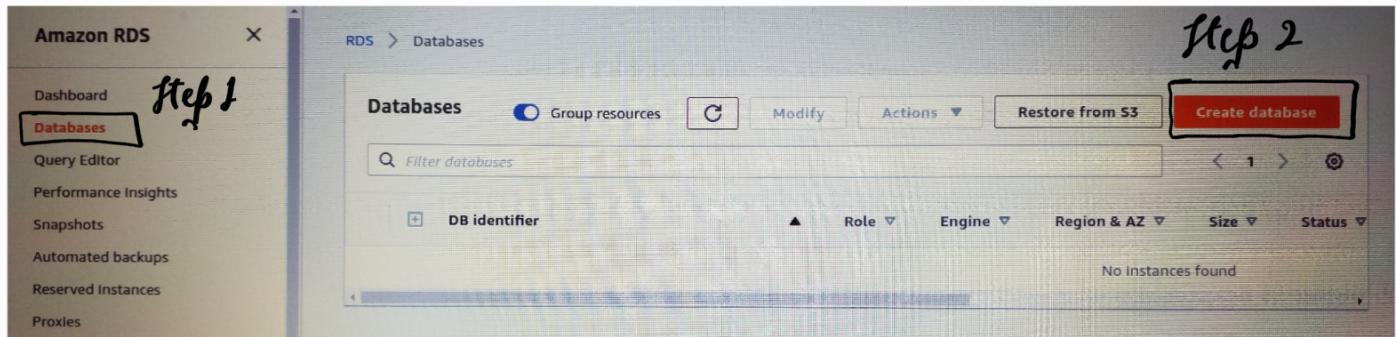


AWF - 107

- RDS with PostgreSQL
- Creating RDS PostgreSQL Database
- Log in to AWS console and search 'RDS' service and click on it.
- Once logged in to the main RDS dashboard, click on 'Databases', then click on 'Create Database'.



- Go with defaults, with these custom selection options:
 - DB Engine options: PostgreSQL
 - Templates: Production
 - Under 'Settings' tab
 - DB instance identifier: <select any db name you want>

- Master username : < select any name >
- Master password . < select any password >
- Under 'Availability & durability' tab :
 - Select 'Multi-AZ deployment'
- Under 'Connectivity' tab :
 - select 'Public access'
- Finally , click 'Create database'.
- Sample Details to create database is shown below:



Create database

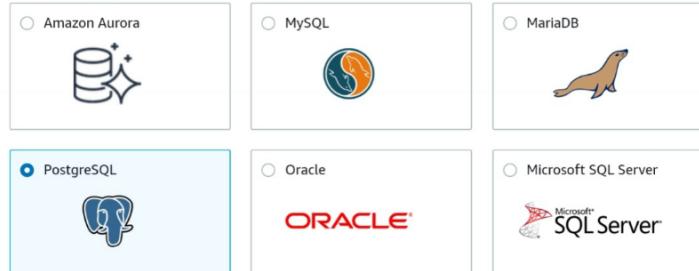
Choose a database creation method [Info](#)

- 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 [Info](#)



Version

PostgreSQL 12.4-R1 ▾

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.
[Info](#)

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.

my-db-springboot

The DB instance identifier is case-insensitive, but is stored as all lowercase (as in "mydbinstance"). Constraints: 1 to 60 alphanumeric characters or hyphens (1 to 15 for SQL Server). 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.

ankit

1 to 16 alphanumeric characters. First character must be a letter

Auto generate a password

Amazon RDS can generate a password for you, or you can specify your own password

Master password [Info](#)

Constraints: At least 8 printable ASCII characters. Can't contain any of the following: / (slash), '(single quote)', "(double quote)" and @ (at sign).

Confirm password [Info](#)

DB instance size

DB instance class [Info](#)

Choose a DB instance class that meets your processing power and memory requirements. The DB instance class options below are limited to those supported by the engine you selected above.

- Standard classes (includes m classes)
- Memory Optimized classes (includes r and x classes)
- Burstable classes (includes t classes)

db.t3.micro

2 vCPUs 1 GiB RAM Network: 2,085 Mbps ▾

[Info](#) New instance classes are available for specific engine versions.

