Hasso Plattner Institut
IT Systems Engineering | Universität Potsdam

Fachgebiet Computergrafische Systeme
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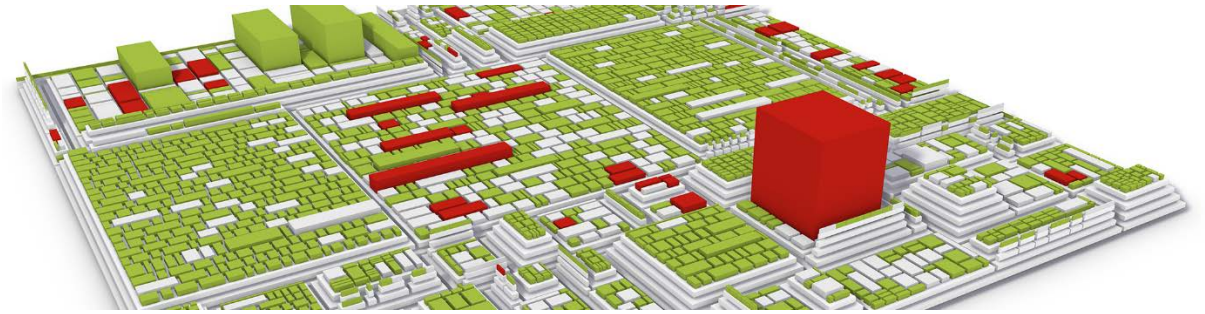
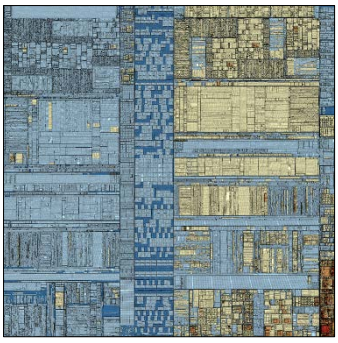


REAL-TIME MONITORING OF MASSIVE FILE SYSTEMS

Visual analytics is one of the key technological directions that shape how we can handle, manage, and use big data across different application domains. This project aims at designing and implementing a visual analytics tool for monitoring large file hierarchies in real-time using 2.5D treemaps. Files and folders are depicted as nested blocks within a 2D layout. The footprint, height, and color of a block is used to map additional data related to the depicted file, e.g., file size to footprint, access status to color, and number of modifications during the monitoring session to height. This mapping can be helpful in answering questions such as 'which files are accessed at a given moment' or 'which files were modified by a specific program during its execution'. An implementation of this file system explorer requires further investigation in the following issues:

1. Gathering file system information is usually slow, hence, high-performance streaming and caching strategies are required in order to depict the files and their attributes as fast as possible.
2. When spacing is used in the layout computation, the hierarchical nesting of folders and files hinders a uniform mapping of their sizes to a treemap node's footprint.
3. For the depiction of changes within the file system it is necessary to track file system operations such as renames, removes, moves, etc.
4. For large data, treemaps cause visual clutter as well as an increased cognitive load due to the treemap inherent 1:1 mapping of data elements to blocks. Therefore, a level-of-detail method that reduces the amount of graphical elements and preserves relevant information should be implemented.



Students should outline concepts and techniques for the monitoring of large file systems in real-time, and implement and test techniques that assist to build a next-generation file system exploration tool. The software will be based on an open-source computer graphics middleware and a research prototype for high-performance hierarchy visualizations.

The presented topic links to current research and software projects of the HPI's Computer Graphics Systems group. It is especially suited for further research in the context of a master thesis or a future doctoral thesis.

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