



SUBOPTIC
FOUNDATION

Enhancing the Strategic Resilience of Subsea Cables in the Caribbean

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ABOUT US

- Our project is an initiative of the **SubOptic Foundation**, the charitable arm of the SubOptic Association, an organization dedicated to promoting the development and sustainability of global subsea fiber-optic cable.
- In 2023, we were funded by the Internet Society Foundation to develop a study, map, and plan that would **enhance the resilience of subsea telecommunications cables in the Caribbean**, with case studies in Dominica, Turks and Caicos, and Puerto Rico.



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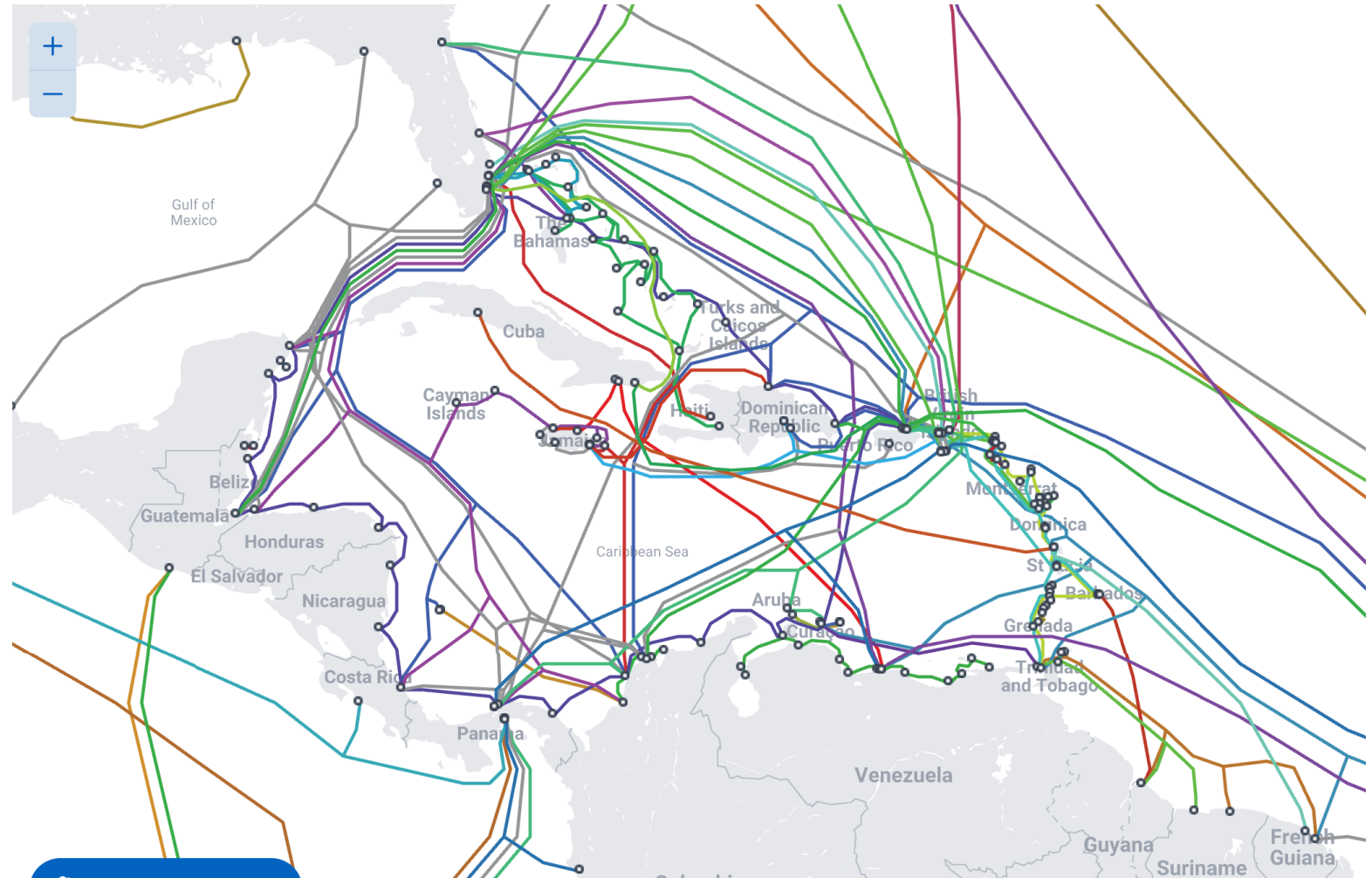


