



VAMPIR

Introduction And Overview

EuroMPI 2012 in Vienna
September, 2012

Bert Wesarg

Slides by: Andreas Knüpfer, Jens Doleschal,
ZIH, Technische Universität Dresden

Part I: Welcome to the Vampir Tool Suite

- Event Trace Visualization
- Vampir & VampirServer
- The Vampir Displays
 - Timeline
 - Process Timeline with Performance Counters
 - Summary Display
 - Message Statistics

Part II: Hands On

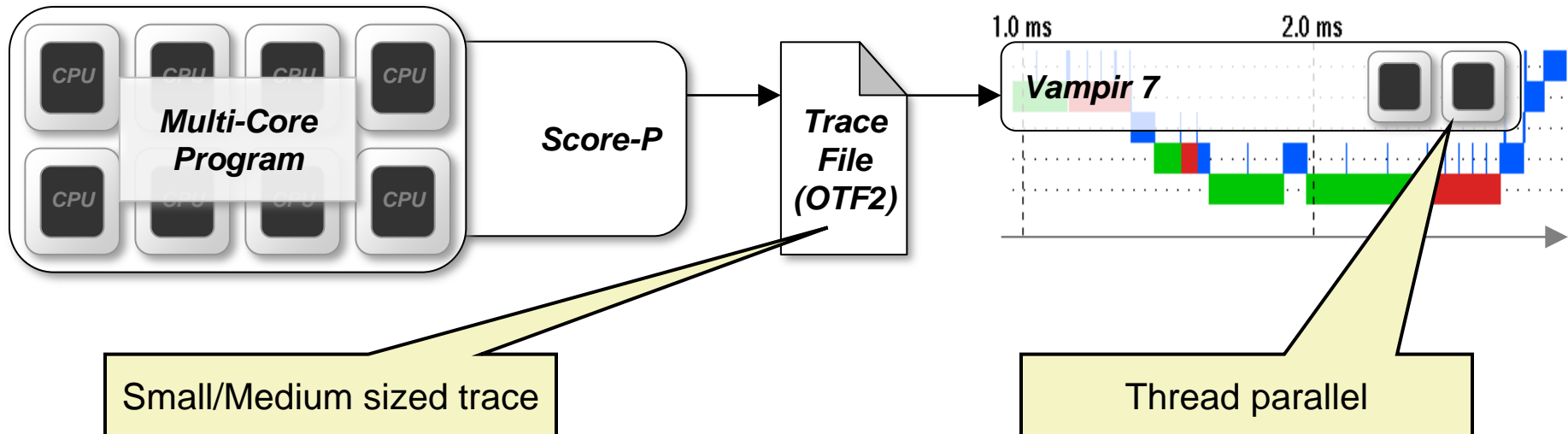
Trace Visualization

- Alternative and supplement to automatic analysis
- Show dynamic run-time behavior graphically
- Provide statistics and performance metrics
 - Global timeline for parallel processes/threads
 - Process timeline plus performance counters
 - Statistics summary display
 - Message statistics
 - more
- Interactive browsing, zooming, selecting
 - Adapt statistics to zoom level (time interval)
 - Also for very large and highly parallel traces

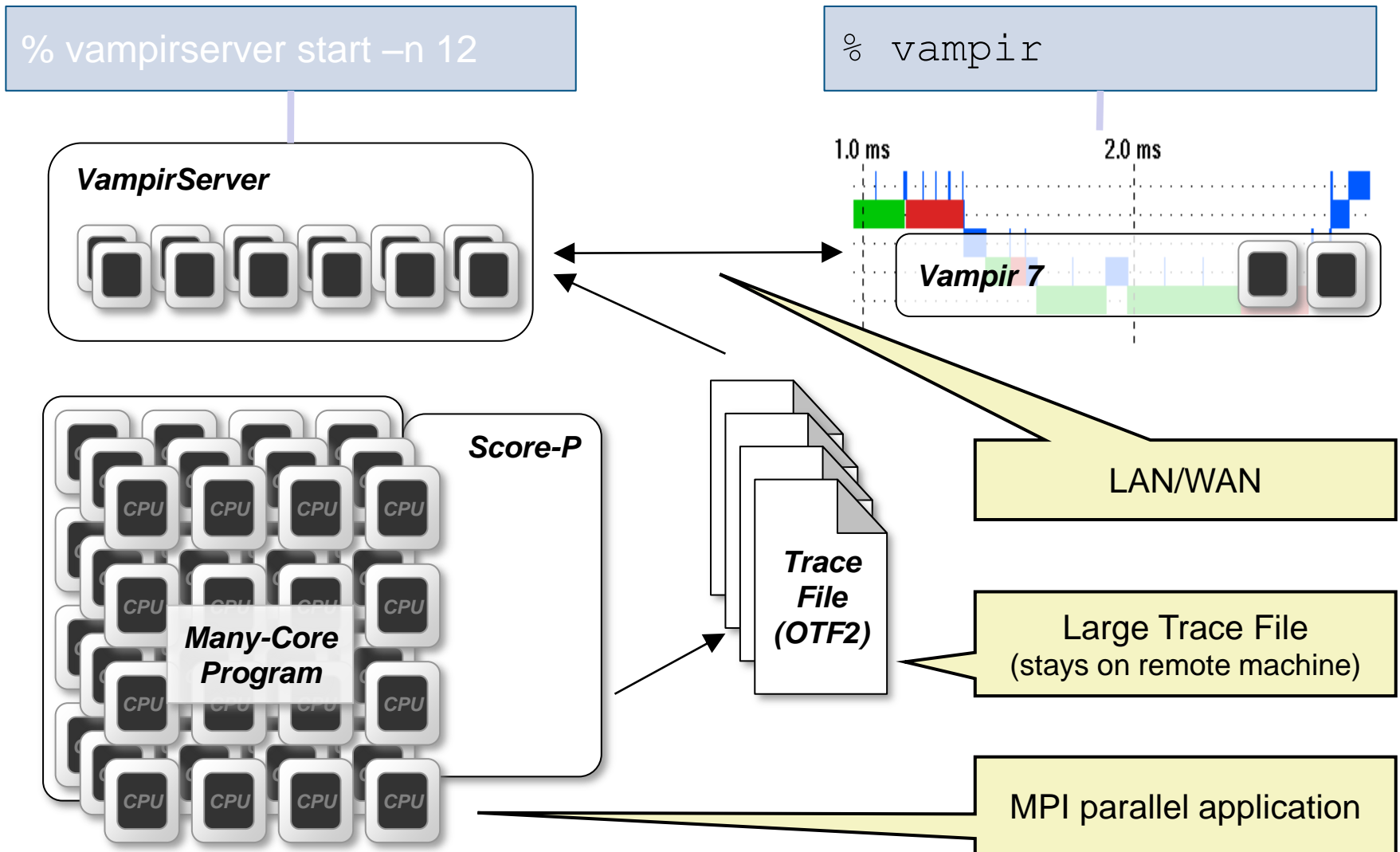
BUT, it does neither solve your problems automatically nor point you directly at them. It does, however, give you FULL insight into the execution of your application.

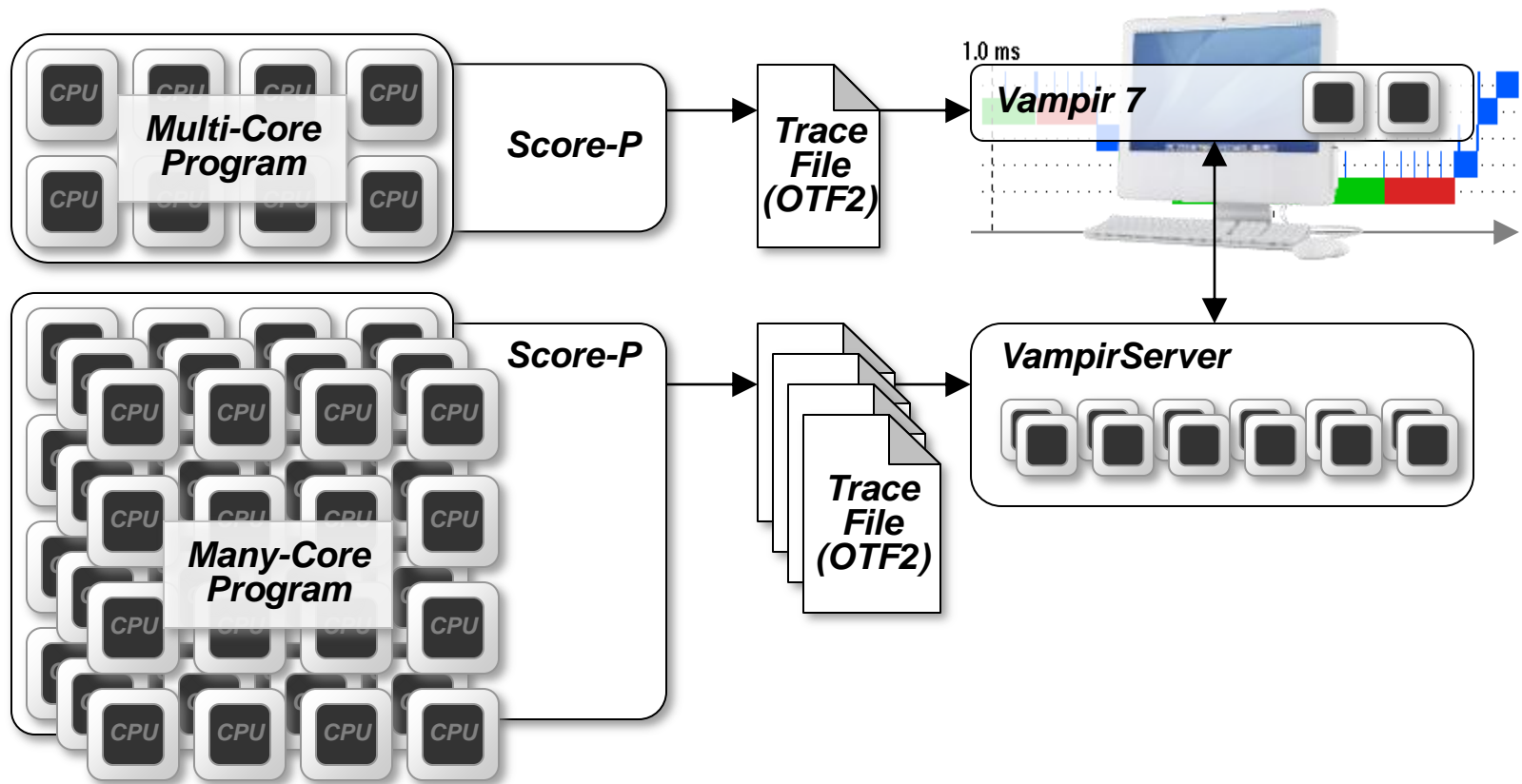
- Directly on front end or local machine

```
% vampir
```



