



**moz://a**

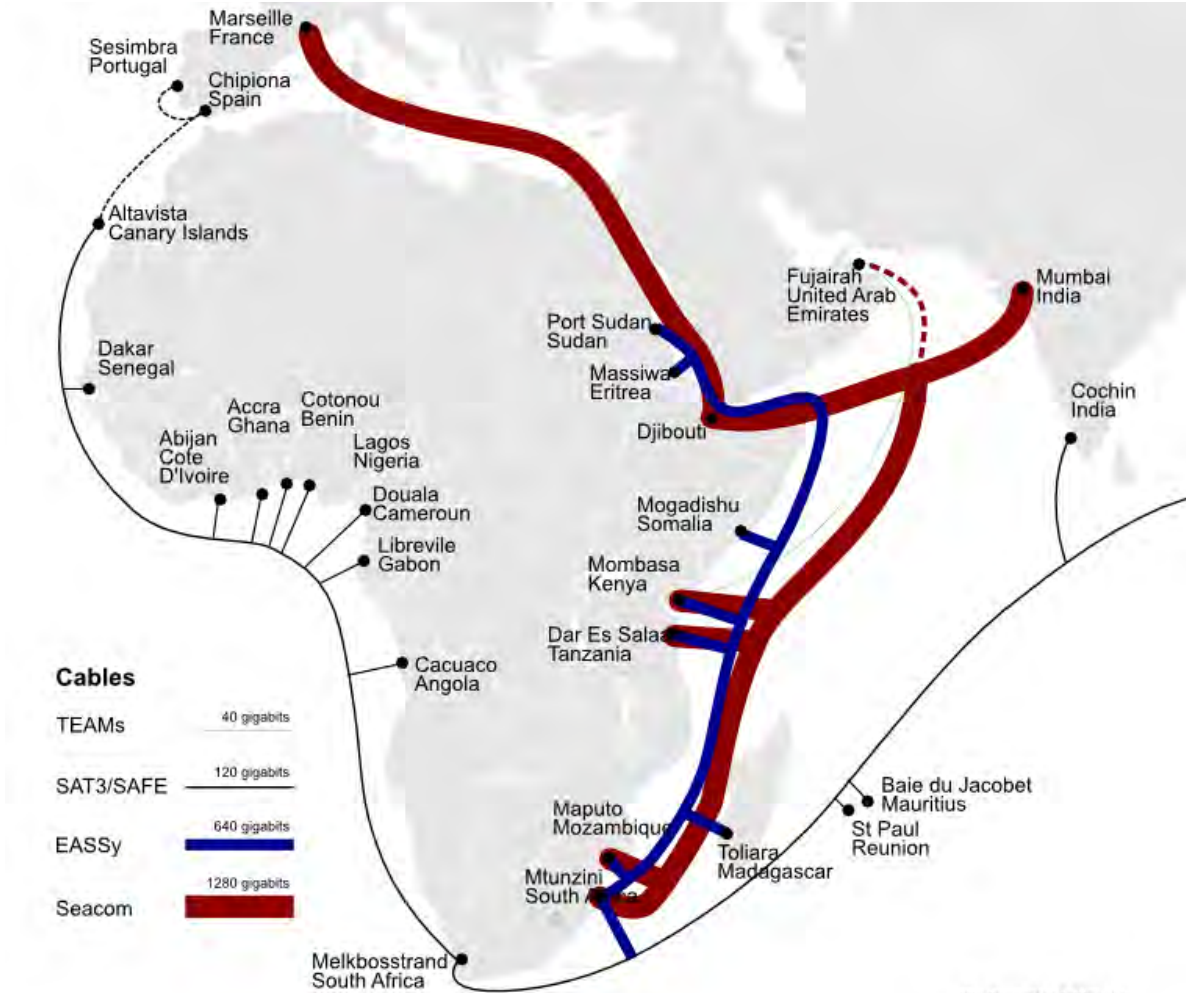
# Introducing the Open Fibre Data Standard

Steve Song

Mozilla

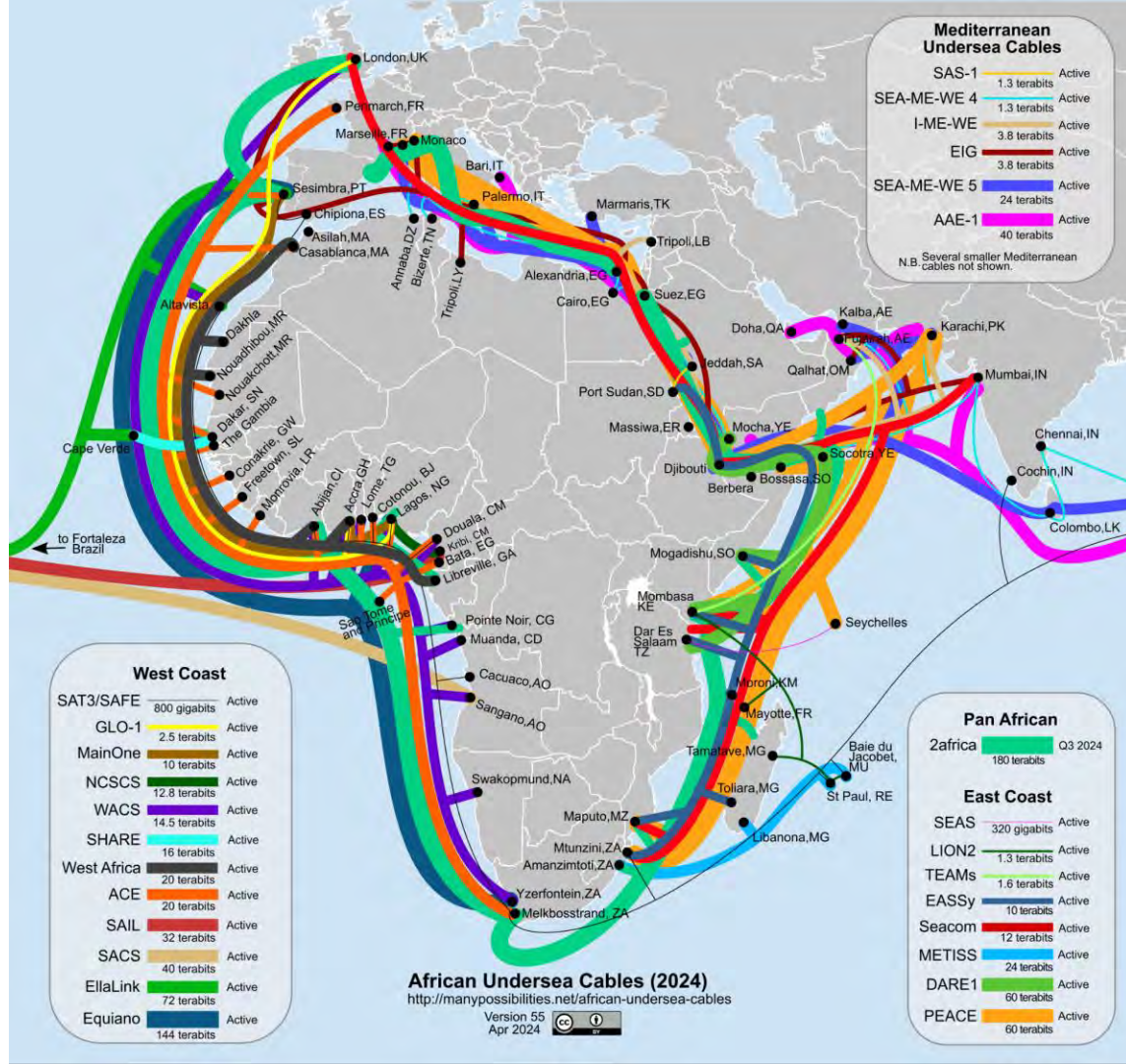
[ssong@mozilla.com](mailto:ssong@mozilla.com)

