Cloud

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Post Graduate Program in Cloud

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Cloud

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AWS Certified SysOps Administrator – Associate Level

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Route 53

Learning Objectives

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

◉ Implement how to register a domain name

◉ Describe DNS routing

◉ Implement different types of routing

◉ Explain Route 53 and its fundamentals

A Day in the Life of an AWS Administrator

You work as a network engineer and are looking for a networking solution that fits the following requirements:

- The company is searching for a domain name service that can connect user requests to AWS-hosted infrastructure.
- The solution should also be capable of routing traffic according to certain policies.

To achieve all of the above along with some additional features, you will be learning a few concepts in this lesson that will help you find solutions for the above-given scenario.

Domain Name System

Domain Name System

Domain Name System translates human-readable domain names (for example, www.amazon.com) to machine-readable IP addresses (for example, 192.0.2.44).

User

Request

Web Server

Amazon.com

192.0.2.44
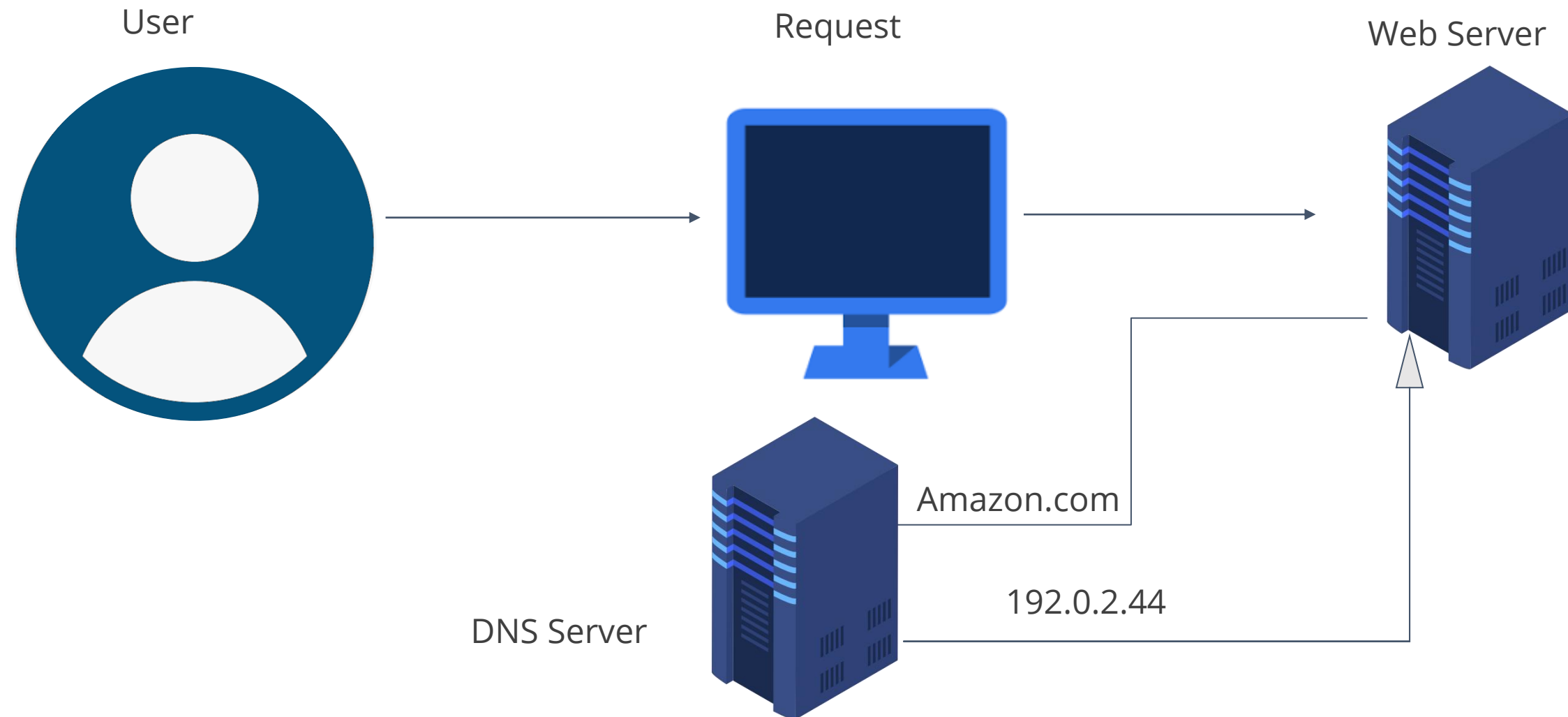
DNS Server

Types of DNS Services

Authoritative DNS

It provides an update mechanism that developers use to manage their public DNS names.

Recursive DNS

It acts like a hotel concierge; while it doesn't own any DNS records, it acts as an intermediary who can get the DNS information on your behalf.

