



DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

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Worksheet 9

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Subject Name: ADBMS

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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

The screenshot shows the AWS Management Console search results for 'rds'. The search bar at the top has 'rds' typed into it. The results are categorized into 'Services' and 'Features'. Under 'Services', there are three items: 'Aurora and RDS' (Managed Relational Database Service), 'Database Migration Service' (Managed Database Migration Service), and 'Kinesis' (Work with Real-Time Streaming Data). Under 'Features', there are two items: 'Database Insights' (CloudWatch feature) and 'Reserved instances' (Aurora and RDS feature). On the right side of the screen, there is a sidebar with account information: 'Account ID: 3951-8312-6319' and 'Shivanshu Ranjan'. Below the sidebar, there is a section titled 'System notes' which lists several recent events: 'Last 1 day', 'Finished DB instance backup', 'Backing up DB instance', 'Performance Insights has been enabled', 'Monitoring Interval changed to 60', and 'DB instance created'. At the bottom of the page, there are links for 'CloudShell', 'Feedback', and copyright information: '© 2025, Amazon Web Services, Inc. or its affiliates.' followed by 'Privacy', 'Terms', and 'Cookie preferences'.



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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 is titled "Databases (0)" and features a search bar, a "Create database" button, and a placeholder message "No resources". A cartoon robot icon is positioned above the message. The top right corner shows account information: Account ID: 3961-8352-6319, Europe (Stockholm), and Shivanshu Ranjan.

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), DB Clusters (0/40), Snapshots (0), and various parameter and option group counts), "Explore RDS" (with a "Start tutorial" button), "Create a database" (with a "Create a database" button), and "Recommended services" (which currently shows "No recommendations yet"). The top right corner displays account details: Account ID: 3961-8352-6319, Europe (Stockholm), and Shivanshu Ranjan.



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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.

5. Selecting PostgreSQL as Database Engine

The screenshot shows the 'Create database' configuration page. The 'DB instance identifier' field contains 'shivanshu-DB'. The 'Master password' field is filled with '.....'. The 'Password strength' bar is at 'Neutral'. The 'Confirm master password' field also contains '.....'. On the left, there are options for managing credentials: 'Managed in AWS Secrets Manager - most secure' (unchecked) and 'Auto generate password' (unchecked). The 'Master password' field has an 'Info' link.



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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.

Databases (1)

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

View connection details

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 'pyAUMITI' is visible, stating 'Management Tools for PostgreSQL' and 'Maximises PostgreSQL | Open Source'. The main pane displays 'Quick Links' for 'Add New Server', 'Configure pgAdmin', 'PostgreSQL Documentation', 'pgAdmin Website', 'Planet PostgreSQL', and 'Community Support'.

9. Configuring Connectivity and VPC Settings

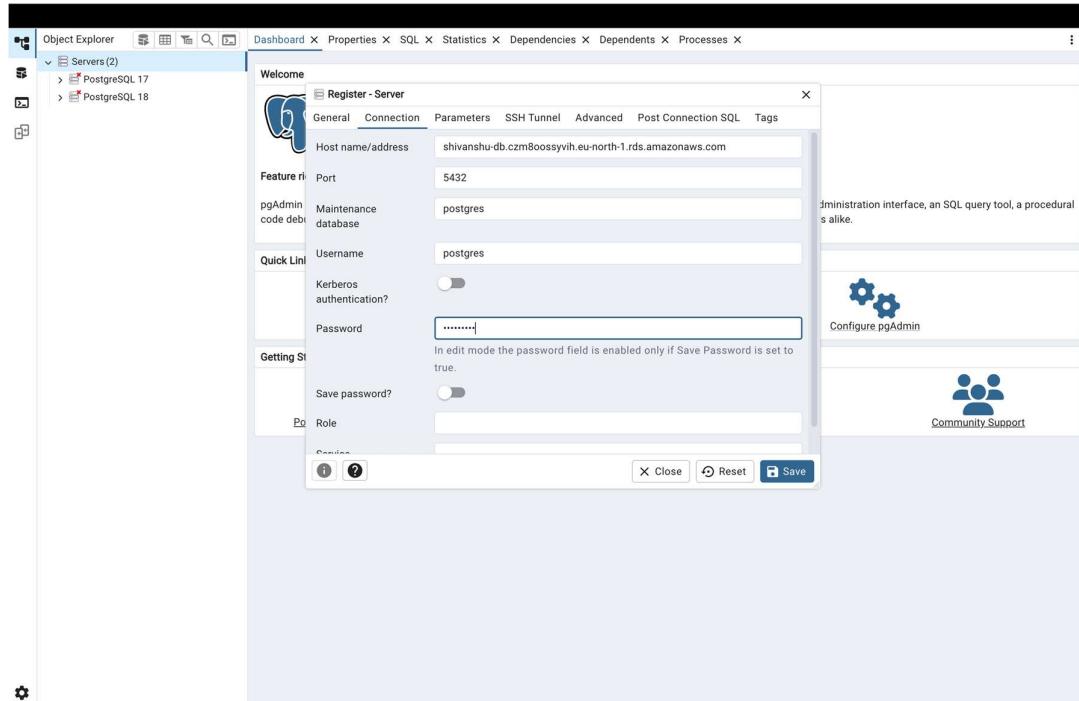
The screenshot shows the 'Register - Server' dialog box in pgAdmin 4. The 'General' tab is selected. The 'Name' field contains 'shivanshu-DB'. Under the 'Feature' section, there is a note about pgAdmin code debt. The 'Background' and 'Foreground' sections both have 'X' icons next to them. The 'Quick Link' section has a 'Connect now?' toggle switch which is turned on. The 'Getting Started' section includes links to 'PostgreSQL Documentation', 'pgAdmin Website', 'Planet PostgreSQL', and 'Community Support'. At the bottom of the dialog are 'Close', 'Reset', and 'Save' buttons.



