

June 2024

Measuring the Health and Resilience of the Internet: Malaysia



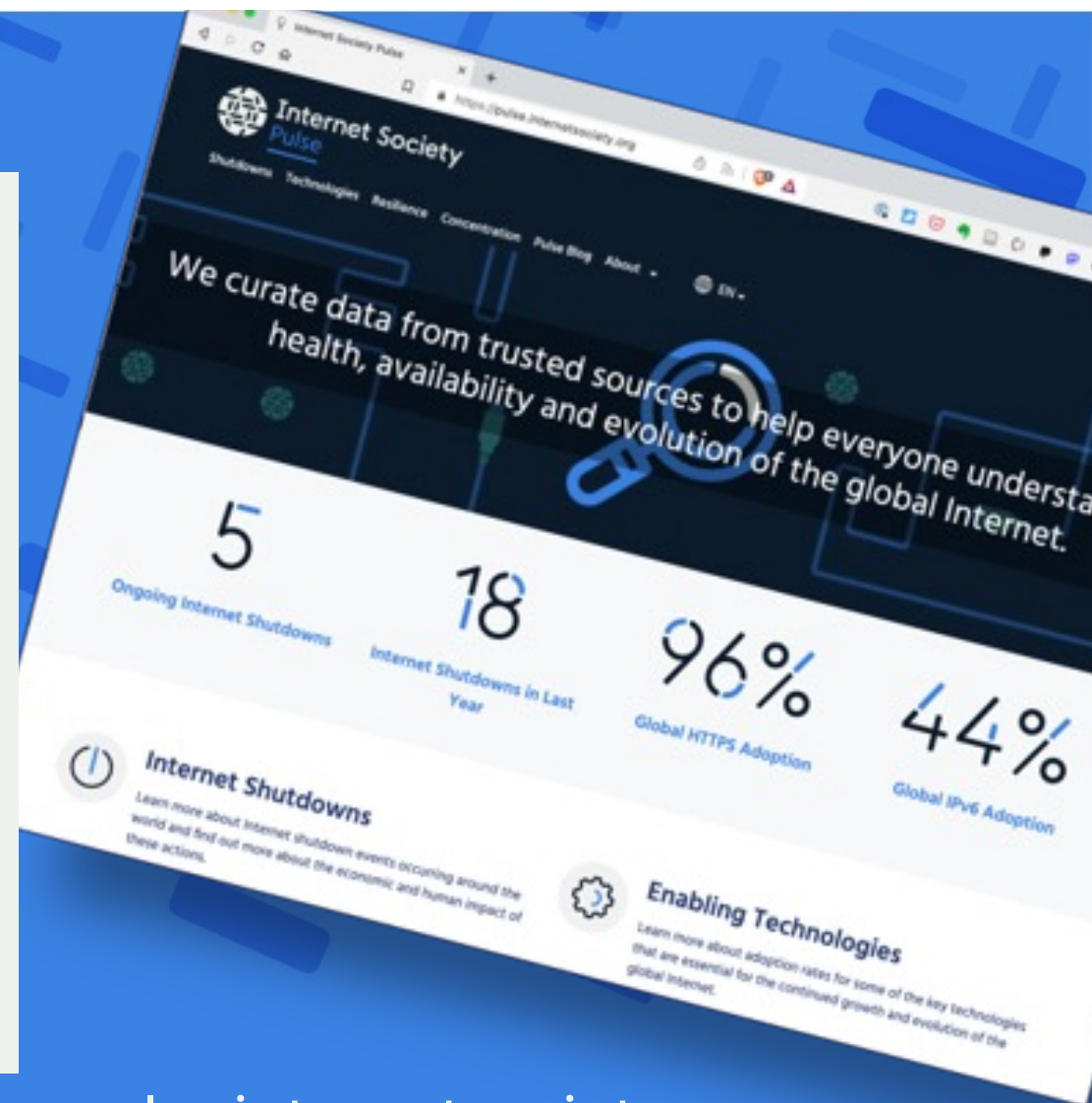
Robbie Mitchell
mitchell@isoc.org

Orange Restricted

- Launched December 2020.
- We curate Internet measurement data from trusted sources to help everyone gain deeper, data-driven insight into the Internet.

Trusted data from multiple sources:

- **Benefit:** Helps to assess whether efforts to ensure that the Internet remains open, globally connected, secure, and trustworthy are working.
- **Benefit:** Allows policymakers, researchers, journalists, network operators, civil society groups, and others to better understand the health, availability, and evolution of the Internet.



pulse.internetsociety.org



Pulse Data Partners



- Data is provided by our trusted data partners



Pulse tracks

Shutdowns: Where do Internet Shutdowns take place and what is the economic cost?

Technologies: What is the state of deployment of technologies critical for the evolution of the Internet?

Concentration: How much are services concentrated in the hands of a few?

Resilience: How robust is the Internet ecosystem?



What I'll cover today

Shutdowns: Where do Internet Shutdowns take place and what is the economic cost?

Technologies: What is the state of deployment of technologies critical for the evolution of the Internet?

Concentration: How much are services concentrated in the hands of a few?

Resilience: How robust is the Internet ecosystem?

Country Reports: Consolidate and illustrate critical Internet health metrics



Technologies



Technologies Globally



HTTPS

96%

Current percentage of top 1000 websites globally that support HTTPS.



IPv6

48%

Current percentage of top 1000 websites globally that support IPv6.



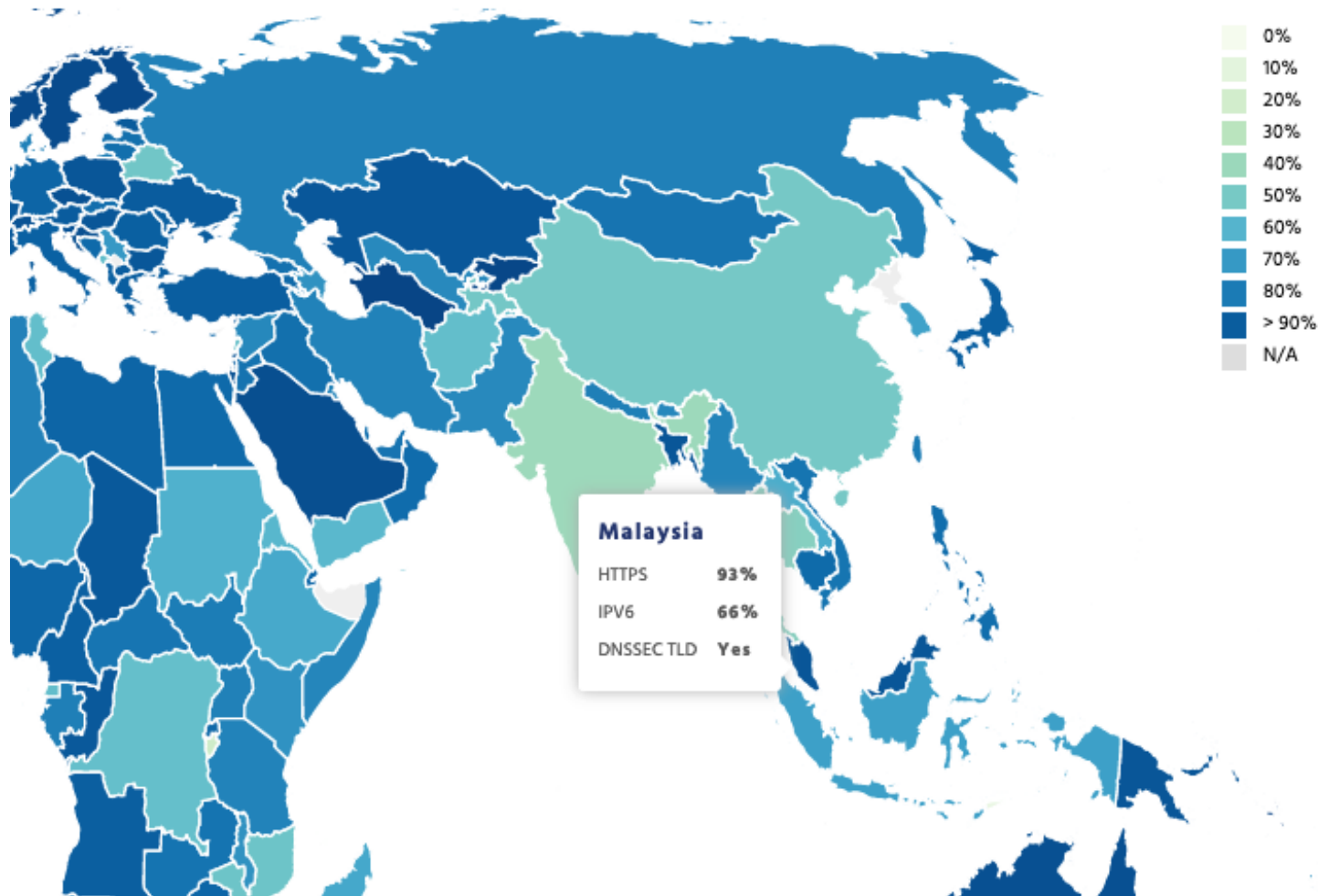
TLS 1.3

81%

Current percentage of top 1000 websites globally that support TLS 1.3.



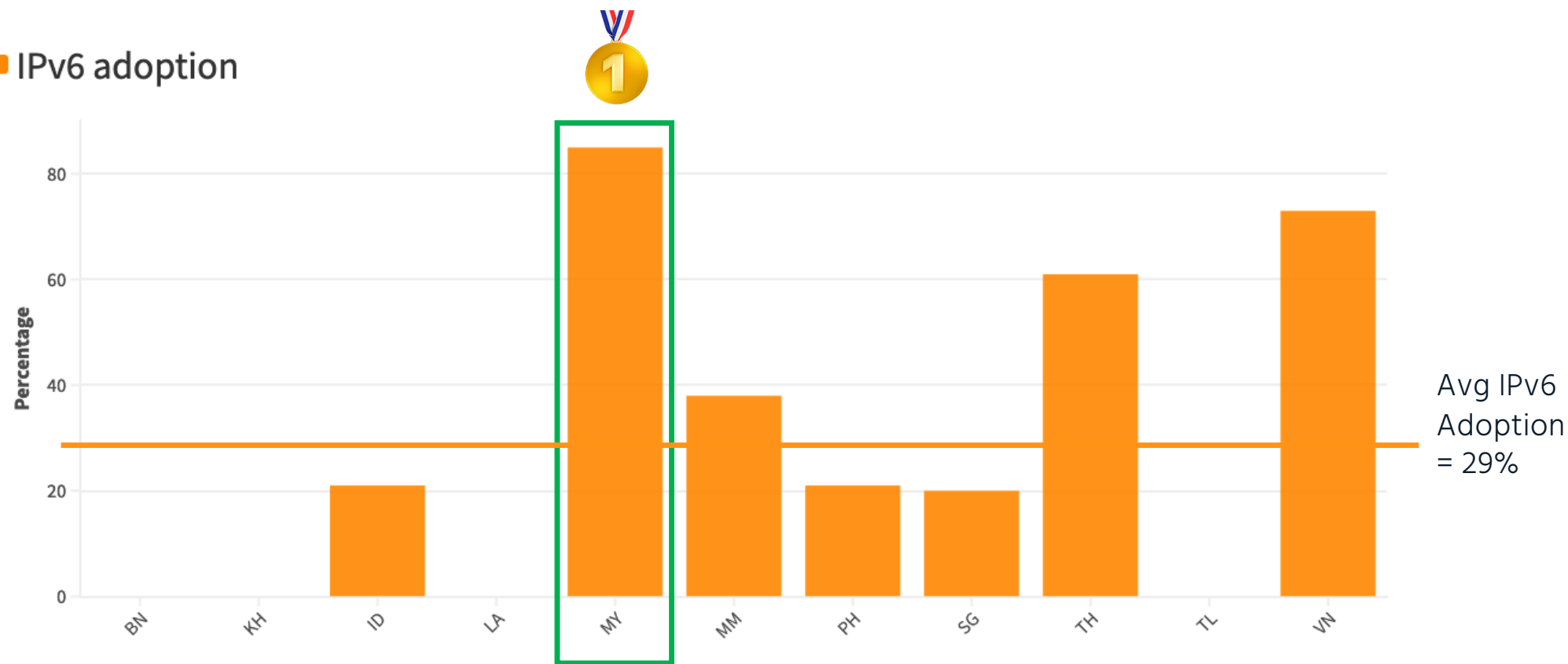
Technologies Malaysia



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IPv6 Adoption in SE Asia

■ IPv6 adoption



Avg IPv6
Adoption
= 29%



Resilience



The Internet Resiliency Index (IRI)

pulse.internetsociety.org/resilience

The framework collates around 30 sets of public metric data that relate to **four pillars** of a resilient Internet:

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.

