N.Sivaprasad

2100031812

Create and visualize data in an Amazon Relational Database (Amazon RDS) MS SQL Express server using Amazon QuickSight

Introduction: Amazon RDS provides a managed relational database service that makes it easy to set up, operate, and scale a relational database in the cloud. With Amazon RDS, you can choose from several database engines, including Microsoft SQL Server (MS SQL). Amazon QuickSight, on the other hand, is a cloud-powered business intelligence service that allows you to easily create and publish interactive dashboards.

Services :

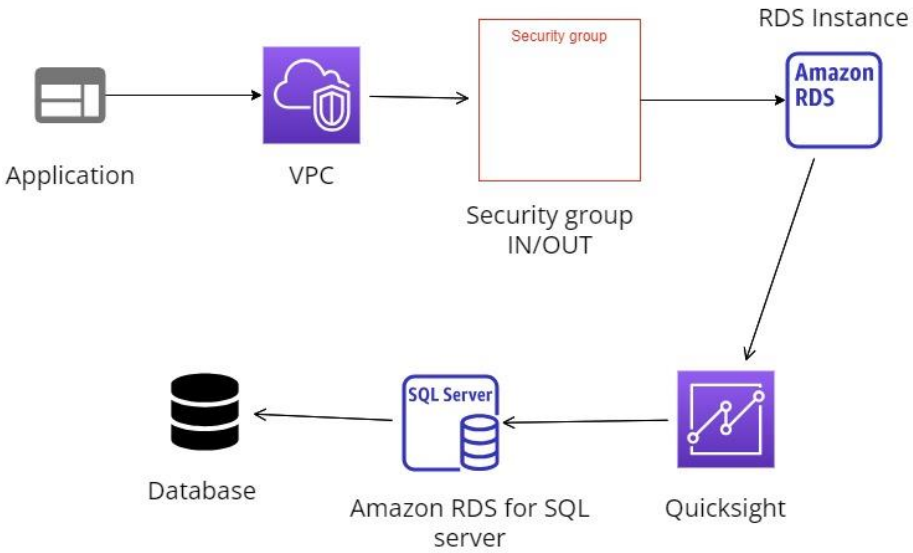
1. **Amazon RDS (Relational Database Service):**
    - Amazon RDS provides a managed relational database service in the cloud.
    - We use Amazon RDS to set up and manage an MS SQL Express database instance.
2. **Amazon QuickSight:**
    - Amazon QuickSight is a cloud-powered business intelligence service that enables users to create and publish interactive dashboards.
    - We use QuickSight to connect to the MS SQL Express database hosted on Amazon RDS and visualize the data stored within it.

3. **AAWS Identity and Access Management (IAM)**
    - IAM is used to manage access to AWS services securely.
    - We utilize IAM to define roles and permissions for accessing resources such as Amazon RDS and QuickSight.

- IAM ensures that only authorized users or applications can interact with the data and services in the AWS environment.

4. **Amazon S3 (Simple Storage Service):**
    - Amazon S3 provides scalable object storage in the cloud.
    - While not explicitly mentioned in the project outline, S3 can be used to store data files, backups, or other resources related to the project.
5. **Amazon EC2 (Elastic Compute Cloud):**
    - Amazon EC2 offers resizable computing capacity in the cloud.

Architecture :



Step-By-Step procedure:

Step 1: Create a Microsoft SQL Server Express Edition database in Amazon RDS

1) Sign up for the AWS Management Console.
2) Open the Amazon RDS console and choose the Region where you want to create the Database.
3) In the Create Database section, choose Create Database.
4) On the Create database page, in the Choose a database creation method section, choose Easy Create.
5) In the Configuration section, make the following changes:

   For Engine type, choose Microsoft SQL Server.

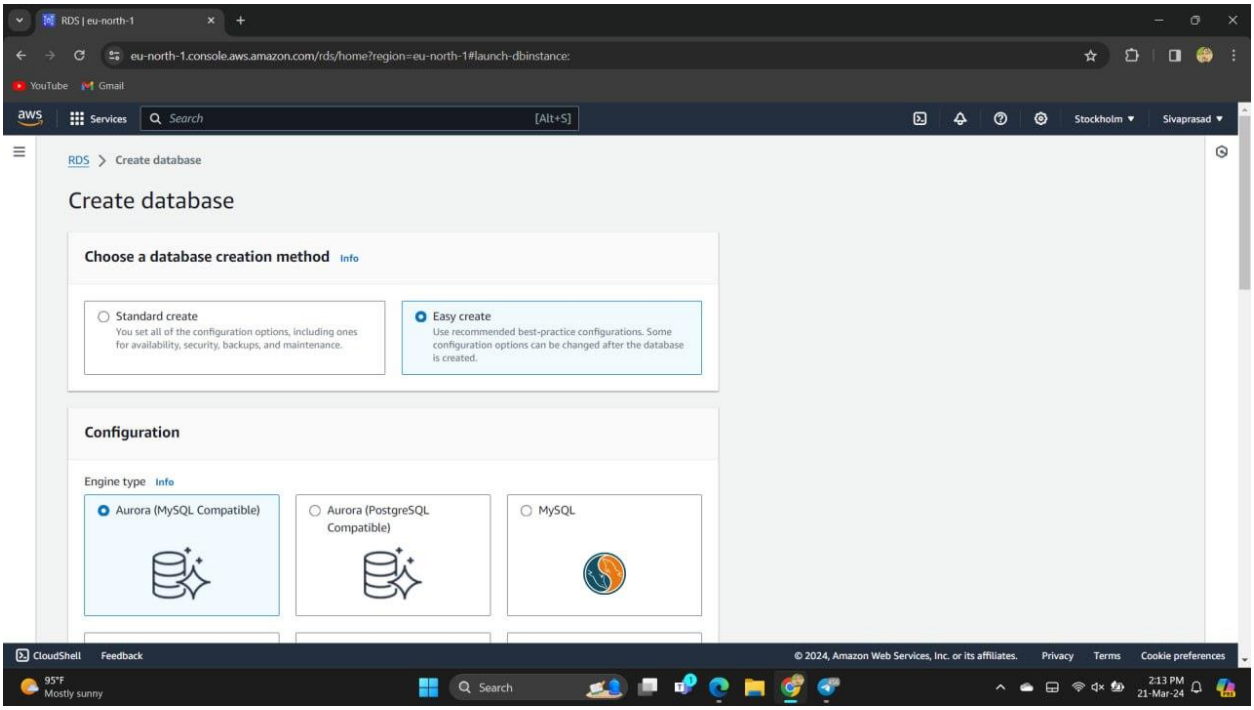
   For DB instance size, choose the Free tier.

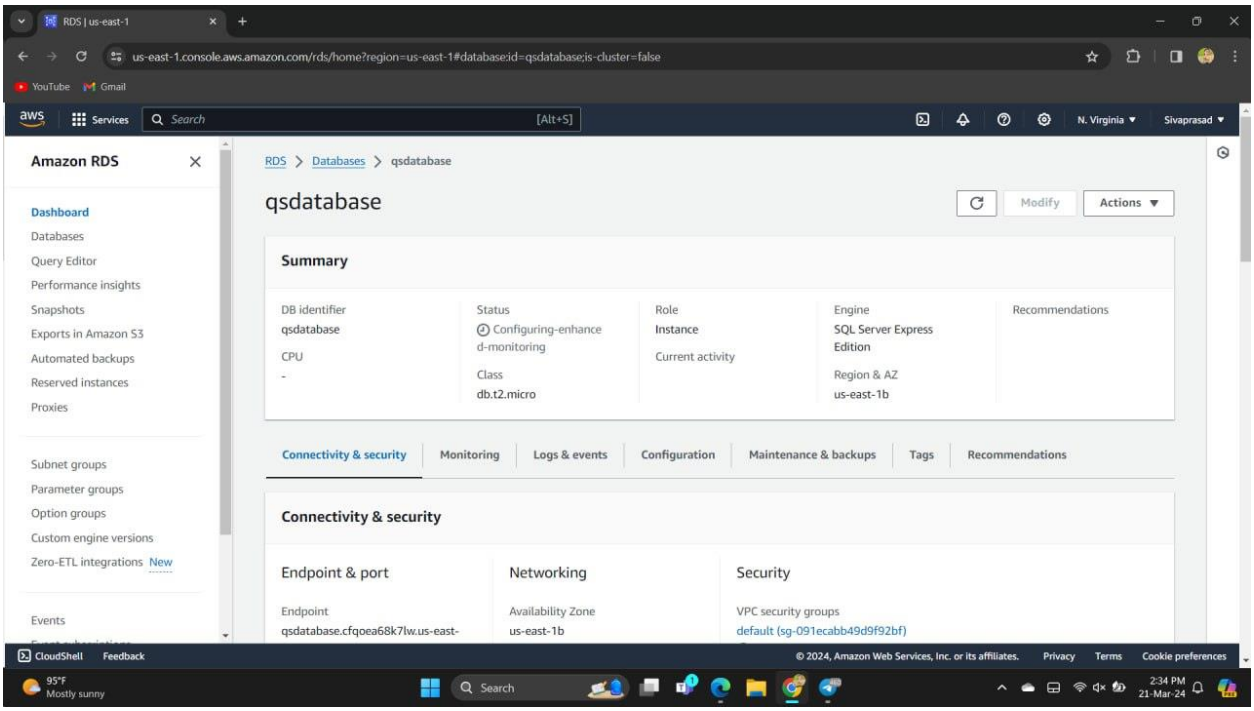
   For DB instance identifier, type qsdatabase.

