AWS Route 53

Domain Name System (DNS) Service

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Google

142.250.184.238

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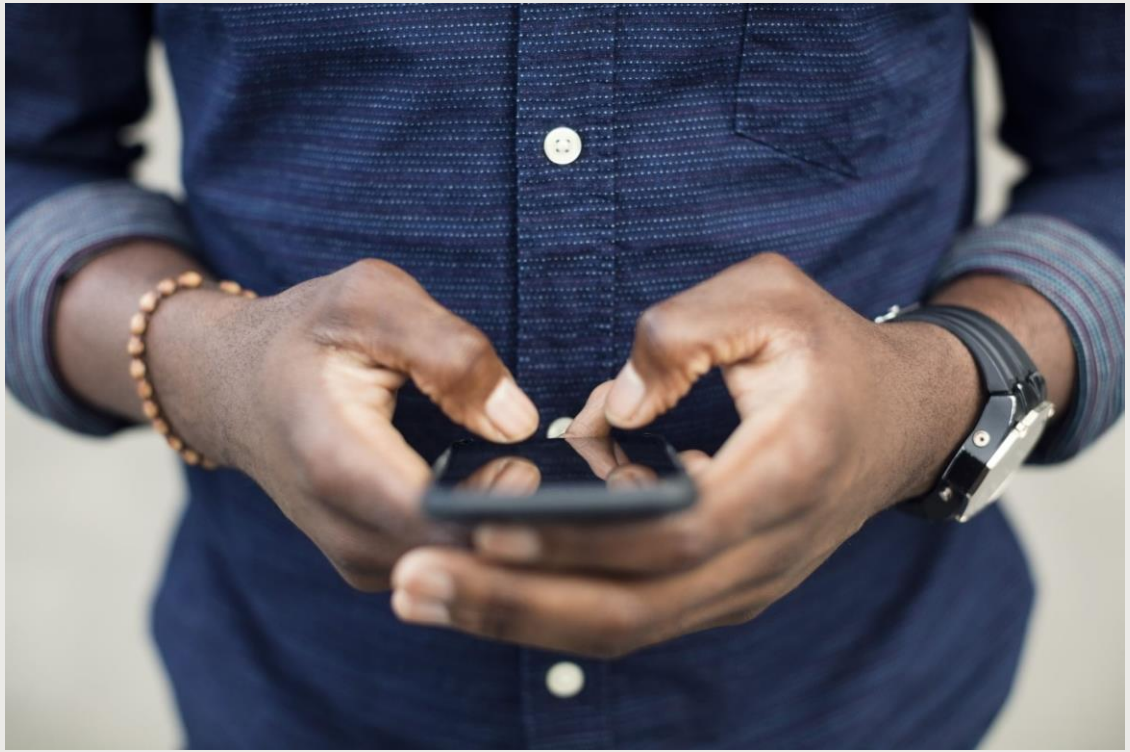
Phone Contact List



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Domain Name System – Lookup Table

Domain	IP Address
www.google.com	142.250.184.238
www.yahoo.com	98.137.11.164

- Where is this lookup table maintained
- Who keeps it up-to-date
- How do we access

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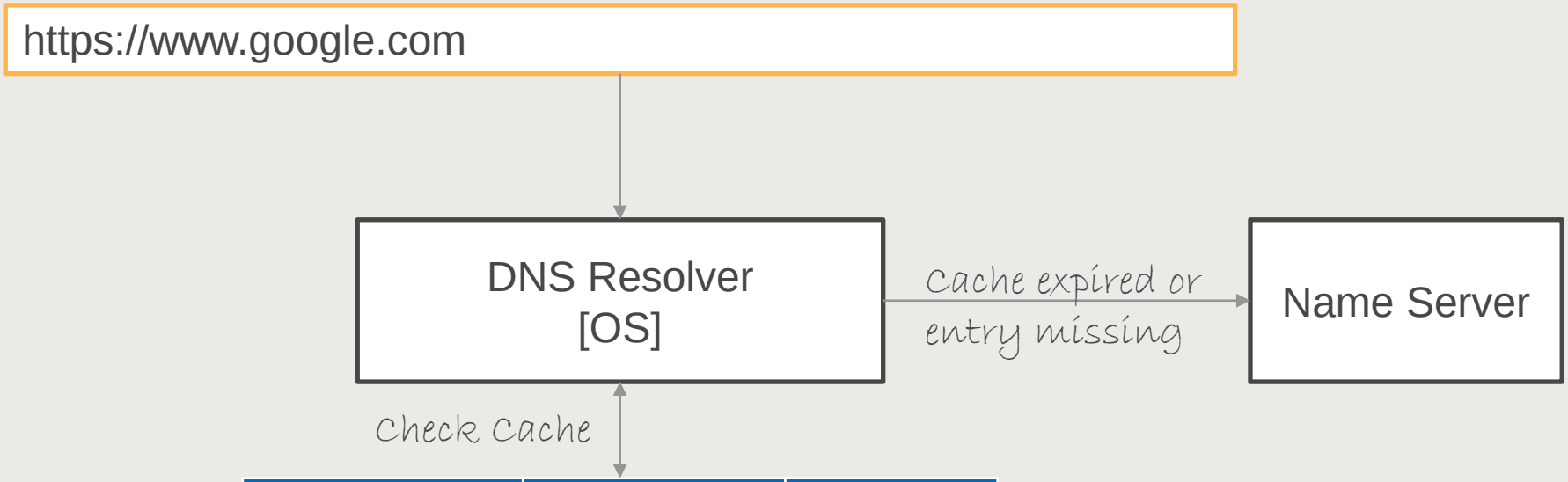
DNS Lookup