- On local machine with remote VampirServer



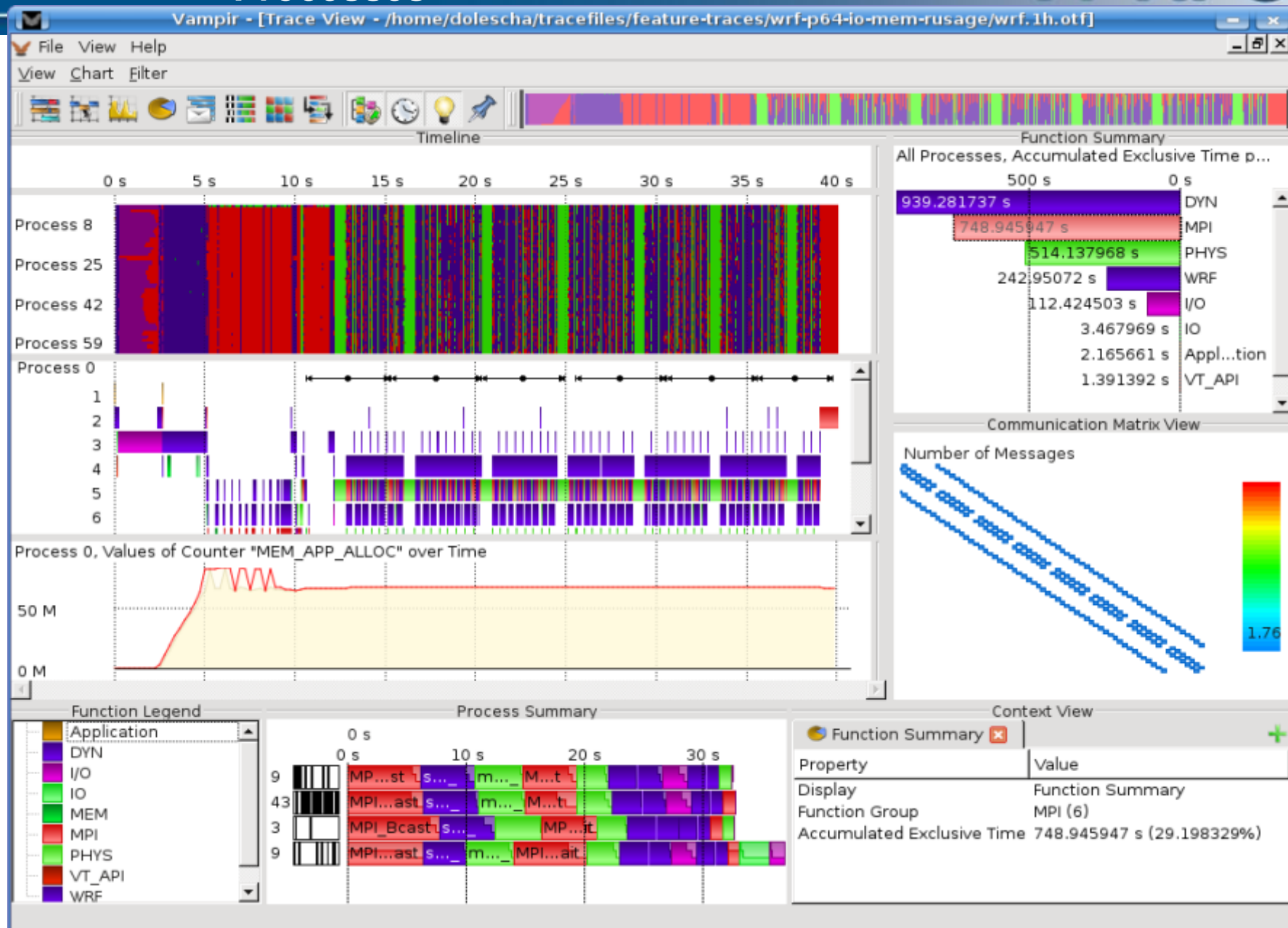


1. Instrument your application with Score-P
2. Run your application with an appropriate test set
3. Analyze your trace file with Vampir
 - Small trace files can be analyzed on your local workstation
 1. Start your local Vampir
 2. Load trace file from your local disk
 - Large trace files should be stored on the HPC file system
 1. Start VampirServer on your HPC system
 2. Start your local Vampir
 3. Connect local Vampir with the VampirServer on the HPC system
 4. Load trace file from the HPC file system

The main displays of Vampir:

- Master Timeline (Global Timeline)
- Process and Counter Timeline
- Function Summary
- Message Summary
- Process Summary
- Communication Matrix
- Call Tree

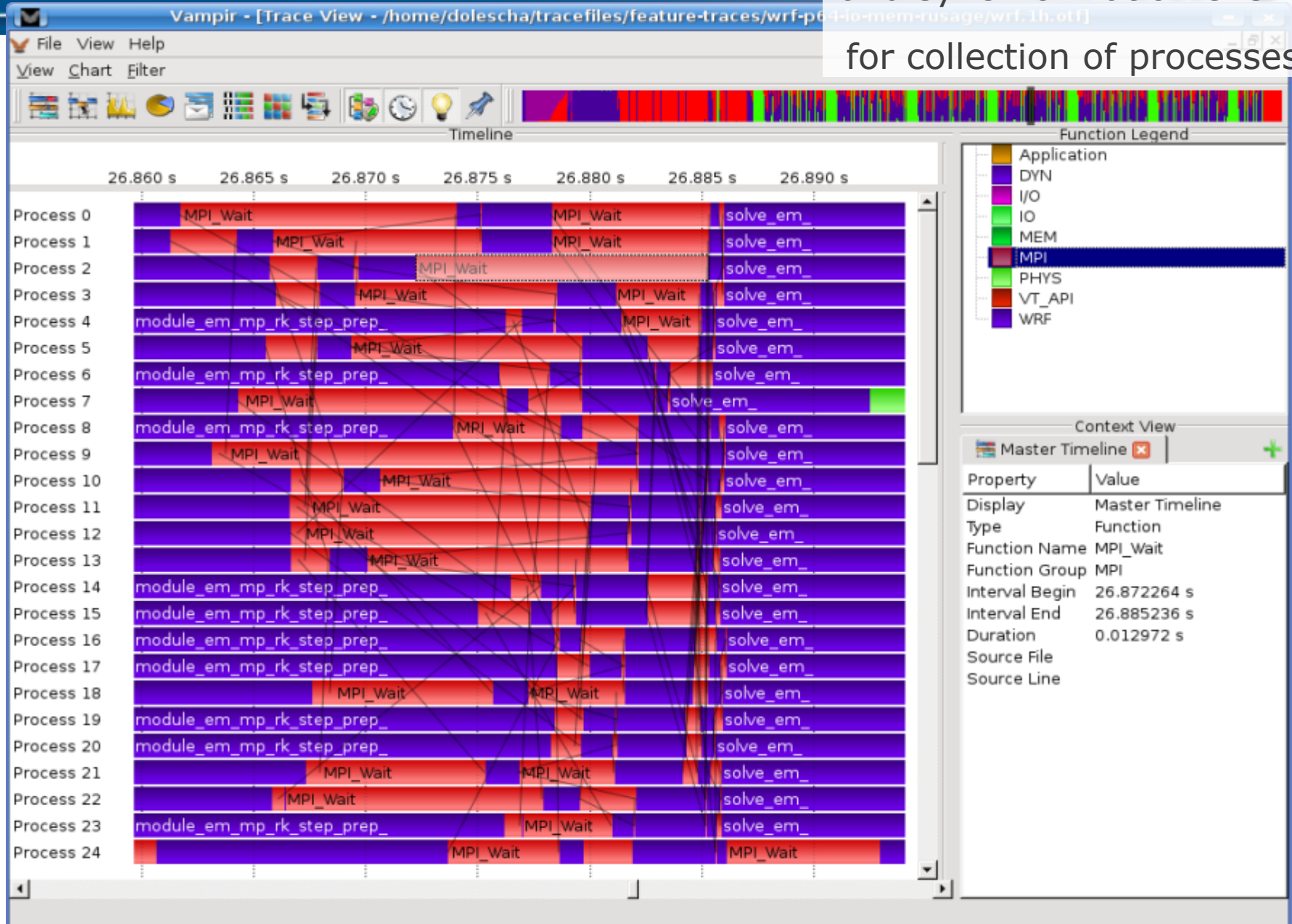
Vampir 7: Displays for a WRF Trace with 64 Processes





