OpenIPMap

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Crowdsourcing Geolocation of IPs

- Open and crowdsourced mapping of IPs and hostnames to geographical locations
- Emphasis on infrastructure, not eyeballs
- Think of OpenStreetMap for IPs
How?

• Creating a database with:

<table>
<thead>
<tr>
<th>IP</th>
<th>Geographic location</th>
</tr>
</thead>
<tbody>
<tr>
<td>2001:a18:0:404::4</td>
<td></td>
</tr>
<tr>
<td>158.64.58.244</td>
<td></td>
</tr>
<tr>
<td>lu-lux-as2602.anchors.atlas.ripe.net</td>
<td></td>
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</tbody>
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Who?

- Anyone can contribute
- Operators have high-quality knowledge
  - Authoritative knowledge of own network

- All Internet users can benefit
- Improves existing geoloc
- Huge potential for improving network diagnostics
Why?

• Users can visualise traceroutes
  - Compare changing routes
  - Visually identify outliers / strange routing

• Statistics/Analysis
  - Percentage of observed paths go outside a country?
  - Contribute to tools like RIPEstat and RIPE Atlas
  - Providing raw/bulk data to the community/researchers

• Potentially help answer strategic questions
  - Where to build out my network to/peer?
  - How to reduce latency/improve resiliency/security?
Why?

- No comprehensive and open service like this exists currently
  - Existing resources mainly focus on eyeballs, not infrastructure

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<tr>
<td>141.136.103.165</td>
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<td>62.115.45.201</td>
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<td>war-b1-link.telia.net</td>
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Location=Warsaw,PL!
Why this solution?

- Crowdsourcing is a proven concept
- Anyone can contribute
  - No need to be authoritative (DNS LOC, registry)
  - It is possible to use a source confidence factor
- Operators have high-quality knowledge
  - e.g. Integrating with RIR authentication we can collect high confidence input
- OpenIPMap should be more global than RIPE NCC service region
Additional possibilities

- Import existing data with lower confidence
  - eg. populate with RIPE Database and CAIDA data

- Help crowdsourcing efforts with a suggestion engine
  - Artificial Intelligence

- Capture naming schemes
  - Using tags: simple, but potentially ambiguous
    esams in wikimedia.org = Amsterdam, NL
  - Using regex: complex, but can capture everything
    ^([a-z]{3})\d+.*\.1e100\net = IATA:\1
  - Domain analysis tool
We have a working prototype

- Implemented the basic functionality with some of the additional possibilities to populate the initial set of data
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From: Poland (30x) To: Tallinn, EE
We have a working prototype

From: Poland (30x) To: Poznan, PL
Where to go?

- Idea received a lot of support at RIPE 67 MAT WG
- Is this going in the right direction?
- Do you want to see this as a service in the future?
  - We can implement the service, publish the code and initial data and bootstrap it
  - Community decides who will operate such a global service
- Want to know more or help: Contact us!
  - To see the prototype
  - To participate in testing the prototype
- Updates on RIPE Labs: https://labs.ripe.net/
How To Contribute?

- Web interface
- API
- Bulk import. Format:
  - `<resource>,<location>,<confidence>`
  - `5.57.80.0/22,"London,GB",20`
  - `lu-lux-as2602.anchors.atlas.ripe.net,"Luxembourg,LU",90`
How To Use

• Web Interface
• API
• Bulk download
  - Also for Geoloc providers
Prototype: Database IP/hostname

- IP prefix / hostname:
  - location: User contributed location string: “Warsaw, PL”
  - user: User ID
  - confidence: 0-100%

Database adds (via geocoder):
- canonical location: Canonical version of location
- lat, lon: Coordinates

Not yet implemented:
- Update creates new object
- Anycast resources
- Granularities other than city
Prototype: Database Contributor

- User ID
- Authenticated with RIPE Access
  - Could do special treatment if user = resource holder
    - only allow confidence > 90% if user=resource holder?

- Other authentication?
  - PGP
  - OpenID
Prototype User Interface

• Uses RIPE Atlas traceroutes
• Builds on underlying API to access crowd-sourced information
• Suggestion engine for when no crowd-sourced information is available
  - Based on IATA, CLLI, and city names
Detail: Granularity

- Current focus on **city level** granularity
  - Conform to other geoIP databases
  - Backbone maps typically are city level

- PoP/datacenter level?
  - Is technically possible to implement if needed

- Others could be supported too
  - DNS LOC-style: point + radius
  - Arbitrary polygons?