Visualization of Yellow Trip Taxi (Task 5)

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Creation of Schema on MySQL (RDS Instance) for storing Outputs

Below DDL is used to create the desired table to store data: -

```
CREATE TABLE mrtask_a
(
      VendorID                Varchar(20)      NOT NULL,
      Vendor_Revenue          DECIMAL(16,4)    NOT NULL
);
CREATE TABLE mrtask_b
(
      PULocationID            Varchar(20)      NOT NULL,
      PULocationID_Revenue    DECIMAL(16,4)    NOT NULL
);
CREATE TABLE mrtask_c
(
      payment_type            Varchar(20)      NOT NULL,
      number_of_transaction   DECIMAL(16,4)    NOT NULL
);
CREATE TABLE mrtask_d
(
      PULocationID            Varchar(20)      NOT NULL,
      avgtriptime_minutes     DECIMAL(16,4)    NOT NULL
);
CREATE TABLE mrtask_e
(
      PULocationID            Varchar(20)      NOT NULL,
      ratio_tiprevenue        DECIMAL(16,4)    NOT NULL
);
CREATE TABLE mrtask_f
(
      Month_Weekday_Day       Varchar(20)      NOT NULL,
      avgtriprevenue          DECIMAL(16,4)    NOT NULL
);
```

```
[root@ip-172-31-27-72 tripdata]# mysql -h $DNS_RDS -P 3306 -u admin -p
Enter password:
Welcome to the MariaDB monitor.  Commands end with ; or \g.
Your MySQL connection id is 14
Server version: 8.0.33 Source distribution

Copyright (c) 2000, 2018, Oracle, MariaDB Corporation Ab and others.

Type 'help;' or '\h' for help. Type '\c' to clear the current input statement.

MySQL [(none)]> use tripdata
Reading table information for completion of table and column names
You can turn off this feature to get a quicker startup with -A

Database changed
MySQL [tripdata]> CREATE TABLE mrtask_a
    -> (
    ->       VendorID               Varchar(20)      NOT NULL,
    ->       Vendor_Revenue         DECIMAL(16,4)    NOT NULL
    -> );
);
CREATE TABLE mrtask_e
(
      PULocationID           Varchar(20)      NOT NULL,
      ratio_tiprevenue       DECIMAL(16,4)    NOT NULL
);
CREATE TABLE mrtask_f
(
      Month_Weekday_Day      Varchar(20)      NOT NULL,
      avgtriprevenue         DECIMAL(16,4)    NOT NULL
);
Query OK, 0 rows affected (0.03 sec)

MySQL [tripdata]> CREATE TABLE mrtask_b
    -> (
    ->       PULocationID           Varchar(20)      NOT NULL,
    ->       PULocationID_Revenue   DECIMAL(16,4)    NOT NULL
    -> );
Query OK, 0 rows affected (0.03 sec)

MySQL [tripdata]> CREATE TABLE mrtask_c
    -> (
    ->       payment_type           Varchar(20)      NOT NULL,
    ->       number_of_transaction  DECIMAL(16,4)    NOT NULL
    -> );
Query OK, 0 rows affected (0.03 sec)
```

```
MySQL [tripdata]> CREATE TABLE mrtask_d
    -> (
    ->       PULocationID           Varchar(20)      NOT NULL,
    ->       avgtriptime_minutes    DECIMAL(16,4)    NOT NULL
    -> );
Query OK, 0 rows affected (0.03 sec)

MySQL [tripdata]> CREATE TABLE mrtask_e
    -> (
    ->       PULocationID           Varchar(20)      NOT NULL,
    ->       ratio_tiprevenue       DECIMAL(16,4)    NOT NULL
    -> );
Query OK, 0 rows affected (0.03 sec)

MySQL [tripdata]> CREATE TABLE mrtask_f
    -> (
    ->       Month_Weekday_Day      Varchar(20)      NOT NULL,
    ->       avgtriprevenue         DECIMAL(16,4)    NOT NULL
    -> );
Query OK, 0 rows affected (0.03 sec)
```

