

# IXPs Role in Measuring the Internet



## Why Do We Measure

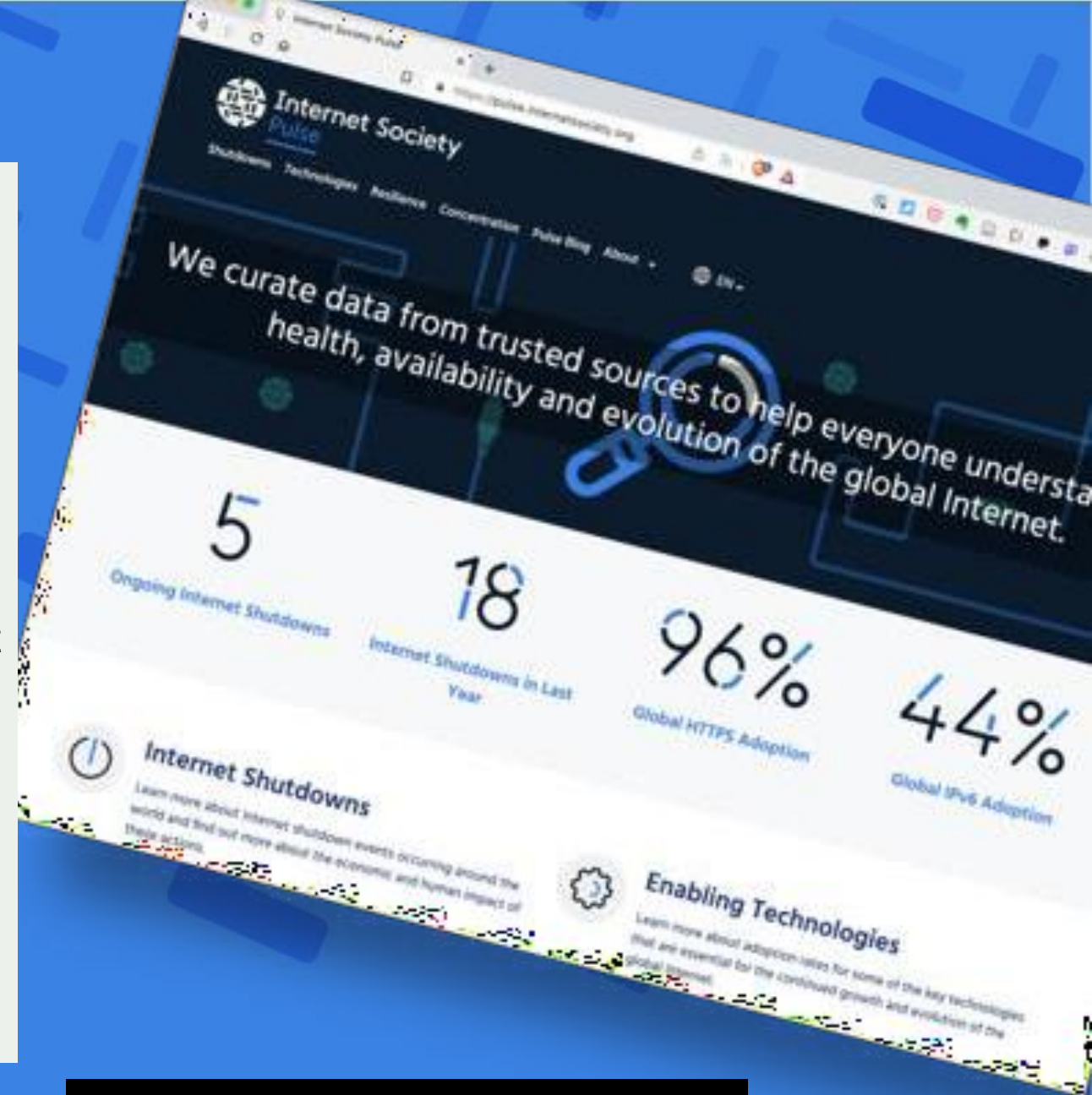
- To answer questions/validate beliefs
- To set a baseline from which we can track change/show results
- To demonstrate value
- To justify decisions
- To identify opportunities for improvement
- Advance our knowledge



