Assignment 4 – EC2 and ALB

Today's task:

1. Practice SGs using 2 public EC2 instances. There will be 2 SGs for each instance.
    a. By enabling SSH rules in SG between them
    b. Running applications
2. Run EC2 behind an ALB.

Bonus task: **NLB**

We will spin up NLBs only in 2 AZs. That means the load balancer can't distribute traffics to EC2s in other region. The reason is, the elastic IPs are precious and we can get up to 5 elastic IPs.

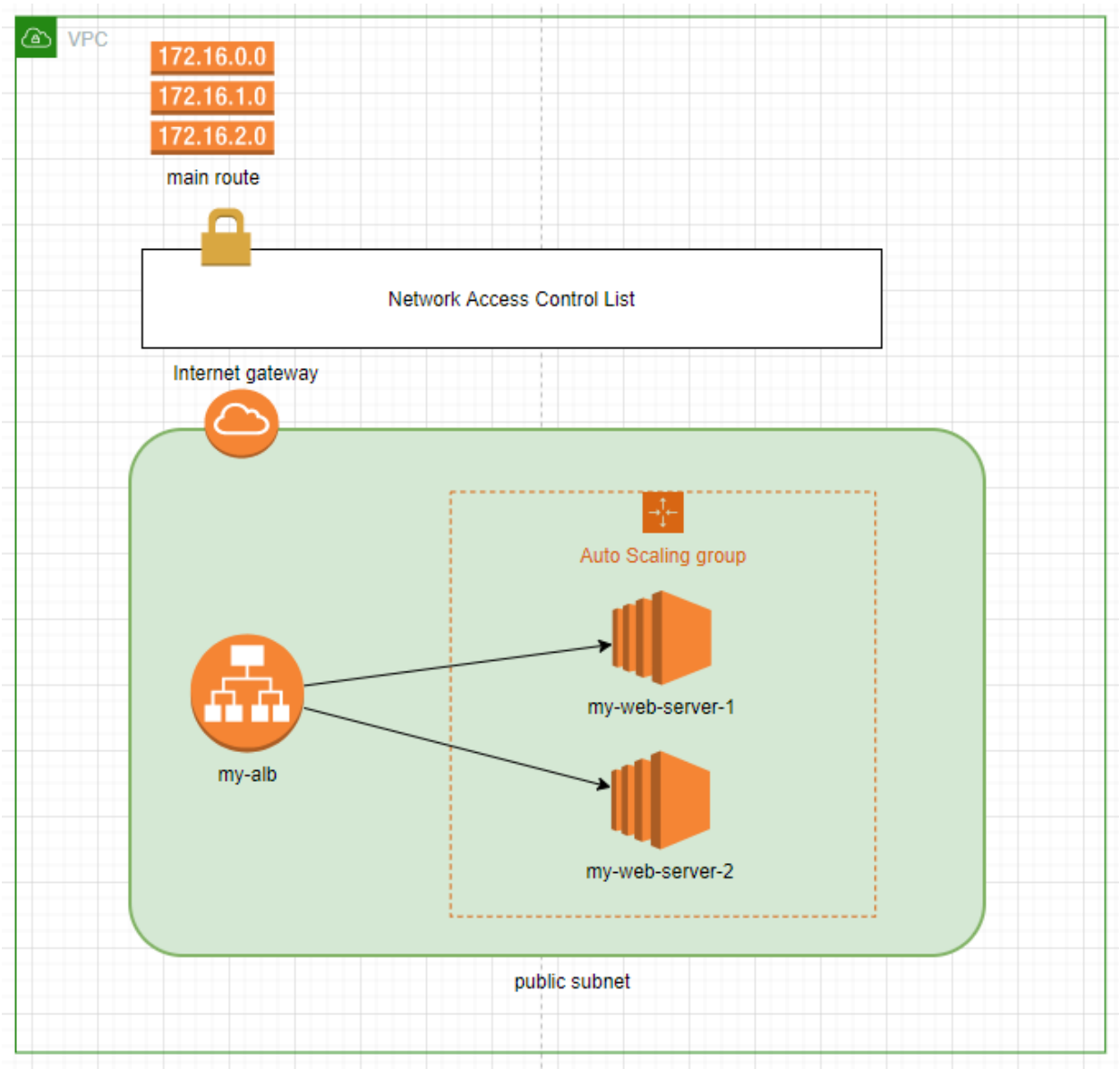
The logical component behind the elastic IP is that **Elastic Network Interface (ENI).** We associate elastic IP with the ENI. All ENIs have the corresponding private IP associated with it. Network Load Balancer doesn't have any ENI that means there is no security group for Network Load Balancers. Basically, we are whitelisting the NLB using elastic ip with static private IPs.