THE SIGNIFICANCE OF
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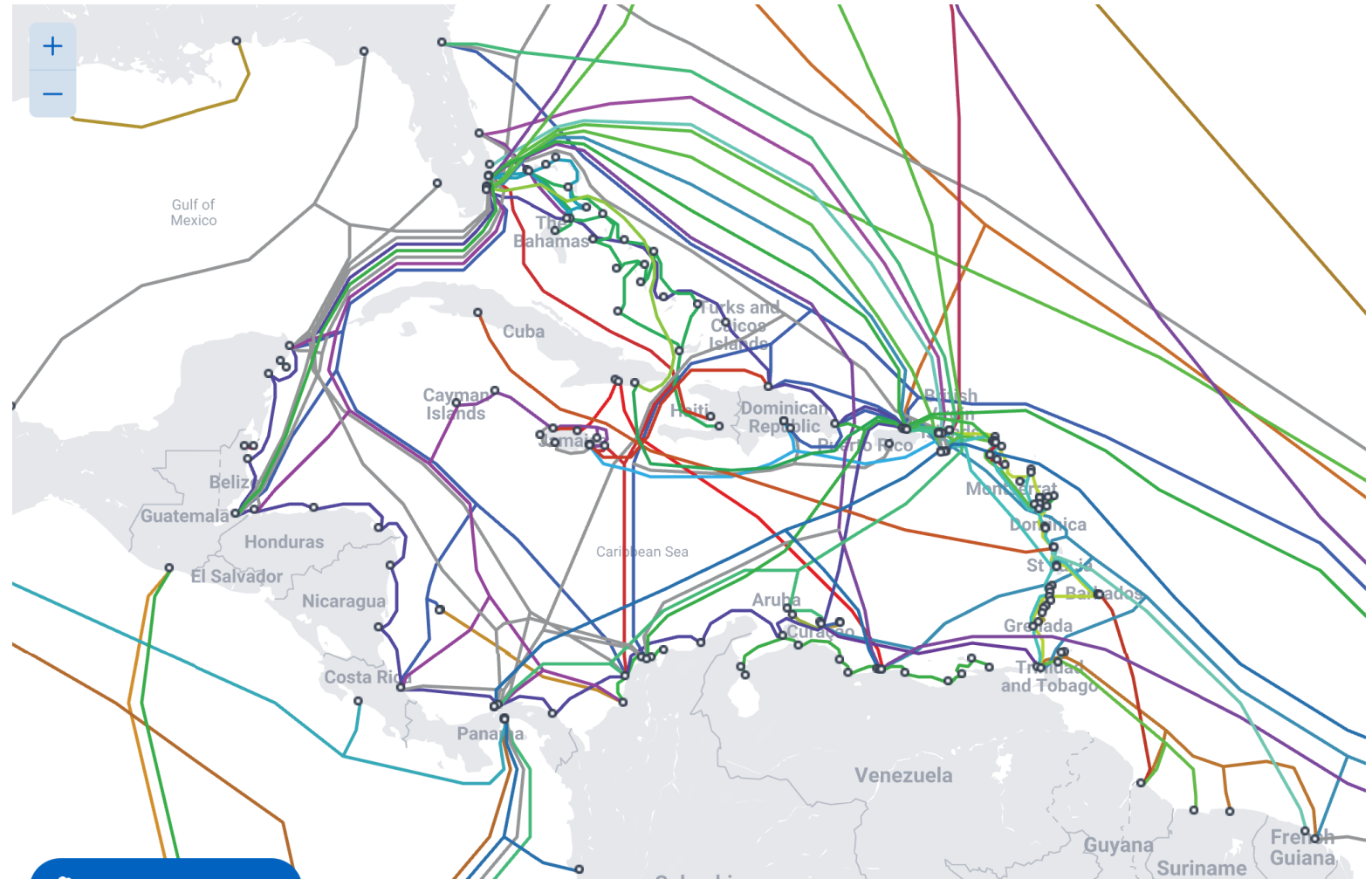
Subsea telecommunications cables carry **over 99% of international data traffic.**

Despite the increase in low-earth orbit satellites, these will not match cables' speed, security, and cost.



