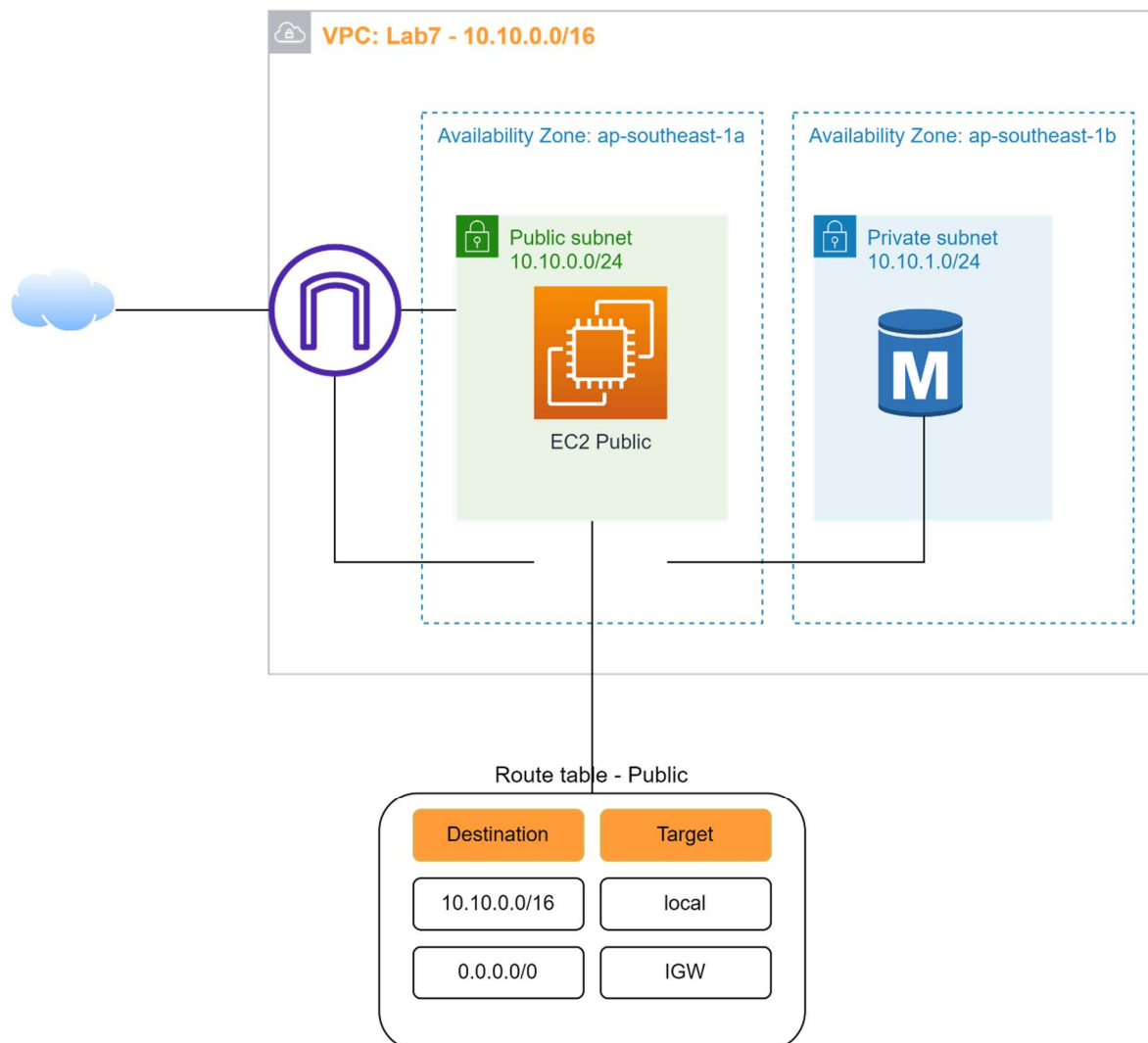


Bài thực hành số 7 Triển khai website với EC2 và RDS

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

VPC settings

Resources to create [Info](#)
Create only the VPC resource or the VPC and other networking resources.

