Bitcot - DevOps - Jr Machine Task - Mahesh Gore

💡 Github Repo - https://github.com/mahigore/php-rds.git

1. Create a PHP Web Application

- Blow is php application.

```
<!DOCTYPE html>
<html>
<head>
  <title>Feedback Form</title>
</head>
<body>
  <h2>Submit Feedback</h2>
  <form method="POST" action="">
    Name: <input type="text" name="name"><br><br>
    Feedback: <textarea name="feedback"></textarea><br><br>
    <input type="submit" value="Submit">
  </form>

  <?php
  $servername = getenv('DB_HOST');
  $username = getenv('DB_USER');
  $password = getenv('DB_PASS');
  $dbname = getenv('DB_NAME');

  $conn = new mysqli($servername, $username, $password, $dbname);

  if ($conn->connect_error) {
    die("Connection failed: " . $conn->connect_error);
  }
```

```
 if ($_SERVER["REQUEST_METHOD"] == "POST") {
  $name = $_POST["name"];
  $feedback = $_POST["feedback"];

  $sql = "INSERT INTO feedback (name, feedback) VALUES ('$name', '$fe
edback')";
  if ($conn->query($sql) === TRUE) {
   echo "Feedback submitted successfully!";
  } else {
   echo "Error: " . $conn->error;
  }
 }

 echo "<h3>All Feedback:</h3>";
 $result = $conn->query("SELECT * FROM feedback");
 while($row = $result->fetch_assoc()) {
  echo "<b>" . $row["name"] . ":</b> " . $row["feedback"] . "<br>";
 }

 $conn->close();
 ?>
</body>
</html>
```

2. Dockerize the PHP Application

- Creation of a Dockerfile for the application. This Dockerfile should use an official PHP Docker image and should copy your application files into the appropriate directory within the Docker image.

```
# Use official PHP image with Apache web server
FROM php:8.2-apache


# Install mysqli extension
RUN docker-php-ext-install mysqli
```

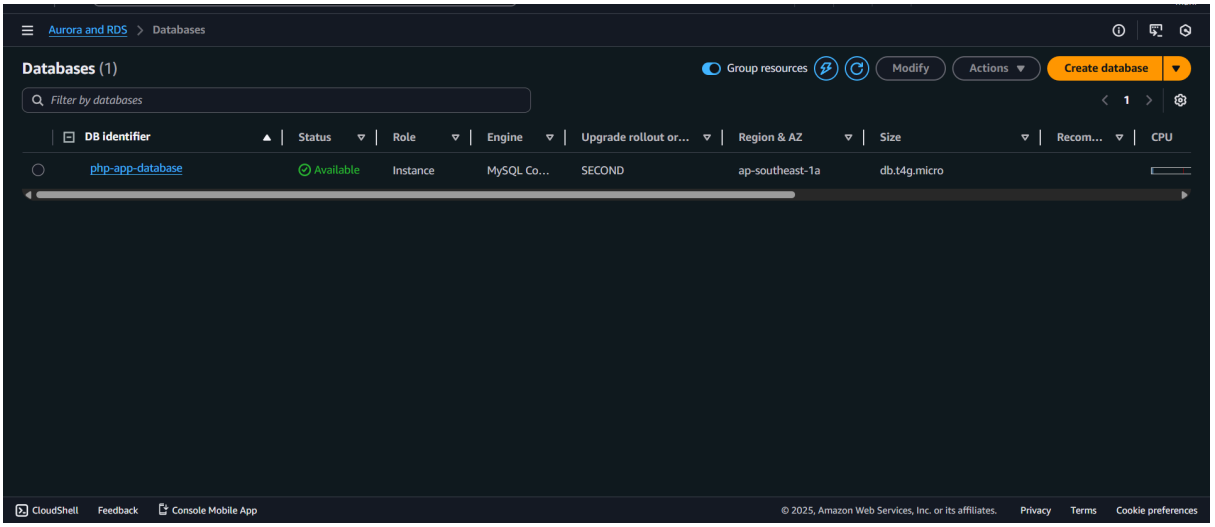
```
# Copy your PHP app files into the web server directory
COPY . /var/www/html/

# Expose port 80 to access the app in the browser
EXPOSE 80

# Start Apache server when the container runs
CMD ["apache2-foreground"]
```

3. Set Up MySQL Database on AWS RDS

3.1 Create a MySQL database instance on AWS RDS. Connect your PHP application to this database and ensure it works as expected.