Domain	IP Address	TTL
www.google.com	142.250.184.238	300 Seconds
www.yahoo.com	98.137.11.164	60 Seconds

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Name Server

Google's Name Server

Domain	IP Address	TTL
www.google.com	142.250.184.238	300 Seconds
google.com	142.250.184.238	300 Seconds
youtube.com	64.233.177.190	300 Seconds
maps.google.com	108.177.122.139	300 Seconds

Domain Owner Maintains
Accurate Lookup Entries

Authoritative Name Server

DNS entries are distributed
to other Name Servers

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Utilities for DNS Lookup

Windows

```
nslookup www.google.com
```

Linux

```
dig www.google.com
```

Web

https://simpledns.plus/lookup-dg

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Global Network of Name Servers

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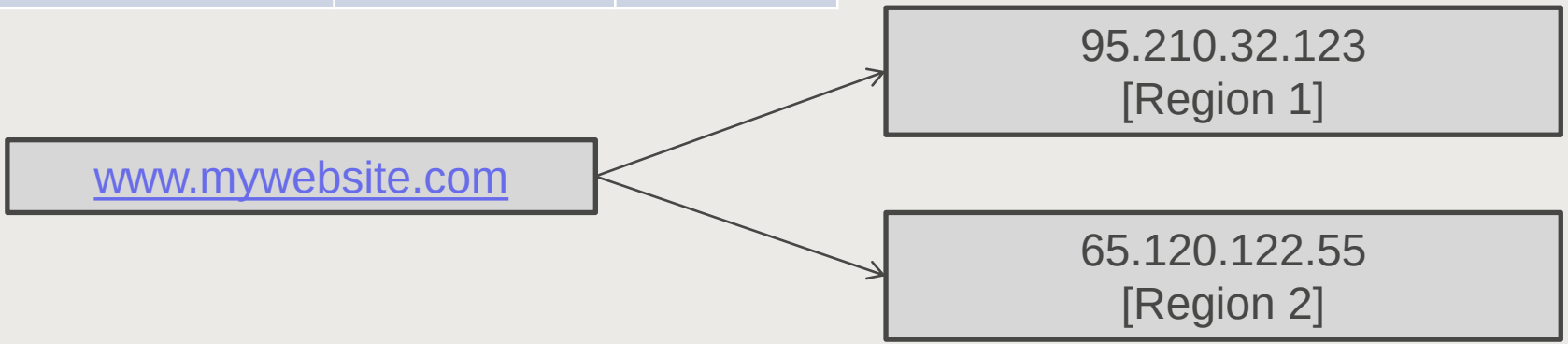
Why TTL?

