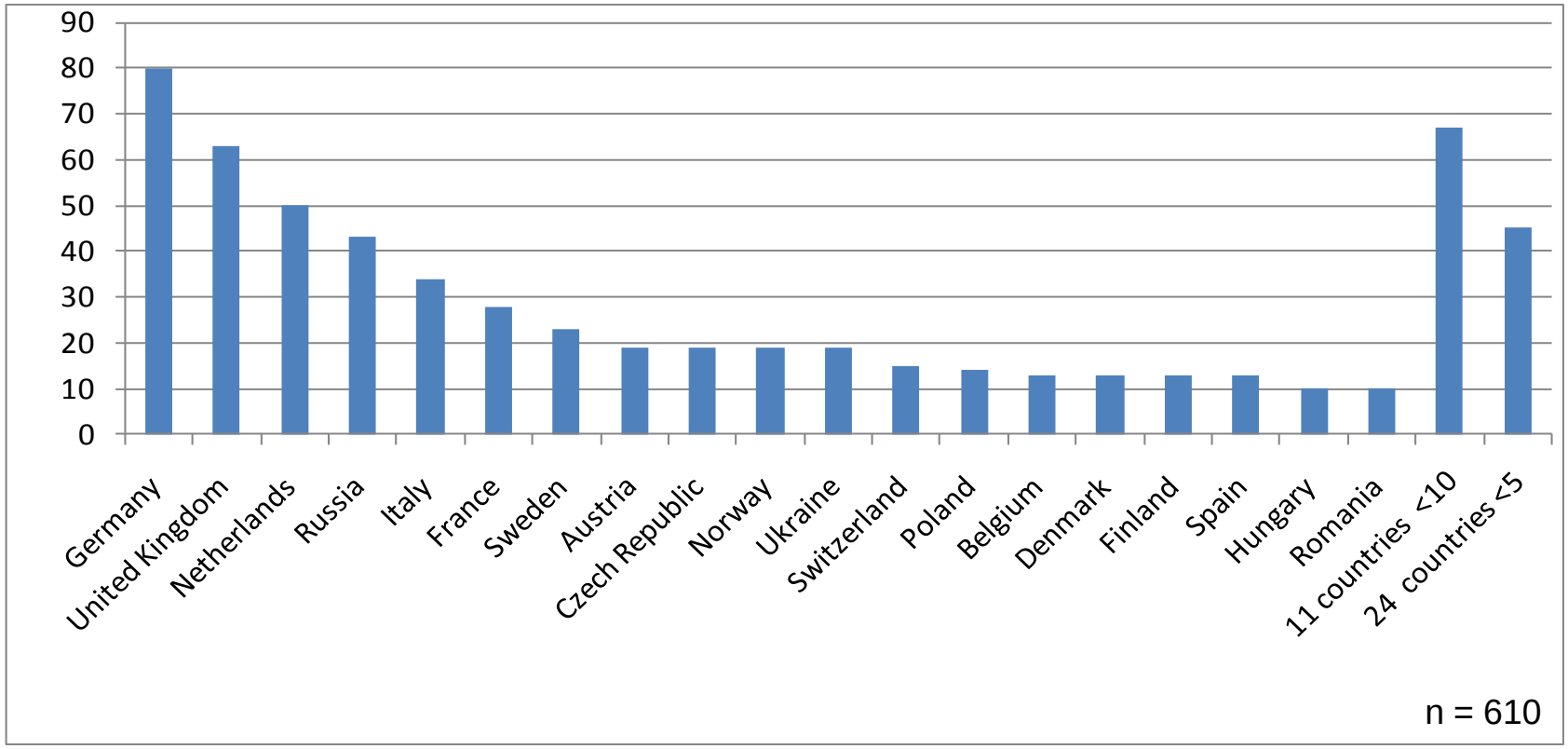
completed
partial
No attempt

n=2000

610 repondents from 54 countries

source: TNO/GNKS 2009

Geographic spread responses



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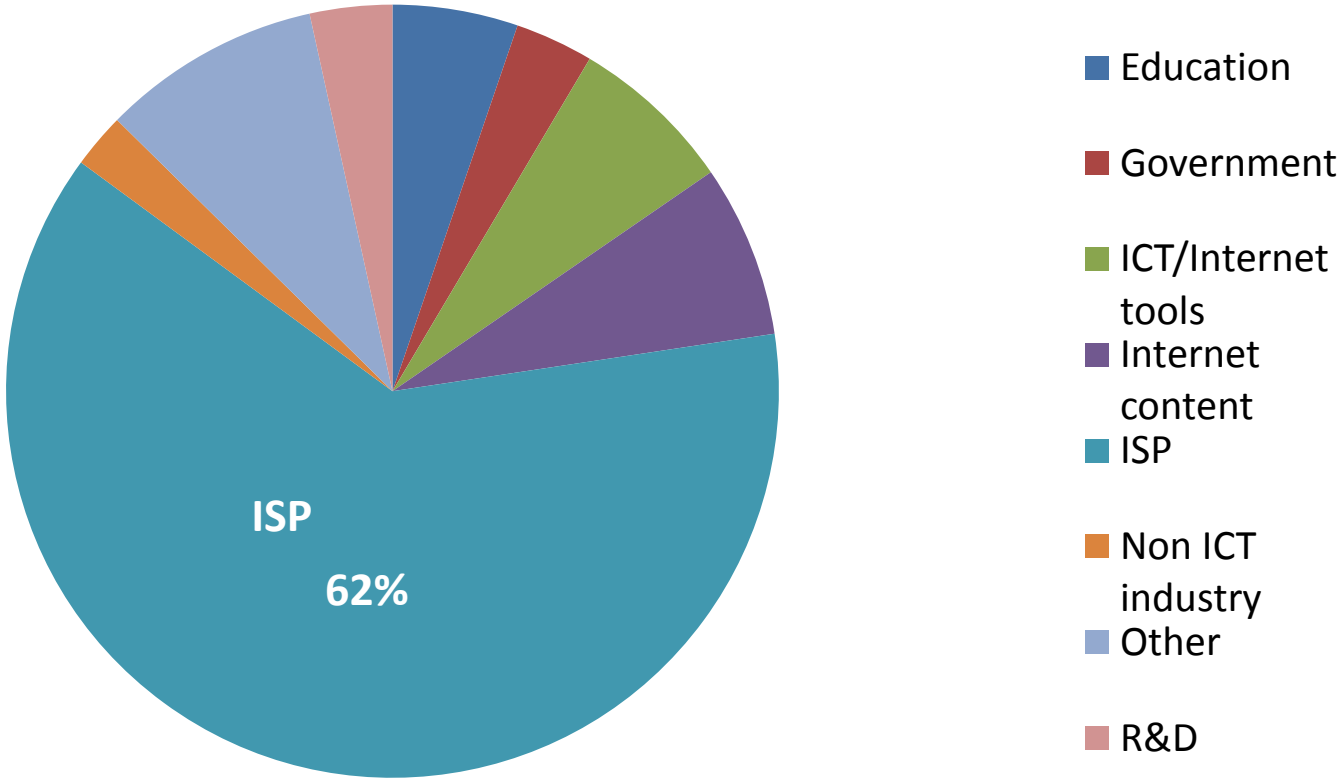
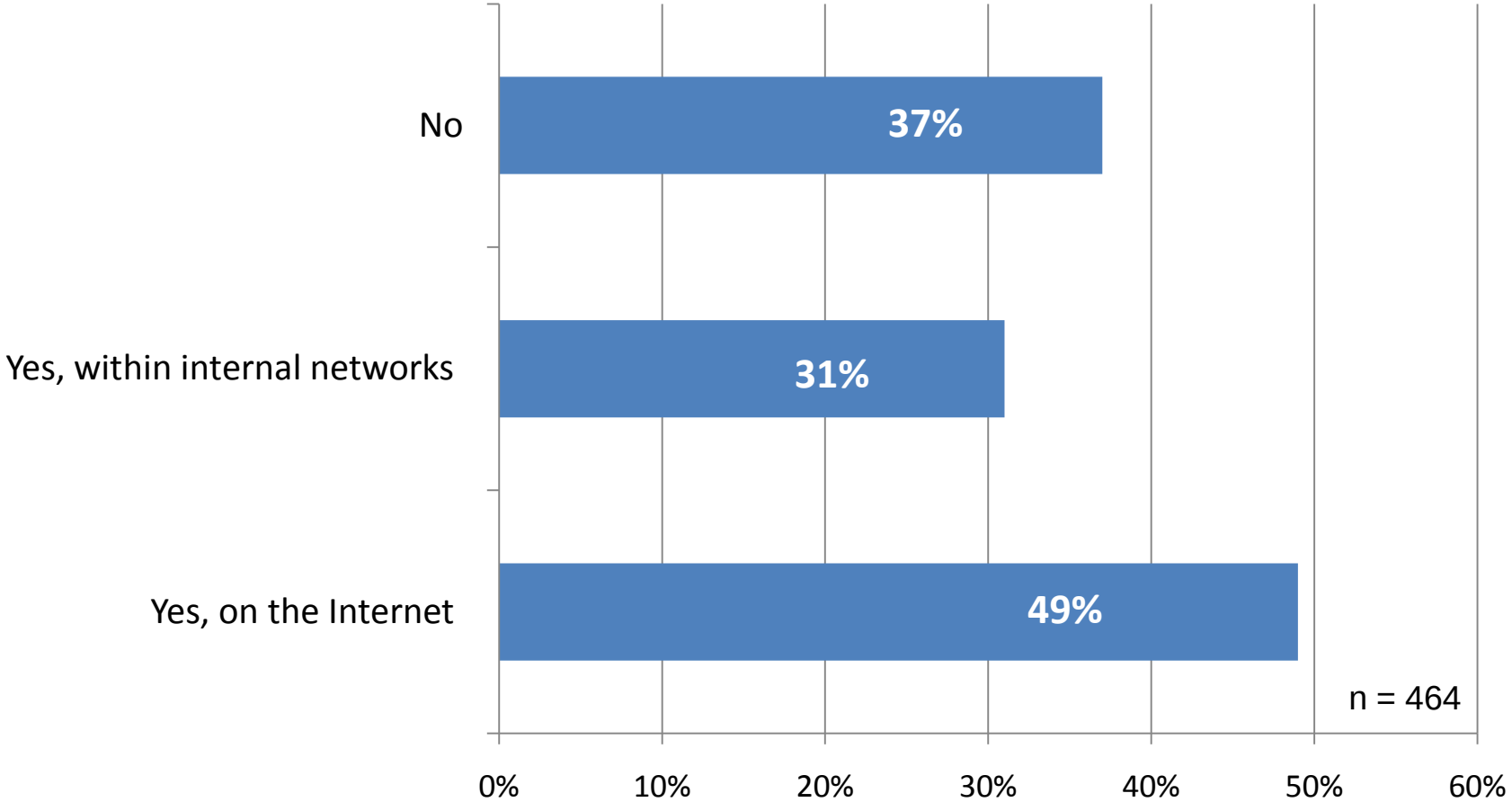
Respondent categories