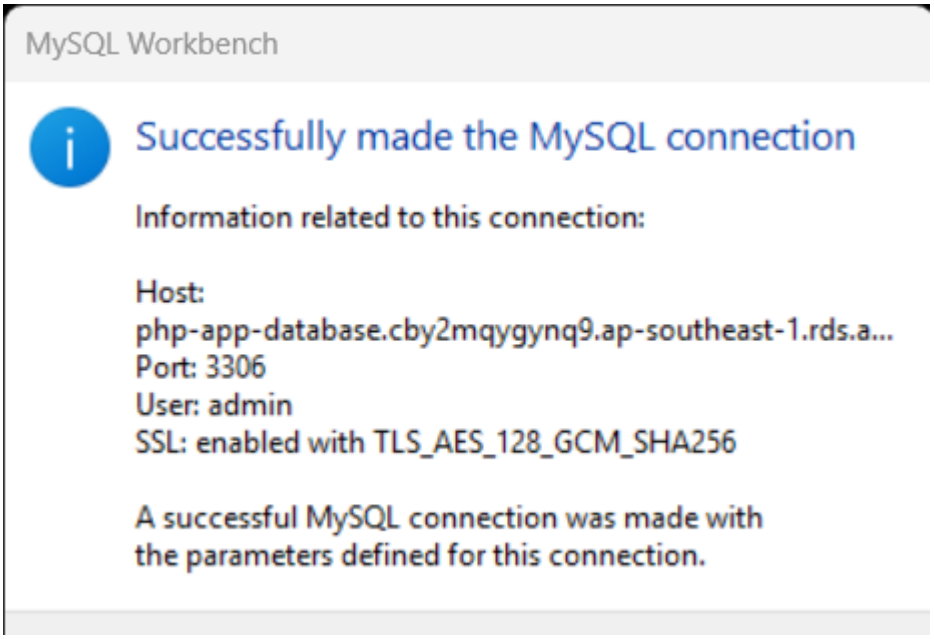
Configuration:

- Creation method: Standard create
- Engine: MySQL
- Engine version: 8.0.43
- Templates: Free tier
- Availability: Single-AZ DB instance
- DB instance identifier: `php-app-database`
- Master username: `admin`
- Credentials management: Self managed
- Master password: `[Your Password]` - Mahi7888
- Instance class: `db.t2g.micro`
- Storage: 5 GB
- VPC: default
- DB subnet group: default
- Public access: Yes
- VPC security group: default { port 3306 }
- Availability Zone: 1a
- Enhanced monitoring: Enable audit logs, error log, slow query log