Domain	IP Address	TTL
www.mywebsite.com	95.210.32.123	24 Hours

Resource IP address can change during scaling or availability event

Domain	IP Address	TTL
www.mywebsite.com	65.120.122.55	24 Hours

DNS Entry Updated To Route Traffic to a Different Resource



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Large TTL – Cached Entries are Stale and Not Accurate

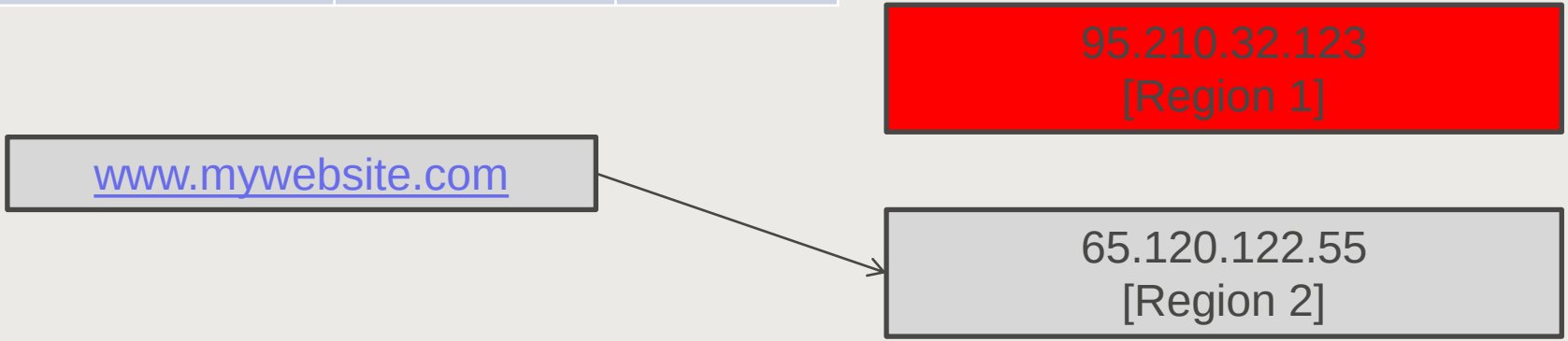
Domain	IP Address	TTL
www.mywebsite.com	95.210.32.123	24 Hours

Domain	IP Address	TTL
www.mywebsite.com	65.120.122.55	24 Hours

Original entry had a TTL of 24 hours

New changes are not updated in cache for 24 hours ☹

Traffic will go to the old resource until TTL expires



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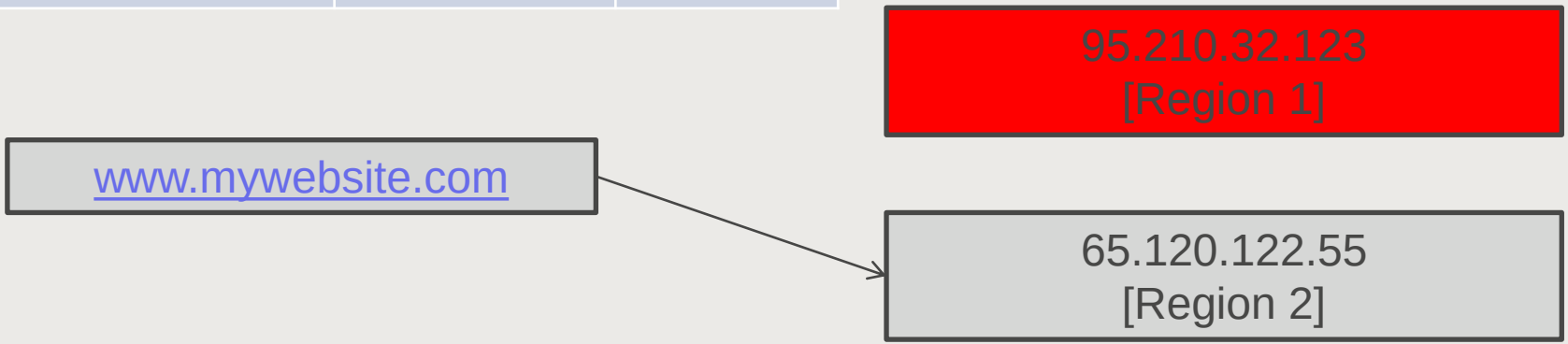
Smaller TTL – Cached Entries are Frequently Updated

Domain	IP Address	TTL
www.mywebsite.com	95.210.32.123	5 Minutes

Domain	IP Address	TTL
www.mywebsite.com	65.120.122.55	5 Minutes

Original entry had a TTL of 5 Minutes.

