



Finding Stories in Data

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A brief history of cartography and projections
Digital maps: Tiles, layers and providers
Practical mapping, formats and conventions

Session 5

Maps

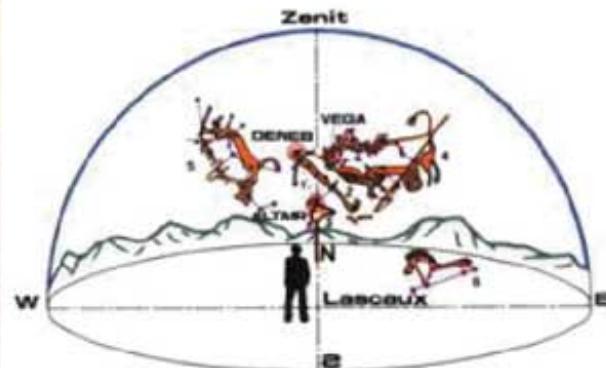


What is a map?

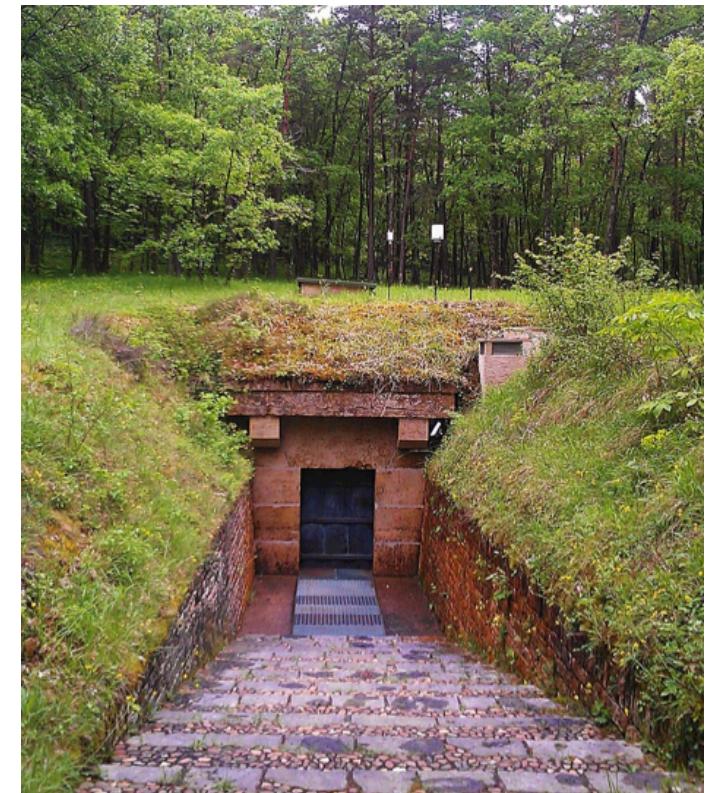
A diagrammatic representation
of an area of land or sea
showing physical features,
cities, roads, etc.



The first map



First known map of the heavens
Depicts the Zodiac



Lascaux Caves
17,300 years old

What is a map?

