

Após a estudo sobre o uso de visões para acelerar o processamento de consultas OLAP, realize as atividades a seguir:

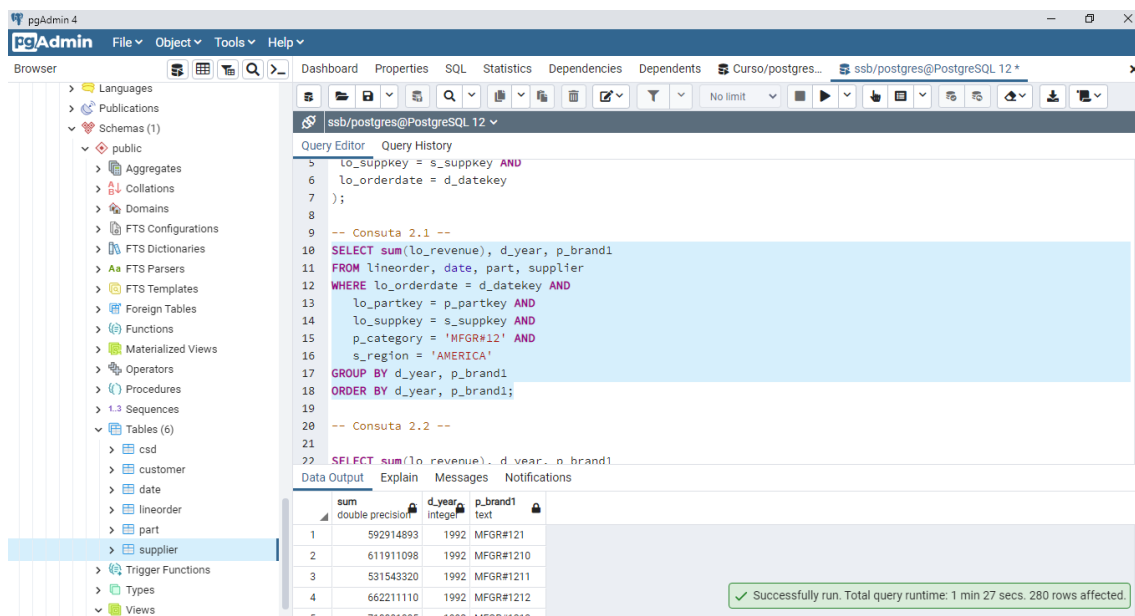
1 - Especifique os comandos SQL para construir as seguintes visões:

- uma **visão fragmentada verticalmente** que consiga responder a todas as consultas do grupo q2 do SSB
- uma **visão materializada (visão agregada)** que consiga responder a todas as consultas do grupo q2 do SSB

2 - Após a criação das visões, reescreva as consultas do grupo q2 do SSB para que as consultas usem as visões criadas. Ou seja, aplique os mesmos passos realizados pela apostila "[Acelerando o Processamento de Consultas OLAP - Projeto Físico de um Data Warehouse](#)", a qual constrói visões para responder as consultas do grupo q3 do SSB. Para relembrar quais são essas consultas do SSB, veja a Seção 3.1 da apostila "[Projeto Lógico de um Data Warehouse](#)".

3 - Execute as consultas reescritas (note que você terá 2 conjuntos de consultas, um para cada tipo de visão) usando o EXPLAIN ANALYZE para analisar o plano de consulta delas. Compare esses planos de execução com os planos de execução das consultas originais (que não usam visão). Qual é a diferença entre os planos?

Consulta 2.1 sem a view



The screenshot shows the pgAdmin 4 interface. The left sidebar displays the database structure, with the 'supplier' table highlighted under the 'public' schema. The main window shows the 'Query Editor' with the following SQL query:

```
-- Consulta 2.1 --
SELECT sum(lo_revenue), d_year, p_brand1
FROM lineorder, date, part, supplier
WHERE lo_orderdate = d_datekey AND
      lo_partkey = p_partkey AND
      lo_suppkey = s_suppkey AND
      p_category = 'MFGR#12' AND
      s_region = 'AMERICA'
GROUP BY d_year, p_brand1
ORDER BY d_year, p_brand1;
```

Below the query editor, the 'Data Output' tab shows the results of the query. The table has 5 rows and 4 columns: sum, d_year, p_brand1, and an unnamed column.

	sum	d_year	p_brand1	
1	592914893	1992	MFGR#121	
2	611911098	1992	MFGR#1210	
3	531543320	1992	MFGR#1211	
4	662211110	1992	MFGR#1212	
5	718801005	1992	MFGR#1213	

A green status bar at the bottom right indicates: "Successfully run. Total query runtime: 1 min 27 secs. 280 rows affected."