# I became interested in fibre optic infrastructure in 2009

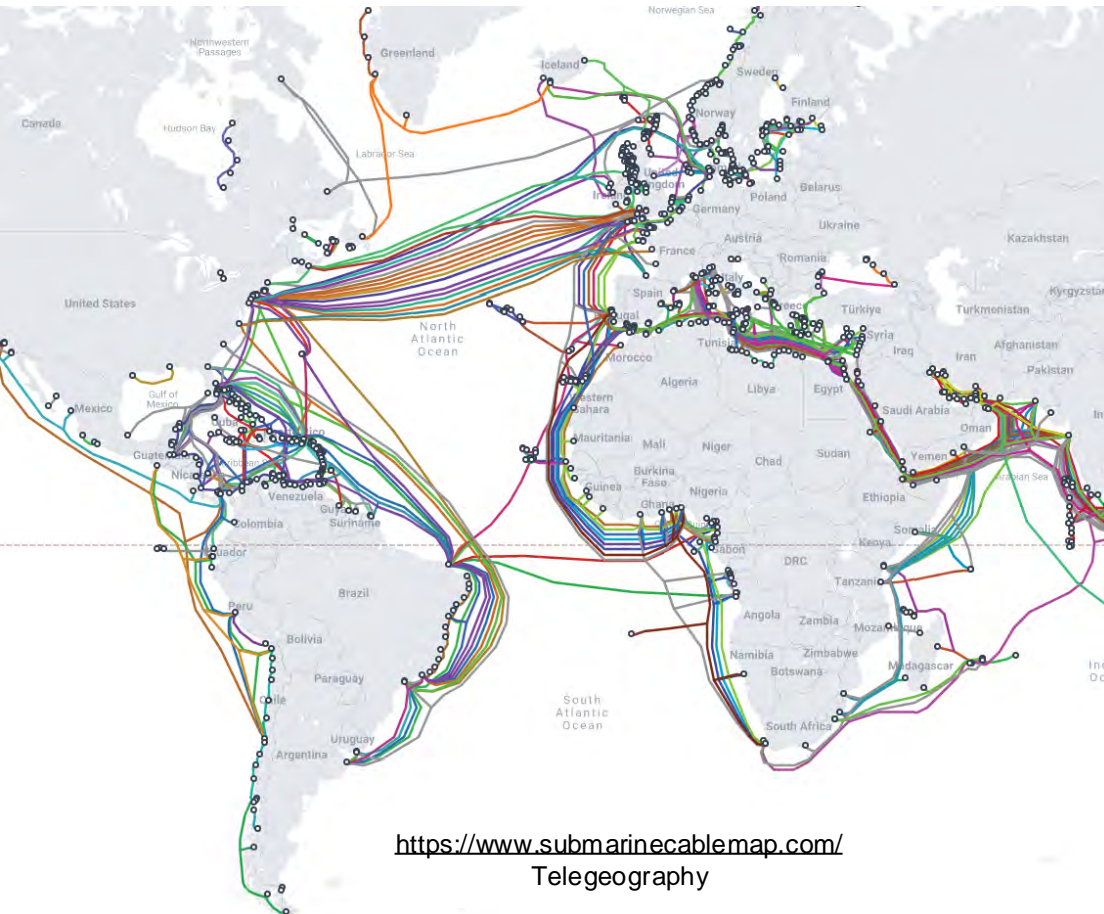


# African Undersea Fibre Optic Cables

## 2024



# The Evolution of Fibre Infrastructure

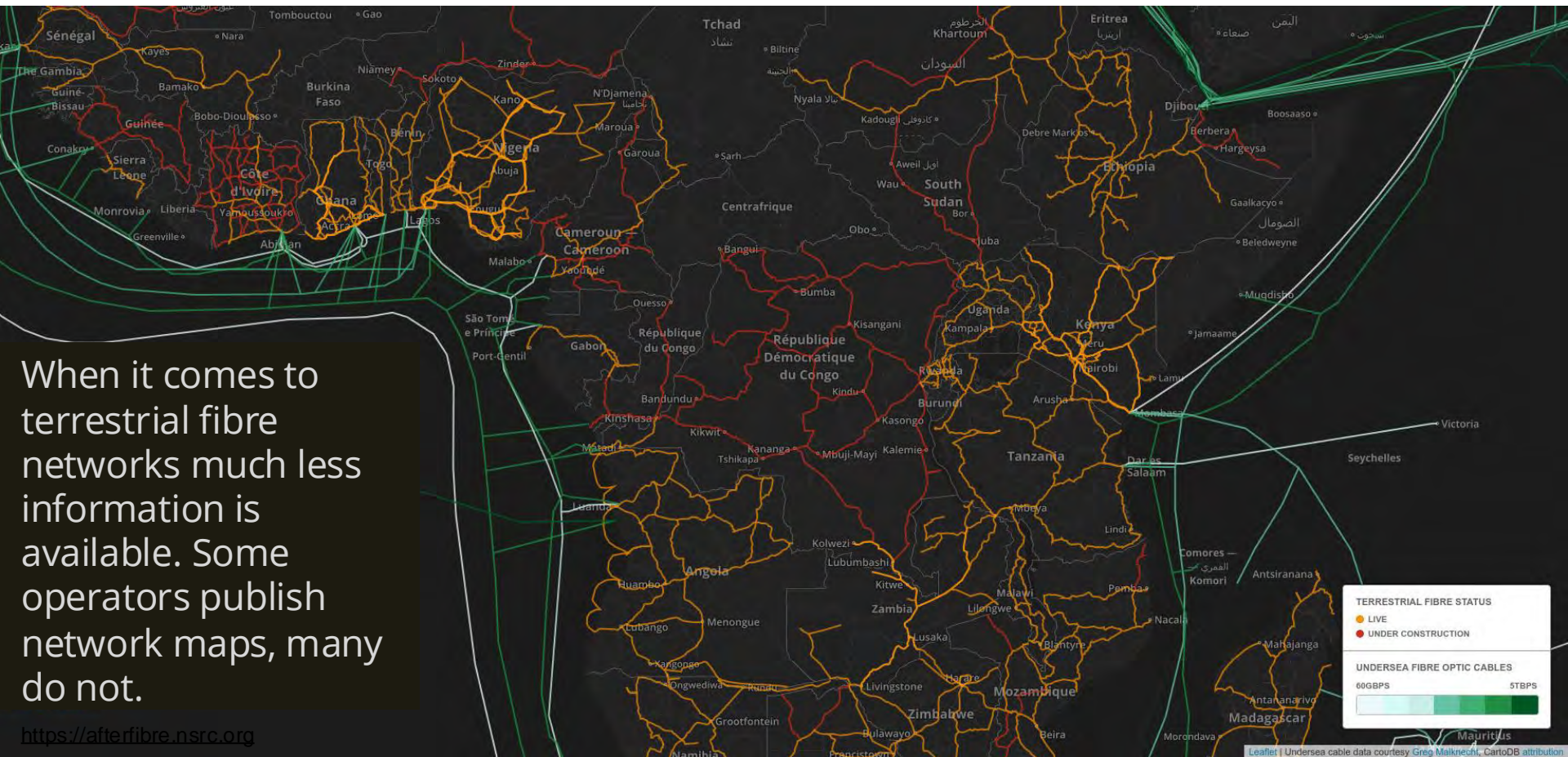


As of 2024, there are more than 550 undersea fibre optic cables, representing nearly 1.4 million kilometres of cable.

A single cable can now carry over 300 Tbps.

Undersea cable maps are readily available.

