



L-Root and Internet in LAC

Mauricio Vergara Ereche | QoS Internet CEPAL | Oct 2015

Agenda

1

What is
ICANN?

2

L-Root

3

LAC
Connectivity

4

Our model for
deployment

5

Recommend
ations



What is ICANN?

What is a resilient and secure Internet?

Quick Look at ICANN

Overview

- ICANN is a global multi-stakeholder, private sector organization that manages Internet resources for the public benefit. It is best known for its role as technical coordinator of the Internet's Domain Name System

Mission

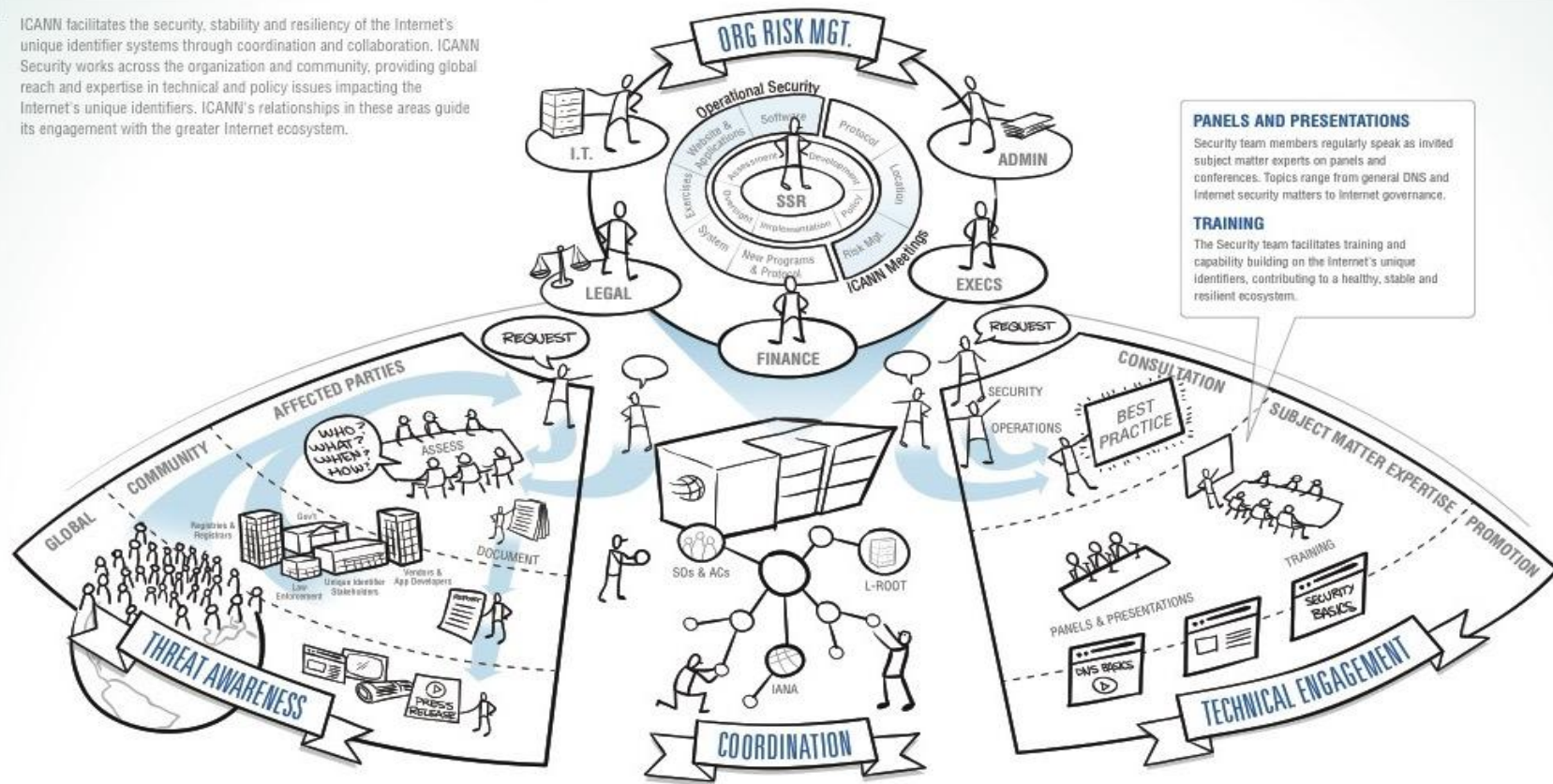
- To coordinate, at the overall level, the global Internet's system of unique identifiers, and in particular to ensure the stable and secure operation of the Internet's unique identifier system

Supporting A Healthy, Resilient Internet



ICANN Security • Supporting A Healthy, Resilient Internet

ICANN facilitates the security, stability and resiliency of the Internet's unique identifier systems through coordination and collaboration. ICANN Security works across the organization and community, providing global reach and expertise in technical and policy issues impacting the Internet's unique identifiers. ICANN's relationships in these areas guide its engagement with the greater Internet ecosystem.



PANELS AND PRESENTATIONS

Security team members regularly speak as invited subject matter experts on panels and conferences. Topics range from general DNS and Internet security matters to Internet governance.

TRAINING

The Security team facilitates training and capability building on the Internet's unique identifiers, contributing to a healthy, stable and resilient ecosystem.

COORDINATE & COLLABORATE



The Security team is regularly invited to speak with community stakeholder groups, and facilitates activity with ICANN's Supporting Organizations and Advisory Committees.

