Hands-on Lab: Querying the Data Warehouse (Cubes, Rollups, Grouping Sets and Materialized Views

Estimated time needed: 30 minutes

Objectives

In this lab you will learn how to create:

- Grouping sets
- Rollup
- Cube
- Materialized Query Tables (MQT)

Exercise 1 - Launch a PostgreSQL server instance on Cloud IDE and open up the pgAdmin Graphical User Interface.

This lab requires that you complete the previous lab Populate a Data Warehouse.

If you have not finished the Populate a Data Warehouse Lab yet, please finish it before you continue.

GROUPING SETS, CUBE, and ROLLUP allow us to easily create subtotals and grand totals in a variety of ways. All these operators are used along with the GROUP BY operator.

GROUPING SETS operator allows us to group data in a number of different ways in a single SELECT statement.

The **ROLLUP** operator is used to create subtotals and grand totals for a set of columns. The summarized totals are created based on the columns passed to the ROLLUP operator.

The **CUBE** operator produces subtotals and grand totals. In addition, it produces subtotals and grand totals for every permutation of the columns provided to the CUBE operator.

Exercise 2 - Write a query using grouping sets

After you launch a PostgreSQL server instance on Cloud IDE and open up the pgAdmin Graphical User Interface run the below query.

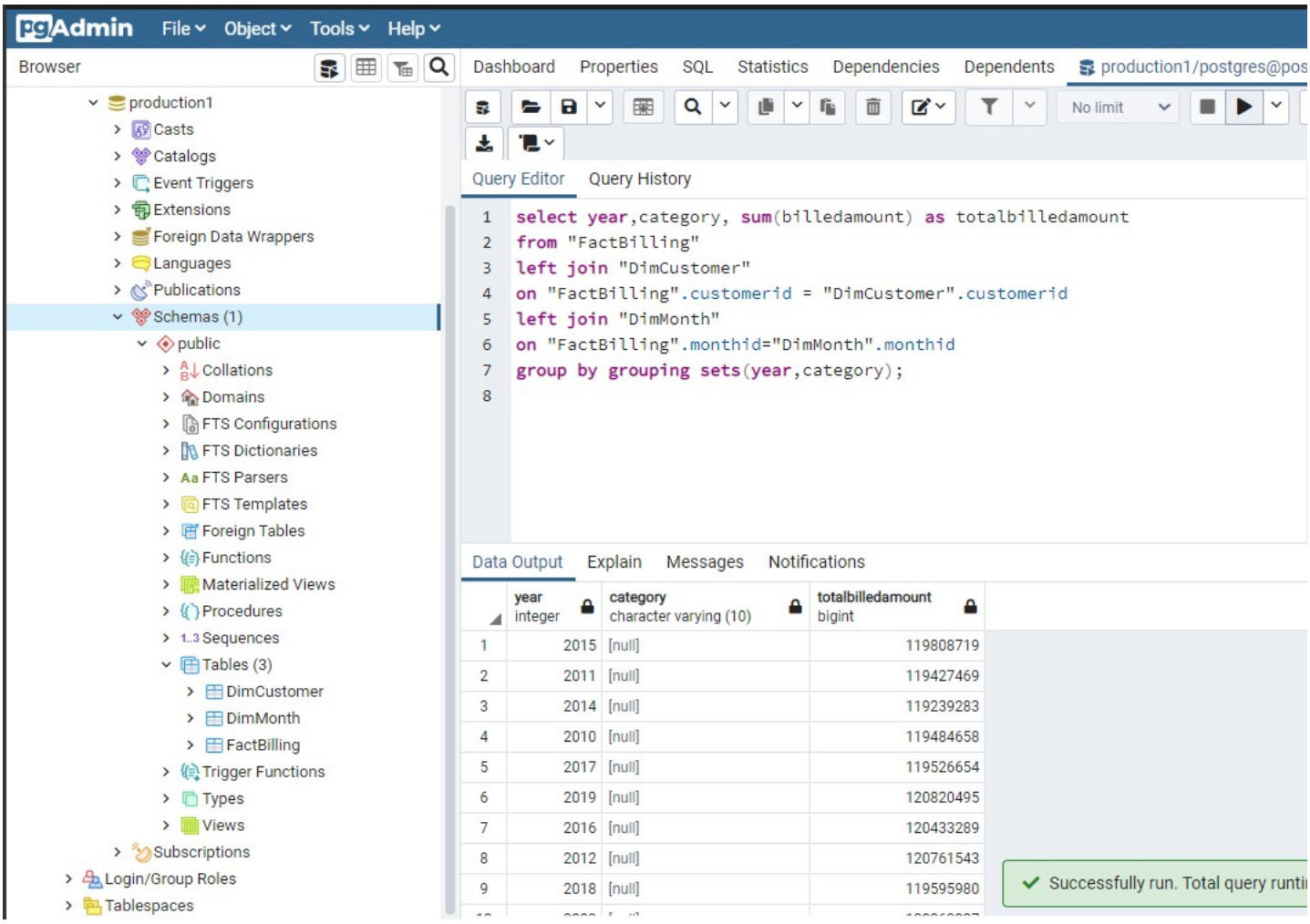
To create a grouping set for three columns labeled year, category, and sum of billedamount, run the sql statement below.

```
1
2
3
4
5
6
7
```

```
select year,category, sum(billedamount) as totalbilledamount
from "FactBilling"
left join "DimCustomer"
on "FactBilling".customerid = "DimCustomer".customerid
left join "DimMonth"
on "FactBilling".monthid="DimMonth".monthid
group by grouping sets(year,category);
```

