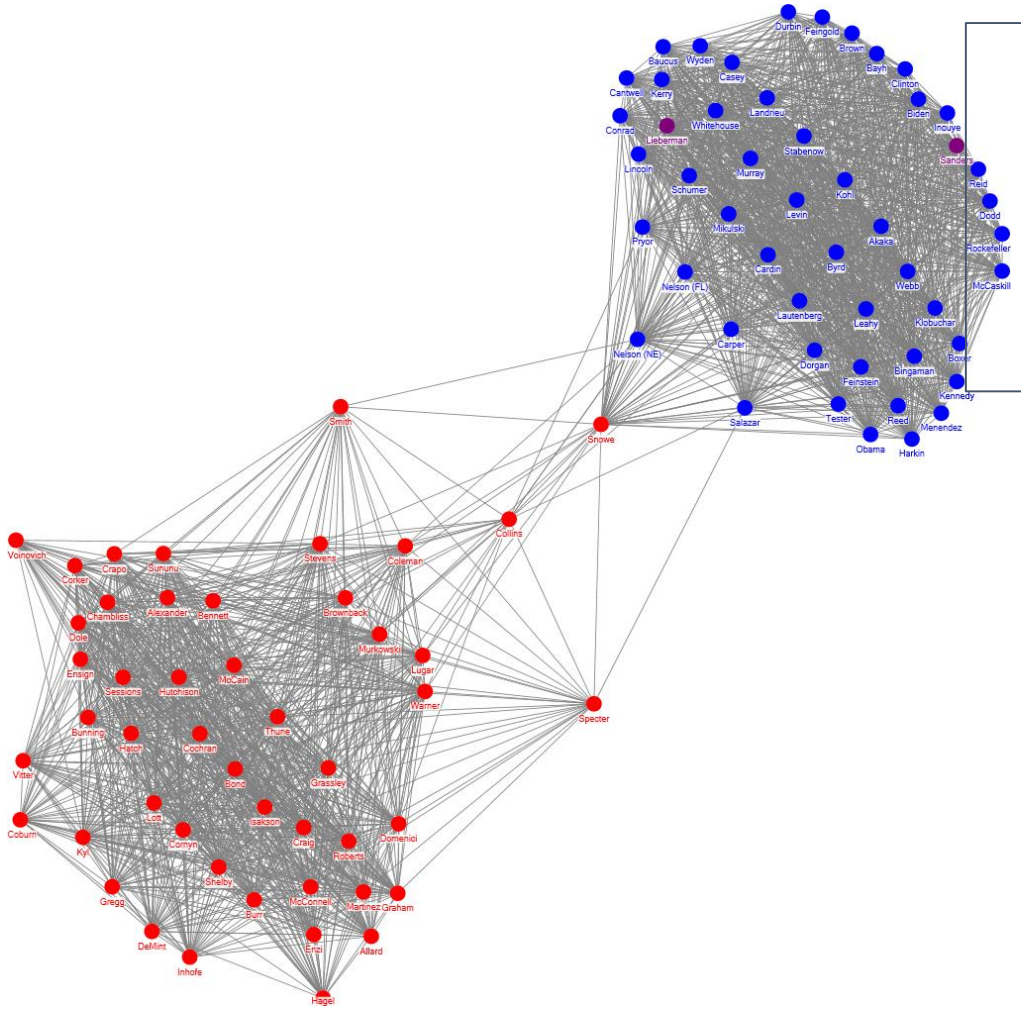
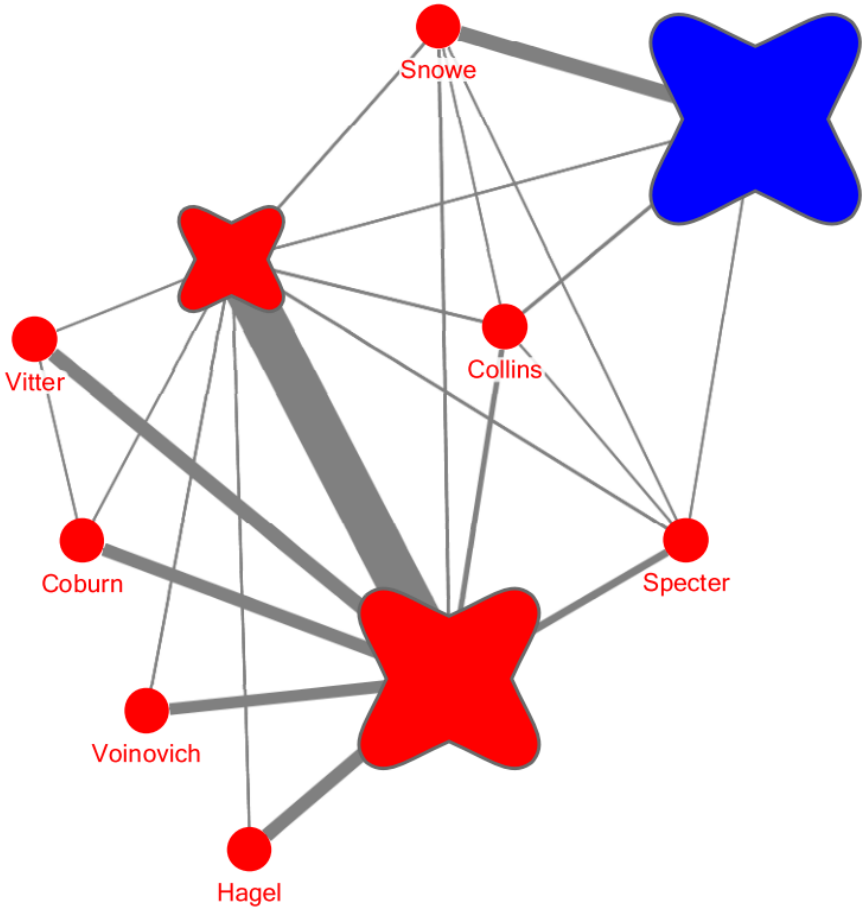


