



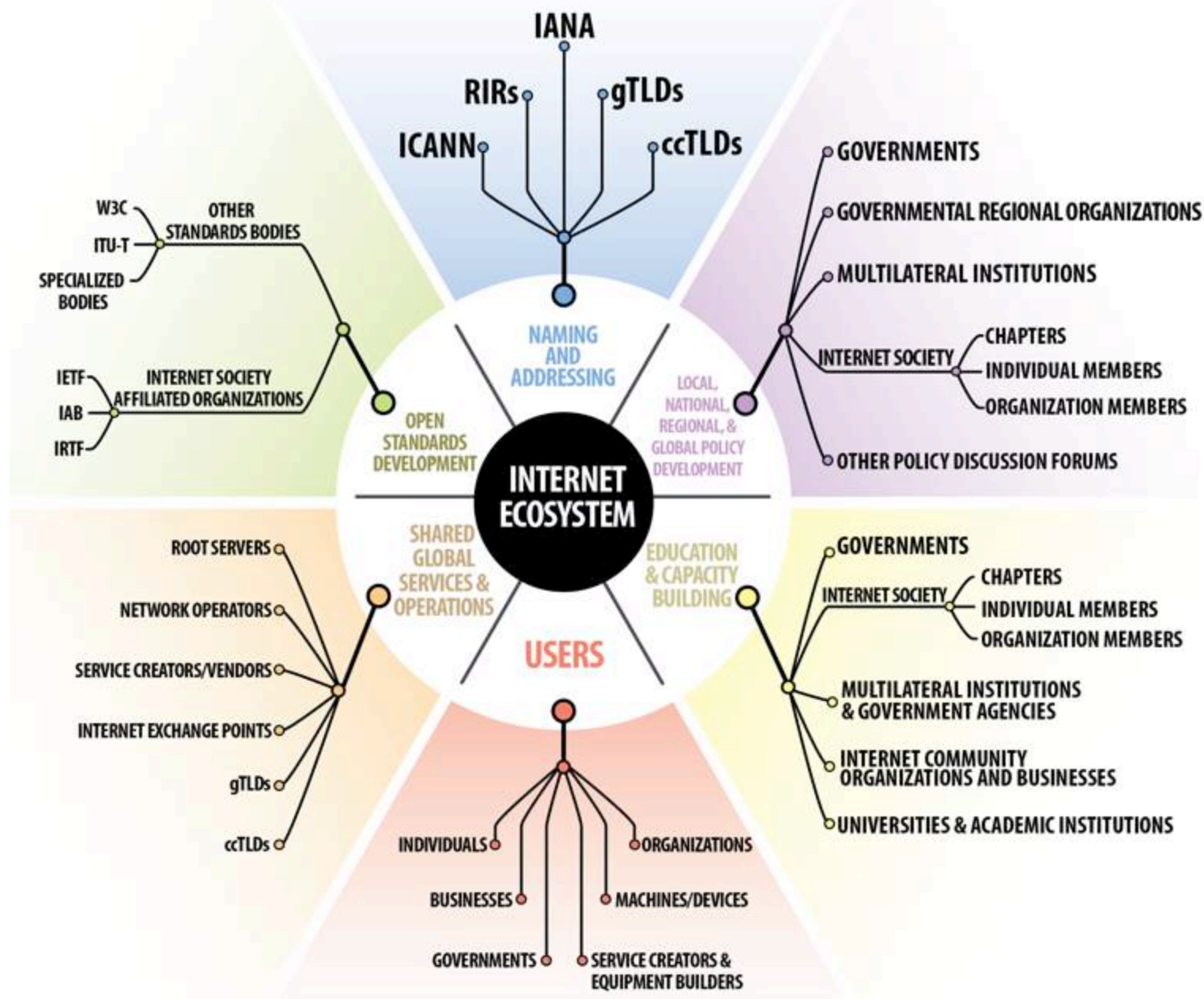
# Introduction to the Internet Ecosystem

John Curran  
President & CEO, ARIN

Caribbean IGF - 26 August 2015

# Introduction to the Internet Ecosystem

- Main actors of the Internet Ecosystem
- Critical Internet Infrastructure
  - Internet Number Registry System  
(Regional Internet Registries and IANA)
- IANA Stewardship Transition
- ARIN's Internet Activities
  - IPv4 Runout and IPv6 Deployment



Source: Internet Society

# Names & Addressing

- Country-Code Top-Level Domains (ccTLDs)
- Generic Top-Level Domains (gTLDs)
- Regional Internet Registries (RIRs)
- Internet Assigned Numbers Authority (IANA)
- Internet Corporation for Assigned Name and Numbers (ICANN)

# Standards

- Internet Engineering Task Force (IETF)
- Internet Architecture Board (IAB)
- Internet Research Task Force (IRTF)
- World Wide Web Consortium (W3C)
- International Telecommunication Union – Standardization Sector (ITU-T)
- Specialized Standards Bodies