n = 610

source: TNO/GNKS 2009

IPv6 presence respondents



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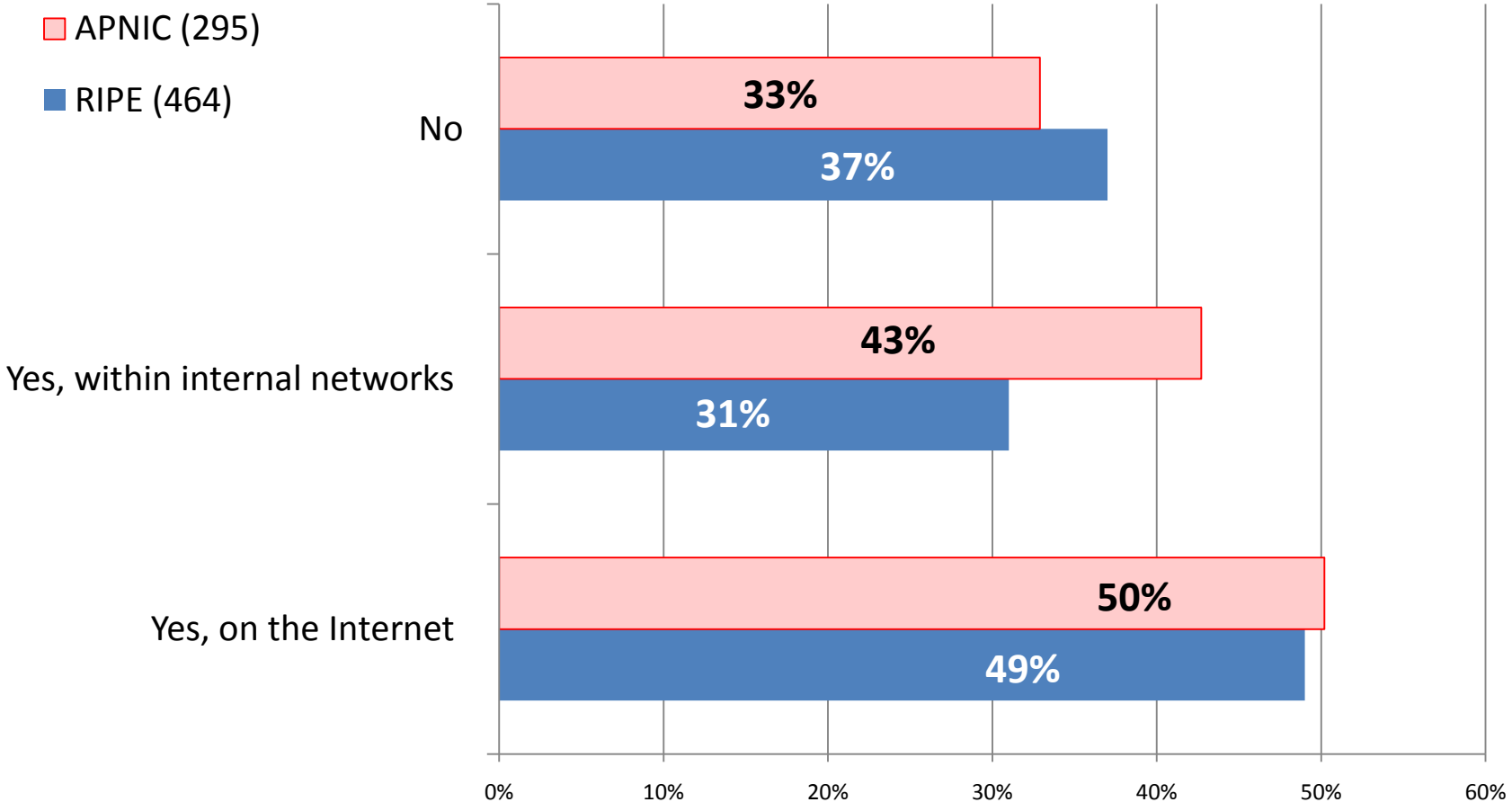
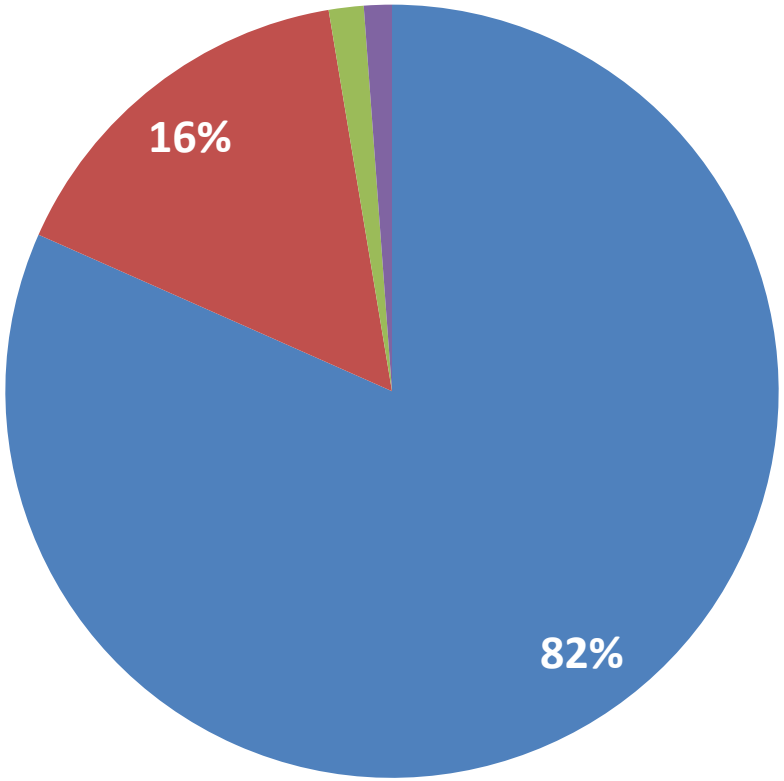


source: TNO/GNKS 2009

More profiling

- ~ 90% of respondents have a registration services agreement with RIPE NCC
- ~80% if respondents works for profit
- ~75% is EU based
- ~85% of 356 ISPs has less than 100,000 customers
- ~50% of respondents have less than 50 employees

IPv6 vs IPv4 traffic



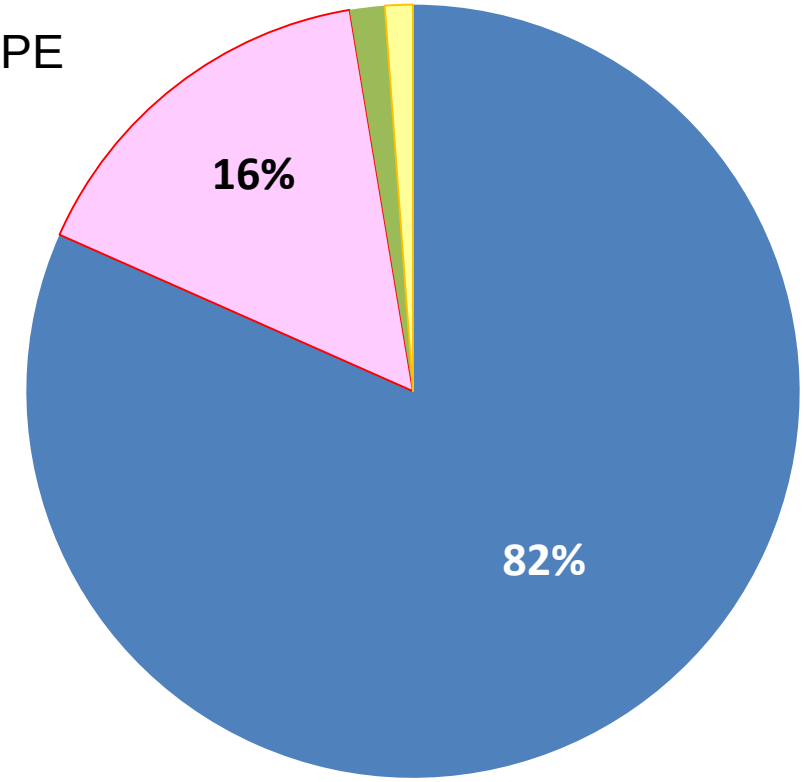
- IPv6 traffic is insignificant
- IPv6 traffic is less than IPv4 traffic
- IPv6 traffic is same as IPv4 traffic
- IPv6 traffic is greater than IPv4 traffic

n = 610

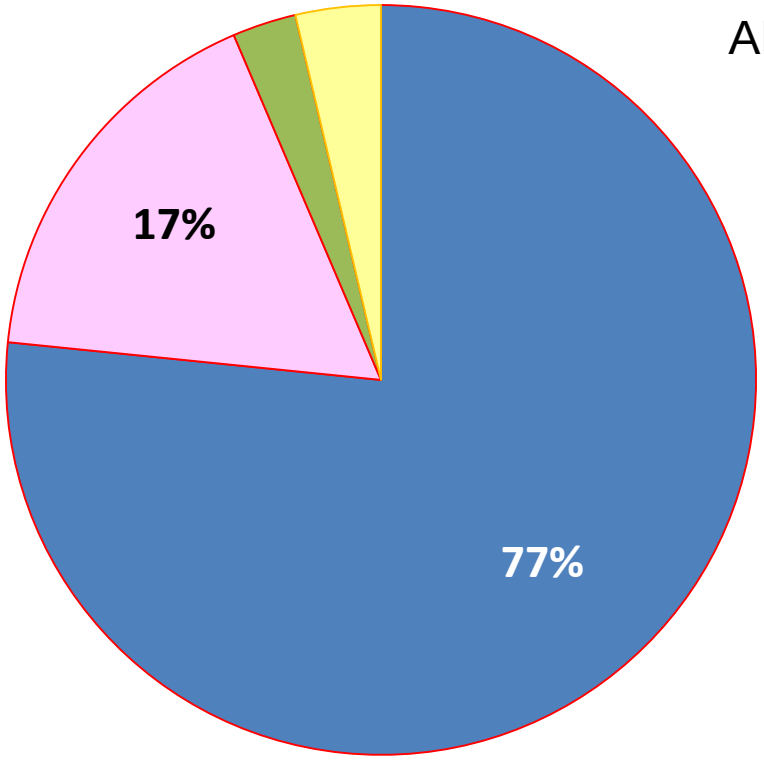
source: TNO/GNKS 2009

IPv6 vs IPv4 traffic

RIPE



APNIC



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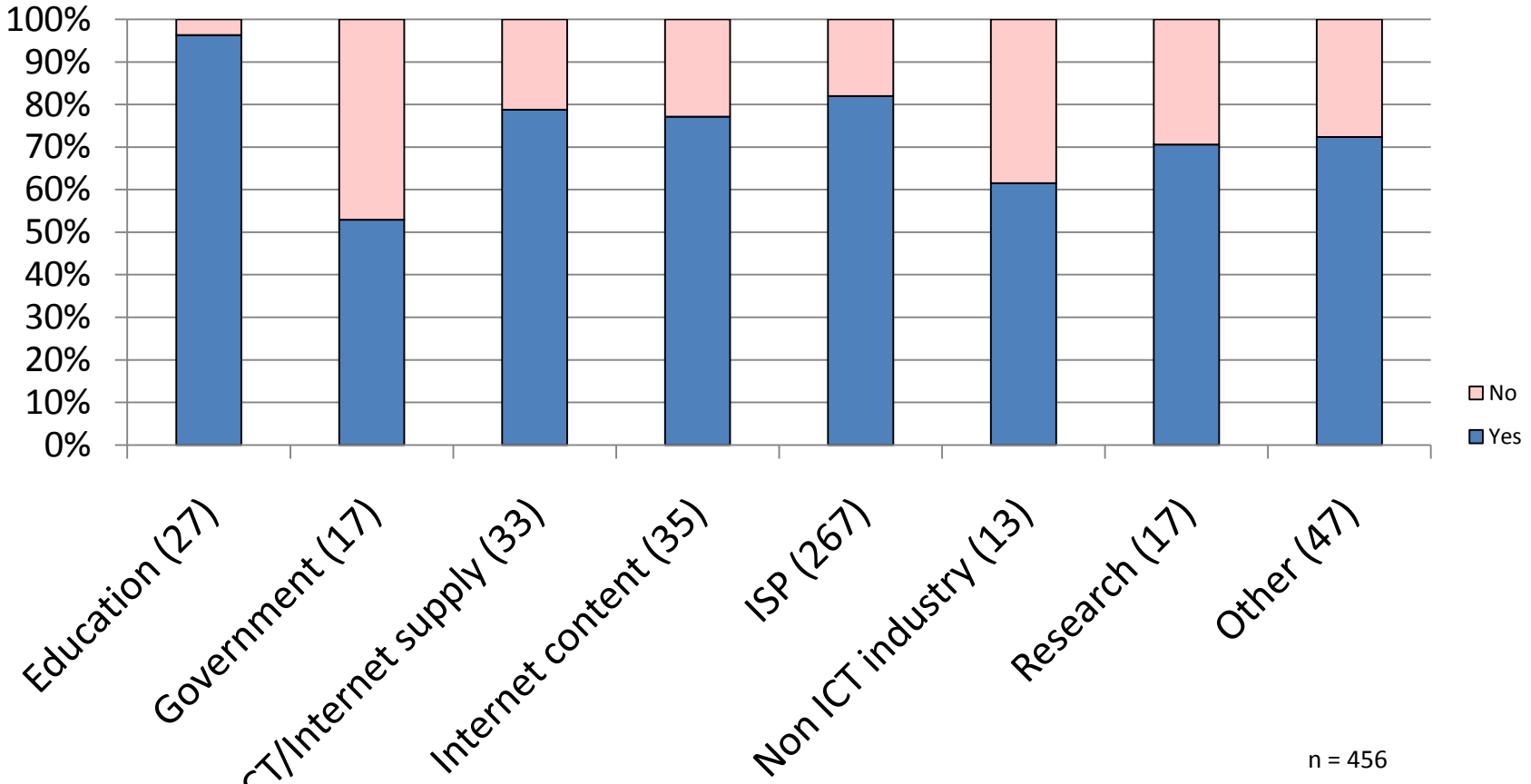
EU sector consider having IPv6 allocation