Master Timeline (Global Timeline)

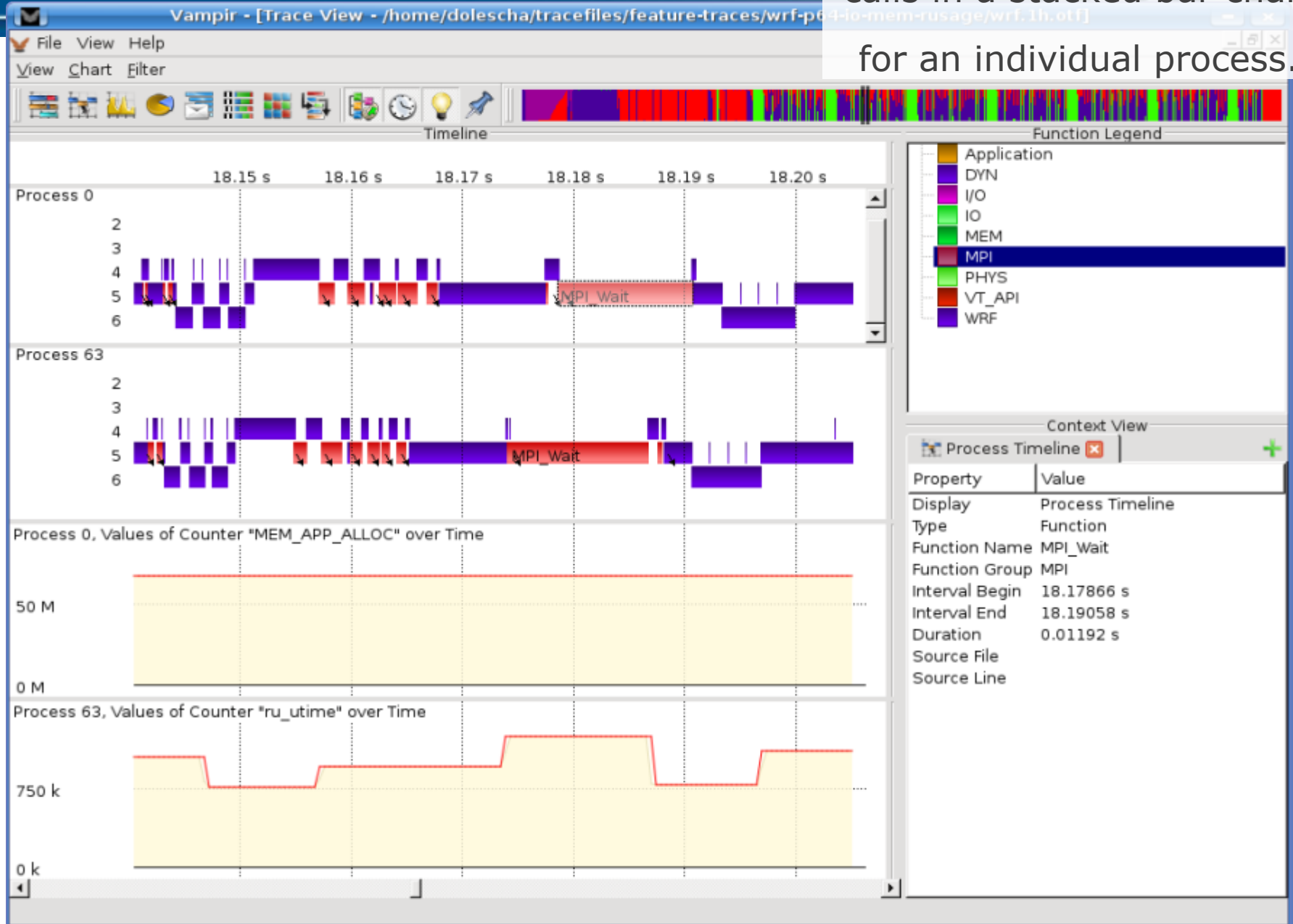
Detailed information about functions, communication and synchronization events for collection of processes.



Process and Counter Timeline

Detailed information about different levels of function calls in a stacked bar chart

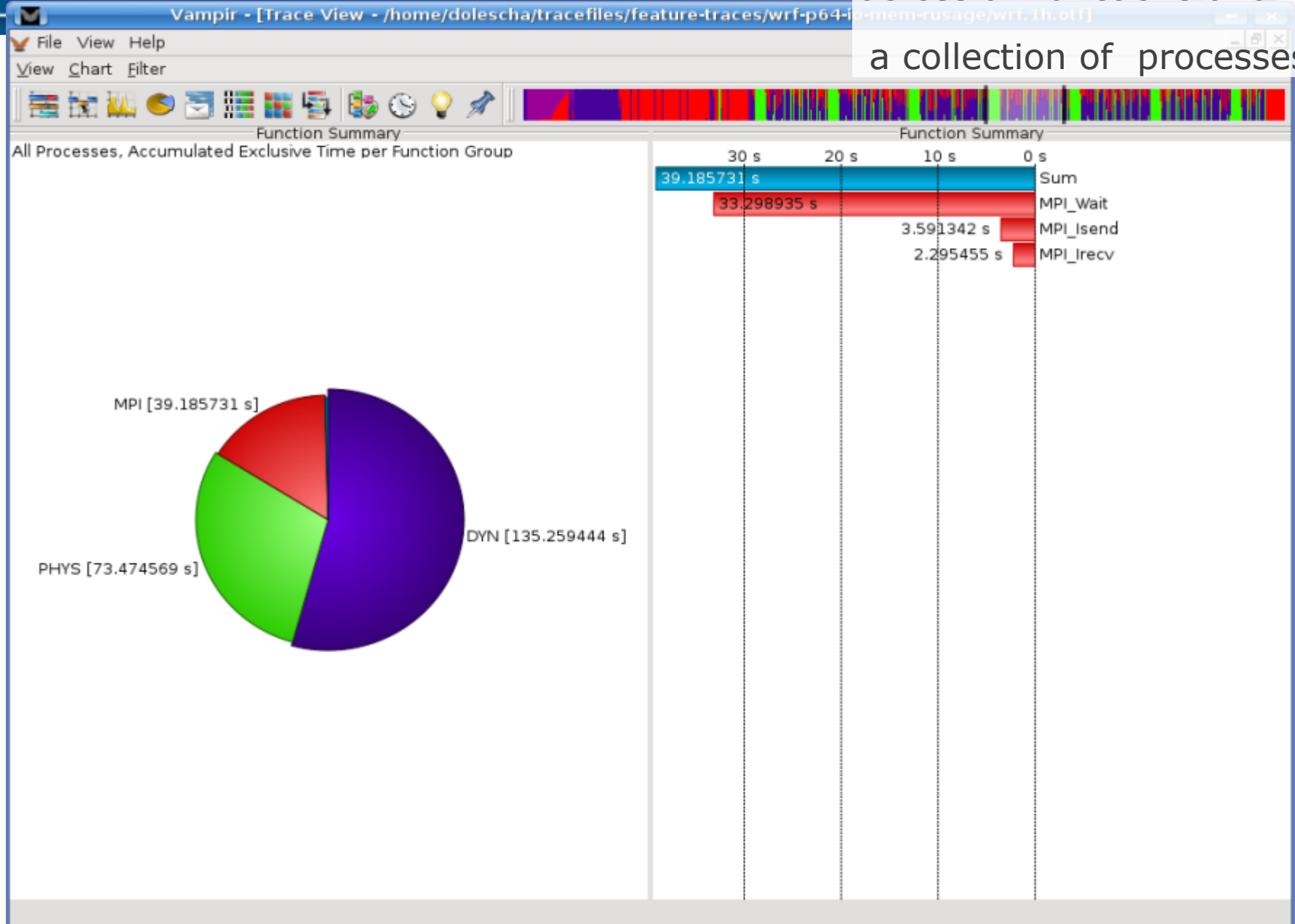
for an individual process.





