

# Optimization cycles — MemAxes / Mitos

Measurement, analysis, and visualization of data movements on HPC nodes

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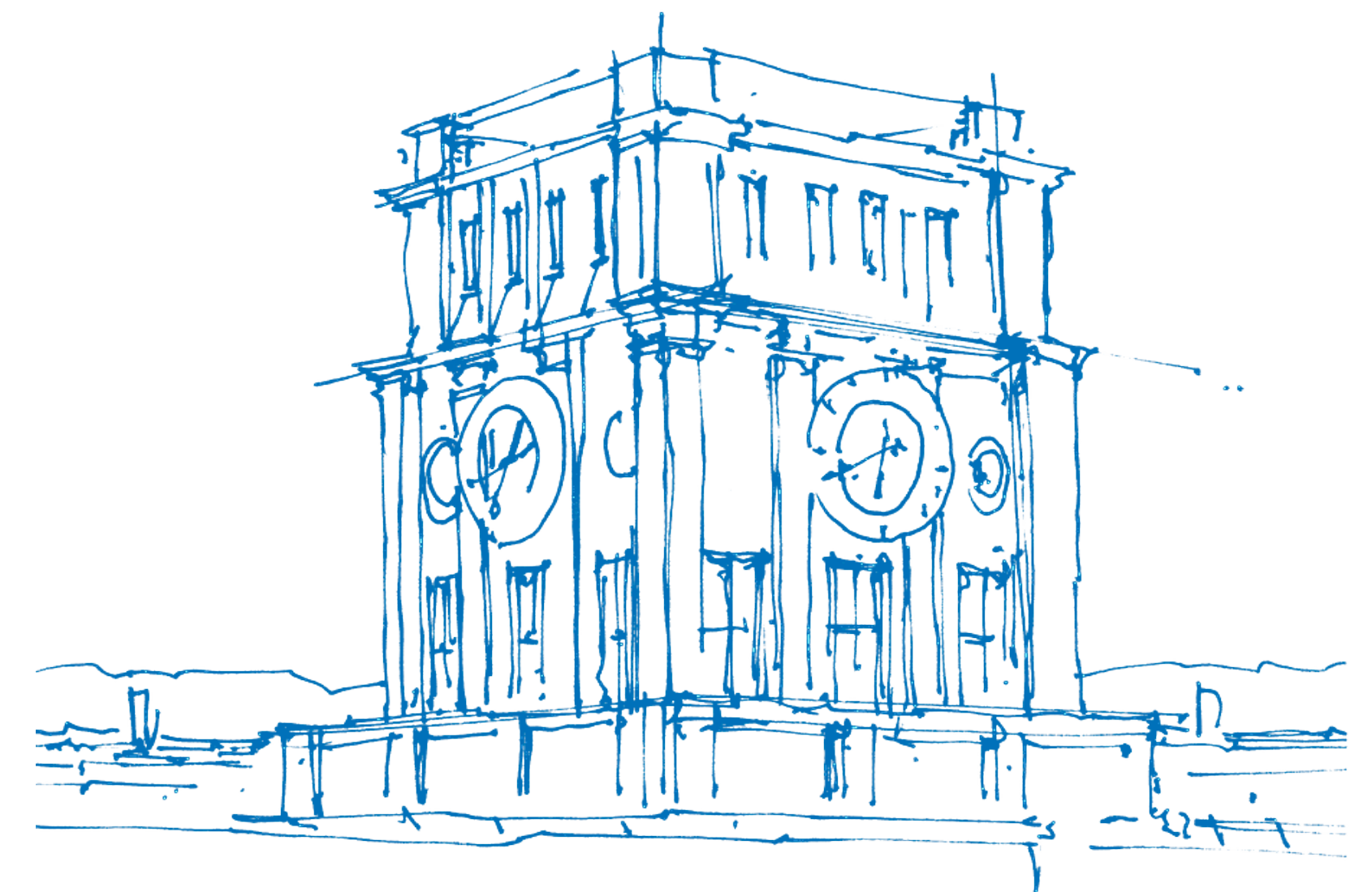
**Martin Schulz**

