DEPARTMENT OF
COMPUTER SCIENCE & ENGINEERING

CU
CHANDIGARH UNIVERSITY

Discover. Learn. Empower.

Experiment - 9

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Semester: 5th	**Date of Performance:** 31 Oct, 2025
Subject Name: ADBMS	**Subject Code:** 23CSP-333

1. 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.

2. 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.

3. 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.

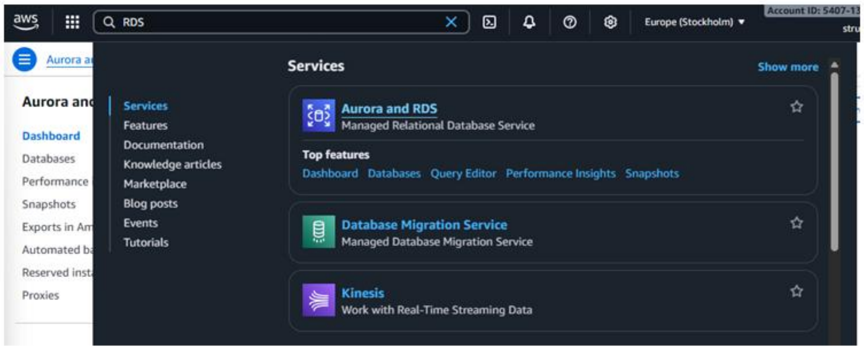
AWS RDS supports multiple database engines, including **MySQL, PostgreSQL, MariaDB, Oracle, and SQL Server**, and provides features like **automated backups**, **multi-AZ deployment**, and **read replicas** to ensure high availability and reliability. Security is managed through **IAM**, **KMS encryption**,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

4. 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.

5. Output:



Services

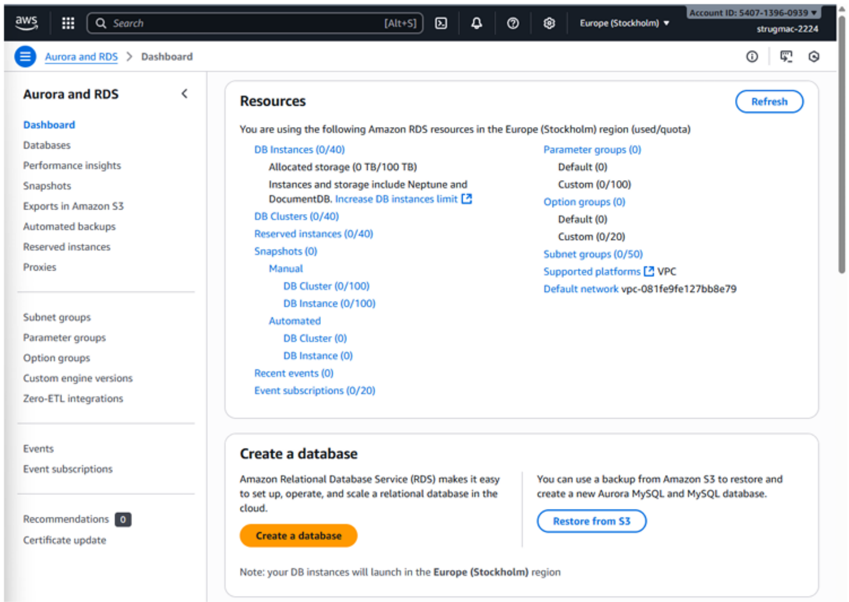
Show more

Aurora and RDS
Managed Relational Database Service

Top features
Dashboard Databases Query Editor Performance Insights Snapshots

Database Migration Service
Managed Database Migration Service

Kinesis
Work with Real-Time Streaming Data



Resources

Refresh

You are using the following Amazon RDS resources in the Europe (Stockholm) region (used/quota)

DB Instances (0/40)
  Allocated storage (0 TB/100 TB)
  Instances and storage include Neptune and DocumentDB. Increase DB instances limit
DB Clusters (0/40)
Reserved instances (0/40)
Snapshots (0)
  Manual
    DB Cluster (0/100)
    DB Instance (0/100)
  Automated
    DB Cluster (0)
    DB Instance (0)
Recent events (0)
Event subscriptions (0/20)

Parameter groups (0)
  Default (0)
  Custom (0/100)
Option groups (0)
  Default (0)
  Custom (0/20)
Subnet groups (0/50)
Supported platforms VPC
Default network vpc-081fe9fe127bb8e79

