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Shore Things

A Data-Driven Look at Submarine Cable Landing Stations

Authored by

TeleGeography

SHORE THINGS: A DATA-DRIVEN LOOK AT SUBMARINE CABLE LANDING STATIONS

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Abstract: This analysis draws summary conclusions from TeleGeography's new cable landing station (CLS) database. The sample size of over 1,500 CLS—representing over half of all current and planned cable landings—provides insight into CLS diversity and common features, including their ownership and distribution within global metros.

1. INTRODUCTION

Cable landing stations (CLS) are the buildings where submarine cables "land" ashore. They are critical connection points between subsea and terrestrial networks and often host multiple cables in a single facility.

In early 2023, TeleGeography accelerated our efforts to track CLS alongside other areas of telecommunications infrastructure and services. This paper represents the first public analysis of that work.

1.1. Study Approach

This study analyzes TeleGeography's new CLS database from both the building and metro levels. Questions answered from each perspective include the following:

1.1.1. Building Level Analysis:

- What is the average number of cables landing at a CLS?
- How often are CLS owners also colocation providers?
- How often do CLS owners also own cables that land in their stations?
- How often are CLS owners local entities (i.e., headquartered in the country where they land cables)?

1.1.2. Metro Level Analysis:

- What is the typical relationship between the number of cables landing at a metro and the number of CLS in that metro?
- Does the number of different CLS owners within a metro impact that relationship?

1.2. About Our Data

Information on which cables land at the same CLS and which companies own each station was collected from CLS owners, submarine cable operators, government documents, company websites, and news articles.

Although cable equipment is sometimes spread throughout multiple facilities, we focused on "primary" CLS, defined as the first building where cables land ashore. This may be a power feeding equipment (PFE) hut, dedicated cable station, or multi-tenant data center.

As of April 2025, our CLS database contains 1,897 instances of in-service or planned cables landing at 1,520 unique buildings or building placeholders. This sample represents 61% of all cable landings that appear on TeleGeography's submarine cable map (www.submarinecablemap.com).

Information from TeleGeography's CLS database is *not* depicted on our online cable map. Landing "points" there are mapped by city or metro only. (For example, our online map shows 11 cables landing together at Shima in Japan, but there are multiple CLS in that metro.) We recognize that the location of CLS is sensitive to some operators and treat this data as confidential.

Numbers of cables landing in a CLS or metro include both in-service and planned cables which appear on our online map. Planned cables are mapped as they reach various milestones for development.

2. BUILDING LEVEL ANALYSIS

Here, we study the 1,086 CLS in our database that have building owners assigned. These CLS are distributed across 127 countries and have 255 different owners. All CLS are referred to as buildings in this study, regardless of their specifications.

Three variables were examined:

- *Colocation services*: The type of data center provider (if any) of a station building's owner was determined via TeleGeography's data center database, which features over 760 regional and global operators. This database is not all-inclusive. Types include:
    - *Bandwidth provider*: Carriers who offer retail colocation.
    - *Carrier neutral*: Non-carriers who offer retail colocation.
    - *Wholesale*: Data center operators who focus on long-term, large-scale leases.
    - *Proprietary*: Operators of non-colocation data centers.
- *Cable ownership*: Whether CLS owners own at least one cable that lands in their station was found by comparing the building owner to information in TeleGeography's submarine cable database.
- *Local ownership*: The CLS owners' headquarters was confirmed through web research.

2.1. Findings

The mean number of cables landing at a CLS is 1.33. If you exclude the many (859) stations landing only one cable, that number jumps to 2.60.

High numbers of cables landing at a single CLS are rare, with five or more cables landing in only 14 known buildings (see *Figure 1*).

