

DATA WAREHOUSE

PART 2 – Columnar Database

TASK

1. Jalankan Citus di komputer lokal dengan menggunakan docker compose!

Jawab:



```
irul_jj@Pringgo:~/Iru1JJ2/Altera2/citus-demo$ docker compose up -d
WARN[0000] /home/irul_jj/Iru1JJ2/Altera2/citus-demo/docker-compose.yml: 'version' is obsolete
[+] Running 31/5
  ✓ manager Pulled                                324.8s
  ✓ worker-2 Pulled                                365.2s
  ✓ master Pulled                                  365.3s
  ✓ worker-1 Pulled                                365.4s
  ✓ worker-3 Pulled                                365.4s
[+] Running 6/6
  ✓ Network citus-demo_postgres-network Created      0.2s
  ✓ Container citus-demo_master Started              11.0s
  ✓ Container citus-demo_manager Started             13.9s
  ✓ Container citus-demo_worker_2 Started            23.0s
  ✓ Container citus-demo_worker_3 Started            22.6s
  ✓ Container citus-demo_worker_1 Started            23.7s
irul_jj@Pringgo:~/Iru1JJ2/Altera2/citus-demo$
```

2. Tuliskan perintah untuk membuat :

Jawab:

- a. Tabel biasa

Jawab:

```
create table events_row as select * from events|columnar;
```

- b. Columnar tabel

Jawab:

```
create table events_columnar (
    device_id bigint,
    event_id bigserial,
    evnet_time timestamptz default now (),
    data jsonb not null
)
using columnar;
```

3. Masukkan 100 baris data ke dalam tabel biasa dan tabel columnar!

Jawab:

- a. Tabel biasa:

```
INSERT INTO events_row (device_id, event_id, event_time, data)
SELECT device_id, event_id, event_time, data FROM events_columnar;
```

Grid

events_row

Enter a SQL expression to filter results (use Ctrl+Space)

| | device_id | event_id | event_time | data |
|-----|-----------|----------|-------------------------------|-----------------------|
| 76 | 76 | 76 | 2024-07-22 13:00:23.047 +0700 | {"hello": "columnar"} |
| 77 | 77 | 77 | 2024-07-22 13:00:23.047 +0700 | {"hello": "columnar"} |
| 78 | 78 | 78 | 2024-07-22 13:00:23.047 +0700 | {"hello": "columnar"} |
| 79 | 79 | 79 | 2024-07-22 13:00:23.047 +0700 | {"hello": "columnar"} |
| 80 | 80 | 80 | 2024-07-22 13:00:23.047 +0700 | {"hello": "columnar"} |
| 81 | 81 | 81 | 2024-07-22 13:00:23.047 +0700 | {"hello": "columnar"} |
| 82 | 82 | 82 | 2024-07-22 13:00:23.047 +0700 | {"hello": "columnar"} |
| 83 | 83 | 83 | 2024-07-22 13:00:23.047 +0700 | {"hello": "columnar"} |
| 84 | 84 | 84 | 2024-07-22 13:00:23.047 +0700 | {"hello": "columnar"} |
| 85 | 85 | 85 | 2024-07-22 13:00:23.047 +0700 | {"hello": "columnar"} |
| 86 | 86 | 86 | 2024-07-22 13:00:23.047 +0700 | {"hello": "columnar"} |
| 87 | 87 | 87 | 2024-07-22 13:00:23.047 +0700 | {"hello": "columnar"} |
| 88 | 88 | 88 | 2024-07-22 13:00:23.047 +0700 | {"hello": "columnar"} |
| 89 | 89 | 89 | 2024-07-22 13:00:23.047 +0700 | {"hello": "columnar"} |
| 90 | 90 | 90 | 2024-07-22 13:00:23.047 +0700 | {"hello": "columnar"} |
| 91 | 91 | 91 | 2024-07-22 13:00:23.047 +0700 | {"hello": "columnar"} |
| 92 | 92 | 92 | 2024-07-22 13:00:23.047 +0700 | {"hello": "columnar"} |
| 93 | 93 | 93 | 2024-07-22 13:00:23.047 +0700 | {"hello": "columnar"} |
| 94 | 94 | 94 | 2024-07-22 13:00:23.047 +0700 | {"hello": "columnar"} |
| 95 | 95 | 95 | 2024-07-22 13:00:23.047 +0700 | {"hello": "columnar"} |
| 96 | 96 | 96 | 2024-07-22 13:00:23.047 +0700 | {"hello": "columnar"} |
| 97 | 97 | 97 | 2024-07-22 13:00:23.047 +0700 | {"hello": "columnar"} |
| 98 | 98 | 98 | 2024-07-22 13:00:23.047 +0700 | {"hello": "columnar"} |
| 99 | 99 | 99 | 2024-07-22 13:00:23.047 +0700 | {"hello": "columnar"} |
| 100 | 100 | 100 | 2024-07-22 13:00:23.047 +0700 | {"hello": "columnar"} |

