

## What is DNS

- Domain Name System which translates the human friendly hostnames into the machine IP addresses
- www.google.com => 172.217.18.36
- DNS is the backbone of the Internet
- DNS uses hierarchical naming structure

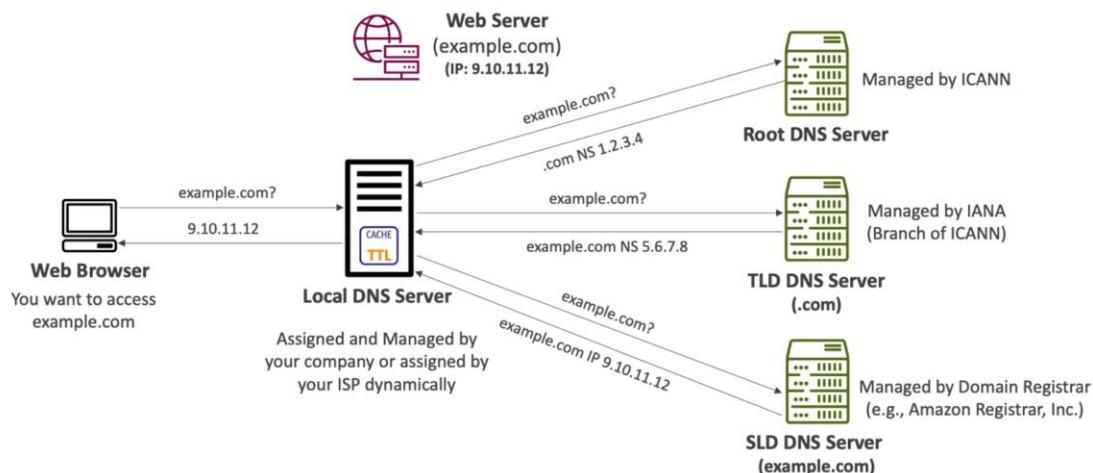
.com  
example.com  
www.example.com  
api.example.com

## DNS Terminologies

- Domain Registrar: Amazon Route 53, GoDaddy, ...
- DNS Records: A, AAAA, CNAME, NS, ...
- Zone File: contains DNS records
- Name Server: resolves DNS queries (Authoritative or Non-Authoritative)
- Top Level Domain (TLD): .com, .us, .in, .gov, .org, ...
- Second Level Domain (SLD): amazon.com, google.com, ...

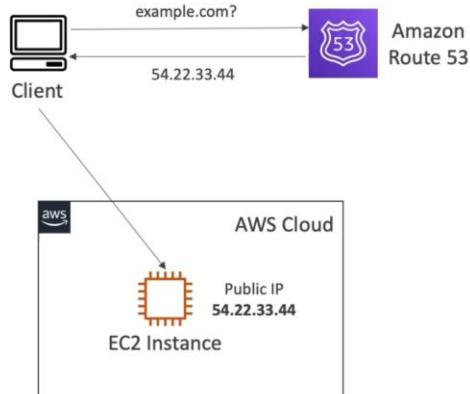


## How DNS work



## Amazon Route 53

- A highly available, scalable, fully managed and Authoritative DNS
  - Authoritative = the customer (you) can update the DNS records
- Route 53 is also a Domain Registrar
- Ability to check the health of your resources
- The only AWS service which provides 100% availability SLA
- Why Route 53? 53 is a reference to the traditional DNS port



## Route 53 Records

- How you want to route traffic for a domain
- Each record contains:
  - Domain/subdomain Name – e.g., example.com
  - Record Type – e.g., A or AAAA
  - Value – e.g., 12.34.56.78
  - Routing Policy – how Route 53 responds to queries
  - TTL – amount of time the record cached at DNS Resolvers
- Route 53 supports the following DNS record types:
  - (must know) A / AAAA / CNAME / NS
  - (advanced) CAA / DS / MX / NAPTR / PTR / SOA / TXT / SPF / SRV

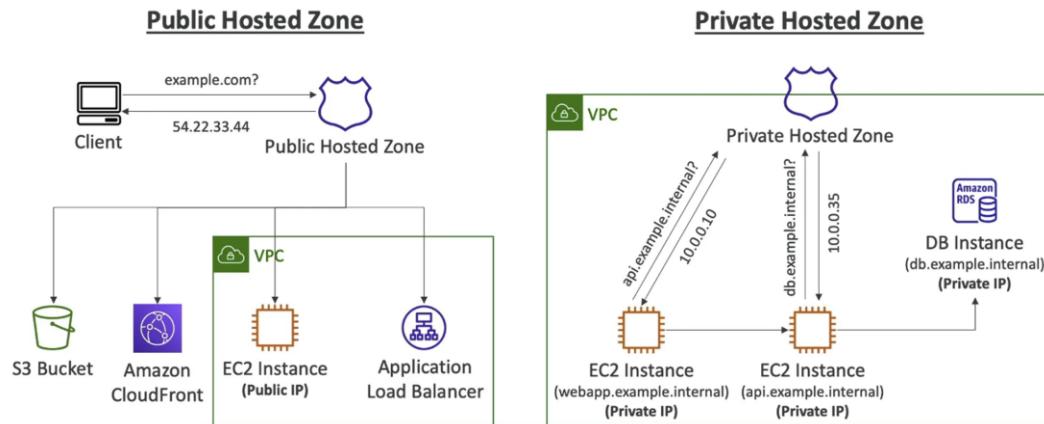
## Route 53 – Record Types

- A – maps a hostname to IPv4
- AAAA – maps a hostname to IPv6
- CNAME – maps a hostname to another hostname
  - The target is a domain name which must have an A or AAAA record
  - Can't create a CNAME record for the top node of a DNS namespace (Zone Apex)
  - Example: you can't create for example.com, but you can create for www.example.com
- NS – Name Servers for the Hosted Zone
  - Control how traffic is routed for a domain

## Route 53 – Hosted Zones

- A container for records that define how to route traffic to a domain and its subdomains
- Public Hosted Zones – contains records that specify how to route traffic on the Internet (public domain names)  
`application1.mypublicdomain.com`
- Private Hosted Zones – contain records that specify how you route traffic within one or more VPCs (private domain names)  
`application1.company.internal`
- You pay \$0.50 per month per hosted zone

## Route 53 – Public vs Private Hosted Zones



### Lab:

Register a domain

create a record with ip 11.22.33.44 for test the dig and nslookup command

```
#nslookup  
#dig  
#sudo yum install -y bind-utils =app install to use nslookup command
```

Now test the command

```
#nslookup test.rajivsiddiqui.com  
#dig test.rajivsiddiqui.com
```

### launch 3 instances in 3 different az

Launch an instance in us-east-1 with the script

Launch an instance in Singapore with the script

Launch an instance in Frankfurt with the script

Also create a load balancer in Frankfurt az

**Keep note in all ip and az name**

|               |                |
|---------------|----------------|
| 3.68.75.209   | eu-central-1   |
| 54.210.74.193 | us-east-1      |
| 18.143.103.48 | ap-southeast-1 |

Load balancer DNS: alb-for-route53-test-420850205.eu-central-1.elb.amazonaws.com

Route 53 > Hosted zones > Create hosted zone

## Create hosted zone Info

**Hosted zone configuration**

A hosted zone is a container that holds information about how you want to route traffic for a domain, such as example.com, and its subdomains.

**Domain name** Info  
This is the name of the domain that you want to route traffic for.

Valid characters: a-z, 0-9, ! " # \$ % & ' ( ) \* + , - / : ; < = > ? @ [ \ ] ^ \_ ` { | } . ~

**Description - optional** Info  
This value lets you distinguish hosted zones that have the same name.

The description can have up to 256 characters. 0/256

**Type** Info  
The type indicates whether you want to route traffic on the internet or in an Amazon VPC.

**Public hosted zone**  
A public hosted zone determines how traffic is routed on the internet.

**Private hosted zone**  
A private hosted zone determines how traffic is routed within an Amazon VPC.

**Tags** Info  
Apply tags to hosted zones to help organize and identify them.

No tags associated with the resource.

