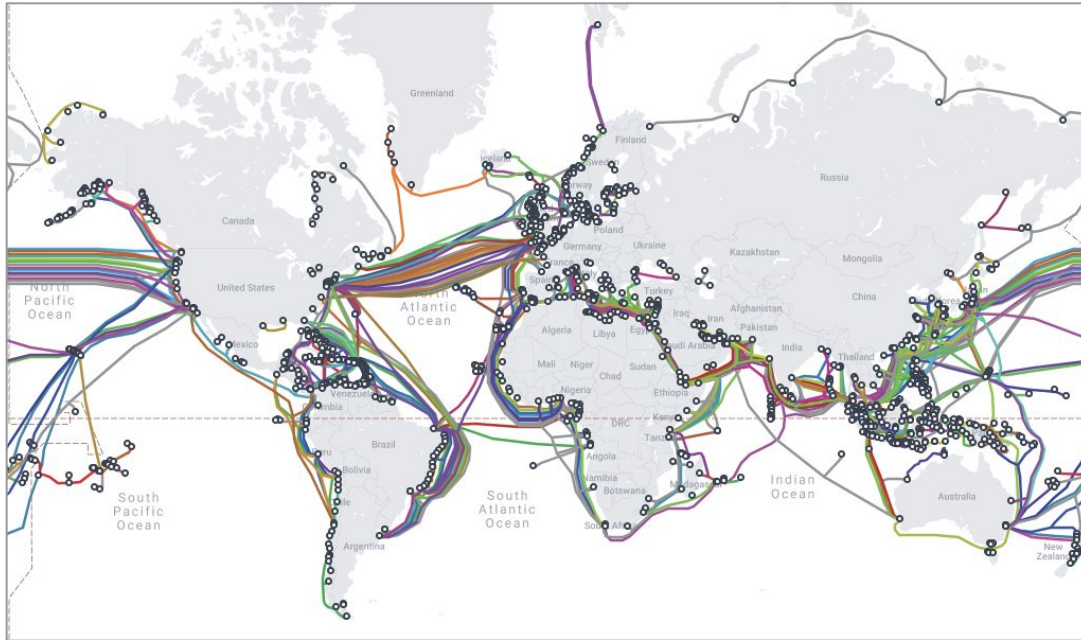


SubZero: Monitoring the Impact of the Submarine Cable Deployments

Ioana Livadariu (SimulaMet) and Vasilis Giotsas (Cloudflare)

RIPE NCC Community Projects Fund 2023 – Open House

Global mesh of submarine cables



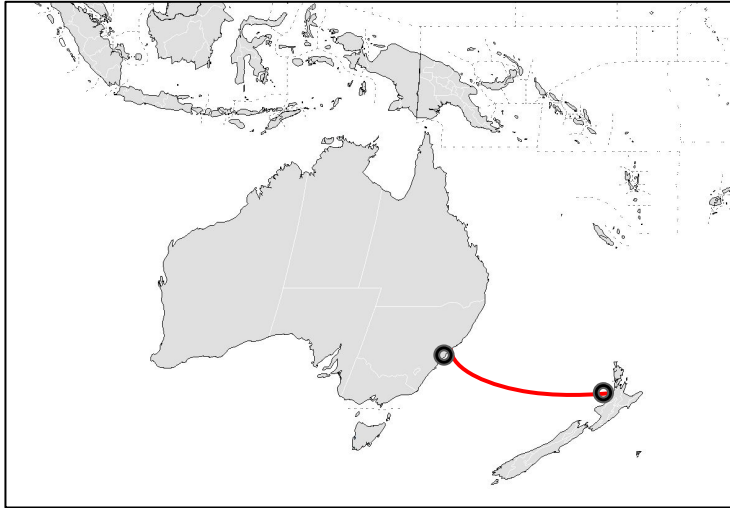
Global submarine cable network (<https://www.submarinecablemap.com/>)

- 2021: 445 deployed cables.
- > 99% of the international traffic [1].
- Critical infrastructure for connectivity.