   For the Master username, enter admin.

   For the Master password, type a unique password, and confirm the password.

6) In the View default settings for Easy create drop down, leave the default settings. Then, choose Create database.

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YouTube
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aws
Services
Search
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Sivaprasad
Amazon RDS
Dashboard
Databases
Query Editor
Performance insights
Snapshots
Exports in Amazon S3
Automated backups
Reserved instances
Proxies
Subnet groups
Parameter groups
Option groups
Custom engine versions
Zero-ETL integrations New
Events
RDS > Databases > qsdatabase
qsdatabase
Modify
Actions
Summary
DB identifier
qsdatabase
Status
Configuring-enhanced-monitoring
Role
Instance
Engine
SQL Server Express Edition
Recommendations
CPU
-
Current activity
Class
db.t2.micro
Region & AZ
us-east-1b
Connectivity & security
Monitoring
Logs & events
Configuration
Maintenance & backups
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Security
Endpoint
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Availability Zone
us-east-1b
VPC security groups
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Feedback
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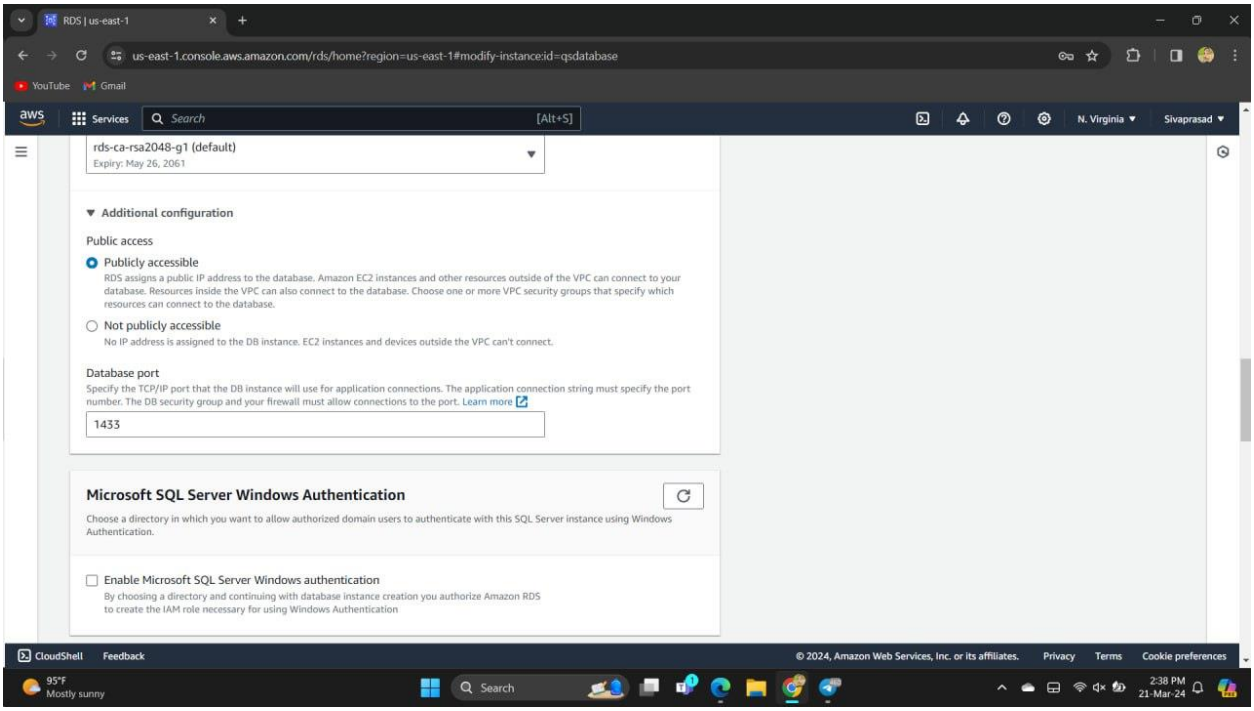
RDS | us-east-1
us-east-1.console.aws.amazon.com/rds/home?region=us-east-1#modify-instance:id=qsdatabase
YouTube
Gmail
aws
Services
Search
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N. Virginia
