Multivariate Network Exploration and Presentation: From Detail to Overview via Selections and Aggregations

Stef van den Elzen

Jarke J. van Wijk

Infovis – Nov 11, 2014

presented by Francisco Escalona

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What?

Why?

How?

Who?

Stef van den Elzen

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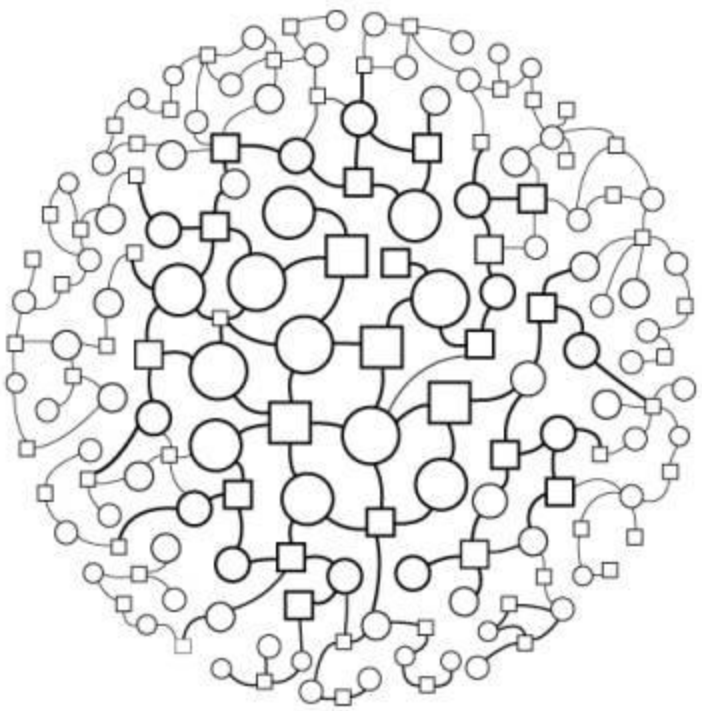
When?

presented by Francisco Escalona

Huh?

