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2KE20CS032

Assignment 49

Understood. To follow the provided instructions and create the files/directory using the same name and case as provided in the task steps, please provide me with the specific names and case instructions for the files/directory you want to create.

AWS

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Assignment: 2 : Creating Lambda Function to access RDS Database

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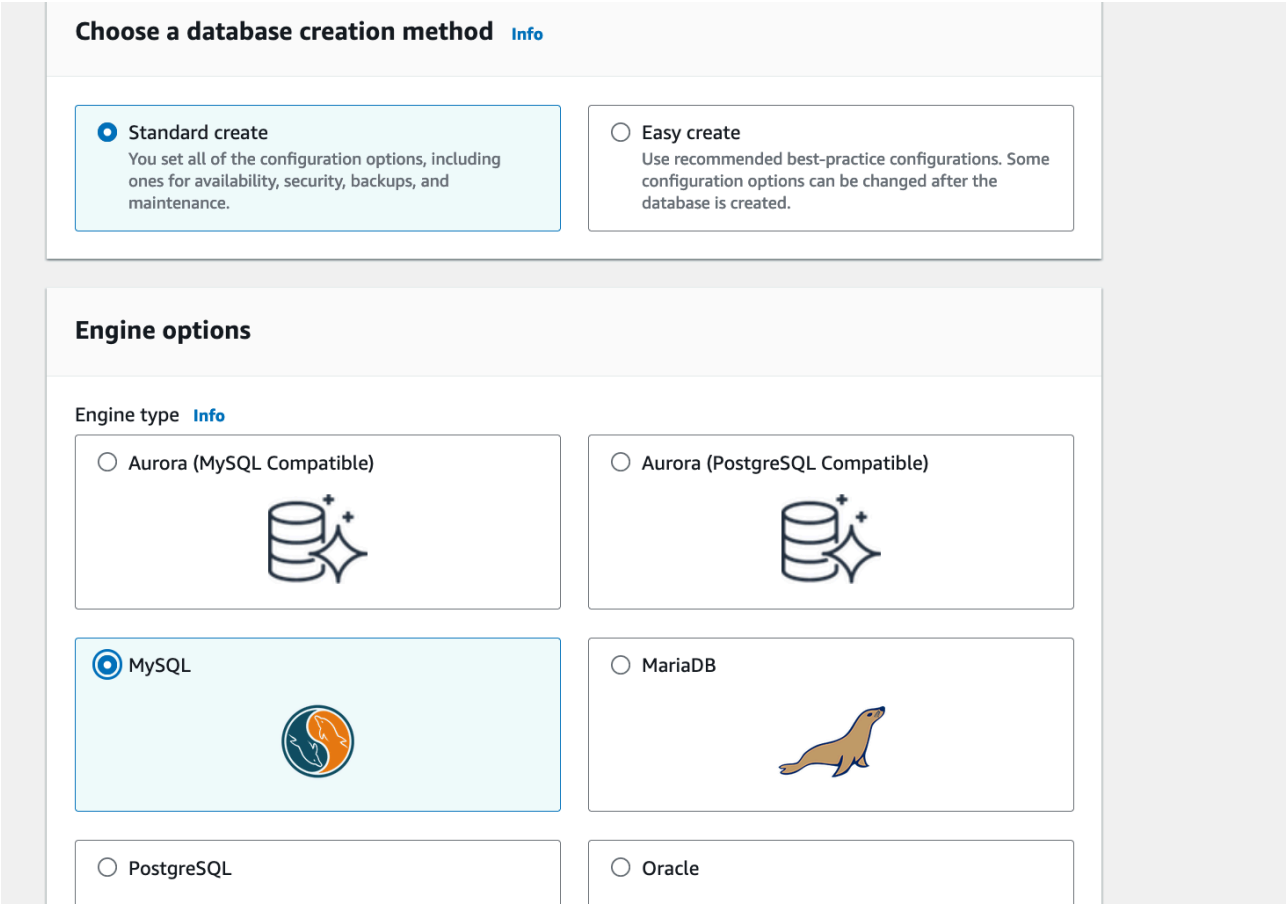
Creating RDS Database

1Navigate to RDS service and Create a Database

2. Choose Standard create, Engine type MySQL, Leave Engine version as default, choose Templates as Free tier
3. In Settings Give a name for your Database or leave it as default, leave Master usernameas default, Set Master password for your Database



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 8.0.35

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

Availability and durability

Deployment options Info

The deployment options below are limited to those supported by the engine you selected above.

