Cloud Plus Plus Services

Create PHP application on EC2 instance with Amazon RDS/MySQL as backend.

Objectives:

1. Learn to configure RDS with MySQL engine.
2. Learn to create a PHP application on EC2 instance with Amazon RDS/MySQL as backend.

Step 1: In **EC2** service console, go to Security groups in side panel. Click on Create security groups.

Create a Security Group for Linux Server with following configuration:

Click on Create security group.

Configure it as follows:

Security group name: MyWebServerSG

Description: Security Group for EC2 Webserver in custom VPC

Add three rules under **Inbound Rules**:

1. **Type**: HTTP
   Source: 0.0.0.0/0
2. **Type**: HTTP
   Source: ::/0
3. **Type**: SSH
   Source: 0.0.0.0/0

Inbound rules

Type	Protocol	Port range	Source
HTTP	TCP	80	0.0.0.0/0
HTTP	TCP	80	::/0
SSH	TCP	22	0.0.0.0/0

Click on Create security group button in bottom right corner. Confirm that it is created.

Go back to **EC2** service console, go to Security groups in side panel. Click on Create security groups.

Provide **Security group name** as RDS-SG.

Provide **Description** as Security Group for Database.

Provide following Inbound rules:

1. **Type**: SSH
   Source:0.0.0.0/0
2. **Type**: MySQL/Aurora
   Source:0.0.0.0/0
3. **Type**: MySQL/Aurora
   Source: MyWebServerSG (security group that would be used to create the EC2 instance)

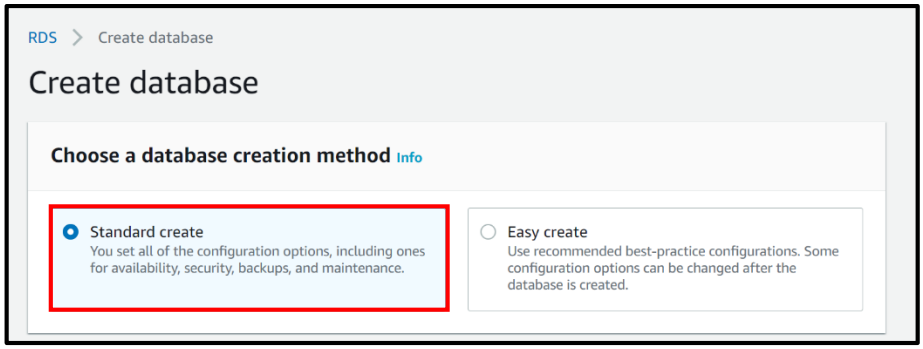
Inbound rules

Type	Protocol	Port range	Source
SSH	TCP	22	0.0.0.0/0
MYSQL/Aurora	TCP	3306	0.0.0.0/0
MYSQL/Aurora	TCP	3306	sg-0ef5565514aef0217 (WebServerSG)

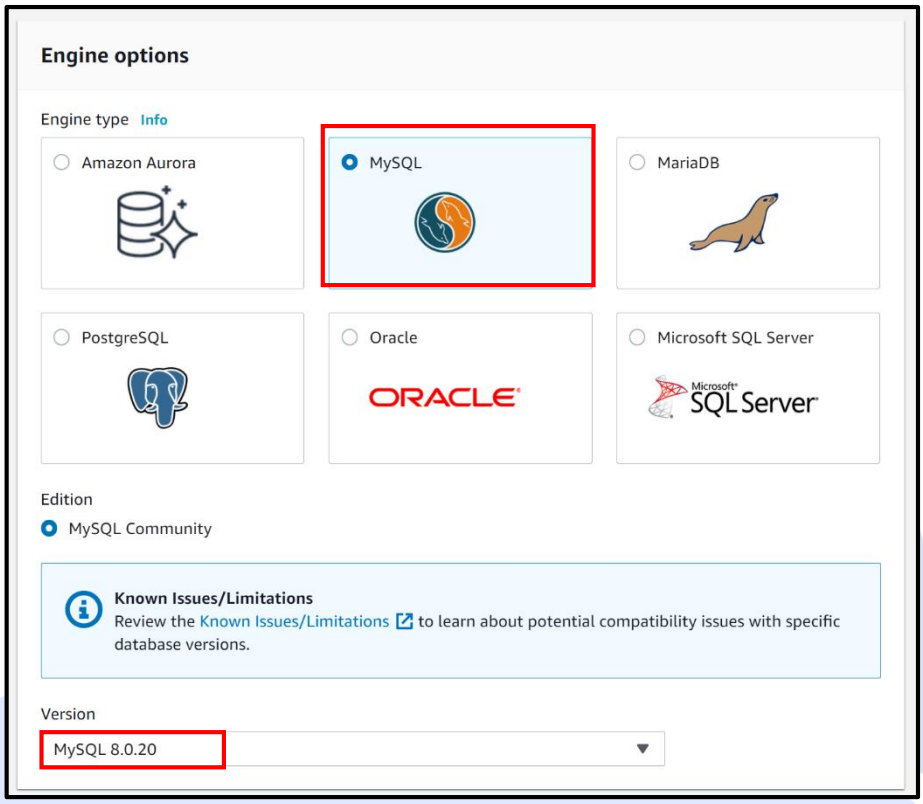
Click on Create security group button in bottom right corner. Confirm that it is created.