**Add tag**

You can add up to 50 more tags.

**Cancel** **Create hosted zone**

## TTL(Time to Live)

In Amazon Route 53, TTL stands for Time to Live, which is a value associated with DNS records. TTL determines how long a DNS resolver or client should cache the DNS information before requesting it again from the authoritative DNS server.

To configure the TTL for a record in Amazon Route 53, you can follow these steps:

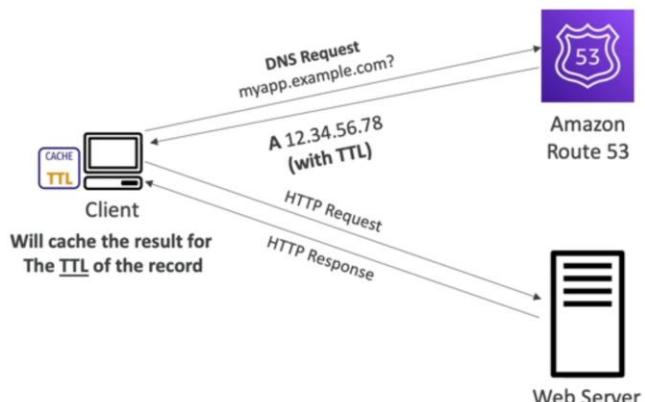
1. Open the Route 53 console: Go to the AWS Management Console, select Route 53, and click on the "Hosted zones" link in the navigation pane.
2. Select the hosted zone: Click on the name of the hosted zone where the record you want to modify is located.
3. Locate the record: Scroll through the list of records in the hosted zone or use the search box to find the specific record you want to modify.
4. Edit the record: Click on the pencil icon or select the record and choose the "Edit" button.
5. Set the TTL value: In the TTL field, enter the desired TTL value in seconds. The valid range for TTL values in Route 53 is from 0 to 2,147,483,647 seconds (approximately 68 years).
6. Save the changes: After setting the TTL value, click on the "Save Record Set" button to save your changes.

It's important to note that changes to TTL values may take some time to propagate across DNS servers due to caching. Therefore, it's recommended to consider the impact of TTL changes on your DNS infrastructure and plan accordingly.

Keep in mind that modifying TTL values should be done carefully, as it can affect how quickly DNS changes propagate and how often clients request updated DNS information.

### Route 53 – Records TTL (Time to Live)

- High TTL – e.g., 24 hr
  - Less traffic on Route 53
  - Possibly outdated records
- Low TTL – e.g., 60 sec.
  - More traffic on Route 53 (\$\$)
  - Records are outdated for less time
  - Easy to change records
- Except for Alias records, TTL is mandatory for each DNS record



### Lab:

create a A record demo.rajivsiddiqui.com and set TTL 60 sec and user any ec2 ip

## **CNAME vs Alias**

In Amazon Route 53, CNAME (Canonical Name) and Alias are two different types of records used for mapping domain names to other resources.

### 1. CNAME Records:

- CNAME records are used to create an alias for a domain name and point it to another domain name.
- They can only be used for subdomains (e.g., [www.example.com](http://www.example.com)) and cannot be used for the root domain (e.g., example.com).
- When a DNS resolver encounters a CNAME record, it resolves the target domain name and returns the corresponding IP address.
- CNAME records can point to any valid DNS name, including external domains.

### 2. Alias Records:

- Alias records are specific to Amazon Route 53 and are used to map a domain name to another AWS resource, such as an Elastic Load Balancer (ELB), Amazon S3 bucket, CloudFront distribution, or an AWS Elastic Beanstalk environment.
- They can be used for both the root domain and subdomains.
- Unlike CNAME records, Alias records do not incur an additional lookup and provide better performance by returning the IP addresses of the target resource directly.
- Alias records are automatically updated by Route 53 when the target resource's IP addresses change, ensuring that your domain always points to the correct resource.

In summary, CNAME records are used for general domain aliasing, while Alias records are specific to Amazon Route 53 and provide more efficient and reliable mappings to AWS resources. If you are using AWS services, it is generally recommended to use Alias records instead of CNAME records when mapping your domain to AWS resources hosted within the same AWS account.

## **CNAME vs Alias**

- AWS Resources (Load Balancer, CloudFront...) expose an AWS hostname:
  - [lb-1234.us-east-2.elb.amazonaws.com](http://lb-1234.us-east-2.elb.amazonaws.com) and you want [myapp.mydomain.com](http://myapp.mydomain.com)
- CNAME:
  - Points a hostname to any other hostname. (app.mydomain.com => blabla.anything.com)
  - ONLY FOR NON ROOT DOMAIN (aka something.mydomain.com)
- Alias:
  - Points a hostname to an AWS Resource (app.mydomain.com => blabla.amazonaws.com)
  - Works for ROOT DOMAIN and NON ROOT DOMAIN (aka mydomain.com)
  - Free of charge
  - Native health check

## Route 53 - Alias Records

- Maps a hostname to an AWS resource
- An extension to DNS functionality
- Automatically recognizes changes in the resource's IP addresses
- Unlike CNAME, it can be used for the top node of a DNS namespace (Zone Apex), e.g.: example.com
- Alias Record is always of type A/AAAA for AWS resources (IPv4 / IPv6)
- You can't set the TTL



## Route 53 - Alias Records Targets

- Elastic Load Balancers
- CloudFront Distributions
- API Gateway
- Elastic Beanstalk environments
- S3 Websites
- VPC Interface Endpoints
- Global Accelerator accelerator
- Route 53 record in the same hosted zone



- You cannot set an ALIAS record for an EC2 DNS name

## Create a CMANE

**Quick create record**

Record name:  .rajivsiddiqui.com

Record type:

Value:

TTL (seconds):  1m 1h 1d

Routing policy: Simple routing

Add another record Cancel Create records

## Create an Alias

Quick create record Switch to wizard

▼ Record 1 Delete

Record name Info  .rajivsiddiqui.com Keep blank to create a record for the root domain.

Record type Info  ▼

Alias

Route traffic to Info  ▼

▼

X

Alias hosted zone ID: Z215JYRZR1TBDS

Routing policy Info  Evaluate target health  Yes

Add another record

Cancel Create records

create a alias on root domain which is rajivsiddiqui.com

rajivsiddiqui.com-----by alias possible

rajivsiddiqui.com-----by CNAME not possible

Create record Info

Quick create record Switch to wizard

▼ Record 1 Delete

Record name Info  rajivsiddiqui.com Keep blank to create a record for the root domain.

Record type Info  ▼

Alias

Route traffic to Info  ▼

▼

X

Alias hosted zone ID: Z215JYRZR1TBDS

Routing policy Info  Evaluate target health  Yes

Add another record

Cancel Create records

NB: main difference between CNAME and alias is, I can add a record by using rajivsiddiqui.com but in CNAME it's not possible.

