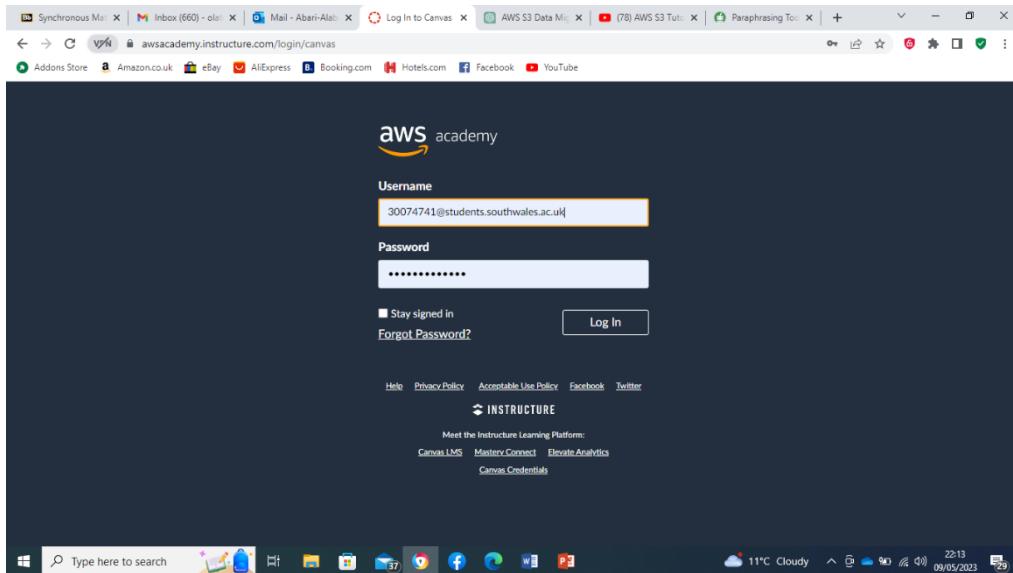
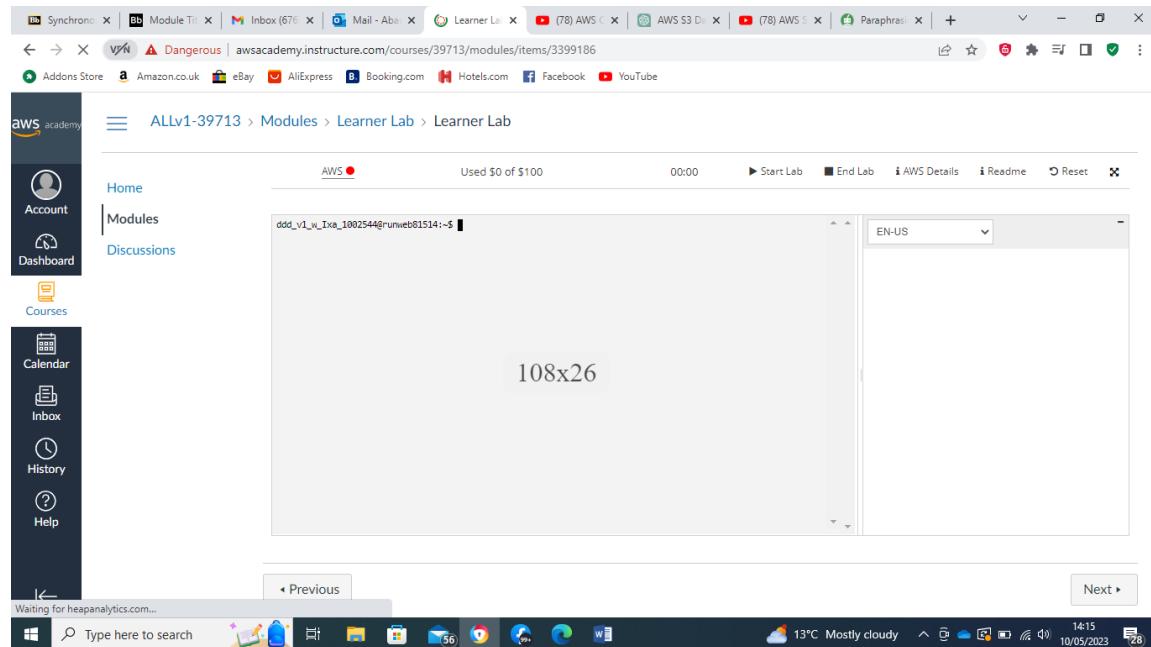


Step-By-Step Guide: Network (Designing a VPC) and Web Application (Hosting a web application)

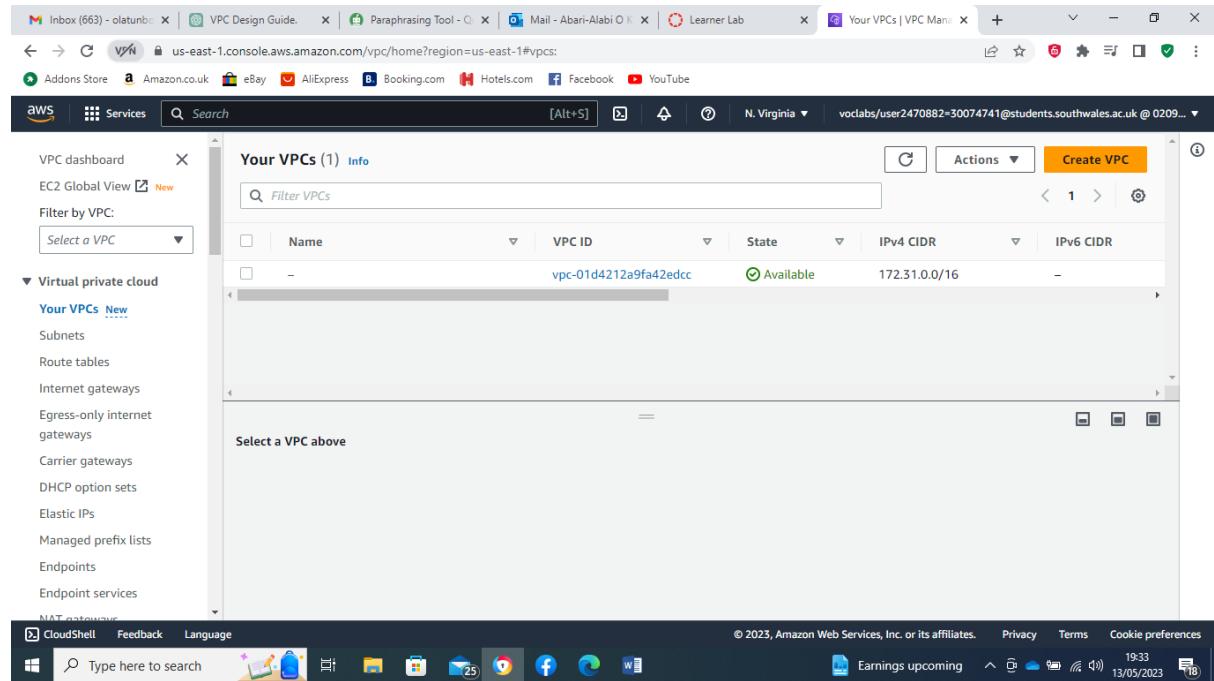
1. Open an AWS website and Click "Log in" on the AWS website. Sign-in with your credentials given to you by your administrator



2. Access the AWS Management Console by choosing ‘Start Lab’ to launch your lab. Wait until you see the message “Lab status: ready”. At the top of your screen, click ‘AWS’, this will open the AWS Management Console in a new browser tab.

