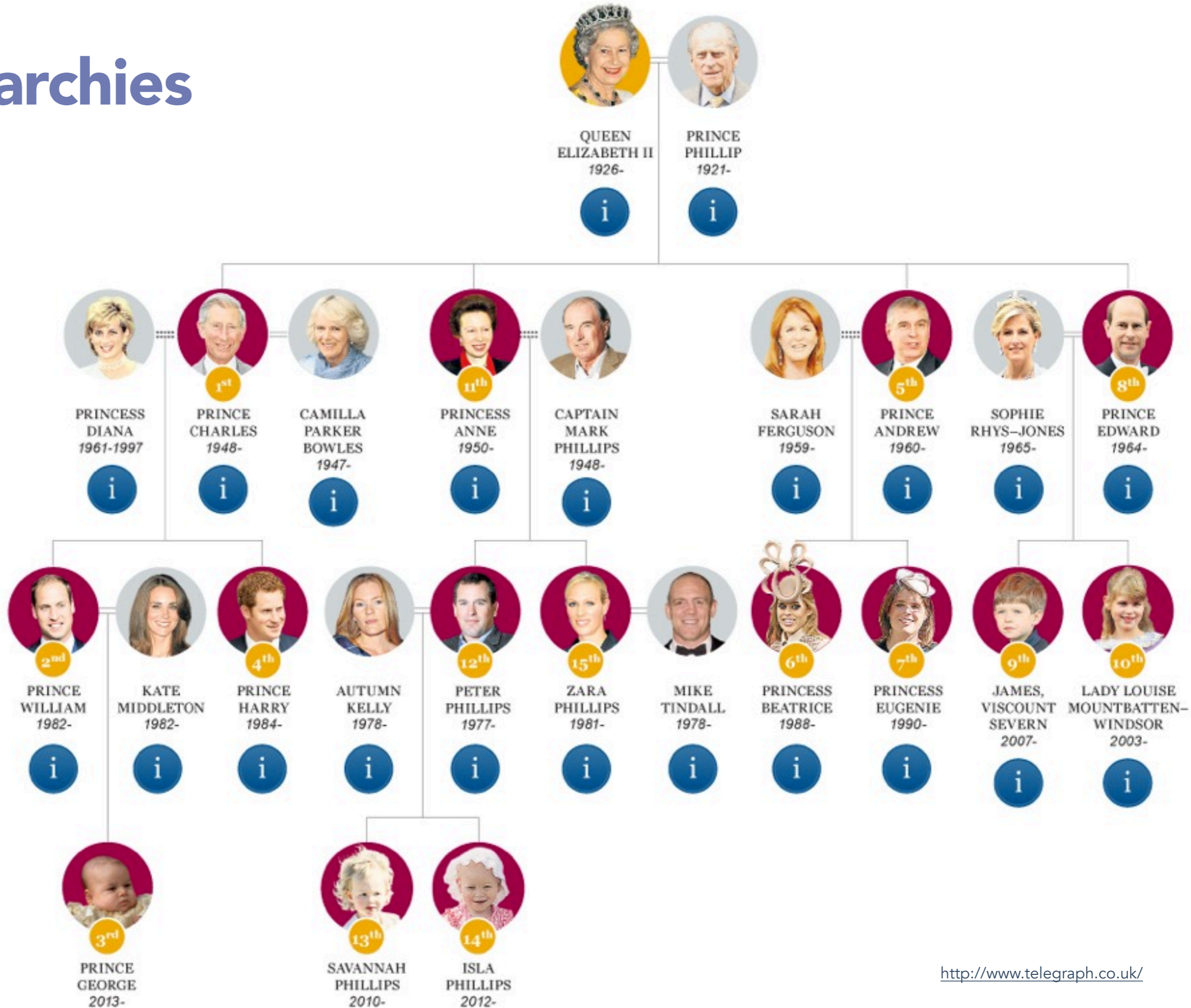


Hierarchies, Graphs, and Networks (oh my) part one

C. Andrews

2014-04-15

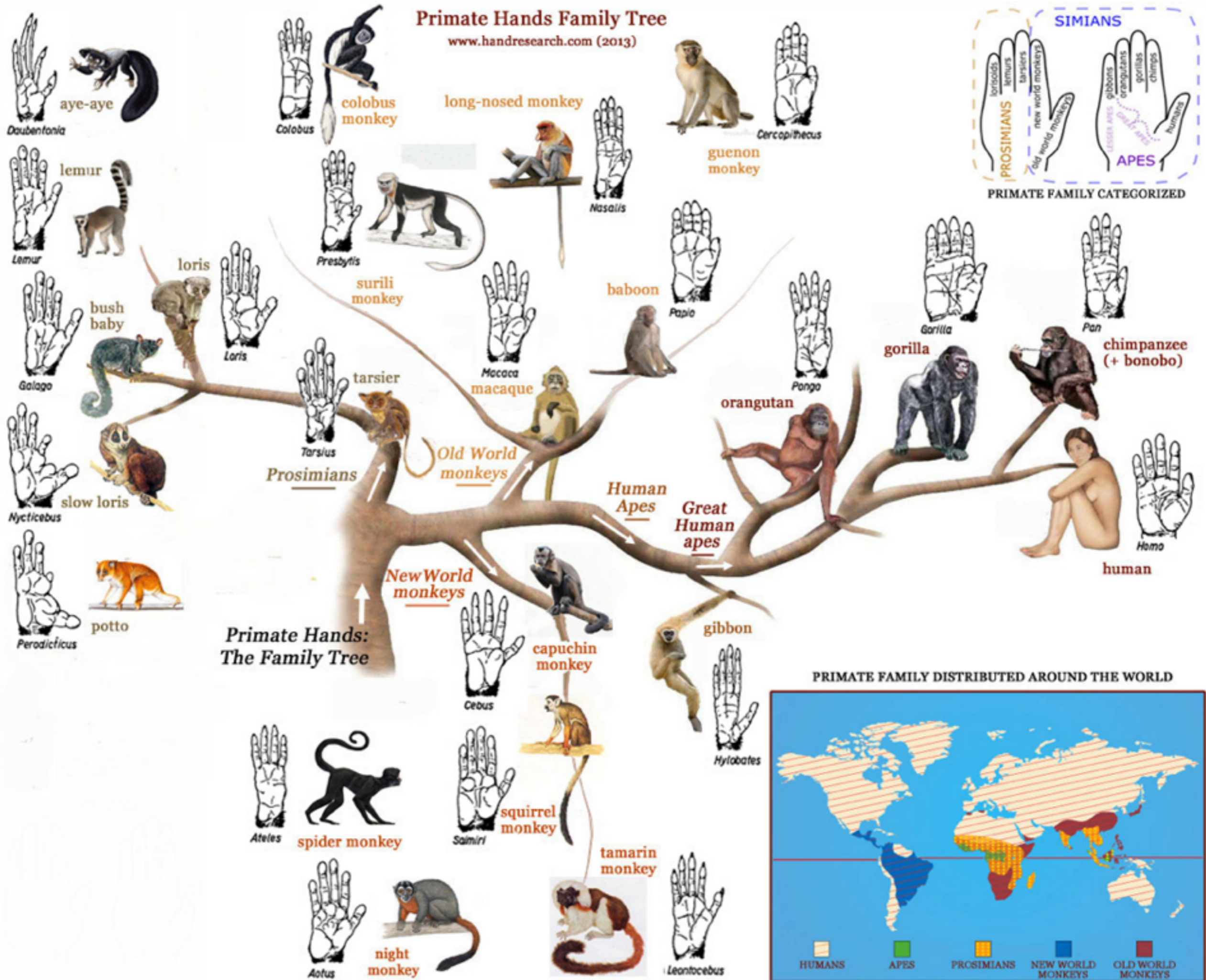
Hierarchies



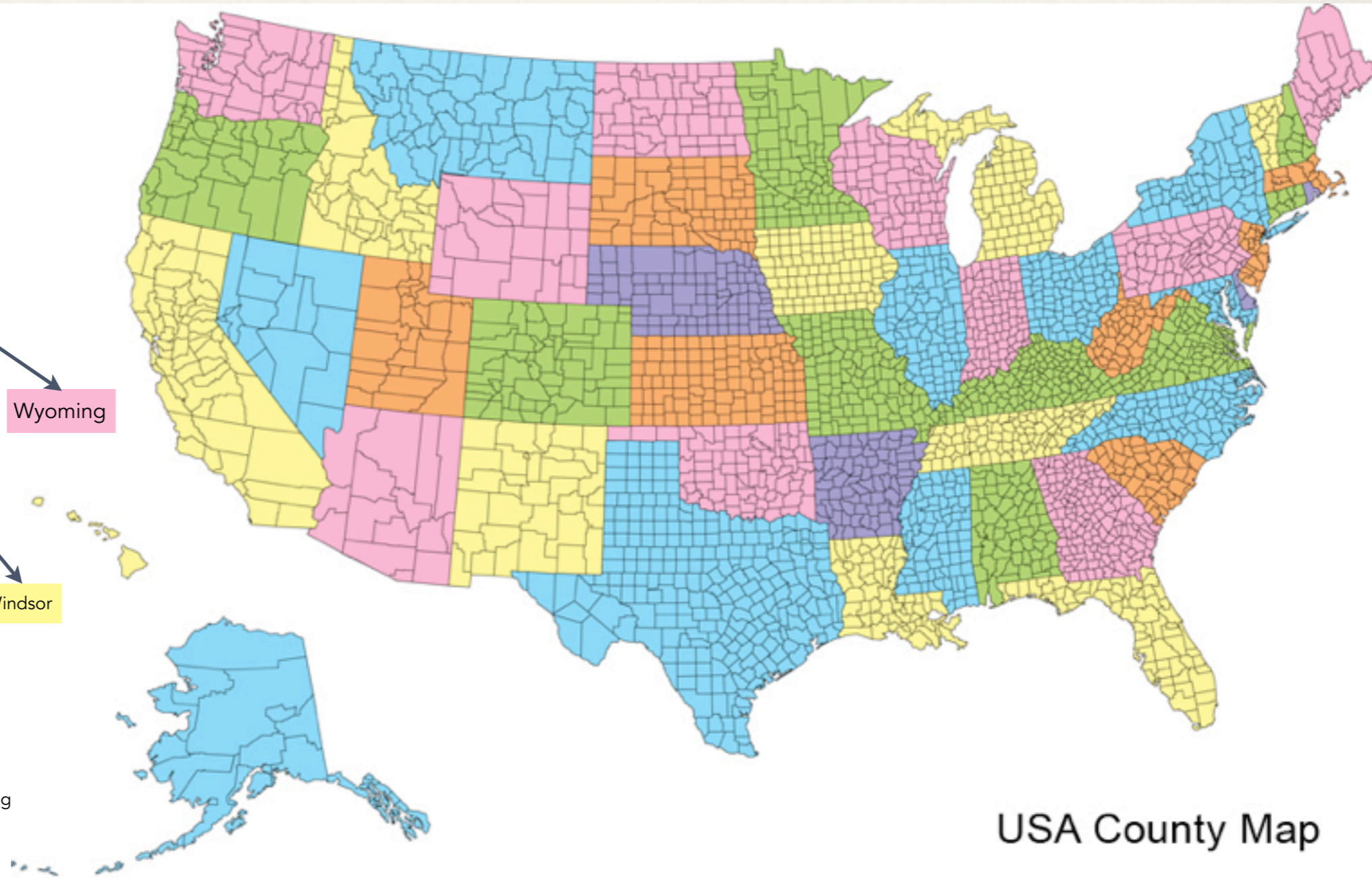
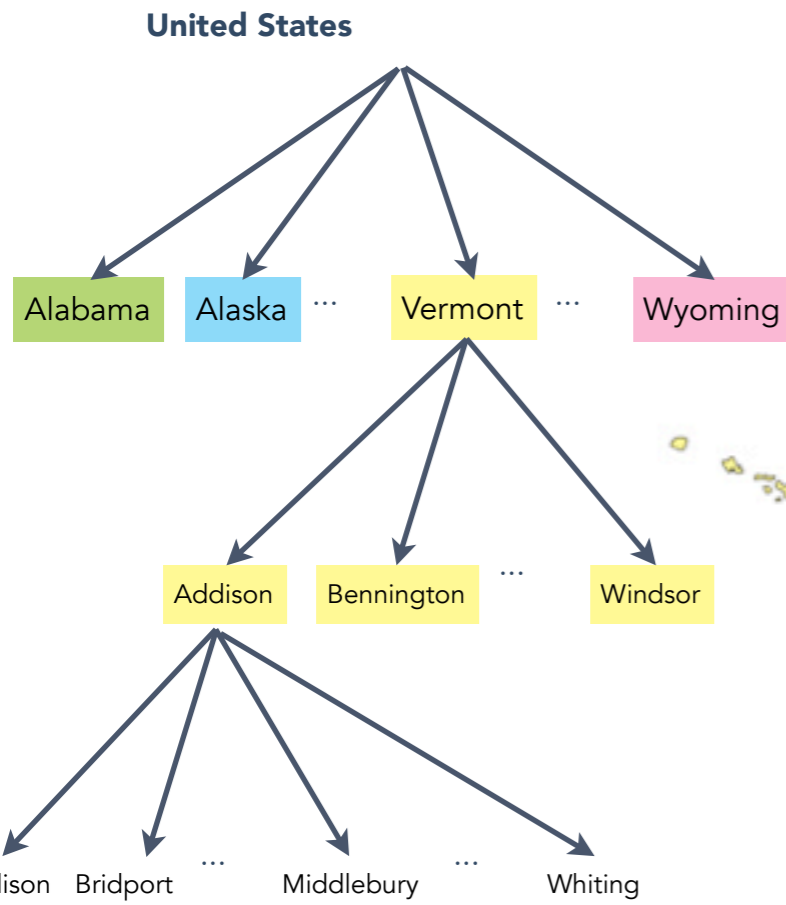
<http://www.telegraph.co.uk/>

Primate Hands Family Tree

www.handresearch.com (2013)



Hierarchies

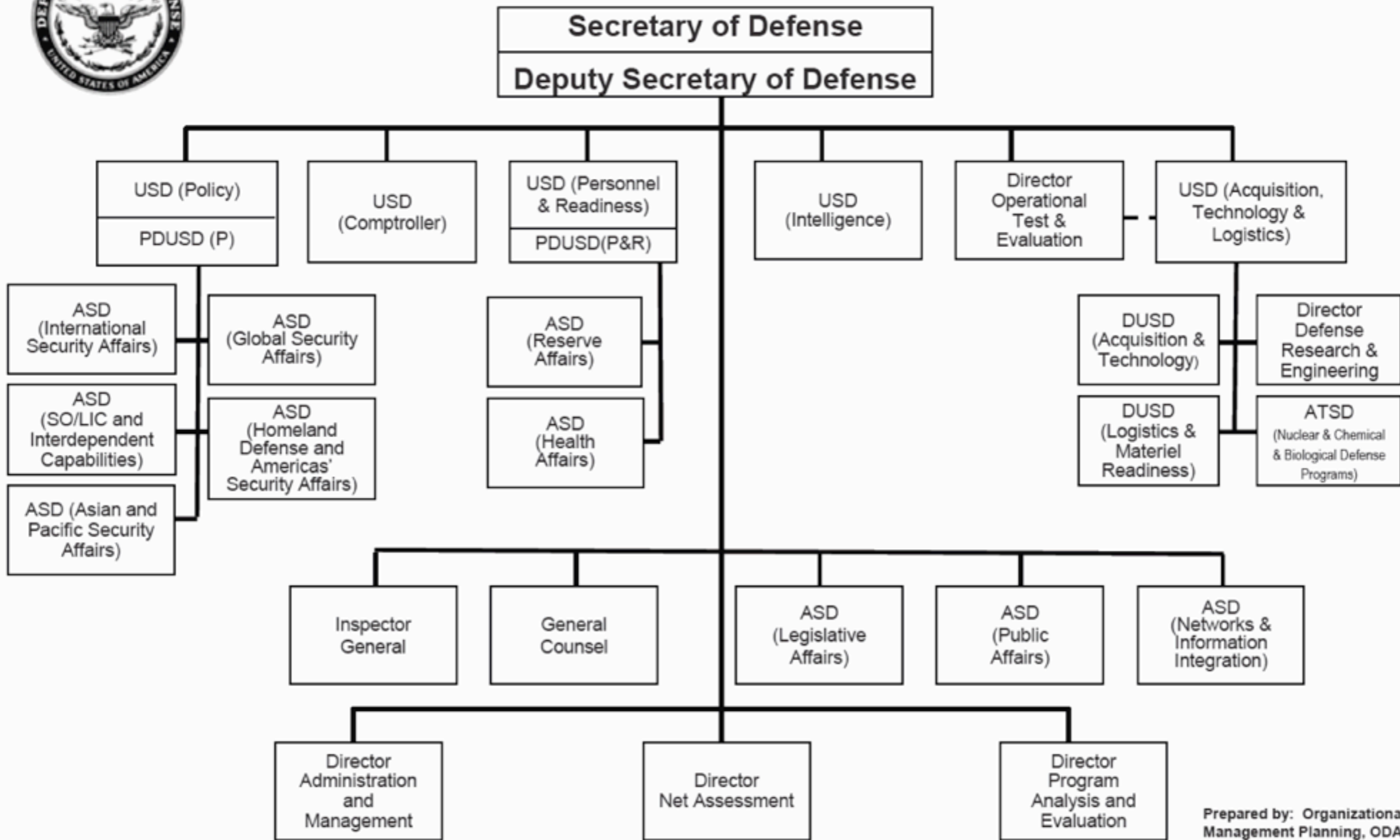


This is a royalty free image that can be used for your personal, corporate or education projects. It can not be resold or freely distributed, if you need an editable PowerPoint or Adobe Illustrator version of this map please visit www.bjdesign.com or www.mapsfordesign.com. This text can be cropped off. © Copyright Bruce Jones Design 2009

Hierarchies



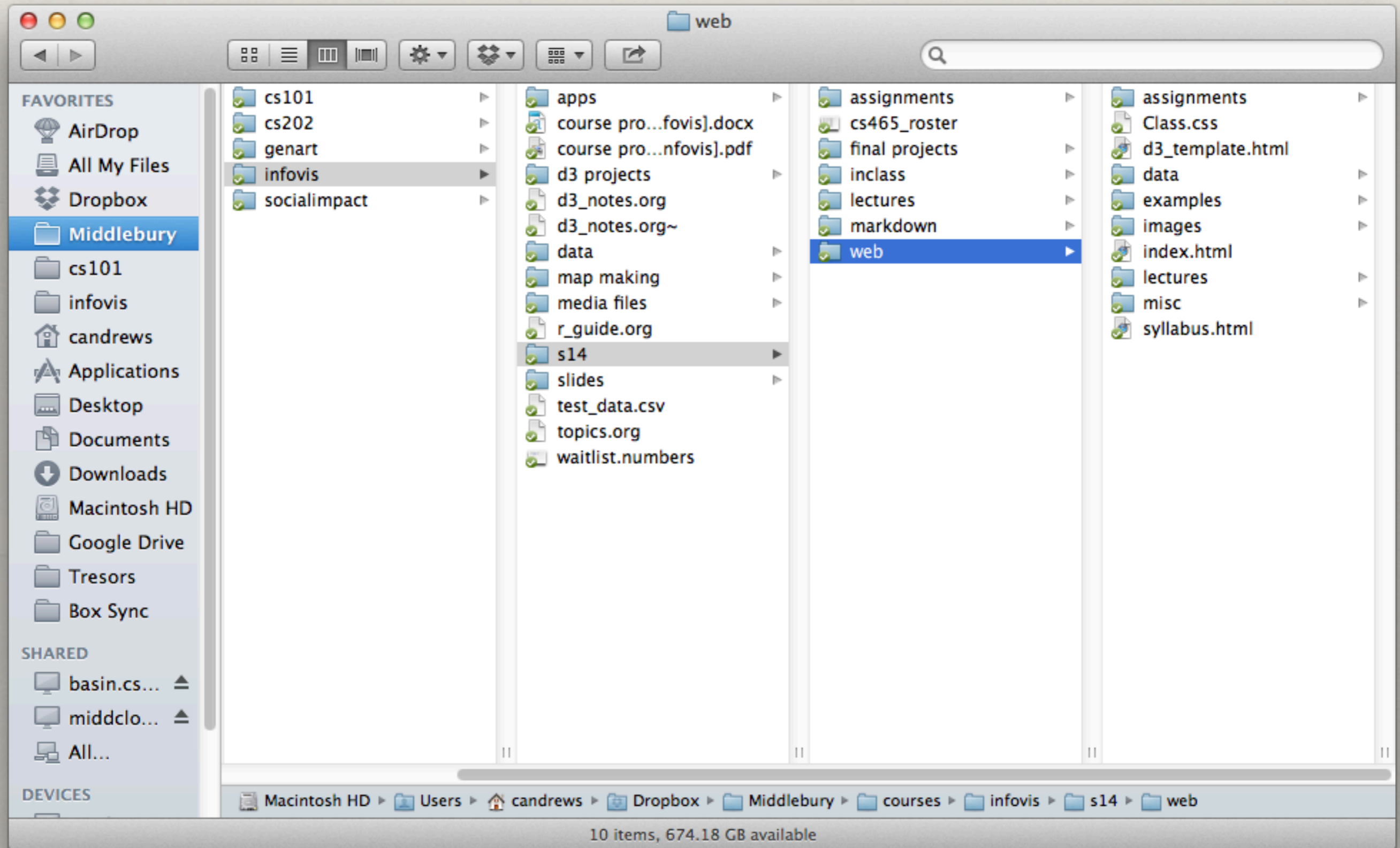
Office of the Secretary of Defense



Prepared by: Organizational & Management Planning, ODA&M, OSD
Date: January 2008

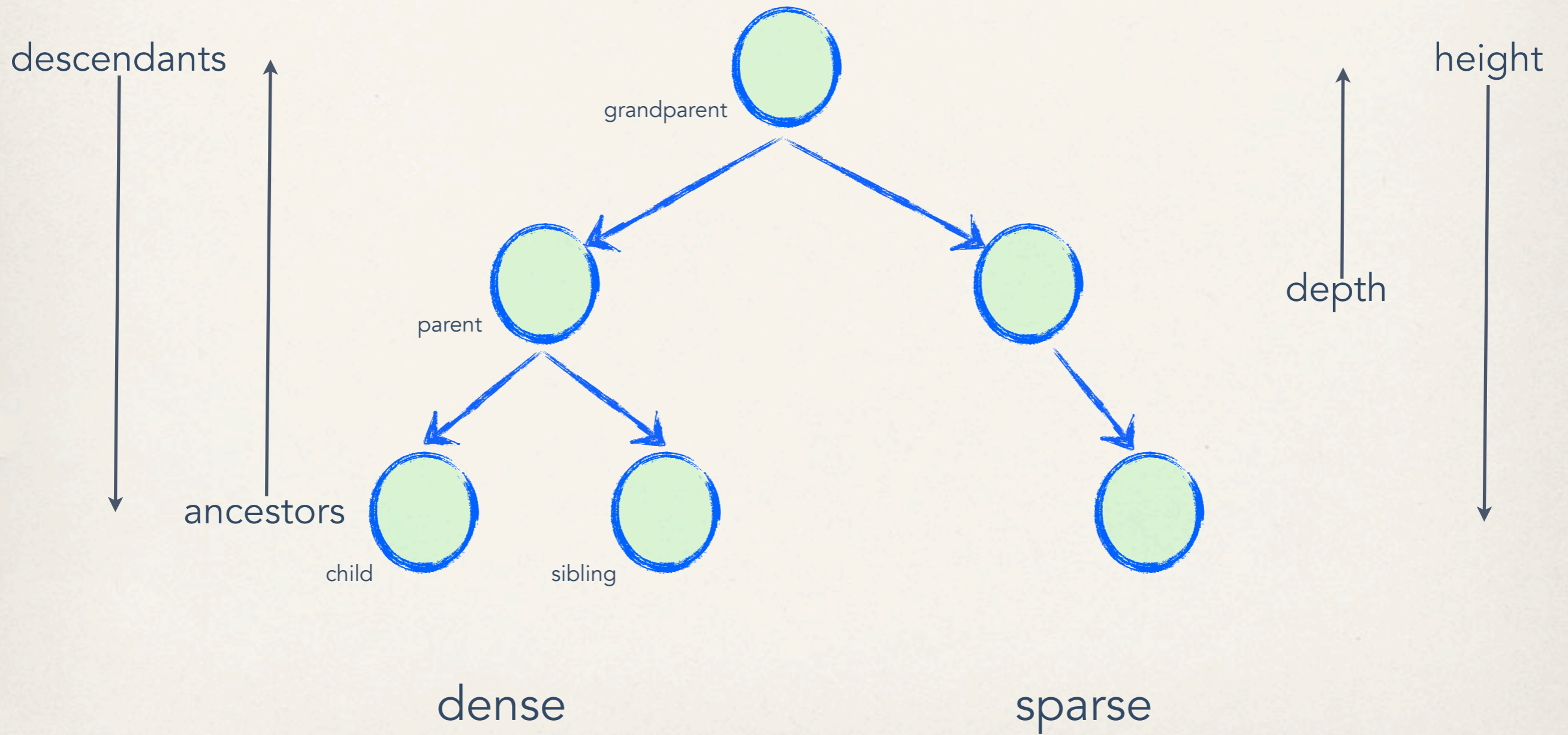
Chart reflects PAS officials and those reporting directly to the Secretary and Deputy Secretary of Defense

