

Primary Objectives:

The primary objective of this SQL project is to analyze and understand the network performance of various operators in different regions. The "network performance" table likely contains data collected from network performance tests, surveys, or monitoring tools. The goal of the project is to derive valuable insights and make data-driven decisions to improve network performance, customer satisfaction, and network reliability.

1) Display the network type having 4G and rating of the VI operator

The screenshot shows the MySQL Workbench interface. The left sidebar displays the 'Schemas' tree with the 'telecom' schema selected. The main editor window contains the following SQL query:

```
1 SELECT * FROM telecom.network_performance;
2 SELECT operator, network_type, rating
3 FROM network_performance
4 WHERE operator = 'VI' AND network_type = '4G';
5
```

The 'Result Grid' at the bottom displays the results of the query:

operator	network_type	rating
VI	4G	4
VI	4G	4
VI	4G	4
VI	4G	4
VI	4G	3
VI	4G	2
VI	4G	1
VI	4G	1
VI	4G	1
VI	4G	1
VI	4G	1

2) Find the average rating of each Telecom operator.

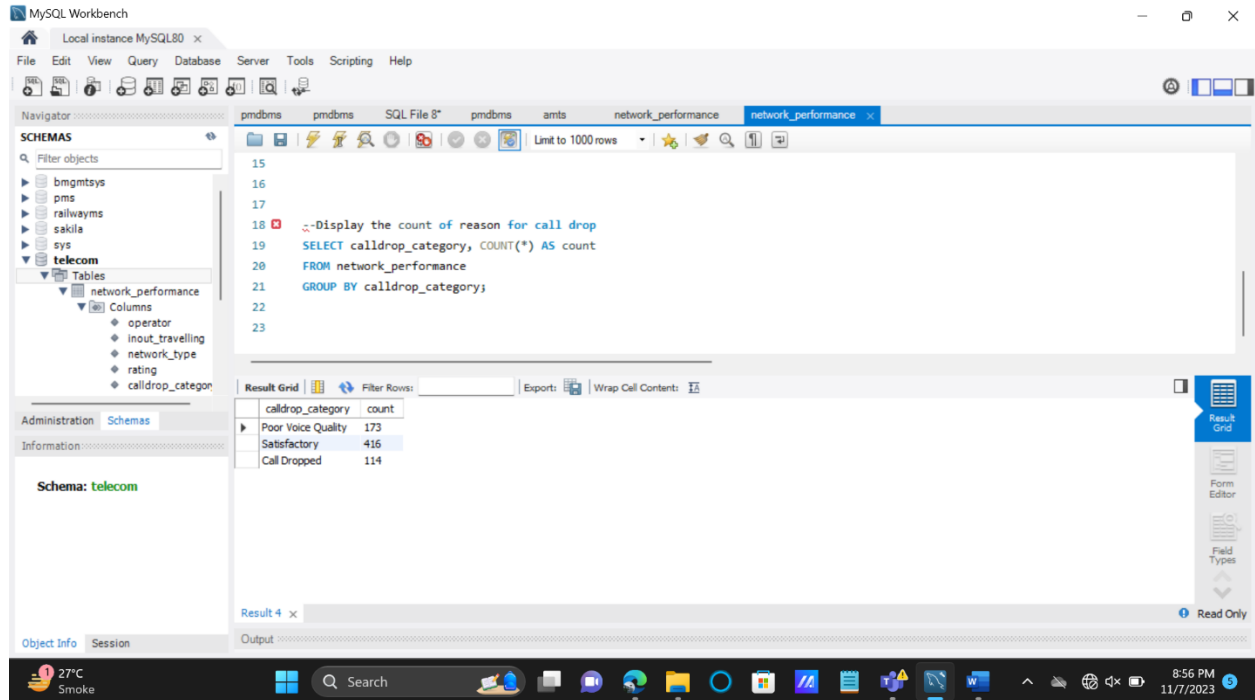
The screenshot shows the MySQL Workbench interface. The left sidebar displays the 'Schemas' tree with the 'telecom' schema selected. The main editor window contains the following SQL query:

```
6
7
8
9 -- Find the average rating of each operator
10 SELECT operator, AVG(rating) AS avg_rating
11 FROM network_performance
12 GROUP BY operator;
13
14
```

The 'Result Grid' at the bottom displays the results of the query:

operator	avg_rating
BSNL	3.5758
Airtel	3.3048
VI	3.5462
RJio	2.5371

3) Display the count of reason for call drop group by call drop category.



