# Little Bit Advance Labs

### Part 1: EC2 with ELB and ASG

**Objective**: Learn how to create a scalable and highly available web application environment using Amazon EC2 instances, ELB, and ASG.

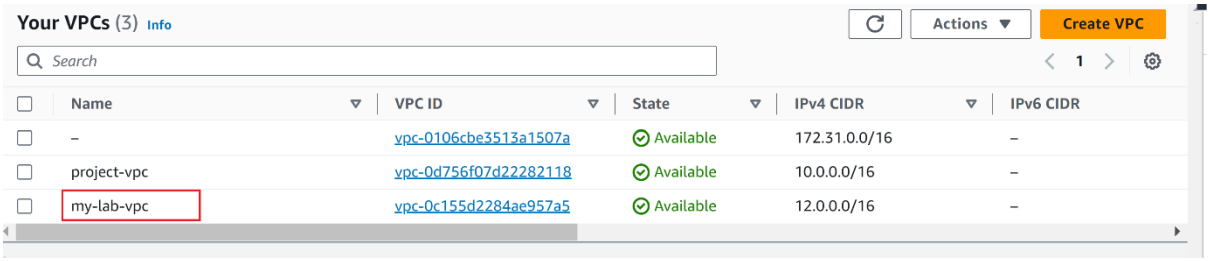
**Approach**:

1. **Launch EC2 Instances**: Start by launching two or more EC2 instances. These instances will run a simple web application (e.g., a "Hello World" page or any basic web service).
2. **Configure Load Balancer**: Set up an Elastic Load Balancer (ELB) to distribute incoming web traffic across your EC2 instances. This step ensures high availability and fault tolerance.
3. **Set Up Auto Scaling Group (ASG)**: Create an ASG that uses the launched EC2 instances. Configure ASG policies to automatically scale the number of instances up or down based on criteria like CPU usage or network traffic.
4. **Test Your Setup**: Simulate traffic to test the scaling policies and the load balancer. Observe how ASG adds or removes instances and how ELB distributes traffic.
5. **Verify Website Functionality**: Ensure that the website hosted on EC2 instances remains accessible and functional during scaling operations.

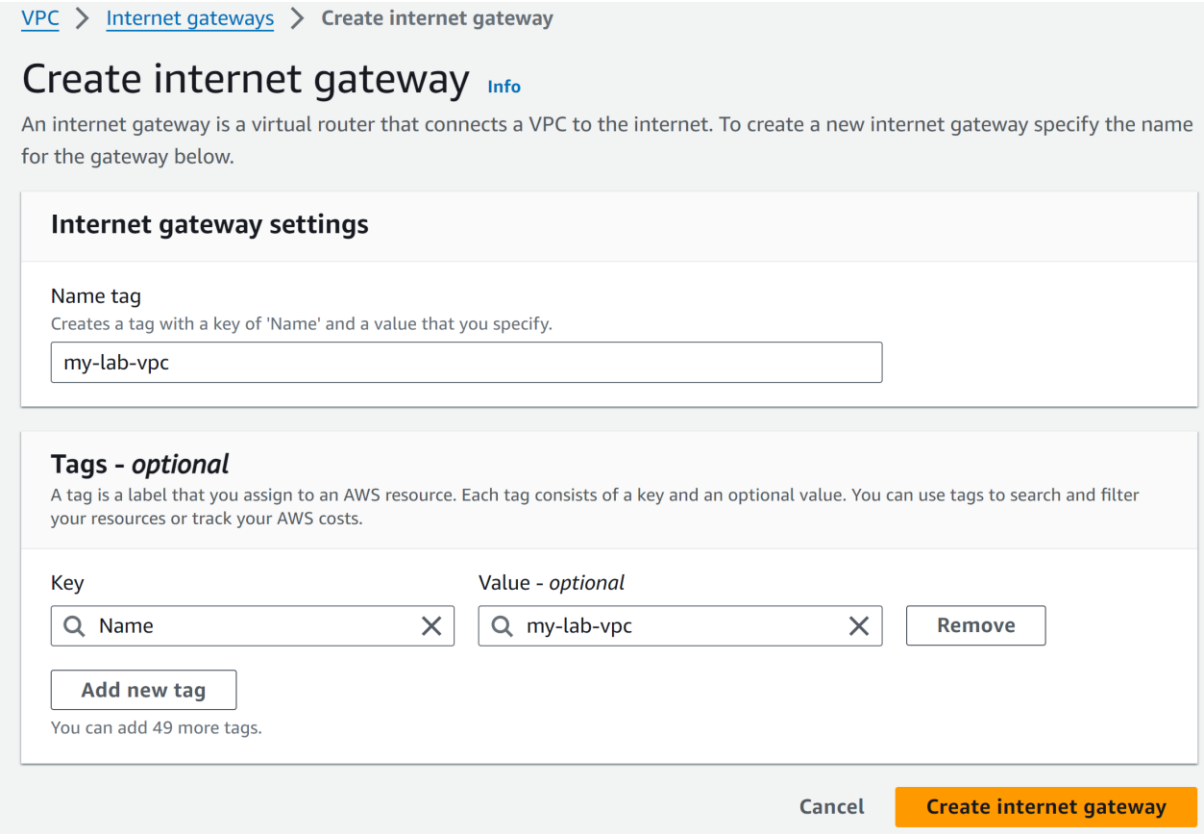
**Goal**: By the end of this lab, students will have a hands-on understanding of setting up a load-balanced and auto-scaled web application using AWS services.

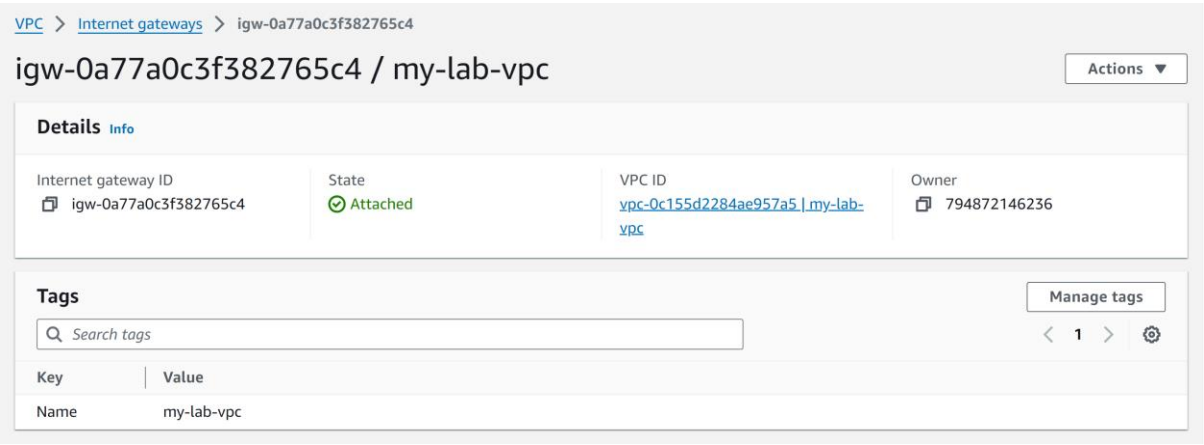
Steps:

1. Open AWS Management Console and create a VPC with necessary configurations.




**2. Next, create an internet gateway with the necessary configuration and attach to our newly created VPC.**




3. Now we will create two different public subnets

# Create subnet Info

## VPC

VPC ID
Create subnets in this VPC.

vpc-0c155d2284ae957a5 (my-lab-vpc)

**Associated VPC CIDRs**

IPv4 CIDRs
12.0.0.0/16

## Subnet settings

Specify the CIDR blocks and Availability Zone for the subnet.

