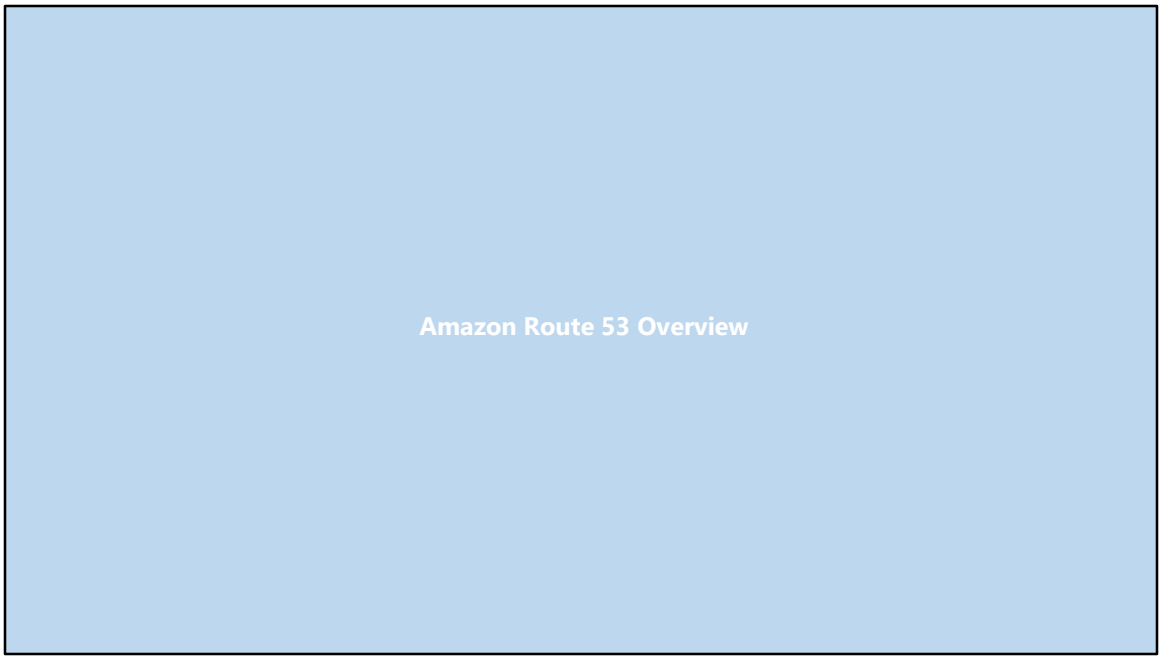
Amazon Route 53

Welcome to the seventh lesson of AWS Solutions Architect Associate level course—Amazon Route 53.

By the end of the lesson you will be able to:

- Explain the uses of Route 53 service
- Describe how Route 53 manages DNS
- Discuss the concept of Routing Policies
- List the AWS recommended best practices for Route 53
- List the costs associated with Route 53



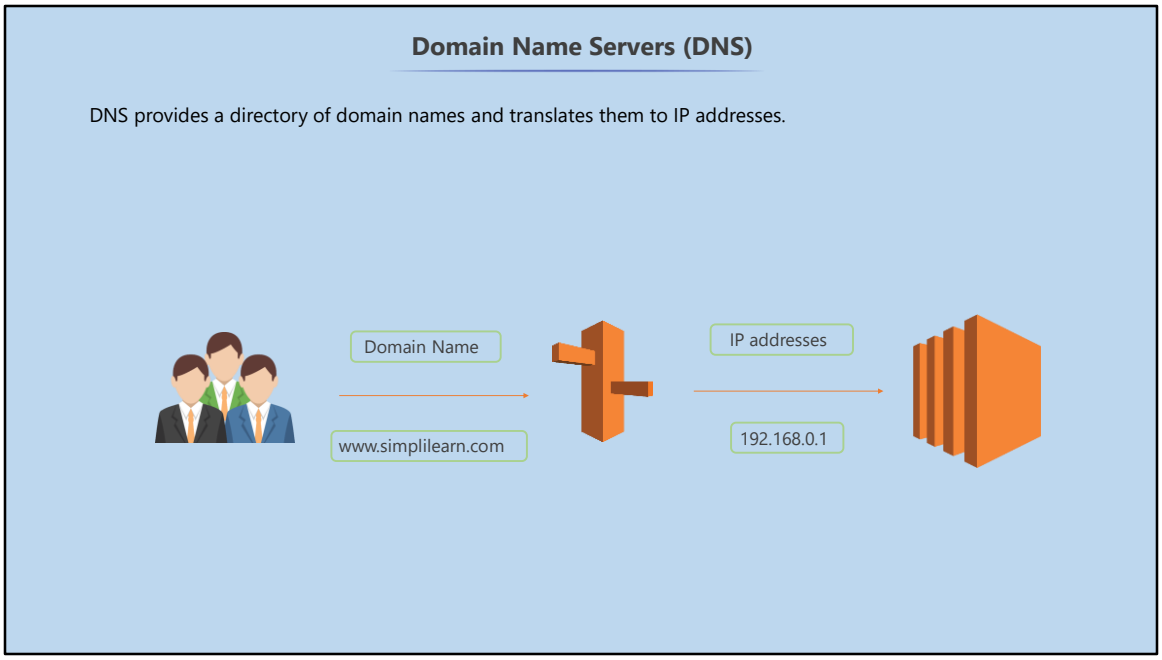
In this section you'll learn about Route 53, its uses, and the benefits of Amazon Route 53.

Amazon Route 53 Overview

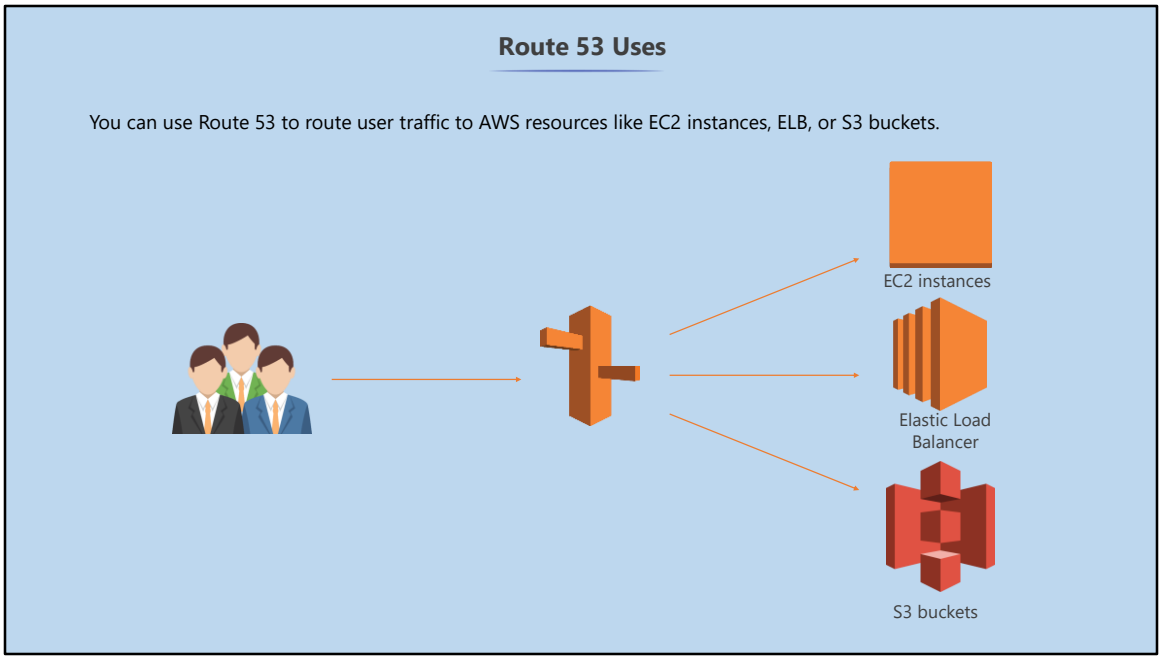
Amazon's definition of Route 53:
"It is a highly available and scalable cloud Domain Name Servers (DNS) web service."

Amazon
Route 53

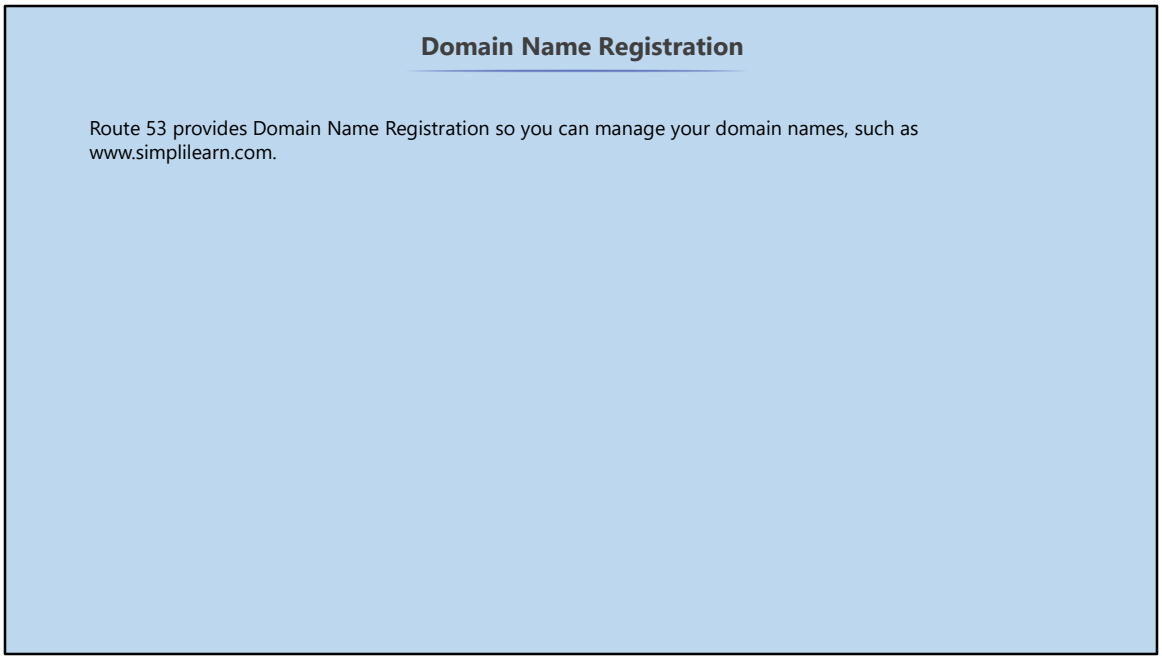
Amazon Route 53 is a highly available and scalable cloud Domain Name Servers (DNS) web service.



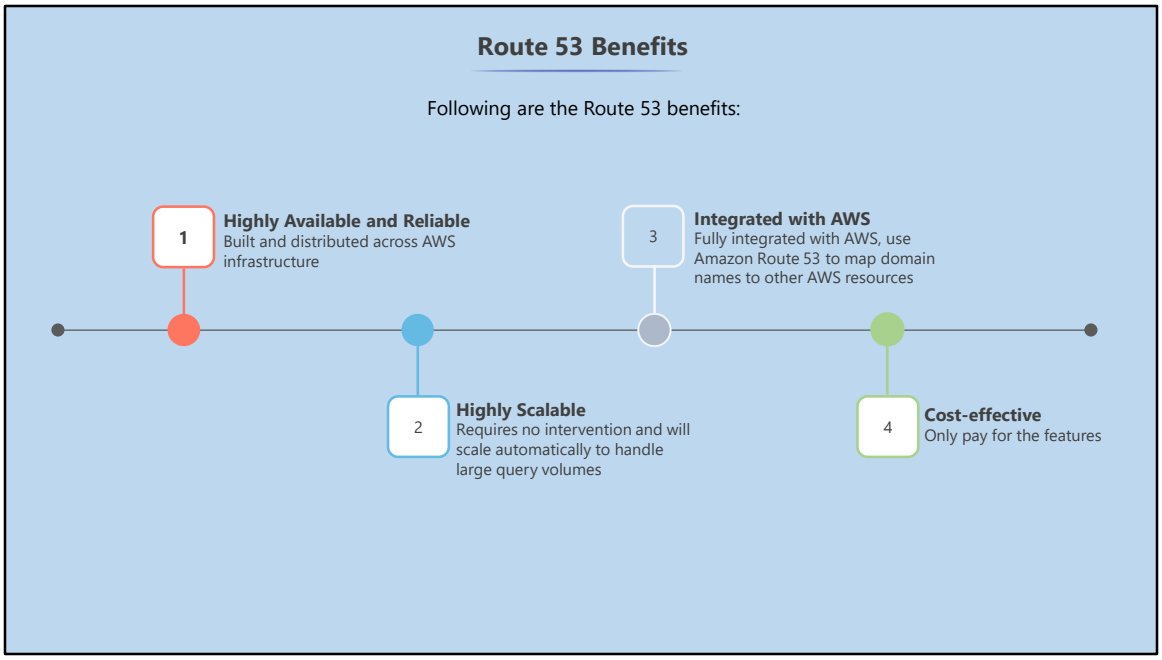
DNS are sometimes referred to as the Internet's equivalent of a phone book. They provide a directory of domain names and translate them to IP addresses.
This is essential as humans like to use domain names because they are easier to remember, while the computers access websites using IP addresses.
Route 53 is designed to provide a cost-effective and reliable way to route users to Internet applications.



