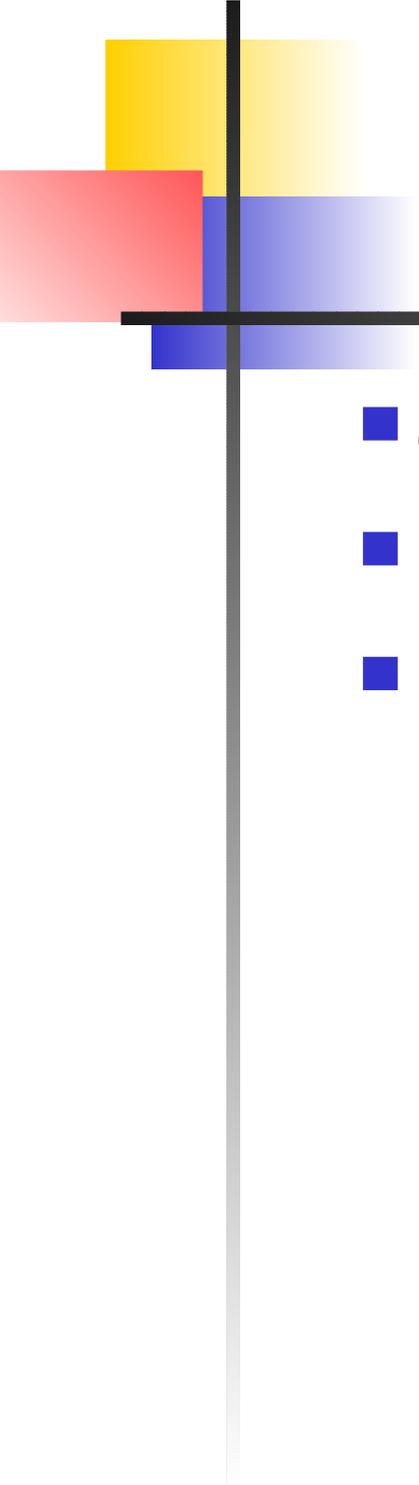


Data Cubes and Zoom Graphs

Chris Gray

`cmg@cs.ubc.ca`

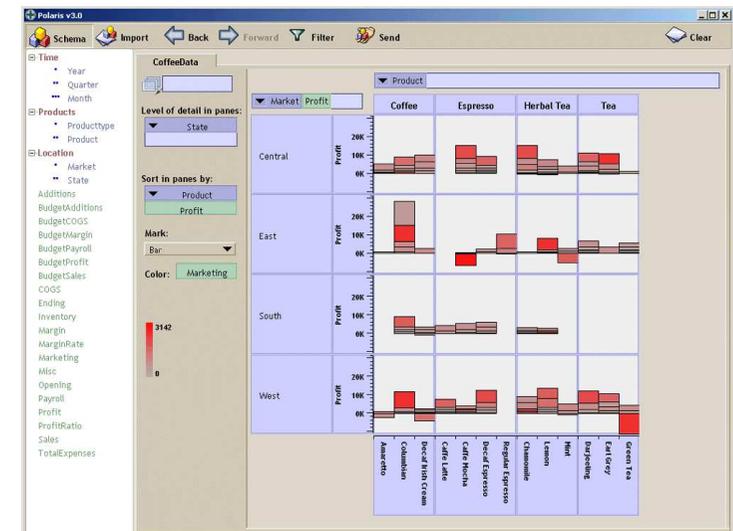


Intro

- Zoom graphs
- Data cubes
- Examples

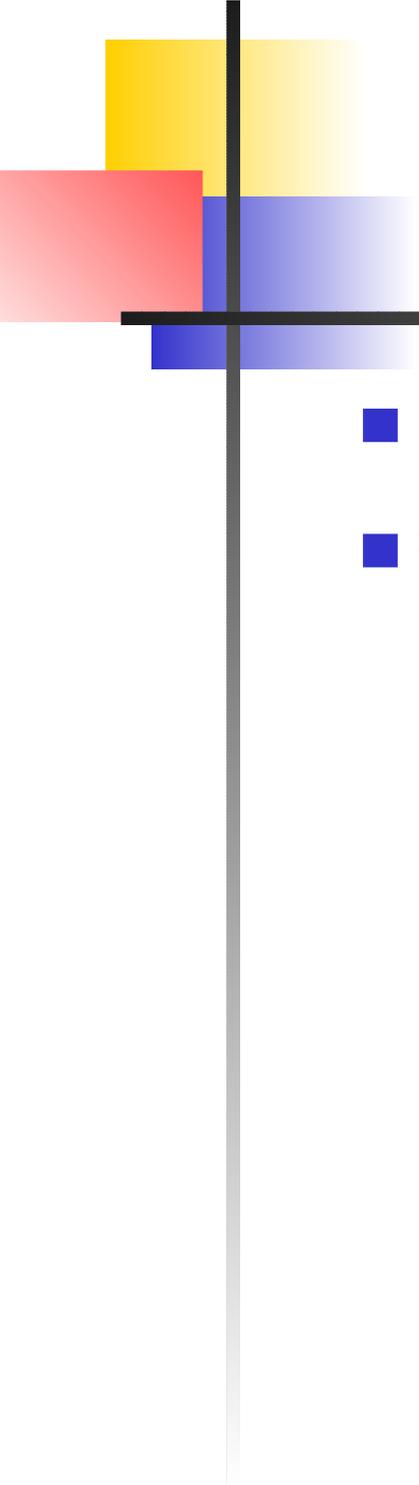
Polaris Review

- Database exploration.
- A formal specification language for describing visualizations of database tables.
- An IDE for generating the specifications.
- A database query generation system to get the data to be visualized.



