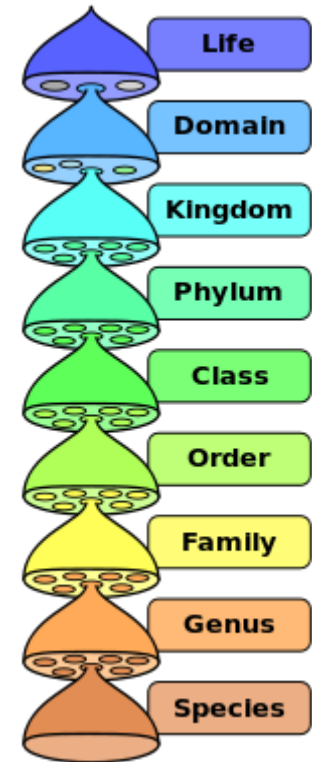


Tree Visualization

Hierarchical/Tree Data Visualization

Tree Data (Hierarchical Data)

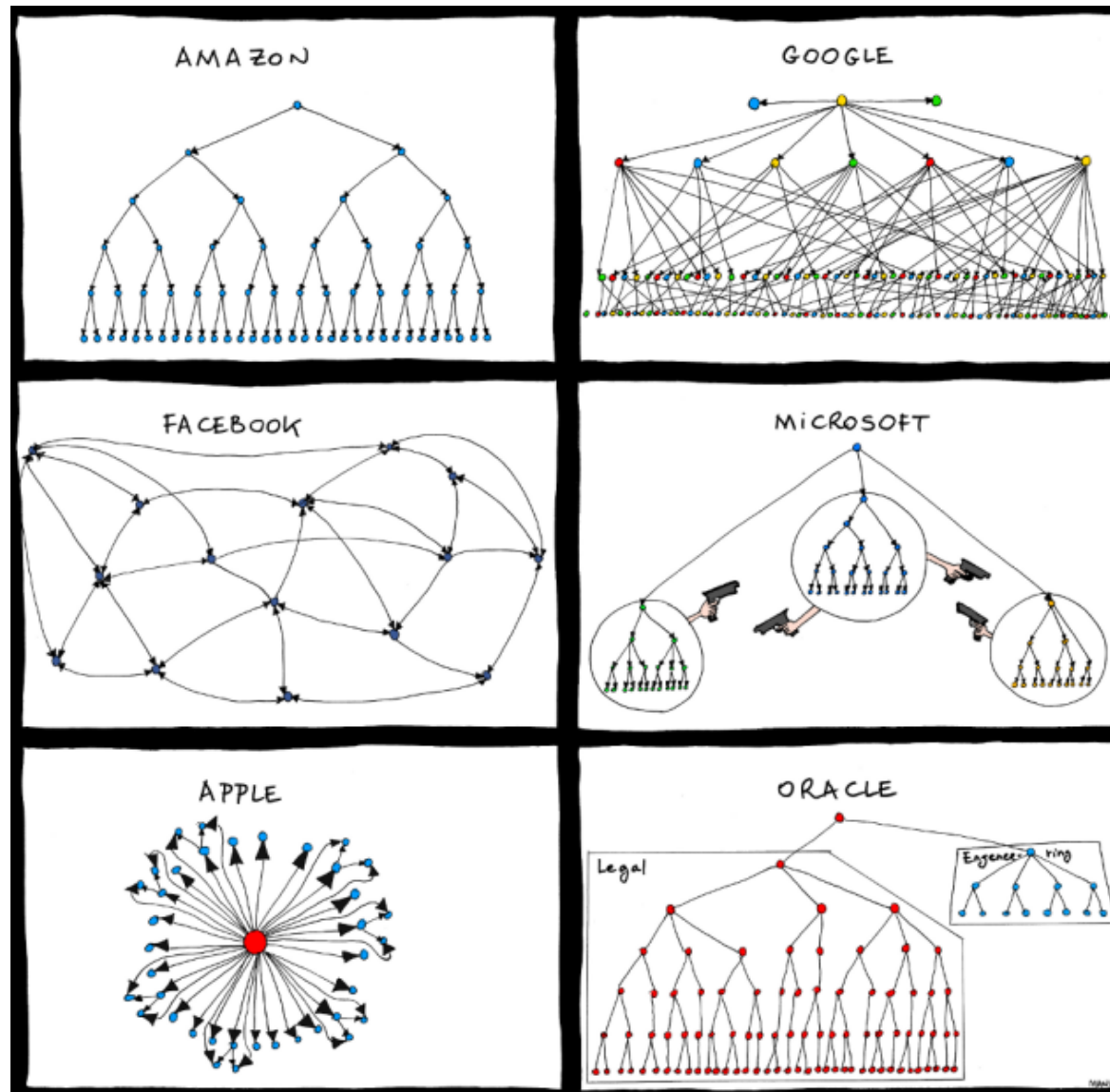
- Everywhere
 - Physical world
 - World, country, state/province, county, city/town, neighborhood
 - Social systems
 - Computing systems
 - File systems



Why Hierarchy?

- Each to manage large and complex systems.
- Interrelated subsystems inside a hierarchy
 - Semi-independent
 - Affecting each other through **what they do, not how they do**.
 - Only outcomes matter, not processes.

