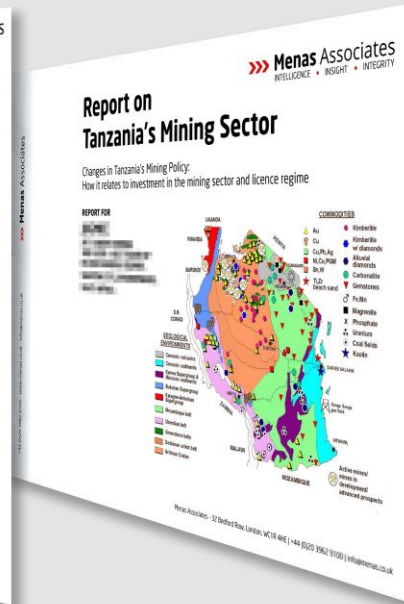


# **THE GLOBAL SUBMARINE CABLE NETWORK: ENSURING RESILIENCE CONNECTIVITY IN THE AGE OF AI AND GEOPOLITICAL CHALLENGES**

**Alan Mauldin**  
Research Director  
TeleGeography  
**15 October 2025**

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**Alan Mauldin** is a Research Director at TeleGeography. He manages the company's infrastructure research group, focusing primarily on submarine cables, terrestrial networks, international Internet infrastructure, and bandwidth demand modelling. He also advises clients with due diligence analysis, feasibility studies, and business plan development for projects around the world. Alan frequently speaks about the global network industry at a wide range of conferences, including PTC, Submarine Networks World, and SubOptic.

# GLOBAL SUBMARINE CABLE MARKET TRENDS

**Alan Mauldin**  
Research Director  
TeleGeography

**15 October 2025**

## Presentation Overview

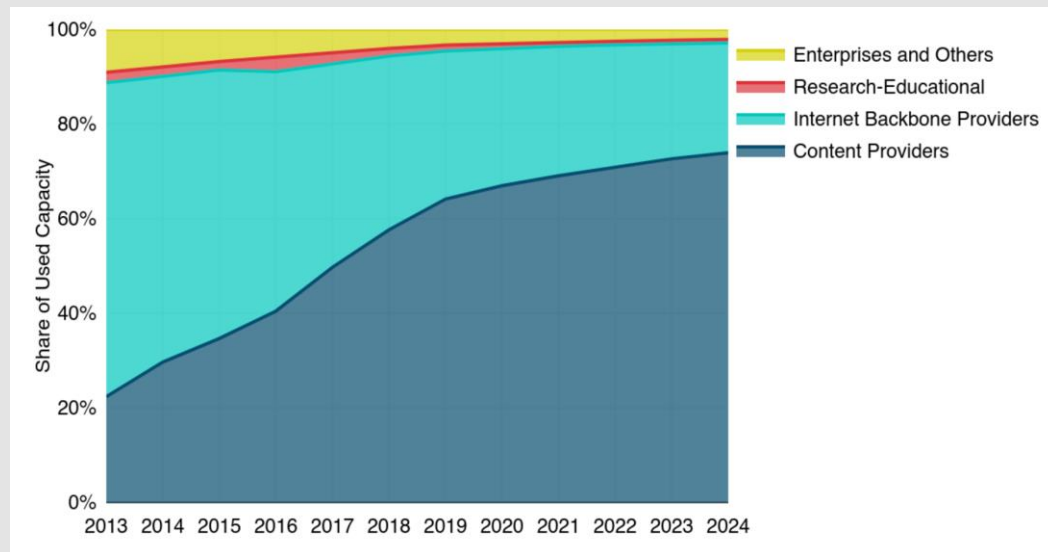
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- Submarine Cables: Users and Owners
- New Cable Demand Drivers
- Diversity and Resilience
- Protecting Cables
- Industry Challenges

# Submarine Cables: Users and Owners

# Who uses undersea cables

## Used International Bandwidth by Source

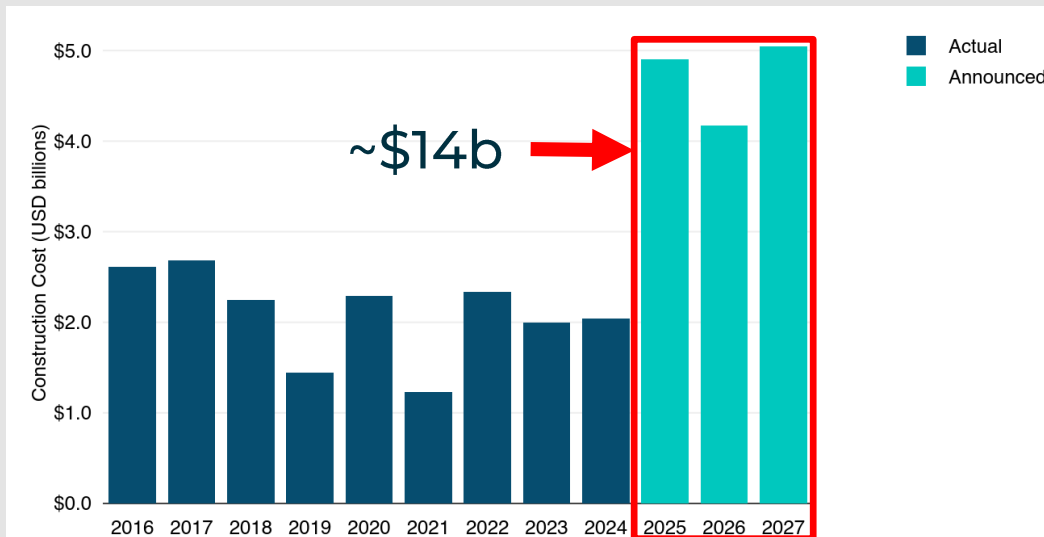


Source: TeleGeography's Transport Networks

- Internet backbone providers (carriers)
  - Once were majority of international bandwidth demand
- Yellow segment includes banks and governments
- Content providers/hyperscalers now majority on most routes
  - 74% of global total in 2024
  - Reason: extremely rapid data center-to-data center growth on their internal networks
- Major content providers/hyperscalers
  - Google
  - Meta
  - Amazon
  - Microsoft

# Who uses undersea cables

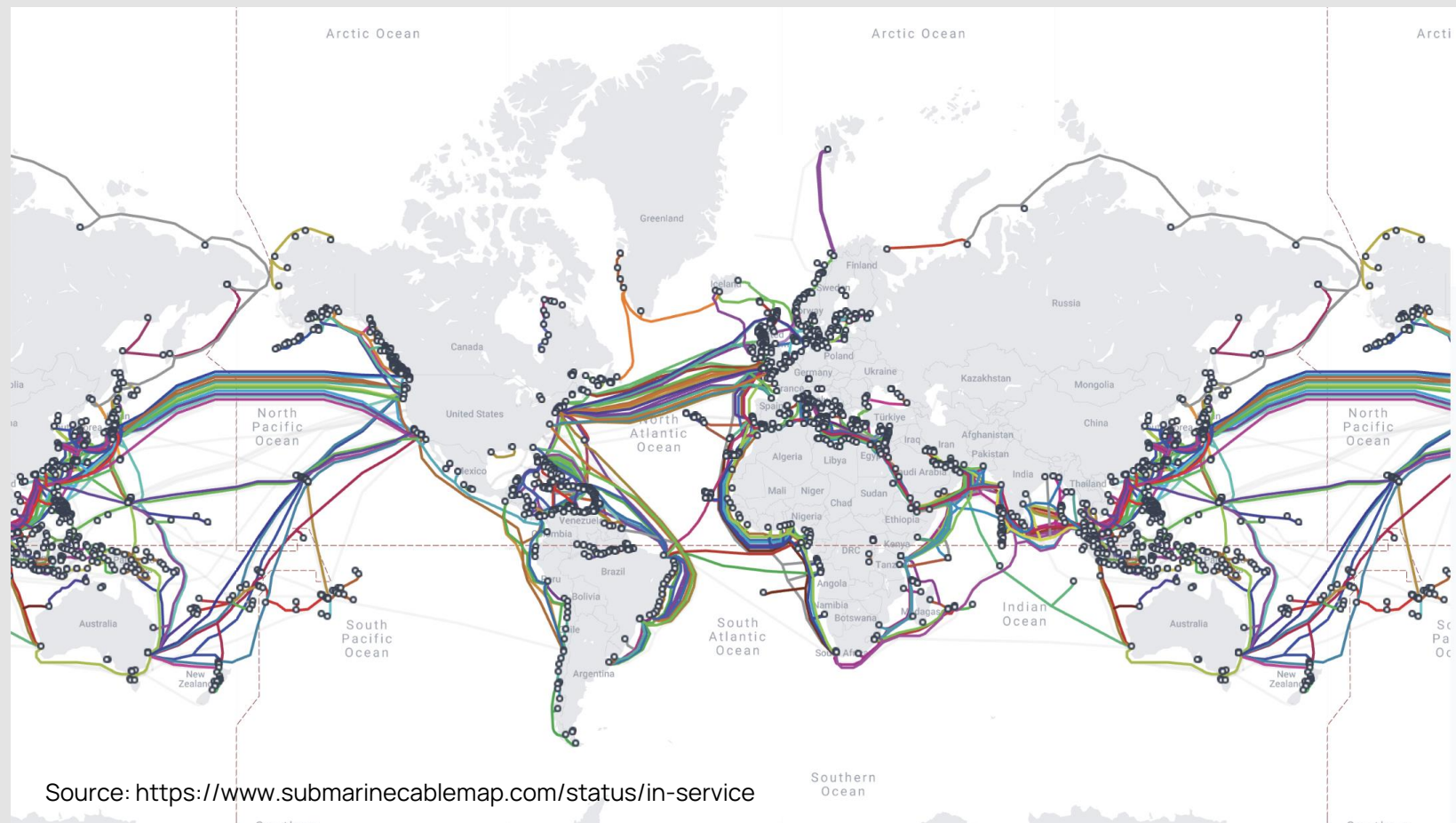
## Combined Construction Costs of Cables Entering Service



