



**Department of Computer Science & Engineering  
Premier University.**

**CSE 482: Contemporary Course of Computer  
Science**

**Build your VPC and Launch a Web Server**

**Submitted By:**

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<b>Semester</b>	7 <sup>th</sup>
<b>Submission Date</b>	1/29/2026

**Remarks**

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## Objectives

The primary objectives of this laboratory session were:

- To create a Virtual Private Cloud (VPC) within Amazon Web Services (AWS) to establish a private and secure network.
- To configure subnets, route tables, and security groups to control and secure network traffic.
- To launch a web server inside this private network.
- To verify that the web server is accessible from the public internet.

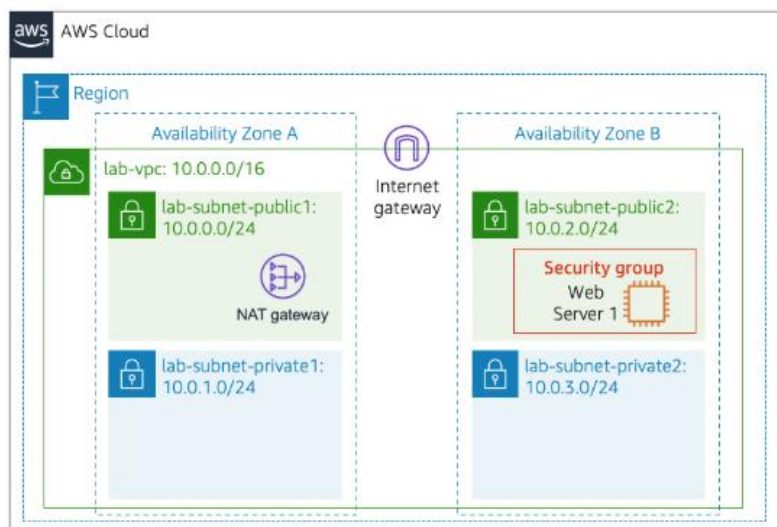
## Scenario

Imagine you are working as a cloud engineer.

Your job is to build a private network where everything is isolated and protected.

Inside this private area, you need to run one web server that people on the internet can visit.

This practice is similar to how real companies launch their websites or apps in a secure cloud setup instead of putting everything directly on the open internet.



Public Route Table

Destination	Target
10.0.0.0/16	local
0.0.0.0/0	Internet gateway

Private Route Tables

Destination	Target
10.0.0.0/16	local
0.0.0.0/0	NAT gateway

## Work Procedure

1. Open the AWS Academy Vocareum lab.
2. Make sure your temporary AWS login is active.
3. Check the region at the top right and set it to **N. Virginia (us-east-1)**.
4. Go to VPC service and choose **Create VPC** → select **VPC and more**.
5. Keep auto name on but change the name from *project* to *lab*.
6. Keep the main network range as 10.0.0.0/16.
7. Use only **1 Availability Zone**.
8. Keep **1 public subnet** and **1 private subnet**.
9. Open the subnet CIDR settings and change:
  - Public subnet to 10.0.0.0/24
  - Private subnet to 10.0.1.0/24

VPC > Your VPCs > Create VPC

Choose the number of AZs in which to provision subnets. We recommend at least two AZs for high availability.

1 2 3

► Customize AZs

Number of public subnets [Info](#)  
The number of public subnets to add to your VPC. Use public subnets for web applications that need to be publicly accessible over the internet.

0 1

Number of private subnets [Info](#)  
The number of private subnets to add to your VPC. Use private subnets to secure backend resources that don't need public access.

0 1 2

▼ Customize subnets CIDR blocks

Public subnet CIDR block in us-east-1a  
10.0.0.0/24 256 IPs

Private subnet CIDR block in us-east-1a  
10.0.1.0/24 256 IPs

Preview

VPC [Show details](#)  
Your AWS virtual network

lab-vpc

Subnets (2)  
Subnets within this VPC

us-east-1a

lab-subnet-public1-us-east-1a

lab-subnet-private1-us-east-1a

10. Set NAT Gateway to **1 in one AZ**.
11. Keep VPC endpoints as **None**.
12. Leave DNS options enabled.
13. Click **Create VPC** and wait, then open the VPC page.