Visualization of Hierarchy

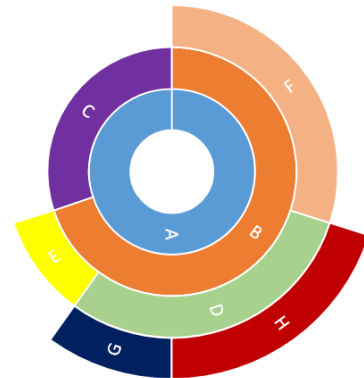
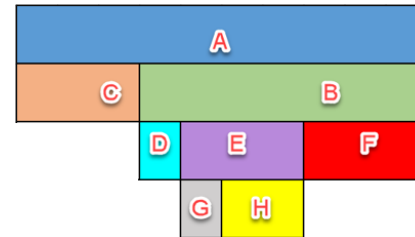
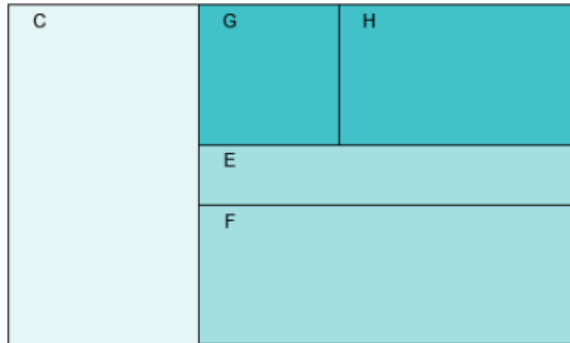
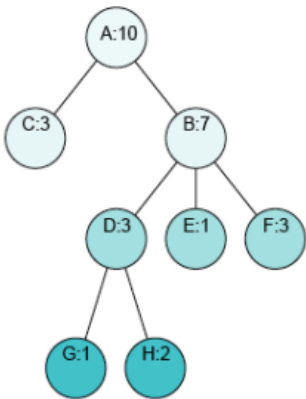


Major Challenges

- Limited screen space for a vast hierarchy
- What do people need to know about a hierarchy?
 - The location of a node
 - Its surrounding
 - Nodes above or below it
 - Its attributes

Classification of Tree Visualization Methods

- Node-link: structure clarity
- Space-filling: space efficiency
- Adjacency diagrams: hybrid of node-link and space-filling
- Others: sunburst

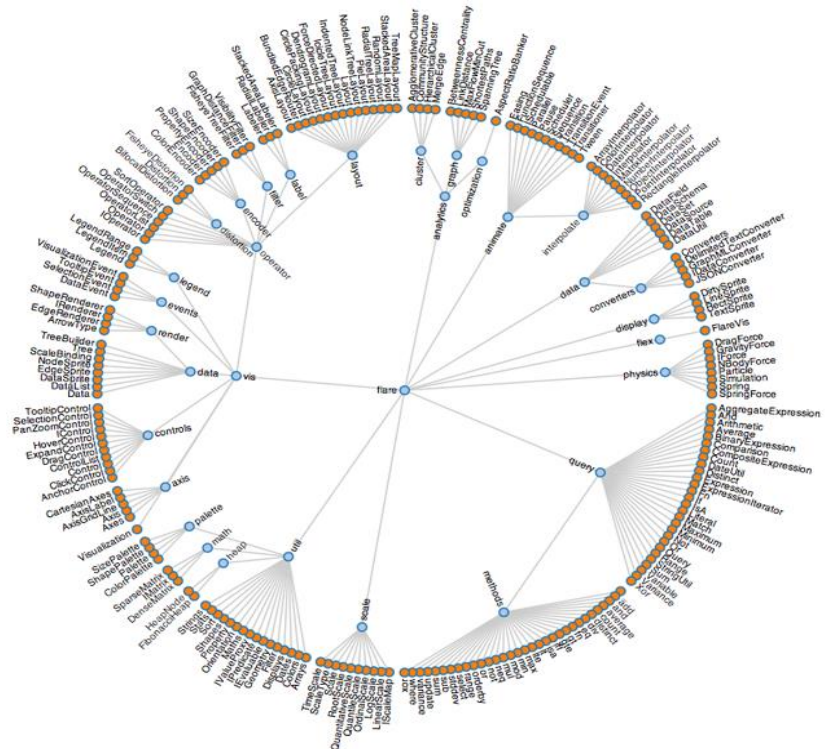
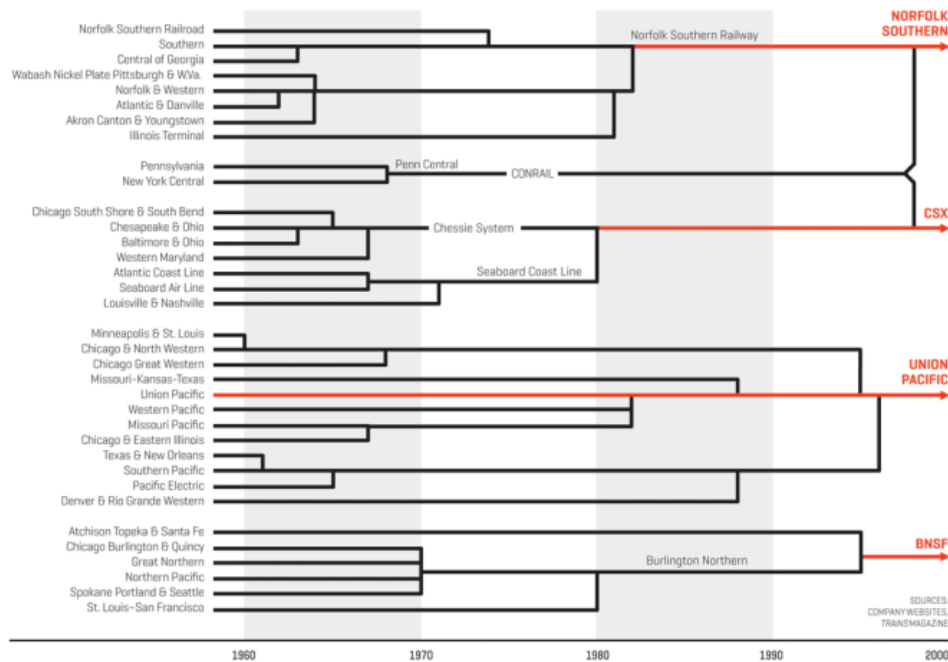