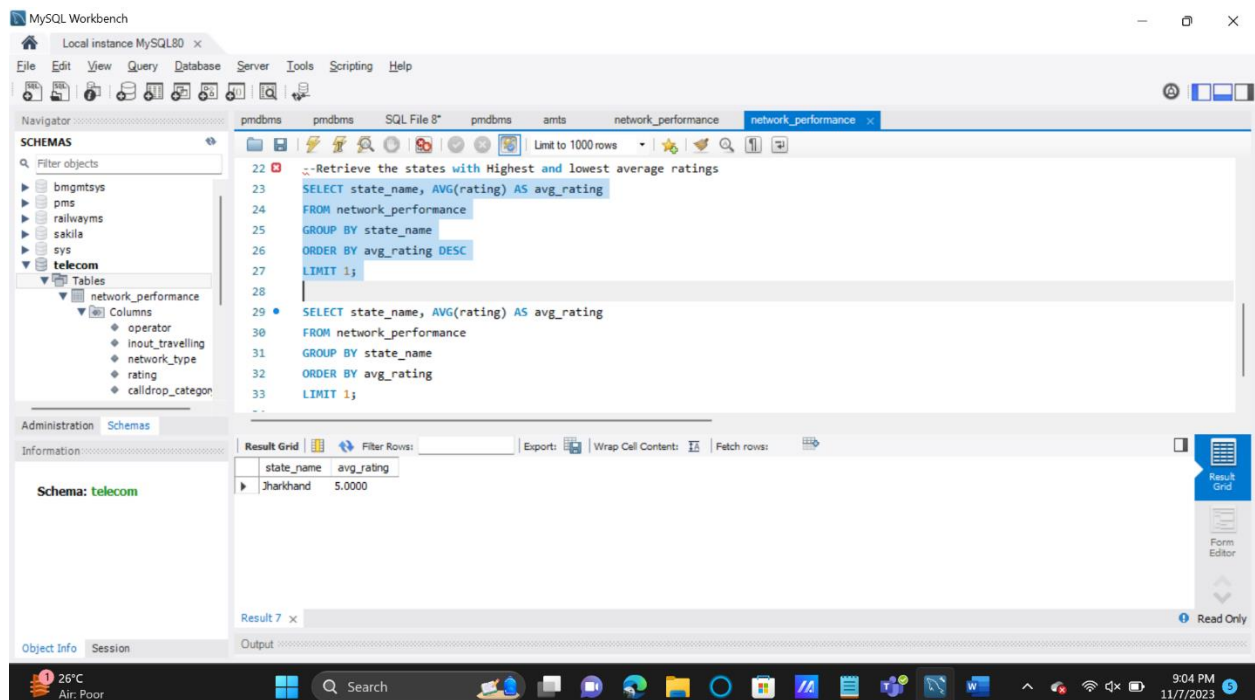
The screenshot shows the MySQL Workbench interface. The left sidebar displays the 'Schemas' panel with the 'telecom' schema selected. The 'network_performance' table is highlighted under the 'telecom' schema. The main editor window contains the following SQL query:

```
--Display the count of reason for call drop
SELECT calldrop_category, COUNT(*) AS count
FROM network_performance
GROUP BY calldrop_category;
```

The 'Result Grid' at the bottom shows the following data:

calldrop_category	count
Poor Voice Quality	173
Satisfactory	416
Call Dropped	114

4) Retrieve the states Highest and Lowest average ratings



The screenshot shows the MySQL Workbench interface. The left sidebar displays the 'Schemas' panel with the 'telecom' schema selected. The 'network_performance' table is highlighted under the 'telecom' schema. The main editor window contains the following SQL query:

```
--Retrieve the states with Highest and lowest average ratings
SELECT state_name, AVG(rating) AS avg_rating
FROM network_performance
GROUP BY state_name
ORDER BY avg_rating DESC
LIMIT 1;
```

