

Lab

AWS RDS Review

Software Studio

DataLab, CS, NTHU

Weathermood-server

- From file to DB system

```
function list(searchText = '') {
  return new Promise((resolve, reject) => {
    if (!fs.existsSync('data-posts.json')) {
      fs.writeFileSync('data-posts.json', '');
    }

    fs.readFile('data-posts.json', 'utf8', (err, data) => {
      if (err) reject(err);

      let posts = data ? JSON.parse(data) : [];
      if (posts.length > 0 && searchText) {
        posts = posts.filter(p => {
          return p.text.toLowerCase().indexOf(searchText.toLowerCase()) !== -1
        });
      }
      resolve(posts);
    });
  });
}
```

branch file

```
export function listPosts(searchText = '', start) {
  let url = `${postBaseUrl}/posts`;
  let query = [];
  if (searchText)
    query.push(`searchText=${searchText}`);
  if (start)
    query.push(`start=${start}`);
  if (query.length)
    url += `?${query.join('&')}`;

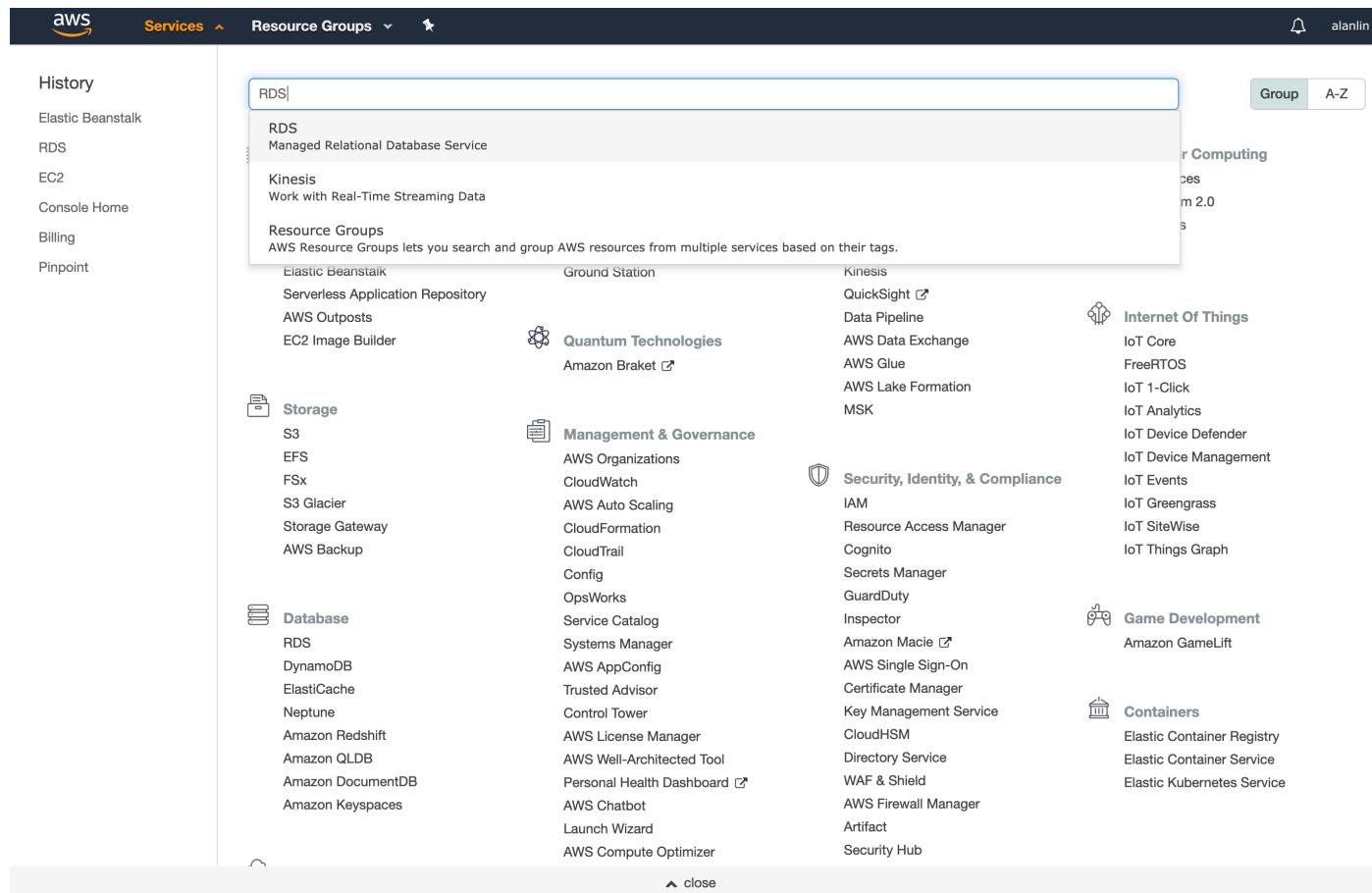
  console.log(`Making GET request to: ${url}`);

  return axios.get(url).then(function(res) {
    if (res.status !== 200)
      throw new Error(`Unexpected response code: ${res.status}`);
    return res.data;
  });
}
```

