RIPE Atlas
Global Internet Measurement Network

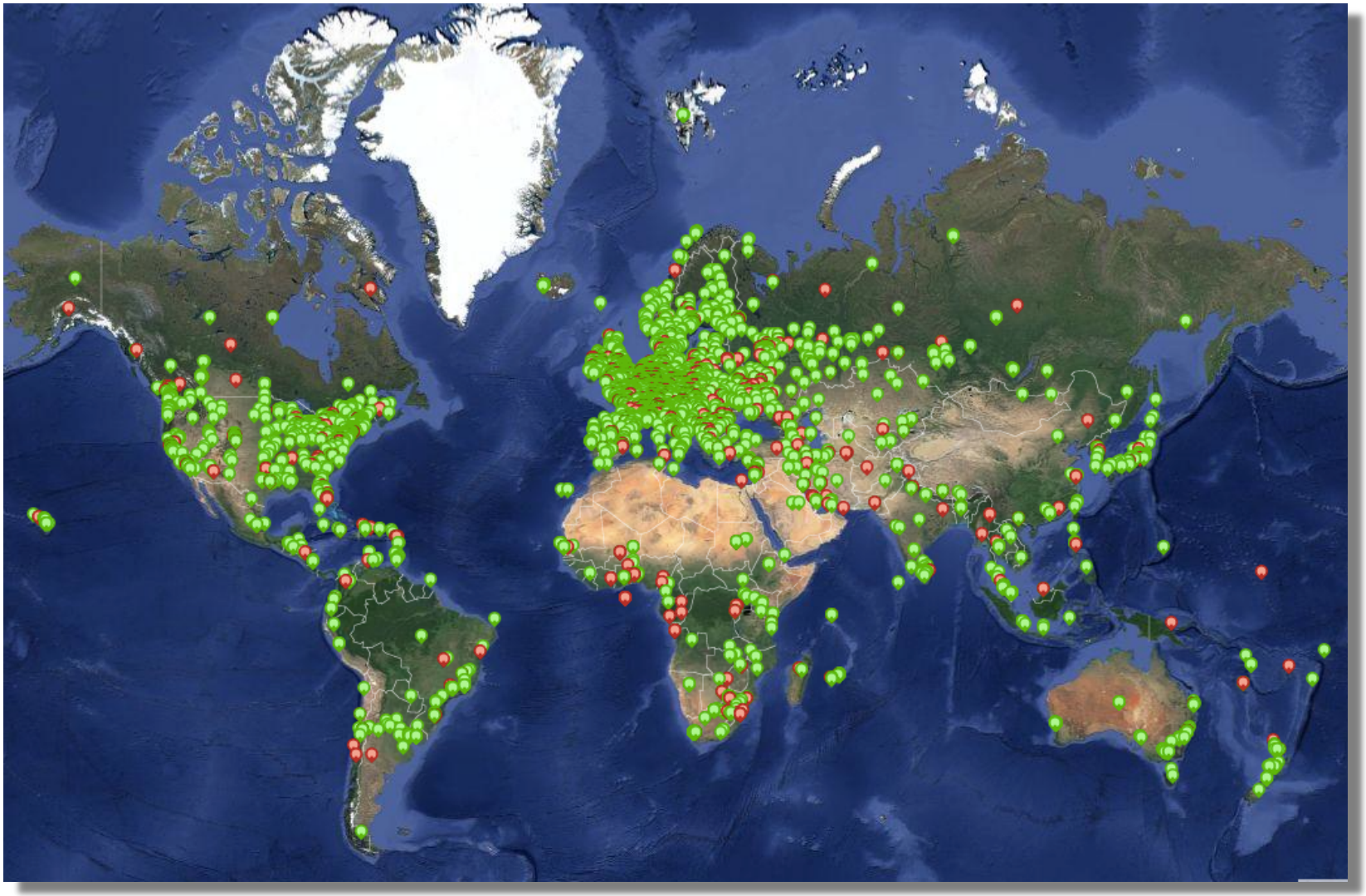
NSRC DrukREN Campus Network Design Workshop

September 2015

RIPE Atlas

- Active measurements network consisting of thousands of probes
- Ongoing global measurements to root nameservers
  - Visualised as Internet traffic maps
- Ongoing regional measurements towards “anchors”
- Users can run measurements to targets of their choice
  - ping, traceroute, DNS, SSL/TLS and NTP
- Data publicly available via API and visualizations

