

Jan Vlasatý, Ben Kotmel

Operátor ICT
Golemio

Introduction to GeoData

17.00

data

maps

sources

visualization

geodata

processing

faq

#1 #2 #3 #4 #5 #6 #7

18.20

#1

17.05

Data
and GeoData

Data

CSV

```
id,name,height  
34,Jan,184  
36,Peter,192
```

JSON

```
...{ id: 34,  
      name: "Jan",  
      height: 184 }  
{ id: 36,  
      name: "Peter",  
      height: 192 },...
```

XML

```
...<human id="34"  
name="Jan"><height  
value="184" /></human>...
```

String

```
Jan (34) - 184cm, Peter  
(36) - 192 cm
```

Data

GeoData

```
id,name,height,address_latitude,address_longitude  
34,Jan,184,50.421,14.2414  
36,Peter,192,50.812,14.0128
```

```
id,district,area_polygon  
34,Prague 1,POLYGON(50.421 14.2414, 50.812,14.012...)  
36,Prague 2,POLYGON(50.812 14.0127, 50.283,14.938...)
```

Reference to geometry with geocoordinates..

#2

17.15

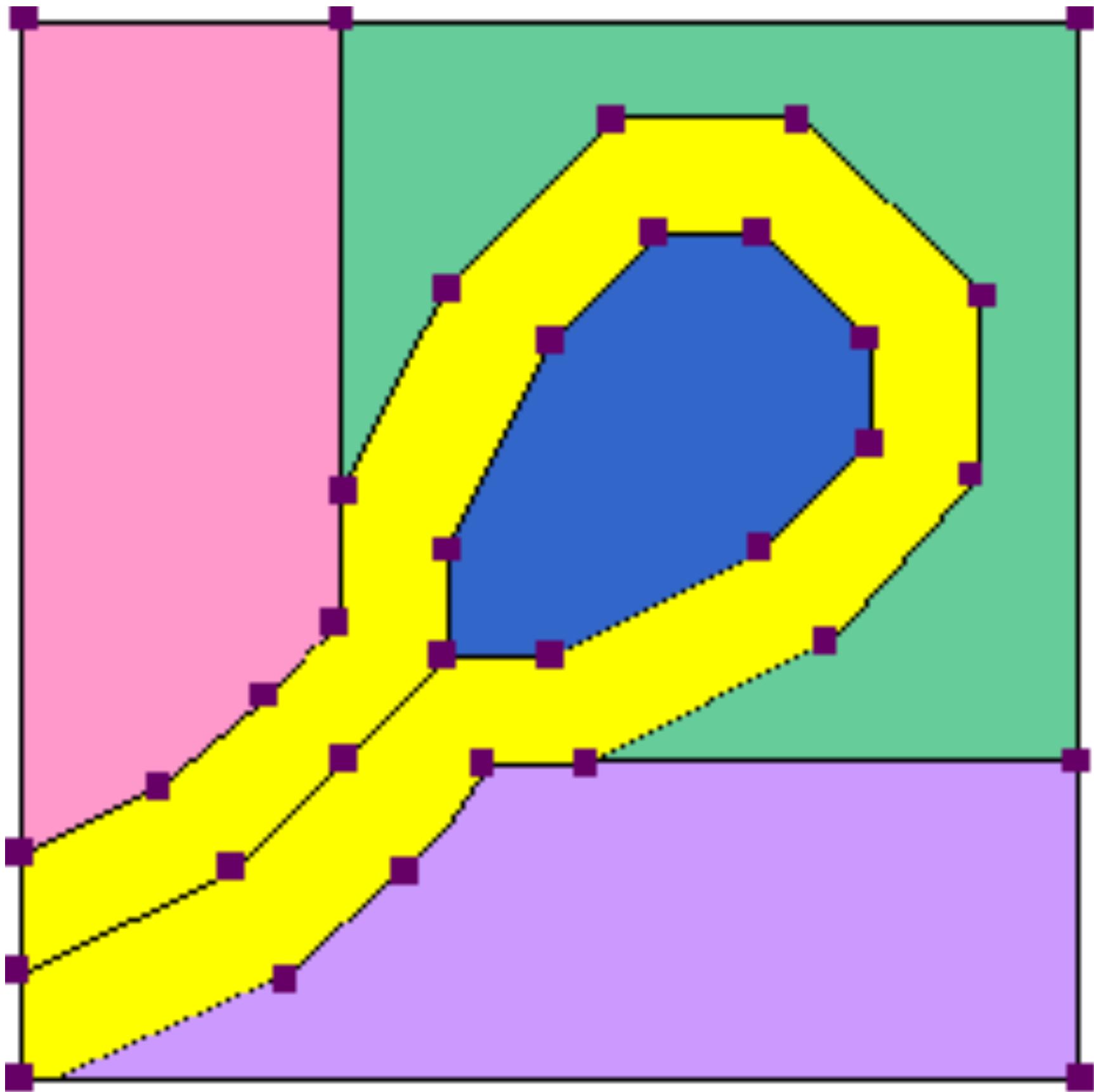
Maps

Coordinate systems

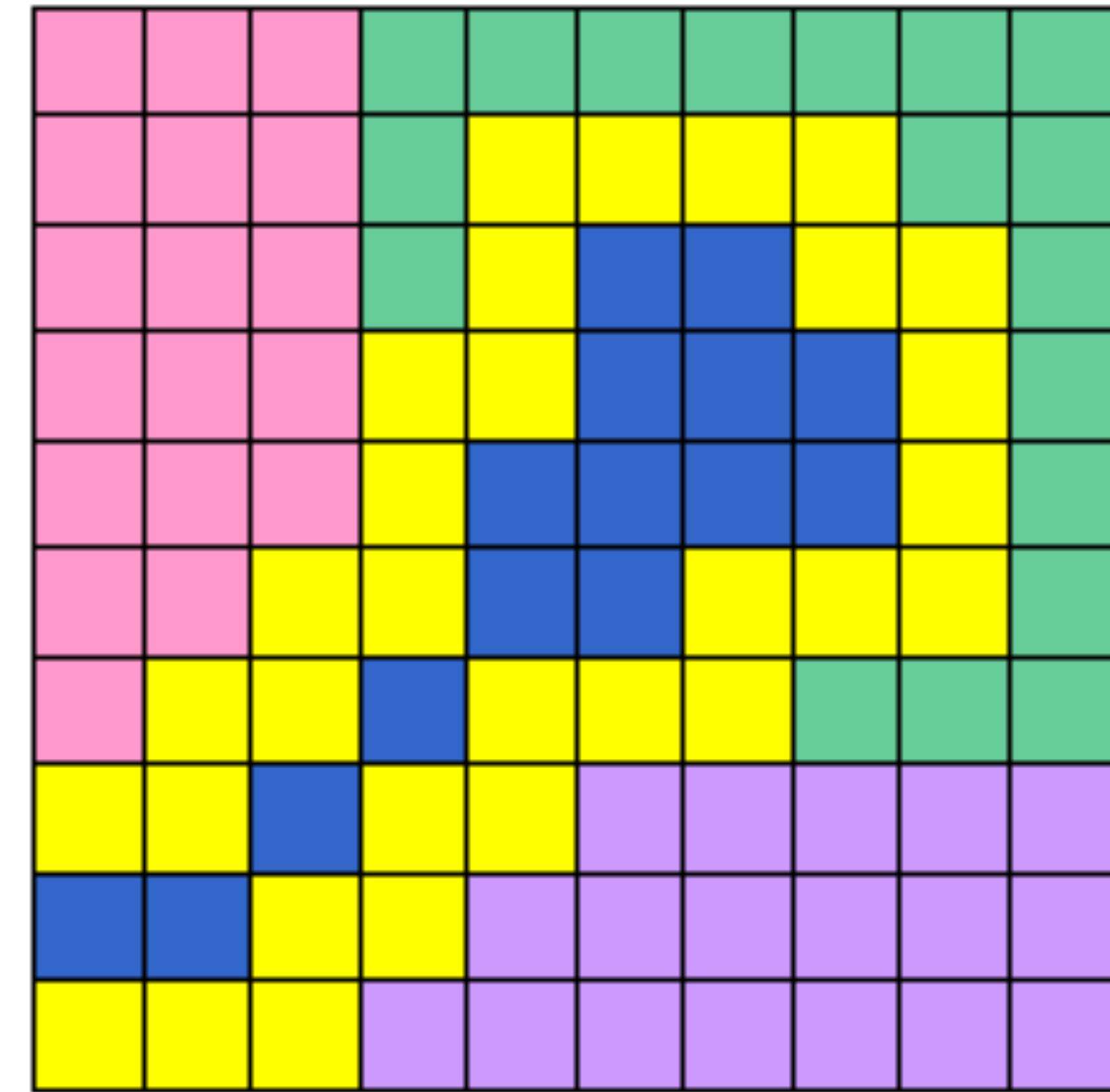
OpenStreetMaps

Maps

Vector



Raster



Maps



Maps



Maps



Maps

<http://gis.brno.cz/mapa/teplotni-mapa/>

<http://mpp.praha.eu/app/map/atlas-zivotniho-prostredi/cs/hlukova-mapa>

Coordinate systems



\$9.97

[https://
www.amazon.com/
Learning-Resources-
Inflatable-inch-Globe/dp/
B0009K3116](https://www.amazon.com/Learning-Resources-Inflatable-inch-Globe/dp/B0009K3116)