CS 7280-03 Special Topics on Visualization in Network Science

Lecture 20



Professor Cody Dunne

https://codydunne.github.io/cs7280-f16/

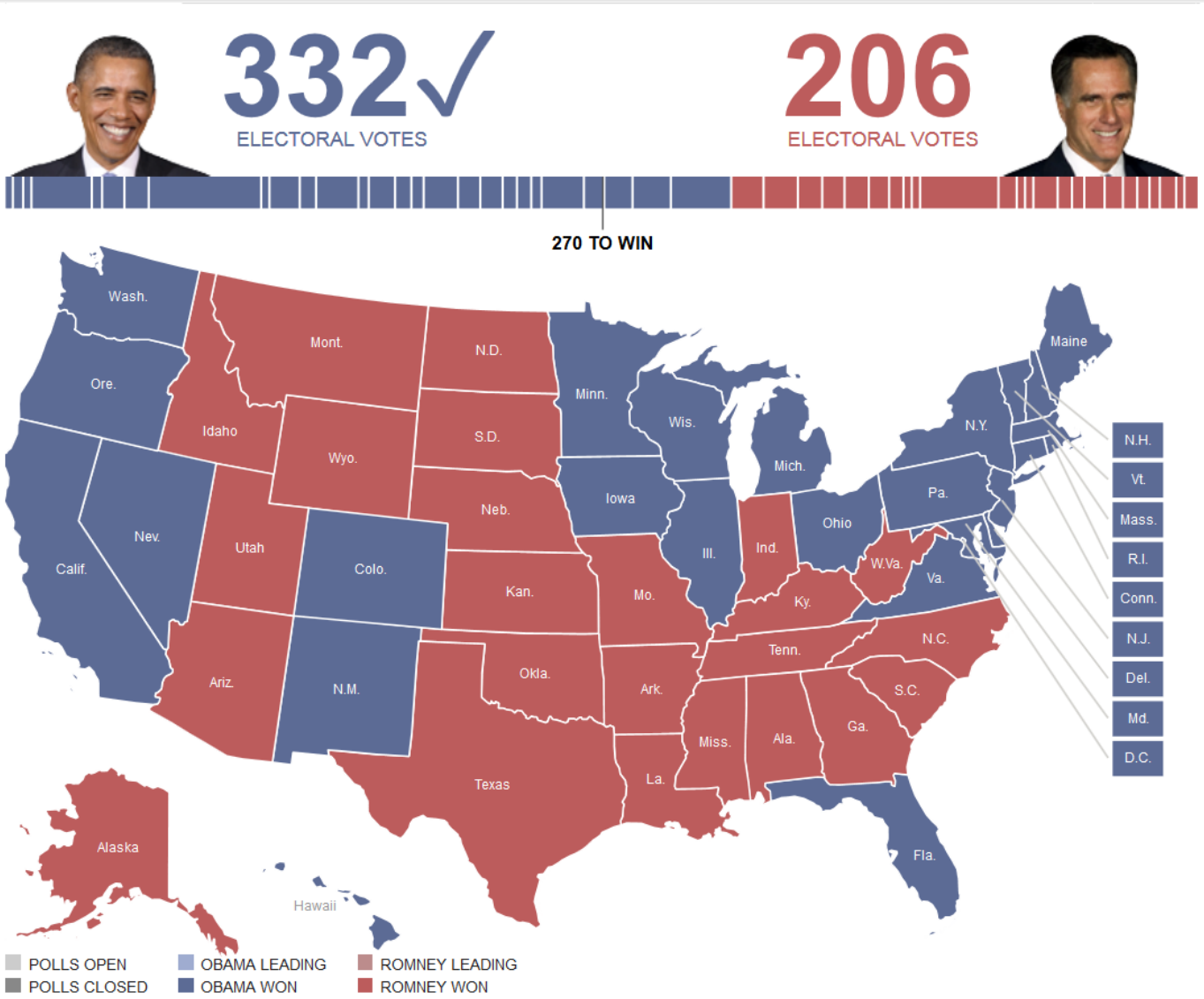
c.dunne@northeastern.edu

Project Discussion

https://codydunne.github.io/cs7280-f16/projects/

Mapping Nodes and Values

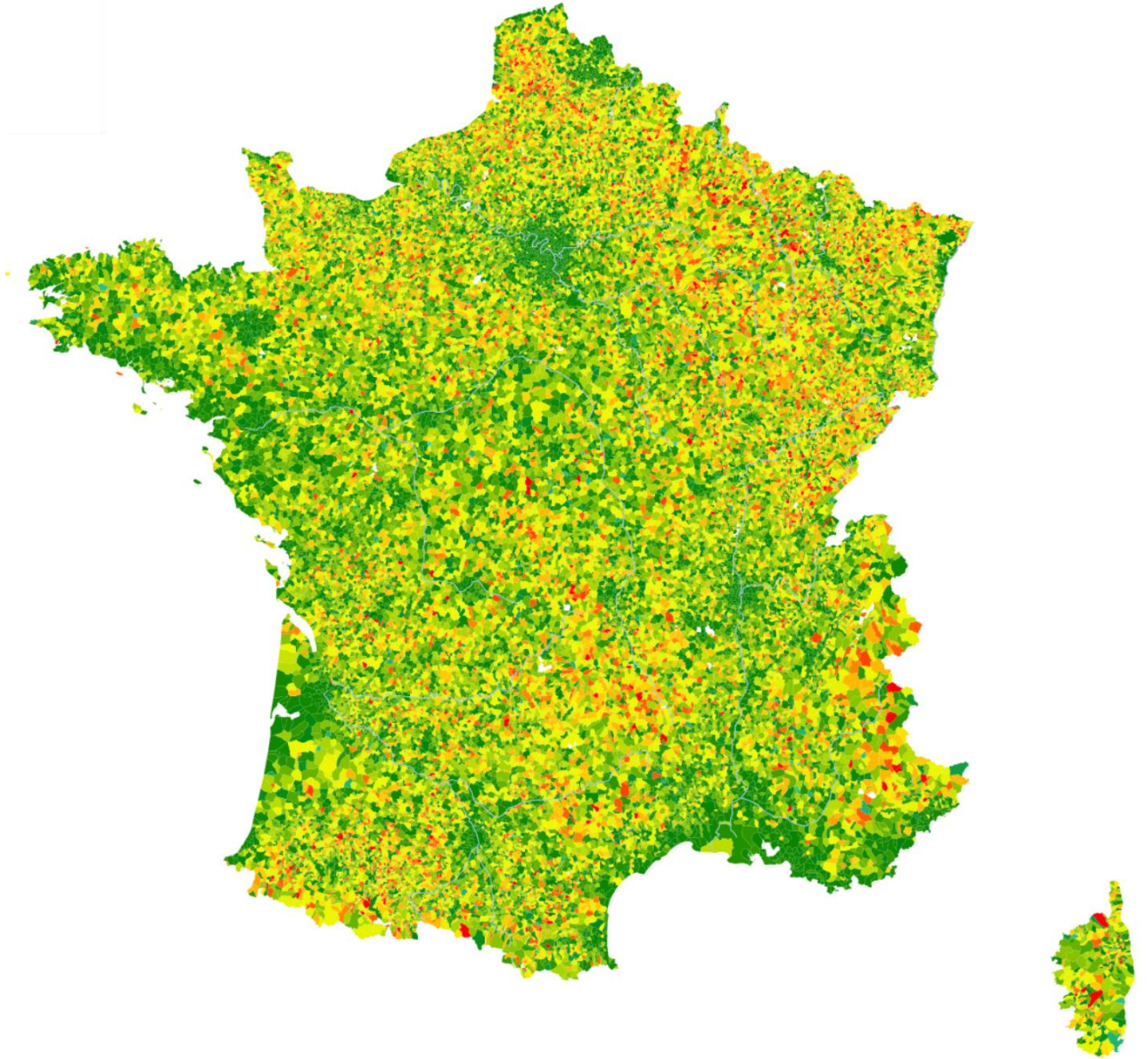
Chloropleth Maps



http://elections.huffingtonpost.com/2012/results

Chloropleth Maps

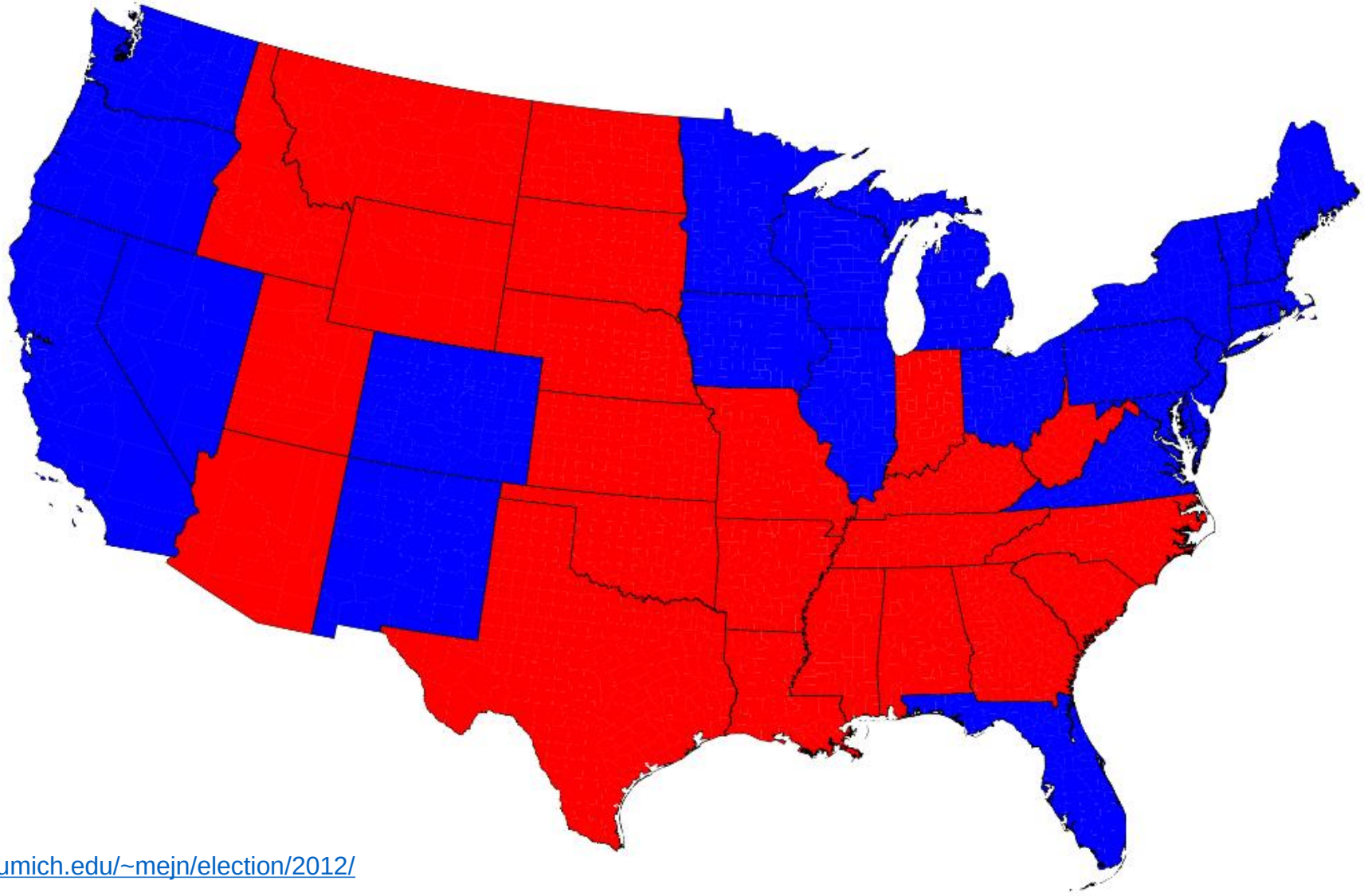
Small regions



http://ssz.fr/parite/

Area Morphing

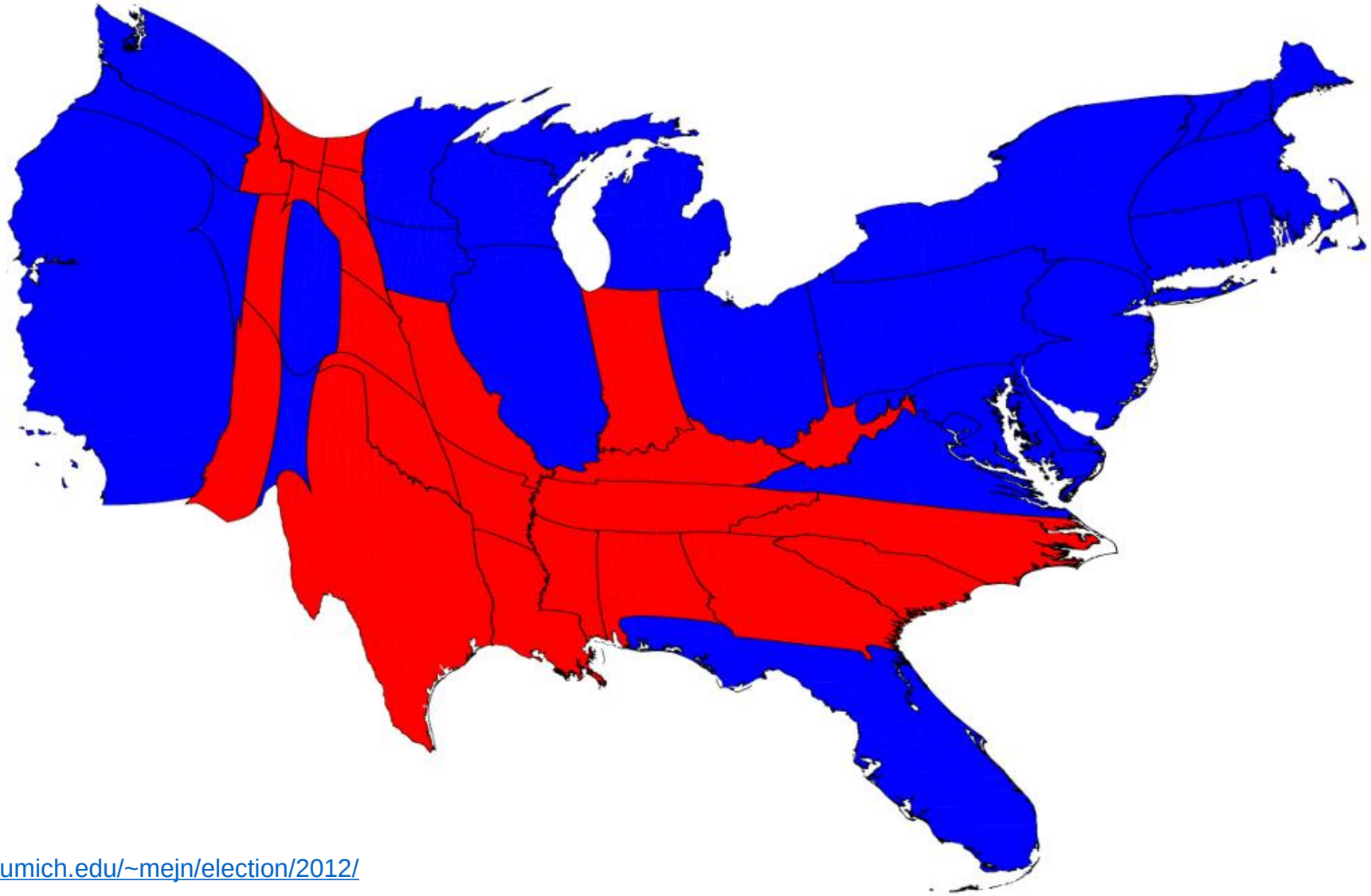
Gastner and Newman 2012 Election (State)



http://www-personal.umich.edu/~mejn/election/2012/

Area Morphing

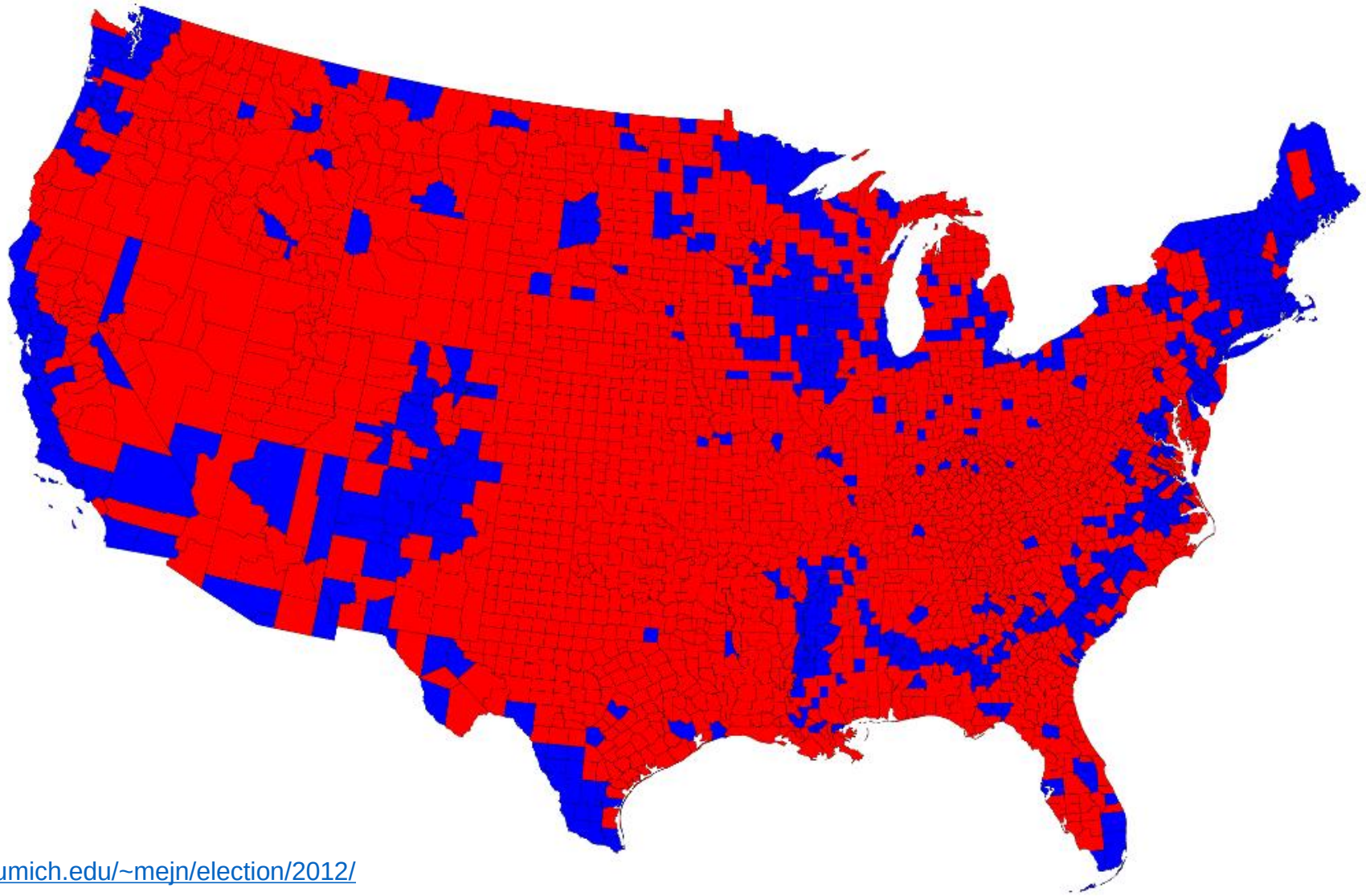
Gastner and Newman 2012 Election (State)



http://www-personal.umich.edu/~mejn/election/2012/

Area Morphing

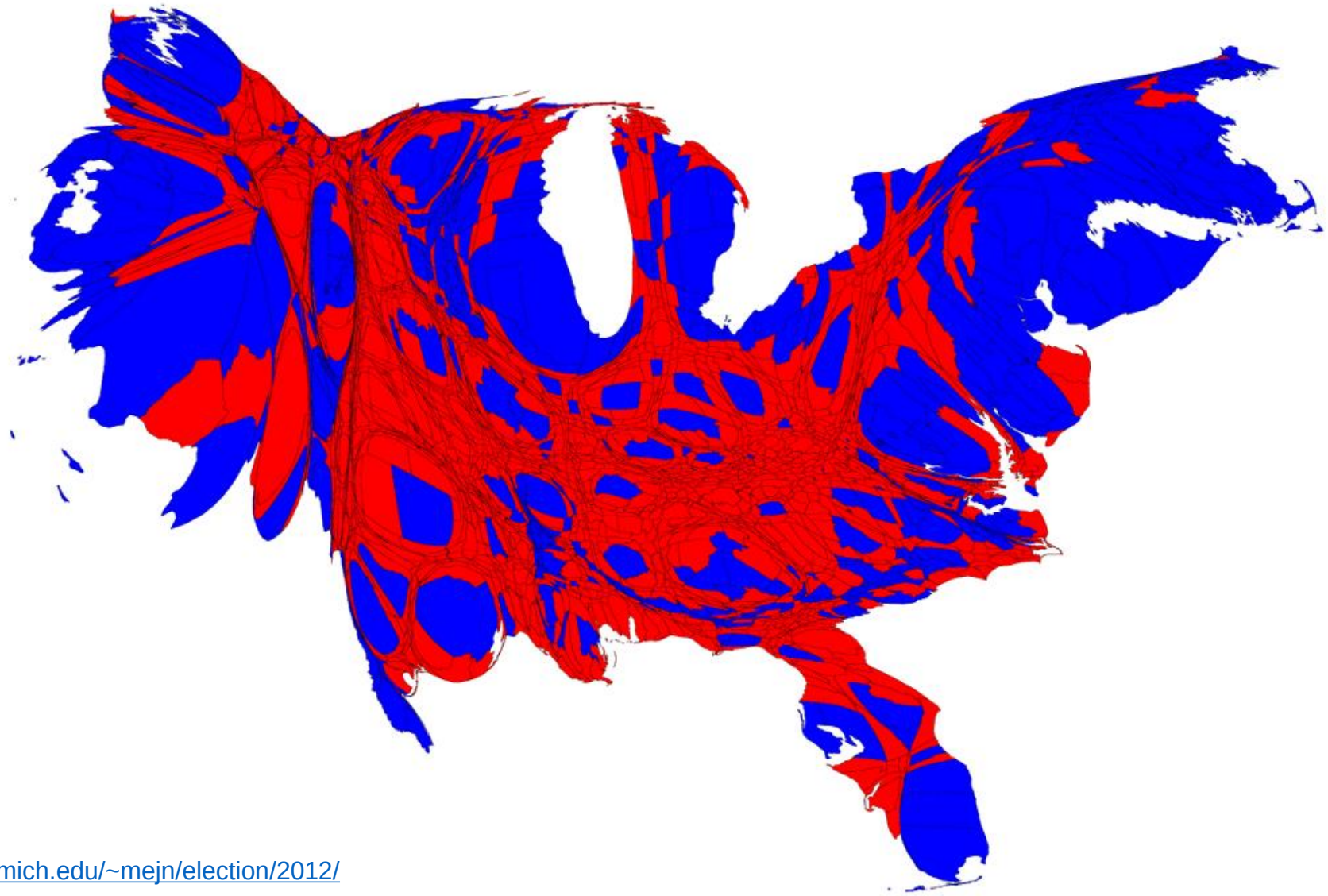
Gastner and Newman 2012 Election (County)



http://www-personal.umich.edu/~mejn/election/2012/

Contiguous Density Equalizing Cartograms

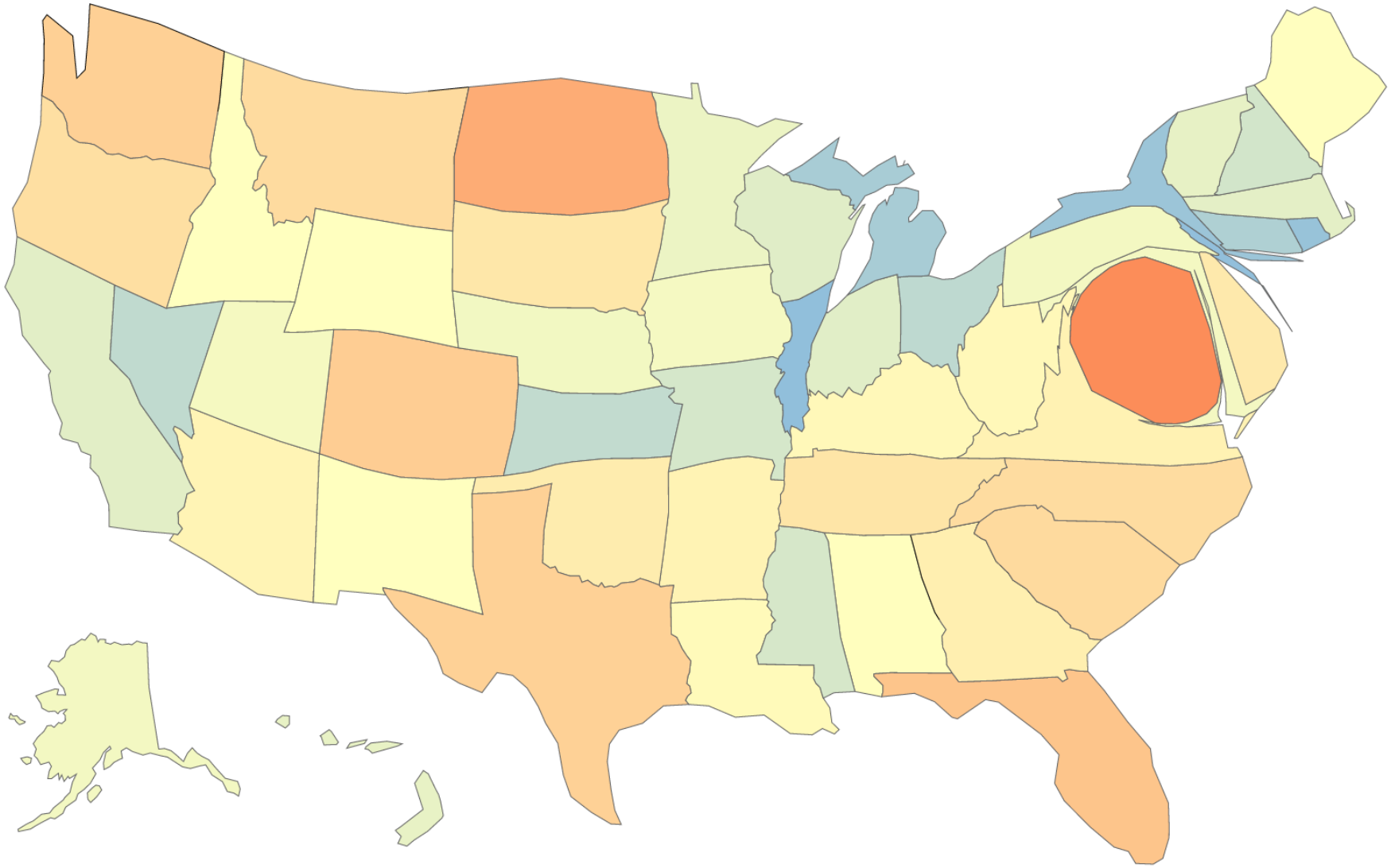
Gastner and Newman 2012 Election (County)