1. Create 2 elastic IPs.
2. Create NLB and associate it with the elastic IPs.
3. Spin up 2 instances with different HTML content in us-east-1a, us-east-1b AZs.
4. Add the private instance in us-east-1a, us-east-1b to the target group of the NLB.
5. Update the target group and deselect **Preserve client IP addresses**

Grab private ip of the elastic ip in the AWS console, VPC, elastic ip section. Update the private instance's security group to allow **private IPs of the elastic IPs** that you created in the first step.

Submit items below in one pdf file:

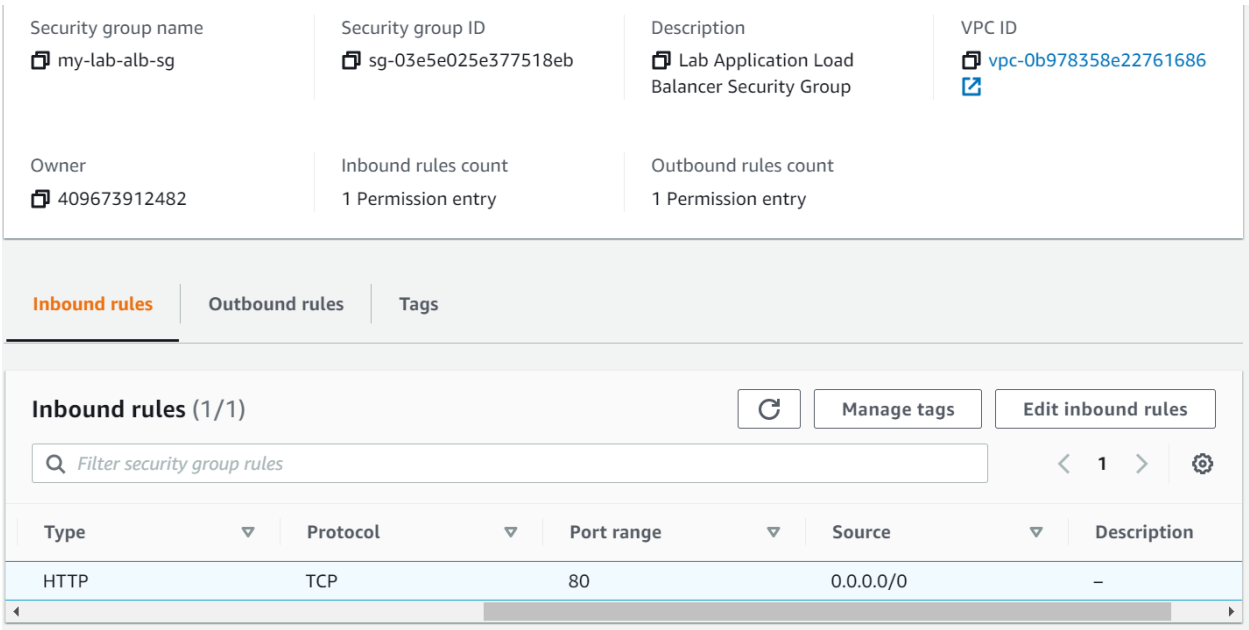
1. Screenshot of app with your name
2. Submit ALB DNS
3. Screenshot of TG