Hierarchies



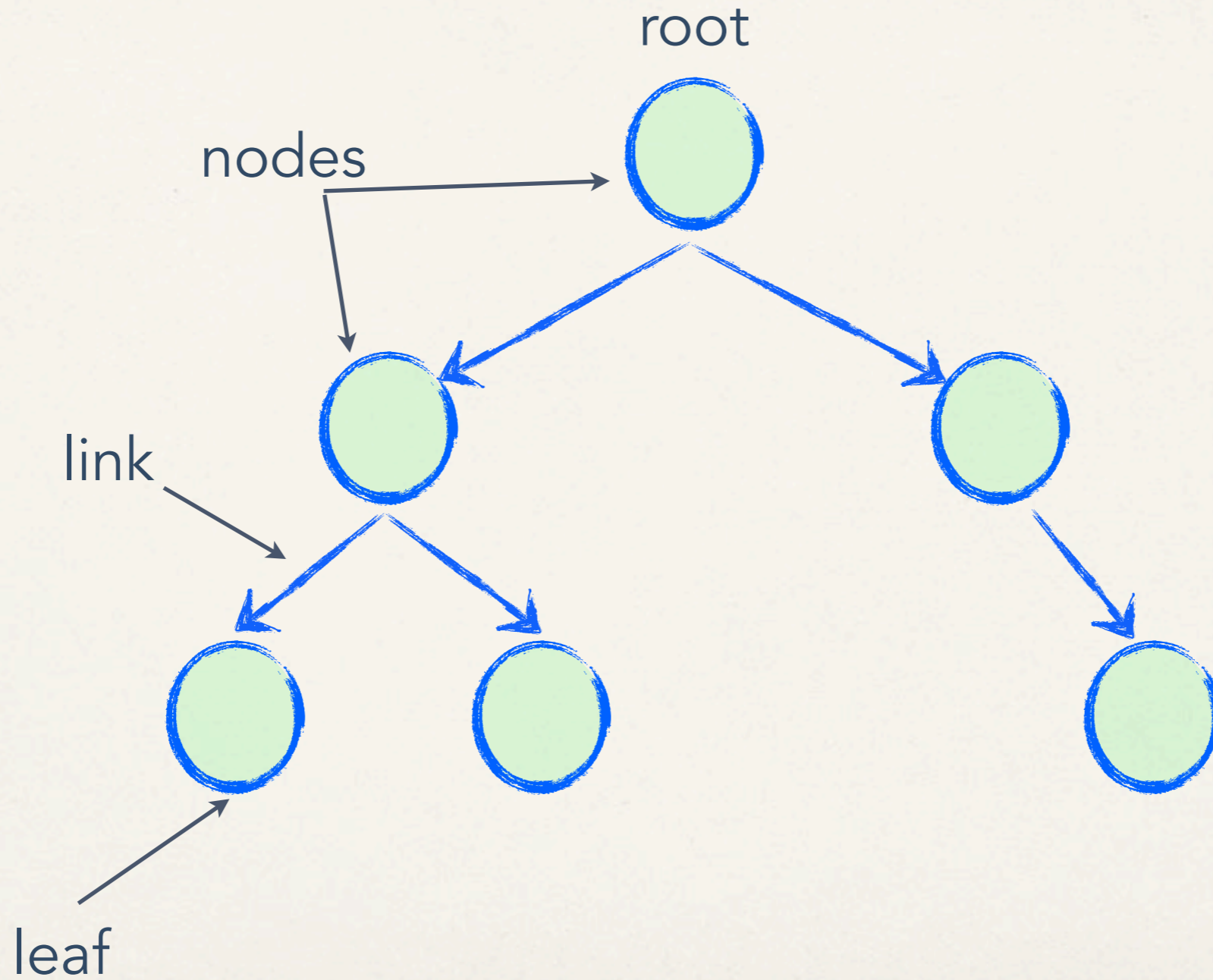
What are we trying to discover?

