



**RIPE
NCC**

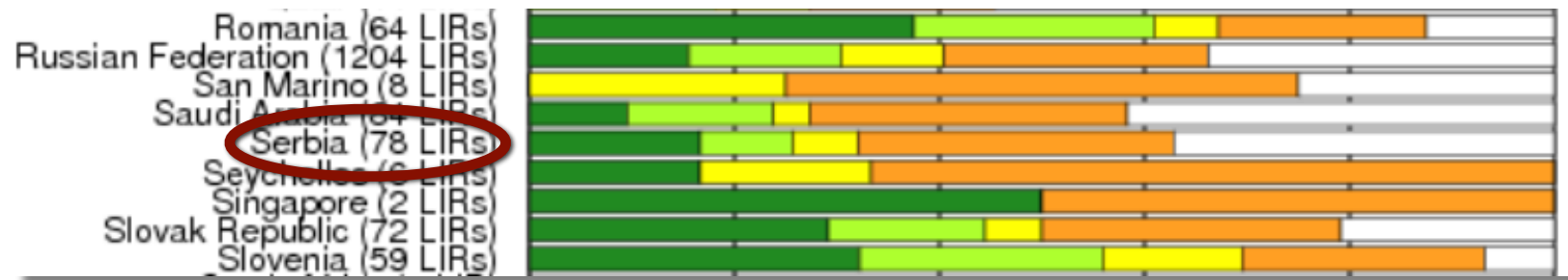
IPv6 RIPEness — from 4 to 5 stars

Vesna Manojlovic

Community Builder for Measurement Tools

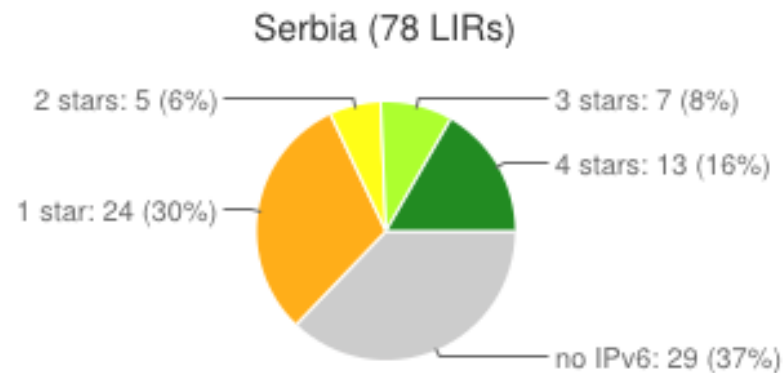
BECHA@ripe.net

- Measure of IPv6 readiness for LIRs
 - allocation
 - reverse DNS
 - route6 object in Routing Registry
 - BGP seen in RIS (Routing Information Service)



- 4 stars == free T-shirt!

