Internet Health Report

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IHR vision

An observatory for the Internet

Monitor & document Internet
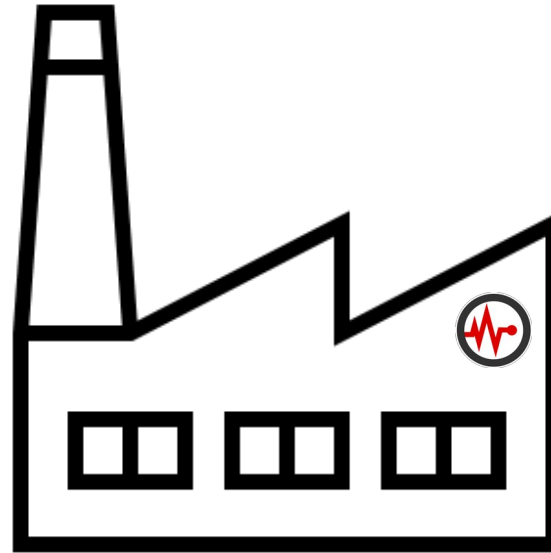topology, evolution, and sudden changes
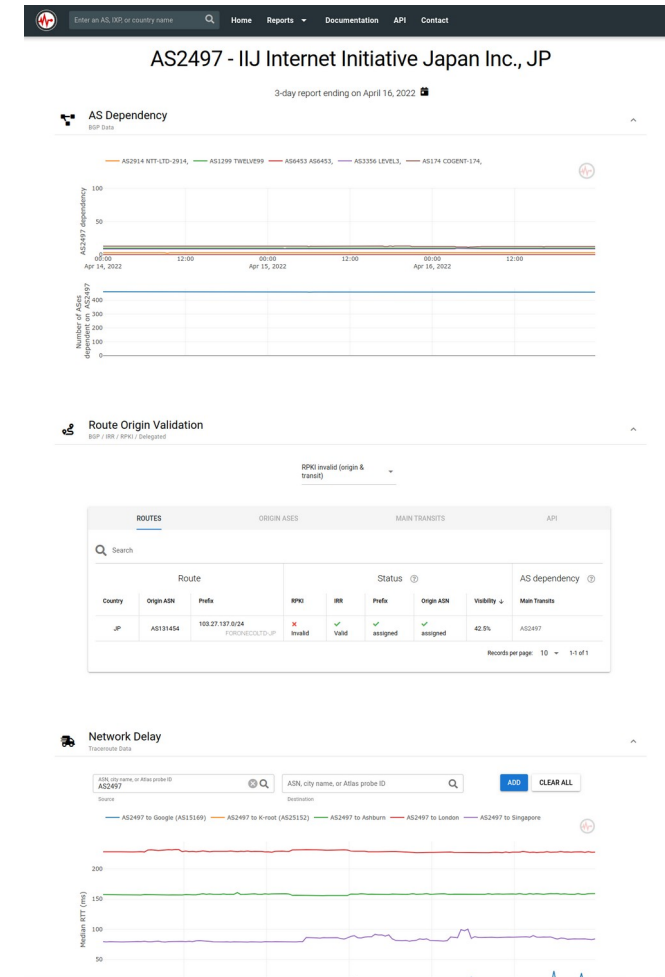
Open data / open source

Monitoring the Internet

Open data
- BGP
- traceroute
- RPKI

Analysis modules
- Network dependency
- Network latency
- Disconnections
- Anomaly detection