### Route 53-Routing policies

- Define how Route 53 responds to DNS queries
- Don't get confused by the word "Routing"
  - It's not the same as Load balancer routing which routes the traffic
  - DNS does not route any traffic, it only responds to the DNS queries
- Route 53 Supports the following Routing Policies
  - Simple
  - Weighted
  - Failover
  - Latency based
  - Geolocation
  - Multi-Value Answer
  - Geoproximity (using Route 53 Traffic Flow feature)

### Routing Policies – Simple

- Typically, route traffic to a single resource
- Can specify multiple values in the same record
- If multiple values are returned, a random one is chosen by the client
- When Alias enabled, specify only one AWS resource
- Can't be associated with Health Checks



### Lab: create a simple record

**Quick create record**

[Switch to wizard](#)

**Record 1**

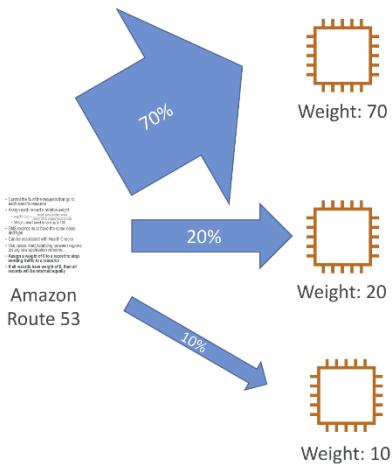
|  |                                  |
|--|----------------------------------|
| Record name <a href="#">Info</a>                             | .rajivsiddiqui.com               |
| Keep blank to create a record for the root domain.           |                                  |
| <input checked="" type="radio"/> Alias                       | Record type <a href="#">Info</a> |
| A – Routes traffic to an IPv4 address and some AWS resources |                                  |
| Value <a href="#">Info</a>                                   | 3.68.75.209                      |
| Enter multiple values on separate lines.                     |                                  |
| TTL (seconds) <a href="#">Info</a>                           | 20                               |
| Recommended value: 604,800 (two days)                        |                                  |
| 1m 1h 1d   |                                  |
| Routing policy <a href="#">Info</a>                          |                                  |
| Simple routing   |                                  |

[Add another record](#)

[Cancel](#) [Create records](#)

## Routing Policies – Weighted

- Control the % of the requests that go to each specific resource
- Assign each record a relative weight:
 
$$\text{traffic (\%)} = \frac{\text{Weight for a specific record}}{\text{Sum of all the weights for all records}}$$
  - Weights don't need to sum up to 100
- DNS records must have the same name and type
- Can be associated with Health Checks
- Use cases: load balancing between regions, testing new application versions...
- Assign a weight of 0 to a record to stop sending traffic to a resource
- If all records have weight of 0, then all records will be returned equally



### Lab weighted:

**Create record Info**

**Quick create record** [Switch to wizard](#)

**Record 1** [Delete](#)

|   |  |   |   |
|---|--|---|---|
| <b>Record name</b> <small>Info</small>  | <input type="text" value="weighted"/> .rajivsiddiqui.com   | <b>Record type</b> <small>Info</small>                | <input type="text" value="A – Routes traffic to an IPv4 address and some AWS resources"/> |
| Keep blank to create a record for the root domain.  |  |   |   |
| <input checked="" type="radio"/> Alias  |  |   |   |
| <b>Value</b> <small>Info</small>  | <input type="text" value="3.68.75.209"/>   |   |   |
| Enter multiple values on separate lines.  |  |   |   |
| <b>TTL (seconds)</b> <small>Info</small>  | <input type="text" value="3"/> <input type="button" value="1m"/> <input type="button" value="1h"/> <input type="button" value="1d"/> | <b>Routing policy</b> <small>Info</small>             | <input type="text" value="Weighted"/>   |
| Recommended values: 60 to 172800 (two days)   |  |   |   |
| <b>Weight</b>   | <input type="text" value="60"/>  | <b>Health check ID - optional</b> <small>Info</small> | <input type="text" value="Choose health check"/> <input type="button" value="C"/>         |
| The weight can be a number between 0 and 255. If you specify 0, Route 53 stops responding to DNS queries using this record. |  |   |   |
| <b>Record ID</b> <small>Info</small>  | <input type="text" value="central"/>   |   |   |

## ▼ Record 2

[Delete](#)Record name [Info](#)

weighted

.rajivsiddiqui.com

Keep blank to create a record for the root domain.

 AliasValue [Info](#)

54.210.74.193

Enter multiple values on separate lines.

TTL (seconds) [Info](#)

3

1m

1h

1d

Routing policy [Info](#)

Weighted

Recommended values: 60 to 172800 (two days)

Weight

30

The weight can be a number between 0 and 255. If you specify 0, Route 53 stops responding to DNS queries using this record.

Record ID [Info](#)

east

[Delete](#)Record name [Info](#)

weighted

.rajivsiddiqui.com

Keep blank to create a record for the root domain.

 AliasValue [Info](#)

18.143.103.48

Enter multiple values on separate lines.

TTL (seconds) [Info](#)

3

1m

1h

1d

Routing policy [Info](#)

Weighted

Recommended values: 60 to 172800 (two days)

Weight

10

The weight can be a number between 0 and 255. If you specify 0, Route 53 stops responding to DNS queries using this record.

Record ID [Info](#)

southeast

[Add another record](#)[Cancel](#)[Create records](#)

Now go to cloudshell and check  
#dig weighted.rajivsiddiqui.com

### Routing Policies – Latency-based

- Redirect to the resource that has the least latency close to us
- Super helpful when latency for users is a priority
- Latency is based on traffic between users and AWS Regions
- Germany users may be directed to the US (if that's the lowest latency)
- Can be associated with Health Checks (has a failover capability)



Lab:

Route 53 > Hosted zones > rajivsiddiqui.com > Create record

### Create record Info

**Quick create record** Switch to wizard

**Record 1** Delete

Record name Info  .rajivsiddiqui.com Keep blank to create a record for the root domain.

Record type Info

Alias

Value Info

Enter multiple values on separate lines.

TTL (seconds) Info     Routing policy Info

Recommended values: 60 to 172800 (two days)

Region  Health check ID - optional Info

Record ID Info

**▼ Record 2**

Record name | [Info](#)

.rajivsiddiqui.com

Keep blank to create a record for the root domain.

Alias

Value | [Info](#)

Enter multiple values on separate lines.

Record type | [Info](#)

A – Routes traffic to an IPv4 address and some AWS resources

---

TTL (seconds) | [Info](#)

1m    1h    1d

Recommended values: 60 to 172800 (two days)

Routing policy | [Info](#)

Latency

Region

Health check ID - optional | [Info](#)

Record ID | [Info](#)

---

**▼ Record 3**

Record name | [Info](#)

.rajivsiddiqui.com

Keep blank to create a record for the root domain.

Alias

Value | [Info](#)

Enter multiple values on separate lines.

Record type | [Info](#)

A – Routes traffic to an IPv4 address and some AWS resources

---

TTL (seconds) | [Info](#)

1m    1h    1d

Recommended values: 60 to 172800 (two days)

Routing policy | [Info](#)

Latency

Region

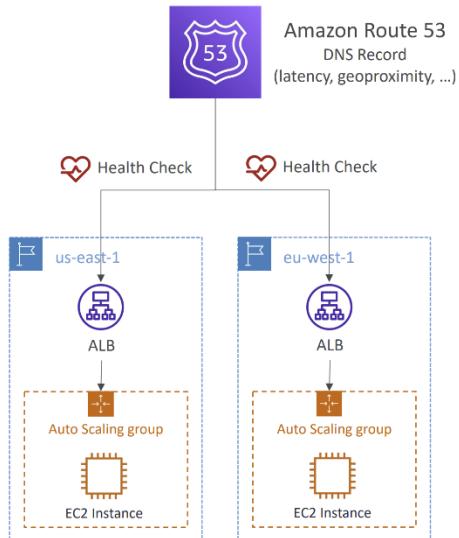
Health check ID - optional | [Info](#)

Record ID | [Info](#)

NB: Now If we brows from Bangladesh we get the page from Singapore zone and if we brows from USA by using vpn or proxy server then the page will come from us-east-1

