



Visualise a Relational Database



Louis Moyo



Introducing Today's Project!

What is Amazon RDS?

Amazon RDS is a managed relational database service that automates provisioning, patching, backups, and scaling for engines like PostgreSQL, MariaDB, SQL Server, Oracle, MySQL, and Aurora. It's useful because it cuts ops overhead, boosts reliability/security, and lets you focus on data and apps.

How I used Amazon RDS in this project

In today's project, I used Amazon RDS to host a relational database, created a schema and tables, loaded sample data with a SQL client, then connected it to QuickSight, first via a public connection, then securely via a VPC connection and security groups.

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

One thing I didn't expect was needing to add EC2/IAM permissions to the aws-quicksight-service-role-v0 so the QuickSight VPC connection could create network interfaces. That taught me how QuickSight actually talks to resources in a VPC.



Louis Moyo
NextWork Student

nextwork.org

This project took me...

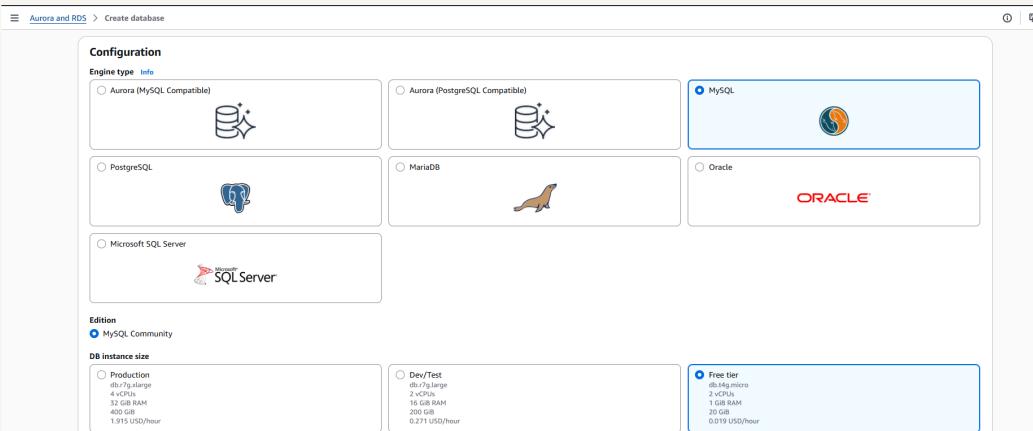
About 2 hours, including time to troubleshoot the VPC connection and tighten security groups.



In the first part of my project...

Creating a Relational Database

I created my relational database by using Amazon RDS, selecting MySQL as the engine, choosing default settings for a simple setup, and launching it inside my VPC for secure access.





Understanding Relational Databases

A relational database is a type of database that stores data in tables with rows and columns, where relationships between the data can be managed and queried using SQL.

MySQL vs SQL

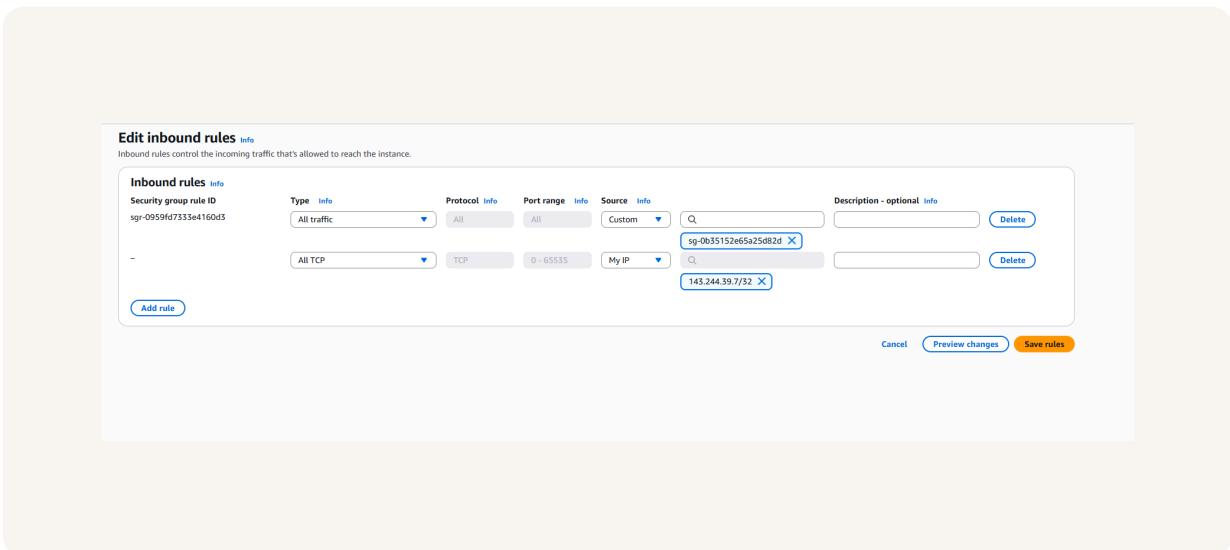
The difference between MySQL and SQL is that SQL is the standard language used to query and manage databases, while MySQL is a specific relational database system that uses SQL to store and manage data.