Copied!

The partial output can be seen in the image below.



Exercise 3 - Write a query using rollup

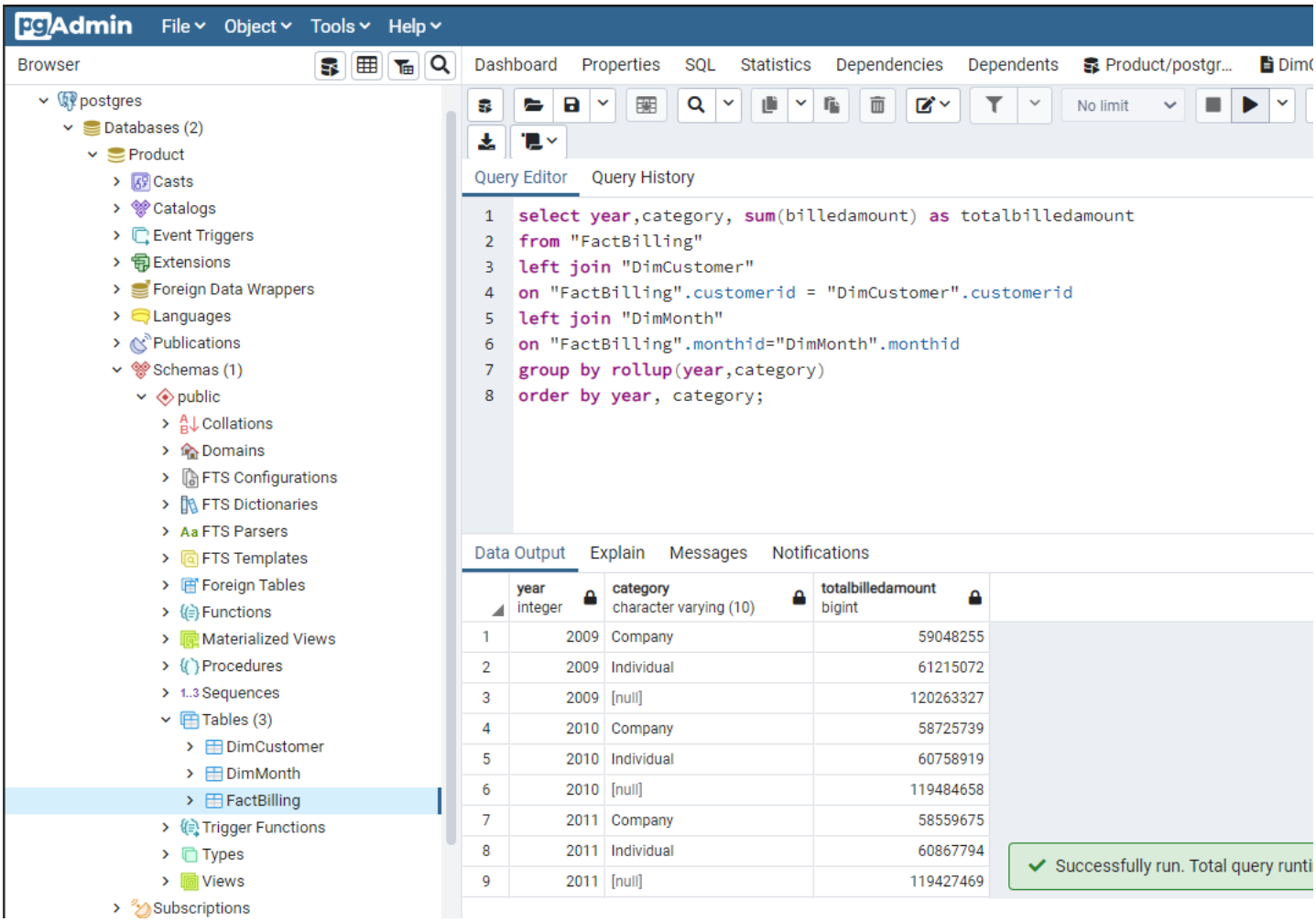
To create a rollup using the three columns year, category and sum of billedamount, run the sql statement below.

```
1
2
3
4
5
6
7
8
```

```
select year,category, sum(billedamount) as totalbilledamount
from "FactBilling"
left join "DimCustomer"
on "FactBilling".customerid = "DimCustomer".customerid
left join "DimMonth"
on "FactBilling".monthid="DimMonth".monthid
group by rollup(year,category)
order by year, category;
```

