



Experiment 9

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Semester:5th

Date of Performance:29 Oct,2025

Subject Name:ADBMS

Subject Code:23CSP-333

Aim:

To understand and implement the creation and management of a relational database instance using **AWS RDS**, including setting up database connectivity (via pgAdmin or MySQL client), configuring security groups, and comparing RDS with EC2 database setups in terms of scalability, performance, and manageability.

Objective:

- To study the concept and features of **Amazon Web Services (AWS) Relational Database Service (RDS)**.
- To understand the **advantages of using RDS** over EC2 and on-premise database setups.
- To learn how to **create a database instance** on AWS RDS.
- To configure and manage **security groups** for secure database access.
- To learn how to **connect AWS RDS to local pgAdmin or MySQL client**.
- To explore various **RDS features** such as automated backups, monitoring, and scaling.
- To understand **Multi-AZ deployment, read replicas, and cross-region replication** for high availability.
- To gain hands-on experience in **launching and managing cloud-based databases** using AWS.

Theory:

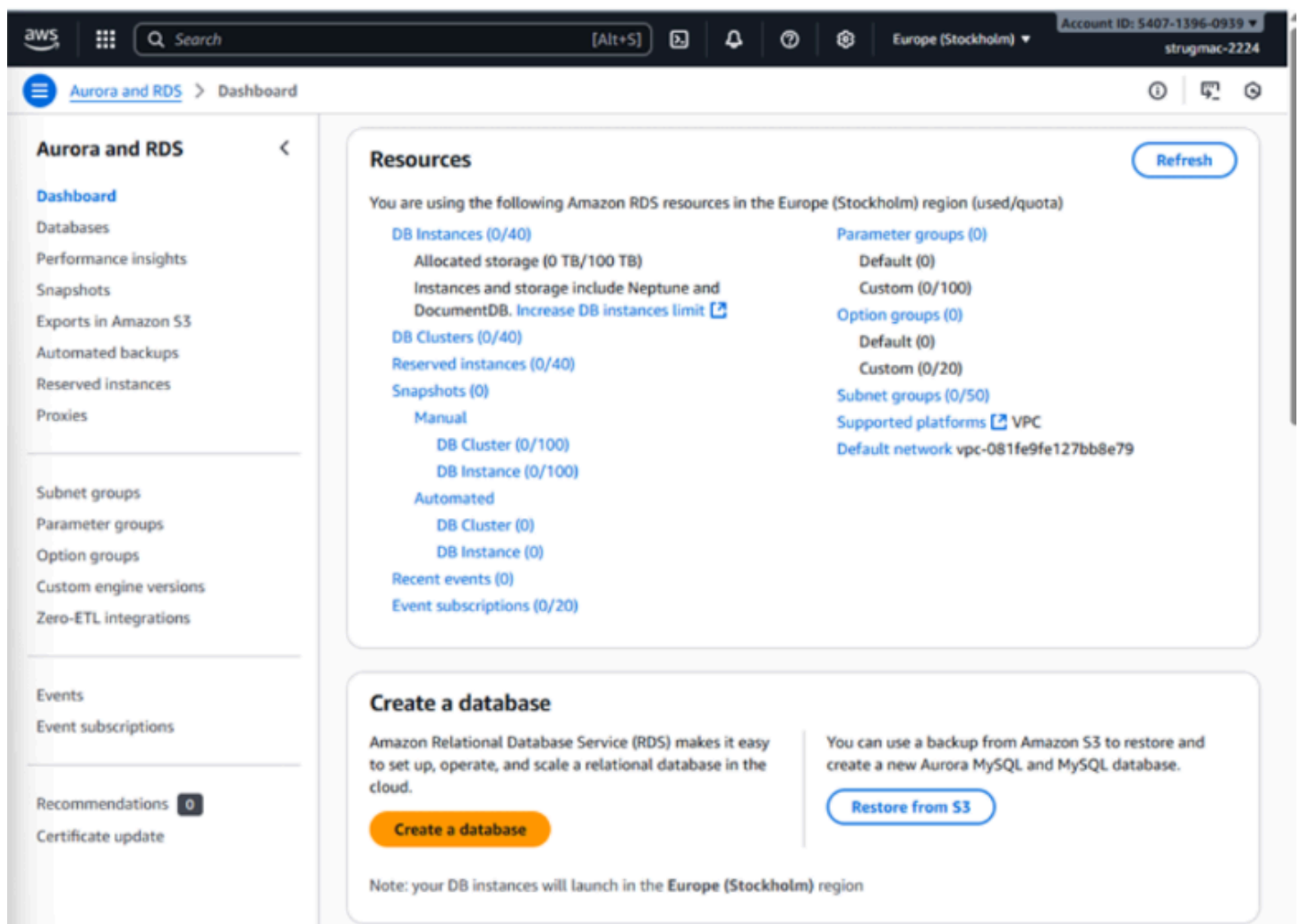
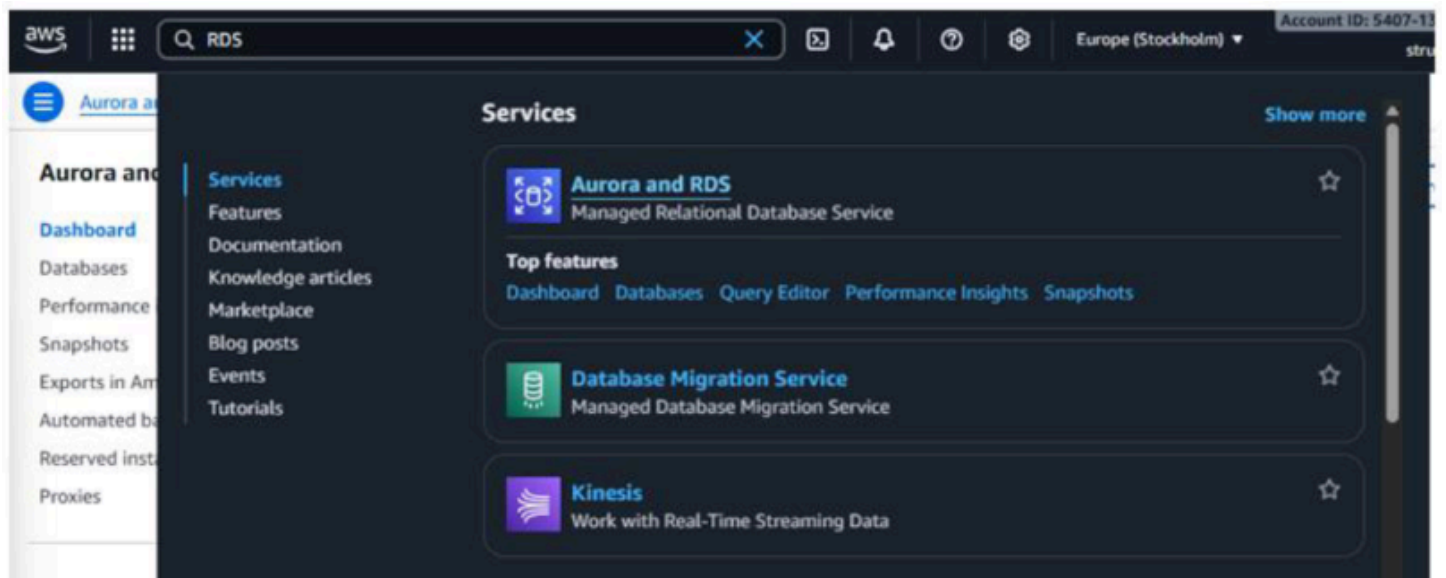
Amazon Web Services (AWS) Relational Database Service (RDS) is a **managed cloud database service** that simplifies the setup, operation, and scaling of relational databases. It automates key administrative tasks such as provisioning, patching, backups, and monitoring, allowing developers to focus on application logic rather than infrastructure management.

