

Cycle 08 AWS Homework

1. Hands-on RDS Parameter Group Configuration

◆ What it is:

A **DB Parameter Group** in RDS is like a *configuration file* for your database engine (MySQL). You can override defaults like time zone, connection timeout, or autocommit.

◆ Steps:

1. Go to RDS → Parameter Groups → Create parameter group.

- Engine: MySQL 8.x
- Name: `custom-mysql-params`

2. Modify parameters:

- `time_zone = 'Asia/Kolkata'`
- `connect_timeout = 60`
- `autocommit = 0`

3. Attach to RDS instance → **Modify DB instance** → Apply parameter group → Reboot.

4. Verify:

```
SELECT @@global.time_zone;
SELECT @@global.connect_timeout;
SELECT @@global.autocommit;
```

📌 **Observation:** Default timezone is `UTC`, after applying custom group it changes to `Asia/Kolkata`. Autocommit changes transaction behavior.

Create Parameter Group | Aurora and RDS | CSV data for MySQL | Cycle 08 AWS Homework | ap-south-1.console.aws.amazon.com/rds/home?region=ap-south-1#create-parameter-group; Account ID: 8459-5873-9988 | Asia Pacific (Mumbai) | CHETAN

Aurora and RDS > Parameter groups > Create parameter group

Create parameter group

Parameter group details

Parameter group name
parameterpg
The name must have 1 to 255 characters and begin with a letter. The name can't end with a hyphen or contain two consecutive hyphens. Valid characters: A-Z, a-z, 0-9, and - (hyphen)

Description
This description appears in the Parameter groups dashboard. You can use it to quickly identify the purpose of the parameter group.
mypg

Engine type
MySQL Community

Parameter group family
You can associate a DB parameter group with only one DB parameter group family. You can apply the parameter group only to a DB instance whose DB engine is compatible with the parameter group family.
mysql8.0

Type
Type for the DB parameter group
DB Parameter Group

Actions: Cancel, Create

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Parameter Groups | Aurora and RDS | CSV data for MySQL | Cycle 08 AWS Homework | ap-south-1.console.aws.amazon.com/rds/home?region=ap-south-1#parameter-group-list; Account ID: 8459-5873-9988 | Asia Pacific (Mumbai) | CHETAN

Aurora and RDS > Parameter groups

Parameter groups Info

Custom **Default**

<input type="checkbox"/>	Name	Family	Type	Description	ARN
<input type="checkbox"/>	parameterpg	mysql8.0	DB instance parameter group	mypg	arn:aws:rds:ap-south-1:845958739988:pg:parameterpg

Actions: Create parameter group

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Aura and RDS | ap-south-1 | CSV data for MySQL | Cycle 08 AWS Homework | ap-south-1.console.aws.amazon.com/rds/home?region=ap-south-1#parameter-group-details:parameter-group-name=parameterpg:type=instance:editing=true

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Aurora and RDS > Parameter groups > Modify parameter group: parameterpg

Modifiable parameters (395)

Name	Value	Apply type	Data type
activate_all_roles_on_login	0	Dynamic	Boolean
auto_increment_increment	Enter Parameter value	Dynamic	Integer
auto_increment_offset	Enter Parameter value	Dynamic	Integer
autocommit	1	Dynamic	Boolean
automatic_sp_privileges	Select Value for Parameter	Dynamic	Boolean
avoid_temporal_upgrade	Select Value for Parameter	Dynamic	Boolean
back_log	Enter Parameter value	Static	Integer

Selected parameter

Name: autocommit

Description: Sets the autocommit mode

Value: 0,1: You can specify the value using a Boolean constant or a Boolean parameter expression.

Apply type: Dynamic: Changes are applied immediately.

Source: Engine default: The parameter group value is determined by the MySQL engine.

