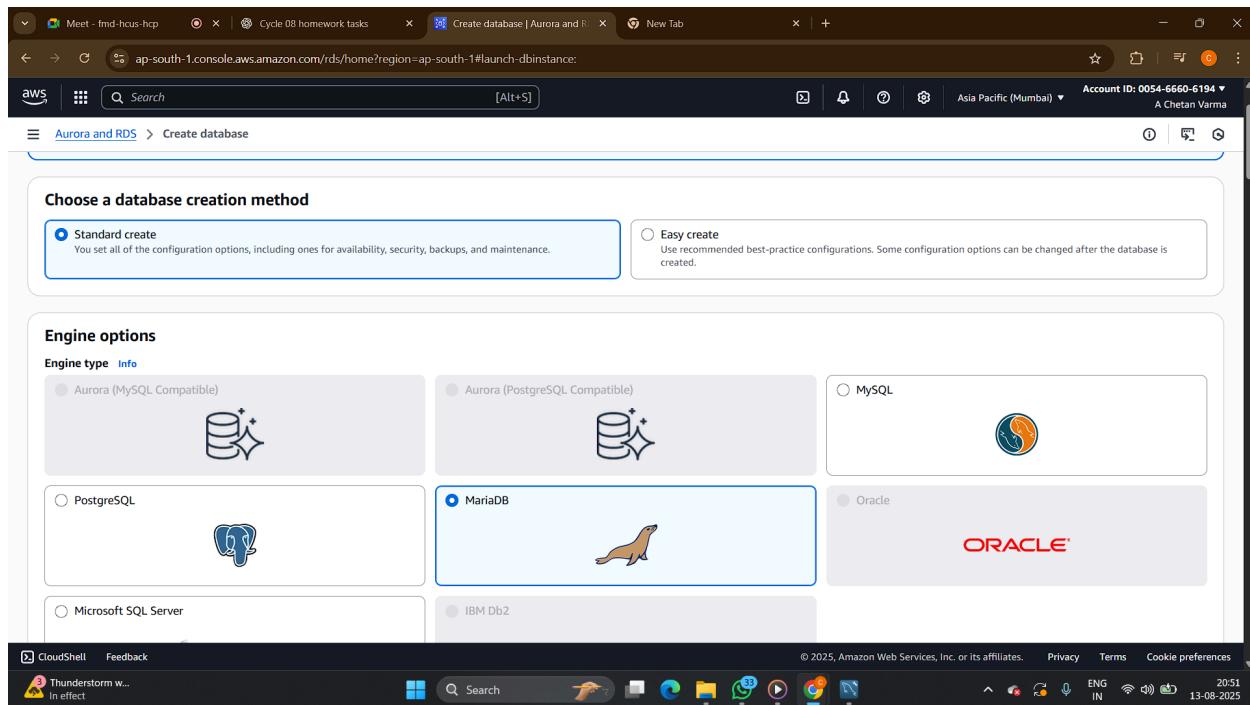


Cycle 08 AWS Homework

1. How to Deploy Databases on AWS RDS

- First, choose the database engine you want: for example, PostgreSQL or MariaDB.
- Use the AWS Console to launch a new RDS instance.
- Configure networking so your computer can connect to the database. This might involve setting up a "security group" to allow network access from your IP address.
- AWS will provide a unique "endpoint" (a URL). In your database client (like PGAdmin for PostgreSQL or MySQL Workbench for MariaDB), use this endpoint along with your database username and password to connect.
- Once connected, test basic queries like creating a table, inserting a record, and selecting data. This proves your setup works.



The screenshot shows the 'Create database' wizard in the AWS RDS console. The current step is 'Settings'. The 'DB instance identifier' field is set to 'chetan2410'. Under 'Credentials Settings', the 'Master username' is 'chetan2410' and the 'Master password' is masked. The 'Self managed' option is selected for password management. Under 'Virtual private cloud (VPC)', the 'Default VPC' dropdown shows 'Default VPC (vpc-023c2a298566fed5)'. The 'Public access' section has 'Yes' selected. In the 'VPC security group (firewall)' section, 'Choose existing' is selected. The 'Existing VPC security groups' dropdown is empty. The bottom of the screen shows the Windows taskbar with various pinned icons.

The screenshot shows the 'Create database' wizard in the AWS RDS console. The current step is 'Virtual private cloud (VPC)'. The 'Default VPC' dropdown shows 'Default VPC (vpc-023c2a298566fed5)'. A note states 'After a database is created, you can't change its VPC.' The 'DB subnet group' dropdown shows 'default'. The 'Public access' section has 'Yes' selected. In the 'VPC security group (firewall)' section, 'Choose existing' is selected. The 'Existing VPC security groups' dropdown is empty. The bottom of the screen shows the Windows taskbar with various pinned icons.

The screenshot shows the 'Edit inbound rules' section of the AWS EC2 Security Groups interface. It lists three existing rules:

Security group rule ID	Type	Protocol	Port range	Source	Description - optional
sgr-0f825d1c7efcd7357	All traffic	All	All	Custom	sg-08c08c219a3c677ac
-	MySQL/Aurora	TCP	3306	Anywh...	0.0.0.0/0
-	MySQL/Aurora	TCP	3306	Anywh...	::/0

A button for 'Add rule' is visible at the bottom left. A note at the bottom states: '⚠ Rules with source of 0.0.0.0/0 or ::/0 allow all IP addresses to access your instance. We recommend setting security group rules to allow access from known IP addresses only.' Buttons for 'Cancel', 'Preview changes', and 'Save rules' are at the bottom right.