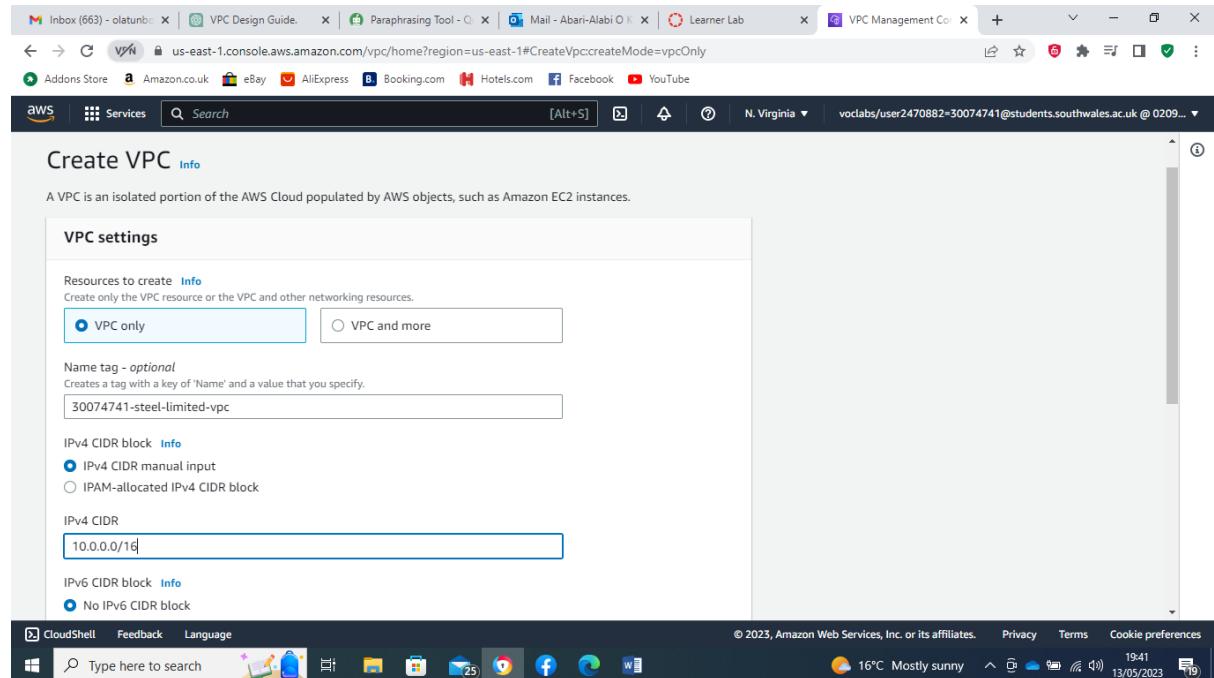


3. After logging in, go to the AWS service and navigate to the VPC dashboard. Click on "Your VPCs" and then click on "Create VPC".

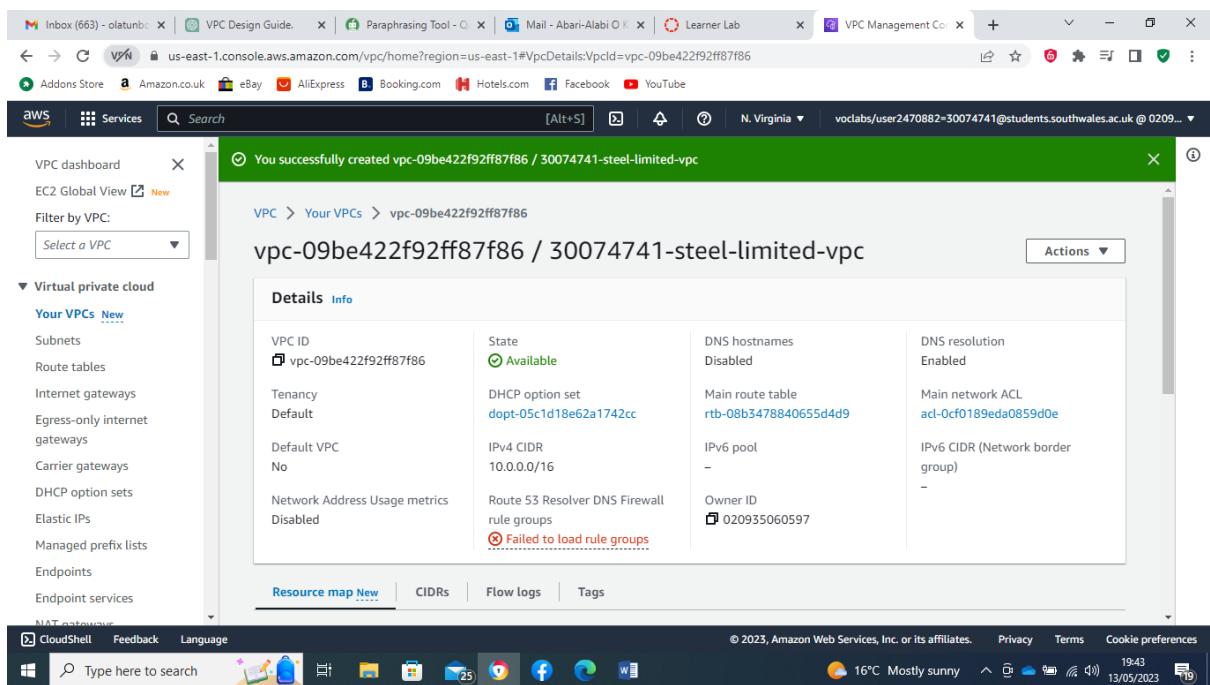
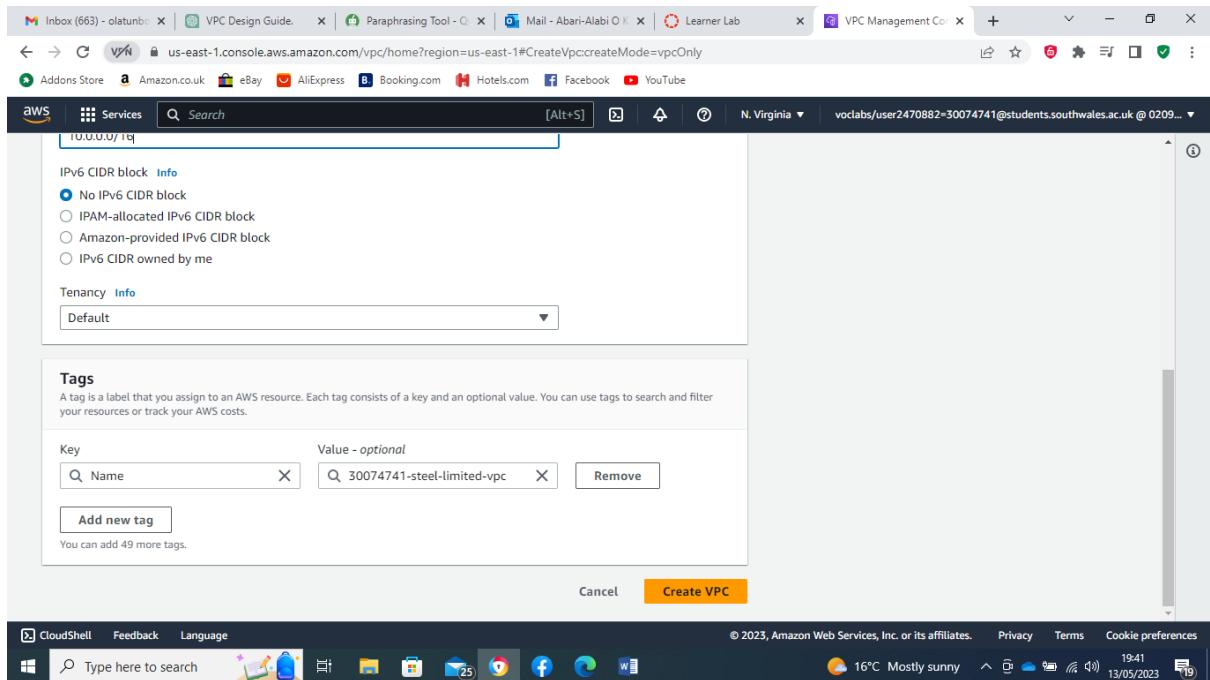


The screenshot shows the AWS VPC dashboard. On the left, there's a sidebar with options like EC2 Global View, Filter by VPC, Virtual private cloud, and various networking components. The main area displays a table titled "Your VPCs (1) Info" with one row. The row contains the VPC ID "vpc-01d4212a9fa42edcc", State "Available", IPv4 CIDR "172.31.0.0/16", and IPv6 CIDR "-". Below the table, a message says "Select a VPC above". At the top right, there are "Actions" and "Create VPC" buttons.

