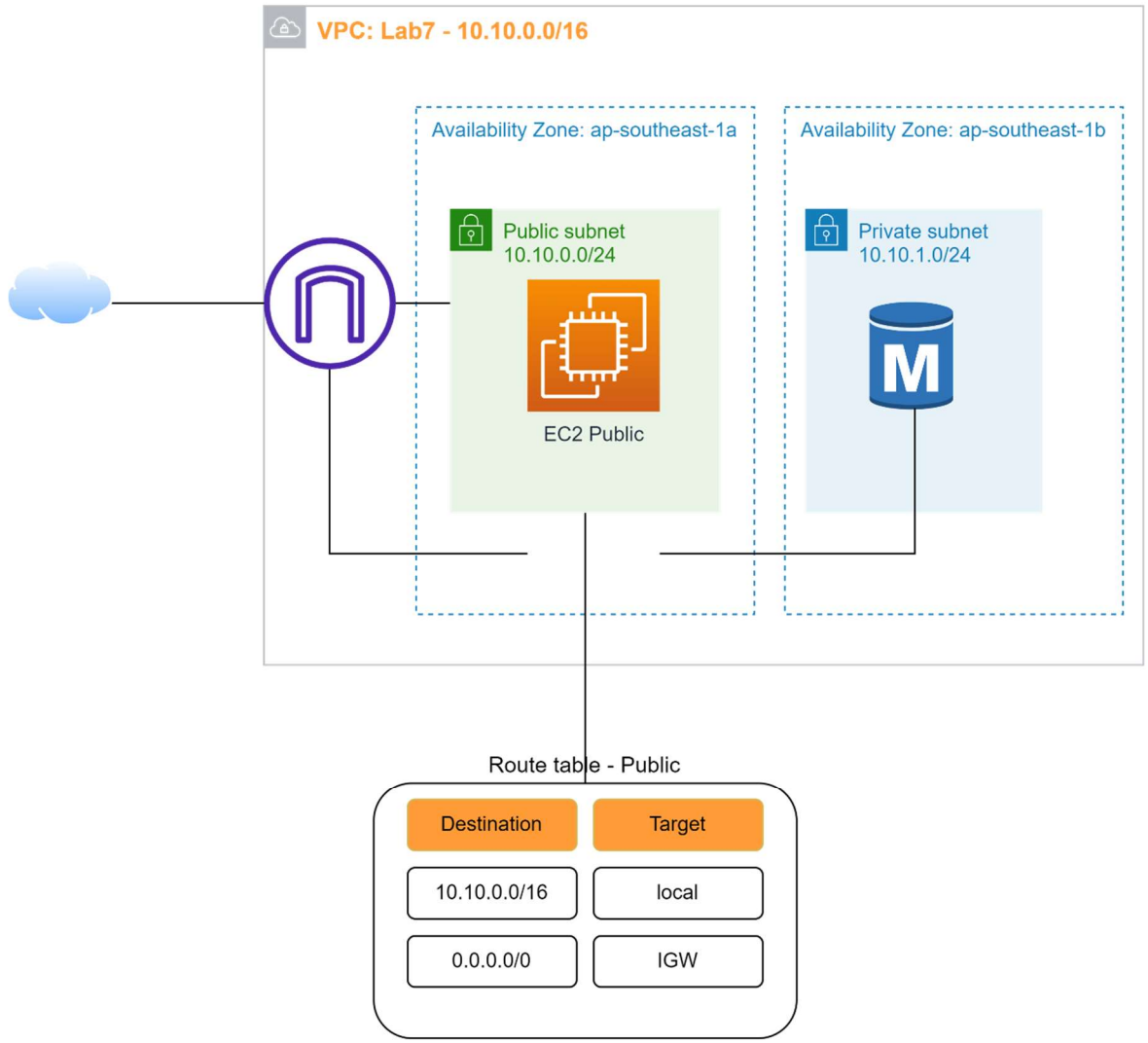
Bài thực hành số 7 Triển khai website với EC2 và RDS

Mục tiêu: Sử dụng EC2 làm webserver kết nối đến máy chủ CSDL sử dụng RDS

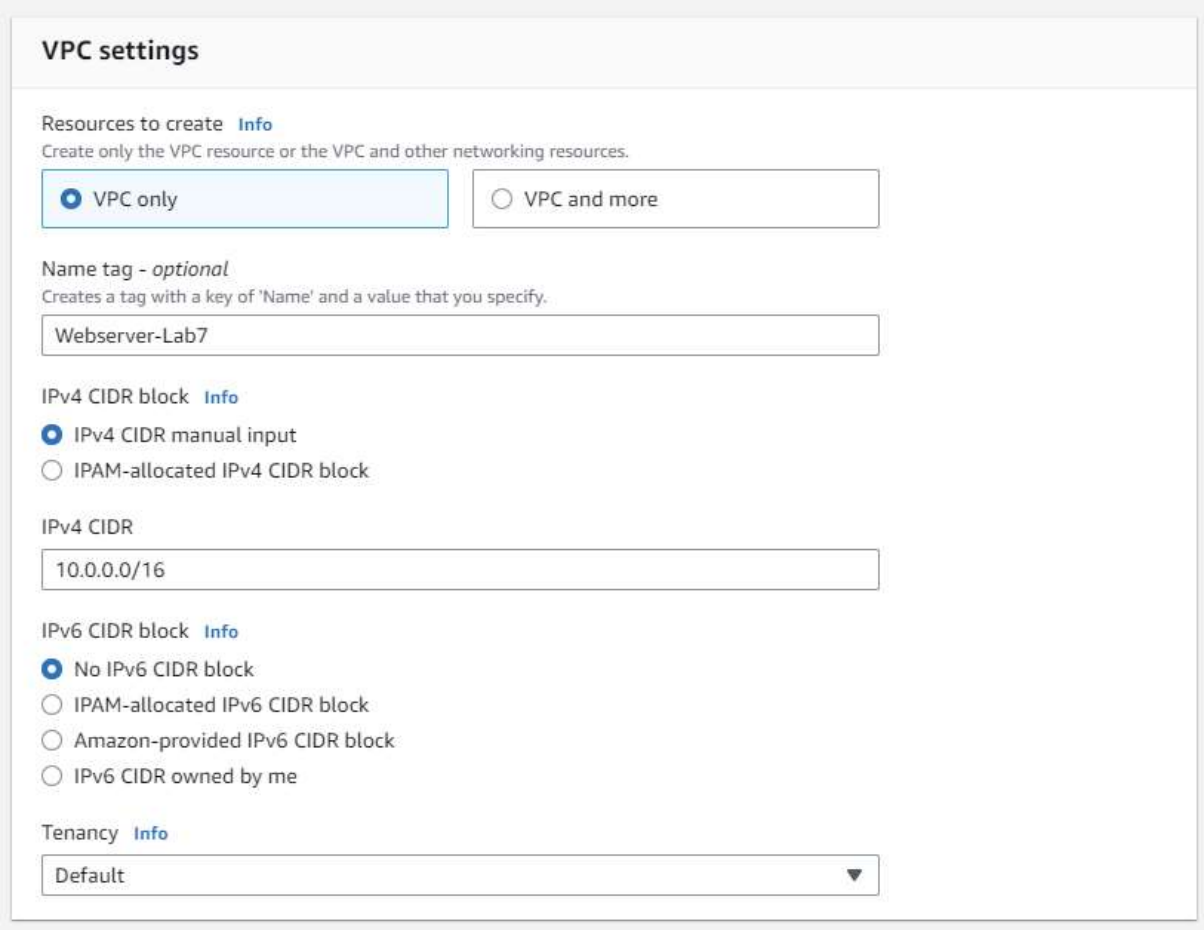
Nội dung thực hành:

Thiết kế một website hosting trên EC2 instance trong đó cơ sở dữ liệu được triển khai trên RDS instance theo sơ đồ:

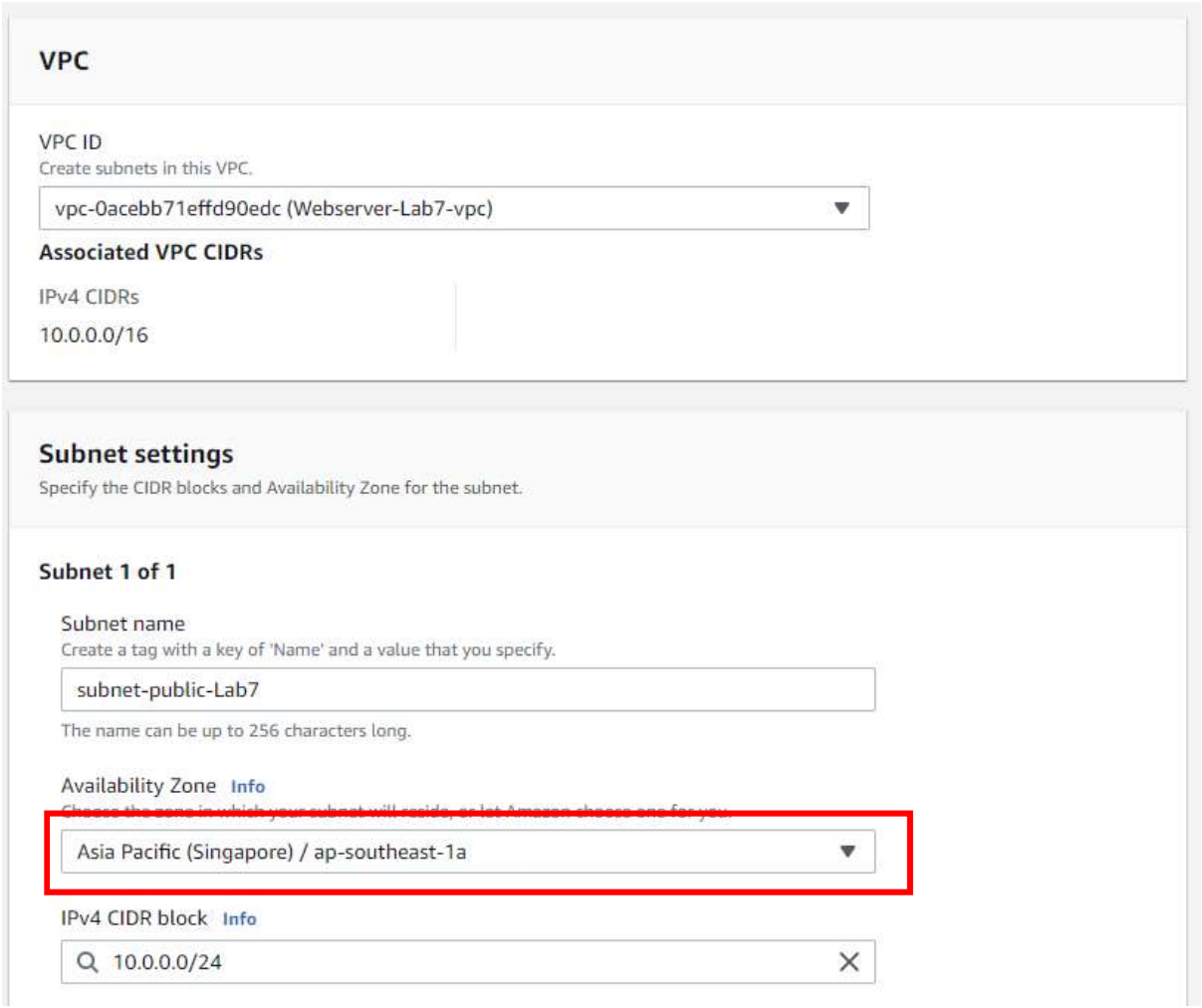


Các bước thực hành:

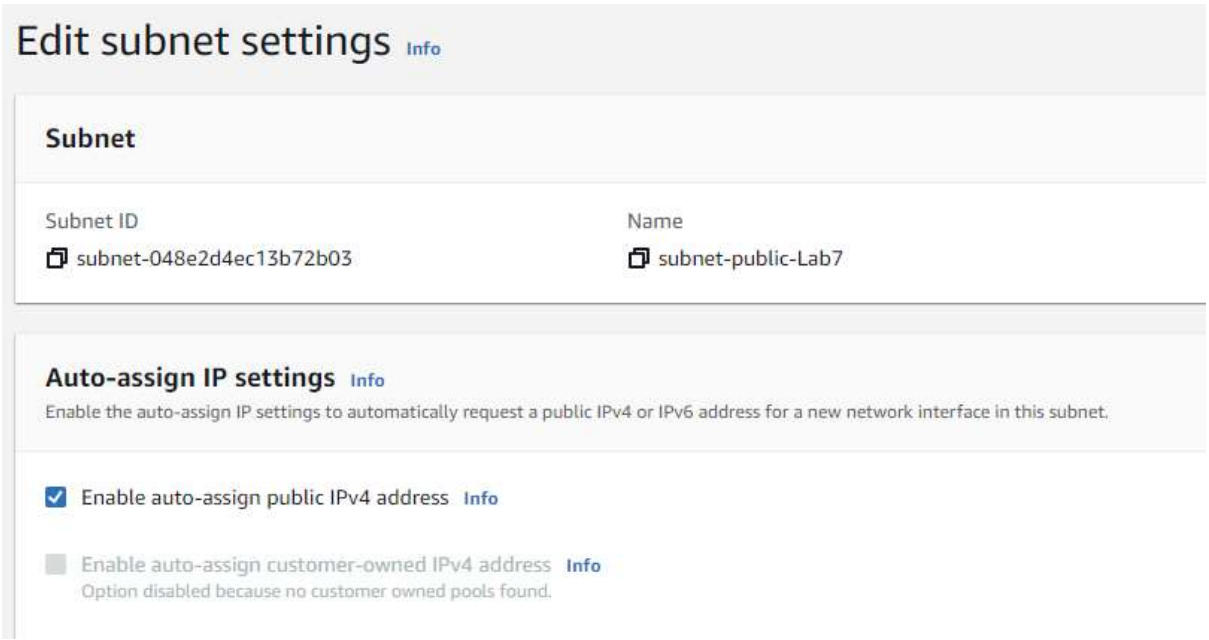
1. Tạo VPC



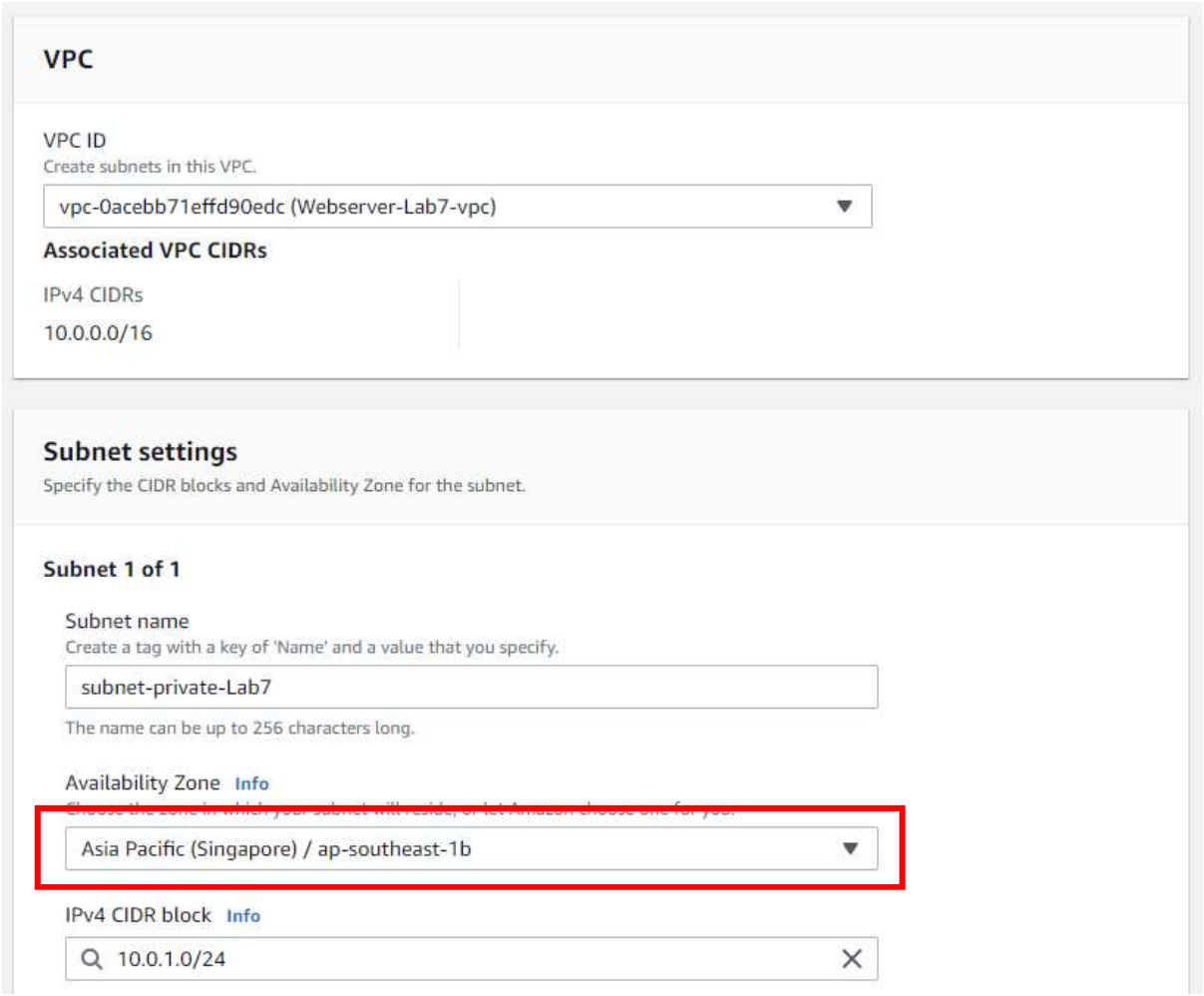
- Tạo Subnet public:



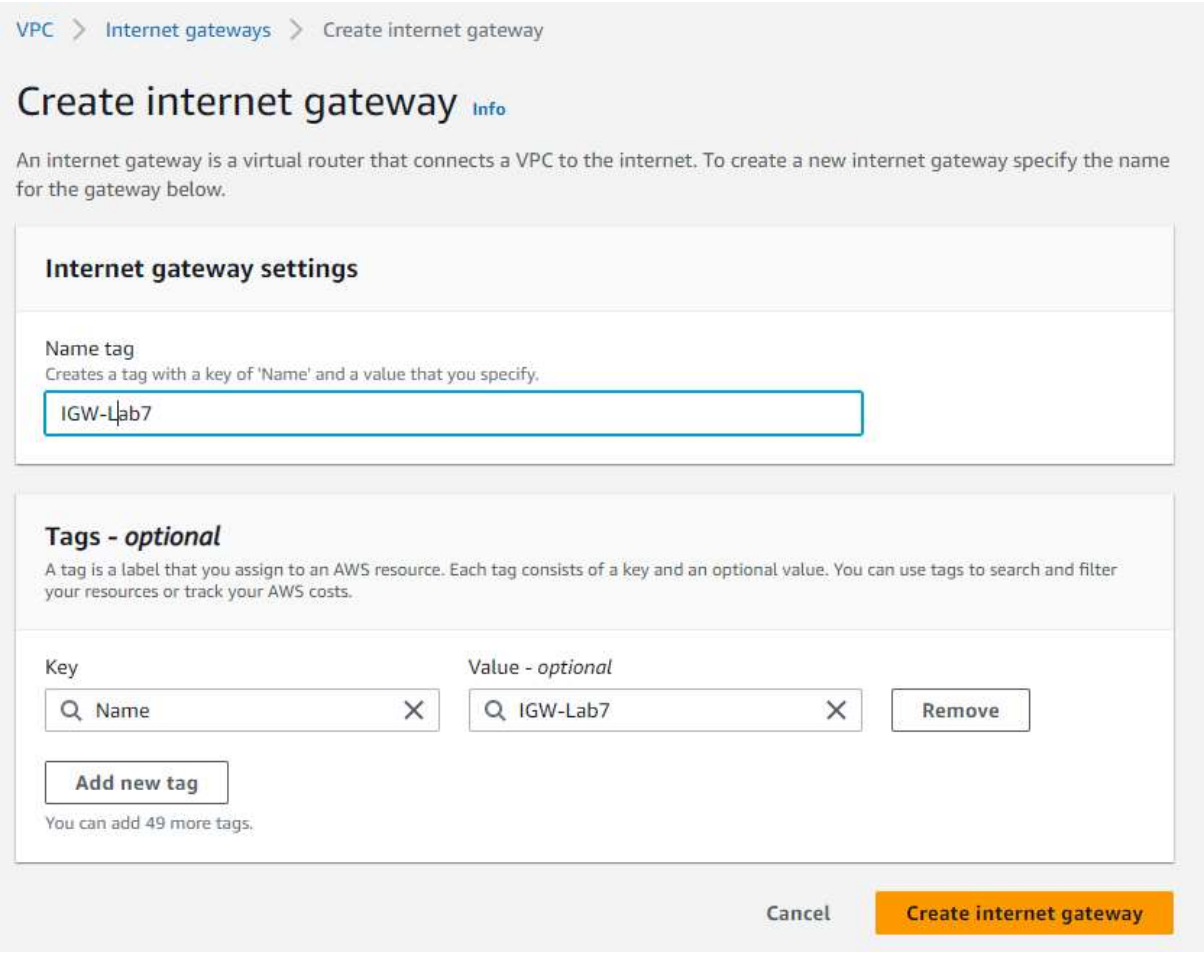
- Bật tính năng Auto-asign public IPv4



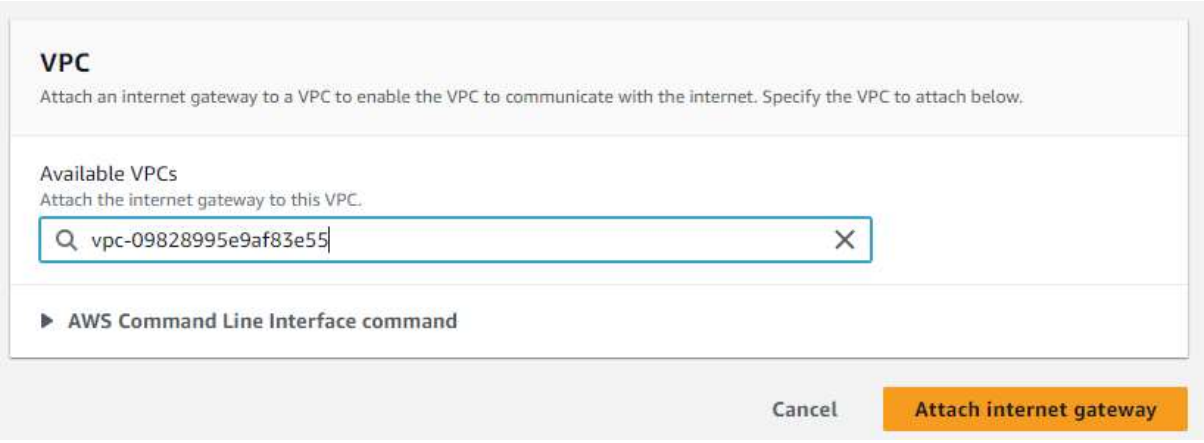
- Tạo Subnet private:



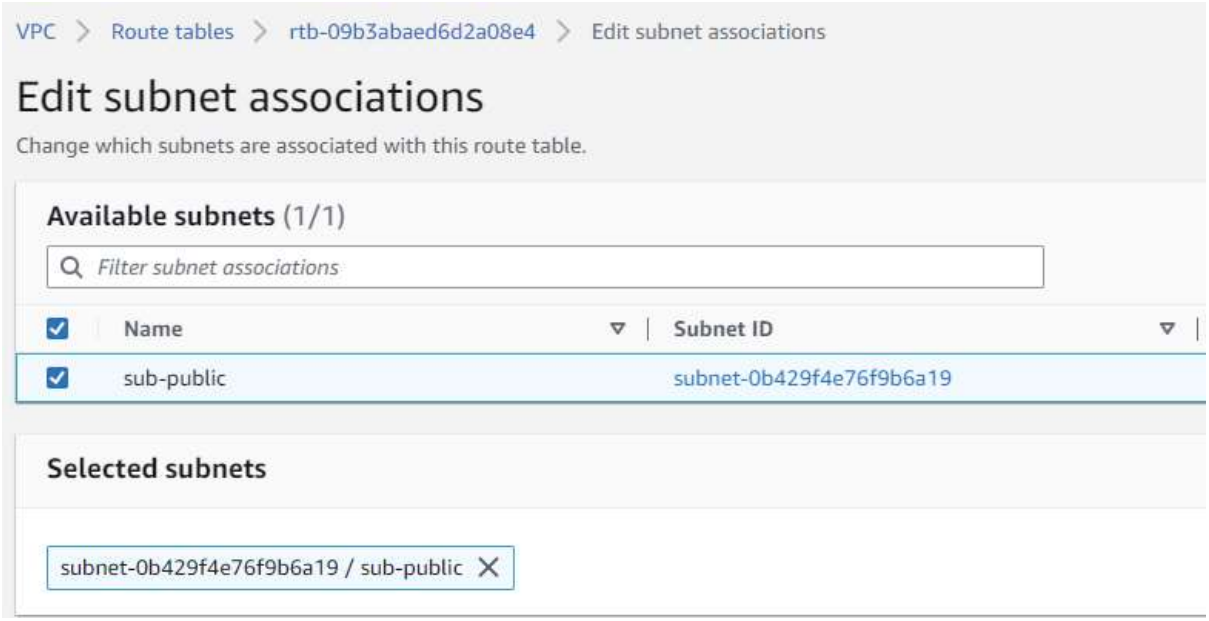
- Tạo Internet gateway



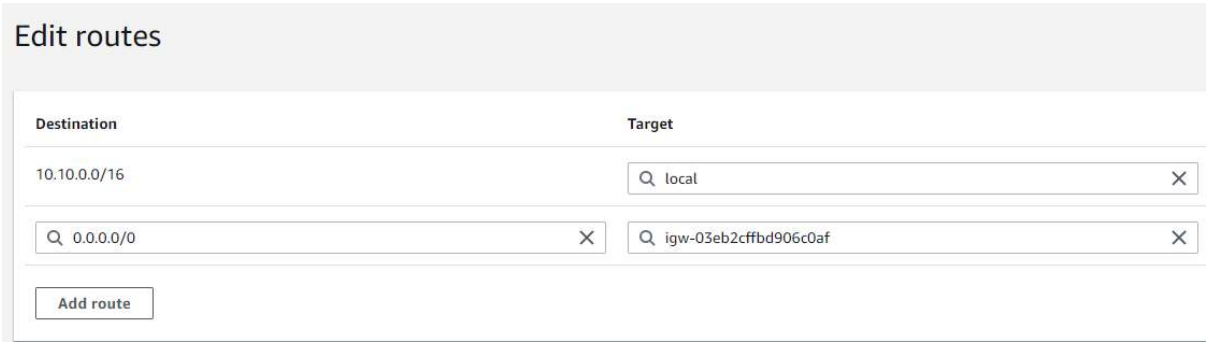
- Gắn Internet gateway với VPC:



- Gắn route table với subnet public (sử dụng route table tạo tự động khi tạo VPC):