PUBLICIZE & PROMOTE



The Security team provides thought leadership in the form of white papers, blog posts and the annual Security, Stability & Resiliency Framework for ICANN.

Team members represent ICANN at various conferences and events worldwide, speaking on cybersecurity and governance, the Internet's unique identifiers and ICANN.

CONSULT & ADVISE



The team contributes to scenarios for global cyber exercises, provides advice on operational practices such as with the root server community and DNS technical community.

REVIEW & COMMENT



The team regularly provides input into policy development processes, comments on protocols and open standards managed by others in the Internet ecosystem.



SSR: Security, Stability and Resiliency

1

Secure

Capacity to protect and prevent misuse of Internet Unique identifiers

2

Stable

Capacity to ensure that the system operates as expected, and that users of the unique identifiers have confidence that the system operates as expected

3

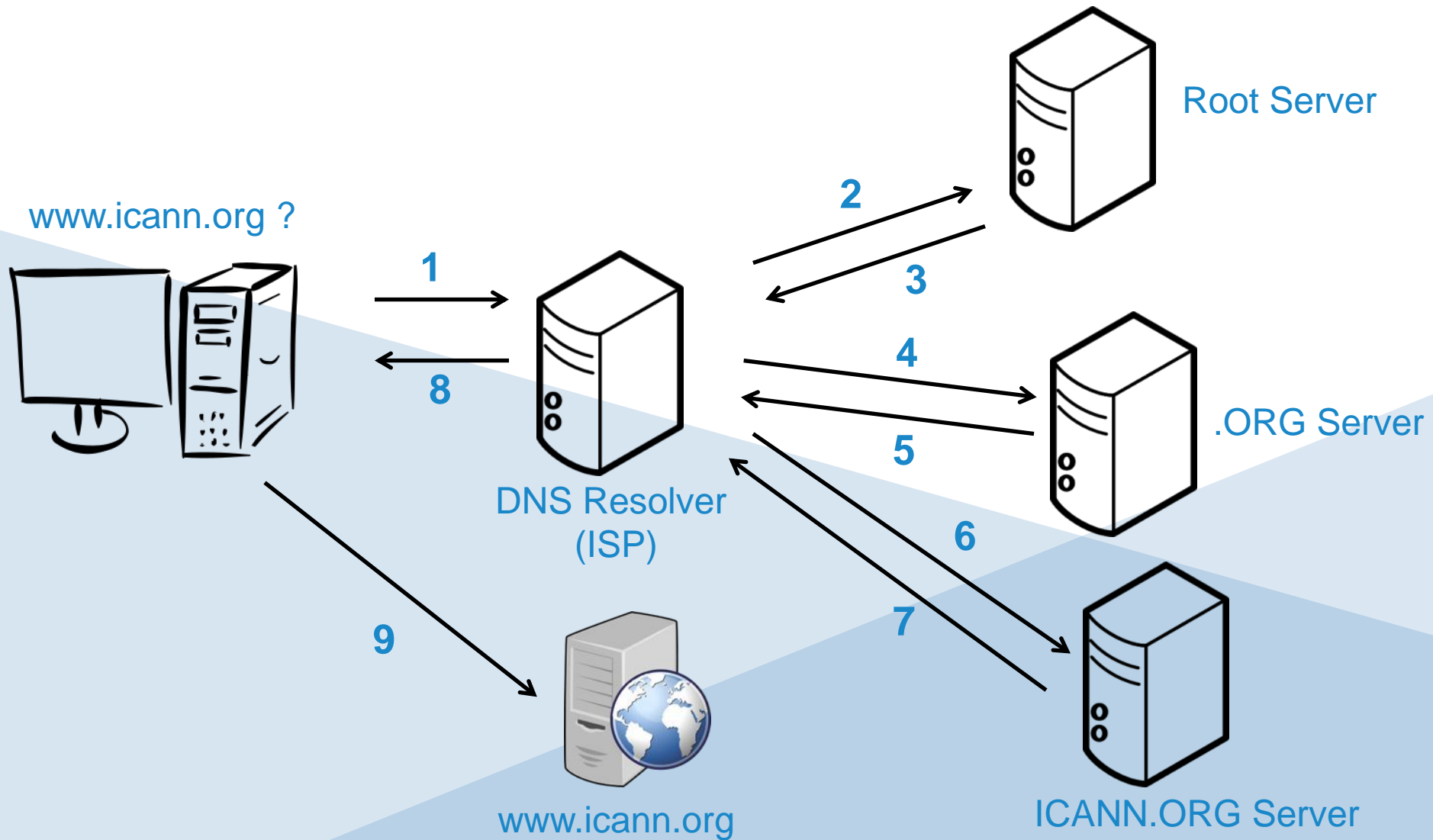
Resilient

Capacity of the unique identifier system to effectively withstand/tolerate/survive malicious attacks and other disruptive events without disruption or cessation of service



L-Root DNS and Anycasting

How DNS Works?



