

A child with blonde hair, seen from behind, is holding a large, unfolded map. The child is wearing a dark jacket with a teal-colored hood. They are standing in a field of tall, dry grass or reeds. The background is a soft-focus landscape of similar vegetation. The overall lighting is dim, suggesting dusk or dawn, with a dark, moody atmosphere. The text "Intro to spatial data" is overlaid in white, serif font across the middle of the image.

Intro to spatial data

About Me



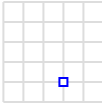
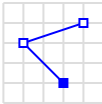
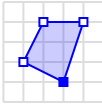
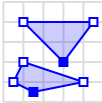
 [kahnwong](https://github.com/kahnwong)

 [Karnsiree Wong](https://www.linkedin.com/in/KarnsireeWong)

 karnwong.me

- **Lead Data Engineer @Baania**
- **Fought with many types of data**
- **Spatial data has a lot of quirks 🤔**

What is spatial data

Type	Example
Point	
LineString	
Polygon	
MultiPolygon	

There's more, but enough for now 🍷

Image credits: M. W. Taves

Question

Thailand province uses which spatial data type?

Sample data

Point

```
{  
  "type": "Point",  
  "coordinates": [30.0, 10.0]  
}
```

LineString

```
{  
  "type": "LineString",  
  "coordinates": [  
    [30.0, 10.0], [10.0, 30.0], [40.0, 40.0]  
  ]  
}
```

Sample data (cont)

Polygon

```
{  
  "type": "Polygon",  
  "coordinates": [  
    [[30.0, 10.0], [40.0, 40.0], [20.0, 40.0], [10.0, 20.0], [30.0, 10.0]]  
  ]  
}
```

MultiPolygon

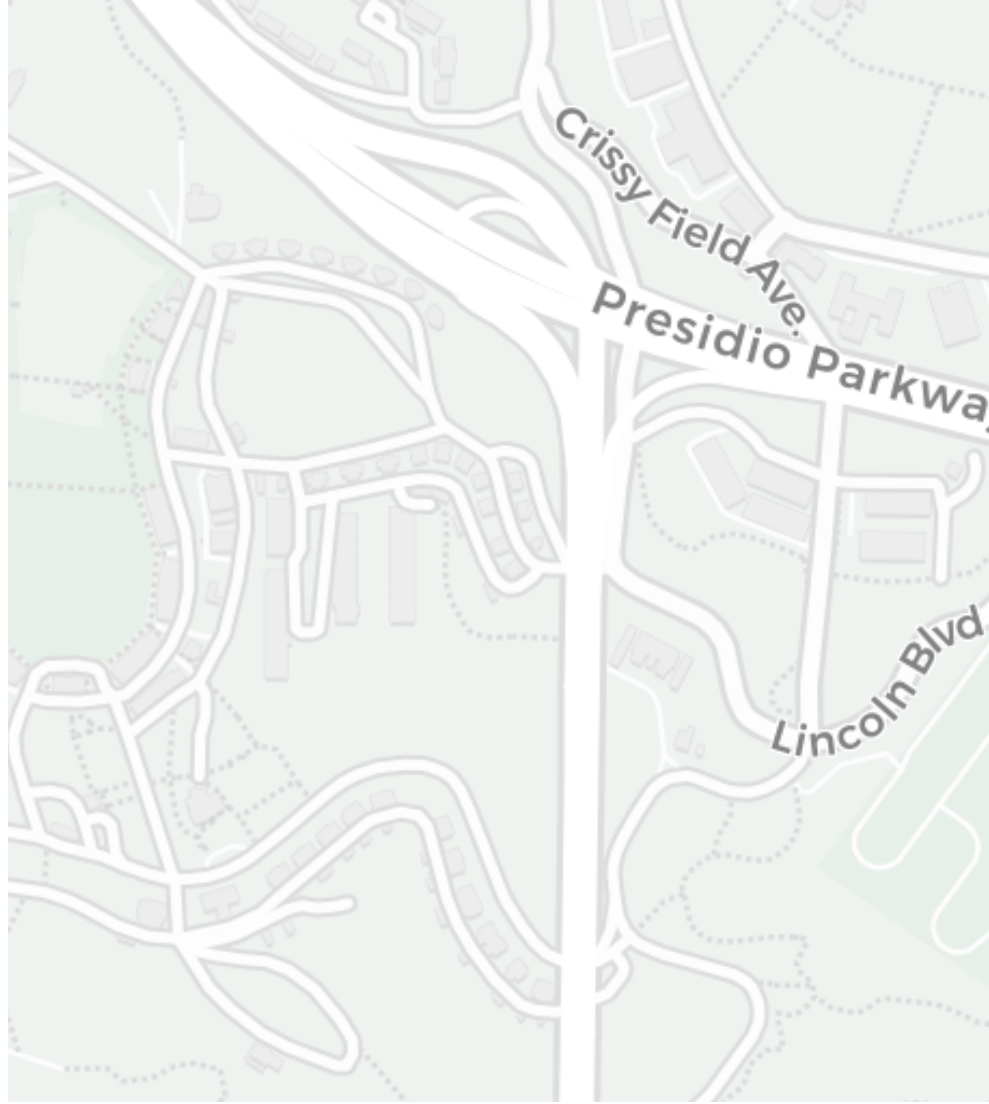
```
{  
  "type": "MultiPolygon",  
  "coordinates": [  
    [  
      [[30.0, 20.0], [45.0, 40.0], [10.0, 40.0], [30.0, 20.0]]  
    ],  
    [  
      [[15.0, 5.0], [40.0, 10.0], [10.0, 20.0], [5.0, 10.0], [15.0, 5.0]]  
    ]  
  ]  
}
```

Map tile

Example url:

[https://tile.openstreetmap.org/\\${z}/\\${x}/\\${y}.png](https://tile.openstreetmap.org/${z}/${x}/${y}.png)

Variable	Description
x	x tile number
y	y tile number
z	zoom level



Technical stuff

Map projection

ESPG Code	Projection	Unit
ESPG:4240	THAILAND	Degree
ESPG:4326	WGS84	Degree
EPSG:3857	GOOGLE	Meter
ESPG:32647	WGS84 / UTM zone 47N - THAILAND	Meter

Standard projection: `ESPG:4326`

Degree / meter conversion

KM = DEGREE * 111.319

DEGREE = KM / 111.319

Sample spatial applications

Find polygon from point

Which province does a listing belong to?

```
SELECT *  
FROM listing JOIN province  
ON ST_WITHIN(listing.geom, province.geom);
```

Find distance between A to B

```
SELECT ST_DISTANCE(  
    GEOGRAPHY(project.geom),  
    GEOGRAPHY(train_station.geom)  
)
```

Count points in polygon

How many listings are in a single province?

```
SELECT province.name, count(listing.geom)  
FROM province LEFT JOIN listing
```