Consulta 2.2 sem a view

The screenshot shows the pgAdmin 4 interface. The left sidebar displays the database structure, with the 'supplier' table selected. The main pane shows a SQL query editor with the following code:

```
15 p_category = 'MFGR#12' AND
16 s_region = 'AMERICA'
17 GROUP BY d_year, p_brand1
18 ORDER BY d_year, p_brand1;
19
20 -- Consulta 2.2 --
21
22 SELECT sum(lo_revenue), d_year, p_brand1
23 FROM lineorder, date, part, supplier
24 WHERE lo_orderdate = d_datekey AND
25       lo_partkey = p_partkey AND
26       lo_suppkey = s_suppkey AND
27       p_brand1 between 'MFGR#2221' and 'MFGR#2228' AND
28       s_region = 'ASIA'
29 GROUP BY d_year, p_brand1
30 ORDER BY d_year, p_brand1;
31
```

Below the query editor, the 'Data Output' tab shows the results of the query:

	sum	d_year	p_brand1
	double precision	integer	text
1	735651877	1992	MFGR#2221
2	681377020	1992	MFGR#2222
3	754184160	1992	MFGR#2223
4	740745695	1992	MFGR#2224
5	823006351	1992	MFGR#2225

A green message box at the bottom right states: "Successfully run. Total query runtime: 16 secs 426 msec. 56 rows affected."

Consulta 2.3 sem a view

The screenshot shows the pgAdmin 4 interface. The left sidebar displays the database structure, with the 'consultas_teste_2_1' view selected. The main pane shows a SQL query editor with the following code:

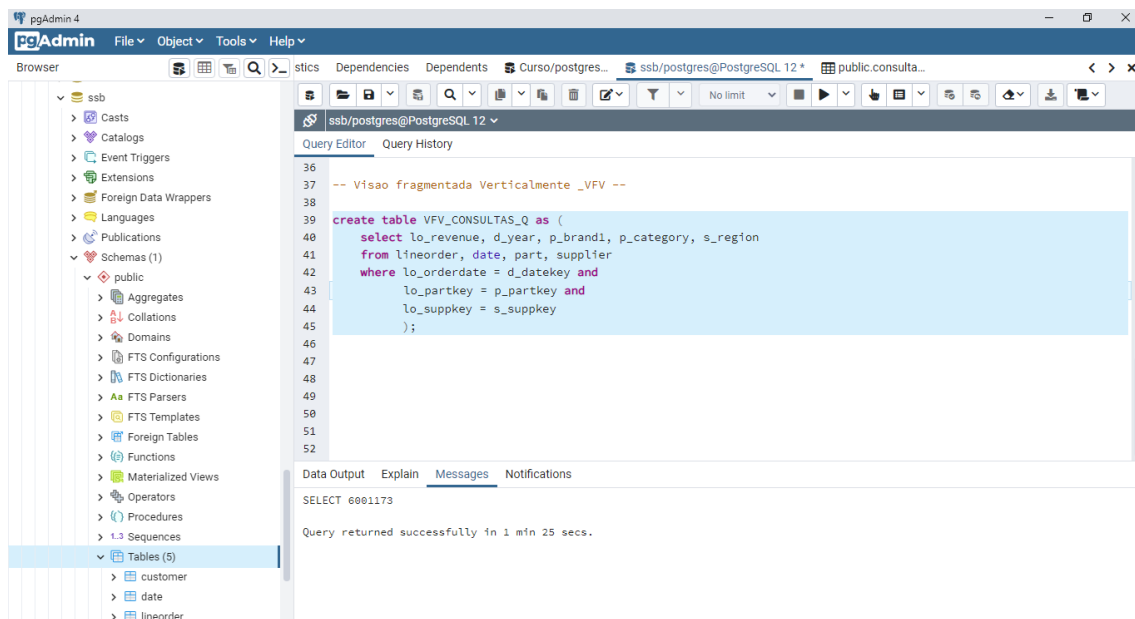
```
22 GROUP BY d_year, p_brand1
23 ORDER BY d_year, p_brand1;
24
25 -- Consulta 2.3 --
26
27 SELECT sum(lo_revenue), d_year, p_brand1
28 FROM lineorder, date, part, supplier
29 WHERE lo_orderdate = d_datekey AND
30       lo_partkey = p_partkey AND
31       lo_suppkey = s_suppkey AND
32       p_brand1 = 'MFGR#2221' AND
33       s_region = 'EUROPE'
34 GROUP BY d_year, p_brand1
35 ORDER BY d_year, p_brand1;
36
37
38
```