Routing Traffic to Web Applications

The figure below depicts traffic routing to web applications.
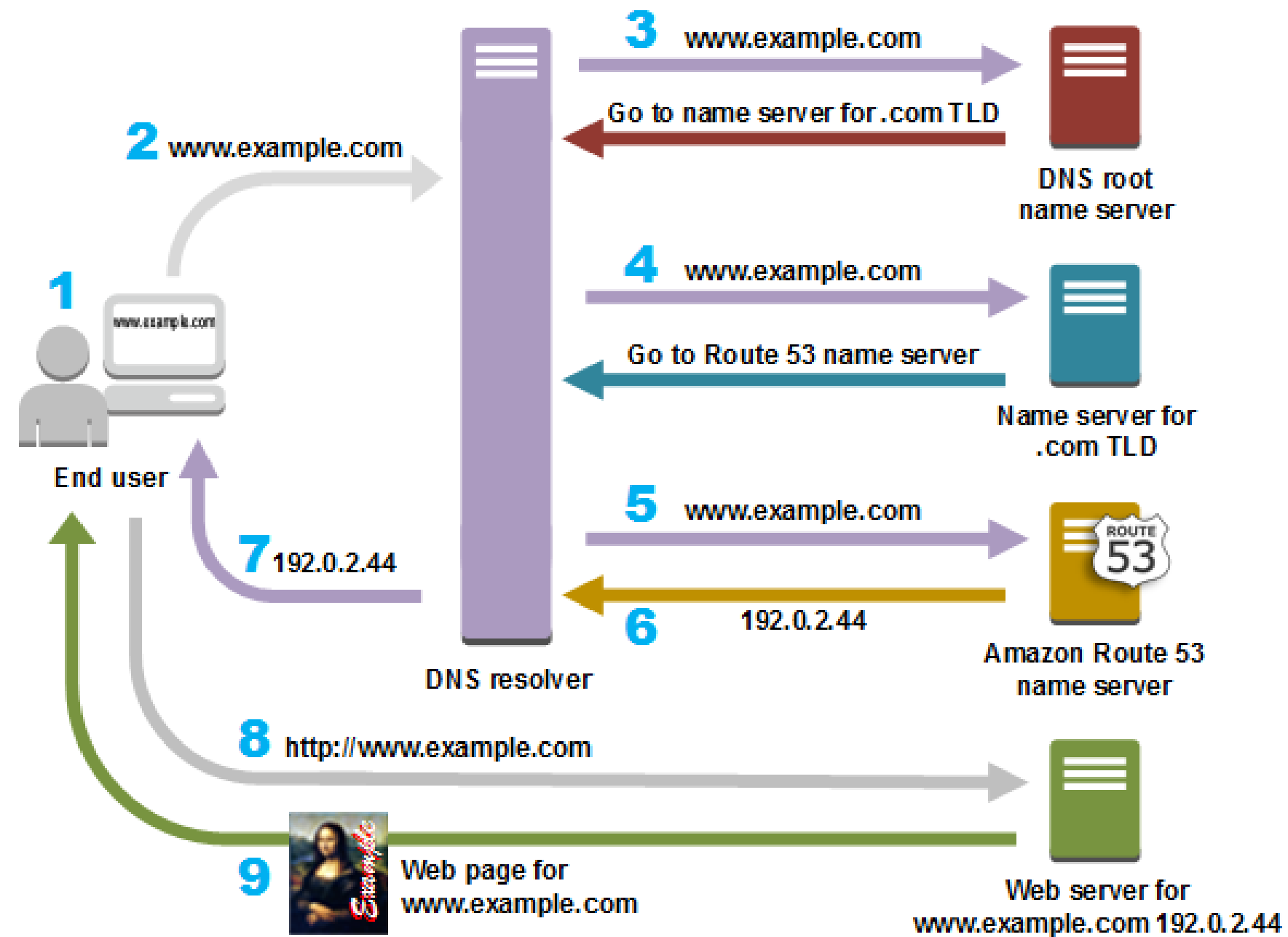
Routing Traffic to Web Applications

User request is routed to a DNS resolver which is managed by an internet service provider or a corporate network.

DNS resolver forwards the request to a DNS root name server.

The name servers for domains respond to the requests associated with the Route 53 servers.

Route 53 name server will get the associated values like an IP address and return it to the DNS resolver.

Web browser sends the request to the server, and the server returns the requested web page.

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Register a Domain Name

Assisted Practice

Register a Domain Name

Duration: 10 Min.

Problem Statement:
You are given a project to register a domain name so that a hosted zone will be automatically created that has the same name as the domain.

Assisted Practice: Guidelines

Steps to register a domain name using Route 53:

1. Obtain a static URL

2. Select an IP address, and choose an instance name

3. Choose a domain and register a domain name

4. Configure DNS with a static IP address

5. Verify the website URL

Hosting a Website

Assisted Practice

Create an S3 bucket and configure it to host a website

Duration: 20 Min.

Problem Statement:
You are given a project to create an S3 bucket and host a website on it.

Assisted Practice: Guidelines

Steps to create and configure an S3 bucket to host a website:

1. Log in to AWS console a choose S3 service

2. Create the S3 bucket by specifying the necessary information

3. Choose a bucket policy and edit the policies accordingly

4. Replace the domain name in the bucket policy with your choice

Assisted Practice

Create a Website and Upload It to the S3 Bucket

Duration: 20 Min.

