AWS RDS

AGENDA

- RDS
- MySQL and Amazon Aurora Database Creations and Query Executions

RDS (Relational Database)

Amazon Relational Database Service (Amazon **RDS**) makes it easy to set up, operate, and scale a relational database in the cloud. It provides cost-efficient and resizable capacity while automating time-consuming administration tasks such as hardware provisioning, database setup, patching and backups.

Key Concepts:

- Master Replica
- Cross Region Replica
- Snapshot
- Cluster
- Clone
- Restore from S3
- Query Editor
- Reserved instance

Key Benefits:

- Lower administrative burden - Easy to use.
- **High Performance** - General Purpose (SSD) Storage.
- **Scalability** – Scale-up & Scale-down is possible.
- **High Availability and durability.**
- **Backup and Recovery**: Possible Automated backups.
- **Data Secure**: Possible with all Encryption, Cross Region replication, Clone, Snapshot, Master Replica.
- **Maintenance** in terms of monitoring the metrics.
- **Cost-effectiveness**: Pay only for what you use.
- This runs in Server (ex: MySQL) as well as in Serverless infrastructure (ex: Amazon Aurora)
- **Pricing** - https://calculator.s3.amazonaws.com/index.html?lng=#

Pre-defined RDS in AWS:

Database	Key Highlights
MySQL	Possible free tier, Runs in Server, simple to create
PostgreSQL	Open-source, cost involved
SQL Server	Open-source, runs in any system, widely use DB
ORACLE	Powerful, Need License, useful for Enterprise app
Amazon Aurora	Amazon Aurora is a MySQL and PostgreSQL-compatible relational database built for the cloud that combines the performance and availability of traditional enterprise databases with the simplicity and cost-effectiveness of open source databases.
MariaDB	Open-Source, Made by original developers of MySQL

Difference among AWS Pre-defined Databases:

	RDS	REDSHIFT	DYNAMODB
DB engine	Amazon aurora, MySQL, PostgreSQL, Oracle, SQL Server and MariaDB	Redshift	NoSQL
Computing Resources	Instances with 64 vCPU & 244 GB RAM	Nodes with vCPU & 244 GB RAM	Not Specified, SaaS
Data Storage Facility (Max)	6 TB per instance and 20000 IOPS	16 TB per instance	Unlimited storage size, 40,000 read/write per table
Maintenance	30 minutes per week	30 minutes per week	No effect
Multi-AZ Replication	As an additional service	Manual	Built-in
Tables(per basic structural unit	Defined by DB Engine	9,900	256
Main usage feature	Conventional DB	Data Warehouse	DB for dynamically modified data

AMAZON MySQL DB Creation:

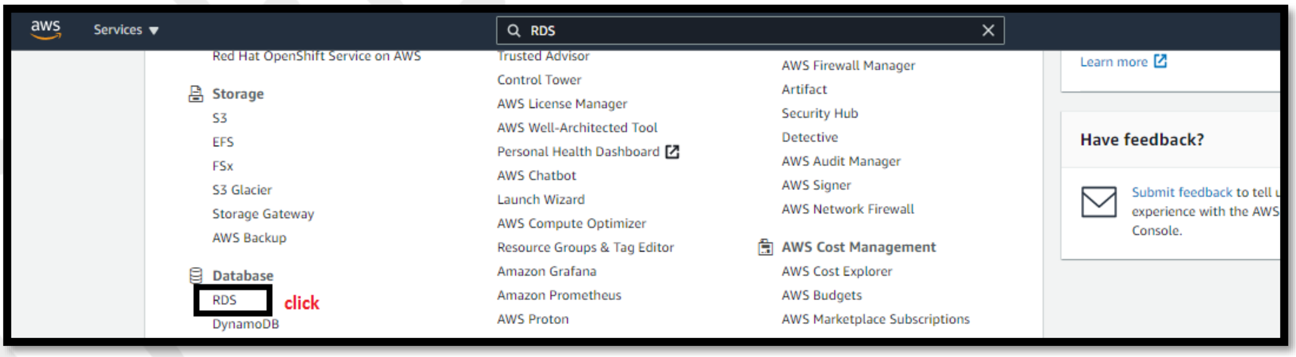
Pre-requisites:

- Create an Subnet Group
- MySQL DB Creation using AWS console GUI
- Create an Amazon Linux EC2 instance
- Install MySQL client to enable to connect the MySQL db from instance
- Basic SQL Queries

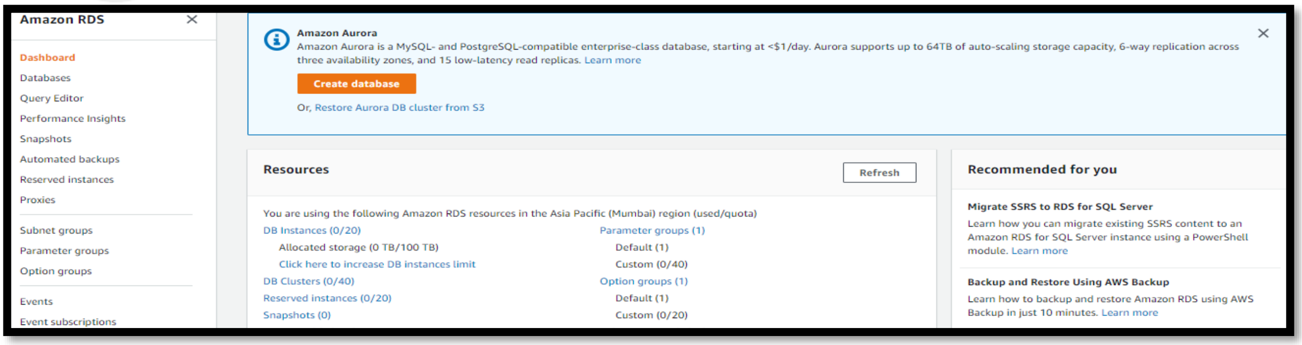
Objective:

- Master Replica – Test Synchronization, Auto Instance Promotion of Replica in case of Master DB is down
- Snapshot or Image – Versioning

1. Select the Service “RDS” as part of Database in console then Click



Navigate to Below GUI



Amazon Aurora

Amazon Aurora is a MySQL- and PostgreSQL-compatible enterprise-class database, starting at <$1/day. Aurora supports up to 64TB of auto-scaling storage capacity, 6-way replication across three availability zones, and 15 low-latency read replicas. Learn more

Or, Restore Aurora DB cluster from S3

Resources

You are using the following Amazon RDS resources in the Asia Pacific (Mumbai) region (used/quota)

DB Instances (0/20)
Allocated storage (0 TB/100 TB)
Click here to increase DB instances limit
DB Clusters (0/40)
Reserved instances (0/20)
Snapshots (0)

Parameter groups (1)
Default (1)
Custom (0/40)
Option groups (1)
Default (1)
Custom (0/20)

Recommended for you

Migrate SSRS to RDS for SQL Server

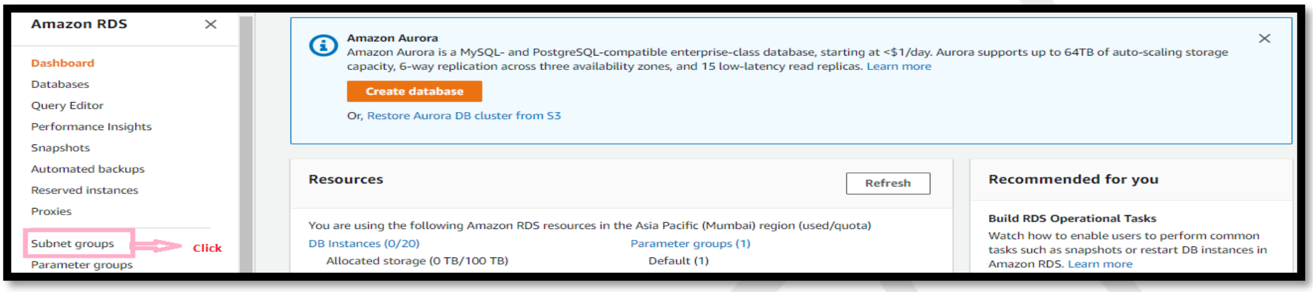
Learn how you can migrate existing SSRS content to an Amazon RDS for SQL Server instance using a PowerShell module. Learn more

Backup and Restore Using AWS Backup

Learn how to backup and restore Amazon RDS using AWS Backup in just 10 minutes. Learn more

2. Create a Subnet Group

Subnets should be in different AZ's, purpose to keep applications and Databases in the different Zones, This assures Security and high availability.



Amazon RDS ×

- Dashboard
- Databases
- Query Editor
- Performance Insights
- Snapshots
- Automated backups
- Reserved instances
- Proxies
- Subnet groups
- Parameter groups

Click

Amazon Aurora

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Create database

Or, Restore Aurora DB cluster from S3

Resources

Refresh

You are using the following Amazon RDS resources in the Asia Pacific (Mumbai) region (used/quota)

DB Instances (0/20)
Allocated storage (0 TB/100 TB)

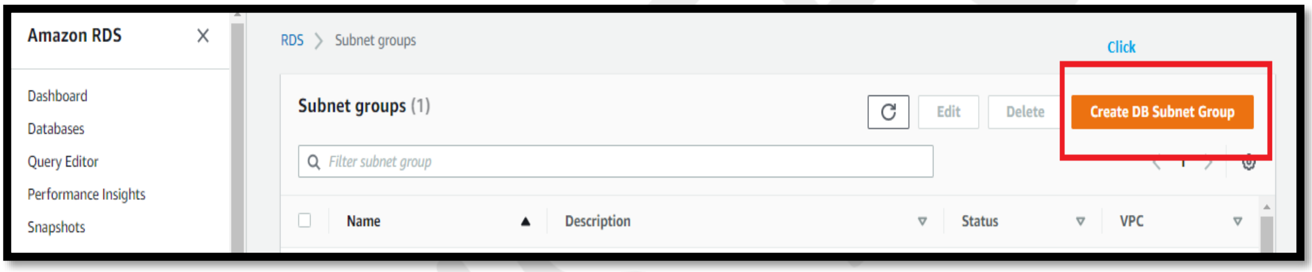
Parameter groups (1)
Default (1)

Recommended for you

Build RDS Operational Tasks

Watch how to enable users to perform common tasks such as snapshots or restart DB instances in Amazon RDS. Learn more

Click on Create DB Subnet Group



Amazon RDS ×

- Dashboard
- Databases
- Query Editor
- Performance Insights
- Snapshots

RDS > Subnet groups

Click

Subnet groups (1)

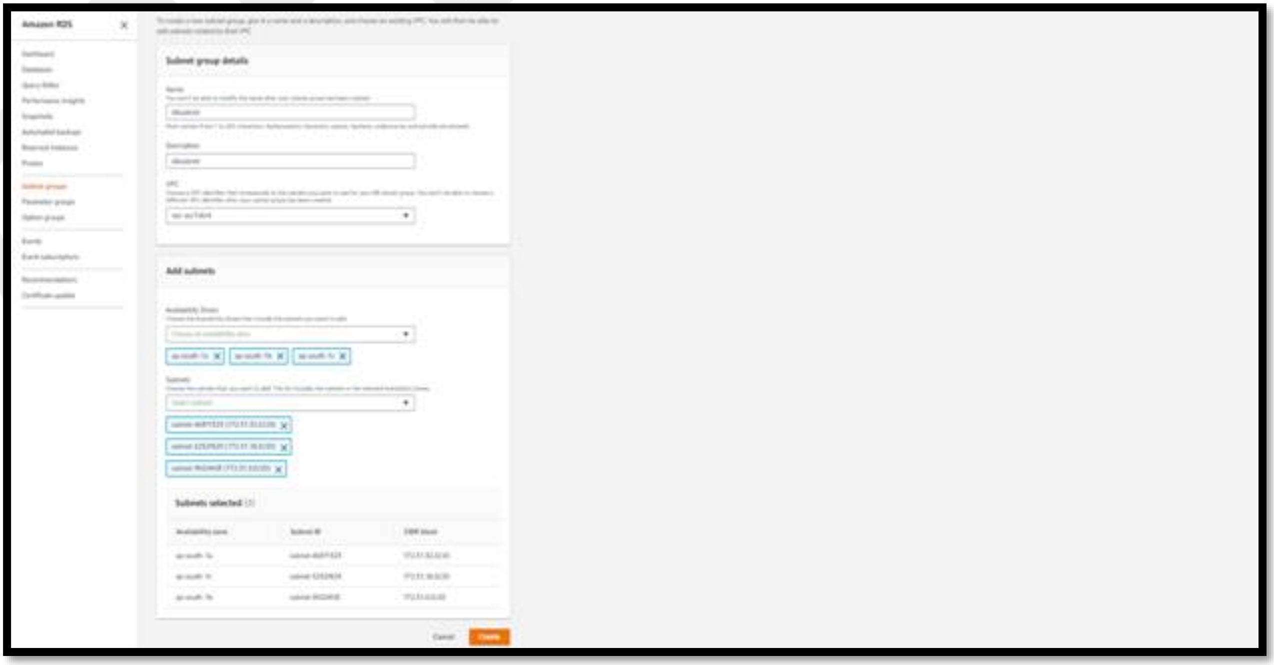
Edit | Delete | Create DB Subnet Group

Filter subnet group

□	Name ▲	Description ▽	Status ▽	VPC ▽

Enter the Parameters:

- Name of the subnet / Description: User defined
- VPC: Default VPC
- Availaility Zones: Choose all Zones listed (ap-south-1a, ap-south-1b and ap-south-1c)
- Subnet Groups: Select all three subnet groups
- Then Click "Create" – Subnet Group has been created.
- Ensure Each Subnet grouped in different AZ



Amazon RDS

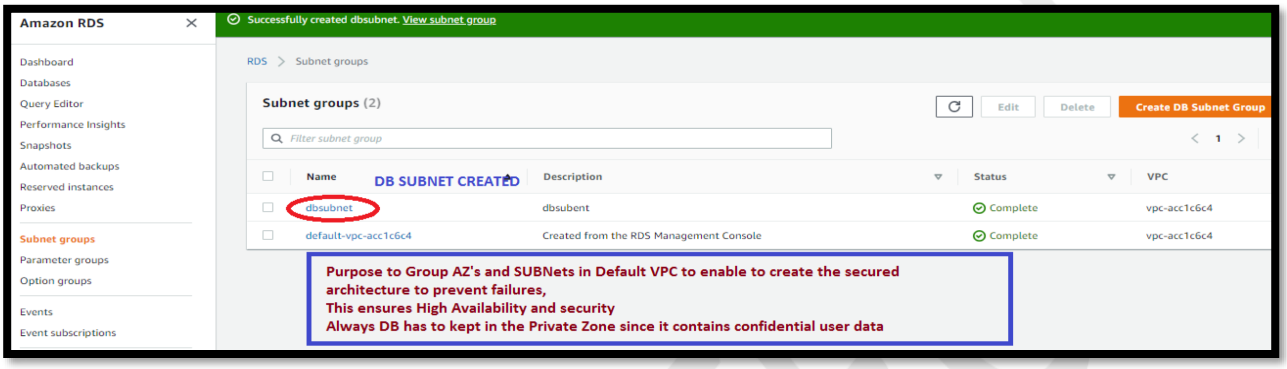
Subnet group details

Add subnets

Cancel | Create

Subnet Group Created

3-tier architecture.png



Amazon RDS ✕

Dashboard
Databases
Query Editor
Performance Insights
Snapshots
Automated backups
Reserved instances
Proxies

Subnet groups
Parameter groups
Option groups

Events
Event subscriptions

Successfully created dbsubnet. View subnet group

RDS > Subnet groups

Subnet groups (2)

DB SUBNET CREATED

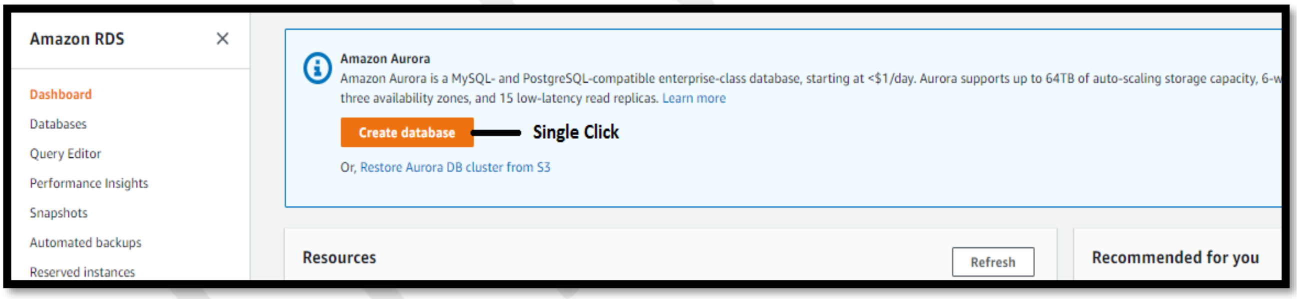
	Name	Description	Status	VPC
□	dbsubnet	dbsubent	Complete	vpc-acc1c6c4
□	default-vpc-acc1c6c4	Created from the RDS Management Console	Complete	vpc-acc1c6c4

Purpose to Group AZ's and SUBNets in Default VPC to enable to create the secured architecture to prevent failures,
This ensures High Availability and security
Always DB has to kept in the Private Zone since it contains confidential user data

3. Create a MySQL RDS Database

MySQL is the most popular open source database in the world. MySQL on RDS offers the rich features of the MySQL community edition with the flexibility to easily scale compute resources or storage capacity for your database.

- Supports database size up to 64 TiB.
- Supports General Purpose, Memory Optimized, and Burstable Performance instance classes.
- Supports automated backup and point-in-time recovery.
- Supports up to 5 Read Replicas per instance, within a single Region or cross-region.



Amazon RDS ✕

Dashboard
Databases
Query Editor
Performance Insights
Snapshots
Automated backups
Reserved instances

Amazon Aurora
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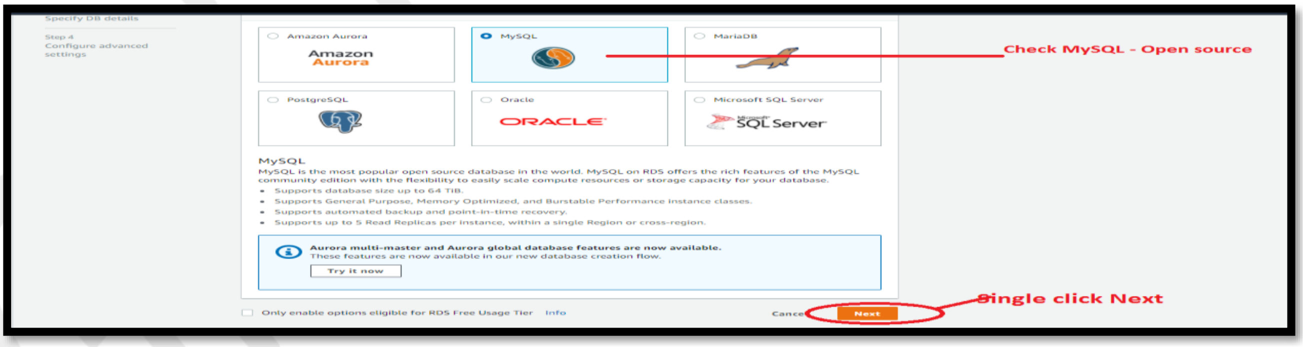
three availability zones, and 15 low-latency read replicas. Learn more

Create database —— Single Click

Or, Restore Aurora DB cluster from S3



Check MySQL - Open source

MySQL
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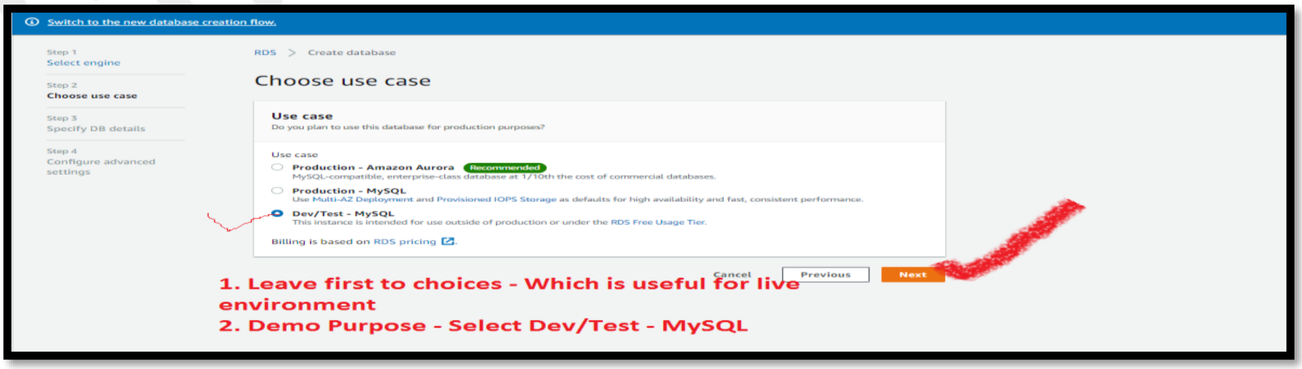
- Supports General Purpose, Memory Optimized, and Burstable Performance instance classes.
- Supports automated backup and point-in-time recovery.
- Supports up to 5 Read Replicas per instance, within a single Region or cross-region.