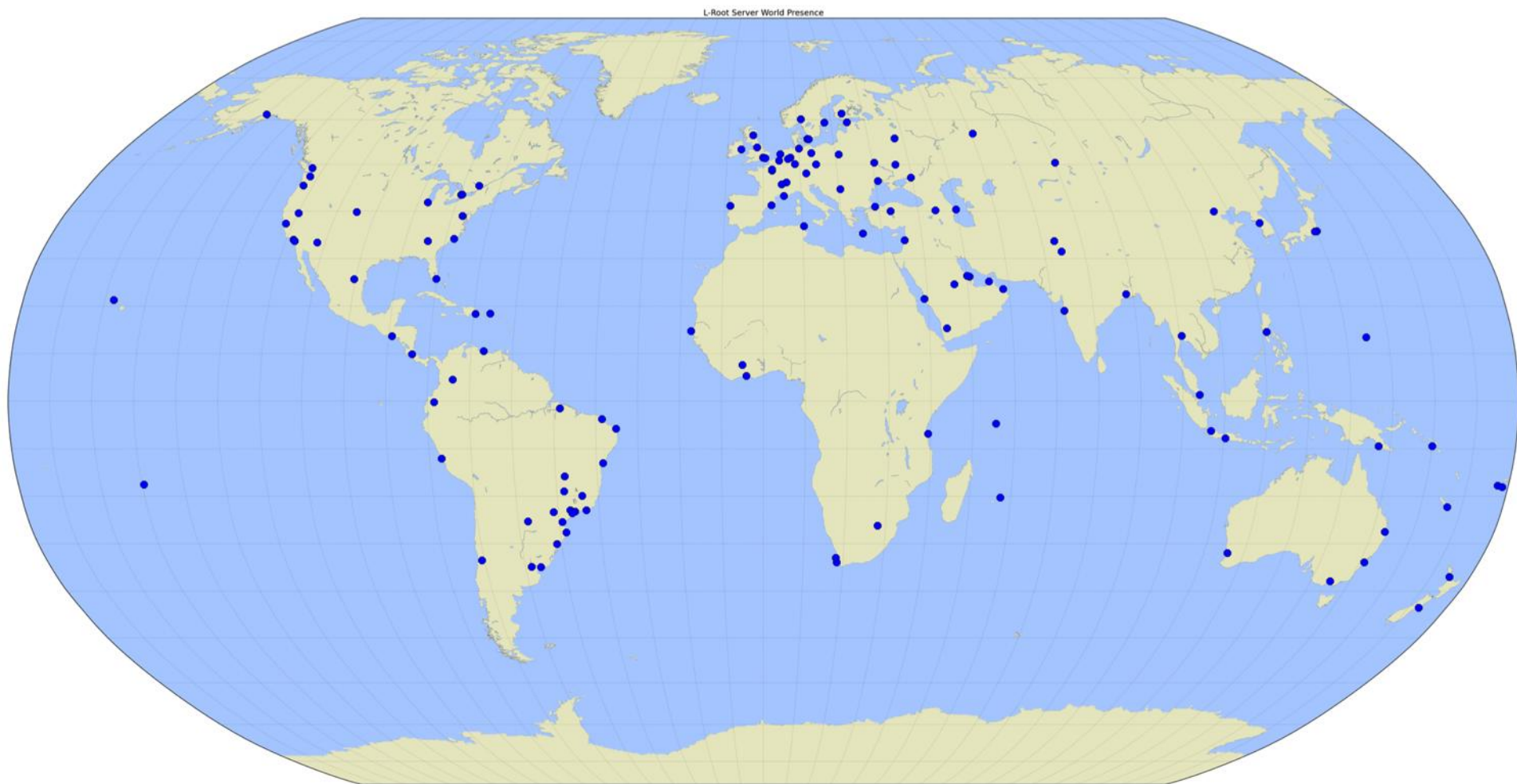
What is L-Root?

- ⦿ “L” is one of 13 independently operated root servers serving the DNS root zone
- ⦿ ICANN DNS Engineering team operates **L** under the Autonomous System Number (ASN) **AS20144** using the following addresses:
 - ⦿ 199.7.83.42
 - ⦿ 2001:500:3::42
- ⦿ Anycasted since 2007
- ⦿ Uses two different Authoritative SWs for name resolution
 - ⦿ Name Server Daemon (NSD) from NLnetLabs
 - ⦿ Knot DNS by CZ.NIC