Create a database

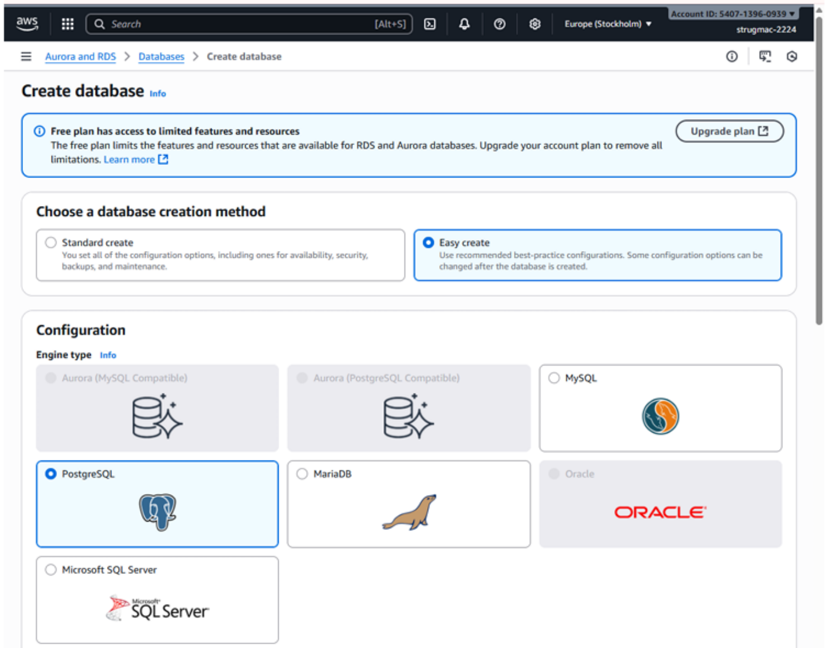
Amazon Relational Database Service (RDS) makes it easy to set up, operate, and scale a relational database in the cloud.

Create a database

You can use a backup from Amazon S3 to restore and create a new Aurora MySQL and MySQL database.

Restore from S3

Note: your DB instances will launch in the **Europe (Stockholm)** region


aws
Search [Alt+S]
Europe (Stockholm) ▾
Account ID: 5407-1396-0939 ▾
strugmac-2224
Aurora and RDS > Databases > Create database
ORACLE
SQL Server

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

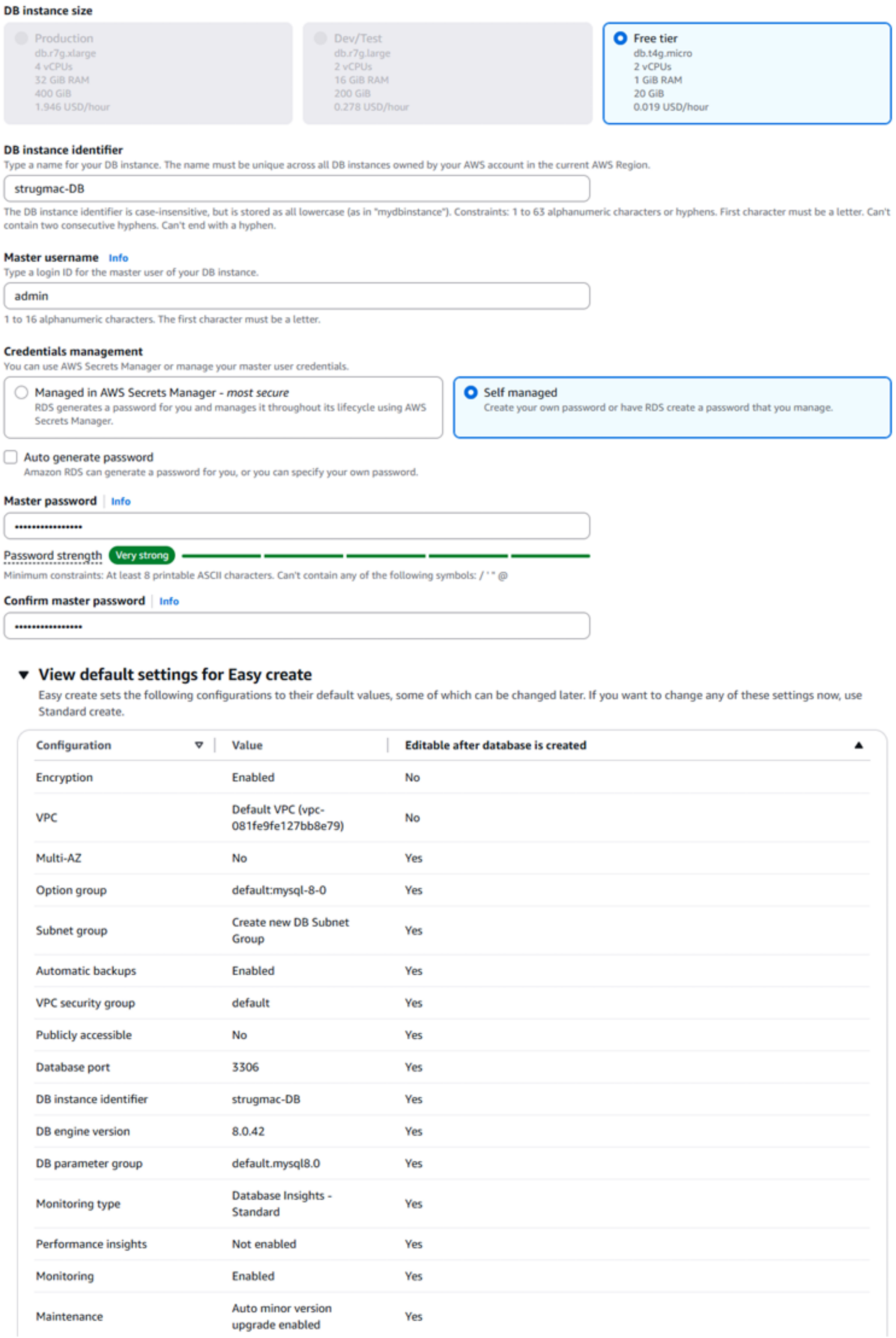
○ Standard create
You set all of the configuration options, including ones for availability, security, backups, and maintenance.

