



DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

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WORKSHEET - 9

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Subject Name: ADBMS

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1. 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

The screenshot shows the AWS Management Console with the search bar set to 'rds'. The left sidebar is for the Aurora and RDS service, listing options like Services, Features, Resources, Documentation, and Aurora and RDS. The main content area displays the 'Aurora and RDS' service page, which includes sections for Top features (Aurora and RDS Managed Relational Database Service), Database Migration Service (Managed Database Migration Service), and Kinesis (Work with Real-Time Streaming Data). Below these are sections for Features (Database Insights, Reserved instances, Proxies), and Events (Event subscriptions). At the bottom, there's a feedback section asking 'Were these results helpful?' with 'Yes' and 'No' buttons, and links for 'CloudShell' and 'Feedback'.



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2. Navigating to RDS Service

The screenshot shows the AWS Aurora and RDS service dashboard. 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 displays a heading 'Databases (0)' with a search bar and filter options for DB identifier, Status, Role, Engine, Region, and Size. Below this is a placeholder image of a robot watering a plant under a cloud, 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), Shivantha Ranjan) and 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 content area is divided into sections: 'Resources' (listing DB Instances (0/40), Parameter groups (0), DB Clusters (0/40), Reserved instances (0/40), Snapshots (0), and Automated), 'Explore RDS' (status: Not started, complete by April 30, 2026, reward value USD 20.00, estimated duration 2-5 minutes, with a 'Start tutorial' button), 'Create a database' (instructions for restoring from S3, with 'Create database' and 'Restore from S3' buttons), and 'Recommended services' (no recommendations yet). The top right corner shows account information (Account ID: 3961-8352-6319, Europe (Stockholm)) and navigation icons. The bottom includes CloudShell, Feedback, Privacy, Terms, and Cookie preferences links.



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4. Creating a New Database Instance

The screenshot shows the 'Create database' page in the AWS RDS console. At the top, there's a note about the free plan having limited features. Below it, two creation methods are listed: 'Standard create' and 'Easy create'. Under 'Configuration', several database engines are shown with icons: Aurora (MySQL Compatible), Aurora (PostgreSQL Compatible), MySQL, PostgreSQL (selected), MariaDB, and Oracle. The PostgreSQL section is highlighted with a blue border. At the bottom, there are links for CloudShell and Feedback, and a copyright notice for Amazon Web Services.

5. Selecting PostgreSQL as Database Engine

The screenshot shows the 'Create database' page for PostgreSQL. It displays three instance types with their details: 4vG2U.S (32 GB RAM, 400 GB, 1.946 USD/hour), XvC2U.S (16 GB RAM, 200 GB, 0.278 USD/hour), and ZvC2U.S (1 GB RAM, 20 GB, 0.019 USD/hour). The 'DB instance identifier' field contains 'shivanshu-DB'. Under 'Master username', 'postgres' is entered. In the 'Credentials management' section, 'Self managed' is selected. The 'Master password' and 'Confirm master password' fields are shown with masked input. A note at the bottom specifies minimum password constraints. The bottom of the page includes standard AWS links for CloudShell, Feedback, and copyright information.



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6. Choosing Deployment Option and Template

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

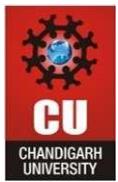
You are responsible for ensuring that you have all of the necessary rights for any third-party products or services that you use with AWS services.

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.

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



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8. Setting Up Instance Size and Storage

The screenshot shows the pgAdmin 4 interface. In the top navigation bar, the 'Servers' menu is open, with 'Server...' highlighted. Below the menu, there is a brief description of pgAdmin: 'pgAdmin 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. The tool is designed to answer the needs of developers, DBAs and system administrators alike.' Under the 'Quick Links' section, there are four links: 'Add New Server' (with a plus icon), 'Configure pgAdmin' (with two gears icon), 'PostgreSQL Documentation' (with a book icon), 'pgAdmin Website' (with a globe icon), 'Planet PostgreSQL' (with a document icon), and 'Community Support' (with two people icon).