RIPE Atlas



August 2015

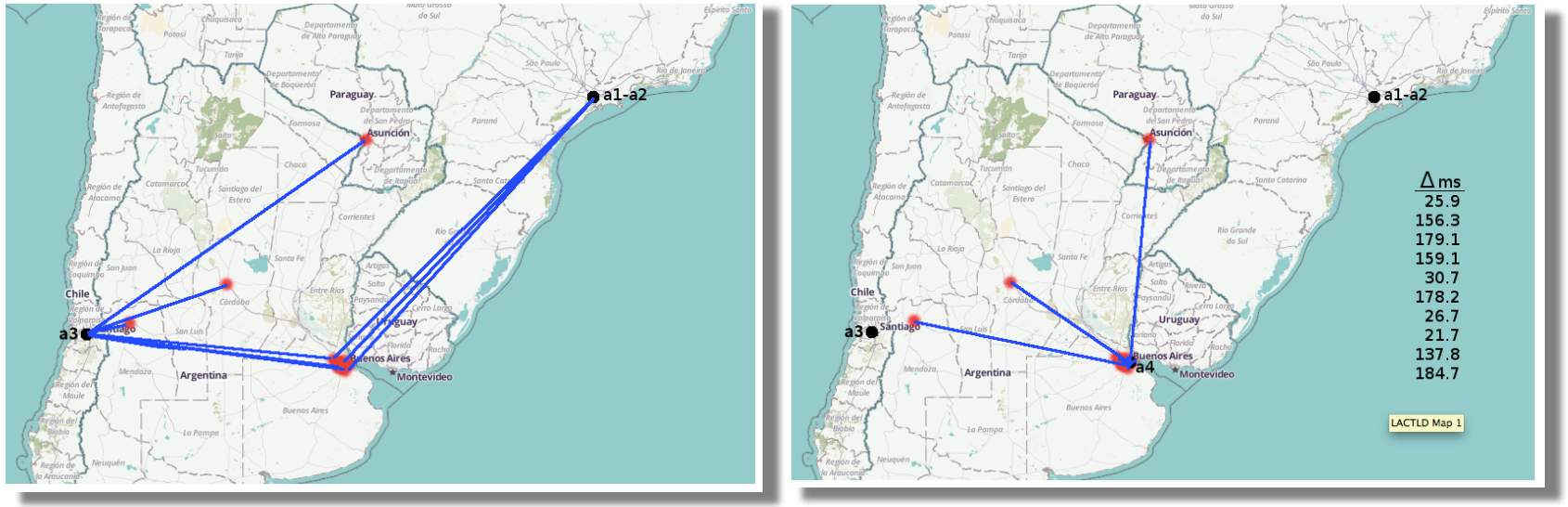
- 8,500+ probes connected
  - Only 8 probes in Bhutan, and only 2 connected ☹
- 5,000+ active users in the last quarter
- 2,500+ results collected per second
- 35,000+ customised measurements weekly

Selected
RIPE Atlas Use Cases

RIPE NCC

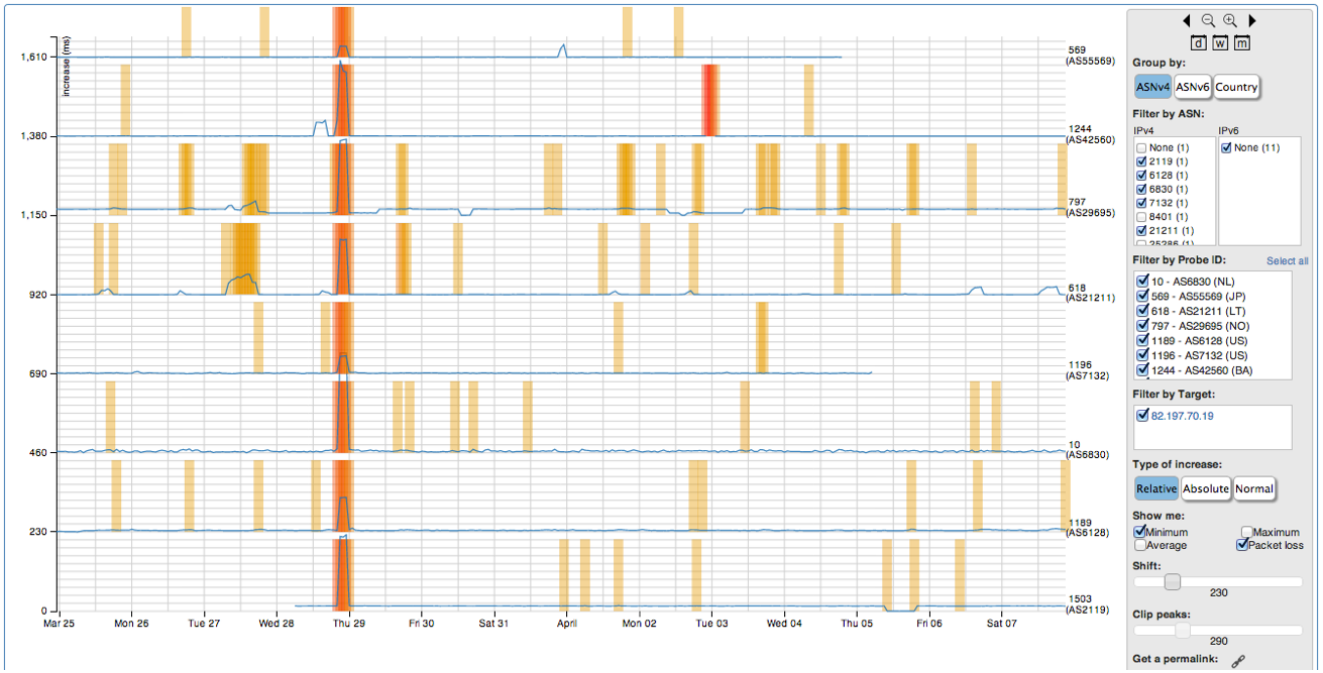
Measuring LACTLD Anycast Service

- Visualizing changes in anycast network architecture
  - https://labs.ripe.net/Members/hugo_salgado/visualisation-of-a-new-node-in-lactld-anycast-service



Monitoring Global Server Reachability

- **Seismograph:**
  - https://labs.ripe.net/Members/massimo_candela/seismograph-user-guide
  - Multiple ping measurements in one view



Measuring IXP effectiveness

- **Impact of IXPs on keeping traffic local**

  https://labs.ripe.net/Members/emileaben/measuring-ixps-with-ripe-atlas

  https://labs.ripe.net/Members/emileaben/measuring-countries-and-ixps-in-the-see-region

  http://sg-pub.ripe.net/emile/ixp-country-jedi/CL+AR-2015-04/geopath/

RIPE Atlas Community

RIPE NCC

Host a Probe or an Anchor!

