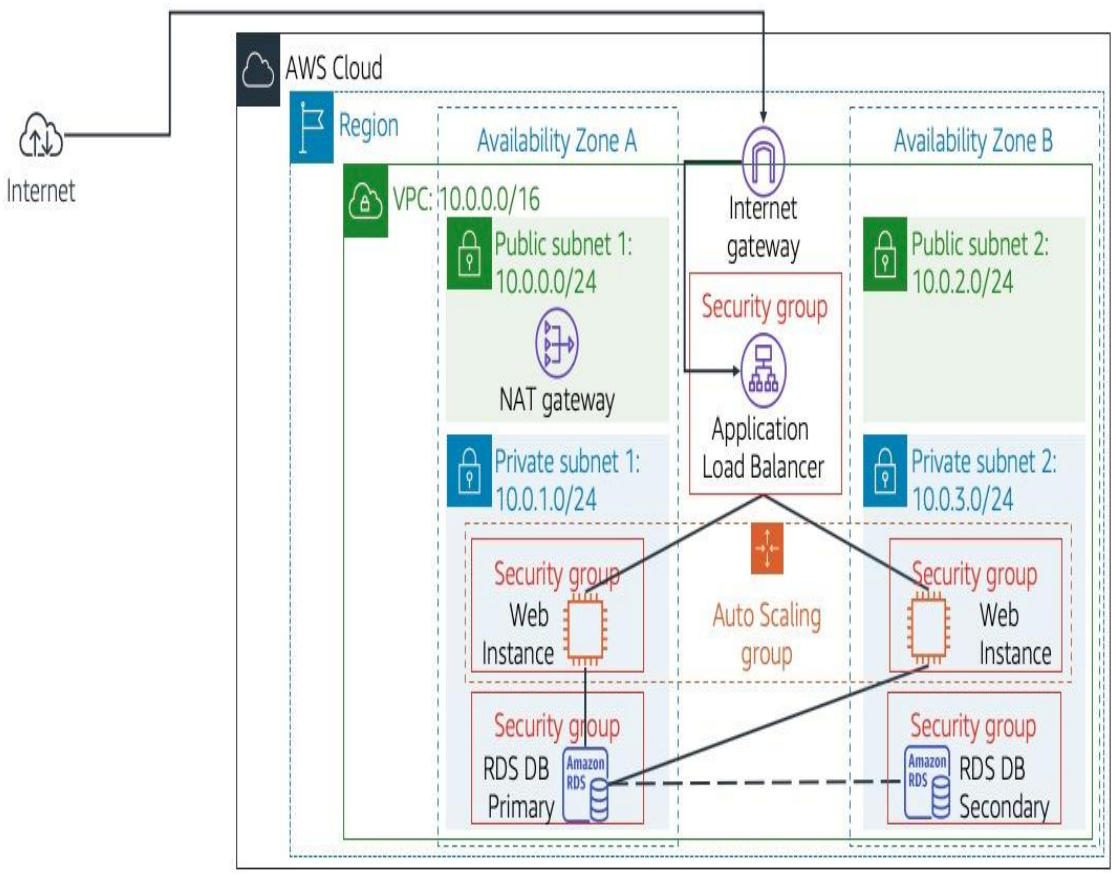
October project

New project launches
In AWS

Hello, my name: Aya Rabih working Dev-ops engineering in multinational lovely company and today we will learn how to Scale and Load Balance to web server Architecture and Multi AZ RDS.

This project it is so critical to lean it and get more info for cloud and AWS.

So, in this documentation you will find all steps you need it to create it with deep details



—

This project contains the following services.

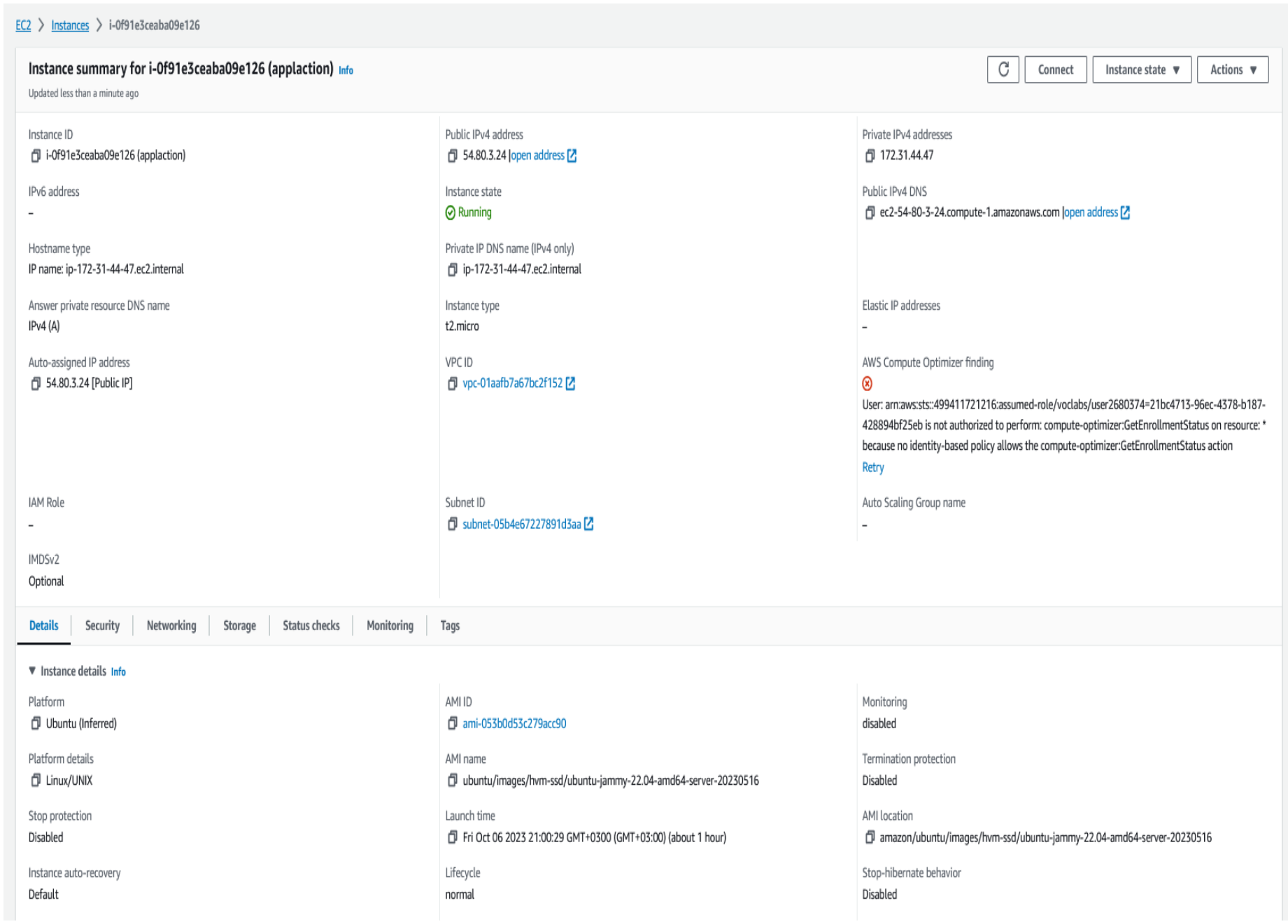
- Create your AWS account or use labs for AWS to also save your money.
- Choose your region you will working it.
- Create your VPC to save your resources in it.
- Create your availability zone to make scale for your resources.
- Create 2 public subnet.
- Create 2 private subnet.
- Attach your internet gateway.
- Create Nat gateway.
- Create load balancing.
- Create autoscaling.
- Create templet.
- Lunch instance
- Lunch RDS my SQL

Create by Aya Rabih

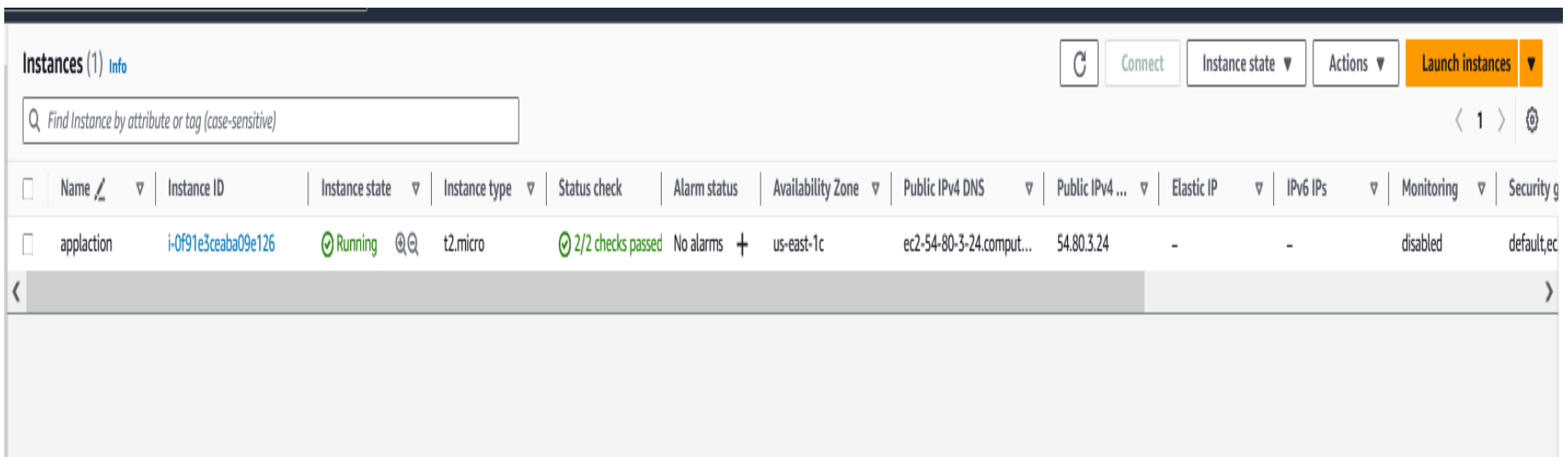
LinkedIn GitHub

Project: build your web app in multi zone RDS with high availability

Create ec2 with name application.



And after launch it will be like that



Now we will create our database RDS MySQL and link ec2 with it

Choose a database creation method Info

- **Standard create**
  You set all of the configuration options, including ones for availability, security, backups, and maintenance.
- **Easy create**
  Use recommended best-practice configurations. Some configuration options can be changed after the database is created.

Engine options

Engine type Info

- Aurora (MySQL Compatible)
- Aurora (PostgreSQL Compatible)
- **MySQL**
- MariaDB
- PostgreSQL
- Oracle
- Microsoft SQL Server

Hide filters

- Show versions that support the Multi-AZ DB cluster Info
  Create a A Multi-AZ DB cluster with one primary DB instance and two readable standby DB instances. Multi-AZ DB clusters provide up to 2x faster transaction commit latency and automatic failover in typically under 35 seconds.
- Show versions that support the Amazon RDS Optimized Writes Info
  Amazon RDS Optimized Writes improves write throughput by up to 2x at no additional cost.

Engine Version

MySQL 8.0.33

Templates

Choose a sample template to meet your use case.