aws [Search] [Alt+S] Ask Amazon Q

VPC > Your VPCs > Create VPC > Create VPC resources

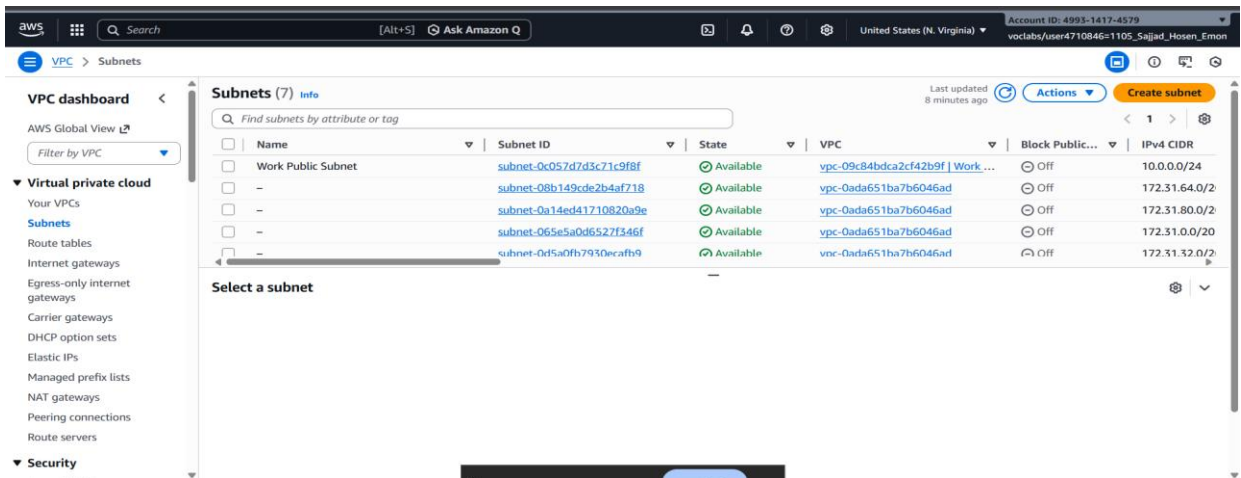
✓ Success

▼ Details

- ✓ Create VPC: [vpc-08b17429ad9c4c9b6](#)
- ✓ Enable DNS hostnames
- ✓ Enable DNS resolution
- ✓ Verifying VPC creation: [vpc-08b17429ad9c4c9b6](#)
- ✓ Create subnet: [subnet-00c22b844bd1de28b](#)
- ✓ Create subnet: [subnet-0971df3af853d4861](#)
- ✓ Create internet gateway: [igw-02d1389f92a558ba2](#)
- ✓ Attach internet gateway to the VPC
- ✓ Create route table: [rtb-069d10ea5b0d7b4d6](#)
- ✓ Create route
- ✓ Associate route table
- ✓ Allocate elastic IP: [eipalloc-034d4ef59c863276a](#)
- ✓ Create NAT gateway: [nat-0f6083b8a5620d3f0](#)
- ✓ Wait for NAT Gateways to activate
- ✓ Create route table: [rtb-0b78329642b1d39c4](#)
- ✓ Create route
- ✓ Associate route table
- ✓ Verifying route table creation