Single DB instance (not supported for Multi-AZ DB cluster snapshot)

Creates a single DB instance with no standby DB instances.

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-1

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. The 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

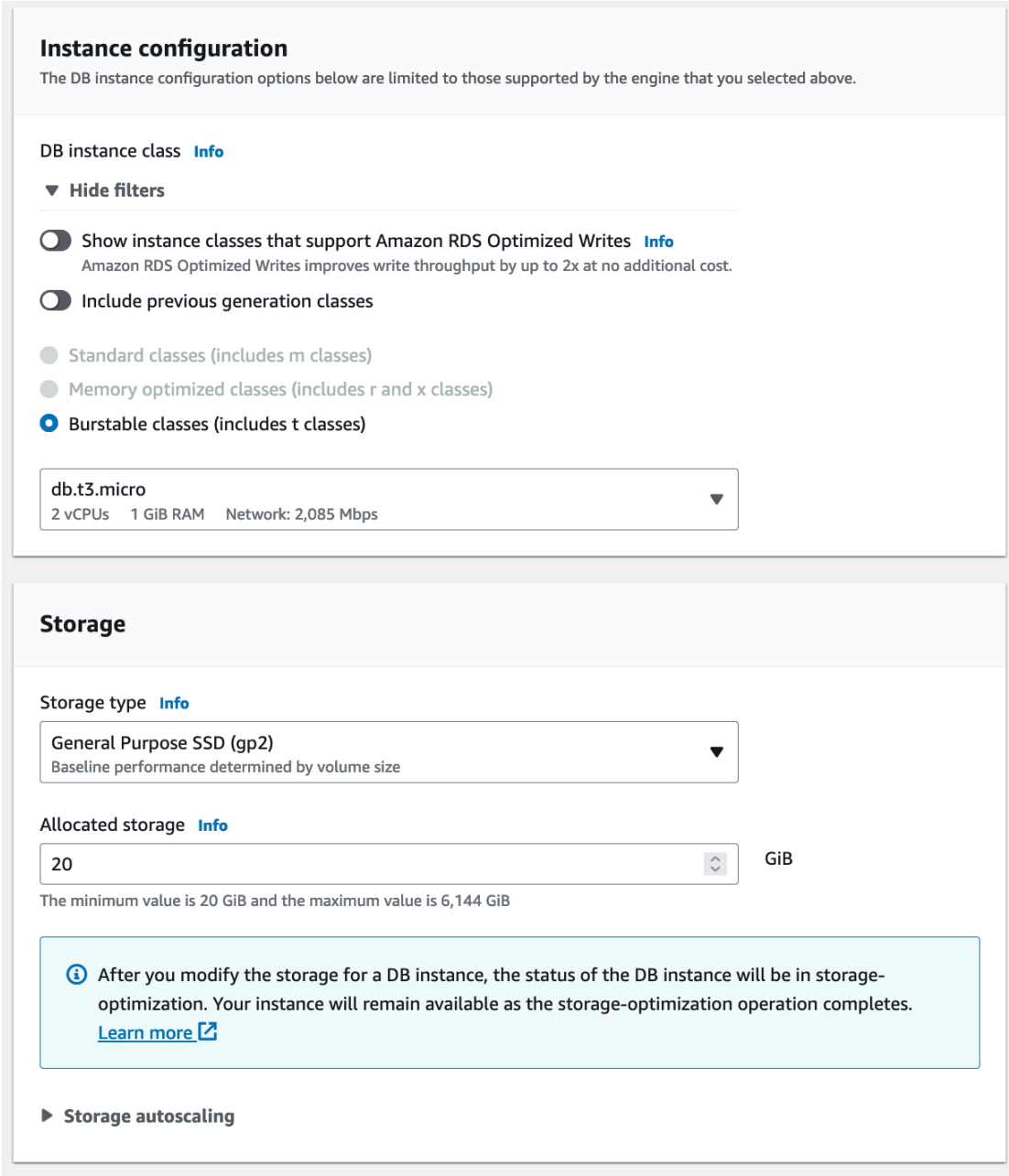
••••••••

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

••••••••

4.Instance Configuration and Storage you can leave it as default



5. In Connectivity Choose first option(Don't connect to an EC2 Compute Resource) and inVPC select your VPC, Public access No, VPC security groups, you can create a newsecurity group

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.

my-vpc-01 (vpc-0e190ca43b317839f)
5 Subnets, 2 Availability Zones

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.

