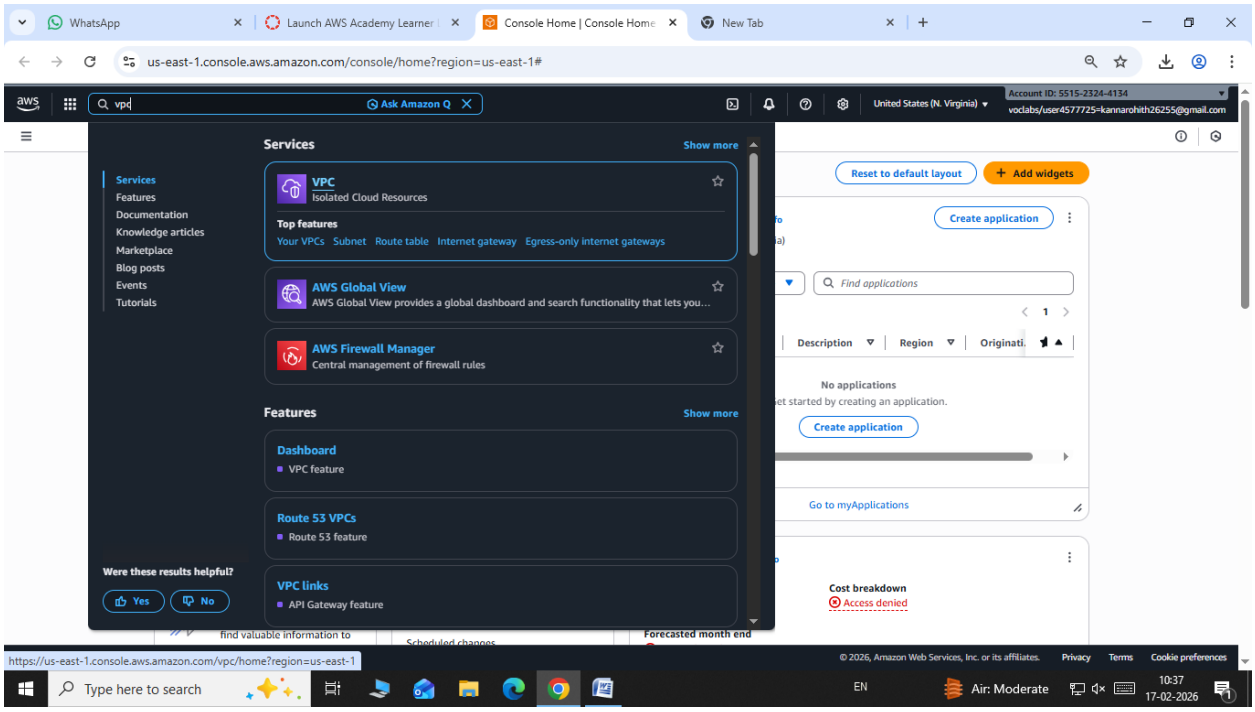
Name: k.Rohith

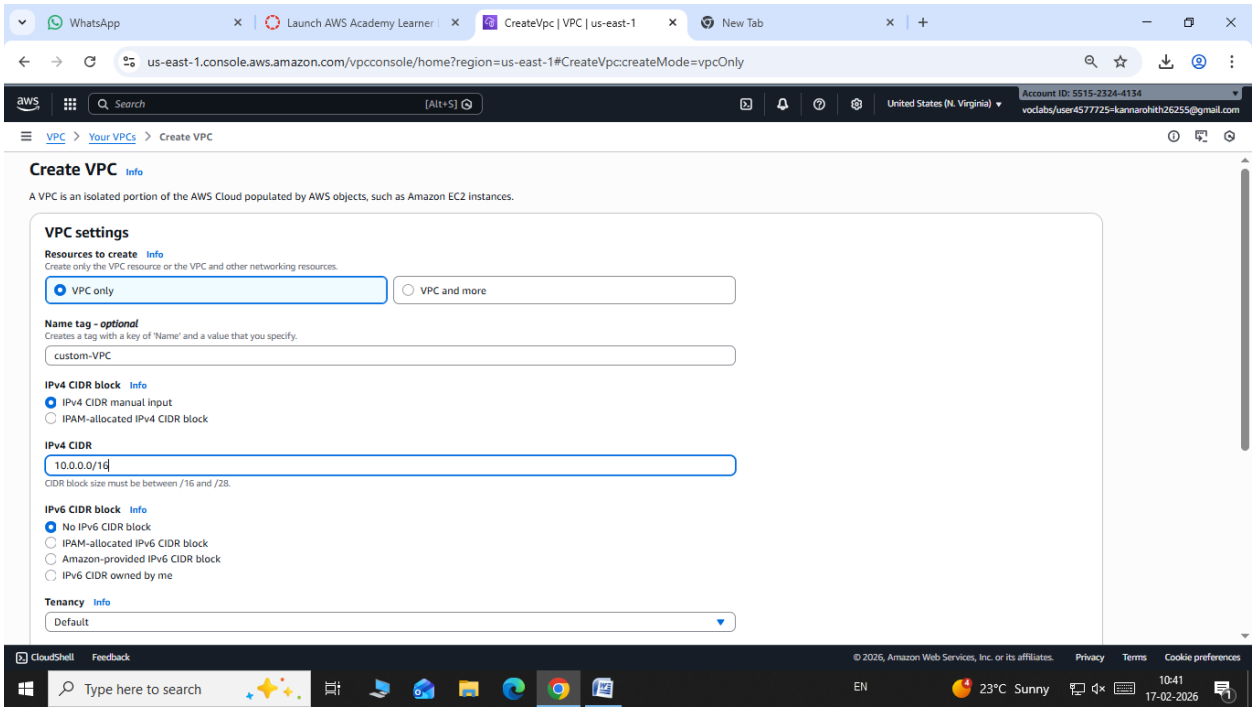
Rollno.: 23bd1a1291

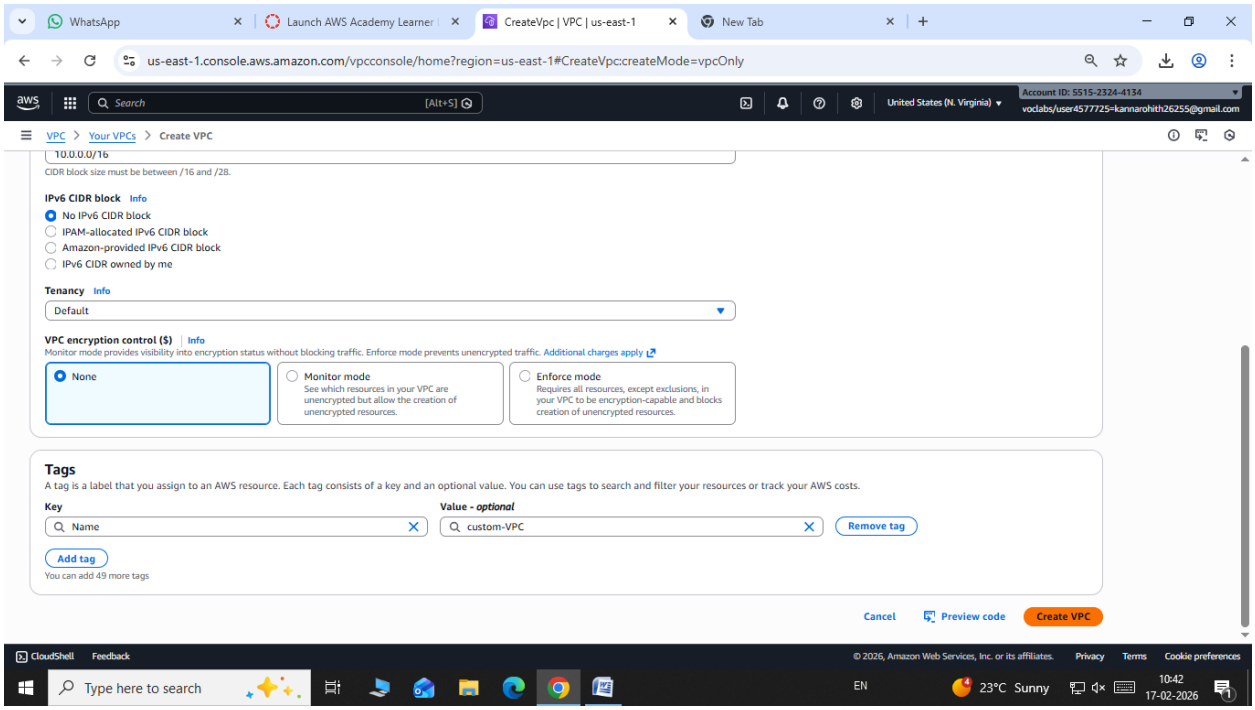
# Week 5: VPC Creation and Ec2 Instance Connection

## ◆Step 1: Create the VPC

1. Go to **AWS Management Console → VPC**
2. Click **Create VPC**
3. Choose **VPC only**
4. Enter:
   - **Name**: `Custom-VPC`
   - **IPv4 CIDR block**: e.g. `10.0.0.0/16`
5. Click **Create VPC**






# ◆ Step 2: Create Subnets (Public & Private)

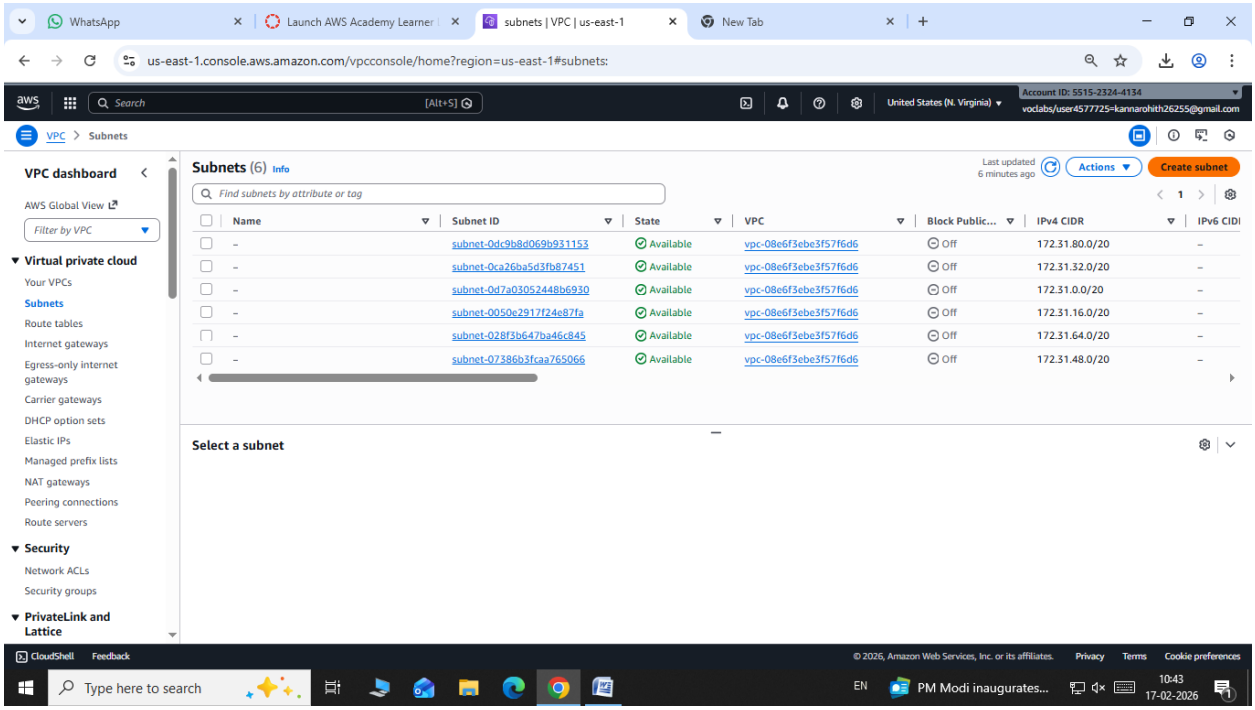
Create subnets in same **Availability Zones** for high availability.

