

PostGIS

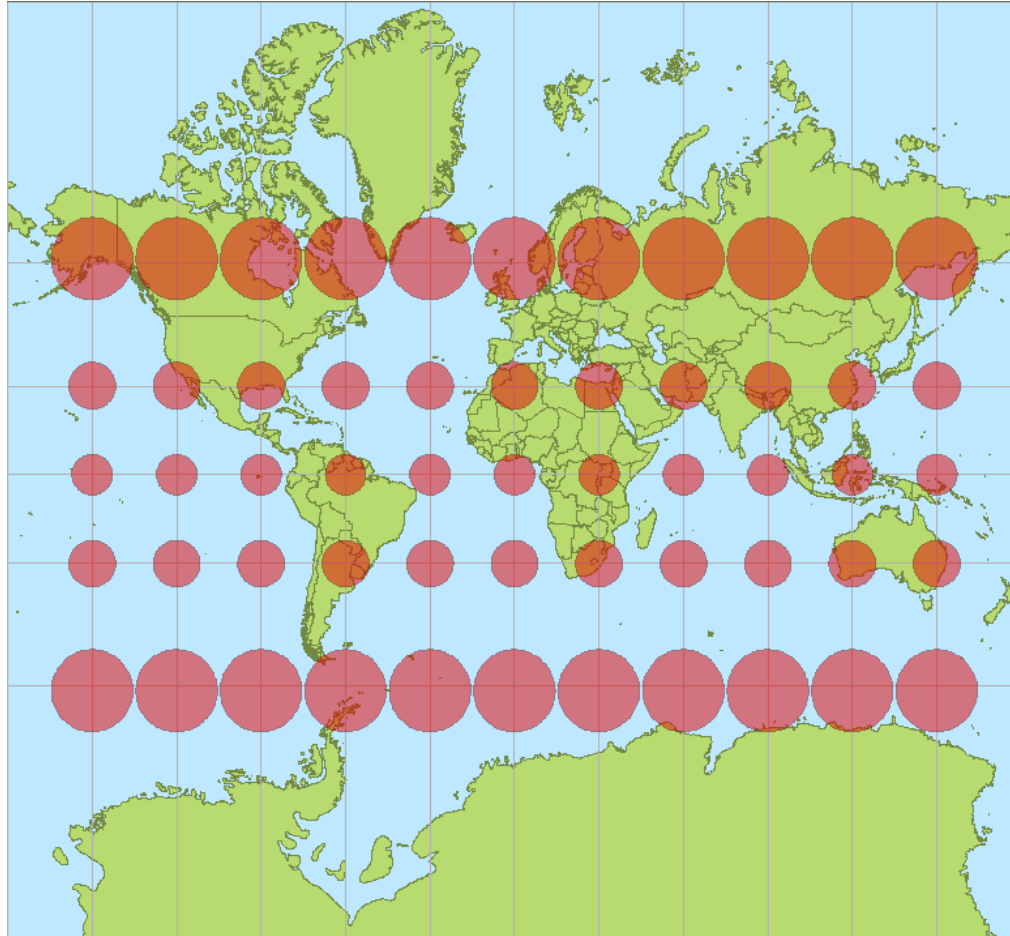
geographical search

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Distortion



Coordinate Reference System

- Coordinate System
- Data source
- Projection
- EPSG: Collection of standard CRS
- SRID: Indicate the Postgis definition of the CRS.
(Defaults collection of EPSG, but can be customized or added to)

Coordinates are only meaningful in context with an SRID!