Multivariate Network

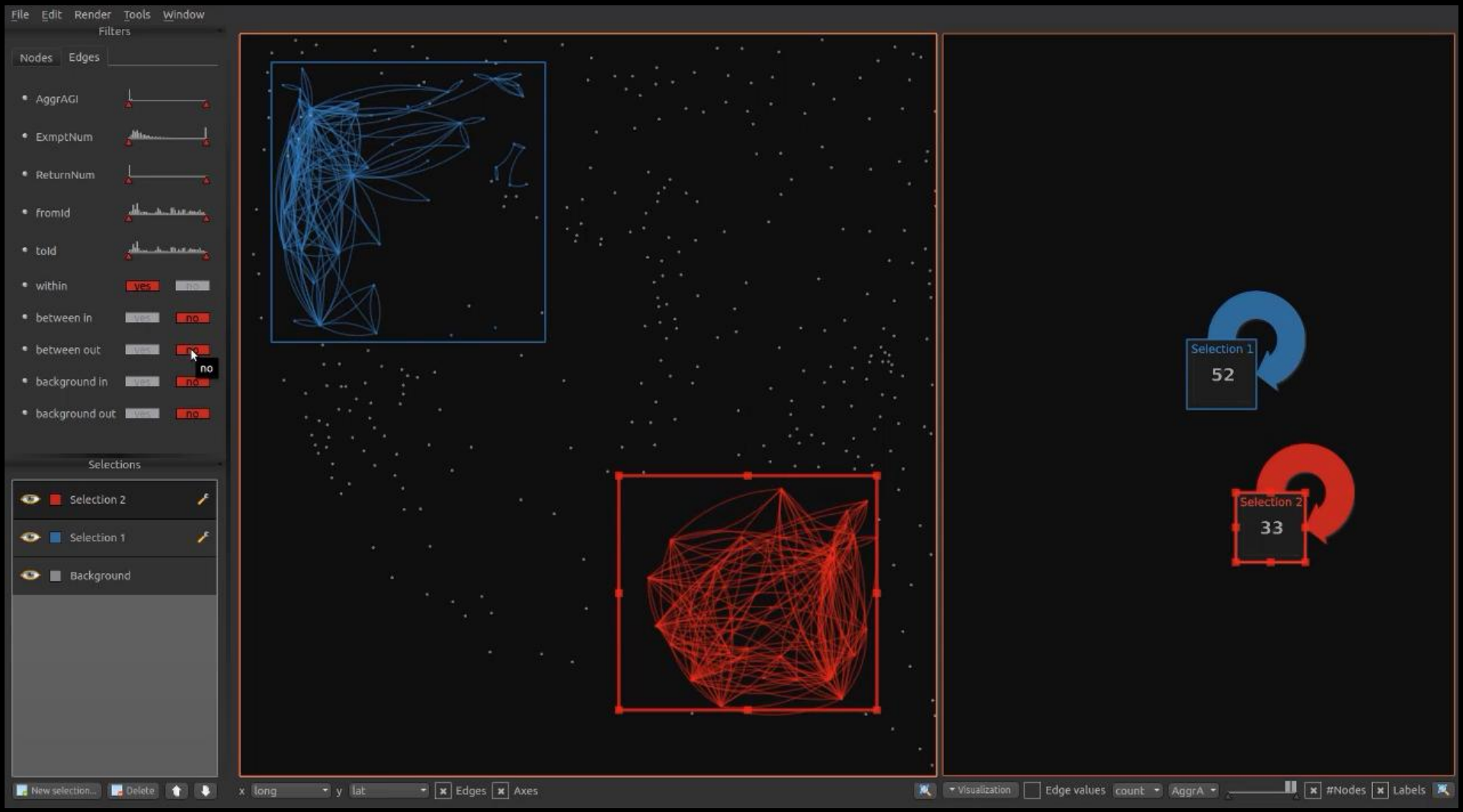


Example:
Census data by county of USA

Nodes
(also edges)

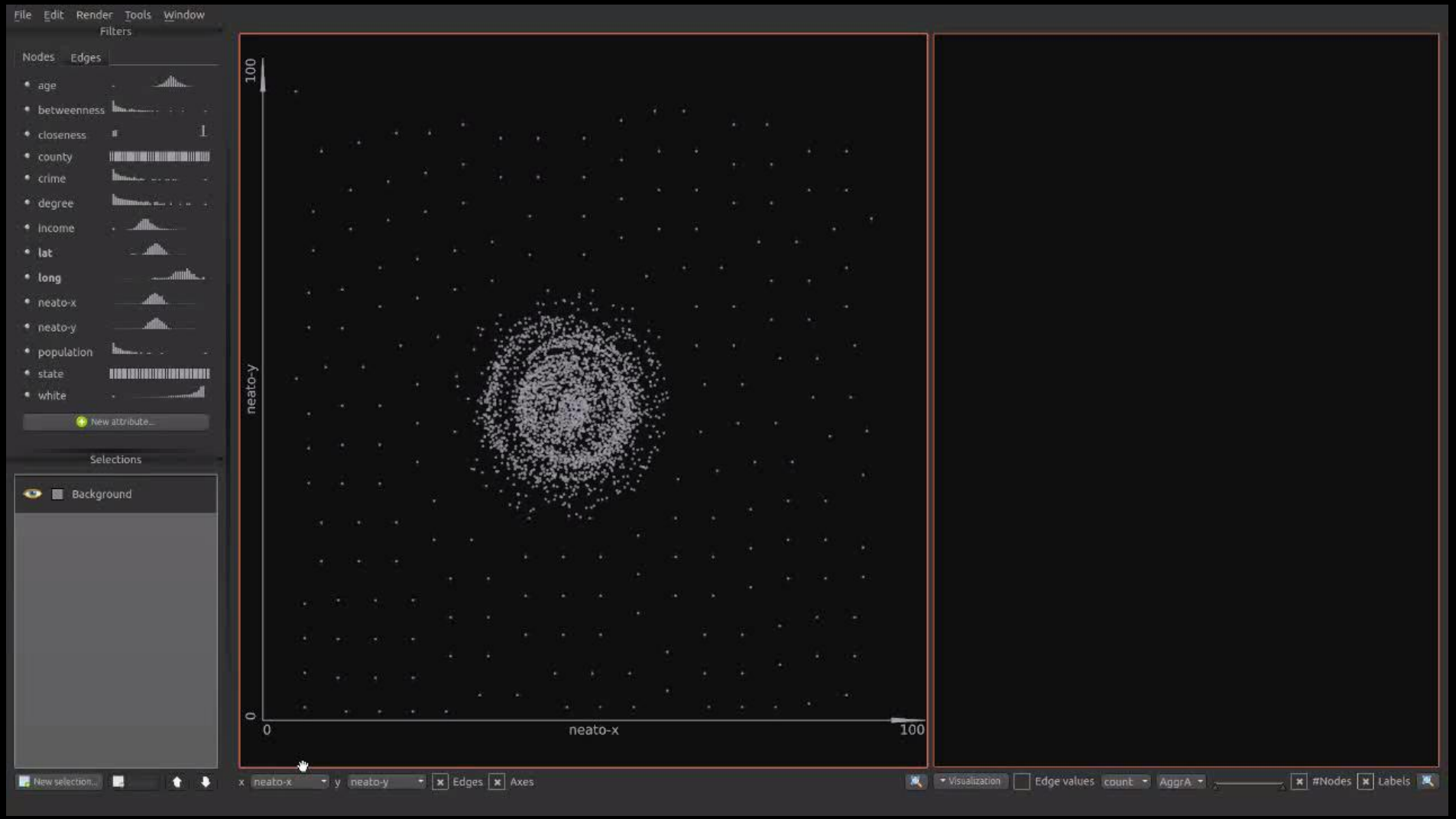
Math	Physics	Dance	Drama
85	95	70	65
90	80	60	50
65	50	90	90
50	40	95	80
40	60	80	90