Aurora multi-master and Aurora global database features are now available.
These features are now available in our new database creation flow.

□ Only enable options eligible for RDS Free Usage Tier Info

Single click Next



Switch to the new database creation flow.

Step 1
Select engine
Step 2
Choose use case
Step 3
Specify DB details
Step 4
Configure advanced settings

RDS > Create database

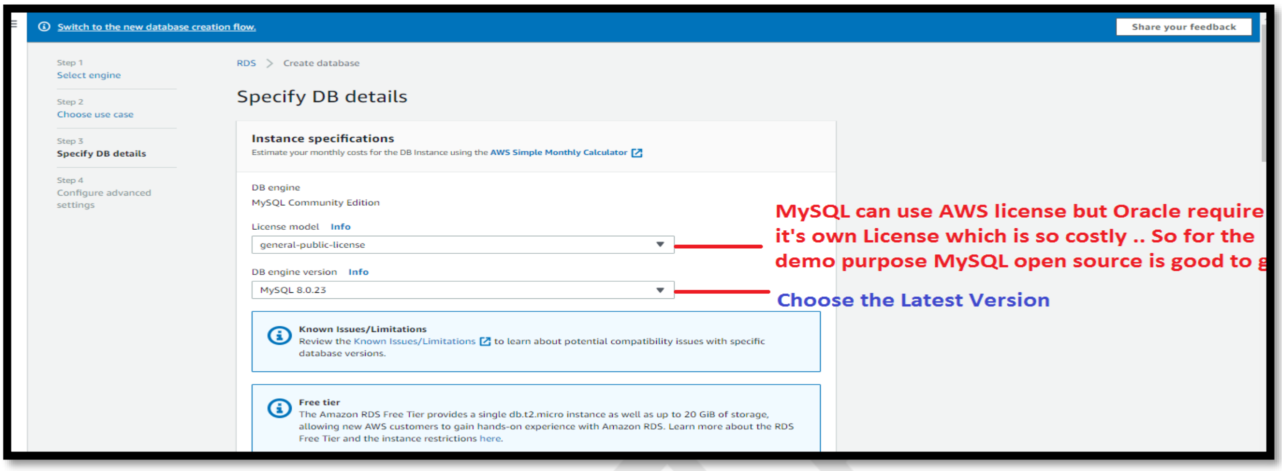
Choose use case

Use case
Do you plan to use this database for production purposes?

Use case
○ **Production - Amazon Aurora** Recommended
MySQL-compatible, enterprise-class database at 1/10th the cost of commercial databases.
○ **Production - MySQL**
Use Multi-AZ Deployment and Provisioned IOPS Storage as defaults for high availability and fast, consistent performance.
● **Dev/Test - MySQL**
This instance is intended for use outside of production or under the RDS Free Usage Tier.

Billing is based on RDS pricing.

1. Leave first to choices - Which is useful for live environment
2. Demo Purpose - Select Dev/Test - MySQL



Switch to the new database creation flow.

Step 1
Select engine

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Specify DB details

Step 4
Configure advanced settings

RDS > Create database

Specify DB details

Instance specifications
Estimate your monthly costs for the DB Instance using the AWS Simple Monthly Calculator

DB engine
MySQL Community Edition

License model Info
general-public-license

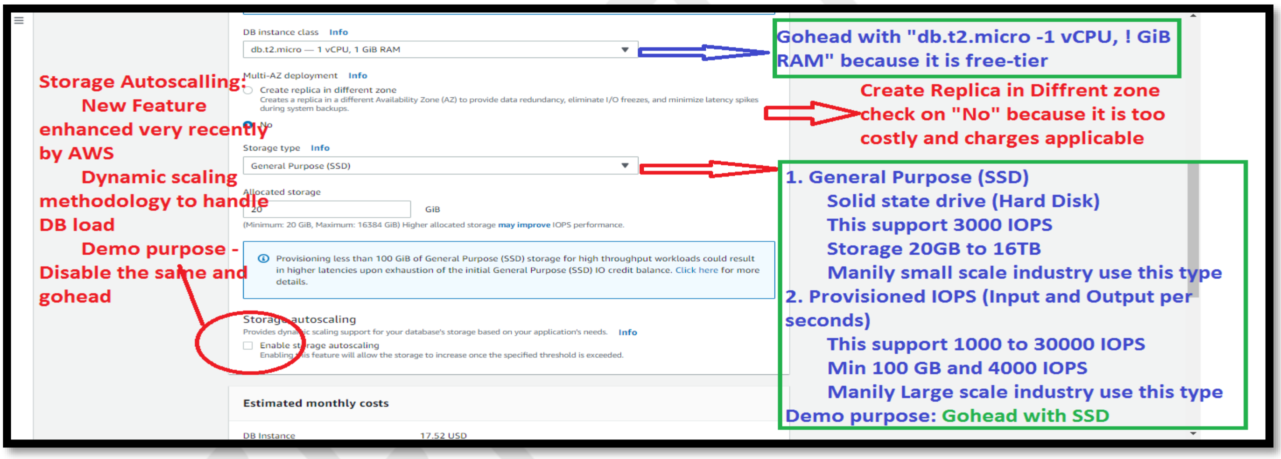
DB engine version Info
MySQL 8.0.23

Known Issues/Limitations
Review the Known Issues/Limitations to learn about potential compatibility issues with specific database versions.

Free tier
The Amazon RDS Free Tier provides a single db.t2.micro instance as well as up to 20 GiB of storage, allowing new AWS customers to gain hands-on experience with Amazon RDS. Learn more about the RDS Free Tier and the instance restrictions here.

MySQL can use AWS license but Oracle require it's own License which is so costly .. So for the demo purpose MySQL open source is good to g

Choose the Latest Version



DB instance class Info
db.t2.micro — 1 vCPU, 1 GiB RAM

Multi-AZ deployment Info
○ Create replica in different zone
Creates a replica in a different Availability Zone (AZ) to provide data redundancy, eliminate I/O freezes, and minimize latency spikes during system backups.
● No

Storage type Info
General Purpose (SSD)

Allocated storage
20 GiB
(Minimum: 20 GiB, Maximum: 16384 GiB) Higher allocated storage may improve IOPS performance.

Provisioning less than 100 GiB of General Purpose (SSD) storage for high throughput workloads could result in higher latencies upon exhaustion of the initial General Purpose (SSD) IO credit balance. Click here for more details.

Storage autoscaling
Provides dynamic scaling support for your database's storage based on your application's needs. Info
□ Enable storage autoscaling
Enabling this feature will allow the storage to increase once the specified threshold is exceeded.

Estimated monthly costs

DB Instance 17.52 USD

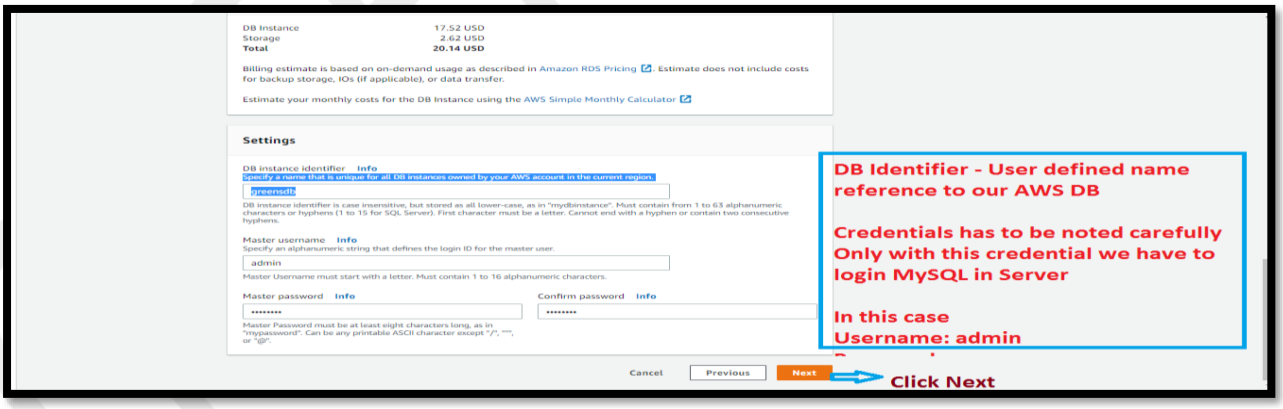
Storage Autoscalling:
New Feature enhanced very recently by AWS
Dynamic scaling methodology to handle DB load
Demo purpose - Disable the same and gohead

Gohead with "db.t2.micro -1 vCPU, ! GiB RAM" because it is free-tier

Create Replica in Diffrent zone check on "No" because it is too costly and charges applicable

1. General Purpose (SSD)
   Solid state drive (Hard Disk)
   This support 3000 IOPS
   Storage 20GB to 16TB
   Manily small scale industry use this type
2. Provisioned IOPS (Input and Output per seconds)
   This support 1000 to 30000 IOPS
   Min 100 GB and 4000 IOPS
   Manily Large scale industry use this type

Demo purpose: Gohead with SSD



DB Instance	17.52 USD
Storage	2.62 USD
Total	**20.14 USD**

Billing estimate is based on on-demand usage as described in Amazon RDS Pricing. Estimate does not include costs for backup storage, IOs (if applicable), or data transfer.

Estimate your monthly costs for the DB Instance using the AWS Simple Monthly Calculator

Settings

DB instance identifier Info
Specify a name that is unique for all DB instances owned by your AWS account in the current region.
greensdb
DB instance identifier is case insensitive, but stored as all lower-case, as in "mydbinstance". Must contain from 1 to 63 alphanumeric characters or hyphens (1 to 15 for SQL Server). First character must be a letter. Cannot end with a hyphen or contain two consecutive hyphens.

Master username Info
Specify an alphanumeric string that defines the login ID for the master user.
admin
Master Username must start with a letter. Must contain 1 to 16 alphanumeric characters.

Master password Info
••••••••
Master Password must be at least eight characters long, as in "mypassword". Can be any printable ASCII character except "/", """, or "@".

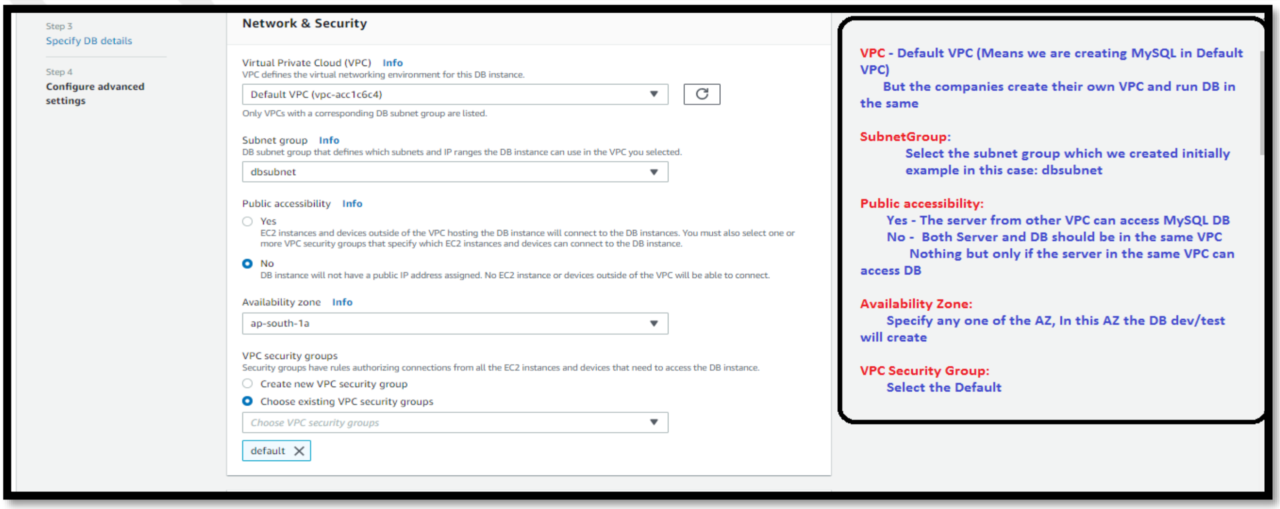
Confirm password Info
••••••••

DB Identifier - User defined name reference to our AWS DB

Credentials has to be noted carefully Only with this credential we have to login MySQL in Server

In this case
Username: admin

Click Next



Step 3
Specify DB details

Step 4
Configure advanced settings

Network & Security

Virtual Private Cloud (VPC) Info
VPC defines the virtual networking environment for this DB instance.
Default VPC (vpc-acc1c6c4)
Only VPCs with a corresponding DB subnet group are listed.

Subnet group Info
DB subnet group that defines which subnets and IP ranges the DB instance can use in the VPC you selected.
dbsubnet

Public accessibility Info
○ Yes
EC2 instances and devices outside of the VPC hosting the DB instance will connect to the DB instances. You must also select one or more VPC security groups that specify which EC2 instances and devices can connect to the DB instance.
● No
DB instance will not have a public IP address assigned. No EC2 instance or devices outside of the VPC will be able to connect.

Availability zone Info
ap-south-1a

VPC security groups
Security groups have rules authorizing connections from all the EC2 instances and devices that need to access the DB instance.
○ Create new VPC security group
● Choose existing VPC security groups
Choose VPC security groups
default ✕

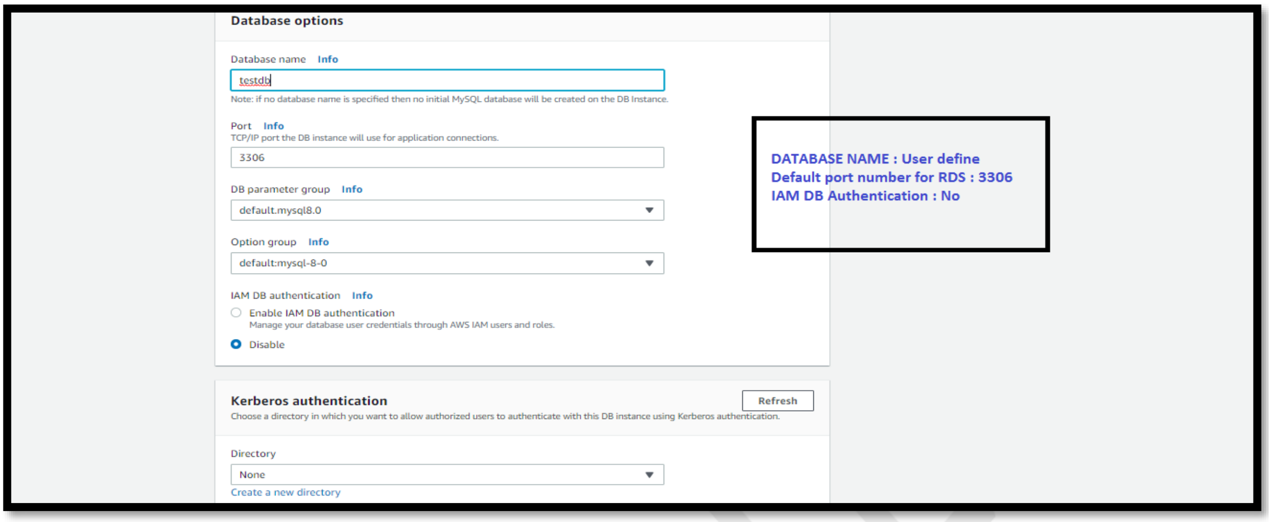
VPC - Default VPC (Means we are creating MySQL in Default VPC)
But the companies create their own VPC and run DB in the same

SubnetGroup:
Select the subnet group which we created initially example in this case: dbsubnet

Public accessibility:
Yes - The server from other VPC can access MySQL DB
No - Both Server and DB should be in the same VPC
Nothing but only if the server in the same VPC can access DB

Availability Zone:
Specify any one of the AZ, In this AZ the DB dev/test will create

VPC Security Group:
Select the Default



Database options

Database name Info

testdb

Note: if no database name is specified then no initial MySQL database will be created on the DB Instance.

Port Info

TCP/IP port the DB instance will use for application connections.

3306

DB parameter group Info

default.mysql8.0

Option group Info

default:mysql-8-0

IAM DB authentication Info

○ Enable IAM DB authentication
Manage your database user credentials through AWS IAM users and roles.

● Disable

Kerberos authentication

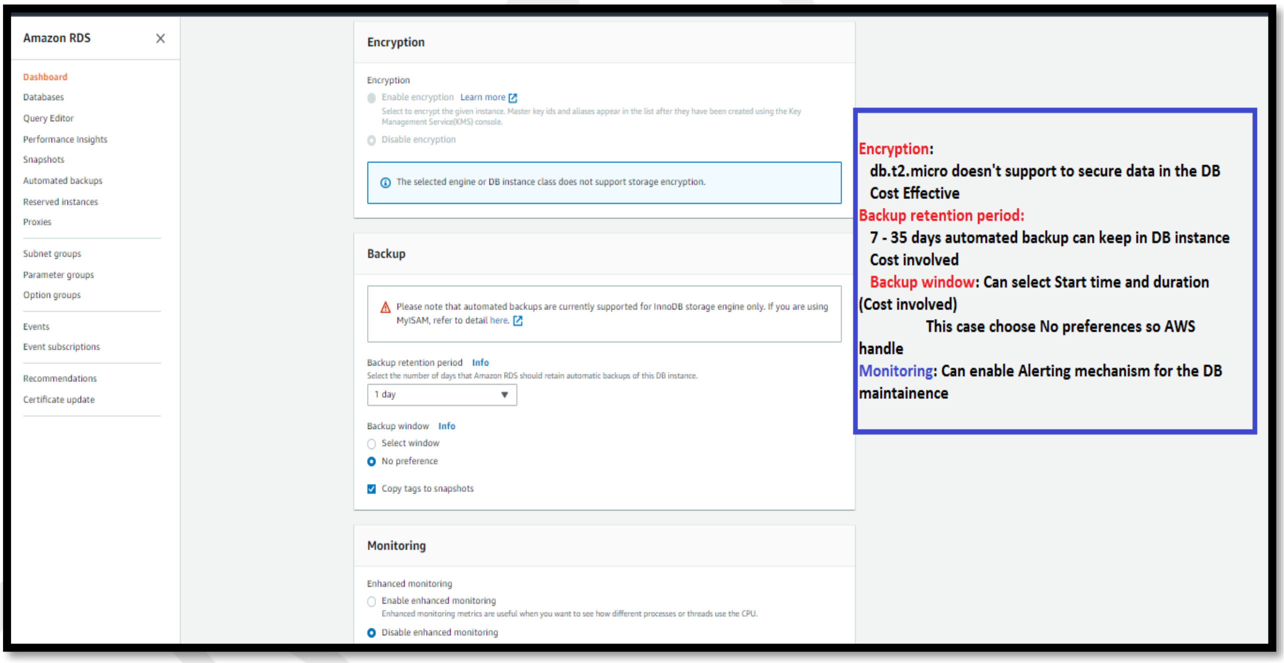
Choose a directory in which you want to allow authorized users to authenticate with this DB instance using Kerberos authentication.

Directory

None

Create a new directory

DATABASE NAME : User define
Default port number for RDS : 3306
IAM DB Authentication : No



Encryption

Encryption

○ Enable encryption Learn more
Select to encrypt the given instance. Master key ids and aliases appear in the list after they have been created using the Key Management Service(KMS) console.

○ Disable encryption

ⓘ The selected engine or DB instance class does not support storage encryption.

Backup

⚠ Please note that automated backups are currently supported for InnoDB storage engine only. If you are using MyISAM, refer to detail here.

Backup retention period Info

Select the number of days that Amazon RDS should retain automatic backups of this DB instance.