Problem Statement:
You are given a project to create a website and upload it to the S3 bucket.

Assisted Practice: Guidelines

Steps to create a website and upload it to an S3 bucket:

1. Create a sample HTML page and save it

2. Configure the S3 bucket

3. Upload the file to the bucket

4. Follow on-screen instructions to complete the process

Assisted Practice

Route DNS traffic for your domain

Problem Statement:

Demonstrate how to route DNS Traffic to your domain.

Assisted Practice: Guidelines

Steps to route DNS traffic from your domain:

1. Open the Route 53 console

2. In the navigation pane, choose **Hosted zones**

3. In the list of hosted zones, choose the name of your domain

4. Choose **Create Record Set**

5. Specify the values and hit **Create**

Amazon Route 53

Amazon Route 53 Fundamentals

Resource Record Sets:

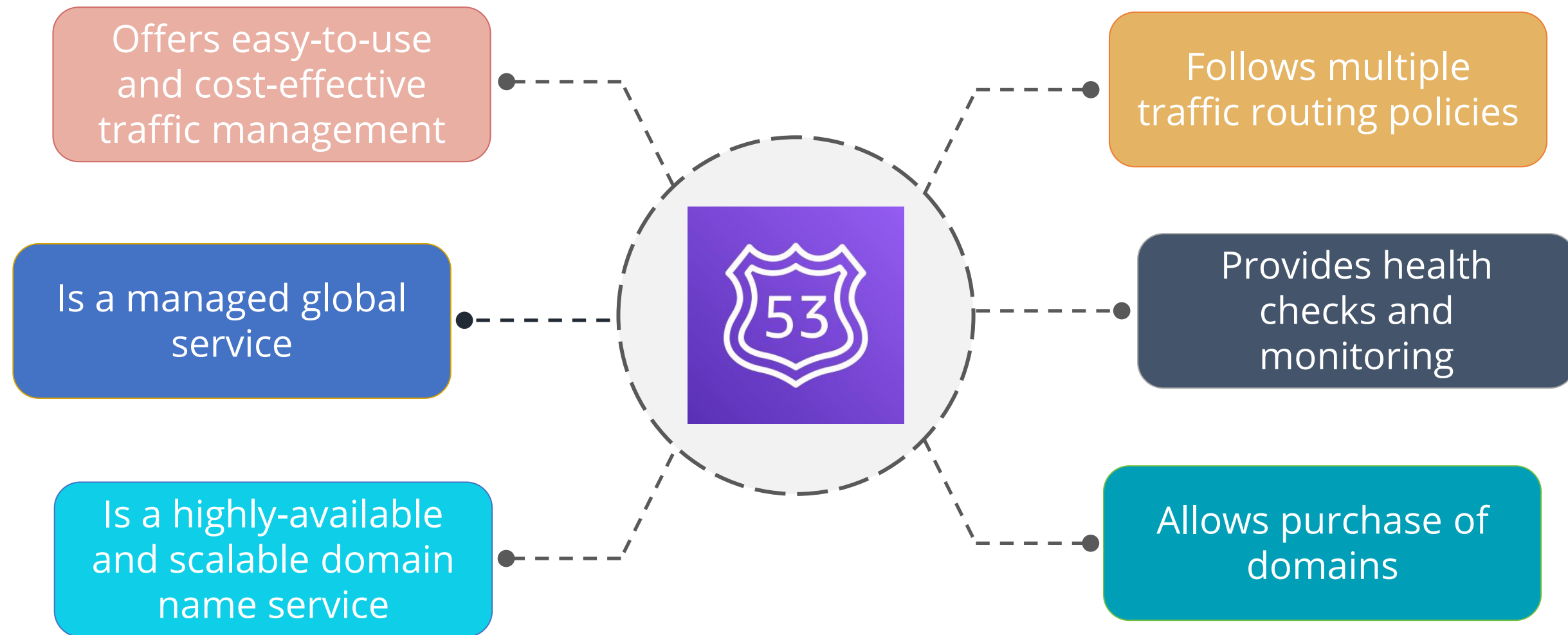Instructions to DNS on how to route traffic for a domain

Hosted Zone:

A collection of resource record sets for a specified domain

- Route 53 defines the resource record sets to create subdomains underneath your zone apex, which is the point of service or groups of services providing different types of services such as web hosting, mail, and FTP.

- A hosted zone typically corresponds to a zone apex (Example: Amazon.com or example.com).

- A hosted zone can be assigned to any host name (Example: While creating a hosted zone for Amazon.com, you can create a hosted zone for example.com).

Features of Amazon Route 53

Offers easy-to-use and cost-effective traffic management

Is a managed global service

Is a highly-available and scalable domain name service

Follows multiple traffic routing policies

Provides health checks and monitoring

Allows purchase of domains

Benefits of Route 53

The various benefits of Amazon Route 53 are listed below:

1 Highly available and reliable

2 Flexible

3 Compatible with AWS services

4 Fast

5 Secure

6 Cost-effective and scalable

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Route 53 TTL

The number of seconds that a user wants DNS recursive resolvers to cache information about a record is known as Route 53 TTL.