3.2. Connect to MySQL in Workbench

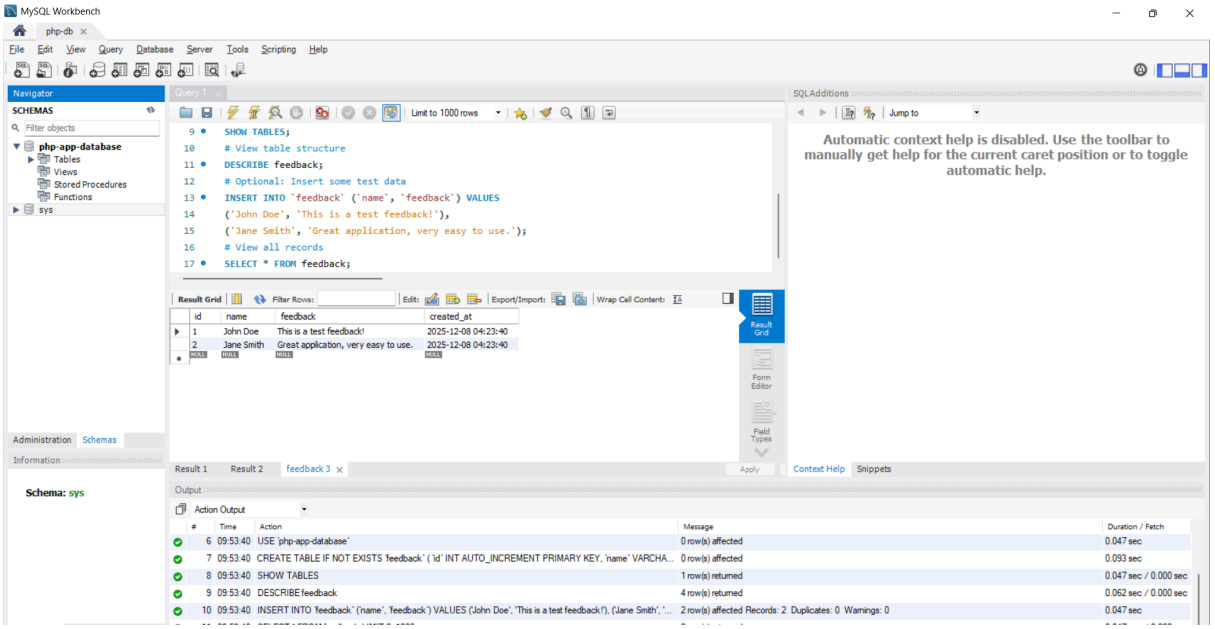
1. Open **MySQL Workbench**
2. Click "+" to create a new connection
3. Enter connection details:
    - **Connection Name**: `PHP Feedback App`
    - **Hostname**: RDS-endpoint
    - **Port**: `3306`
    - **Username**: `admin`
    - **Password**: Click "Store in Vault" and enter your password
4. Click **"Test Connection"** to verify
5. Click **"OK"** to save



3.3. Create Database and Table

Once connected, open a new SQL tab and run this script:

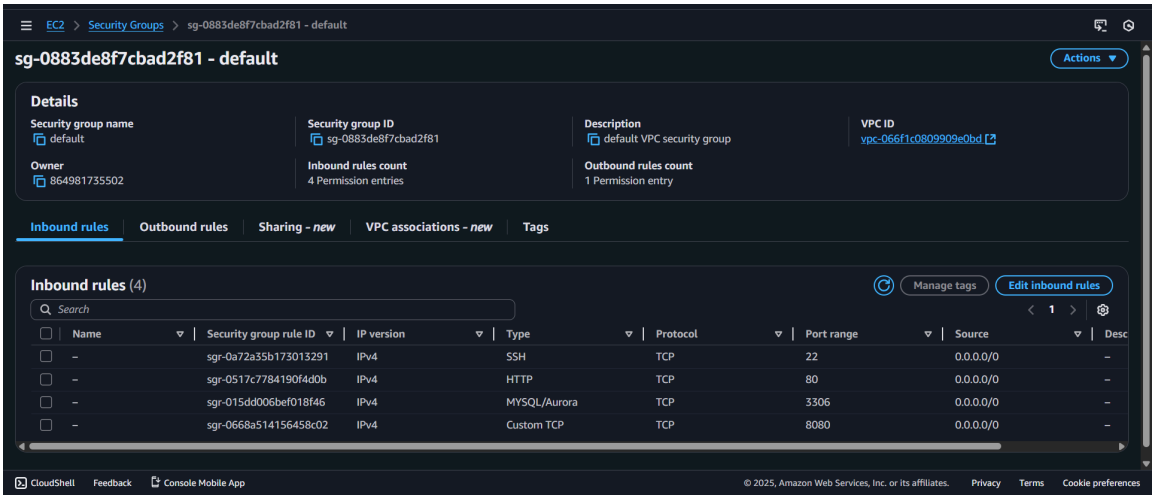
```
# Create the database
CREATE DATABASE IF NOT EXISTS `php-app-database`;
# Use the database
USE `php-app-database`;
# Create the feedback table
CREATE TABLE IF NOT EXISTS `feedback` ( `id` INT AUTO_INCREMENT PRI
MARY KEY, `name` VARCHAR(255) NOT NULL, `feedback` TEXT NOT NUL
L, `created_at` TIMESTAMP DEFAULT CURRENT_TIMESTAMP
) ENGINE=InnoDB DEFAULT CHARSET=utf8mb4 COLLATE=utf8mb4_unico
de_ci;
# Verify table was created
SHOW TABLES;
# View table structure
DESCRIBE feedback;
# Optional: Insert some test data
INSERT INTO `feedback` (`name`, `feedback`) VALUES
('John Doe', 'This is a test feedback!'),
('Jane Smith', 'Great application, very easy to use.');
# View all records
SELECT * FROM feedback;
```