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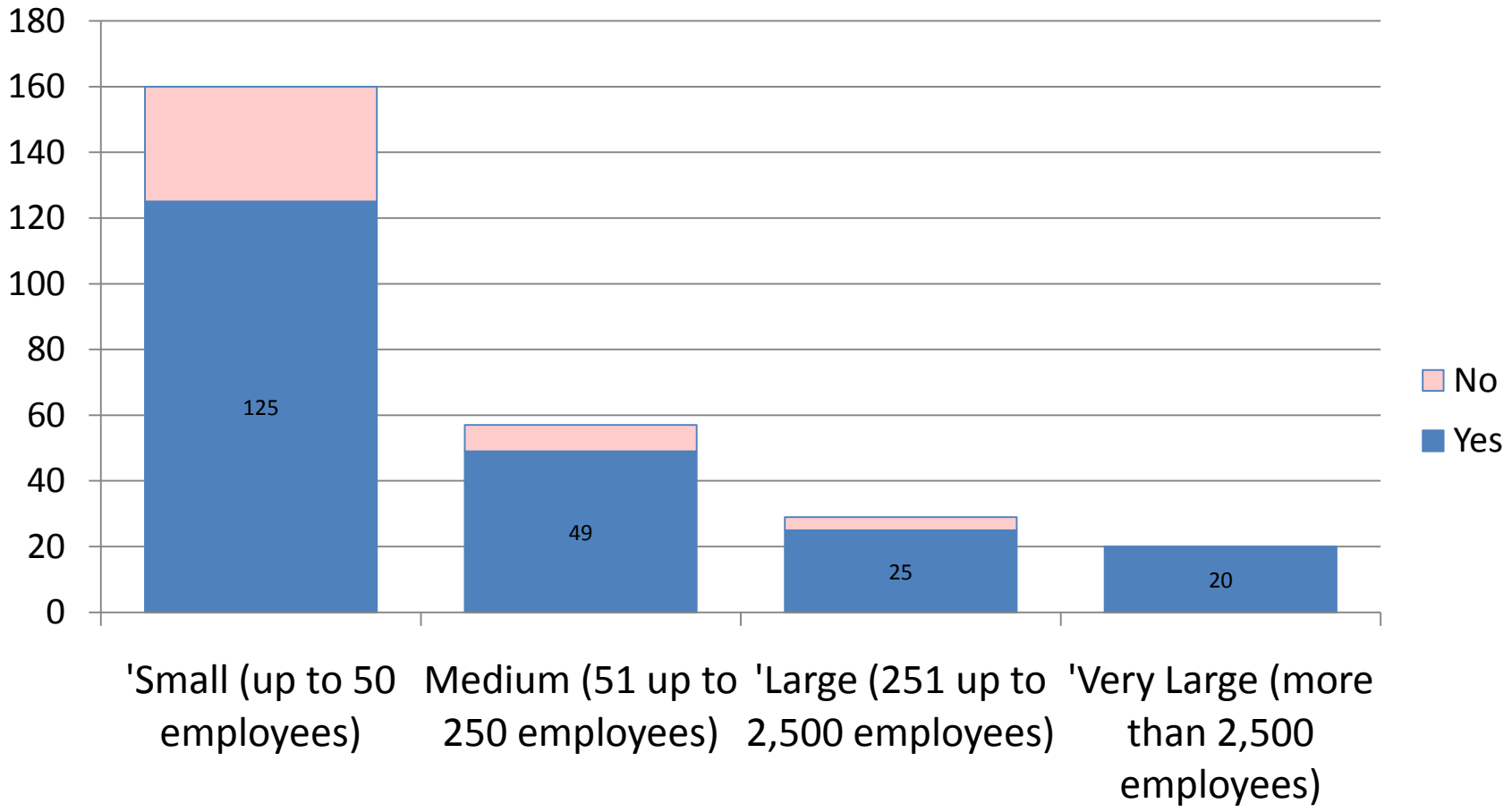
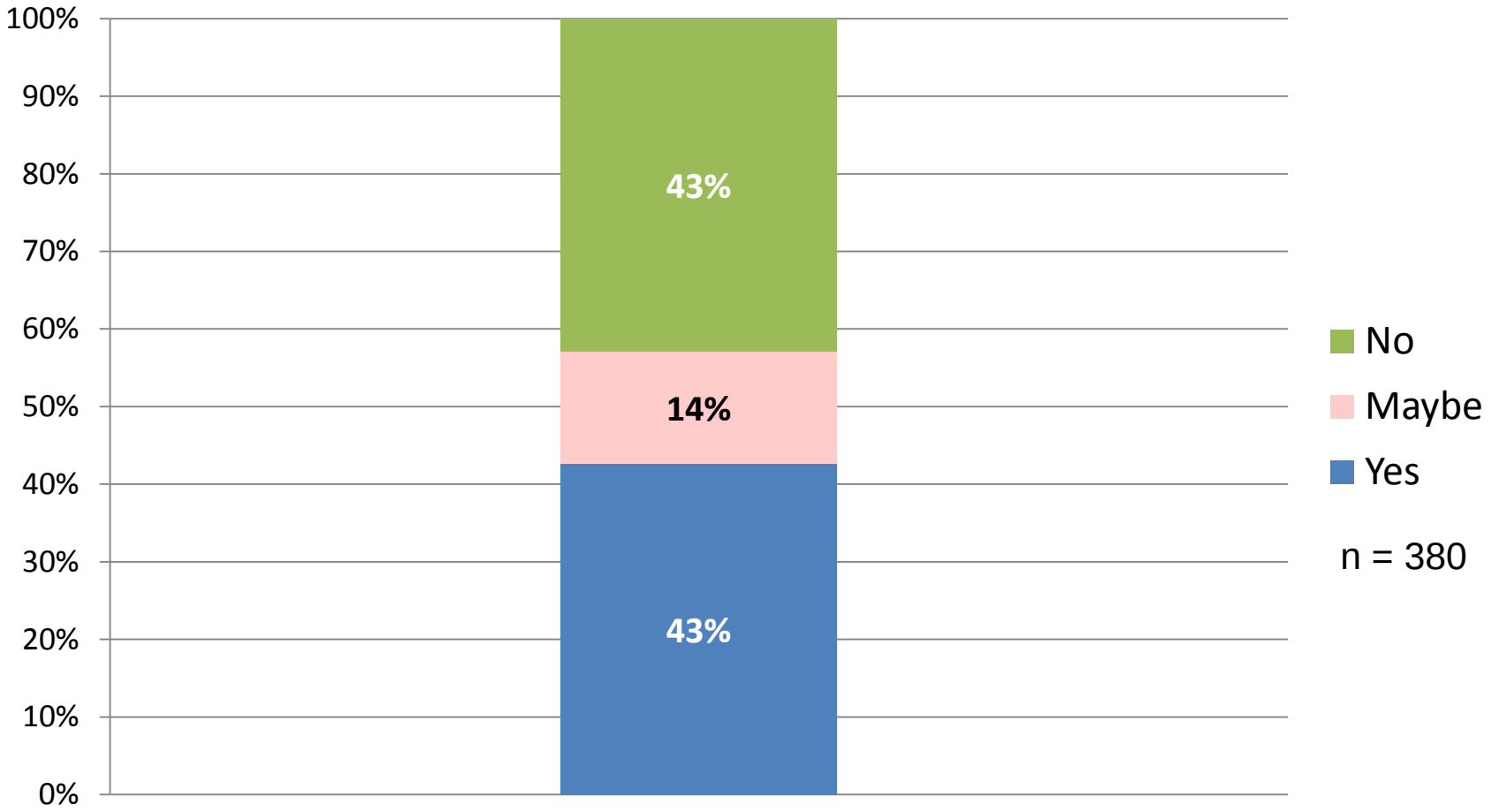
EU ISPs consider having IPv6 allocation



source: TNO/GNKS 2009

ISP, do you considering promoting IPv6 uptake to your customers



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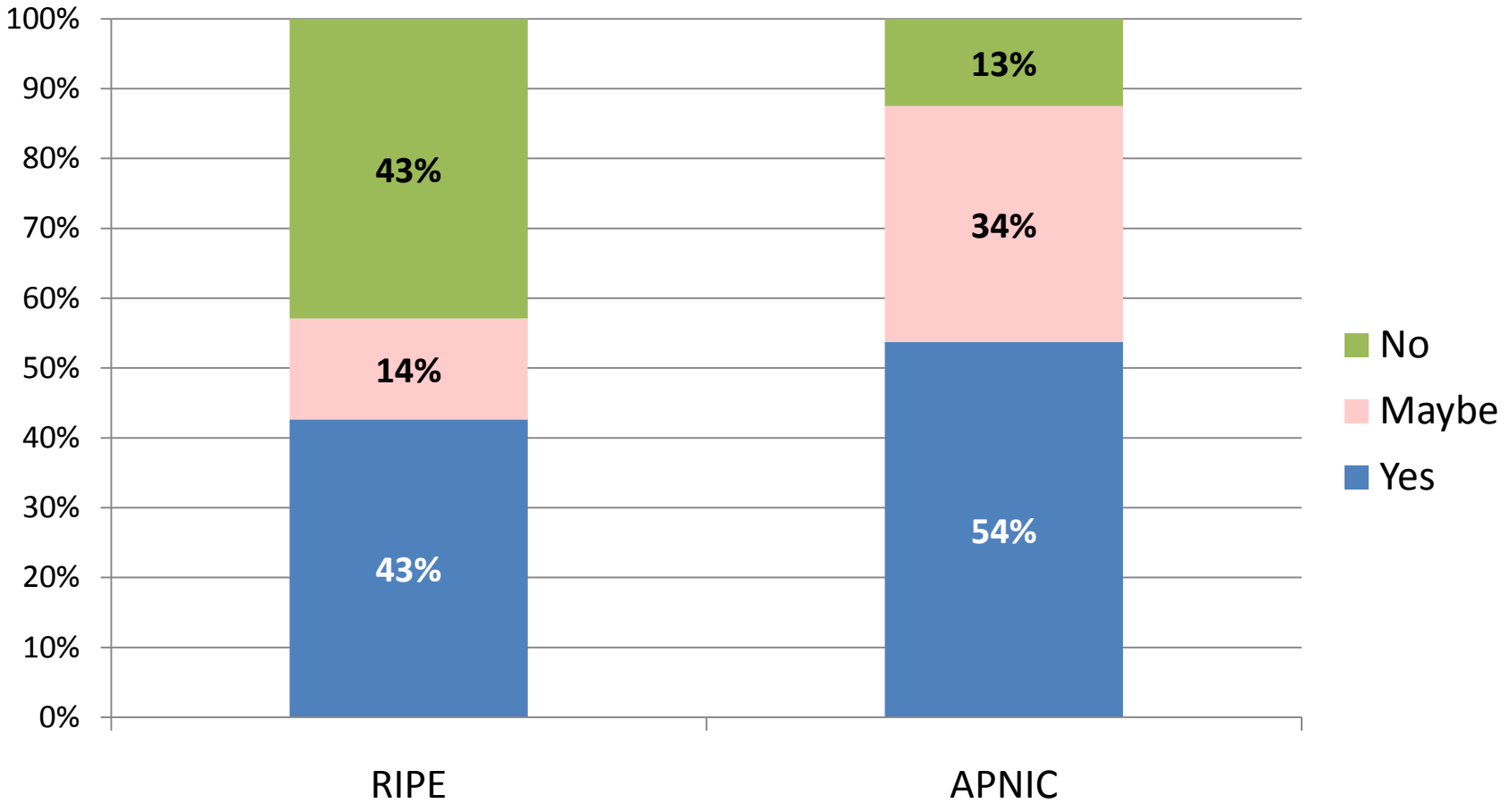