Outcomes
- **https://ihr.iijlab.net**
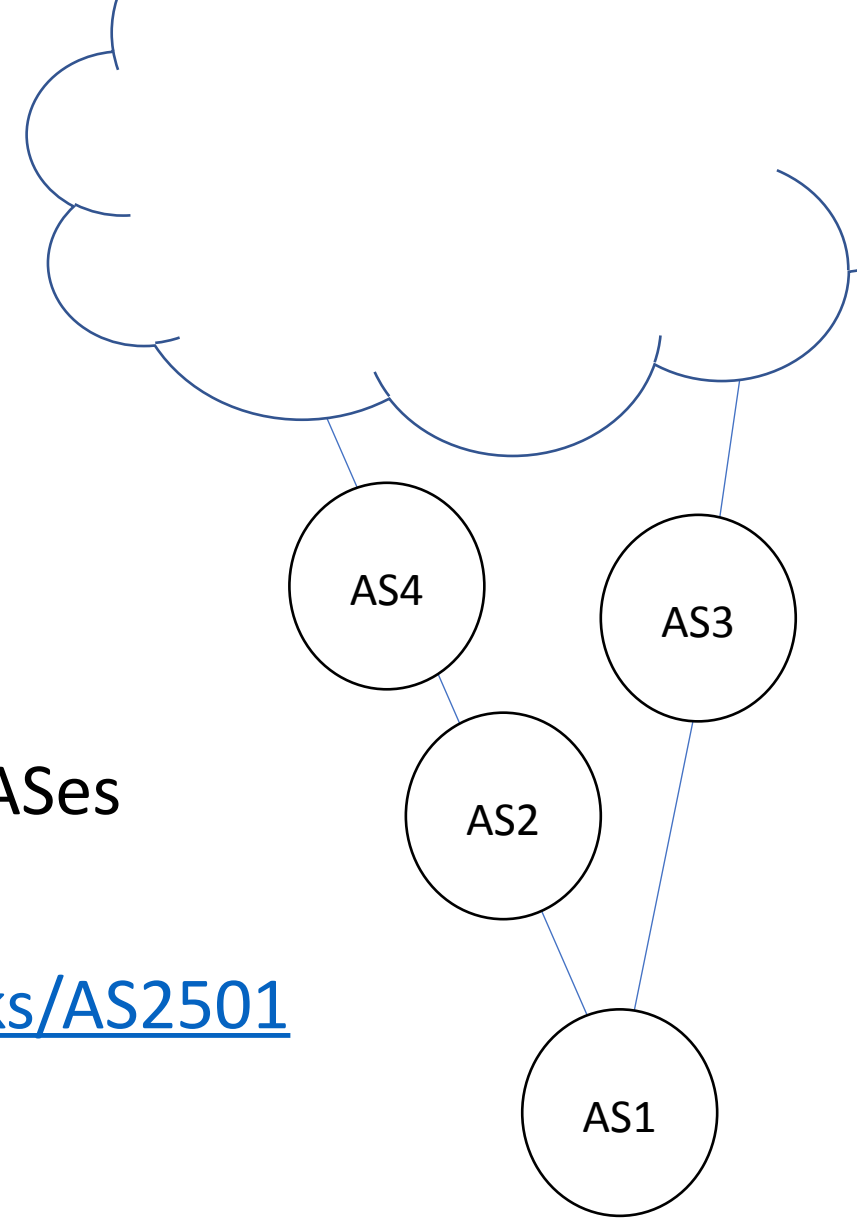 - Visualization
  - API
  - Daily dumps
- External collaborations / tools

Network dependency (AS Hegemony)

- Measure AS inter-dependencies
- Using BGP data
- Give a good idea of the 'topological location' of ASes
- Customers of an AS
- Example: https://ihr.iijlab.net/ihr/en-us/networks/AS2501

Network dependency variants

- Regional bottleneck
  (e.g. Crimea)

- Countries' AS dependency:
  - https://ihr.iijlab.net/ihr/en-us/countries/JP

- BGP leak/hijacks, routing anomalies, AS ranking, consolidation, bottlenecks, peering
  - Rogers outage: https://twitter.com/ihr_alerts/status/1545789981603823616

RPKI

- Convey operators' intent
- Trust (Public Key Infra.)
- Route Origin Authorization (ROA)
  - AS15169 is authorized to announce 8.8.8.0/24

- IHR monitors operators' intentions (RPKI) and actions (BGP)
  - Global view: https://ihr.iijlab.net/ihr/en-us/rov
  - Country-wide view: https://ihr.iijlab.net/ihr/en-us/countries/JP
  - Per AS: https://ihr.iijlab.net/ihr/en-us/networks/AS22822

