



DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

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Worksheet 9

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- Aim:** To understand and implement the setup of Amazon Relational Database Service (AWS RDS) by creating a database instance, configuring security groups, and establishing a secure connection between the local pgAdmin tool and the RDS instance hosted on the AWS Cloud.

2. Objective:

- To learn the basic concepts and features of Amazon Relational Database Service (AWS RDS).
- To create and configure a new RDS database instance on the AWS Management Console.
- To understand the role and configuration of security groups for controlling database access.
- To connect a local pgAdmin client to the AWS RDS instance securely using proper credentials and endpoint details.
- To verify successful database connectivity and perform basic operations through pgAdmin.

3. Code & Output:

1. Sign-in



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2. Navigating to RDS Service

The screenshot shows the AWS Aurora and RDS service dashboard. The left sidebar contains navigation links for Databases, Performance insights, Snapshots, Exports in Amazon S3, Automated backups, Reserved instances, Proxies, Subnet groups, Parameter groups, Option groups, Custom engine versions, Zero-ETL integrations, Events, Event subscriptions, Recommendations (0), and Certificate update. The main content area displays a heading "Databases (0)" with a search bar and filter options for DB identifier, Status, Role, Engine, Region, and Size. A central illustration of a robot watering a plant is present, with the text "No resources" and "No resources to display". A prominent orange "Create database" button is at the bottom. The top right corner shows account information (Account ID: 3961-8352-6319, Europe (Stockholm), Shivanshu Ranjan) and standard AWS navigation icons.

3. Amazon RDS Dashboard Overview

The screenshot shows the Amazon RDS Dashboard. The left sidebar includes links for Dashboard, Databases, Performance insights, Snapshots, Exports in Amazon S3, Automated backups, Reserved instances, Proxies, Subnet groups, Parameter groups, Option groups, Custom engine versions, Zero-ETL integrations, Events, Event subscriptions, Recommendations (0), and Certificate update. The main area features a "Resources" section with a "Refresh" button, displaying statistics for DB Instances (0/40), DB Clusters (0/40), and Snapshots (0). It also lists Parameter groups (0), Option groups (0), and Subnet groups (0/50). Below this is a "Create a database" section with a description of RDS's capabilities and a "Create a database" button. To the right is an "Explore RDS" section with a "Start tutorial" button, status information (Not started), completion by April 30, 2026, reward value USD 20.00, and estimated duration 2-5 minutes. At the bottom is a "Recommended services" section with a note about no recommendations yet and a link to AWS console usage.



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4. Creating a New Database Instance

The screenshot shows the AWS RDS 'Create database' interface. In the 'Choose a database creation method' section, 'Easy create' is selected. Under 'Configuration', 'PostgreSQL' is chosen as the engine type. The PostgreSQL icon features a blue brain-like shape with a lightning bolt. Other options shown include Aurora (MySQL Compatible), Aurora (PostgreSQL Compatible), MySQL, MariaDB, and Oracle. At the bottom, there are links for CloudShell, Feedback, and various AWS terms like Privacy, Terms, and Cookie preferences.

5. Selecting PostgreSQL as Database Engine

This screenshot shows the detailed configuration for a new PostgreSQL database instance. In the 'DB instance identifier' field, 'shivanshu-DB' is entered. Under 'Master password', 'postgres' is specified as the username. The 'Self managed' option for credentials is selected. The 'Auto generate password' checkbox is unchecked. The 'Master password' field contains '*****'. The 'Password strength' bar is at 'Neutral'. Below it, a note states: 'Minimum constraints: At least 8 printable ASCII characters. Can't contain any of the following symbols: / \ * @'. The 'Confirm master password' field also contains '*****'. The bottom of the screen includes standard AWS navigation links for CloudShell, Feedback, Privacy, Terms, and Cookie preferences.