Sivaprasad
rds-ca-rsa2048-g1 (default)
Expiry: May 26, 2061
Additional configuration
Public access
Publicly accessible
RDS assigns a public IP address to the database. Amazon EC2 instances and other resources outside of the VPC can connect to your database. Resources inside the VPC can also connect to the database. Choose one or more VPC security groups that specify which resources can connect to the database.
Not publicly accessible
No IP address is assigned to the DB instance. EC2 instances and devices outside the VPC can't connect.
Database port
Specify the TCP/IP port that the DB instance will use for application connections. The application connection string must specify the port number. The DB security group and your firewall must allow connections to the port. Learn more
1433
Microsoft SQL Server Windows Authentication
Choose a directory in which you want to allow authorized domain users to authenticate with this SQL Server instance using Windows Authentication.
Enable Microsoft SQL Server Windows authentication
By choosing a directory and continuing with database instance creation you authorize Amazon RDS to create the IAM role necessary for using Windows Authentication
CloudShell
Feedback
© 2024, Amazon Web Services, Inc. or its affiliates.
Privacy
Terms
Cookie preferences
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Mostly sunny
Search
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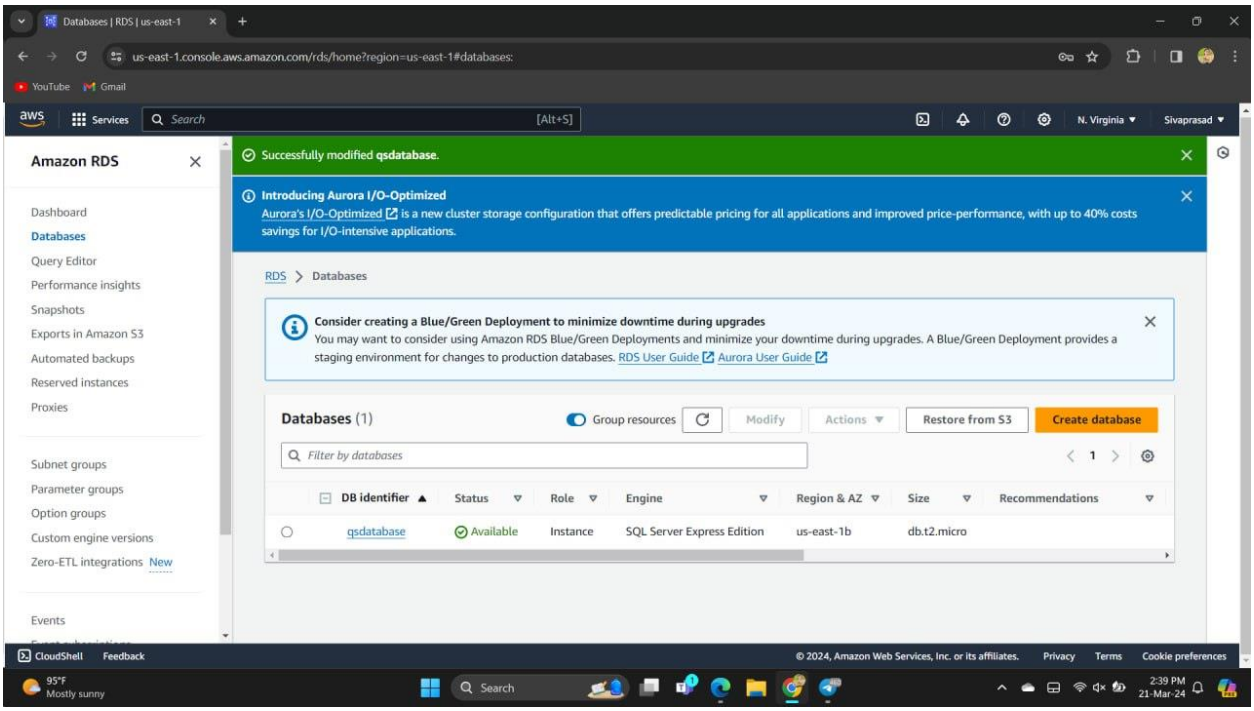
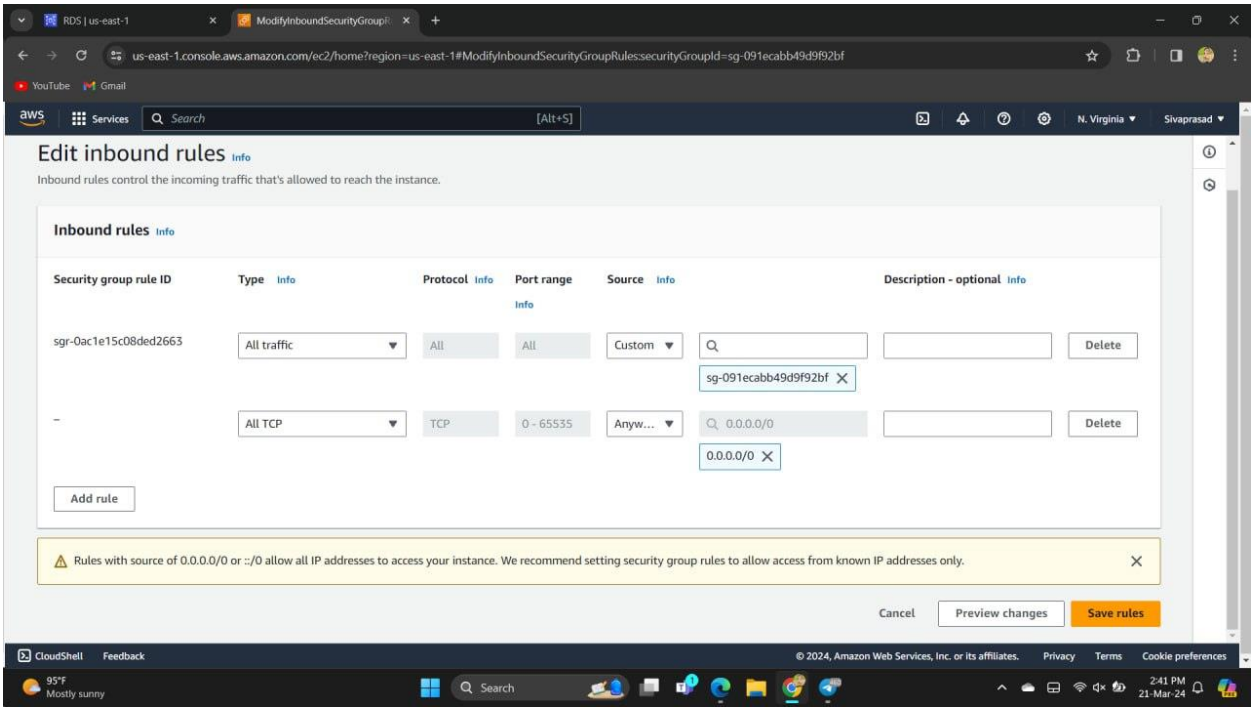
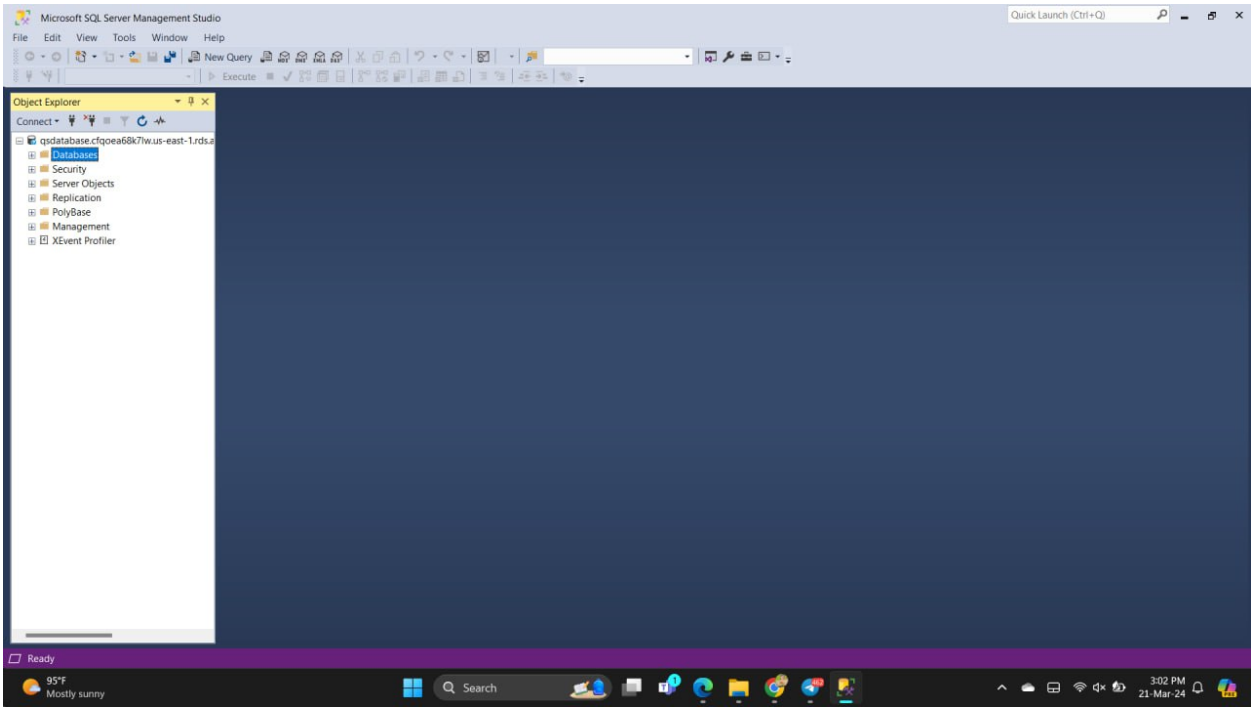




