

1-

```
ficha6a=> select *from teste where id=3456;
  id | c1 | c2
-----+-----
 3456 |    |
(1 row)
```

Time: 368,277 ms

```
ficha6a=> explain select*from teste where id=3456;
               QUERY PLAN
```

```
-----
Gather  (cost=1000.00..49165.77 rows=1 width=40)
  Workers Planned: 2
    -> Parallel Seq Scan on teste  (cost=0.00..48165.67 rows=1 width=40)
        Filter: (id = 3456)
(4 rows)
```

Time: 10,008 ms

```
ficha6a=> explain analyze select * from teste where id=3456;
               QUERY PLAN
```

```
-----
Gather  (cost=1000.00..49165.77 rows=1 width=40) (actual time=2.591..310.194 rows=1 loops=1)
  Workers Planned: 2
  Workers Launched: 2
    -> Parallel Seq Scan on teste  (cost=0.00..48165.67 rows=1 width=40) (actual time=99.389..
187.609 rows=0 loops=3)
        Filter: (id = 3456)
        Rows Removed by Filter: 1666666
Planning Time: 0.089 ms
Execution Time: 310.227 ms
(8 rows)
```

```
ficha6a=> explain (format json) select * from teste where id=3456;
               QUERY PLAN
```

```
-----
[
  {
    "Plan": {
      "Node Type": "Gather",
      "Parallel Aware": false,
      "Startup Cost": 1000.00,
      "Total Cost": 49165.77,
      "Plan Rows": 1,
      "Plan Width": 40,
      "Workers Planned": 2,
      "Single Copy": false,
      "Plans": [
        {
          "Node Type": "Seq Scan",
          "Parent Relationship": "Outer",
          "Parallel Aware": true,
          "Relation Name": "teste",
          "Alias": "teste",
          "Startup Cost": 0.00,
          "Total Cost": 48165.67,
          "Plan Rows": 1,
          "Plan Width": 40,
          "Filter": "(id = 3456)"
        }
      ]
    }
  ]
]
(1 row)
```

```
ficha6a=> explain (ANALYZE, COSTS, VERBOSE, BUFFERS, FORMAT JSON) select *
ficha6a-> from teste where id=3456;
QUERY PLAN
```

```
[
  {
    "Plan": {
      "Node Type": "Gather",
      "Parallel Aware": false,
      "Startup Cost": 1000.00,
      "Total Cost": 49165.77,
      "Plan Rows": 1,
      "Plan Width": 40,
      "Actual Startup Time": 1.733,
      "Actual Total Time": 251.896,
      "Actual Rows": 1,
      "Actual Loops": 1,
      "Output": ["id", "c1", "c2"],
      "Workers Planned": 2,
      "Workers Launched": 2,
      "Single Copy": false,
      "Shared Hit Blocks": 16055,
      "Shared Read Blocks": 6069,
      "Shared Dirtied Blocks": 0,
      "Shared Written Blocks": 0,
      "Local Hit Blocks": 0,
      "Local Read Blocks": 0,
      "Local Dirtied Blocks": 0,
      "Local Written Blocks": 0,
      "Temp Read Blocks": 0,
      "Temp Written Blocks": 0,
      "Plans": [
        {
          "Node Type": "Seq Scan",
          "Parent Relationship": "Outer",
          "Parallel Aware": true,
          "Relation Name": "teste",
          "Schema": "public",
          "Alias": "teste",
          "Startup Cost": 0.00,
          "Total Cost": 48165.67,
          "Plan Rows": 1,
          "Plan Width": 40,
          "Actual Startup Time": 97.860,
          "Actual Total Time": 171.411,
          "Actual Rows": 0,
```

plan created on November 27, 2019 2:49 PM 



<1	0.07	<1	1	8.45	
execution time (ms)	planning time (ms)	slowest node (ms)	largest node (rows)	costliest node	