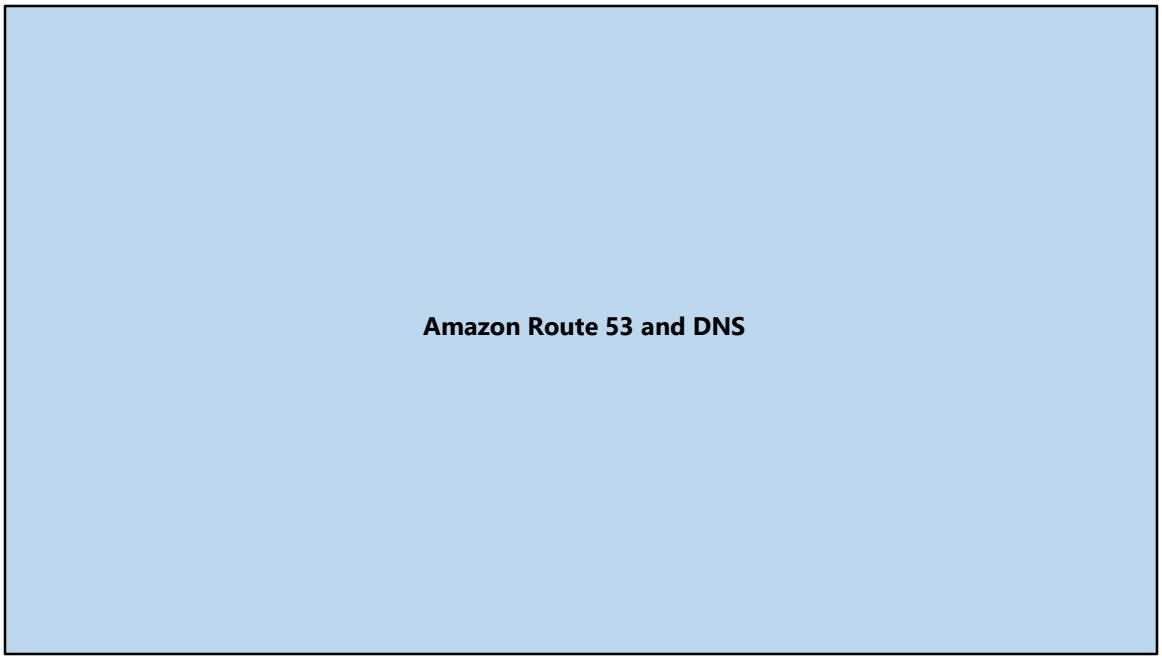
You can use Route 53 to route user traffic to AWS resources like EC2 instances, ELB, or S3 buckets. Route 53 can also be used to route traffic to resources outside AWS.



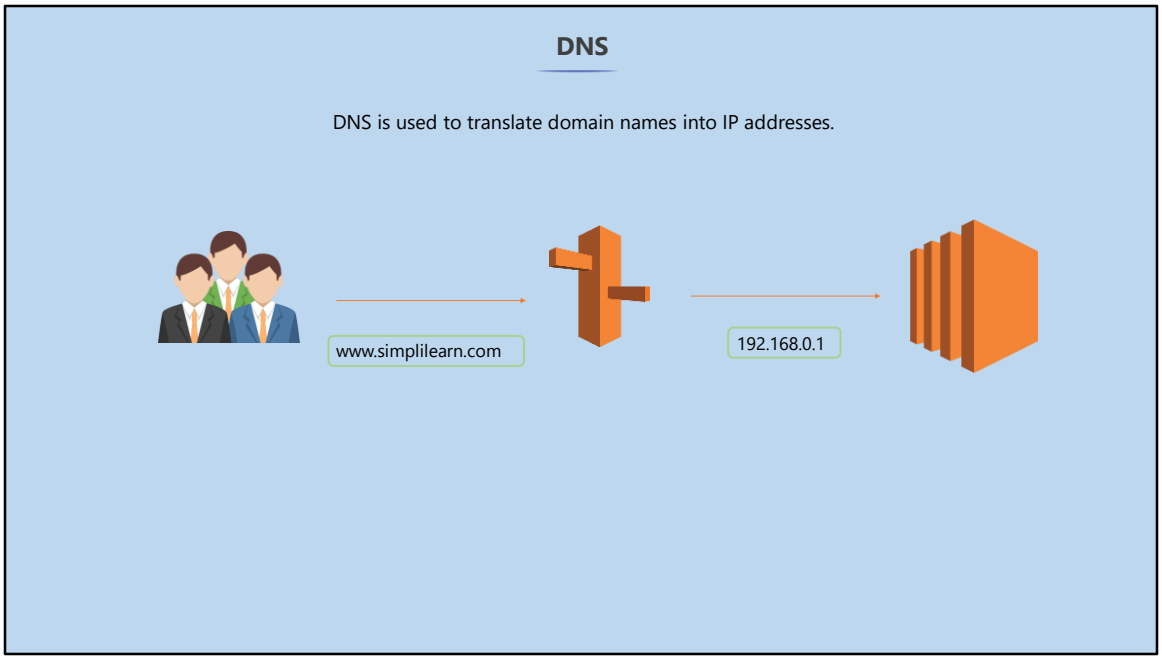
Route 53 provides Domain Name Registration so you can manage your domain names, such as www.simplilearn.com.



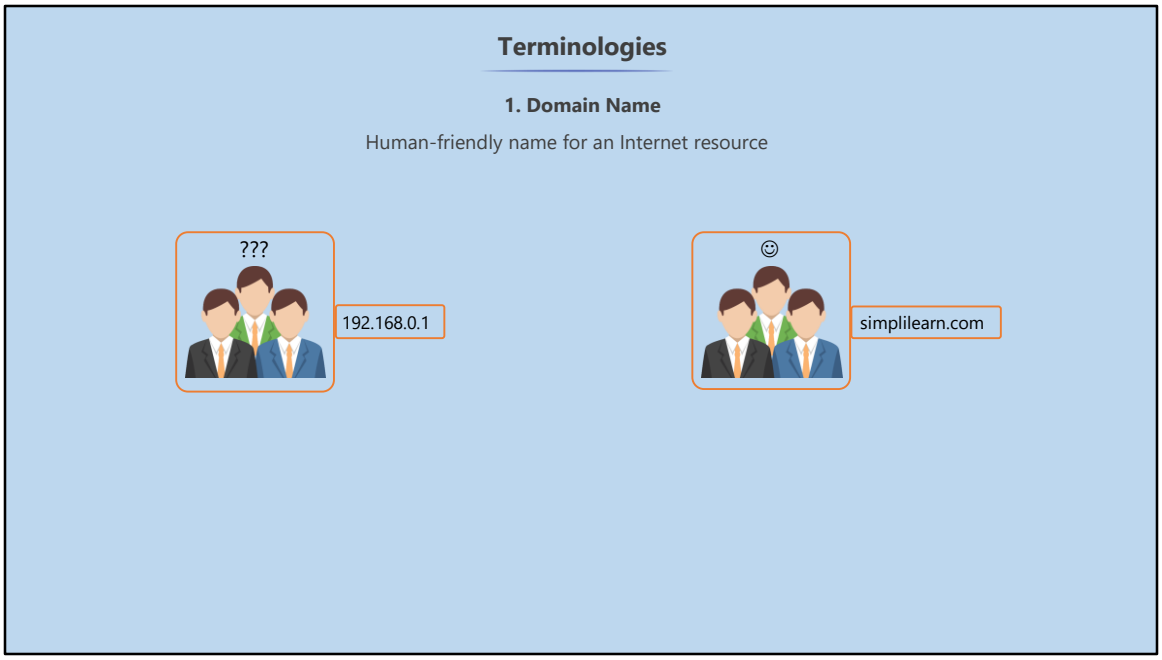
Highly Available and Reliable: Amazon Route 53 is highly available and reliable as it is built and distributed across the AWS infrastructure.
Highly Scalable: Route 53 requires no intervention and will scale automatically to handle large query volumes.
Integrated with AWS: Amazon Route 53 is fully integrated with AWS, so you can use Amazon Route 53 to map domain names to other Amazon EC2 instances, Amazon S3 buckets, Amazon CloudFront distributions, and other AWS resources.
Cost-Effective: With Route 53, you only pay for the features such as the number of queries that the Route 53 service answers for each domain, the number of hosted zones that you manage, and optional features such as traffic policies.



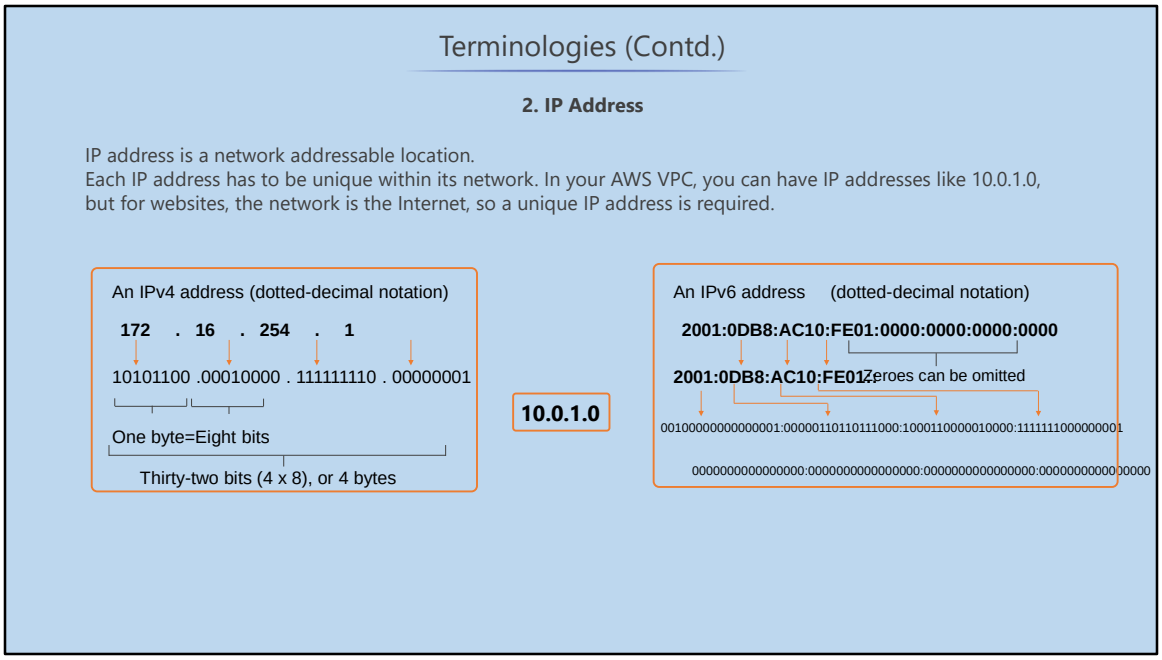
In this section, you'll learn about important DNS terminologies and different record sets, especially alias record sets.



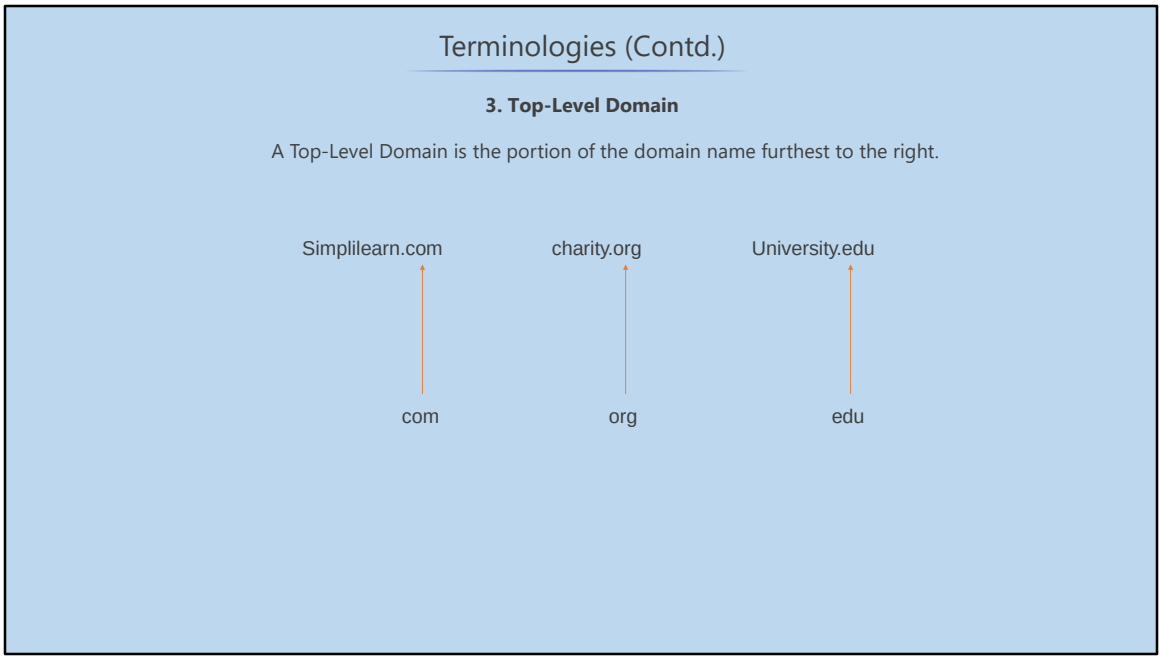
DNS is used to translate domain names into IP addresses.
You don’t need to be a DNS expert but understanding the terminology is very important for the Solutions Architect exam.



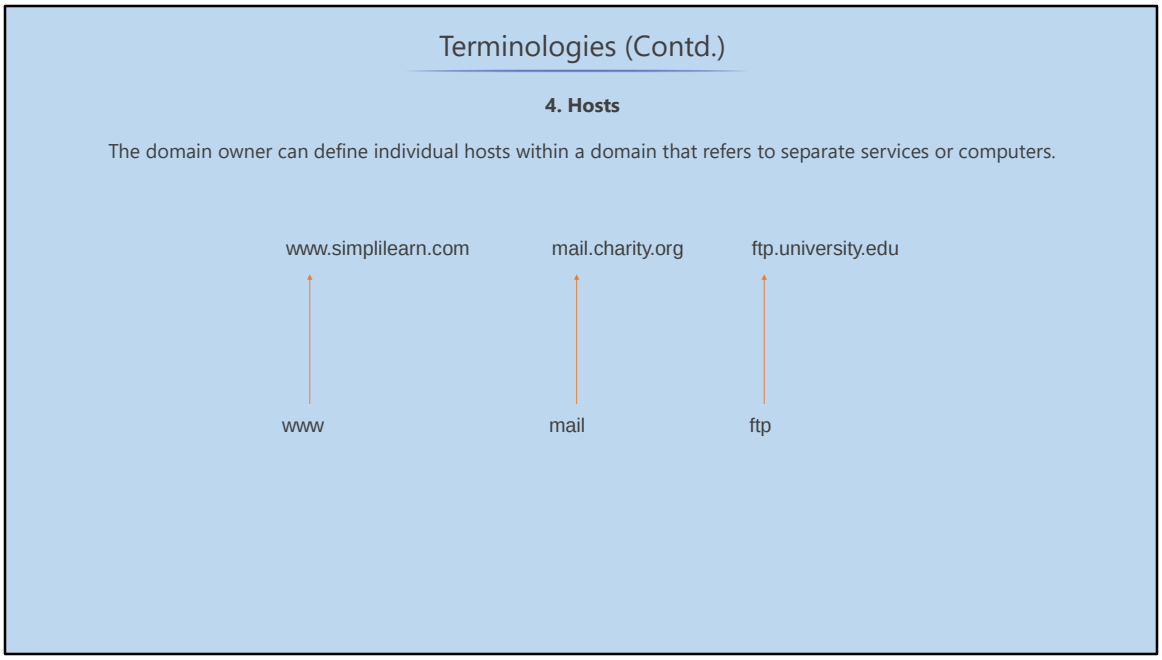
Domain Name refers to a human-friendly name for an Internet resource, for example, simplilearn.com is a domain name.