TTL is inversely proportional to the number of calls that DNS recursive resolvers should make to Route 53 to get the latest information.

Example:

If a user specifies 259200 or three days of TTL, the number of calls will be very less by the DNS recursive resolvers.

CNAME vs. Alias

ALIAS

Amazon Route 53 Alias records add Route 53–specific capabilities to DNS. You can route traffic to specific AWS resources using alias records, like CloudFront deployments and Amazon S3 buckets.
They also help to route traffic from one record to another in a particular zone.

CNAME

A CNAME or a Canonical name record can be used to generate an alias record at the zone apex, which is the top node of a Domain Name Server namespace.

Example: Users can't create a CNAME record for a DNS, but they can create an alias record that routes traffic to that DNS.

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Third-Party Domains and Route53

To migrate DNS service for a domain that is currently receiving traffic to Amazon Route 53, follow the steps given below:

Step 1 → Get your current DNS configuration from the service provider

Step 2 → Create a hosted zone and then create records

Step 3 → Lower TTL settings

Step 4 → Remove the DS record from the parent zone if you have DNSSEC configured

Step 5 → Wait for the old TTL to expire

Third-Party Domains and Route53

To migrate DNS service for a domain that is currently receiving traffic to Amazon Route 53, follow the steps given below:

Step 6 → Update the NS records to use Route 53 name servers

Step 7 → Monitor traffic for the domain

Step 8 → Change the TTL for the NS record back to a higher value

Step 9 → Transfer domain registration to Amazon Route 53

Step 10 → Re-enable DNSSEC signing

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Route 53 Health Checks

Amazon Route 53 health checks keep track of the status and performance of your web applications, web servers, and other services.

Every health check can monitor one or more of the following:

- The health of a specified resource, such as a web server

- The status of other health checks

- The status of an Amazon CloudWatch alarm

- Amazon Route 53 Application Recovery Controller helps the user to set up routing control health checks with DNS failover records

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Routing Policy

DNS Routing Policies

When you create a record, you choose a routing policy, which determines how Amazon Route 53 responds to queries. Following are the routing policies supported by DNS:

1	Simple Routing
2	Weighted Routing
3	Latency Routing
4	Failover Routing
5	Geolocation Routing
6	Geoproximity Routing

Simple Routing

Amazon Route 53 → **Amazon ELB** → Custom VPC

Availability Zone
- Instance 1
- Instance 2
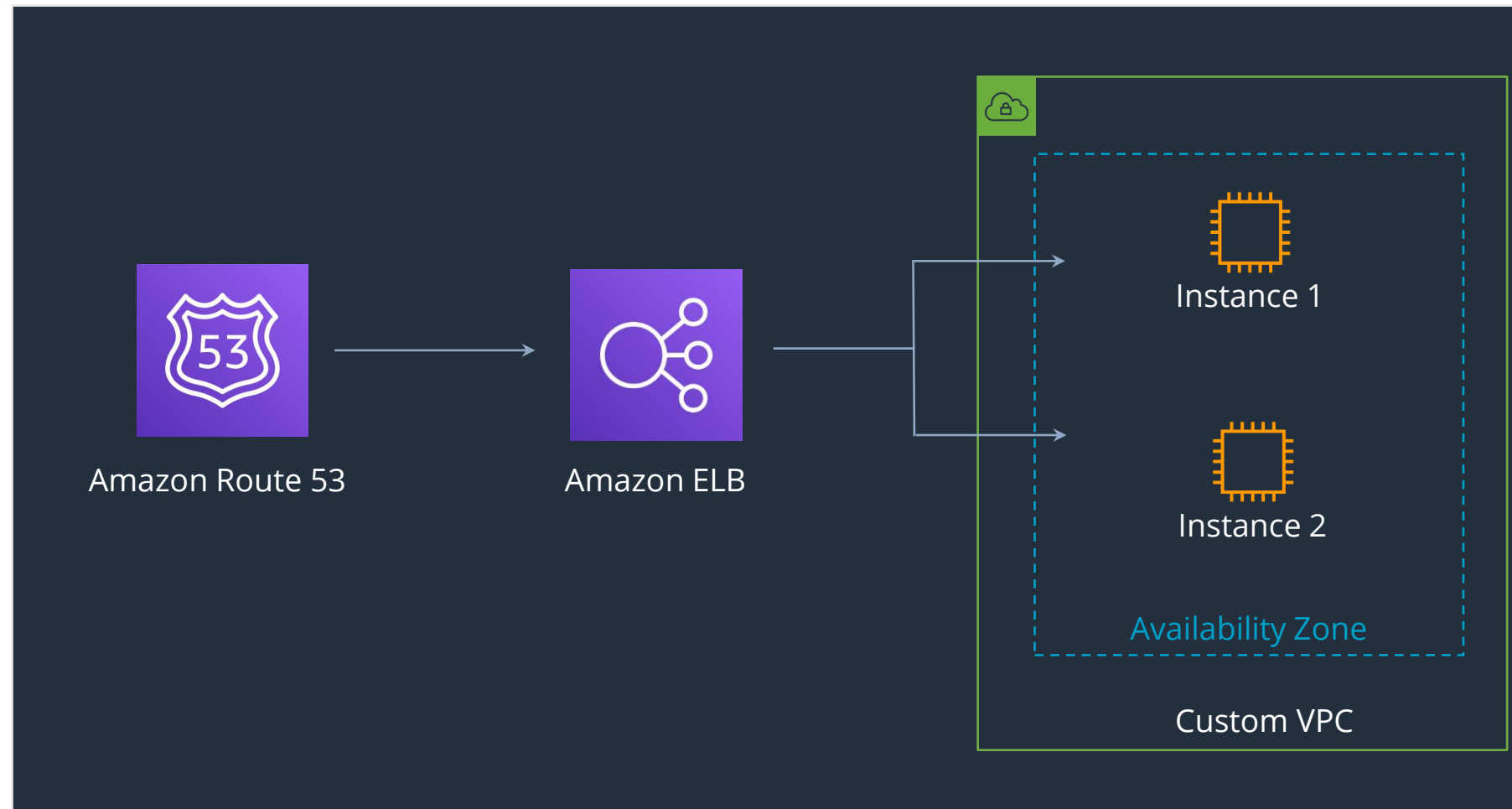
All requests for your domain that come to Route 53 will be forwarded to one region.