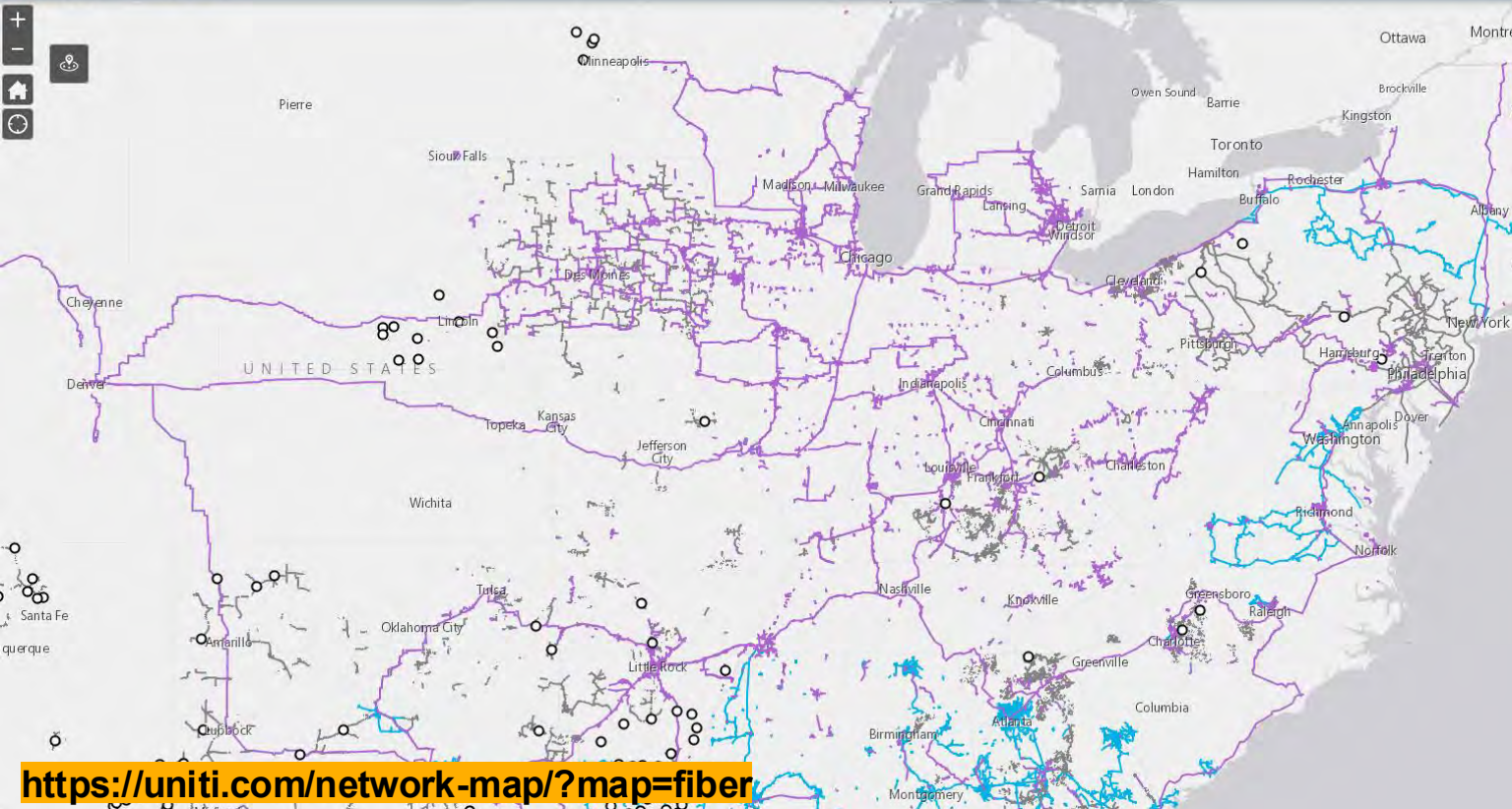
# Growth of Terrestrial Fibre



When it comes to terrestrial fibre networks much less information is available. Some operators publish network maps, many do not.

<https://afterfibre.nsrc.org>

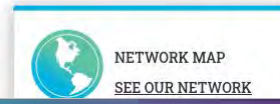
# United States: Uniti



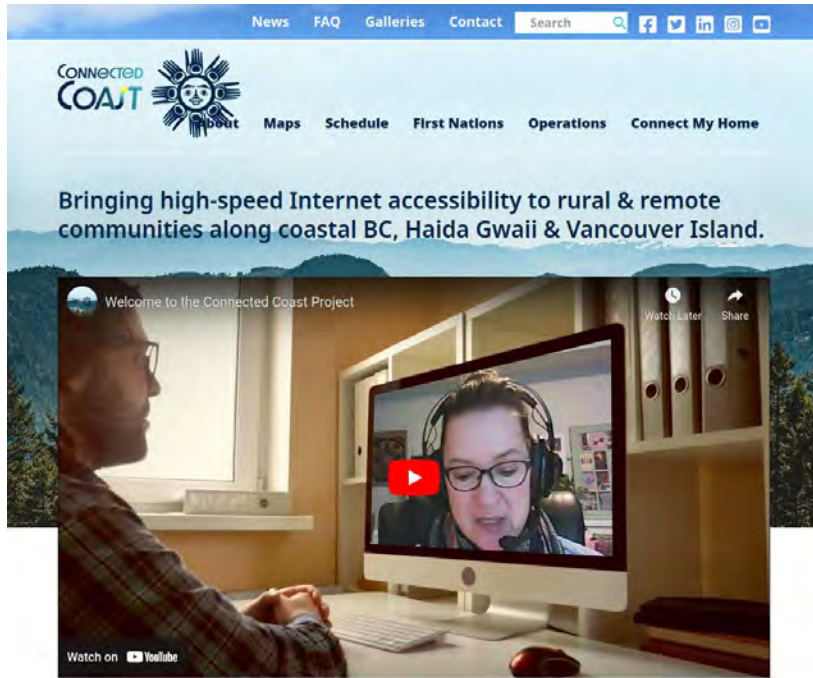
Layer List

- Uniti Tower Sites
- Dark Fiber Available
- Dark Fiber Fully Leased
- Network Services

<https://uniti.com/network-map/?map=fiber>



# Canada: Connected Coast



News FAQ Galleries Contact Search

CONNECTED COAST

About Maps Schedule First Nations Operations Connect My Home

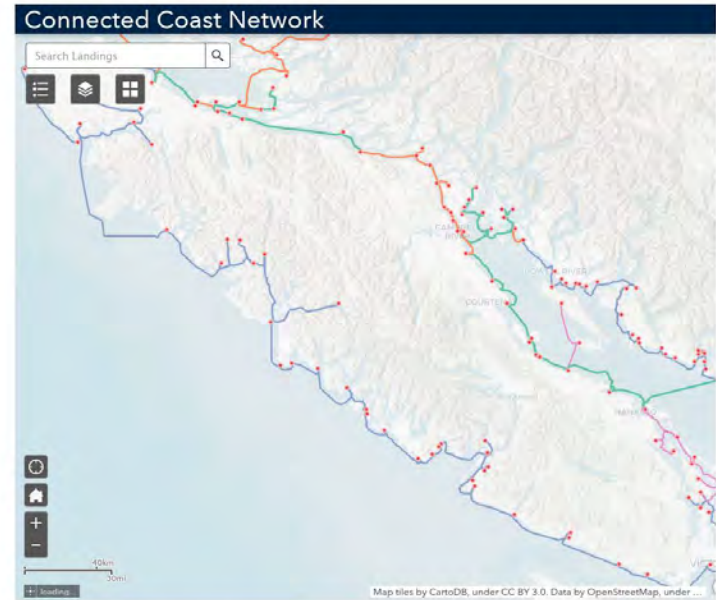
Bringing high-speed Internet accessibility to rural & remote communities along coastal BC, Haida Gwaii & Vancouver Island.