- 4 star: <http://ipv6ripeness.ripe.net/4star/RS.html> = 13 LIRs

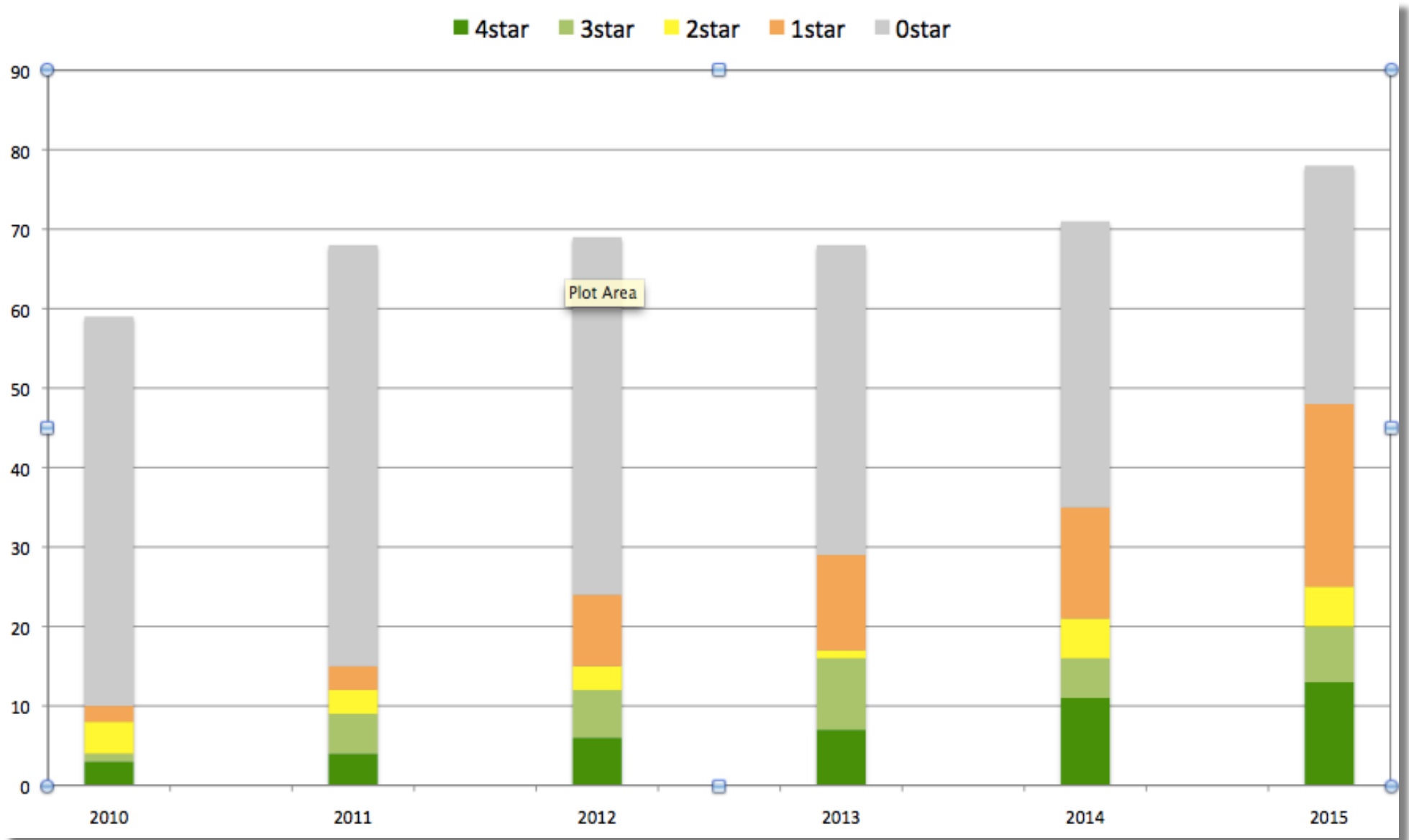


- 5 star: <http://ipv6ripeness.ripe.net/5star/RS.html>

Access (last 6 months)	Access (last month)	Content	LIR
7.8 %	8.2 %	15.5 %	Akademski mreza Republike Srbije - AMRES
		41.1 %	Drustvo za telekomunikacije Verat d.o.o, Bulevar Vojvode Misica 37
		100.0 %	Vip mobile d.o.o.

IPv6 RIPEness in Serbia over time

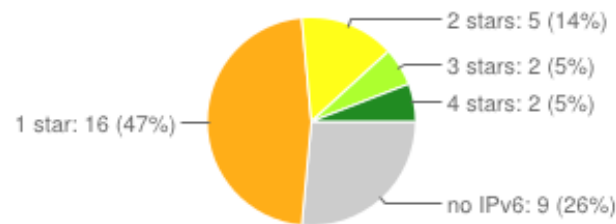
| 4



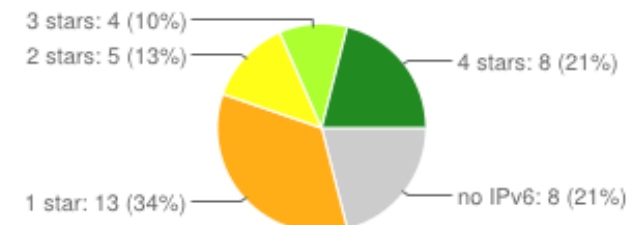
IPv6 RIPEness in the region

| 5

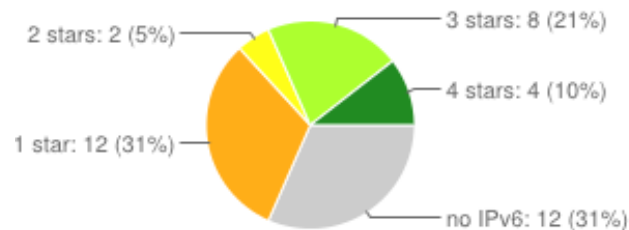
Albania (34 LIRs)



