

RIPE Atlas: the Largest Active Measurements Network

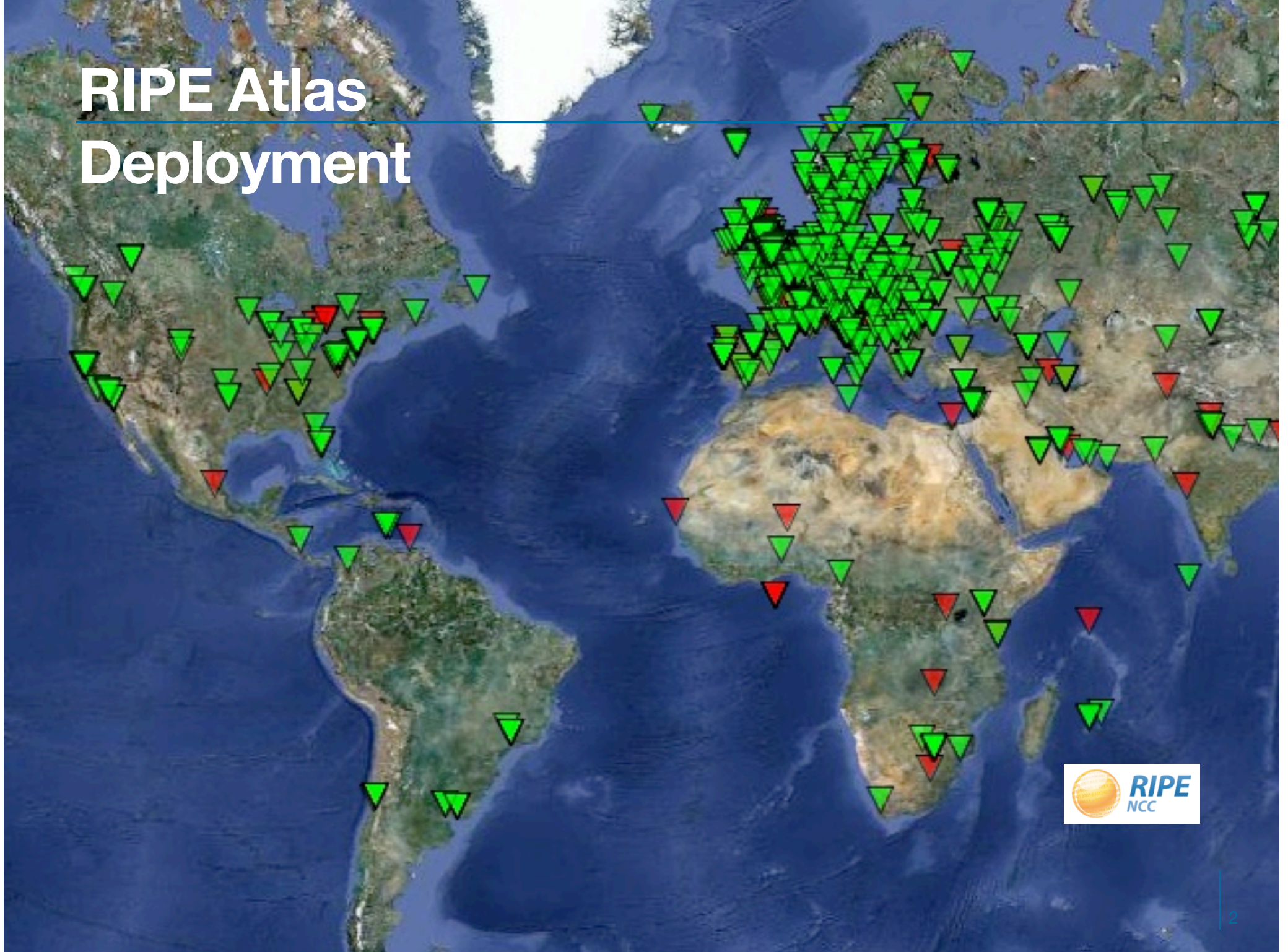
SEE2 meeting, Skopje

Vesna Manojlovic


RIPE NCC



RIPE Atlas Deployment

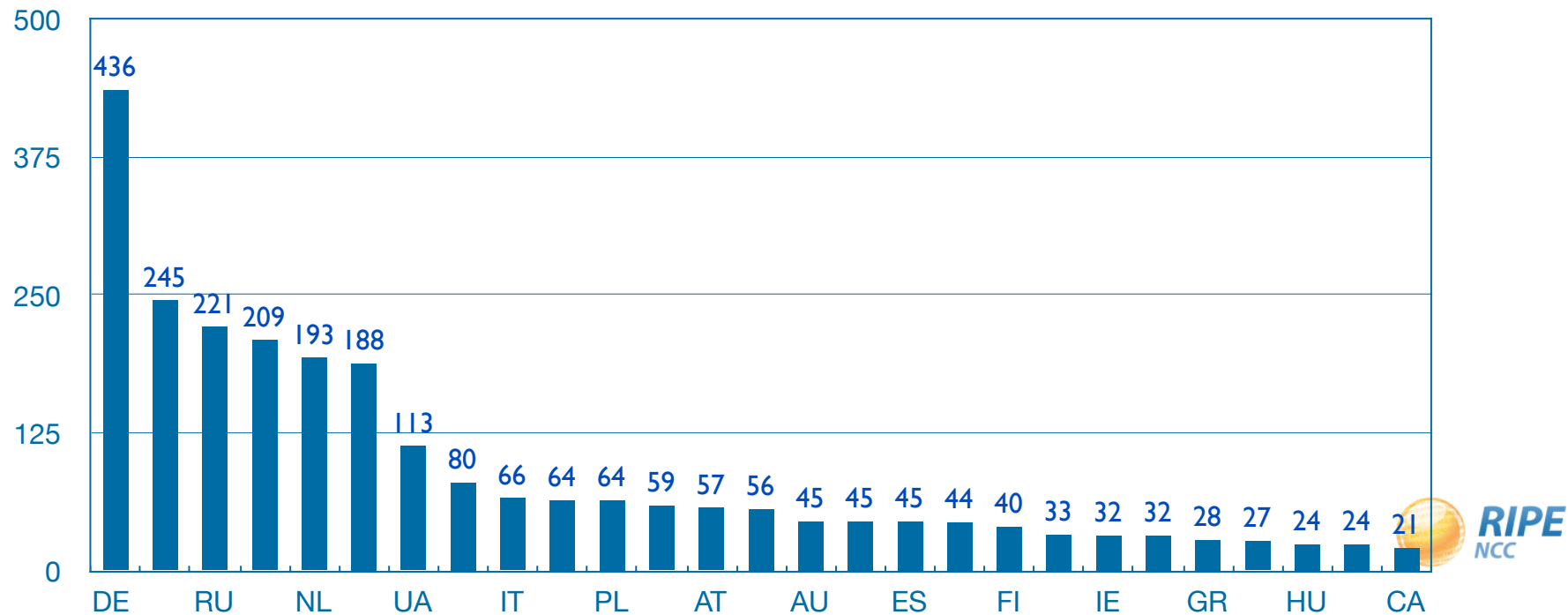


RIPE Atlas Now (April 2013)

- **2,900+** probes are up and running
 - **1,048+ IPv6-capable** probes
- Data of built-in measurements available to **everyone**
 - In form of maps, tables, public probes data and **API to download raw data**
- Four types of customised measurements available to **hosts and RIPE NCC members:**
ping, traceroute, DNS, SSL
- Major benefit: look at your network from the outside!
- Anyone can become a RIPE Atlas probe host: 
apply now at <https://atlas.ripe.net/apply>

