



The Sad Tale of 462 Operators Who Switched Off IPv6*

***with a happy ending**

Why Do People Implement IPv6?

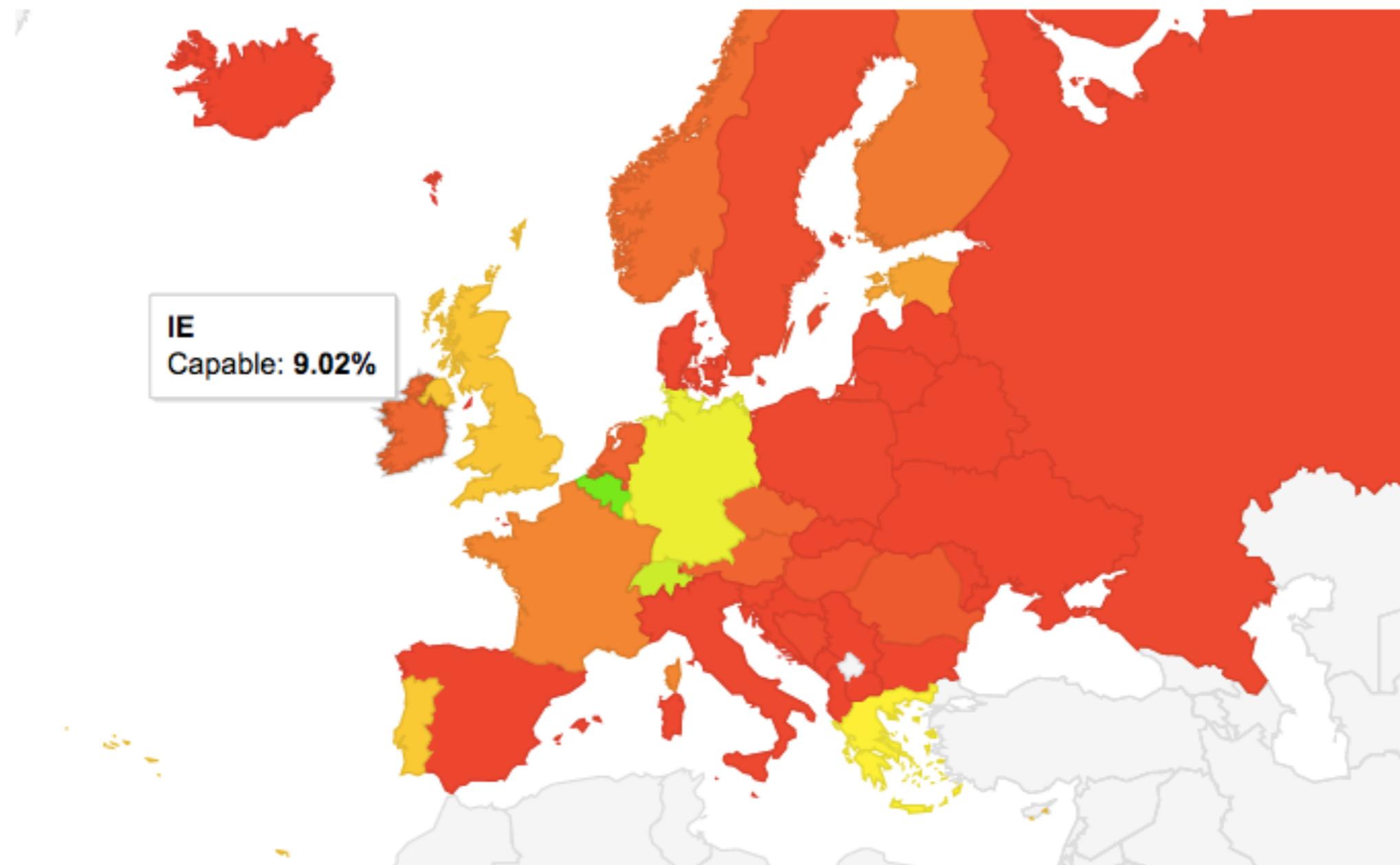


- “IPv4 depletion was the main reason for our IPv6 deployment” - Big ISP, Belgium
- “IPv6 was a business continuity decision”
 - Large enterprise
- “All apps in the App Store must support IPv6 starting in early 2016” - Apple
- “IPv6 is important for us, as we pursue our mission of helping the world connect online” - Facebook

Where Do People Implement IPv6?