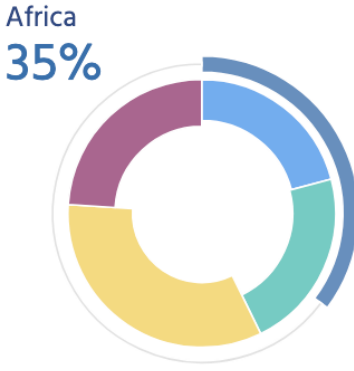
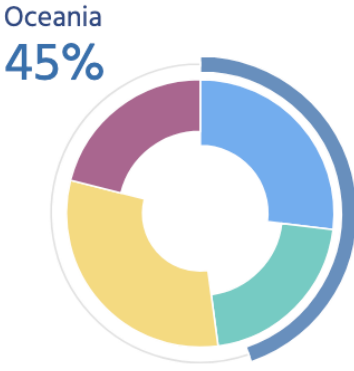
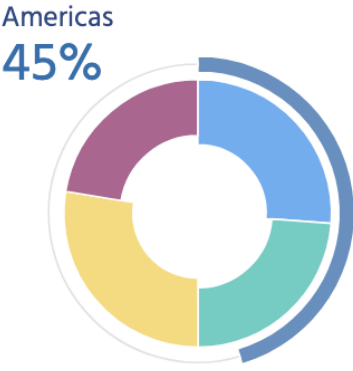
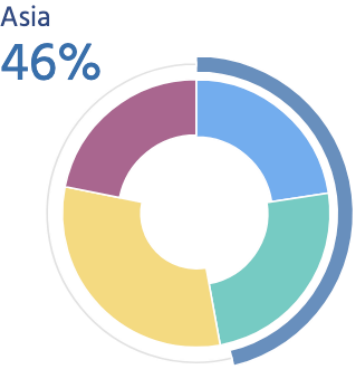
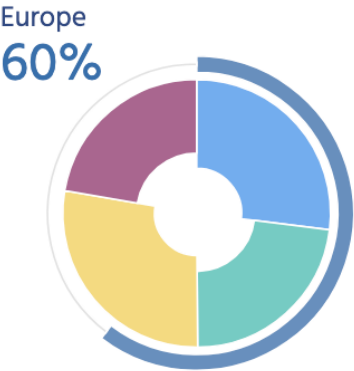


Methodology: <https://pulse.internetsociety.org/wp-content/uploads/2023/07/Internet-Society-Pulse-IRI-Methodology-July-2023-v2.0-Final-EN.pdf>

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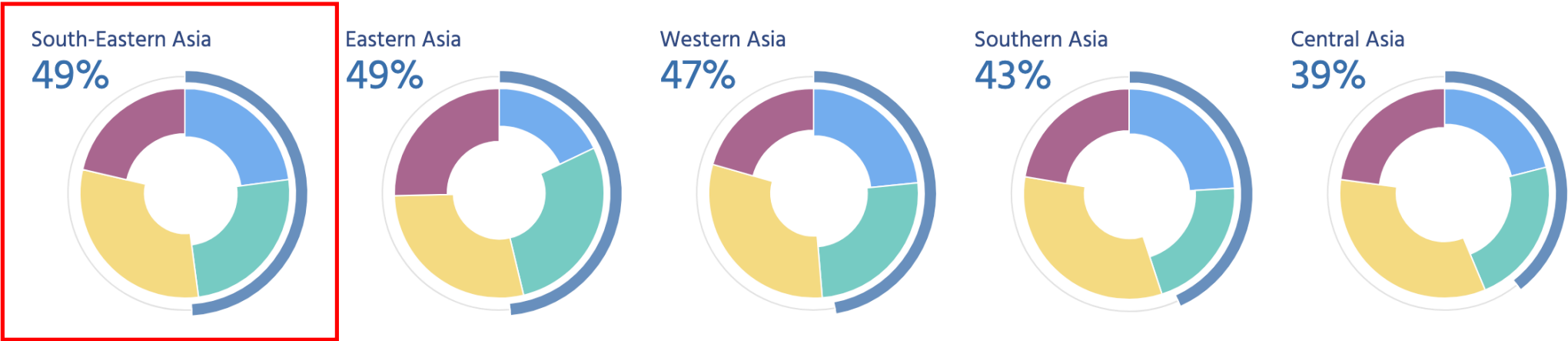
Overall Internet Resilience — By Region

● Overall Resilience ● Infrastructure ● Performance ● Security ● Market Readiness

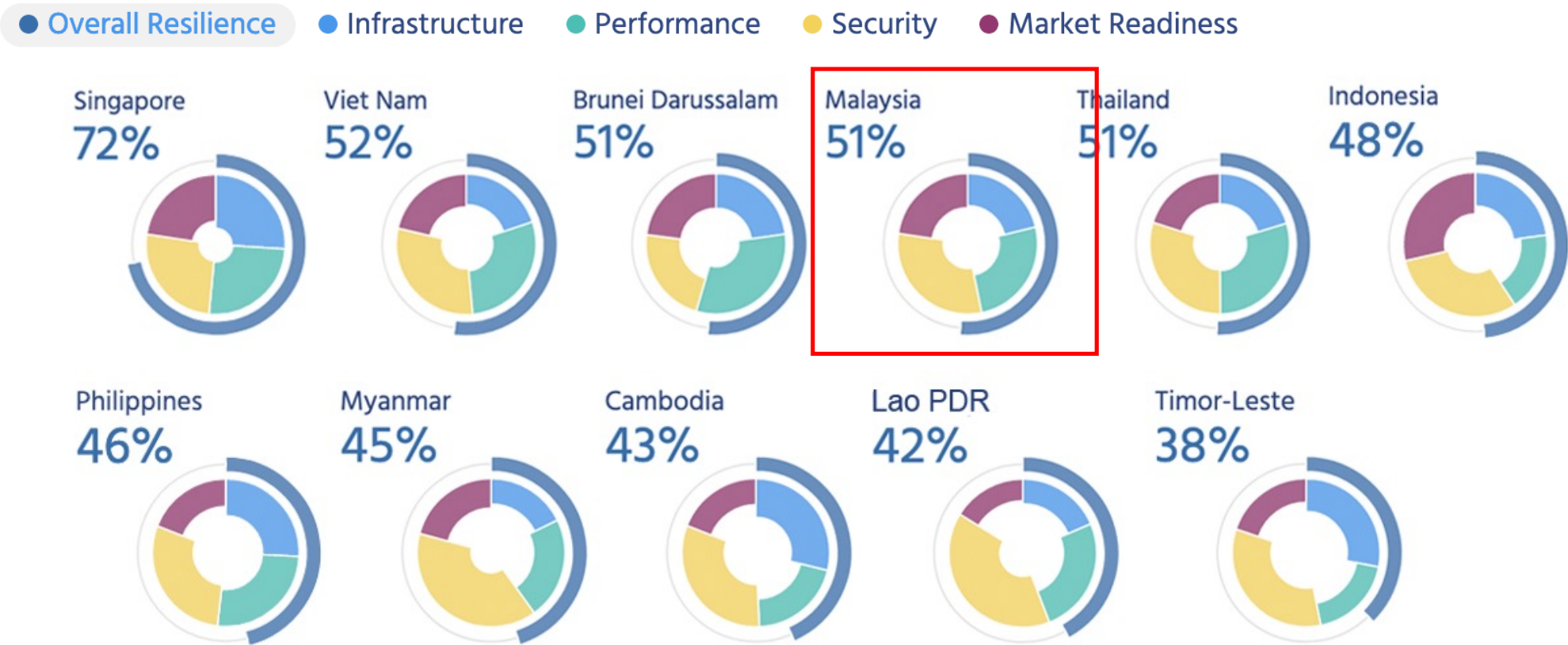


Overall Internet Resilience — Asia

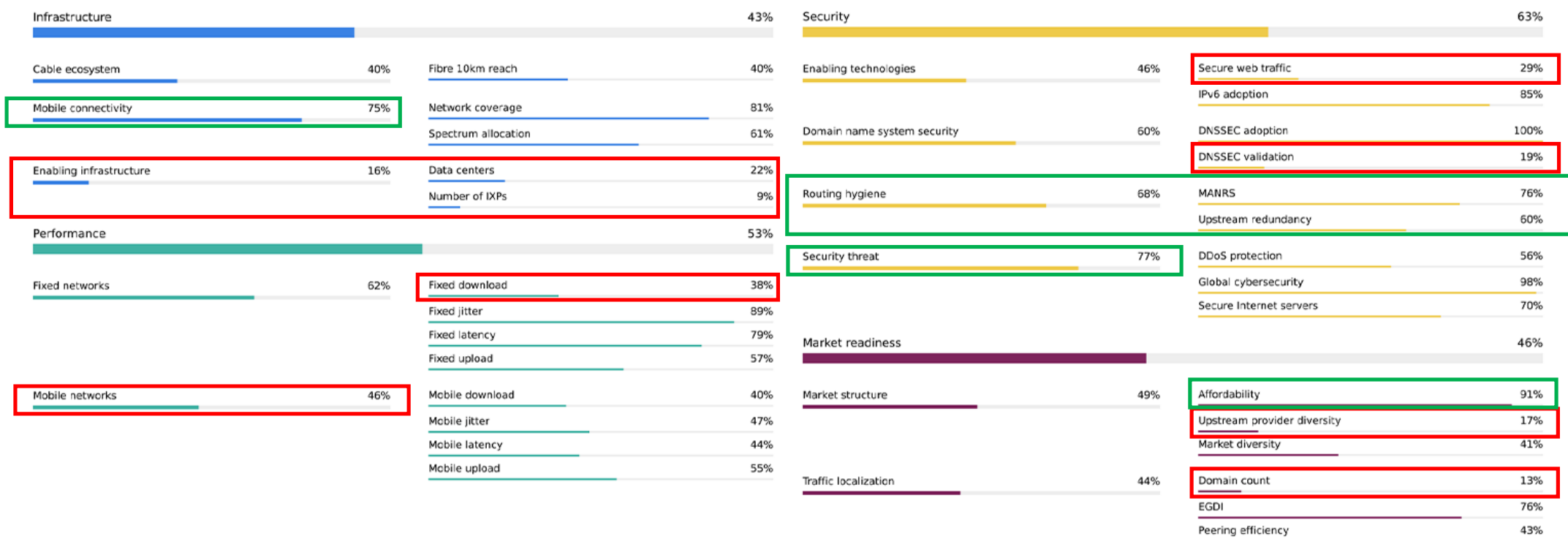
● Overall Resilience ● Infrastructure ● Performance ● Security ● Market Readiness