4 linked juxtaposed views: DOSA

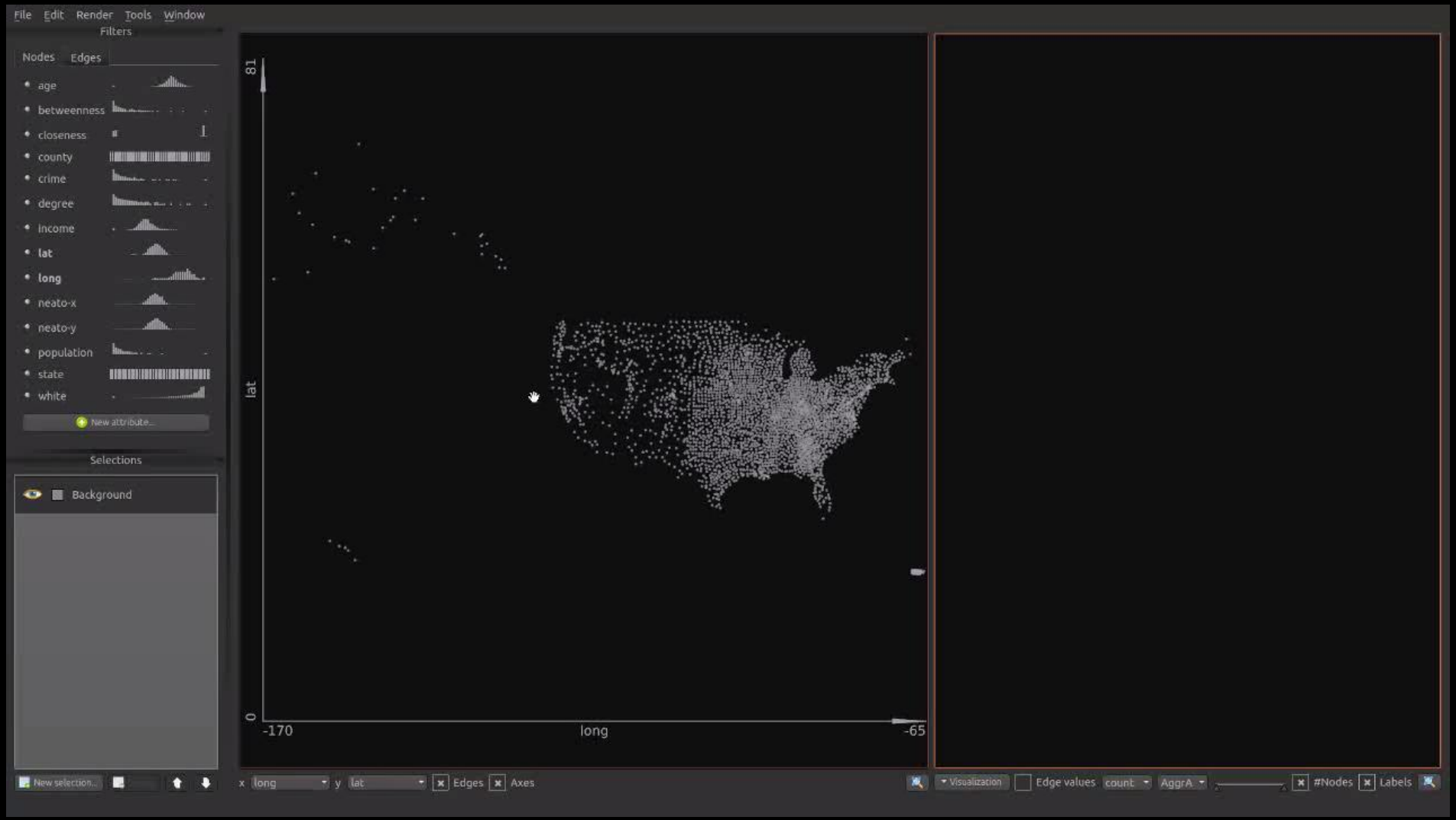


Exploration task

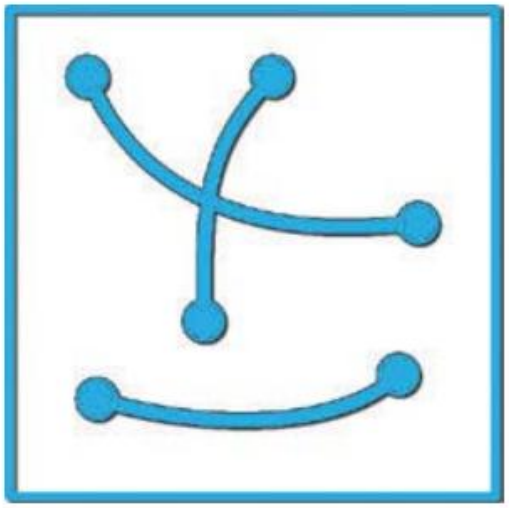
