

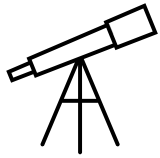
Internet Health Report

Romain Fontugne
IIJ Research Lab



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IHR vision



An observatory for the Internet



Monitor & document Internet topology, evolution, and sudden changes



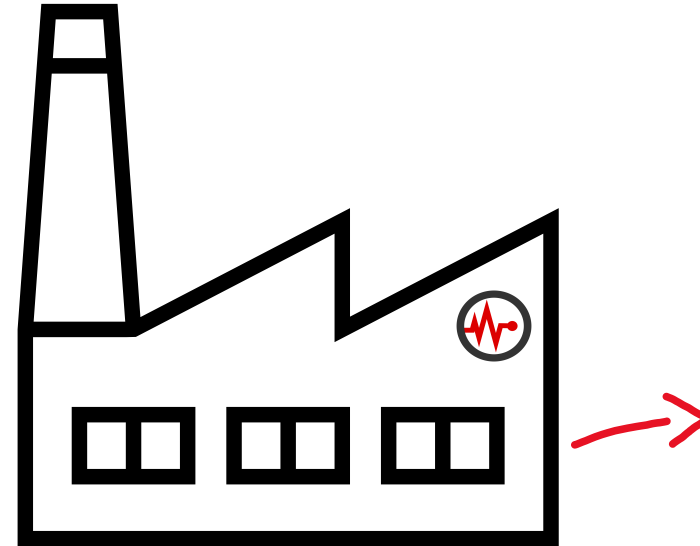
Open data / open source

Monitoring the Internet



