

Visualise a Relational Database



Unmilan Mukherjee

Result Grid		Filter Rows:		Edit:		Export/Import:		Wrap Cell Cor
	empno	ename	job	manager	hiredate	salary	comm	department
▶	1	JOHNSON	ADMIN	6	1990-12-17 00:00:00	18000.00	NULL	4
	2	HARDING	MANAGER	9	1998-02-02 00:00:00	52000.00	300.00	3
	3	TAFT	SALES I	2	1996-01-02 00:00:00	25000.00	500.00	3
	4	HOOVER	SALES I	2	1990-04-02 00:00:00	27000.00	NULL	3
	5	LINCOLN	TECH	6	1994-06-23 00:00:00	22500.00	1400.00	4
	6	GARFIELD	MANAGER	9	1993-05-01 00:00:00	54000.00	NULL	4
	7	POI K	TECH	6	1997-09-22 00:00:00	25000.00	NULL	4

Introducing Today's Project!

What is Amazon RDS?

Amazon RDS is a Relational Database service and it is useful as it allows us to create RDBs for any of our needs and connect it to other services offered by AWS.

How I used Amazon RDS in this project

I used Amazon RDS to populate it with data using MySQL Workbench, and then connect it to QuickSight using a private security group to maintain security and created a basic visualization dashboard.

One thing I didn't expect in this project was...

I did not expect how complicated managing so many different security groups would be in AWS!

This project took me...

This project took me roughly an hour and a half.








In the first part of my project...

Creating a Relational Database

I created my relational database by going to RDS service, clicking on create database and using the Easy Create option on AWS I simply entered my configs, setup my master password and created the RDB in minutes!

Configuration

Engine type [Info](#)

<input type="radio"/> Aurora (MySQL Compatible) 	<input type="radio"/> Aurora (PostgreSQL Compatible) 	<input checked="" type="radio"/> MySQL 
<input type="radio"/> PostgreSQL 	<input type="radio"/> MariaDB 	<input type="radio"/> Oracle 
<input type="radio"/> Microsoft SQL Server 		

Edition

☒ MySQL Community

DB instance size

<input type="radio"/> Production db.r7g.xlarge 4 vCPUs 32 GiB RAM 500 GiB	<input type="radio"/> Dev/Test db.r7g.large 2 vCPUs 16 GiB RAM 100 GiB	<input checked="" type="radio"/> Free tier db.t4g.micro 2 vCPUs 1 GiB RAM 20 GiB
---	--	--

Understanding Relational Databases

A relational database is a type of database that organizes data into tables, which are structured in rows and columns. Each table(relation), stores data about a specific entity.

MySQL vs SQL

The difference between MySQL and SQL is that SQL is the standardized programming language for RDBs but MySQL is a RDBMS, which is basically a management system for RDBs(Kind of like a librarian for books).

Populating my RDS instance

The first thing I did was make my RDS instance public because we need to have a public instance to connect it with our MySQL Workbench on our local computer.

I had to update the default security group for my RDS schema because if we do not tell it to allow connections from our IP address, then the security group will not allow connection from our system to our RDS instance and block SQL Workbench.

Edit inbound rules [Info](#)

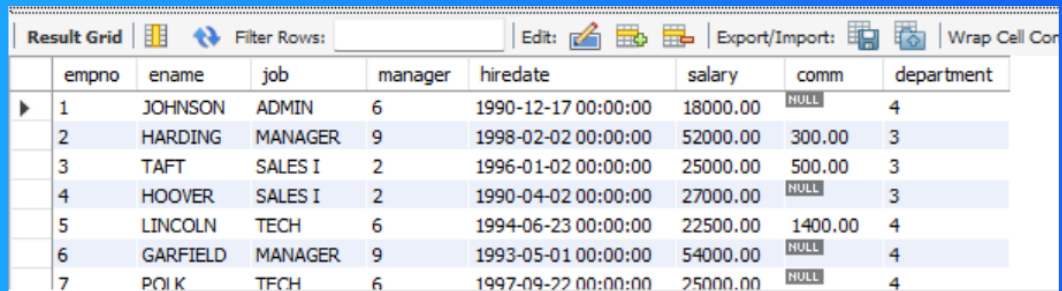
Inbound rules control the incoming traffic that's allowed to reach the instance.