It is all about structure and relationships



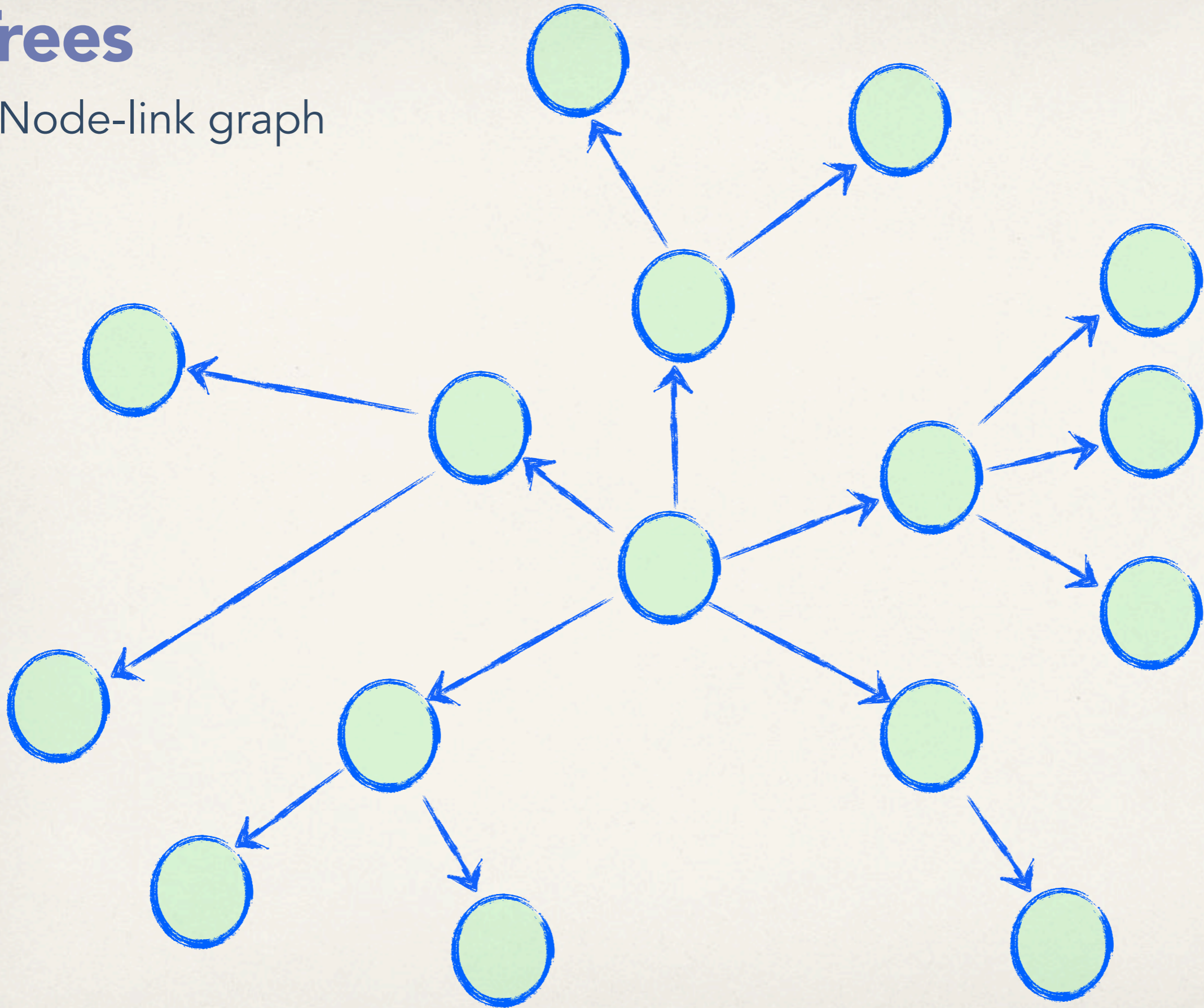
Trees

Node-link graph



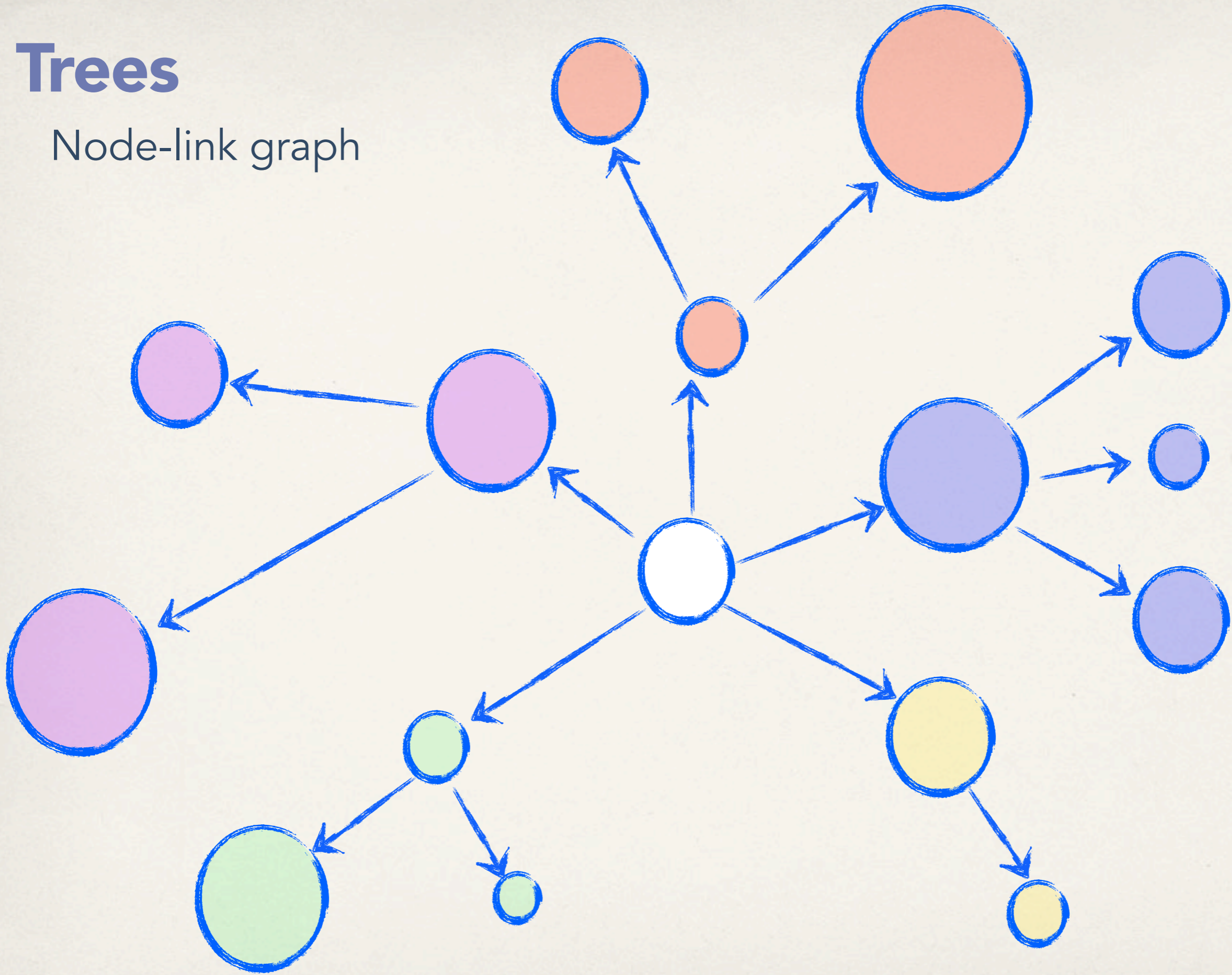
Trees

Node-link graph



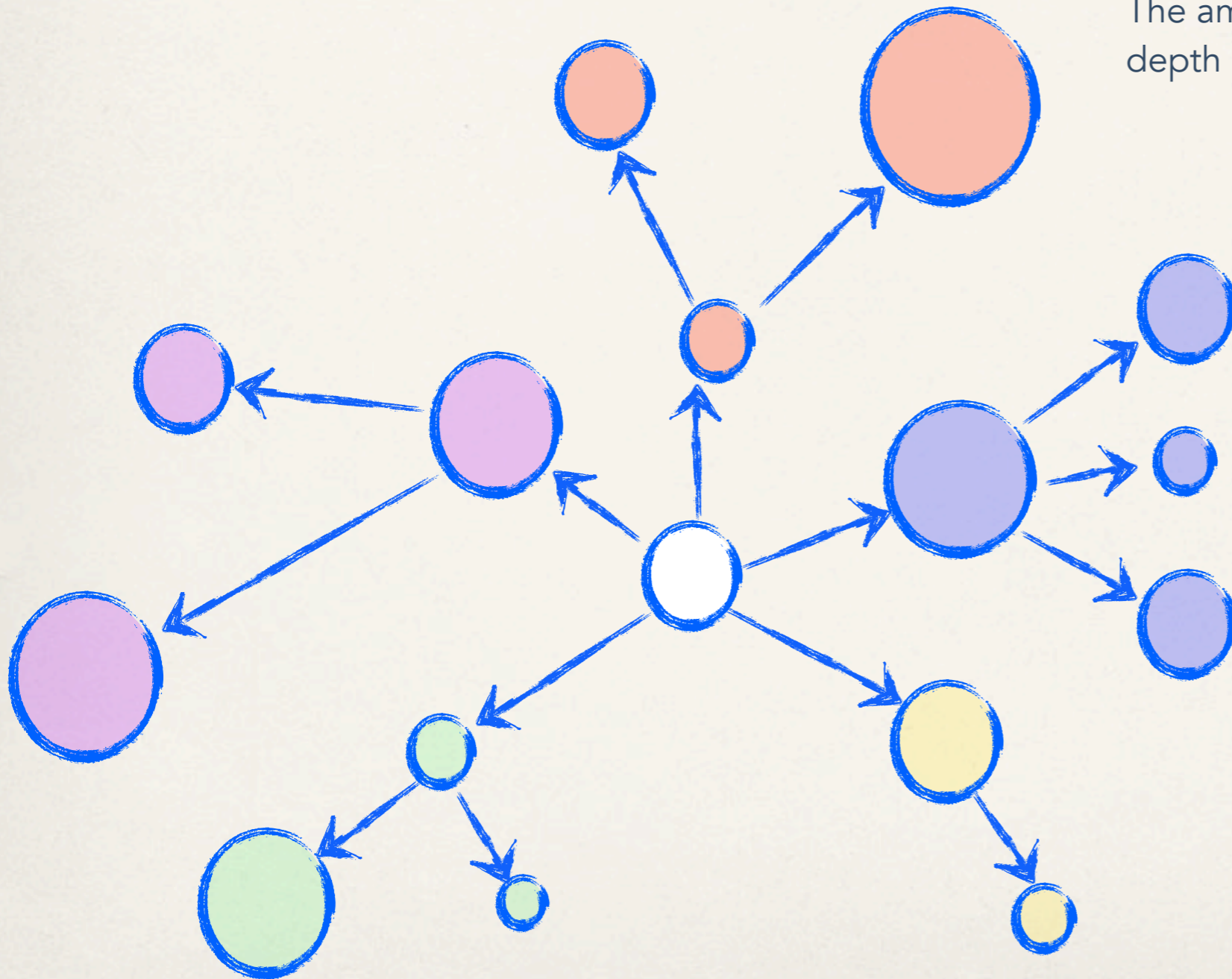
Trees

Node-link graph



Trees

Node-link graph



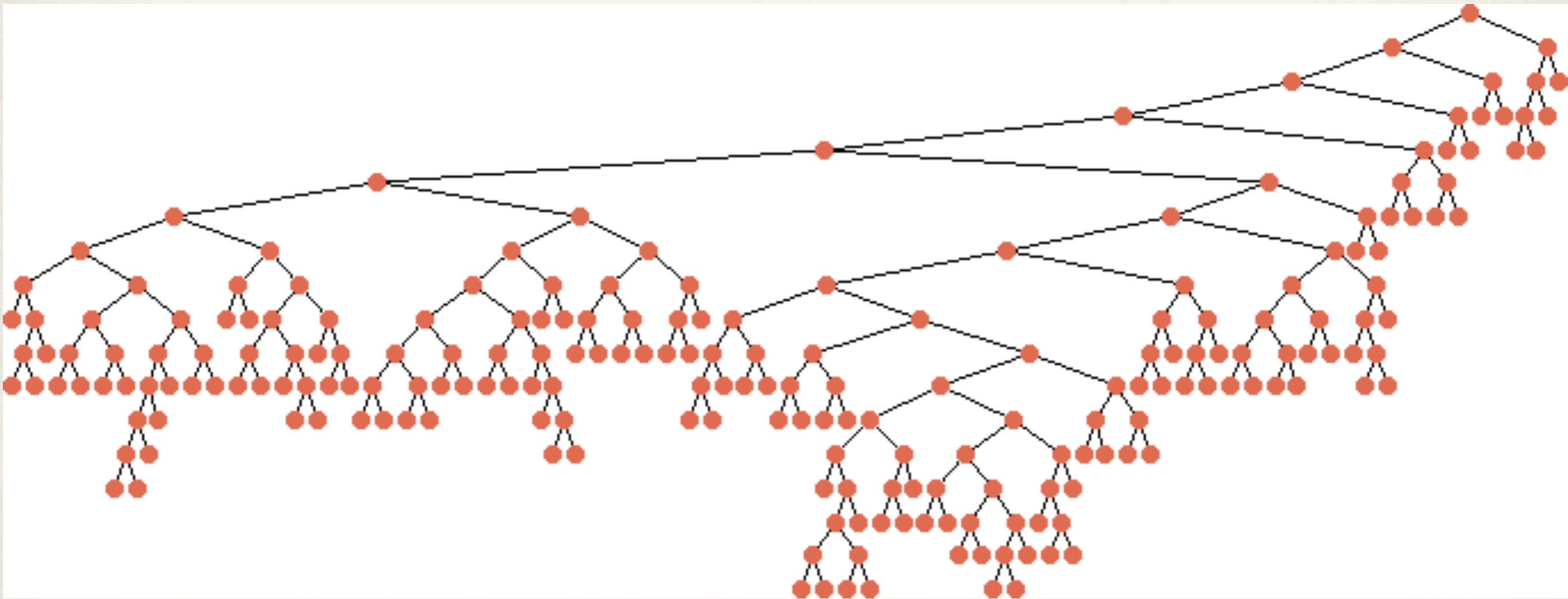
Challenges

We need to display both structure **and** data

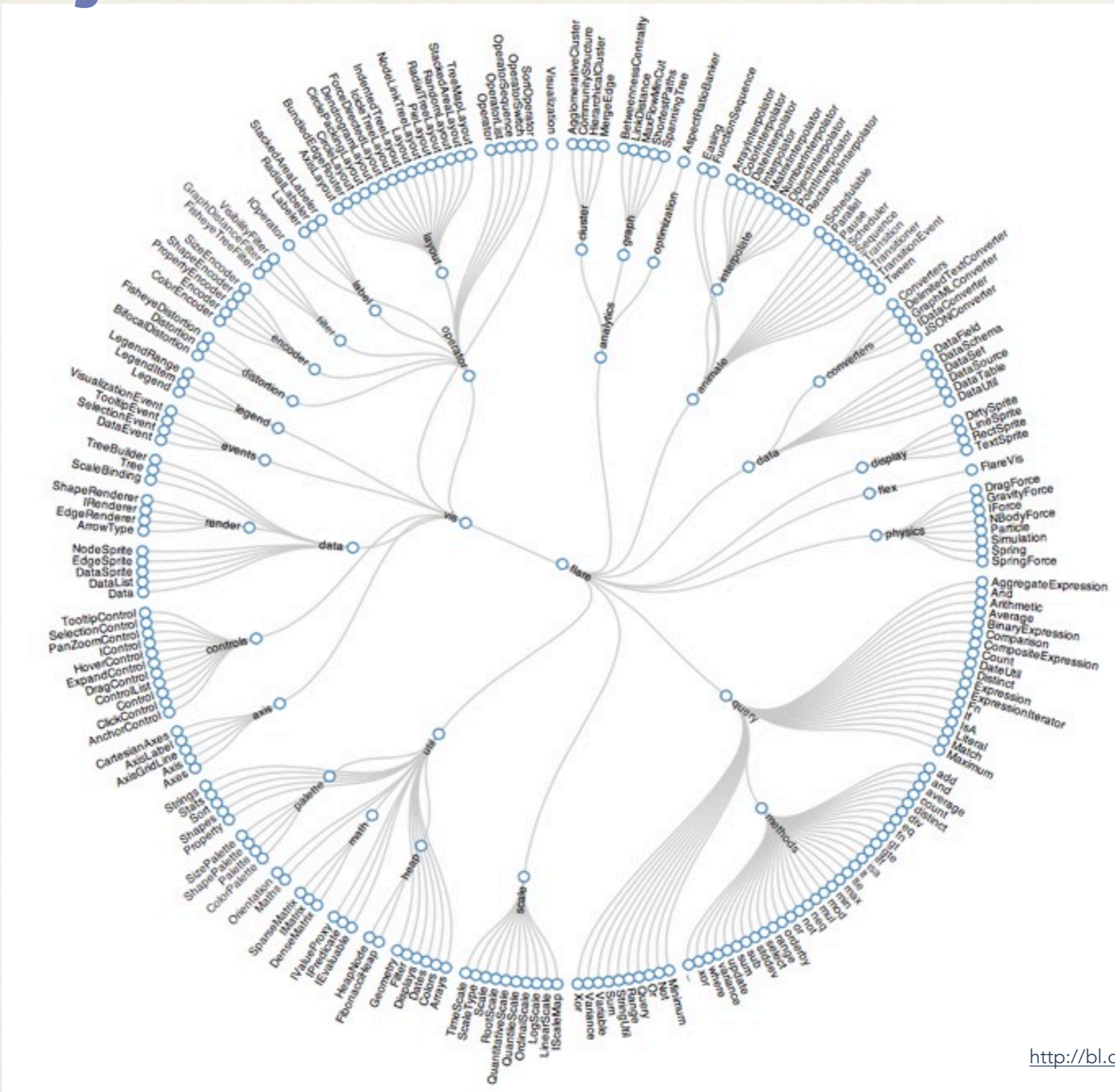
Structure consume space

The amount of data grows exponentially with the depth

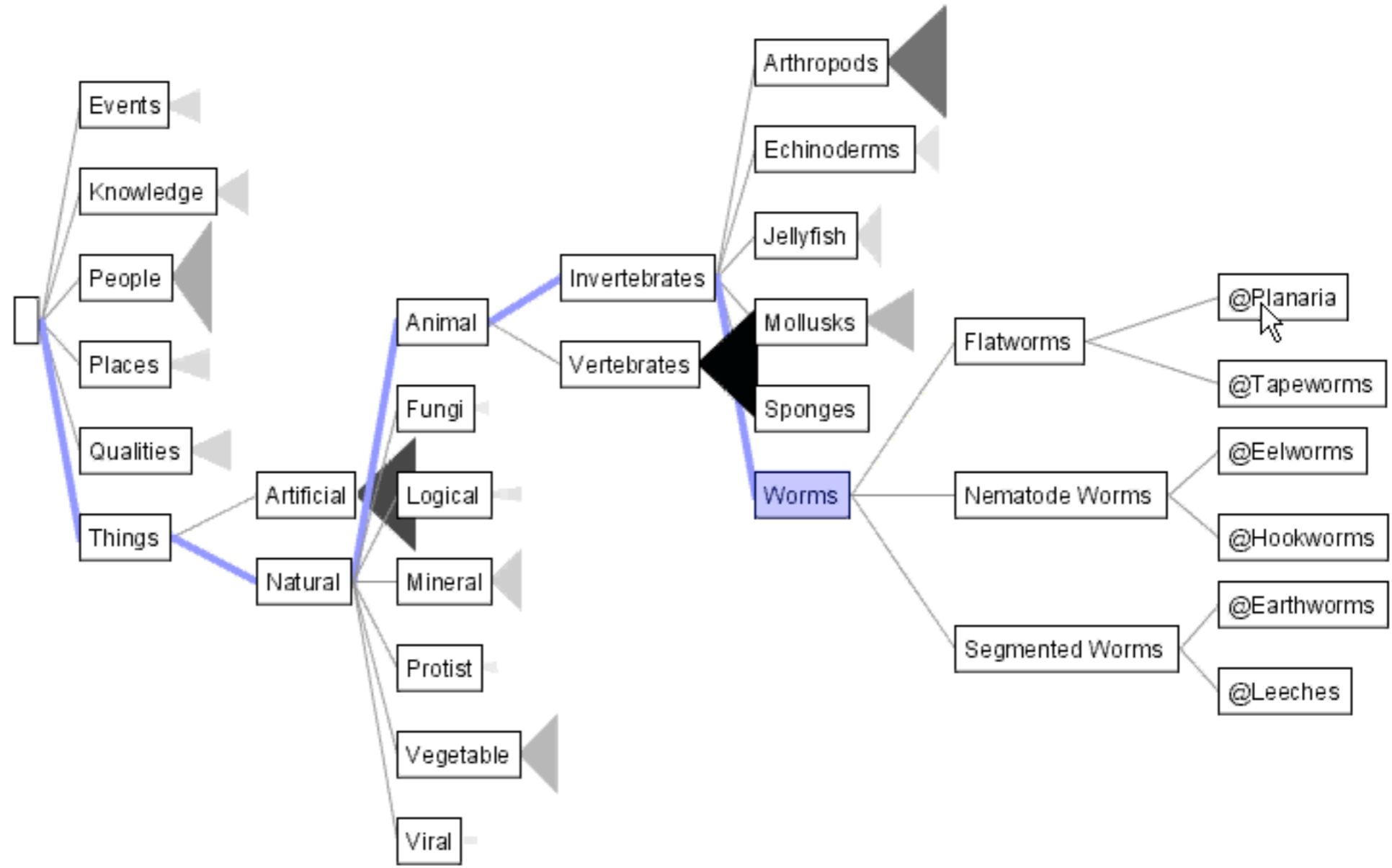
Conventional tree visualization



Radial layout

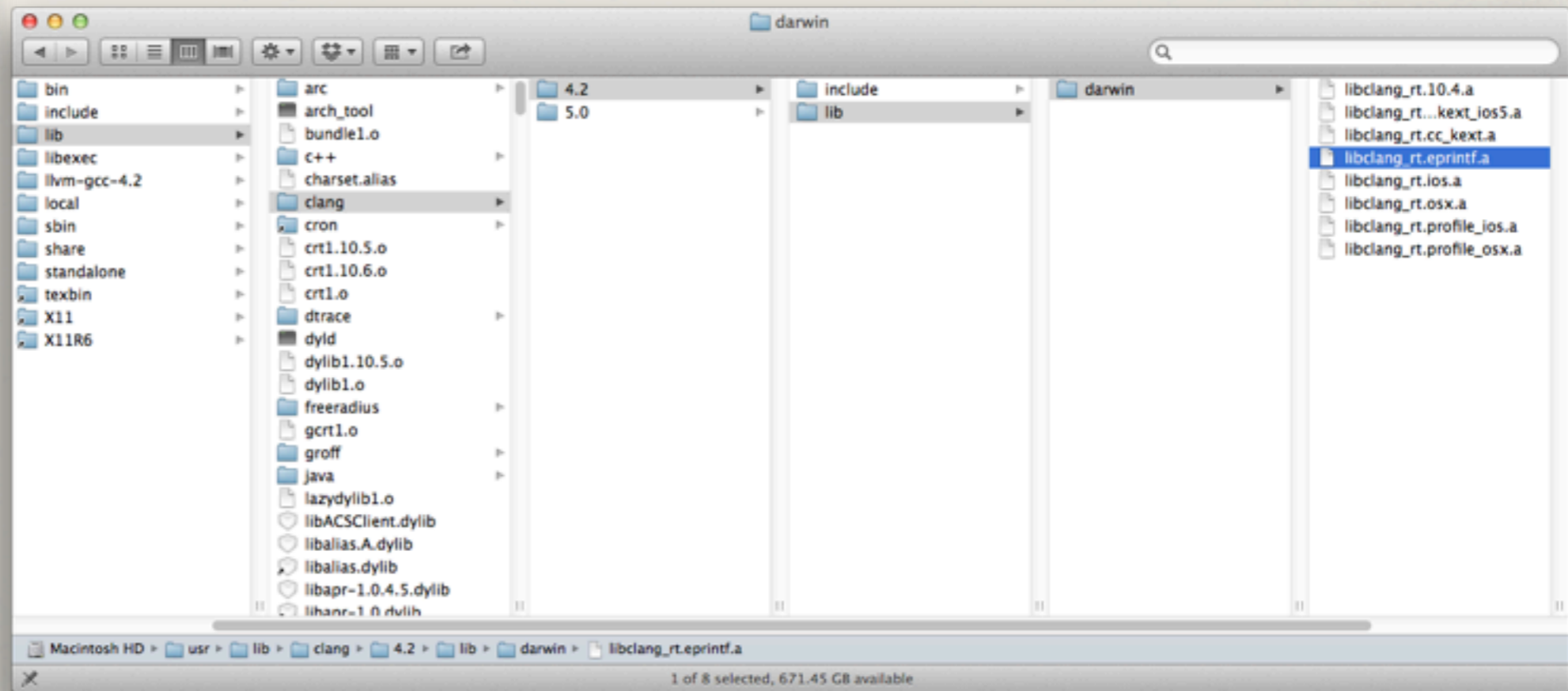
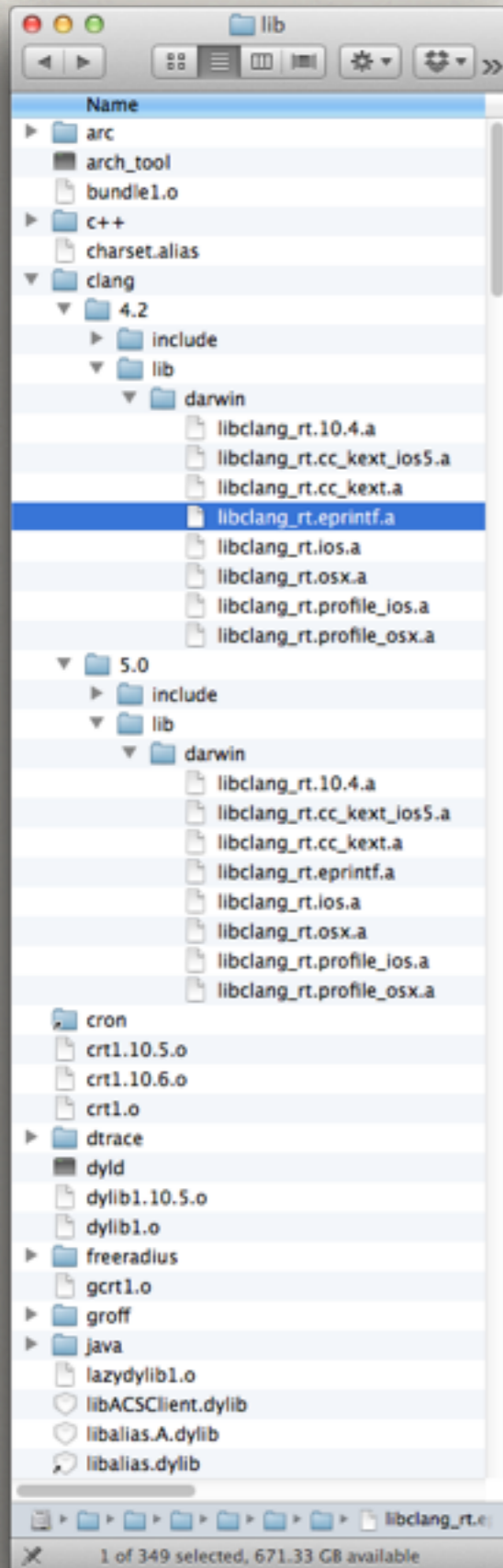


SpaceTree

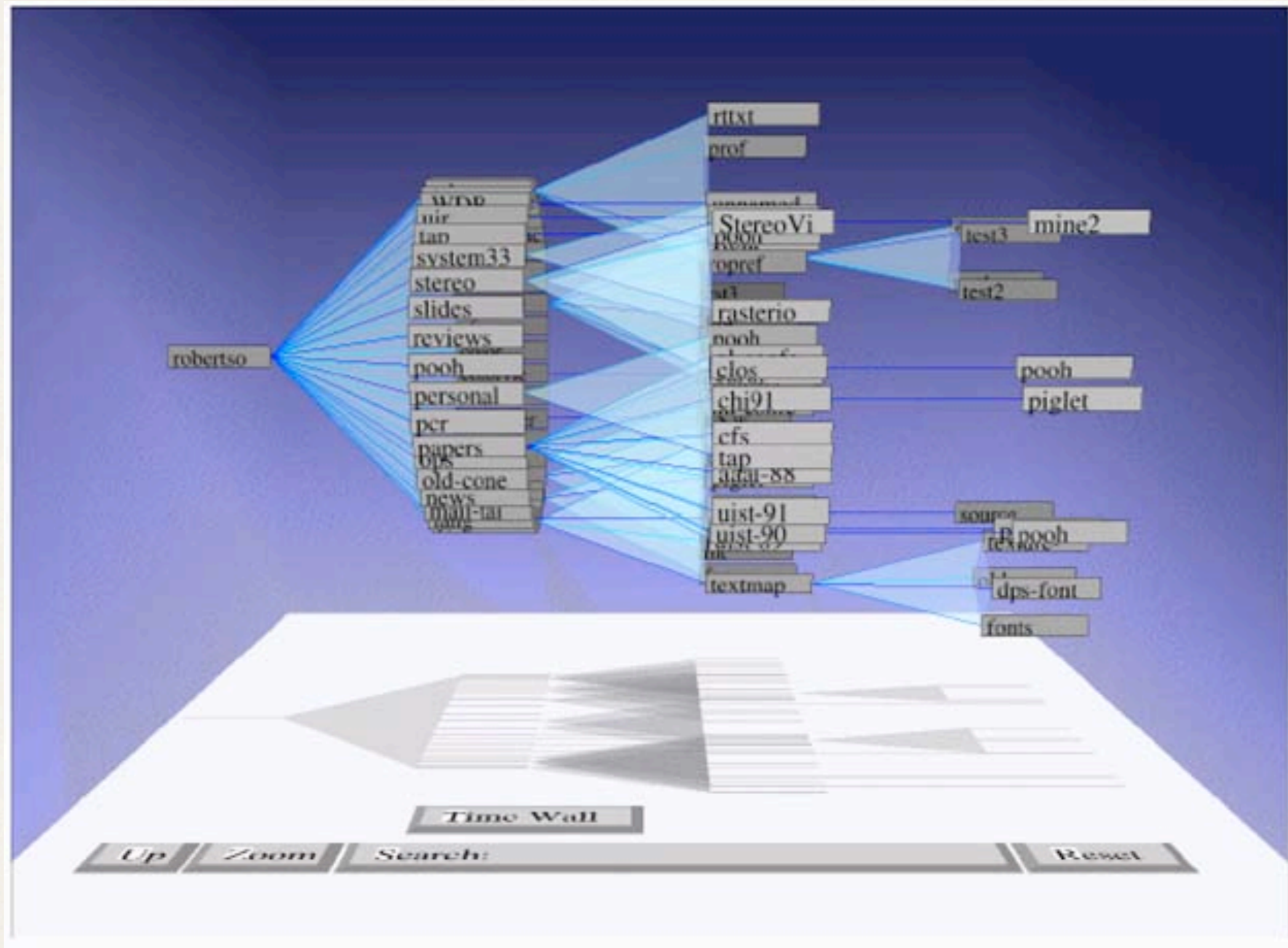


Grosjean, et al. "SpaceTree: Supporting Exploration in Large Node Link Tree, Design Evolution and Empirical Evaluation"

Two views of a tree



Cone Trees

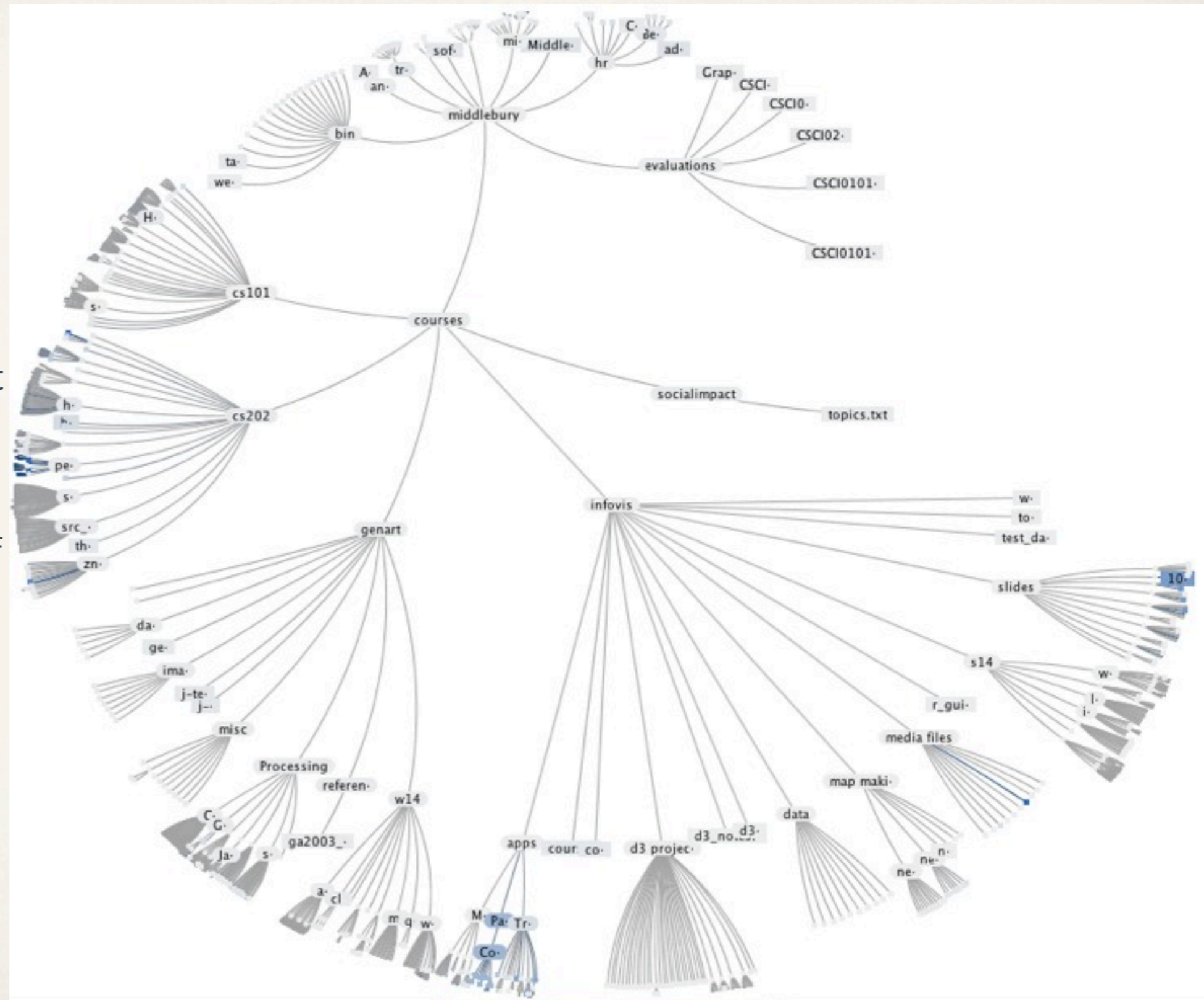


Robertson et al., "Cone Trees: Animated 3D Visualizations of Hierarchical Information"

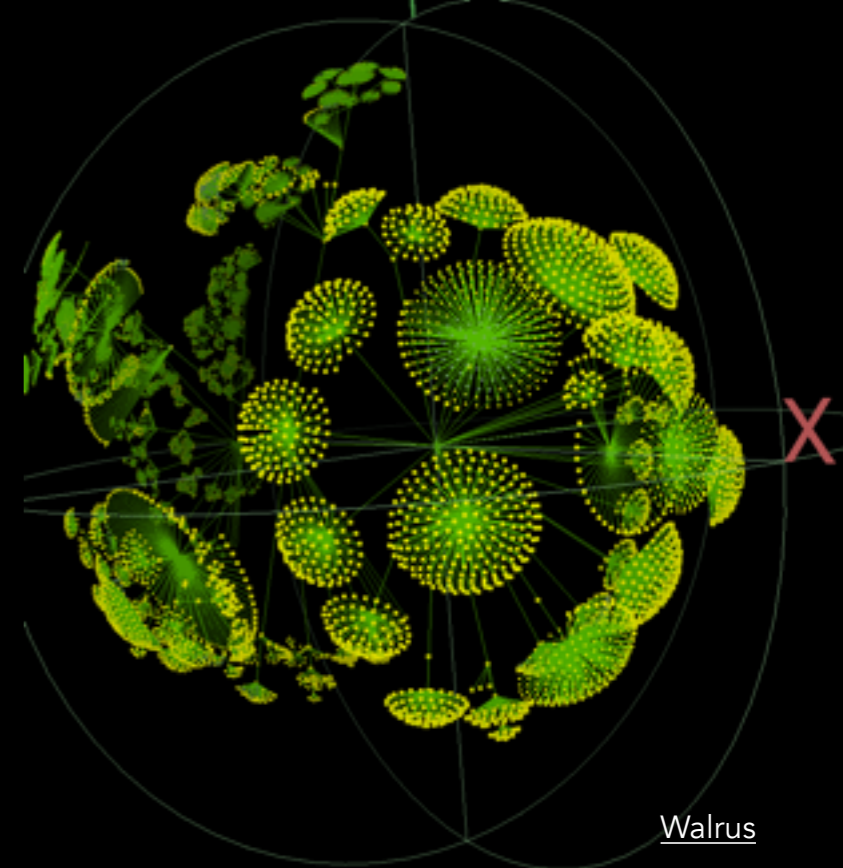
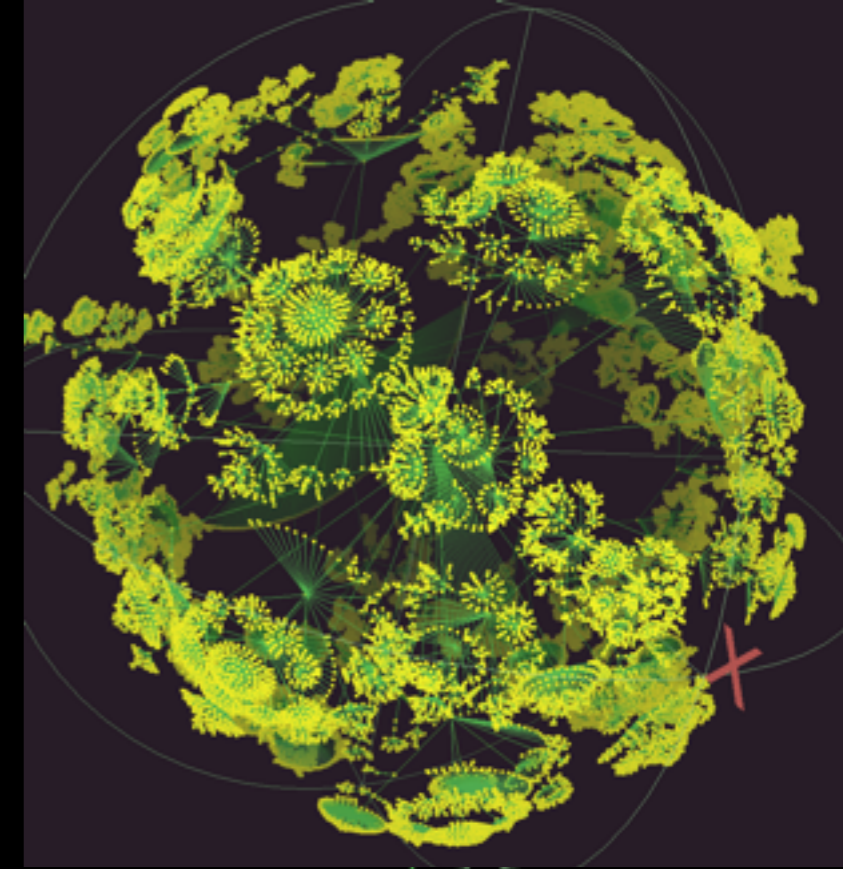
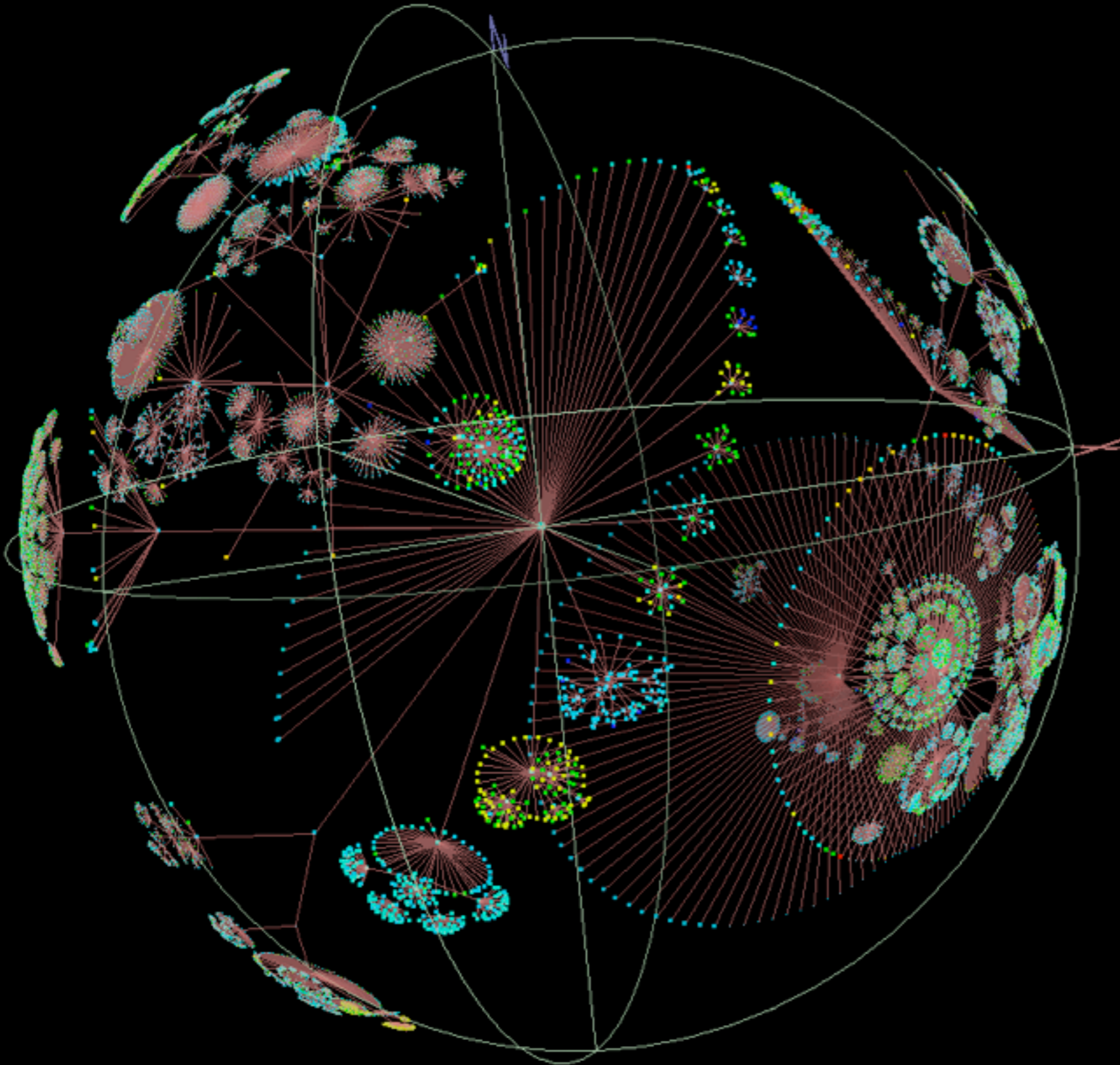
Hyperbolic browser

The tree is laid out in hyperbolic space and mapped back to the unit circle.