**Subnet 1 of 1**

Subnet name
Create a tag with a key of 'Name' and a value that you specify.

test-subnet-1

The name can be up to 256 characters long.

Availability Zone Info
Choose the zone in which your subnet will reside, or let Amazon choose one for you.

US East (N. Virginia) / us-east-1a

IPv4 VPC CIDR block Info
Choose the VPC's IPv4 CIDR block for the subnet. The subnet's IPv4 CIDR must lie within this block.

12.0.0.0/16

IPv4 subnet CIDR block

12.0.3.0/24 256 IPs

▼ Tags - *optional*

| Key | Value - *optional* | |
|---|---|---|
| Name | test-subnet-1 | Remove |

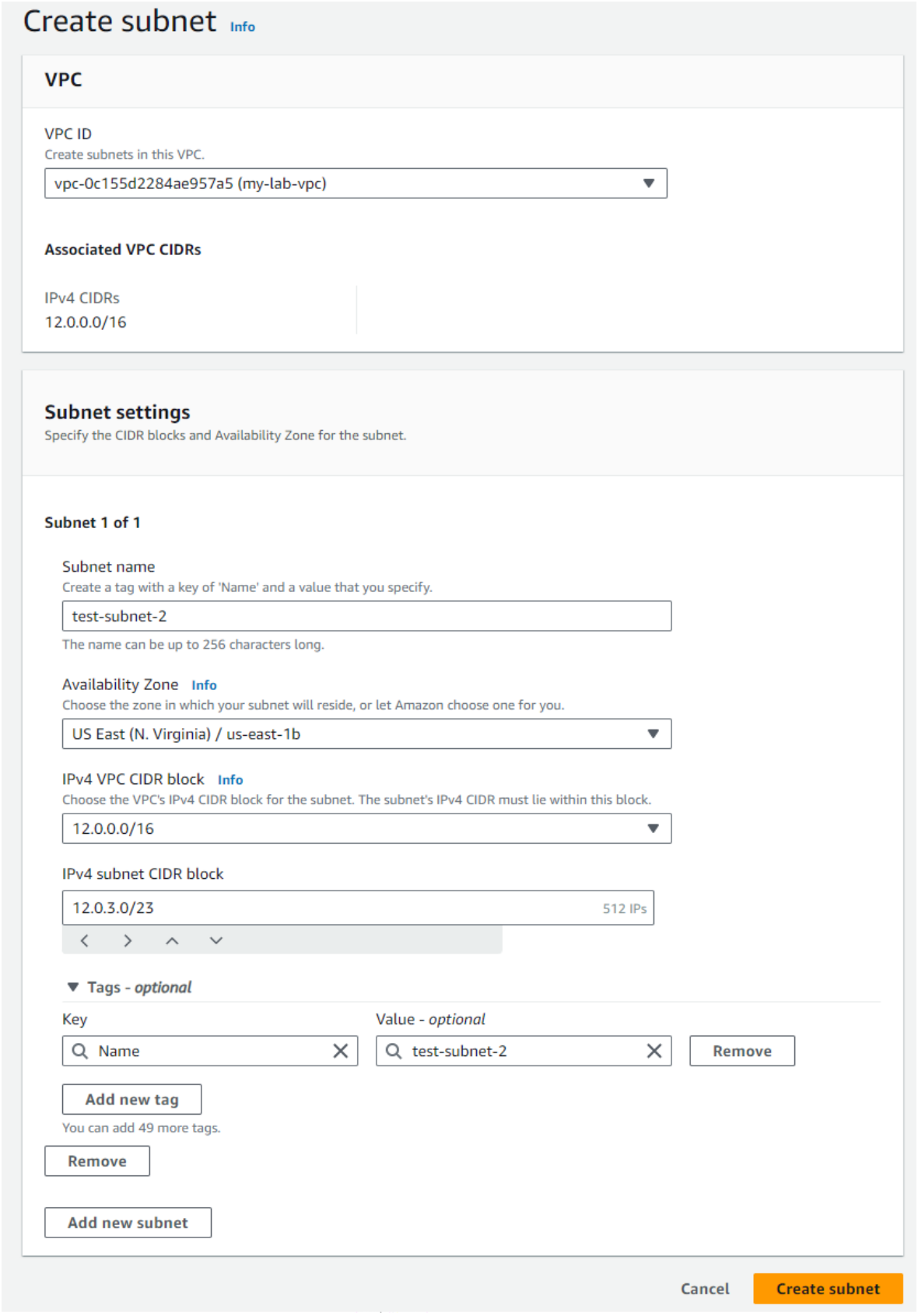
Add new tag

You can add 49 more tags.