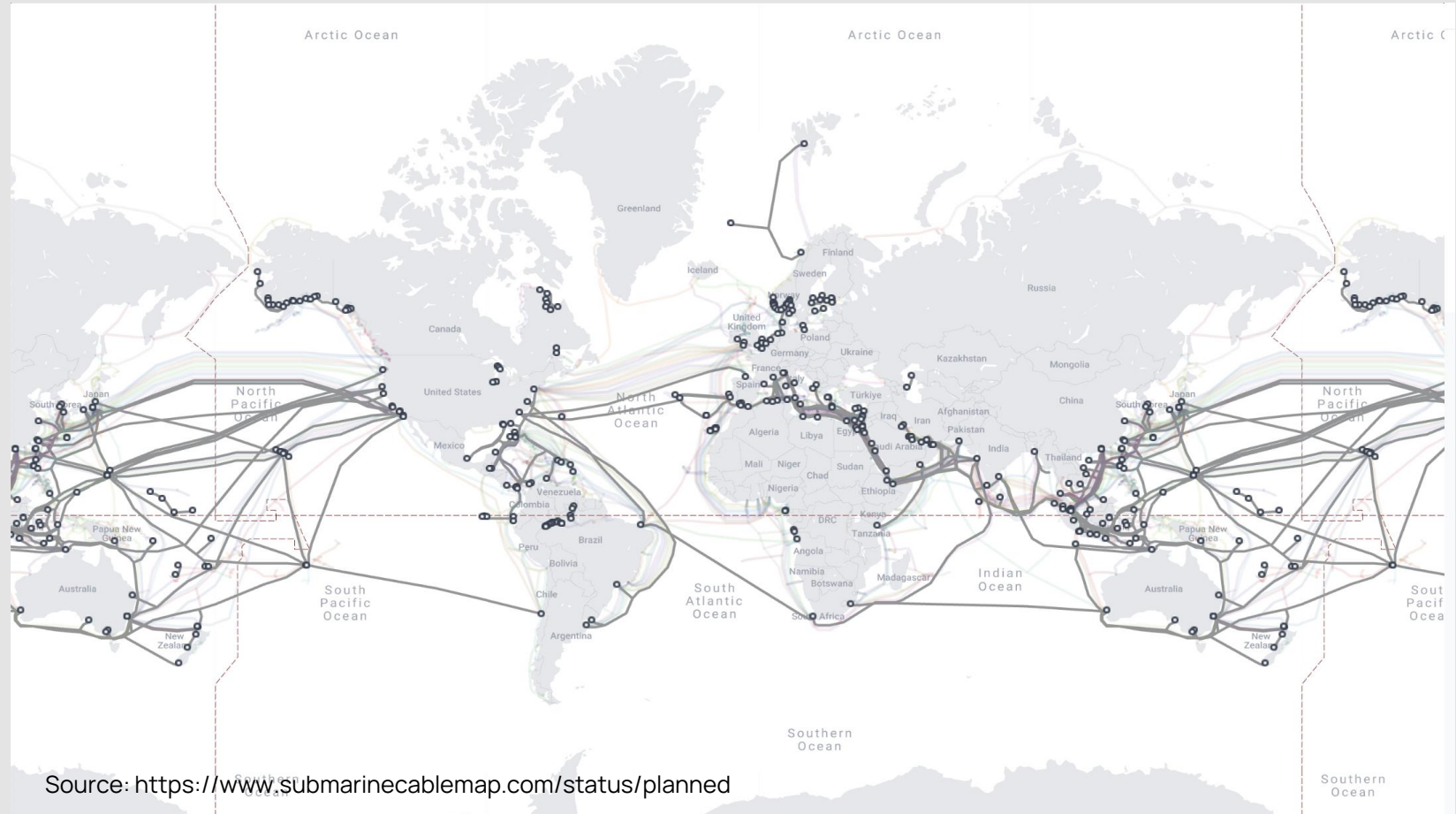
Notes: Total construction costs of all international and domestic submarine cables entering service in designated years. Construction costs exclude the cost of subsequent capacity upgrades and annual operational costs. 2025-2027 construction costs based on announced contract values and TeleGeography estimates. Not all planned cables may be constructed.

- Huge number of cables planned to enter service in 2025-2027
  - Many of these cables have already been manufactured; some have been partially laid
- Some of the cables expected to enter service in 2025 or 2026 will slip by 1-2 years
  - Construction delay is often common due to several reasons such as permitting delays, finalizing consortium members and closing financial agreements