## Create extra subnets

14. Once it is complete, choose View VPC.
15. Then go to subnet in left menu

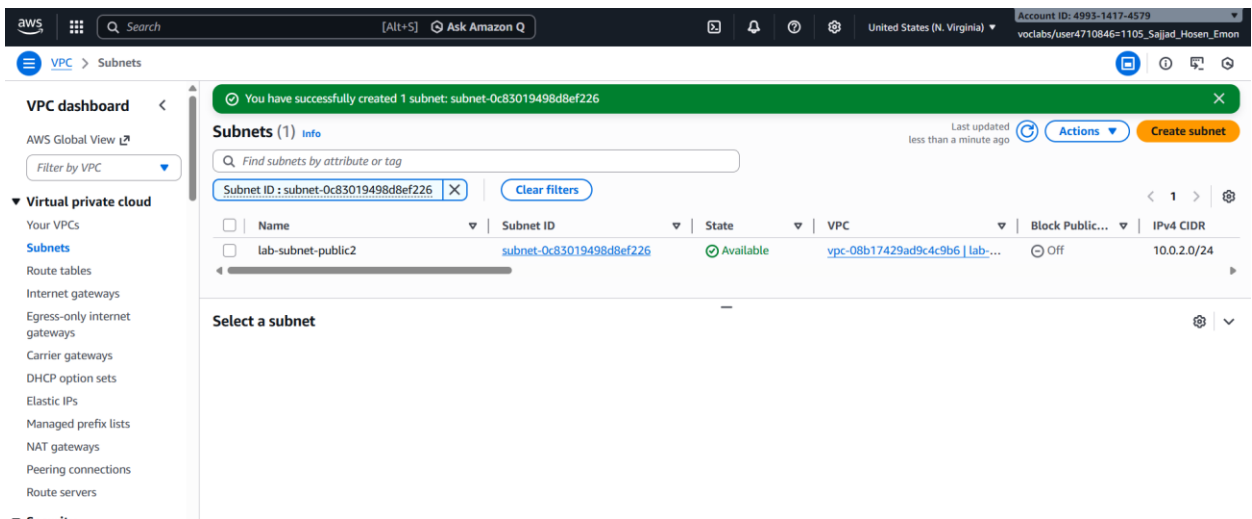
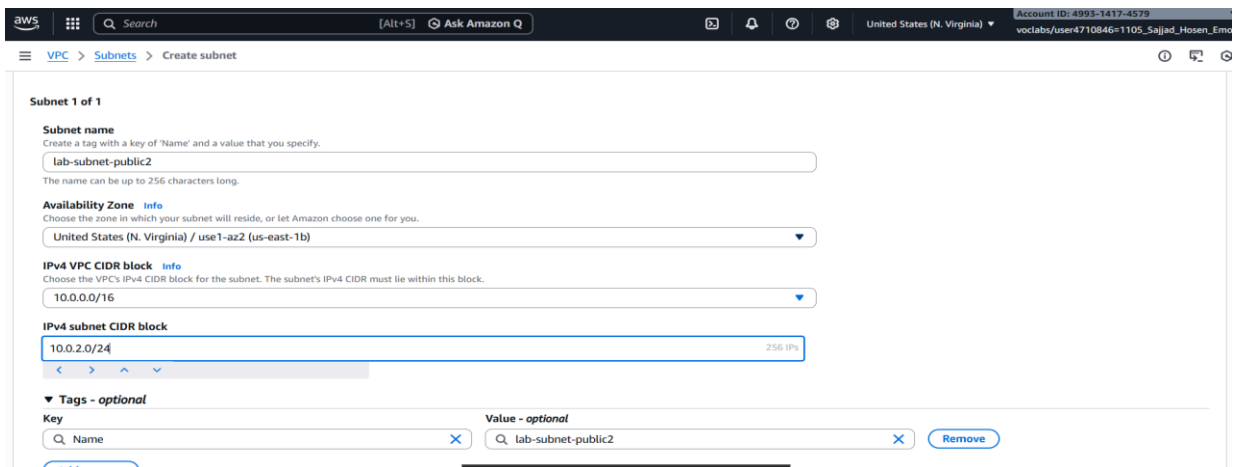


16. Go to **Subnets** → **Create subnet**.

17. Select lab-vpc.

18. Create a second public subnet:

- Name: lab-subnet-public2
- AZ: second zone (like us-east-1b)
- CIDR: 10.0.2.0/24



17. Create another subnet again for private use:

- Name: lab-subnet-private2
- AZ: second zone
- CIDR: 10.0.3.0/24

The screenshot shows the AWS Management Console interface. The top navigation bar includes the AWS logo, a search bar, and account information. The main content area is divided into two sections. The top section, titled 'Subnet 1 of 1', shows the 'Create subnet' wizard. It includes fields for 'Subnet name' (lab-subnet-private2), 'Availability Zone' (United States (N. Virginia) / us-east-1b), 'IPv4 VPC CIDR block' (10.0.0.0/16), and 'IPv4 subnet CIDR block' (10.0.3.0/24). Below these fields are 'Tags - optional' with a key-value pair (Name: lab-subnet-private2). The bottom section, titled 'Subnets (1)', shows a list of subnets. A green banner at the top of this section indicates 'You have successfully created 1 subnet: subnet-01b66a57f723cada4'. The list of subnets includes 'lab-subnet-private2' with ID 'subnet-01b66a57f723cada4', state 'Available', and VPC 'vpc-08b17429ad9c4c9b6'. The left sidebar shows the 'VPC dashboard' with a 'Subnets' link highlighted.

**Subnet 1 of 1**

**Subnet name**  
Create a tag with a key of 'Name' and a value that you specify.  
lab-subnet-private2  
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.  
United States (N. Virginia) / us-east-1b

**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.  
10.0.0.0/16

**IPv4 subnet CIDR block**  
10.0.3.0/24 256 IPs

**Tags - optional**  
Key: Name Value: lab-subnet-private2 Remove

**VPC dashboard**  
AWS Global View  
Filter by VPC  
Virtual private cloud  
Your VPCs  
Subnets  
Route tables  
Internet gateways  
Egress-only internet gateways  
Carrier gateways  
DHCP option sets  
Elastic IPs  
Managed prefix lists  
NAT gateways  
Peering connections  
Route servers  
Security

**Subnets (1)** Info  
Find subnets by attribute or tag  
Subnet ID: subnet-01b66a57f723cada4 Clear filters  
Last updated less than a minute ago Actions Create subnet  
Table with 7 columns: Name, Subnet ID, State, VPC, Block Public..., IPv4 CIDR  
lab-subnet-private2 subnet-01b66a57f723cada4 Available vpc-08b17429ad9c4c9b6 | lab-... Off 10.0.3.0/24  
Select a subnet