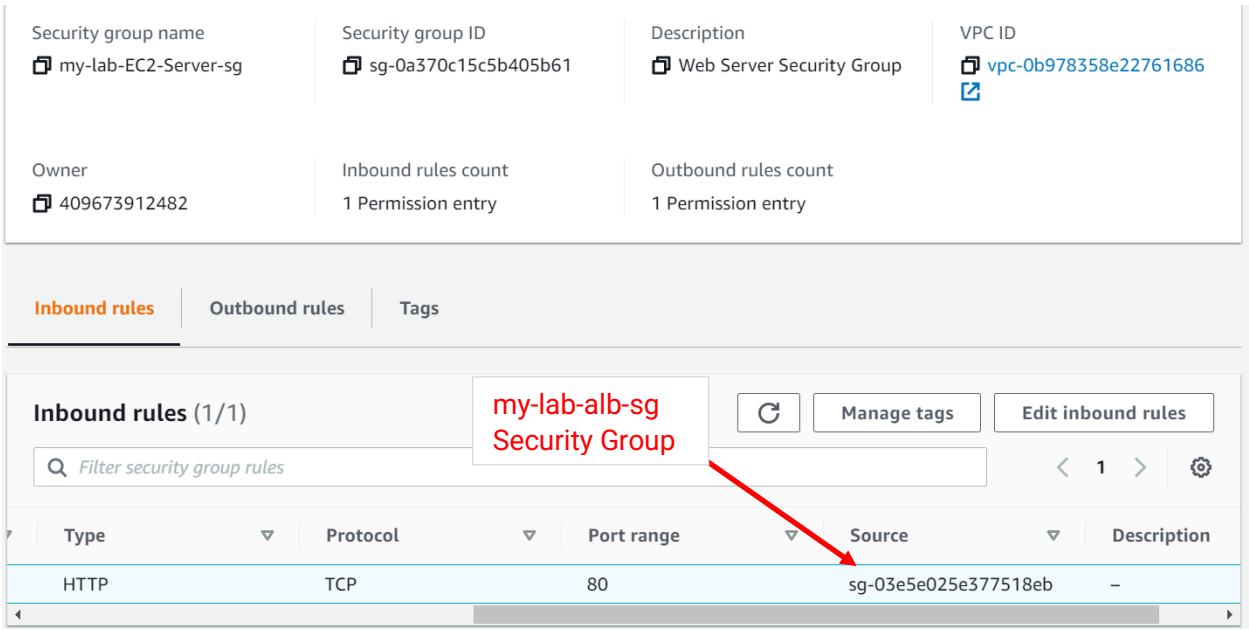
Instruction 1. Create Security Goups

- Create a SG for the ALB which is open to the world.
- Create a SG for web servers that allows ALB's SG.

Create Application Load Balancer Security Group (Outbound Rule is Default - All Traffic)



Create EC2 Web Server Security Group (Outbound Rule is Default - All Traffic)



Instruction 2. Create 2 instances in public subnets

- Instance 1 prints instance 1 and Instance2 prints instance 2 so we can differentiate them.

EC2 Instance Startup Commands

```
#!/bin/bash
```

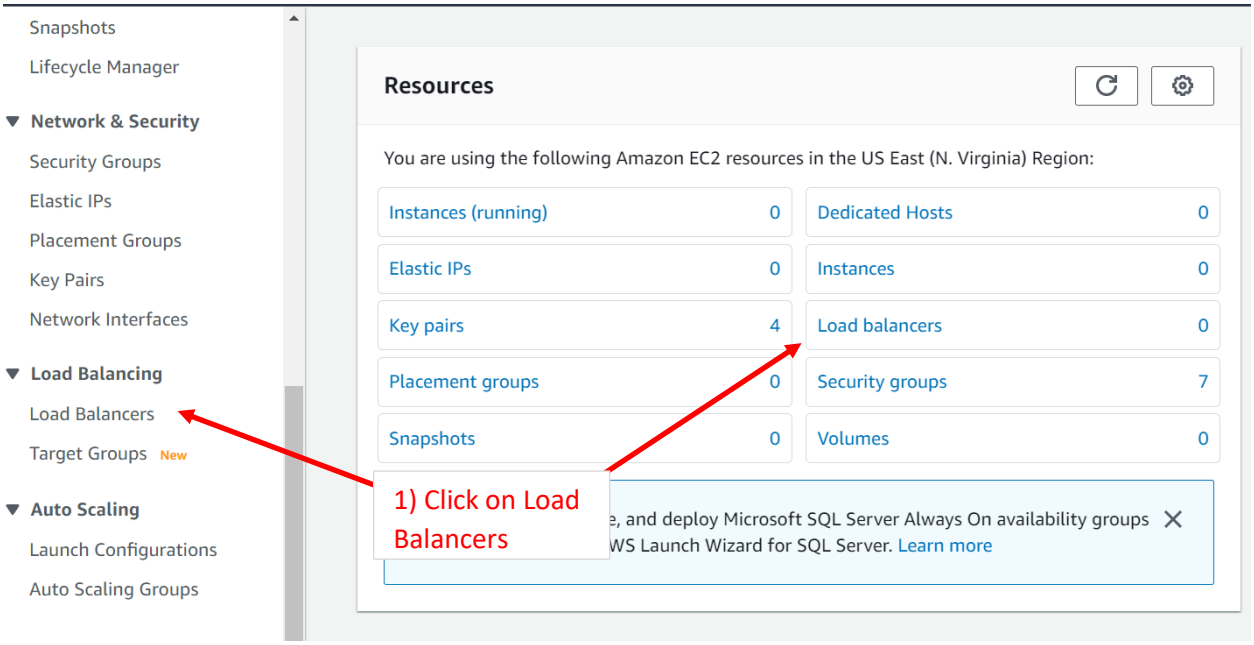
```
yum install httpd -y
cd /var/www/html
echo '<p>Instance 1</p>' > index.html
sudo service httpd start
```

#!/bin/bash --> tells the OS to invoke the specified shell to execute the script commands

Instruction 3. Create an ALB and attach instances

- Create the default http:80 listener.
- Select VPC and public subnets.
- Select the ALB's SG that you created in Task 1.
- Create a target group, type as Instance. Don't register targets for now.