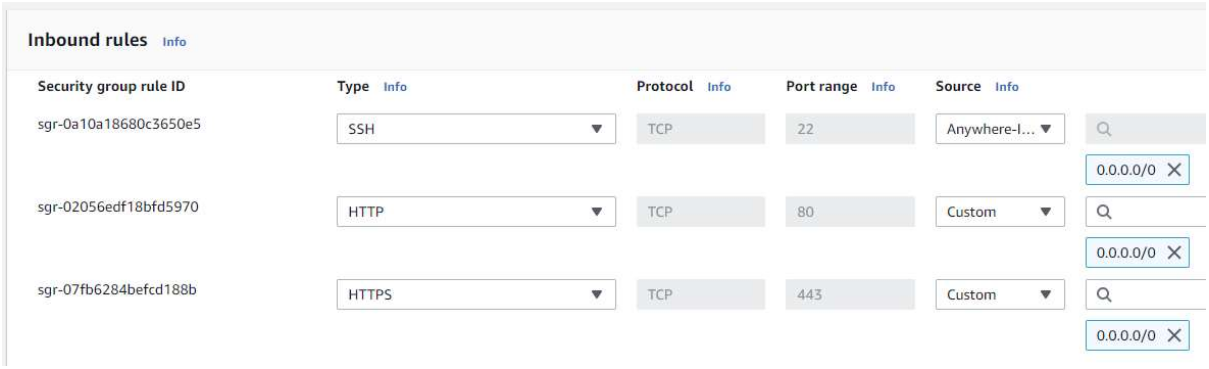
- Edit route: định tuyến qua internet gateway



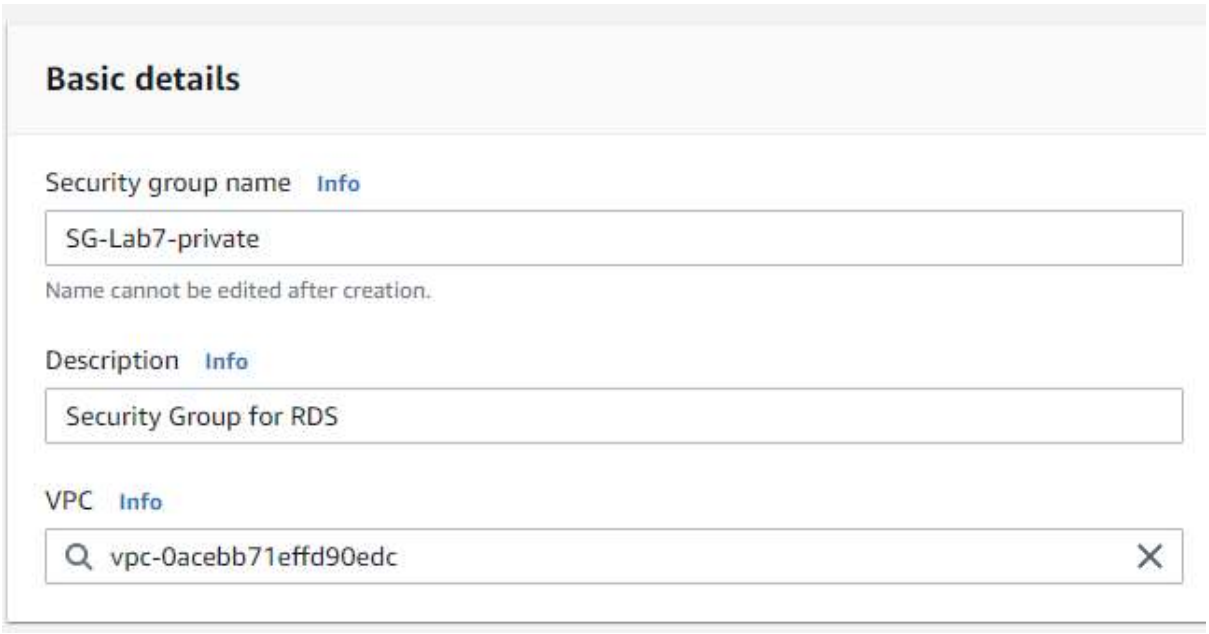
2. Tạo Security Group

- Security Group public:

- Inbound rules



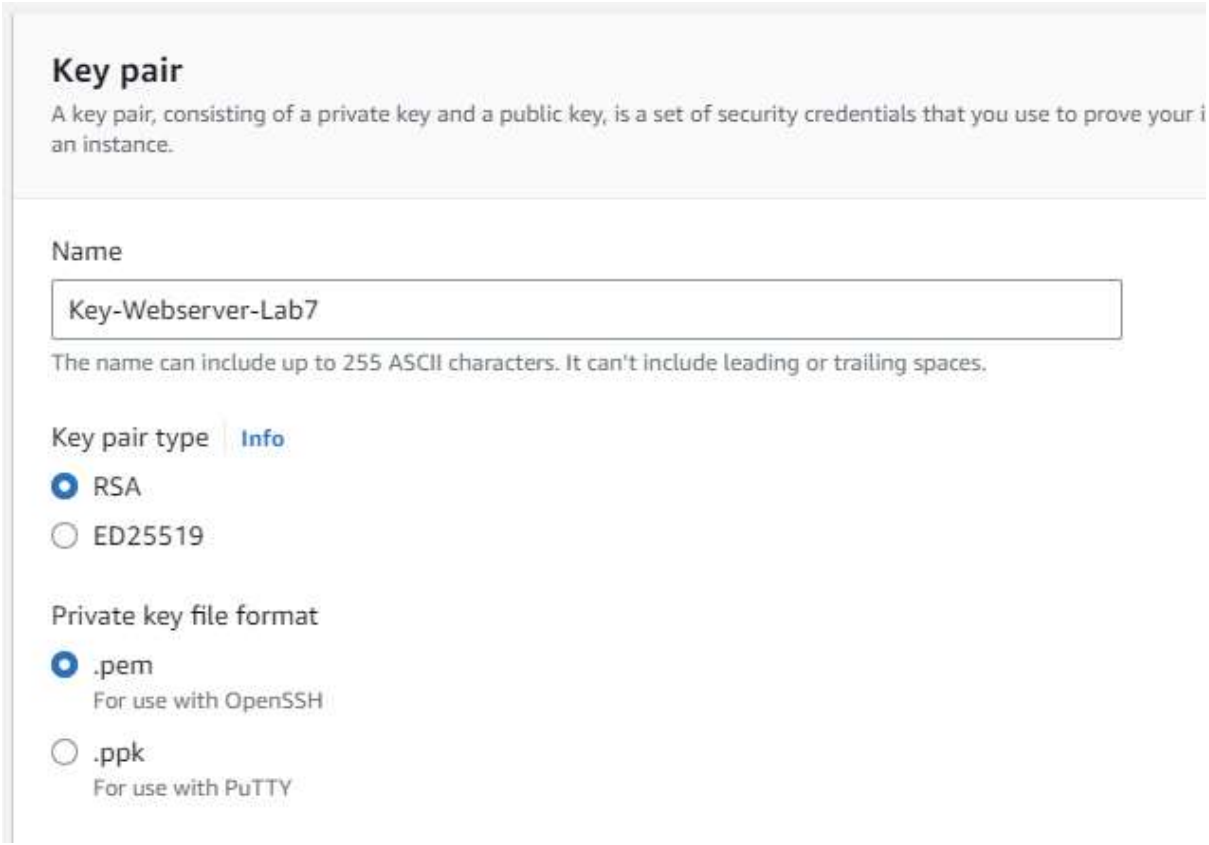
- Security Group private:



- Inbound rules

3. Tạo máy chủ Webserver

- Tạo key pair


Key pair
A key pair, consisting of a private key and a public key, is a set of security credentials that you use to prove your i
an instance.
Name
Key-Webserver-Lab7
The name can include up to 255 ASCII characters. It can't include leading or trailing spaces.
Key pair type
Info
RSA
ED25519
Private key file format
.pem
For use with OpenSSH
.ppk
For use with PuTTY

- Tạo EC2

Name and tags Info

Name

Webserver-Lab7-Ubuntu

Add additional tags

Application and OS Images (Amazon Machine Image) Info

An AMI is a template that contains the software configuration (operating system, application server, and applications) required to launch your instance. Search or Browse for AMIs if you don't see what you are looking for below

Search our full catalog including 1000s of application and OS images

Recents | Quick Start

Amazon Linux | macOS | Ubuntu | Windows | Red Hat | S

Browse more AMIs

Including AMIs from AWS, Marketplace and the Community

Amazon Machine Image (AMI)

Ubuntu Server 22.04 LTS (HVM), SSD Volume Type — Free tier eligible

ami-0a72af05d27b49ccb (64-bit (x86)) / ami-0dd28c803f9318319 (64-bit (Arm))