● 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: / ' " @

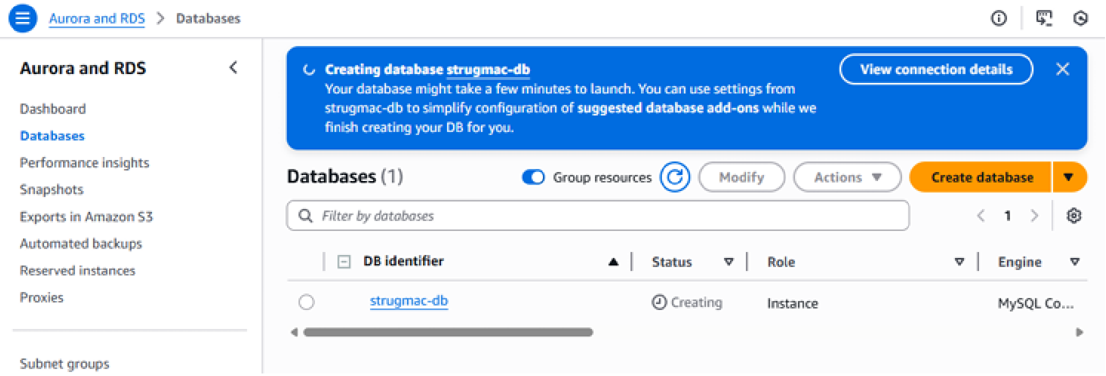
Confirm master password | Info

••••••••••••••••

▼ 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.

