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Department of Computer Science & Engineering

EXPERIMENT: 9

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SECTION : KRG_2A **SEMESTER**: 5TH
SUBJECT CODE: 23CSP-339 **SUBJECT** : ADBMS

Problem Statement:

- To design and interact with cloud-based data storage systems using AWS RDS.
- Connect it with local database from your system.

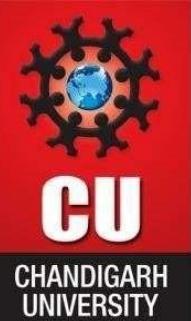
Hardware/Software Requirements

Component	Specification
Hardware	Personal computer
Cloud Services	AWS RDS
Tools	PGAdmin
Languages	PostgreSQL
OS	Windows

Steps:

- i) Go to aws homepage -> click on sign in-> enter user name with email address.
- ii) After sign-in -> go to search bar -> search for rds -> hit enter.

The screenshot shows the AWS RDS service page. At the top, there is a search bar with 'RDS' typed into it. Below the search bar, there is a navigation bar with icons for search, refresh, notifications, help, and region selection ('Europe (Stockholm)'). On the left side, there is a sidebar with links for 'Services', 'Features', 'Documentation', 'Knowledge articles', 'Marketplace', 'Blog posts', 'Events', and 'Tutorials'. The main content area is titled 'Services' and shows three services: 'Aurora and RDS' (Managed Relational Database Service), 'Database Migration Service' (Managed Database Migration Service), and 'Kinesis' (Work with Real-Time Streaming Data). Each service has a small icon, a title, a description, and a star icon for favoriting.



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Aurora and RDS > Dashboard

Resources

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

DB Instances (0/40)	Parameter groups (0)
Allocated storage (0 TB/100 TB)	Default (0)
Instances and storage include Neptune and DocumentDB. Increase DB instances limit ↗	Custom (0/100)
DB Clusters (0/40)	Option groups (0)
Reserved instances (0/40)	Default (0)
Snapshots (0)	Custom (0/20)
Manual	Subnet groups (0/50)
DB Cluster (0/100)	Supported platforms ↗ VPC
DB Instance (0/100)	Default network vpc-081fe9fe127bb8e79
Automated	
DB Cluster (0)	
DB Instance (0)	
Recent events (0)	
Event subscriptions (0/20)	

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

iii) Click on create database.

Aurora and RDS > Databases > Create database

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

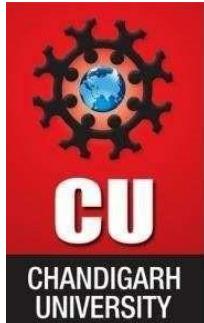
Standard create
You set all of the configuration options, including ones for availability, security, backups, and maintenance.

Easy create
Use recommended best-practice configurations. Some configuration options can be changed after the database is created.

Configuration

Engine type [Info](#)

<input type="radio"/> Aurora (MySQL Compatible) 	<input type="radio"/> Aurora (PostgreSQL Compatible) 	<input type="radio"/> MySQL
<input checked="" type="radio"/> PostgreSQL 	<input type="radio"/> MariaDB 	<input type="radio"/> Oracle
<input type="radio"/> Microsoft SQL Server 		



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- iv) In the standalone create, we can set everything for our database, the incoming traffic, ip addresses to be used, backup.

DB instance size

<input type="radio"/> Production db.r7g.xlarge 4 vCPUs 32 GiB RAM 400 GiB 1,946 USD/hour	<input type="radio"/> Dev/Test db.r7g.large 2 vCPUs 16 GiB RAM 200 GiB 0.278 USD/hour	<input checked="" type="radio"/> 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.

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.

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.

<input type="radio"/> Managed in AWS Secrets Manager - <i>most secure</i> RDS generates a password for you and manages it throughout its lifecycle using AWS Secrets Manager.	<input checked="" type="radio"/> 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



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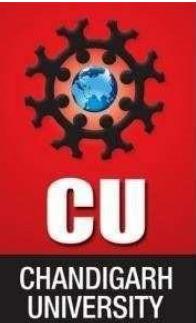
Publicly accessible	No	Yes
Database port	3306	Yes
DB instance identifier	strugmac-DB	Yes
DB engine version	8.0.42	Yes
DB parameter group	default.mysql8.0	Yes
Monitoring type	Database Insights - Standard	Yes
Performance insights	Not enabled	Yes
Monitoring	Enabled	Yes
Maintenance	Auto minor version upgrade enabled	Yes

v) Confirm all your selection .