- 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](https://pulse.internetsociety.org)

# Pulse Data Partners



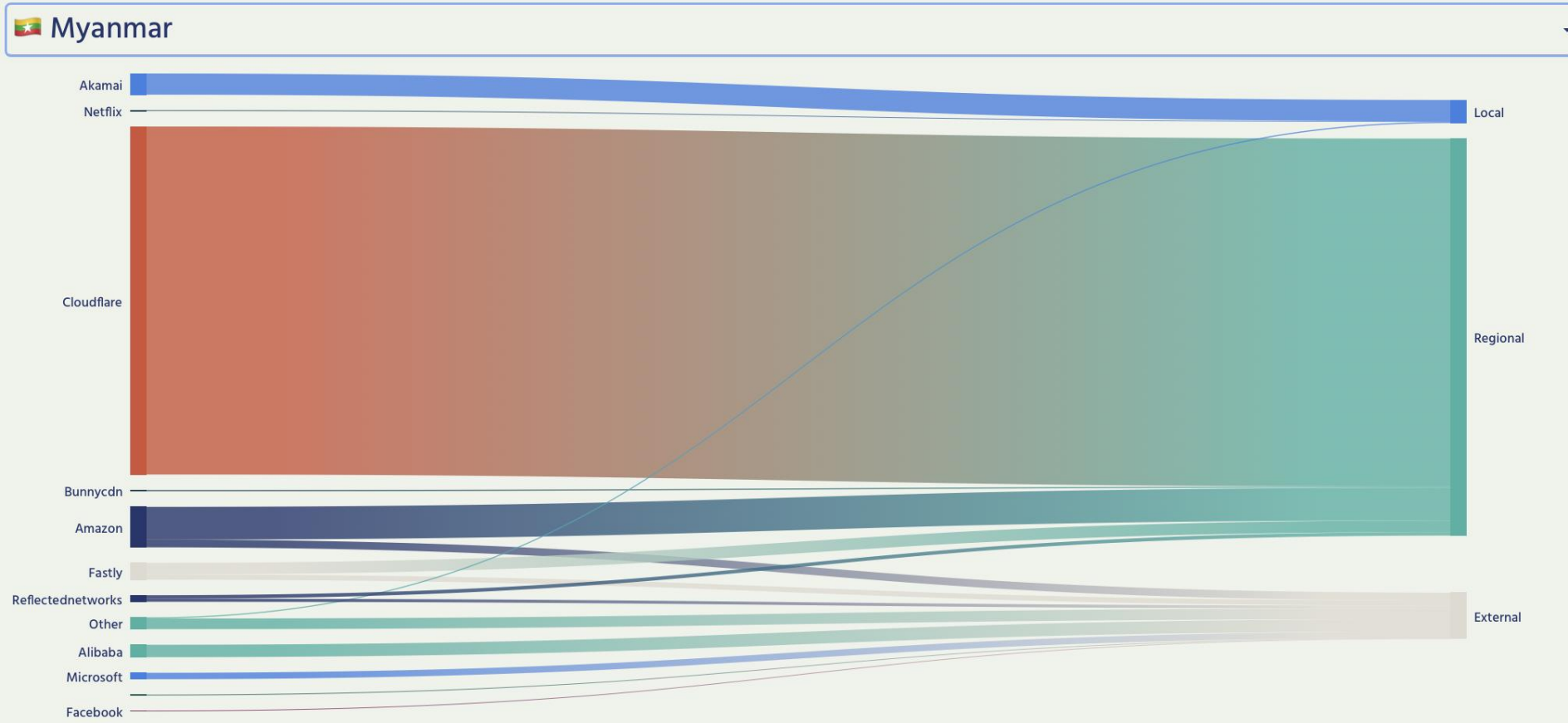
- Data is provided by our trusted data partners



# Data example - Myanmar

## Locally Cached Content

Hosting Location of Top 1,000 Websites



Source: [Internet Society Pulse](#) • Measurements updated every month  
Additional data: Google CRuX, FindCDN, IPinfo/Maxmind

