



Internet Resilience in Thailand

Threats and Opportunities

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Background



In 2014, discussions began among the APNIC Executive Council (EC) when it set out to expand the APNIC Development Program. The EC wanted to do this by raising funds, independent from APNIC membership contributions, to support regional Internet development efforts in the future. Those discussions led to the establishment of APNIC Foundation in September 2016.

It became operational in early 2017.

ISIF Asia is the Foundation's grant fund. It was officially launched in 2008, as a partnership between APNIC, the Internet Society (ISOC) and the International Development Research Centre (IDRC). Various other sponsors have supported the fund since.

ISIF Asia provides grant and award funding for Internet development projects supporting Infrastructure, Inclusion and Knowledge in the Asia Pacific.

ISIF Asia was administered by APNIC from 2008 until 2016. As APNIC established the APNIC Foundation in 2016, ISIF Asia was transferred to the Foundation from 2017.

The School on Internet Asia (SOI Asia) is led by Keio University. It was launched in 2001 as a platform for inter-university education and research programs among institutions throughout Asia, focused on science and Internet-related domains. SOI Asia has several major programs, in particular the Asia Pacific Internet Engineers Program (APIE), the Evidence Based Approach (EBA) and Community Based Research (CBR).

In 2021, SOI Asia and the Foundation began working together and the Foundation has a staff member based out of Keio University.





Internet Resilience

Internet resilience refers to the ability of the Internet to maintain its functionality and services despite facing threats, disruptions, or adverse conditions. It encompasses various aspects, including availability, performance, reachability, and reliability of the Internet infrastructure.



Internet Resilience

- There are many ways to measure the resiliency of the Internet. Lets focus on the methodology used by Internet Society Pulse platform.



Infrastructure

The existence and availability of physical infrastructure that provides Internet connectivity.



Performance

The ability of the network to provide end-users with seamless and reliable access to Internet services.



Security

The ability of the network to resist intentional or unintentional disruptions through the adoption of security technologies and best practices.



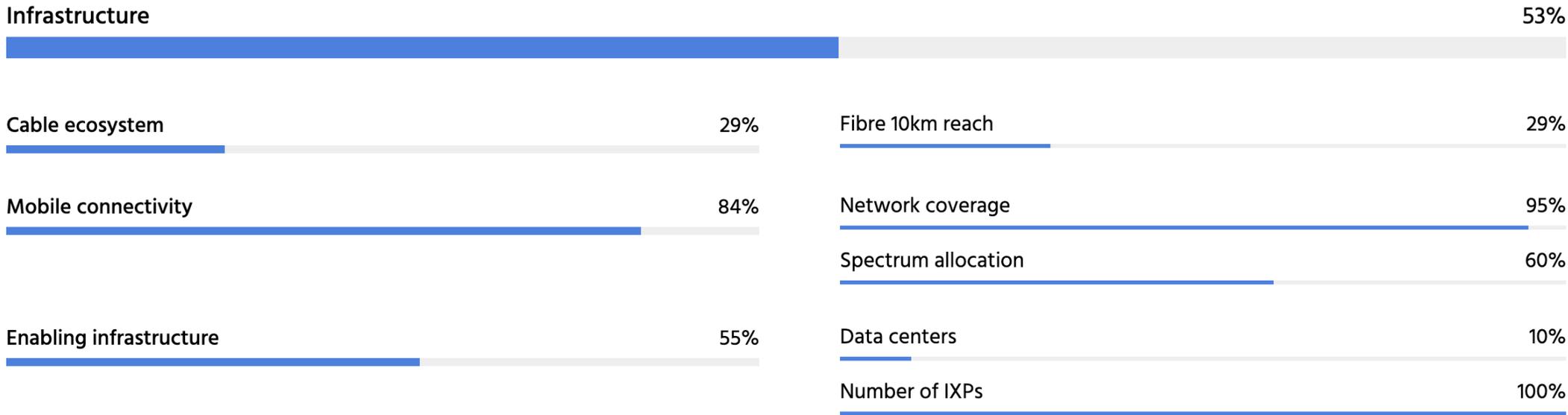
Market Readiness

The ability of the market to self-regulate and provide affordable prices to end-users by maintaining a diverse and competitive market.