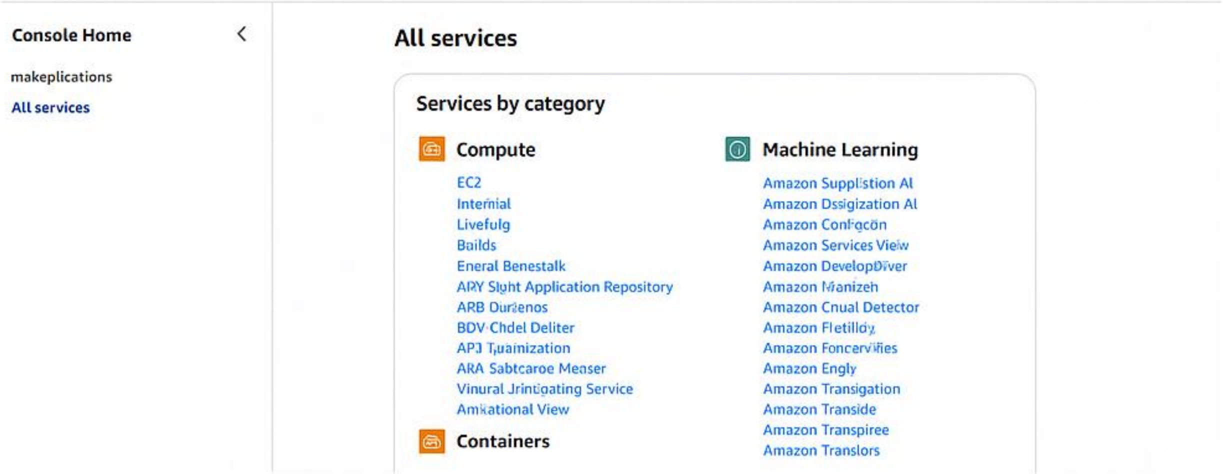
Configuration	Value	Editable after database is created
Encryption	Enabled	No
VPC	Default VPC (vpc-081fe9fe127bb8e79)	No
Multi-AZ	No	Yes
Option group	default:mysql-8-0	Yes
Subnet group	Create new DB Subnet Group	Yes
Automatic backups	Enabled	Yes
VPC security group	default	Yes
Publicly accessible	No	Yes
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



Creating database strugmac-db
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)

	DB identifier	Status	Role	Engine
○	strugmac-db	Creating	Instance	MySQL Co...



All services

Services by category

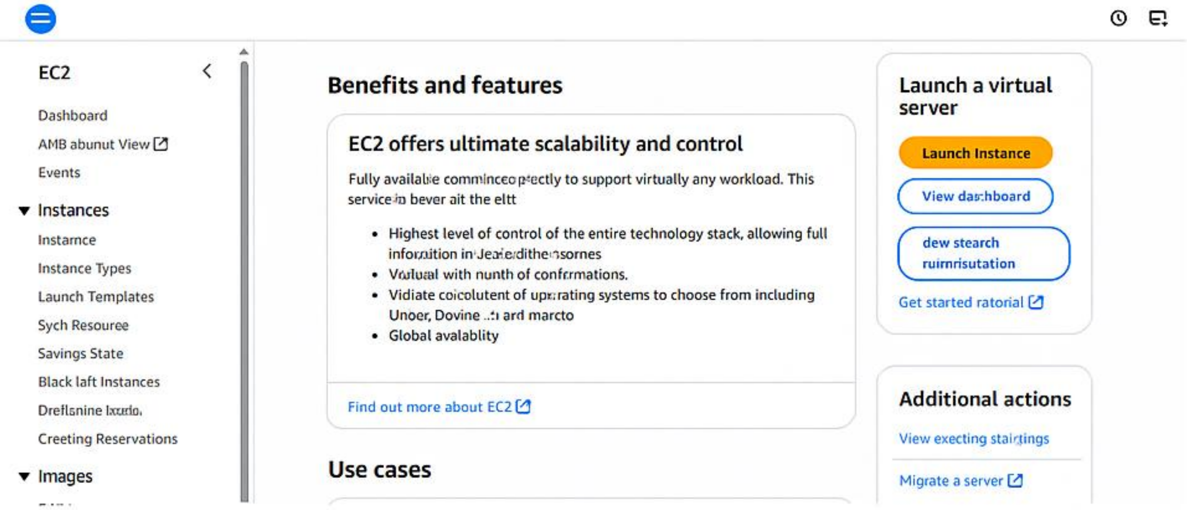
Compute

- EC2
- Interñial
- Livefulg
- Bailds
- Eneral Benestalk
- ARY Slght Application Repository
- ARB Durlenos
- BDV Chdel Deliter
- APJ Tjuainization
- ARA Sabtcaroe Measer
- Vinural Jrintigating Service
- Amkational View

Containers

Machine Learning

- Amazon Supplistion Al
- Amazon Dssigization Al
- Amazon Confgcön
- Amazon Services Vielw
- Amazon DevelopDiver
- Amazon Manizeh
- Amazon Cnual Detector
- Amazon Fletilldy
- Amazon Foncervifies
- Amazon Engly
- Amazon Transigation
- Amazon Transide
- Amazon Transpiree
- Amazon Translors



Benefits and features

EC2 offers ultimate scalability and control

Fully availabie comminceo pectly to support virtually any workload. This service in bever ait the eltt