- **For individuals:**
  - Create a RIPE NCC Access account
  - Go to https://atlas.ripe.net/apply
  - You will receive a probe by post
  - Register your probe
  - Plug in your probe
- **For organisations:**
  - Host an anchor https://atlas.ripe.net/anchors/apply/
  - Sponsor RIPE Atlas
- **Find out more in your language:**
  - http://www.lacnic.net/web/lacnic/ripe-atlas

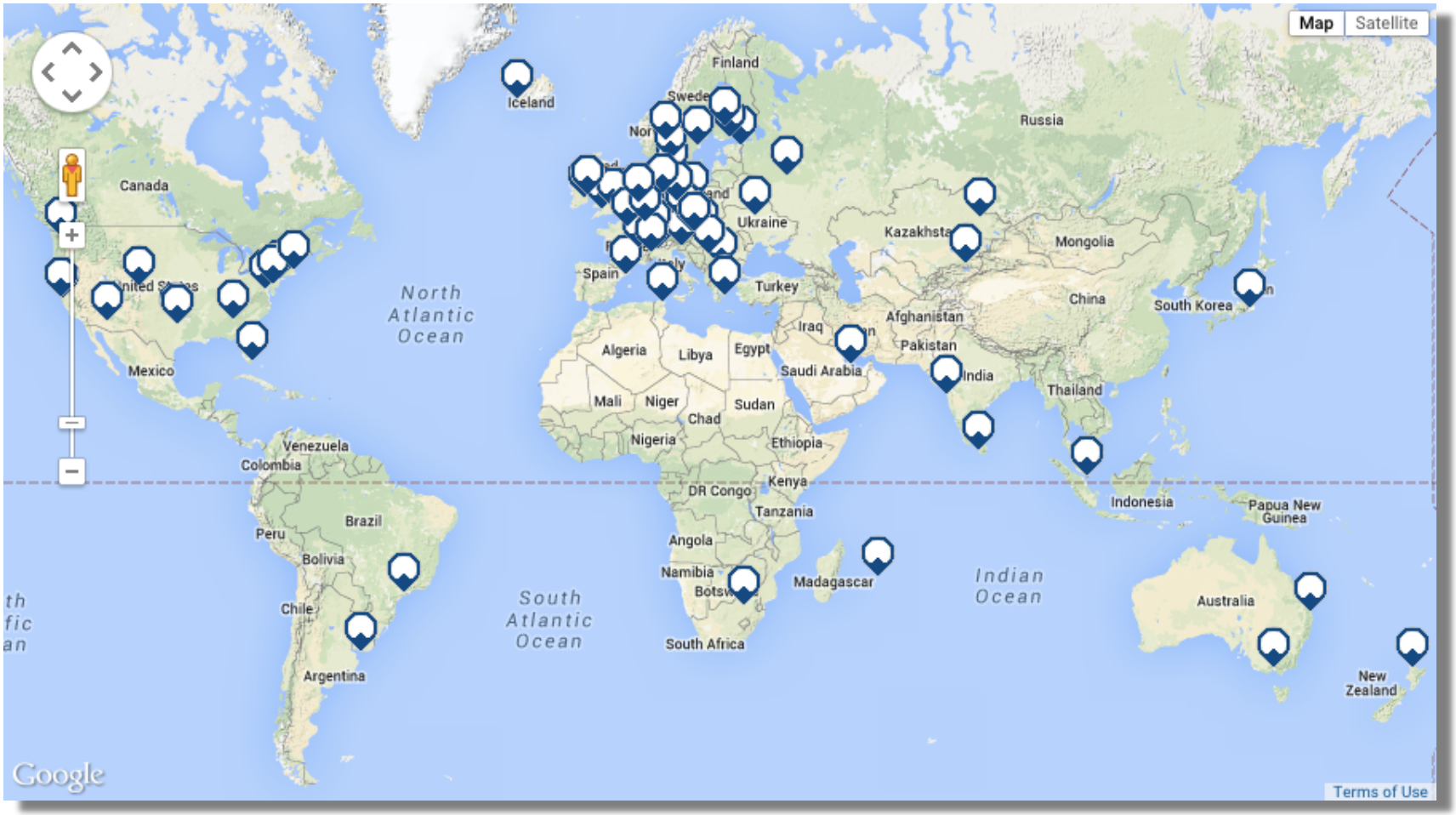
RIPE Atlas Anchors

- Anchors: stable targets and powerful probes

- Benefits of hosting an anchor:
  - External view of your own network - all other anchors measure you
  - 400 probes also target each anchor with ongoing measurements

- 140 RIPE Atlas anchors
  - DrukREN will receive an Anchor soon
  - This anchor will serve all Bhutan probe installations

Anchor Locations



Ambassadors

- **If you want to...**
  - Help distribute probes outside RIPE NCC service region
  - Give workshops, tutorials and promote RIPE Atlas

- **To become an ambassador:**
  - https://atlas.ripe.net/get-involved/become-a-ripe-atlas-ambassador/
  - email mcb@ripe.net: we will ship you some probes

Become a Sponsor!