Internet Resilience

- The underlying physical systems such as inland fiber backbones, submarine cables, data centers, Internet exchange point interconnects and last-mile links that must be in place and operational to deliver reliable, high-capacity Internet connectivity across a region. A robust infrastructure ensures broad geographic reach, sufficient bandwidth, redundant paths for resilience and the ability to scale as demand grows.





Internet Accessibility - Facts

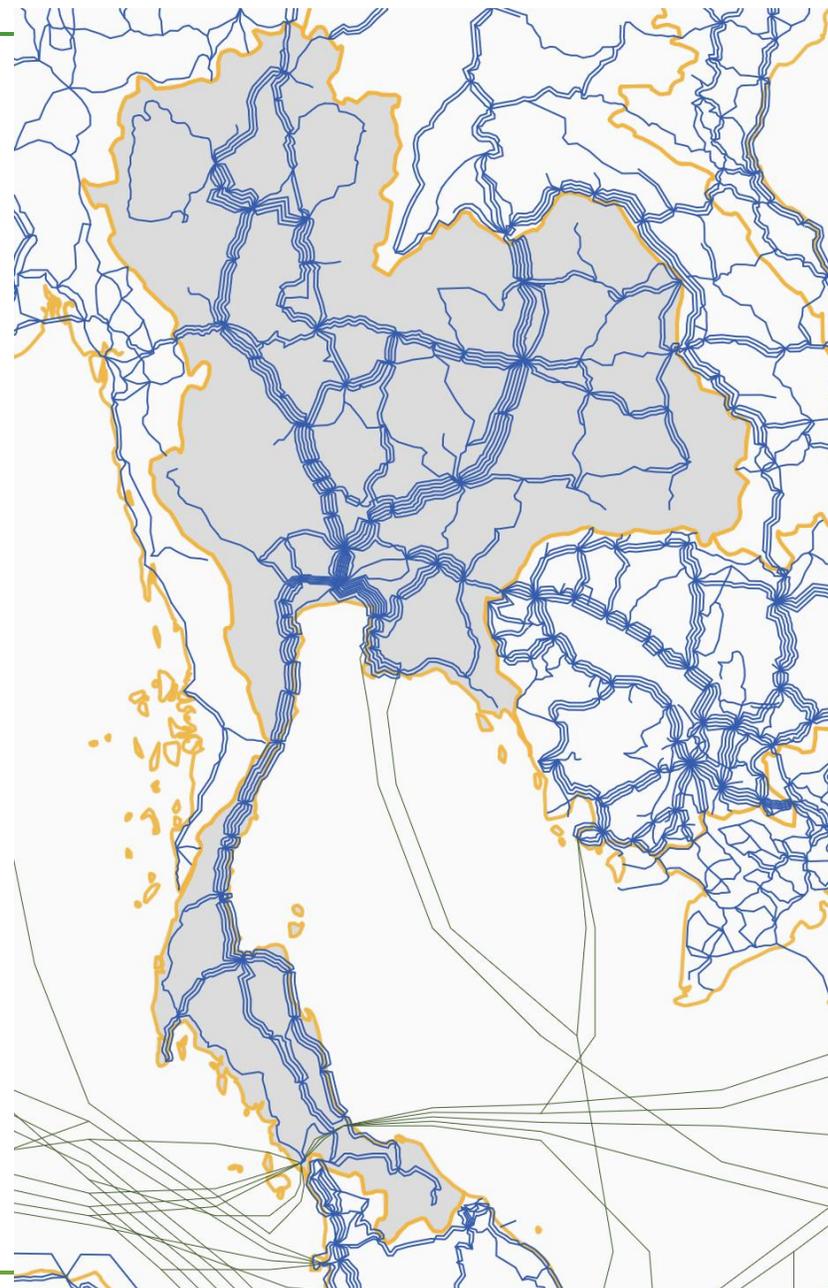
- There are approximately 63.5 million internet users in Thailand.
- ~83% of the population use mobile networks as their primary Internet connection
- A total of 97.81 million cellular mobile connections were active in Thailand in early 2024, with this figure equivalent to 136.1 percent of the total population.
- ~11.5 million fixed-broadband lines (almost 16 subscriptions per 100 inhabitants)
- Mobile broadband clearly dominates Thai Internet access, but fixed-broadband especially fibre to the home is rapidly expanding



Cable Infrastructure

Thailand's cable infrastructure encompasses three main components:

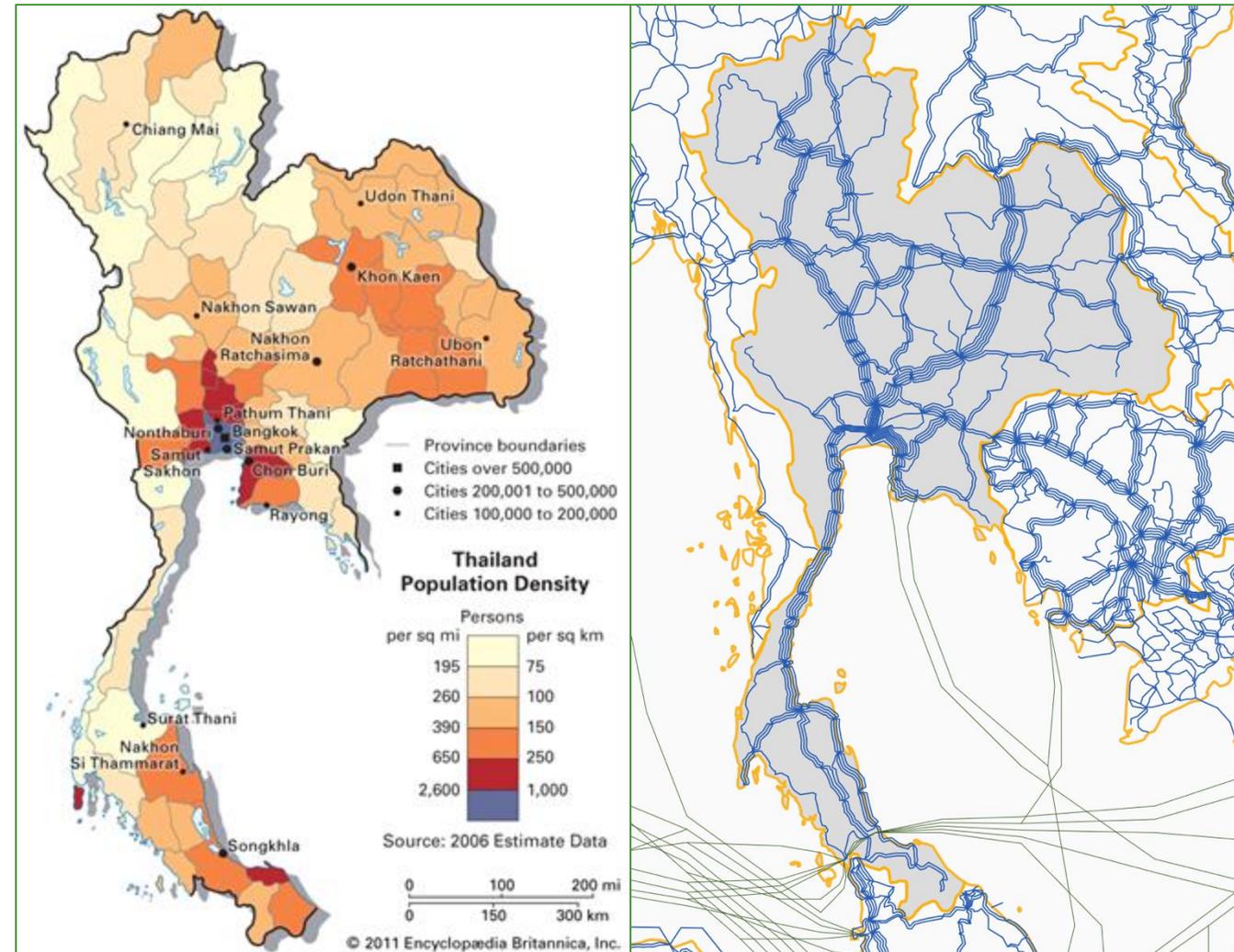
- **Domestic terrestrial networks**, which span fibre links between major cities;
- **Cross-border connections**, linking Thailand's network to those of its neighbours; and
- **International submarine cables**, which serve as the critical backbone for the country's global Internet connectivity.





Cable Infrastructure

- ITU broadband maps indicate strong terrestrial fibre coverage in Thailand's urban centres, but large regions remain unserved.
- Overlaying fibre availability with population-density data reveals that most cables cluster around highly populated areas.
- Since roughly 40 % of Thai lives in rural zones, many communities have limited fixed-broadband options.