Below the query editor, the 'Data Output' tab shows the results of the query:

	sum	d_year	p_brand1
	double precision	integer	text
1	642241208	1992	MFGR#2221
2	659060755	1993	MFGR#2221
3	568978344	1994	MFGR#2221
4	642107947	1995	MFGR#2221

A green message box at the bottom right states: "Successfully run. Total query runtime: 28 secs 687 msec. 7 rows affected."

Criação da Visão vfv

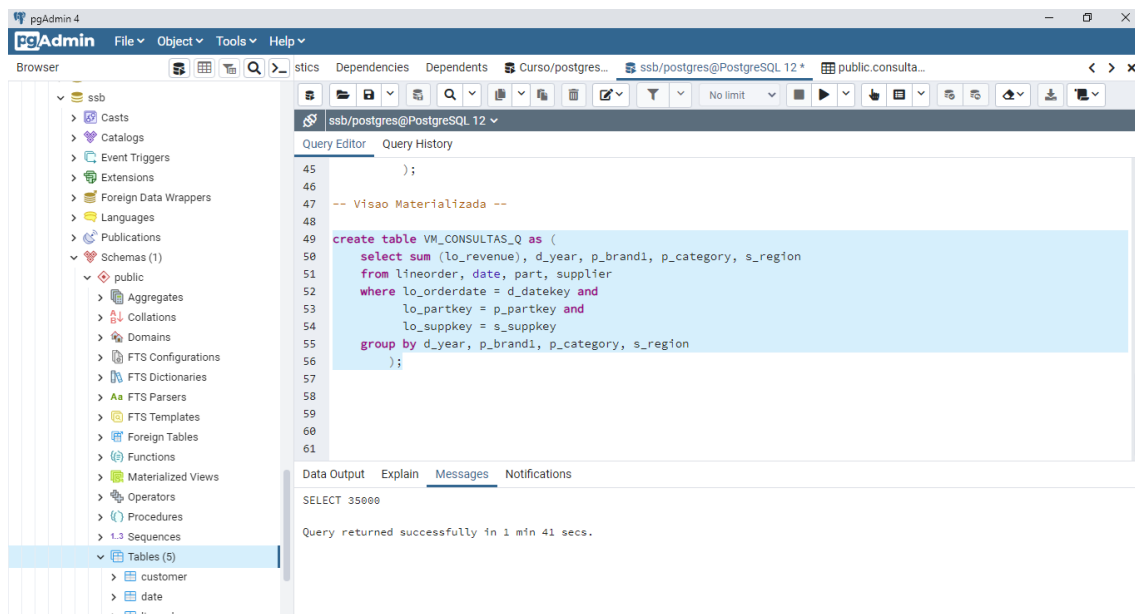


The screenshot shows the pgAdmin 4 interface. On the left, the 'Tables (5)' folder is expanded, showing 'customer', 'date', and 'lineorder'. The main pane displays the 'Query Editor' with the following SQL code:

```
-- Visao fragmentada Verticalmente _VFW --  
  
create table VFW_CONSULTAS_Q as (  
    select lo_revenue, d_year, p_brand1, p_category, s_region  
    from lineorder, date, part, supplier  
    where lo_orderdate = d_datekey and  
          lo_partkey = p_partkey and  
          lo_suppkey = s_suppkey  
);
```

The 'Messages' tab at the bottom shows the execution result: 'SELECT 6001173' and 'Query returned successfully in 1 min 25 secs.'

Visão Materializada



The screenshot shows the pgAdmin 4 interface. On the left, the 'Tables (5)' folder is expanded, showing 'customer', 'date', and 'lineorder'. The main pane displays the 'Query Editor' with the following SQL code:

```
-- Visao Materializada --  
  
create table VM_CONSULTAS_Q as (  
    select sum(lo_revenue), d_year, p_brand1, p_category, s_region  
    from lineorder, date, part, supplier  
    where lo_orderdate = d_datekey and  
          lo_partkey = p_partkey and  
          lo_suppkey = s_suppkey  
    group by d_year, p_brand1, p_category, s_region  
);
```

The 'Messages' tab at the bottom shows the execution result: 'SELECT 35000' and 'Query returned successfully in 1 min 41 secs.'