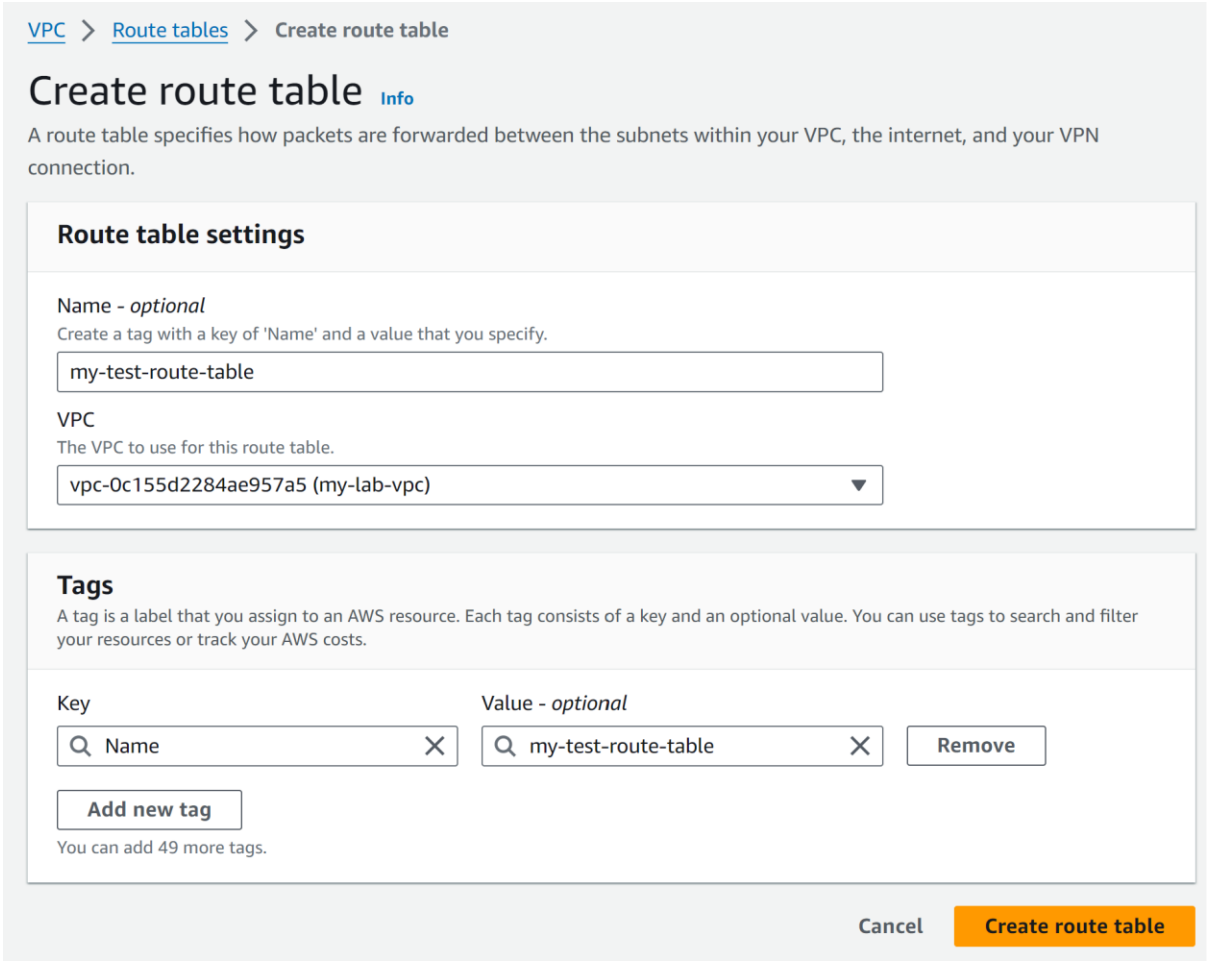
Remove

Add new subnet

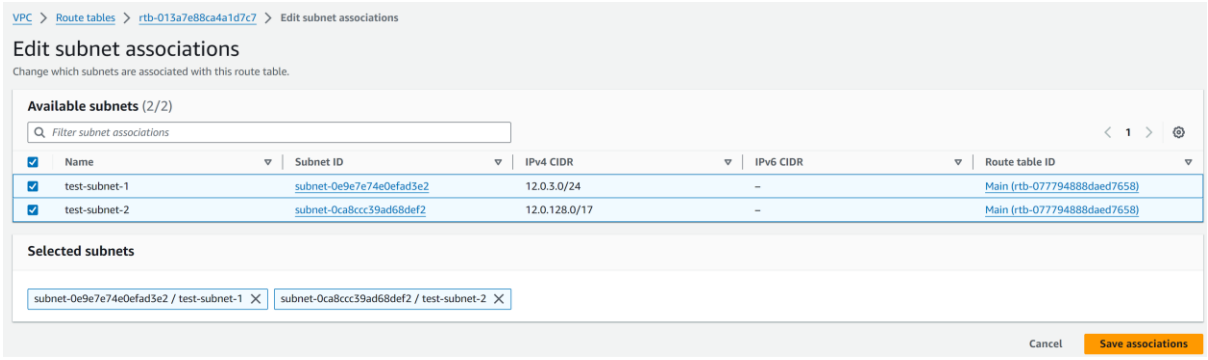
Cancel Create subnet



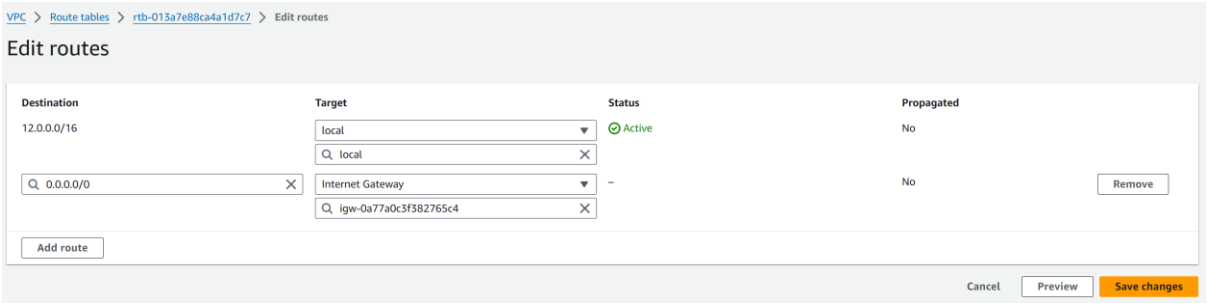

4. Now we will create a route table with our VPC



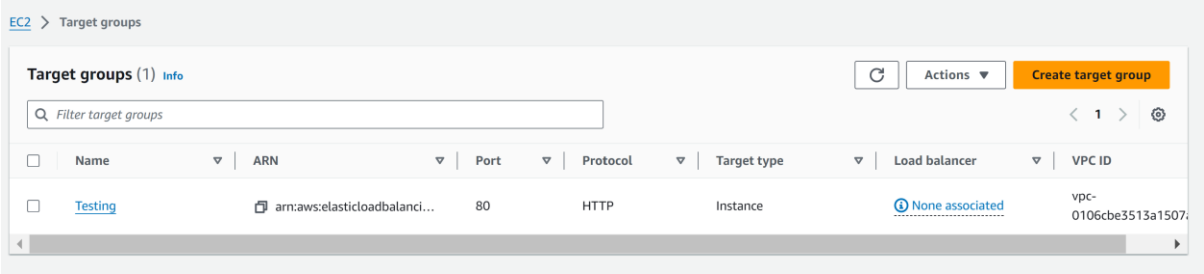

5. **Now we will link the route table to the subnet.**



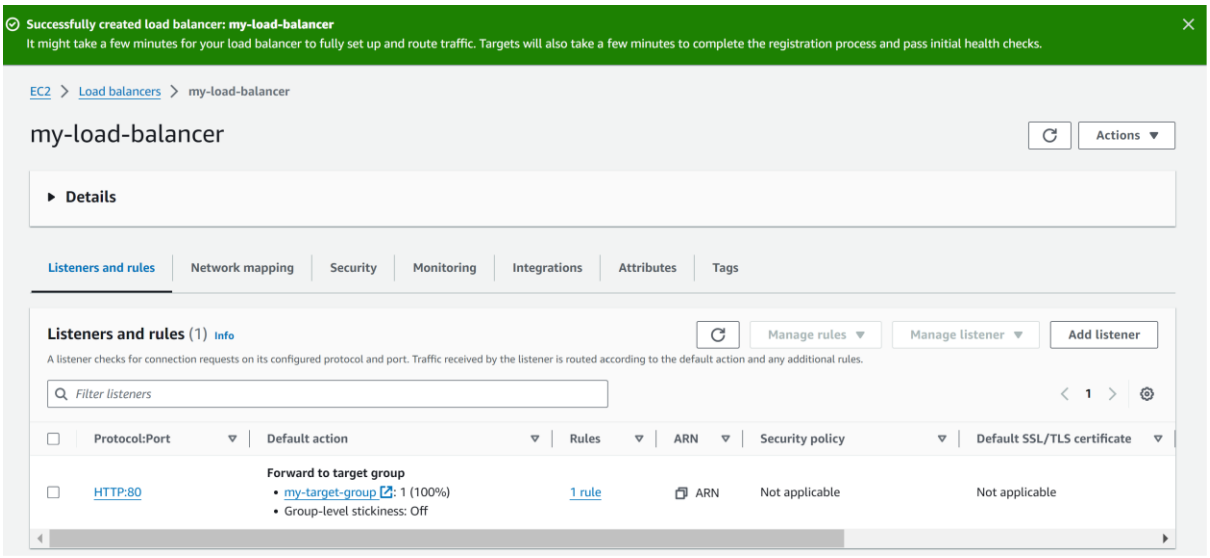

6. We will also add the routes from the Route Table by selecting Internet Gateway.




7. Now we will create a target group that will point to our EC2 Instance so we will choose a target type to instance and our created VPC while creating target group.