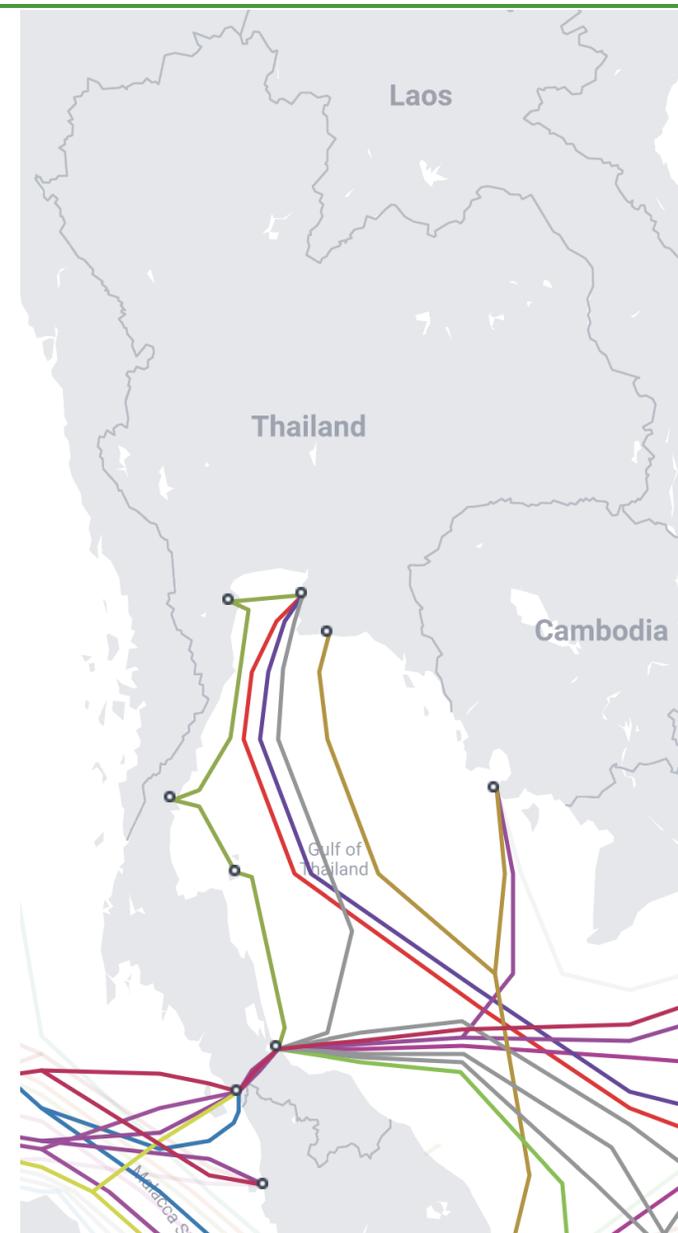
<https://bbmaps.itu.int/bbmaps/>



Cable Infrastructure

Below is the list of all submarine cables landing in Thailand (active and under construction), with their design capacities (where available) and Thai landing-station locations. Data from TeleGeography's Submarine Cable Map

- Asia Africa Europe-1 (AAE-1)
- Asia-America Gateway (AAG) Cable System
- Asia Direct Cable (ADC)
- Asia Pacific Gateway (APG)
- CAT Submarine Network (CSN)
- FLAG Europe-Asia (FEA)
- India Asia Xpress (IAX)
- Malaysia-Cambodia-Thailand (MCT) Cable
- MIST SEA-H2X2025
- SeaMeWe-4 Southeast
- Asia-Japan Cable 2 (SJC2) 2025
- Thailand Domestic Submarine Cable Network (TDSCN)
- Thailand-Indonesia-Singapore (TIS)
- Vietnam-Singapore Cable System (VTS) 2027