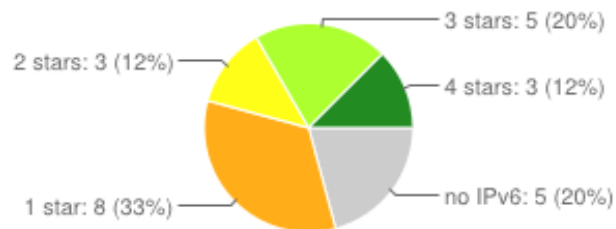
Croatia (38 LIRs)



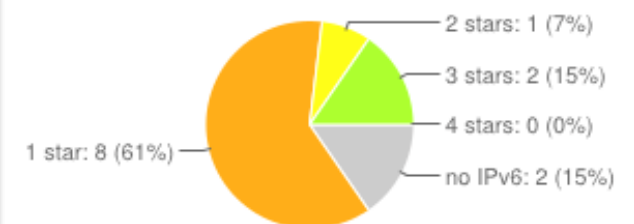
Bosnia-Herzegovina (38 LIRs)



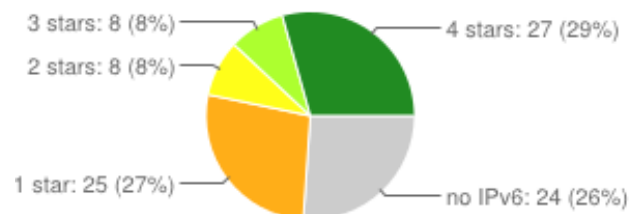
Macedonia (24 LIRs)



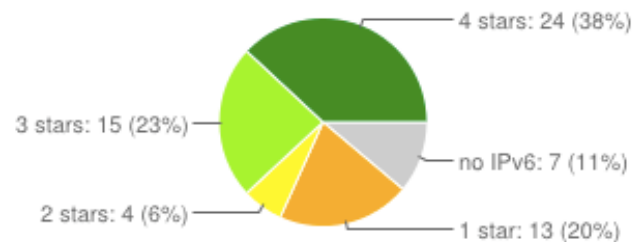
Montenegro (13 LIRs)



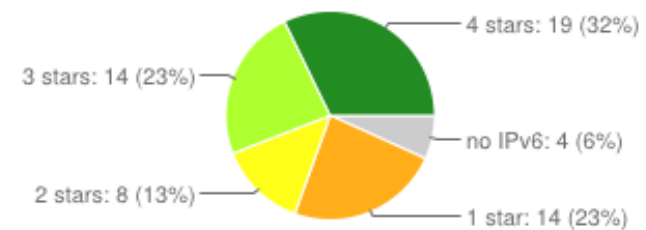
Bulgaria (92 LIRs)



Romania (63 LIRs)



Slovenia (59 LIRs)