Go to the Load Balancers Display from the EC2 Dashboard



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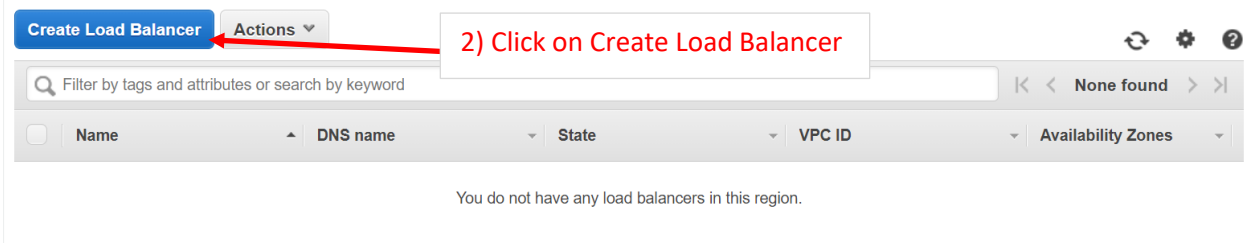

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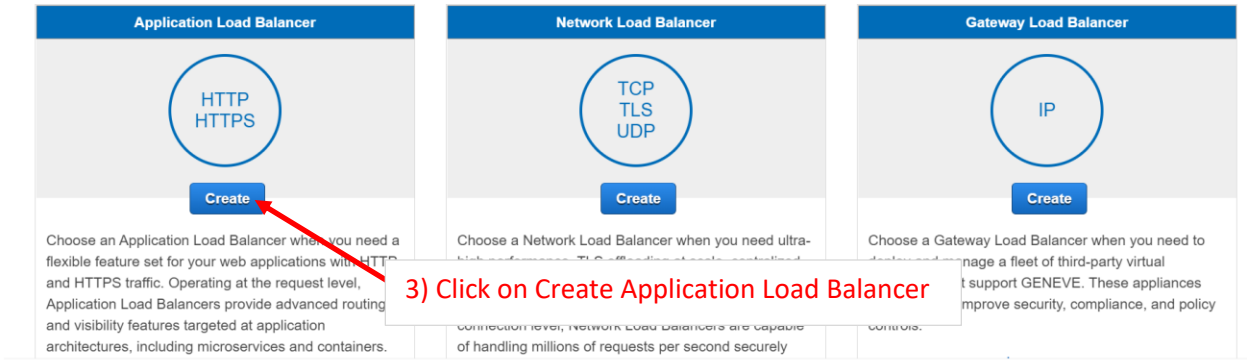
Select load balancer type

Elastic Load Balancing supports four types of load balancers: Application Load Balancers, Network Load Balancers, Gateway Load Balancers, and Classic Load Balancers. Choose the load balanc type that meets your needs.

Learn more about which load balancer is right for you



3) Click on Create Application Load Balancer

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1. Configure Load Balancer | 2. Configure Security Settings | 3. Configure Security Groups | 4. Configure Routing | 5. Register Targets | 6. Review

Step 1: Configure Load Balancer

Basic Configuration

To configure your load balancer, provide a name, select a scheme, specify one or more listeners, and select a network. The default configuration is an Internet-facing load balancer in the selected network with a listener that receives HTTP traffic on port 80.

Name: my-lab-alb

Scheme: internet-facing / internal

IP address type: ipv4

4) Name Load Balancer

Listeners

A listener is a process that checks for connection requests, using the protocol and port that you configured.

Load Balancer Protocol	Load Balancer Port
HTTP	80

Cancel | Next: Configure Security Settings

Availability Zones

Specify the Availability Zones to enable for your load balancer. The load balancer routes traffic to the targets in these Availability Zones only. You can specify only one subnet per Availability Zone. You must specify subnets from at least two Availability Zones to increase the availability of your load balancer.

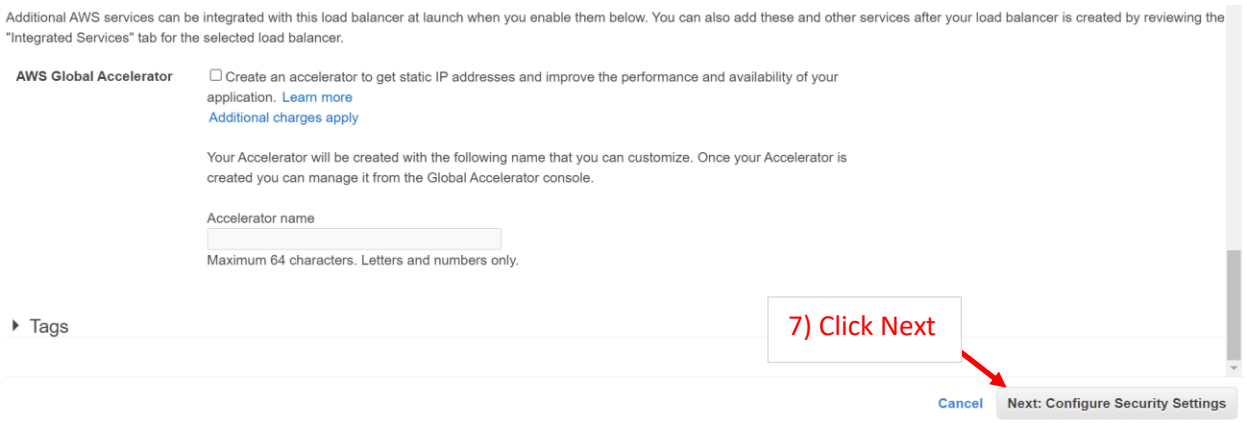
VPC: vpc-0b978358e22761686 (10.0.0.0/16) | my-lab-vpc