Include previous generation classes

Storage

Storage type [Info](#)

Provisioned IOPS (SSD)

Allocated storage

100

GiB

Minimum: 100 GiB, Maximum: 16,384 GiB

Provisioned IOPS [Info](#)

1000

IOPS

Minimum: 1,000 IOPS, Maximum: 80,000 IOPS

Storage autoscaling [Info](#)

Provides dynamic scaling support for your database's storage based on your application's needs.

Enable storage autoscaling

Enabling this feature will allow the storage to increase once the specified threshold is exceeded.

Maximum storage threshold [Info](#)

Charges will apply when your database autoscales to the specified threshold

101

GiB

Minimum: 101 GiB, Maximum: 16,384 GiB

Availability & durability

Multi-AZ deployment [Info](#)

Create a standby instance (recommended for production usage)

Creates a standby in a different Availability Zone (AZ) to provide data redundancy, eliminate I/O freezes, and minimize latency spikes during system backups.

Do not create a standby instance

Connectivity



Virtual private cloud (VPC) [Info](#)

VPC that defines the virtual networking environment for this DB Instance.

Default VPC (vpc-de02e9b5)

Only VPCs with a corresponding DB subnet group are listed.

i After a database is created, you can't change the VPC selection.

Subnet group [Info](#)

DB subnet group that defines which subnets and IP ranges the DB Instance can use in the VPC you selected.

default-vpc-de02e9b5

Public access [Info](#)

Yes

Amazon EC2 instances and devices outside the VPC can connect to your database. Choose one or more VPC security groups that specify which EC2 instances and devices inside the VPC can connect to the database.

No

RDS will not assign a public IP address to the database. Only Amazon EC2 instances and devices inside the VPC can connect to your database.

VPC security group

Choose a VPC security group to allow access to your database. Ensure that the security group rules allow the appropriate incoming traffic.

Choose existing

Choose existing VPC security groups

Create new

Create new VPC security group

Existing VPC security groups

Choose VPC security groups

default

► Additional configuration

Database authentication

Database authentication options [Info](#)

Password authentication

Authenticates using database passwords.

Password and IAM database authentication

Authenticates using the database password and user credentials through AWS IAM users and roles.

Password and Kerberos authentication

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

▼ Additional configuration

Database options, encryption enabled, backup enabled, backtrack disabled, Performance Insights enabled, Enhanced Monitoring enabled, maintenance, CloudWatch Logs, delete protection disabled

Database options

Initial database name [Info](#)

If you do not specify a database name, Amazon RDS does not create a database.

DB parameter group [Info](#)

 default.postgres12 ▾

Option group [Info](#)

 default:postgres-12 ▾

Backup

Creates a point-in-time snapshot of your database

Enable automatic backups

Enabling backups will automatically create backups of your database during a certain time window.

Backup retention period [Info](#)

Choose the number of days that RDS should retain automatic backups for this instance.

 7 days ▾

Backup window [Info](#)

Select the period for which you want automated backups of the database to be created by Amazon RDS.

Select window

No preference

Copy tags to snapshots

Encryption

Enable encryption

Choose to encrypt the given instance. Master key IDs and aliases appear in the list after they have been created using the AWS Key Management Service console. [Info](#)

Master key [Info](#)

 (default) aws/rds ▾

Account

023194539562

KMS key ID

e08cc806-6baf-4342-b056-e9ab703d6bac

Performance Insights [Info](#)

Enable Performance Insights

Retention period [Info](#)

 Default (7 days) ▾

Master key [Info](#)

 (default) aws/rds ▾

Account

023194539562

KMS key ID

e08cc806-6baf-4342-b056-e9ab703d6bac

⚠ You can't change the KMS key after enabling Performance Insights.

Monitoring

Enable Enhanced monitoring

Enabling Enhanced monitoring metrics are useful when you want to see how different processes or threads use the CPU

Granularity

 60 seconds ▾

Monitoring Role

 default ▾

Clicking "Create database" will authorize RDS to create the IAM role rds-monitoring-role

Log exports

Select the log types to publish to Amazon CloudWatch Logs

Postgresql log

Upgrade 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

Enabling auto minor version upgrade will automatically upgrade to new minor versions as they are released. The automatic upgrades occur during the maintenance window for the database.

Maintenance window [Info](#)

Select the period you want pending modifications or maintenance applied to the database 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.



Estimated monthly costs

DB instance	18.98 USD
Storage	26.20 USD
Multi-AZ standby instance	18.98 USD
Provisioned IOPS	105.00 USD
Total	169.16 USD

This 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](#).

