



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 with a search bar at the top containing 'rds'. The main pane displays the 'Services' section under 'Aurora and RDS'. It lists 'Aurora and RDS Managed Relational Database Service' as the top feature, with options for 'Dashboard', 'Database', 'Query Editor', 'Performance Insights', and 'Snapshots'. Below it are 'Database Migration Service Managed Database Migration Service' and 'Kinesis Work with Real-Time Streaming Data'. The 'Features' section includes 'Database Insights' and 'CloudWatch Feature'. At the bottom, there are links for 'Reserved Instances' and 'Proxies'. A sidebar on the left lists various AWS services like Aurora, RDS, Database, Performance Insights, Snapshots, and more. The top right corner shows the account ID '3981-0552-4319' and the user name 'Shivam Rangan'. A message at the bottom asks 'Were these results helpful?' with 'Yes' and 'No' buttons. The footer contains standard AWS links: CloudTrail, Feedback, © 2025, Amazon Web Services, Inc. or its affiliates., Privacy, Terms, and Cookie preferences.



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2. Navigating to RDS Service

The screenshot shows the AWS Aurora and RDS Databases page. 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 displays a message "No resources" and "No resources to display". A "Create database" button is visible at the bottom. The top navigation bar shows "Account ID: 3961-8352-6319" and "Shivanshu Ranjan".

3. Amazon RDS Dashboard Overview

The screenshot shows the AWS 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 has three sections: "Resources" (listing DB Instances, DB Clusters, and various snapshot and event subscription counts), "Explore RDS" (with a status of "Not started", a completion date of April 30, 2026, a reward value of USD 20.00, and an estimated duration of 2-5 minutes), and "Recommended services" (which currently shows "No recommendations yet"). The top navigation bar shows "Account ID: 3961-8352-6319" and "Shivanshu Ranjan".



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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 a free plan having limited features. Below it, two creation methods are shown: 'Standard create' (unselected) and 'Easy create' (selected), which uses recommended best-practice configurations. In the 'Configuration' section, 'PostgreSQL' is selected as the engine type, highlighted with a blue border. Other options like Aurora (MySQL Compatible), MySQL, MariaDB, and Oracle are also listed. At the bottom, there are links for CloudShell and Feedback, and standard AWS footer links for Privacy, Terms, and Cookie preferences.

5. Selecting PostgreSQL as Database Engine

This screenshot continues from the previous one, showing the configuration for a PostgreSQL database instance. It highlights the 'PostgreSQL' engine choice. On the left, there are two columns of instance types: one with 4 vCPUs and another with 2 vCPUs. The right column shows the configuration for the 2 vCPU instance: 16 GiB RAM, 200 GiB storage, and a price of 0.019 USD/hour. Below these, the 'DB instance identifier' is set to 'shivanshu-DB'. The 'Master username' is 'postgres'. Under 'Credentials management', 'Self managed' is selected, allowing the user to create their own password. The 'Master password' field contains a masked password. A 'Password strength' bar indicates the password is 'Neutral'. At the bottom, there are links for CloudShell and Feedback, and standard AWS footer links for Privacy, Terms, and Cookie preferences.



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6. Choosing Deployment Option and Template

The screenshot shows the 'Create database' configuration page for AWS Aurora and RDS. The configuration details are as follows:

Setting	Value	Status
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

A note at the bottom states: "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."

Buttons at the bottom right include 'Cancel' and 'Create database'.

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

The screenshot shows the 'Databases' page for the Aurora and RDS service. A blue banner at the top indicates that the database 'shivanshu-db' is currently 'Creating'. The main table displays the following information:

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

The left sidebar contains a navigation menu with the following items:

- 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)
- Certificate update

At the bottom, there are links for CloudShell, Feedback, and a footer with copyright information: © 2025, Amazon Web Services, Inc. or its affiliates. Privacy Terms Cookie preferences.