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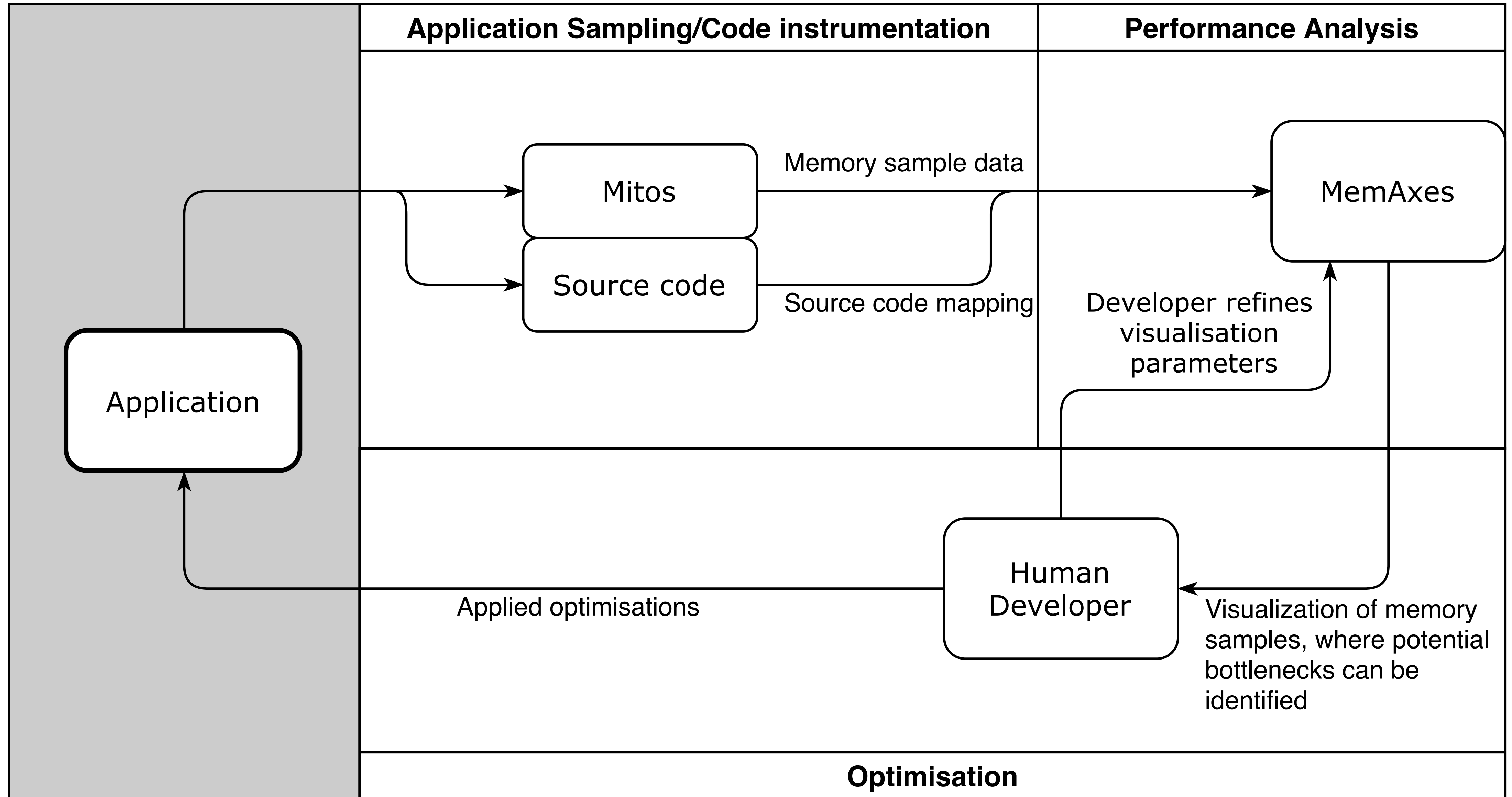
Technische Universität München

