#### TASK 3

Task: Design a Multi-Cloud Architecture (AWS-Only Steps)

**Focus:** Configure AWS services to enable interoperability with another cloud platform.

# **Step-by-Step Guide**

Region: Use the default AWS region (e.g., us-east-1) for all steps.

# **Step 1: Create a VPC for AWS Resources**

**Objective:** Design a secure network to host AWS services.

1. Go to AWS Management Console > VPC Dashboard.

## 2. Click Create VPC.

Name: MultiCloud-VPC

o **IPv4 CIDR:** 10.0.0.0/16

Leave other settings as default.

#### 3. Create **Public Subnets**:

- o Subnet 1: 10.0.1.0/24 (Name: Public-Subnet-1, Availability Zone: us-east-1a)
- o Subnet 2: 10.0.2.0/24 (Name: Public-Subnet-2, Availability Zone: us-east-1b)

### 4. Attach an **Internet Gateway**:

o Create an Internet Gateway named MultiCloud-IGW and attach it to the VPC.

# 5. Configure **Route Tables**:

o Edit the main route table to route 0.0.0.0/0 traffic to the Internet Gateway.

#### **Screenshot Heading:**

"Step 1: AWS VPC Configuration Showing Subnets and Internet Gateway"

Where to Capture: VPC Dashboard showing the created VPC, subnets, and Internet Gateway.

### **Step 2: Launch an EC2 Instance for Frontend Application**

**Objective:** Host a web server to interact with the other cloud platform.

1. Go to EC2 Dashboard > Launch Instance.

- 2. Configure:
  - o Name: MultiCloud-WebServer
  - o **AMI:** Amazon Linux 2023
  - o **Instance Type:** t2.micro
  - o **Key Pair:** Create/use an existing key pair.
  - o **Network:** Select MultiCloud-VPC and Public-Subnet-1.
  - o Auto-assign Public IP: Enable.
- 3. Under Security Groups:
  - o Create a new security group: WebServer-SG
  - o Allow HTTP (Port 80), HTTPS (Port 443), and SSH (Port 22).
- 4. Launch the instance.

# **Screenshot Heading:**

"Step 2: EC2 Instance Launch Configuration with Public IP"

Where to Capture: EC2 instance summary page showing the public IP and security group.

### Step 3: Set Up RDS MySQL Database

**Objective:** Create a database accessible from both AWS and the other cloud.

- 1. Go to **RDS Dashboard** > Create Database.
- 2. Configure:
  - o **Engine:** MySQL
  - o **Template:** Free Tier
  - o **DB Instance Identifier:** multicloud-db
  - o **Credentials:** Set admin username/password.
  - Network: Select MultiCloud-VPC and place the DB in Public-Subnet-2 (for demo purposes).
- 3. Under Security Group, create a new SG: DB-SG
  - o Allow inbound traffic from WebServer-SG on **Port 3306**.
- 4. Disable **Public Access** (for production, but enable temporarily for the demo).

# **Screenshot Heading:**

"Step 3: RDS Database Configuration in Public Subnet"

Where to Capture: RDS database connectivity & security tab showing the security group and subnet.

### **Step 4: Configure IAM Roles for Cross-Cloud Access**

**Objective:** Grant EC2 permissions to access S3 (simulating cross-cloud storage).

- 1. Go to IAM Dashboard > Roles > Create Role.
- 2. Select AWS Service > EC2 > Next.
- 3. Attach the **AmazonS3FullAccess** policy (for demo purposes).
- 4. Name the role: EC2-S3-Access and create it.
- 5. Attach the role to the MultiCloud-WebServer EC2 instance.

## **Screenshot Heading:**

"Step 4: IAM Role with S3 Access Attached to EC2"

Where to Capture: IAM role summary page showing the attached policies.

### **Step 5: Deploy a Sample Web Application**

**Objective:** Test connectivity between EC2, RDS, and S3.

- 1. SSH into the EC2 instance.
- 2. Install Apache and PHP:

bash

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sudo yum install -y httpd php mysql

sudo systemctl start httpd

3. Create a PHP file (/var/www/html/index.php) to connect to RDS:

php

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<?php

\$servername = "<RDS ENDPOINT>";

```
$username = "<DB_USER>";
$password = "<DB_PASSWORD>";
$conn = new mysqli($servername, $username, $password);
if ($conn->connect_error) {
    die("Connection failed: " . $conn->connect_error);
}
echo "Connected to RDS successfully!";
?>
```

4. Test the page at http://<EC2\_PUBLIC\_IP>/index.php.

# **Screenshot Heading:**

"Step 5: Web App Successfully Connecting to RDS"

Where to Capture: Browser showing "Connected to RDS successfully!".

# Step 6: Simulate Cross-Cloud Interoperability with S3

**Objective:** Use S3 as a mock service for the second cloud platform.

- 1. Create an S3 bucket:
  - o Go to S3 Dashboard > Create Bucket > Name: multicloud-demo-bucket
- 2. On the EC2 instance, use the AWS CLI to upload a test file:

bash

Copy

echo "Multi-Cloud Demo" > test.txt

aws s3 cp test.txt s3://multicloud-demo-bucket/

#### **Screenshot Heading:**

"Step 6: File Uploaded to S3 from EC2 Instance"

Where to Capture: S3 bucket contents showing the uploaded test.txt.