- Production
  Use defaults for high availability and fast, consistent performance.
- **Dev/Test**
  This instance is intended for development use outside of a production environment.
- Free tier
  Use RDS Free Tier to develop new applications, test existing applications, or gain hands-on experience with Amazon RDS. Info

Availability and durability

Deployment options Info

The deployment options below are limited to those supported by the engine you selected above.

- Single DB instance
  Creates a single DB instance with no standby DB instances.
- Multi-AZ DB instance
  Creates a primary DB instance and a standby DB instance in a different AZ. Provides high availability and data redundancy, but the standby DB instance doesn't support connections for read workloads.
- **Multi-AZ DB Cluster - *new***
  Creates a DB cluster with a primary DB instance and two readable standby DB instances, with each DB instance in a different

Settings

DB instance identifier **Info**

Type a name for your DB instance. The name must be unique across all DB instances owned by your AWS account in the current AWS Region.

app-db

The DB instance identifier is case-insensitive, but is stored as all lowercase (as in "mydbinstance"). Constraints: 1 to 60 alphanumeric characters or hyphens. First character must be a letter. Can't contain two consecutive hyphens. Can't end with a hyphen.

▼ **Credentials Settings**

Master username **Info**

Type a login ID for the master user of your DB instance.

admin

1 to 16 alphanumeric characters. The first character must be a letter.

☐ Manage master credentials in AWS Secrets Manager

Manage master user credentials in Secrets Manager. RDS can generate a password for you and manage it throughout its lifecycle.

ⓘ If you manage the master user credentials in Secrets Manager, some RDS features aren't supported.
Learn more

☐ Auto generate a password

Amazon RDS can generate a password for you, or you can specify your own password.

Master password **Info**

••••••••••

Constraints: At least 8 printable ASCII characters. Can't contain any of the following: / (slash), '(single quote), "(double quote) and @ (at sign).

Confirm master password **Info**

••••••••••

DB instance class **Info**

○ Standard classes (includes m classes)

○ Memory optimized classes (includes r and x classes)

◉ Burstable classes (includes t classes)

db.t3.micro
2 vCPUs 1 GiB RAM Network: 2,085 Mbps

◯ Include previous generation classes

Storage

Storage type **Info**

General Purpose SSD (gp2)
Baseline performance determined by volume size

Allocated storage **Info**

20 GiB

The minimum value is 20 GiB and the maximum value is 6,144 GiB

ⓘ Provisioning less than 100 GiB of General Purpose (SSD) storage for high throughput workloads could result in higher latencies upon exhaustion of the initial General Purpose (SSD) IO credit balance. Learn more

ⓘ After you modify the storage for a DB instance, the status of the DB instance will be in storage-optimization. Your instance will remain available as the storage-optimization operation completes.

Compute resource

Choose whether to set up a connection to a compute resource for this database. Setting up a connection will automatically change connectivity settings so that the compute resource can connect to this database.

- (●) Don't connect to an EC2 compute resource
  Don't set up a connection to a compute resource for this database. You can manually set up a connection to a compute resource later.
- ( ) Connect to an EC2 compute resource
  Set up a connection to an EC2 compute resource for this database.

Virtual private cloud (VPC) Info

Choose the VPC. The VPC defines the virtual networking environment for this DB instance.

app-vpc (vpc-0b99cf48dedf48e03)
1 Subnets, 1 Availability Zones

Only VPCs with a corresponding DB subnet group are listed.

After a database is created, you can't change its VPC.

DB subnet group Info

Choose the DB subnet group. The DB subnet group defines which subnets and IP ranges the DB instance can use in the VPC that you selected.

Create new DB Subnet Group

Public access Info

- ( ) Yes
  RDS assigns a public IP address to the database. Amazon EC2 instances and other resources outside of the VPC can connect to your database. Resources inside the VPC can also connect to the database. Choose one or more VPC security groups that specify which resources can connect to the database.
- (●) No
  RDS doesn't assign a public IP address to the database. Only Amazon EC2 instances and other resources inside the VPC can connect to your database. Choose one or more VPC security groups that specify which resources can connect to the database.

VPC security group (firewall) Info

Choose one or more VPC security groups to allow access to your database. Make sure that the security group rules allow the appropriate incoming traffic.

- (●) Choose existing
  Choose existing VPC security groups
- ( ) Create new
  Create new VPC security group

Database authentication options Info

- (●) Password authentication
  Authenticates using database passwords.
- ( ) Password and IAM database authentication
  Authenticates using the database password and user credentials through AWS IAM users and roles.
- ( ) Password and Kerberos authentication
  Choose a directory in which you want to allow authorized users to authenticate with this DB instance using Kerberos Authentication.

Monitoring

Monitoring

- [ ] Enable Enhanced monitoring
  Enabling Enhanced monitoring metrics are useful when you want to see how different processes or threads use the CPU.

Additional configuration

Database options, encryption turned on, backup turned off, backtrack turned off, maintenance, CloudWatch Logs, delete protection turned off.

Database options

Initial database name Info

app

If you do not specify a database name, Amazon RDS does not create a database.

DB parameter group Info

default.mysql8.0

(default) aws/rds

Account
038601000160

KMS key ID
ee7c47e8-e75c-4a39-91fa-cde3b347db93

Log exports

Select the log types to publish to Amazon CloudWatch Logs

- [ ] Audit log
- [ ] Error log
- [ ] General log
- [ ] Slow query log

IAM role
The following service-linked role is used for publishing logs to CloudWatch Logs.

RDS service-linked role

Maintenance

Auto minor version upgrade **Info**

- [ ] Enable auto minor version upgrade
  Enabling auto minor version upgrade will automatically upgrade to new minor versions as they are released. The automatic upgrades occur during the maintenance window for the database.

Maintenance window **Info**
Select the period you want pending modifications or maintenance applied to the database by Amazon RDS.

- ○ Choose a window
- ◉ No preference

Deletion protection

- [ ] Enable deletion protection
  Protects the database from being deleted accidentally. While this option is enabled, you can't delete the database.

You are responsible for ensuring that you have all of the necessary rights for any third-party products or services that you use with AWS services.

Cancel **Create database**

RDS > Databases > Set up EC2 connection

Step 1
Set up EC2 connection

Step 2
Review and confirm

Set up EC2 connection Info

Select EC2 instance

Database
app

EC2 instance
Choose the EC2 instance to connect to this database. Only EC2 instances in the same VPC as the database are shown. If no EC2 instances in the same VPC are available, you can create a new EC2 instance.

i-090b1128083574fee
applcation us-east-1c

Create EC2 instance

Cancel **Continue**

Connected compute resources (0) Info

Actions

Connections to compute resources that were created automatically by RDS are shown here. Connections to compute resources that were created manually aren't shown.

Filter by compute resources

1

Resource identifier	Resource type	Availability Zone	VPC security group	Compute resource security group	Connected proxy

No connected compute resources

No connected compute resources that were created automatically to display.

Set up EC2 connection | Set up Lambda connection

Connection summary Info

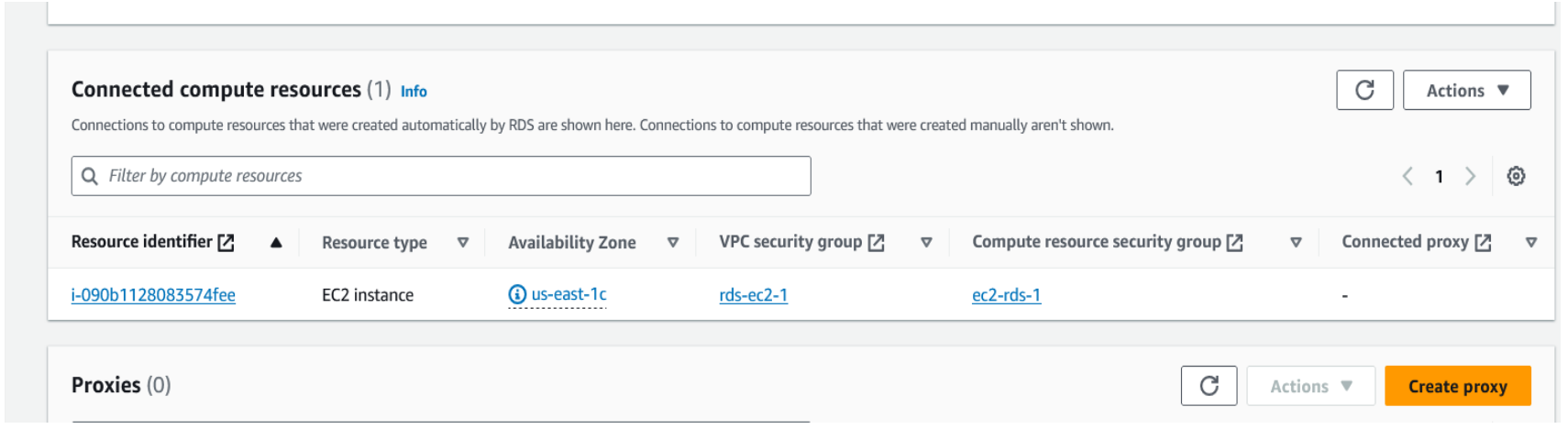
You are setting up a connection between RDS database app and EC2 instance i-090b1128083574fee.

To set up a connection between the database and the EC2 instance, VPC security group *rds-ec2-1* is added to the database, and VPC security group *ec2-rds-1* is added to the EC2 instance.