Create new DB Subnet Group

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

New VPC security group name

rds-security-group

Availability Zone Info

ap-south-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

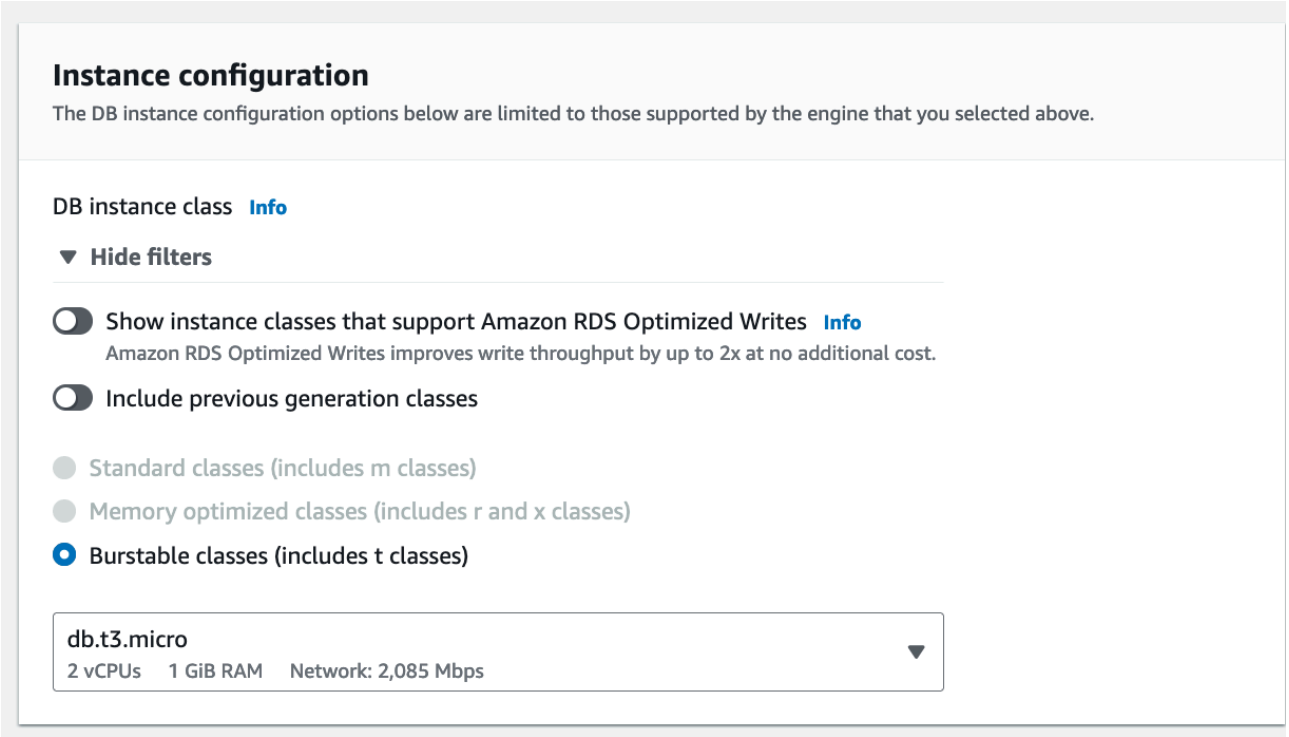
Using a server certificate provides an extra layer of security by validating that the connection is being made to an Amazon database. It does so by checking the server certificate that is automatically installed on all databases that you provision.