### **Step 7: Document the Architecture**

1. Use **AWS** Architecture **Tool** or draw.io to create a diagram showing:

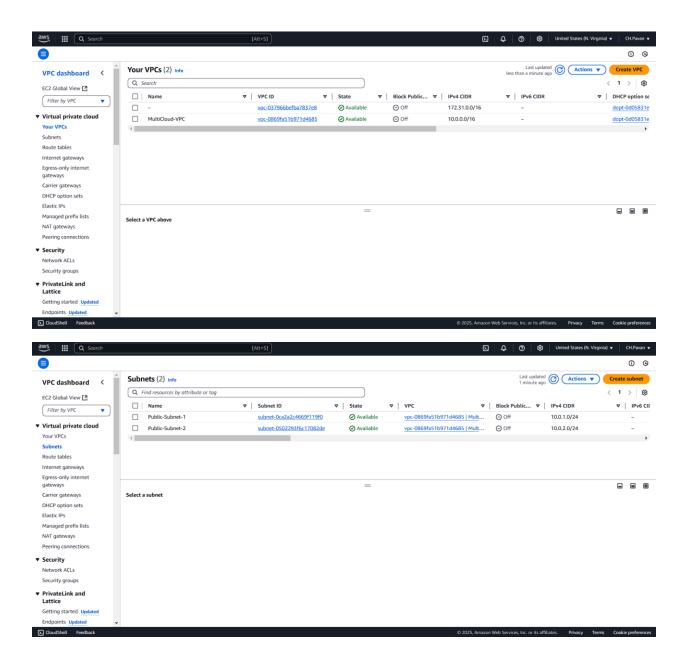
- o EC2, RDS, S3, and VPC components.
- o Label the other cloud platform as a placeholder (e.g., "External Cloud Provider").
- 2. Write a summary explaining how data flows between AWS and the other cloud.

# **Screenshot Heading:**

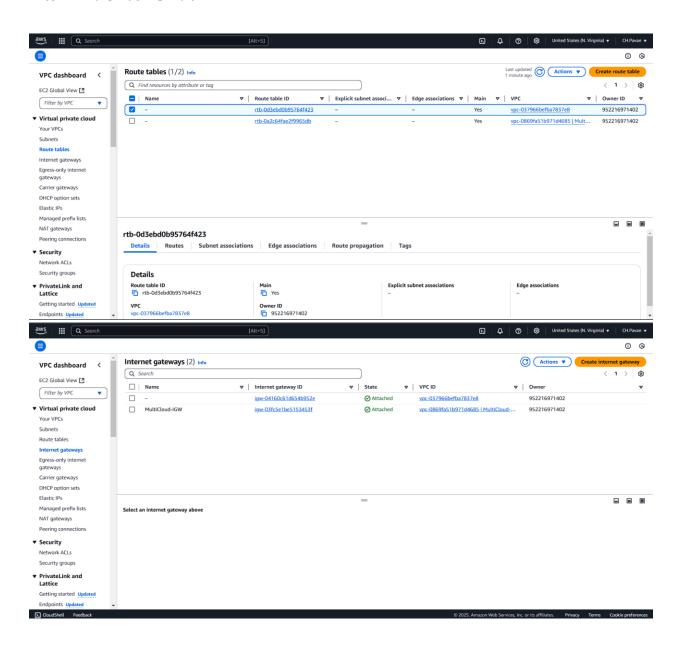
"Step 7: Multi-Cloud Architecture Diagram"

Where to Capture: Final architecture diagram with AWS and placeholder components.

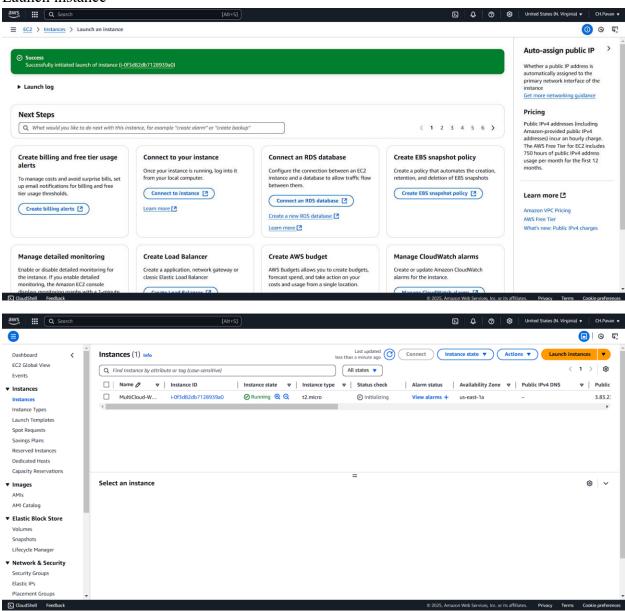
AWS VPC Configuration Showing Subnets and Internet Gateway"



VPC Dashboard showing the created VPC, subnets, and Internet Gateway.



#### Launch instance



# Creating Database