5) Select VPC

Availability Zones:

- us-east-1a: subnet-0ef43ef1cfcb561a0 (lab-sn-public-1A) — IPv4 address: Assigned by AWS
- us-east-1b: subnet-03b7f8298553c4646 (lab-sn-public-1B) — IPv4 address: Assigned by AWS
- us-east-1c: subnet-028d2f8b4b0b12258 (lab-sn-public-1c)

6) Select At Least 2 AZ Zones and Subnets


Additional AWS services can be integrated with this load balancer at launch when you enable them below. You can also add these and other services after your load balancer is created by reviewing the "Integrated Services" tab for the selected load balancer.
AWS Global Accelerator
Create an accelerator to get static IP addresses and improve the performance and availability of your application. Learn more
Additional charges apply
Your Accelerator will be created with the following name that you can customize. Once your Accelerator is created you can manage it from the Global Accelerator console.
Accelerator name
Maximum 64 characters. Letters and numbers only.
Tags
7) Click Next
Cancel
Next: Configure Security Settings

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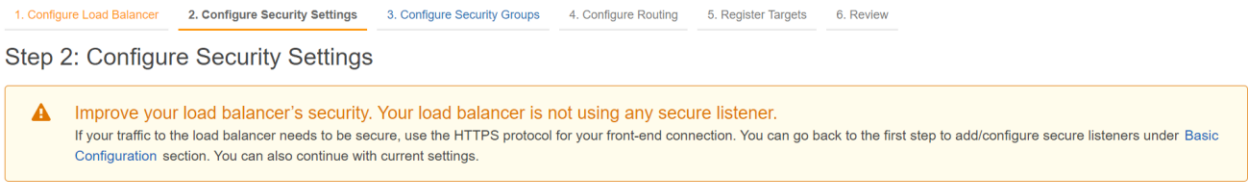
1. Configure Load Balancer
2. Configure Security Settings
3. Configure Security Groups
4. Configure Routing
5. Register Targets
6. Review
Step 2: Configure Security Settings
Improve your load balancer's security. Your load balancer is not using any secure listener.
If your traffic to the load balancer needs to be secure, use the HTTPS protocol for your front-end connection. You can go back to the first step to add/configure secure listeners under Basic Configuration section. You can also continue with current settings.


8) Click Next
Cancel
Previous
Next: Configure Security Groups

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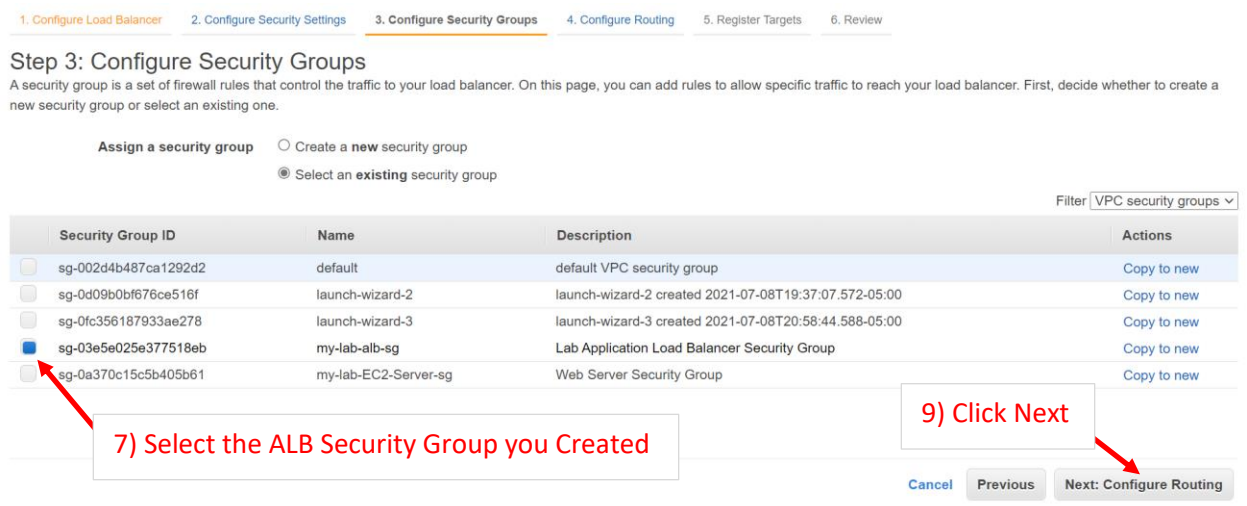
1. Configure Load Balancer
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Step 3: Configure Security Groups
A security group is a set of firewall rules that control the traffic to your load balancer. On this page, you can add rules to allow specific traffic to reach your load balancer. First, decide whether to create a new security group or select an existing one.
Assign a security group
Create a new security group
Select an existing security group
Filter VPC security groups
Security Group ID
Name
Description
Actions
sg-002d4b487ca1292d2 default default VPC security group Copy to new
sg-0d09b0bf676ce516f launch-wizard-2 launch-wizard-2 created 2021-07-08T19:37:07.572-05:00 Copy to new
sg-0fc356187933ae278 launch-wizard-3 launch-wizard-3 created 2021-07-08T20:58:44.588-05:00 Copy to new
sg-03e5e025e377518eb my-lab-alb-sg Lab Application Load Balancer Security Group Copy to new
sg-0a370c15c5b405b61 my-lab-EC2-Server-sg Web Server Security Group Copy to new
7) Select the ALB Security Group you Created
9) Click Next
Cancel
Previous
Next: Configure Routing