- stats.labs.apnic.net/ipv6



...and how much?



RANK	IPV6 %	COUNTRY
1	46.8%	Belgium
2	27.6%	Greece
3	26.1%	Germany
4	25.6%	Switzerland
5	25.4%	India
6	23.6%	United States of America
7	23.4%	Luxembourg
8	18.3%	Portugal
9	16.4%	Estonia
10	13.6%	United Kingdom

23	6.3%	Ireland
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Source: <https://www.akamai.com/us/en/our-thinking/state-of-the-internet-report>

How About Our Members?



- 24% have no plans for IPv6
- 20% are finished with their IPv6 roll-out
- 56% are in a stage of IPv6 deployment
 - from planning to testing

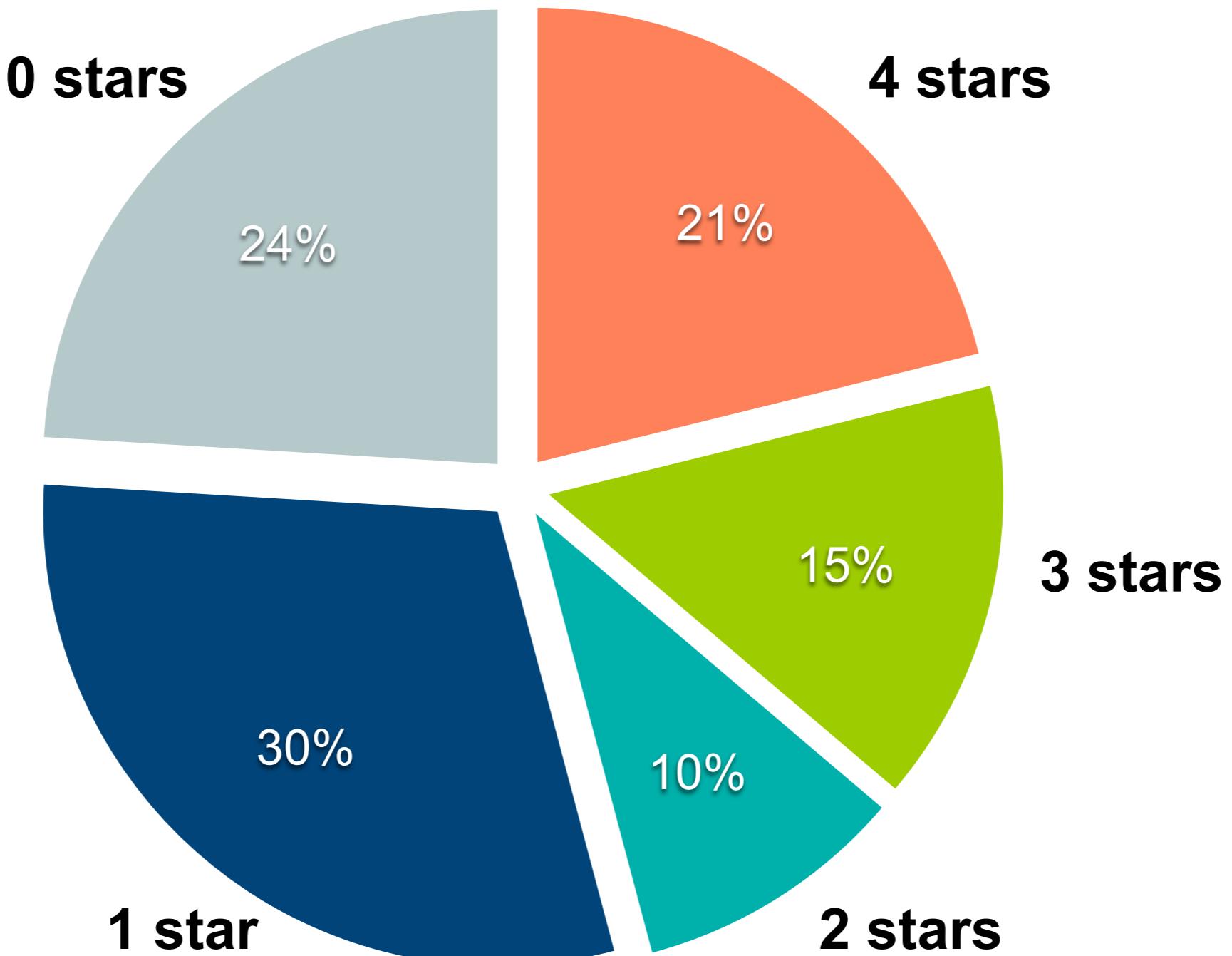
IPv6 RIPEness



- 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 Total (14,239 LIRs)