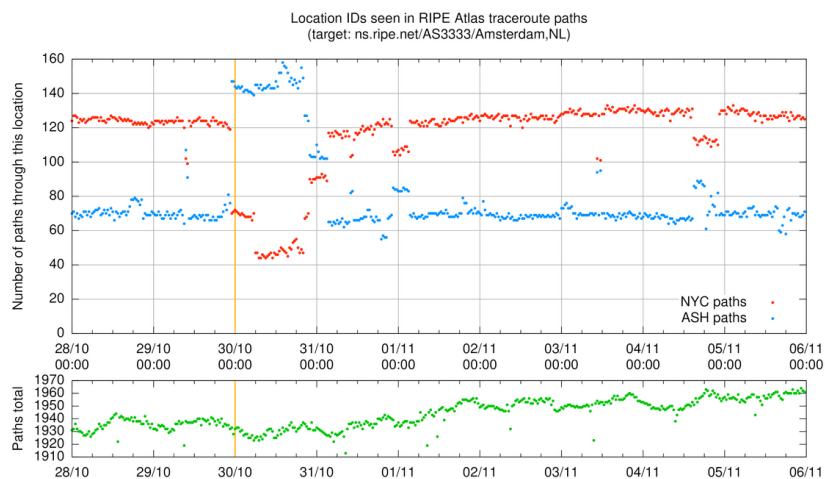
RIPE Atlas Coverage

- Probes deployed in 108 countries
- Network coverage criteria for distribution: varied ASNs and IP prefixes
- <https://atlas.ripe.net/contrib/coverage.html>



Measuring Hurricane Sandy with RIPE Atlas

- Most RIPE Atlas probes in affected area unavailable during Hurricane Sandy
- Traffic partially shifted away from NYC as a transit hub



<https://labs.ripe.net/sandy-2012>

RIPEstat: Probes Per ASN, IP Prefix or Country

Routing	(1)
Database	(1)
Activity	(1)

RIPE Atlas Probes (mk)

Found 7 RIPE Atlas probes in this network.

Never Connected Connected Disconnected

Map Satellite



RIPE Atlas Probe: 3rd Generation

- TP-Link TL-MR3020
- Powered from normal USB port (500mA)
- 32 MB RAM, 4 MB flash built-in, 4GB flash on USB stick
- Runs OpenWRT
- 400 MHz MIPS CPU with MMU
- A reboot takes about 1 minute
- An SSH connection takes less than two seconds
- Firmware is updated remotely, both on the built-in flash & on the USB stick