After 5 minutes, all traffic will be routed to the new resource



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TTL

Select an appropriate value for TTL to react quickly to infrastructure events

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Security

DNS is a critical service

Multi-step verification mechanism to confirm domain ownership

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Route 53

Manage Domains

Configure DNS Entries

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DNS Record Types

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A, AAAA Record – Map domain name to IP address

Record Type	Domain	IP Address	TTL
A	www.mywebsite.com	95.210.32.123	5 Minutes
AAAA	www.mywebsite.com	<IPv6 Address>	5 Minutes

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Alias Record – Route 53 specific

Route traffic to AWS resources such as ELB, CloudFront, S3 Bucket, API Gateway and more

IP Address can change for these resources

Record Type	Domain	Value
Alias	www.mywebsite.com	myelb.us-east-2.amazonaws.com

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Alias Record – Zone apex support

https://www.google.com

https://google.com

Zone Apex

Record Type	Domain	Value
Alias	www.mywebsite.com	myelb.us-east-2.amazonaws.com
Alias	mywebsite.com	myelb.us-east-2.amazonaws.com

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CNAME Record – Rename

https://humanresources.mywebsite.com

https://hr.mywebsite.com

Record Type	Domain	Value
Alias	humanresources.mywebsite.com	myelb.us-east-2.amazonaws.com
CNAME	hr.mywebsite.com	humanresources.mywebsite.com

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MX Record – Mail servers for your domain

Record Type	Domain	IP Address	TTL
MX	www.mywebsite.com	95.210.32.144	5 Minutes
MX	www.mywebsite.com	95.210.32.145	5 Minutes

Recipient Mail Server can cross check MX record to see if sender is a valid email server for your domain [spam protection]

Remote server needs to forward email to your domain – Check MX record to get the server details

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TTL

TTL parameter required for every record

Route 53 Alias Record – Inherits TTL settings from the target service

Record Type	Domain	Value
Alias	www.mywebsite.com	myelb.us-east-2.amazonaws.com

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DNS Summary

Lookup Table to connect resources using friendly name

DNS entries are public information

Entries are cached at various Name Servers and Resolvers

Use an appropriate TTL value

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Route 53 Features

Manage Domains

DNS Records Management

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Public Certificates for SSL/TLS

1. AWS Certificate Manager (ACM) – Free Public Certificates for hosting on AWS
2. To verify domain ownership, ACM will require you to add a CNAME record with a specific value to your DNS
3. ACM will do a DNS lookup to verify if correct value is configured
4. With Route 53, ACM can automatically configure required CNAME records

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Existing domains

Transfer your existing domain from another registrar to Route 53

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Route 53 Hosted Zones

DNS records are organized as hosted zones

- Public Hosted Zone
- Private Hosted Zone

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Public Hosted Zone

Route internet traffic for your domain

https://www.mywebsite.com

Domain	Value
www.mywebsite.com	myelb.us-east-2.amazonaws.com

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Private Hosted Zone

Route traffic inside one or more VPCs

DNS records are visible only inside your VPC

https://www.internaluse.com

Configure internal apps

Domain	Value
hrdb.internaluse.com	mydb.us-east-1.rds.amazonaws.com

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Name Servers For Hosted Zone

Four Name Servers (Virtual)

Answer DNS queries for your domain

Global anycast network – DNS queries are answered from optimal Route 53 location based on network condition

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Route 53 Security

IAM based fine-grain access control

Who can update DNS records

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Route 53 Health Checks

Health Checks to continuously monitor your application for failures

Route user requests to healthy infrastructure

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Route 53 Routing Policies

Run application in multiple locations around the world

Manage traffic flow based on:

- Endpoint health
- Geolocation
- Latency and so forth

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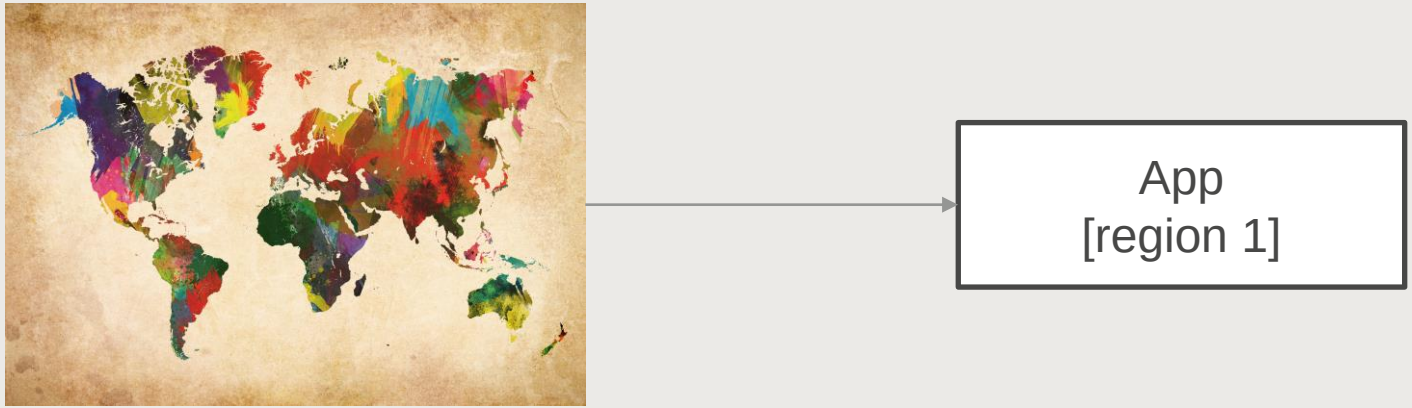
Simple Routing