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%



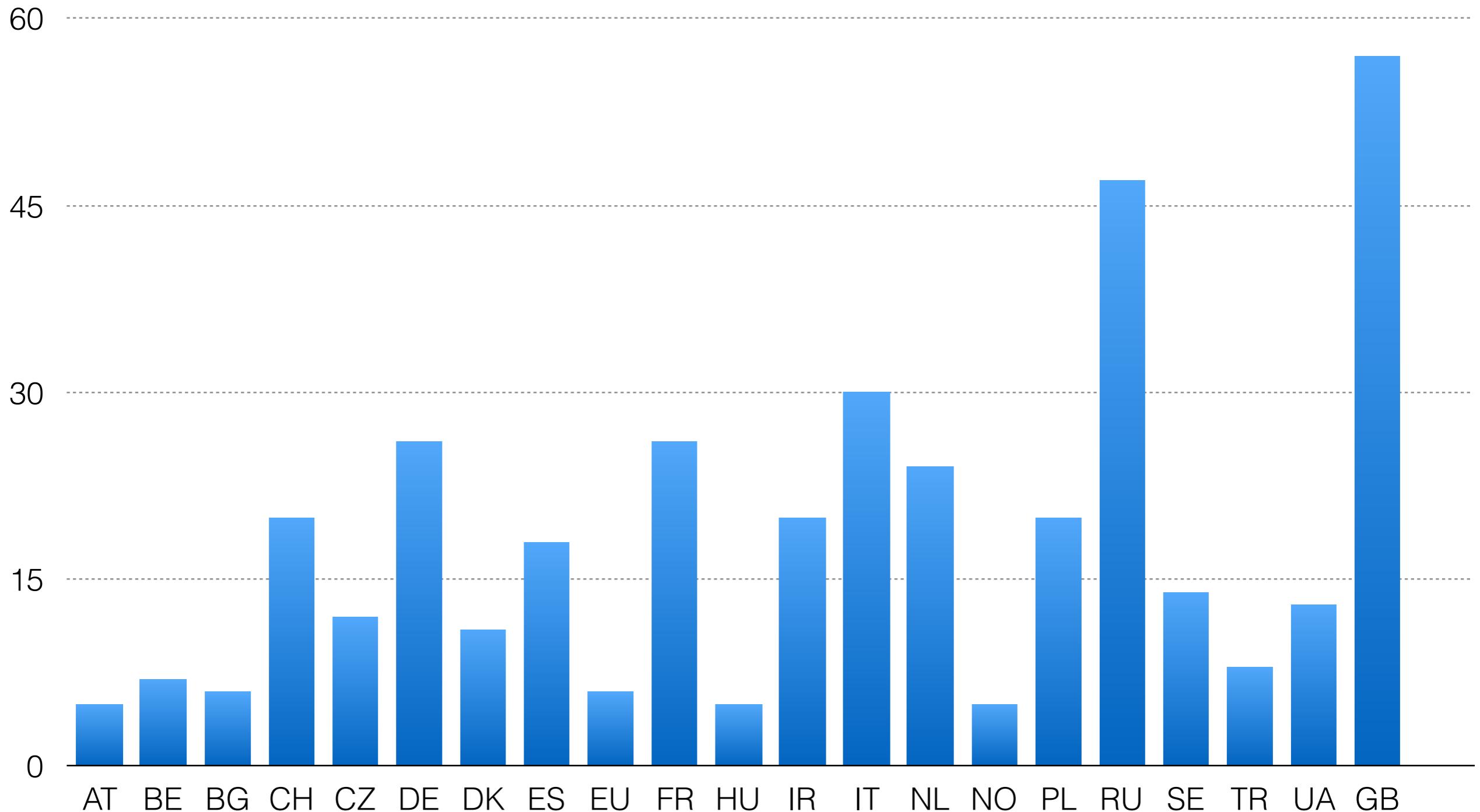
Current status at various thresholds

False Starts?