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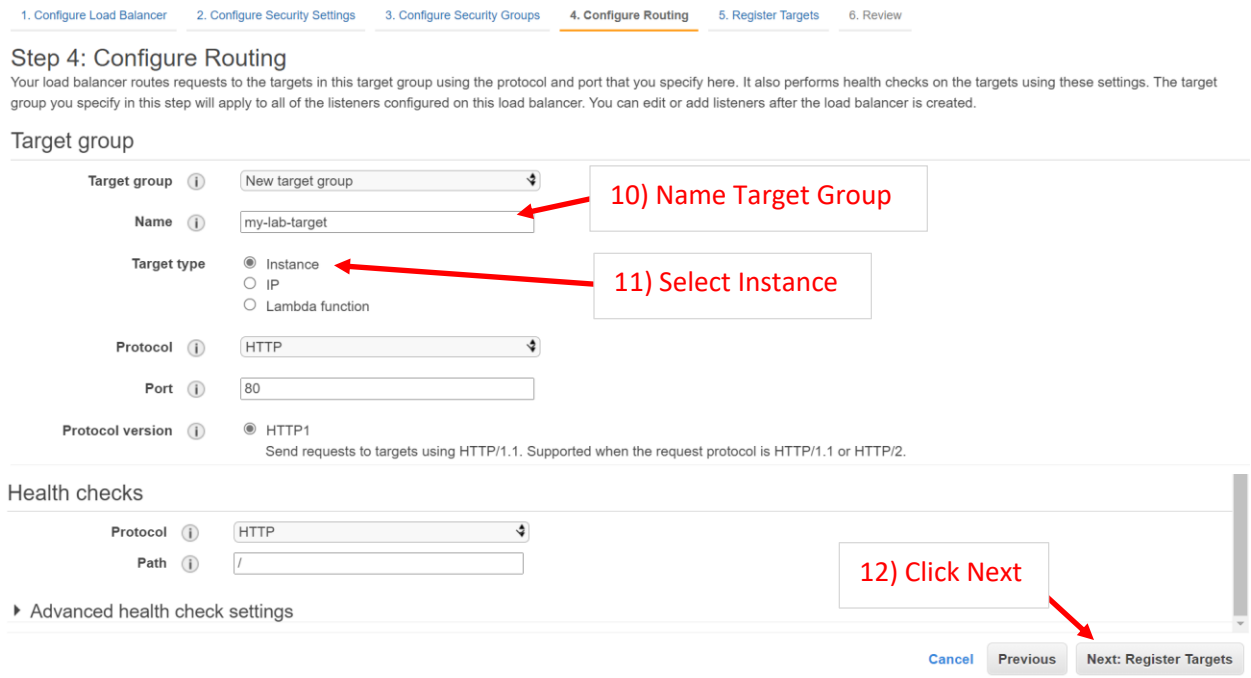
1. Configure Load Balancer
2. Configure Security Settings
3. Configure Security Groups
4. Configure Routing
5. Register Targets
6. Review
Step 4: Configure Routing
Your load balancer routes requests to the targets in this target group using the protocol and port that you specify here. It also performs health checks on the targets using these settings. The target group you specify in this step will apply to all of the listeners configured on this load balancer. You can edit or add listeners after the load balancer is created.
Target group
Target group
New target group
Name
my-lab-target
10) Name Target Group
Target type
Instance
IP
Lambda function
11) Select Instance
Protocol
HTTP
Port
80
Protocol version
HTTP1
Send requests to targets using HTTP/1.1. Supported when the request protocol is HTTP/1.1 or HTTP/2.
Health checks
Protocol
HTTP
Path
/
12) Click Next
Advanced health check settings
Cancel
Previous
Next: Register Targets