Step 2: Download and connect to a Microsoft SQL Server client

1) Open the Download Microsoft SQL Server Management Studio page and choose the link under the Download SSMS section.

2) Open the Amazon RDS console, in the left-hand navigation pane, choose Databases. Then, choose the qsdatabase.
3) On the qsdatabase page, choose Modify.
4) On the ModifyDB instance: qsdatabase page, in the Connectivity section, choose Additional Configuration. Then, choose Publicly accessible, and choose Continue.
5) On the ModifyDB instance: qsdatabase page, in the Scheduling of modifications section, choose Apply immediately. Then, choose Modify DB instance.
6) Verify that the SSMS Client download has been completed. Then, install and open the software.
7) In the SQL Server pop up window, enter the following details.
8) For Server Name, paste the qsdatabase Endpoint and Port separated by commas. Example: qdatabase.abc.us-east-1.rds.amazonaws.com,1433.



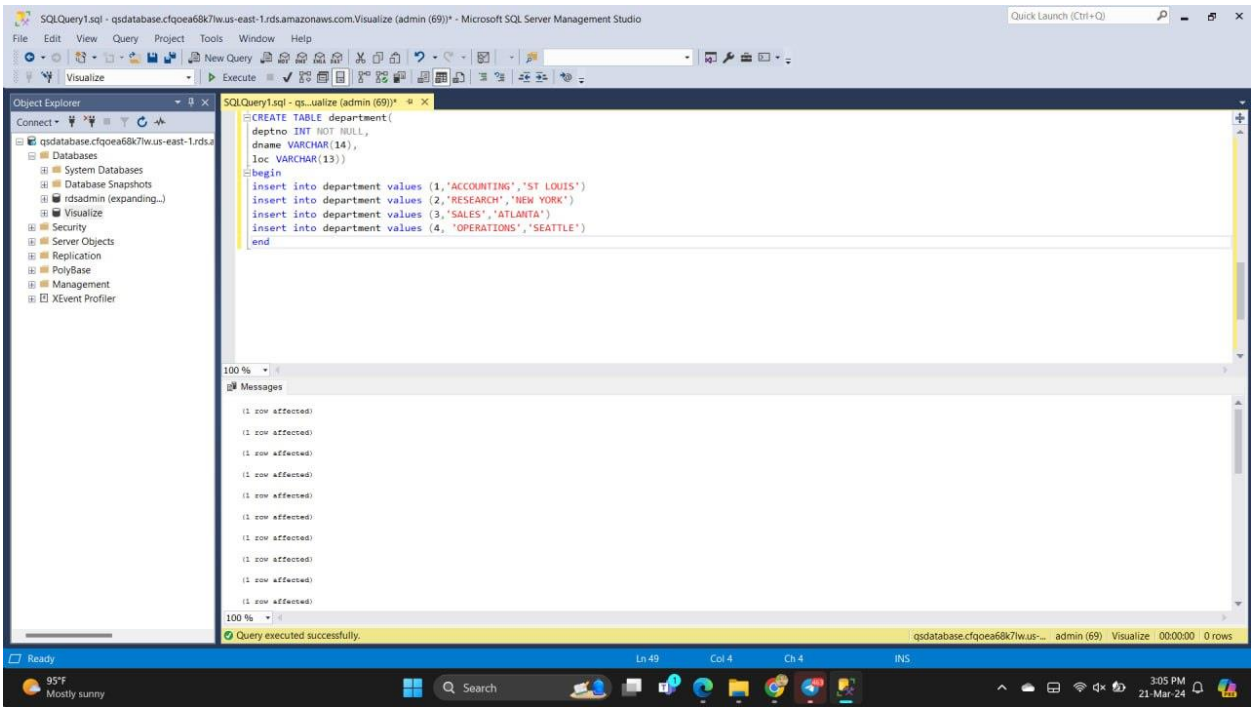
Step 3: Create a sample database and tables, and load sample data

1) Open SQL Server Management Studio, in the left-hand navigation, choose Databases. Then, right-click and choose Create Database.
2) On the New database page, for the Database name, type Visualize. Then, choose OK.
3) Choose Visualize, and choose New Query.
4) In the Query editor, run the following script.

Query:

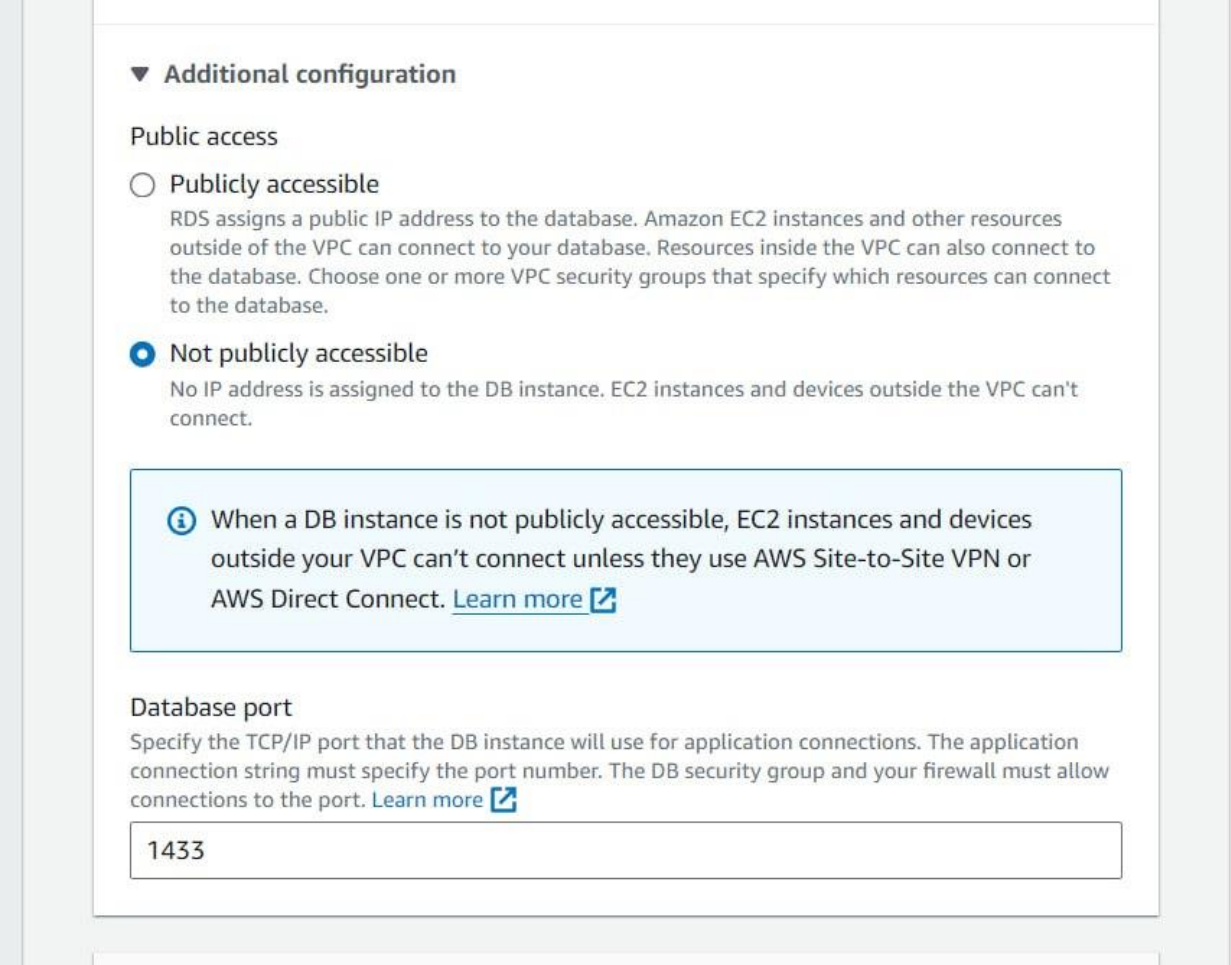
```
CREATE TABLE newhire(
empno INT PRIMARY KEY,
ename VARCHAR(10),
job VARCHAR(9),
manager INT NULL,
hiredate DATETIME,
salary NUMERIC(7,2),
comm NUMERIC(7,2) NULL,
department INT)
begin
insert into newhire values
   (1,'JOHNSON','ADMIN',6,'12-17-1990',18000,NULL,4)
insert into newhire values
   (2,'HARDING','MANAGER',9,'02-02-1998',52000,300,3)
insert into newhire values
   (3,'TAFT','SALES I',2,'01-02-1996',25000,500,3)
insert into newhire values
   (4,'HOOVER','SALES I',2,'04-02-1990',27000,NULL,3)
insert into newhire values
   (5,'LINCOLN','TECH',6,'06-23-1994',22500,1400,4)
insert into newhire values
   (6,'GARFIELD','MANAGER',9,'05-01-1993',54000,NULL,4)
insert into newhire values
   (7,'POLK','TECH',6,'09-22-1997',25000,NULL,4)
insert into newhire values
   (8,'GRANT','ENGINEER',10,'03-30-1997',32000,NULL,2)
insert into newhire values
   (9,'JACKSON','CEO',NULL,'01-01-1990',75000,NULL,4)
insert into newhire values
   (10,'FILLMORE','MANAGER',9,'08-09-1994',56000,NULL,2)
```

```
insert into newhire values
   (11,'ADAMS','ENGINEER',10,'03-15-1996',34000,NULL,2)
insert into newhire values
   (12,'WASHINGTON','ADMIN',6,'04-16-1998',18000,NULL,4)
insert into newhire values
   (13,'MONROE','ENGINEER',10,'12-03-2000',30000,NULL,2)
insert into newhire values
   (14,'ROOSEVELT','CPA',9,'10-12-1995',35000,NULL,1)
end
CREATE TABLE department(
deptno INT NOT NULL,
dname VARCHAR(14),
loc VARCHAR(13))
begin
insert into department values (1,'ACCOUNTING','ST LOUIS')
insert into department values (2,'RESEARCH','NEW YORK')
insert into department values (3,'SALES','ATLANTA')
insert into department values (4, 'OPERATIONS','SEATTLE')
end
```



Step 4: Make the database instance Not publicly accessible:

1) Open the Amazon RDS console, in the left-hand navigation, choose Databases. Then, choose the qsdatabase.
2) On the qsdatabase page, choose Modify.
3) On the ModifyDB instance: qsdatabase page, in the Connectivity section, choose Additional Configuration. Then, choose Not publicly accessible, and choose Continue.
4) On the ModifyDB instance:qsdatabase page, in the Scheduling of modifications section, choose Apply immediately. Then, choose Modify DB instance.



