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Matkul: Sistem Informasi Geografis

Pertemuan 3

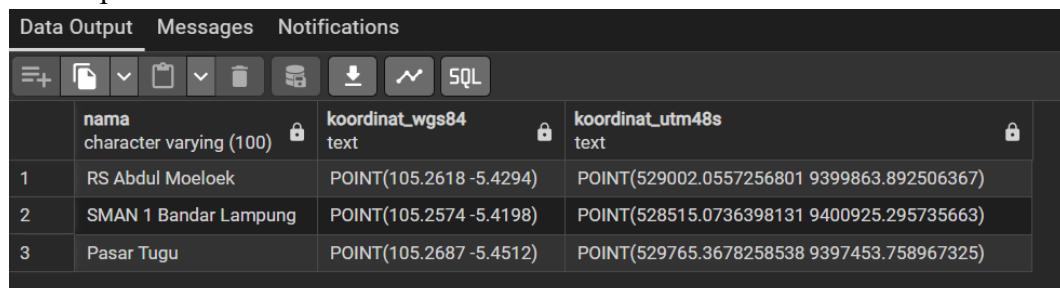
1. Transform data ke EPSG:32748 (UTM Zone 48S)

Sql:



```
Query  Query History
1  -- Transform fasilitas_publik ke UTM 48S
2  SELECT
3      nama,
4      ST_AsText(geom) as koordinat_wgs84,
5      ST_AsText(ST_Transform(geom, 32748)) as koordinat_utm48s
6  FROM fasilitas_publik;
```

Data Output:

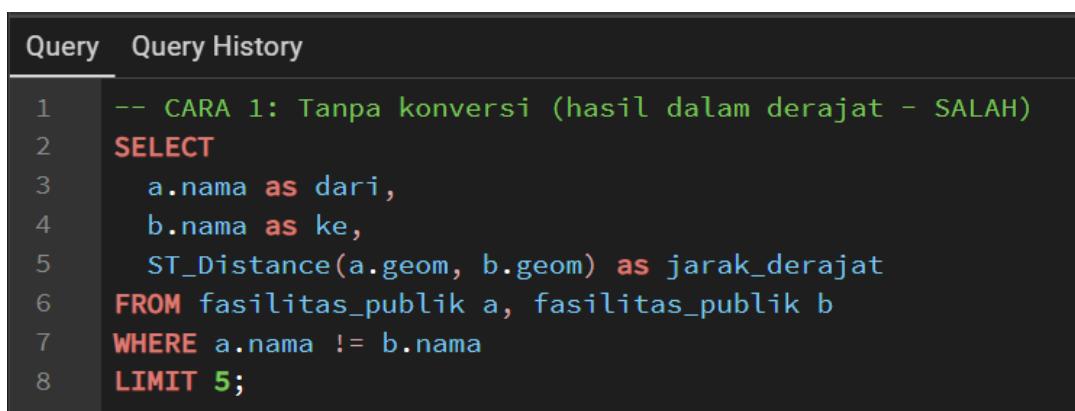


	nama character varying (100)	koordinat_wgs84 text	koordinat_utm48s text
1	RS Abdul Moeloek	POINT(105.2618 -5.4294)	POINT(529002.0557256801 9399863.892506367)
2	SMAN 1 Bandar Lampung	POINT(105.2574 -5.4198)	POINT(528515.0736398131 9400925.295735663)
3	Pasar Tugu	POINT(105.2687 -5.4512)	POINT(529765.3678258538 9397453.758967325)

2. Hitung jarak 3 cara

- Cara 1: Tanpa konversi

sql:



```
Query  Query History
1  -- CARA 1: Tanpa konversi (hasil dalam derajat - SALAH)
2  SELECT
3      a.nama as dari,
4      b.nama as ke,
5      ST_Distance(a.geom, b.geom) as jarak_derajat
6  FROM fasilitas_publik a, fasilitas_publik b
7  WHERE a.nama != b.nama
8  LIMIT 5;
```

Data Output:

Data Output			
	dari character varying (100)	ke character varying (100)	jarak_derajat double precision
1	RS Abdul Moeloek	SMAN 1 Bandar Lampung	0.010560303025950842
2	RS Abdul Moeloek	Pasar Tugu	0.022865913495857
3	SMAN 1 Bandar Lampung	RS Abdul Moeloek	0.010560303025950842
4	SMAN 1 Bandar Lampung	Pasar Tugu	0.033371394936379035
5	Pasar Tugu	RS Abdul Moeloek	0.022865913495857

- Cara 2 Menggunakan geography

Sql:

```
Query Query History
1 -- CARA 2: Menggunakan geography (hasil dalam meter)
2 SELECT
3     a.nama as dari,
4     b.nama as ke,
5     ST_Distance(
6         a.geom::geography,
7         b.geom::geography
8     ) as jarak_meter_geography
9     FROM fasilitas_publik a, fasilitas_publik b
10    WHERE a.nama != b.nama
11    LIMIT 5;
```

