

# Task 1

**Objective:** Design and configure a basic AWS network with the following requirements:

1. Create **1 VPC**
2. Create **2 Public Subnets**
3. Create **2 Private Subnets**
4. Attach an **Internet Gateway (IGW)**
5. Configure **NAT Gateway** for private subnet outbound access

## Solution:

### VPC Design

**VPC CIDR:** 10.0.0.0/16

**Reason:** A /16 network offers 65,536 IP addresses, making it ideal for scalable beginner AWS setups. It allows easy subdivision into multiple /24 subnets while avoiding IP exhaustion.

### Subnet

According to the task I divided the VPC into 2 public and 2 private subnets = 4 Total Subnets

Each subnet uses /24 CIDR, giving 256 IPs which is common choice

### Public subnets

**Public 1** 10.0.1.0/24 Hosts public-facing EC2/ Load Balancer

**Public 2** 10.0.2.0/24 Redundancy in another availability Zone

### Why /24?

- Allow enough IPs for EC2, load balancers, and NAT gateways.
- Easy to understand and commonly used in real deployments.

### Private subnets

**Private 1** 10.0.3.0/24 Backend EC2, app servers, RDS

**Private 2** 10.0.4.0/24 Redundancy for backend services

### Why private?

- Protect internal resources
- Prevent direct exposure from the internet

## Routing Design

### Public Route Table

**Default:** 0.0.0.0/0 (Internet Gateway IGW) for both public subnets.

### Private Route Table

**Default:** 0.0.0.0/0 (NAT Gateway) for both private subnets.

**Note:** Public subnets are host internet facing, while private subnets are get outbound internet

## ScreenShots

### a) VPC Creation

**Name:** MyVPC

The screenshot shows the AWS VPC dashboard. In the top navigation bar, it says "aws" and "Search [Alt+S]". On the right, it shows "Account ID: 3224-0285-1464", "Region: Asia Pacific (Hyderabad)", and a user name "mohak1702". Below the navigation, there's a success message: "You successfully created vpc-02675f599c9a8514e / MyVPC".  
The main area displays the "Details" tab for the VPC. It includes the following information:

- VPC ID:** vpc-02675f599c9a8514e
- State:** Available
- DNS resolution:** Enabled
- Main network ACL:** acl-043f0d65538fb944d
- IPv6 CIDR:** -
- Encryption control ID:** -
- Tenancy:** default
- Default VPC:** No
- Network Address Usage metrics:** Disabled
- Encryption control mode:** -
- Block Public Access:** Off
- DHCP option set:** dopt-0e529950b5fcab708
- IPv4 CIDR:** 10.0.0.0/16
- Route 53 Resolver DNS Firewall rule groups:** -
- DNS hostnames:** Disabled
- Main route table:** rtb-04b88dd2bf9d9c76d6
- IPv6 pool:** -
- Owner ID:** 322402851464

Below the details, there are tabs for "Resource map", "CIDRs", "Flow logs", "Tags", and "Integrations". The "Resource map" tab is selected, showing three cards: "VPC", "Subnets (0)", and "Route tables (1)". At the bottom, there are links for "CloudShell", "Feedback", "Console Mobile App", and copyright information: "© 2025, Amazon Web Services, Inc. or its affiliates. Privacy Terms Cookie preferences".

## VPC Details

The screenshot shows the AWS VPC dashboard with the 'Your VPCs' section selected. It displays two VPC entries:

Name	VPC ID	State	Encryption controls	Encryption control	Block Public Access	IPv4 CIDR
MyVPC	vpc-02675f599c9a8514e	Available	-	-	Off	10.0.0.0/16
-	vpc-025eb7803f2573fae	Available	-	-	Off	172.31.0.0/24

**Details for vpc-02675f599c9a8514e / MyVPC:**

Attribute	Value
VPC ID	vpc-02675f599c9a8514e
State	Available
DNS resolution	Enabled
Main network ACL	acl-043f0d65538fb944d
Default VPC	No
IPv6 CIDR	-
Network Address Usage metrics	Disabled
Block Public Access	Off
DHCP option set	dopt-0e529950b5fcab708
IPv4 CIDR	10.0.0.0/16
Route 53 Resolver DNS Firewall rule groups	-
DNS hostnames	Disabled
Main route table	rtb-04b88dd28fd9c76d6
IPv6 pool	-
Owner ID	322402851464