# Infrastructures/Equipment

- Network Operators/ISPs
- Internet Exchange Points (IXP)
- Root Servers Operators
- Equipment Manufacturers

# Users/Applications Providers

- Service Creators/Vendors
- Users

# Capacity Building/Education

- Universities & Academic Institutions
- Multilateral Institutions & Development Agencies
- Internet Society (ISOC)
- Internet Community Organizations & Businesses



# Policy Development

- Governments
- Governmental Regional Organizations
- Multilateral Institutions & Development Agencies
- IG Policy Discussion Fora

# Critical Internet Infrastructure

- DNS Root Servers and infrastructure

- Internet Number Resources

The unique numeric identifiers given to each device on the Internet, aka Internet Protocol addresses, “IP addresses”

The Internet Number Registry System consists of -

- Regional Internet Registries (RIRs)
  - Internet Assigned Numbers Authority (IANA)
- Internet Exchange Points
  - ...

# Regional Internet Registries

- RIRs
  - Not-for-profit organizations that provide uniqueness of Internet number resources through the technical coordination and management within a defined geographical region
- RIRs manage the distribution of:
  - IP addresses (IPv4 and IPv6)
  - Autonomous System Numbers (ASNs)
- Operate Internet Number Registry System

# RIR Services

Each RIR:

- Allocates and assigns Internet number resources in its geographical service area
- Participates in the global Internet community
- Facilitates policy development
- Is a nonprofit, membership organization
- Is governed by an elected executive board

# Policy Principles

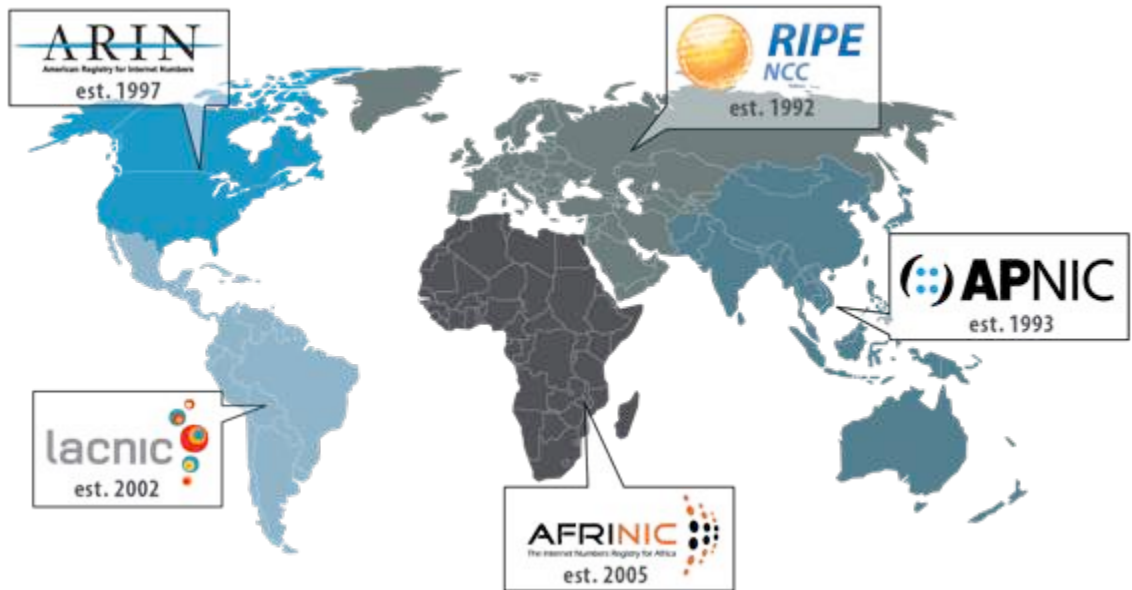
- All policies are developed by each RIR community from the bottom up
- All policies are developed in an open forum where anyone may participate
- Membership is not necessary
- Community-defined policies are used to distribute Internet resources fairly and equitably based on need
- RIRs' respective policy development processes are available on their websites

# Regional Internet Registries

- The Regional Internet Registry (RIR) system began in 1992
- There are five RIRs:
  - AfriNIC – 2005
  - APNIC – 1993
  - ARIN – 1997
  - LACNIC – 2002
  - RIPE NCC – 1992
- RIRs coordinate closely with the Internet Assigned Numbers Authority (IANA)
- In 2003 the five RIRs formed the Number Resource Organization (NRO) to undertake joint activities, including joint technical projects, liaison activities and policy coordination

# Number Resource Organization (NRO)

- Includes the five RIRs
  - AFRINIC
  - APNIC
  - ARIN
  - LACNIC
  - RIPE NCC





Internet Assigned Numbers Authority

“Throughout its entire history, the Internet system has employed a central Internet Assigned Numbers Authority (IANA)”