- We found that **462** LIRs stopped announcing IPv6
- We contacted them all to find out why
- Within two weeks we received 69 survey responses
 - And a lot of e-mails sent directly to us

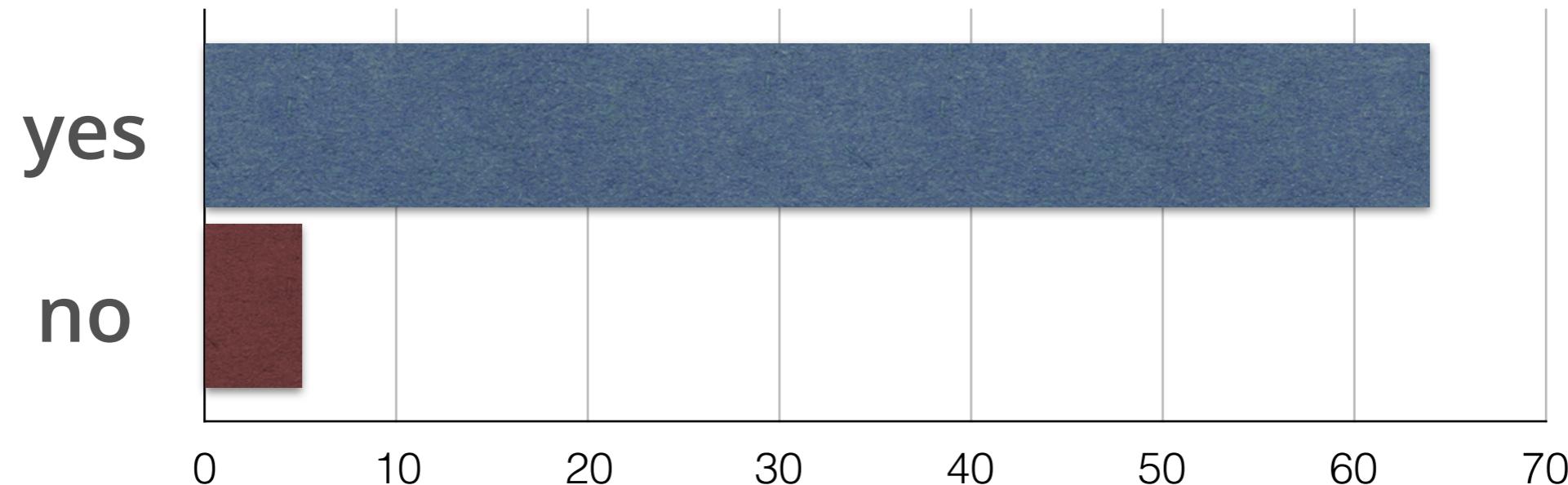
Where Are These LIRs?



