Lecture 2: Visualization Design Exercise

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DSCI 531: Data Visualization 1
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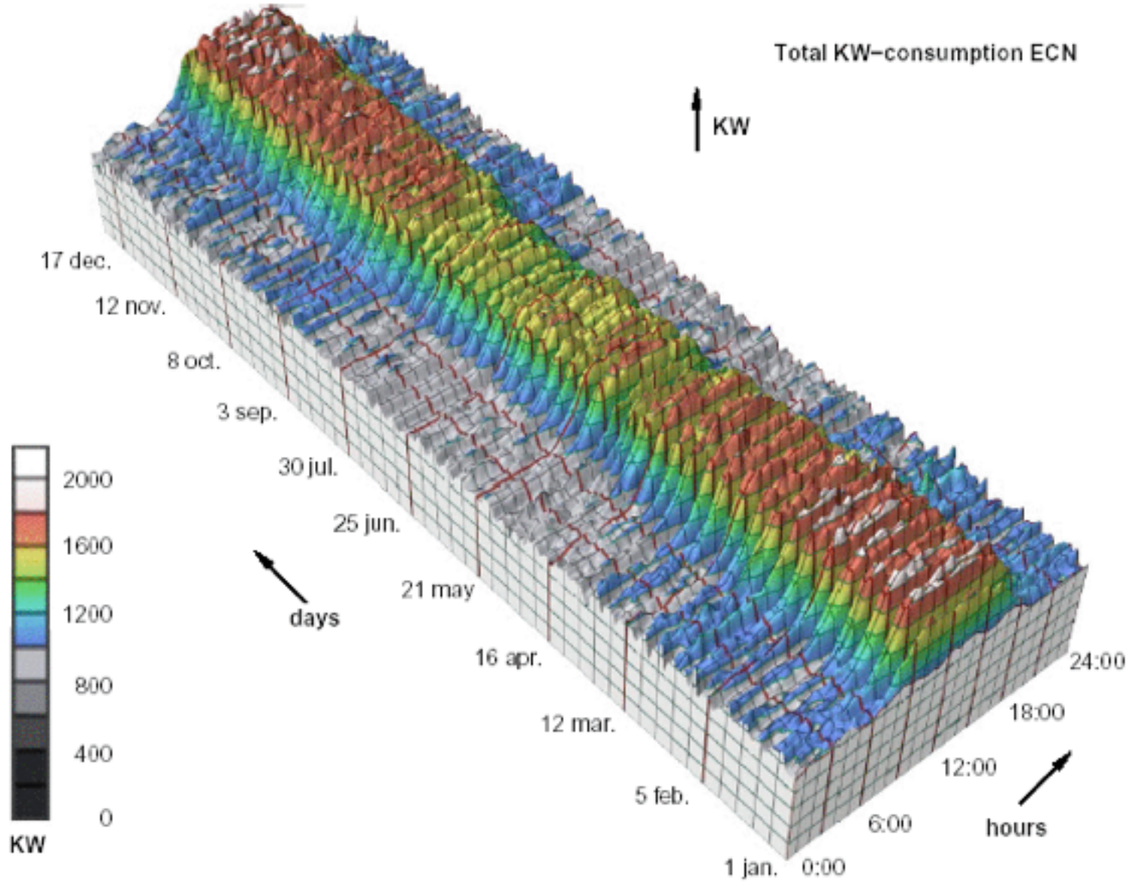
https://github.ubc.ca/ubc-mds-2016/DSCI_531_viz-1_students

Today: In-class Design Exercise

- Five time-series data scenarios
  - A: every 5 min, duration 1 year, 1 thing: building occupancy rates
  - B: every 5 min, 1 year, 2 things: currency values (exchange rate)
  - C: several years and several things: 5 years, 10 currencies
  - D: 1 year, many things: 1000 machines (CPU load)
  - E: 1 year, several parameters, many things: 1 year, 10 params, 1000 machines
- Small-group exercise: 15-20 min
  - one group per table (4-5 people/group), 5 groups total
  - discuss/sketch possible visual encodings appropriate for your group's data
- Reportback: 20-30 min
  - 4-5 min from each group
- Design space examples/discussion: 15-20 min

Case A: 3D Approach (Not Recommended)