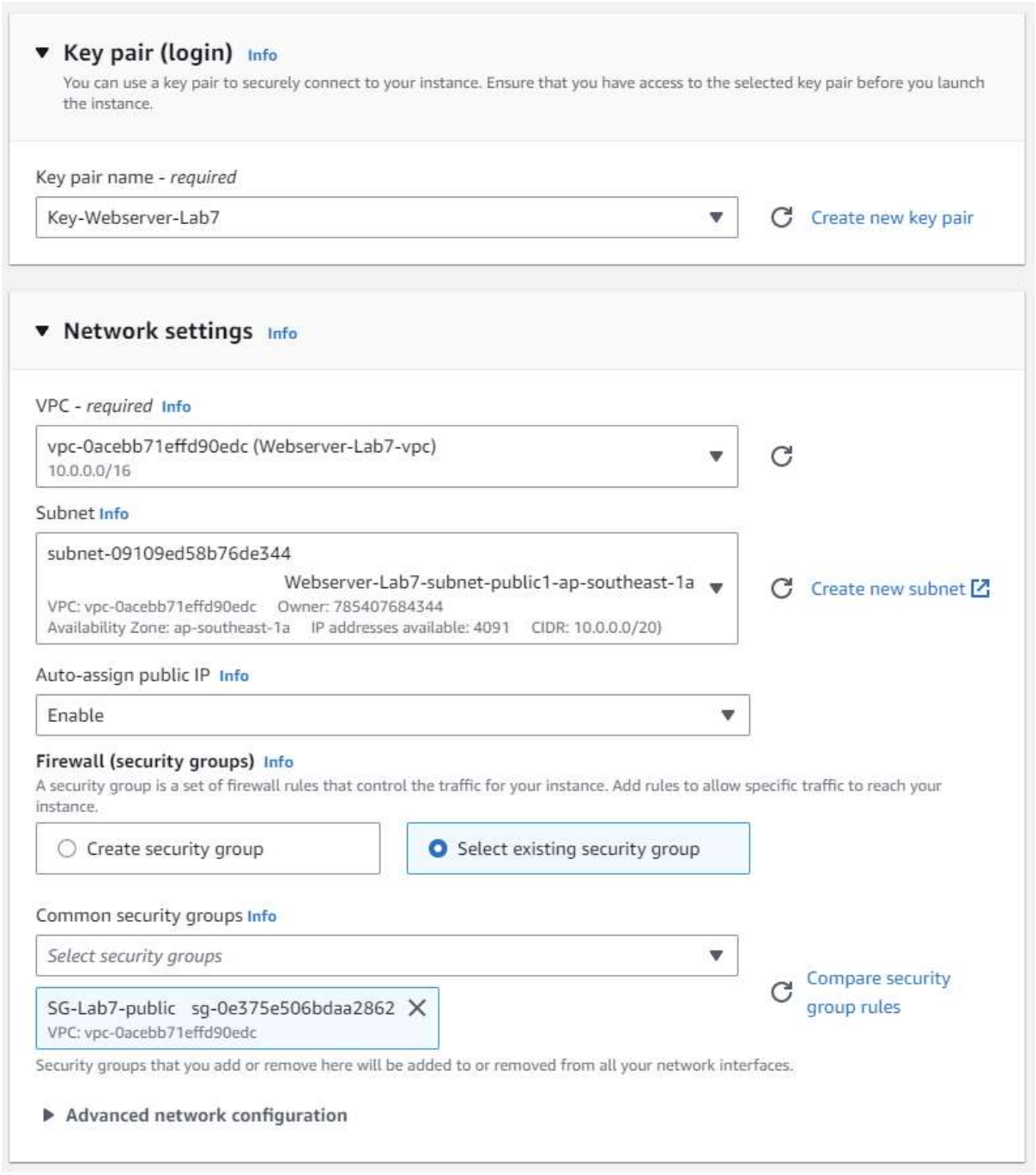
Virtualization: hvm ENA enabled: true Root device type: ebs

Description

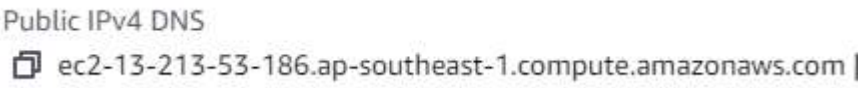
Canonical, Ubuntu, 22.04 LTS, amd64 jammy image build on 2023-03-25

Architecture: 64-bit (x86)

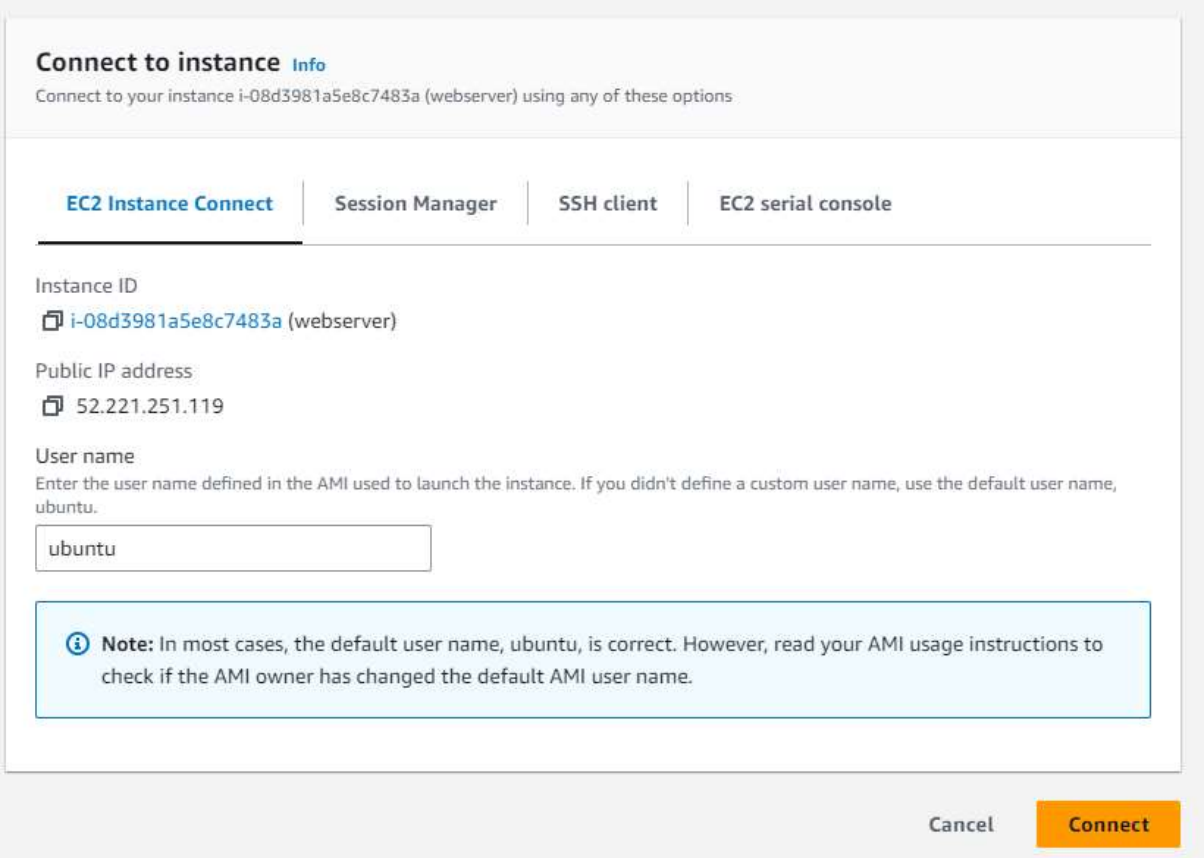
AMI ID: ami-0a72af05d27b49ccb — Verified provider



- Ghi nhận public DNS:



- Kết nối EC2:



- Cài đặt webserver Apache

```
sudo apt update -y
sudo apt install apache2
```

- Kiểm tra trạng thái:

```
sudo systemctl status apache2
```

```
ubuntu@ip-10-0-7-61:~$ sudo systemctl status apache2
● apache2.service - The Apache HTTP Server
     Loaded: loaded (/lib/systemd/system/apache2.service; enabled; vendor preset: enabled)
     Active: active (running) since Thu 2023-03-30 07:28:59 UTC; 28s ago
       Docs: https://httpd.apache.org/docs/2.4/
   Main PID: 2896 (apache2)
      Tasks: 55 (limit: 1141)
     Memory: 5.0M
        CPU: 29ms
     CGroup: /system.slice/apache2.service
             ├─2896 /usr/sbin/apache2 -k start
             ├─2898 /usr/sbin/apache2 -k start
             └─2899 /usr/sbin/apache2 -k start

Mar 30 07:28:59 ip-10-0-7-61 systemd[1]: Starting The Apache HTTP Server...
Mar 30 07:28:59 ip-10-0-7-61 systemd[1]: Started The Apache HTTP Server.
```

- Start webserver

```
sudo systemctl start httpd
```

- Thiết lập Apache khởi động cùng hệ thống

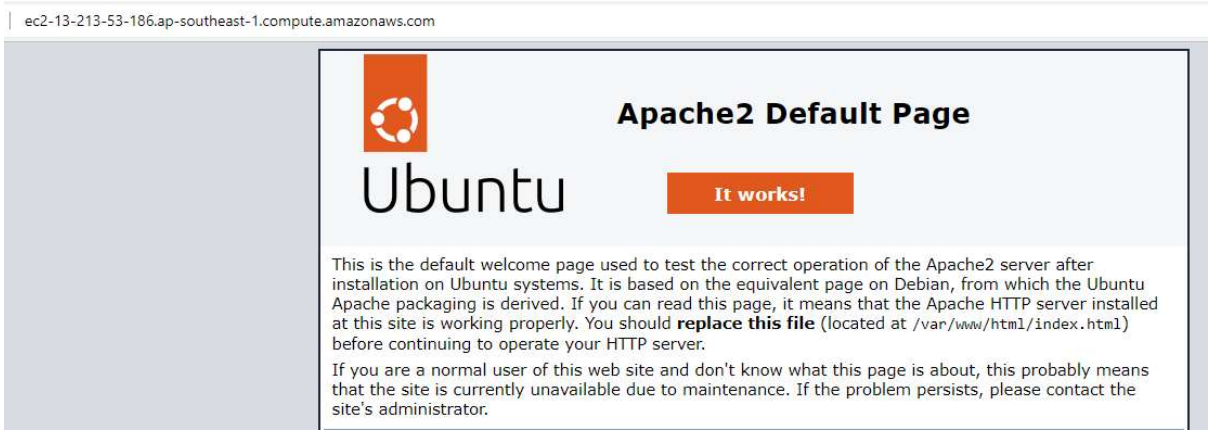
```
sudo systemctl enable httpd
```

- Kiểm tra webserver:

+ Từ Ubuntu:

```
curl http://localhost
```

+ Từ trình duyệt web:



- Cài đặt PHP:

```
sudo apt install php libapache2-mod-php php-mysql
```

+ Kiểm tra:

```
php -v
```

```
ubuntu@ip-10-0-7-61:~$ php -v
PHP 8.1.2-1ubuntu2.11 (cli) (built: Feb 22 2023 22:56:18) (NTS)
Copyright (c) The PHP Group
Zend Engine v4.1.2, Copyright (c) Zend Technologies
    with Zend OPcache v8.1.2-1ubuntu2.11, Copyright (c), by Zend Technologies
```

- Khởi động lại Apache:

sudo systemctl restart httpd

- Cài đặt gói MySQL client

```
sudo apt install mysql-client-core-8.0
```

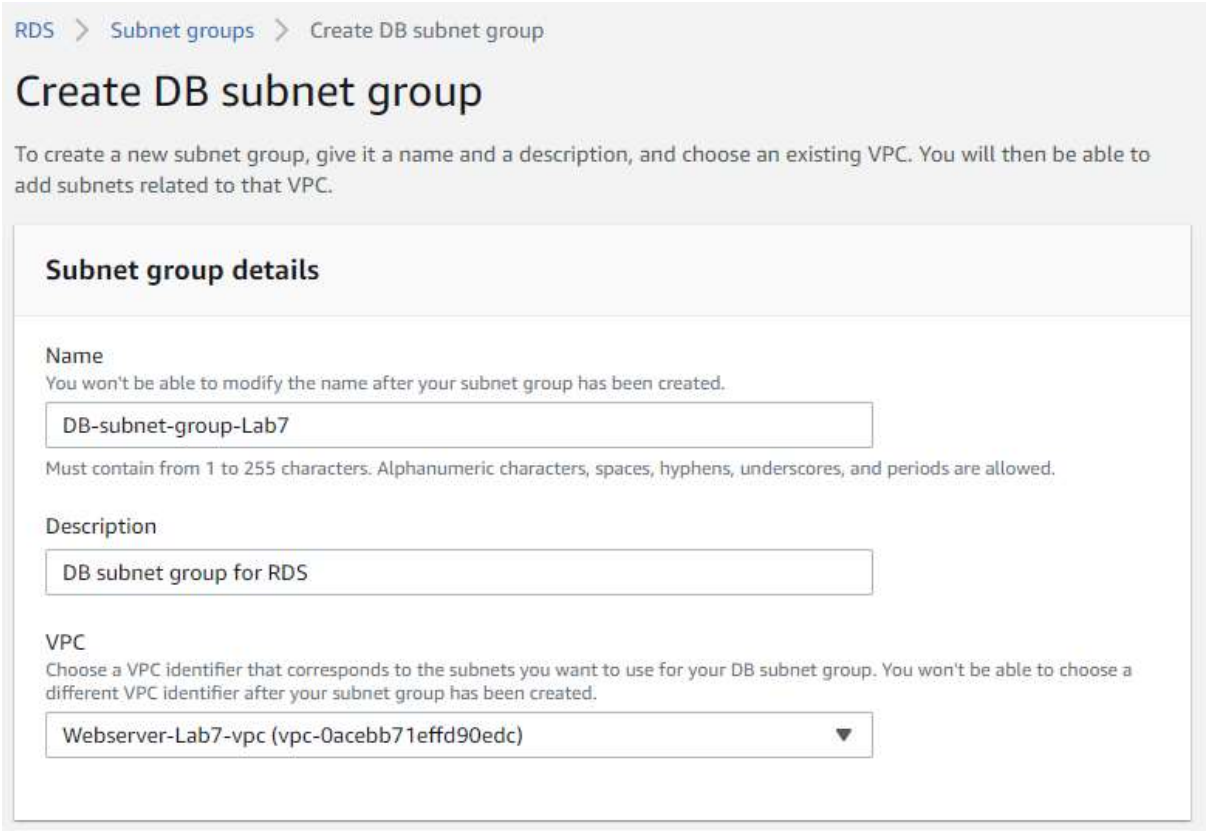
+ Kiểm tra:

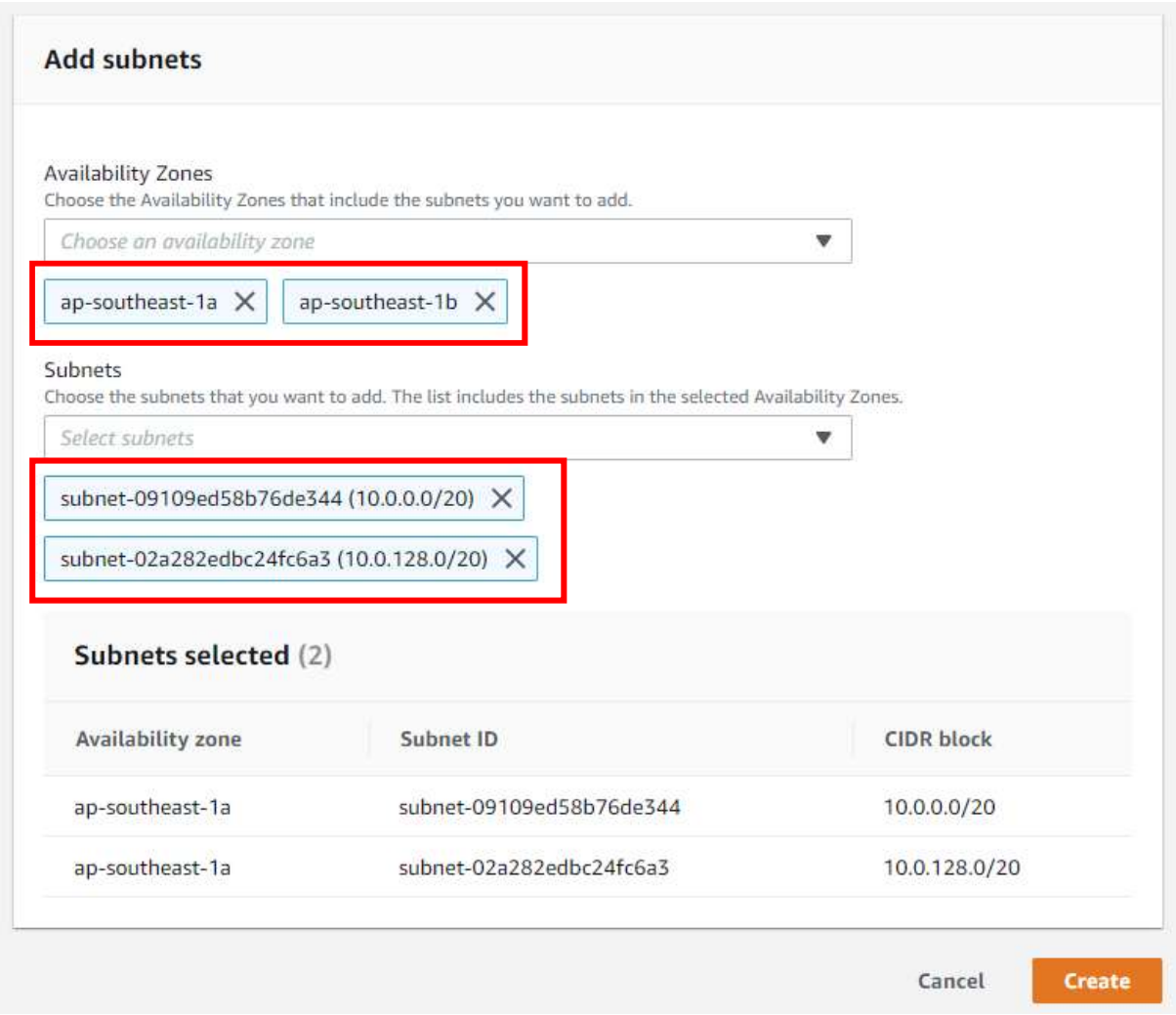
```
mysql -V
```

```
ubuntu@ip-10-0-7-61:~$ mysql -V
mysql  Ver 8.0.32-0ubuntu0.22.04.2 for Linux on x86_64 ((Ubuntu))
```

