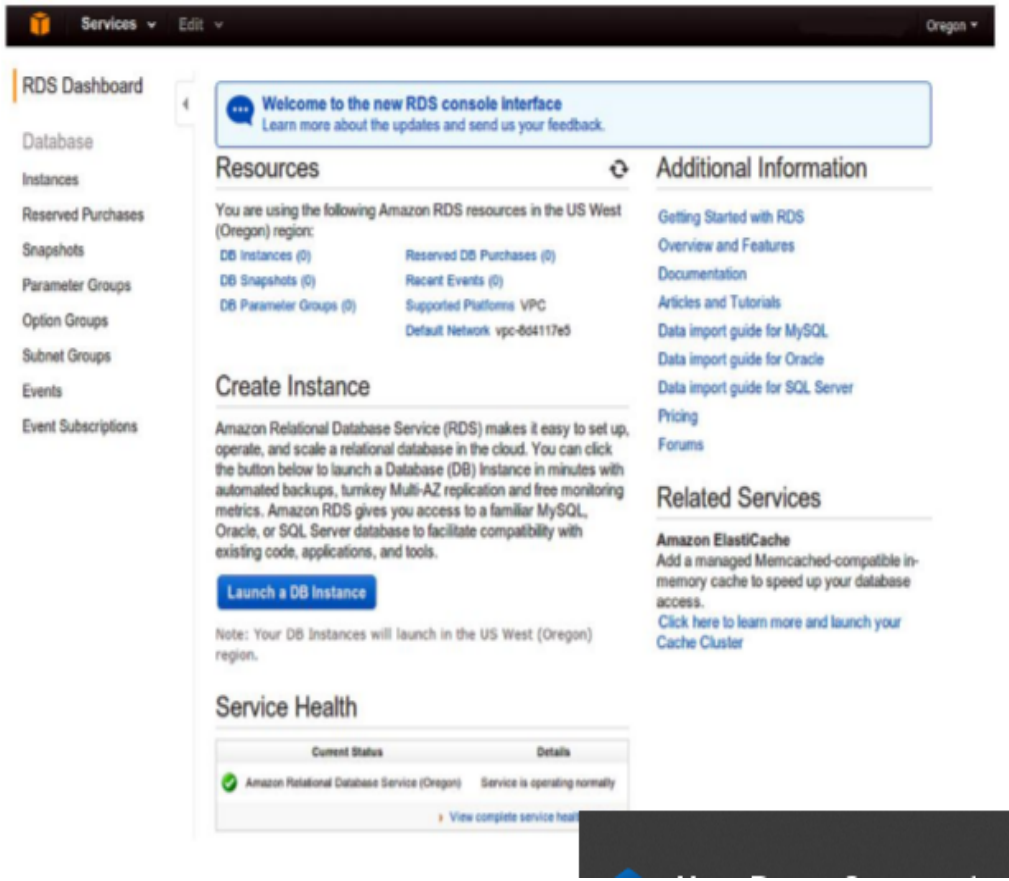
Databases as Cloud Service

- Cloud database services allow you to set-up and operate relational or non-relational databases in the cloud.
- Relational Databases
  - Popular relational databases provided by various cloud service providers include MySQL, Oracle, SQL Server, etc.
- Non-relational Databases
  - The non-relational (No-SQL) databases provided by cloud service providers are mostly proprietary solutions.
- Scalability
  - Cloud database services allow provisioning as much compute and storage resources as required to meet the application workload levels. Provisioned capacity can be scaled-up or down. For read-heavy workloads, read-replicas can be created.
- Reliability
  - Cloud database services are reliable and provide automated backup and snapshot options.
- Performance
  - Cloud database services provide guaranteed performance with options such as guaranteed input/output operations per second (IOPS) which can be provisioned upfront.
- Security
  - Cloud database services provide several security features to restrict the access to the database instances and stored data, such as network firewalls and authentication mechanisms.

Database Services – Amazon RDS

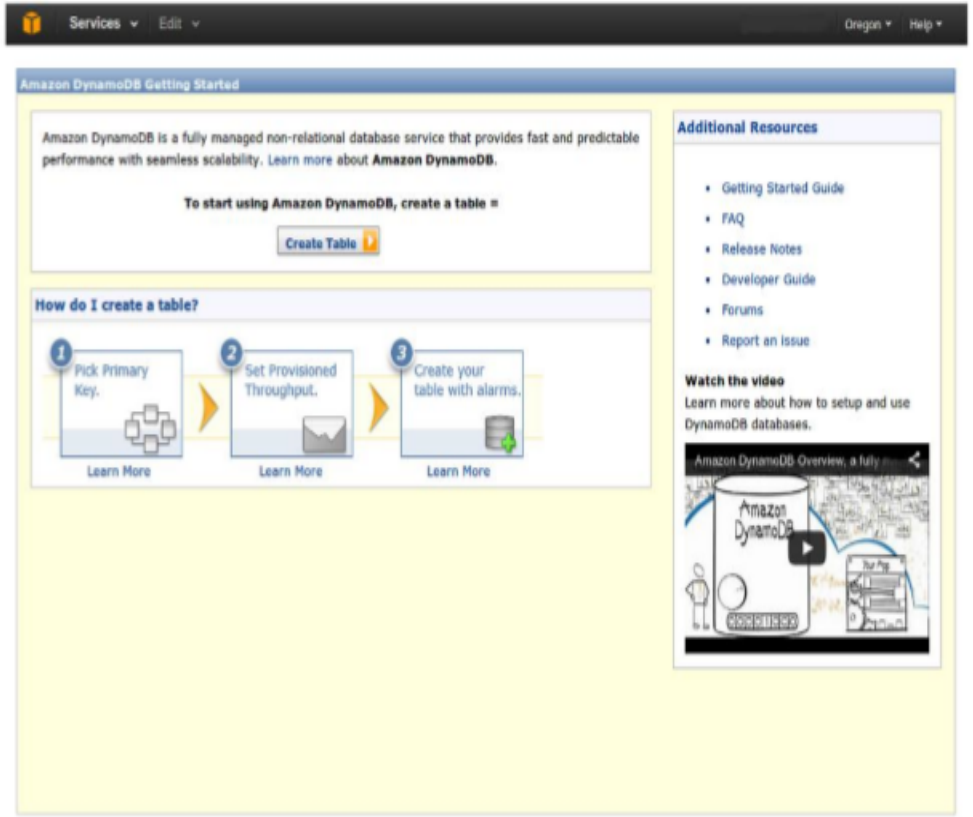
- Amazon Relational Database Service (RDS) is a web service that makes it easy to setup, operate and scale a relational database in the cloud.
- Launching DB Instances
  - The console provides an instance launch wizard that allows you to select the type of database to create (MySQL, Oracle or SQL Server) database instance size, allocated storage, DB instance identifier, DB username and password. The status of the launched DB instances can be viewed from the console.
- Connecting to a DB Instance
  - Once the instance is available, you can note the instance end point from the instance properties tab. This end point can then be used for securely connecting to the instance.