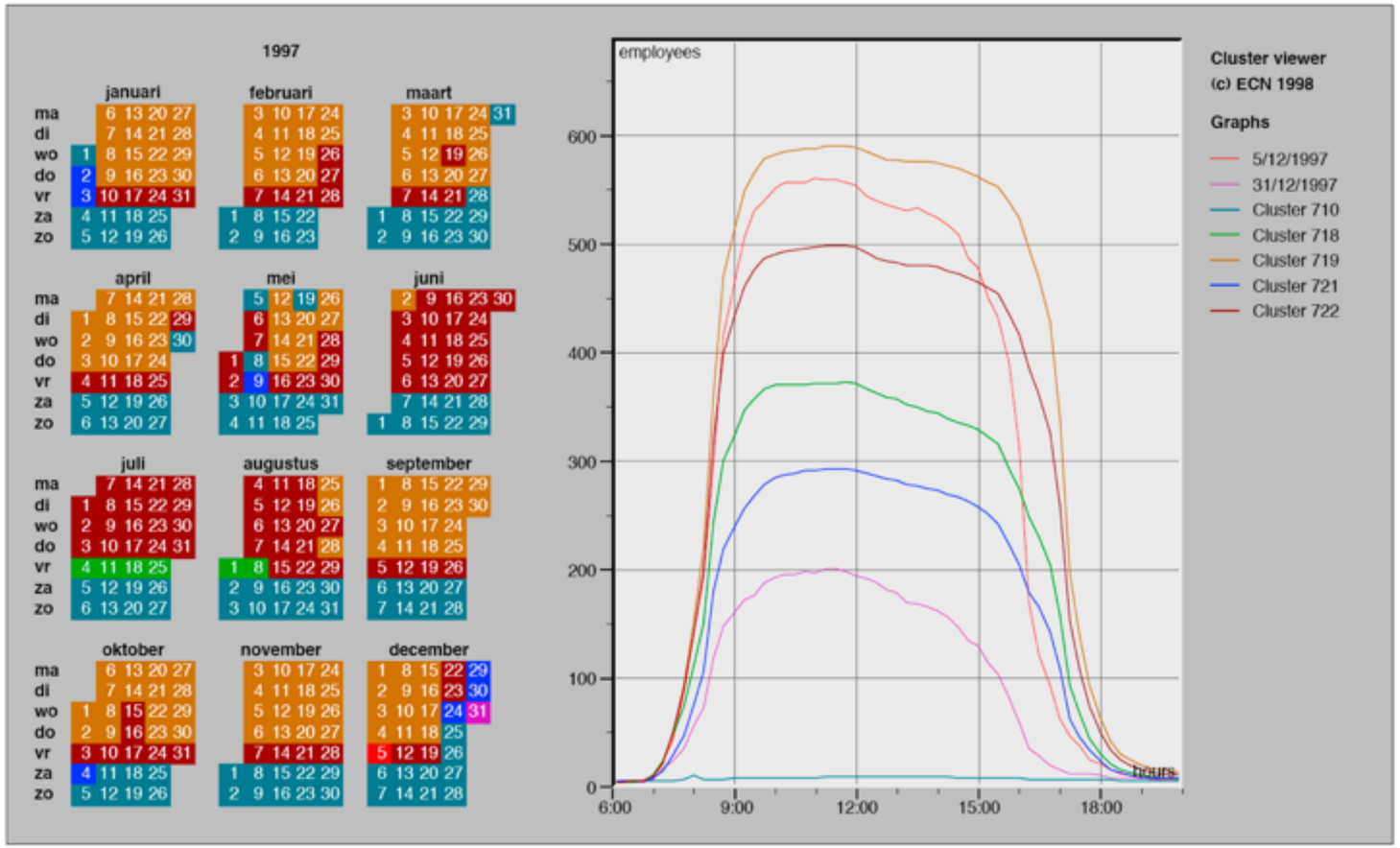
- extruded curves: detailed comparisons impossible



[Cluster and Calendar based Visualization of Time Series Data. van Wijk and van Selow, Proc. InfoVis 99.]