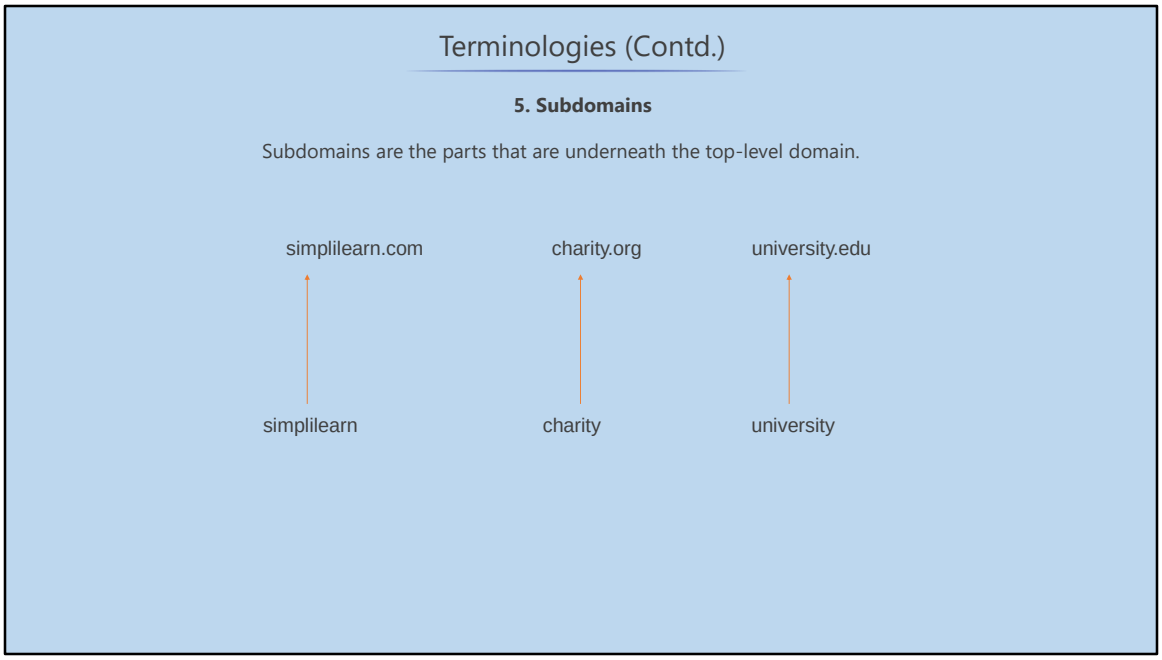
IP address is a network addressable location. Each IP address has to be unique within its network. In your AWS VPC, you can have IP addresses like 10.0.1.0, but for websites, the network is the Internet, so a unique IP address is required.
IPv4 is the most widely used form of address. But with the boom of the Internet and connected devices, IPv4 is running out of IP addresses; IPv6 is slowly replacing it as it has more IP addresses available.



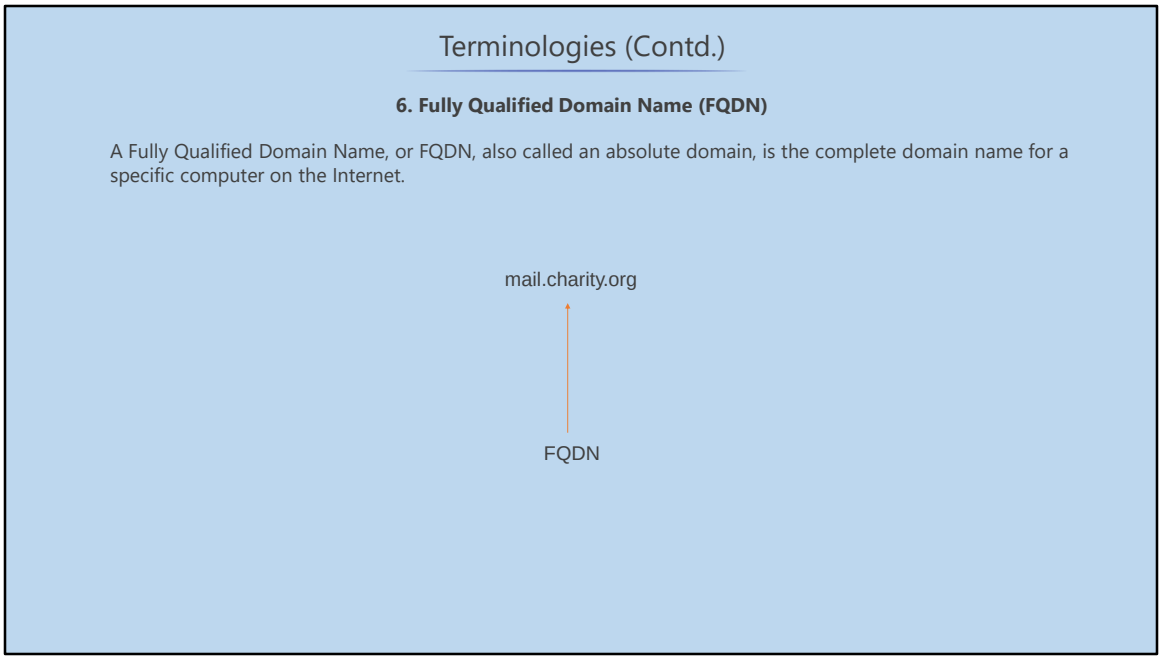
Top-Level Domain is the portion of the domain name furthest to the right, for example com, net, and org.



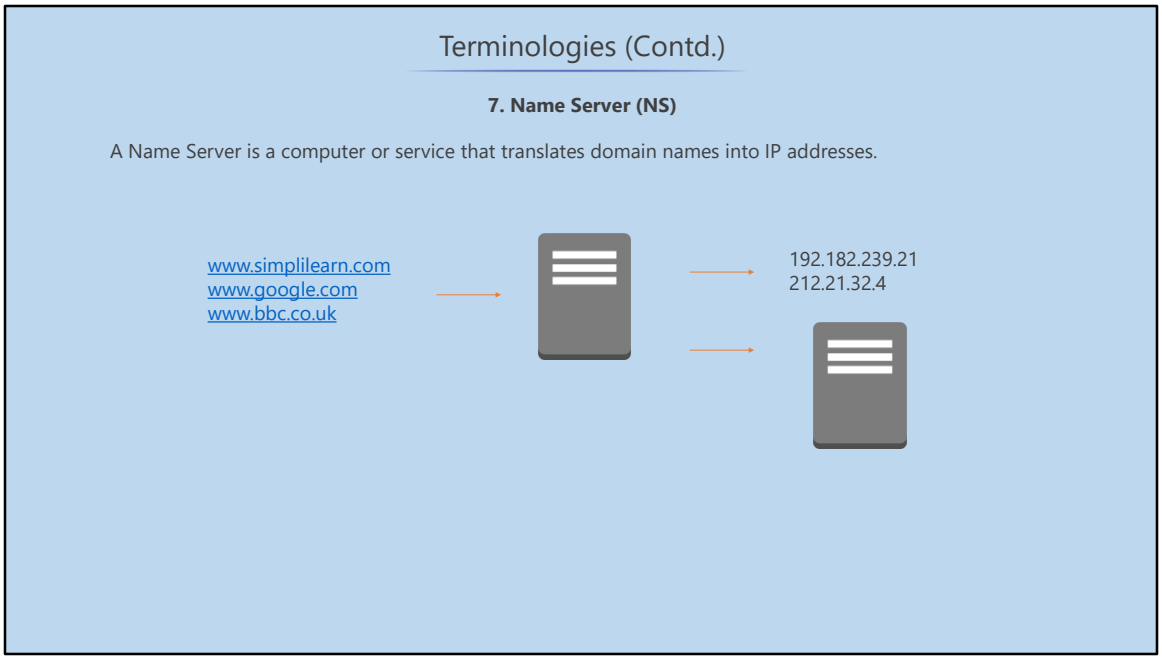
The domain owner can define individual hosts within a domain which refer to separate services or computers. For example, www is a host definition as is mail or FTP.



Subdomains are the parts that are underneath the top-level domain, for example, in simplilearn.com, “Simplilearn” is a subdomain of “com” or is sometimes referred to as a second- level domain.



A Fully Qualified Domain Name, or FQDN, also called absolute domain, is the complete domain name for a specific computer on the Internet. For example, mail.charity.org is a FQDN.



A Name Server is a computer or service that translates domain names into IP addresses. A name server can be “authoritative,” which means it can answer queries about domains under its control. Alternatively, it can redirect requests to other name servers.

Terminologies (Contd.)

8. Zone Files

Zone Files reside in name servers and are text files that contain the mappings between domain names and IP addresses.

```
$ORIGIN example.com
$TTL 86400
@     IN     SOA    dns1.example.com.     hostmaster.example.com. (
                    2001062501 ; serial
                    21600      ; refresh after 6 hours
                    3600       ; retry after 1 hour
                    604800     ; expire after 1 week
                    86400 )    ; minimum TTL of 1 day

      IN     NS     dns1.example.com.
      IN     NS     dns2.example.com.

      IN     MX     10     mail.example.com.
      IN     MX     20     mail2.example.com.

             IN     A       10.0.1.5

server1      IN     A       10.0.1.5
server2      IN     A       10.0.1.7
dns1         IN     A       10.0.1.2
dns2         IN     A       10.0.1.3

ftp          IN     CNAME   server1
mail         IN     CNAME   server1
mail2        IN     CNAME   server2
www          IN     CNAME   server2
```

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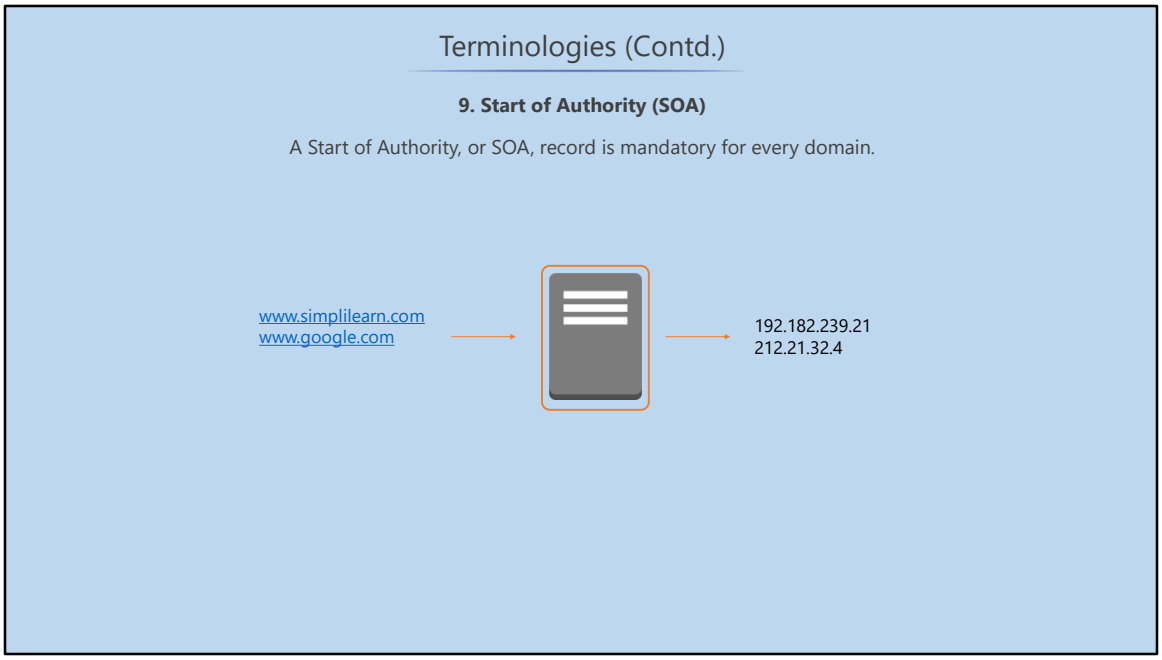
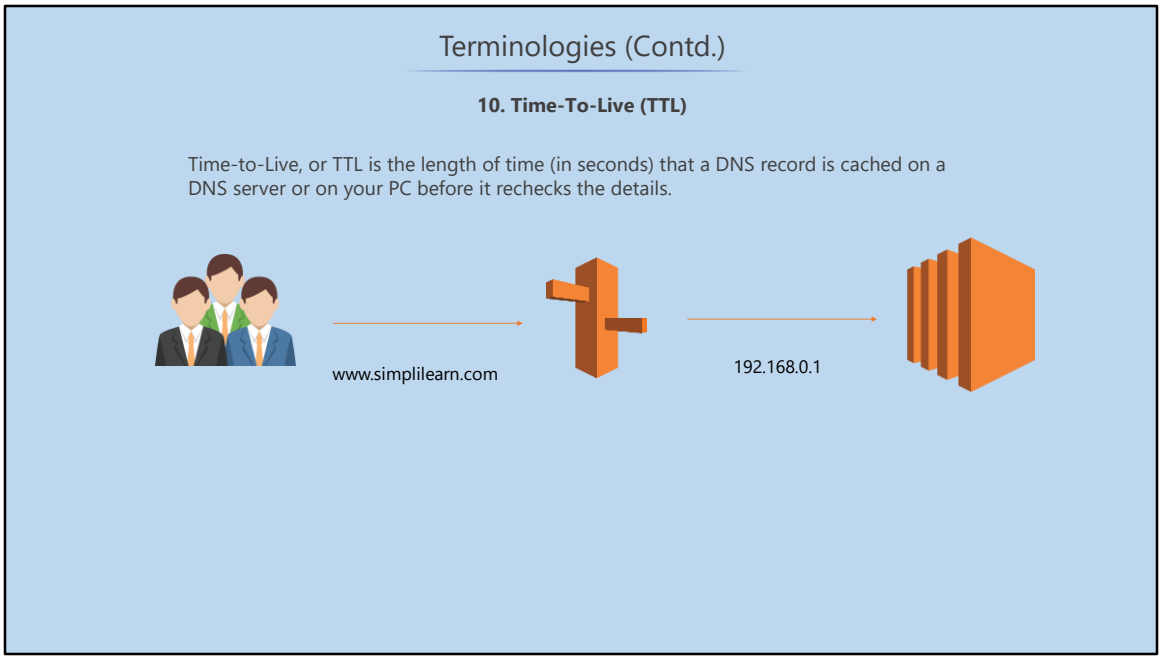
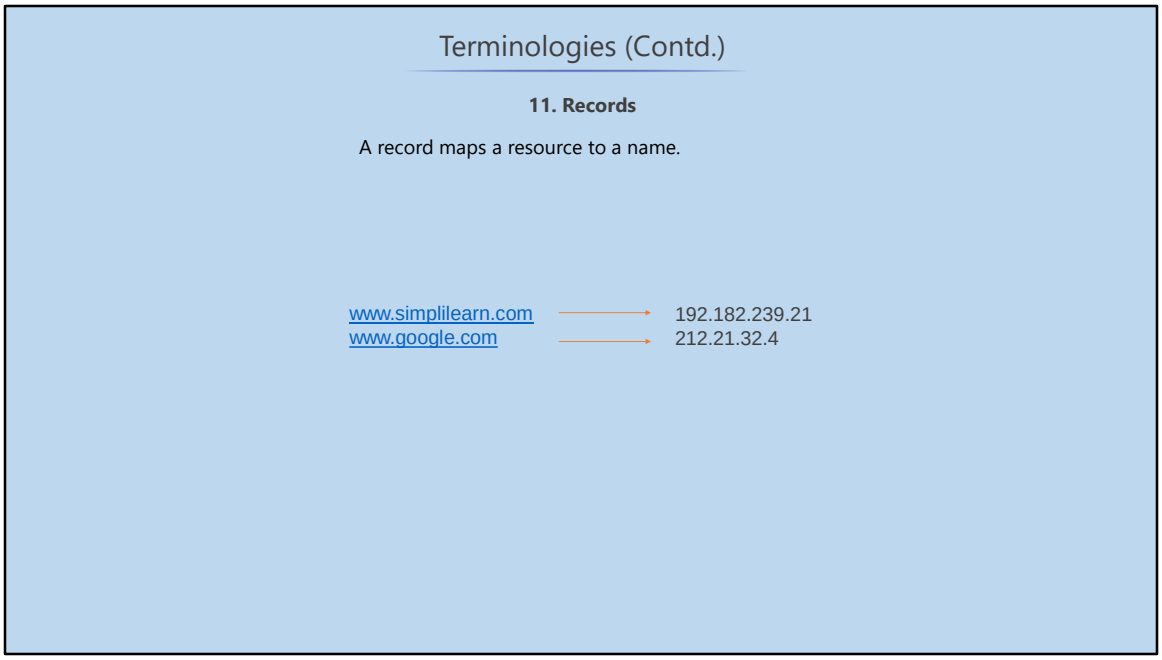