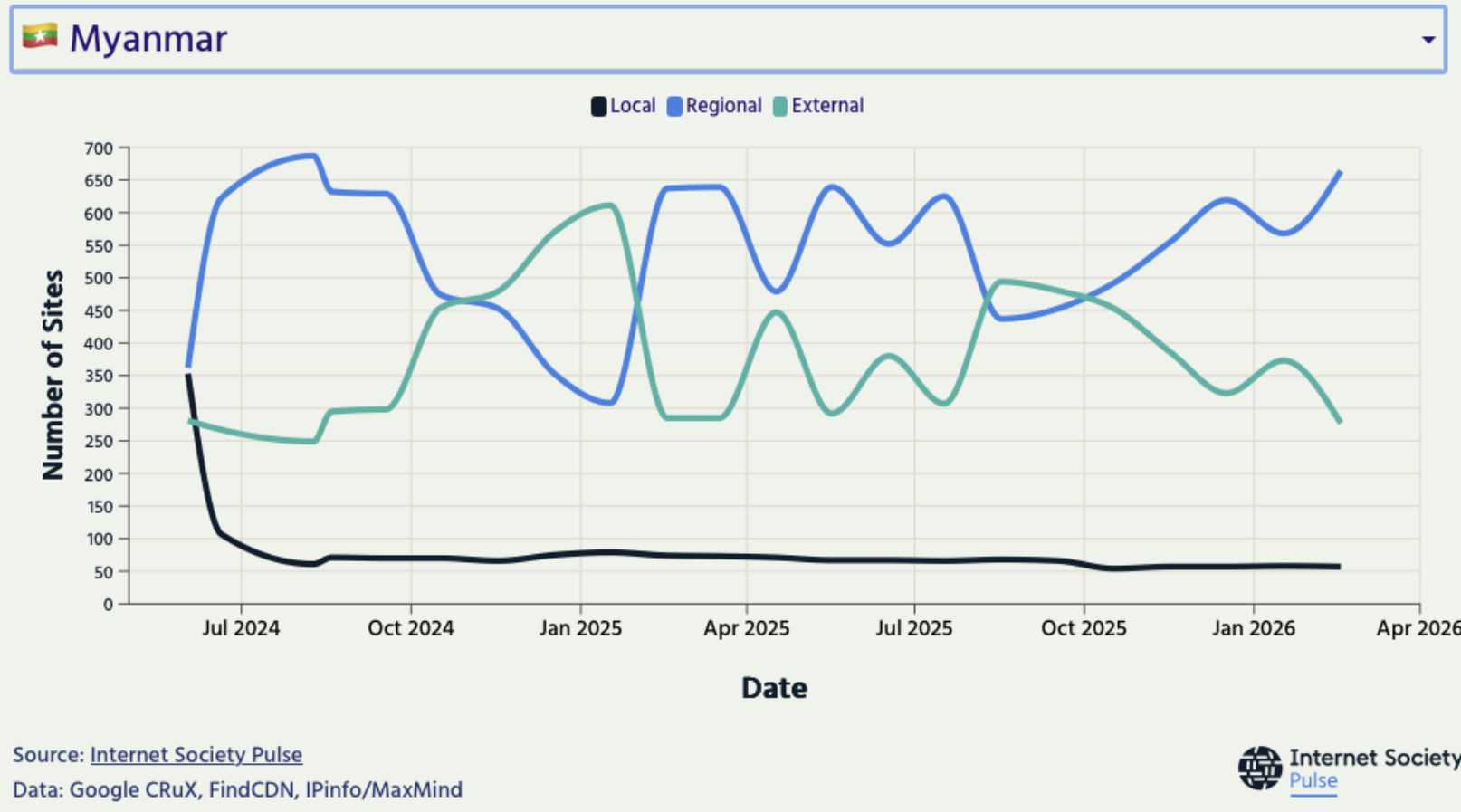


<https://public.flourish.studio/visualisation/27774599/>

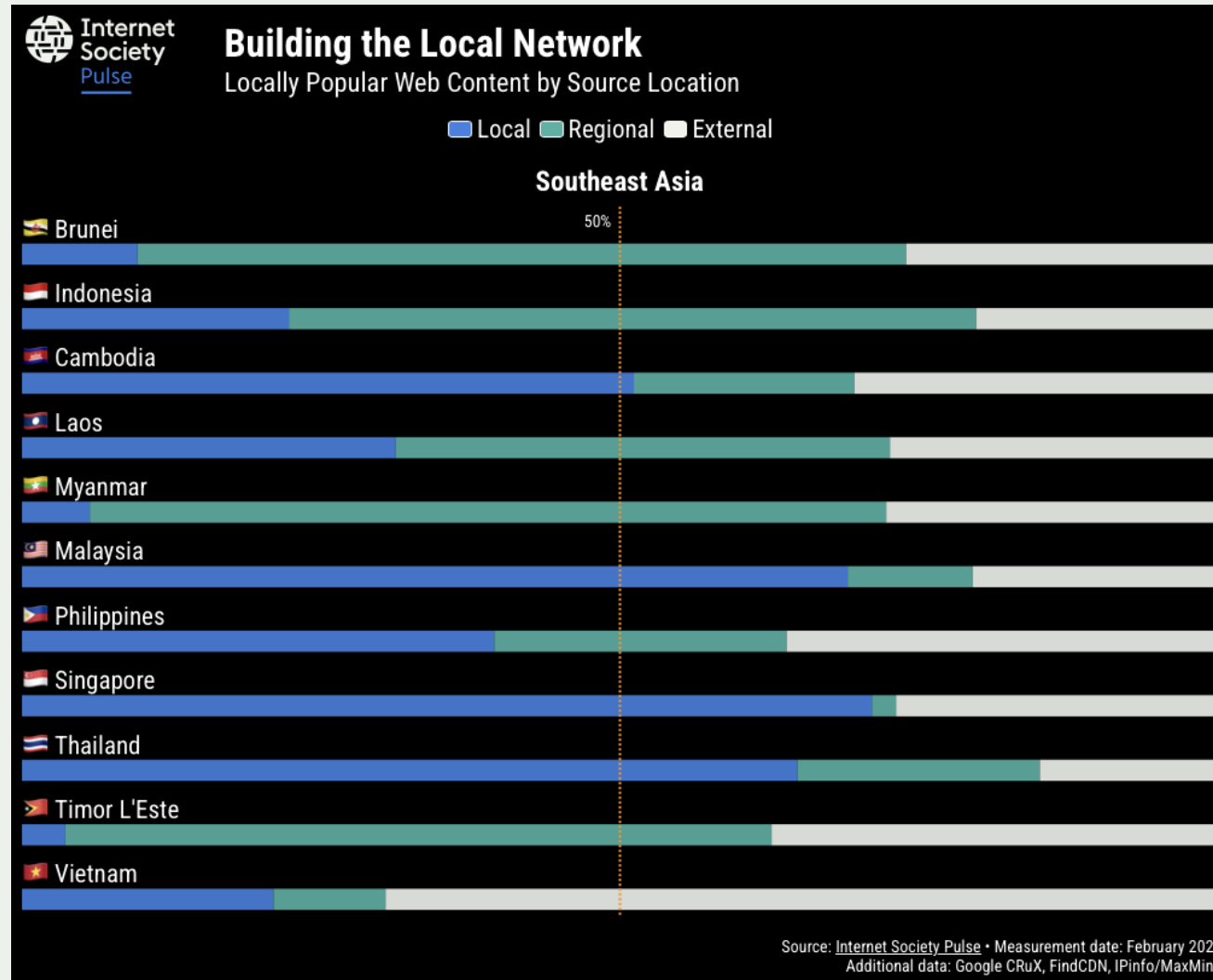
# Data example - Myanmar

## Building the Local Network

Popular content locality measurements over time



# Data example - Myanmar



<https://public.flourish.studio/visualisation/27996960/>

# Limitations of Measuring the Internet

- Open Source
- Vantage Point
- Quality
- Consistency
- Resolution
- Bias



# Limitations of Measuring the Internet

- Open Source 🙄♂
- Vantage Point 🙄♂
- Quality 🙄♂
- Consistency 🙄♂
- Resolution 🙄♂
- Bias 🙄♂

**Can IXPs help with some of these?**



“When you can measure what you are speaking about, and express it in numbers, you know something about it; but when you cannot measure it, when you cannot express it in numbers, your knowledge is of a meager and unsatisfactory kind” – Lord Kelvin



# What Are Internet Measurements?

"Internet measurements are like health check-ups for the Internet. They help us understand how data flows, where bottlenecks are, and how fast your cat pictures load."