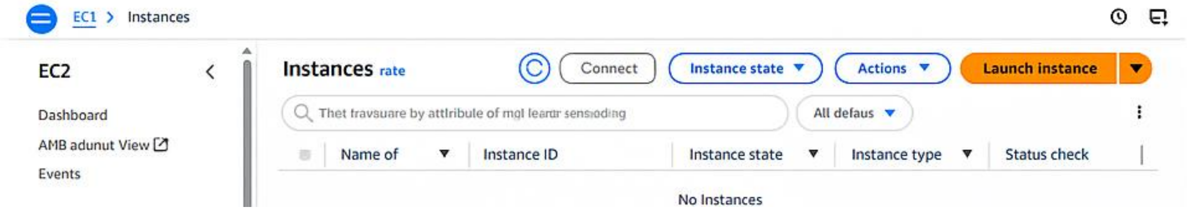
- Highest level of control of the entire technology stack, allowing full inforaition in Jeaierdithe sornes
- Vuluual with nunth of confrmations.
- Vidiate coicolutent of upsrating systems to choose from including Unoer, Dovine ..n ard marcto
- Global avalablity

Find out more about EC2

Use cases

Launch a virtual server

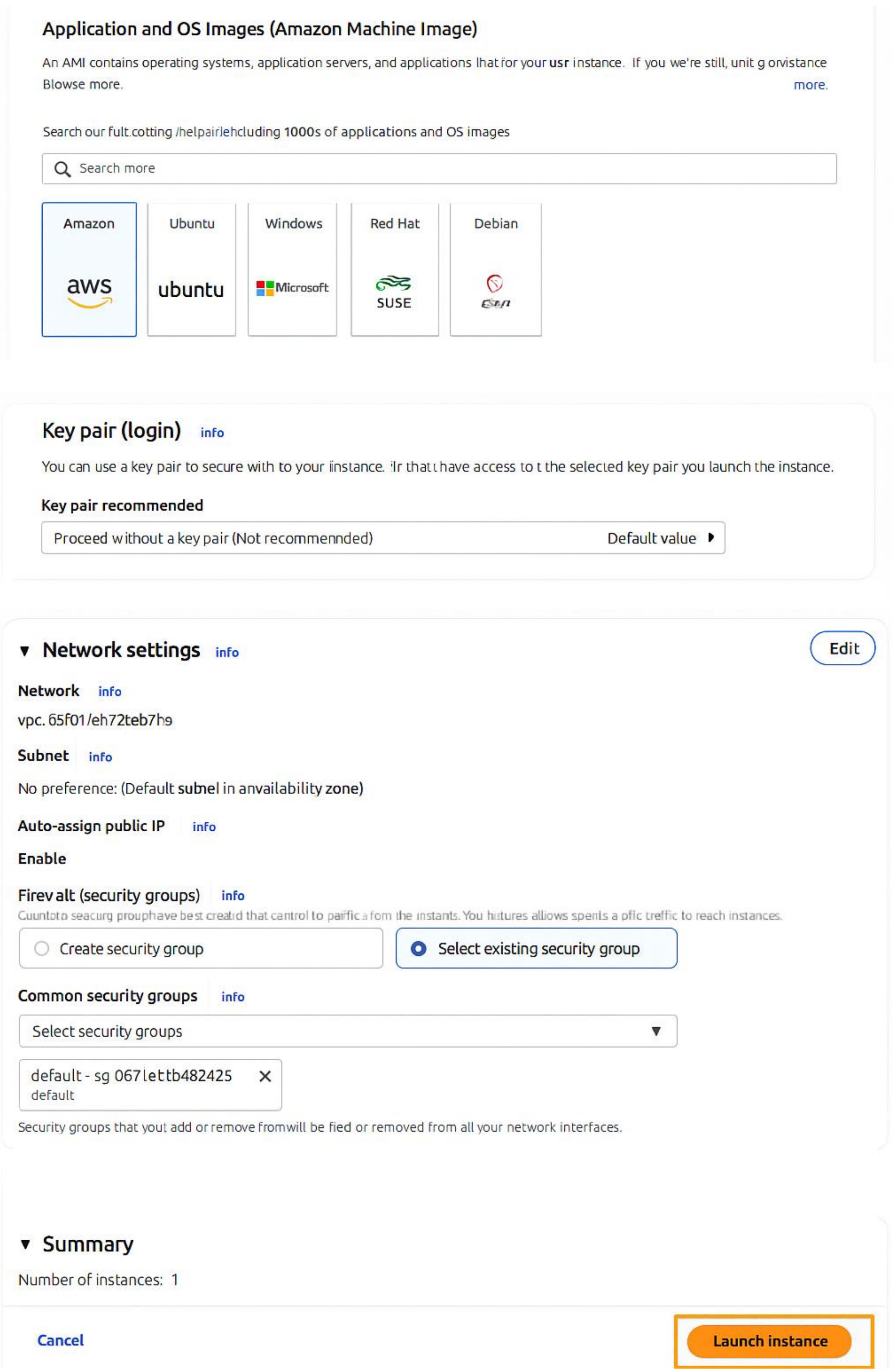
Additional actions



Instances rate

	Name of ▼	Instance ID	Instance state ▼	Instance type ▼	Status check

No Instances



Application and OS Images (Amazon Machine Image)

An AMI contains operating systems, application servers, and applications lhat for your **usr** instance. If you we're still, unit g orvistance Blowse more. more.

Search our fult.cotting /helpairlehcluding **1000s** of applications and OS images

Search more

Key pair (login) info