1 day

Backup window Info

○ Select window

● No preference

☑ Copy tags to snapshots

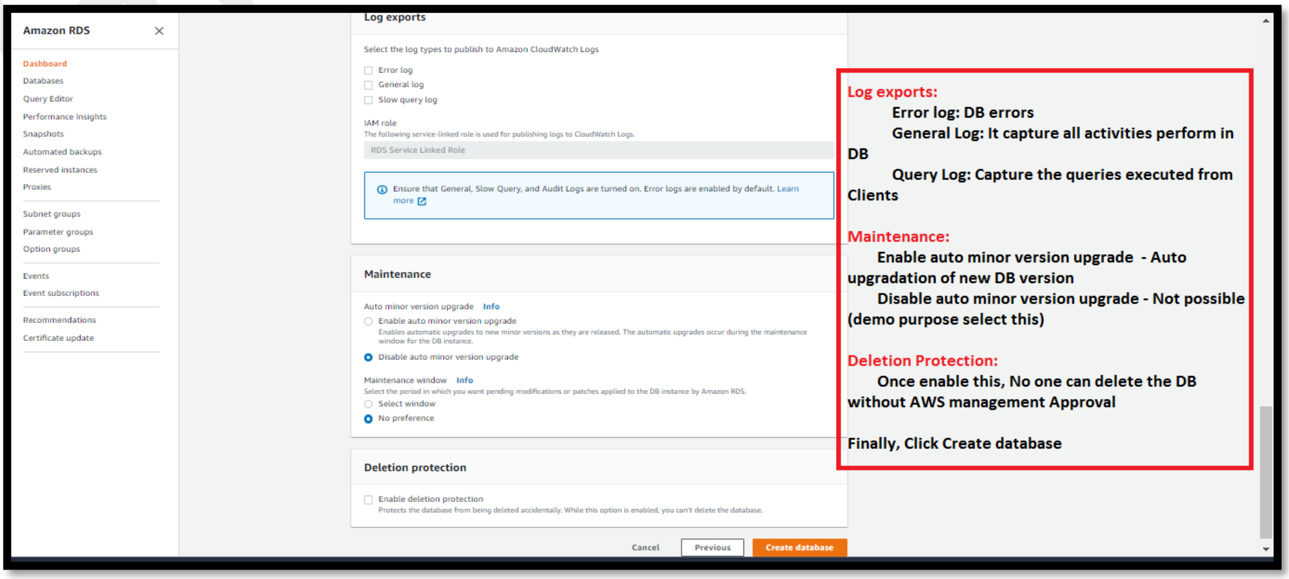
Monitoring

Enhanced monitoring

○ Enable enhanced monitoring
Enhanced monitoring metrics are useful when you want to see how different processes or threads use the CPU.

● Disable enhanced monitoring

Encryption:
db.t2.micro doesn't support to secure data in the DB
Cost Effective
Backup retention period:
7 - 35 days automated backup can keep in DB instance
Cost involved
Backup window: Can select Start time and duration (Cost involved)
This case choose No preferences so AWS handle
Monitoring: Can enable Alerting mechanism for the DB maintainence



Log exports

Select the log types to publish to Amazon CloudWatch Logs

□ Error log
□ General log
□ Slow query log

IAM role

The following service-linked role is used for publishing logs to CloudWatch Logs.

RDS Service Linked Role

ⓘ Ensure that General, Slow Query, and Audit Logs are turned on. Error logs are enabled by default. Learn more

Maintenance

Auto minor version upgrade Info

○ Enable auto minor version upgrade
Enables automatic upgrades to new minor versions as they are released. The automatic upgrades occur during the maintenance window for the DB instance.

● Disable auto minor version upgrade

Maintenance window Info

Select the period in which you want pending modifications or patches applied to the DB instance by Amazon RDS.

○ Select window

● No preference

Deletion protection

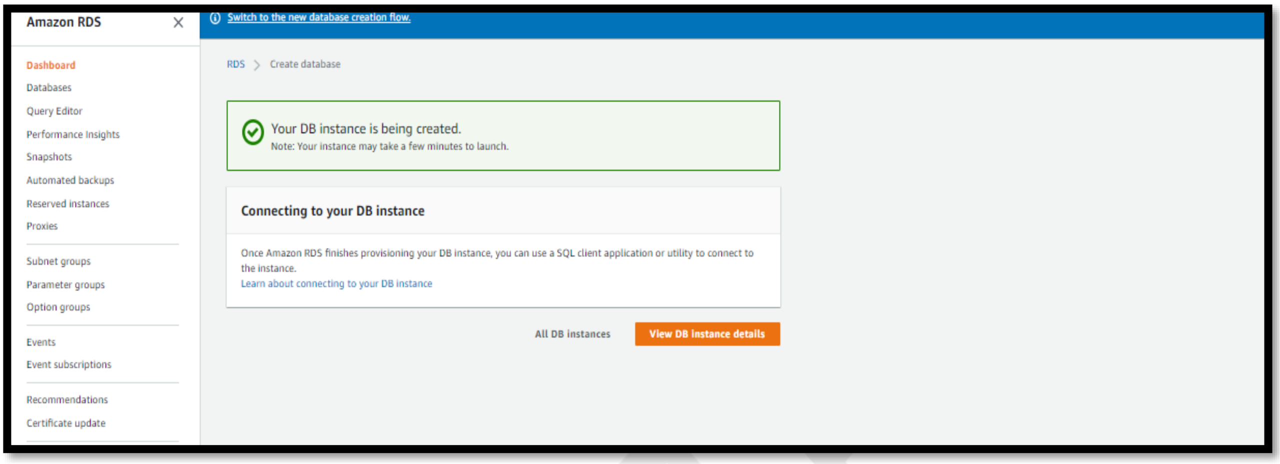
□ Enable deletion protection
Protects the database from being deleted accidentally. While this option is enabled, you can't delete the database.

Log exports:
Error log: DB errors
General Log: It capture all activities perform in DB
Query Log: Capture the queries executed from Clients

Maintenance:
Enable auto minor version upgrade - Auto upgradation of new DB version
Disable auto minor version upgrade - Not possible (demo purpose select this)

Deletion Protection:
Once enable this, No one can delete the DB without AWS management Approval

Finally, Click Create database

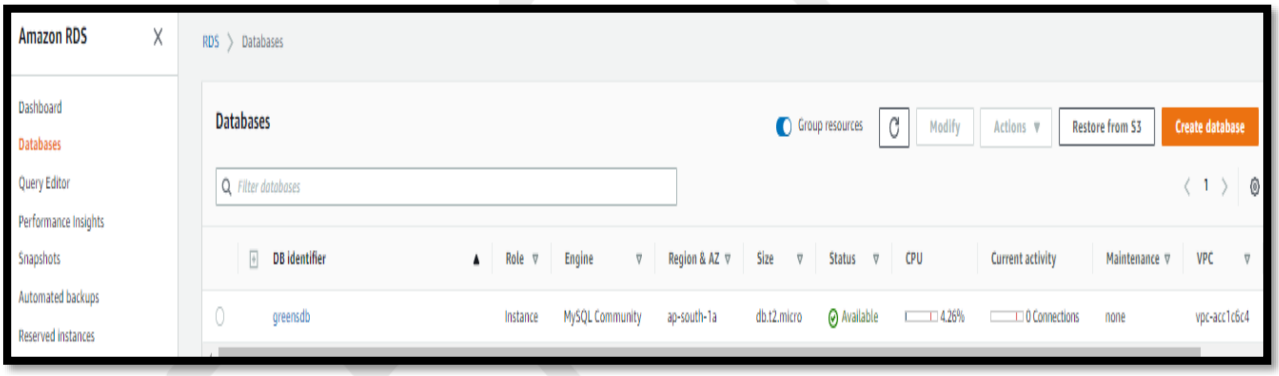


Your DB instance is being created.
Note: Your instance may take a few minutes to launch.

Connecting to your DB instance

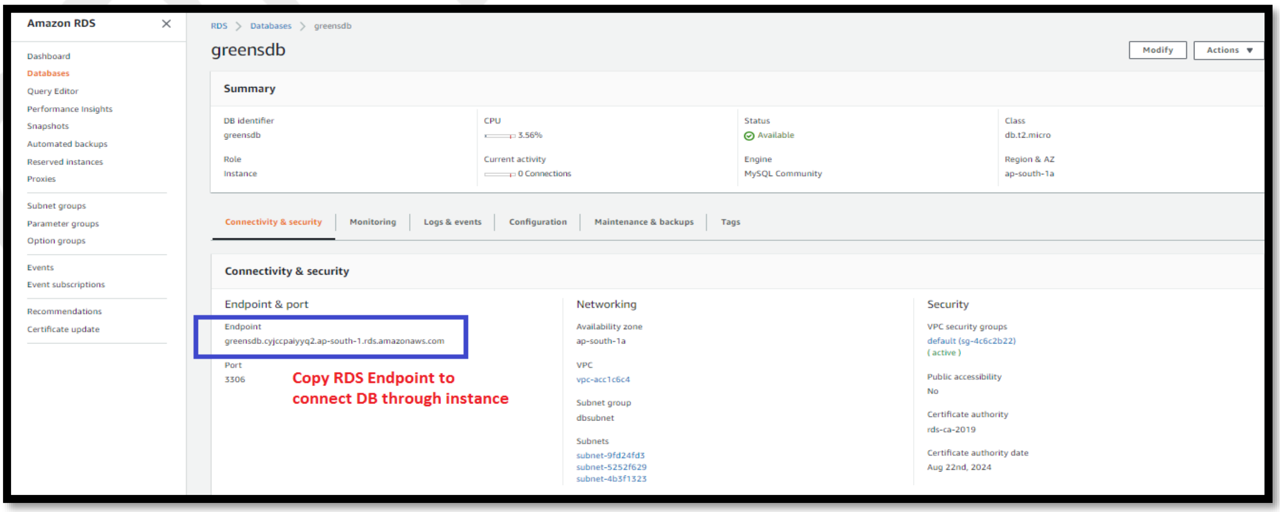
Once Amazon RDS finishes provisioning your DB instance, you can use a SQL client application or utility to connect to the instance.
Learn about connecting to your DB instance

DB Instance created successfully



	DB identifier	Role	Engine	Region & AZ	Size	Status	CPU	Current activity	Maintenance	VPC
○	greensdb	Instance	MySQL Community	ap-south-1a	db.t2.micro	Available	4.26%	0 Connections	none	vpc-acc1c6c4

Check the attributes



greensdb

Summary

DB identifier
greensdb

Role
Instance

CPU
3.56%

Current activity
0 Connections

Status
Available

Engine
MySQL Community

Class
db.t2.micro

Region & AZ
ap-south-1a

Connectivity & security

Endpoint & port

Endpoint
greensdb.cyjccpaiyyq2.ap-south-1.rds.amazonaws.com

Port
3306

Copy RDS Endpoint to connect DB through instance

Networking

Availability zone
ap-south-1a

VPC
vpc-acc1c6c4

Subnet group
dbsubnet

Subnets
subnet-9fd24fd3
subnet-5252f629
subnet-4b3f1323

Security

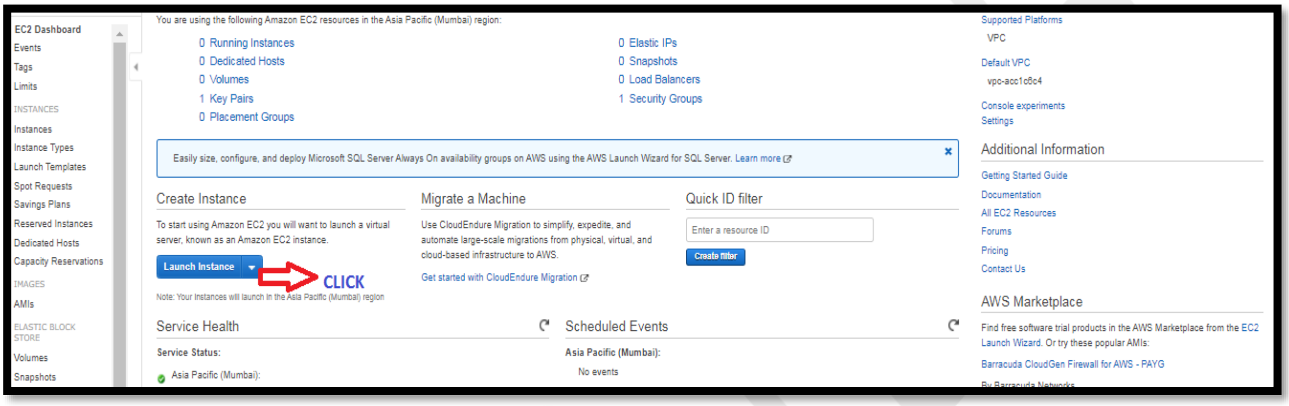
VPC security groups
default (sg-4c6c2b22)
(active)

Public accessibility
No

Certificate authority
rds-ca-2019

Certificate authority date
Aug 22nd, 2024

4. Create an Amazon Linux EC2 Instance



EC2 Dashboard
Events
Tags
Limits
INSTANCES
Instances
Instance Types
Launch Templates
Spot Requests
Savings Plans
Reserved Instances
Dedicated Hosts
Capacity Reservations
IMAGES
AMIs
ELASTIC BLOCK STORE
Volumes
Snapshots

You are using the following Amazon EC2 resources in the Asia Pacific (Mumbai) region:

0 Running Instances	0 Elastic IPs
0 Dedicated Hosts	0 Snapshots
0 Volumes	0 Load Balancers
1 Key Pairs	1 Security Groups
0 Placement Groups	

Easily size, configure, and deploy Microsoft SQL Server Always On availability groups on AWS using the AWS Launch Wizard for SQL Server. Learn more

Create Instance

To start using Amazon EC2 you will want to launch a virtual server, known as an Amazon EC2 instance.

Launch Instance

CLICK

Note: Your Instances will launch in the Asia Pacific (Mumbai) region

Migrate a Machine

Use CloudEndure Migration to simplify, expedite, and automate large-scale migrations from physical, virtual, and cloud-based infrastructure to AWS.

Get started with CloudEndure Migration

Quick ID filter

Enter a resource ID

Create filter

Service Health

Service Status:

Asia Pacific (Mumbai):

Scheduled Events

Asia Pacific (Mumbai):

No events

Supported Platforms
VPC

Default VPC
vpc-acc1c6c4

Console experiments
Settings

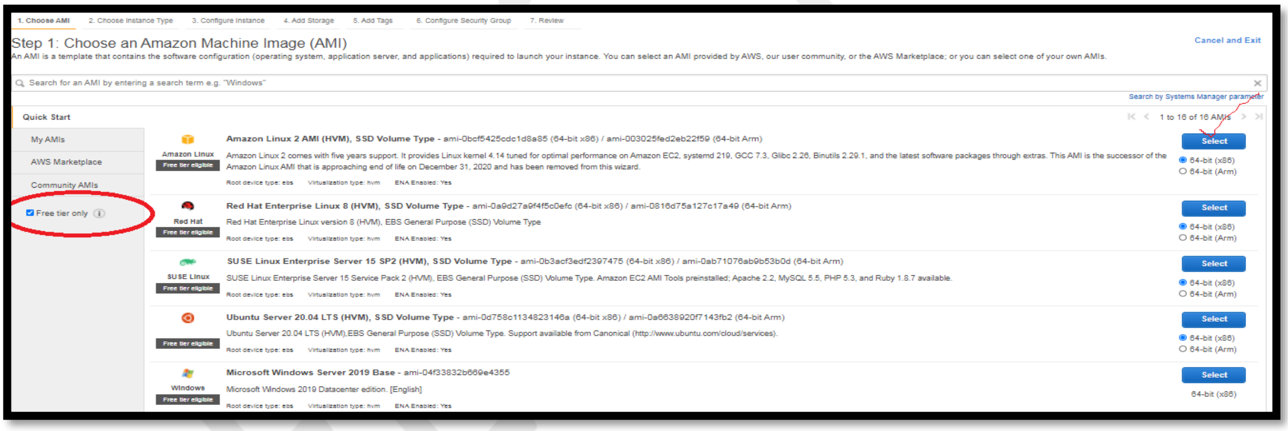
Additional Information

Getting Started Guide
Documentation
All EC2 Resources
Forums
Pricing
Contact Us

AWS Marketplace

Find free software trial products in the AWS Marketplace from the EC2 Launch Wizard. Or try these popular AMIs:

Barracuda CloudGen Firewall for AWS - PAYG
By Barracuda Networks



1. Choose AMI | 2. Choose Instance Type | 3. Configure Instance | 4. Add Storage | 5. Add Tags | 6. Configure Security Group | 7. Review

Cancel and Exit

Step 1: Choose an Amazon Machine Image (AMI)

An AMI is a template that contains the software configuration (operating system, application server, and applications) required to launch your instance. You can select an AMI provided by AWS, our user community, or the AWS Marketplace; or you can select one of your own AMIs.

Search for an AMI by entering a search term e.g. "Windows"

Search by Systems Manager parameter

Quick Start
My AMIs
AWS Marketplace
Community AMIs
☑ Free tier only

1 to 16 of 16 AMIs

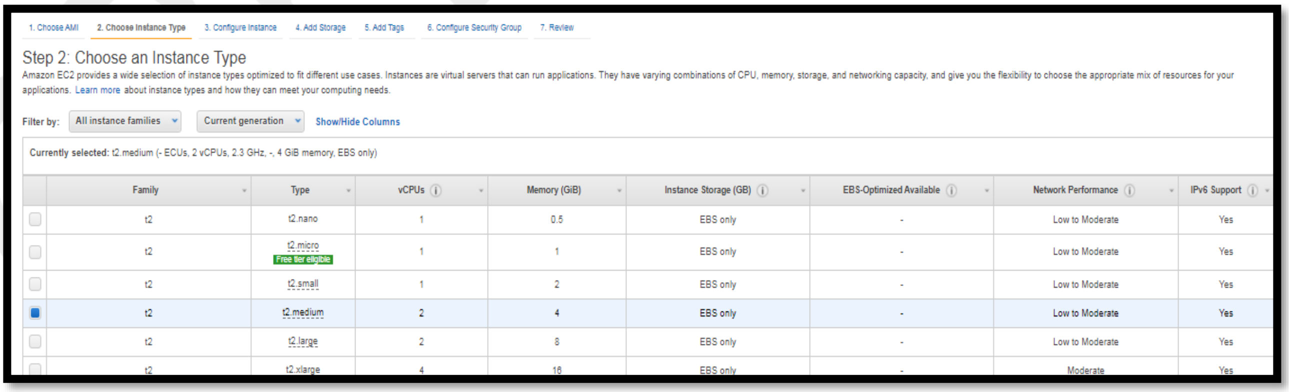
Amazon Linux — Free tier eligible
Amazon Linux 2 AMI (HVM), SSD Volume Type - ami-0bcf5425cdc1d8a85 (64-bit x86) / ami-003025fed2eb22f59 (64-bit Arm)
Amazon Linux 2 comes with five years support. It provides Linux kernel 4.14 tuned for optimal performance on Amazon EC2, systemd 219, GCC 7.3, Glibc 2.26, Binutils 2.29.1, and the latest software packages through extras. This AMI is the successor of the Amazon Linux AMI that is approaching end of life on December 31, 2020 and has been removed from this wizard.
Root device type: ebs Virtualization type: hvm ENA Enabled: Yes
Select — ● 64-bit (x86) ○ 64-bit (Arm)

Red Hat — Free tier eligible
Red Hat Enterprise Linux 8 (HVM), SSD Volume Type - ami-0a9d27a9f4f5c0efc (64-bit x86) / ami-0816d75a127c17a49 (64-bit Arm)
Red Hat Enterprise Linux version 8 (HVM), EBS General Purpose (SSD) Volume Type
Root device type: ebs Virtualization type: hvm ENA Enabled: Yes
Select — ● 64-bit (x86) ○ 64-bit (Arm)

SUSE Linux — Free tier eligible
SUSE Linux Enterprise Server 15 SP2 (HVM), SSD Volume Type - ami-0b3acf3edf2397475 (64-bit x86) / ami-0ab71076ab9b53b0d (64-bit Arm)
SUSE Linux Enterprise Server 15 Service Pack 2 (HVM), EBS General Purpose (SSD) Volume Type. Amazon EC2 AMI Tools preinstalled; Apache 2.2, MySQL 5.5, PHP 5.3, and Ruby 1.8.7 available.
Root device type: ebs Virtualization type: hvm ENA Enabled: Yes
Select — ● 64-bit (x86) ○ 64-bit (Arm)

Free tier eligible
Ubuntu Server 20.04 LTS (HVM), SSD Volume Type - ami-0d758c1134823146a (64-bit x86) / ami-0a6638920f7143fb2 (64-bit Arm)
Ubuntu Server 20.04 LTS (HVM),EBS General Purpose (SSD) Volume Type. Support available from Canonical (http://www.ubuntu.com/cloud/services).
Root device type: ebs Virtualization type: hvm ENA Enabled: Yes
Select — ● 64-bit (x86) ○ 64-bit (Arm)

Windows — Free tier eligible
Microsoft Windows Server 2019 Base - ami-04f33832b669e4355
Microsoft Windows 2019 Datacenter edition. [English]
Root device type: ebs Virtualization type: hvm ENA Enabled: Yes
Select — 64-bit (x86)



1. Choose AMI | 2. Choose Instance Type | 3. Configure Instance | 4. Add Storage | 5. Add Tags | 6. Configure Security Group | 7. Review

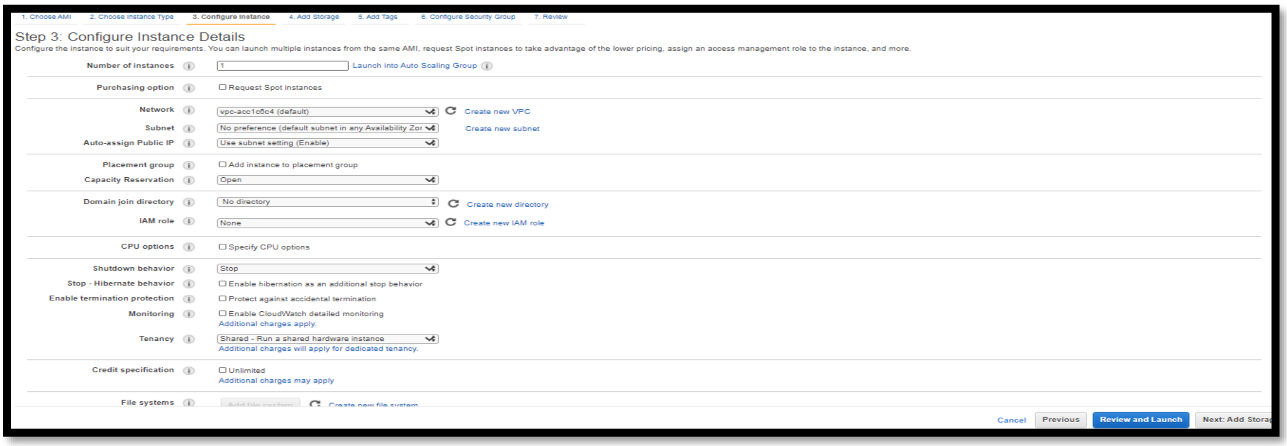
Step 2: Choose an Instance Type

Amazon EC2 provides a wide selection of instance types optimized to fit different use cases. Instances are virtual servers that can run applications. They have varying combinations of CPU, memory, storage, and networking capacity, and give you the flexibility to choose the appropriate mix of resources for your applications. Learn more about instance types and how they can meet your computing needs.

