

Navigation

Three Techniques

- Zooming and panning
- Overview plus detail
- Focus plus context

Zooming and Panning

Manipulate the *viewport*
onto the data space

Types of Zooming

- Standard (geometric): see more detail
- Semantic: see different representations
- Intelligent, fisheye: focus plus context

Standard vs. Semantic Zooming

Standard

View depends on physical properties of object

Zoom out: see smaller version

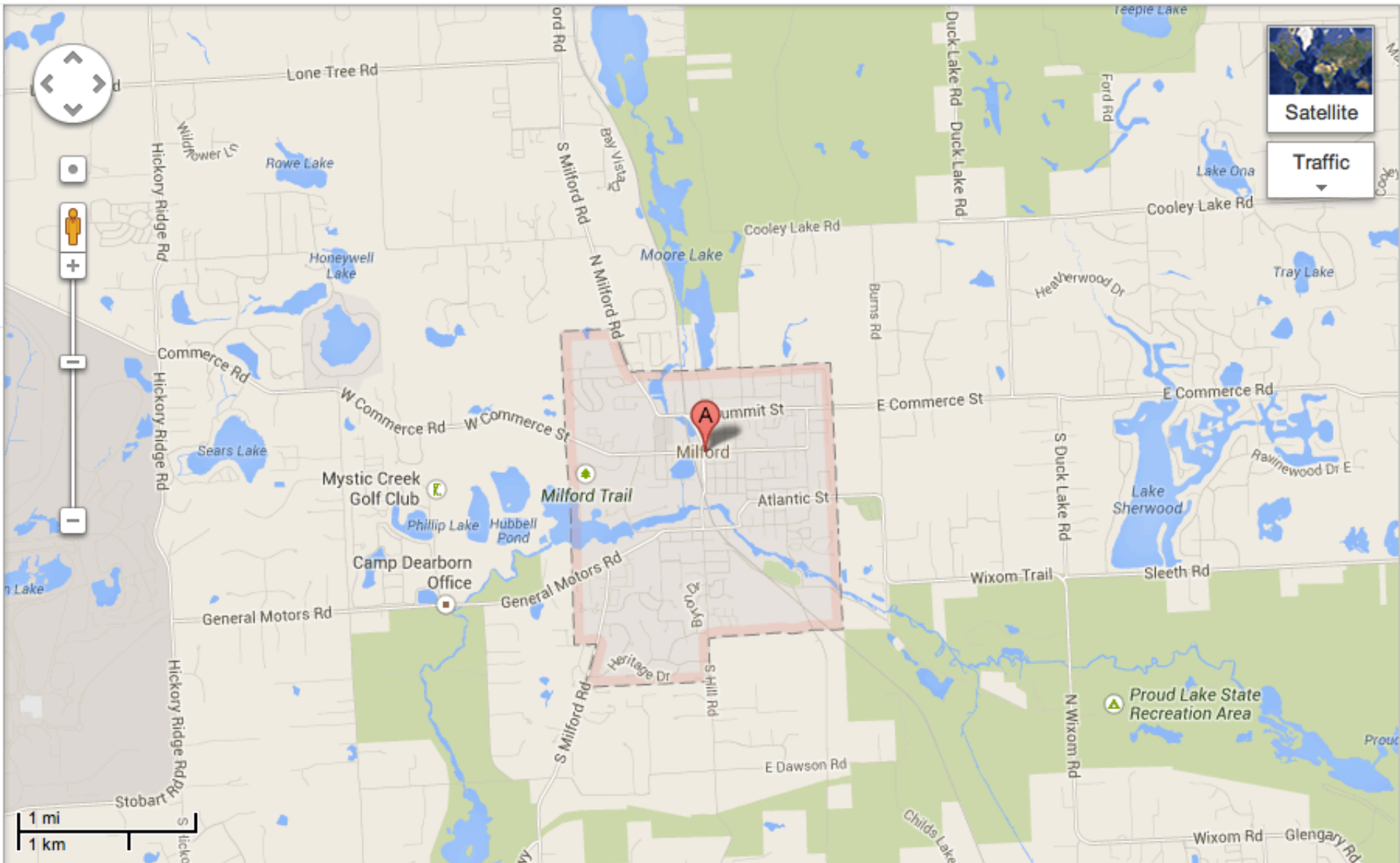
Zoom in: see larger version

Semantic

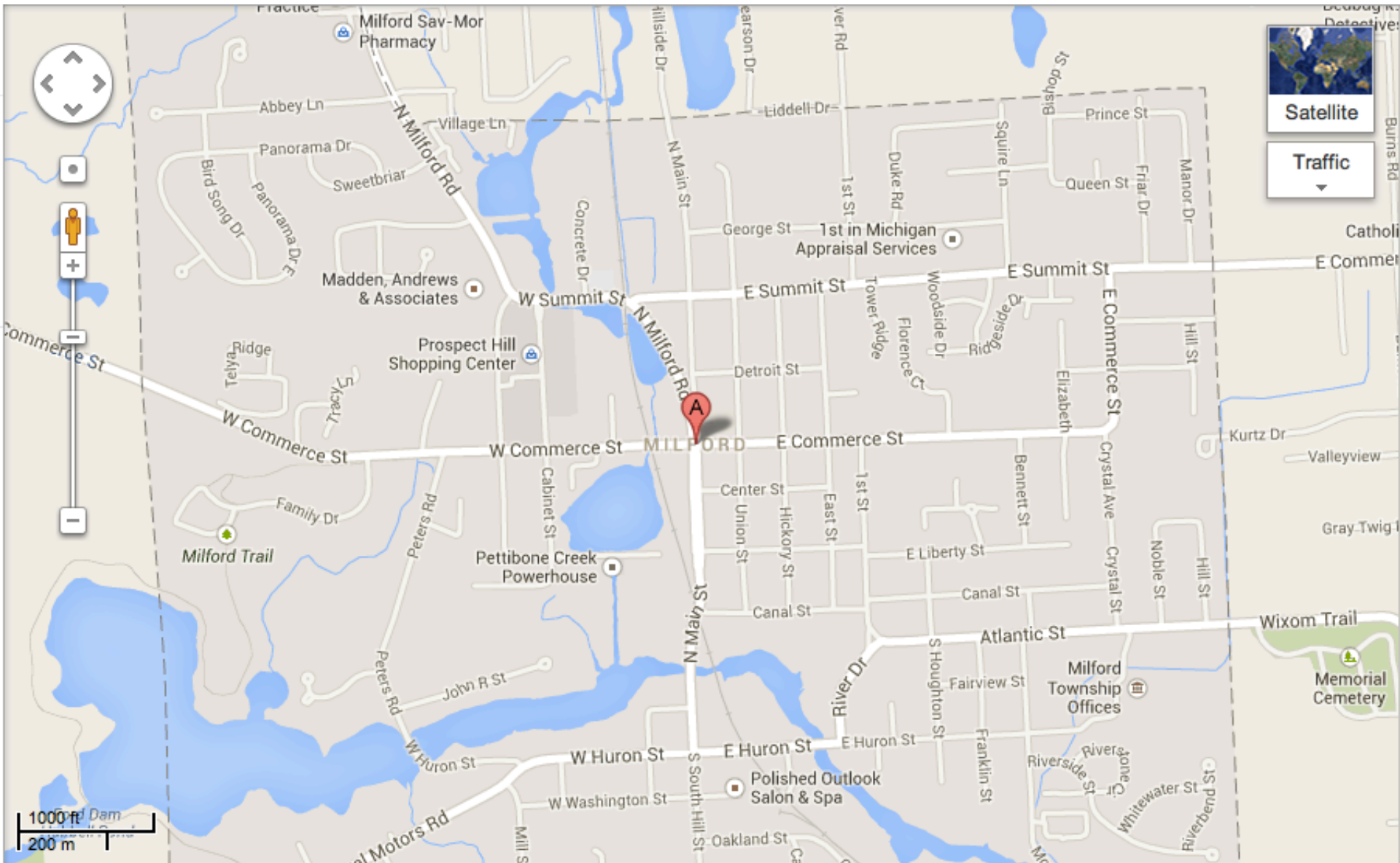
View depends on semantic meaning of object at that scale

Zoom out or in: see different representation

Semantic Zooming in Maps



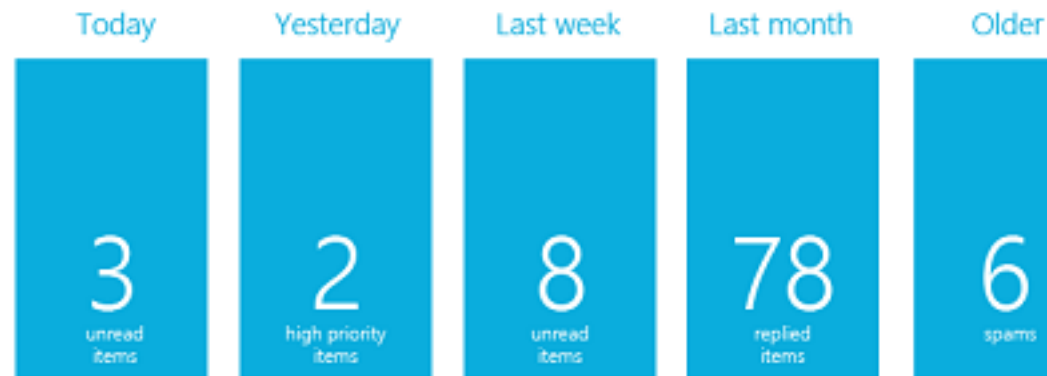
Semantic Zooming in Maps



Semantic Zoom in Windows

- Zoomed-out view

Messages



Semantic Zoom in Windows

- Zoomed-in view

Messages

Today



Yesterday



Last month

Last week

Zooming and Panning Together

- Zooming is logarithmic
- Panning is linear
- If calculated separately, panning can't keep up with zooming

Zooming and Panning Together

- What if you pan from one zoomed-in spot to another near the same zoom but far away?
- How do you keep it smooth and efficient?