Refresh Save Cancel Export data 200 100

100 row(s) fetched - 0.042s (0.014s fetch), on 2024-07-22 at 13:32:21

b. Tabel columnar:

```
insert into events_columnar (device_id, data)
select d, '{"hello": "columnar"}' from generate_series(1,100) d;
```

| | device_id | event_id | event_time | data |
|-----|-----------|----------|-------------------------------|-----------------------|
| 76 | 76 | 76 | 2024-07-22 13:00:23.047 +0700 | {"hello": "columnar"} |
| 77 | 77 | 77 | 2024-07-22 13:00:23.047 +0700 | {"hello": "columnar"} |
| 78 | 78 | 78 | 2024-07-22 13:00:23.047 +0700 | {"hello": "columnar"} |
| 79 | 79 | 79 | 2024-07-22 13:00:23.047 +0700 | {"hello": "columnar"} |
| 80 | 80 | 80 | 2024-07-22 13:00:23.047 +0700 | {"hello": "columnar"} |
| 81 | 81 | 81 | 2024-07-22 13:00:23.047 +0700 | {"hello": "columnar"} |
| 82 | 82 | 82 | 2024-07-22 13:00:23.047 +0700 | {"hello": "columnar"} |
| 83 | 83 | 83 | 2024-07-22 13:00:23.047 +0700 | {"hello": "columnar"} |
| 84 | 84 | 84 | 2024-07-22 13:00:23.047 +0700 | {"hello": "columnar"} |
| 85 | 85 | 85 | 2024-07-22 13:00:23.047 +0700 | {"hello": "columnar"} |
| 86 | 86 | 86 | 2024-07-22 13:00:23.047 +0700 | {"hello": "columnar"} |
| 87 | 87 | 87 | 2024-07-22 13:00:23.047 +0700 | {"hello": "columnar"} |
| 88 | 88 | 88 | 2024-07-22 13:00:23.047 +0700 | {"hello": "columnar"} |
| 89 | 89 | 89 | 2024-07-22 13:00:23.047 +0700 | {"hello": "columnar"} |
| 90 | 90 | 90 | 2024-07-22 13:00:23.047 +0700 | {"hello": "columnar"} |
| 91 | 91 | 91 | 2024-07-22 13:00:23.047 +0700 | {"hello": "columnar"} |
| 92 | 92 | 92 | 2024-07-22 13:00:23.047 +0700 | {"hello": "columnar"} |
| 93 | 93 | 93 | 2024-07-22 13:00:23.047 +0700 | {"hello": "columnar"} |
| 94 | 94 | 94 | 2024-07-22 13:00:23.047 +0700 | {"hello": "columnar"} |
| 95 | 95 | 95 | 2024-07-22 13:00:23.047 +0700 | {"hello": "columnar"} |
| 96 | 96 | 96 | 2024-07-22 13:00:23.047 +0700 | {"hello": "columnar"} |
| 97 | 97 | 97 | 2024-07-22 13:00:23.047 +0700 | {"hello": "columnar"} |
| 98 | 98 | 98 | 2024-07-22 13:00:23.047 +0700 | {"hello": "columnar"} |
| 99 | 99 | 99 | 2024-07-22 13:00:23.047 +0700 | {"hello": "columnar"} |
| 100 | 100 | 100 | 2024-07-22 13:00:23.047 +0700 | {"hello": "columnar"} |

4. Tampilkan perbedaan ukuran antara tabel biasa dan tabel columnar!

Jawab:

Tabel biasa:

The screenshot shows a database client interface with a SQL query: `SELECT pg_size_pretty(pg_total_relation_size('events_row')) AS size_events_row;`. The results pane displays a single row with the value '48 kB'. The status bar at the bottom indicates '1 row(s) fetched - 0.215s, on 2024-07-22 at 13:34:44'.

| size_events_row |
|-----------------|
| 48 kB |

Tabel columnar:

The screenshot shows a database client interface with a SQL query: `SELECT pg_size_pretty(pg_total_relation_size('events_columnar')) AS size_events_columnar;`. The results pane displays a single row with the value '24 kB'. The status bar at the bottom indicates '1 row(s) fetched - 0.010s, on 2024-07-22 at 13:08:24'.

| size_events_columnar |
|----------------------|
| 24 kB |

5. Tuliskan kesimpulannya!

Jawab: Kesimpulannya adalah tabel biasa memiliki ukurannya lebih banyak karena bertujuan untuk operasi write. Sementara tabel columnar ukurannya lebih kecil karena bertujuan untuk penyimpanan dan read sehingga kecepatannya lebih cepat dari tabel biasa.