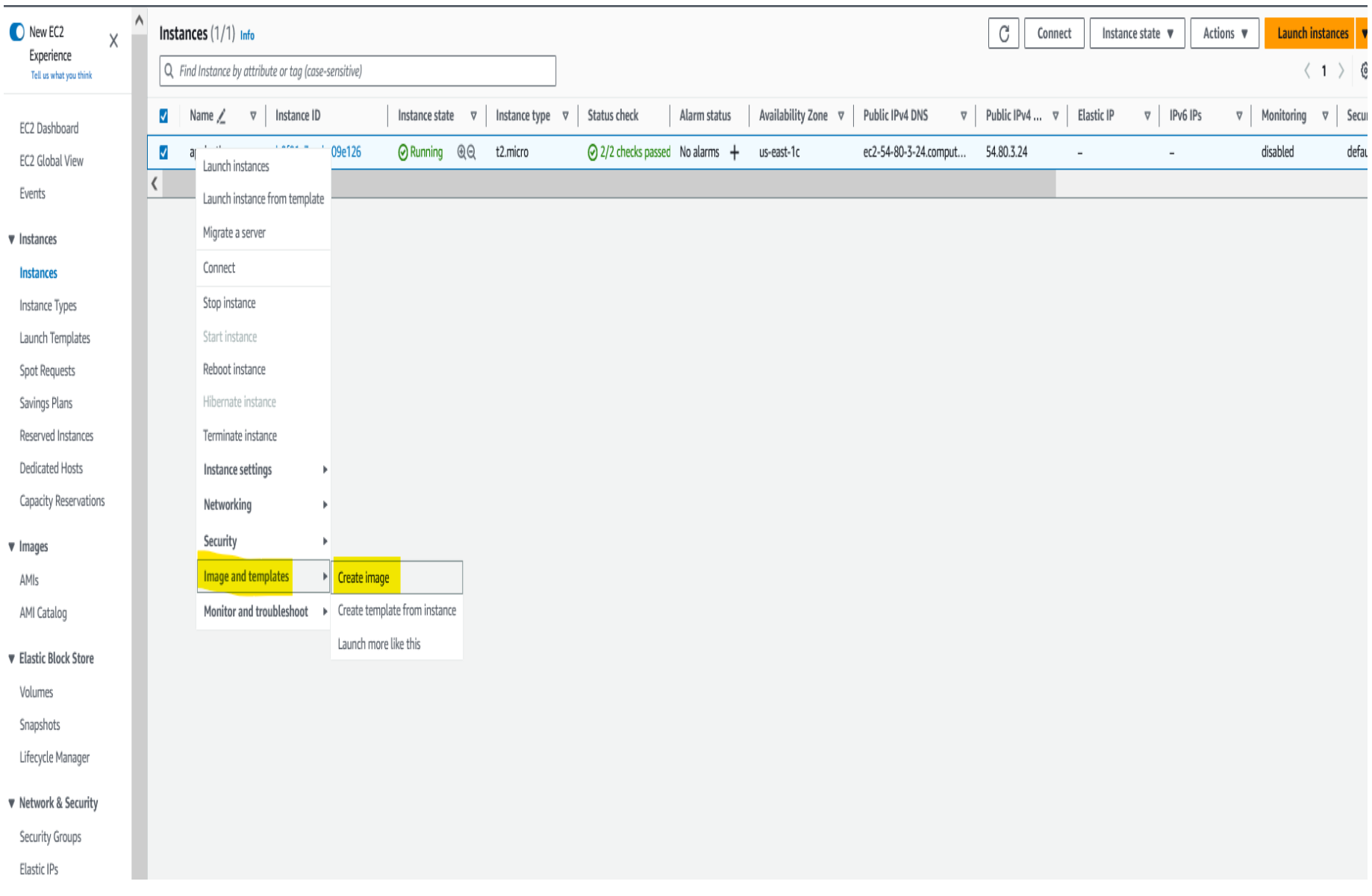
Bold indicates an addition being made to set up a connection.

Changes to RDS database: app

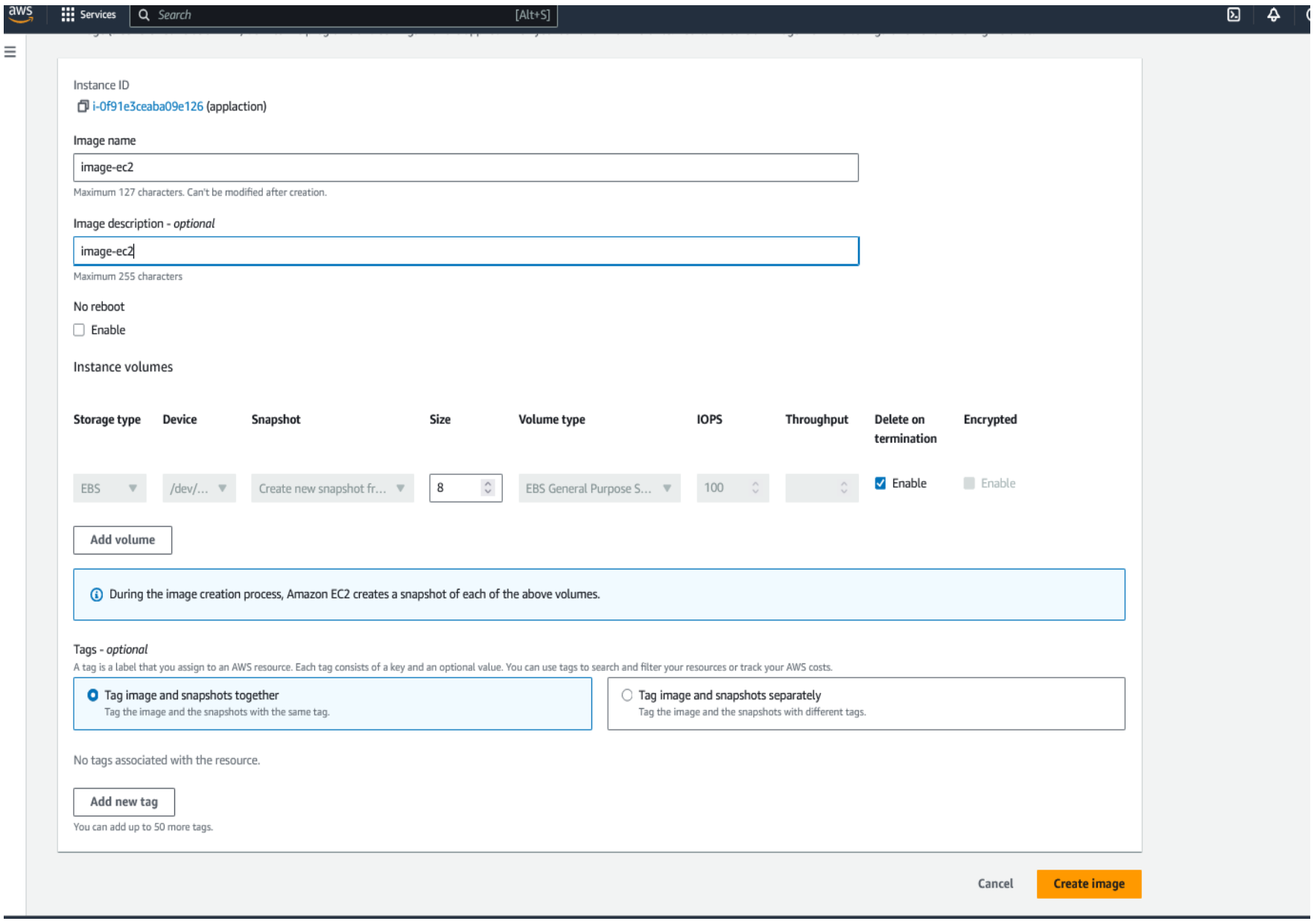
Attribute	Current value	New value
Security group	default	default, **rds-ec2-1**



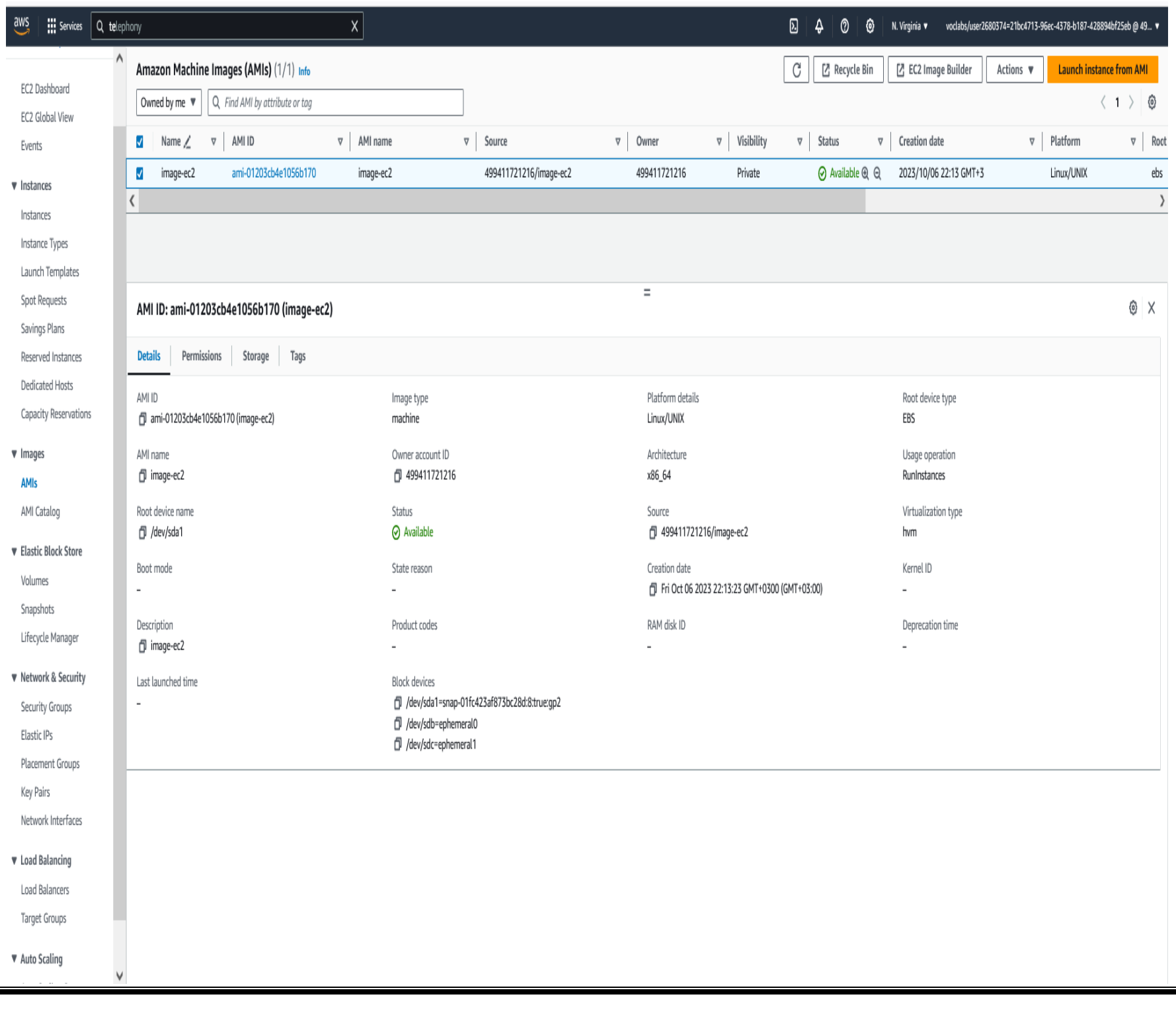
Now we will create image form our ec2 instance



