18 January 2024

Local Power – Global Impact

Strengthening Pacific Interconnection and Digital Capacities

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About the Internet Society

We are a global nonprofit organization connecting and empowering communities to protect this essential resource since 1992.

Community members of Pu'uhonua O Waimanalo work together with the Internet Society to learn how to use and install the Internet during a training session.
© Elyse Butler

The Internet Society Community: A Global Network of People

91,000

Global Members

130

Chapters, Special Interest Groups, and Standing Groups

90

Organization Members

140

Internet Society Staff

The Internet is for everyone.

The whole of the Internet Society works towards this vision by building, promoting, and defending a bigger and stronger Internet.

Enhancing local interconnection infrastructure

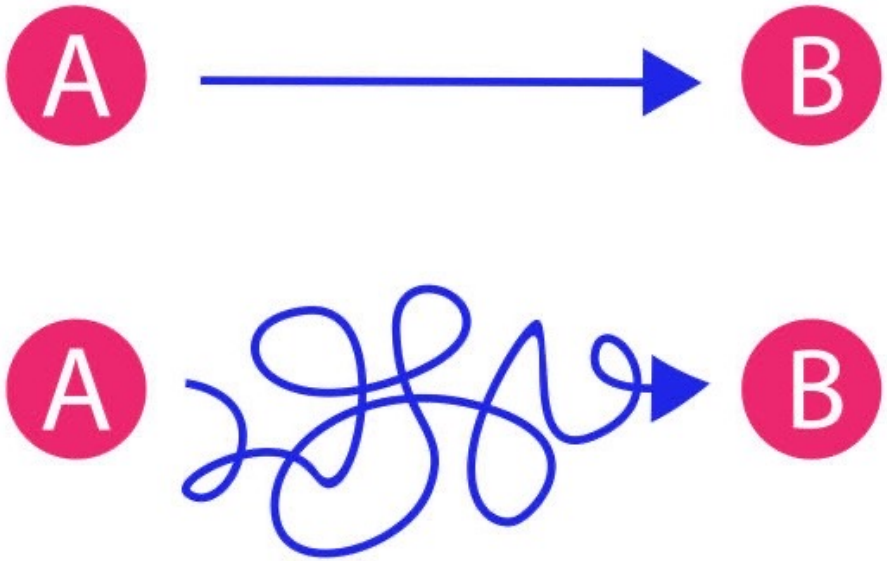
More affordable and reliable access for the Pacific

Internet Exchange Points

The fastest route from Point A to Point B is a straight line, but when Internet infrastructure is underdeveloped, sometimes data zigzags through faraway places. The result is that Internet access is slower and more expensive.

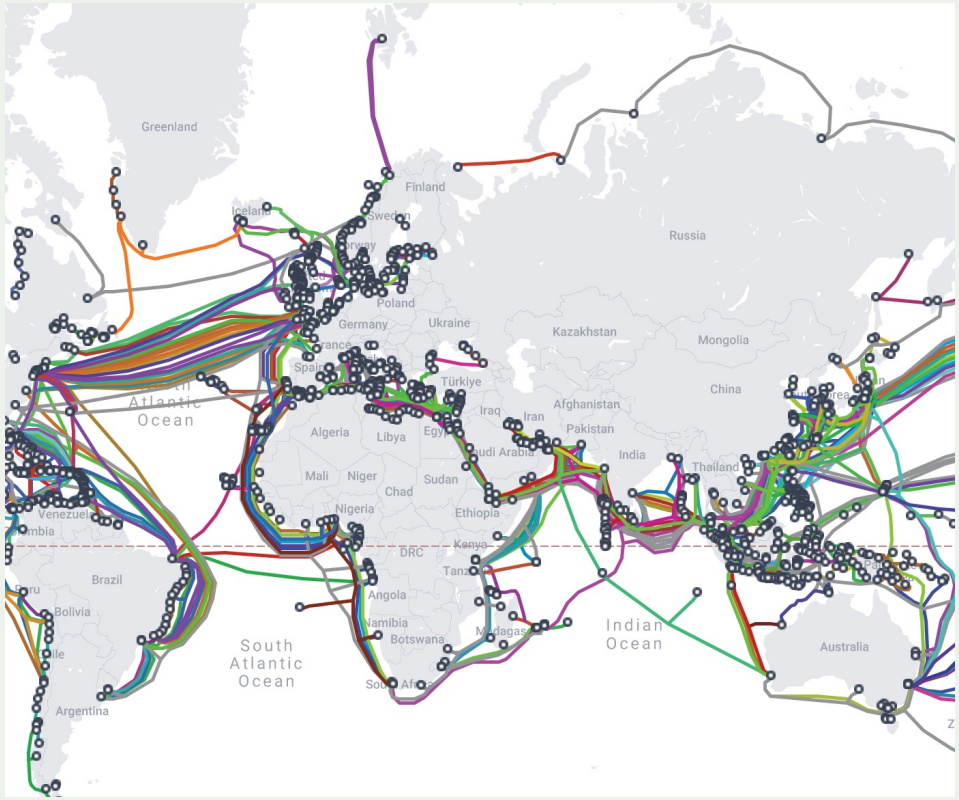
An Internet Exchange Point (IXP) is a physical location where Internet infrastructure companies like ISPs and CDNs connect with each other.

IXPs create shorter, more direct routes for Internet traffic, making Internet access faster, cheaper, and more reliable.



The economic value of IXPs – Keeping traffic local

- The delivery of Internet traffic to and from a country is carried out via terrestrial, undersea or satellite channels.
    - Satellite is (for the time being) an expensive method,
    - Fiber is the preferred link to connect countries and continents
- Fiber links carry almost 98% of Internet Global traffic
- **But international links are expensive!**



https://www.submarinecablemap.com/

The economic value of IXPs - anchors of a thriving Internet ecosystem

- **Attract investment.** Create a convenient hub for attracting key Internet infrastructures.
- **Spark development.** Act as a catalyst for overall Internet development.
- **Keep traffic local.** Reduce costs associated with traffic exchange between networks.
- **Improve performance.** Reduce delay, improve traffic management and end-user experience.
- **Improve resiliency:** Key resources in case of national disasters, Internet access outages, and security threats.