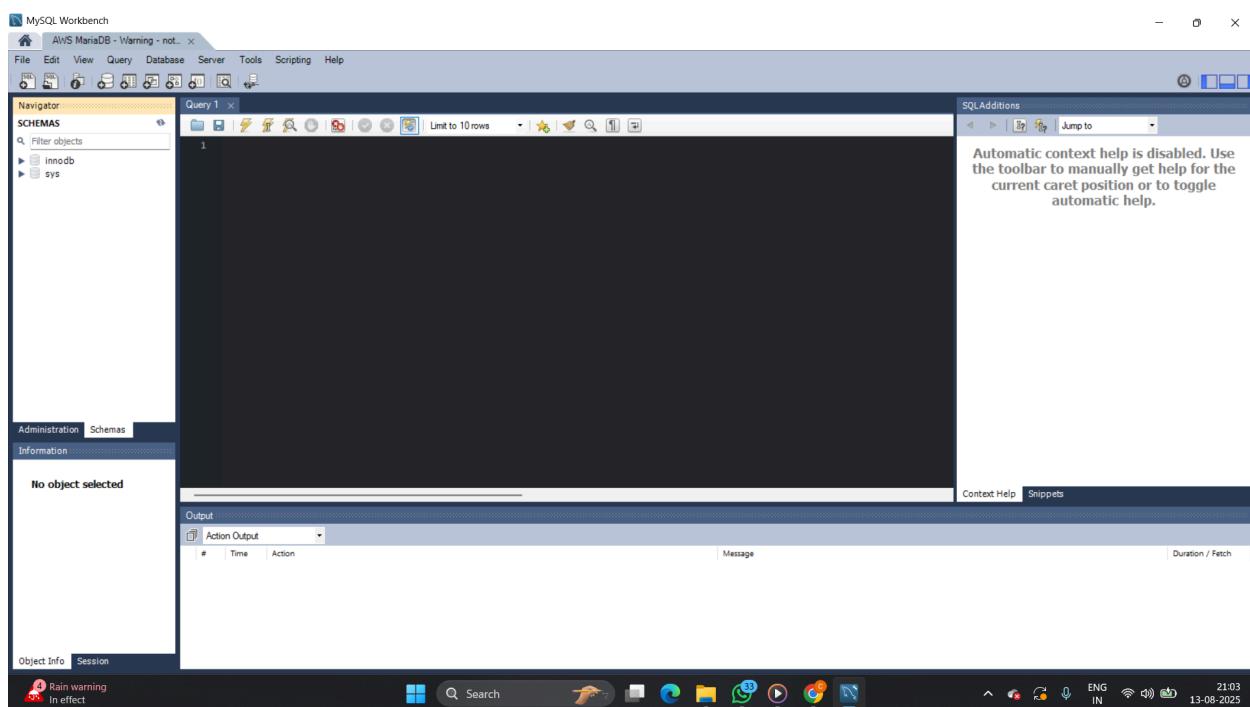
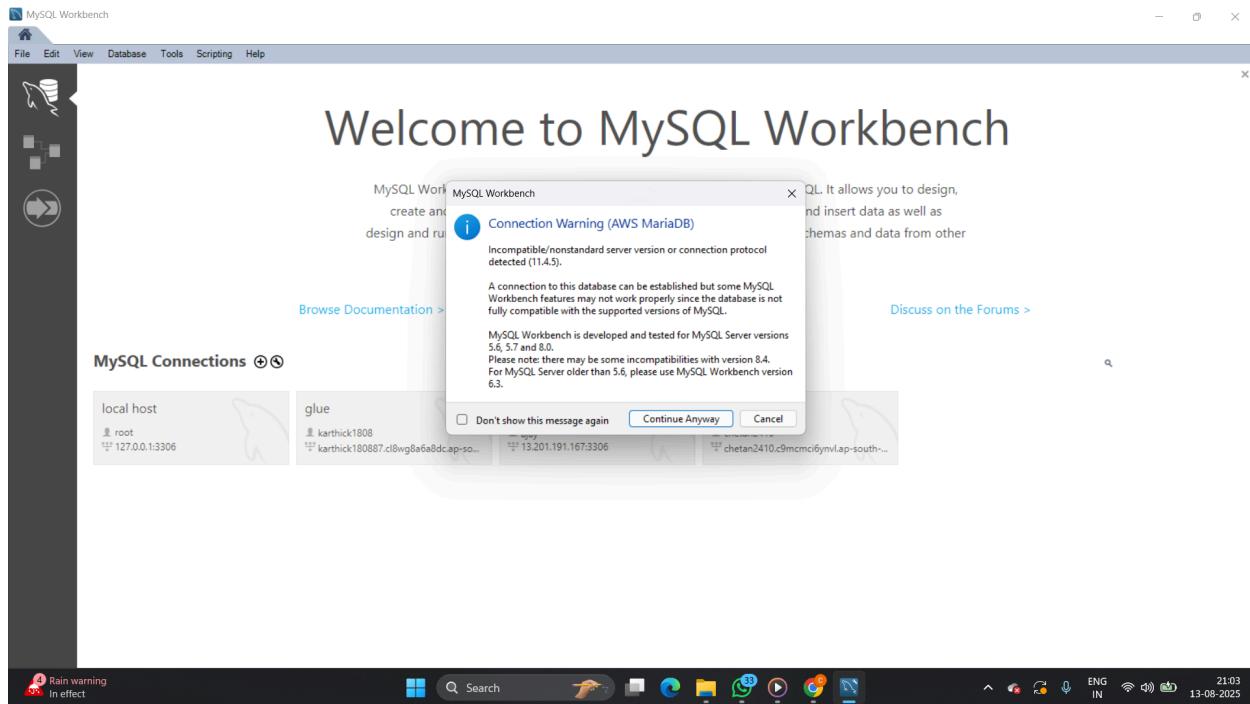
The screenshot shows the 'Databases' section of the AWS Aurora and RDS interface. A blue notification bar at the top right suggests creating a blue/green deployment. The main table displays one database entry:

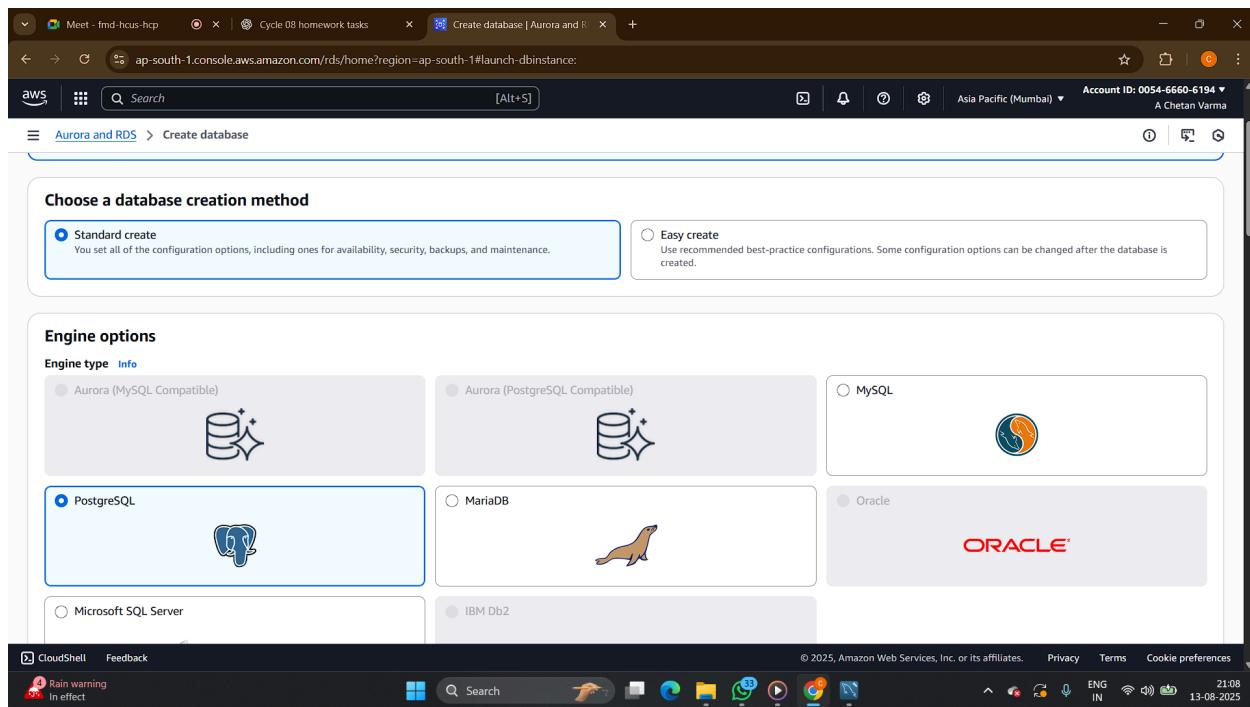
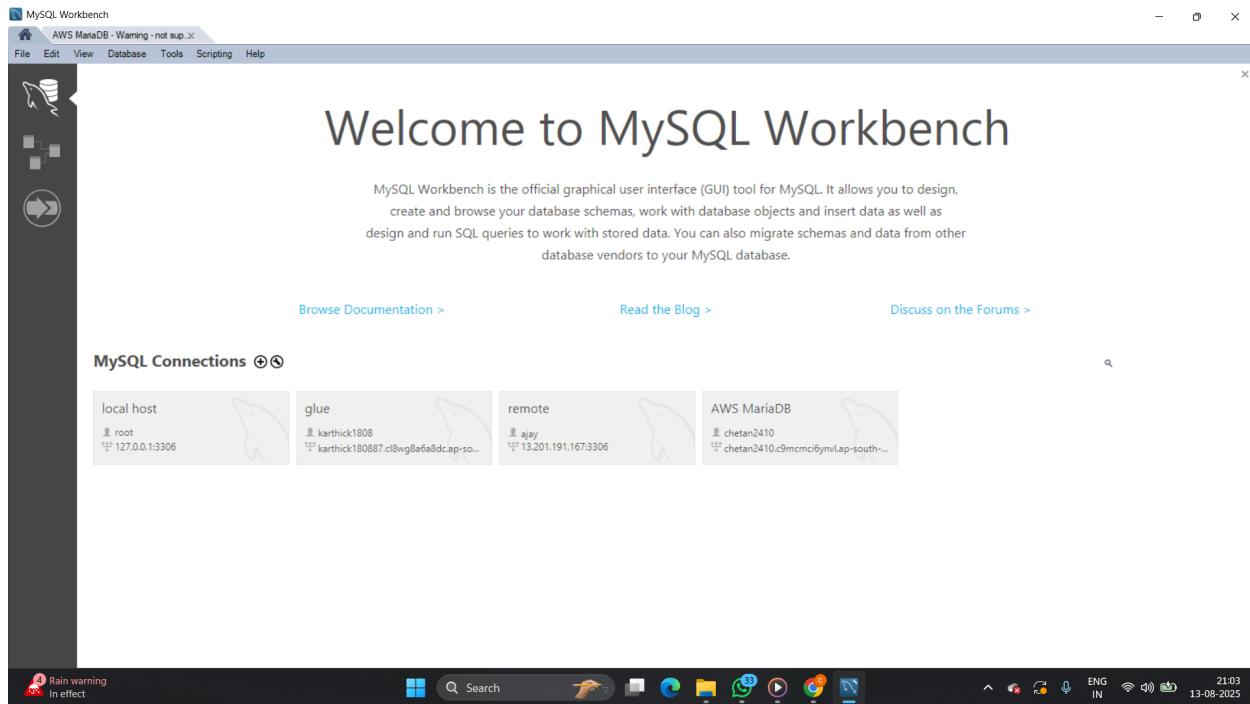
DB identifier	Status	Role	Engine	Region ...	Size
chetan2410	Available	Instance	MariaDB	ap-south-1c	db.t4g.micro

