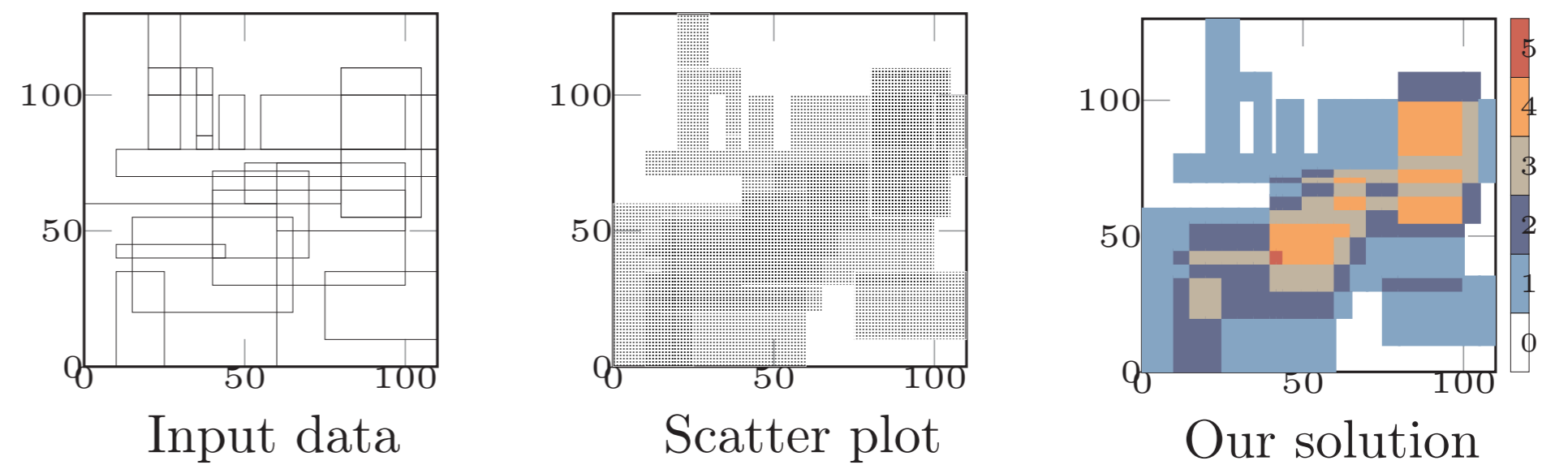


## PROBLEM DESCRIPTION

- Input: two datasets with intervals
- Goal: find if intervals **correlate**
- Solution: **Rectangle Aggregation** and visualization using **color-coding of heatmaps**
- Examples
  - daily low-high prices of two stocks
  - daily low-high temperature for two locations
  - booking period and stay period of tourists