Overall Internet Resilience — South East Asia



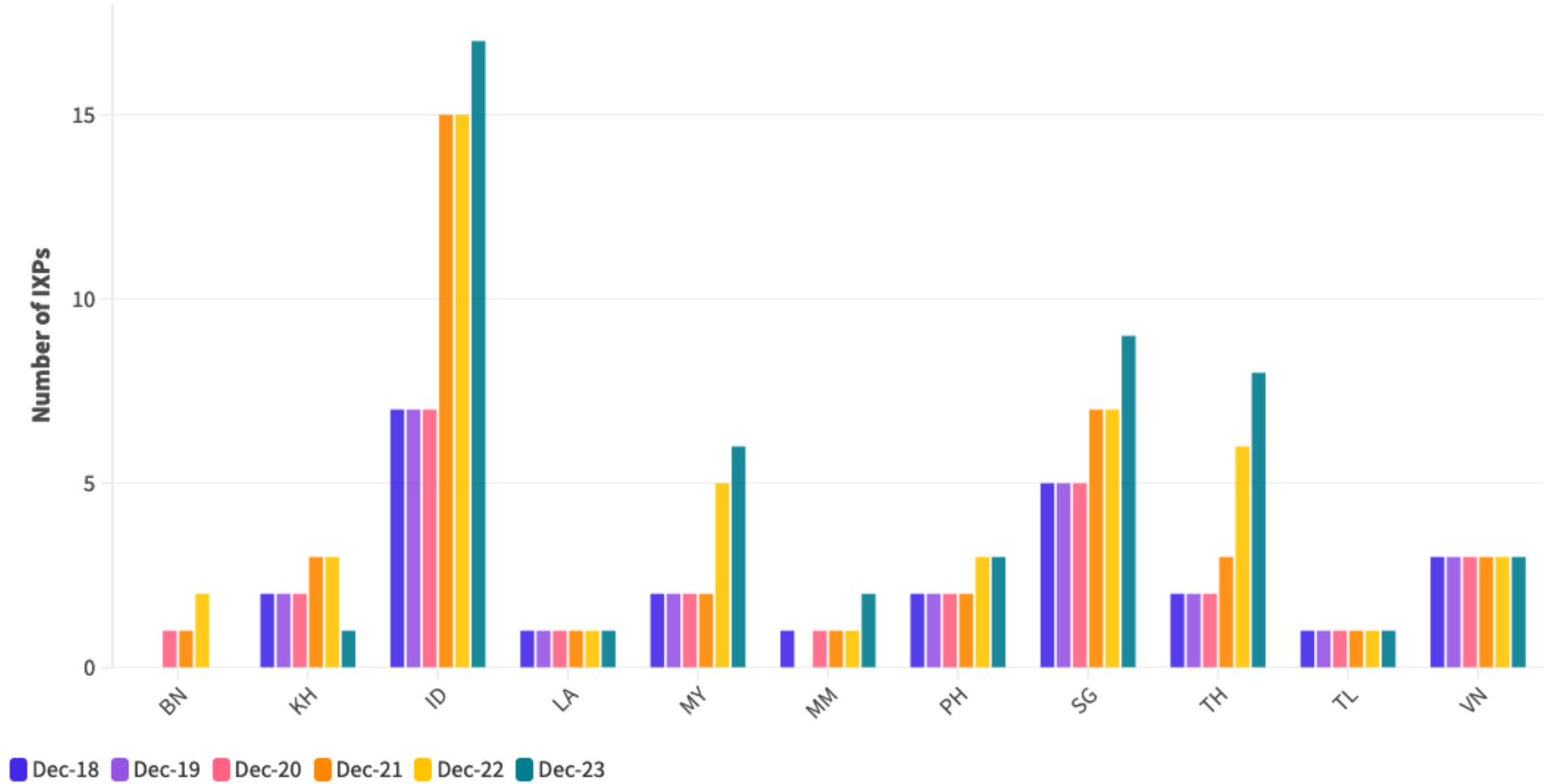
Malaysia– Internet Resilience Index



Internet Resilience
pulse.internet-society.org

data source: Pulse Internet Resilience Index

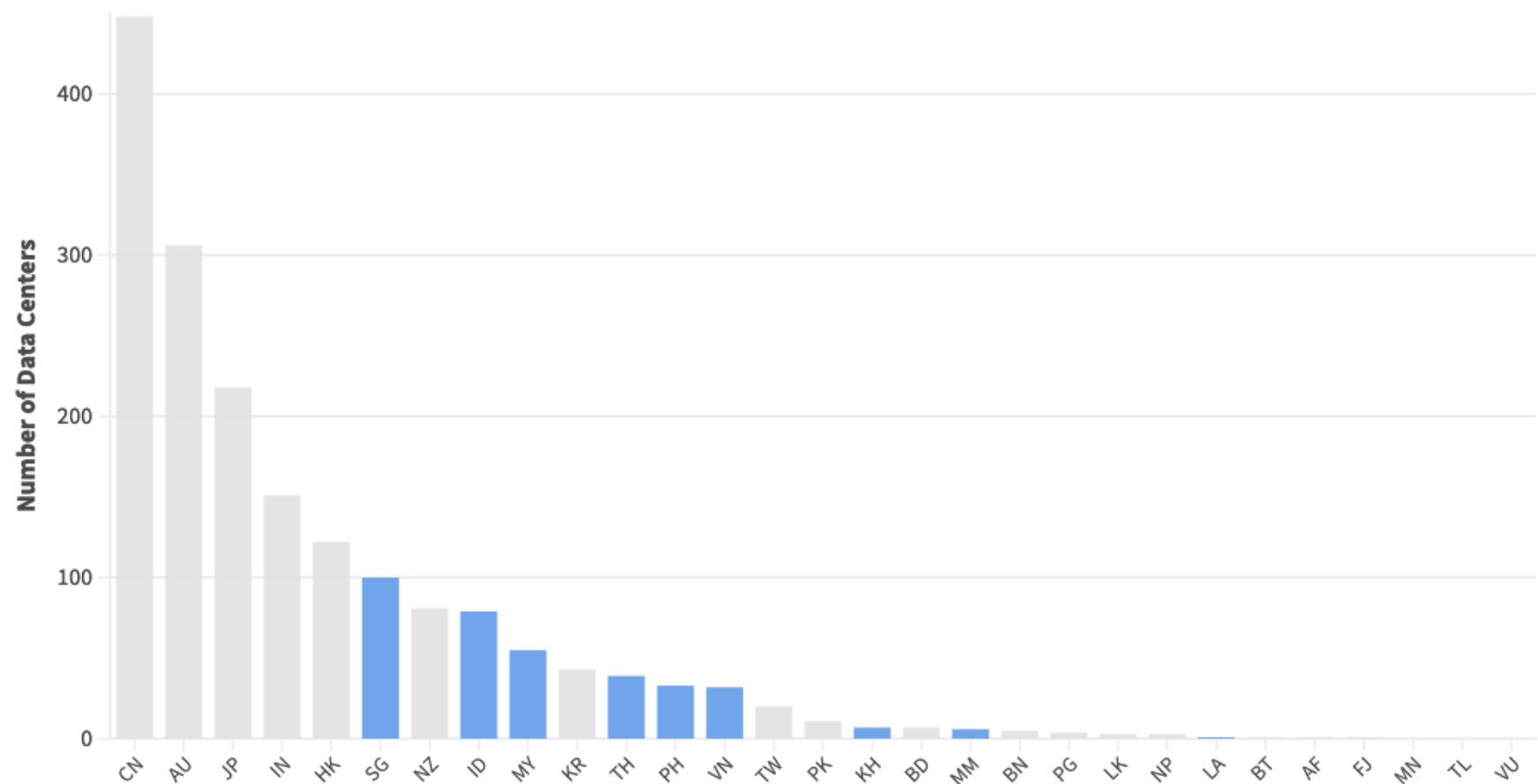
Growth of IXPs in SE Asia, 2018-23



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Source: [PCH](#)