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8. Setting Up Instance Size and Storage

The screenshot shows the pgAdmin interface. In the top navigation bar, the 'Servers' tab is selected. A context menu is open over a PostgreSQL 18 instance named 'shivanshu-DB'. The menu options include 'Register', 'Create', 'Refresh...', 'Remove Server Group', 'Disconnect from all servers', and 'Properties...'. Below the menu, a tooltip for 'pgAdmin' is displayed, stating: 'Management Tools for PostgreSQL' and 'Maximises PostgreSQL | Open Source'. A descriptive text box below the menu explains that pgAdmin is an open-source administration and management tool for PostgreSQL databases, including a graphical interface, SQL query tool, procedural code debugger, and more, designed for developers, DBAs, and system administrators.

9. Configuring Connectivity and VPC Settings

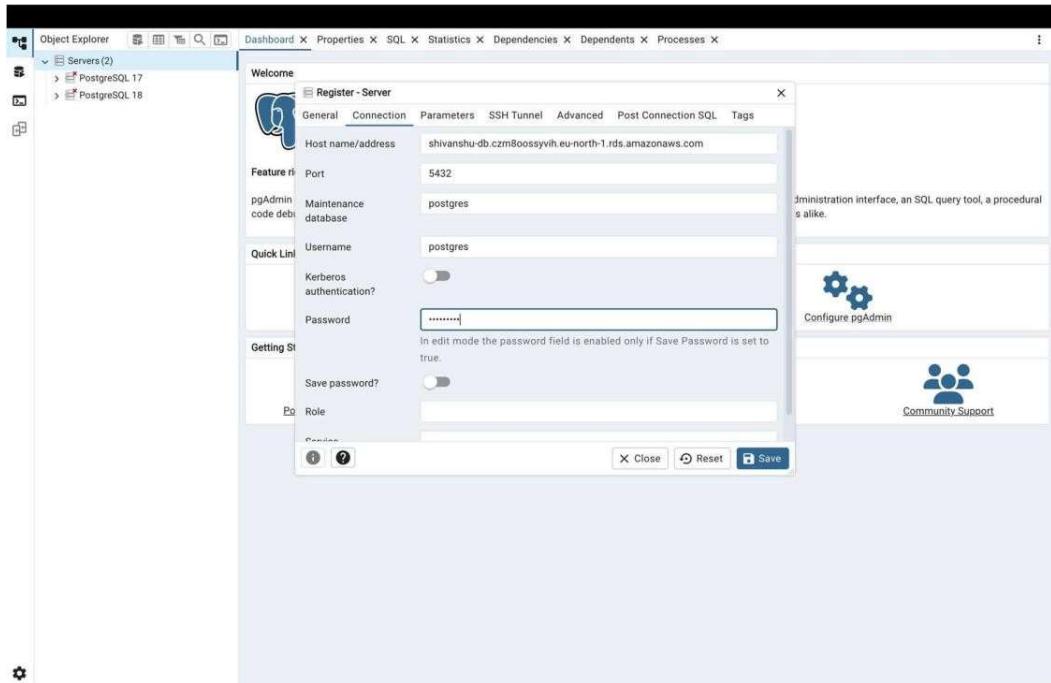
The screenshot shows the 'Register - Server' dialog box in pgAdmin. The 'General' tab is selected. The 'Name' field contains 'shivanshu-DB'. Under the 'Feature' section, 'Server group' is set to 'Servers'. The 'Background' and 'Foreground' checkboxes are unchecked. The 'Connect now?' checkbox is checked. The 'Comments' field is empty. On the right side of the dialog, there is a tooltip for 'Configure pgAdmin' and another for 'Community Support'. At the bottom, there are 'Close', 'Reset', and 'Save' buttons.



