



**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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Remarks

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.

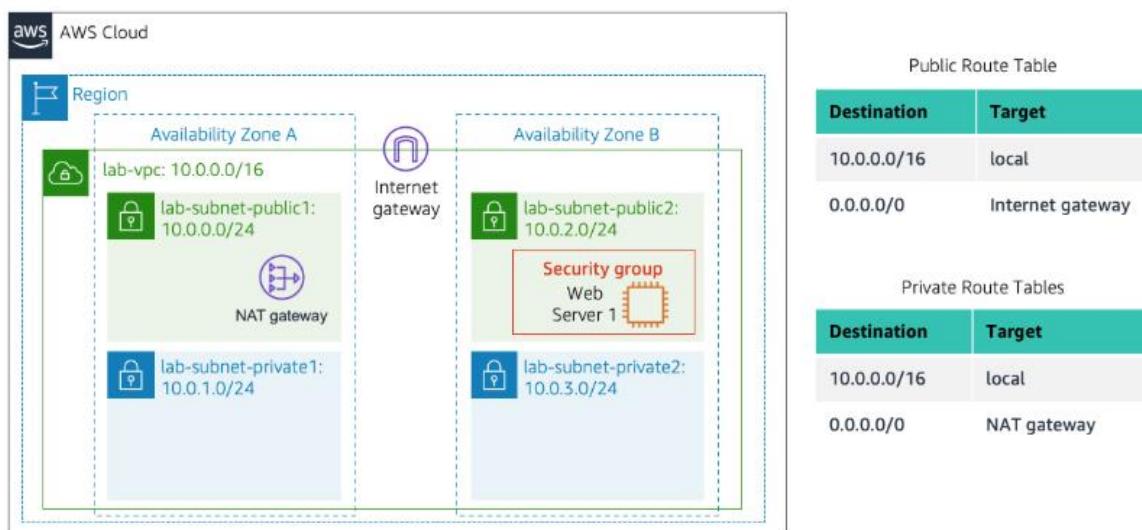
Scenario

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.



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:
 - o Public subnet to *10.0.0.0/24*
 - o Private subnet to *10.0.1.0/24*

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

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** 2

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
Subnets (2)
Subnets within this VPC
us-east-1a
1 lab-subnet-public1-us-east-1a
2 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.

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

Subnets (7) Info

Name	Subnet ID	State	VPC	Block Public...	IPv4 CIDR
Work Public Subnet	subnet-0c057d7d5c71c9f8f	Available	vpc-09c84bdca2cf42b9f Work...	Off	10.0.0.0/24
-	subnet-08b149cde2b4af718	Available	vpc-0ada651ba7b6046ad	Off	172.31.64.0/2
-	subnet-0a14ed41710820a9e	Available	vpc-0ada651ba7b6046ad	Off	172.31.80.0/2
-	subnet-065e5a0dd6527f346f	Available	vpc-0ada651ba7b6046ad	Off	172.31.0.0/20
-	subnet-0d5a0fb7930ecab9	Available	vpc-0ada651ba7b6046ad	Off	172.31.32.0/2

Select a subnet

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

Subnet 1 of 1

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

The name can be up to 256 characters long.

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

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

IPv4 subnet CIDR block

Tags - optional

Key	Value - optional
<input type="text" value="Name"/>	<input type="text" value="lab-subnet-public2"/>

Subnets (1) Info

Name	Subnet ID	State	VPC	Block Public...	IPv4 CIDR
lab-subnet-public2	subnet-0c83019498d8ef226	Available	vpc-08b17429ad9c4c9b6 lab...	Off	10.0.2.0/24

Select a subnet

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 'Create subnet' wizard. In the 'Subnet 1 of 1' step, the 'Subnet name' is set to 'lab-subnet-private2'. The 'Availability Zone' is 'United States (N. Virginia) / us-east-1a (us-east-1b)'. The 'IPv4 VPC CIDR block' is '10.0.0.0/16' and the 'IPv4 subnet CIDR block' is '10.0.3.0/24'. A tag 'Name' is added with the value 'lab-subnet-private2'. The final step shows the successful creation of the subnet.

The screenshot shows the VPC dashboard with the newly created subnet listed. The subnet ID is 'subnet-01b66a57f723cada4', it is in an 'Available' state, associated with VPC 'vpc-08b17429ad9c4c9b6', and has an IPv4 CIDR of '10.0.3.0/24'.

Update route tables

18. Open Route tables.

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

The screenshot shows the 'Route tables' page with one route table selected: 'lab-rtb-private1-us-east-1a'. This table is associated with the subnet 'lab-subnet-private1-us-east-1a'.