Can show 10x the number of nodes of a standard 2D approach (1000 vs. 100)



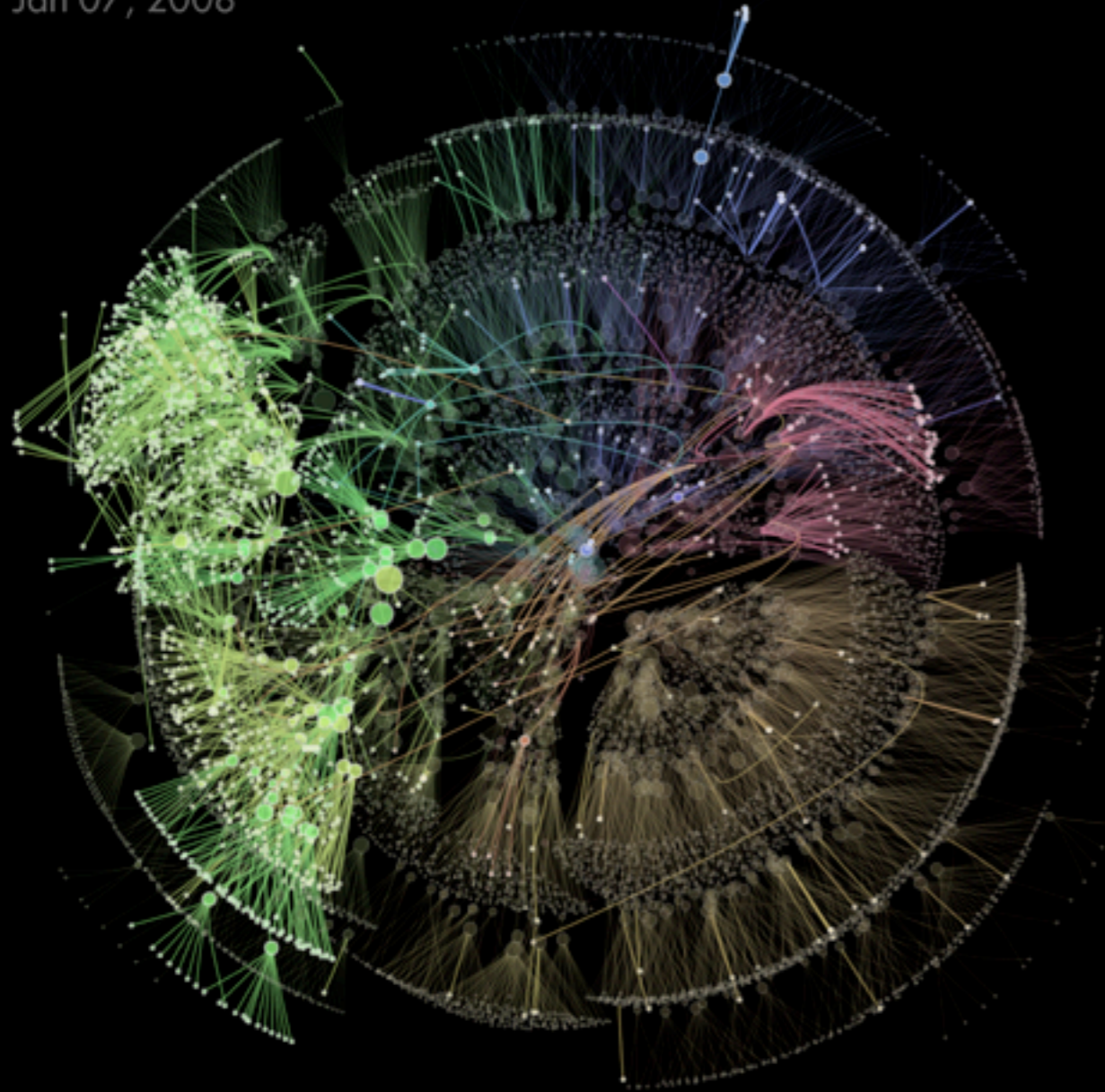
3D Hyperbolic Tree



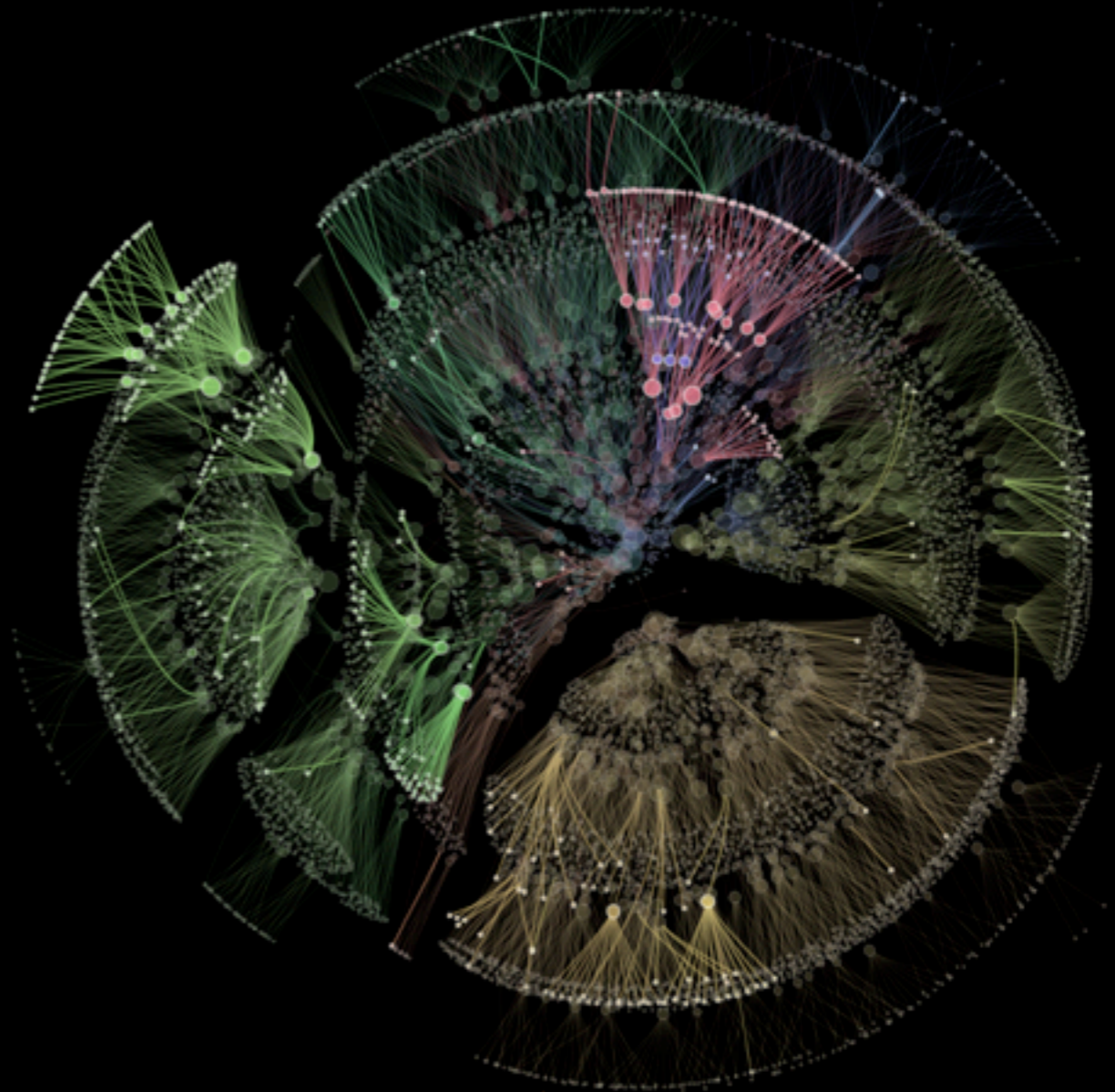
Walrus

Force-directed radial layout

Jan 07, 2008

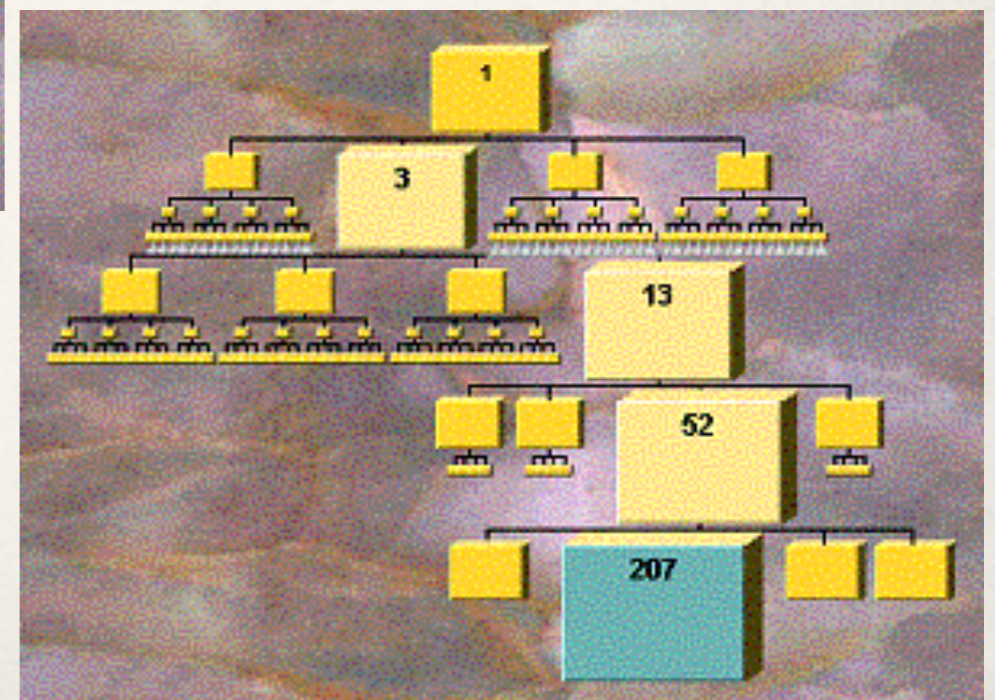
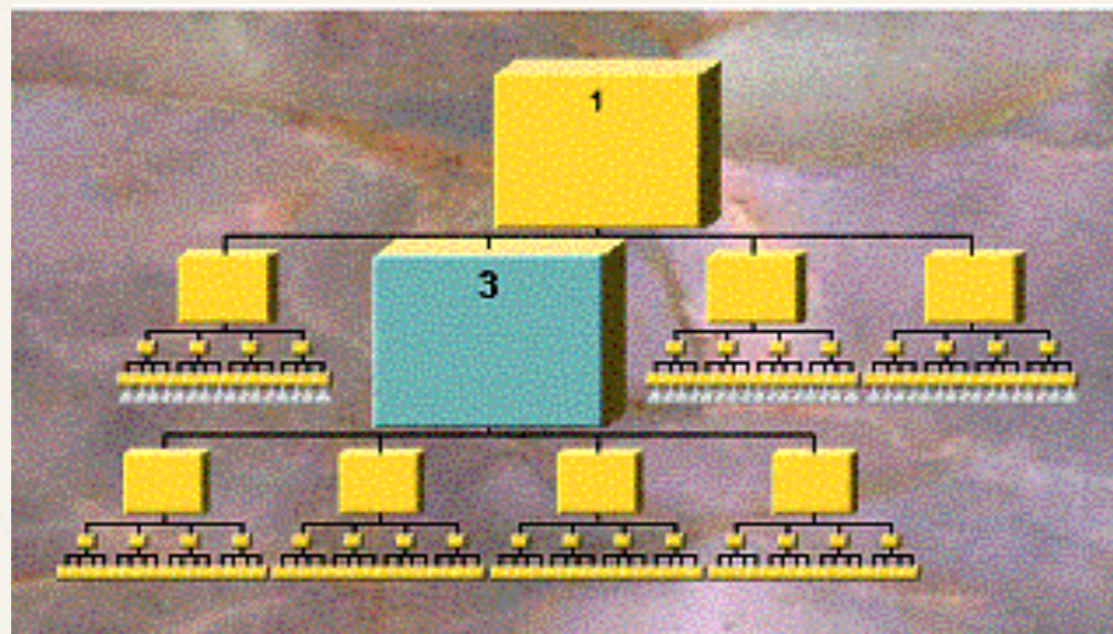
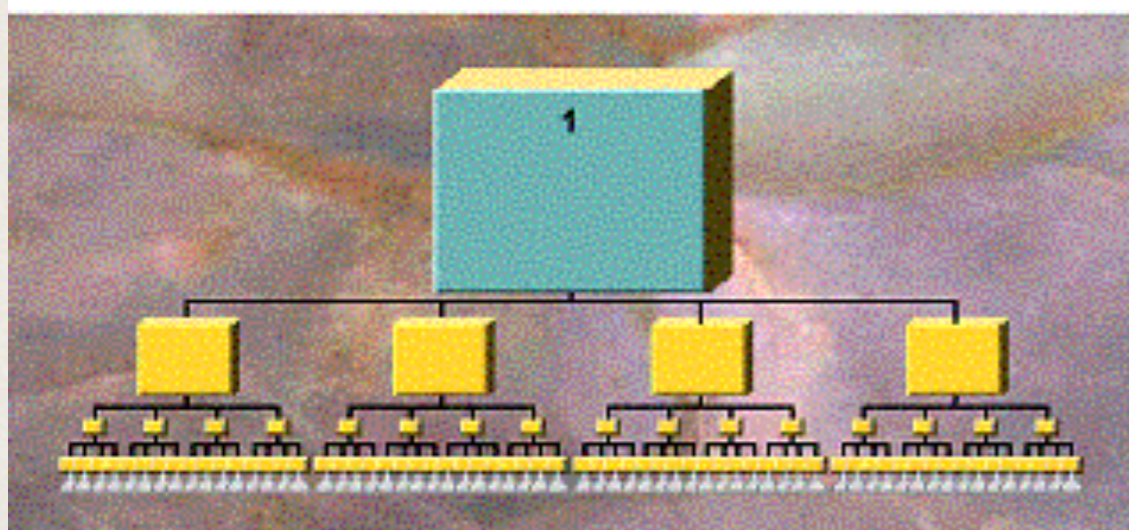


Mar 26, 2009



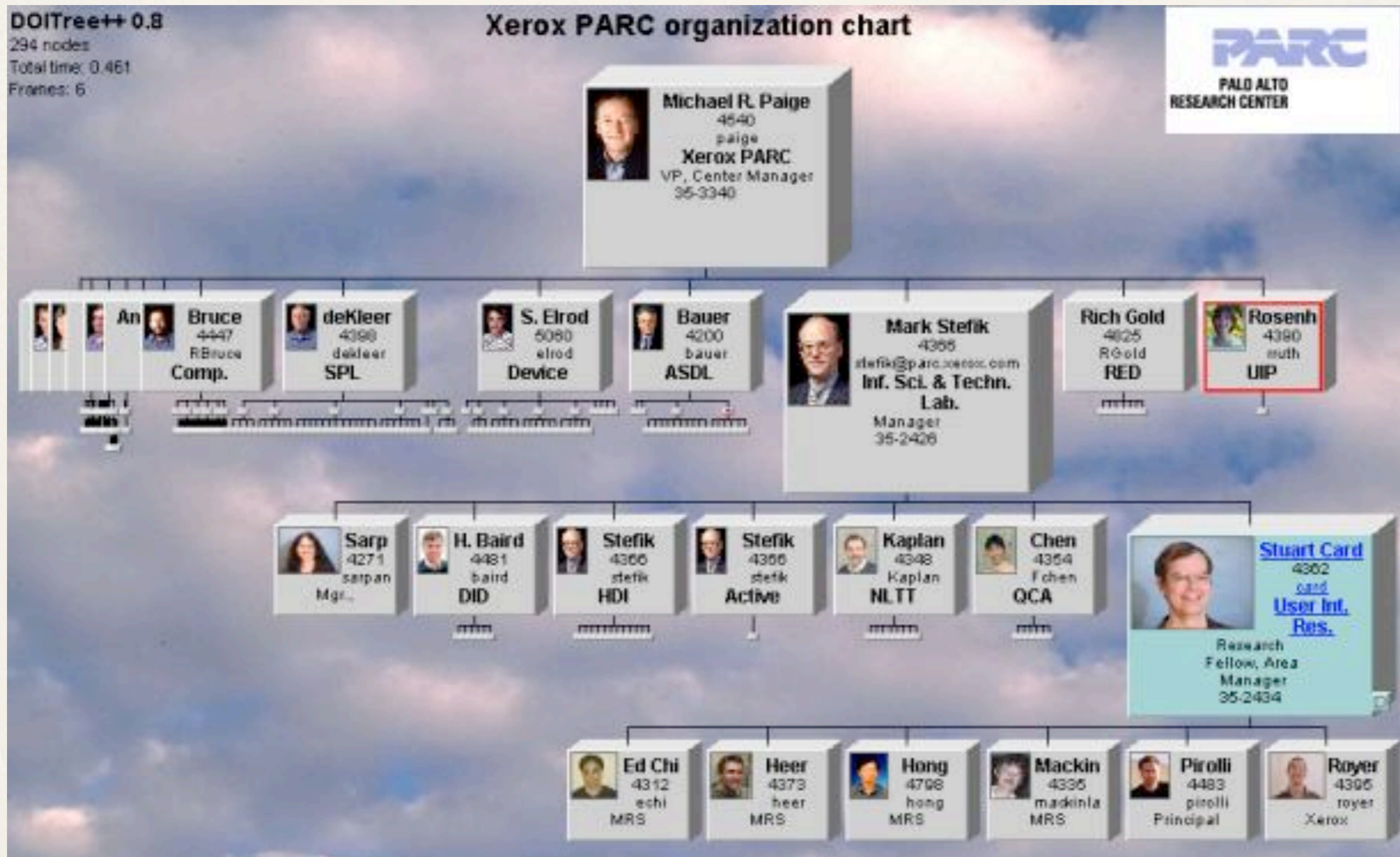
<http://www.autodeskresearch.com/projects/orgorgchart>

Degree-of-Interest (DOI) Trees



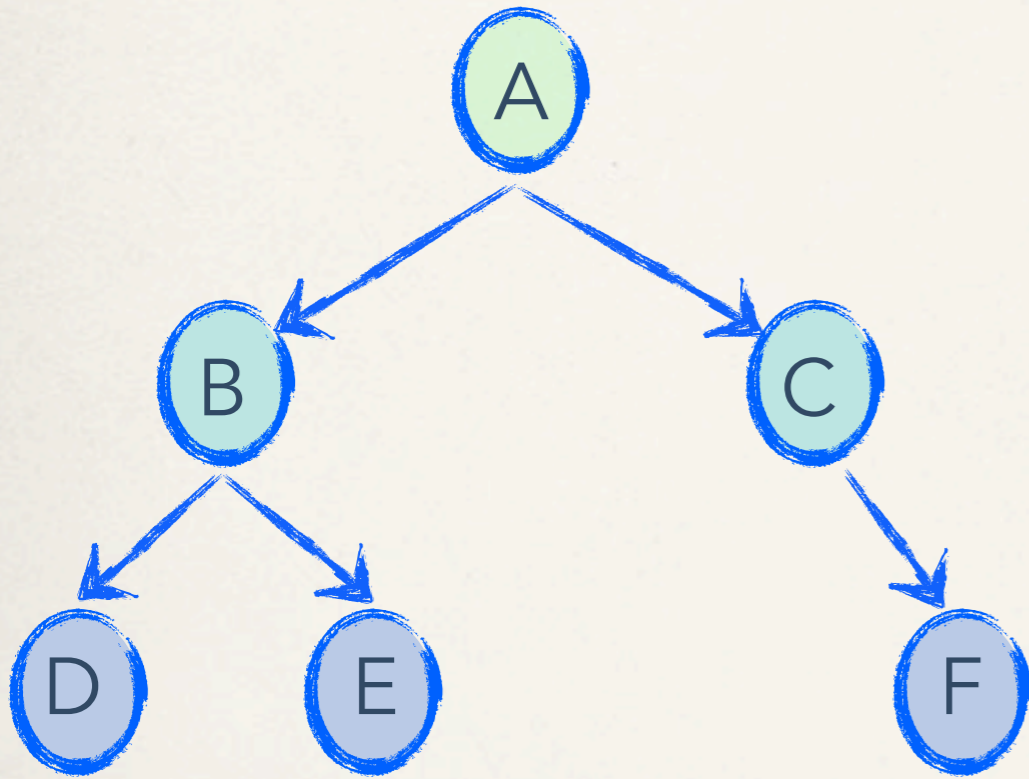
Card and Nation, "Degree-of-Interest Trees: A Component of an Attention-Reactive User Interface"

Degree-of-Interest Trees

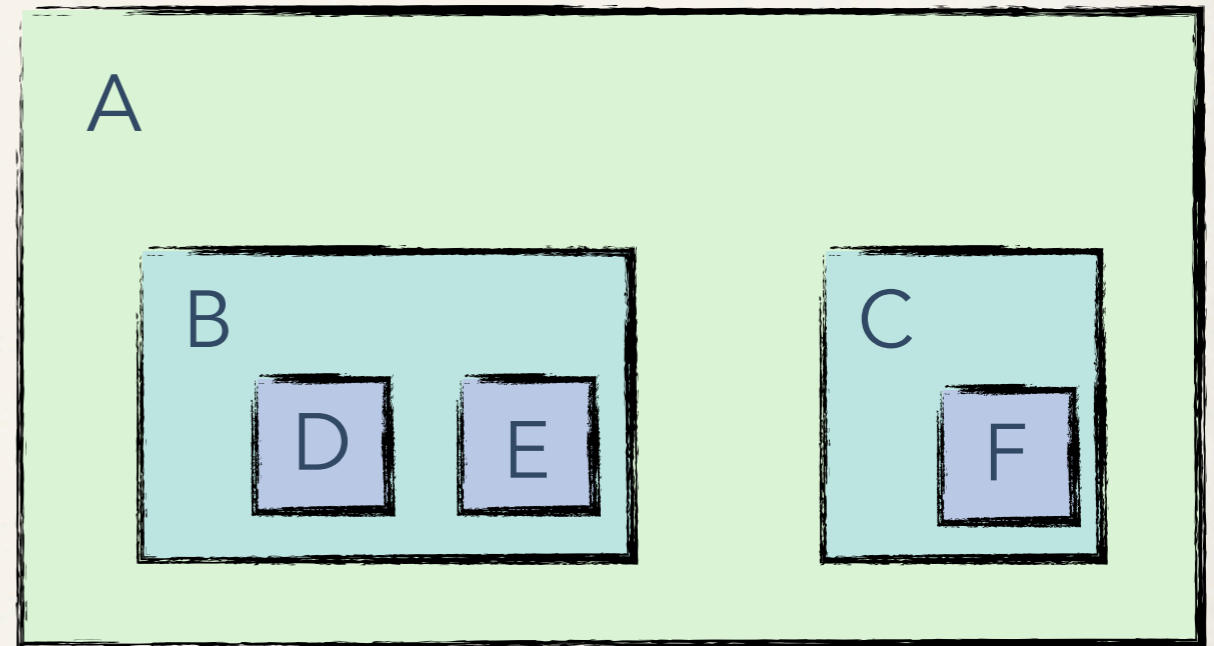


Card and Nation, "Degree-of-Interest Trees: A Component of an Attention-Reactive User Interface"