## Existing Submarine Cables



## Planned Submarine Cables

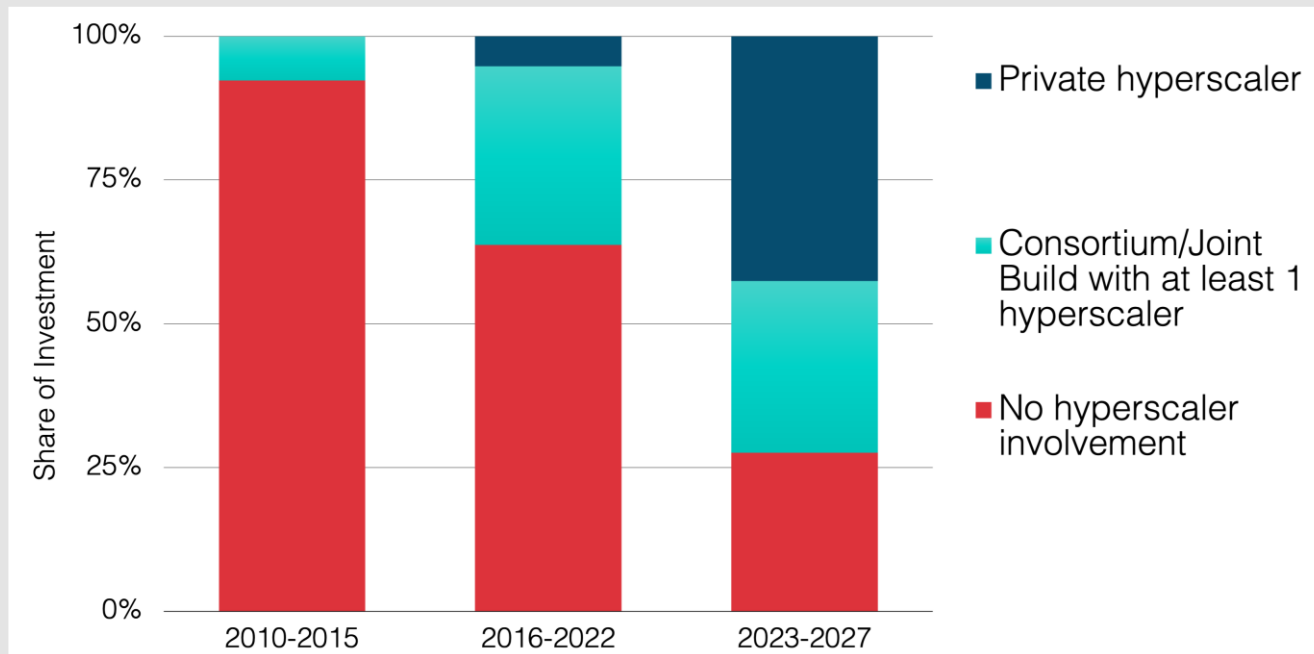


# Shifting to private hyperscaler cables

Hyperscalers=

- Google
- Meta
- Microsoft
- Amazon

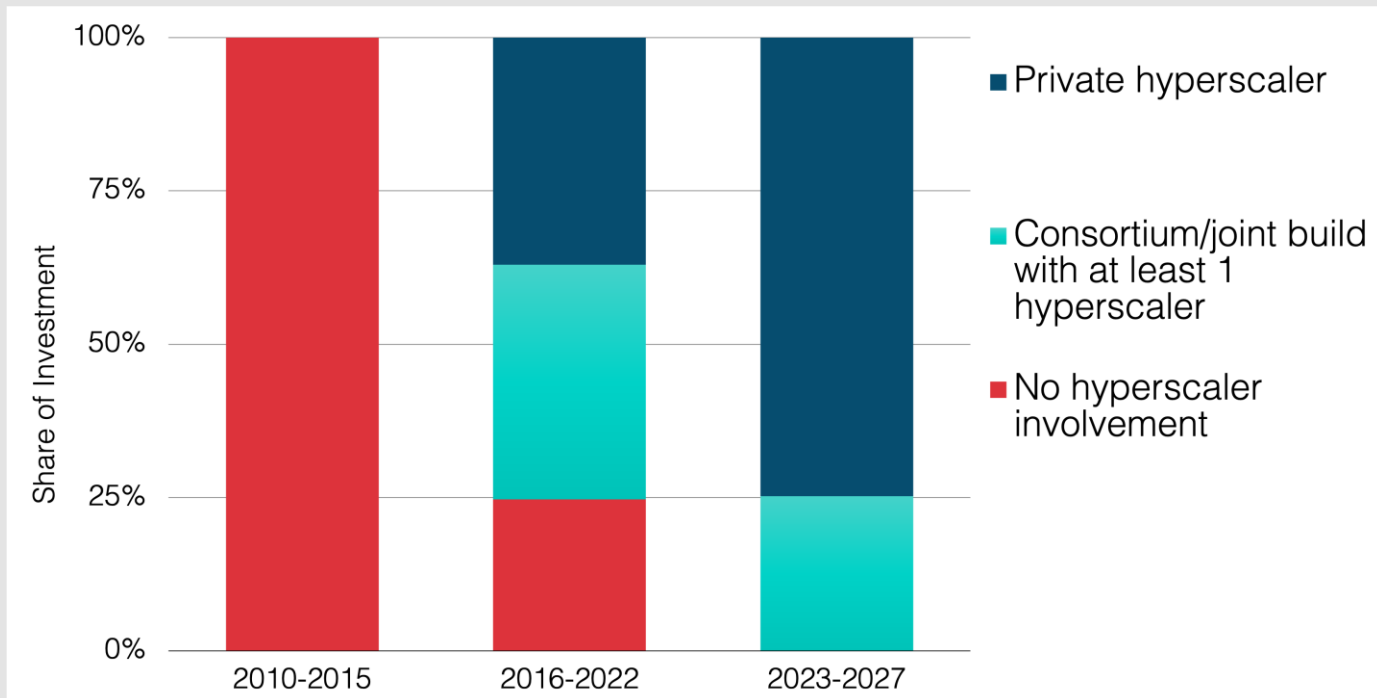
## New Cable Investment by Ownership Type



Source: TeleGeography's Transport Networks

# Shifting to private hyperscaler cables

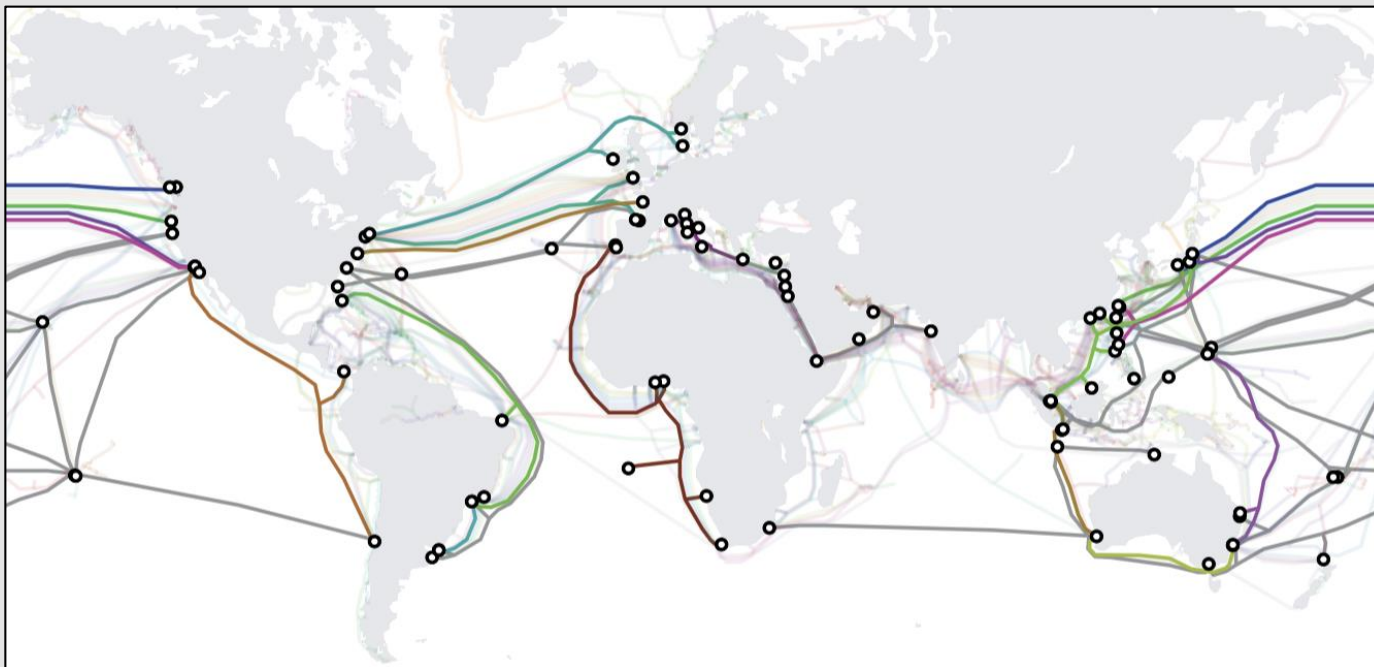
## New Cable Investment by Ownership Type – Trans-Atlantic



Source: TeleGeography's Transport Networks

# Google cables

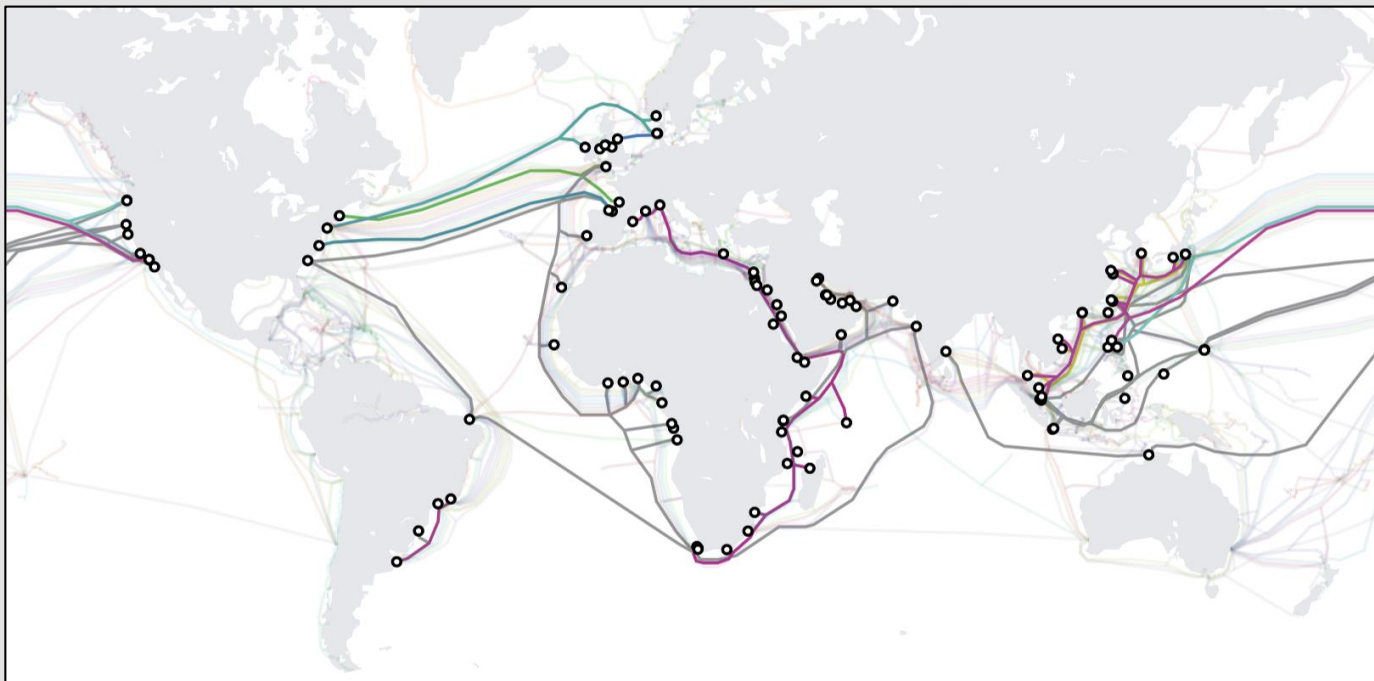
## Google's Private Cable and Consortium Investments



Notes: Publicly disclosed investments only. Google has fiber pairs and capacity on additional cables.  
Source: TeleGeography's Transport Networks

# Meta cables

## Meta's Private Cable and Consortium Investments



Notes: Publicly disclosed investments only. Meta has fiber pairs and capacity on additional cables.  
Source: TeleGeography's Transport Networks