The economic value of IXPs – Our ongoing analysis

- At the Internet Society, our economic analysis (still ongoing) suggest that:
    - **Keeping traffic local** come with some economic consequences that **can be expressed in terms of costs** (to providers or customers) **as well as benefits** (to providers, customers, and the economy-at-large)
    - The existence of peering infrastructure comes down to **how cheap or expensive it is relative to transit**; on average, transit prices have reduced over time globally
        - Our ongoing work suggests that **peering is substantially cheaper than transit in some countries** (i.e Thailand or Malaysia), whereas in others it is far more expensive (i.e Spain, or USA)
    - There are also potentially **downstream benefits on Internet affordability to consumers**, with the marginal benefit of an IXP reducing score on the World Data Lab Affordability index significantly
    - For every additional IXP in a country, our economic model suggests **that latency reduces on average by approximately 30 percentage points.**

It all suggests that there are important economic implications of IXPs that require careful investigation in each country level scenario.

And we are more than happy to collaborate with all of you

Policymakers enabling IXPs

Through an enabling environment for interconnection via policy and regulatory frameworks

Transparent policy and regulatory processes to encourage local interconnection.

Encourage competitive access to wired and wireless connections.

Minimize barriers such as taxation, authorization, or licensing.

Promote local investment opportunities and development of local content.

We are here to help

ISOC Infrastructure, Technical communities and Community-led Networks supported (since 2020 – preliminary data)

- Development of new and existing IXPs
  - 64 supported
  - Over USD $1,500,000 distributed through grants
- Technical Communities
  - 44 supported
  - USD $200,640 distributed through grants

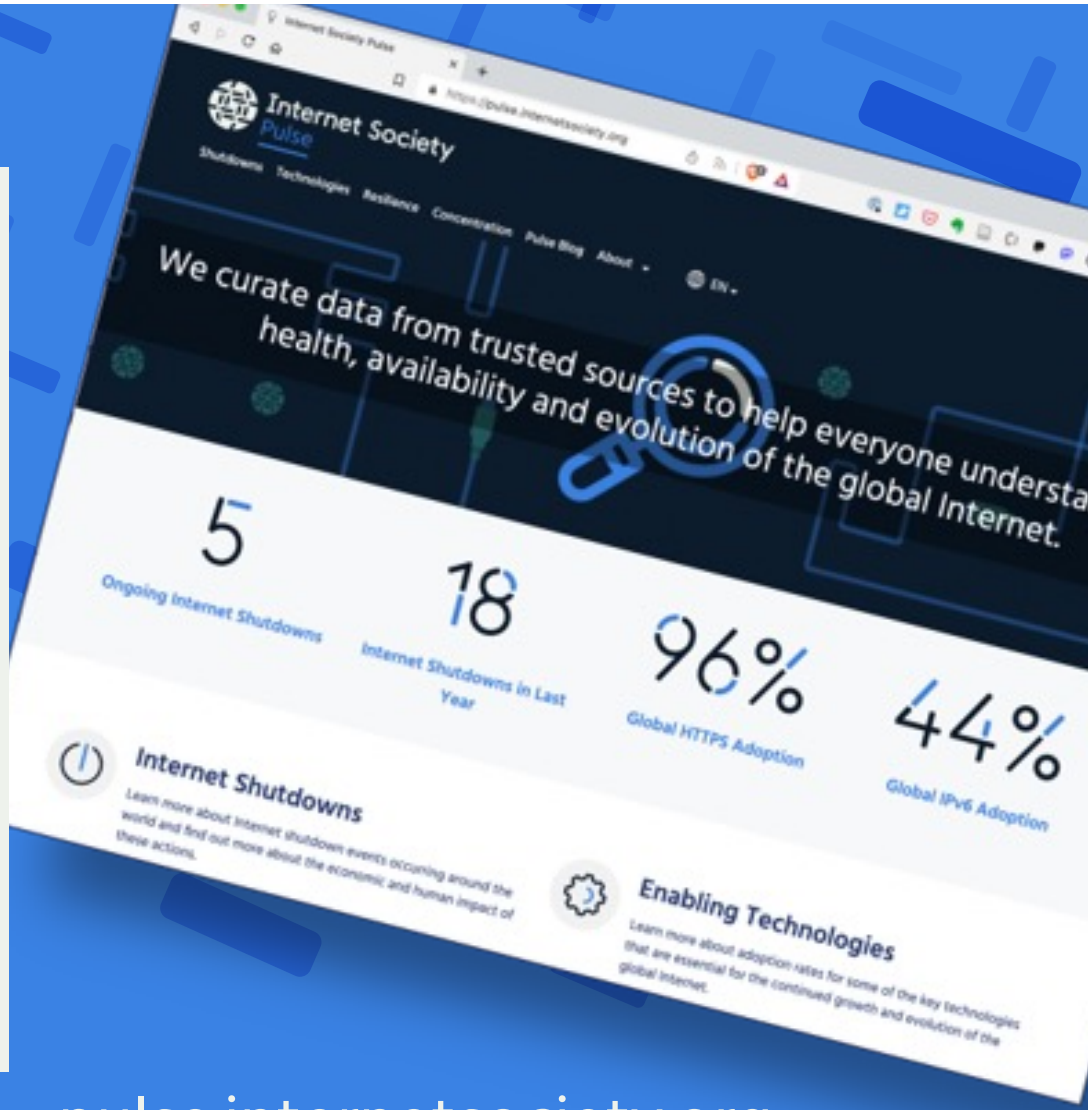
Some Internet Insights

Internet Society Pulse

- 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 understand the availability, evolution, and resilience of the Internet.



pulse.internetsociety.org

Pulse Data Partners

- Data is provided by our trusted data partners

pulse.internetsociety.org/partners

Pulse tracks

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

Internet Exchange Points: The number, size, and capacity of IXPs in each country.

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?

The 50/50 Vision

Our 50/50 Vision is an ambitious but achievable plan to keep at least half of all Internet traffic local in selected economies by 2025.