http://www-personal.umich.edu/~mejn/election/2012/

Area Morphing

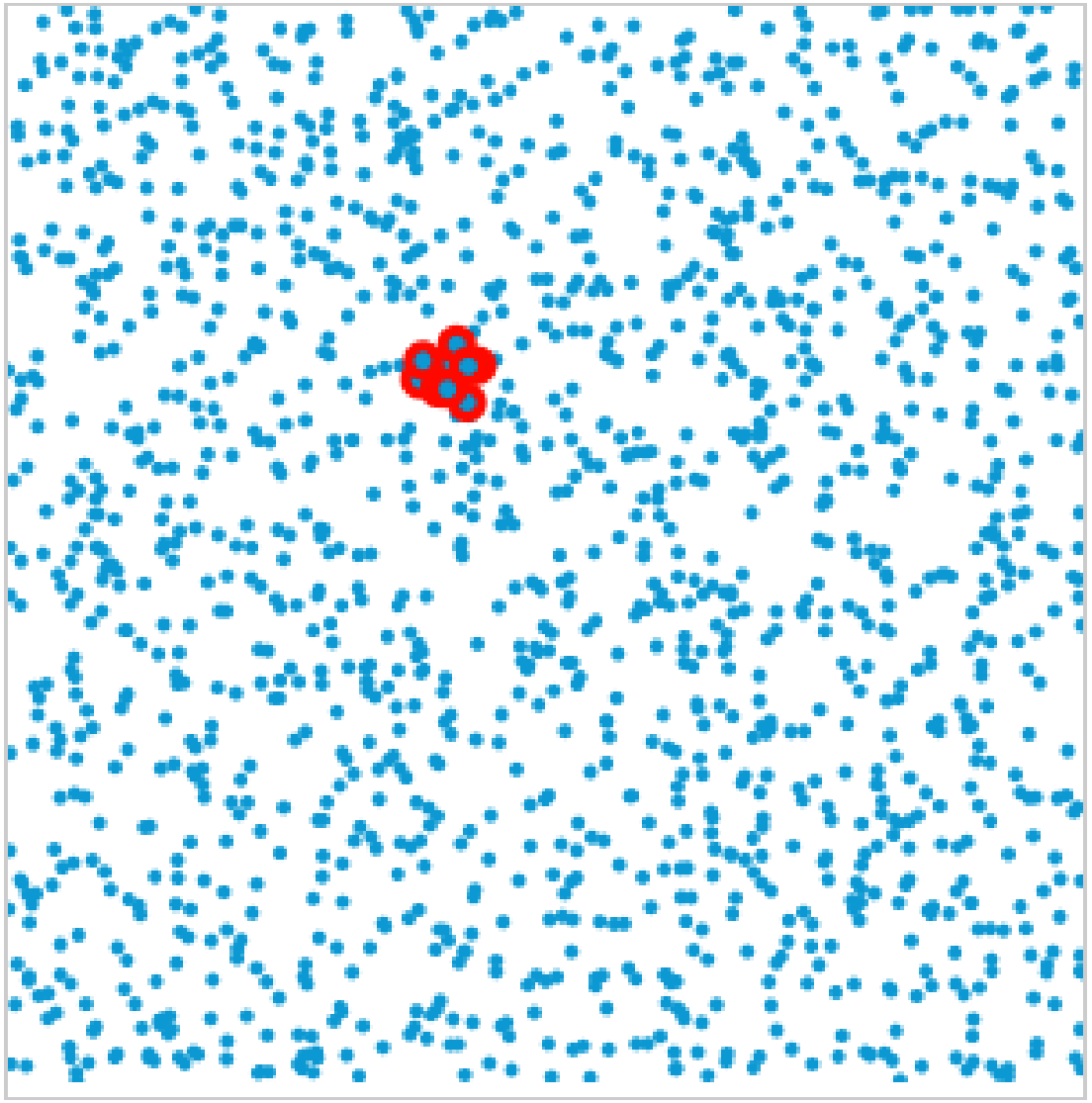
Dougenik, Chrisman, and Niemeyer

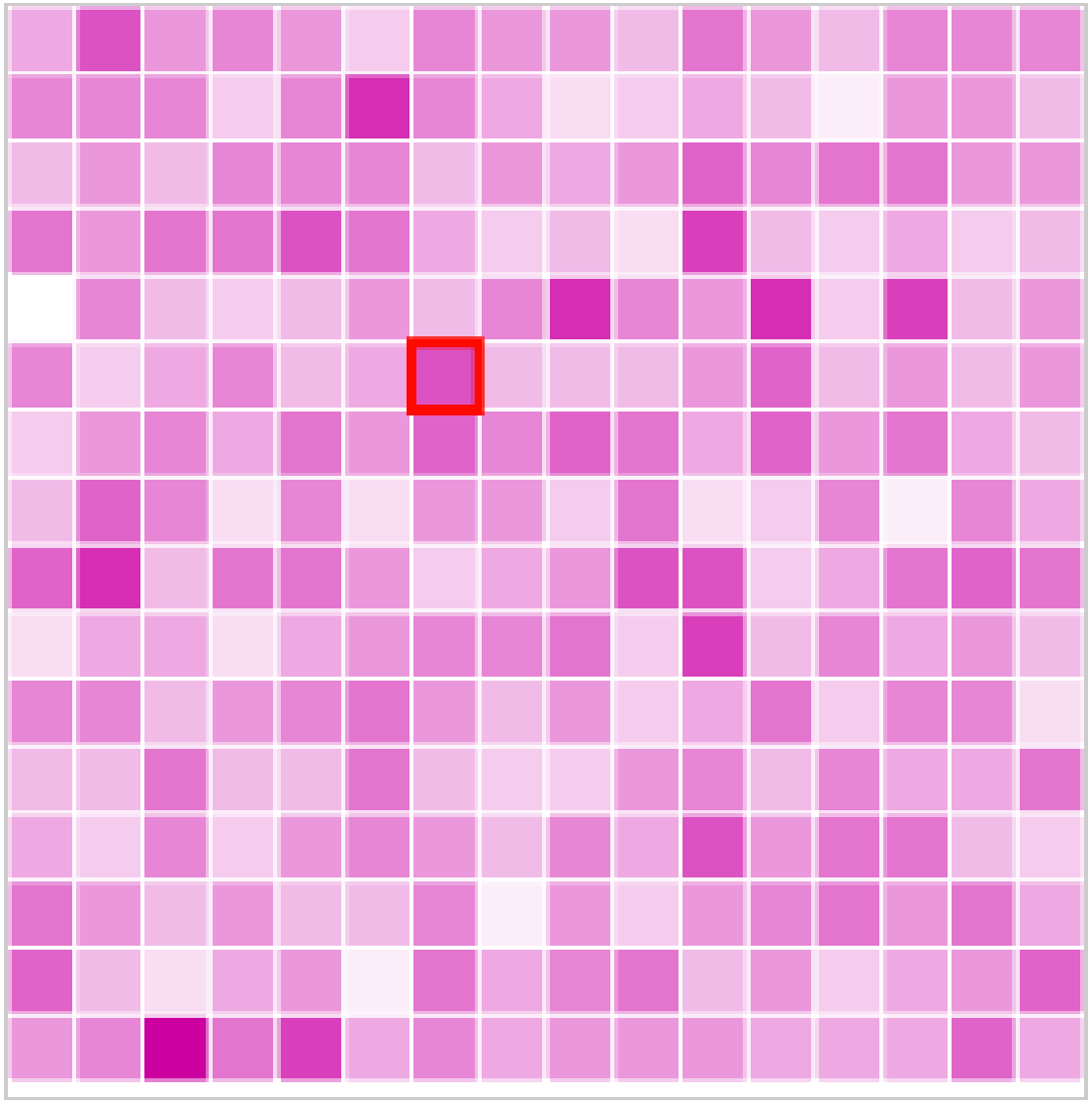


http://prag.ma/code/d3-cartogram/#domesticmigrate/2011

Area Binning

Square

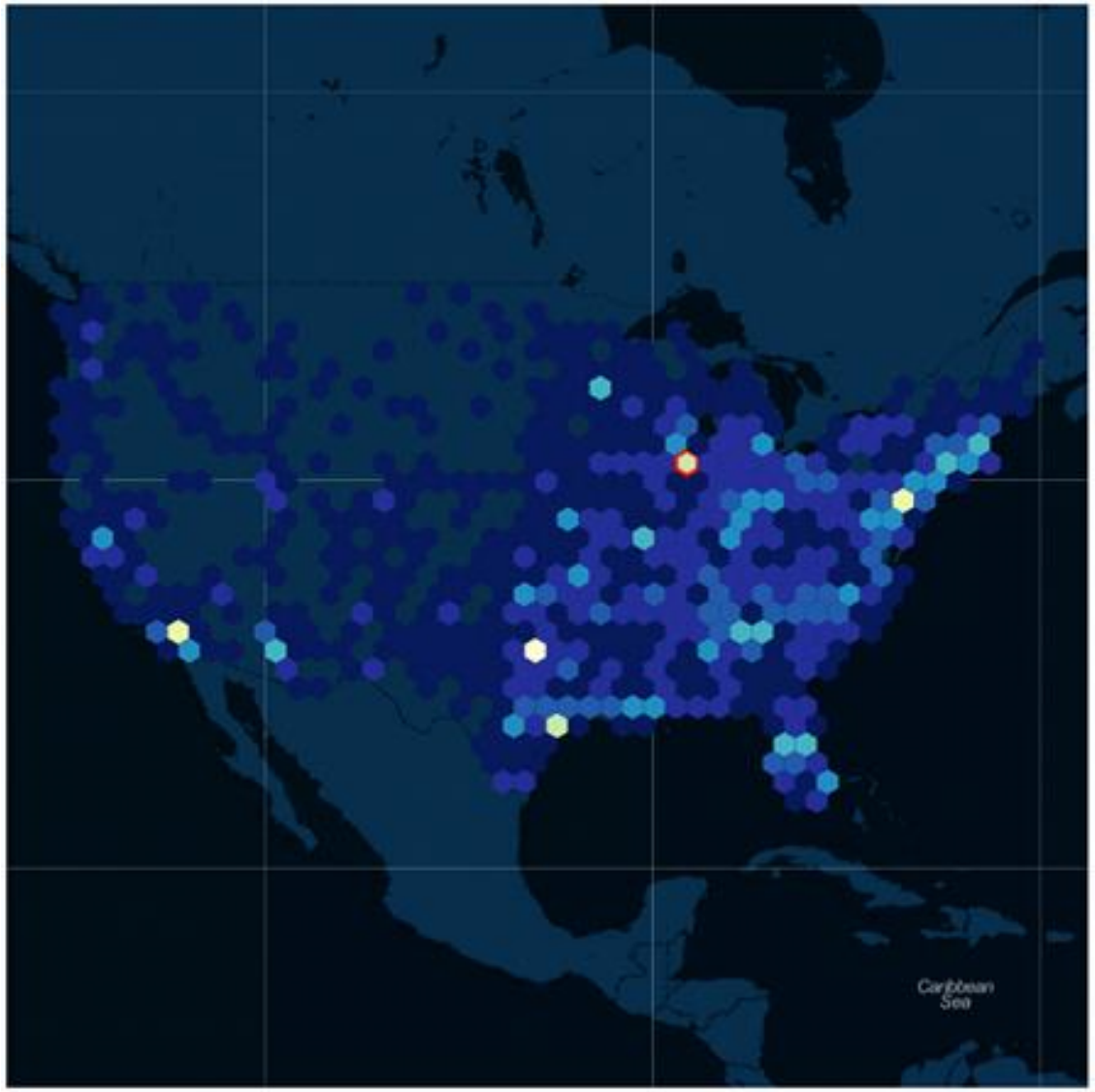




http://jsfiddle.net/indiemaps/gzPDU/

Area Binning

Hexagon



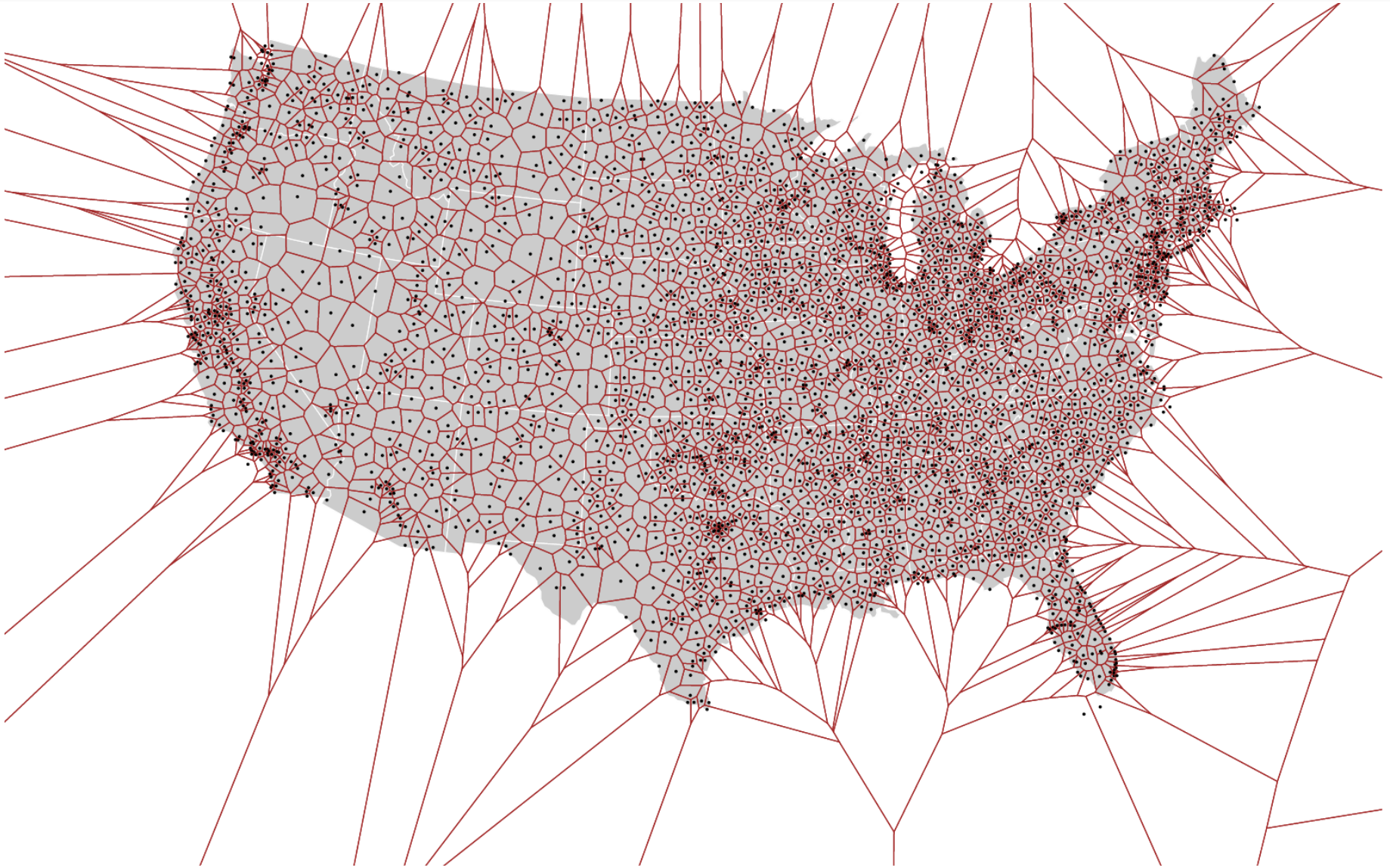
http://indiemaps.github.com/hexbin-js/tests/walmart.html