branch db

AWS RDS

- Find RDS service



AWS RDS

- Click Create database

The screenshot shows the AWS RDS Dashboard. On the left, a sidebar lists various options like Dashboard, Databases, and Query Editor. The main area features a callout box for 'Amazon Aurora' with a 'Create database' button highlighted by a red box. Below this, there's a 'Resources' section showing usage statistics for DB Instances, DB Clusters, Reserved instances, Snapshots, and other resources. A 'Create database' section contains a note about setting up a relational database in the cloud, with 'Restore from S3' and 'Create database' buttons. To the right, there's a 'Recommended for you' sidebar with links to Aurora Global Database, RDS Proxy, RDS Performance Insights, and Aurora Serverless. At the bottom, there's an 'Additional information' section with links to Getting started with RDS, Overview and features, and Documentation.

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

You are using the following Amazon RDS resources in the US West (Oregon) region (used/quota)

DB Instances (1/40)
Allocated storage (0.02 TB/100 TB)
[Click here to increase DB instances limit](#)

DB Clusters (0/40)

Reserved instances (0/40)

Snapshots (1)
Manual (0/100)
Automated (1)

Recent events (9)

Event subscriptions (0/20)

Parameter groups (1)
Default (1)
Custom (0/100)

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

Subnet groups (1/50)
Supported platforms VPC
Default network vpc-358fed4d

Create database

Amazon Relational Database Service (RDS) makes it easy to set up, operate, and scale a relational database in the cloud.

[Restore from S3](#) [Create database](#)

Note: your DB instances will launch in the US West (Oregon) region

Service health

[View service health dashboard](#)

Recommended for you

Aurora Global Database
Create an Aurora database that spans multiple AWS regions for low-latency reads and global DR. [Learn more](#)

RDS Proxy - Now in Preview
Pool and share database connections for improved application scaling and reduce database failover times. [Learn more](#)

RDS Performance Insights
Quickly assess load on your DB and take faster action with an easy-to-use performance dashboard. [Learn more](#)

Aurora Serverless
Run an Aurora database without having to manage instances, and pay on a per-second basis for capacity. [Learn more](#)

Additional information

[Getting started with RDS](#)
[Overview and features](#)
[Documentation](#)

Feedback English (US)

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AWS RDS

- Database creation method
 - choose Standard Create
- Engine options
 - choose PostgreSQL
 - Version: (up to you)

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

Amazon Aurora



MySQL



MariaDB



PostgreSQL



Oracle

ORACLE®

Microsoft SQL Server



Version Info

PostgreSQL 11.5-R1

i If you want to create PostgreSQL 12 in the Preview environment, click [here](#).

AWS RDS

- Templates
 - Choose **Free tier** of Dev/Test
 - You *may need to pay the bill*, if you choose **Production**.

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](#)

AWS RDS

- **Settings**
 - Credentials Settings
 - For login database

Settings

DB instance identifier [Info](#)

Type a name for your DB instance. The name must be unique cross all DB instances owned by your AWS account in the current AWS Region.

database-lab-demo

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.

postgres

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), "(double quote) and @ (at sign).

Confirm password [Info](#)

.....

AWS RDS

- DB instance size
 - Choose Burstable classes
- Storage
 - General Purpose
 - 20GB
 - Uncheck autoscaling

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.