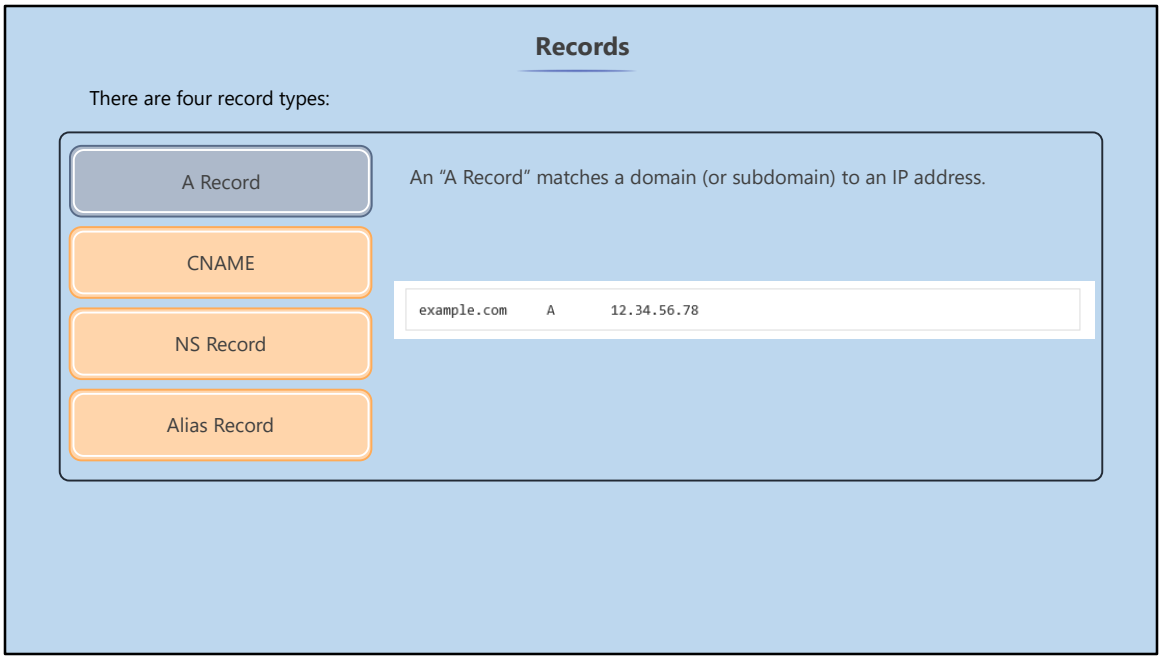
A Start of Authority, or SOA, record is mandatory for every domain. An SOA record is information stored in a DNS zone that indicates that it is the best source of information for the data.



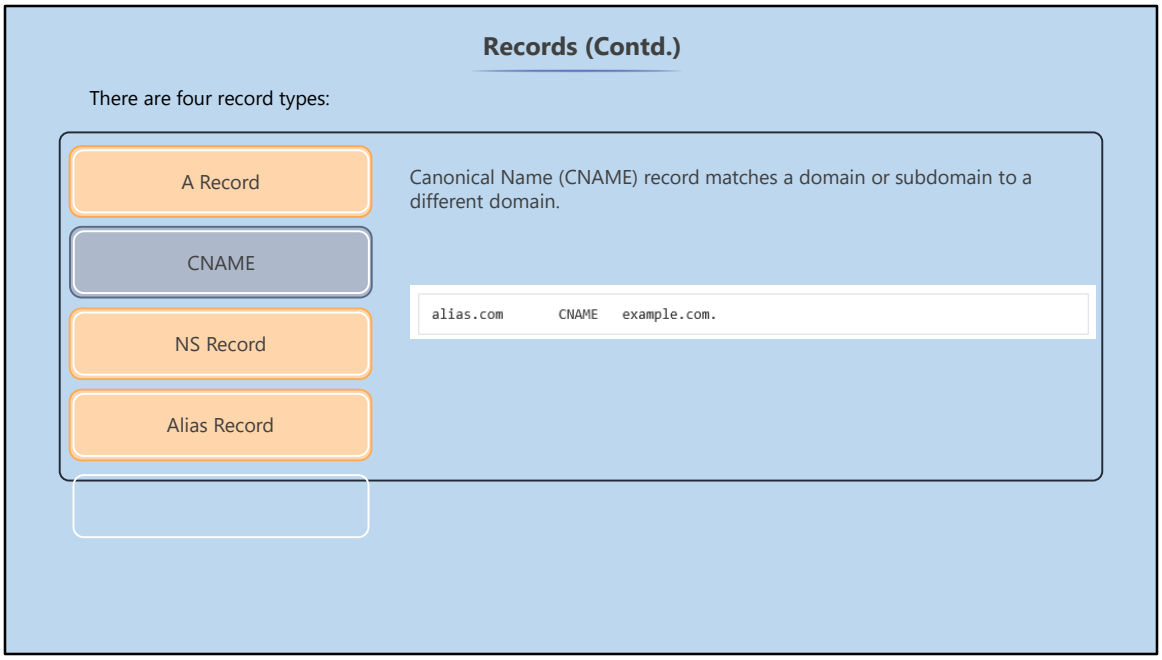
Time-to-live (TTL) is the length of time (in seconds) that a DNS record is cached on a DNS server or on your PC before it rechecks the details. If a PC doesn't have the IP address for a domain name, then it will contact Route 53 and cache the TTL result so that it doesn't have to repeat the process.



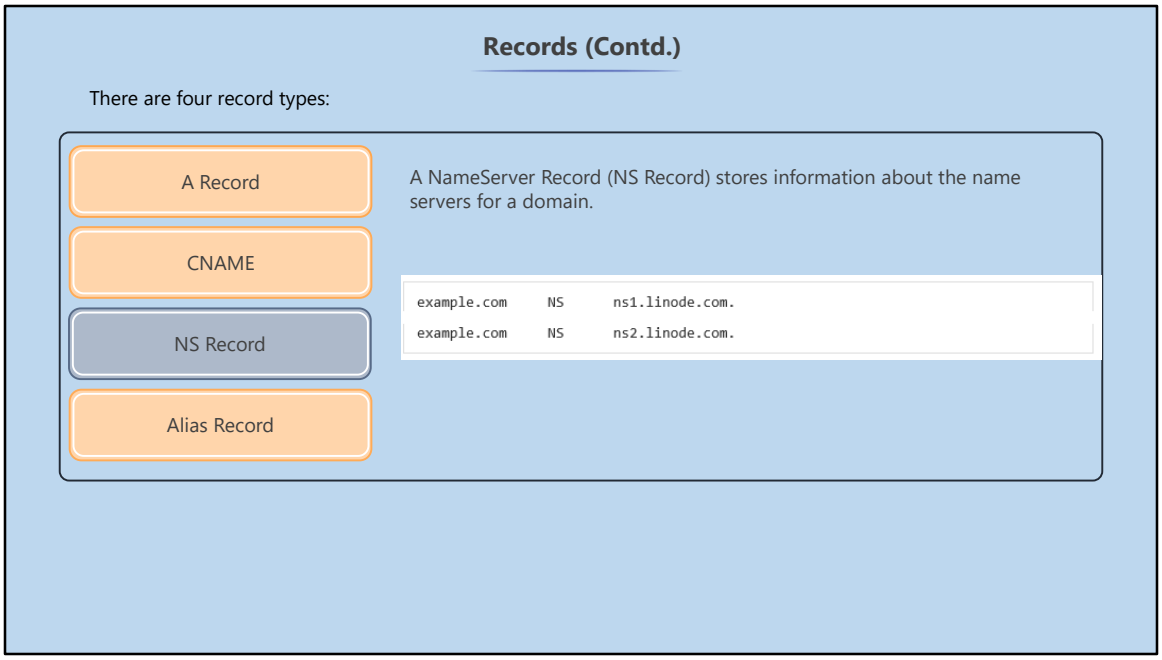
A record maps a resource to a name.
There are four types of record: A record, Canonical Name (CNAME), Name Server Record (NS Record), and alias record.



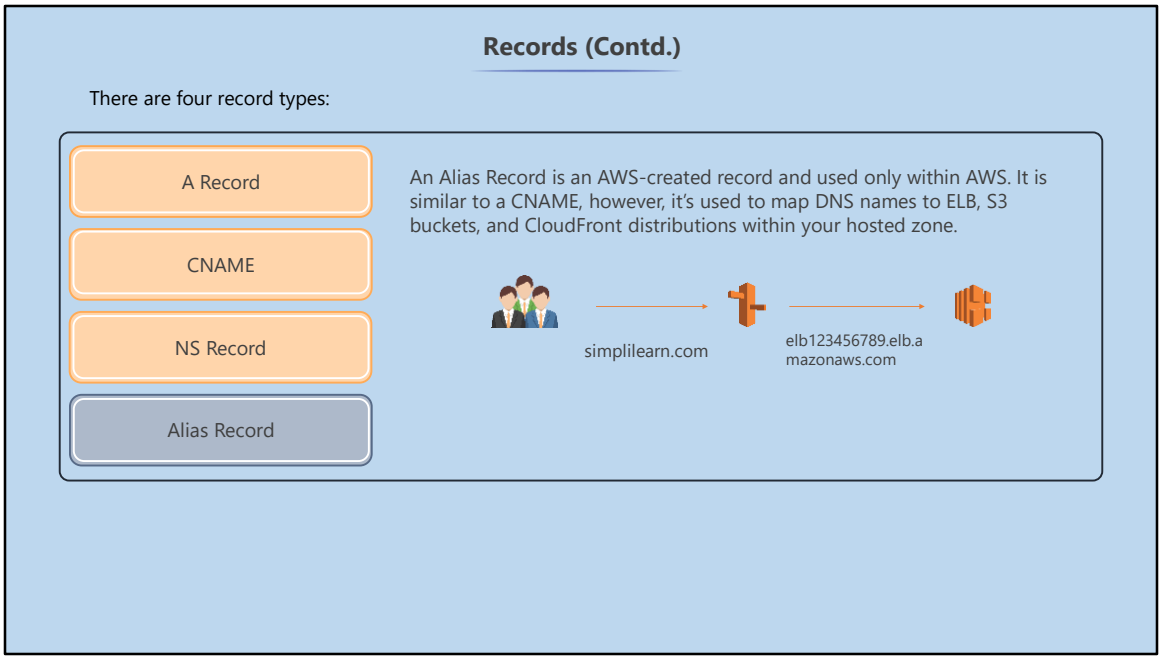
An A record matches a domain (or subdomain) to an IP address.



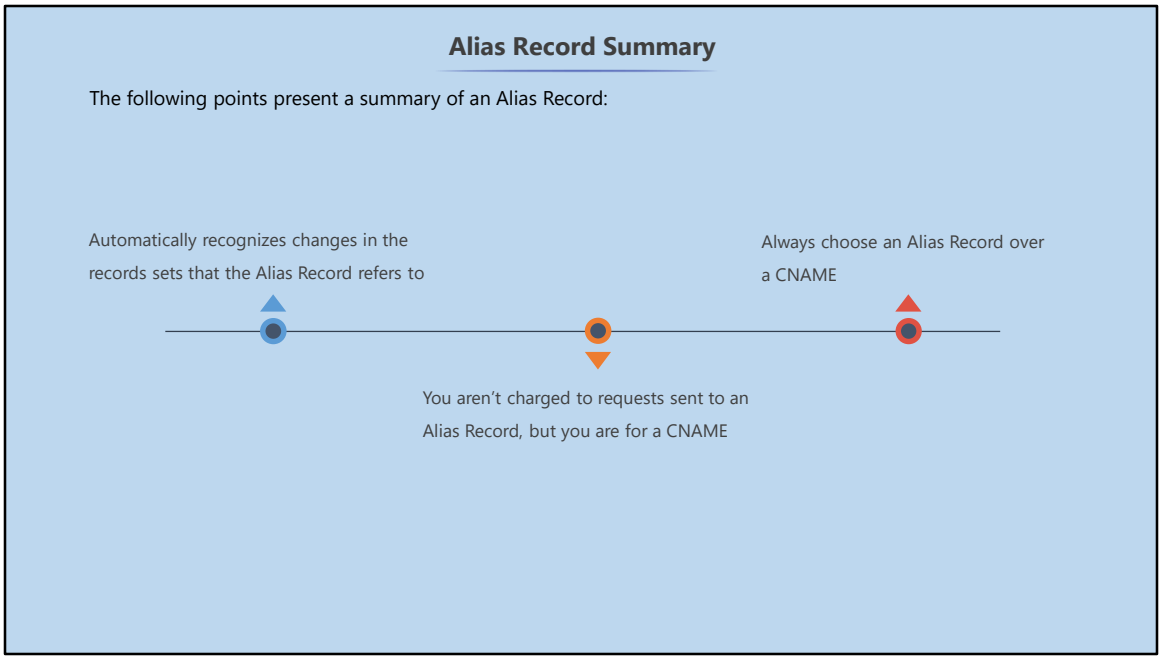
A CNAME record matches the domain or subdomain to a different domain. It exists so that domains can have aliases for you to point multiple domain names to one domain name.