9. Configuring Connectivity and VPC Settings

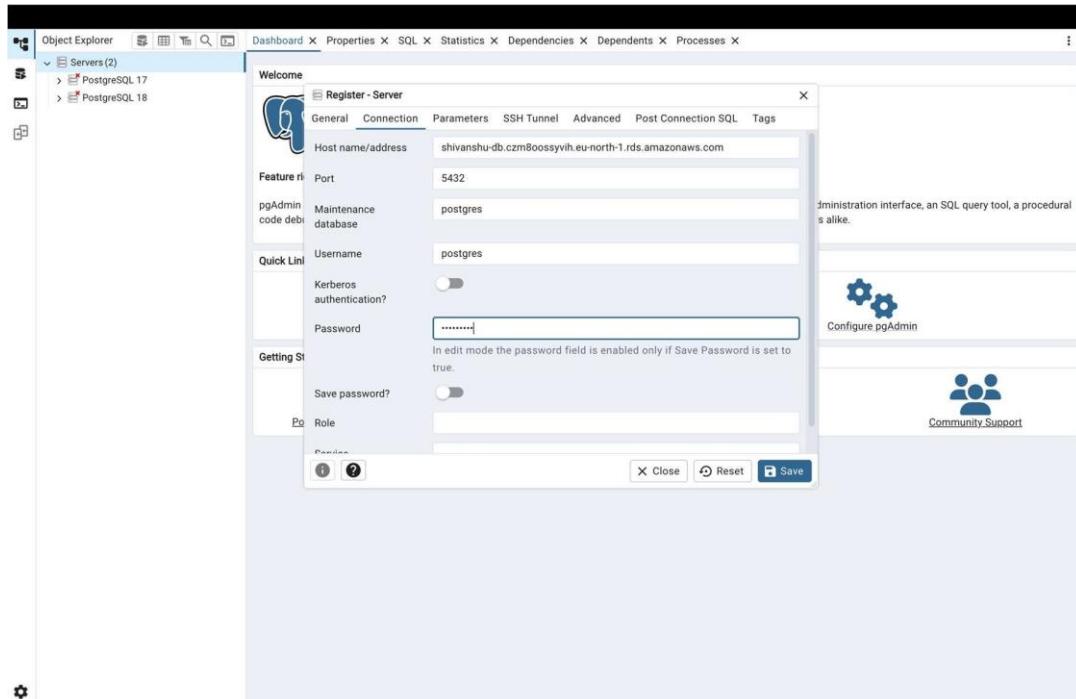
The screenshot shows the 'Register - Server' dialog box in pgAdmin 4. The 'General' tab is selected. The 'Name' field contains 'shivanshu-DB'. Under the 'Feature' section, 'pgAdmin' is checked. The 'Background' and 'Foreground' dropdowns are empty. The 'Connect now?' checkbox is checked. At the bottom of the dialog, there are 'Close', 'Reset', and 'Save' buttons.