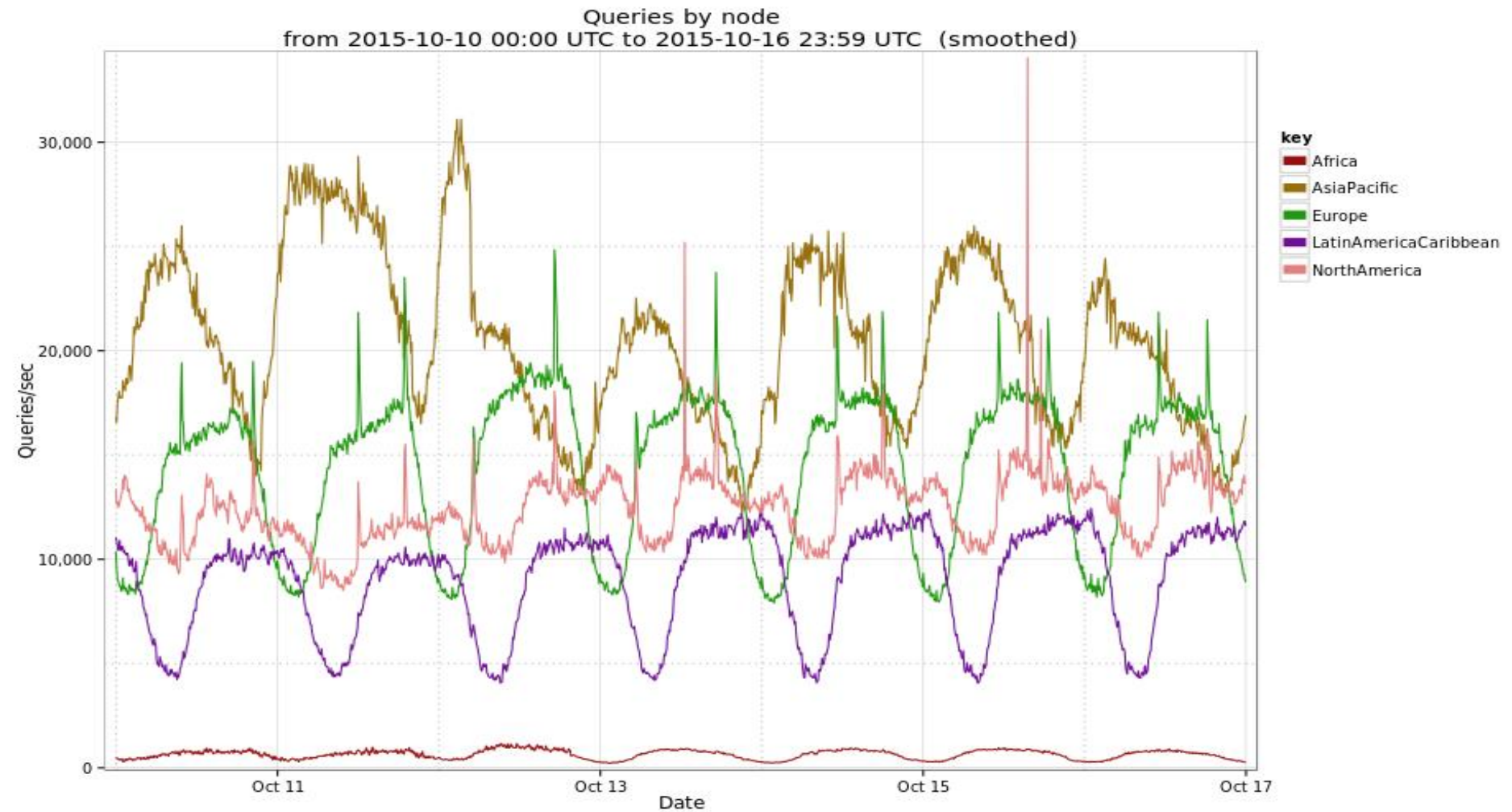
L-Root geographical diversity via Anycast

- ⦿ Anycast allow multiple copies of a server to be on multiple places, allowing us to:
 - ⦿ Put service **closer** to the end-user:
 - ⦿ Lower RTT
 - ⦿ Improve user experience
 - ⦿ Increase query capacity
 - ⦿ Reduces the likelihood that some types of attack traffic would affect the rest of the Internet by keeping it closer to the source
 - ⦿ Flexibility to add/remove instances