Enable storage autoscaling

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

AWS RDS

- Connectively
 - Using default

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

C

Virtual Private Cloud (VPC) [Info](#)

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

Default VPC (vpc-358fed4d)



Only VPCs with a corresponding DB subnet group are listed.

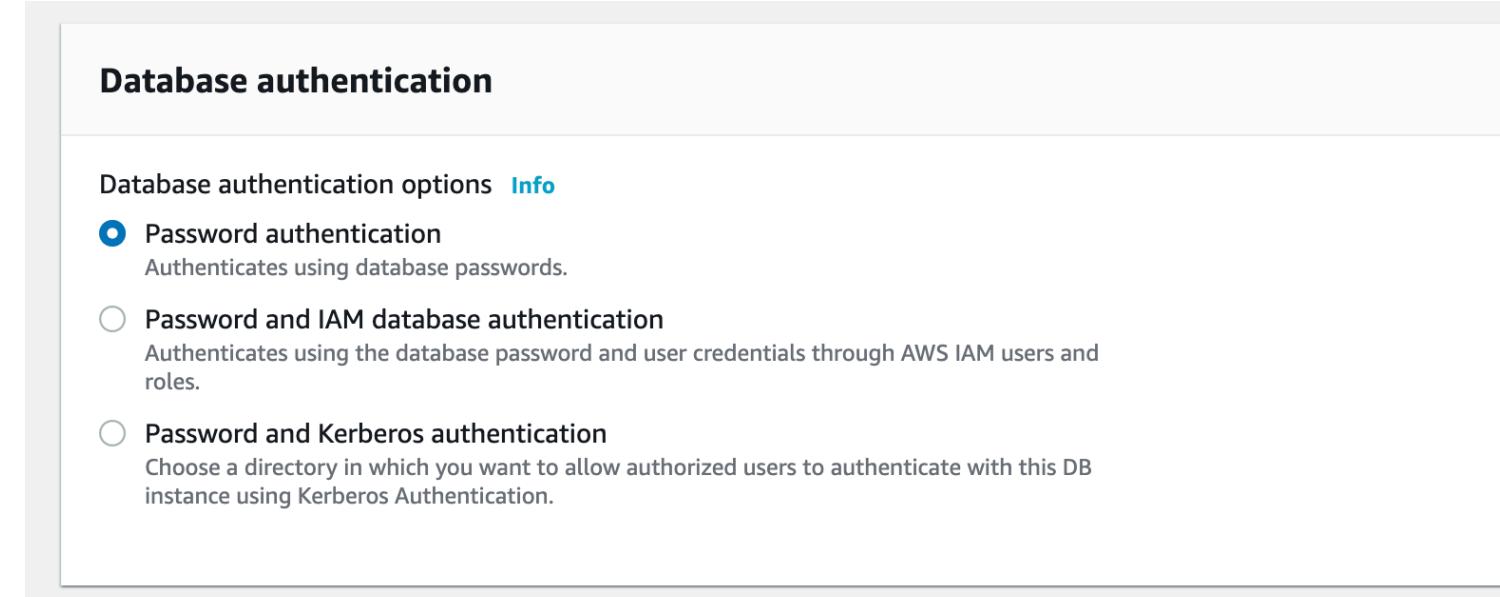


After a database is created, you can't change the VPC selection.

► Additional connectivity configuration

AWS RDS

- Database authentication
 - Choose Password authentication



AWS RDS

- Click create database

Estimated monthly costs

The Amazon RDS Free Tier is available to you for 12 months. Each calendar month, the free tier will allow you to use the Amazon RDS resources listed below for free:

- 750 hrs of Amazon RDS in a Single-AZ db.t2.micro Instance.
- 20 GB of General Purpose Storage (SSD).
- 20 GB for automated backup storage and any user-initiated DB Snapshots.

[Learn more about AWS Free Tier.](#)

When your free usage expires or if your application use exceeds the free usage tiers, you simply pay standard, pay-as-you-go service rates as described in the [Amazon RDS Pricing page](#).

Info 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](#)

EB + RDS

- Set up RDS security group to allow ingress from machines in the same group.
 - Remember the VPC security groups

The screenshot shows the 'Connectivity & security' tab of an AWS RDS database configuration page. The interface has a header with tabs: Connectivity & security, Monitoring, Logs & events, Configuration, Maintenance & backups, and Tags. Below the tabs, there are three main sections: Endpoint & port, Networking, and Security.