- **Benefits:**
  - Promotion on RIPE Atlas website
  - Community recognition
  - Double credits for every probe distributed
- **Become a sponsor:**

  https://atlas.ripe.net/get-involved/become-a-sponsor/
- **Current sponsors:**

RIPE Atlas Community GitHub

- **Programmers contribute analysis code:**

  https://github.com/RIPE-Atlas-Community/

- **Measurements source code available**

  https://labs.ripe.net/Members/philip_homburg/ripe-atlas-measurements-source-code

Contacting RIPE Atlas

- https://atlas.ripe.net
- Mailing list for active users: ripe-atlas@ripe.net
- Roadmap: http://roadmap.ripe.net/ripe-atlas/
- Articles and updates on RIPE Labs: https://labs.ripe.net/atlas
- Questions: atlas@ripe.net
- Twitter: @RIPE_Atlas and #RIPEAtlas

Additional Slides

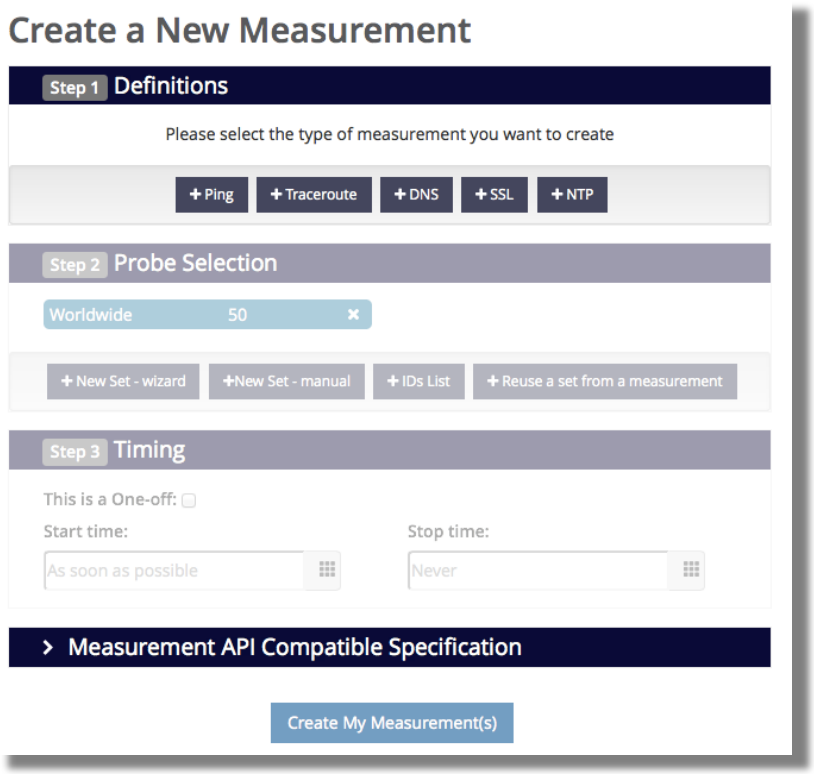
RIPE NCC

New Features

- RIPE Atlas streaming: a new architecture that allows users to receive measurement results as soon as the probes send them
  - Real-time measurement results and connection events
  - Can specify filters
  - Possibility to replay history (prototype)
  - https://atlas.ripe.net/docs/result-streaming/
  - Results from RIPE Atlas hackathon: https://labs.ripe.net/Members/becha/ripe-atlas-hackathon-results

New Features

- New measurement type: NTP
- https://labs.ripe.net/Members/philip_homburg/ntp-measurements-with-ripe-atlas