Welcome to the Connected Coast Project

Watch on YouTube

The Connected Coast project will bring new or improved high-speed internet accessibility to 139 rural and remote coastal communities, including 48 Indigenous communities – representing 44 First Nations – along the BC coast from north of Prince Rupert, to Haida Gwaii, south to Vancouver, and around Vancouver Island.

<https://connectedcoast.ca/map/>



Build Status Map – PDF

[View/Download PDF Here.](#)

Landing Sites Map – PDF

[View/Download PDF Here.](#)

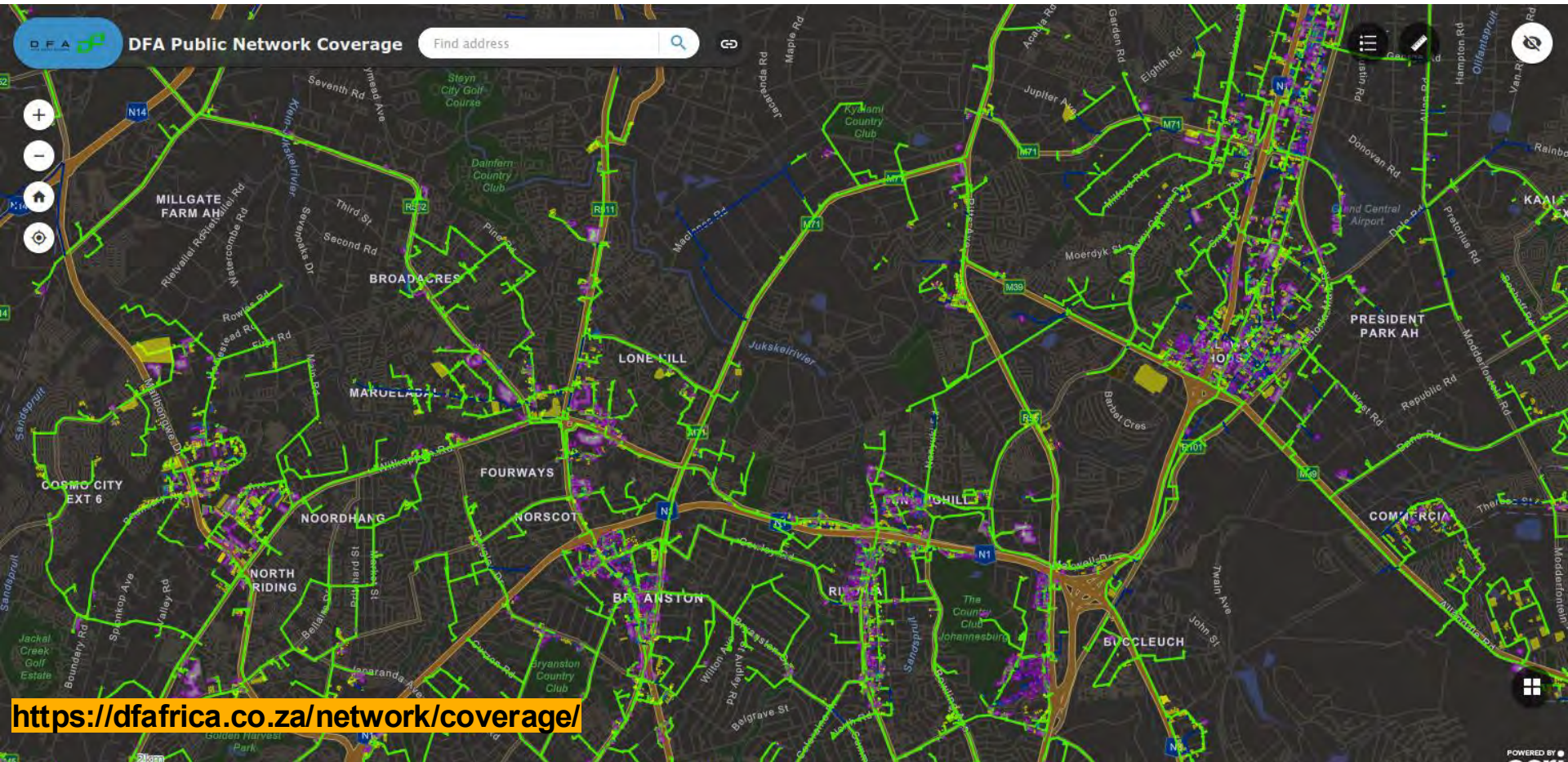
Cable Location Map – KMZ FILE

As-built cable location files in KMZ (Google Earth file format) & GPX (navigation file) are available. To receive a copy and future file updates, please fill out the form on our Operations page.