Step 2: Go to RDS service console. Click on Create database.

Choose a Standard create **database creation method**.



Select the MySQL radio button in **Engine options**. Confirm **MySQL 8.0.20**



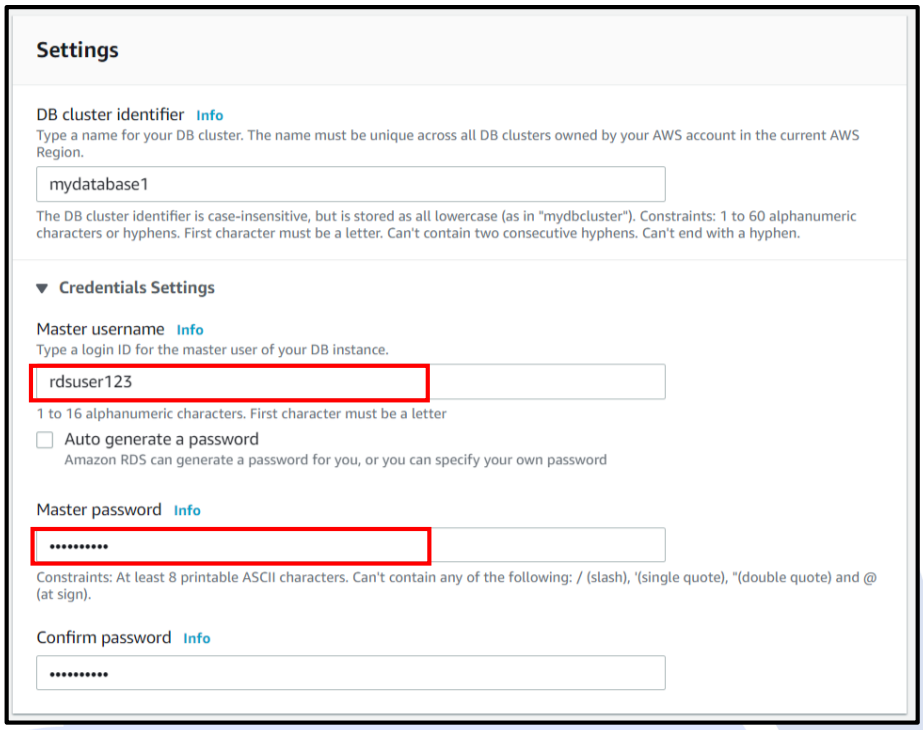
Select the Dev/Test in **Templates**.

Under **Settings**:

Give **DB instance identifier** as mydatabase1.

Provide **Credentials Settings** as per your choice and store it in a secure place. We refer to following values for this document:

- **Master Username**: rdsuser123
- **Master password**: rdspass123



Let the **DB instance class** be Standard Classes and **size** be db.m5.xlarge.

Confirm the default **Storage** settings as **Storage type**: General type- General Purpose (SSD) and **Allocated storage** 20 GiB.