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Aura and RDS | ap-south-1 | CSV data for MySQL | Cycle 08 AWS Homework | ap-south-1.console.aws.amazon.com/rds/home?region=ap-south-1#parameter-group-details:parameter-group-name=parameterpg:type=instance:editing=true

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Aurora and RDS > Parameter groups > Modify parameter group: parameterpg

Modifiable parameters (395)

mb4_pl_0900_ai_ci.utf8mb4_pl_0900_as_cs.utf8mb4_ro_0900_ai_ci.utf8mb4_ro_0900_as_cs.utf8mb4_ru_0900_ai_ci.utf8mb4_ru_0900_as_ci.utf8mb4_sl_0900_ai_ci.utf8mb4_sl_0900_as_ci.utf8mb4_sv_0900_ai_ci.utf8mb4_sv_0900_as_ci.utf8mb4_tr_0900_ai_ci.utf8mb4_tr_0900_as_ci.utf8mb4_unicode_520_ci.utf8mb4_vietnamese_ci.utf8mb4_vi_0900_ai_ci.utf8mb4_vi_0900_as_ci	Enter Parameter value	Dynamic	Integer
completion_type	Allowed values 0-2	Dynamic	Integer
concurrent_insert	Allowed values 0-2	Dynamic	Integer
connect_timeout	50	Dynamic	Integer
cte_max_recursion_depth	1000	Dynamic	Integer
default_password_lifetime	0	Dynamic	Integer

Selected parameter

Name: connect_timeout

Description: The number of seconds that the MySQLd server waits for a connect packet before responding with Bad handshake.

Apply type: Dynamic: Changes are applied immediately.

Source: Engine default: The parameter group value is determined by the MySQL engine.

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Modifiable parameters (395)

Name	Value	Apply type	Data type
activate_all_roles_on_login	1	Dynamic	Boolean
auto_increment_increment	Enter Parameter value	Dynamic	Integer
auto_increment_offset	Enter Parameter value	Dynamic	Integer
autocommit	1	Dynamic	Boolean
automatic_sp_privileges	Select Value for Parameter	Dynamic	Boolean
avoid_temporal_upgrade	Select Value for Parameter	Dynamic	Boolean
back_log	Enter Parameter value	Static	Integer

Selected parameter

Name: activate_all_roles_on_login

Description: Automatically set all granted roles as active after the user has authenticated successfully.

Value: 0(default)

You can specify the value using a Boolean constant or a Boolean DB parameter expression.

Apply type: Dynamic

Changes are applied immediately.

Source: Engine default

Parameter groups

Custom **Default**

Name	Family	Type	Description	ARN
parameterpg	mysql8.0	DB instance parameter group	mypg	arn:aws:rds:ap-south-1:845958739988:pg:parameterpg

Screenshot of the AWS RDS 'Create database' wizard - Step 1: Choose a database creation method.

Choose a database creation method

- Standard create: You set all of the configuration options, including ones for availability, security, backups, and maintenance.
- Easy create: Use recommended best-practice configurations. Some configuration options can be changed after the database is created.

Engine options

Engine type: MySQL

- Aurora (MySQL Compatible)
- Aurora (PostgreSQL Compatible)
- MySQL
- PostgreSQL
- MariaDB
- Oracle
- Microsoft SQL Server
- IBM Db2

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Screenshot of the AWS RDS 'Create database' wizard - Step 2: Aurora and RDS.

Edition: MySQL Community

Engine version: MySQL 8.0.42

Enable RDS Extended Support: 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 MySQL 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.

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Aurora and RDS > Create database

Additional configuration
Database options, encryption turned on, backup turned on, backtrack turned off, maintenance, CloudWatch Logs, delete protection turned off.

Database options
Initial database name [Info](#)
DB parameter group [Info](#) parametergrp
Option group [Info](#) default:mysql-8-0

Backup
 Enable automated backups
Creates a point-in-time snapshot of your database

Backup retention period [Info](#)
The number of days (1-35) for which automatic backups are kept.
1 day

Databases (1)

DB identifier	Status	Role	Engine	Region ...	Size
mydbinstance	Creating	Instance	MySQL Co...	-	db.t4g.micro

Aurora and RDS

- 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 [New](#)
- Events
- Event subscriptions

2. Implement Optional Groups for Auditing

◆ What it is:

An **Option Group** lets you enable *extra features* for RDS, such as the **MariaDB Audit Plugin**, which logs user activity.