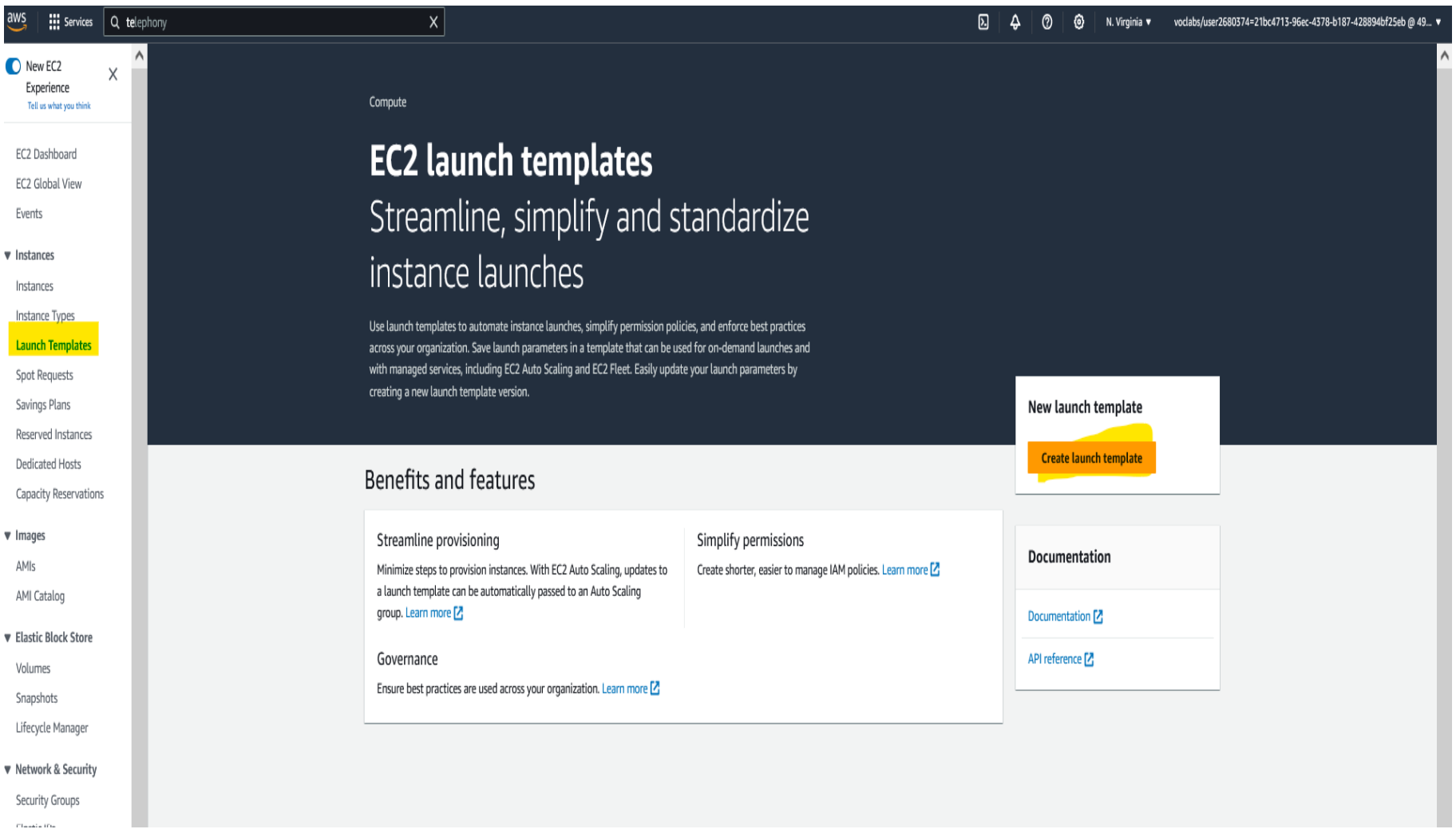
And this steps to create image



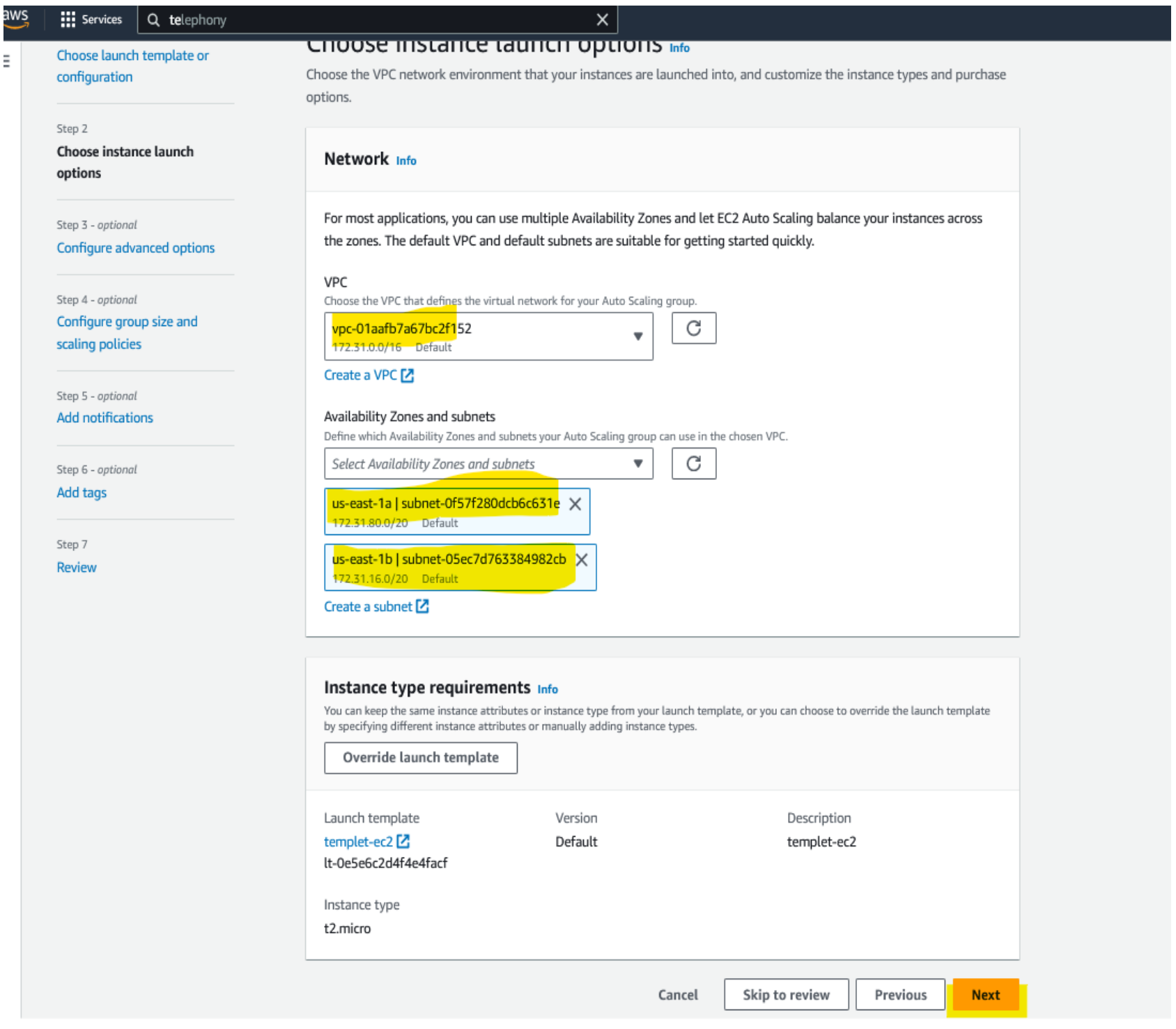
And after create it will be like that



And now we will create templet from our image



And this steps to create our templet



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

Launch template name - *required*

templet-ec2

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

Template version description

templet-ec2

Max 255 chars

Auto Scaling guidance Info

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

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

▼ Template tags

Key Info	Value Info	
Name	templet-ec2	Remove tag

Add new tag

You can add up to 49 more tags.

▶ Source template

▼ Summary

Software Image (AMI)
Canonical, Ubuntu, 22.04 LTS, ...read more
ami-053b0d53c279acc90

Virtual server type (instance type)
t2.micro

Firewall (security group)
rds-ec2-1

Storage (volumes)
1 volume(s) - 8 GiB

Free tier: In your first year includes 750 hours of t2.micro (or t3.micro in the Regions in which t2.micro is unavailable) instance usage on free tier AMIs per month, 30 GiB of EBS storage, 2 million IOs, 1 GB of snapshots, and 100 GB of bandwidth to the internet.

Cancel | Create launch 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.

▼ Application and OS Images (Amazon Machine Image) Info

An AMI is a template that contains the software configuration (operating system, application server, and applications) required to launch your instance. Search or Browse for AMIs if you don't see what you are looking for below

Search our full catalog including 1000s of application and OS images

Recents | My AMIs | Quick Start

☐ Don't include in launch template ◉ Owned by me ☐ Shared with me

Browse more AMIs
Including AMIs from AWS, Marketplace and the Community

Amazon Machine Image (AMI)

image-ec2
ami-01203cb4e1056b170
2023-10-06T19:13:23.000Z Virtualization: hvm ENA enabled: true Root device type: ebs

Description
image-ec2

Architecture	AMI ID
x86_64	ami-01203cb4e1056b170

▼ Summary

Software Image (AMI)
image-ec2
ami-01203cb4e1056b170

Virtual server type (instance type)
t2.micro

Firewall (security group)
rds-ec2-1

Storage (volumes)
1 volume(s) - 8 GiB

Free tier: In your first year includes 750 hours of t2.micro (or t3.micro in the Regions in which t2.micro is unavailable) instance usage on free tier AMIs per month, 30 GiB of EBS storage, 2 million IOs, 1 GB of snapshots, and 100 GB of bandwidth to the internet.

Cancel | Create launch template

Instance type Info

Advanced

Instance type

t2.micro — Free tier eligible

Family: t2 1 vCPU 1 GiB Memory Current generation: true
On-Demand Windows base pricing: 0.0162 USD per Hour
On-Demand SUSE base pricing: 0.0116 USD per Hour
On-Demand RHEL base pricing: 0.0716 USD per Hour
On-Demand Linux base pricing: 0.0116 USD per Hour

All generations

Compare instance types

Additional costs apply for AMIs with pre-installed software

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

data

Create new key pair

Network settings Info

Subnet Info

Don't include in launch template

Create new subnet

When you specify a subnet, a network interface is automatically added to your template.

Firewall (security groups) Info

A security group is a set of firewall rules that control the traffic for your instance. Add rules to allow specific traffic to reach your instance.

Select existing security group

Create security group

Security groups Info

Select security groups

ec2-rds-1 sg-0ac3a98bd9a526e95
VPC: vpc-01aafb7a67bc2f152

Compare security group rules

Advanced network configuration

Storage (volumes) Info

EBS Volumes

Hide details

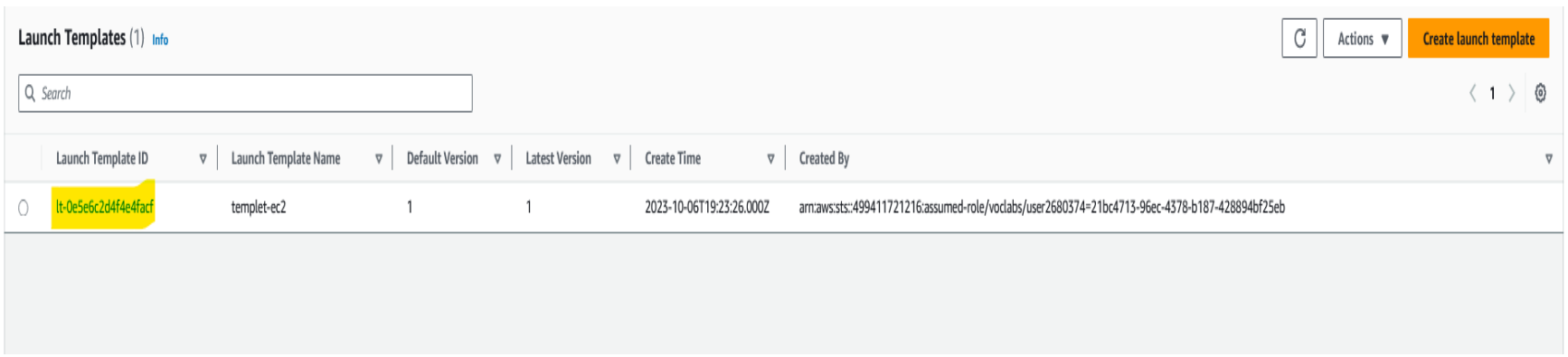
Volume 1 (AMI Root) (8 GiB, EBS, General purpose SSD (gp2))
AMI Volumes are not included in the template unless modified