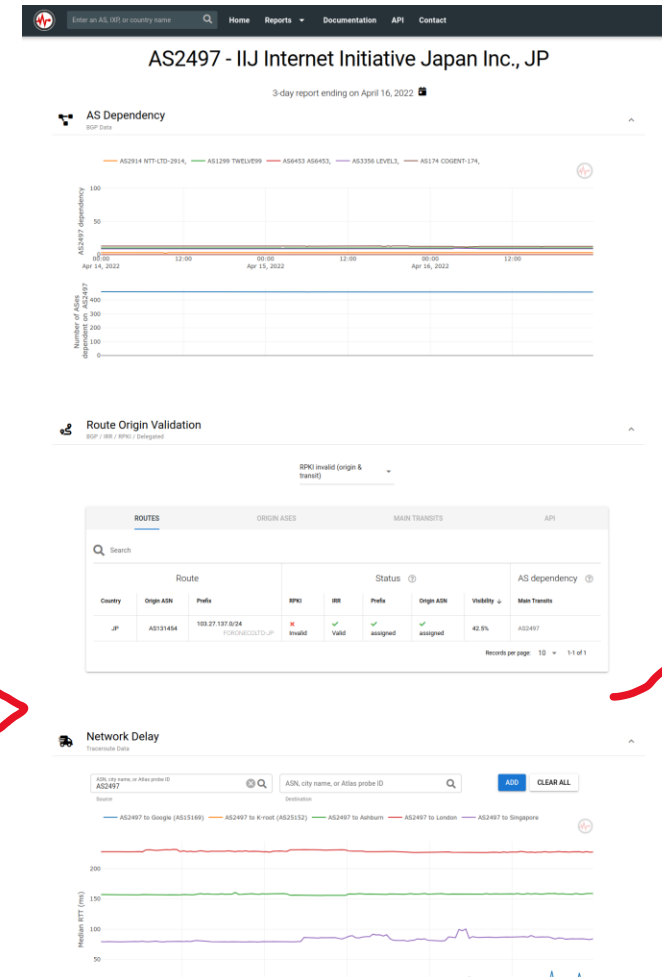
Open data

- BGP
- traceroute
- RPKI



Analysis modules

- Network dependency
- Network latency
- Disconnections
- Anomaly detection



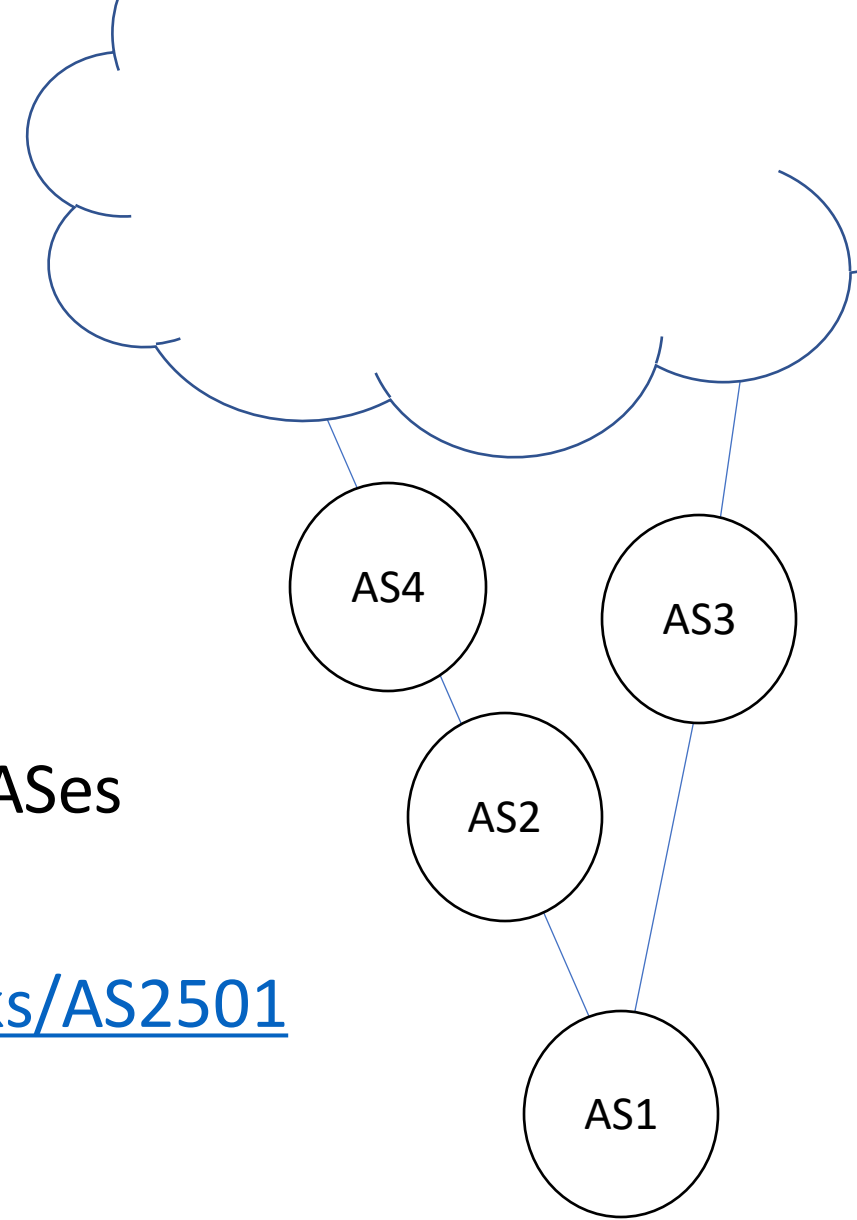
Outcomes

- <https://ihr.ijlab.net>
- Visualization
- API
- Daily dumps
- External collaborations / tools



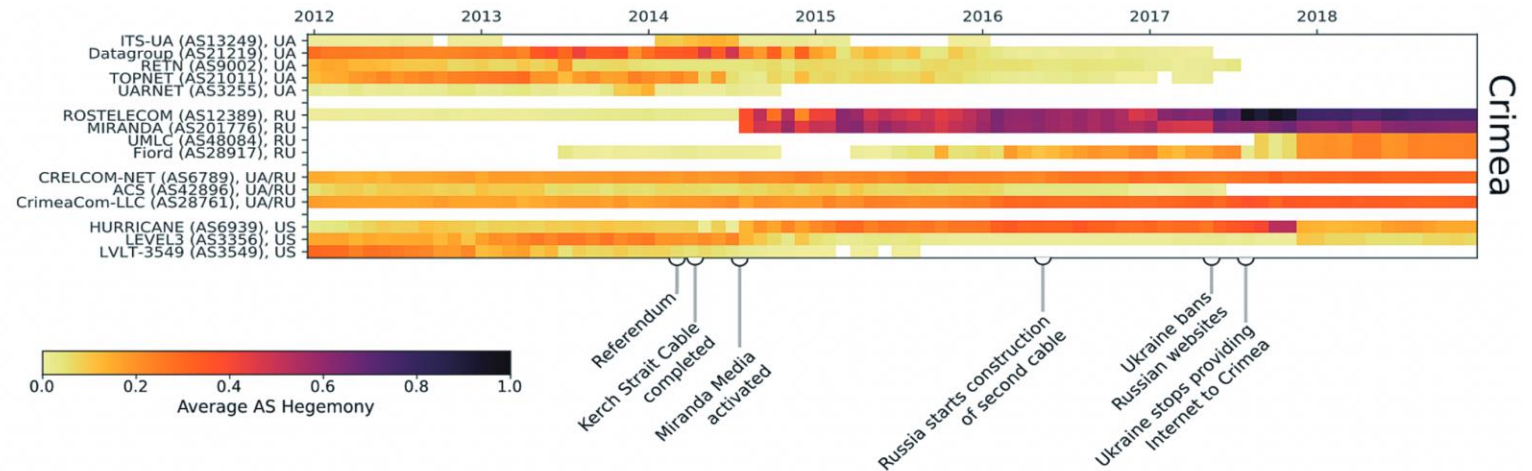
Network dependency (AS Hegemony)