The screenshot shows the AWS Aurora and RDS console under the 'Databases' section. A confirmation message box is open, stating: '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.' Below the message, the 'Databases (1)' list is visible, showing one entry: 'strugmac-db' (Status: Creating, Instance Type: MySQL). The left sidebar includes links for Dashboard, Databases, Performance insights, Snapshots, Exports in Amazon S3, Automated backups, Reserved instances, Proxies, and Subnet groups.

Now this will create a MySQL database to me, and we want to connect to RDS for which we have to launch a server which basically will have MySQL Client installed inside it. For that we have to launch an EC2 instance, Launching an EC2 instance.

The screenshot shows the AWS Console Home under the 'All services' section. The 'Services by category' section is displayed, showing the 'Compute' and 'Machine Learning' categories. Under 'Compute', 'EC2' is highlighted, along with other services like Lightsail, Lambda, Batch, Elastic Beanstalk, Serverless Application Repository, AWS Outposts, EC2 Image Builder, AWS App Runner, AWS SimSpace Weaver, Parallel Computing Service, and AWS Global View. Under 'Machine Learning', services like Amazon SageMaker AI, Amazon Augmented AI, Amazon CodeGuru, Amazon DevOps Guru, Amazon Comprehend, Amazon Forecast, Amazon Fraud Detector, Amazon Kendra, Amazon Personalize, Amazon Polly, Amazon Rekognition, Amazon Textract, Amazon Transcribe, and Amazon Translate are listed. The left sidebar includes links for myApplications and All services.



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EC2

- Dashboard
- AWS Global View
- Events
- Instances**
 - Instances
 - Instance Types
 - Launch Templates
 - Spot Requests
 - Savings Plans
 - Reserved Instances
 - Dedicated Hosts
 - Capacity Reservations
- Images**

Benefits and features

EC2 offers ultimate scalability and control

Fully resizable compute capacity to support virtually any workload. This service is best if you want:

- Highest level of control of the entire technology stack, allowing full integration with all AWS services
- Widest variety of server size options
- Widest availability of operating systems to choose from including Linux, Windows, and macOS
- Global scalability

[Find out more about EC2](#)

Use cases

Instances Info

Find Instance by attribute or tag (case-sensitive)

All states

Name | Instance ID | Instance state | Instance type | Status check

No instances
You do not have any instances in this region

[Launch instances](#)

Application and OS Images (Amazon Machine Image)

An AMI contains the operating system, application server, and applications for your instance. If you don't see a suitable AMI below, use the search field or choose [Browse more AMIs](#).

Search our full catalog including 1000s of application and OS images

Quick Start

[Browse more AMIs](#)
Including AMIs from AWS, Marketplace and the Community

Key pair (login)

You can use a key pair to securely connect to your instance. Ensure that you have access to the selected key pair before you launch the instance.

Key pair name - required

Proceed without a key pair (Not recommended)



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▼ Network settings [Info](#) [Edit](#)

Network | [Info](#)
vpc-081fe9fe127bb8e79

Subnet | [Info](#)
No preference (Default subnet in any availability zone)

Auto-assign public IP | [Info](#)
Enable

Firewall (security groups) | [Info](#)
A security group is a set of firewall rules that control the traffic for your instance. Add rules to allow specific traffic to reach your instance.

Create security group Select existing security group

Common security groups | [Info](#)
[Select security groups](#) ▾

default sg-0e67db7abaff84225 X
VPC: vpc-081fe9fe127bb8e79

Compare security group rules

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

▼ Summary

Number of instances | [Info](#)
1

Software Image (AMI)
Canonical, Ubuntu, 24.04, amd6... [read more](#)
ami-0a716d3f3b16d290c