Free tier eligible customers can get up to 30 GB of EBS General Purpose (SSD) or Magnetic storage

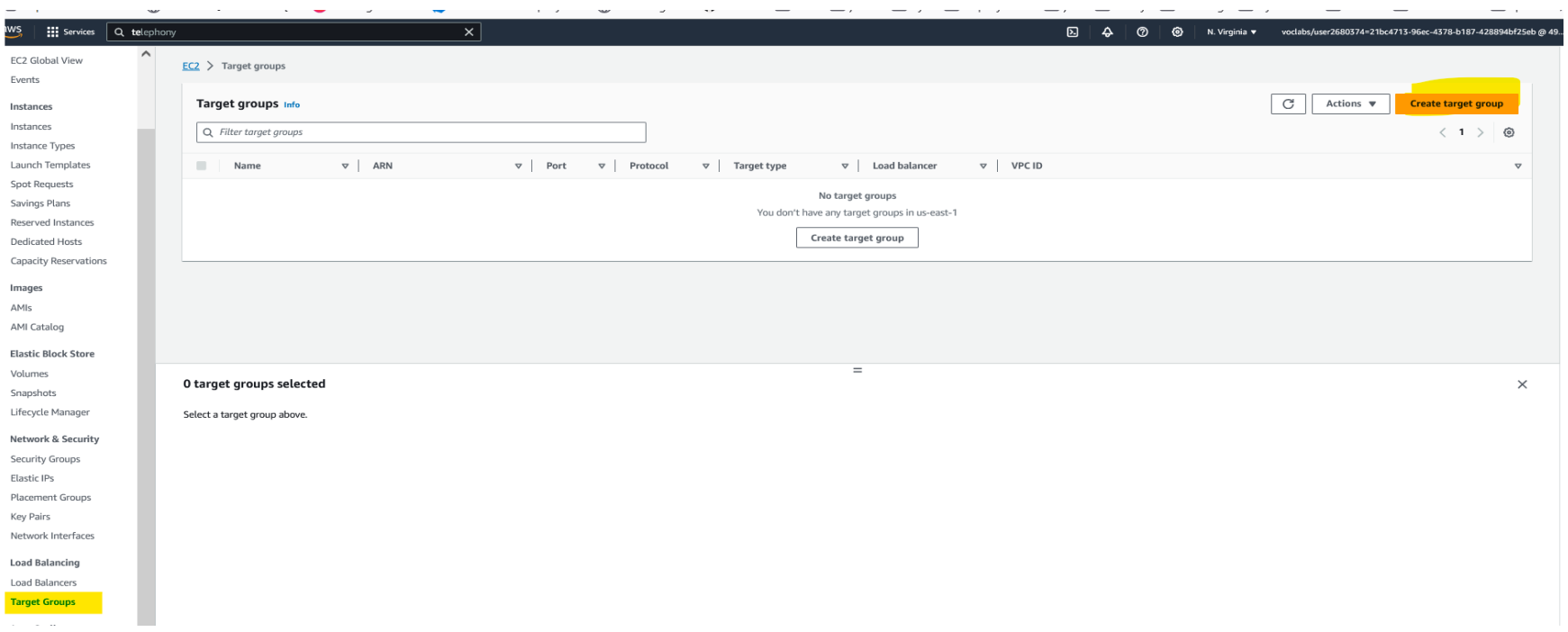
Add new volume

The selected AMI contains more instance store volumes than the instance allows. Only the first 0 instance store volumes from the AMI will be accessible from the instance

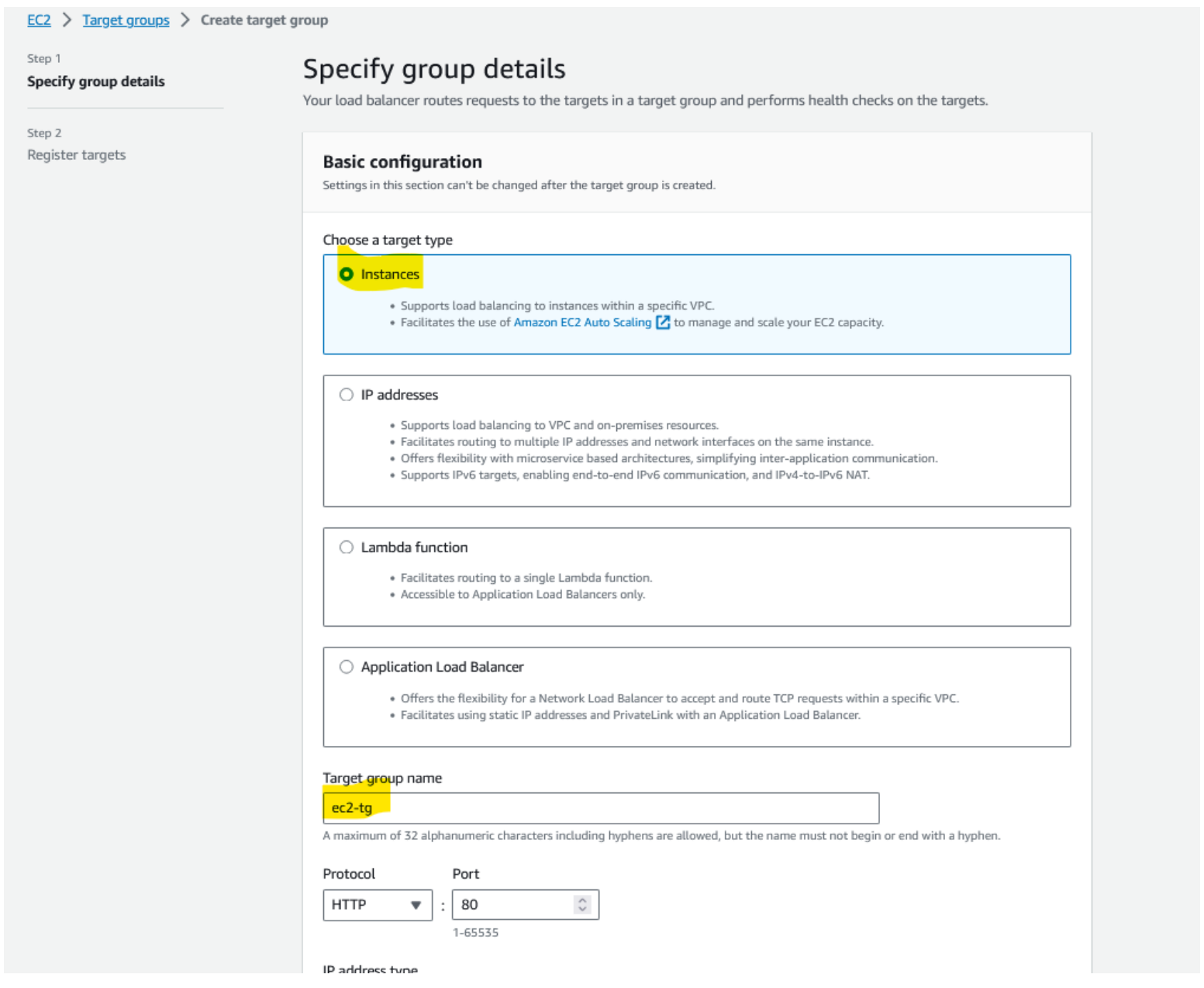
Now after adding all steps to create templet will be like that



Now we will create target group



Now this steps to create our target group



Target group name

ec2-tg

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

Protocol: HTTP : Port: 80

1-65535

IP address type

Only targets with the indicated IP address type can be included in this target group.

- (•) IPv4
  Each instance has a default network interface (eth0) that is assigned the primary private IPv4 address. The instance's primary private IPv4 address is the one that will be applied to the target.
- ( ) IPv6
  Each target you register must have an assigned primary IPv6 address. This is configured on the instances default network interface (eth0). Learn more

VPC

Select the VPC with the instances that you want to include in the target group. Only VPCs that support the IP address type selected above are available in this list.

-
vpc-01aafb7a67bc2f152
IPv4: 172.31.0.0/16

Protocol version

- (•) HTTP1
  Send requests to targets using HTTP/1.1. Supported when the request protocol is HTTP/1.1 or HTTP/2.
- ( ) HTTP2
  Send requests to targets using HTTP/2. Supported when the request protocol is HTTP/2 or gRPC, but gRPC-specific features are not available.
- ( ) gRPC
  Send requests to targets using gRPC. Supported when the request protocol is gRPC.

Health checks

The associated load balancer periodically sends requests, per the settings below, to the registered targets to test their status.

Health check protocol

HTTP

Health check path

Use the default path of "/" to ping the root, or specify a custom path if preferred.

/

Tags - *optional*

Consider adding tags to your target group. Tags enable you to categorize your AWS resources so you can more easily manage them.