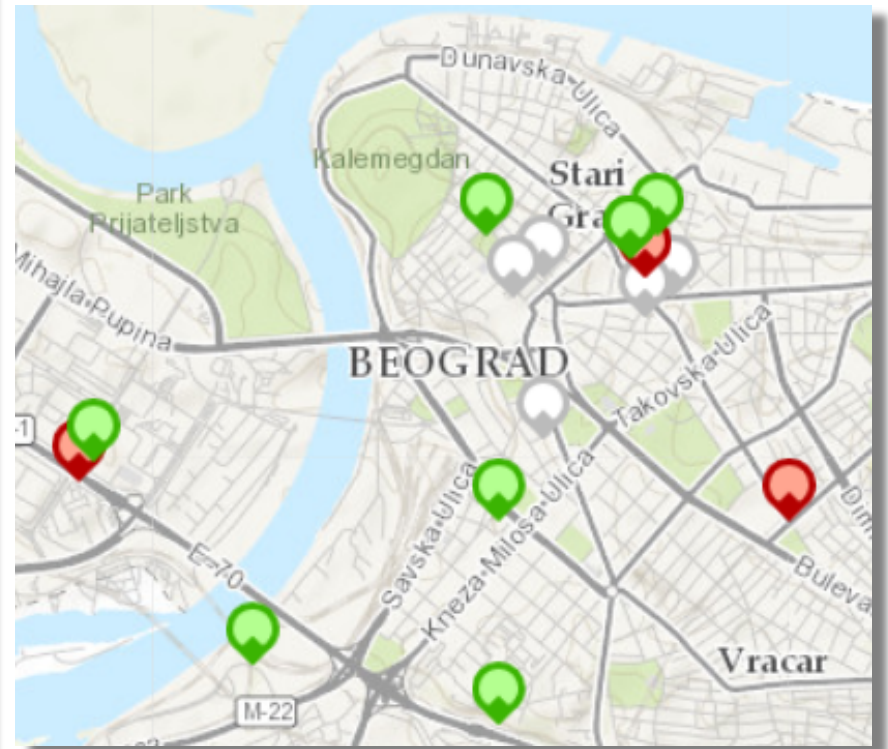


More Serbian IPv6 Statistics



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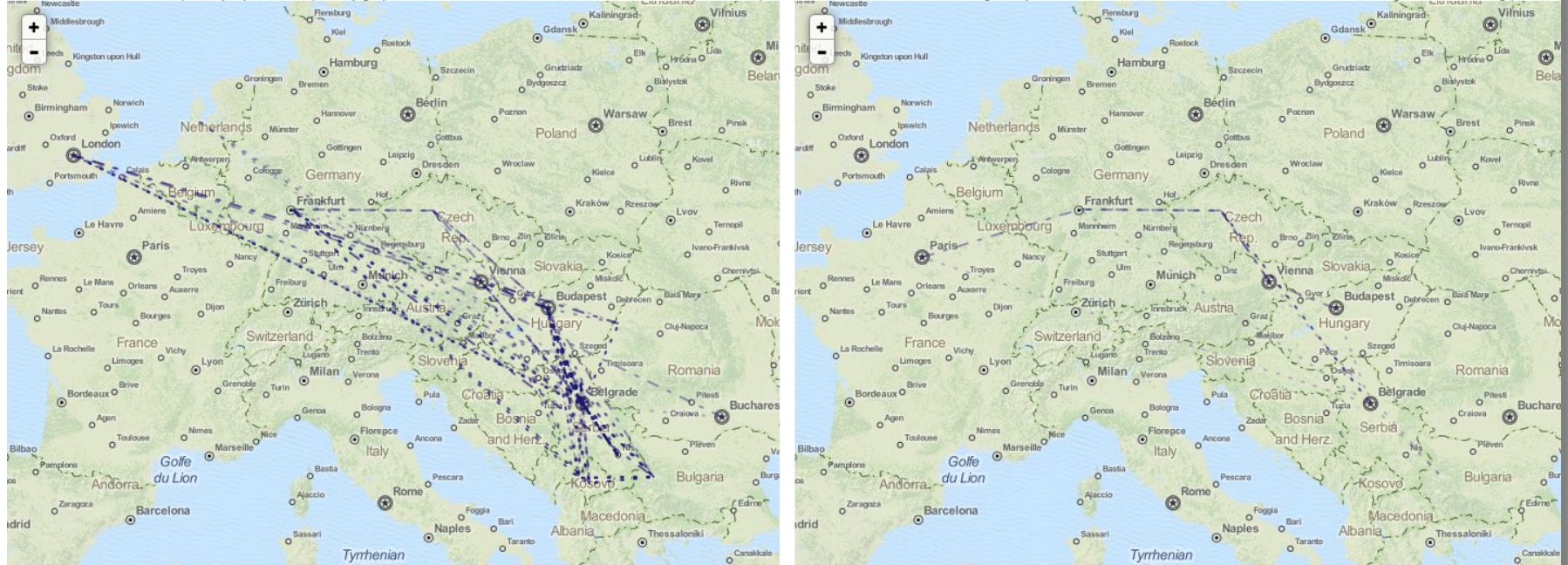
Serbia (rs) 33 connected, 8 disconnected, 19 abandoned.