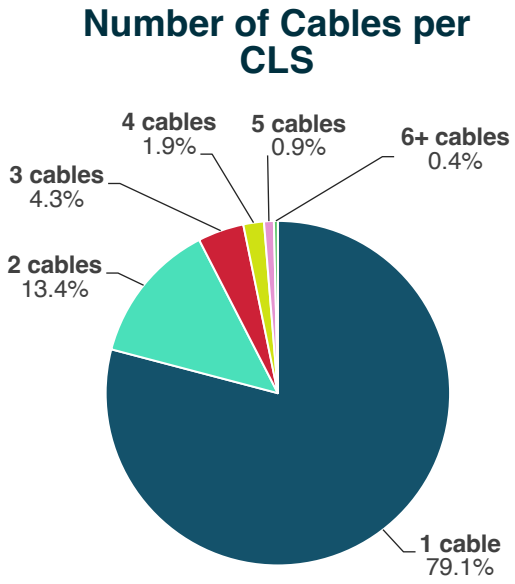

Figure 1: *Number of cables landing at each CLS. (Source: TeleGeography)*

Most CLS owners are not major providers of colocation services (54%), either within the market of their CLS or otherwise. About 1% of owners operate proprietary data centers for their content and cloud requirements. Owners who also operate proprietary data centers tend to house newer cable systems (see *Table 1*).

Most (85%) CLS owners also own one or more cables landing in their station (See *Figure 2*). Slightly fewer (80%) of CLS

	Percent of CLS Owners	Average RFS of Cables in CLS	Average Cables per CLS
Bandwidth Provider	36%	2011	1.48
Carrier Neutral	7%	2014	1.32
Proprietary	1%	2023	1.60
Wholesale	2%	2011	1.53
None	54%	2012	1.22

Table 1: *The percentage of CLS owners that are also colocation providers by type of colocation available, the average cable ready for service (RFS) year, and the average number of cables per CLS. (Source: TeleGeography)*

owners are headquartered in the same country where their station is located (See *Figure 3*). Most (67%) of CLS owners fulfill both criteria. Very few (<5%) are neither.

Of these few stations owned by non-local entities that also do not own any cables landing in their stations, 37% are owned by either carrier neutral or wholesale colocation providers.

2.2. Discussion

The idea that most CLS owners would be local entities or have a stake in one or more cables landing in their station is intuitive. Still, the fact that nearly all CLS owners fit one or both criteria (96%) is surprising.

The 4% of CLS that are neither locally headquartered nor owned by a CLS cable owner are approximately four times more likely to be owned by a carrier neutral or wholesale colocation provider. The most common are Equinix or Digital Realty.

Despite perceptions that the number of cables landing in data centers is increasing, the absolute number of cables landing in facilities owned by carrier neutral or wholesale colocation providers remains relatively low (9%). Cables landing in these stations are also not newer on average than cables landing in stations with other owner types.

While most primary CLS are not colocation facilities, cables are often integrated to one or more data centers with terrestrial backhaul. Non-CLS data centers may also house submarine line terminal equipment (also known as SLTE).

CLS owned by companies that also operate proprietary data centers (for example, content providers like Meta or Google) land much newer cables (average RFS = 2023) than all other CLS types. They also feature a

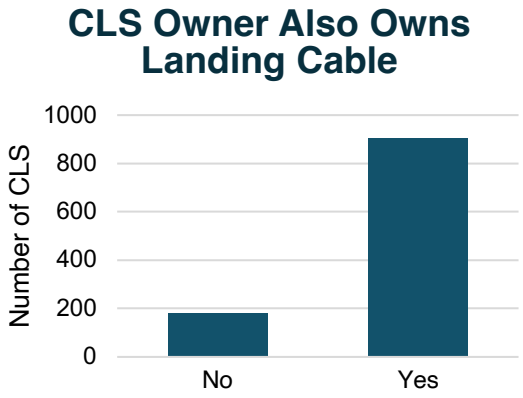

Figure 2: *Number of CLS owners that also own a cable that lands in their station. (Source: TeleGeography)*

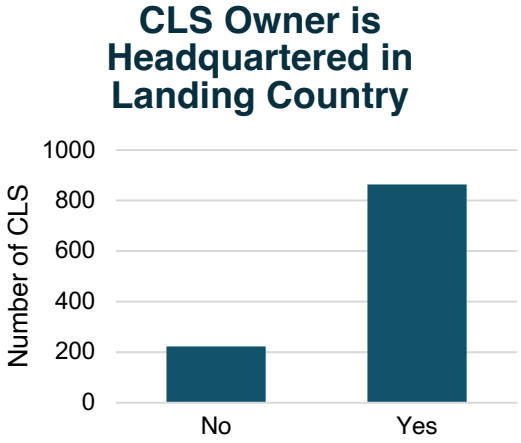

Figure 3: *Number of CLS owners whose headquarters are in the same country as their CLS. (Source: TeleGeography)*

slightly higher ratio of cables per CLS. This may be because they have fewer stations landing only one cable (rather than more stations that land high numbers of cables).