The screenshot shows the details for the selected route table, which is associated with the subnet 'lab-subnet-private1-us-east-1a' (subnet ID: 'subnet-0971df3af853d4861').

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

The screenshot shows the AWS VPC Route Tables page. A success message at the top states: "You have successfully updated subnet associations for rtb-0b78329642b1d39c4 / lab-rtb-private1-us-east-1a." The main table lists six route tables, with "lab-rtb-public" selected. Below the table, a specific route table configuration for "rtb-069d10ea5b0d7b4d6 / lab-rtb-public" is shown, detailing its subnet associations. At the bottom, there is a section for "Subnets without explicit associations" with two entries, and a "Edit subnet associations" button.

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

The screenshot shows the AWS Security Groups page. A "Create security group" form is open. In the "Basic details" section, the name is set to "Web Security Group". The "Description" field contains "Enable HTTP access". The "VPC" dropdown is set to "vpc-08b17429ad9c4c9b6 (lab-vpc)". In the "Inbound rules" section, it says "This security group has no inbound rules" and features an "Add rule" button.

22. Add inbound rule:

- Type: HTTP
- Source: Anywhere (IPv4)

23. Create the security group.

The screenshot shows the AWS VPC Security Groups interface. A new security group named "sg-01ee1437ee49d2c5b" has been created successfully. The inbound rules section shows one rule allowing HTTP traffic from 0.0.0.0/0 to port 80. The outbound rules section shows all traffic going to 0.0.0.0/0. The security group details page is also visible, showing the security group name, ID, owner, and various counts of rules and associations.

Launch the web server

24. Open EC2 service and click Launch instance.

The screenshot shows the AWS EC2 Instances page. A new instance is being launched, and the "Launch instance" button is highlighted. The "Service health" section indicates that the service is operating normally. The "Explore AWS" section provides tips for reducing costs.

25. Name it Web Server 1.

The screenshot shows the AWS EC2 'Launch an instance' wizard. The 'Quick Start' tab is selected. In the top navigation bar, 'EC2 > Instances > Launch an instance' is visible. The main area displays various AMI options: Amazon Linux, macOS, Ubuntu, Windows, Red Hat, SUSE Linux, and Debian. A search bar for 'Browse more AMIs' is present. Below the AMI section, there's a 'Description' of the selected Amazon Linux 2023 AMI, which is marked as 'Free tier eligible'. The 'Instance type' section shows 't2.micro' selected, along with its details and a 'Compare instance types' link. The 'Key pair (login)' section lists 'vockey' as the selected key pair. On the right side, a 'Summary' panel shows '1' instance, the selected 'Software Image (AMI)', 'Virtual server type (instance type) t2.micro', and other configuration details like 'Firewall (security group)' and 'Storage (volumes)'. Buttons for 'Cancel', 'Launch instance', and 'Preview code' are at the bottom.

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

This screenshot shows the same 'Launch an instance' wizard as the previous one, but with different configurations. The 'Instance type' section now shows 't2.micro' selected, with its details and a 'Compare instance types' link. The 'Key pair (login)' section lists 'vockey' as the selected key pair. The right side of the screen shows the 'Summary' panel with the same configuration: '1' instance, 'Amazon Linux 2023 AMI 2023.10....', 'Virtual server type (instance type) t2.micro', and other settings. Buttons for 'Cancel', 'Launch instance', and 'Preview code' are at the bottom.

27. Choose the provided key pair vockey.

The screenshot shows the 'Launch an instance' wizard with the 'Key pair (login)' section selected. It displays the message: '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.' Below this, a 'Key pair name - required' field contains 'vockey', and a 'Create new key pair' button is available. The 'Network settings' section shows 'Network' set to 'vpc-0ada651ba7b6046ad' and an 'Edit' button. The right side of the screen shows the 'Summary' panel with the same configuration: '1' instance, 'Amazon Linux 2023 AMI 2023.10....', 'Virtual server type (instance type) t2.micro', and other settings. Buttons for 'Cancel', 'Launch instance', and 'Preview code' are at the bottom.

28. Select Exacting security group

29. Network settings:

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

Subnet | Info

subnet-0c83019498d8ef226
VPC: vpc-08b17429ad9c4c9b6 Owner: 499314174579
Availability Zone: us-east-1b (use1-a2z) Zone type: Availability Zone
IP addresses available: 251 CIDR: 10.0.2.0/24

lab-subnet-public2

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

Select security groups

Web Security Group sg-01ee1437ee49d2c5b
VPC: vpc-08b17429ad9c4c9b6

Common security groups | Info

Compare security group rules

Advanced network configuration

Summary

Number of instances | Info

1

Software Image (AMI)

Amazon Linux 2023 AMI 2023 ami-0532be01f26a3de55

Virtual server type (instance)

t2.micro

Firewall (security group)