- Vint Cerf, RFC 1174



# Internet Assigned Numbers Authority (IANA)

- Handles the central registries for the Internet
  - “Names” (The DNS root zone)
  - “Numbers” (The IPv4, IPv6, ASN global free pools)
  - “Protocol Parameters” (port numbers, type codes, etc.)
- IANA services are provided under two agreements:
  - USG NTIA IANA Functions Contract with ICANN
  - RFC 2860 MOU between IAB/IETF and ICANN

# Globalization of IANA Oversight

- On 14 March 2014, the US Government announced plans to transition oversight of the IANA functions contract to the global multistakeholder community



# NTIA Conditions for Transition Proposal

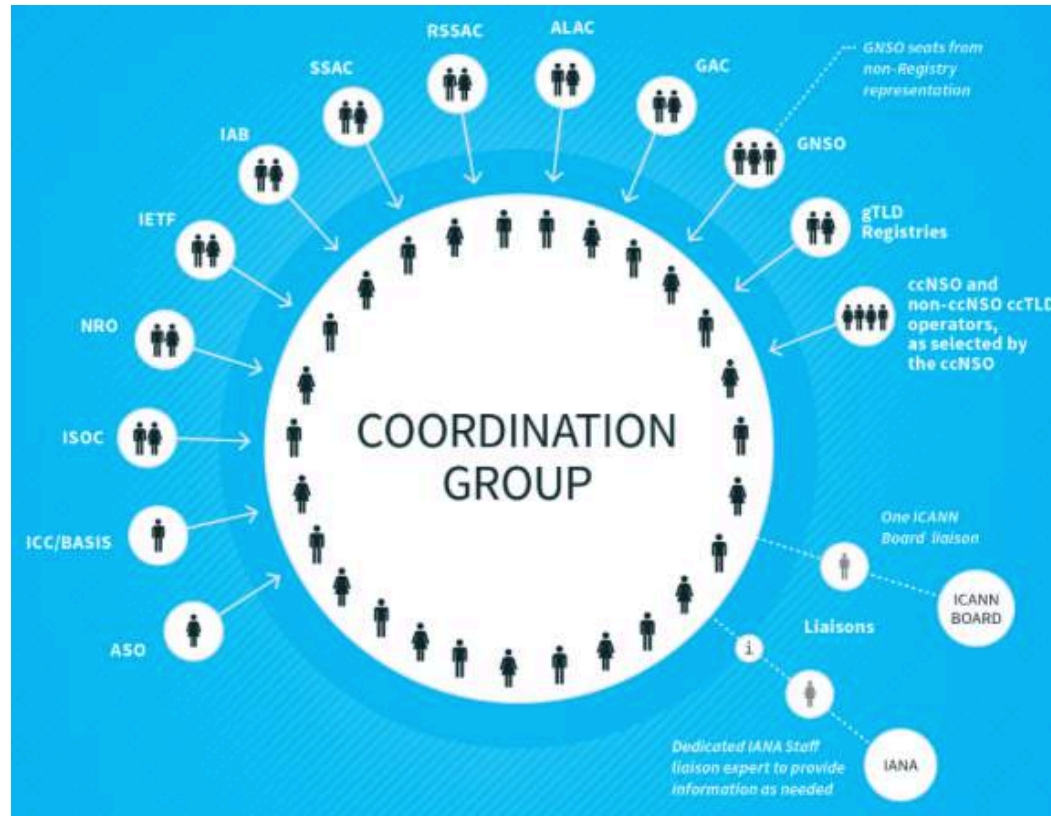


1. Support and enhance the multistakeholder model
2. Maintain the security, stability, and resiliency of the Internet DNS
3. Meet the needs and expectation of the global customers and partners of the IANA services
4. Maintain the openness of the Internet

# USG/NTIA will not accept a government-based proposal



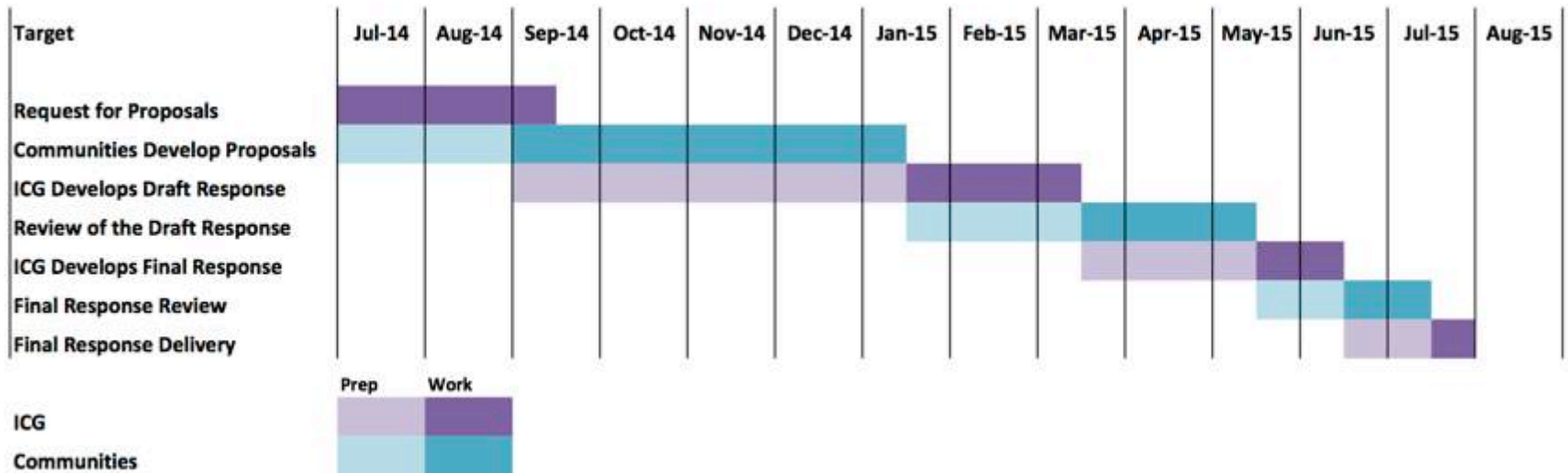
# June 2014 – ICANN’s convenes “IANA Stewardship Coordination Group”