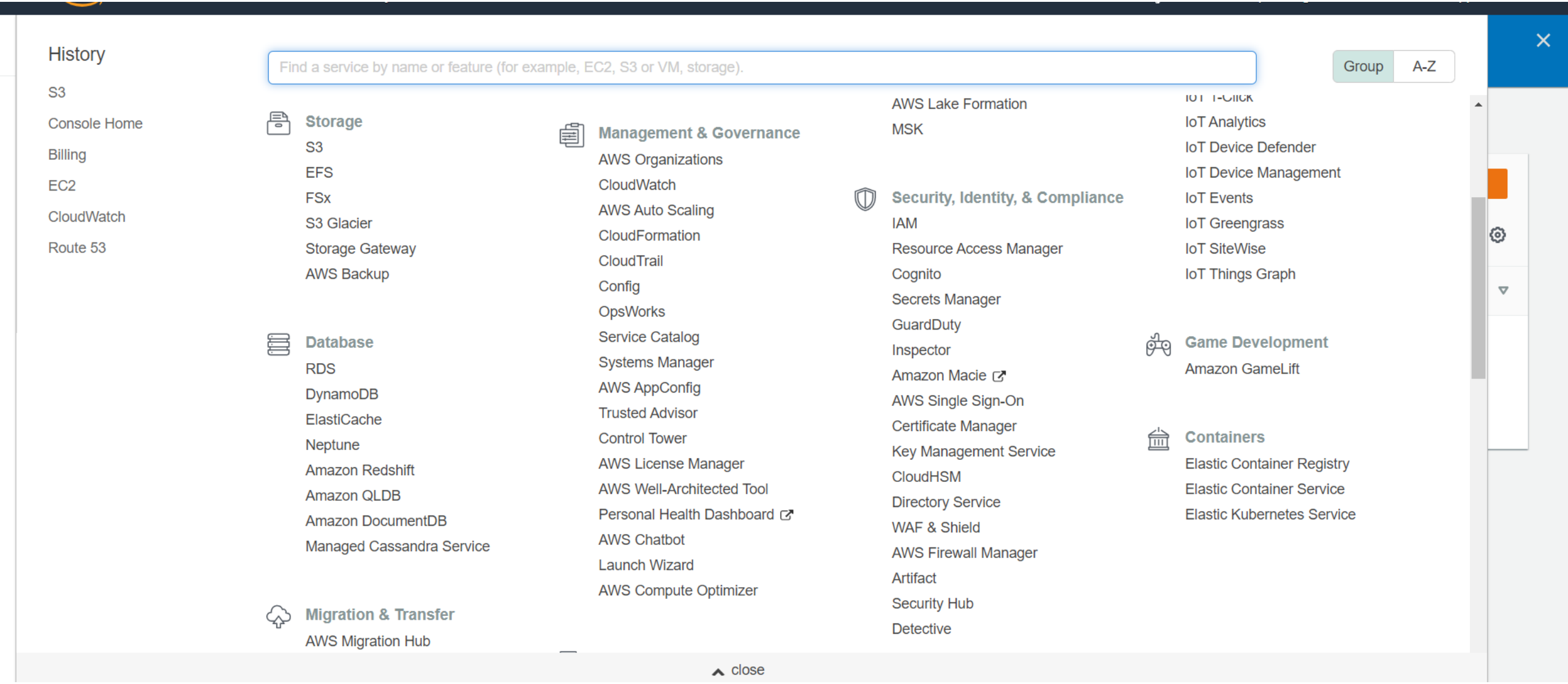


PostgresSQL, Amazon Aurora

DynamoDB

- Amazon DynamoDB is the non-relational (No-SQL) database service from Amazon.
- Data Model
  - The DynamoDB data model includes include tables, items and attributes.
  - A table is a collection of items and each item is a collection of attributes.
  - To store data in DynamoDB you have to create a one or more tables and specify how much throughput capacity you want to provision and reserve for reads and writes.
- Fully Managed Service
  - DynamoDB is a fully managed service that automatically spreads the data and traffic for the stored tables over a number of servers to meet the throughput requirements specified by the users.
- Replication
  - All stored data is automatically replicated across multiple availability zones to provide data durability.




History
S3
Console Home
Billing
EC2
CloudWatch
Route 53
Find a service by name or feature (for example, EC2, S3 or VM, storage).
Group
A-Z
Storage
S3
EFS
FSx
S3 Glacier
Storage Gateway
AWS Backup
Database
RDS
DynamoDB
ElastiCache
Neptune
Amazon Redshift
Amazon QLDB
Amazon DocumentDB
Managed Cassandra Service
Migration & Transfer
AWS Migration Hub
Management & Governance
AWS Organizations
CloudWatch
AWS Auto Scaling
CloudFormation
CloudTrail
Config
OpsWorks
Service Catalog
Systems Manager
AWS AppConfig
Trusted Advisor
Control Tower
AWS License Manager
AWS Well-Architected Tool
Personal Health Dashboard
AWS Chatbot
Launch Wizard
AWS Compute Optimizer
AWS Lake Formation
MSK
Security, Identity, & Compliance
IAM
Resource Access Manager
Cognito
Secrets Manager
GuardDuty
Inspector
Amazon Macie
AWS Single Sign-On
Certificate Manager
Key Management Service
CloudHSM
Directory Service
WAF & Shield
AWS Firewall Manager
Artifact
Security Hub
Detective
IoT 1-Click
IoT Analytics
IoT Device Defender
IoT Device Management
IoT Events
IoT Greengrass
IoT SiteWise
IoT Things Graph
Game Development
Amazon GameLift
Containers
Elastic Container Registry
Elastic Container Service
Elastic Kubernetes Service
close