## Update route tables

18. Open Route tables.

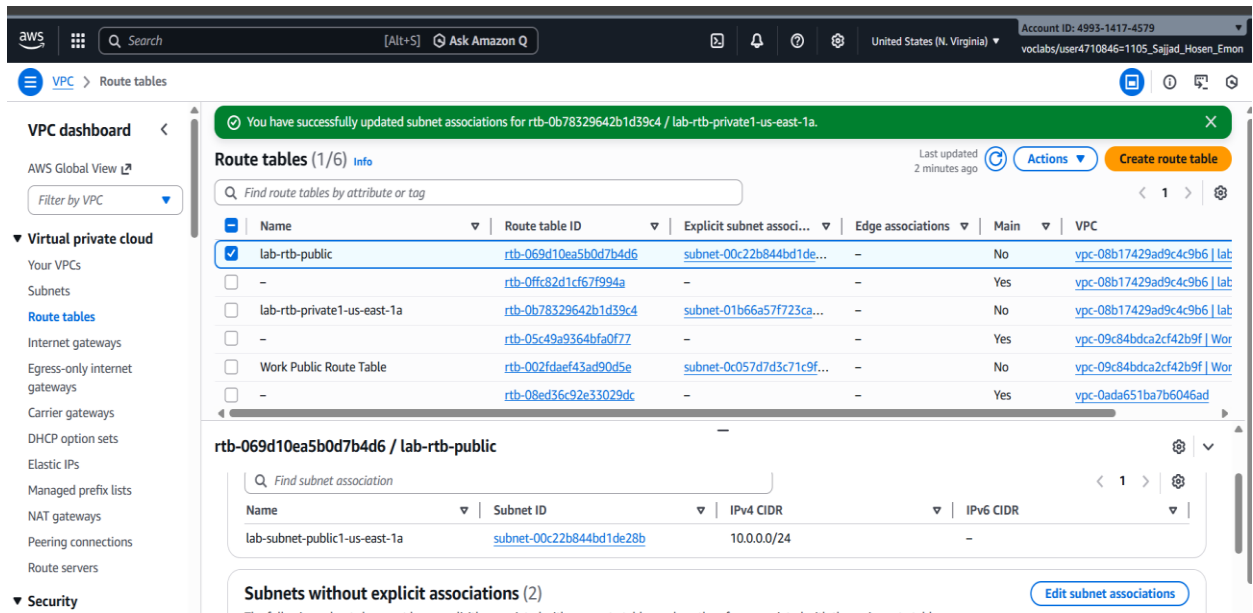
19. Select the private route table and add both private subnets to it.

The screenshot shows the AWS Management Console interface. The top navigation bar includes the AWS logo, a search bar, and account information. The main content area is divided into two sections. The top section, titled 'Route tables (1/6)', shows a list of route tables. The bottom section, titled 'rtb-0b78329642b1d39c4 / lab-rtb-private1-us-east-1a', shows the 'Subnet associations' for the selected route table. The list of subnets includes 'lab-subnet-private1-us-east-1a' with ID 'subnet-0971df3af853d4861' and IPv4 CIDR '10.0.1.0/24'. The left sidebar shows the 'VPC dashboard' with a 'Route tables' link highlighted.

**Route tables (1/6)** Info  
Find route tables by attribute or tag  
Last updated 1 minute ago Actions Create route table  
Table with 7 columns: Name, Route table ID, Explicit subnet associ..., Edge associations, Main, VPC  
lab-rtb-public rtb-069d10ea5b0d7b4d6 subnet-00c22b844bd1de... No vpc-08b17429ad9c4c9b6 | la  
lab-rtb-private1-us-east-1a rtb-0b78329642b1d39c4 subnet-0971df3af853d4... No vpc-08b17429ad9c4c9b6 | la  
Work Public Route Table rtb-002fdae43ad90d5e subnet-0c057d7d3c71c9f... No vpc-09c84bdca2cf42b9f | Woi  
rtb-08ed36c92e33029dc Yes vpc-0ada651ba7b6046ad

**rtb-0b78329642b1d39c4 / lab-rtb-private1-us-east-1a**  
Find subnet association  
Table with 4 columns: Name, Subnet ID, IPv4 CIDR, IPv6 CIDR  
lab-subnet-private1-us-east-1a subnet-0971df3af853d4861 10.0.1.0/24 -  
Subnets without explicit associations (2) Edit subnet associations