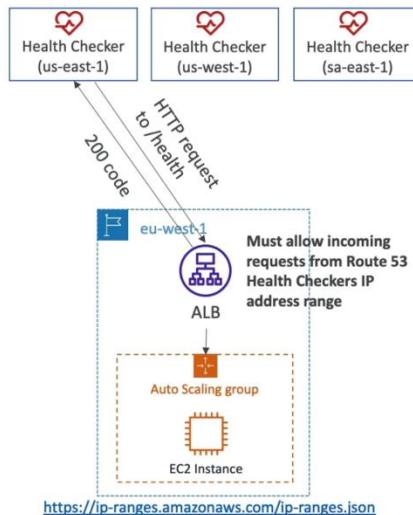
## Route 53 - Health Check

- HTTP Health Checks are only for public resources
- Health Check => Automated DNS Failover:
  1. Health checks that monitor an endpoint (application, server, other AWS resource)
  2. Health checks that monitor other health checks (Calculated Health Checks)
  3. Health checks that monitor CloudWatch Alarms (full control !!) – e.g., throttles of DynamoDB, alarms on RDS, custom metrics, ... (helpful for private resources)
- Health Checks are integrated with CW metrics



## Health Check – Monitor and Endpoint

- About 15 global health checkers will check the endpoint health
  - Healthy/Unhealthy Threshold – 3 (default)
  - Interval – 30 sec (can set to 10 sec – higher cost)
  - Supported protocol: HTTP, HTTPS and TCP
  - If > 18% of health checkers report the endpoint is healthy, Route 53 considers it **Healthy**. Otherwise, it's **Unhealthy**
  - Ability to choose which locations you want Route 53 to use
- Health Checks pass only when the endpoint responds with the 2xx and 3xx status codes
- Health Checks can be setup to pass / fail based on the text in the first 5120 bytes of the response
- Configure your router/firewall to allow incoming requests from Route 53 Health Checkers

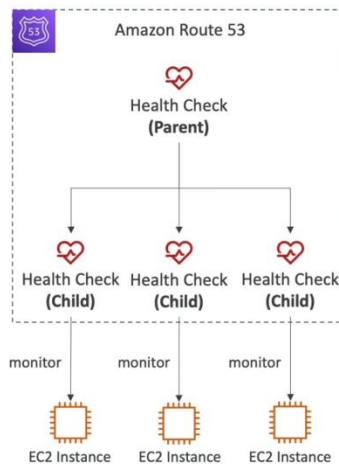


## IP range use in amazon aws

<https://ip-ranges.amazonaws.com/ip-ranges.json>

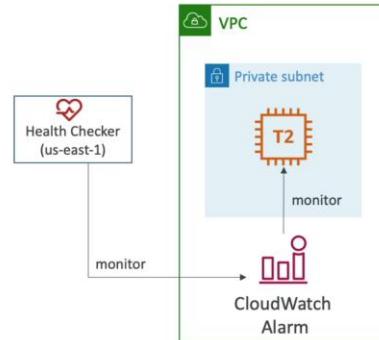
## Route 53 – Calculated Health Check

- Combine the results of multiple Health Checks into a single Health Check
- You can use OR, AND, or NOT
- Can monitor up to 256 Child Health Checks
- Specify how many of the health checks need to pass to make the parent pass
- Usage: perform maintenance to your website without causing all health checks to fail



## Health Check – Private Hosted Zones

- Route 53 health checkers are outside the VPC
- They can't access private endpoints (private VPC or on-premises resource)



## Lab

### Create 3 health for 3 ec2

The screenshot shows the AWS Route 53 Health Checks console interface. The left sidebar includes links for Dashboard, Hosted zones, Health checks (which is selected), IP-based routing, CNAME collections, Domains, and Application Recovery Controller. The main content area has a survey banner at the top. Below it, there's a 'Welcome to Route 53 health checks' message with a 'Create health check' button. Two sections are shown: 'Availability and performance monitoring' (with a computer icon) and 'DNS failover' (with a shield and cross icon). Each section has a brief description and a 'Learn more' link.

## Endpoint health check

Create all three regions health check here I just create one region (eu-central-1) same we need to do the rest 2 region health check.

## Create health check

### Step 1: Configure health check

Step 2: Get notified when health check fails

### Configure health check

?

Route 53 health checks let you track the health status of your resources, such as web servers or mail servers, and take action when an outage occurs.

Name  ⓘ

What to monitor  Endpoint  Status of other health checks (calculated health check)  State of CloudWatch alarm

Monitor an endpoint

Multiple Route 53 health checkers will try to establish a TCP connection with the following resource to determine whether it's healthy. [Learn more](#)

Specify endpoint by  IP address  Domain name

Protocol  ⓘ

IP address \*  ⓘ

Host name  ⓘ

Port \*  ⓘ

Path  ⓘ

▶ Advanced configuration

URL  ⓘ

Health check type Basic - no additional options selected ([View Pricing](#))

\* Required

[Cancel](#) [Next](#)

## Create health check

### Step 1: Configure health check

### Step 2: Get notified when health check fails

### Get notified when health check fails

?

If you want CloudWatch to send you an Amazon SNS notification, such as an email, when the status of the health check changes to unhealthy, create an alarm and specify where to send notifications.

Create alarm  Yes  No ⓘ

\* Required

[Cancel](#)

[Previous](#)

[Create health check](#)

Now create another one region health check

## Create health check

### Step 1: Configure health check

Step 2: Get notified when health check fails

### Configure health check



Route 53 health checks let you track the health status of your resources, such as web servers or mail servers, and take action when an outage occurs.

Name

What to monitor  Endpoint

Status of other health checks (calculated health check)

State of CloudWatch alarm

#### Monitor an endpoint

Multiple Route 53 health checkers will try to establish a TCP connection with the following resource to determine whether it's healthy.  
[Learn more](#)

Specify endpoint by  IP address  Domain name

Protocol

IP address \*

Host name

Port \*

Path

Advanced configuration

URL

Health check type Basic - no additional options selected ([View Pricing](#))

\* Required

[Cancel](#)

[Next](#)

## Create health check

### Step 1: Configure health check

### Step 2: Get notified when health check fails

### Get notified when health check fails



If you want CloudWatch to send you an Amazon SNS notification, such as an email, when the status of the health check changes to unhealthy, create an alarm and specify where to send notifications.

Create alarm  Yes  No

\* Required

[Cancel](#)

[Previous](#)

[Create health check](#)

Now create another one region health check

## Create health check

### Step 1: Configure health check

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Status of other health checks (calculated health check)

State of CloudWatch alarm

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Multiple Route 53 health checkers will try to establish a TCP connection with the following resource to determine whether it's healthy.  
[Learn more](#)

Specify endpoint by  IP address  Domain name

Protocol

IP address \*

Host name

Port \*

Path

#### Advanced configuration

URL

Health check type Basic - no additional options selected [\(View Pricing\)](#)

\* Required

[Cancel](#)

[Next](#)

## Create health check

### Step 1: Configure health check

### Step 2: Get notified when health check fails

### Get notified when health check fails



If you want CloudWatch to send you an Amazon SNS notification, such as an email, when the status of the health check changes to unhealthy, create an alarm and specify where to send notifications.