Copied!

The partial output can be seen in the image below.



Exercise 4 - Write a query using cube

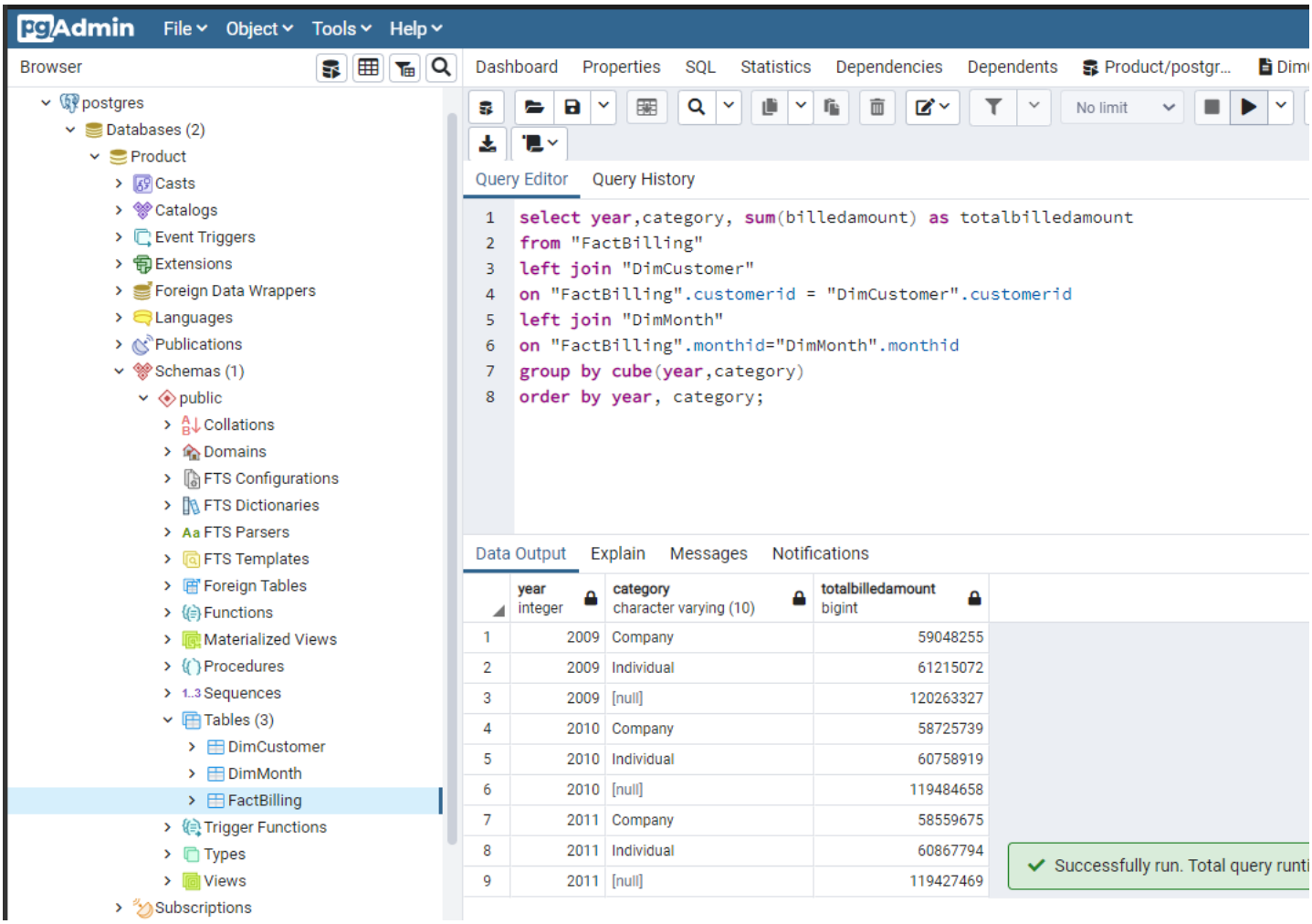
To create a cube using the three columns labeled year, category, and sum of billedamount, run the sql statement below.

```
1
2
3
4
5
6
7
8
```

```
select year,category, sum(billedamount) as totalbilledamount
from "FactBilling"
left join "DimCustomer"
on "FactBilling".customerid = "DimCustomer".customerid
left join "DimMonth"
on "FactBilling".monthid="DimMonth".monthid
group by cube(year,category)
order by year, category;
```

