

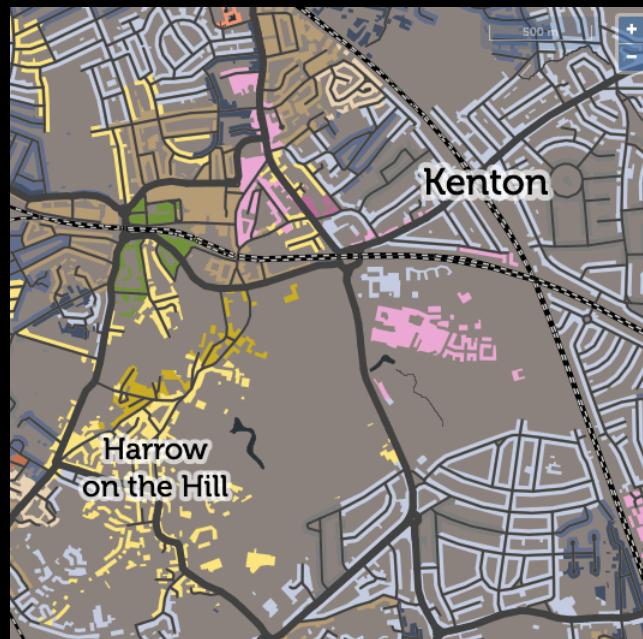
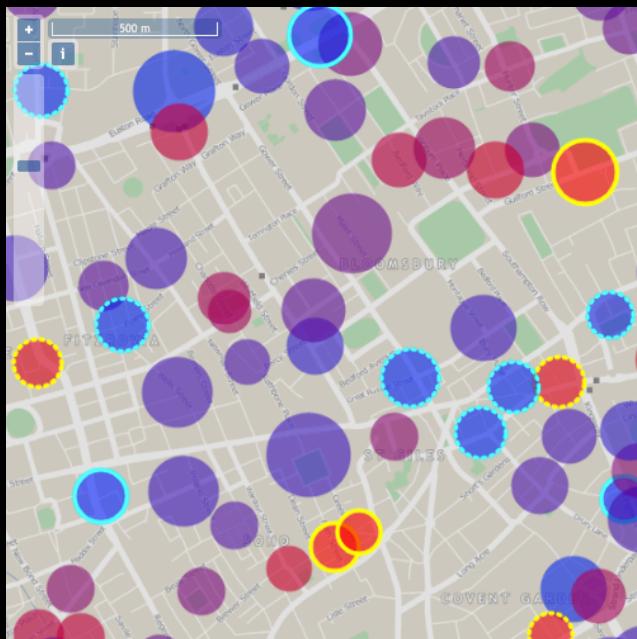
Web Visualisation

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Introduction

This is mainly about maps.



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Part A: Web Mapping Basics

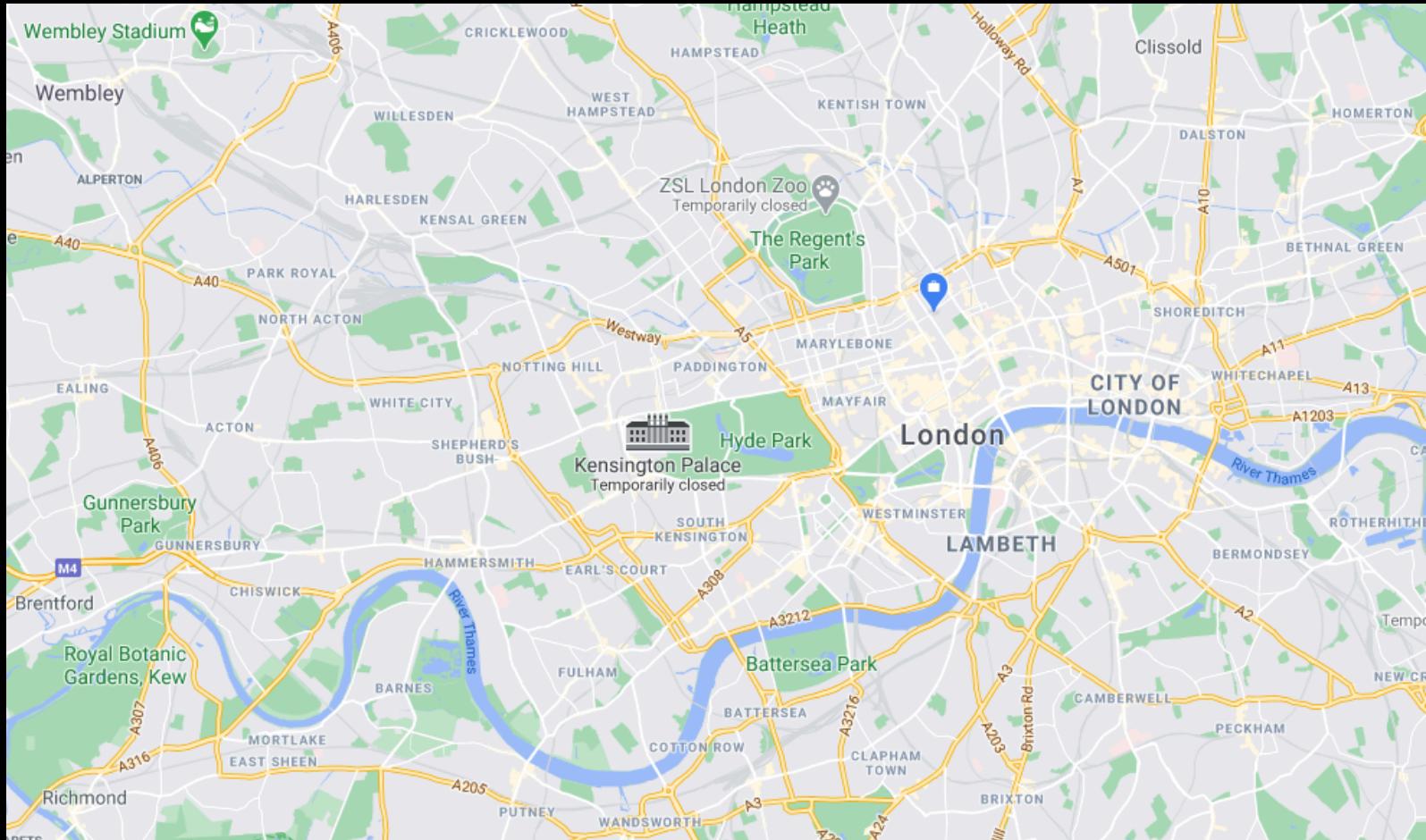
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Part B: Beyond Slippy Maps