Security group rule ID	Type Info	Protocol Info	Port range Info	Source Info	Description - optional Info
sg-03ce54bdf693ccf9b	All traffic	All	All	Cu... Q...	Delete
-	All TCP	TCP	0 - 6553!	My IP Q...	Delete
				sg-023daf9ffc9e295e	

[Add rule](#)

[Cancel](#) [Preview changes](#) [Save rules](#)

Using MySQL Workbench



The screenshot shows the MySQL Workbench interface with the 'Result Grid' tab selected. It displays a table with 9 columns: empno, ename, job, manager, hiredate, salary, comm, and department. There are 7 rows of data. The 'comm' column contains NULL values for rows 1, 4, 6, and 7. The interface includes a toolbar with icons for editing, exporting, and filtering, and a 'Filter Rows' input field.

	empno	ename	job	manager	hiredate	salary	comm	department
▶	1	JOHNSON	ADMIN	6	1990-12-17 00:00:00	18000.00	NULL	4
	2	HARDING	MANAGER	9	1998-02-02 00:00:00	52000.00	300.00	3
	3	TAFT	SALES I	2	1996-01-02 00:00:00	25000.00	500.00	3
	4	HOOVER	SALES I	2	1990-04-02 00:00:00	27000.00	NULL	3
	5	LINCOLN	TECH	6	1994-06-23 00:00:00	22500.00	1400.00	4
	6	GARFIELD	MANAGER	9	1993-05-01 00:00:00	54000.00	NULL	4
	7	POIK	TECH	6	1997-09-22 00:00:00	25000.00	NULL	4

To populate my database I first created a Schema, after that I created a table using CREATE TABLE command and ran an SQL query with the details of the type of data and their values to populate the database using the INSERT INTO command.

Connecting QuickSight and RDS

To connect my RDS instance to QuickSight, I had to go to my Quicksight console, select Datasets and click on create dataset option. From there I had to select RDS and move on with the config settings and validate the connection in the end!

This solution is risky because our RDS is public and hackers can easily get access to our confidential data. We need to change the solution such that only Quicksight can access our data in the RDS instance.

A better strategy

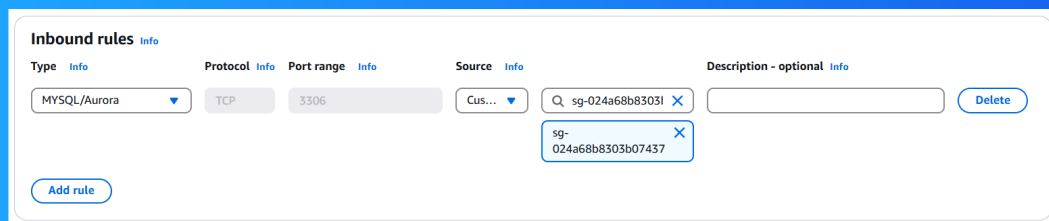
First, I made a new security group so that we can later attach it to our QuickSight.

Next, I connected my new security group to QuickSight by first heading over to IAM and editing the permissions of my quicksight-service-role that AWS has by default. Next in QuickSight we go to manage QuickSight and Add VPC connection from there.

Now to secure my RDS instance

To make my RDS instance secure, I created a new security group for it and added an inbound rule that allows connections from MySQL/Aurora and only from the security group attached to the QuickSight security group.

I made sure that my RDS instance could be accessed from QuickSight by going to my database identifier and modifying the connection tab to use the newly created RDS security group that allows QuickSight inbound connections and removing the default.



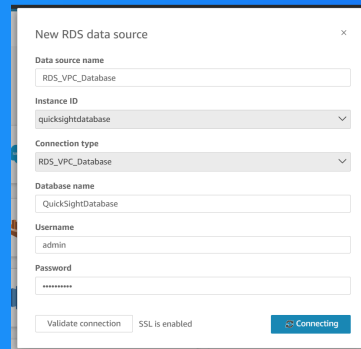
The screenshot shows the 'Inbound rules' configuration page in the AWS IAM console. The page has a blue header and a white content area. The 'Inbound rules' section is active, showing a table with columns: Type, Protocol, Port range, Source, and Description - optional. The 'Type' column has a dropdown menu with 'MySQL/Aurora' selected. The 'Protocol' column has a dropdown menu with 'TCP' selected. The 'Port range' column has a text input field with '3306' entered. The 'Source' column has a dropdown menu with 'Cus...' selected. The 'Description - optional' column has a text input field. There is a 'Delete' button next to the 'Description - optional' field. Below the table, there is an 'Add rule' button. A search bar is visible above the table, with the text 'sg-024a68b8303b07437' entered and a search icon. A dropdown menu is open below the search bar, showing the selected security group ID 'sg-024a68b8303b07437' with a close button.

Type	Protocol	Port range	Source	Description - optional
MySQL/Aurora	TCP	3306	Cus...	

Add rule

sg-024a68b8303b07437

Adding RDS as a data source for QuickSight



The screenshot shows the 'New RDS data source' dialog box. It contains the following fields and options:

- Data source name:** RDS_VPC_Database
- Instance ID:** quicksightdatabase (dropdown menu)
- Connection type:** RDS_VPC_Database (dropdown menu)
- Database name:** QuickSightDatabase
- Username:** admin
- Password:** (masked with asterisks)
- Buttons:** 'Validate connection' and 'Connecting' (with a progress bar).
- Status:** SSL is enabled

This data source is different from my initial data source because now my RDS instance is private and only allows connections from QuickSight, making it way more secure than the earlier setup I had.

