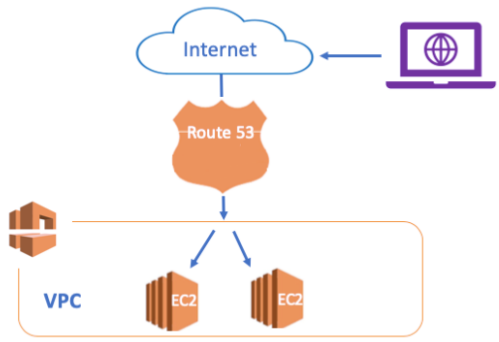
Introduction to Route 53

What is AWS Route 53?

Amazon Route 53 is a highly available and scalable **Domain Name System (DNS)** web service. Route 53 design is intended to provide a highly reliable and cost-effective approach to routing end-users to internet applications.

The name of Route 53 is a inspired by TCP or UDP port 53, where DNS server requests are addressed. In addition, the **route** in the name route 53 derived from **Road 66** which is the iconic highway in USA.

What is AWS Route 53 used for?



What is AWS Route 53 used for?

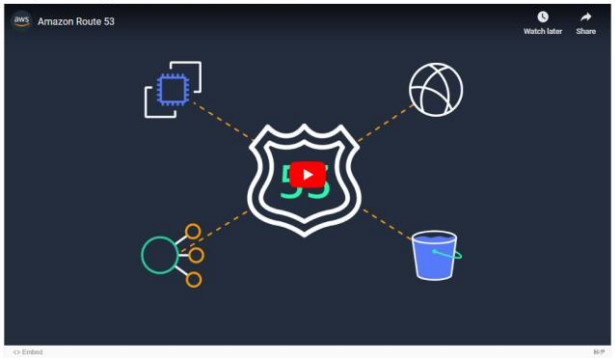
Amazon Route 53 effectively connects user requests to infrastructure running in AWS, such as Amazon EC2 instances, Elastic Load Balancer or Amazon S3 buckets. It can also be used to route users to infrastructure outside of AWS.

You can use Amazon Route 53 to configure DNS health checks to route traffic to healthy endpoints.

Thanks to Amazon Route 53 you can manage traffic globally through a variety of routing types, including Latency Based Routing and Weighted, etc.

Amazon Route 53 also offers Domain Name Registration. You can purchase and manage domain names such as **clarusway.com** and Amazon Route 53 will automatically configure DNS settings for your domains.

Complementary Lesson about Amazon Route 53



What is DNS?

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DNS stands for the **Domain Name System**. It is a system used for transferring human-readable domain names such as www.clarusway.com to a machine-readable IP address such as 1.2.3.45

Domain Name is the phrase given to the naming that corresponds to the IP address to which a device in the internet environment is connected.

Domain names consist of a set of words, letters, or numbers to describe a unique individual or company.

In fact, we can say the Domain Name System (DNS) is the phonebook of the Internet like in your home. All the IP numbers which correspond to domain names are listed in this phonebook.

Why do we need DNS?

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Each device connected to the Internet has a unique IP address that other machines use to find the device. Computers communicate with each other over IP addresses, not names.

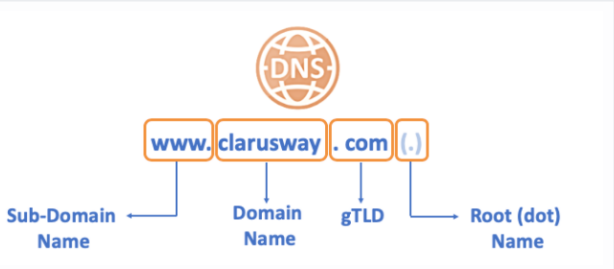
But the human brain using these computers has the ability to remember names rather than numbers. Therefore, in order to simplify the complex IP numbers, there was a need to match them with the names.

Let's give an example. Assume that you are a postman. Which of the address you prefer to deliver, **47.622317N-122.336488E** or **South Lake Union Farmers Market, 410 Terry Ave N, Seattle, WA 98109, United States**. Of course, all of us select the second one.

In fact, both addresses define the same location **Amazon Corporate Headquarters**. But the human brain remembers and memorizes the words better than the numbers.

So, we can say DNS is designed to make the connections easier for computer users.

Structure of DNS



Structure of DNS

Let's examine the FQDN (Fully Qualified Domain Name) of **clarusway** to understand the structure of DNS.

- **Root (dot) Name:**

The basis of all naming is Root (dot) Name. It represents the beginning of the DNS query, although it is not visible. Also, the query for resolving the DNS depends on the Root (dot) Name.

- **gTLD:**

To the left of the route name are **gTLD** domains. **gTLD** stands for Generic Top-Level Domain. Management and responsibility for gTLDs are delegated to organizations by the Internet Corporation for Assigned Names and Numbers (ICANN) and the Internet Assigned Numbers Authority (IANA),

Generic Top-Level Domain was designed to help classify a feature of a website, such as its purpose. There are currently 21 gTLDs and the most common TLDs are **com**, **net** and **org**.

