Assignment 4 – ALB and ASG

In the PDF, there should be:

- 2 links for ALB and NLB that should return results.
- Screenshot of healthy instances in TG for.
- Screenshot of the ASG.

Tasks:

1. Run 2 web servers behind ALB.
    a. Create an SG for the ALB that allows access from the internet on port 80 (HTTP). Give a meaningful name like “alb-sg”. The meaningful name will help when whitelisting this SG in the web servers’ SG.
    b. Create an SG for an EC2 instance (web servers). Open up port 80 from the ALB SG. That means the web servers only allow access from the load balancer.
    c. Create 2 web servers in us-east-1a and us-east-1b AZs with different HTML content. To do that, hit “Edit” in the “Network Settings” and select subnets with “us-east-1a” for the first instance and “us-east1b” for the second instance. Select the SG for the webserver you created in the previous step.
    d. Put the following script in “User Data”. So, your web server starts automatically when the server starts.

```
#!/bin/bash
yum install httpd -y
cd /var/www/html
echo '<p>Hello from Cloud Computing</p>' > index.html
systemctl start httpd.service
systemctl enable httpd.service
```

#!/bin/bash – is equivalent to “sudo -s” in bash.

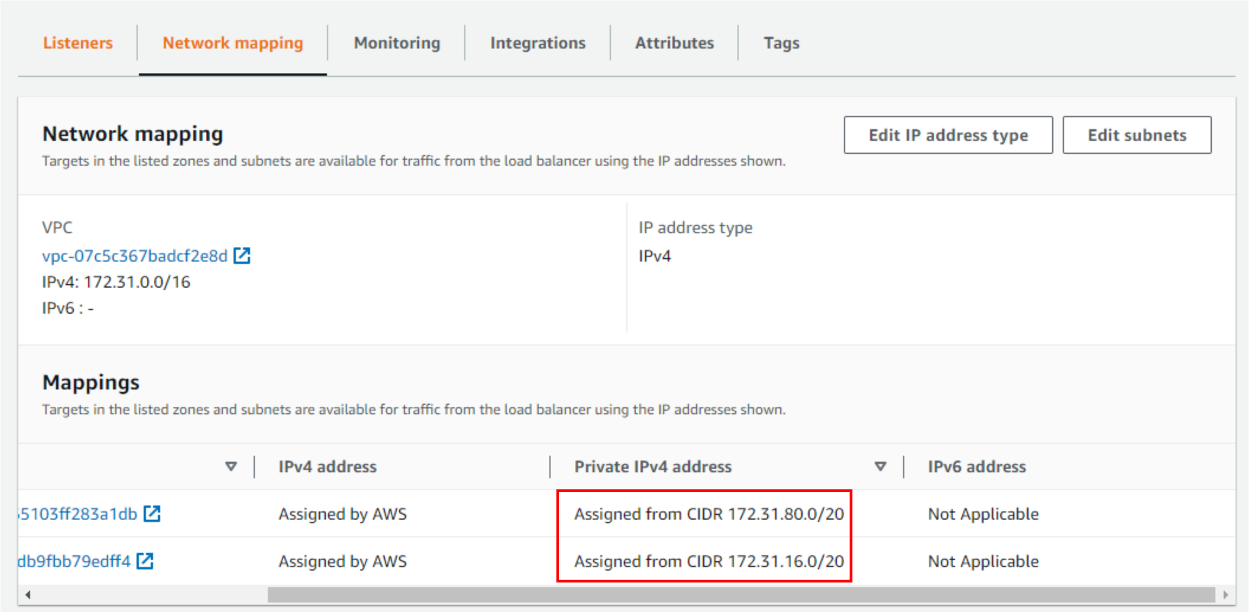
    e. Create ALB. Select us-east-1a and us-east-1b AZs for HA (High Availability). Create the TG and register the servers. And select the TG you created.

2. Practice Listener Rules
    a. Create (or you can use existing one) 2 web servers. The first server prints “App 1” and the second server prints “App2”.
    b. Create a “TG1” and register the “App 1”. Create a “TG2” and register the “App 2”.
    c. Create the ALB.
        i. The default rule return “Fixed Response”
        ii. If the request path starts with “app1”, the route the to TG1 (App1)
        iii. If the request path starts with “app2”, the route the to TG2 (App2)
3. Run web servers behind NLB.

*NLB operates at layer 4 and has fewer features even though it is hyper-performant. **You can not associate NLB with SG**. How you are going to whitelist access only from NLB in your EC2?*

The solution is to whitelist subnets (172.31.x.x) in which the NLB nodes are created.

a. Add the instances you created in task 1 to the target group of the NLB. The protocol must be **TCP** (Layer 4)**,** not HTTP (Layer 4).
b. Once NLB is provisioned, you will find the subnets in which the NLB nodes are created. Whitelist them in the web server SG.



Network mapping

Targets in the listed zones and subnets are available for traffic from the load balancer using the IP addresses shown.

VPC
vpc-07c5c367badcf2e8d
IPv4: 172.31.0.0/16
IPv6 : -

IP address type
IPv4

Mappings

Targets in the listed zones and subnets are available for traffic from the load balancer using the IP addresses shown.

▽	IPv4 address	Private IPv4 address ▽	IPv6 address
5103ff283a1db	Assigned by AWS	Assigned from CIDR 172.31.80.0/20	Not Applicable
db9fbb79edff4	Assigned by AWS	Assigned from CIDR 172.31.16.0/20	Not Applicable

c. Update the target group and deselect **Preserve client IP addresses.**

By default, your servers see the clients' IP addresses. We don't want that. Because we want to allow access only from the NLB in the web servers. For that, you must deselect "Preserve client IP addresses". So, your servers see the NLB nodes' IP address as the source IP instead of the clients' IPs.

4. Run the web server behind the ALB in ASG.
    a. Deregister instances behind the ALB. We will register them through ASG. So they can scale automatically.
    b. Create a launch configuration. You can use the "launch template" instead which is recommended.

    i. Give it a name
    ii. Select the Amazon Linux AMI. You can find the AMI ID from the EC2 creation wizard.
    iii. Select instance type, t2.micro.
    iv. Expand advanced. Select the IAM profile.
    v. Enter the previous User Data above.
    vi. Select the web server's SG. Created in task 1.
    vii. Select any key pair. It doesn't matter. Because we use Session Manager to SSH into the instance.

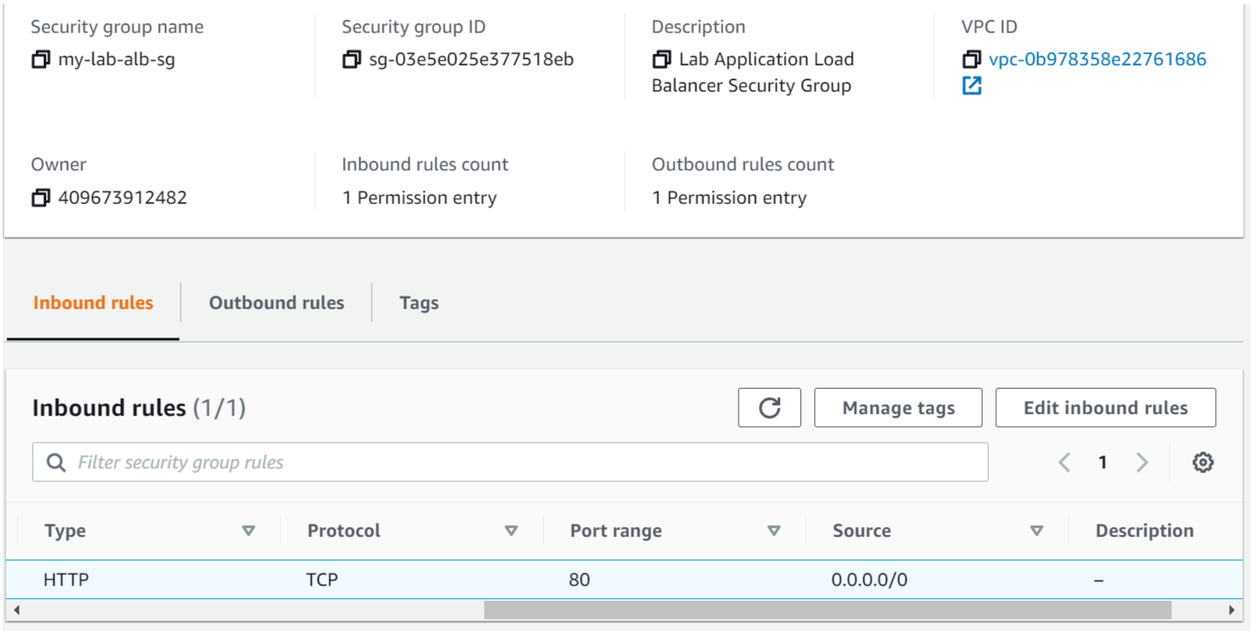
c. Create the Auto Scaling Group.
    i. Select launch template/configuration.
    ii. Select AZs (Subnets). That is where your instances launched.
    iii. Click on attach to an existing load balancer and select the default TG of the ALB.
    iv. Select ELB in the health checks panel.
    v. Set desired, min, and max capacity. Set a target tracking scale policy.

d. mimic the high CPU utilization with the "stress" library to test scaling out behavior.

Create Security Groups

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

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



Security group name
my-lab-alb-sg

Security group ID
sg-03e5e025e377518eb

Description
Lab Application Load Balancer Security Group

VPC ID
vpc-0b978358e22761686

Owner
409673912482

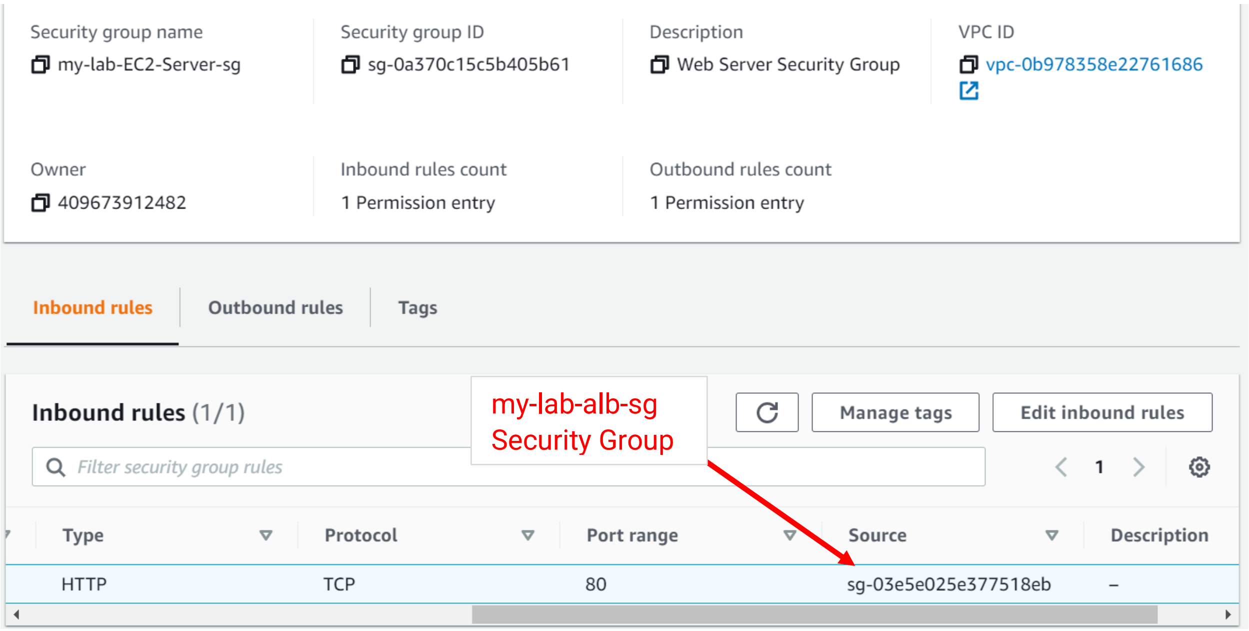
Inbound rules count
1 Permission entry

Outbound rules count
1 Permission entry

Inbound rules (1/1)

Type	Protocol	Port range	Source	Description
HTTP	TCP	80	0.0.0.0/0	–

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



Security group name
my-lab-EC2-Server-sg

Security group ID
sg-0a370c15c5b405b61

Description
Web Server Security Group

VPC ID
vpc-0b978358e22761686

Owner
409673912482

Inbound rules count
1 Permission entry

Outbound rules count
1 Permission entry

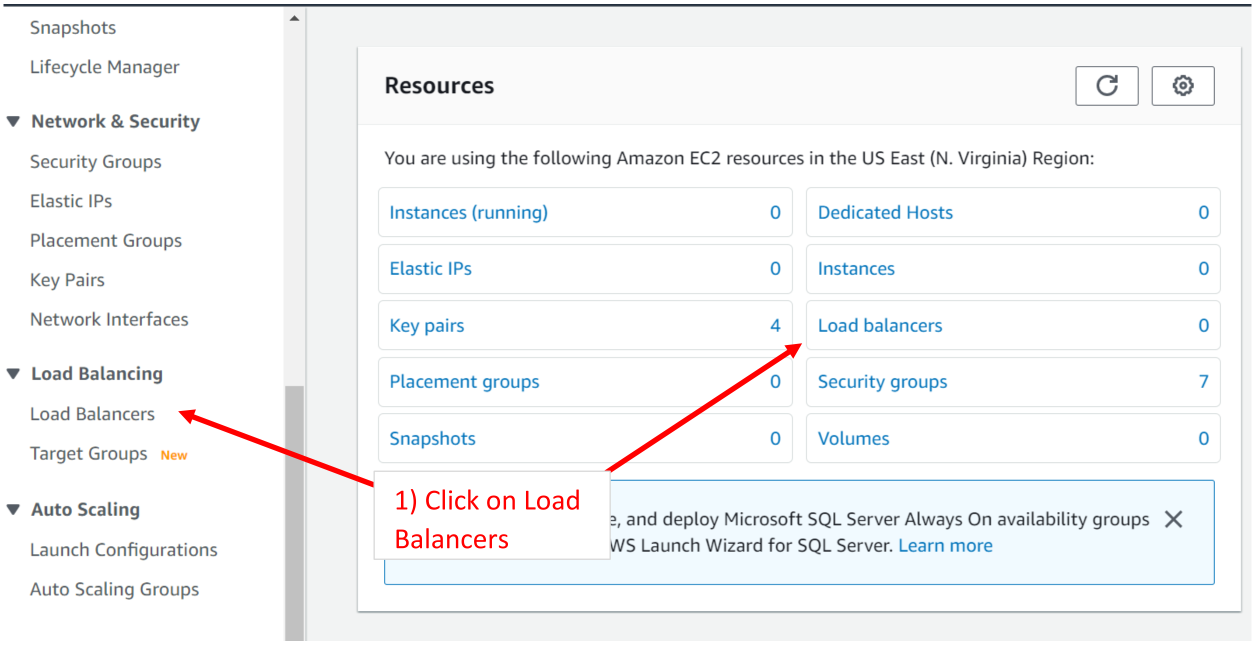
Inbound rules (1/1)

my-lab-alb-sg
Security Group

Type	Protocol	Port range	Source	Description
HTTP	TCP	80	sg-03e5e025e377518eb	–

Create an ALB

Go to the Load Balancers Display from the EC2 Dashboard



Resources

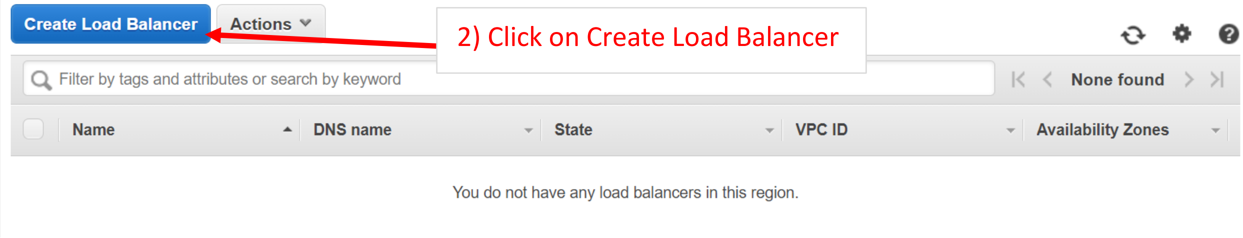
You are using the following Amazon EC2 resources in the US East (N. Virginia) Region:

Instances (running)	0	Dedicated Hosts	0
Elastic IPs	0	Instances	0
Key pairs	4	Load balancers	0
Placement groups	0	Security groups	7
Snapshots	0	Volumes	0

e, and deploy Microsoft SQL Server Always On availability groups
WS Launch Wizard for SQL Server. Learn more

1) Click on Load Balancers

…

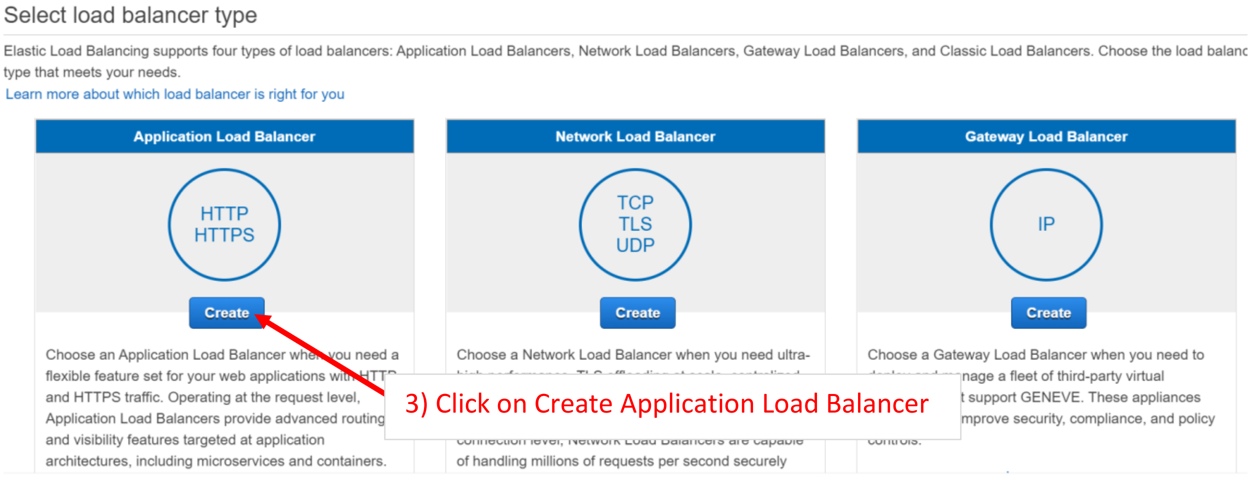


2) Click on Create Load Balancer

Name	DNS name	State	VPC ID	Availability Zones

You do not have any load balancers in this region.

…


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

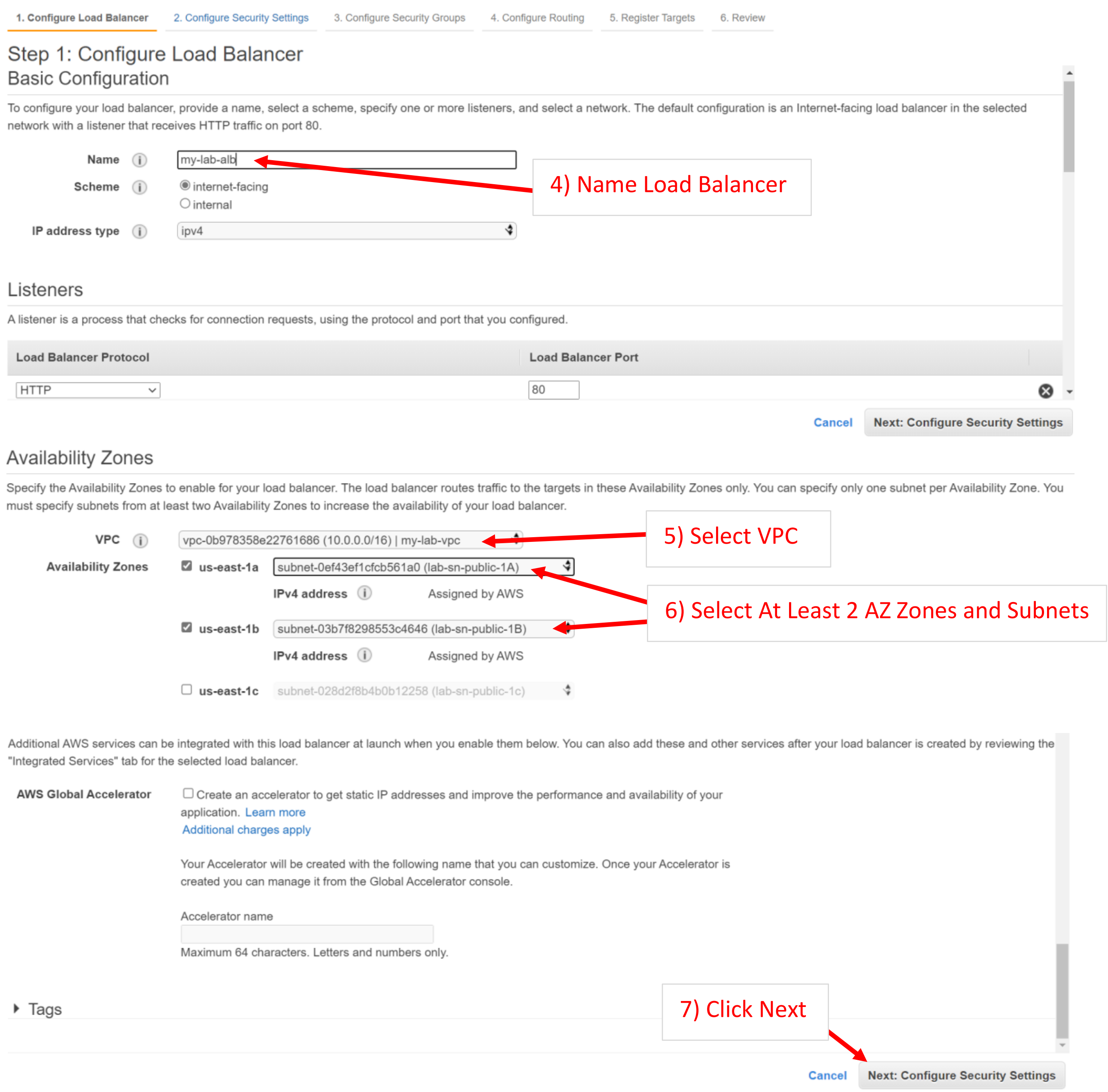
Choose an Application Load Balancer whe you need a flexible feature set for your web applications with HTTP and HTTPS traffic. Operating at the request level, Application Load Balancers provide advanced routing and visibility features targeted at application architectures, including microservices and containers.

Choose a Network Load Balancer when you need ultra- connection level, Network Load Balancers are capable of handling millions of requests per second securely

Choose a Gateway Load Balancer when you need to nage a fleet of third-party virtual t support GENEVE. These appliances mprove security, compliance, and policy controls.

3) Click on Create Application Load Balancer

…



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:

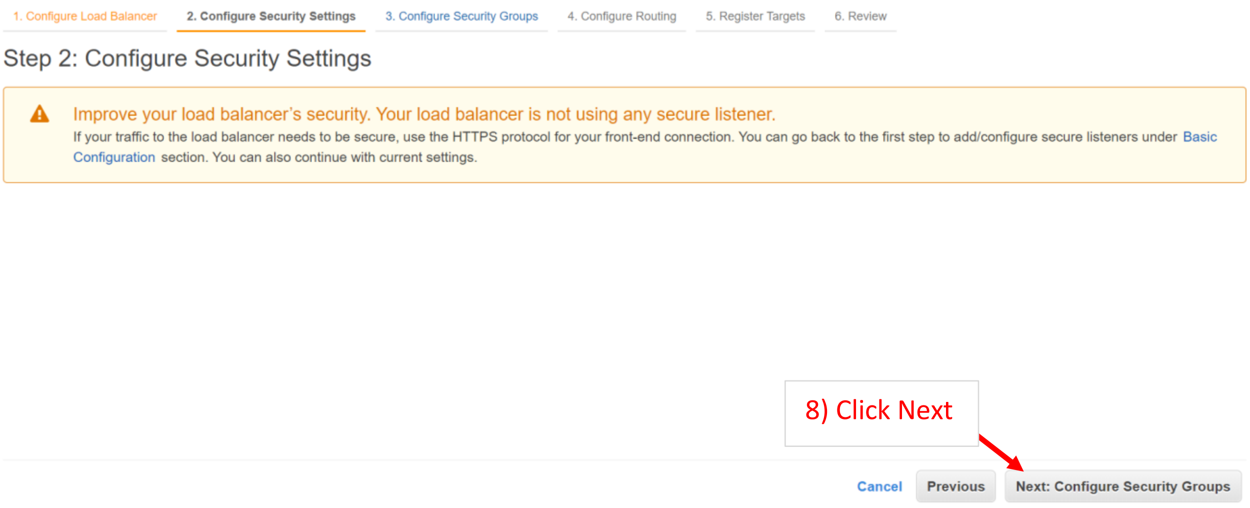
Maximum 64 characters. Letters and numbers only.

▸ Tags

7) Click Next

Cancel | Next: Configure Security Settings

…



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

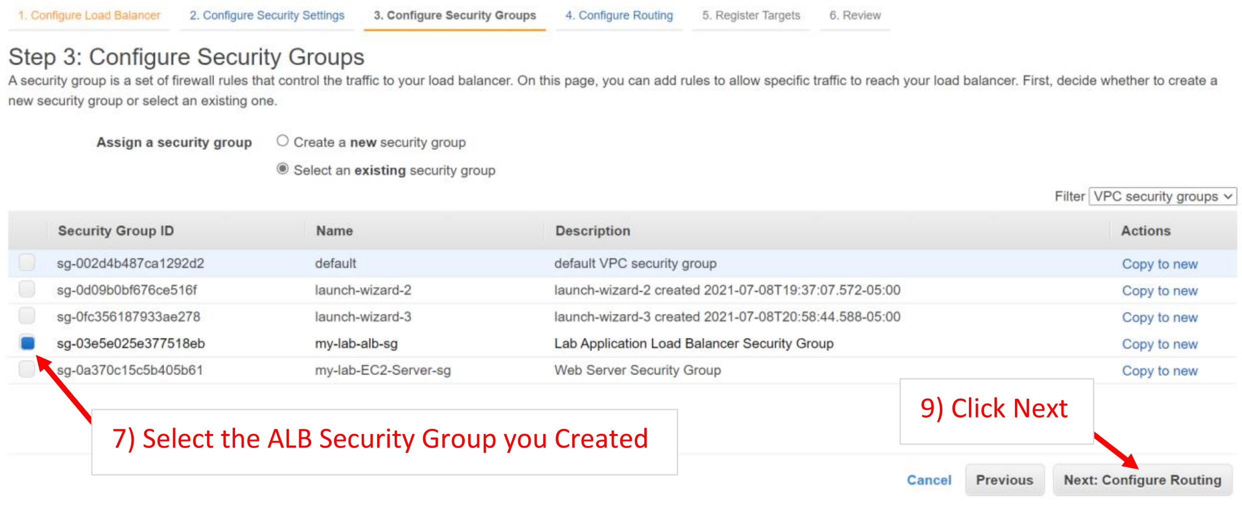
Step 2: Configure Security Settings

⚠ 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

...



1. Configure Load Balancer
2. Configure Security Settings
3. Configure Security Groups
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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

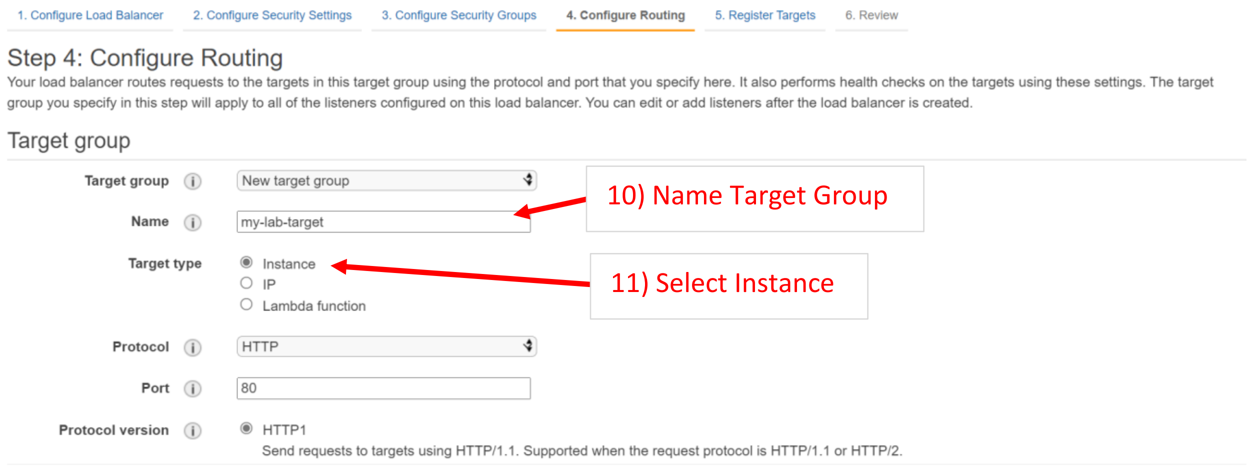
Filter VPC security groups

	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

...