☒ VPC only ☐ VPC and more

Name tag - *optional*
Creates a tag with a key of 'Name' and a value that you specify.

Webserver-Lab7

IPv4 CIDR block [Info](#)
☒ IPv4 CIDR manual input ☐ IPAM-allocated IPv4 CIDR block

IPv4 CIDR
10.0.0.0/16

IPv6 CIDR block [Info](#)
☒ No IPv6 CIDR block ☐ IPAM-allocated IPv6 CIDR block ☐ Amazon-provided IPv6 CIDR block ☐ IPv6 CIDR owned by me

Tenancy [Info](#)
Default

- Tạo Subnet public:

VPC

VPC ID

Create subnets in this VPC.

vpc-0acebb71effd90edc (Webserver-Lab7-vpc) ▼

Associated VPC CIDRs

IPv4 CIDRs

10.0.0.0/16

Subnet settings

Specify the CIDR blocks and Availability Zone for the subnet.

Subnet 1 of 1

Subnet name

Create a tag with a key of 'Name' and a value that you specify.

subnet-public-Lab7

The name can be up to 256 characters long.

Availability Zone [Info](#)

Choose the zone in which your subnet will reside, or let Amazon choose one for you.

Asia Pacific (Singapore) / ap-southeast-1a ▼

IPv4 CIDR block [Info](#)

Q

10.0.0.0/24

X

- Bật tính năng Auto-assign public IPv4

Edit subnet settings [Info](#)

Subnet

Subnet ID	Name
🔗 subnet-048e2d4ec13b72b03	🔗 subnet-public-Lab7

Auto-assign IP settings [Info](#)

Enable the auto-assign IP settings to automatically request a public IPv4 or IPv6 address for a new network interface in this subnet.

☒

Enable auto-assign public IPv4 address [Info](#)

☐

Enable auto-assign customer-owned IPv4 address [Info](#)

Option disabled because no customer owned pools found.

- Tạo Subnet private:

VPC

VPC ID

Create subnets in this VPC.

vpc-0acebb71effd90edc (Webserver-Lab7-vpc) ▼

Associated VPC CIDRs

IPv4 CIDRs

10.0.0.0/16

Subnet settings

Specify the CIDR blocks and Availability Zone for the subnet.

Subnet 1 of 1

Subnet name

Create a tag with a key of 'Name' and a value that you specify.

subnet-private-Lab7

The name can be up to 256 characters long.

Availability Zone [Info](#)

Choose the zone in which your subnet will reside, or let Amazon choose one for you.

Asia Pacific (Singapore) / ap-southeast-1b ▼

IPv4 CIDR block [Info](#)

Q 10.0.1.0/24

×

- Tạo Internet gateway

VPC > Internet gateways > Create internet gateway

Create internet gateway [Info](#)

An internet gateway is a virtual router that connects a VPC to the internet. To create a new internet gateway specify the name for the gateway below.

Internet gateway settings

Name tag
Creates a tag with a key of 'Name' and a value that you specify.

Tags - optional

A tag is a label that you assign to an AWS resource. Each tag consists of a key and an optional value. You can use tags to search and filter your resources or track your AWS costs.

Key	Value - optional	
<input type="text" value="Name"/>	<input type="text" value="IGW-Lab7"/>	<input type="button" value="Remove"/>

You can add 49 more tags.

- Gắn Internet gateway với VPC:

VPC

Attach an internet gateway to a VPC to enable the VPC to communicate with the internet. Specify the VPC to attach below.

Available VPCs
Attach the internet gateway to this VPC.

► AWS Command Line Interface command

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

VPC > Route tables > rtb-09b3abaed6d2a08e4 > Edit subnet associations

Edit subnet associations

Change which subnets are associated with this route table.

Available subnets (1/1)

<input checked="" type="checkbox"/>	Name	Subnet ID
<input checked="" type="checkbox"/>	sub-public	subnet-0b429f4e76f9b6a19

Selected subnets

subnet-0b429f4e76f9b6a19 / sub-public
 ✕

- Edit route: định tuyến qua internet gateway

Edit routes

Destination	Target
10.10.0.0/16	<input type="text" value="local"/> ✕
<input type="text" value="0.0.0.0/0"/> ✕	<input type="text" value="igw-03eb2cffbd906c0af"/> ✕

2. Tạo Security Group

- Security Group public:

Basic details

Security group name [Info](#)

Name cannot be edited after creation.