Node-Link

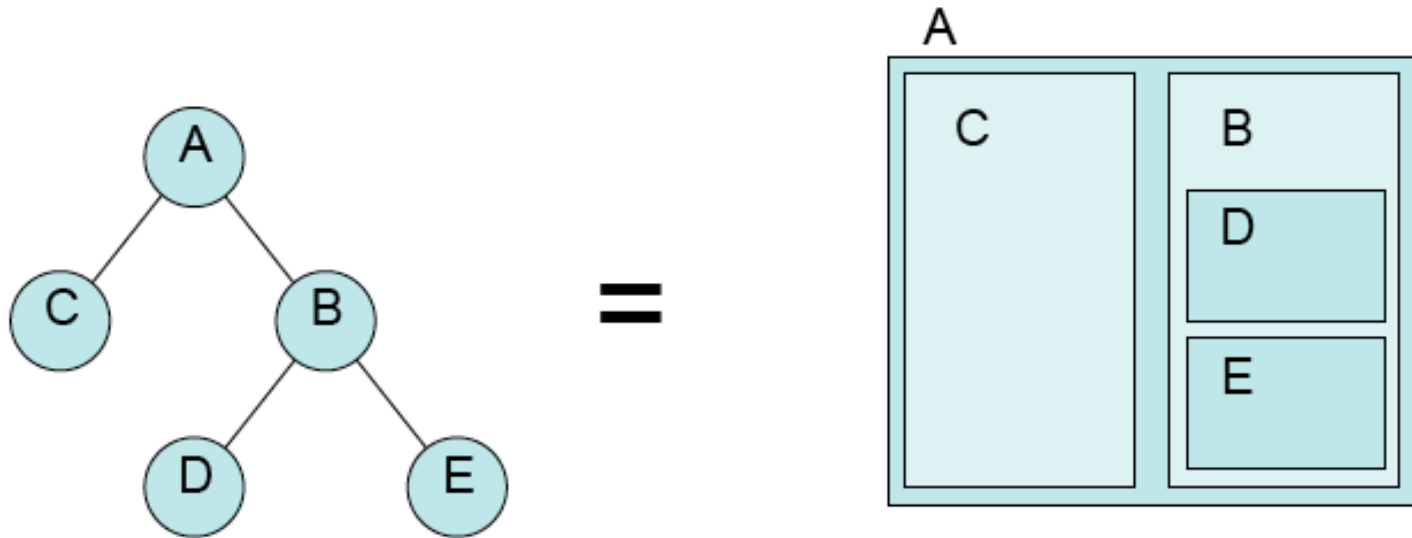
► RAILROAD SHOWDOWN

MAKING THE BIG FOUR

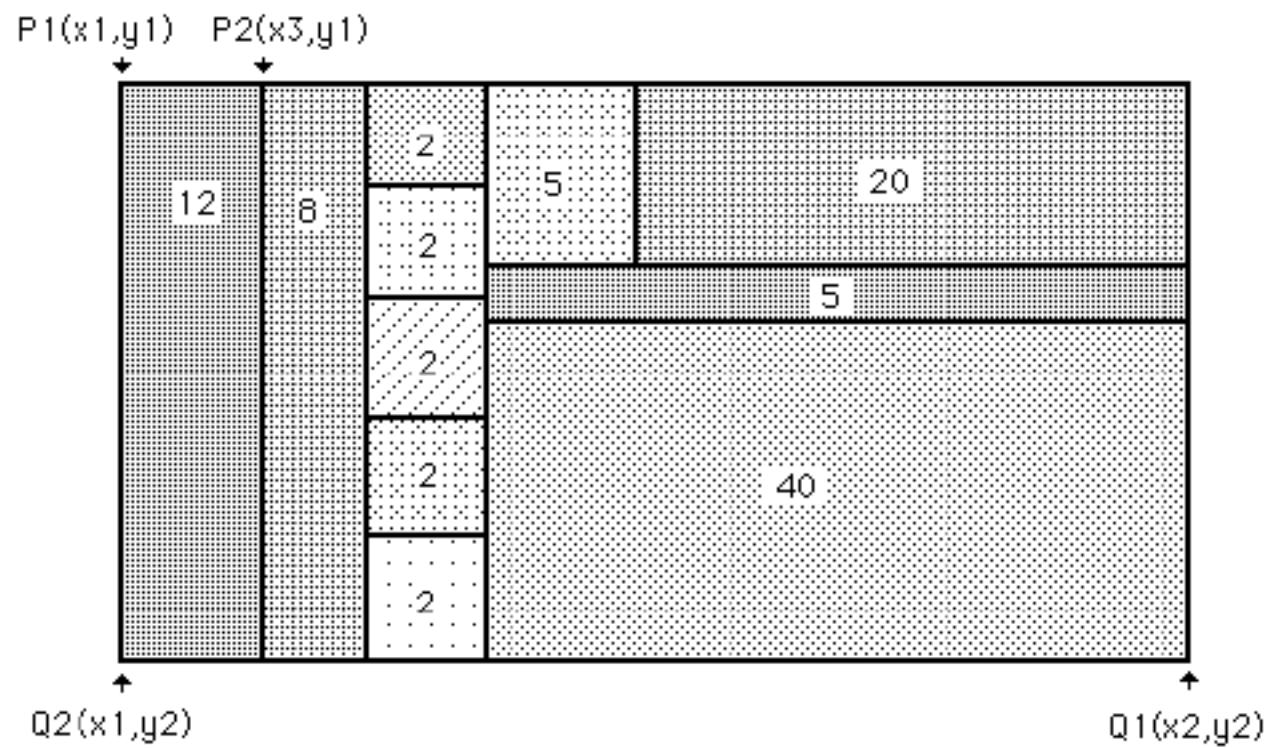
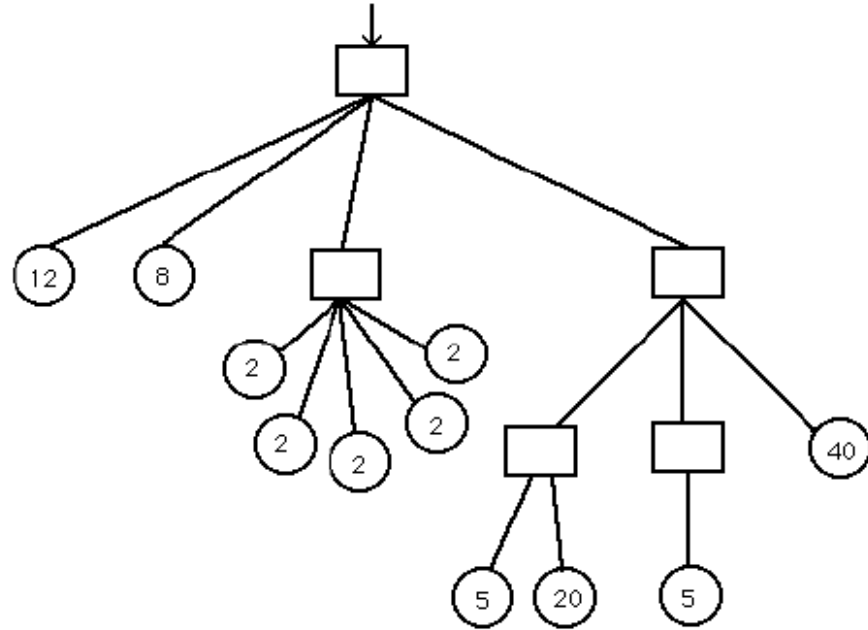
A series of mergers over the past 50 years has led to the creation of four freight rail behemoths that now control 90% of all business. Below, some of the notable deals along the way.