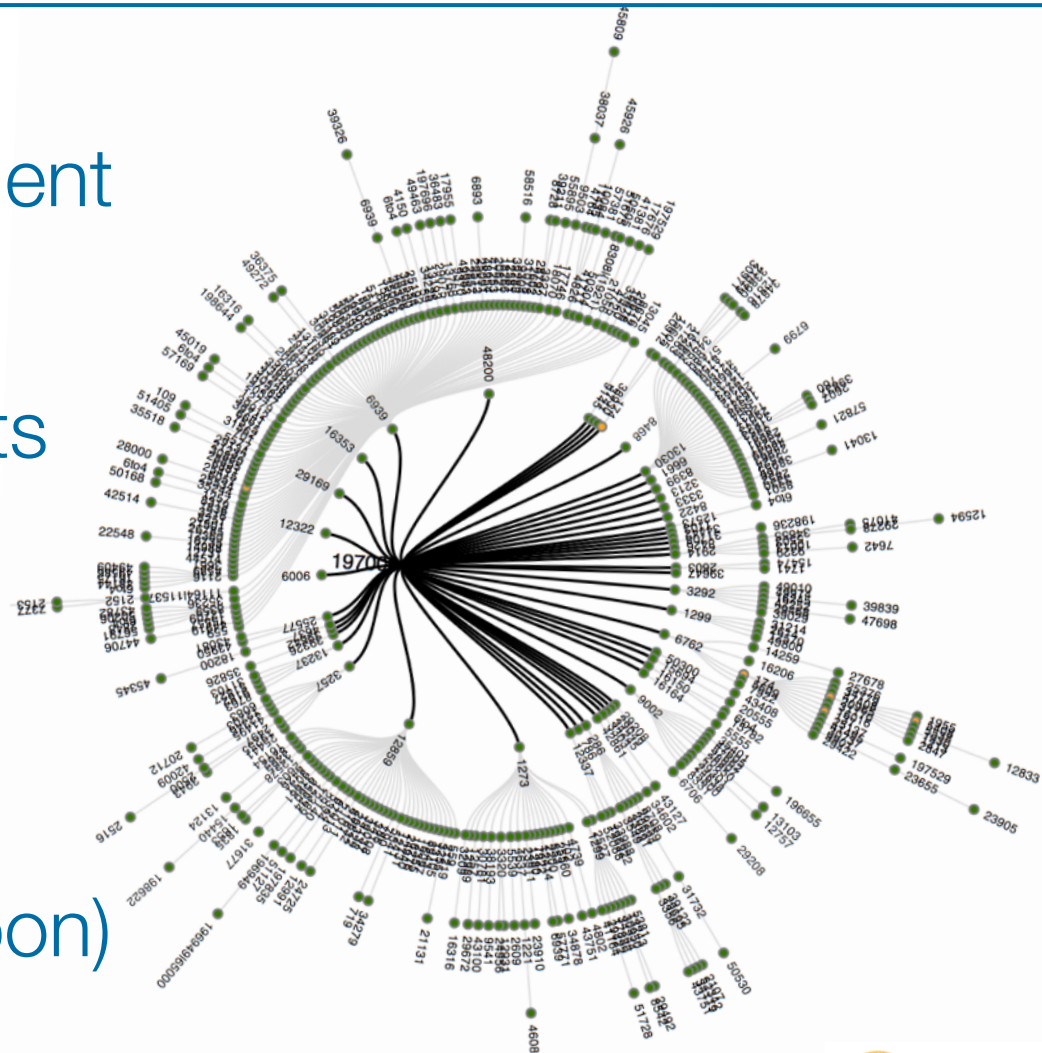
RIPE Atlas Anchors

- Anchors are powerful probes and well-known targets
 - Pilot started in September 2012
 - Currently 11 anchors deployed
 - Goal: ~50 deployed in 2013



RIPE Atlas: for LIRs/ RIPE NCC members

- One-click measurement
"Test your IPv6"
- Get 1,000,000 credits
- Apply for the probe
via LIR Portal
- Quick Look
measurements (soon)



More News

- 6 new sponsors in 2013
- One-off measurements introduced to testers
- REST API available for creating measurements
- Community pages (Top-10 users, photos)
- GitHub Community Repository available
- Established cooperation with interested users:
regulators, researchers, operators



RIPE Atlas is grateful to our sponsors...

<https://atlas.ripe.net/get-involved/become-a-sponsor/>



New Arrivals to the Community

Community Information

<https://atlas.ripe.net/atlas/community>

General information about Atlas members and their contributions.

Always Up

Big Spenders

New Arrivals

These are the new users in the past ten days. Note that the flags are representative of their probe locations and not necessarily their nationality.



Jack Pennings



BECHA (Xs4all)



Sonny Piers



Kiran Chittimaneni



Ruud Verstijnen



Nikolay Melnikov



Philip Basford



Vegard Haaverstad



Mark Martin



Dorothy Gellert



RIPE Atlas: Contact

- Get a probe: **atlas.ripe.net/apply**
- Community pages: <https://atlas.ripe.net/atlas/community>
- Mailing list for active users: **ripe-atlas@ripe.net**
- Questions: **atlas@ripe.net**
- Twitter: **#RIPEAtlas** & **@RIPE_Atlas**
- Community Builder: Vesna Manojlovic: BECHA@ripe.net

<https://atlas.ripe.net>



Questions?



Background Info - How Atlas Works



Hardware Devices: Probes

- For accurate maps we need many vantage points
 - Small probes
 - Easily deployable
 - USB powered
 - 24 x 365 capable



- Hosted and sponsored by organisations and end-users
 - ISPs, Internet Exchange Points, individuals...
 - Free of charge for volunteers who host individual probes



Who Can Perform Which Measurements?