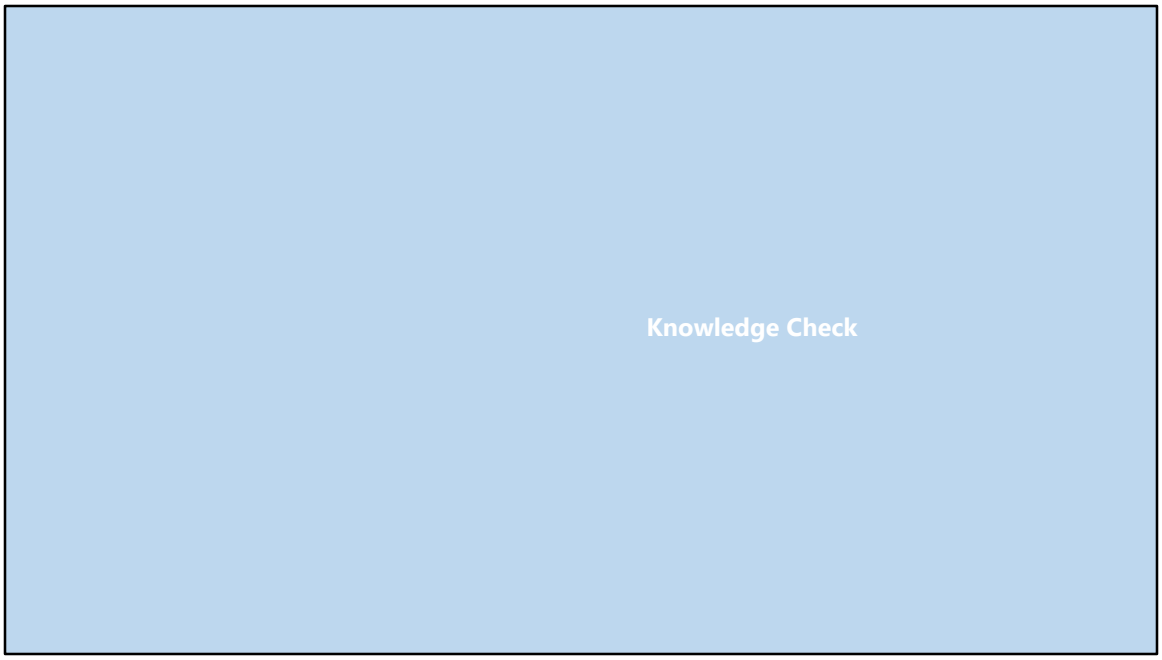
A NS Record stores information about the nameservers for a domain. You direct your domain name to the nameserver that contains the authoritative DNS records.



An alias record is an AWS created record and used only within AWS.
It is similar to a CNAME, however, it's used to map DNS names to ELB, S3 buckets, and CloudFront distributions within your hosted zone.
It maps one DNS name to another: example.com -> elb123456789.elb.amazonaws.com.
AWS has created alias records because CNAMEs, for example, simplilearn.com, must have an A Record and A Records need an IP address.
It's not always possible to get an IP address from an Elastic Load Balancer and even if you could, it could be constantly changing. In such a case, you'll have to constantly update your records. The alias record automatically maps the constantly changing IP addresses to your domain name.



It automatically recognizes changes in the records sets that the alias record refers to.
You aren't charged to requests sent to an Alias record, but you are for a CNAME.
Always choose an alias record over a CNAME.


Knowledge Check

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Why did AWS create an Alias Record?

To create mappings to devices that have constantly changing IP addresses, like ELB, S3 buckets, and so on

Because CNAMES and A Records are becoming defunct

So you can create instances in different regions with the same name

To increase the performance of an ELB

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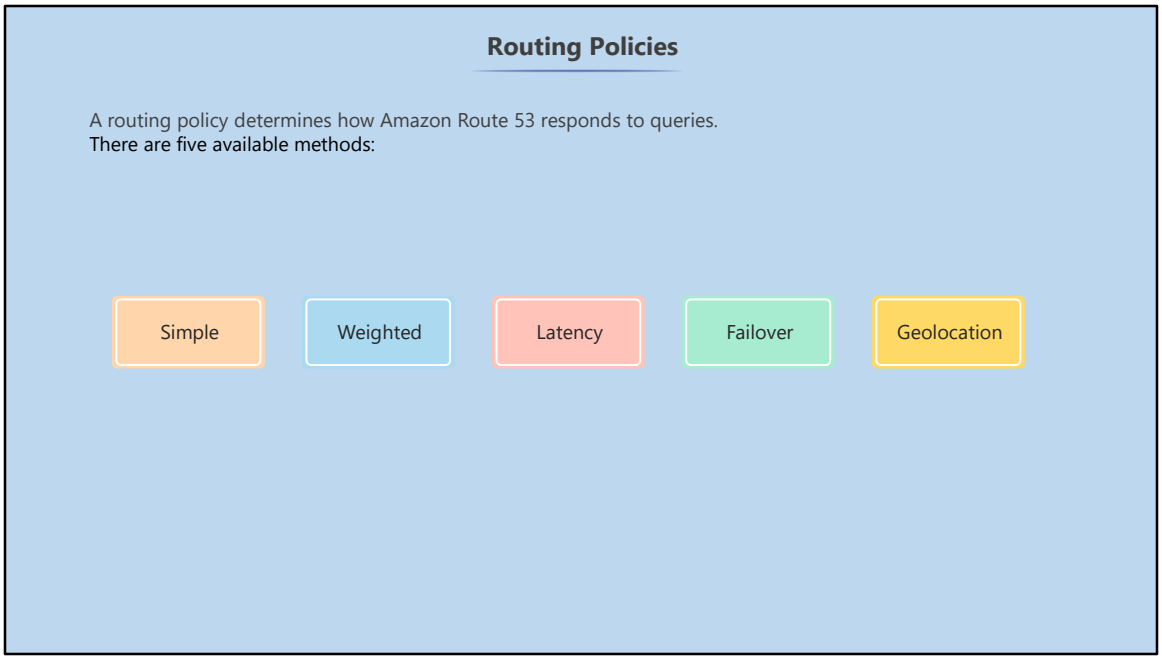
a

Alias Records were created to resolve the issue of CNAME naked domain mapping to A Record IP addresses. With some AWS services like ELB, the IP address is not always known.

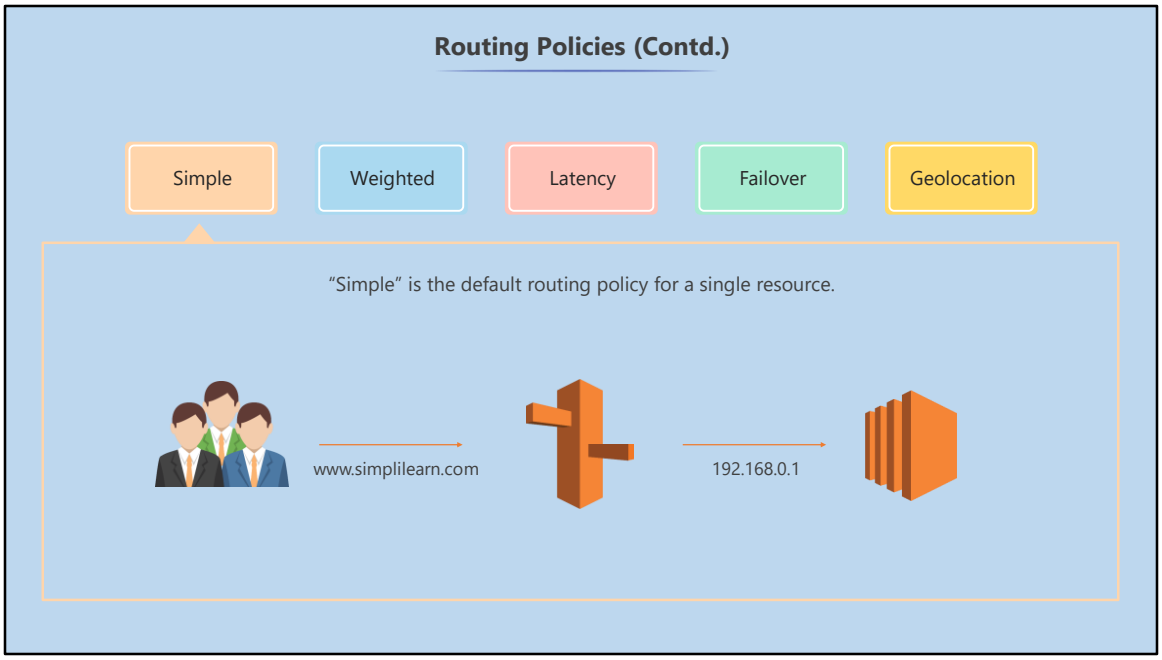
Route 53 Routing Policies

In this section, you'll learn about routing policy. We'll also discuss the five types of routing policies that Amazon route 53 supports, which are Simple, Weighted, Latency, Failover, and Geolocation.

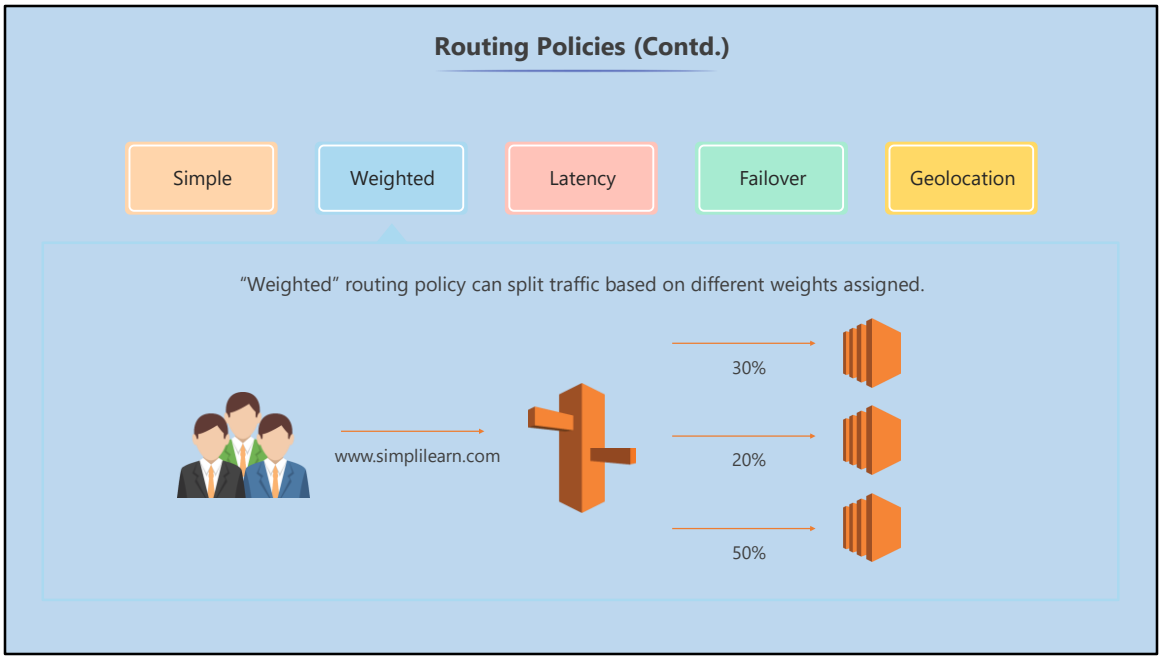


A routing policy determines how Amazon Route 53 responds to queries.
There are five available methods:

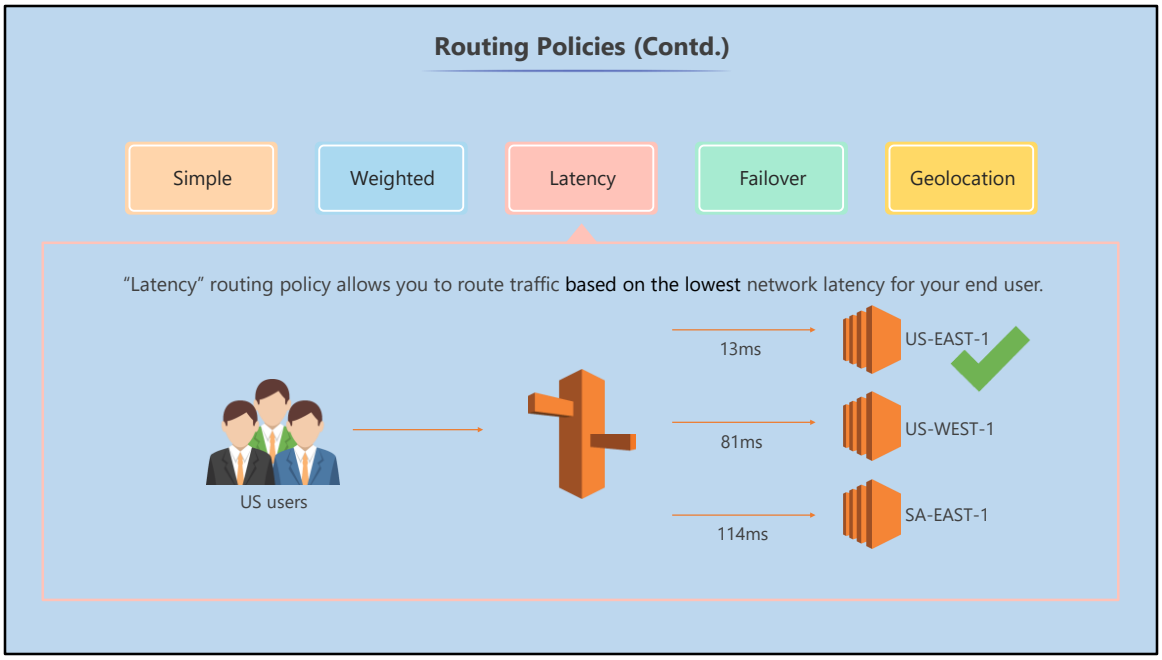
1. Simple
2. Weighted
3. Latency
4. Failover
5. Geolocation