- *Goal: Monitor the submarine cable network*

[1] Undersea Cables Transport 99 Percent of International Data
(<https://www.newsweek.com/undersea-cables-transport-99-percent-international-communications-319072>)

Inferring undersea cable links



Tasman Global Access Cable [1-5]:

Ready-for-service

March 2017

Landing points:

Oxford Falls, Australia
Raglan, New Zealand

Owners

Spark New Zealand
Telstra
Vodafone

[1] <https://www.vodafone.com/business/solutions/by-business-type/carrier-and-infrastructure-provider/submarine-and-terrestrial-cables/tga>

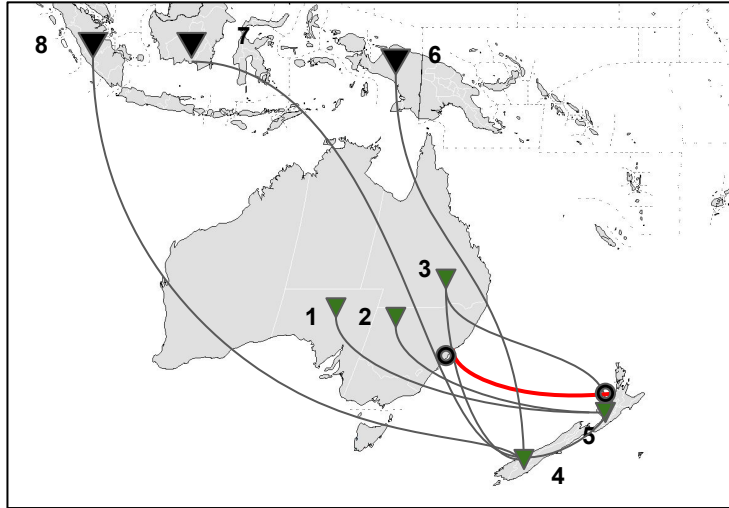
[2] <https://telco2.atlassian.net/wiki/spaces/PACPUB/pages/141983786/TGA+Tasman+Global+Access>

[3] <https://www.fiberatlantic.com/system/G6840>

[4] <https://www.submarinecablemap.com/submarine-cable/tasman-global-access-tga-cable>

[5] https://en.wikipedia.org/wiki/Tasman_Global_Access

Inferring undersea cable links



Tasman Global Access Cable:

Ready-for-service

March 2017

Landing points:

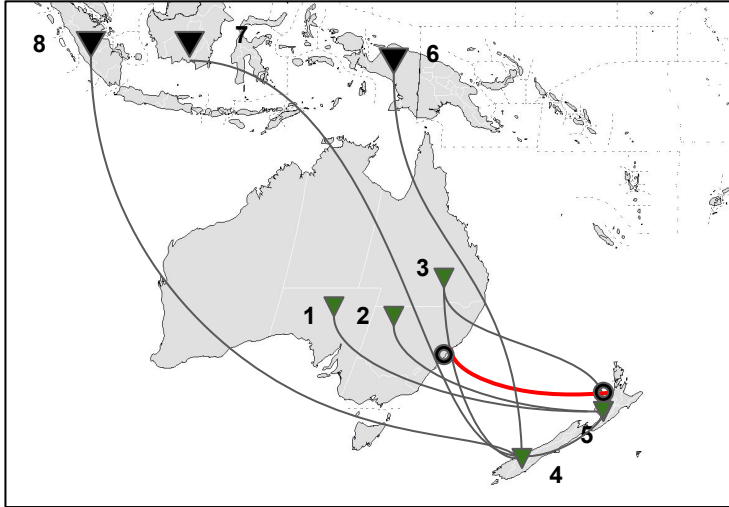
Oxford Falls, Australia
Raglan, New Zealand

Owners

Spark New Zealand
Telstra
Vodafone

- Use traceroute measurements between selected vantage points (located in landing point countries) to track changes in the IP-level path.