Awareness



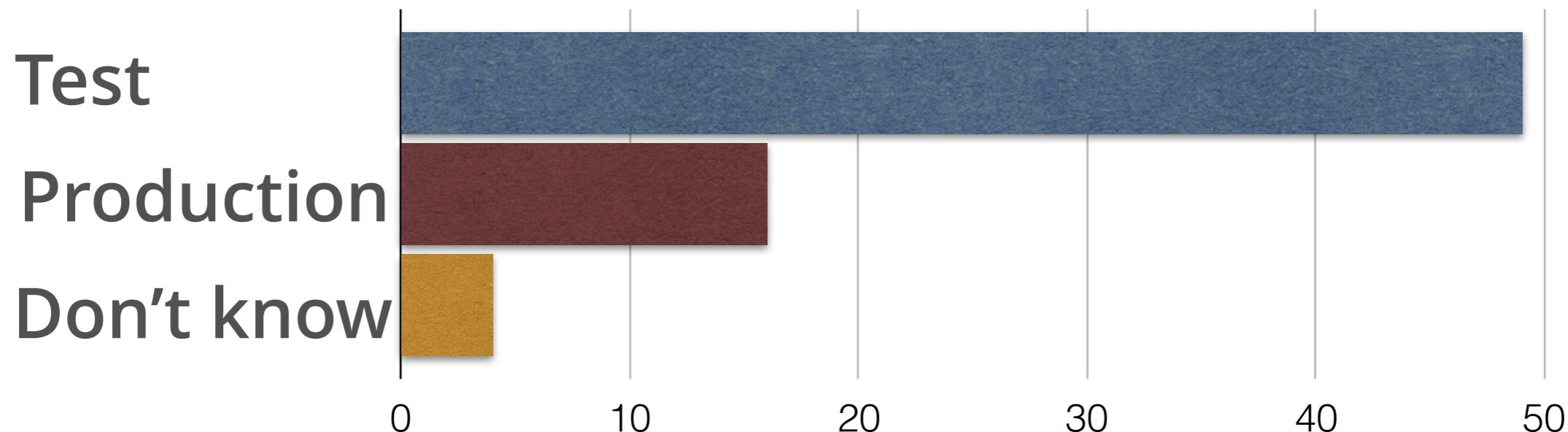
- Are you aware you previously announced your IPv6 allocation to the global routing table?



Purpose



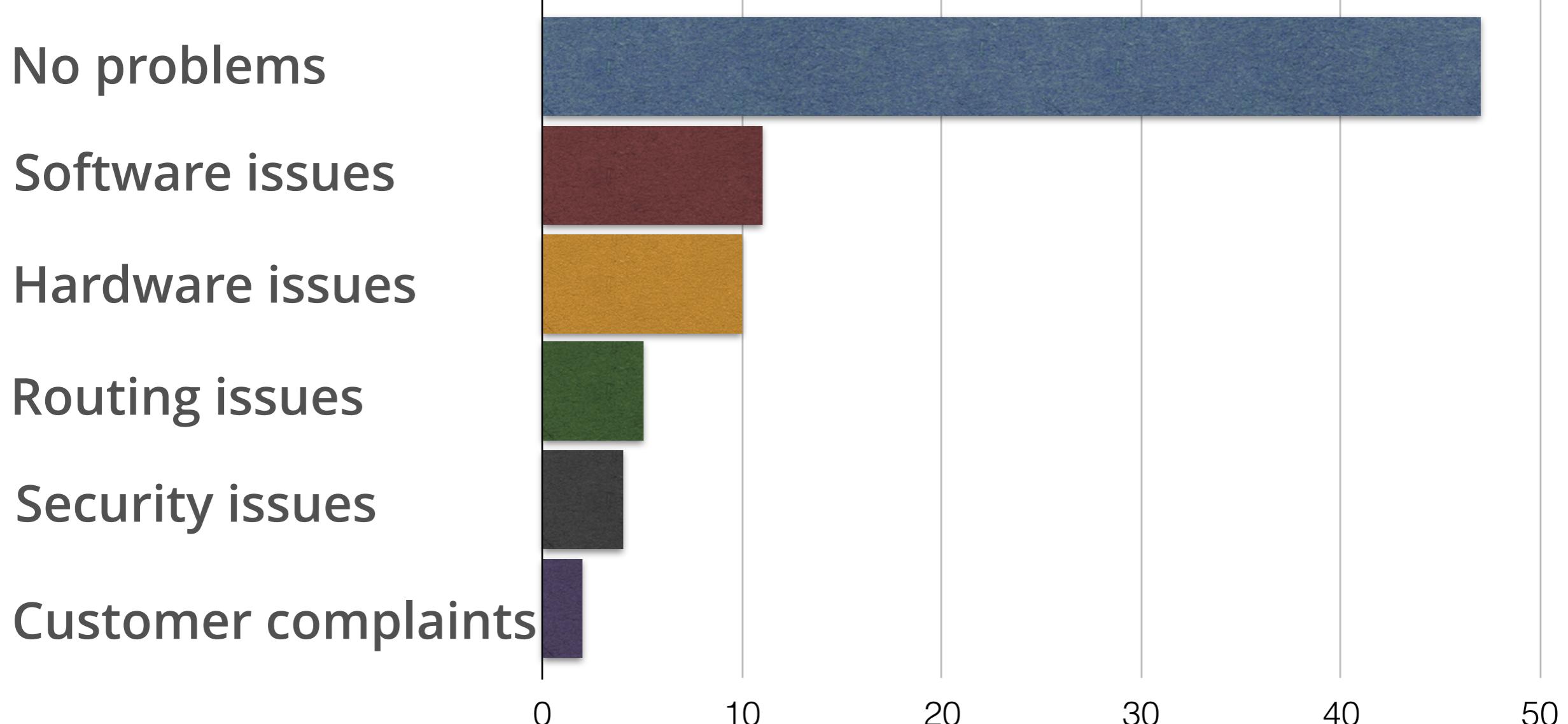
- What was the purpose of the announcement?