20. Select the public route table and add both public subnets to it.

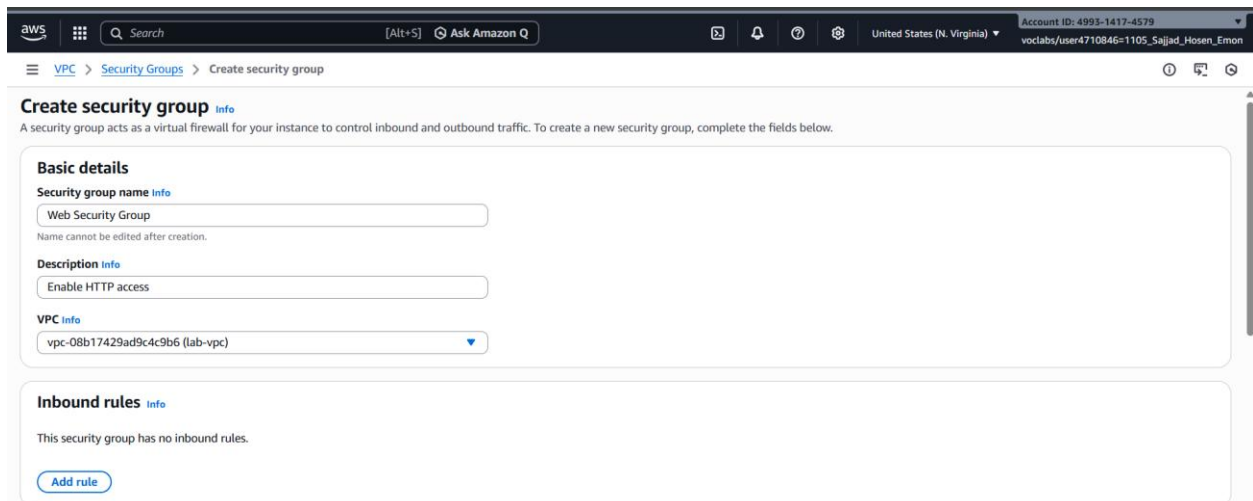


This makes public subnets able to talk to the internet.

## Create a security group for the web server

21. Create new Security Group:

- Name: **Web Security Group**
- Description: allow web access
- Choose lab-vpc



22. Add inbound rule:

- Type: HTTP
- Source: Anywhere (IPv4)

## 23. Create the security group.

The screenshot shows the AWS Management Console interface. The top navigation bar includes the AWS logo, a search bar, and account information (United States (N. Virginia), Account ID: 4993-1417-4579). The main content area is titled "Create security group" and shows the "VPC Info" section with a dropdown menu set to "vpc-08b17429ad9c4c9b6 (lab-vpc)".

The "Inbound rules" section is active, showing a rule for "HTTP" (Type), "TCP" (Protocol), "80" (Port range), and "Anywhere" (Source). The description is "Permit web requests". A warning message states: "Rules with source of 0.0.0.0/0 or ::/0 allow all IP addresses to access your instance. We recommend setting security group rules to allow access from known IP addresses only."

The "Outbound rules" section is also visible, showing a rule for "All traffic" (Type), "All" (Protocol), "All" (Port range), and "Custom" (Destination). The description is empty.

Below the rules sections, a green notification banner states: "Security group (sg-01ee1437ee49d2c5b | Web Security Group) was created successfully".

The "Details" section for "sg-01ee1437ee49d2c5b - Web Security Group" is shown. It includes the following information:

- Security group name: Web Security Group
- Security group ID: sg-01ee1437ee49d2c5b
- Description: Enable HTTP access
- VPC ID: vpc-08b17429ad9c4c9b6
- Owner: 499314174579
- Inbound rules count: 1 Permission entry
- Outbound rules count: 1 Permission entry

The "Inbound rules" tab is selected, showing a table with one rule:

Name	Security group rule ID	IP version	Type	Protocol	Port range
-	sgr-0194f12d0b7a02969	IPv4	HTTP	TCP	80

## Launch the web server

## 24. Open EC2 service and click **Launch instance**.

The screenshot shows the AWS Management Console interface for the EC2 service. The top navigation bar includes the AWS logo, a search bar, and account information (United States (N. Virginia), Account ID: 4993-1417-4579).

The main content area is titled "EC2" and shows a "Resources" section with a table of EC2 resources in the United States (N. Virginia) Region:

Resource	Count
Instances (running)	1
Dedicated Hosts	0
Key pairs	1
Security groups	5
Auto Scaling Groups	0
Elastic IPs	2
Load balancers	0
Snapshots	0
Capacity Reservations	0
Instances	1
Placement groups	0
Volumes	1

The "Launch instance" section is visible, with a "Launch instance" button and a "Migrate a server" button.

The "Service health" section shows the "AWS Health Dashboard" and indicates that the service is operating normally.

The "Account attributes" section shows the "Default VPC" (vpc-0ada651ba7b6046ad) and "Settings" (Data protection and security, Allowed AMIs, Zones, EC2 Serial Console, Default credit specification, EC2 console preferences).