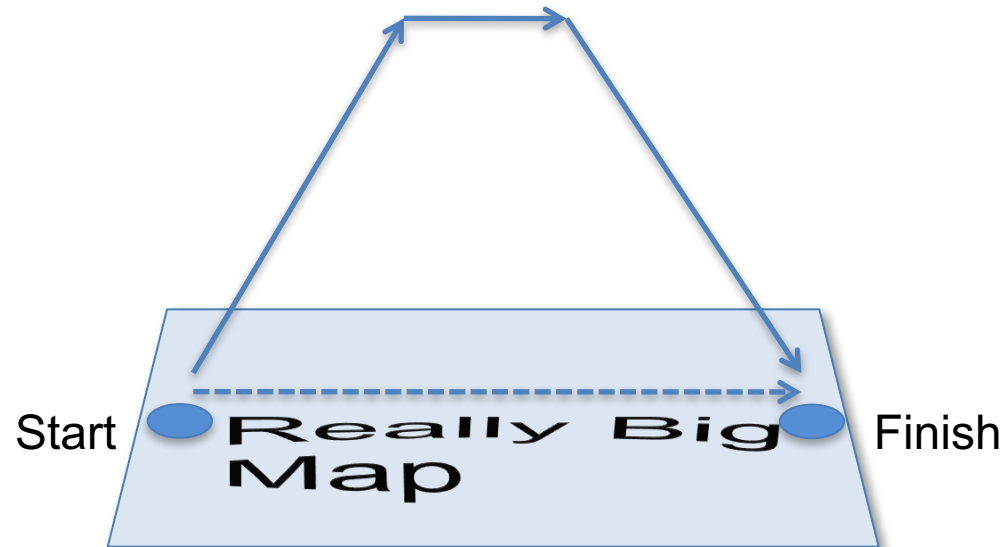
One Possibility

- Pan waaaaaaay over



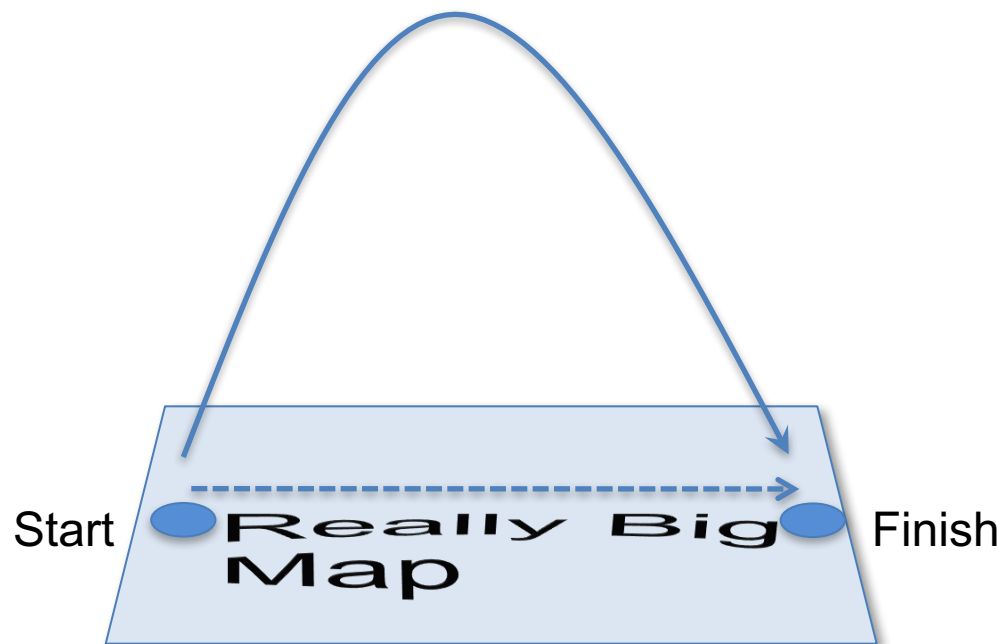
Another Possibility

- Zoom out, pan, then zoom back in

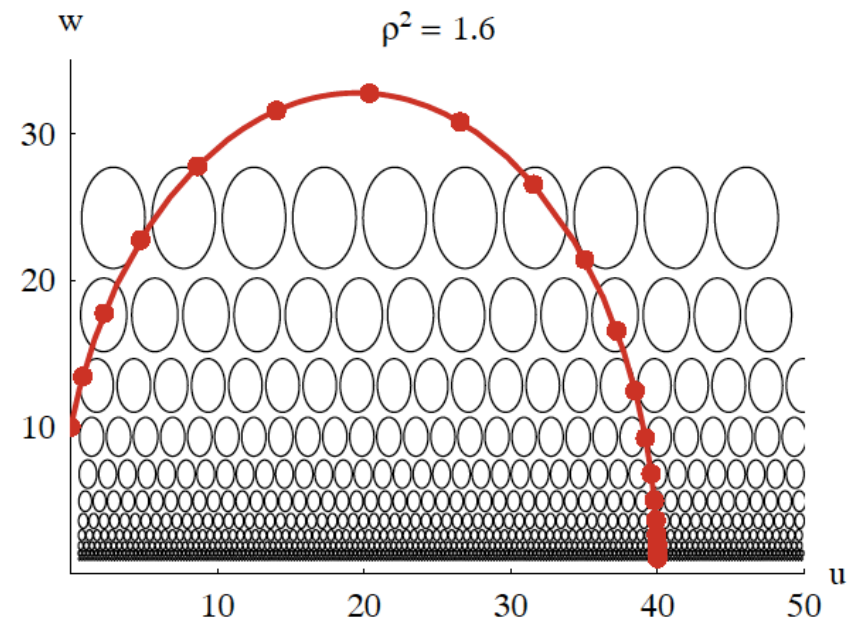
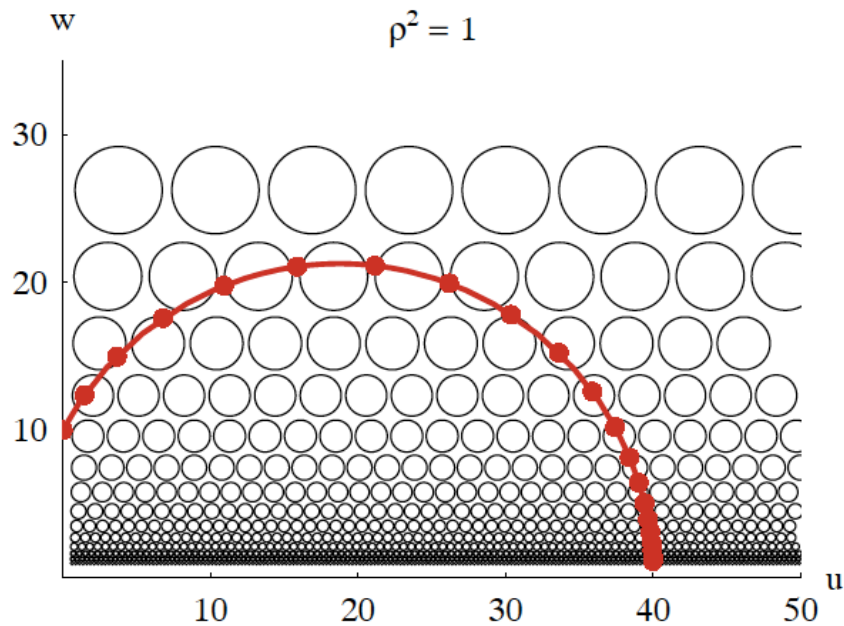