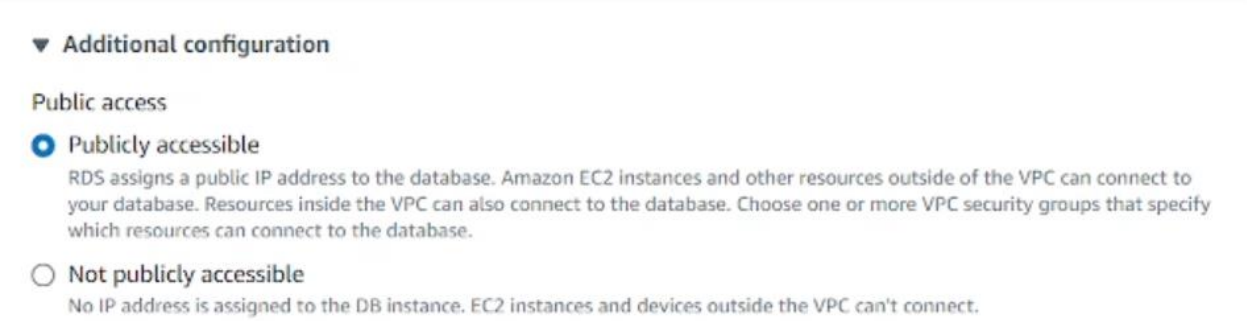
Export of Outputs of MR Tasks performed to MySQL (RDS Instance) using SQOOP

Below SQOOP commands are used to export outputs of MR Tasks (from 1 to 6) performed from HDFS to MySQL (RDS Instance):

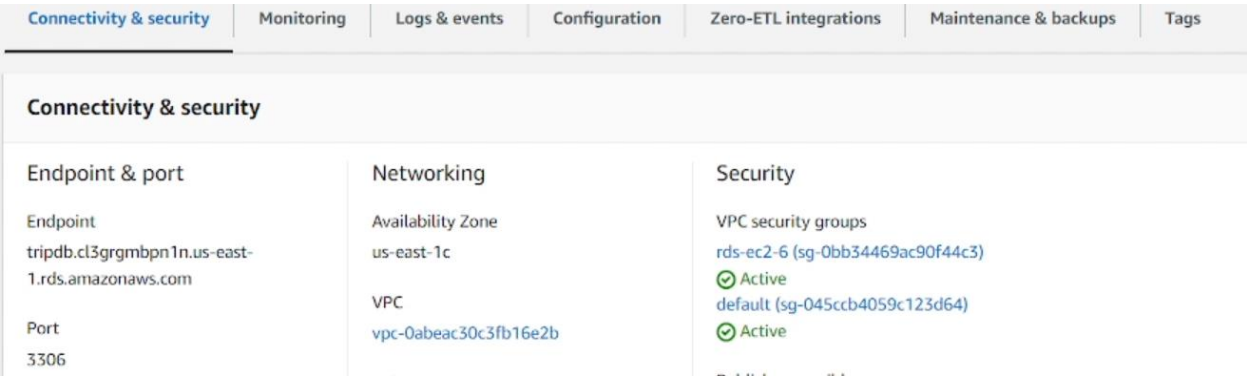
```
sqoop export -D org.apache.sqoop.splitter.allow_text_splitter=true \
--connect jdbc:mysql://$DNS_RDS:3306/tripdata \
--username admin --password-file /user/root/tripdata/password.txt \
--table mrtask_a \
--export-dir /user/root/tripdata/out_mrtask_a \
--fields-terminated-by '\t' \
--lines-terminated-by '\n'

sqoop export -D org.apache.sqoop.splitter.allow_text_splitter=true \
--connect jdbc:mysql://$DNS_RDS:3306/tripdata \
--username admin --password-file /user/root/tripdata/password.txt \
--table mrtask_b \
--export-dir /user/root/tripdata/out_mrtask_b \
--fields-terminated-by '\t' \
--lines-terminated-by '\n'

sqoop export -D org.apache.sqoop.splitter.allow_text_splitter=true \
--connect jdbc:mysql://$DNS_RDS:3306/tripdata \
--username admin --password-file /user/root/tripdata/password.txt \
--table mrtask_c \
--export-dir /user/root/tripdata/out_mrtask_c \
--fields-terminated-by '\t' \
--lines-terminated-by '\n'

sqoop export -D org.apache.sqoop.splitter.allow_text_splitter=true \
--connect jdbc:mysql://$DNS_RDS:3306/tripdata \
--username admin --password-file /user/root/tripdata/password.txt \
--table mrtask_d \
--export-dir /user/root/tripdata/out_mrtask_d \
--fields-terminated-by '\t' \
--lines-terminated-by '\n'

sqoop export -D org.apache.sqoop.splitter.allow_text_splitter=true \
--connect jdbc:mysql://$DNS_RDS:3306/tripdata \
--username admin --password-file /user/root/tripdata/password.txt \
--table mrtask_e \
--export-dir /user/root/tripdata/out_mrtask_e \
--fields-terminated-by '\t' \
--lines-terminated-by '\n'

sqoop export -D org.apache.sqoop.splitter.allow_text_splitter=true \
--connect jdbc:mysql://$DNS_RDS:3306/tripdata \
--username admin --password-file /user/root/tripdata/password.txt \
--table mrtask_f \
--export-dir /user/root/tripdata/out_mrtask_f \
--fields-terminated-by '\t' \
--lines-terminated-by '\n'
```

