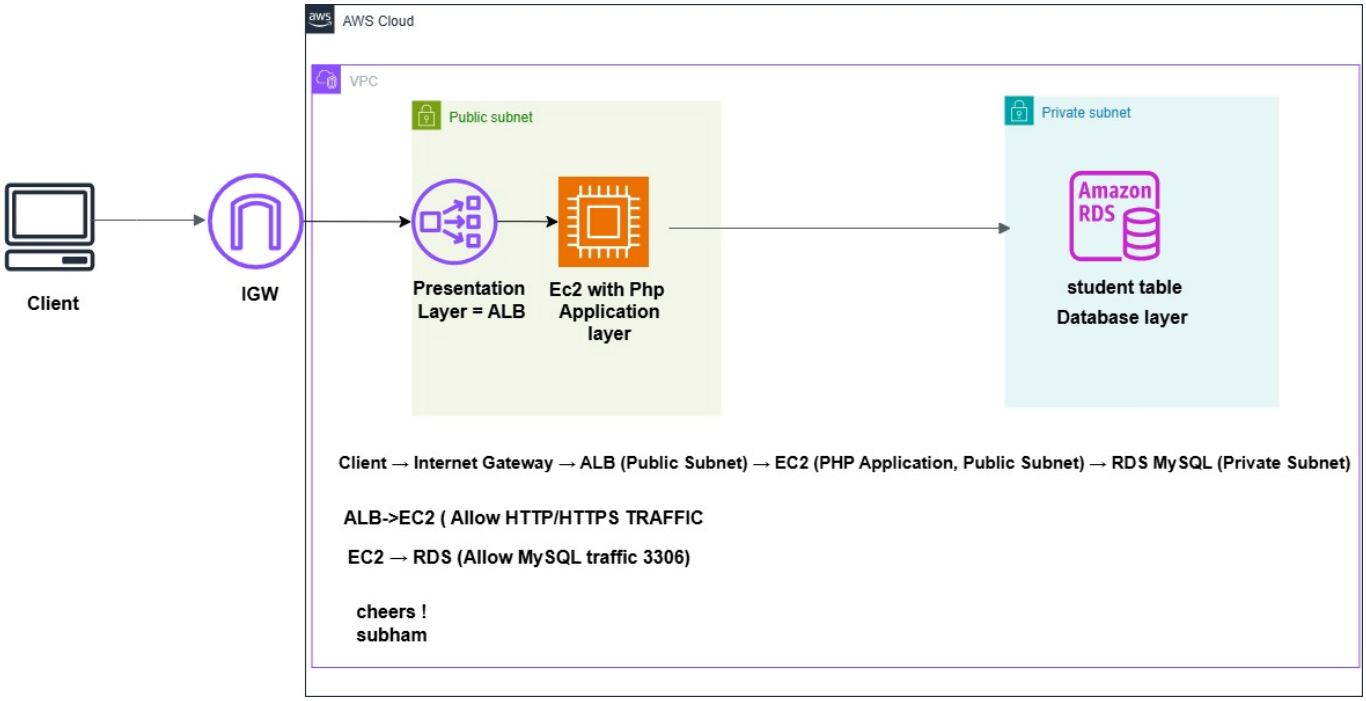
# Project Name:

# AWS 3-Tier Architecture with Load Balancer, PHP Application, and RDS MySQL

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**Step-by-Step Project Guide :**

## 1) Networking & Security Groups

- **RDS SG (sg-rds):** Inbound 3306 → Source = sg-ec2 (your EC2 security group).
- **EC2 SG (sg-ec2):** Inbound 80 → Source = sg-alb (or 0.0.0.0/0 for testing). Inbound 22 from your own IP only.
- **ALB SG (sg-alb):** Inbound 80 → Source = 0.0.0.0/0.
- RDS **Public Accessibility = No**.
- EC2 must be in **public subnet**, RDS in **private subnet**.