Filter by: All instance families | Current generation | Show/Hide Columns

Currently selected: t2.medium (- ECUs, 2 vCPUs, 2.3 GHz, -, 4 GiB memory, EBS only)

	Family	Type	vCPUs	Memory (GiB)	Instance Storage (GB)	EBS-Optimized Available	Network Performance	IPv6 Support
□	t2	t2.nano	1	0.5	EBS only	-	Low to Moderate	Yes
□	t2	t2.micro Free tier eligible	1	1	EBS only	-	Low to Moderate	Yes
□	t2	t2.small	1	2	EBS only	-	Low to Moderate	Yes
■	t2	t2.medium	2	4	EBS only	-	Low to Moderate	Yes
□	t2	t2.large	2	8	EBS only	-	Low to Moderate	Yes
□	t2	t2.xlarge	4	16	EBS only	-	Moderate	Yes



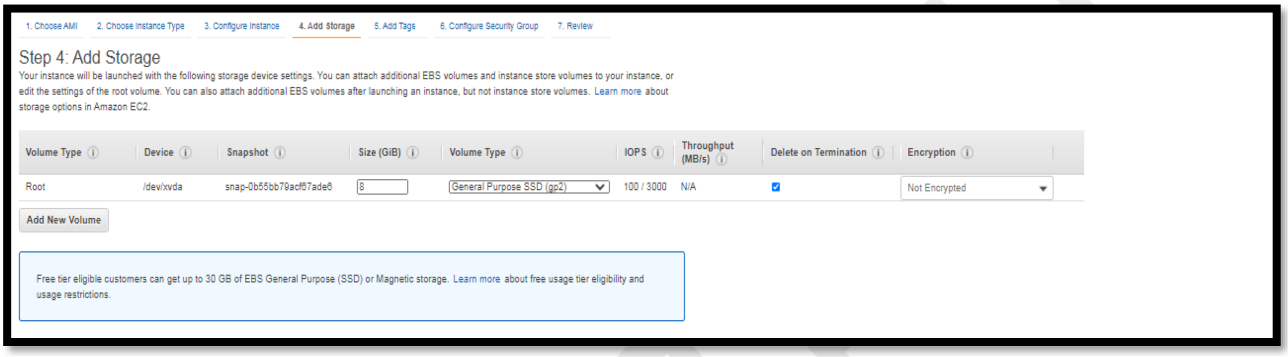
1. Choose AMI | 2. Choose Instance Type | 3. Configure Instance | 4. Add Storage | 5. Add Tags | 6. Configure Security Group | 7. Review

Step 3: Configure Instance Details

Configure the instance to suit your requirements. You can launch multiple instances from the same AMI, request Spot instances to take advantage of the lower pricing, assign an access management role to the instance, and more.

Number of instances	1 — Launch into Auto Scaling Group
Purchasing option	□ Request Spot instances
Network	vpc-acc1c6c4 (default) — Create new VPC
Subnet	No preference (default subnet in any Availability Zor — Create new subnet
Auto-assign Public IP	Use subnet setting (Enable)
Placement group	□ Add instance to placement group
Capacity Reservation	Open
Domain join directory	No directory — Create new directory
IAM role	None — Create new IAM role
CPU options	□ Specify CPU options
Shutdown behavior	Stop
Stop - Hibernate behavior	□ Enable hibernation as an additional stop behavior
Enable termination protection	□ Protect against accidental termination
Monitoring	□ Enable CloudWatch detailed monitoring Additional charges apply.
Tenancy	Shared - Run a shared hardware instance Additional charges will apply for dedicated tenancy.
Credit specification	□ Unlimited Additional charges may apply
File systems	Add file system — Create new file system

Cancel | Previous | Review and Launch | Next: Add Storag



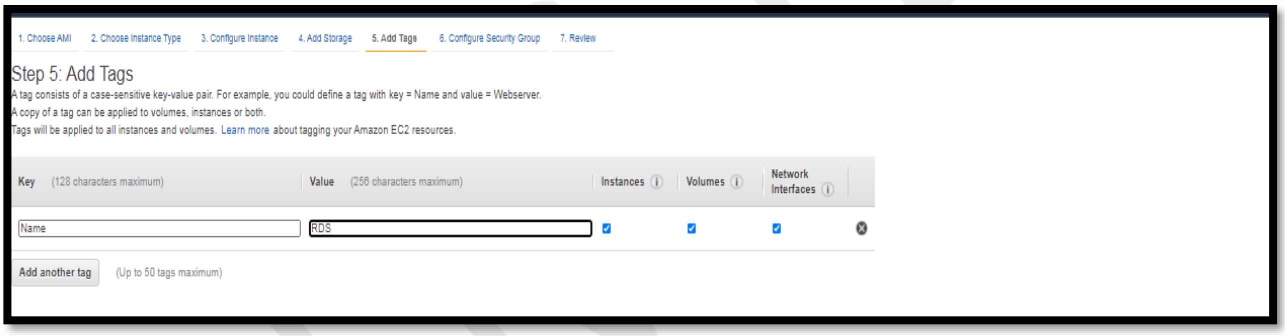
Step 4: Add Storage

Your instance will be launched with the following storage device settings. You can attach additional EBS volumes and instance store volumes to your instance, or edit the settings of the root volume. You can also attach additional EBS volumes after launching an instance, but not instance store volumes. Learn more about storage options in Amazon EC2.

Volume Type	Device	Snapshot	Size (GiB)	Volume Type	IOPS	Throughput (MB/s)	Delete on Termination	Encryption
Root	/dev/xvda	snap-0b55bb79acf67ade6	8	General Purpose SSD (gp2)	100 / 3000	N/A	☑	Not Encrypted

Free tier eligible customers can get up to 30 GB of EBS General Purpose (SSD) or Magnetic storage. Learn more about free usage tier eligibility and usage restrictions.

Customization – Easy to identify instance in future

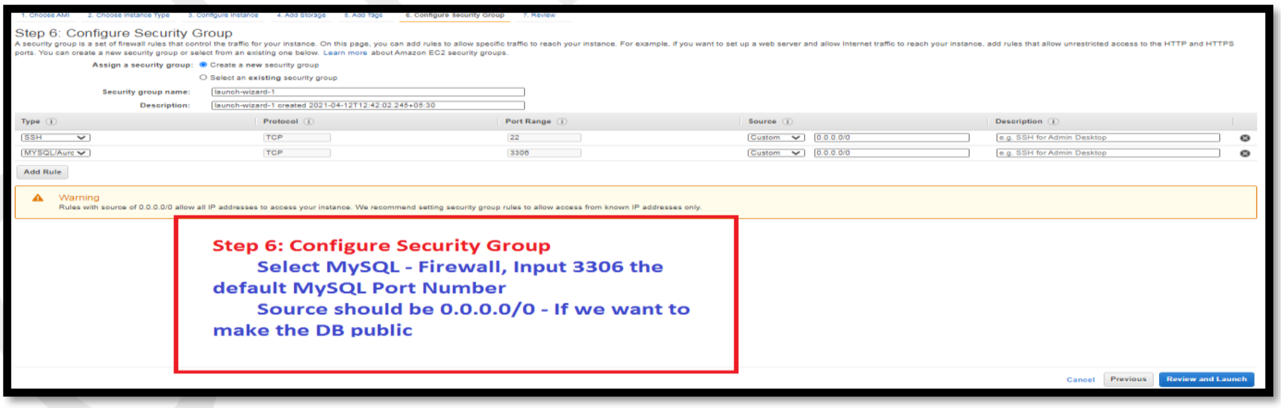


Step 5: Add Tags

A tag consists of a case-sensitive key-value pair. For example, you could define a tag with key = Name and value = Webserver.
A copy of a tag can be applied to volumes, instances or both.
Tags will be applied to all instances and volumes. Learn more about tagging your Amazon EC2 resources.

Key (128 characters maximum)	Value (256 characters maximum)	Instances	Volumes	Network Interfaces
Name	RDS	☑	☑	☑

Create new security Group with MySQL protocol - Public



Step 6: Configure Security Group

A security group is a set of firewall rules that control the traffic for your instance. On this page, you can add rules to allow specific traffic to reach your instance. For example, if you want to set up a web server and allow Internet traffic to reach your instance, add rules that allow unrestricted access to the HTTP and HTTPS ports. You can create a new security group or select from an existing one below. Learn more about Amazon EC2 security groups.

Assign a security group: ● Create a new security group
○ Select an existing security group

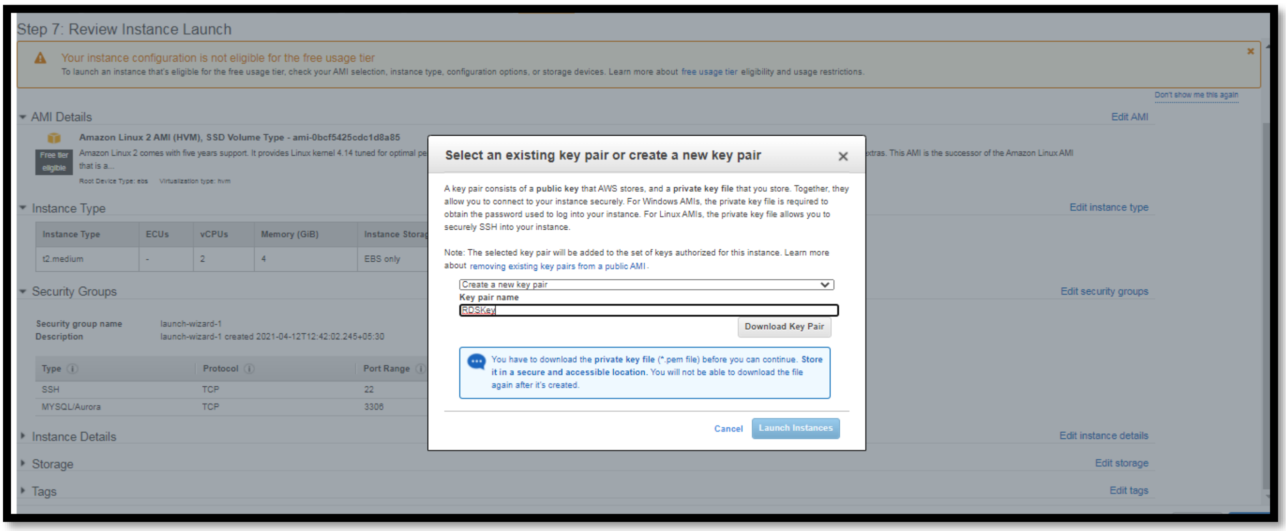
Security group name: launch-wizard-1
Description: launch-wizard-1 created 2021-04-12T12:42:02.245+05:30

Type	Protocol	Port Range	Source		Description
SSH	TCP	22	Custom	0.0.0.0/0	e.g. SSH for Admin Desktop
MYSQL/Aurc	TCP	3306	Custom	0.0.0.0/0	e.g. SSH for Admin Desktop

Warning
Rules with source of 0.0.0.0/0 allow all IP addresses to access your instance. We recommend setting security group rules to allow access from known IP addresses only.

Step 6: Configure Security Group
Select MySQL - Firewall, Input 3306 the default MySQL Port Number
Source should be 0.0.0.0/0 - If we want to make the DB public

Create a pem file



Step 7: Review Instance Launch

Your instance configuration is not eligible for the free usage tier
To launch an instance that's eligible for the free usage tier, check your AMI selection, instance type, configuration options, or storage devices. Learn more about free usage tier eligibility and usage restrictions.

AMI Details

Amazon Linux 2 AMI (HVM), SSD Volume Type - ami-0bcf5425cdc1d8a85
Free tier eligible
Amazon Linux 2 comes with five years support. It provides Linux kernel 4.14 tuned for optimal pe … xtras. This AMI is the successor of the Amazon Linux AMI that is a...
Root Device Type: ebs Virtualization type: hvm

Instance Type

Instance Type	ECUs	vCPUs	Memory (GiB)	Instance Storag
t2.medium	-	2	4	EBS only

Security Groups

Security group name launch-wizard-1
Description launch-wizard-1 created 2021-04-12T12:42:02.245+05:30

Type	Protocol	Port Range
SSH	TCP	22
MYSQL/Aurora	TCP	3306

Instance Details

Storage

Tags

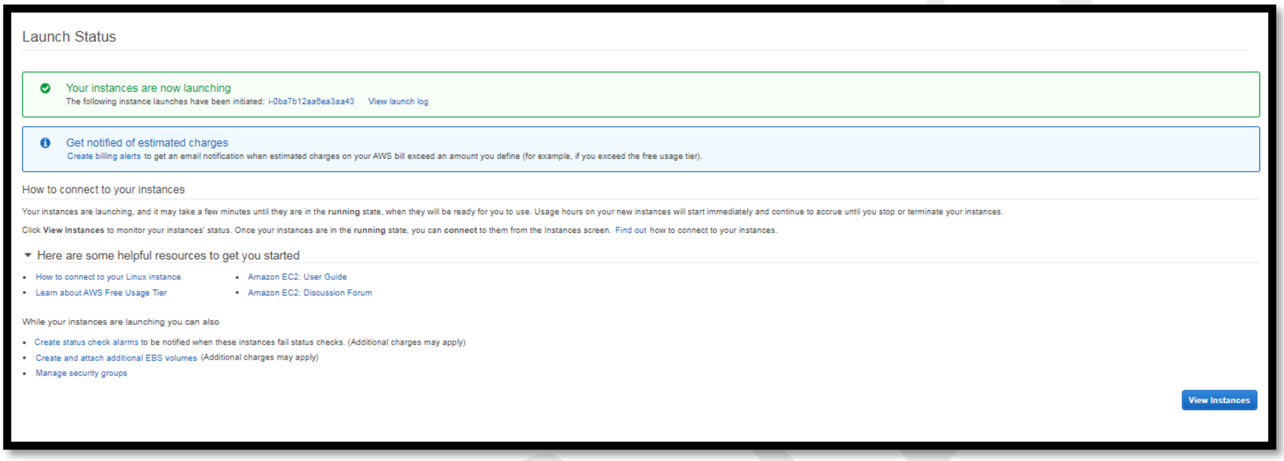
Select an existing key pair or create a new key pair

A key pair consists of a **public key** that AWS stores, and a **private key file** that you store. Together, they allow you to connect to your instance securely. For Windows AMIs, the private key file is required to obtain the password used to log into your instance. For Linux AMIs, the private key file allows you to securely SSH into your instance.

Note: The selected key pair will be added to the set of keys authorized for this instance. Learn more about removing existing key pairs from a public AMI.

Create a new key pair
Key pair name
RDSKey

You have to download the **private key file** (*.pem file) before you can continue. **Store it in a secure and accessible location.** You will not be able to download the file again after it's created.



Launch Status

Your instances are now launching
The following instance launches have been initiated: i-0ba7b12aa6ea3aa43 View launch log

Get notified of estimated charges
Create billing alerts to get an email notification when estimated charges on your AWS bill exceed an amount you define (for example, if you exceed the free usage tier).

How to connect to your instances

Your instances are launching, and it may take a few minutes until they are in the **running** state, when they will be ready for you to use. Usage hours on your new instances will start immediately and continue to accrue until you stop or terminate your instances.

Click **View Instances** to monitor your instances' status. Once your instances are in the **running** state, you can **connect** to them from the Instances screen. Find out how to connect to your instances.

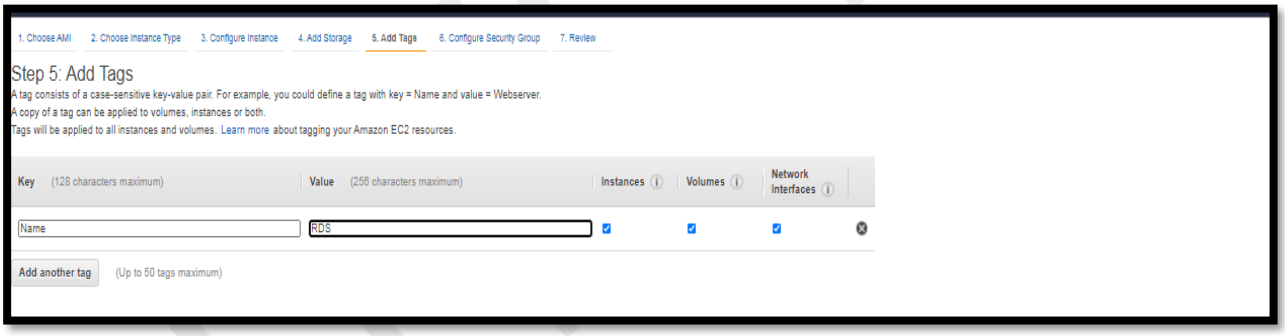
▾ Here are some helpful resources to get you started

- How to connect to your Linux instance
- Learn about AWS Free Usage Tier
- Amazon EC2: User Guide
- Amazon EC2: Discussion Forum

While your instances are launching you can also

- Create status check alarms to be notified when these instances fail status checks. (Additional charges may apply)
- Create and attach additional EBS volumes (Additional charges may apply)
- Manage security groups

Launch Instance

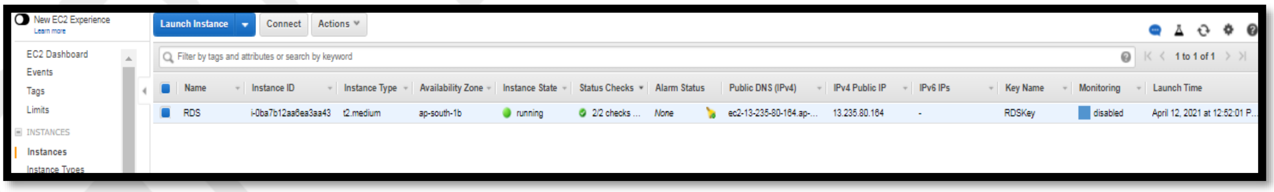


Step 5: Add Tags

A tag consists of a case-sensitive key-value pair. For example, you could define a tag with key = Name and value = Webserver.
A copy of a tag can be applied to volumes, instances or both.
Tags will be applied to all instances and volumes. Learn more about tagging your Amazon EC2 resources.