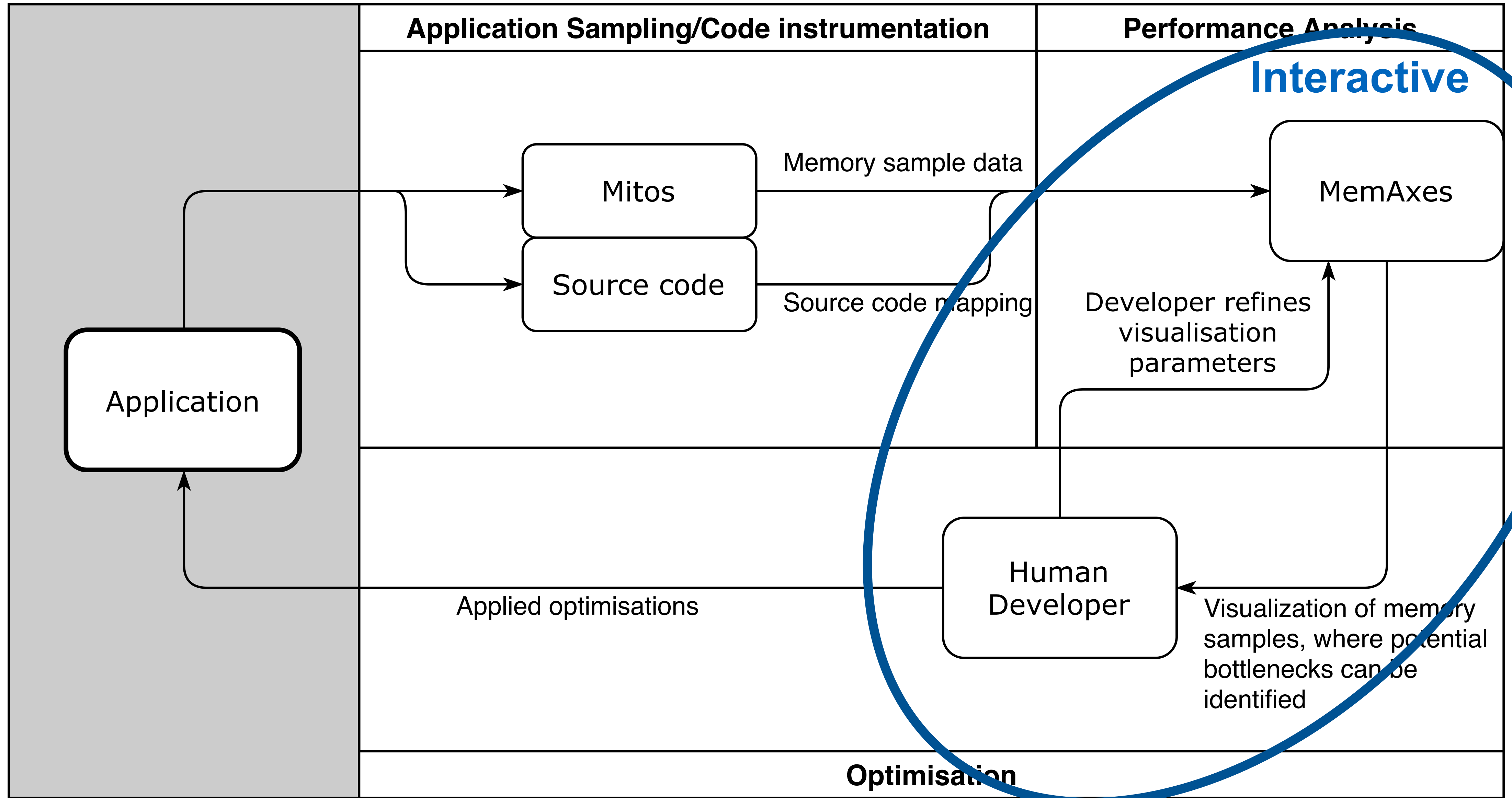
Fakultät für Informatik

Lehrstuhl für Rechnerarchitektur & Parallele Systeme



*TUM Uhrenturm*





Code

Top Offenders

Source Lines

?? 0

Data Objects

??