This is the default routing policy when you create a new record set.

It is commonly used when you have a single resource (for example, one web server) that performs a given function for your domain.

Assisted Practice

Simple Routing

Duration: 20 Min.
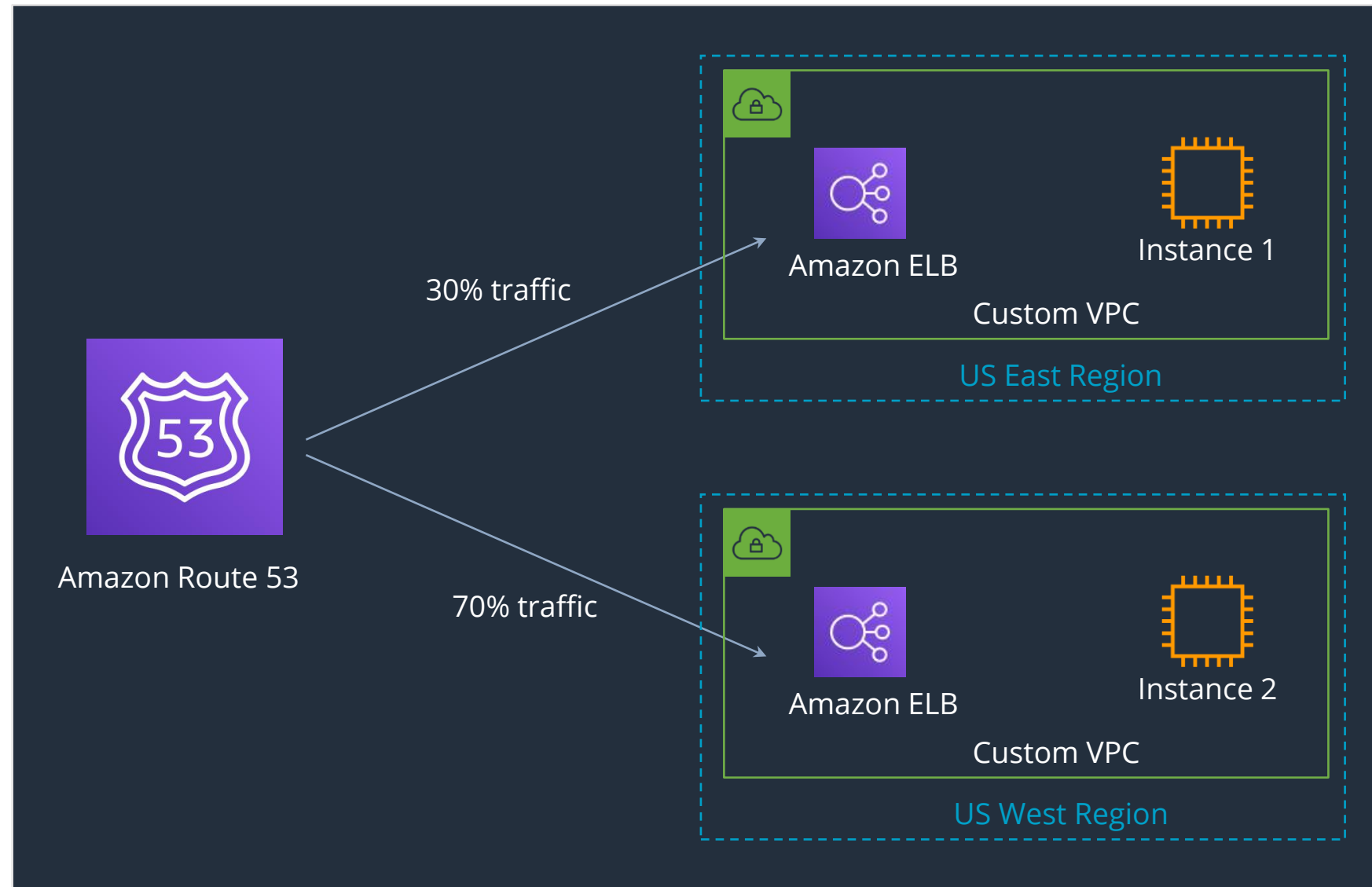
Problem Statement:

Demonstrate Simple routing policy by Route 53 which lets you configure standard DNS records, with no special Route 53 routing such as weighted or latency. With simple routing, you typically route traffic to a single resource.