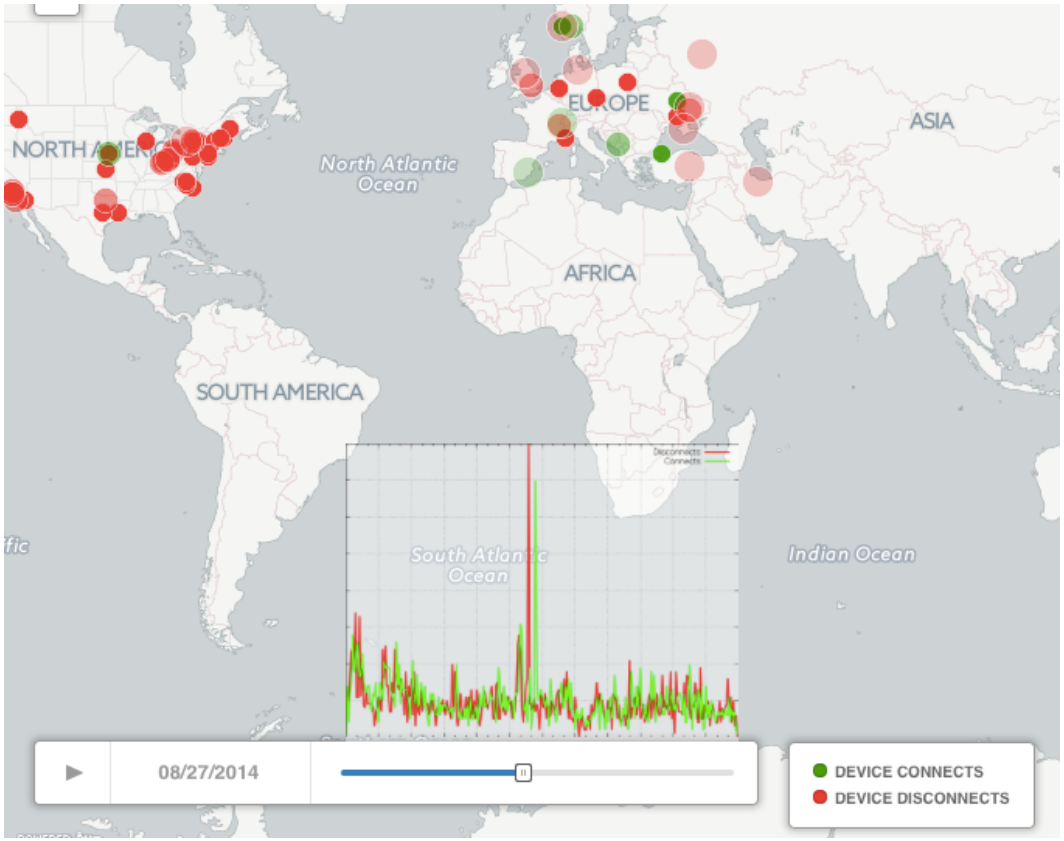
More
RIPE Atlas Use Cases

RIPE NCC

Root Name Server Measurements

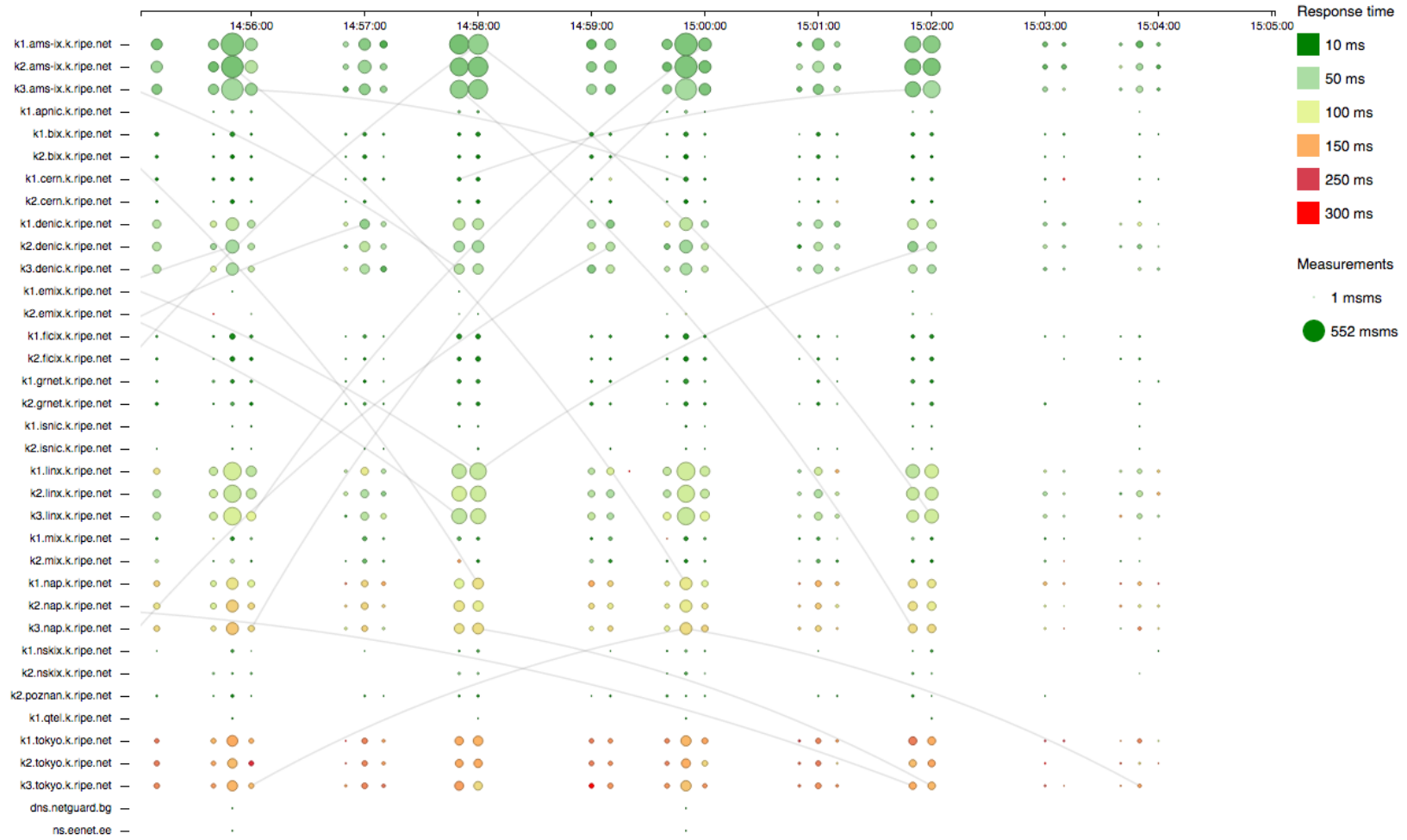
- Which instance is queried?
  - Per country
  - Per ASN
- What's the fastest response?
- TCP/UDP performance

Visualising Network Outages



- https://labs.ripe.net/Members/emileaben/visualising-network-outages-with-ripe-atlas
- https://labs.ripe.net/Members/emileaben/facebookdown-and-what-internet-data
- https://labs.ripe.net/Members/emileaben/time-warner-cable-outage

Monitoring K-root Performance



Monitoring DNS: dnsmon.ripe.net

- **Currently monitoring small selection of TLD zones**
  - Root name servers, 30 ccTLDs and few gTLDs
  - New zones added later this year
- **On the roadmap: “domain checks”**
- https://atlas.ripe.net/dnsmon