You are responsible for ensuring that you have all of the necessary rights for any third-party products or services that you use with AWS services.

Cancel

Create database

← click to
create DB

→ Now, wait till 'Status' of DB changes to 'Available'.

NOTE

→ Now configure Networking details to able

to access this postgresql db from local:

Step 1

→ Go to the details of the created database as shown below

my-db-springboot[Modify](#)[Actions ▾](#)**Summary**

DB identifier	CPU
my-db-springboot	<div style="width: 20%;">2.00%</div>
Status	Class
Available	db.t3.micro
Role	Current activity
Instance	<div style="width: 0%;">0 Sessions</div>
Engine	Region & AZ
PostgreSQL	ap-south-1c

[Connectivity & security](#) | [Monitoring](#) | [Logs & events](#) | [Configuration](#)[Maintenance & backups](#) | [Tags](#)**Connectivity & security**

Endpoint & port	Networking
Endpoint my-db-springboot.cphjaxjsdqed.ap-south-1.rds.amazonaws.com	Availability zone ap-south-1c
Port 5432	VPC vpc-de02e9b5

click here

→ Now, check the 'route table' of this VPC

Your VPCs (1/1) [Info](#)

Name	VPC ID	State	IPv4 CIDR	IPv6 CIDR	DHCP options set	Main route
vpc-de02e9b5	vpc-de02e9b5	Available	172.31.0.0/16	-	dopt-e156808a	rtb-47369f2c

[vpc-de02e9b5](#)

[Details](#) | [CIDRs](#) | [Flow logs](#) | [Tags](#)

Details

VPC ID	vpc-de02e9b5
Tenancy	State
Default	Available
Default VPC	DHCP options set
Yes	dopt-e156808a
Owner ID	IPv4 CIDR
023194539562	172.31.0.0/16

DNS hostnames
Enabled

Route table

rtb-47369f2c

IPv6 pool

click here

DNS resolution
Enabled

Network ACL

acl-af25f7c4

IPv6 CIDR

→ Check if 'Internet Gateway' is enabled or not (Igw)

Screenshot of the AWS Route Table configuration page:

Route Table ID: rtb-47369f2c

Name	Route Table ID	Main	VPC ID
	rtb-47369f2c	Yes	vpc-de02

Route Table: rtb-47369f2c

Summary Routes Subnet Associations Edge Associations Route Propagation Tags

Edit routes

View All routes

Destination	Target	Status	Propagated
172.31.0.0/16	local	active	No
0.0.0.0/0	igw-e929ac81	active	No

Hence, 'Internet Gateway' is enabled for this VPC.

Step 2: Add your laptop IP in the inbound rules for this 'VPC security group'



my-db-springboot

Modify

Actions ▾

Summary

DB identifier my-db-springboot	CPU <div style="width: 2.00%;">2.00%</div>	Status Available	Class db.t3.micro
Role Instance	Current activity 0 Sessions	Engine PostgreSQL	Region & AZ ap-south-1c

Connectivity & security

Monitoring

Logs & events

Configuration

Maintenance & backups

Tags

Connectivity & security

Endpoint & port

Endpoint
my-db-springboot.cphjaxjsdqed.ap-south-1.rds.amazonaws.com

Port
5432

Networking

Availability zone
ap-south-1c

VPC
vpc-de02e9b5

Subnet group
default-vpc-de02e9b5

Subnets
subnet-4f362627
subnet-450f4e09
subnet-3711994c

Security

VPC security groups
default (sg-1f105f79)
(active)

Public accessibility
Yes

Certificate authority
rds-ca-2019

Certificate authority date
Aug 22nd, 2024

Click here

→ Click 'Inbound Rules' and then click 'Edit Inbound' rules as shown below

Security Groups (1/1) [Info](#)

[C](#) Actions ▾ [Create security group](#)

Filter security groups

search: sg-1f105f79 [X](#) [Clear filters](#)

Name	Security group ID	Security group name	VPC ID
-	sg-1f105f79	default	vpc-de02e9b5

sg-1f105f79 - default

Inbound rules [Edit inbound rules](#)