Coordinate systems



Coordinate systems

50.0718728N,
14.4427653E

GPS != WGS84

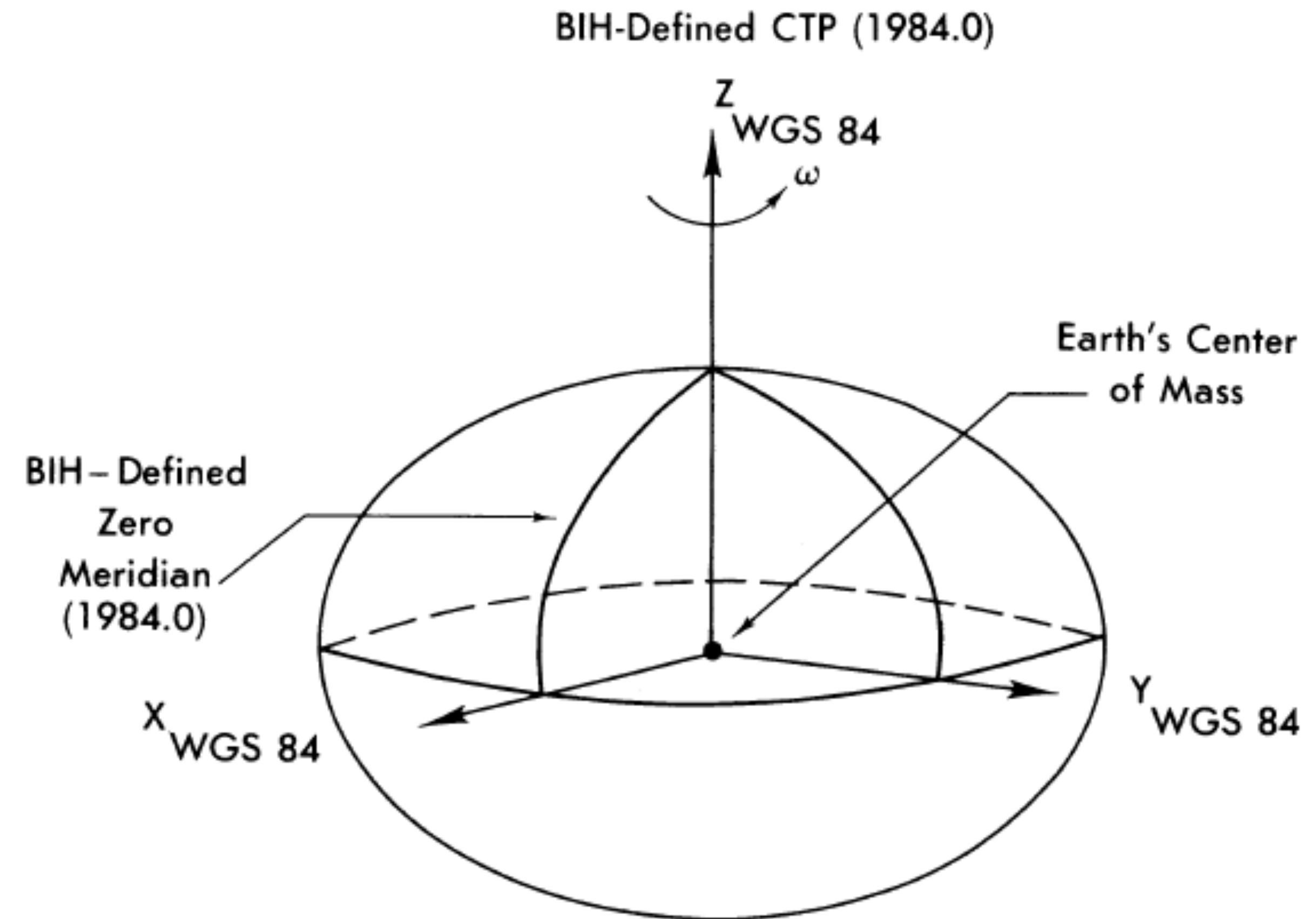
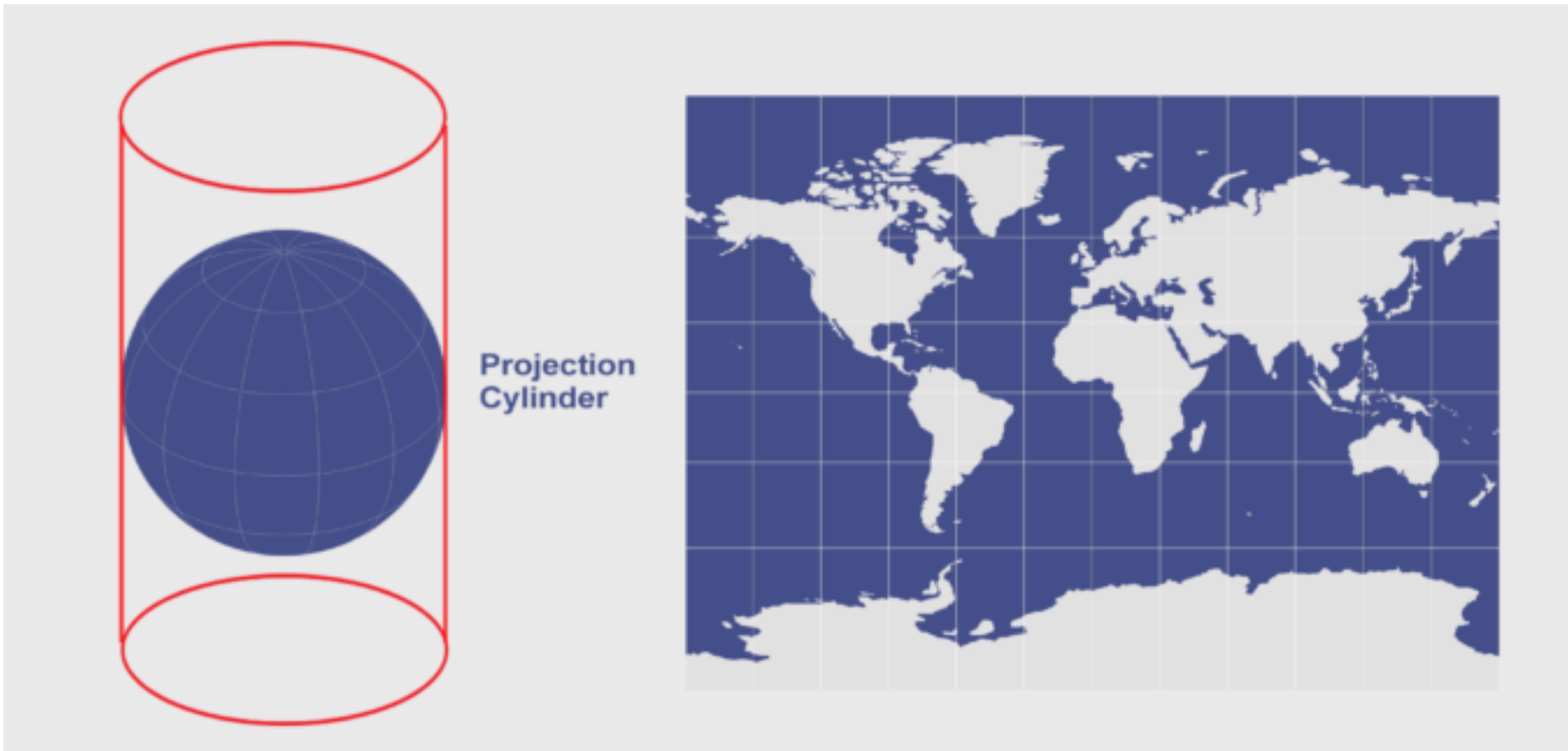