AWS RDS supports multiple database engines, including **MySQL, PostgreSQL, MariaDB, Oracle, and SQL Server**, and provides features like **automated backups, multi-AZ deployment**, and **read replicas** to ensure high availability and reliability. Security is managed through **IAM, KMS encryption**, and **VPC security groups**, which protect databases from unauthorized access.

Additionally, AWS RDS integrates with **CloudWatch** for performance monitoring and offers **storage auto-scaling** to handle growing data needs efficiently. Compared to running databases on EC2 instances, RDS provides greater scalability, reduced administrative overhead, and enhanced performance, making it a cost-effective and reliable choice for cloud-based database management.

Procedure:

- Log in to the AWS Management Console using your credentials.
- Search for and open the **RDS** service from the AWS dashboard.
- Click on **Create Database** to start a new RDS instance setup.
- Choose the **Standard Create** option for manual configuration.
- Select the required **database engine** (MySQL or PostgreSQL).
- Enter the **DB instance name**, **master username**, and **password**.
- Choose the **instance class** and configure **storage settings**.
- Enable **storage auto-scaling** if needed.
- Configure **VPC** and **security groups** for database connectivity.
- Set the database to be **publicly accessible** (if connecting locally).
- Enable **automated backups** and optional **Multi-AZ deployment**.
- Review all settings and click **Create Database**.
- Wait for the instance status to become **Available** in the RDS dashboard.
- Copy the **endpoint** (host name) of the created database.
- Open **pgAdmin** or **MySQL Workbench** on your local machine.
- Create a new connection using the endpoint, username, and password.
- If connection fails, modify **inbound rules** in the security group to allow your local IP.
- Test the connection and perform basic SQL operations to verify setup.



Create database [Info](#)

 **Free plan has access to limited features and resources**
The free plan limits the features and resources that are available for RDS and Aurora databases. Upgrade your account plan to remove all limitations. [Learn more](#)

[Upgrade plan](#)


Choose a database creation method


☐ **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.


Configuration


Engine type [Info](#)


☐ Aurora (MySQL Compatible)



☐ Aurora (PostgreSQL Compatible)


☐ MySQL


☒ PostgreSQL


☐ MariaDB


☐ Oracle


☐ Microsoft SQL Server


DB instance size

☐ Production
db.r7g.xlarge
4 vCPUs
32 GiB RAM
400 GiB
1.946 USD/hour

☐ Dev/Test
db.r7g.large
2 vCPUs
16 GiB RAM
200 GiB
0.278 USD/hour

☒ Free tier
db.t4g.micro
2 vCPUs
1 GiB RAM
20 GiB
0.019 USD/hour

DB instance identifier

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.

strugmac-DB

The DB instance identifier is case-insensitive, but is stored as all lowercase (as in "mydbinstance"). Constraints: 1 to 63 alphanumeric characters or hyphens. First character must be a letter. Can't contain two consecutive hyphens. Can't end with a hyphen.

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.

Credentials management

You can use AWS Secrets Manager or manage your master user credentials.

☐ Managed in AWS Secrets Manager - *most secure*
RDS generates a password for you and manages it throughout its lifecycle using AWS Secrets Manager.

☒ Self managed
Create your own password or have RDS create a password that you manage.

☐ Auto generate password

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

Master password [Info](#)

Password strength **Very strong**

Minimum constraints: At least 8 printable ASCII characters. Can't contain any of the following symbols: / ' * @

Confirm master password [Info](#)

▼ View default settings for Easy create

Easy create sets the following configurations to their default values, some of which can be changed later. If you want to change any of these settings now, use Standard create.

