



Visualize a Relational Database



Benjamin Kofi Yankey

The screenshot shows the MySQL Workbench interface. In the top-left, the Navigator pane displays the schema 'QuickSightDatabase' with its tables, views, stored procedures, and functions. A query window titled 'Query 1 - SQL File 1' contains the following SQL code:

```
1 • SELECT * FROM newhire;
```

The 'Result Grid' pane below shows the results of the query, listing 14 rows from the 'newhire' table. The columns are: empno, ename, job, manager, hiredate, salary, and comm. The data includes entries like HOOVER, SALES I, 2, 1990-04-02 00:00:00, 27000.00, NULL; LINCOLN, TECH, 6, 1994-06-23 00:00:00, 22500.00, NULL; GARFIELD, MANAGER, 9, 1993-05-01 00:00:00, 54000.00, NULL; POLK, TECH, 6, 1997-09-22 00:00:00, 25000.00, NULL; GRANT, ENGINEER, 10, 1997-03-30 00:00:00, 32000.00, NULL; JACKSON, CEO, NULL, 1990-01-01 00:00:00, 75000.00, NULL; FILLMORE, MANAGER, 9, 1994-08-09 00:00:00, 56000.00, NULL; ADAMS, ENGINEER, 10, 1996-03-15 00:00:00, 34000.00, NULL; WASHIN..., ADMIN, 6, 1998-04-16 00:00:00, 18000.00, NULL; MONROE, ENGINEER, 10, 2000-12-03 00:00:00, 30000.00, NULL; ROOSEVELT, CPA, 9, 1995-10-12 00:00:00, 35000.00, NULL.

The bottom pane, 'Output', displays the 'Action Output' log with the following entries:

#	Time	Action	Message	Duration / Fetch
1	11:13:57	Apply changes to QuickSightDatabase	Change applied	0.406 sec
2	11:15:17	CREATE TABLE newhire(empno INT PRIMARY KEY,...	0 row(s) affected	0.516 sec / 0.000 sec
3	11:15:56	SELECT * FROM newhire LIMIT 0, 1000	0 row(s) returned	
4	11:17:26	INSERT INTO newhire (empno, ename, job, manager, ...	14 row(s) affected Records: 14 Duplicates: 0 Warning: 0	0.422 sec
5	11:17:31	SELECT * FROM newhire LIMIT 0, 1000	14 row(s) returned	0.406 sec / 0.000 sec



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Introducing Today's Project!

What is Amazon RDS?

Amazon RDS (Relational Database Service) is a managed database service that simplifies the setup, operation, and scaling of relational databases.

How I used Amazon RDS in this project

In today's project, I used Amazon RDS to create a relational database for storing and managing data. I connected it to QuickSight for data visualization and implemented security measures for safe access.

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

One thing I didn't expect in this project was the complexity of configuring security settings for both RDS and QuickSight. Balancing access control while ensuring secure connections required more attention than anticipated.

This project took me...

2 hours.



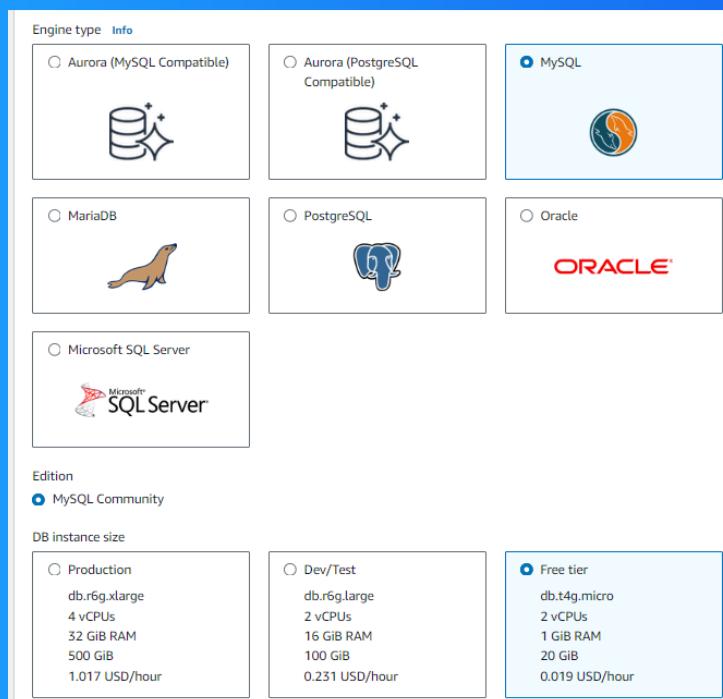
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In the first part of my project...

Creating a Relational Database

I created my relational database by using Amazon RDS. I selected the database engine (MySQL) configured instance settings, storage, and security options, and then launched the RDS instance. After that, I connected to the database using standard SQL.





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Understanding Relational Databases

A relational database is a type of database that stores data in structured tables, where each table consists of rows and columns. The tables are linked by relationships, typically through primary and foreign keys, allowing efficient data organization

MySQL vs SQL

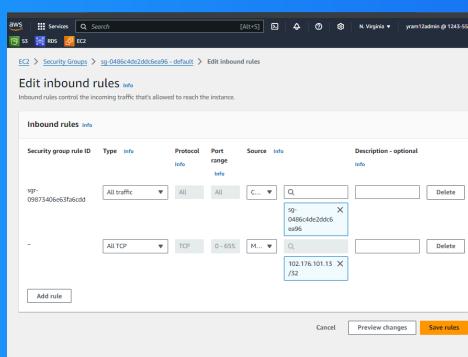
The difference between MySQL and SQL is that SQL (Structured Query Language) is a standard language used for querying and managing databases, while MySQL is an open-source relational database management system that uses SQL as its query language.