Description [Info](#)

VPC [Info](#)

 ✕

- Inbound rules

Inbound rules Info				
Security group rule ID	Type Info	Protocol Info	Port range Info	Source Info
sgr-0a10a18680c3650e5	SSH	TCP	22	Anywhere-I... 0.0.0.0/0 X
sgr-02056edf18bfd5970	HTTP	TCP	80	Custom 0.0.0.0/0 X
sgr-07fb6284befcd188b	HTTPS	TCP	443	Custom 0.0.0.0/0 X

- Security Group private:

Basic details

Security group name [Info](#)

SG-Lab7-private

Name cannot be edited after creation.

Description [Info](#)

Security Group for RDS

VPC [Info](#)

[vpc-0acebb71effd90edc](#) X

- Inbound rules

Inbound rules Info				
Type Info	Protocol Info	Port range Info	Source Info	
MSSQL	TCP	1433	Custom	sg-0e375e506bdaa2862 X

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 identity to 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




[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

AMI ID

64-bit (x86) ▼

ami-0a72af05d27b49ccb

Verified provider

▼ Key pair (login) [Info](#)

You can use a key pair to securely connect to your instance. Ensure that you have access to the selected key pair before you launch the instance.

Key pair name - *required*

Key-Webserver-Lab7 ▼

[Create new key pair](#)

▼ Network settings [Info](#)

VPC - *required* [Info](#)

vpc-0acebb71effd90edc (Webserver-Lab7-vpc) ▼

10.0.0.0/16

Subnet [Info](#)

subnet-09109ed58b76de344

Webserver-Lab7-subnet-public1-ap-southeast-1a ▼

VPC: vpc-0acebb71effd90edc

Owner: 785407684344

Availability Zone: ap-southeast-1a

IP addresses available: 4091

CIDR: 10.0.0.0/20)

[Create new subnet](#) [↗](#)

Auto-assign public IP [Info](#)

Enable ▼

Firewall (security groups) [Info](#)

A security group is a set of firewall rules that control the traffic for your instance. Add rules to allow specific traffic to reach your instance.

☐ Create security group

☒ Select existing security group

Common security groups [Info](#)

Select security groups ▼

SG-Lab7-public sg-0e375e506bdaa2862 ✕

VPC: vpc-0acebb71effd90edc

[Compare security group rules](#)

Security groups that you add or remove here will be added to or removed from all your network interfaces.

▶ Advanced network configuration

- Ghi nhận public DNS:

Public IPv4 DNS


ec2-13-213-53-186.ap-southeast-1.compute.amazonaws.com |


- Kết nối EC2:

Connect to instance [Info](#)

Connect to your instance i-08d3981a5e8c7483a (webserver) using any of these options

EC2 Instance Connect | Session Manager | SSH client | EC2 serial console

Instance ID
 i-08d3981a5e8c7483a (webserver)

Public IP address
 52.221.251.119

User name
 Enter the user name defined in the AMI used to launch the instance. If you didn't define a custom user name, use the default user name, ubuntu.

Note: In most cases, the default user name, ubuntu, is correct. However, read your AMI usage instructions to check if the AMI owner has changed the default AMI user name.