The 'Result Grid' at the bottom shows the following data:

state_name	avg_rating
Jharkhand	5.0000

Lowest average ratings – Nagaland

The screenshot shows the MySQL Workbench interface. The left sidebar displays the 'Schemas' tree with 'telecom' selected. The main editor shows a SQL query to retrieve the state with the lowest average rating. The query is as follows:

```
22 --Retrieve the states with Highest and lowest average ratings
23 SELECT state_name, AVG(rating) AS avg_rating
24 FROM network_performance
25 GROUP BY state_name
26 ORDER BY avg_rating DESC
27 LIMIT 1;
28
29 • SELECT state_name, AVG(rating) AS avg_rating
30 FROM network_performance
31 GROUP BY state_name
32 ORDER BY avg_rating
33 LIMIT 1;
```

The 'Result Grid' at the bottom shows the following data:

state_name	avg_rating
Nagaland	1.1333

The status bar at the bottom indicates the temperature is 26°C and the air quality is 'Poor'.

5) Calculate and display the Network type distribution by operator

The screenshot shows the MySQL Workbench interface. The left sidebar displays the 'Schemas' tree with 'telecom' selected. The main editor shows a SQL query to calculate the network type distribution by operator. The query is as follows:

```
35 • SELECT operator, network_type, COUNT(*) AS type_count
36 FROM network_performance
37 GROUP BY operator, network_type;
```

The 'Result Grid' at the bottom shows the following data:

operator	network_type	type_count
BSNL	4G	35
Airtel	4G	82
VI	4G	197
R.Jio	4G	278
BSNL	Unknown	17
VI	3G	12
VI	Unknown	38
R.Jio	Unknown	5
BSNL	3G	13
Airtel	2G	4
Airtel	Unknown	19
BSNL	2G	1
VI	2G	2

The status bar at the bottom indicates the USD/CAD exchange rate is +0.54%.

6) Using case function classify the states into regions and find the average ratings which will help to determine which region is having less average so that assessment can be done.

The screenshot shows the MySQL Workbench interface with a SQL query in the editor. The query uses a CASE statement to classify states into regions and calculates the average rating for each region.

```
SELECT
CASE
WHEN state_name IN ('Bihar', 'West Bengal', 'Nagaland') THEN 'Northeast'
WHEN state_name IN ('Maharashtra', 'Rajasthan') THEN 'West'
WHEN state_name IN ('Himachal Pradesh', 'Uttar Pradesh') THEN 'Central'
ELSE 'Other'
END AS Region,
AVG(rating) AS avg_rating
FROM network_performance
GROUP BY region;
```

The result grid displays the following data:

Region	avg_rating
Other	3.0939
Central	2.0000
West	3.7042
Northeast	2.2727

7) Display the latitude greater than 20 in the state of Maharashtra

The screenshot shows the MySQL Workbench interface with a SQL query in the editor. The query filters records from the network_performance table where the latitude is greater than 20 and the state_name is 'Maharashtra'.

```
SELECT operator, latitude, longitude
FROM network_performance
WHERE latitude > 20 AND state_name LIKE 'Maharashtra';
```

The result grid displays the following data:

operator	latitude
VI	21.1231862
VI	20.92996026
VI	21.11283525
VI	20.92996026
VI	20.92996026
VI	20.99015432
RJio	20.7186385
VI	21.12305235
VI	21.12305235
VI	21.12305235
VI	20.09737704
VI	21.12305235
VI	21.12305235
VI	21.11296945
VI	21.112786

8) Return the operator, network type and state name with a call drop category starting with any character, followed by "atisfactory"

MySQL Workbench interface showing a query in the SQL editor:

```

53
54 SELECT operator, network_type, calldrop_category, state_name
55 FROM network_performance
56 WHERE calldrop_category LIKE 'atisfactory';
57