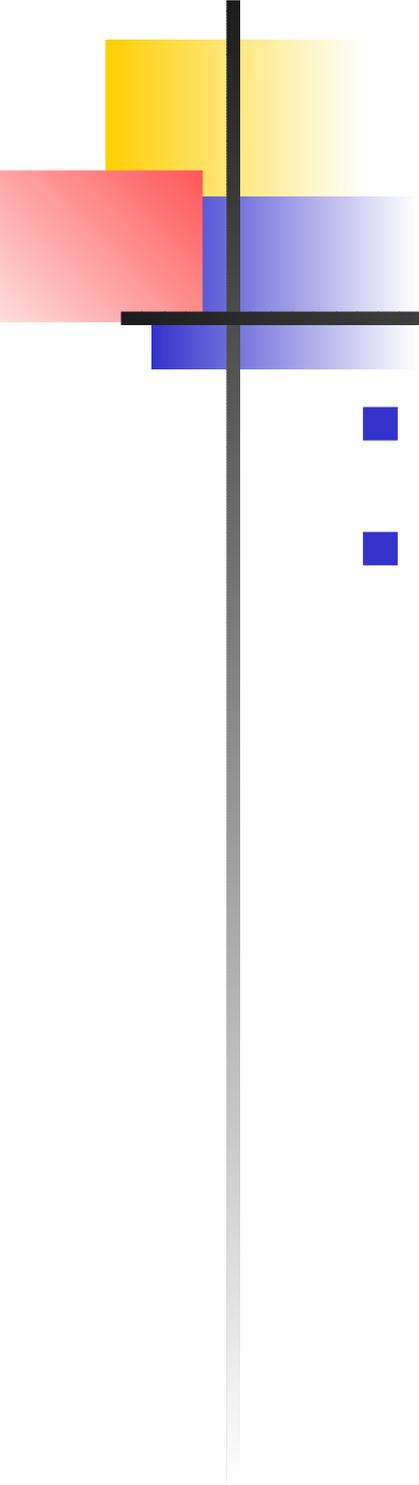
Big Picture





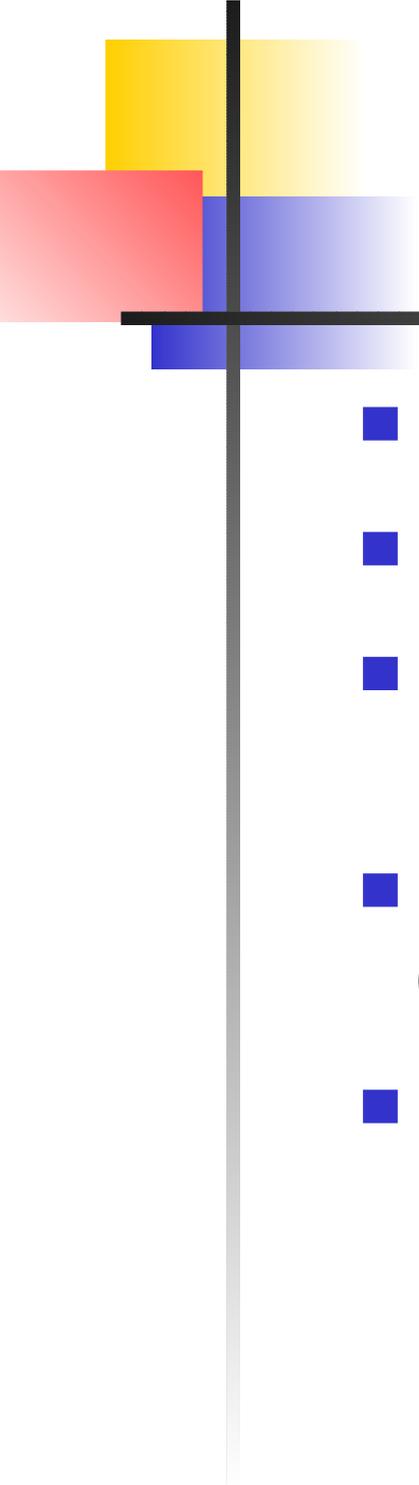
Zoom Graphs

- Like a space/scale diagram, but discrete.
- Going from node to node via an edge represents a zoom.



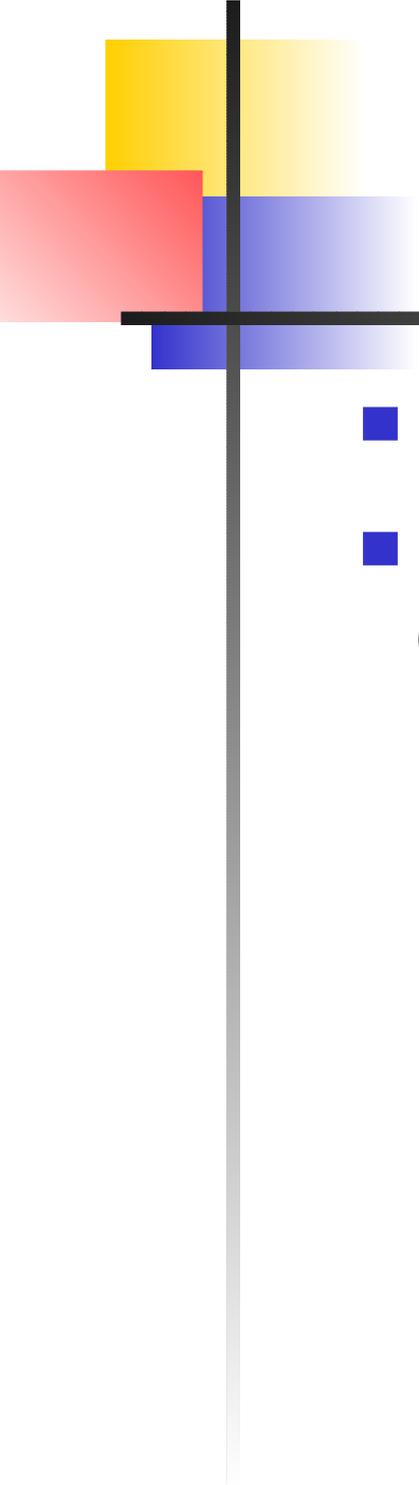
Differences from ZUIs

- Not intended as a desktop replacement.
- Multiple dimensions.



n -dimensional cubes

- Dimensions and measures.
- One dimension for each variable.
- Each variable has a “measure” – its magnitude.
- Each dimension can be at a different level of detail.
- Ordinal data must be given an ordering.