4. In the "Create VPC" dialog box, enter a name for your VPC, here "30074741-steel-limited-vpc". Set the "IPv4 CIDR block" to a value that will provide enough IP addresses for your VPC. You should use "10.0.0.0/16". Click on "Create VPC" to create your new VPC.



The screenshot shows the "Create VPC" dialog box. Under "VPC settings", there are two radio button options: "VPC only" (selected) and "VPC and more". A "Name tag - optional" field contains "30074741-steel-limited-vpc". Under "IPv4 CIDR block", there are two options: "IPv4 CIDR manual input" (selected) and "IPAM-allocated IPv4 CIDR block". The "IPv4 CIDR" field is filled with "10.0.0.0/16". At the bottom, there's an "IPv6 CIDR block" section with the option "No IPv6 CIDR block" selected. The status bar at the bottom indicates "16°C Mostly sunny" and the date "13/05/2023".



5. Once your VPC is created, do the following:

- Click on "Subnets" in the left-hand menu.
- Click on "Create subnet" to create a new subnet.
- In the "Create subnet" dialog box, enter a name for your subnet, such as "public-subnet". Choose the VPC you just created from the "VPC" dropdown menu.

d. Set the "Availability Zone" to the desired region. Set the "IPv4 CIDR block" to a public IP range, here use "10.0.1.0/24".

e. Click on "Create" to create your public subnet.

The screenshot shows the 'Create subnet' wizard in the AWS VPC Management Console. The 'VPC' section displays the VPC ID 'vpc-09be422f92ff87f86 (30074741-steel-limited-vpc)' and the associated IPv4 CIDR '10.0.0.0/16'. The 'Subnet settings' section is expanded, showing the 'Subnet 1 of 1' configuration. The subnet name is set to 'public-subnet', the availability zone is 'US East (N. Virginia) / us-east-1a', and the IPv4 CIDR block is '10.0.1.0/24'. The bottom status bar indicates the date and time as '13/05/2023 20:01'.

This screenshot shows the same 'Create subnet' wizard with more detailed configuration options visible. In the 'Subnet 1 of 1' section, a 'Tags - optional' section is shown, containing a single tag named 'Name' with the value 'public-subnet'. The bottom status bar shows the date and time as '13/05/2023 20:01'.

The screenshot shows the AWS VPC Management Console. A green success message at the top right says "You have successfully created 1 subnet: subnet-0d402af808d92a8c5". Below it, the "Subnets (1) Info" section displays a table with one row. The table columns are Name, Subnet ID, State, VPC, and IPv4 CIDR. The single entry is "public-subnet" with Subnet ID "subnet-0d402af808d92a8c5", State "Available", VPC "vpc-09be422f92ff87f86 | 300...", and IPv4 CIDR "10.0.1.0/24". On the left sidebar, under "Virtual private cloud", "Your VPCs" is selected. At the bottom, the Windows taskbar shows the date as 13/05/2023.

6. Repeat steps “5a-5e” to create two private subnets, making sure to use different IPv4 CIDR blocks than the public subnet. Here, you should use “10.0.2.0/24” and “10.0.3.0/24”.

The screenshot shows the "Create Subnet" wizard. The first step, "Subnet 1 of 1", is displayed. It asks for a "Subnet name" (input: "private-subnet1"), an "Availability Zone" (input: "US East (N. Virginia) / us-east-1a"), and an "IPv4 CIDR block" (input: "10.0.2.0/24"). Below these fields, there's a "Tags - optional" section with a key-value pair ("Name" and "private-subnet1"). At the bottom, there are buttons for "Add new subnet" and "Next Step". The Windows taskbar at the bottom shows the date as 13/05/2023.

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us-east-1.console.aws.amazon.com/vpc/home?region=us-east-1#subnets:SubnetId=subnet-016e6e3a4915b5075

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VPC dashboard EC2 Global View New

Filter by VPC: Select a VPC

Virtual private cloud Your VPCs New

Subnets

Route tables Internet gateways Egress-only internet gateways Carrier gateways DHCP option sets Elastic IPs Managed prefix lists Endpoints Endpoint services

NAT gateways

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You have successfully created 1 subnet: subnet-016e6e3a4915b5075

Subnets (1) Info

Subnet ID: subnet-016e6e3a4915b5075 Clear filters

Name	Subnet ID	State	VPC	IPv4 CIDR
private-subnet1	subnet-016e6e3a4915b5075	Available	vpc-09be422f92ff87f86 300...	10.0.2.0/24

Select a subnet

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us-east-1.console.aws.amazon.com/vpc/home?region=us-east-1#CreateSubnet:

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Subnet 1 of 1

Subnet name Create a tag with a key of 'Name' and a value that you specify. private-subnet2 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. US East (N. Virginia) / us-east-1a

IPv4 CIDR block Info Q 10.0.3.0/24

Tags - optional

Key	Value - optional
Name	private-subnet2

Add new tag You can add 49 more tags. Remove Add new subnet

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The screenshot shows the AWS VPC Subnets management interface. A green success message at the top states: "You have successfully created 1 subnet: subnet-03e839bbea2a18a24". The main table displays one subnet entry:

Name	Subnet ID	State	VPC	IPv4 CIDR
private-subnet2	subnet-03e839bbea2a18a24	Available	vpc-09be422f92ff87f86 300...	10.0.3.0/24

7. Next is Internet Gateway:

- Click on "Internet Gateways" in the left-hand menu.
- Click on "Create internet gateway" to create a new internet gateway.
- Give your internet gateway a name, as "30074741-steel-limited-igw", and click on "Create".
- Select your newly created internet gateway and click on "Attach to VPC".
- Select the VPC you created (30074741-steel-limited-vpc and click on "Attach internet gateway".

The screenshot shows the AWS Internet Gateways management interface. A green success message at the top states: "You have successfully created 1 internet gateway: igw-067044fa1d630c0b7". The main table displays one internet gateway entry:

Name	Internet gateway ID	State	VPC ID	Owner
-	igw-067044fa1d630c0b7	Attached	vpc-01d4212a9fa42edcc	02093506

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for the gateway below.

Internet gateway settings

Name tag
Creates a tag with a key of 'Name' and a value that you specify.
30074741-steel-limited-igw

Tags - optional
A tag is a label that you assign to an AWS resource. Each tag consists of a key and an optional value. You can use tags to search and filter your resources or track your AWS costs.

Key	Value - optional
Q Name	Q 30074741-steel-limited-igw

Add new tag
You can add 49 more tags.