INDEX SCAN

<1ms | 57 %

on public.teste (teste)
using teste_idx



slowest **costliest** **largest**

```
ficha6a=> create index teste_idx on teste (id);
CREATE INDEX
ficha6a=> explain select * from teste where id = 3456;
               QUERY PLAN
-----
Index Scan using teste_idx on teste  (cost=0.43..8.45 rows=1 width=40)
   Index Cond: (id = 3456)
(2 rows)

ficha6a=> explain select * from teste where id > 3;
               QUERY PLAN
-----
Seq Scan on teste  (cost=0.00..84624.00 rows=4999997 width=40)
   Filter: (id > 3)
(2 rows)
```

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```
ficha6a=> SELECT relname as "Table", pg_size_pretty(pg_total_relation_size(relid)) As
ficha6a-> "Size", pg_size_pretty(pg_total_relation_size(relid) - pg_relation_size(relid))
ficha6a-> as "Size of other objects" FROM pg_catalog.pg_statio_user_tables ORDER BY
ficha6a-> pg_total_relation_size(relid) DESC;
 Table | Size | Size of other objects
-----+-----+-----
 teste | 280 MB | 107 MB
(1 row)
```

3-

```
ficha6a=> SELECT relname, ((relpages*8)/1024) as MB, reltype FROM pg_class WHERE reltype=0
ficha6a-> ORDER BY relpages DESC LIMIT 30;
      relname      | mb | reltype
-----+-----+-----
 teste_idx         | 107 |      0
 pg_depend_reference_index |    0 |      0
 pg_depend_depender_index |    0 |      0
 pg_proc_prname_args_nsp_index |    0 |      0
 pg_description_o_c_o_index |    0 |      0
 pg_attribute_relid_attnam_index |    0 |      0
 pg_attribute_relid_attnum_index |    0 |      0
 pg_proc_oid_index |    0 |      0
 pg_class_relname_nsp_index |    0 |      0
 pg_operator_oprname_l_r_n_index |    0 |      0
 pg_collation_name_enc_nsp_index |    0 |      0
 pg_type_typname_nsp_index |    0 |      0
 pg_class_tblspc_relfilenode_index |    0 |      0
 pg_operator_oid_index |    0 |      0
 pg_amop_opr_fam_index |    0 |      0
 pg_amop_fam_strat_index |    0 |      0
 pg_ts_config_map_index |    0 |      0
 pg_collation_oid_index |    0 |      0
 pg_amproc_oid_index |    0 |      0
 pg_amproc_fam_proc_index |    0 |      0
 pg_amop_oid_index |    0 |      0
 pg_class_oid_index |    0 |      0
 pg_aggregate_fnoid_index |    0 |      0
 pg_toast_2618_index |    0 |      0
 pg_constraint_oid_index |    0 |      0
 pg_authid_rolname_index |    0 |      0
 pg_authid_oid_index |    0 |      0
 pg_auth_members_role_member_index |    0 |      0
 pg_auth_members_member_role_index |    0 |      0
 pg_constraint_conrelid_contypid_conname_index |    0 |      0
(30 rows)
```

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```
ficha6a=> drop table teste;
DROP TABLE
ficha6a=> create table teste (id int not null, c1 int, c2 text);
CREATE TABLE
ficha6a=> CREATE FUNCTION random_string(minlen NUMERIC, maxlen NUMERIC)RETURNS
ficha6a-> VARCHAR(1000)
ficha6a-> AS
ficha6a-> $$
ficha6a$> DECLARE
ficha6a$>   rv VARCHAR(1000) := '';
ficha6a$>   i INTEGER := 0;
ficha6a$>   len INTEGER := 0;
ficha6a$> BEGIN
ficha6a$>   IF maxlen < 1 OR minlen < 1 OR maxlen < minlen THEN
ficha6a$>     RETURN rv;
ficha6a$>   END IF;
ficha6a$>   len := floor(random()*(maxlen-minlen)) + minlen;
ficha6a$>   FOR i IN 1..floor(len) LOOP
ficha6a$>     rv := rv || chr(97+CAST(random() * 25 AS INTEGER));
ficha6a$>   END LOOP;
ficha6a$>   RETURN rv;
ficha6a$> END;
ficha6a$> $$ LANGUAGE plpgsql;
CREATE FUNCTION
ficha6a=> INSERT INTO teste (id, c1, c2) SELECT GENERATE_SERIES, CAST(floor(random() *
ficha6a(> 90000 + 10000) AS NUMERIC), initcap(lower(random_string(2, 8))) FROM
ficha6a-> GENERATE_SERIES(1, 500000);
INSERT 0 500000
ficha6a=>
ficha6a=> create index teste_idx on teste (id);
CREATE INDEX
```