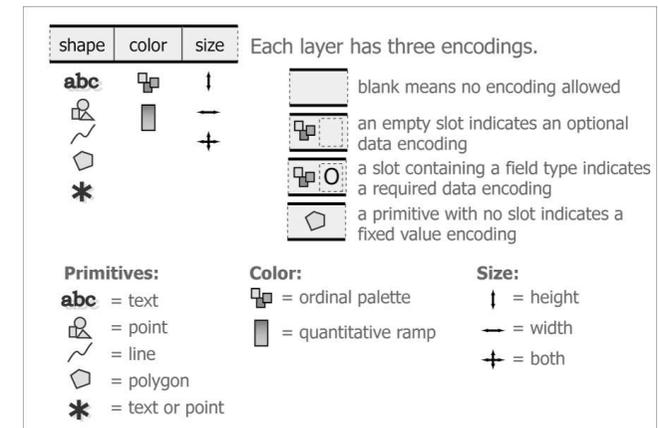


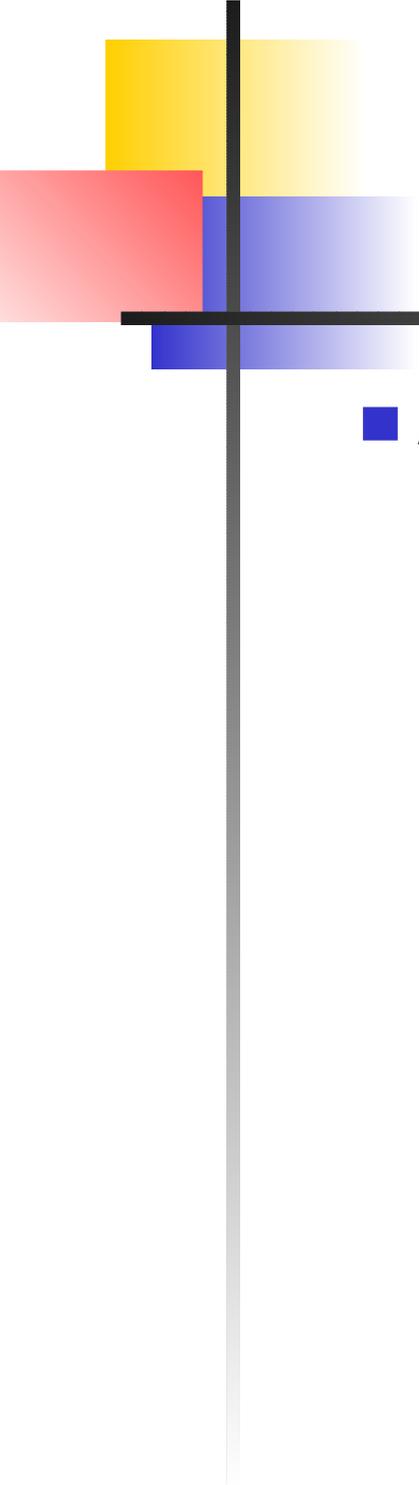
Lattice

- \leq relation between some cubes.
- Defined by a higher level of detail in one dimension.

Visual Encodings

- Possible to specify visual encodings completely in the graphs.
 - Color
 - Quantitative ramp, qualitative.
 - Size
 - Height, width, or both.
 - Shape
 - Text, point, line, or polygon.