# IANA Stewardship Transition Coordination Group (ICG) Mission

- To coordinate the development of a proposal among the communities affected by the IANA functions
- The ICG is comprised of 30 individuals representing 13 communities. Those communities include direct and indirect stakeholders.
- Charter:  
<https://www.icann.org/news/announcement-2014-08-27-en>

# IANA Stewardship Transition Coordination Group (ICG) Mission



# Number Community – Consolidated RIR IANA Stewardship Proposal (CRISP) Team

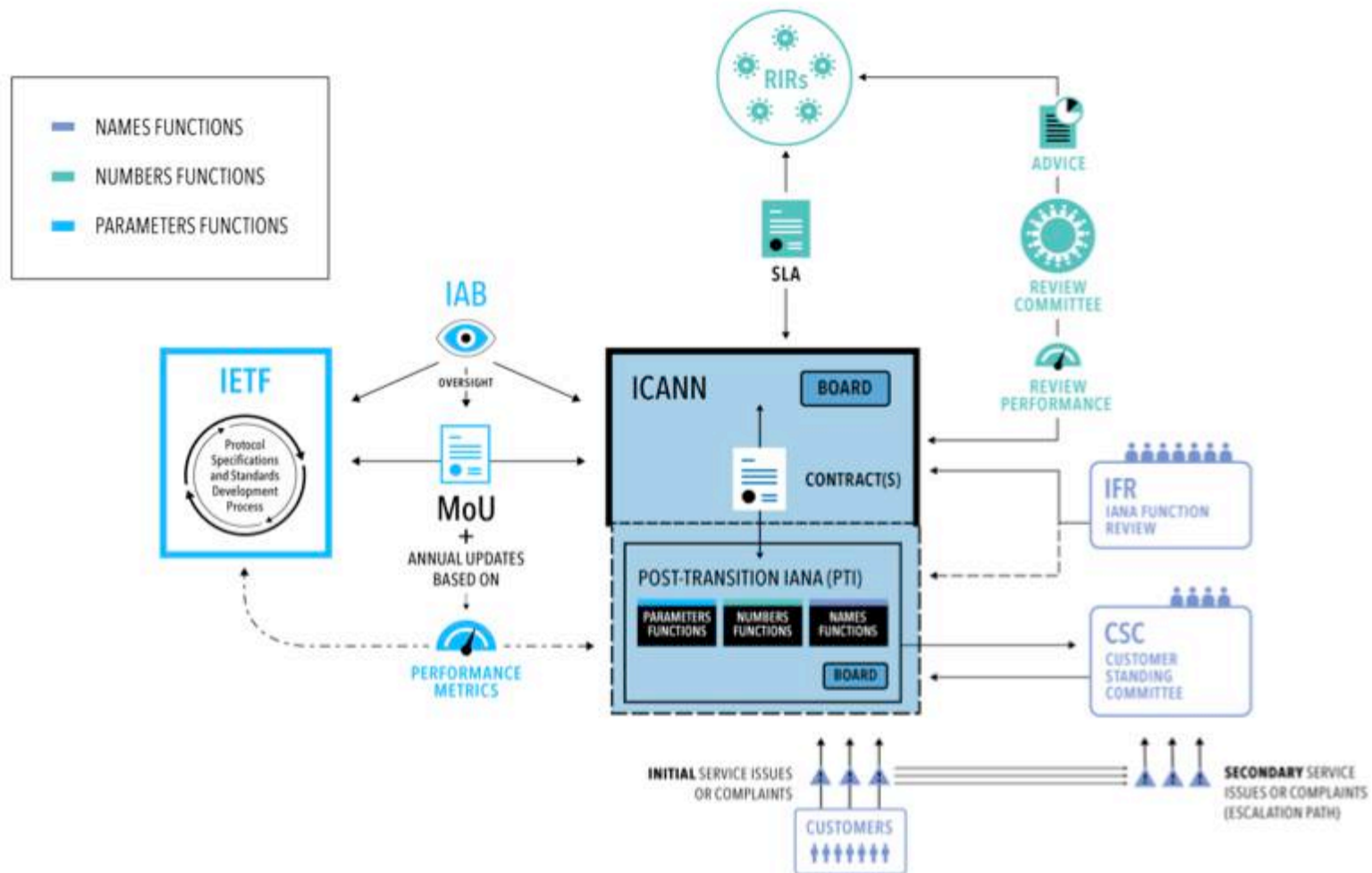
- 15 member team (3 per region) to integrate the input from each of the 5 RIR regions and finalize the “numbers community” submission to the ICG
- Charter:  
<https://www.nro.net/nro-and-internet-governance/iana-oversight/consolidated-rir-iana-stewardship-proposal-team-crisp-team>
- Open mailing list (and teleconferences) to create the proposal for number resources