A diagrammatic representation
of an area ~~of land or sea~~
showing physical features,
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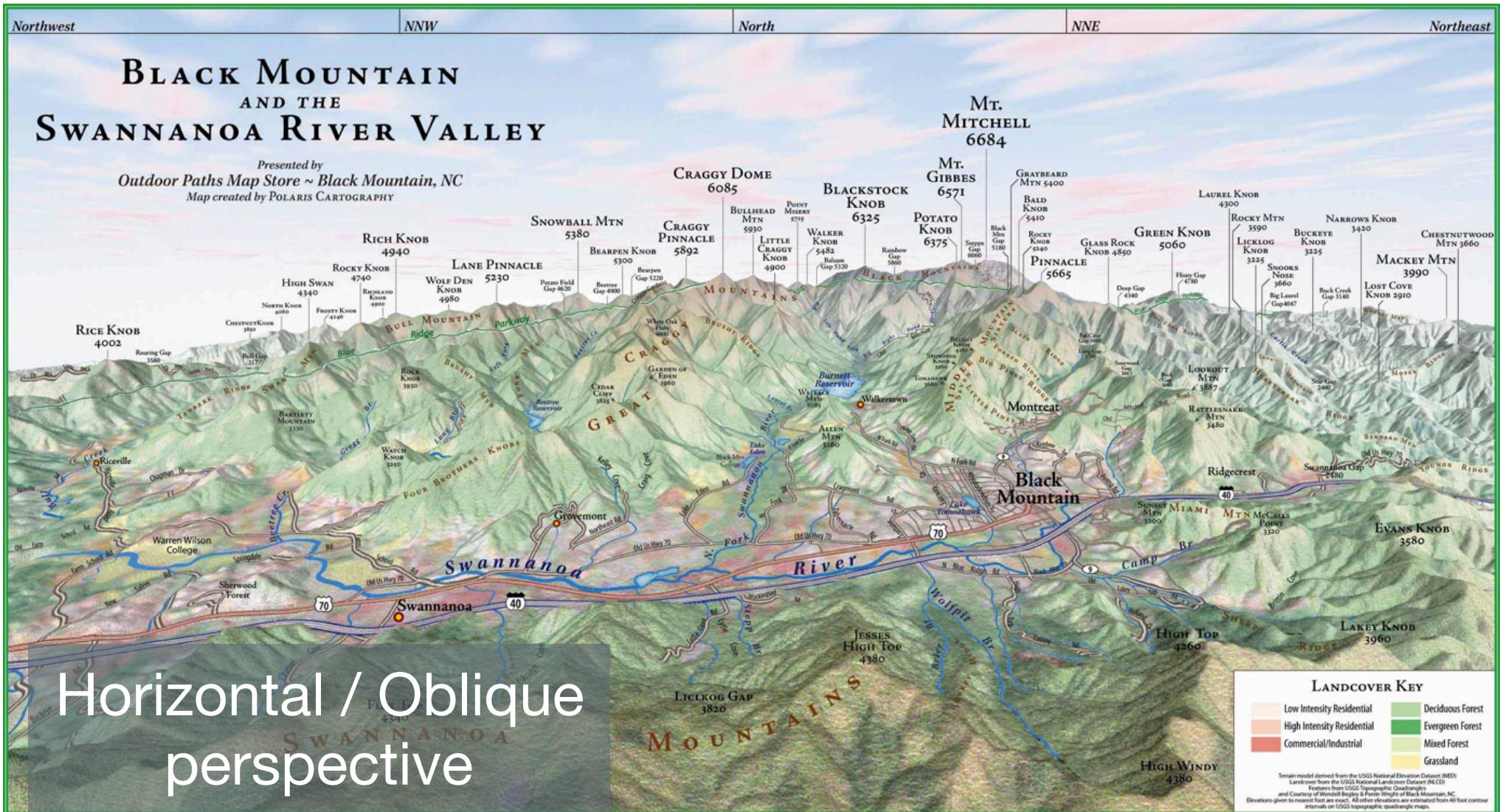
What is a map?

A representation, usually on a flat surface, as of the features of an area of the earth or a portion of the heavens.



