ASN

A RIPE Atlas Hackathon Project
Project

• ASN Tryst is an ASN to ASN interconnect viewer written during the November/2015 RIPE Atlas Hackathon in Bucharest Romania (just prior to RIPE71)
  - A closer look a RIPE Atlas traceroute data to find relations between networks
Team

• Team created on-the-fly Saturday morning
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  – James Reilly <fun -at- fb -dot- com>
  – Christian Teuschel <cteusche -at- ripe -dot- net>

• Help from
  – Emile Aben <emile -dot- aben -at- ripe -dot- net>
  – plus others …
Motivation

- Motivation:
  - It would be nice to know where one ASN interconnects with another ASN
  - There's 1,000's of traceroutes running within Atlas every minute
  - They are for many random sources towards many semi-random destinations
  - A trace may pass between one backbone (ASN) and another backbone (a different ASN)

```
aws$ traceroute -f6 -m14 -q1 www.telmex.net
traceroute to www.telmex.net (201.147.20.245), 14 hops max, 60 byte packets
  6  54.239.111.88 (54.239.111.88)  23.961 ms
  7  54.239.109.121 (54.239.109.121)  1.099 ms
  8  dca2-edge-01.inet.qwest.net (67.133.224.205)  0.953 ms
  9  dep-brdr-04.inet.qwest.net (67.14.28.18)  2.094 ms
 10  63.146.27.246 (63.146.27.246)  2.231 ms
 11  ae-3.r22.asbnva02.us.bb.gin.ntt.net (129.250.6.112)  1.804 ms
 12  ae-5.r123.isanca07.us.bb.gin.ntt.net (129.250.3.189)  72.994 ms
 13  ae-2.r00.isanca07.us.bb.gin.ntt.net (129.250.3.238)  65.201 ms
 14  129.250.199.34 (129.250.199.34)  80.190 ms
aws$
```
Methodology

• Spend zero RIPE Atlas credits
• Query RIPE Atlas database (via API) and:
  – Collect a list of measurement IDs (public tests)
  – Collect the many traceroutes run by that one measurement
  – Repeat for all measurement IDs
  – Scan the sequential IP addresses from the traceroute
  – Detect when the next IP address is from a different ASN
  – Place the pair of IP addresses that show an ASN boundary in a database table (the pairs table)
  – Repeat, repeat, repeat
• Match the IP pairs table with a geo-database (OpenIPMap - marmot.ripe.net/openipmap/)
  – Display on a map
Database

- Tables:
  - measurements (measurement_id, af, description, start, stop, interval)
  - ipv4/ipv6 IP’s found (ip, asn)
  - ipv4pairs/ipv6pairs (ip1, ip2)
  - locations (ip, lat, long, city, hostname)
  - mids (measurement_id, af, timestamp, pair_id)
Database

• Results (so far):

  175415 measurement_id’s found
  79730 traceroutes

  41334 IPv4’s found at an ASN boundary
  27354 IPv6’s found at an ASN boundary

  53729 IPv4’s in geoloc (from Emile)
  24023 IPv6’s in geoloc (from Emile)

  11658 IP pairs found
  3342 asns found
  3236 dots
  2610 unique dots
  626 coincident dots (i.e. more than one pair in a location)
  2290 IP1,IP2 pairs with only one geoloc
### Database

- **Results (so far):**

<table>
<thead>
<tr>
<th>#</th>
<th>AUTNUM</th>
<th>name</th>
</tr>
</thead>
<tbody>
<tr>
<td>1020</td>
<td>1299</td>
<td>TeliaSonera International Carrier</td>
</tr>
<tr>
<td>732</td>
<td>2914</td>
<td>NTT America, Inc.</td>
</tr>
<tr>
<td>708</td>
<td>174</td>
<td>Cogent Communications</td>
</tr>
<tr>
<td>545</td>
<td>3257</td>
<td>Tinet SpA</td>
</tr>
<tr>
<td>483</td>
<td>3356</td>
<td>Level 3 Communications, Inc.</td>
</tr>
<tr>
<td>372</td>
<td>6453</td>
<td>TATA COMMUNICATIONS (AMERICA) INC</td>
</tr>
<tr>
<td>296</td>
<td>6939</td>
<td>Hurricane Electric, Inc.</td>
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<tr>
<td>275</td>
<td>3549</td>
<td>Level 3 Communications, Inc. (GBLX)</td>
</tr>
<tr>
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<td>6762</td>
<td>TELECOM ITALIA SPARKLE S.p.A.</td>
</tr>
<tr>
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<td>6461</td>
<td>Abovenet Communications, Inc.</td>
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<td>157</td>
<td>3320</td>
<td>Deutsche Telekom AG</td>
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<tr>
<td>137</td>
<td>7018</td>
<td>AT&amp;T Services, Inc.</td>
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<tr>
<td>135</td>
<td>2828</td>
<td>XO Communications</td>
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<td>88</td>
<td>1239</td>
<td>Sprint</td>
</tr>
<tr>
<td>85</td>
<td>701</td>
<td>Verizon Business/UUnet</td>
</tr>
<tr>
<td>13</td>
<td>702</td>
<td>Verizon Business/UUnet Europe</td>
</tr>
<tr>
<td>6</td>
<td>5511</td>
<td>Orange S.A.</td>
</tr>
<tr>
<td>5</td>
<td>703</td>
<td>Verizon Business/UUnet ASPAC</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>#</th>
<th>City</th>
</tr>
</thead>
<tbody>
<tr>
<td>176</td>
<td>London, England, GB</td>
</tr>
<tr>
<td>133</td>
<td>Frankfurt am Main, Hesse, DE</td>
</tr>
<tr>
<td>114</td>
<td>Amsterdam, North Holland, NL</td>
</tr>
<tr>
<td>97</td>
<td>Los Angeles, California, US</td>
</tr>
<tr>
<td>91</td>
<td>New York, New York, US</td>
</tr>
<tr>
<td>82</td>
<td>Paris, Île-de-France, FR</td>
</tr>
<tr>
<td>69</td>
<td>San Jose, California, US</td>
</tr>
<tr>
<td>63</td>
<td>Miami, Florida, US</td>
</tr>
<tr>
<td>55</td>
<td>Stockholm, Stockholm, SE</td>
</tr>
<tr>
<td>48</td>
<td>Singapore,, SG</td>
</tr>
</tbody>
</table>
Results
Results (lines between ASNs)
Results
Results (filter on two ASNs)
Results (Tier1’s)
Further work …

• Current state
  – Nearly all on GitHub - https://github.com/dk379/asn-tryst
  – Live website - http://asntryst.com/
  – Missing ASN search on live site

• LOTS MORE WORK TO DO!
  – It was a hackathon after-all