# IANA Stewardship Proposal – Status

- ✓ Protocol Parameters (IETF community)
  - IANAPlan Working Group  
<https://tools.ietf.org/html/draft-ietf-ianaplan-icg-response-09> - Submitted 6 Jan 2015
- ✓ Number Resources (RIR community)
  - CRISP Team  
<https://www.nro.net/wp-content/uploads/ICG-RFP-Number-Resource-Proposal.pdf> - submitted 15 Jan 2015
- ✓ Names (DNS community)
  - Cross Community Working Group (CWG)  
<https://community.icann.org/pages/viewpage.action?pageId=53779816> - submitted 11 July 2015

# ICG Proposal Summary



# Open for Public Comments



*Public comment period:*

**July 31 to Sept 8**

Internet Assigned Numbers Authority  
(IANA) Stewardship Transition Proposal

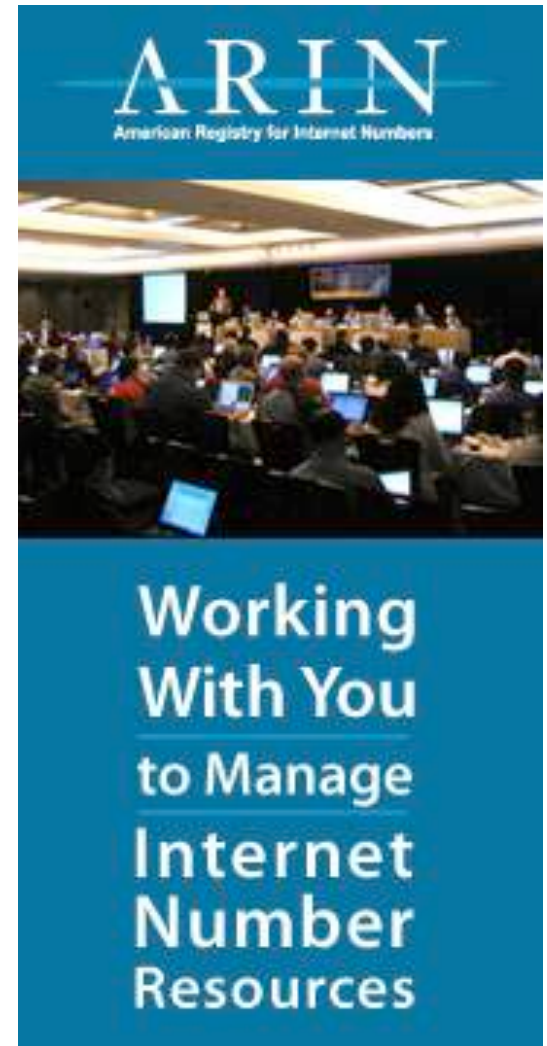
*Public comment website:*

**[comments.ianacg.org](https://comments.ianacg.org)**

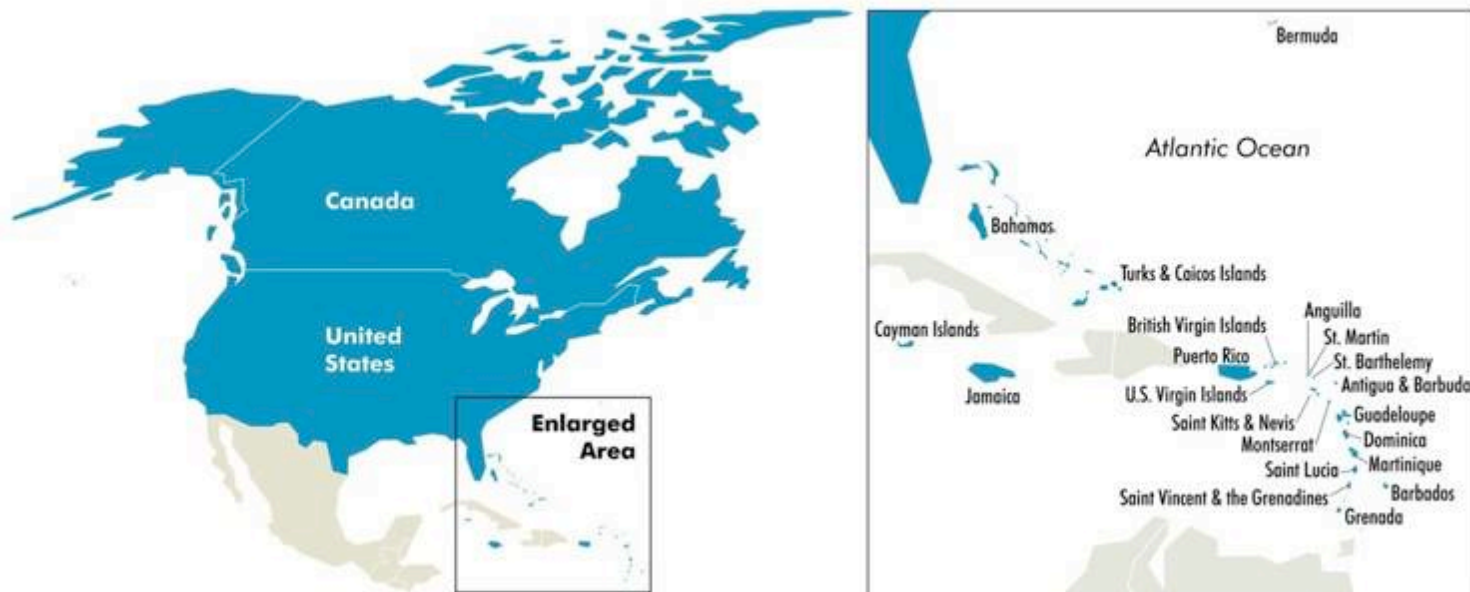
# ARIN and Internet Governance

As a Regional Internet Registry (RIR), ARIN is...

- a well-respected & active leader in the Internet community
- a thought leader in Internet governance discussions



