

Router Geolocation

emile.aben@ripe.net
RIPE67



Router Geolocation?

- What?
 - “normal” IP geolocation looks only at the edge
 - router geolocation = figuring out the rest
- Why?
 - Detect hairpinning
 - Does a forward path traverse a specific country/region
 - In case of events?
 - Structurally?

Example - Hurricane Sandy (2012)

- Tons of interesting RIPE Atlas traceroutes
 - Naive router geolocation: Use Maxmind (or any other geoloc DB): Doesn't work!
 - Ended up using a few regexes on hostnames:

`/nyc|nyk|newyork|jfk|lga/i`
`/ash|abn|ashburn|dca|iad|washington/i`
- Next event: Can we do better?

Idea

- Find ways to geolocate Internet infrastructure better
- Ask the experts (you!) to participate
- Make collected data publicly available
 - so also for geoloc providers
- **Not** a competing service to existing geoloc
 - their data can be enhanced with router geoloc

Prior Art (#rule 11)

- Existing router geoloc bits-and-pieces
 - rocketfuel (undns), IXmaps, ...
 - problem: unmaintained and/or limited scope
- ‘Visual traceroute’
 - Typically use edge geolocation service
- IETF draft-google-self-published-geofeeds
 - complementary

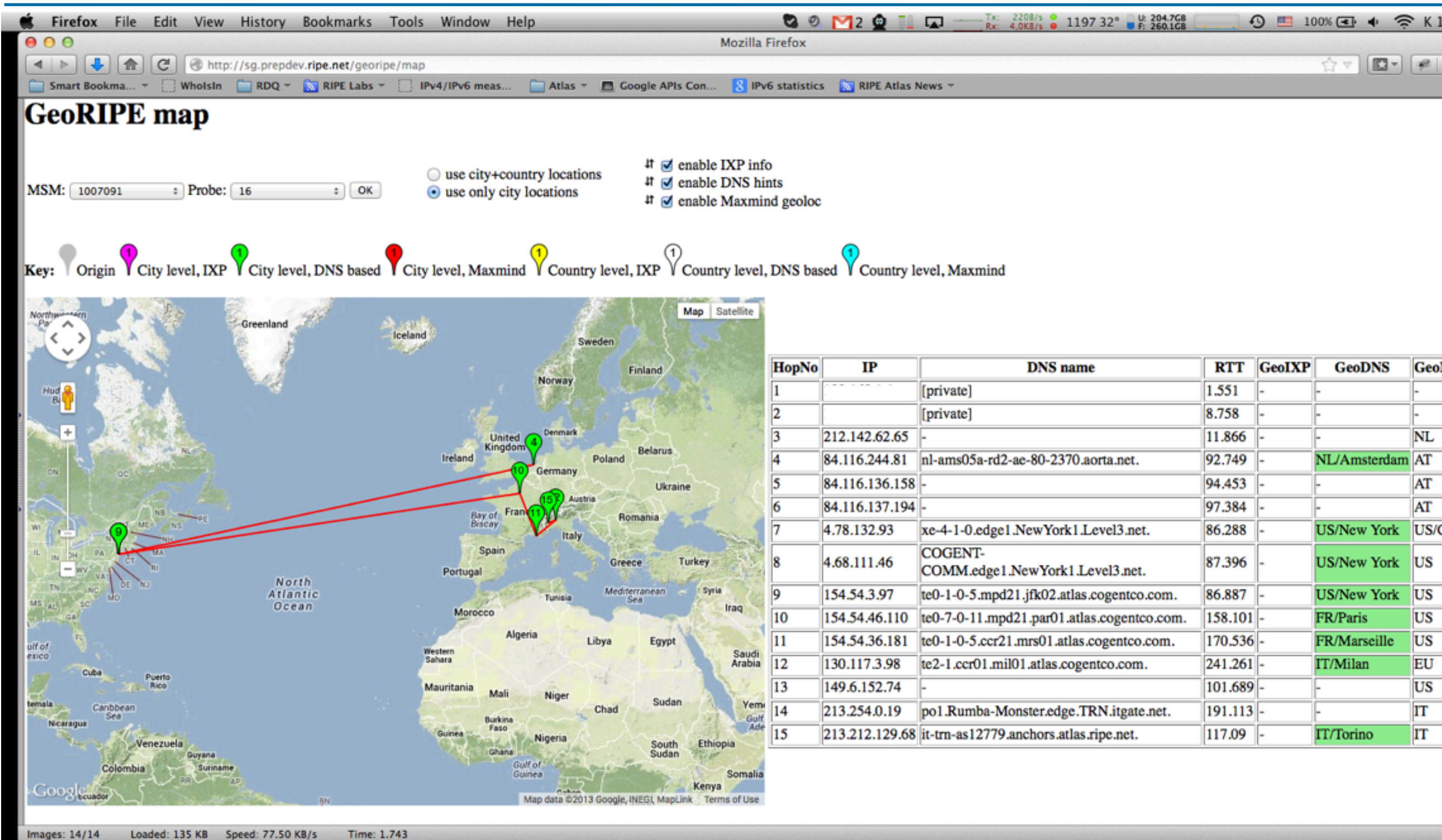
Proposed Method

- Combine data-sources:
 - Existing edge geolocation
 - Hostnames from reverse DNS
 - 1.13 billion reverse DNS records in IPv4
 - Users could tag naming schemes
 - RTTs allow for some triangulation / speed-of-light constraints
 - IXP IPs/prefixes (when not remote-peering)
- Probabilistic answer: ie. 95% Athens,GR