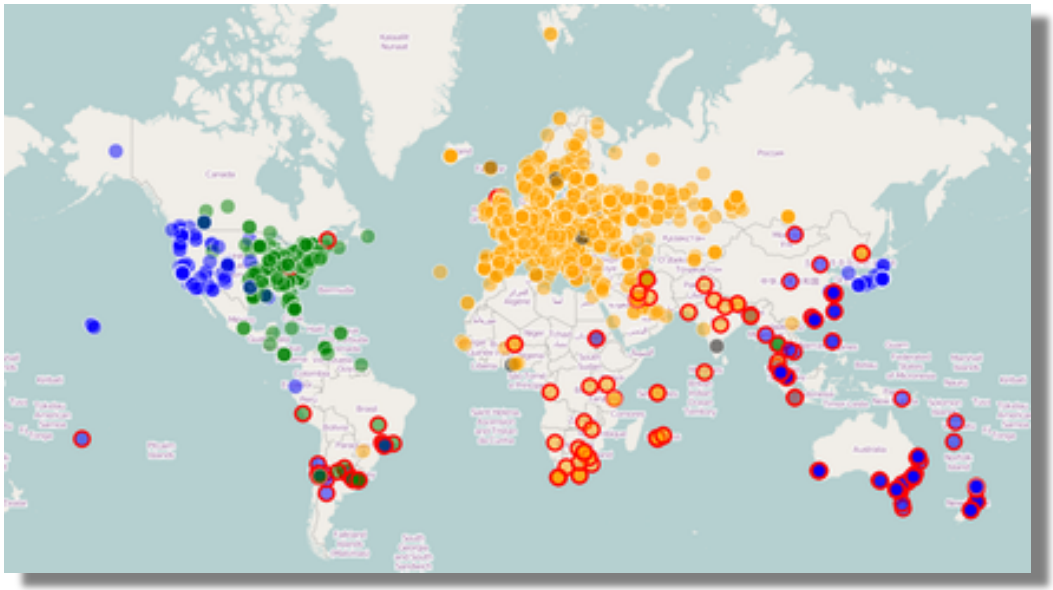
https://labs.ripe.net/Members/fatemah_mafi/an-updated-dns-monitoring-service

Integrated Network Monitoring

- Generating alerts via “status checks”
  - Based on ping measurements
  - User defines alert parameters
  - Integrate into existing tools like Icinga and Nagios
  - https://atlas.ripe.net/docs/status-checks/
- GitHub examples, contributed by operators:
  - http://bit.ly/1BSi1Fu
- Post on Icinga blog:
  - http://bit.ly/1EPERLC

Latency to Multiple Locations

- Together with Wikimedia we identified ways to decrease latency and improve performance
  - https://labs.ripe.net/Members/emileaben/how-ripe-atlas-helped-wikipedia-users