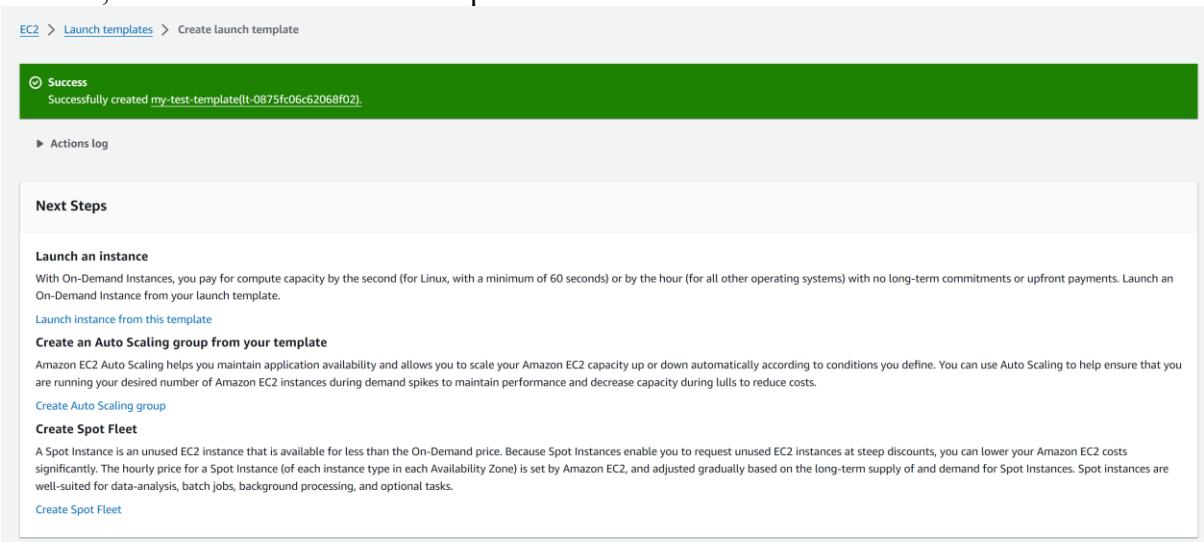



8. Once more, set up a load balancer, opting for an application load balancer, and designate our VPC along with the two subnets we've established. Additionally, generate a new security group in this step. Post-creation, allow some time for the load balancer to transition into an active state.




9. Now we will create Auto Scaling Groups

For that, first we create a launch template



# Choose launch template Info

Specify a launch template that contains settings common to all EC2 instances that are launched by this Auto Scaling group.

## Name

Auto Scaling group name

Enter a name to identify the group.

my-autoscaling-group

Must be unique to this account in the current Region and no more than 255 characters.

## Launch template Info

For accounts created after May 31, 2023, the EC2 console only supports creating Auto Scaling groups with launch templates. Creating Auto Scaling groups with launch configurations is not recommended but still available via the CLI and API until December 31, 2023.

Launch template

Choose a launch template that contains the instance-level settings, such as the Amazon Machine Image (AMI), instance type, key pair, and security groups.

my-test-template

Create a launch template

Version

Default (1)

Create a launch template version

| Description | Launch template | Instance type |
|---|---|---|
| first temp | my-test-template<br>lt-0875fc06c62068f02 | t2.micro |
| **AMI ID** | **Security groups** | **Request Spot Instances** |
| ami-0e731c8a588258d0d | - | No |
| **Key pair name** | **Security group IDs** | |
| - | - | |

### Additional details

| Storage (volumes) | Date created |
|---|---|
| - | Mon Feb 19 2024 18:18:08<br>GMT+0545 (Nepal Time) |

Cancel Next

# Choose instance launch options Info

Choose the VPC network environment that your instances are launched into, and customize the instance types and purchase options.

## Instance type requirements Info

Override launch template

You can keep the same instance attributes or instance type from your launch template, or you can choose to override the launch template by specifying different instance attributes or manually adding instance types.

| Launch template | Version | Description |
| --- | --- | --- |
| my-test-template<br>lt-0875fc06c62068f02 | Default | first temp |

Instance type

t2.micro

## Network Info

For most applications, you can use multiple Availability Zones and let EC2 Auto Scaling balance your instances across the zones. The default VPC and default subnets are suitable for getting started quickly.

VPC

Choose the VPC that defines the virtual network for your Auto Scaling group.

vpc-0c155d2284ae957a5 (my-lab-vpc)
12.0.0.0/16

Create a VPC

Availability Zones and subnets

Define which Availability Zones and subnets your Auto Scaling group can use in the chosen VPC.

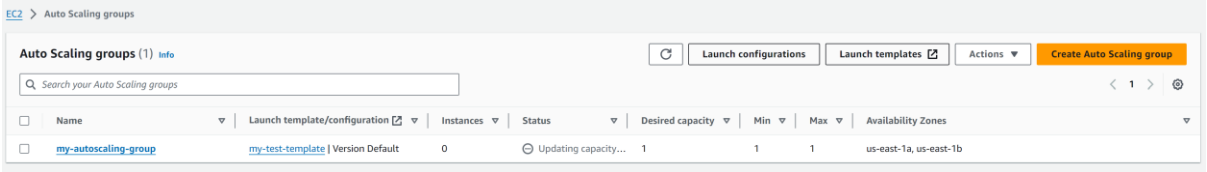
*Select Availability Zones and subnets*

us-east-1a | subnet-0e9e7e74e0efad3e2 (test-subnet-1)
12.0.3.0/24

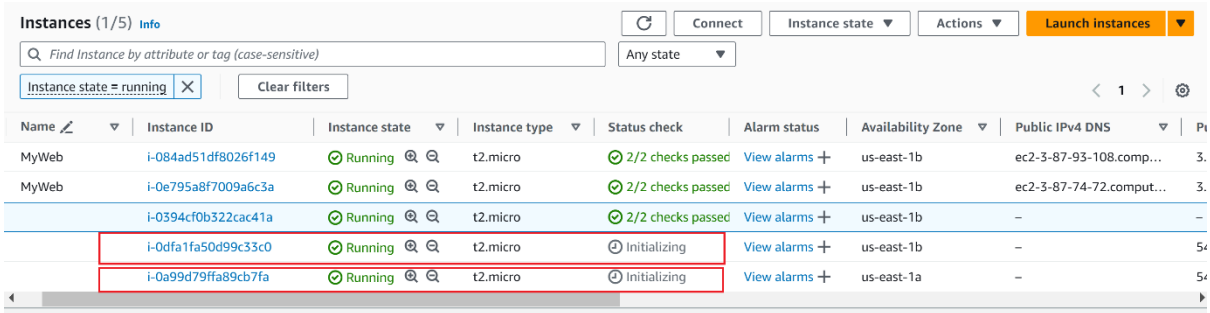
us-east-1b | subnet-0ca8ccc39ad68def2 (test-subnet-2)
12.0.128.0/17