Space Filling Method



- Not only hierarchy, but also a specific node attribute

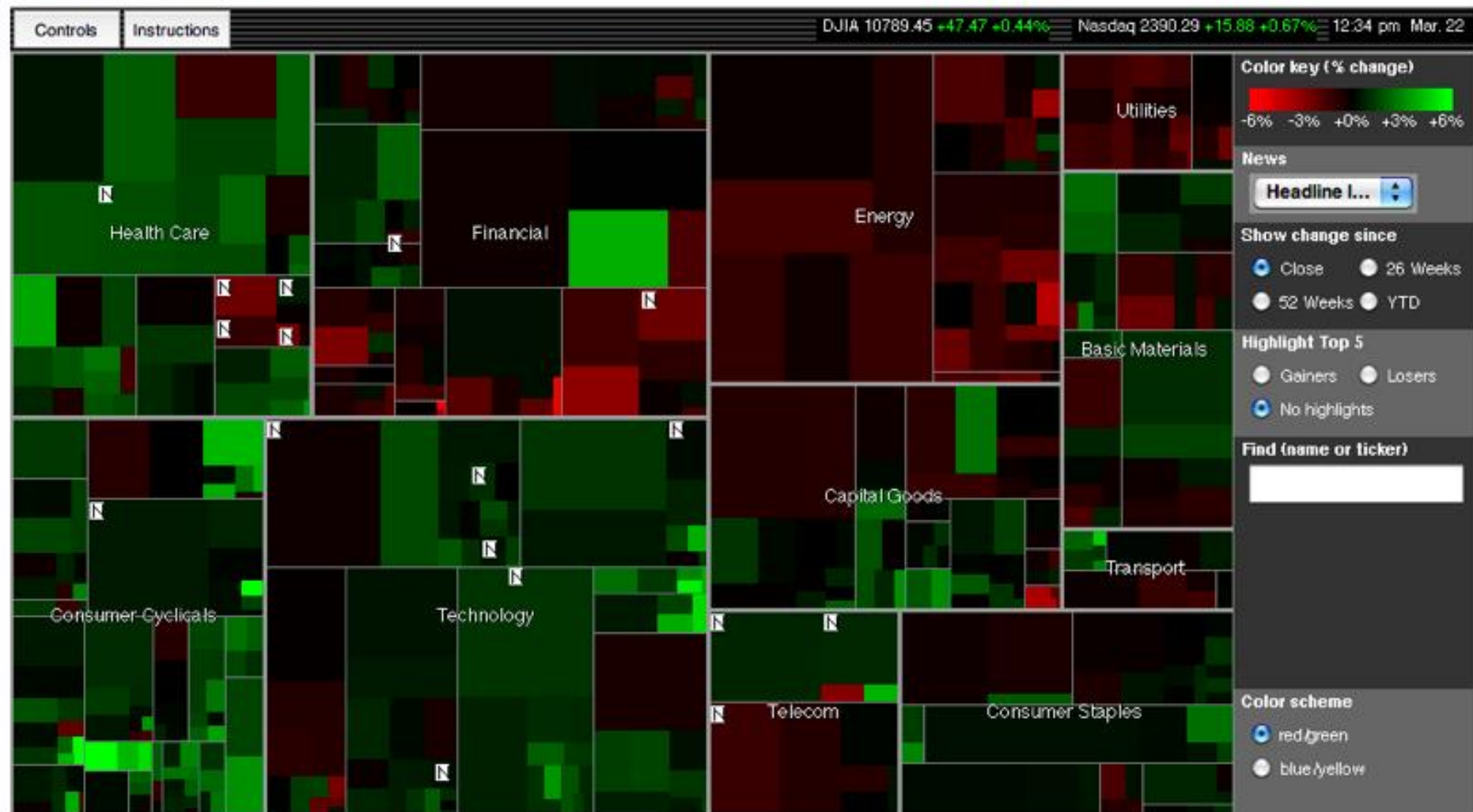


Map of the Market

Launch Map in Separate Window 

SmartMoneySelect

Upgrade [here](#) to access the **Market Map 1000** and search 1,000 companies with enhanced screening capabilities.



