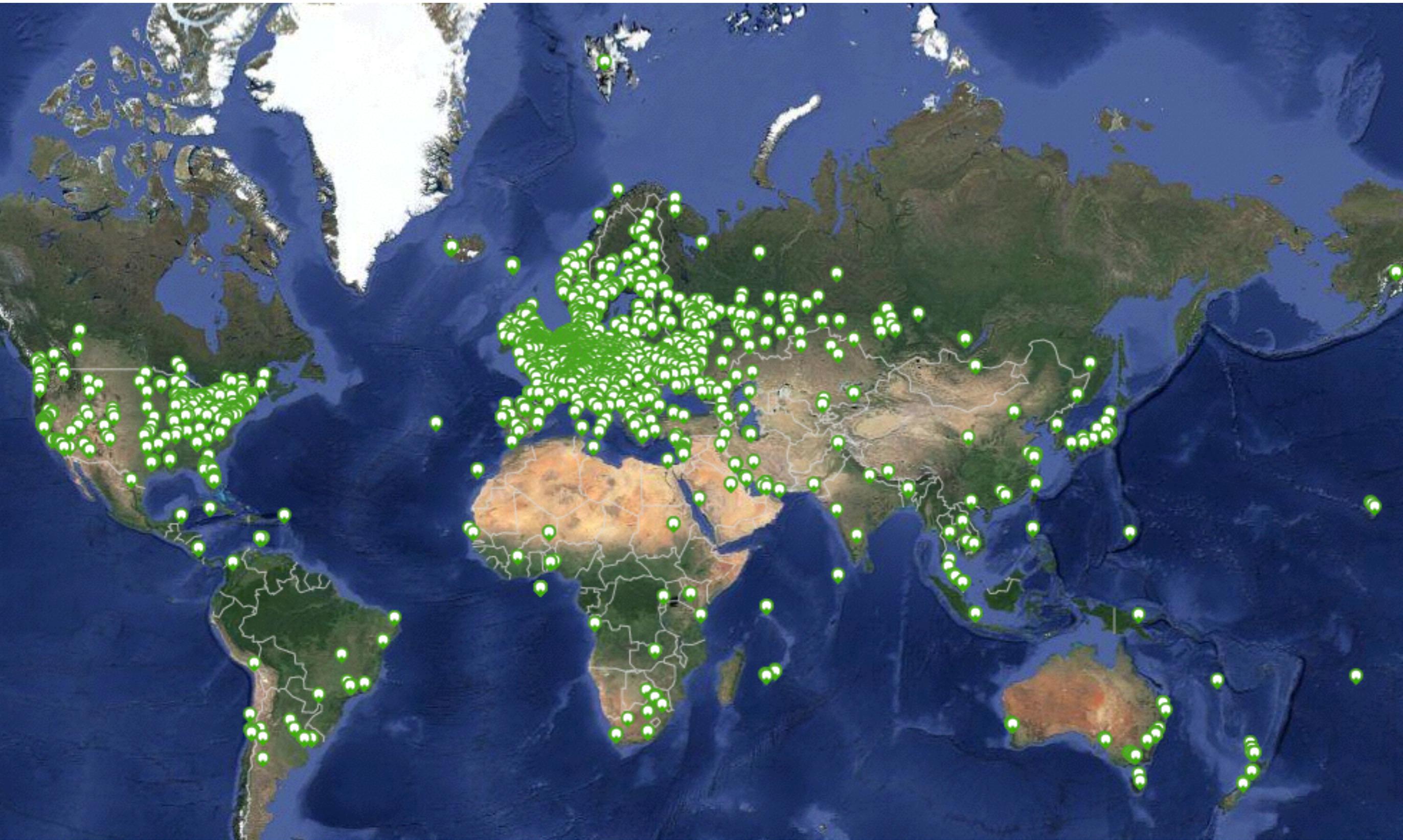




Measuring DNSSEC using RIPE Atlas

Kaveh Ranjbar
RIPE NCC





Global RIPE Atlas Network Coverage

This map shows the locations of all RIPE Atlas probes, including those that are connected, disconnected and abandoned (meaning they have not been connected for a long period of time).