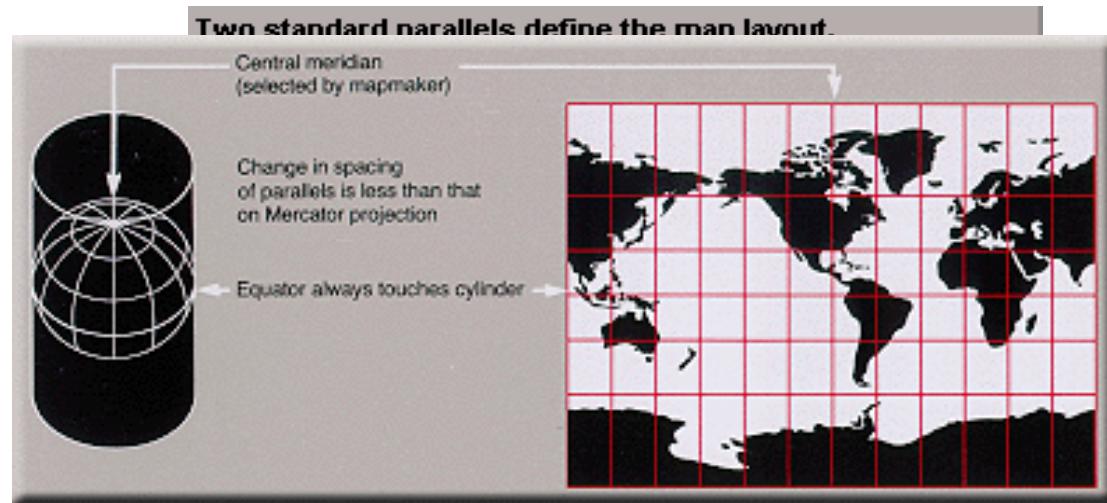
Shows them in their respective forms, sizes, and relationships according to some convention of representation.





Properties of maps

- Area
- Shape
- Direction
- Bearing
- Distance
- Scale



Map projections can be constructed to preserve at least one of these properties, though only in a limited way for most.

<https://github.com/mbostock/d3/wiki/Geo-Projections>



Flight Paths (Mercator)