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2. Deck.gl & Kepler.gl
 - Examples from Uber Vis
 - Applying to bikeflows with a multi-city DB
3. D3
4. Google Charts

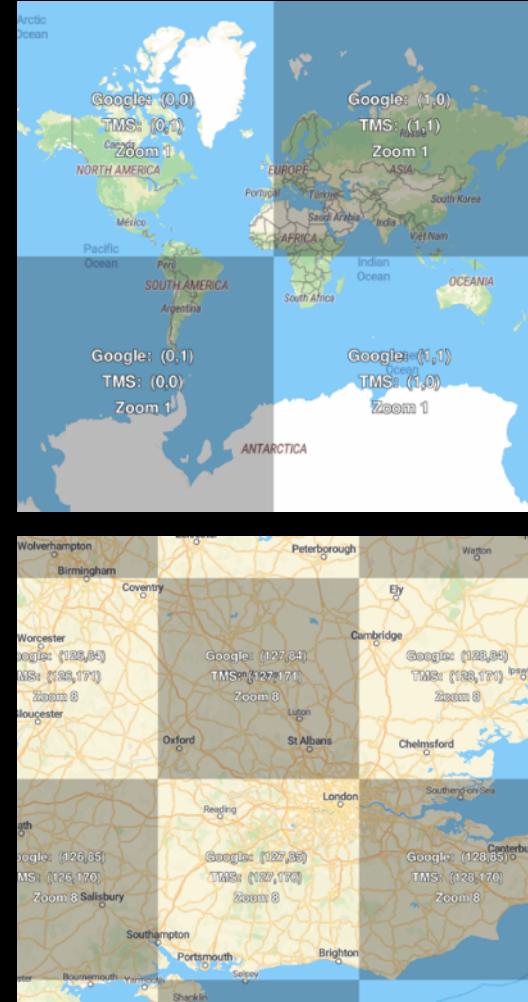
Part A:

Web Mapping Basics



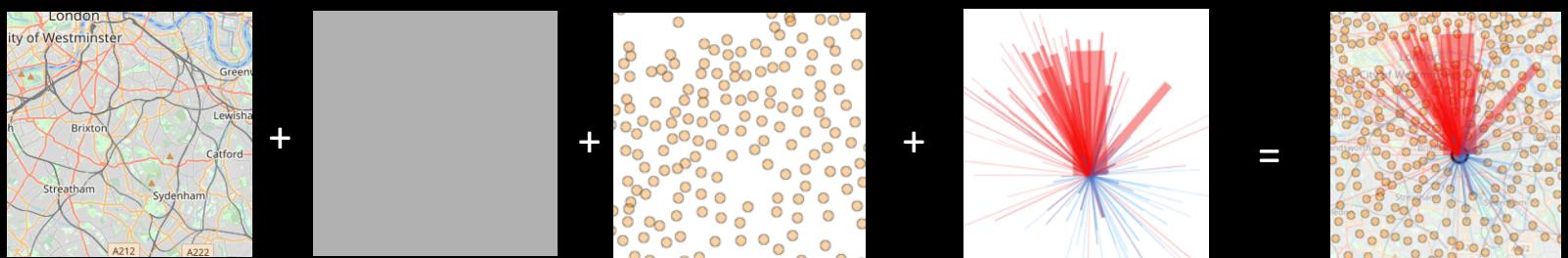
I. Slippy Maps Intro

- Slippy
 - A square grid of tiles that can be loaded on demand by your web browser/ smartphone app as you scroll them into view.
 - Spherical Mercator Projection
 - Computationally simple
 - Earth's surface as a square
 - “Metres” from top left not lat/lon degrees
 - Size deforming away from equator
 - Not available $>85^\circ$
 - XYZ
 - Z=0 is a single square tile for the world.
 - Z=1 is a grid of 4 square image tiles
 - Z=2 is 16 tiles, etc.