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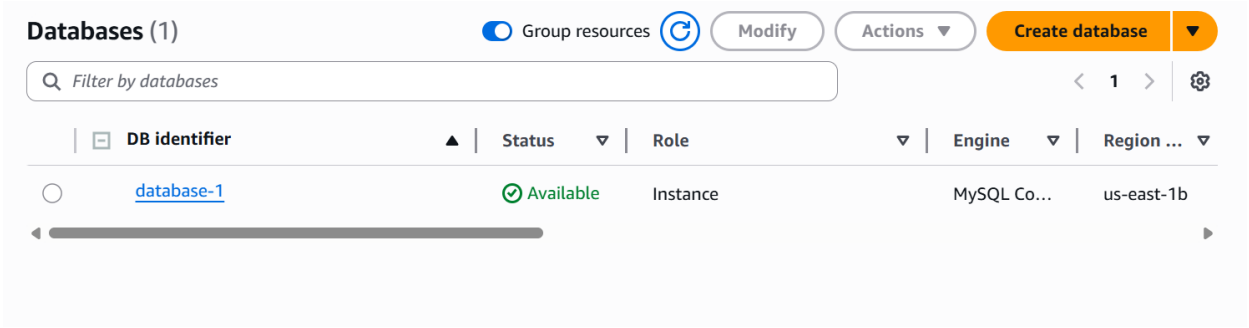
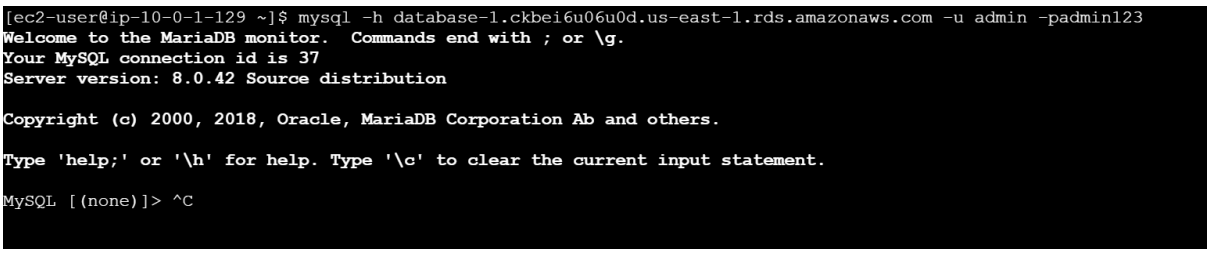
## 2) Create RDS MySQL

- Console → **Create database → MySQL**.

- DB subnet group → private subnets across AZs.
- Public accessibility → **No**.
- Master username: admin, Password: admin123.
- Initial DB name: student.
- Launch and note the **endpoint** (you gave it earlier):
- database-1.ckbei6u06u0d.us-east-1.rds.amazonaws.com
- 

- 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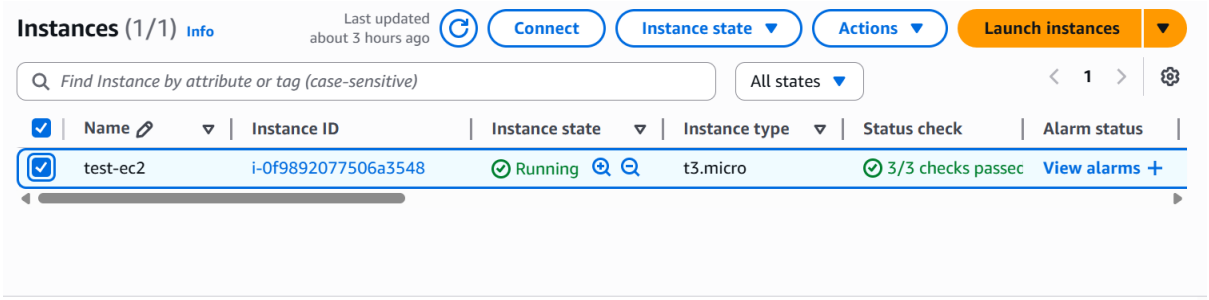
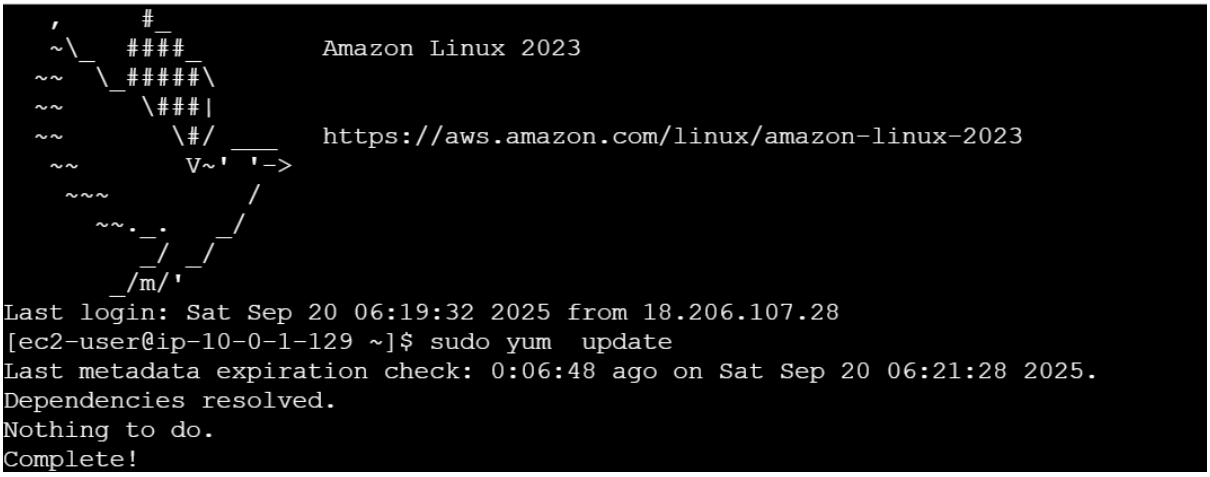
## 3) Launch EC2 (public subnet)