- Measure AS inter-dependencies
- Using BGP data
- Give a good idea of the 'topological location' of ASes
- Customers of an AS
- Example: <https://ihr.ijlab.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



Enter an AS, IXP, or country name




Home

Reports

Documentation

API

Contact

Route Origin Validation

3-day report ending on July 12, 2021


RPKI invalid

ROUTES

ORIGIN ASES

MAIN TRANSITS

API

 Search

Route			Status						
Country	Origin ASN	Prefix		RPKI	IRR	Prefix	Origin ASN	Visibility	Main Transits
IN	AS36040	43.229.88.0/22	Route object	Invalid	Invalid	assigned	assigned	80.3%	AS58969, AS9498,
US	AS26695	23.140.96.0/24	PNAP-SEF Wow Technologies	Invalid	Invalid	assigned	assigned	78.3%	AS16584, AS31857
IN	AS138785	121.243.86.0/23	VSNL Route Object	Invalid	Invalid	assigned	assigned	76.3%	AS4755, AS6453, A
IN	AS133902	115.111.150.0/24	TCL Route Object - HYD-LEGACY-STDILL	Invalid	Invalid	assigned	assigned	75.7%	AS4755, AS6453, A
UK	AS26040	107.730.70.0/24	GGP America & Europe	Invalid	Invalid	assigned	assigned	75%	AS26095, AS5511