Experiences



- What were your experiences during the announcement?



Experiences - Details (1)



- It was only a test
 - Announced IPv6 just for testing
 - “test customer hasn't setup his test scenario”
- Hardware or software issues
 - New router and new set-up needed
 - Documentation tools needed to keep records clean

Experiences - Details (2)

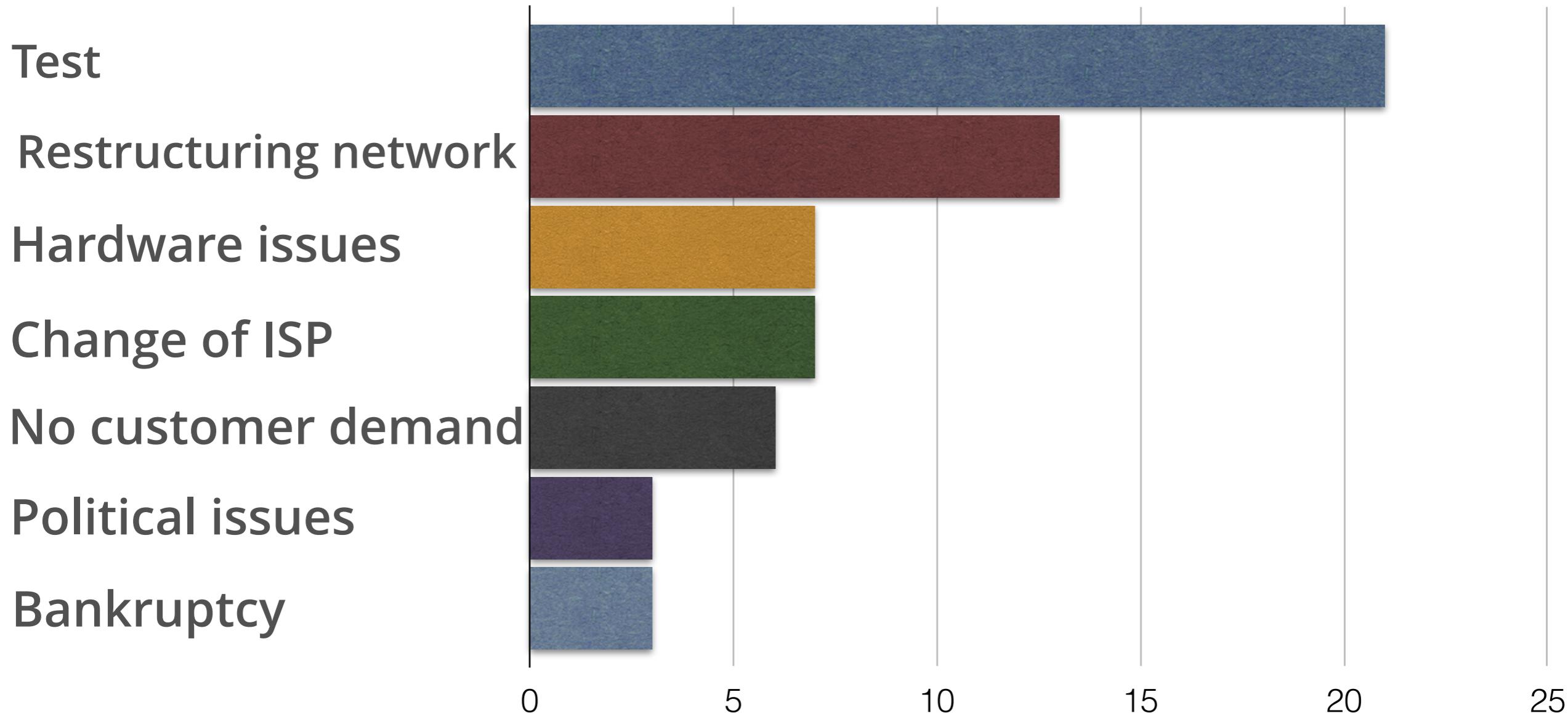


- Lack of acceptance by other aspects of the business
- IPv6 not supported in my country
- Main engineer left
 - Are a lot of IPv6 deployments driven by a single person?