Inferring undersea cable links

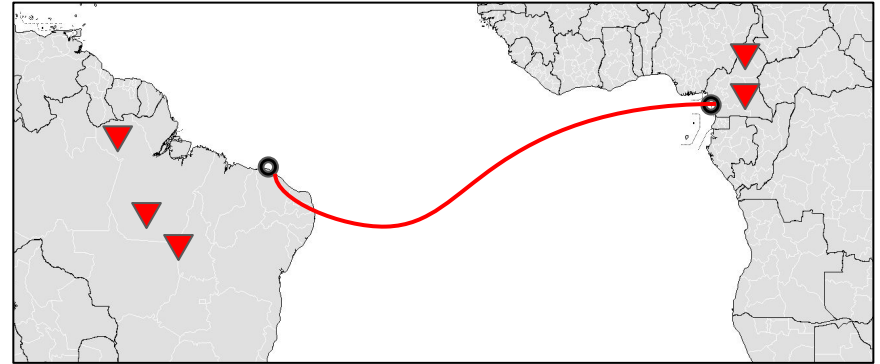


Tasman Global Access Cable:

Ready-for-service: March 2017

Landing points: Oxford Falls, Australia
Raglan, New Zealand

Owners: Spark New Zealand, Telstra
Vodafone



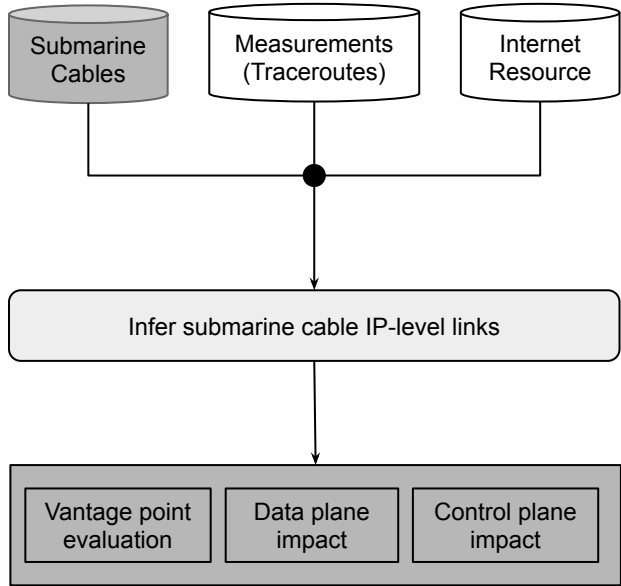
South Atlantic Inter Link (SAIL):

Ready-for-service: 2020

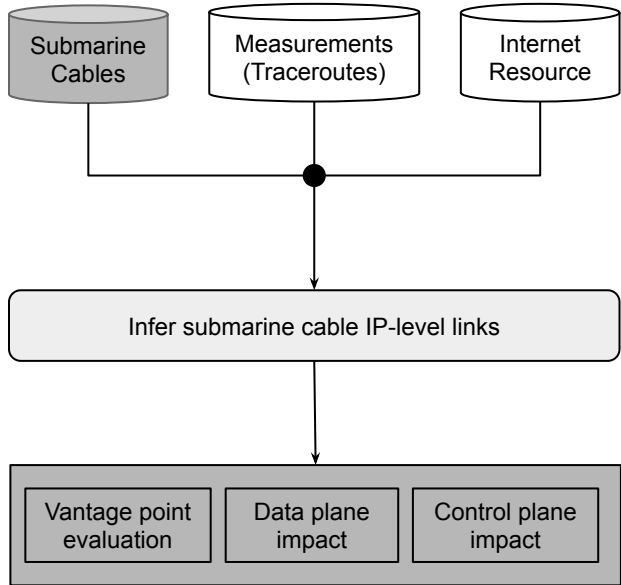
Landing points: Fortaleza, Brazil
Kribi, Cameroon