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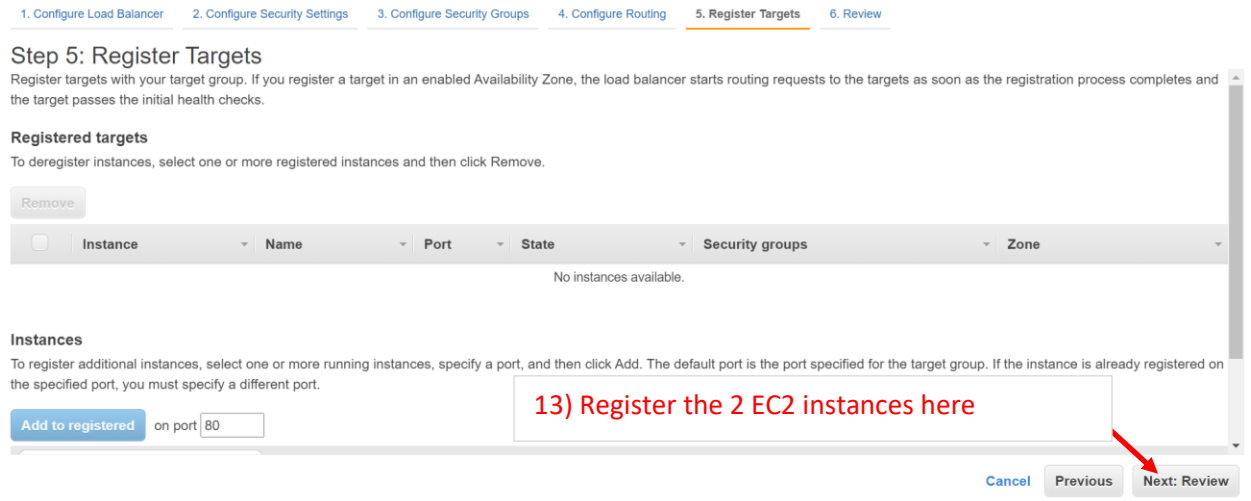
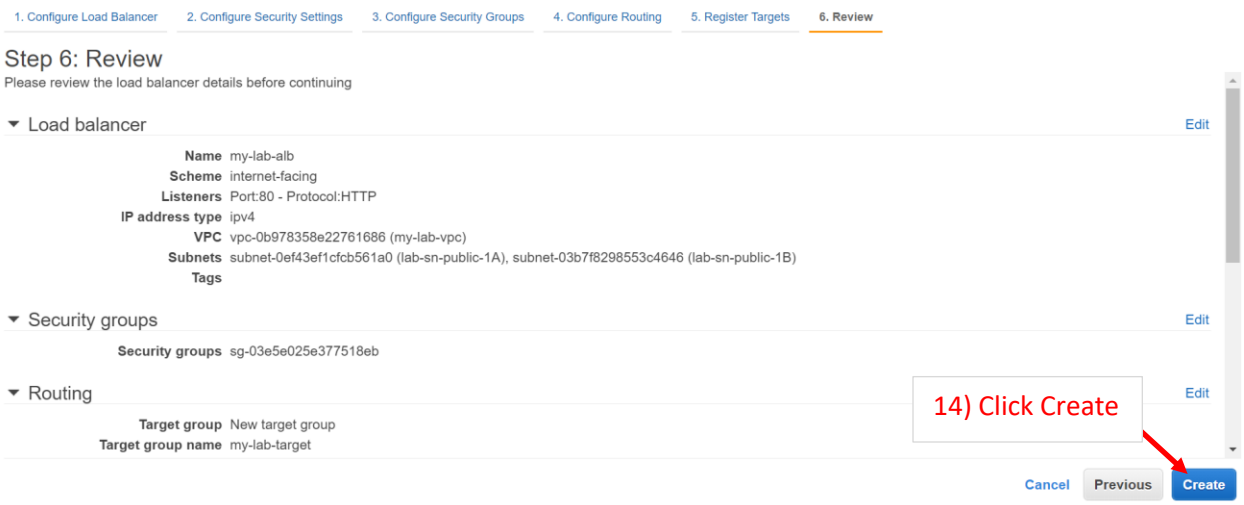
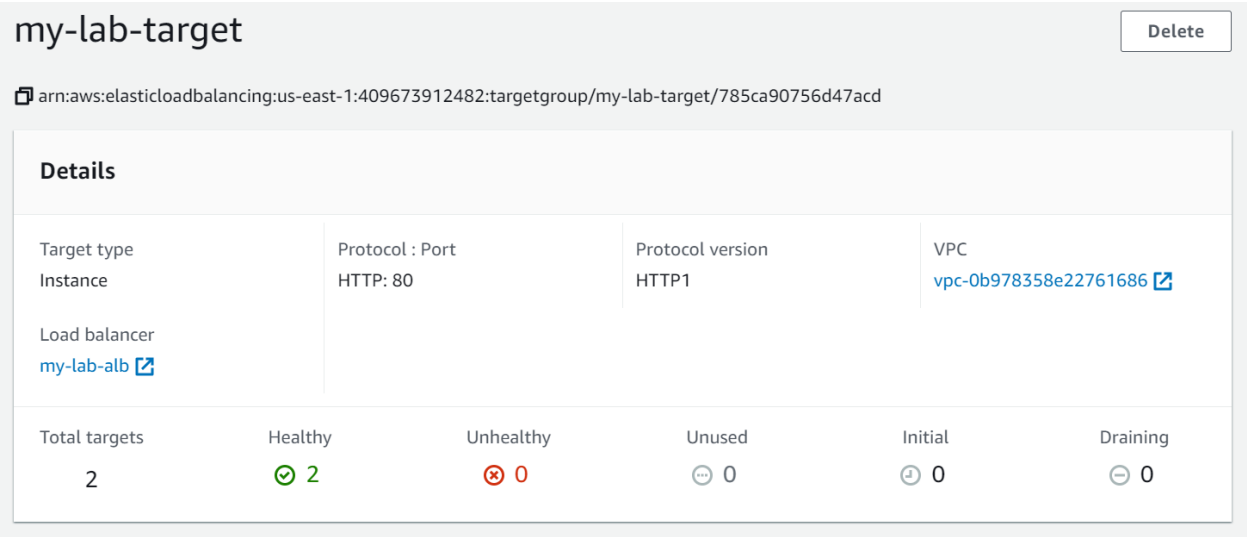