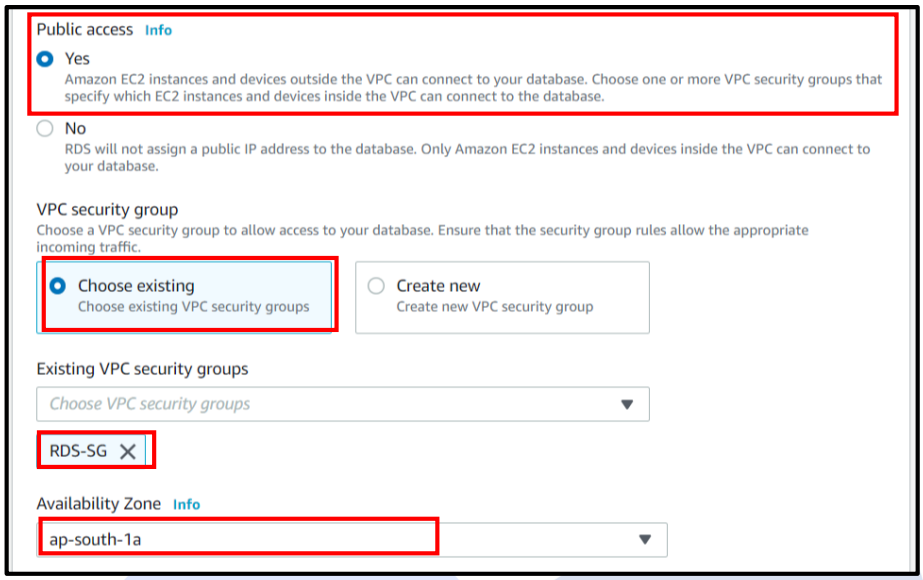
Uncheck the Enable storage autoscaling.

Under **Availability & durability** select Do not create a standby instance radio button.

Connectivity section will have Default VPC selected.

Click on **Additional connectivity configuration** for drop down.

- Select default-vpc Subnet group.
- Select Yes radio button under **Public access**.
- Select Choose Existing radio button in **VPC security group**.
- In the **Existing VPC security groups** default will be selected. Remove this security group by clicking on the **cross** sign. Select the RDS-SG created in previous step.
- In **Availability Zone** select 1a which should be **same as the AZ of Linux Instance**.
- The **Database port** will be default 3306.

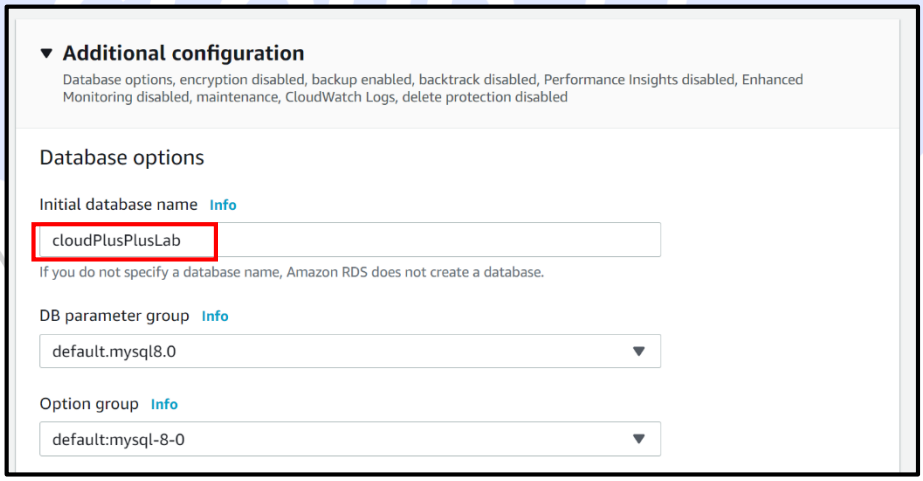


Database authentication is set to Password authentication.

Click on **Additional configuration** drop down.

Provide **Initial database name** as cloudPlusPlusLab.

DB **parameter group** and **Option group** will be default .mysql8.0.



In **Backup** the Enable automatic backups will be checked.

Backup retention period will be 0 days.