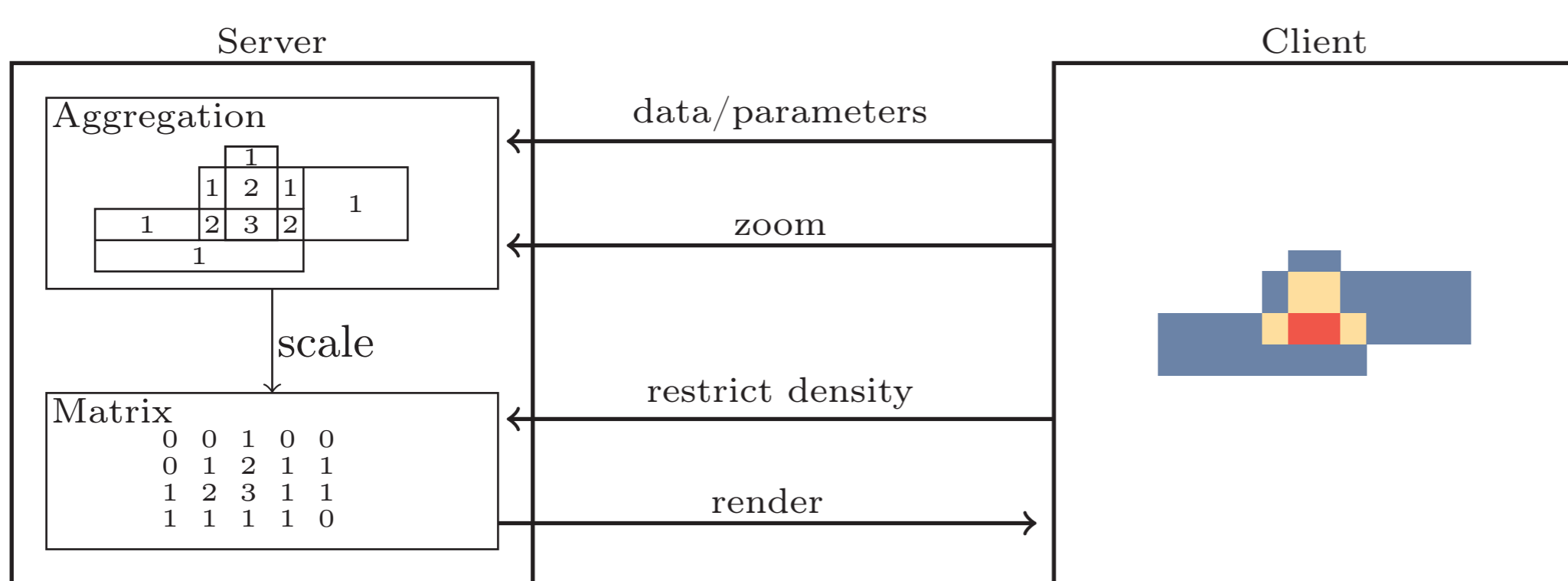


## CHALLENGES

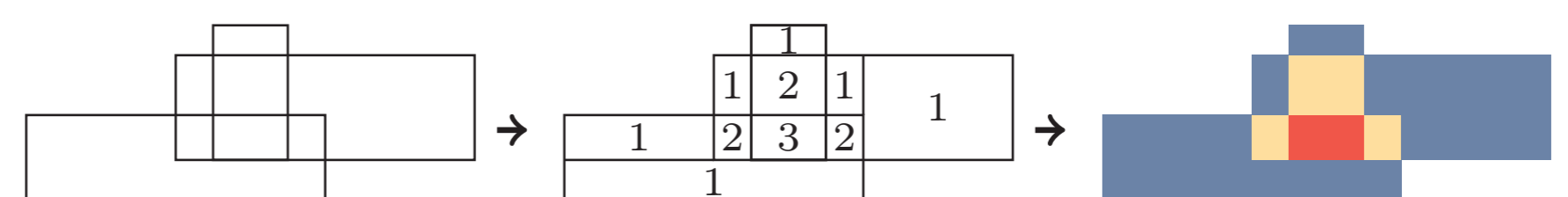
- Conventional scatterplot **insufficient for interval measures**
- **Efficient** rectangle aggregation

## SYSTEM DESCRIPTION

- Client/Server architecture
- Operations:
  - Upload datasets; download the generated image; query values of each point
  - Zooming: user selects area of interest
  - Restrict density: only densities in a specified range are shown
- Server computes aggregation result. Result is **kept in memory** and **re-used** in successive requests
- Server scales the result to lower resolution: **avoid large data transfers and rendering times**
- <https://dbs.inf.unibz.it/projects/tda/>



## RECTANGLE AGGREGATION



Bitemporal Aggregation / Spatiotemporal Aggregation

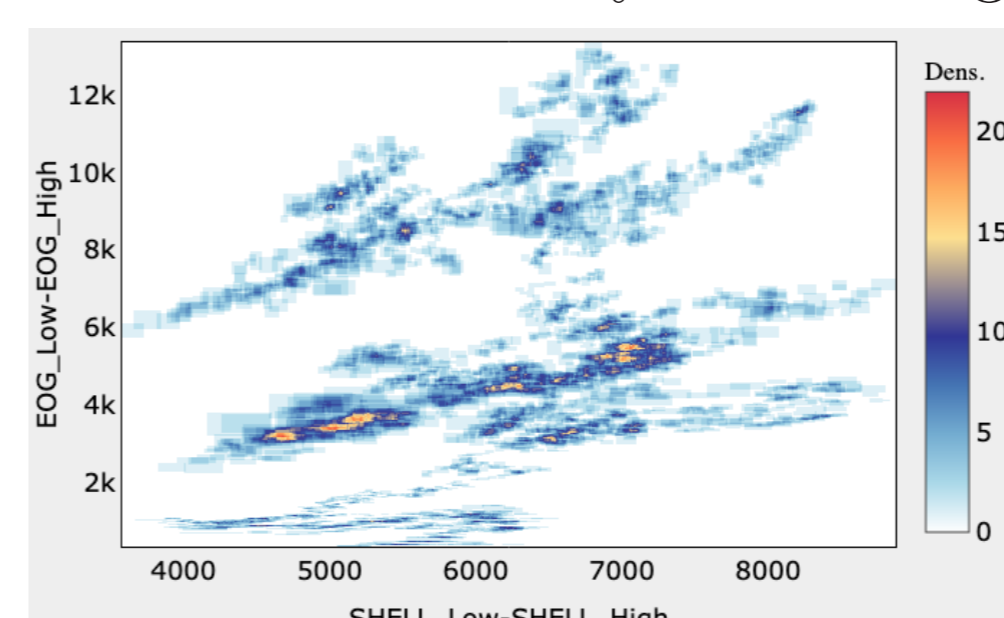
- Sweep along first dimension to determine active tuples
- Aggregate the active tuples over the second dimension