Space filling trees

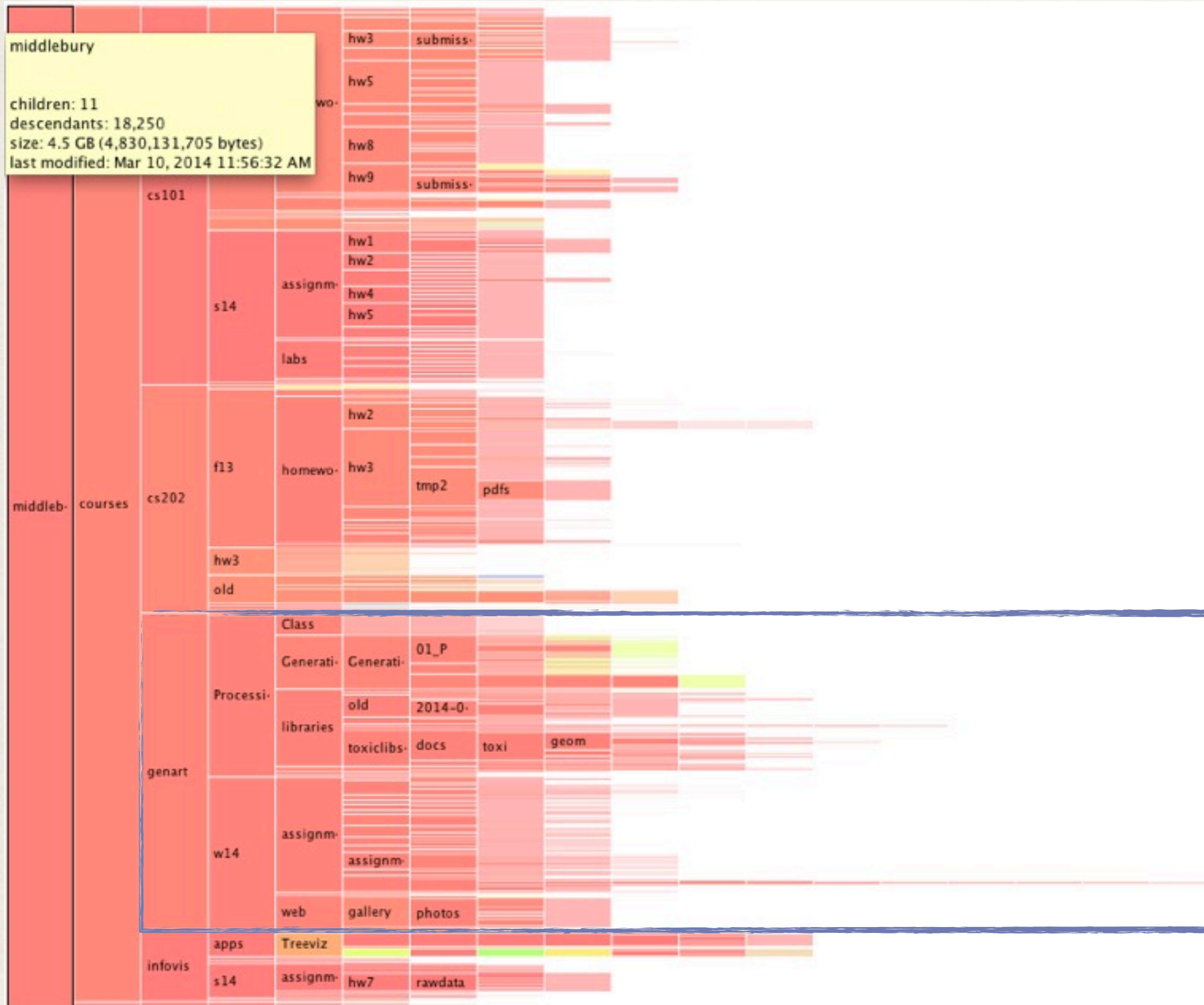


Connections

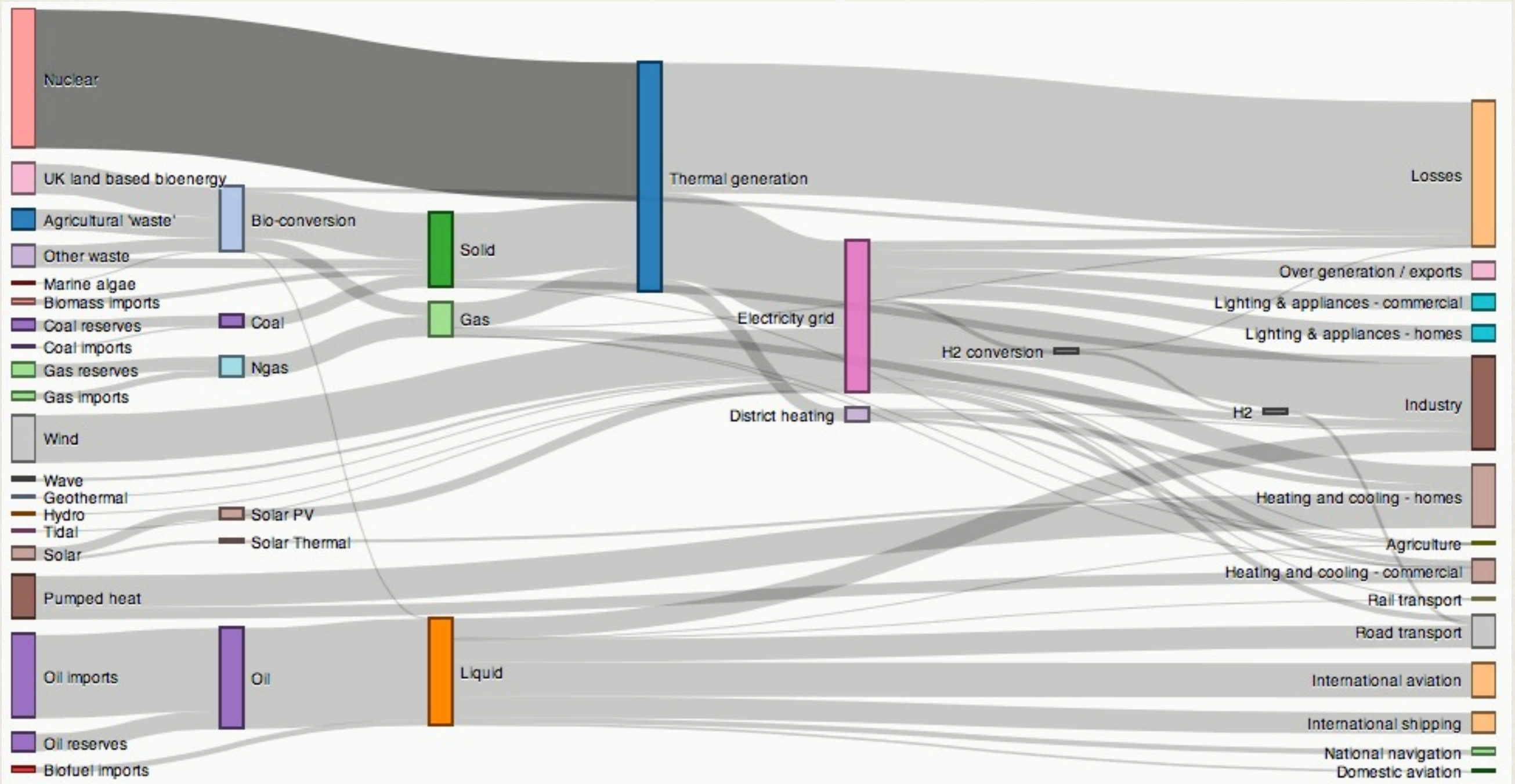


Containment

Icicle Plot



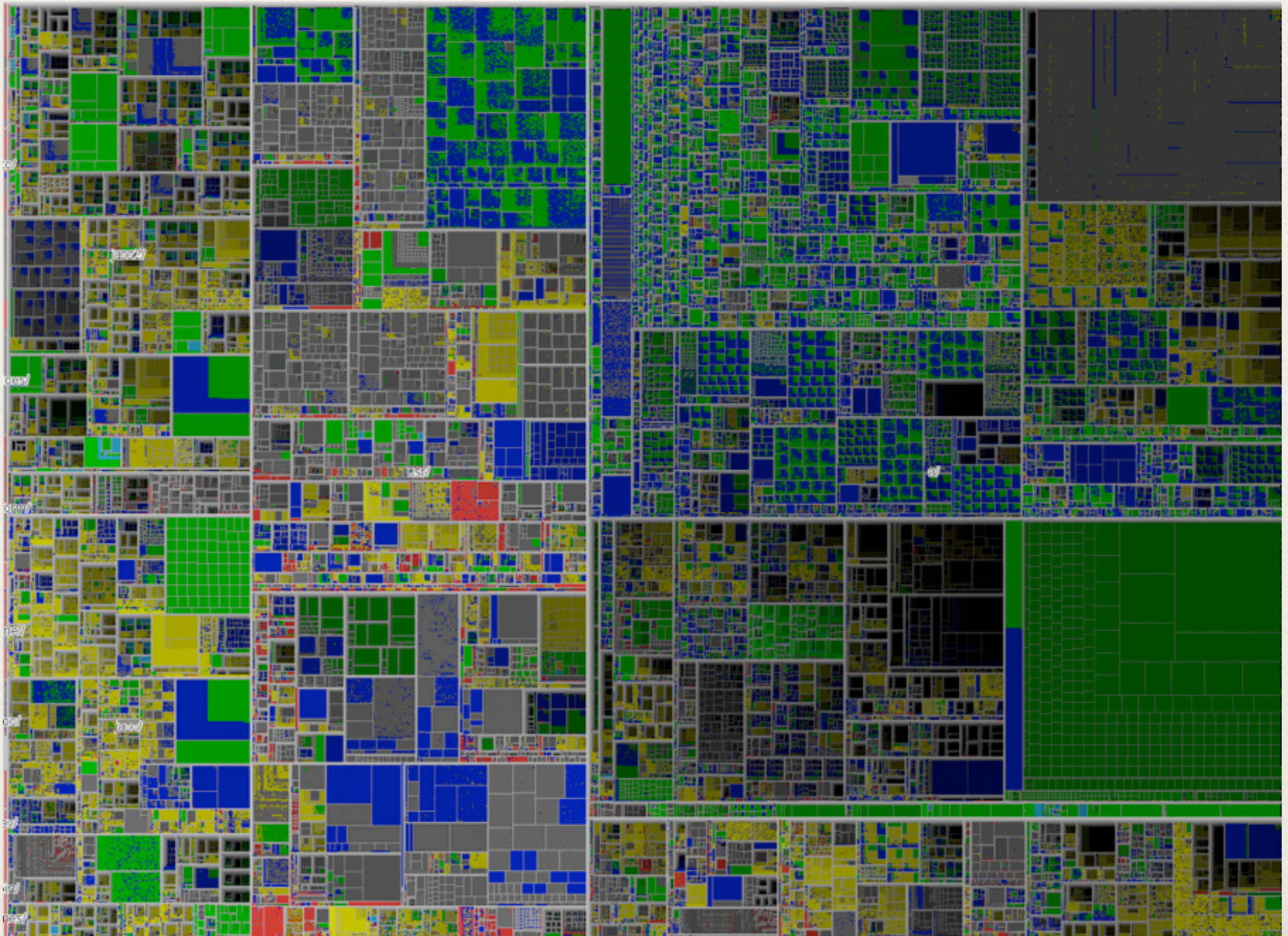
Aside: Sankey Diagram



<http://bost.ocks.org/mike/sankey/>

Treemaps

<http://www.cs.umd.edu/hcil/VisuMillion/>



Building a treemap

```
makeTreeMap(node, orientation)
  for each child of node
    if orientation is vertical
      create rectangle with width scaled as proper
      percentage of node
      if child has children
        makeTreeMap(child, horizontal)
    else
      create rectangle with height scaled as proper
      percentage of node
      if child has children
        makeTreeMap(child, vertical)
```


Treemaps

Example: Sales figures (\$M)

North America

United States (\$200)

Canada (\$200)

Europe

Germany (\$150)

Austria (\$100)

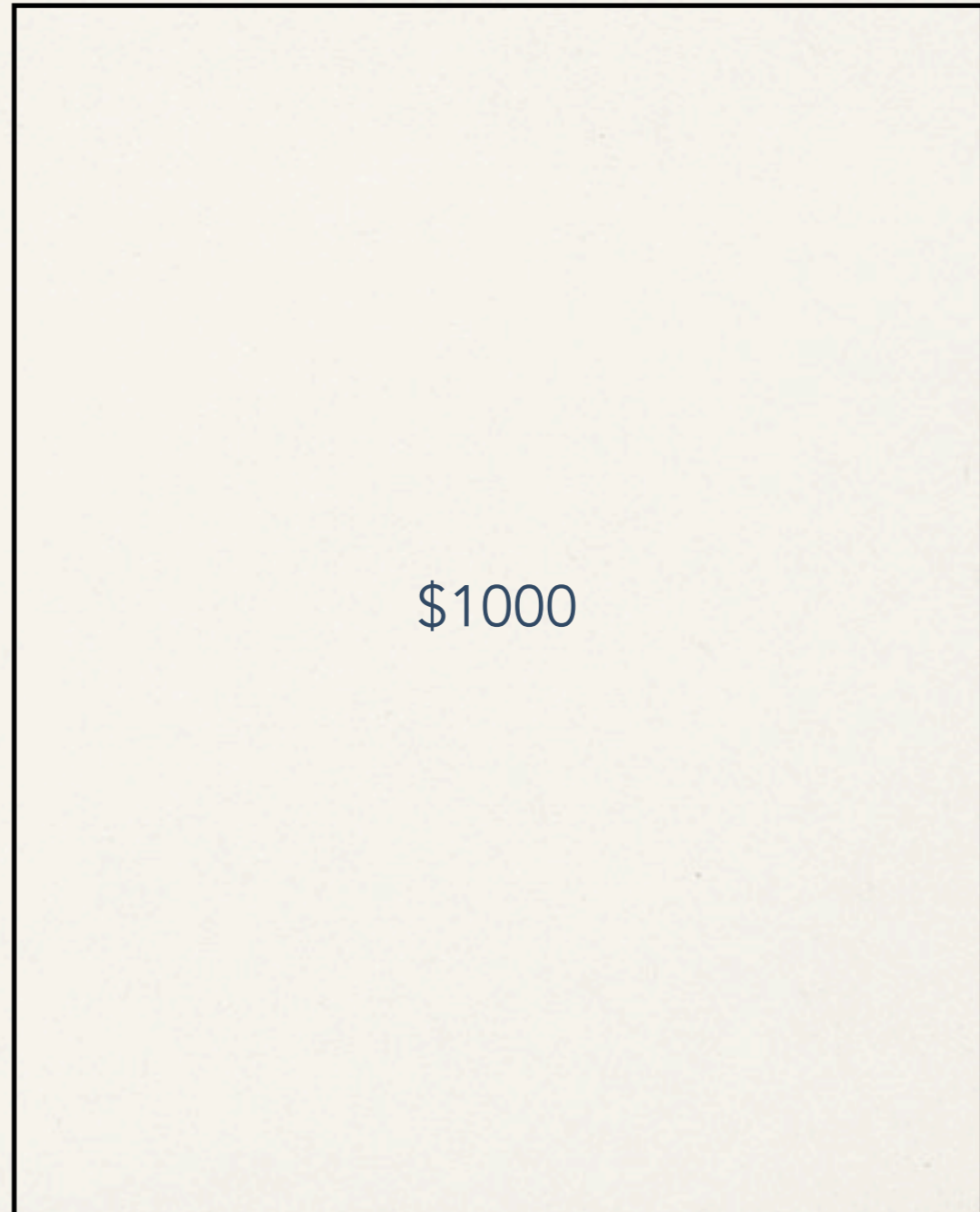
Russia (\$150)

Sweden (\$100)

Asia

S. Korea (\$50)

China (\$50)



Treemaps

Example: Sales figures (\$M)

North America (\$400)

United States (\$200)

Canada (\$200)

Europe (\$500)

Germany (\$150)

Austria (\$100)

Russia (\$150)

Sweden (\$100)

Asia (\$100)

S. Korea (\$50)

China (\$50)



borrowed from M. Porath

Treemaps

Example: Sales figures (\$M)

North America (\$400)

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Europe (\$500)

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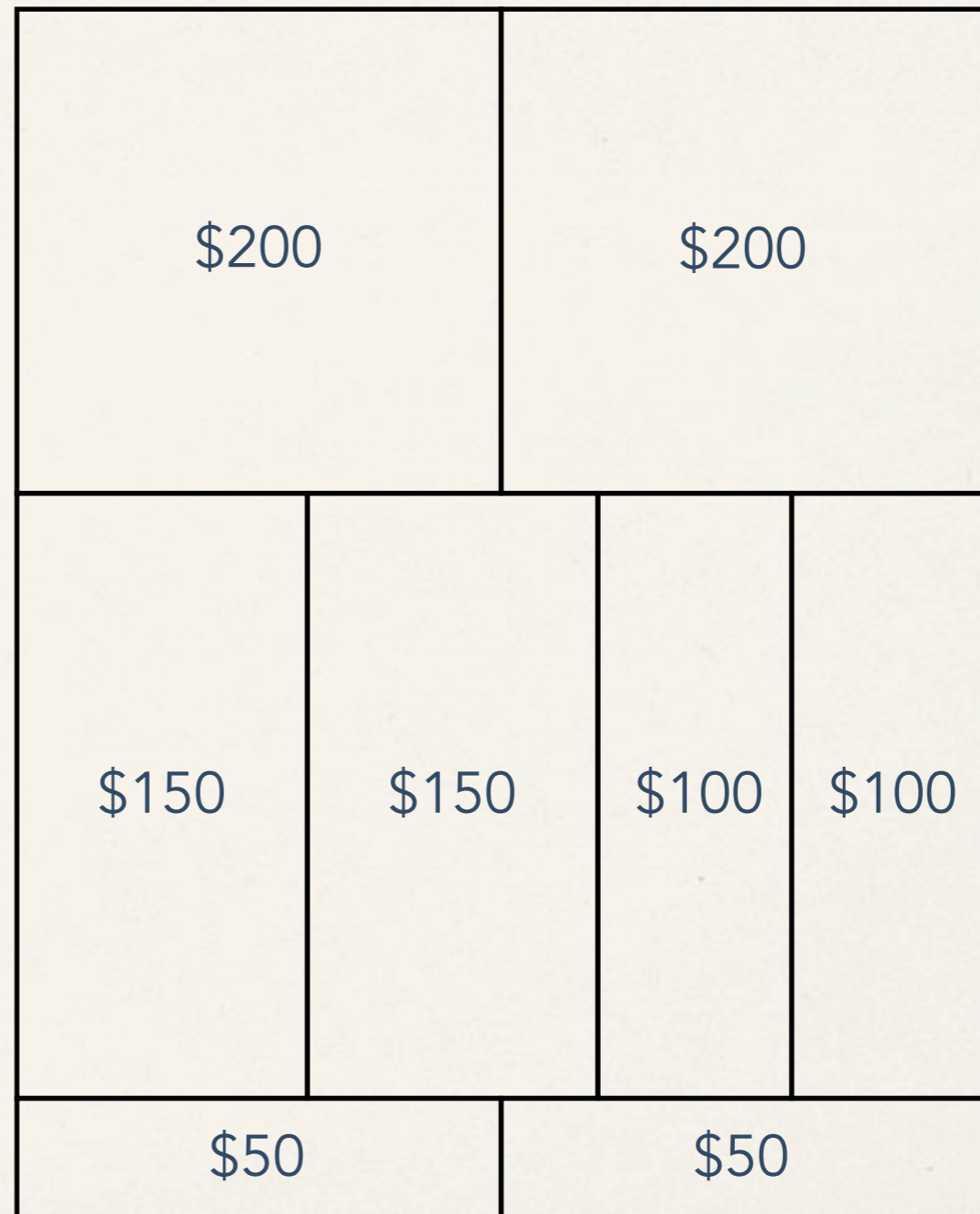
Russia (\$150)

Sweden (\$100)

Asia (\$100)

S. Korea (\$50)

China (\$50)



borrowed from M. Porath

Treemaps

Example: Sales figures (\$M)

North America (\$400)

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Austria (\$100)

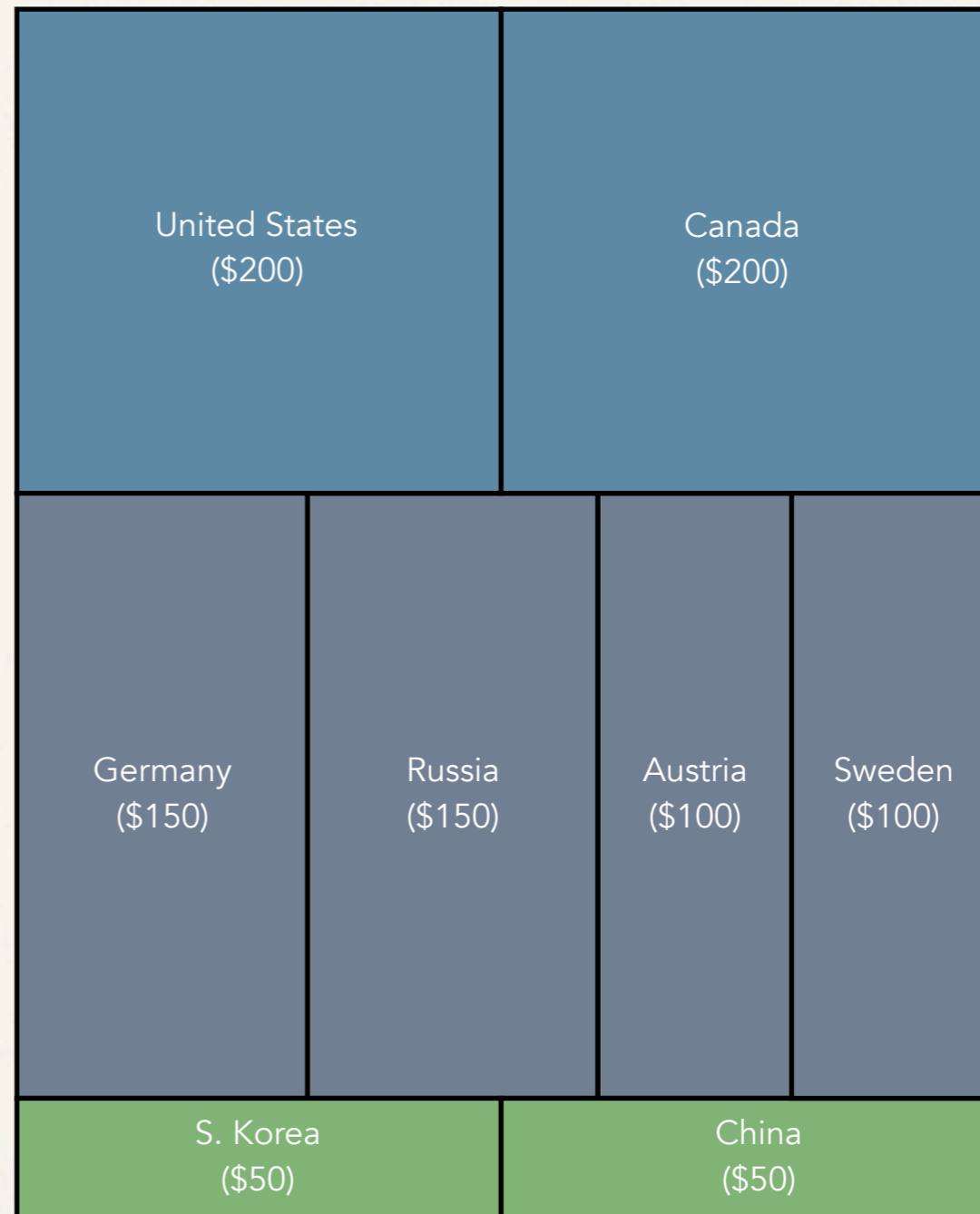
Russia (\$150)

Sweden (\$100)

Asia (\$100)

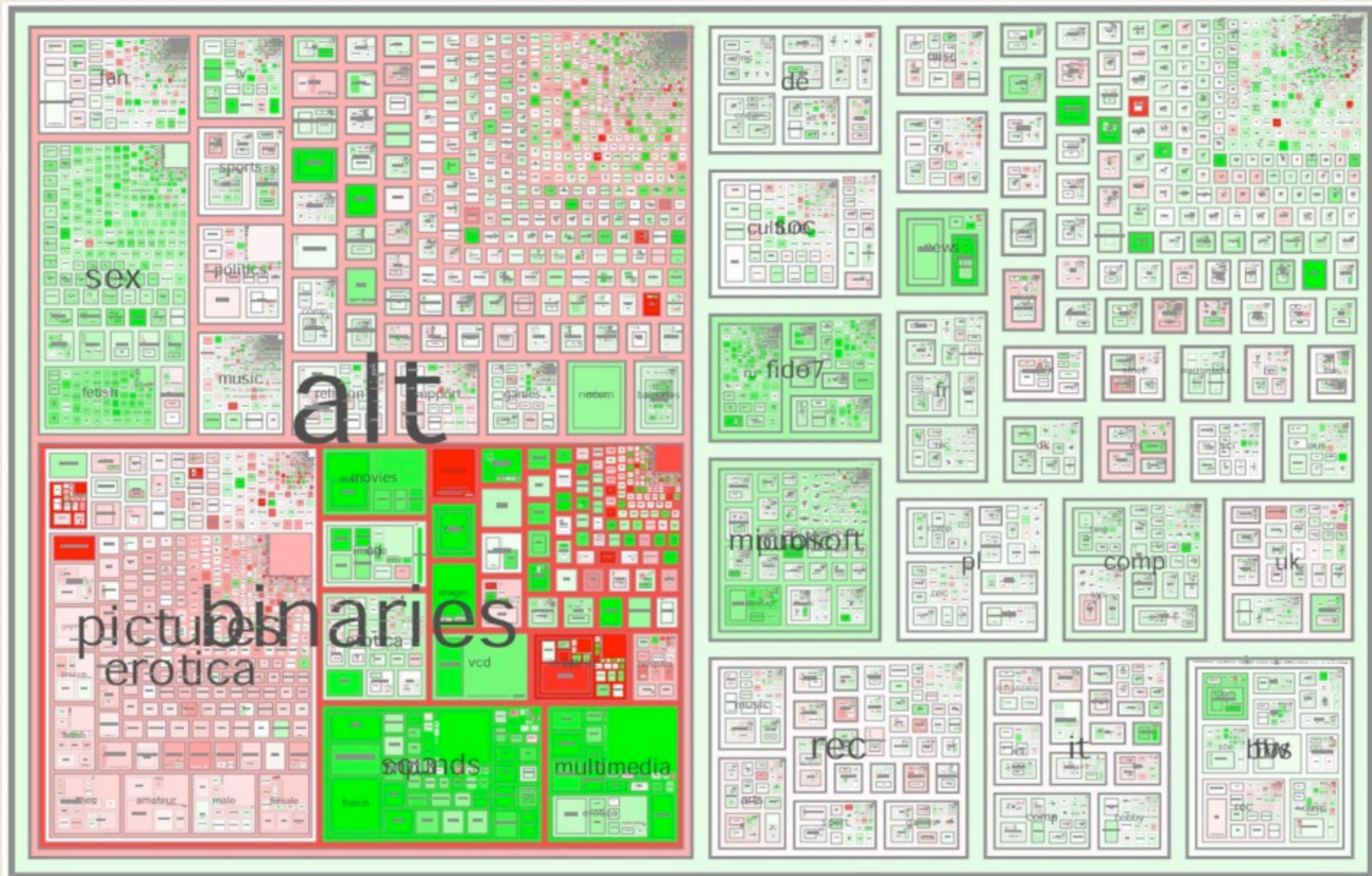
S. Korea (\$50)