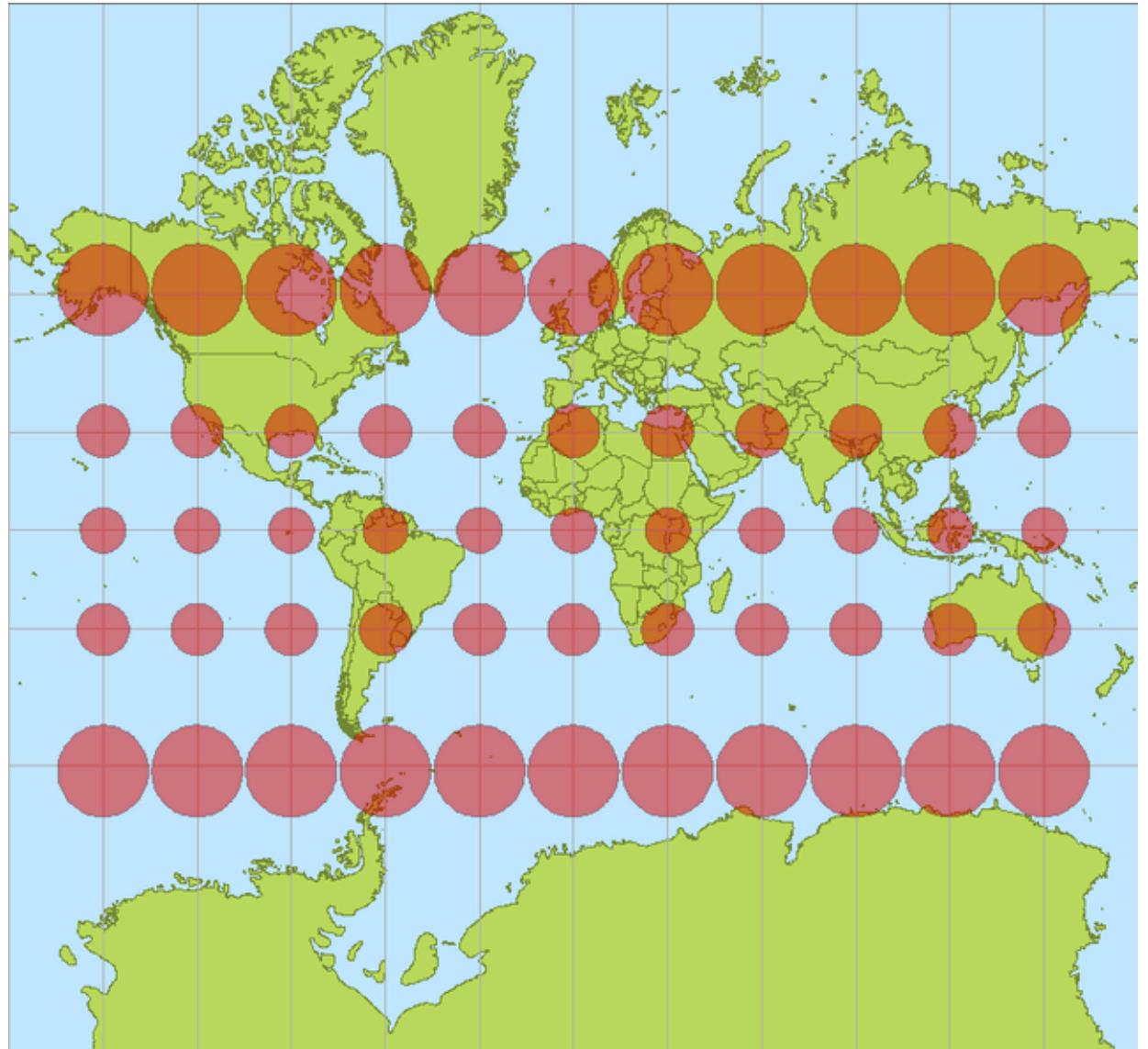


Flight Paths (Orthographic)



Tissot's distortion (mercator)

Thanks: Stefan Kuhn



Digital maps: Tiles, layers and providers



Making a digital map

Step 1: Projection

Step 2: Base layer

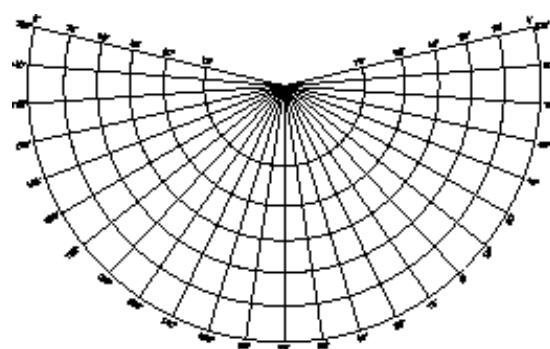
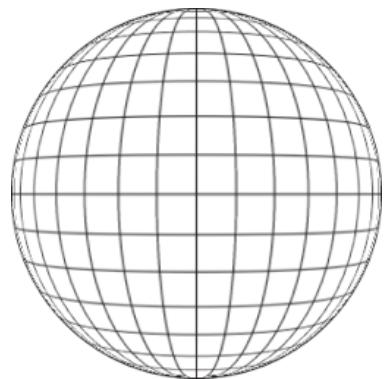
Step 3: Tiles