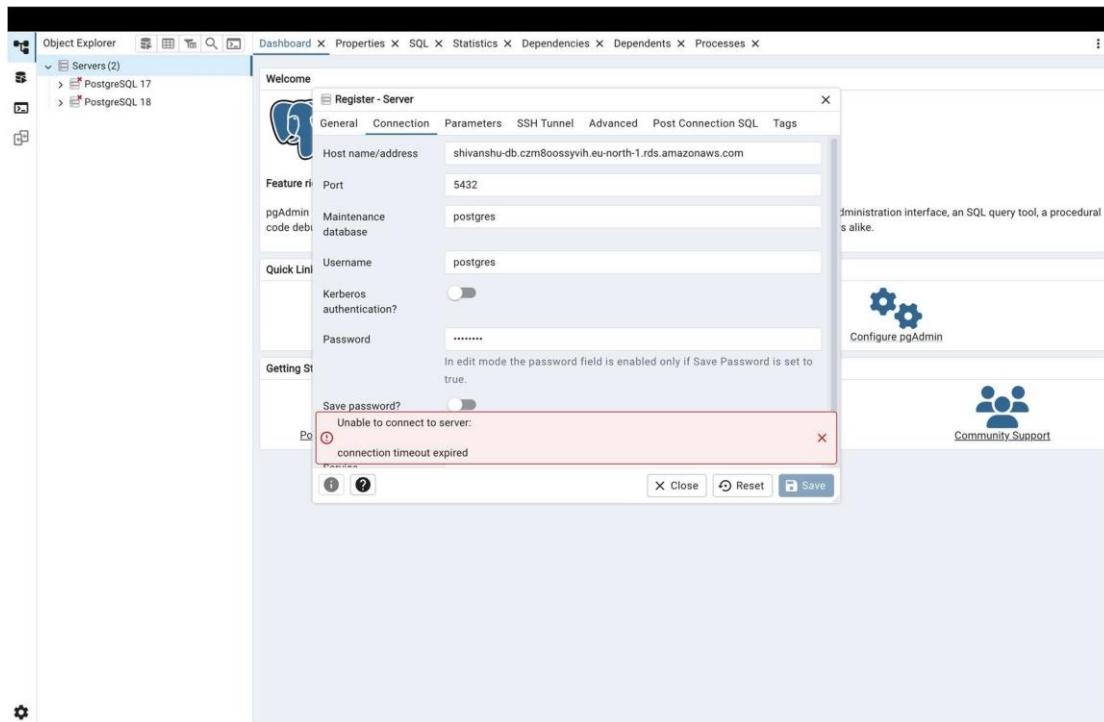
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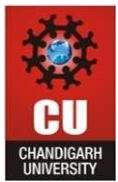
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10. Gr Setting Up Security Groups for RDS Access



11. Additional Database Configuration Options





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12. Reviewing and Creating the Database Instance

The screenshot shows the AWS RDS console for the 'Aurora and RDS' service. The main view displays the summary for the database 'shivanshu-db'. Key details include:

- DB identifier:** shivanshu-db
- Status:** Available
- Role:** Instance
- Engine:** PostgreSQL
- Region & AZ:** eu-north-1a

The 'Connectivity & security' tab is selected, showing the following configuration:

- Endpoint & port:** Endpoint: shivanshu-db.czmoossyvih.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
- Security:** VPC security groups: default (sg-0b4c8dc4647072099) (Active), Publicly accessible: No, Certificate authority: rds-ca-rsa2048-g1, Certificate authority date: May 25, 2061, 03:29 (UTC+05:30), DB instance certificate expiration: N/A

The left sidebar lists various RDS management options like 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, and Certificate update.

13. RDS Instance Creation in Progress

The screenshot shows the AWS EC2 Security Groups console. The user is editing the inbound rules for the security group 'sg-0b4c8dc4647072099 - default'. The current rule is:

Security group rule ID	Type	Protocol	Port range	Source	Description - optional
sgr-040a1d1889af5e91c	All traffic	All	All	Custom	sg-0b4c8dc4647072099
-	PostgreSQL	TCP	5432	My IP	47.247.118.30/32

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](#)