Figure 1.1. WGS 84 Reference Frame

Coordinate systems



https://en.wikipedia.org/wiki/Web_Mercator_projection

Projection

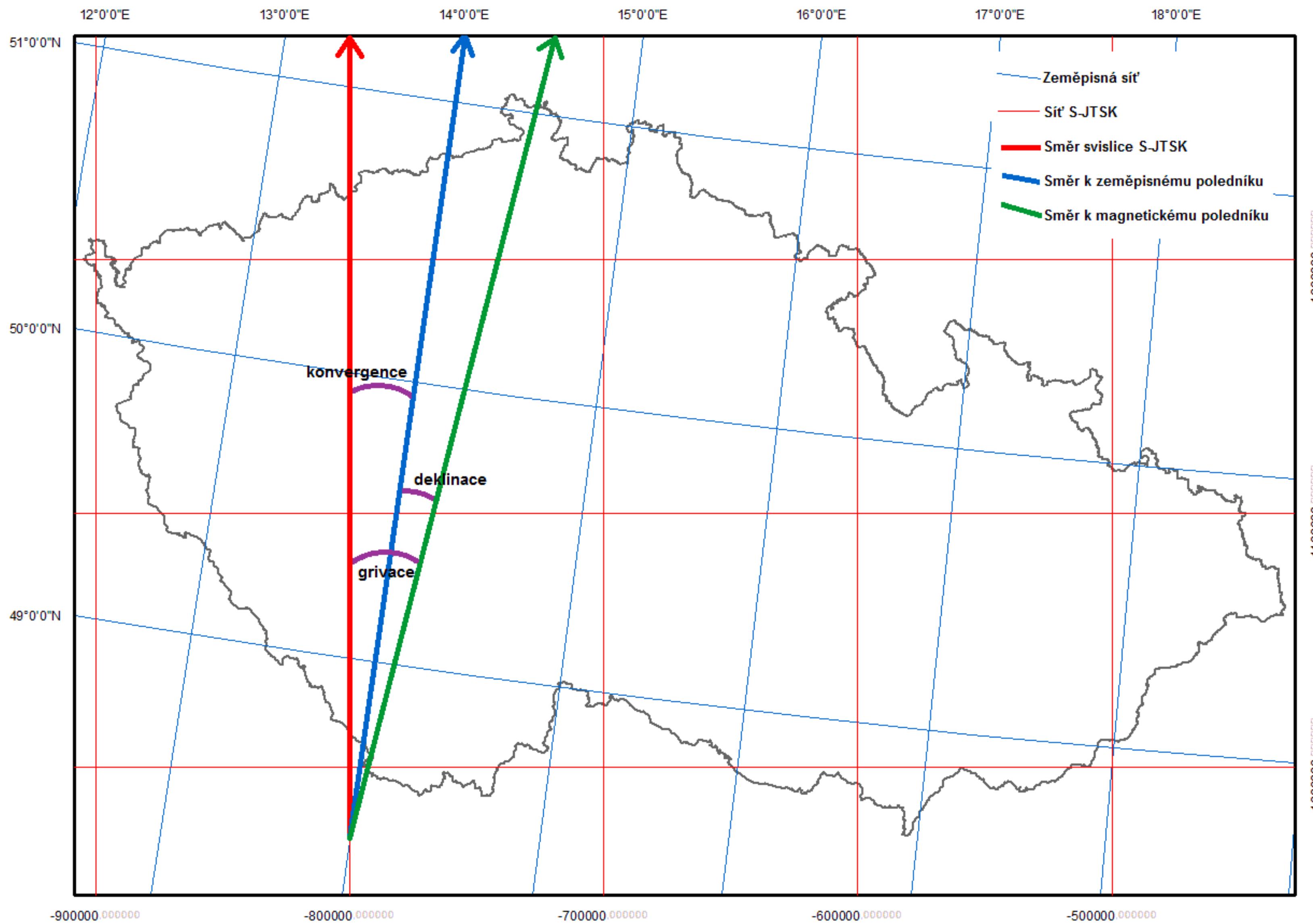
WGS84

S-JTSK

[http://www.geoportalpraha.cz/cs/opendata/
4A14E013-3B9D-4270-BEBE-64944C3DFA19](http://www.geoportalpraha.cz/cs/opendata/4A14E013-3B9D-4270-BEBE-64944C3DFA19)

[https://source.opennews.org/articles/
choosing-right-map-projection/](https://source.opennews.org/articles/choosing-right-map-projection/)

Coordinate systems



Flight route paradox

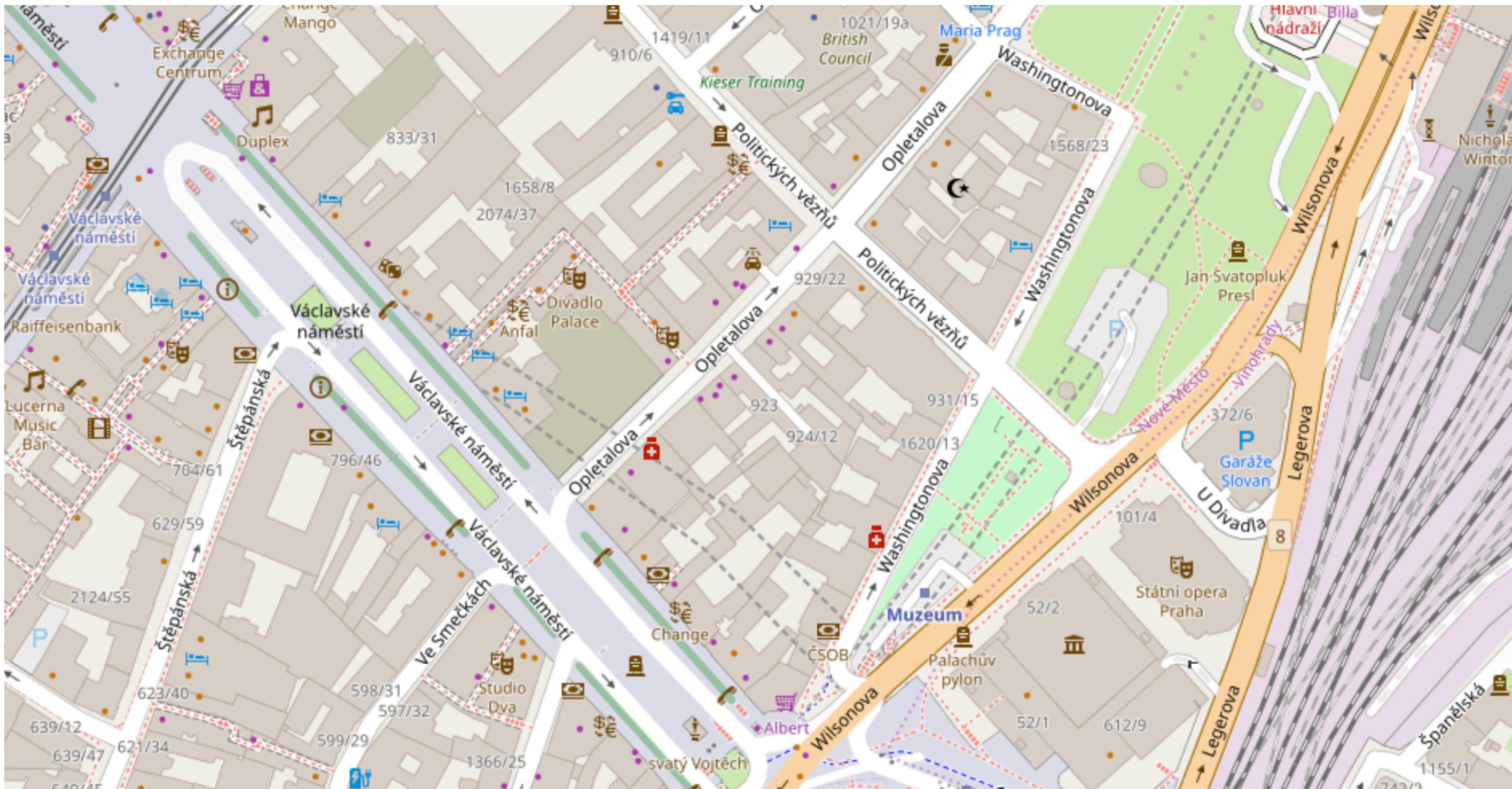


Flight route paradox



[https://
gisgeography.com/great-
circle-geodesic-line-
shortest-flight-path/](https://gisgeography.com/great-circle-geodesic-line-shortest-flight-path/)