Web Security Group

Storage (volumes)

1 volume(s) - 8 GiB

Free tier: In your first year

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"

1 2 3 4 5 6

Create billing and free tier usage alerts

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

Connect to instance

Learn more

Connect to your instance

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

Connect an RDS database

Create EBS snapshot policy

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

Create EBS snapshot policy

EC2 > Instances

Instances (1/2) | Info

Last updated less than a minute ago

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

Name	Instance ID	Instance state	Instance type	Status check	Alarm status	Availability Zone	Public IP
Web Server 1	i-0021d6aeac511109b	Running	t2.micro	2/2 checks passed	View alarms +	us-east-1b	ec2-54-152-186-249.compute-1.amazonaws.com
Bastion Host	i-0d7e6ecdbe8b48168	Running	t2.micro	2/2 checks passed	View alarms +	us-east-1a	ec2-44-196-111-111.compute-1.amazonaws.com

i-0021d6aeac511109b (Web Server 1)

Details | Status and alarms | Monitoring | Security | Networking | Storage | Tags

Instance summary

Instance ID: i-0021d6aeac511109b

Public IPv4 address: 54.152.186.249 | open address

Private IPv4 addresses: 10.0.2.200

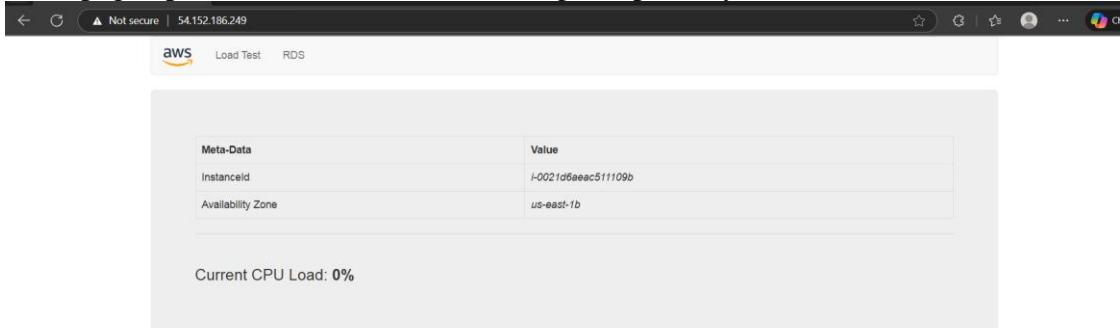
IPv6 address: -

Instance state: Running

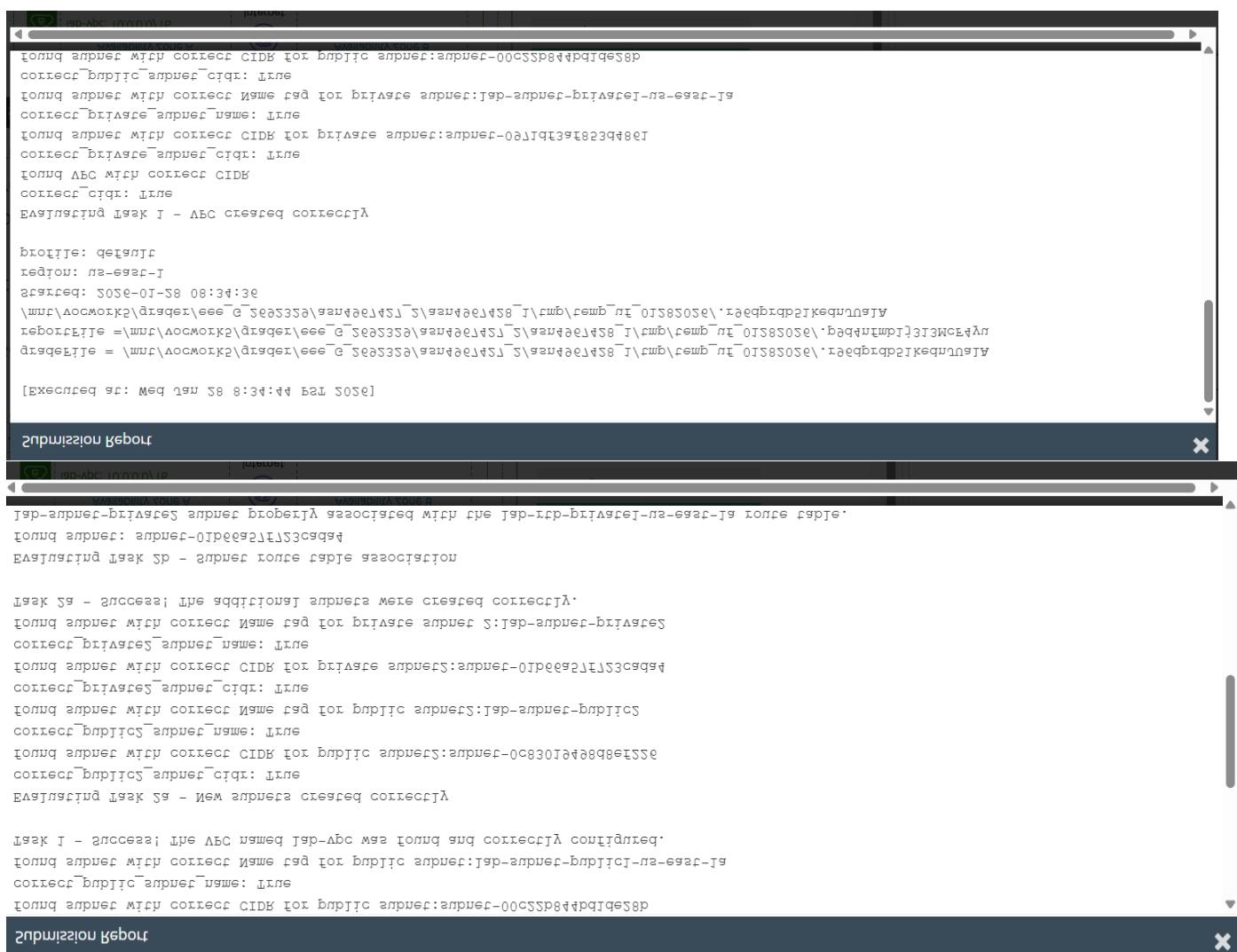
Public DNS: ec2-54-152-186-249.compute-1.amazonaws.com | open

