



DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

Discover. Learn. Empower.

Experiment - 9

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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:

The image consists of three vertically stacked screenshots of the AWS Aurora and RDS service interface.

Screenshot 1: Services Overview

This screenshot shows the main services page under the "Aurora and RDS" section. It features a sidebar with links like "Dashboard", "Databases", "Performance", "Snapshots", "Exports in Amazon S3", "Automated backups", "Reserved instances", and "Proxies". The main content area displays three cards: "Aurora and RDS" (Managed Relational Database Service), "Database Migration Service" (Managed Database Migration Service), and "Kinesis" (Work with Real-Time Streaming Data). Each card includes a "Top features" section with links to "Dashboard", "Databases", "Query Editor", "Performance Insights", and "Snapshots".

Screenshot 2: Dashboard

This screenshot shows the "Dashboard" page for Aurora and RDS. The left sidebar lists "Dashboard", "Databases", "Performance insights", "Snapshots", "Exports in Amazon S3", "Automated backups", "Reserved instances", "Proxies", "Subnet groups", "Parameter groups", "Option groups", "Custom engine versions", and "Zero-ETL integrations". The main content area is titled "Resources" and shows usage statistics for DB Instances, DB Clusters, Reserved instances, Snapshots, and other resources. It also includes sections for "Create a database" (with "Create a database" and "Restore from S3" buttons) and a note about launching instances in the Europe (Stockholm) region.

Screenshot 3: Create database

This screenshot shows the "Create database" page. It starts with a note about the free plan limitations and a "Upgrade plan" button. The next section, "Choose a database creation method", offers two options: "Standard create" (which allows full configuration) and "Easy create" (which uses recommended configurations). The "Configuration" section allows selecting the engine type: PostgreSQL (selected), Aurora (MySQL Compatible), MySQL, MariaDB, Oracle, and Microsoft SQL Server. Each engine has a corresponding icon and a brief description.

DB instance size
<input type="radio"/> Production db.r7g.xlarge 4 vCPUs 32 GB RAM 400 GB 1.946 USD/hour
<input type="radio"/> Dev/Test db.r7g.large 2 vCPUs 16 GB RAM 200 GB 0.278 USD/hour
<input checked="" type="radio"/> Free tier db.t4g.micro 2 vCPUs 1 GB RAM 20 GB 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

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)		Group resources	Actions	Create database
<input type="text"/> Filter by databases				
DB identifier	Status	Role	Engine	MySQL Co...
strugmac-db	Creating	Instance		

All services

Services by category

- Compute**
 - EC2
 - Internal
 - Livefulg
 - Balids
 - Ereral Benestalk
 - ARY Slight Application Repository
 - ARB Durienos
 - BDV Chdel Deliter
 - APJ Tuaamization
 - ARA Sabtcareo Measer
 - Vinural Jrintgating Service
 - Amikational View
- Containers**
- Machine Learning**
 - Amazon Suppligion Al
 - Amazon Dssigization Al
 - Amazon Confecón
 - Amazon Services View
 - Amazon DevelopDiver
 - Amazon Manizeh
 - Amazon Cnual Detector
 - Amazon Fletilldy
 - Amazon Fonceriviles
 - Amazon Engly
 - Amazon Transigation
 - Amazon Transide
 - Amazon Transpree
 - Amazon Translors

EC2

Dashboard

AMB abunut View

Events

Instances

Instance

Instance Types

Launch Templates

Sych Resource

Savings State

Black laft Instances

Drellsnine Ixurlo,

Creating Reservations

Images

EC2 > Instances

Benefits and features

EC2 offers ultimate scalability and control

Fully available comminceopately to support virtually any workload. This service in never alt the elt

- Highest level of control of the entire technology stack, allowing full information in Jeacidititones
- Virtual with mutch of confrrmations.
- Widec cololutent of upraring systems to choose from including Unoer, Dovine ..i arl marco
- Global availability

[Find out more about EC2](#)

Use cases

Launch a virtual server

[Launch Instance](#)

[View dashboard](#)

[dew stearch](#)

[ruimrisutat](#)

[Get started ratorial](#)

Additional actions

[View existing startings](#)

[Migrate a server](#)

Instances

Connect

Instance state

Actions

Launch instance

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 that for your `usr` instance. If you we're still, unit g orvistance
Browse more.

Search our full catalog /helpairlecluding 1000s of applications and OS images

Search more



Key pair (login) info

You can use a key pair to secure with to your instance. If that have access to t the selected key pair you launch the instance.

Key pair recommended

Proceed without a key pair (Not recommended)

Default value ▾

Edit

▼ Network settings info

Network info

vpc.65f01/eh72teb7hs

Subnet info

No preference: (Default subnet in availability zone)

Auto-assign public IP info

Enable

Fire alt (security groups) info

Create to securg proup have best created that control to parfica from the instants. You hitures allows spepls a pfic traffic to reach instances.