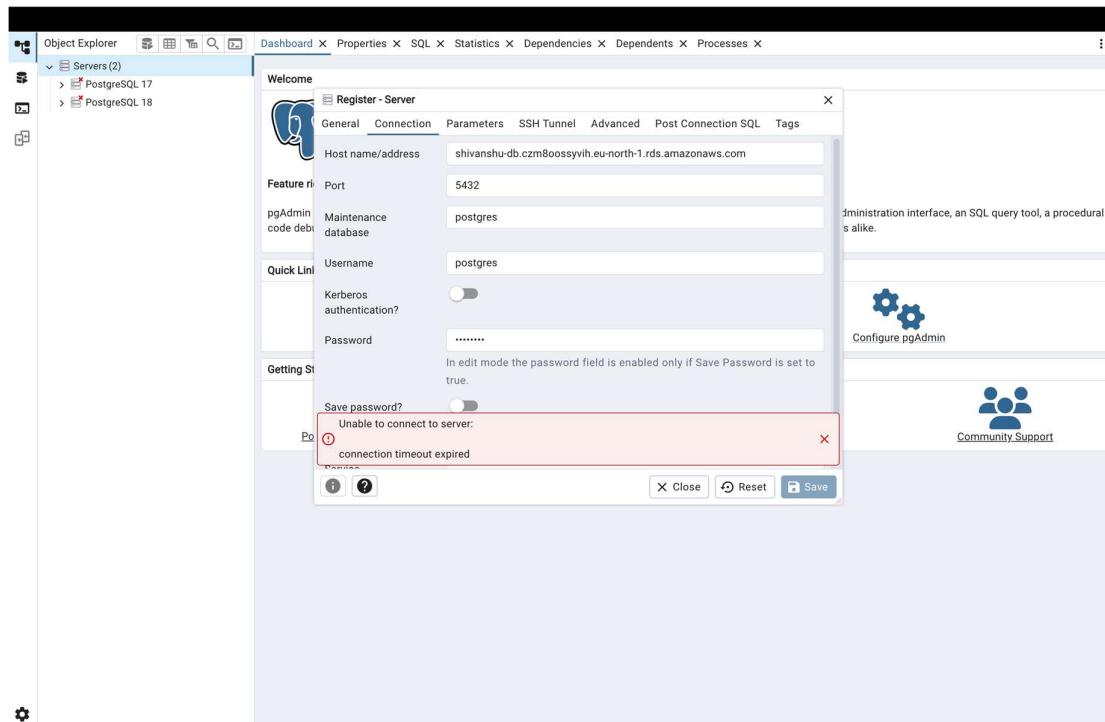
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10. Gr Setting Up Security Groups for RDS Access



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 '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, Availability Zone: eu-north-1a), and security (VPC security group: default). The bottom of the page includes CloudShell, Feedback, and standard footer links.