**Active Measurements:** Sending probes (e.g., ping, traceroute) to measure performance.

**Passive Measurements:** Observing traffic without interfering.



# Types of Network monitoring

1. Real-time monitoring
2. Device and interface monitoring  
Bandwidth monitoring
3. Performance metrics and analytics
4. Alerts and notifications
5. Network mapping and visualization
6. Security monitoring: Reporting and analytics
7. Remote monitoring and management



# What Can We Discover by Measuring the Internet?

**Latency:** How long it takes for your cat picture to load.

**Packet Loss:** Why your video call freezes mid-meow.

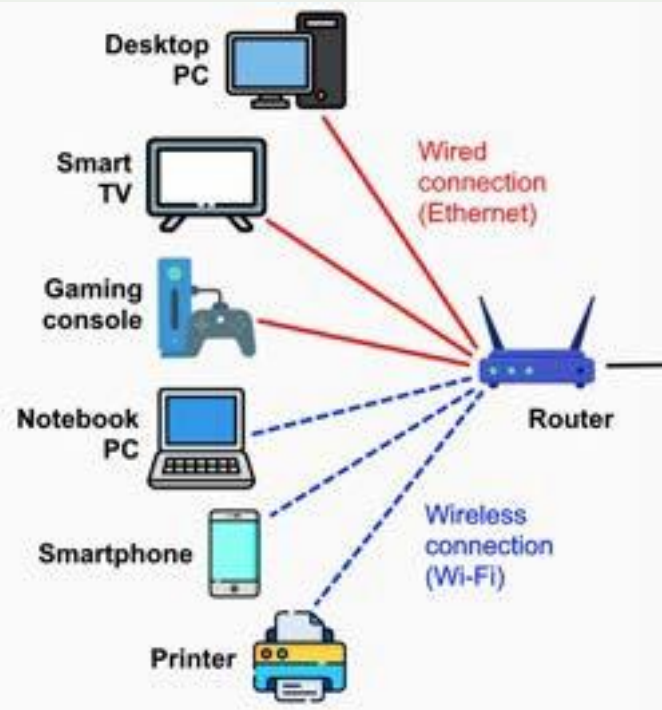
**Routing Paths:** The secret highways your data takes to reach you.