© OpenStreetMaps



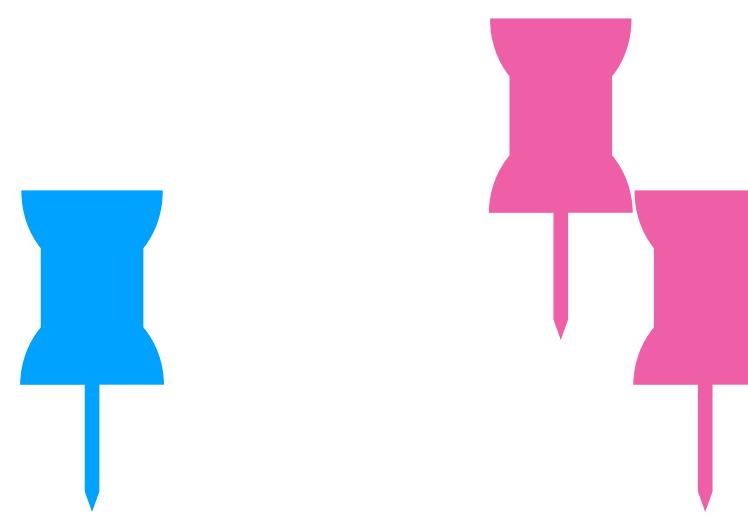
#3

17.25

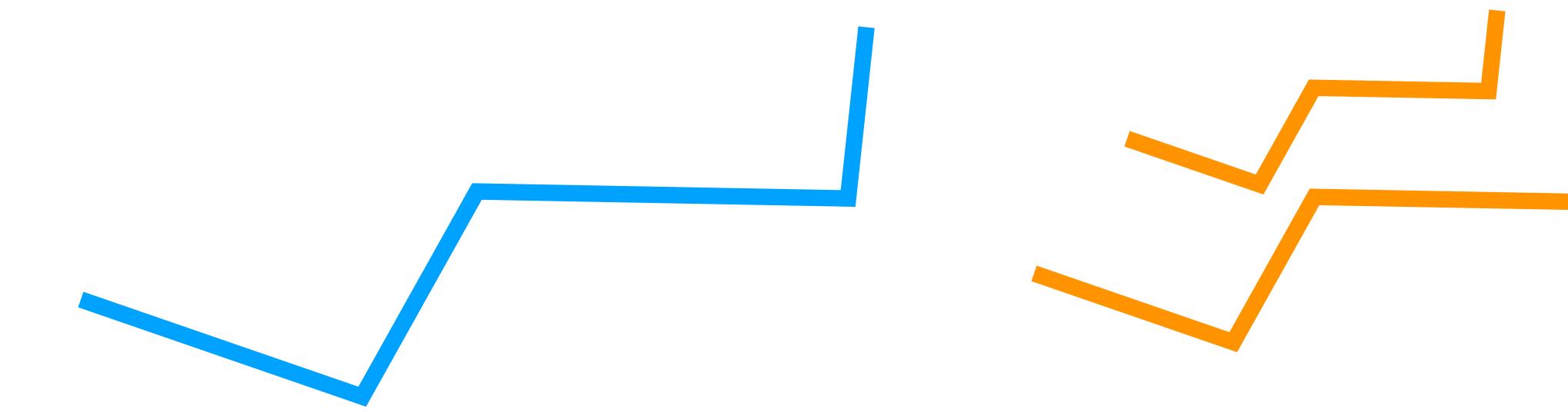
GeoData How it look?