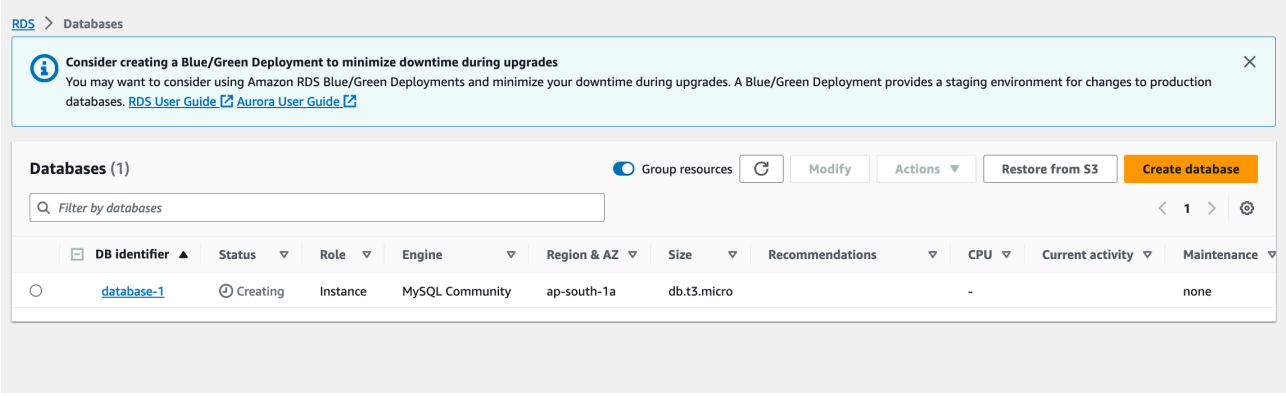
rds-ca-2019 (default)
Expiry: Aug 22, 2024

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

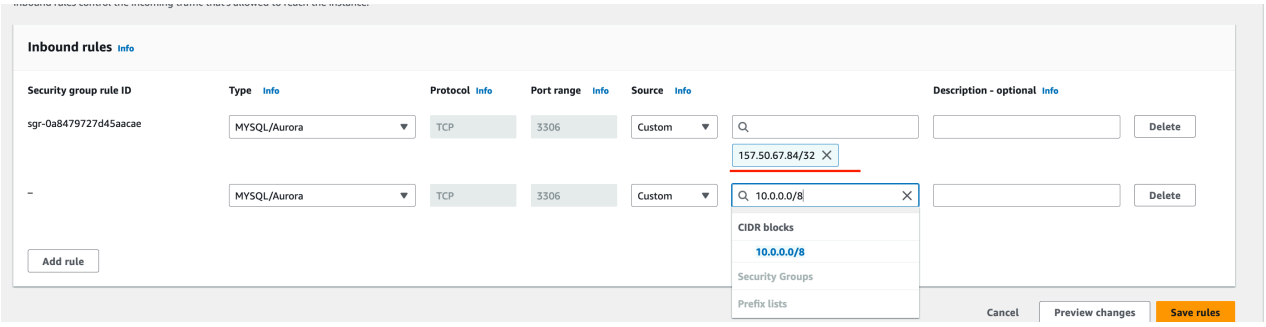
▶ **Additional configuration**

6In Database Authentication choose first method
7Disable Monitoring and click on Create database, Your database will be created





8.Go to the database and open your security group, In inbound rules, add a rule in securitygroup, choose the type as MYSQL/Aurora and allow your VPC range, In Outbound rule allow all traffic



Connect to RDS instance

1Launch an ec2 instance and install mysql alone there follow mattermost softwareInstallation Document

```
  Verifying        : mysql-community-common-8.0.35-1.el9.x86_64                3/6
  Verifying        : mysql-community-icu-data-files-8.0.35-1.el9.x86_64        4/6
  Verifying        : mysql-community-libs-8.0.35-1.el9.x86_64                  5/6
  Verifying        : mysql-community-server-8.0.35-1.el9.x86_64                6/6

Installed:
  mysql-community-client-8.0.35-1.el9.x86_64   mysql-community-client-plugins-8.0.35-1.el9.x86_64
  mysql-community-common-8.0.35-1.el9.x86_64   mysql-community-icu-data-files-8.0.35-1.el9.x86_64
  mysql-community-libs-8.0.35-1.el9.x86_64     mysql-community-server-8.0.35-1.el9.x86_64

Complete!
```

```
ec2-user@ip-10-0-1-197.ap-south-1.compute.internal ~ (0.969s)
sudo systemctl status mysqld
● mysqld.service - MySQL Server
     Loaded: loaded (/usr/lib/systemd/system/mysqld.service; enabled; preset: disabled)
     Active: active (running) since Sun 2023-12-31 07:16:14 UTC; 4s ago
       Docs: man:mysqld(8)
             http://dev.mysql.com/doc/refman/en/using-systemd.html
   Main PID: 4915 (mysqld)
     Status: "Server is operational"
      Tasks: 38 (limit: 1114)
     Memory: 426.9M
        CPU: 5.869s
```