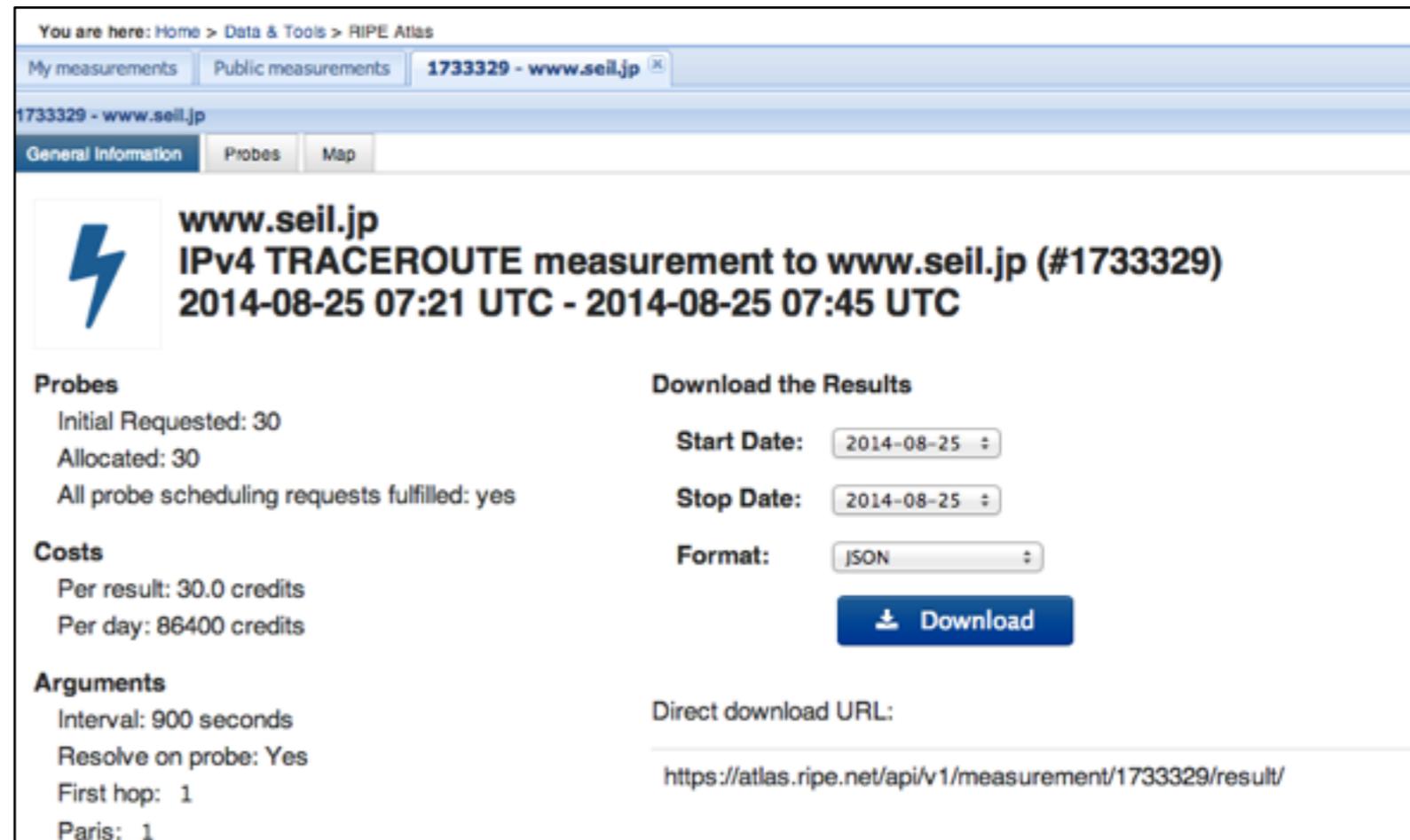
- v1 & v2: Lantronix XPort Pro
- v3: TP-Link TL-MR3020 powered from USB port
 - Does not work as a wireless router!
 - Same functionality as the old probe!
- RIPE Atlas anchor: Soekris net6501-70



- 6,800+ probes connected
- 3,000+ active users this year
- 1,000+ built-in measurements daily
- 5,000+ user-defined measurements daily
 - Four types of user-defined measurements available to probe hosts and RIPE NCC members: ping, traceroute, DNS, SSL

Country	Probes
United States	787
Germany	752
France	659
United Kingdom	533
Russia	416
Nederland	399
Ukraine	179
Belgium	167
Czech Republic	162
Italy	161

- Click on msm, then “Download”
- Or: go to URL
- Or: use API
- Results in JSON
- Libraries for parsing available on gitHub