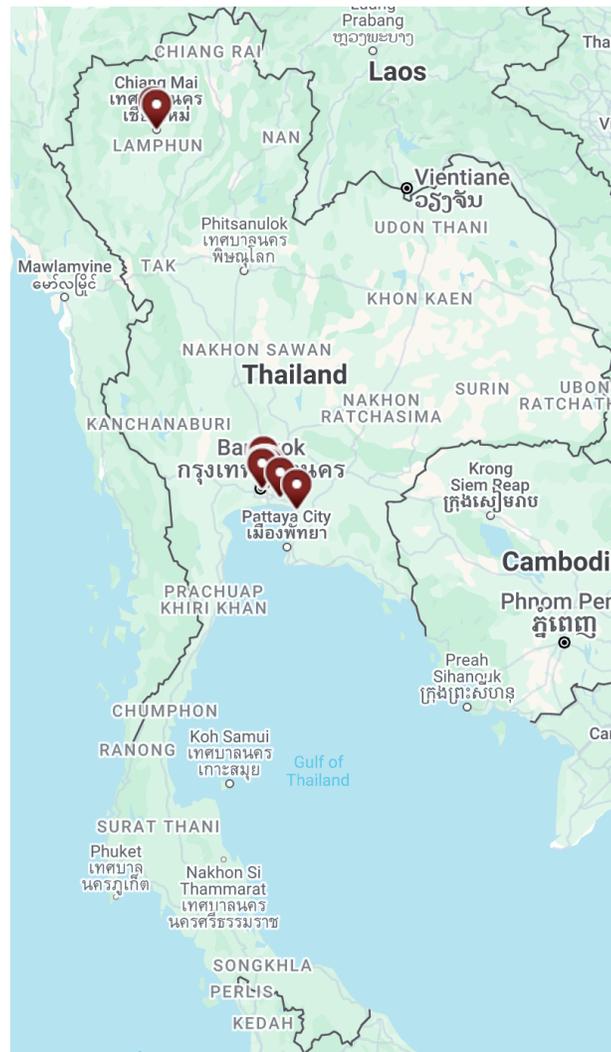
Enabling Infrastructure

- Deploying terrestrial or submarine fibre alone isn't enough to guarantee meaningful Internet access across an economy.
- Enabling facilities such like data centres are required to host content, cloud services, and other related services close to end users, reducing latency and improving performance.
- Internet Exchange Points provide the critical switching fabric where local networks interconnect and exchange traffic directly, keeping regional traffic in-region and lowering transit costs.

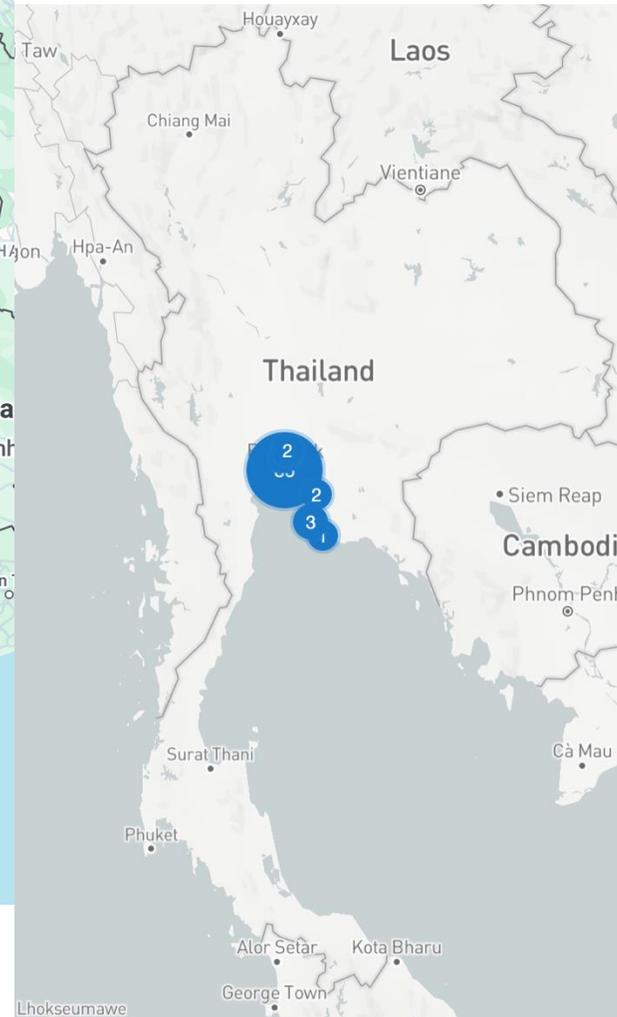


Enabling Infrastructure

- Internet Exchange Points (IXPs): Thailand has 12 active IXPs as of May 2025 [[Internet Society Pulse](#)].
- Data Centres: There are 45 data centres spread across six primary locations in Thailand [[Data Center Map](#)]:
 - Bangkok: 36
 - Pakkret: 1
 - Pathum Thani: 2
 - Chonburi: 2
 - Ban Chang: 1
 - Pattaya: 3