# ARIN Service Region



The ARIN Region includes many Caribbean and North Atlantic islands, Canada, the United States and outlying areas.

**ARIN's key roles** in the area of Internet governance are as follows:

## On the **REGIONAL** level ARIN...

**Works with 26 economies in ARIN region to:**

- ➔ Advance understanding of number resource management model
- ➔ Provide educational opportunities
- ➔ Promote awareness
- ➔ Ensure openness and transparency
- ➔ Support multi-stakeholder open policy dialogue

**ARIN's key roles** in the area of Internet governance are as follows:

## On the **GLOBAL** level ARIN...

- ➔ Follows regulatory decision-making processes
- ➔ Maintains multi-stakeholder approach to policy development
- ➔ Is a **KEY** resource for information, ideas, and knowledge
- ➔ Supports cooperation & involvement in international organizations

# **& Internet Governance** *the Multistakeholder Approach*

Internet Governance



=

**COORDINATION OF  
THE MANY ASPECTS**

**INCLUDING** →

**TECHNICAL STANDARDS,  
POLICIES,  
INFRASTRUCTURE**

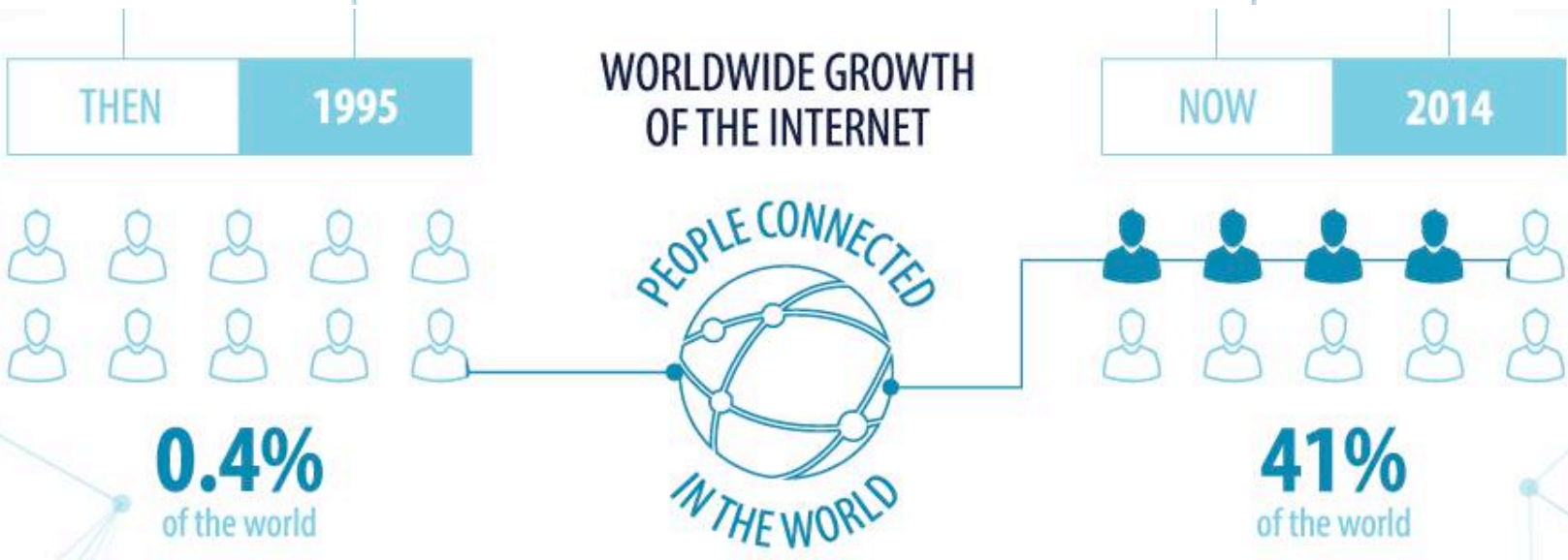
THAT MAKE THE  
INTERNET **WORK**  
& **DETERMINE**  
HOW IT IS USED