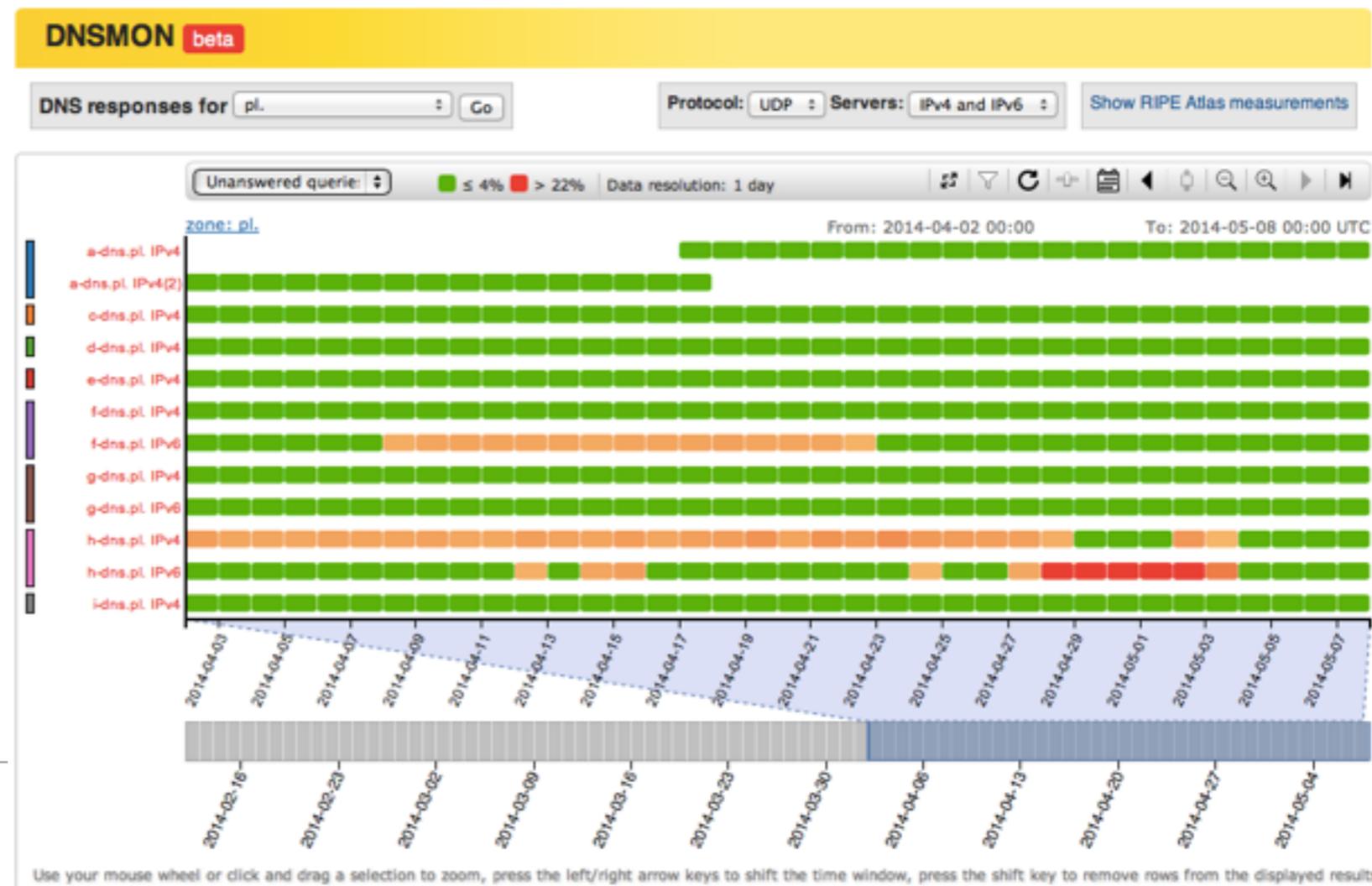


The screenshot shows the RIPE Atlas web interface for a specific measurement. The breadcrumb trail is "You are here: Home > Data & Tools > RIPE Atlas". The page title is "1733329 - www.seil.jp". The main content area is titled "www.seil.jp IPv4 TRACEROUTE measurement to www.seil.jp (#1733329) 2014-08-25 07:21 UTC - 2014-08-25 07:45 UTC". It includes sections for "Probes" (Initial Requested: 30, Allocated: 30, All probe scheduling requests fulfilled: yes), "Costs" (Per result: 30.0 credits, Per day: 86400 credits), and "Arguments" (Interval: 900 seconds, Resolve on probe: Yes, First hop: 1, Paris: 1). On the right, there is a "Download the Results" section with "Start Date" and "Stop Date" set to 2014-08-25, "Format" set to JSON, and a "Download" button. Below this is a "Direct download URL:" field with the value "https://atlas.ripe.net/api/v1/measurement/1733329/result/".

