

Напредна тема - PostGIS

Додавање на колона за координати во табелата Аеродроми и полнење на истата:

```
ALTER TABLE Airport
ADD COLUMN Coordinates geometry(Point, 4326);
```

```
UPDATE Airport
SET Coordinates = ST_SetSRID(
    ST_MakePoint(
        CASE IataCode
            WHEN 'SKP' THEN 21.6214
            WHEN 'OHD' THEN 20.7423
            WHEN 'BEG' THEN 20.3091
            WHEN 'INI' THEN 21.8544
            WHEN 'ZAG' THEN 16.0688
            WHEN 'SPU' THEN 16.2980
            WHEN 'DBV' THEN 18.2682
            WHEN 'SJJ' THEN 18.3315
            WHEN 'BNX' THEN 17.2975
            WHEN 'TGD' THEN 19.2519
            WHEN 'TIV' THEN 18.7244
            WHEN 'TIA' THEN 19.7206
            WHEN 'PRN' THEN 21.0358
            WHEN 'ATH' THEN 23.9445
            WHEN 'SKG' THEN 22.9709
            WHEN 'HER' THEN 25.1803
            WHEN 'SOF' THEN 23.4114
            WHEN 'VAR' THEN 27.8251
            WHEN 'BOJ' THEN 27.5152
            WHEN 'OTP' THEN 26.0850
            WHEN 'CLJ' THEN 23.6862
            WHEN 'TSR' THEN 21.3379
            WHEN 'IST' THEN 28.7519
            WHEN 'SAW' THEN 29.3092
            WHEN 'ESB' THEN 32.9951
            WHEN 'FRA' THEN 8.5706
            WHEN 'MUC' THEN 11.7861
            WHEN 'BER' THEN 13.5033
            WHEN 'HAM' THEN 9.9882
            WHEN 'CDG' THEN 2.5479
            WHEN 'NCE' THEN 7.2159
            WHEN 'LYS' THEN 5.0811
            WHEN 'FCO' THEN 12.2508
            WHEN 'MXP' THEN 8.7281
            WHEN 'VCE' THEN 12.3519
            WHEN 'NAP' THEN 14.2908
            WHEN 'BLQ' THEN 11.2887
```

```
WHEN 'TRN' THEN 7.6496
WHEN 'PMO' THEN 13.0910
WHEN 'CTA' THEN 15.0664
WHEN 'CAG' THEN 9.0543
WHEN 'OLB' THEN 9.5176
WHEN 'MAD' THEN -3.5676
WHEN 'BCN' THEN 2.0785
WHEN 'VLC' THEN -0.4816
WHEN 'LHR' THEN -0.4543
WHEN 'LGW' THEN -0.1903
WHEN 'MAN' THEN -2.2749
WHEN 'AMS' THEN 4.7639
WHEN 'BRU' THEN 4.4844
WHEN 'EIN' THEN 5.3745
WHEN 'VIE' THEN 16.5697
WHEN 'ZRH' THEN 8.5492
WHEN 'GVA' THEN 6.1089
WHEN 'WAW' THEN 20.9671
WHEN 'PRG' THEN 14.2632
WHEN 'BUD' THEN 19.2611
WHEN 'DXB' THEN 55.3644
WHEN 'DOH' THEN 51.6138
WHEN 'AUH' THEN 54.6511
WHEN 'JFK' THEN -73.7781
WHEN 'YYZ' THEN -79.6306
WHEN 'HND' THEN 139.7798
WHEN 'PEK' THEN 116.5871
WHEN 'SIN' THEN 103.9940
END,
CASE IataCode
WHEN 'SKP' THEN 41.9616
WHEN 'OHD' THEN 41.1799
WHEN 'BEG' THEN 44.8184
WHEN 'INI' THEN 43.3373
WHEN 'ZAG' THEN 45.7429
WHEN 'SPU' THEN 43.5389
WHEN 'DBV' THEN 42.5614
WHEN 'SJJ' THEN 43.8246
WHEN 'BNX' THEN 44.9414
WHEN 'TGD' THEN 42.3594
WHEN 'TIV' THEN 42.4047
WHEN 'TIA' THEN 41.4147
WHEN 'PRN' THEN 42.5728
WHEN 'ATH' THEN 37.9364
WHEN 'SKG' THEN 40.5197
WHEN 'HER' THEN 35.3397
WHEN 'SOF' THEN 42.6967
WHEN 'VAR' THEN 43.2321
WHEN 'BOJ' THEN 42.5696
WHEN 'OTP' THEN 44.5711
```

```
WHEN 'CLJ' THEN 46.7852
WHEN 'TSR' THEN 45.8099
WHEN 'IST' THEN 41.2753
WHEN 'SAW' THEN 40.8986
WHEN 'ESB' THEN 40.1281
WHEN 'FRA' THEN 50.0379
WHEN 'MUC' THEN 48.3538
WHEN 'BER' THEN 52.3667
WHEN 'HAM' THEN 53.6304
WHEN 'CDG' THEN 49.0097
WHEN 'NCE' THEN 43.6584
WHEN 'LYS' THEN 45.7256
WHEN 'FCO' THEN 41.8003
WHEN 'MXP' THEN 45.6306
WHEN 'VCE' THEN 45.5053
WHEN 'NAP' THEN 40.8860
WHEN 'BLQ' THEN 44.5354
WHEN 'TRN' THEN 45.2008
WHEN 'PMO' THEN 38.1759
WHEN 'CTA' THEN 37.4668
WHEN 'CAG' THEN 39.2515
WHEN 'OLB' THEN 40.8987
WHEN 'MAD' THEN 40.4983
WHEN 'BCN' THEN 41.2974
WHEN 'VLC' THEN 39.4893
WHEN 'LHR' THEN 51.4700
WHEN 'LGW' THEN 51.1537
WHEN 'MAN' THEN 53.3537
WHEN 'AMS' THEN 52.3105
WHEN 'BRU' THEN 50.9010
WHEN 'EIN' THEN 51.4501
WHEN 'VIE' THEN 48.1103
WHEN 'ZRH' THEN 47.4581
WHEN 'GVA' THEN 46.2381
WHEN 'WAW' THEN 52.1657
WHEN 'PRG' THEN 50.1008
WHEN 'BUD' THEN 47.4369
WHEN 'DXB' THEN 25.2532
WHEN 'DOH' THEN 25.2731
WHEN 'AUH' THEN 24.4330
WHEN 'JFK' THEN 40.6413
WHEN 'YYZ' THEN 43.6777
WHEN 'HND' THEN 35.5494
WHEN 'PEK' THEN 40.0799
WHEN 'SIN' THEN 1.3644
```

```
END
```

```
),
4326
```

```
);
```