## Market implications of hyperscaler dominance

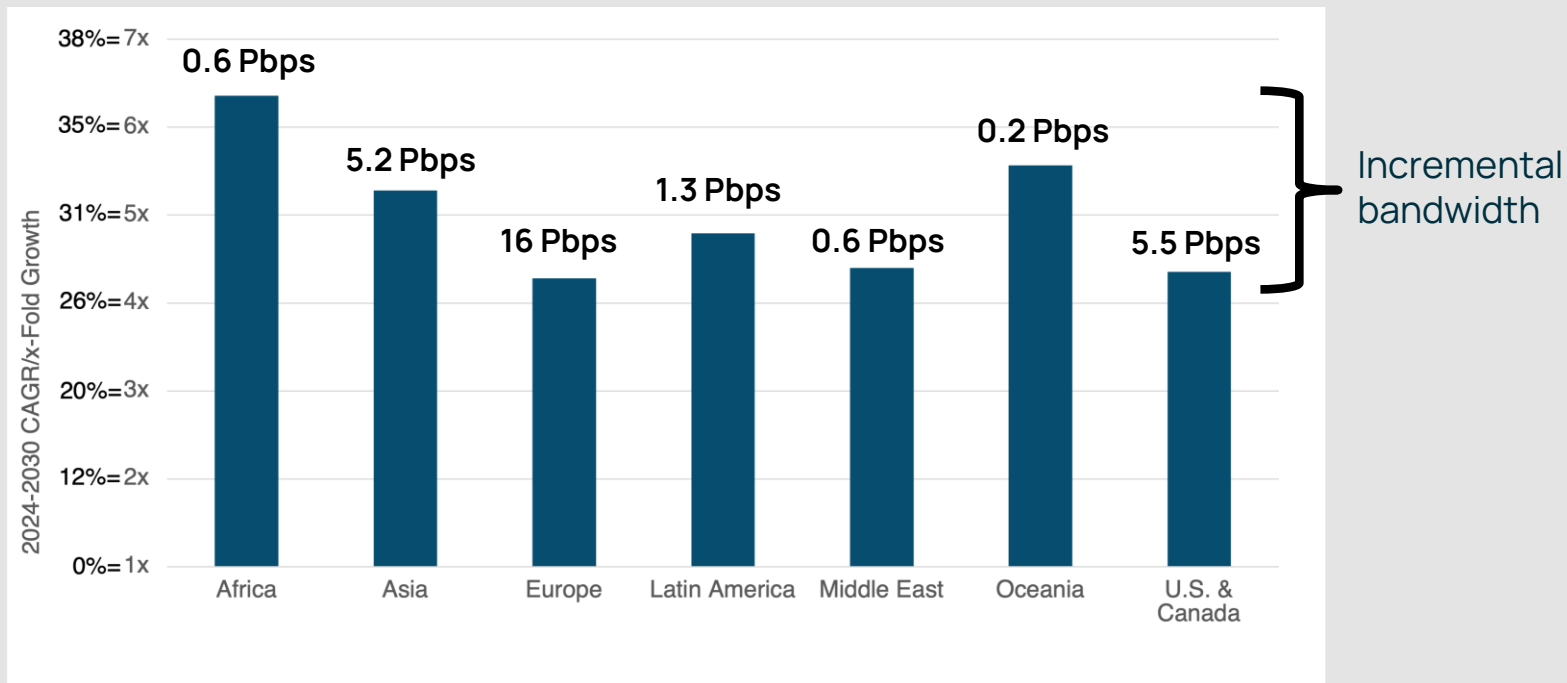
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- Private cables are not for sole use of hyperscalers
  - Hyperscalers will engage in swaps and sells IRUs for fiber pairs, as well as  $\frac{1}{4}$  and  $\frac{1}{2}$  pairs
  - Carriers may collaborate with hyperscalers to fund entire branches that link into private cables
- Financing new cables without hyperscaler investment is increasingly challenging
- Carriers still needed as partners for hyperscaler cables in less open regulatory/investment environments (e.g. Middle East, Africa)
- Hyperscalers dictate where their cables go
  - Connecting big data centers; not always at major population centers
  - Google has big emphasis on diversity and uptime

# New Cable Demand Drivers

## Slower growth, volumes are massive

### Used International Bandwidth Increases, 2024-2030

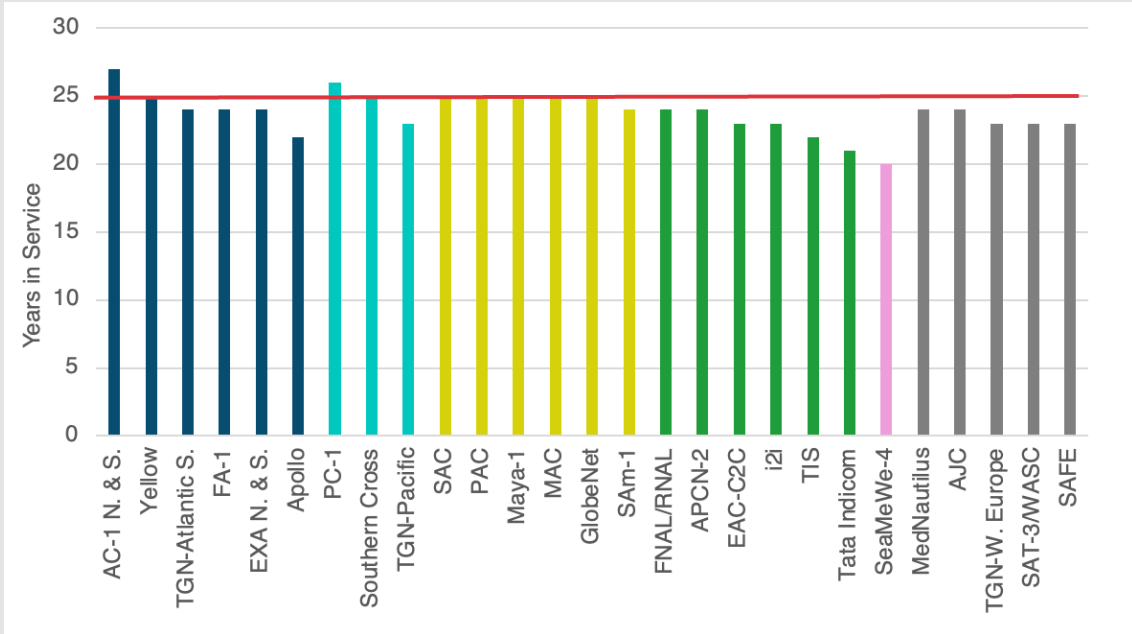


Source: TeleGeography's Transport Networks

## Many aging cables

- Cables have a minimum design life of 25 years.
- Many cables at or beyond these levels, will likely be retired by the end of the decade.
- Retired cables may not be replaced on a 1-for-1 basis

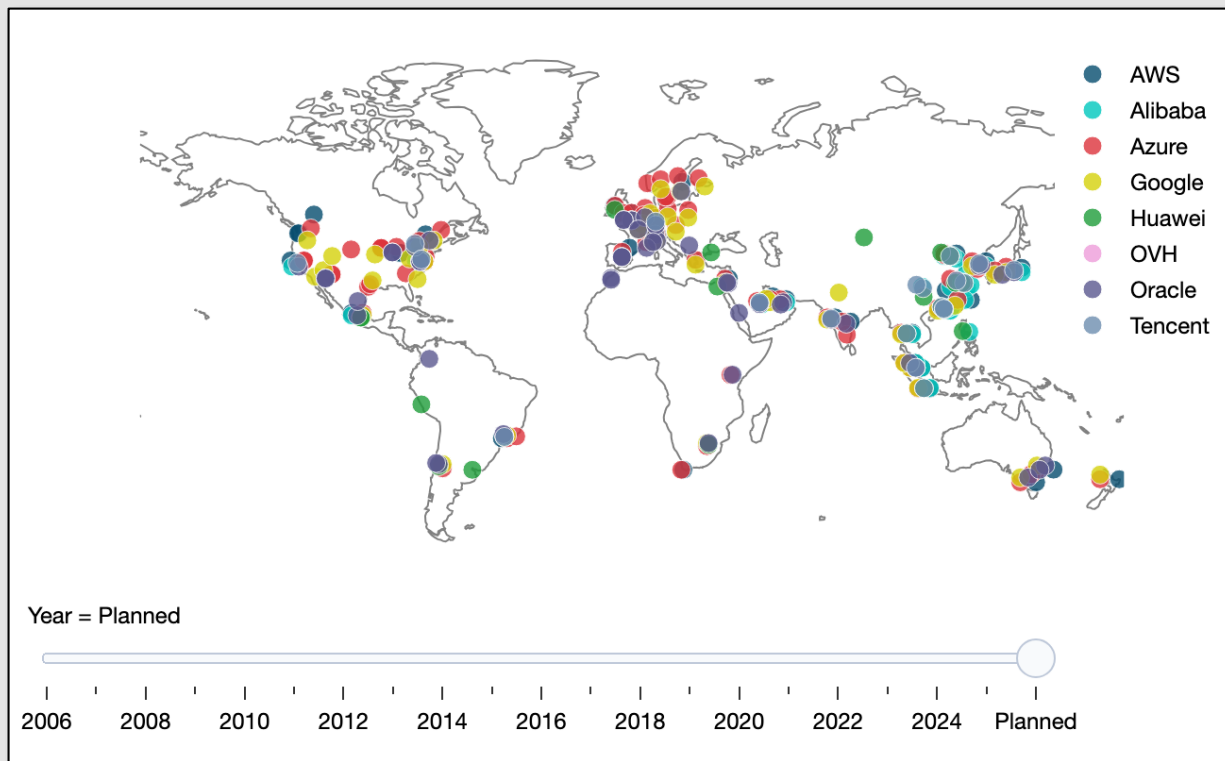
### Selected Active Cables +20 years of service