Presentation task



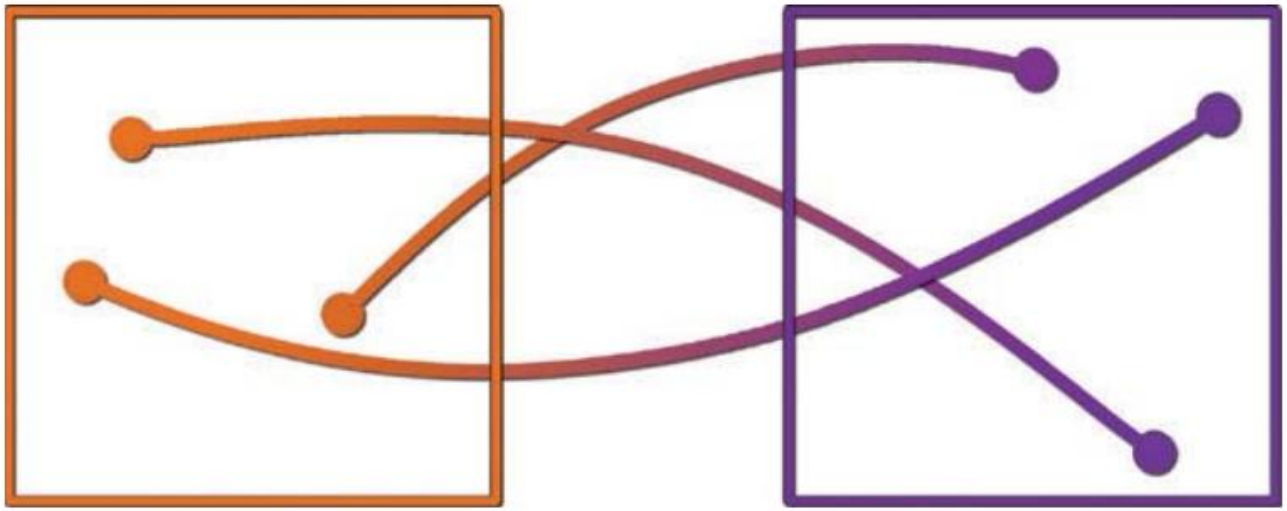
Adjustable 2D projection of nodes



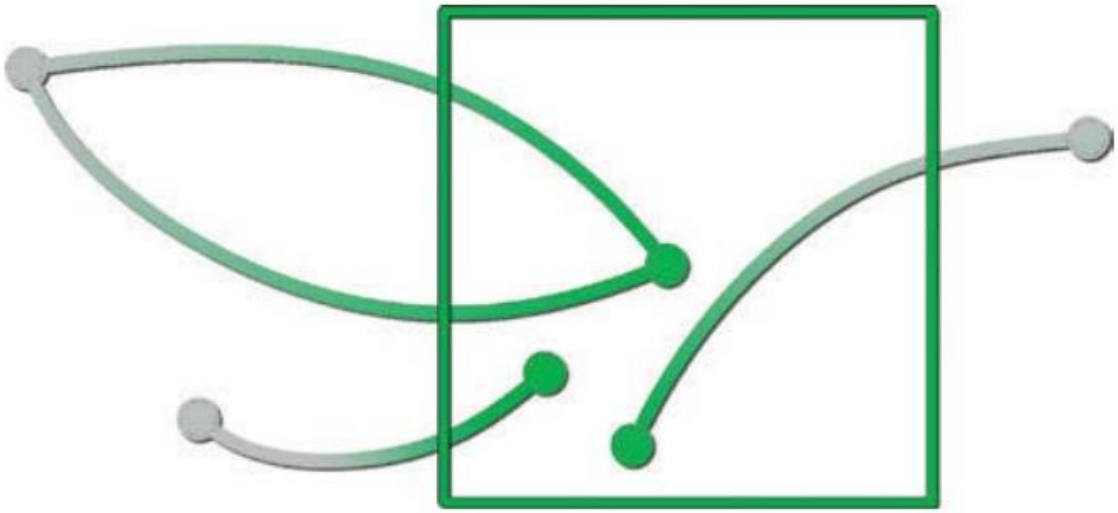