- Please plug in & register!

- IXP-Jedi: country-specific RIPE Atlas probes traceroute mesh

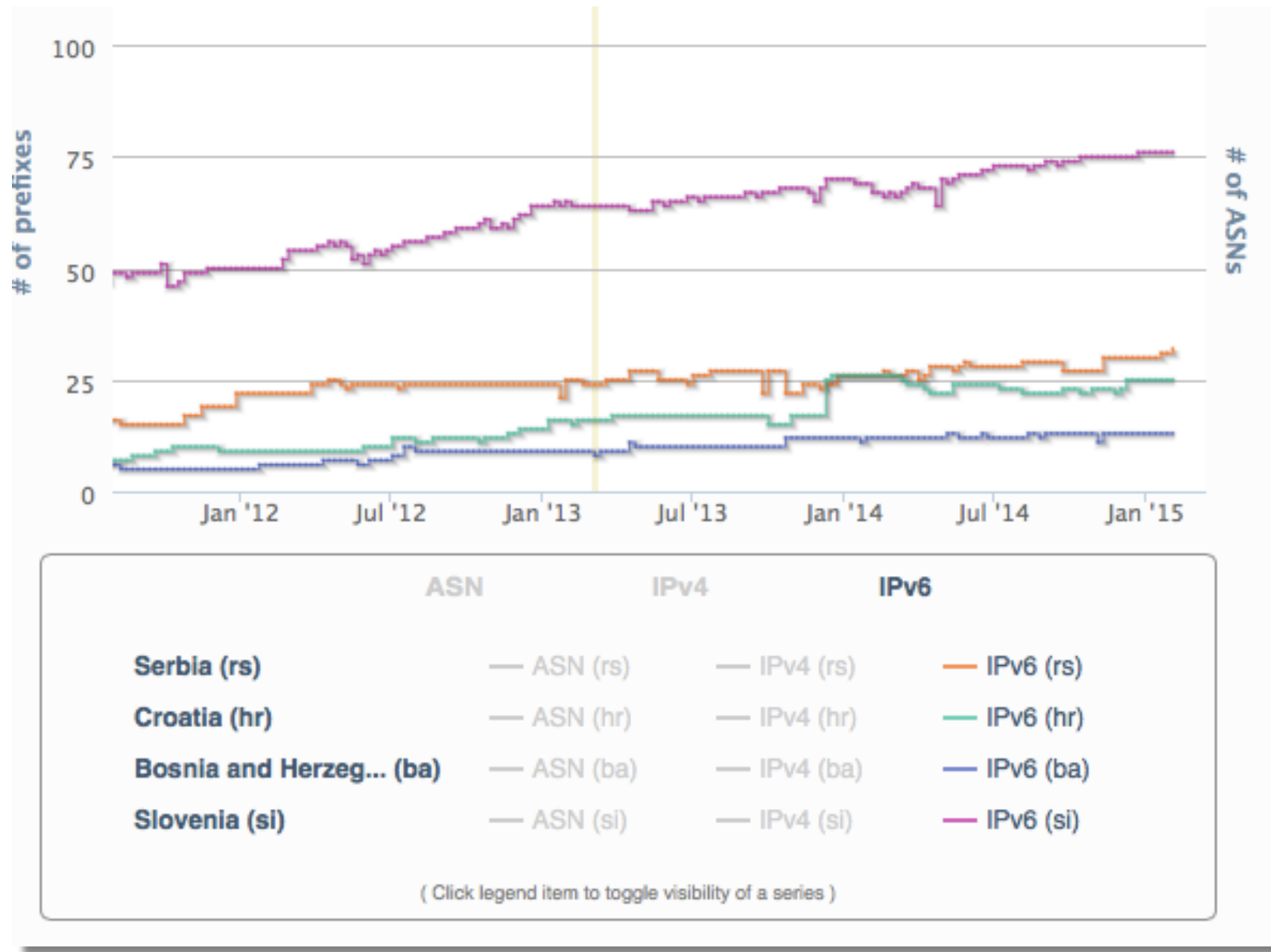
These maps show the IPv4 paths (left) and IPv6 paths (right) seen in traceroutes. Indirect links in traceroutes (ie. with hops inbetween without answer, or no geoloc) are shown with dotted lines, direct links with lines with long-short alternating pattern.