4. Manual Deployment to EC2

4.1 Create an AWS EC2 instance

- **Basic Configuration:**
  - Name: `php-app`
  - AMI: Amazon Linux 2
  - Instance type: `t2.micro`
  - Key pair: [your key pair]
  - VPC: default
  - Public IP: Enable
  - Security groups: default [ports → 22, 80]
  - VPC: default
- Security group



- Install Git, Docker

```
yum install git
yum install docker
systemctl enable docker
systemctl start docker
systemctl status docker
sudo usermod -aG docker ec2-user
sudo systemctl restart docker
```

4.2 Manually transfer your PHP application files and Dockerfile to the EC2 instance.

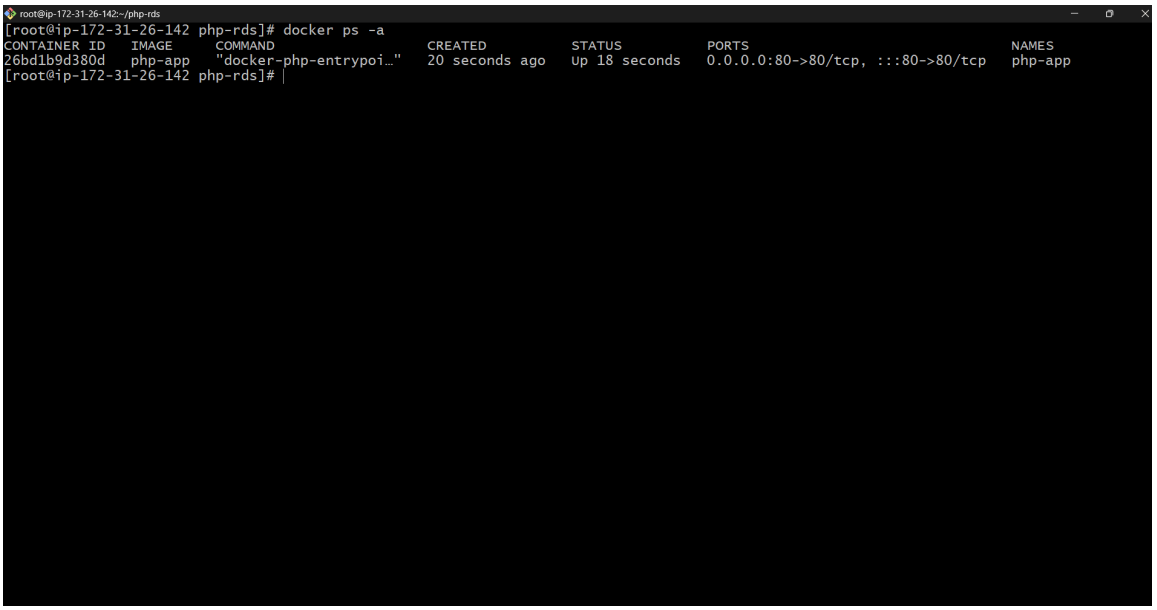
1. `git clone https://github.com/mahigore/php-rds.git`
2. `cd php-rds`