Assisted Practice: Guidelines

Steps to create a record set for a simple routing policy:

1. Open the Route 53 console

2. In the navigation pane, choose **Hosted zones**

3. Specify all the necessary details for the hosted zones

4. Select the routing policies and **Define simple record**
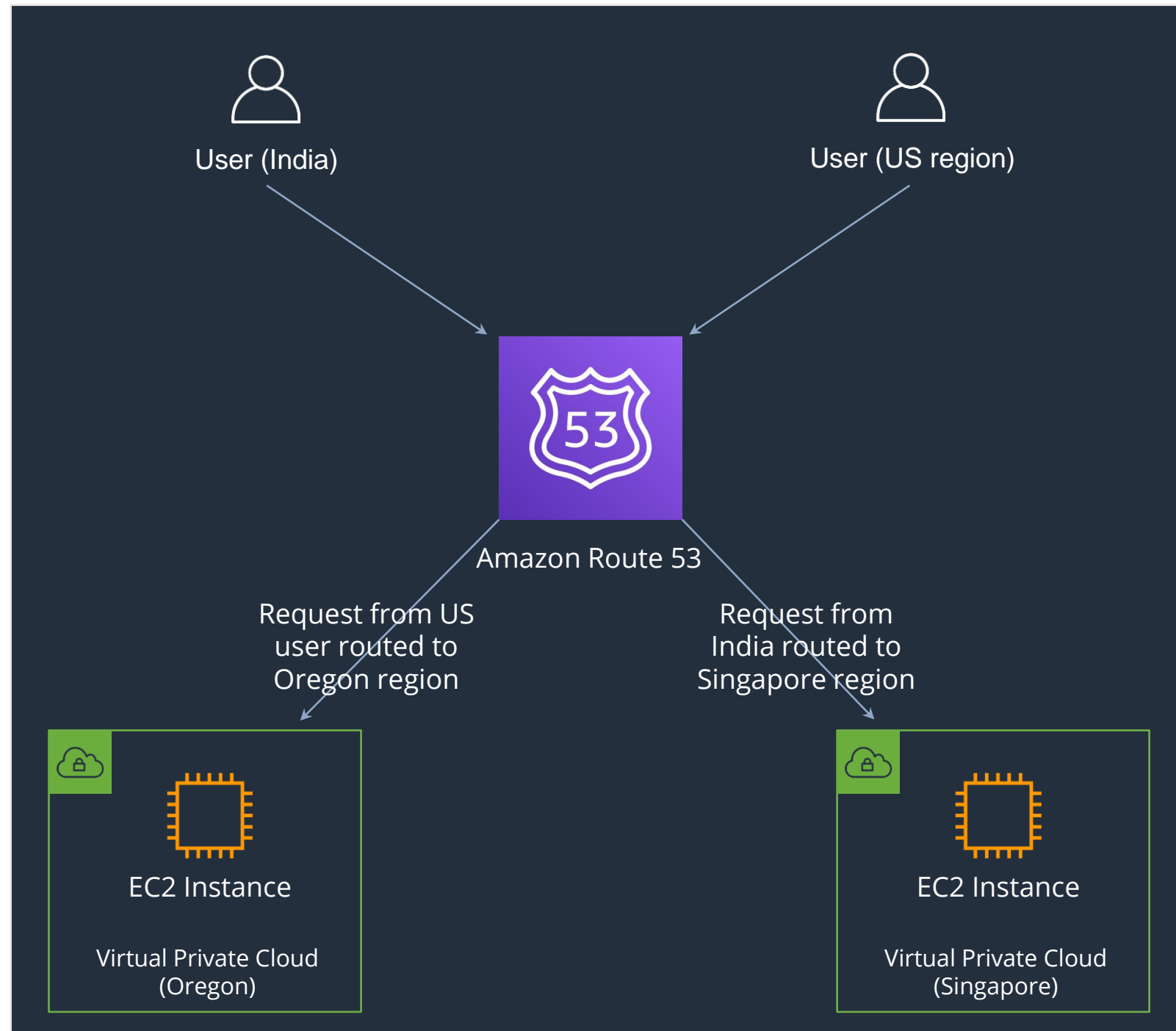
5. Specify the values and hit Create

Weighted Routing

30% traffic

Amazon Route 53

Amazon ELB
Instance 1
Custom VPC
US East Region

70% traffic

Amazon ELB
Instance 2
Custom VPC
US West Region

Requests for your domain that come to Route 53 will be forwarded to different regions or even different ELBs based on the weight specified.