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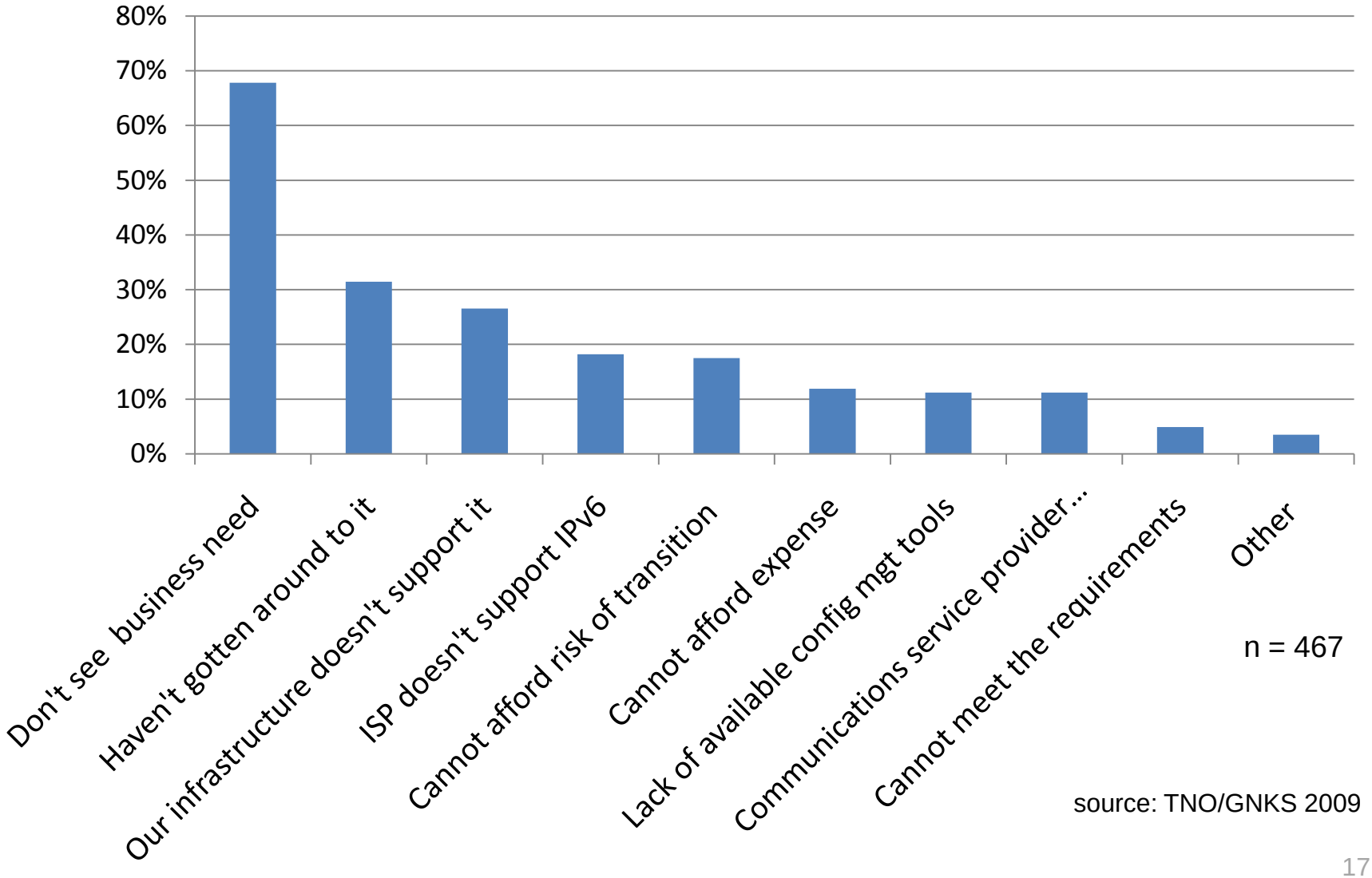
Why not considering IPv6?



n = 467

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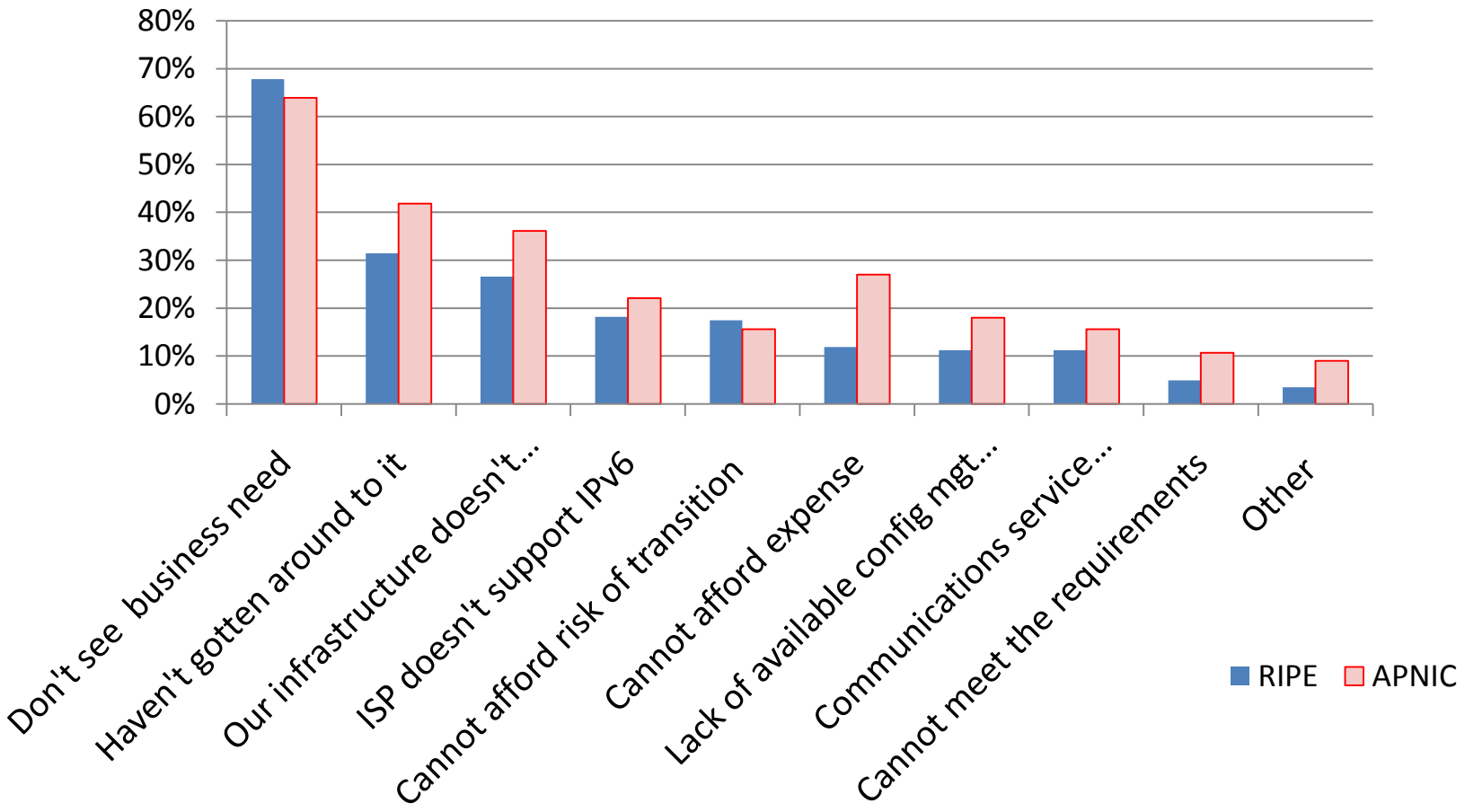

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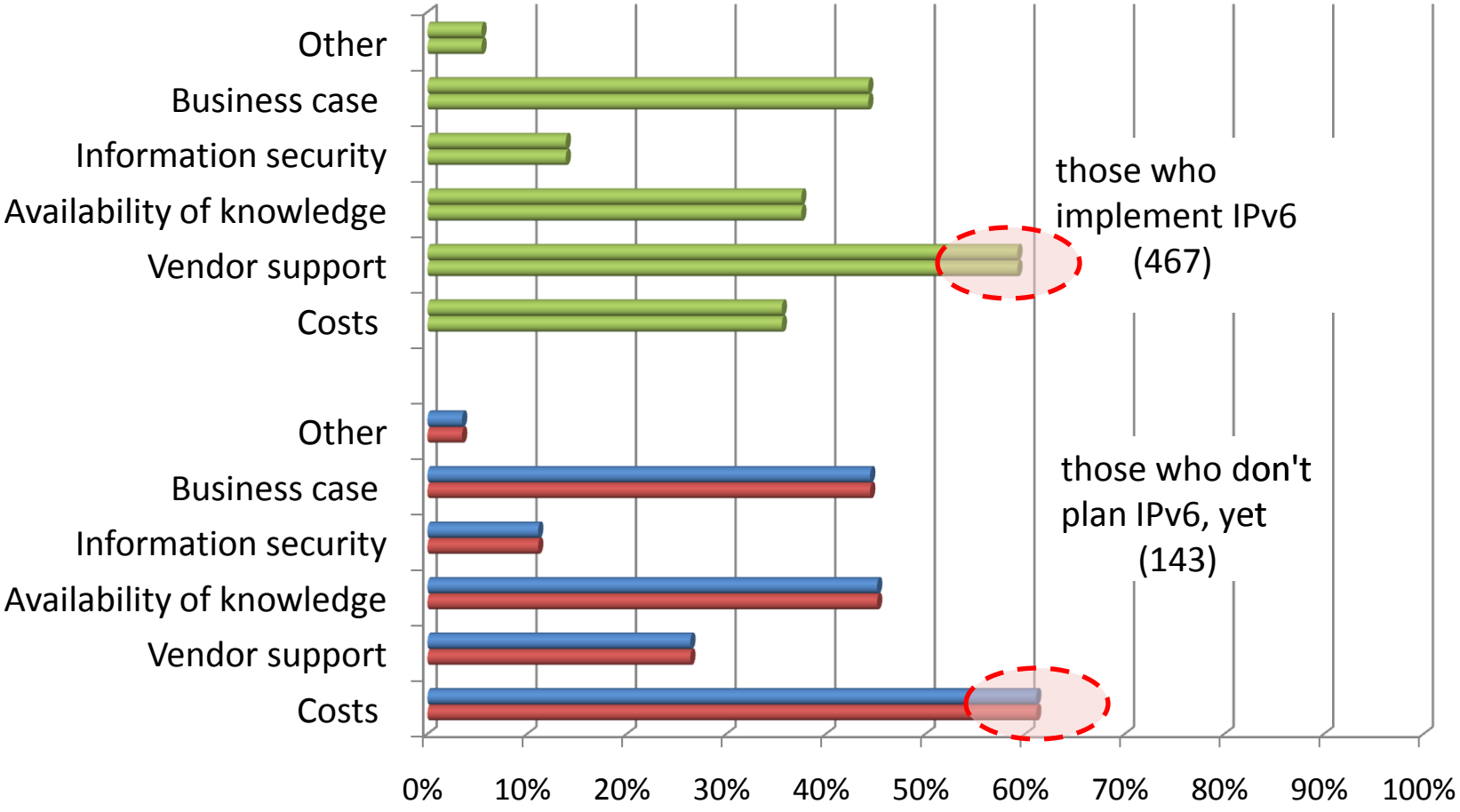
Biggest hurdles