Function Summary

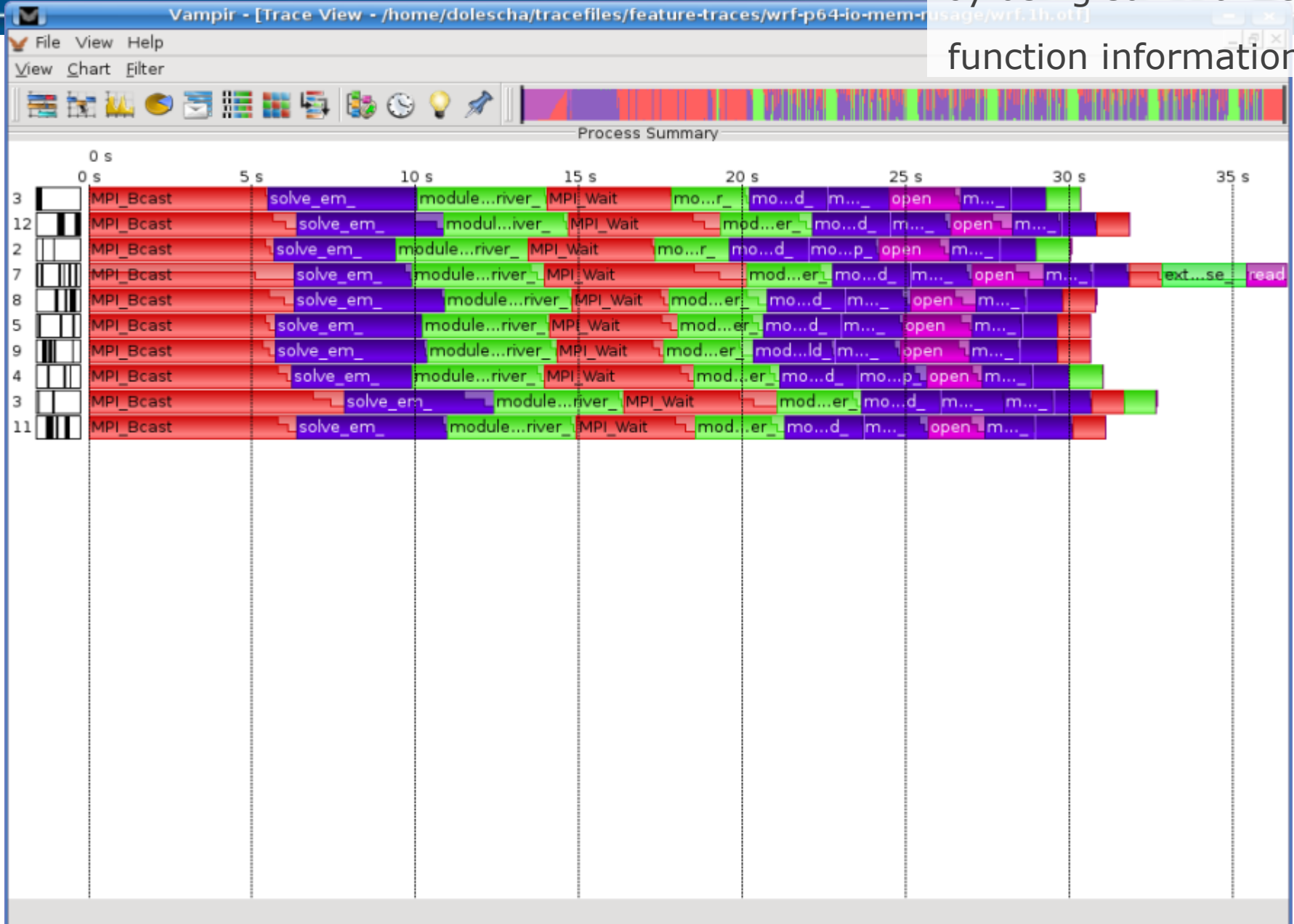
Overview of the accumulated information across all functions and for a collection of processes.





Process Summary

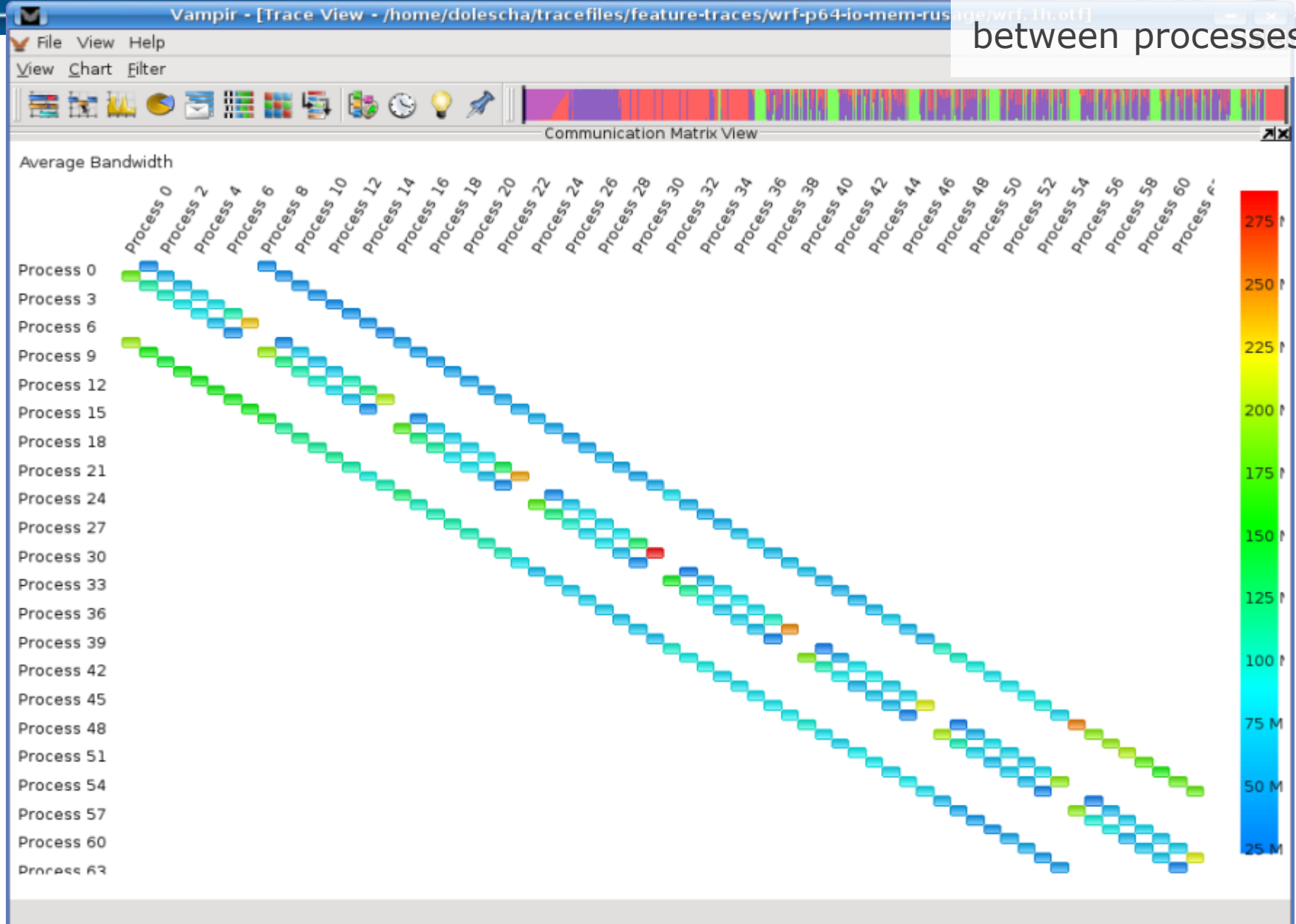
Find groups of similar processes and threads by using summarized function information.





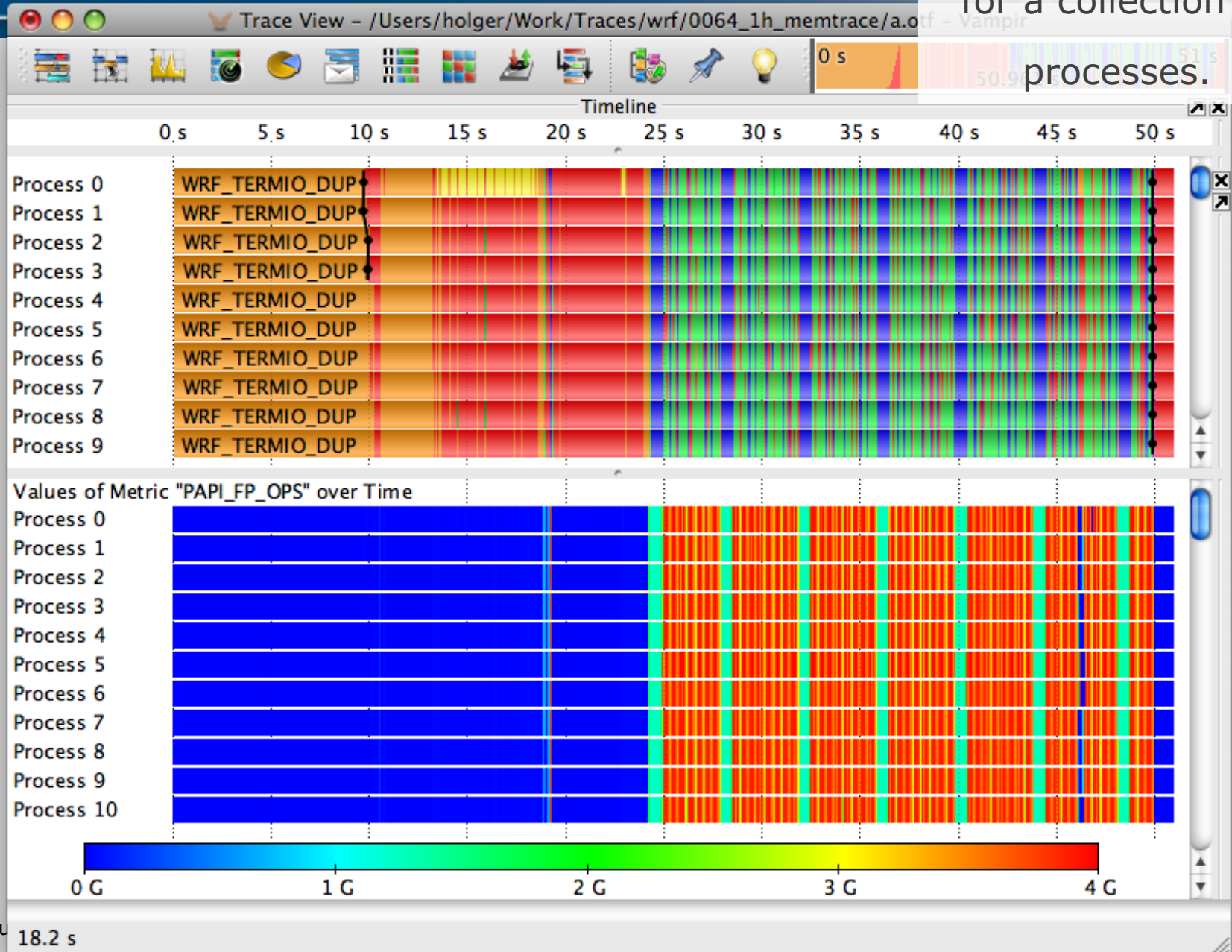
Communication Matrix

Information about
messages sent
between processes.