If stations owned by content providers become more popular, the percentage of locally owned CLS may decline. However, significant investment by these owners would be needed to reduce this majority.

3. METRO LEVEL ANALYSIS

This sample was derived from metros in TeleGeography's databases where we had CLS data for over 70% of in-service and planned cable landings within that metro (995 metros).

Identified metros were then studied through the number of cables landing in their area for which we have CLS information, the number of CLS identified in their area, and the number of unique CLS owners in their area. Only cables for which we have CLS data are included in metro landing totals. In cases where one cable had two distinct landings within one metro, both landings are counted.

3.1. Findings

The most common number of cables landing in a metro is one (833 metros) and 94 metros feature three or more cable landings. These are globally distributed with the most being in the United States (18 metros).

The number of cables landing in each metro was plotted against the number of CLS identified in each metro (see *Figure 4*). A linear trend line was then generated (R^2=0.82) and used to assess how many CLS

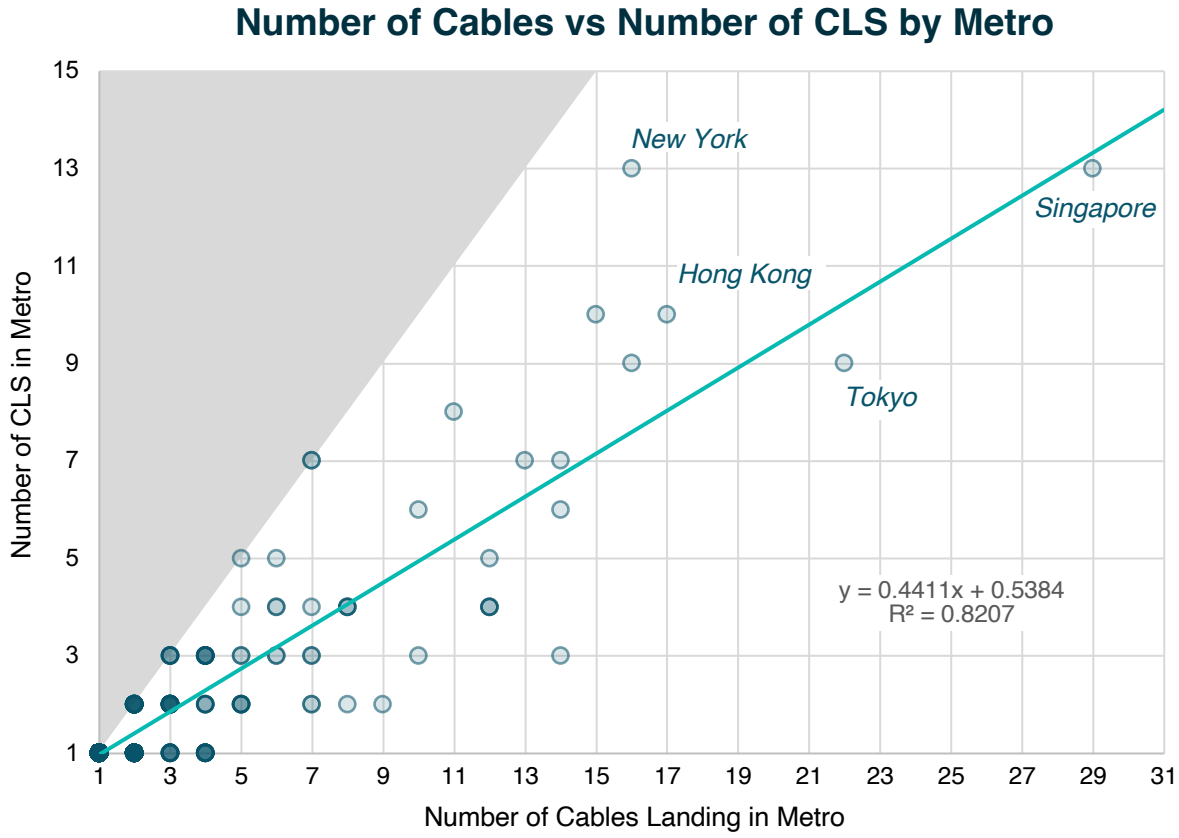

Figure 4: *Number of cables by the number of CLS per metro area. Darker bubbles indicate a higher number of records matching each description. Impossible levels of diversity (i.e., 7 primary stations for 5 cables) are obscured by the gray triangle. (Source: TeleGeography)*

Number of Cables in Metro	Expected Number of CLS
1	1.0
3	1.9
5	2.8
8	4.1
10	5.0
21	9.8

Table 2: *Number of cables landing in a metro area vs the estimated number of CLS that can be expected in that metro, as determined by Figure 3. (Source: TeleGeography)*

are expected within a metro based on the number of cables landing there (see *Table 2*).