- RIPE NCC is performing “built-in” measurements
 - From **all** the probes, towards root name servers and our infrastructure
 - Periodically: few times a day **(55 million / day)**
 - pings, traceroutes and DNS queries
 - Data stored on Hbase/Hadoop clusters
 - Results available to everyone!
- Probe hosts and RIPE NCC members perform customised measurements using the targets of their choice and desired frequency
 - **(5 million / day)**
- Anchoring measurements coming up soon
 - Each probe will measure 4-5 “anchors” as a regional baseline
 - RIPE Atlas anchor hosts can perform their own customized measurements



Credits System

- By hosting a probe, a host earns credits
 - As a reward for making his/her probe available to other users, for performing measurements **from** that probe towards any target
 - Hosts earn 21,000+ credits per day, as long as the probe is connected
- In order to schedule customised measurements, users spend credits
 - ping costs 10 credits, traceroute 20, etc.
 - Daily limit applies
- Credits system introduced to ensure fairness and protect system from overload
- Extra credits can be earned by: being a RIPE NCC member, hosting a RIPE Atlas anchor or sponsoring multiple probes



Results and Case Studies

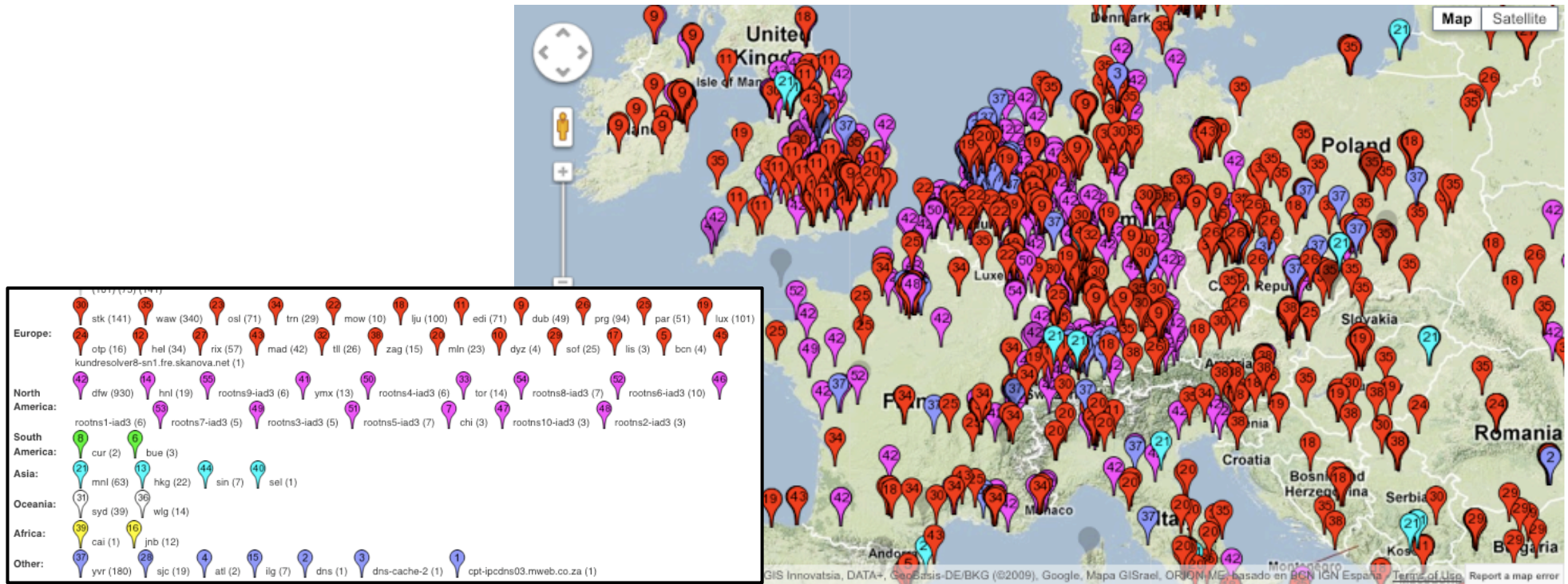


RIPE Atlas Maps: Comparing DNS Root Servers RTT

Key (minimum response time and protocol): ? <=10ms ? <=20ms ? <=30ms ? <=40ms ? <=50ms ? <=100ms ? <=200ms ? <=300ms ? <=500ms
>500ms (unreachable) = IPv4 = IPv6



Which Anycast Instance is Each Probe Querying?