L-Root Locations



Traffic: Queries per Second

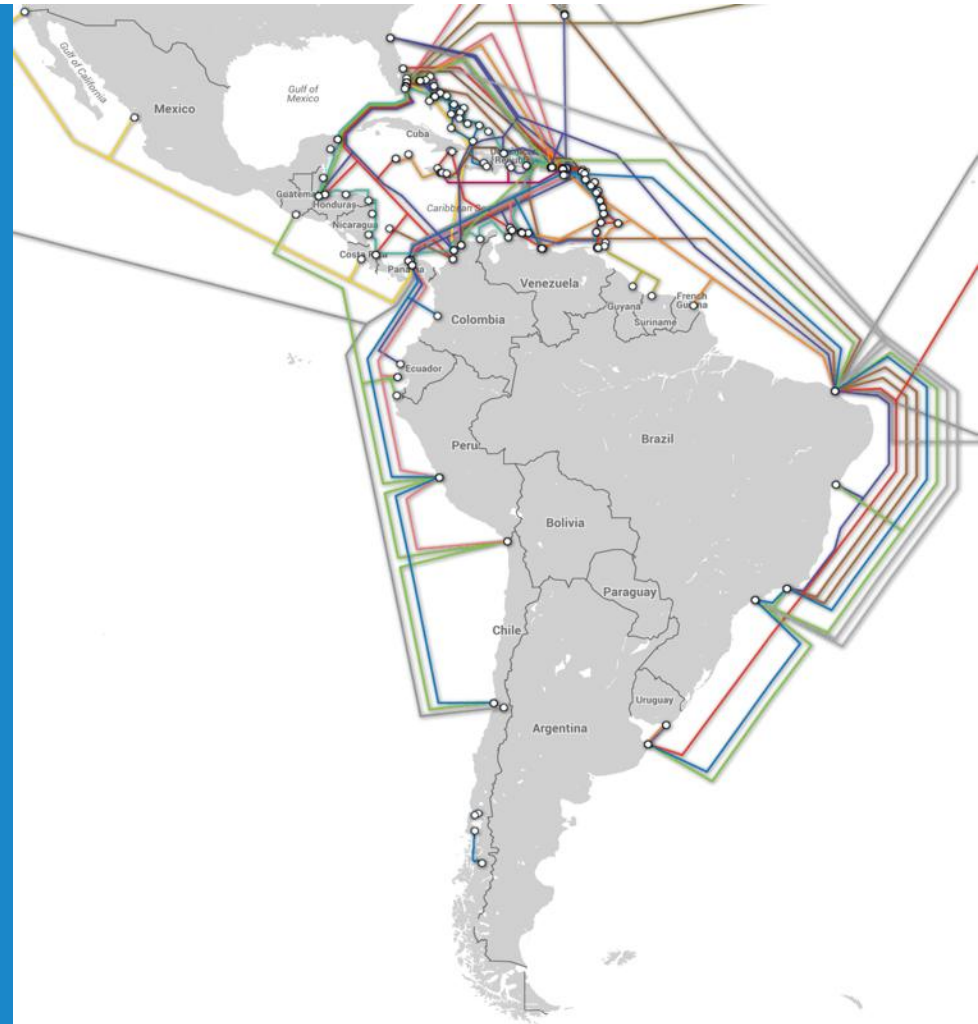




Latin America and Caribbean Connectivity

LAC Infrastructure: Submarine Cables

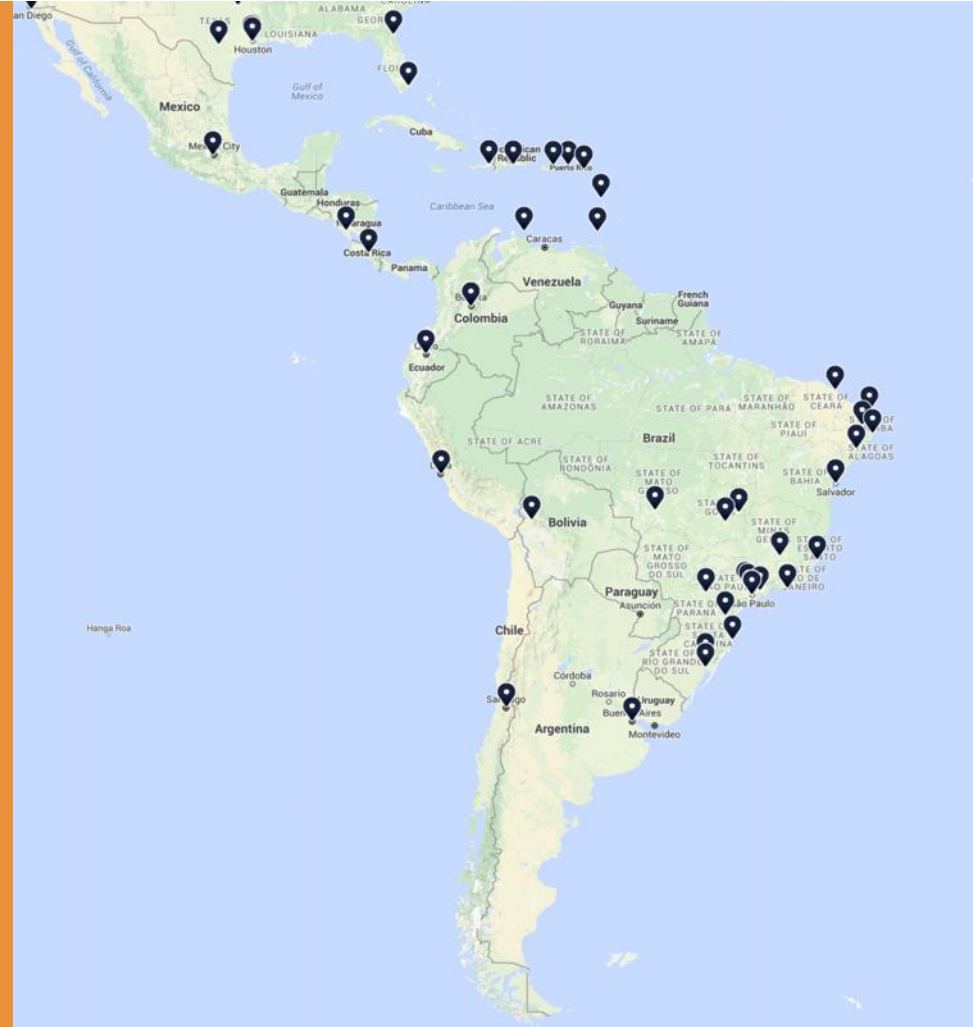
- ⦿ Caribbean provides a big place for landing spots
- ⦿ Atlantic coast has a bigger connectivity than the Pacific coast
- ⦿ Different providers share same connectivity as upstream



source: submarinecablemap.com

LAC Infrastructure: Internet Exchange Points

- ⦿ Atlantic countries present a larger footprint of IXPs.
- ⦿ Most of the countries centralize on capitals most of their traffic exchange points



source: internetexchangemap.com

LAC Infrastructure: L-Root presence

- ⦿ Currently present on 14 countries
- ⦿ 32 instances in total
- ⦿ Countries with larger presence
 - ⦿ Brazil: 16
 - ⦿ Chile, Colombia, Mexico : 2