13. RDS Instance Creation in Progress

The screenshot shows the AWS EC2 Security Groups console for the 'sg-0b4c8dc4647072099 - default' security group. 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 existing rules: one for 'All traffic' from 'Custom' source and another for 'PostgreSQL' on port 5432 from 'My IP'. A new rule is being added, with 'Protocol' set to 'TCP', 'Port range' to '5432', and 'Source' set to '47.247.118.30/32'. Buttons for 'Add rule', 'Cancel', 'Preview changes', and 'Save rules' are at the bottom.



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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

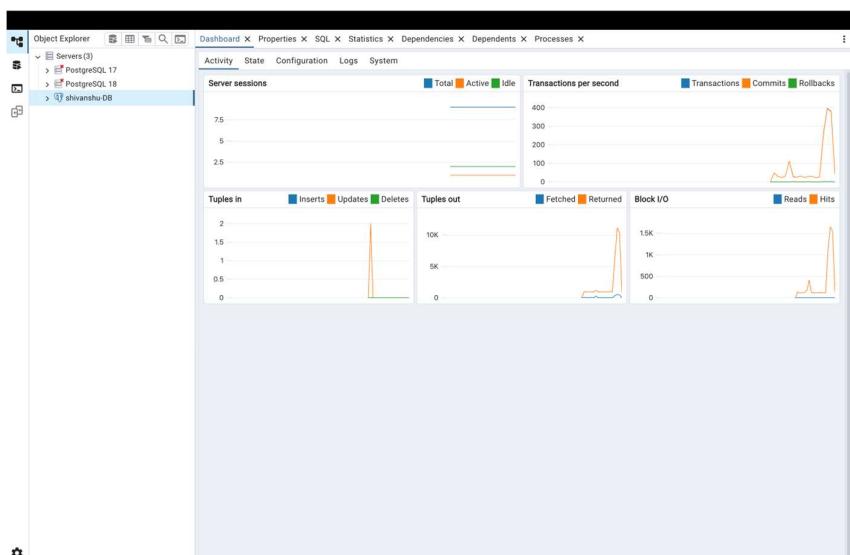
Certificate authority date