Create a subnet

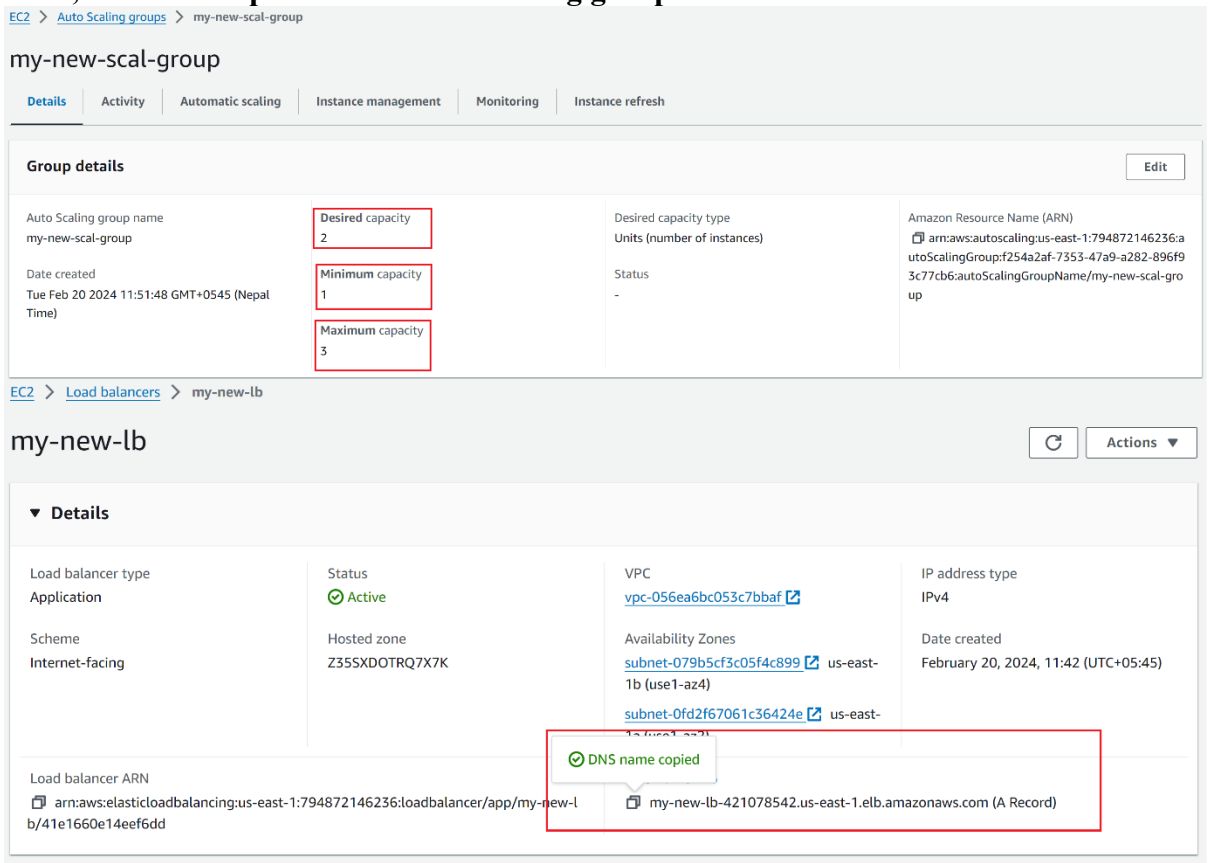
Cancel | Skip to review | Previous | Next



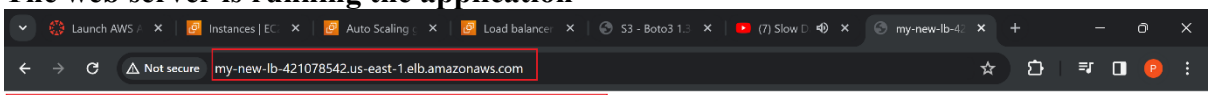

**The following are the two instances that we have created**




**Here, is the description of our auto scaling group**

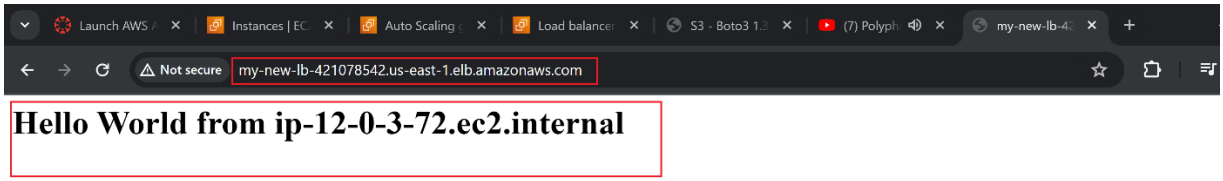



**Now we copy the above outlined DNS name and paste the copied DNS name in the browser url:**
**The web server is running the application**

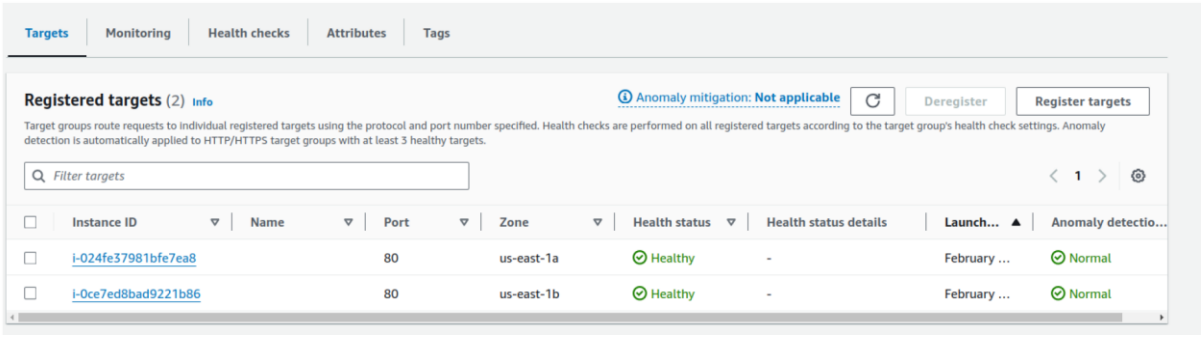



**Hello World from ip-12-0-1-225.ec2.internal**

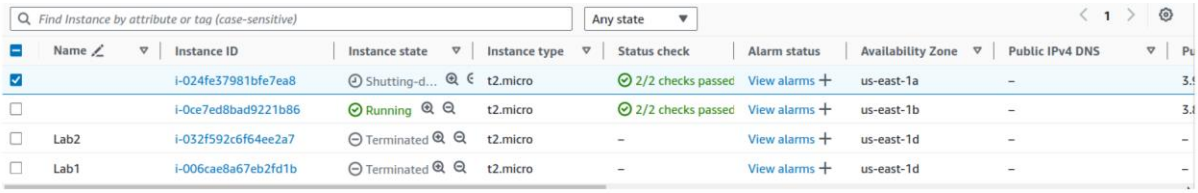
We can also see that when we refresh the url link, our another instance ip address is displayed which means the load balancer is balancing the requests according to the load to the instances.