**INVOLVING**

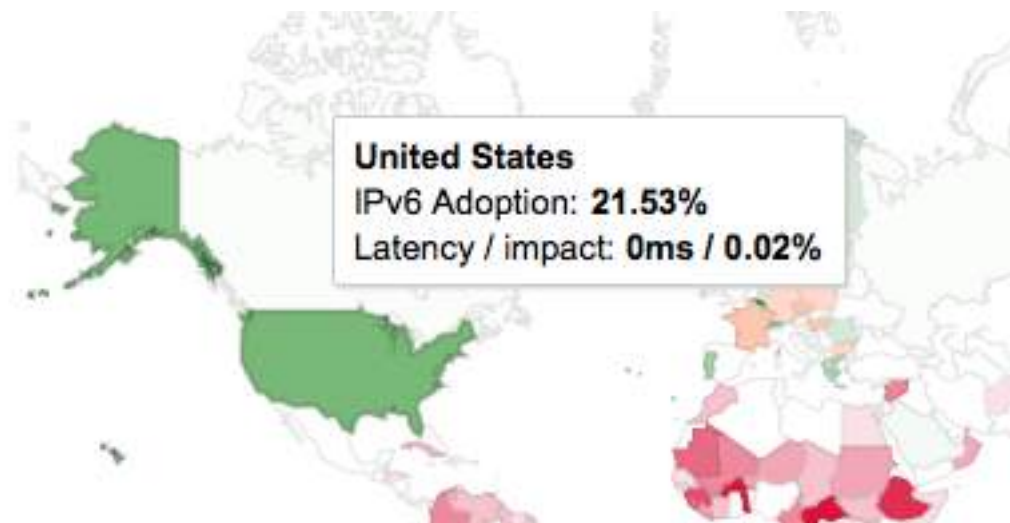
**GOVERNMENTS  
PRIVATE SECTOR  
CIVIL SOCIETY**



# Growth of the Internet



# IPv6 Deployment

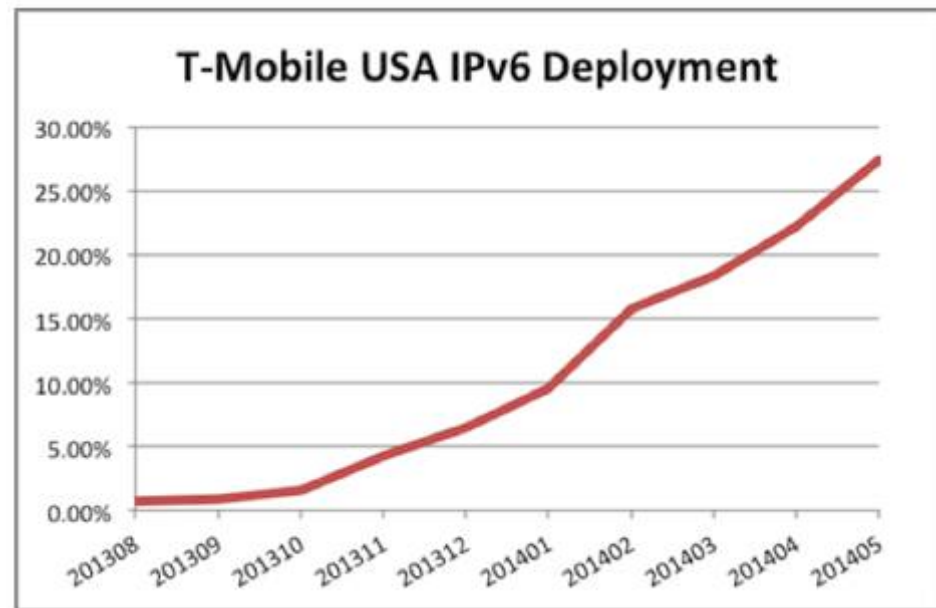


> 20% of US customers connected via IPv6 up from 10% one year ago today & growing rapidly