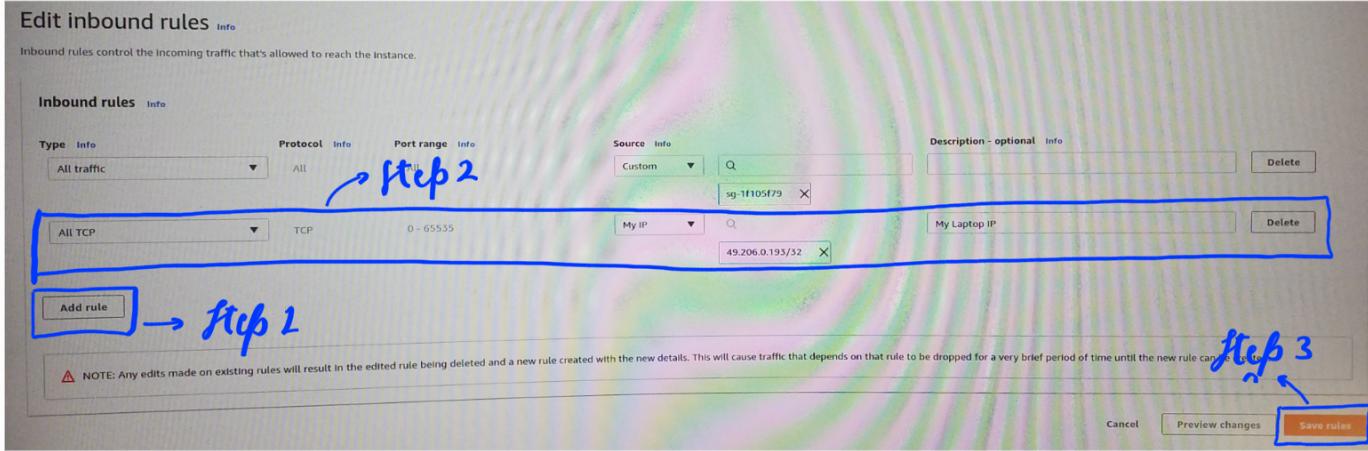
Outbound rules Tags

Step 1

Step 2

Type	Protocol	Port range	Source	Description - optional
All TCP	TCP	0 - 65535	49.206.0.193/32	my current ip

→ Add rule to allow all requests from your personal laptop IP:



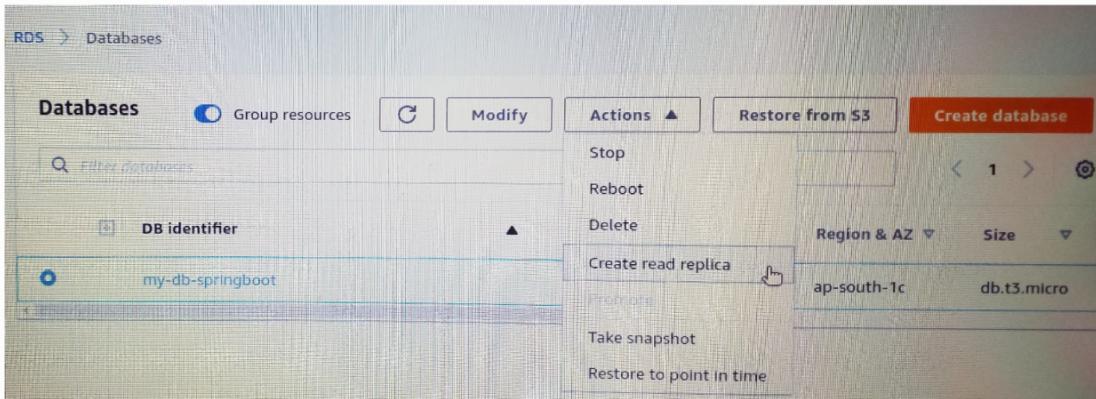
⇒ Finally, check the connectivity to the RDS PostgreSQL from your local terminal.

```
ankit@ankit-Inspiron-3542:~$ telnet my-db-springboot.cphjaxjsdqed.ap-south-1.rds.amazonaws.com 5432
Trying 15.206.251.215...
Connected to ec2-15-206-251-215.ap-south-1.compute.amazonaws.com.
Escape character is '^'.
Connection closed by foreign host.
ankit@ankit-Inspiron-3542:~$
```

⇒ Yeah!! Your AWS RDS PostgreSQL DB is ready to use.

⇒ Creating Read Replica for the above PostgreSQL DB

- Go to AWS RDS dashboard, then click 'Databases'.
- Select the database for which read replica needs to be created.