Case A: Cluster-Calendar Solution

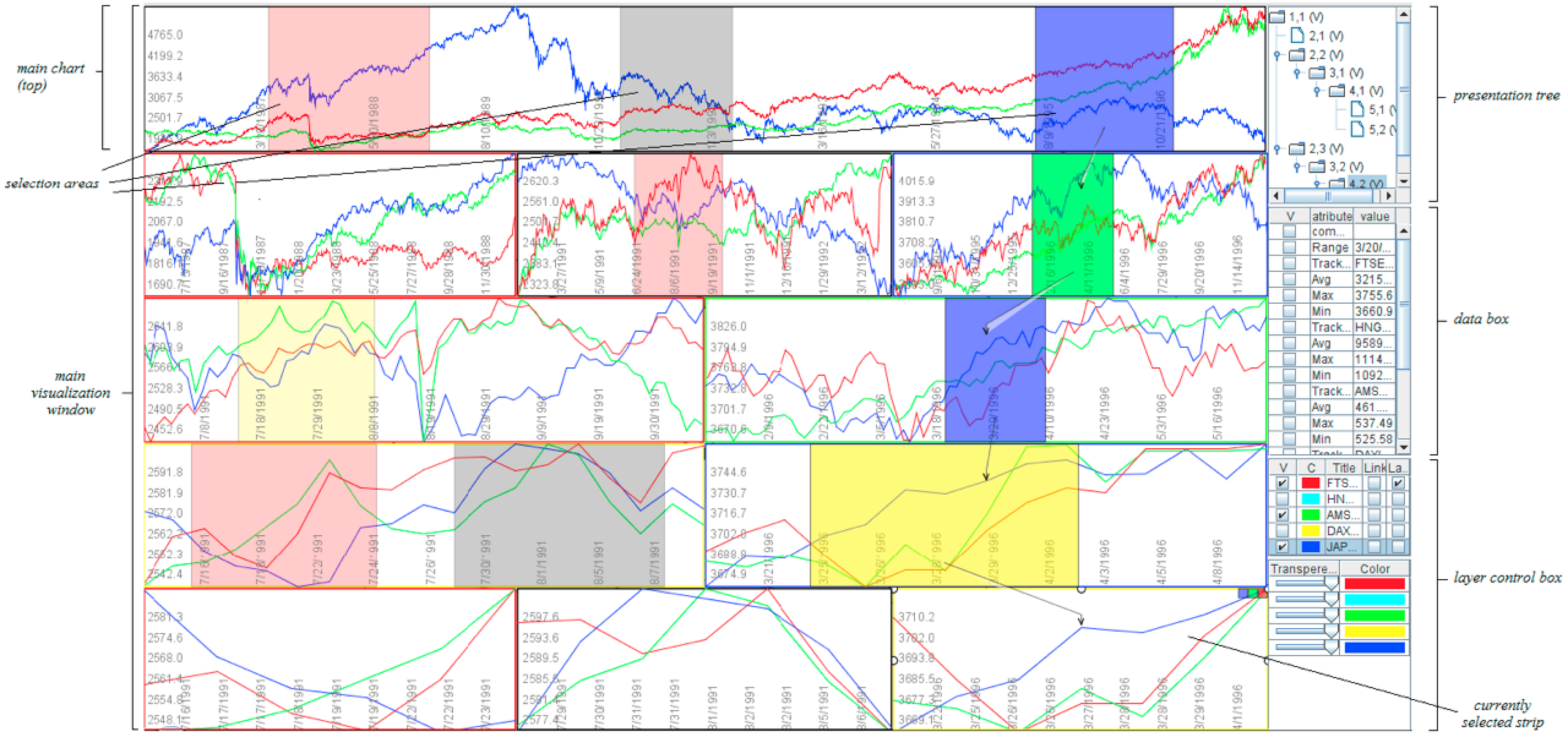
- derived data: cluster hierarchy
- juxtapose multiple views: calendar, superimposed 2D curves



[Cluster and Calendar based Visualization of Time Series Data. van Wijk and van Selow, Proc. InfoVis 99.]