Create security group

Select existing security group

Common security groups info

Select security groups

default - sg 067le7tb482425 X

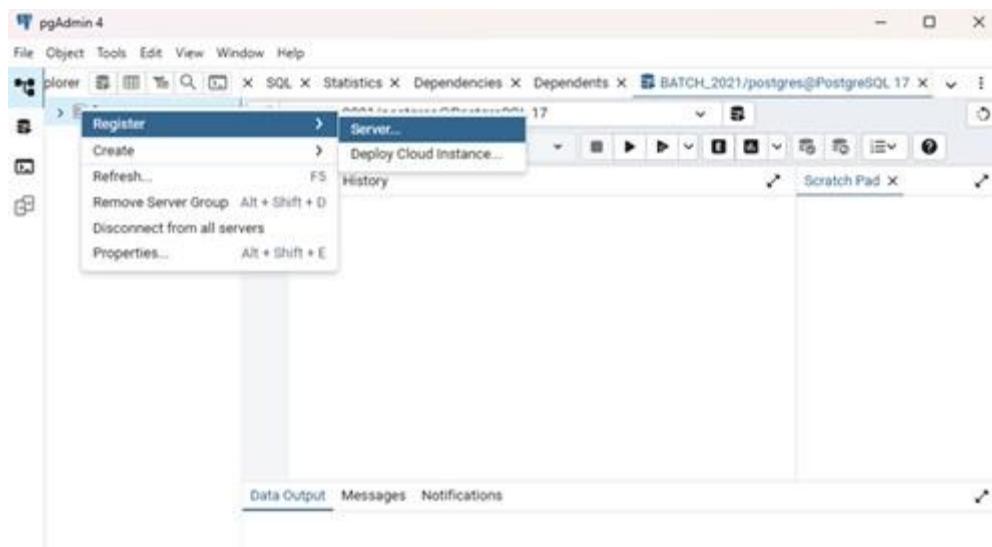
Security groups that you add or remove from will be fied or removed from all your network interfaces.

▼ Summary

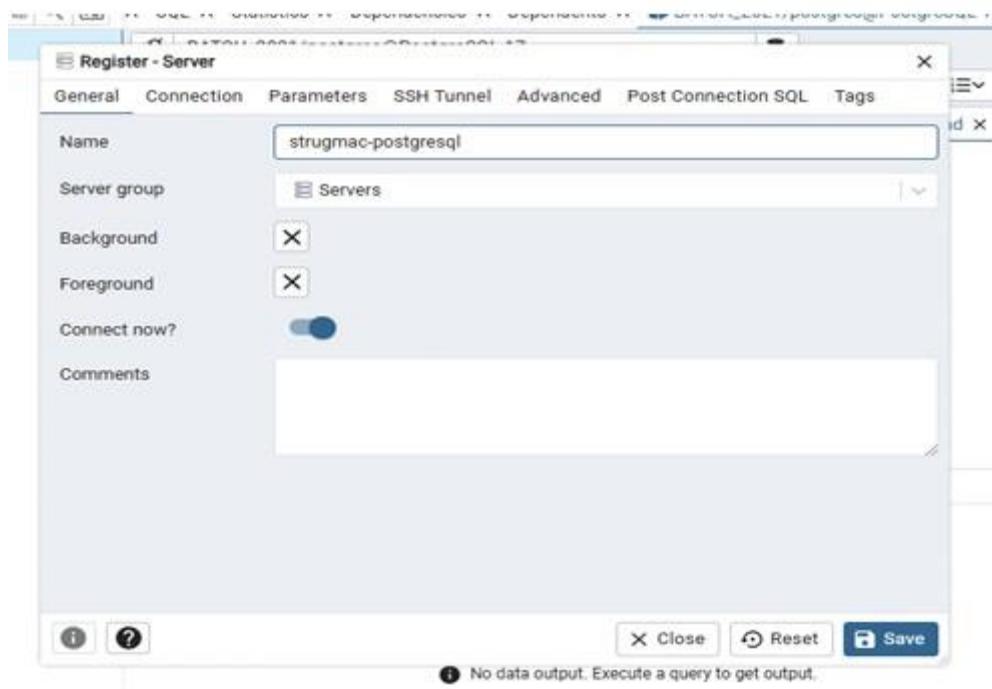
Number of instances: 1

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?	<input checked="" type="checkbox"/>
Password
In edit mode the password field is enabled only if Save Password is set to	
Save password?	<input checked="" type="checkbox"/>
Role	

Close Reset Save

No data output. Execute a query to get output.

legister - Server

Host name/address	strugmac-postgresql.czqk2gqwqtco.eu-north-1.rds		
Port	5432		
Maintenance database	postgres		

X Close
C Reset
↻ Save
OK

! No data output. Execute a query to get output.

Connectivity & security

Endpoint & port	Networking	Security
Endpoint strugmacan-postgresql Csa62gqwetcq eu north-1.tds.amazonaws.com	Availability Zone eu-north-1c	VPC security groups default-tsy Ce987b74baff34225)
Port 5432	VPC vpc-081fefe127dbbe879	Publicly accessible No
	Subnet group default-vpc-081fefef127bb8e78	Certificate authority Info caii-rs-rsa2048-q1
	Subnets subnet 00b10747db8495492 subnet 0ao1f0688o7d8cecc subnet 0f9ea2b6ab9688f28	Certificate authority date May 25, 2061, 03.20 (UTC-03.30)

Edit inbound rules Info

trust me, I have report the trapping table, this rule allowed to reach the instance.

Inbound rule	Range	Port-range	Source - optional	Description - optional
ssg 08FF5010110783e0	All traffic	All	All	

PodgesQL+o
3462
53
Raw
236.51.100.173:57
Delete

Add rule

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.