RSSAC and the Root Server System

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Fred Baker, RSSAC Chair

GAC / RSSAC Joint Session for Fellows

What is RSSAC?

- Stands for **R**oot **S**erver **S**ystem **A**dvisory **C**ommittee
- The role of the Root Server System Advisory Committee (“RSSAC”) is to advise the ICANN community and Board on matters relating to the operation, administration, security, and integrity of the Internet's Root Server System.
- This is a very narrow scope!

RSSAC: Roles and Responsibilities

- Communicate on matters relating to the operation of the root server system with the technical community and ICANN community
- Communicate on matters relating to the administration of the root zone
- Engage in ongoing threat assessment and risk analysis of the root server system
- Respond to requests for information or advice from the Board
- Report periodically to the ICANN community and the Board on its activities
- RSSAC does not involve itself in operational matters

RSSAC Organization

- RSSAC is composed of
  - Representatives of the root server operators
  - Alternates to these
  - Liaisons
- RSSAC Caucus
  - Body of volunteer subject matter experts
  - Members confirmed by RSSAC based on statement of interest

RSSAC Caucus

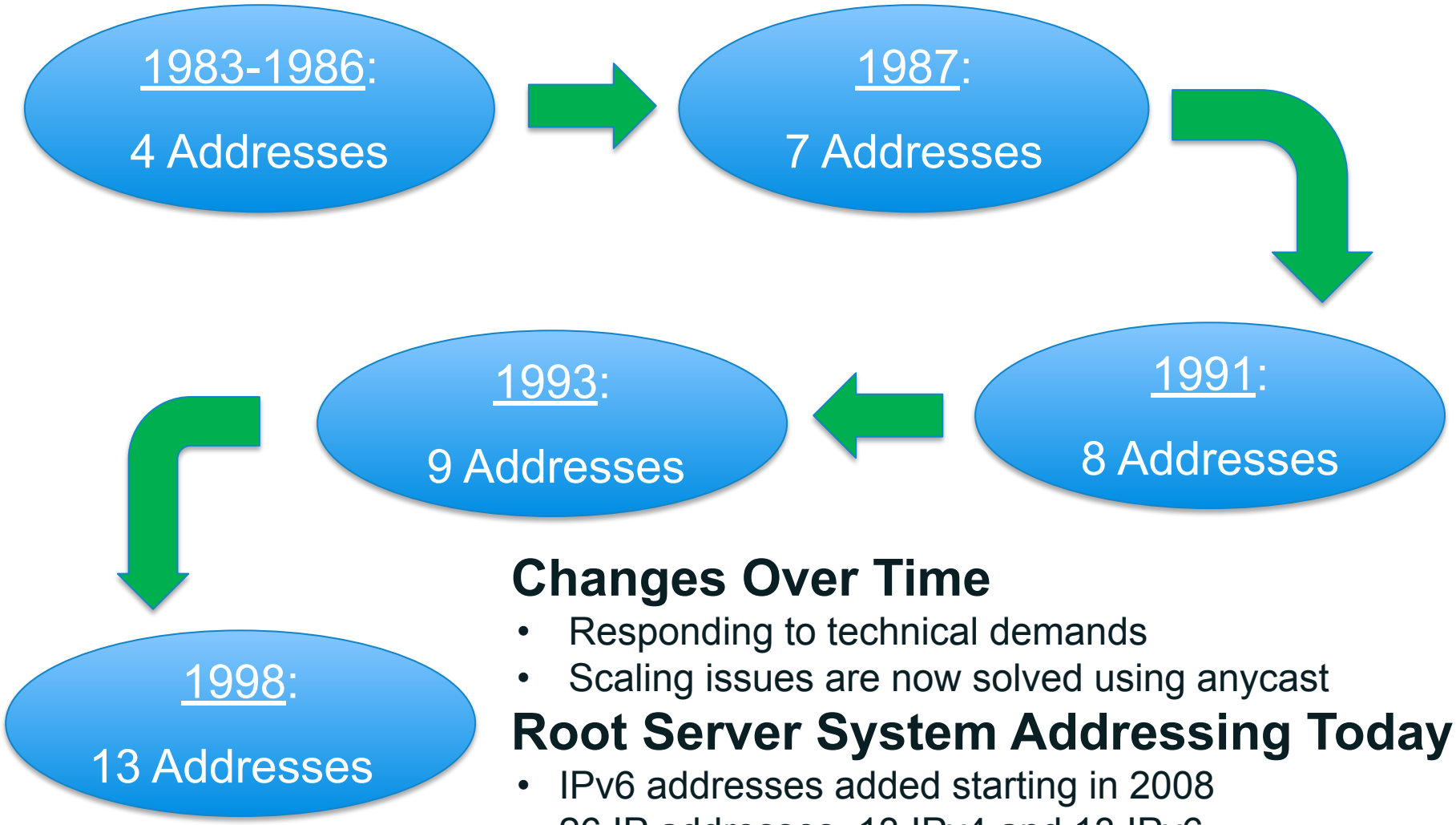
- Pool of experts with DNS expertise
- Broad spectrum and varied backgrounds of membership
- RSSAC members are also members of the RSSAC Caucus
- Charters work parties to explore topics and produce publications
- If interested in joining, submit statement of interest to rssac-membership@icann.org