Connectivity & security		
Endpoint & port	Networking	Security
Endpoint database-lab-demo.csaegcmm9exz.us-west-2.rds.amazonaws.com	Availability zone us-west-2b	VPC security groups default (sg-ea3620b5) (active)
Port 5432	VPC vpc-358fed4d	Public accessibility Yes
	Subnet group default-vpc-358fed4d	Certificate authority rds-ca-2019
	Subnets subnet-a0dd22d8 subnet-0c65ab51 subnet-157a625e subnet-ab236280	Certificate authority date Aug 23rd, 2024

EB + RDS

- Find EB service
 - Click Configuration
 - Click Instances

Elastic Beanstalk

Elastic Beanstalk > Environments > weathermood-server-file-dev > Configuration

Environments

Applications

weathermood-server-file

- Application versions
- Saved configurations

weathermood-server-file-dev

- Go to environment
- Configuration** (highlighted)
- Logs
- Health
- Monitoring
- Alarms
- Managed updates
- Events
- Tags

Recent environments

weathermood-server-file-dev

Configuration overview

Cancel Review changes Apply configuration

Search for an option name or value

Category	Options	Actions
Software	Environment properties: NODE_ENV, RDS_DB_NAME, RDS_HOSTNAME, RDS_PASSWORD, RDS_PORT, RDS_USERNAME Log streaming: disabled Proxy server: nginx Rotate logs: disabled X-Ray daemon: disabled	
Instances	EC2 security groups: awseb-e-73fxef3dmt-stack-AWSEBSecurityGroup-1AJQ91G4PYUIK, default IOPS: container default Monitoring interval: 5 minute Root volume type: container default Size: container default	
Capacity	AMI ID: ami-0d844c1111ed934c6 Environment type: single instance Instance type: t2.micro Scaling cooldown: 360 seconds Time-based Scaling:	
Load balancer	<i>This configuration does not contain a load balancer.</i>	
Rolling updates and deployments	Command timeout: 600 Deployment policy: All at once Healthy threshold: Single instance Ignore health check: disabled Rolling updates: disabled	
Security	EC2 key pair: -- IAM instance profile: aws-elasticbeanstalk-ec2-role Service role: arn:aws:iam::372538974272:role/aws-elasticbeanstalk-service-role	
	CloudWatch Custom Metrics-Environment: CloudWatch Custom Metrics-Instance: Health check: disabled	

EB + RDS

- Click the security group that is from RDS
- Click Apply

EC2 security groups

Group name	Group ID	Name
<input checked="" type="checkbox"/> awseb-e-73fxef3dmt-stack-AWSEBSecurityGroup-1AJQ91G4PYUIK	sg-07706e679bb8c0c4b	weathermood-server-file-dev
<input checked="" type="checkbox"/> default	sg-ea3620b5	

Cancel Continue **Apply**

EB + RDS

- Change public accessibility to **YES**
 - Check the accessibility
 - If is NO click Modify

RDS > Databases > database-lab-demo

database-lab-demo

Modify Actions ▾

Summary

DB identifier database-lab-demo	CPU 4.00%	Info Available	Class db.t2.micro
Role Instance	Current activity 0 Sessions	Engine PostgreSQL	Region & AZ us-west-2b

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

Connectivity & security

Endpoint & port	Networking	Security
Endpoint database-lab-demo.csaegcm9exz.us-west-2.rds.amazonaws.com	Availability zone us-west-2b	VPC security groups default (sg-ea3620b5) (active)
Port 5432	VPC vpc-358fed4d	Public accessibility Yes
	Subnet group default-vpc-358fed4d	Certificate authority rds-ca-2019
	Subnets subnet-a0dd22d8 subnet-0c65ab51 subnet-157a625e subnet-ab236280	Certificate authority date Aug 23rd, 2024

EB + RDS

- Change public accessibility to **YES**
 - Check the accessibility
 - If is NO click Modify

Network & Security

Subnet group
Use this field to move the DB instance to a new subnet group in another vpc. [Learn more.](#)

default-vpc-358fed4d ▾

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

Choose security groups ▾

default (sg-ea3620b5) (vpc-358fed4d) X

Certificate authority
Certificate authority for this DB instance

rds-ca-2019 ▾

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.

