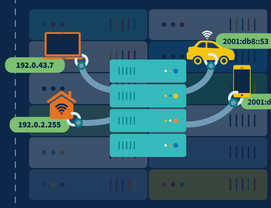
Understanding the Internet's Root Server System

DNS AND IP ADDRESSES

How do billions of connected devices find each other?

Each device or website on the Internet has a unique address – like a telephone number.



This address is a series of numbers and letters, called an **IP address**. IP stands for **Internet Protocol**.

The Domain Name System (DNS) makes navigating the Internet easier by allowing users to type in familiar letters – the **domain name** – instead of the **IP address**.

For example, you only need to type in **https://icann.org** to reach ICANN's website, instead of its **IP address - 192.0.43.7**

THE LOOKUP PROCESS

What happens when you type in that domain name?

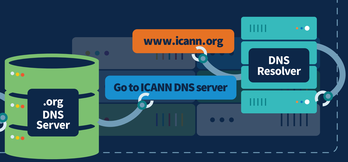
STEP 1: Your laptop asks the **DNS resolver**, "Where is www.icann.org?"

STEP 2: The DNS resolver asks a **root DNS server**, "Where is www.icann.org?"

Root DNS servers only know information about **top-level domain (TLD)* names**, so it tells the DNS resolver to "try .org" and gives the DNS resolver referral information to a **.org server**.

STEP 3: The DNS resolver asks the **.org DNS server**, "Where is www.icann.org?"

The .org server only knows about .org domains, so it tells the DNS resolver to "try www.icann.org" and gives the DNS resolver referral information to a **www.icann.org DNS server**.



STEP 4: The DNS resolver asks the **www.icann.org DNS server**, "Where is www.icann.org?"

Since the www.icann.org DNS server knows about the entire website address, not just the TLD, it tells the DNS resolver that "**www.icann.org** is at IP address **192.0.43.7**"

STEP 5: The DNS resolver tells your laptop that "**www.icann.org** is at **192.0.43.7**"

Success!

THE ROOT SERVER SYSTEM

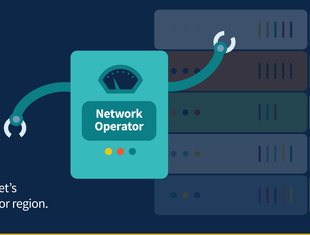
There are 12 independent **root server operators** that manage 13 root identities across the globe. The ICANN organization runs one of these root identities – the ICANN Managed Root Server (IMRS). These identities represent over 1,000 individual servers, each providing identical information from the root zone to resolvers all over the world.

What is the root zone?

The root zone holds referral information for the TLDs, which points to their DNS servers to help **resolve** your device's request.

ROOT SERVICE AND YOU

- ICANN encourages qualified network operators to host machines in your country, territory, or region to serve root data.
- This is also known as **instances of the IMRS**.
- Other root server operators have similar programs that allow network operators to manage a root zone instance locally.
- Running an instance helps improve the security, stability, and resiliency of the Internet's DNS infrastructure in your country, territory, or region.



LEARN MORE

Read ICANN's Overview of the Root Server System:
https://go.icann.org/rootserversystem

Visit ICANN's Website: https://icann.org

Follow us on social media: https://go.icann.org/socialmedia

*A TLD is a domain at the top of the naming hierarchy of the DNS. In a domain name, the TLD appears after the second-level domain. For example, in the domain name **icann.org**, the characters **org** identify the TLD.

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