Reasons



- Why did you disable your IPv6 announcement?



Reasons - Details (1)



- No interest from customers
- Just testing
 - Wanted to get ready
 - Switched it off until needed
- Network infrastructure changed
 - We changed something, didn't re-enable IPv6 again (core routers, data centre, ...)
 - Traffic moved to different IPv6 range

Reasons - Details (2)

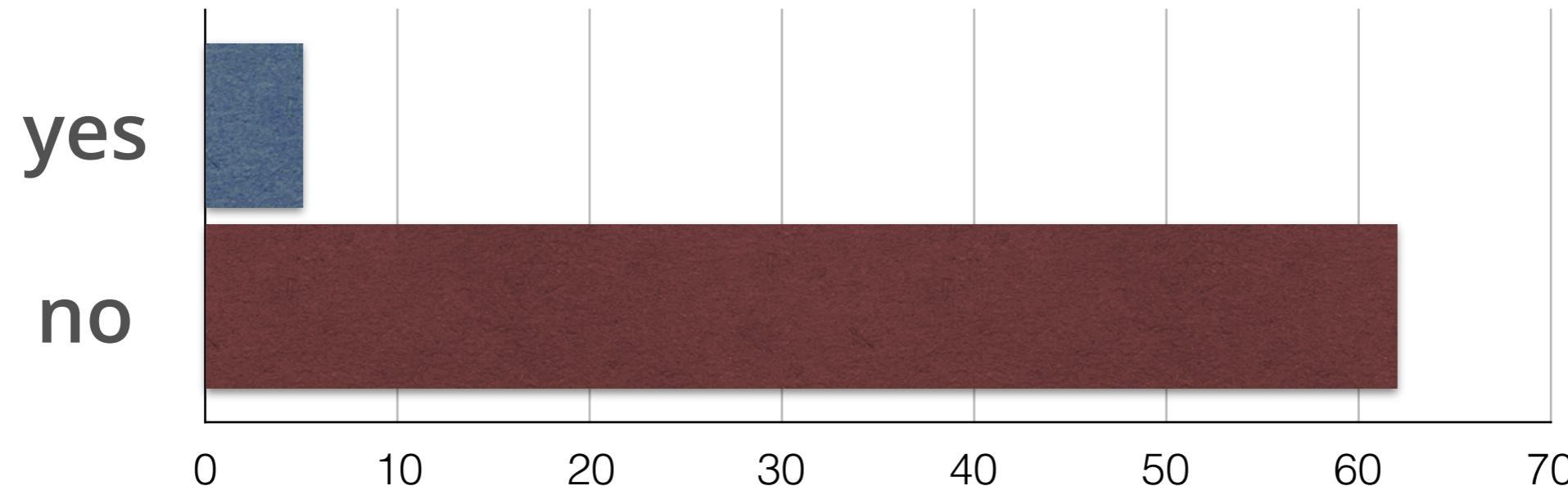


- Hardware or security issues
 - “Compatibility issues with old Cisco and new Juniper equipment related to deployment of 6PE MPLS”
 - “We were under huge DDoS attacks all the time”
 - Routers didn’t survive stress testing (IPv6 done in software)
- Service provider issues or issues with tunnel broker
- Didn’t realise that announcement stopped
 - Need for better monitoring tools?

IPv4?



