ClockMap: Enhancing Circular Treemaps with Temporal Glyphs for Time-Series Data

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Multiple Time-Series Data

Visualization of Time-Oriented Data.
Real-World Example for Time-Series Data

Monitoring Network Traffic
Glyph Design (Clockeye)

**type** = circular glyph  
**idea** = 24-hour clock metaphor  
**each segment** = 1 hour  
**color of segment** = data value

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Hierarchies in Time-Series Data

- Continents
- USA
- Germany
- Austria
- Vienna
Hierarchies in Time-Series Data

Monitoring Network Traffic
Example: Subnet Hierarchy

10.1.0.0/16

10.1.2.0/24
10.1.3.0/24
10.1.4.0/24

10.1.4.1
Circular TreeMaps

- not space-filling
- waste space
- fill space to varying degree
- introduce imprecision

For good reasons the circular treemap has not been frequently used, but our glyph is circular anyway and fixed aspect-ratio is beneficial!
ClockMap

Visually explore thousands of hierarchical time-series...
Case Study / Demo

• **Network Traffic Data**
  – Computer Network with IP addresses:
    • e.g., 10.1.2.3 / 10.99.1.2 (subnets are the hierarchy)

• **ClockMap Demo**
  – Simplified Java Applet.
  – Position of nodes is fixed.
  – Dataset anonymized and shortened to 5691 hosts, each with 24-hour time-series.

  http://ff.cx/clockmap/
Contributions & Future Work

**ClockMap** = Circular nested treemaps & Clock-like glyphs.

to visualize hierarchical time-series data.

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Generalize the Idea

Apply to other datasets / applications.

**Glyph & Layout Evaluation**

Effectiveness with user study / specific real-world tasks.
Thank you very much for your attention!

Questions?

For more information about this work please contact

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