Configuration	Value	Editable after database is created
Encryption	Enabled	No
VPC	Default VPC (vpc-081fe9fe127bb8e79)	No
Multi-AZ	No	Yes
Option group	default:mysql-8-0	Yes
Subnet group	Create new DB Subnet Group	Yes
Automatic backups	Enabled	Yes
VPC security group	default	Yes
Publicly accessible	No	Yes
Database port	3306	Yes
DB instance identifier	strugmac-DB	Yes
DB engine version	8.0.42	Yes
DB parameter group	default.mysql8.0	Yes
Monitoring type	Database Insights - Standard	Yes
Performance insights	Not enabled	Yes
Monitoring	Enabled	Yes
Maintenance	Auto minor version upgrade enabled	Yes

 [Aurora and RDS](#) > [Databases](#)

Aurora and RDS

[Dashboard](#)

[Databases](#)

[Performance insights](#)

[Snapshots](#)

[Exports in Amazon S3](#)

[Automated backups](#)

[Reserved instances](#)

[Proxies](#)

[Subnet groups](#)

Creating database strugmac-db

[View connection details](#)

Your database might take a few minutes to launch. You can use settings from strugmac-db to simplify configuration of suggested database add-ons while we finish creating your DB for you.

Databases (1)



☒ Group resources

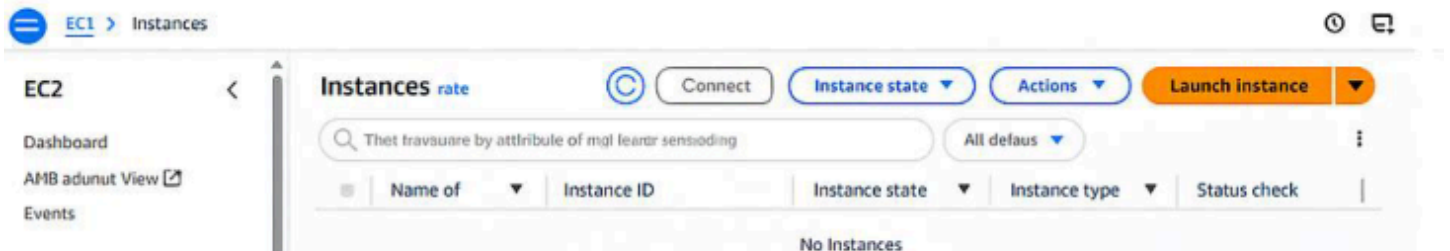
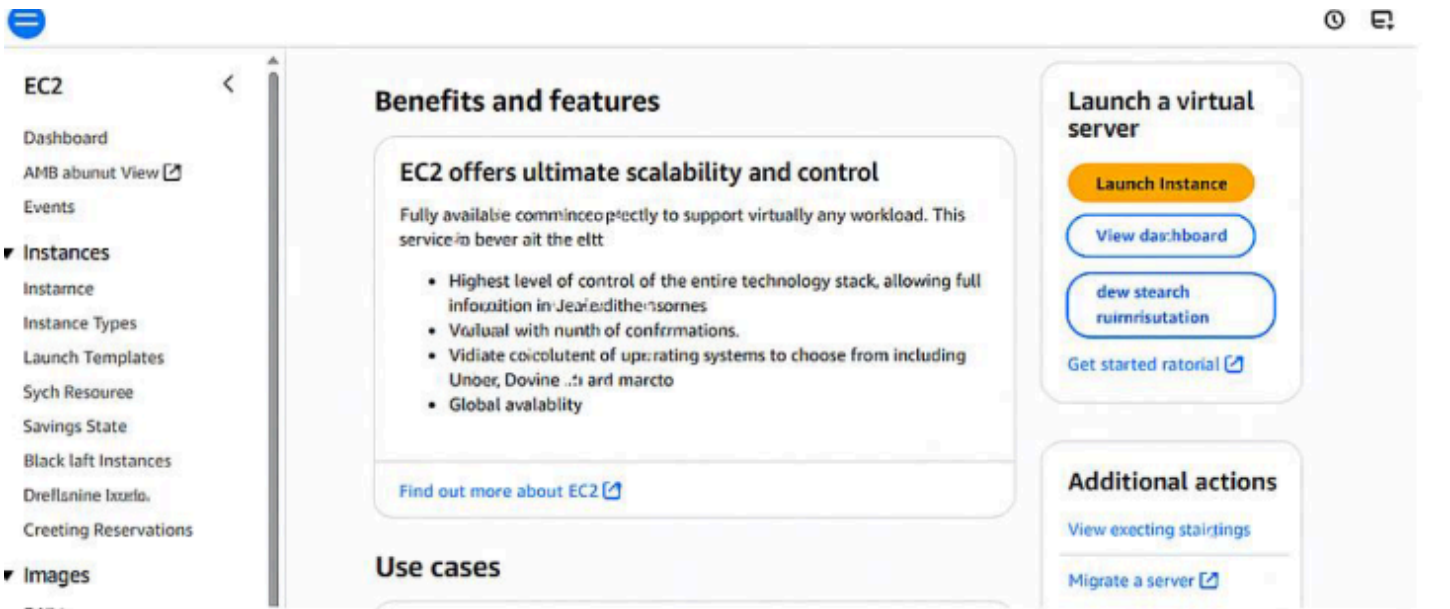
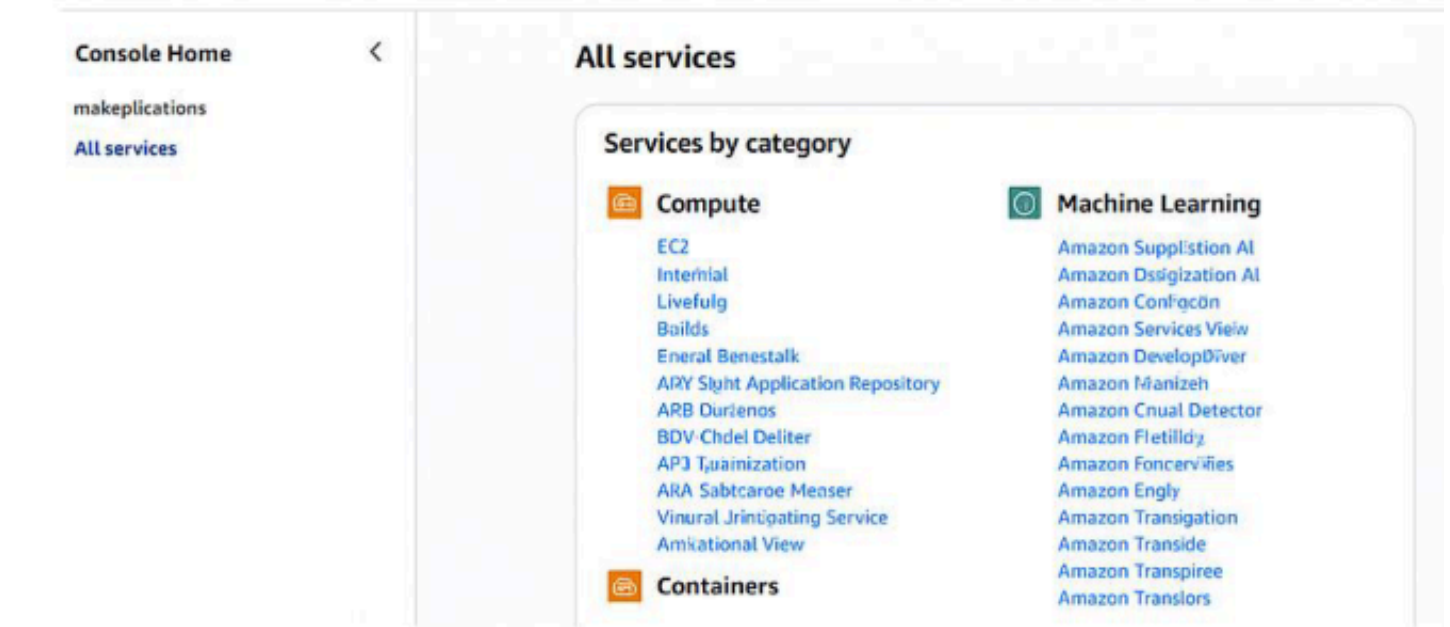
[Modify](#)