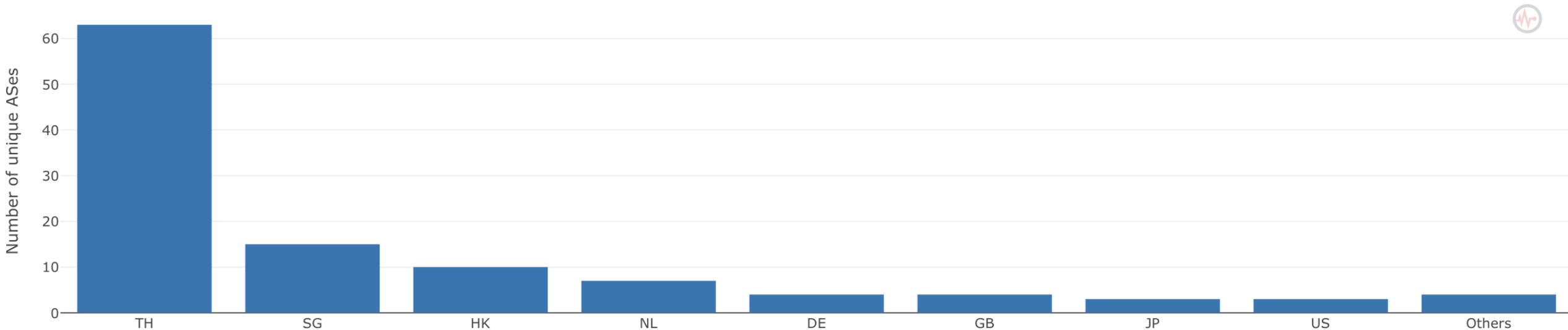
<https://www.internetexchangemap.com>



<https://www.datacentermap.com/thailand/>



Peering outlook in Thailand



- Most Thai networks peer at one or more domestic IXPs leveraging local exchanges to keep traffic in-country, minimise latency, and reduce transit fees.
- Beyond their home exchanges, many operators also establish sessions at nearby or regional IXPs (e.g. HKIX, SGIX)

Peering outlook in Thailand

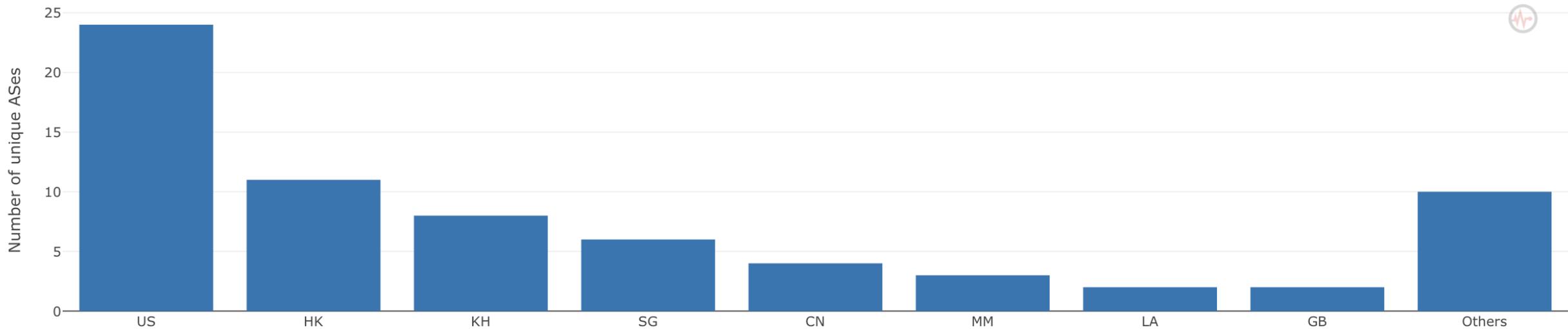
IXP Membership for ASes Registered in Thailand

- Top 5 IXPs in terms of local networks
 - BKNIX
 - Thailand-IX
 - BBIX-Thailand
 - Equinix-Singapore
 - CSL-Thai-IX
- As per the records, there are 12 exchanges in Thailand.