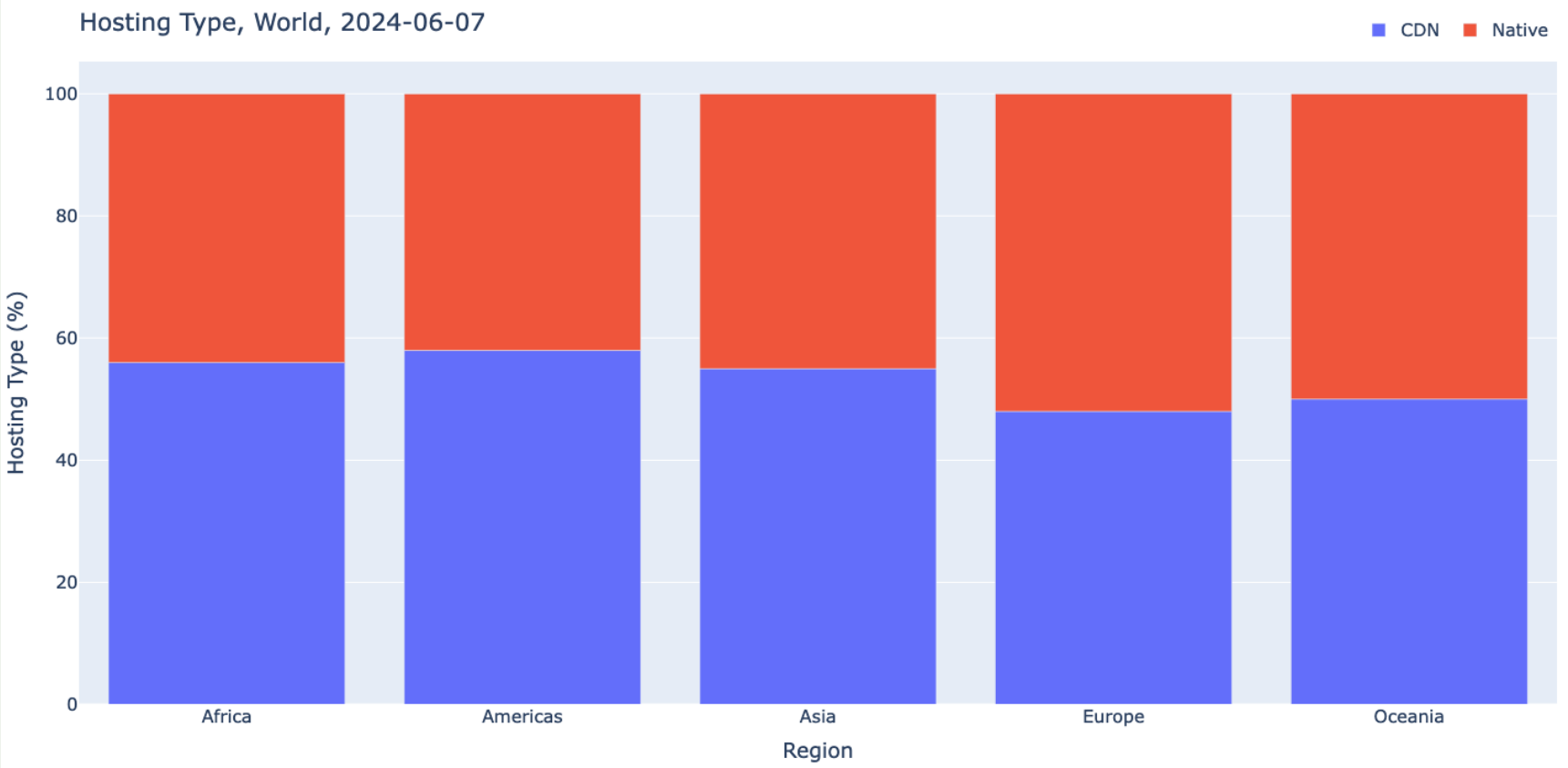
When we reach this goal, the people who need it most will have faster, stronger, and cheaper Internet access.

Locality definitions

- **Local traffic**: Sourced locally from an in-country server.
- **External traffic**: Sourced from a remote (out-of-country) server.
- **Content Delivery Networks**: operators responsible for delivering content to the edge.
- **Content caches**: content hosting equipment placed by a content provider close to the end-users.
- **Edge Network**: access network where eyeballs (consumers) are located.

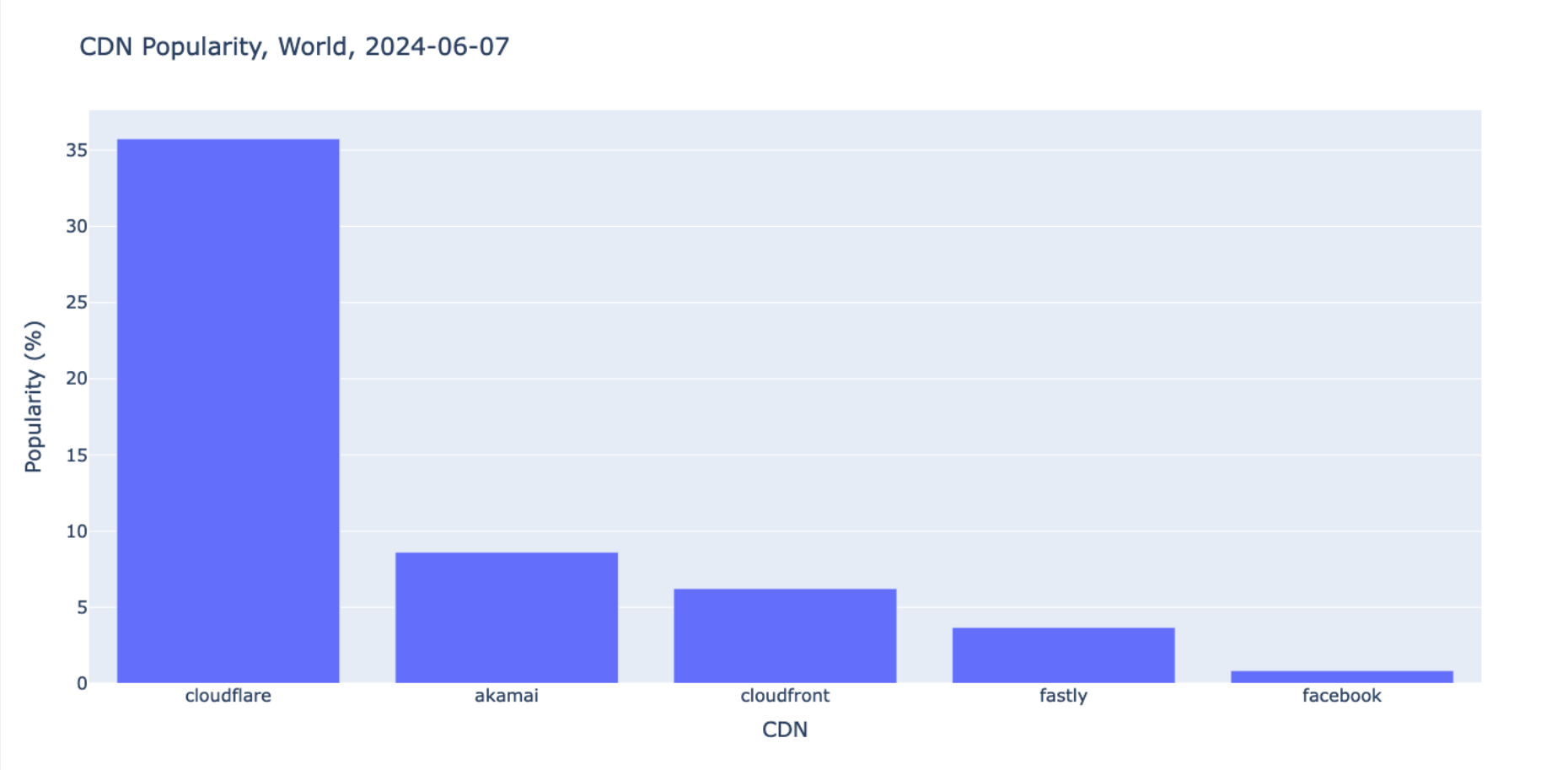
https://opentelecomdata.org/cdns/

Hosting type (85k unique websites)