- <https://github.com/RIPE-NCC/ripe.atlas.sagan> &
- <https://github.com/RIPE-Atlas-Community/>

- Currently monitoring small selection of TLD zones
 - root name servers & 30 ccTLDs & few gTLDs
 - new zones will be added later this year
- On the roadmap: “domain checks”
- <https://dnsmon.ripe.net/>

[https://labs.ripe.net/
Members/fatemah_mafi/
an-updated-dns-
monitoring-service](https://labs.ripe.net/Members/fatemah_mafi/an-updated-dns-monitoring-service)



- RIPE Atlas measures DNS and DNS6
- Using probe's resolver config one can send queries and get full raw results on any probe on the network
- Users can choose between using probe's local resolver or enter any resolver they desire as target
- Multiple query types are possible including IN DS, IN DNSKEY, IN NSEC(3)
- Results will be available in full raw format for further investigation

Measuring DNS

DNS [X]

Measurement interval (s):

UDP reply bytes:

Retry times:

Qbuf:

No Abuf:

Prepend probe's ID:

DO:

TCP query:

NSID:

Use probe's resolver:

Recursion desired:

Query:

* Argument:

* Target:

Resolve on probe:

Public:

Description:

Ok Cancel

DNS [X]

Measurement interval (s):

UDP reply bytes:

Retry times:

Qbuf:

No Abuf:

Prepend probe's ID:

DO:

TCP query:

NSID:

Use probe's resolver:

Recursion desired:

Query:

* Argument:

* Target:

Resolve on probe:

Public:

Description:

Ok Cancel

- IN DNSKEY
- IN DS
- IN MX
- IN NAPTR
- IN NS
- IN NSEC
- IN NSEC3
- IN PTR
- IN RRSIG
- IN SOA
- IN SRV
- IN TXT
- CHAOS hostname_bind
- CHAOS id.server
- CHAOS version.bind

- We do not analyse DNSSEC results (yet.) but
 - It is possible to do all kind of analysis on results and measure different aspects of DNSSEC
 - Nicolas Canceill from NLnet Labs has already done a lot of DNSSEC measurements using RIPE Atlas and a measured Nameserver
 - Code to parse DNSSEC results is available on:
 - <https://github.com/ncanceill/atlas-dnssec>
 - Research results were presented in ICANN 50:
 - <https://london50.icann.org/en/schedule/wed-dnssec/presentation-dnssec-validation-deployment-25jun14-en>

Findings

Validation and protection

- ▶ AD bit indicates 26%-28% validation
- ▶ Bad zones indicate 26% protection

DNSSEC-awareness

- ▶ DO bit indicates 88%
- ▶ 93% Can get a zone's DS
- ▶ Proof of non existence available with 63%
- ▶ Signatures available for normal answers with 65%
- ▶ Signatures available for wildcard answers with 46%

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

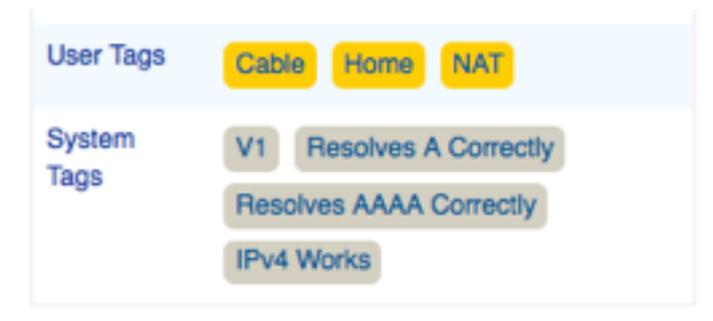
Questions?





Backup slides

- Users can tag their probes any way they like
 - The commonly used tags are available to everyone
- The system also tags them automatically
 - (non)working IPv6, IPv4, DNS (A/AAAA), ...
- Coming up: use these tags when scheduling measurements!
 - measure from home or not
 - measure from broken or working IPv6 probes
 - Combine this with other filters (eg. country)



- We're moving to a more user friendly layout
- Includes fully revamped scheduler form
 - Much nicer, involves less clicks to achieve something
 - Can also give you API compatible output

The screenshot displays three main components of the new MSM UI:

- Summary Dashboard:** Shows a gauge for 'Daily costs' at 0%. Below it, text states: 'By scheduling this measurement, your total daily consumption will be 0.0% of your daily income' and 'You will not run out of credits'. A bar chart at the bottom shows 'Total Incomes' (blue) and 'Total Expenses' (orange) from 2014 to 2014.
- Step 1 Definitions Form:** A configuration form for a 'Ping measurement to www.ripe.net'. Fields include: Target (www.ripe.net), Address Family (IPv6), Packets (3), Size (48), and Interval (240). A 'Resolve on Probe' checkbox is set to 'NO'. A description field contains 'Ping measurement to www.ripe.net'.
- API Compatible Specification:** A text area showing a curl command and its corresponding JSON definition:

```
$ curl --dump-header - -H "Content-Type: application/json" -H "Accept: application/json" -X POST -d {
  "definitions": [
    {
      "target": "www.ripe.net",
      "is_oneoff": true,
      "af": 6,
      "packets": 3,
      "size": 48
    }
  ]
}
```

- Measurement API:
 - query/search, create, change, stop, ...
- Probe API: query/search
- Probe archive / bulk access API
- Coming up:
 - Anchors
 - Anchoring measurements
 - Result streaming

- Tap into the real-time data flow!
- For public data only

