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**COMPUTER SCIENCE & ENGINEERING**

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## **Experiment - 5**

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**Semester:** 5<sup>th</sup>

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**Subject Name:** Advanced Database and Management System

**Subject Code:** 23CSP-333

### **Aim:**

#### **Medium-Problem:**

Generate 1 million records per ID in 'transaction data' using generate\_series() and random() ,create a normal view and a materialized view 'sales\_summary' with aggregated metrics (total\_quantity\_sold, total\_sales, total\_orders) , and compare their performance and execution time.

#### **Hard-Problem**

Create restricted views in the sales database to provide summarized, non-sensitive data to the reporting team, and control access using DCL commands( GRANT and REVOKE).

## **1. SQL QUERY AND OUTPUTS -**

### **-----MEDIUM LEVEL PROBLEM-----**

```
Create table TRANSACTION_DATA(id int,val decimal);
```

```
INSERT INTO TRANSACTION_DATA(ID,VAL)
```

```
SELECT 1,RANDOM()
```

```
FROM GENERATE_SERIES(1,1000000);
```

```
INSERT INTO TRANSACTION_DATA(ID,VAL)
```

```
SELECT 2,RANDOM()
```

```
FROM GENERATE_SERIES(1,1000000);
```

```
SELECT * FROM TRANSACTION_DATA;
```



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```
CREATE or REPLACE VIEW SALES_SUMMARY AS SELECT  
ID,  
COUNT(*) AS total_quantity_sold,  
sum(val) AS total_sales,  
count(distinct id) AS total_orders FROM  
TRANSACTION_DATA GROUP BY  
ID;
```

```
EXPLAIN ANALYZE  
SELECT * FROM SALES_SUMMARY;
```

```
CREATE MATERIALIZED VIEW SALES_SUMM AS  
SELECT ID, COUNT(*) AS  
total_quantity_sold, sum(val) AS total_sales,  
count(distinct id) AS total_orders  
FROM TRANSACTION_DATA  
GROUP BY ID;
```

```
EXPLAIN ANALYZE  
SELECT * FROM SALES_SUMM;
```

```
5  
6 INSERT INTO TRANSACTION_DATA(ID, VAL)  
7 SELECT 2, RANDOM()  
8 FROM GENERATE_SERIES(1, 1000000);  
9 SELECT * FROM TRANSACTION_DATA;
```

Data Output Messages Notifications

	id integer	val numeric
1	1	0.748060017288284
2	1	0.158813530918857
3	1	0.482094772953915
4	1	0.461220286286965
5	1	0.601375928005661
6	1	0.120882758237791
7	1	0.626445464971291
8	1	0.448741750697511
9	1	0.127332205463045

21 `SELECT * FROM SALES_SUMMARY; /*Simple view */`

Data Output Messages Notifications

	id integer	total_quantity_sold bigint	total_sales numeric	total_orders bigint
1	1	2000000	1000226.201610874170319933640	1
2	2	1000000	499473.47586932728250459408	1

20 `EXPLAIN ANALYZE`

21 `SELECT * FROM SALES_SUMMARY; /*Simple view */`

Data Output Messages Notifications

	QUERY PLAN text
1	GroupAggregate (cost=471514.97..509014.99 rows=2 width=52) (a
2	Group Key: transaction_data.id
3	-> Sort (cost=471514.97..479014.97 rows=3000000 width=15) (ac
4	Sort Key: transaction_data.id
5	Sort Method: external merge Disk: 73504kB
6	-> Seq Scan on transaction_data (cost=0.00..46224.00 rows=3
7	Planning Time: 0.135 ms
8	Execution Time: 4396.880 ms

33 `SELECT * FROM SALES_SUMM; /*Materialized view*/`

Data Output Messages Notifications

	id integer	total_quantity_sold bigint	total_sales numeric	total_orders bigint
1	1	1000000	500106.667545326356598143529	1
2	2	1000000	499473.47586932728250459408	1

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```
32 | EXPLAIN ANALYZE
33 | SELECT * FROM SALES_SUMM; /*Materialized view*/
```

Data Output Messages Notifications

SQL

Showing rows: 1

QUERY PLAN

text

1	Seq Scan on sales_summ (cost=0.00..20.20 rows=1020 width=52) (actual time=0.017..0.018 rows=2 loops=...
2	Planning Time: 0.063 ms
3	Execution Time: 0.032 ms

OUTPUT -

As we can see that the execution time using the materialized view is very less as compared to the simple view's execution time.