RSSAC Caucus Recent Work

- RSSAC056: RSSAC Advisory on Rogue DNS Root Server Operators
- RSSAC057: Requirements for Measurements of the Local Perspective on the Root Server System
- RSSAC047v2: RSSAC Advisory on Metrics for the DNS Root Servers and the Root Server System
- Come to the RSSAC public session to learn more

The Root Server System

Growth of the Root Server System



Changes Over Time

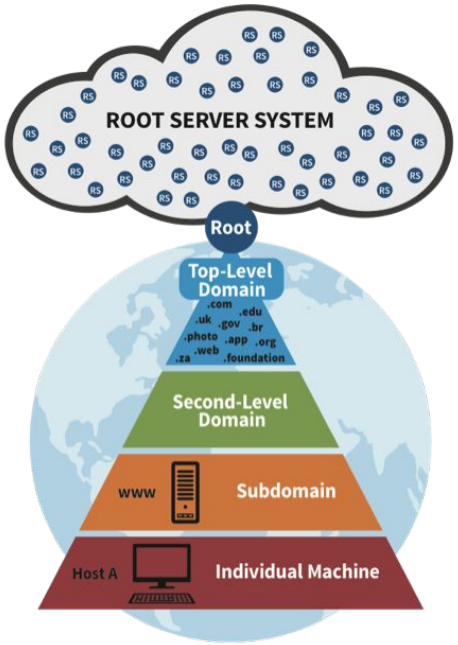
- Responding to technical demands
- Scaling issues are now solved using anycast

Root Server System Addressing Today

- IPv6 addresses added starting in 2008
- 26 IP addresses, 13 IPv4 and 13 IPv6
- Served from over 1000 physical Instances

Global DNS Root Services

- Root server system is composed of 13 root server identifiers operated by 12 different organizations
- 26 IP addresses (13 IPv4 and 13 IPv6) with over 1000 instances around the world
- Anycasting is used to access root servers