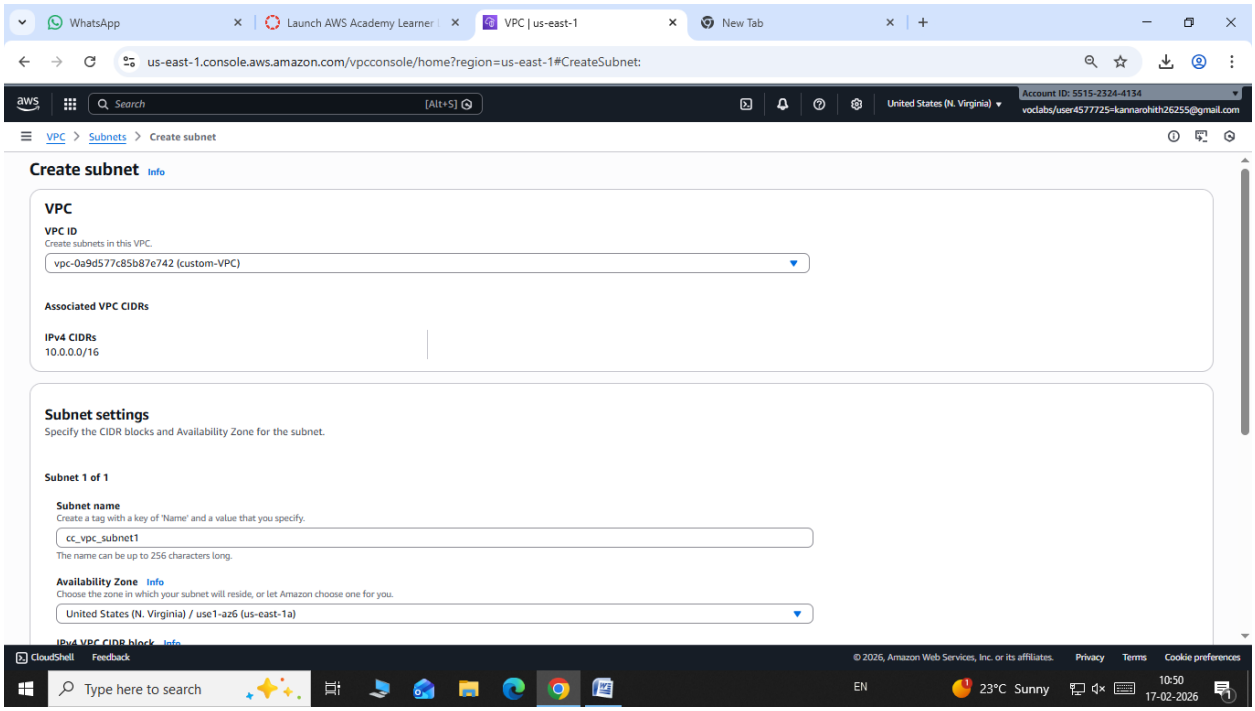
**Example:**

- **Public Subnet**: `10.0.1.0/24` (AZ-A)
- **Private Subnet**: `10.0.2.0/24` (AZ-A)

Steps:

1. Go to **Subnets → Create subnet**
2. Select your VPC
3. Choose AZ
4. Enter CIDR
5. Create subnet




WhatsApp
Launch AWS Academy Learner
VPC | us-east-1
New Tab
us-east-1.console.aws.amazon.com/vpcconsole/home?region=us-east-1#CreateSubnet:
Search
[Alt+S]
United States (N. Virginia)
Account ID: 5515-2324-4134
voclabs/user4577725=kannarohith26255@gmail.com
VPC > Subnets > Create subnet
Create subnet Info
VPC
VPC ID
Create subnets in this VPC.
vpc-0a9d577c85b87e742 (custom-VPC)
Associated VPC CIDRs
IPv4 CIDRs
10.0.0.0/16
Subnet settings
Specify the CIDR blocks and Availability Zone for the subnet.
Subnet 1 of 1
Subnet name
Create a tag with a key of 'Name' and a value that you specify.
cc_vpc_subnet1
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) / use1-az6 (us-east-1a)
CloudShell
Feedback
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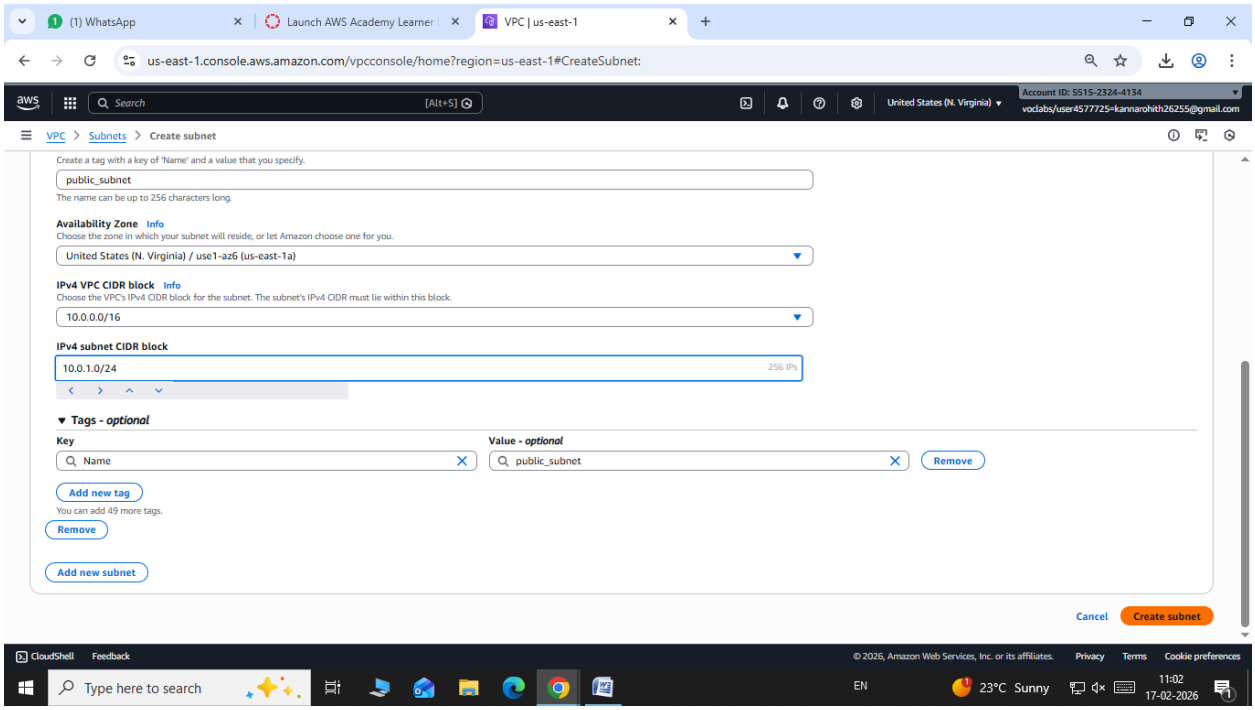
Privacy
Terms
Cookie preferences
Type here to search
EN
23°C Sunny
10:50
17-02-2026


(1) WhatsApp
Launch AWS Academy Learner
VPC | us-east-1
us-east-1.console.aws.amazon.com/vpcconsole/home?region=us-east-1#CreateSubnet:
Search
[Alt+S]
United States (N. Virginia)
Account ID: 5515-2324-4134
voclabs/user4577725=kannarohith26255@gmail.com
VPC > Subnets > Create subnet
Create a tag with a key of 'Name' and a value that you specify.
public_subnet
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) / use1-az6 (us-east-1a)
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
10.0.1.0/24
256 IPs
Tags - optional
Key
Value - optional
Name
public_subnet
Remove
Add new tag
You can add 49 more tags.
Remove
Add new subnet
Cancel
Create subnet
CloudShell
Feedback
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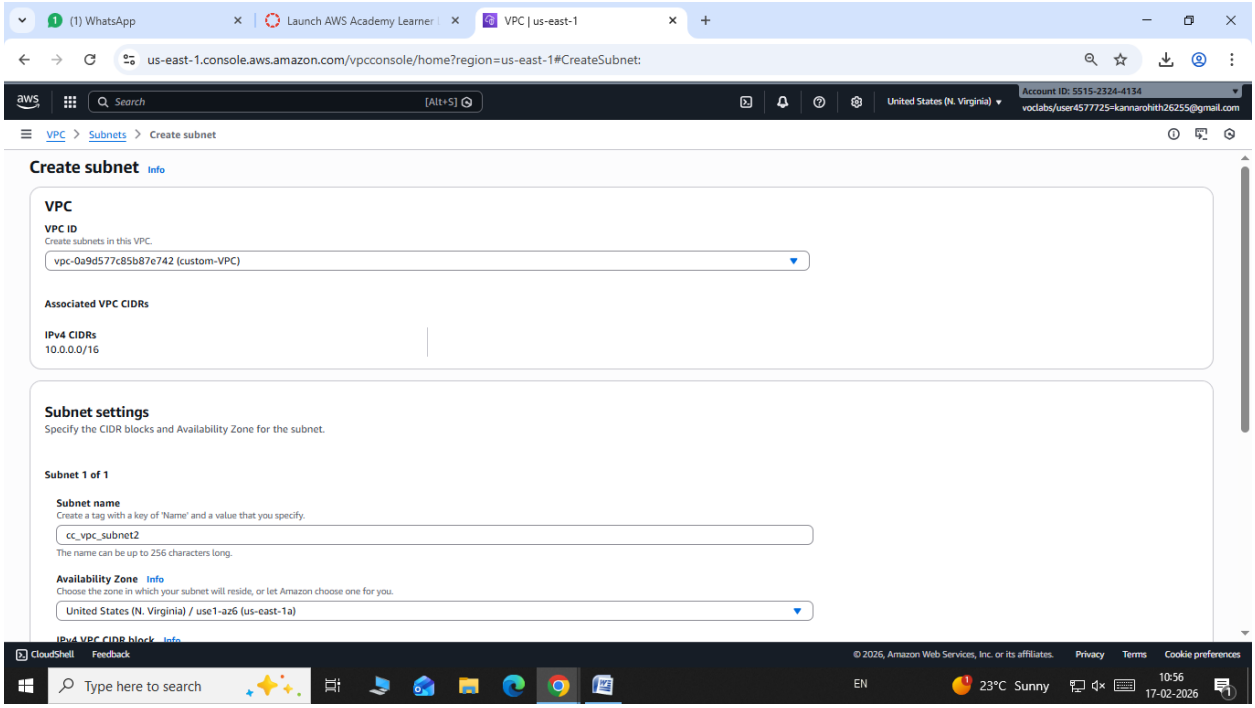
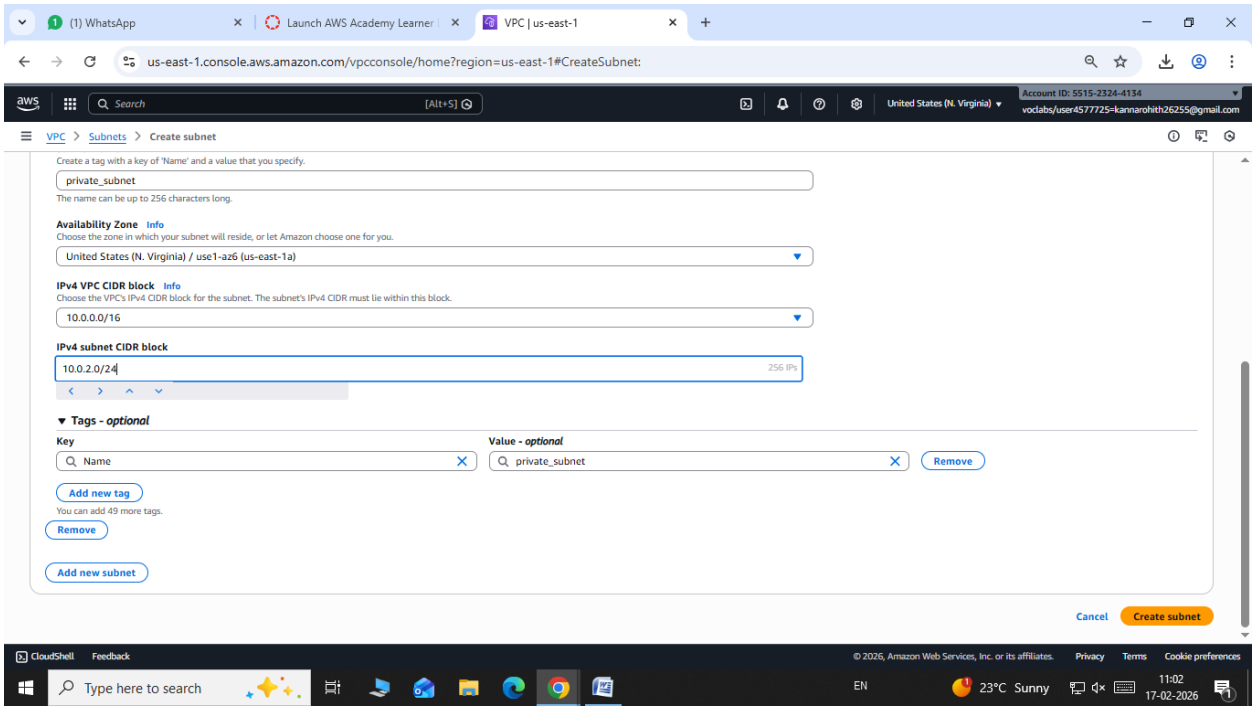
Cookie preferences
Type here to search
EN
23°C Sunny
11:02
17-02-2026

Private:

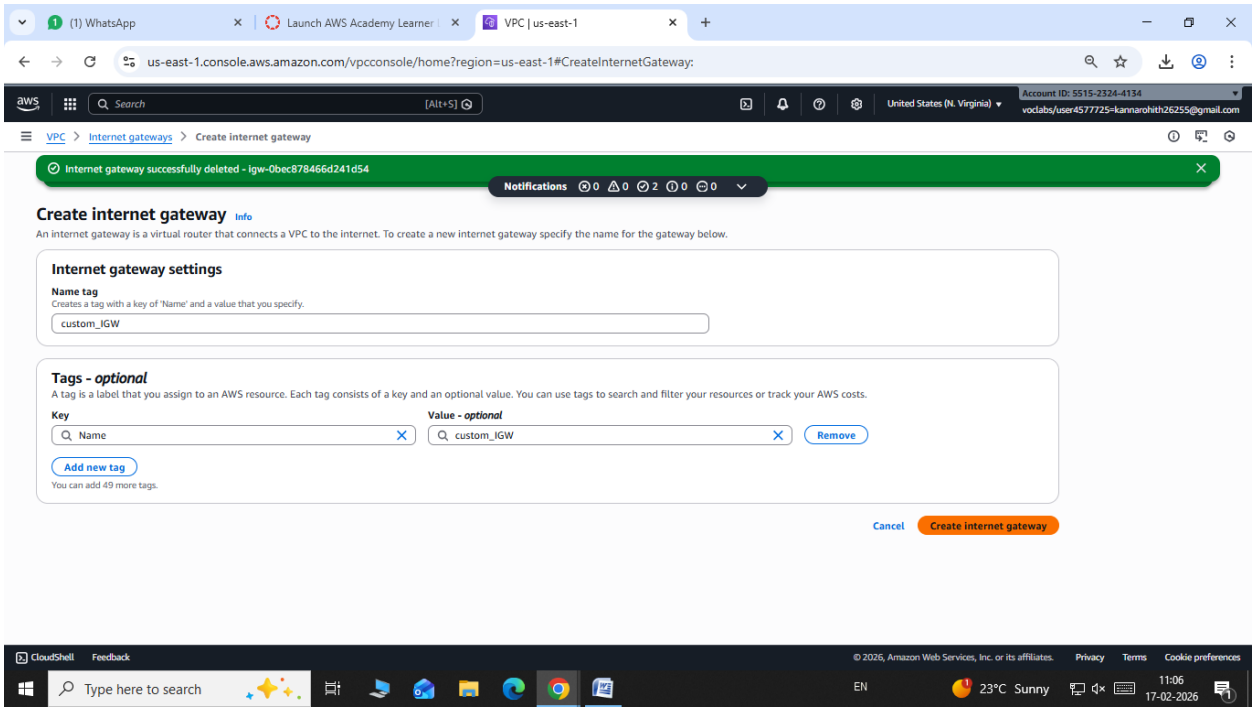


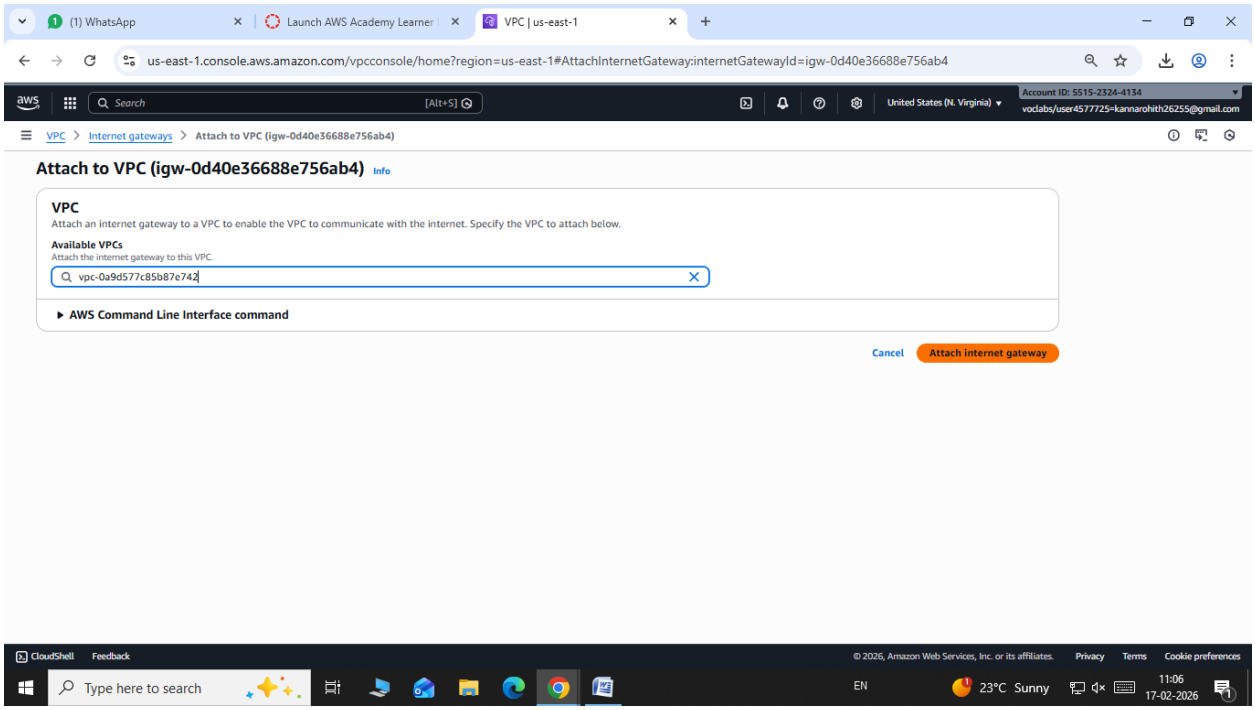




# ◆ Step 3: Create an Internet Gateway (IGW)

1. Go to **Internet Gateways**
2. Click **Create internet gateway**

3. Name it `Custom-IGW`
4. **Attach** it to your VPC



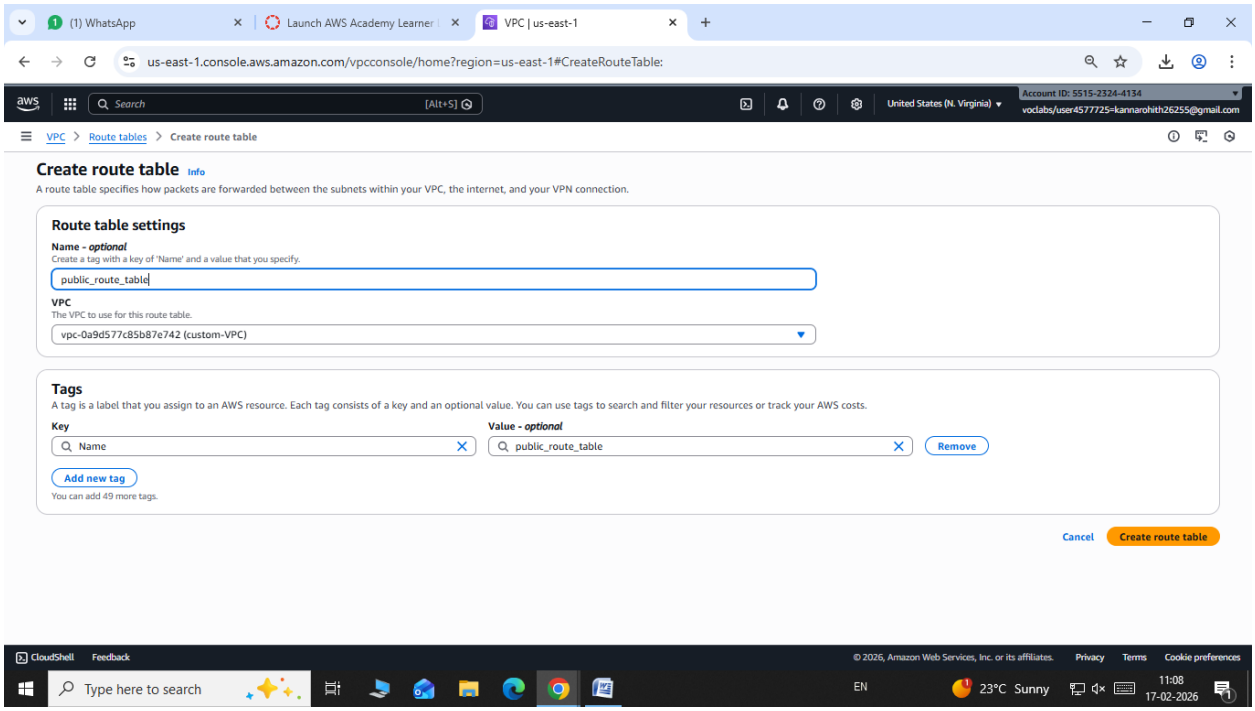



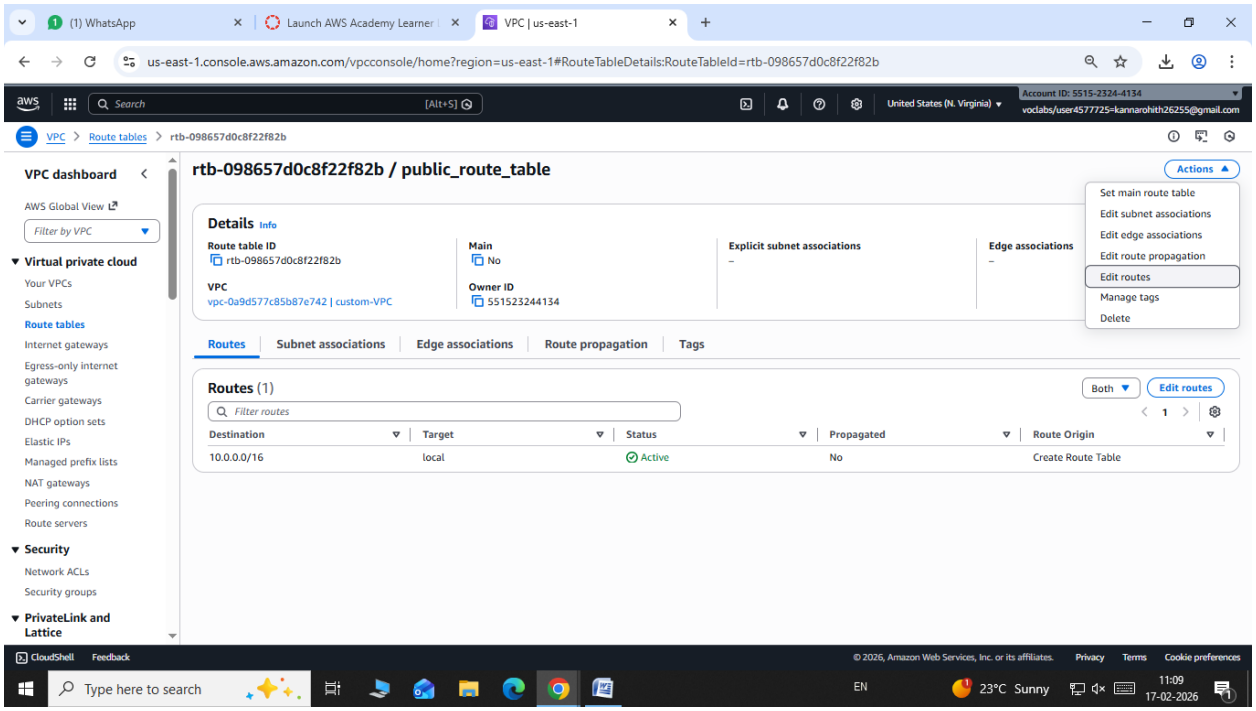

# ◆ Step 4: Create Route Tables

You need **separate route tables** for public and private subnets.

## Public Route Table

1. Go to **Route Tables → Create route table**
2. Select VPC
3. Add route:
    - Destination: `0.0.0.0/0`
    - Target: **Internet Gateway**
4. Associate with **public subnet**




(1) WhatsApp
Launch AWS Academy Learner
VPC | us-east-1
us-east-1.console.aws.amazon.com/vpcconsole/home?region=us-east-1#RouteTableDetails:RouteTableId=rtb-098657d0c8f22f82b
Search
[Alt+S]
United States (N. Virginia)
Account ID: 5515-2324-4134
voclabs/user4577725=kannarohith26255@gmail.com
VPC > Route tables > rtb-098657d0c8f22f82b
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
Network ACLs
Security groups
PrivateLink and Lattice
rtb-098657d0c8f22f82b / public_route_table
Actions
Set main route table
Edit subnet associations
Edit edge associations
Edit route propagation
Edit routes
Manage tags
Delete
Details Info
Route table ID
rtb-098657d0c8f22f82b
Main
No
Explicit subnet associations
–
Edge associations
–
VPC
vpc-0a9d577c85b87e742 | custom-VPC
Owner ID
551523244134
Routes
Subnet associations
Edge associations
Route propagation
Tags
Routes (1)
Both
Edit routes
Filter routes
Destination
Target
Status
Propagated
Route Origin
10.0.0.0/16
local
Active
No
Create Route Table
CloudShell
Feedback
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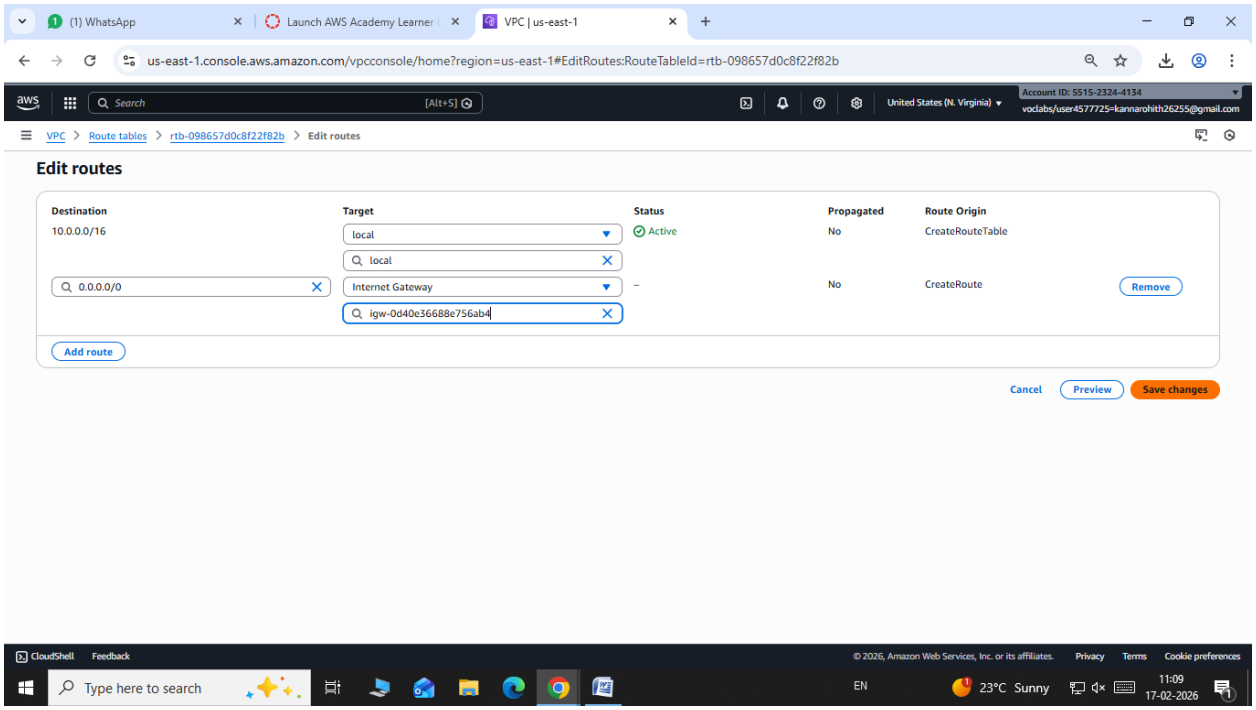
Privacy
Terms
Cookie preferences
Type here to search
EN
23°C Sunny
11:09
17-02-2026