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

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)
- Click here to increase DB instances limit

DB Clusters (0/40)
Reserved instances (0/20)
Snapshots (0)
- Manual (0/100)
- Automated (0)

Recent events (0)
Event subscriptions (0/20)

Parameter groups (0)
- Default (0)
- Custom (0/40)

Option groups (0)
- Default (0)
- Custom (0/20)

Subnet groups (0/20)
Supported platforms VPC
Default network vpc-cdac89a5

Additional information

Getting started with RDS
Overview and features
Documentation
Articles and tutorials
Data import guide for MySQL
Data import guide for Oracle
Data import guide for SQL Server
New RDS feature announcements
Pricing
Forums

Create database

Database Preview Environment

Switch to the new database creation flow.

Share your feedback

Step 1
Select engine

Step 2
Choose use case

Step 3
Specify DB details

Step 4
Configure advanced settings

RDS > Create database

Select engine

Engine options

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

MySQL

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

Switch to the new database creation flow.

Share your feedback

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.

Cancel | Previous | Next

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.t2.micro
1 vCPUs 1 GiB RAM Not EBS Optimized

Include previous generation classes

Storage

Storage type Info

General Purpose (SSD)

Allocated storage

20 GiB

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

Storage autoscaling Info

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

- [x] Enable storage autoscaling

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

Maximum storage threshold Info

Storage	0.13 USD
Total	**197.23 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.

mydbinstance

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.

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**

Cancel | Previous | Next

Step 2
Choose use case

Step 3
Specify DB details

Step 4
Configure advanced settings

Configure advanced settings

Network & Security

Virtual Private Cloud (VPC) **Info**
VPC defines the virtual networking environment for this DB instance.

Default VPC (vpc-cdac89a5)

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.

default-vpc-cdac89a5

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**

No preference

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

Switch to the new database creation flow.

Share your feedback

RDS > 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

Usage charges

The following selections disqualify the instance from being eligible for the free tier:

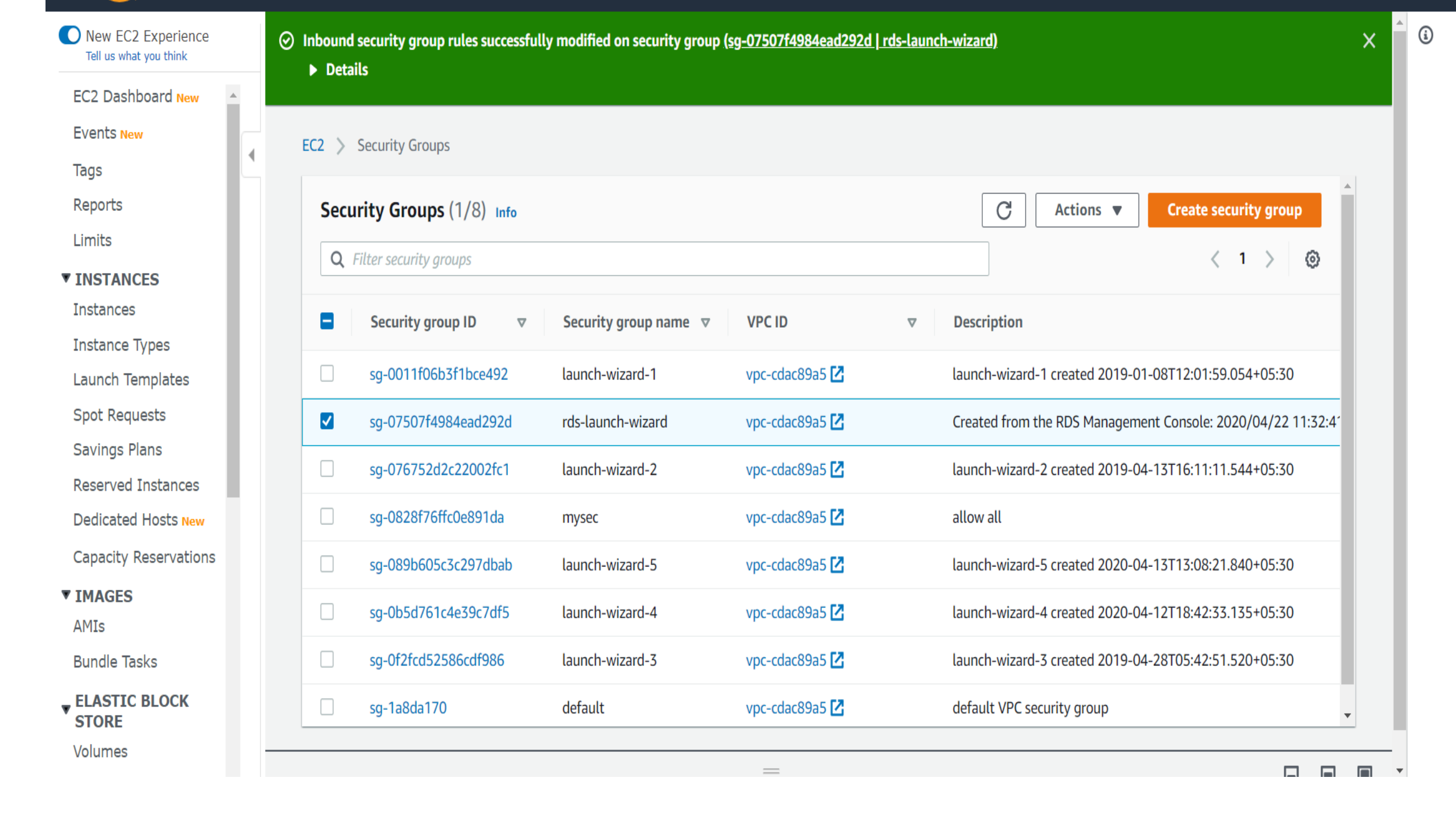
- DB instance class

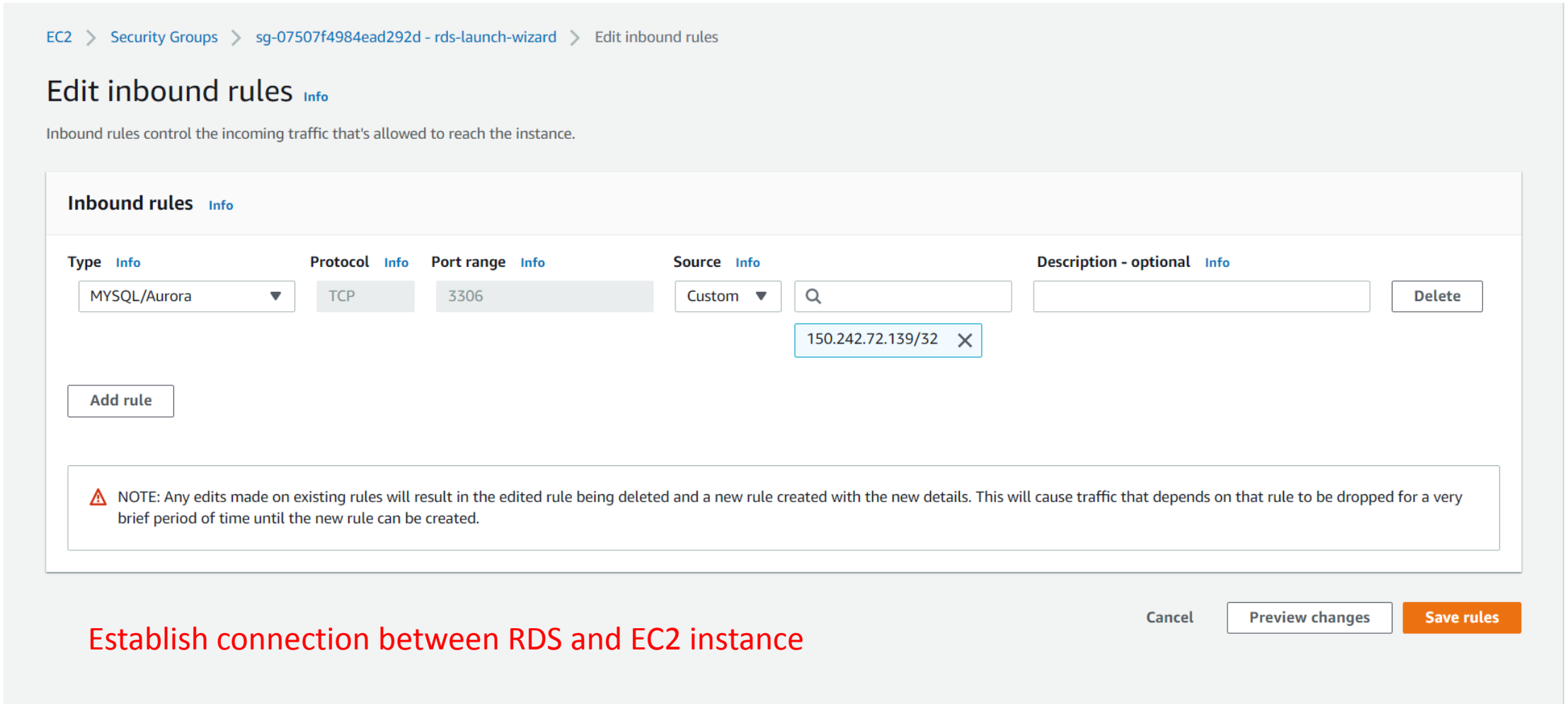
You will be charged normal RDS Prices. Learn More

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

All DB instances

View DB instance details


New EC2 Experience
Tell us what you think
EC2 Dashboard New
Events New
Tags
Reports
Limits
INSTANCES
Instances
Instance Types
Launch Templates
Spot Requests
Savings Plans
Reserved Instances
Dedicated Hosts New
Capacity Reservations
IMAGES
AMIs
Bundle Tasks
ELASTIC BLOCK STORE
Volumes
Inbound security group rules successfully modified on security group (sg-07507f4984ead292d | rds-launch-wizard)
Details
EC2 > Security Groups
Security Groups (1/8) Info
Actions
Create security group
Filter security groups
1
Security group ID
Security group name
VPC ID
Description
sg-0011f06b3f1bce492 launch-wizard-1 vpc-cdac89a5 launch-wizard-1 created 2019-01-08T12:01:59.054+05:30
sg-07507f4984ead292d rds-launch-wizard vpc-cdac89a5 Created from the RDS Management Console: 2020/04/22 11:32:4
sg-076752d2c22002fc1 launch-wizard-2 vpc-cdac89a5 launch-wizard-2 created 2019-04-13T16:11:11.544+05:30
sg-0828f76ffc0e891da mysec vpc-cdac89a5 allow all
sg-089b605c3c297dbab launch-wizard-5 vpc-cdac89a5 launch-wizard-5 created 2020-04-13T13:08:21.840+05:30
sg-0b5d761c4e39c7df5 launch-wizard-4 vpc-cdac89a5 launch-wizard-4 created 2020-04-12T18:42:33.135+05:30
sg-0f2fcd52586cdf986 launch-wizard-3 vpc-cdac89a5 launch-wizard-3 created 2019-04-28T05:42:51.520+05:30
sg-1a8da170 default vpc-cdac89a5 default VPC security group



Establish connection between RDS and EC2 instance

Connectivity & security

Endpoint & port

Endpoint
wordoressdb.ck6msceqjru4.ap-south-1.rds.amazonaws.com

Port
3306

Networking

Availability zone
ap-south-1c

VPC
vpc-cdac89a5

Subnet group
default-vpc-cdac89a5

Subnets
subnet-a7de11dc
subnet-56d4671a
subnet-367d3f5e

Security

VPC security groups
rds-launch-wizard (sg-07507f4984ead292d)
(active)