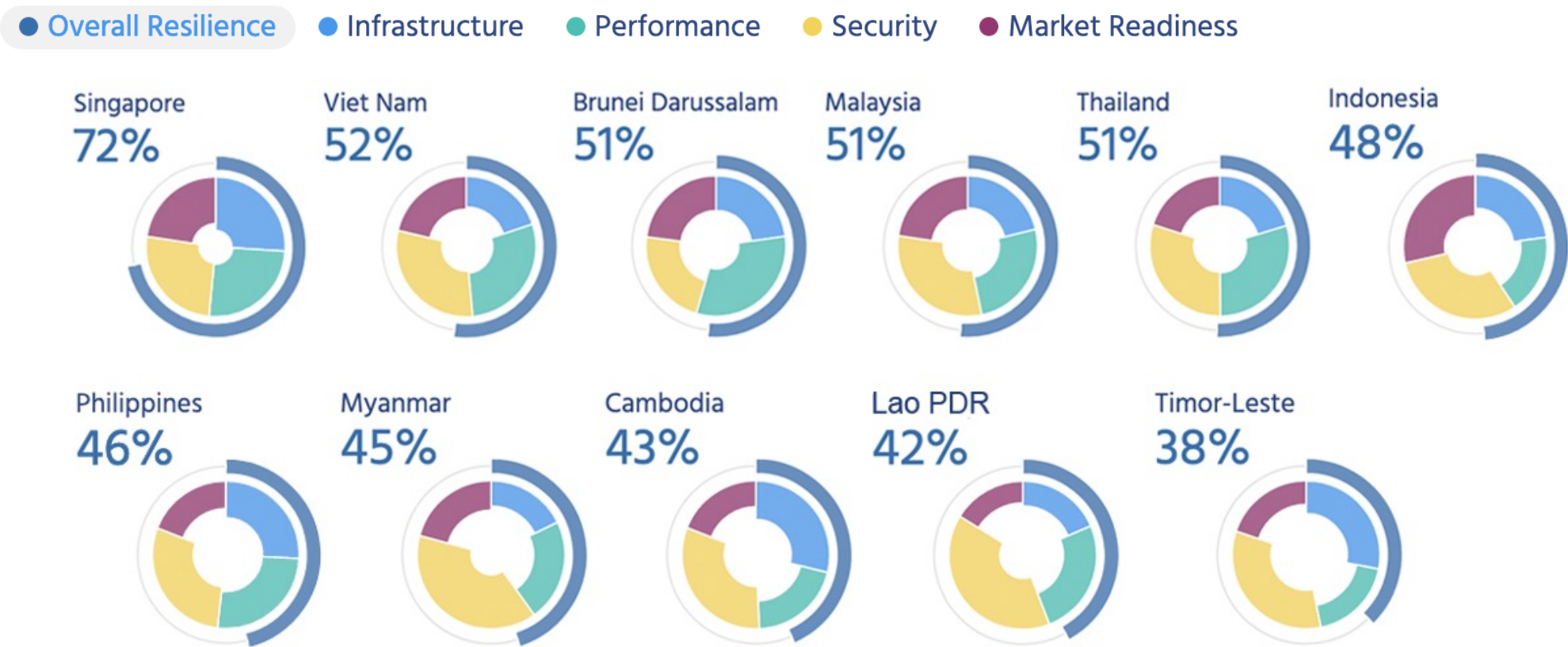
Number of Data Centers, 2023



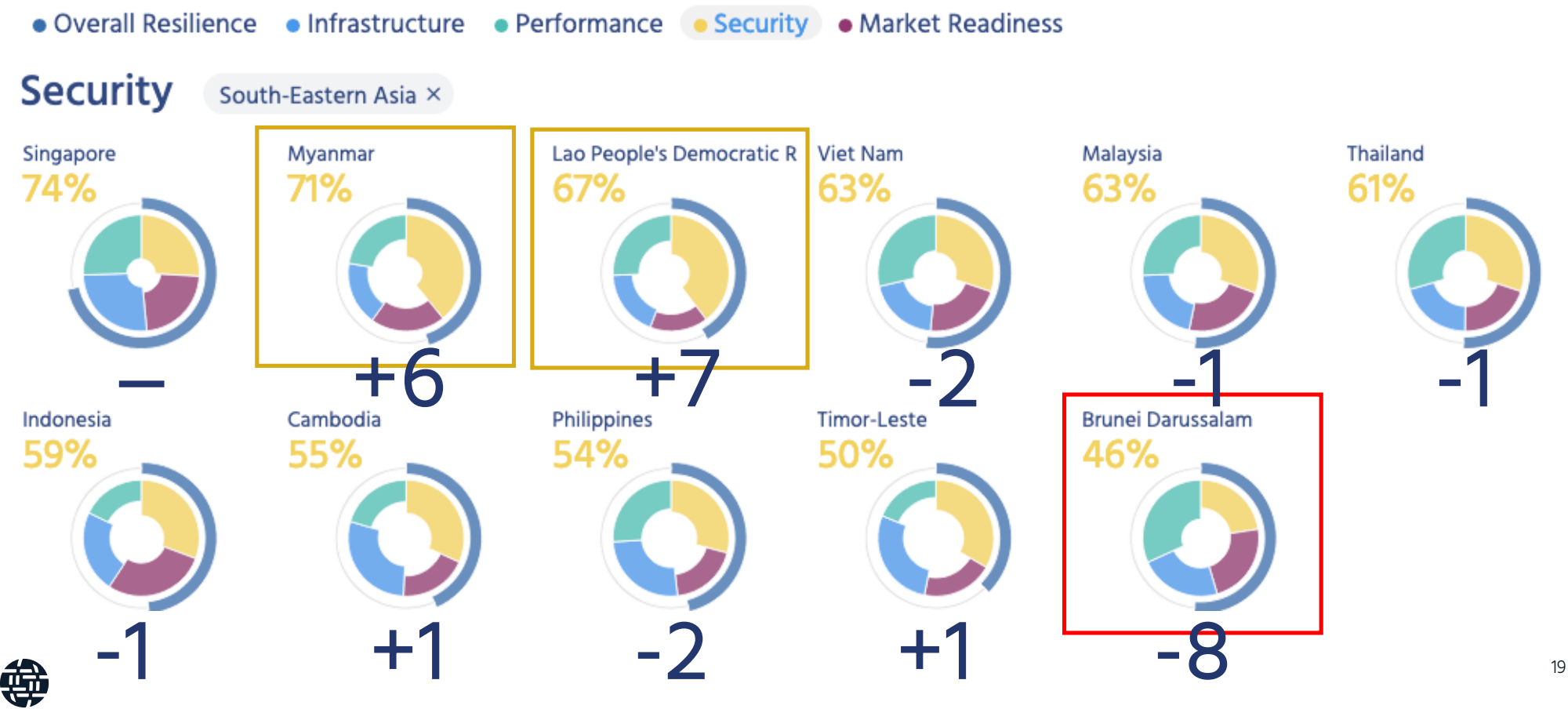
Orange Research

Source: [Cloudscene](#) • September 2023

Overall Internet Resilience — South East Asia



Security Resilience — South East Asia



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The Internet Resiliency Index — Security

Infrastructure

Performance

Security

Market Readiness

Enabling
technologies

DNSSEC

Routing hygiene

Security Threat

Secure web traffic (Webpage loads using HTTPS. Source Mozilla

IPv6 adoption. Source APNIC Labs

DNSSEC adoption, i.e., is ccTLD signed. Source: ICANN

DNSSEC validation, i.e., Users validating DNSSEC.
Source: APNIC Labs

MANRS score.. Source: MANRS

Upstream redundancy i.e., Avg # of upstream providers.
Source: CAIDA

DDoS Protection.. Source: Cybergreen

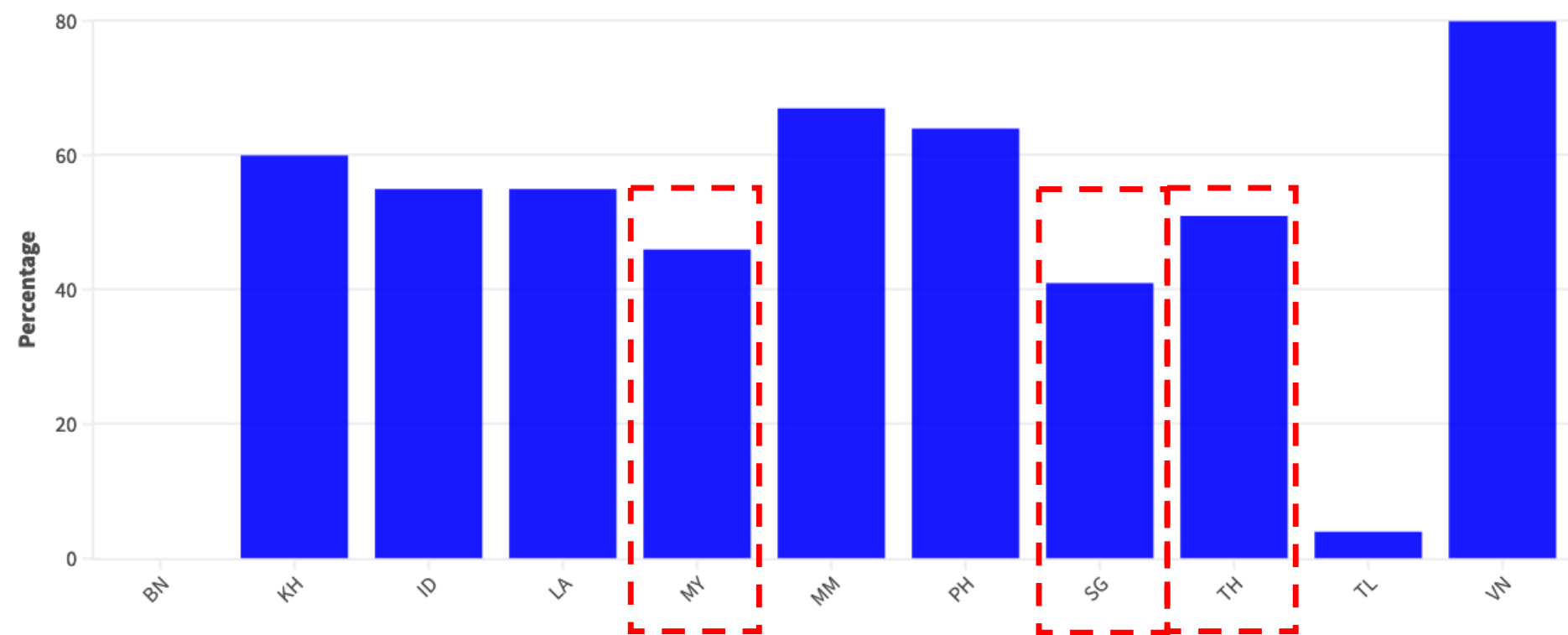
Global cybersecurity index score.
Source: ITU