Area Binning

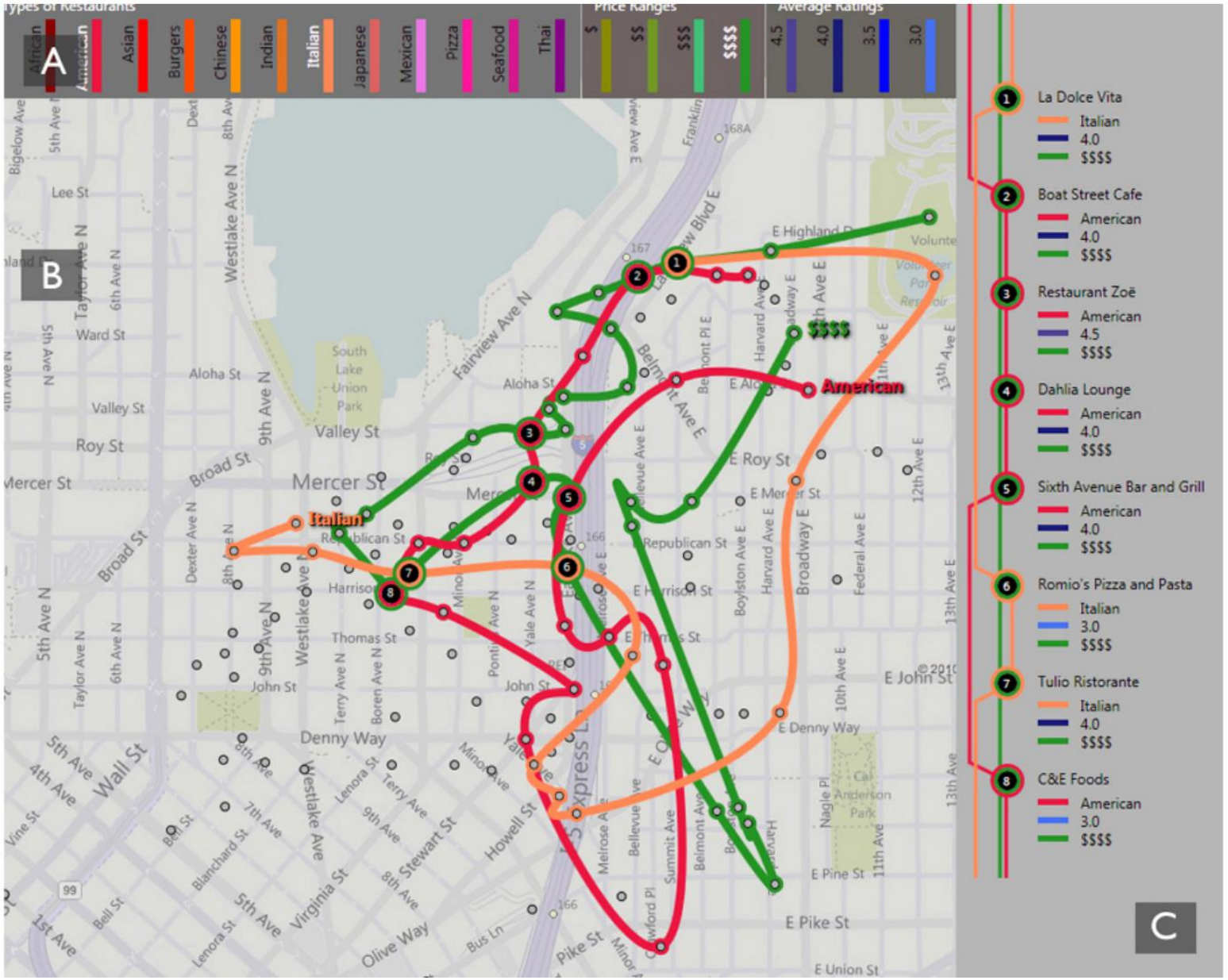
Hexagon – Multivariate

http://indiemaps.com/blog/2011/10/hexbins/

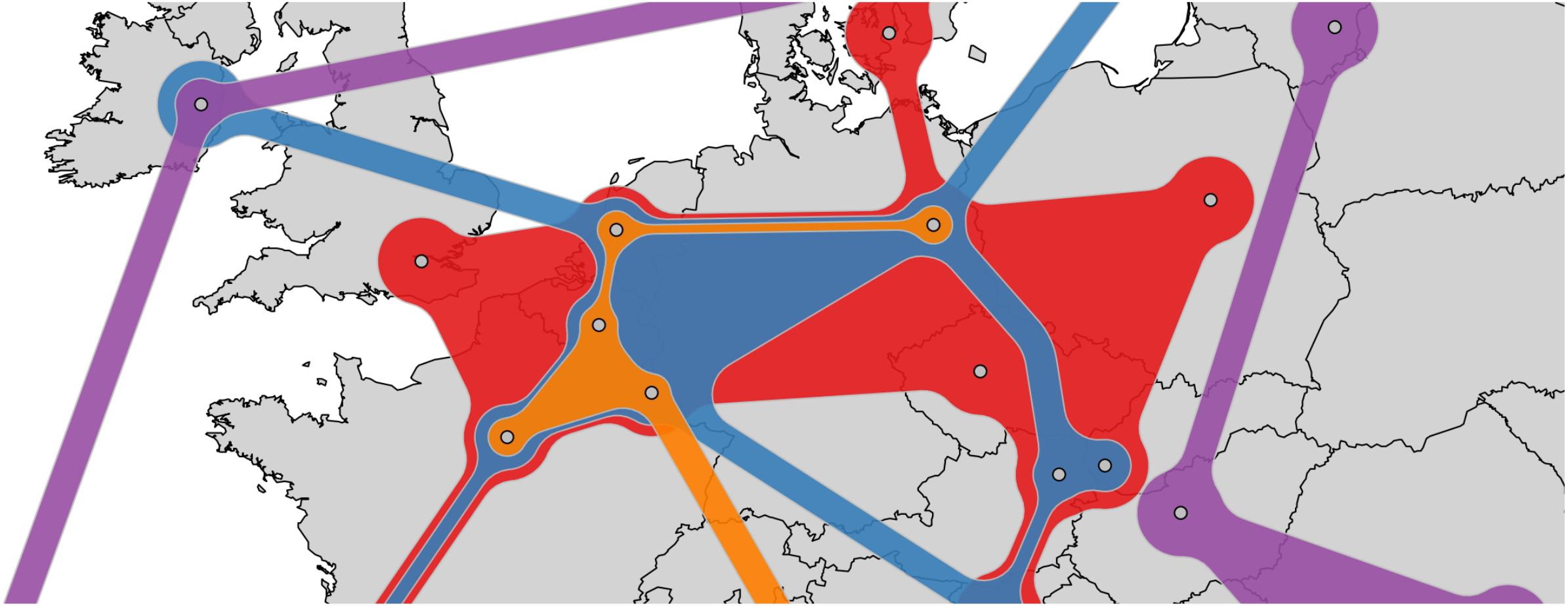
Voronoi Tessellations



http://mbostock.github.io/d3/talk/20111116/airports-all.html



[Alper et al., 2011]

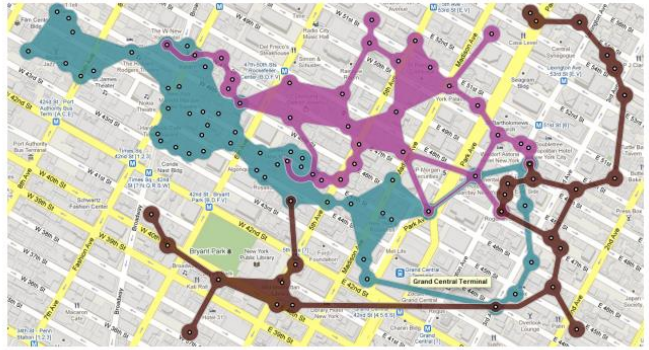


Muelemans et al., 2013

(a) Bubble Sets

(b) Kelp Diagrams

(c) LineSets



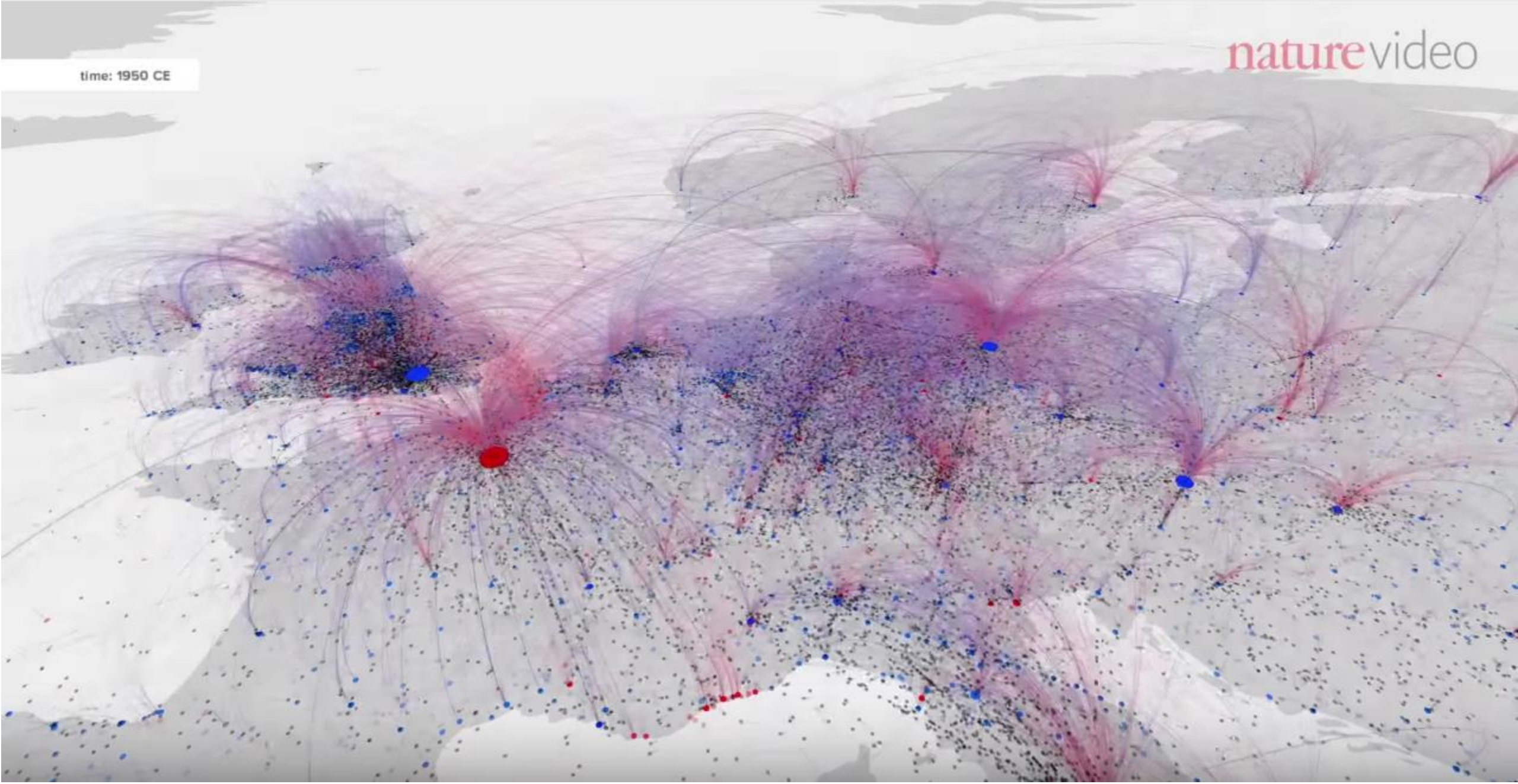
(d) KelpFusion (dense)

(e) KelpFusion (medium)

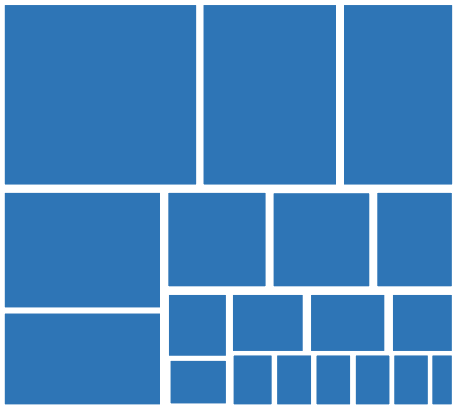
(f) KelpFusion (sparse)

[Muelemans et al., 2013]