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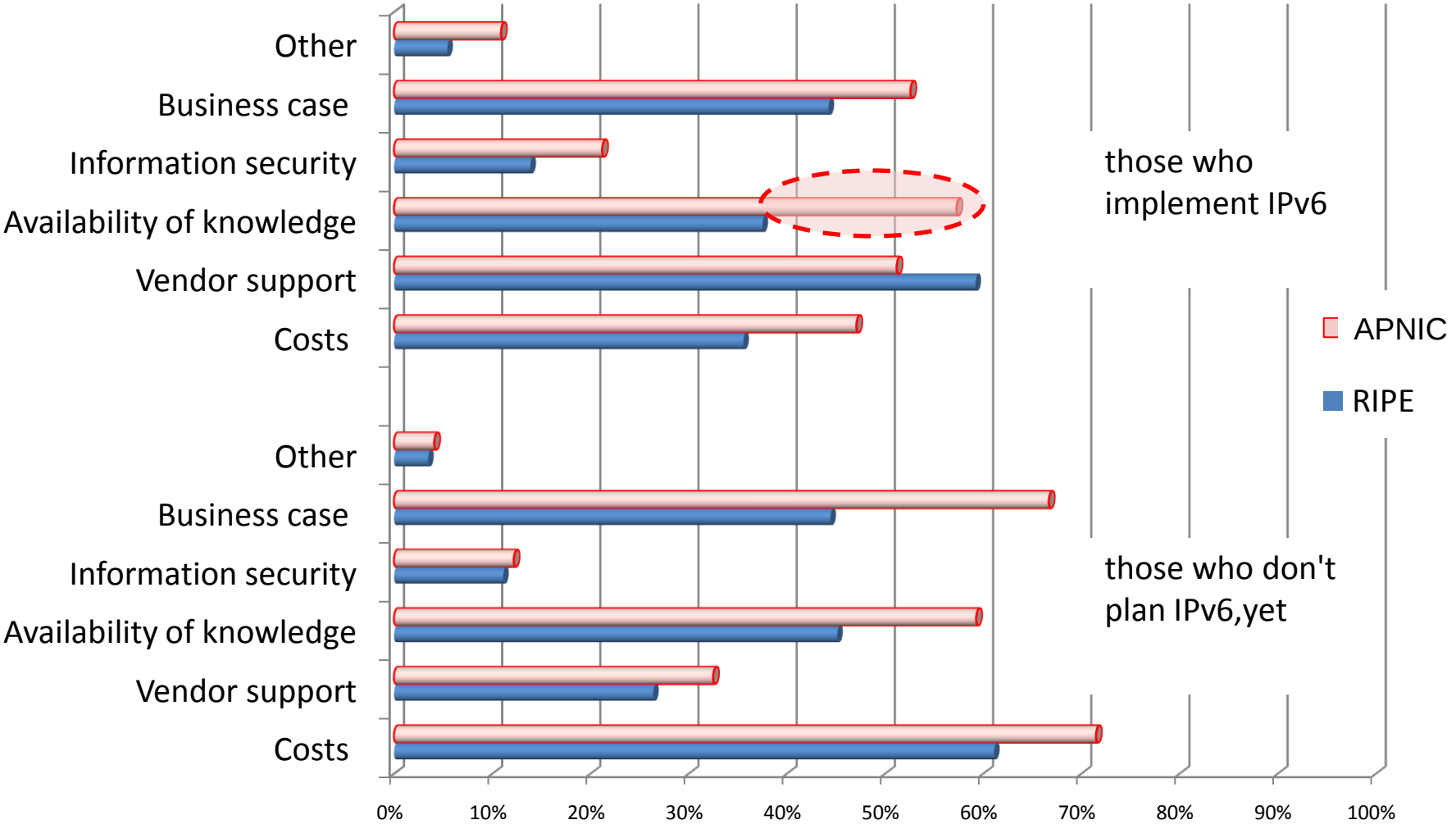

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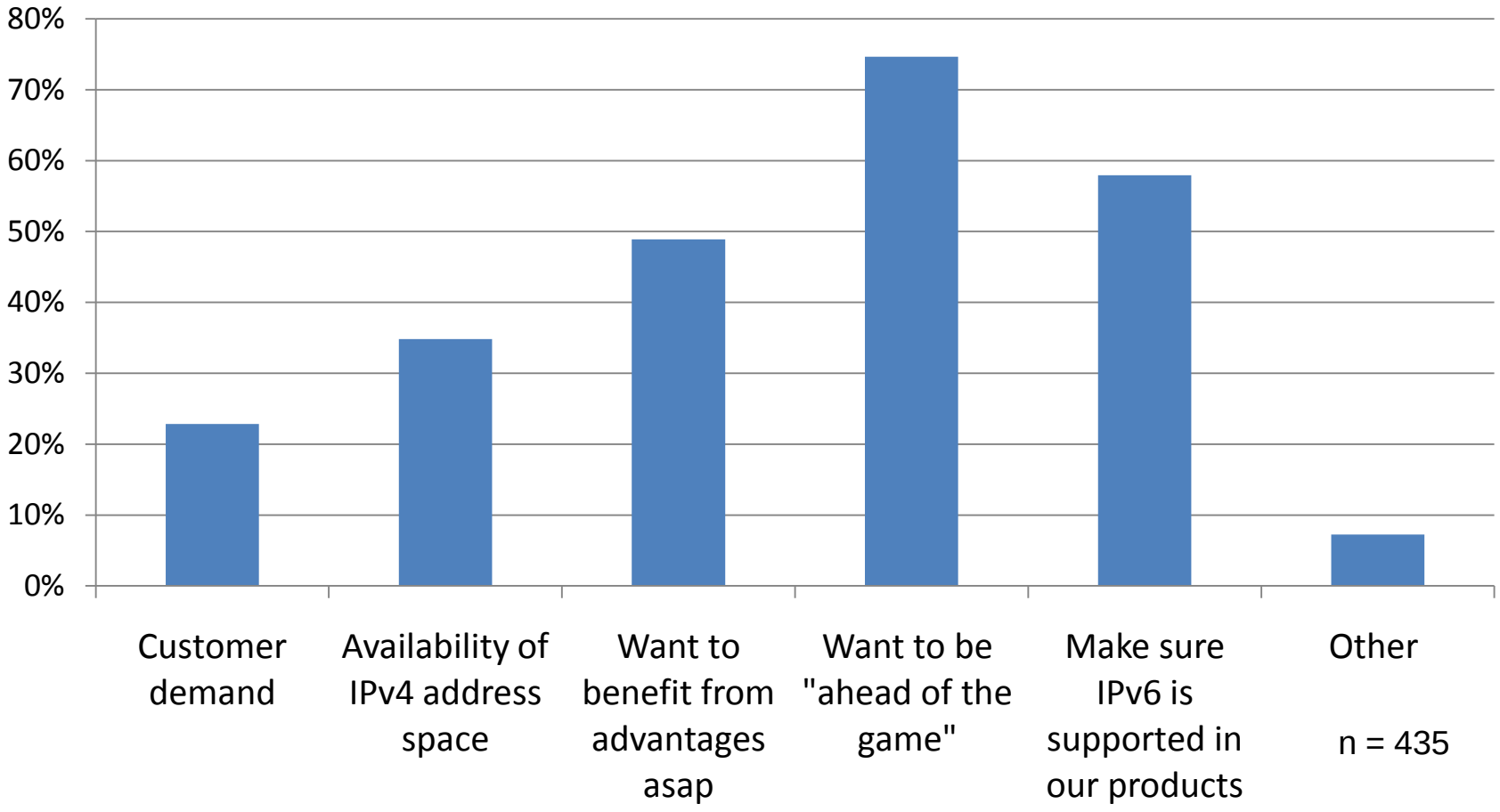
Main drivers to IPv6 deployment



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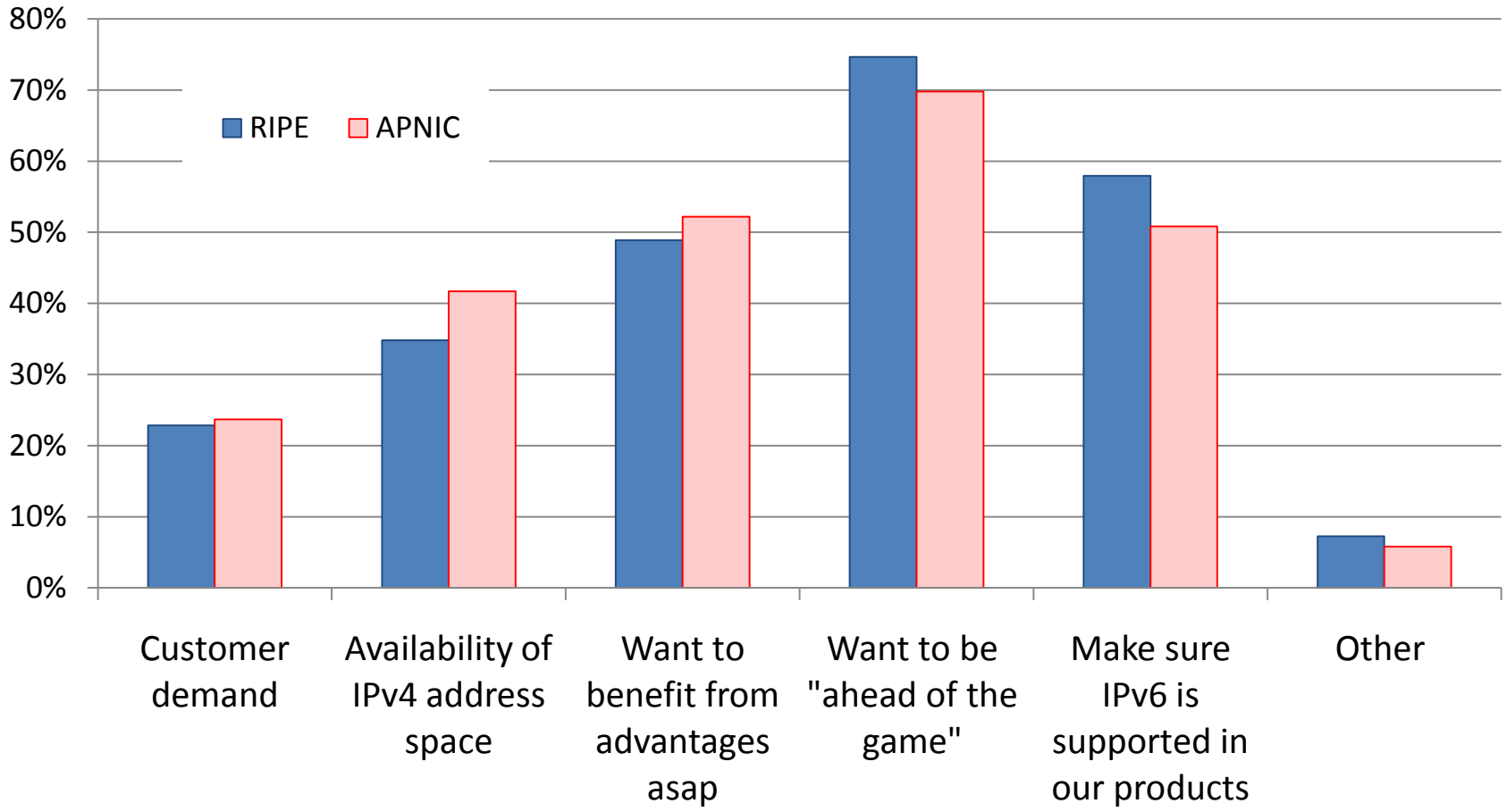

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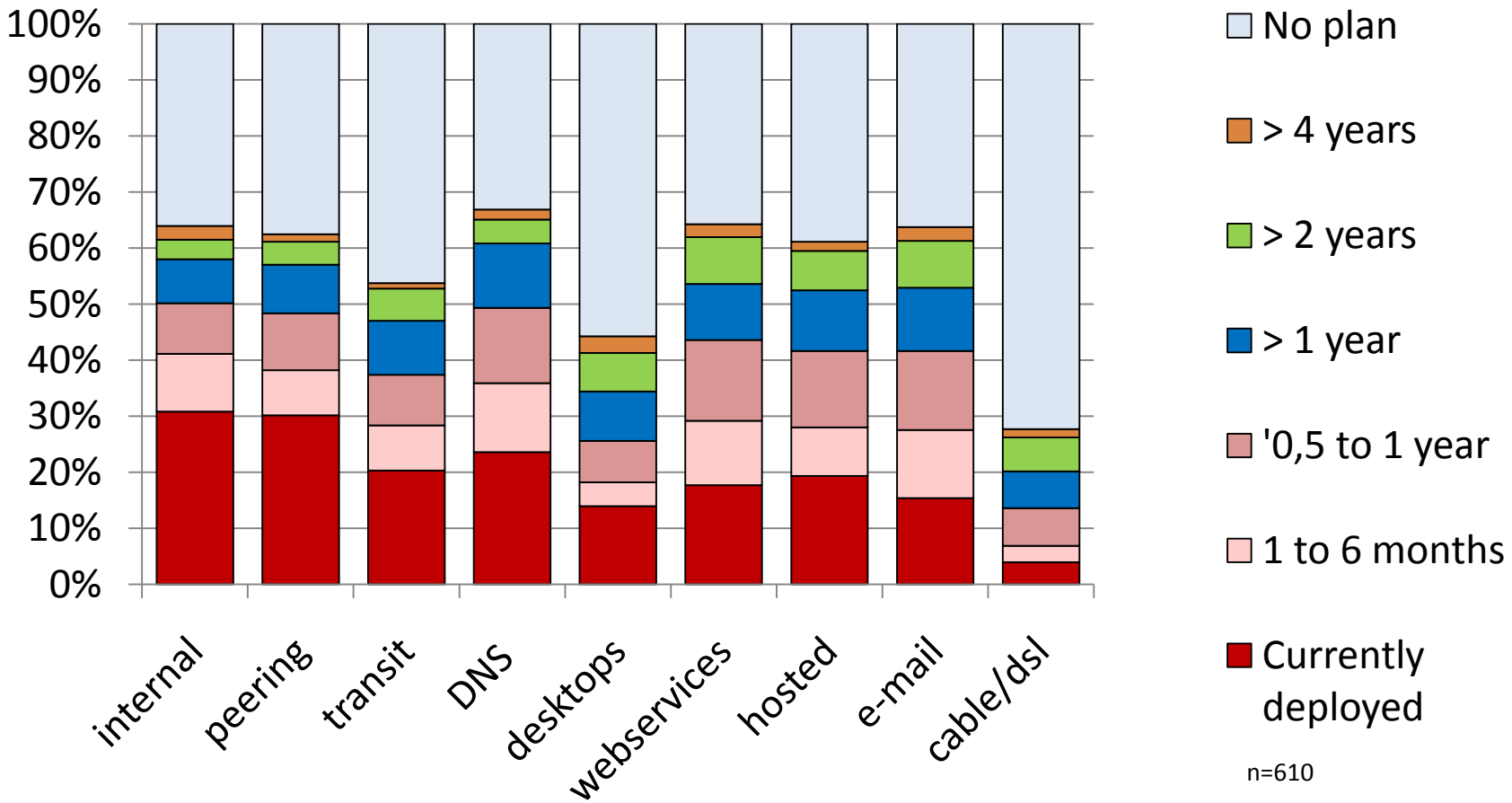
Planning IPv6 deployment