Open Data



# South Africa: Dark Fibre Africa





# Ukraine: RETN



CUSTOMER PORTAL

EN ▾



Search

Network

Long Haul Fibre

Metro Fibre

Leased

Spectrum

Buildings

Data Centers

Business Centers

RETN Offices

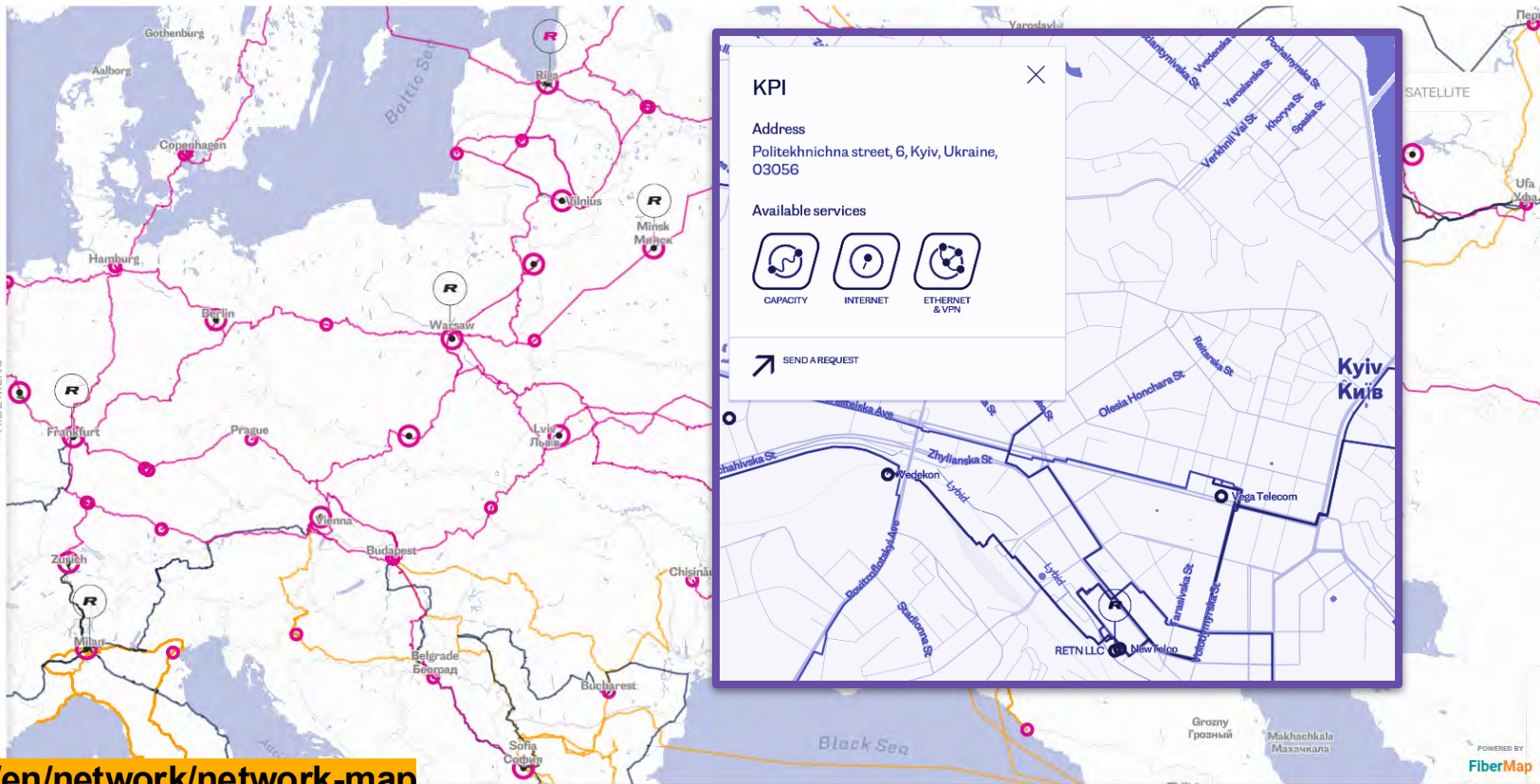
Other

Services

Capacity

Internet

Ethernet & VPN



<https://retn.net/en/network/network-map>

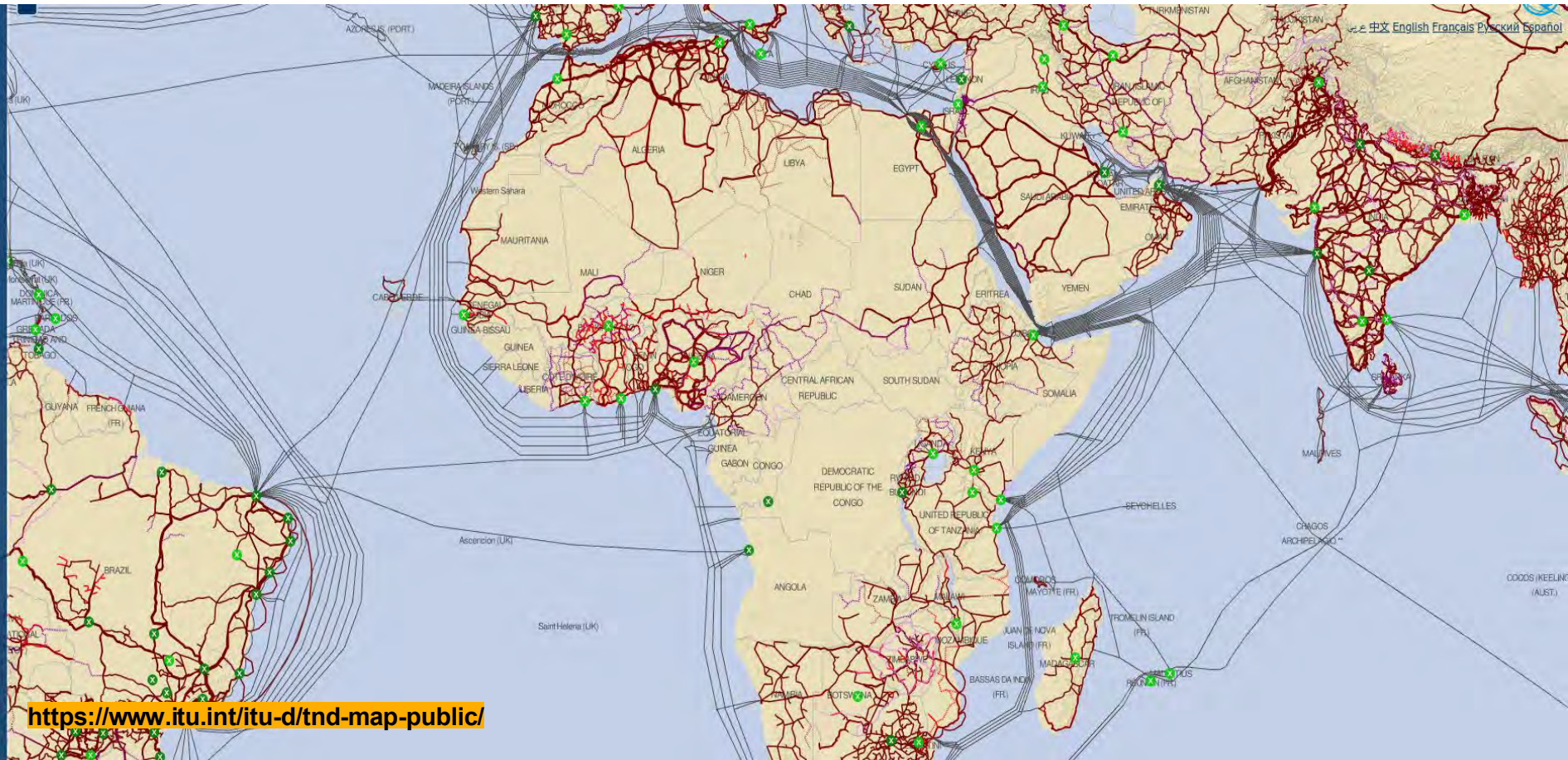
GET IN TOUCH WITH RETN

PDF Download network map



POWERED BY  
FiberMap

# ITU Transmission Map





# Lessons from mapping fibre in Africa

- ◆ Map compiled via official maps (from some operators), shareholder reports, World Bank studies, and other 'informal' sources over 10 years
- ◆ Probably about 70% complete and many networks require updating

*"The Arrival of Fast Internet and Employment in Africa"*  
2019, Hjort and Poulsen



<https://www.aeaweb.org/articles?id=10.1257/aer.20161385>

# Multistakeholder initiative

The World Bank, the International Telecommunications Union (ITU), Mozilla Corporation, the Internet Society (ISOC), Liquid Intelligent Technologies, CSquared, and Digital Council Africa are partnering to promote the collaborative development of open data standards for describing telecommunications infrastructure.



**The Open Fibre Data Standard (OFDS)** is a standard for publishing data on terrestrial fibre optic broadband infrastructure.



# Open Data Services

Open Data Services (ODS) were contracted by the World Bank to provide technical support in the development of the standard. ODS are international experts in data standards

- International **Aid Transparency** Initiative (IATI)  
<https://iatistandard.org/en/iati-standard/>
- Open **Contracting** Data Standard  
<https://standard.open-contracting.org/>
- **Beneficial Ownership** Data Standard  
<https://standard.openownership.org/>