4.3 On the EC2 instance, build your Docker image using the docker build command and run it using the docker run command. Ensure the PHP application is able to connect and interact with the MySQL database hosted on AWS RDS.

1. `docker build -t php-app .`
2. `docker run`

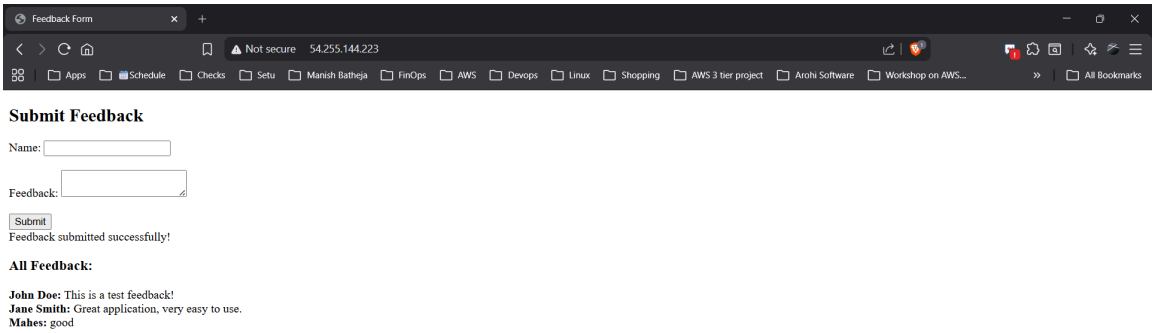
```
docker run -d \
  -p 80:80 \
```

```
  -e DB_HOST=php-app-database.cby2mqygynq9.ap-southeast-1.rds.amazonaws.com \
  -e DB_NAME=php-app-database \
  -e DB_USER=admin \
  -e DB_PASS=Mahi7888 \
  --name php-app \
  --restart unless-stopped \
  php-app
```



5. Testing

- Test your application by accessing the public IP of your EC2 instance. Verify that your application can read and write to the database.



6. Set Up CI\CD (Jenkins):

Jenkins Server - Create an AWS EC2 instance

- **Basic Configuration:**
  - Name: Jenkins
  - AMI: Amazon Linux 2
  - Instance type: `t2.medium`
  - Key pair: [your key pair]
  - Security groups: default [ports → 22, 8080]
  - VPC: default
- **Install Git:**

```
yum install git
```

- **Install Docker:**

```
yum install docker
systemctl enable docker
systemctl start docker
systemctl status docker
```

- **Install Java**

```
# Become a root
sudo su -
sudo yum update
sudo yum install java-17-amazon-corretto-devel -y
java -version
```