Step 4: Layers

Step 5: API

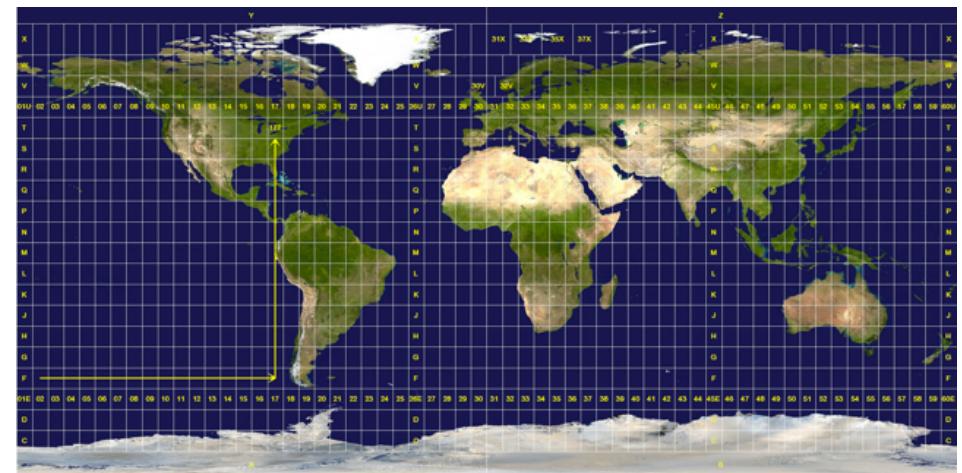


Step 1: Projection

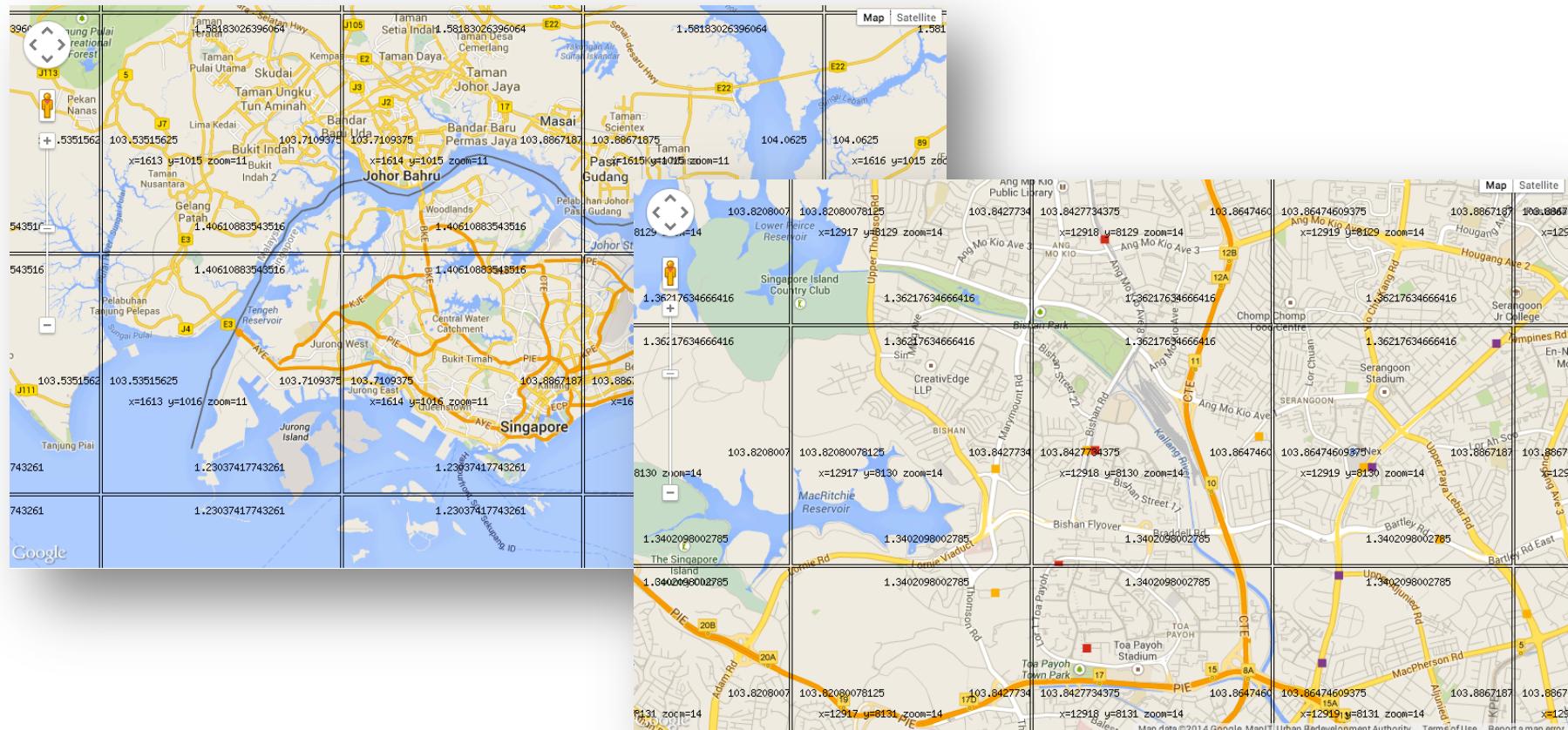


Step 2: Base Layer