<https://opendataservices.coop/>



# Benefits to government and regulators

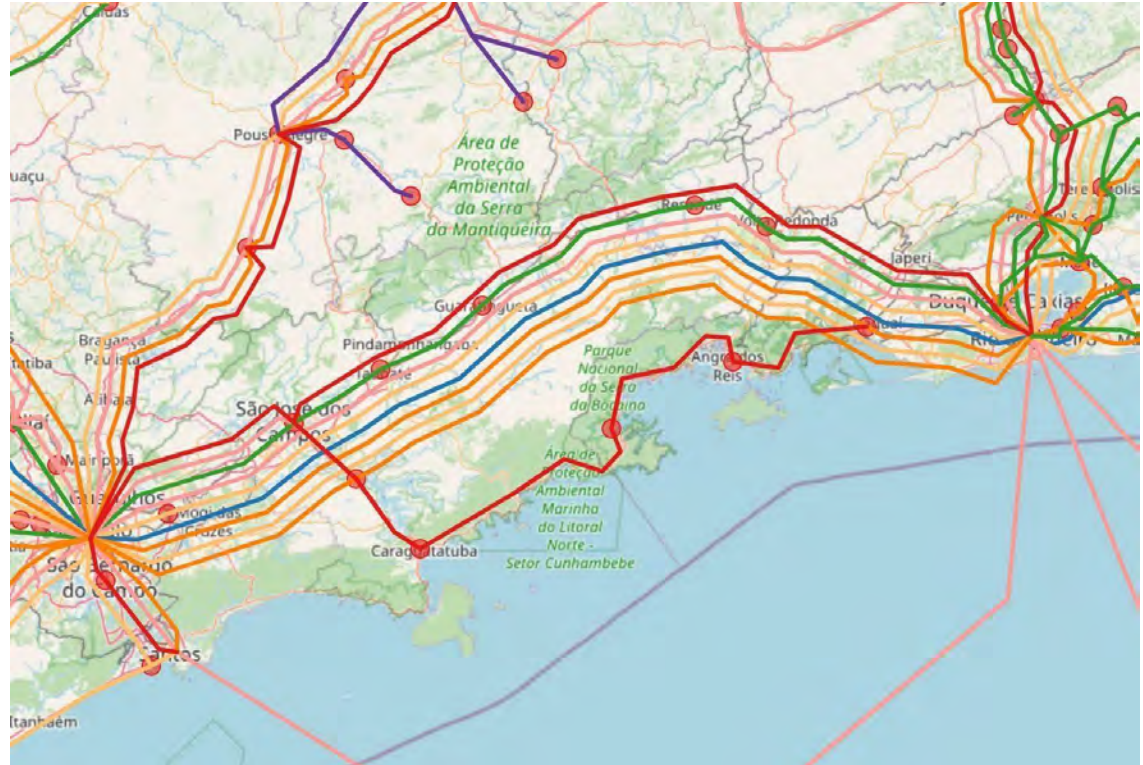
- ◆ More effective network investments by accurately targeting the unserved.
- ◆ Improved coordination across infrastructure sectors e.g. road, electricity, rail, oil & gas.
- ◆ Reduction of physical network interruption and destruction.
- ◆ Opportunity for national and regional benchmarking



<https://www.bbc.com/news/science-environment-65174512>

# Benefits to government and regulators

- ◆ Understanding the true extent of national fibre infrastructure
- ◆ Benefits to cyber security. Redundancy is key to network resilience. Resilience has less to do with failsafe networks than networks that are safe when they fail.

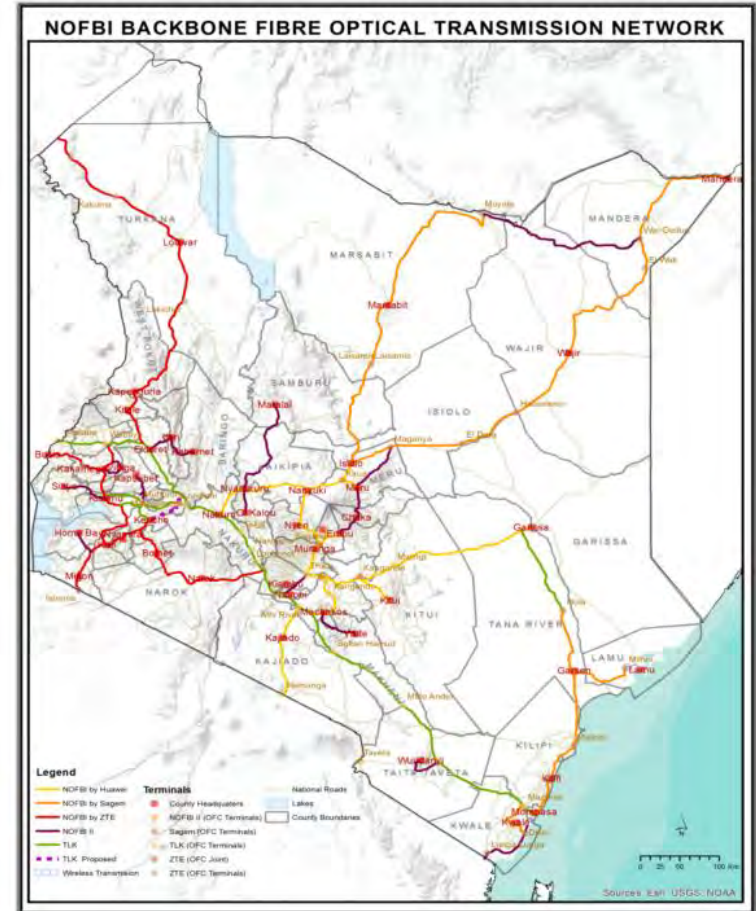


Map of fibre networks from Sao Paulo to Rio de Janeiro

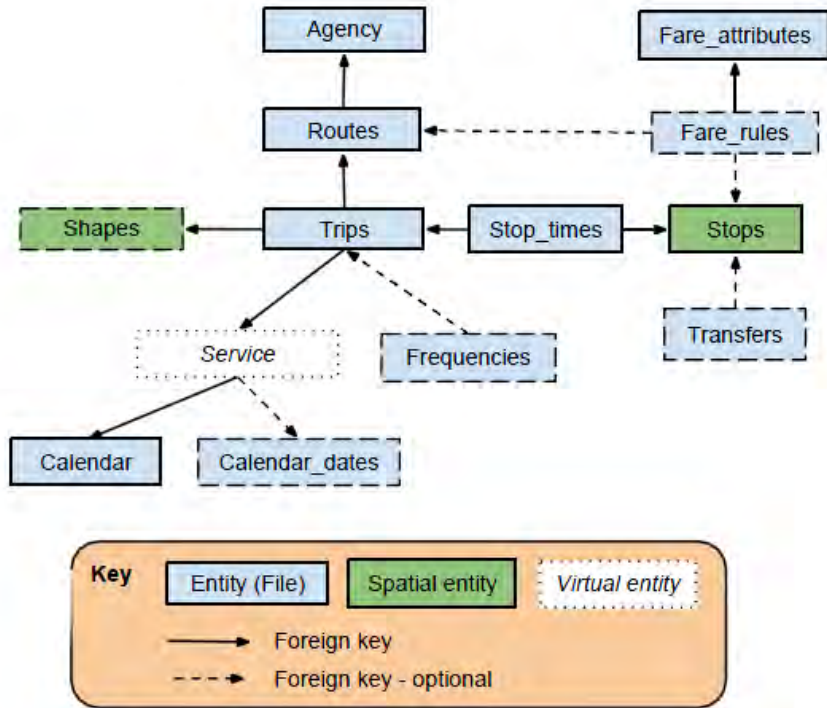


# Benefits to Operators

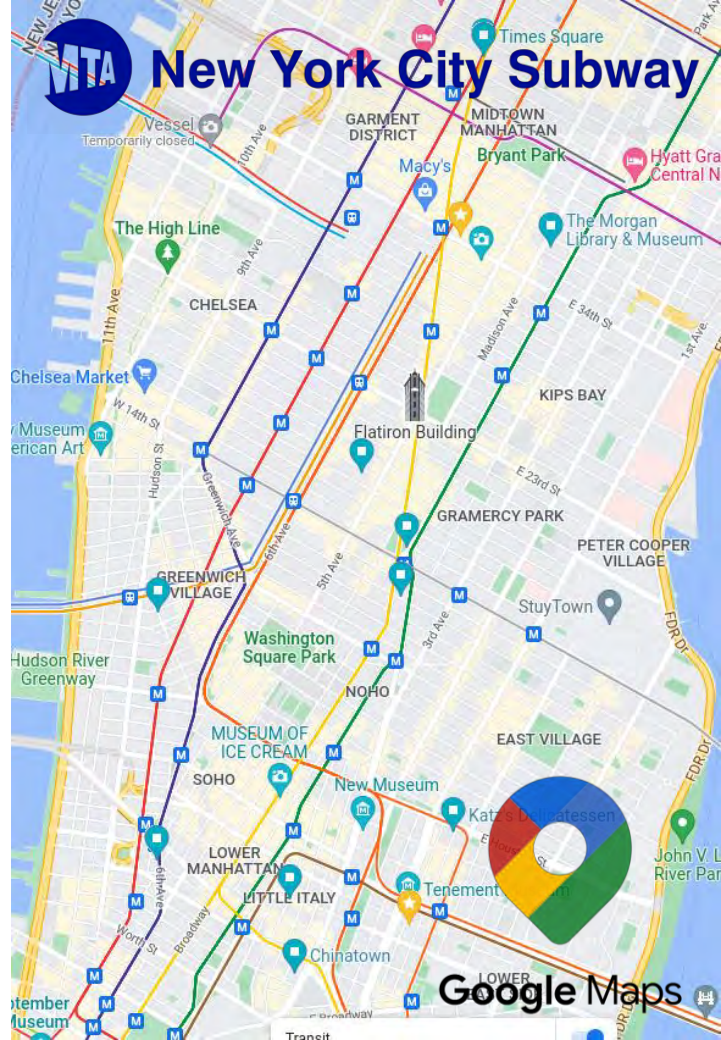
- ◆ Opportunities for small ISPs, rural operators in particular.
- ◆ More strategic information for investors
- ◆ Levelling the playing field in terms of information sharing and building trust
- ◆ Better evidence of the socio-economic impact of their networks
- ◆ Better network analysis tools