- Now choose defaults, with these custom options :
- Region : choose different regions as of master db
- Sample form for creating Read Replica :

RDS > Databases > Create replica: my-db-springboot

Create read replica

You are creating a replica DB instance from a source DB instance. This new DB instance will have the source DB instance's DB security groups and DB parameter groups.

Settings

Replica source
Source DB Instance Identifier
my-db-springboot

DB instance identifier
DB Instance Identifier. This is the unique key that identifies a DB Instance. This parameter is stored as a lowercase string (for example, mydbinstance).
my-replica-db-springboot

Region

Destination Region
The Region where the replica will be launched.
US East (N. Virginia)

DB instance size

DB instance class [Info](#)
Choose a DB instance class that meets your processing power and memory requirements. The DB instance class options below are limited to those supported by the engine you selected above.

- Standard classes (includes m classes)
- Memory Optimized classes (includes r and x classes)
- Burstable classes (includes t classes)

db.t3.micro	2 vCPUs	1 GiB RAM	Network: 2,085 Mbps
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Include previous generation classes

Storage

Storage type [Info](#)

Provisioned IOPS (SSD)

Provisioned IOPS [Info](#)

1000

IOPS

Minimum: 1,000 IOPS, Maximum: 80,000 IOPS

Storage autoscaling [Info](#)

Provides dynamic scaling support for your database's storage based on your application's needs.

Enable storage autoscaling

Enabling this feature will allow the storage to increase once the specified threshold is exceeded.

Maximum storage threshold [Info](#)

Charges will apply when your database autoscales to the specified threshold

101

GiB

Minimum: 101 GiB, Maximum: 16,384 GiB

Availability & durability

Multi-AZ deployment [Info](#)

Specifies if the DB instance should have a standby deployed in another Availability Zone.

Create a standby instance (recommended for production usage)

Creates a standby in a different Availability Zone (AZ) to provide data redundancy, eliminate I/O freezes, and minimize latency spikes during system backups.

Do not create a standby instance

Connectivity



Subnet group [Info](#)

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

None



Public access

Publicly accessible

EC2 instances and devices outside the VPC can connect to the instance. You define the security groups for supported devices and instances.

Not publicly accessible

No IP address is assigned to the DB instance. EC2 instances and devices outside the VPC can't connect.

Database port [Info](#)

Port number on which the database accepts connections

5432

Database authentication

Database authentication options [Info](#)

Password authentication

Authenticates using database passwords.

Password and IAM database authentication

Authenticates using the database password and user credentials through AWS IAM users and roles.

Password and Kerberos authentication

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

▼ Additional configuration

Database options, Encryption, Backup, Backtrack, Monitoring, and Maintenance

Tags

Copy tags to snapshots

Encryption

Enable encryption

Choose to encrypt the given instance. Master key IDs and aliases appear in the list after they have been created using the AWS Key Management Service console. [Info](#)

Master key [Info](#)

(default) aws/rds ▾

Account

023194539562

KMS key ID

alias/aws/rds

Performance Insights [Info](#)

Enable Performance Insights

Retention period [Info](#)

Default (7 days) ▾

Master key [Info](#)

(default) aws/rds ▾

Account

023194539562

KMS key ID

alias/aws/rds

⚠ You can't change the KMS key after enabling Performance Insights.

Monitoring

Enable Enhanced monitoring

Enabling Enhanced monitoring metrics are useful when you want to see how different processes or threads use the CPU

Log exports

Select the log types to publish to Amazon CloudWatch Logs

Postgresql log

Upgrade log

Log exports

Select the log types to publish to Amazon CloudWatch Logs

- Postgresql log
- Upgrade log

IAM role

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

RDS service-linked role

- i** 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

Enabling auto minor version upgrade will automatically upgrade to new minor versions as they are released. The automatic upgrades occur during the maintenance window for the database.

Cancel

Create read replica

- Then Click 'Create read replica' to create the read replica
- Test if created Read replica is accessible from local terminal

```
ankit@ankit-Inspiron-3542:~/.Ankit$ telnet my-replica-db-springboot.cphjaxjsdqed.ap-south-1.rds.amazonaws.com 5432
Trying 13.127.213.60...
Connected to ec2-13-127-213-60.ap-south-1.compute.amazonaws.com.
Escape character is '^]'.
```

- ⇒ Awesome, read replica is also working correctly !!

NOTE: When using AWS RD² databases, make sure you are configuring your 'VPC' and 'Security Group' settings appropriately.