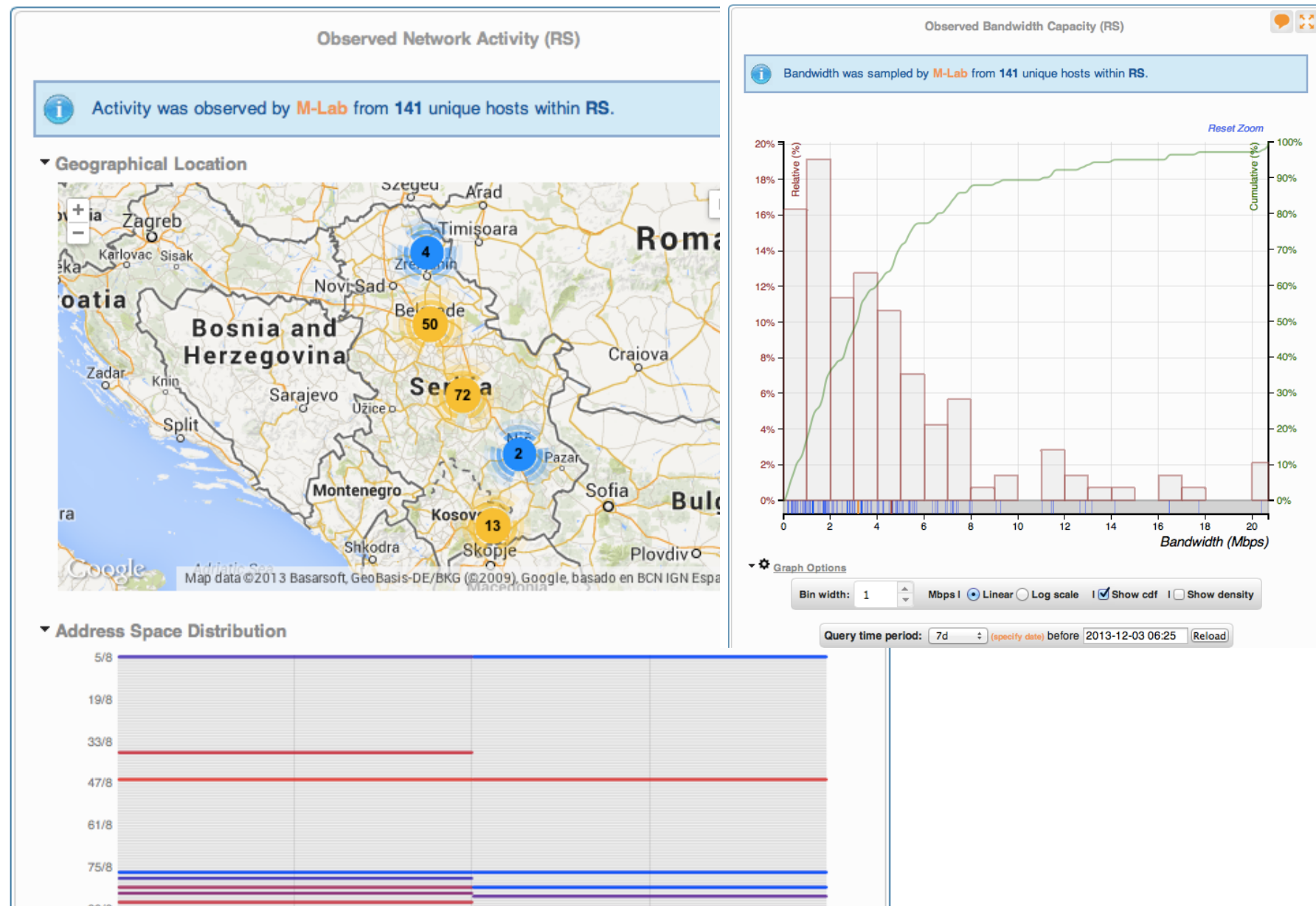


- In Serbia: four (4!!!) probes have IPv6!
 - SOX, Verat, AMRES (& Hurricane Electric ;-)