## Subnets with CIDR

The screenshot shows the AWS VPC dashboard with the 'Subnets' section selected. It displays seven subnets:

Name	Subnet ID	State	VPC	Block Public...	IPv4 CIDR
private-subnet-1	subnet-07bdbab65e8332daa6	Available	vpc-02675f599c9a8514e   MyVPC	Off	10.0.3.0/24
public-subnet-2	subnet-0a17b56c138685f9f	Available	vpc-02675f599c9a8514e   MyVPC	Off	10.0.2.0/24
-	subnet-064cc64100e5faf8e	Available	vpc-025eb7803f2573fae	Off	172.31.0.0/20
-	subnet-0fce6e551d086fe3	Available	vpc-025eb7803f2573fae	Off	172.31.32.0/20
-	subnet-081bd19930f1b7223	Available	vpc-025eb7803f2573fae	Off	172.31.16.0/20
public-subnet-1	subnet-0fa5da922c1e138c6	Available	vpc-02675f599c9a8514e   MyVPC	Off	10.0.1.0/24
private-subnet-2	subnet-0dba4b9f6170b2722	Available	vpc-02675f599c9a8514e   MyVPC	Off	10.0.4.0/24

**Subnets:** subnet-07bdbab65e8332daa6, subnet-0a17b56c138685f9f, subnet-0fce6e551d086fe3, subnet-081bd19930f1b7223, subnet-0fa5da922c1e138c6, subnet-0dba4b9f6170b2722

## Subnet with Availability Zone

The screenshot shows the AWS VPC Subnets page. On the left, there's a navigation sidebar under 'Virtual private cloud' with options like Subnets, Route tables, Internet gateways, Egress-only internet gateways, DHCP option sets, Elastic IPs, Managed prefix lists, Endpoints, Endpoint services, NAT gateways, Peering connections, and Route servers. The main area displays a table titled 'Subnets (4/7) Info' with the following data:

IPv4 CIDR	IPv6 CIDR	IPv6 CDR association ID	Available IPv4 addresses	Availability Zone	Rout
10.0.3.0/24	-	-	251	aps2-az1 (ap-south-2a)	rtb-1
10.0.2.0/24	-	-	251	aps2-az2 (ap-south-2b)	rtb-1
172.31.0.0/20	-	-	4091	aps2-az1 (ap-south-2a)	rtb-1
172.31.32.0/20	-	-	4091	aps2-az2 (ap-south-2b)	rtb-1
172.31.16.0/20	-	-	4091	aps2-az3 (ap-south-2c)	rtb-1
10.0.1.0/24	-	-	250	aps2-az1 (ap-south-2a)	rtb-1
10.0.4.0/24	-	-	251	aps2-az2 (ap-south-2b)	rtb-1

At the bottom of the table, it says 'Subnets: subnet-07bdbab65e8332daa6, subnet-0a17b56c138685f9f, subnet-0fa5da922c1e138c6, subnet-0dba4b9f6170b2722'. The page also includes standard AWS navigation elements like CloudShell, Feedback, and Console Mobile App.

## (c) Route tables

- One with IGW route(public subnets)
- One with NAT Gateway route(private subnets)