[Actions](#)

[Create database](#)

< 1 >

<input type="checkbox"/> DB identifier	Status	Role	Engine
 strugmac-db	 Creating	Instance	MySQL Co...



Application and OS Images (Amazon Machine Image)

An AMI contains operating systems, application servers, and applications that run on your instance. If you're still unsure, visit [AWS documentation](#) for more information.

Search our full catalog of AMIs including 1000s of applications and OS images



Amazon



Ubuntu

ubuntu

Windows



Red Hat



Debian



Key pair (login) [info](#)

You can use a key pair to securely connect to your instance. If you don't have access to the selected key pair you launch the instance.

Key pair recommended

Proceed without a key pair (Not recommended)

Default value ▶

▼ Network settings [info](#)

[Edit](#)

Network [info](#)

vpc-65f01/eh72teb7h9

Subnet [info](#)

No preference: (Default subnet in availability zone)

Auto-assign public IP [info](#)

Enable

Firewall (security groups) [info](#)

CloudFormation stacks have best control to protect from the instances. You must allow specific traffic to reach instances.

☐ Create security group

☒ Select existing security group

Common security groups [info](#)

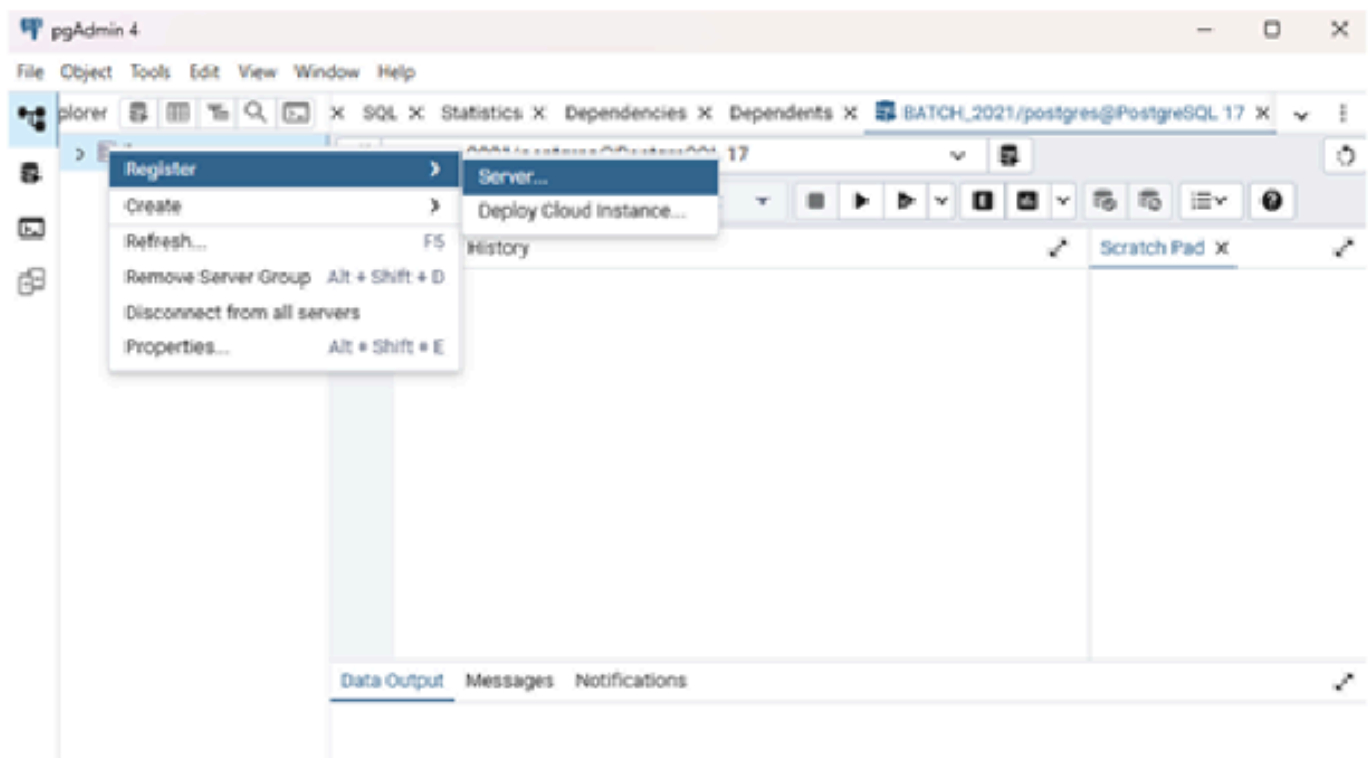
Select security groups

default - sg-0671ettb482425 ✕
default

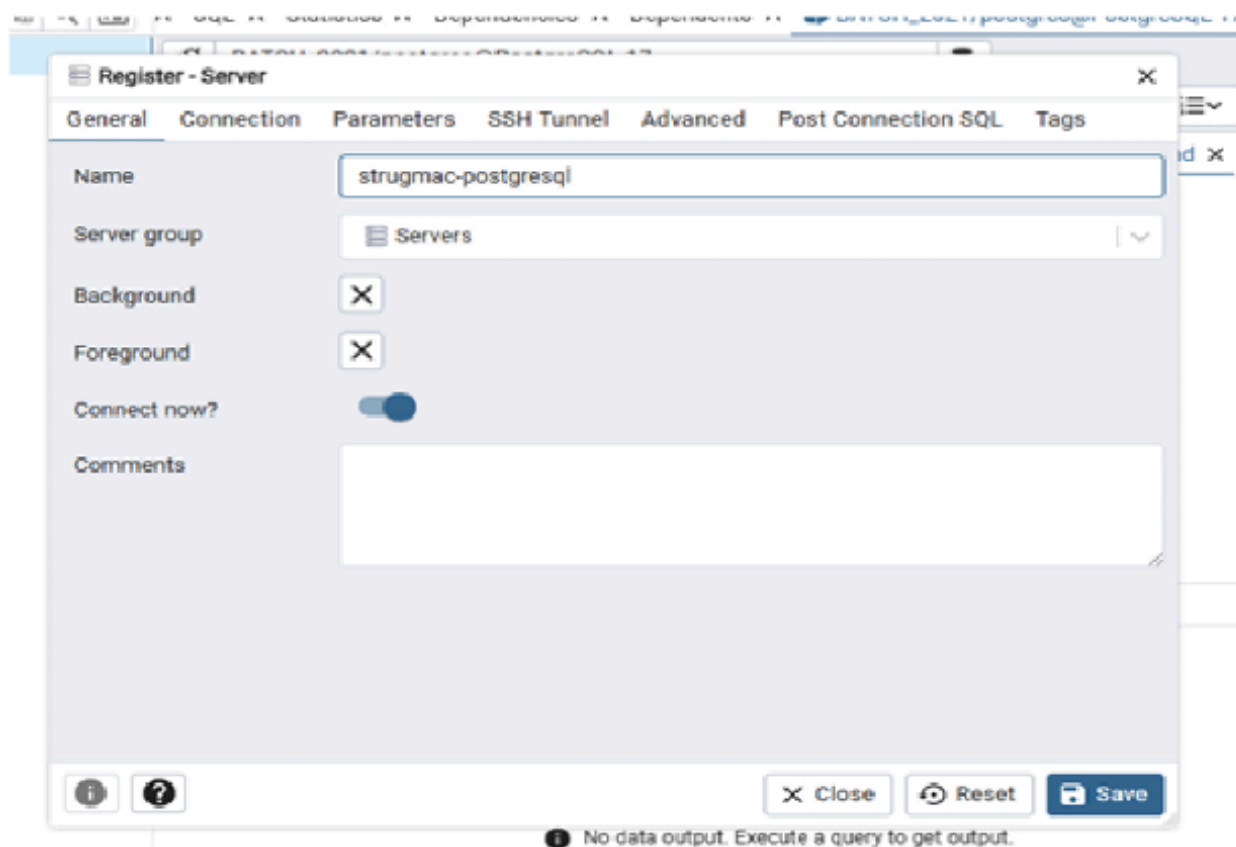
Security groups that you add or remove from will be added or removed from all your network interfaces.