Selection: boxes, ranges



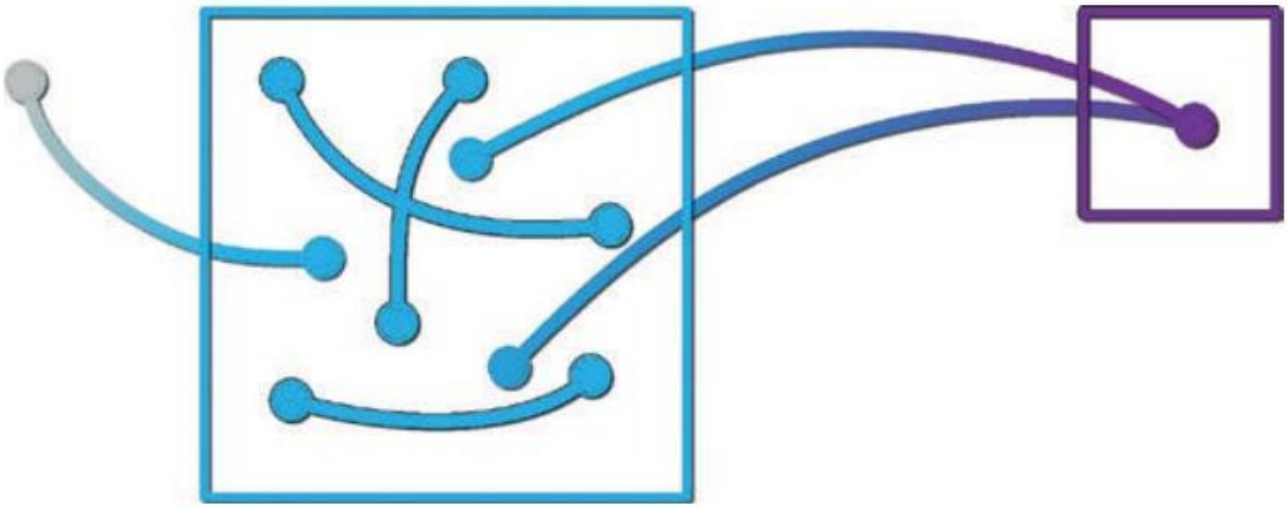
Within



Between – color map



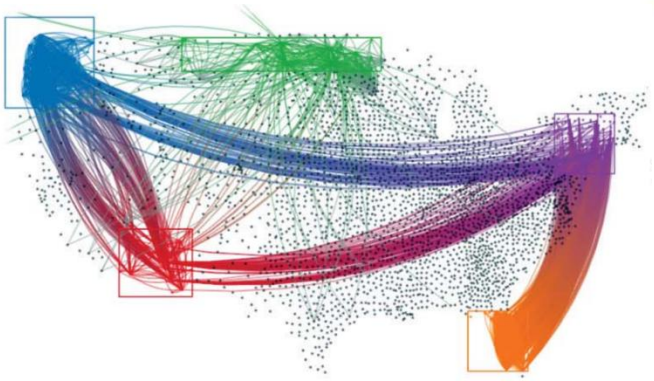