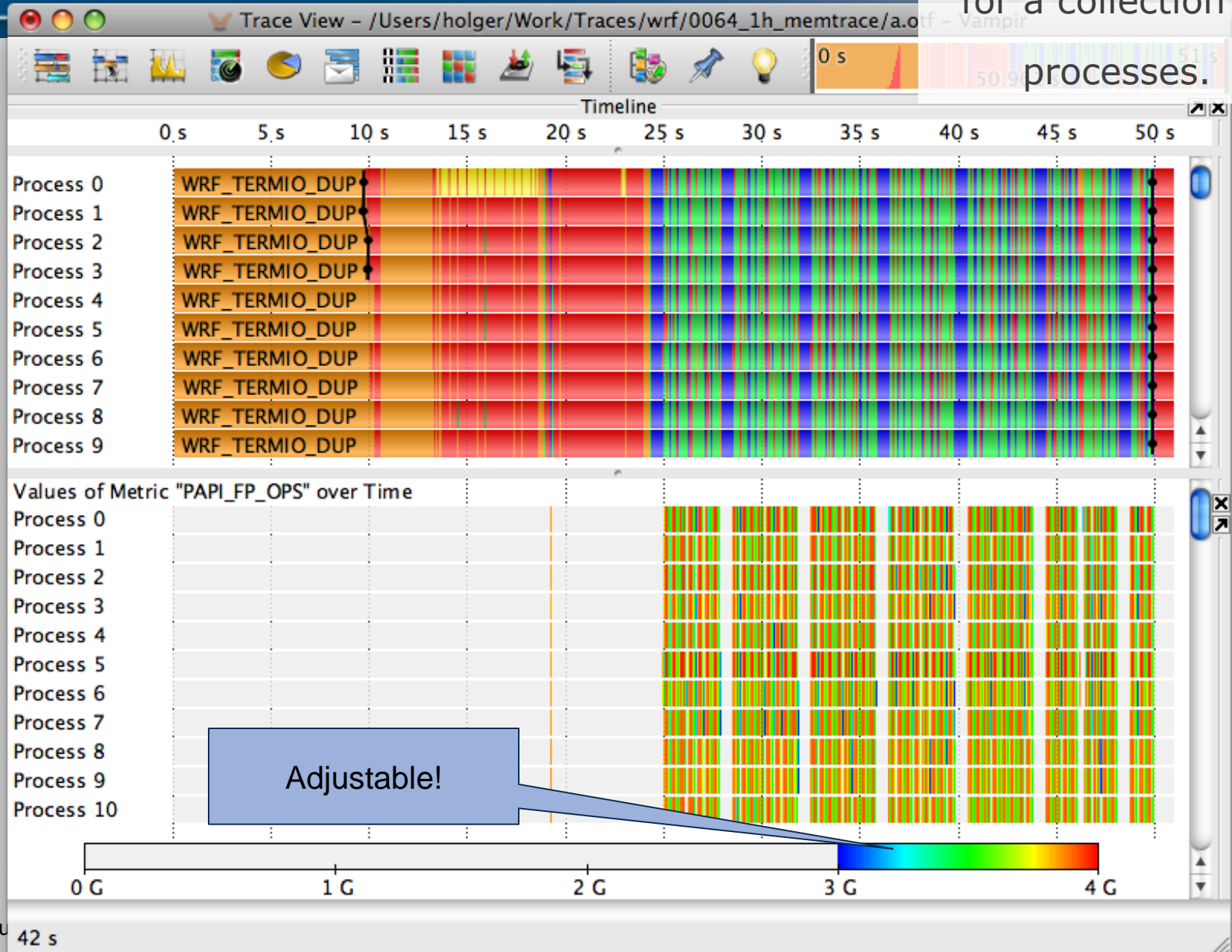
Performance Radar

Detailed counter information over time for a collection of processes.



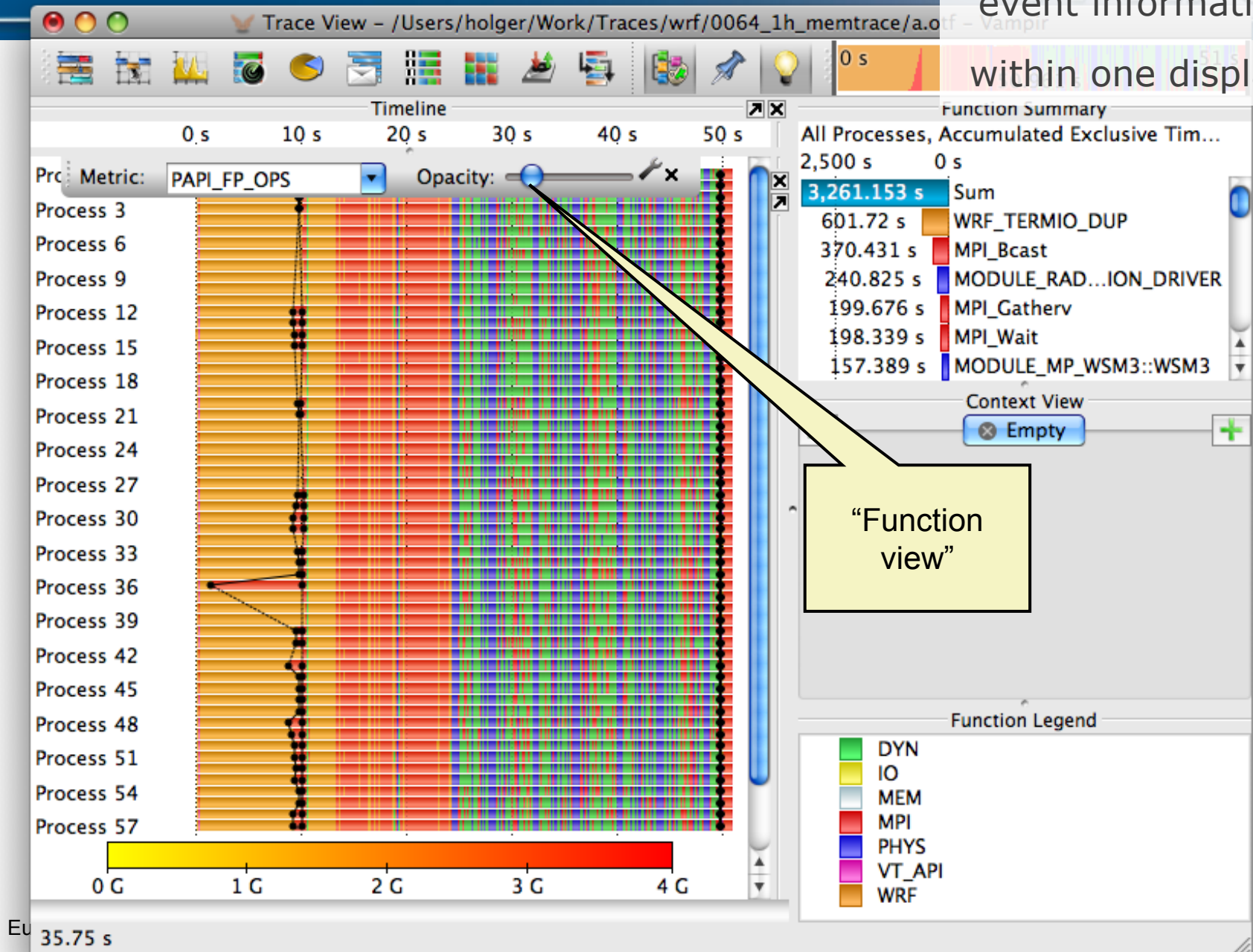
Performance Radar

Detailed counter information over time for a collection of processes.