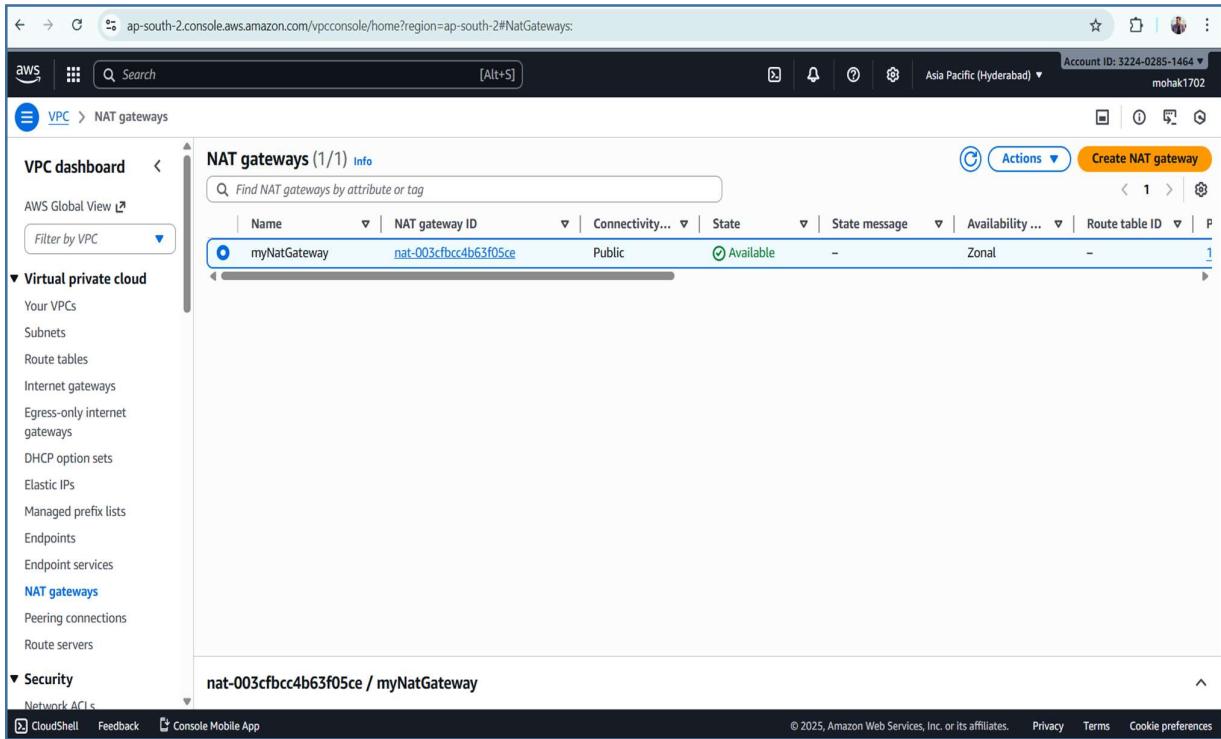
The screenshot shows the AWS VPC Route tables page. On the left, there's a navigation sidebar under 'Virtual private cloud' with options like Subnets, Route tables, Internet gateways, Egress-only internet gateways, DHCP option sets, Elastic IPs, Managed prefix lists, Endpoints, Endpoint services, NAT gateways, Peering connections, and Route servers. The main area displays a table titled 'Route tables (2/4) Info' with the following data:

Name	Route table ID	Explicit subnet associ...	Edge associations	Main	VPC
-	rtb-0653d9e8e662c766c	-	-	Yes	vpc-025eb7803f2573fae
-	rtb-04b88dd28fd9c76d6	-	-	Yes	vpc-02675f599c9a8514e   MyVPC
private-rt	rtb-0b201b7da32557065	2 subnets	-	No	vpc-02675f599c9a8514e   MyVPC
public-rt	rtb-0ebad53ff5b4999ae	2 subnets	-	No	vpc-02675f599c9a8514e   MyVPC

At the bottom of the table, it says 'Route tables: rtb-0b201b7da32557065, rtb-0ebad53ff5b4999ae'. The page also includes standard AWS navigation elements like CloudShell, Feedback, and Console Mobile App.