source: dns.icann.org

Our model for deployment

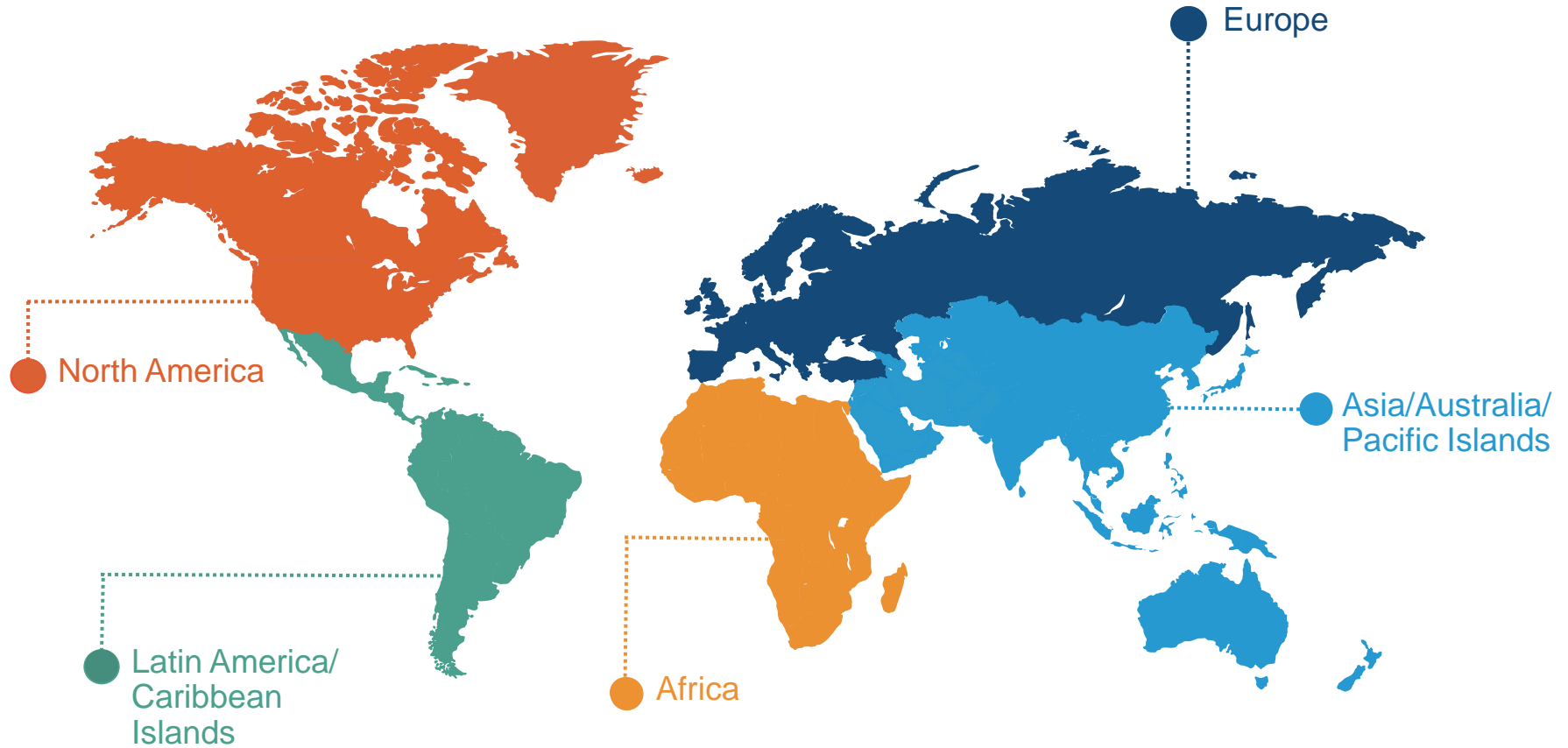
Hosting a L-Root instance

- ⦿ Our Global Stake Engagement (GSE) team will reach organizations that might be interested
 - ⦿ Most of the times they run large networks
- ⦿ GSE will explain benefits of hosting an L-Root
 - ⦿ Provide resiliency over network outages from the outside
 - ⦿ Reduce response time
 - ⦿ Provide resiliency for entire region (commitment to global growth and stability of the Internet)
 - ⦿ Adds to the global footprint and diversity of root DNS servers