(1) WhatsApp
Launch AWS Academy Learner
VPC | us-east-1
us-east-1.console.aws.amazon.com/vpcconsole/home?region=us-east-1#EditRoutes:RouteTableId=rtb-098657d0c8f22f82b
Search
[Alt+S]
United States (N. Virginia)
Account ID: 5515-2324-4134
voclabs/user4577725=kannarohith26255@gmail.com
VPC > Route tables > rtb-098657d0c8f22f82b > Edit routes
Edit routes
Destination
Target
Status
Propagated
Route Origin
10.0.0.0/16
local
Active
No
CreateRouteTable
local
0.0.0.0/0
Internet Gateway
–
No
CreateRoute
Remove
igw-0d40e36688e756ab4
Add route
Cancel
Preview
Save changes
CloudShell
Feedback
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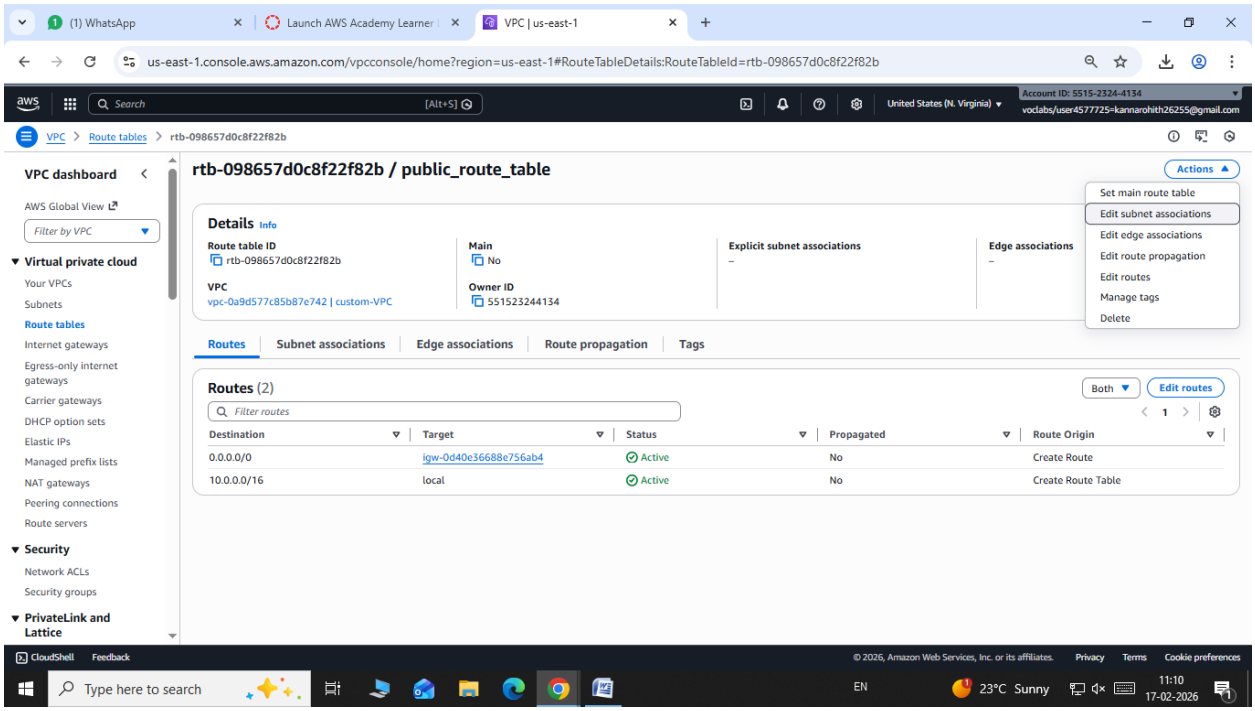
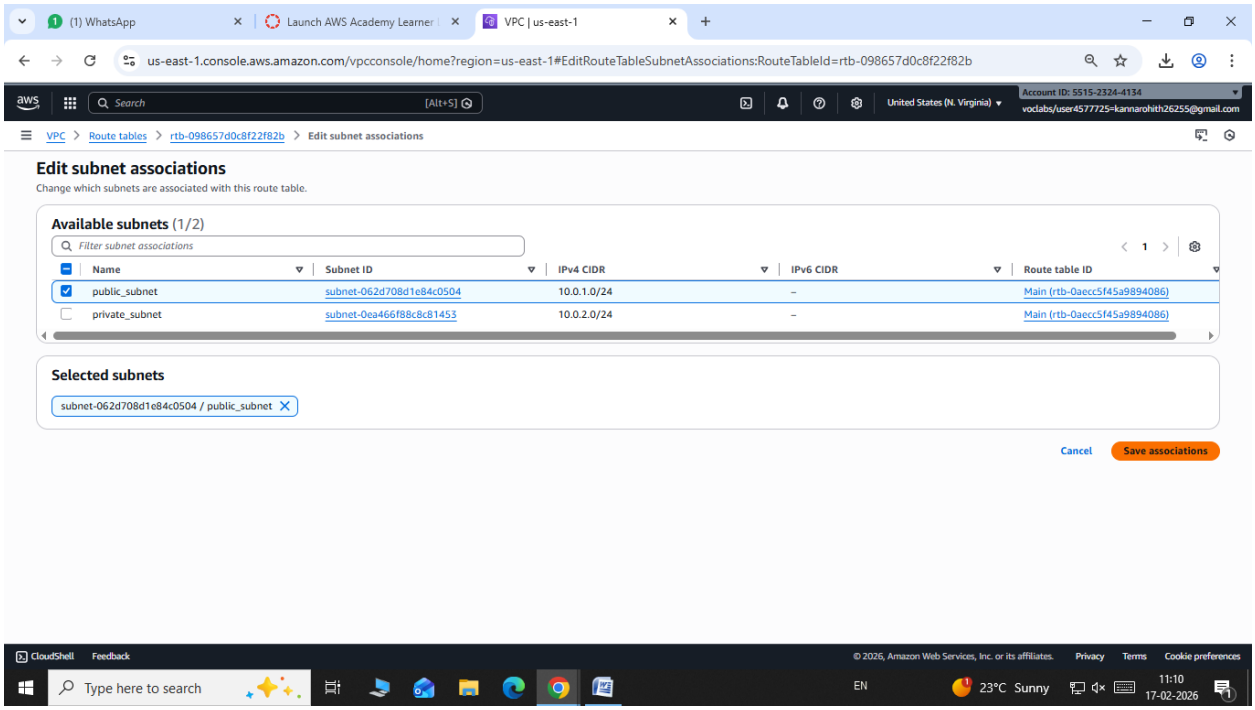
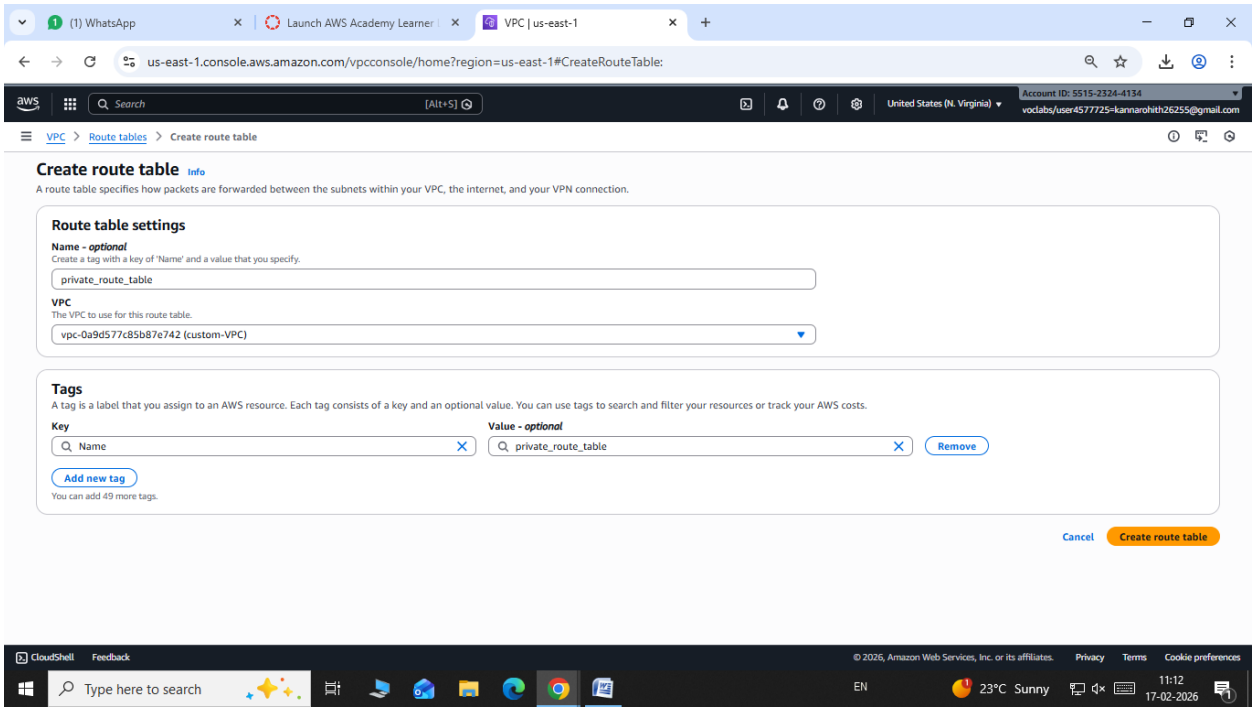
Privacy
Terms
Cookie preferences
Type here to search
EN
23°C Sunny
11:09
17-02-2026




## Private Route Table

- Keep default local route only (no IGW)
- Associate with **private subnet**


(1) WhatsApp
Launch AWS Academy Learner
VPC | us-east-1
us-east-1.console.aws.amazon.com/vpcconsole/home?region=us-east-1#CreateRouteTable:
Search
[Alt+S]
United States (N. Virginia)
Account ID: 5515-2324-4134
voclabs/user4577725=kannarohith26255@gmail.com
VPC > Route tables > Create route table
Create route table Info
A route table specifies how packets are forwarded between the subnets within your VPC, the internet, and your VPN connection.
Route table settings
Name - optional
Create a tag with a key of 'Name' and a value that you specify.
private_route_table
VPC
The VPC to use for this route table.
vpc-0a9d577c85b87e742 (custom-VPC)
Tags
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
Name
Value - optional
private_route_table
Remove
Add new tag
You can add 49 more tags.
Cancel
Create route table
CloudShell
Feedback
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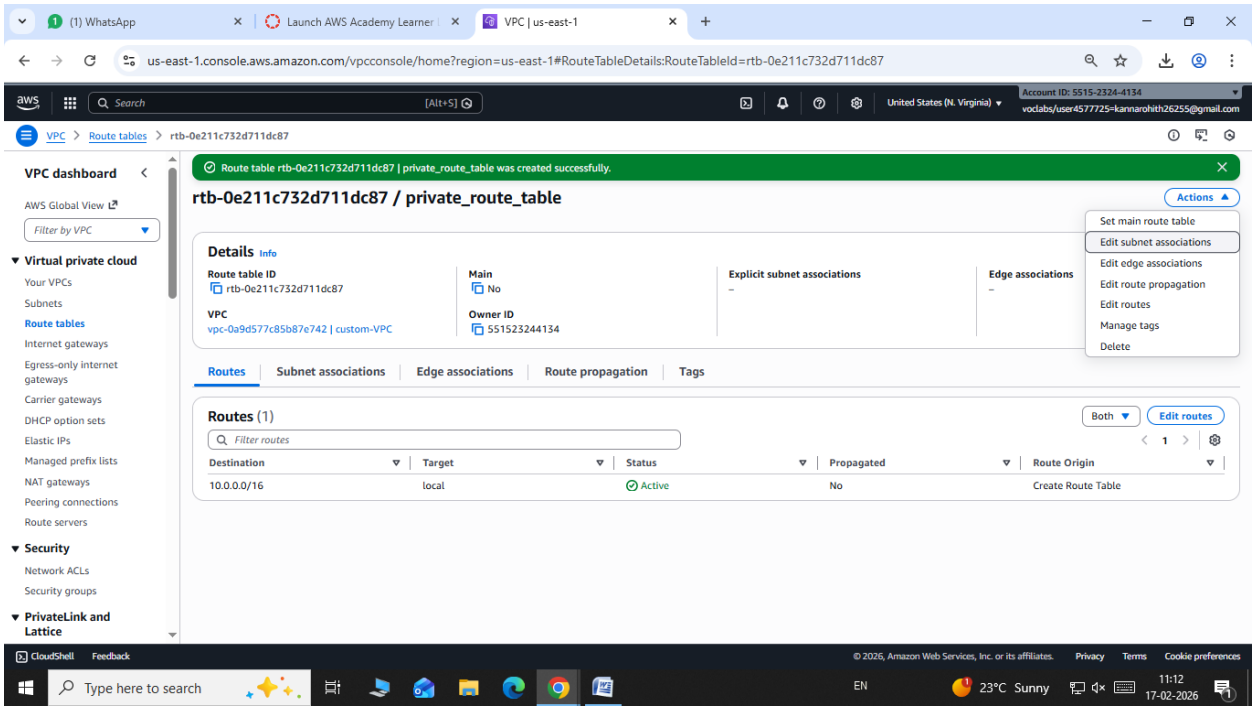
Privacy
Terms
Cookie preferences
Type here to search
EN
23°C Sunny
11:12
17-02-2026