I. Slippy Maps Intro

- Layerable
 - Easy without needing to reproject, because the XYZ convention is very popular. Traditionally this is sets of pre-rendered PNG image tiles (256px x 256px)
 - Layering allows multiple sources to be shown together, for example social media location data (e.g. density of tweets) on top of a background “context” layer.



I. Slippy Maps Intro

- Widely implemented
- Slippy tiled maps are still extremely popular but some popular tools (e.g. Google Maps) are moving away from them for small scales.
 - With the move to vector-based maps, the “Z” is less important, due to client framework extrapolation
- Alternatives to the “top down” map may be a better way of visualising some types of spatial data.
 - Look at these in Part B.

2. Toolkits

- Examples include:
 - Google Maps API
 - Kick-started the “Map Mashup” concept in 2007
 - OpenLayers
 - An open source Google Maps API
 - Need an alternative background – e.g. OpenStreetMap
 - Leaflet
 - An Easier, more modular OpenLayers
 - R integration
 - Mapbox GL JS
- Toolkits are DIY.
 - Write the code yourself
 - Host it yourself
 - You might get the API bit (only) hosted and background maps (Google/Mapbox)

2. Platforms

- Major platforms include
 - Google Maps Platform
 - Mapbox Studio
 - Carto
 - Tableau
 - ArcGIS Online
 - HERE
- Platforms are generally “freemium”
 - Provide GUI editors, hosting/storage and background maps content
 - Ideal if you don’t want to code, but less flexible

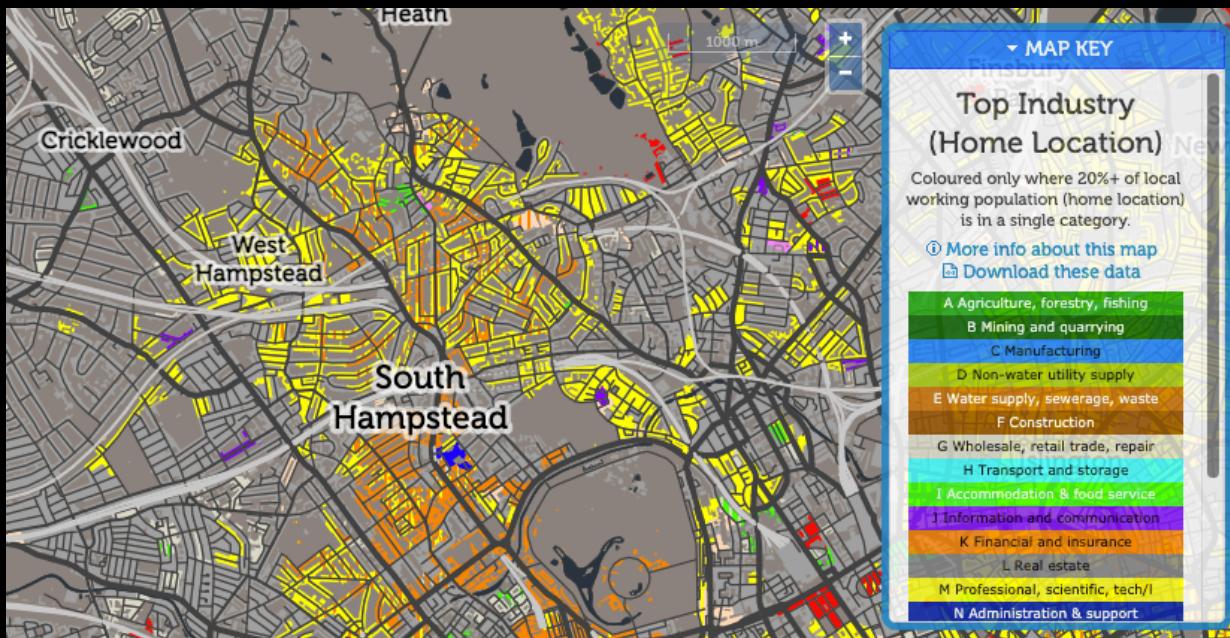
3. CDRC Maps

- In-house slippy mapping platform
 - Hosts around 100 mainly socioeconomic/geodemographic data maps from various CDRC projects