**Congestion Points:** Where the internet gets clogged (like traffic jams for data).



# Where do we do measure?

## LAN

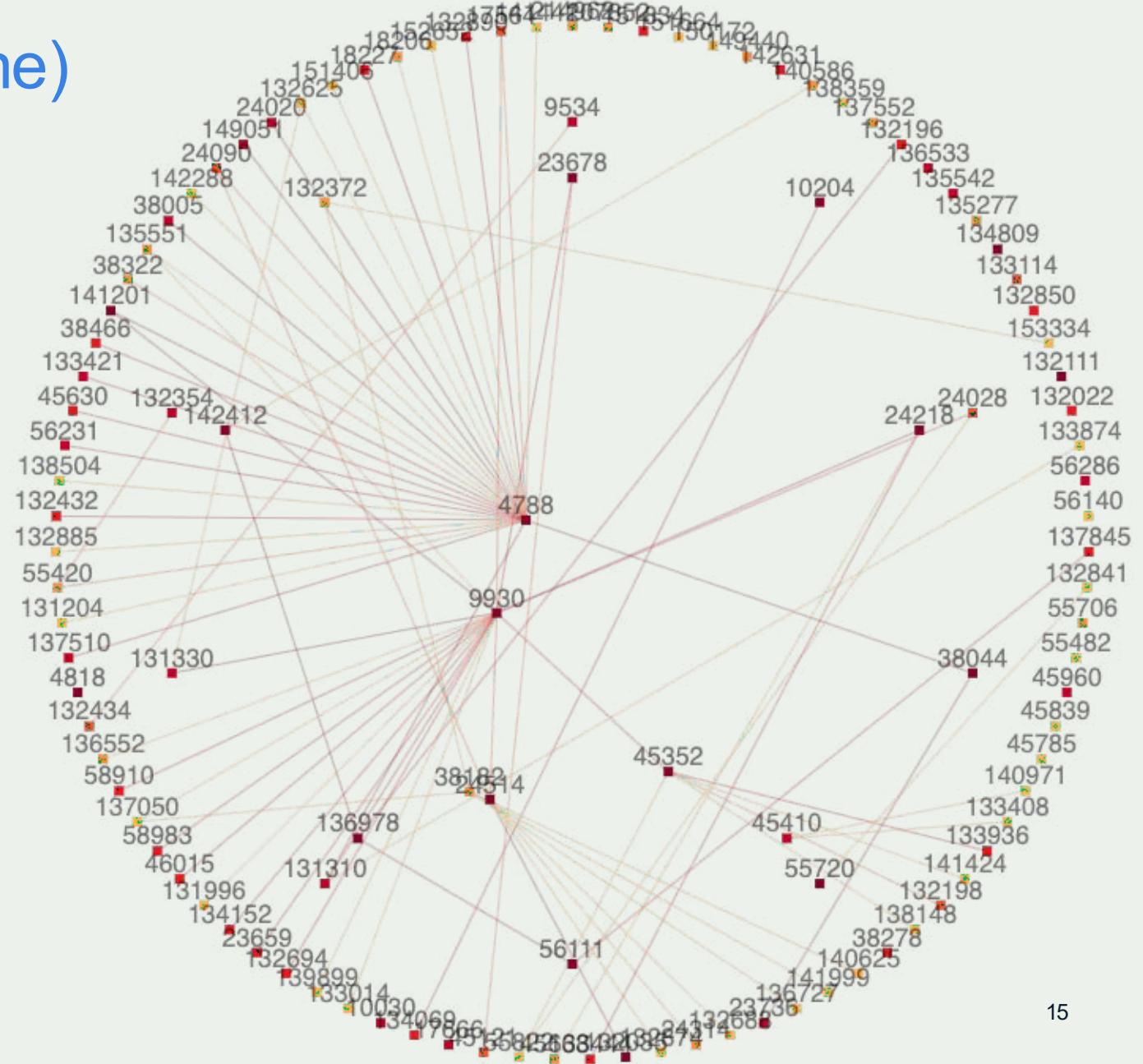


## WAN



# Network topology (Control plane)

- Routeviews
- RIS (RIPE NCC)
- PCH (Packet Clearing House)
- Looking Glasses



# Peering and interconnection

- IXPs play a huge role in improving Internet performance & resilience.
- Measurements help identify **where new peering opportunities exist**.
- Data gaps and biases mean we must **interpret results carefully**.
- Better measurement = **better interconnection decisions!**



APNIC Blog



# Opportunities and Challenges

## Opportunities

- Better understanding of Internet topology.
- Improve performance for users.
- Insights into peering and interconnection dynamics.

## Challenges

- Coverage gaps. "Some parts of the internet are like dark alleys—hard to see."
- Data gaps. "Not all networks share their data. It's like trying to solve a puzzle with missing pieces."



National Geographic



## Think about ...

- What perspective can IXPs offer us that we don't already have?
- Why can't IXPs offer this data?
  - Examples of IXPs already providing public data as well as analysis
  - Challenges for IXPs to do this
- What would an IXP measurement system look like?
  - What can the industry do to support IXPs to collect and contribute data?
- Question to the audience: Is there interest in this data? Why or why not?



# 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



<https://www.isocfoundation.org/grant-programme/sustainable-peering-infrastructure/>



# 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 is 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 Exist
13. What the Internet Needs to Thrive
14. How to write an Internet Impact Brief



Thank you



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