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

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Multiple Time-Series Data





W. Aigner, S. Miksch, H. Schumann, and C. Tominski (2011). Visualization of Time-Oriented Data.

Human-Computer Interaction. Springer Verlag, 1st edition, 2011.

Real-World Example for Time-Series Data Monitoring Network Traffic



The National Archives (UK), 2011

Glyph Design (Clockeye)



type =
circular glyph

idea =
24-hour clock
metaphor

each segment =
1 hour

color of segment =
data value



C. Kintzel, J. Fuchs and F. Mansmann (2011). Monitoring Large IP Spaces with ClockView. Proc. of Int. Symp. on Visualization for Cyber Security (VizSec), 2011.

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Hierarchies in Time-Series Data



Hierarchies in Time-Series Data Monitoring Network Traffic



The National Archives (UK), 2011

Example: Subnet Hierarchy



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

0,^

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.

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

ClockMap = Circular nested treemaps & Clock-like glyphs.

to visualize hierarchical time-series data.

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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http://ff.cx/clockmap/







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