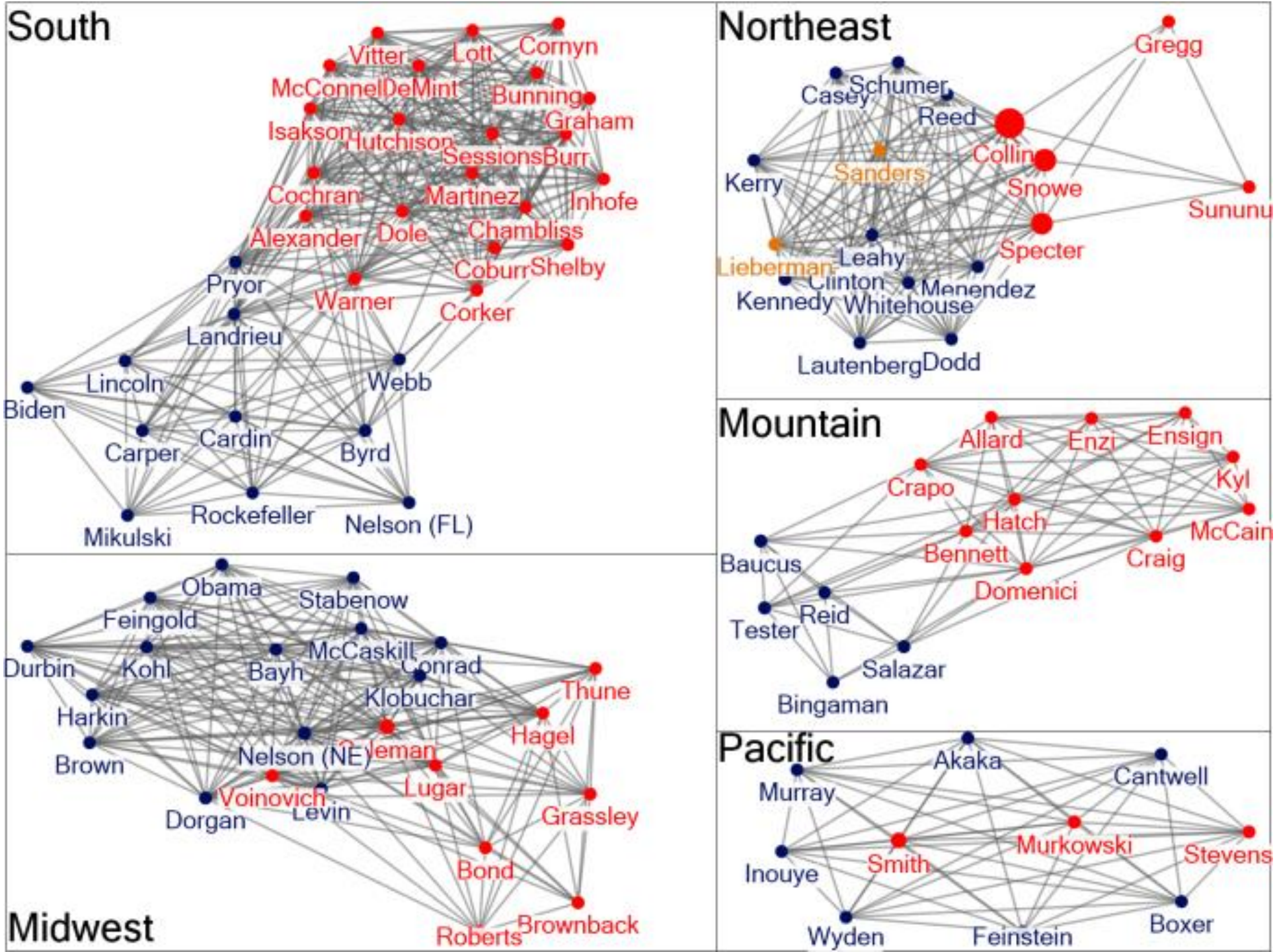
Mapping Edges

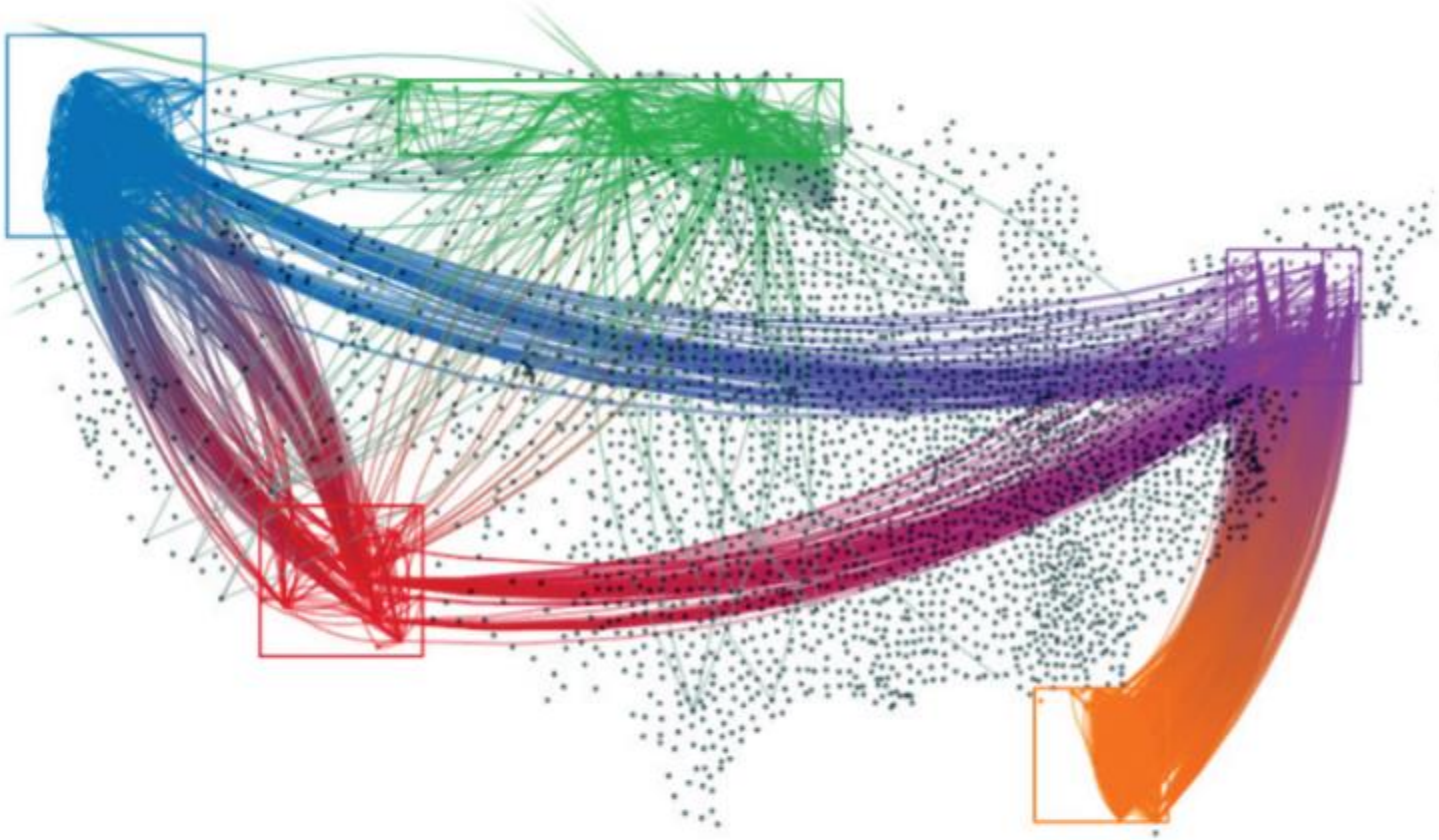


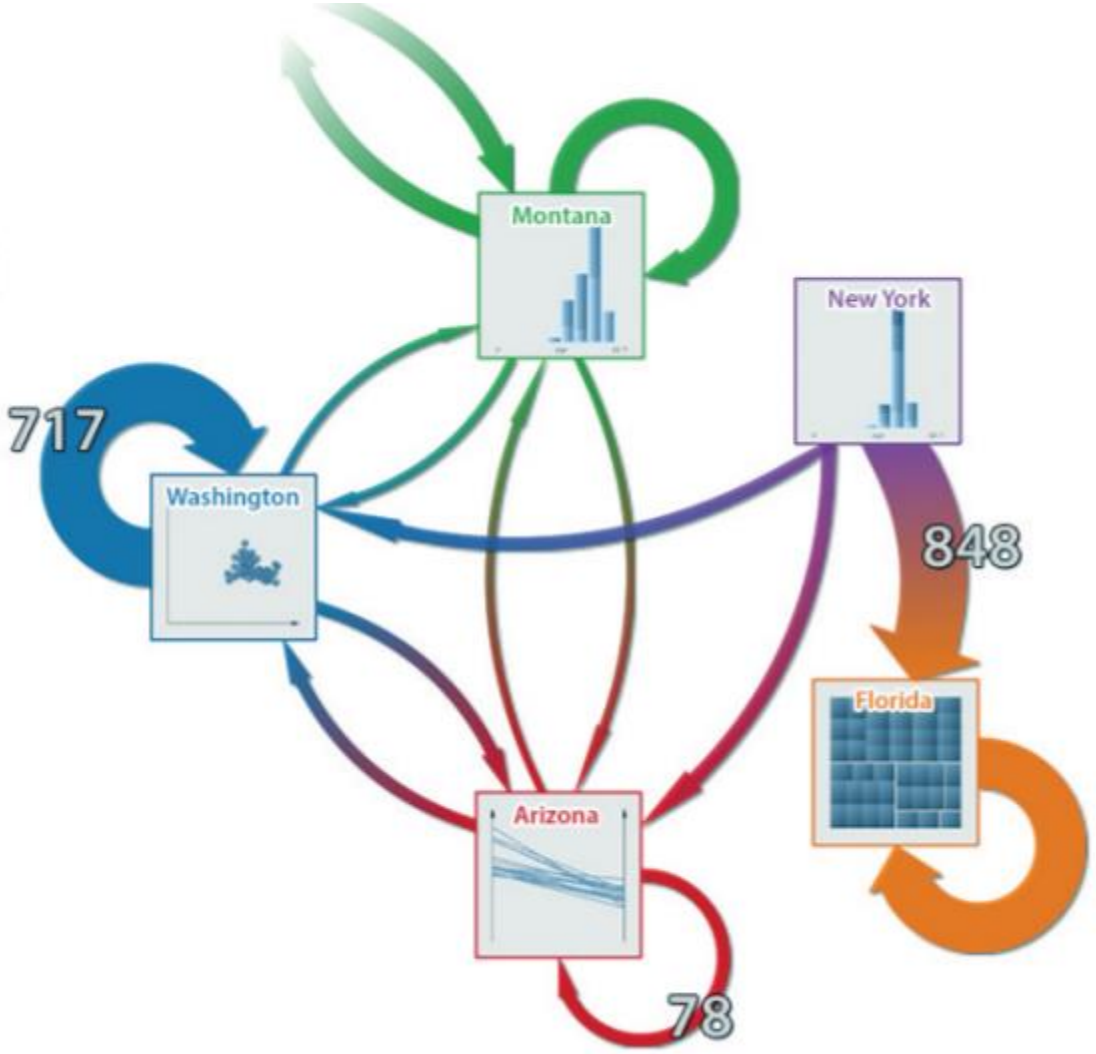
https://www.youtube.com/watch?v=4gIhRkCcD4U



Squarified Treemap
(Rodrigues et al., 2011)







https://www.youtube.com/watch?v=E1PVTitj7h0

van den Elzen and van Wijk, 2014

https://vimeo.com/183311464

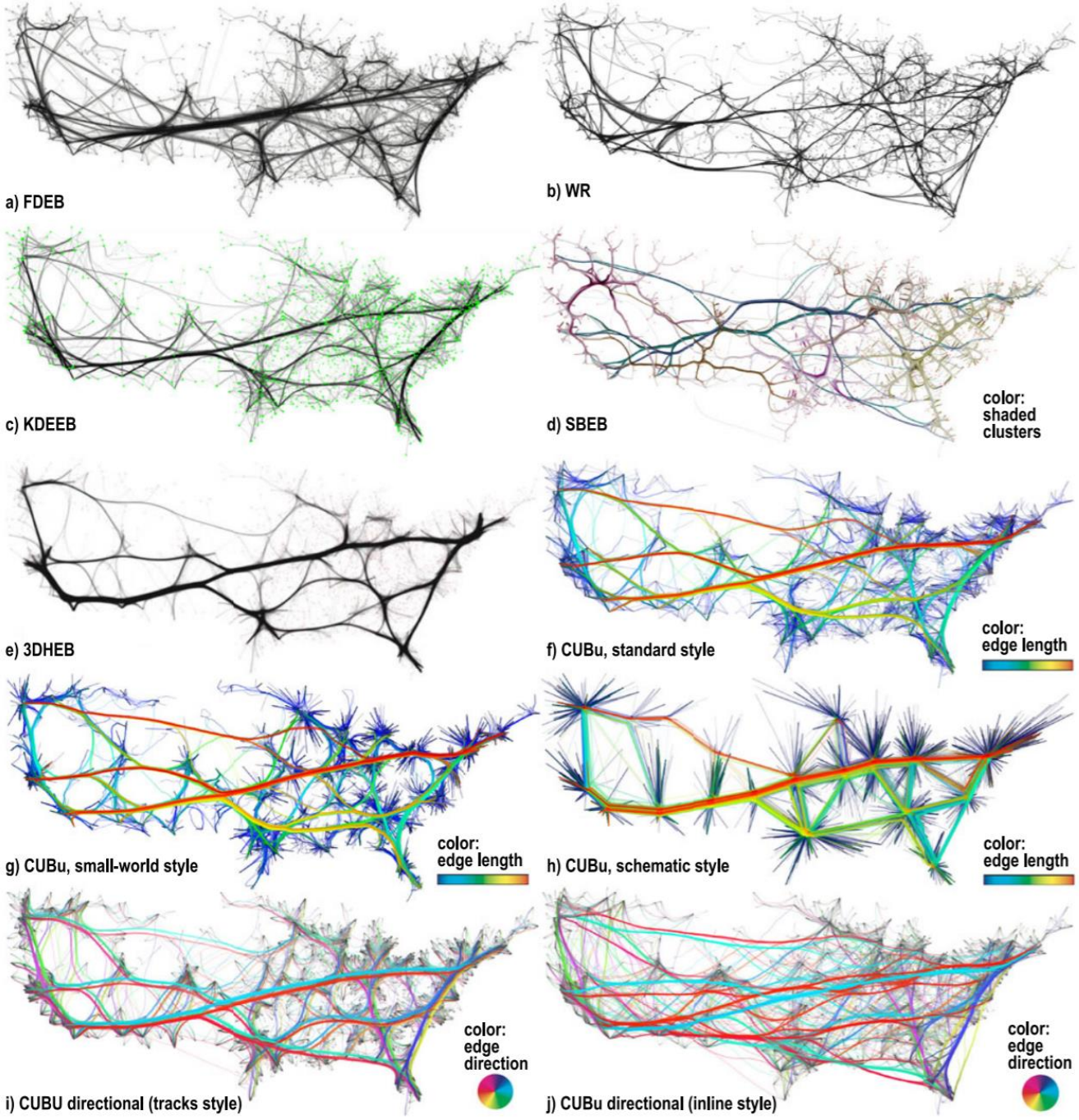
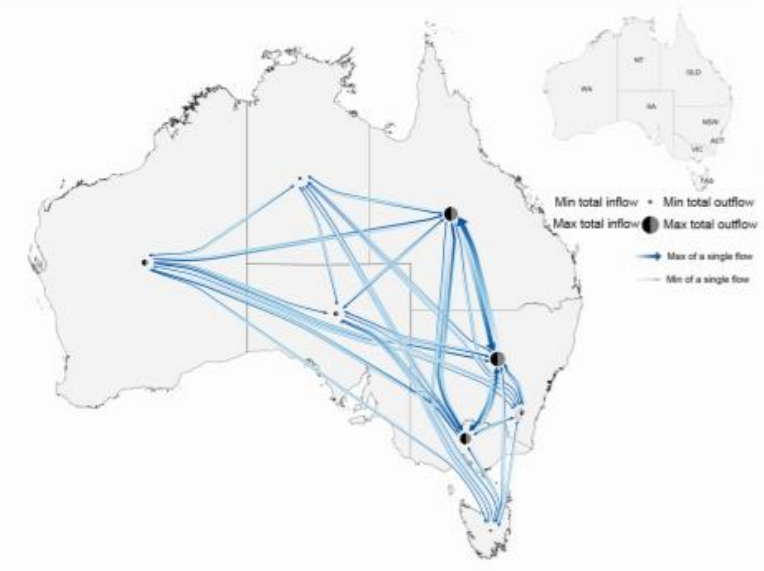
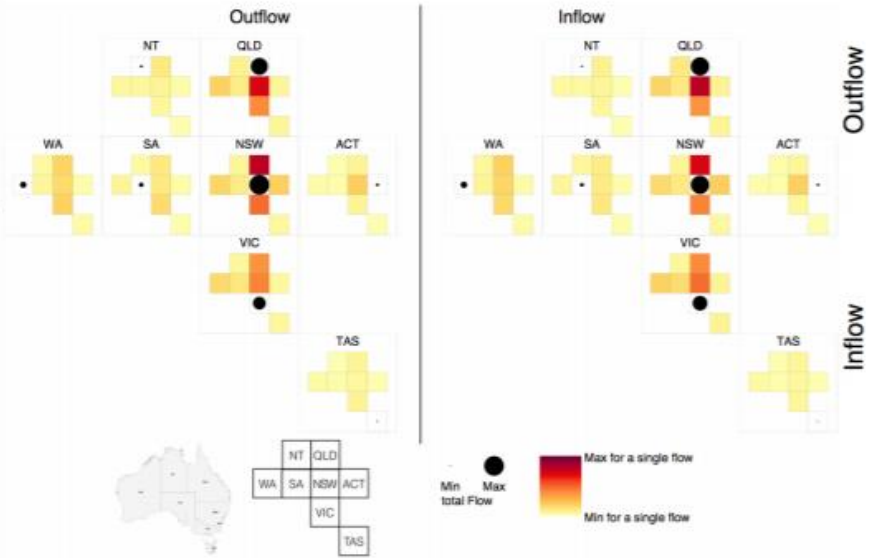


Fig. 2. Bundling styles for *migrations* graph. (a-e) Existing algorithms. (f-j) Styles produced by our single CUBu method.