Better Possibility

- Zoom out, pan, then zoom back in smoothly



van Wijk and Nuij, 2003



Zoom in D3

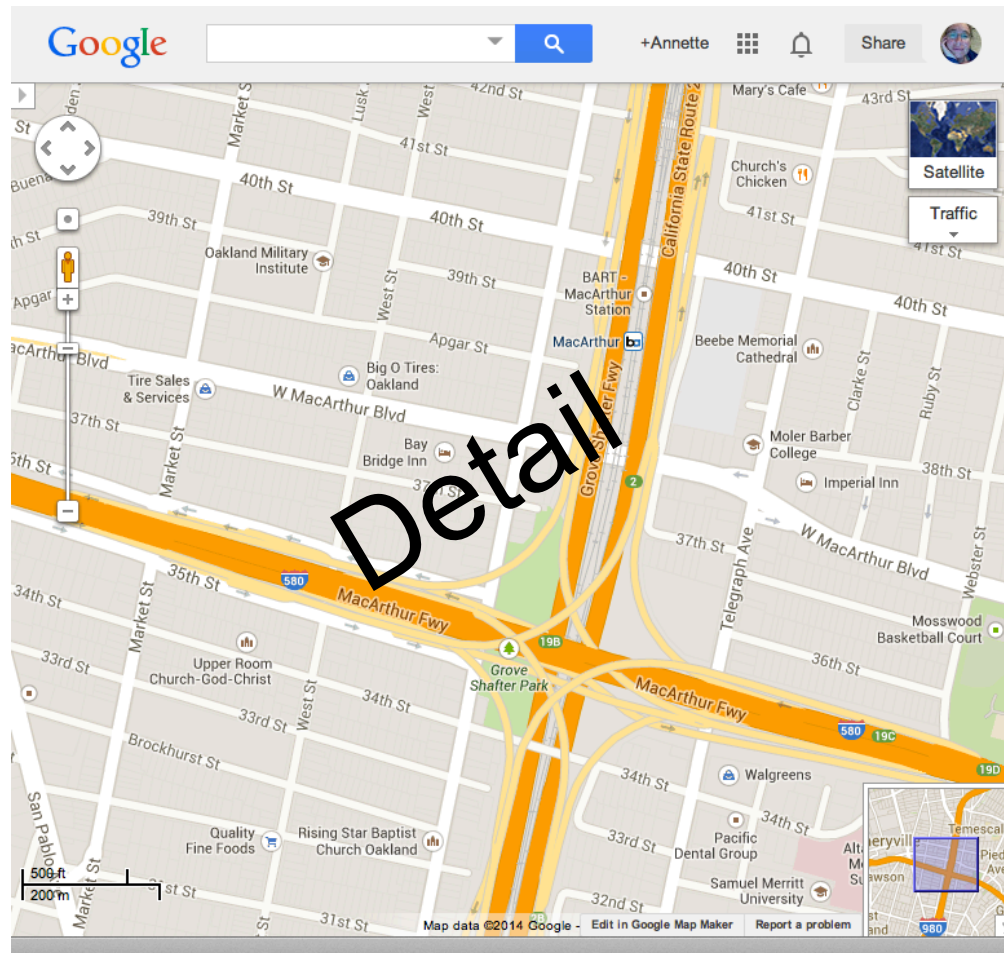
Automatic transitions for zoom behavior
`transition.call()`