▼ Summary

Number of instances: 1

[Cancel](#)[Launch instance](#)

Copy the API Endpoints from the dashboard of AWS RDS Database instance.



Register - Server

General

Connection

Parameters

SSH Tunnel

Advanced

Post Connection

SQL

Tags

Host name/address

strugmac-postgresql.czqk2qqwqtc0.eu-north-1.rds.am

Port

5432

Maintenance database

postgres

Username

postgres

Kerberos authentication?

☐

Password

.....

In edit mode the password field is enabled only if Save Password is set to

Save password?

☐

Role

!

?

Close

Reset

Save

No data output. Execute a query to get output.

legister - Server

✕

Host name/address

strugmac-postgresql.czqk2qgwqtc0.eu-north-1.rds

Port

5432

Maintenance database

postgres

?

?

✕ Close

↺ Reset

↻ Save

OK

1

No data output. Execute a query to get output.

Connectivity & security

Endpoint & port

Endpoint

struginacan-postgresql
Csa62qgwetq0.eu-north-1.rds.amazonaws.com

Port

5432

Networking

Availability Zone

eu-north-1c

VPC

vpc-081fe7e127Dbbe879

Subnet group

default-vpc-081fe7e127bb8e78

Subnets

subnet-00b10747db8495492

subnet-0a01f068807d8cecc

subnet-0f9ca2b66b9688f28

Security

VPC security groups

default-tsg-Ce937b74baff34225

Publicly accesible

No

Certificate authority

Info

ca:rs-rsa2048-g1

Certificate authority date

May 25, 2061, 03:20 (UTC-03:30)

Edit inbound rules

Learned 1 that report the trapping traffic, but not allowed to reach the instance.

Inbound rule Tab

Range time

Port range

Source - optional

Description - optional

sg-CBF5010110783ae0

All traffic

All

All

-

PodnetQLao

3-62

53

Range

226.51.100.173/57

Delete

Add rule

Cancel

Previous changes

Save rules

Learning Outcome:

- Understood the concept and functionality of **Amazon RDS (Relational Database Service)**.
- Learned how to **create and configure a database instance** on AWS RDS.
- Gained practical knowledge of **connecting AWS RDS with local pgAdmin/MySQL Workbench**.
- Understood how to **set up and modify VPC security groups** to manage inbound and outbound traffic.
- Learned to **edit inbound rules** to allow database access from specific IP addresses securely.
- Understood the importance of **network configuration and security** in cloud database management.
- Learned to **troubleshoot common connectivity errors** like “connection timeout expired.”
- Gained experience in **launching and configuring EC2 instances** for database connectivity.
- Understood **differences between databases on EC2 and AWS RDS** in terms of scalability and maintenance.
- Developed the ability to **deploy, manage, and secure cloud-based relational databases** effectively.