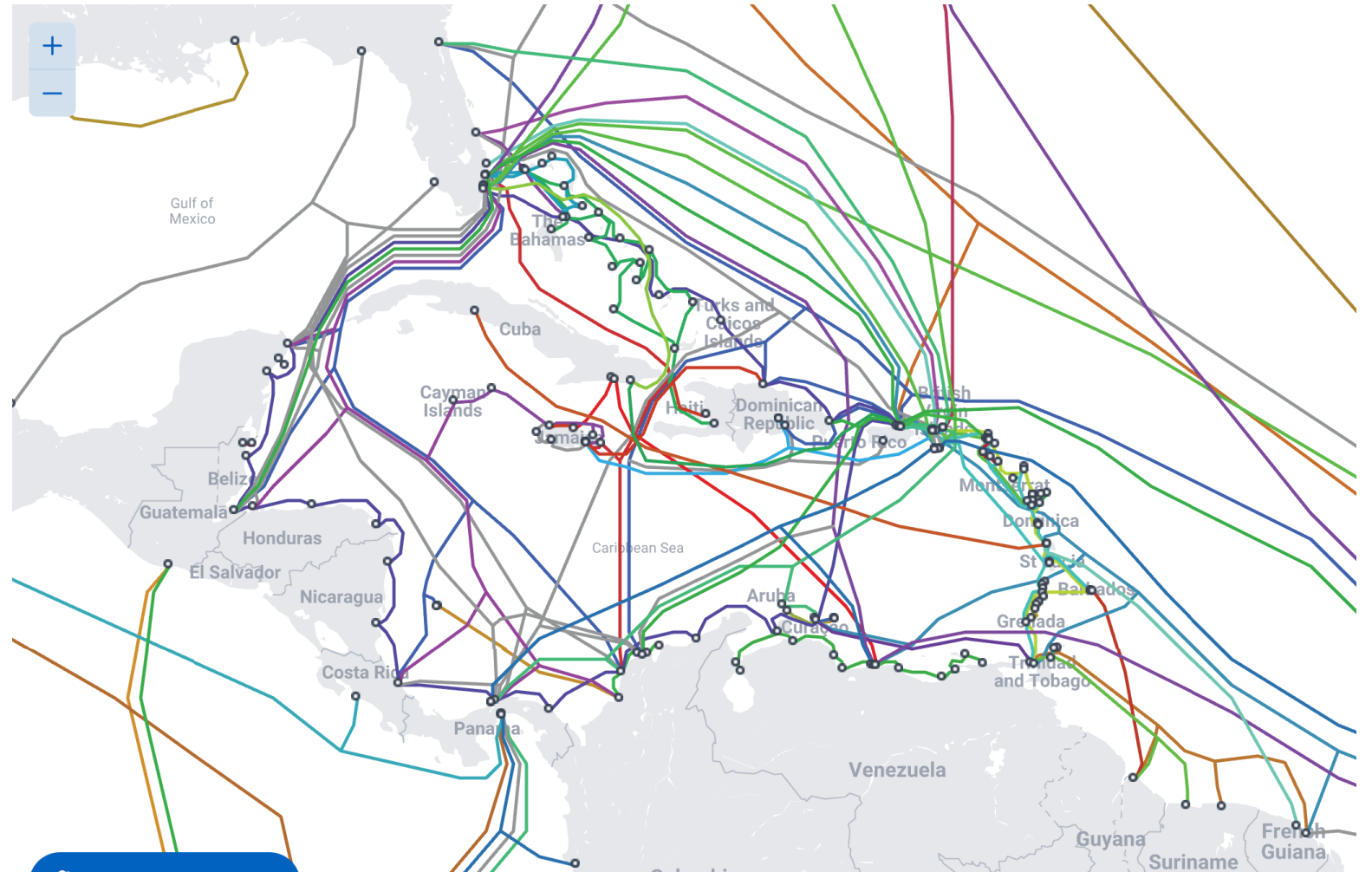
THE SIGNIFICANCE OF SUBSEA CABLES IN THE CARIBBEAN

These cables are **absolutely essential** to a resilient internet, and in turn, to economic stability and future investment.



THE SIGNIFICANCE OF SUBSEA CABLES IN THE CARIBBEAN

However, to-date, there has been **no holistic evaluation of the resilience of this system**, which considers the technology in its entirety.





OUR PROJECT:

**EVALUATE AND FIND
AVENUES TO
ENHANCE SUBSEA
CABLE RESILIENCE**

THERE IS A NEED FOR
**STRATEGIC
RESILIENCE**

An abstract graphic on a purple background. It features several curved lines in shades of blue and red. Two solid circular dots are placed at the intersections of these lines: a dark blue dot in the upper right and a red dot in the lower right. The lines appear to be part of a larger, partially visible network or path.