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```
ficha6a=> \dt+ teste
               List of relations
 Schema | Name  | Type  | Owner  | Size  | Description
-----+-----+-----+-----+-----+-----
 public | teste | table | myuser | 211 MB |
(1 row)

ficha6a=> SELECT pg_size_pretty(pg_total_relation_size('teste'));
pg_size_pretty
-----
318 MB
(1 row)
```

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```
ficha6a=> SELECT relid, relname, indexrelname, idx_scan, idx_tup_read, pg_size_pretty(
ficha6a(> pg_relation_size(indexrelname::text)) FROM pg_stat_all_indexes WHERE
ficha6a-> schemaname = 'public' ORDER BY pg_relation_size(indexrelname::text) DESC,
ficha6a-> idx_scan ASC;
 relid | relname | indexrelname | idx_scan | idx_tup_read | pg_size_pretty
-----+-----+-----+-----+-----+-----
 25019 | teste  | teste_idx    |         0 |              0 | 107 MB
(1 row)
```

7-

```
ficha6a=> explain select*from teste where c2 like 'a%';
              QUERY PLAN
-----
 Gather  (cost=1000.00..54117.57 rows=479 width=13)
    Workers Planned: 2
    -> Parallel Seq Scan on teste  (cost=0.00..53069.67 rows=200 width=13)
        Filter: (c2 ~~ 'a%':text)
(4 rows)

ficha6a=> explain select*from teste;
              QUERY PLAN
-----
 Seq Scan on teste  (cost=0.00..77028.00 rows=5000000 width=13)
(1 row)

ficha6a=> explain select*from teste where id>2500000;
              QUERY PLAN
-----
 Index Scan using teste_idx on teste  (cost=0.43..84929.85 rows=2506881 width=13)
    Index Cond: (id > 2500000)
(2 rows)

ficha6a=> explain select*from teste where id>2750000;
              QUERY PLAN
-----
 Index Scan using teste_idx on teste  (cost=0.43..76137.27 rows=2247362 width=13)
    Index Cond: (id > 2750000)
(2 rows)

ficha6a=> explain select*from teste where id<2750000;
              QUERY PLAN
-----
 Seq Scan on teste  (cost=0.00..89528.00 rows=2752637 width=13)
    Filter: (id < 2750000)
(2 rows)
```

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lower() -> converte todos os caracteres da coluna c2 para minúsculas

```
ficha6a=> explain analyze select*from teste where c2 = 'a%';
              QUERY PLAN
-----
 Gather  (cost=1000.00..54073.87 rows=42 width=13) (actual time=358.719..401.301 rows=0 loops=1)
    Workers Planned: 2
    Workers Launched: 2
    -> Parallel Seq Scan on teste  (cost=0.00..53069.67 rows=18 width=13) (actual time=276.036..276.036 rows=0 loops=3)
        Filter: (c2 = 'a%':text)
        Rows Removed by Filter: 1666667
    Planning Time: 0.120 ms
    Execution Time: 401.329 ms
(8 rows)
```

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```
ficha6a=> create unique index teste_c1_idx on teste (c1);  
ERROR:  could not create unique index "teste_c1_idx"  
DETAIL:  Key (c1)=(39467) is duplicated.  
ficha6a=>
```

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```
ficha6a=> update teste set c1=33 where id=22;  
UPDATE 1  
ficha6a=> update teste set c1=33 where id=23;  
UPDATE 1
```