Comparing IPv6 networks numbers

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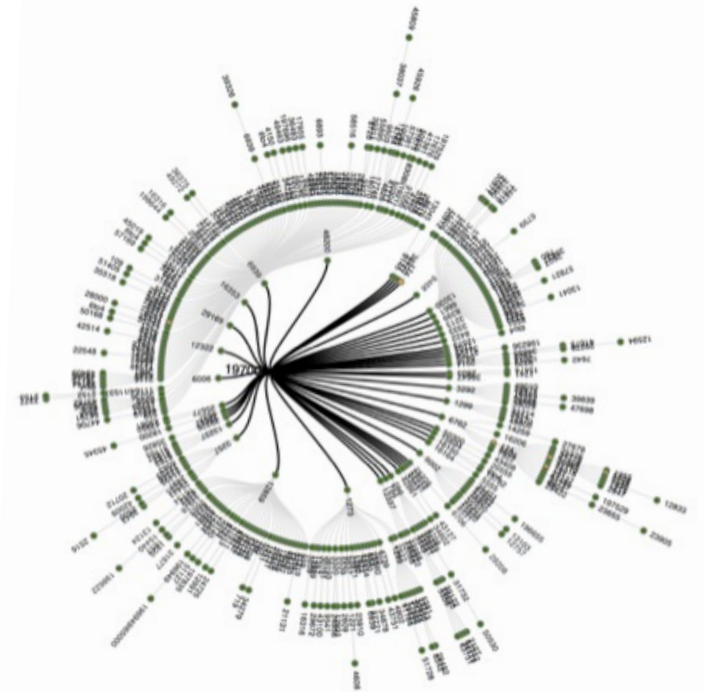


Extra slides: RIPE Atlas IPv6 Measurements



RIPE
NCC

- Only for RIPE NCC members! (LIRs)
 - Via the LIR Portal
 - Using 1,000 RIPE Atlas probes
 - Visualising:
 - Completed paths
 - Unsuccessful paths
 - Clickable hops (ASNs)
-
- <https://labs.ripe.net/Members/becha/test-your-ipv6-reachability-using-ripe-atlas>
 - <https://labs.ripe.net/Members/emileaben/visualise-your-ipv6-connectivity-using-ripe-atlas>



Global Reachability Measurements

- We test the reachability of the globally-defined v6DPs using **100 active probes** within the RIPE Atlas platform



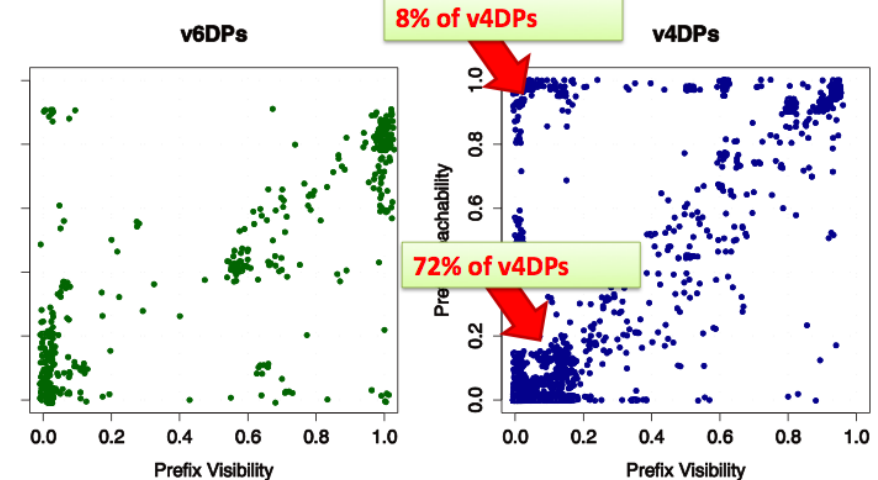
RIPE68@Warsaw

[https://ripe68.ripe.net/presentations/226-Understanding the Reachability of IPv6 Limited Visibility Prefixes.pdf](https://ripe68.ripe.net/presentations/226-Understanding%20the%20Reachability%20of%20IPv6%20Limited%20Visibility%20Prefixes.pdf)

Results

average reachability degree for a v6DP is of **46.5%**

average reachability degree for v4DPs is of **17.4%**



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Help us to help you!