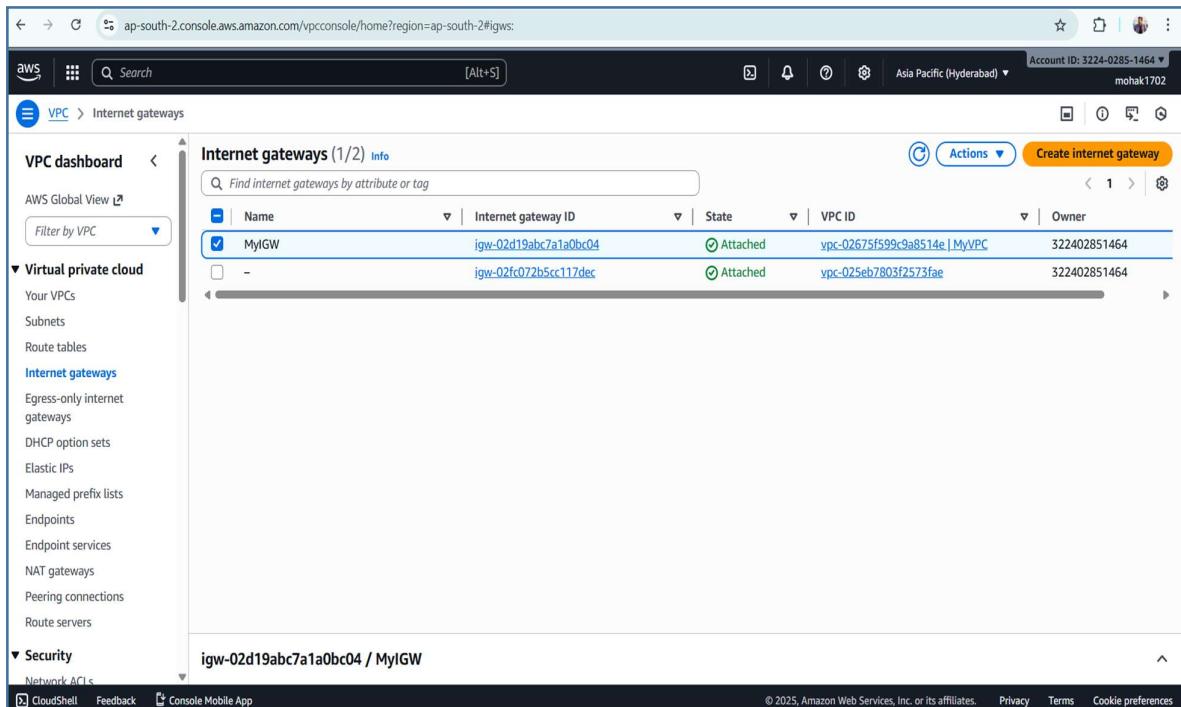
## (d) NAT Gateway

- NAT Gateway page



The screenshot shows the AWS VPC console with the 'NAT gateways' page selected. The left sidebar shows navigation options like 'VPC dashboard', 'Virtual private cloud', and 'NAT gateways'. The main area displays a table titled 'NAT gateways (1/1)'. The table has columns for Name, NAT gateway ID, Connectivity..., State, State message, Availability ..., Route table ID, and P. One row is listed: 'myNatGateway' with NAT gateway ID 'nat-003cfbcc4b63f05ce', State 'Public', and State message 'Available'. A 'Create NAT gateway' button is visible at the top right.

- Internet Gateway page (attached to VPC) (MyIGW)



The screenshot shows the AWS VPC console with the 'Internet gateways' page selected. The left sidebar shows navigation options like 'VPC dashboard', 'Virtual private cloud', and 'Internet gateways'. The main area displays a table titled 'Internet gateways (1/2)'. The table has columns for Name, Internet gateway ID, State, VPC ID, and Owner. Two rows are listed: 'MyIGW' with Internet gateway ID 'igw-02d19abc7a1a0bc04', State 'Attached', VPC ID 'vpc-02675f599c9a8514e | MyVPC', and Owner '322402851464'. Another row is listed below it with Internet gateway ID 'igw-02fc072b5cc117dec', State 'Attached', VPC ID 'vpc-025eb7803f2573fae', and Owner '322402851464'. A 'Create internet gateway' button is visible at the top right.

## **CIDR Summary**

<b>Component</b>	<b>CIDR</b>
<b>VPC</b>	10.0.0.0/16
<b>Public Subnet 1</b>	10.0.1.0/24
<b>Public Subnet 2</b>	10.0.2.0/24
<b>Private Subnet 1</b>	10.0.3.0/24
<b>Private Subnet 2</b>	10.0.4.0/24