Changing Security Group Settings to allow access from Internet

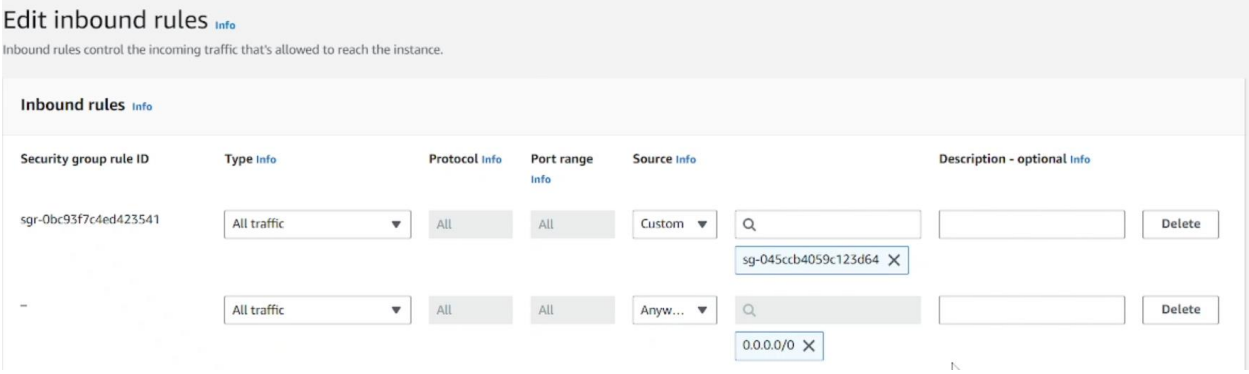
- Modify the RDS Instance setting using AWS console.
- Change Public access under Additional configuration in Connectivity haed:



- Choose option “Apply Immediately” to get it effective instantaneously.
- Additionally, add “Inbound Rule” in security group. For this select “default” security group under “Connectivity & security” on RDS database configuration page.