Visão VFV 2.1

pgAdmin 4

File Object Tools Help

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 - Tables (5)
 - customer
 - date
 - lineorder

Query Editor

```
52 where lo_orderdate = d_datekey and
53       lo_partkey = p_partkey and
54       lo_suppkey = s_suppkey
55 group by d_year, p_brand1, p_category, s_region
56 );
57
58 -- Consula Visao VFV_2.1 --
59
60 SELECT sum(lo_revenue), d_year, p_brand1
61 FROM VFV_CONSULTAS_Q
62 WHERE p_category = 'MFGR#12' AND
63       s_region = 'AMERICA'
64 GROUP BY d_year, p_brand1
65 ORDER BY d_year, p_brand1;
```

Data Output

	sum	d_year	p_brand1
	double precision	integer	text
1	592914893	1992	MFGR#121
2	611911098	1992	MFGR#1210
3	531543320	1992	MFGR#1211
4	662211110	1992	MFGR#1212
5	718801005	1992	MFGR#1213

Messages

Notifications

Successfully run. Total query runtime: 1 min 7 secs. 280 rows affected.

Visão VFV 2.2

pgAdmin 4

File Object Tools Help

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 - Sequences
 - Tables (5)
 - customer
 - date
 - lineorder

Query Editor

```
60 SELECT sum(lo_revenue), d_year, p_brand1
61 FROM VFV_CONSULTAS_Q
62 WHERE p_category = 'MFGR#12' AND
63       s_region = 'AMERICA'
64 GROUP BY d_year, p_brand1
65 ORDER BY d_year, p_brand1;
66
67 -- Consula Visao VFV_2.2 --
68
69 SELECT sum(lo_revenue), d_year, p_brand1
70 FROM VFV_CONSULTAS_Q
71 WHERE p_brand1 BETWEEN 'MFGR#2222' AND 'MFGR#2228'
72 AND s_region = 'ASIA'
73 GROUP BY d_year, p_brand1
74 ORDER BY d_year, p_brand1;
```

Data Output

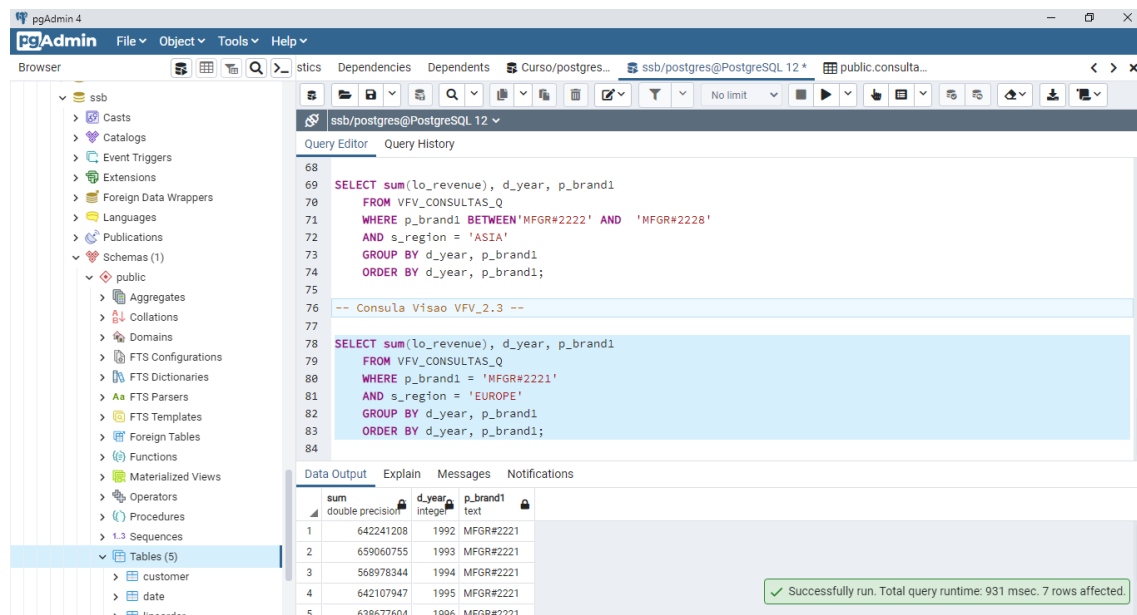
	sum	d_year	p_brand1
	double precision	integer	text
1	681377020	1992	MFGR#2222
2	754184160	1992	MFGR#2223
3	740745695	1992	MFGR#2224
4	823006351	1992	MFGR#2225
5	808764555	1992	MFGR#2226