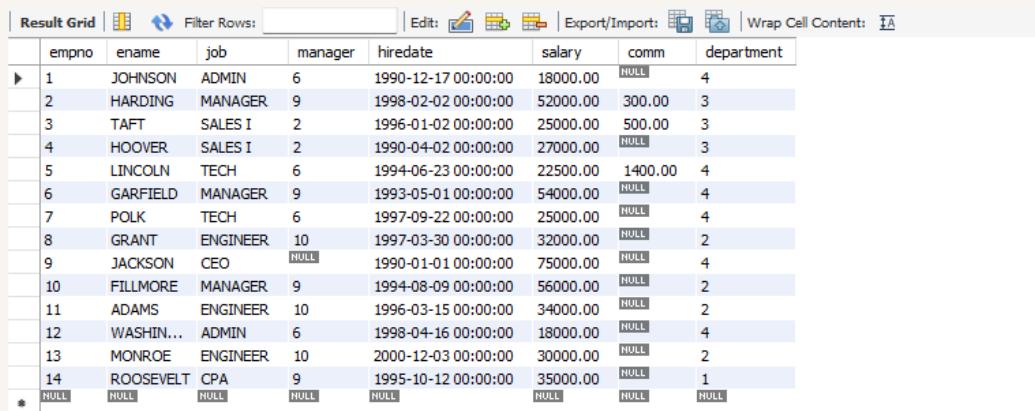
Populating my RDS instance

The first thing I did was make my RDS instance public because I'll need to connect to it from outside AWS later on. By default, RDS databases are private inside a VPC, but making it public prepares the instance so I can access it with tools like MySQL Workbench from my own computer.

I had to update the default security group for my RDS schema because, by default, it blocks all external access. MySQL Workbench on my computer needs to talk to the RDS instance over the network, so I added an inbound rule that allows connections from my own IP address. This way, only my machine can reach the database, which keeps it secure while still letting me connect.



Using MySQL Workbench



The screenshot shows a MySQL Workbench result grid displaying data from a table. The columns are labeled: empno, ename, job, manager, hiredate, salary, comm, and department. The data consists of 14 rows, each representing an employee. The 'empno' column contains values from 1 to 14. The 'ename' column lists names like JOHNSON, HARDING, TAFT, HOOVER, LINCOLN, GARFIELD, POLK, GRANT, JACKSON, FILLMORE, ADAMS, WASHIN..., MONROE, and ROOSEVELT. The 'job' column includes various roles such as ADMIN, MANAGER, SALES I, TECH, ENGINEER, CEO, and CPA. The 'manager' column shows the employee number of the supervisor. The 'hiredate' column shows the date of employment. The 'salary' column displays monetary values. The 'comm' column contains NULL or specific commission amounts. The 'department' column shows department numbers 1 through 4.

	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	POLK	TECH	6	1997-09-22 00:00:00	25000.00	NULL	4
	8	GRANT	ENGINEER	10	1997-03-30 00:00:00	32000.00	NULL	2
	9	JACKSON	CEO	NULL	1990-01-01 00:00:00	75000.00	NULL	4
	10	FILLMORE	MANAGER	9	1994-08-09 00:00:00	56000.00	NULL	2
	11	ADAMS	ENGINEER	10	1996-03-15 00:00:00	34000.00	NULL	2
	12	WASHIN...	ADMIN	6	1998-04-16 00:00:00	18000.00	NULL	4
	13	MONROE	ENGINEER	10	2000-12-03 00:00:00	30000.00	NULL	2
*	14	ROOSEVELT	CPA	9	1995-10-12 00:00:00	35000.00	NULL	1
		NULL	NULL	NULL	NULL	NULL	NULL	NULL

I populated my database by using MySQL Workbench to create the QuickSightDatabase schema, creating the newhire and department tables, running the provided INSERT statements to load sample rows, and verifying the data with SELECT * queries.



Connecting QuickSight and RDS

To connect my RDS instance to QuickSight I updated the RDS security group to allow inbound access (0.0.0.0/0), then in QuickSight created a new RDS dataset, selected my DB instance, chose Public network, entered QuickSightDatabase with my username/password, and validated the connection.