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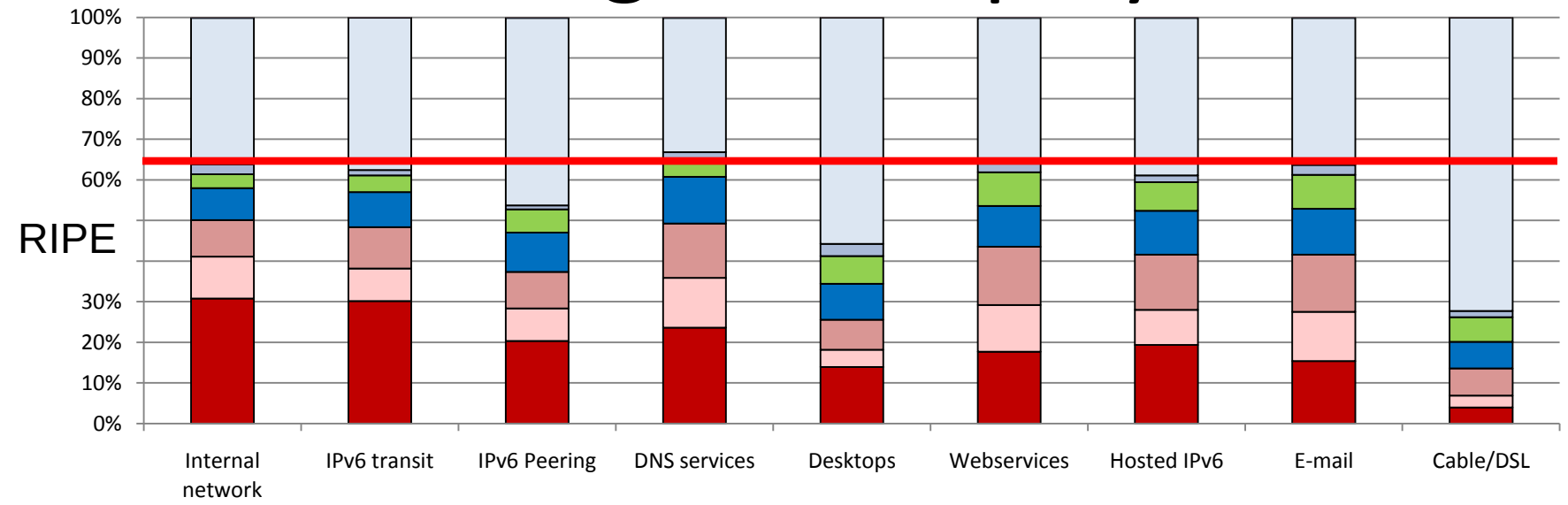

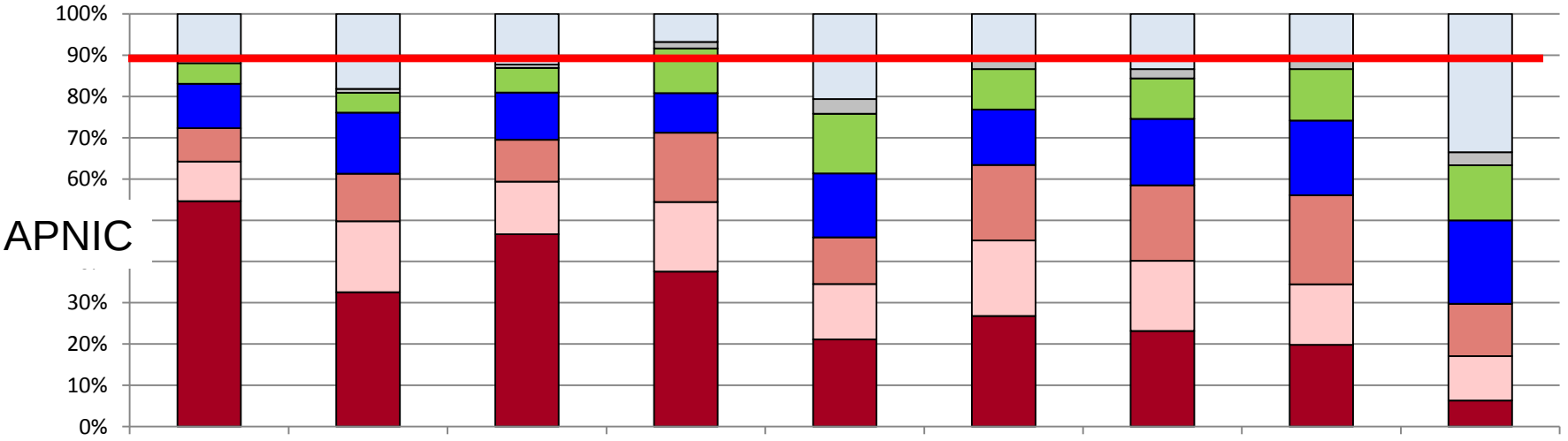

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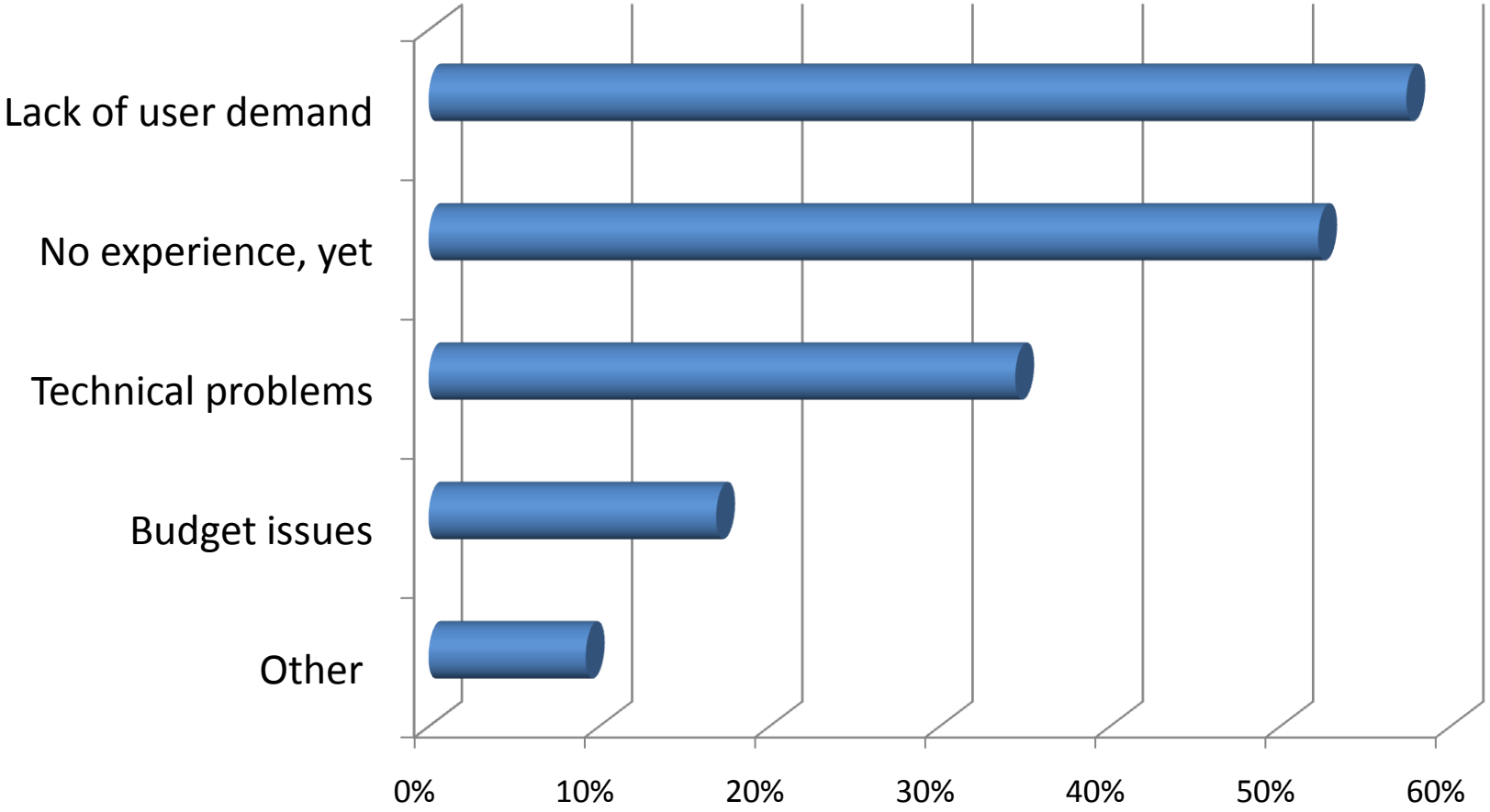
Experience: biggest problems with IPv6 in production?