Source: TeleGeography's Transport Networks

# Linking the cloud

## Cloud Region Deployments over time

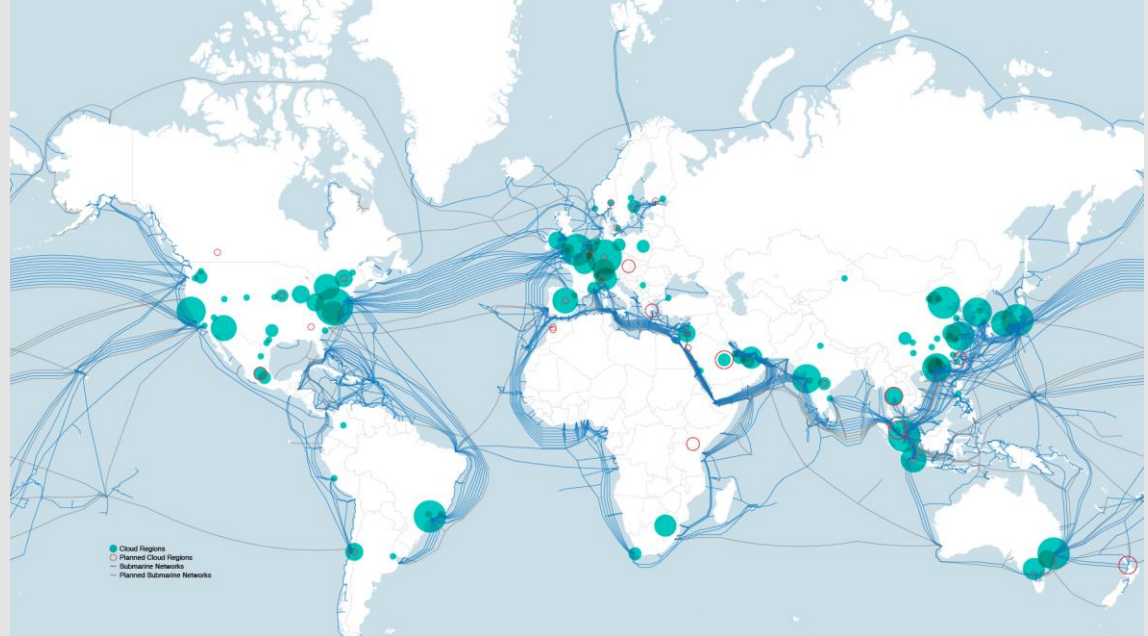


Source: TeleGeography's Cloud and WAN

# Connecting new locations

- Where will AI factories (AI-focused data centers) be built?
- New cables may be needed to locations currently not connected or underserved

## Existing + Planned Cables and Cloud Data Centers

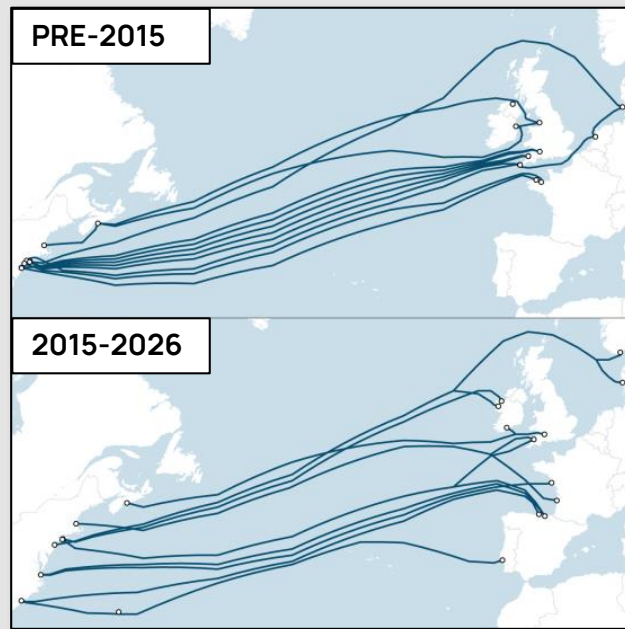


Source: TeleGeography's Cloud and WAN

# Diversity and resilience

## Diversity on the trans-Atlantic route

- Focused on New York/New Jersey
- Broad distribution from Canada to SE USA now
- New landings in Virginia Beach and Myrtle Beach

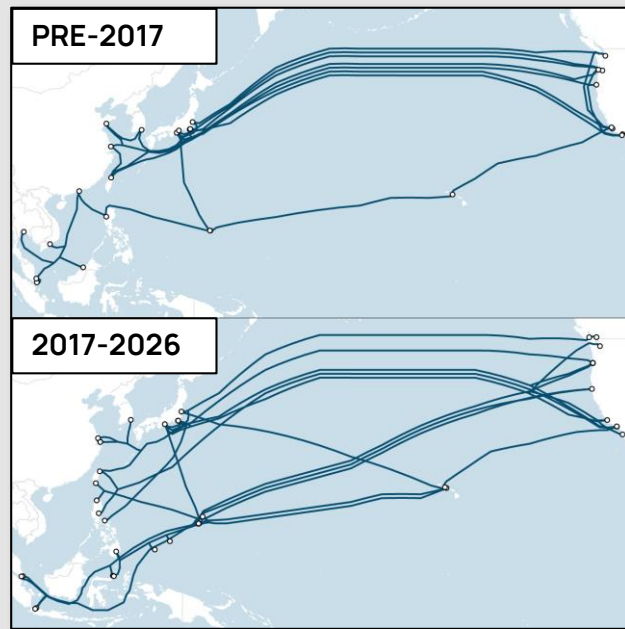


- Mainly focused on the U.K. and NW France
- Broad distribution from Scandinavia to the Iberian Peninsula
- New landings in SW France, N. Spain, W. Ireland, and Norway

Source: TeleGeography's Transport Networks

## Diversity on the trans-Pacific route

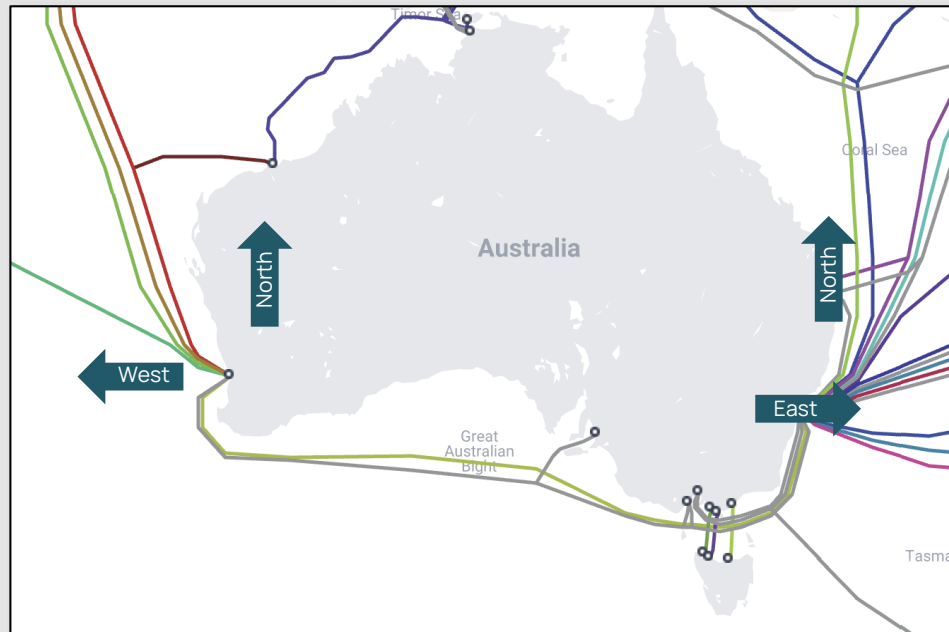
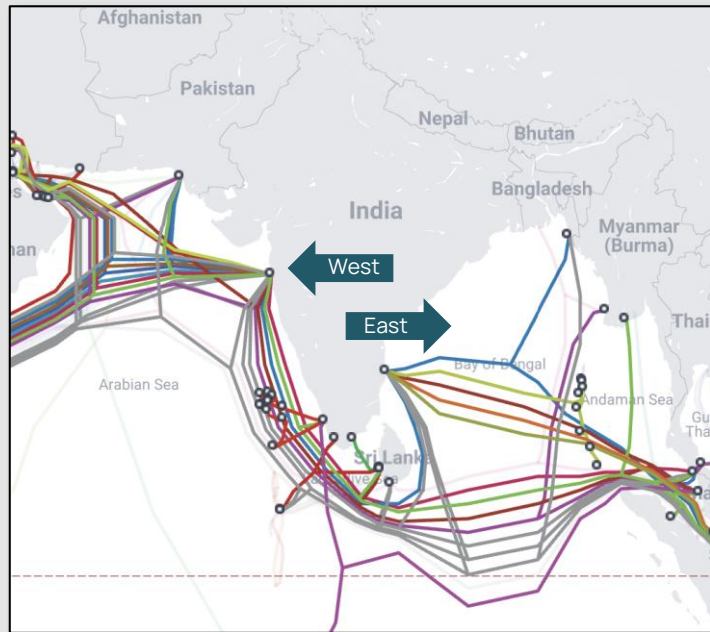
- Heavily focused in Japan
- More cables to Japan, but increasingly Singapore, the Philippines, Taiwan and Indonesia