Messages

Notifications

Successfully run. Total query runtime: 2 secs 216 msec. 49 rows affected.

Visão VFV 2.3



pgAdmin 4

File Object Tools Help

Browser

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 - Extensions
 - Foreign Data Wrappers
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 - Materialized Views
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 - Sequences
 - Tables (5)
 - customer
 - date
 - lineorder

Query Editor

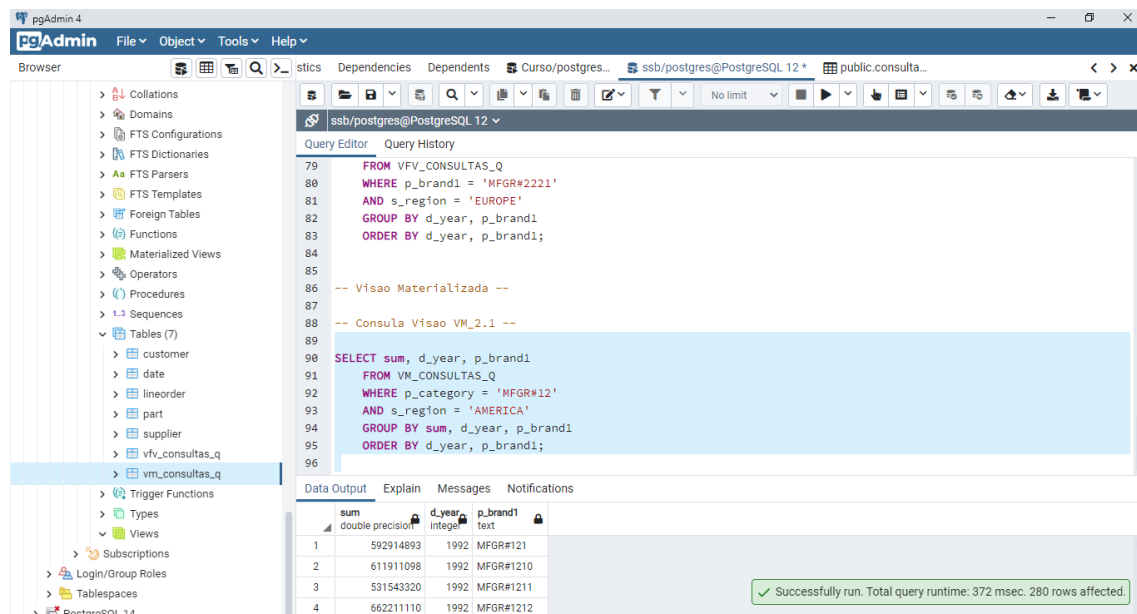
```
68
69 SELECT sum(lo_revenue), d_year, p_brand1
70 FROM VFV_CONSULTAS_Q
71 WHERE p_brand1 BETWEEN 'MFGR#2222' AND 'MFGR#2228'
72 AND s_region = 'ASIA'
73 GROUP BY d_year, p_brand1
74 ORDER BY d_year, p_brand1;
75
76 -- Consula Visao VFV_2.3 --
77
78 SELECT sum(lo_revenue), d_year, p_brand1
79 FROM VFV_CONSULTAS_Q
80 WHERE p_brand1 = 'MFGR#2221'
81 AND s_region = 'EUROPE'
82 GROUP BY d_year, p_brand1
83 ORDER BY d_year, p_brand1;
84
```

Data Output

	sum	d_year	p_brand1
	double precision	integer	text
1	642241208	1992	MFGR#2221
2	659060755	1993	MFGR#2221
3	568978344	1994	MFGR#2221
4	642107947	1995	MFGR#2221
5	638677604	1996	MFGR#2221

Successfully run. Total query runtime: 931 msec. 9 rows affected.