Cancel Create internet gateway

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us-east-1.console.aws.amazon.com/vpc/home?region=us-east-1#InternetGateway:internetGatewayId=igw-00f994553147979b4

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The following internet gateway was created: igw-00f994553147979b4 - 30074741-steel-limited-igw. You can now attach to a VPC to enable the VPC to communicate with the internet. Attach to a VPC

VPC dashboard EC2 Global View New

Filter by VPC: Select a VPC

Virtual private cloud Your VPCs New Subnets Route tables Internet gateways Egress-only internet gateways Carrier gateways DHCP option sets Elastic IPs Managed prefix lists Endpoints Endpoint services NAT gateways

VPC > Internet gateways > igw-00f994553147979b4 / 30074741-steel-limited-igw Actions ▾

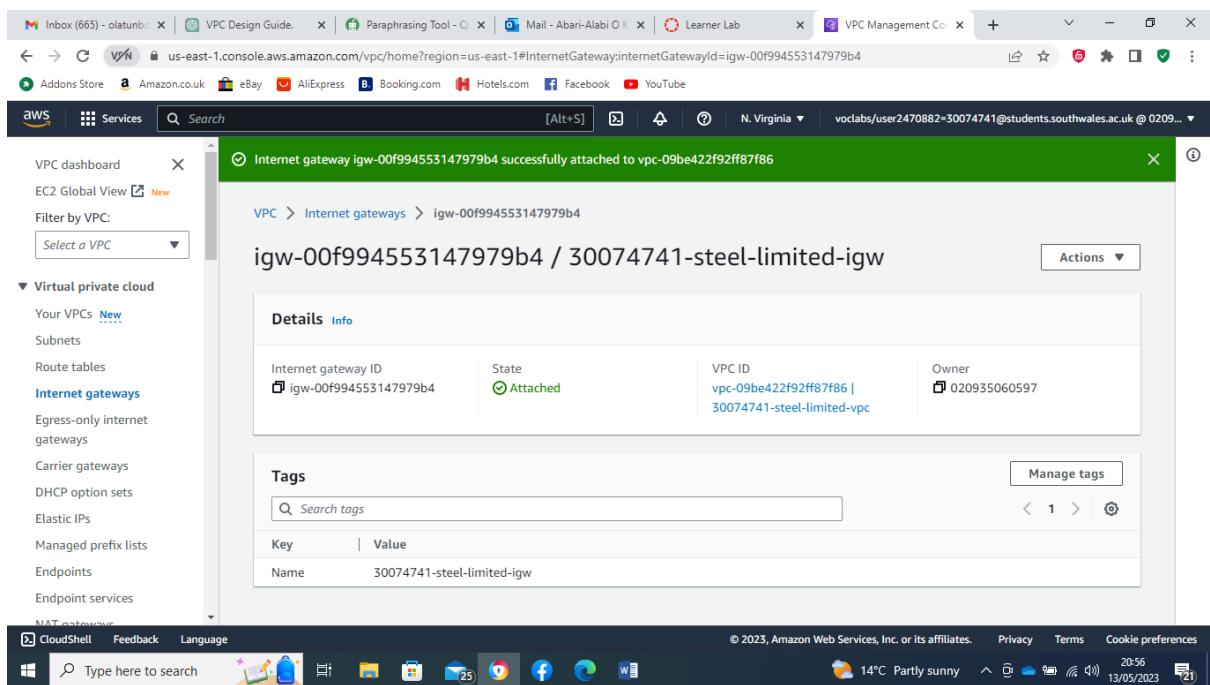
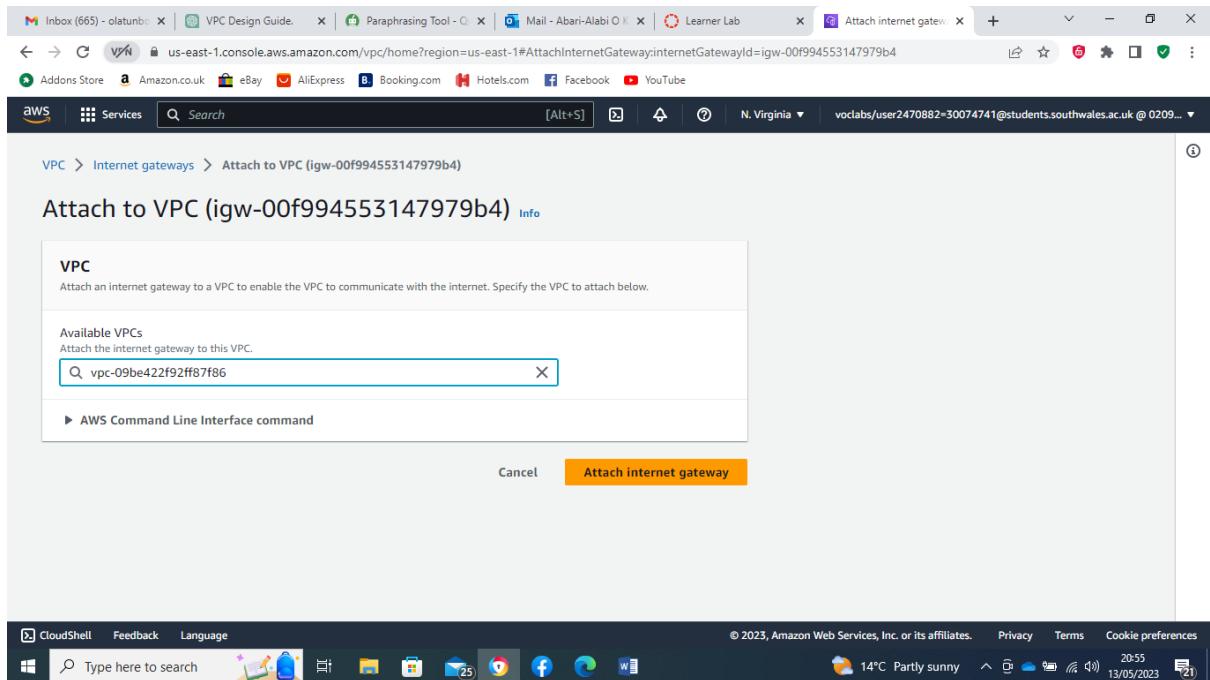
Details		Info	
Internet gateway ID	igw-00f994553147979b4	State	Detached
		VPC ID	-
		Owner	020935060597

Tags

Manage tags	
Key	Value
Name	30074741-steel-limited-igw

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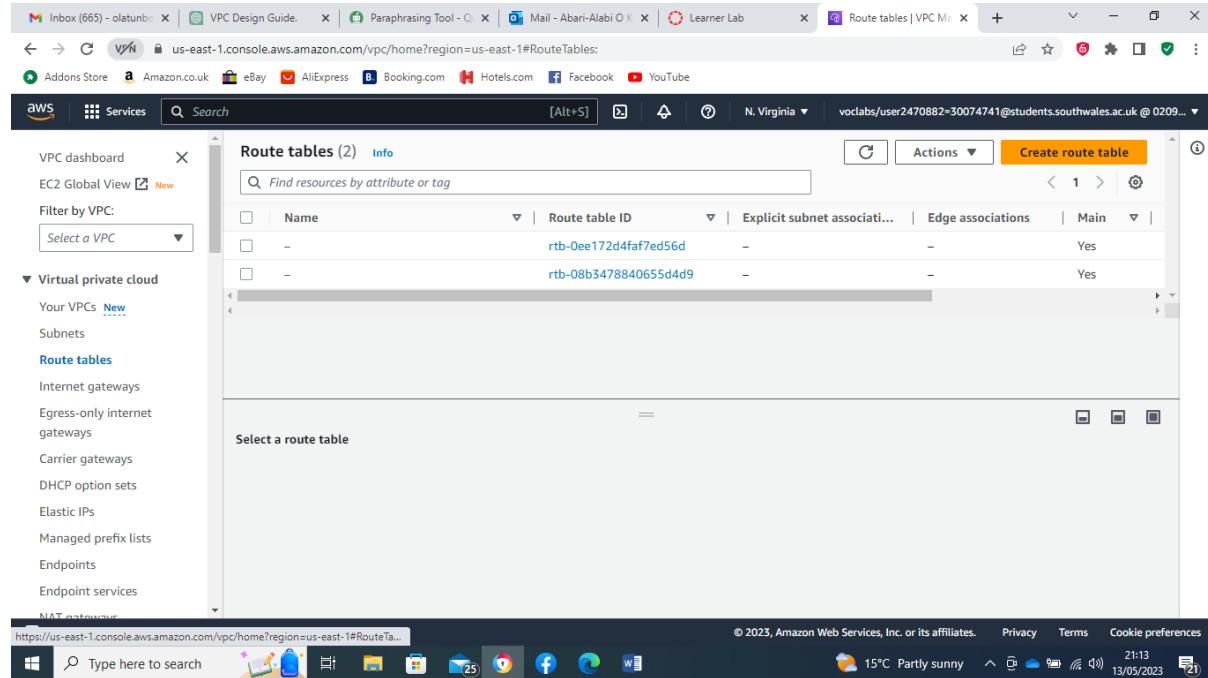
8. Next Route Table:

- Click on "Route Tables" in the left-hand menu.
- Click on "Create route table" to create a new route table.
- Give your route table a name, such as "{student number}-steel-limited-rt", and select the VPC you created in step 3.
- Click on "Create" to create your new route table.

e. Once your new route table is created, select it and click on the "Routes" tab.

f. Click on "Edit routes" and add a new route with the destination of "0.0.0.0/0" and the target of the internet gateway (30074741-steel-limited-igw) we created earlier.

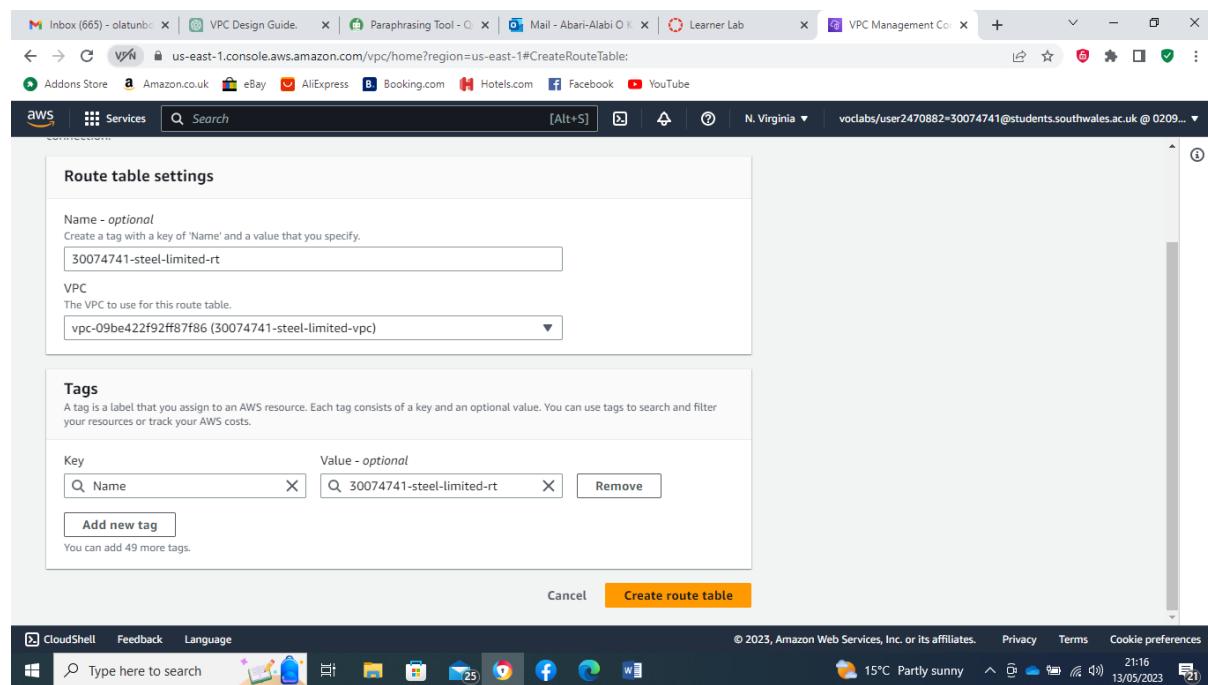
g. Click on "Save routes".



The screenshot shows the AWS VPC Route Tables page. On the left, there's a sidebar with options like VPC dashboard, EC2 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, Endpoints, and Endpoint services. The main area is titled "Route tables (2)" and contains a table with two rows:

Name	Route table ID	Explicit subnet associations	Edge associations	Main
-	rtb-0ee172d4faf7ed56d	-	-	Yes
-	rtb-08b3478840655d4d9	-	-	Yes

Below the table, there's a section titled "Select a route table". At the bottom right of the main area, there are "Actions" and "Create route table" buttons.



The screenshot shows the "Create route table" settings page. It has sections for "Route table settings" and "Tags".

Route table settings:

- Name - optional:** A text input field containing "30074741-steel-limited-rt".
- VPC:** A dropdown menu showing "vpc-09be422f92ff87f86 (30074741-steel-limited-vpc)".

Tags:

A tag is a label you assign to an AWS resource. Each tag consists of a key and an optional value. You can use tags to search and filter your resources or track your AWS costs.

Key	Value - optional
Q Name	Q 30074741-steel-limited-rt X Remove

Buttons at the bottom include "Cancel" and "Create route table".

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VPC dashboard EC2 Global View New

Filter by VPC: Select a VPC

Virtual private cloud Your VPCs New Subnets

Route tables

Internet gateways Egress-only internet gateways Carrier gateways DHCP option sets Elastic IPs Managed prefix lists Endpoints Endpoint services NAT gateways

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Route table rtb-01eef0834e5b16b2c | 30074741-steel-limited-rt was created successfully.

VPC > Route tables > rtb-01eef0834e5b16b2c

rtb-01eef0834e5b16b2c / 30074741-steel-limited-rt

You can now check network connectivity with Reachability Analyzer Run Reachability Analyzer

Details Info

Route table ID rtb-01eef0834e5b16b2c	Main No	Explicit subnet associations -	Edge associations -
VPC vpc-09be422f92ff87f86 30074741-steel-limited-vpc	Owner ID 020935060597		

Routes Subnet associations Edge associations Route propagation Tags

Routers (1)

Edit routes

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VPC > Route tables > rtb-01eef0834e5b16b2c > Edit routes

Edit routes

Destination	Target	Status	Propagated
10.0.0.0/16	local	Active	No
0.0.0.0/0	igw-00f994553147979b4	-	No

Add route Cancel Preview Save changes

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The screenshot shows the AWS VPC Management Console with a success message: "Updated routes for rtb-01eef0834e5b16b2c / 30074741-steel-limited-rt successfully". The main panel displays details for the route table "rtb-01eef0834e5b16b2c / 30074741-steel-limited-rt". It shows the Route table ID, Main status (No), and VPC information (VPC ID: vpc-09be422f92ff87f86). Below this, there are tabs for Routes, Subnet associations, Edge associations, Route propagation, and Tags. Under the Routes tab, it says "Routes (2)". At the bottom, there are buttons for Run Reachability Analyzer, Edit routes, and a CloudShell icon.

9. Next:

- Associate your public subnet with your new route table by selecting your public subnet, clicking on "Actions", and selecting "Edit route table association".
- Select the route table you just created and click on "Save".
- Repeat step (9a) for each of your private subnets, but associate them with a different route table that does not have a route to the internet gateway. This will ensure that the private subnets are not accessible from the internet.

