Measuring DNSSEC using RIPE Atlas

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RIPE Atlas Coverage

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).

Filter by ASN, prefix, or country. Just start typing:
Measurement Devices

- 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
RIPE Atlas Numbers: October 2014

- 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

<table>
<thead>
<tr>
<th>Country</th>
<th>Probes</th>
</tr>
</thead>
<tbody>
<tr>
<td>United States</td>
<td>787</td>
</tr>
<tr>
<td>Germany</td>
<td>752</td>
</tr>
<tr>
<td>France</td>
<td>659</td>
</tr>
<tr>
<td>United Kingdom</td>
<td>533</td>
</tr>
<tr>
<td>Russia</td>
<td>416</td>
</tr>
<tr>
<td>Nederland</td>
<td>399</td>
</tr>
<tr>
<td>Ukraine</td>
<td>179</td>
</tr>
<tr>
<td>Belgium</td>
<td>167</td>
</tr>
<tr>
<td>Czech Republic</td>
<td>162</td>
</tr>
<tr>
<td>Italy</td>
<td>161</td>
</tr>
</tbody>
</table>
Getting to and Parsing Results

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

- [https://github.com/RIPE-NCC/ripe.atlas.sagan](https://github.com/RIPE-NCC/ripe.atlas.sagan)
- [https://github.com/RIPE-Atlas-Community](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
Measuring DNS

- 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

Measurement interval (s):  240
UDP reply bytes:  512
Retry times:  0
Qbuf:  
No Abuf:  
Prepend probe's ID:  
DO:  
TCP query:  
NSID:  
Use probe's resolver:  
Recursion desired:  
Query:  IN A
* Argument:  
* Target:  Enter target...
Resolve on probe:  
Public:  
Description:  

DNS

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:  IN A
* Argument:  
* Target:  Enter target...
Resolve on probe:  
Public:  
Description:  

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

IN A
• 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:
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%
Contacting RIPE Atlas

- 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
Backup slides
Coming Soon: Using Probe Tags

- 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)
Coming Soon: New MSM UI + Form

- 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
APIs, APIs, APIs

• Measurement API:
  - query/search, create, change, stop, ...

• Probe API: query/search

• Probe archive / bulk access API

• Coming up:
  - Anchors
  - Anchoring measurements
  - Result streaming
Coming Soon: Result Streaming

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