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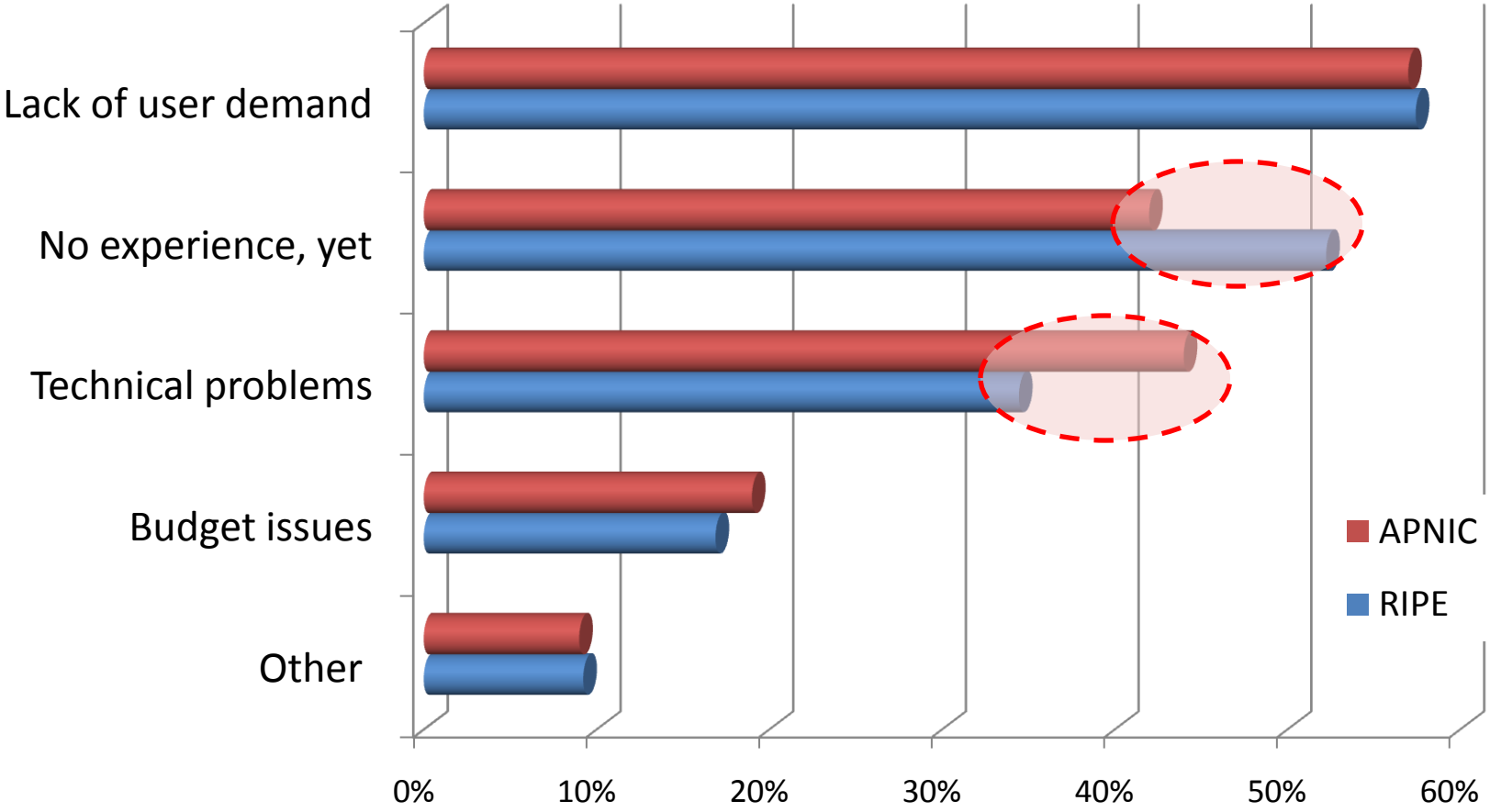
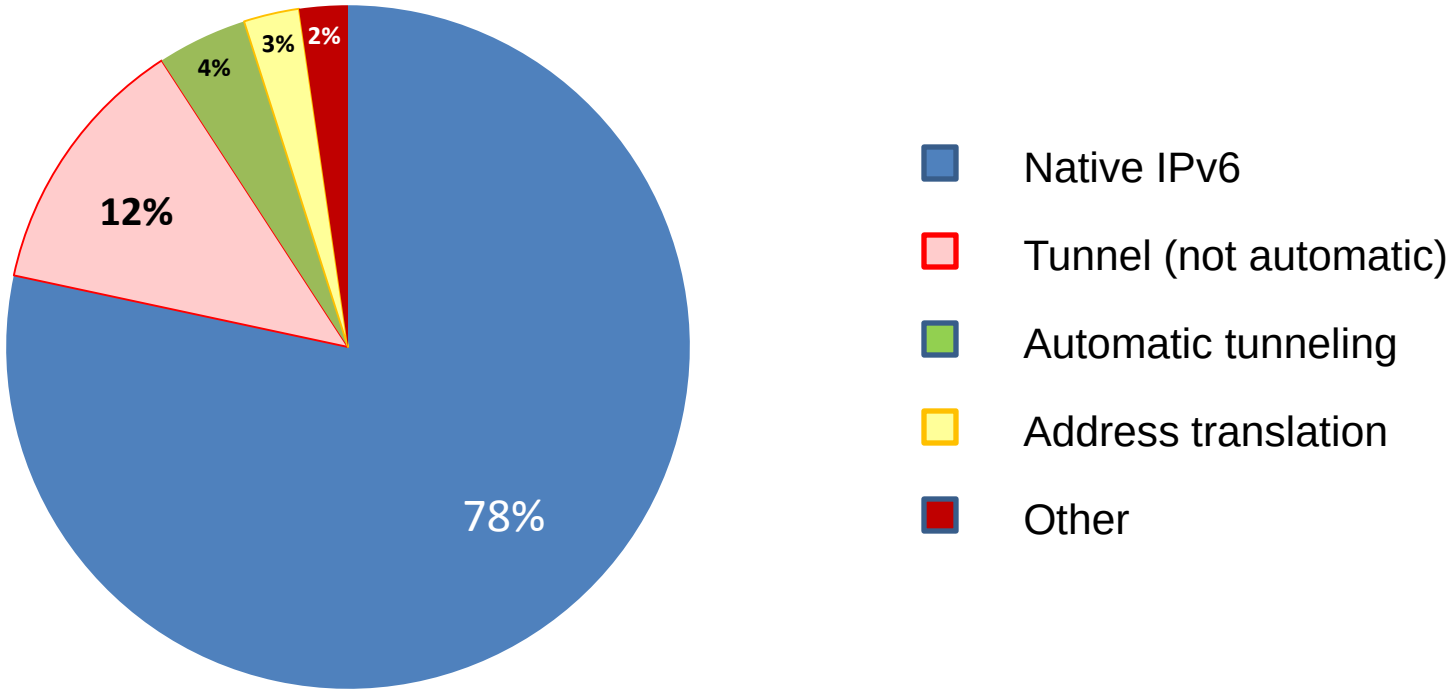


source: TNO/GNKS 2009

Experience: Set-up

- Overwhelmingly dual-stack (~90%)
- Mostly native IPv6



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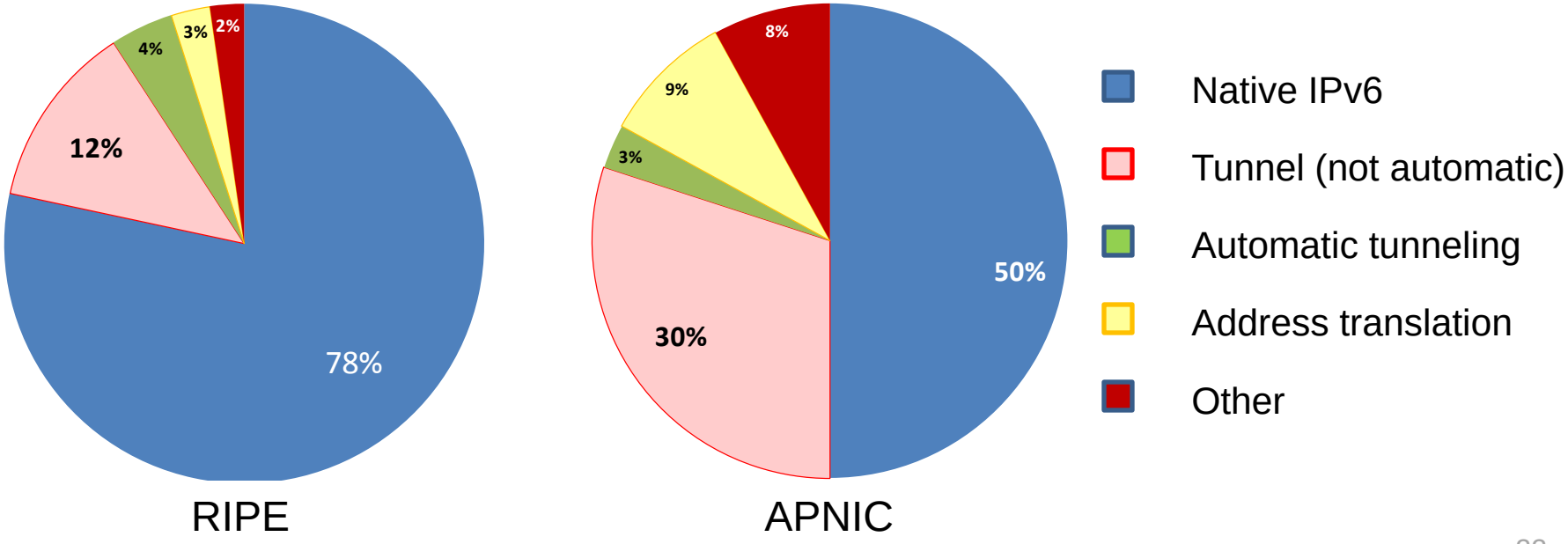
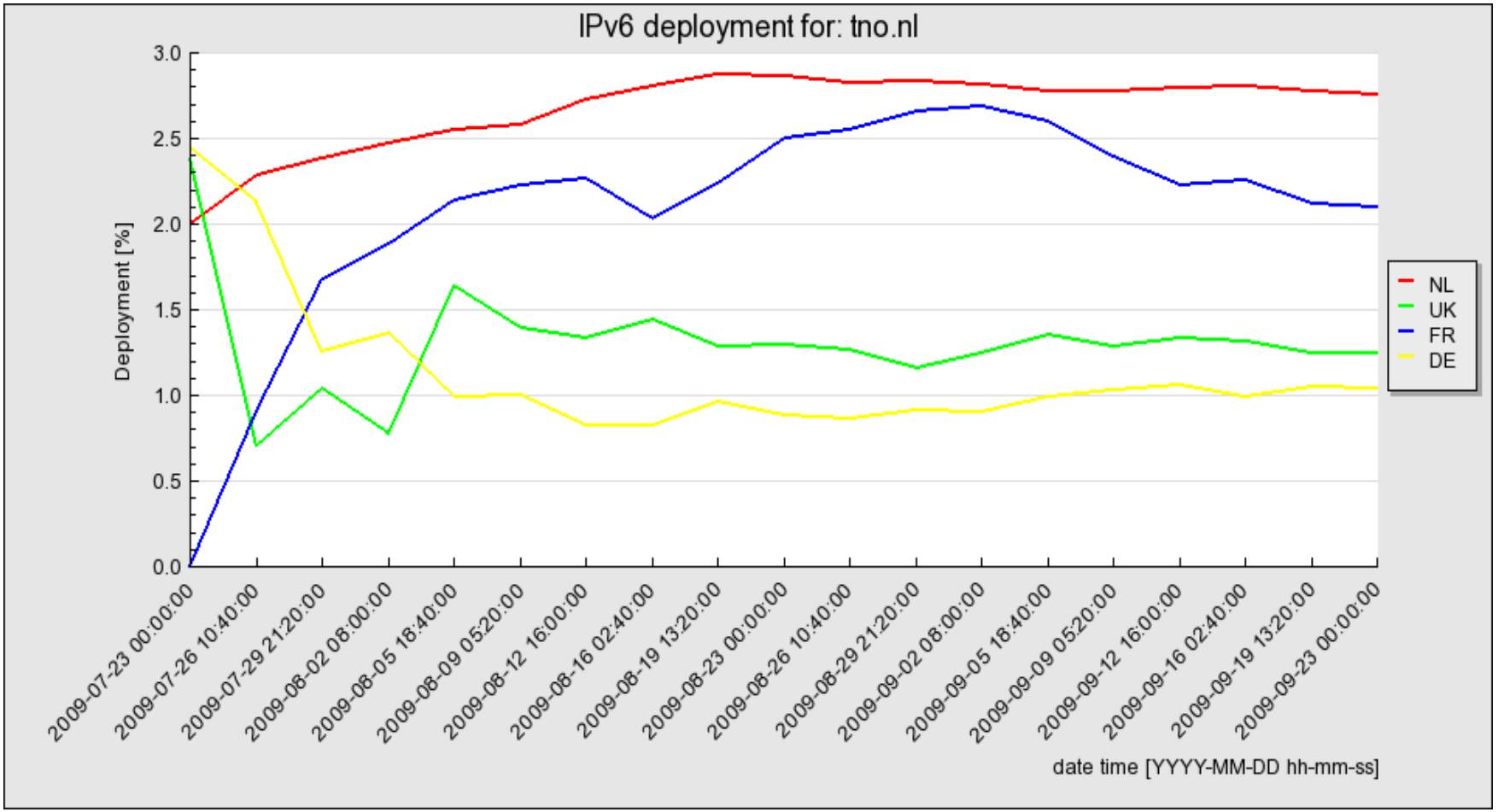


Indication of real IPv6 usage?