Key (128 characters maximum)	Value (256 characters maximum)	Instances	Volumes	Network Interfaces	
Name	RDS	☑	☑	☑	⊗

Instance “RDS” Created



Name	Instance ID	Instance Type	Availability Zone	Instance State	Status Checks	Alarm Status	Public DNS (IPv4)	IPv4 Public IP	IPv6 IPs	Key Name	Monitoring	Launch Time
RDS	i-0ba7b12aa6ea3aa43	t2.medium	ap-south-1b	● running	✓ 2/2 checks ...	None	ec2-13-235-80-164.ap-...	13.235.80.164	-	RDSKey	disabled	April 12, 2021 at 12:52:01 P...

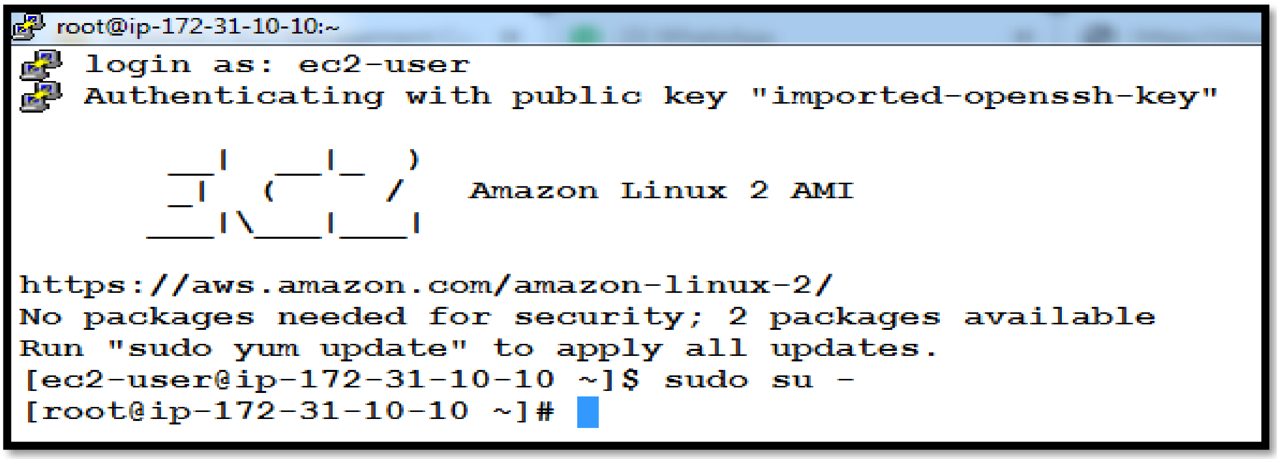
Use puttygen and convert pem file into ppk file

I have converted RDSKey.pem into RDSKey.ppk

Use putty to login EC2 instance with EC2 public ip

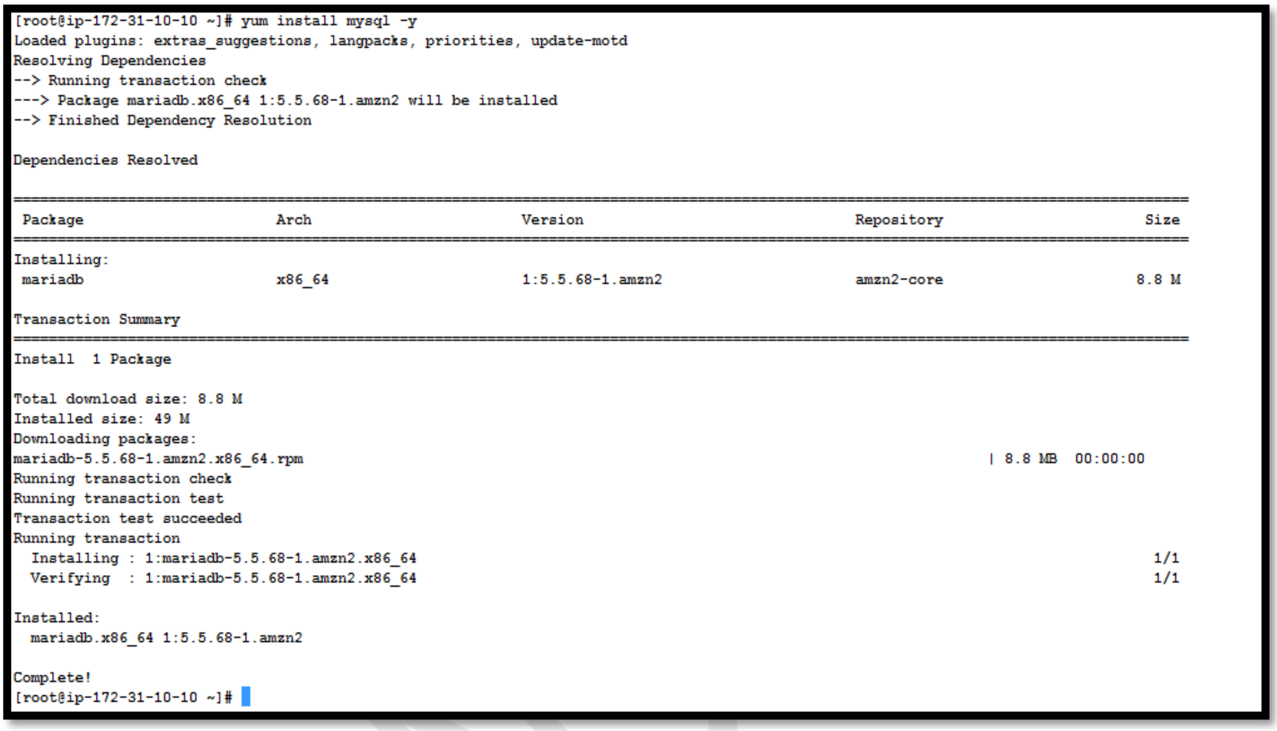
Take the credentials from connect tab and login.

Once the Login completed, we will get below screen, switch to root user



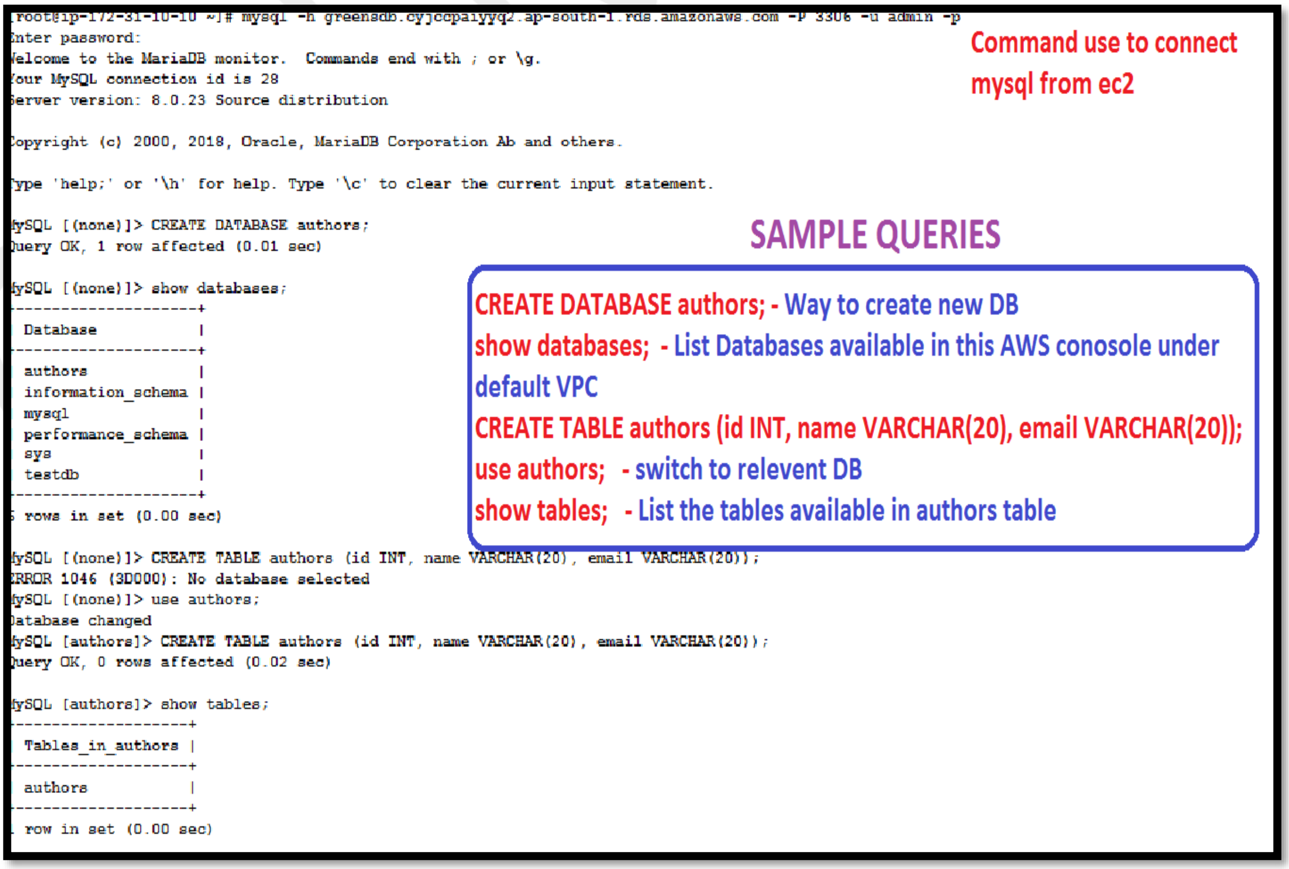
```
root@ip-172-31-10-10:~
login as: ec2-user
Authenticating with public key "imported-openssh-key"

       __|  __|_  )
       _|  (     /   Amazon Linux 2 AMI
      ___|\___|___|

https://aws.amazon.com/amazon-linux-2/
No packages needed for security; 2 packages available
Run "sudo yum update" to apply all updates.
[ec2-user@ip-172-31-10-10 ~]$ sudo su -
[root@ip-172-31-10-10 ~]#
```

Install mysql client to enable to listen mysql commands in our EC2



```
[root@ip-172-31-10-10 ~]# yum install mysql -y
Loaded plugins: extras_suggestions, langpacks, priorities, update-motd
Resolving Dependencies
--> Running transaction check
---> Package mariadb.x86_64 1:5.5.68-1.amzn2 will be installed
--> Finished Dependency Resolution

Dependencies Resolved

================================================================================================================================
 Package                      Arch                        Version                                Repository                 Size
================================================================================================================================
Installing:
 mariadb                      x86_64                      1:5.5.68-1.amzn2                       amzn2-core                8.8 M

Transaction Summary
================================================================================================================================
Install  1 Package

Total download size: 8.8 M
Installed size: 49 M
Downloading packages:
mariadb-5.5.68-1.amzn2.x86_64.rpm                                                                   | 8.8 MB  00:00:00
Running transaction check
Running transaction test
Transaction test succeeded
Running transaction
  Installing : 1:mariadb-5.5.68-1.amzn2.x86_64                                                                           1/1
  Verifying  : 1:mariadb-5.5.68-1.amzn2.x86_64                                                                           1/1

Installed:
  mariadb.x86_64 1:5.5.68-1.amzn2

Complete!
[root@ip-172-31-10-10 ~]#
```

Connect MySQL and Query Execution



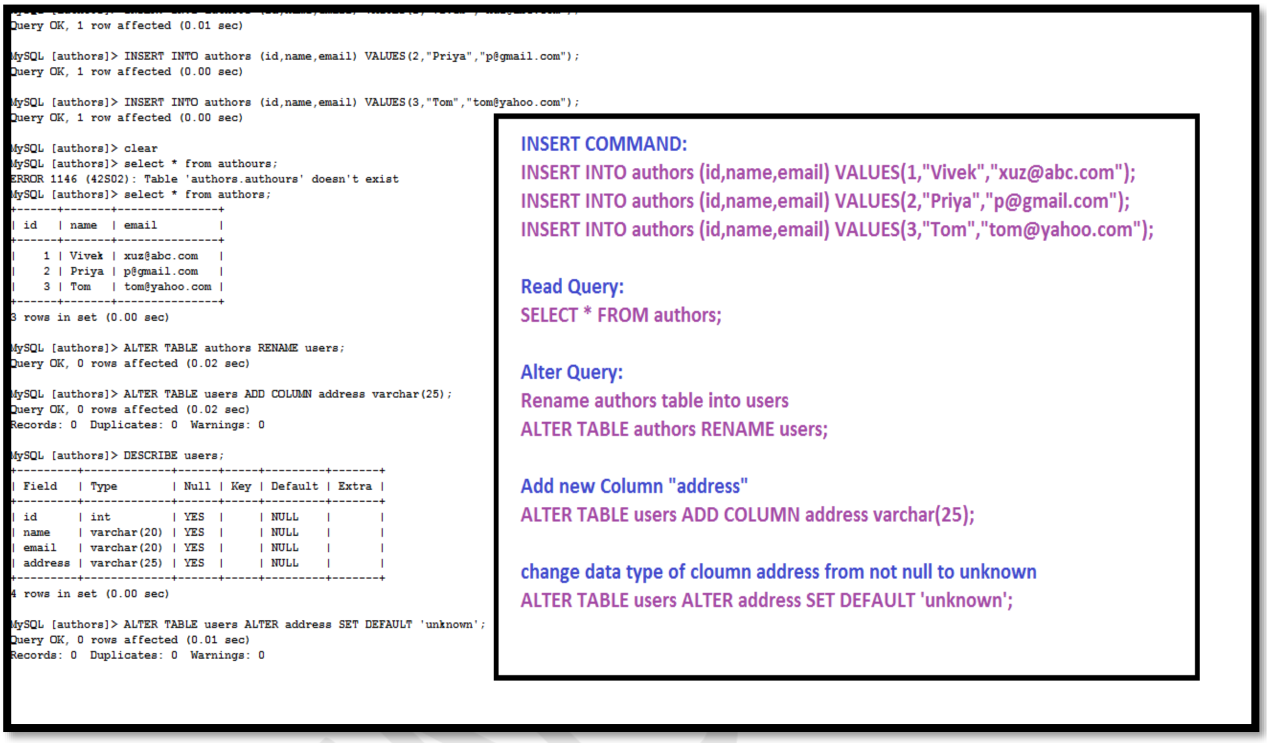
```
[root@ip-172-31-10-10 ~]# mysql -h greensdb.cyjccpaiyyq2.ap-south-1.rds.amazonaws.com -P 3306 -u admin -p
nter password:
elcome to the MariaDB monitor.  Commands end with ; or \g.
our MySQL connection id is 28
erver version: 8.0.23 Source distribution

opyright (c) 2000, 2018, Oracle, MariaDB Corporation Ab and others.

ype 'help;' or '\h' for help. Type '\c' to clear the current input statement.

ySQL [(none)]> CREATE DATABASE authors;
uery OK, 1 row affected (0.01 sec)

ySQL [(none)]> show databases;
--------------------+
 Database           |
--------------------+
 authors            |
 information_schema |
 mysql              |
 performance_schema |
 sys                |
 testdb             |
--------------------+
 rows in set (0.00 sec)

ySQL [(none)]> CREATE TABLE authors (id INT, name VARCHAR(20), email VARCHAR(20));
RROR 1046 (3D000): No database selected
ySQL [(none)]> use authors;
atabase changed
ySQL [authors]> CREATE TABLE authors (id INT, name VARCHAR(20), email VARCHAR(20));
uery OK, 0 rows affected (0.02 sec)

ySQL [authors]> show tables;
-------------------+
 Tables_in_authors |
-------------------+
 authors           |
-------------------+
 row in set (0.00 sec)
```

Command use to connect mysql from ec2

SAMPLE QUERIES

CREATE DATABASE authors; - Way to create new DB
show databases; - List Databases available in this AWS conosole under default VPC
CREATE TABLE authors (id INT, name VARCHAR(20), email VARCHAR(20));
use authors; - switch to relevent DB
show tables; - List the tables available in authors table

Install mysql client to enable to listen mysql commands in our EC2



```
Query OK, 1 row affected (0.01 sec)

MySQL [authors]> INSERT INTO authors (id,name,email) VALUES(2,"Priya","p@gmail.com");
Query OK, 1 row affected (0.00 sec)

MySQL [authors]> INSERT INTO authors (id,name,email) VALUES(3,"Tom","tom@yahoo.com");
Query OK, 1 row affected (0.00 sec)

MySQL [authors]> clear
MySQL [authors]> select * from authours;
ERROR 1146 (42S02): Table 'authors.authours' doesn't exist
MySQL [authors]> select * from authors;
+------+-------+---------------+
| id   | name  | email         |
+------+-------+---------------+
|    1 | Vivek | xuz@abc.com   |
|    2 | Priya | p@gmail.com   |
|    3 | Tom   | tom@yahoo.com |
+------+-------+---------------+
3 rows in set (0.00 sec)

MySQL [authors]> ALTER TABLE authors RENAME users;
Query OK, 0 rows affected (0.02 sec)

MySQL [authors]> ALTER TABLE users ADD COLUMN address varchar(25);
Query OK, 0 rows affected (0.02 sec)
Records: 0  Duplicates: 0  Warnings: 0

MySQL [authors]> DESCRIBE users;
+---------+-------------+------+-----+---------+-------+
| Field   | Type        | Null | Key | Default | Extra |
+---------+-------------+------+-----+---------+-------+
| id      | int         | YES  |     | NULL    |       |
| name    | varchar(20) | YES  |     | NULL    |       |
| email   | varchar(20) | YES  |     | NULL    |       |
| address | varchar(25) | YES  |     | NULL    |       |
+---------+-------------+------+-----+---------+-------+
4 rows in set (0.00 sec)

MySQL [authors]> ALTER TABLE users ALTER address SET DEFAULT 'unknown';
Query OK, 0 rows affected (0.01 sec)
Records: 0  Duplicates: 0  Warnings: 0
```

INSERT COMMAND:

INSERT INTO authors (id,name,email) VALUES(1,"Vivek","xuz@abc.com");
INSERT INTO authors (id,name,email) VALUES(2,"Priya","p@gmail.com");
INSERT INTO authors (id,name,email) VALUES(3,"Tom","tom@yahoo.com");

Read Query:

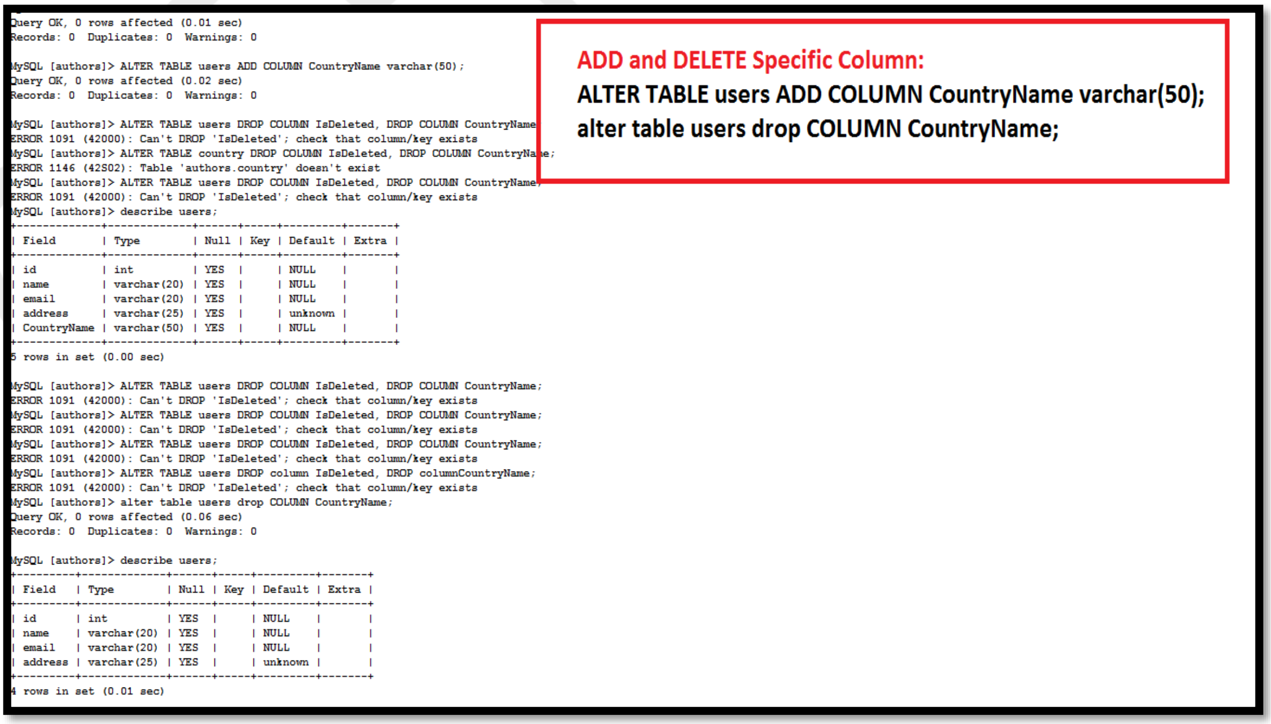
SELECT * FROM authors;