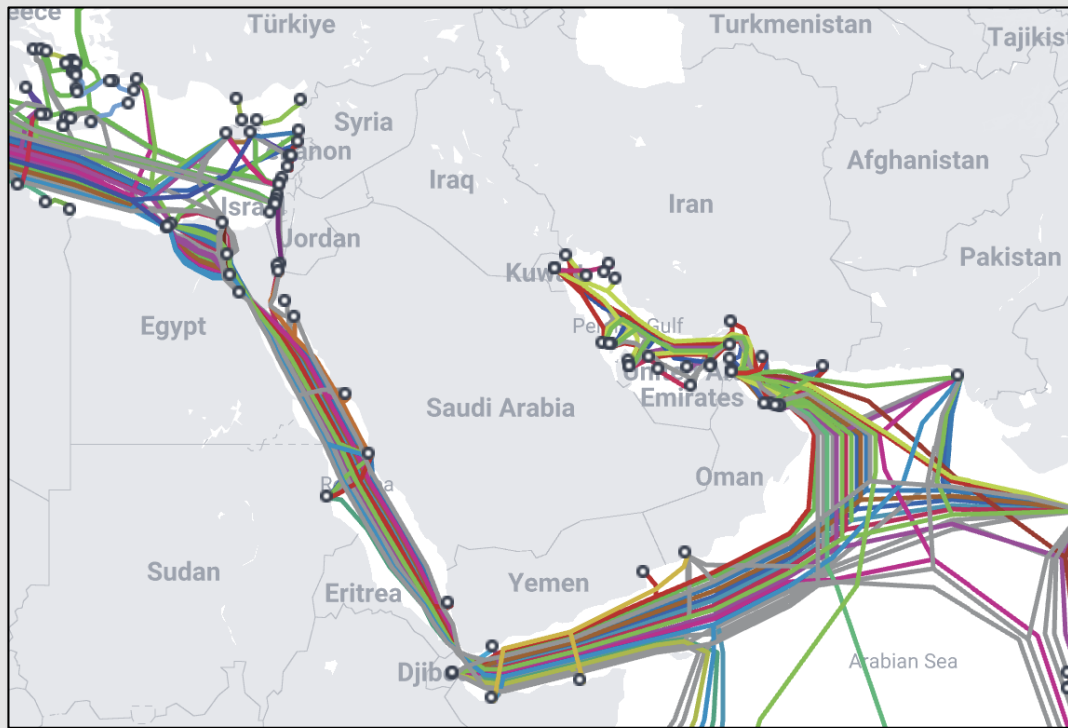
- U.S.-focused on Oregon and Southern California mainly
- New landing in Northern California (Eureka)
- Cables connected to Canada and Mexico

Source: TeleGeography's Transport Networks

# Diversity through corridors



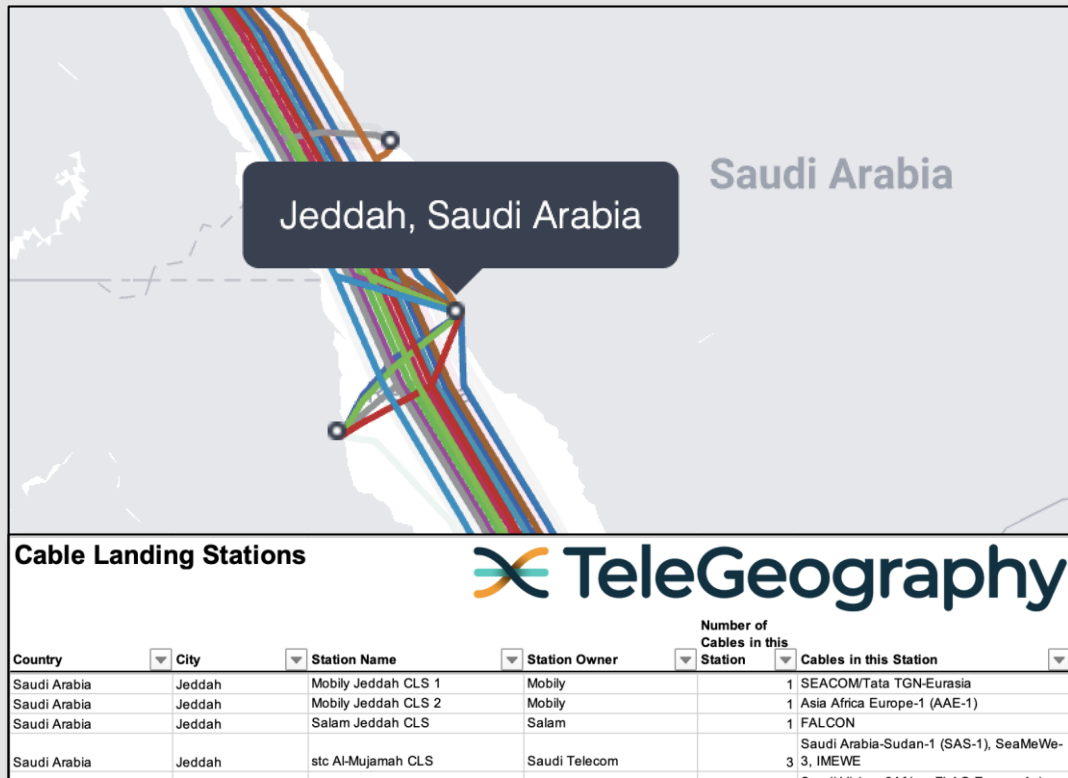
# Connectivity $\neq$ capacity



- Don't be fooled, cable maps show connectivity, not how capacity is deployed
- The Middle East has substantial cable connectivity in all directions, but 84% of the region's used international capacity is linked to Europe

## Landing site diversity

- Multiple cables in multiple landing stations with multiple owners in Jeddah, Saudi Arabia
- stc Alrowis CLS – 3 cables
- stc Al-Mujamah CLS – 3 cables
- stc Al-Salamah CLS – 4 cables
- Mobily Jeddah 1 CLS – 1 cable
- Mobily Jeddah 2 CLS – 1 cable
- Salam CLS – 1 cable
- Zain CLS – 1 cable