App hosted in a single location



Routing	Domain	Value
Simple	www.mywebsite.com	myelb.us-east-2.amazonaws.com

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Failover Routing

Routing	Domain	Value	Health Check
Failover - Primary	www.mywebsite.com	myelb.us-east-2.amazonaws.com	Primary Health Check Endpoint
Failover - Secondary	www.mywebsite.com	static-website-s3-bucket.us-east-2.amazonaws.com	

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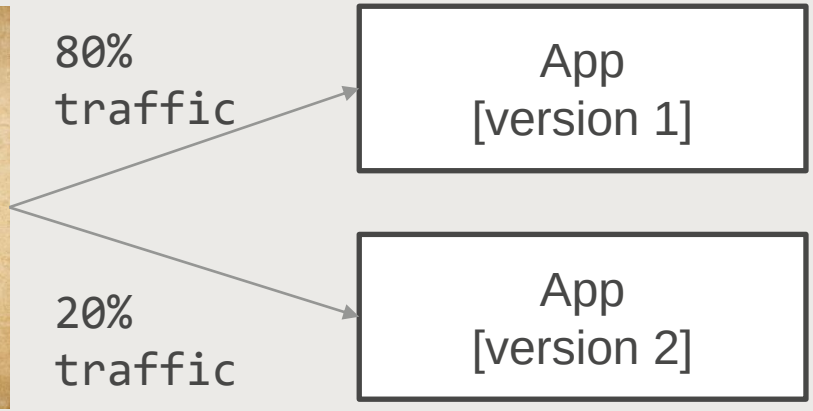
Weighted Routing – Distribute traffic by weight



Routing	Domain	Value	Weight
Weighted	www.mywebsite.com	myelb-v1.us-east-2.amazonaws.com	80%
Weighted	www.mywebsite.com	myelb-v2.us-east-2.amazonaws.com	20%

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Geolocation Routing – Route based on user's location

North America Users

India Users

Other users

App [Oregon]

App [Mumbai]

App [Default Singapore]

Routing	Domain	Value	Country
Geolocation	www.mywebsite.com	myelb.us-west-2.amazonaws.com	North America
Geolocation	www.mywebsite.com	myelb.ap-south-1.amazonaws.com	India
Geolocation	www.mywebsite.com	myelb.ap-southeast-1.amazonaws.com	Default

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Latency Routing - Route based on lowest latency

App [Bahrain]

App [Singapore]

App [Sydney]

Routing	Domain	Value	Country
Latency	www.mywebsite.com	myelb.me-south-1.amazonaws.com	Bahrain
Latency	www.mywebsite.com	myelb.ap-southeast-1.amazonaws.com	Singapore
Latency	www.mywebsite.com	myelb.ap-southeast-2.amazonaws.com	Sydney

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Geoproximity Routing

- Similar to Geolocation based routing
- Gives more routing control using a bias parameter
- Expand and shrink size of geographic region covered by a resource
- Requires Route 53 Traffic Flow Capability (additional charge)

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Multivalue Answer Routing – Let the client decide!

- Several resources can handle the traffic – Route 53 returns up to eight configured resources
- Let the client decide which one to use!
- Optional – configure health checks to return only healthy resources

Routing	Domain	Value
Multivalue answer	www.mywebsite.com	myelb.me-south-1.amazonaws.com
Multivalue answer	www.mywebsite.com	myelb.ap-southeast-1.amazonaws.com
Multivalue answer	www.mywebsite.com	myelb.ap-southeast-2.amazonaws.com

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Route 53

Domain Registration

DNS Records Management

Ease of Integration

Flexible Routing Policies

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