Background

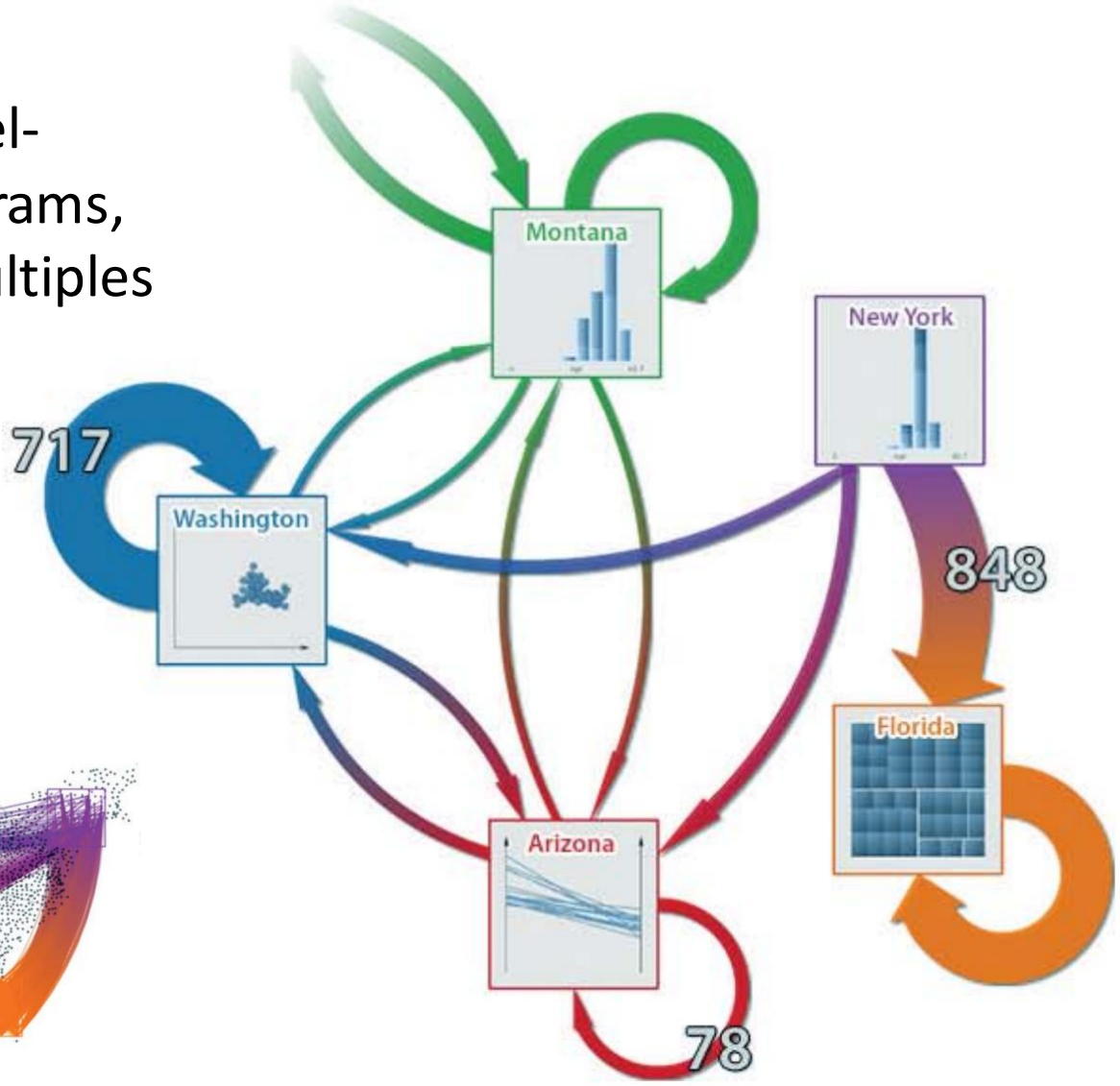


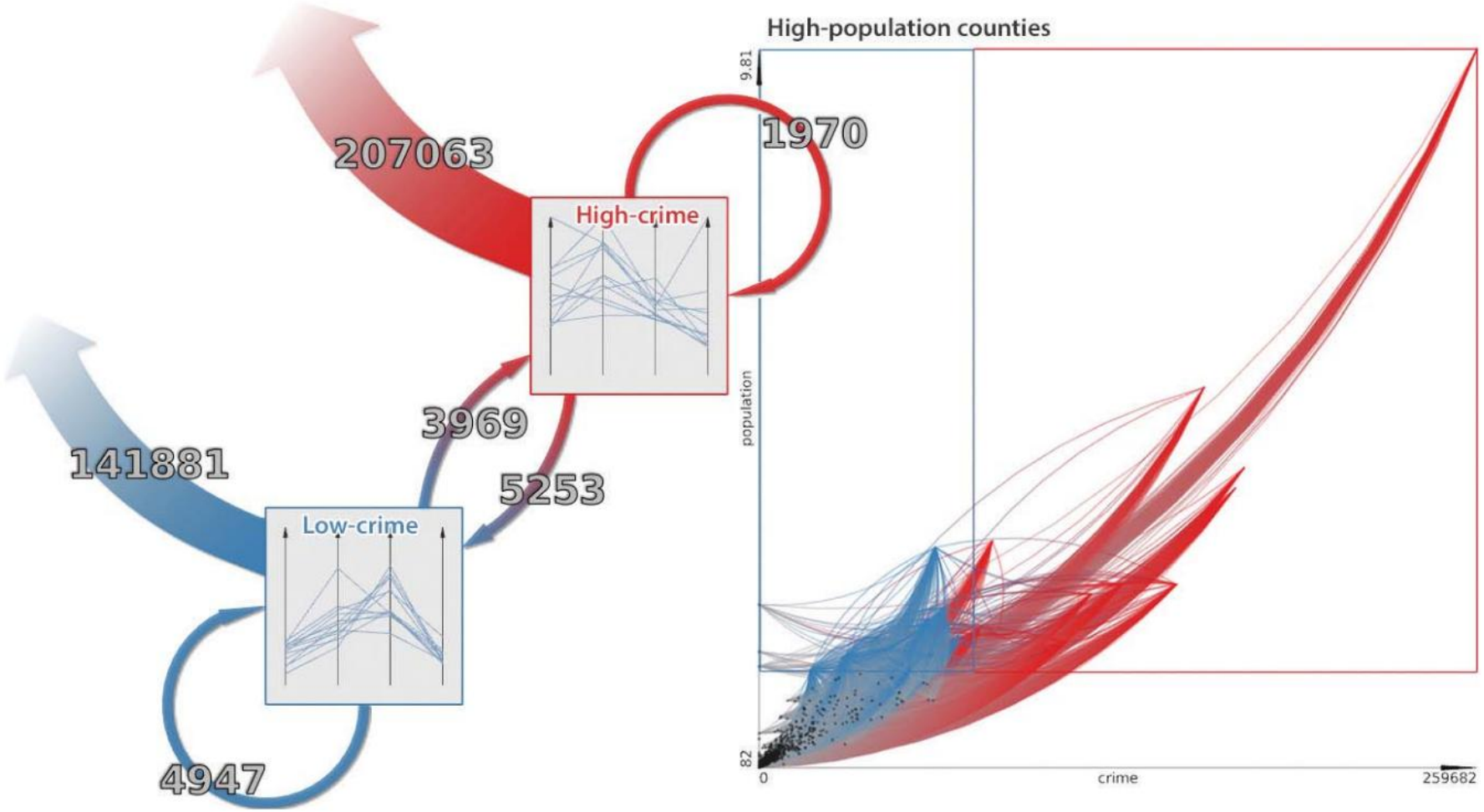
Combined

Overview

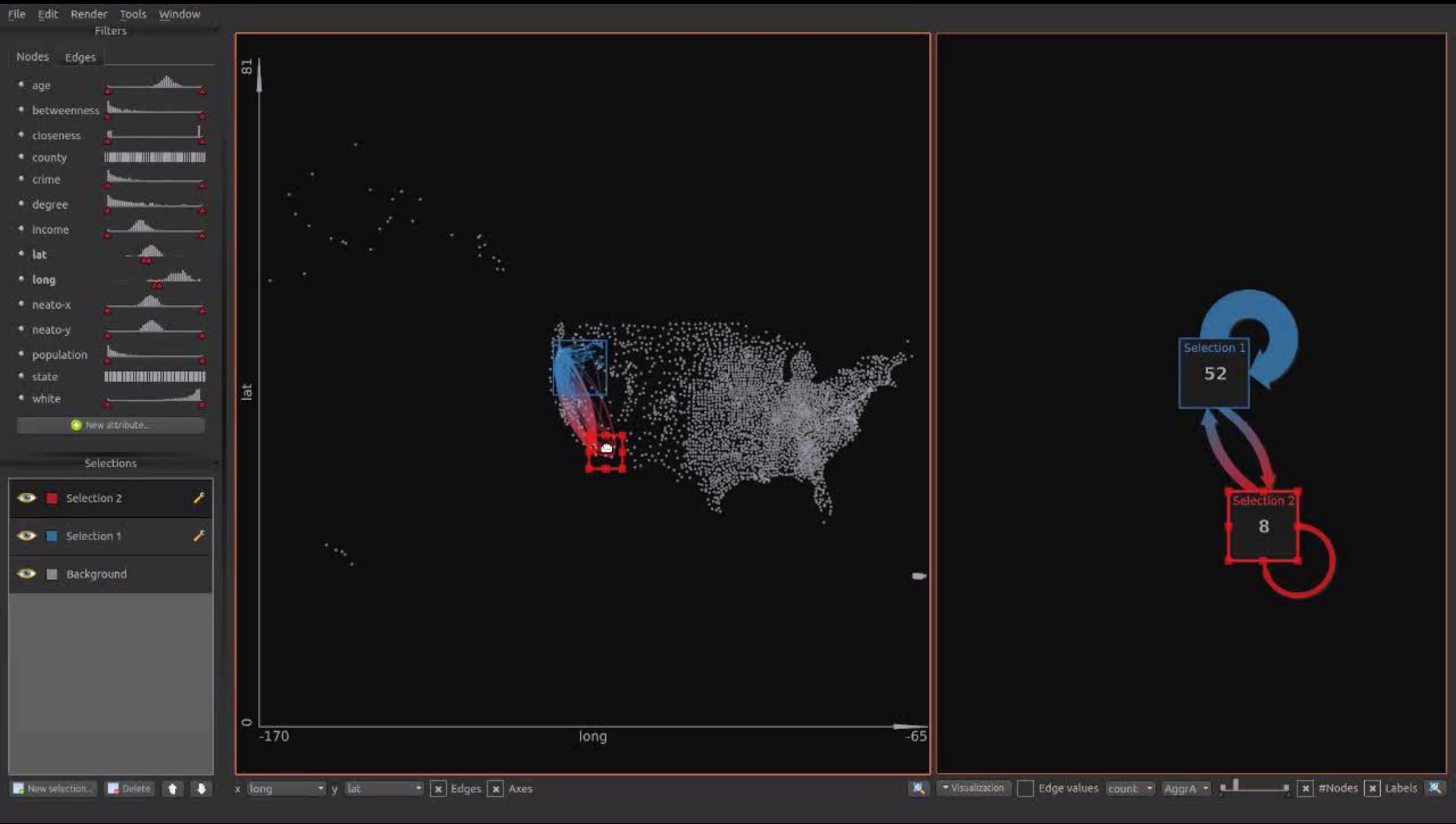
- Manual layout
- Scatterplots, parallel-coordinates, histograms, treemaps, small multiples
- Zooming
- Aggregation