Alter Query:

Rename authors table into users
ALTER TABLE authors RENAME users;

Add new Column "address"
ALTER TABLE users ADD COLUMN address varchar(25);

change data type of cloumn address from not null to unknown
ALTER TABLE users ALTER address SET DEFAULT 'unknown';



```
Query OK, 0 rows affected (0.01 sec)
Records: 0  Duplicates: 0  Warnings: 0

MySQL [authors]> ALTER TABLE users ADD COLUMN CountryName varchar(50);
Query OK, 0 rows affected (0.02 sec)
Records: 0  Duplicates: 0  Warnings: 0

MySQL [authors]> ALTER TABLE users DROP COLUMN IsDeleted, DROP COLUMN CountryName
ERROR 1091 (42000): Can't DROP 'IsDeleted'; check that column/key exists
MySQL [authors]> ALTER TABLE country DROP COLUMN IsDeleted, DROP COLUMN CountryNa e;
ERROR 1146 (42S02): Table 'authors.country' doesn't exist
MySQL [authors]> ALTER TABLE users DROP COLUMN IsDeleted, DROP COLUMN CountryName
ERROR 1091 (42000): Can't DROP 'IsDeleted'; check that column/key exists
MySQL [authors]> describe users;
+-------------+-------------+------+-----+---------+-------+
| Field       | Type        | Null | Key | Default | Extra |
+-------------+-------------+------+-----+---------+-------+
| id          | int         | YES  |     | NULL    |       |
| name        | varchar(20) | YES  |     | NULL    |       |
| email       | varchar(20) | YES  |     | NULL    |       |
| address     | varchar(25) | YES  |     | unknown |       |
| CountryName | varchar(50) | YES  |     | NULL    |       |
+-------------+-------------+------+-----+---------+-------+
5 rows in set (0.00 sec)

MySQL [authors]> ALTER TABLE users DROP COLUMN IsDeleted, DROP COLUMN CountryName;
ERROR 1091 (42000): Can't DROP 'IsDeleted'; check that column/key exists
MySQL [authors]> ALTER TABLE users DROP COLUMN IsDeleted, DROP COLUMN CountryName;
ERROR 1091 (42000): Can't DROP 'IsDeleted'; check that column/key exists
MySQL [authors]> ALTER TABLE users DROP COLUMN IsDeleted, DROP COLUMN CountryName;
ERROR 1091 (42000): Can't DROP 'IsDeleted'; check that column/key exists
MySQL [authors]> ALTER TABLE users DROP column IsDeleted, DROP columnCountryName;
ERROR 1091 (42000): Can't DROP 'IsDeleted'; check that column/key exists
MySQL [authors]> alter table users drop COLUMN CountryName;
Query OK, 0 rows affected (0.06 sec)
Records: 0  Duplicates: 0  Warnings: 0

MySQL [authors]> describe users;
+---------+-------------+------+-----+---------+-------+
| Field   | Type        | Null | Key | Default | Extra |
+---------+-------------+------+-----+---------+-------+
| id      | int         | YES  |     | NULL    |       |
| name    | varchar(20) | YES  |     | NULL    |       |
| email   | varchar(20) | YES  |     | NULL    |       |
| address | varchar(25) | YES  |     | unknown |       |
+---------+-------------+------+-----+---------+-------+
4 rows in set (0.01 sec)
```

ADD and DELETE Specific Column:

ALTER TABLE users ADD COLUMN CountryName varchar(50);
alter table users drop COLUMN CountryName;

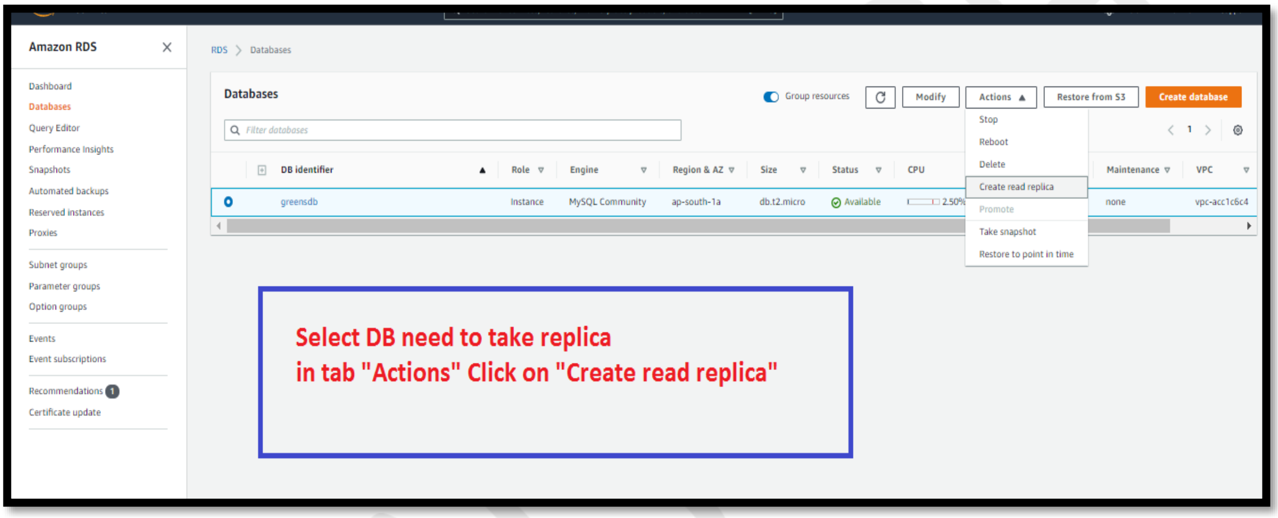
SQL SAMPLE QUERIES: Please refer for the Practice

SQL DML Queries.txt

KEY CONCEPTS:

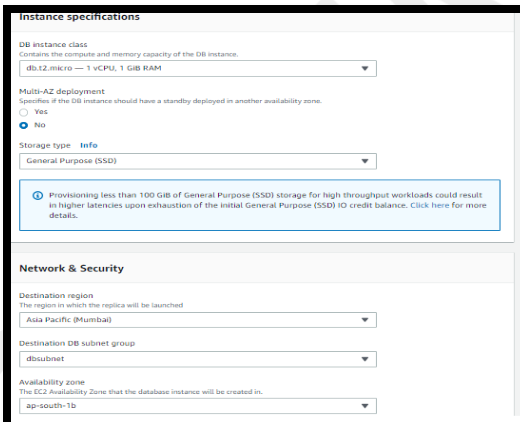
MASTER REPLICA:

Key Note: The concept of Replica and Snapshot alone possible in MySQL.



DB identifier	Role	Engine	Region & AZ	Size	Status	CPU	Maintenance	VPC
greensdb	Instance	MySQL Community	ap-south-1a	db.t2.micro	Available	2.50%	none	vpc-acc1c6c4

Select DB need to take replica
in tab "Actions" Click on "Create read replica"


Instance specifications

DB instance class
Contains the compute and memory capacity of the DB instance.
db.t2.micro — 1 vCPU, 1 GiB RAM

Multi-AZ deployment
Specifies if the DB instance should have a standby deployed in another availability zone.
○ Yes
● No

Storage type Info
General Purpose (SSD)

Provisioning less than 100 GiB of General Purpose (SSD) storage for high throughput workloads could result in higher latencies upon exhaustion of the initial General Purpose (SSD) IO credit balance. Click here for more details.

Network & Security

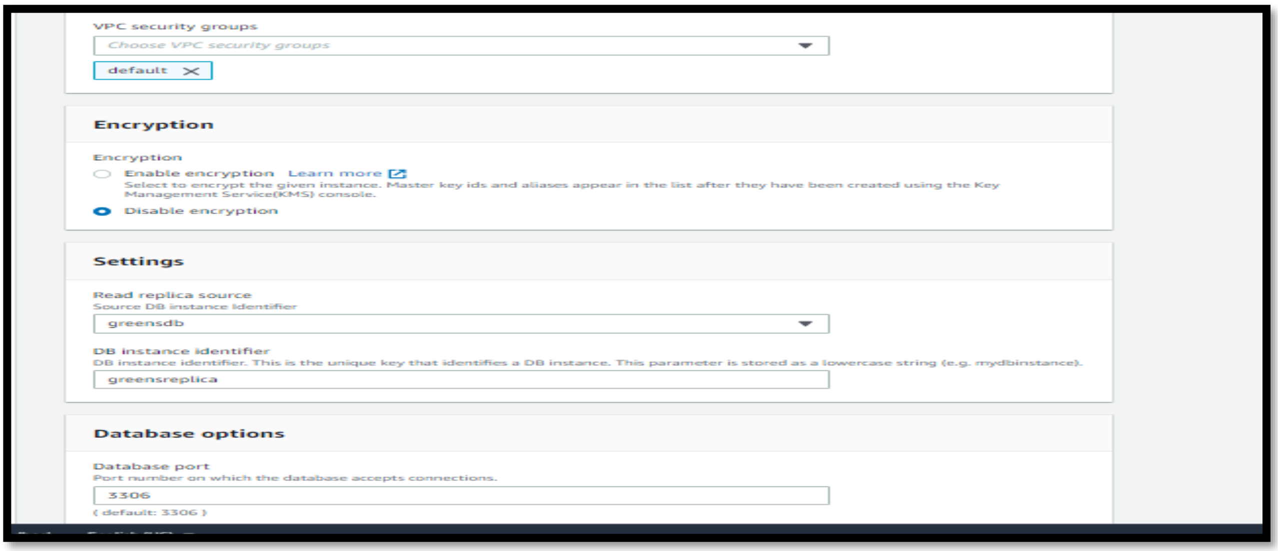
Destination region
The region in which the replica will be launched
Asia Pacific (Mumbai)

Destination DB subnet group
dbsubnet

Availability zone
The EC2 Availability Zone that the database instance will be created in.
ap-south-1b

Master Replica:
AWS never recommend to run any db as a instance
So Master Replica - can create a replica in diffrent AZ
100% synched with Master and whatever happens in Master will automatically updated in replica
If our db down we can make use replica to avoid business interuptions
Cost Involved

Experiment:
Post creation of replica DB, Try to Delete the Master db
once master completely deleted, try to connect the replica using
mysql -h endpoint of replica -P 3306 -u greens -p
No changes in the credentials
db will connect successfully
check the db and tables and data either it is synced ..100% no doubt
so the replica will auto promote as a master and allows both read and write operations
so the replica will become a instance


VPC security groups
Choose VPC security groups
default ✕

Encryption

Encryption
○ Enable encryption Learn more
Select to encrypt the given instance. Master key ids and aliases appear in the list after they have been created using the Key Management Service(KMS) console.
● Disable encryption

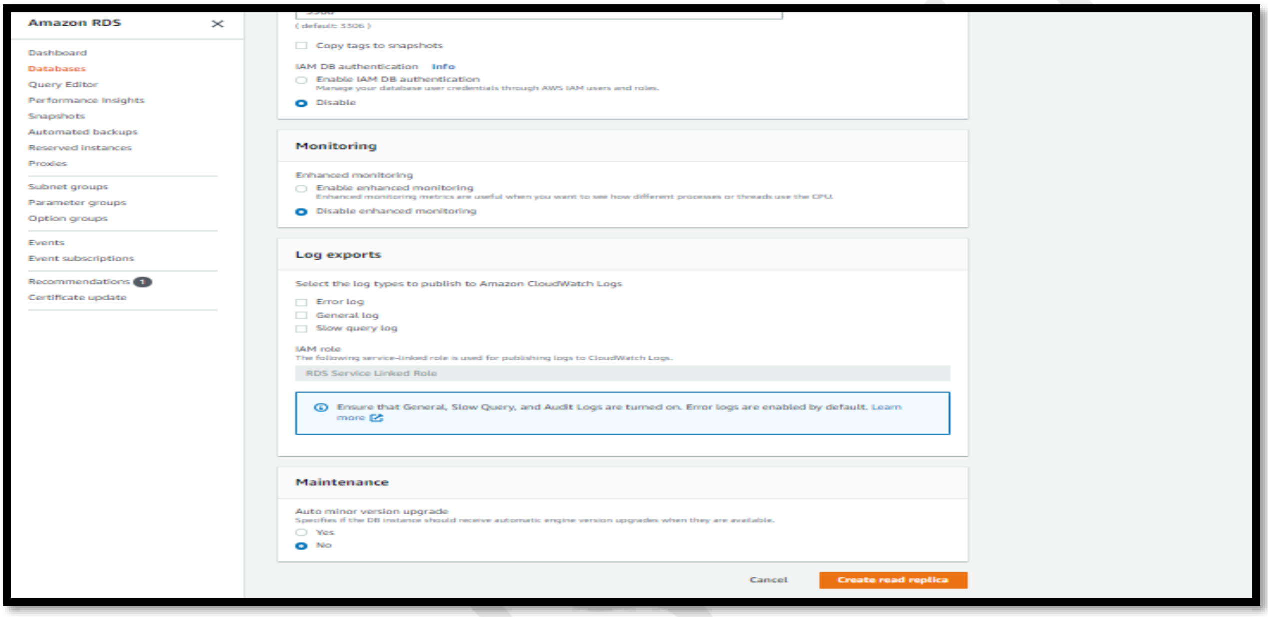
Settings

Read replica source
Source DB instance identifier
greensdb

DB instance identifier
DB instance identifier. This is the unique key that identifies a DB instance. This parameter is stored as a lowercase string (e.g. mydbinstance).
greensreplica

Database options

Database port
Port number on which the database accepts connections.
3306
(default: 3306)



Amazon RDS ✕

- Dashboard
- Databases
- Query Editor
- Performance insights
- Snapshots
- Automated backups
- Reserved instances
- Proxies
- Subnet groups
- Parameter groups
- Option groups
- Events
- Event subscriptions
- Recommendations 1
- Certificate update

(default: 3306)

□ Copy tags to snapshots

IAM DB authentication Info

○ Enable IAM DB authentication
Manage your database user credentials through AWS IAM users and roles.

● Disable

Monitoring

Enhanced monitoring

○ Enable enhanced monitoring
Enhanced monitoring metrics are useful when you want to see how different processes or threads use the CPU.

● Disable enhanced monitoring

Log exports

Select the log types to publish to Amazon CloudWatch Logs

□ Error log
□ General log
□ Slow query log

IAM role
The following service-linked role is used for publishing logs to CloudWatch Logs.

RDS Service Linked Role

Ensure that General, Slow Query, and Audit Logs are turned on. Error logs are enabled by default. Learn more

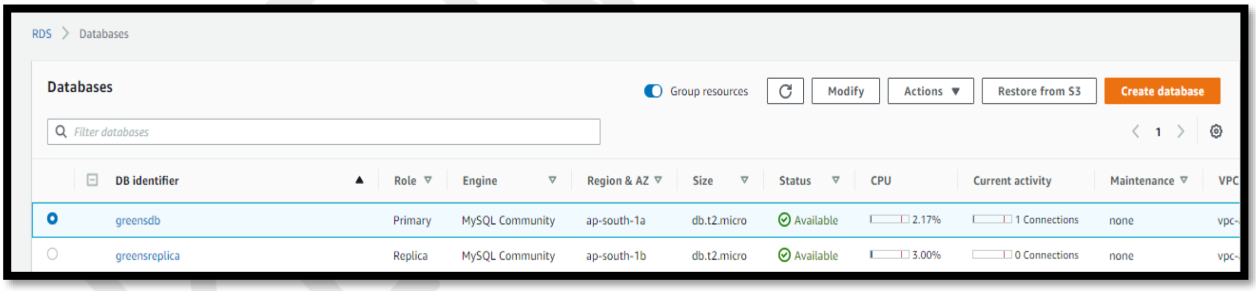
Maintenance

Auto minor version upgrade
Specifies if the DB instance should receive automatic engine version upgrades when they are available.

○ Yes
● No

REPLICA CREATED SUCCESSFULLY

Note: Once Replica created the role of the master DB changed from instance to Primary

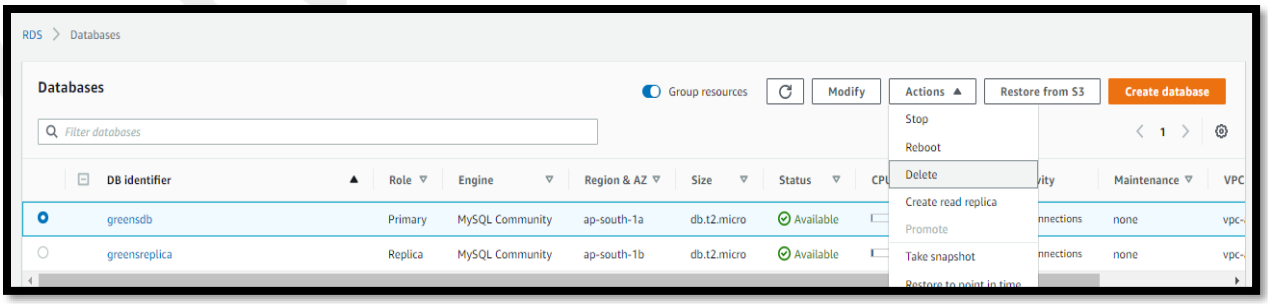


RDS > Databases

Databases

	DB identifier ▲	Role	Engine	Region & AZ	Size	Status	CPU	Current activity	Maintenance	VPC
●	greensdb	Primary	MySQL Community	ap-south-1a	db.t2.micro	✓ Available	2.17%	1 Connections	none	vpc-
○	greensreplica	Replica	MySQL Community	ap-south-1b	db.t2.micro	✓ Available	3.00%	0 Connections	none	vpc-

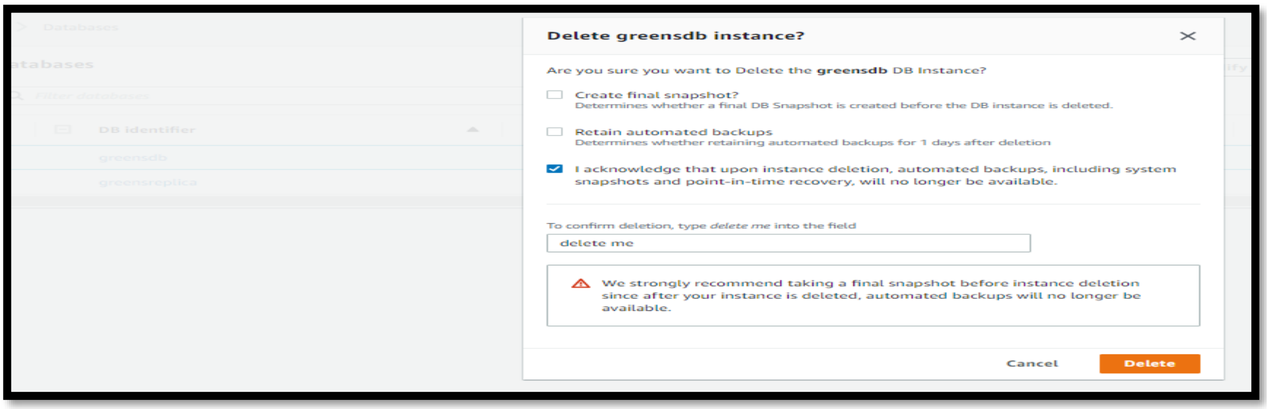
DELETE MASTER DB INSTANCE AND TRY TO USE REPLICA



RDS > Databases

Databases

	DB identifier ▲	Role	Engine	Region & AZ	Size	Status	CPU	…ity	Maintenance	VPC
●	greensdb	Primary	MySQL Community	ap-south-1a	db.t2.micro	✓ Available		…nnections	none	vpc-
○	greensreplica	Replica	MySQL Community	ap-south-1b	db.t2.micro	✓ Available		…nnections	none	vpc-



Delete greensdb instance? ✕

Are you sure you want to Delete the **greensdb** DB Instance?