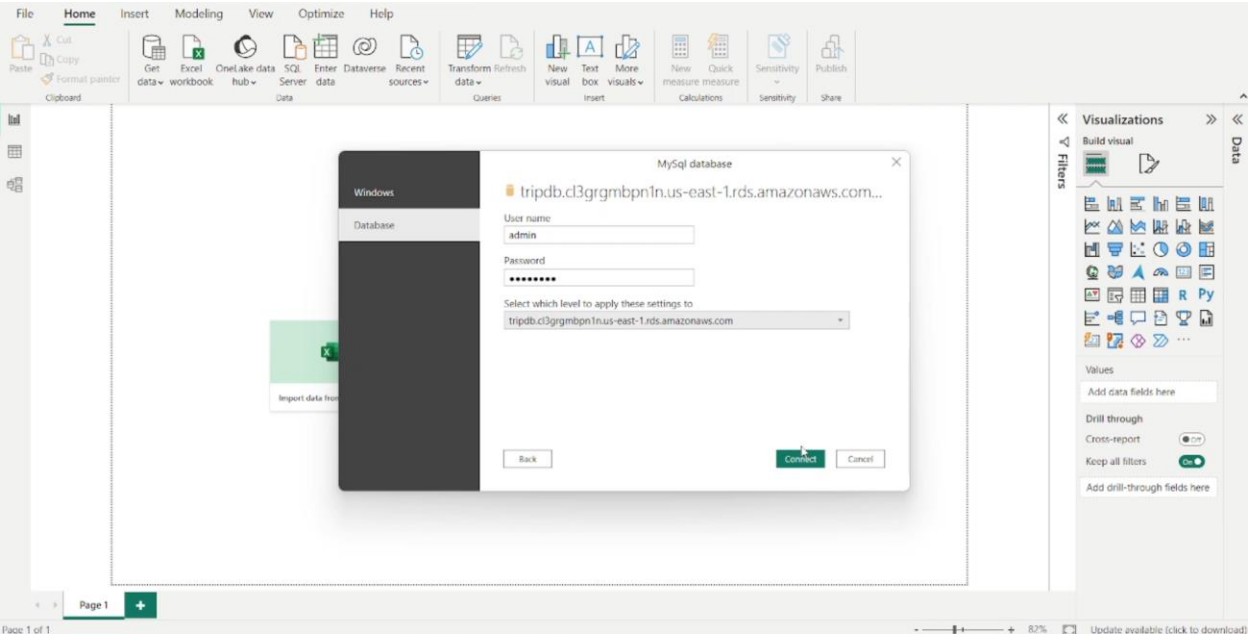


- Add inbound rule to allow “all traffic” from “Anywhere” under “Edit Inbound Rules”:

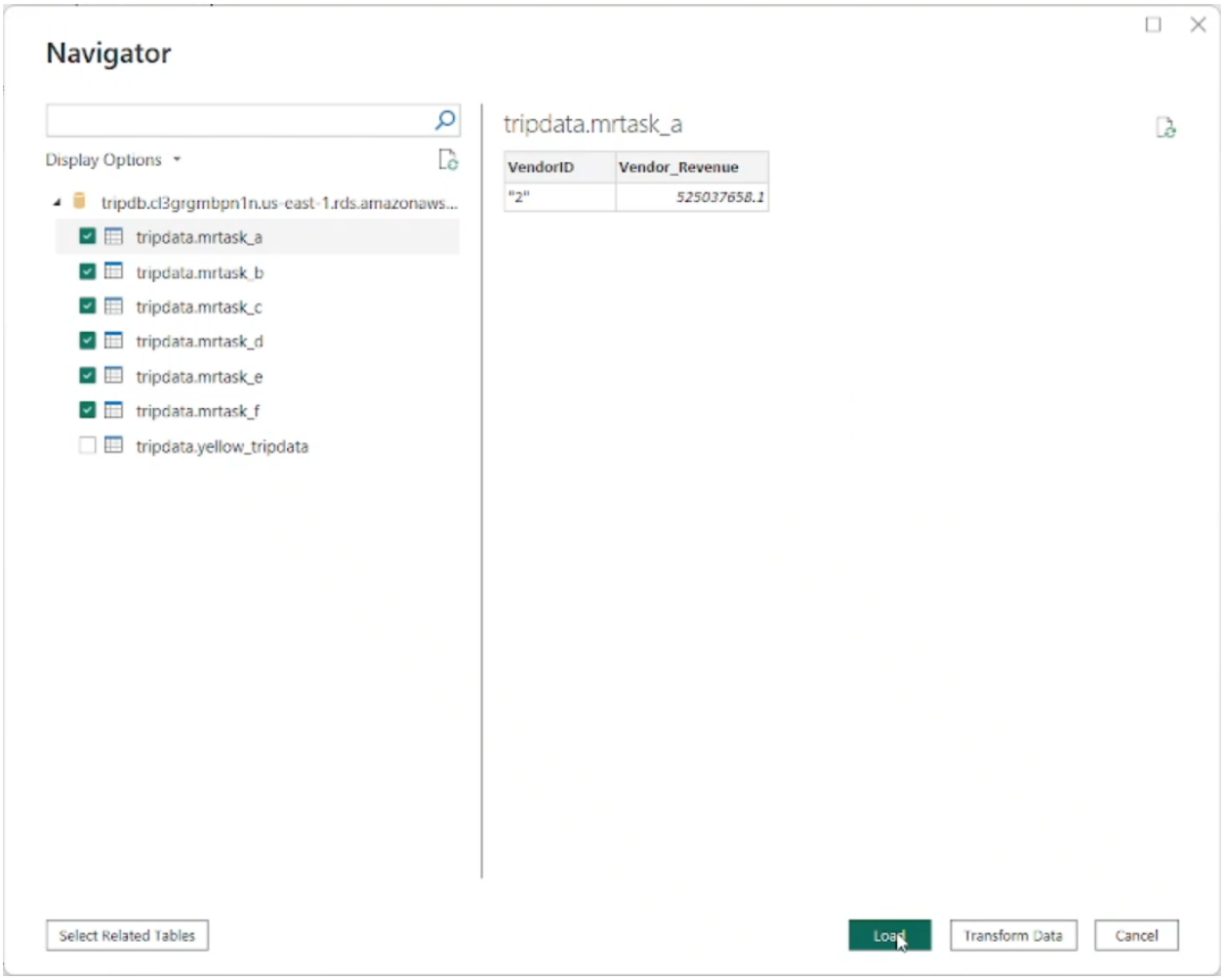


Establish connection between RDS Instance and Power BI (Desktop)