2.Connect to mysql using the command as follows,
mysql -h your-rds-dnsname -u admin -p

```
mysql -h   database-1.c5usk8ag8mpj.ap-south-1.rds.amazonaws.com -p  3306 -u admin  -p
Enter password:
ERROR 1049 (42000): Unknown database '3306'


ec2-user@ip-10-0-1-197.ap-south-1.compute.internal ~
mysql -h   database-1.c5usk8ag8mpj.ap-south-1.rds.amazonaws.com -u admin  -p
Enter password:
Welcome to the MySQL monitor.  Commands end with ; or \g.
Your MySQL connection id is 47
Server version: 8.0.35 Source distribution

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owners.

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

mysql>
```

3.For Creating Database, tables, Inserting Content into the tables, follow the attachedimages

```
mysql> create  database simpleDB ;
Query OK, 1 row affected (0.01 sec)

mysql> use simpleDB;
Database changed
mysql> CREATE TABLE CUSTOMERS (
    ->     ID INT NOT NULL,
    ->     NAME VARCHAR(20) NOT NULL,
    ->     AGE INT NOT NULL,
    ->     ADDRESS CHAR(25),
    ->     SALARY DECIMAL(18, 2),
    ->     PRIMARY KEY (ID)
    -> );
Query OK, 0 rows affected (0.02 sec)

mysql>
```

```
    ->     AGE INT NOT NULL,
    ->     ADDRESS CHAR(25),
    ->     SALARY DECIMAL(18, 2),
    ->     PRIMARY KEY (ID)
    -> );
Query OK, 0 rows affected (0.02 sec)

mysql> show  tables;
+--------------------+
| Tables_in_simpleDB |
+--------------------+
| CUSTOMERS          |
+--------------------+
1 row in set (0.01 sec)

mysql>
```

```
| Tables_in_sampleDB |
+--------------------+
| CUSTOMERS          |
+--------------------+
1 row in set (0.01 sec)

mysql> INSERT INTO CUSTOMERS (ID, NAME, AGE, ADDRESS, SALARY) VALUES (1, 'Ramesh', 32, 'Ahmedabad', 2000.00);
Query OK, 1 row affected (0.01 sec)

mysql> INSERT INTO CUSTOMERS (ID, NAME, AGE, ADDRESS, SALARY) VALUES (2, 'Khilan', 25, 'Delhi', 1500.00);
Query OK, 1 row affected (0.00 sec)

mysql> INSERT INTO CUSTOMERS (ID, NAME, AGE, ADDRESS, SALARY) VALUES (3, 'Kaushik', 23, 'Kota', 2000.00);
Query OK, 1 row affected (0.00 sec)

mysql> INSERT INTO CUSTOMERS (ID, NAME, AGE, ADDRESS, SALARY) VALUES (4, 'Chaitali', 25, 'Mumbai', 6500.00);
Query OK, 1 row affected (0.00 sec)

mysql> INSERT INTO CUSTOMERS (ID, NAME, AGE, ADDRESS, SALARY) VALUES (5, 'Hardik', 27, 'Bhopal', 8500.00);
Query OK, 1 row affected (0.00 sec)

mysql>
```

```
mysql> commit;
Query OK, 0 rows affected (0.01 sec)

mysql> select * form tables;
ERROR 1064 (42000): You have an error in your SQL syntax; ch
e 1
mysql> select * form customers;
ERROR 1064 (42000): You have an error in your SQL syntax; ch
line 1
mysql> select * form CUSTOMERS;
ERROR 1064 (42000): You have an error in your SQL syntax; ch
line 1
mysql> select * from CUSTOMERS;
+----+----------+-----+-----------+---------+
| ID | NAME     | AGE | ADDRESS   | SALARY  |
+----+----------+-----+-----------+---------+
|  1 | Ramesh   |  32 | Ahmedabad | 2000.00 |
|  2 | Khilan   |  25 | Delhi     | 1500.00 |
|  3 | Kaushik  |  23 | Kota      | 2000.00 |
|  4 | Chaitali |  25 | Mumbai    | 6500.00 |
|  5 | Hardik   |  27 | Bhopal    | 8500.00 |
+----+----------+-----+-----------+---------+
5 rows in set (0.01 sec)

mysql>
```

```
mysql> FLUSH PRIVILEGES;
Query OK, 0 rows affected (0.01 sec)

mysql> commit;
Query OK, 0 rows affected (0.01 sec)

mysql>
```