bknix (thailand) - TH	29	10	9	3	4	8	5	2	2	3	1	1	1	1	1	3	3	1	1	1	2	2	0	1	1	0	0	1
thailand ix (th-ix) - TH	10	27	8	3	7	9	2	2	2	4	1	2	2	2	1	2	1	2	2	2	1	2	0	1	1	1	1	2
bbix thailand - TH	9	8	16	6	3	5	2	4	5	3	3	0	0	2	2	3	0	2	3	2	0	1	1	2	1	0	1	1
equinix singapore - SG	3	3	6	14	1	0	3	6	7	1	6	2	2	5	2	4	1	4	4	3	1	0	2	2	2	2	2	2
csl thai-ix bangkok - TH	4	7	3	1	14	7	1	1	1	4	0	4	4	1	1	1	0	1	1	1	0	1	0	1	1	0	0	1
true-ix - TH	8	9	5	0	7	13	0	0	0	2	0	2	2	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0
ams-ix bangkok - TH	5	2	2	3	1	0	10	2	1	2	1	1	1	1	0	0	0	0	1	1	1	0	2	1	0	0	1	0
ams-ix - NL	2	2	4	6	1	0	2	7	6	1	4	1	1	4	2	3	0	4	4	3	2	0	1	2	1	2	2	2
hkix - HK	2	2	5	7	1	0	1	6	7	1	5	1	1	4	2	4	0	4	4	3	1	0	1	2	1	2	2	2
jtix (thailand) - TH	3	4	3	1	4	2	2	1	1	7	0	1	1	1	1	1	0	1	1	1	0	1	0	1	1	0	0	1
bbix singapore - SG	1	1	3	6	0	0	1	4	5	0	6	1	1	3	0	3	0	2	2	2	1	0	1	1	1	2	2	1
csl thai-ix singapore - TH	1	2	0	2	4	2	1	1	1	1	1	6	6	1	0	1	0	1	0	0	1	0	0	0	0	1	0	0
csl thai-ix malaysia - TH	1	2	0	2	4	2	1	1	1	1	1	6	6	1	0	1	0	1	0	0	1	0	0	0	0	1	0	0
equinix hong kong - HK	1	2	2	5	1	0	1	4	4	1	3	1	1	5	1	3	0	3	2	2	1	0	0	1	1	2	1	2
france-ix paris - FR	1	1	2	2	1	0	0	2	2	1	0	0	0	1	2	1	0	2	2	1	0	0	0	1	1	0	0	1
sgix - SG	3	2	3	4	1	0	0	3	4	1	3	1	1	3	1	5	0	2	1	1	2	0	0	1	1	1	0	1
bknix chiang mai (thailand) - TH	3	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0
linx lon1 - GB	1	2	2	4	1	0	0	4	4	1	2	1	1	3	2	2	0	4	3	2	1	0	0	1	1	2	1	2
de-cix frankfurt - DE	1	2	3	4	1	0	1	4	4	1	2	0	0	2	2	1	0	3	4	3	0	0	1	2	1	1	2	2
any2west - US	1	2	2	3	1	0	1	3	3	1	2	0	0	2	1	1	0	2	3	3	0	0	1	2	1	1	2	2
ams-ix hong kong - HK	2	1	0	1	0	0	1	2	1	0	1	1	1	1	0	2	0	1	0	0	3	0	0	0	0	1	0	0
symphony thai - ix bangkok - 1 - TH	2	2	1	0	1	2	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0
de-cix asean - SG	0	0	1	2	0	0	2	1	1	0	1	0	0	0	0	0	0	0	1	1	0	0	2	1	0	0	1	0
jpix tokyo - JP	1	1	2	2	1	0	1	2	2	1	1	0	0	1	1	1	0	1	2	2	0	0	1	2	1	0	1	1
myix - MY	1	1	1	2	1	0	0	1	1	1	1	0	0	1	1	1	0	1	1	1	0	0	0	1	2	0	0	1
bbix hong kong - HK	0	1	0	2	0	0	0	2	2	0	2	1	1	2	0	1	0	2	1	1	1	0	0	0	0	2	1	1
bbix tokyo - JP	0	1	1	2	0	0	1	2	2	0	2	0	0	1	0	0	0	1	2	2	0	0	1	1	0	1	2	1
nl-ix - NL	1	2	1	2	1	0	0	2	2	1	1	0	0	2	1	1	0	2	2	2	0	0	0	1	1	1	1	2
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jpix tokyo - JP																												
myix - MY																												
bbix hong kong - HK																												
bbix tokyo - JP																												
nl-ix - NL																												



Peering outlook in Thailand



- Majority of networks are originated from US, Hong Kong and Cambodia.