- Go to **visibility.it.uc3m.es**
- Check if the prefixes of an AS are LVPs/DPs– monitor the global visibility of your prefixes!
- ... and tell us why the prefixes discovered have limited visibility in the first place: intended/unintended behaviour?

Query for ASN:

Get prefixes

Please take the time to fill in the short survey form after visualizing the results of your query

Fill in the AS number here

- Using RIPE Atlas to perform worldwide traces to measure round-trip times and other route measurements
 - We identified routes that can be optimised and sent to other POPs with much better response times
 - We also identified routes that can be optimised by changing the transit provider for the same POP
 - <https://labs.ripe.net/Members/becha/world-ipv6-launch-ripe-atlas-use-cases>
- The success rate with IPv6-only domain names is much lower (~60%) than with "mixed" (both IPv4 and IPv6) domain names (~96%)
 - https://labs.ripe.net/Members/stephane_bortzmeyer/how-many-ripe-atlas-probes-can-resolve-ipv6-only-domain-names

- Is there BGP route filtering based on prefix size in IPv6?
 - We saw roughly 1% out of ~500 RIPE Atlas probes that can't reach a destination in an IPv6 /48 prefix (without a covering shorter prefix) out of IPv6 PA space
 - Likely due to filtering
 - <https://labs.ripe.net/Members/emileaben/ripe-atlas-a-case-study-of-ipv6-48-filtering>
- Is the DNS filtering of AAAA causing unexpected problems?
 - <https://labs.ripe.net/Members/emileaben/ripe-atlas-case-study-of-aaaa-filtering>

- What happens when users try to send large packets over the Internet? Above a certain size, these packets will have to be fragmented, which might cause problems
- 9% of RIPE Atlas probes have problems with fragmentation in IPv4, and 10% of probes have fragmentation problems in IPv6
- <https://labs.ripe.net/Members/emileaben/ripe-atlas-packet-size-matters>
- <http://www.nlnetlabs.nl/downloads/publications/pmtu-black-holes-msc-thesis.pdf>

- Performing traceroute6 to DNS name that does not have IPv6 helped troubleshoot IPv6 at Vienna University!
 - Most probes reported “name resolution failed”
 - “One probe, 13255 resolved wsw2.cc.univie.ac.at to 2001:6f8:114e:3::c099:aec4, which is interesting because c099:aec4 is exactly equal to the IPv4 address of wsw2.cc.univie.ac.at. So I suspect that this probe is behind a resolver that does DNS64.” (allowing this user-defined measurement was a RIPE Atlas bug ;-)

- “It is quite common in the IPv6 world to have devices that believe they are connected to the IPv6 Internet while they are not”
 - “When you use RIPE Atlas to measure the connectivity of an IPv6 device, 90% success is the maximal reachability you'll get.”
 - https://labs.ripe.net/Members/stephane_bortzmeyer/how-many-atlas-probes-believe-they-have-ipv6-but-are-wrong

- Application Aspects of IPv6 Transition: <http://tools.ietf.org/html/rfc4038>
- Porting applications to IPv6:
 - <http://gsync.escet.urjc.es/~eva/IPv6-web/ipv6.html>
 - http://www.euchinagrid.org/IPv6/IPv6_presentation/Introduction_to_IPv6_programming.pdf
- Ecdysis: open-source implementation of a NAT64 gateway:
 - <http://ecdysis.viagenie.ca/>
- **A Recommendation for IPv6 Address Text Representation**
 - <http://tools.ietf.org/html/rfc5952>
- IETF WGs - Behave: Standardising NATs and protocol translators
 - <https://www.ietf.org/dyn/wg/chapter/behavior-charter.htm>