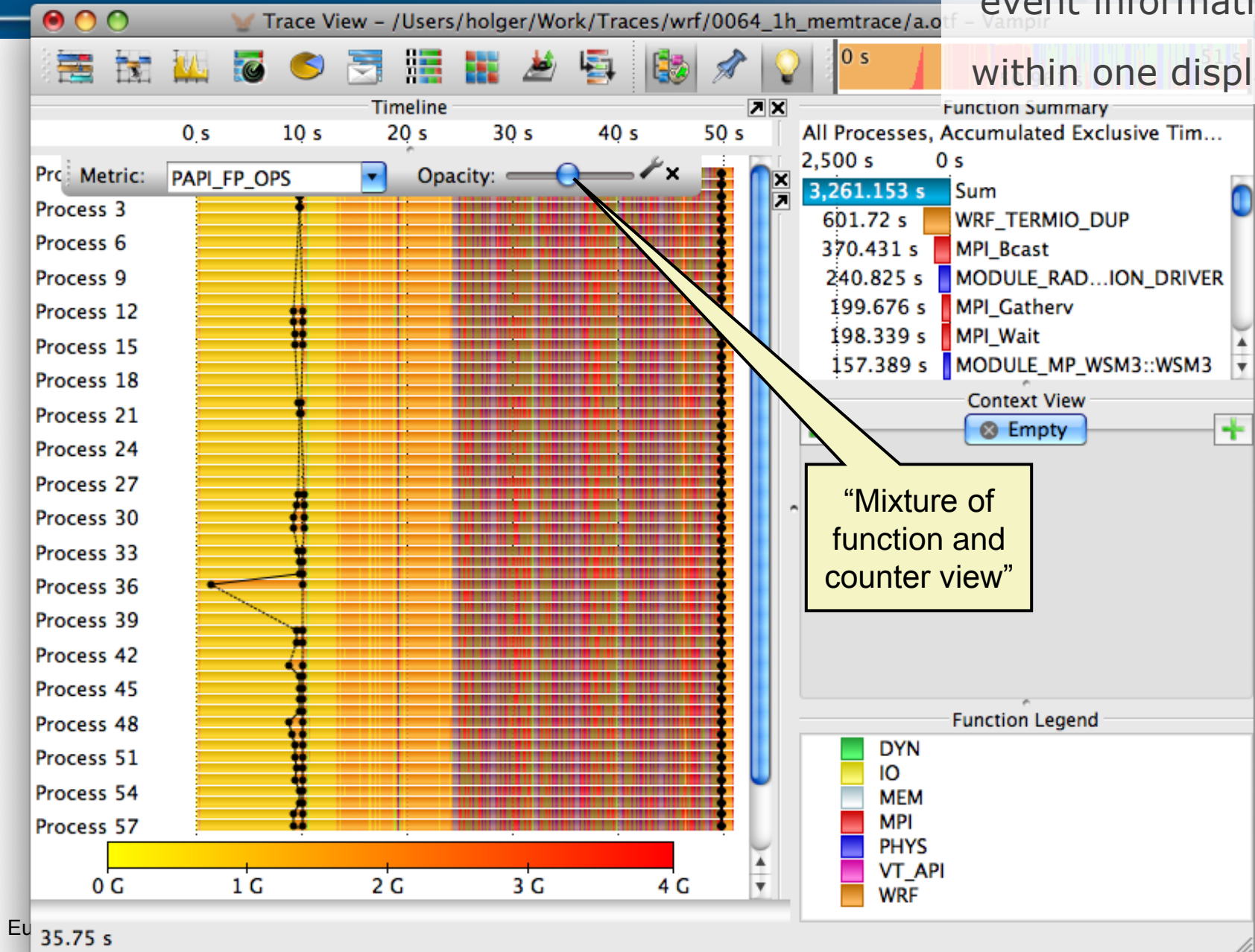
Overlay Functionality of Master Timeline

Correlate counter information with event information within one display.



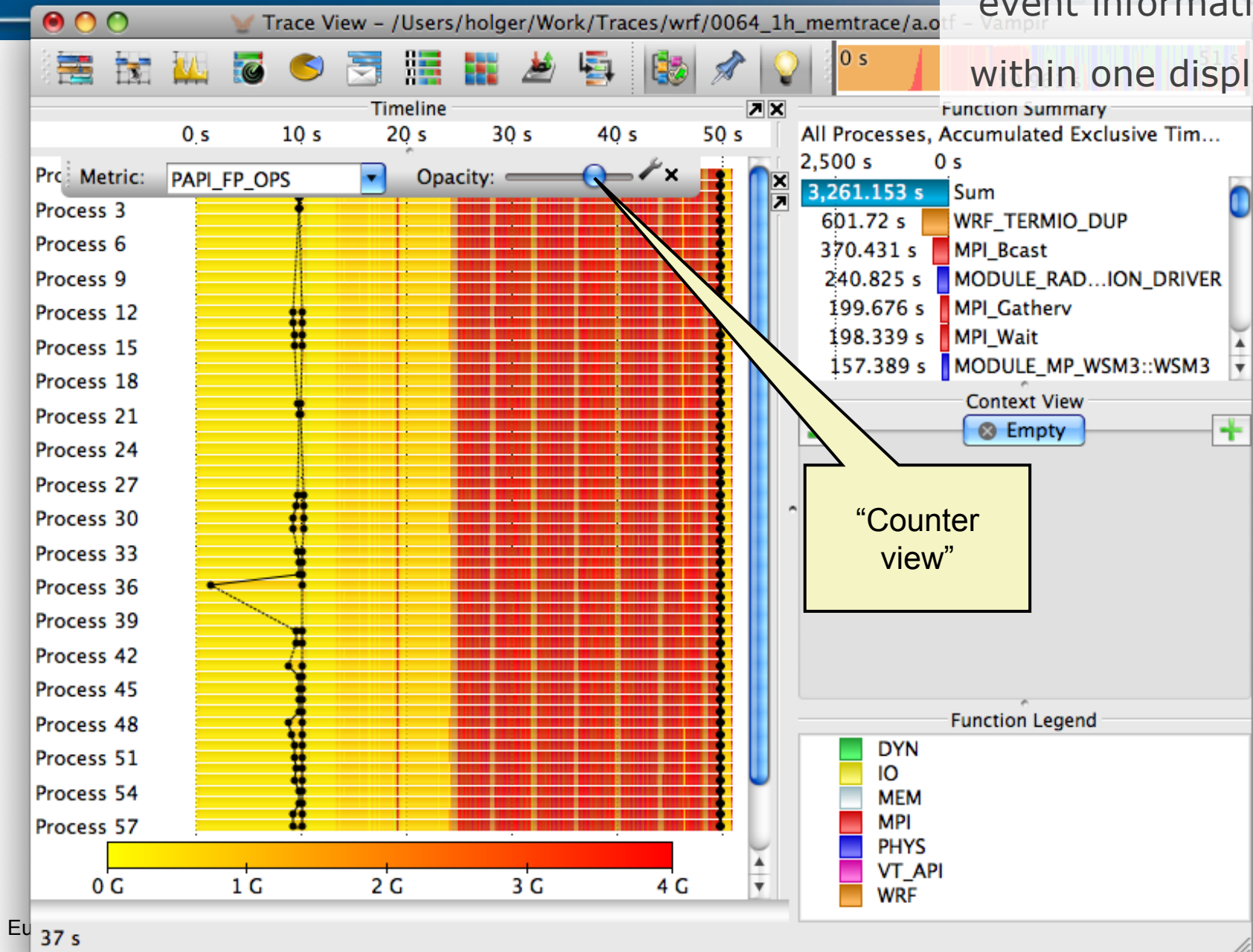
Overlay Functionality of Master Timeline

Correlate counter information with event information within one display.



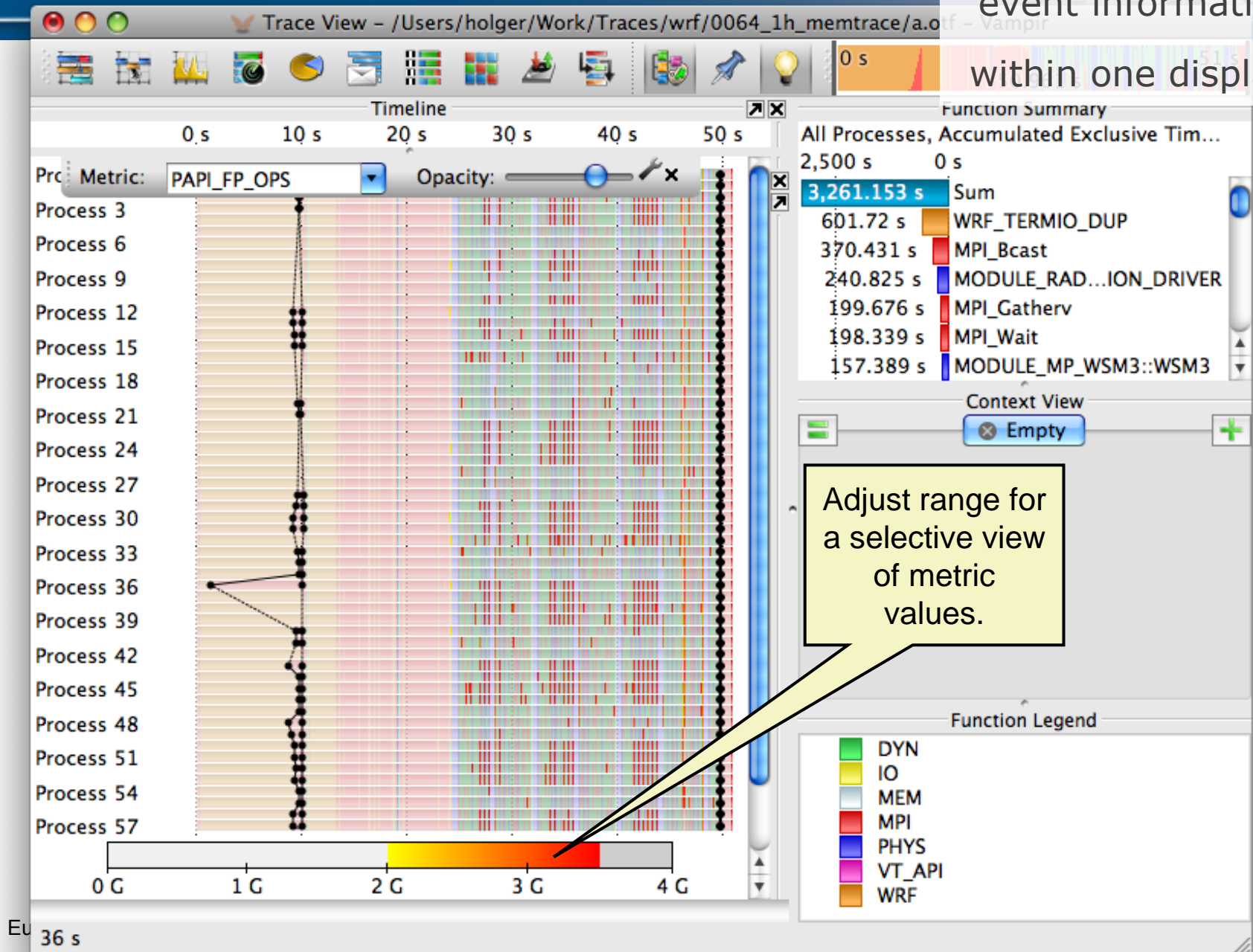
Overlay Functionality of Master Timeline