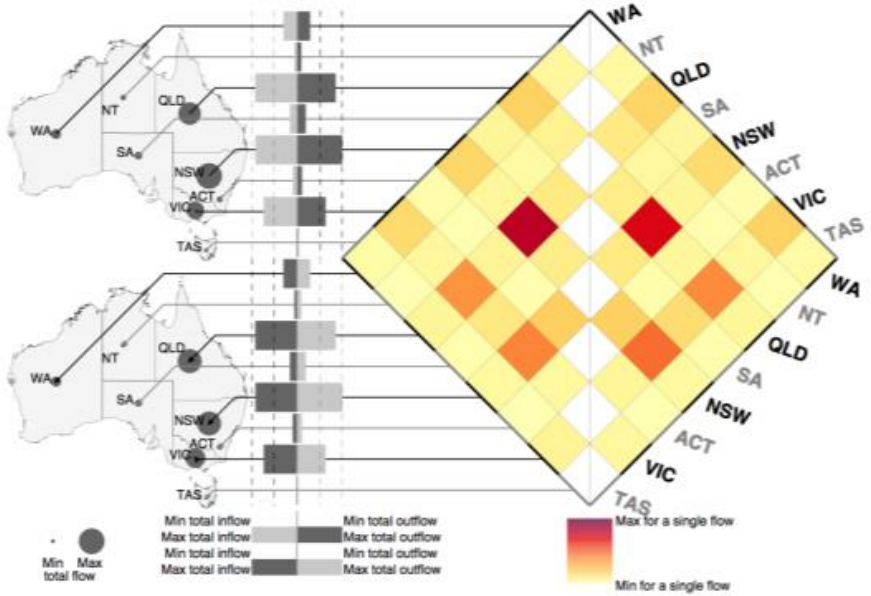
van der Zwan et al., 2016



(a) Bundled Flow Map



(b) OD Map



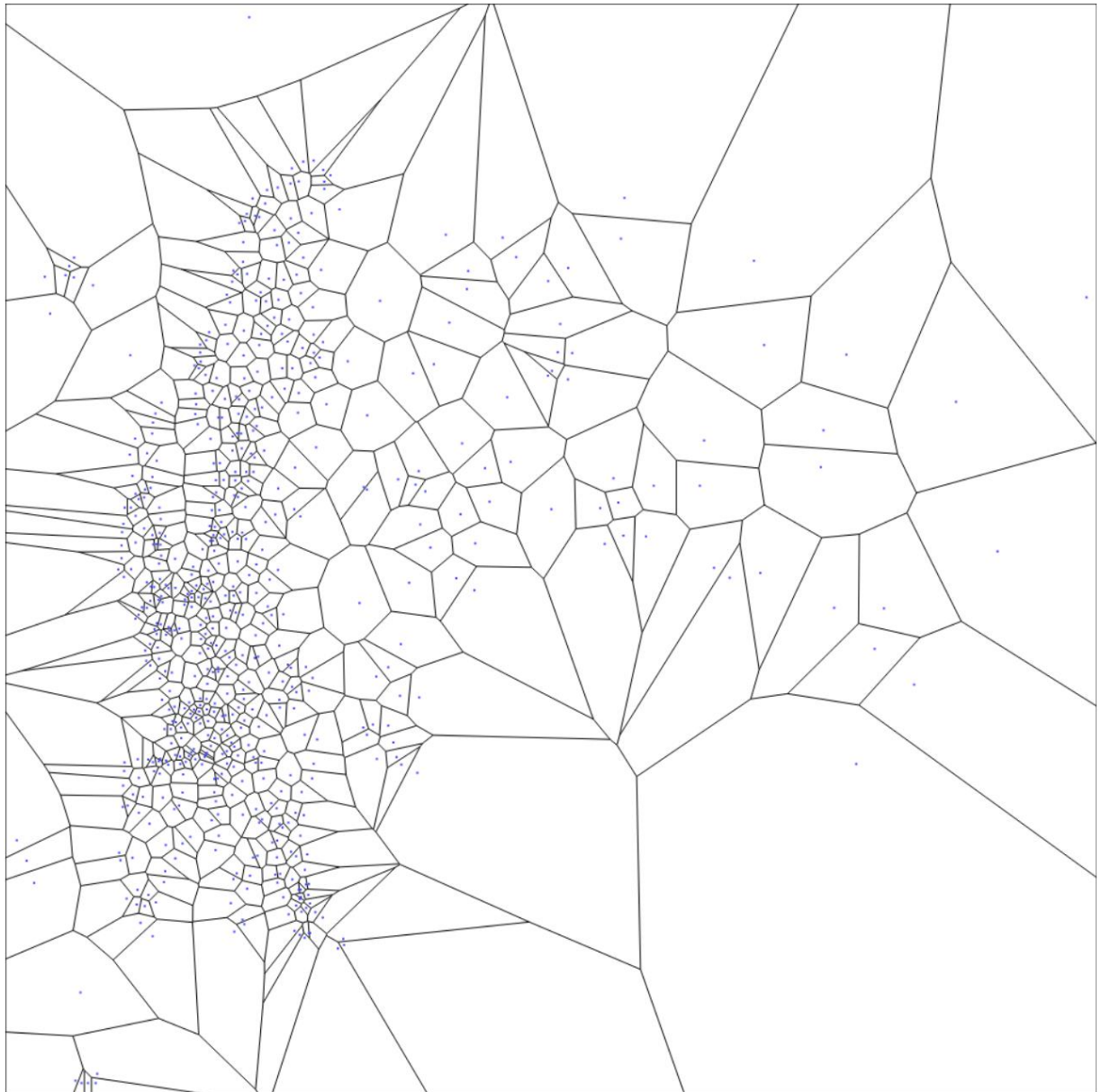
(c) MapTrix

https://vimeo.com/182970812

Yang et al., 2016

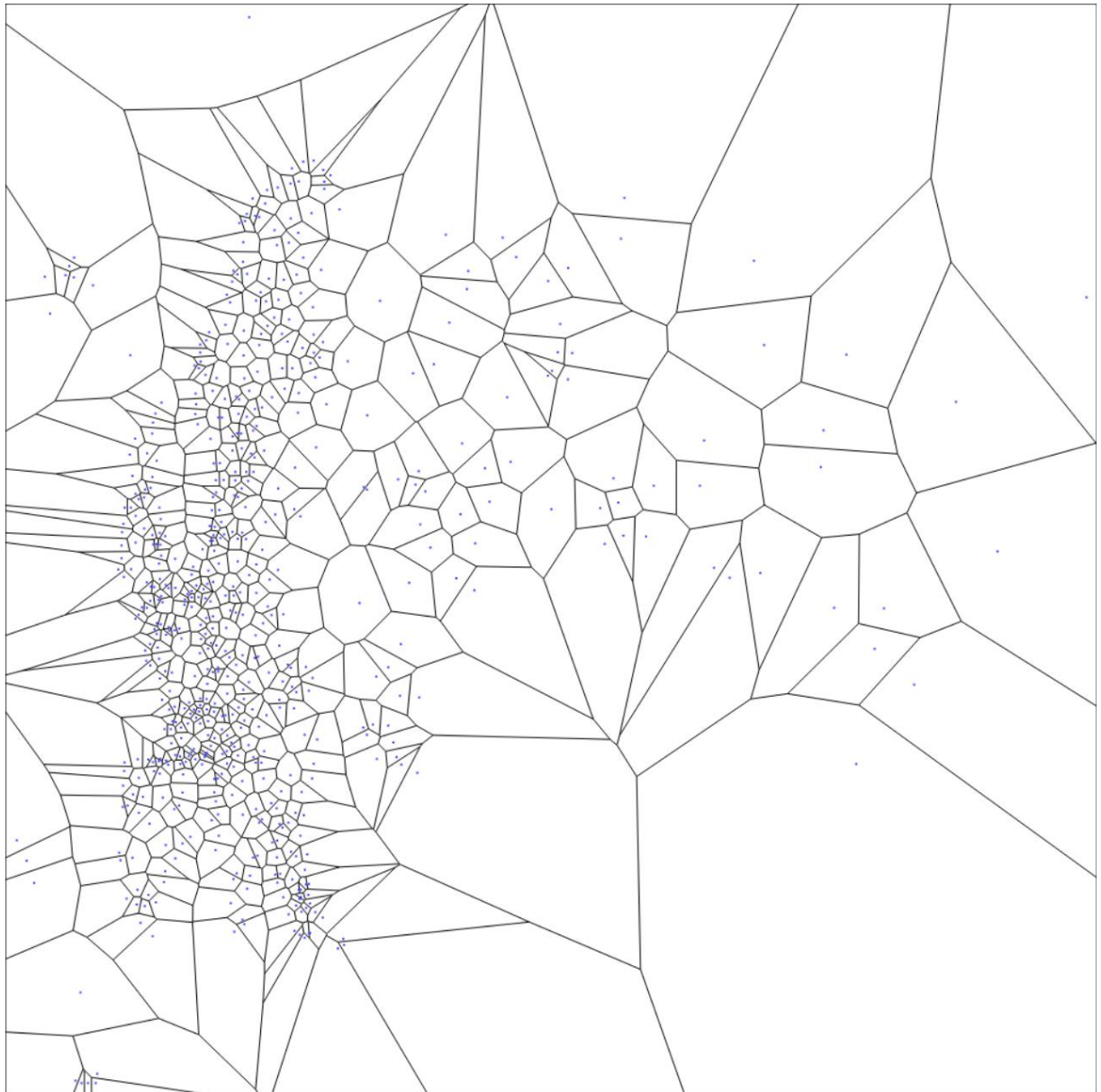
Voronoi Tessellation

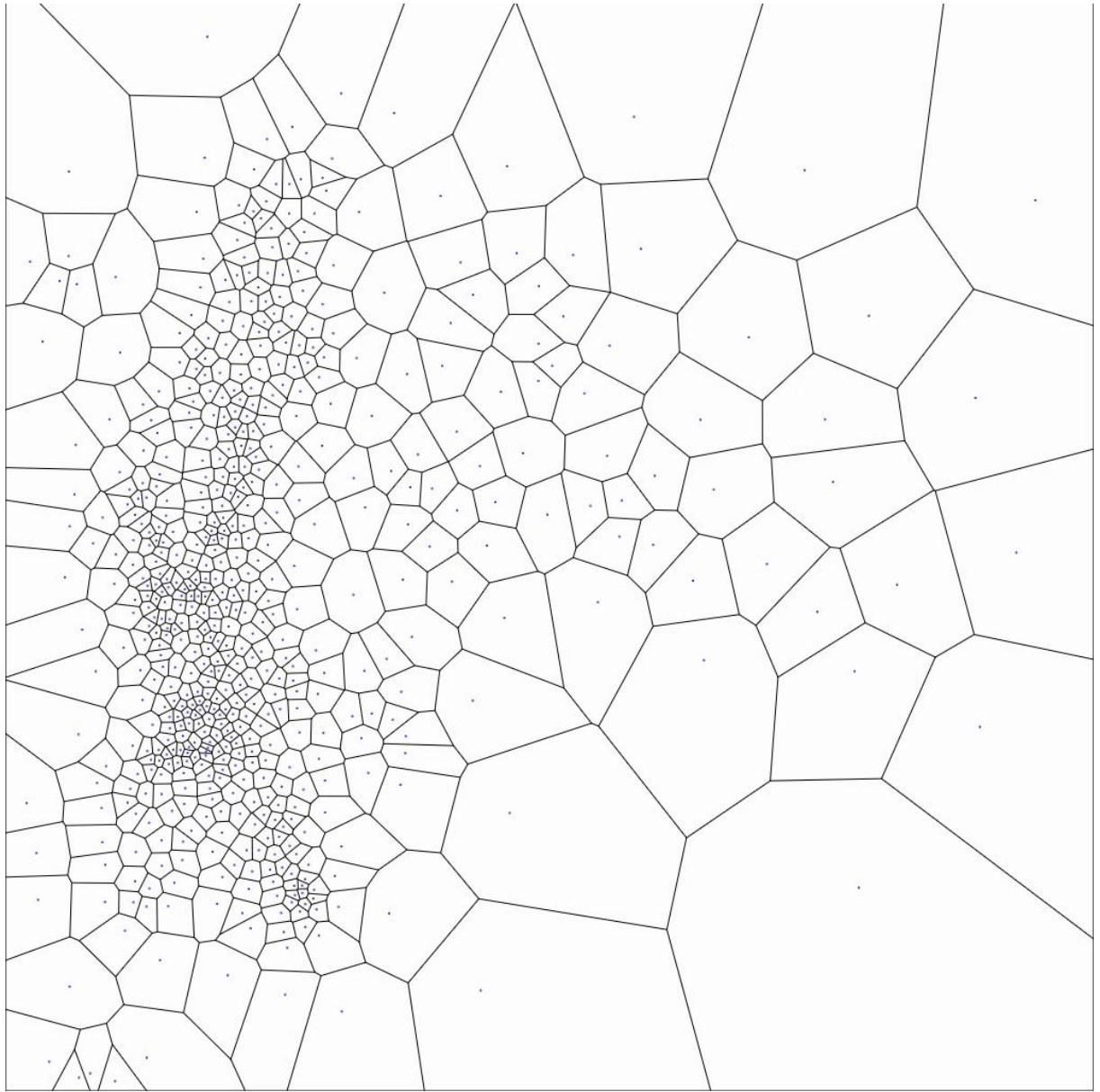
Western Europe

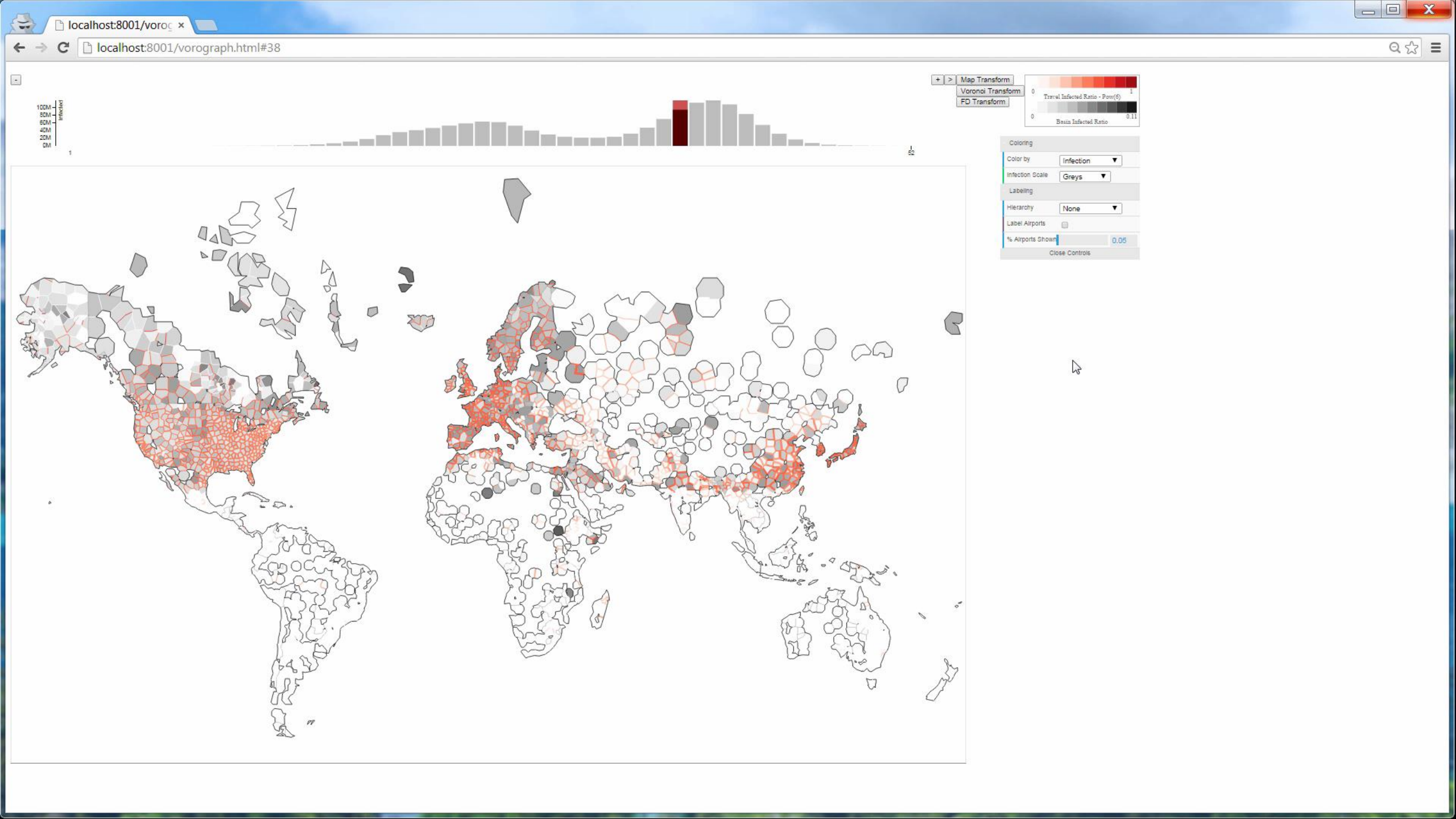


Centroidal Voronoi Tessellation – Animated!