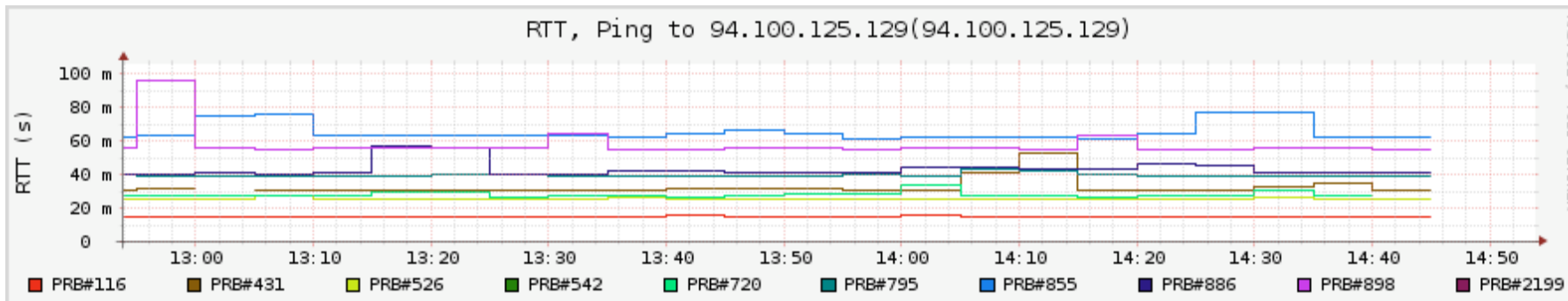
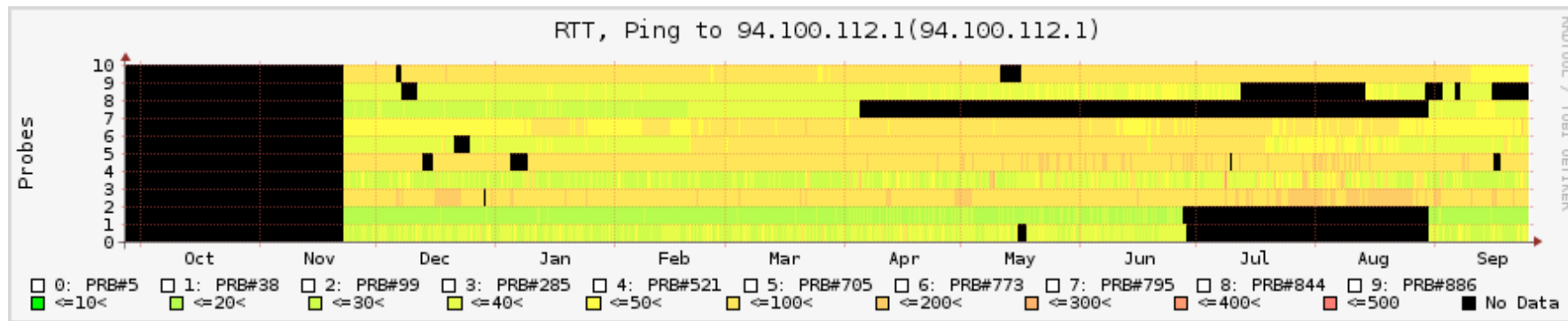


Where is D-root?

Showing results of last measurements. Key (minimum RTT):
▼ ≤10ms ▼ ≤20ms ▼ ≤30ms ▼ ≤40ms ▼ ≤50ms ▼ ≤100ms ▼ ≤200ms ▼ ≤300ms
▼ ≤500ms ▼ >500ms ▼ (unreachable)



Details of Customised Measurements



Case Studies of RIPE Atlas Usage

- Testing an occasional operational issue to verify DNS responses from a number of widely distributed measurement points
<https://labs.ripe.net/Members/pk/denic-case-study-using-ripe-atlas>
- A Case Study of IPv6 /48 Filtering, Emile Aben
- IPv6 reachability testing before and during World IPv6 Launch
<https://labs.ripe.net/Members/becha/world-ipv6-launch-ripe-atlas-use-cases>
- Correlating Routing Configuration Changes with Forwarding Changes
David Lebrun, University of Louvain, Belgium
- Discovering Path MTU Black Holes on the Internet Using RIPE Atlas
Maikel de Boer, Jeffrey Bosma

labs.ripe.net/atlas and **<https://atlas.ripe.net/analyses>**