Public accessibility
No

Certificate authority
rds-ca-2019

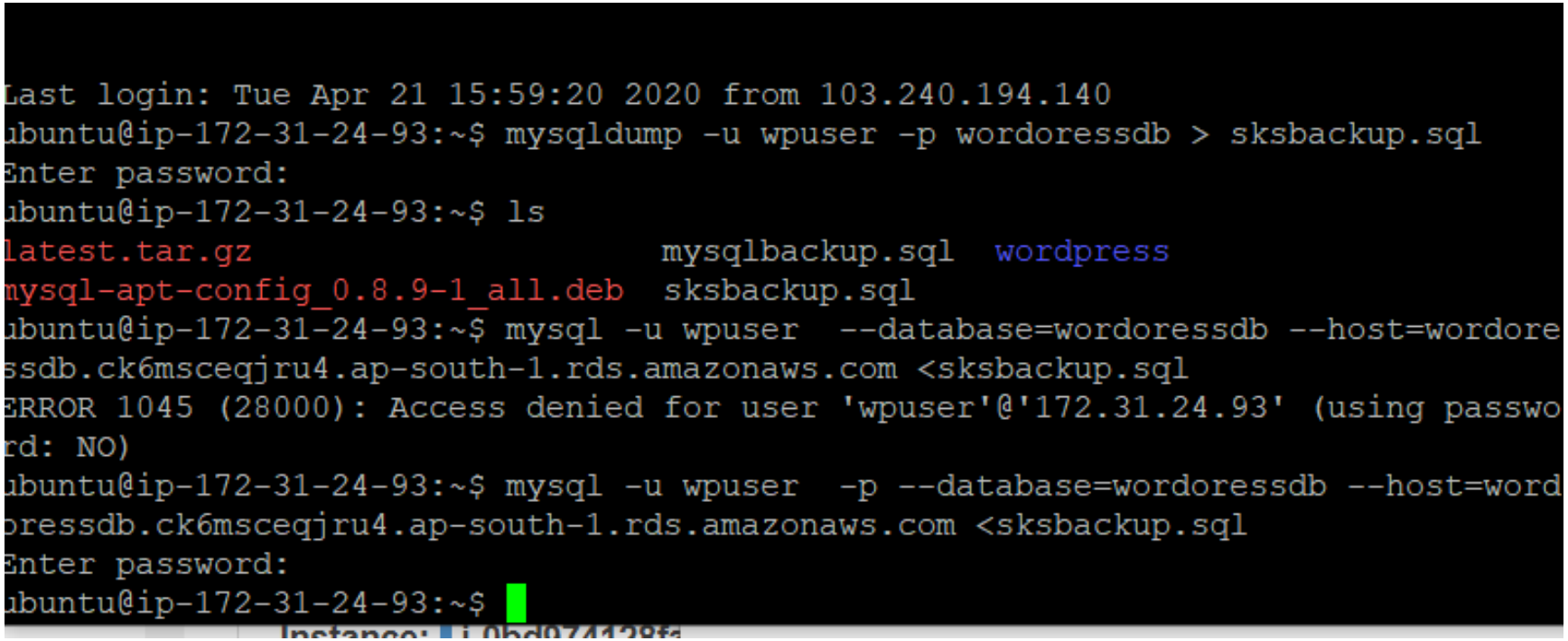
Certificate authority date
Aug 22nd, 2024

Security group rules (3)