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, and Event subscriptions.

The screenshot shows the AWS RDS Database Details page for a database named 'chetan2410'. The main navigation bar includes tabs for Aurora and RDS, Databases, and chetan2410. On the left, a sidebar lists various RDS management options like 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, and Event subscriptions. The central panel is titled 'Connectivity & security' and contains sections for 'Endpoint & port', 'Networking', and 'Security'. The 'Endpoint & port' section shows the endpoint as 'chetan2410.9mcmc6gymv.ap-south-1.rds.amazonaws.com' and the port as '3306'. The 'Networking' section details the VPC ('vpc-023c2a298566fed5'), subnet group ('default-vpc-023c2a298566fed5'), and subnets ('subnet-01a488a142b8f6269', 'subnet-0d5d8f0a85de164f0', 'subnet-047712ef248d68208'). The 'Security' section shows the VPC security group ('default sg-08c08c219a5c677ac') as active. Other details include the public accessibility ('Yes'), certificate authority ('rds-ca-rsa2048-g1'), certificate authority date ('May 20, 2061, 00:10 (UTC+05:30)'), and DB instance certificate expiration date ('August 13, 2026, 20:53 (UTC+05:30)'). A message 'Endpoint copied' is displayed above the endpoint information.

The screenshot shows the MySQL Workbench interface. The main window displays a 'Welcome to MySQL Workbench' message. On the left, there's a sidebar with icons for Home, File, Edit, View, Database, Tools, Scripting, Help, and CloudShell. Below this is a 'MySQL Connections' section with entries for 'local host' and 'glue'. A 'Setup New Connection' dialog box is open in the center, prompting for connection details. The 'Connection Name' is set to 'AWS MariaDB', 'Connection Method' is 'Standard (TCP/IP)', and 'Parameters' are set to 'SSL Advanced'. The 'Hostname' field contains 'no6yv1.ap-south-1.rds.amazonaws.com', 'Port' is '3306', 'Username' is 'chetan2410', and 'Password' is left blank. The 'Default Schema' field is also empty. At the bottom of the dialog are 'Configure Server Management...', 'Test Connection', 'Cancel', and 'OK' buttons. The status bar at the bottom indicates a 'Rain warning' and the date '13-08-2025'.





Aurora and RDS > Create database

Enable RDS Extended Support [Info](#)
Amazon RDS Extended Support is a [paid offering](#). By selecting this option, you consent to being charged for this offering if you are running your database major version past the RDS end of standard support date for that version. Check the end of standard support date for your major version in the [RDS for PostgreSQL documentation](#).

Templates
Choose a sample template to meet your use case.

- Production**
Use defaults for high availability and fast, consistent performance.
- Dev/Test**
This instance is intended for development use outside of a production environment.
- Free tier**
Use RDS Free Tier to develop new applications, test existing applications, or gain hands-on experience with Amazon RDS.

Availability and durability

Deployment options [Info](#)
Choose the deployment option that provides the availability and durability needed for your use case. AWS is committed to a certain level of uptime depending on the deployment option you choose. Learn more in the [Amazon RDS service level agreement \(SLA\)](#).

- Multi-AZ DB cluster deployment (3 instances)**
Creates a primary DB instance with two readable standbys in separate Availability Zones. This setup provides:
 - 99.95% uptime
 - Redundancy across Availability Zones
 - Increased read capacity
 - Reduced write latency
- Multi-AZ DB instance deployment (2 instances)**
Creates a primary DB instance with a non-readable standby instance in a separate Availability Zone. This setup provides:
 - 99.95% uptime
 - Redundancy across Availability Zones
- Single-AZ DB instance deployment (1 instance)**
Creates a single DB instance without standby instances. This setup provides:
 - 99.5% uptime
 - No data redundancy

Write/read endpoint AZ 1 Reader endpoints AZ 2 Write/read endpoint AZ 1 Standby (no endpoint) AZ 2 Write/read endpoint AZ 1

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Rain warning In effect

Aurora and RDS > Create database

Settings

DB instance identifier [Info](#)
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.

Credentials Settings

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.

- Managed in AWS Secrets Manager - most secure**
RDS generates a password for you and manages it throughout its lifecycle using AWS Secrets Manager.
- 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](#)

Minimum constraints: At least 8 printable ASCII characters. Can't contain any of the following symbols: / * @

CloudShell Feedback Rain warning In effect © 2025, Amazon Web Services, Inc. or its affiliates. Privacy Terms Cookie preferences ENG IN 21:08 13-08-2025

The screenshot shows the 'Create database' wizard in the AWS RDS console. In the 'Instance configuration' section, a 'DB instance class' is selected as 'db.t4g.micro' (2 vCPUs, 1 GiB RAM, Network: Up to 2,085 Mbps). Under 'Storage', it indicates 'Provisioned IOPS SSD (io2) storage volumes are now available'. The status bar at the bottom shows 'CloudShell Feedback' and a 'Rain warning' icon.