Configure security group

- Click the VPC security groups

The screenshot shows the AWS RDS security group configuration page. The top navigation bar includes tabs for Connectivity & security, Monitoring, Logs & events, Configuration (which is selected), Maintenance & backups, and Tags.

The main content area is titled "Connectivity & security". It is divided into three columns: "Endpoint & port", "Networking", and "Security".

Endpoint & port:

- Endpoint: database-lab-demo.csaegcmm9exz.us-west-2.rds.amazonaws.com
- Port: 5432

Networking:

- Availability zone: us-west-2b
- VPC: vpc-358fed4d
- Subnet group: default-vpc-358fed4d
- Subnets:
 - subnet-a0dd22d8
 - subnet-0c65ab51
 - subnet-157a625e
 - subnet-ab236280

Security:

- VPC security groups:
 - default (sg-ea3620b5) (active)
- Public accessibility: Yes
- Certificate authority: rds-ca-2019
- Certificate authority date: Aug 23rd, 2024

Configure security group

- Click Inbound rules
- Click Edit inbound rules

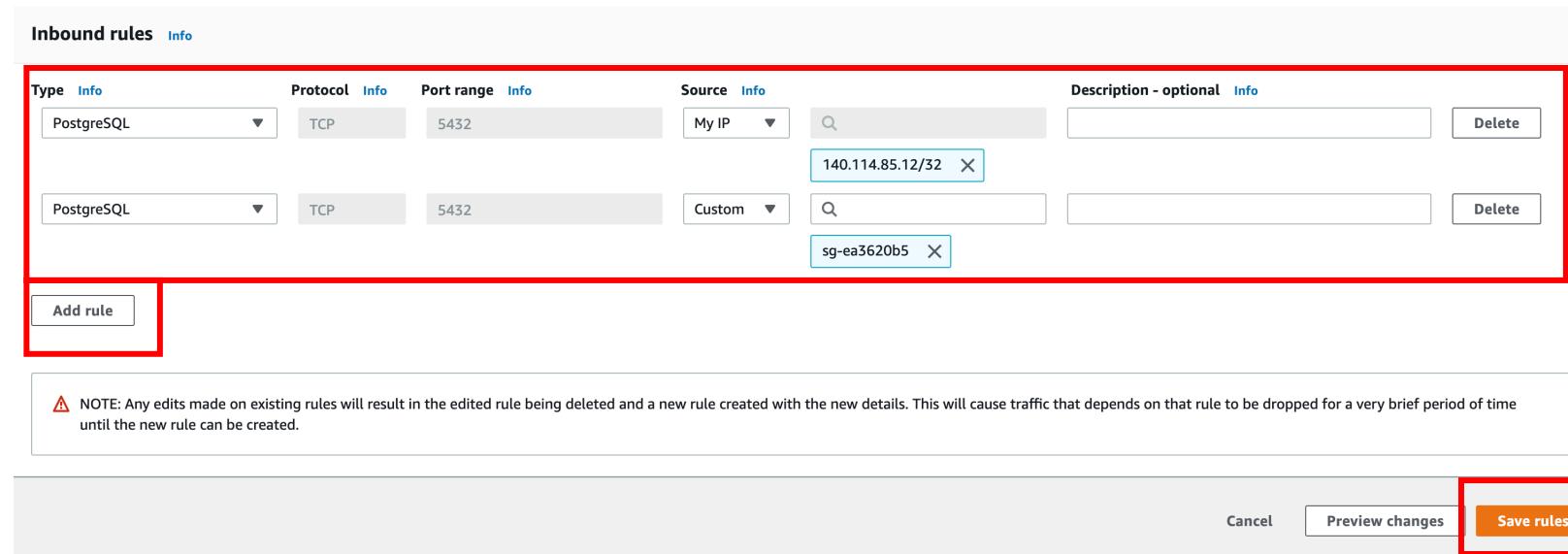
The screenshot shows the AWS EC2 Security Groups configuration interface. At the top, there's a search bar with the filter "search: sg-ea3620b5" and a "Clear filters" button. Below the search bar is a table header with columns: Security group ID, Security group name, VPC ID, Description, Owner, and Inbound rules count. A single row is listed: "sg-ea3620b5" (Security group ID), "default" (Security group name), "vpc-358fed4d" (VPC ID), "default VPC security gr..." (Description), "372538974272" (Owner), and "2 Permission entries" (Inbound rules count). Below this, a sub-section titled "sg-ea3620b5 - default" is shown. It has tabs for "Details", "Inbound rules" (which is highlighted with a red box), "Outbound rules", and "Tags". Under the "Inbound rules" tab, there's a table with columns: Type, Protocol, Port range, Source, and Description - optional. Two rows are listed: one for PostgreSQL (Type: PostgreSQL, Protocol: TCP, Port range: 5432, Source: 140.114.85.17/32) and another for PostgreSQL (Type: PostgreSQL, Protocol: TCP, Port range: 5432, Source: sg-ea3620b5 (default)). A red box also surrounds the "Edit inbound rules" button located at the bottom right of this table.