(1) WhatsApp
Launch AWS Academy Learner
VPC | us-east-1
us-east-1.console.aws.amazon.com/vpcconsole/home?region=us-east-1#RouteTableDetails:RouteTableId=rtb-0e211c732d711dc87
Search
[Alt+S]
United States (N. Virginia)
Account ID: 5515-2324-4134
voclabs/user4577725=kannarohith26255@gmail.com
VPC > Route tables > rtb-0e211c732d711dc87
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
Network ACLs
Security groups
PrivateLink and Lattice
Route table rtb-0e211c732d711dc87 | private_route_table was created successfully.
rtb-0e211c732d711dc87 / private_route_table
Actions
Set main route table
Edit subnet associations
Edit edge associations
Edit route propagation
Edit routes
Manage tags
Delete
Details Info
Route table ID
rtb-0e211c732d711dc87
Main
No
Explicit subnet associations
-
Edge associations
-
VPC
vpc-0a9d577c85b87e742 | custom-VPC
Owner ID
551523244134
Routes
Subnet associations
Edge associations
Route propagation
Tags
Routes (1)
Filter routes
Both
Edit routes
Destination
Target
Status
Propagated
Route Origin
10.0.0.0/16
local
Active
No
Create Route Table
CloudShell
Feedback
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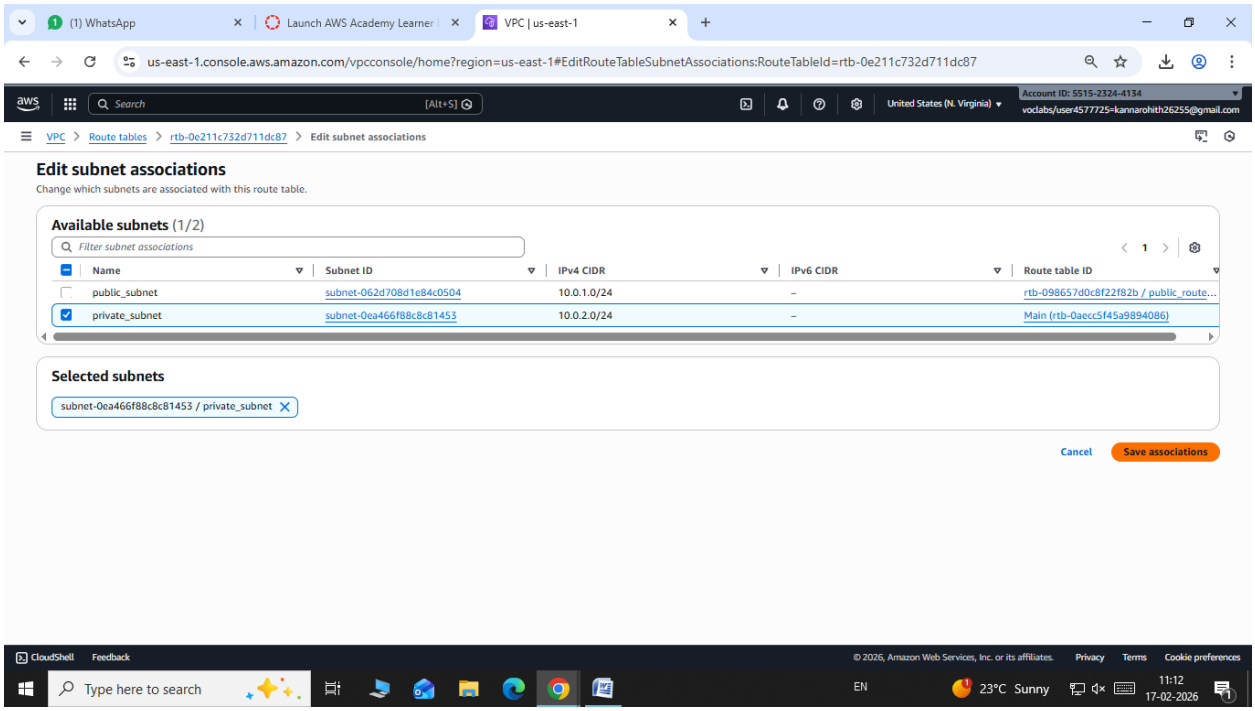
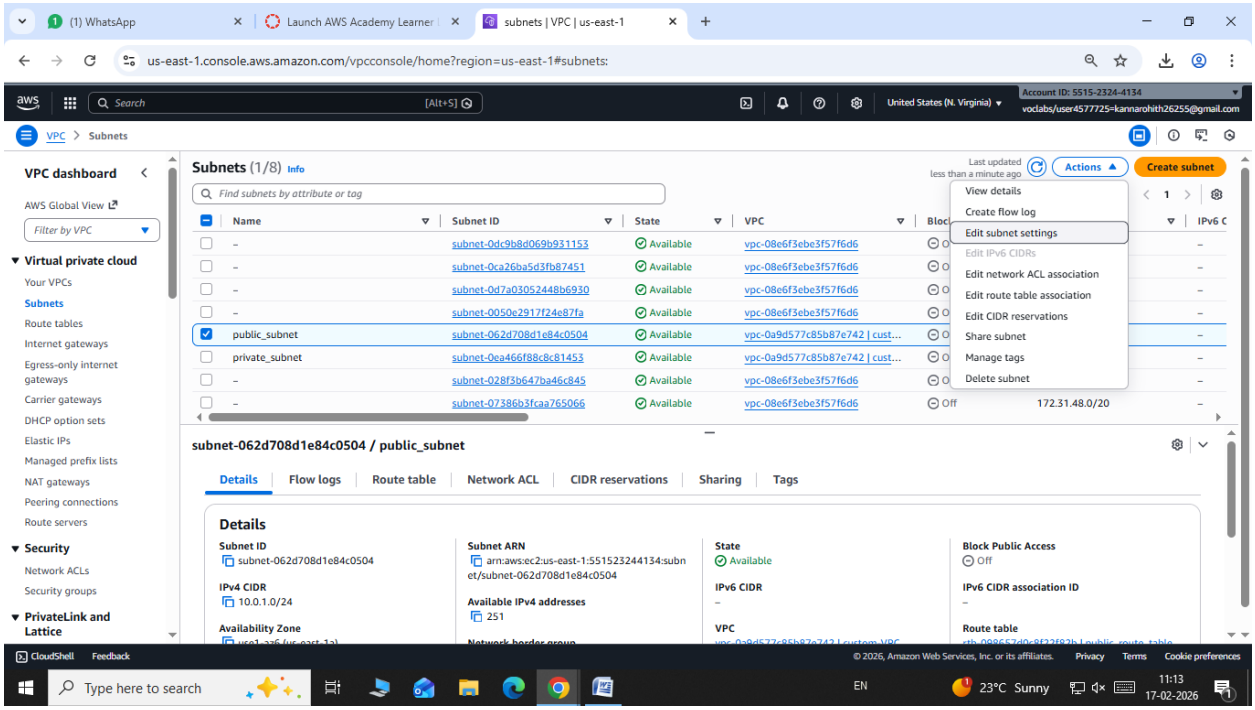
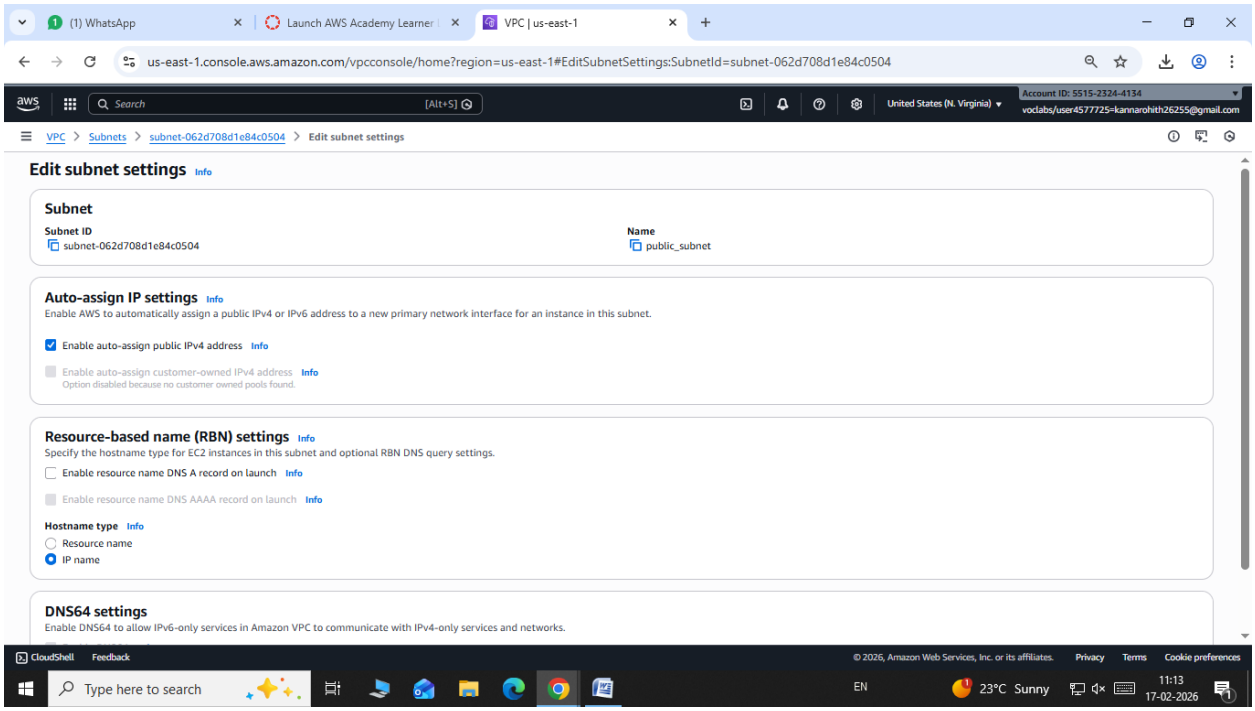
Cookie preferences
Type here to search
EN
23°C Sunny
11:12
17-02-2026




# ◆ Step 5: Enable Auto-Assign Public IP (Public Subnet)

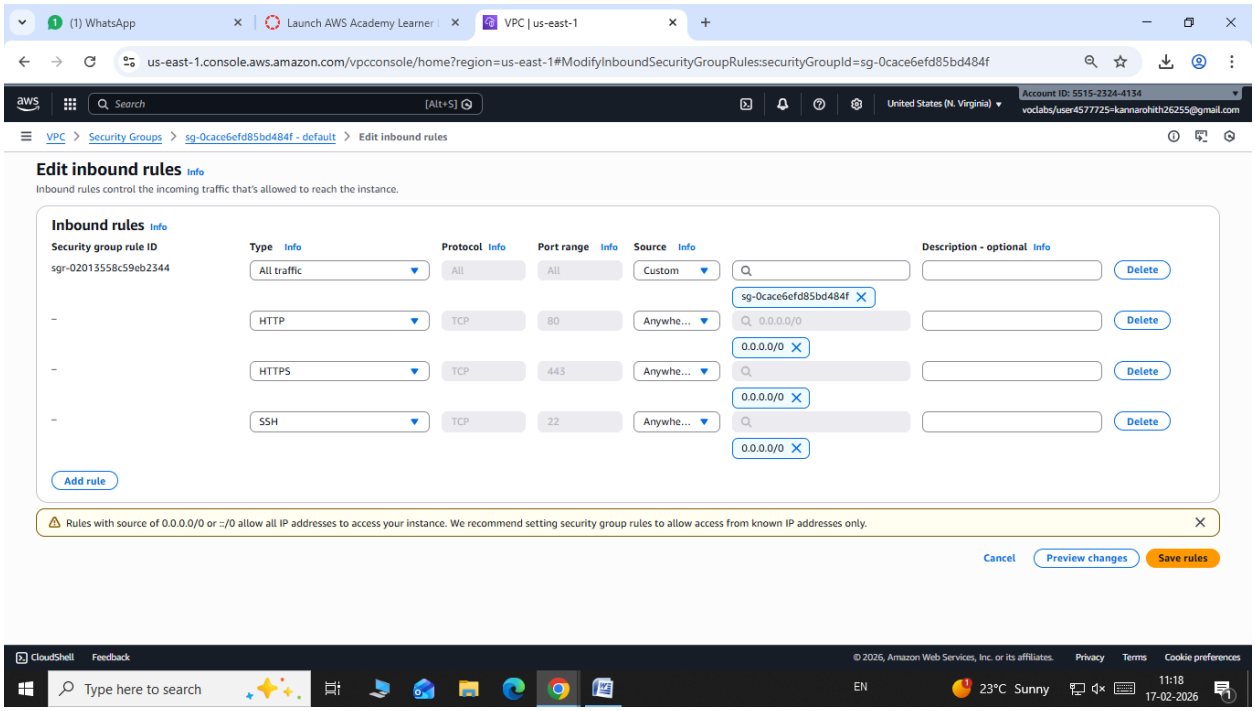
1. Select **Public Subnet**
2. Go to **Edit subnet settings**
3. Enable **Auto-assign public IPv4 address**