Creating a Lambda Function

1. Navigate to Lambda Function and create a function and copy the function in the attached document and make all the necessary changes **- Lambda Function for RDS DB.pdf**
2. You need to have aws-sdk libraries, if you want to execute lambda functions, we can install the aws-sdk using nom, For that go to your centos machine in which you have
nodejs and pm, create one folder in your CentOS and navigate into the folder and execute nom install aws-sdk and nom install mysql , You will get node modules and fewfiles, Create a Zip file for that folders and files. Using filezilla, send that zip file to your windows.
3. Add layers to your lambda functions. Navigate to layers and click on create layer
4. Give a layer name and upload that zip file which you have created before
5. Choose the run time as Nodejs16
6. In the lambda Configuration choose your VPC, Subnet, Security groups Which will makeyour lambda available at your VPC level,
7. In the lambda Configuration, In Permissions, make sure lambda has correct roles to access your Database, If not create a role and attach it to the lambda

Reference video:

references

AWS - Lambda - Layer Using Node.js
https://www.youtube.com/watch?v=flJ_cfQ53vQ&t=121s

Connect to MySQL on AWS RDS using NodeJS
https://www.youtube.com/watch?v=6Nt-Jl3CzxE&t=184s

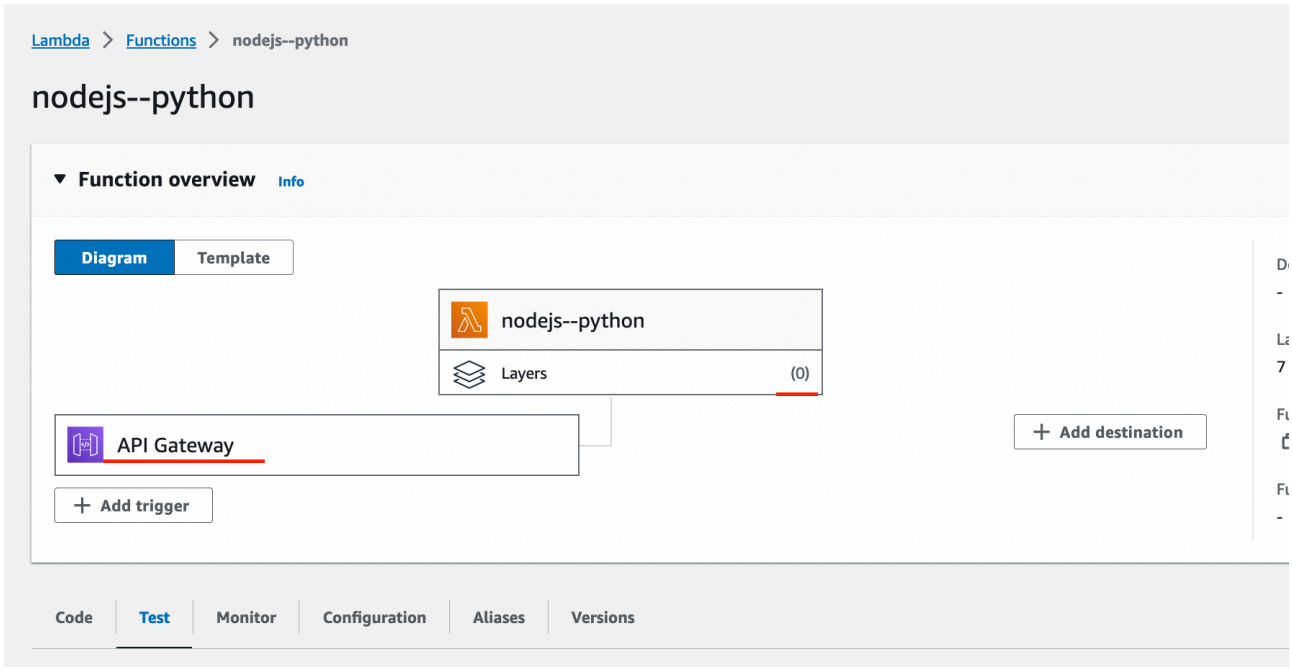
Lambda with AWS RDS Tutorial: Connecting to MySQL on Lambda using mysql-connector-python
https://www.youtube.com/watch?v=D2OrhX4XkXQ