Security group ID	Security group name	VPC ID	Description	Owner	Inbound rules count
sg-ea3620b5	default	vpc-358fed4d	default VPC security gr...	372538974272	2 Permission entries

Type	Protocol	Port range	Source	Description - optional
PostgreSQL	TCP	5432	140.114.85.17/32	-
PostgreSQL	TCP	5432	sg-ea3620b5 (default)	-

Configure security group

- Click Add rule
 - Click Add rule
 - Type -> PostgreSQL
 - Source
 - My IP
 - Custom -> choose the security group from RDS.
- Click Save rules



Create Database in RDS

- Create Database in RDS
 - `createdb -h {RDS-endpoint} -p 5432 -U {RDS-master name} weathermood`

```
➔ ~ createdb -h database-lab-demo.csaegcmm9exz.us-west-2.rds.amazonaws.com -p 5432 -U postgres weathermood  
Password:
```

```
➔ ~ █
```

Configure Database in RDS

- Create Table and insert Data
 - Migrate schema/data
 - Connect to remote psql server and manually create and insert.

Add environment variables on EB

- Using cmd

```
$ eb setenv NODE_ENV=production, \
  RDS_HOSTNAME=<rds-endpoint>, RDS_PORT=5432, \
  RDS_USERNAME=<user>, RDS_PASSWORD=<password>, \
  RDS_DB_NAME=weathermood
```

Eb Deployment

- Commit and deploy

```
& git commit
```

```
$ eb deploy weathermood-production
```

Lab

- There is **no Lab** this week.

Homework

- **lab-weathermood-server-db-todo**
- In this assignment, you might need to create new tables or test SQL queries.
- You can use pdAdmin to accomplish this.

The screenshot shows the pgAdmin 4 interface. The left sidebar displays a tree view of database objects under 'cloudprog' and 'public'. The 'posts' table is selected. The main area has two tabs: 'Query Editor' and 'Query History'. The 'Query Editor' tab contains the following SQL code:

```
1 SELECT * FROM public.posts
2 ORDER BY id ASC LIMIT 100
3
```

Below the code, the 'Data Output' tab is active, showing a table with 14 rows of data. The columns are: id, mood, text, ts, clearVotes, cloudsVotes, drizzleVotes, rainVotes, thunderVotes, snowVotes, windyVotes. The data consists of 14 entries where each row's 'mood' column contains the word 'Clear'.

	id	mood	text	ts	clearVotes	cloudsVotes	drizzleVotes	rainVotes	thunderVotes	snowVotes	windyVotes
1	1	Clear	word...	42323304	0	0	0	0	0	0	0
2	2	Clear	word...	42319704	0	0	0	0	0	0	0
3	3	Clear	word...	42316104	0	0	0	0	0	0	0
4	4	Clear	word...	42312504	0	0	0	0	0	0	0
5	5	Clear	word...	42308904	0	0	0	0	0	0	0
6	6	Clear	word...	42305304	0	0	0	0	0	0	0
7	7	Clear	word...	42301704	0	0	0	0	0	0	0
8	8	Clear	word...	42298104	0	0	0	0	0	0	0
9	9	Clear	word...	42294504	0	0	0	0	0	0	0
10	10	Clear	word...	42290904	0	0	0	0	0	0	0
11	11	Clear	word...	42287304	0	0	0	0	0	0	0
12	12	Clear	word...	42283704	0	0	0	0	0	0	0
13	13	Clear	word...	42280104	0	0	0	0	0	0	0
14	14	Clear	word...	42276504	0	0	0	0	0	0	0