The "Explore AWS" section shows a link to "10 Things You Can Do Today to Reduce AWS Costs".



## 25. Name it **Web Server 1**.

EC2 > Instances > Launch an instance

Recents Quick Start

Amazon Linux macOS Ubuntu Windows Red Hat SUSE Linux Debian

Amazon Machine Image (AMI)

Amazon Linux 2023 kernel-6.1 AMI  
ami-0532be01f26a3de55 (64-bit (x86), uefi-preferred) / ami-0bb7267a511c0a8e8 (64-bit (Arm), uefi)  
Virtualization: hvm ENA enabled: true Root device type: ebs

Description

Amazon Linux 2023 (kernel-6.1) is a modern, general purpose Linux-based OS that comes with 5 years of long term support. It is optimized for AWS and designed to provide a secure, stable and high-performance execution environment to develop and run your cloud applications.

Amazon Linux 2023 AMI 2023.10.20260120.4 x86\_64 HVM kernel-6.1

Architecture 64-bit (x86) Boot mode uefi-preferred AMI ID ami-0532be01f26a3de55 Publish Date 2026-01-22 Username ec2-user Verified provider

▼ Instance type Info | Get advice

Instance type

t2.micro  
Family: t2 1 vCPU 1 GiB Memory Current generation: true  
On-Demand Windows base pricing: 0.0162 USD per Hour  
On-Demand Ubuntu Pro base pricing: 0.0134 USD per Hour  
On-Demand SUSE base pricing: 0.0116 USD per Hour On-Demand RHEL base pricing: 0.026 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

▼ Summary

Number of instances 1

Software Image (AMI)  
Amazon Linux 2023 AMI 2023.10...read more  
ami-0532be01f26a3de55

Virtual server type (instance type)  
t2.micro

Firewall (security group)  
New security group

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

Free tier: In your first year of opening an AWS

Cancel Launch instance Preview code

## 26. Use default Amazon Linux image and `t2.micro` type.

▼ Instance type Info | Get advice

Instance type

t2.micro  
Family: t2 1 vCPU 1 GiB Memory Current generation: true  
On-Demand Windows base pricing: 0.0162 USD per Hour  
On-Demand Ubuntu Pro base pricing: 0.0134 USD per Hour  
On-Demand SUSE base pricing: 0.0116 USD per Hour On-Demand RHEL base pricing: 0.026 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

Virtual server type (instance type)  
t2.micro

Firewall (security group)  
New security group

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

Free tier: In your first year of opening an AWS

Cancel Launch instance Preview code

## 27. Choose the provided key pair `vockey`.

▼ 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 - required

vockey

Create new key pair

▼ Network settings Info

Network Info

vpc-0ada651ba7b6046ad

Edit



28. Select Existing security group

29. Network settings:

- VPC: lab-vpc
- Subnet: lab-subnet-public2

**Subnet** | Info

subnet-0c83019498d8ef226 lab-subnet-public2

VPC: vpc-08b17429ad9c4c9b6 Owner: 499314174579  
Availability Zone: us-east-1b (use1-az2) Zone type: Availability Zone  
IP addresses available: 251 CIDR: 10.0.2.0/24

[Create new subnet](#)

**Auto-assign public IP** | Info

Enable

Additional charges apply when outside of free tier allowance

**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.

☐ Create security group ☒ Select existing security group

**Common security groups** | Info

Select security groups

Web Security Group sg-01ee1437ee49d2c5b X

VPC: vpc-08b17429ad9c4c9b6

[Compare security group rules](#)

Security groups that you add or remove here will be added to or removed from all your network interfaces.

► Advanced network configuration

**▼ Summary**

**Number of instances** | Info

1

**Software Image (AMI)**

Amazon Linux 2023 AMI 2023  
ami-0532be01f26a3de55

**Virtual server type (instance type)**

t2.micro

**Firewall (security group)**

Web Security Group

**Storage (volumes)**

1 volume(s) - 8 GiB

Free tier: In your first y

Cancel

- Enable auto public IP
- Use existing security group: **Web Security Group**

29. Launch the instance and wait until status checks are 2/2 passed.

**Success**

Successfully initiated launch of instance (i-0021d6aeac511109b)

► Launch log

**Next Steps**

What would you like to do next with this instance, for example "create alarm" or "create backup"

**Create billing and free tier usage alerts**

To manage costs and avoid surprise bills, set up email notifications for billing and free tier usage thresholds.

[Create billing alerts](#)

**Connect to your instance**

Once your instance is running, log into it from your local computer.

[Connect to instance](#)

[Learn more](#)

**Connect an RDS database**

Configure the connection between an EC2 instance and a database to allow traffic flow between them.