Correlate counter information with event information within one display.



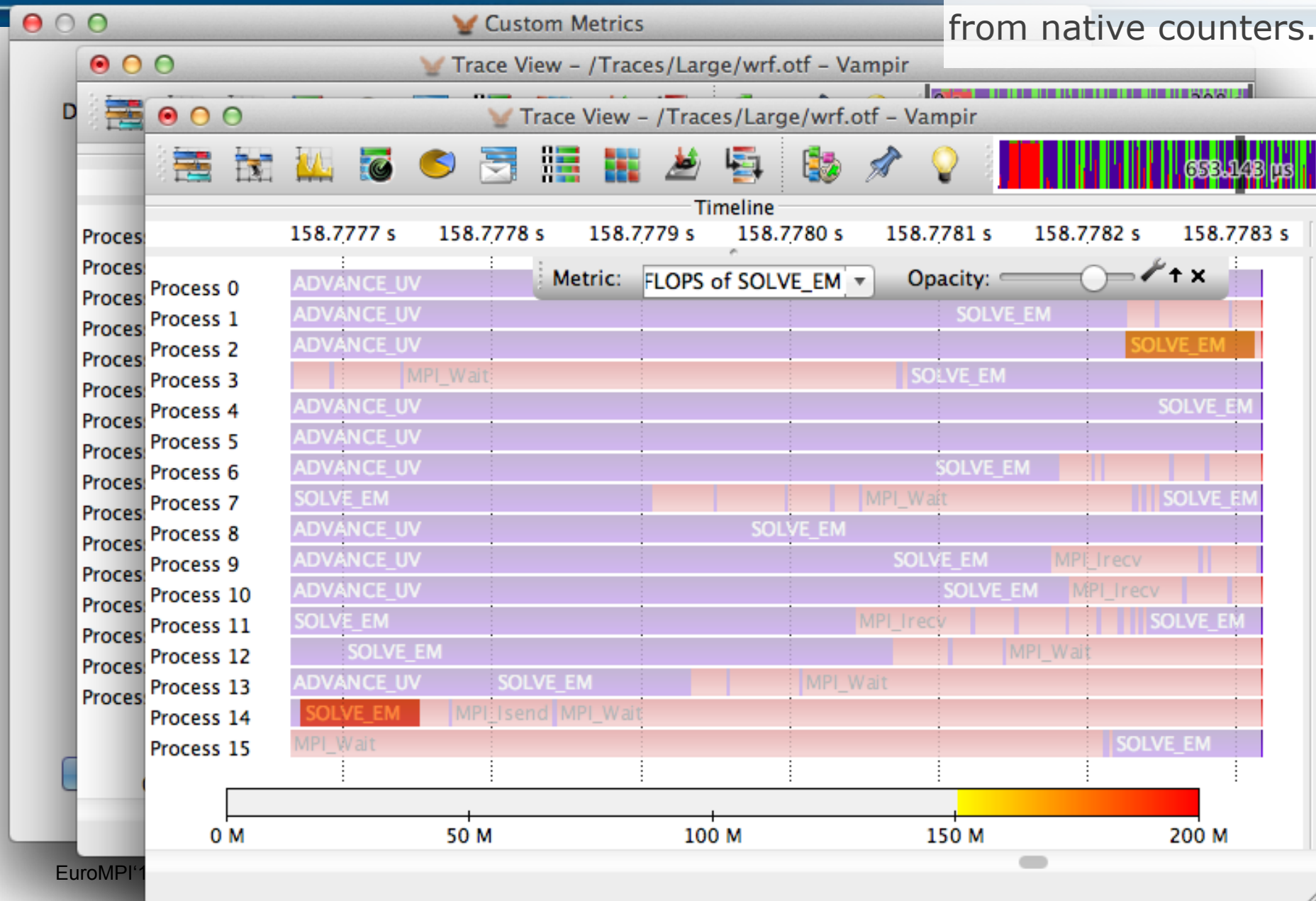
Overlay Functionality of Master Timeline

Correlate counter information with event information within one display.



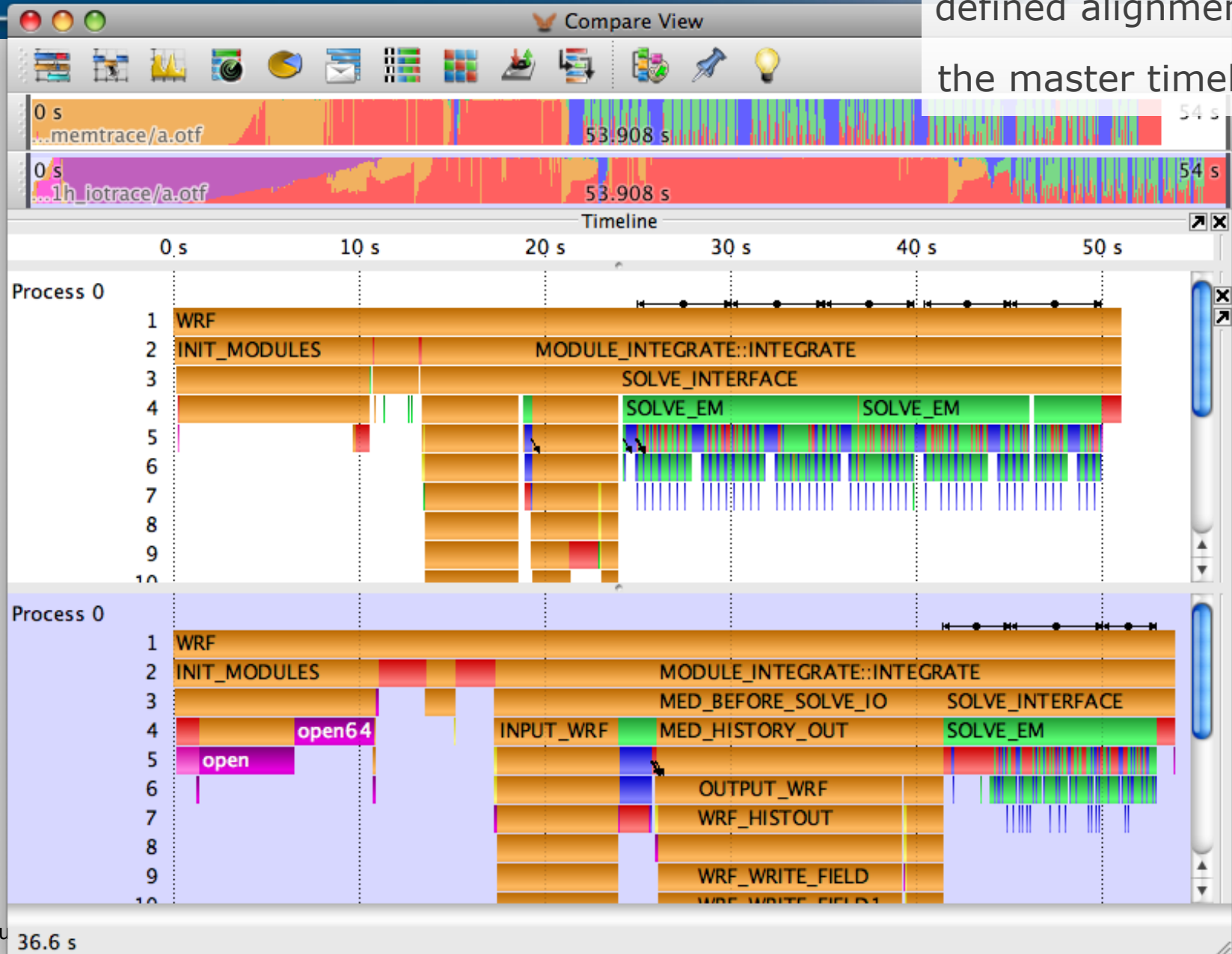
Custom Metrics within the Counter Displays

Create user customized metrics from native counters.