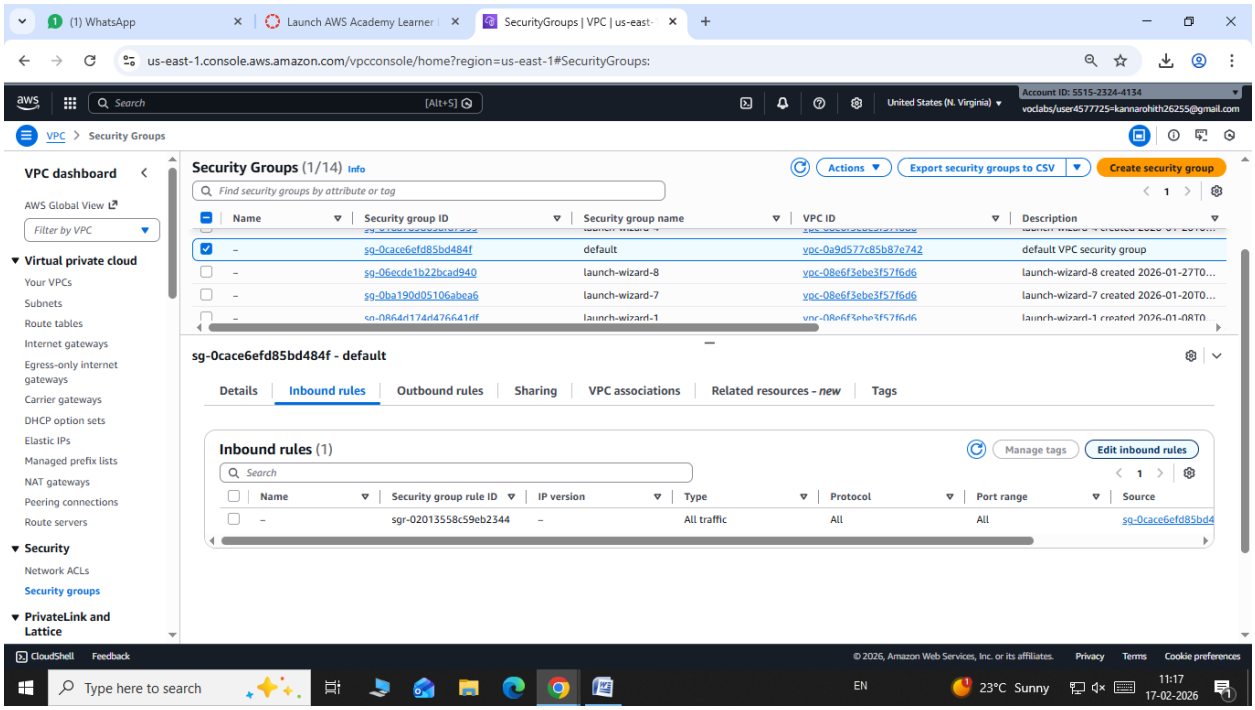





# ◆ Step 6: Configure Security Groups

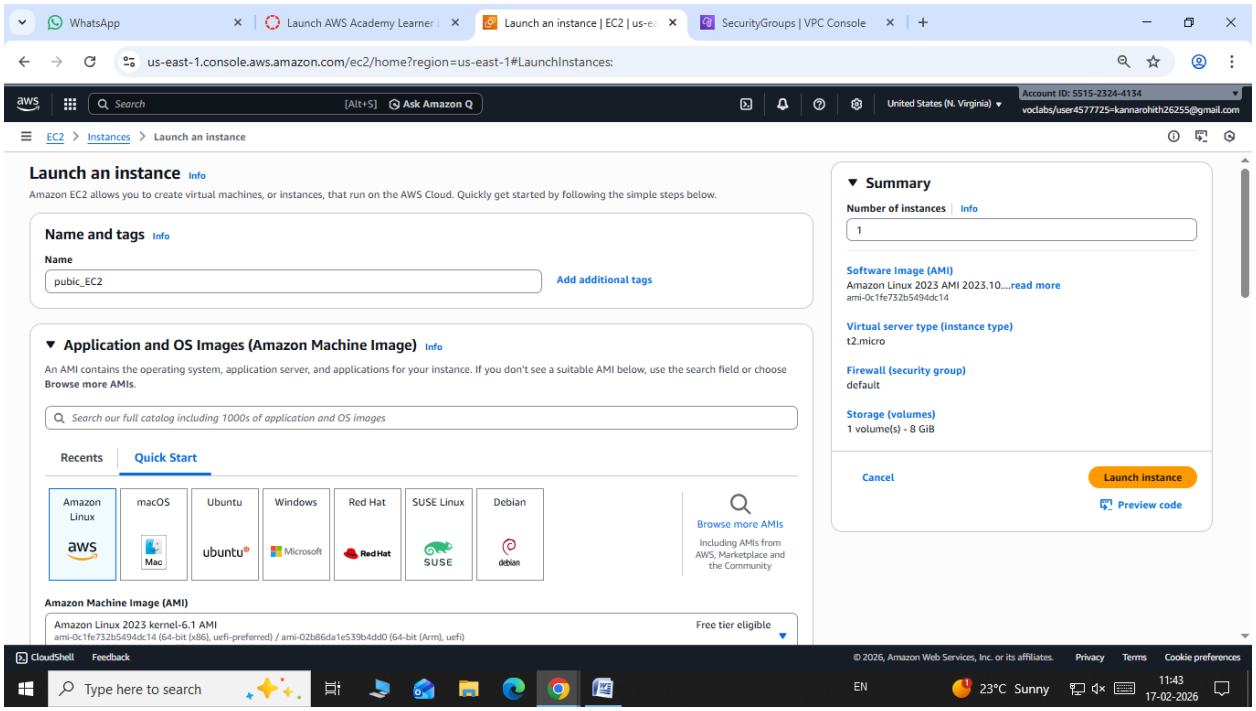
1. Create a **Security Group**
2. Add inbound rules:
   - HTTP (80) / HTTPS (443)
   - SSH (22) from trusted IP
3. Attach to EC2 instances

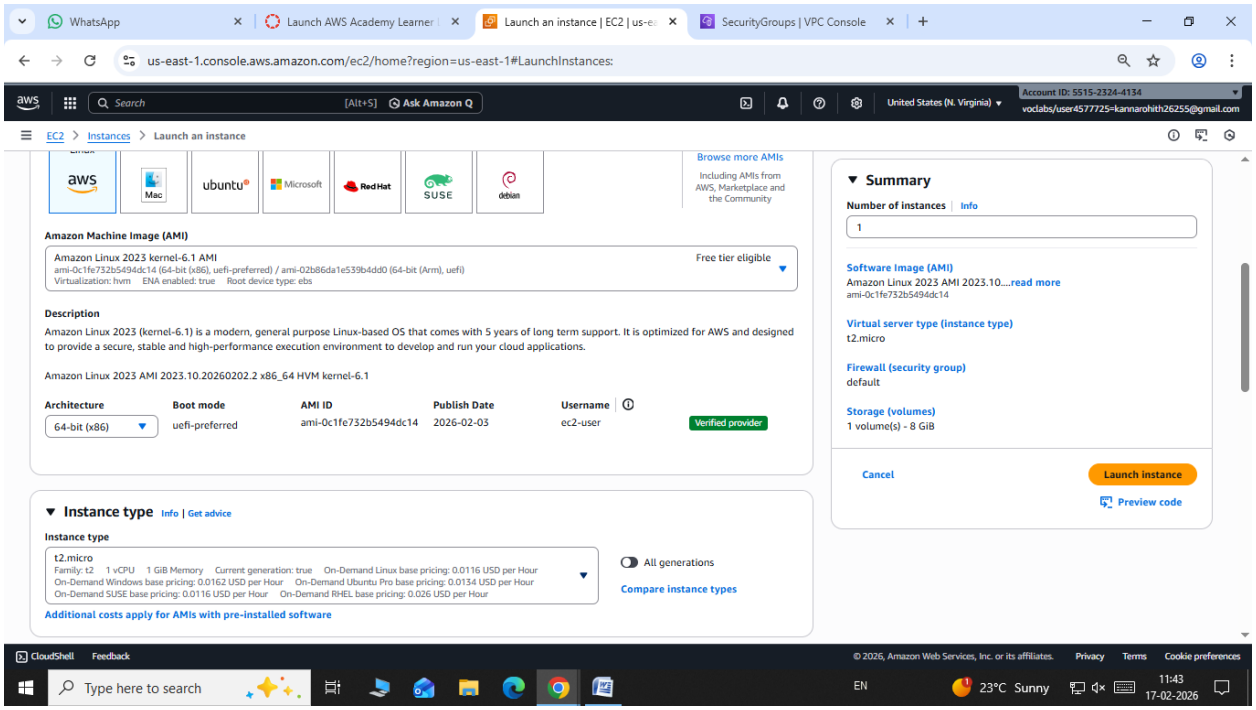



# ◆ Step 7: Launch EC2 Instances

- Public EC2 → Public subnet


WhatsApp
Launch AWS Academy Learner
Launch an instance | EC2 | us-e
SecurityGroups | VPC Console
us-east-1.console.aws.amazon.com/ec2/home?region=us-east-1#LaunchInstances:
Search
[Alt+S]
Ask Amazon Q
United States (N. Virginia)
Account ID: 5515-2324-4134
voclabs/user4577725=kannarohith26255@gmail.com
EC2 > Instances > Launch an instance
Launch an instance Info
Amazon EC2 allows you to create virtual machines, or instances, that run on the AWS Cloud. Quickly get started by following the simple steps below.
Name and tags Info
Name
pubic_EC2
Add additional tags
Application and OS Images (Amazon Machine Image) Info
An AMI contains the operating system, application server, and applications for your instance. If you don't see a suitable AMI below, use the search field or choose Browse more AMIs.
Search our full catalog including 1000s of application and OS images
Recents
Quick Start
Amazon Linux
macOS
Ubuntu
Windows
Red Hat
SUSE Linux
Debian
Browse more AMIs
Including AMIs from AWS, Marketplace and the Community
Amazon Machine Image (AMI)
Amazon Linux 2023 kernel-6.1 AMI
ami-0c1fe732b5494dc14 (64-bit (x86), uefi-preferred) / ami-02b86da1e539b4dd0 (64-bit (Arm), uefi)
Free tier eligible
Summary
Number of instances Info
1
Software Image (AMI)
Amazon Linux 2023 AMI 2023.10....read more
ami-0c1fe732b5494dc14
Virtual server type (instance type)
t2.micro
Firewall (security group)
default
Storage (volumes)
1 volume(s) - 8 GiB
Cancel
Launch instance
Preview code
CloudShell
Feedback
© 2026, Amazon Web Services, Inc. or its affiliates.
Privacy
Terms
Cookie preferences
Type here to search
EN
23°C Sunny
11:43
17-02-2026