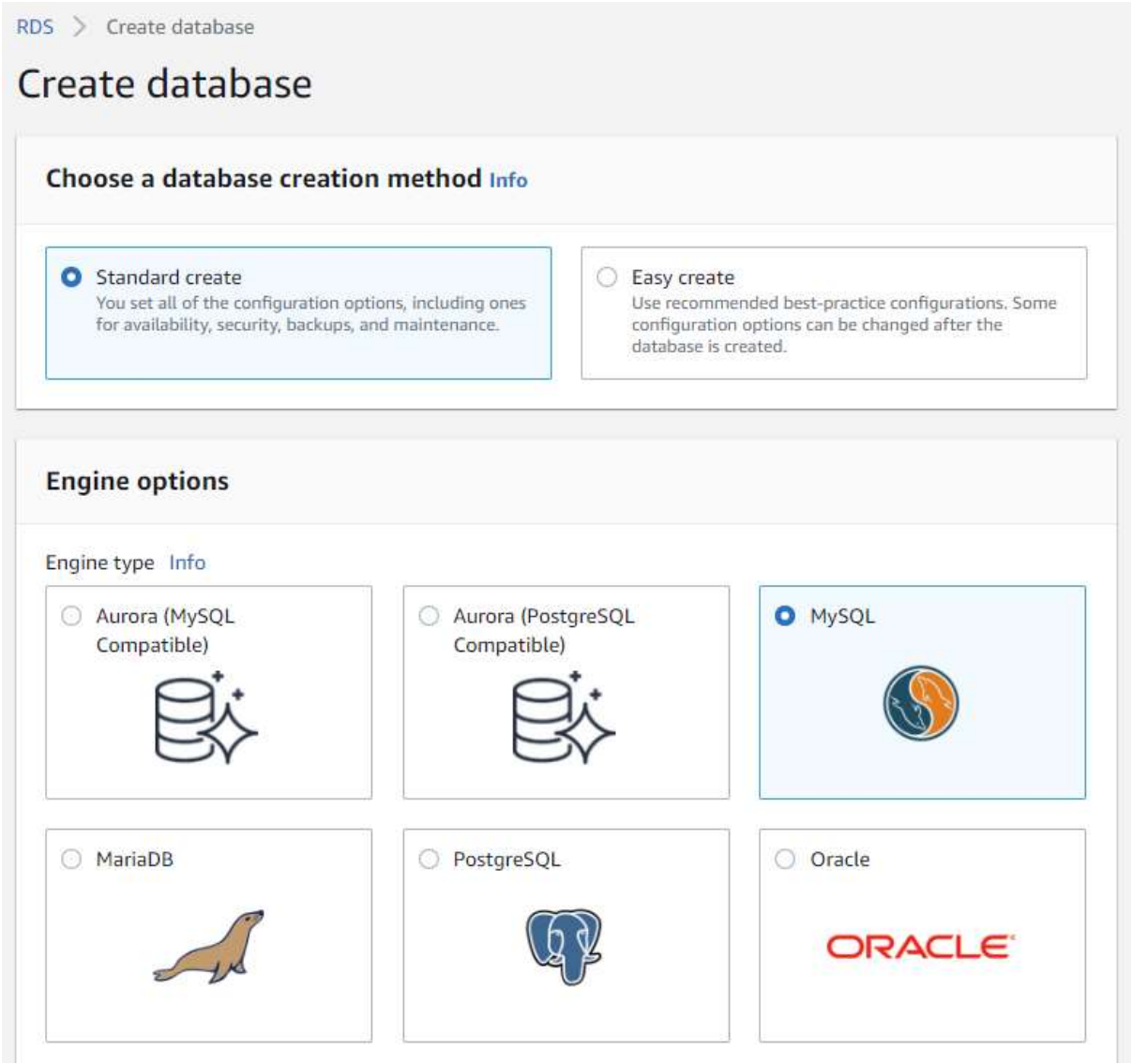
4. Tạo máy chủ CSDL RDS

- Tạo DB subnet group


RDS > Subnet groups > Create DB subnet group
Create DB subnet group
To create a new subnet group, give it a name and a description, and choose an existing VPC. You will then be able to add subnets related to that VPC.
Subnet group details
Name
You won't be able to modify the name after your subnet group has been created.
DB-subnet-group-Lab7
Must contain from 1 to 255 characters. Alphanumeric characters, spaces, hyphens, underscores, and periods are allowed.
Description
DB subnet group for RDS
VPC
Choose a VPC identifier that corresponds to the subnets you want to use for your DB subnet group. You won't be able to choose a different VPC identifier after your subnet group has been created.
Webserver-Lab7-vpc (vpc-0acebb71effd90edc)



- Tạo RDS instance


RDS
Create database
Create database
Choose a database creation method Info
Standard create
You set all of the configuration options, including ones for availability, security, backups, and maintenance.
Easy create
Use recommended best-practice configurations. Some configuration options can be changed after the database is created.
Engine options
Engine type Info
Aurora (MySQL Compatible)
Aurora (PostgreSQL Compatible)
MySQL
MariaDB
PostgreSQL
Oracle
ORACLE

Edition

MySQL Community

Known issues/limitations
Review the Known issues/limitations to learn about potential compatibility issues with specific database versions.

▼ Hide filters

Show versions that support the Multi-AZ DB cluster Info
Create a A Multi-AZ DB cluster with one primary DB instance and two readable standby DB instances. Multi-AZ DB clusters provide up to 2x faster transaction commit latency and automatic failover in typically under 35 seconds.

Show versions that support the Amazon RDS Optimized Writes Info
Amazon RDS Optimized Writes improves write throughput by up to 2x at no additional cost.

Engine Version

MySQL 8.0.32

Templates

Choose a sample template to meet your use case.

Production
Use defaults for high availability and fast, consistent performance.

Dev/Test
This instance is intended for development use outside of a production environment.

Free tier
Use RDS Free Tier to develop new applications, test existing applications, or gain hands-on experience with Amazon RDS.
Info

Settings

DB instance identifier Info

Type a name for your DB instance. The name must be unique across all DB instances owned by your AWS account in the current AWS Region.

database-server-Lab7

The DB instance identifier is case-insensitive, but is stored as all lowercase (as in "mydbinstance"). Constraints: 1 to 60 alphanumeric characters or hyphens. First character must be a letter. Can't contain two consecutive hyphens. Can't end with a hyphen.

▼ Credentials Settings

Master username Info

Type a login ID for the master user of your DB instance.

admin

1 to 16 alphanumeric characters. First character must be a letter.

☐ Manage master credentials in AWS Secrets Manager

Manage master user credentials in Secrets Manager. RDS can generate a password for you and manage it throughout its lifecycle.

ⓘ If you manage the master user credentials in Secrets Manager, some RDS features aren't supported.
Learn more

☐ Auto generate a password

Amazon RDS can generate a password for you, or you can specify your own password.

Master password Info

••••••••

Constraints: At least 8 printable ASCII characters. Can't contain any of the following: / (slash), '(single quote), "(double quote) and @ (at sign).

Confirm master password Info

••••••••

Instance configuration

The DB instance configuration options below are limited to those supported by the engine that you selected above.

Amazon RDS Optimized Writes - *new* Info

Show instance classes that support Amazon RDS Optimized Writes

DB instance class Info

- Standard classes (includes m classes)
- Memory optimized classes (includes r and x classes)
- Burstable classes (includes t classes)