- Latitude / Longitude
- Universal Transverse Mercator (UTM)
- Easting / Northing

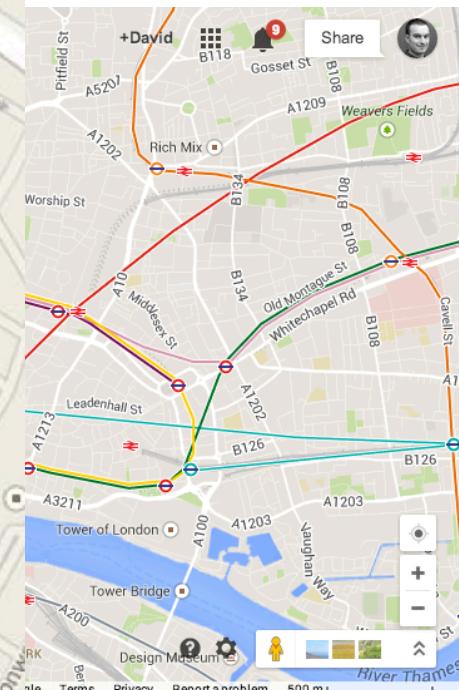
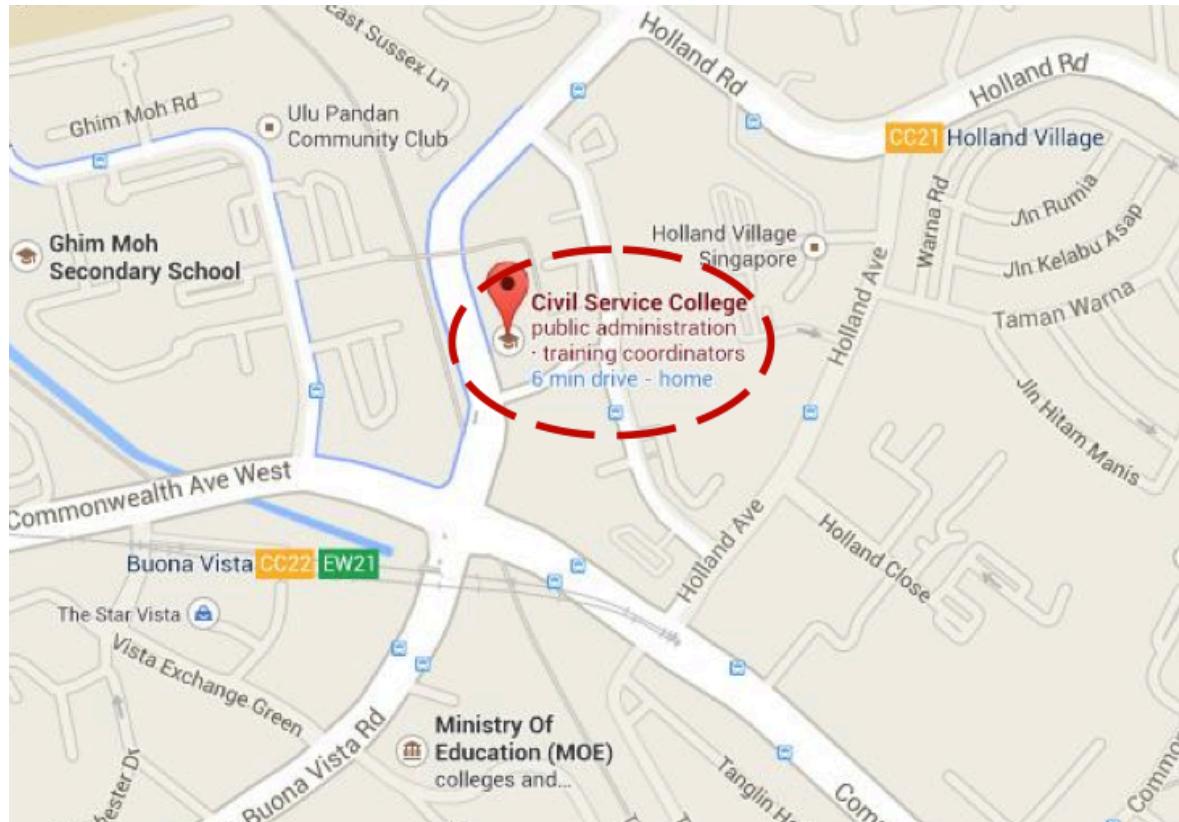