Geometries

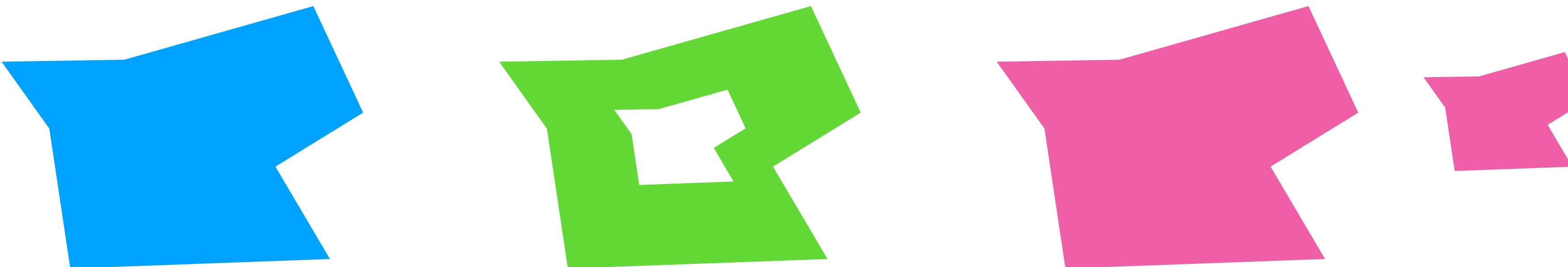
Point / MultiPoint



LineString / MultiLineString

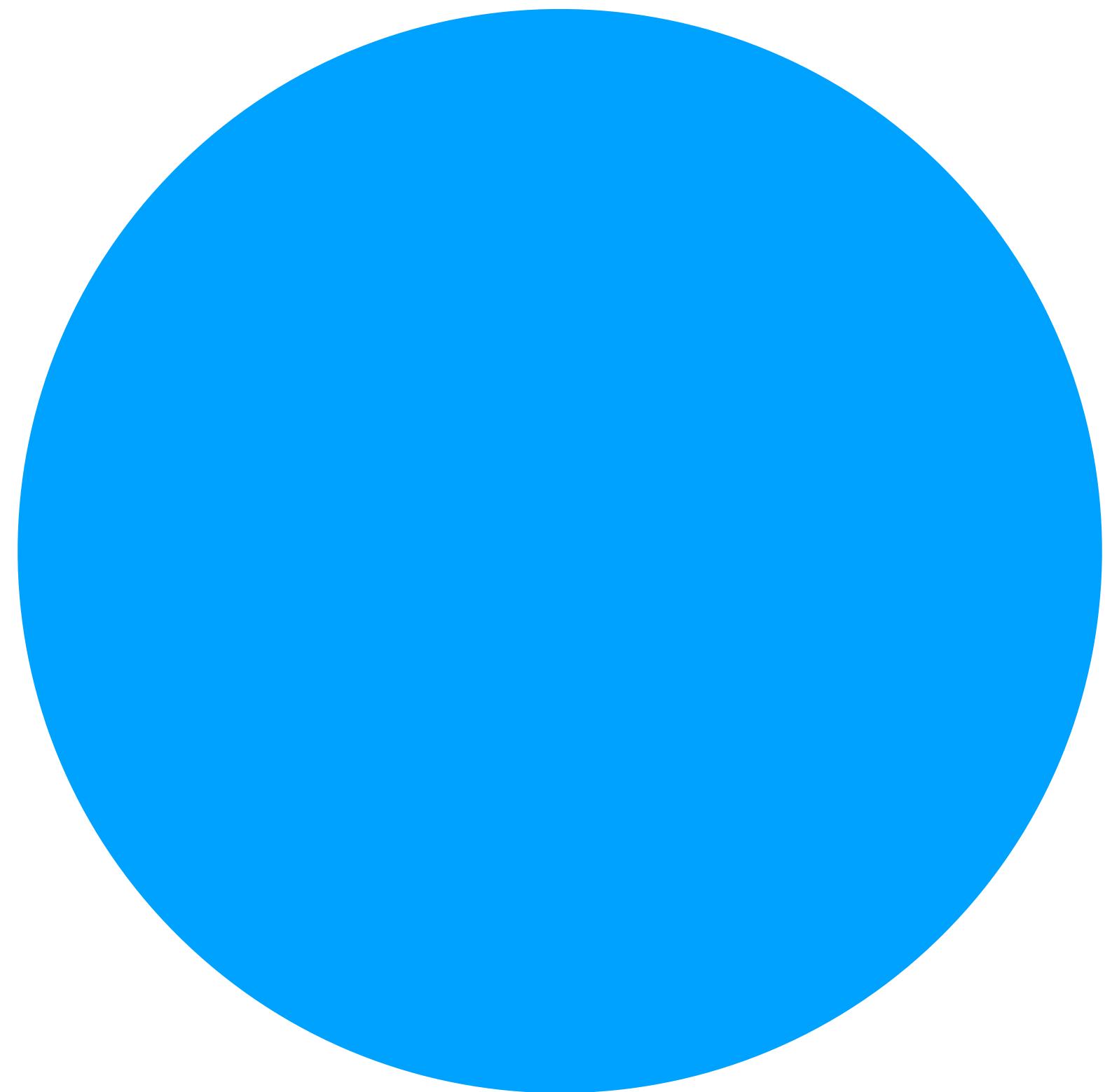


Polygon / MultiPolygon



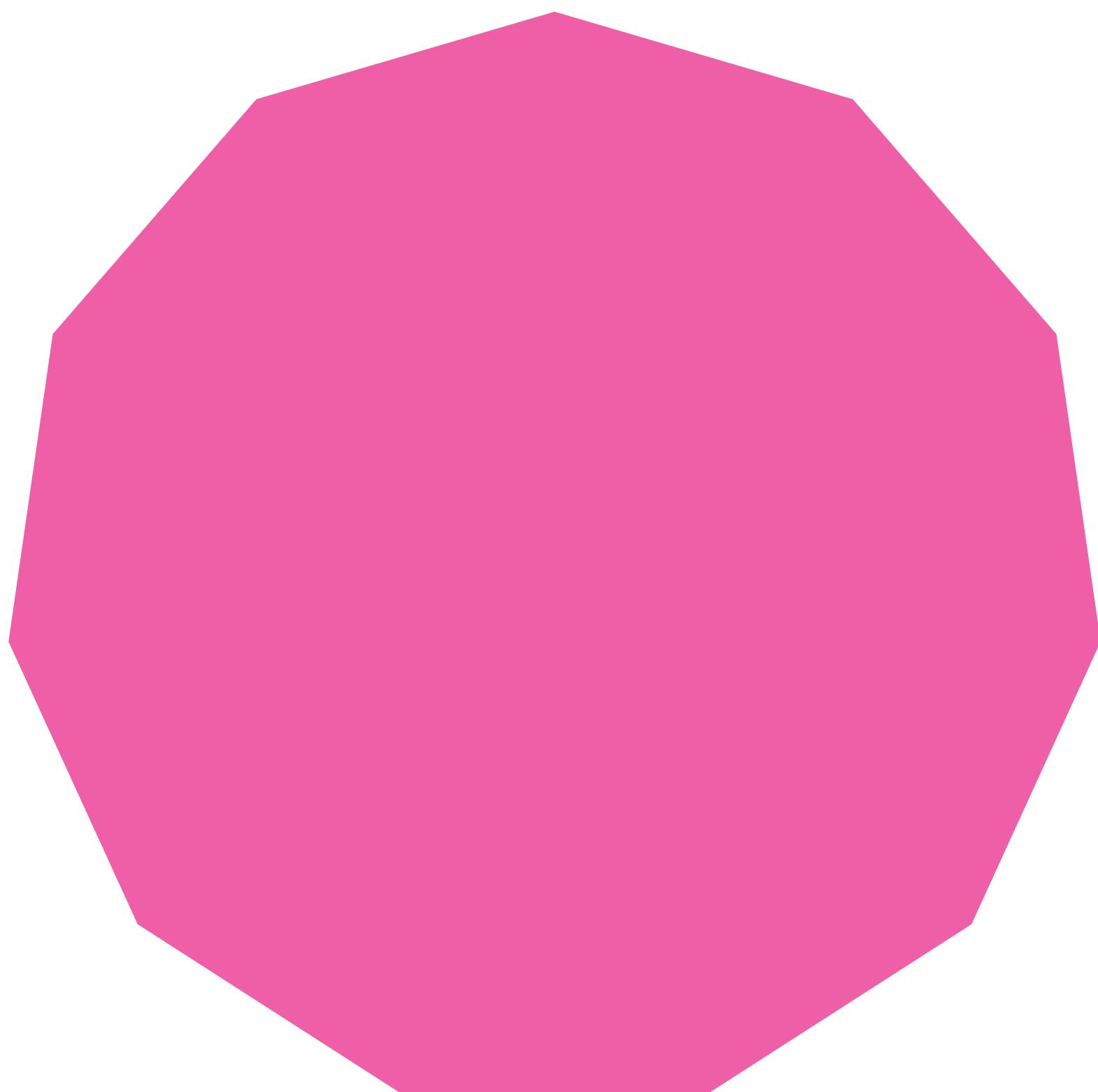
Where is circle?

Circle



Where is circle?

Polygon



GeoJSON

```
{  
  "type": "FeatureCollection",  
  "features": [  
    {  
      "type": "Feature",  
      "properties": {},  
      "geometry": {  
        "type": "Polygon",  
        "coordinates": [  
          [  
            [  
              [14.407196044921875,  
               50.16194458443368  
              ],  
              [14.279479980468748,  
               50.03156310080884  
              ],  
              [14.5733642578125,  
               50.034209492254064  
              ],  
              [14.407196044921875,  
               50.16194458443368  
              ]  
            ]  
          ]  
        }  
      }  
    }  
  ]  
}
```