Create alarm  Yes  No

\* Required

[Cancel](#)

[Previous](#)

[Create health check](#)

Now need to wait few minutes then it will show all region are healthy

| Health Checks                         |                            |                           |                       |                                      |  |
|---------------------------------------|----------------------------|---------------------------|-----------------------|--------------------------------------|--|
| Name                                  | Status                     | Description               | Alarms                | ID                                   |  |
| <input type="checkbox"/> eu-central   | 15 minutes ago now Healthy | http://3.76.251.249:80/   | No alarms configured. | 2e4ddc9f-06d5-453b-8ecc-2411780df8d  |  |
| <input type="checkbox"/> us-east-1    | 15 minutes ago now Healthy | http://54.196.98.184:80/  | No alarms configured. | 31259fd9-df1c-4a0d-be9e-a9184e29b1f4 |  |
| <input type="checkbox"/> ap-southeast | 15 minutes ago now Healthy | http://54.255.147.239:80/ | No alarms configured. | 455df801-a088-41b3-8896-34e6c5070e16 |  |

## Calculated health check

### Create health check

#### Step 1: Configure health check

Step 2: Get notified when health check fails

Configure health check

Route 53 health checks let you track the health status of your resources, such as web servers or mail servers, and take action when an outage occurs.

|  |  |                          |   |                     |  |                            |                          |                      |   |
|--|--|--------------------------|---|---------------------|--|----------------------------|--------------------------|----------------------|---|
| Name   | calculated   |                          |   |                     |  |                            |                          |                      |   |
| What to monitor  | <input type="radio"/> Endpoint <input checked="" type="radio"/> Status of other health checks (calculated health check) <input type="radio"/> State of CloudWatch alarm  |                          |   |                     |  |                            |                          |                      |   |
| Monitor other health checks (calculated health check)  |  |                          |   |                     |  |                            |                          |                      |   |
| The health of this health check depends on the status of the following health checks:  |  |                          |   |                     |  |                            |                          |                      |   |
| <table border="1"> <tr> <td>Health checks to monitor</td> <td>us-east-1<br/>eu-central-1<br/>ap-southeast-1</td> </tr> <tr> <td>Report healthy when</td> <td><input type="radio"/> at least 1 of 3 selected health checks are healthy <input checked="" type="radio"/> all health checks are healthy (AND) <input type="radio"/> one or more health checks are healthy (OR)</td> </tr> <tr> <td>Invert health check status</td> <td><input type="checkbox"/></td> </tr> <tr> <td>Disable health check</td> <td><input type="checkbox"/> By default, disabled health checks are considered healthy. Learn more <i>i</i></td> </tr> </table> |  | Health checks to monitor | us-east-1<br>eu-central-1<br>ap-southeast-1 | Report healthy when | <input type="radio"/> at least 1 of 3 selected health checks are healthy <input checked="" type="radio"/> all health checks are healthy (AND) <input type="radio"/> one or more health checks are healthy (OR) | Invert health check status | <input type="checkbox"/> | Disable health check | <input type="checkbox"/> By default, disabled health checks are considered healthy. Learn more <i>i</i> |
| Health checks to monitor   | us-east-1<br>eu-central-1<br>ap-southeast-1  |                          |   |                     |  |                            |                          |                      |   |
| Report healthy when  | <input type="radio"/> at least 1 of 3 selected health checks are healthy <input checked="" type="radio"/> all health checks are healthy (AND) <input type="radio"/> one or more health checks are healthy (OR) |                          |   |                     |  |                            |                          |                      |   |
| Invert health check status   | <input type="checkbox"/>   |                          |   |                     |  |                            |                          |                      |   |
| Disable health check   | <input type="checkbox"/> By default, disabled health checks are considered healthy. Learn more <i>i</i>  |                          |   |                     |  |                            |                          |                      |   |
| Health check type Basic - no additional options selected <a href="#">View Pricing</a>  |  |                          |   |                     |  |                            |                          |                      |   |
| <span style="float: left;">* Required</span> <span style="float: right;"><a href="#">Cancel</a> <a href="#">Next</a></span>  |  |                          |   |                     |  |                            |                          |                      |   |

### Create health check

#### Step 1: Configure health check

#### Step 2: Get notified when health check fails

#### Get notified when health check fails

If you want CloudWatch to send you an Amazon SNS notification, such as an email, when the status of the health check changes to unhealthy, create an alarm and specify where to send notifications.

[Create alarm](#)  Yes  No *i*

\* Required

[Cancel](#)

[Previous](#)

[Create health check](#)

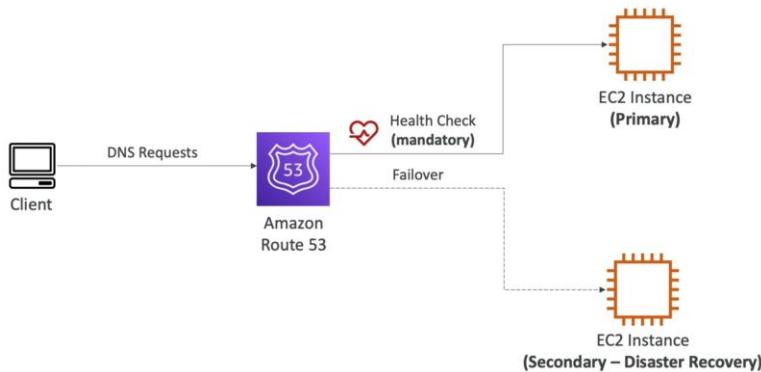
Now wait few minutes then it will show healthy

| <a href="#">Create health check</a> <a href="#">Delete health check</a> <a href="#">Edit health check</a> |   |             |                              |                       |                                      |
|---|---|-------------|------------------------------|-----------------------|--------------------------------------|
| <input type="text"/> Filter by keyword  |   |             |                              |                       |                                      |
| Name  | Status  | Description | Alarms                       | ID                    |                                      |
| <input type="checkbox"/> calculate  |  now | Healthy     | Calculated threshold: 3 of 3 | No alarms configured. | 2ac00aae-6507-4dc0-949c-b5d07417654e |
| <input type="checkbox"/> eu-central   |  now | Healthy     | http://3.76.251.249.80/      | No alarms configured. | 2e4ddcf9-06d5-453b-8ecc-241178f0df8d |
| <input type="checkbox"/> us-east-1  |  now | Healthy     | http://54.196.98.184.80/     | No alarms configured. | 31259fd9-df1c-4a0d-be9e-a9184e29b114 |
| <input type="checkbox"/> ap-southeast   |  now | Healthy     | http://54.255.147.239.80/    | No alarms configured. | 455df801-a088-41b3-8896-34e6c5070e16 |

Now delete http port from anu region security group and wait few minutes then we can see its unhealthy as show blow image

| <a href="#">Create health check</a> <a href="#">Delete health check</a> <a href="#">Edit health check</a> |   |             |                              |                       |                                      |
|---|---|-------------|------------------------------|-----------------------|--------------------------------------|
| <input type="text"/> Filter by keyword  |   |             |                              |                       |                                      |
| Name  | Status  | Description | Alarms                       | ID                    |                                      |
| <input type="checkbox"/> calculate  |  now | Unhealthy   | Calculated threshold: 3 of 3 | No alarms configured. | 2ac00aae-6507-4dc0-949c-b5d07417654e |
| <input type="checkbox"/> eu-central   |  now | Unhealthy   | http://3.76.251.249.80/      | No alarms configured. | 2e4ddcf9-06d5-453b-8ecc-241178f0df8d |
| <input type="checkbox"/> us-east-1  |  now | Healthy     | http://54.196.98.184.80/     | No alarms configured. | 31259fd9-df1c-4a0d-be9e-a9184e29b114 |
| <input type="checkbox"/> ap-southeast   |  now | Healthy     | http://54.255.147.239.80/    | No alarms configured. | 455df801-a088-41b3-8896-34e6c5070e16 |

## Routing Policy-Failover (Active-Passive)



Lab: failover-Create 2 heaths check one is primary and another one is secondary

Route 53 > Hosted zones > rajivsiddiqui.com > Create record

Create record [Info](#)

**Quick create record** [Switch to wizard](#)

**Record 1**

**Record name** [Info](#)  .rajivsiddiqui.com [Delete](#)

Keep blank to create a record for the root domain.