Overview Plus Detail

Overview Plus Detail

- Overview and detail shown simultaneously
- Two separate views
- No distortion

Google Maps



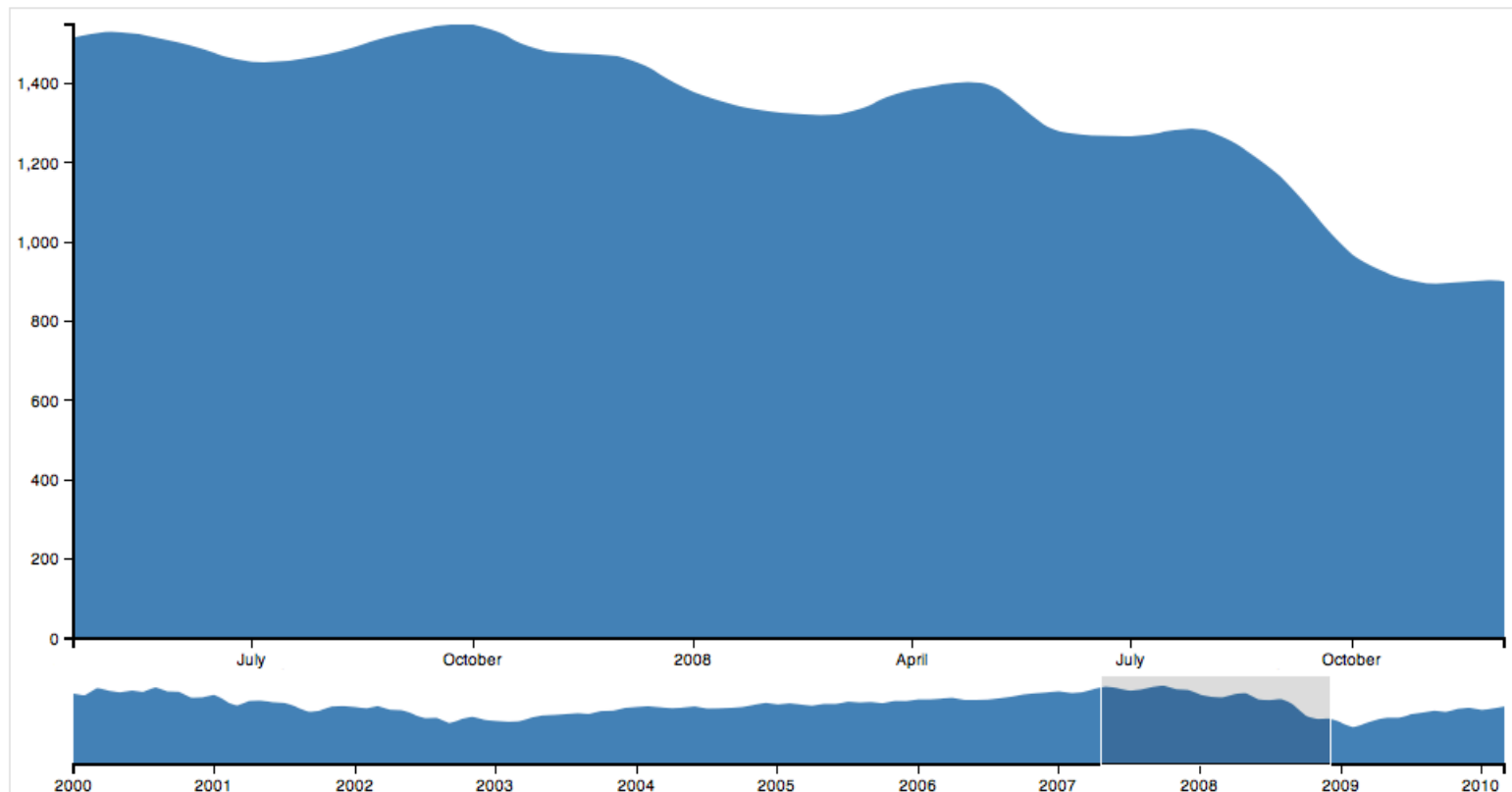
} Overview

Drawbacks

- User has to shift attention
- Both views take up space
- You lose some context in overview

<http://bl.ocks.org/mbostock/1667367>

Brush & Zoom



This examples demonstrates how to use D3's brush component to implement focus + context zooming. Click and drag in the small chart below to pan or zoom.

[Open in a new window.](#)

Stacked Zoom

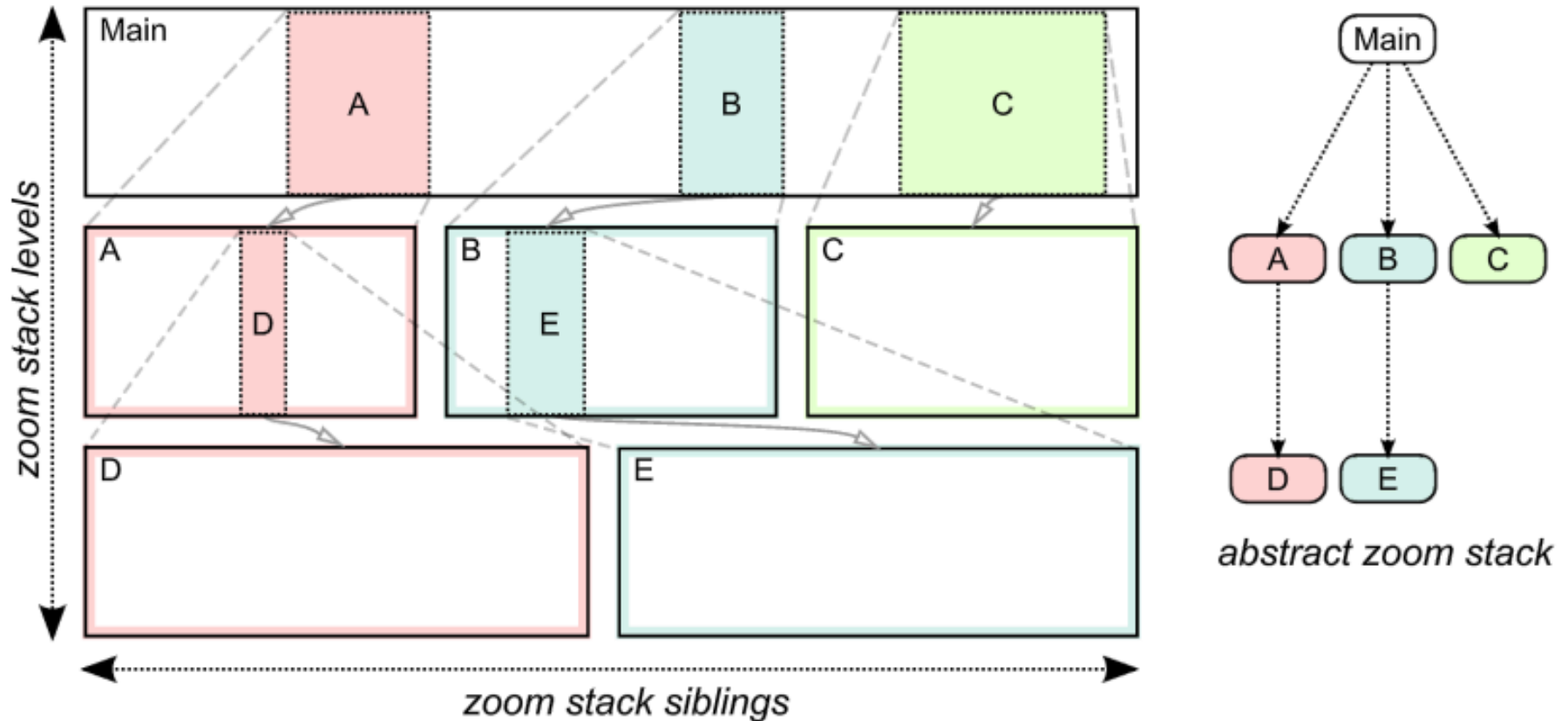


Diagram Source: Javed, W., & Elmqvist, N. (2010, March). Stack zooming for multi-focus interaction in time-series data visualization. In *Visualization Symposium (PacificVis), 2010 IEEE Pacific* (pp. 33-40). IEEE.

Pan/Zoom vs. Overview/Detail

Why not do both?