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6. Choosing Deployment Option and Template

VPC security group: default
Publicly accessible: No
Database port: 5432
DB instance identifier: shivanshu-DB
DB engine version: 17.4
DB parameter group: default.postgres17
Monitoring type: Database Insights - Standard
Performance insights: Enabled
Monitoring: Enabled
Maintenance: Auto minor version upgrade enabled
Delete protection: Not enabled

You are responsible for ensuring that you have all of the necessary rights for any third-party products or services that you use with AWS services.

Create database

7. Configuring Database Settings (Name, Username, Password)

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

View connection details

Databases (1)

DB identifier	Status	Role	Engine	Region ...	Size
shivanshu-db	Creating	Instance	PostgreSQL	-	db.t4g.micro

Group resources Modify Actions Create database

Filter by databases

Aurora and RDS

- Dashboard
- Databases
- Performance insights
- Snapshots
- Exports in Amazon S3
- Automated backups
- Reserved instances
- Proxies

Subnet groups

Parameter groups

Option groups

Custom engine versions

Zero-ETL integrations

Events

Event subscriptions

Recommendations 0

Certificate update

CloudShell Feedback

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8. Setting Up Instance Size and Storage

The screenshot shows the pgAdmin 4 interface. In the top navigation bar, the 'Dashboard' tab is selected. On the left, the Object Explorer shows three servers: PostgreSQL 17, PostgreSQL 18, and shivanshu-DB. A context menu is open over the 'shivanshu-DB' entry, with the 'Register' option highlighted. Other options in the menu include 'Create', 'Refresh...', 'Remove Server Group', 'Disconnect from all servers', and 'Properties...'. Below the menu, a tooltip for 'pyAUMIITI' is visible, which is a management tool for PostgreSQL. The main pane displays a brief introduction to pgAdmin, stating it is an open-source administration and management tool for the PostgreSQL database. It includes a graphical administration interface, an SQL query tool, a procedural code debugger, and much more. It is designed to answer the needs of developers, DBAs, and system administrators alike. Below this, there are 'Quick Links' for 'Add New Server', 'Configure pgAdmin', and links to 'PostgreSQL Documentation', 'pgAdmin Website', 'Planet PostgreSQL', and 'Community Support'.

9. Configuring Connectivity and VPC Settings

The screenshot shows the 'Register - Server' dialog box in pgAdmin 4. The 'General' tab is selected. The 'Name' field contains 'shivanshu-DB'. Under the 'Feature' section, 'Background' is set to 'Servers' and 'Foreground' is set to 'X'. The 'Quick Link' section has 'Connect now?' checked. The 'Getting Started' section is partially visible at the bottom. At the bottom of the dialog box are buttons for 'Close', 'Reset', and 'Save'.



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10. Gr Setting Up Security Groups for RDS Access

The screenshot shows the 'Register - Server' dialog in the Object Explorer. The 'Connection' tab is active. The host name/address is 'shivanshu-db.czmn8oosyvih.eu-north-1.rds.amazonaws.com', port is 5432, and the database is 'postgres'. The username is 'postgres' and the password is masked. The 'Save password?' checkbox is unchecked. A red error message at the bottom states 'Unable to connect to server: connection timeout expired'.

11. Additional Database Configuration Options

The screenshot shows the 'Register - Server' dialog in the Object Explorer. The 'Connection' tab is active. The host name/address is 'shivanshu-db.czmn8oosyvih.eu-north-1.rds.amazonaws.com', port is 5432, and the database is 'postgres'. The username is 'postgres' and the password is masked. The 'Save password?' checkbox is checked. A red error message at the bottom states 'Unable to connect to server: connection timeout expired'.