◆ Steps:

1. Go to **RDS** → **Option Groups** → **Create option group**.

- Engine: MySQL / MariaDB
- Name: `audit-option-group`

2. Add option:

- `MARIADB_AUDIT_PLUGIN`

3. Configure parameters:

- `server_audit_events = 'CONNECT,QUERY'`
- `server_audit_logging = 1`

4. Attach option group to RDS instance → Reboot if needed.

5. **Verify logs:**

- Check under **RDS** → **Logs & Events** → **audit log**.
- Or view in **CloudWatch Logs**.

📌 **Observation:** You can see who connected, queries executed, and from where.

Create Option Group | Aurora > MySQL RDS settings > Meet - ivo-vcjn-sxz > process associate - Google Se... > +

ap-south-1.console.aws.amazon.com/rds/home?region=ap-south-1#create-option-group:

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Create option group

Option group details Info

Name myoptiongroup

Description og

Engine mysql

Major Engine Version 8.0

Create

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Option Groups | Aurora and RD > MySQL RDS settings > Meet - ivo-vcjn-sxz > process associate - Google Se... > +

ap-south-1.console.aws.amazon.com/rds/home?region=ap-south-1#option-groups-list:

AWS Search [Alt+S] Account ID: 8459-5873-9988 Asia Pacific (Mumbai) CHETAN

Option groups (5)

<input type="checkbox"/>	Name	Description	Engine	Engine version	Options
<input type="checkbox"/>	default:aurora-mysql-8-0	Default option group for aurora-mysql 8.0	Aurora MySQL	8.0	-
<input type="checkbox"/>	default:mariadb-11-4	Default option group for mariadb 11.4	MariaDB	11.4	-
<input type="checkbox"/>	default:mysql-8-0	Default option group for mysql 8.0	MySQL Community	8.0	-
<input type="checkbox"/>	default:postgres-17	Default option group for postgres 17	PostgreSQL	17	-
<input type="checkbox"/>	myoptiongroup	og	MySQL Community	8.0	-

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Screenshot of the AWS RDS console showing the "Add Option Group" page for Aurora and RDS. The "Option groups" section is selected. A new option group named "MARIADB_AUDIT_PLUGIN" is being added.

Option name: MARIADB_AUDIT_PLUGIN

Option settings (9):

Option setting	Value	Allowed values	Description
SERVER_AUDIT	FORCE_PLUS_PERMA	FORCE_PLUS_PERMAN...	This setting is enabled for security and ...
SERVER_AUDIT_EVENTS*	CONNECT,QUERY	CONNECT, QUERY, QU...	Types of actions to be logged (connect, ...)
SERVER_AUDIT_EXCL_US...			Exclude specified users
SERVER_AUDIT_FILE_PATH	/rdsdbdata/log/audit		File location for logs
SERVER_AUDIT_FILE_ROT...		1-1000000000	Size limit of a log file before rotating

* Indicates multiple, comma-separated values are allowed, e.g. AES256,RC4_128. (Note that spaces after commas are not accepted.) Otherwise, only a single value is allowed.

Apply immediately: Yes

Screenshot of the AWS RDS console showing the "Option Groups" page for Aurora and RDS. The "Option groups" section is selected. A success message indicates that the option "MARIADB_AUDIT_PLUGIN" was successfully added to the option group "myoptiongroup".

Option groups (5):

Name	Description	Engine	Engine version	Options
default:aurora-mysql-8-0	Default option group for aurora-mysql 8.0	Aurora MySQL	8.0	-
default:mariadb-11-4	Default option group for mariadb 11.4	MariaDB	11.4	-
default:mysql-8-0	Default option group for mysql 8.0	MySQL Community	8.0	-
default:postgres-17	Default option group for postgres 17	PostgreSQL	17	-
myoptiongroup	og	MySQL Community	8.0	MARIADB_AUDIT_PLUGIN

Additional configuration

Database options, backup turned on, maintenance, delete protection turned off

Database options

DB parameter group [Info](#)
parameterpg

Option group [Info](#)
myoptiongroup

Backup

Enable automated backups
Creates a point-in-time snapshot of your database

⚠ Please note that automated backups are currently supported for InnoDB storage engine only. If you are using MyISAM, refer to details [here](#).