[Connect an RDS database](#)

[Create a new RDS database](#)

[Learn more](#)

**Create EBS snapshot policy**

Create a policy that automates the creation, retention, and deletion of EBS snapshots

[Create EBS snapshot policy](#)

**EC2**

Dashboard

EC2 Global View

Events

**Instances**

Instances

Instance Types

Launch Templates

Spot Requests

Savings Plans

Reserved Instances

Dedicated Hosts

Capacity Reservations

Capacity Manager

**Images**

AMIs

AMI Catalog

**Elastic Block Store**

**Instances (1/2)** | Info

Last updated less than a minute ago

[Connect](#) [Instance state](#) [Actions](#) [Launch instances](#)

Find Instance by attribute or tag (case-sensitive)

All states

	Name	Instance ID	Instance state	Instance type	Status check	Alarm status	Availability Zone	Public IP
<input checked="" type="checkbox"/>	Web Server 1	i-0021d6aeac511109b	Running	t2.micro	2/2 checks passed	View alarms	us-east-1b	ec2-54-
<input type="checkbox"/>	Bastion Host	i-0d7e6ecdbe8b48168	Running	t2.micro	2/2 checks passed	View alarms	us-east-1a	ec2-44-

**i-0021d6aeac511109b (Web Server 1)**

[Details](#) [Status and alarms](#) [Monitoring](#) [Security](#) [Networking](#) [Storage](#) [Tags](#)

**▼ Instance summary** | Info

Instance ID

i-0021d6aeac511109b

IPv6 address

-

Public IPv4 address

54.152.186.249 | [open address](#)