Case B: Stack Zooming

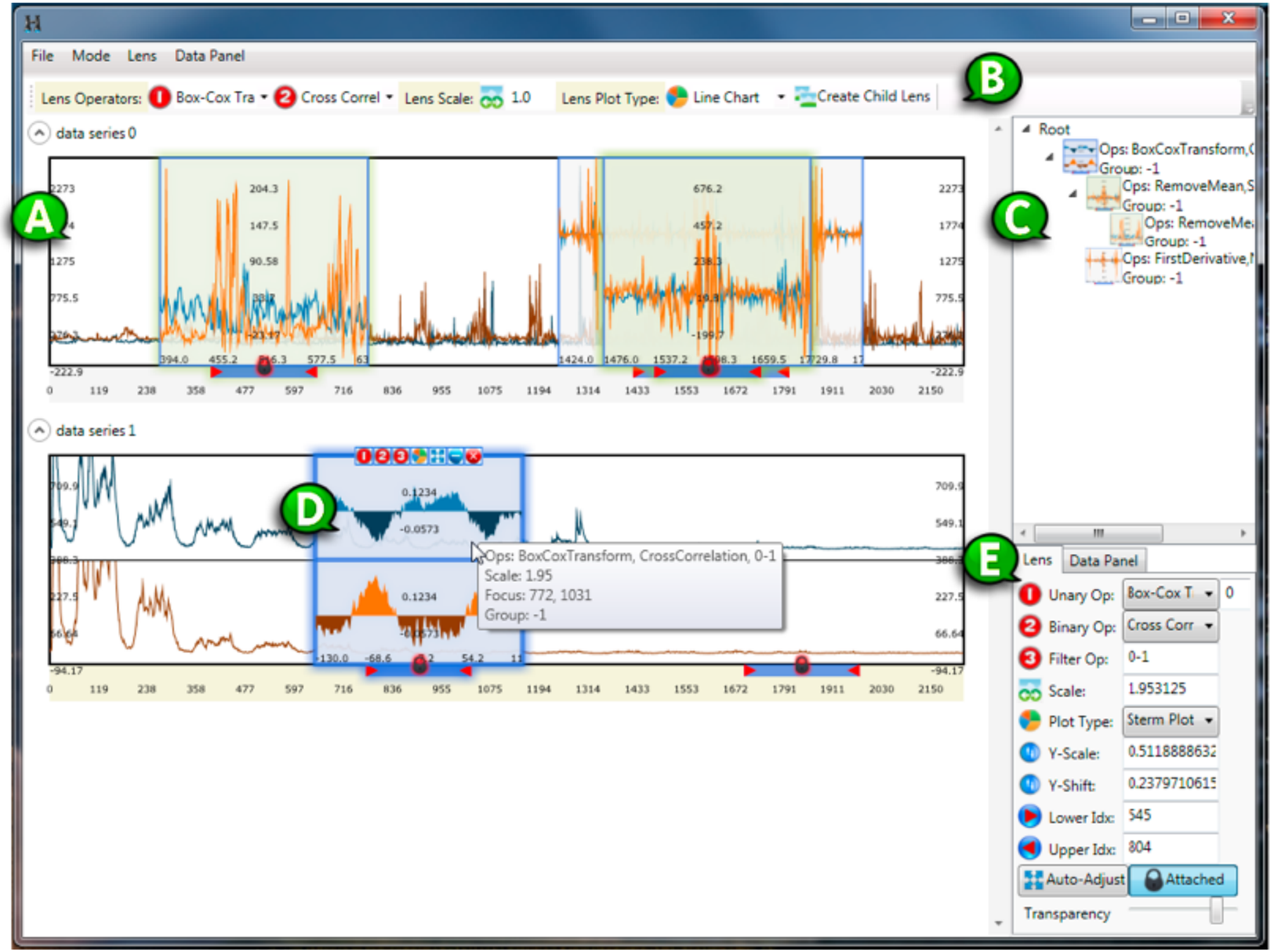
https://youtu.be/dK0De4XPm5Y

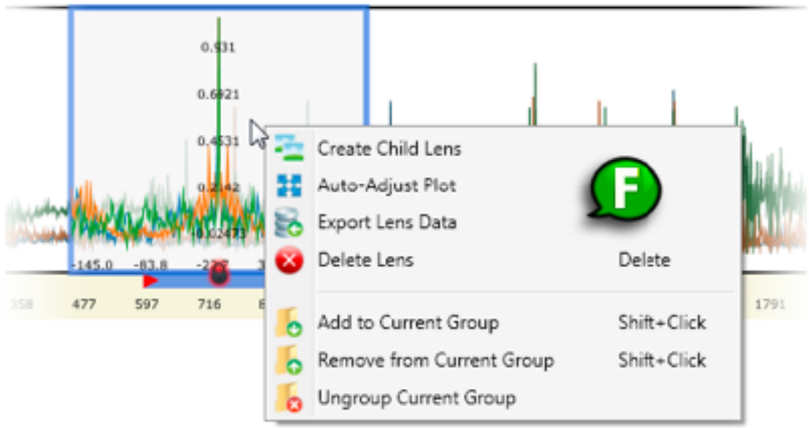