1. Configure Load Balancer
2. Configure Security Settings
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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

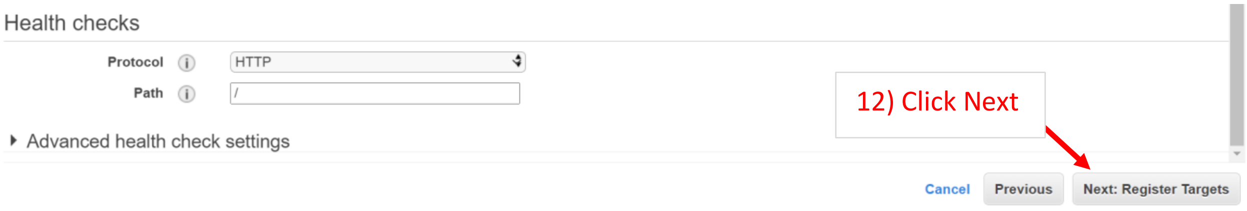
Target type: ● Instance ○ IP ○ Lambda function

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

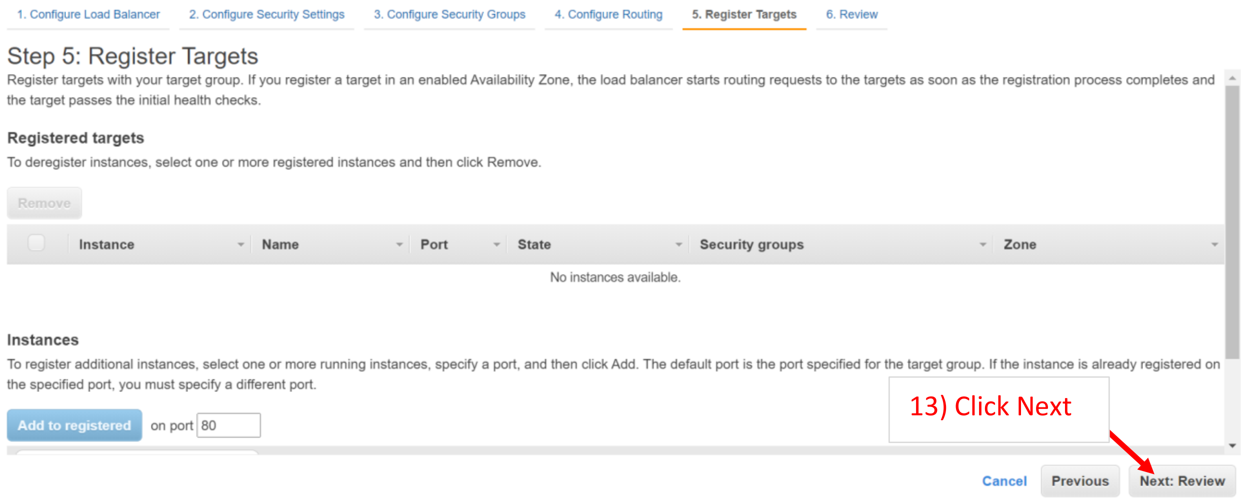
Protocol: HTTP

Path: /

Advanced health check settings

12) Click Next

…



1. Configure Load Balancer
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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.

Instance	Name	Port	State	Security groups	Zone

No instances available.

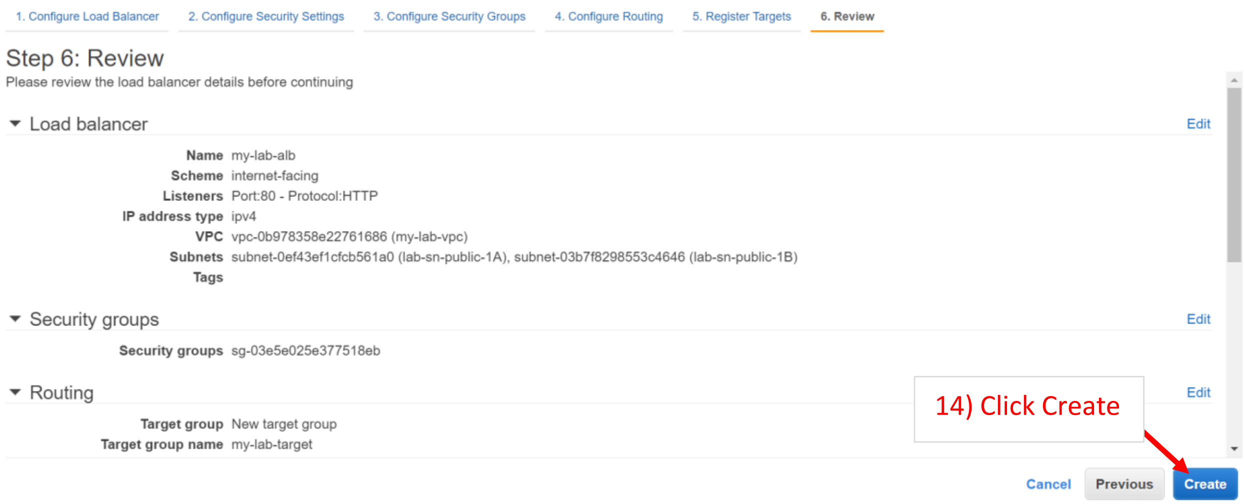
Instances

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.

Add to registered on port 80

13) Click Next

…



1. Configure Load Balancer
2. Configure Security Settings
3. Configure Security Groups
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Step 6: Review

Please review the load balancer details before continuing

Load balancer

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

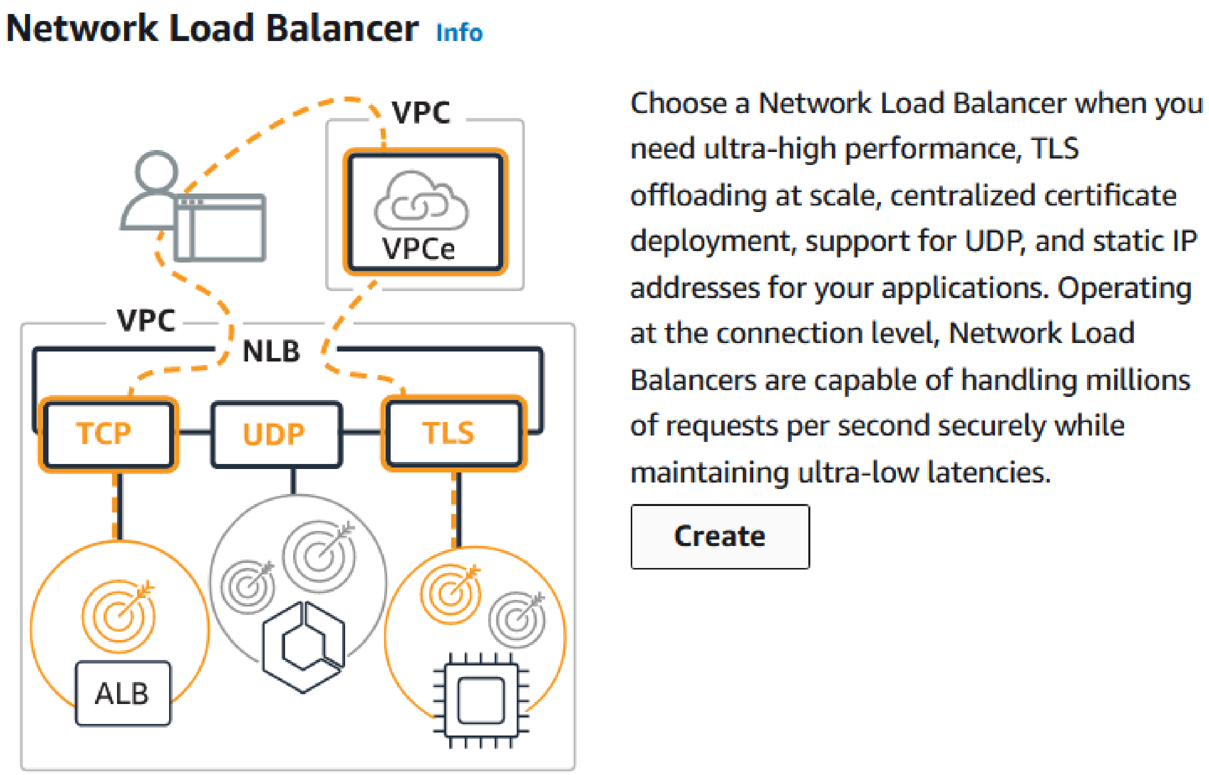
Security groups: sg-03e5e025e377518eb

Routing

Target group: New target group
Target group name: my-lab-target

14) Click Create

Create an NLB

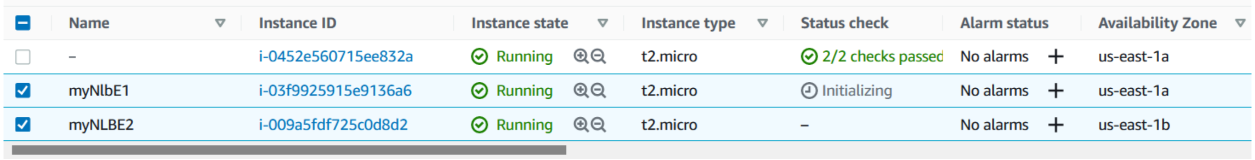


Network Load Balancer Info

Choose a Network Load Balancer when you need ultra-high performance, TLS offloading at scale, centralized certificate deployment, support for UDP, and static IP addresses for your applications. Operating at the connection level, Network Load Balancers are capable of handling millions of requests per second securely while maintaining ultra-low latencies.

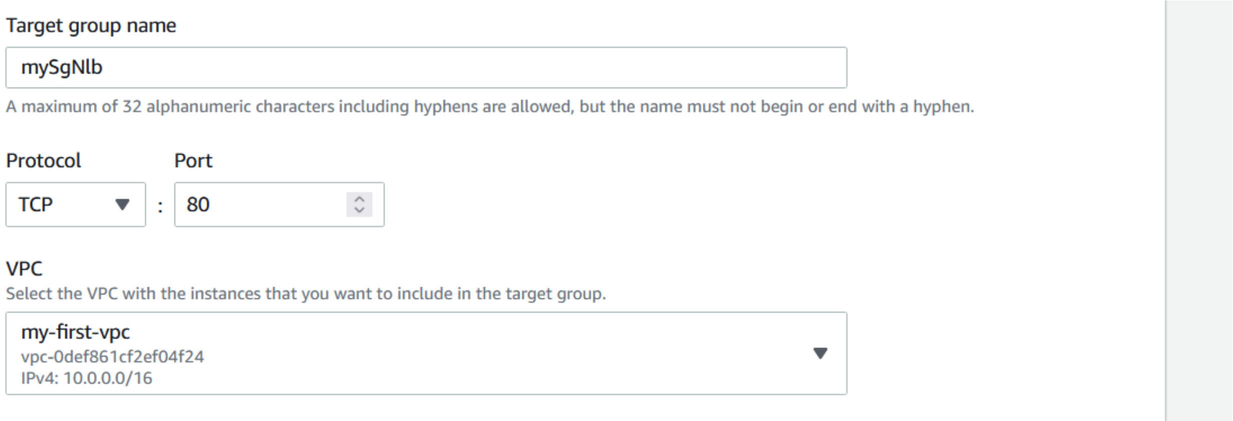
Create

a. Spin up 2 instances with different HTML content in us-east-1a, us-east-1b AZs.



−	Name	Instance ID	Instance state	Instance type	Status check	Alarm status	Availability Zone
□	–	i-0452e560715ee832a	✓ Running	t2.micro	✓ 2/2 checks passed	No alarms +	us-east-1a
☑	myNlbE1	i-03f9925915e9136a6	✓ Running	t2.micro	Initializing	No alarms +	us-east-1a
☑	myNLBE2	i-009a5fdf725c0d8d2	✓ Running	t2.micro	–	No alarms +	us-east-1b

b. Add the instances in us-east-1a, us-east-1b to the target group of the NLB.



Target group name

mySgNlb

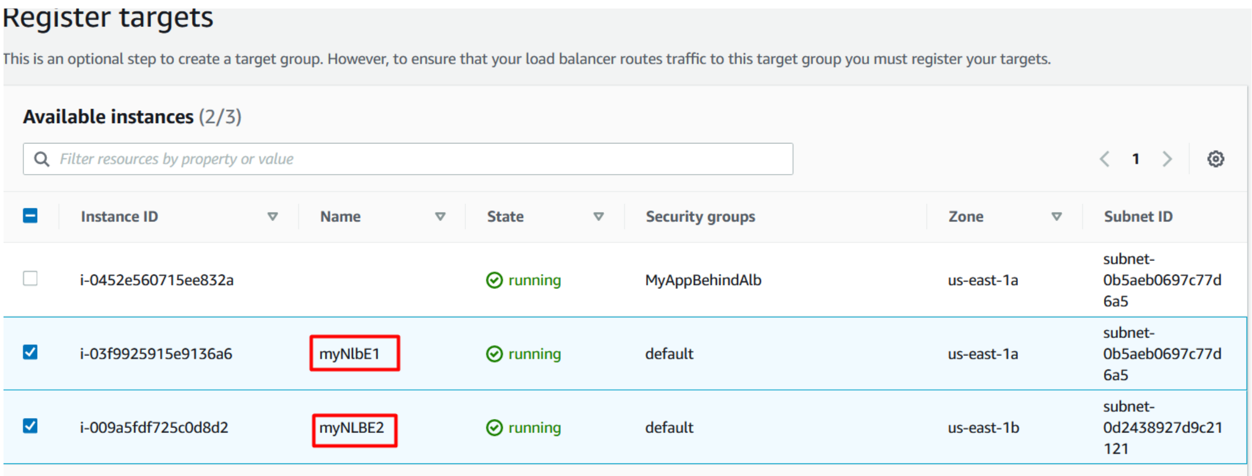
A maximum of 32 alphanumeric characters including hyphens are allowed, but the name must not begin or end with a hyphen.

Protocol: TCP ▼ Port: 80

VPC

Select the VPC with the instances that you want to include in the target group.

my-first-vpc
vpc-0def861cf2ef04f24
IPv4: 10.0.0.0/16 ▼



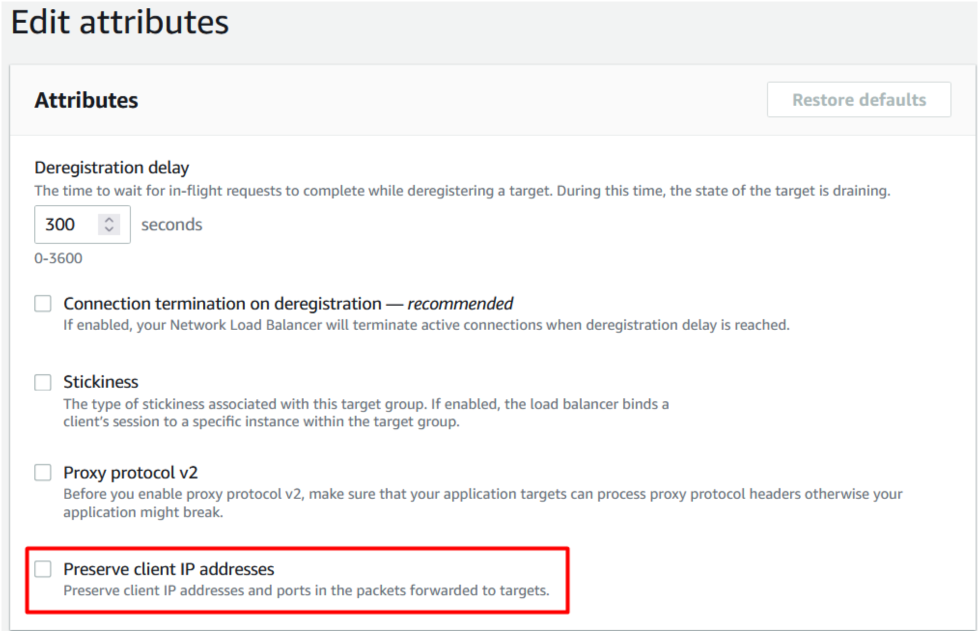
Register targets

This is an optional step to create a target group. However, to ensure that your load balancer routes traffic to this target group you must register your targets.