China (\$50)

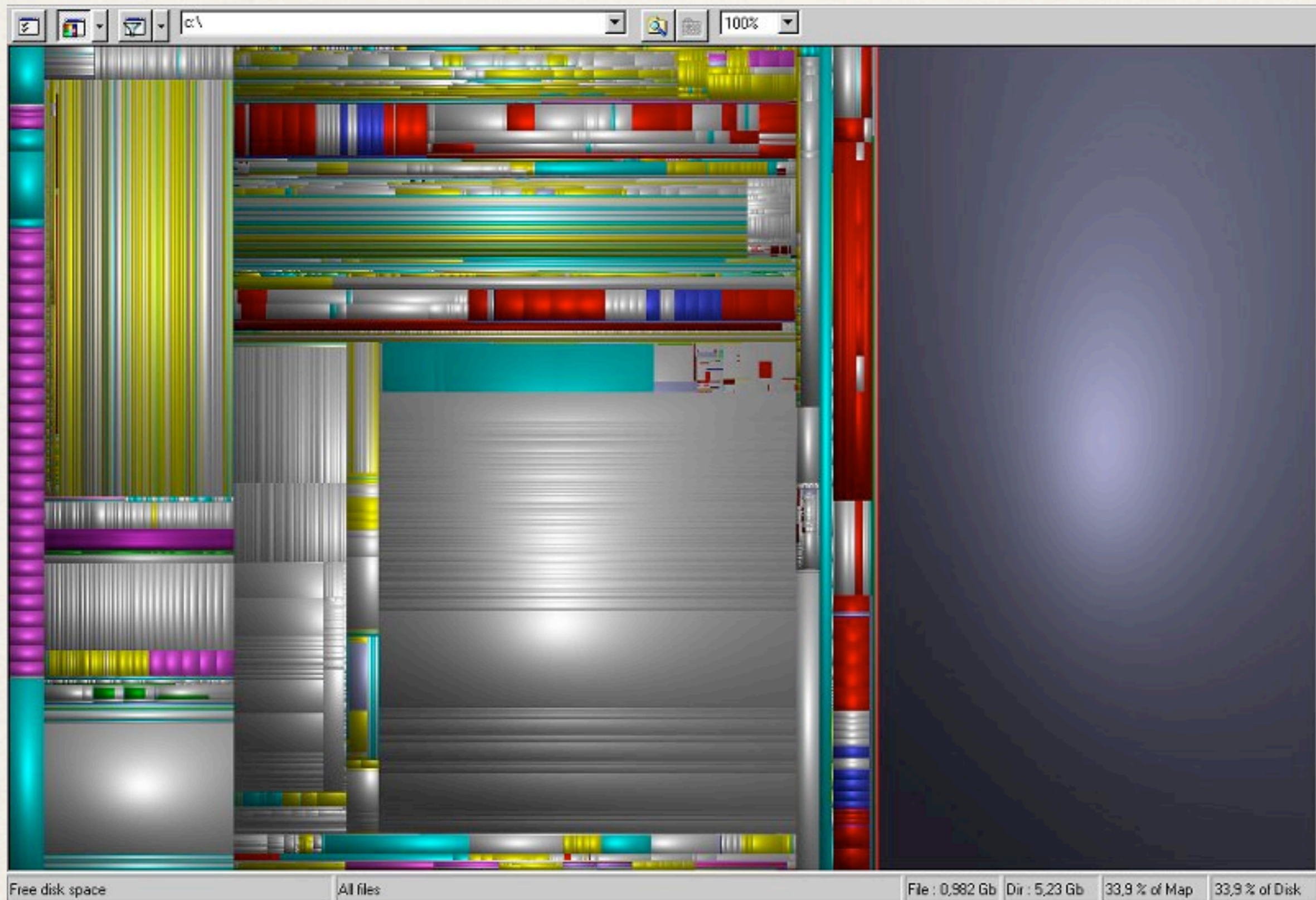


borrowed from M. Porath

Nested treemap

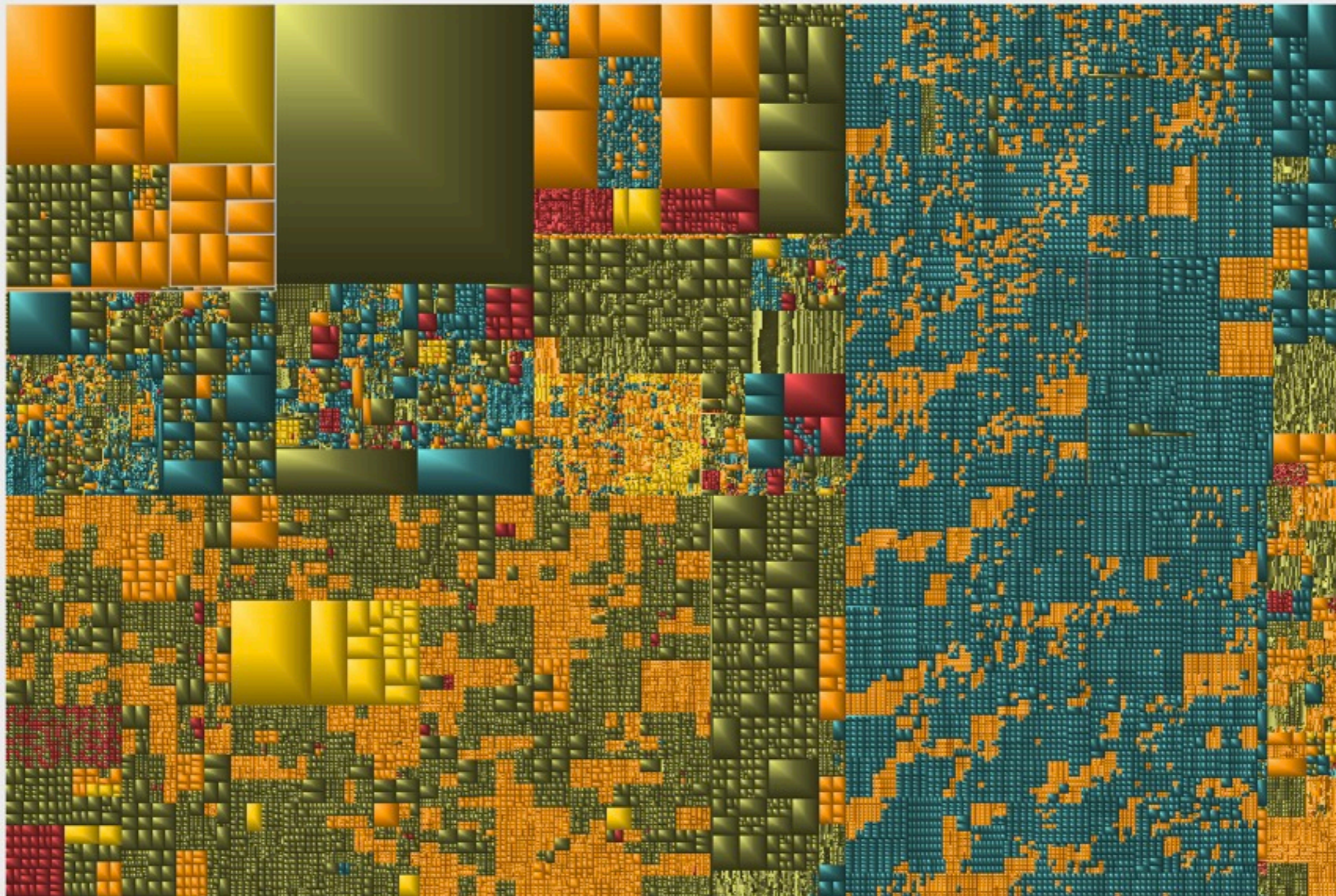


Cushion treemaps



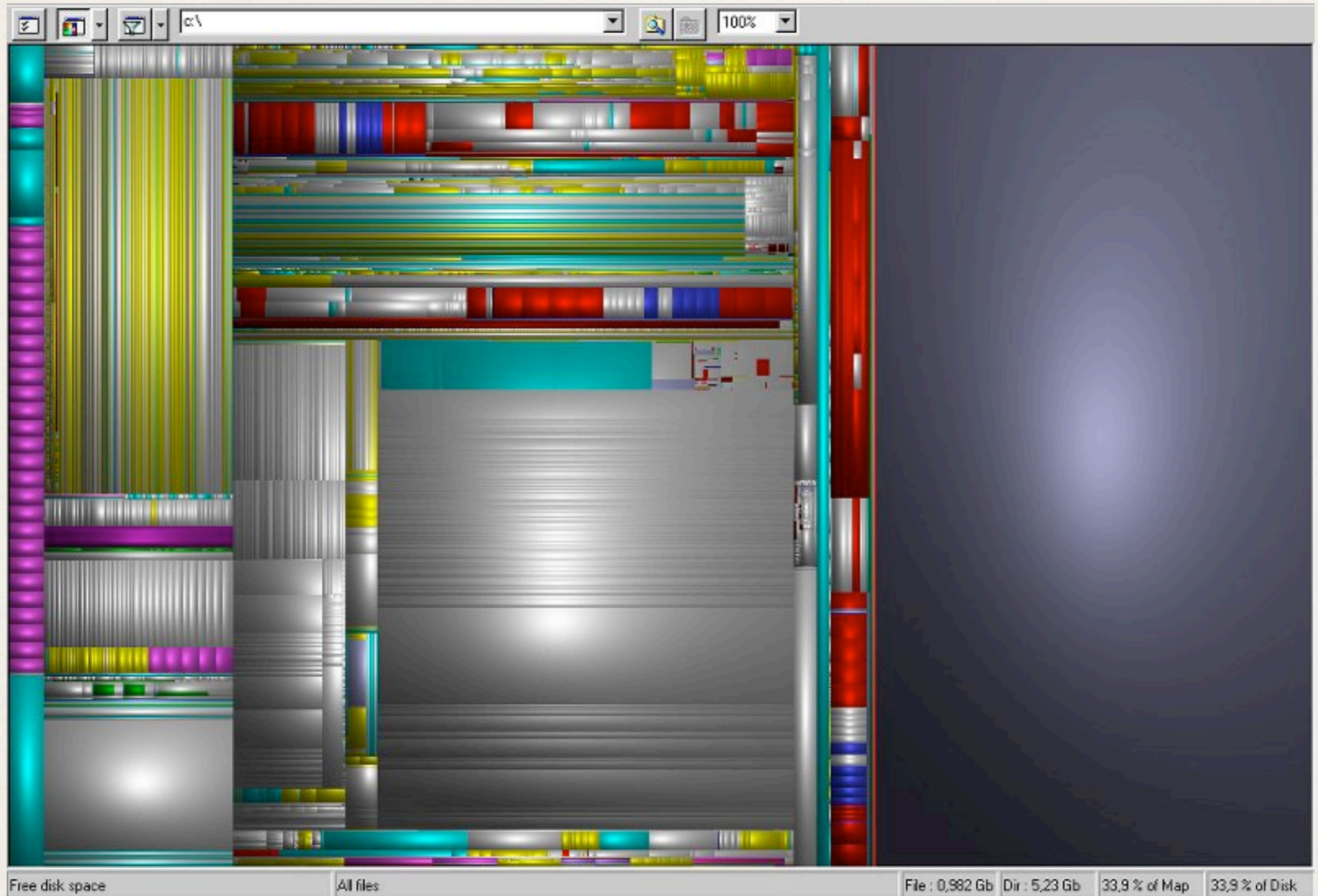
Sequoia View

Not a cushion treemap



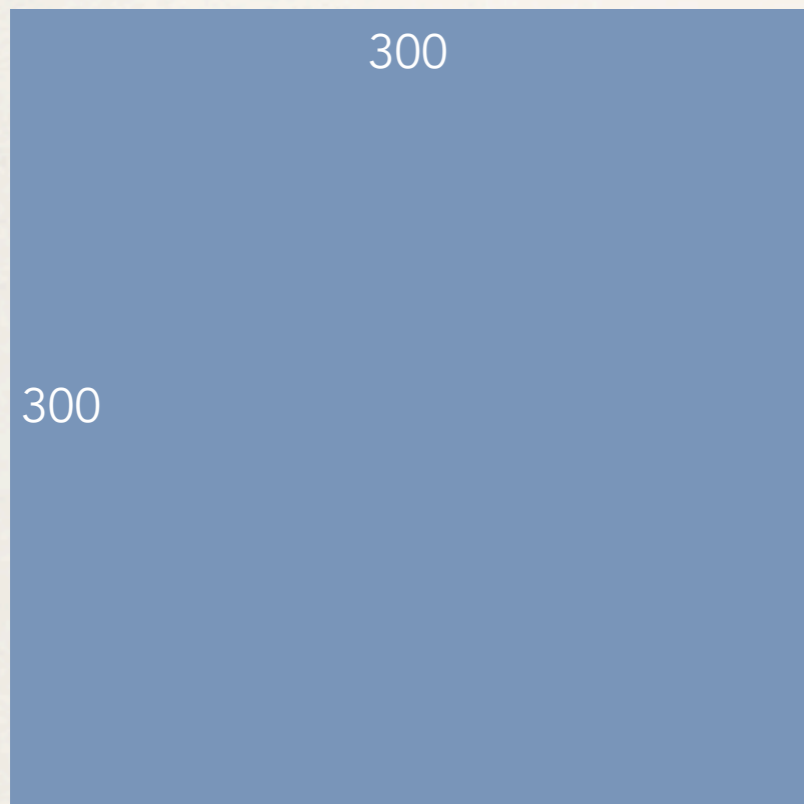
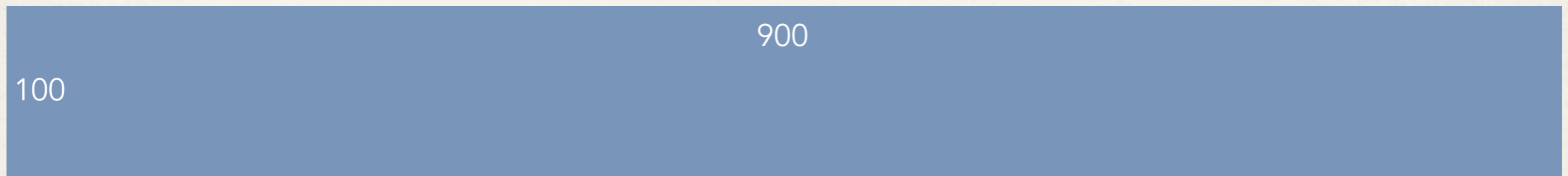
Grand Perspective

The aspect ratio problem...



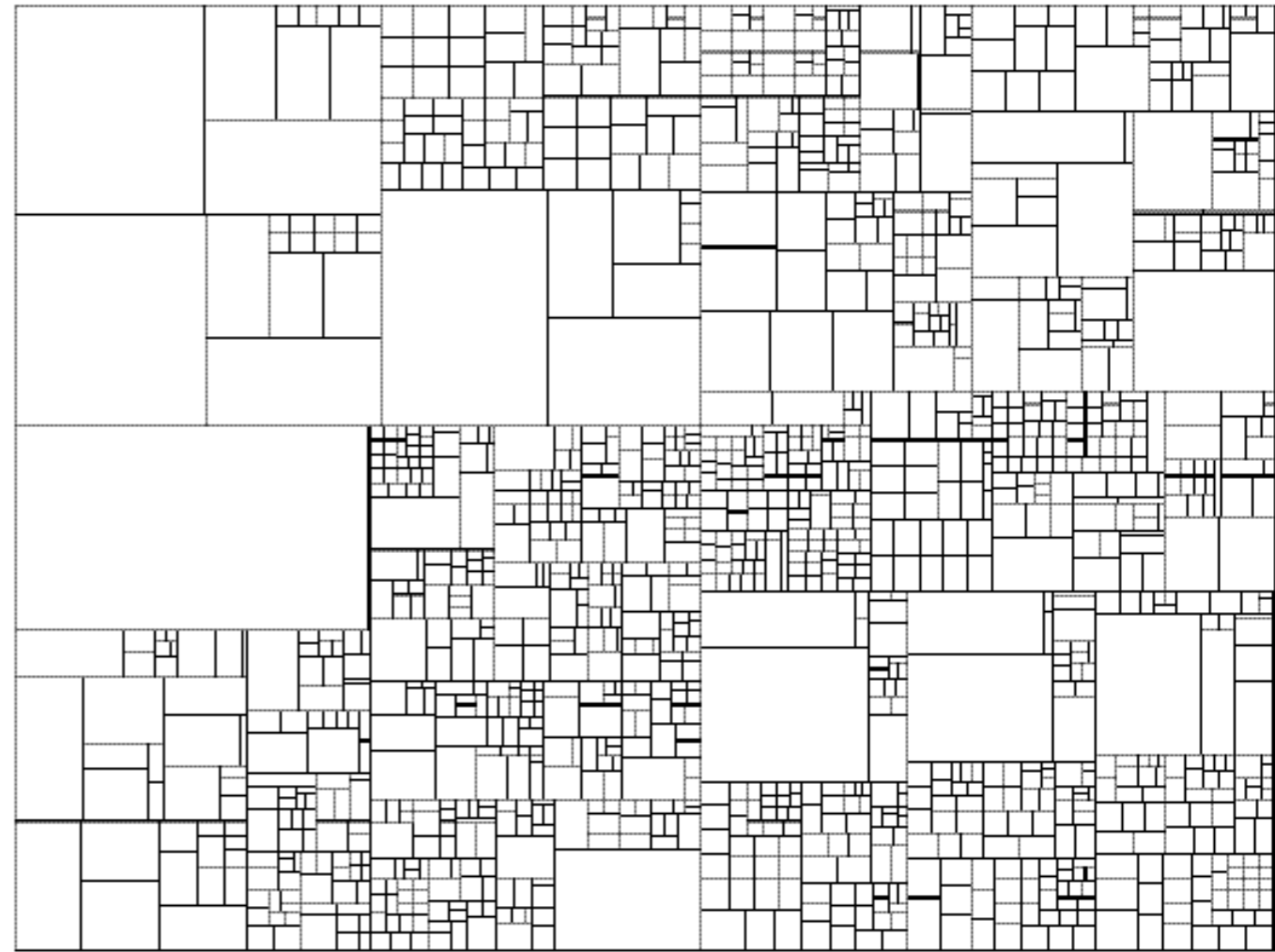
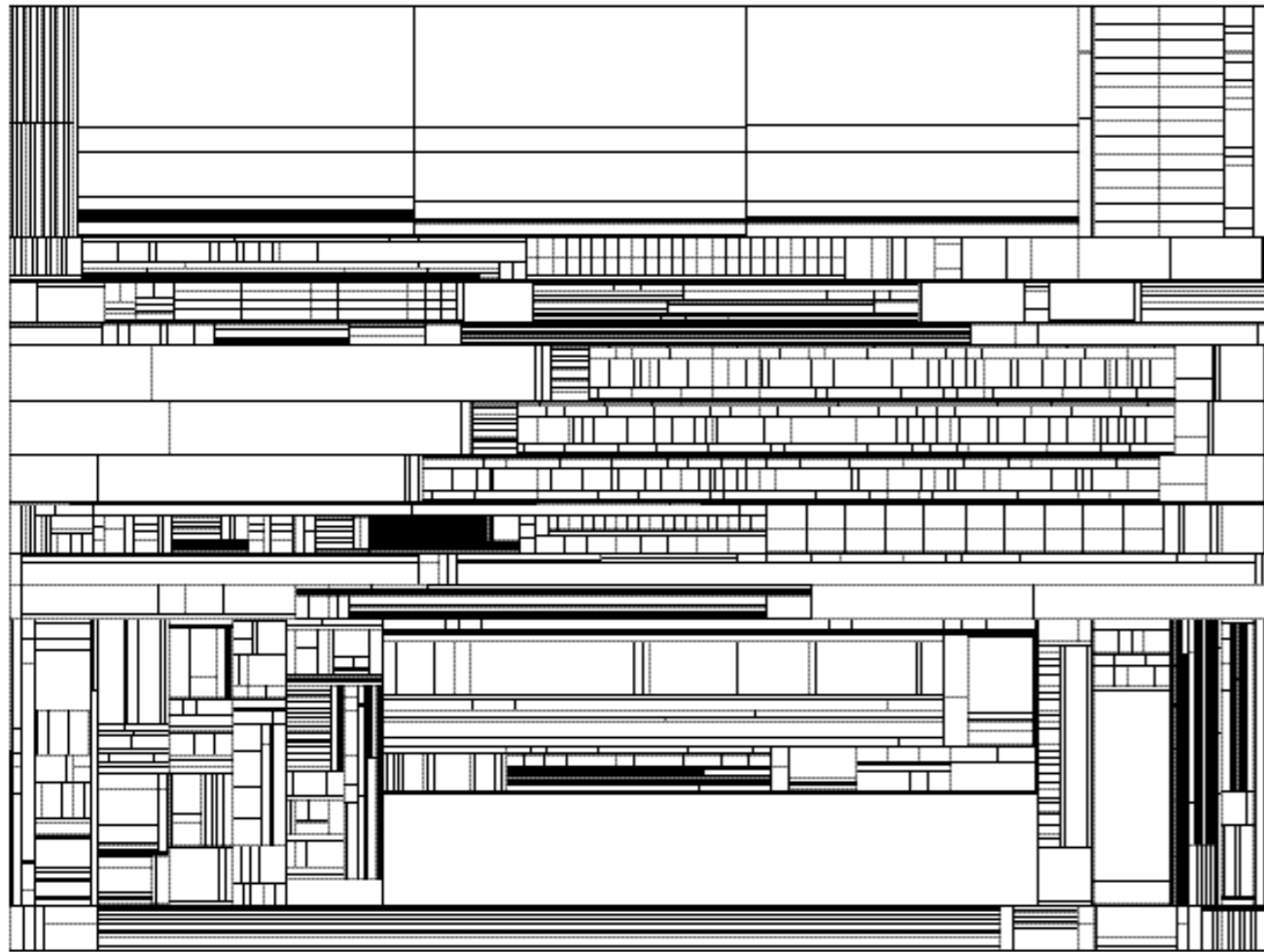
Sequoia View

The aspect ratio problem...

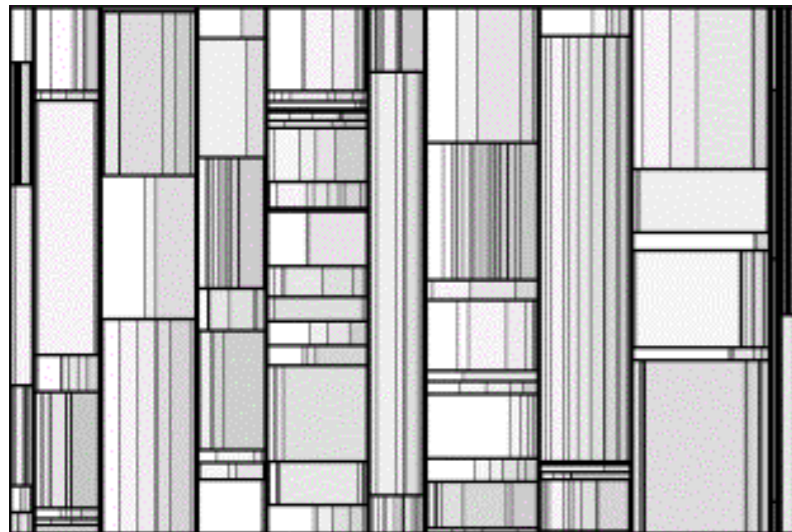


Which one is bigger?
Trick Question!