Alias

**Value** [Info](#)

Enter multiple values on separate lines.

**TTL (seconds)** [Info](#)  +1m 1h 1d Recommended values: 60 to 172800 (two days)

**Routing policy** [Info](#)

**Failover record type**

**Health check ID** [Info](#)  [X](#) [C](#)

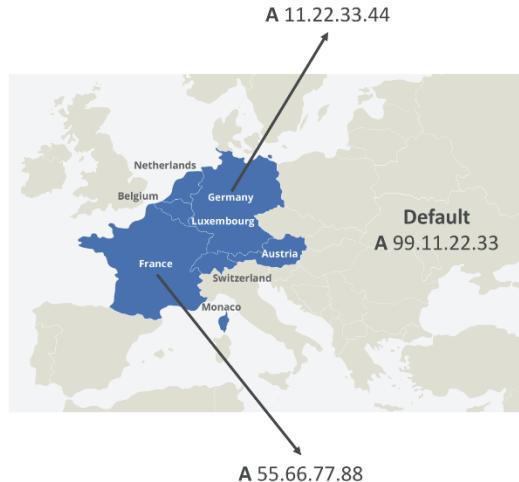
**Record ID** [Info](#)

▼ Record 2

|   |   |
|---|---|
| Record name <a href="#">Info</a>                | .rajivsiddiqui.com  |
| failover  | Keep blank to create a record for the root domain.  |
| <input checked="" type="radio"/> Alias          |   |
| Value <a href="#">Info</a>                      | 54.210.74.193   |
| Enter multiple values on separate lines.        |   |
| TTL (seconds) <a href="#">Info</a>              | 60    +1m    1h    1d   |
| Recommended values: 60 to 172800 (two days)     |   |
| Routing policy <a href="#">Info</a>             | Failover  |
| Failover record type                            | Secondary   |
| Health check ID - optional <a href="#">Info</a> | <input type="text" value="ad9724d2-9c28-452c-8334-85ab4eeaf6a0"/> <input type="button" value="X"/> <input type="button" value="C"/> |
| Record ID <a href="#">Info</a>                  | us-east-1   |

## Routing Policies – Geolocation

- Different from Latency-based!
- This routing is based on user location
- Specify location by Continent, Country or by US State (if there's overlapping, most precise location selected)
- Should create a “Default” record (in case there's no match on location)
- Use cases: website localization, restrict content distribution, load balancing, ...
- Can be associated with Health Checks



**Lab:**

Create record [Info](#)

**Quick create record**

**Record 1**

**Record name** [Info](#)  
geo .rajivsiddiqui.com  
Keen blank to create a record for the root domain.

**Record type** [Info](#)  
A – Routes traffic to an IPv4 address and some AWS resources

Alias

**Value** [Info](#)  
54.210.74.193

Enter multiple values on separate lines.

**TTL (seconds)** [Info](#)  
300    **1m**    **1h**    **1d**  
Recommended values: 60 to 172800 (two days)

**Routing policy** [Info](#)  
Geolocation

**Location**  
Asia

**Health check ID - optional** [Info](#)  
 Choose health check

**Record ID** [Info](#)  
Asia

[Delete](#) [Switch to wizard](#)

**Record 2**

Record name [Info](#)  
 .rajivsiddiqui.com  
Keep blank to create a record for the root domain.

Alias

Value [Info](#)

Enter multiple values on separate lines.

TTL (seconds) [Info](#)  
     
Recommended values: 60 to 172800 (two days)

Routing policy [Info](#)

Location

Health check ID - optional [Info](#)

Record ID [Info](#)

[Add another record](#)

[Cancel](#) [Create records](#)

---

**Record 3**

Record name [Info](#)  
 .rajivsiddiqui.com  
Keep blank to create a record for the root domain.

Alias

Value [Info](#)

Enter multiple values on separate lines.

TTL (seconds) [Info](#)  
     
Recommended values: 60 to 172800 (two days)

Routing policy [Info](#)

Location

Health check ID - optional [Info](#)

Record ID [Info](#)

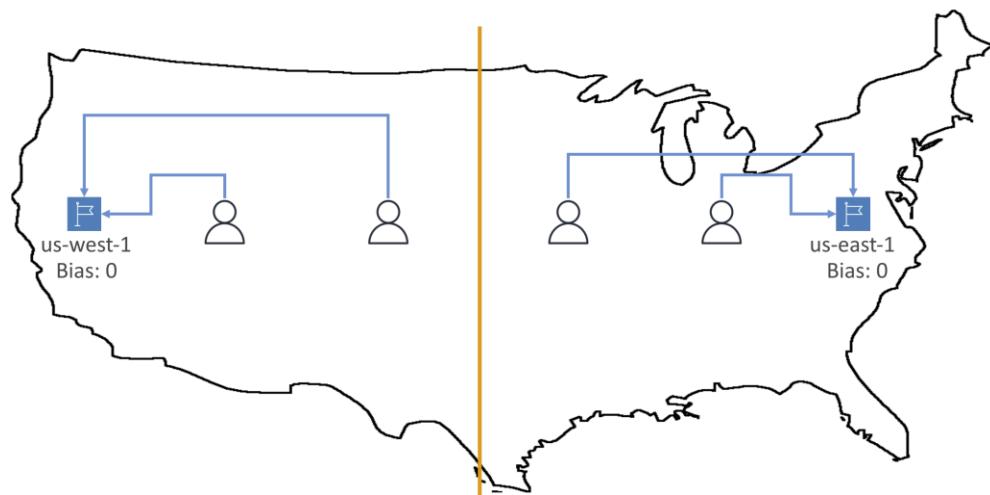
[Add another record](#)

[Cancel](#) [Create records](#)

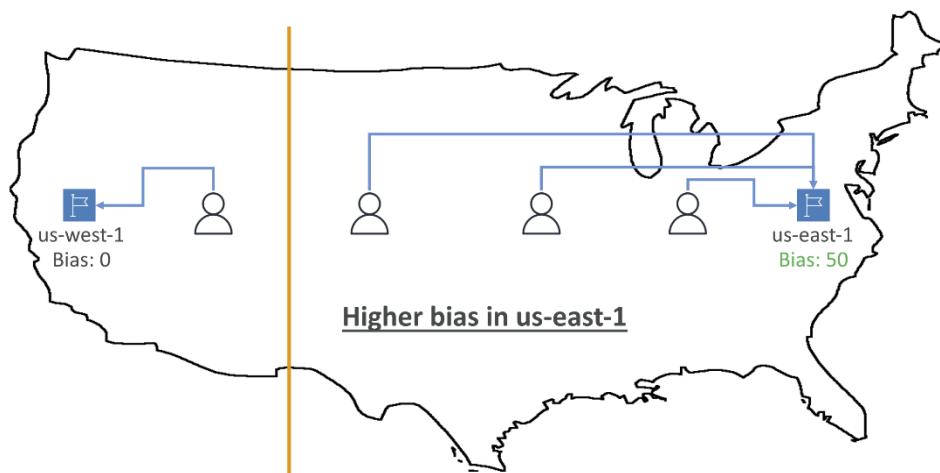
Now brows geo.rajivsiddiqui.com ---we can see page is come from singapore  
use vpn and select usa and brows then we can see page is come from usa

### Geoproximity Routing policy

- Route traffic to your resources based on the geographic location of users and resources
- Ability to shift more traffic to resources based on the defined bias
- To change the size of the geographic region, specify **bias** values:
  - To expand (1 to 99) – more traffic to the resource
  - To shrink (-1 to -99) – less traffic to the resource
- Resources can be:
  - AWS resources (specify AWS region)
  - Non-AWS resources (specify Latitude and Longitude)
- You must use Route 53 Traffic Flow to use this feature