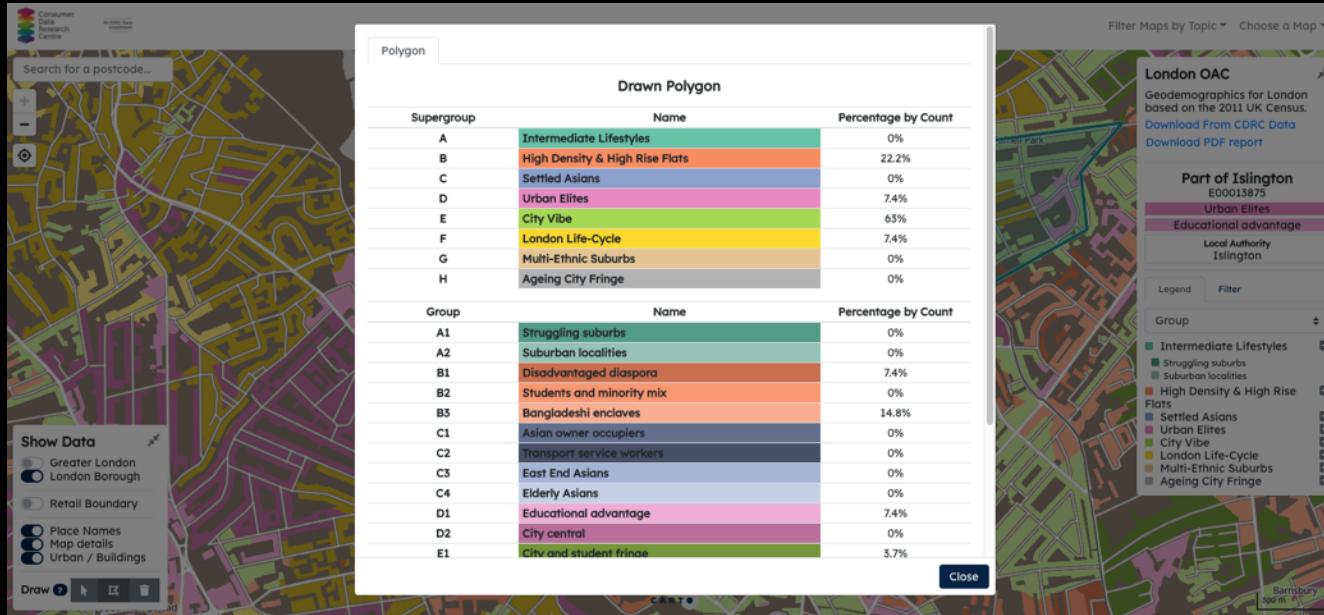
3. CDRC Maps

- Based on OpenLayers
 - Relatively low tech (mainly pre-tiled raster)
 - Rasters mean no browser-side analysis but allow for richer detail



3. CDRC Mapmaker

- A pure-vector rewrite of CDRC Maps
 - Based on Mapbox GL JS
 - Uses Carto to store its mapping data
 - Has simple analysis and reporting tools