Memory Topology

Visualization Layout

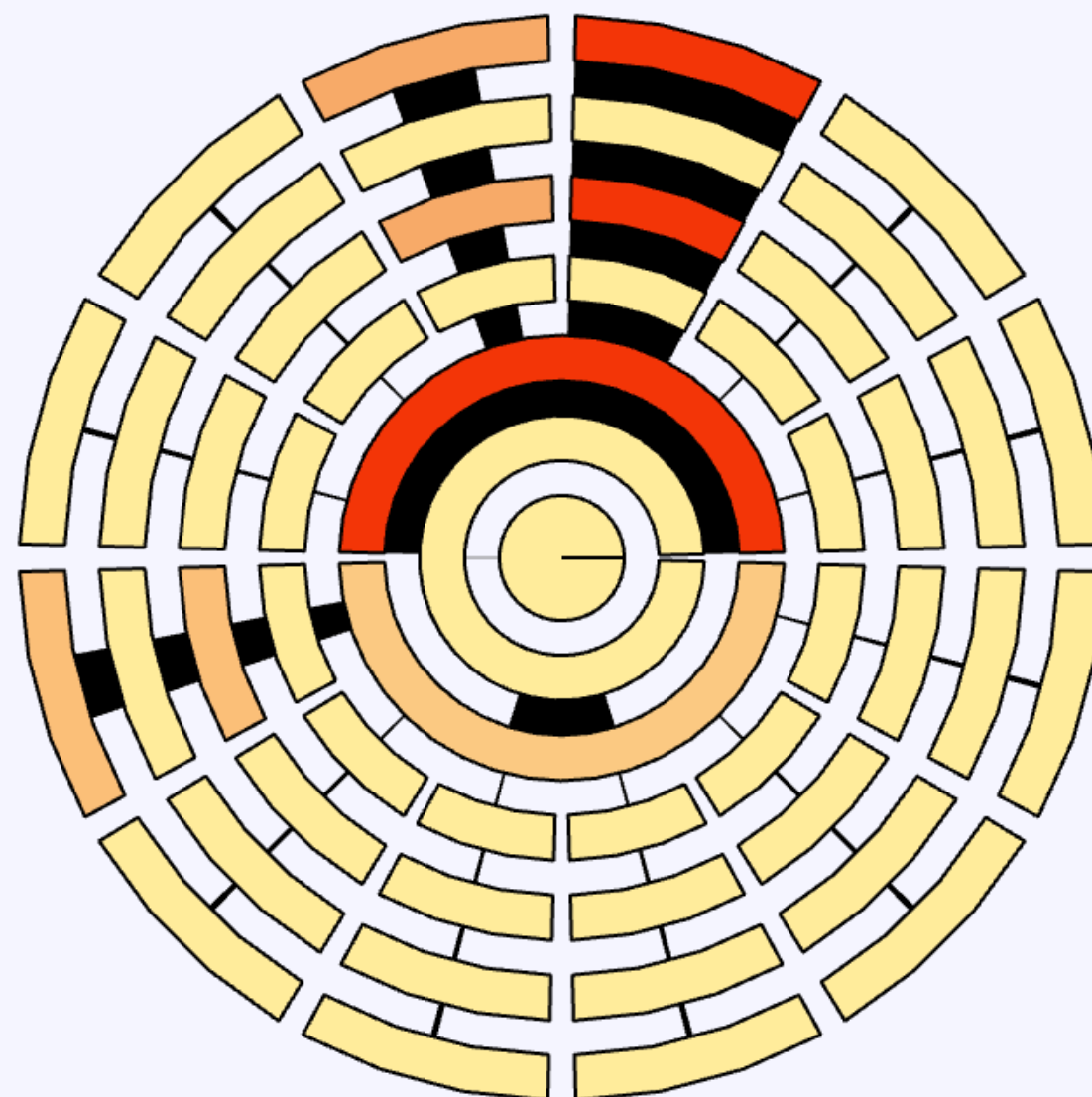
Icicle

Sunburst

Color by:

# of cycles

# of samples



Console

```
select [--mode={new,append,filter}] <query>
hide <query>
show <query>
```

<query> is of the form:  
[DIMRANGE dim=vmin:vmax]  
[RESOURCE resource=id]

inspect

derivedim <expression>  
<expression> is of the form:  
dim1 <op> dim2  
<op> is one of:  
+ - \* /

Examples :  
select DIMRANGE 4=30:40 5=4:5

Selection / Visibility

Select All

Deselect All

Select Visible

Select Mode:

New

Append

Filter

Show All

Show Selected

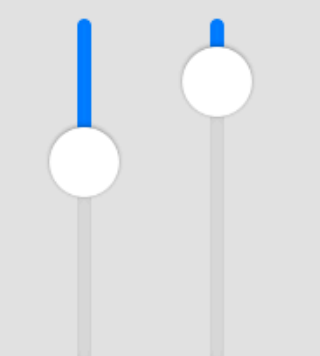
Hide Selected

Parallel Coordinates

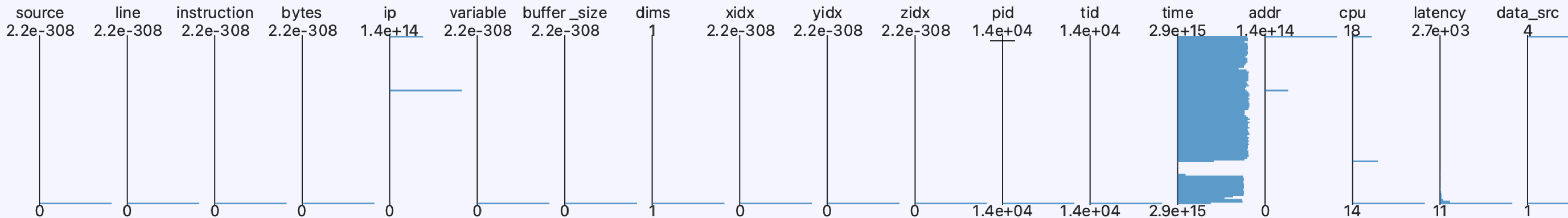
PCoords Options

Opacity:

Sel Unsel



Histograms





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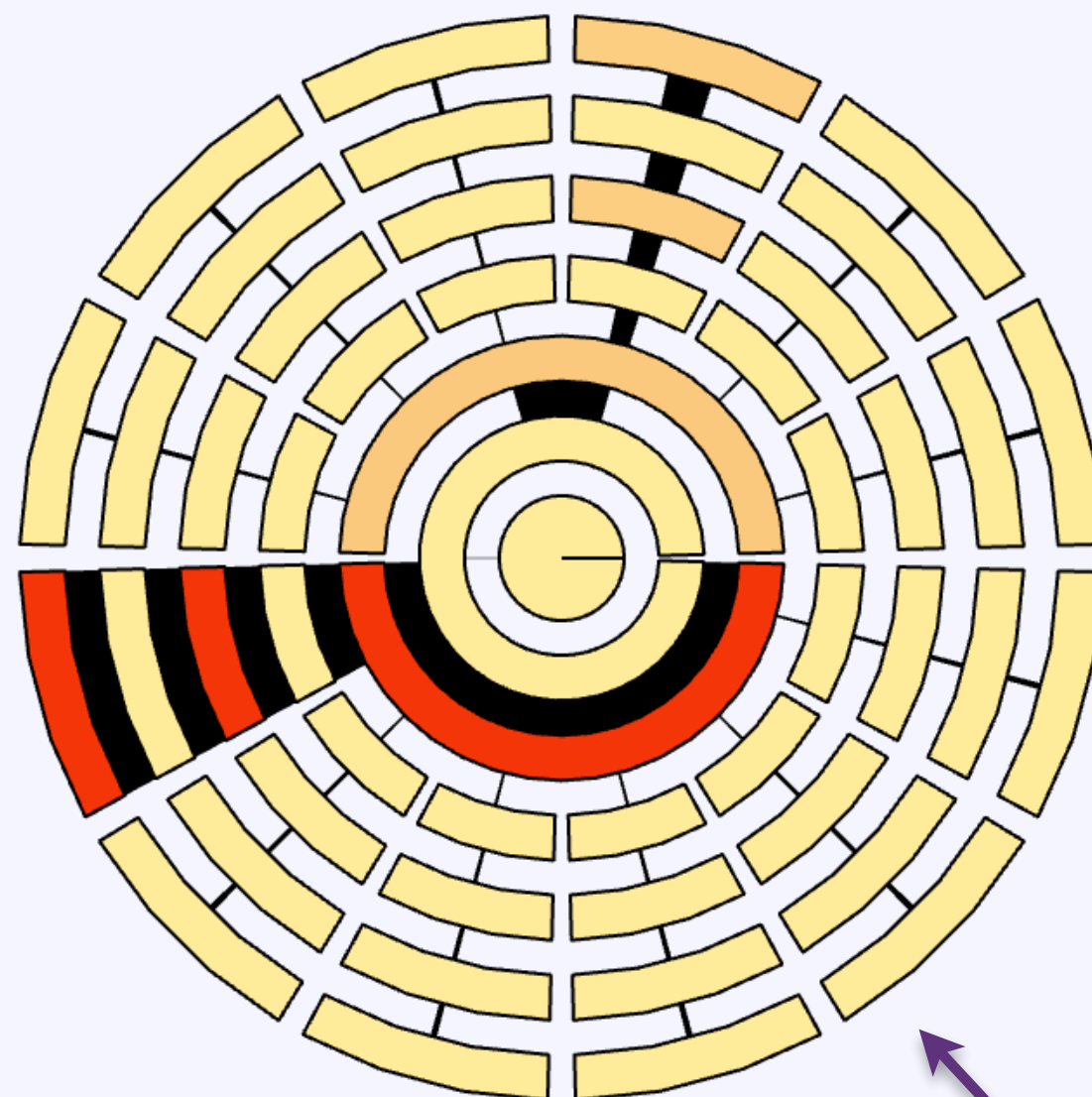
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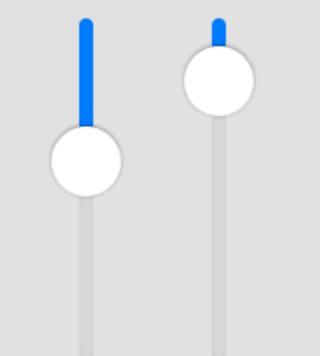
Hide Selected