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12. Reviewing and Creating the Database Instance

The screenshot shows the AWS RDS console for the 'shivanshu-db' database instance. The top navigation bar includes the AWS logo, a search bar, and account information (Account ID: 3961-8352-6319, Europe (Stockholm), Shivanshu Ranjan). The left sidebar has sections for Dashboard, Databases, Snapshots, Exports in Amazon S3, Automated backups, Reserved instances, Proxies, Subnet groups, Parameter groups, Option groups, Custom engine versions, Zero-ETL integrations, Events, Event subscriptions, Recommendations (0), and Certificate update. The main content area displays the 'Summary' tab for the 'shivanshu-db' instance, which is currently available. It shows metrics like CPU usage (21.27%), status (Available), role (Instance), engine (PostgreSQL), and region (eu-north-1a). Below the summary, tabs for Connectivity & security, Monitoring, Logs & events, Configuration, Zero-ETL integrations, Maintenance & backups, and Actions are visible. The 'Connectivity & security' tab is selected, showing details about the endpoint, port (5432), networking (VPC vpc-086507ee77883ae1b, subnet group default-vpc-086507ee77883ae1b), and security (VPC security group default sg-0b4c8dc4647072099, Active). Other tabs include Monitoring, Logs & events, Configuration, Zero-ETL integrations, Maintenance & backups, and Actions.

13. RDS Instance Creation in Progress

The screenshot shows the AWS EC2 Security Groups console for the security group 'sg-0b4c8dc4647072099 - default'. The top navigation bar includes the AWS logo, a search bar, and account information (Account ID: 3961-8352-6319, Europe (Stockholm), Shivanshu Ranjan). The left sidebar shows the EC2 and Security Groups sections. The main content area is titled 'Edit inbound rules' and shows two rules. Rule 1: Type All traffic, Protocol All, Port range All, Source Custom, Description optional. Rule 2: Type PostgreSQL, Protocol TCP, Port range 5432, Source My IP, Description optional. Buttons at the bottom include 'Add rule', 'Cancel', 'Preview changes', and 'Save rules'.



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14. Viewing Database Instance Details

▼ Additional configuration

Public access

Publicly accessible

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.

Not publicly accessible

No IP address is assigned to the DB instance. EC2 instances and devices outside the VPC can't connect.

Database port

Specify the TCP/IP port that the DB instance will use for application connections. The application connection string must specify the port number. The DB security group and your firewall must allow connections to the port. [Learn more](#)

5432

15. Copying the RDS Endpoint for Connection

Connectivity & security

Endpoint & port

Endpoint

shivanshu-db.czr8oossyvih.eu-north-1.rds.amazonaws.com

Port

5432

Networking

Availability Zone

eu-north-1a

VPC

vpc-086507ee77883ae1b

Subnet group

default-vpc-086507ee77883ae1b

Subnets

subnet-0db6b45e321b7000a

subnet-087377db566f545dc

subnet-0bac42bdab1e990c5

Network type

IPv4

Security

VPC security groups

default (sg-0b4c8dc4647072099)

Active

Publicly accessible

Yes

Certificate authority [Info](#)

rds-ca-rsa2048-g1

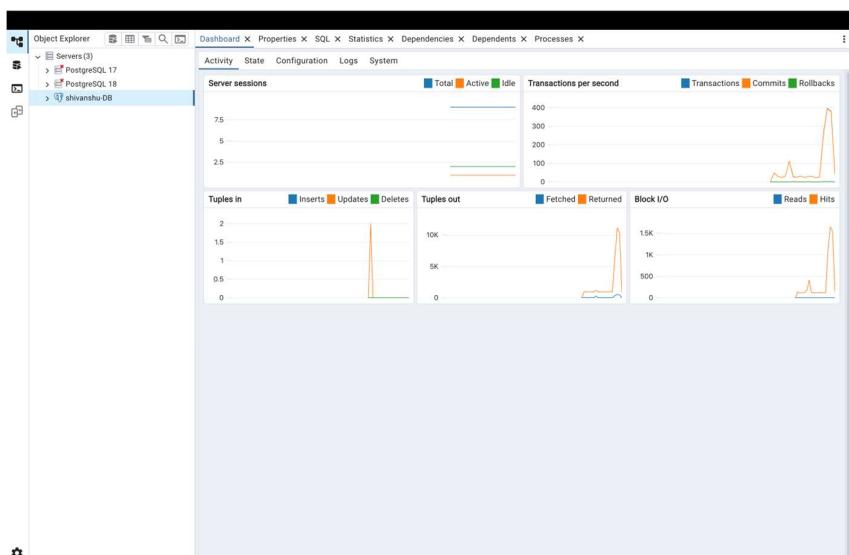
Certificate authority date

May 25, 2061, 03:29 (UTC+05:30)