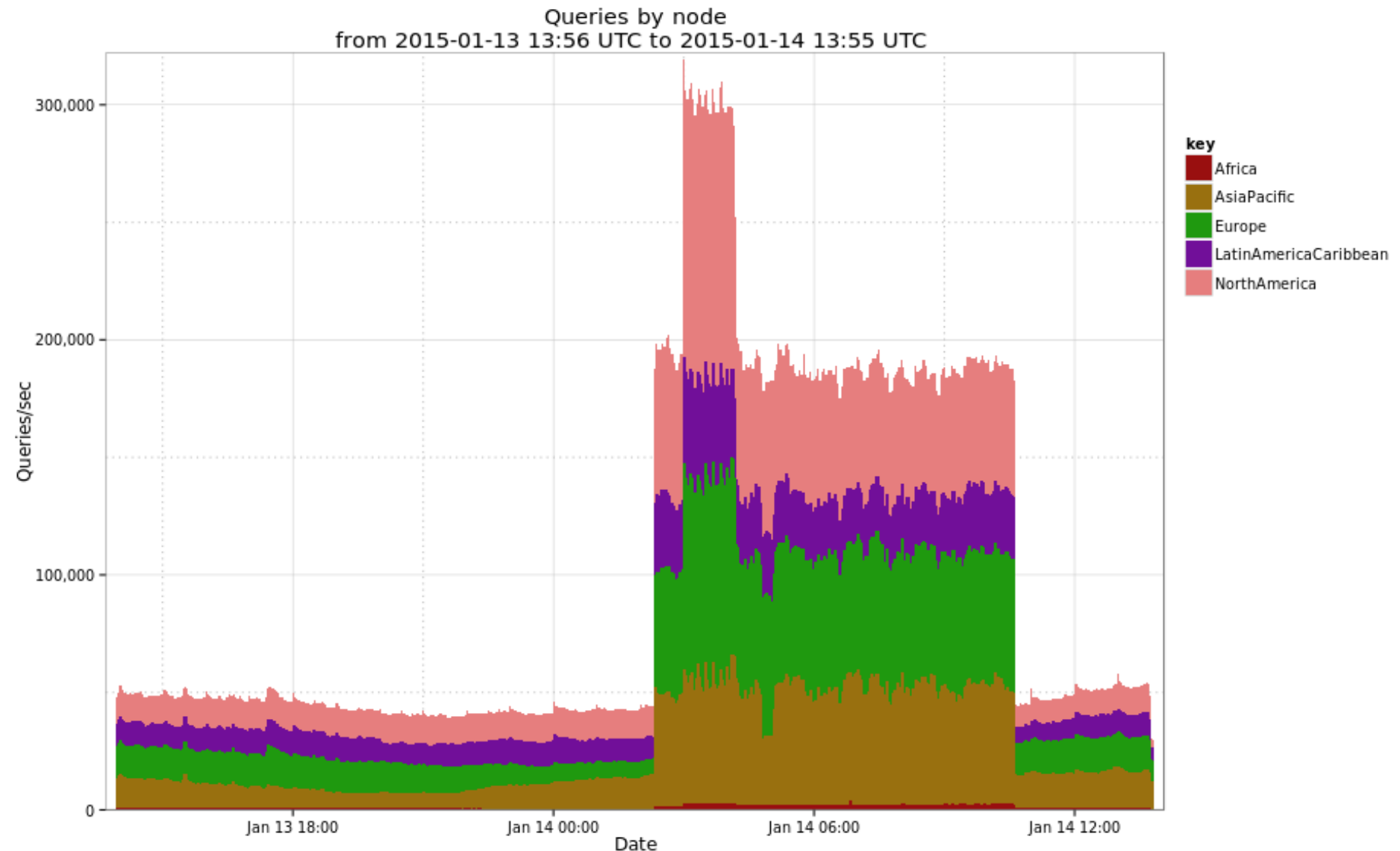
Hosting an L-Root Workflow

- ⦿ Once the organization is willing to purchase an appliance, provide housing and ability to establish BGP peering session to propagate L-Root
- ⦿ The organization will contact ICANN GSE local representative and complete a contact information document
- ⦿ The organization will then need to sign a NDA and the provided L-Single contract
- ⦿ ICANN will return the documents executed
- ⦿ The organization will need to complete a technical form with the server details
- ⦿ ICANN DNS Engineering team installs and commissions

GSE Regions



Benefit examples of large deployment



Even on high traffic, RTT is still low

» DNSMON > I-root

DNSMON

DNS responses for

Protocol: Servers:

[Show RIPE Atlas measurements](#)

Response time Data resolution: 10 minutes



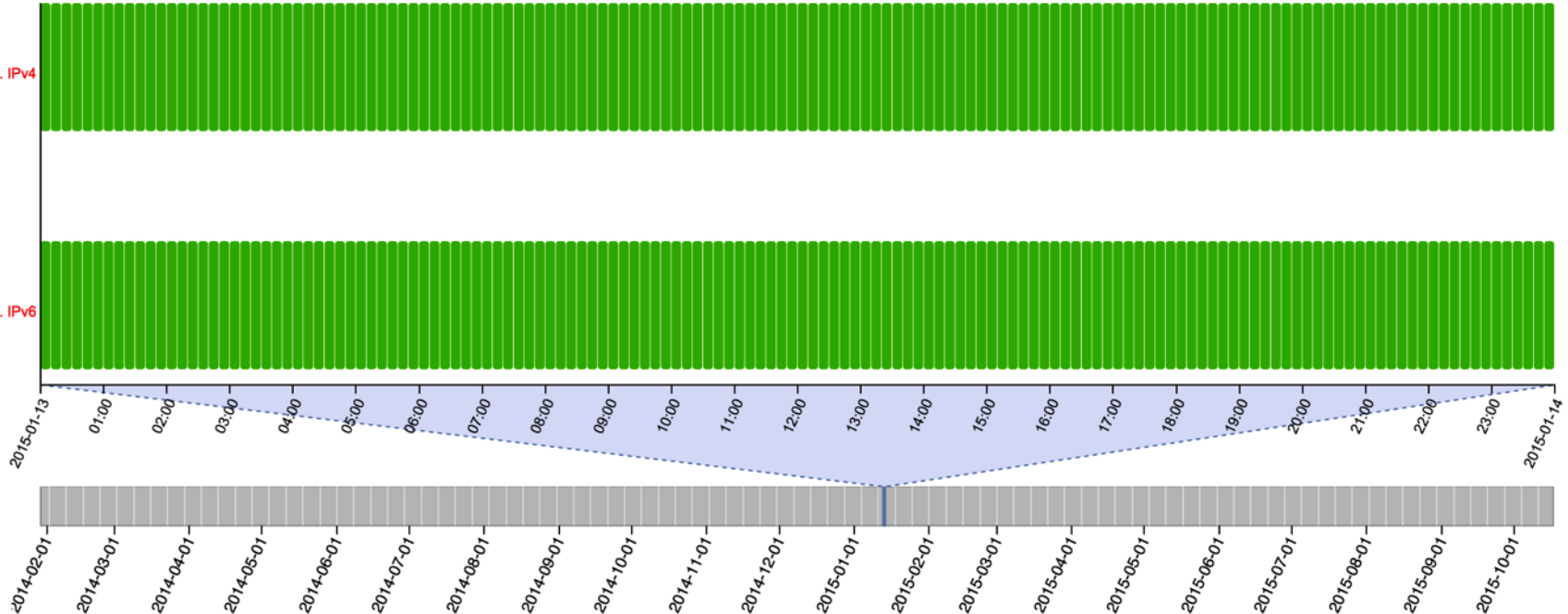
zone:

From: 2015-01-13 00:00

To: 2015-01-14 00:00 UTC

I.root-s...net. IPv4

I.root-s...net. IPv6



Use your mouse wheel or click and drag a selection to zoom, press the left/right arrow keys to shift the time window, press the shift key to remove rows from the displayed results