This solution is risky because the RDS instance is publicly accessible and the security group allows 0.0.0.0/0, exposing the database to the entire internet.

A better strategy

First, I made a new security group so that QuickSight traffic is isolated. I'll attach it to the QuickSight VPC connection and then allow only this group to reach my RDS on port 3306, keeping the database private and least-privilege.

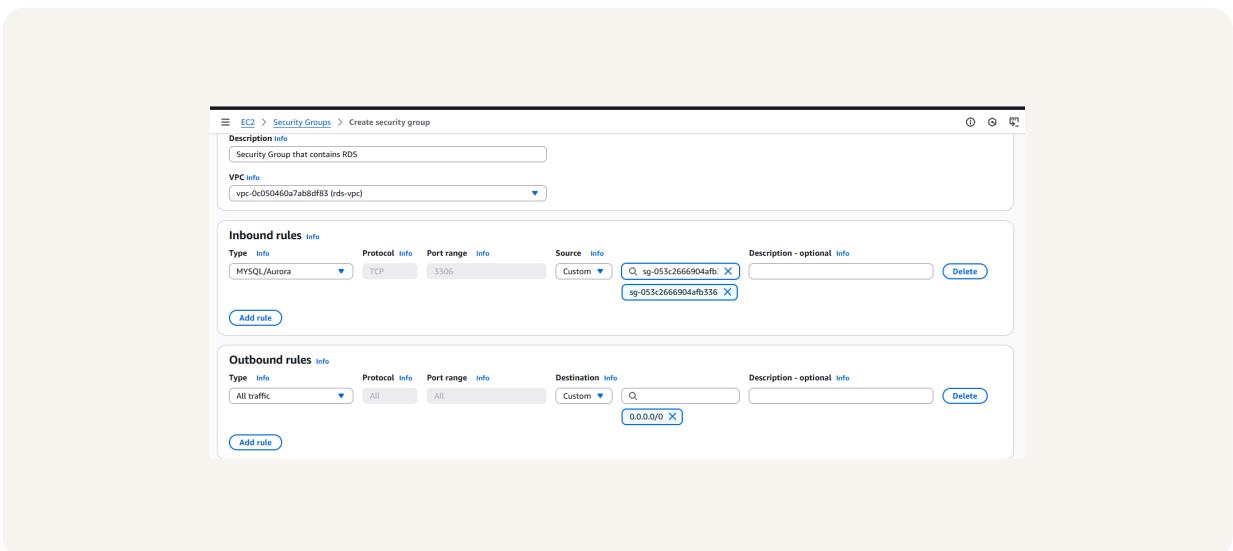
Next, I connected my new security group to QuickSight by creating a VPC connection (Manage QuickSight, Manage VPC connections), selecting my VPC, subnets, and attaching the QuickSight_SecGp ID after granting the aws-quicksight-service-role-v0 the needed EC2/IAM permissions.



Now to secure my RDS instance

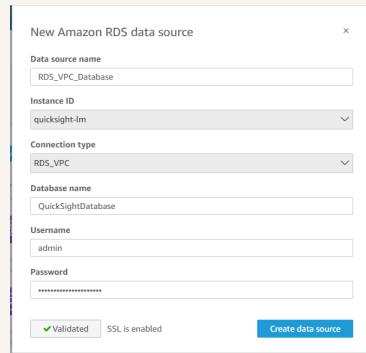
To make my RDS instance secure I set it not publicly accessible, ensured it sits in private subnets, created and attached an RDS_SecGp, and limited inbound access to only the QuickSight security group—removing any open 0.0.0.0/0 rules.

I made sure that my RDS instance could be accessed from QuickSight by creating a QuickSight VPC connection with QuickSight_SecGp, attaching a dedicated RDS_SecGp to the DB, and allowing inbound only from QuickSight_SecGp.

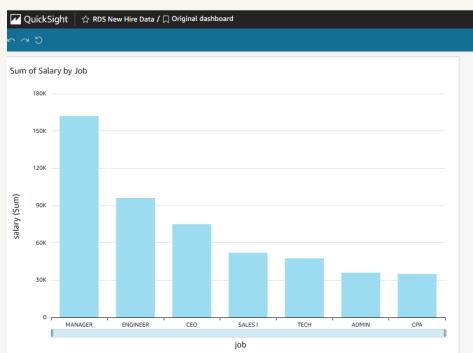




Adding RDS as a data source for QuickSight



This data source is different because it now connects via a private VPC connection instead of a public network. My RDS is not publicly accessible, and access is limited to the QuickSight security group—so only QuickSight can query it.





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