Backup retention period [Info](#)

Summary of modifications

You are about to submit the following modifications. Only values that will change are displayed. Carefully verify your changes and choose **Modify DB Instance**.

Attribute	Current value	New value
Public accessibility	No	Yes
Option group	default:mysql-8-0	myoptiongroup

Schedule modifications

When to apply modifications

- Apply during the next scheduled maintenance window
Current maintenance window: August 21, 2025 12:41 - 13:11 (UTC+5:50)
- Apply immediately
The modifications in this request and any pending modifications will be asynchronously applied as soon as possible, regardless of the maintenance window setting for this database instance.

Buttons: Cancel, Back, **Modify DB instance**

3. Subnet Group Setup for High Availability

◆ What it is:

A **DB Subnet Group** defines which subnets (across different AZs) your RDS can use. For **Multi-AZ RDS**, this ensures failover capability.

◆ Steps:

1. Go to RDS → Subnet Groups → Create DB Subnet Group.

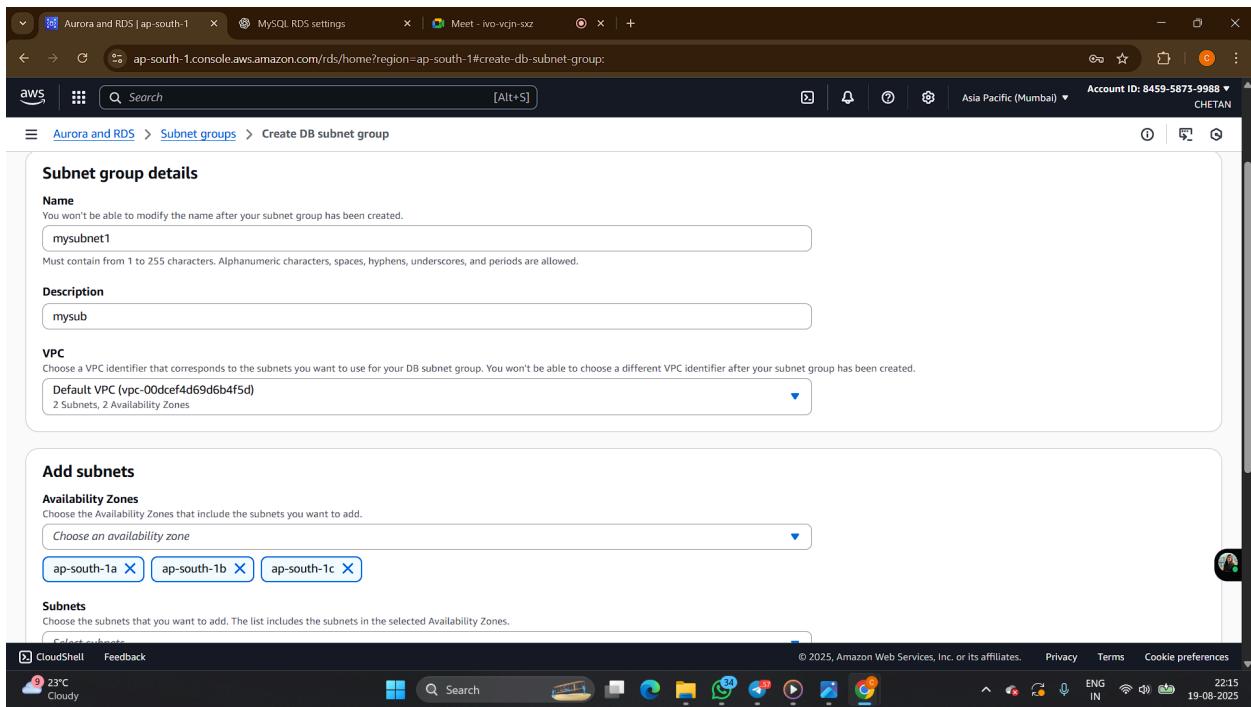
- Add **at least 2 subnets** in different AZs (e.g., `us-east-1a`, `us-east-1b`).