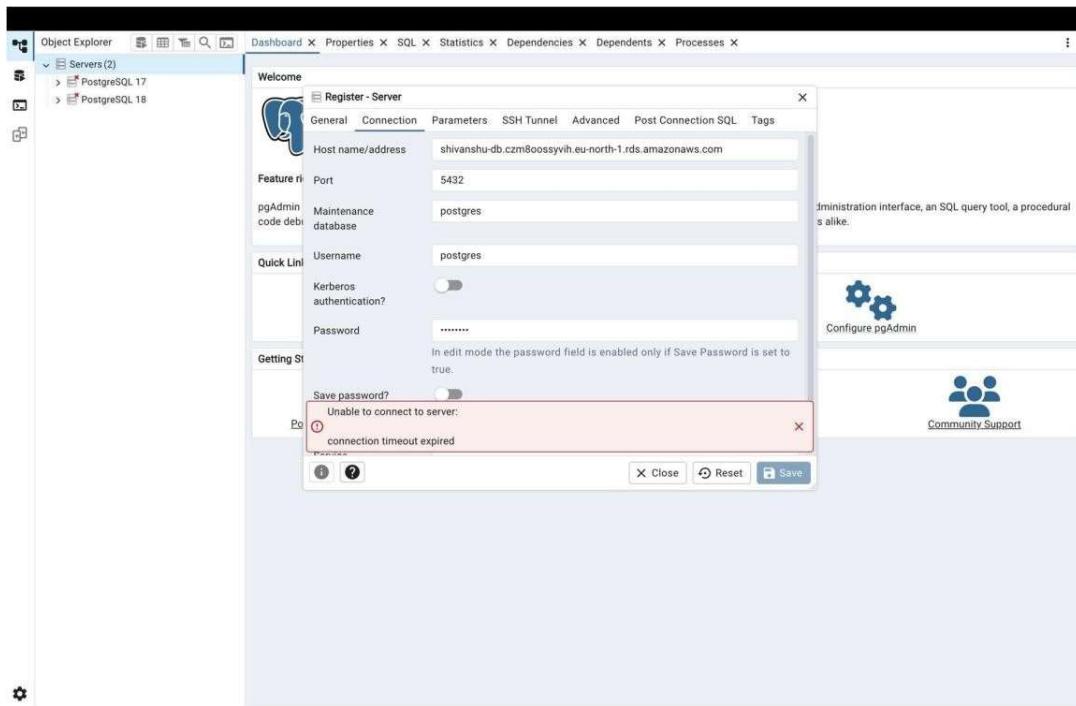
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10. Gr Setting Up Security Groups for RDS Access



11. Additional Database Configuration Options





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12. Reviewing and Creating the Database Instance

The screenshot shows the AWS Aurora and RDS console. On the left, there's a sidebar with 'Aurora and RDS' selected. The main area displays the 'shivanshu-db' database instance. The 'Summary' section shows the DB identifier as 'shivanshu-db', Status as 'Available', Role as 'Instance', Engine as 'PostgreSQL', and Region & AZ as 'eu-north-1a'. Below the summary, tabs for 'Connectivity & security', 'Monitoring', 'Logs & events', 'Configuration', 'Zero-ETL integrations', and 'Maintenance & backups' are visible, with 'Connectivity & security' being the active tab. Under 'Connectivity & security', sections for 'Endpoint & port' (Endpoint: shivanshu-db.czm8oossyvih.eu-north-1.rds.amazonaws.com, Port: 5432), 'Networking' (Availability Zone: eu-north-1a, Subnet group: default-vpc-086507ee77883ae1b, Subnets: subnet-0db6b45e321b7000a, subnet-087377db566f545dc, subnet-0bac42bdab1e990c5), and '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) are shown. At the bottom, there are links for CloudShell, Feedback, and a footer with copyright information.

13. RDS Instance Creation in Progress

The screenshot shows the 'Edit inbound rules' page for a security group. It lists two rules: one for 'All traffic' (Protocol: All, Port range: All, Source: Custom, Destination: sg-0b4c8dc4647072099) and another for 'PostgreSQL' (Protocol: TCP, Port range: 5432, Source: My IP, Destination: 47.247.118.30/32). There are buttons for 'Add rule', 'Cancel', 'Preview changes', and 'Save rules'. At the bottom, there are links for CloudShell, Feedback, and a footer with copyright information.



