DNS

What is DNS ?

- DNS, or the Domain Name System, translates human readable domain names (for example, www.amazon.com) to machine readable IP addresses (for example, 192.0.2.44).

- The Domain Name System (DNS) is the phonebook of the Internet. Humans access information online through domain names, like nytimes.com or espn.com. Web browsers interact through Internet Protocol (IP) addresses.

- Each device connected to the Internet has a unique IP address which other machines use to find the device. DNS servers eliminate the need for humans to memorize IP addresses such as 192.168.1.1 (in IPv4

How is the DNS work?

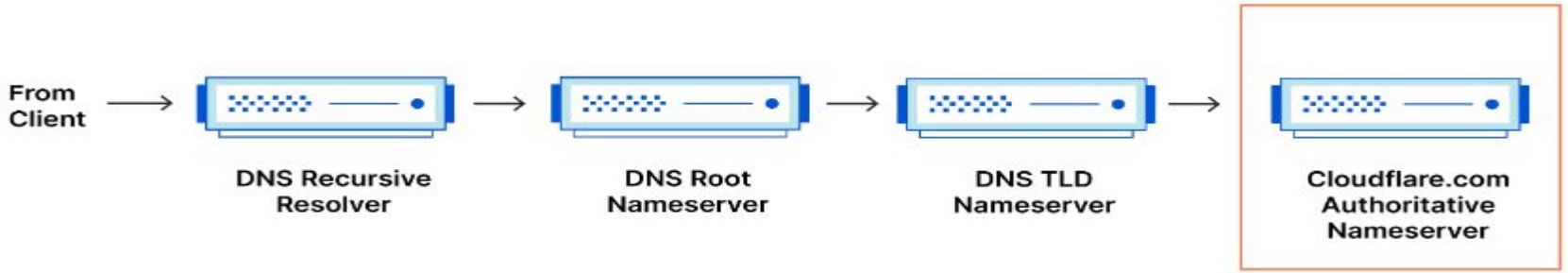
The process of DNS resolution involves converting a hostname (such as www.example.com) into a computer-friendly IP address (such as 192.168.1.1). An IP address is given to each device on the Internet, and that address is necessary to find the appropriate Internet device - like a street address is used to find a particular home.

When a user wants to load a webpage, a translation must occur between what a user types into their web browser (example.com) and the machine-friendly address necessary to locate the example.com webpage.

In order to understand the process behind the DNS resolution, it’s important to learn about the different hardware components a DNS query must pass between. For the web browser, the DNS lookup occurs "behind the scenes" and requires no interaction from the user’s computer apart from the initial request.

Types of DNS service

Authoritative DNS: An authoritative DNS service provides an update mechanism that developers use to manage their public DNS names. It then answers DNS queries, translating domain names into IP address so computers can communicate with each other. Authoritative DNS has the final authority over a domain and is responsible for providing answers to recursive DNS servers with the IP address information. Amazon Route 53 is an authoritative DNS system.



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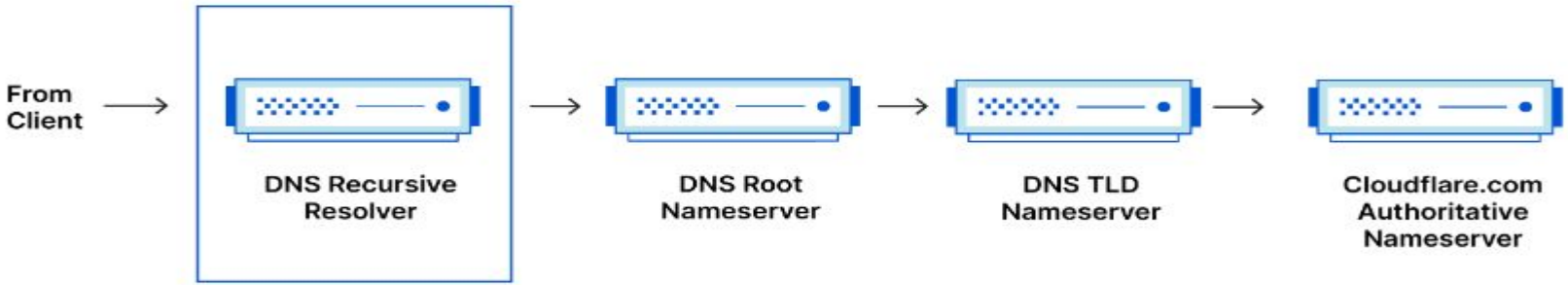
Recursive DNS: The recursive resolver is the computer that responds to a recursive request from a client and takes the time to track down the DNS record

It does this by making a series of requests until it reaches the authoritative DNS nameserver for the requested record (or times out or returns an error if no record is found).

Luckily, recursive DNS resolvers do not always need to make multiple requests in order to track down the records needed to respond to a client; caching is a data persistence process that helps short-circuit the necessary requests by serving the requested resource record earlier in the DNS lookup.