Owners: Camtel, China Unicom

Monitoring system for the submarine cable network



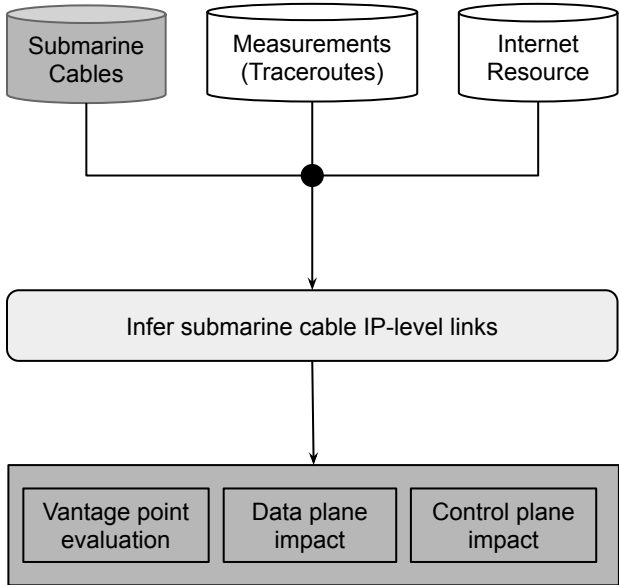
Monitoring system for the submarine cable network



Results

- Public list of major cables.
- Inferring submarine cable IP-links in traceroute data.
- Vantage point evaluation.
- Data and Control plane impact.

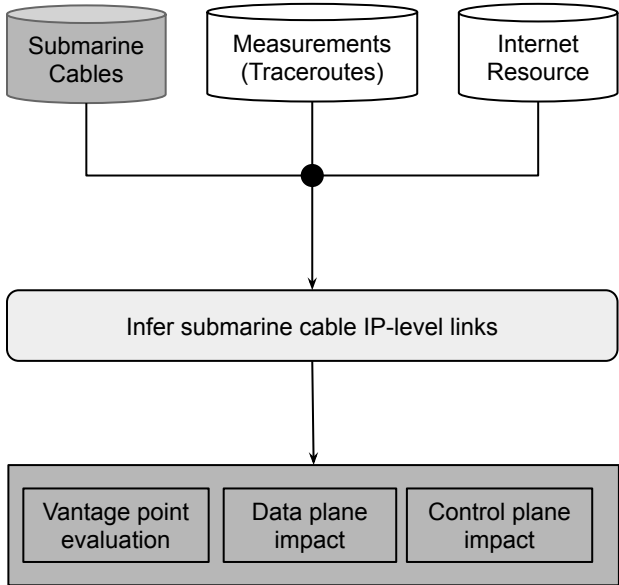
Monitoring system for the submarine cable network



Metrics

- Number of cables and information collected for each cable.
- Number of inferred and validated cables.
- Selected vantage points (locations) to study existing cables.
- Fraction of networks and paths that utilize each submarine cable.

Monitoring system for the submarine cable network

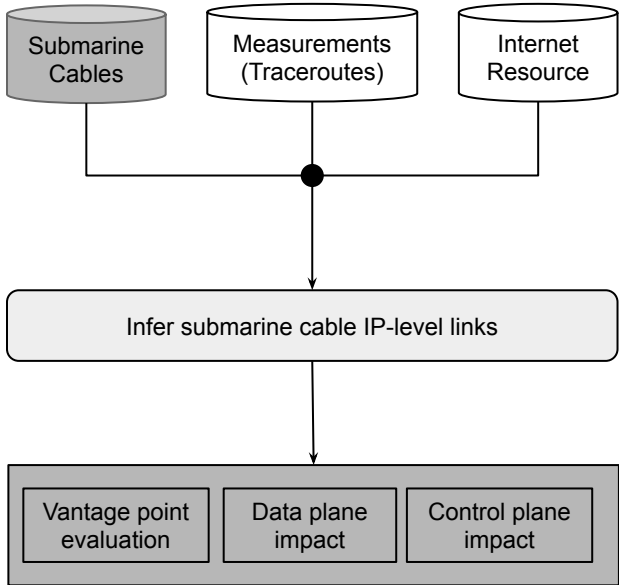


List of submarine cables: system for collecting public information and aggregating the collected information.

Algorithm on vantage point selection to find the optimal topological and geographical location of probes (Data: RIPE Atlas and Cloudflare platform).

Code open-sourced and publish data.

Monitoring system for the submarine cable network



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Q & A (ioana@simula.no)