The screenshot shows the 'Edit inbound rules' page for a security group. It lists three rules:

- Rule 1: Type 'All traffic', Protocol 'All', Port range 'All', Source 'Custom' (selected), Destination 'sg-08c08c219a3c677ac' (selected), Description 'optional'.
- Rule 2: Type 'PostgreSQL', Protocol 'TCP', Port range '5432', Source 'Anywhere' (selected), Destination '0.0.0.0/0' (selected), Description 'optional'.
- Rule 3: Type 'PostgreSQL', Protocol 'TCP', Port range '5432', Source 'Anywhere' (selected), Destination '::/0' (selected), Description 'optional'.

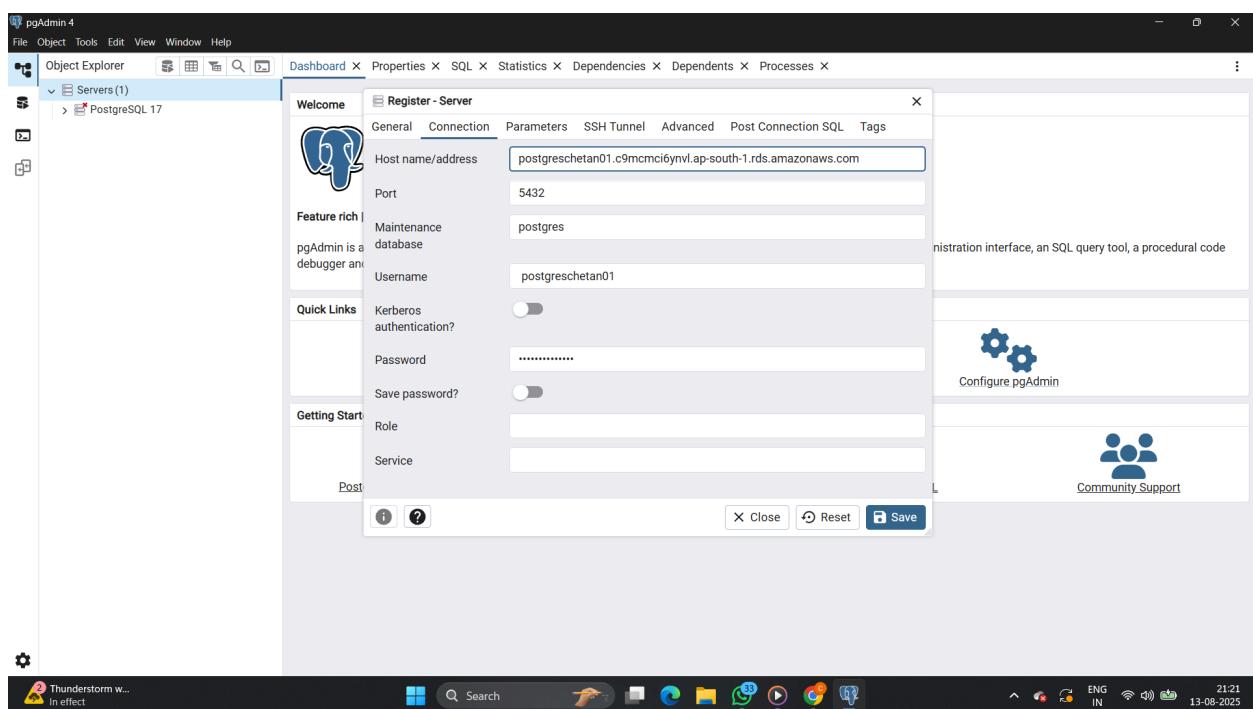
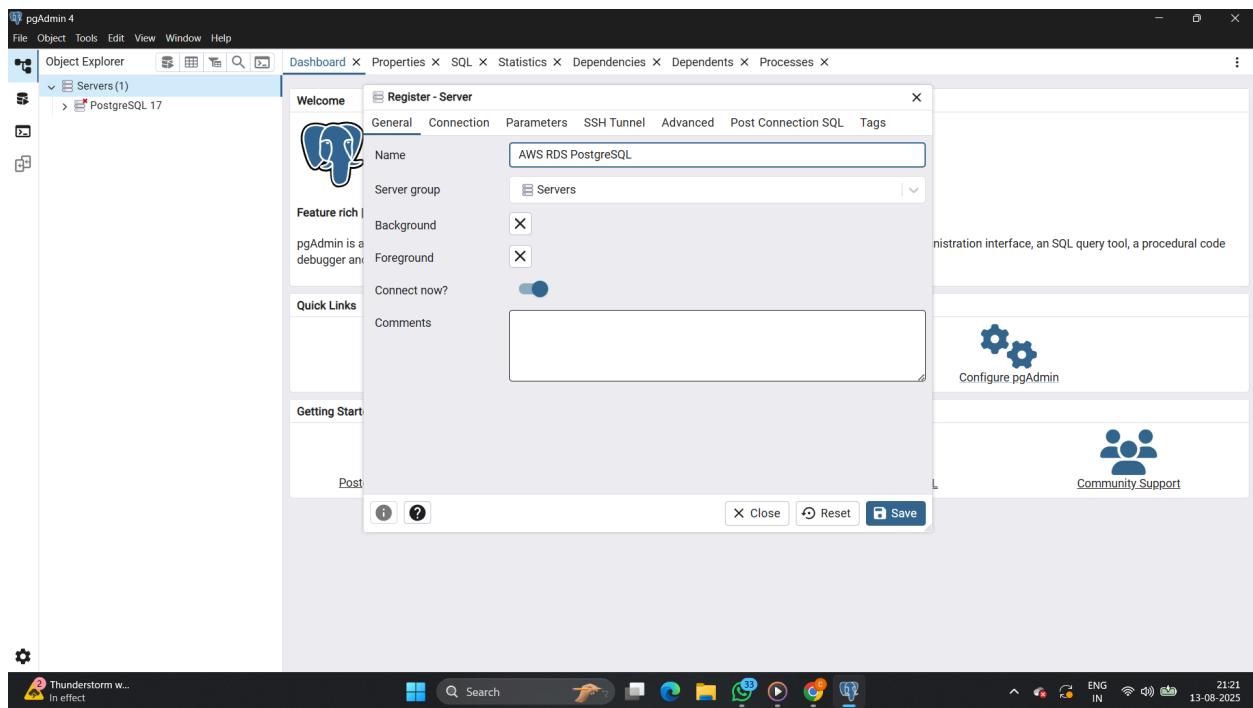
A note at the bottom states: '⚠ Rules with source of 0.0.0.0/0 or ::/0 allow all IP addresses to access your instance. We recommend setting security group rules to allow access from known IP addresses only.' Buttons for 'Cancel', 'Preview changes', and 'Save rules' are visible.