4326 е **SRID** (Spatial Reference ID) — број кој кажува кој координатен систем се користи.
4326 = WGS 84 — тоа е системот кој го користи **GPS**

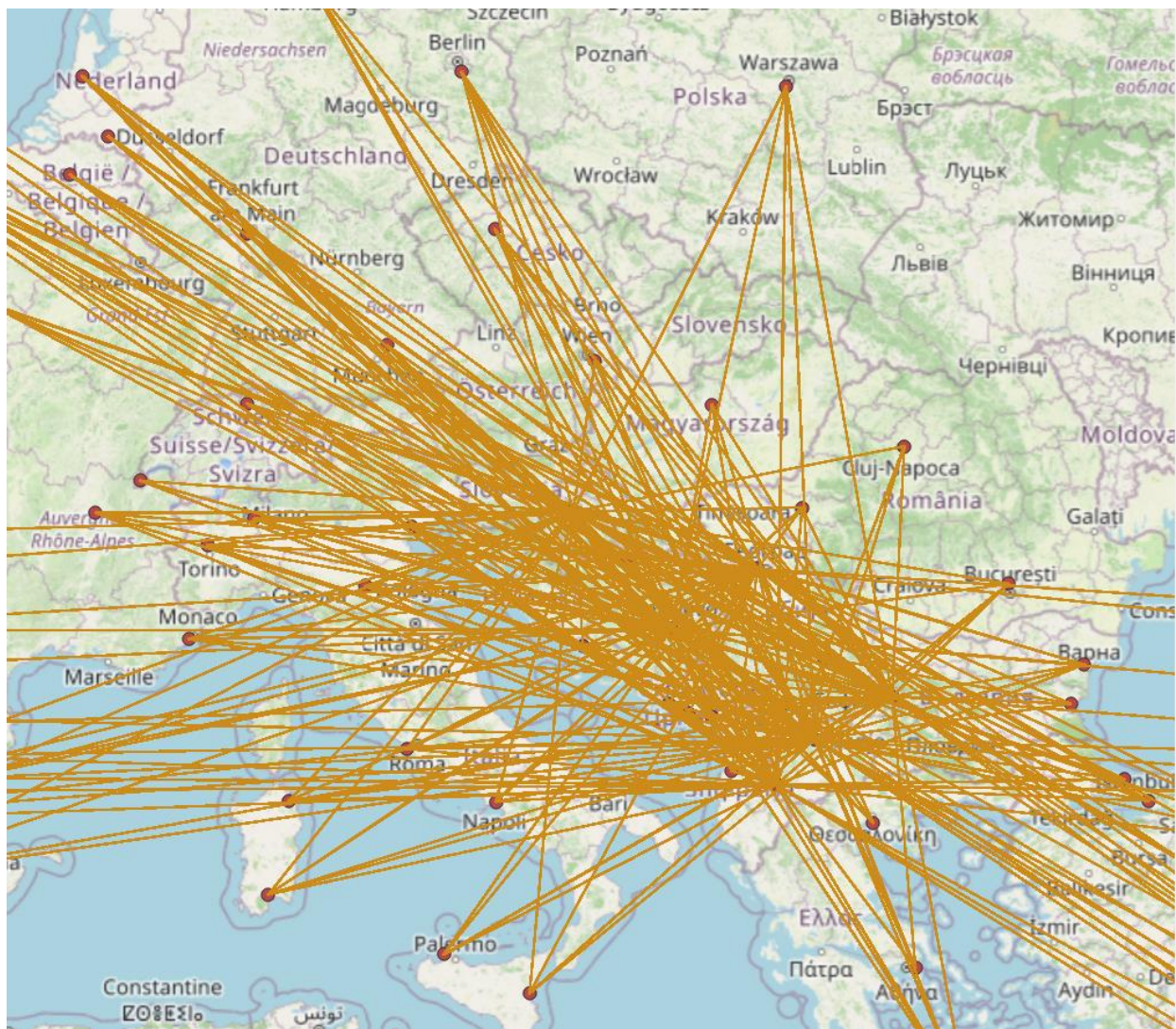
View за дистанца на секој лет:

```
CREATE VIEW flight_distances AS
SELECT
    f.flightid,
    a1.IataCode AS from_airport,
    a2.IataCode AS to_airport,
    ST_Distance(
        a1.Coordinates::geography,
        a2.Coordinates::geography
    ) / 1000 AS distance_km
FROM flights f
JOIN Airport a1 ON a1.AirportId = f.originairportid
JOIN Airport a2 ON a2.AirportId = f.destinationairportid;
```