Step 5: Enable the RDS database instance for access to Amazon QuickSight

1) Open the Amazon RDS console, in the left-hand navigation, choose Databases. Then, choose the qsdatabase.
2) On the qsdatabase page, in the Connectivity & security section, copy the VPC id.
3) Under Security, choose the VPC security groups link.
4) On the Security Groups page, choose Create Security Group.
5) On the Create security group page, in the Basic details section, enter the following details.

   For Name, type RDS SecGP

   For Description, type for QS

   For VPC, choose the VPC id for your RDS instance.

6) Then, choose Create security group.Choose Create
7) On the Security Groups page, choose Create security group.

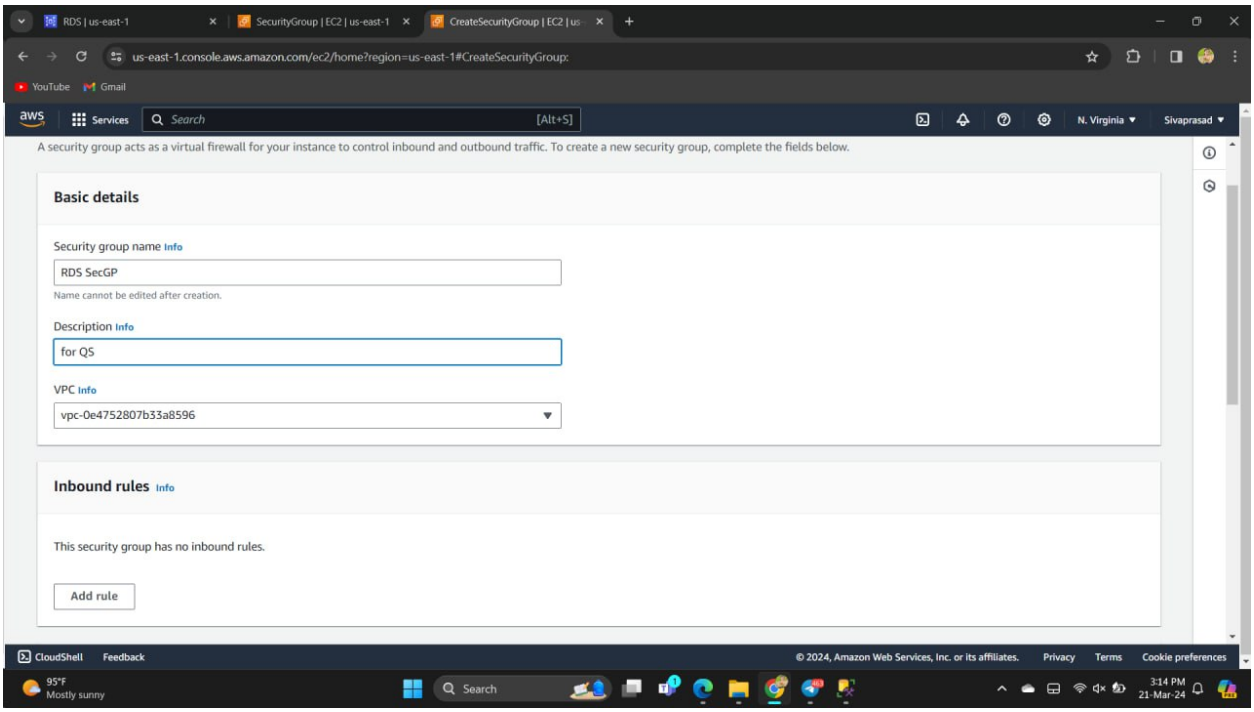
8) On the Create security group page, in the Basic details section, enter the following details.

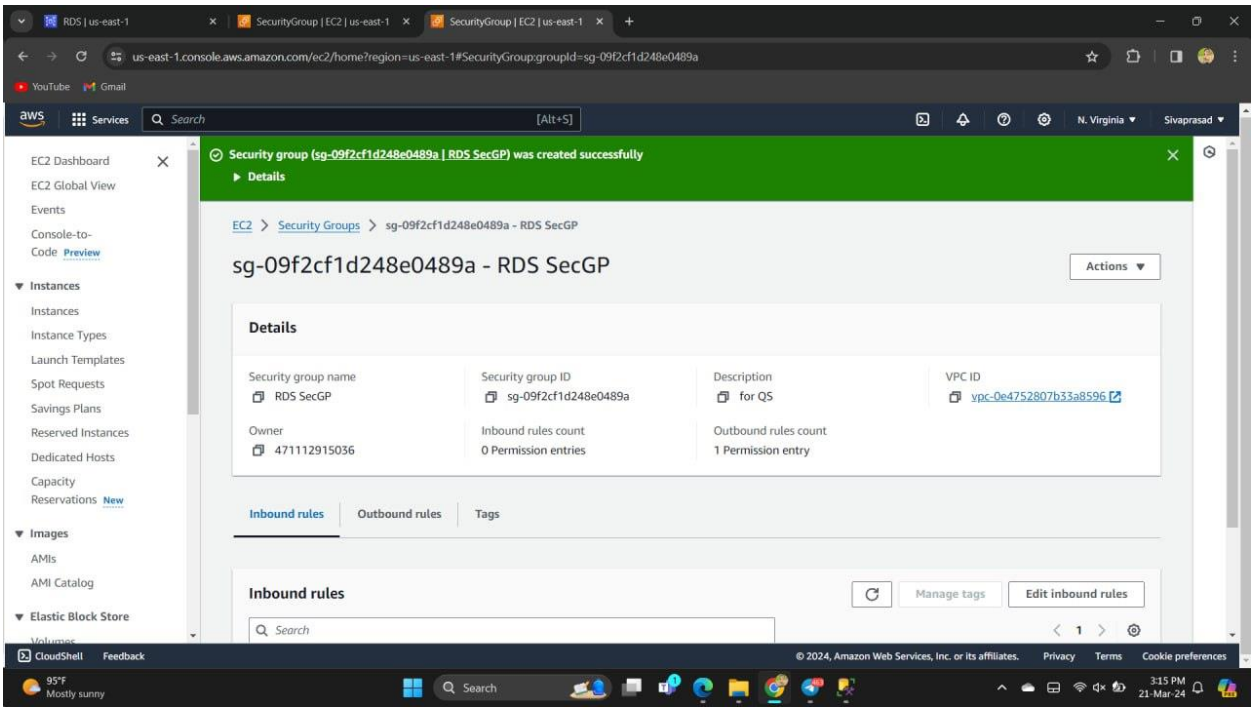
For Name, type QS SecGP

For Description, type for RDS

For VPC, choose the VPC id for your RDS instance.

9) In the Inbound rules section, choose Add rule.
10) On the Modify DB instance: qsdatabase page, in the Scheduling of modifications section, choose Apply immediately. Then, choose Modify DB instance.