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

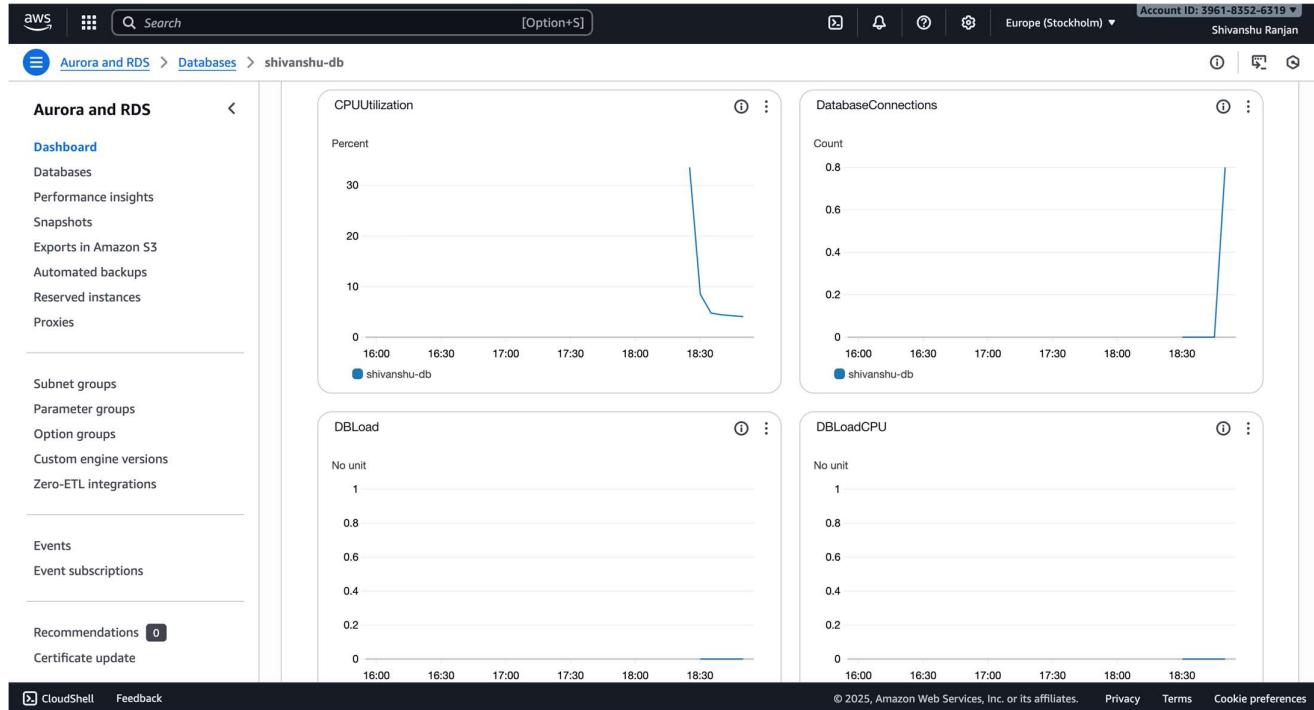




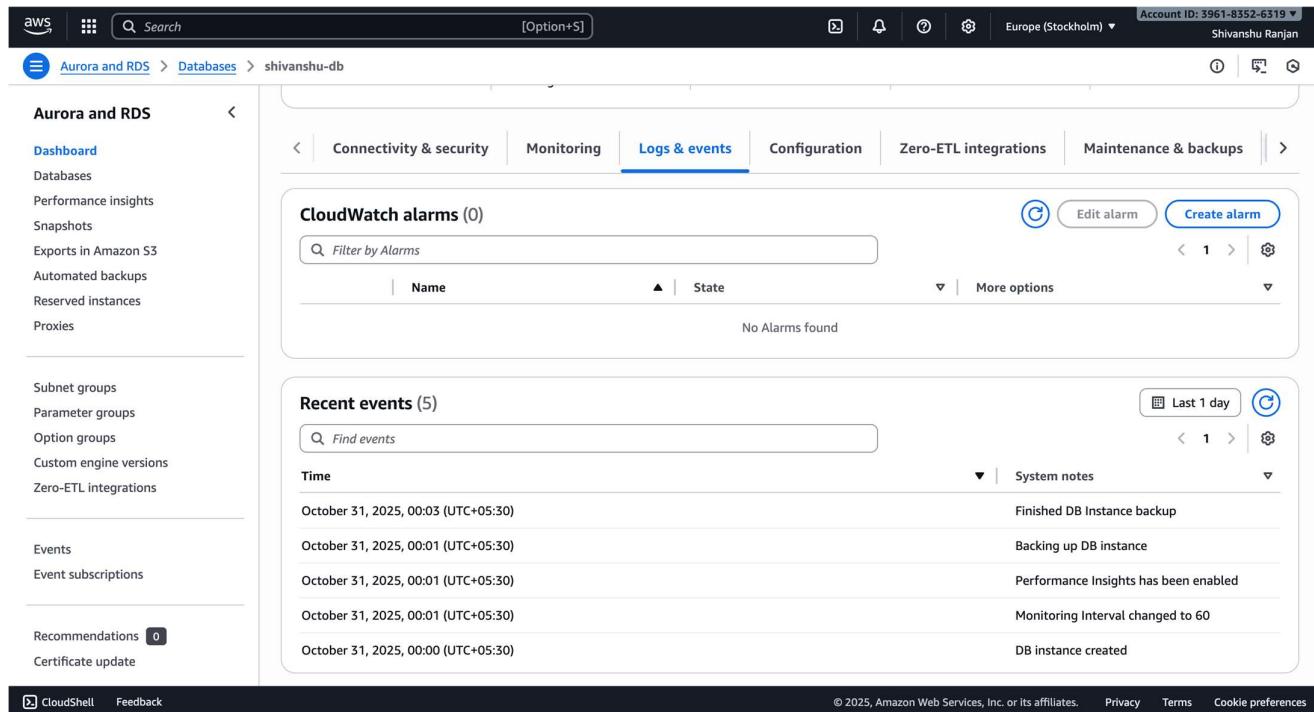
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17. Adding a New Server in pgAdmin



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 navigation includes: 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' and displays 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'. The top right of the main area has buttons for Group resources, Modify, Actions (with a dropdown menu), Create database, and a refresh icon. The top bar also shows Account ID: 3961-8352-6319, Europe (Stockholm), and the user name Shivanshu Ranjan.

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.