Databases (1)

DB identifier	Status	Role	Engine	Region ...	Size
postgreschetal01	Creating	Instance	PostgreSQL	ap-south-1c	db.t4g.micro

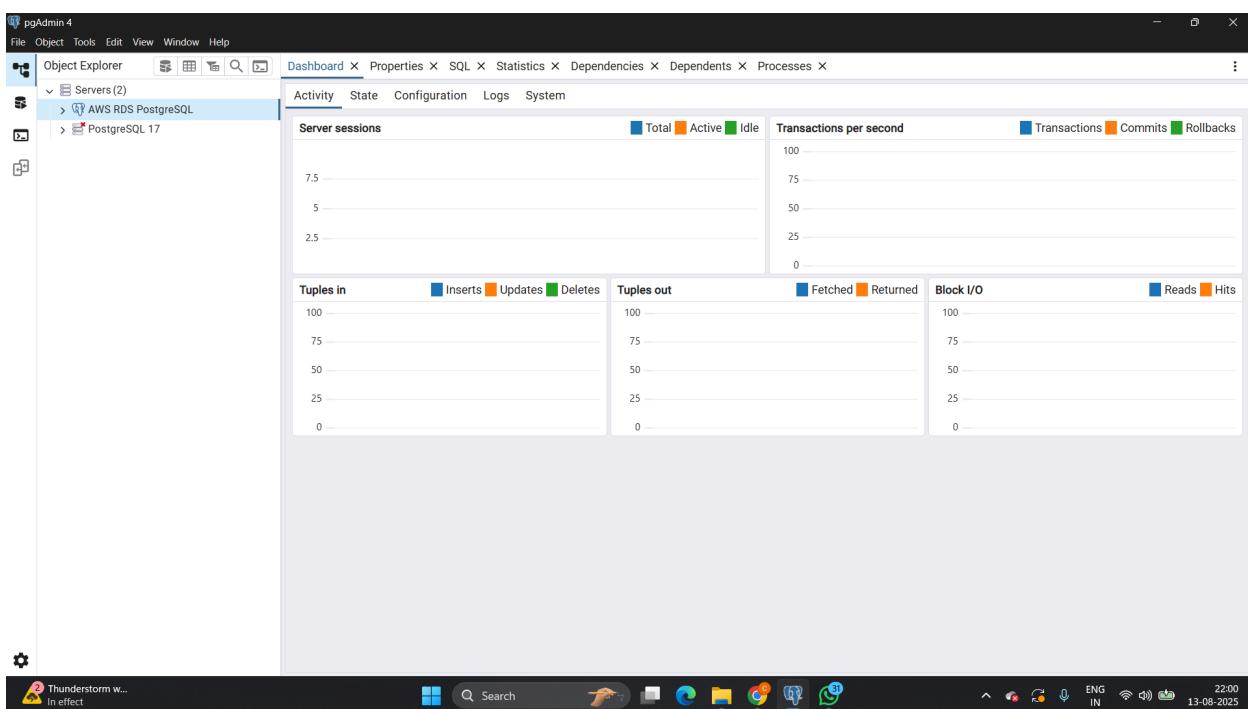
Connectivity & security

Endpoint port	Networking	Security
postgreschetal01.c9mcmci6ynvl.ap-south-1.rds.amazonaws.com	Availability Zone ap-south-1c	VPC security groups default (sg-08c08c219a3c677ac) Active
Port 5432	VPC vpc-023c2a2985666fed5	Publicly accessible No
Subnets	Subnet group default-vpc-023c2a2985666fed5	Certificate authority Info rds-ca-rsa2048-g1
Subnet type	Subnets	Certificate authority date May 20, 2061, 00:10 (UTC+05:30)



The screenshot shows the AWS RDS Modify DB instance page for a PostgreSQL database named 'postgres01'. The 'Additional configuration' section includes:

- Public access:** Set to 'Publicly accessible' (radio button selected). A note explains that RDS assigns a public IP address to the database, allowing connections from VPC and non-VPC resources.
- Database port:** Set to 5432.
- Database authentication:** Set to 'Password authentication' (radio button selected).



2. Aurora Database Testing

- Amazon Aurora is another database option that offers high performance and scalability.

- You can choose Aurora that is MySQL-compatible and set it to testing mode (not free tier, so delete when done to save money).
 - With Aurora Serverless, you don't set a fixed size—it automatically scales up when busy and pauses when idle. You set minimum and maximum capacity.
 - Aurora offers two types of endpoints: writer and reader. Writer allows you to make changes (INSERT, UPDATE), while reader is just for getting data (SELECT).
 - Test by running a write operation on the writer endpoint (should work).
 - Attempt a write on the reader endpoint (should fail) and read queries on it (should work).
-

3. Performance Benchmarking

- AWS databases use different types of storage:
 - Magnetic HDDs: slow performance, not recommended for most workloads.
 - General Purpose SSDs: balanced performance and price.
 - Provisioned IOPS SSDs: fastest, designed for high-performance needs.
 - To compare, deploy test databases with each storage type, run similar queries, and measure how long they take. You will find magnetic is slowest, SSD is in the middle, and provisioned IOPS is the fastest.
-

4. Advanced Aurora Features

- Multi-AZ clusters automatically switch to a standby copy if something fails, keeping your database online with minimal interruption.
- You can scale reads by adding more reader replicas to distribute query loads.

Screenshot of the AWS RDS console showing the creation of a new database named "chetandb1". The database is listed under "Databases" with one instance, "chetandb1-instance-1", which is currently "Creating". A context menu is open for "chetandb1", showing options like "Stop temporarily", "Set up EC2 connection", and "Add reader".

Screenshot of the AWS RDS console showing the configuration of a new "Add reader" instance. The "Aurora replica source" is set to "chetandb1-instance-1". The "DB instance identifier" is "reader-instance". Under "Instance configuration", the "DB instance class" is set to "Serverless v2" and the "Capacity range" is "0.5 ACUs (1 GiB) - 1 ACUs (2 GiB)".

The screenshot shows the AWS RDS console with the URL ap-south-1.console.aws.amazon.com/rds/home?region=ap-south-1#databases. The page is titled "Create a new database instance". A note says "The replica database will be in the same Region as the source database." Under "Connectivity", "Public access" is set to "Publicly accessible". Under "Availability Zone", "Info" indicates the EC2 Availability Zone is "No preference". Under "Certificate authority - optional", it shows "rds-ca-rsa2048-q1 (default)" with an expiry date of "May 20, 2061". The bottom status bar shows "CloudShell Feedback" and the date "16-08-2025".

The screenshot shows the AWS RDS console with the URL ap-south-1.console.aws.amazon.com/rds/home?region=ap-south-1#databases. A green success message says "Successfully modified chetandb1-instance-1.". The "Databases" table lists three entries: "chetandb1" (Regional cluster, Aurora MySQL, ap-south-1, 2 instances), "chetandb1-instance-1" (Writer instance, Aurora MySQL, ap-south-1b, Serverless v2 (0.5 - 1 ACUs)), and "reader-instance" (Reader instance, Aurora MySQL, ap-south-1a, Serverless v2 (0.5 - 1 ACUs)). The left sidebar includes links for Dashboard, Databases, Query editor, 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, and Event subscriptions. The bottom status bar shows "CloudShell Feedback" and the date "16-08-2025".