Western Europe

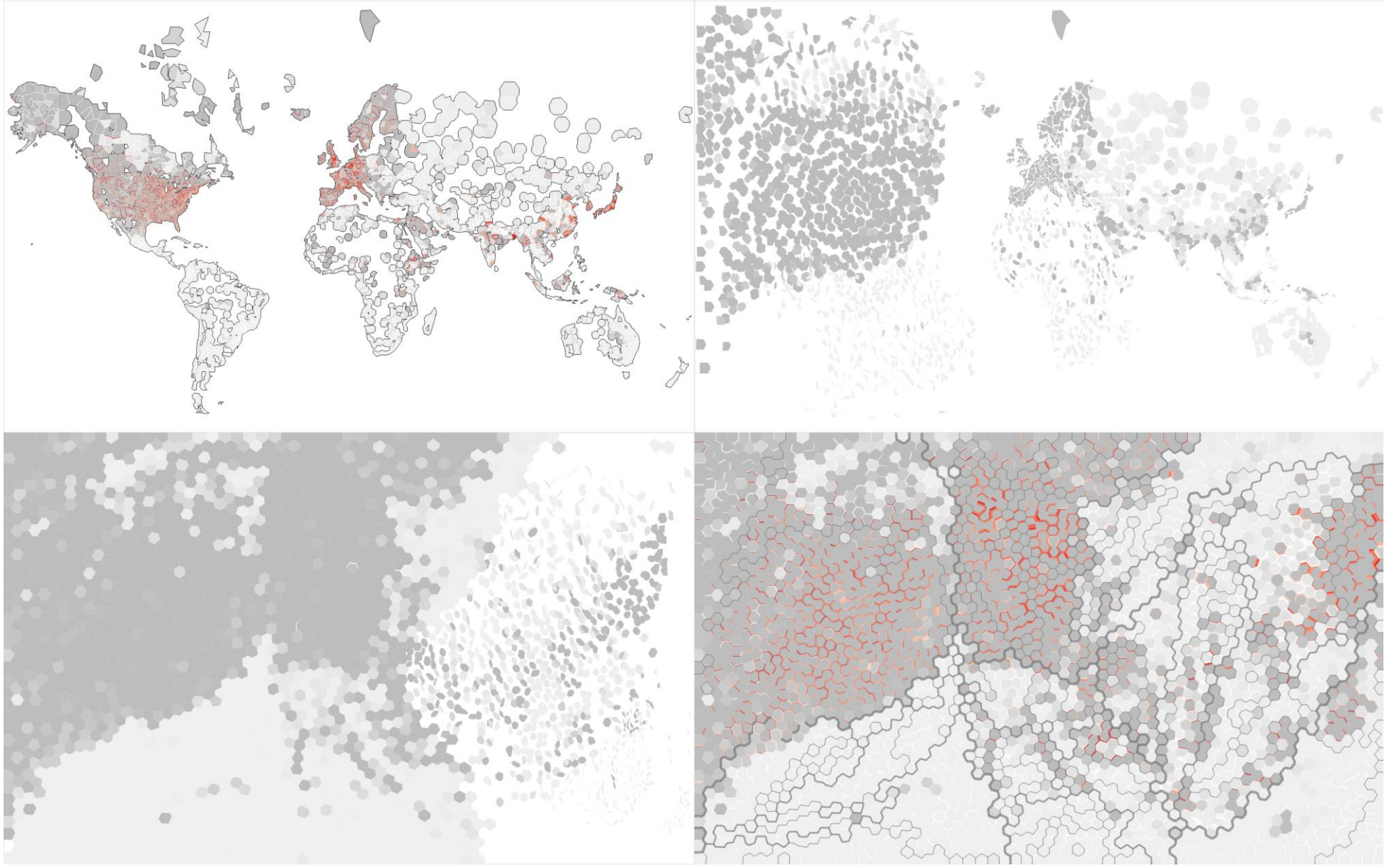





localhost:8001/voroc
localhost:8001/vorograph.html#38
100M
80M
60M
40M
20M
0M
Infected
1
52
+
>
Map Transform
Voronoi Transform
FD Transform
0
1
Travel Infected Ratio - Pow(6)
0
0.11
Basin Infected Ratio
Coloring
Color by
Infection
Infection Scale
Greys
Labeling
Hierarchy
None
Label Airports
% Airports Shown
0.05
Close Controls

VoroGraph

Animated Transitions

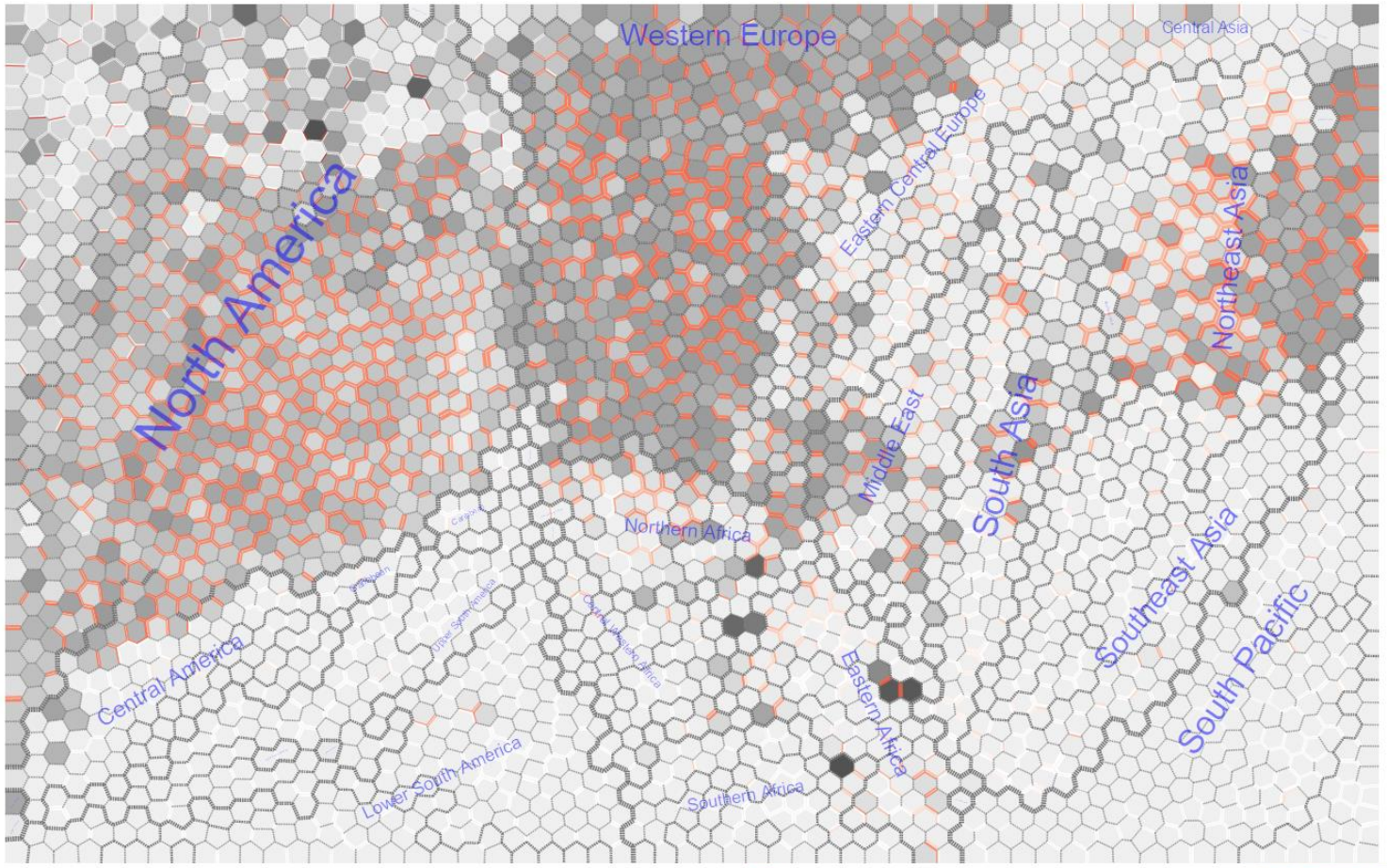


VoroGraph

Interface Demo

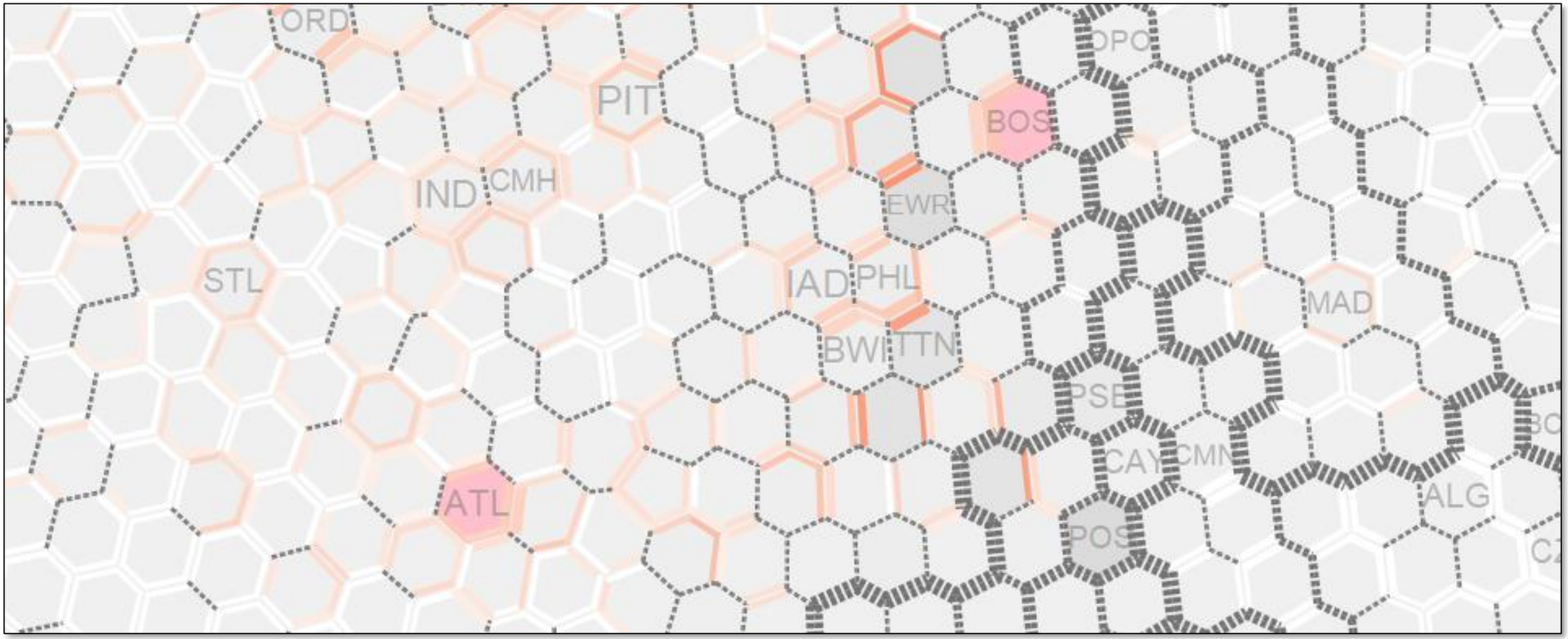
New York Influenza Scenario: Consider a new strain of influenza starting in New York City in mid February. In a dense population the disease could quickly reach pandemic proportions. Indeed, the millions of commuters and visitors could carry the virus home with them. As with H1N1, the authorities would have to face both the local and global spreading of the disease.