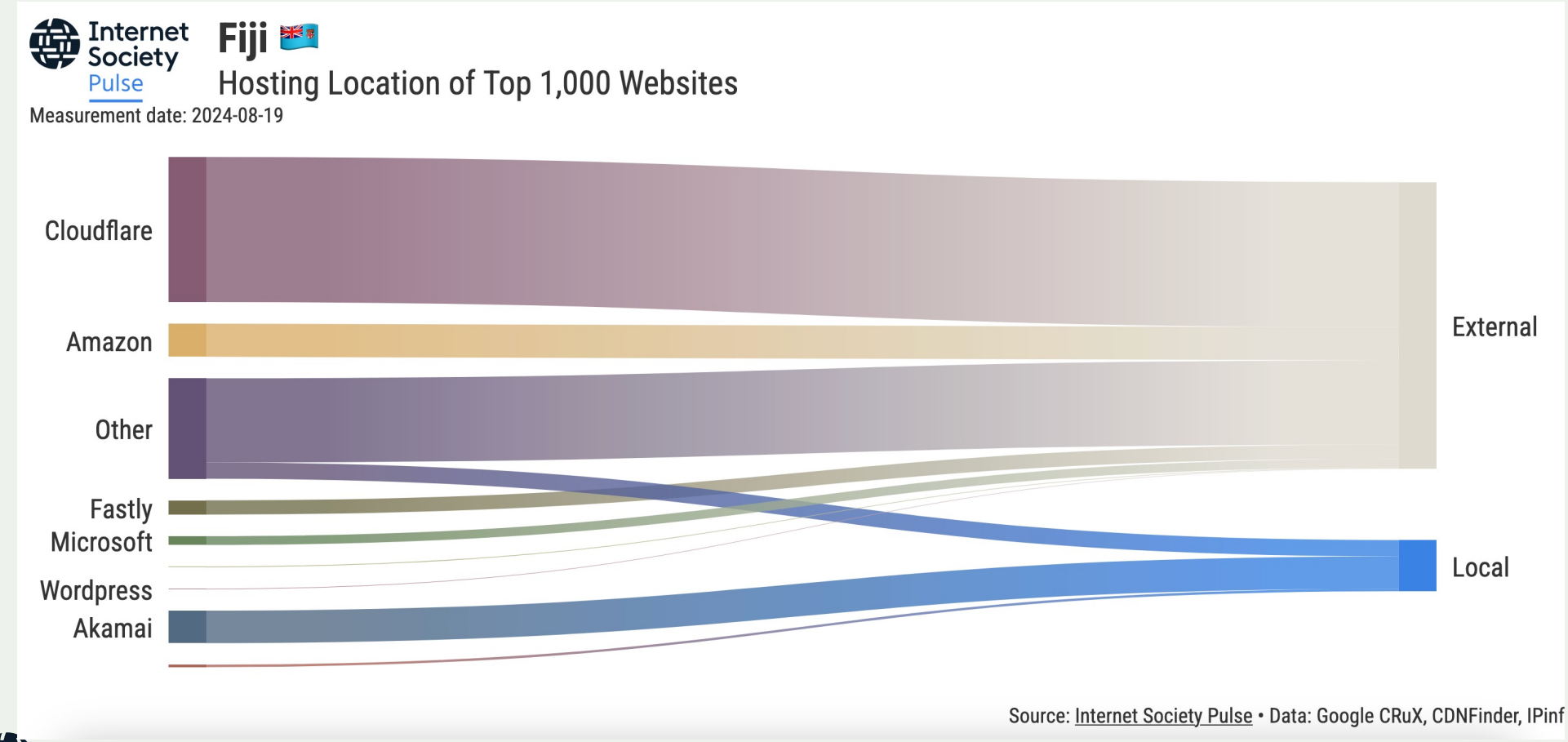
Source: Pulse

Most popular CDNs (World)



Source: Pulse

Data Example - Fiji



The Internet Resiliency Index (IRI)

Methodology

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

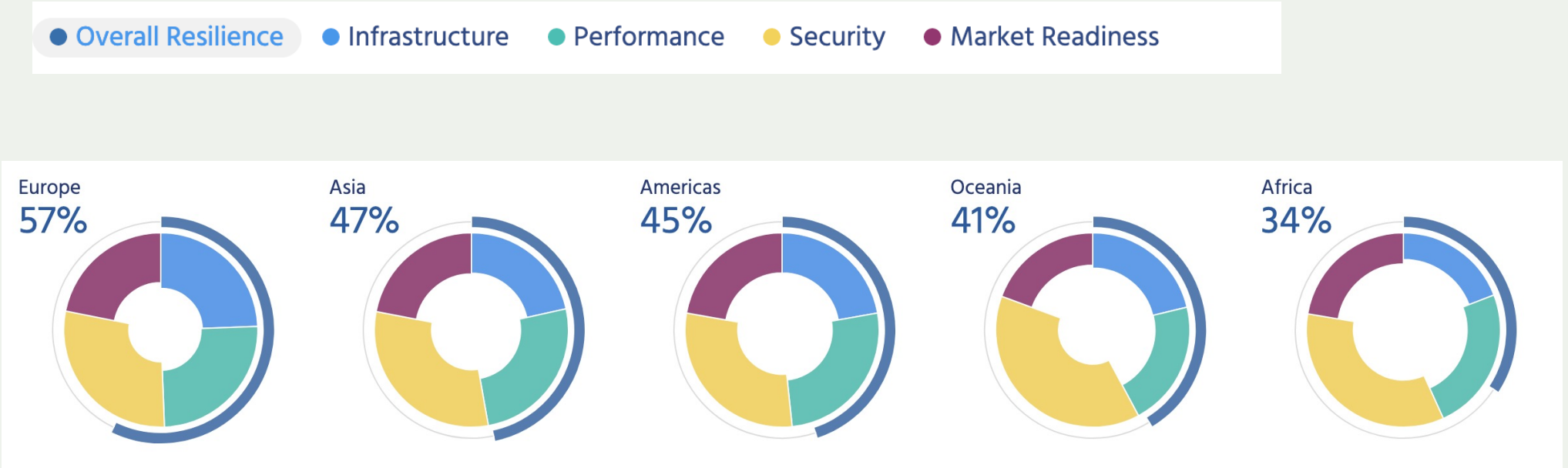
The ability of the network to resist intentional or unintentional disruptions through the adoption of security technologies and best practices.