- Amazon Linux 2023 or 2.
- Subnet = public, Auto-assign Public IP = Enabled.
- Security group = sg-ec2.
- Launch and connect (SSH or Session Manager).

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## 4) Install Apache + PHP + MySQL client on EC2

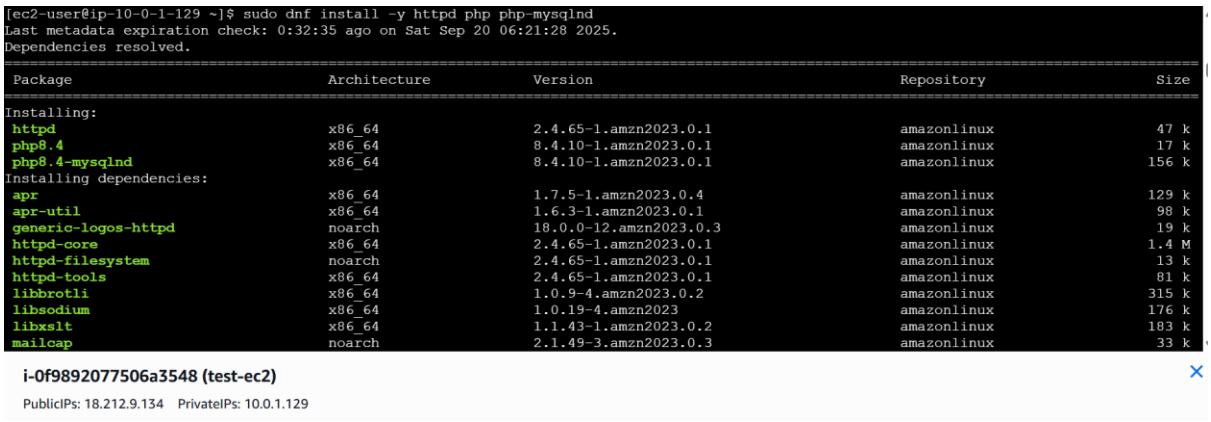
Amazon Linux 2023:

sudo dnf update -y

sudo dnf install -y httpd php php-mysqlnd mariadb105

sudo systemctl enable --now httpd

(Amazon Linux 2 → use yum. Ubuntu → use apt install apache2 php php-mysql mariadb-client.)

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## 5) Create DB & table in RDS

On EC2:

mysql -h database-1.ckbei6u06u0d.us-east-1.rds.amazonaws.com -u admin -p

```
# enter: admin123
Inside MySQL:
CREATE DATABASE IF NOT EXISTS student;
USE student;

CREATE TABLE IF NOT EXISTS students (
  id INT AUTO_INCREMENT PRIMARY KEY,
  name VARCHAR(100),
  course VARCHAR(100)
);

INSERT INTO students (name, course) VALUES
('Rahul','B.Tech'),
('Priya','MBA'),
('Asha','BSc');
```

SELECT * FROM students;

```
MySQL [student]> SELECT * FROM students;
+----+-------+--------+
| id | name  | course |
+----+-------+--------+
|  1 | Rahul | B.Tech |
|  2 | Priya | MBA    |
|  3 | Asha  | BSc    |
+----+-------+--------+
3 rows in set (0.001 sec)
```