db.t2.micro
1 vCPUs 1 GiB RAM Not EBS Optimized

Include previous generation classes

Storage

Storage type Info

General Purpose SSD (gp2)
Baseline performance determined by volume size

Allocated storage Info

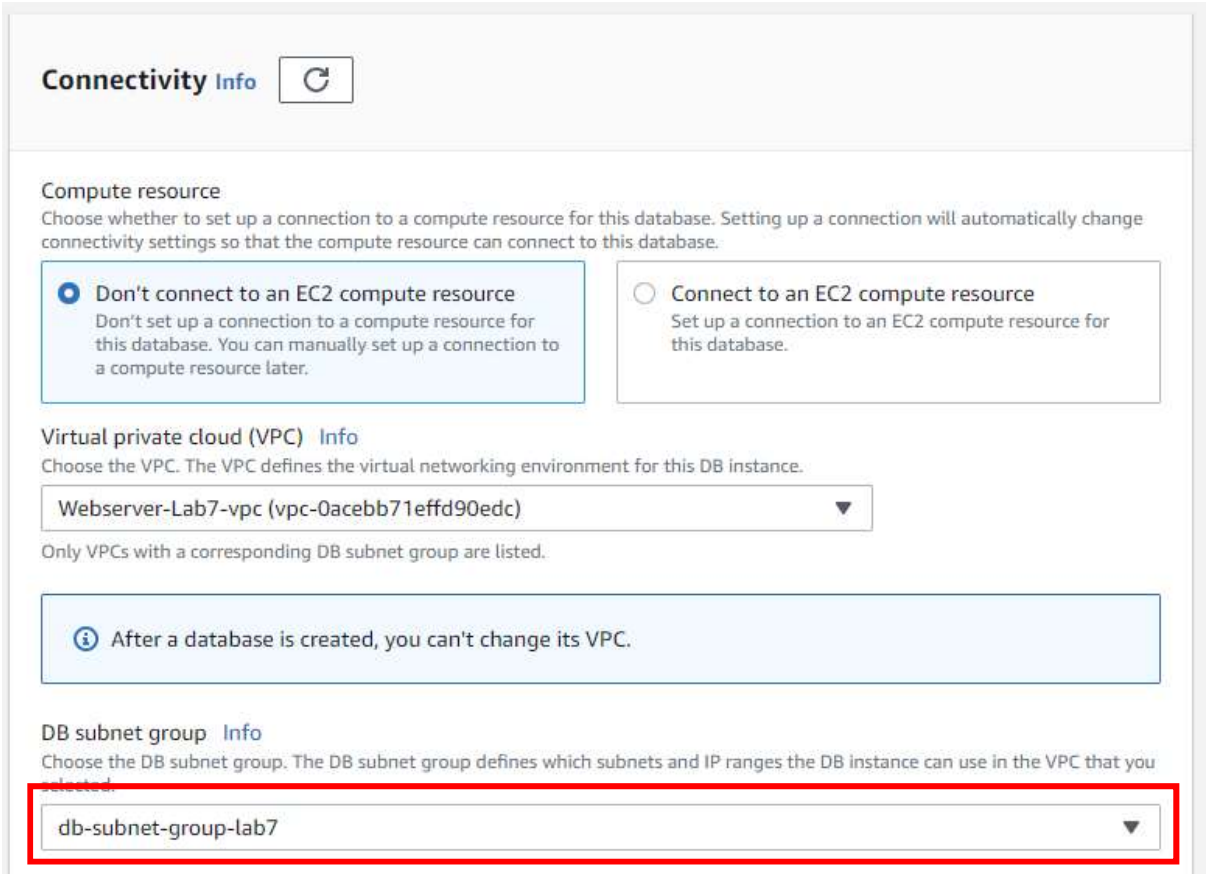
20 GiB

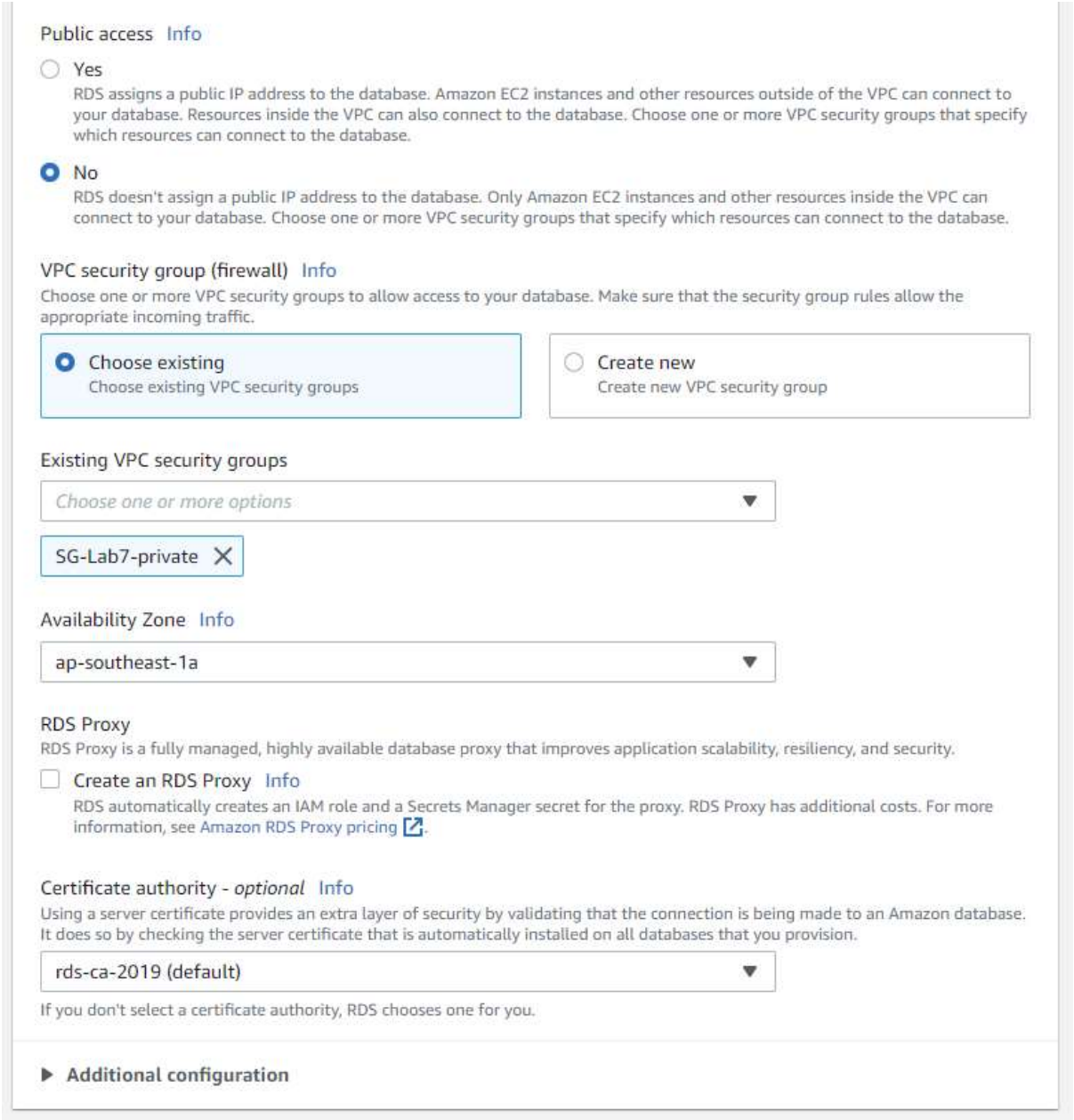
The minimum value is 20 GiB and the maximum value is 6,144 GiB

Storage autoscaling Info

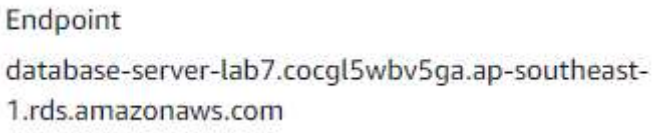
Provides dynamic scaling support for your database's storage based on your application's needs.

Enable storage autoscaling
Enabling this feature will allow the storage to increase after the specified threshold is exceeded.


Connectivity Info
Compute resource
Choose whether to set up a connection to a compute resource for this database. Setting up a connection will automatically change connectivity settings so that the compute resource can connect to this database.
Don't connect to an EC2 compute resource
Don't set up a connection to a compute resource for this database. You can manually set up a connection to a compute resource later.
Connect to an EC2 compute resource
Set up a connection to an EC2 compute resource for this database.
Virtual private cloud (VPC) Info
Choose the VPC. The VPC defines the virtual networking environment for this DB instance.
Webserver-Lab7-vpc (vpc-0acebb71effd90edc)
Only VPCs with a corresponding DB subnet group are listed.
After a database is created, you can't change its VPC.
DB subnet group Info
Choose the DB subnet group. The DB subnet group defines which subnets and IP ranges the DB instance can use in the VPC that you
db-subnet-group-lab7



- Ghi nhận Enpoint:



5. Kết nối từ máy chủ webserver đến máy chủ CSDL

- Từ máy chủ webserver:

```
mysql -h <endpoint RDS> -u <username RDS> -p
```

+ Nhập mật khẩu

+ Kết nối thành công

```
ubuntu@ip-10-0-7-61:~$ mysql -h database-server-lab7.cocgl5wbv5ga.ap-southeast-1.rds.amazonaws.com -u admin -p
Enter password:
Welcome to the MySQL monitor.  Commands end with ; or \g.
Your MySQL connection id is 17
Server version: 8.0.32 Source distribution

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affiliates. Other names may be trademarks of their respective
owners.

Type 'help;' or '\h' for help. Type '\c' to clear the current input statement.

mysql>
```

+ Tạo cơ sở dữ liệu:

```
create database myDB;
use myDB;
```

+ Tạo bảng User

```
CREATE TABLE User (userName VARCHAR(255) PRIMARY KEY, password VARCHAR(255));
```

+ Insert dữ liệu:

```
INSERT INTO User VALUE('user1','12345678');
```

+ Kiểm tra:

```
mysql> select * from User;
+----------+----------+
| userName | password |
+----------+----------+
| user1    | 12345678 |
+----------+----------+
1 row in set (0.00 sec)
```

6. Đưa website lên webserver

- Tạo trang login.php

```
<?php

// Thiết lập thông tin kết nối đến database
$servername = "database-server-lab7.cocgl5wbv5ga.ap-southeast-1.rds.amazonaws.com";
$username = "admin";
$password = "12345678";
$dbname = "myDB";

// Tạo kết nối đến database
$conn = new mysqli($servername, $username, $password, $dbname);

// Kiểm tra kết nối
```

```
if ($conn->connect_error) {
    die("Kết nối không thành công: " . $conn->connect_error);
}

// Kiểm tra nếu form đã submit
if ($_SERVER["REQUEST_METHOD"] == "POST") {
    // Lấy giá trị từ form
    $username = $_POST["username"];
    $password = $_POST["password"];

    // Truy vấn lấy dữ liệu từ database
    $sql = "SELECT * FROM User WHERE username='$username' AND
password='$password'";
    $result = $conn->query($sql);

    // Kiểm tra số lượng bản ghi trả về
    if ($result->num_rows > 0) {
        // Nếu có, đăng nhập thành công
        echo "Bạn đã đăng nhập thành công";
        // Thực hiện các hành động cần thiết, ví dụ như đưa người dùng
vào trang chào mừng
    } else {
        // Nếu không, đăng nhập không thành công
        echo "Bạn đã đăng nhập không thành công";    }
}
?>

<!DOCTYPE html>
<html>

<head>
    <meta charset="UTF-8">
    <title>Đăng nhập</title>
</head>

<body>
    <h2>Đăng nhập</h2>
```

```
    <form          method="post"          action="<?php          echo
htmlspecialchars($_SERVER["PHP_SELF"]); ?>">
        <label>Tên đăng nhập:</label>
        <input type="text" name="username"><br><br>
        <label>Mật khẩu:</label>
        <input type="password" name="password"><br><br>
        <input type="submit" value="Đăng nhập">
    </form>
</body>

</html>
```

+ Đưa trang web lên một nơi lưu trữ trên internet (như github)

+ Trên máy webserver download trang login.php:

- Cấp quyền truy cập cho Apache:

```
sudo chown -R www-data:www-data /var/www/html/
```

- Chuyển vào thư mục chứa website của Apache

```
cd /var/www/html/
```

- Download file login.php:

```
sudo wget
https://raw.githubusercontent.com/thanhtranthien/aws/main/login.php
```

7. Test hệ thống

- Vào trang login từ trình duyệt:

8. Dọn dẹp tài nguyên

Xóa các tài nguyên tạo ra trong quá trình thực hành.