STRATEGIC RESILIENCE *COMPLEMENTS* OTHER FORMS OF RESILIENCE

- Resilience of **marine route planning and maintenance** has long been discussed by the International Cable Protection Committee (ICPC) and is well-defined by the ICPC Best Practices. Features that have enhanced resilience include cable awareness, reducing inconsistencies in permitting requirements, cable burial, and many others.
- Resilience of **subsea equipment, CLS and front-haul** has long been the purview of individual companies that often have an economic incentive to ensure business continuity.
- Resilience of the **cable landing point**, including diversity of landing points is less well-covered but receives attention in the design process.
- Resilience of the **network** has advanced due to work on mesh networking and is a consideration for all operators who often have an economic incentive to offer multiple routes.

STRATEGIC RESILIENCE

Strategic resilience entails the identification and enhancement of features that will make the **entire network within a region** more resilient.

Features of Strategic Resilience


- It is geographically specific. The features that will strategically advance resilience in one area of the world will not necessarily be translatable to other areas.
- It requires considerations of commercial affordances and constraints. It requires assessing how resilience may be hindered or enabled by existing market conditions.
- Its scope typically extends beyond a single cable or single network and thus requires consideration of multiple operators.

HOW STRATEGIC RESILIENCE *COMPLEMENTS* OTHER FORMS OF RESILIENCE

Strategic resilience focuses on the features that enhance resilience of the **region's network as a whole.**

Strategic resilience can reveal challenges to resilience that **cannot be remedied by design, equipment, marine route engineering, or building specifications.**

WHAT DOES
STRATEGIC
RESILIENCE
MEAN IN THE
CARIBBEAN?

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ASSESSING STRATEGIC RESILIENCE IN THE CARIBBEAN

- To assess strategic resilience, we undertook a **qualitative** and a **quantitative** study.
- The following short **report on our qualitative study** aggregates information from:
 - Interviews with individuals with many years of experience in building subsea cable networks, maintaining and operating these systems, regulating island telecommunications, and representing various sectors across the Caribbean islands.

ASSESSING STRATEGIC RESILIENCE IN THE CARIBBEAN

*All interviewees have argued that an **increase in the number of cables** connecting to Caribbean islands is a primary need for resilient infrastructure.*

- **Problem 1:** Subsea cables are getting old in the region
 - Many existing cables in the Caribbean were built in the late 1990s or early 2000s
 - Now getting toward their theoretical end-of-life of 25 years
 - Some islands are about to face the situation of either having no subsea cables or second-tier Internet connectivity
 - This is a problem, not of increasing resilience, but simply maintaining an existing level of resilience.
- **Problem 2:** To participate in an expanding digital economy and to ensure continuity during catastrophic events, islands require even more resilient networks.

WHAT DOES
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**ADDITIONAL
CABLES**

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OBSTACLES TO
ACHIEVING
STRATEGIC
RESILIENCE IN
THE CARIBBEAN:

COST

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THE COST OF RESILIENCE

- There is often (though not always) a **direct correlation** between **increased resilience** and **increased cost**.
- There is a cost to resilience **across all parts of the network**: from the marine route to the cable landing station.
- Interviewees noted that at some times there is an inclination to reduce costs and building a “cheap” system, but our research shows that **subsea cable systems have been well-engineered and constructed**, typically with tight specifications.

THE COST OF RESILIENCE

- Because of the market, we have heard that there is **not a business case for private investors**.
- There are also some **technical challenges**. Submarine cable technology cannot be deployed at a small scale.
- As a result, there has been **a lack of investment in new subsea systems**, compared to other parts of the world.

OBSTACLES TO
ACHIEVING
STRATEGIC
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INFORMATION

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WHAT CAN A STRATEGIC RESILIENCE PLAN DO?



STRATEGIC RESILIENCE PLAN

- A strategic resilience plan can not only identify **challenges** such as:
 - Shared-risk scenarios.
 - Obstacles to financing.
 - Political challenges to cable development.

- But also **paths forward**:
 - Best practices in incentives for attracting and facilitating cable development.
 - Best practices in financing and funding.
 - Scenarios for collaboration, such as the identification of timelines for participation and the navigation of relationships with large players in the subsea industry.
 - Generation of awareness of the significance of cables for internet resilience in the region.
 - Considerations of hubbing.

A TRANSITION IN RESILIENCE

- In terrestrial networks, today, resilience is modeled as a **zero-sum game**.
 - Providers are business competitors.
 - Each provider tries to maximize their resilience/revenue by not sharing their infrastructure with others.
- By considering shared-risk scenarios, "strategic resilience" implies a **positive-sum game**: providers can be:
 - Incentivized by a government in the region to build physically diverse cables, given faster permits, etc. such that all providers benefit in the region.

We need you!

Please contact me at
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to share your insights and opinions

Thank you!