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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](#)

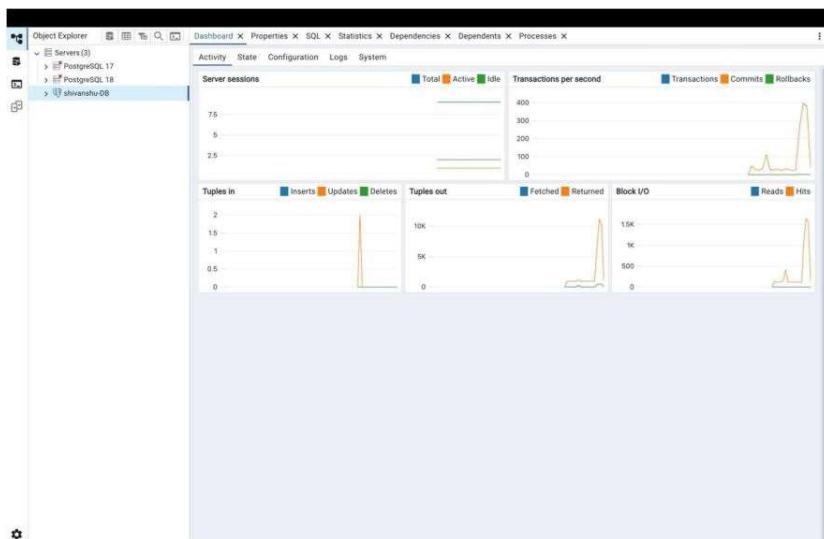
5432

15. Copying the RDS Endpoint for Connection

Connectivity & security

Endpoint & port	Networking	Security
Endpoint shivanshu-db.czmm8oossyvih.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-0db6b45e321b7000 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