Available instances (2/3)

▬	Instance ID	Name	State	Security groups	Zone	Subnet ID
□	i-0452e560715ee832a		✓ running	MyAppBehindAlb	us-east-1a	subnet-0b5aeb0697c77d6a5
☑	i-03f9925915e9136a6	myNlbE1	✓ running	default	us-east-1a	subnet-0b5aeb0697c77d6a5
☑	i-009a5fdf725c0d8d2	myNLBE2	✓ running	default	us-east-1b	subnet-0d2438927d9c21121

c. Update the target group and deselect Preserve client IP addresses



Edit attributes

Attributes

Deregistration delay
The time to wait for in-flight requests to complete while deregistering a target. During this time, the state of the target is draining.
300 seconds
0-3600

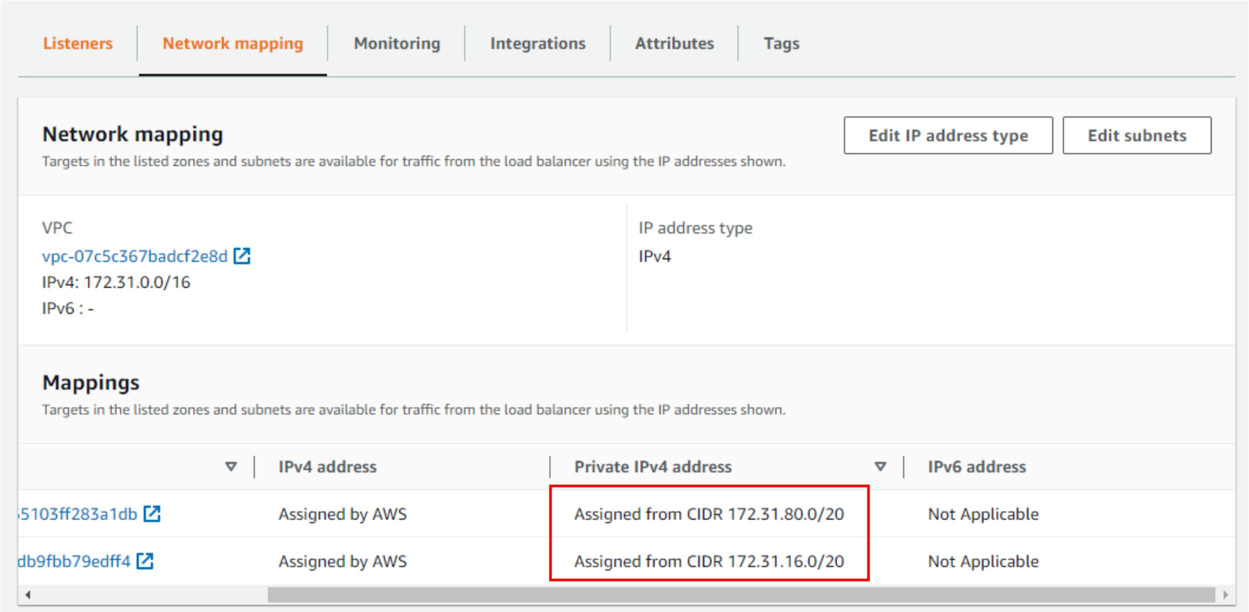
□ Connection termination on deregistration — *recommended*
If enabled, your Network Load Balancer will terminate active connections when deregistration delay is reached.

□ Stickiness
The type of stickiness associated with this target group. If enabled, the load balancer binds a client's session to a specific instance within the target group.

□ Proxy protocol v2
Before you enable proxy protocol v2, make sure that your application targets can process proxy protocol headers otherwise your application might break.

□ Preserve client IP addresses
Preserve client IP addresses and ports in the packets forwarded to targets.

f. Grab private subnets. Update the instance's security group to allow access from the NLB nodes created in those subnets.



Network mapping

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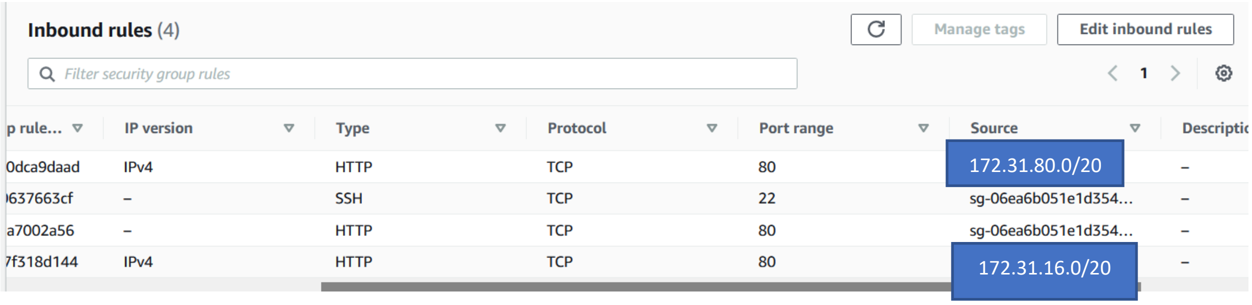
VPC
vpc-07c5c367badcf2e8d
IPv4: 172.31.0.0/16
IPv6 : -

IP address type
IPv4

Mappings

Targets in the listed zones and subnets are available for traffic from the load balancer using the IP addresses shown.

	IPv4 address	Private IPv4 address	IPv6 address
)5103ff283a1db	Assigned by AWS	Assigned from CIDR 172.31.80.0/20	Not Applicable
db9fbb79edff4	Assigned by AWS	Assigned from CIDR 172.31.16.0/20	Not Applicable

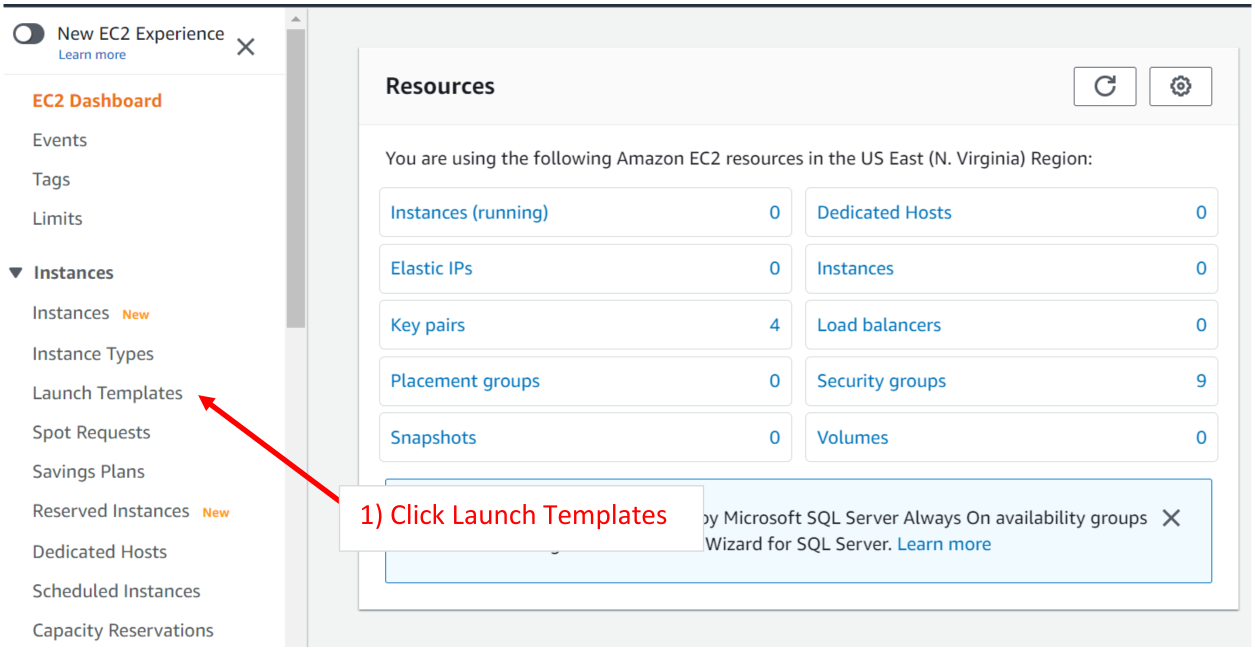


Inbound rules (4)

p rule…	IP version	Type	Protocol	Port range	Source	Descriptio
0dca9daad	IPv4	HTTP	TCP	80	172.31.80.0/20	–
)637663cf	–	SSH	TCP	22	sg-06ea6b051e1d354…	–
a7002a56	–	HTTP	TCP	80	sg-06ea6b051e1d354…	–
7f318d144	IPv4	HTTP	TCP	80	172.31.16.0/20	–

Create a launch template

Go to Launch Templates Display from EC2 Display



Resources

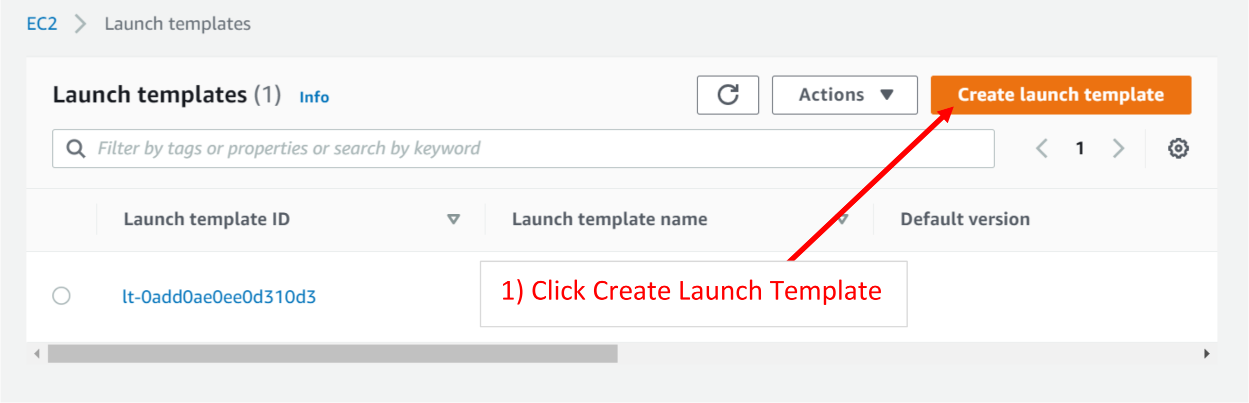
You are using the following Amazon EC2 resources in the US East (N. Virginia) Region:

Instances (running)	0	Dedicated Hosts	0
Elastic IPs	0	Instances	0
Key pairs	4	Load balancers	0
Placement groups	0	Security groups	9
Snapshots	0	Volumes	0

y Microsoft SQL Server Always On availability groups
Wizard for SQL Server. Learn more

1) Click Launch Templates

Create Launch Template

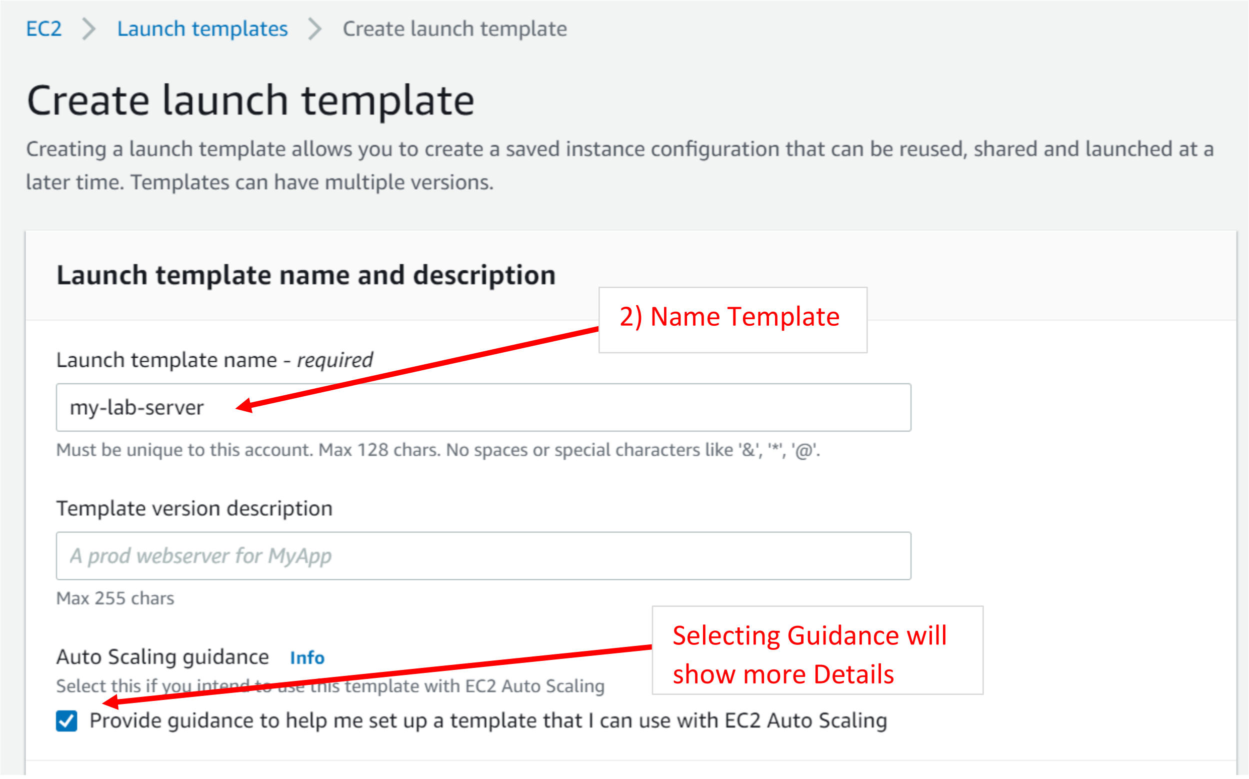


Launch templates (1) Info

	Launch template ID	Launch template name	Default version
○	lt-0add0ae0ee0d310d3		

1) Click Create Launch Template

...



EC2 > Launch templates > Create launch template

Create launch template

Creating a launch template allows you to create a saved instance configuration that can be reused, shared and launched at a later time. Templates can have multiple versions.

Launch template name and description

2) Name Template

Launch template name - *required*

my-lab-server

Must be unique to this account. Max 128 chars. No spaces or special characters like '&', '*', '@'.