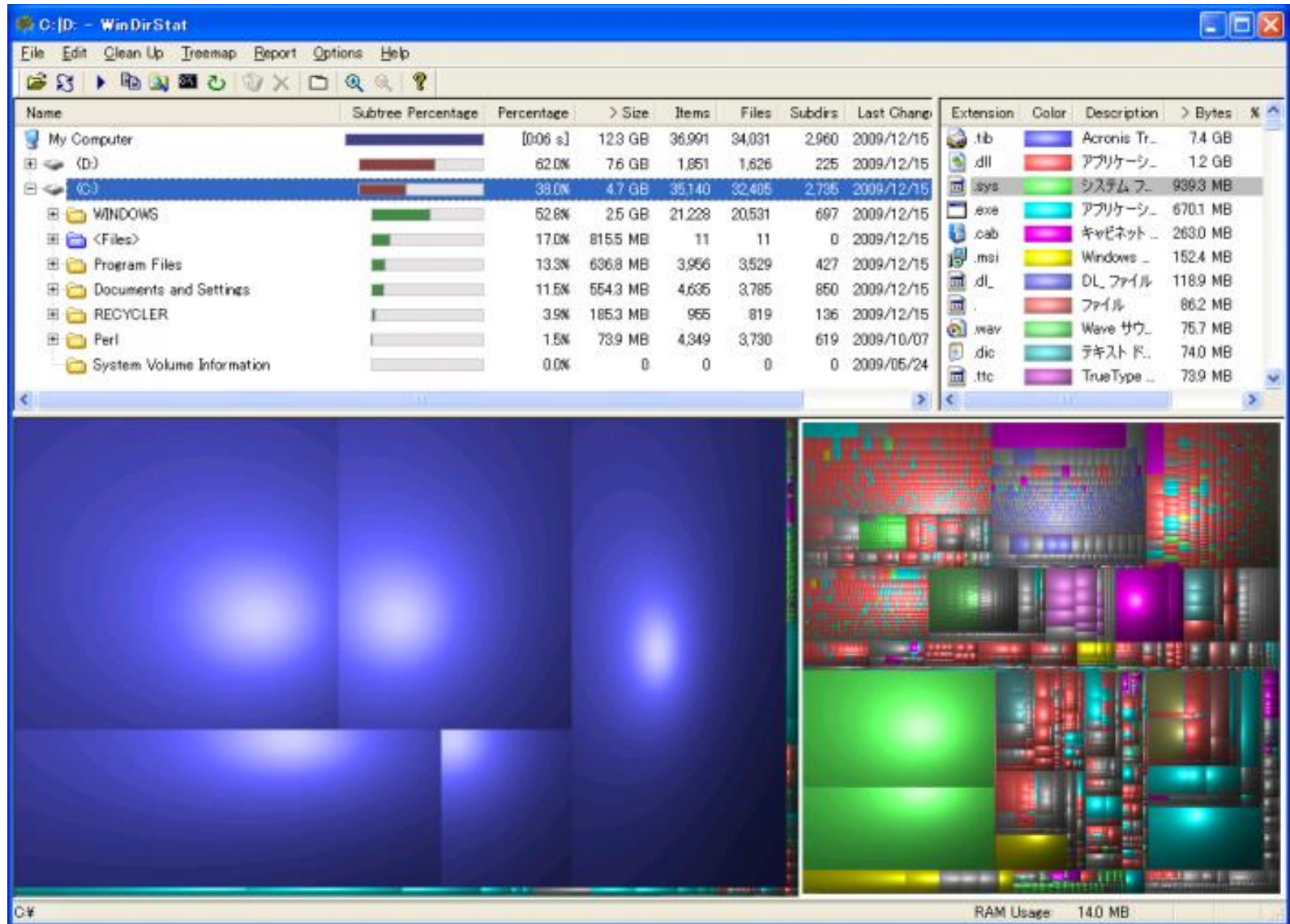
MARKET NEWS

- [President Obama Hails Passage of Health Care Bill](#)
- [Health Bill Taxes Drug, Device Makers and the Rich](#)
- [Stock Screen: 3 Stocks With Big Dividends and Buybacks](#)

Patent No.: US 6,583,794 B1

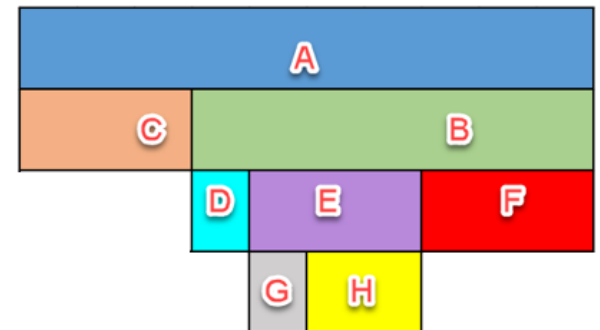
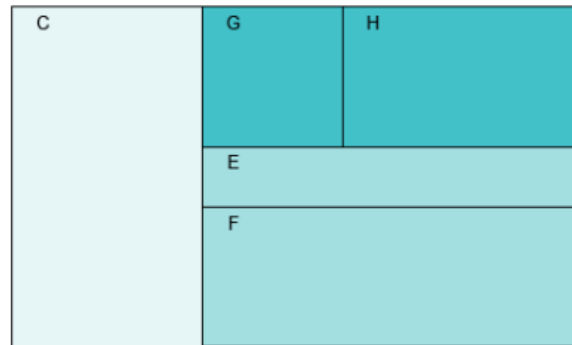
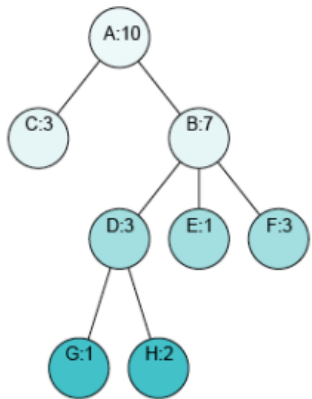
[Click Here to License the Map Applet](#)