Ratio of IPv6/total IP visitors from selected countries

source: TNO/GNKS 2009

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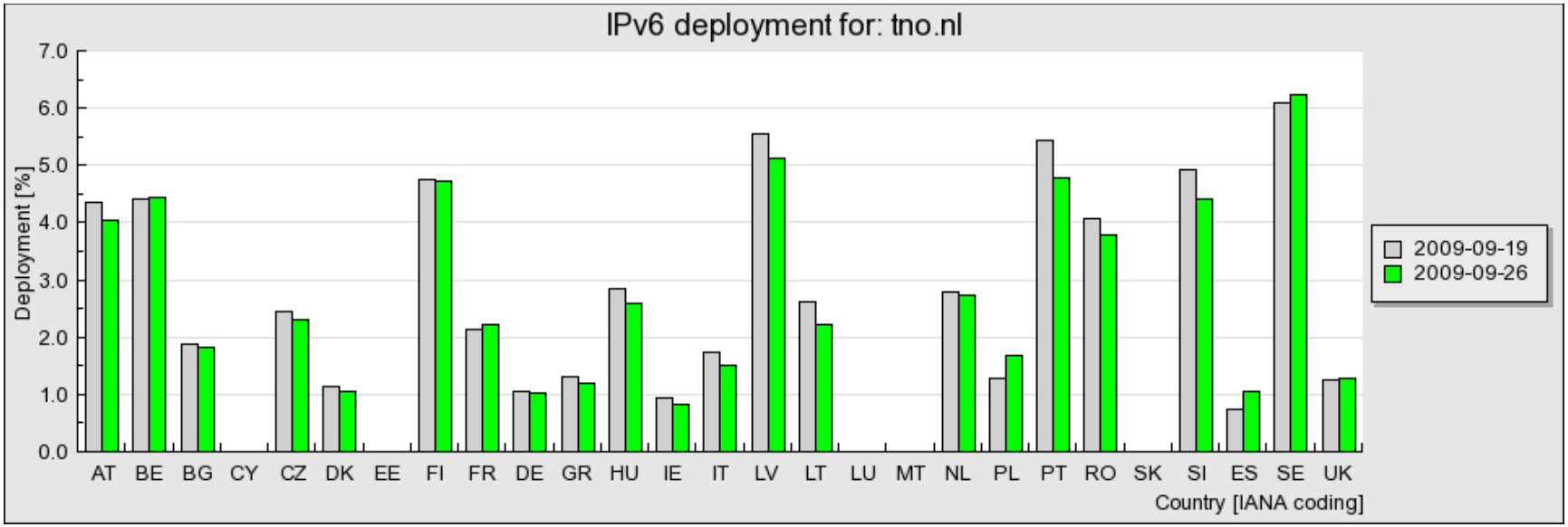
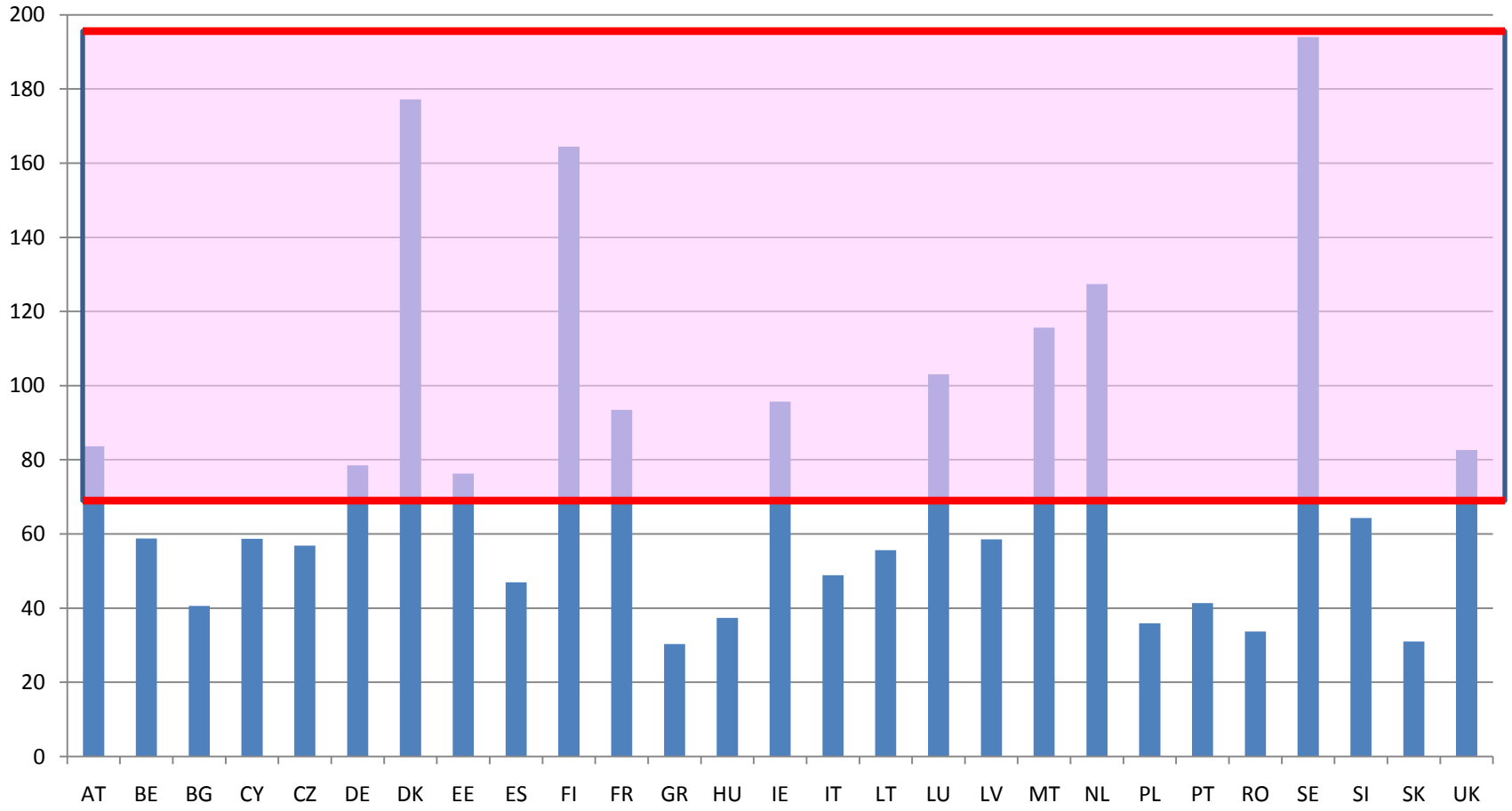


Ratio of IPv6/total IP visitors from EU countries to a measured web site

source: TNO/GNKS 2009

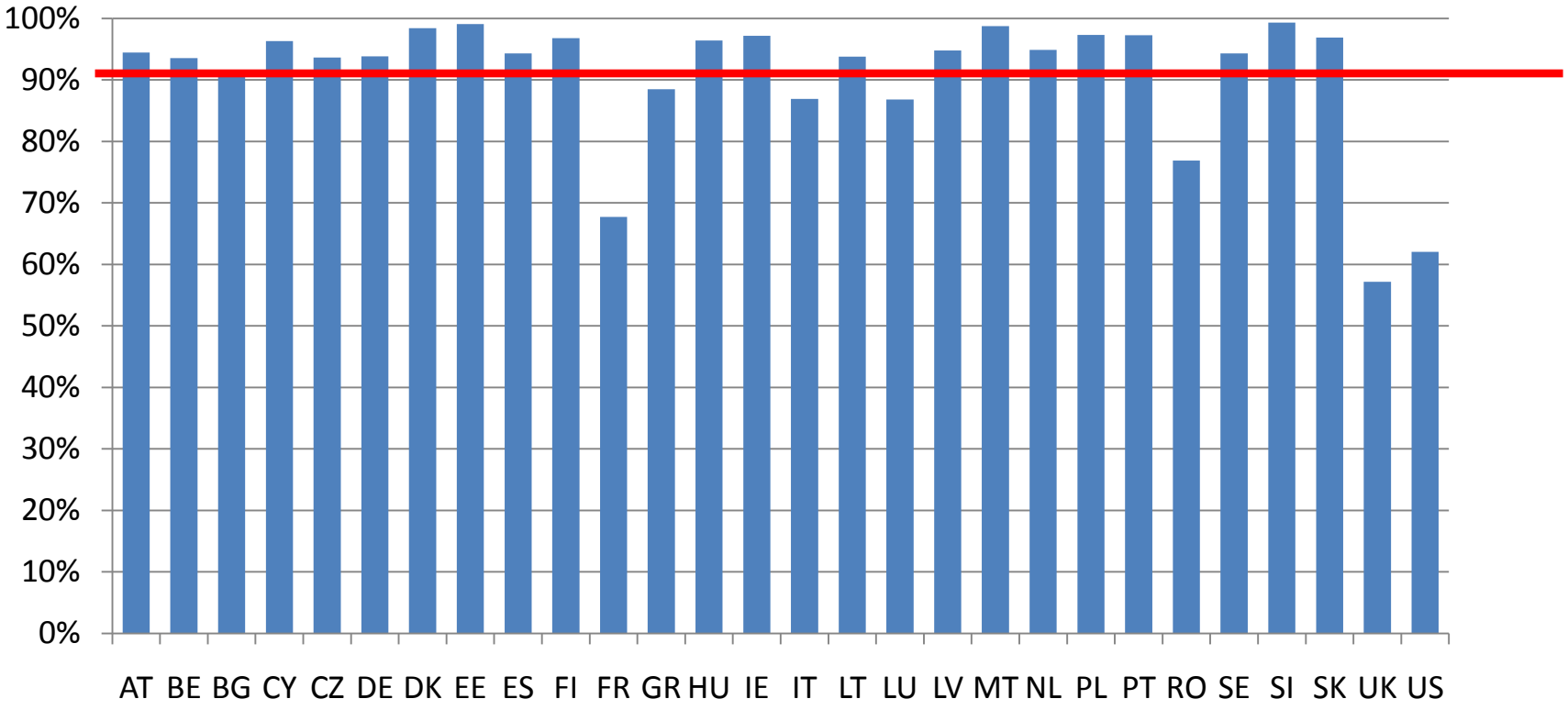
Growth foresight ?



Number of advertised IPv4 addresses per 100 inhabitants

source: NII/TNO/GNKS 2009

IPv4 address shortage indication?



Ratio of announced/allocated of IPv4 addresses in the EU and US
(nb: announced is not necessarily assigned)

source: NII/TNO/GNKS 2009

Main conclusions, overall

- Much more IP addresses will be needed during the coming years
  - If only for other countries to get up to the IP maturity levels of Scandinavian countries
  - But also mobile internet, and Internet of Things
- Whatever happens: no new IPv4 addresses available anymore, anywhere, at some point!
  - IANA source IPv4 will be depleted by 2011
  - RIPE source of IPv4 will be depleted by 2012/2013
  - In some countries the need for new IP addresses will be greater than in others

Main conclusions survey 2009 (1/2)

- Need to be careful with drawing conclusions
  - In particular when breaking down the sample to small size categories
  - This group is biased by IPv6 interest, at least
  - How well do respondents know what is really going on within their organisation
- Overall reason for IPv6 not being a priority yet is “lack of business case/lack of customer demand”
  - IPv6 vendor support is still lacking
  - How to turn this around?
- 63% of RIPE respondents have, or consider having an IPv6 allocation, today
  - Only 53% of Government respondents consider having IPv6
  - Still 21% of all respondents not convinced of the need to have IPv6 towards the future: why?

Main conclusions survey 2009 (2/2)

- ISPs:
  - 82% has, or considers having IPv6
  - 56% has IPv6 in production
  - 37% of ISPs in Europe *do not* consider IPv6 promotion
  - What is needed to get more ISPs on board
- Web site content
  - Just one out of 27 x Top 30 websites measured supports IPv6
- Set-up today is overwhelmingly dual stack and native IPv6
  - Are these the “lucky few”? Much less extreme “dual stack” in APNIC region
  - What future for tunneling, address translation?

We thank all respondents for their contributions !

- More than 70% indicated their willingness to collaborate to further follow up questions
- More than 90% indicated their willingness to respond again, next year

This survey could not have been done without the help of RIPE NCC, and APNIC

Thanks to the European Commission who has made this possible by granting GNKS Consult and TNO a study contract on IPv6 Deployment, in line with the EU IPv6 Action Plan

Thanks to all RIPE members that helped improve the survey instrument, before it was launched.

Thanks to RIPE and APNIC staff for support and help, and for sending out the survey to their mailing lists.

Special thanks to KC Claffy (CAIDA), Karine Perset (OECD), Leslie Daigle (ISOC), Paul Rendek and Nick Hyrka (RIPE NCC), Miwa Fujii and Paul Wilson (APNIC) for their feedback, advice and support.

http://www.ipv6monitoring.eu/

Questions regarding the survey and this presentation:

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The European IPv6 Web Site

http://ec.europa.eu/information_society/policy/ipv6

Questions regarding the Action Plan to the European Commission:

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