RIPE Atlas Success Stories

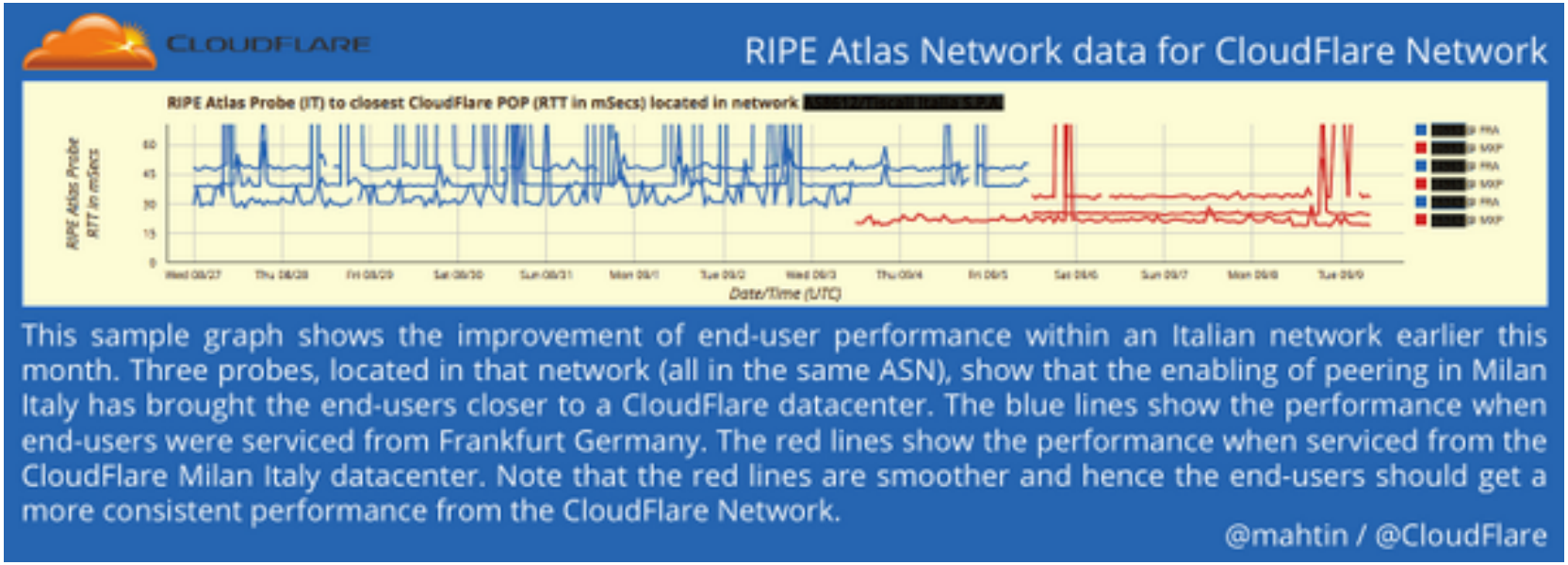
Operators

RIPE NCC

Powered by

RIPE ATLAS

atlas.ripe.net



http://t.co/9lX7Jvk5nl

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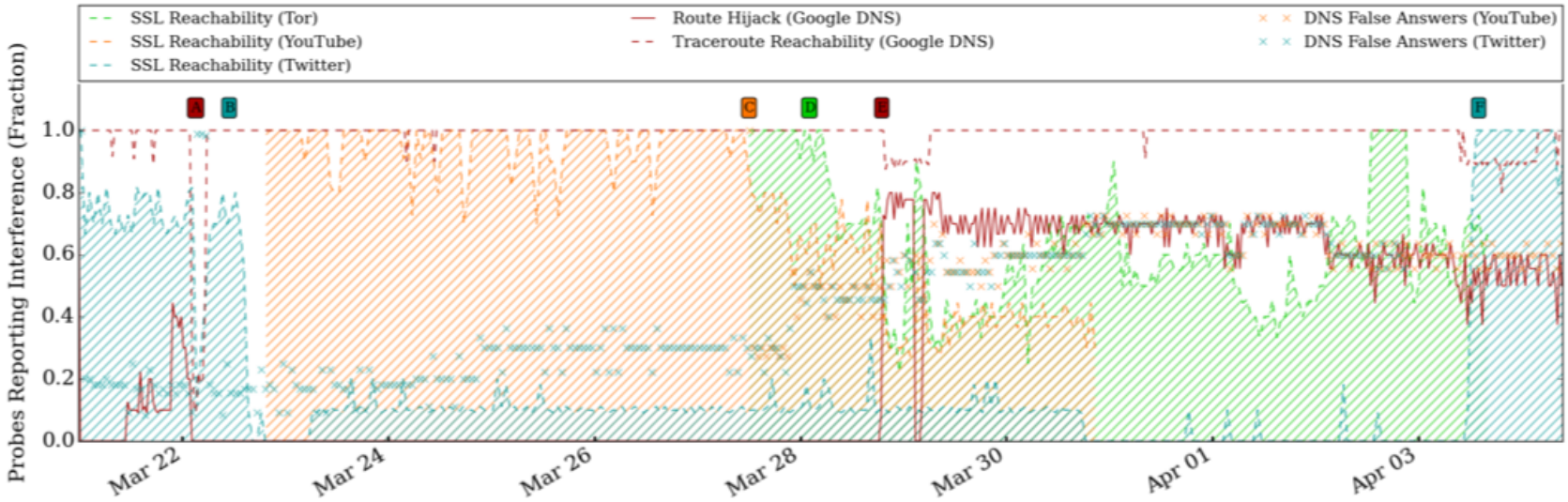
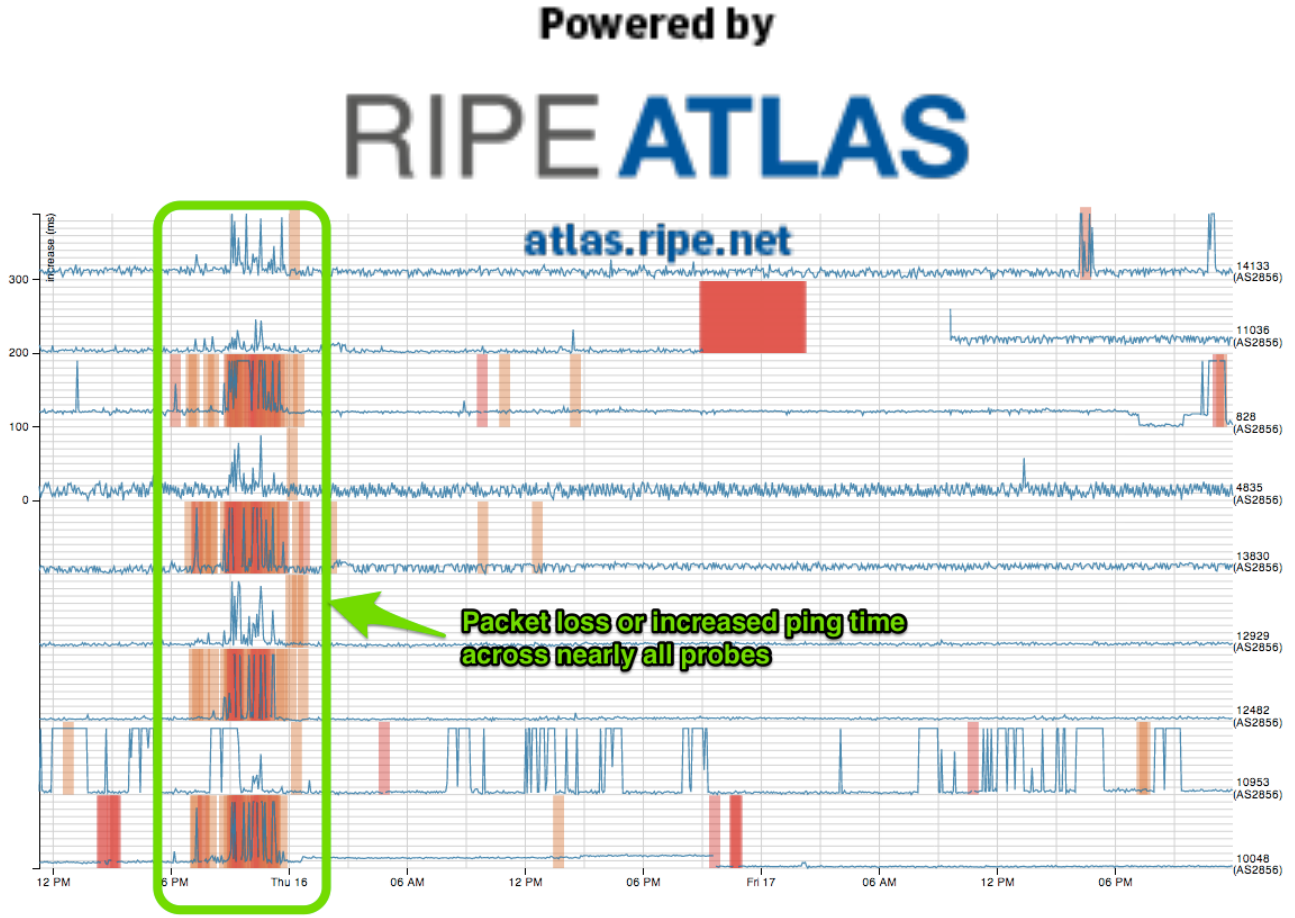