Virtual server type (instance type)
t3.micro

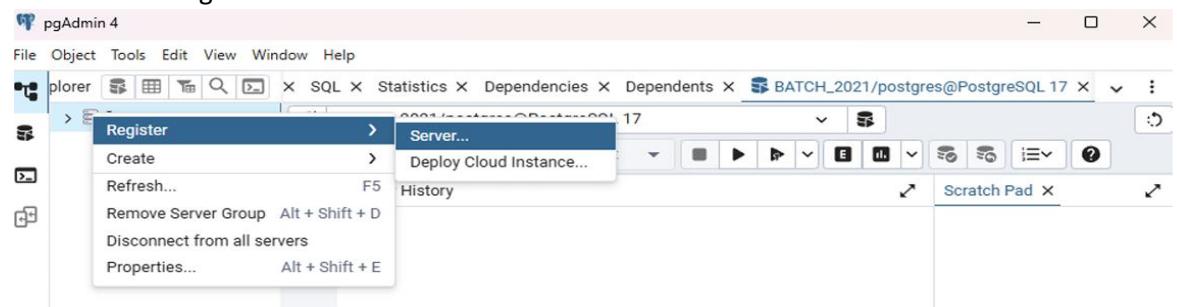
Firewall (security group)
default

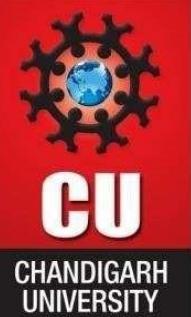
Storage (volumes)
1 volume(s) - 8 GiB

[Cancel](#) Launch instance Preview code

vi) Connect the Postgres AWS RDS to our local machine.

- Create AWS RDS database for PostgreSQL
- Connect from PgAdmin.





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

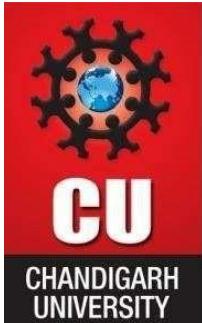
The screenshot shows a 'Register - Server' dialog box with the following fields:

- General** tab selected.
- Host name/address**: strugmac-postgresql.czqk2qqwqtc0.eu-north-1.rds.amazonaws.com (highlighted with a red box).
- Port**: 5432
- Maintenance database**: postgres
- Username**: postgres
- Kerberos authentication?**: Off (toggle switch)
- Password**: (highlighted with a red box)
- In edit mode the password field is enabled only if Save Password is set to true.
- Save password?**: Off (toggle switch)
- Role**: (empty input field)
- Services**: (empty input field)
- Buttons**: Close (grey), Reset (grey), Save (blue)

viii) Change the INBOUND RULES of DB Instance from the AWS Console.

Connectivity & security

Endpoint & port	Networking	Security
Endpoint strugmac-postgresql.czqk2qqwqtc0.eu-north-1.rds.amazonaws.com	Availability Zone eu-north-1c VPC vpc-081fe9fe127bb8e79	VPC security groups default (sg-0e67db7abaff84225) Active
Port 5432	Subnet group default-vpc-081fe9fe127bb8e79 Subnets subnet-00bf0147db6493492 subnet-Oaa3f608f07d8cecc subnet-0f9ee2b6eb9698f78	Publicly accessible No Certificate authority Info rds-ca-rsa2048-g1 Certificate authority date May 25, 2061, 03:29 (UTC+05:30)



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Edit inbound rules Info

Inbound rules control the incoming traffic that's allowed to reach the instance.

A screenshot of the AWS RDS Inbound Rules editor. The interface shows a table with one row of data. The columns are: Security group rule ID (sgr-0d9f21030174e69aa), Type (All traffic), Protocol (TCP), Port range (5432), Source (M...), and Description - optional (sg-Oe67db7abaff84 225). A red box highlights the 'Add rule' button at the bottom left. Another red box highlights the 'Save rules' button at the bottom right. A third red box highlights the 'Preview changes' button at the bottom right. A fourth red box highlights the source IP address '223.181.100.173 /32' in the source dropdown.

- ix) This allows the local editor to access the cloud db via the ip of local host over the internet provided in the inbound rules.

Learning outcomes:

- I learned the core benefits of AWS RDS over EC2-hosted databases, including scalability, manageability, and built-in high availability.
- I practiced creating a database instance on AWS RDS and configuring parameters like engine type, storage, and backup settings.
- I understood how security groups control access to RDS instances and how to modify inbound rules for external connectivity.
- I learned how to retrieve the RDS endpoint and use it to connect a PostgreSQL database to my local PgAdmin client.
- I troubleshooted common connectivity issues and understood how to resolve them by adjusting AWS Console settings.
- I gained hands-on experience integrating cloud-hosted databases with local development tools for real-world applications.