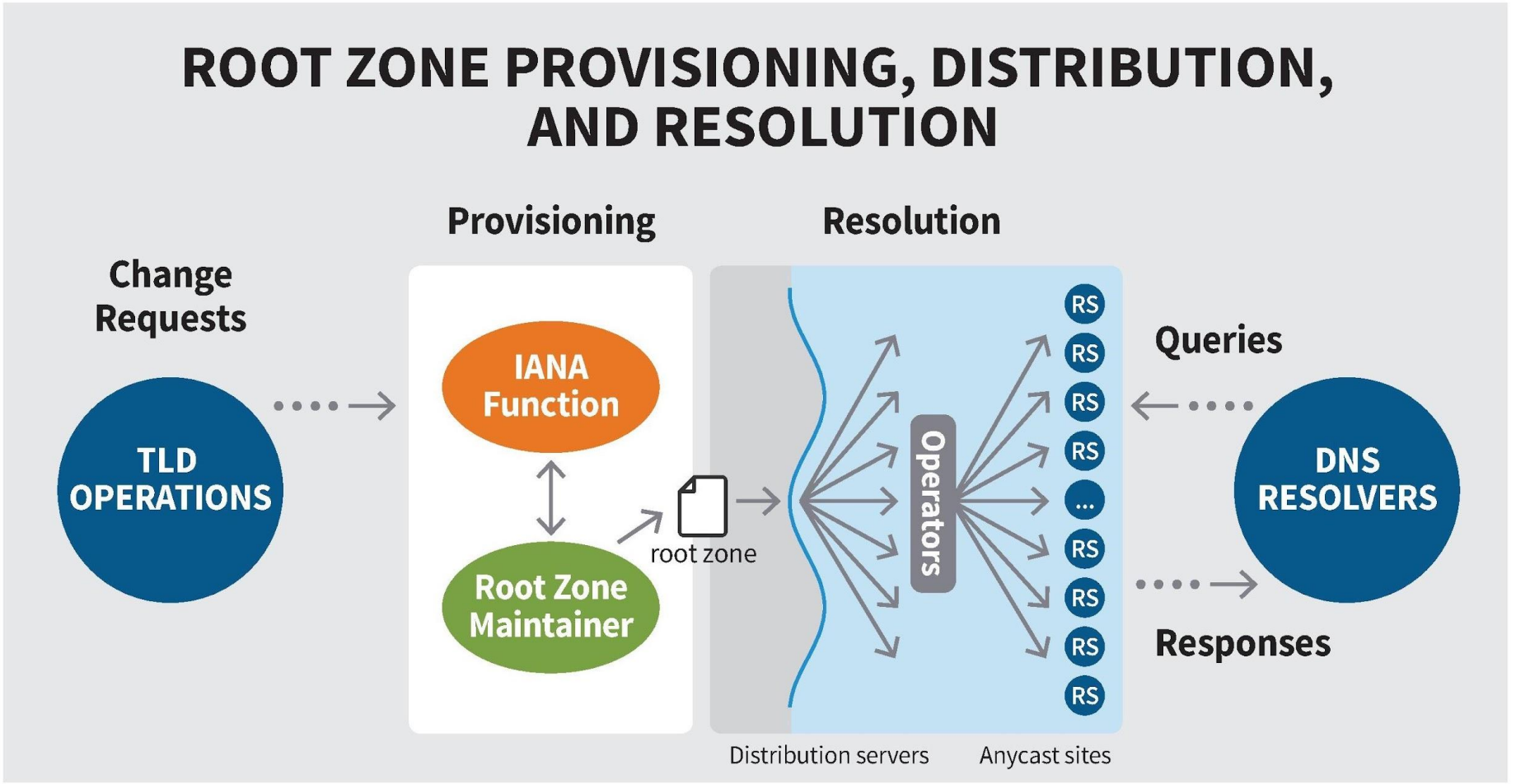


1. Cogent Communications
2. ICANN
3. Internet Systems Consortium
4. NASA Ames Research Center
5. Netnod
6. Réseaux IP Européens Network Coordination Centre
7. University of Maryland
8. University of Southern California, Information Sciences Institute
9. U.S. Department of Defense Network Information Center
10. U.S. Army Research Laboratory
11. Verisign, Inc.
12. WIDE Project and Japan Registry Services

Root Servers Today - 2022

Over 1000 instances around the world – https://root-servers.org/

Root Zone Management and Resolution



Root Zone vs. Root Server System

Root Zone

- The starting point: the list of TLDs and their nameservers
- Managed by ICANN, per community policy
- Compiled & distributed by the Root Zone Maintainer to all root server operators
- The information served by the root servers

