bite-sized.sql

# SQL Server: Calculate geographic distances

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# Sample data of trips between 2 stations in NYC

The location data are stored as latitude and longitude in separate columns

```
SELECT TOP 5 *
FROM #trips;
```

| | start_station_name | start_lat | start_lng | |
|---|---|---|---|---|
| 1 | Audobon Ave & W 179 St | 40.8472251892... | -73.933380126... | W |
| 2 | Wards Meadow Comfort Station | 40.7829399108... | -73.930770874... | |
| 3 | Pulaski St & Marcus Garvey Blvd | 40.6934242248... | -73.939849853... | B |
| 4 | 6 Ave & W 33 St | 40.7490119934... | -73.988487243... | |
| 5 | W 64 St & Thelonious Monk Circle | 40.7752189636... | -73.988700866... | |

| | end_station_name | end_lat | end_lng |
|---|---|---|---|
| 0126... | W 160 St & St. Nicholas Ave | 40.8344688415... | -73.939865112... |
| 0874... | E 106 St & Madison Ave | 40.7934341430... | -73.949447631... |
| 49853... | Broadway & Madison St | 40.6882209777... | -73.919662475... |
| 37243... | 35 St & Broadway | 40.7603378295... | -73.922241210... |
| 8700866... | W 70 St & Amsterdam Ave | 40.7774810791... | -73.982887268... |

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# Calculate shortest LineString between two geography points

geography:: indicates we are using the .NET Common-language runtime (CLR) geography data type

Point( creates a geography representing a Point instance from the given lat/long. 4326 is the Spatial Reference ID (SRID)

```
WITH

trips AS
(SELECT *,
    geography::Point(start_lat, start_lng, 4326) AS start_geog,
    geography::Point(end_lat, end_lng, 4326) AS end_geog
FROM #trips),


distances AS
(SELECT *, start_geog.STDistance(end_geog) AS distance
FROM trips)


SELECT  MIN(distance) AS min_distance,
        AVG(distance) AS avg_distance,
        MAX(distance) AS max_distance
FROM distances;
```

The .STDistance function calculates the distance of the shortest line between the two geographies.

The distance is returned in metres

| | min_distance | avg_distance | max_distance |
|---|---|---|---|
| 1 | 0 | 2792.3624344996... | 24905.405721206218 |

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# There are many other spatial functions

- STArea
- STAsBinary
- STAsText
- STBuffer
- STContains
- STConvexHull
- STCurveN
- STCurveToLine
- STDifference
- STDimension
- STDisjoint
- STDistance
- STEndpoint
- STEquals
- STGeometryN
- STGeometryType
- STIntersection
- STIntersects
- STIsClosed
- STIsEmpty
- STIsValid
- STLength
- STNumCurves
- STNumGeometries

SQL Server:

MySQL:

PostgreSQL
(PostGIS extension)

Oracle
(SDO_Geom package)