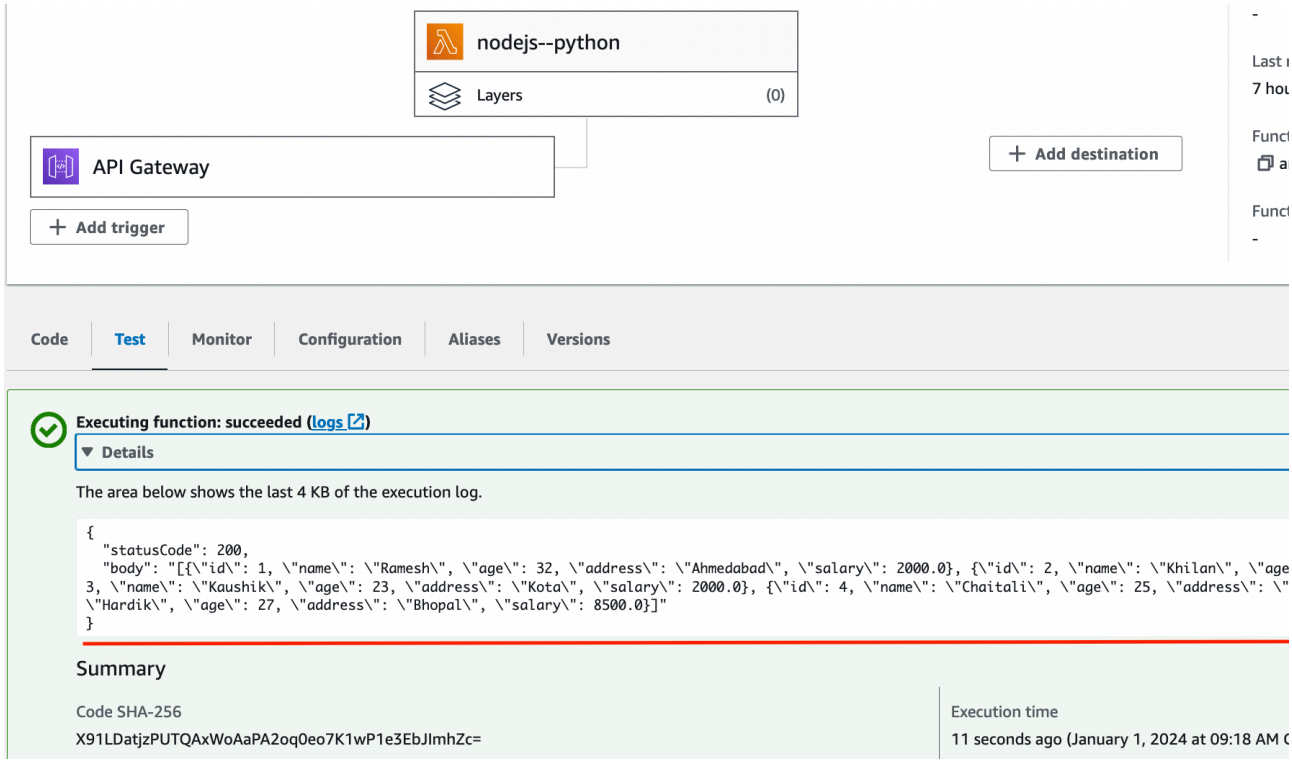
Private RDS Instance & AWS Lambda
https://www.youtube.com/watch?v=UgWjbSixRg4&t=474s

Installing npm modules in aws
https://www.youtube.com/watch?v=RnFowJ130pc&t=247s

For both the methord I have installed rerequested modules in host machine and transfered those files using FileZilla

Using python 3.10





Using nodejs 16x and nodejs 18x

lambdafunctionn