# Open Data Standard Example

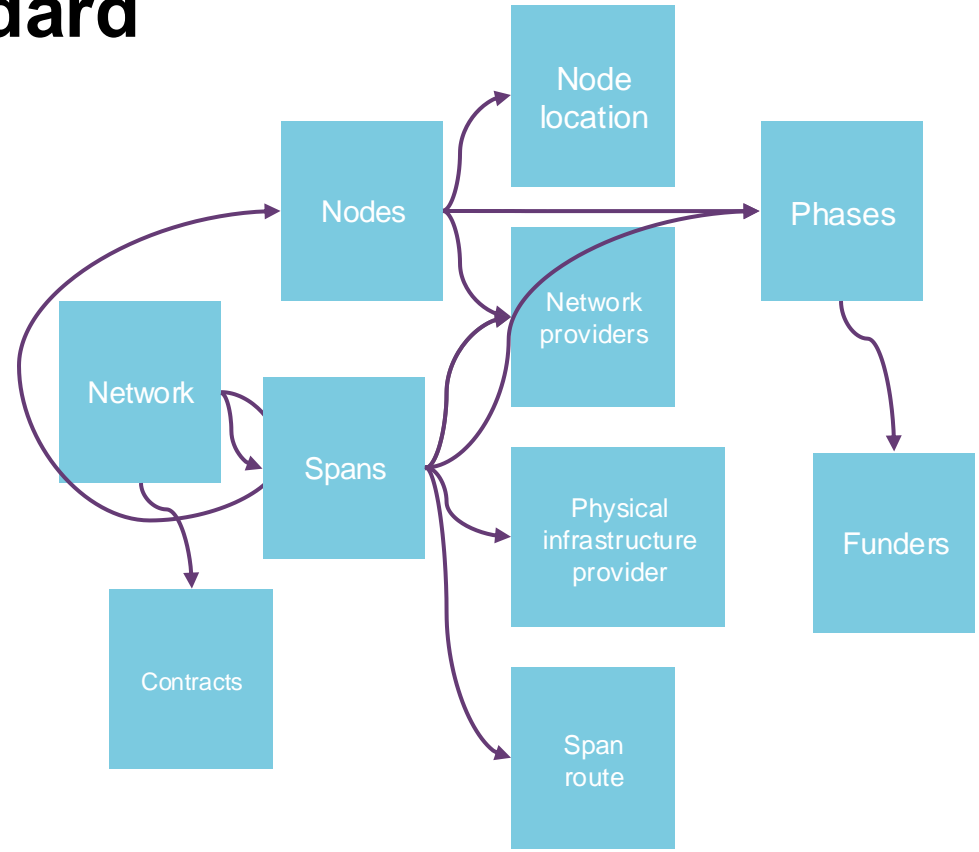


## General Transit Feed Specification



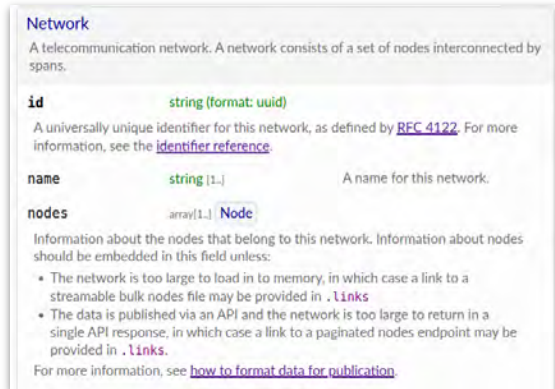
# Open Fibre Data Standard

- ◆ Describes **what data to publish** about fibre networks
- ◆ Provides a **vocabulary** and **structure** for fibre network data
- ◆ Offers **guidance and software tools** for publishers and users



# Components

Schema and codelists	Documentation	Open source tools
Define the structure and format of OFDS data, the meaning of each field, and the rules that must be followed to publish OFDS data.	A primer, guidance and reference documentation covering how to publish and use OFDS data.	Software tools for converting, validating and exploring OFDS data.



**Network**  
A telecommunication network. A network consists of a set of nodes interconnected by spans.

**id** `string (format: uuid)`  
A universally unique identifier for this network, as defined by [RFC 4122](#). For more information, see the [identifier reference](#).

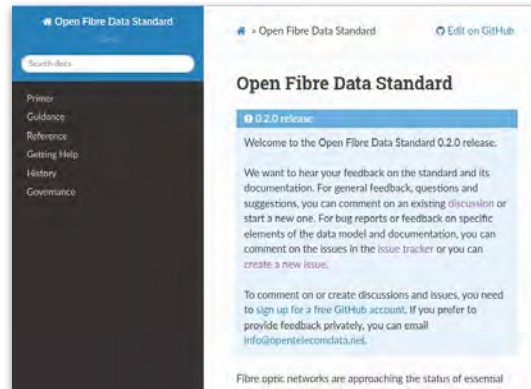
**name** `string [1..]` A name for this network.

**nodes** `array [1..] Node`  
Information about the nodes that belong to this network. Information about nodes should be embedded in this field unless:

- The network is too large to load in to memory, in which case a link to a streamable bulk nodes file may be provided in `.links`
- The data is published via an API and the network is too large to return in a single API response, in which case a link to a paginated nodes endpoint may be provided in `.links`.

For more information, see [how to format data for publication](#).

<https://open-fibre-data-standard.readthedocs.io/en/latest/reference/schema.html>



Open Fibre Data Standard

Primer  
Guidance  
Reference  
Getting Help  
History  
Governance

## Open Fibre Data Standard

0.2.0 release:


Welcome to the Open Fibre Data Standard 0.2.0 release:

We want to hear your feedback on the standard and its documentation. For general feedback, questions and suggestions, you can comment on an existing [discussion](#) or start a new one. For bug reports or feedback on specific elements of the data model and documentation, you can comment on the issues in the [issue tracker](#) or you can [create a new issue](#).

To comment on or create discussions and issues, you need to sign up for a [free GitHub account](#). If you prefer to provide feedback privately, you can email [info@openfibre.com/data.json](mailto:info@openfibre.com/data.json).

Fibre optic networks are approaching the status of essential

<https://open-fibre-data-standard.readthedocs.io/en/latest/>



Open Fibre Data Standard

CoVE Convert, Validate, Explore

Standard Documentation

Load New File

Schema Version

Your data was checked against schema version: 0.2

Data Conversion

Download the data that you submitted in either its original format or in alternative formats. For more information, see the [publication format reference](#). If you are investigating an error, you might find the alternative formats easier to use.