Market Readiness

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

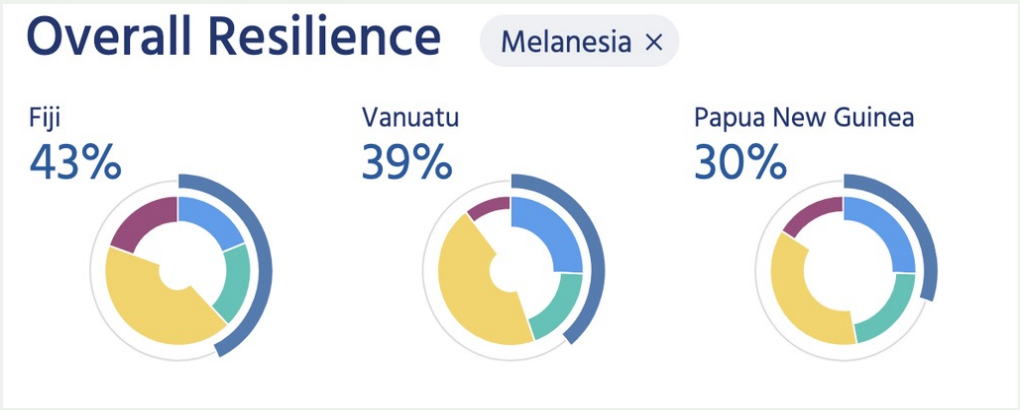
Internet Society Pulse

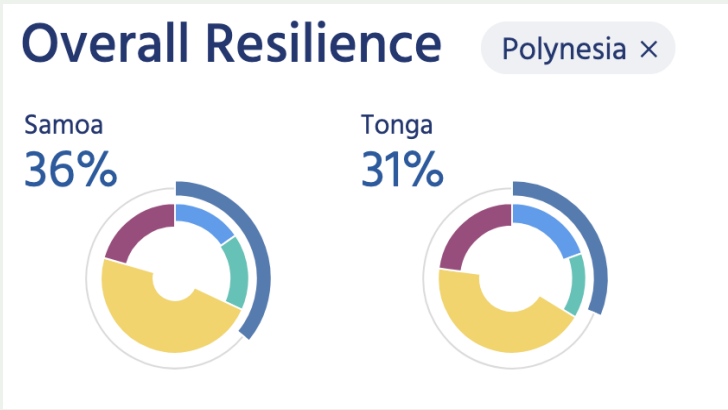
Overall Internet Resilience — By Region



Internet Society Pulse

Overall Internet Resilience — By Sub-Region





Country Reports

Africa | Americas | Asia | Europe | Oceania

Oceania

 American Samoa

 Australia

 Christmas Island

 Cocos (Keeling) Islands

 Cook Islands

 Fiji

 French Polynesia

 Guam

 Heard Island and McDonald Islands

 Kiribati

 Marshall Islands

 Micronesia

 Nauru

 New Caledonia

 New Zealand

 Niue

 Norfolk Island

 Northern Mariana Islands

 Palau

 Papua New Guinea

 Pitcairn

 Samoa

 Solomon Islands

 Tokelau

 Tonga

 Tuvalu

 United States Minor Outlying Islands

 Vanuatu

 Wallis and Futuna

Guam

Oceania - Micronesia

Open Internet Environment

The open Internet allows people and organizations to mix and match technologies without permission and with minimal barriers. Sustaining and growing an open Internet helps to spur innovation and keep it fit for future applications. An open Internet is an accessible Internet – it is easy to connect to the open Internet and use its services.

Internet Use

Individuals using the Internet as a percentage of the total population.

80%

Regional Rank: 7th
Oceania average: 61%

Internet Shutdowns

Intentional disruptions of Internet communications, making them unavailable for a specific population, location, or type of access.

Ongoing: 0

Last 12 months: 0

Read more about Internet Shutdowns

Transit Provider Diversity

More diversity in routes to the global Internet improves connection resilience.

Poor

Retail ISP Diversity

Diversity of retail Internet providers improves resilience and user choice.

Fair

IXP Operator Market

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

University of Guam: 53%
Guam Exchange: 41%
GU-IX: 6%

See details

Popular Content Locality

A measure of how much locally popular web content is hosted in-country or in-region.

32%

Regional Rank: 7th
Oceania average: 20%

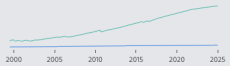
See details

Globally Connected Infrastructure

The globally connected Internet is inclusive. It allows networks and users to interconnect without geographical restrictions. Increasing the connectivity of the Internet makes it more valuable to every participant, as a tool for communications, learning, commerce.

Networks Assigned

A measure of how many Internet networks are active here.

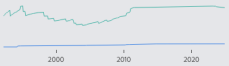


10

Regional Rank: 8th
Oceania average: 202

IPv4 Addresses Assigned

A measure of how many legacy addresses are assigned here.

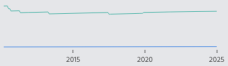


219,392

Regional Rank: 3rd
Oceania average: 2,830,605

IPv6 Addresses Assigned

A measure of how many Internet addresses are assigned here.

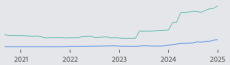


524,292

Regional Rank: 8th
Oceania average: 34,265,280

IPv6 Adoption

Enabling the Internet to support more users and more uses.



3%

Regional Rank: 17th
Oceania average: 20%

IXP Count

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

4

Regional Rank: 3rd
Oceania average: 10

See details

Peering Networks

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

15

Regional Rank: 3rd
Oceania average: 101

Secure and Trustworthy Internet

A secure Internet is resistant to attacks on its infrastructure, delivering a robust service to its user community. A trustworthy Internet meets the expectations of its users by offering a resilient and reliable base for applications and services.

Naming Security Status

Adopting DNSSEC improves trustworthiness of Internet communications.