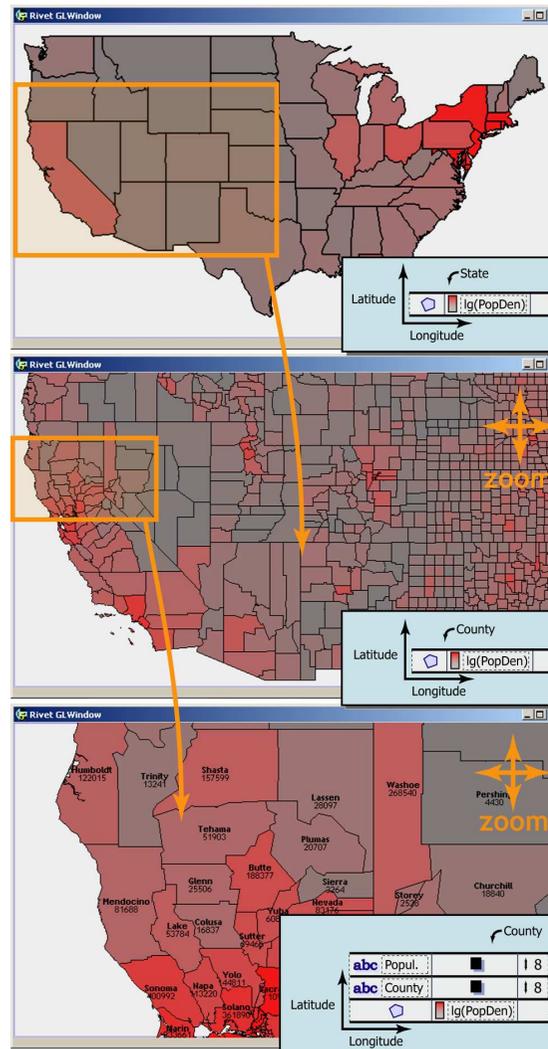


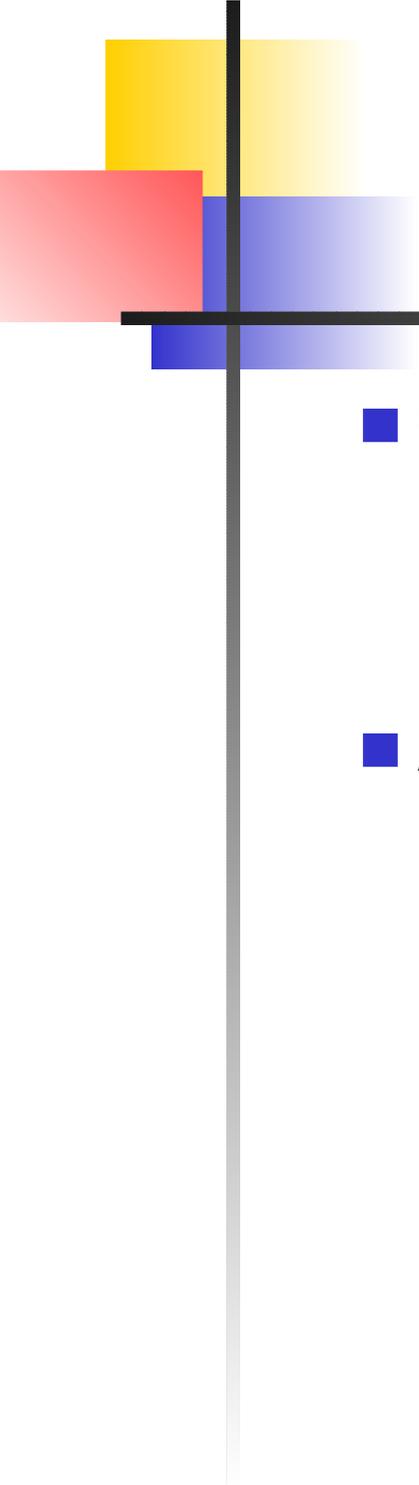


Layers

- As user zooms in, more layers emerge.
 - Labels appear when user is close enough.
 - Aggregated data become separated.