The screenshot shows the AWS VPC Management Console on the Subnets page. It lists 1/9 subnets, including "public-subnet" which is selected. The table columns are Name, Subnet ID, State, and VPC. The "Actions" menu for the selected subnet includes options like View details, Create flow log, Edit subnet settings, Edit IPv6 CIDRs, Edit network ACL association, Edit route table association, and Edit CIDR reservations. Below the table, a specific subnet is selected: "subnet-0d402af808d92a8c5 / public-subnet". The Details tab is active, showing the subnet's ID, ARN, and state. Other tabs include Flow logs, Route table, Network ACL, CIDR reservations, Sharing, and Tags.

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Subnet route table settings

Subnet ID: subnet-0d402af808d92a8c5

Route table ID: rtb-01eef0834e5b16b2c (30074741-steel-limited-rt)

You can now check network connectivity with Reachability Analyzer | Run Reachability Analyzer

Routes (2)

Destination	Target
10.0.0.0/16	local
0.0.0.0/0	igw-00f994553147979b4

Cancel | Save

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Subnet (subnet-0d402af808d92a8c5) has been successfully associated with route table (rtb-01eef0834e5b16b2c).

Subnets (9) info

Name	Subnet ID	State	VPC	IPv4 CIDR
-	subnet-0e53a82f9b4031e98	Available	vpc-01d4212a9fa42edcc	172.31.64.0/20
private-subnet1	subnet-016e6e3a4915b5075	Available	vpc-09be422f92ff87f86 300...	10.0.2.0/24
-	subnet-0cb77ad171f98a3ea	Available	vpc-01d4212a9fa42edcc	172.31.16.0/20

Select a subnet

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us-east-1.console.aws.amazon.com/vpc/home?region=us-east-1#subnets:

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VPC dashboard EC2 Global View New Filter by VPC: Select a VPC

Virtual private cloud Your VPCs New Subnets Route tables Internet gateways Egress-only internet gateways Carrier gateways DHCP option sets Elastic IPs Managed prefix lists Endpoints Endpoint services NAT gateways

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Subnets (1/9) Info Actions Create subnet

Filter subnets

	Name	Subnet ID	State	VPC	IPv4 CIDR
<input type="checkbox"/>	-	subnet-0e53a82f9b4031e98	Available	vpc-01d4212a9fa42edcc	172.31.64.0/20
<input checked="" type="checkbox"/>	private-subnet1	subnet-016e6e3a4915b5075	Available	vpc-09be422f92ff87f86 300...	10.0.2.0/24
<input type="checkbox"/>	-	subnet-0cb77ad171f98a3ea	Available	vpc-01d4212a9fa42edcc	172.31.16.0/20

subnet-016e6e3a4915b5075 / private-subnet1

Details Flow logs Route table Network ACL CIDR reservations Sharing Tags

Details

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us-east-1.console.aws.amazon.com/vpc/home?region=us-east-1#subnets:

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VPC dashboard EC2 Global View New Filter by VPC: Select a VPC

Virtual private cloud Your VPCs New Subnets Route tables Internet gateways Egress-only internet gateways Carrier gateways DHCP option sets Elastic IPs Managed prefix lists Endpoints Endpoint services NAT gateways

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Subnets (1/9) Info Actions Create subnet

Filter subnets

	Name	Subnet ID	State	VPC	IPv4 CIDR
<input type="checkbox"/>	-	subnet-02960fe0e4d42ba7	Available	vpc-01d4212a9fa42edcc	172.31.32.0/20
<input type="checkbox"/>	-	subnet-021cede37c80105fa	Available	vpc-01d4212a9fa42edcc	172.31.80.0/20
<input type="checkbox"/>	-	subnet-050d471d7906f6570	Available	vpc-01d4212a9fa42edcc	172.31.48.0/20
<input checked="" type="checkbox"/>	private-subnet2	subnet-03e839bbea2a18a24	Available	vpc-09be422f92ff87f86 300...	10.0.3.0/24

subnet-03e839bbea2a18a24 / private-subnet2

Details Flow logs Route table Network ACL CIDR reservations Sharing Tags

Details

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Hosting a Web Application

1. Launch a new EC2 instance in your newly designed VPC. Choose an appropriate instance type and operating system. You can follow the previous step-by-step guide on EC2 launching, the only difference here will be your VPC settings as view below:

The screenshot shows the 'Launch an instance' wizard on the AWS Management Console. The 'Name and tags' section has 'Name' set to '30074741-suitable-instance2'. The 'Application and OS Images (Amazon Machine Image)' section shows 'Amazon Linux 2023 AMI 2023.0.2...' selected. The 'Virtual server type (instance type)' is set to 't2.micro'. Under 'Storage (volumes)', there is one volume of 8 GB. On the right, a summary panel shows the configuration: 1 instance, Amazon Linux 2023 AMI 2023.0.2..., t2.micro instance type, and 1 volume(8 GB). A large orange 'Launch instance' button is prominent.

The screenshot shows the 'Instance details' page for the launched EC2 instance. The instance ID is 'i-0beed62b2a685ad25'. The 'Instance summary' table provides the following details:

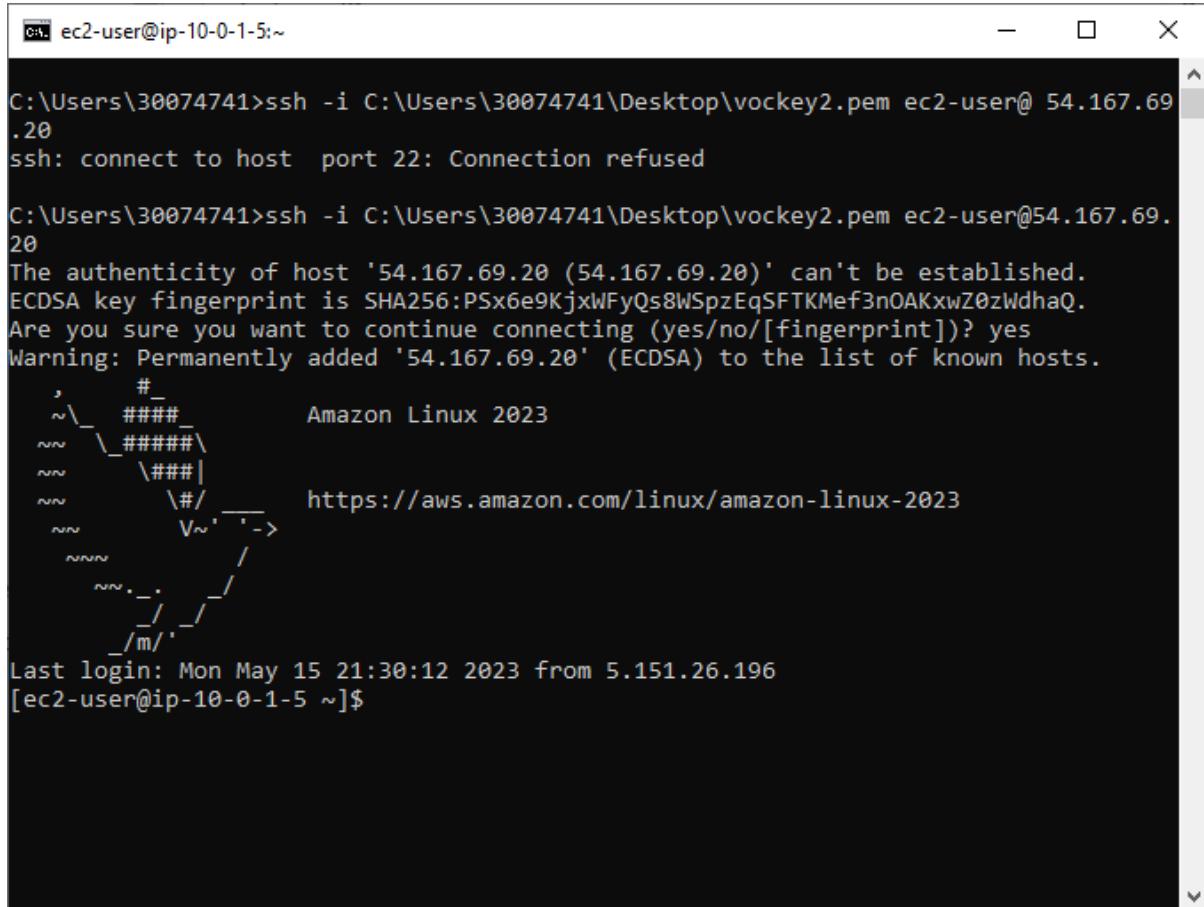
Attribute	Value
Public IPv4 address	34.234.87.61
Private IP4 addresses	10.0.1.5
Public IPv4 DNS	-
Elastic IP addresses	-
AWS Compute Optimizer finding	Opt-in to AWS Compute Optimizer for recommendations.
Auto Scaling Group name	-

Other visible fields include: Instance state (Running), Hostname type (IP name: ip-10-0-1-5.ec2.internal), Private IP DNS name (ip-10-0-1-5.ec2.internal), Instance type (t2.micro), VPC ID (vpc-09be422f92ff87f86), and Subnet ID.