Data Output:

The screenshot shows a software interface titled "Data Output" with tabs for "Messages" and "Notifications". Below the tabs is a toolbar with various icons. The main area displays a table with four columns and five rows of data. The columns are labeled "dari", "ke", and "jarak_meter_geography". The data rows are as follows:

	dari	ke	jarak_meter_geography
1	RS Abdul Moeloek	SMAN 1 Bandar Lampung	1168.24314723
2	RS Abdul Moeloek	Pasar Tugu	2529.1042775
3	SMAN 1 Bandar Lampung	RS Abdul Moeloek	1168.24314723
4	SMAN 1 Bandar Lampung	Pasar Tugu	3691.2619654
5	Pasar Tugu	RS Abdul Moeloek	2529.1042775

- Cara 3: Transform ke UTM dulu

Sql:

The screenshot shows a "Query History" tab with a SQL script. The code is numbered from 1 to 11. It performs a spatial join between two tables, "fasilitas_publik", using their names as aliases "a" and "b". It filters out records where the names are identical. The result is limited to 5 rows. The code uses the "ST_Distance" function to calculate the distance between the transformed geometries of "a" and "b". The transformation is done using SRID 32748, which corresponds to UTM zone 48N.

```
1 -- CARA 3: Transform ke UTM dulu (hasil dalam meter)
2
3     a.nama as dari,
4     b.nama as ke,
5     ST_Distance(
6         ST_Transform(a.geom, 32748),
7         ST_Transform(b.geom, 32748)
8     ) as jarak_meter_utm
9
10    FROM fasilitas_publik a, fasilitas_publik b
11    WHERE a.nama != b.nama
12    LIMIT 5;
```

Data Output:

Data Output			
	dari character varying (100)	ke character varying (100)	jarak_meter_utm double precision
1	RS Abdul Moeloek	SMAN 1 Bandar Lampung	1167.7878091142081
2	RS Abdul Moeloek	Pasar Tugu	2528.119664549973
3	SMAN 1 Bandar Lampung	RS Abdul Moeloek	1167.7878091142081
4	SMAN 1 Bandar Lampung	Pasar Tugu	3689.824262152288
5	Pasar Tugu	RS Abdul Moeloek	2528.119664549973

3. Hitung luas wilayah dengan UTM

Sql:

Query	Query History
1 SELECT 2 nama , 3 ST_Area(ST_Transform(geom, 32748)) as luas_m2 , 4 ST_Area(ST_Transform(geom, 32748)) / 10000 as luas_ha , 5 ST_Area(ST_Transform(geom, 32748)) / 1000000 as luas_km2 6 FROM wilayah;	

Data Output:

Data Output				
	nama character varying (100)	luas_m2 double precision	luas_ha double precision	luas_km2 double precision
1	Kecamatan Sukarambe	12940277.740606293	1294.0277740606293	12.940277740606293
2	Sabah Balau	7298195.421065092	729.8195421065092	7.298195421065092

4. Tabel perbandingan 3 cara sekaligus

Sql:

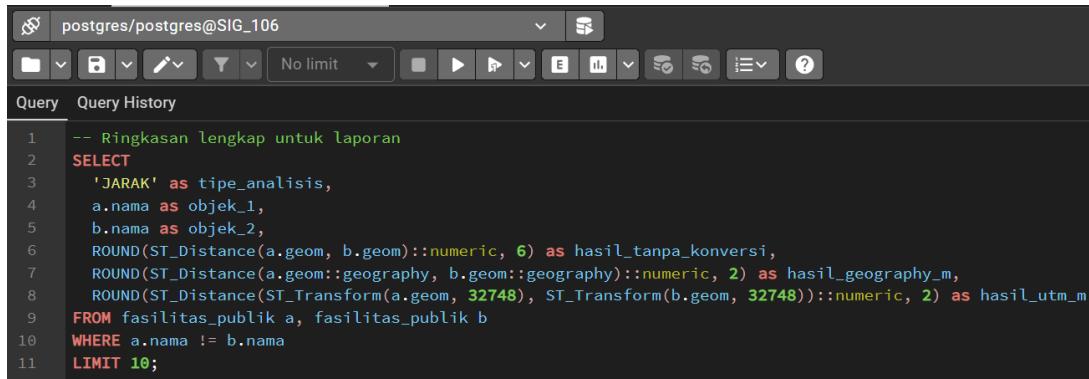
```
Query Query History
1  SELECT
2      a.nama as dari,
3      b.nama as ke,
4      -- Cara 1: tanpa konversi
5      ST_Distance(a.geom, b.geom) as jarak_derajat,
6      -- Cara 2: geography
7      ST_Distance(
8          a.geom::geography,
9          b.geom::geography
10     ) as jarak_geography_m,
11     -- Cara 3: UTM
12     ST_Distance(
13         ST_Transform(a.geom, 32748),
14         ST_Transform(b.geom, 32748)
15     ) as jarak_utm_m,
16     -- Selisih cara 2 dan 3
17     ABS(
18         ST_Distance(a.geom::geography, b.geom::geography) -
19         ST_Distance(ST_Transform(a.geom, 32748), ST_Transform(b.geom, 32748))
20     ) as selisih_m
21 FROM fasilitas_publik a, fasilitas_publik b
22 WHERE a.nama != b.nama
23 LIMIT 10;
```

