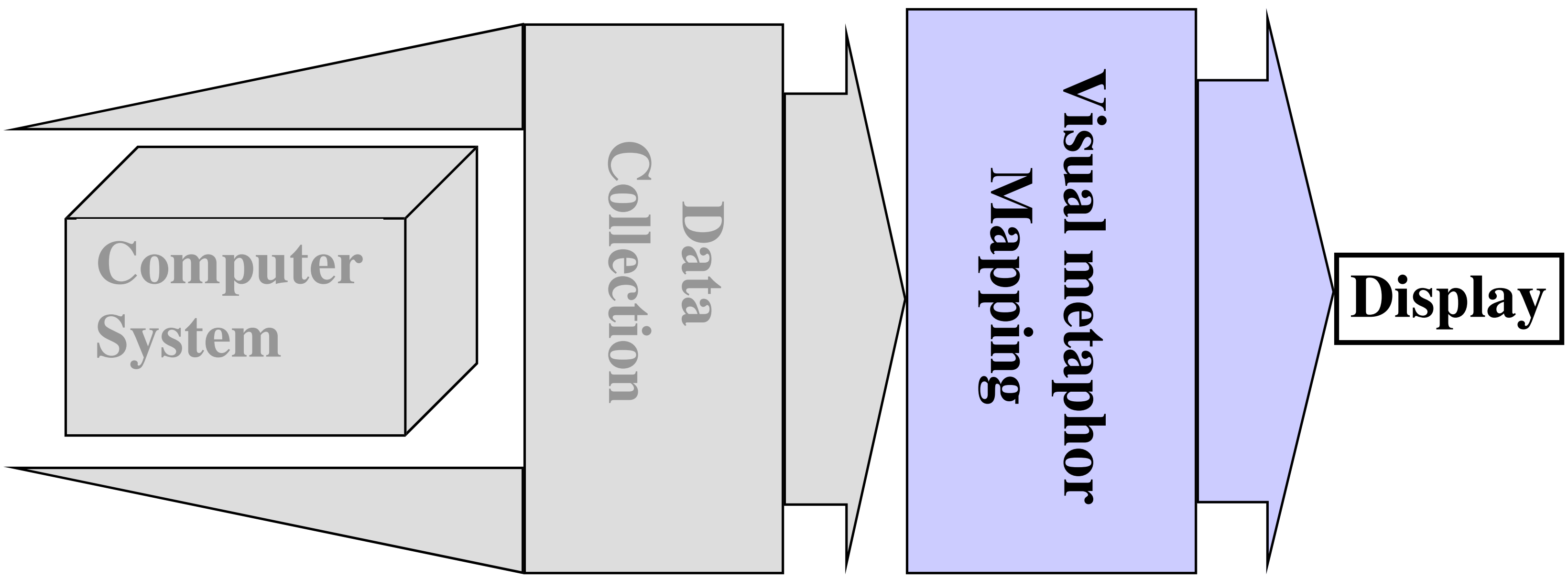
Visual Metaphors for visualizing Computer Systems

Visual metaphors



Visual metaphors

- Tend to be domain specific
- Common theme:
  - Time is frequently a dominate axis
- Main areas
  - Networks
  - Execution time
  - Memory systems
  - Parallel machines

Outline

- Quick survey of techniques
- Networks
- Computer visualization
  - Resource utilization
- Program visualization
  - Locality visualization
- Neat examples

Network visualization

- Area of much research
  - Becker, Eick, and Wilks
  - Similar to graph layout problem
- Geographic examples:
  - AT&T phone switch network (Christmas day)
  - Web access as geographic bar chart (Pablo)
  - MBONE tunnels (Geoview)

Computer System Visualization

- SGI's performance co-pilot (PCP) software
  - Time line utilization charts
  - Memory allocation classification (Bloatview)
    - Overview system by process
    - Within a process
    - Operating system
  - Bogus use of 3D example:
    - Processor/disk as 3D bar charts

Resource utilization visualization

- Strip charts (SimOS)
- Gantt charts (Paragraph)
- Kiviat diagram (2D & 3D)

Program visualization

- SGI's Workshop Pro
  - Static program visualization
  - Dynamic call graph display
  - Resource usage strip charts
  - Execution time mapped back to source & asm.
  - Heap fragmentation/error visualization
  - Working set visualization

SeeSoft

- Large scale program visualization
- Color source lines, files, etc.

Locality visualization

- Sites' instruction by data scatterplot.
- Message passing
  - Paragraph
  - Pablo's time tunnel
  - PV's block diagrams
- Multiple strip surfaces

ParVis

- Different system views
  - Single time point - snapshot
  - Animation
  - Summary statistics
  - Time-line view

IBM’s PV

- Process Tree view
- Color strip

Pablo

- Use VR
  - Scattermatrix
- Sound along with pictures