RDS | us-east-1
SecurityGroup | EC2 | us-east-1
SecurityGroup | EC2 | us-east-1
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Sivaprasad
Security group (sg-09f2cf1d248e0489a | RDS SecGP) was created successfully
Details
EC2 Dashboard
EC2 Global View
Events
Console-to-Code Preview
Instances
Instances
Instance Types
Launch Templates
Spot Requests
Savings Plans
Reserved Instances
Dedicated Hosts
Capacity Reservations New
Images
AMIs
AMI Catalog
Elastic Block Store
EC2 > Security Groups > sg-09f2cf1d248e0489a - RDS SecGP
sg-09f2cf1d248e0489a - RDS SecGP
Actions
Details
Security group name
RDS SecGP
Security group ID
sg-09f2cf1d248e0489a
Description
for QS
VPC ID
vpc-0e4752807b33a8596
Owner
471112915036
Inbound rules count
0 Permission entries
Outbound rules count
1 Permission entry
Inbound rules
Outbound rules
Tags
Inbound rules
Manage tags
Edit inbound rules
Search
CloudShell
Feedback
© 2024, Amazon Web Services, Inc. or its affiliates.
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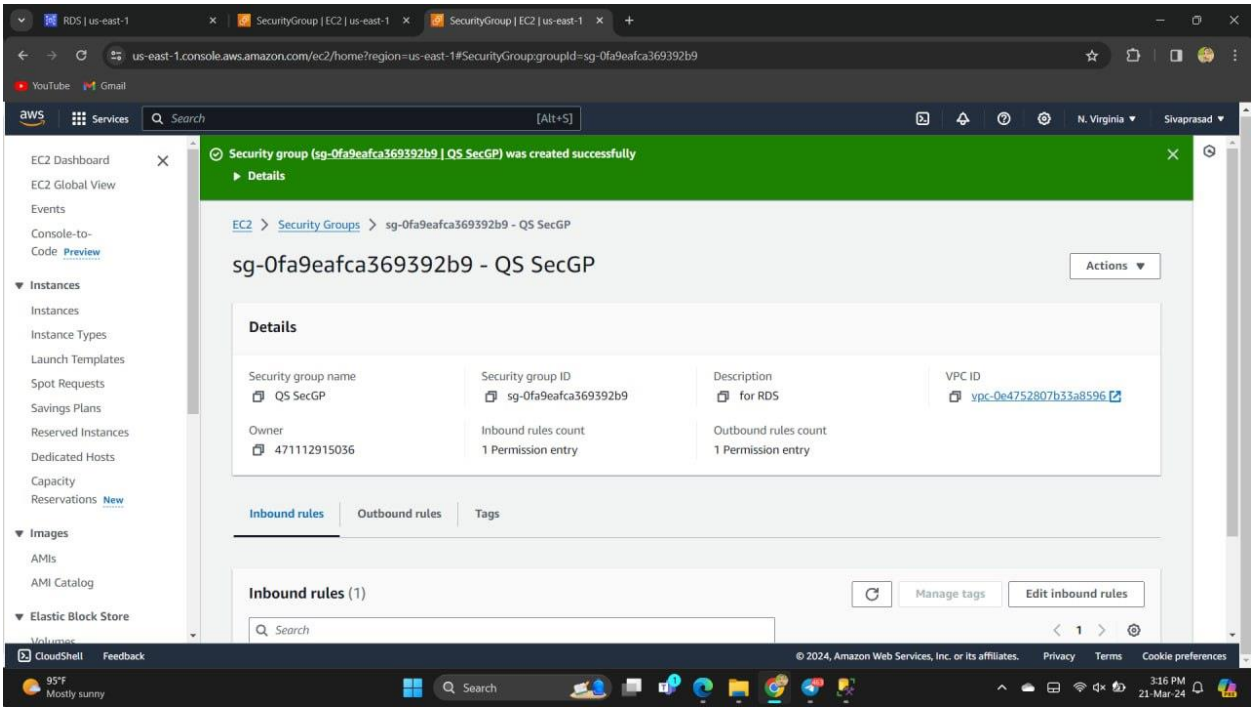
RDS | us-east-1
SecurityGroup | EC2 | us-east-1
SecurityGroup | EC2 | us-east-1
us-east-1.console.aws.amazon.com/ec2/home?region=us-east-1#SecurityGroup:groupId=sg-0fa9eafca369392b9
YouTube
Gmail
aws
Services
Search
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N. Virginia
Sivaprasad
Security group (sg-0fa9eafca369392b9 | QS SecGP) was created successfully
Details
EC2 Dashboard
EC2 Global View
Events
Console-to-Code Preview
Instances
Instances
Instance Types
Launch Templates
Spot Requests
Savings Plans
Reserved Instances
Dedicated Hosts
Capacity Reservations New
Images
AMIs
AMI Catalog
Elastic Block Store
EC2 > Security Groups > sg-0fa9eafca369392b9 - QS SecGP
sg-0fa9eafca369392b9 - QS SecGP
Actions
Details
Security group name
QS SecGP
Security group ID
sg-0fa9eafca369392b9
Description
for RDS
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Owner
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Inbound rules count
1 Permission entry
Outbound rules count
1 Permission entry
Inbound rules
Outbound rules
Tags
Inbound rules (1)
Manage tags
Edit inbound rules
Search
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Feedback
© 2024, Amazon Web Services, Inc. or its affiliates.
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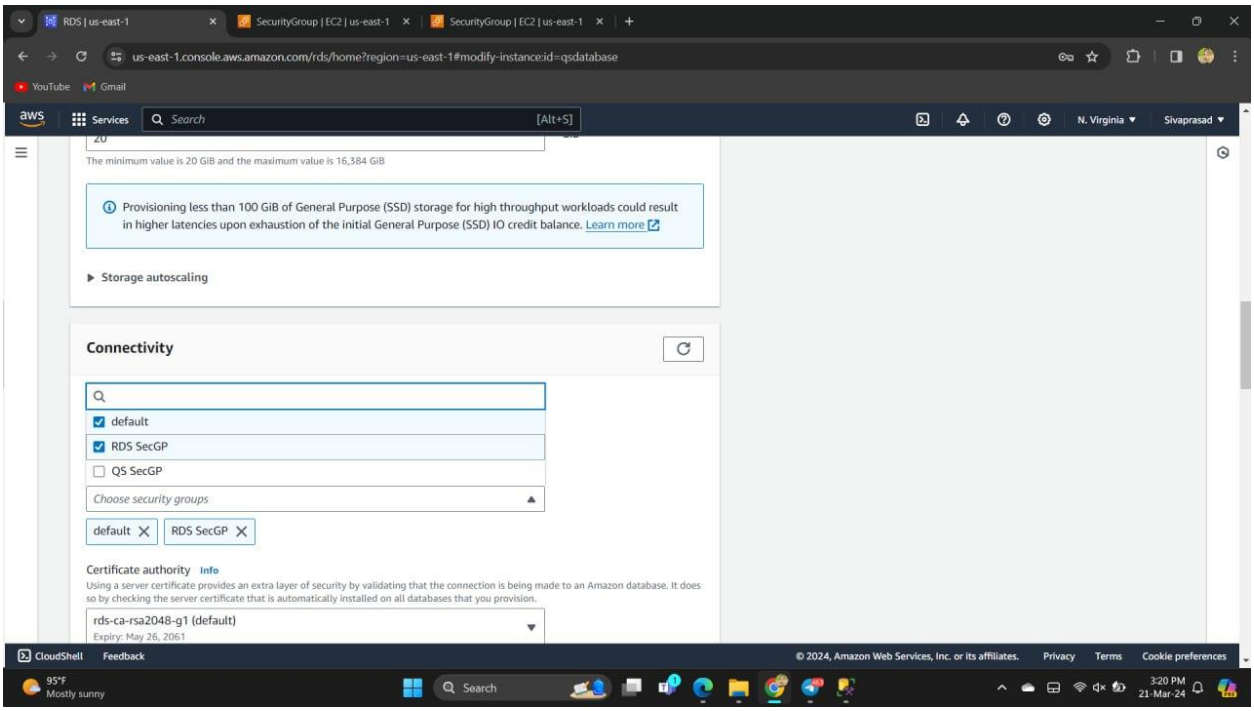


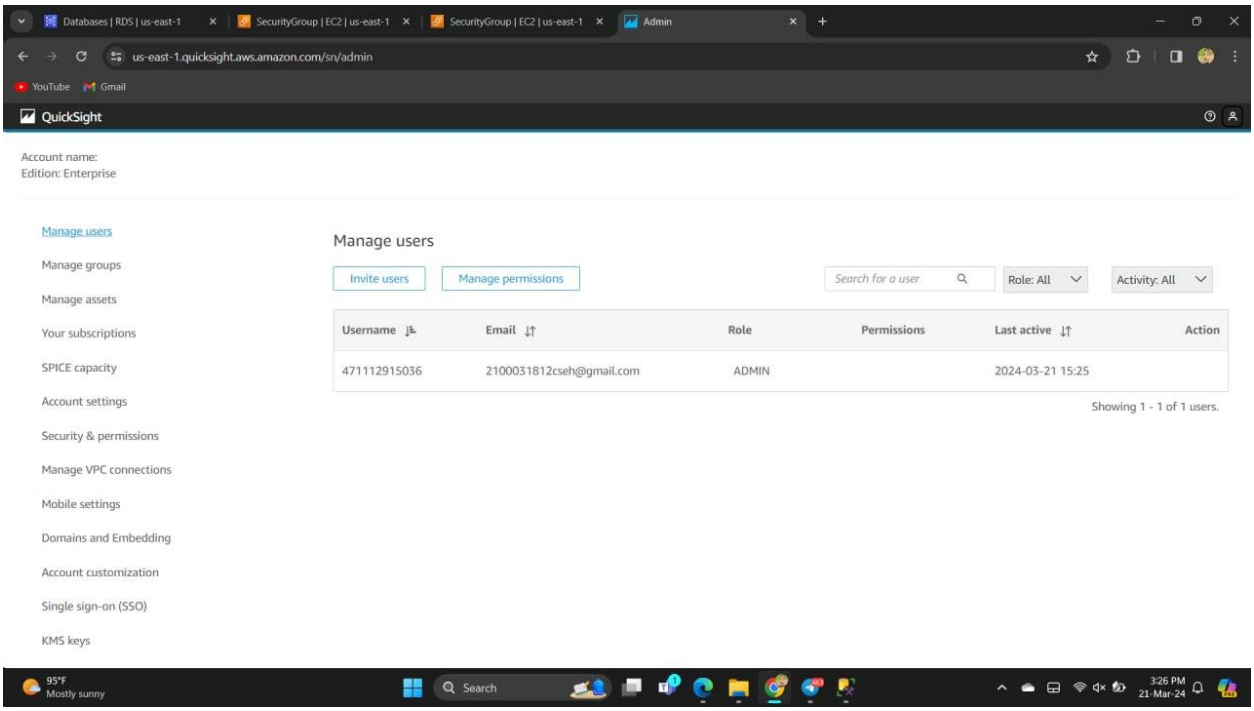
Step 6: Create your Amazon QuickSight account:

1) Open the Amazon QuickSight landing page and choose Sign up for QuickSight.
2) On the Create you QuickSight account page, for Edition, choose Enterprise, and choose Continue.
3) On the Create your QuickSight account page, in the Edition section, choose Use IAM federated identities and QuickSight-managed users.
4) In the QuickSight region section, enter the following details.

   Select a region from the drop-down list.
   - For the QuickSight account name, type a unique account name.
   - For Notification email address, type an email address where you will receive notifications.

5) Then click on finish.
6) Choose Go to Amazon QuickSight, to open the Amazon QuickSight console.

In the Output delivery section, for Delivery method, choose Public



Step 7: Enable Amazon QuickSight to connect to Amazon RDS and create a dataset for visualization:

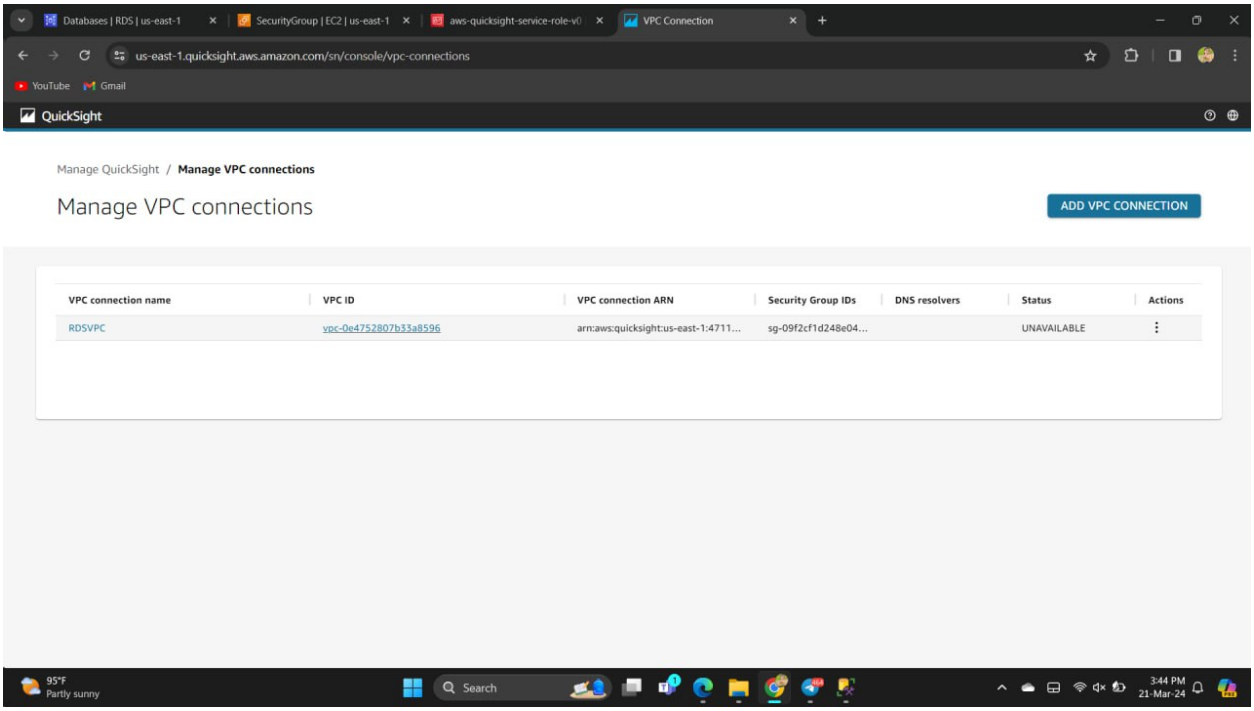
1) On the Analyses page, in the top right corner of the screen, and choose your username. Then, from the drop-down list, choose Manage QuickSight.
2) On the left navigation pane, choose Manage VPC connections. Then, choose Add VPC connection.
3) In your web browser, open a new tab. Then, open the Amazon RDS console, in the left-hand navigation, choose Databases. Then, choose the qsdatabase.
4) On the qsdatabase page, in the Connectivity & security section, under VPC, copy the id. Then, under Subnets, copy one of the ids.
5) Navigate back to the Adding VPC connection page, and enter the following details.

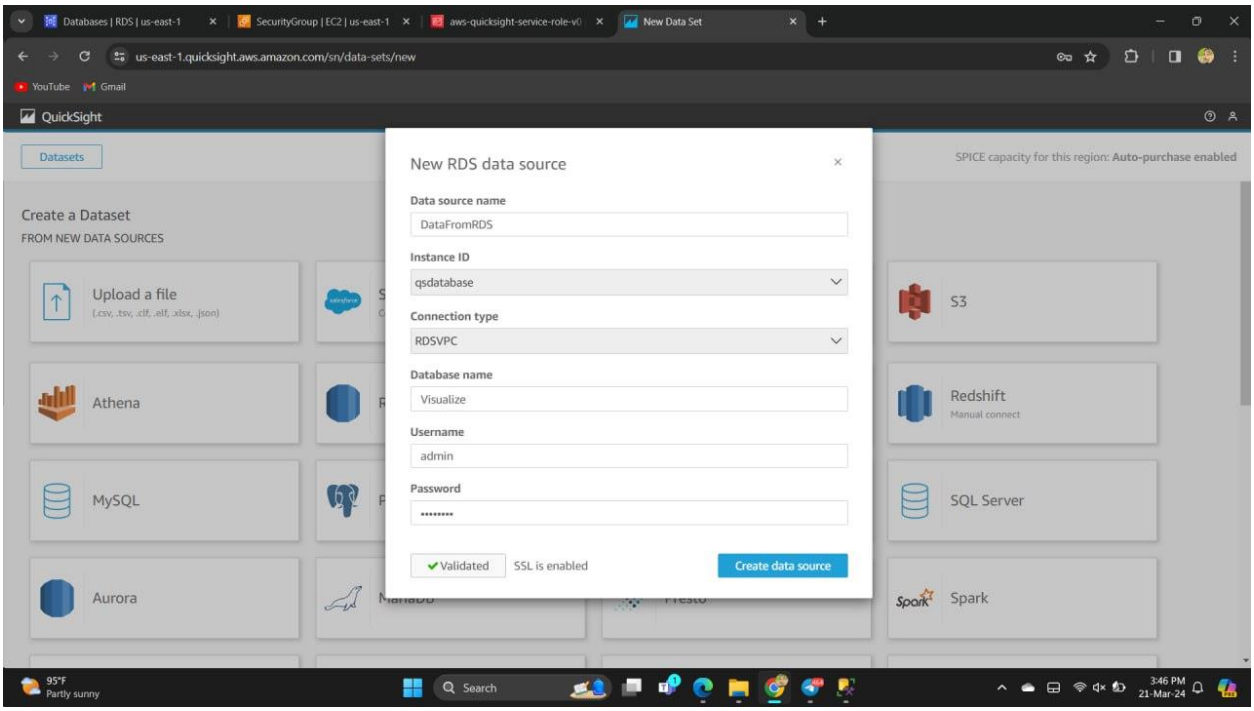
- For the VPC connection name, type RDSVPC
- For VPC ID, choose the ID you copied .
- For Subnet ID, paste the ID you copied.
- For the Security group ID, paste the id.