View за да се исртаат линии кои го означуваат секој лет

```
CREATE VIEW flight_lines AS
SELECT
    f.flightid,
    f.flightnumber,
    f.operatingstatus,
    f.flightclass,
    a1.IataCode AS from_airport,
    a2.IataCode AS to_airport,
    ROUND(
        ST_Distance(
            a1.Coordinates::geography,
            a2.Coordinates::geography
        ) / 1000
    ) AS distance_km,
    ST_MakeLine(a1.Coordinates, a2.Coordinates) AS geom
FROM flights f
JOIN Airport a1 ON a1.AirportId = f.originairportid
JOIN Airport a2 ON a2.AirportId = f.destinationairportid
WHERE a1.Coordinates IS NOT NULL
    AND a2.Coordinates IS NOT NULL;
```

Изглед во QGIS



Функција која ги прикажува најблиските аеродроми за даден ИАТА код на аеродром во даден радиус

```
CREATE OR REPLACE FUNCTION airports_near(
    iata_code varchar, radius_km float
)
RETURNS TABLE(AirportName varchar, IataCode varchar, distance_km numeric)
AS $$
    SELECT a.AirportName, a.IataCode,
        ROUND(ST_Distance(
            a.Coordinates::geography,
            origin.Coordinates::geography
        ) / 1000) AS distance_km
    FROM Airport a
    CROSS JOIN (
        SELECT Coordinates
        FROM Airport
```

```

        WHERE IataCode = iata_code
    ) origin
    WHERE ST_Distance(
        a.Coordinates::geography,
        origin.Coordinates::geography
    ) / 1000 <= radius_km
    AND a.IataCode != iata_code
    ORDER BY distance_km;
$$ LANGUAGE sql;

```

Пример:

```
SELECT * FROM airports_near('SKP', 500);
```

	airportname	iatacode	distance_km
1	Pristina International Airport	PRN	83
2	Ohrid St. Paul the Apostle Airport	OHD	114
3	Niš Constantine the Great Airport	INI	154
4	Sofia Airport	SOF	169
5	Tirana International Airport	TIA	170
6	Thessaloniki Airport	SKG	196
7	Podgorica Airport	TGD	201
8	Tivat Airport	TIV	244
9	Dubrovnik Airport	DBV	285
10	Belgrade Nikola Tesla Airport	BEG	335
11	Sarajevo International Airport	SJJ	339
12	Timișoara Airport	TSR	428
13	Henri Coandă Airport	OTP	464
14	Split Airport	SPU	470
15	Banja Luka Airport	BNX	482
16	Athens International Airport	ATH	489
17	Burgas Airport	BOJ	491