2. Once your instance is running, SSH into it using an SSH client like PuTTY. You will need to use the key pair you specified when launching the instance. As you can see below, we have successfully

connected to our EC2 instance using ssh -i C:\Users\30074741\Desktop\vokey2.pem ec2-user@54.167.69.20 as earlier explained.

NOTE: The IP here is dynamic and the path too can change depending on the system you are using.



The screenshot shows a terminal window with the following content:

```
ec2-user@ip-10-0-1-5:~
```

```
C:\Users\30074741>ssh -i C:\Users\30074741\Desktop\vokey2.pem ec2-user@ 54.167.69.20
ssh: connect to host 54.167.69.20 port 22: Connection refused

C:\Users\30074741>ssh -i C:\Users\30074741\Desktop\vokey2.pem ec2-user@54.167.69.20
The authenticity of host '54.167.69.20 (54.167.69.20)' can't be established.
ECDSA key fingerprint is SHA256:PSx6e9KjxWFyQs8WSpzEqSFTKMef3nOAKXwZ0zWdhaQ.
Are you sure you want to continue connecting (yes/no/[fingerprint])? yes
Warning: Permanently added '54.167.69.20' (ECDSA) to the list of known hosts.

          #
 ~\_ ##_
 ~~ \_#####\
 ~~   \###|
 ~~     \#/  __ https://aws.amazon.com/linux/amazon-linux-2023
 ~~      \~'-'>
 ~~~   /
 ~~.~. /_
 /_m/.'
```

Last login: Mon May 15 21:30:12 2023 from 5.151.26.196
[ec2-user@ip-10-0-1-5 ~]\$

3. As we are in the EC2 instance (30074741-suitable-instance2) created using the newly designed VPC (300-steel-limited-vpc), hosting of the website begins:

- Run the command sudo su - to switch to the root user.
- Run the command yum update -y to update the instance's software packages.

```
root@ip-10-0-1-5:~  
C:\Users\30074741>ssh -i C:\Users\30074741\Desktop\vockey2.pem ec2-user@54.167.69.  
20  
The authenticity of host '54.167.69.20 (54.167.69.20)' can't be established.  
ECDSA key fingerprint is SHA256:PSx6e9KjxFyQs8WSpzEqSFTKmef3nOAKxwZ0zWdhaQ.  
Are you sure you want to continue connecting (yes/no/[fingerprint])? yes  
Warning: Permanently added '54.167.69.20' (ECDSA) to the list of known hosts.  
      _#_  
     ~\_\_ #####_          Amazon Linux 2023  
     ~~ \|#####\|  
     ~~ \###|  
     ~~   \#/  ____ https://aws.amazon.com/linux/amazon-linux-2023  
     ~~     V~' '-->  
     ~~~      /  
     ~~_. /  
     _/_/_/  
     _/m/'  
Last login: Mon May 15 21:30:12 2023 from 5.151.26.196  
[ec2-user@ip-10-0-1-5 ~]$ sudo su -  
Last login: Mon May 15 21:30:37 UTC 2023 on pts/0  
[root@ip-10-0-1-5 ~]# yum update -y  
Last metadata expiration check: 17:08:17 ago on Mon May 15 20:12:06 2023.  
Dependencies resolved.  
Nothing to do.  
Complete!  
[root@ip-10-0-1-5 ~]# yum install -y httpd  
Last metadata expiration check: 17:11:43 ago on Mon May 15 20:12:06 2023.  
Dependencies resolved.  
=====  
 Package           Arch      Version           Repository      Size  
=====
```

c. Run the command `yum install -y httpd` to install the Apache web server.

```
root@ip-10-0-1-5:~ - □ X ^ ↴ ↵
Verifying : apr-util-openssl-1.6.3-1.amzn2023.0.1.x86_64 2/12
Verifying : httpd-2.4.56-1.amzn2023.x86_64 3/12
Verifying : libbrotli-1.0.9-4.amzn2023.0.2.x86_64 4/12
Verifying : httpd-core-2.4.56-1.amzn2023.x86_64 5/12
Verifying : apr-util-1.6.3-1.amzn2023.0.1.x86_64 6/12
Verifying : mod_http2-2.0.11-2.amzn2023.x86_64 7/12
Verifying : httpd-tools-2.4.56-1.amzn2023.x86_64 8/12
Verifying : mod_lua-2.4.56-1.amzn2023.x86_64 9/12
Verifying : mailcap-2.1.49-3.amzn2023.0.3.noarch 10/12
Verifying : generic-logos-httpd-18.0.0-12.amzn2023.0.3.noarch 11/12
Verifying : httpd-filesystem-2.4.56-1.amzn2023.noarch 12/12

Installed:
apr-1.7.2-2.amzn2023.0.2.x86_64
apr-util-1.6.3-1.amzn2023.0.1.x86_64
apr-util-openssl-1.6.3-1.amzn2023.0.1.x86_64
generic-logos-httpd-18.0.0-12.amzn2023.0.3.noarch
httpd-2.4.56-1.amzn2023.x86_64
httpd-core-2.4.56-1.amzn2023.x86_64
httpd-filesystem-2.4.56-1.amzn2023.noarch
httpd-tools-2.4.56-1.amzn2023.x86_64
libbrotli-1.0.9-4.amzn2023.0.2.x86_64
mailcap-2.1.49-3.amzn2023.0.3.noarch
mod_http2-2.0.11-2.amzn2023.x86_64
mod_lua-2.4.56-1.amzn2023.x86_64

Complete!
[root@ip-10-0-1-5 ~]#
```

d. Run the command echo 'Hello World, welcome to Steel Ltd. 30074741' > /var/www/html/index.html to create a simple HTML file that displays the desired message.

