Overview of RIPE Atlas

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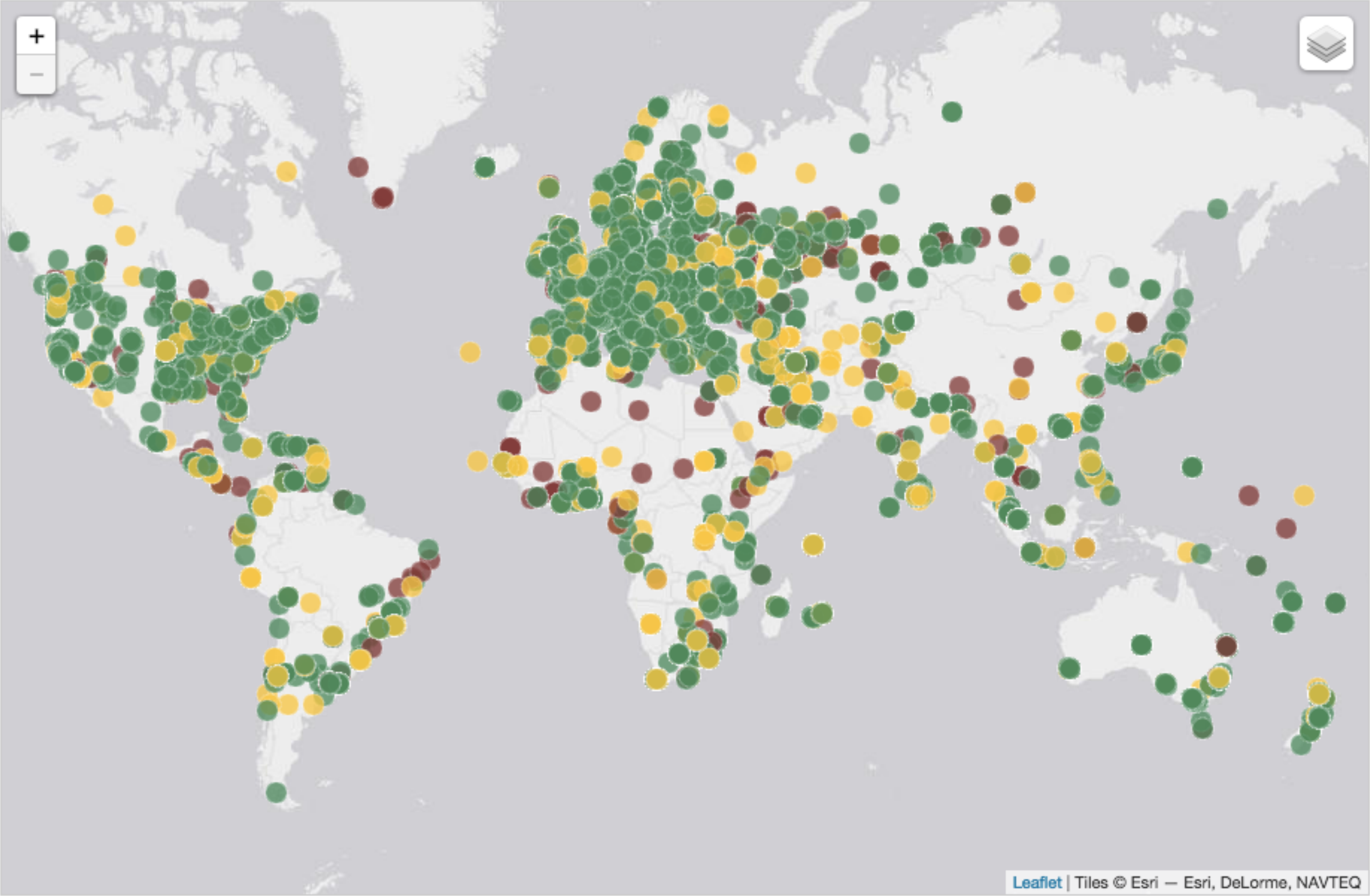
What is RIPE Atlas

- You already know what it is :-)



Capabilities

- Already supported measurement types:
  - ping
  - traceroute (ICMP/UDP/TCP)
  - DNS
  - NTP
  - SSL/TLS certificate checks
- In the making:
  - HTTP towards (RIPE Atlas) anchors, later perhaps HTTPS too
  - SSL/TLS version / cipher tests
  - WiFi (opt-in, above tests using a wifi connection)

Technicalities

- We work with dedicated hardware devices
  - Deployed mostly in homes, so they must be small
  - They are small, so they have limited capabilities
- In particular:
  - v1 is a Lantronix XPortPro, 8MB RAM, 16MB flash
  - v2 is a Lantronix XPortPro, 16MB RAM, 16MB flash
  - v3 is a TP-Link MR3020, 32MB RAM, 4MB flash + 4GB USB
  - anchors are Soekris Net6501-70, rack mountable
- Small devices are getting more powerful over time, but we need to support the existing nodes too

Technicalities

- We need to deal with resource constraints:
    - The measurement code has to be extremely efficient
    - (In addition we also need to deal with instrumentation…)
- Some insights into the measurement code
    - model is no-fork; that is code is started once, it picks up and executes measurements tasks while running
    - we use lib event for this, with a few processes
    - implementing complex protocols is hard
    - implementing exotic protocols is even harder :-)
    - implementing experimental protocols have high risks

Technicalities

- Probes are headless, we need to deal with that
  - (especially tricky to do field-upgrades)
  - any new code must play very friendly with the model
- Anchors / VMs are a bit easier
  - but still cannot run completely different code for the benefit of uniform measurements
  - may be possible to run “extensions" but must be very careful on interfacing and integration
    - resource use is key to avoid interference with other measurements
  - these are in the core, so “HOPS testing” for checking home NAT boxes is tough
- Bottom line: supporting to new protocols is tough…

Usefulness for HOPS

- Current potential for HOPS
  - Atlas’ power is in the numbers and deployment diversity, not in protocol variety
    - 3032 (5.95%) IPv4 ASNs covered
    - 1131 (11.499%) IPv6 ASNs covered
    - 172 countries covered
  - traceroute with varying packet sizes and other options
    - PMTU, paris ID, …
  - TCP traceroutes (for middlebox detection?)
  - measurement code works well naively with NATs, no UPnP or other dark magic are used
    - can detect differences between TCP/UDP behaviour related to NATs