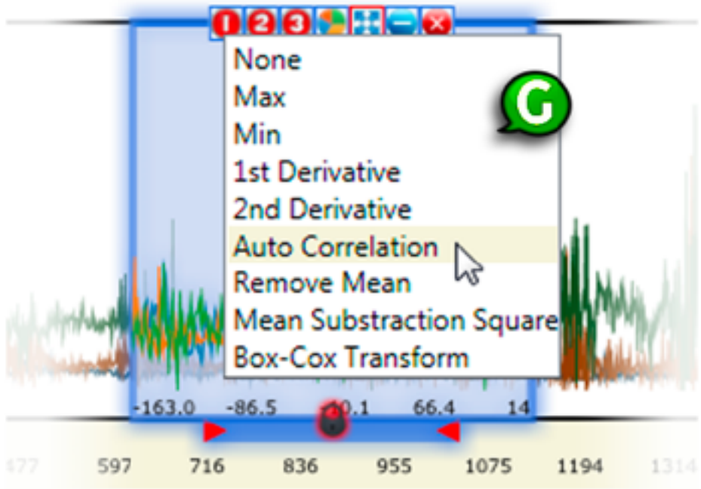
[Stack Zooming for Multi-Focus Interaction in Time-Series Data Visualization. Javed and Elmqvist. Proc PacificVis 2010, p 33-40.]

