

ICANN 78 Root Server System Information Session

Root Server System Advisory Committee (RSSAC)

Useful Definitions

- **Root Zone**
 - The DNS zone at the top of the DNS hierarchy. It has no parent and contains all the information necessary to contact the TLDs.
- **Root Server System (RSS)**
 - The set of root servers that collectively serve the root zone.
- **Root Server Operator (RSO)**
 - An organization responsible for managing the root service on IP addresses specified in the root zone.
- **Root Server Anycast Instance**
 - One network location responding to DNS queries on a root server operator's IP address.
- **Root Server System Advisory Committee (RSSAC)**
 - ICANN advisory committee composed of representatives from the root server operators and liaisons.

Root Zone vs. Root Server System

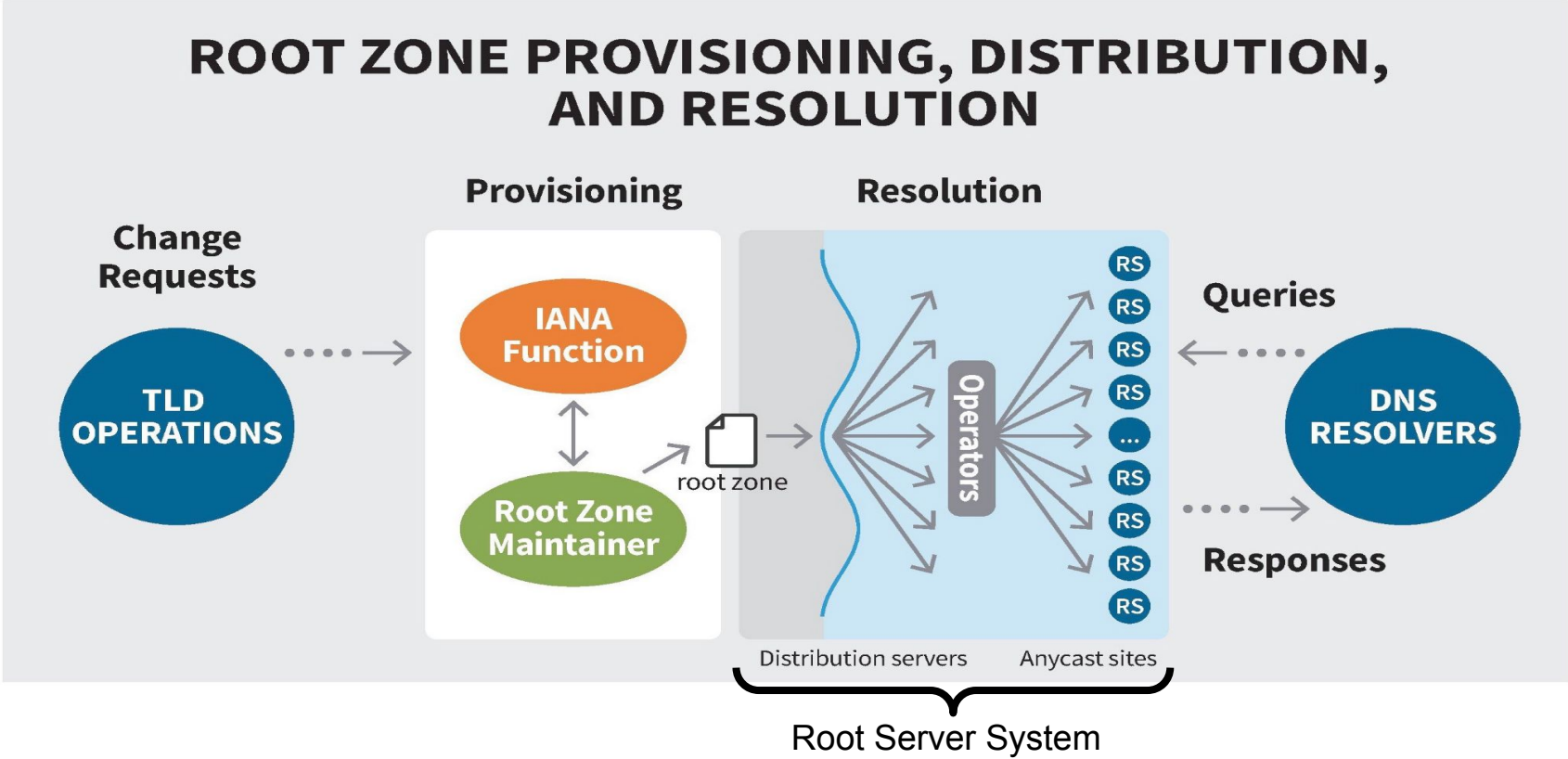
Root Zone

- 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 served from 13 IPv4 and 13 IPv6 addresses, from over 1500 instances
- Purely technical role to serve the root zone
- Responsibility of the root server operators