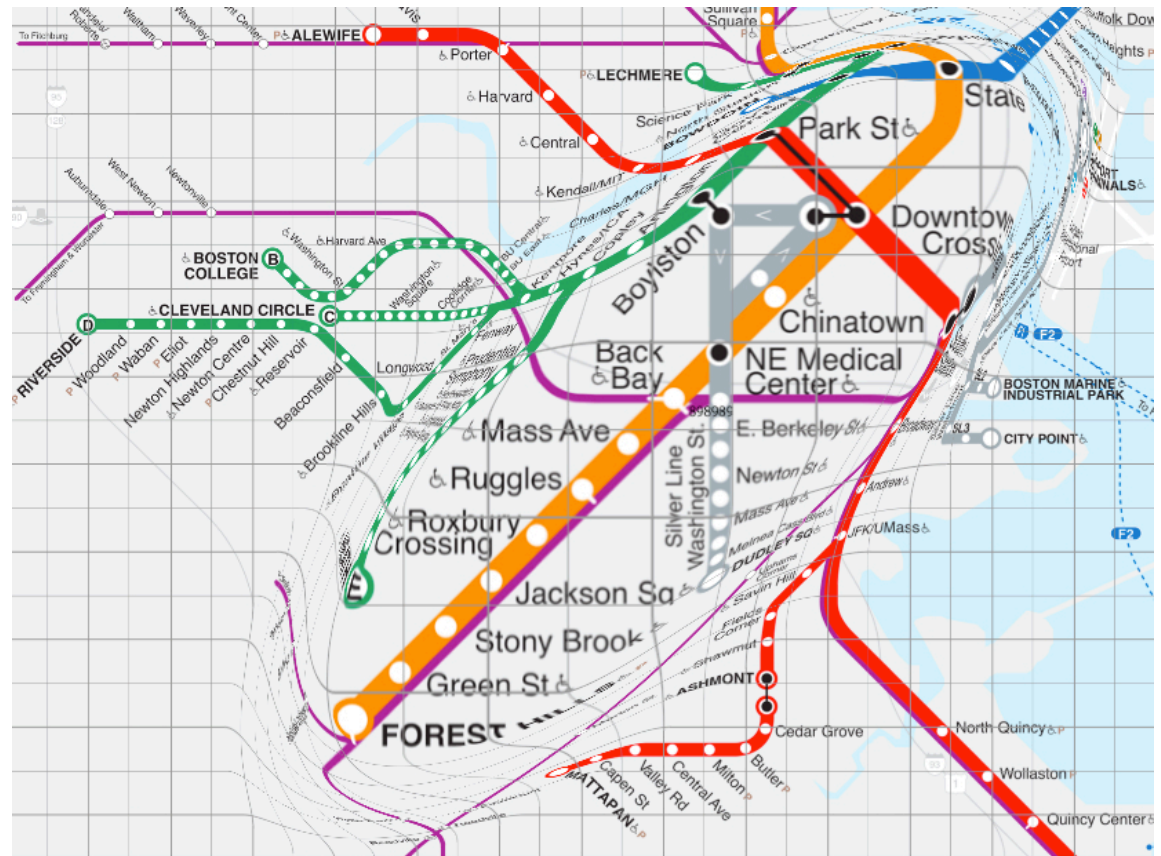
Pietriga et al. (2007)

- Zoom and pan
- Fisheye distortion lens
- Overview + detail lens ("dragmag") (second best)
- Overview + detail with zoom and pan (best)