Case C: ChronoLenses

https://youtu.be/k7pI8ikczqk



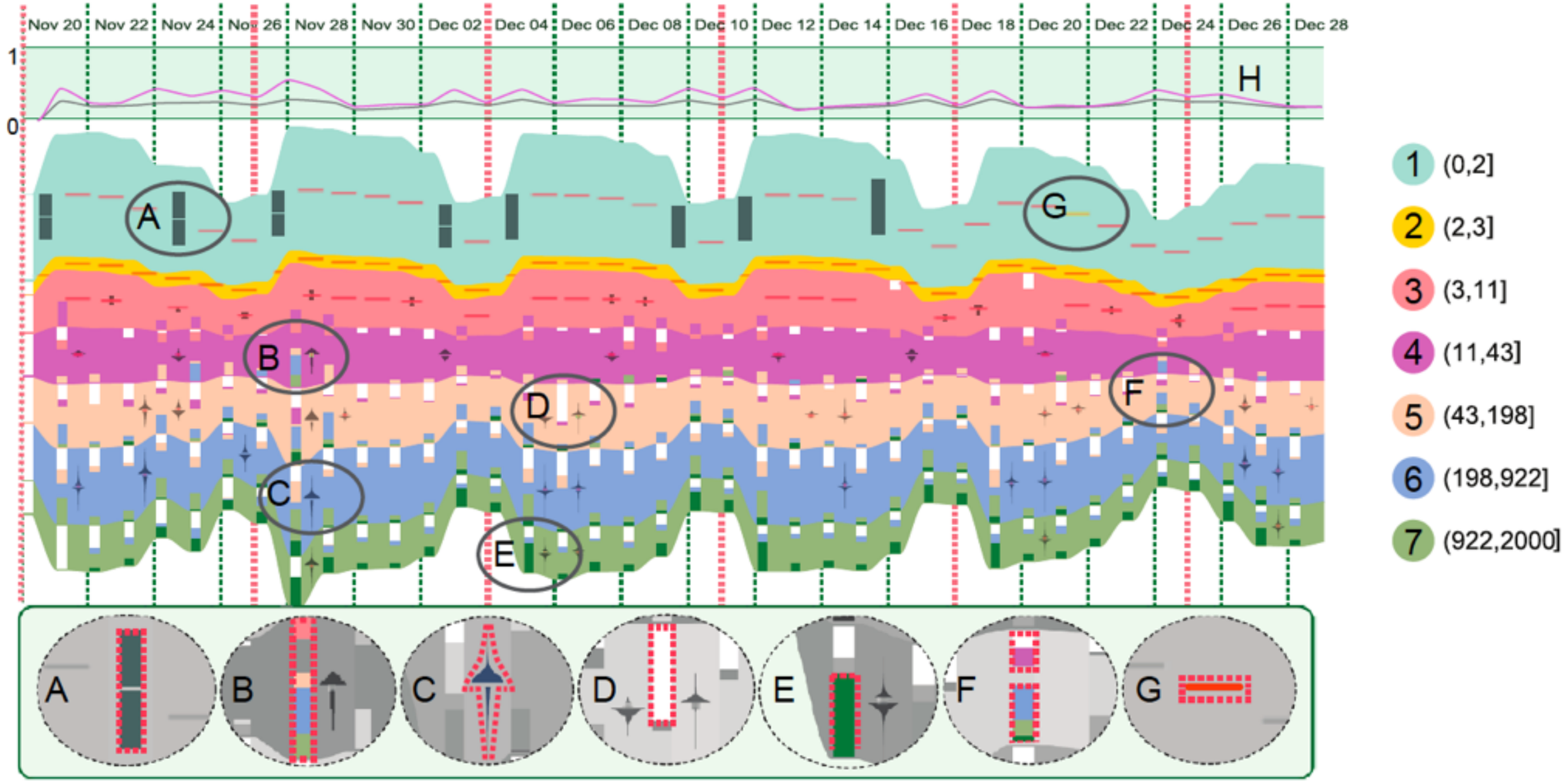




[Exploratory Analysis of Time-Series with ChronoLenses. Zhao, Chevalier, Pietriga, and Balakrishnan. IEEE TVCG 17(12):2422-2431 (Proc. InfoVis 2011).]