.gu Inactive

Naming Security Adoption

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

84%

Regional Rank: 16th
Oceania average: 66%

Routing Security Adoption

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

2%

Regional Rank: 27th
Oceania average: 35%

Routing Security Coverage IPv4

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

54%

Regional Rank: 20th
Oceania average: 57%

Routing Security Coverage IPv6

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

100%

Regional Rank: 1st
Oceania average: 52%

IXP Case Study – Maldives (MVIX)

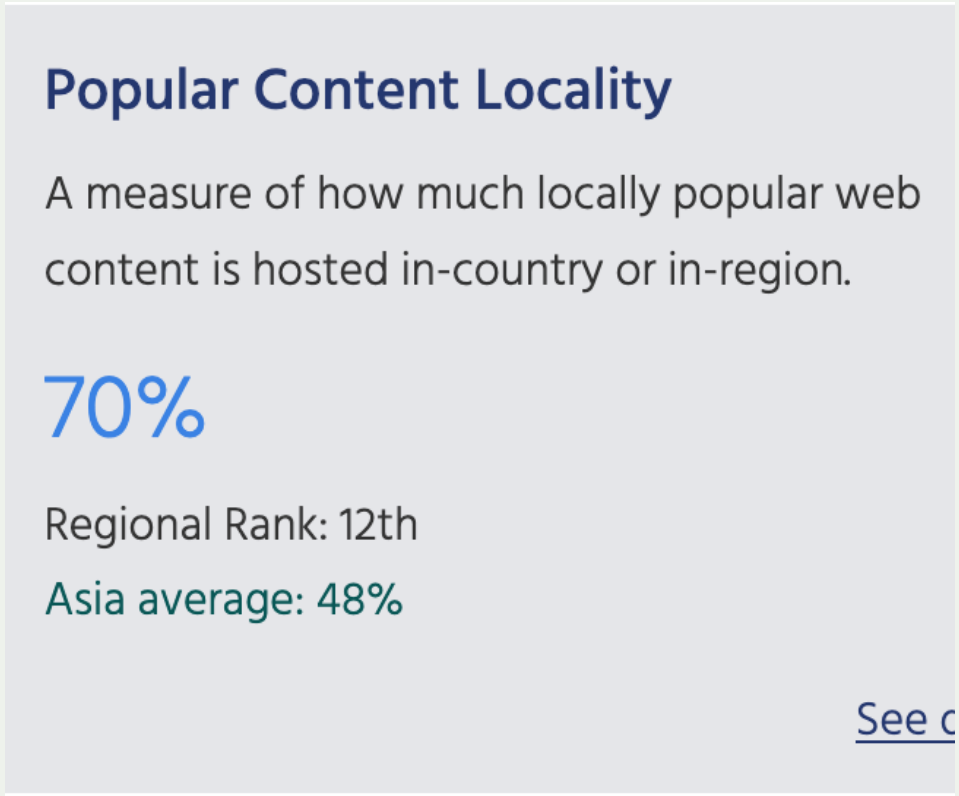
The Maldives IXP (MVIX) started operating in 2022. This is a huge success of our mutual multistakeholder efforts to establish neutral and open IP peering facilities for network operators/Internet service providers in small island developing states (SIDS).

Before the IXP, all local data was accessed and transferred via international transit peers, which was expensive and slow.

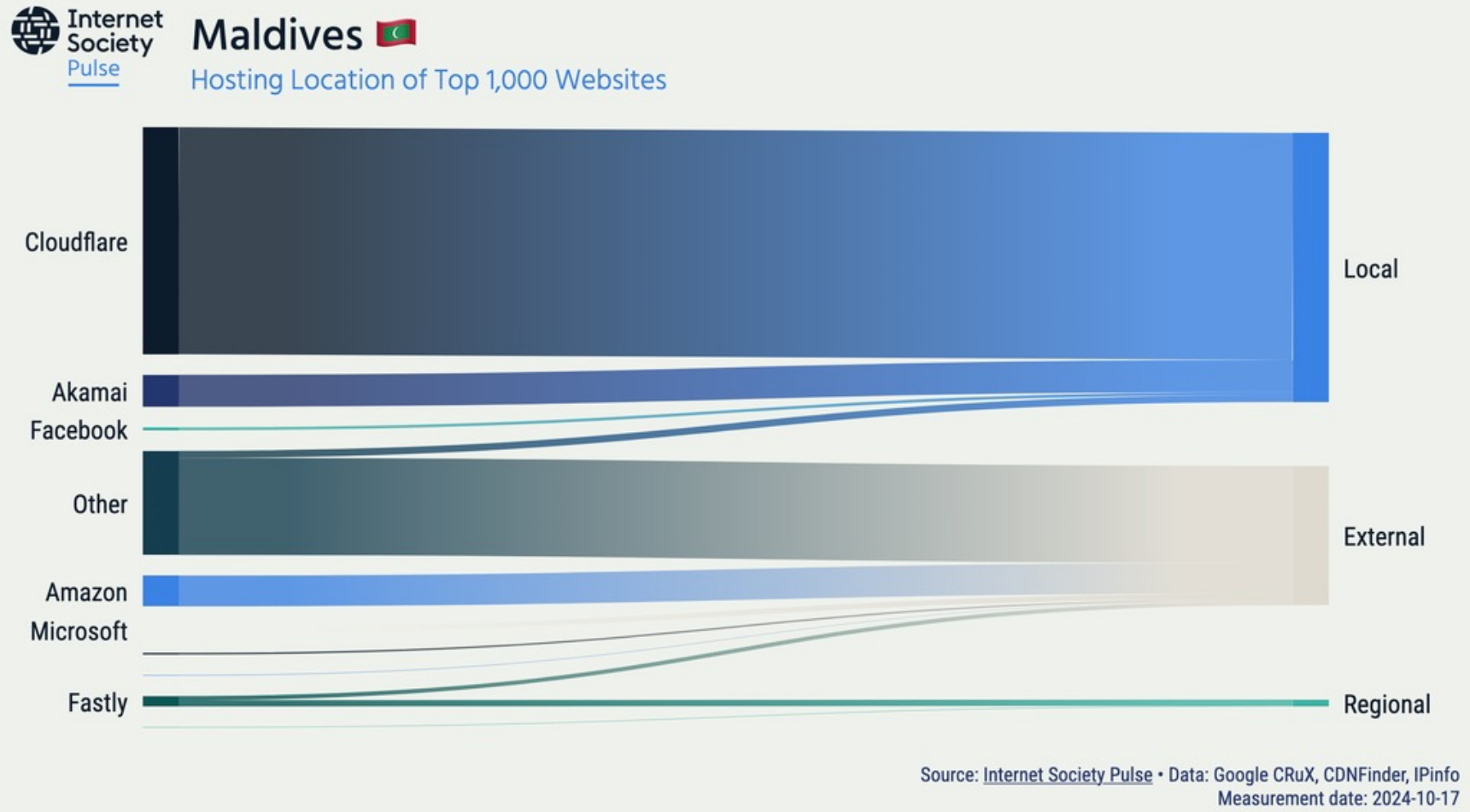
Keeping traffic local instead of sending it via international routes provides better resilience, stability, efficiency, and quality improvements all at a lower cost.