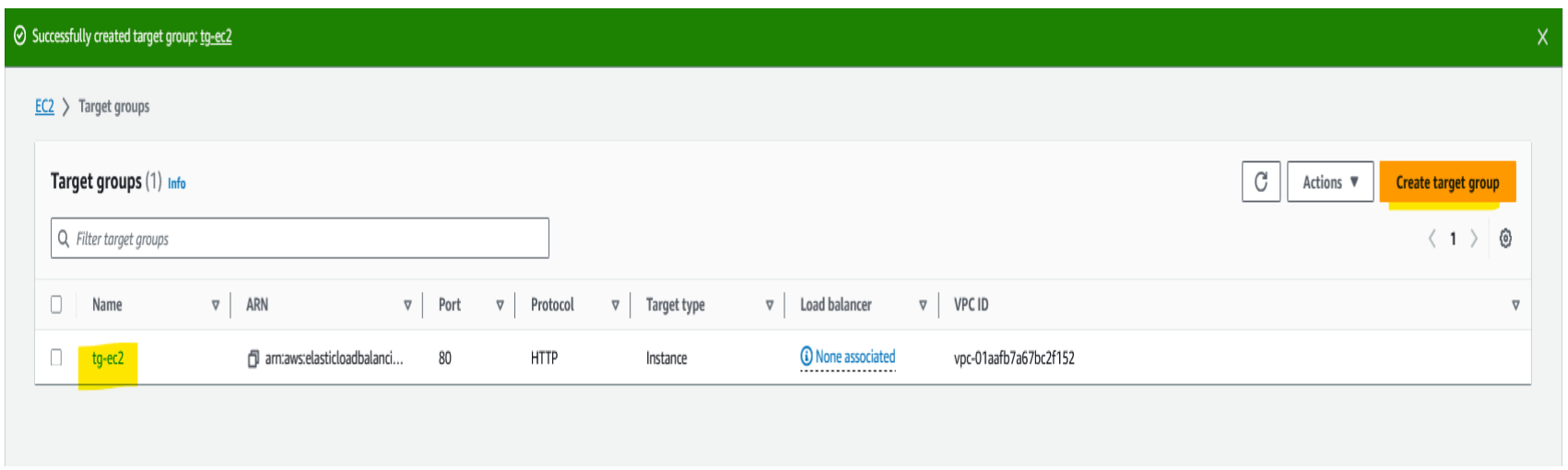
Key	Value	
name	tg-ec2	Remove

Add new tag

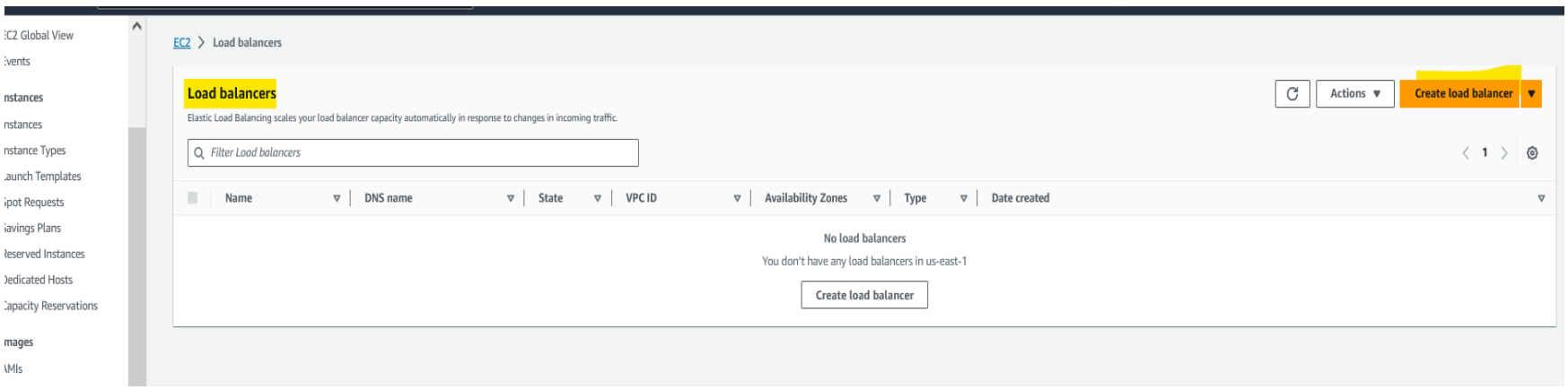
You can add up to 49 more tags.

Cancel Next

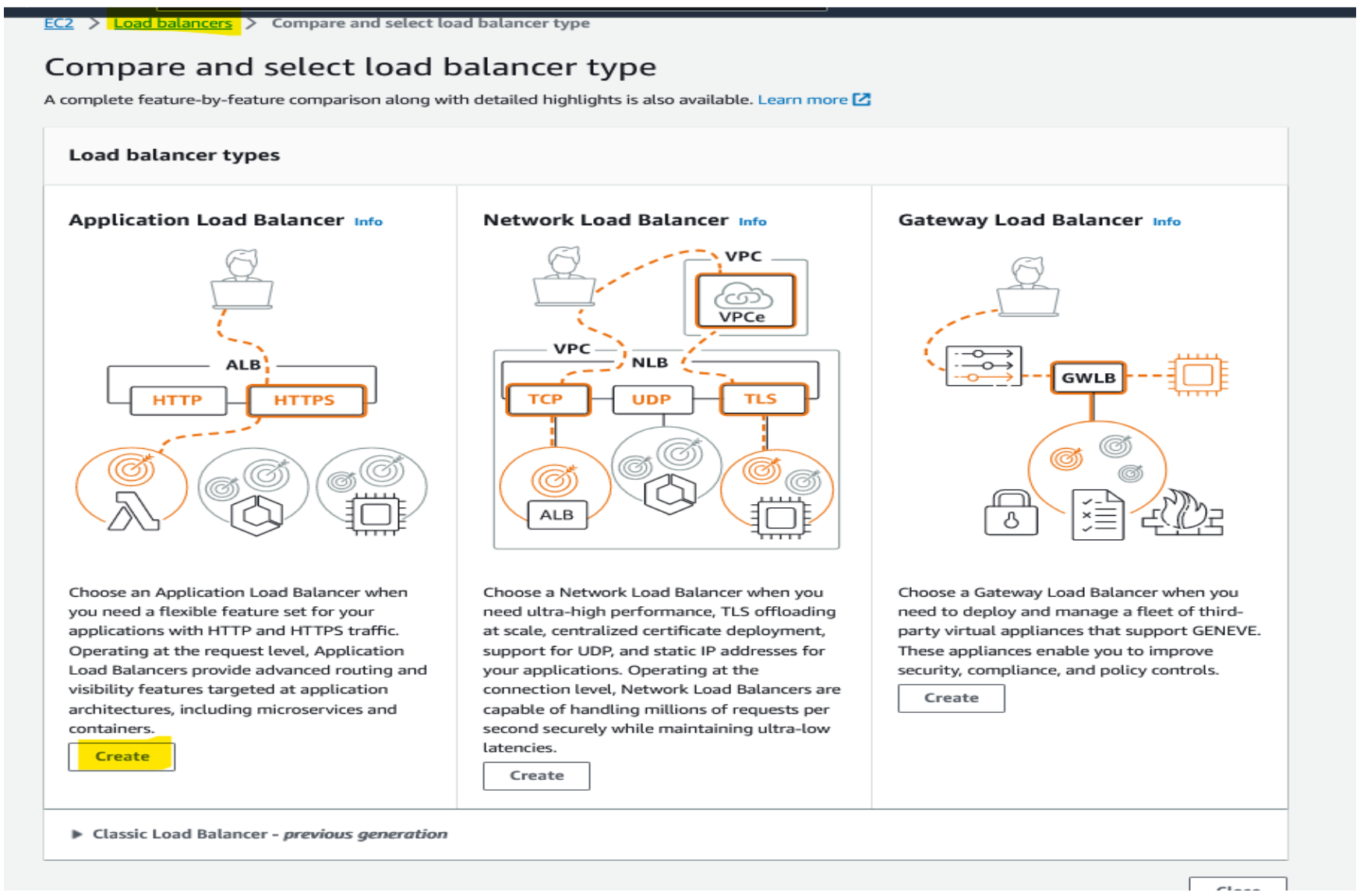
And after creating all steps will be like that below



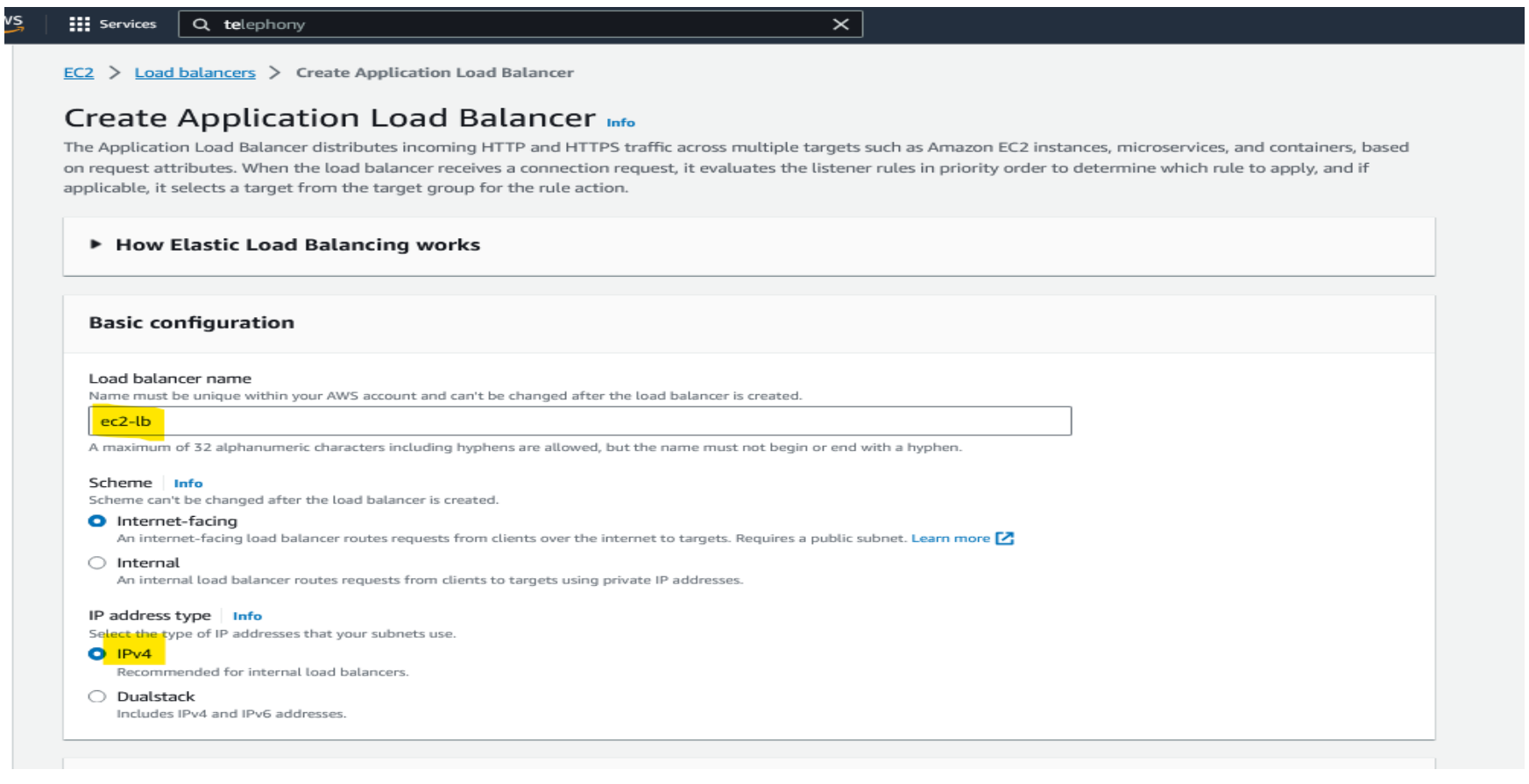
Now we will create load balance.



And this steps to create load balance.



We will create application load balancer.



Network mapping Info

The load balancer routes traffic to targets in the selected subnets, and in accordance with your IP address settings.

VPC Info

Select the virtual private cloud (VPC) for your targets or you can create a new VPC. Only VPCs with an internet gateway are enabled for selection. The selected VPC can't be changed after the load balancer is created. To confirm the VPC for your targets, view your target groups.

-
vpc-01aafb7a67bc2f152
IPv4: 172.31.0.0/16

Mappings Info

Select at least two Availability Zones and one subnet per zone. The load balancer routes traffic to targets in these Availability Zones only. Availability Zones that are not supported by the load balancer or the VPC are not available for selection.

- [ ] **us-east-1a (use1-az2)**
- [ ] **us-east-1b (use1-az4)**
- [x] **us-east-1c (use1-az6)**

  Subnet

  subnet-05b4e67227891d3aa

  IPv4 address

  Assigned by AWS

- [ ] **us-east-1d (use1-az1)**
- [ ] **us-east-1e (use1-az3)**
- [ ] **us-east-1f (use1-az5)**

Security groups Info

A security group is a set of firewall rules that control the traffic to your load balancer. Select an existing security group, or you can create a new security group.