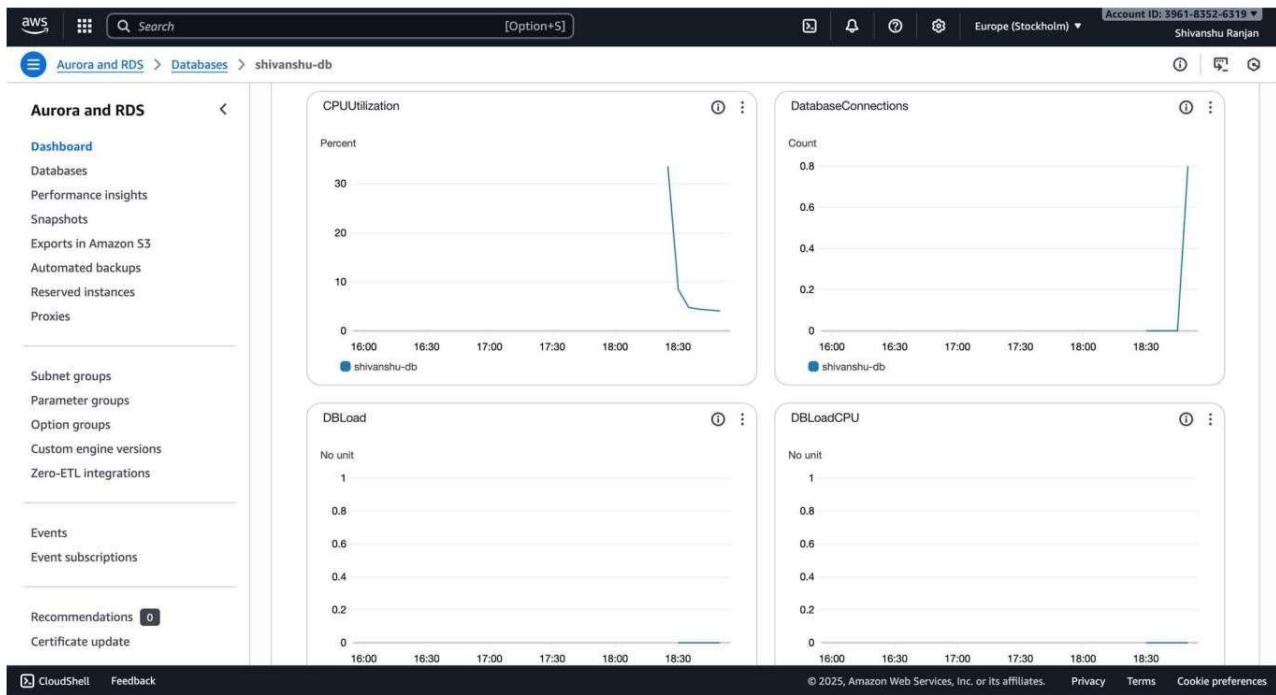




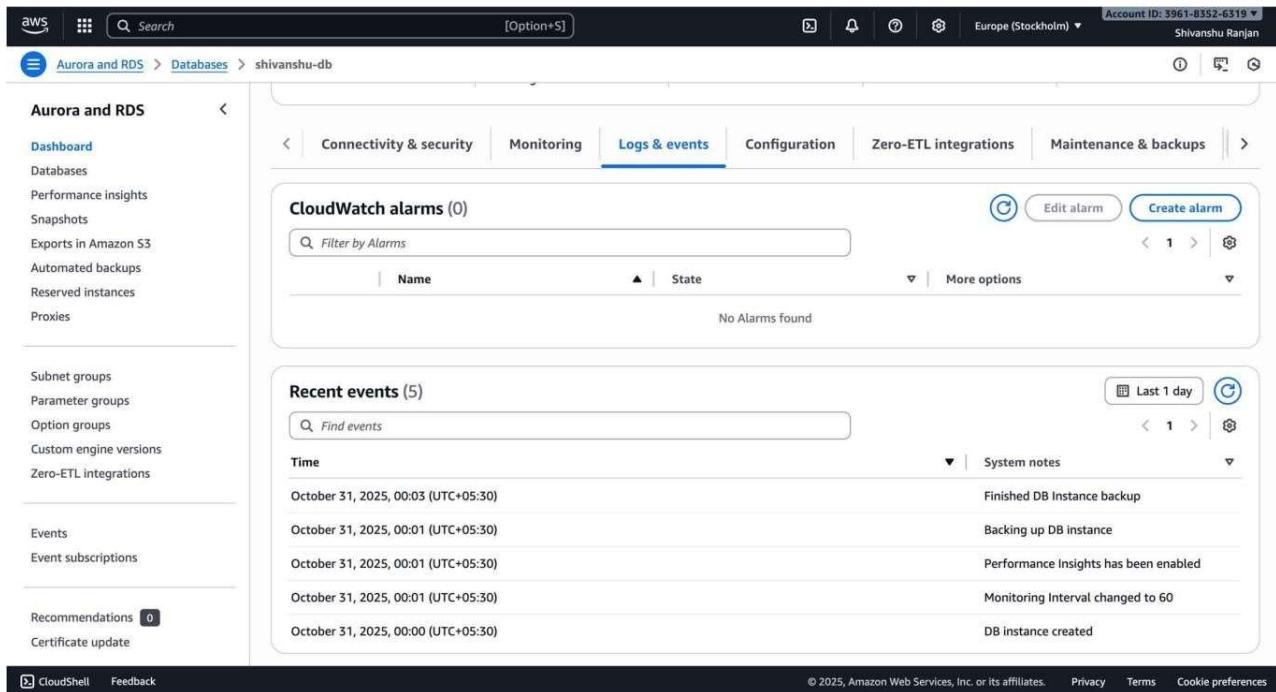
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17. Adding a New Server in pgAdmin



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. On the left, there's a sidebar with navigation links like Dashboard, Databases, Performance insights, Snapshots, and Automated backups. The main area is titled 'Deleting DB instance shivanshu-db' and shows a table of databases. One row is selected, showing the identifier 'shivanshu-db' with a status of 'Deleting'. The table includes columns for DB identifier, Status, Role, Engine, Region, and Size. The top right of the page shows account information: Account ID: 3961-8352-6319, Europe (Stockholm), and 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.