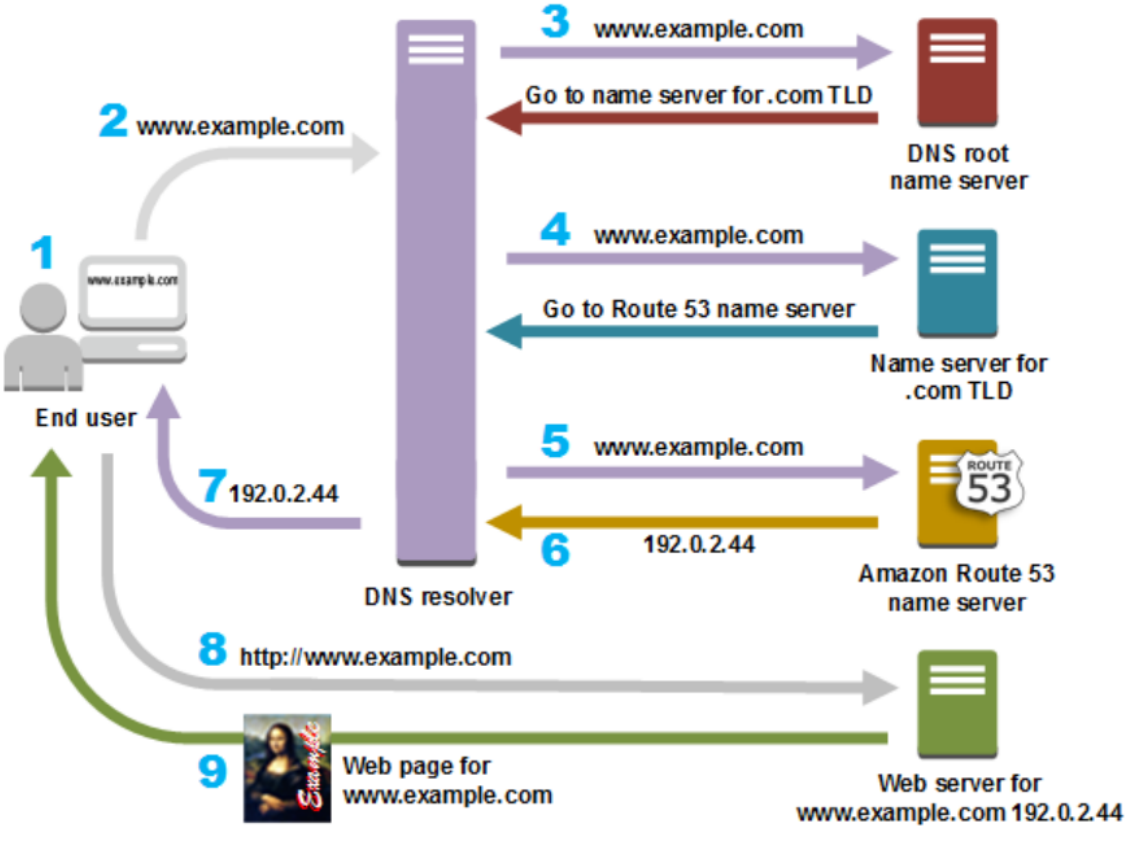
# ROUTE 53

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).

## How Does DNS Route Traffic To Your Web Application?




Route 53 provides three main functions:

- **Domain registration**
  - allows domain names registration
- **Domain Name System (DNS) service**
  - translates friendly domains names like www.example.com into IP addresses like 192.0.2.1
  - responds to DNS queries using a global network of authoritative DNS servers, which reduces latency
  - can route Internet traffic to CloudFront, Elastic Beanstalk, ELB, or S3. There's no charge for DNS queries to these resources
- **Health Checking**

- can monitor the health of resources such as web and email servers.
- sends automated requests over the Internet to the application to verify that it's reachable, available, and functional
- CloudWatch alarms can be configured for the health checks to send notifications when a resource becomes unavailable.
- can be configured to route Internet traffic away from resources that are unavailable

## Supported DNS Record Types

- **A Record Type** – the value for an A record is an IPv4 address in dotted decimal notation.
- **AAAA Record Type** – the value for an AAAA record is an IPv6 address in colon-separated hexadecimal format.
- CAA Record Type – lets you specify which certificate authorities (CAs) are allowed to issue certificates for a domain or subdomain.
- **CNAME Record Type** – a CNAME Value element is the same format as a domain name.
- DS Record Type – represents key tag, algorithm, digest type, and digest of the zone key.
- **MX Record Type** – each value for an MX record actually contains two values, *priority* and *domain name*.
- NAPTR Record Type – converts one value to another or replaces one value with another.

- **NS Record Type** – identifies the name servers for the hosted zone. The value for an NS record is the domain name of a name server.
- PTR Record Type – is the same format as a domain name.
- **SOA Record Type** – provides information about a domain and the corresponding Amazon Route 53 hosted zone.
- SPF Record Type – a list of all authorized hostnames or IP addresses that are allowed to send an email on behalf of your domain.

- SRV Record Type – represents priority, weight, port, and domain name.

- TXT Record Type – contains text information for sources outside your domain.