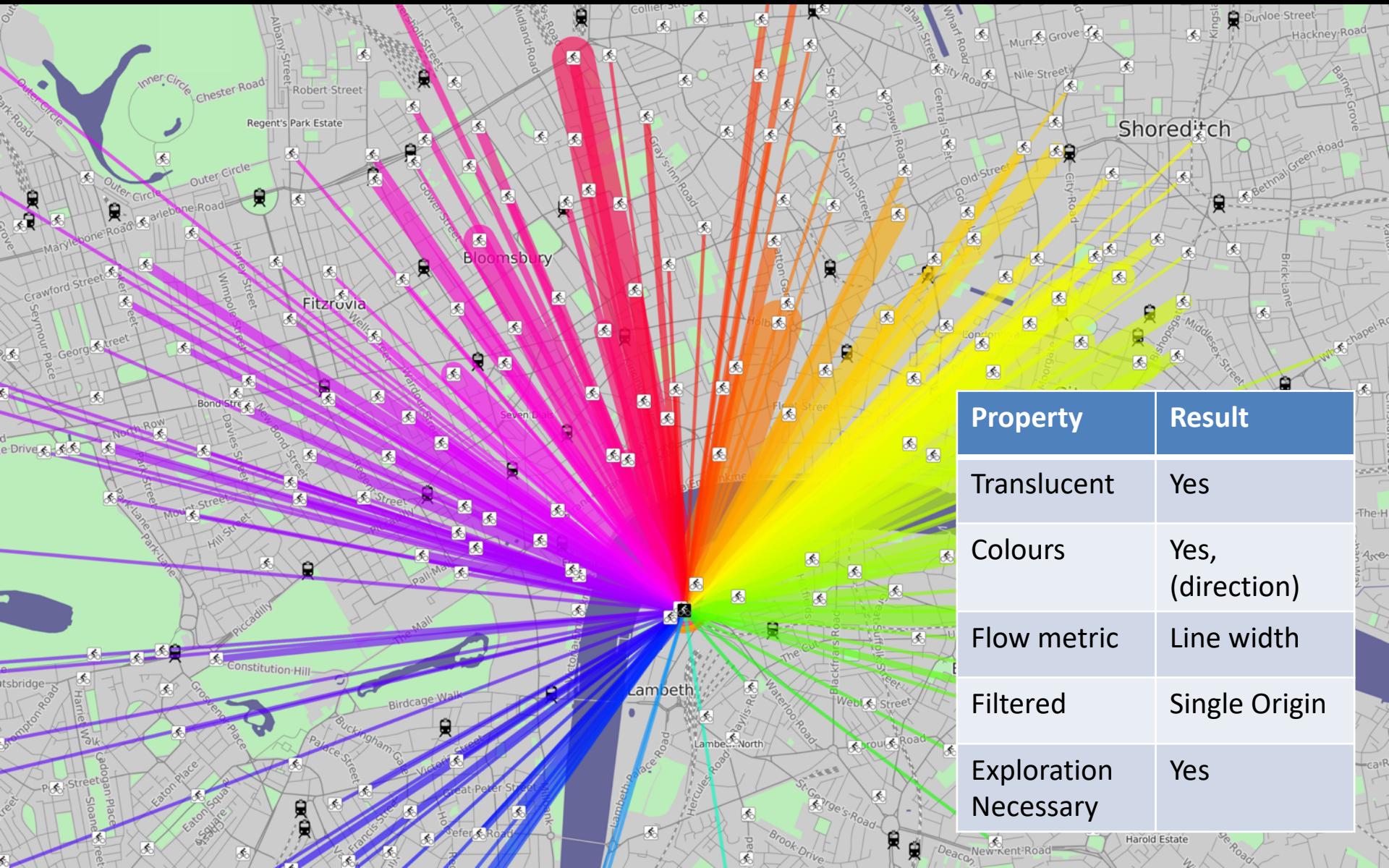


<https://mapmaker.cdrc.ac.uk/>

4. Examples: Travel Flows

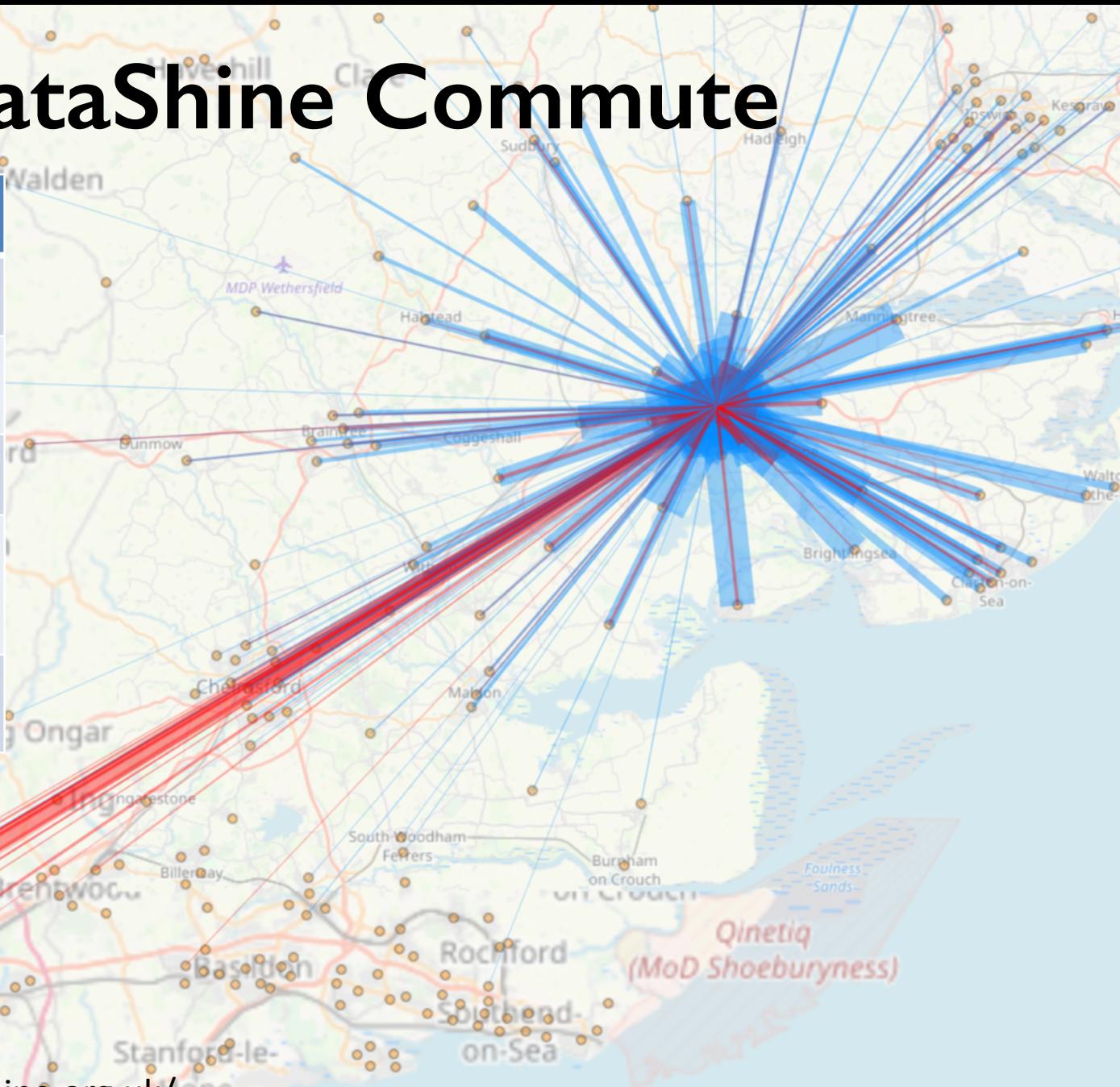
- When showing flows on a 2D geographic map you need to compromise on something to avoid a “nest of lines”
 - Colour hue/saturation/luminosity variation
 - Translucency
 - Line curving
 - Filtering: Flow size, single origin or destination
 - Routing via a node/edge graph
 - Interactivity - user exploration necessary

4. “Hello World”