Secure Internet Servers
Source: World Bank



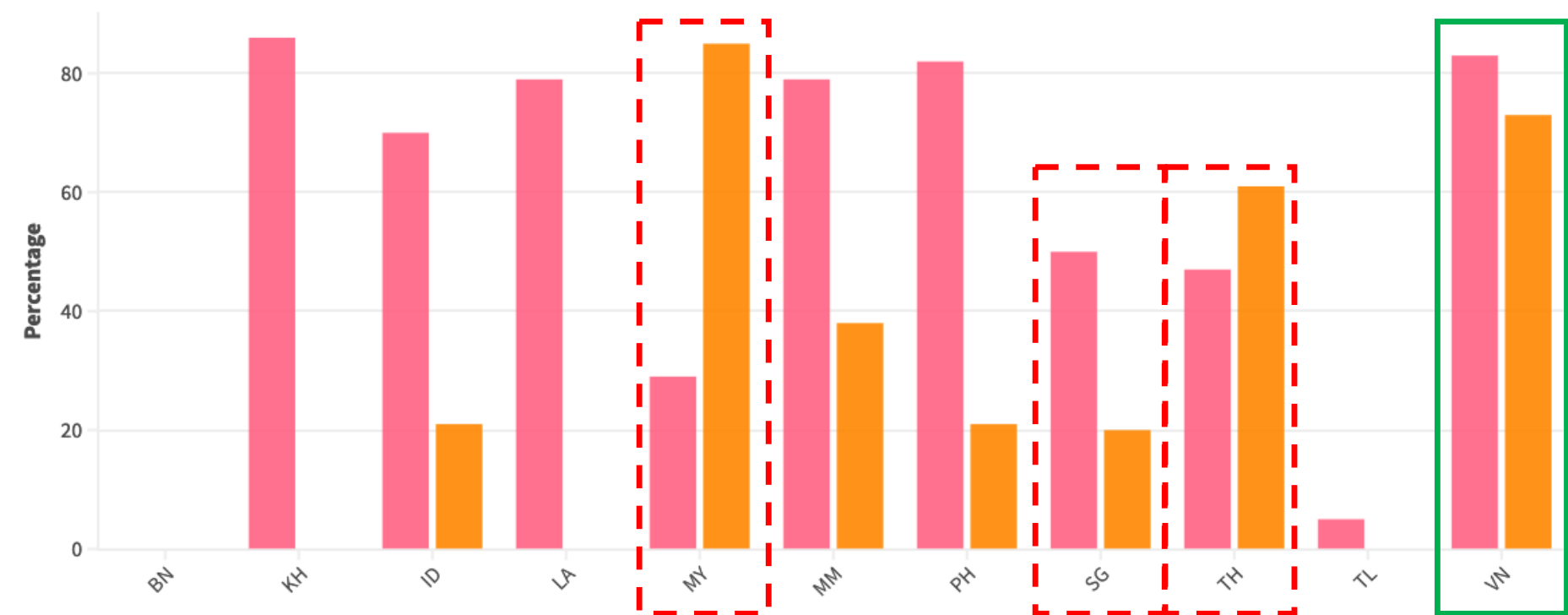
Enabling Technologies

■ Enabling Technologies



Enabling Technologies

Secure web traffic IPv6 adoption

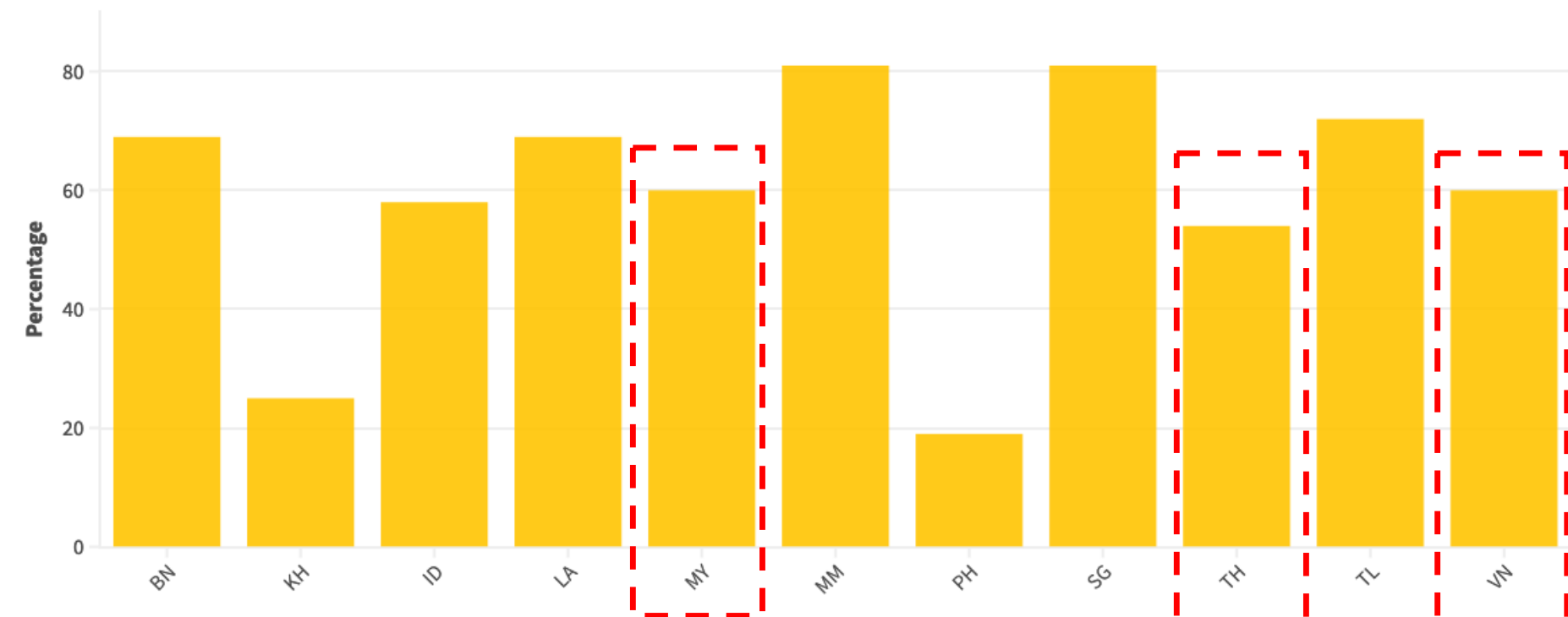


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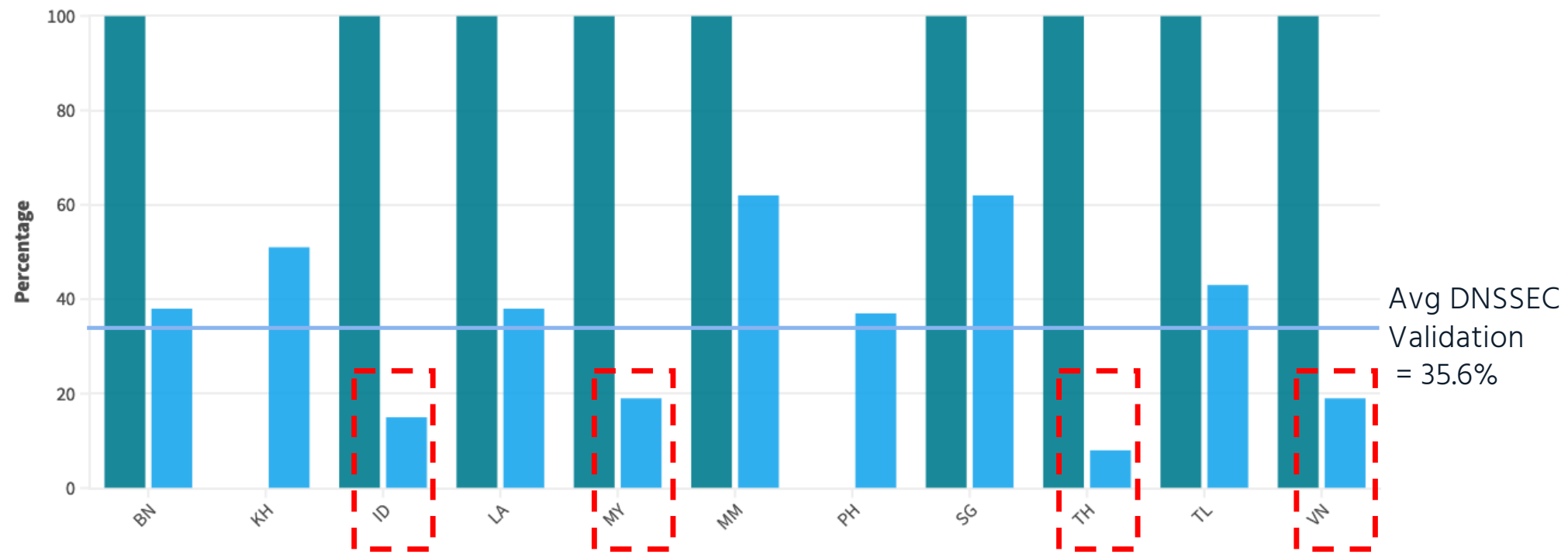
DNSSEC