Root Server System

- Responds with data from the root zone
- Currently distributed from 26 IP addresses, 13 IPv4 and 13 IPv6, from over 1000 physical instances
- Purely technical role to serve the root zone
- Responsibility of the root server operators

Myths vs. Reality

Myth	Reality
Root servers control where Internet traffic goes.	Routers control where Internet traffic goes.
Root server operators can easily change the root zone content, including removing a TLD	DNSSEC validation would reveal any tampering with root server responses, including the removal of a TLD
Administration of the root zone and service provision are the same thing.	Administration of the root zone is separate from service provision.
The root server identifiers have special meaning.	None of the root server identifiers are special.
There are only 13 root servers.	There are more than 1000 servers globally, but only 13 root server identifiers.
The root server operators conduct operations independently.	The collective root server operators coordinate root service operation as a whole.

Root Server System Governance Evolution

Root Server System Evolution Timeline

RSSAC037 Overview

- Defines eleven principles for the operation and evolution of the Root Server System
- Proposes an initial governance model (the RSSAC037 Model) for the Root Server System and its operators
- Demonstrates how the RSSAC037 Model works through a set of scenarios on designation and removal of operators

11 Principles of the Root Server System

1. To remain a global network, the Internet requires a globally unique public namespace.
2. IANA is the source of DNS root data.
3. The RSS must be a stable, reliable, and resilient platform for the DNS service to all users.
4. Diversity of the root server operations is a strength of the overall system.
5. Architectural changes should result from technical evolution and demonstrated technical need.
6. The IETF defines technical operation of the DNS protocol.

11 Principles of the Root Server System (continued)

7. RSOs must operate with integrity and an ethos demonstrating a commitment to the common good of the Internet.
8. RSOs must be transparent.
9. RSOs must collaborate and engage with their stakeholder community.
10. RSOs must be autonomous and independent.
11. RSOs must be neutral and impartial.

RSSAC038 Overview

Recommendations that complement RSSAC037.

The RSSAC recommends the ICANN Board:

1. Initiate a process to produce a final version of the Model based on RSSAC037.
2. Estimate costs of the RSS and developing the Model. Initial efforts should focus on developing a timeline.
3. Implement the final version of the Model based upon principles of accountability, transparency, sustainability, and service integrity.

RSSAC058 & RSSAC059

- RSSAC058: Success Criteria for the RSS Governance Structure
  - Contains success criteria for any proposed root server system governance structure (RSS GS).
  - These success criteria form a framework to assess the degree to which any proposed RSS GS conforms with previous RSSAC statements concerning RSS governance.
- RSSAC059: RSSAC Advisory on Success Criteria for the Root Server System Governance Structure
  - Contains recommendations on how these success criteria should be integrated with the recommendations in RSSAC038.

Governance Working Group (GWG)

- Composed of representatives from the RSOs, ccTLD Name Supporting Organization (ccNSO), the Internet Architecture Board (IAB), Registry Stakeholder Group, and the Security and Stability Advisory Committee (SSAC)
  - Liasons from the ICANN Board, the IANA, and the Root Zone Maintainer (RZM)
- Tasked with working out the details of the Model
- The GWG was tasked with
  - Committing to a timeline with clear milestones
  - Working openly and transparently
  - Seeking informed contributions when necessary
  - Embracing the principles outlined in RSSAC037
  - Refer to RSSAC037, Concept Paper, Public Comment feedback, and other relevant RSSAC publications as references

RSSAC at ICANN73

Meetings at ICANN73

- **RSSAC & ICANN Board Joint Meeting,** Monday 7 March
- **RSSAC Meeting,** Tuesday 8 March
- **RSSAC Public Session,** Thursday 10 March

How to Prepare for RSSAC Sessions at ICANN73

- RSSAC Mainpage: https://www.icann.org/groups/rssac
- RSSAC Caucus Mainpage: https://www.icann.org/groups/rssac-caucus
- RSSAC Publications: https://www.icann.org/groups/rssac/documents
- RSSAC FAQ: https://www.icann.org/groups/rssac/faq