Security groups

Select up to 5 security groups

default
sg-00db8700affe65499 VPC: vpc-01aafb7a67bc2f152

Listeners and routing Info

A listener is a process that checks for connection requests using the port and protocol you configure. The rules that you define for a listener determine how the load balancer routes requests to its registered targets.

▶ Listener **HTTP:80** Remove

Add listener

▶ Add-on services - *optional*

Additional AWS services can be integrated with this load balancer at launch. 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.

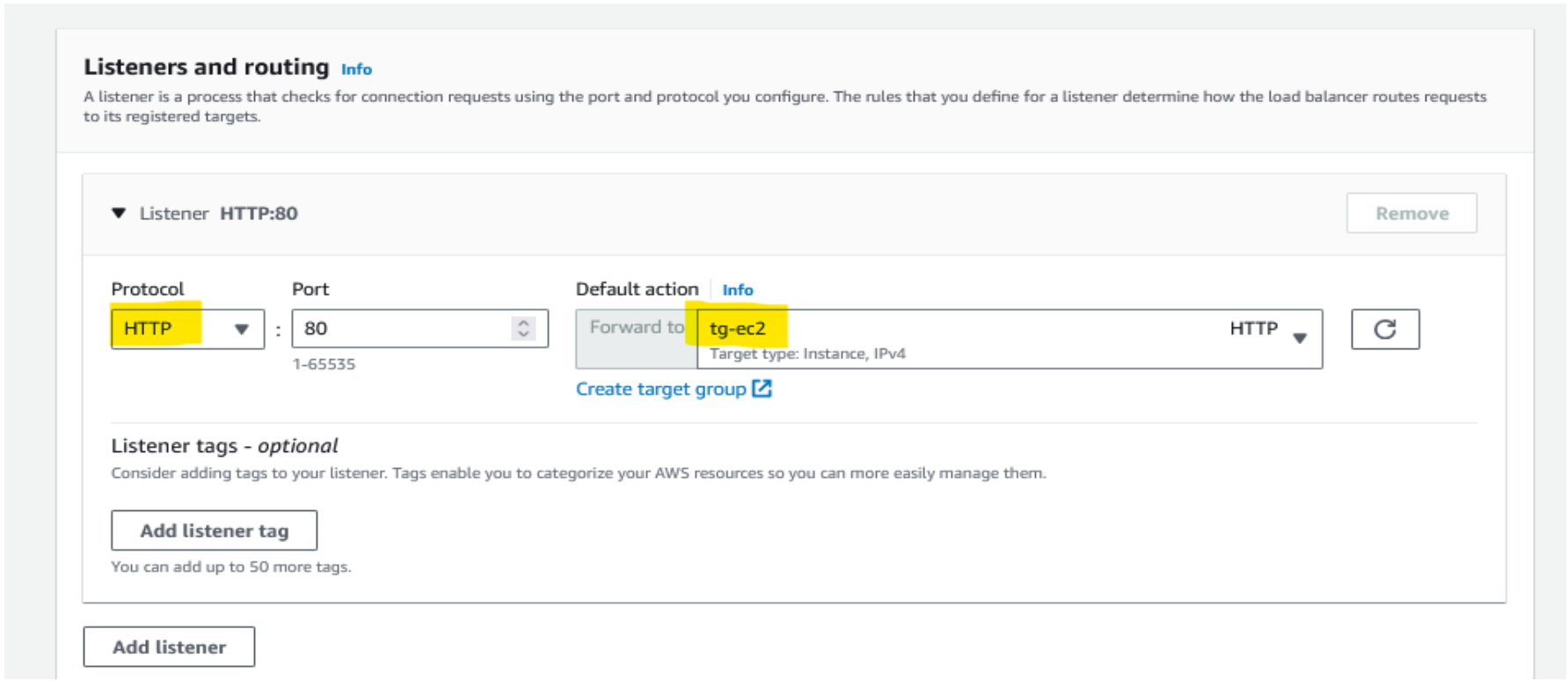
▶ Load balancer tags - *optional*

Consider adding tags to your load balancer. Tags enable you to categorize your AWS resources so you can more easily manage them. The 'Key' is required, but 'Value' is optional. For example, you can have Key = production-webserver, or Key = webserver, and Value = production.

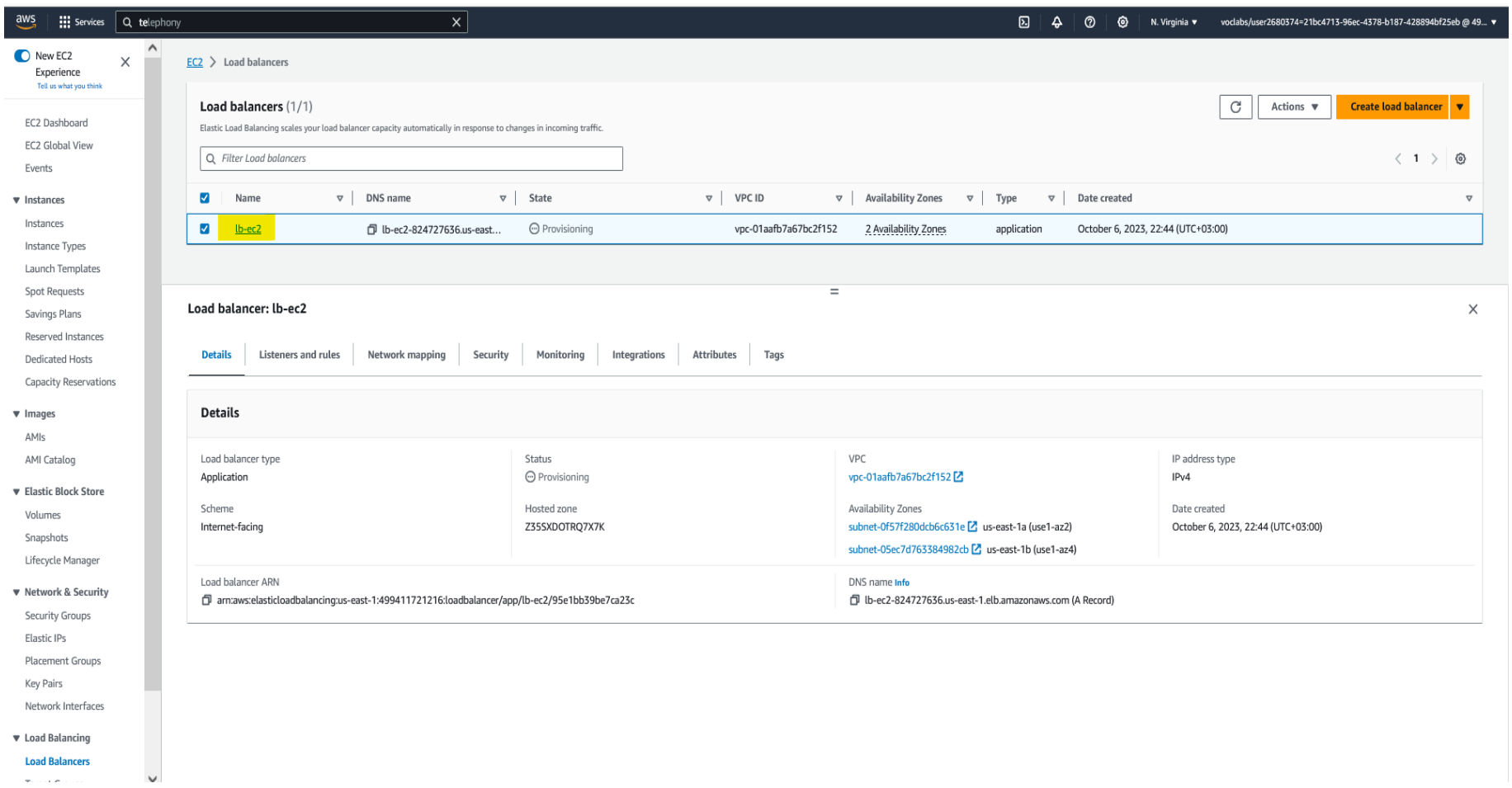
Summary

Review and confirm your configurations. Estimate cost

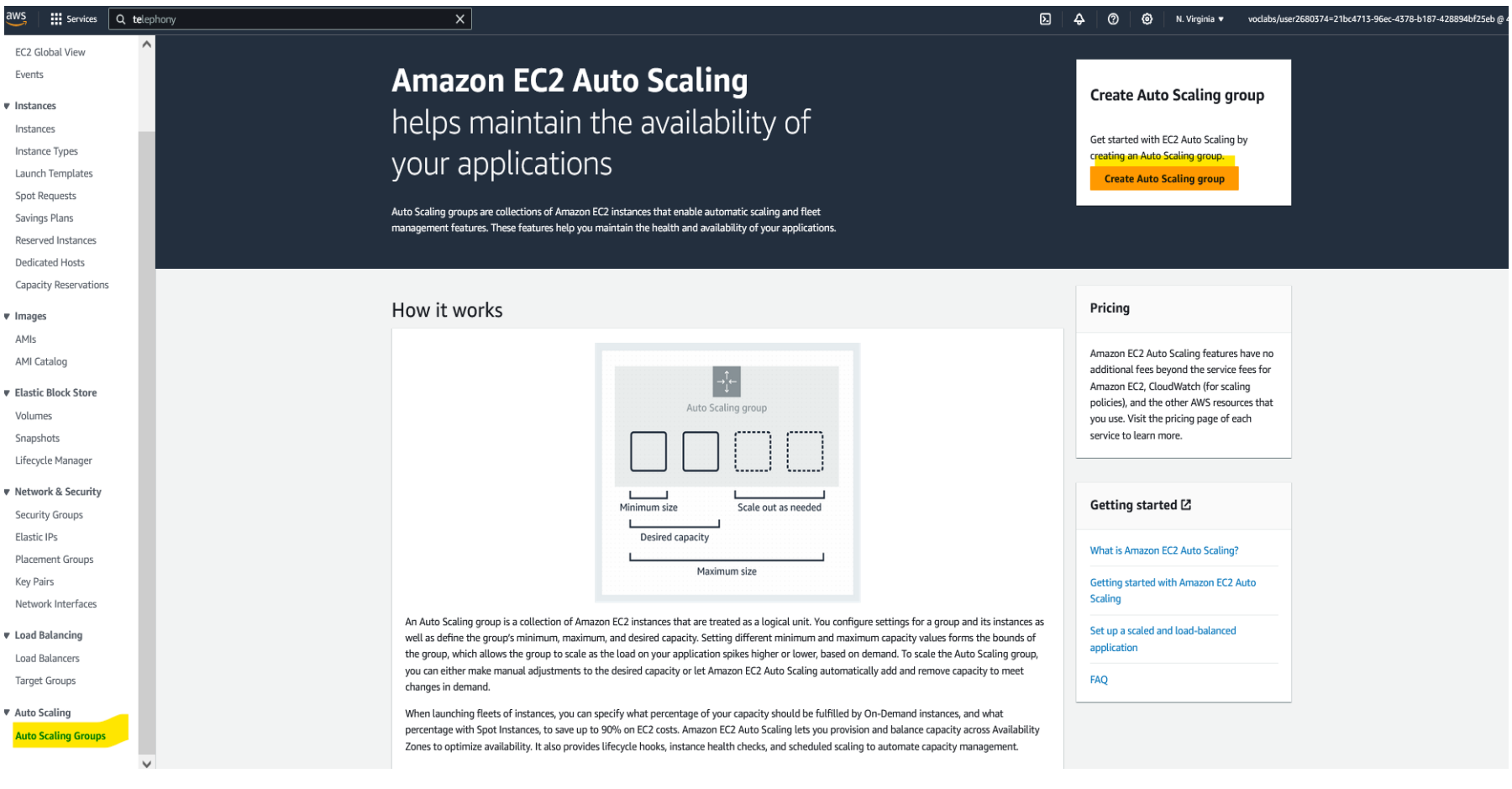
Basic configuration Edit | Security groups Edit | Network mapping Edit | Listeners and routing Edit