□ Create final snapshot?
Determines whether a final DB Snapshot is created before the DB instance is deleted.

□ Retain automated backups
Determines whether retaining automated backups for 1 days after deletion

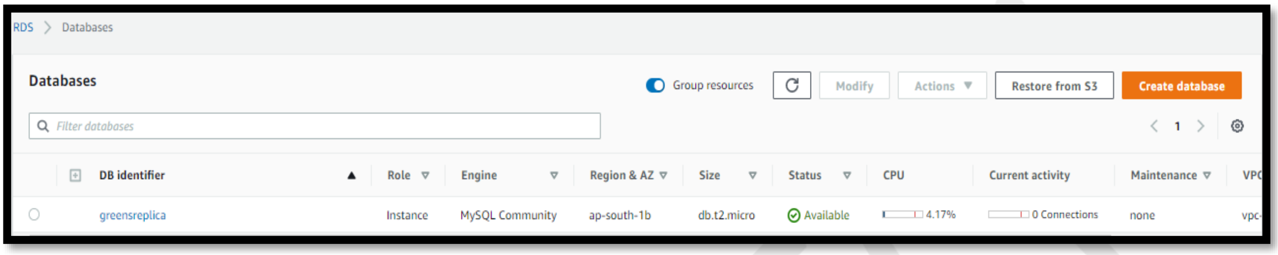
☑ I acknowledge that upon instance deletion, automated backups, including system snapshots and point-in-time recovery, will no longer be available.

To confirm deletion, type *delete me* into the field

delete me

We strongly recommend taking a final snapshot before instance deletion since after your instance is deleted, automated backups will no longer be available.

Note: Role of Replica changed as “instance”

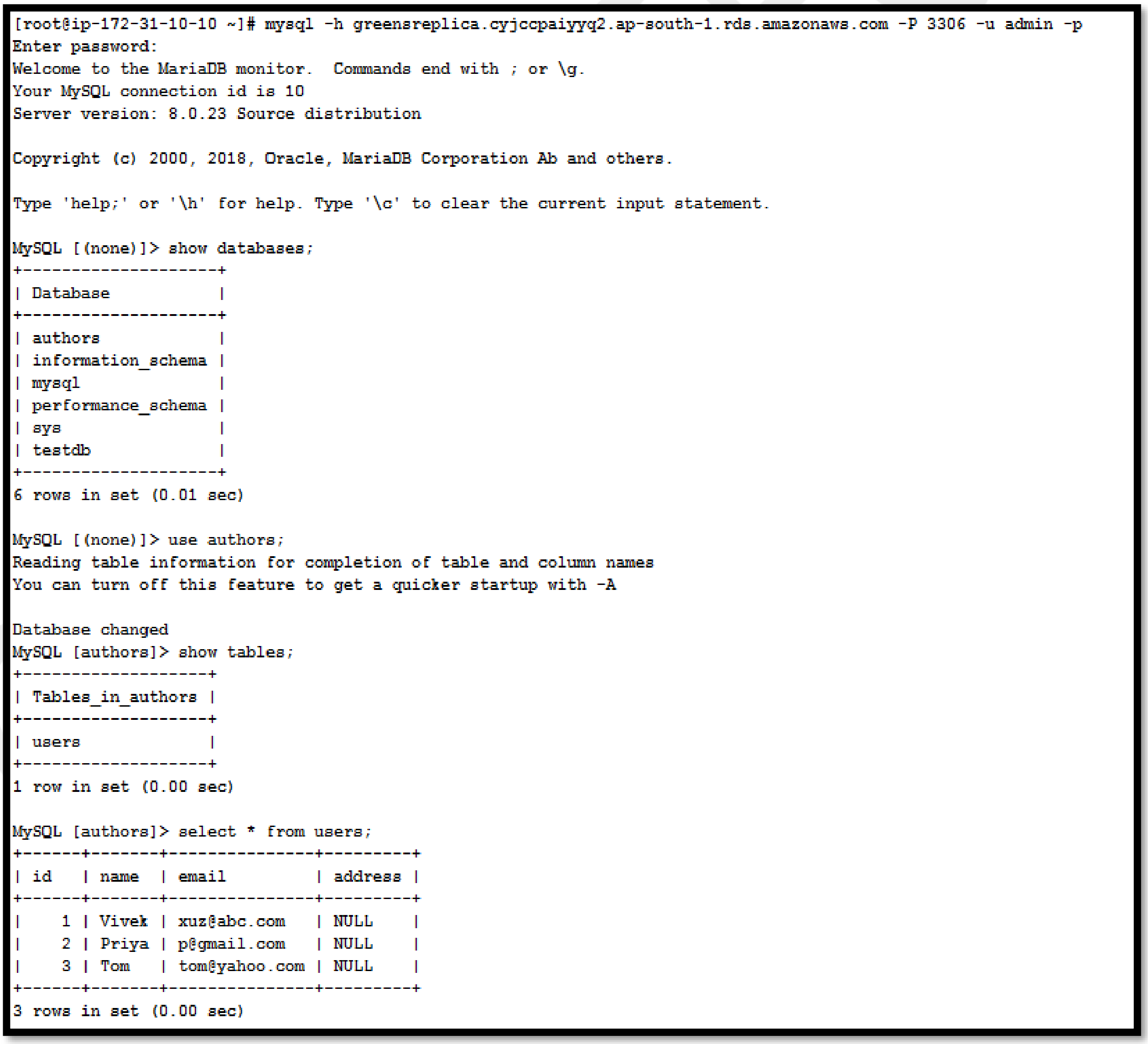


RDS > Databases

Databases

DB identifier	Role	Engine	Region & AZ	Size	Status	CPU	Current activity	Maintenance	VPC
greensreplica	Instance	MySQL Community	ap-south-1b	db.t2.micro	✓ Available	4.17%	0 Connections	none	vpc-

Try to connect MySQL using greensreplica endpoint and check the data



```
[root@ip-172-31-10-10 ~]# mysql -h greensreplica.cyjccpaiyyq2.ap-south-1.rds.amazonaws.com -P 3306 -u admin -p
Enter password:
Welcome to the MariaDB monitor.  Commands end with ; or \g.
Your MySQL connection id is 10
Server version: 8.0.23 Source distribution

Copyright (c) 2000, 2018, Oracle, MariaDB Corporation Ab and others.

Type 'help;' or '\h' for help. Type '\c' to clear the current input statement.

MySQL [(none)]> show databases;
+--------------------+
| Database           |
+--------------------+
| authors            |
| information_schema |
| mysql              |
| performance_schema |
| sys                |
| testdb             |
+--------------------+
6 rows in set (0.01 sec)

MySQL [(none)]> use authors;
Reading table information for completion of table and column names
You can turn off this feature to get a quicker startup with -A

Database changed
MySQL [authors]> show tables;
+-------------------+
| Tables_in_authors |
+-------------------+
| users             |
+-------------------+
1 row in set (0.00 sec)

MySQL [authors]> select * from users;
+------+-------+---------------+---------+
| id   | name  | email         | address |
+------+-------+---------------+---------+
|    1 | Vivek | xuz@abc.com   | NULL    |
|    2 | Priya | p@gmail.com   | NULL    |
|    3 | Tom   | tom@yahoo.com | NULL    |
+------+-------+---------------+---------+
3 rows in set (0.00 sec)
```

Note: No single data get lost

Through this we can ensure High Availability of the DB Instance

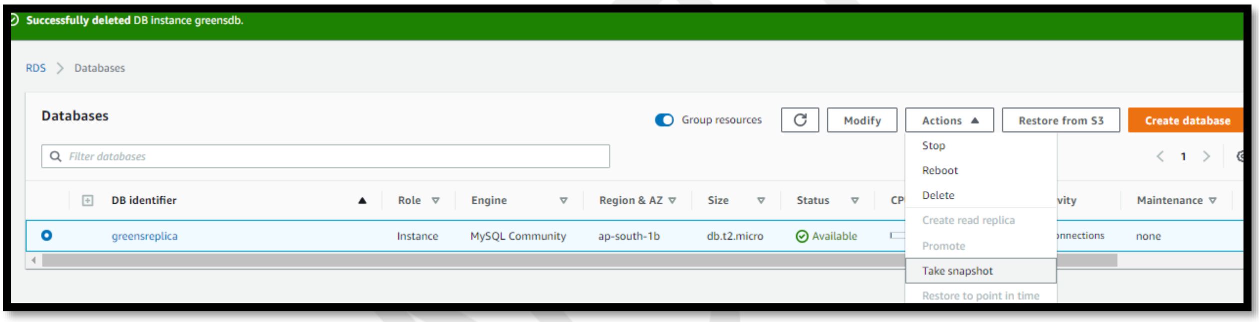
It avoids business and customer impacts

We cannot take a replica copy from the instance which became a Master

Technical team needs to troubleshoot and up and run the Master

SNAPSHOT:

- Dormant data, it is like a image
- Kind of Versioning
- before perform any Change management, recommend to take a snapshot
- In case of failure in CM implementation, we can restore the snapshot
- can automate backup
- charges applicable
- Snapshot create in the same DB zone itself
- Snapshot stores at AWS
- Can export to S3
- Restore the SNAPSHOT when requires to avoid Business impact

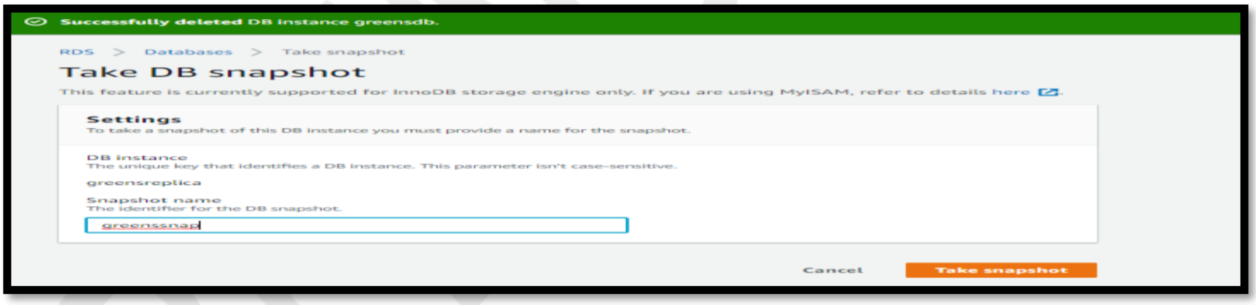


Successfully deleted DB instance greensdb.

RDS > Databases

Databases

	DB identifier	Role	Engine	Region & AZ	Size	Status	CP	...vity	Maintenance
●	greensreplica	Instance	MySQL Community	ap-south-1b	db.t2.micro	✓ Available		...nnections	none



Successfully deleted DB instance greensdb.

RDS > Databases > Take snapshot

Take DB snapshot

This feature is currently supported for InnoDB storage engine only. If you are using MyISAM, refer to details here.

Settings

To take a snapshot of this DB instance you must provide a name for the snapshot.

DB instance

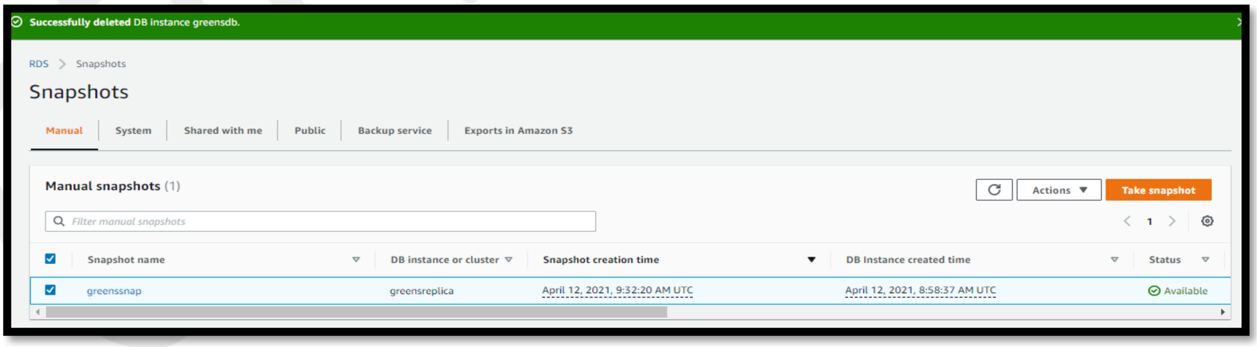
The unique key that identifies a DB instance. This parameter isn't case-sensitive.

greensreplica

Snapshot name

The identifier for the DB snapshot.

greenssnap



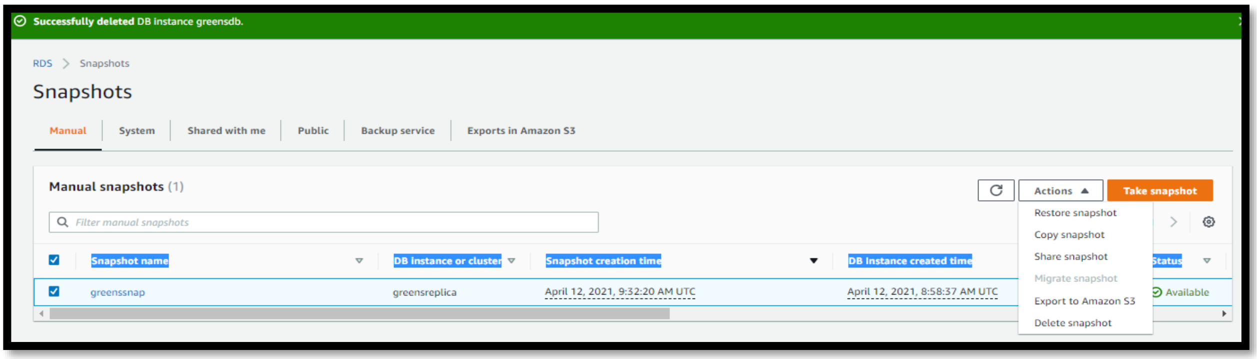
Successfully deleted DB instance greensdb.

RDS > Snapshots

Snapshots

Manual snapshots (1)

☑	Snapshot name	DB instance or cluster	Snapshot creation time	DB Instance created time	Status
☑	greenssnap	greensreplica	April 12, 2021, 9:32:20 AM UTC	April 12, 2021, 8:58:37 AM UTC	✓ Available



Successfully deleted DB instance greensdb.

RDS > Snapshots

Snapshots

Manual snapshots (1)

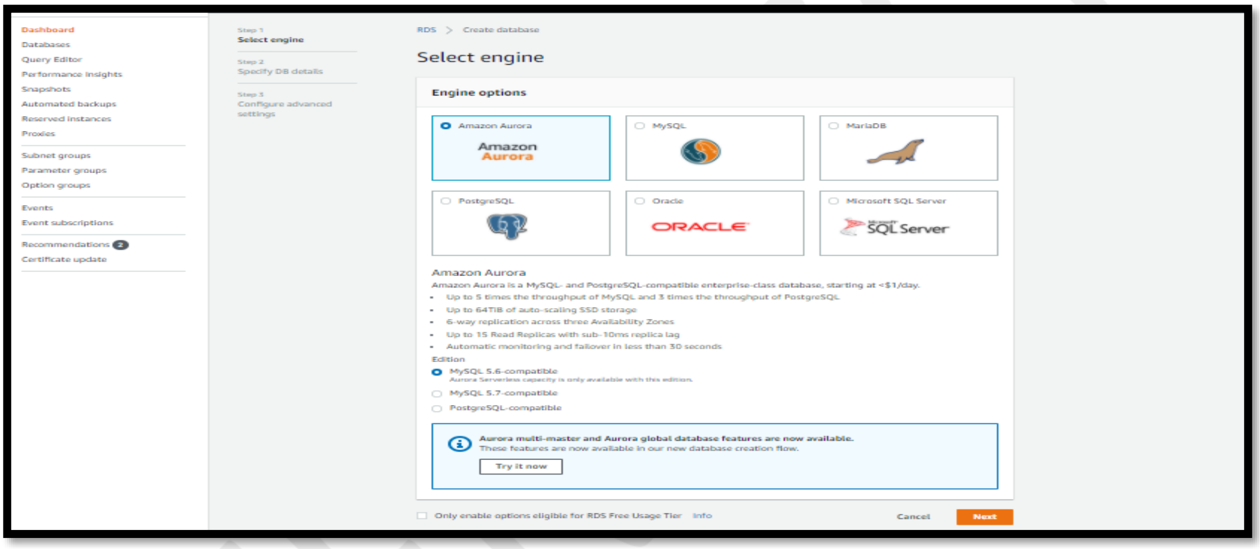
☑	Snapshot name	DB instance or cluster	Snapshot creation time	DB Instance created time	Status
☑	greenssnap	greensreplica	April 12, 2021, 9:32:20 AM UTC	April 12, 2021, 8:58:37 AM UTC	✓ Available

Please delete the snapshot immediately.

CLUSTERING:

- Group of DBs
- Clustering helps to handle huge application request
- This distributes request to slaves to perform Read and Write Operations paralley
- High level of Performance
- Usually Read operations volume is very high
- it runs without server or ec2 instance

Create an Amazon Aurora DB Instance: select MySQL edition



Select engine

Engine options

● Amazon Aurora ○ MySQL ○ MariaDB
○ PostgreSQL ○ Oracle ○ Microsoft SQL Server

Amazon Aurora

Amazon Aurora is a MySQL- and PostgreSQL-compatible enterprise-class database, starting at <$1/day.

- Up to 5 times the throughput of MySQL and 3 times the throughput of PostgreSQL
- Up to 64TiB of auto-scaling SSD storage
- 6-way replication across three Availability Zones
- Up to 15 Read Replicas with sub-10ms replica lag
- Automatic monitoring and failover in less than 30 seconds

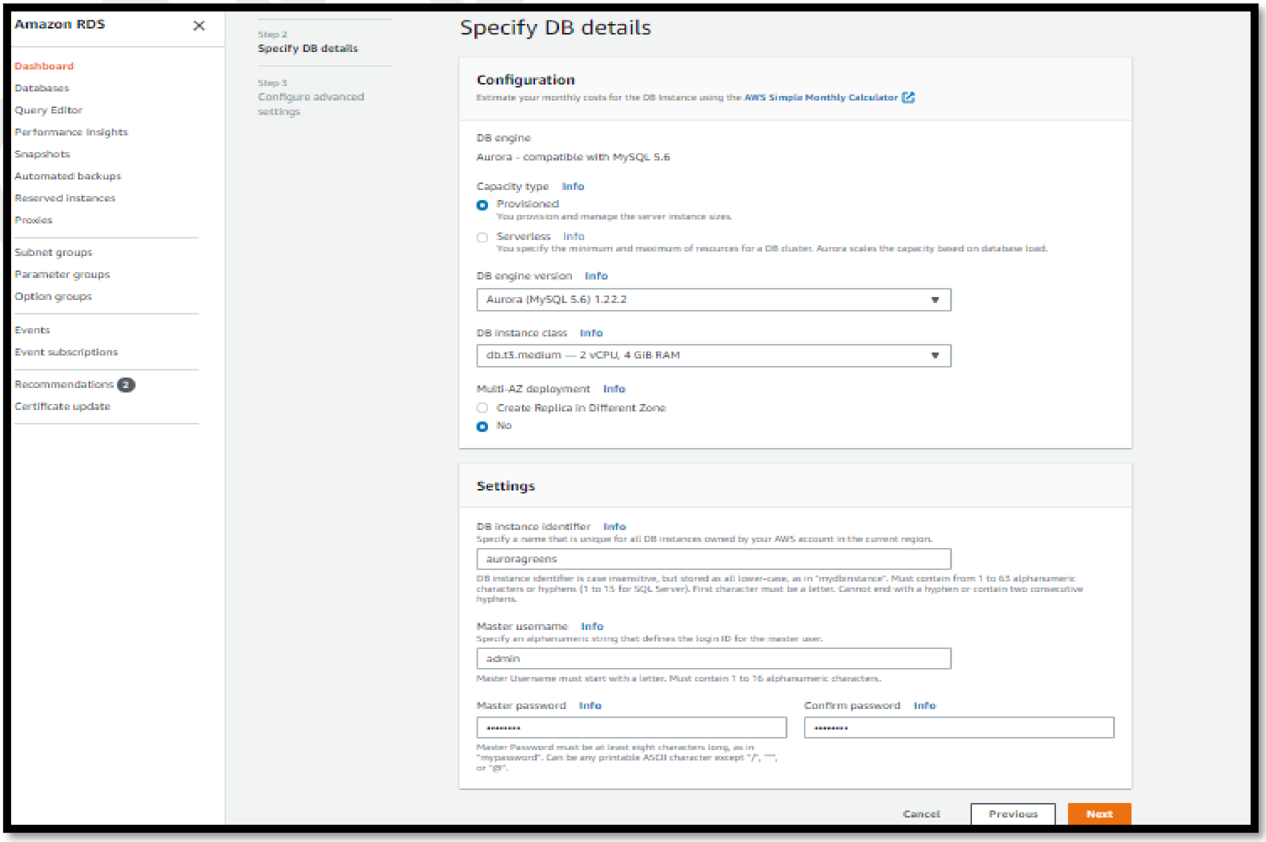
Edition

● MySQL 5.6-compatible
Aurora Serverless capacity is only available with this edition.
○ MySQL 5.7-compatible
○ PostgreSQL-compatible

Aurora multi-master and Aurora global database features are now available.
These features are now available in our new database creation flow.