WhatsApp
Launch AWS Academy Learner
Launch an instance | EC2 | us-e
SecurityGroups | VPC Console
us-east-1.console.aws.amazon.com/ec2/home?region=us-east-1#LaunchInstances:
Search
[Alt+S]
Ask Amazon Q
United States (N. Virginia)
Account ID: 5515-2324-4134
voclabs/user4577725=kannarohith26255@gmail.com
EC2 > Instances > Launch an instance
Browse more AMIs
Including AMIs from AWS, Marketplace and the Community
Amazon Machine Image (AMI)
Amazon Linux 2023 kernel-6.1 AMI
ami-0c1fe732b5494dc14 (64-bit (x86), uefi-preferred) / ami-02b86da1e539b4dd0 (64-bit (Arm), uefi)
Virtualization: hvm ENA enabled: true Root device type: ebs
Free tier eligible
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 2023.10.20260202.2 x86_64 HVM kernel-6.1
Architecture
64-bit (x86)
Boot mode
uefi-preferred
AMI ID
ami-0c1fe732b5494dc14
Publish Date
2026-02-03
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 Linux base pricing: 0.0116 USD per Hour
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
All generations
Compare instance types
Additional costs apply for AMIs with pre-installed software
Summary
Number of instances Info
1
Software Image (AMI)
Amazon Linux 2023 AMI 2023.10....read more
ami-0c1fe732b5494dc14
Virtual server type (instance type)
t2.micro
Firewall (security group)
default
Storage (volumes)
1 volume(s) - 8 GiB
Cancel
Launch instance
Preview code
CloudShell
Feedback
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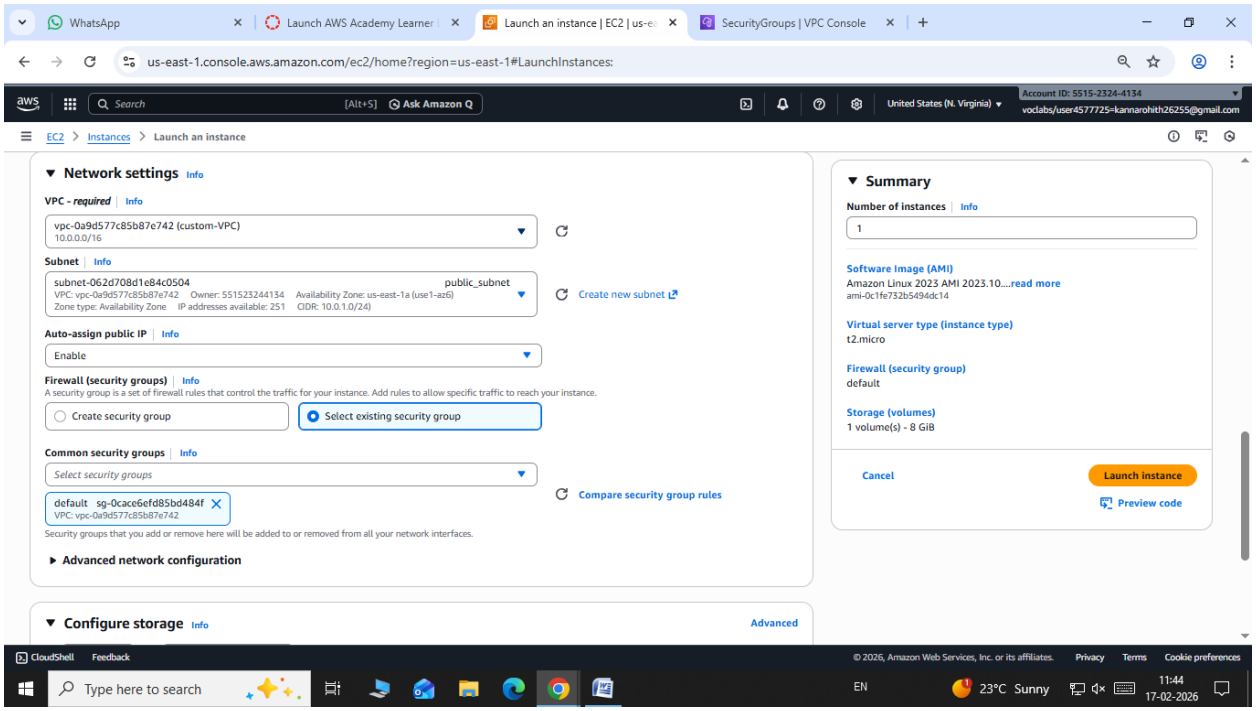
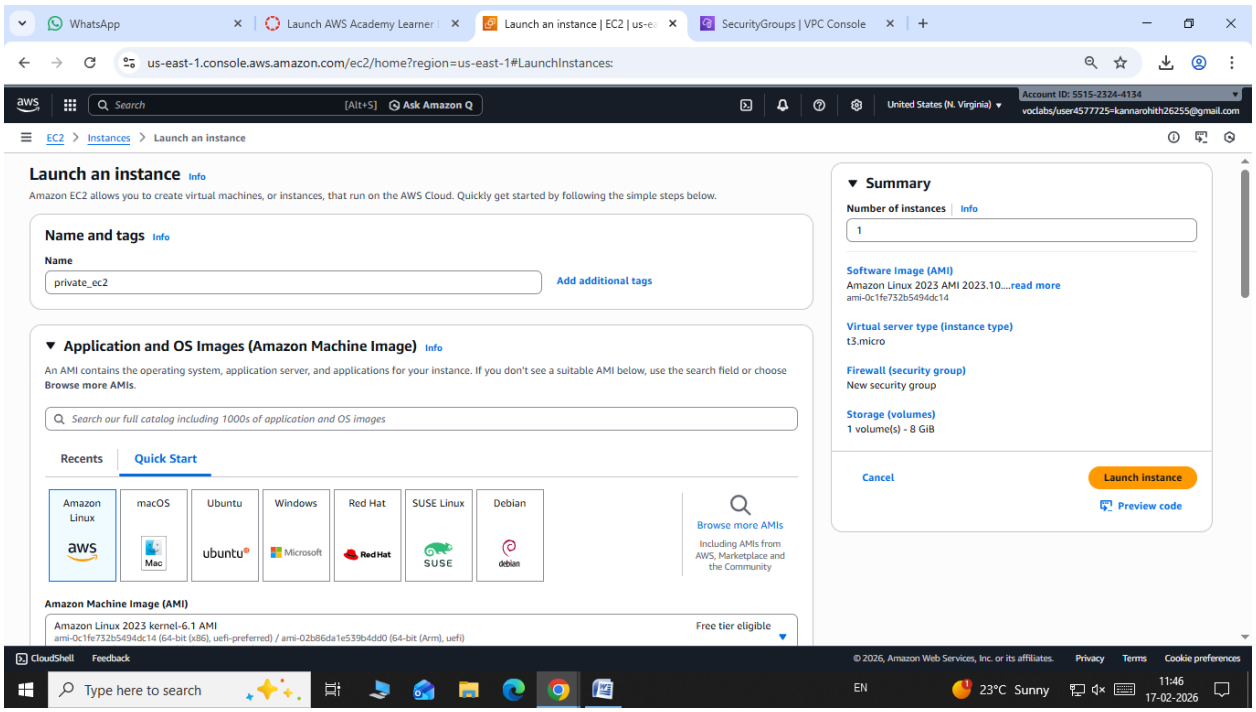
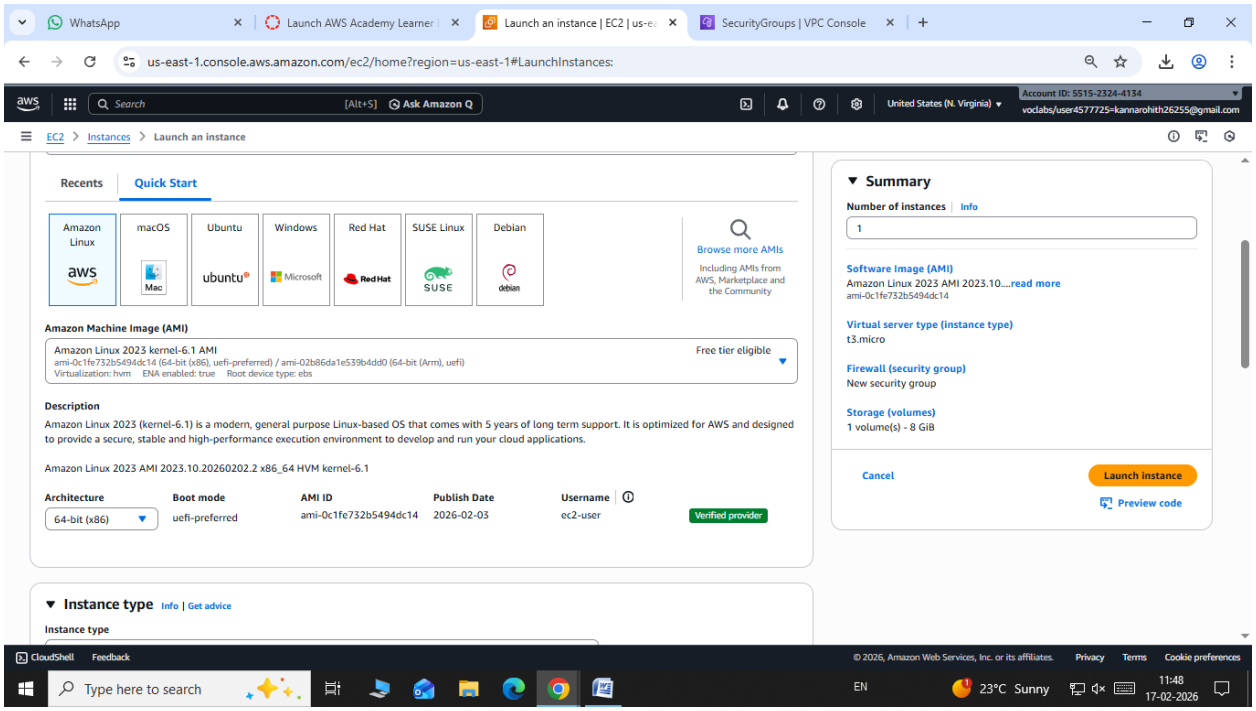
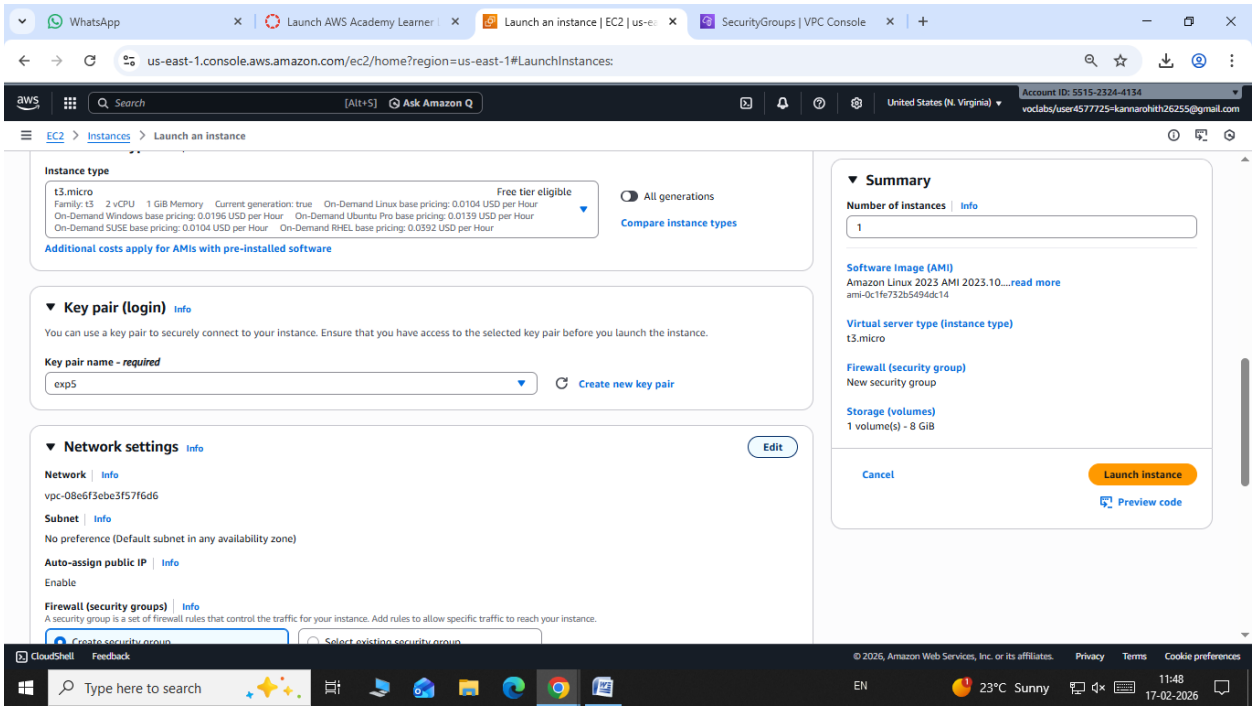
Terms
Cookie preferences
Type here to search
EN
23°C Sunny
11:43
17-02-2026

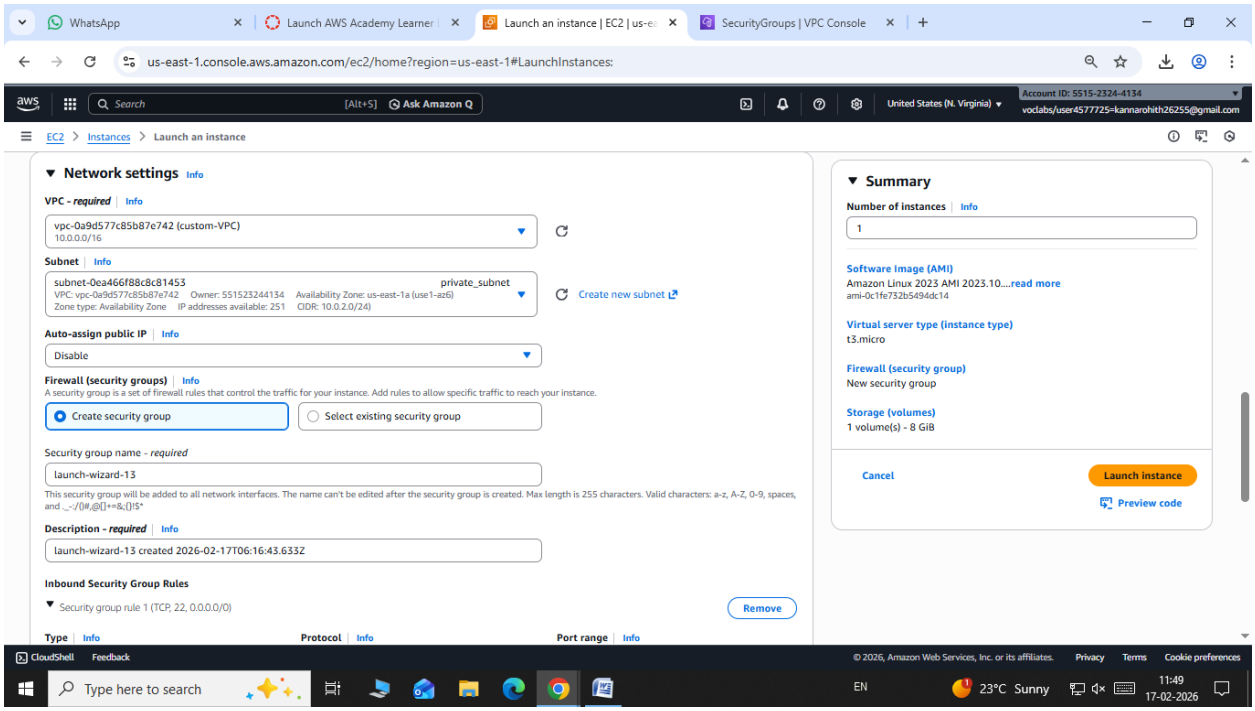


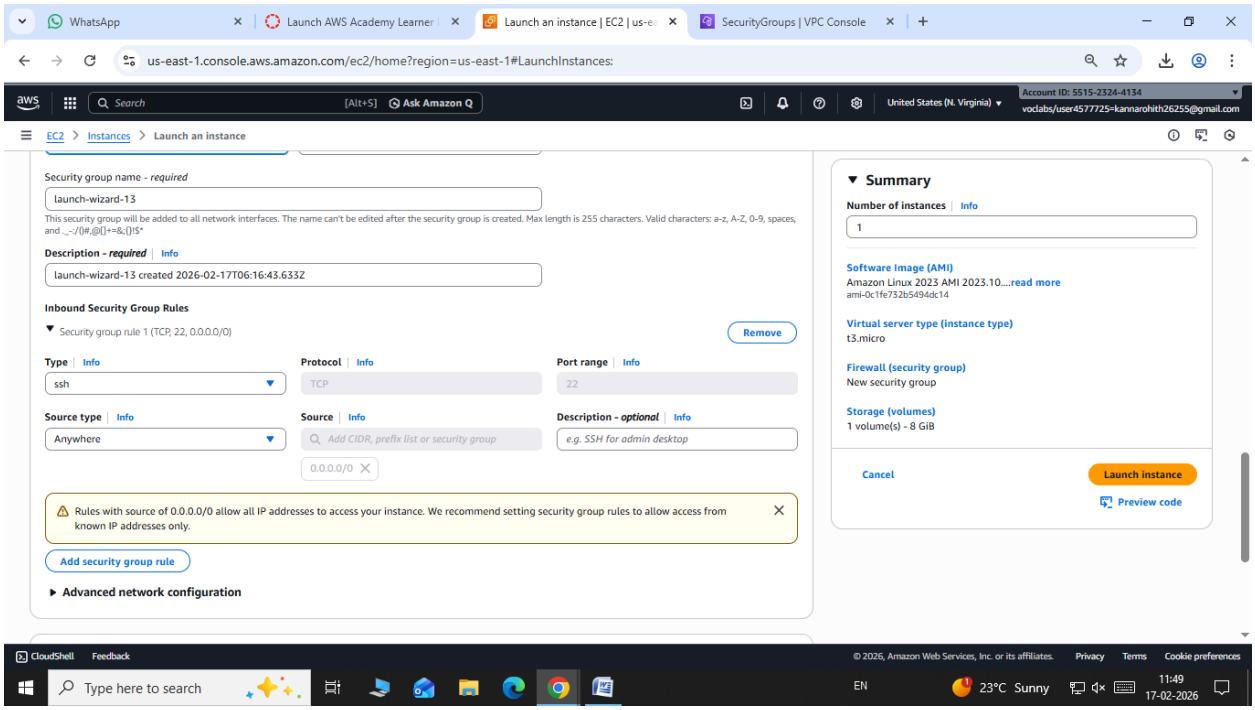

- Private EC2 → Private subnet
  Attach correct security groups.