Example: 20% to one region and 80% to another or 20% to one ELB and 80% to another

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Latency Routing

User (India)

User (US region)

Amazon Route 53

Request from US user routed to Oregon region

Request from India routed to Singapore region

EC2 Instance

Virtual Private Cloud (Oregon)

EC2 Instance

Virtual Private Cloud (Singapore)

This allows you to route based on the lowest latency for an end user.
Example: The region that gives the fastest response time

You need to create a latency record set for the EC2 or ELB resource in each region that hosts your website.

AWS will select a record for each request based on the least latency and use it to respond.

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Assisted Practice

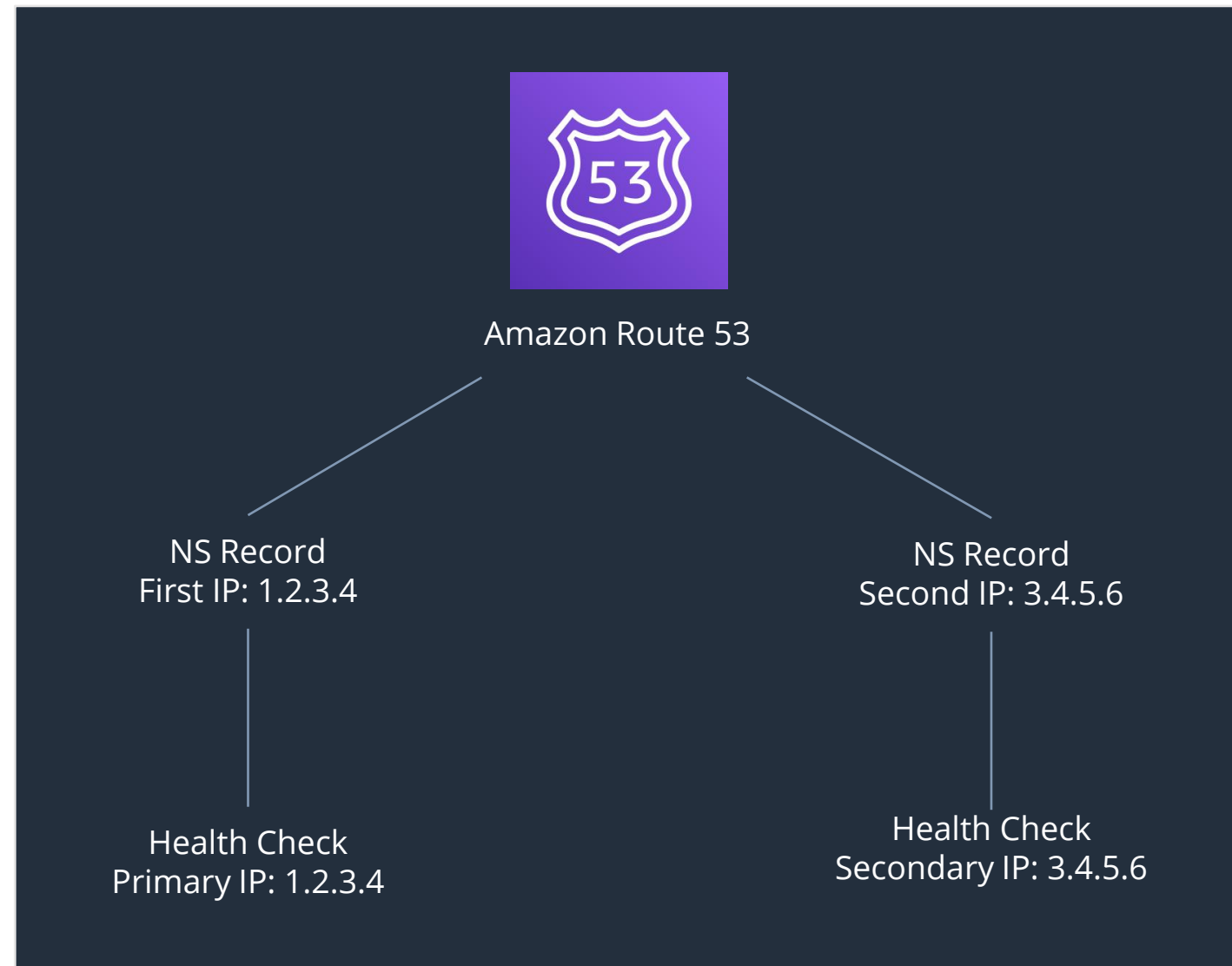Latency Routing

Problem Statement:

Demonstrate Latency Routing policy by route 53 for multiple resources with same functionality. This policy allows Route 53 to respond to DNS queries with answers that provide the best latency i.e. the region that will give the fastest response time.

Assisted Practice: Guidelines

Steps to create a record set for a latency routing policy:

1. Open the Route 53 console

2. In the navigation pane, choose **Hosted zones**

3. Specify all the necessary details for hosted zones

4. Select the routing policies and **Define Latency record**

5. Specify the values and create the records

6. View the **Hosted zone details** in the dashboard

Failover Routing

Amazon Route 53

NS Record
First IP: 1.2.3.4

NS Record
Second IP: 3.4.5.6

Health Check
Primary IP: 1.2.3.4

Health Check
Secondary IP: 3.4.5.6

This is suitable when you want an active or a passive setup.

