**Assignment: AWS Cloud Infrastructure Setup for E-Commerce Application**

**Objective:**

The goal of this assignment is to design and implement a complete cloud infrastructure using AWS services to support an e-commerce website. The setup should ensure security, scalability, and availability using the services learned in the labs.

**Business Scenario:**

You are tasked with setting up a secure, scalable, and resilient infrastructure for an e-commerce company that is moving its services to AWS. The company expects growth in traffic and needs to ensure that its infrastructure can handle high availability, secure user data, and be able to recover from failures.

**Instructions:**

**Part 1: IAM Setup (Lab 1 - IAM)**

1. **Create IAM Users and Groups:**
   * Create three IAM users: admin\_user, web\_support, and db\_support.
   * Create two groups:
     + **Web Support Group:** Assign read-only access to Amazon EC2.
     + **DB Support Group:** Assign full access to Amazon RDS.
   * Add users to respective groups.
   * Ensure that admin\_user has administrator privileges across the entire AWS account​(Lab 1Introduction to AW…).

**Part 2: Virtual Private Cloud (VPC) Setup (Lab 2 - VPC)**

1. **VPC Creation:**
   * Create a VPC with two public and two private subnets across two Availability Zones.
   * Set up an Internet Gateway (IGW) for public subnets and a NAT Gateway for private subnets.
   * Ensure that the web servers are deployed in public subnets and the database servers in private subnets​(Lab 2Build your VPC and…).
2. **Security Group Configuration:**
   * Create a security group for web servers that allows inbound HTTP traffic on port 80 from anywhere.
   * Create a security group for database servers that only allows inbound traffic from the web server's security group on port 3306 (MySQL/Aurora)​(Lab 2Build your VPC and…)​(Lab 5 Build Your DB Ser…).

**Part 3: EC2 and Web Server Deployment (Lab 3 - EC2)**

1. **Launch an EC2 Instance:**
   * Deploy an EC2 instance in the public subnet with a user-data script that installs a web server (Apache) and deploys a sample website.
   * Enable termination protection and monitor the instance using CloudWatch​(Lab 3 Introduction to A…).
2. **Resizing and Scaling:**
   * Resize the instance from t2.micro to t2.small and add an additional instance for load balancing​(Lab 3 Introduction to A…).

**Part 4: Elastic Block Store (EBS) Configuration (Lab 4 - EBS)**

1. **Create and Attach EBS Volumes:**
   * Create a 10 GiB EBS volume and attach it to your EC2 instance.
   * Format the volume and mount it to /mnt/data-store to store website logs.
   * Create a snapshot of the volume and restore it to a new volume​(Lab 4 Working with EBS).

**Part 5: RDS and Database Server Deployment (Lab 5 - RDS)**

1. **RDS Setup:**
   * Launch an Amazon RDS instance using MySQL, ensuring high availability with Multi-AZ deployment.
   * Connect the RDS instance to the web server using the security groups created earlier.
   * Use a simple web application to interact with the RDS instance by adding, updating, and deleting data​(Lab 5 Build Your DB Ser…).

**Part 6: Scaling and Load Balancing (Lab 6 - Auto Scaling and ELB)**

1. **Set Up Auto Scaling:**
   * Create an Auto Scaling group with a minimum of 2 and a maximum of 6 instances using the AMI from your original EC2 instance.
   * Configure CloudWatch alarms to automatically add instances when CPU utilization exceeds 60%​(Lab 6 Scale and Load Ba…).
2. **Load Balancing:**
   * Deploy an Elastic Load Balancer (ELB) to distribute traffic across your EC2 instances.
   * Verify that the load balancer is properly distributing the traffic by simulating a load test​(Lab 6 Scale and Load Ba…).

**Submission Requirements:**

* **Documentation:**
  + Provide screenshots of all major steps, including IAM user creation, VPC setup, EC2 instance creation, EBS volume attachment, RDS connection, and Auto Scaling configuration.
  + Include the script used in the user-data field when launching EC2 instances.
* **Written Report:**
  + Write a report explaining your setup, add all screenshots, the AWS services used, and how they contribute to the security, scalability, and availability of the e-commerce infrastructure.