File Systems

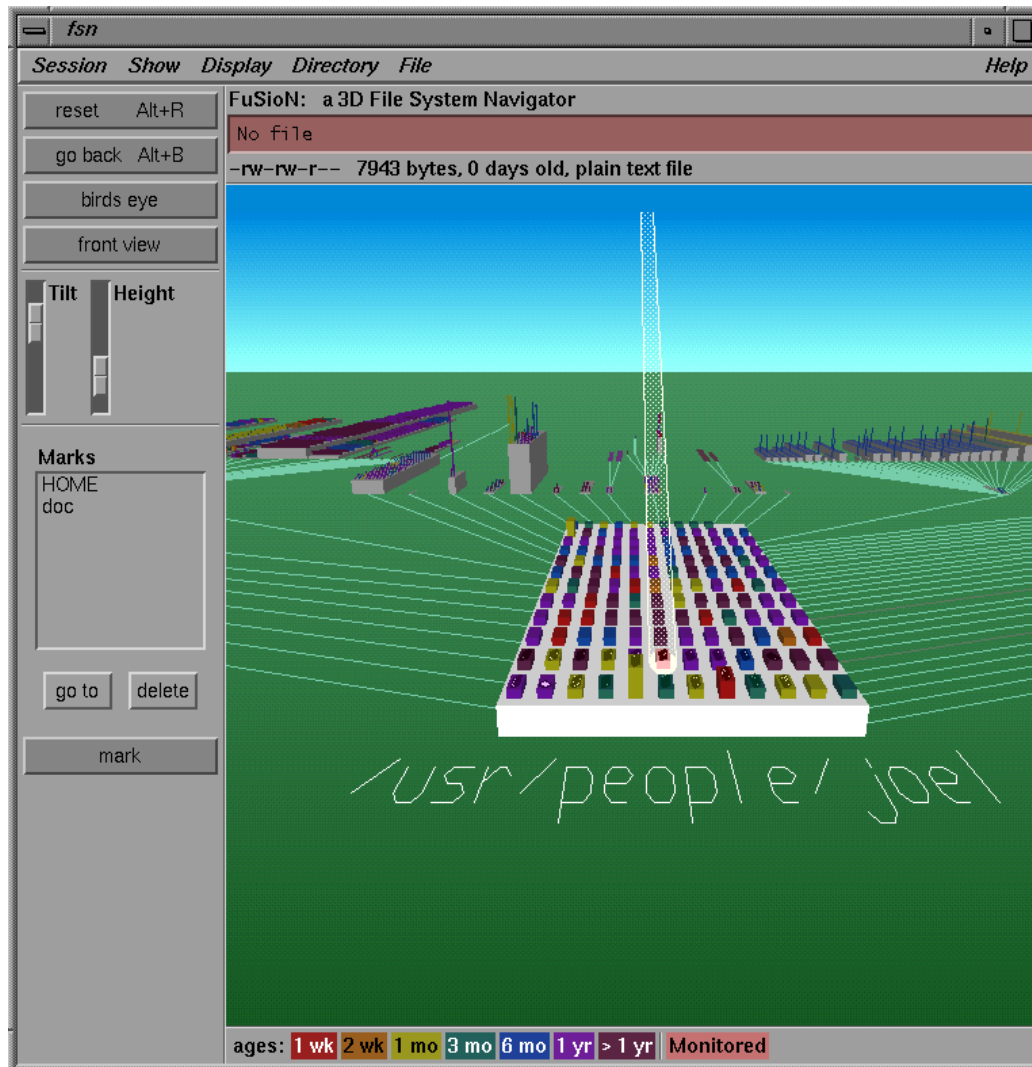


Adjacency Diagrams

- Node-link connections are still valid
 - Nodes are sized.