Case D: RankExplorer

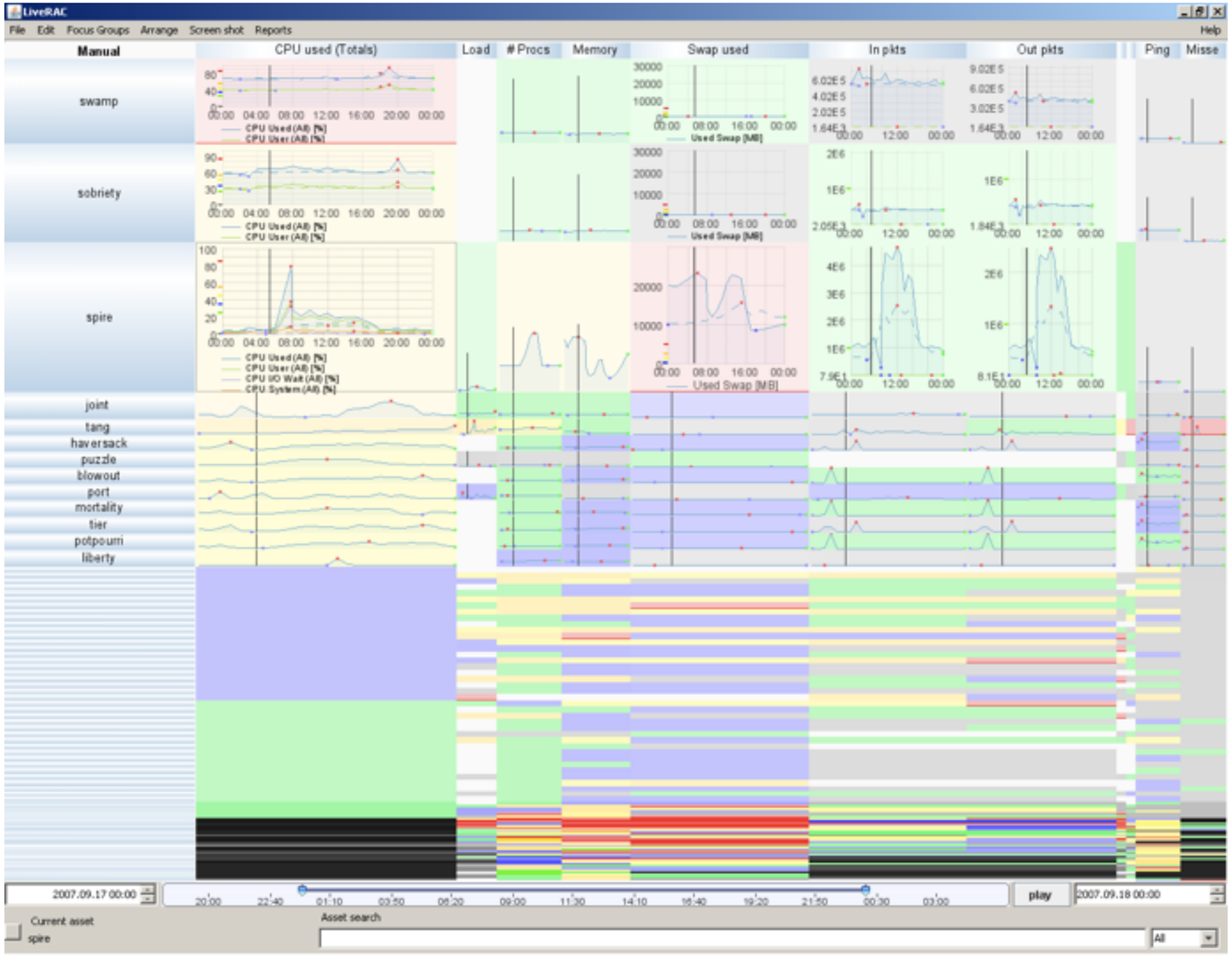
https://youtu.be/rdgn1qcZ2A4



[RankExplorer:Visualization of Ranking Changes in Large Time Series Data. Shi, Cui, Liu, Xu, Chen and Qu. IEEE TVCG 12(18):2669-2678 (Proc. InfoVis 2012)]

Case E: LiveRAC video

http://youtu.be/ld0c3H0VSkw



[LiveRAC - Interactive Visual Exploration of System Management Time-Series Data. McLachlan, Munzner, Koutsofios, and North. Proc. Conf. on Human Factors in Computing Systems (CHI) 2008, pp 1483-1492.]

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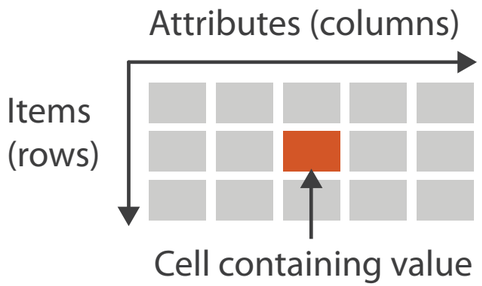
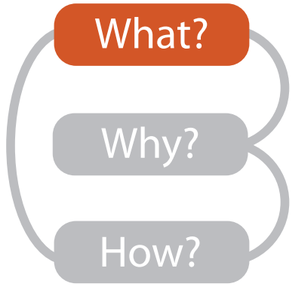
Case E: LiveRAC data abstraction

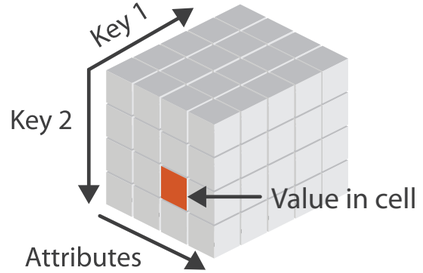
- multidimensional table: time series data
  - key attributes
    - time
      - 50,000: 5-minute intervals over 6 months
      - multiscale levels of interest
    - devices
      - 4000
    - parameters
      - 20
      - ex: CPU usage, memory load, network traffic, alarms, ...
  - value attributes
    - parameter value for device at time point
      - quantitative
    - device groups
      - categorical

➔ Tables





➔ *Multidimensional Table*



➔ **Attribute Types**

➔ Categorical

➔ Ordered

➔ *Quantitative*