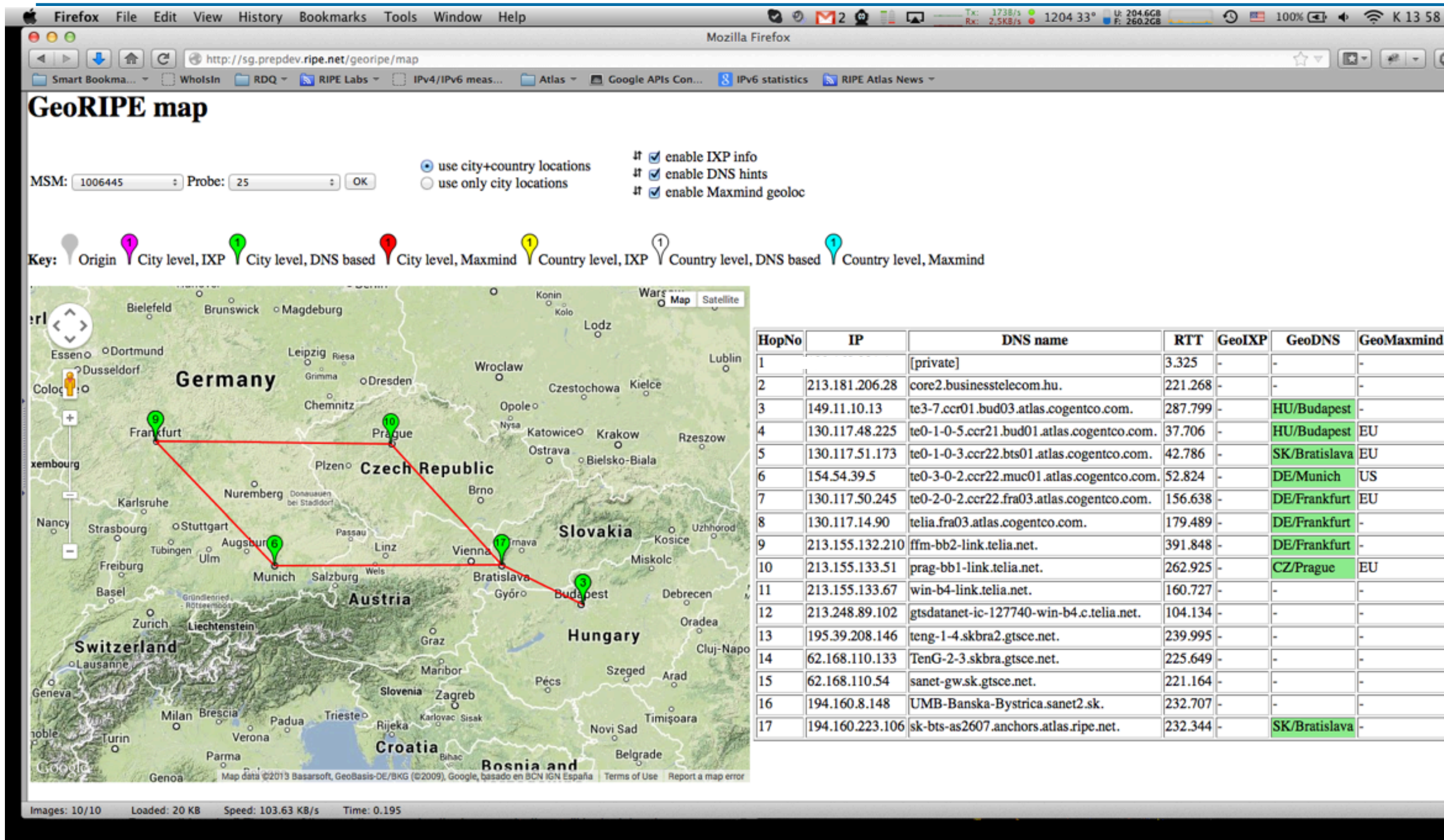
Proposed Method - Crowdsourcing

- Combine data-sources:
 - Existing edge geolocation
 - Hostnames from reverse DNS
 - 1.13 billion reverse DNS records in IPv4
 - Users could tag naming schemes
 - RTTs allow for some triangulation / speed-of-light constraints
 - IXP IPs/prefixes (when not remote-peering)
- Probabilistic answer: ie. 95% Athens,GR

Prototype - Hairpins



Prototype - Other Fun Shapes



Further Improve: Crowdsource

- What you give:
 - Info on your network
 - Info on other networks
- What you get back:
 - Better router geolocation for everybody

Cooperation

- CAIDA are running a related project
 - Thinking of data exchange format
- If you have related projects
 - Talk with us!



Conclusion

- We'd like to explore this idea further because:
 - Could give you better tools/viz in RIPE Atlas
 - Could give you data to build your own tools on
 - Could give geolocation providers data to make their data better
- Let us know what you think!

Questions?