Populating my RDS instance

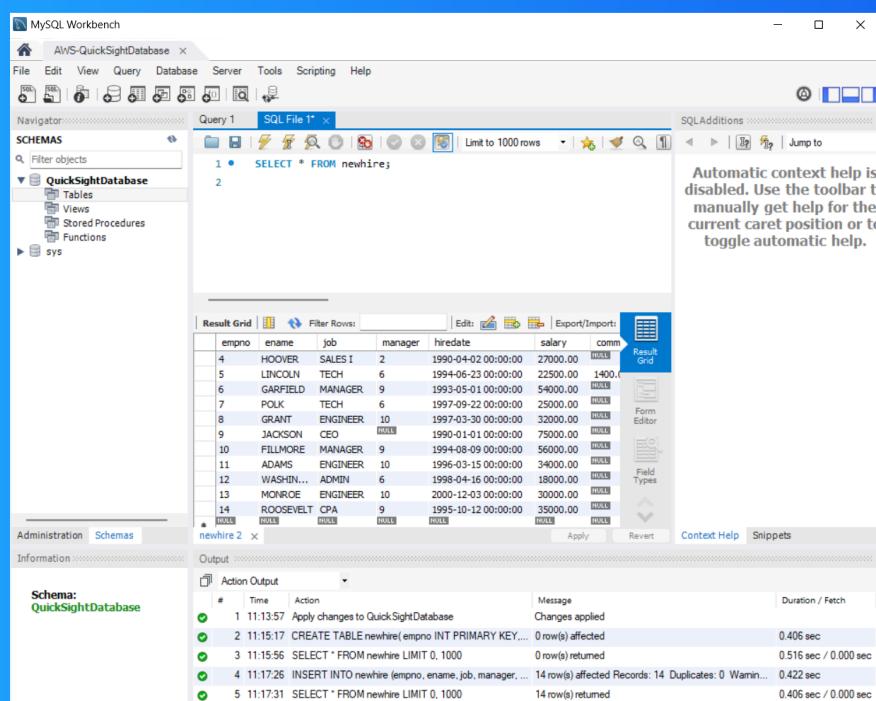
The first thing I did was make my RDS instance public because it allows external access from my local machine using tools like MySQL Workbench. Without making it public, only resources within the AWS network could connect, limiting remote database.

I had to update the default security group for my RDS schema because it controls inbound and outbound traffic. By adding my local machine's IP address, I ensured that it could securely connect to the RDS instance, enabling external access for queries.





Using MySQL Workbench



To populate my database, I wrote SQL 'INSERT' statements to add data into the tables I created. I defined values for each column, ensuring that the data matched the table structure, and executed the queries in MySQL Workbench to load the data.



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Connecting QuickSight and RDS

To connect my RDS instance to QuickSight, I adjusted the security group to allow inbound requests from QuickSight. Then, I logged into QuickSight, selected "New Data Set," and added the RDS instance as a data source, entering the required connection.

This solution is risky because making the RDS instance public and allowing inbound requests can expose it to potential security threats. If not properly secured, unauthorized users might gain access, leading to data breaches or malicious activities.

A better strategy

First, I made a new security group so that QuickSight could access our RDS instance securely without public exposure. This group allows specific inbound rules, enhancing security while enabling data visualization.

Next, I connected my new security group to QuickSight by updating the RDS instance's settings to associate it with the security group. This allows QuickSight to access the database while maintaining security.



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Now to secure my RDS instance

To make my RDS instance secure, I configured it to be private, preventing public access. I also created a new security group specifically for the RDS instance and allowed access only from the QuickSight security group.

I made sure that my RDS instance could be accessed from QuickSight by updating the security group rules. I allowed inbound traffic from the QuickSight security group to the RDS security group, enabling communication.

The screenshot shows the 'Create security group' wizard in the AWS Management Console. The 'Basic details' step is completed with the name 'RDS_SecGrp'. The 'Inbound rules' step is shown, with one rule defined:

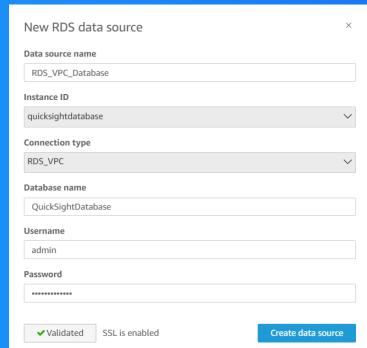
Type	Protocol	Port range	Source	Description
MySQL/Oracle	TCP	3306	sg-09e969070f0117e08cc (QuickSight)	(optional)



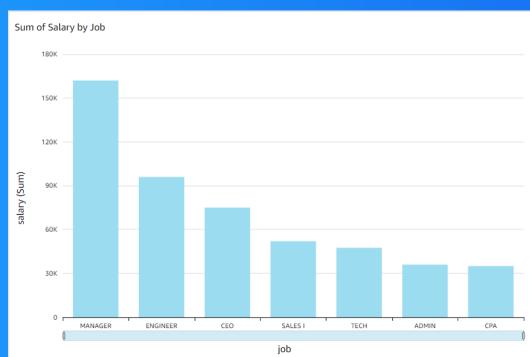
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Adding RDS as a data source for QuickSight



This data source is different from my initial data source because it is now securely connected through a dedicated security group, preventing public access to the RDS instance. This setup enhances security while maintaining connectivity for data visualization.





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