Root Zone Administration and Resolution



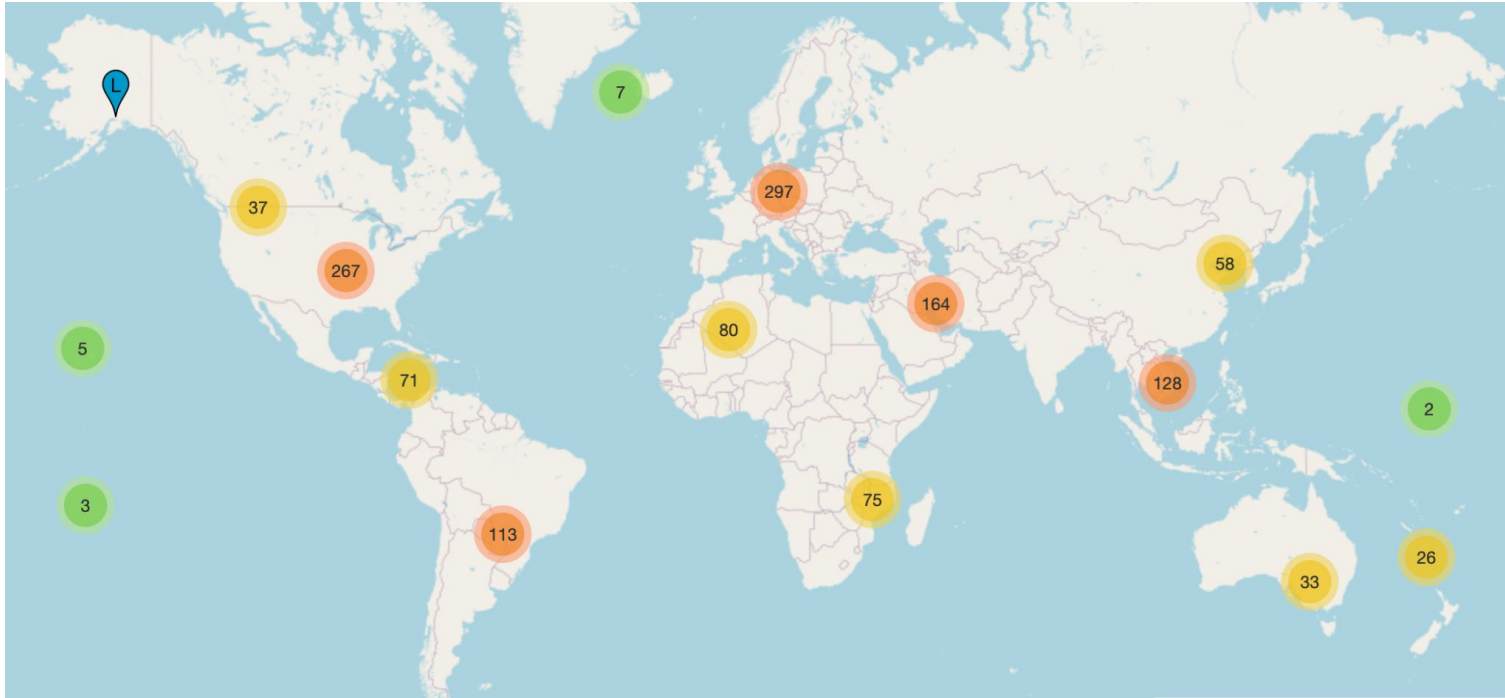
Growth of the Root Server System

1984 - 1985	4 Root Servers	USC-ISI (x2), SRI (DDN NIC), BRL (now ARL)
1987	7 Root Servers	Growth of NSFNet (UMD, NASA, RPI)
1991	8 Root Servers	First RSO based outside of North America (KTH)
1993	9 Root Servers	Registration duties assigned by NSF (NSI)
1998	13 Root Servers	Renaming of root servers to accommodate up to 13 identifiers
2001 - Present	Anycast introduced	13 physical instances grew to >1500