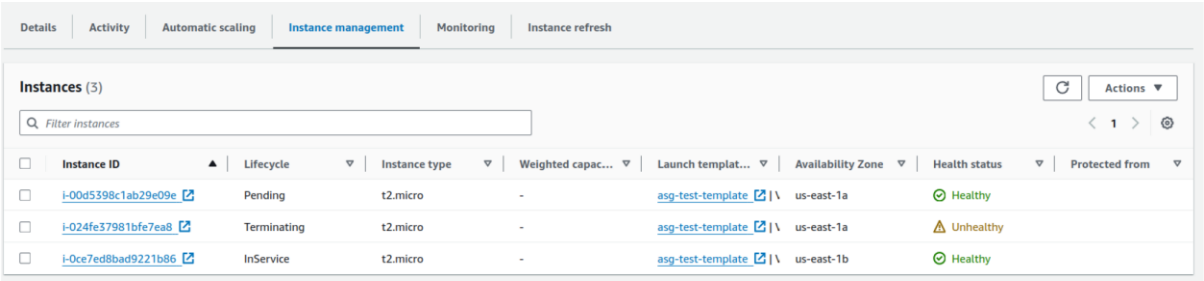



Now, we will go to the load balancer target group instance. We can see the two instances are running in healthy condition.




Now, if we terminate one or two of the EC2 instance, then the auto scaling group will automatically re-create the instance.

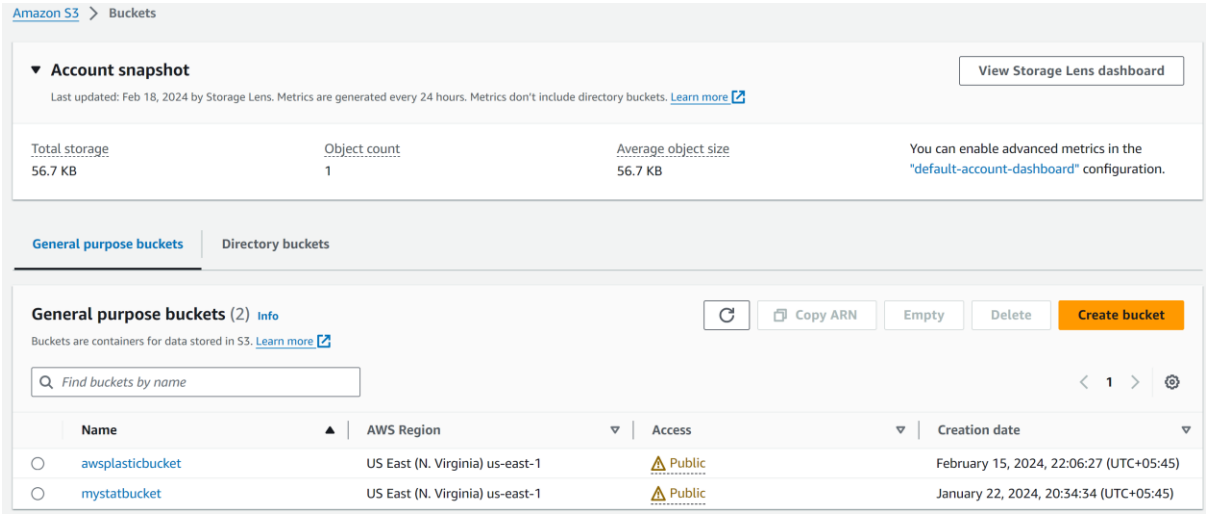


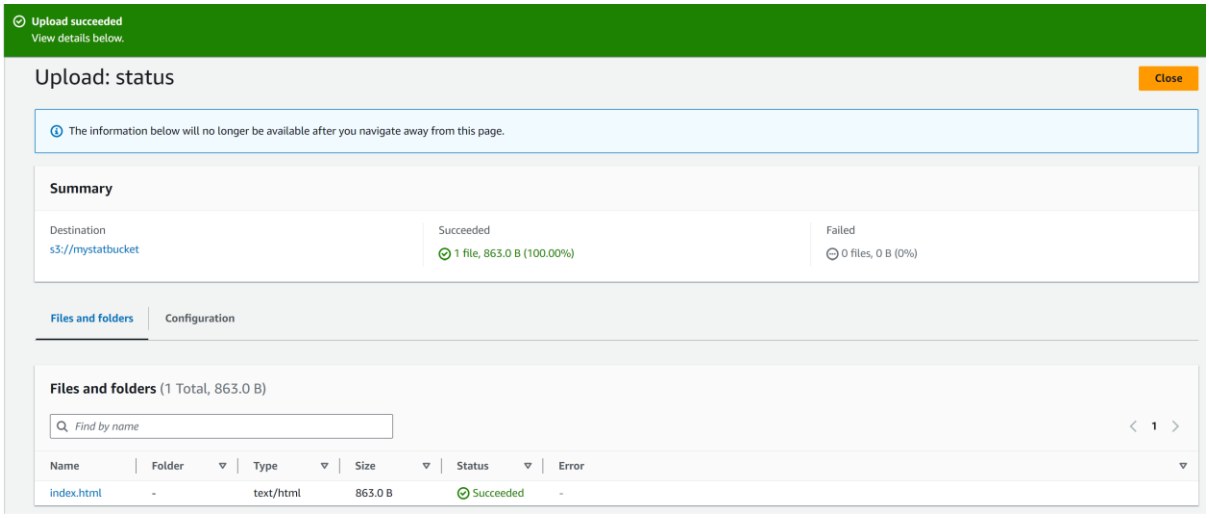
**Part 2: Hosting a Static Portfolio Website on S3**
**Objective**: Learn to host a static website (such as a personal portfolio) on Amazon S3.
**Approach**:
1. **Create an S3 Bucket**: Start by creating a new S3 bucket. Configure the bucket for website hosting, which includes setting permissions to make the content publicly accessible.
2. **Upload Website Files**: Upload the static files of your portfolio website (HTML, CSS, JavaScript, images) to the S3 bucket.
3. **Configure DNS**: Use Amazon Route 53 or another DNS service to point a domain name to the S3 bucket. This makes the website accessible via a user-friendly URL.
4. **Enable Additional Features** (Optional): Implement features like HTTPS for secure access and CloudFront for content delivery optimization.
**Goal**: Students will understand how to use S3 for hosting static websites, manage bucket permissions, and integrate with other AWS services for a complete web hosting solution.