You can use a key pair to secure with to your iinstance. 'Ir thatι have access to t the seleclcd key pair you launch the instance.

Key pair recommended

Proceed without a key pair (Not recommennded) Default value ▸

▼ Network settings info

Edit

Network info

vpc. 65f01/eh72teb7h9

Subnet info

No preference: (Default **subnel** in availability **zone)**

Auto-assign public IP info

Enable

Firev alt (security groups) info

Cuuntoto seacurg prouphave best creatid that cantrol to paific a fom the instants. You histures allows spenls a pfic treffic to reach instances.

○ Create security group

● Select existing security group

Common security groups info

Select security groups ▼

default - sg 067lettb482425 ✕
default

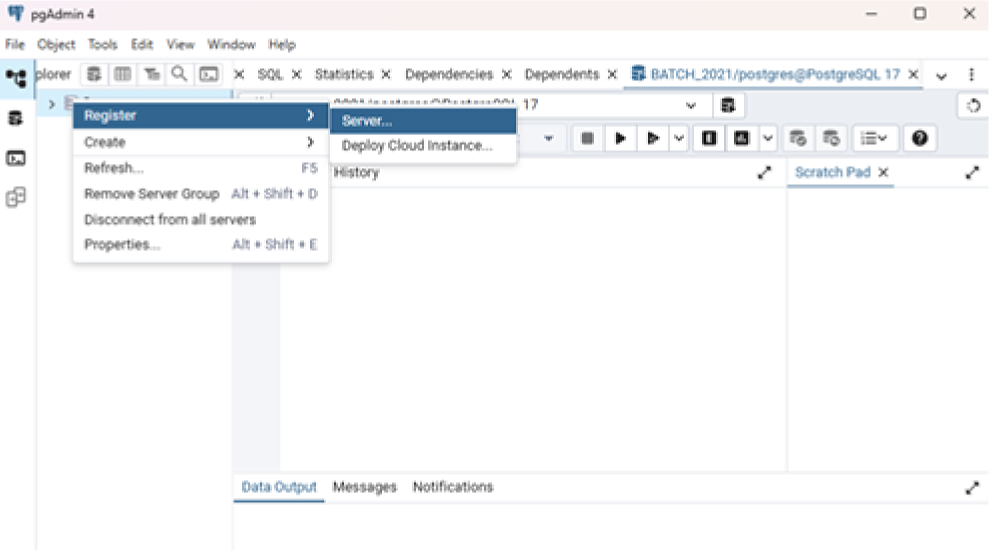
Security groups that yout add or remove fromwill be fied or removed from all your network interfaces.