Backup window will have No preference selected.

Uncheck Copy tags to snapshots.

Uncheck Enable Encryption.

Uncheck Enable Performance Insights.

Uncheck Enable Enhanced monitoring.

Uncheck all options under Log Exports.

Uncheck Enable auto minor version upgrade.

Select No preference for **Maintenance window**.

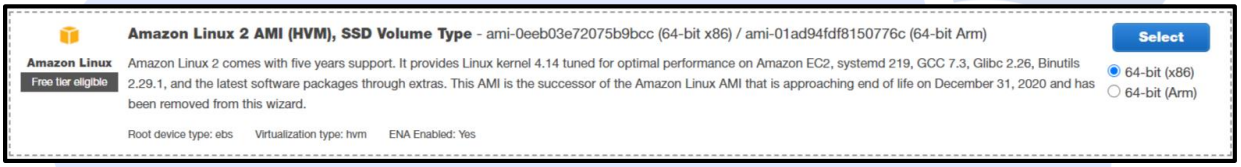
Uncheck Enable deletion protection.

Ensure no additional cost is being incurred in the **Estimated monthly cost** section.

Click on Create database button in bottom right corner.

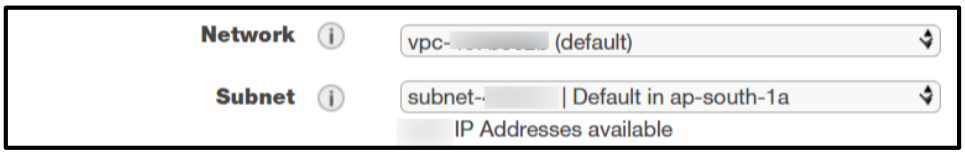
Confirm that the database is created and Available.

Step 3: Go to EC2 in AWS Console. Click on Launch Instance. Select The Linux2 AMI.



In **Step 2: Choose an Instance Type** keep the default **t2.micro** and go to next step.

In **Step 3**, select a subnet same as the one in which RDS is created. In our case we select ap-south-1a.



Keep the defaults for **Step 4: Add Storage**. And go to Step 5. Provide the **Key** as **Name** and **Value** as **LinuxWebServerforRDS**.

In **Step 6** select the **existing** Linux Web Server Security Group MyWebServerSG created earlier in this exercise. For more information refer to our blog in Linux Server Configuration here. **Review, acknowledge the Key-pair** and **Launch** the Instance. Make sure it is running.

Step 4: SSH into the instance.

Run the following command. This will get the latest bug fixes and security updates by updating the software on your EC2 instance:

sudo yum update

Now install the PHP software using following command. This command installs multiple software packages and related dependencies:

sudo amazon-linux-extras install -y lamp-mariadb10.2-php7.2 php7.2

Now we Install Apache web server:

sudo yum install -y httpd

Start the Apache web server using following command:

sudo systemctl start httpd

Configure the web server to start with each system boot using following command:

sudo systemctl enable httpd

```
[ec2-user@ip-172-31-32-14 ~]$ sudo systemctl enable httpd
Created symlink from /etc/systemd/system/multi-user.target.wants/httpd.service
to /usr/lib/systemd/system/httpd.service.
```

Test your web server by entering the DNS name of your EC2 instance in the address bar of the web browser. You should see the Apache test page.

To allow ec2-user to manage files in the default root directory for your Apache web server, modify the ownership and permissions of the /var/www directory.

We will add a group named www to your EC2 instance. Then we give that group ownership of the /var/www directory and add write permissions for the group. Any members of that group can then add, delete, and modify files for the web server.