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_private2_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 tables.
```

Evaluating Task 3 - Security group created correctly

Security Group created successfully

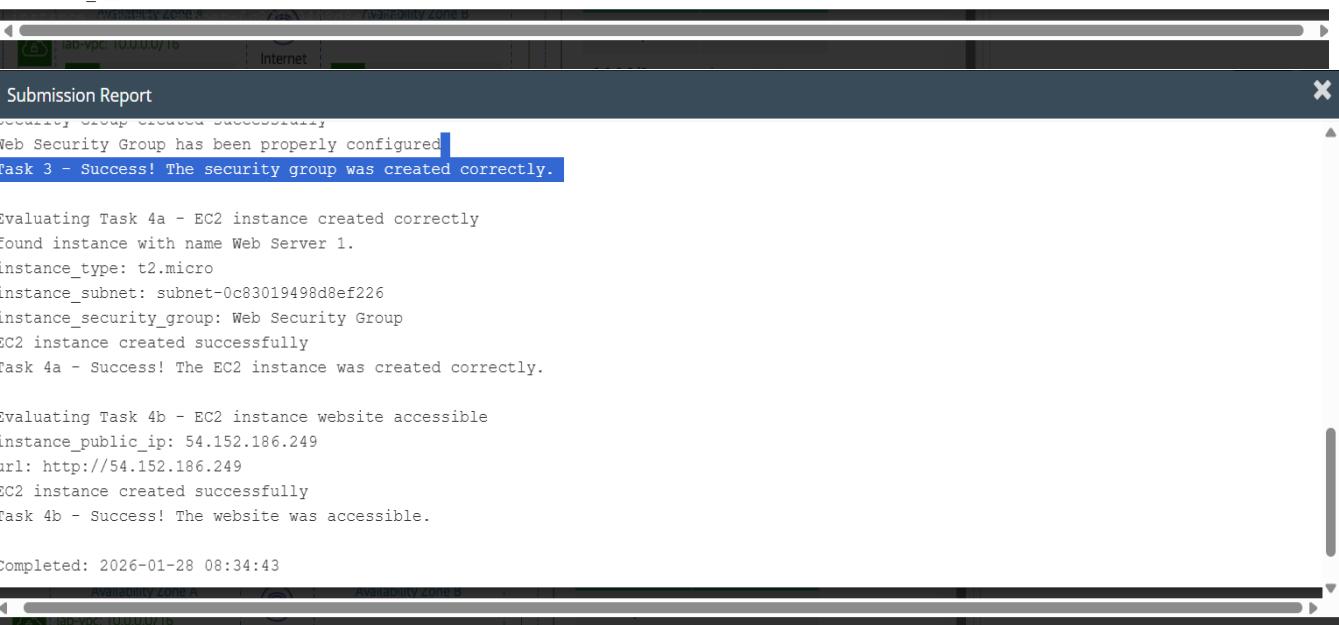
Web Security Group has been properly configured

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



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:

Total score	30/30
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.