▼ Summary

Number of instances: 1

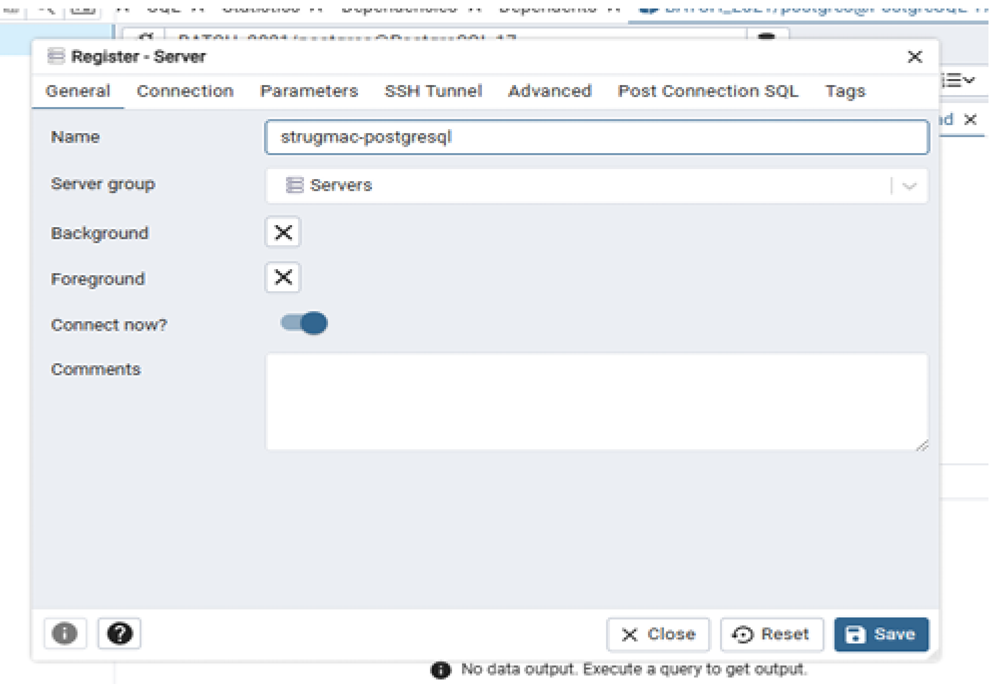
Cancel

Launch instance



pgAdmin 4
File Object Tools Edit View Window Help
plorer
SQL Statistics Dependencies Dependents BATCH_2021/postgres@PostgreSQL 17
Register
Server...
Deploy Cloud Instance...
Create
Refresh... F5
Remove Server Group Alt + Shift + D
Disconnect from all servers
Properties... Alt + Shift + E
History
Scratch Pad
Data Output Messages Notifications

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



Register - Server
General Connection Parameters SSH Tunnel Advanced Post Connection SQL Tags
Close Reset Save