Add the www group to your EC2 instance with the following command:

sudo groupadd www

Add the ec2-user user to the www group:

sudo usermod -a -G www ec2-user

Log out to refresh your permissions and include the new www group:

Exit

Log back in again and verify that the www group exists with the next command. You should see output as below:

groups

```
[ec2-user@ip-172-31-32-14 ~]$ groups
ec2-user adm wheel systemd-journal www
```

Change the group ownership of the /var/www directory and its contents to the www group:

sudo chgrp -R www /var/www

Change the directory permissions of /var/www and its subdirectories to add group write permissions and set the group ID on subdirectories created in the future:

sudo chmod 2775 /var/www

find /var/www -type d -exec sudo chmod 2775 {} +

Recursively change the permissions for files in the /var/www directory and its subdirectories to add group write permissions:

find /var/www -type f -exec sudo chmod 0664 {} +

Connect your Apache web server to your DB instance. Change the directory to /var/www and create a new subdirectory named inc:

cd /var/www

```
[ec2-user@ip-172-31-32-14 ~]$ cd /var/www
[ec2-user@ip-172-31-32-14 www]$
```


Create a directory **inc** and enter the directory. Inside the directory we create a file dbinfo.inc:

mkdir inc

cd inc

Create a new file in the **inc** directory named dbinfo.inc:

>dbinfo.inc

Go into the nano editor and add the following code into the dbinfo.inc file:

nano dbinfo.inc

The Blue part in following code is to be replaced by **your database endpoint**, username, password and database name that was created in the above steps.

```
<?php

define('DB_SERVER', 'my-database-1.          .ap-south-1.rds.amazonaws.com');

define('DB_USERNAME', 'rdsuser123');

define('DB_PASSWORD', 'rdspass123');

define('DB_DATABASE', 'cloudPlusPlusLab');

?>
```

Press *Ctrl+X* to exit, further *Y* to save changes and *Enter* to keep the name unchanged.

Change the directory to html:

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

Here create a SamplePage.php document. Go to Nano editor to edit the document:

```
>SamplePage.php

nano SamplePage.php
```

Add the following code:

```
<?php include "../inc/dbinfo.inc"; ?>
<html><body>
<h1>Sample page</h1>
<?php
/* Connect to MySQL and select the database. */
$connection = mysqli_connect(DB_SERVER, DB_USERNAME, DB_PASSWORD);
if (mysqli_connect_errno()) echo "Failed to connect to MySQL: " .
mysqli_connect_error();
$database = mysqli_select_db($connection, DB_DATABASE);
/* Ensure that the EMPLOYEES table exists. */
VerifyEmployeesTable($connection, DB_DATABASE);
/* If input fields are populated, add a row to the EMPLOYEES table. */
$employee_name = htmlentities($_POST['NAME']);
$employee_address = htmlentities($_POST['ADDRESS']);
if (strlen($employee_name) || strlen($employee_address)) {
AddEmployee($connection, $employee_name, $employee_address);
```

```
}
?>
<!-- Input form -->
<form action="<?PHP echo $_SERVER['SCRIPT_NAME'] ?>" method="POST">
<table border="0">
<tr><td>NAME</td><td>ADDRESS</td></tr>
<tr>
<td><input type="text" name="NAME" maxlength="45" size="30" /></td>
<td><input type="text" name="ADDRESS" maxlength="90" size="60" /></td>
<td><input type="submit" value="Add Data" /></td>
</tr>
</table>
</form>
<!-- Display table data. -->
<table border="1" cellpadding="2" cellspacing="2">
<tr><td>ID</td><td>NAME</td><td>ADDRESS</td></tr>
<?php
$result = mysqli_query($connection, "SELECT * FROM EMPLOYEES");
while($query_data = mysqli_fetch_row($result)) {
echo "<tr>";
echo "<td>",$query_data[0], "</td>",
"<td>",$query_data[1], "</td>",
"<td>",$query_data[2], "</td>";
echo "</tr>";
}
?>
</table>
<!-- Clean up. -->
<?php
mysqli_free_result($result);
mysqli_close($connection);
?>
</body></html>
<?php
/* Add an employee to the table. */
function AddEmployee($connection, $name, $address) {
$n = mysqli_real_escape_string($connection, $name);
$a = mysqli_real_escape_string($connection, $address);
$query = "INSERT INTO EMPLOYEES (NAME, ADDRESS) VALUES ('$n', '$a');";
if(!mysqli_query($connection, $query)) echo("<p>Error adding employee
data.</p>");
}
```

```
/* Check whether the table exists and, if not, create it. */
function VerifyEmployeesTable($connection, $dbName) {
if(!TableExists("EMPLOYEES", $connection, $dbName))
{
$query = "CREATE TABLE EMPLOYEES (
ID int(11) UNSIGNED AUTO_INCREMENT PRIMARY KEY,
NAME VARCHAR(45),
ADDRESS VARCHAR(90)
)";
if(!mysqli_query($connection, $query)) echo("<p>Error creating table.</p>");
}
}
/* Check for the existence of a table. */
function TableExists($tableName, $connection, $dbName) {
$t = mysqli_real_escape_string($connection, $tableName);
$d = mysqli_real_escape_string($connection, $dbName);
$checktable = mysqli_query($connection,
"SELECT TABLE_NAME FROM information_schema.TABLES WHERE TABLE_NAME =
'$t' AND TABLE_SCHEMA = '$d'");
if(mysqli_num_rows($checktable) > 0) return true;
return false;
}
?>
```