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## 6) Create PHP app (hardcoded DB credentials)

On EC2:

sudo tee /var/www/html/index.php > /dev/null <<'PHP'

<?php

$host = "database-1.ckbei6u06u0d.us-east-1.rds.amazonaws.com";

$user = "admin";

$pass = "admin123";

```
$dbname = "student";


$conn = new mysqli($host, $user, $pass,
$dbname);
if ($conn->connect_error) {
    die("Connection failed: " . $conn-
>connect_error);
}


$result = $conn->query("SELECT id, name,
course FROM students");
echo "<h2>Student Records</h2>";
if ($result && $result->num_rows > 0) {
    echo "<table border='1'
cellpadding='6'><tr><th>ID</th><th>Name</t
h><th>Course</th></tr>";
    while($row = $result->fetch_assoc()) {
```

```
        echo
"<tr><td>".htmlspecialchars($row['id'])."</td>
<td>".htmlspecialchars($row['name'])."</td><
td>".htmlspecialchars($row['course'])."</td><
/tr>";
    }
    echo "</table>";
} else {
    echo "No records found";
}
$conn->close();
?>
```

PHP

```
[ec2-user@ip-10-0-1-129 ~]$ sudo tee /var/www/html/index.php > /dev/null <<'PHP'
<?php                       mysql -h database-1.ckbei6u06u0d.us-east-1.rds.amazonaws.com -u admin -padmin123
                            sudo tee /var/www/html/index.php > /dev/null <<'PHP'
<?php
$host = "<RDS-ENDPOINT>";
$user = "<DB-USER>";
$pass = "<DB-PASS>";
$dbname = "student";

$conn = new mysqli($host, $user, $pass, $dbname);
if ($conn->connect_error) {
    die("Connection failed: " . $conn->connect_error);
}

$result = $conn->query("SELECT id, name, course FROM students");
echo "<h2>Student Records</h2>";
if ($result->num_rows == 0) {
```

**i-0f9892077506a3548 (test-ec2)**

PublicIPs: 18.212.9.134 PrivateIPs: 10.0.1.129

sudo chown -R apache:apache /var/www/html

sudo chmod -R 755 /var/www/html

sudo systemctl restart httpd

```
[ec2-user@ip-10-0-1-129 ~]$ sudo nano /var/www/html/index.php
[ec2-user@ip-10-0-1-129 ~]$ sudo systemctl restart httpd
```

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## 7) Local test on EC2

curl http://localhost/index.php

✅ If you see student table → it works.

❌ If error → check DB connection details & security groups.





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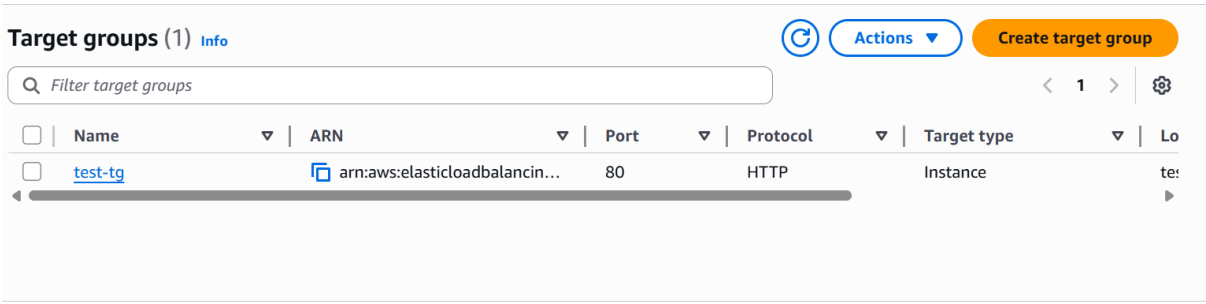
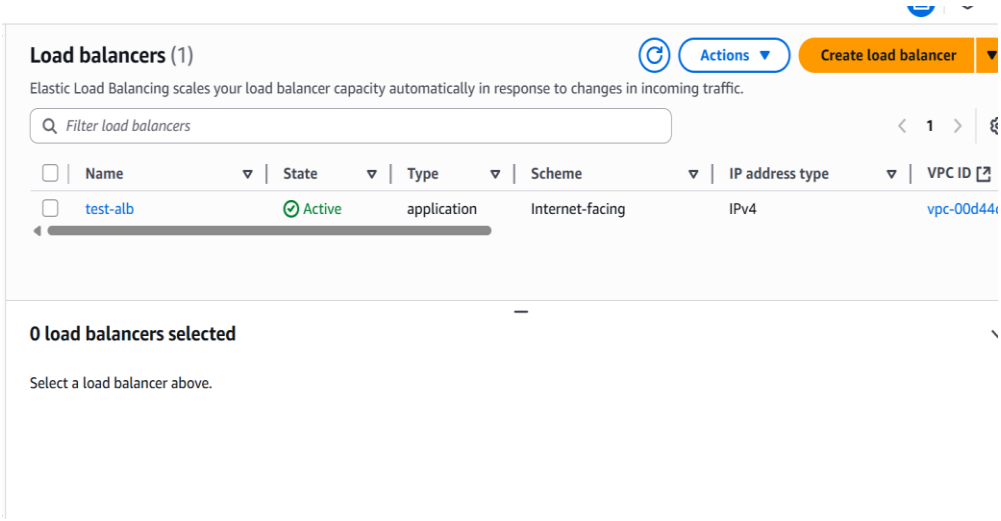
## 8) Create Target Group & ALB