# US IPv6 Deployment - example

- T-Mobile US launched 8 Android phone models with **464XLAT** as the default in the last 8 months, all Android 4.3+ phones will be 464XLAT in the future at T-Mobile US (network transport is entirely IPv6)
- 8 million unique IPv6 subscribers in the first 8 months are active
- <http://www.worldipv6launch.org/measurements/> measurements show 27% of all T-Mobile connections to dual-stack sites are now IPv6
- Over 50% of IPv6-user traffic is end-to-end IPv6 (no translation needed)  
← This saves money and makes the network simpler

*“If you have mobile optimized website, you might want to have it on v6, so it doesn't have to go through hoops.”*



Credit: Cameron Byrne/T-Mobile, NANOG 61 Presentation, June 2014

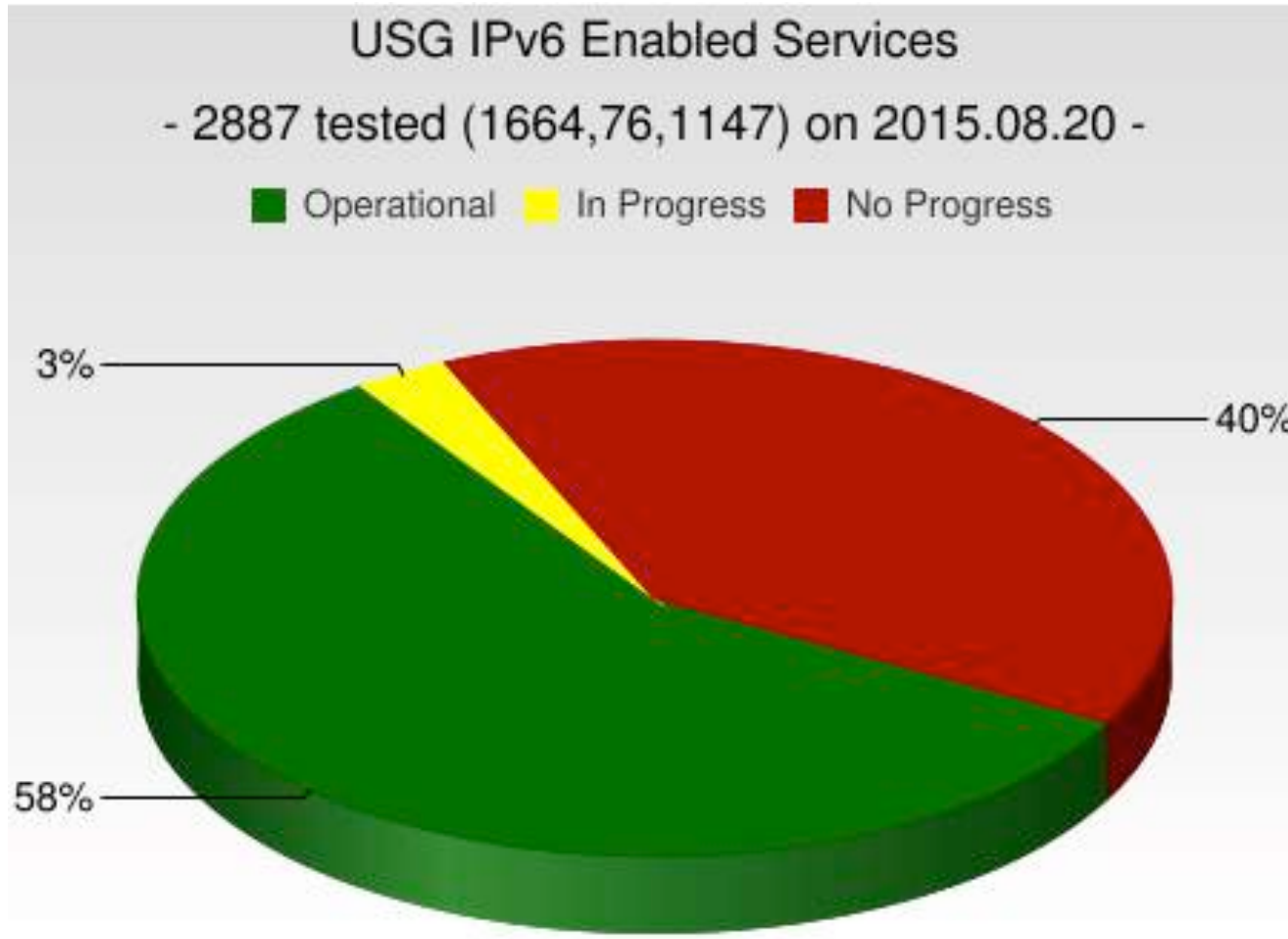
# Better Performance Over IPv6



- Facebook says it has seen users' news feeds loading 20% to 40% faster on mobile devices using IPv6

Credit: Facebook

# Policy can matter – USG website mandate



Credit: Advanced Network Technologies Division / NIST [fedv6-deployment.antd.nist.gov](http://fedv6-deployment.antd.nist.gov)

# Questions?