Step 3: Tiles



Map data ©2014 Google, MapIT, Urban Redevelopment Authority Terms of Use Report a map error

Step 4: Layers



Step 5: API

Allow people to add their own features and share the result.



A 5 step problem

Each of the 5 steps could have it's own license. So putting it all together can be a nightmare.

And that's before we think about the license on the data and how to translate it for use.



Providers



Google Maps



here





http://en.wikipedia.org/wiki/Comparison_of_web_map_services

Practical mapping, formats and conventions

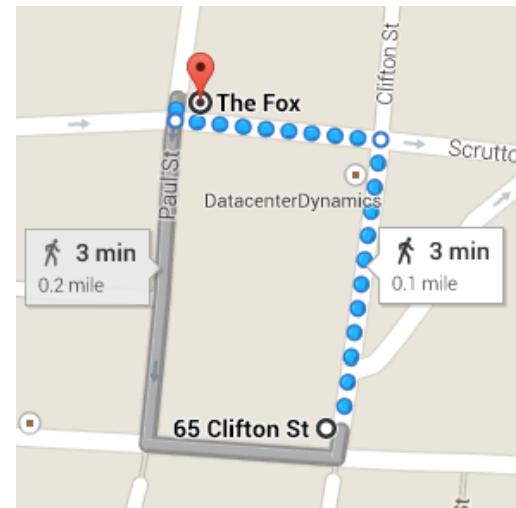


Representing Geo Data

Point



Line



Polygon



Formats

KML, Shapefile, GeoJSON

All allow representation of points,
lines, polygons and metadata.

All Open (shapefile less so)



GeoJSON

Typical geographic file patterns

Most geographic files abuse the <description> tag to include all other data.

This means that it IS NOT machine readable.



Example KML

(Friendly Buildings)

```
<Placemark>
  <name>Hougang Avenue 10 Block 512</name>
  <description>
    <p><font color="red"><i></i></font></p>
    <b>PostalCode - 530512</b>
    </font></p>
    <p><font color="Blue"><i></i></font>
      <b>Description - Level of Friendliness 2 out of 5</b>
    </font></p>
  </description>
  <Point>
    <coordinates>103.888845156917,1.37119814170758</coordinates>
  </Point>
</Placemark>
```



Example KML (Friendly Buildings)

```
<Placemark>
  <name>Hougang Avenue 10 Block 512</name>
  <ExtendedData>
    <Data name="PostalCode">
      <value>530512</value>
    </Data>
    <Data name="Friendliness">
      <value>2</value>
    </Data>
  </ExtendedData>
  <Point>
    <coordinates>103.888845156917,1.37119814170758</coordinates>
  </Point>
</Placemark>
```



Geographic Information Systems Science

Is a point inside a polygon?

Calculate a route between point A and point B.



Exercise

Simple intro to CartoDB

D3 maps

Coding with maps

<http://harrywood.co.uk/maps/examples/>





G'DAY

Thank-you