### Routing policy – Geoproximity



## Routing policies – IP based Routing

- Routing is based on clients' IP addresses
- You provide a list of CIDRs for your clients and the corresponding endpoints/locations (user-IP-to-endpoint mappings)
- Use cases: Optimize performance, reduce network costs...
- Example: route end users from a particular ISP to a specific endpoint



## Routing Policies- Multi Value

- Use when routing traffic to multiple resources
- Route 53 return multiple values/resources
- Can be associated with Health Checks (return only values for healthy resources)
- Up to 8 healthy records are returned for each Multi-Value query
- Multi-Value is not a substitute for having an ELB

| Name            | Type     | Value        | TTL | Set ID | Health Check |
|-----------------|----------|--------------|-----|--------|--------------|
| www.example.com | A Record | 192.0.2.2    | 60  | Web1   | A            |
| www.example.com | A Record | 198.51.100.2 | 60  | Web2   | B            |
| www.example.com | A Record | 203.0.113.2  | 60  | Web3   | C            |

## Lab: Multi value-

Create record [Info](#)

## Quick create record

[Switch to wizard](#)

## ▼ Record 1

[Delete](#)Record name [Info](#)multi  .rajivsiddiqui.com

Keep blank to create a record for the root domain.

Record type [Info](#)

A – Routes traffic to an IPv4 address and some AWS resources

 Alias

You can't use an alias record with multivalue routing policy.

Value [Info](#)

54.210.74.193

Enter multiple values on separate lines.

TTL (seconds) [Info](#)

60

+1m

1h

1d

Routing policy [Info](#)

Multivalue answer

Recommended values: 60 to 172800 (two days)

Health check ID - optional [Info](#)

ad9724d2-9c28-452c-8334-85ab4eeaf6a0

Record ID [Info](#)

us-east-1

## ▼ Record 2

[Delete](#)Record name [Info](#)multi  .rajivsiddiqui.com

Keep blank to create a record for the root domain.

 Alias

You can't use an alias record with multivalue routing policy.

Value [Info](#)

3.68.75.209

Enter multiple values on separate lines.

TTL (seconds) [Info](#)

60

+1m

1h

1d

Routing policy [Info](#)

Multivalue answer

Recommended values: 60 to 172800 (two days)

Health check ID - optional [Info](#)

ce05938b-0fc9-4054-9c22-a778751651aa

▼ Record 3

**Record name** [Info](#)  .rajivsiddiqui.com  
Keep blank to create a record for the root domain.

**Record type** [Info](#)

Alias  
You can't use an alias record with multivalue routing policy.

**Value** [Info](#)   
Enter multiple values on separate lines.

**TTL (seconds)** [Info](#)  +1m 1h 1d  
Recommended values: 60 to 172800 (two days)

**Routing policy** [Info](#)

**Health check ID - optional** [Info](#)  X C

**Record ID** [Info](#)

[Add another record](#)

[Cancel](#) [Create records](#)

Now if we check it from cloud shell we can see all are coming

```
ubuntu@ip-172-31-30-116:~$ dig multi.devopssteps.com

; <>> DiG 9.18.12-0ubuntu0.22.04.3-Ubuntu <>> multi.devopssteps.com
;; global options: +cmd
;; Got answer:
;; ->>HEADER<<- opcode: QUERY, status: NOERROR, id: 50119
;; flags: qr rd ra; QUERY: 1, ANSWER: 3, AUTHORITY: 0, ADDITIONAL: 1

;; OPT PSEUDOSECTION:
;; EDNS: version: 0, flags:; udp: 65494
;; QUESTION SECTION:
;multi.devopssteps.com.      IN      A

;; ANSWER SECTION:
multi.devopssteps.com.  20      IN      A      3.76.251.249
multi.devopssteps.com.  20      IN      A      54.196.98.184
multi.devopssteps.com.  20      IN      A      54.255.147.239
```

Now make one region unhealthy we nee to flow the following steps.

[Edit health for making unhealthy a az](#)

| <a href="#">Create health check</a> <a href="#">Delete health check</a> <a href="#">Edit health check</a> |                              |             |                              |                       |                                      |
|---|------------------------------|-------------|------------------------------|-----------------------|--------------------------------------|
| <input type="text"/> Filter by keyword  |                              |             |                              |                       |                                      |
| Name  | Status                       | Description | Alarms                       | ID                    |                                      |
| <input type="checkbox"/> us-east-1  | 3 hours ago <span>now</span> | Healthy     | http://54.210.74.193:80/     | No alarms configured. | ad9724d2-9c28-452c-b334-85ab4eeaf6a0 |
| <input type="checkbox"/> calculated   | 3 hours ago <span>now</span> | Healthy     | Calculated threshold: 3 of 3 | No alarms configured. | cb466c28-661d-45b9-94d6-050e3a463f6c |
| <input type="checkbox"/> eu-central-1   | 3 hours ago <span>now</span> | Healthy     | http://3.68.75.209:80/       | No alarms configured. | ce05938b-0fc9-4054-9c22-a778751651aa |
| <input checked="" type="checkbox"/> ap-southeast-1  | 3 hours ago <span>now</span> | Healthy     | http://18.143.103.48:80/     | No alarms configured. | f61f194a-4b07-438b-a364-06ddb93ec610 |

[Health checks](#) > f61f194a-4b07-438b-a364-06ddb93ec610

## Configure health check

Route 53 health checks let you track the health status of your resources, such as web servers or mail servers, and take action when an outage occurs.

Name  [i](#)

What to monitor  [i](#)

### Monitor an endpoint

Multiple Route 53 health checkers will try to establish a TCP connection with the following resource to determine whether it's healthy. [Learn more](#)

Specify endpoint by  IP address

Protocol  HTTP [i](#)

IP address  [i](#)

Host name  [i](#)

Port \*  [i](#)

Path  [i](#)

### Advanced configuration

Request interval  Standard (30 seconds) [i](#)

Failure threshold \*  [i](#)

String matching  No [i](#)

Latency graphs  No [i](#)

Invert health check status  [i](#)

Disable health check  By default, disabled health checks are considered healthy. [Learn more](#) [i](#)

Health checker regions  Customize  Use recommended [i](#)

US East (N. Virginia)

US West (N. California)

US West (Oregon)

EU (Ireland)

Asia Pacific (Singapore)

Asia Pacific (Sydney)

Asia Pacific (Tokyo)

Now wait for few minutes to get it unhealthy.

| Health Checks |  |                              |                       |                                      |   |
|---------------|--|------------------------------|-----------------------|--------------------------------------|---|
| Name          | Status                                 | Description                  | Alarms                | ID                                   | Actions   |
| calculative   | Healthy<br>1 hour ago 5 minutes ago    | Calculated threshold: 3 of 3 | No alarms configured. | 2ac00aee-6507-4dc0-949c-b5d07417854e | <a href="#">Create health check</a> <a href="#">Delete health check</a> <a href="#">Edit health check</a> |
| eu-central    | Unhealthy<br>2 hours ago 5 minutes ago | http://3.76.251.249:80/      | No alarms configured. | 2e4ddcf9-06d5-453b-8ecc-2411780f0fd8 | <a href="#">Create health check</a> <a href="#">Delete health check</a> <a href="#">Edit health check</a> |
| us-east-1     | Healthy<br>2 hours ago 5 minutes ago   | http://54.196.98.184:80/     | No alarms configured. | 31259fd9-df1c-4ad0-be9e-a9114e29bf1f | <a href="#">Create health check</a> <a href="#">Delete health check</a> <a href="#">Edit health check</a> |
| ap-southeast  | Healthy<br>2 hours ago 5 minutes ago   | http://54.255.147.239:80/    | No alarms configured. | 455df801-a088-41b3-8896-34e6c5070e16 | <a href="#">Create health check</a> <a href="#">Delete health check</a> <a href="#">Edit health check</a> |

```
ubuntu@ip-172-31-30-116:~$ dig multi.devopssteps.com

; <>> DiG 9.18.12-0ubuntu0.22.04.3-Ubuntu <>> multi.devopssteps.com
;; global options: +cmd
;; Got answer:
;; ->>HEADER<<- opcode: QUERY, status: NOERROR, id: 62773
;; flags: qr rd ra; QUERY: 1, ANSWER: 2, AUTHORITY: 0, ADDITIONAL: 1

;; OPT PSEUDOSECTION:
;; EDNS: version: 0, flags:; udp: 65494
;; QUESTION SECTION:
;multi.devopssteps.com.      IN      A

;; ANSWER SECTION:
multi.devopssteps.com.  60      IN      A      54.196.98.184
multi.devopssteps.com.  60      IN      A      54.255.147.239
```