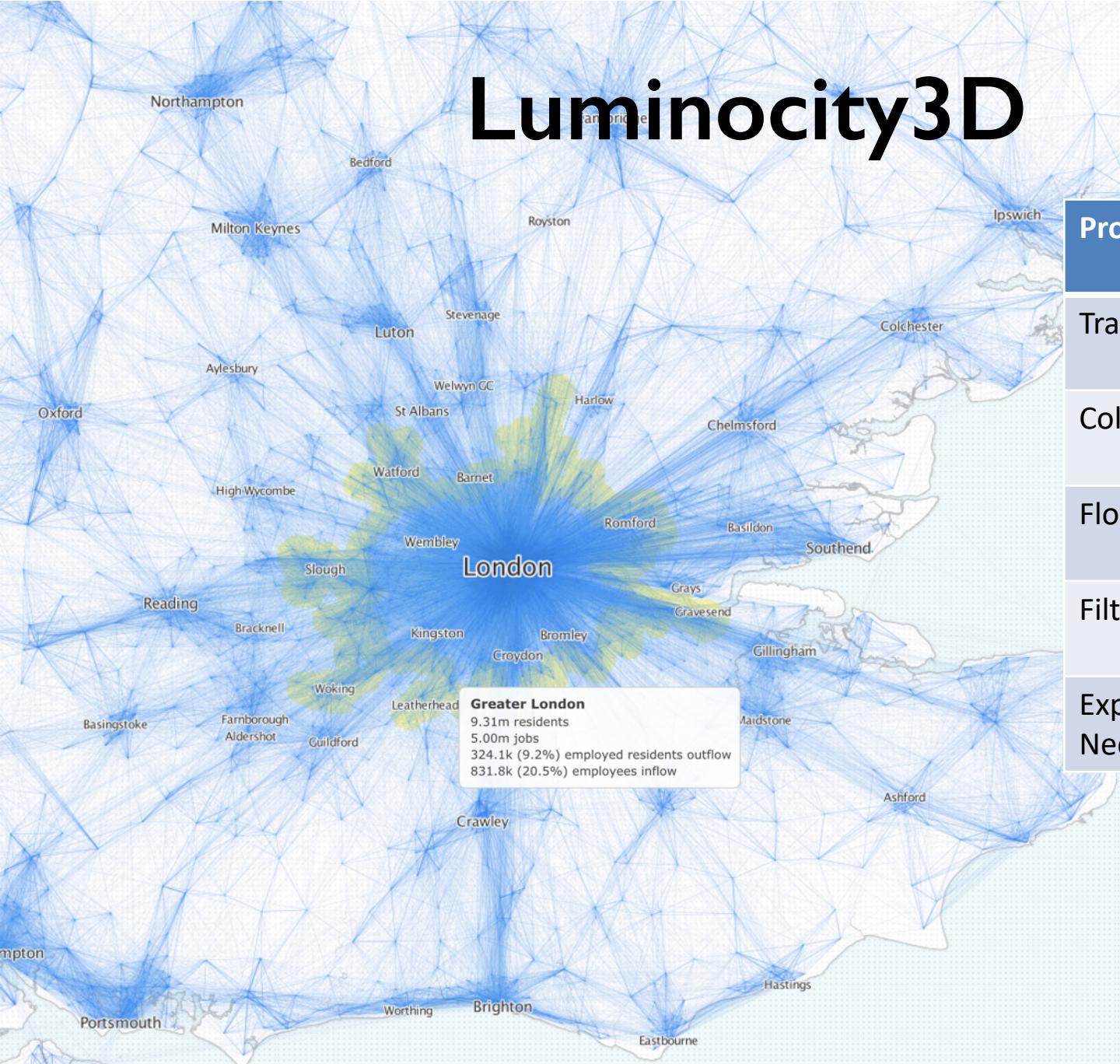


DataShine Commute

Property	Result
Translucent	Yes
Colours	Yes, by filter type
Flow metric	Line width
Filtered	Single Location (both O+D)
Exploration Necessary	Yes