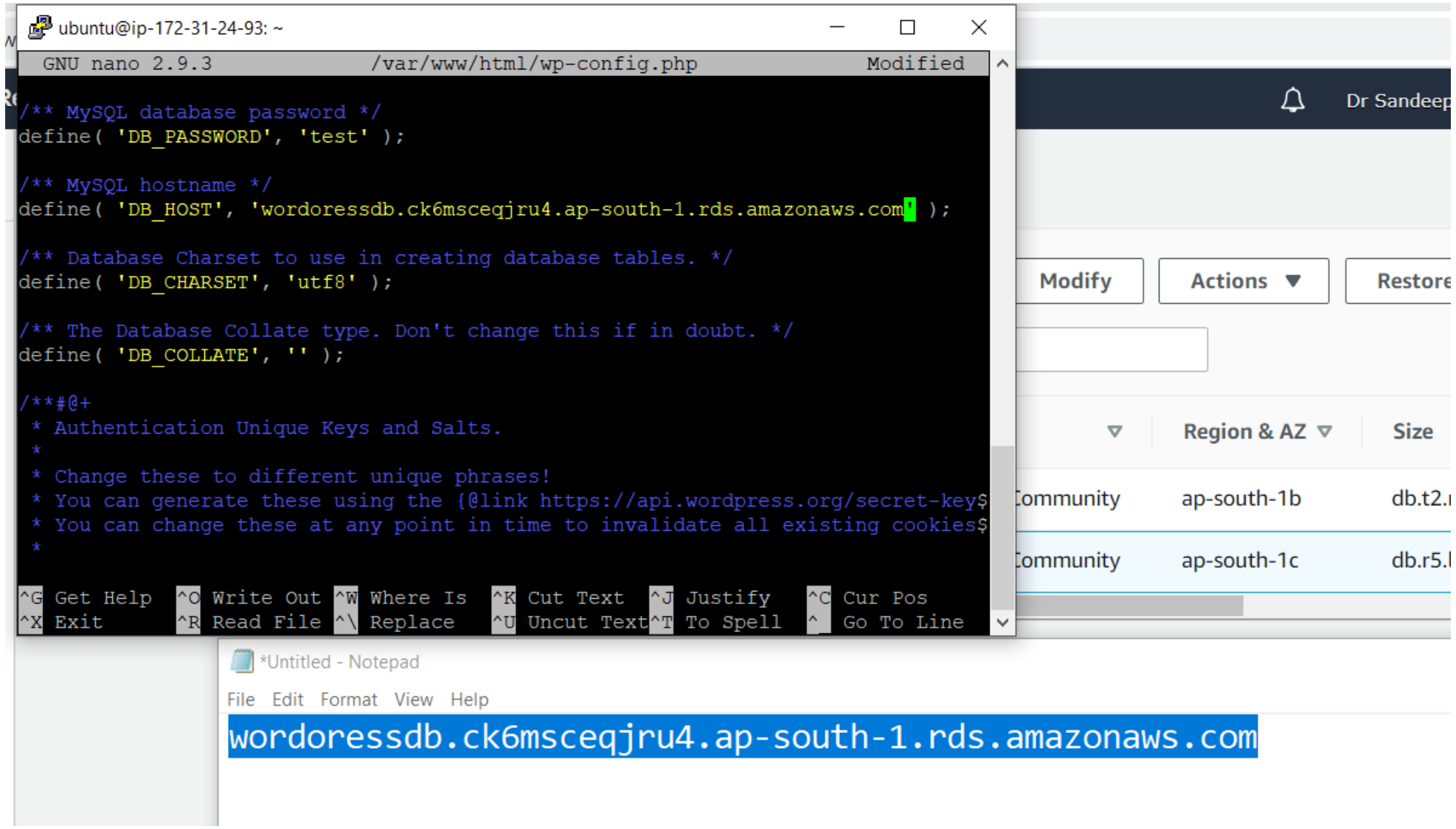
Filter security group rules

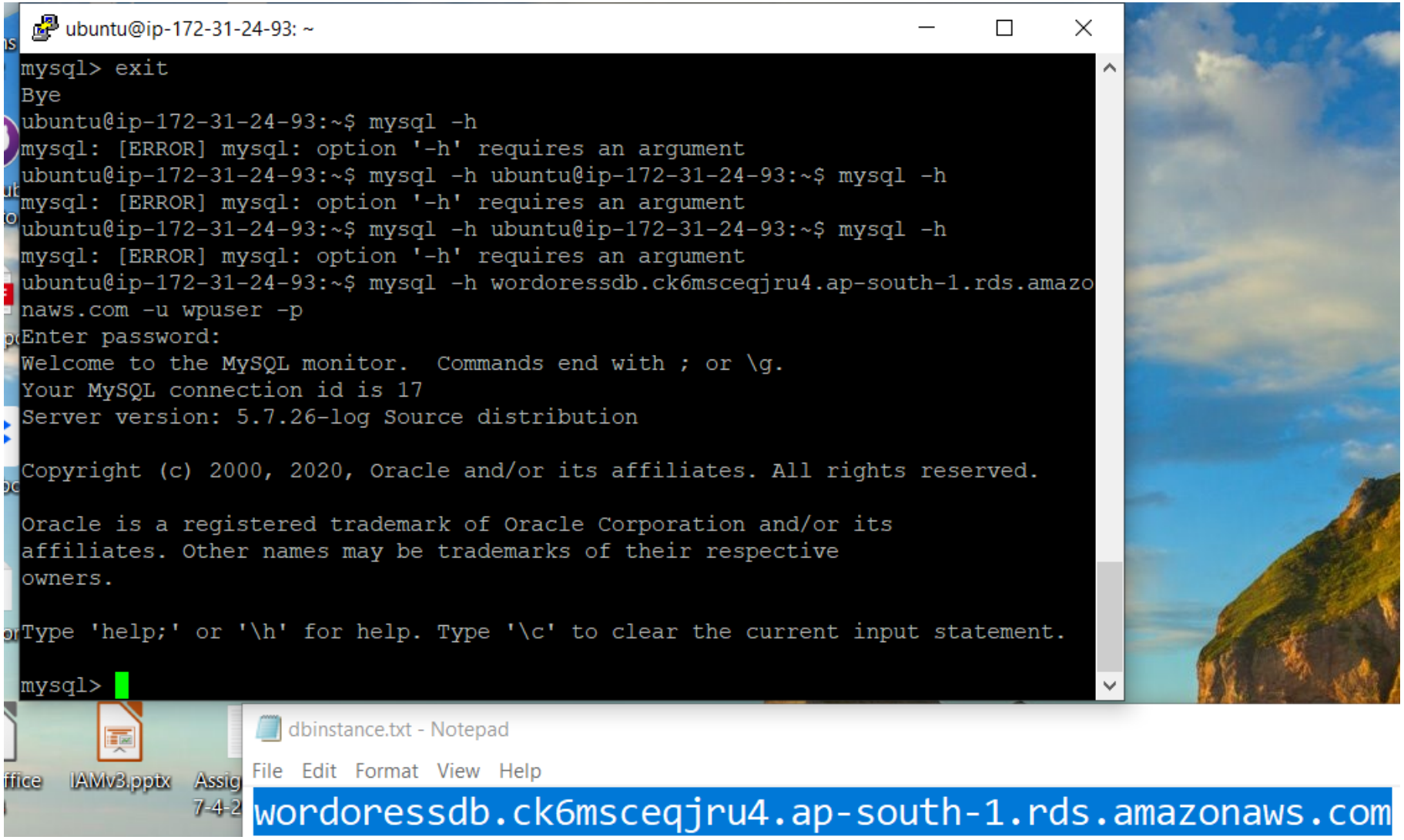
1

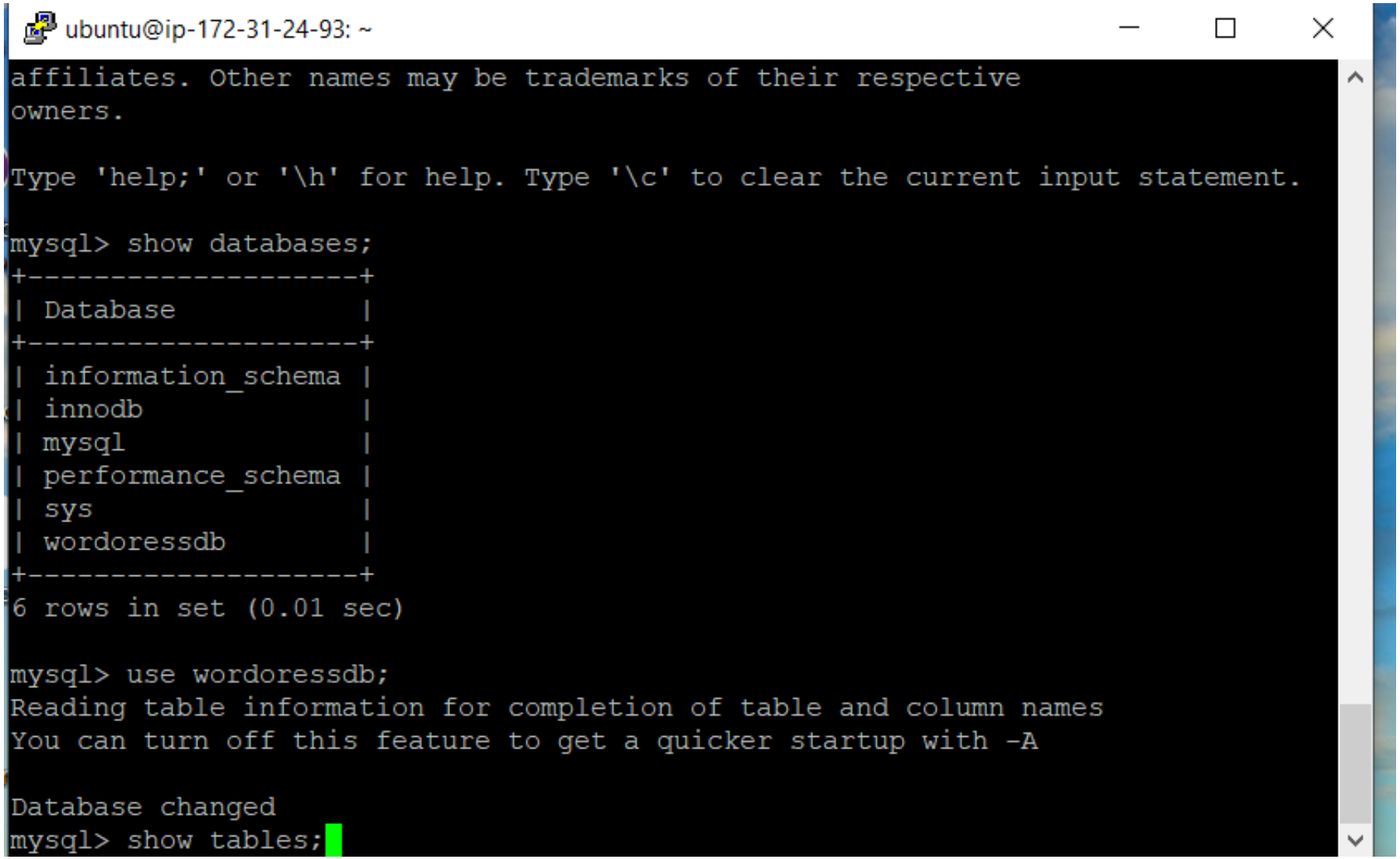
Security group	Type	Rule
rds-launch-wizard (sg-07507f4984ead292d)	CIDR/IP - Inbound	150.242.72.139/32
rds-launch-wizard (sg-07507f4984ead292d)	EC2 Security Group - Inbound	sg-089b605c3c297dbab
rds-launch-wizard (sg-07507f4984ead292d)	CIDR/IP - Outbound	0.0.0.0/0