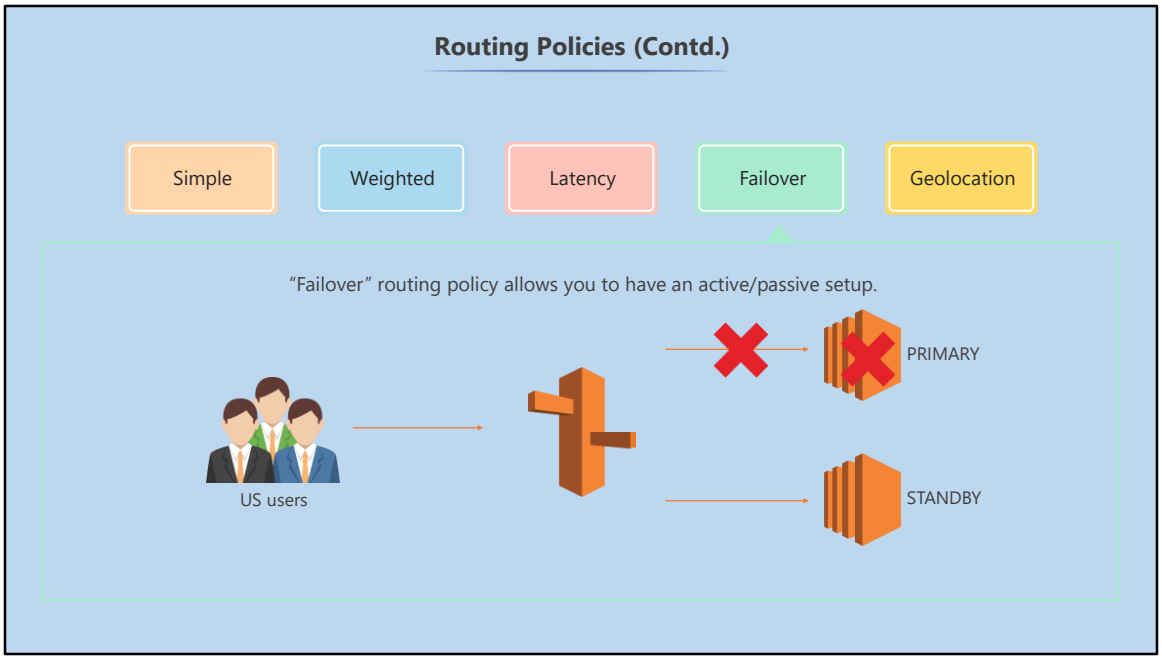
"Simple" is the default routing policy for a single resource. One web server maps to one IP address. For example, "simplilearn.com" mapping to "192.168.0.1".



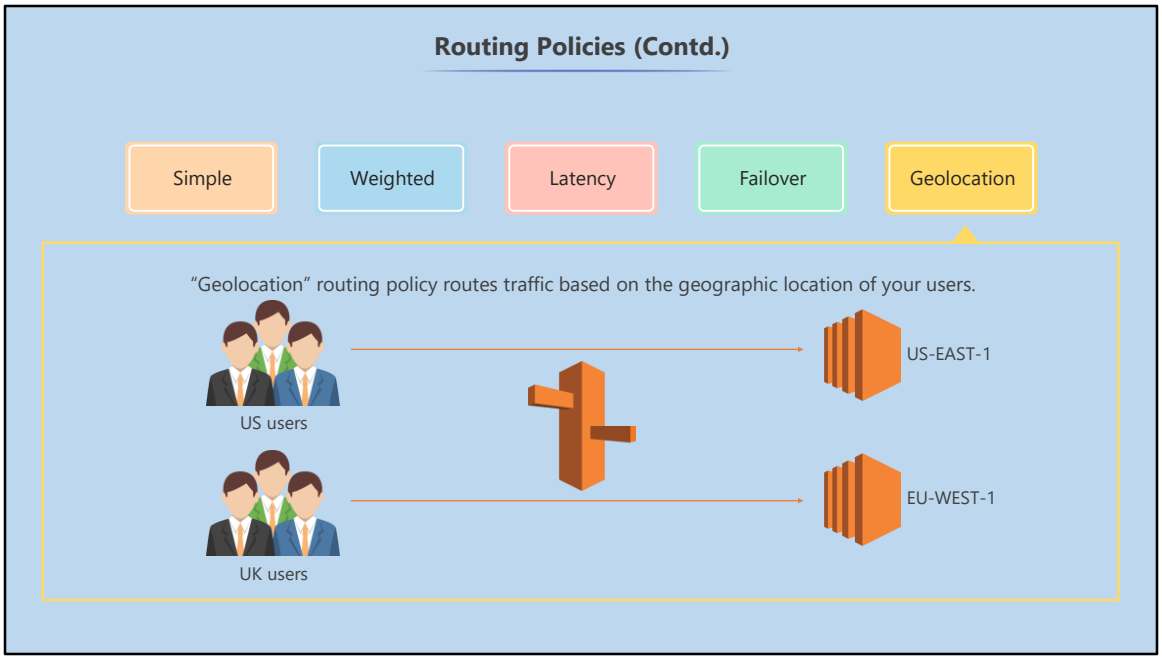
"Weighted" routing policy can split traffic based on different weights assigned. For example, 30% to one, 20% to another, and 50% to the third.



"Latency" routing policy allows you to route traffic based on the lowest network latency for your end user. This ensures that users get the best response time.
Create a latency resource record set for the EC2/ELB resource in each region that you host your website. Route 53 will automatically select the one with the lowest latency for the user.



"Failover" routing policy allows you to have an active/passive setup. There are primary and standby sites in different regions. Route 53 monitors the health of your primary site using a health check if there is a failure it will point traffic to the standby site.



"Geolocation" routing policy routes traffic based on the geographic location of your users. This is defined by the location where the DNS request originates.
US-based queries are directed to US-based webservers (prices in U.S. dollars).
You need to know the routing policy options as questions related to routing policy come regularly in the sysops exam for solutions architect.

Demo: Route 53 Hosted Zones

In this demonstration, we're going to look at how you can configure Route 53 hosted zones.

Knowledge Check

1 **Which of the following are Amazon Route 53 Routing Policies?**

Simple, Weighted, Network, Failover, and Geolocation

Easy, Weighted, Latency, Migration, and Geolocation

Easy, Defined, Latency, Failover, and Geodiverse

Simple, Weighted, Latency, Failover, and Geolocation

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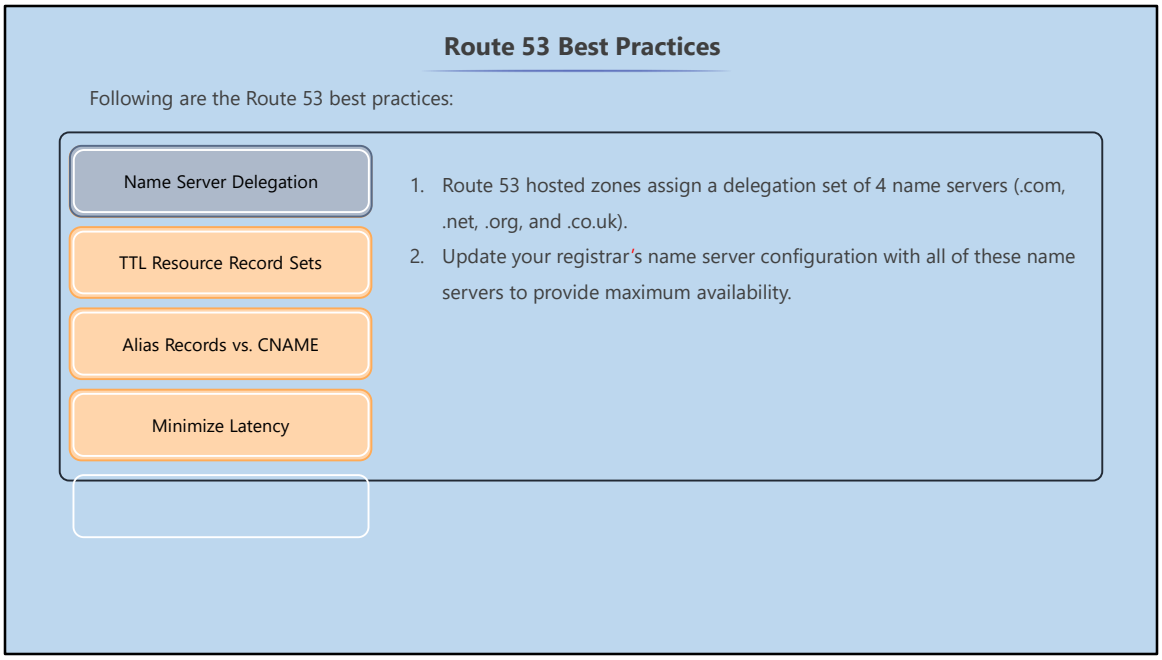
Simple, Weighted, Latency, Failover, and Geolocation are Amazon Route 53 Routing Policies.

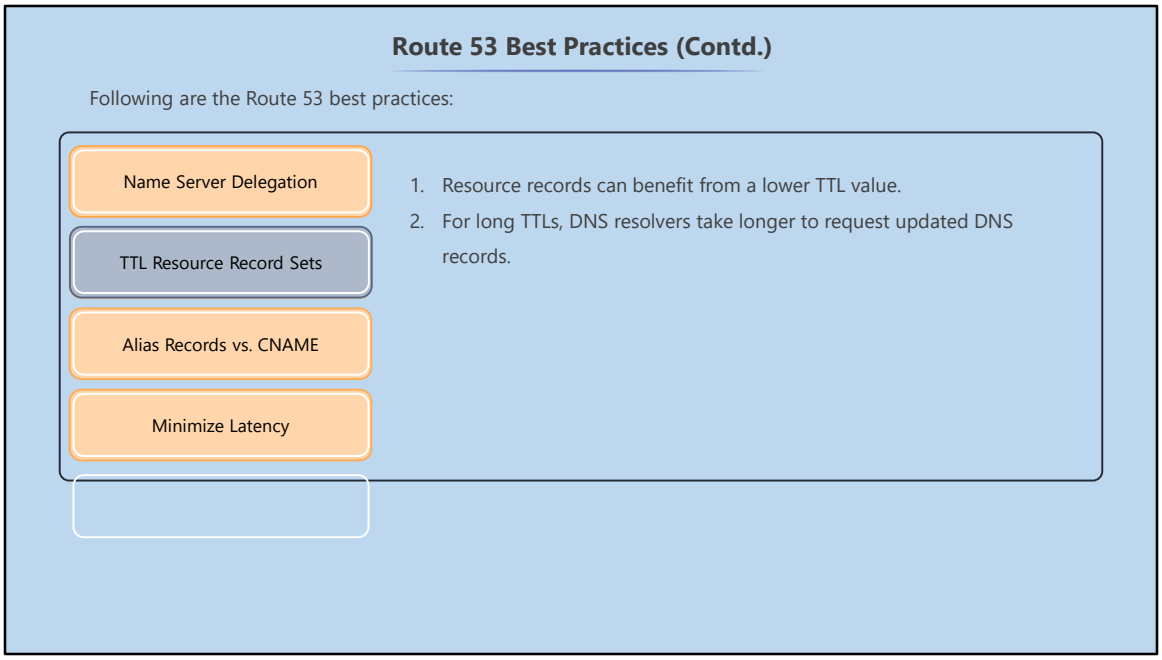
Amazon Route 53 Best Practices

In this section, we'll take a look at the best practices Amazon recommends for Route 53. These are Name Server delegation, TTL Resource Record Sets, alias record versus CNAME, and latency minimization.



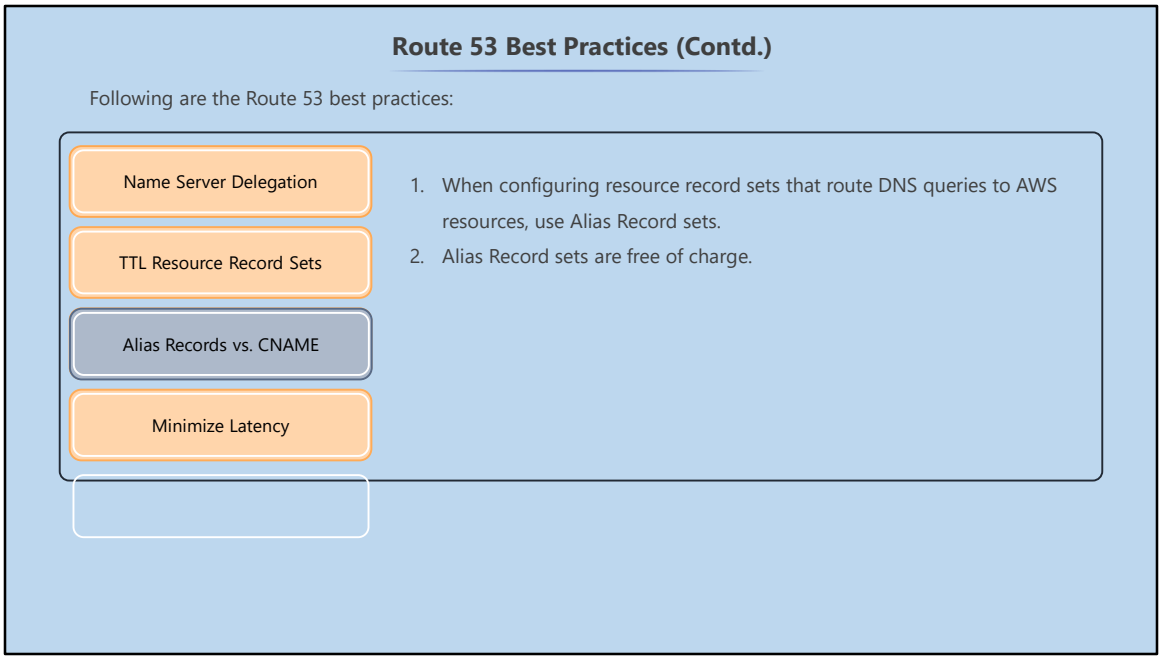
Name Server Delegation

Route 53 hosted zones assign a delegation set of four name servers (.com, .net, .org, and .co.uk). Update your registrar's name server configuration with all of these name servers to provide maximum availability.