Luminocity3D



Great British Cycle to Work

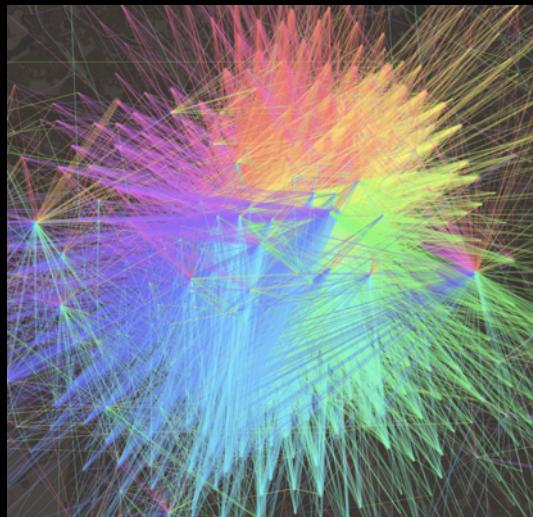
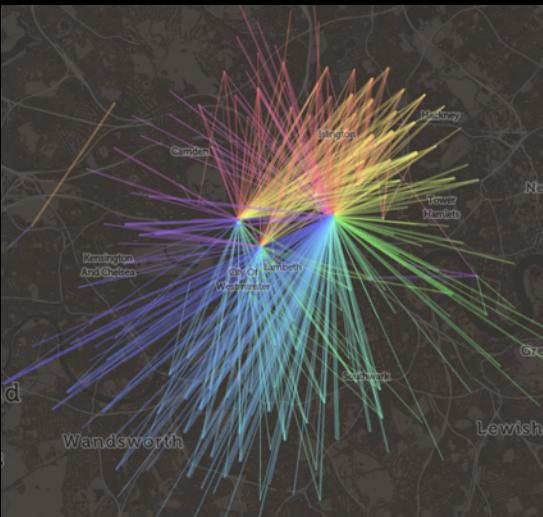
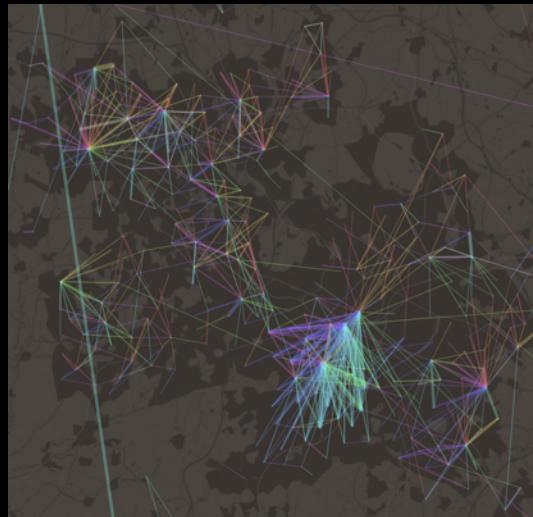
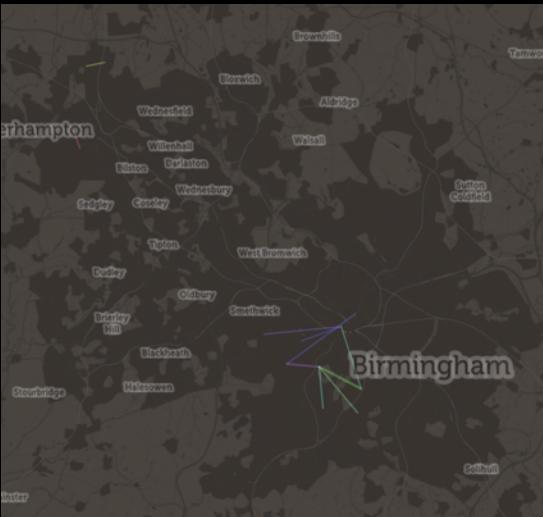


Property	Result
Translucent	Yes
Colours	Yes (direction)
Flow metric	Line width, translucency
Filtered	Yes
Exploration Necessary	No (but enhances)

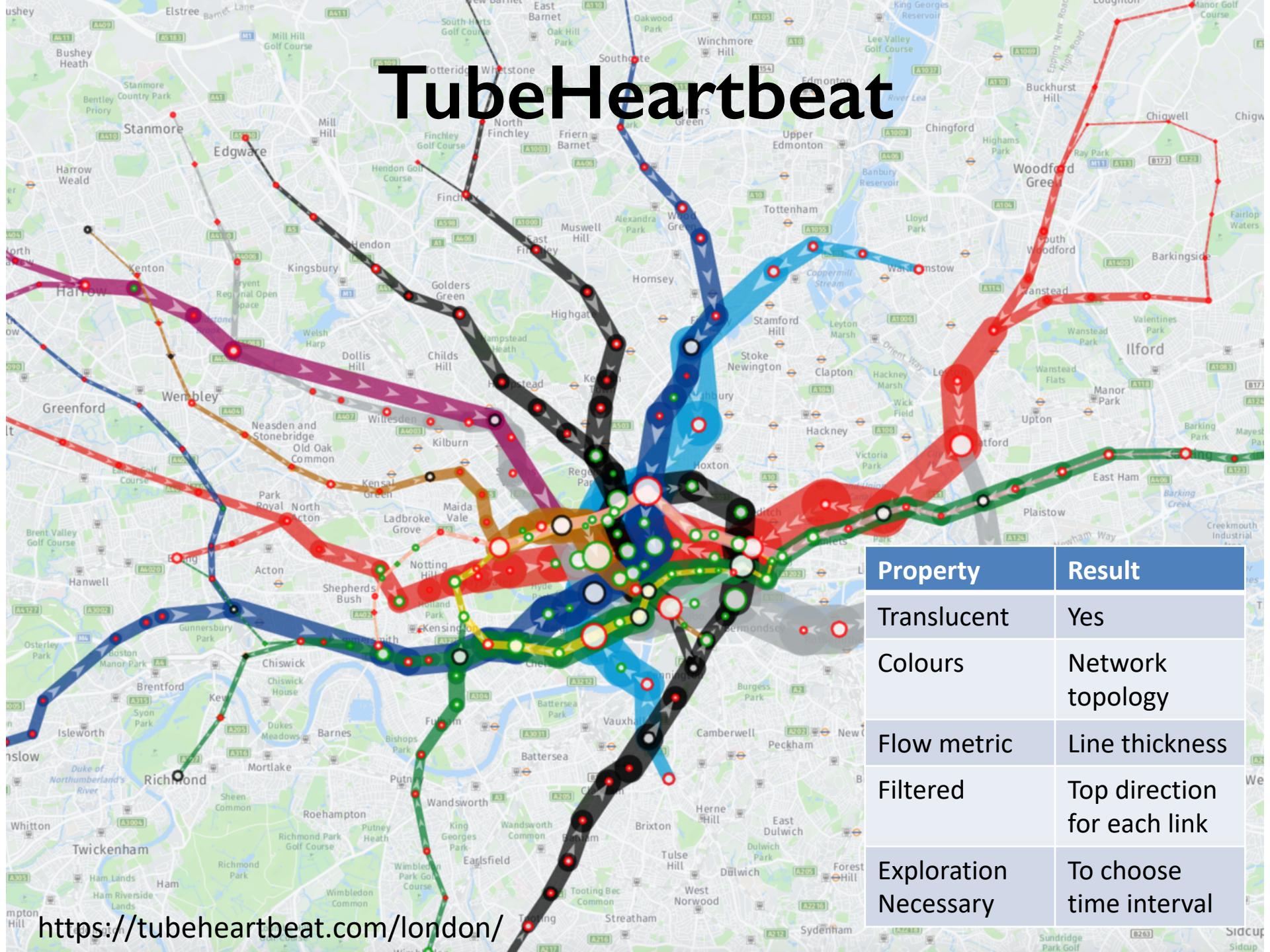
<https://commute.datashine.org.uk/cycle.php>