- On start of Power BI add credentials and connectivity url of RDS instance:



- Select the required tables and “Load”:



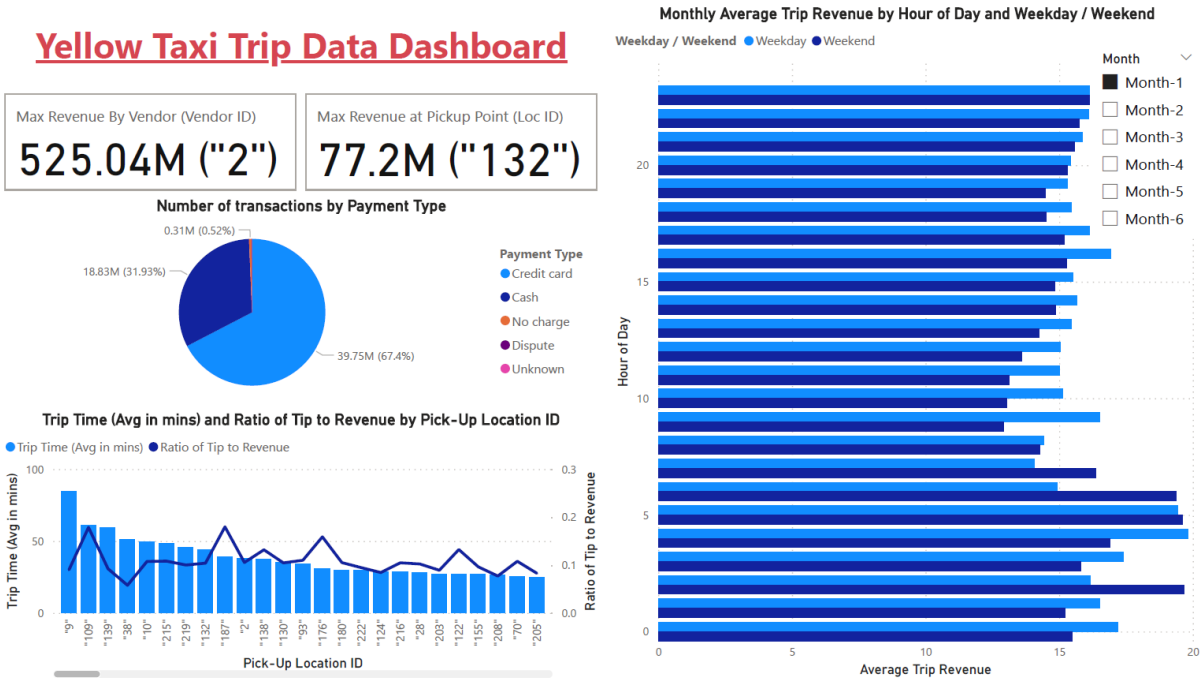
Transformations using "Power Query Editor"

Following small transformations are done using "Power Query Editor":

- For mrtask_a:
  - Add additional column that is concatenation of Vendor Revenue in millions with VendorID in bracket.
- For mrtask_b:
  - Add additional column that is concatenation of Revenue in millions with Pick-up location ID in bracket.
- For mrtask_c:
  - Mapping following code to values as mentioned in column description document:
    - "1" : Credit card
    - "2" : Cash
    - "3" : No charge
    - "4" : Dispute
    - "5" : Unknown

- For mrtask_f:
    - Split key to Month, Weekend/Weekday, and Hour of Day

Final Dashboard:



Final Observations:

Following observations are made through Dashboard:

- Vendor “Verifone Inc.” (code “2”) made maximum revenue among two vendors and total revenue made during first six months of 2017 is 525.04 million.
- Pickup point “132” generate maximum revenue of 77.2 million during first six months of 2017.
- Approx. 2/3 of transaction are done using “Credit card” as payment type. There is very less cases of “No Charge”, “Dispute”, and “Unknown”. There is no instance found for “Voided trip”.
- Average Trip Time is maximum for pick-up location ID “9” followed by “109”, and “139”.
- Among top 25 pick-up locations with average trip time, pick-up location ID “109”, “187”, and “176” have ‘Tip to Revenue’ ration higher than 50%.
- Average Trip Revenue is higher during 04-07 hour of days. Also, there was drop in average trip revenue from Jan-2017 to Feb-2017, and then start growing for day hours from 07 to 22 hour.