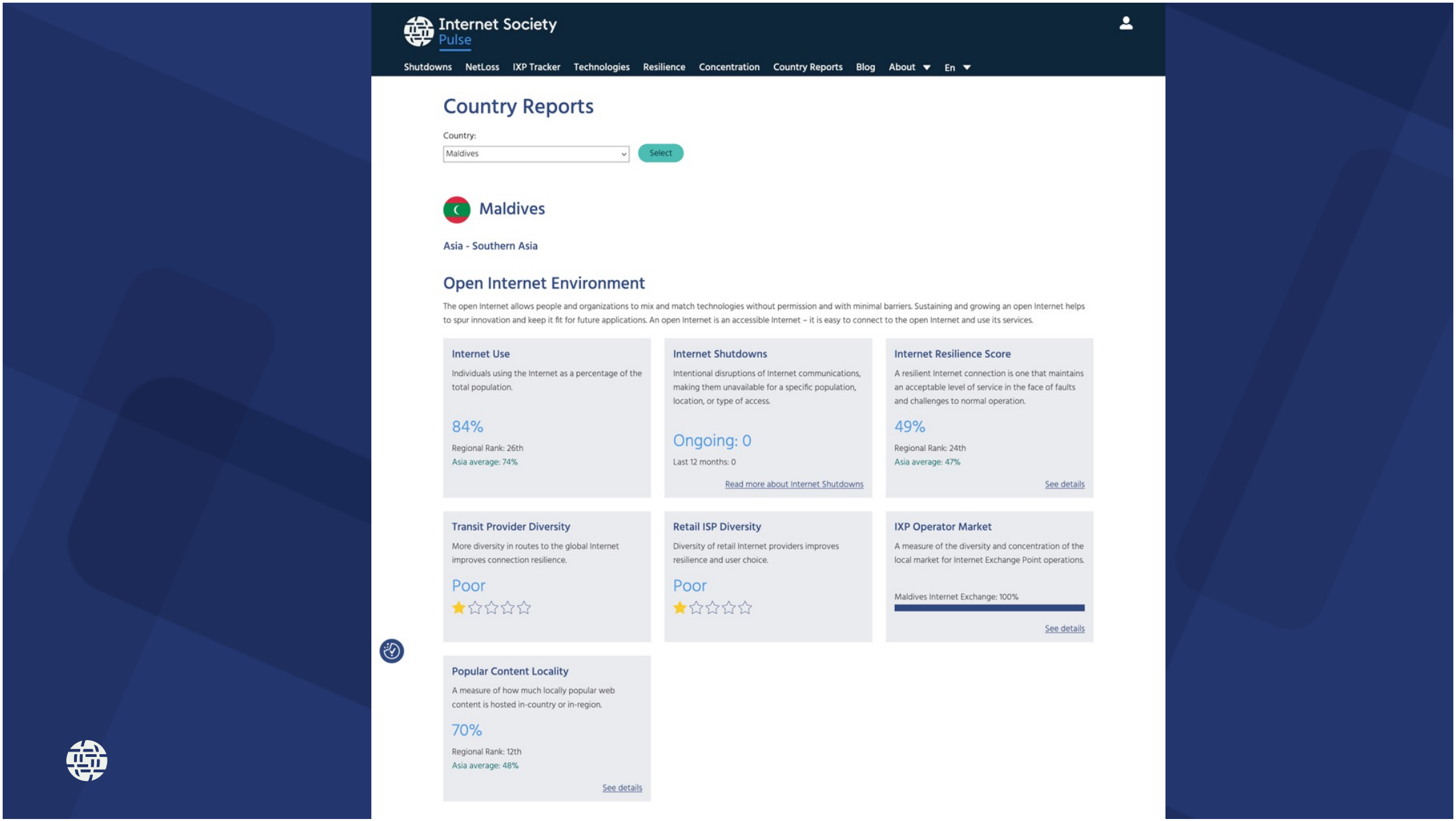
MVIX Impact

- Right from the start, MVIX's impact on increasing local traffic and reducing reliance on expensive transit links was clear.
- In the months after starting operation, Maldives IX (MVIX) has recorded a massive increase in local Internet traffic from 700mbps to 2.5Gbps (280% growth).
- This is also thanks to a primary CDN (e.g., Meta, Cloudflare) peering when the IXP start operating



Popular Content Locality - CDN distribution




Internet Society
Pulse
Shutdowns NetLoss IXP Tracker Technologies Resilience Concentration Country Reports Blog About En
Country Reports
Country:
Maldives
Select
Maldives
Asia - Southern Asia
Open Internet Environment
The open Internet allows people and organizations to mix and match technologies without permission and with minimal barriers. Sustaining and growing an open Internet helps to spur innovation and keep it fit for future applications. An open Internet is an accessible Internet – it is easy to connect to the open Internet and use its services.
Internet Use
Individuals using the Internet as a percentage of the total population.
84%
Regional Rank: 26th
Asia average: 74%
Internet Shutdowns
Intentional disruptions of Internet communications, making them unavailable for a specific population, location, or type of access.
Ongoing: 0
Last 12 months: 0
Read more about Internet Shutdowns
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.
49%
Regional Rank: 24th
Asia average: 47%
See details
Transit Provider Diversity
More diversity in routes to the global Internet improves connection resilience.
Poor
Retail ISP Diversity
Diversity of retail Internet providers improves resilience and user choice.
Poor
IXP Operator Market
A measure of the diversity and concentration of the local market for Internet Exchange Point operations.
Maldives Internet Exchange: 100%
See details
Popular Content Locality
A measure of how much locally popular web content is hosted in-country or in-region.
70%
Regional Rank: 12th
Asia average: 48%
See details

Globally Connected Infrastructure

The globally connected Internet is inclusive. It allows networks and users to interconnect without geographical restrictions. Increasing the connectivity of the Internet makes it more valuable to every participant, as a tool for communications, learning, commerce.

Networks Assigned

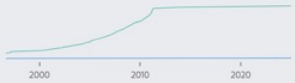
A measure of how many Internet networks are active here.

18

Regional Rank: 42nd
Asia average: 615

IPv4 Addresses Assigned

A measure of how many legacy addresses are assigned here.