We will map an S3 bucket with a static website

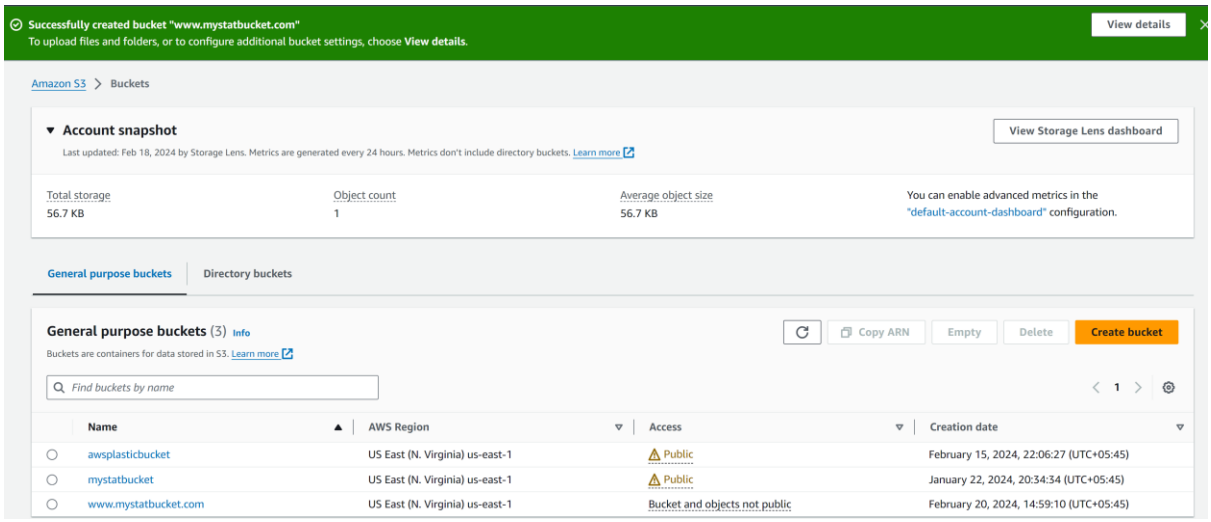
We have already created two buckets and will be using one of them.



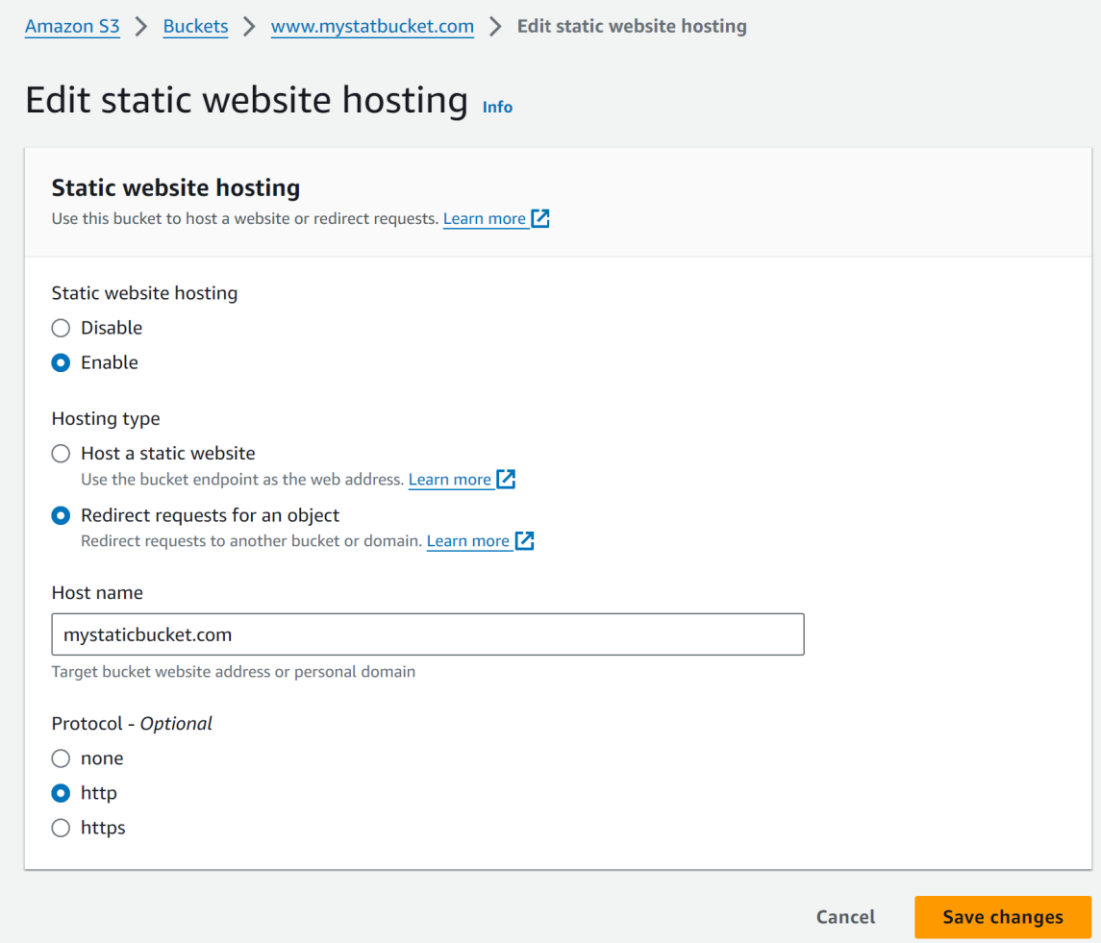

We also have created an HTML file named index.html, we will be uploading it to our bucket.



We will now create a new bucket with the same as our previous bucket but will be adding ‘www.’ In the beginning and ’.com’ in the end.




Next we will go to our bucket i.e. www.mystaticbucket.com and edit static we hosting. Here we will enable the static web hosting and other changes such as hosting type to redirect request host name to your root bucket name and protocol to http.




Next, we will go to Route 53 and create a new hosted zone. We have to make sure that the name we give should be same as our root S3 bucket name (in our case it is mystaticbucket)

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.

mystaticbucket

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

Description - *optional* Info

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

This is used for testing our static website

The description can have up to 256 characters. 43/256

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.

**mystaticbucket.com was successfully created.**

Now you can create records in the hosted zone to specify how you want Route 53 to route traffic for your domain.