Aurora and RDS

Related

DB identifier	Status	Role	Engine	Region ...	Size	Recom...	CPU
chetandb1	Available	Regional c...	Aurora My...	ap-south-1	2 instances	-	-
chetandb1-instance-1	Available	Writer ins...	Aurora My...	ap-south-1b	Serverless...	45	45
reader-instance	Available	Reader ins...	Aurora My...	ap-south-1a	Serverless...	42	42

Connectivity & security | Monitoring | Logs & events | Configuration | Maintenance & backups | Tags | Recommendations

Connectivity & security

Endpoint **port** **Endpoint copied**

reader-instance.czv4c442w5fq.ap-south-1.rds.amazonaws.com

Networking

Availability Zone: ap-south-1a
VPC: vpc-00dcef4d69d6b4f5d
Subnet group: default-vpc-00dcef4d69d6b4f5d

Security

VPC security groups: default (sg-0eac963e1cef69496) **Active**
Publicly accessible: Yes
Certificate authority: rds-ca-rsa2048-01

Welcome to MySQL Workbench

Setup New Connection

Connection Name: aws only reader

Connection Method: Standard (TCP/IP)

Parameters: SSL Advanced

Hostname: H2w5fq.ap-south-1.rds.amazonaws.com Port: 3306

Username: chetandb1

Password: Store in Vault... Clear

Default Schema:

MySQL Workbench

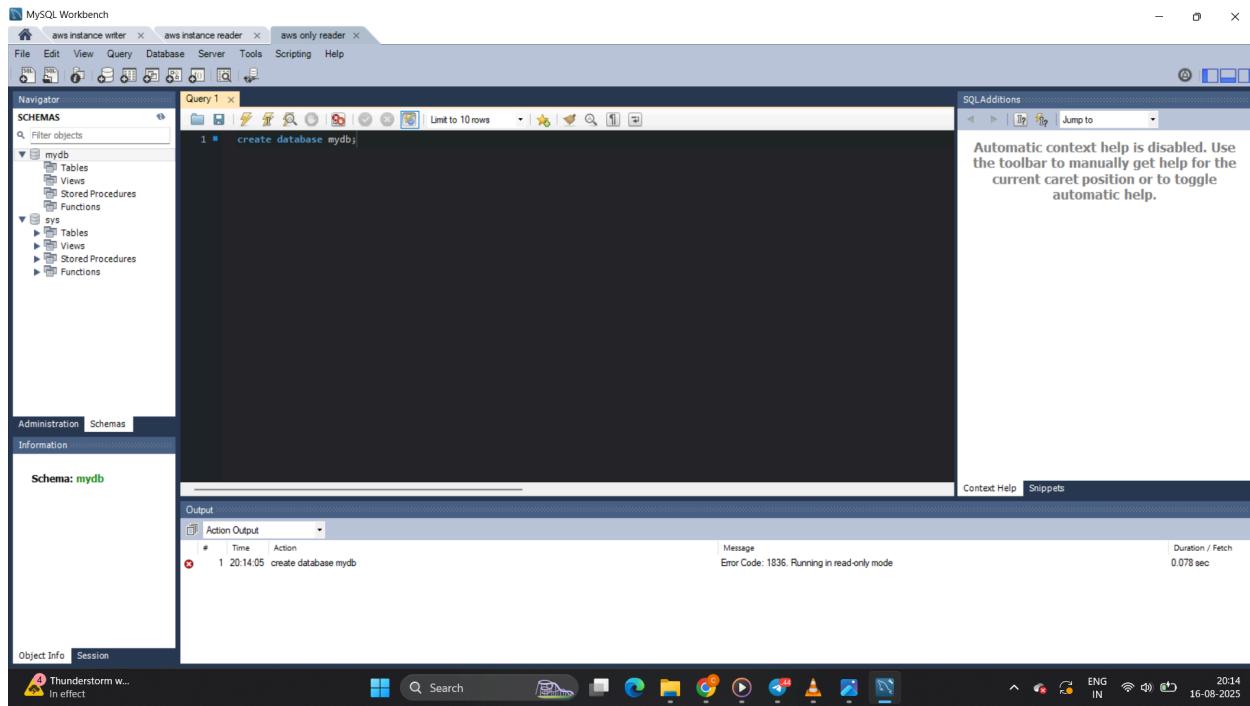
Successfully made the MySQL connection

Information related to this connection:

Host: reader-instance.czv4c442w5fq.ap-south-1.rds.amazonaws.com
Port: 3306
User: chetandb1
SSL enabled with TLS_AES_128_GCM_SHA256

A successful MySQL connection was made with the parameters defined for this connection.