1. Configure Load Balancer
2. Configure Security Settings
3. Configure Security Groups
4. Configure Routing
5. Register Targets
6. Review
Step 5: Register Targets
Register targets with your target group. If you register a target in an enabled Availability Zone, the load balancer starts routing requests to the targets as soon as the registration process completes and the target passes the initial health checks.
Registered targets
To deregister instances, select one or more registered instances and then click Remove.
Remove
Instance
Name
Port
State
Security groups
Zone
No instances available.
Instances
To register additional instances, select one or more running instances, specify a port, and then click Add. The default port is the port specified for the target group. If the instance is already registered on the specified port, you must specify a different port.
13) Register the 2 EC2 instances here
Add to registered
on port
80
Cancel
Previous
Next: Review

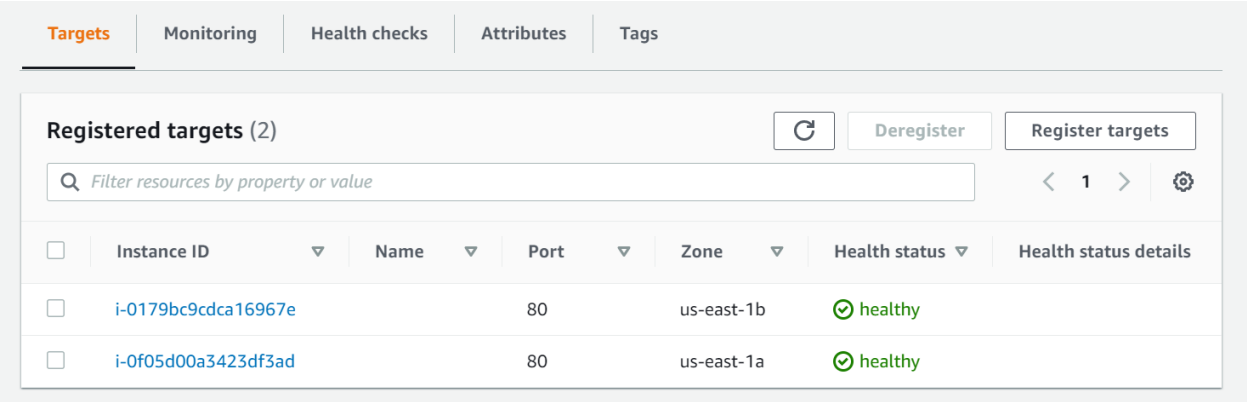
...


1. Configure Load Balancer
2. Configure Security Settings
3. Configure Security Groups
4. Configure Routing
5. Register Targets
6. Review
Step 6: Review
Please review the load balancer details before continuing
Load balancer
Edit
Name my-lab-alb
Scheme internet-facing
Listeners Port:80 - Protocol:HTTP
IP address type ipv4
VPC vpc-0b978358e22761686 (my-lab-vpc)
Subnets subnet-0ef43ef1cfcb561a0 (lab-sn-public-1A), subnet-03b7f8298553c4646 (lab-sn-public-1B)
Tags
Security groups
Edit
Security groups sg-03e5e025e377518eb
Routing
Edit
Target group New target group
Target group name my-lab-target
14) Click Create
Cancel
Previous
Create

Instruction 4. Verify and Test the ALB

View the Health Check on your the Target Group Details. Both Instances Should be Healthy





DNS on Load Balancer Display. Each EC2 will have a public address but you cannot access due to security group settings.

Test DNS with Web Browser