Public **mystaticbucket.com** Info

Delete zone | Test record | Configure query logging

▸ **Hosted zone details** — Edit hosted zone

Records (2) | DNSSEC signing | Hosted zone tags (0)

**Records** (2) Info

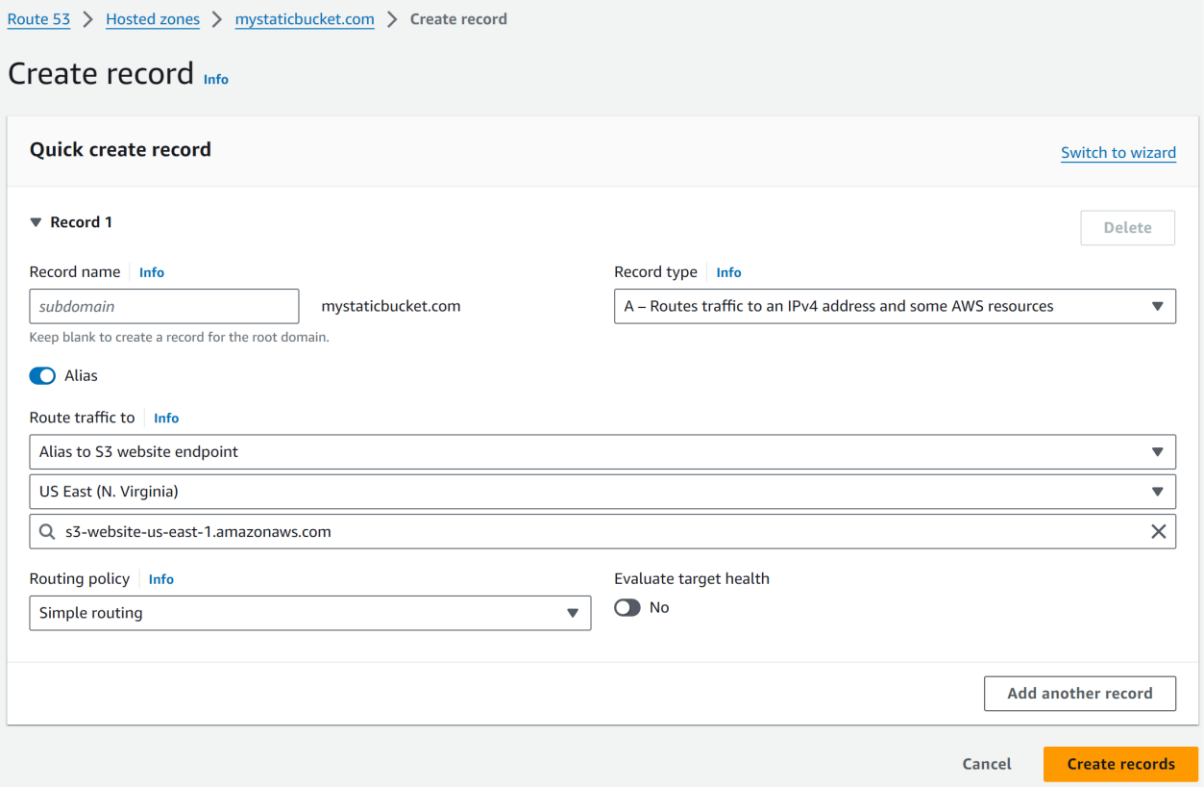
Delete record | Import zone file | Create record

Automatic mode is the current search behavior optimized for best filter results. To change modes go to settings.

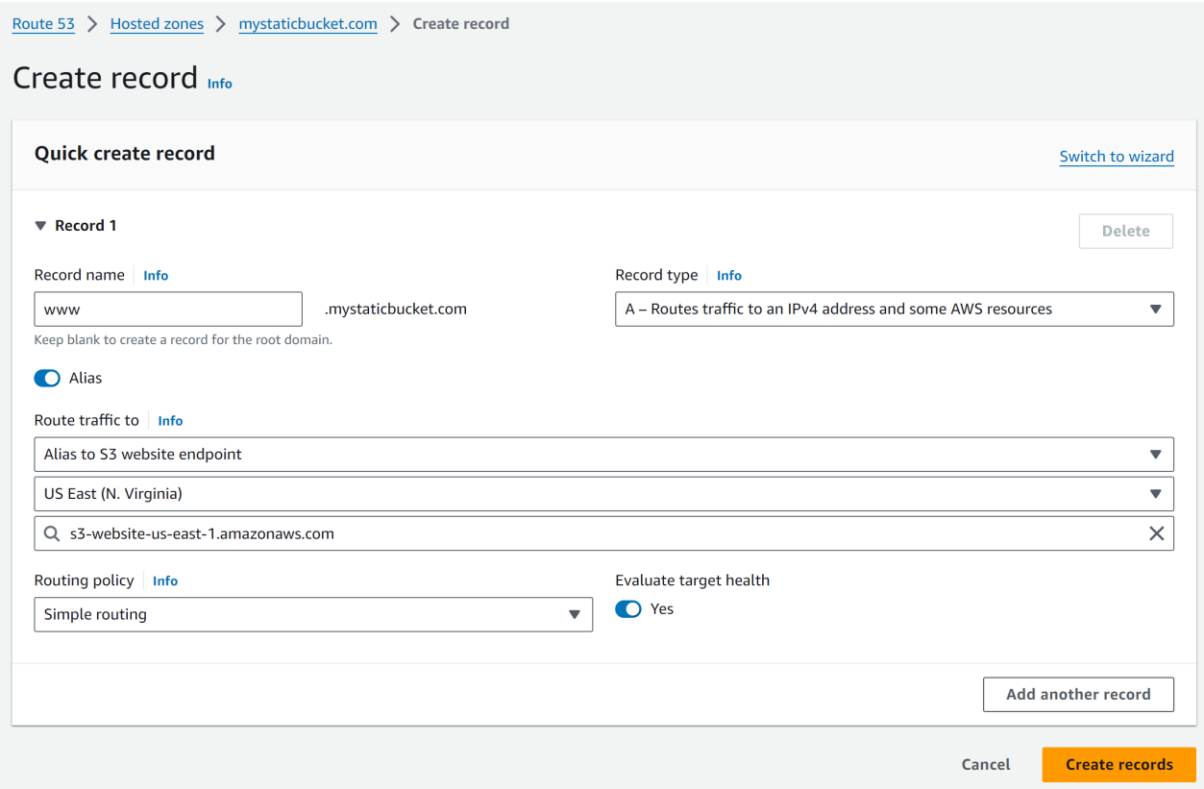
Filter records by property or value | Type | Routing policy | Alias | 1

| Record name | Type | Routin... | Differ... | Alias | Value/Route traffic to |
|---|---|---|---|---|---|
| mystaticbucket.com | NS | Simple | - | No | ns-831.awsdns-39.net.<br>ns-1843.awsdns-38.co.uk.<br>ns-1266.awsdns-30.org.<br>ns-299.awsdns-37.com. |
| mystaticbucket.com | SOA | Simple | - | No | ns-831.awsdns-39.net. awsd… |

Next, generate a record for your primary S3 bucket. Here, activate the alias feature and deactivate the evaluate target health option. Choose the region as your current region and direct traffic to the S3 website endpoint via the alias, following the steps illustrated in the provided figure.




Now, establish a record for your primary S3 bucket. Here, activate the alias option while deactivating the evaluate target health feature. Choose the current region as your selection and direct traffic to the S3 website endpoint using the alias, adhering to the instructions depicted in the figure.




These are the list of our records