Others



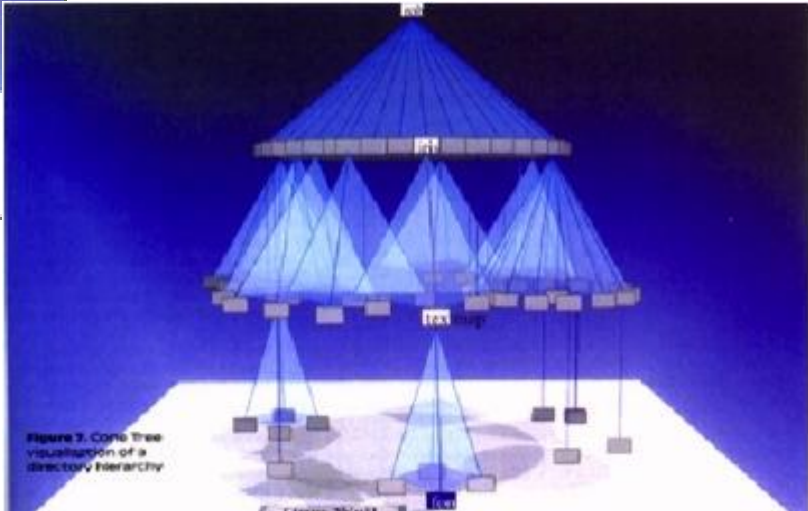
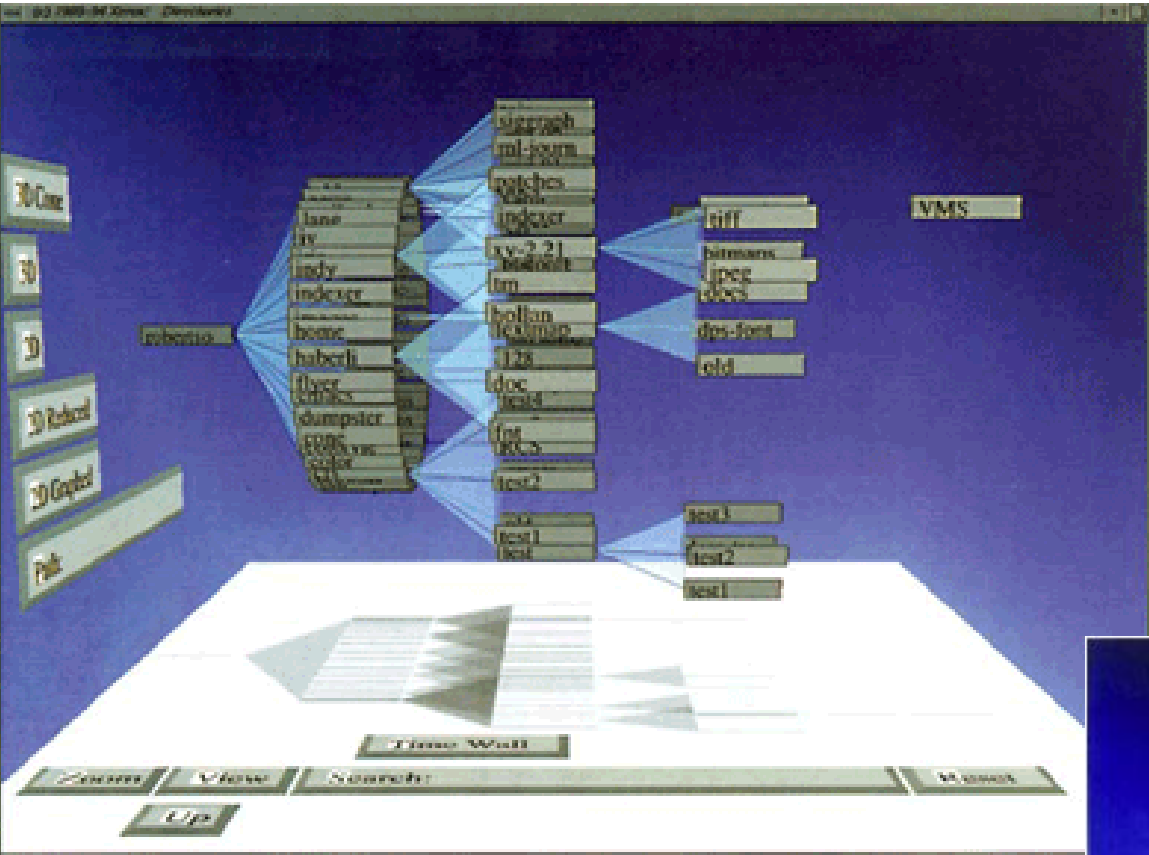
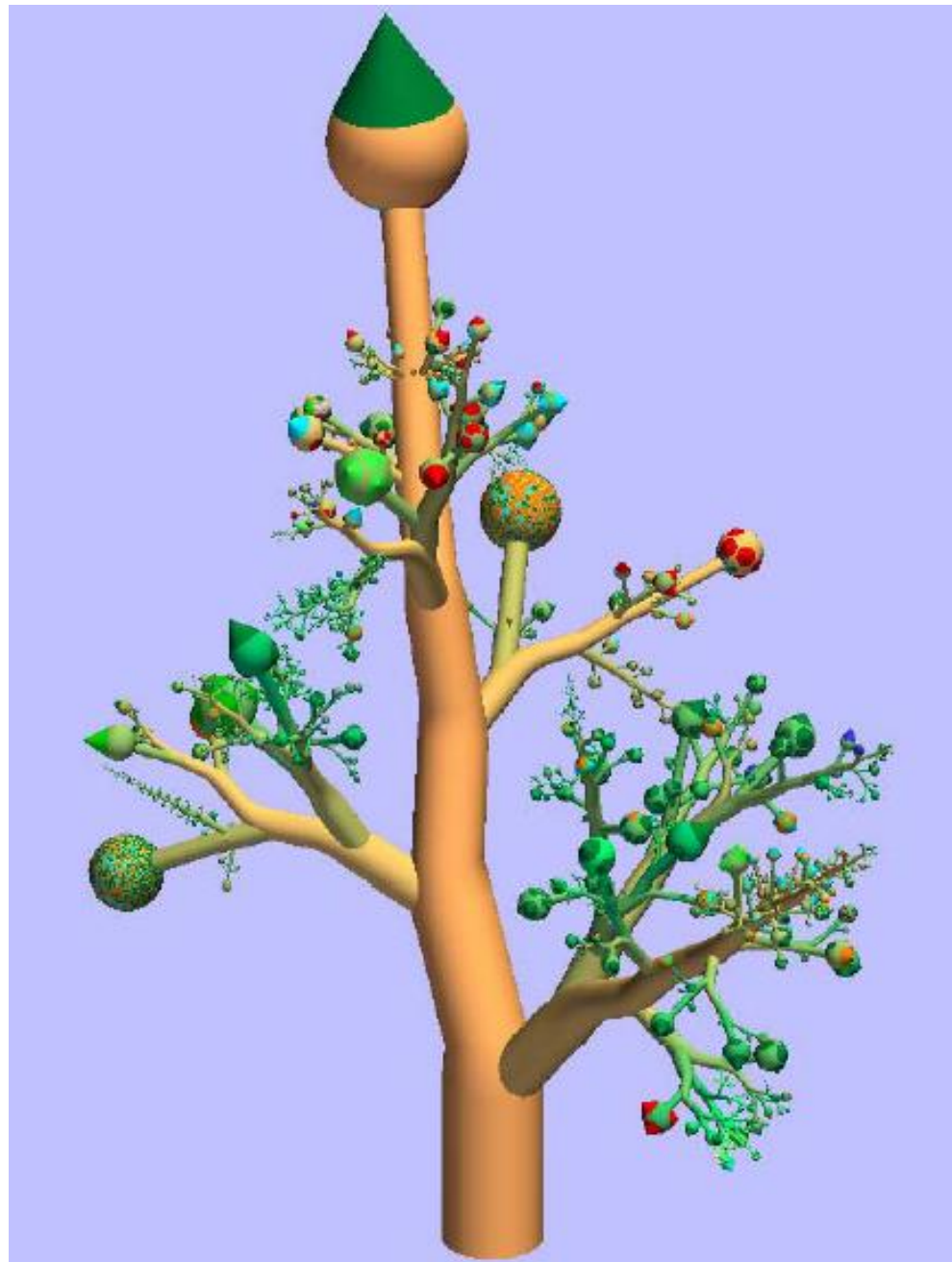
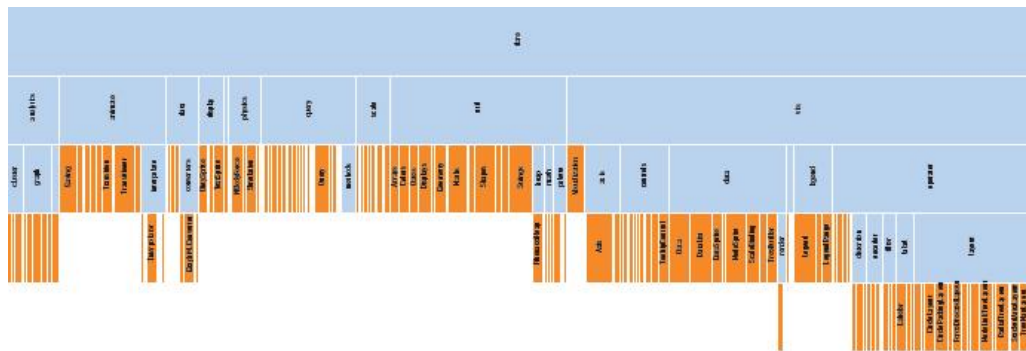
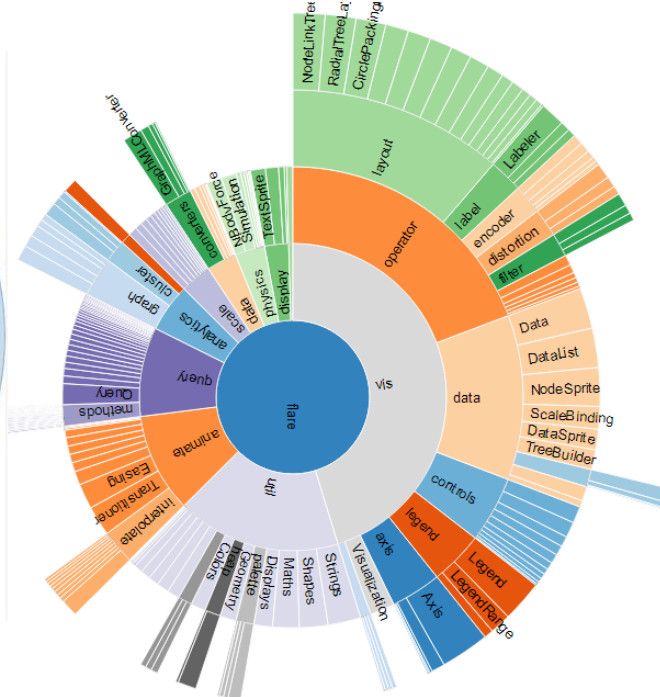
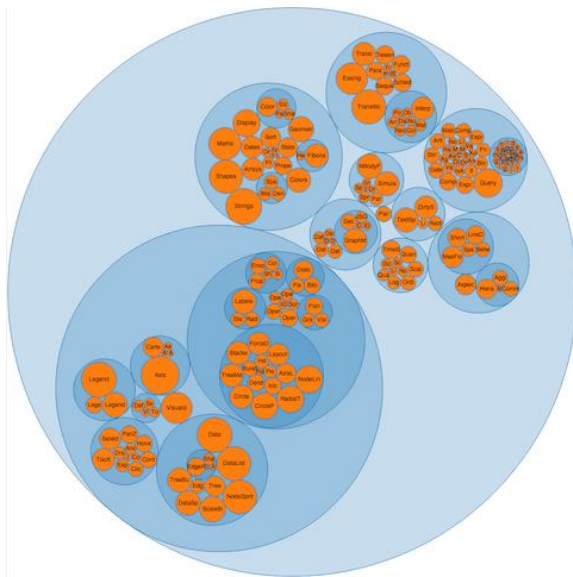
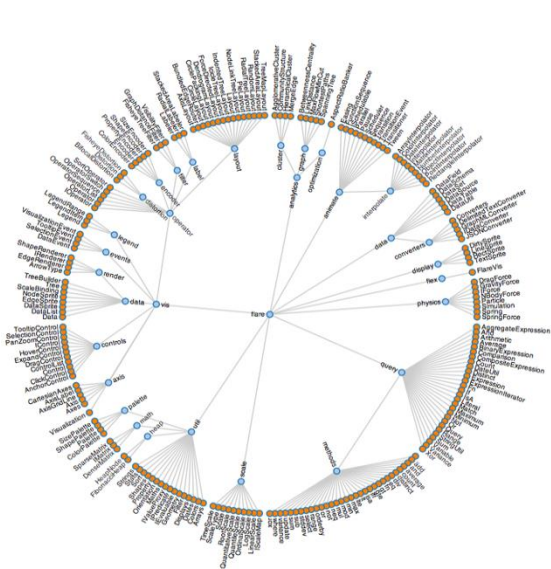