## Alias Resource Record Sets

- Route 53 supports alias resource record sets, which enables routing of queries to a CloudFront distribution, Elastic Beanstalk, ELB, an S3 bucket configured as a static website, or another Route 53 resource record set

| CNAME Records | Alias Records |
| --- | --- |
| You can't create a CNAME record at the zone apex. | You can create an alias record at the zone apex. Alias records must have the same type as the record you're routing traffic to. |
| Route 53 charges for CNAME queries. | Route 53 doesn't charge for alias queries to AWS resources. |
| A CNAME record redirects queries for a domain name regardless of record type. | Route 53 responds to a DNS query only when the name and type of the alias record matches the name and type in the query. |
| A CNAME record can point to any DNS record that is hosted anywhere. | An alias record can only point to selected AWS resources or to another record in the hosted zone that you're creating the alias record in. |
| A CNAME record appears as a CNAME record in response to dig or Name Server (NS) lookup queries. | An alias record appears as the record type that you specified when you created the record, such as A or AAAA. |

## Route 53 Hosted Zone

- Hosted Zone is a container for records, which include information about how to route traffic for a domain (such as example.com) and all of its subdomains (such as www.example.com, retail.example.com, and seattle.accounting.example.com).
- A hosted zone has the same name as the corresponding domain.
- Routing Traffic to the Resources
  - Create a hosted zone with either a public hosted zone or a private hosted zone:
    - **Public Hosted Zone** – for routing internet traffic to the resources for a specific domain and its subdomains

    - **Private hosted zone** – for routing traffic within a VPC
  - Create records in the hosted zone
    - Records define where to route traffic for each domain name or subdomain name.
    - Name of each record in a hosted zone must end with the name of the hosted zone.
- For public/private and private Hosted Zones that have overlapping namespaces, Route 53 Resolvers routes traffic to the most specific match.

## Route 53 Health Checks

- Route 53 health checks monitor the health and performance of the underlying resources.
- Health check types:

  1) Health checks that monitor an endpoint, such as a web server.

  2) Calculated health checks – Health checks that monitor the status of other health checks.

  3) Health checks that monitor the status of a CloudWatch alarm.

- Route 53 checks the health of an endpoint by sending an HTTP, HTTPS, or TCP request to the specified IP address and port.

# AWS Route 53 Routing Policy

## Simple Routing Policy

- Simple routing policy is a simple round-robin policy and can be applied when there is a single resource doing the function for the domain *e.g. web server that serves content for the website*.
- Simple routing does not allow the creation of multiple records with the same name and type, but multiple values can be specified in the same record, such as multiple IP addresses.
- Simple routing policy does not support health checks, so the record would be returned to the client even if it is unhealthy.

## Weighted Routing Policy

- Weighted routing policy helps route traffic to different resources in specified proportions (weights) *e.g., 75% to one server and 25% to the other during a pilot release*
- Weighted resource record sets allow associating multiple resources with a single DNS name.
- Weighted routing policy use cases include
  - load balancing between regions
  - A/B testing and piloting new versions of software
- Weighted routing policy supports health checks.

## Latency-based Routing (LBR) Policy

- Latency-based Routing Policy helps respond to the DNS query based on which data center gives the user the lowest network latency.
- Latency-based routing policy can be used when there are multiple resources performing the same function and Route 53 needs to be configured to respond to the DNS queries with the resources that provide the fastest response with the lowest latency.
- Latency-based routing policy supports health checks.

## Failover Routing Policy

- Failover routing policy allows **active-passive** failover configuration, in which one resource (primary) takes all traffic when it's healthy and the other resource (secondary) takes all traffic when the first isn't healthy.
- Route 53 health checking agents will monitor each location/endpoint of the application to determine its availability.
- Failover routing policy is applicable for Public hosted zones only.

## Geolocation Routing Policy

- Geolocation routing policy helps respond to DNS queries based on the geographic location of the users i.e. location from which the DNS queries originate.
- Geolocation routing policy use cases include

    - localization of content and presenting some or all of the website in the user's language
    - restrict distribution of content to only the locations in which you have distribution rights.
    - balancing load across endpoints in a predictable, easy-to-manage way, so that each user location is consistently routed to the same endpoint.
- Geolocation routing policy allows geographic locat
- Two geolocation resource record sets that specify the same geographic location **cannot** be created.

## Multivalue Routing Policy

- Multivalue routing helps return multiple values, *e.g. IP addresses for the web servers*, in response to DNS queries.
- Multivalue routing also helps check the health of each resource, so only the values for healthy resources are returned.
- To route traffic approximately randomly to multiple resources, such as web servers, one multivalue answer record can be created for each resource and, optionally, associate a Route 53 health check with each record. If a web server becomes unavailable after the resolver caches a response, client software can try another IP address in the response.

# Amazon Route 53 pricing

With Amazon Route 53, you don't have to pay any upfront fees or commit to the number of queries the service answers for your domain. Like with other AWS services, you pay as you go and only for what you use:

- Managing hosted zones: You pay a monthly charge for each hosted zone managed with Route 53.
- Serving DNS queries: You incur charges for every DNS query answered by the Amazon Route 53 service, except for queries to Alias A records that are mapped to Elastic Load Balancing instances, CloudFront distributions, AWS Elastic Beanstalk environments, API Gateways, VPC endpoints, or Amazon S3 website buckets, which are provided at no additional charge.
- Managing domain names: You pay an annual charge for each domain name registered via or transferred into Route 53.