Network delays

- RIPE Atlas (12k probes)
  Tons of traceroutes to several destinations

- IHR monitors latency between Atlas probes and ASes/IXPs/cities/countries found in traceroutes

- Examples:
  - Impact of subsea cable cut:
    https://twitter.com/DougMadory/status/1447659550975406094
  - Impact of COVID lockdowns:
    https://ihr.iijlab.net/ihr/en-us/covid19?country=France
  - War in Ukraine: https://twitter.com/ihr_alerts/status/1501446740498841604

Network congestion
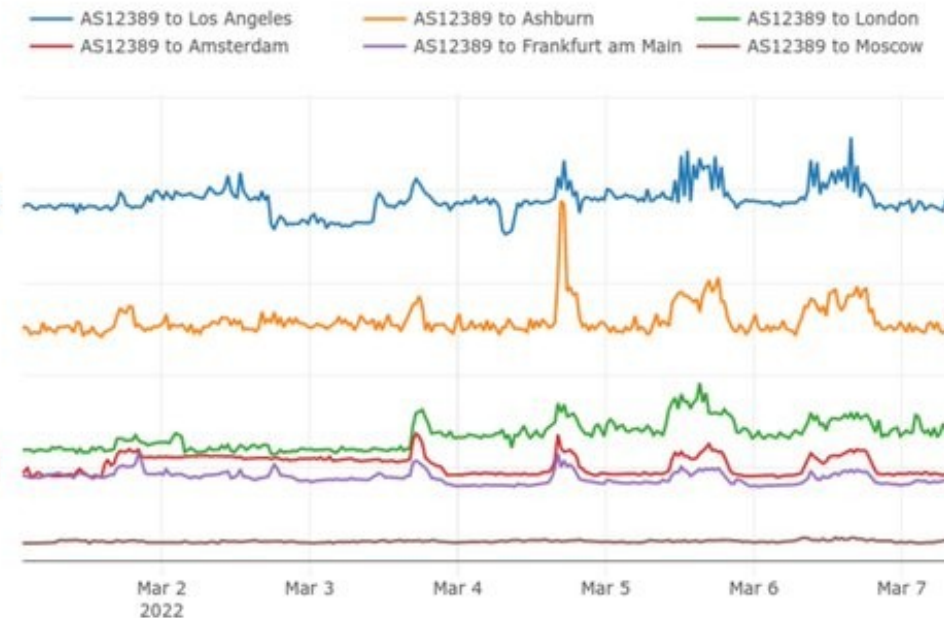

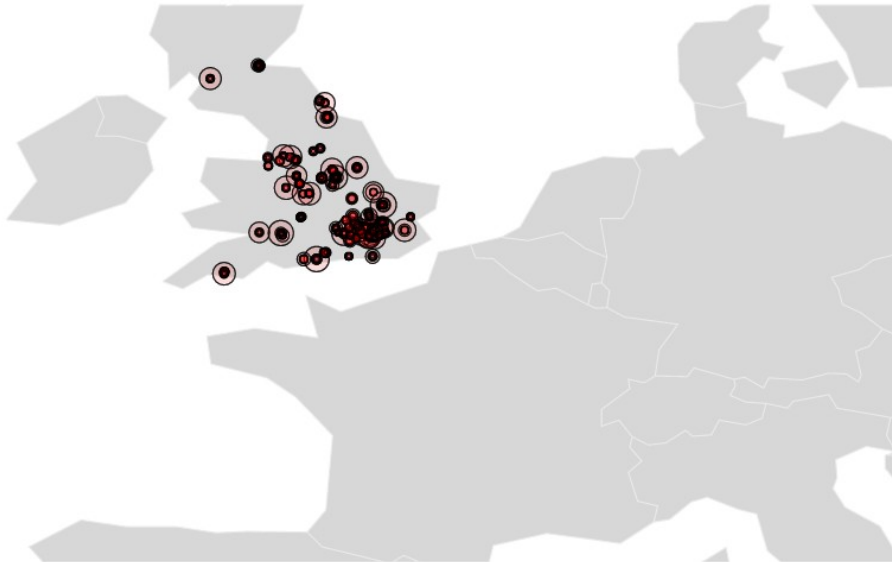Round Trip Time from Rostelecom (AS12389)
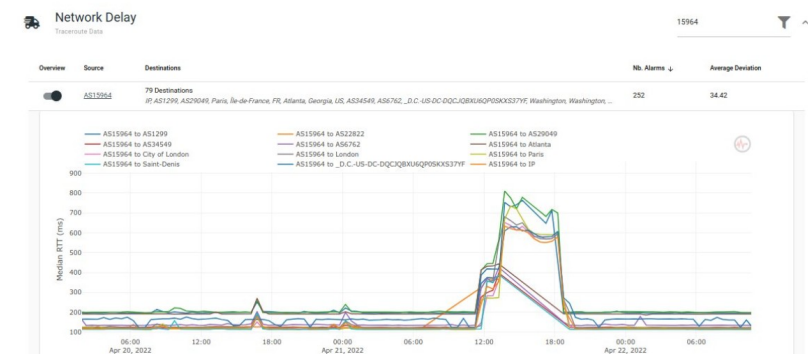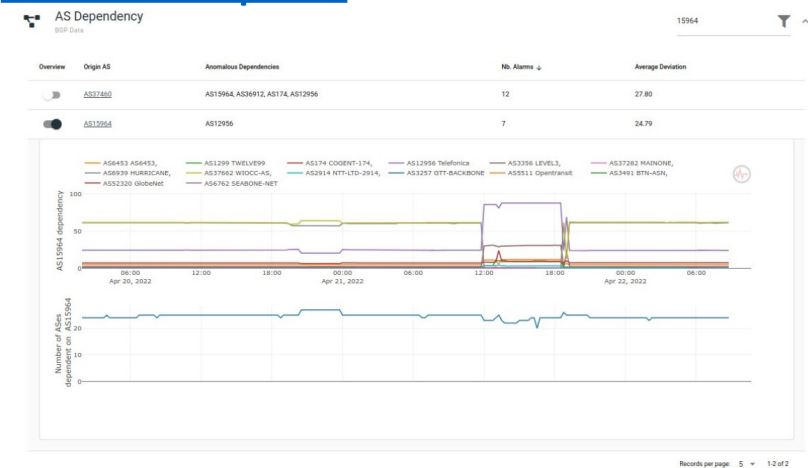
February 2022 — March 2022
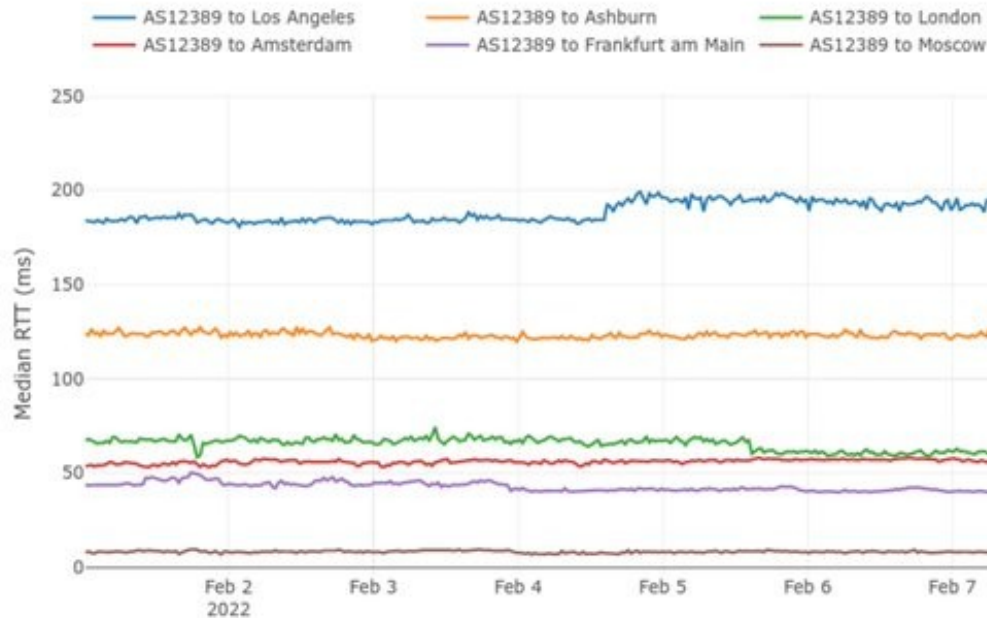
IHR Anomaly detectors