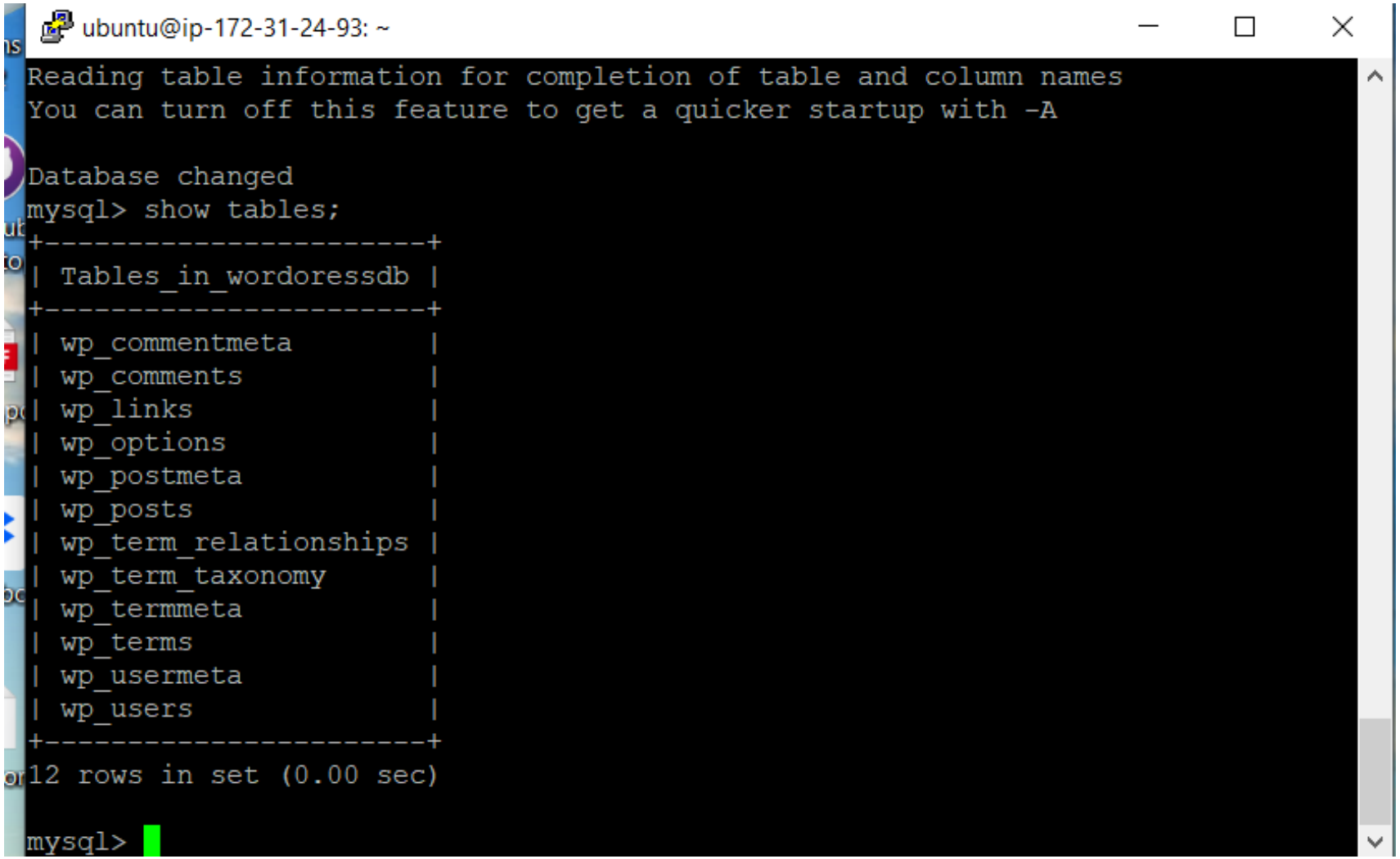


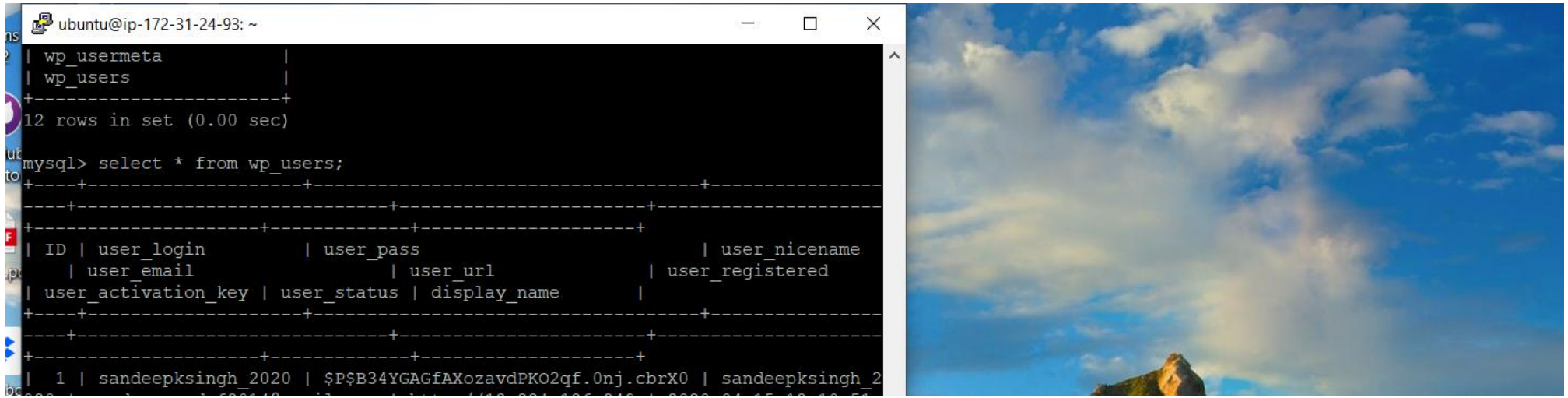
Upload and Test database dump to RDS database server


ubuntu@ip-172-31-24-93: ~
GNU nano 2.9.3 /var/www/html/wp-config.php Modified
/** MySQL database password */
define('DB_PASSWORD', 'test');
/** MySQL hostname */
define('DB_HOST', 'wordoressdb.ck6msceqjru4.ap-south-1.rds.amazonaws.com');
/** Database Charset to use in creating database tables. */
define('DB_CHARSET', 'utf8');
/** The Database Collate type. Don't change this if in doubt. */
define('DB_COLLATE', '');
/**#@+
* Authentication Unique Keys and Salts.
*
* Change these to different unique phrases!
* You can generate these using the {@link https://api.wordpress.org/secret-key$
* You can change these at any point in time to invalidate all existing cookies$
*
^G Get Help ^O Write Out ^W Where Is ^K Cut Text ^J Justify ^C Cur Pos
^X Exit ^R Read File ^\ Replace ^U Uncut Text ^T To Spell ^_ Go To Line
Dr Sandeep
Modify
Actions
Restore
Region & AZ
Size
ap-south-1b
ap-south-1c
*Untitled - Notepad
File Edit Format View Help
wordoressdb.ck6msceqjru4.ap-south-1.rds.amazonaws.com


ubuntu@ip-172-31-24-93: ~
mysql> exit
Bye
ubuntu@ip-172-31-24-93:~$ mysql -h
mysql: [ERROR] mysql: option '-h' requires an argument
ubuntu@ip-172-31-24-93:~$ mysql -h ubuntu@ip-172-31-24-93:~$ mysql -h
mysql: [ERROR] mysql: option '-h' requires an argument
ubuntu@ip-172-31-24-93:~$ mysql -h ubuntu@ip-172-31-24-93:~$ mysql -h
mysql: [ERROR] mysql: option '-h' requires an argument
ubuntu@ip-172-31-24-93:~$ mysql -h wordoressdb.ck6msceqjru4.ap-south-1.rds.amazo
naws.com -u wpuser -p
Enter password:
Welcome to the MySQL monitor. Commands end with ; or \g.
Your MySQL connection id is 17
Server version: 5.7.26-log Source distribution
Copyright (c) 2000, 2020, Oracle and/or its affiliates. All rights reserved.
Oracle is a registered trademark of Oracle Corporation and/or its
affiliates. Other names may be trademarks of their respective
owners.
Type 'help;' or '\h' for help. Type '\c' to clear the current input statement.
mysql>
IAMv3.pptx
dbinstance.txt - Notepad
File Edit Format View Help
wordoressdb.ck6msceqjru4.ap-south-1.rds.amazonaws.com


ubuntu@ip-172-31-24-93: ~
affiliates. Other names may be trademarks of their respective
owners.
Type 'help;' or '\h' for help. Type '\c' to clear the current input statement.
mysql> show databases;
+--------------------+
| Database |
+--------------------+
| information_schema |
| innodb |
| mysql |
| performance_schema |
| sys |
| wordoressdb |
+--------------------+
6 rows in set (0.01 sec)
mysql> use wordoressdb;
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> show tables;


ubuntu@ip-172-31-24-93: ~
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> show tables;
+-----------------------+
| Tables_in_wordoressdb |
+-----------------------+
| wp_commentmeta |
| wp_comments |
| wp_links |
| wp_options |
| wp_postmeta |
| wp_posts |
| wp_term_relationships |
| wp_term_taxonomy |
| wp_termmeta |
| wp_terms |
| wp_usermeta |
| wp_users |
+-----------------------+
12 rows in set (0.00 sec)
mysql>



Use Case Outcome- Wordpress still running on EC2 but using MySQL database hosted on RDS managed DB instance.