```

The Result Grid displays the following data:

operator	network_type	calldrop_category	state_name
Airtel	4G	Satisfactory	Karnataka
VI	4G	Satisfactory	NA
VI	4G	Satisfactory	Tamil Nadu
VI	4G	Satisfactory	NA
VI	4G	Satisfactory	NA
Airtel	4G	Satisfactory	NA
Airtel	4G	Satisfactory	Karnataka
VI	3G	Satisfactory	Maharashtra
VI	4G	Satisfactory	Maharashtra
VI	3G	Satisfactory	Maharashtra
RJio	4G	Satisfactory	NA
VI	3G	Satisfactory	Maharashtra
BSNL	Unknown	Satisfactory	West Bengal
VI	4G	Satisfactory	Maharashtra
BSNL	Unknown	Satisfactory	West Bengal

9) Display the count of different network type in each state.

MySQL Workbench interface showing a query in the SQL editor:

```

57 -- Count of different network types in each state
58 SELECT state_name, network_type, COUNT(*) AS network_type_count
59 FROM network_performance
60 GROUP BY state_name, network_type;
61
62

```

The Result Grid displays the following data:

state_name	network_type	network_type_count
Karnataka	4G	7
Tamil Nadu	4G	30
Himachal Pradesh	4G	27
Rajasthan	4G	4
Maharashtra	4G	107
Bihar	Unknown	6
West Bengal	Unknown	8
West Bengal	4G	7
Maharashtra	3G	5
Maharashtra	Unknown	24
Nagaland	4G	14
Jharkhand	4G	1
Uttar Pradesh	4G	11
Uttarakhand	4G	11
Bihar	4G	8
Madhya Pradesh	4G	9

10) Using standard deviation display the operators with high variability in ratings

The screenshot shows the MySQL Workbench interface. The left sidebar displays the 'SCHEMAS' panel with the 'telecom' database selected, showing tables like 'network_performance'. The main editor window contains the following SQL query:

```
-- Operators with high variability in ratings
SELECT operator, STDEV(rating) AS rating_deviation
FROM network_performance
GROUP BY operator
ORDER BY rating_deviation DESC
LIMIT 5;
```

The 'Result Grid' shows the output of the query:

operator	rating_deviation
Airtel	1.6184676463401766
R.Jio	1.4962467461149294
BSNL	1.4067298564006128
VI	1.1512741197323217

The bottom status bar shows the system temperature as 26°C and the date as 11/11/2023.

11) Count of Network performance records by operator and state

The screenshot shows the MySQL Workbench interface. The left sidebar displays the 'SCHEMAS' panel with the 'telecom' database selected, showing tables like 'network_performance'. The main editor window contains the following SQL query:

```
-- Count of Network Performance Records by Operator and State
SELECT operator, state_name, COUNT(*) AS record_count
FROM network_performance
GROUP BY operator, state_name
ORDER BY record_count DESC;
```

The 'Result Grid' shows the output of the query:

operator	state_name	record_count
R.Jio	Maharashtra	76
VI	Maharashtra	55
R.Jio	Himachal Pradesh	25
VI	Tamil Nadu	15
Airtel	Tamil Nadu	15
R.Jio	Nagaland	14
Airtel	Karnataka	11
VI	Madhya Pradesh	9
R.Jio	Bihar	8
BSNL	Uttarakhand	8
BSNL	West Bengal	8
BSNL	Bihar	6
Airtel	Maharashtra	5
Airtel	Telangana	5
Airtel	Kerala	5
BSNL	Uttar Pradesh	5
VI	West Bengal	4

The bottom status bar shows the system temperature as 26°C and the date as 11/11/2023.

Key Takeaways:

- Operators with the highest and lowest network performance ratings.
- States with the best and worst network performance.
- Network types that are most common and their associated performance.
- Operators with the highest call drop rates and their performance improvement needs.
- Geographical clusters of network issues based on latitude and longitude data.
- The distribution of call drop categories and their impact on user satisfaction.