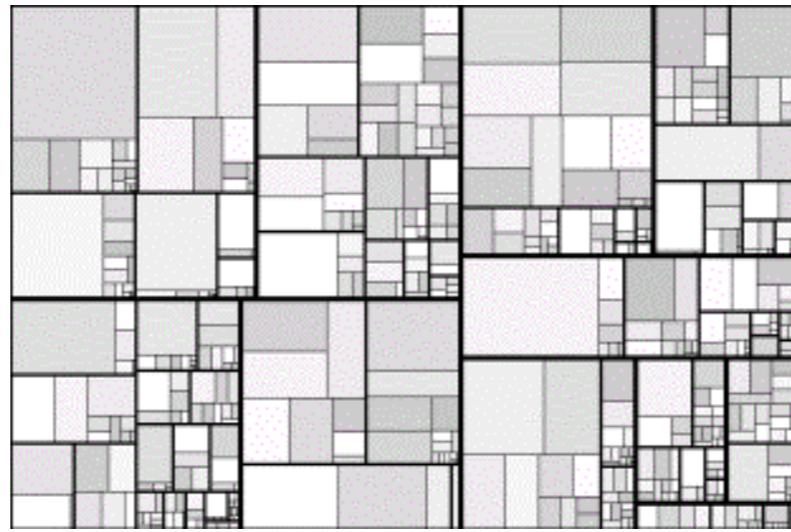
Squarified treemaps



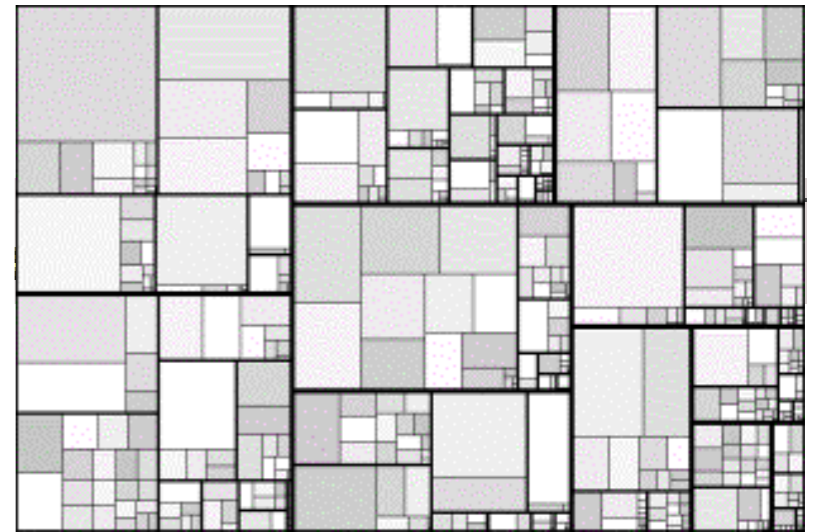
Even more approaches...



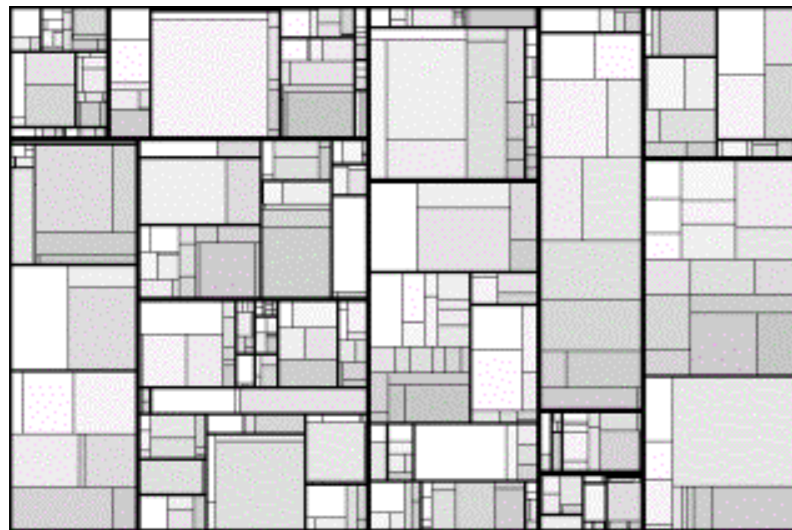
Slice-and-dice



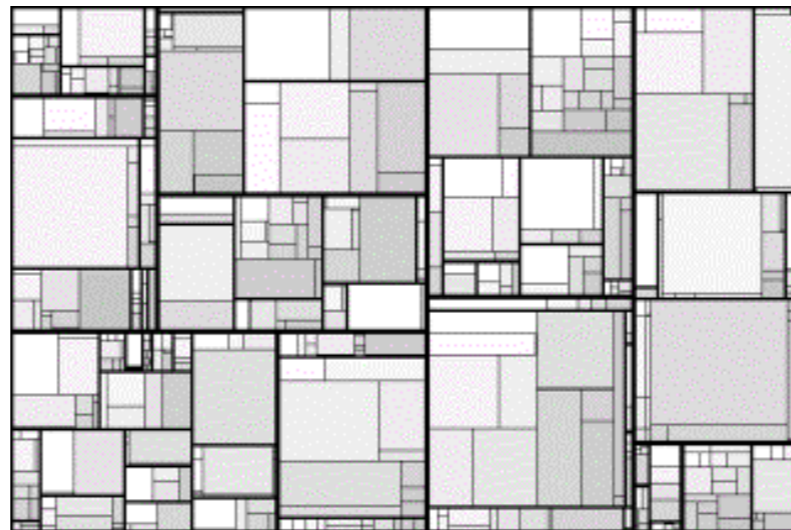
Cluster



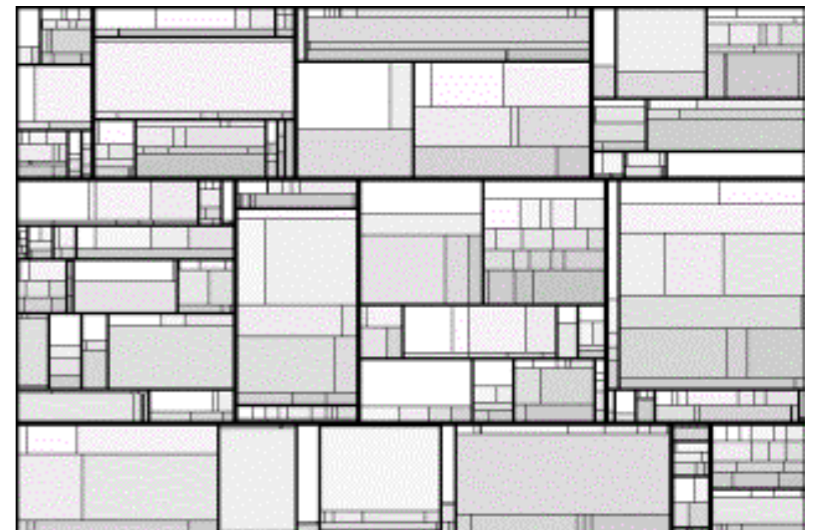
Squarified



Pivot-by-middle

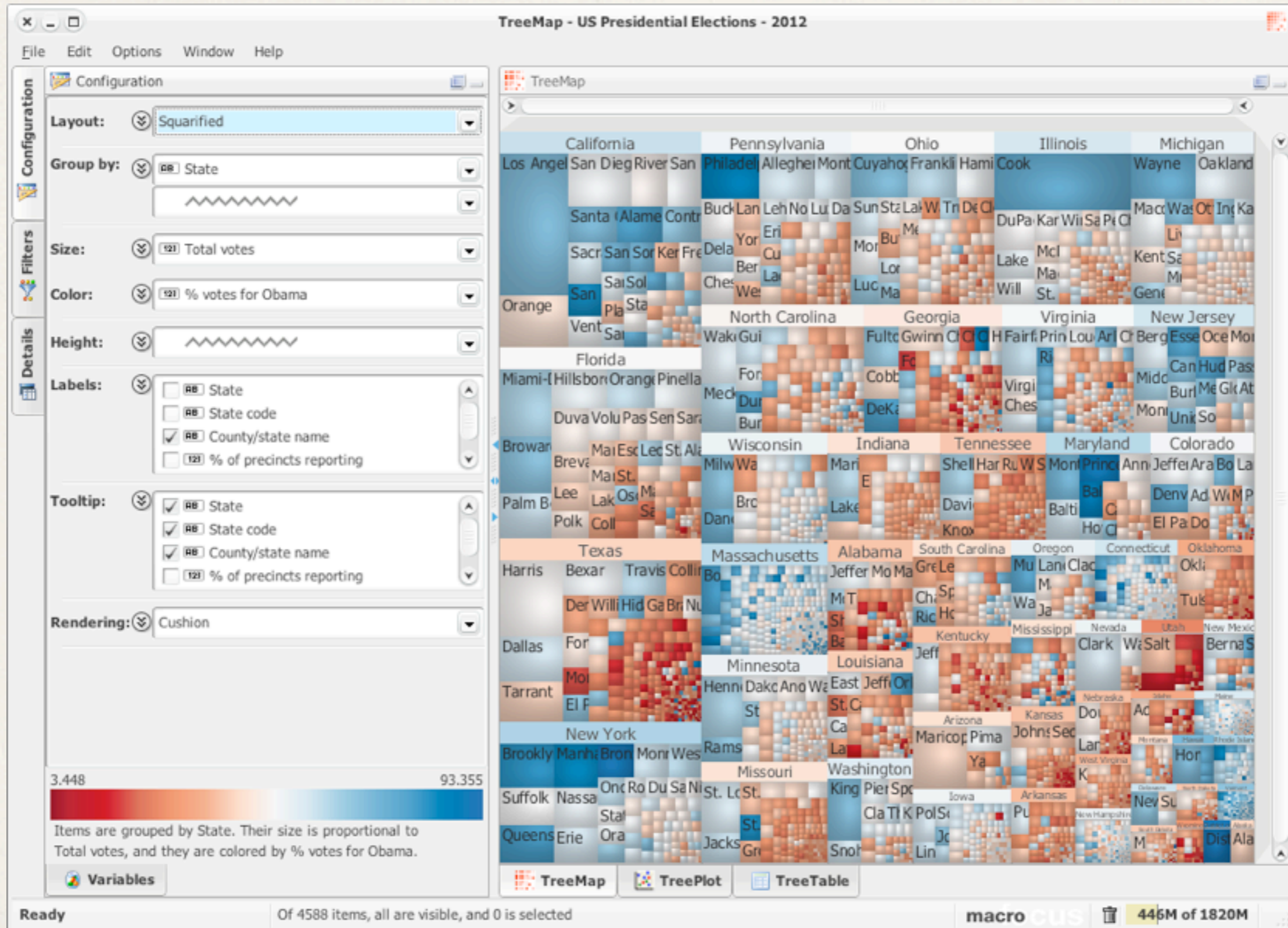


Pivot-by-size

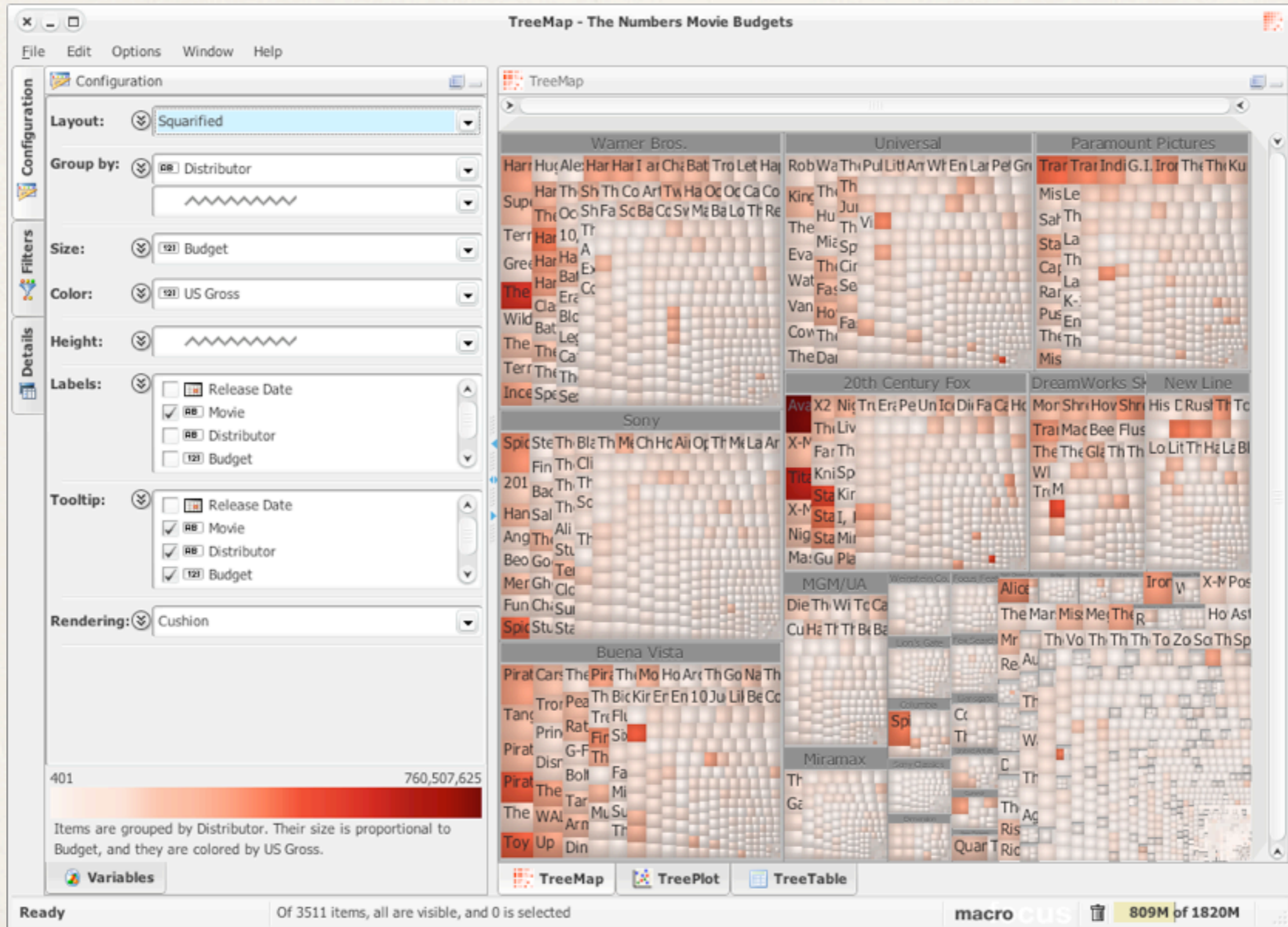


Strip

Example: Presidential election 2012



Example: Movie budgets



Example: News stories

http://newsmap.jp

Liverpool Edges Manchester City and Edges Toward Premier League Title

Spieth, 20, joins Watson atop Masters leaderboard

NASCAR: Harvick wins Sprint Cup race at Darlington in overtime

Jordan Spieth joins Bubba Watson on top at Masters

Sunday Notes: Ryan Zimmerman Out 4-6 Weeks

Rays place right-hander Alex Cobb on DL

Ryan Smyth sent out in style as Oilers beat Canucks 5-2

Lightning LW Ryan Malone busted for DUI, cocaine possession

Anatomy of a 9-2 record: Why the Brewers have baseball's best record

Comet claims Katowice Open title

Knicks officially eliminated from playoffs

Premier League: Swansea boss Garry Monk unhappy after Chico Flores' red card

Gray Stymies Seattle in Oakland's 3-1 Win

Five Cuts: Nats lose Zimmerman to broken thumb, divergent fortunes in the NL...

Dale Earnhardt Jr. doesn't want to hear how he almost won

Harden leads Rockets over Pelicans 111-104

Preview: Ducks at Kings

Facing regular starters to play vs. the underdog

Ukraine Launches 'Anti-Terrorist' Operation in Slovyansk

William returns to Christchurch with Kate

Kate Middleton Sips Wine in New Zealand, Quashing Pregnancy Rumors

FWC investigating bear attack near Orlando

Bigger, more rarefied Coachella offers revelers creature comforts

Plane Searchers Expand Visual Hunt as Black Boxes Remain Silent

'This would never have happened pre-Diana'

No brother or sister for Prince George - yet

IPCC report: Climate needs swift shift to clean energy

Last minute tax tips as April 15 deadline nears

Marilyn Monroe Earrings Auctioned for \$185000

AP PHOTOS: Vatican, Holy Land mark Palm Sunday

Can Duchess Kate be pregnant if she's sipping wine?

Missing Plane's Black Box Batteries May Have Died

A Guide Through the Complexities of 401(k) Fees

Graceland issues more bonds, alternate success

Chance Of PG Audit Is The Lowest In Years

Mark Carter marries Lauren Hill but younger brother Aaron doesn't make it

Seahawk Hacks Saturday Night Live: All the Highlights

WTF? Jay Z and Beyonce Make Surprise Appearances at Coachella

Clutching palms, olive branches, faithful join pope at Holy Week's start in St...

36 killed in insurgent attacks across Iraq

Flight 370 search continues as black box ping fails

Funeral held for Florida soldier killed at Fort Hood

Ukraine to launch anti-terror operation

Rand Paul: US 'can't invite the whole world'

Black Bear Mauls Florida Woman, Gags Her Out of Gavage

Wile Nerd Best Space Stories of the Week - April 13, 2014

Cherry Trees Museum six years early after a trip to space

Abdullah Leads Ghani in Afghan Presidential Poll Partial Results

Opposition PD-IPs deal with Western party clears way for Jokowi to govern

Dear Rebecca prosecutor, known as 'pabul', makes his mark

Fire destroys 500 homes in Yogyakarta

Supreme Court ruling sets of pace for bigger donations

Neighbors: Man Killed by Police After Not Dropping Gun Was Part of Hearing

Andrew Sullivan sparks ire of gay community over defense of former Winkler

Princess Nori a bit killed on same day as father's

Ancient Daddy Longlegs Had Extra Eyes

US Government Will Detail Internet

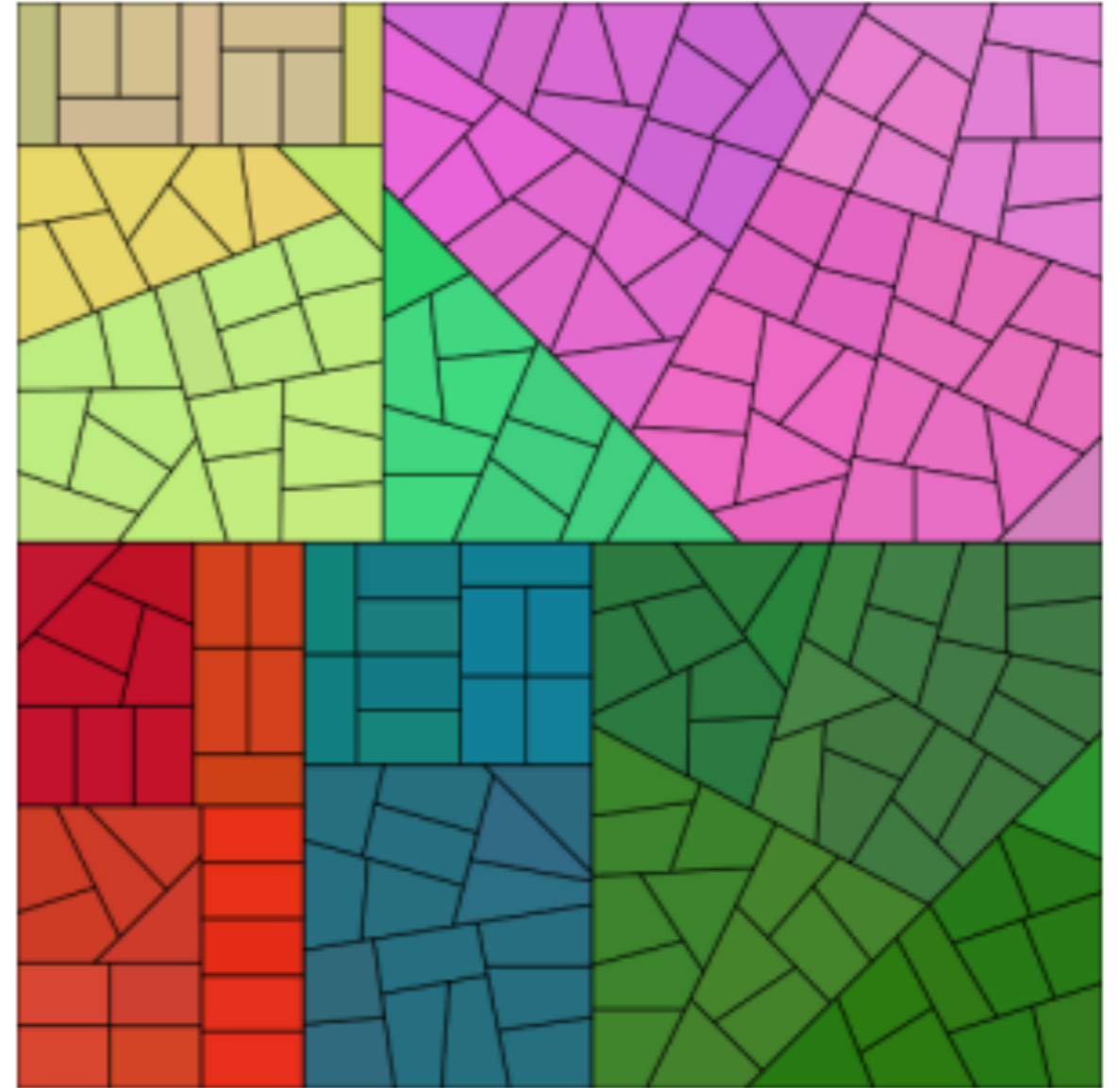
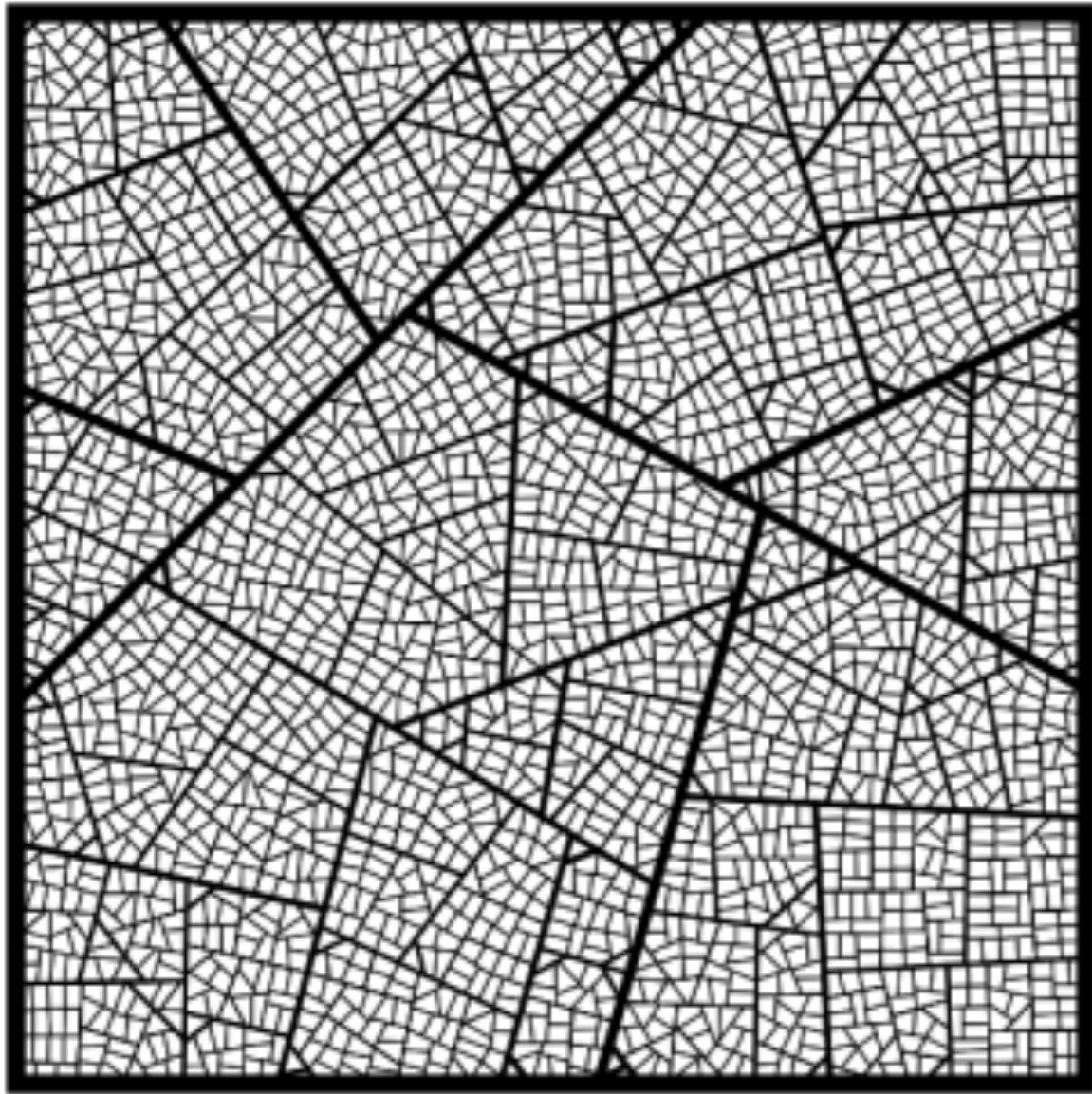
PG tactics to own