- **Domain Names:**

A Domain Name is your website name. For example, **clarusway** is the domain name of our company where internet users can access our website. It represents to name of the firm, organization or foundation, etc.

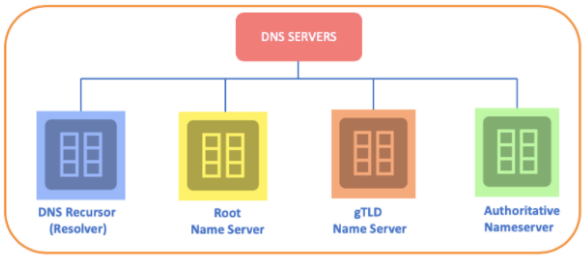
Domain names are being sold and leased by organizations authorized by ICANN. AWS is one of these organizations and registers domain names via Route 53 Service.

- **Sub-domains:**

On the far left, there is a sub-domain. Sub-domains are commonly used to specify domains for communication purposes, device type, content type, or for other reasons.

www, **mobile**, **mail** and **info** are some of the most common subdomains.

DNS Servers



DNS Servers

To understand the process behind the DNS resolution, it's important to learn about the different hardware components that a DNS query needs to pass through.

There are 4 DNS servers involved in DNS;

- **DNS Recursor (Resolver):**

Clients typically do not make queries directly to authoritative DNS services. Instead, they generally connect to another type of DNS service known a resolver, or DNS Recursor.

If a Recursor has the DNS reference cached or stored for a period of time, then it answers the DNS query by providing the source or IP information. If not, it passes the query to one or more authoritative DNS servers to find the information.

- **Root(dat) Nameserver:**

The Root Nameserver is the first step in resolving the hostnames process. There are 13 different locations Root DNS server clusters in the world.

In this DNS server, there are IP addresses of authorized DNS servers where **all gTLD domains such as com, net, and org etc are kept.**

So the purpose of the Root Nameserver is to point out the gTLD Nameserver's IP

- **gTLD Nameserver:**

This nameserver is the next step in the search for a specific IP address, and it hosts the last portion of a hostname. It keeps the IP of all the Authoritative Nameserver.

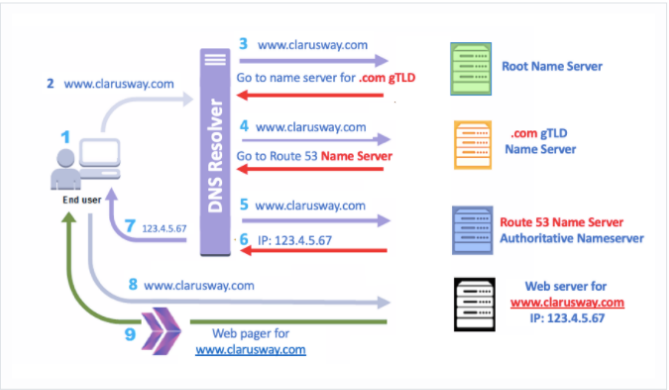
For clarusway.com; gTLD Nameserver is **.com gTLD Nameserver** and it holds the list of Authoritative Nameserver's IP under this gTLD (com).

The responsibility of the **gTLD Nameserver** is to respond to the query with associated Authoritative Nameserver's IP.

- **Authoritative Nameserver:**

Authoritative Nameserver 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 Nameserver**.

DNS Resolving



DNS Resolving

1. A user opens a web browser, enters www.clarusway.com in the address bar, and hit Enter.
2. The request for www.clarusway.com is routed to a DNS resolver, which is typically managed by the user's Internet service provider (ISP), such as a cable internet provider.
3. The DNS resolver for the ISP forwards the request for www.clarusway.com to a **DNS Root Name Server**.
4. The DNS resolver forwards the request for www.clarusway.com again, this time to one of the gTLD name servers for **.com** domains. The name server for **.com** domains responds to the request with the names of the **four Amazon Route 53 Name Servers** that are associated with the clarusway.com domain.
5. The DNS resolver chooses an Amazon Route 53 name server and forwards the request for www.clarusway.com to that name server.
6. The Amazon Route 53 name server looks in the clarusway.com hosted zone for the www.clarusway.com record, gets the associated value, such as the IP address for a web server 123.4.5.67 and returns the IP address to the DNS resolver.
7. The DNS resolver for the ISP finally has the IP address that the user needs. The resolver returns that value to the web browser.
8. The web browser sends a request for www.clarusway.com to the IP address that it got from the DNS resolver.
9. The web server or other resources at 123.4.5.67 return the web page for www.clarusway.com to the web browser, and the web browser displays the page.