Instance state

Running

Private IPv4 addresses

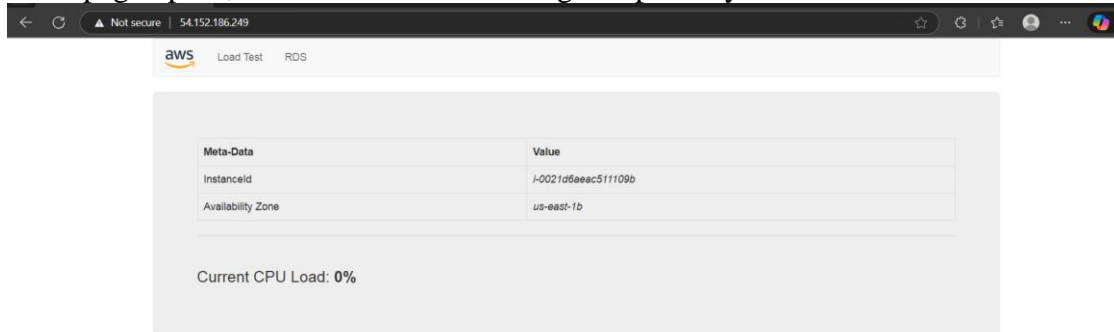
10.0.2.200

Public DNS

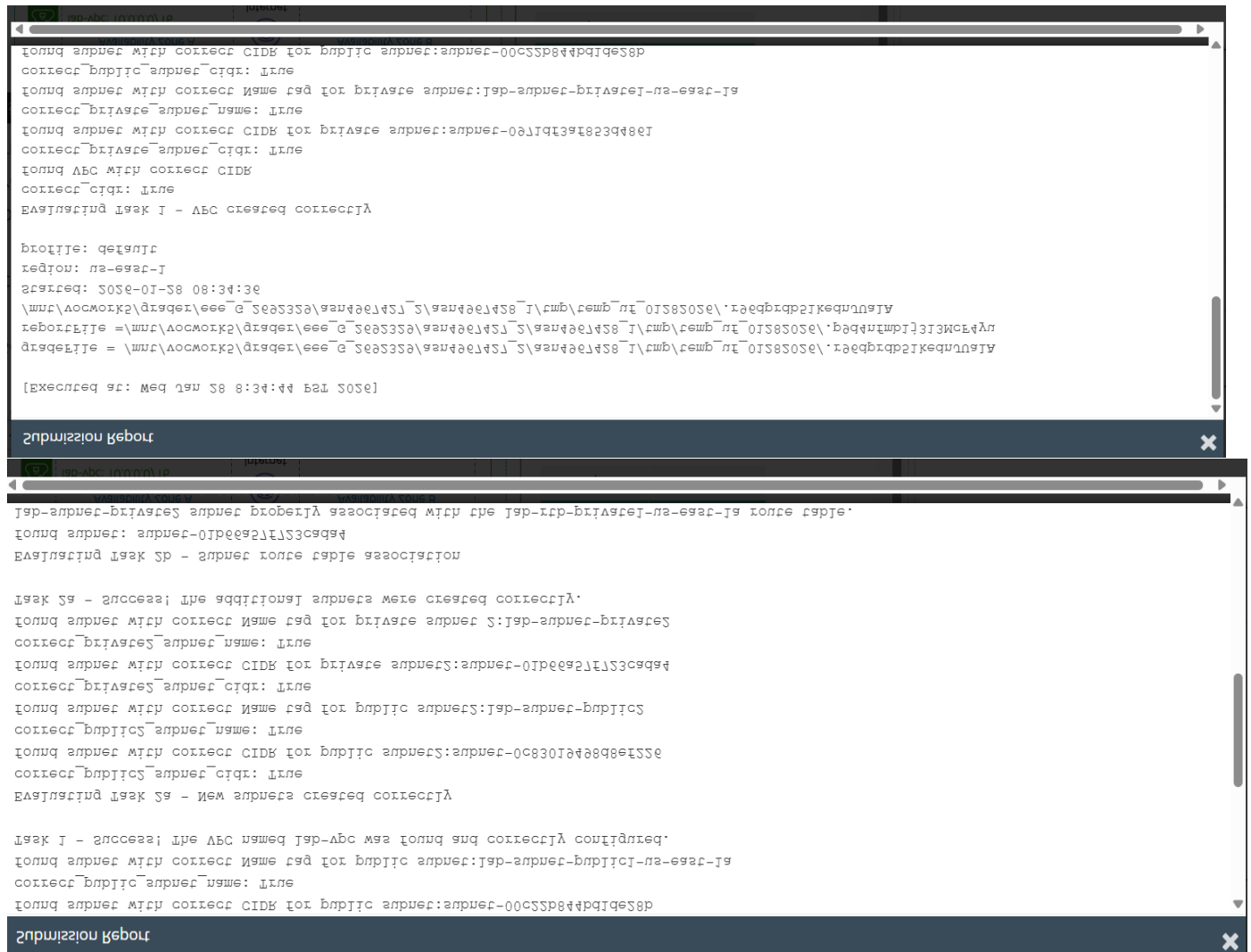
ec2-54-152-186-249.compute-1.amazonaws.com | [open address](#)

## Test the server

30. Open the instance details.
31. Copy the **Public IPv4 DNS**.
32. Paste it in your browser.
33. If the page opens, the web server is working and publicly reachable.



34. Finally, submit the lab and view the report.



### Submission Report

```
correct_private_subnet_name: true
found subnet with correct Name tag for private subnet 2:lab-subnet-private2
Task 2a - Success! The additional subnets were created correctly.

Evaluating Task 2b - Subnet route table association
found subnet: subnet-01b66a57f723cada4
lab-subnet-private2 subnet properly associated with the lab-rtb-private1-us-east-1a route table.
found subnet: subnet-0c83019498d8ef226
lab-subnet-public2 subnet properly associated with the lab-rtb-public route table.
Task 2b - Success! The lab-subnet-private2 subnet and lab-subnet-public2 subnet were both properly associated with the correct route table:

Evaluating Task 3 - Security group created correctly
Security Group created successfully
Web Security Group has been properly configured
Task 3 - Success! The security group was created correctly.

Evaluating Task 4a - EC2 instance created correctly
found instance with name Web Server 1.
instance_type: t2.micro
```

### Submission Report

```
Security Group created successfully
Web Security Group has been properly configured
Task 3 - Success! The security group was created correctly.

Evaluating Task 4a - EC2 instance created correctly
found instance with name Web Server 1.
instance_type: t2.micro
instance_subnet: subnet-0c83019498d8ef226
instance_security_group: Web Security Group
EC2 instance created successfully
Task 4a - Success! The EC2 instance was created correctly.

Evaluating Task 4b - EC2 instance website accessible
instance_public_ip: 54.152.186.249
url: http://54.152.186.249
EC2 instance created successfully
Task 4b - Success! The website was accessible.

Completed: 2026-01-28 08:34:43
```

```
Evaluating Task 4b - EC2 instance website accessible
instance_public_ip: 54.152.186.249
url: http://54.152.186.249
EC2 instance created successfully
Task 4b - Success! The website was accessible.

Completed: 2026-01-28 08:34:43
```

```
Back in submit.sh...
end
```

35. Grade:

<b>Total score</b>	<b>30/30</b>
Task 1 - VPC created correctly	5/5
Task 2a - New subnets created correctly	5/5
Task 2b - Subnet route table association	5/5
Task 3 - Security group created correctly	5/5
Task 4a - EC2 instance created correctly	5/5
Task 4b - EC2 instance website accessible	5/5

## Conclusion

- A private cloud network was created successfully.
- Networking rules were set so public and private areas stay organized and secure.
- A web server was launched inside the public subnet and connected to the internet.
- This exercise shows the basic but important skills needed to deploy real applications safely in the cloud.