HotPeriods uses a **combination** of

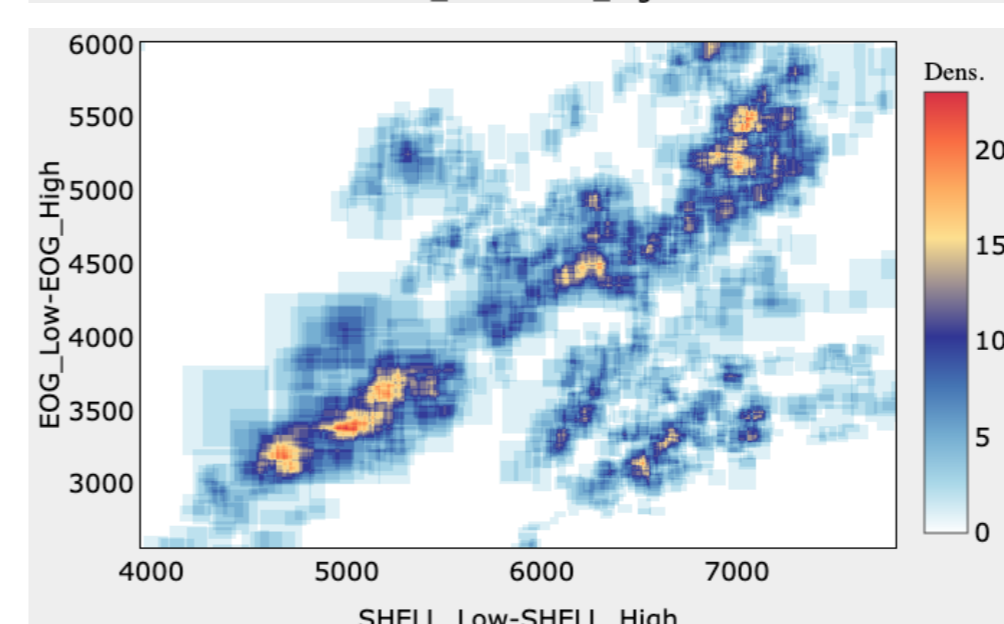
- **cache efficient** Aggregation for **first** dimension
- Aggregation based on **dynamic data structure** for **second** dimension

## SCENARIO 1

Dataset records daily low and high rate of two stocks

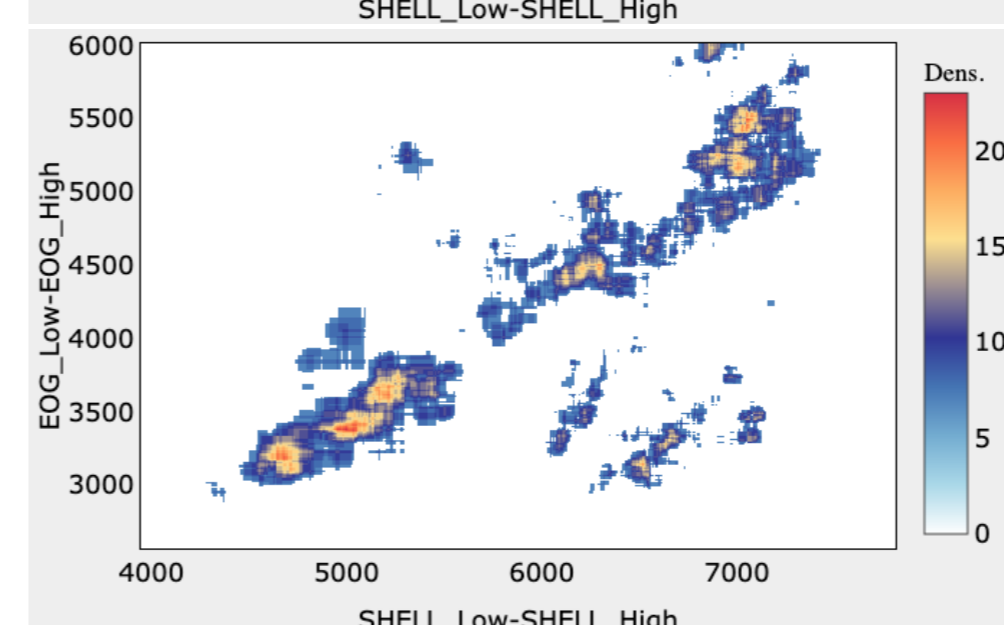


- Identify a linear correlation between the two rates
- Note: traditional scatter plot only either high or low can be plotted
- HotPeriods visualizes the entire daily range