Template version description

A prod webserver for MyApp

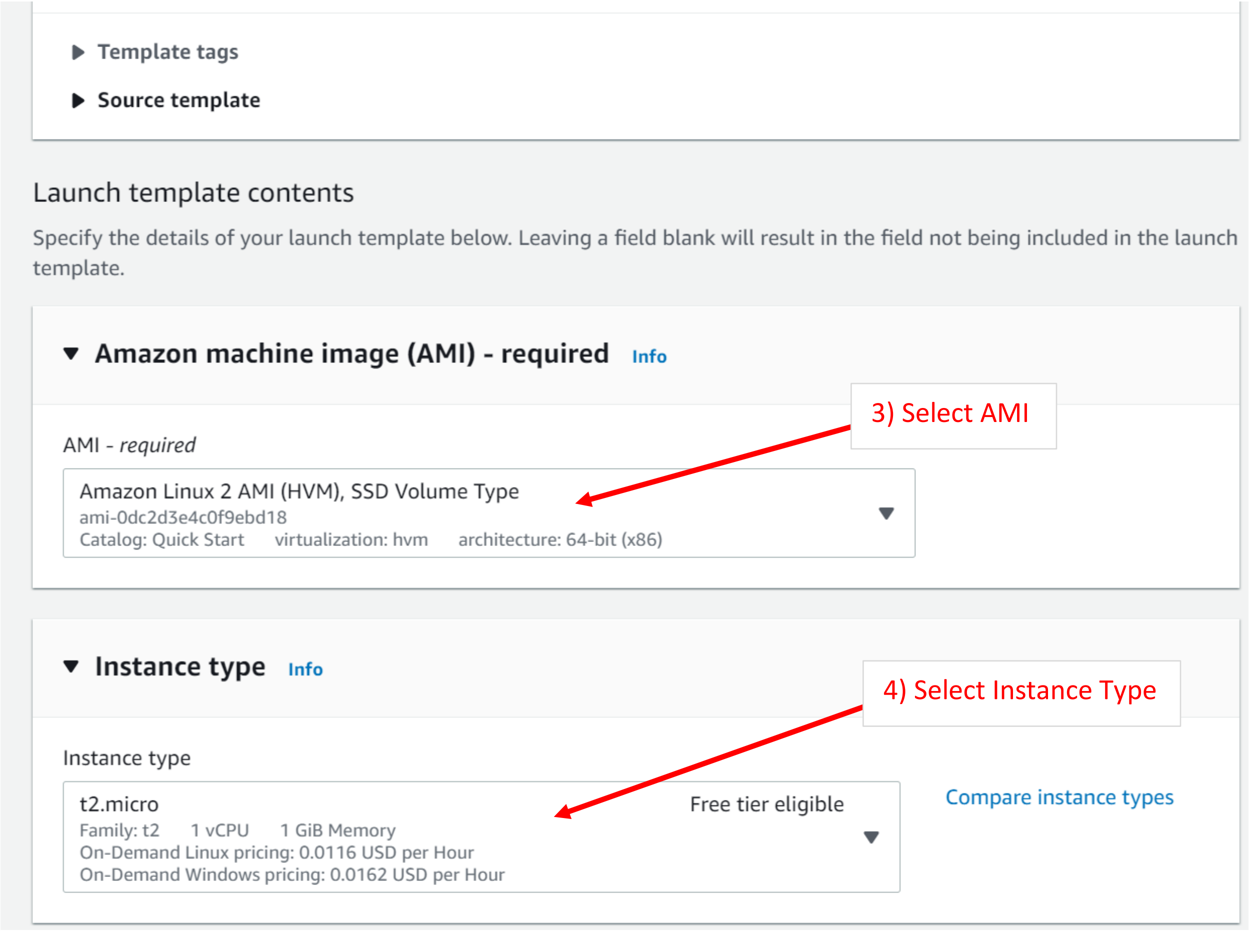
Max 255 chars

Auto Scaling guidance Info

Select this if you intend to use this template with EC2 Auto Scaling

Selecting Guidance will show more Details

☑ Provide guidance to help me set up a template that I can use with EC2 Auto Scaling



▶ **Template tags**

▶ **Source template**

Launch template contents

Specify the details of your launch template below. Leaving a field blank will result in the field not being included in the launch template.

▼ **Amazon machine image (AMI) - required** Info

3) Select AMI

AMI - *required*

Amazon Linux 2 AMI (HVM), SSD Volume Type
ami-0dc2d3e4c0f9ebd18
Catalog: Quick Start virtualization: hvm architecture: 64-bit (x86)

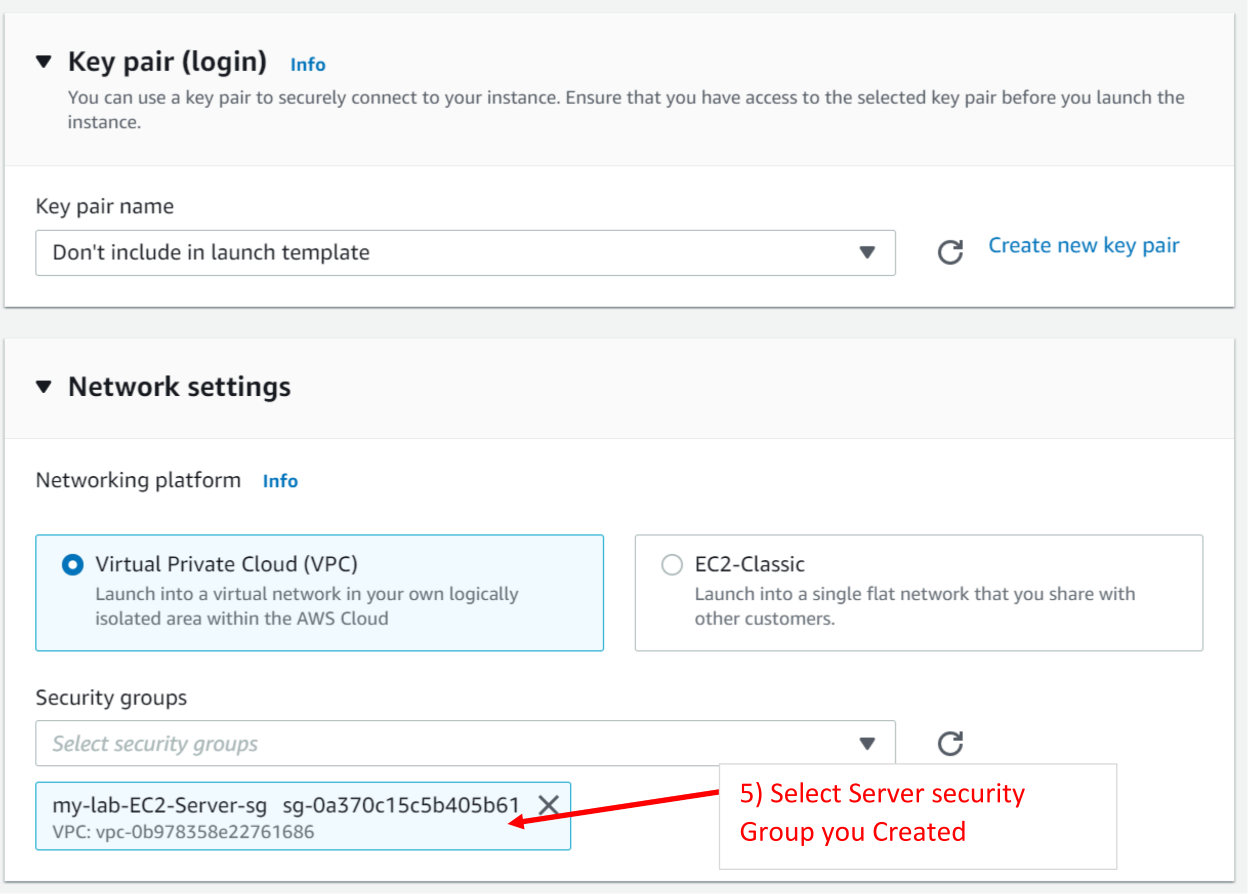
▼ **Instance type** Info

4) Select Instance Type

Instance type

t2.micro Free tier eligible
Family: t2 1 vCPU 1 GiB Memory
On-Demand Linux pricing: 0.0116 USD per Hour
On-Demand Windows pricing: 0.0162 USD per Hour

Compare instance types



▼ **Key pair (login)** Info

You can use a key pair to securely connect to your instance. Ensure that you have access to the selected key pair before you launch the instance.

Key pair name

Don't include in launch template ▼

▼ **Network settings**

Networking platform Info

● Virtual Private Cloud (VPC)
Launch into a virtual network in your own logically isolated area within the AWS Cloud

○ EC2-Classic
Launch into a single flat network that you share with other customers.

Security groups

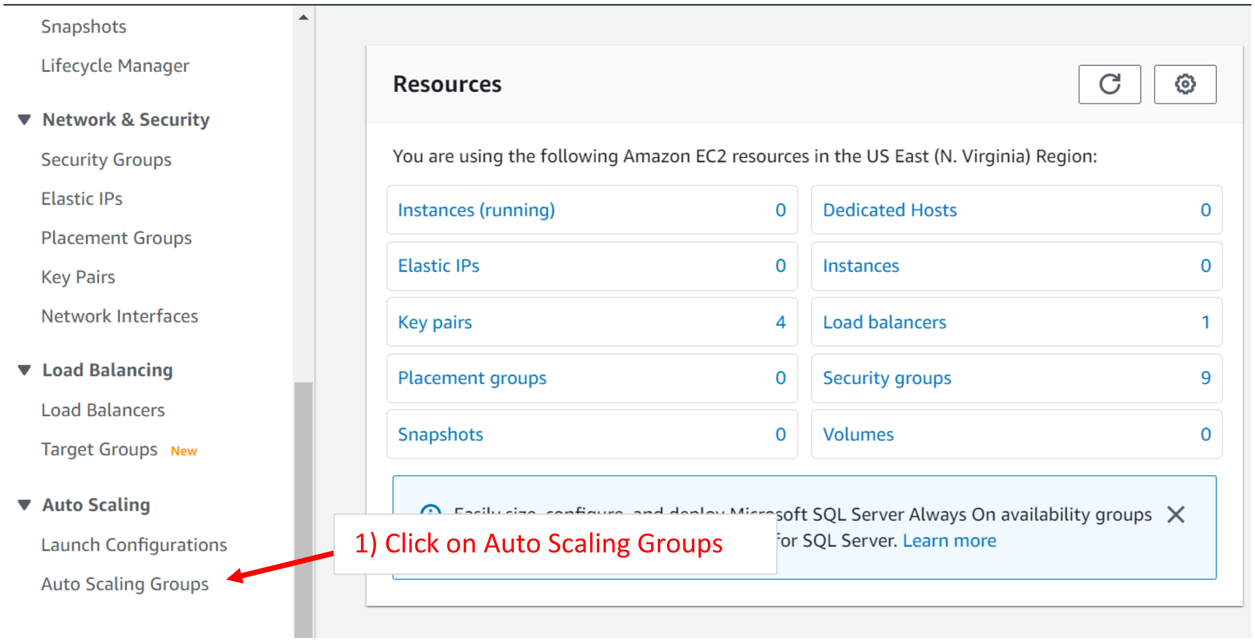
Select security groups ▼

my-lab-EC2-Server-sg sg-0a370c15c5b405b61
VPC: vpc-0b978358e22761686

5) Select Server security Group you Created

Create Auto Scaling Group

Go to Auto Scaling Display from EC2 Display



Resources

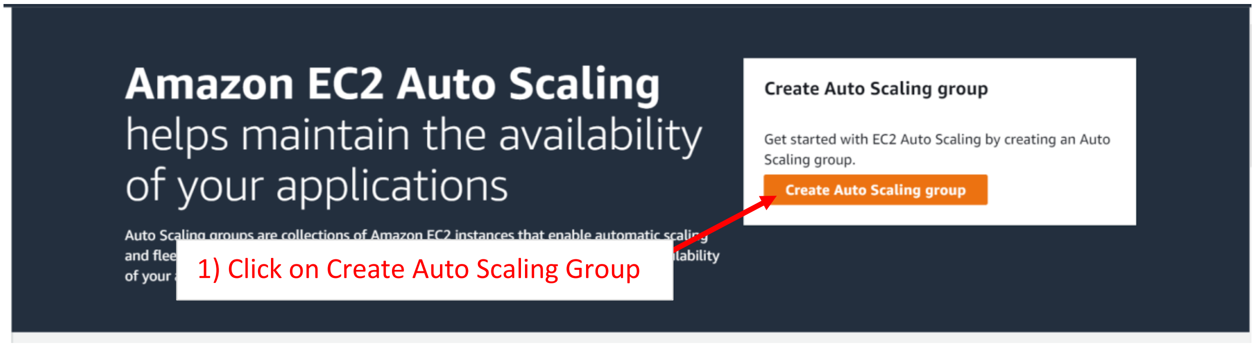
You are using the following Amazon EC2 resources in the US East (N. Virginia) Region:

Instances (running)	0	Dedicated Hosts	0
Elastic IPs	0	Instances	0
Key pairs	4	Load balancers	1
Placement groups	0	Security groups	9
Snapshots	0	Volumes	0

Easily size, configure, and deploy Microsoft SQL Server Always On availability groups ... for SQL Server. Learn more

1) Click on Auto Scaling Groups

Create Auto Scaling Group



Amazon EC2 Auto Scaling helps maintain the availability of your applications

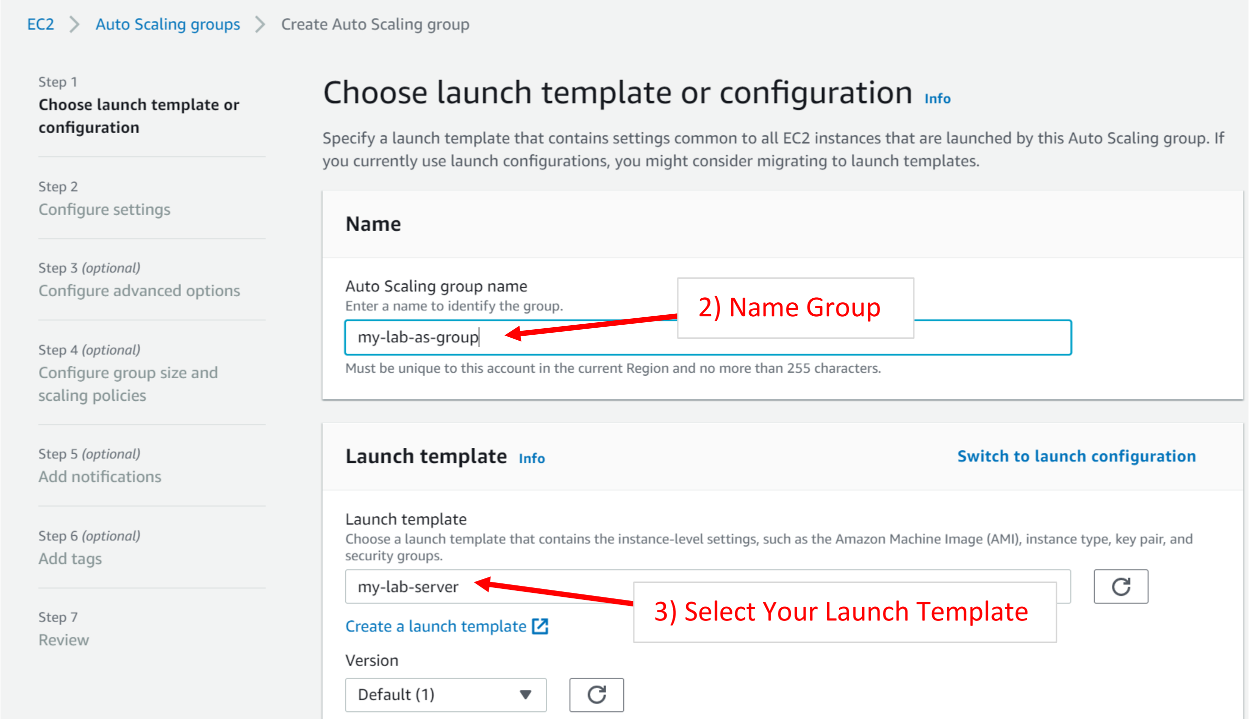
Auto Scaling groups are collections of Amazon EC2 instances that enable automatic scaling and flee ... lability of your ...