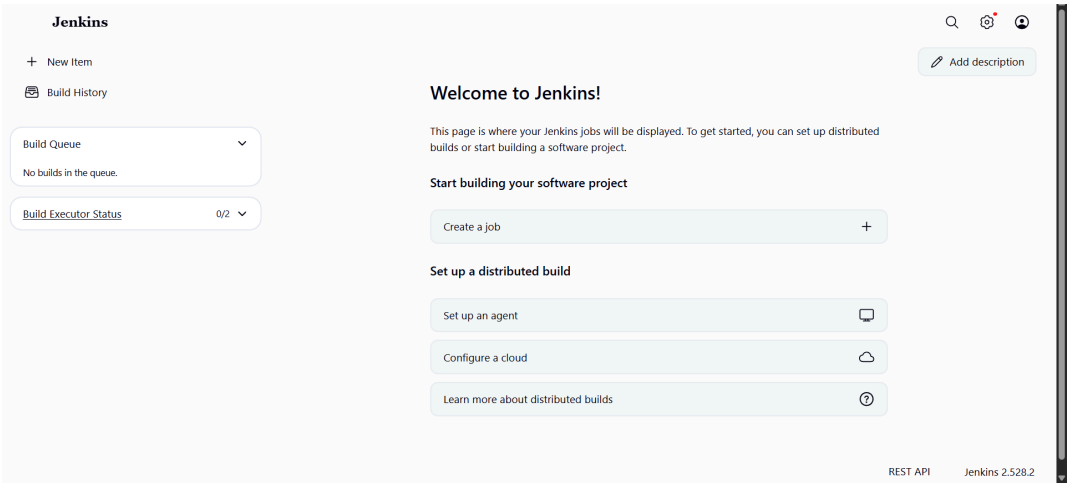
- **Install Jenkins**

```
# Become a root
sudo su -

# Jenkins repo is added to yum.repos.d
sudo wget -O /etc/yum.repos.d/jenkins.repo https://pkg.jenkins.io/redh
at-stable/jenkins.repo

# Import key from Jenkins
sudo rpm --import https://pkg.jenkins.io/redhat-stable/jenkins.io-2023.
key

# Install Jenkins
yum install jenkins -y

# You can enable the Jenkins service to start at boot with the comman
d:
systemctl enable jenkins

# You can start the Jenkins service with the command:
systemctl start jenkins

# You can check the status of the Jenkins service using the command:
systemctl status jenkins
```

- Adding users to Jenkins group

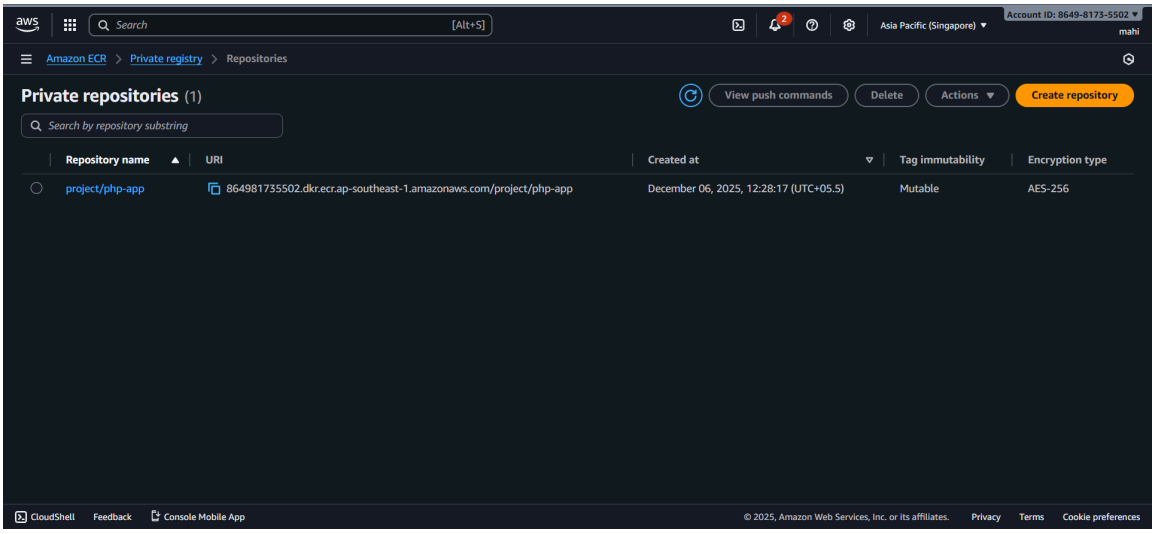
```
sudo usermod -aG sudo jenkins
sudo usermod -aG docker jenkins
```