WhatsApp
Launch AWS Academy Learner
Launch an instance | EC2 | us-e
SecurityGroups | VPC Console
us-east-1.console.aws.amazon.com/ec2/home?region=us-east-1#LaunchInstances:
Search [Alt+S] Ask Amazon Q
United States (N. Virginia)
Account ID: 5515-2324-4134
voclabs/user4577725=kannarohith26255@gmail.com
EC2 > Instances > Launch an instance
Recents
Quick Start
Amazon Linux
macOS
Ubuntu
Windows
Red Hat
SUSE Linux
Debian
Browse more AMIs
Including AMIs from AWS, Marketplace and the Community
Amazon Machine Image (AMI)
Amazon Linux 2023 kernel-6.1 AMI
ami-0c1fe732b5494dc14 (64-bit (x86), uefi-preferred) / ami-02b86da1e539b4dd0 (64-bit (Arm), uefi)
Virtualization: hvm ENA enabled: true Root device type: ebs
Free tier eligible
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 2023.10.20260202.2 x86_64 HVM kernel-6.1
Architecture
Boot mode
AMI ID
Publish Date
Username
64-bit (x86)
uefi-preferred
ami-0c1fe732b5494dc14
2026-02-03
ec2-user
Verified provider
Instance type Info | Get advice
Instance type
Summary
Number of instances | Info
1
Software Image (AMI)
Amazon Linux 2023 AMI 2023.10....read more
ami-0c1fe732b5494dc14
Virtual server type (instance type)
t3.micro
Firewall (security group)
New security group
Storage (volumes)
1 volume(s) - 8 GiB
Cancel
Launch instance
Preview code
CloudShell Feedback
© 2026, Amazon Web Services, Inc. or its affiliates. Privacy Terms Cookie preferences
Type here to search
EN
23°C Sunny
11:48
17-02-2026

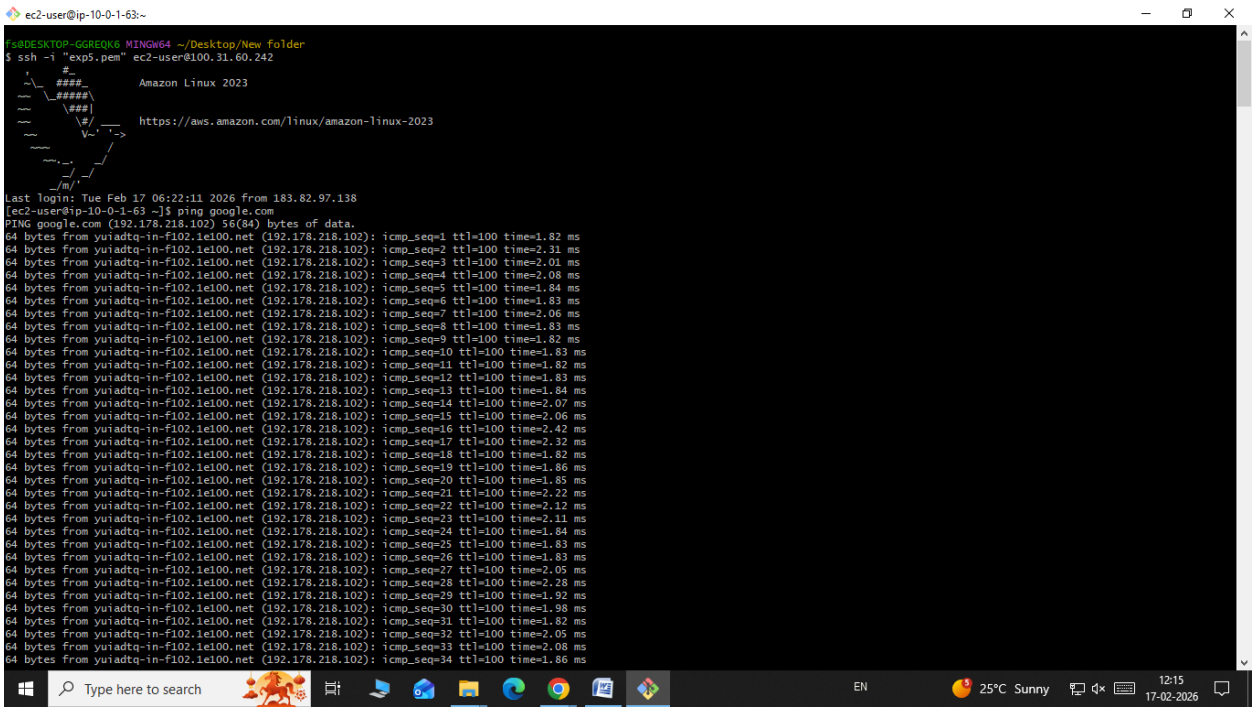

WhatsApp
Launch AWS Academy Learner
Launch an instance | EC2 | us-e
SecurityGroups | VPC Console
us-east-1.console.aws.amazon.com/ec2/home?region=us-east-1#LaunchInstances:
Search [Alt+S] Ask Amazon Q
United States (N. Virginia)
Account ID: 5515-2324-4134
voclabs/user4577725=kannarohith26255@gmail.com
EC2 > Instances > Launch an instance
Instance type
t3.micro
Family: t3 2 vCPU 1 GiB Memory Current generation: true On-Demand Linux base pricing: 0.0104 USD per Hour
On-Demand Windows base pricing: 0.0196 USD per Hour On-Demand Ubuntu Pro base pricing: 0.0139 USD per Hour
On-Demand SUSE base pricing: 0.0104 USD per Hour On-Demand RHEL base pricing: 0.0392 USD per Hour
Free tier eligible
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 - required
exp5
Create new key pair
Network settings Info
Edit
Network | Info
vpc-08e6f3ebe3f57f6d6
Subnet | Info
No preference (Default subnet in any availability zone)
Auto-assign public IP | Info
Enable
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.
Summary
Number of instances | Info
1
Software Image (AMI)
Amazon Linux 2023 AMI 2023.10....read more
ami-0c1fe732b5494dc14
Virtual server type (instance type)
t3.micro
Firewall (security group)
New security group
Storage (volumes)
1 volume(s) - 8 GiB
Cancel
Launch instance
Preview code
CloudShell Feedback
© 2026, Amazon Web Services, Inc. or its affiliates. Privacy Terms Cookie preferences
Type here to search
EN
23°C Sunny
11:48
17-02-2026

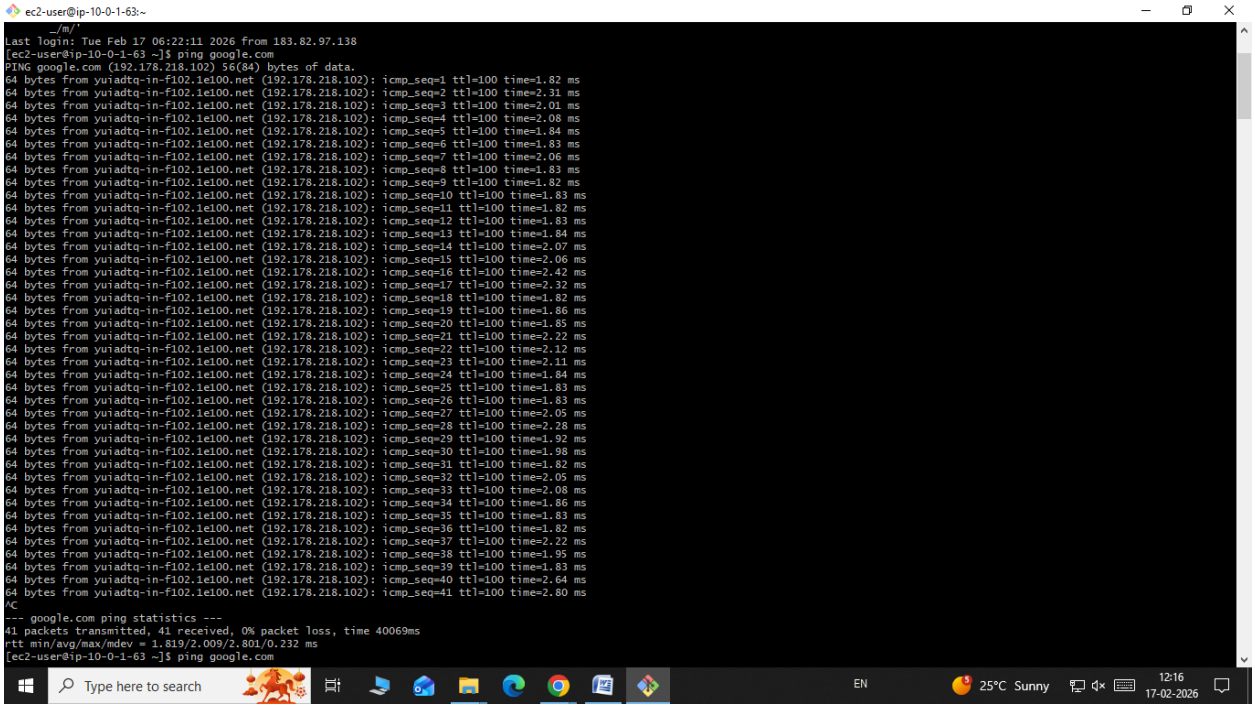


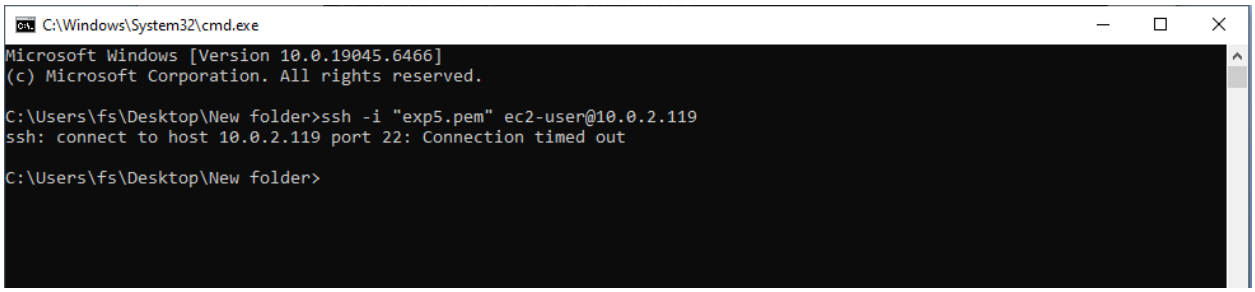

# ◆ Step 8: Test the Setup

- Public EC2 → Internet access ✓




- Private EC2 → Internet via NAT ✓
- Private EC2 → No direct inbound access ✓




**Scenario Based Questions:**

1. You have a web application where users access a website, but the database should not be exposed to the internet. How would you design the VPC? Which resources go into public and private subnets?

Answer: Place ALB/Web servers in public subnets and the database in private subnets; allow DB access only from the application security group.

2. An EC2 instance in a public subnet cannot access the internet. What VPC components would you check and why?

Answer: Check Internet Gateway attachment, route table (0.0.0.0/0 → IGW), public IP assignment, and Security Group/NACL rules.

3. Your application server needs to connect to an RDS database securely. How would you configure security groups and subnets?

Answer: Deploy RDS in a private subnet and allow inbound DB port access only from the application server's security group.

4. You are asked to design a VPC for 500 servers today, but it should scale to 2,000 servers in the future. How would you choose the CIDR block?

Answer: Choose a larger CIDR block (e.g., /20) to accommodate future scaling without IP exhaustion.

5. A company wants secure connectivity between its on-premises data center and AWS VPC. Which AWS services would you choose and why (VPN vs Direct Connect)?

Answer: Use VPN for quick, cost-effective setup; choose Direct Connect for dedicated, high-bandwidth, low-latency connectivity.

6. You need to connect two VPCs, but both use the same CIDR range. How would you solve this problem?

Answer: Modify one VPC's CIDR range or use NAT/PrivateLink to handle overlapping IP addresses.

7. Multiple microservices running in different subnets need to communicate securely. How would you design routing and security groups?

Answer: Use private subnets with proper route tables and configure security groups referencing each other for controlled access.

8. Design a VPC for a 3-tier application (Web, App, DB) with high security and scalability. Explain subnets, route tables, gateways, and security groups.

Answer: Use public subnets for ALB, private subnets for App, isolated private subnets for DB; attach IGW/NAT appropriately and restrict access via security groups.

9. You suspect unusual traffic inside your VPC. How would you monitor and analyze network traffic?

Answer: Enable VPC Flow Logs and analyze using CloudWatch, GuardDuty, or Traffic Mirroring.

10. Why can't a private subnet have an Internet Gateway directly attached?

Answer: An Internet Gateway attaches to the VPC, not to individual subnets; private subnets simply lack a route to it.

11. What happens if route tables are misconfigured in a VPC?

Answer: Traffic will fail to reach intended destinations, causing connectivity issues or outages.

12. What happens if a route table has no local route?

Answer: Instances within the VPC will not be able to communicate with each other.

13. An EC2 instance allows traffic on port 80 in the security group, but traffic is still blocked. What could be the reason?

Answer: Possible causes include NACL blocking, OS firewall rules, missing public IP, incorrect routing, or the web service not running.

14. You need to create a VPC that will host 1,000+ EC2 instances across multiple AZs. How do you decide the CIDR block?

Answer: Select a sufficiently large CIDR (e.g., /21 or /20) and divide it into multiple subnets across AZs for scalability.

15. Only a company's corporate IP should be able to SSH into EC2 instances. How would you implement this securely in AWS VPC?

Answer: Configure the security group to allow port 22 access only from the corporate public IP address (/32).

16. An EC2 instance can send traffic out but cannot receive responses. Which VPC component might be misconfigured and why?

Answer: Likely a Network ACL blocking inbound return traffic (ephemeral ports) or asymmetric routing issue.