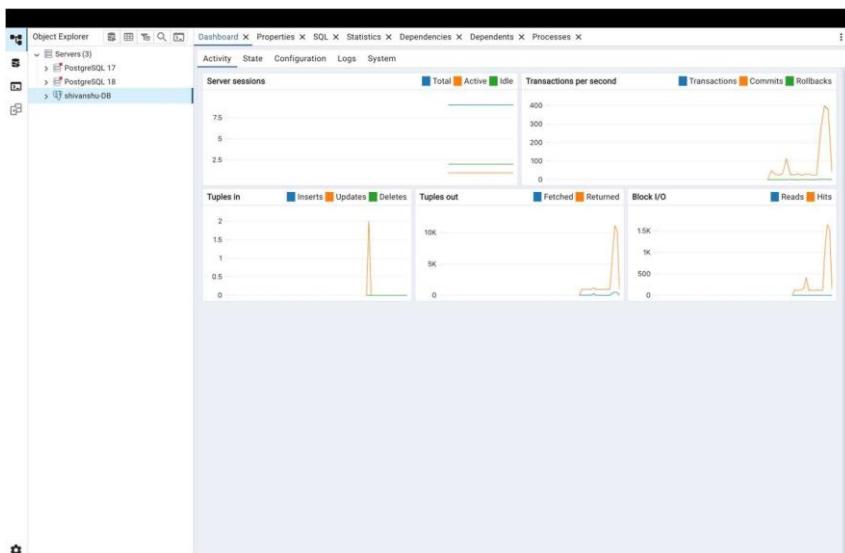
5432

15. Copying the RDS Endpoint for Connection

Connectivity & security

Endpoint & port	Networking	Security
Endpoint shivanshu-db.czr8oossyvih.eu-north-1.rds.amazonaws.com	Availability Zone eu-north-1a	VPC security groups default (sg-0b4c8dc4647072099) <input checked="" type="checkbox"/> Active
Port 5432	VPC vpc-086507ee77883ae1b	Publicly accessible Yes
	Subnet group default-vpc-086507ee77883ae1b	Certificate authority Info rds-ca-rsa2048-g1
	Subnets subnet-0db6b45e321b7000a subnet-087377db566f545dc subnet-0bac42bdab1e990c5	Certificate authority date May 25, 2061, 03:29 (UTC+05:30)
	Network type IPv4	DB instance certificate expiration date October 30, 2026, 23:59 (UTC+05:30)