Copied!

The partial output can be seen in the image below.



Exercise 5 - Create a Materialized Query Table(MQT)

In pgAdmin we can implement materialized views using Materialized Query Tables.

Step 1: Create the MQT.

Execute the sql statement below to create an MQT named countrystats.

```
1
2
3
4
5
6
7
8
```

```
CREATE MATERIALIZED VIEW countrystats (country, year, totalbilledamount) AS
(select country, year, sum(billedamount)
from "FactBilling"
left join "DimCustomer"
on "FactBilling".customerid = "DimCustomer".customerid
left join "DimMonth"
on "FactBilling".monthid="DimMonth".monthid
group by country,year);
```

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The above command creates an MQT named countrystats that has 3 columns.

- Country
- Year
- totalbilledamount

The MQT is essentially the result of the below query, which gives you the year, quartername and the sum of billed amount grouped by year and quartername.

```
1
2
3
4
5
6
7
```

```
select year, quartername, sum(billedamount) as totalbilledamount
from "FactBilling"
left join "DimCustomer"
on "FactBilling".customerid = "DimCustomer".customerid
left join "DimMonth"
```

```
6. on "FactBilling".monthid="DimMonth".monthid
7. group by grouping sets(year, quartername);
```

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Step 2: Populate/refresh data into the MQT.

Execute the sql statement below to populate the MQT countrystats.

```
1. 1
```

```
1. REFRESH MATERIALIZED VIEW countrystats;
```

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The command above populates the MQT with relevant data.

Step 3: Query the MQT.

Once an MQT is refreshed, you can query it.

Execute the sql statement below to query the MQT countrystats.

```
1. 1
```

```
1. select * from countrystats;
```

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Practice exercises

Problem 1: Create a grouping set for the columns year, quartername, sum(billedamount).

▶ Click here for Hint
▶ Click here for Solution

Problem 2: Create a rollup for the columns country, category, sum(billedamount).

▶ Click here for Hint
▶ Click here for Solution

Problem 3: Create a cube for the columns year,country, category, sum(billedamount).

▶ Click here for Hint
▶ Click here for Solution

Problem 4: Create an MQT named average_billamount with columns year, quarter, category, country, average_bill_amount.

▶ Click here for Hint
▶ Click here for Solution

Congratulations! You have successfully finished the Populating a Data Warehouse lab.

Author

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Change Log

Date (YYYY-MM-DD)	Version	Changed By	Change Description
2022-04-14	0.2	Amrutha Rao	converted initial version to pgAdmin workaround.
2021-09-29	0.1	Ramesh Sannareddy	Created initial version of the lab