Visão Materializada 2.1



pgAdmin 4

File Object Tools Help

Browser

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 - FTS Templates
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 - Functions
 - Materialized Views
 - Operators
 - Procedures
 - Sequences
 - Tables (7)
 - customer
 - date
 - lineorder
 - part
 - supplier
 - vfvs_consultas_q
 - vm_consultas_q

Query Editor

```
79 FROM VFV_CONSULTAS_Q
80 WHERE p_brand1 = 'MFGR#2221'
81 AND s_region = 'EUROPE'
82 GROUP BY d_year, p_brand1
83 ORDER BY d_year, p_brand1;
84
85 -- Visao Materializada --
86
87 -- Consula Visao VM_2.1 --
88
89 SELECT sum, d_year, p_brand1
90 FROM VM_CONSULTAS_Q
91 WHERE p_category = 'MFGR#12'
92 AND s_region = 'AMERICA'
93 GROUP BY sum, d_year, p_brand1
94 ORDER BY d_year, p_brand1;
95
96
```

Data Output

	sum	d_year	p_brand1
	double precision	integer	text
1	592914893	1992	MFGR#121
2	611911098	1992	MFGR#1210
3	531543320	1992	MFGR#1211
4	662211110	1992	MFGR#1212

Successfully run. Total query runtime: 372 msec. 280 rows affected.

Visão Materializada 2.2

The screenshot shows the pgAdmin 4 interface with the 'vm_consultas_q' table selected in the left sidebar. The central pane displays a SQL query in the 'Query Editor' tab. The query is as follows:

```
89
90 SELECT sum, d_year, p_brand1
91 FROM VM_CONSULTAS_Q
92 WHERE p_category = 'MFGR#12'
93 AND s_region = 'AMERICA'
94 GROUP BY sum, d_year, p_brand1
95 ORDER BY d_year, p_brand1;
96
97 -- Consula Visao VM_2.2 --
98
99 SELECT sum, d_year, p_brand1
100 FROM VM_CONSULTAS_Q
101 WHERE p_brand1 BETWEEN 'MFGR#2222' AND 'MFGR#2228'
102 AND s_region = 'ASIA'
103 GROUP BY SUM, d_year, p_brand1
104 ORDER BY d_year, p_brand1;
105
106
```

Below the query editor, the 'Data Output' tab shows the results of the query. The results are displayed in a table with the following columns: sum (double precision), d_year (integer), and p_brand1 (text).

sum	d_year	p_brand1
681377020	1992	MFGR#2222
754184160	1992	MFGR#2223
740745695	1992	MFGR#2224
823006351	1992	MFGR#2225

A status message at the bottom right indicates: 'Successfully run. Total query runtime: 84 msec. 49 rows affected.'

Visão Materializada 2.3

The screenshot shows the pgAdmin 4 interface with the 'vm_consultas_q' table selected in the left sidebar. The central pane displays a SQL query in the 'Query Editor' tab. The query is as follows:



```
99
100 SELECT sum, d_year, p_brand1
101 FROM VM_CONSULTAS_Q
102 WHERE p_brand1 BETWEEN 'MFGR#2222' AND 'MFGR#2228'
103 AND s_region = 'ASIA'
104 GROUP BY SUM, d_year, p_brand1
105 ORDER BY d_year, p_brand1;
106
107 -- Consula Visao VM_2.3 --
108
109 SELECT sum, d_year, p_brand1
110 FROM VM_CONSULTAS_Q
111 WHERE p_brand1 = 'MFGR#2221'
112 AND s_region = 'EUROPE'
113 GROUP BY SUM, d_year, p_brand1
114 ORDER BY d_year, p_brand1;
115
116
```

Below the query editor, the 'Data Output' tab shows the results of the query. The results are displayed in a table with the following columns: sum (double precision), d_year (integer), and p_brand1 (text).



sum	d_year	p_brand1
642241208	1992	MFGR#2221
659060755	1993	MFGR#2221
568978344	1994	MFGR#2221
642107947	1995	MFGR#2221

A status message at the bottom right indicates: 'Successfully run. Total query runtime: 86 msec. 7 rows affected.'