16. Launching pgAdmin on Local Machine

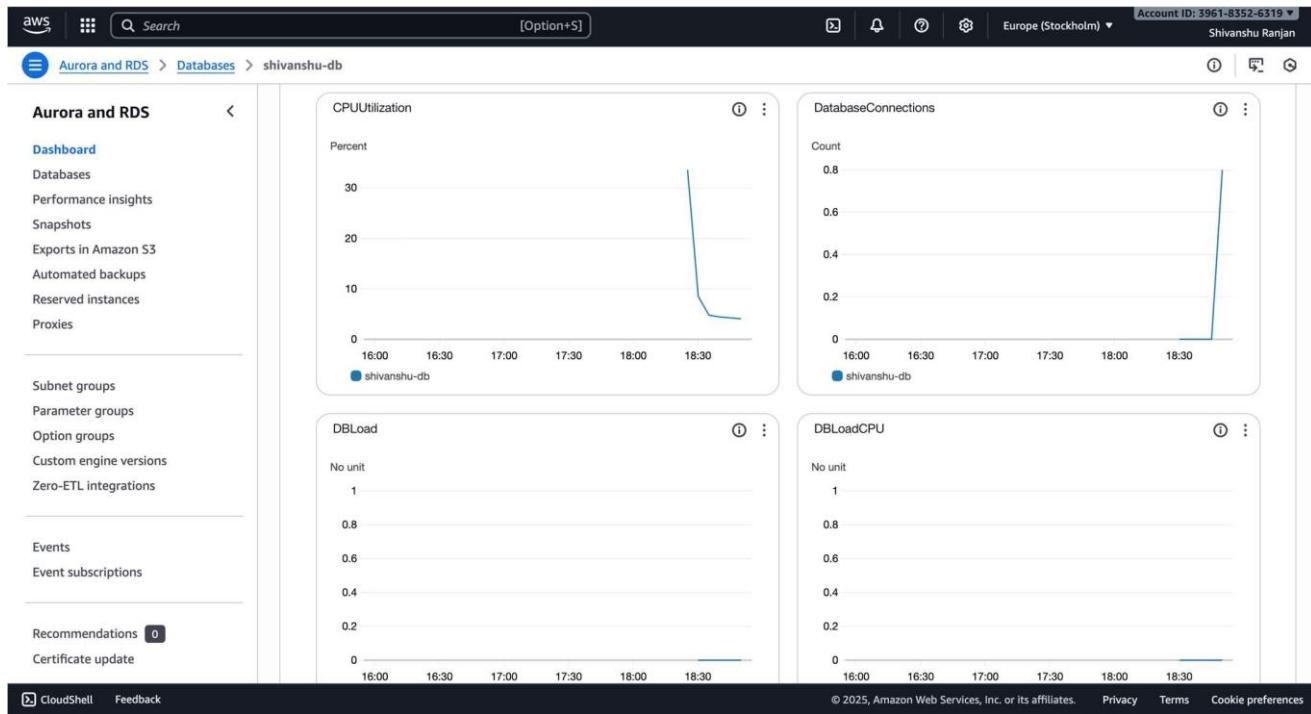




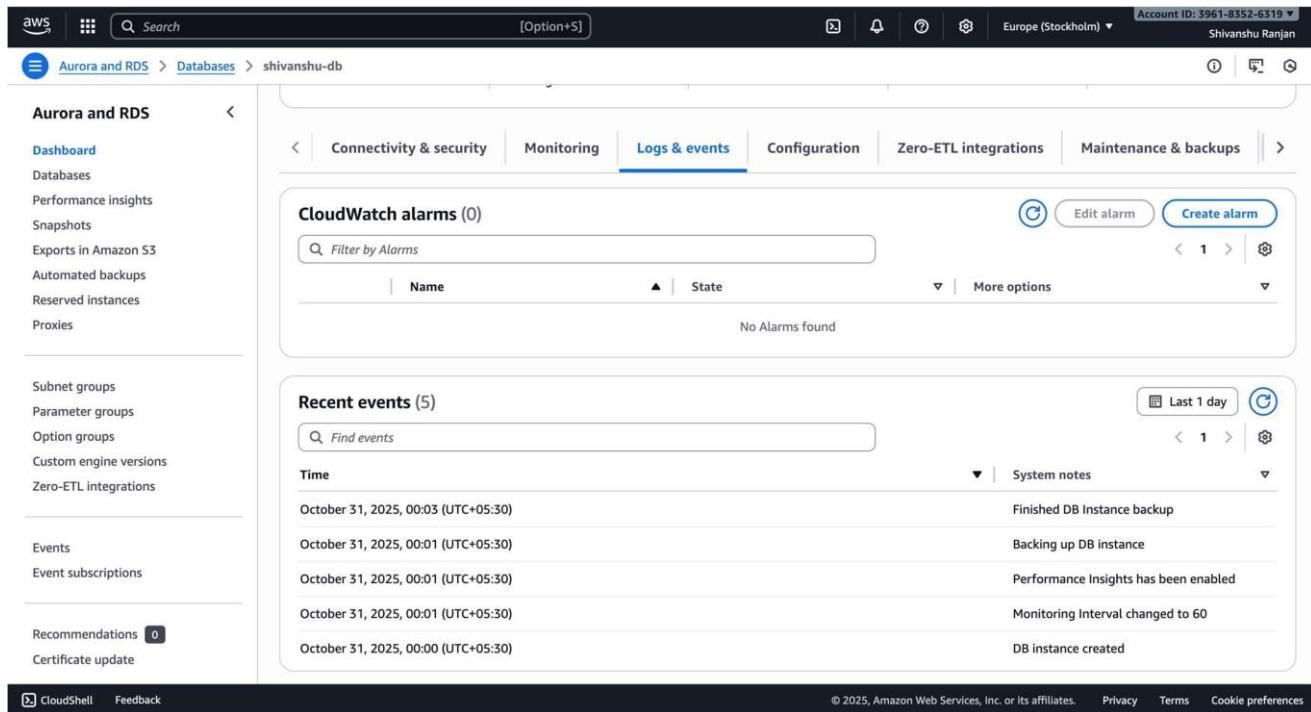
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17. Adding a New Server in pgAdmin



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 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 a 'Databases' section selected, listing options like Dashboard, 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' and shows a table of databases. The table has columns: DB identifier, Status, Role, Engine, Region ..., and Size. One row is selected, showing 'shivanshu-db' with a status of 'Deleting', engine 'PostgreSQL', region 'eu-north-1a', and size 'db.t4g.micro'. There are buttons for Group resources, Modify, Actions (with a dropdown arrow), Create database, and a delete icon. At the bottom, there are links for CloudShell, Feedback, and copyright information (© 2025, Amazon Web Services, Inc. or its affiliates).

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.