```
root@ip-10-0-1-5:~ Verifying : apr-util-openssl-1.6.3-1.amzn2023.0.1.x86_64 2/12  
root@ip-10-0-1-5:~ Verifying : httpd-2.4.56-1.amzn2023.x86_64 3/12  
root@ip-10-0-1-5:~ Verifying : libbrotli-1.0.9-4.amzn2023.0.2.x86_64 4/12  
root@ip-10-0-1-5:~ Verifying : httpd-core-2.4.56-1.amzn2023.x86_64 5/12  
root@ip-10-0-1-5:~ Verifying : apr-util-1.6.3-1.amzn2023.0.1.x86_64 6/12  
root@ip-10-0-1-5:~ Verifying : mod_http2-2.0.11-2.amzn2023.x86_64 7/12  
root@ip-10-0-1-5:~ Verifying : httpd-tools-2.4.56-1.amzn2023.x86_64 8/12  
root@ip-10-0-1-5:~ Verifying : mod_lua-2.4.56-1.amzn2023.x86_64 9/12  
root@ip-10-0-1-5:~ Verifying : mailcap-2.1.49-3.amzn2023.0.3.noarch 10/12  
root@ip-10-0-1-5:~ Verifying : generic-logos-httpd-18.0.0-12.amzn2023.0.3.noarch 11/12  
root@ip-10-0-1-5:~ Verifying : httpd-filesystem-2.4.56-1.amzn2023.noarch 12/12  
  
Installed:  
apr-1.7.2-2.amzn2023.0.2.x86_64  
apr-util-1.6.3-1.amzn2023.0.1.x86_64  
apr-util-openssl-1.6.3-1.amzn2023.0.1.x86_64  
generic-logos-httpd-18.0.0-12.amzn2023.0.3.noarch  
httpd-2.4.56-1.amzn2023.x86_64  
httpd-core-2.4.56-1.amzn2023.x86_64  
httpd-filesystem-2.4.56-1.amzn2023.noarch  
httpd-tools-2.4.56-1.amzn2023.x86_64  
libbrotli-1.0.9-4.amzn2023.0.2.x86_64  
mailcap-2.1.49-3.amzn2023.0.3.noarch  
mod_http2-2.0.11-2.amzn2023.x86_64  
mod_lua-2.4.56-1.amzn2023.x86_64  
  
Complete!  
[root@ip-10-0-1-5 ~]# echo 'Hello World, welcome to Steel Ltd. 30074741' > /var/www/html/index.html  
[root@ip-10-0-1-5 ~]#
```

e. Run the command systemctl enable httpd to configure the Apache web server to start automatically when the instance boots up.

```

root@ip-10-0-1-5:~#
Verifying : httpd-core-2.4.56-1.amzn2023.x86_64 5/12
Verifying : apr-util-1.6.3-1.amzn2023.0.1.x86_64 6/12
Verifying : mod_http2-2.0.11-2.amzn2023.x86_64 7/12
Verifying : httpd-tools-2.4.56-1.amzn2023.x86_64 8/12
Verifying : mod_lua-2.4.56-1.amzn2023.x86_64 9/12
Verifying : mailcap-2.1.49-3.amzn2023.0.3.noarch 10/12
Verifying : generic-logos-httpd-18.0.0-12.amzn2023.0.3.noarch 11/12
Verifying : httpd-filesystem-2.4.56-1.amzn2023.noarch 12/12

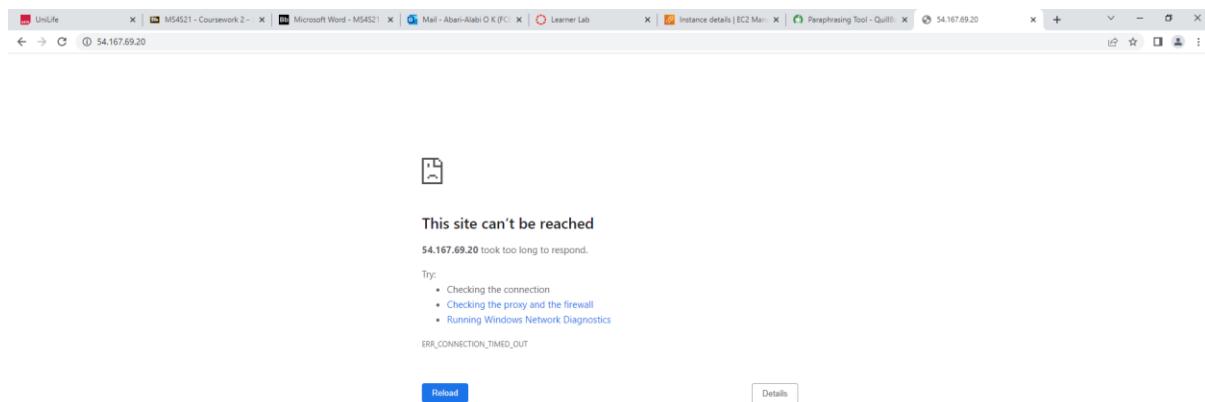
Installed:
apr-1.7.2-2.amzn2023.0.2.x86_64
apr-util-1.6.3-1.amzn2023.0.1.x86_64
apr-util-openssl-1.6.3-1.amzn2023.0.1.x86_64
generic-logos-httpd-18.0.0-12.amzn2023.0.3.noarch
httpd-2.4.56-1.amzn2023.x86_64
httpd-core-2.4.56-1.amzn2023.x86_64
httpd-filesystem-2.4.56-1.amzn2023.noarch
httpd-tools-2.4.56-1.amzn2023.x86_64
libbrotli-1.0.9-4.amzn2023.0.2.x86_64
mailcap-2.1.49-3.amzn2023.0.3.noarch
mod_http2-2.0.11-2.amzn2023.x86_64
mod_lua-2.4.56-1.amzn2023.x86_64

Complete!
[root@ip-10-0-1-5 ~]# echo 'Hello World, welcome to Steel Ltd. 30074741' > /var/www/html/index.html
[root@ip-10-0-1-5 ~]# systemctl enable httpd
Created symlink /etc/systemd/system/multi-user.target.wants/httpd.service → /usr/lib/systemd/system/httpd.service.
[root@ip-10-0-1-5 ~]#

```

f. Run the command `systemctl start httpd` to start the Apache web server.

g. Open a web browser and navigate to your instance's public IP address. You should see the message "Hello World, welcome to Steel Ltd. 30074741" displayed on the screen.



h. The above shows the web application is not yet to the public. To make the web application available to the public, you'll need to open up the appropriate ports in your instance's security

group. Navigate to the EC2 dashboard, select your instance, and click on the "Security" tab. Edit the security group associated with your instance to allow inbound traffic on port 80 (HTTP) from all sources (0.0.0.0/0) and click on save rules

Name	Security group rule ID	Port range	Protocol	Source	Security groups	Description
-	sgr-02613fd572052bc11	22	TCP	0.0.0.0/0	launch-wizard-4	-

Name	Security group ID	Description	VPC ID
launch-wizard-4	sg-0431fb55ad9a7d5ae	launch-wizard created 2023-05-15T18:52:41.790Z	vpc-09be422f92ff87ff6

Name	Security group rule ID	IP version	Type	Protocol	Port range	Source	Description
-	sgr-02613fd572052bc11	IPv4	SSH	TCP	22	0.0.0.0/0	-

and click on the "Security" tab. Edit the security group associated with your instance to allow inbound traffic on port 80 (HTTP) from all sources (0.0.0.0/0) and click on save rules.

Inbound rules

Security group rule ID	Type	Protocol	Port range	Source	Description - optional
sgr-02613fd572052bc11	SSH	TCP	22	Custom	
-	HTTP	TCP	80	Anywhere-1...	

Add rule Cancel Preview changes Save rules

Inbound security group rules successfully modified on security group sg-0431f855ad9a7d5ae | launch-wizard-4

Details

Security group name	Security group ID	Description	VPC ID
launch-wizard-4	sg-0431f855ad9a7d5ae	launch-wizard created 2023-05-15T18:52:41.790Z	vpc-09be422f92ff87f86

Owner: 020935060597 Inbound rules count: 2 Permission entries Outbound rules count: 1 Permission entry

Inbound rules | Outbound rules | Tags

You can now check network connectivity with Reachability Analyzer Run Reachability Analyzer

Inbound rules (2)

Name	Security group rule...	IP version	Type	Protocol	Port range	Source	Description
-	sgr-056ef5e758d6bebdb5	IPv4	HTTP	TCP	80	0.0.0.0/0	-
-	sgr-02613fd572052bc11	IPv4	SSH	TCP	22	0.0.0.0/0	-

Open a web browser again and navigate to your instance's public IP address. You should see the message "Hello World, welcome to Steel Ltd. 30074741" displayed on the screen.