DB instance certificate expiration date

October 30, 2026, 23:59 (UTC+05:30)

16. Launching pgAdmin on Local Machine

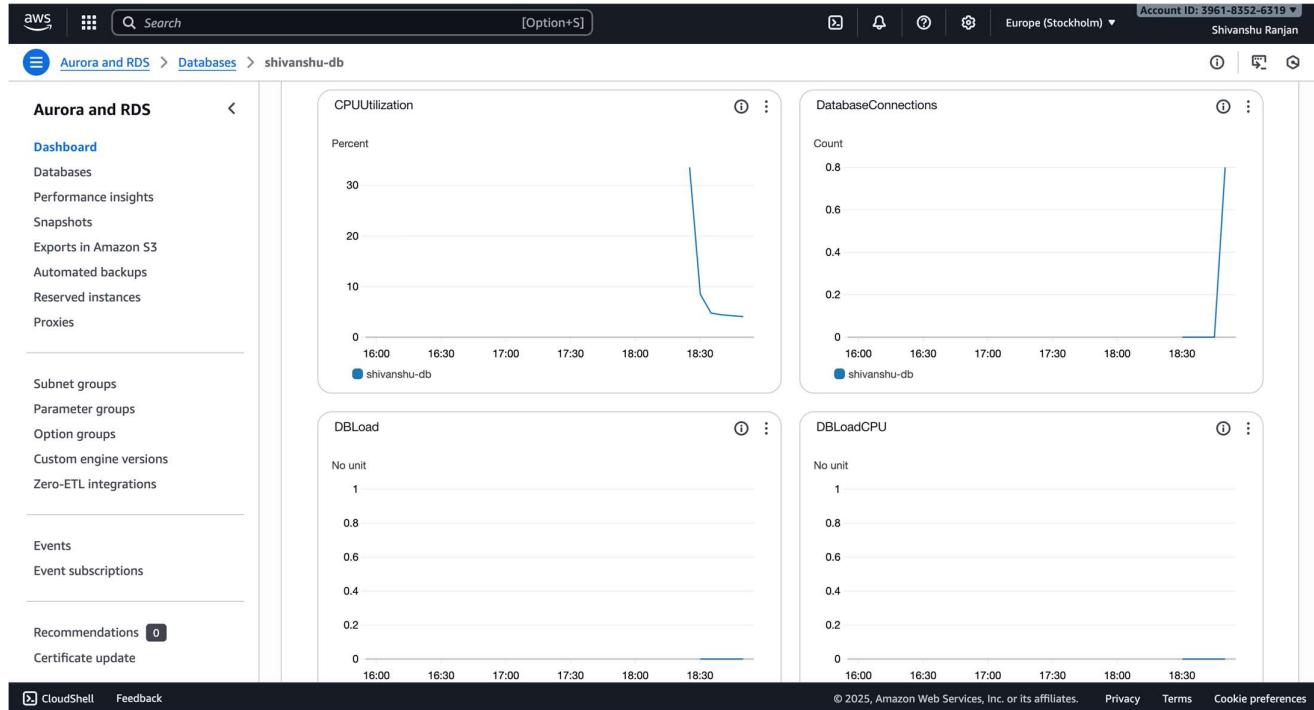




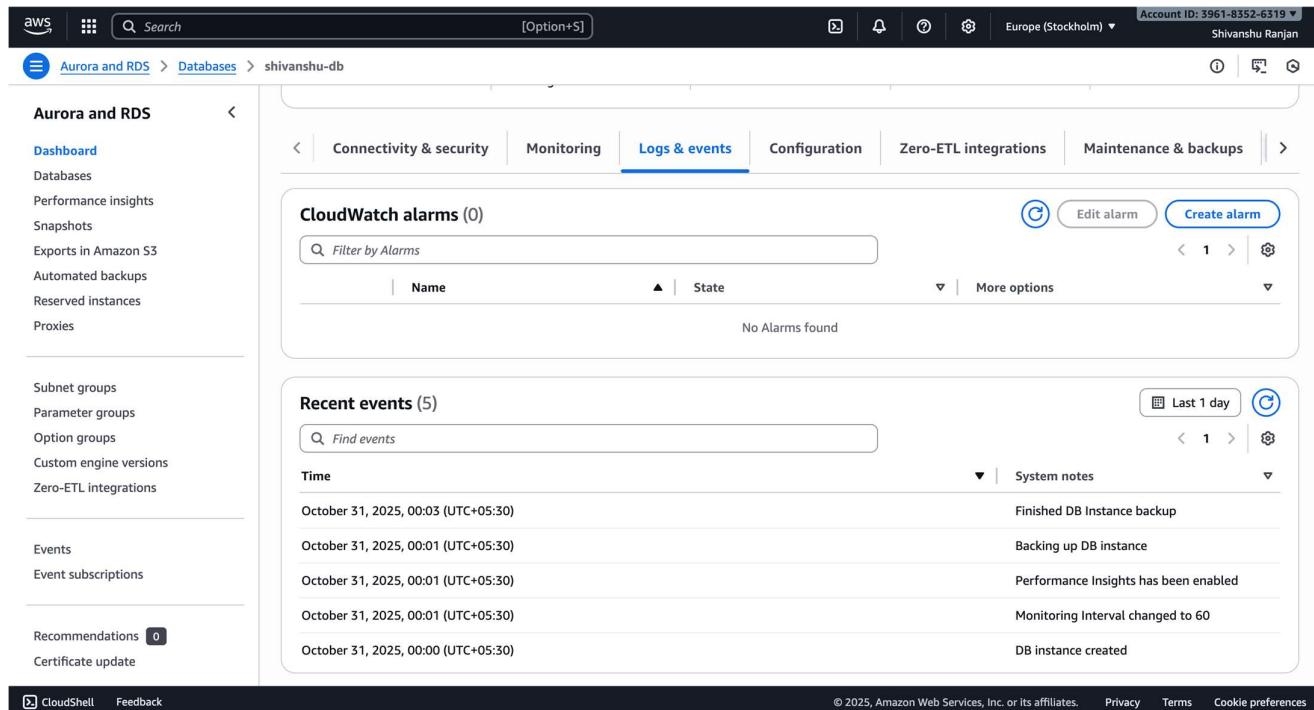
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17. Adding a New Server in pgAdmin



18. Entering Connection Details (Endpoint, Username, Password)





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19. Successful Connection to AWS RDS Database via pgAdmin

The screenshot shows the AWS RDS console interface. The left sidebar includes links for Dashboard, Databases (selected), Performance insights, Snapshots, Exports in Amazon S3, Automated backups, Reserved instances, Proxies, Subnet groups, Parameter groups, Option groups, Custom engine versions, Zero-ETL integrations, Events, Event subscriptions, Recommendations (0), and Certificate update. The main content area is titled "Deleting DB instance shivanshu-db". It shows a table with one row for "shivanshu-db". The columns are DB identifier, Status, Role, Engine, Region ..., and Size. The status is "Deleting". The table has headers for DB identifier, Status, Role, Engine, Region ..., and Size. The bottom right of the main area shows copyright information: "© 2025, Amazon Web Services, Inc. or its affiliates." and links for Privacy, Terms, and Cookie preferences.

4. Learning Outcomes:

- Understand the fundamental concepts and benefits of using Amazon RDS for relational database management in the cloud.
- Gain practical knowledge of creating and configuring an RDS database instance on AWS.
- Learn how to manage and secure database access using AWS security groups.
- Develop skills to connect a local pgAdmin client to a cloud-hosted RDS instance.
- Be able to monitor, manage, and test database connectivity and performance in a cloud environment.