93,952

Regional Rank: 43rd
Asia average: 17,583,897

IPv6 Addresses Assigned

A measure of how many Internet addresses are assigned here.

262,157

Regional Rank: 48th
Asia average: 200,649,942

IPv6 Adoption

Enabling the Internet to support more users and more uses.

8%

Regional Rank: 32nd
Asia average: 21%

IXP Count

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

1

Regional Rank: 30th
Asia average: 6

See details

Peering Networks

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

8

Regional Rank: 38th
Asia average: 128

Secure and Trustworthy Internet

A secure Internet is resistant to attacks on its infrastructure, delivering a robust service to its user community. A trustworthy Internet meets the expectations of its users by offering a resilient and reliable base for applications and services.

Naming Security Status

Adopting DNSSEC improves trustworthiness of Internet communications.

.mv Inactive

Naming Security Adoption

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

51%

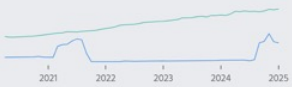
Regional Rank: 21st
Asia average: 42%

Routing Security Adoption

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

2%

Regional Rank: 43rd
Asia average: 12%



8%

Regional Rank: 32nd
Asia average: 21%

activity.

1

Regional Rank: 30th
Asia average: 6

See details

8

Regional Rank: 38th
Asia average: 128

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Routing Security Adoption

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2%

Regional Rank: 43rd
Asia average: 12%

Routing Security Coverage IPv4

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

98%

Regional Rank: 3rd
Asia average: 78%

Routing Security Coverage IPv6

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

100%

Regional Rank: 1st
Asia average: 80%

Local Capacity Building

Training

We offer moderated online courses, face-to-face courses, and self-paced tutorials for the Internet Society community.

These are the most related with the topics above:

- Fundamentals of Designing and Deploying Computer Networks
- Introduction to Network Operations
- Advanced Network Operations
- Internet Exchange Points (IXP)
- Mutually Agreed Norms for Routing Security (MANRS)

But there's more!

Technical Skills

How to maintain Internet's technical infrastructure.

1. Designing and Deploying Computer Networks
2. Introduction Network Operations 1.0
3. Advanced Network Operations 2.0
4. MANRS
5. IXPs 2.0

Knowledge Exchange, Business, and Policy Skills

How to reduce the gap between policymakers and technical experts.

6. Community Networks
7. Internet Governance

Online Safety Skills

How to reduce the gap between policymakers and technical experts.

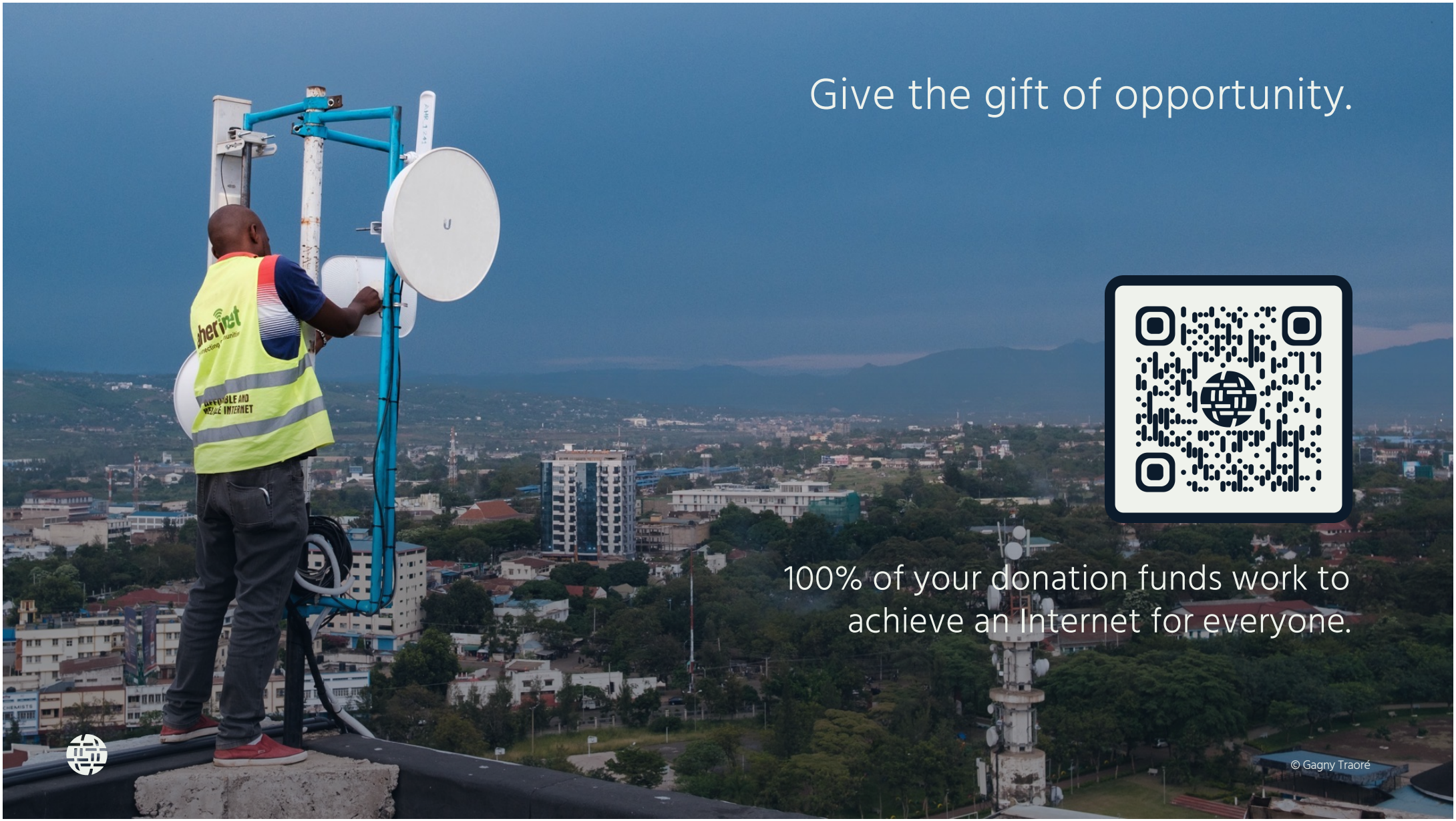
8. Digital Footprint
9. Privacy
10. Internet Security

Advocacy Skills

How to champion protocols that keep the Internet secure.

11. Encryption
12. What the Internet Needs to Exists
13. What the Internet Needs to Thrive
14. How to write an Internet Impact Brief

Become an Internet Champion!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