<http://geojson.io/>

#4

17.35

Sources of geodata

GeoJSON / Shapefile

www.golemio.cz

opendata.praha.eu

www.geoportalpraha.cz

#5

17.45

Processing of geodata

XY

dummy

programming

feature
beast

mongoDB

PostGIS

turf.js

geopandas.py

shapely.py

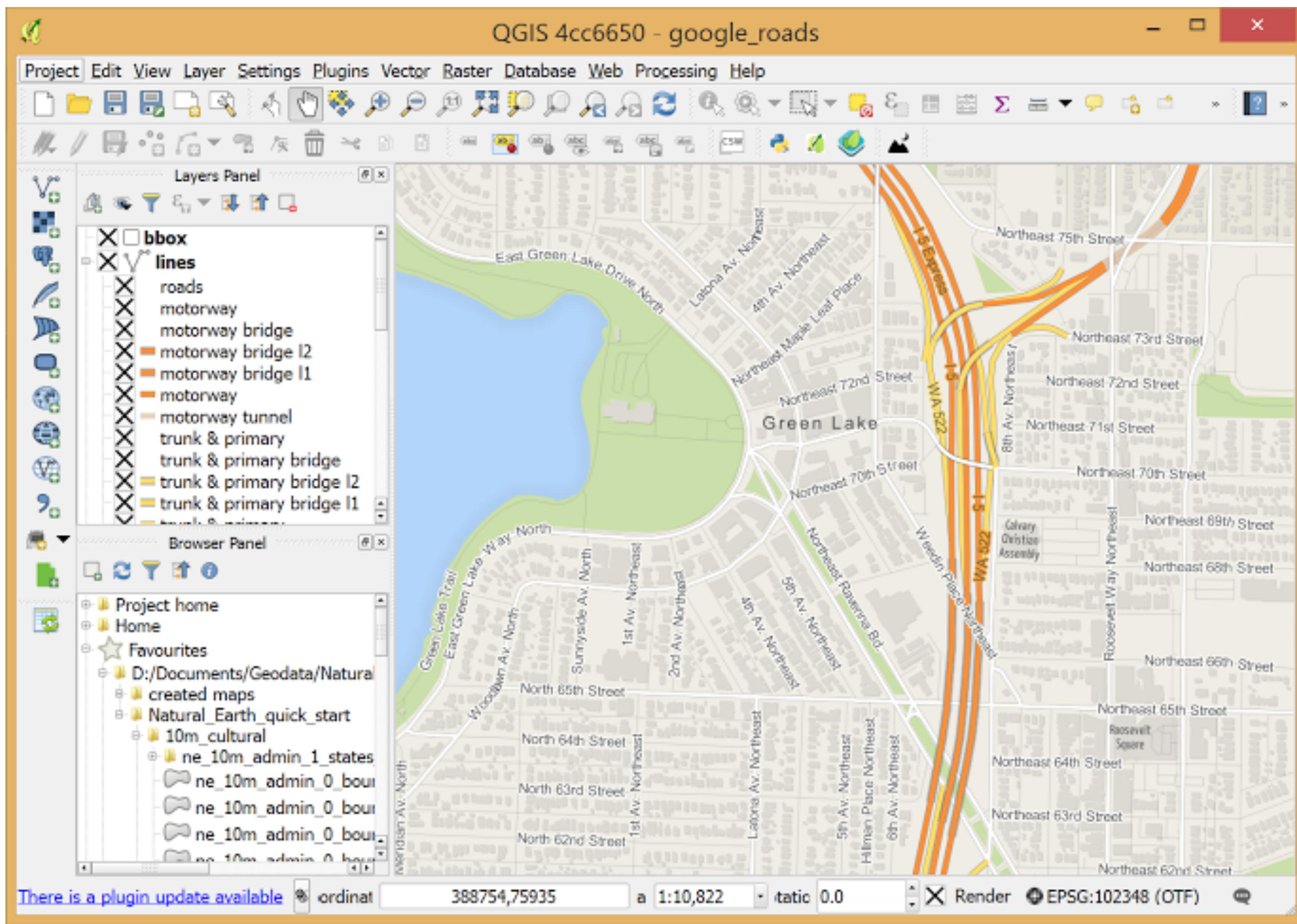
geojson.io

qgis.py

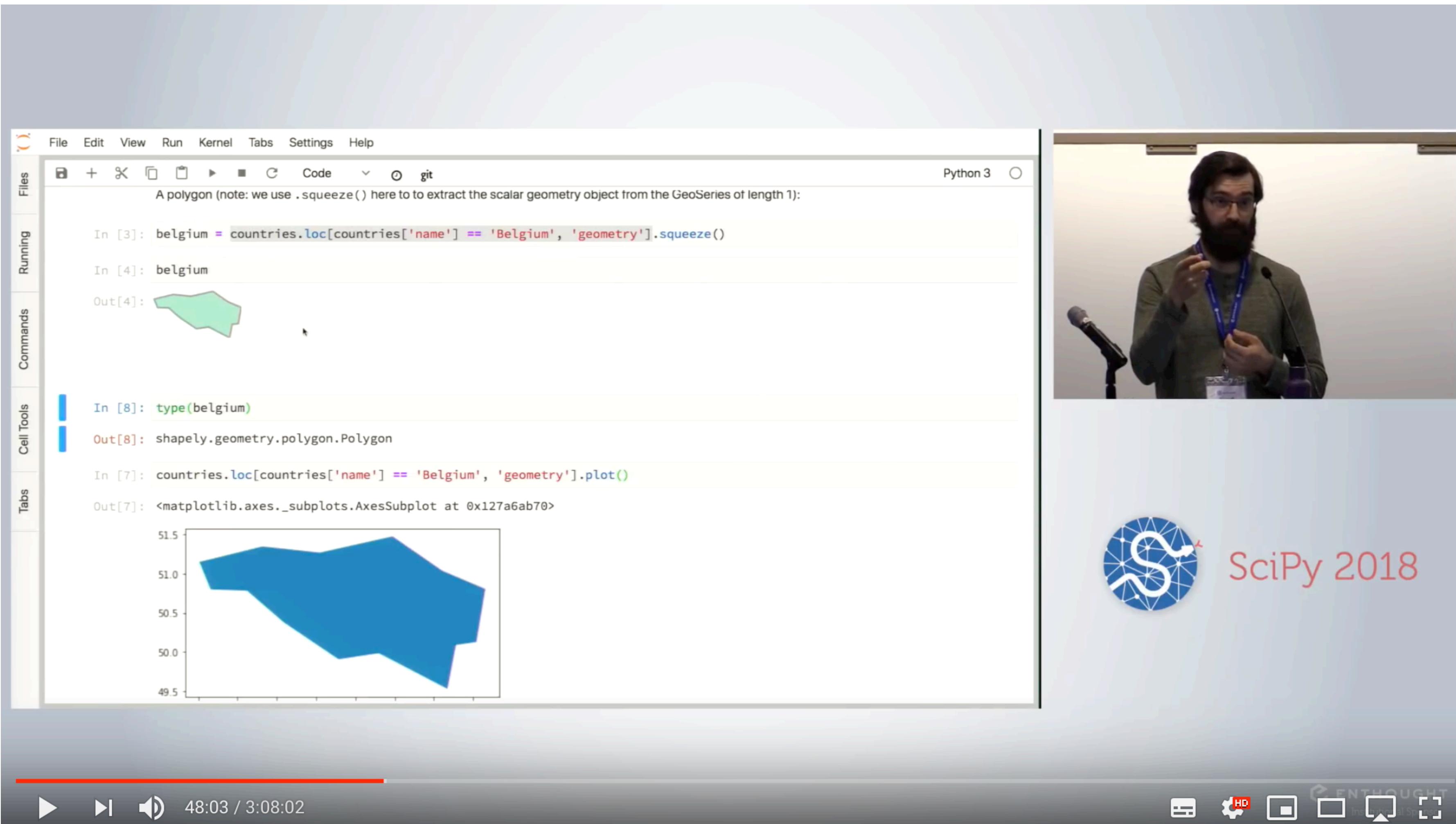
arcgis.paid

click & play

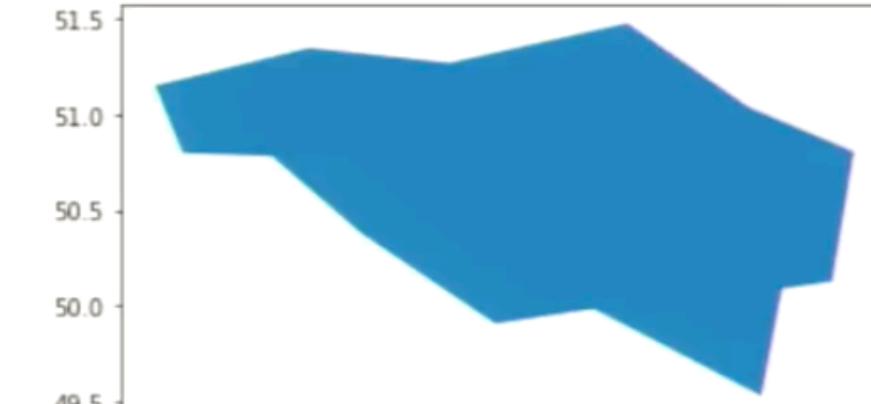
QGIS



Geopandas, Shapely



A polygon (note: we use `.squeeze()` here to extract the scalar geometry object from the GeoSeries of length 1):

```