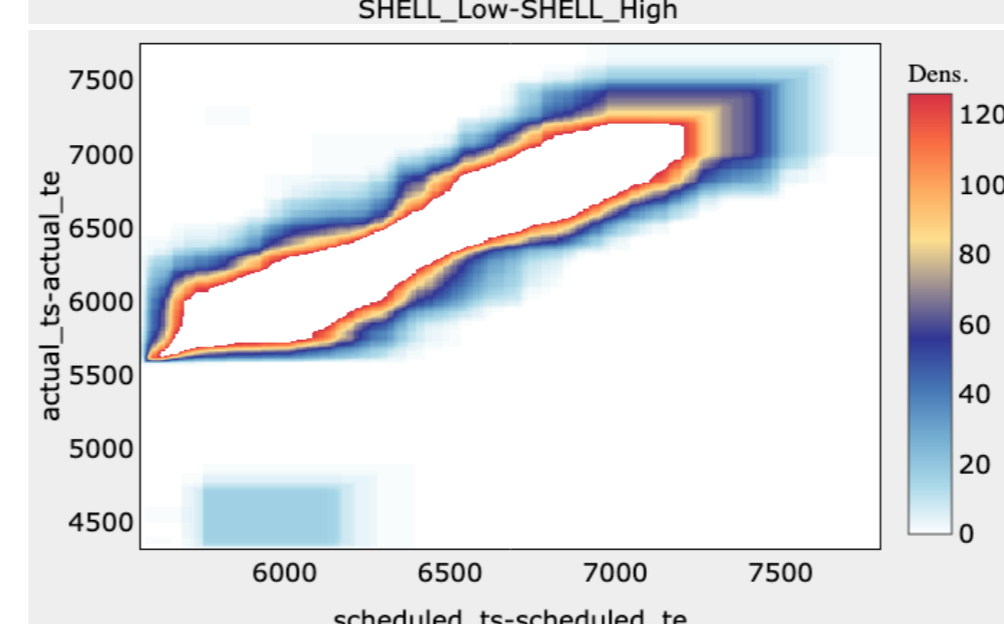
User zooms in area

- Density matrix is computed out of rectangle aggregation



Restrict density

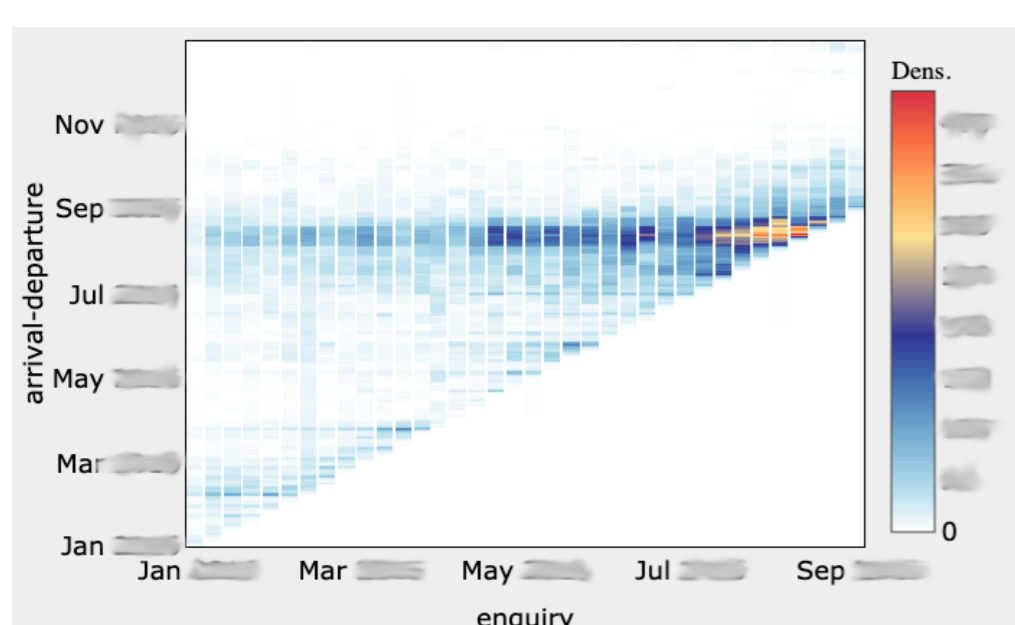
- only density matrix is used for rendering new image



Identification of outliers through blank out of high densities (figure shows a different dataset)

## SCENARIO 2

Dataset records hotel searches  
Two periods **enquiry** and **stay**



- Staircase pattern: many tourists book last minute
- Dense region from mid August to September: most requests
- Identify time frames for advertising campaigns