**Step 1: Create an RDS Database**

1. Navigate to the **Amazon RDS** service.
2. Click on **Create Database** and use the following configurations:
   * **Database Name:** example
   * **Username:** admin
   * **Password:** lab-password
   * **VPC:** Example VPC
   * **Security Group:** Example-DB

⚠ **Note:** Do not wait for the database to be fully available. Proceed to the next steps.

**Step 2: Verify Security Groups**

Ensure the following security groups exist:

* **ALBSG**
* **Bastion-SG**
* **Example-DB**
* **Inventory-App**

**Step 3: Create a Key Pair**

1. Go to **EC2 Dashboard** → **Key Pairs**
2. Click on **Create Key Pair** and enter:
   * **Key Pair Name:** vockey2
   * **Key Type:** RSA
3. Download the **PPK file**.

**Step 4: Download the PPK File**

1. Navigate to the **Capstone Project** page in AWS Academy.
2. Click on **AWS Details** in the upper right corner.
3. Click on **Download PPK** to save the private key file.

**Step 5: Launch EC2 Instance for Web Application**

1. Navigate to **EC2 Dashboard** → **Instances** → **Launch Instance**
2. Use the following configurations:
   * **AMI:** Amazon Linux 2
   * **Instance Type:** t2.small
   * **VPC:** Example VPC
   * **Subnet:** Private Subnet 1
   * **Auto-assign Public IP:** Disabled
   * **IAM Role:** Inventory-App-Role
   * **Instance Name:** ExampleApp
   * **Security Group:** Inventory-App
   * **Key Pair:** vockey2
3. **Modify Security Group Rules**:
   * Go to **Security Groups** → Inventory-App
   * Edit **Inbound Rules**:
     + **Type:** SSH
     + **Source:** Bastion-SG
   * Click **Save Rules**.

**Step 6: Create Parameter Store Entries in AWS Systems Manager**

Navigate to **AWS Systems Manager** → **Parameter Store** and create the following parameters:

* /example/endpoint → example.cbufnmin3yj3.us-east-1.rds.amazonaws.com
* /example/username → admin
* /example/password → lab-password
* /example/database → example

**Step 7: Access the Web Application via Bastion Instance**

1. Open **Pageant** on your PC.
   * Add the vockey2 key and close Pageant.
2. Open **PuTTY**:
   * **Session → Hostname:** Enter the **IPv4 Address** of the **Bastion Instance**.
   * **Connection → SSH → Auth:**
     + Enable **Agent Forwarding**.
     + Select the **PPK file** (vockey2.ppk).
   * Click **Open** and **Accept** the pop-up warning.
3. Login as:
4. ec2-user
5. Once logged into the Bastion instance, access the **ExampleApp Instance**:
6. ssh ec2-user@<Private IPv4 of ExampleApp>
7. Confirm connection by entering yes.

**Step 8: Install Apache Web Server and MySQL on ExampleApp**

Run the following commands:

ping www.google.com

Ctrl + C # Stop ping

sudo su

yum install -y httpd mysql

amazon-linux-extras enable php7.2

amazon-linux-extras install -y php7.2

**Step 9: Download SQL Database File**

wget https://aws-tc-largeobjects.s3-us-west-2.amazonaws.com/ILT-TF-200-ACACAD-20-EN/capstone-project/Countrydatadump.sql

**Step 10: Download Web Application Source Code**

wget https://aws-tc-largeobjects.s3-us-west-2.amazonaws.com/ILT-TF-200-ACACAD-20-EN/capstone-project/Example.zip

**Step 11: Extract and Copy Web Application Files**

unzip Example.zip -d /var/www/html/

ls /var/www/html/Example/

**Step 12: Start Apache Web Server**

systemctl enable httpd

systemctl start httpd

systemctl status httpd

**Step 13: Connect to RDS Database**

mysql -u admin -p --host example.cbufnmin3yj3.us-east-1.rds.amazonaws.com

* Enter **Password:** lab-password
* Run the following commands to check database connectivity:
* show databases;
* exit;

**Step 14: Import Data into Database**

mysql -u admin -p --host example.cbufnmin3yj3.us-east-1.rds.amazonaws.com example < Countrydatadump.sql

* Enter **Password:** lab-password
* Type exit twice to close the session.

**Step 15: Create a Target Group**

1. Go to **EC2 Dashboard** → **Target Groups**
2. Click **Create Target Group** and configure:
   * **VPC:** Example VPC
   * **Health Check Settings:**
     + **Healthy threshold:** 2
     + **Interval:** 10
   * **Tags:** TG-Example
3. Click **Create Target Group**.

**Step 16: Create an Application Load Balancer**

1. Navigate to **Load Balancers** → **Create Load Balancer**
2. Select **Application Load Balancer** and configure:
   * **Name:** LB-Example
   * **VPC:** Example VPC
   * **Subnets:**
     + us-east-1a → Public Subnet 1
     + us-east-1b → Public Subnet 2
   * **Security Group:** ALBSG
   * **Listeners & Routing:**
     + Target Group: TG-Example
3. Click **Create Load Balancer**.

**Step 17: Configure Auto Scaling Group**

1. Go to **Auto Scaling Groups** → **Create Auto Scaling Group**
2. Configure:
   * **Name:** ASG-Example
   * **Launch Template:** Example-LT
   * **VPC:** Example VPC
   * **Subnets:**
     + Private Subnet 1
     + Private Subnet 2
   * **Attach Load Balancer:**
     + Select TG-Example
3. Click **Create Auto Scaling Group**.

**Step 18: Verify Auto Scaling Instances**

1. Navigate to **EC2 Instances**.
2. Ensure **two new instances** are launching.
3. Wait **2-3 minutes** for health checks to pass.

**Step 19: Test Web Application**

1. Go to **Load Balancers** → Select LB-Example.
2. Copy the **Load Balancer DNS Name**.
3. Open a new browser tab and paste the DNS URL.
4. Verify the web application is running.

✅ **Congratulations! Your Capstone Project is Complete.** 🎉