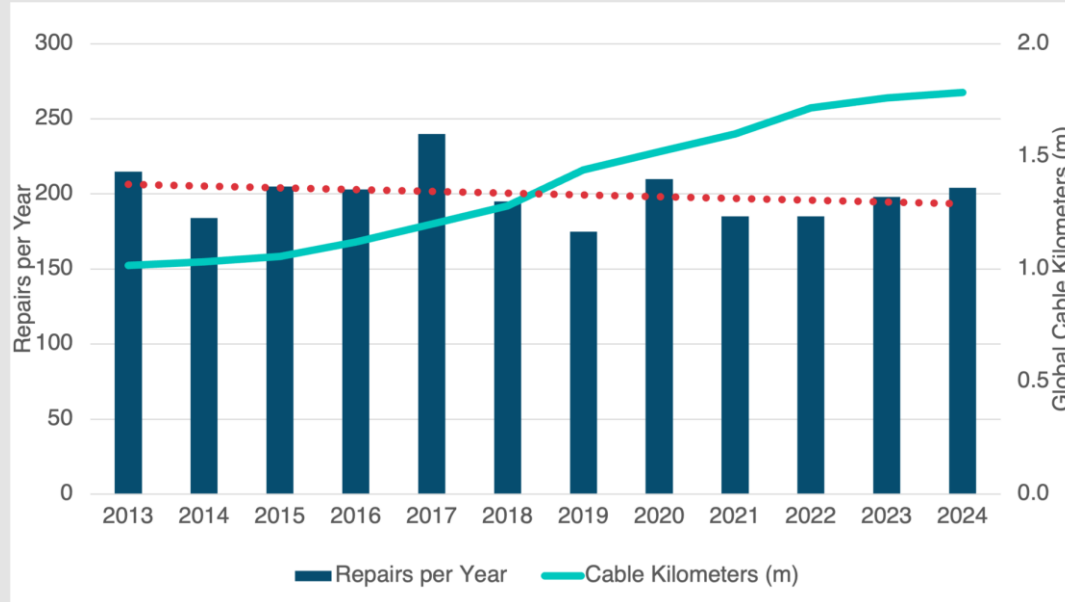


Source: TeleGeography's Transport Networks

# Protecting Cables

# Frequency of faults

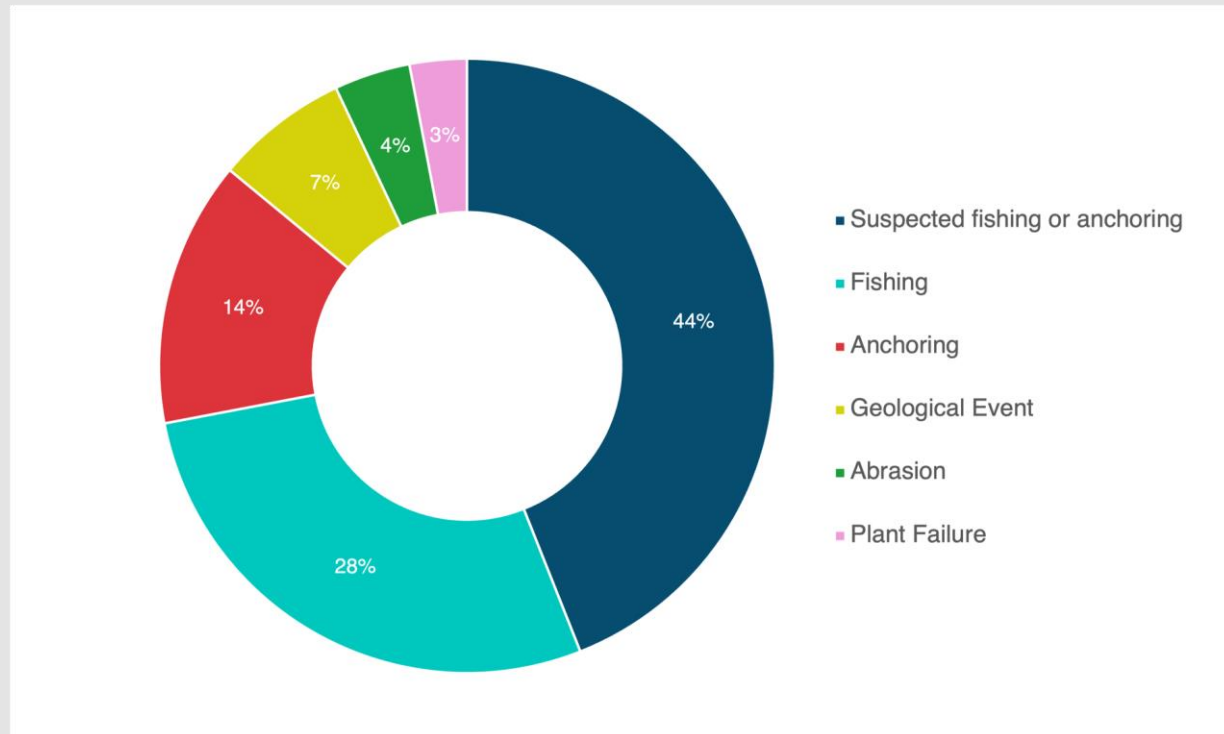
## Global Repairs per Year and Cable Kilometer



Source: International Cable Protection Committee, Global Cable Repair Data Analysis 2025

- Despite recent media hype about cable faults, the total number of repairs has actually remained fairly consistent over time
- This is significant as the total global submarine cable length has increased by over 50% during the same period

# Cause of submarine cable faults



Source: International Cable Protection Committee Global Cable Repair Data Analysis 2025

# Methods to protect cables

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- Improve cable diversity
  - Diverse routes, varied corridors, and multiple cable landing stations
- Burial
  - Deeper burial (up to 3m) under seabed becoming more common in shallow seas Impractical to bury along entire length
- Deterrence
  - Education/cooperation with other seabed users
  - Civil action against negligent faults
  - Government action: For e.g., Sweden and Finland seized and investigated vessels responsible for cable faults
- Automated Identification System (AIS)
  - Used to track and monitor vessel activity near submarine cable routes
- Detection (fiber sensing)
  - Possible to retrofit existing cables using equipment in cable landing stations

# Industry challenges

# South China Sea

## Submarine Cables in the South China Sea



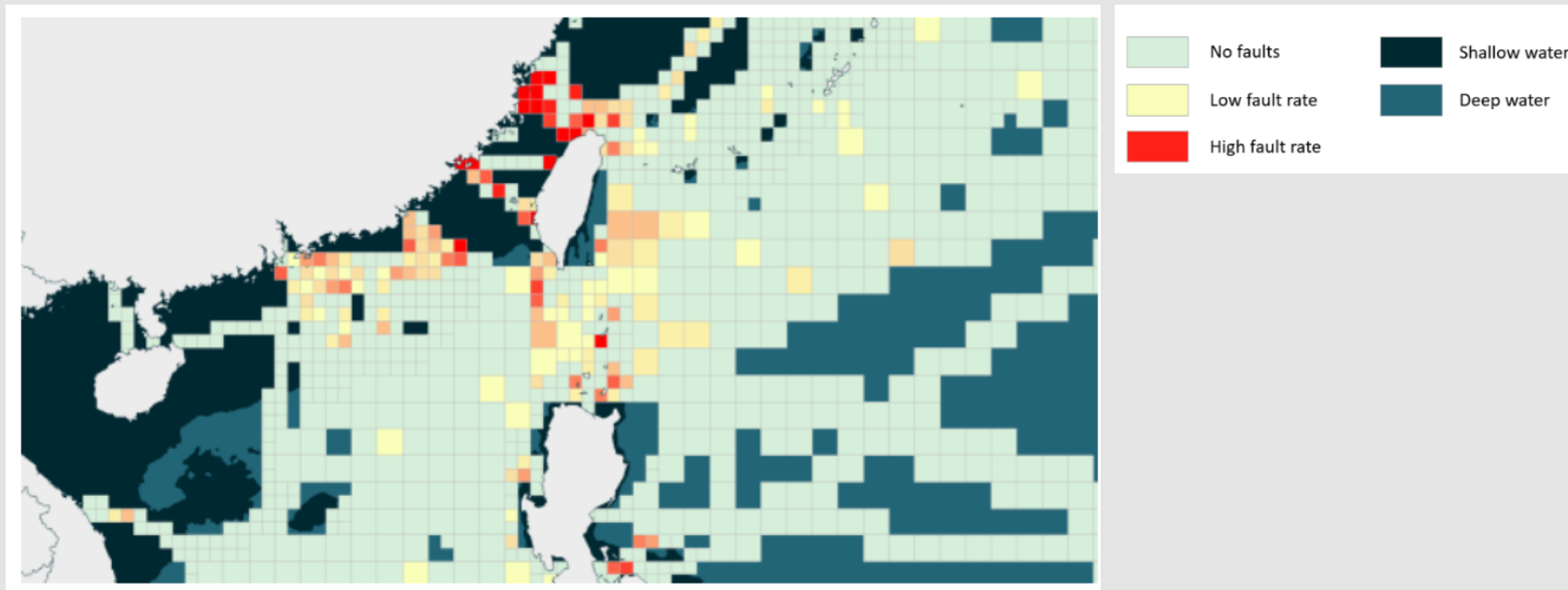
- Aggressive claims by China around Spratly Islands and nearby shoals have made permitting difficult
  - In some cases, subsea cable suppliers have pulled dual permits for same stretch of ocean (e.g., one set of permits from Chinese authorities and one from Philippines)
  - Some major suppliers stopped working in South China Sea entirely
- New Non-Chinese submarine cables are routing around Nine-Dashed Line. These newer cables frequently run through Indonesian waters, then head north past the East of the Philippines towards Japan and Korea, just to avoid the South China Sea

Sources: Cable data: TeleGeography (cable routes do not show precise cable positioning).

Geographic boundary data on Chinese claims: Greg Poling, The South China Sea in Focus: Clarifying the Limits of Maritime Dispute

# Flashpoints are historically troubled

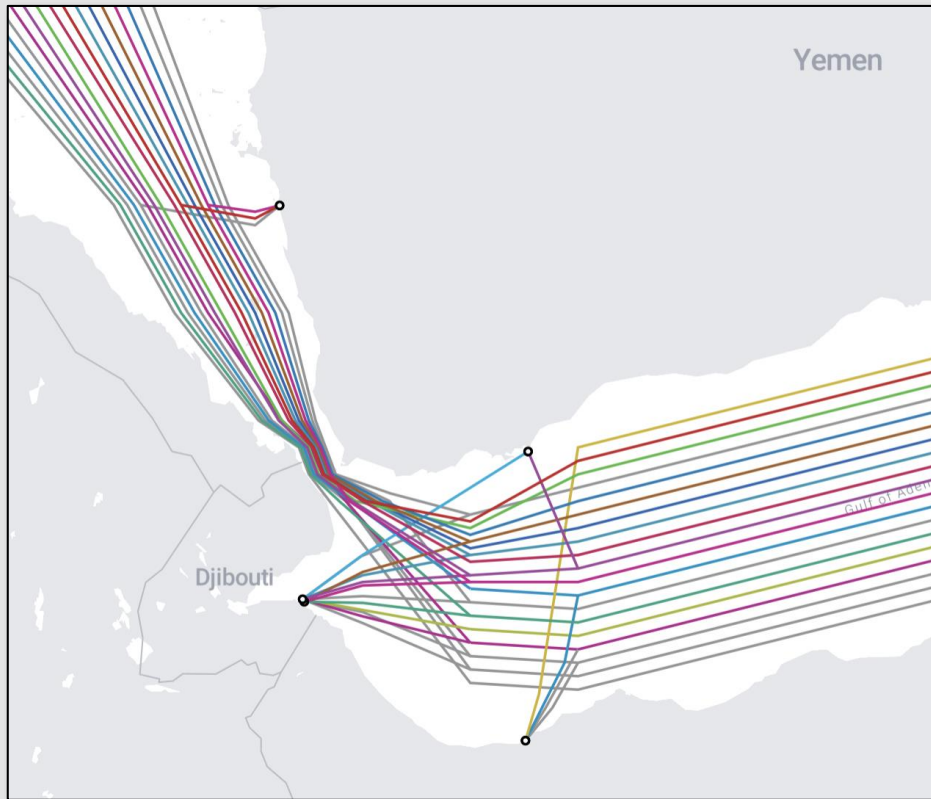
## Waters around Taiwan: Historical Fault Data (1985-2023)