- Disco
  - Outage detection
  - Based on RIPE Atlas
  - Virgin Media outage

- Route, delay changes
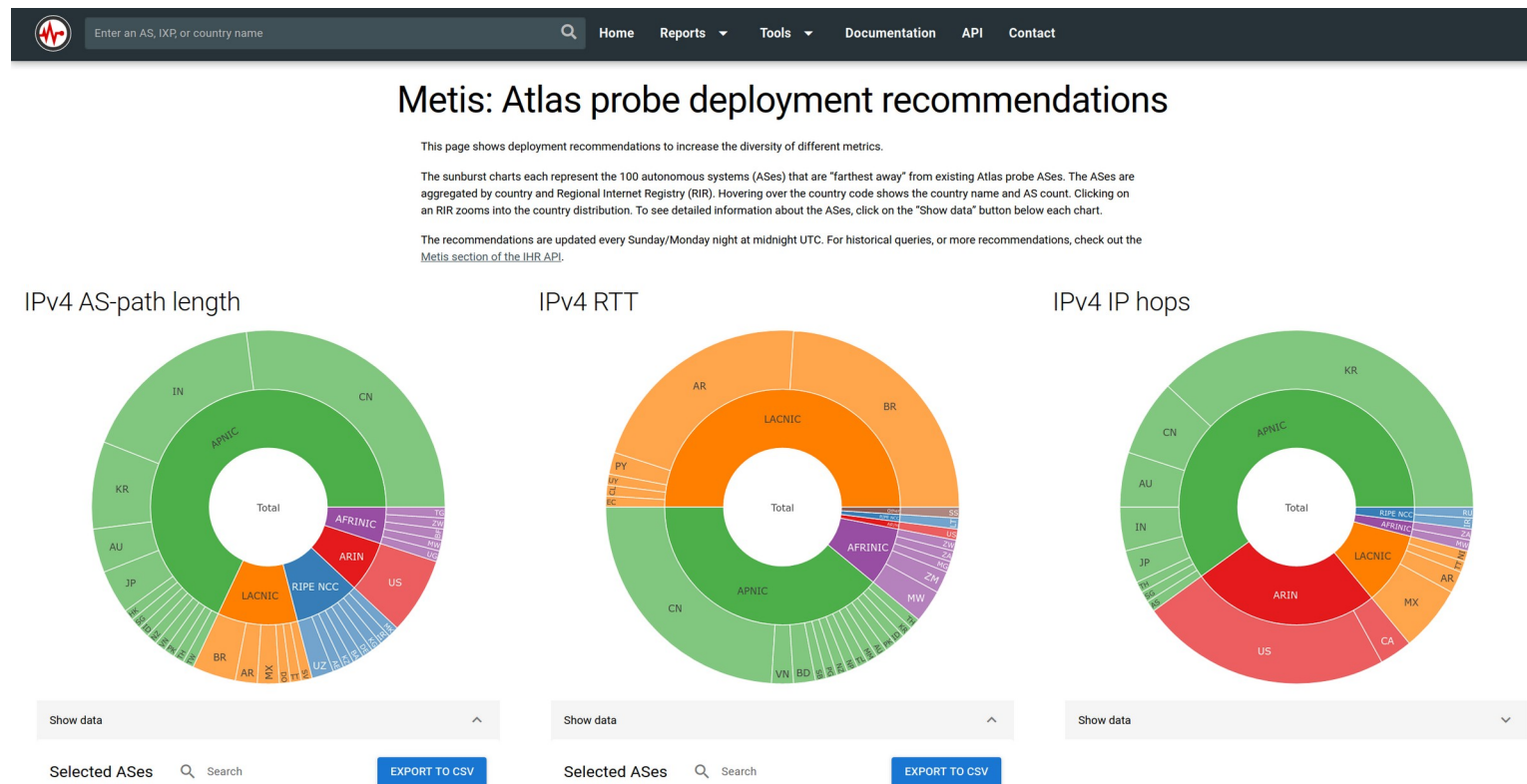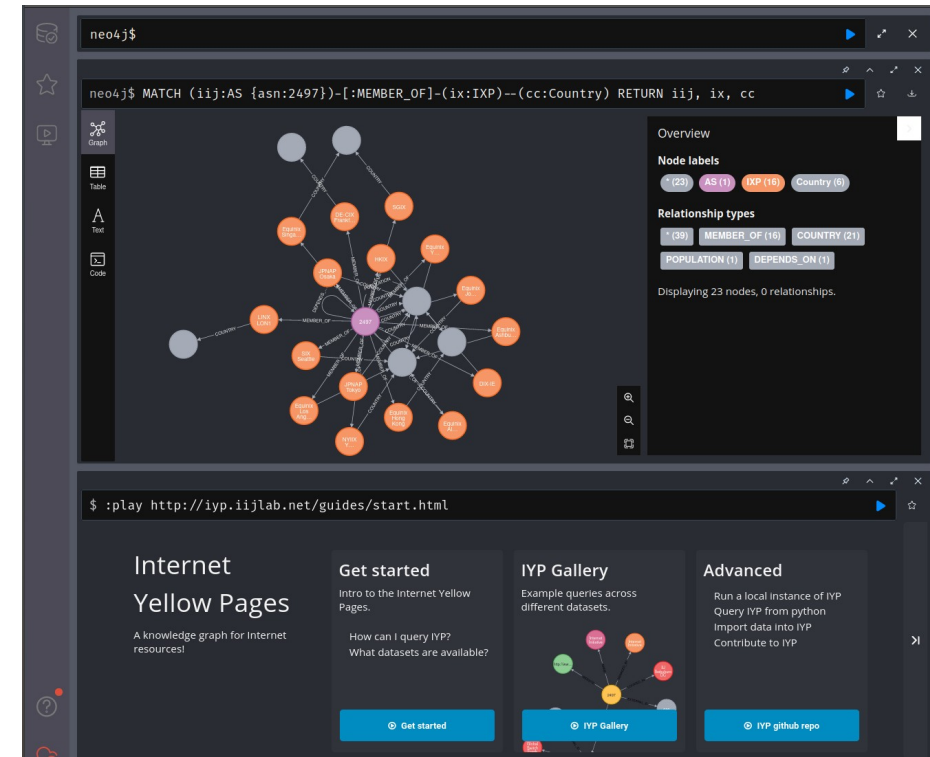 - Global report

Metis: Probe selection/placement

- Select a diverse set of Atlas probes?

- Where to place new probes?

https://ihr.iijlab.net/ihr/en-us/metis

Internet Yellow Pages

- Knowledge graph for networking data

- 13 data sources:
  - APNIC, BGPKIT, Bgp.tools, CAIDA, Citizen Lab, Cloudflare, IHR, MANRS, OpenINTEL, PeeringDB, RIPE NCC, NRO, Tranco

- Semantic: 18 node types, 21 link types

- About 4M nodes, 20M links

References

- IHR: http://ihr.live

- Github: https://github.com/InternetHealthReport

- IHR daily dumps: https://ihr-archive.iijlab.net

- Yellow Pages: https://github.com/InternetHealthReport/internet-yellow-pages/

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IYP Tutorial

- Crash course to cypher/neo4j
- Overview of IYP datasets
- Discuss applications
- (local install, how to import your data)