Gain insight into AWS networking and security.

Task 1: Create a Custom Virtual Private Cloud (VPC)
1. In the AWS Console, navigate to the VPC service.
2. Click “Create VPC” and enter details: name tag (e.g., `MyVPC`), IPv4 CIDR block (e.g., `10.0.0.0/16`).
3. Create a subnet:
   - Go to Subnets and click “Create subnet”.
   - Associate it with `MyVPC`, specify a name, and set an IPv4 CIDR (e.g., `10.0.1.0/24`).
4. Create an Internet Gateway:
   - Go to Internet Gateways, create a new one, and attach it to `MyVPC`.
5. Modify the main route table of your VPC:
   - Add a route that directs internet-bound traffic (`0.0.0.0/0`) to the Internet Gateway.

Task 2: Implement Security Groups and Network ACLs
1. Create a Security Group within `MyVPC`:
   - Specify inbound/outbound rules (e.g., allow SSH, HTTP).
2. Create a Network ACL:
   - Associate it with the subnet in `MyVPC`.
   - Configure inbound and outbound rules for traffic control.

Task 3: Introduction to IAM
1. In the AWS Console, go to the IAM service.
2. Create a new user:
   - Assign a user name.
   - Select “Programmatic access” as the access type.
3. Create a group:
   - Assign a policy (e.g., AmazonEC2FullAccess) and add your user to this group.
4. Explore roles:
   - Create a role and associate it with your EC2 instance for accessing other AWS services.

Task 4: Apply IAM Roles to EC2
1. Go back to the EC2 dashboard.
2. Select your instance, and in the actions menu, navigate to Security -> Modify IAM role.
3. Attach the role you created.

In this lab, users learn about AWS networking by creating a custom VPC, setting up security through security groups and network ACLs, and understand IAM for managing access to AWS services.

Lab 4: Big Data Analytics with Amazon Redshift and QuickSight

Objective: Learn the basics of data warehousing and visualization using AWS.

Task 1: Set up an Amazon Redshift Cluster
1. Go to the Redshift service in AWS Console.
2. Click “Create cluster” and choose “Free trial” if available.
3. Select node type and number, and set up cluster details (name, database name, master user, password).
4. Choose the VPC, create a security group, and configure access permissions.

Task 2: Load Sample Data into Redshift
1. Create an S3 bucket and upload sample data (CSV files).
2. Create tables in Redshift to match the sample data structure.
3. Use the `COPY` command to load data from S3 into Redshift tables:

   ```sql
   copy mytable from 's3://mybucket/mydata.csv'
   credentials 'aws_iam_role=arn:aws:iam::123456789012:role/MyRedshiftRole'
   csv;
   ```

Task 3: Data Querying with Redshift
1. Connect to the Redshift cluster using a SQL client (e.g., SQL Workbench).
2. Perform SQL queries to analyze the data:

   ```sql
   SELECT * FROM mytable WHERE condition;
   ```

Task 4: Visualization with AWS QuickSight
1. Sign up for AWS QuickSight and connect it to your Redshift cluster.
2. Import the dataset from Redshift.
3. Create analyses and visualizations:
   - Use different chart types to visualize the data (bar chart, line chart, etc.).
   - Experiment with filters and aggregations.