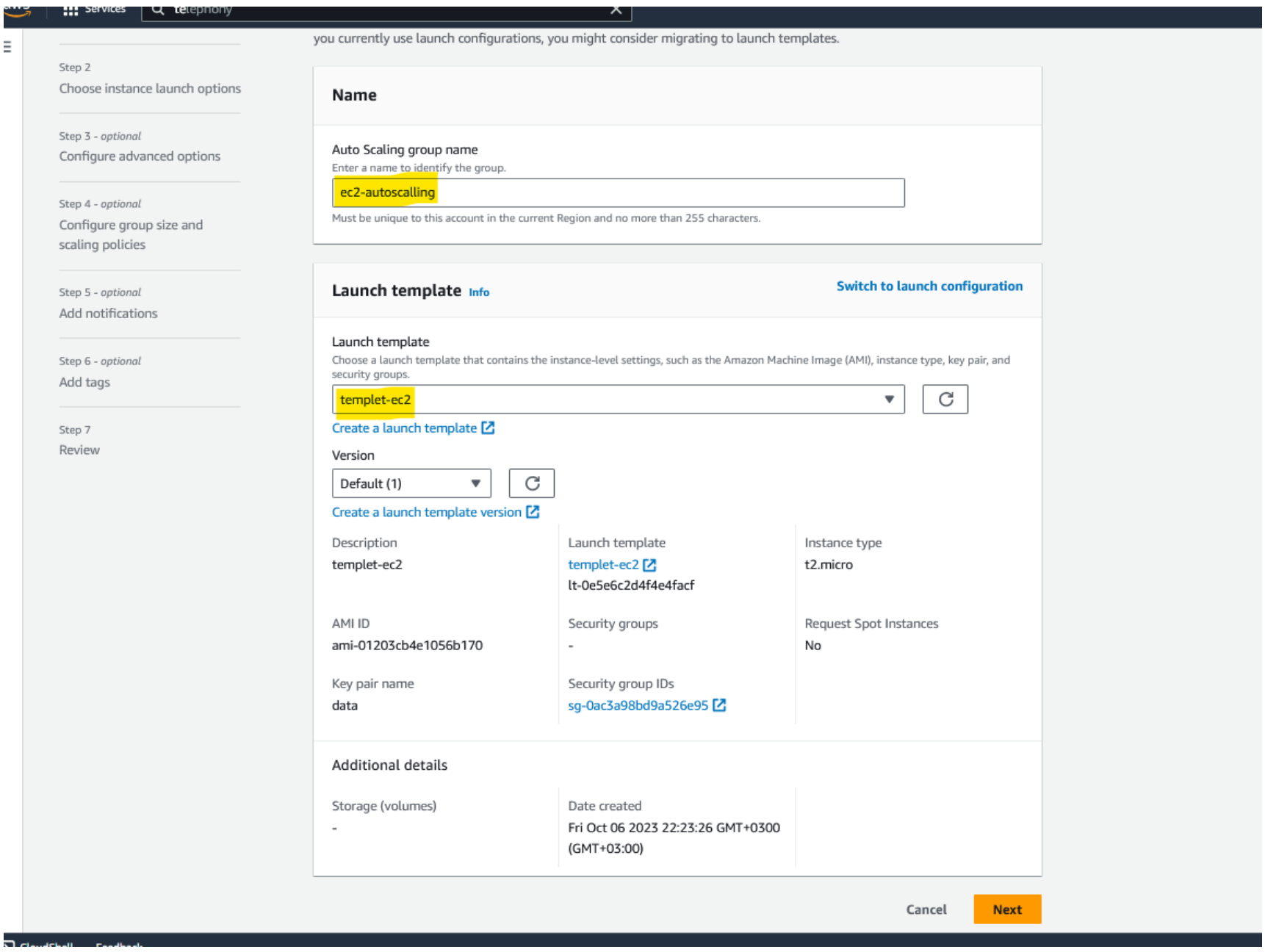
And after create load balance will be like that



Now we will create auto scaling



Now will create auto scaling group.



Instance type requirements Info

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.

Reset to launch template

- (•) **Specify instance attributes** — Provide your compute requirements. We fulfill your desired capacity with matching instance types based on your allocation strategy selection.
- ( ) **Manually add instance types** — Add one or more instance types. Any of the instance types may be launched to fulfill your desired capacity based on your allocation strategy selection.

Required instance attributes

Enter your compute requirements in virtual CPUs (vCPUs) and memory.

vCPUs

Enter the minimum and maximum number of vCPUs per instance.

0 minimum — 60 maximum

☐ No minimum ☐ No maximum

Memory (GiB)

Enter the minimum and maximum GiBs of memory per instance.

0 minimum — 80 maximum

☐ No minimum ☐ No maximum

Additional instance attributes - *optional*

Add instance attributes to further limit which instance types may be used to fulfill your desired capacity.

Choose attribute — Add attribute

▶ Preview matching instance types (330)

This list includes all the instance types that match your compute requirements. Amazon EC2 may provision from any of these instance types. The exact instance types that are used to fulfill your desired capacity depend on the allocation strategy you choose and available capacity.

EC2 > Auto Scaling groups > Create Auto Scaling group

Step 1
Choose launch template or configuration

Step 2
Choose instance launch options

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 advanced options - *optional* Info

Integrate your Auto Scaling group with other services to distribute network traffic across multiple servers using a load balancer or to establish service-to-service communications using VPC Lattice. You can also set options that give you more control over health check replacements and monitoring.

Load balancing Info

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.

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 ▼ ↻

tg-ec2 | HTTP ✕
Application Load Balancer: lb-ec2

Health checks

Health checks increase availability by replacing unhealthy instances. When you use multiple health checks, all are evaluated, and if at least one fails, instance replacement occurs.

EC2 health checks

Always enabled

Additional health check types - *optional* Info

☑ Turn on Elastic Load Balancing health checks Recommended

Elastic Load Balancing monitors whether instances are available to handle requests. When it reports an unhealthy instance, EC2 Auto Scaling can replace it on its next periodic check.

EC2 Auto Scaling will start to detect and act on health checks performed by Elastic Load Balancing. To avoid unexpected terminations, first verify the settings of these health checks in the Load Balancer console ✕

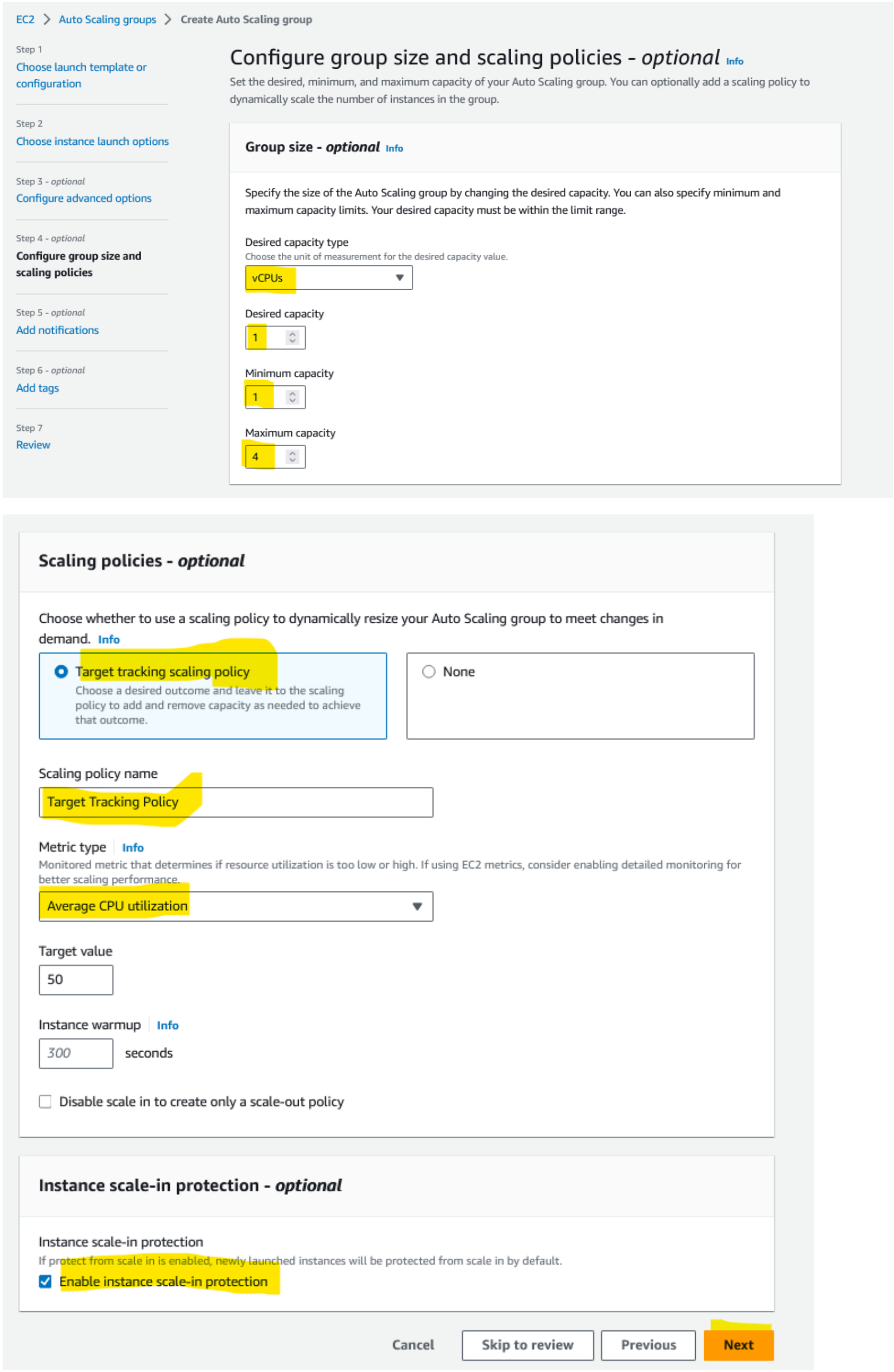
☐ Turn on VPC Lattice health checks

VPC Lattice can monitor whether instances are available to handle requests. If it considers a target as failed a health check, EC2 Auto Scaling replaces it after its next periodic check.

Health check grace period Info

This time period delays the first health check until your instances finish initializing. It doesn't prevent an instance from terminating when placed into a non-running state.

300 seconds



After you create your steps, you will find that your instance has high availability.

And if get any CPU saturation high 60 % will recover your drop instance and create another

Also, if your instance will terminate will create another instance without any issue.