Data Output:

	dari	ke	jarak_derajat	jarak_geography_m	jarak_utm_m	selisih_m
1	RS Abdul Moeook	SMAN 1 Bandar Lampung	0.010560303025950842	1168.24314723	1167.7878091142081	0.4553381157918466
2	RS Abdul Moeook	Pasar Tugu	0.022865913495857	2529.1042775	2528.119664549973	0.9846129500269853
3	SMAN 1 Bandar Lampung	RS Abdul Moeook	0.010560303025950842	1168.24314723	1167.7878091142081	0.4553381157918466
4	SMAN 1 Bandar Lampung	Pasar Tugu	0.033371394936379035	3691.2619654	3689.824262152288	1.4377032477118519
5	Pasar Tugu	RS Abdul Moeook	0.022865913495857	2529.1042775	2528.119664549973	0.9846129500269853
6	Pasar Tugu	SMAN 1 Bandar Lampung	0.033371394936379035	3691.2619654	3689.824262152288	1.4377032477118519

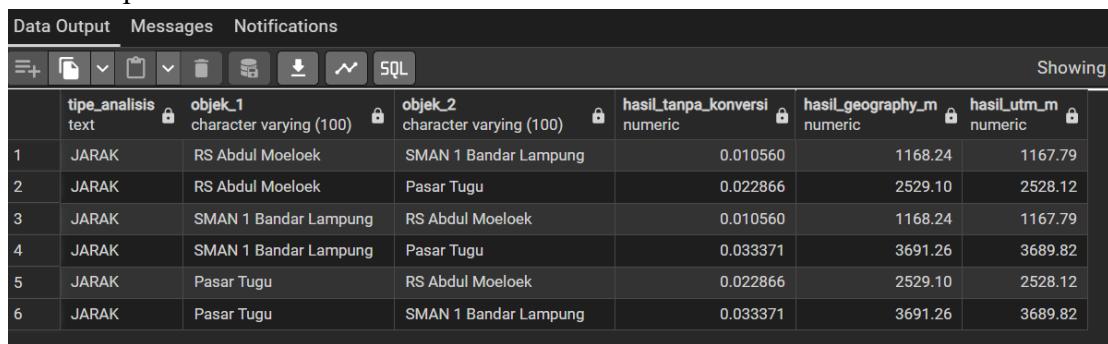
5. Tampilkan semua hasil dalam 1 laporan

Sql:



```
-- Ringkasan lengkap untuk laporan
SELECT
    'JARAK' AS tipe_analisis,
    a.nama AS objek_1,
    b.nama AS objek_2,
    ROUND(ST_Distance(a.geom, b.geom)::numeric, 6) AS hasil_tanpa_konversi,
    ROUND(ST_Distance(a.geom::geography, b.geom::geography)::numeric, 2) AS hasil_geography_m,
    ROUND(ST_Distance(ST_Transform(a.geom, 32748), ST_Transform(b.geom, 32748))::numeric, 2) AS hasil_utm_m
FROM fasilitas_publik a, fasilitas_publik b
WHERE a.nama != b.nama
LIMIT 10;
```

Data Output:



	tipe_analisis	objek_1	objek_2	hasil_tanpa_konversi	hasil_geography_m	hasil_utm_m
1	JARAK	RS Abdul Moeloek	SMAN 1 Bandar Lampung	0.010560	1168.24	1167.79
2	JARAK	RS Abdul Moeloek	Pasar Tugu	0.022866	2529.10	2528.12
3	JARAK	SMAN 1 Bandar Lampung	RS Abdul Moeloek	0.010560	1168.24	1167.79
4	JARAK	SMAN 1 Bandar Lampung	Pasar Tugu	0.033371	3691.26	3689.82
5	JARAK	Pasar Tugu	RS Abdul Moeloek	0.022866	2529.10	2528.12
6	JARAK	Pasar Tugu	SMAN 1 Bandar Lampung	0.033371	3691.26	3689.82