Changes Over Time

- Responding to technical demands
- Scaling issues are now addressed with anycast
- See RSSAC023 for a detailed history of the RSS

The Root Server System Today



Over 1700 instances around the world – <https://root-servers.org/>

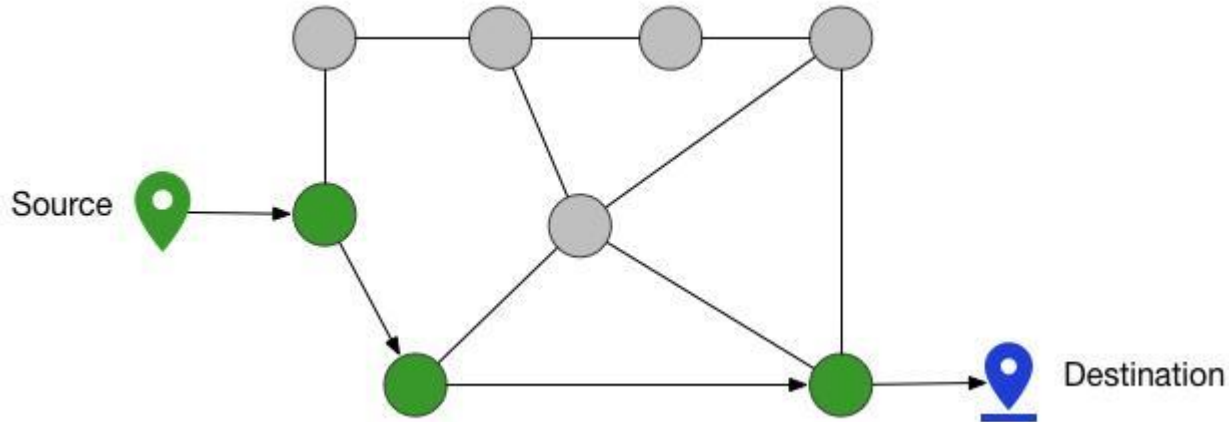
Queries Received by-week (billion) (daily average)

Source: RSSAC002 Data



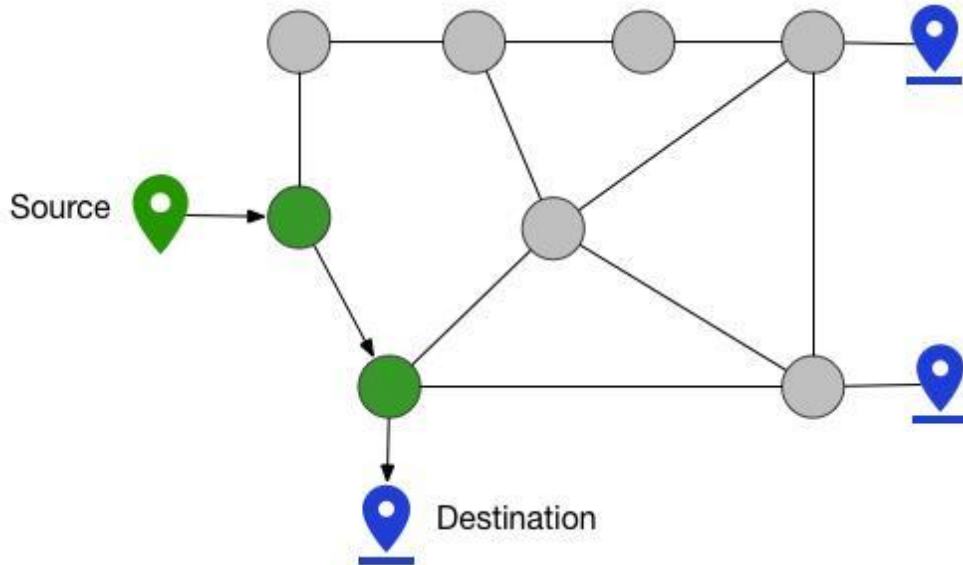
Unicast

Traffic takes shortest route to single destination.



Anycast

- Traffic takes shortest route to closest destination.
- Intermediate routing policies determine the destination for a source.
- Path is shortened and data is delivered more quickly.



Anycast Under DDoS Attacks

- DDoS attack traffic also takes shortest route to closest destination, thus gets distributed across all destinations.