- Restart Jenkins: `http://<Your_Jenkins_URL>/restart`
- Access Jenkins Dashboard → `http://public-ip:8080`
- Copy password form CLI → `cat /var/lib/jenkins/secrets/initialAdminPassword`
- Install plugins
- **Create First Admin User**
- Start Jenkins



Create ECR Repo:

- Name = **project/php-app**



Iam Role for EC2 to access ECR Repo:

- Name = ec2-ecr
- trust entity = ec2
- policy name = AmazonElasticContainerRegistryPublicFullAccess
- AmazonEC2ContainerRegistryPowerUser
- Create role
- Attach to Jenkins, Php-app ec2 instances

Jenkins Plugins to add:

- stage view
- blueocean
- click install
- Restart

Create a Jenkins Pipeline:

- Name - php-app
- Create pipeline
- string - App_Version
- Choose - ipeline script form SCM
- Add git repo url = https://github.com/mahigore/php-rds.git
- Branch = */main
- Script Path = Jenkinsfile
- Apply, Save

Jenkins Credentials to add:

- SSH key pair
  - ID = ssh-key
  - Description = ssh-key
  - Username = ec2-user
  - Private key = add ssh key here
- Database pass
  - ID = db-pass

- Description = db-pass
- secret = add password here

Jenkins Pipeline

```
pipeline {
    agent any

    environment {
        // AWS Configuration
        AWS_REGION = 'ap-southeast-1'  // Your region
        AWS_ACCOUNT_ID = '864981735502'
        ECR_REGISTRY = "${AWS_ACCOUNT_ID}.dkr.ecr.${AWS_REGION}.
amazonaws.com"
        ECR_REPOSITORY = 'project/php-app'

        // EC2 Configuration
        EC2_HOST = '54.255.144.223'  // Application EC2 (2nd EC2)
        EC2_USER = 'ec2-user'

        // Database Configuration (store only non-sensitive info here)
        DB_HOST = 'php-app-database.cby2mqygynq9.ap-southeast-1.rds.
amazonaws.com'
        DB_NAME = 'php-app-database'
        DB_USER = 'admin'
    }

    stages{
      stage("Repo Clone") {
        steps{
          echo "checkout github code"
          checkout scmGit(branches: [[name: '*/main']], extensions: [], use
rRemoteConfigs: [[url: 'https://github.com/mahigore/php-rds.git']])
        }
      }
      stage("Docker Image Build") {
        steps {
          sh '''
```