Create Auto Scaling group

Get started with EC2 Auto Scaling by creating an Auto Scaling group.

1) Click on Create Auto Scaling Group

...



EC2 > Auto Scaling groups > Create Auto Scaling group

Step 1
Choose launch template or configuration

Step 2
Configure settings

Step 3 *(optional)*
Configure advanced options

Step 4 *(optional)*
Configure group size and scaling policies

Step 5 *(optional)*
Add notifications

Step 6 *(optional)*
Add tags

Step 7
Review

Choose launch template or configuration Info

Specify a launch template that contains settings common to all EC2 instances that are launched by this Auto Scaling group. If you currently use launch configurations, you might consider migrating to launch templates.

Name

Auto Scaling group name
Enter a name to identify the group.
my-lab-as-group
Must be unique to this account in the current Region and no more than 255 characters.

2) Name Group

Launch template Info

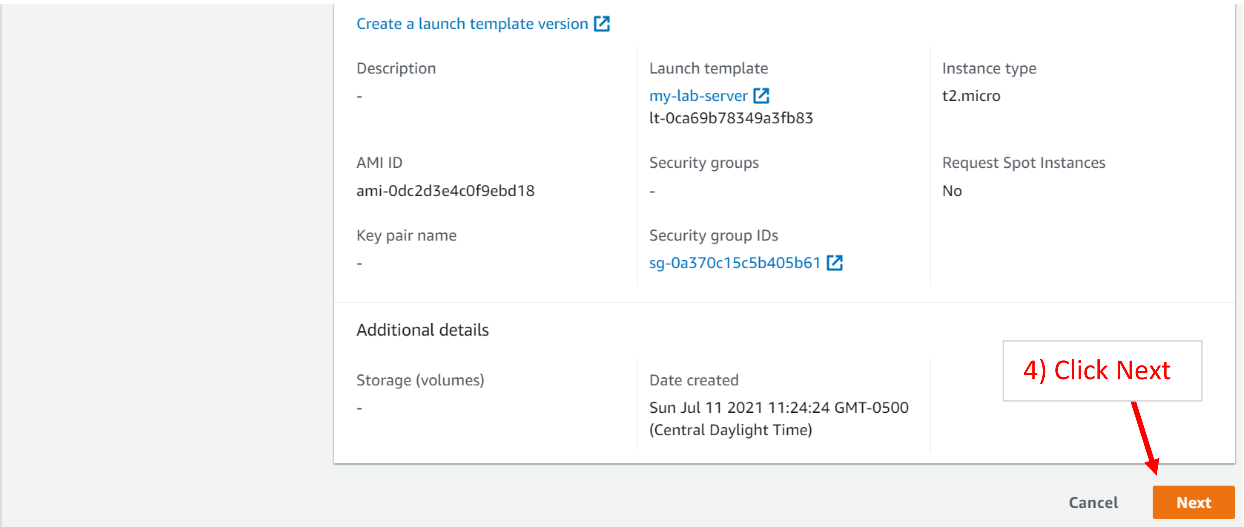
Switch to launch configuration

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-lab-server

3) Select Your Launch Template

Create a launch template

Version
Default (1) ▼



Create a launch template version

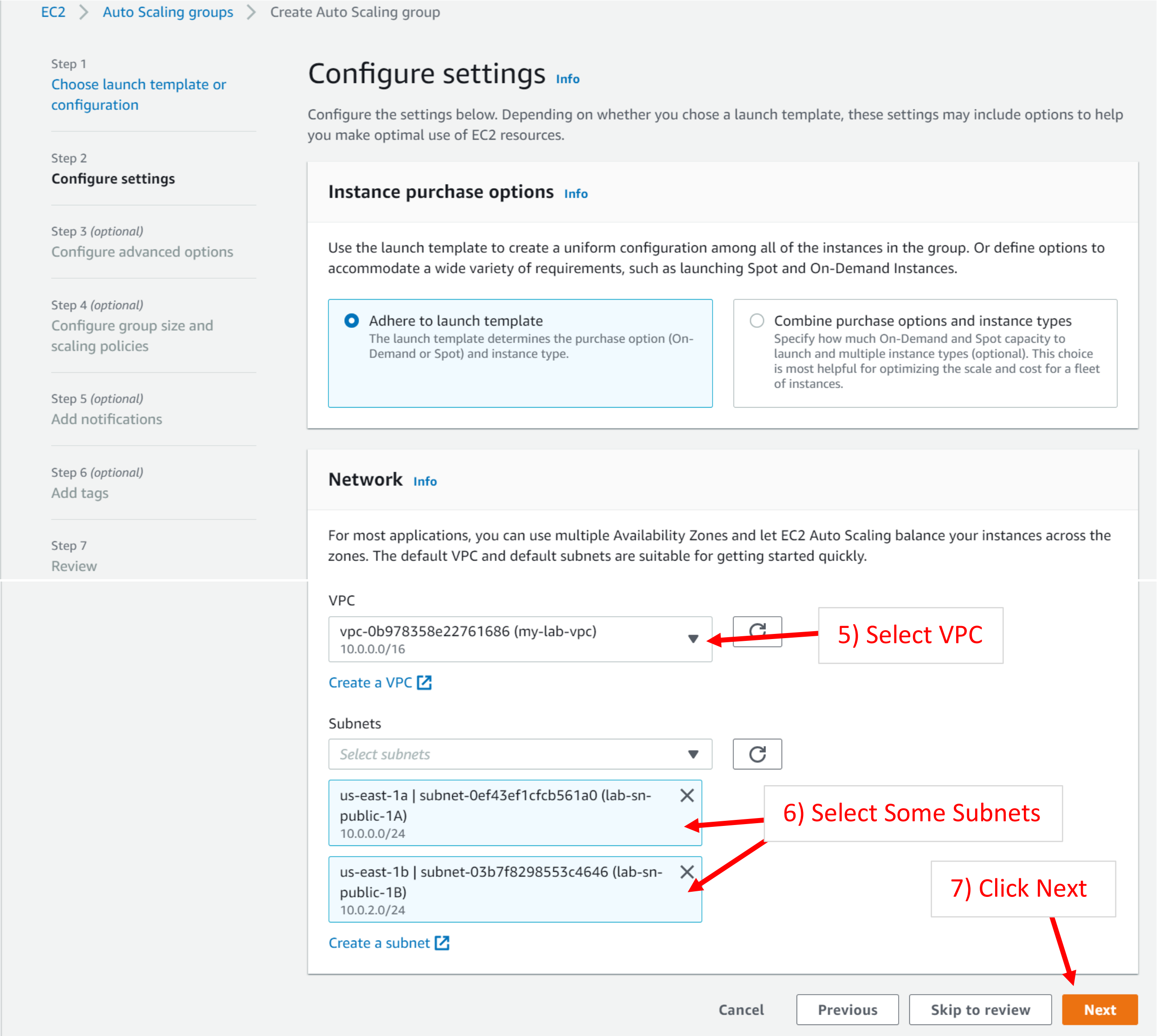
Description	Launch template	Instance type
-	my-lab-server lt-0ca69b78349a3fb83	t2.micro
AMI ID	Security groups	Request Spot Instances
ami-0dc2d3e4c0f9ebd18	-	No
Key pair name	Security group IDs	
-	sg-0a370c15c5b405b61	

Additional details

Storage (volumes)	Date created
-	Sun Jul 11 2021 11:24:24 GMT-0500 (Central Daylight Time)

4) Click Next

...



EC2 > Auto Scaling groups > Create Auto Scaling group

Step 1
Choose launch template or configuration

Step 2
Configure settings

Step 3 *(optional)*
Configure advanced options

Step 4 *(optional)*
Configure group size and scaling policies

Step 5 *(optional)*
Add notifications

Step 6 *(optional)*
Add tags

Step 7
Review

Configure settings Info

Configure the settings below. Depending on whether you chose a launch template, these settings may include options to help you make optimal use of EC2 resources.

Instance purchase options Info

Use the launch template to create a uniform configuration among all of the instances in the group. Or define options to accommodate a wide variety of requirements, such as launching Spot and On-Demand Instances.

● Adhere to launch template
The launch template determines the purchase option (On-Demand or Spot) and instance type.

○ Combine purchase options and instance types
Specify how much On-Demand and Spot capacity to launch and multiple instance types (optional). This choice is most helpful for optimizing the scale and cost for a fleet of instances.

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
vpc-0b978358e22761686 (my-lab-vpc)
10.0.0.0/16

5) Select VPC

Create a VPC

Subnets
Select subnets

us-east-1a | subnet-0ef43ef1cfcb561a0 (lab-sn-public-1A)
10.0.0.0/24

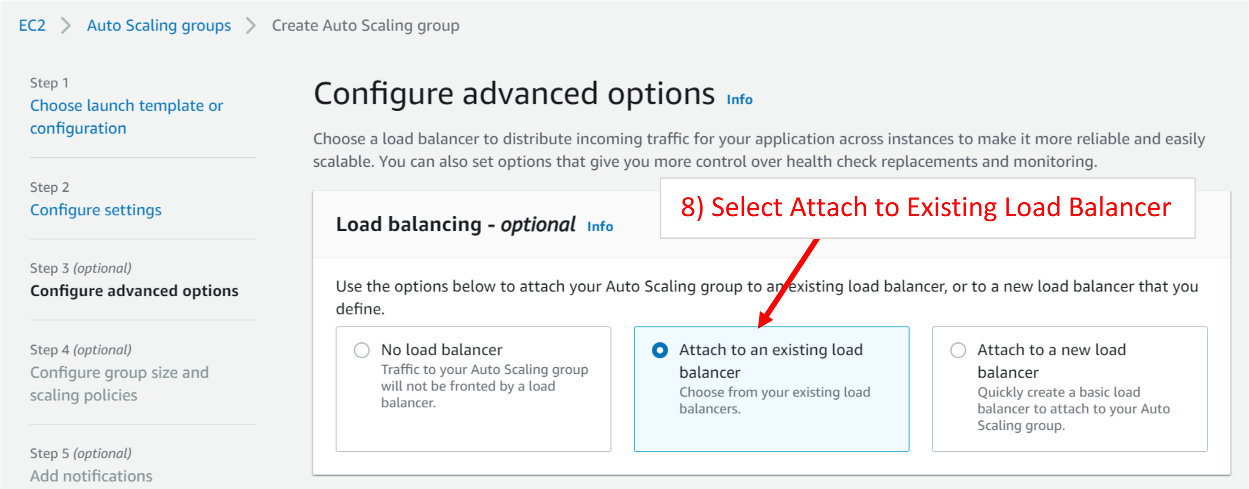
us-east-1b | subnet-03b7f8298553c4646 (lab-sn-public-1B)
10.0.2.0/24

6) Select Some Subnets

7) Click Next

Create a subnet

…



EC2 > Auto Scaling groups > Create Auto Scaling group

Step 1
Choose launch template or configuration

Step 2
Configure settings

Step 3 *(optional)*
Configure advanced options

Step 4 *(optional)*
Configure group size and scaling policies

Step 5 *(optional)*
Add notifications

Configure advanced options Info

Choose a load balancer to distribute incoming traffic for your application across instances to make it more reliable and easily scalable. You can also set options that give you more control over health check replacements and monitoring.

Load balancing - *optional* Info

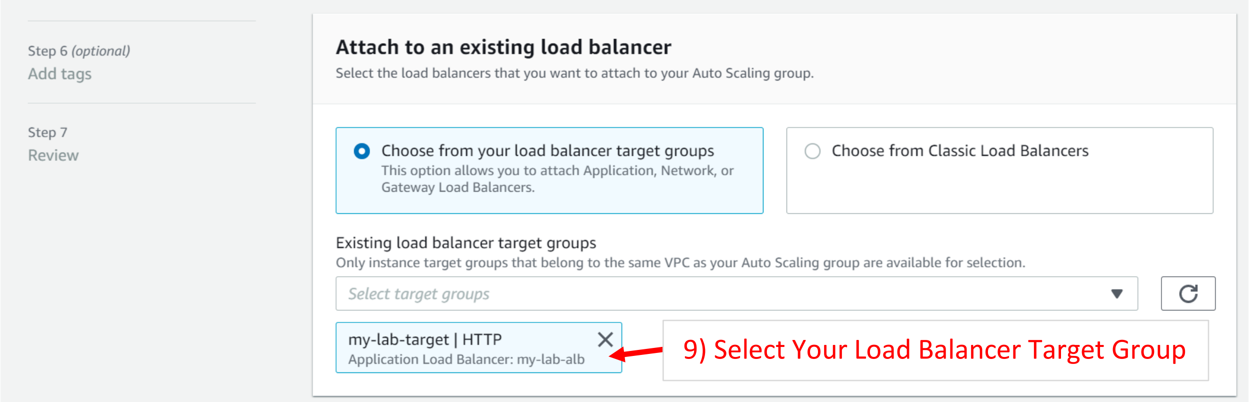
8) Select Attach to Existing Load Balancer

Use the options below to attach your Auto Scaling group to an existing load balancer, or to a new load balancer that you define.

○ No load balancer
Traffic to your Auto Scaling group will not be fronted by a load balancer.

● Attach to an existing load balancer
Choose from your existing load balancers.

○ Attach to a new load balancer
Quickly create a basic load balancer to attach to your Auto Scaling group.



Step 6 *(optional)*
Add tags

Step 7
Review

Attach to an existing load balancer

Select the load balancers that you want to attach to your Auto Scaling group.

● Choose from your load balancer target groups
This option allows you to attach Application, Network, or Gateway Load Balancers.