Explain Visão Materializada

Data Output		Explain	Messages	Notifications
	QUERY PLAN text			
1	Seq Scan on vm_consultas_q (cost=0.00..650.00 rows=35000 width=36) (actual time=0.021..3.211 rows=35000 loops=1)			
2	Planning Time: 0.065 ms			
3	Execution Time: 4.343 ms			

Explain Visão Fragmentada Verticalmente

Data Output		Explain	Messages	Notifications
	QUERY PLAN text			
1	Seq Scan on vfv_consultas_q (cost=0.00..111391.47 rows=6001247 width=36) (actual time=0.062..860.489 rows=6001173 loops=1)			
2	Planning Time: 0.059 ms			
3	Execution Time: 1050.178 ms			

Nos planos de visões a materializada obteve melhor desempenho.

SQL

-- Consuta 2.1 --

```
SELECT sum(lo_revenue), d_year, p_brand1
FROM lineorder, date, part, supplier
WHERE lo_orderdate = d_datekey AND
      lo_partkey = p_partkey AND
      lo_suppkey = s_suppkey AND
      p_category = 'MFGR#12' AND
      s_region = 'AMERICA'
GROUP BY d_year, p_brand1
ORDER BY d_year, p_brand1;
```

-- Consuta 2.2 --

```
SELECT sum(lo_revenue), d_year, p_brand1
FROM lineorder, date, part, supplier
WHERE lo_orderdate = d_datekey AND
      lo_partkey = p_partkey AND
      lo_suppkey = s_suppkey AND
      p_brand1 between 'MFGR#2221' and 'MFGR#2228' AND
      s_region = 'ASIA'
GROUP BY d_year, p_brand1
ORDER BY d_year, p_brand1;
```

-- Consuta 2.3 --

```
SELECT sum(lo_revenue), d_year, p_brand1
FROM lineorder, date, part, supplier
```


WHERE lo_orderdate = d_datekey AND

lo_partkey = p_partkey AND

lo_suppkey = s_suppkey AND

p_brand1 = 'MFGR#2221' AND

s_region = 'EUROPE'

GROUP BY d_year, p_brand1

ORDER BY d_year, p_brand1;

-- Visao fragmentada Verticalmente _VFV --

create table VFV_CONSULTAS_Q as (

select lo_revenue, d_year, p_brand1, p_category, s_region

from lineorder, date, part, supplier

where lo_orderdate = d_datekey and

lo_partkey = p_partkey and

lo_suppkey = s_suppkey

);

-- Visao Materializada --

create table VM_CONSULTAS_Q as (

select sum (lo_revenue), d_year, p_brand1, p_category, s_region

from lineorder, date, part, supplier

where lo_orderdate = d_datekey and

lo_partkey = p_partkey and

lo_suppkey = s_suppkey

group by d_year, p_brand1, p_category, s_region

);

-- Consula Visao VFV_2.1 --

```
SELECT sum(lo_revenue), d_year, p_brand1
      FROM VFV_CONSULTAS_Q
      WHERE p_category = 'MFGR#12' AND
s_region = 'AMERICA'
      GROUP BY d_year, p_brand1
      ORDER BY d_year, p_brand1;
```

-- Consula Visao VFV_2.2 --

```
SELECT sum(lo_revenue), d_year, p_brand1
      FROM VFV_CONSULTAS_Q
      WHERE p_brand1 BETWEEN'MFGR#2222' AND 'MFGR#2228'
      AND s_region = 'ASIA'
      GROUP BY d_year, p_brand1
      ORDER BY d_year, p_brand1;
```

-- Consula Visao VFV_2.3 --

```
SELECT sum(lo_revenue), d_year, p_brand1
      FROM VFV_CONSULTAS_Q
      WHERE p_brand1 = 'MFGR#2221'
      AND s_region = 'EUROPE'
      GROUP BY d_year, p_brand1
      ORDER BY d_year, p_brand1;
```

-- Visao Materializada --

-- Consula Visao VM_2.1 --

```
SELECT sum, d_year, p_brand1
      FROM VM_CONSULTAS_Q
     WHERE p_category = 'MFGR#12'
        AND s_region = 'AMERICA'
     GROUP BY sum, d_year, p_brand1
     ORDER BY d_year, p_brand1;
```

-- Consula Visao VM_2.2 --

```
SELECT sum, d_year, p_brand1
      FROM VM_CONSULTAS_Q
     WHERE p_brand1 BETWEEN 'MFGR#2222' AND 'MFGR#2228'
        AND s_region = 'ASIA'
     GROUP BY SUM, d_year, p_brand1
     ORDER BY d_year, p_brand1;
```