Source: "Interpreting Detailed Historic Cable Fault Data to Ensure We Don't Repeat Mistakes of the Past", Brian Perratt (OceanIQ, Global Marine Group), SubOptic 2023

# Red Sea

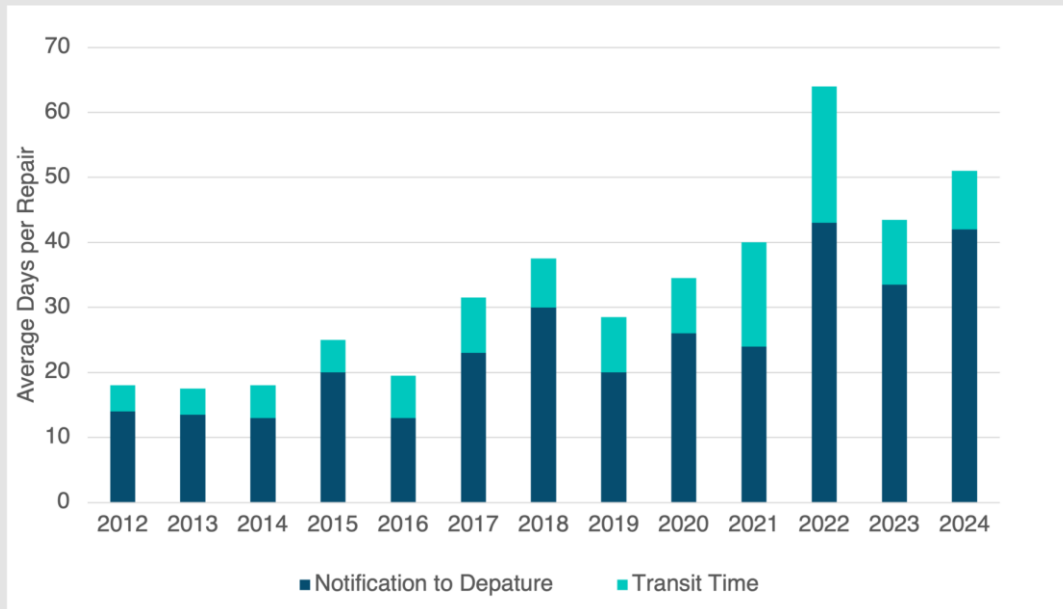
## Cables via the Bab al-Mandab Strait



- Houthi strikes on shipping has paused installation of most cables
  - Difficult to get marine insurance to cover installation and repair
  - The industry is building infrastructure around the Red Sea (Israel, Saudi Arabia, Turkey/Iraq)
- Geographic crowding of cables -> multi-fault incidents
  - Houthi missile struck container vessel in February 2024. Anchor was dropped prior to abandonment. Currents pushed vessel 70 km kilometers northward, causing faults in 3 different cables. Repair required almost 4 months
  - New incident this September. Four cables still out of service as of mid-October. Repair timeframe t.b.d.

# Permit delays

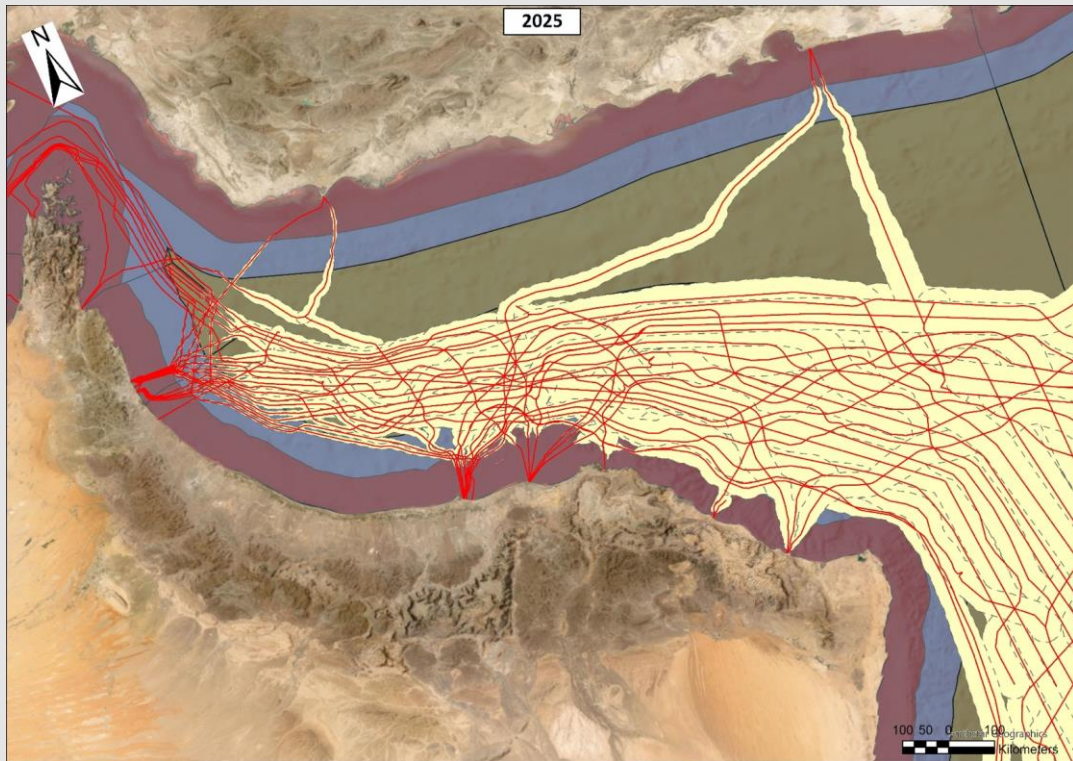
## Average Time before Repair



Source: International Cable Protection Committee Global Cable Repair Data Analysis 2025

- Notification to Departure = hold before commencing repair
  - Sometimes due to repair queuing due to unavailable vessels
  - Most commonly due to permitting delay
  - On average, over a month before repair is commenced
- Why the noticeable increase in delay?
  - More faults/repairs happening now in Asia and Middle East, where repair regulations can be onerous

# Overcrowding

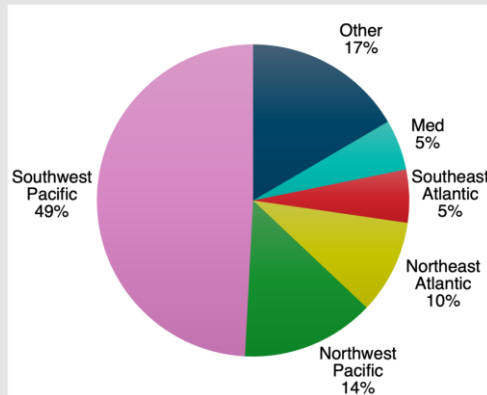
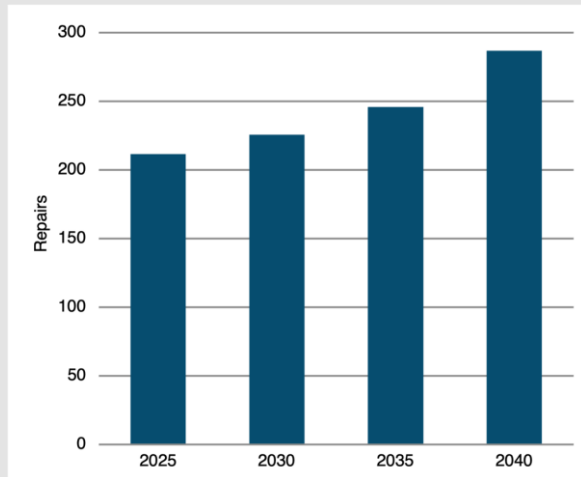


Source: James Porter, "Seabed congestion – how much room is left?", SubOptic 2025 conference

- Cable overcrowding in Gulf of Oman
  - Worse over time
  - Impossible to adhere to spatial best practices
- Good example of how geopolitics can -> overcrowding
  - Note the avoidance of Iranian EEZ
- Multi-cable faults can easily occur in these areas
- Seabed sharing (offshore wind, oil & gas, deep sea mining, marine sanctuaries) further restricts available corridors

# Repair vessel availability

## Baseline Forecasted Annual Repairs, 2025-2040



- 287 total repairs in 2040
  - +2.1% CAGR 2025-2040
- 49% of all repairs by 2040 in Southwest Pacific (East Asia)
- 20 new repair vessels needed by 2040
  - 15 replacement ships for retiring vessels
  - 5 additional ships (all in Asia)
  - Estimated ~ \$3 Billion CAPEX

Note: Repair by region data reflects 2040 forecast repairs.  
Source: TeleGeography and Infra Analytics, "The Future of Submarine Cable Maintenance: Authored by Trends, Challenges, and Strategies"

# Resources

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- Free resources
  - TeleGeography's cable map: [www.submarinecablemap.com](http://www.submarinecablemap.com)
  - International Cable Protection Committee's Government Best Practices for Protecting and Promoting Resilience of Submarine Telecommunications Cables":  
<https://www.iscpc.org/publications/icpc-best-practices/>
  - "The Future of Submarine Cable Maintenance" study:  
<https://www2.telegeography.com/future-submarine-cable-maintenance-report>

# Thank you

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# Q&A

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