2. Launch/modify RDS instance → Associate this subnet group.

3. **Test failover:**

- If Multi-AZ enabled → Reboot with failover.
- Observe that the endpoint remains the same but RDS shifts AZs.

📌 **Observation:** Failover tested successfully → high availability achieved.



Choose an availability zone

ap-south-1a X ap-south-1b X ap-south-1c X

Subnets

Select subnets

Subnet ID: subnet-0a14d154b1b33442a CIDR: 172.31.0.0/20

Subnet ID: subnet-00bb156050e0ef090 CIDR: 172.31.32.0/20

For Multi-AZ DB clusters, you must select 3 subnets in 3 different Availability Zones.

Availability zone	Subnet name	Subnet ID	CIDR block
ap-south-1b	-	subnet-0a14d154b1b33442a	172.31.0.0/20
ap-south-1a	-	subnet-00bb156050e0ef090	172.31.32.0/20

Create

Subnet groups (3)

Notifications 0 0 3 0 0 0

Name	Description	Status	VPC
default-vpc-00dcef4d69d6b4f5d	Created from the RDS Management Console	Complete	vpc-00dcef4d69d6b4f5d
default-vpc-02c61daa229cc1aa8	Created from the RDS Management Console	Complete	vpc-02c61daa229cc1aa8
mysubnet1	mysub	Complete	vpc-00dcef4d69d6b4f5d

Connectivity

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.

DB subnet group
 mysubnet1

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

Successfully created mysubnet1. View subnet group

Notifications [0](#) [Δ 0](#) [🕒 3](#) [ⓘ 0](#) [⊖ 0](#)

Modify DB instance: mydbinstance

Summary of modifications
 You are about to submit the following modifications. Only values that will change are displayed. Carefully verify your changes and choose **Modify DB Instance**.

Attribute	Current value	New value
Subnet group	default-vpc-00dcef4d69d6b4f5d	mysubnet1

Schedule modifications

When to apply modifications

- Apply during the next scheduled maintenance window
 Current maintenance window: August 21, 2025 12:41 - 13:11 (UTC+5:50)
- Apply immediately**
 The modifications in this request and any pending modifications will be asynchronously applied as soon as possible, regardless of the maintenance window setting for this database instance.

[Cancel](#) [Back](#) [Modify DB instance](#)

4. Compare Default vs. Custom Parameter Groups

◆ Steps:

1. Launch **Instance A** → Default parameter group.
2. Launch **Instance B** → Custom parameter group (IST timezone, autocommit off).
3. Insert test data with `CURRENT_TIMESTAMP`.

📌 **Observation:**

- Default → timestamps in `UTC`.
- Custom → timestamps in `Asia/Kolkata`.
- Autocommit affects whether `INSERT` requires explicit `COMMIT`.

5. Real-World Use Case: Multi-Region Time Zones

◆ **Steps:**

1. Launch RDS in **Mumbai (ap-south-1)** with timezone `Asia/Kolkata`.
2. Launch RDS in **Virginia (us-east-1)** with timezone `US/Eastern`.
3. Insert sample rows with timestamps.

📌 **Observation:**

- Mumbai instance → stores IST timestamps.
- Virginia instance → stores EST timestamps.
- Demonstrates global apps need **timezone standardization (usually UTC)**.

6. Troubleshooting Parameter Conflicts

◆ **Steps:**

1. Set `connect_timeout = 1`.
2. Try connecting → you'll often see:

```
ERROR 2013 (HY000): Lost connection to MySQL server during query
```

3. Recovery:

- Modify group back to `connect_timeout = 60`.
- Apply + reboot instance.

📌 **Observation:** Misconfigured parameters can break connectivity. Parameter groups must be carefully tuned.

7. Optional Group Advanced Scenario (Query Logging)

◆ Steps:

1. Create option group → enable **general_log = 1**, `log_output = TABLE` or `FILE`.
2. Run test queries (e.g., suspicious SQL like `SELECT * FROM users WHERE id='' OR '1'='1';`).
3. Check logs → detect unusual patterns.

📌 **Observation:**

Query logging helps in **security monitoring** (detect SQL injection attempts).