Parallel Coordinates

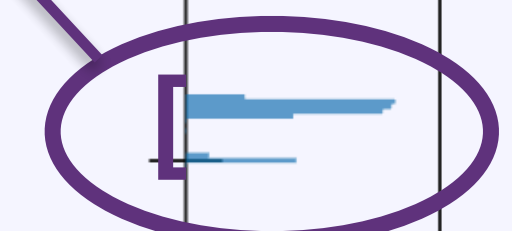
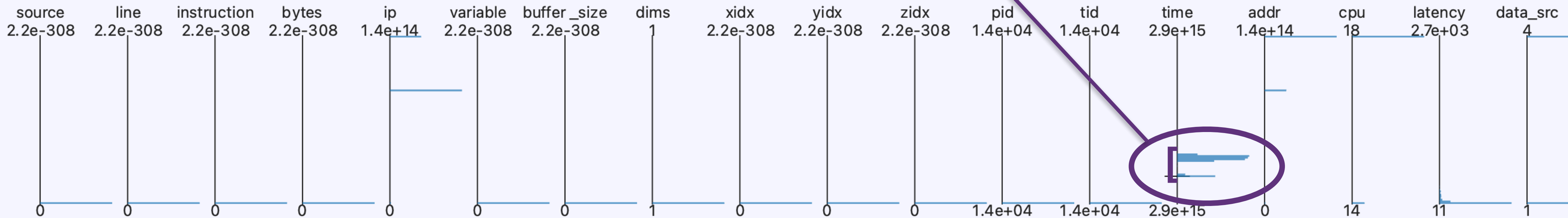
PCoords Options

Opacity:

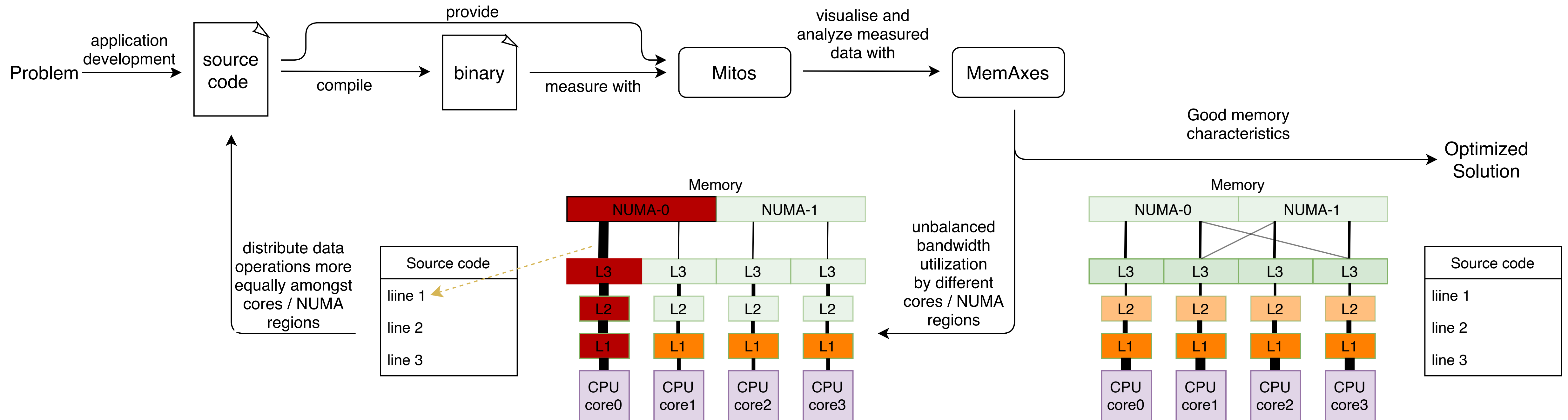
Sel Unsel



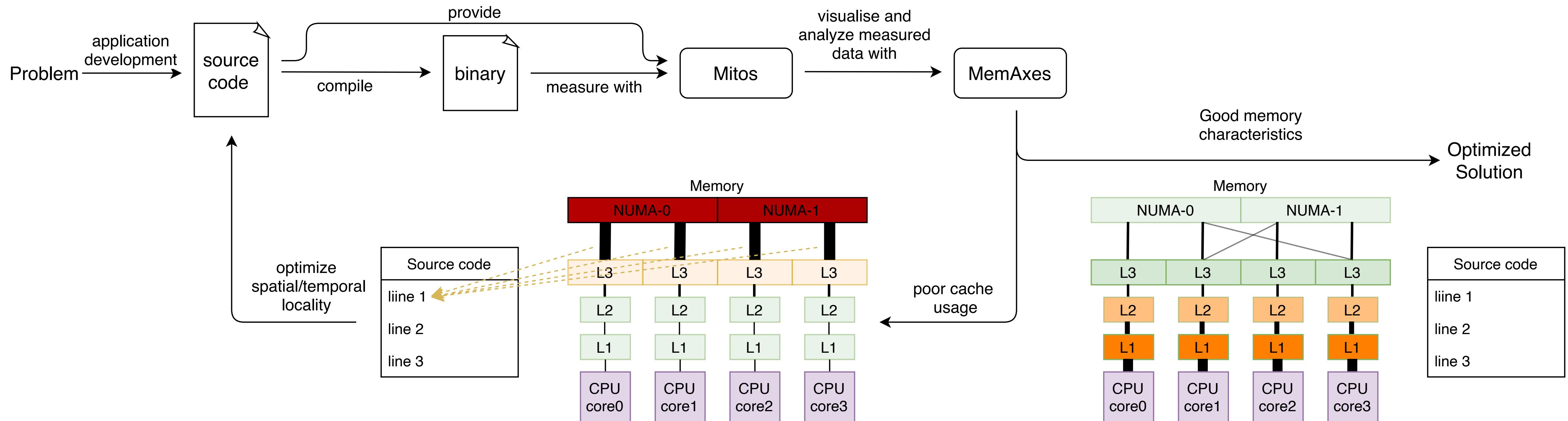
Histograms



# Use-case example



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# Optimization cycles

1. Developer prepares an application for analysis and defines parameters for code sampling.
2. Mitos wrapper triggers the application and collects memory samples; these are saved in an output file.
3. Output file is opened in MemAxes, where the collected samples are visualised.
4. The developer analyzes the data and interactively refines visualisation parameters.
5. Based on the observed behaviour, optimizations can be proposed and implemented.
6. Repeated run verifies the effect of implemented optimizations.