6) Then, choose Create.
7) On the top left corner of your screen, choose the QuickSight icon. Then, in the left navigation, choose Datasets.
8) On the Datasets page, choose New dataset.
9) On the Create a Datasets page, choose RDS.
10) On the New RDS data source page, enter the following details.

1. For Data source name, type DataFromRDS
2. For Instance ID, choose qsdatabase
3. For Connection type, choose RDSVPC
4. For Database name, type Visualize
5. For Username, type the username you entered when creating the Visualize database
6. For Password, type the password you entered when creating the Visualize database

11) Then, choose Validate connection. If the connection was successful, choose Create data source.
12) On the Choose your table page, in the Schema section, choose dbo. In the Tables section, choose nowhere. Then, choose Select.
13) On the Finish dataset creation page, leave the default selections, and choose Visualize.
14) In the Fields list section, drag and drop ename and salary to the Field Wells section.




Databases | RDS | us-east-1
SecurityGroup | EC2 | us-east-1
aws-quicksight-service-role-v0
New Data Set
us-east-1.quicksight.aws.amazon.com/sn/data-sets/new
YouTube
Gmail
QuickSight
Datasets
SPICE capacity for this region: Auto-purchase enabled
Create a Dataset
FROM NEW DATA SOURCES
Upload a file
(.csv, .tsv, .clf, .elf, .xlsx, .json)
S3
Athena
Redshift
Manual connect
MySQL
SQL Server
Aurora
Spark
New RDS data source
Data source name
DataFromRDS
Instance ID
qsdatabase
Connection type
RDSVPC
Database name
Visualize
Username
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Password
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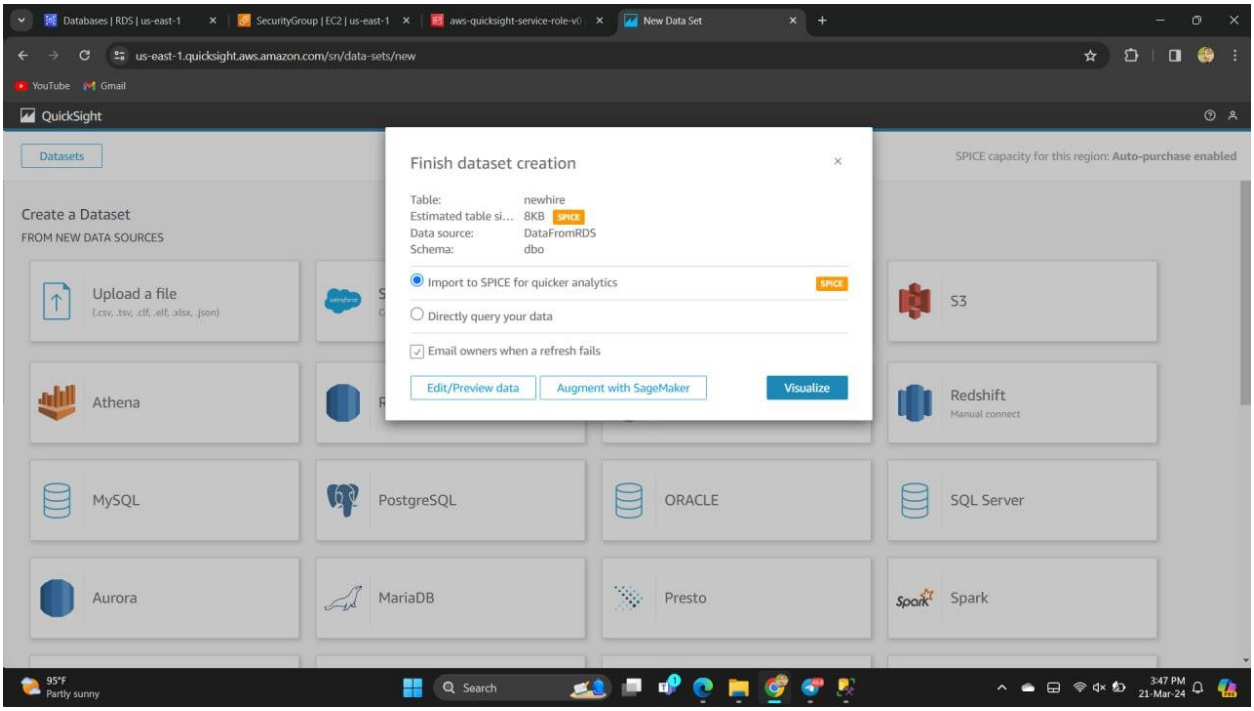
Databases | RDS | us-east-1
SecurityGroup | EC2 | us-east-1
aws-quicksight-service-role-v0
New Data Set
us-east-1.quicksight.aws.amazon.com/sn/data-sets/new
YouTube
Gmail
QuickSight
Datasets
SPICE capacity for this region: Auto-purchase enabled
Create a Dataset
FROM NEW DATA SOURCES
Upload a file
(.csv, .tsv, .clf, .elf, .xlsx, .json)
S3
Athena
Redshift
Manual connect
MySQL
PostgreSQL
ORACLE
SQL Server
Aurora
MariaDB
Presto
Spark
Finish dataset creation
Table: newhire
Estimated table si... 8KB SPICE
Data source: DataFromRDS
Schema: dbo
Import to SPICE for quicker analytics
Directly query your data
Email owners when a refresh fails
Edit/Preview data
Augment with SageMaker
Visualize
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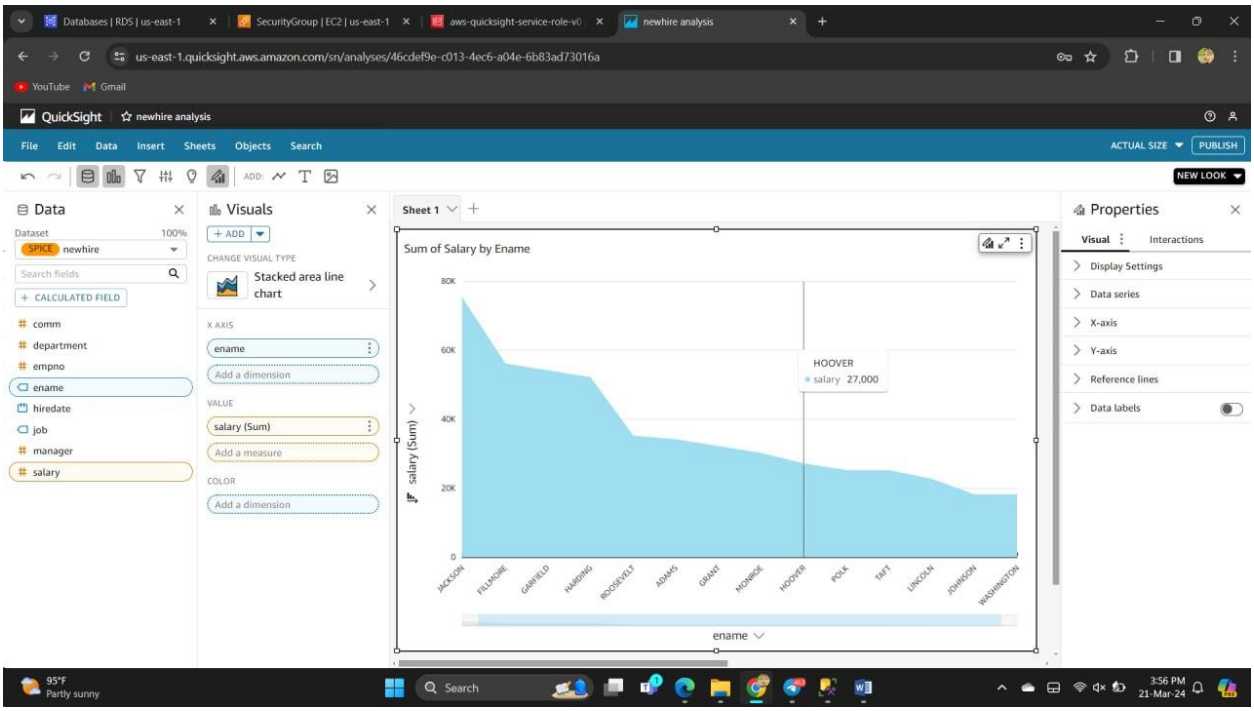
Output



Conclusion

Here I successfully implemented my project to set up and visualize data in an Amazon RDS MS SQL Express server using Amazon QuickSight marks a significant milestone in leveraging cloud-based solutions for data management and analysis. The creation of an interactive dashboard empowers stakeholders with the ability to derive valuable insights from the data, facilitating informed decision-making and driving business growth.