■ DNSSEC



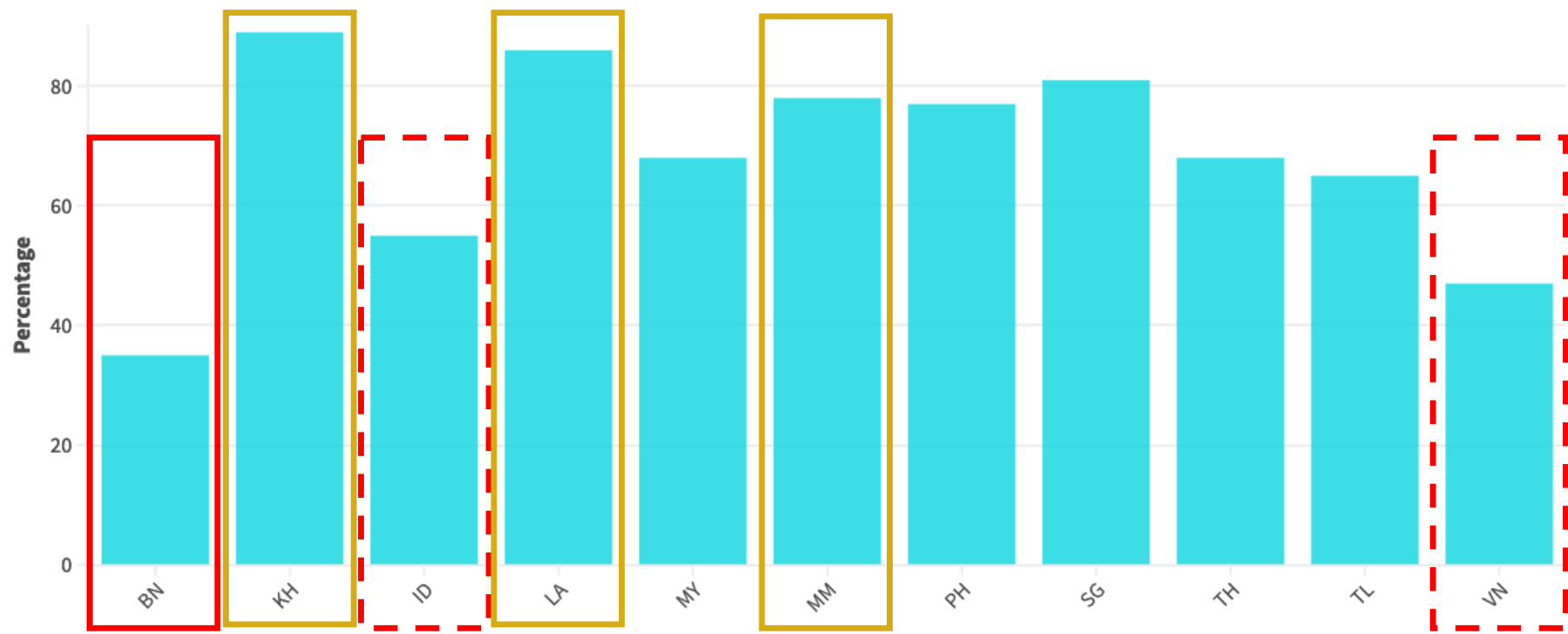
DNSSEC

■ DNSSEC adoption ■ DNSSEC validation



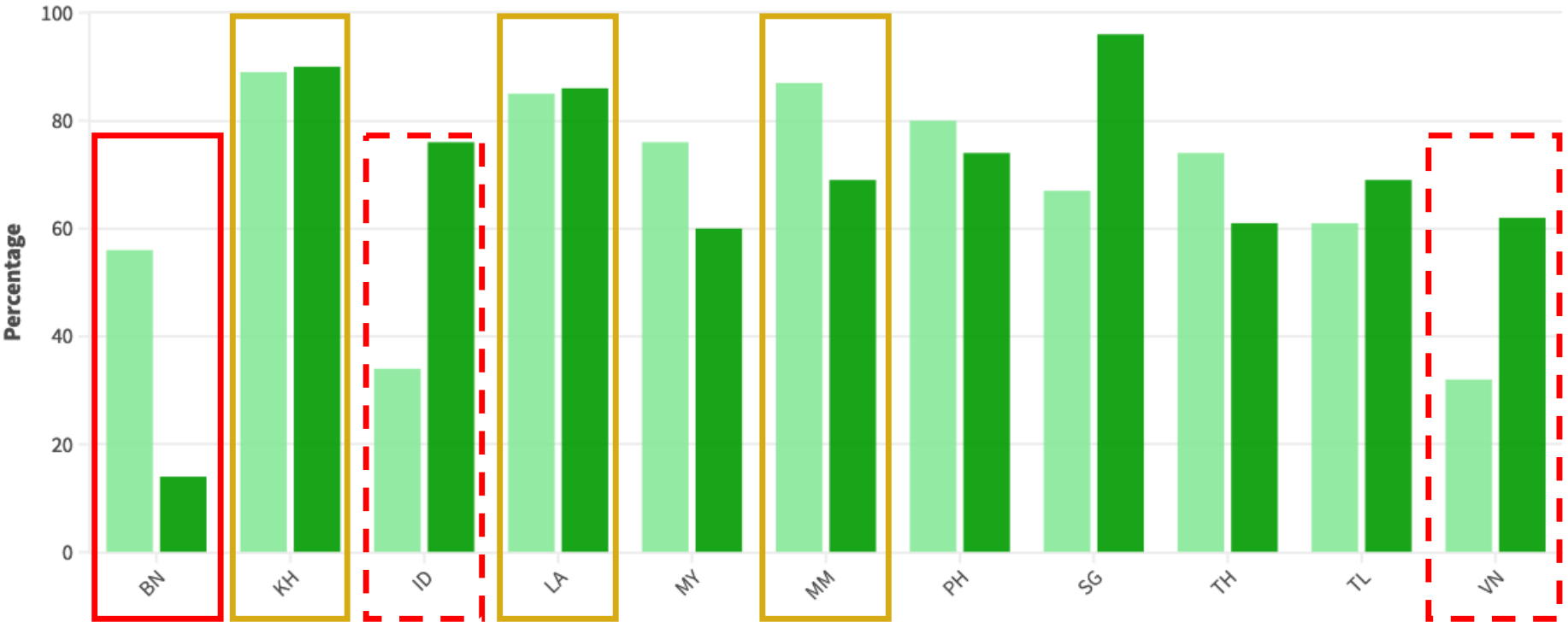
Routing Hygiene

■ Routing hygiene



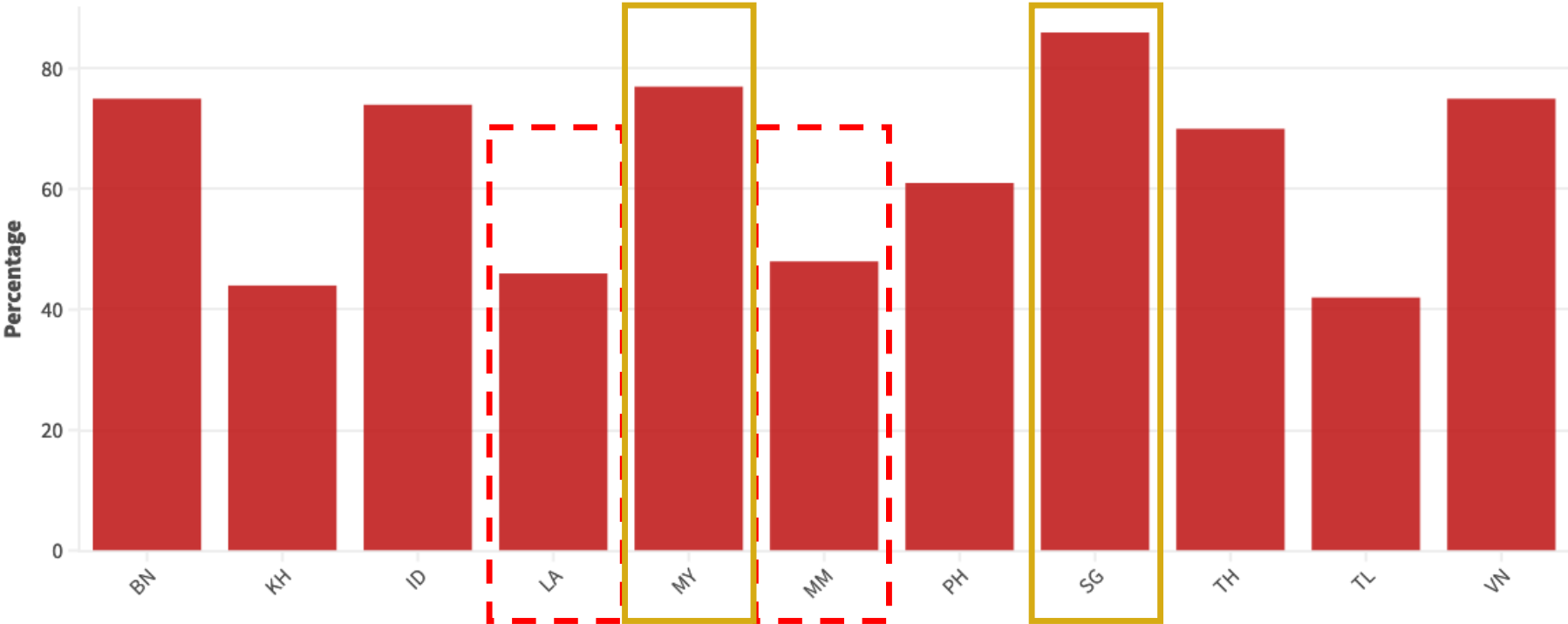
Routing Hygiene

MANRS Upstream redundancy



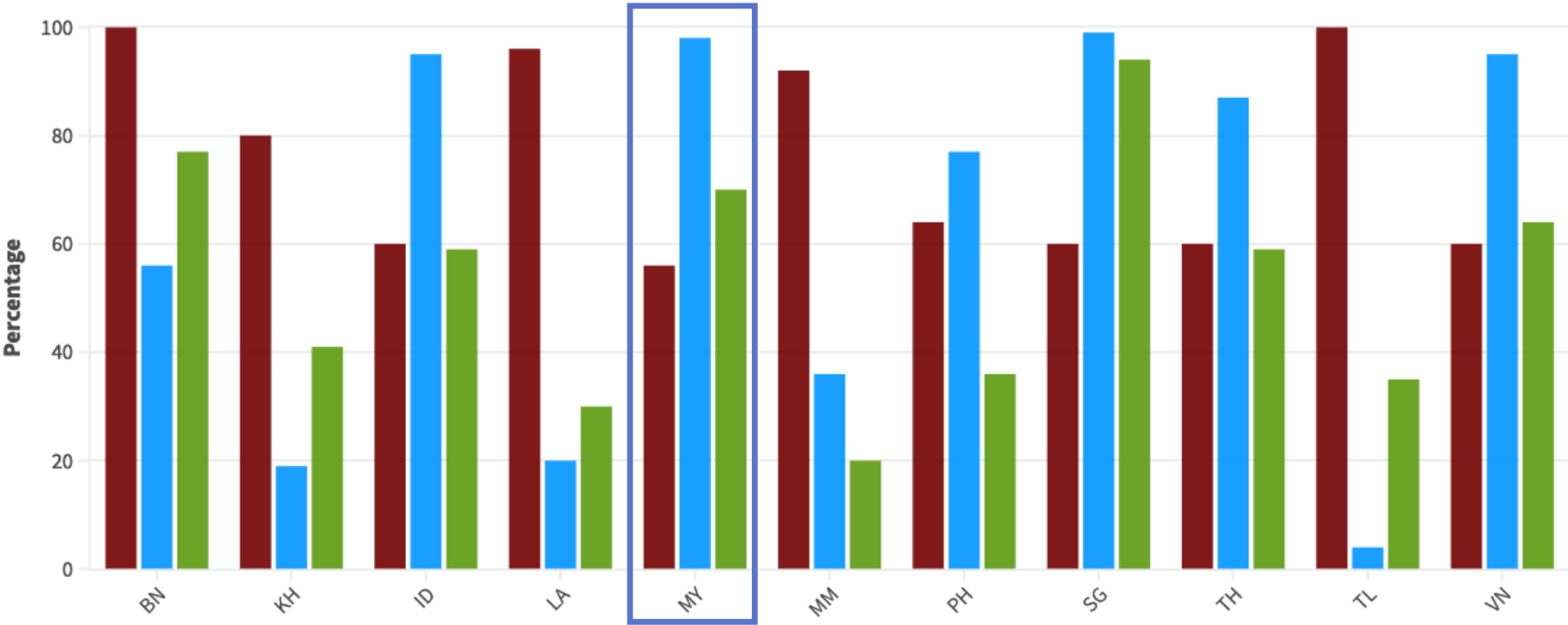
Security Threats

■ Security threat



Security Threats

■ DDoS protection ■ Global cybersecurity ■ Secure Internet servers



Country Reports



Open Internet Environment

Internet Use

Individuals using the Internet as a percentage of the total population

97%

Regional
Rank: 7

71%
Asia avg.



Internet Resilience Score

A resilient Internet connection is one that maintains an acceptable level of service in the face of faults and challenges to normal operation

51%

Regional
Rank: 11

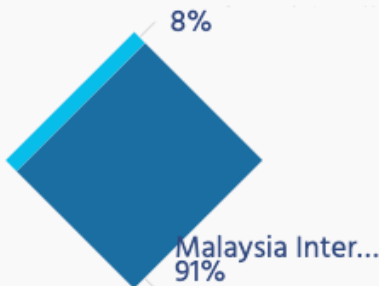
46%
Asia avg.



[See details](#)

IXP Operator Market

A measure of the diversity and concentration of the local market for Internet Exchange Point operations



Retail ISP Diversity

Diversity of retail Internet providers improves resilience and user choice

Very Good



Transit Provider Diversity

More diversity in routes to the global Internet improves connection resilience

Poor



Internet Freedom

Freedom on the Net measures Internet freedom in 70 countries

Partly Free



[See details on freedomhouse.org](https://freedomhouse.org)



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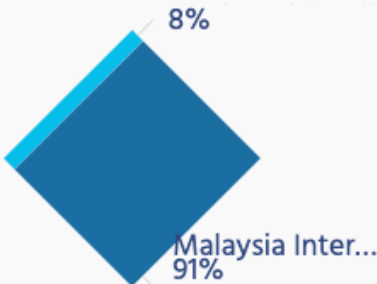
46%
Asia avg.