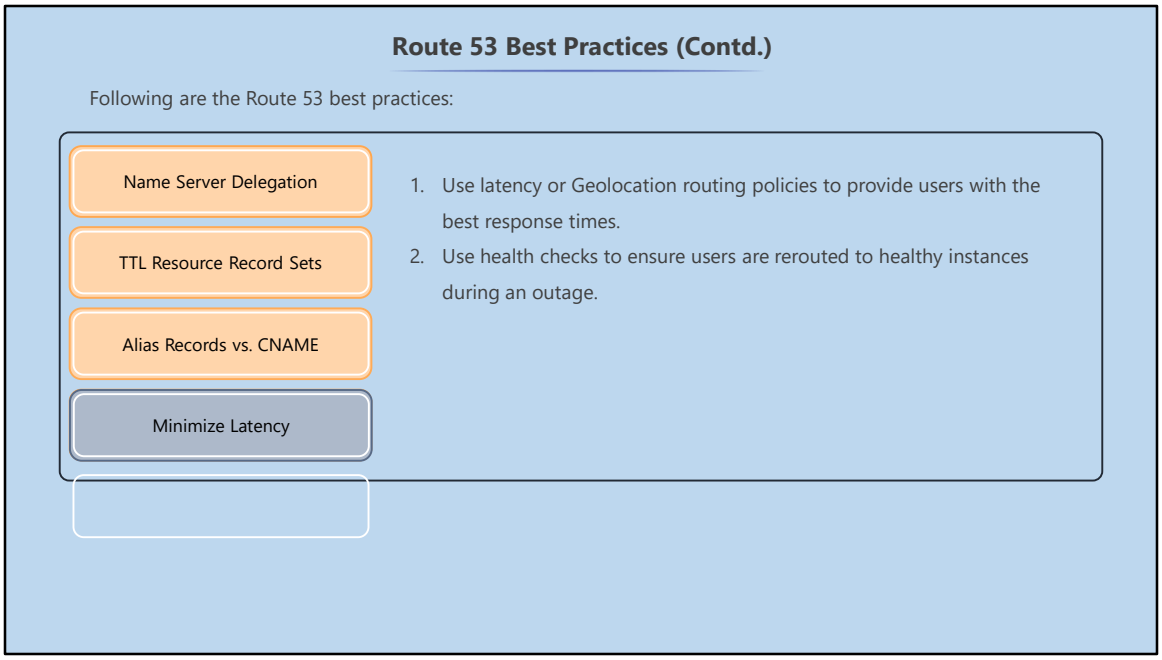
TTL Resource Record Sets

Resource records can benefit from a lower TTL value. When you specify long TTL, DNS resolvers take longer to request updated DNS records, which can result in delays to rerout your traffic, for example, in case of instance failures.



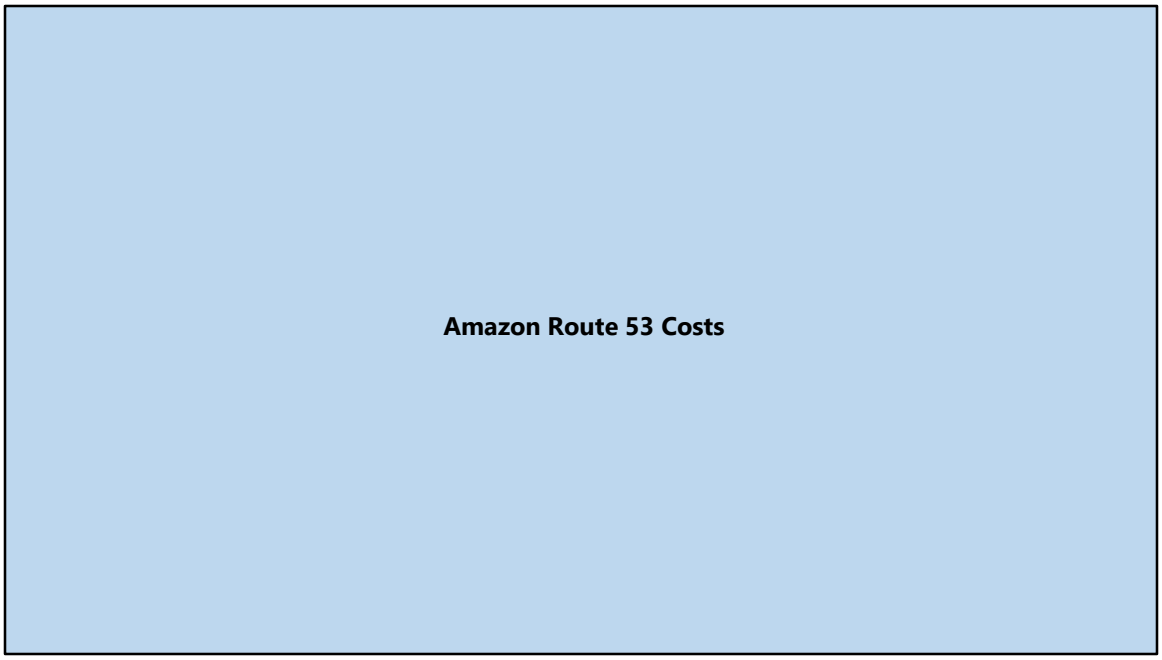
Alias Records versus CNAME

When configuring resource record sets that route DNS queries to AWS resources, use alias record sets as they are free of any charge.

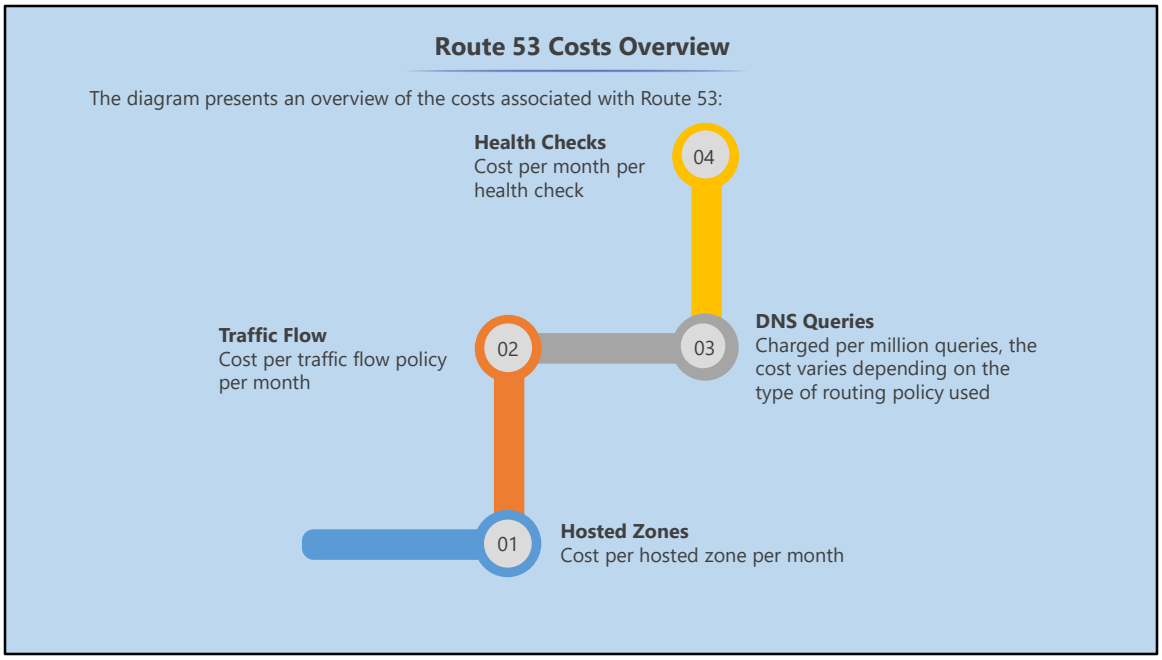


Minimize Latency

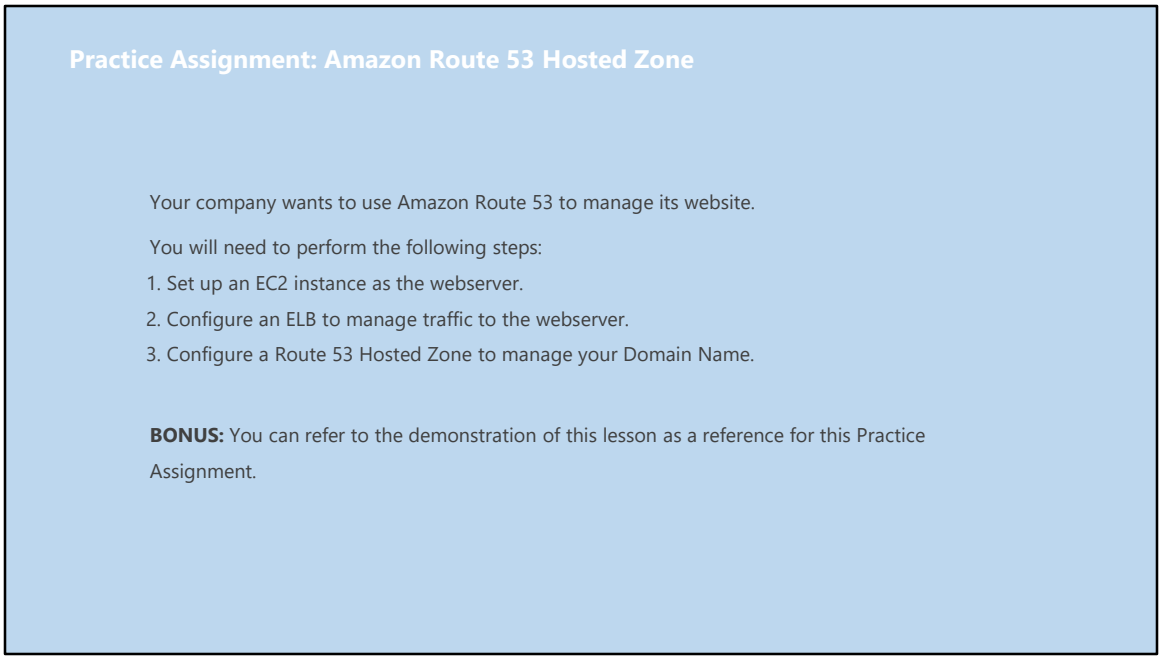
Use latency or Geolocation routing policies to provide users with the best response times and use health checks to ensure users are rerouted to healthy instances during an outage.



In this section, you'll learn about the costs associated with Amazon Route 53 products and services.

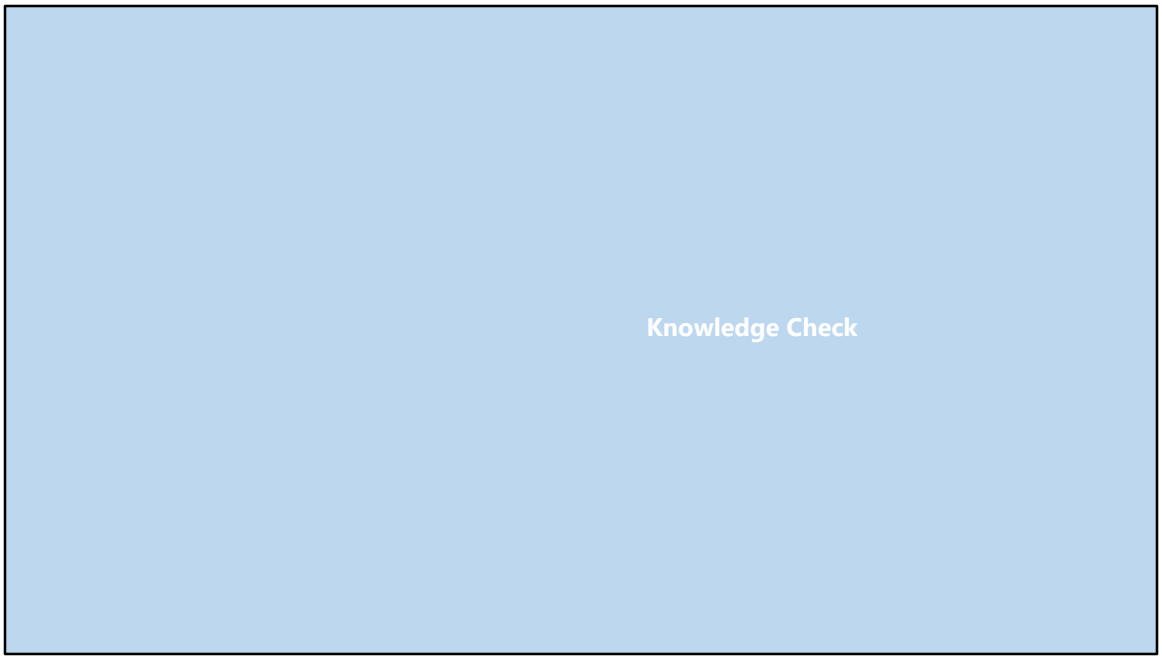


Hosted Zones:
There is a cost per month associated with each hosted zone, the cost gets lower as the number of hosted zones increase.
Traffic Flow:
There is a cost per month associated with each traffic flow policy. The traffic flow policies provide a visual editor that allows you to create complex routing policies.
DNS Queries:
You are charged per million DNS queries, the cost varies depending on the type of routing policy used.
Queries to Alias records that are mapped to Elastic Load Balancers, Amazon CloudFront distributions, AWS Elastic Beanstalk environments, and Amazon S3 website buckets are free.
Health Checks:
There is a cost per month associated with each health check.



In this practice assignment you'll configure Route 53 to manage your domain name using a hosted zone.

- Route 53 provides Domain Name System services that provide a domain name to IP address mapping
- Alias Record is similar to a CNAME; however, it's used to map DNS names to ELB, S3 buckets, and CloudFront distributions within your hosted zone.
- A routing policy determines how Amazon Route 53 responds to queries. There are five types of routing policies: Simple, Weighted, Latency, Failover, and Geolocation.