Map Transform
Voronoi Transform
FD Transform
Open Controls



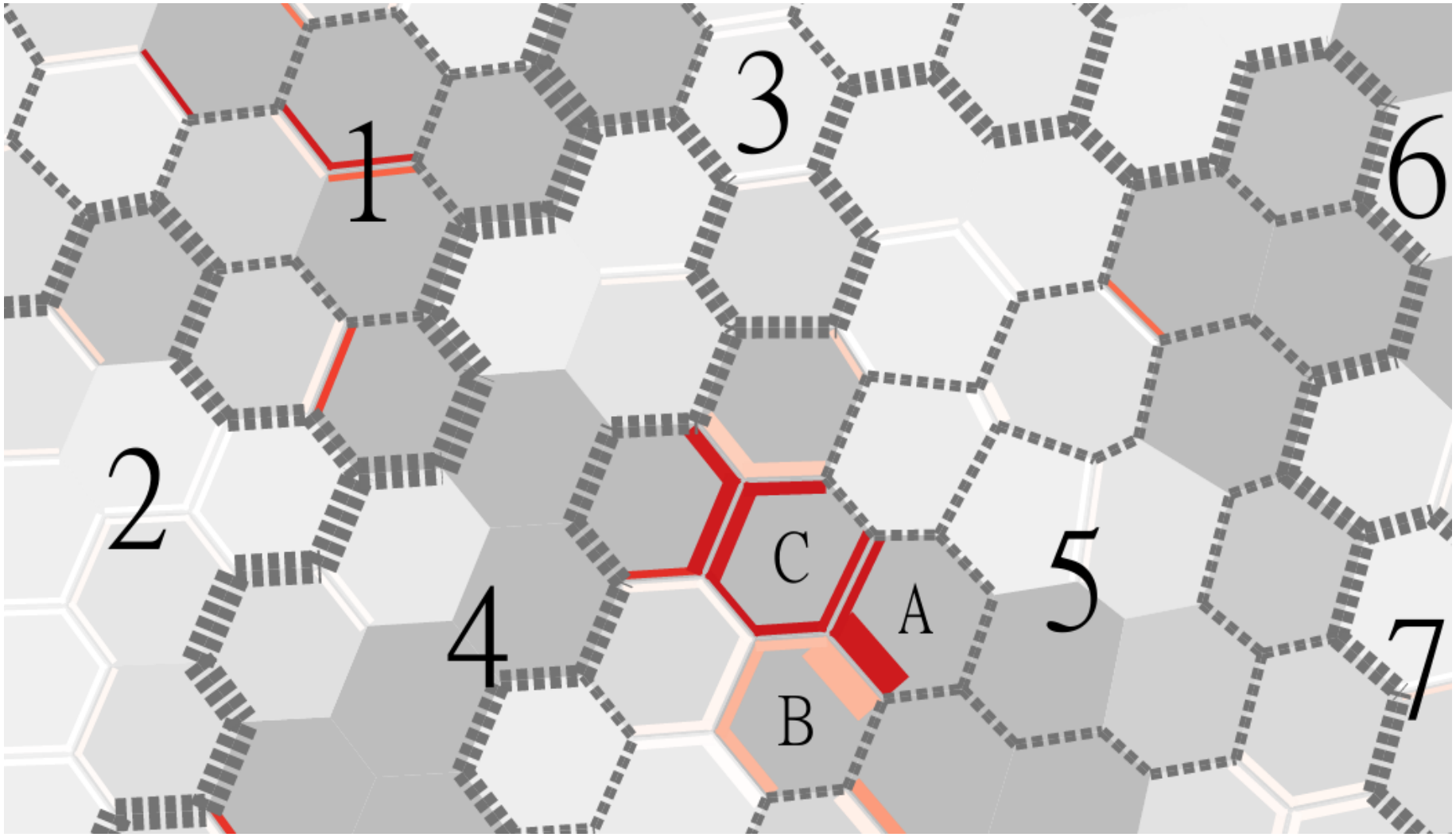
VoroGraph

Contiguous Edge Coding



VoroGraph

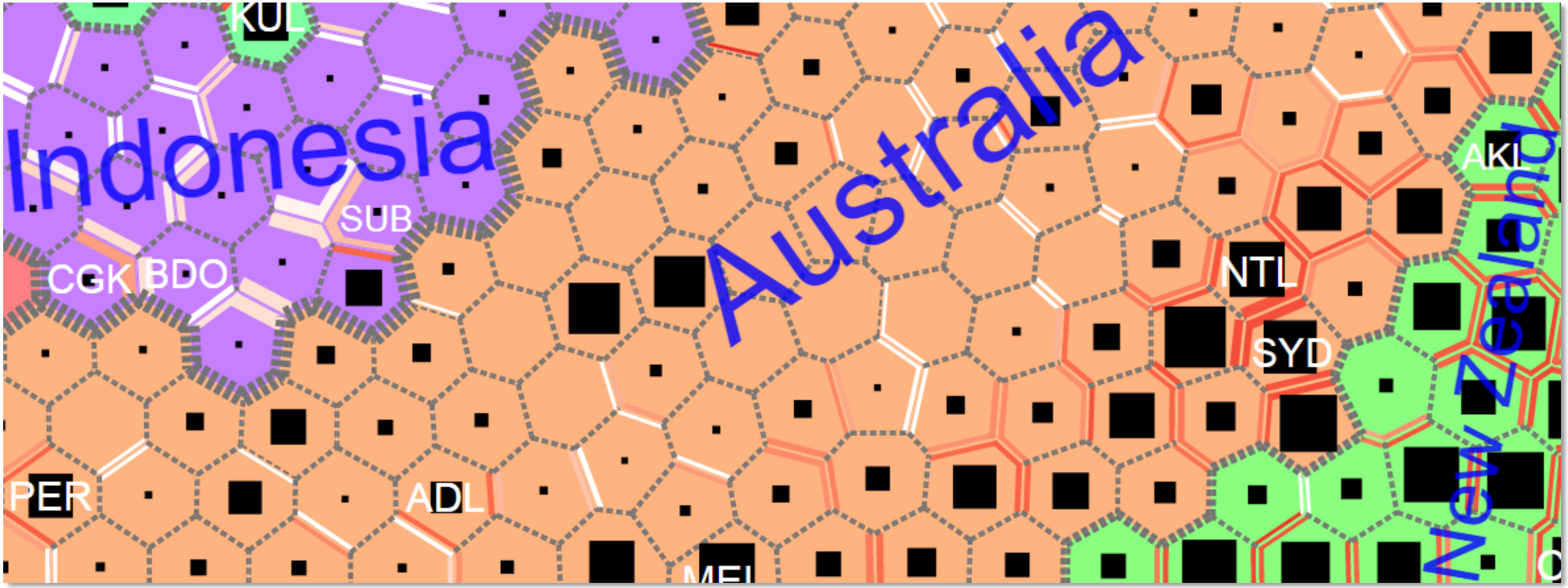
Contiguous Edge Coding



(1) Central Europe
(2) Western Europe
(3) Central Asia
(4) Middle East
(5) South Asia
(6) Northeast Asia
(7) Southeast Asia

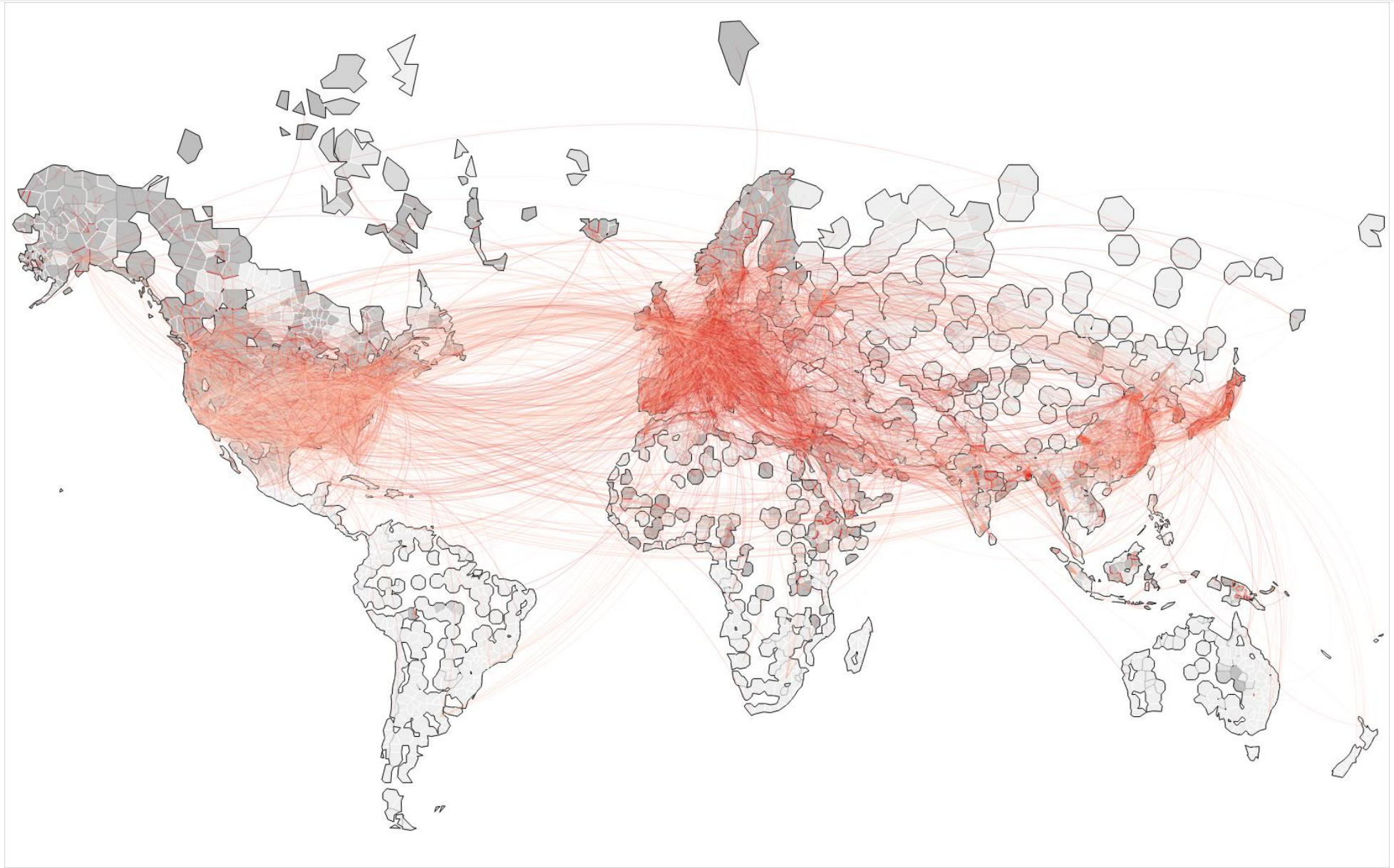
VoroGraph

Data Squares



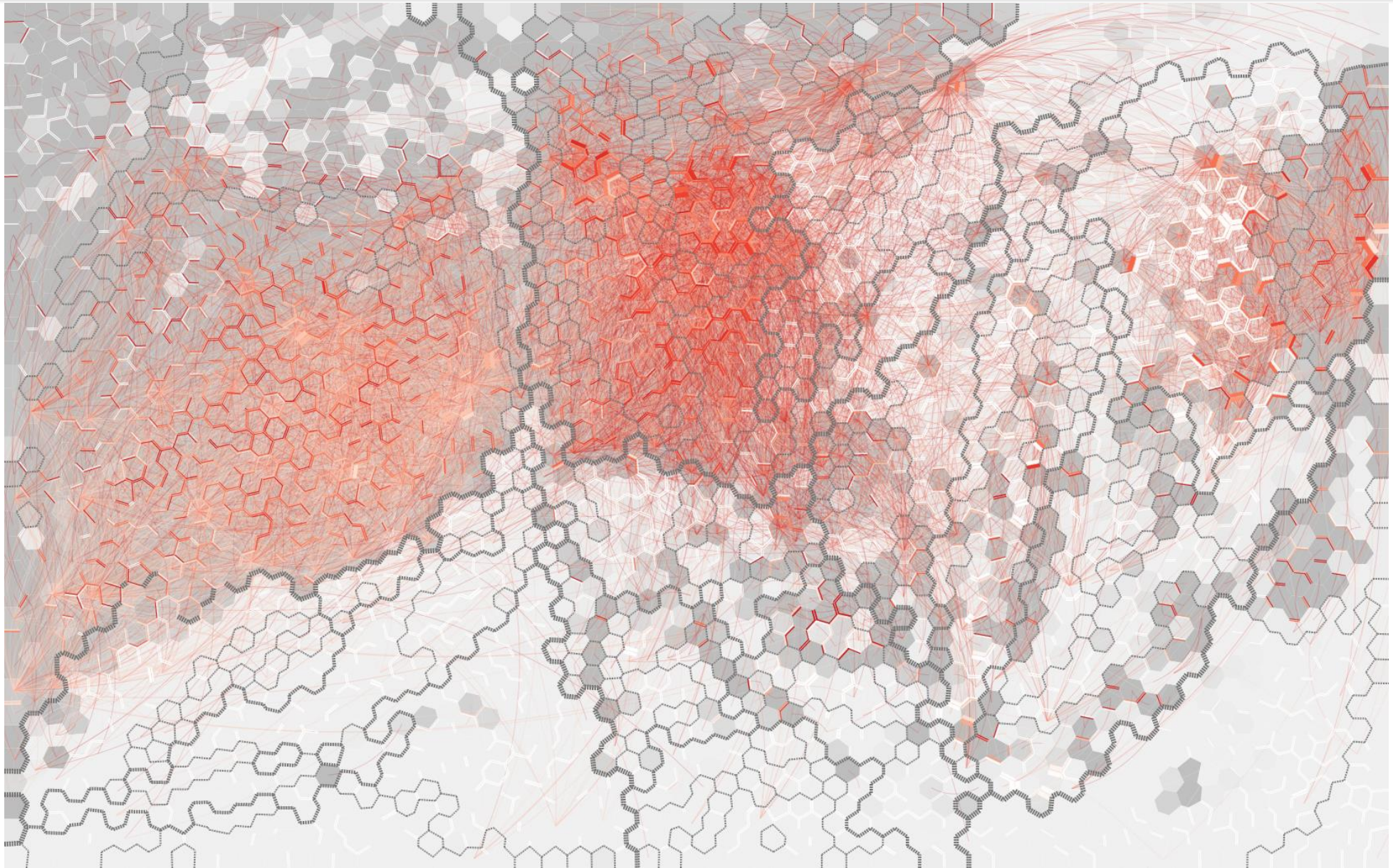
VoroGraph

Non-Contiguous Edge Coding



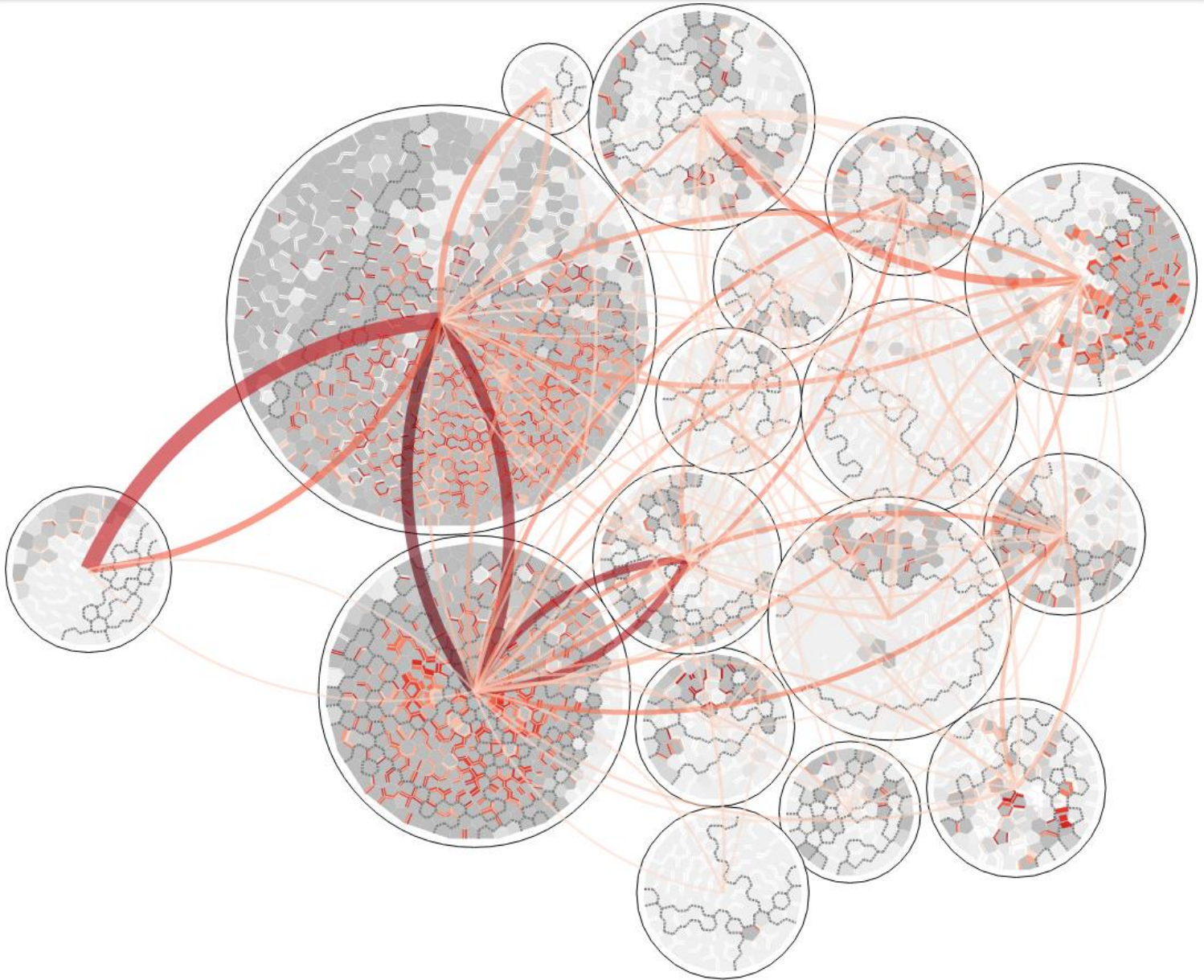
VoroGraph

Non-Contiguous Edge Coding



VoroGraph

Force-Directed Group-in-a-Box



VoroGraph

Discussion

- Equal-population hexagons discretize the space for **countability**
- Easier **attribute comparison** with color/size coding
- Hexagons make clear it is an **artificial representation**
- Enforces a degree of **generalization**
- **Contiguous relationship** display

Dunne C, Muller M, Perra N, and Martino M. (2015) "*VoroGraph: Visualization Tools for Epidemic Analysis",* In CHI '15 Interactivity. DOI:10.1145/2702613.2725459