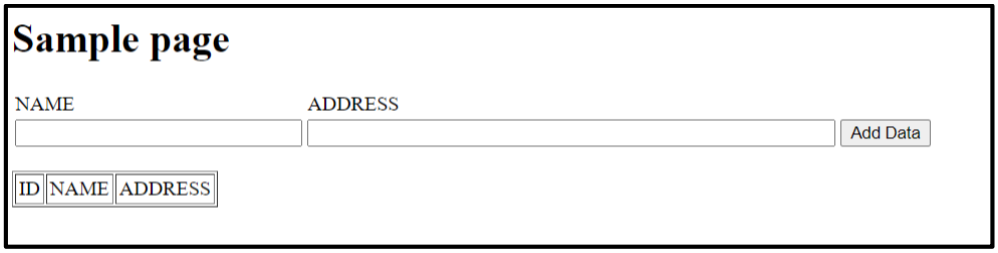
Press *Ctrl+X* to exit, further *Y* to save changes and *Enter* to keep the name unchanged.

Step 5: Verify that your web server successfully connects to your DB instance by opening a web browser and browsing to

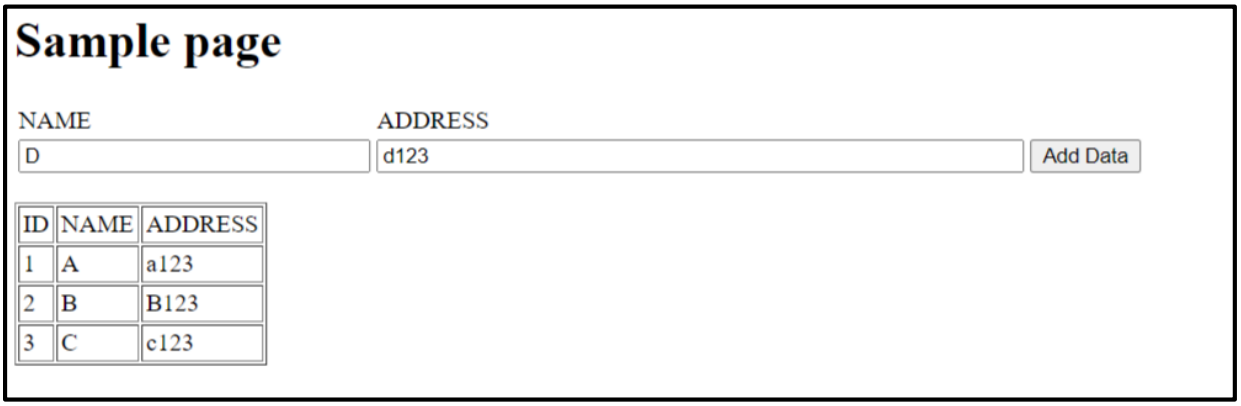
EC2 instance endpoint/SamplePage.php.

The Blue part will be your DNS name:

ec2-172-31-32-14.ap-south-1.compute.amazonaws.com/SamplePage.php



As you enter the data, it will be stored on the created database server.



Step 6: Thus we have created a Web Server on EC2 Instance and connected to MySQL database successfully.

Note: Delete RDS instance, Security groups and terminate the instances if you no longer need them.

Was this document helpful? YES / NO

Document Created by	Version
Parag Deshpande	10-March-2021