How ATLAS monitor sees L-Root



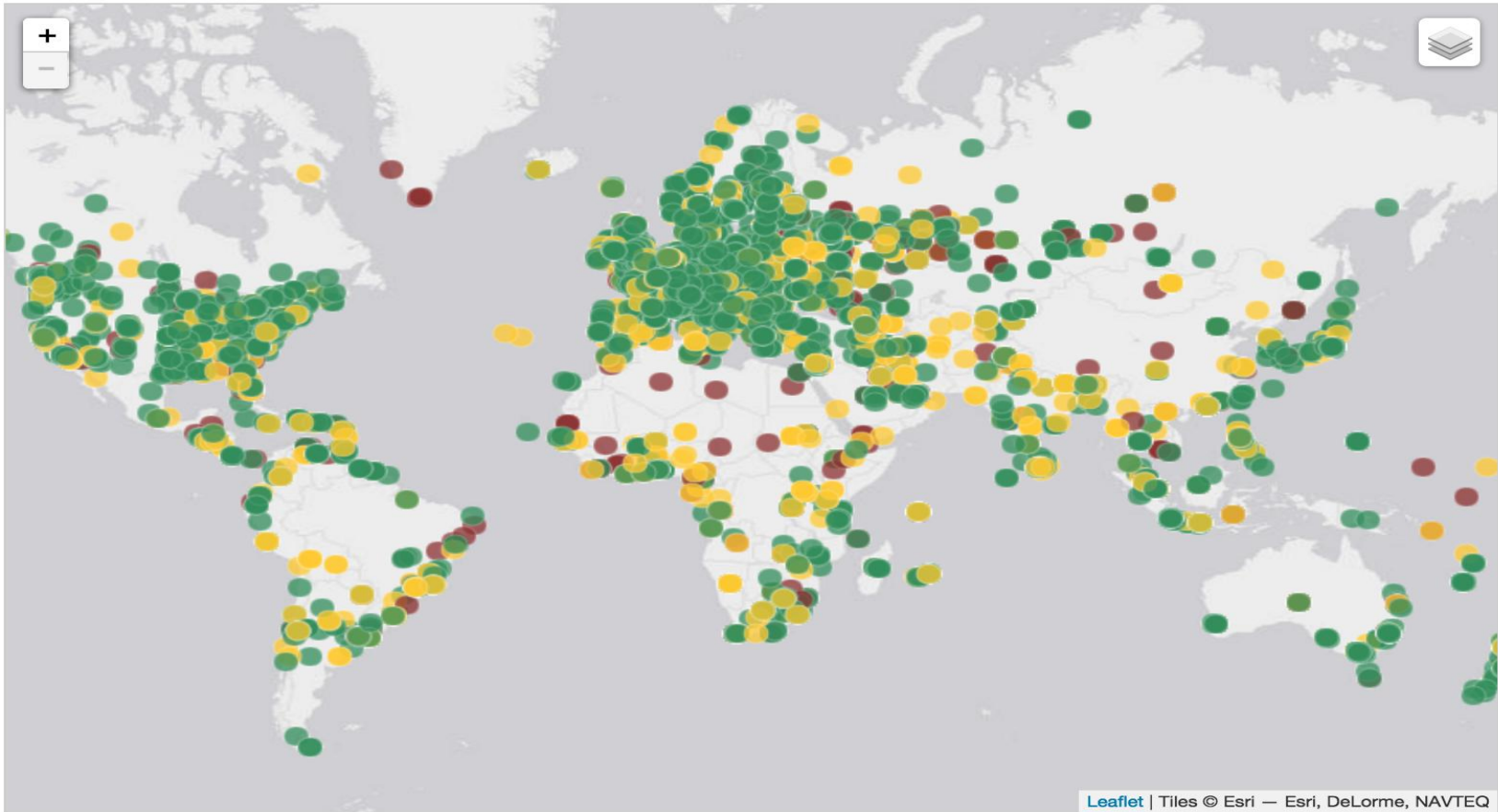
ATLAS probes?

Global RIPE Atlas Network Coverage

[Permalink](#)

This map shows the locations of all RIPE Atlas probes, including those that are connected, disconnected and abandoned (meaning they have not been connected for a long period of time).

Filter by ASN, prefix, or country:



Leaflet | Tiles © Esri — Esri, DeLorme, NAVTEQ

Connected: 8814 Disconnected: 2890 Abandoned: 1582

Recommendations

Recommendations

- ⦿ Become involved on the deployment of a Secure, Stable and Resilient Internet
- ⦿ De-centralize and create local content is VERY good.
- ⦿ The Internet Protocol is a great tool to improve global and regional communications without a just-one-and-only path
 - ⦿ Think of Natural disasters or major Outages
 - ⦿ A-synchronous communications can find different paths to reach final destination
- ⦿ Let's reinforce the most cost-efficient and optimal ways to connect 2 points.

How to engage us?

- ⦿ Research bodies (DNS-OARC)
- ⦿ Network Operations (NANOG, LACNOG, AUSNOG, CENTR)
- ⦿ Standard bodies (IETF)
- ⦿ Participation on many different mailing lists
- ⦿ Social media (Website, Twitter)



@ICANNdnsEng

Engage with ICANN



Thank You and Questions

Reach us at:

Email: engagement@icann.org

Website: icann.org



twitter.com/icann



[gplus.to/icann](https://plus.to/icann)



facebook.com/icannorg



weibo.com/ICANNorg



linkedin.com/company/icann



flickr.com/photos/icann



youtube.com/user/icannnews



slideshare.net/icannpresentations