DNS servers involved in loading a webpage

DNS recursor -

The recursor can be thought of as a librarian who is asked to go find a particular book somewhere in a library. The DNS recursor is a server designed to receive queries from client machines through applications such as web browsers. Typically the recursor is then responsible for making additional requests in order to satisfy the client's DNS query.

Root nameserver -

The root server is the first step in translating (resolving) human readable host names into IP addresses. It can be thought of like an index in a library that points to different racks of books - typically it serves as a reference to other more specific locations

TLD nameserver -

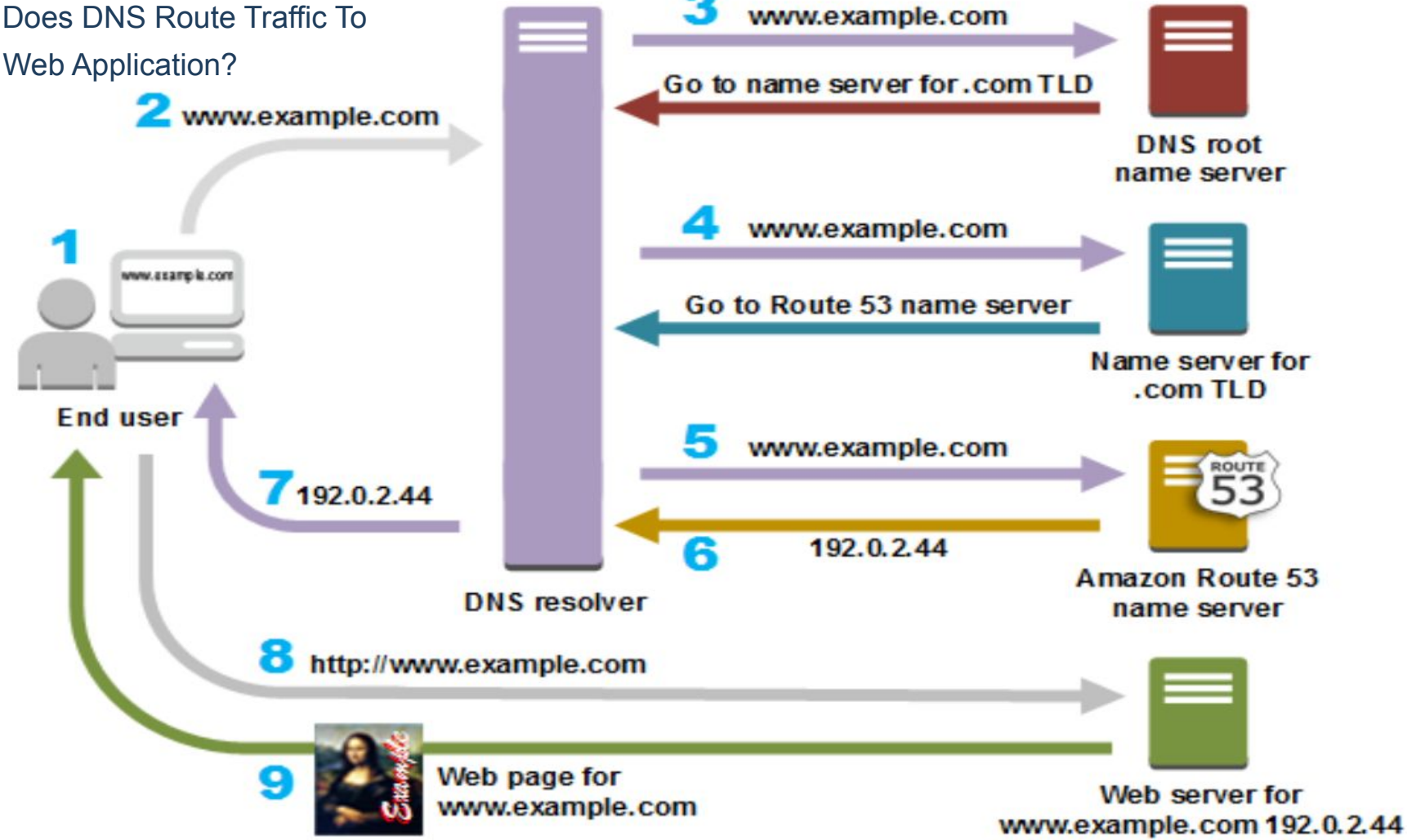
The top level domain server (TLD) can be thought of as a specific rack of books in a library. This nameserver is the next step in the search for a specific IP address, and it hosts the last portion of a hostname (In example.com, the TLD server is “com”).

Authoritative nameserver -

This final nameserver can be thought of as a dictionary on a rack of books, in which a specific name can be translated into its definition. The authoritative nameserver is the last stop in the nameserver query.

If the authoritative name server has access to the requested record, it will return the IP address for the requested hostname back to the DNS Recursor (the librarian) that made the initial request.

How Does DNS Route Traffic To Your Web Application?



DNS Queries