Route 53 will monitor the health of your endpoints; when primary endpoint is down, it connects to the secondary one.

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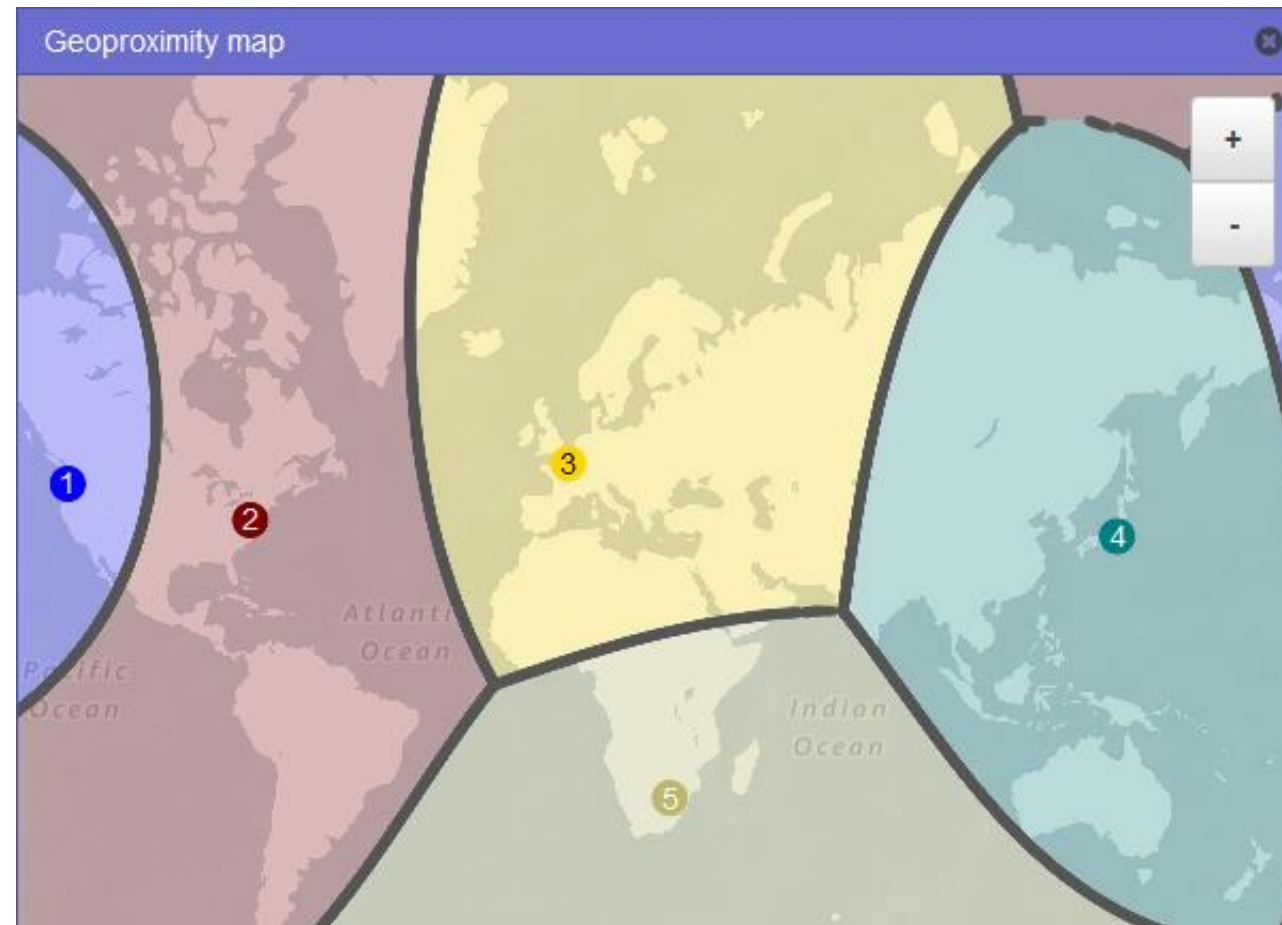
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Geolocation Routing

This lets you choose where traffic will be sent based on the geographical location of a user.

Example: European customers can be sent to European servers and US customers to US servers.

Geoproximity Routing

Geoproximity map

Users can use this method to route traffic based on the location of their resources and move traffic from one area to another.

Example: If a user have resources in AWS in two different regions with a large number of users, a little bias shift could result in a big swing in traffic from one AWS region to the other.

Key Takeaways

◉ Route 53 defines the resource record sets to create subdomains underneath your zone apex, which is the point of service.

◉ Amazon Route 53 automatically creates a name server (NS) record that has the same name as your hosted zone.

◉ Requests for your domain that come to Route 53 will be forwarded to different regions on the weight specified in case of weighted routing.

◉ A Record is a type of DNS record in which A stands for Address. It is used to translate a domain name to an IP address.