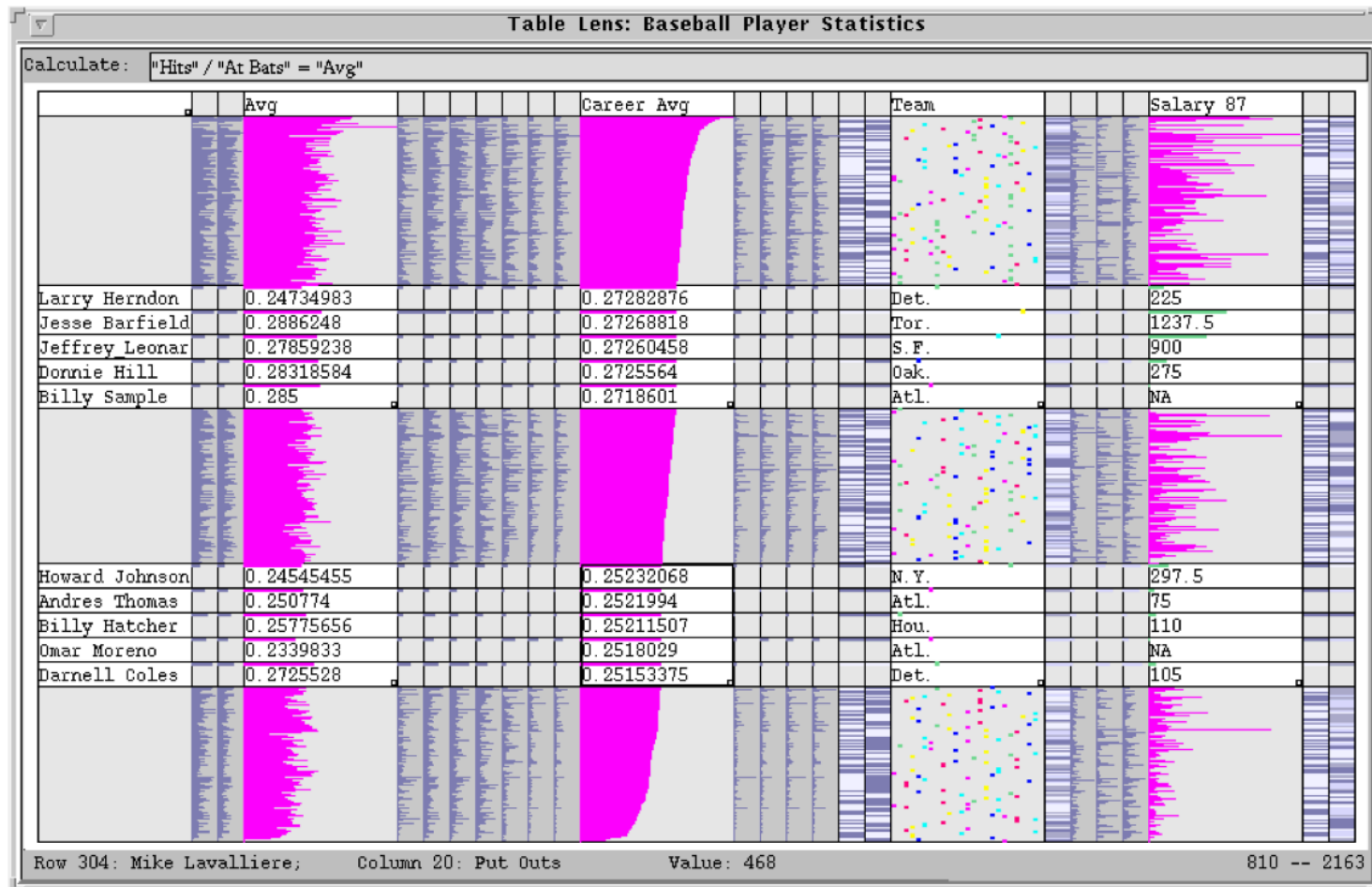
Focus Plus Context

Focus Plus Context

- Shows overview and detail
- No separate view
- Often uses distortion to show context