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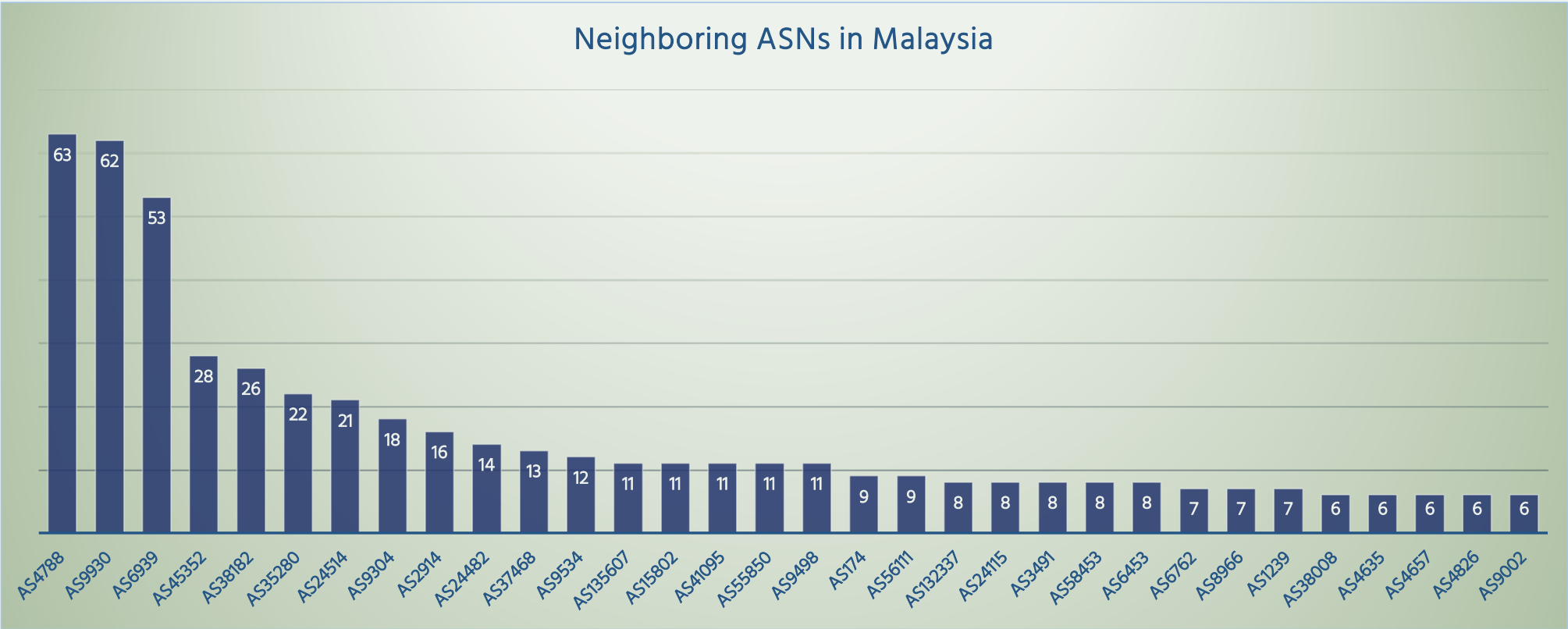
Partly Free



[See details on freedomhouse.org](https://freedomhouse.org)



Retail and Transit Provider Diversity



Globally Connected Infrastructure

Networks Assigned

A measure of how many Internet networks are active here

364

Regional Rank: 15

597

Asia avg.

November 1996

March 2024

Addresses Assigned IPv6

A measure of how many Internet addresses are assigned here

11.1M

Regional Rank: 26

152.2M

Asia avg.

August 2002

March 2024

IPv6 Adoption

Top 5

Enabling the Internet to support more users and more uses

64%

Regional Rank: 2

19%

Asia avg.

April 2020

February 2024

Internet Exchange Points

IXPs help strengthen local Internet connectivity, develop local Internet industry, improve competitiveness, and serve as a hub for technical activity

5

Regional Rank: 12

6

Asia avg.



Addresses Assigned IPv4

A measure of how many legacy addresses are assigned here

6.7M

Regional Rank: 14

17.6M

Asia avg.



Peering Networks

Peering networks help to keep Internet traffic local, provide faster connections, and improve the experience of the people relying on them

128

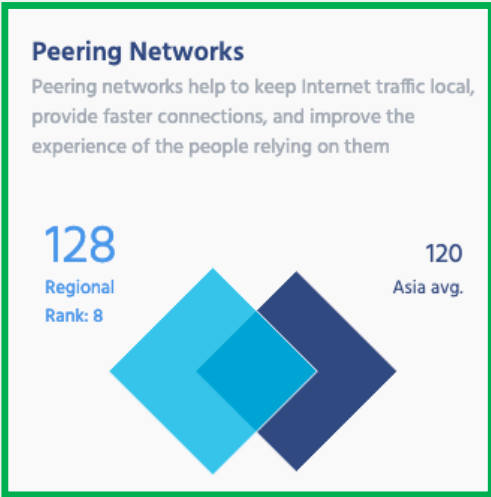
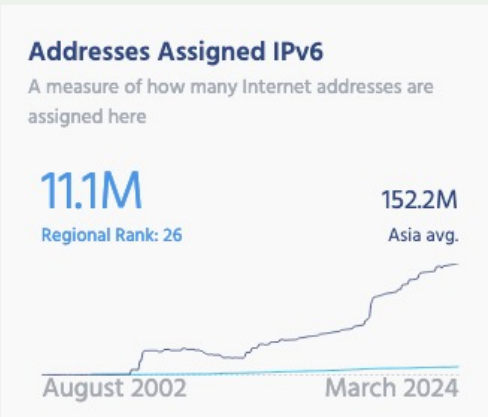
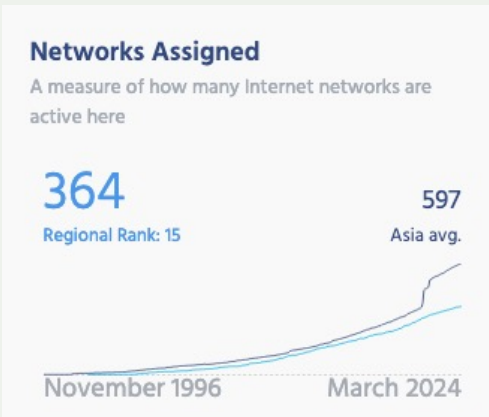
Regional Rank: 8

120

Asia avg.

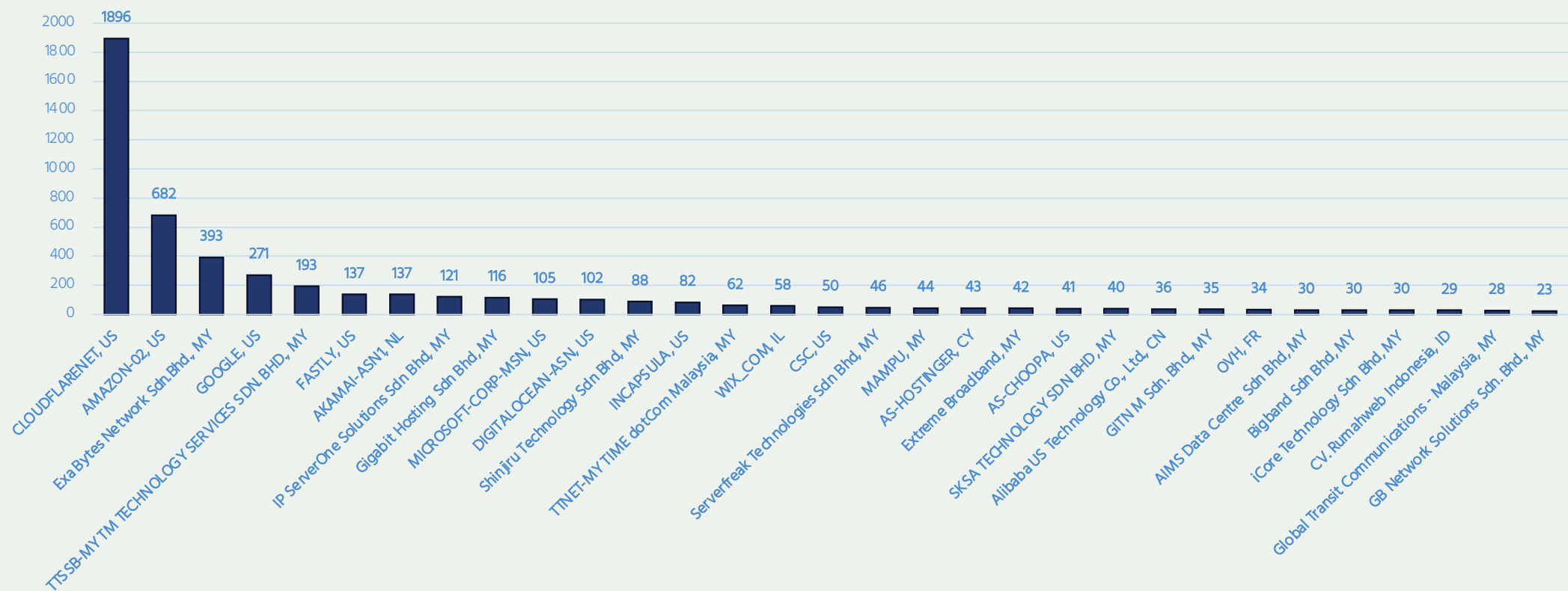


Globally Connected Infrastructure



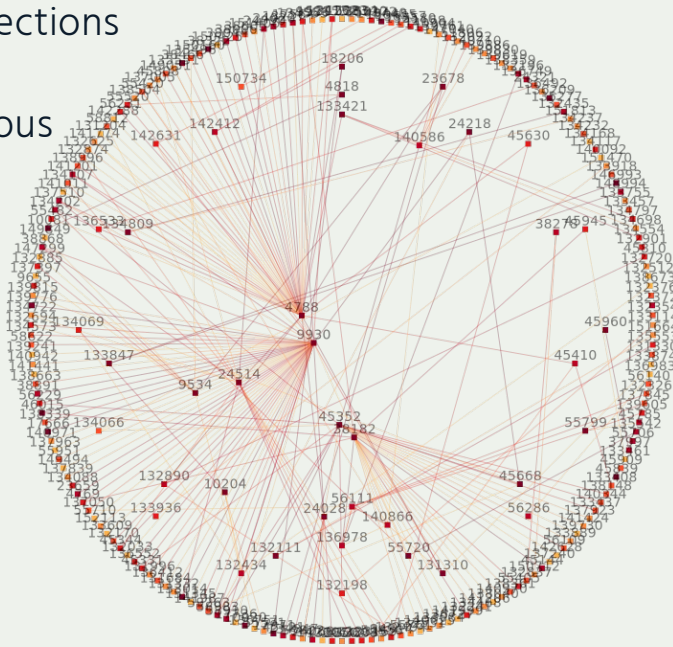
50/50 Vision - Working together to keep half of all traffic local

Domain Count [Total 5816]

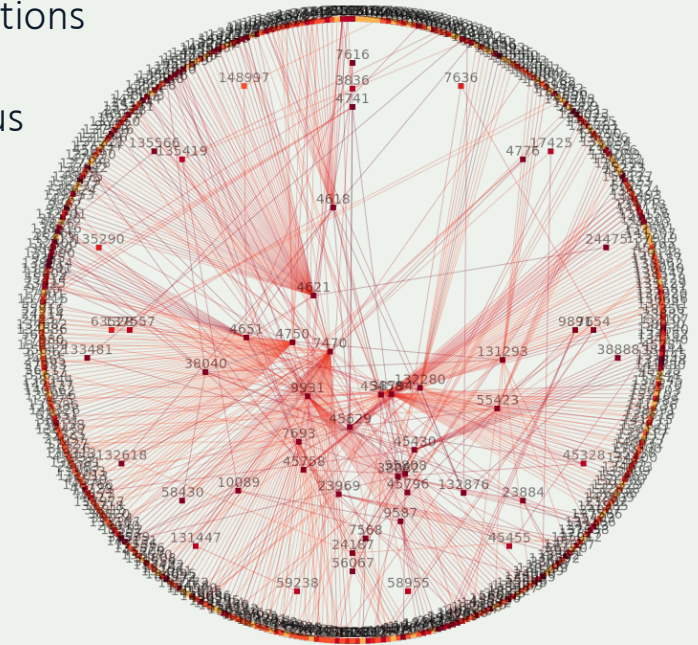


Peering in Malaysia

Malaysia Visible IPv4
Interconnections
236 interconnections
among
238 Autonomous
Systems