Third party domain use

### Domain Register vs DNS Service

- You buy or register your domain name with a Domain Registrar typically by paying annual charges (e.g., GoDaddy, Amazon Registrar Inc., ...)
- The Domain Registrar usually provides you with a DNS service to manage your DNS records
- But you can use another DNS service to manage your DNS records
- Example: purchase the domain from GoDaddy and use Route 53 to manage your DNS records



### GoDaddy as Register & Route 53 as DNS Service



## Records

We can't display your DNS information because your nameservers aren't managed by us.

**Nameservers**

Using custom nameservers [Change](#)

| Nameserver              |
|-------------------------|
| ns-1063.awsdns-07.org   |
| ns-932.awsdns-52.net    |
| ns-1911.awsdns-46.co.uk |
| ns-481.awsdns-60.com    |



## Amazon Route 53

**Public Hosted Zone**  
stephanetheteacher.com

**Hosted zone details**

| Hosted zone ID | Type                                    |
|----------------|---|
| Z30RUCCWPKZUV  | Public hosted zone                      |
| Description    | HostedZone created by Route53 Registrar |
| Query log      |   |
| Record count   | 22                                      |

Name servers

- ns-153.awsdns-31.com
- ns-146.awsdns-55.org
- ns-653.awsdns-15.net
- ns-1800.awsdns-53.co.uk

## 3<sup>rd</sup> Party Register with Amazon Route 53

- If you buy your domain on a 3<sup>rd</sup> party registrar, you can still use Route 53 as the DNS Service provider
1. Create a Hosted Zone in Route 53
  2. Update NS Records on 3<sup>rd</sup> party website to use Route 53 Name Servers
- Domain Registrar != DNS Service
  - But every Domain Registrar usually comes with some DNS features

## Record created in the lab

| <input checked="" type="checkbox"/> | Record name                | Type  | Routin...    | Differ...    | Alias | Value/Route traffic to   | TTL (s...) | Health     |
|-------------------------------------|----------------------------|-------|--------------|--------------|-------|--|------------|------------|
| <input checked="" type="checkbox"/> | rajivsiddiqui.com          | A     | Simple       | -            | Yes   | dualstack.alb-for-route53-te...  | -          | -          |
| <input checked="" type="checkbox"/> | rajivsiddiqui.com          | NS    | Simple       | -            | No    | ns-1390.awsdns-45.org.<br>ns-626.awsdns-14.net.<br>ns-1915.awsdns-47.co.uk.<br>ns-452.awsdns-56.com. | 172800     | -          |
| <input checked="" type="checkbox"/> | rajivsiddiqui.com          | SOA   | Simple       | -            | No    | ns-1390.awsdns-45.org. aw...   | 900        | -          |
| <input checked="" type="checkbox"/> | demo.rajivsiddiqui.com     | A     | Simple       | -            | No    | 54.210.74.193  | 120        | -          |
| <input checked="" type="checkbox"/> | failover.rajivsiddiqui.com | A     | Failover     | Primary      | No    | 3.68.75.209  | 60         | ce05938... |
| <input checked="" type="checkbox"/> | failover.rajivsiddiqui.com | A     | Failover     | Secondary    | No    | 54.210.74.193  | 60         | ad9724...  |
| <input checked="" type="checkbox"/> | geo.rajivsiddiqui.com      | A     | Geolocation  | Asia         | No    | 54.210.74.193  | 300        | -          |
| <input checked="" type="checkbox"/> | geo.rajivsiddiqui.com      | A     | Geolocation  | Default      | No    | 18.143.103.48  | 300        | -          |
| <input checked="" type="checkbox"/> | geo.rajivsiddiqui.com      | A     | Geolocation  | United S...  | No    | 3.68.75.209  | 300        | -          |
| <input checked="" type="checkbox"/> | latency.rajivsiddiqui.com  | A     | Latency      | Asia Paci... | No    | 18.143.103.48  | 300        | -          |
| <input checked="" type="checkbox"/> | latency.rajivsiddiqui.com  | A     | Latency      | Europe (...) | No    | 3.68.75.209  | 300        | -          |
| <input checked="" type="checkbox"/> | latency.rajivsiddiqui.com  | A     | Latency      | US East ...  | No    | 54.210.74.193  | 300        | -          |
| <input checked="" type="checkbox"/> | multi.rajivsiddiqui.com    | A     | Multivalu... | -            | No    | 18.143.103.48  | 60         | f61f194... |
| <input checked="" type="checkbox"/> | multi.rajivsiddiqui.com    | A     | Multivalu... | -            | No    | 3.68.75.209  | 60         | ce05938... |
| <input checked="" type="checkbox"/> | multi.rajivsiddiqui.com    | A     | Multivalu... | -            | No    | 54.210.74.193  | 60         | ad9724...  |
| <input checked="" type="checkbox"/> | myalias.rajivsiddiqui.com  | A     | Simple       | -            | Yes   | dualstack.alb-for-route53-te...  | -          | -          |
| <input checked="" type="checkbox"/> | myapp.rajivsiddiqui.com    | CNAME | Simple       | -            | No    | alb-for-route53-test-420850...   | 300        | -          |
| <input checked="" type="checkbox"/> | simple.rajivsiddiqui.com   | A     | Simple       | -            | No    | 3.68.75.209<br>54.210.74.193   | 20         | -          |
| <input checked="" type="checkbox"/> | weighted.rajivsiddiqui.com | A     | Weighted     | 60           | No    | 3.68.75.209  | 3          | -          |
| <input checked="" type="checkbox"/> | weighted.rajivsiddiqui.com | A     | Weighted     | 30           | No    | 54.210.74.193  | 3          | -          |
| <input checked="" type="checkbox"/> | weighted.rajivsiddiqui.com | A     | Weighted     | 10           | No    | 18.143.103.48  | 3          | -          |

## Edit rajivsiddiqui.com [Info](#)

### Edit hosted zone

A hosted zone is a container that holds information about how you want to route traffic for a domain, such as example.com, and its subdomains.

Domain name

rajivsiddiqui.com

Hosted zone ID

Z09321743TA43O6ILY3KI

Record count

21

Type

Public hosted zone

Description - *optional* [Info](#)

This value lets you distinguish hosted zones that have the same name.

HostedZone created by Route53 Registrar

The description can have up to 256 characters. 39/256

### Tags [Info](#)

Apply tags to hosted zones to help organize and identify them.

No tags associated with the resource.

Add tag

You can add up to 50 more tags.

[Cancel](#)

[Save changes](#)

### Cleaning Lab

first delete load balancer  
then delete target group  
then delete 3 ec2 instances  
Delete health check.

NB: For deleting hosted zone first delete the A record then CNAME record then delete all other records together.