□ Only enable options eligible for RDS Free Usage Tier Info

Provisioned - Provision and manage server instances – low cost compare to serverless
Serverless - AWS will handle end to end ASG etc - high in cost



Specify DB details

Configuration

Estimate your monthly costs for the DB Instance using the AWS Simple Monthly Calculator

DB engine
Aurora - compatible with MySQL 5.6

Capacity type Info
● Provisioned
You provision and manage the server instance sizes.
○ Serverless Info
You specify the minimum and maximum of resources for a DB cluster. Aurora scales the capacity based on database load.

DB engine version Info
Aurora (MySQL 5.6) 1.22.2

DB instance class Info
db.t3.medium — 2 vCPU, 4 GiB RAM

Multi-AZ deployment Info
○ Create Replica in Different Zone
● No

Settings

DB instance identifier Info
Specify a name that is unique for all DB instances owned by your AWS account in the current region.
auroragreens
DB instance identifier is case insensitive, but stored as all lower-case, as in "mydbinstance". Must contain from 1 to 63 alphanumeric characters or hyphens (1 to 15 for SQL Server). First character must be a letter. Cannot end with a hyphen or contain two consecutive hyphens.

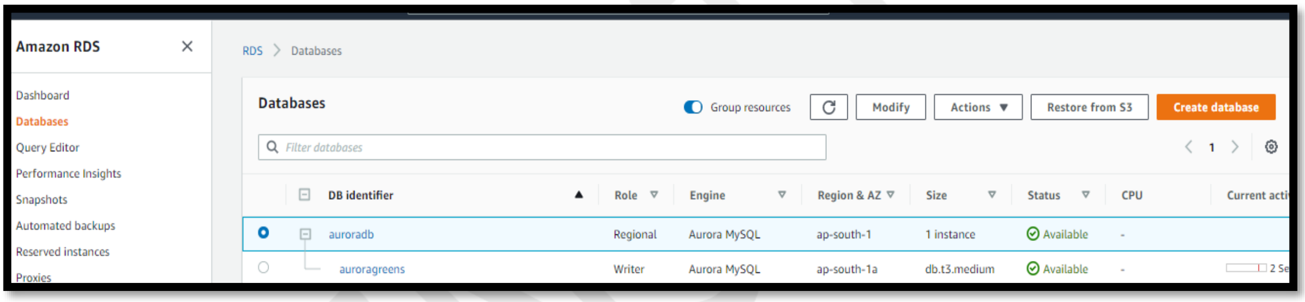
Master username Info
Specify an alphanumeric string that defines the login ID for the master user.
admin
Master Username must start with a letter. Must contain 1 to 16 alphanumeric characters.

Master password Info
••••••••
Master Password must be at least eight characters long, as in "mypassword". Can be any printable ASCII character except "/", """, or "@".

Confirm password Info
••••••••

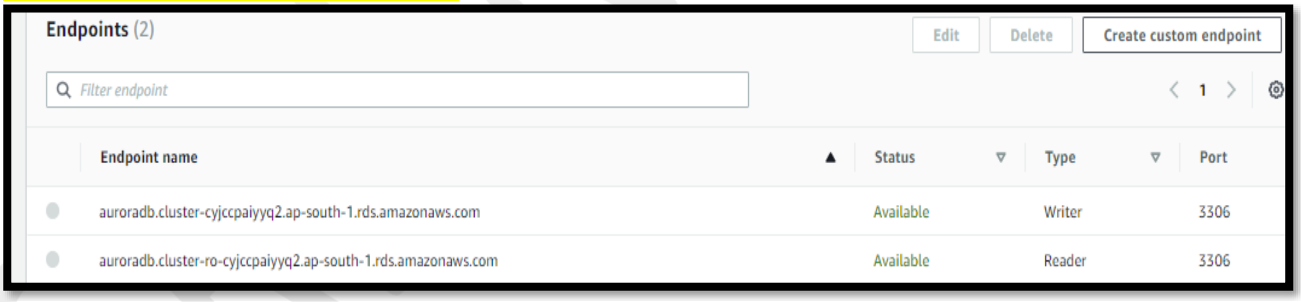
Follow below steps and create an aurora DB:

- Network & Security (Default VPC, db subnet group, public accessibility (No), AZ, Existing SG)
- Database options (Identifier, db name, port(3306), Disable IAM authentication)
- Encryption - Disable
- Failover - No preferences
- Backup - default 1 days
- Backtrack - Disable
- Log exports - Keep as such
- Monitoring - disable
- Maintenance - Disable
- Deletion protection - uncheck
- then click on create database



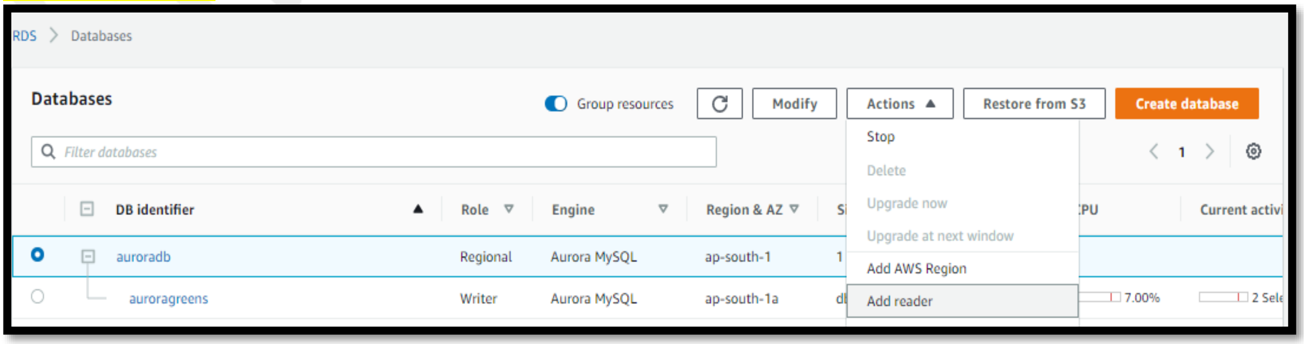
	DB identifier	Role	Engine	Region & AZ	Size	Status	CPU	Current acti
●	auroradb	Regional	Aurora MySQL	ap-south-1	1 instance	✓ Available	-	
○	auroragreens	Writer	Aurora MySQL	ap-south-1a	db.t3.medium	✓ Available	-	2 Se

Reader and Writer has been created



	Endpoint name	Status	Type	Port
○	auroradb.cluster-cyjccpaiyyq2.ap-south-1.rds.amazonaws.com	Available	Writer	3306
○	auroradb.cluster-ro-cyjccpaiyyq2.ap-south-1.rds.amazonaws.com	Available	Reader	3306

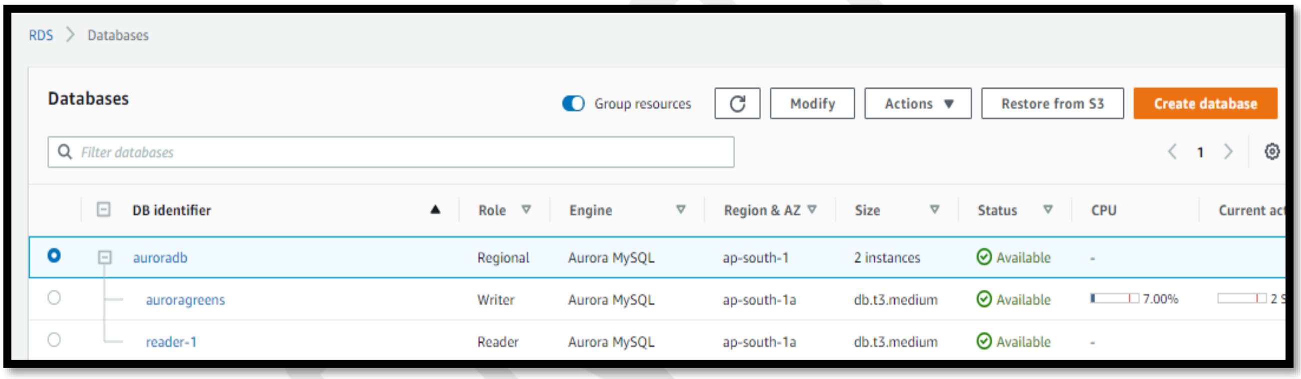
Add New Reader



	DB identifier	Role	Engine	Region & AZ	Si	PU	Current activi
●	auroradb	Regional	Aurora MySQL	ap-south-1	1		
○	auroragreens	Writer	Aurora MySQL	ap-south-1a	d	7.00%	2 Sele

Follow the instruction mentioned below and create New Reader:

- DB instance identifier : reader-1
- DB instance class - Burstable classes (includes t classes)
- Connectivity - Not publicly accessible
- Database authentication - Password authentication
- DB cluster parameter - default
- Failover priority - No preferences
- Encryption - disable
- Monitoring - disable
- Maintenance - Then click add reader



RDS > Databases

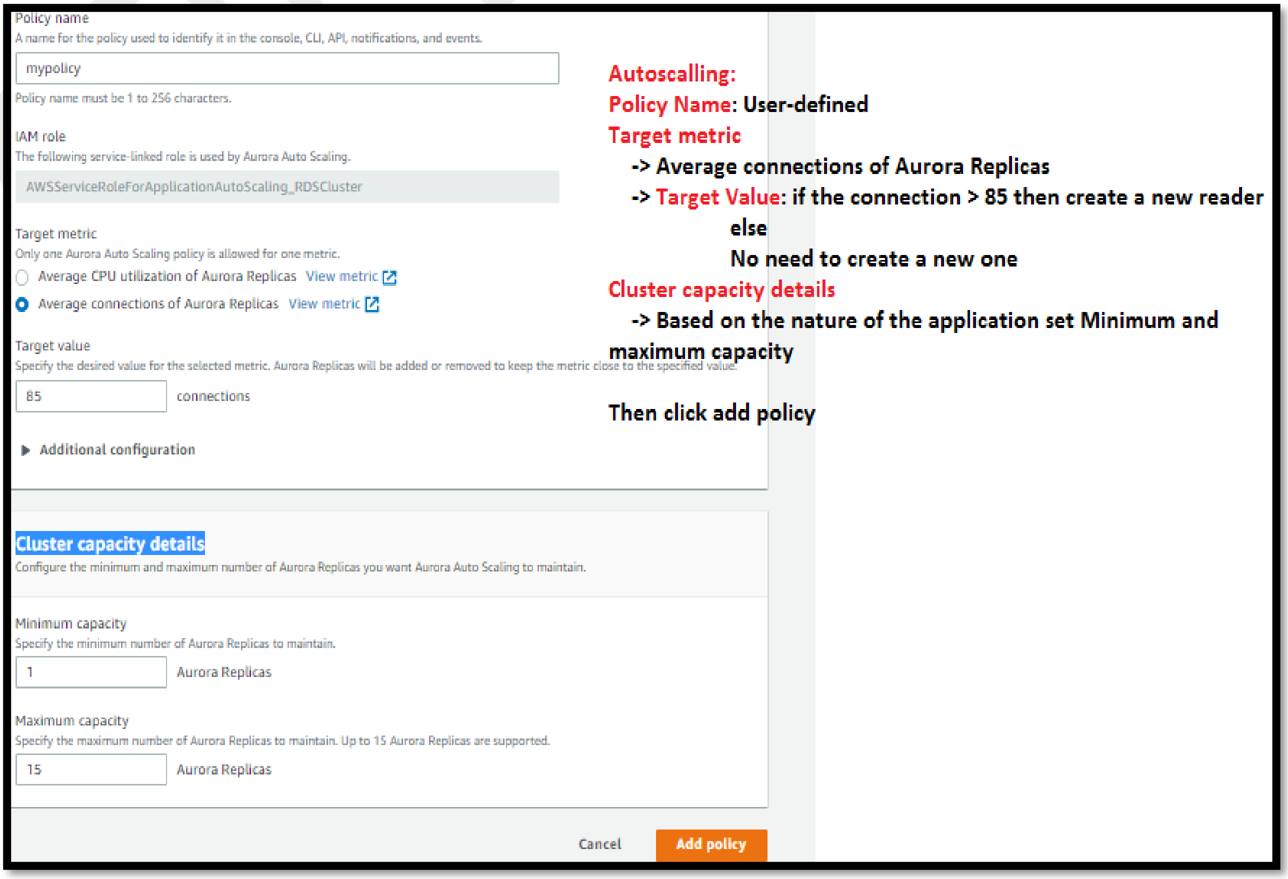
Databases

	DB identifier ▲	Role	Engine	Region & AZ	Size	Status	CPU	Current act
●	auroradb	Regional	Aurora MySQL	ap-south-1	2 instances	✓ Available	-	
○	auroragreens	Writer	Aurora MySQL	ap-south-1a	db.t3.medium	✓ Available	7.00%	2 s
○	reader-1	Reader	Aurora MySQL	ap-south-1a	db.t3.medium	✓ Available	-	

Add Replica Autoscalling: This Cost very high

It avoids unwanted monitoring

Automatically scale-up and scale-down take place based on connection



Policy name

A name for the policy used to identify it in the console, CLI, API, notifications, and events.

mypolicy

Policy name must be 1 to 256 characters.

IAM role

The following service-linked role is used by Aurora Auto Scaling.

AWSServiceRoleForApplicationAutoScaling_RDSCluster

Target metric

Only one Aurora Auto Scaling policy is allowed for one metric.

○ Average CPU utilization of Aurora Replicas View metric

● Average connections of Aurora Replicas View metric

Target value

Specify the desired value for the selected metric. Aurora Replicas will be added or removed to keep the metric close to the specified value.

85 connections

▶ Additional configuration

Cluster capacity details

Configure the minimum and maximum number of Aurora Replicas you want Aurora Auto Scaling to maintain.

Minimum capacity

Specify the minimum number of Aurora Replicas to maintain.

1 Aurora Replicas

Maximum capacity

Specify the maximum number of Aurora Replicas to maintain. Up to 15 Aurora Replicas are supported.

15 Aurora Replicas

Autoscalling:

Policy Name: User-defined

Target metric

-> Average connections of Aurora Replicas

-> Target Value: if the connection > 85 then create a new reader

else

No need to create a new one

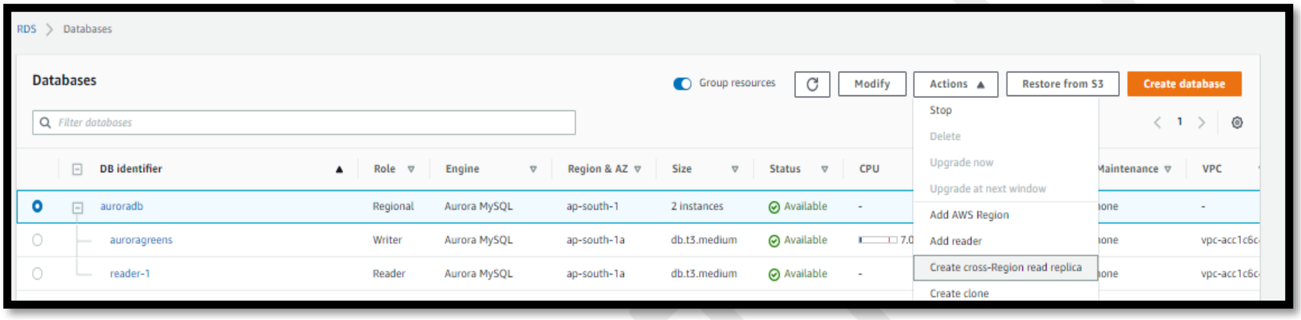
Cluster capacity details

-> Based on the nature of the application set Minimum and maximum capacity

Then click add policy

Create cross-region read replica

- Keep the replica copy in different Regions
- If any issue in our region we can make use the replica available in other regions

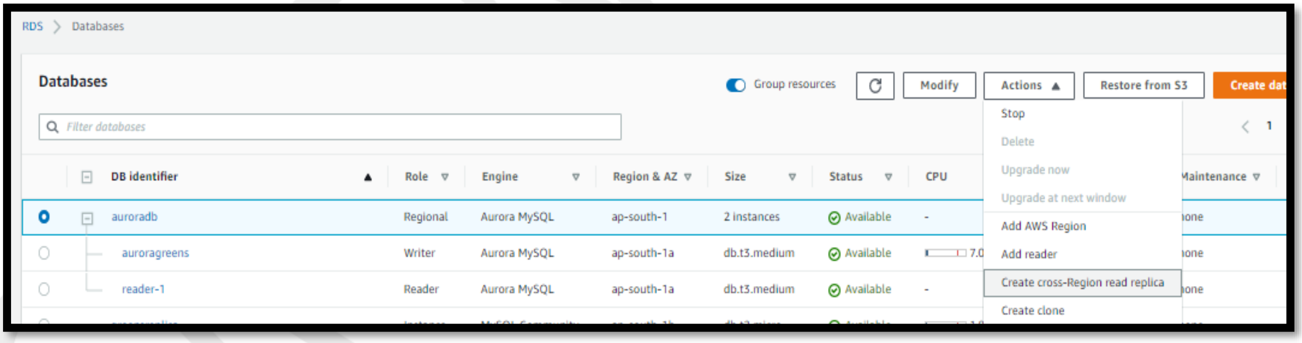


DB identifier	Role	Engine	Region & AZ	Size	Status	CPU	Maintenance	VPC
auroradb	Regional	Aurora MySQL	ap-south-1	2 instances	Available	-	one	-
auroragreens	Writer	Aurora MySQL	ap-south-1a	db.t3.medium	Available	7.0	one	vpc-acc1c6c
reader-1	Reader	Aurora MySQL	ap-south-1a	db.t3.medium	Available	-	one	vpc-acc1c6c

Create Clone

- Copy of a db, It run as a instance
- The data persist upto when we taken a Clone, It is not synched with DB

  use case:
- Helps when the db have a problem, we can take a clone and perform troubleshoot
- help to create a new db with same data clone is very much helpful
- Read and Write will happen in clone as well



DB identifier	Role	Engine	Region & AZ	Size	Status	CPU	Maintenance
auroradb	Regional	Aurora MySQL	ap-south-1	2 instances	Available	-	one
auroragreens	Writer	Aurora MySQL	ap-south-1a	db.t3.medium	Available	7.0	one
reader-1	Reader	Aurora MySQL	ap-south-1a	db.t3.medium	Available	-	one

Query Editor: New Feature, Front end tool to connect DB to enable to execute queries

CREATE DATABASE BY RESTORING FROM S3:

Restore the log files or snapshot, data whatever it may be can restore in case of loss in db with this option

Purchase reserved DB instances – Low cost, because we pay upfront cost

PRICING: understand more refer link: https://calculator.s3.amazonaws.com/index.html?lng=#

DEMOLISH:

1. **MySQL: Delete the Master and Replica**
2. **Amazon Aurora: Delete all the Readers then automatically cluster deleted.**
3. **Delete subnet group**
4. **Delete EC2 instance**
5. **Check any Snapshot created, if yes, delete the same**