Cancel **Connect**

- 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

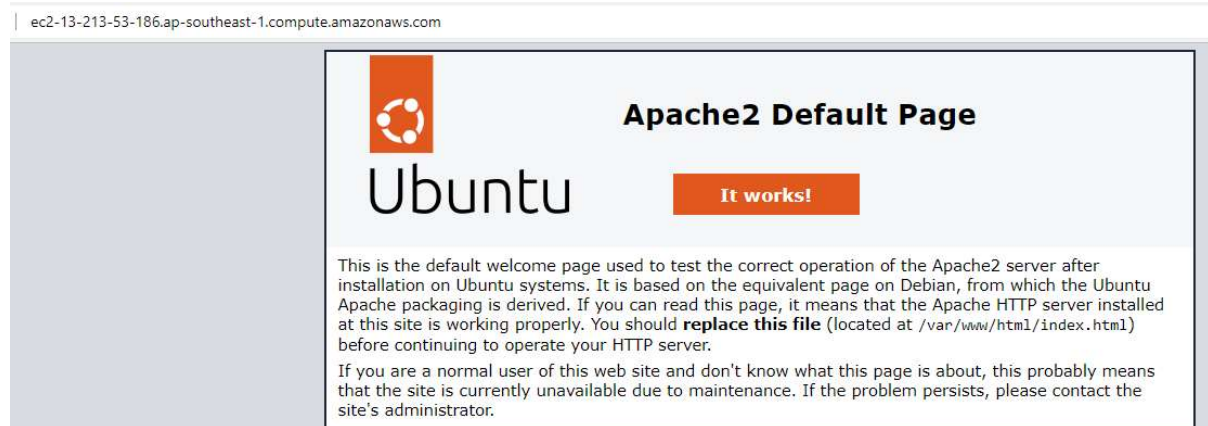
```
sudo systemctl enable httpd
```

- 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

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.

Must contain from 1 to 255 characters. Alphanumeric characters, spaces, hyphens, underscores, and periods are allowed.

Description

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.



Add subnets

Availability Zones

Choose the Availability Zones that include the subnets you want to add.

Choose an availability zone ▼

ap-southeast-1a ✕ ap-southeast-1b ✕

Subnets

Choose the subnets that you want to add. The list includes the subnets in the selected Availability Zones.

Select subnets ▼

subnet-09109ed58b76de344 (10.0.0.0/20) ✕
subnet-02a282edbc24fc6a3 (10.0.128.0/20) ✕

Subnets selected (2)

Availability zone	Subnet ID	CIDR block
ap-southeast-1a	subnet-09109ed58b76de344	10.0.0.0/20
ap-southeast-1a	subnet-02a282edbc24fc6a3	10.0.128.0/20

Cancel

Create

- Tạo RDS instance

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 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.

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.

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 selected.

db-subnet-group-lab7 ▼

Public access [Info](#)

☐ Yes

RDS assigns a public IP address to the database. Amazon EC2 instances and other resources outside of the VPC can connect to your database. Resources inside the VPC can also connect to the database. Choose one or more VPC security groups that specify which resources can connect to the database.

☒ No

RDS doesn't assign a public IP address to the database. Only Amazon EC2 instances and other resources inside the VPC can connect to your database. Choose one or more VPC security groups that specify which resources can connect to the database.

VPC security group (firewall) [Info](#)

Choose one or more VPC security groups to allow access to your database. Make sure that the security group rules allow the appropriate incoming traffic.

☒

Choose existing

Choose existing VPC security groups

☐

Create new

Create new VPC security group

Existing VPC security groups

Choose one or more options

SG-Lab7-private X

Availability Zone [Info](#)

ap-southeast-1a

RDS Proxy

RDS Proxy is a fully managed, highly available database proxy that improves application scalability, resiliency, and security.

☐ Create an RDS Proxy [Info](#)

RDS automatically creates an IAM role and a Secrets Manager secret for the proxy. RDS Proxy has additional costs. For more information, see [Amazon RDS Proxy pricing](#).

Certificate authority - optional [Info](#)

Using a server certificate provides an extra layer of security by validating that the connection is being made to an Amazon database. It does so by checking the server certificate that is automatically installed on all databases that you provision.

rds-ca-2019 (default)

If you don't select a certificate authority, RDS chooses one for you.

► Additional configuration

- Ghi nhận Endpoint:

Endpoint

database-server-lab7.cocgl5wbv5ga.ap-southeast-1.rds.amazonaws.com

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

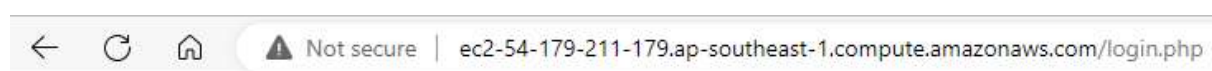
```
cd /var/www/html/
```

- 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:



Đăng nhập

Tên đăng nhập:

Mật khẩu:

8. Dọn dẹp tài nguyên

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