Figure 3. Cone Tree visualization of a directory hierarchy





<http://hci.stanford.edu/~heer/files/zoo/ex/hierarchies/icicle.html>

flare	933KB	controls	43KB
analytics	47KB	data	107KB
cluster	14KB	events	6KB
graph	25KB	legend	35KB
optimization	6KB	operator	179KB
animate	97KB	IOperator	1KB
data	29KB	Operator	2KB
display	23KB	OperatorList	5KB
flex	4KB	OperatorSequence	4KB
physics	29KB	OperatorSwitch	2KB
DragForce	1KB	SortOperator	1KB
GravityForce	1KB	distortion	13KB
IForce	0KB	encoder	14KB
NBodyForce	10KB	filter	11KB
Particle	2KB	label	16KB
Simulation	9KB	layout	105KB
Spring	2KB	AxisLayout	6KB
SpringForce	1KB	BundleEdgeRouter	3KB
query	87KB	CircleLayout	9KB
scale	30KB	CirclePackingLayout	11KB
util	161KB	DendrogramLayout	4KB
vis	422KB	ForceDirectedLayout	8KB
visualization	16KB	IcicleTreeLayout	4KB
axis	33KB	IndentedTreeLayout	3KB

<http://hci.stanford.edu/~heer/files/zoo/ex/hierarchies/indent.html>

Pros and Cons

- Node-link only
 - Easy to see as a whole
 - Inefficient in space use
 - Logical relationship only
- Space-filling only
 - Quantitative comparison
 - Hard to understand the whole structure
- Adjacency diagrams
 - Visually complex