To learn more about how the number of unique CLS owners within a metro may impact CLS diversity, we analyzed a subset of metros with 2 or more cable landings and for which we had ownership data for every CLS building (n=122). The mean number of cables per CLS in each metro was then charted against the number of unique CLS owners within that metro (see *Figure 5*). Analysis of variance (one-way ANOVA) indicated that differences between groups were statistically significant (*p*=0.026).

3.2. Discussion

The density of cables per CLS varies. A metro with one CLS might land a single cable, or up to four. Most metros with two CLS land fewer than five cables, but some host up to nine.

Based on information from *Table 2,* a new CLS can be expected within a metro area for every 2-3 cables landed after the first. This may provide a baseline indicator of CLS diversity.

Metros with the fewest unique CLS owners also feature the highest ratio of cables per CLS. This potentially demonstrates the

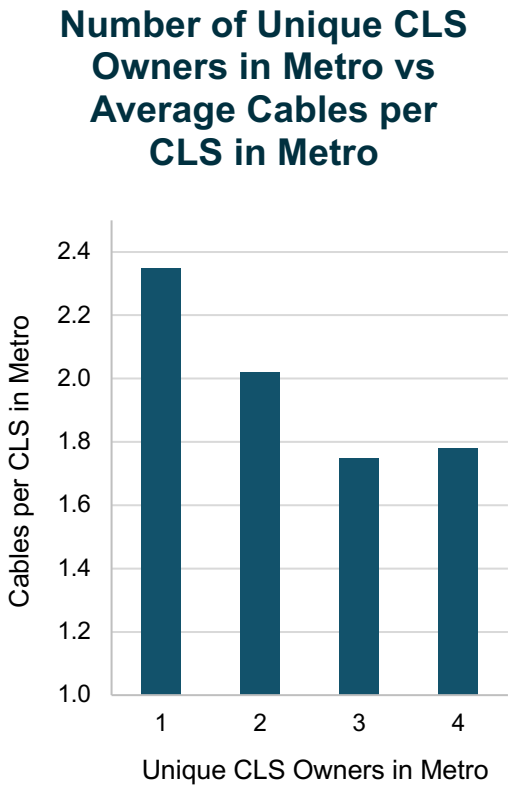

Figure 5: *Number of unique CLS owners in metro vs the average number of cables per CLS in that metro. (Source: TeleGeography)*

effects of reduced market competition on CLS diversity.

One important caveat is that the "Expected Number of Cables" listed in *Table 2* relates to typical numbers, not ideal ones. The appropriate number of cables per CLS depends on local circumstances and should not be based on arbitrary guidelines.

There are many reasons that companies might decide to build a new CLS or to land at existing facilities. Some examples are budgetary concerns, external regulation, local requirements, demand for landing diversity, corporate relationships, pending retirements of older cables, and quality/availability of existing infrastructure.

4. CONCLUSIONS

Using analysis from the building level, we can conclude that most CLS host between 1 and 2 cable systems. They are owned almost

entirely by companies that are either local entities (i.e., headquartered in the country where their station is located) or owners/consortia members of at least one cable landing in their facility.

Approximately half of CLS owners are colocation providers, with a smaller percentage (<10%) providing carrier neutral colocation services at the building where a cable first lands.

From data at the metro level, we estimate that a new CLS can be anticipated for every 2-3 cables added to a metro. Stations with the most cables occur in metros where all CLS are owned by the fewest unique entities.

A more complex analysis would consider cables unequally. For example, landing 5 high-capacity, trans-Atlantic systems in a single building would increase the risk that simultaneous damage would impact network performance. However, 5 cables with varied routes and capacities landing together in a metro with lots of other systems would present less risk.

TeleGeography will continue to collect information to expand our CLS database. We are grateful for support we've received thus far from industry and look forward to continuing conversations on the accuracy of this data and how it should be used.