newsmap
Sun April 13, 2014 15:57:35
powered by Google™ hosting by heteml

SELECT ALL
[X] WORLD [X] NATIONAL [X] BUSINESS [X] TECHNOLOGY [X] SPORTS [X] ENTERTAINMENT [X] HEALTH

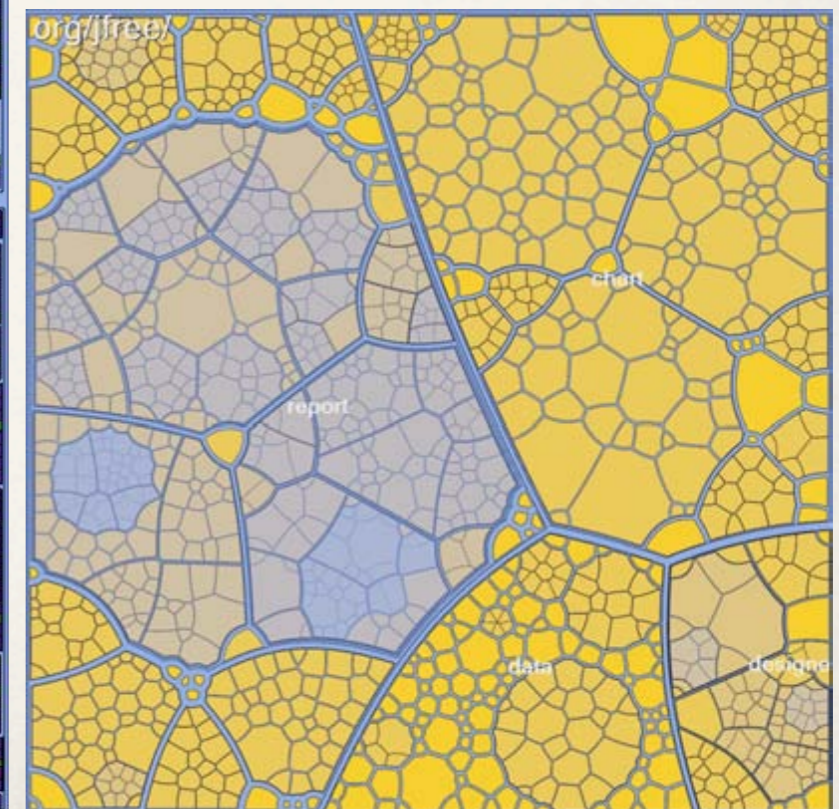
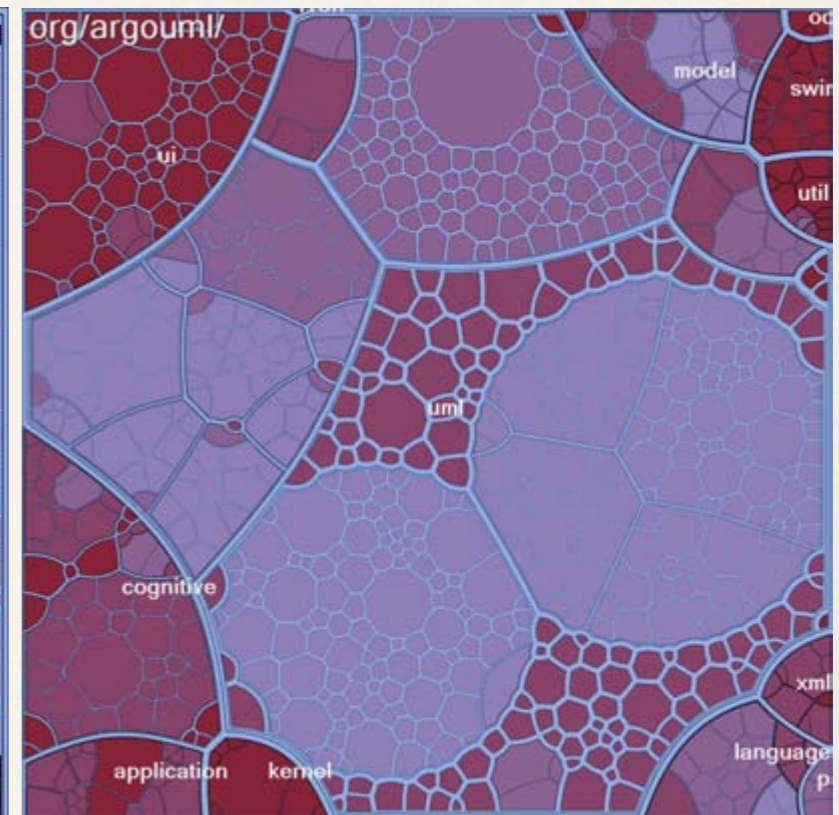
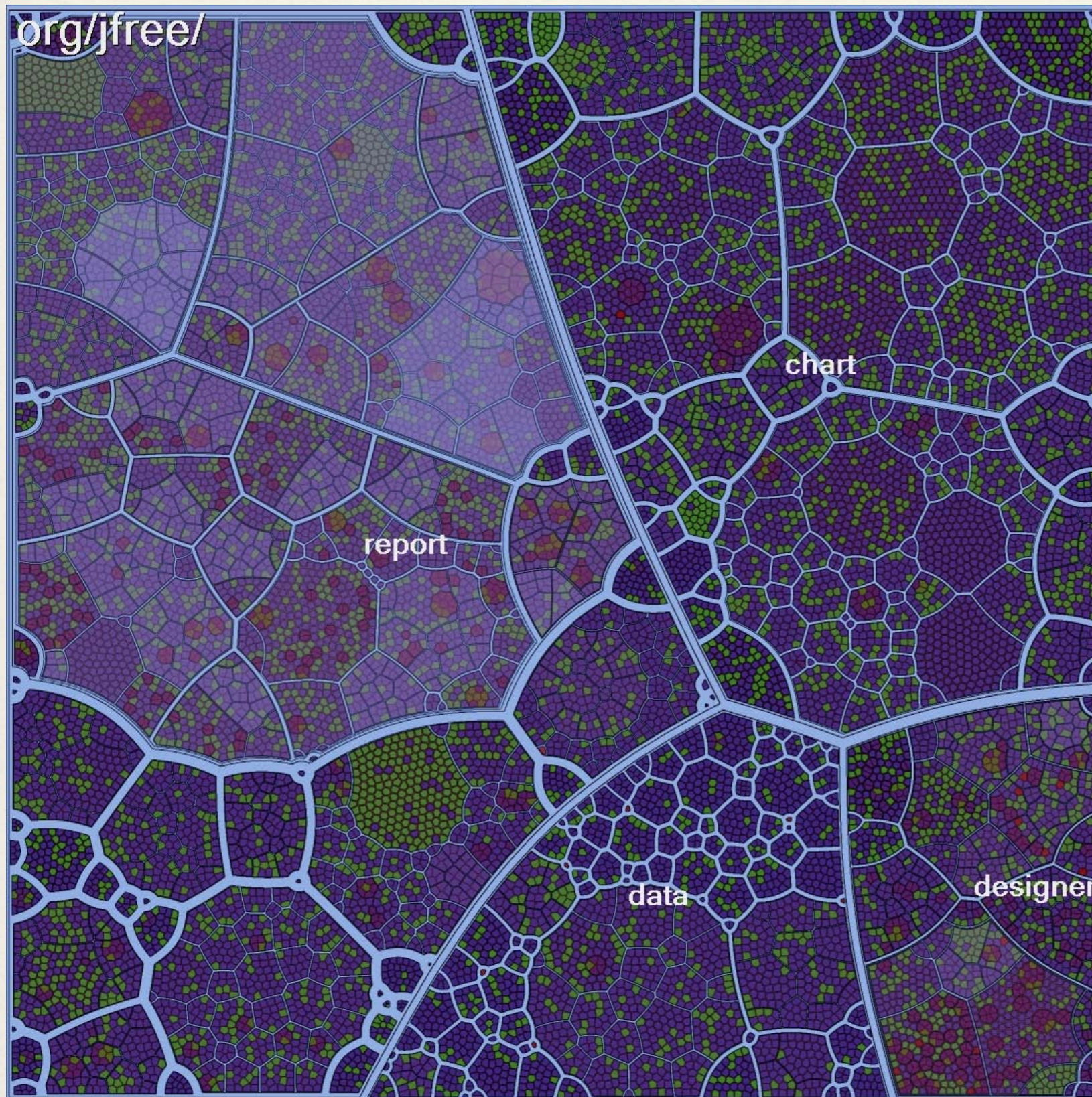
LESS THAN 10 MIN. AGO
MORE THAN 10 MIN. AGO
MORE THAN 1 HOUR AGO

Circular partition treemaps



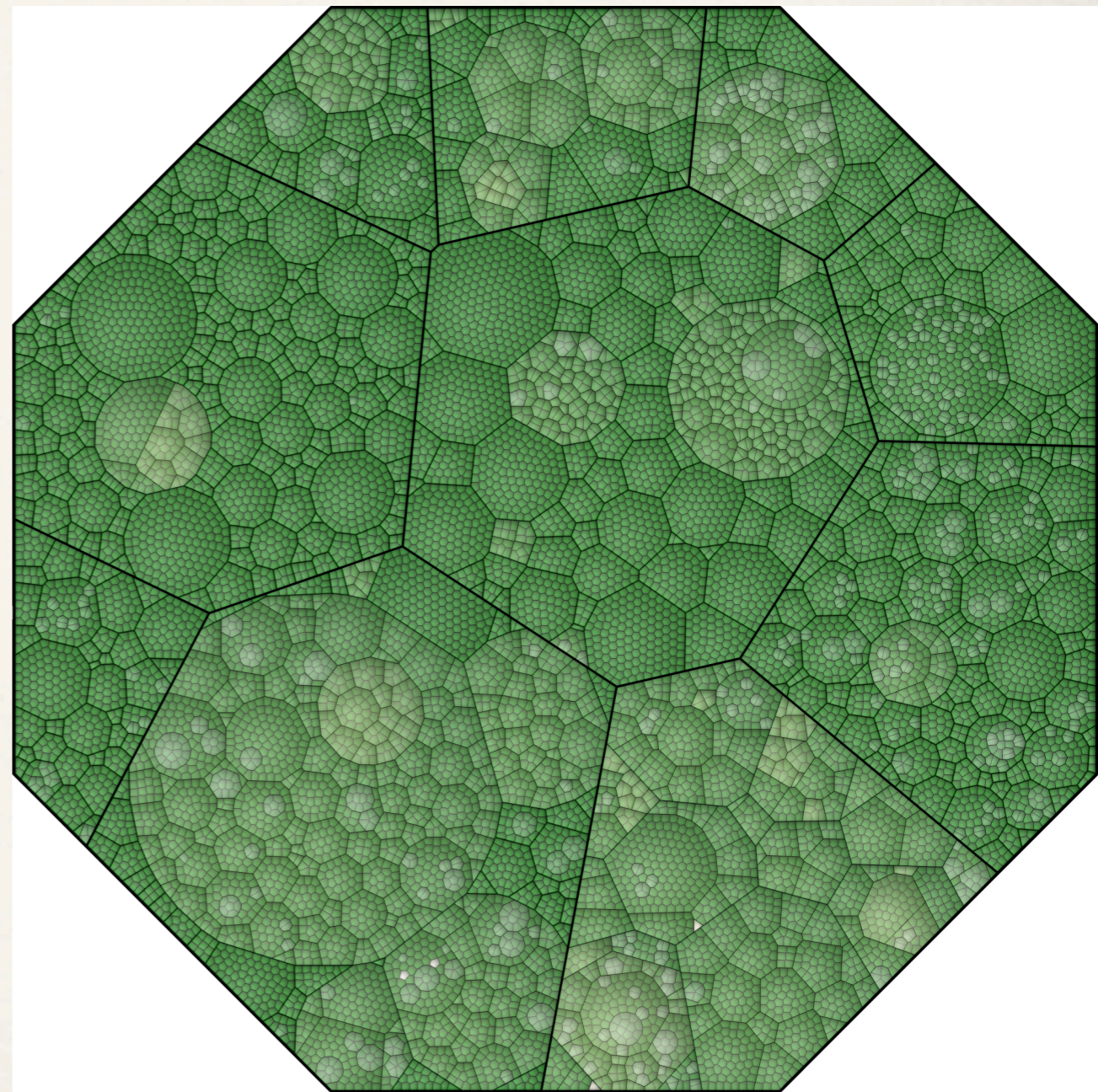
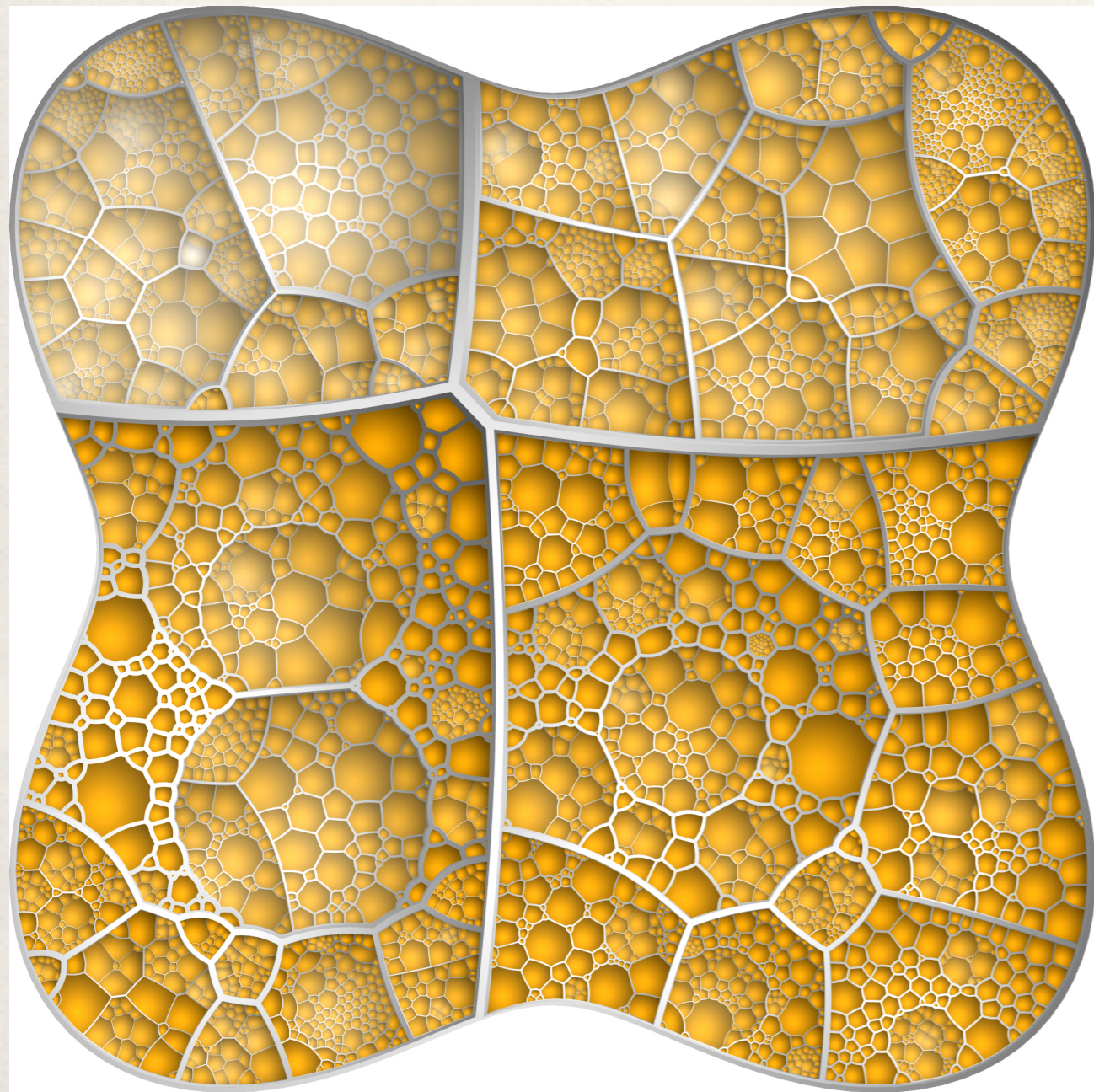
Onak and Sidiropoulos, "Circular Partitions with Applications to Visualization and Embeddings"

Voronoi treemaps

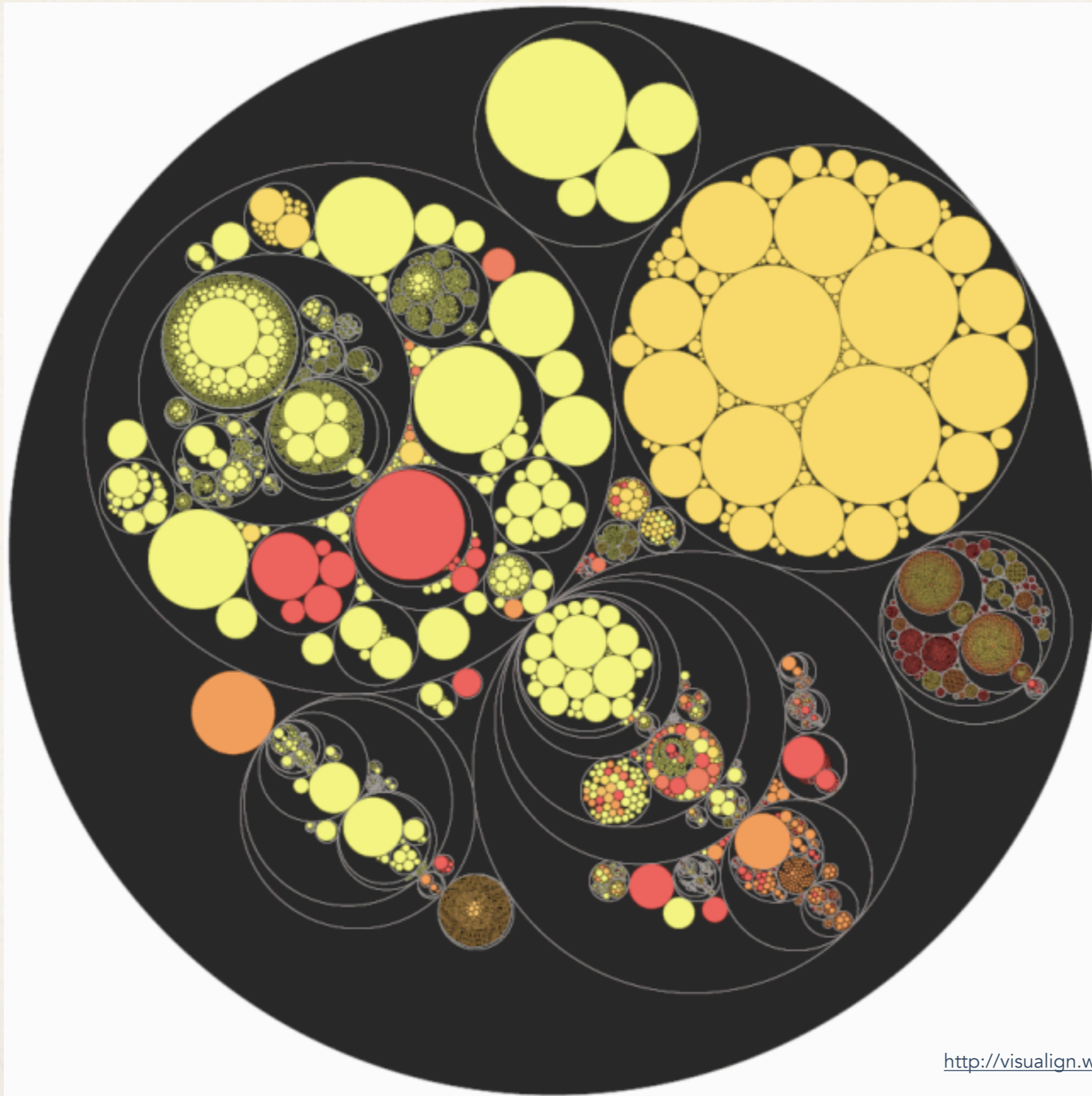


Balzer et al. "Voronoi Treemaps for the Visualization of Software Metrics"

Voronoi Treemaps

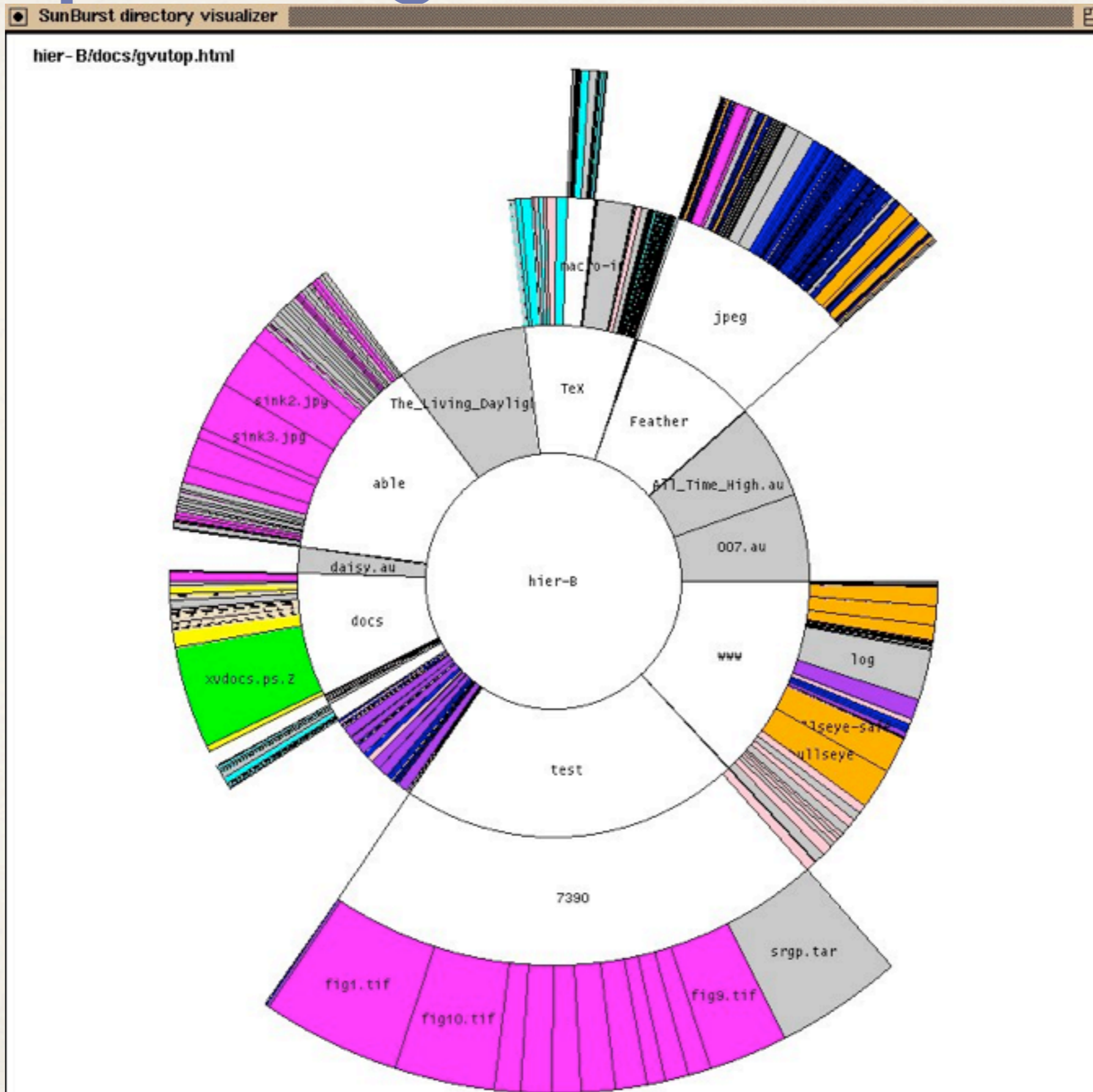


Circular treemaps



<http://visualign.wordpress.com/tag/treemap/>

Radial Space-filling



Demo: DaisyDisk