In [3]: belgium = countries.loc[countries['name'] == 'Belgium', 'geometry'].squeeze()  
In [4]: belgium  
Out[4]:   
  
In [8]: type(belgium)  
Out[8]: shapely.geometry.polygon.Polygon  
  
In [7]: countries.loc[countries['name'] == 'Belgium', 'geometry'].plot()  
Out[7]: <matplotlib.axes._subplots.AxesSubplot at 0x127a6ab70>  
  

```



<https://www.youtube.com/watch?v=kJXUUO5M4ok>

Turf.js

<https://turfjs.org>

Which to choose?

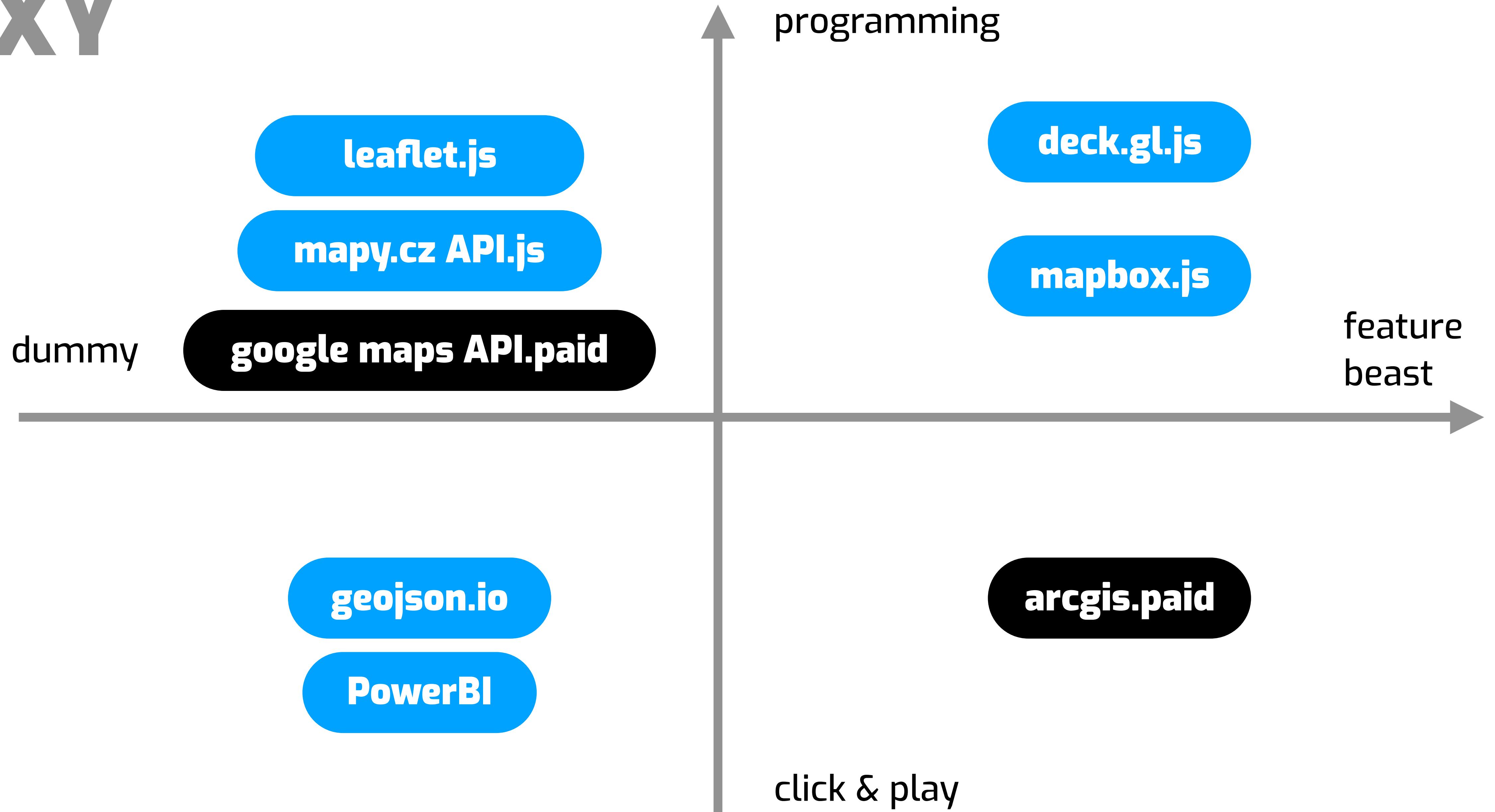
It depends, but 100%
up to you...

#6

18.00

Visualization of geodata

XY



Let's start coding...

#7

18.15

That's all, thanks...
...questions?