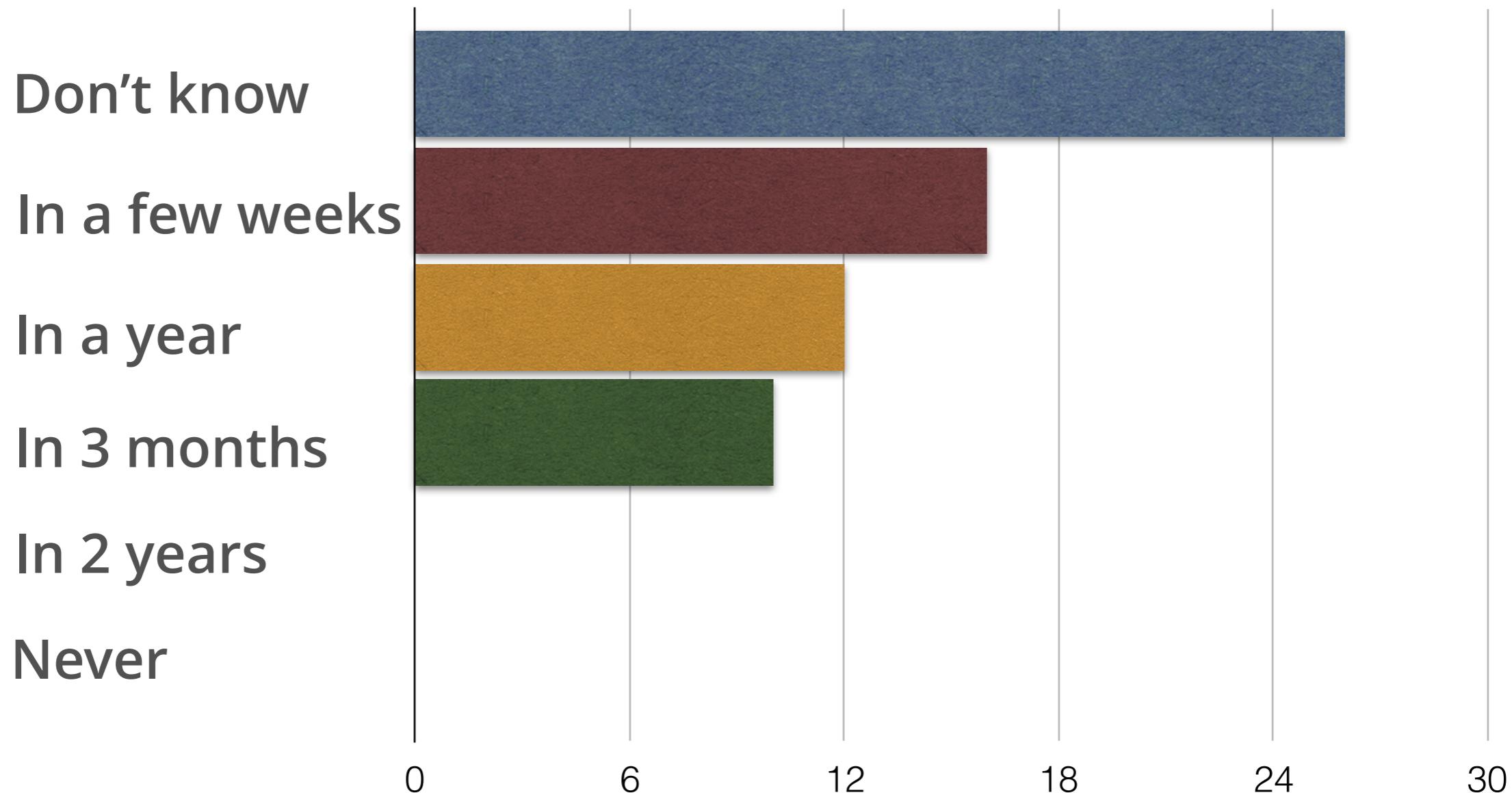
- Did you also stop your IPv4 announcements?



Plans



- When will you announce your IPv6 prefix again?



Plans - Details



- Sorry - Fixed!
- Will return resources
- When customers want it
- Depends on upstream provider

How Can the RIPE NCC Help?



- Provide more training
- Tips for addressing plans
- Pointers for best practices
- Discuss IPv6 with governments

<https://ipv6actnow.org/>

Summary



- People appreciated us asking
- Still various issues
 - Hardware, software, upstream
- Lack of customer demand
 - Will customer demand for IPv6 ever exist?
- Monitoring missing
- One-man-show

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Questions



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