1. **Target Group:**
   - Type = Instances
   - Protocol = HTTP, Port = 80
   - Health check path /index.php
   - Register EC2.
   - 

2. **ALB:**
   - Internet-facing, public subnets in 2 AZs.
   - Security group = sg-alb (inbound 80).
   - Listener HTTP:80 → forward to target group.

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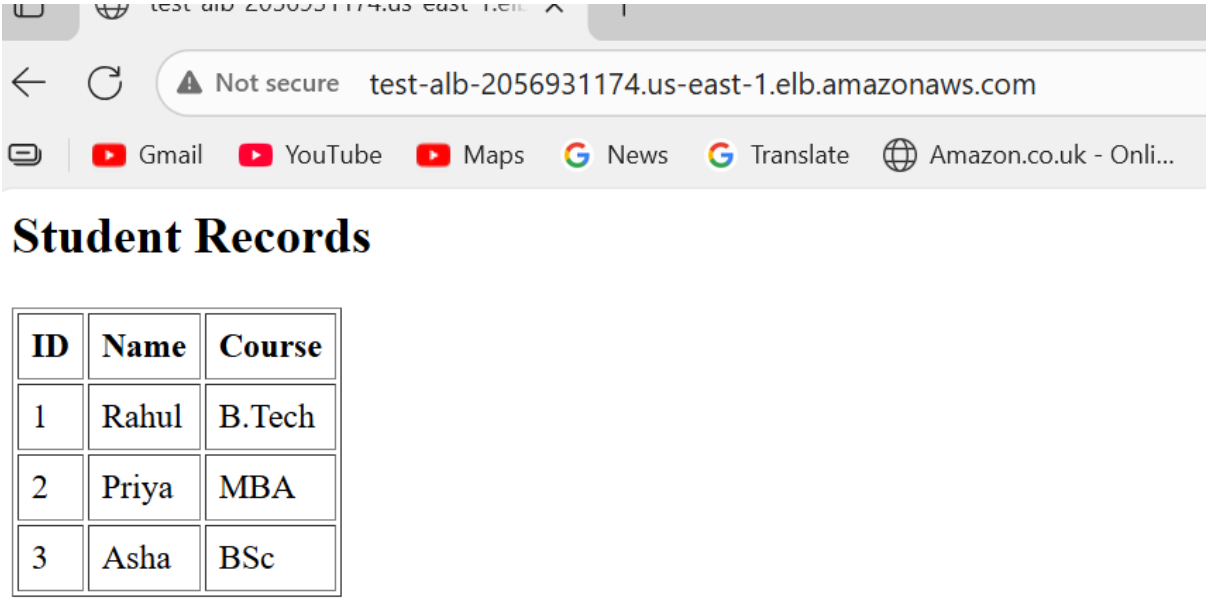
# 9) Test from Browser

Open:

http://test-alb-xxxxx.us-east-1.elb.amazonaws.com/



- ALB forwards → EC2 → PHP runs → connects to RDS → displays student table.

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## 10) Troubleshooting Checklist

- sudo systemctl status httpd → Apache running?
- curl http://localhost/index.php → works locally?
- mysql -h ... -u admin -p → EC2 can reach RDS?
- Security groups set correctly?
- ALB Target group shows **healthy**?

**THANK YOU**

**STAY CONNECT WITH**

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