Figure 2: Disruption of Social Media Platforms in Turkey, March – April 2014

http://cartography.io/foci2014.pdf



- Investigating problems of slow servers
  - http://engineering.freeagent.com/2014/01/24/atlas-probes/

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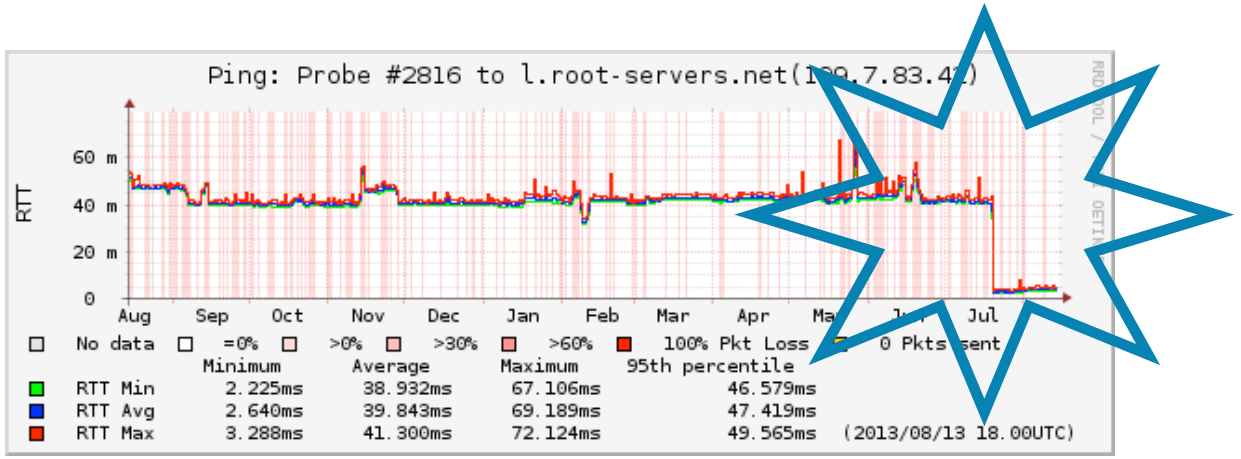
atlas.ripe.net



- IXP: Measuring the effect of installing L-root in Belgrade / SOX

RIPE NCC

Success Stories

- Investigating problems of slow servers:
  - http://engineering.freeagent.com/2014/01/24/atlas-probes/
- Measuring packet loss to determine congested networks, Jared Mauch, NTT
- Selective blackholing (examples based on RIPE Atlas)
  - https://ripe68.ripe.net/presentations/176-RIPE68_JSnijders_DDoS_Damage_Control.pdf
- Anycast analysis:
  - https://labs.ripe.net/Members/stephane_bortzmeyer/the-many-instances-of-the-l-root-name-server

More Stories on RIPE Labs

- Measuring K-root performance
  - https://labs.ripe.net/Members/suzanne_taylor_muzzin/experiment-proposal-to-improve-k-root
- Time-Warner Cable Outage
  - https://labs.ripe.net/Members/emileaben/time-warner-cable-outage
- How Fast the RIPE Atlas Anchor has Paid Off
  - https://labs.ripe.net/Members/tim_kleefass/how-fast-the-ripe-atlas-anchor-has-paid-off
- Basic Evaluation of new IXP Peering Partners with RIPE Atlas and Zabbix
  - https://labs.ripe.net/Members/daniel_gomez/basic-evaluation-of-new-ixp-peering-partners-with-ripe-atlas-and-zabbix

Network Monitoring with RIPE Atlas

RIPE NCC

Network Monitoring

- Network operators use tools to monitor network health
  - Such as Nagios & Icinga
- Tools can receive input from RIPE Atlas via API
- Benefits:
  - Pings from 500 out of 6,000+ probes around the world
  - See your network from the outside
  - Plugs into your existing tools and practices

Integration with Monitoring Systems

- Three easy steps:

1. Create a RIPE Atlas ping measurement
2. Go to “status checks” URL
3. Add your alerts in Icinga or Nagios

1. How to Schedule a Measurement

- General case - applicable for ping, too!
- Log in to https://atlas.ripe.net
- Go to “My Atlas” and “Measurements”
- Choose “New Measurement” or “One-off”
  - Most measurements are periodic and last a long time
  - Choose type, target, frequency, # of probes, region...
  - You will spend credits (next slides)
- More details: https://atlas.ripe.net/doc/udm
- Or use the API:
  - https://atlas.ripe.net/docs/measurement-creation-api/

1.5 Credit System

- To perform measurements, you spend credits
  - Ping costs 10 credits, traceroute costs 20, etc.
- Credit system introduced to ensure fairness and protect system from overload
- By hosting a probe, you earn credits
- Extra credits can be earned by:
  - Being a RIPE NCC member
  - Hosting a RIPE Atlas anchor
  - Sponsoring probes
- More details: https://atlas.ripe.net/doc/credits

2. Creating Status Checks

- Status checks work via RIPE Atlas' RESTful API
  - https://atlas.ripe.net/api/v1/status-checks/MEASUREMENT_ID/
- You define the alert parameters, for example:
  - Threshold for percentage of successful replies
  - How many of the most recent measurements to evaluate
  - Maximum acceptable packet loss
- Documentation:
  - https://atlas.ripe.net/docs/status-checks/

3. Icinga Examples

- Community of operators contributed configuration code!
  - Make use of the built-in “check_http” plugin
- GitHub repo examples:
  - https://github.com/RIPE-Atlas-Community/ripe-atlas-community-contrib/blob/master/scripts_for_nagios_icinga_alerts
- Post on Icinga blog:
  - https://www.icinga.org/2014/03/05/monitoring-ripe-atlas-status-with-icinga-2/