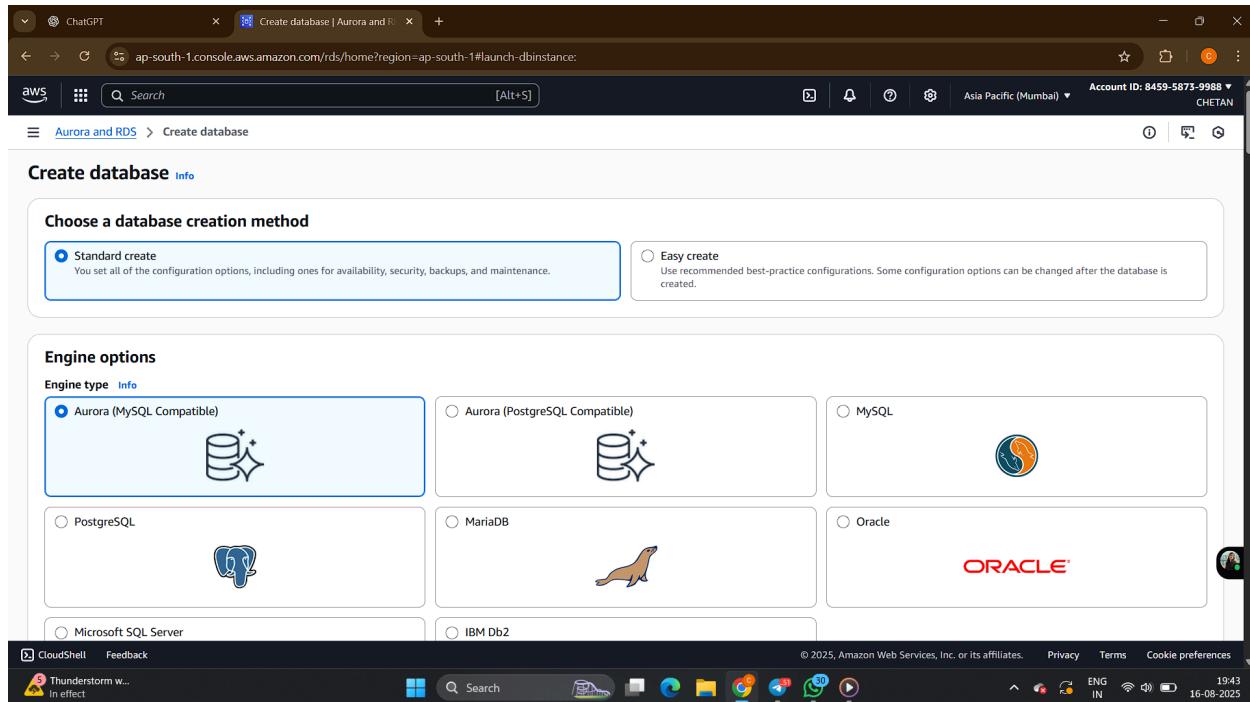
OK



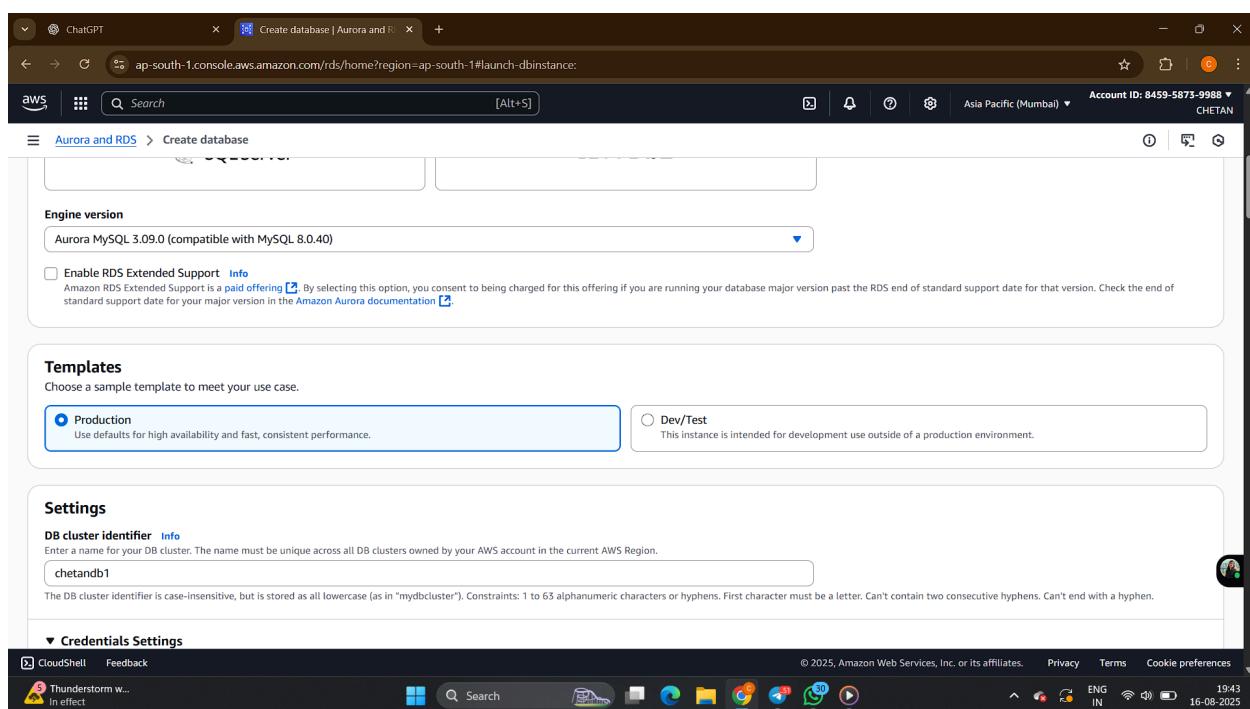
5. Cost Optimization

- Aurora Serverless saves costs because it scales down when not used; you can also set it to auto-pause after inactivity (for example, 5 minutes).
- Billing dashboards in AWS show you cost differences between serverless and provisioned databases. You'll see that serverless databases cost less when your usage is low or intermittent.

Screenshot of the AWS RDS Create database page (Standard create method selected). The page shows engine options: Aurora (MySQL Compatible) is selected, followed by PostgreSQL, MariaDB, MySQL, Oracle, IBM Db2, and Microsoft SQL Server.



Screenshot of the AWS RDS Create database page (Standard create method selected). The page shows engine version (Aurora MySQL 3.09.0), enable RDS Extended Support (unchecked), templates (Production selected, Dev/Test available), and settings (DB cluster identifier: chetandb1).



The screenshot shows the 'Create database' step in the AWS RDS console. The storage configuration is set to 'Aurora Standard'. Under 'Cluster storage configuration', it says: 'Choose the storage configuration for the Aurora DB cluster that best fits your application's price predictability and price performance needs.' The 'Aurora Standard' option is selected, showing: 'Cost-effective pricing for many applications with moderate I/O usage (I/O costs <25% of total database costs). Pay-per-request I/O charges apply. DB instance and storage prices don't include I/O usage.' Below this, the 'Instance configuration' section is visible, showing options for DB instance class (selected: 'Serverless v2') and capacity range (ACUs: 0.5 to 1). The status bar at the bottom indicates 'Thunderstorm w... In effect'.

This screenshot shows the same 'Create database' step, but the instance configuration has been changed to 'Serverless v2'. The 'DB instance class' dropdown now shows 'Serverless v2' as selected. The 'Capacity range' section shows 'Minimum capacity (ACUs)' set to 0.5 and 'Maximum capacity (ACUs)' set to 1 (2 GiB). The status bar at the bottom indicates 'Thunderstorm w... In effect'.

Screenshot of the AWS RDS 'Create database' wizard.

Availability & durability

Multi-AZ deployment Info

- Create an Aurora Replica or Reader node in a different AZ (recommended for scaled availability)
Creates an Aurora Replica for fast failover and high availability.
- Don't create an Aurora Replica

Connectivity

Compute resource Info

Choose whether to set up a connection to a compute resource for this database. Setting up a connection will automatically change connectivity settings so that the compute resource can connect to this database.

- Don't connect to an EC2 compute resource
Don't set up a connection to a compute resource for this database. You can manually set up a connection to a compute resource later.
- Connect to an EC2 compute resource
Set up a connection to an EC2 compute resource for this database.

Network type Info

To use dual-stack mode, make sure that you associate an IPv6 CIDR block with a subnet in the VPC you specify.

- IPv4
Your resources can communicate only over the IPv4 addressing protocol.
- Dual-stack mode
Your resources can communicate over IPv4, IPv6, or both.

Virtual private cloud (VPC)

Info

Choose the VPC. The VPC defines the virtual networking environment for this DB cluster.

Default VPC (vpc-00decf4d69d6b4f5d)
2 Subnets, 2 Availability Zones

Only VPCs with a corresponding DB subnet group are listed.

CloudShell Feedback Thunderstorm w... In effect

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Screenshot of the AWS RDS 'Modify DB instance' wizard.

Change Aurora public access

chetandb1-instance-1 - Modify

Security group

List of DB security groups to associate with this DB instance.

Choose security groups

default X

Certificate authority

Info

Using a server certificate provides an extra layer of security by validating that the connection is being made to an Amazon database. It does so by checking the server certificate that is automatically installed on all databases that you provision.

rds-ca-rsa2048-g1 (default)
Expiry: May 20, 2061

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](#)

3306

CloudShell Feedback Rain warning In effect

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Screenshot of the AWS RDS console showing the creation of a new database.

Success Message: Successfully created database chetandb1

Databases (2)

DB identifier	Status	Role	Engine	Region ...	Size
chetandb1	Available	Regional cluster	Aurora My...	ap-south-1	1 instance
chetandb1-instance-1	Creating	Writer instance	Aurora My...	ap-south-1b	Serverless v2 (0.5 - 1 ACUs)

Actions: Group resources, Modify, Actions, Create database

Screenshot of the AWS EC2 Security Groups console showing the configuration of an inbound rule for a specific security group.

sg-0eac963e1cef69496 - default

Details

Security group name	sg-0eac963e1cef69496	Description	VPC ID
Owner	845958739988	Inbound rules count	vpc-00dcef4d69d6b4f5d
		4 Permission entries	
		Outbound rules count	0 Permission entries

Inbound rules (4)

Name	Security group rule ID	IP version	Type	Protocol	Port range
-	sgr-0daaaae4f0126c177	IPv6	PostgreSQL	TCP	5432
-	sgr-080050ee61f907a44	IPv4	PostgreSQL	TCP	5432
-	sgr-0d2e05dd47beab888	IPv6	MySQL/Aurora	TCP	3306
-	sgr-007eb44ef28d99381	IPv4	MySQL/Aurora	TCP	3306