Name: strugmac-postgresql

Server group: Servers

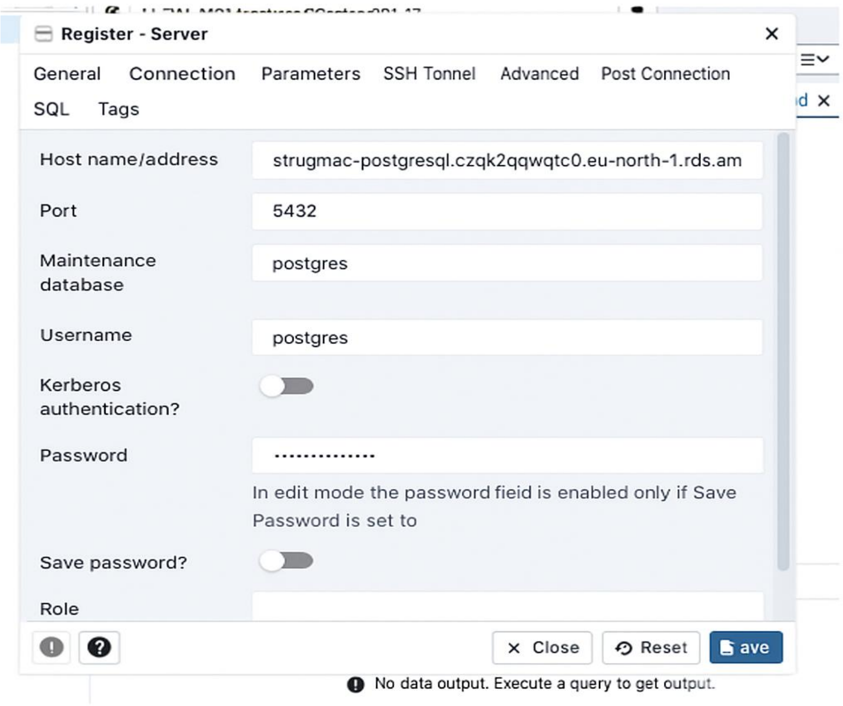
Background: ☒

Foreground: ☒

Connect now? ●

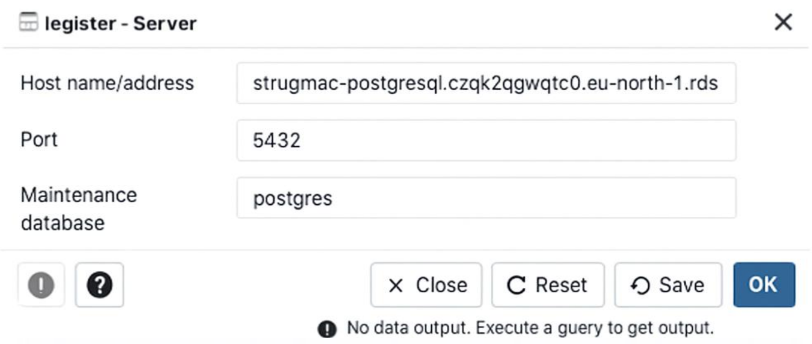
Comments:

No data output. Execute a query to get output.



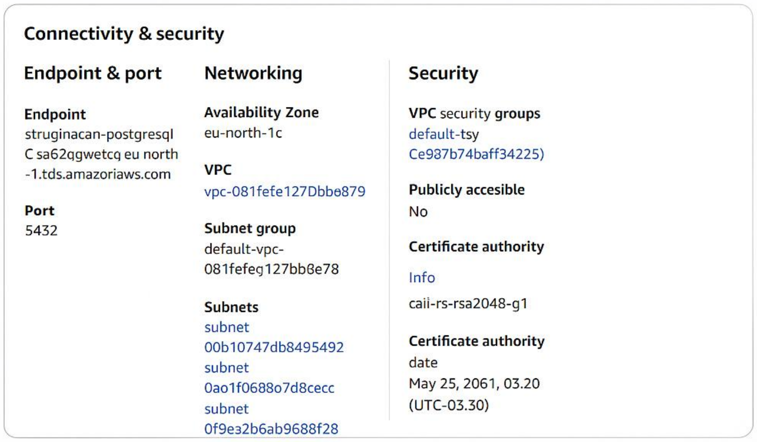
Host name/address	strugmac-postgresql.czqk2qqwqtc0.eu-north-1.rds.am
Port	5432
Maintenance database	postgres
Username	postgres
Kerberos authentication?	○
Password	··············
	In edit mode the password fieid is enabled only if Save Password is set to
Save password?	○
Role	

No data output. Execute a query to get output.



Host name/address	strugmac-postgresql.czqk2qgwqtc0.eu-north-1.rds
Port	5432
Maintenance database	postgres

No data output. Execute a guery to get output.



Connectivity & security

Endpoint & port

Endpoint
struginacan-postgresql
C sa62qgwetcq eu north
-1.tds.amazoriaws.com

Port
5432

Networking

Availability Zone
eu-north-1c

VPC
vpc-081fefe127Dbbe879

Subnet group
default-vpc-
081fefeg127bb8e78

Subnets
subnet
00b10747db8495492
subnet
0ao1f0688o7d8cecc
subnet
0f9ea2b6ab9688f28

Security

VPC security **groups**
default-tsy
Ce987b74baff34225)

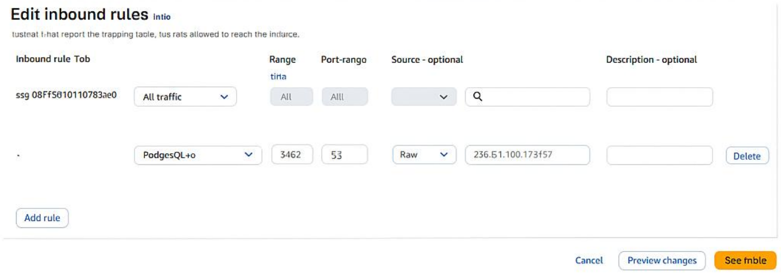
Publicly accesible
No

Certificate authority

Info

caii-rs-rsa2048-g1

Certificate authority
date
May 25, 2061, 03.20
(UTC-03.30)



Edit inbound rules Intio

tusteat i-hat report the trapping taole, tus rats allowed to reach the indurce.

Inbound rule Tob		Range tiна	Port-rango	Source - optional		Description - optional	
ssg 08FfS810110783ae0	All traffic	All	Alll				
·	PodgesQL+o	3462	53	Raw	236.51.100.173f57		Delete

6. Learning Outcomes:

- 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.