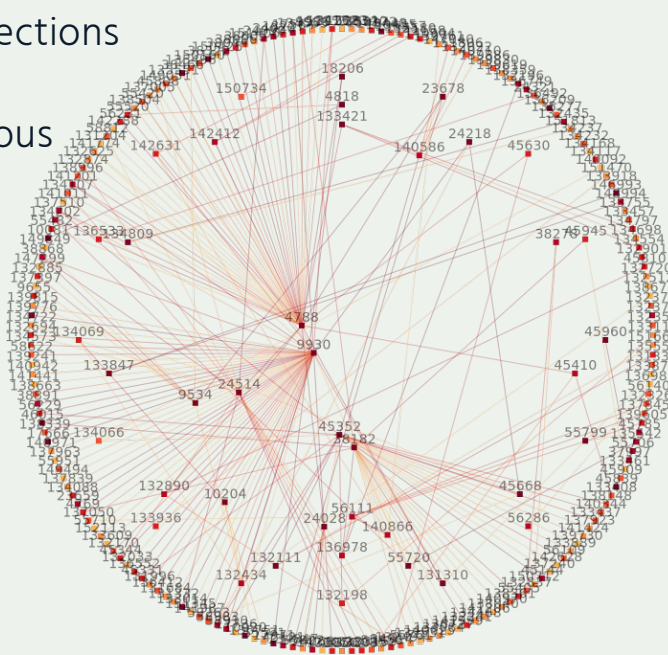
Thailand Visible IPv4
Interconnections
272 interconnections
among
402 Autonomous
Systems



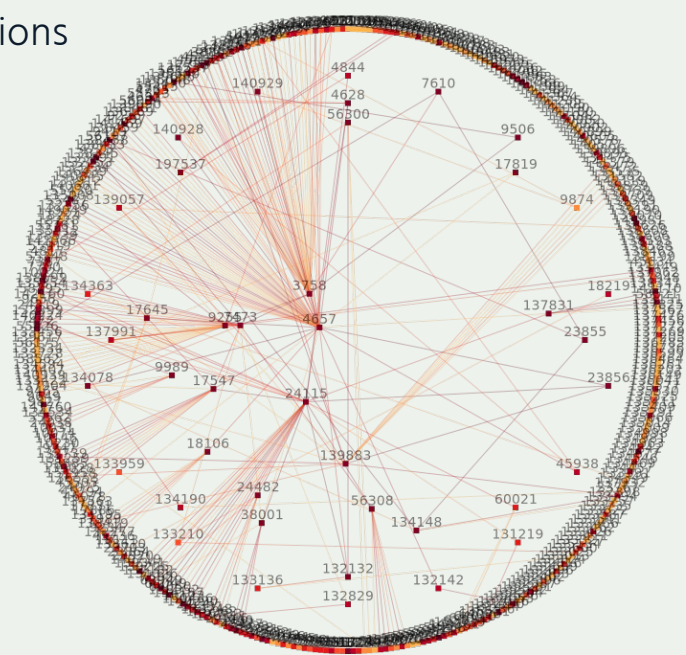
Source: <https://rex.apnic.net/as-interconnections>

Peering in Malaysia Analysis coming

Malaysia Visible IPv4
Interconnections
236 interconnections
among
238 Autonomous
Systems



Singapore Visible IPv4
Interconnections
588 interconnections
among
433 Autonomous
Systems

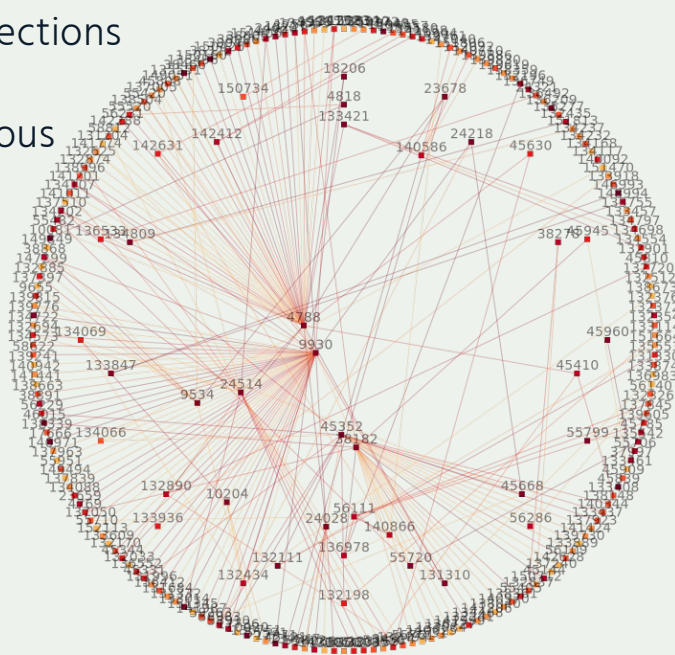


Source: <https://rex.apnic.net/as-interconnections>

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Peering in Malaysia Analysis coming

Malaysia Visible IPv4
Interconnections
236 interconnections
among
238 Autonomous
Systems



Australia Visible IPv4
Interconnections
1843 interconnections
among
1660 Autonomous
Systems



Source: <https://rex.apnic.net/as-interconnections>

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Secure and Trustworthy Internet

Naming Security Status

Adopting DNSSEC improves trustworthiness of Internet communications



Naming Security Coverage

A measure of how much local web content supports DNSSEC for improved trustworthiness

0%

Regional
Rank: 7

1%

Asia avg.



Naming Security Adoption

A measure of how much local Internet users are protected by DNSSEC

19%

Regional
Rank: 32

37%

Asia avg.



Routing Security Coverage IPv4

One measure of how much local Internet network providers are securing their infrastructure

90%

Regional
Rank: 19

73%

Asia avg.



Routing Security Adoption

A measure of how much local Internet providers are checking validity of connectivity information they receive from other networks

0%

Regional
Rank: 43

15%

Asia avg.



Routing Security Coverage IPv6

One measure of how much local Internet network providers are securing their infrastructure

74%

Regional
Rank: 29

73%

Asia avg.



Secure and Trustworthy Internet

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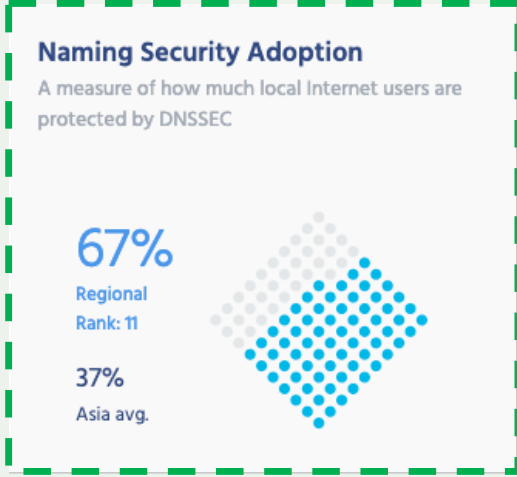
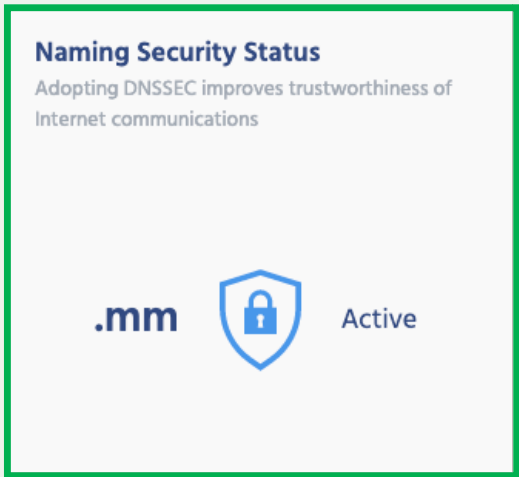
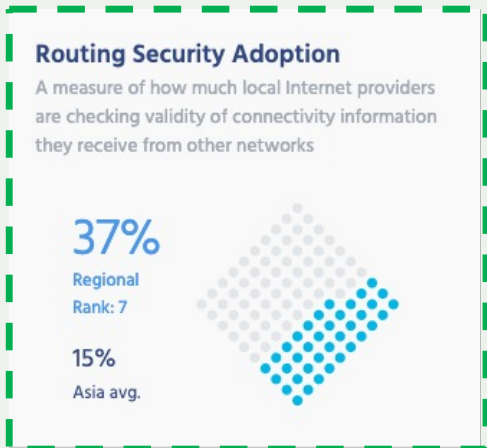
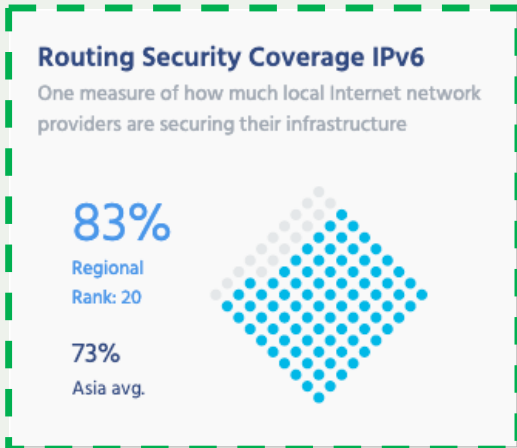
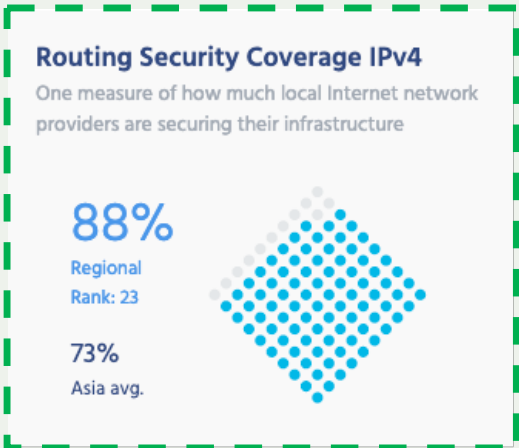
73%

Asia avg.



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Secure and Trustworthy Internet



Limitations



Limitations

- The data is pulled from external public sources, not always up-to-date.
 - An indicator is not included if data is missing on more than 25% of countries in the Index.
- Without in-country measurements, it's difficult to validate the data.
 - RIPE Atlas and OONI are doing great work in this area, but more is needed.
- Some of the data undergoes processing, normalization, and weighing, we use a methodology that is reproducible.
 - You can see raw numbers via API. Email us for access pulse@isoc.org
- Ultimately, the Index benchmarks countries with one another and helps decision makers recognize gaps and weaknesses to conduct further study into validating these and work towards addressing them.



We all have a role to play



Take aways

- Understanding what's happening upstream and beyond your borders is equally important as knowing your network's health.
- Having an insightful national measurement system in place improves the resolution of the health of the edge.
- Your network's health and the health of the whole of Asia Pacific's Internet are interconnected. We all have a role to play to make sure it is robust and secure.



Take aways

- Suggested areas to improve resilience include:
 - Improved localized peering infrastructure and promoting localized content (ccTLD)
 - Greater transit provider diversity
 - Improved security resilience, particularly HTTPS and DNSSEC validation and to a lesser extent DDoS protection



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methodology



Thank you



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mitchell@isoc.org

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