Aurora and RDS > Databases > chetandb1

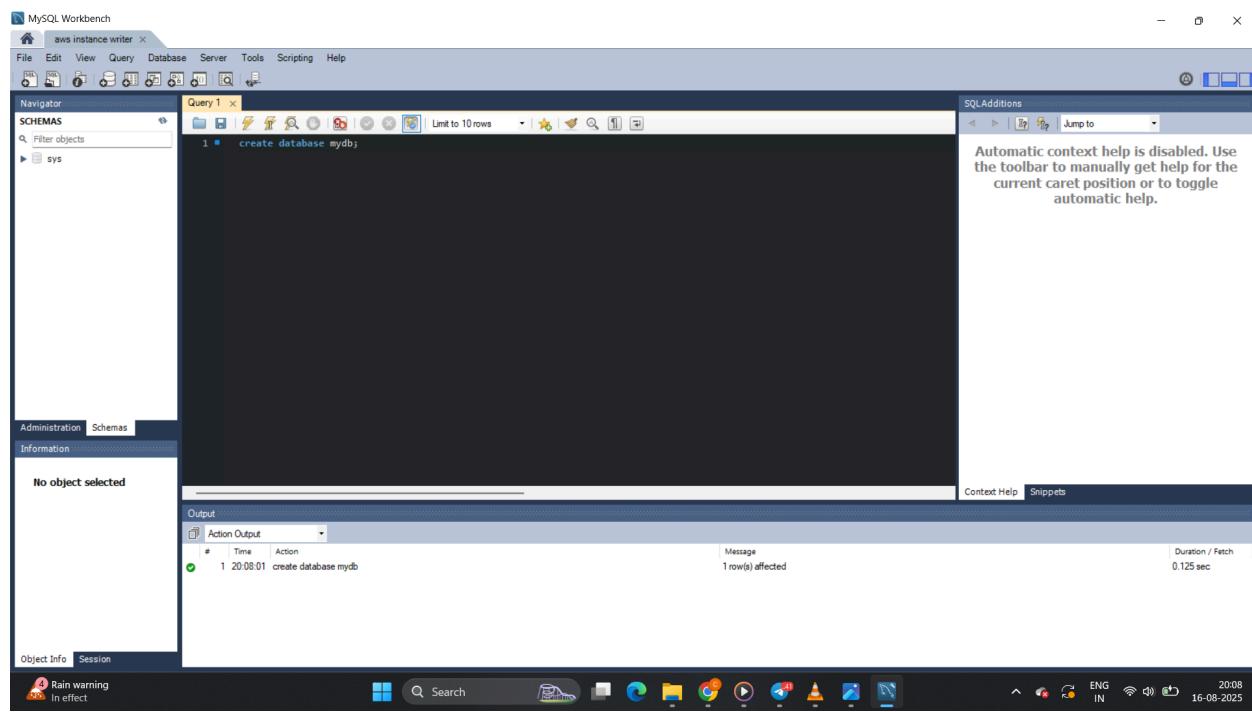
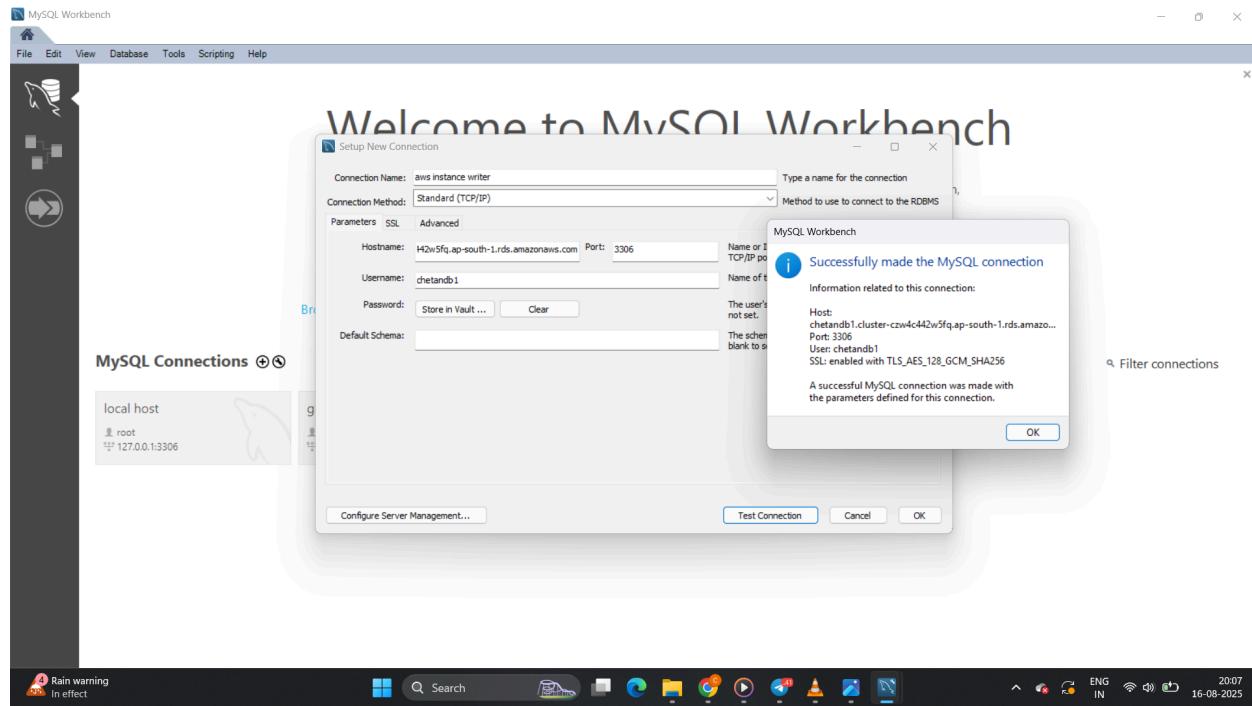
Endpoints (2)

Endpoint name	Status	Type	Port
chetandb1.cluster-czw4c442w5fq.ap-south-1.rds.amazonaws.com	Available	Writer	3306
chetandb1.cluster-ro-czw4c442w5fq.ap-south-1.rds.amazonaws.com	Available	Reader	3306

Aurora and RDS > Databases > chetandb1

Endpoints (2)

Endpoint name	Status	Type	Port
chetandb1.cluster-czw4c442w5fq.ap-south-1.rds.amazonaws.com	Available	Writer	3306
chetandb1.cluster-ro-czw4c442w5fq.ap-south-1.rds.amazonaws.com	Available	Reader	3306



Aurora and RDS > Databases > chetandb1

Connectivity & security

DB identifier	Status	Role	Engine	Region	Size	Recom...	CPU
chetandb1	Available	Regional c...	Aurora My...	ap-south-1	2 instances	-	-
chetandb1-instance-1	Available	Writer ins...	Aurora My...	ap-south-1b	Serverless... 45	-	-
reader-instance	Available	Reader ins...	Aurora My...	ap-south-1a	Serverless... 42	-	-

Endpoints (2)

Endpoint name	Status	Type	Port
1.cluster-czw4c442w5fq.ap-south-1.rds.amazonaws.com	Available	Writer	3306
chetandb1.cluster-ro-czw4c442w5fq.ap-south-1.rds.amazonaws.com	Available	Reader	3306

Welcome to MySQL Workbench

Setup New Connection

Connection Name: aws instance reader

Connection Method: Standard (TCP/IP)

Parameters: SSL Advanced

Hostname: H2w5fq.ap-south-1.rds.amazonaws.com Port: 3306

Username: chetandb1

Password: Store in Vault ... Clear

Default Schema:

MySQL Workbench

Successfully made the MySQL connection

Information related to this connection:

Host: chetandb1.cluster-ro-czw4c442w5fq.ap-south-1.rds.amazonaws.com
Port: 3306
User: chetandb1
SSL: enabled with TLS_AES_128_GCM_SHA256

A successful MySQL connection was made with the parameters defined for this connection.

OK