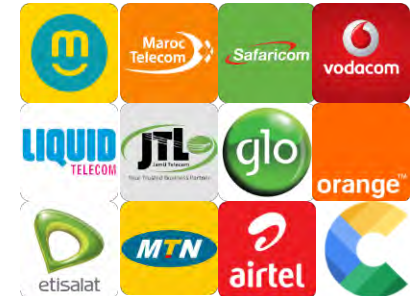
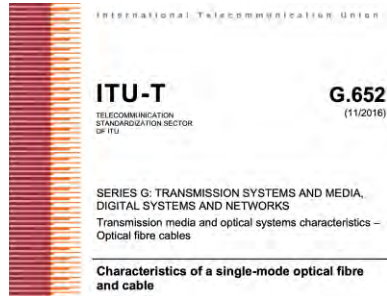
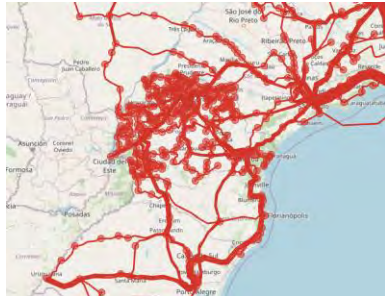
JSON (original)

network-package.json (9.2 KB)

<https://ofds.cove.opendataservices.coop/>

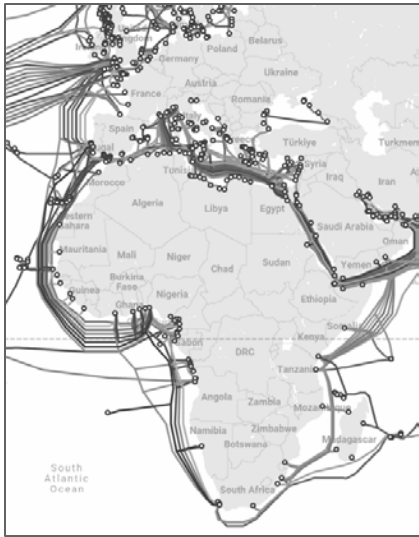
# Categories of Data

Location data	Technical data	Administrative data
The route of fibre cables, the coordinates of PoPs, towers and IXPs.	Capacity, ITU fibre standards, power availability.	The organisations that own and operate infrastructure, the status of infrastructure, dark fibre availability.

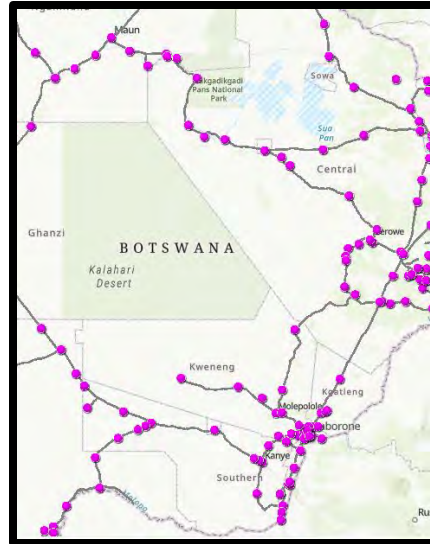


# Reach

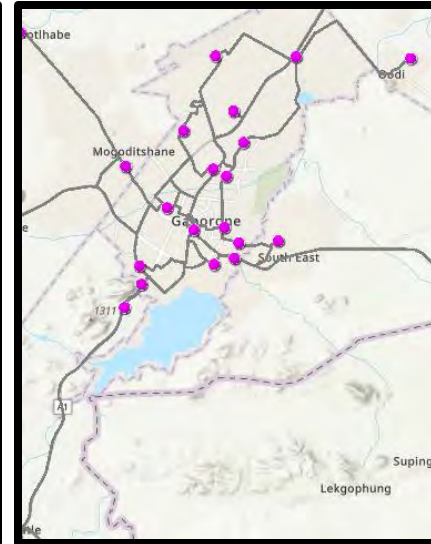
The initial focus of OFDS lies in describing **national** and **middle mile** networks but will ultimately encompass **last mile networks**.



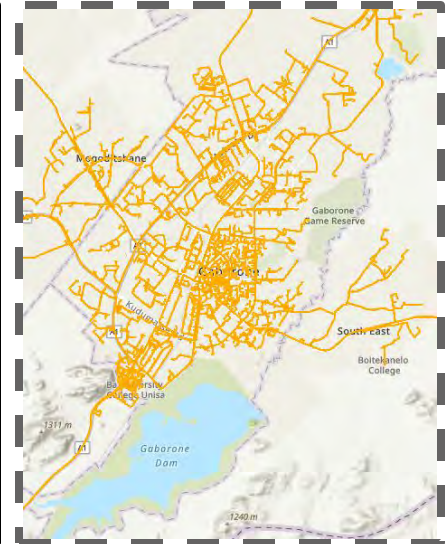
Undersea



National



Middle mile



Last mile

# What we're currently working on

The screenshot shows the GitHub repository page for 'ofds\_consolidation\_tool'. The repository is public and has 3 forks and 1 star. The description reads: 'A tool to consolidate multiple data sets formatted using the Open Fibre Data Standard'. A commit by 'rhiaro and RZZERO' is visible, titled 'feat(tool): Increase threshold fo...'. The file list includes .github/workflows, .vscode, docs, scripts, tests, tool, .flake8, .gitignore, LICENSE, README.md, \_init\_.py, dev\_requirements.in, dev\_requirements.txt, gui.py, and gui.ui.

**Consolidation Tool**  
A guided tool to integrate multiple overlapping fibre OFDS maps into a single resource.

[https://github.com/Open-Telecoms-Data/ofds\\_consolidation\\_tool](https://github.com/Open-Telecoms-Data/ofds_consolidation_tool)

The screenshot shows the GitHub repository page for 'kml2ofds'. The repository is public and has 2 forks and 4 stars. The description reads: 'KML2OFDS is a python script for converting KML maps of fibre optic network infrastructure to the Open Fibre Data Standard. Consult the documentation for more info.' A commit by 'stevesong' is visible, titled 'Create input and output directo...'. The file list includes .vscode, .gitignore, README, default.p, kml2ofds, pyproj, requirem, and README.

**KML to OFDS Export**  
A command line tool for exporting KML fibre network maps to the OFDS standard.





<https://github.com/stevesong/kml2ofds>

# Workshops

- ◆ Working with partners to promote the development of a global initiative to support the standard
- ◆ Next steps are to develop transparent, democratic governance mechanisms for OFDS and fundraise for its support globally.

**Join us!**

## National Workshops

	Kenya	Ghana
Regulator	 <b>COMMUNICATIONS AUTHORITY OF KENYA</b>	 <b>NATIONAL COMMUNICATIONS AUTHORITY</b> <i>Communications for Development</i>
Operator Association	 <b>tespok</b>	 <b>GHANA CHAMBER OF TELECOMMUNICATIONS</b> <i>M-Powering People • SIMpacting Lives</i>

## Regional Workshops





# Further Reading

## Articles

World Bank - [Making it Possible for the World to Log On](#)

Mozilla - [Open Fibre Data Standard: Understanding the True Extent of the Internet](#)

Mozilla Op Ed - [Why Telcos Must Be Open About Their Infrastructure, And How It Could Connect The Unconnected](#)

Internet Society - [A Standard to Increase Availability, Accessibility of Terrestrial Fiber Infrastructure Data](#)

Internet Society - [Mapping Terrestrial Fibre Optic Networks is Essential for Measuring Internet Resilience](#)

Open Data Services Cooperative - [Open Fibre Data Standard: opening up fibre optic broadband infrastructure](#)

The State of Open Data - [Telecommunications and the State of Open Data](#)

## Canonical sources

Documentation

<https://open-fibre-data-standard.readthedocs.io/en/latest/reference/schema.html>

Repository for the standard

<https://github.com/Open-Telecoms-Data/open-fibre-data-standard>



**moz://a**

**Thank you**

**Steve Song**

Mozilla

[ssong@mozilla.com](mailto:ssong@mozilla.com)