Migration in highly populated counties


File Edit Render Tools Window
Filters
Nodes Edges
age
betweenness
closeness
county
crime
degree
income
lat
long
neato-x
neato-y
population
state
white
New attribute...
Selections
Selection 2
Selection 1
Background
New selection...
Delete
81
lat
0
-170
long
-65
x long
y lat
Edges
Axes
Selection 1
52
Selection 2
8
Visualization
Edge values
count
AggrA
#Nodes
Labels

Scale

- 5-10 selections (2-6 expected)
- 1-2 dozen attributes
- 100s-1000s of nodes
  - more with aggregation
- $L < 4N$

Strengths

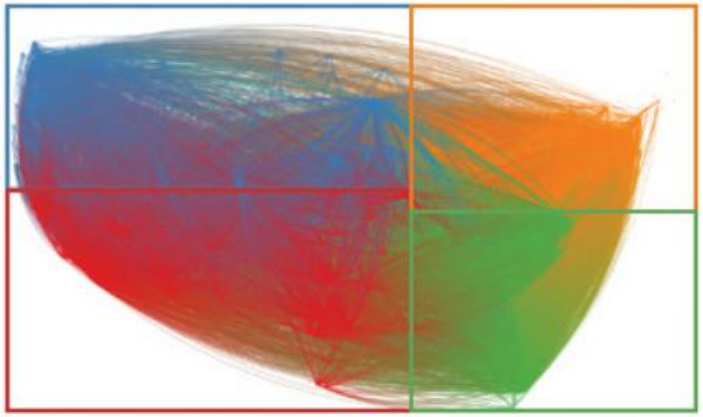
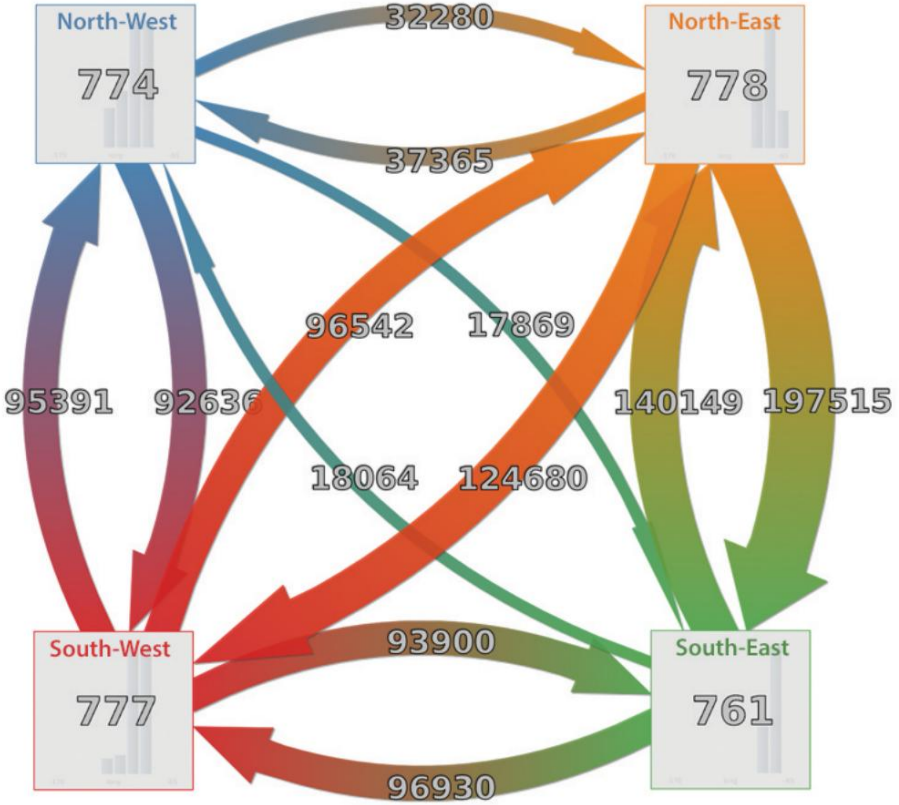
- Both network exploration and multivariate analysis
- Intuitive, easy to use (?)
- Dynamic exploration, visual querying
- Can be used by novices
- Expressive
  - Time
  - Topology

Limitations

- Partitions only by nodes
- Only supports ranges
- Limited scaling up

- No help on where to start
- Overview can be too summarized
- Axis can be difficult to see

- One tool in a toolkit

In Summary

A tool for **exploration and presentation**
of **multivariate network** data
using **selection and aggregation**
in juxtaposed **linked views**