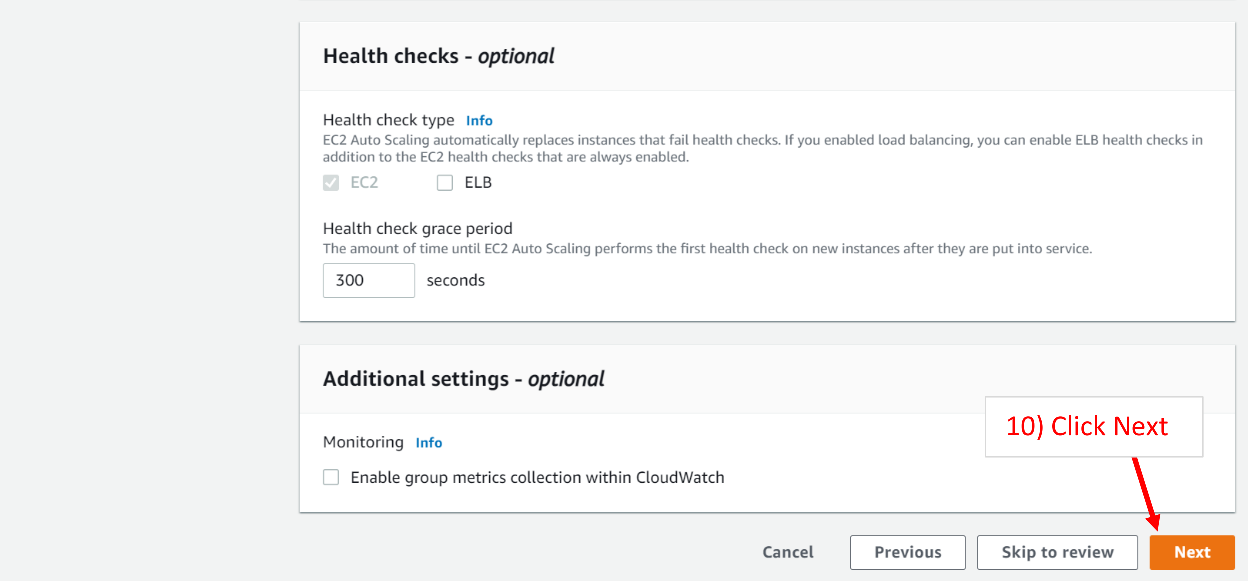
○ Choose from Classic Load Balancers

Existing load balancer target groups
Only instance target groups that belong to the same VPC as your Auto Scaling group are available for selection.

Select target groups ▼

my-lab-target | HTTP ✕
Application Load Balancer: my-lab-alb

9) Select Your Load Balancer Target Group



Health checks - *optional*

Health check type Info
EC2 Auto Scaling automatically replaces instances that fail health checks. If you enabled load balancing, you can enable ELB health checks in addition to the EC2 health checks that are always enabled.

☑ EC2 □ ELB

Health check grace period
The amount of time until EC2 Auto Scaling performs the first health check on new instances after they are put into service.

300 seconds

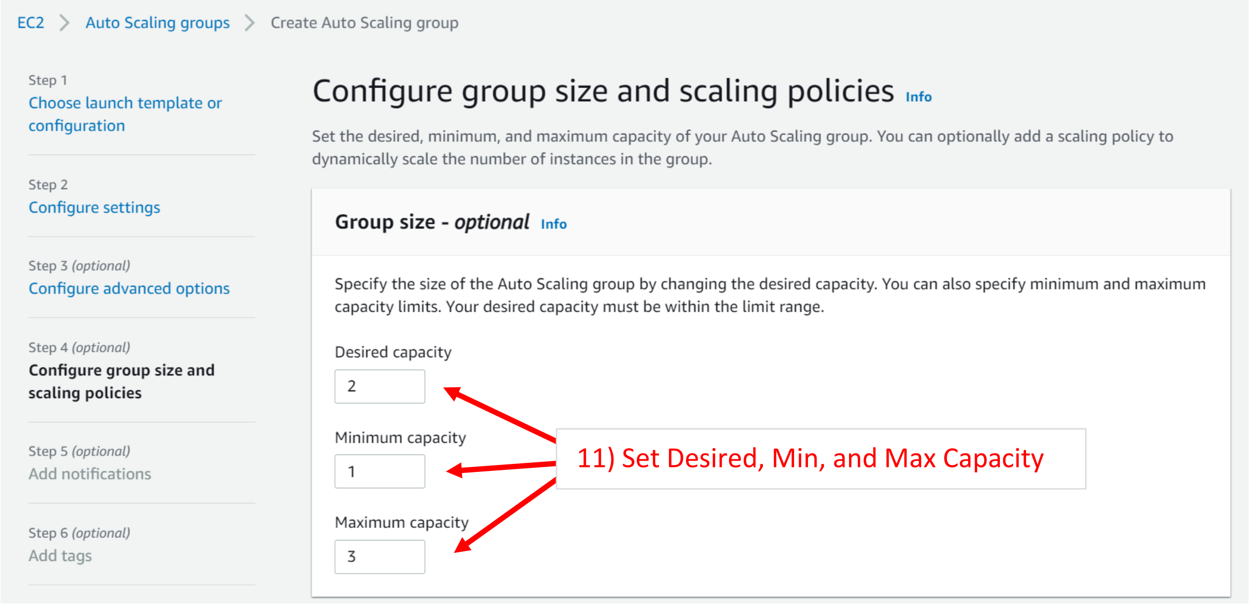
Additional settings - *optional*

10) Click Next

Monitoring Info

□ Enable group metrics collection within CloudWatch

...



EC2 > Auto Scaling groups > Create Auto Scaling group

Step 1
Choose launch template or configuration
Step 2
Configure settings
Step 3 (optional)
Configure advanced options
Step 4 (optional)
Configure group size and scaling policies
Step 5 (optional)
Add notifications
Step 6 (optional)
Add tags

Configure group size and scaling policies Info

Set the desired, minimum, and maximum capacity of your Auto Scaling group. You can optionally add a scaling policy to dynamically scale the number of instances in the group.

Group size - *optional* Info

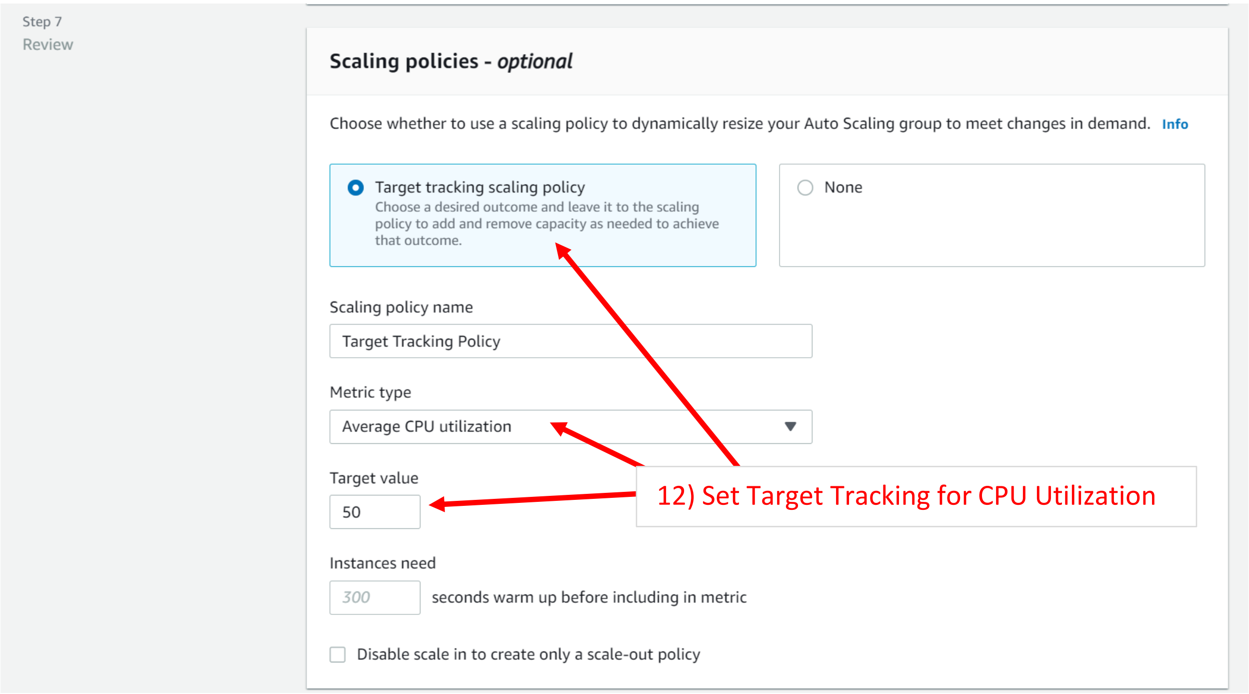
Specify the size of the Auto Scaling group by changing the desired capacity. You can also specify minimum and maximum capacity limits. Your desired capacity must be within the limit range.

Desired capacity: 2

Minimum capacity: 1

Maximum capacity: 3

11) Set Desired, Min, and Max Capacity



Scaling policies - *optional*

Choose whether to use a scaling policy to dynamically resize your Auto Scaling group to meet changes in demand. Info

● Target tracking scaling policy
Choose a desired outcome and leave it to the scaling policy to add and remove capacity as needed to achieve that outcome.

○ None

Scaling policy name: Target Tracking Policy

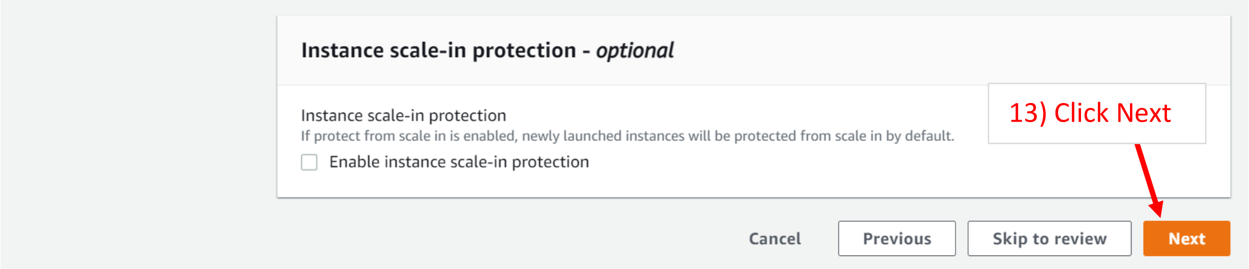
Metric type: Average CPU utilization ▼

Target value: 50

Instances need: 300 seconds warm up before including in metric

□ Disable scale in to create only a scale-out policy

12) Set Target Tracking for CPU Utilization



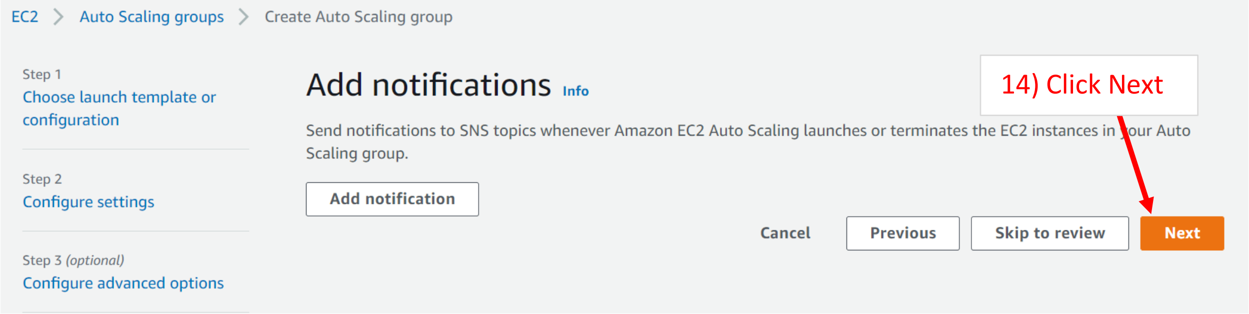
Instance scale-in protection - *optional*

Instance scale-in protection
If protect from scale in is enabled, newly launched instances will be protected from scale in by default.

□ Enable instance scale-in protection

13) Click Next

...



EC2 > Auto Scaling groups > Create Auto Scaling group

Step 1
Choose launch template or configuration

Step 2
Configure settings

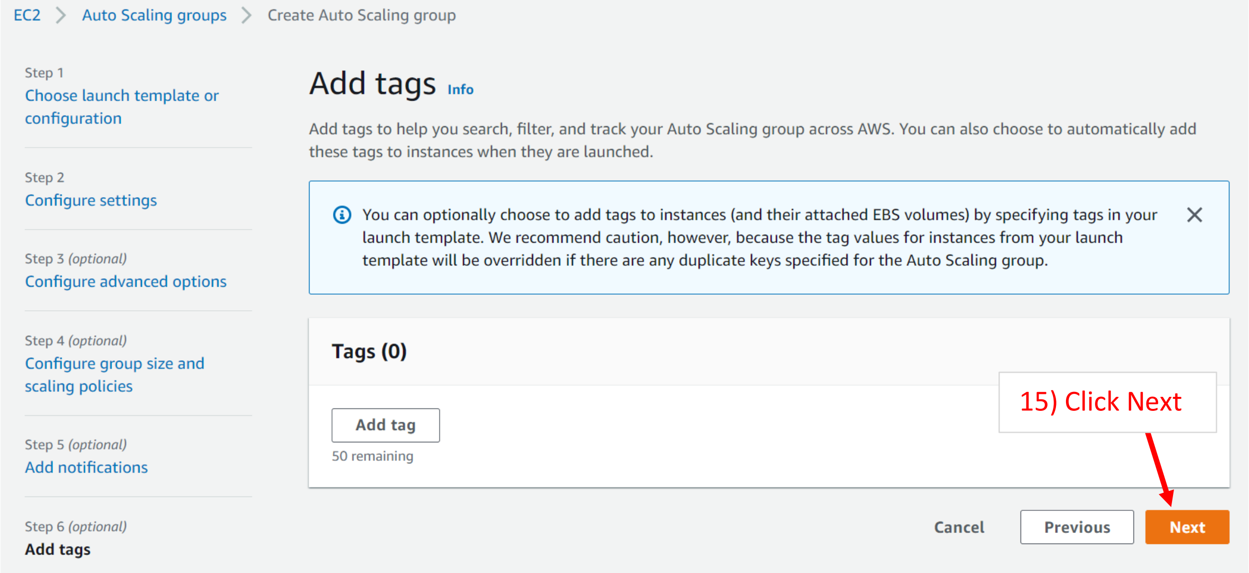
Step 3 *(optional)*
Configure advanced options

Add notifications Info

Send notifications to SNS topics whenever Amazon EC2 Auto Scaling launches or terminates the EC2 instances in your Auto Scaling group.

14) Click Next

...



EC2 > Auto Scaling groups > Create Auto Scaling group

Step 1
Choose launch template or configuration

Step 2
Configure settings

Step 3 *(optional)*
Configure advanced options

Step 4 *(optional)*
Configure group size and scaling policies

Step 5 *(optional)*
Add notifications

Step 6 *(optional)*
Add tags

Add tags Info

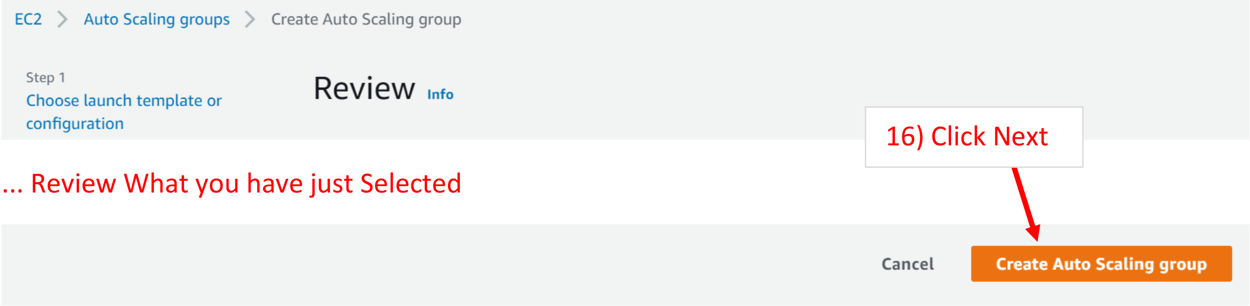
Add tags to help you search, filter, and track your Auto Scaling group across AWS. You can also choose to automatically add these tags to instances when they are launched.