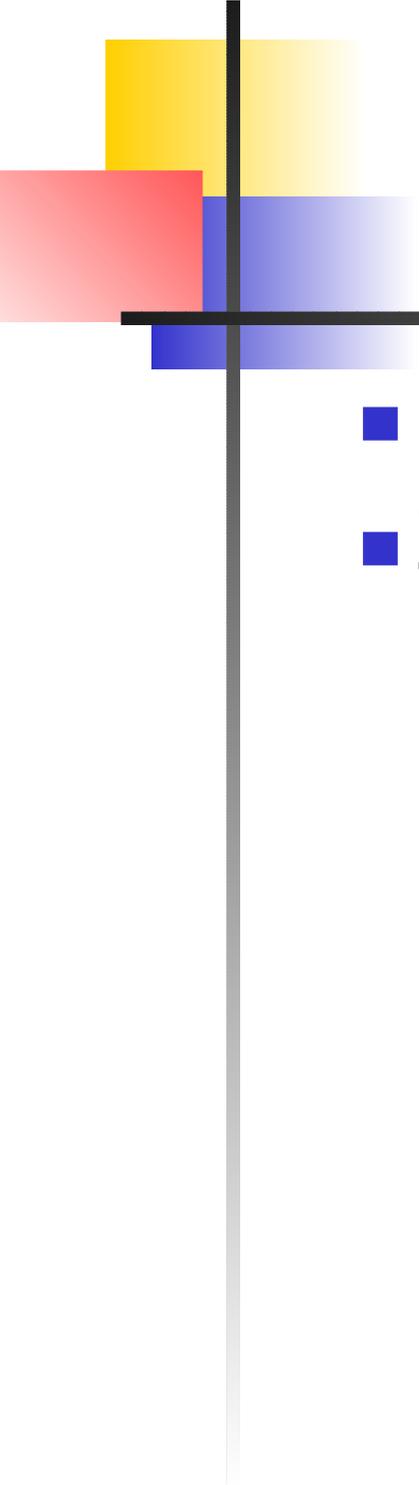
Example





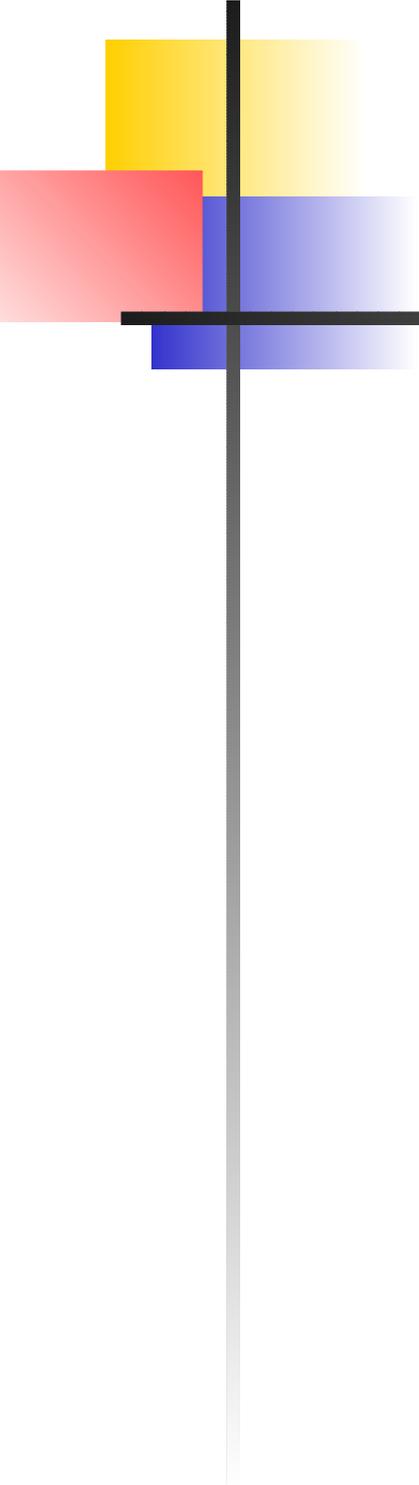
Problems

- Continuous zooms are hard to do with this abstraction.
 - Design decision.
- Arbitrary zooms are not possible.



Conclusions

- Data cubes
- Zoom graphs



Questions?

References

- [1] Chris Stolte, Diane Tang and Pat Hanrahan, “Multiscale Visualization Using Data Cubes”, *Proceedings of the Eighth IEEE Symposium on Information Visualization*, October 2002.
- [2] Chris Stolte, Diane Tang and Pat Hanrahan, “Polaris”, <http://graphics.stanford.edu/projects/polaris/>