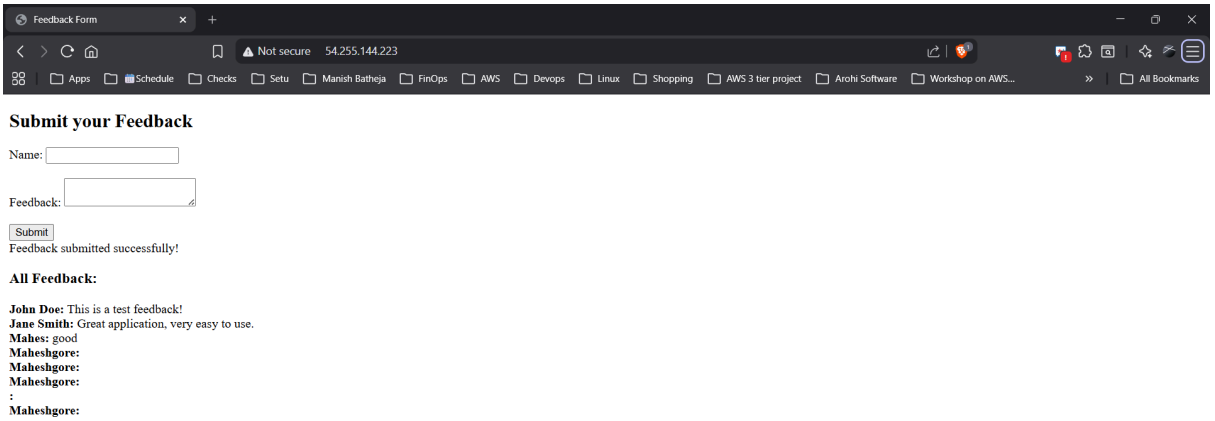
```
            echo "-------- Building Docker Image --------"
            docker build -t php-app:latest .
            echo "-------- Image Successfully Built --------"
            '''
        }
    }
    stage("Docker Image Tag") {
        steps{
            sh '''
            echo "-------- Tagging Docker Image --------"
            docker tag php-app:latest "${ECR_REGISTRY}"/"${ECR_REPOSIT
ORY}":latest
            echo "-------- Tagging Docker Image Completed."
            '''
        }
    }
    stage("Loggingin & Pushing Docker image to ECR") {
        steps {
            sh '''
            echo "-------- Logging To ECR  --------"
            aws ecr get-login-password --region ${AWS_REGION} | docker lo
gin --username AWS --password-stdin ${ECR_REGISTRY}
            echo "-------- Login Successful --------"

            echo "-------- Pushing Docker Image To ECR --------"
            docker push "${ECR_REGISTRY}"/"${ECR_REPOSITORY}":latest
            echo "-------- Docker Image Pushed Successfully --------"
            '''
        }
    }
    stage("cleanup") {
        steps {
            sh '''
              echo "-------- Cleaning Up Jenkins Machine --------"
              docker image prune -a -f
              echo "-------- Clean Up Successful --------"
            '''
        }
```

```
        }
        stage("Deployment Acceptance") {
            steps {
                input 'Trigger Deployment'
            }
        }
        stage('Deploy to EC2') {
            steps {
                script{
                    echo 'Deploying to EC2 instance...'
                    withCredentials([
                        sshUserPrivateKey(credentialsId: 'ssh-key', keyFileVariable:
'SSH_KEY'),
                        string(credentialsId: 'db-pass', variable: 'DB_PASS')
                    ]) {
                        sh """
                            # Deploy using SSH
                            ssh -o StrictHostKeyChecking=no -i \${SSH_KEY} \${EC2_
USER}@\${EC2_HOST} << 'ENDSSH'
                            set -e

                            # Login to ECR
                            echo "Logging into ECR on EC2..."
                            aws ecr get-login-password --region ${AWS_REGION} | d
ocker login --username AWS --password-stdin ${ECR_REGISTRY}

                            # Stop existing container
                            echo "Stopping existing container..."
                            docker stop php-app 2>/dev/null || true
                            docker rm php-app 2>/dev/null || true
                            docker rmi -f \$(docker images -aq) 2>/dev/null || true

                            # Pull latest image
                            echo "Pulling latest image..."
                            docker pull ${ECR_REGISTRY}/${ECR_REPOSITORY}:latest

                            # Run new container
                            echo "Starting new container..."
```

```
                    docker run -d \\
                    -p 80:80 \\
                    -e DB_HOST=${DB_HOST} \\
                    -e DB_NAME=${DB_NAME} \\
                    -e DB_USER=${DB_USER} \\
                    -e DB_PASS=${DB_PASS} \\
                    --name php-app \\
                    --restart unless-stopped \\
                    ${ECR_REGISTRY}/${ECR_REPOSITORY}:latest

                    # Verify container is running
                    echo "Verifying deployment..."
                    sleep 10
                    docker ps | grep php-app
ENDSSH
                """
            }
        }
    }
  }
}
```

Click Build Now:

- new image usng Jenkins CICD is build and deployed.



Video Links:

- Bitcot Task Part 1 → https://drive.google.com/file/d/1qiZCcccLrf6zMJm9WqZ8vkda7wr6mdqG/view?usp=drive_link
- Bitcot Task Part 2 → https://drive.google.com/file/d/19EbT9neO4LOhJnp_3MxJgY7h77mNwjDR/view?usp=drive_link