Great British Cycle to Work

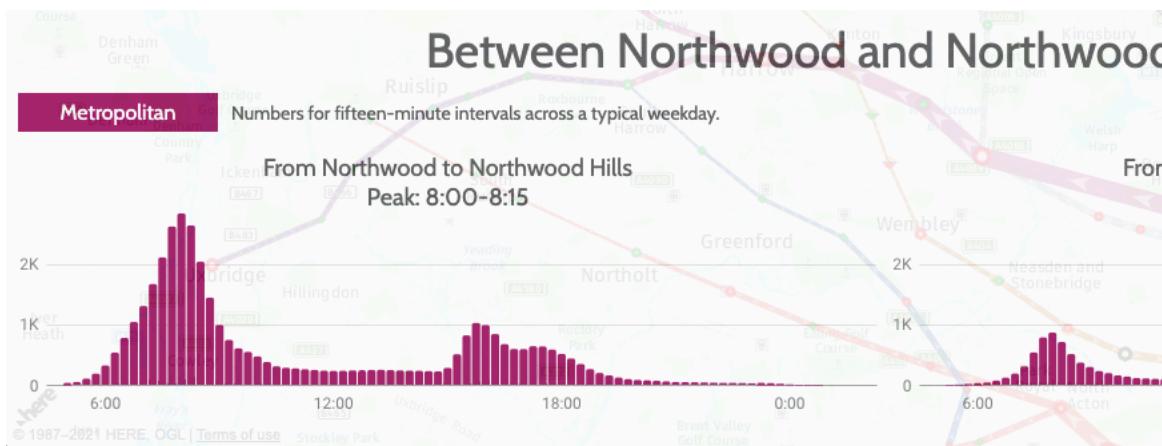
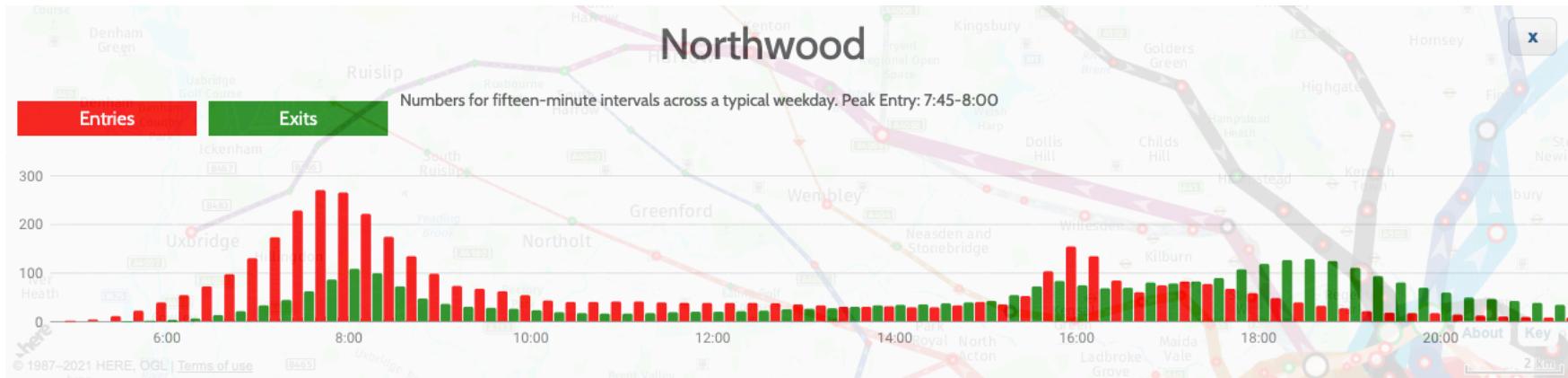
With lower threshold filter



TubeHeartbeat



TubeHeartbeat



Property	Result
Translucent	No
Colours	Network direction
Flow metric	Graph height
Filtered	Single node or link
Exploration Necessary	To choose location

End of Part A