WGS 84

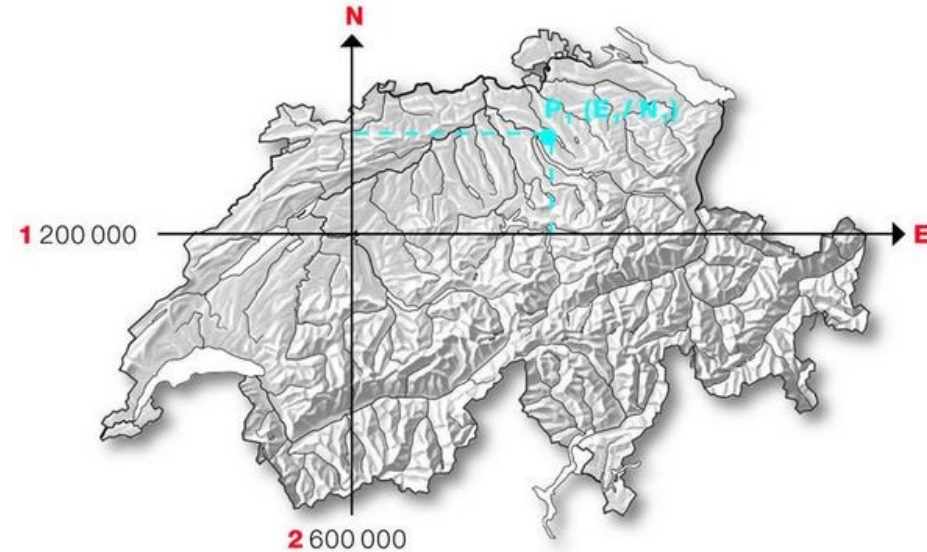
- Longitude east/west: -180 to +180
- Latitude north/south: -90 (south pole) to +90 (north pole)

PostGIS uses X=lon, Y=lat

If you swap them, you end up in completely wrong places...

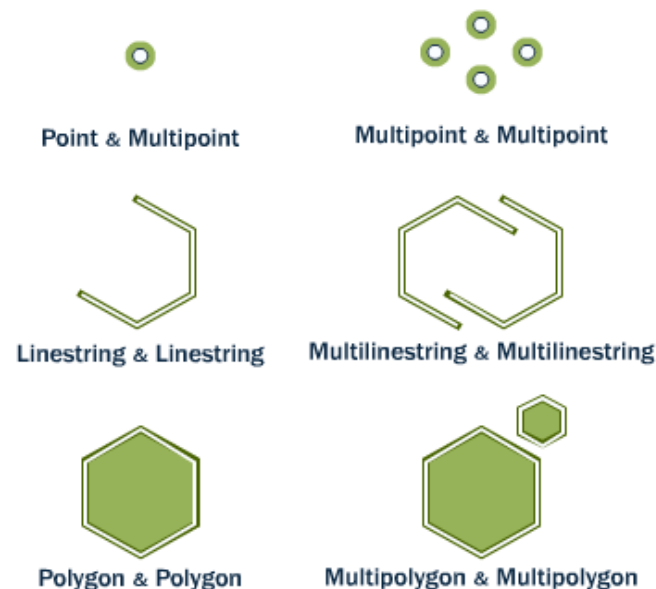
LV 95

- “Fake origin” outside of Switzerland:
 - Avoid negative numbers.
 - Offset so that Easting and Northing can not be confused.
- Easting: Meters to the east
- Northing: Meters toward north



PostGIS features

- Primitives: POINT, LINESTRING, POLYGON and MULTI-...
- Spatial Relationships: Equals, Intersects / Disjoint (special cases Crosses, Overlaps), Contains / Within, Touches
- Measure: ST_Area, ST_Length, ST_Perimeter
- Operations: ST_Union, ST_Intersection, ST_Difference, ST_Buffer (polygon around geometry)



PostGIS in practice

```
CREATE TABLE points (  
    id    SERIAL PRIMARY KEY,  
    name  TEXT,  
    geom  geometry(Point, 2056) NOT NULL  
);
```

```
CREATE INDEX points_geom_idx  
ON points  
USING GIST (geom);
```


PostGIS in practice

```
INSERT INTO points (name, geom)
VALUES
    ('Bern', ST_SetSRID(ST_MakePoint(2600000, 1200000), 2056)),
    ('Zurich', ST_SetSRID(ST_MakePoint(2683000, 1247000), 2056))
;
```

PostGIS in practice

```
SELECT *  
FROM points  
WHERE ST_Within(  
    geom,  
    ST_GeomFromText(  
        'POLYGON((2600000 1200000, 2601000 1200000,  
                  2601000 1201000, 2600000 1201000,  
                  2600000 1200000))',  
        2056  
    )  
);
```

PostGIS with Doctrine/Symfony

composer require jsor/doctrine-postgis
(provides ST_* functions for Doctrine)

```
#[ORM\Column(  
    type: PostGISType::GEOMETRY,  
    nullable: true,  
    options: [  
        'geometry_type' => 'POINT',  
        'srid' => 2056  
    ],  
)]  
private ?string $geoCoordinatesWGS84 = null;
```

and happy mapping!