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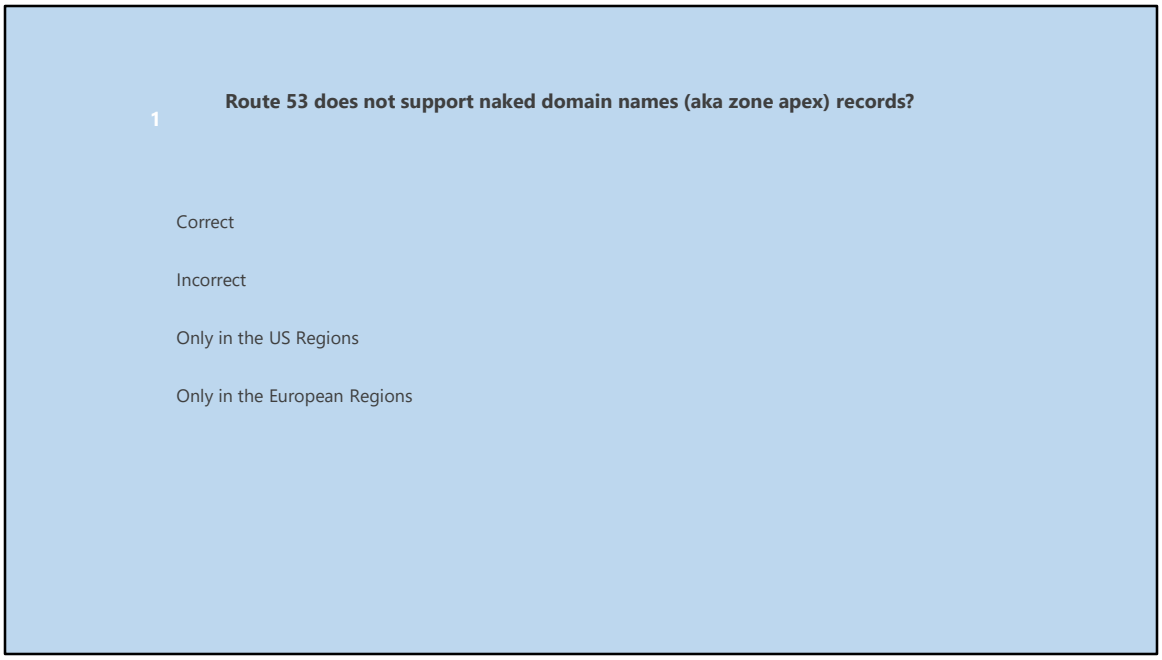

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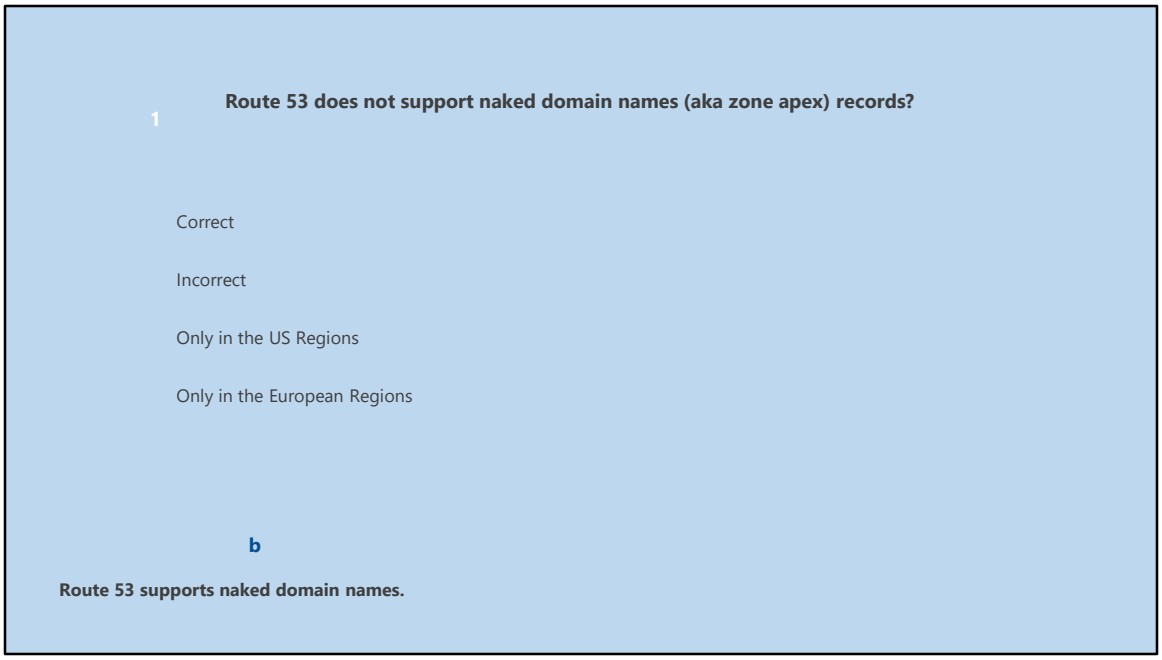

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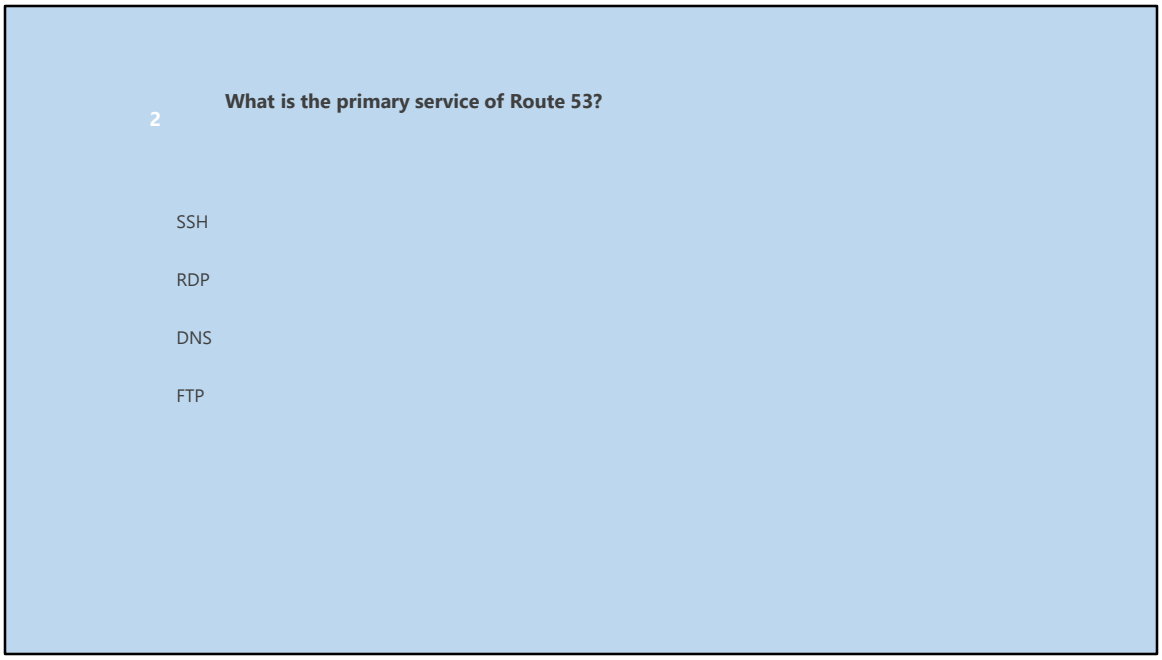

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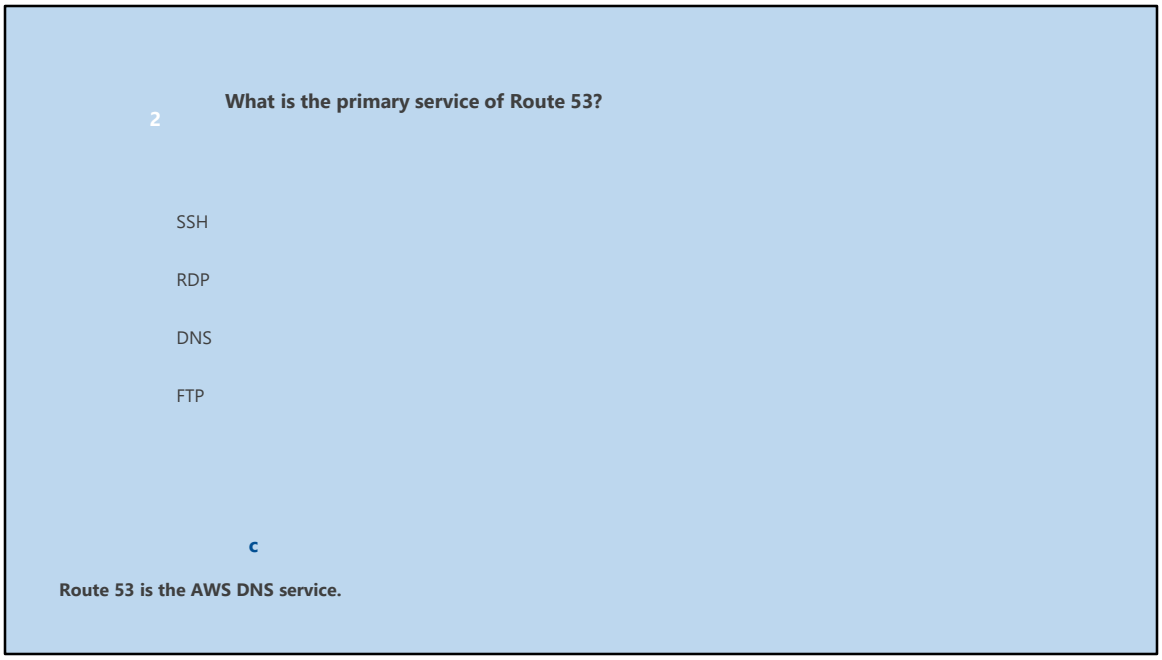

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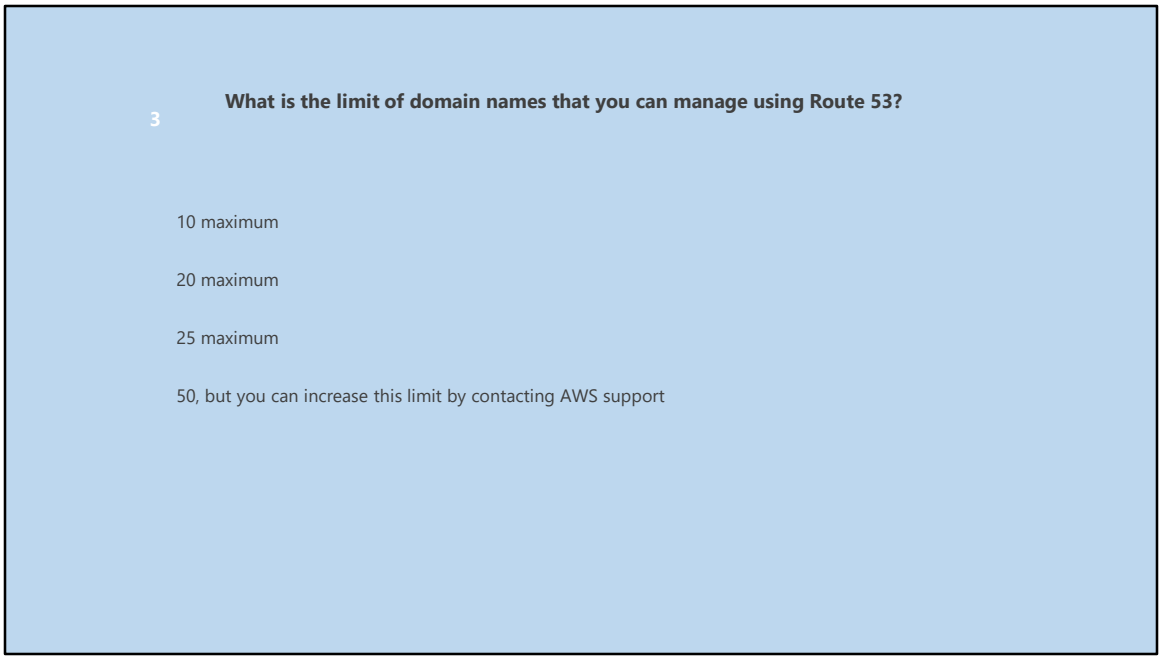

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3 **What is the limit of domain names that you can manage using Route 53?**

10 maximum

20 maximum

25 maximum

50, but you can increase this limit by contacting AWS support

d

There is a limit of 50, but this can be increased by raising a ticket with AWS support.

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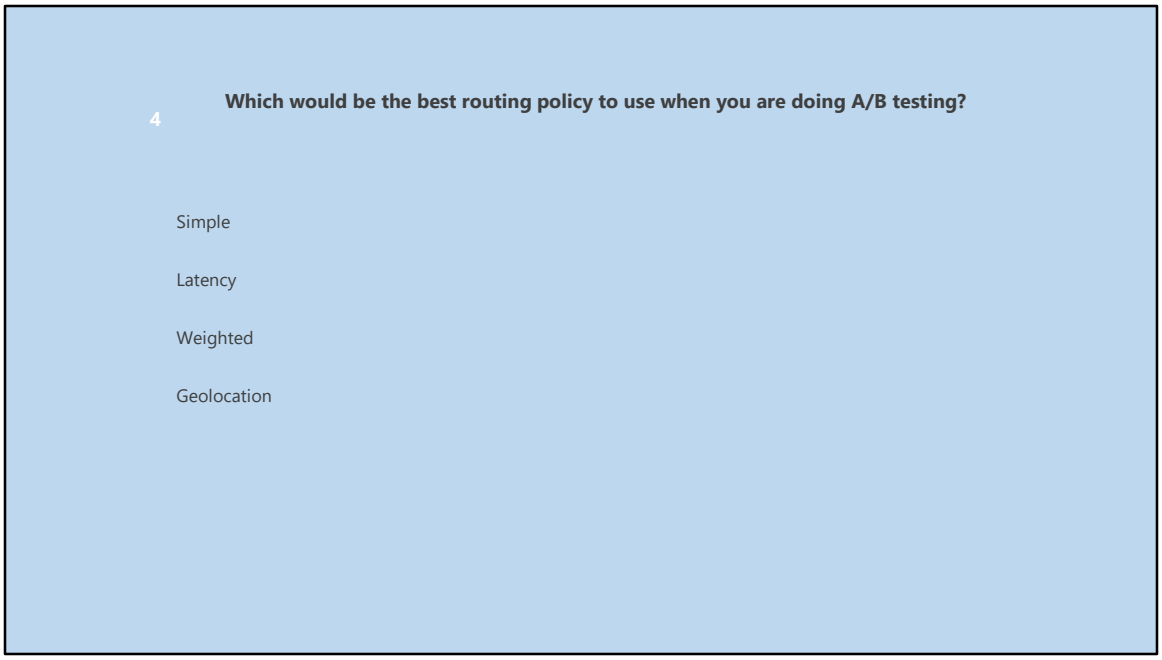

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4 **Which would be the best routing policy to use when you are doing A/B testing?**

Simple

Latency

Weighted

Geolocation

c

Weighted allows you to determine what percentage of traffic is sent to a particular webserver so you can easily do A/B testing.

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5 **Which would be the best routing policy when you want specific countries to use specific webservers?**

Failover

Latency

Weighted

Geolocation

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5 **Which would be the best routing policy when you want specific countries to use specific webservers?**

Failover

Latency

Weighted

Geolocation

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Geolocation allows you to specify which webserver users from different countries are sent to.

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