## -----HARD PROBLEM -----

```
CREATE TABLE customer_data ( transaction_id
SERIAL PRIMARY KEY, customer_name
VARCHAR(100), email VARCHAR(100), phone
VARCHAR(15),
payment_info VARCHAR(50), -- sensitive order_value
DECIMAL, order_date DATE DEFAULT
CURRENT_DATE
);
```

-- Insert sample data

```
INSERT INTO customer_data (customer_name, email, phone, payment_info, order_value) VALUES
('John', 'John@example.com', '9040122324', '1234-5678-9012-3456', 500),
('John', 'John@example.com', '9040122324', '1234-5678-9012-3456', 1000),
('Alice Singh', 'Alice@example.com', '9876543210', '9876-5432-1098-7654', 700),
('Alice Singh', 'Alice@example.com', '9876543210', '9876-5432-1098-7654', 300);
```



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```
CREATE OR REPLACE VIEW RESTRICTED_SALES_DATA AS  
SELECT  
CUSTOMER_NAME,  
COUNT(*) AS total_orders,  
SUM(order_value) as total_sales from  
customer_data group by  
customer_name;
```

```
SELECT * from restricted_sales_data;
```

```
CREATE USER CLIENT1 WITH PASSWORD 'REPORT1234';  
GRANT SELECT ON RESTRICTED_SALES_DATA TO CLIENT1;  
REVOKE SELECT ON RESTRICTED_SALES_DATA FROM CLIENT1;
```

The session is idle and there is no current transaction.

Query Query History

```
62 group by customer_name;  
63  
64 select * from restricted_sales_data;  
65
```

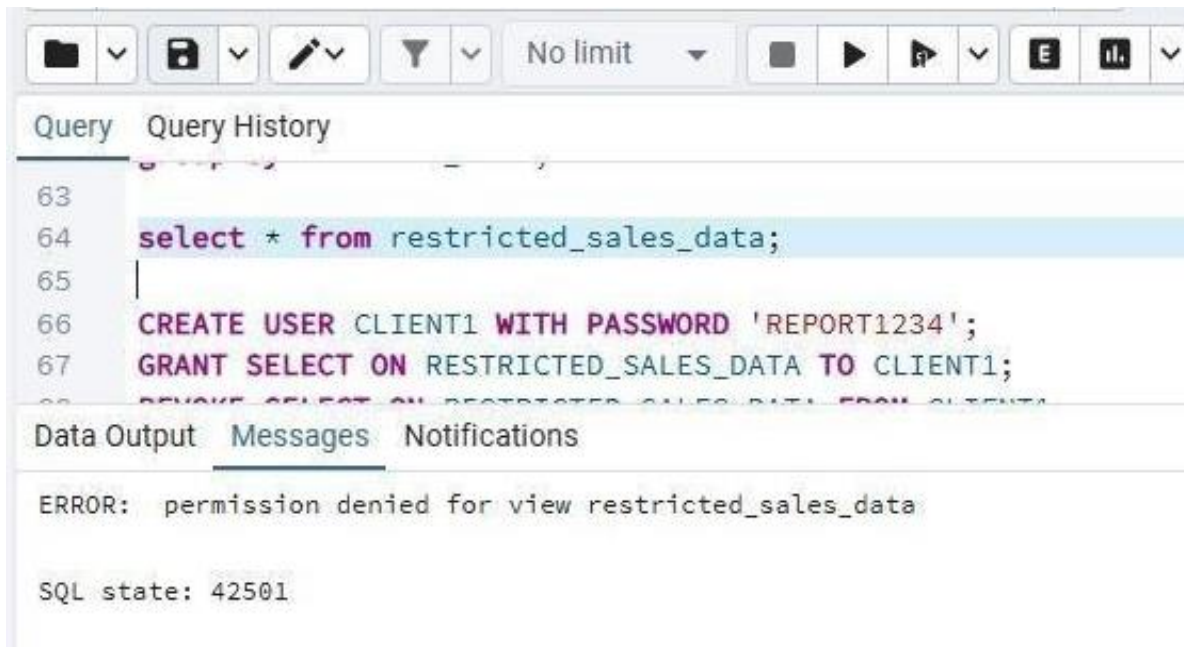
Data Output Messages Notifications

ERROR: permission denied for view restricted\_sales\_data

SQL state: 42501

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The screenshot shows a SQL IDE interface. At the top is a toolbar with icons for file operations, query execution, and settings. Below the toolbar are tabs for 'Query' and 'Query History'. The 'Query' tab is active, displaying a SQL script with line numbers 63 through 68. Line 64 contains the query 'select \* from restricted\_sales\_data;', which is highlighted in blue. Lines 66 and 67 contain 'CREATE USER CLIENT1 WITH PASSWORD 'REPORT1234';' and 'GRANT SELECT ON RESTRICTED\_SALES\_DATA TO CLIENT1;'. Below the query editor are tabs for 'Data Output', 'Messages', and 'Notifications'. The 'Messages' tab is active, showing an error message: 'ERROR: permission denied for view restricted\_sales\_data' and 'SQL state: 42501'.

```
63  
64 select * from restricted_sales_data;  
65  
66 CREATE USER CLIENT1 WITH PASSWORD 'REPORT1234';  
67 GRANT SELECT ON RESTRICTED_SALES_DATA TO CLIENT1;  
68
```

ERROR: permission denied for view restricted\_sales\_data

SQL state: 42501