ⓘ You can optionally choose to add tags to instances (and their attached EBS volumes) by specifying tags in your launch template. We recommend caution, however, because the tag values for instances from your launch template will be overridden if there are any duplicate keys specified for the Auto Scaling group.

Tags (0)

15) Click Next

...



EC2 > Auto Scaling groups > Create Auto Scaling group

Step 1
Choose launch template or configuration

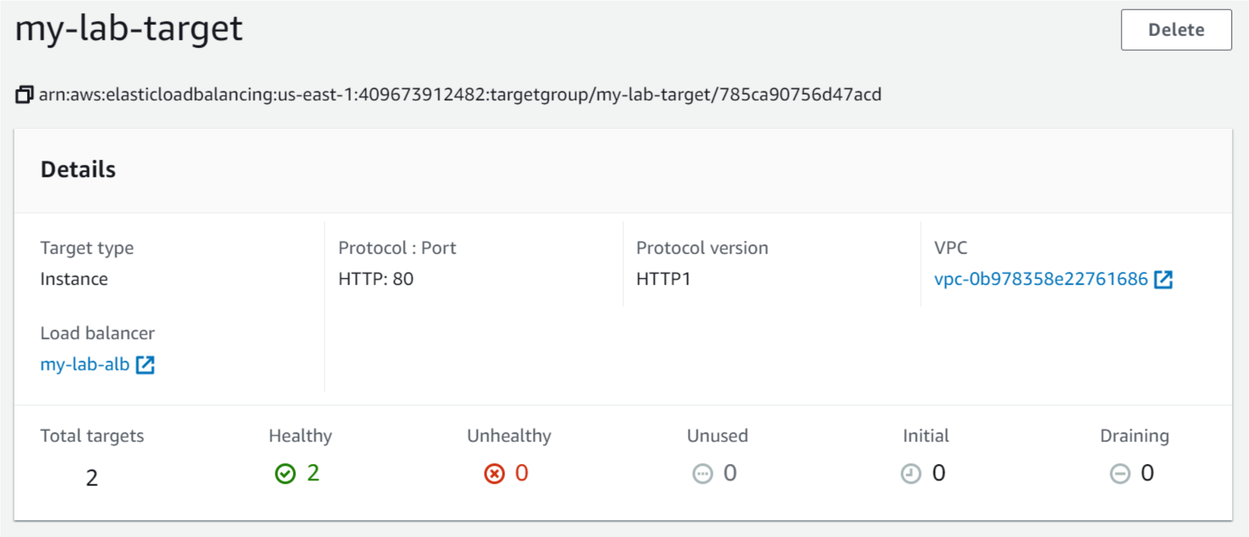
Review Info

16) Click Next

... Review What you have just Selected

Verify and Test the ALB

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



my-lab-target

arn:aws:elasticloadbalancing:us-east-1:409673912482:targetgroup/my-lab-target/785ca90756d47acd

Details

Target type
Instance

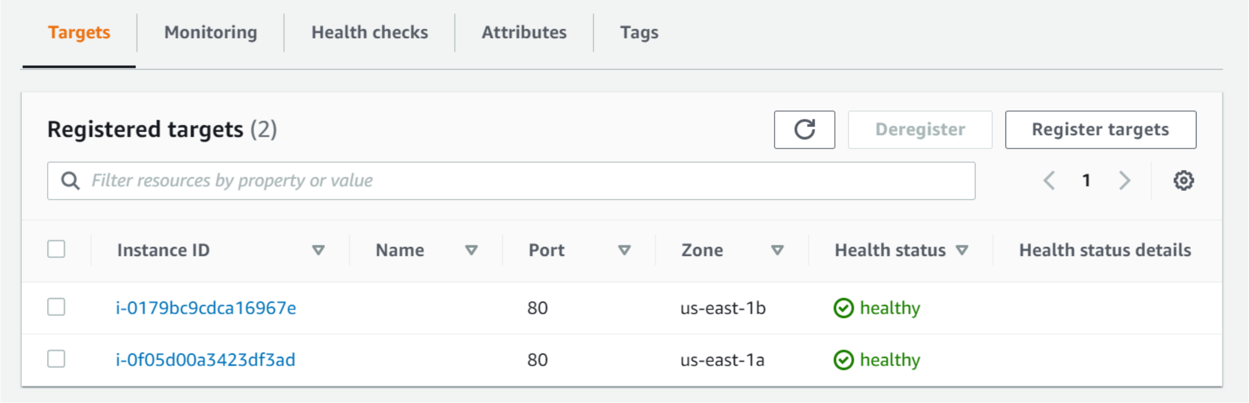
Protocol : Port
HTTP: 80

Protocol version
HTTP1

VPC
vpc-0b978358e22761686

Load balancer
my-lab-alb

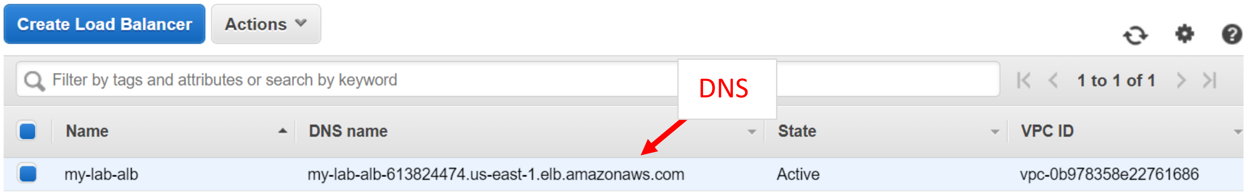
Total targets	Healthy	Unhealthy	Unused	Initial	Draining
2	✓ 2	⊗ 0	0	0	0



Registered targets (2)

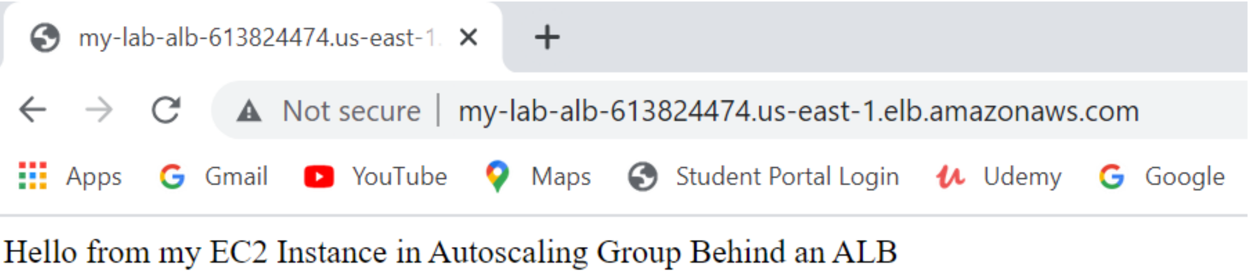
□	Instance ID	Name	Port	Zone	Health status	Health status details
□	i-0179bc9cdca16967e		80	us-east-1b	✓ healthy	
□	i-0f05d00a3423df3ad		80	us-east-1a	✓ healthy	

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



Name	DNS name	State	VPC ID
my-lab-alb	my-lab-alb-613824474.us-east-1.elb.amazonaws.com	Active	vpc-0b978358e22761686

Test DNS with Web Browser


my-lab-alb-613824474.us-east-1
Not secure
my-lab-alb-613824474.us-east-1.elb.amazonaws.com
Apps
Gmail
YouTube
Maps
Student Portal Login
Udemy
Google

Hello from my EC2 Instance in Autoscaling Group Behind an ALB

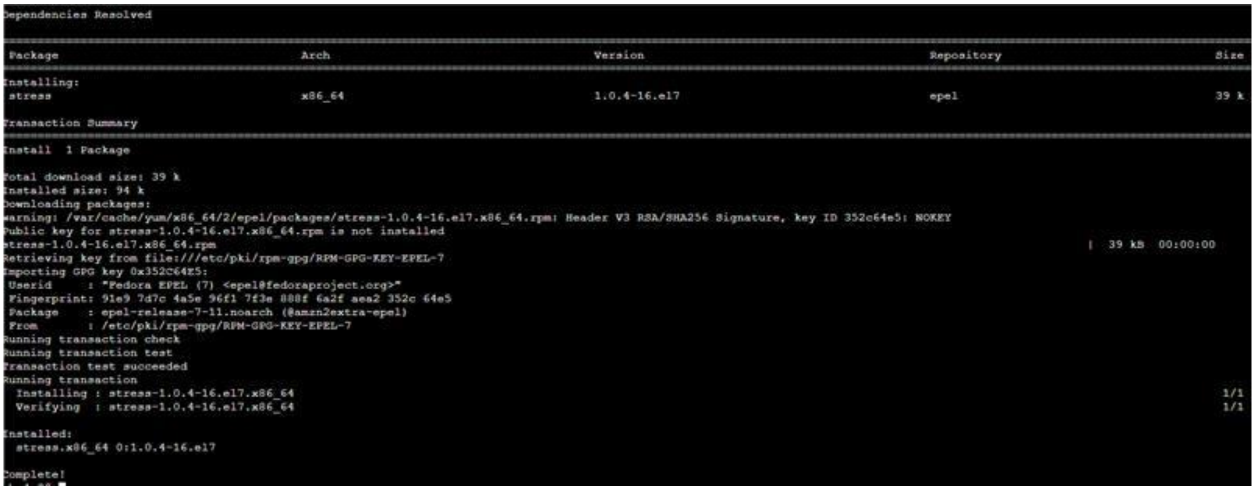
EC2 stress tool

1-select the EC2 instance you want to install the stress tool: we can use the instance we have during the ASG class.

install stress tool using the following commands:

sudo amazon-linux-extras install epel -y

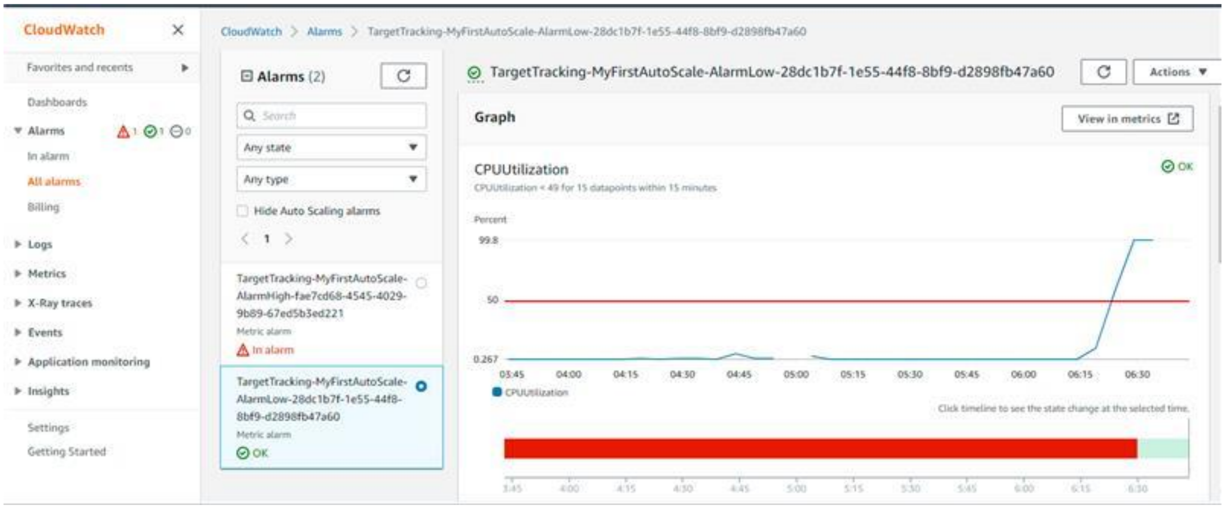
sudo yum install stress -y



```
Dependencies Resolved

================================================================================================================================
 Package                          Arch                          Version                          Repository                Size
================================================================================================================================
Installing:
 stress                           x86_64                        1.0.4-16.el7                     epel                      39 k

Transaction Summary
================================================================================================================================
Install  1 Package

Total download size: 39 k
Installed size: 94 k
Downloading packages:
warning: /var/cache/yum/x86_64/2/epel/packages/stress-1.0.4-16.el7.x86_64.rpm: Header V3 RSA/SHA256 Signature, key ID 352c64e5: NOKEY
Public key for stress-1.0.4-16.el7.x86_64.rpm is not installed
stress-1.0.4-16.el7.x86_64.rpm                                                                              |  39 kB  00:00:00
Retrieving key from file:///etc/pki/rpm-gpg/RPM-GPG-KEY-EPEL-7
Importing GPG key 0x352C64E5:
 Userid     : "Fedora EPEL (7) <epel@fedoraproject.org>"
 Fingerprint: 91e9 7d7c 4a5e 96f1 7f3e 888f 6a2f aea2 352c 64e5
 Package    : epel-release-7-11.noarch (@amzn2extra-epel)
 From       : /etc/pki/rpm-gpg/RPM-GPG-KEY-EPEL-7
Running transaction check
Running transaction test
Transaction test succeeded
Running transaction
  Installing : stress-1.0.4-16.el7.x86_64                                                                                   1/1
  Verifying  : stress-1.0.4-16.el7.x86_64                                                                                   1/1

Installed:
  stress.x86_64 0:1.0.4-16.el7

Complete!
```

Then to visualize the CPU and memory utilization write the following commands:

```
sudo stress --cpu 8 --vm-bytes $(awk '/MemAvailable/{printf "%d\n", $2 * 0.9;}' < /proc/meminfo)k --vm-keep -m 1
```



CloudWatch > Alarms > TargetTracking-MyFirstAutoScale-AlarmLow-28dc1b7f-1e55-44f8-8bf9-d2898fb47a60

Alarms (2)

TargetTracking-MyFirstAutoScale-AlarmHigh-fae7cd68-4545-4029-9b89-67ed5b3ed221
Metric alarm
In alarm

TargetTracking-MyFirstAutoScale-AlarmLow-28dc1b7f-1e55-44f8-8bf9-d2898fb47a60
Metric alarm
OK

TargetTracking-MyFirstAutoScale-AlarmLow-28dc1b7f-1e55-44f8-8bf9-d2898fb47a60

CPUUtilization
CPUUtilization < 49 for 15 datapoints within 15 minutes
OK

Click timeline to see the state change at the selected time.

–cpu

This will spawn 8 CPU workers spinning on a square root task (sqrt(x))

–vm-bytes

This will use 90% of the available memory from /proc/meminfo

–vm-keep

This will re-dirty memory instead of freeing and reallocating.

-m 1

This will spawn 1 worker spinning on malloc()/free()

As time goes on, it will continue to update the graph. To remove the load, press

CTRL-C to stop the stress script.

Reference: https://www.wellarchitectedlabs.com/performance-efficiency/100_labs/100_monitoring_linux_ec2