Routes seen in
RIS/Routeviews

Status in RPKI
& IRR

Upstream
networks

- 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

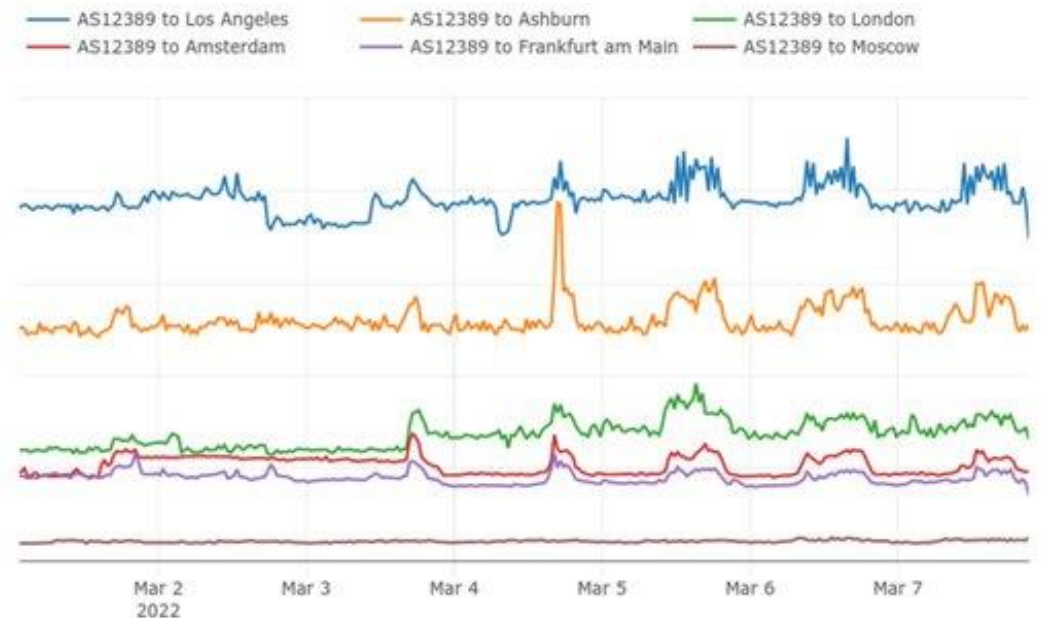


Los Angeles

Ashburn

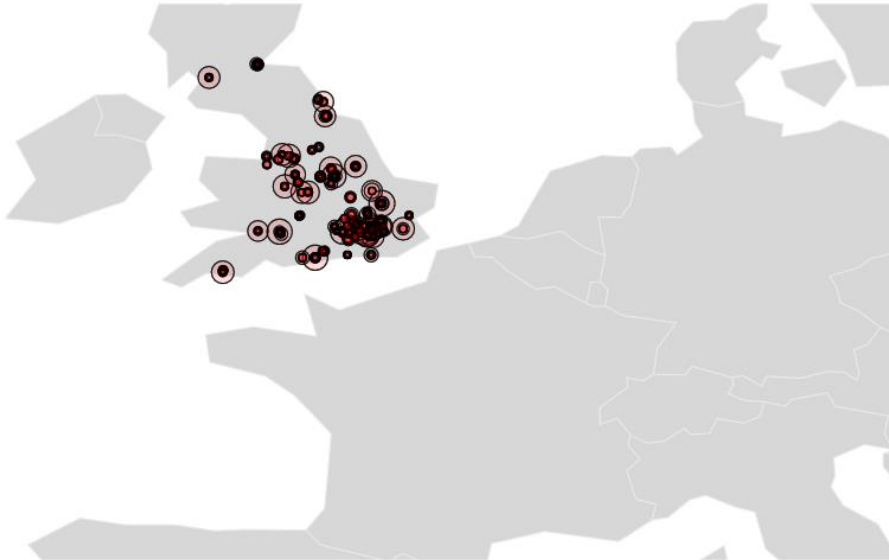
London
Amsterdam
Frankfurt
Moscow

March 2022

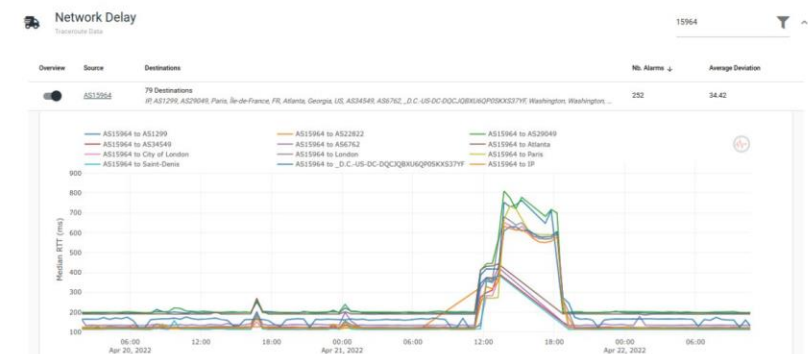
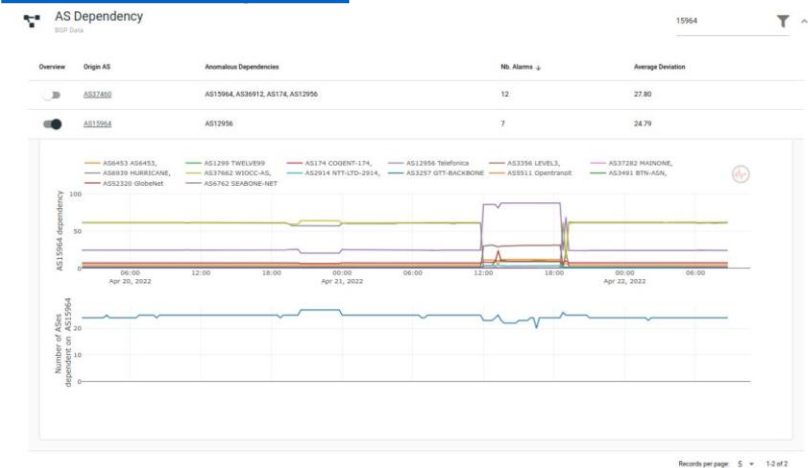


IHR Anomaly detectors

- Disco
 - Outage detection
 - Based on RIPE Atlas
 - [Virgin Media outage](#)



- Route, delay changes
 - [Global report](#)



Internet Yellow Pages

- Knowledge graph for networking data
- 12 data sources:
 - APNIC, BGPKIT, Bgp.tools, CAIDA, Cloudflare, IHR, MANRS, OpenINTEL, PeeringDB, RIPE NCC, NRO, Tranco
- Semantic: 17 node types, 21 link types
- About 4M nodes, 15M 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/>

romain@iij.ad.jp @ihr_alerts