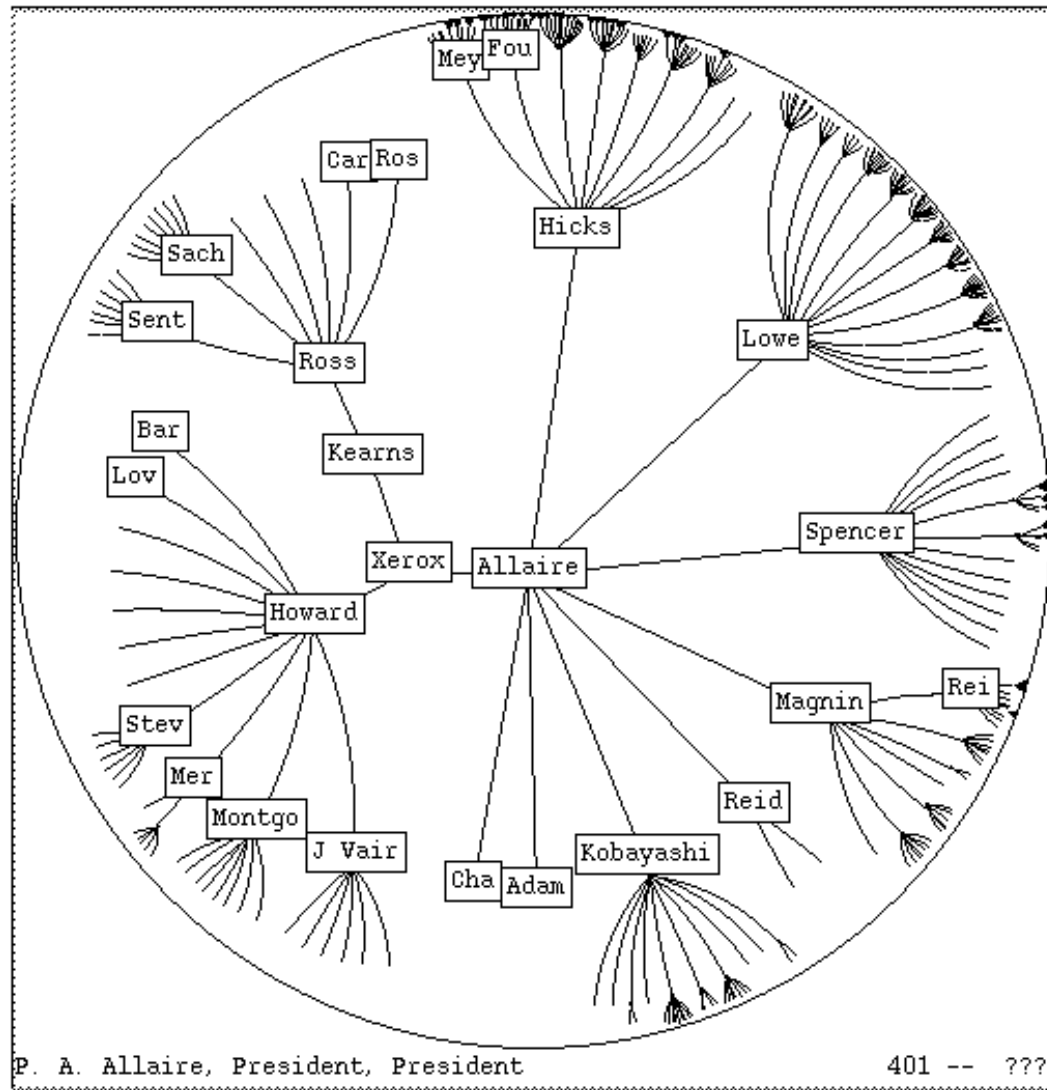


TableLens



Ramana Rao and Stuart
Card, PARC, 1994

Hyperbolic Tree



John Lamping,
Ramana Rao,
and Peter Pirolli,
PARC, 1995

Javascript Infovis Toolkit Hypertree

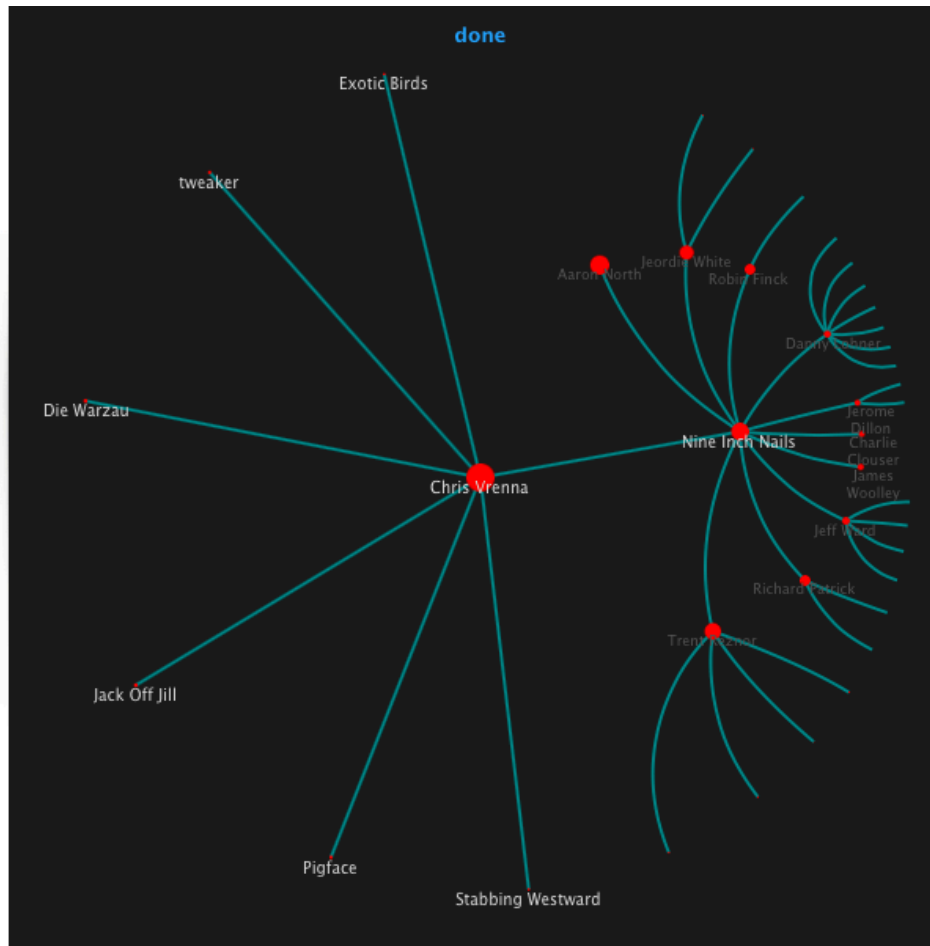
Tree Animation

A static JSON Tree structure is used as input for this animation.

Clicking on a node should move the tree and center that node.

The centered node's children are displayed in a relations list in the right column.

[See the Example Code](#)



Chris Vrenna

Connections:

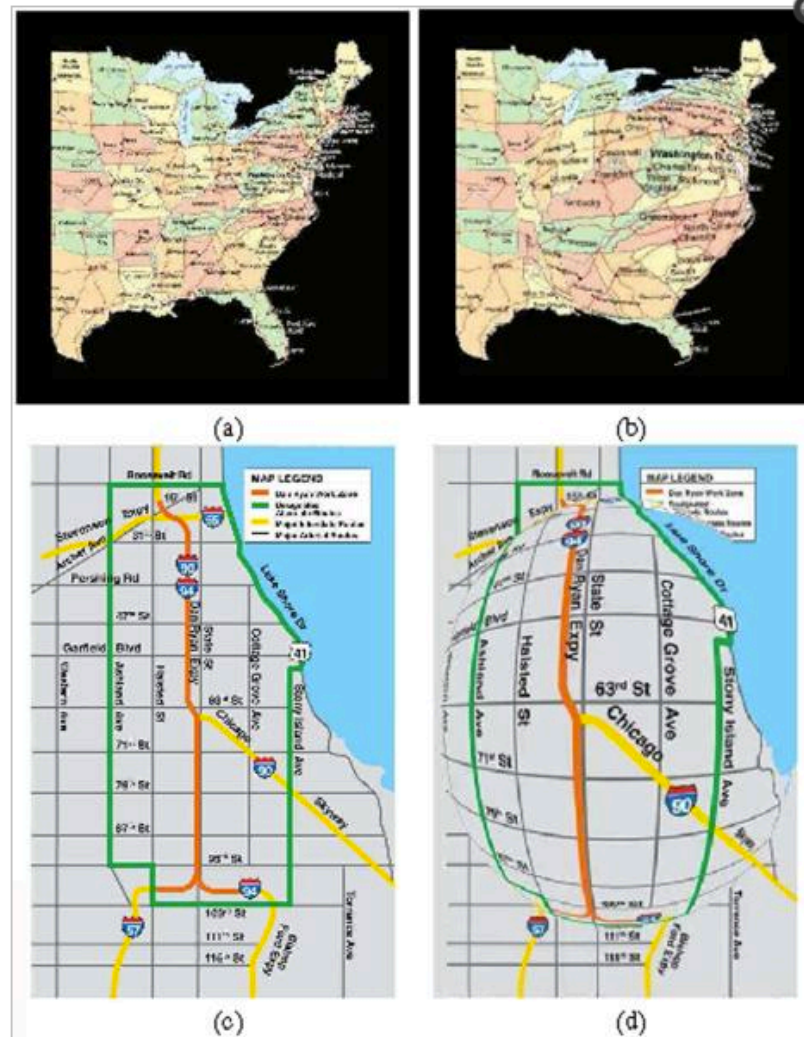
- Nine Inch Nails (relation: member of band)
- Stabbing Westward (relation: member of band)
- Pigface (relation: member of band)
- Jack Off Jill (relation: member of band)
- Die Warzau (relation: member of band)
- tweaker (relation: is person)
- Exotic Birds (relation: member of band)

<http://philogb.github.io/jit/static/v20/Jit/Examples/Hypertree/example1.html>

Drawbacks

- Distorted data can be hard to interpret
- Distorted labels can be hard to read

Conformal Magnifier



[Zhao et al., 2012]

Berkeley SCHOOL OF
INFORMATION