Peering outlook in Thailand

IXP Membership for ASes Registered outside Thailand

- Top 5 IXPs in terms of Intl networks
 - BKNIX
 - Thailand-IX
 - BBIX-Thailand
- Majority of International networks rely on top 3 local IXPs otherwise they connect to foreign commercial IXEs.

bknix (thailand) - TH	27	8	11	2	0	4	0	1	3	3	2	0	0
thailand ix (th-ix) - TH	8	25	9	1	0	4	1	0	3	3	0	0	0
bbix thailand - TH	11	9	19	1	2	4	0	1	2	2	2	0	0
csl thai-ix bangkok - TH	2	1	1	5	0	0	0	3	3	3	0	0	0
true-ix - TH	0	0	2	0	5	1	0	1	0	0	0	0	0
ams-ix bangkok - TH	4	4	4	0	1	7	1	0	2	2	0	0	0
jtix (thailand) - TH	0	1	0	0	0	1	4	0	0	0	0	0	0
csl thai-ix singapore - TH	1	0	1	3	1	0	0	14	3	3	0	0	0
thai-ix - TH	3	3	2	3	0	2	0	3	7	7	0	0	0
csl thai-ix malaysia - TH	3	3	2	3	0	2	0	3	7	7	0	0	0
bknix chiang mai (thailand) - TH	2	0	2	0	0	0	0	0	0	0	2	0	0
symphony thai - ix bangkok - 1 - TH	0	0	0	0	0	0	0	0	0	0	0	1	1
symc-ix - TH	0	0	0	0	0	0	0	0	0	0	0	1	1
	bknix (thailand) - TH	thailand ix (th-ix) - TH	bbix thailand - TH	csl thai-ix bangkok - TH	true-ix - TH	ams-ix bangkok - TH	jtix (thailand) - TH	csl thai-ix singapore - TH	thai-ix - TH	csl thai-ix malaysia - TH	bknix chiang mai (thailand) - TH	symphony thai - ix bangkok - 1 - TH	symc-ix - TH



Peering and Interconnection

- Roughly 130 of the 439 active Thai networks peer at domestic IXPs, that's an average “peering efficiency” of 30 %. (Each network at an IXP counts independently, so dual-peering AS contribute twice.)
- Smaller, lightly populated exchanges struggle to cover their fixed costs and when spread across few members, threatening their long-term viability.
- An overabundance of exchanges splinters the national peering fabric into isolated “islands,” eroding economies of scale.



Local Content

This measurement leverages Google’s CRuX data to identify the CDNs behind the top 1,000 most-visited websites in a given country or region and then assesses how many of those sites serve content from in-country servers or caches. An active IXP ecosystem is critical for this local content delivery, since it provides the peering fabric that CDNs and ISPs need to host and exchange caches close to end users. By keeping content on local servers, routes are shortened, latency drops, and reliability and affordability improve while dependence on costly international links diminishes.

Locally cached content

83%

of the top 1000 websites in Thailand can be accessed through an in-country server or cache

56%

Asia average

2025

<https://pulse.internetsociety.org/en/reports/th/>



Threats and Opportunities

- Only about 30 % of Thailand's 439 AS-holders peer at domestic IXPs, leaving the majority dependent on upstream transit for local traffic. This under-utilization both erodes potential cost savings and limits redundancy in the local fabric.
- Multiple submarine cables (AAE-1, AAG, APG, SJC2, etc.) deliver high aggregate bandwidth but many land at just two coastal locations. A cable cut or data-centre outage in Satun or Songkhla could disrupt the bulk of international capacity.
- Under-populated IXPs struggle financially and technically, creating isolated “peer islands” rather than one cohesive fabric.



Threats and Opportunities

- Limited fixed-broadband options in low-density areas increase reliance on often-congested mobile networks, risking service degradation during peak events or emergencies.
- Centralized landing stations and DC clusters elevate the impact of natural disasters or targeted outages.



Threats and Opportunities

- Offer financial incentives along with streamlined onboarding and peering “starter kits” to lower barriers.
- Require government, education and health networks to peer locally, creating anchor tenants that attract commercial ISPs.
- Partner with utilities or leverage universal-service funds to build last-mile fibre to underserved districts.
- Establish small PoPs and caching nodes nearer to rural populations, co-located with community IXPs to shorten paths and improve QoS.
- Explore secondary cable landings beyond Satun/Songkhla to spread risk.