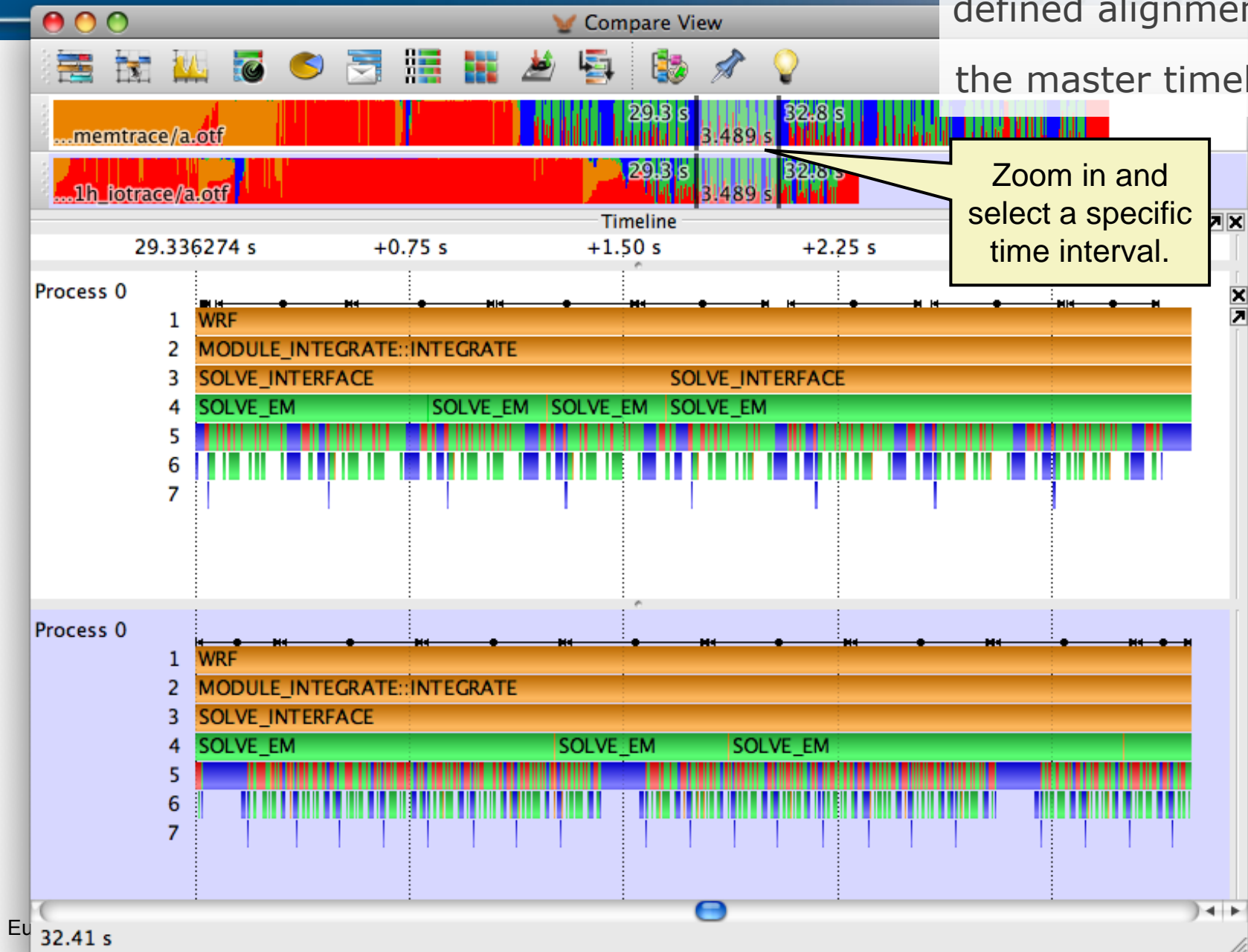
Compare View

Compare multiple trace files by user-defined alignment of the master timeline.



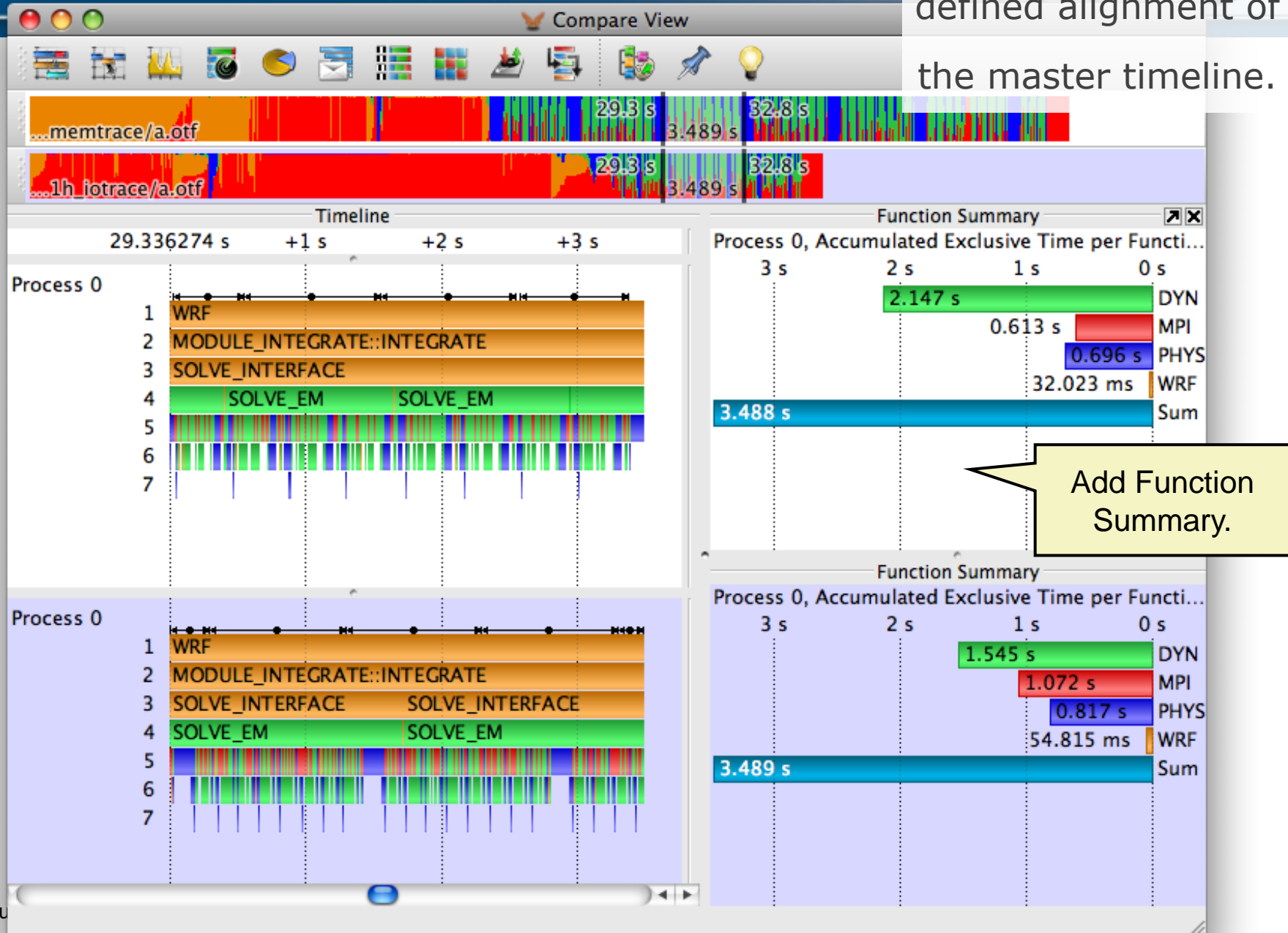
Compare View

Compare multiple trace files by user-defined alignment of the master timeline.

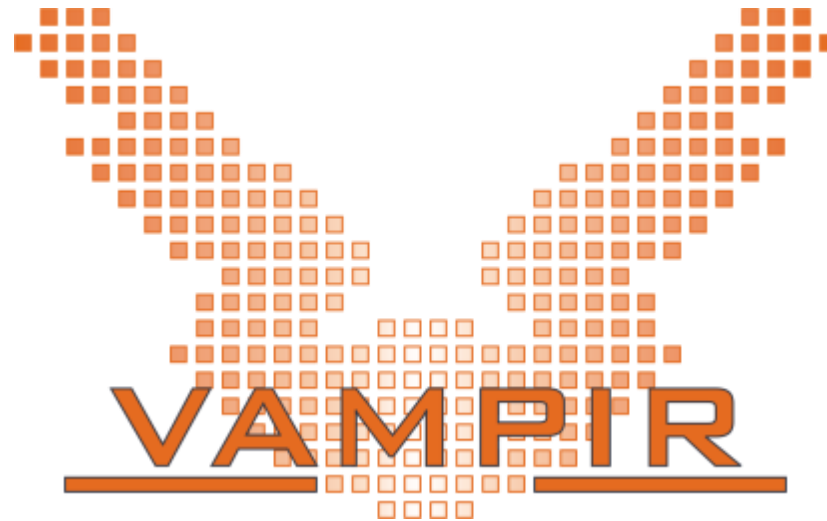


Compare View

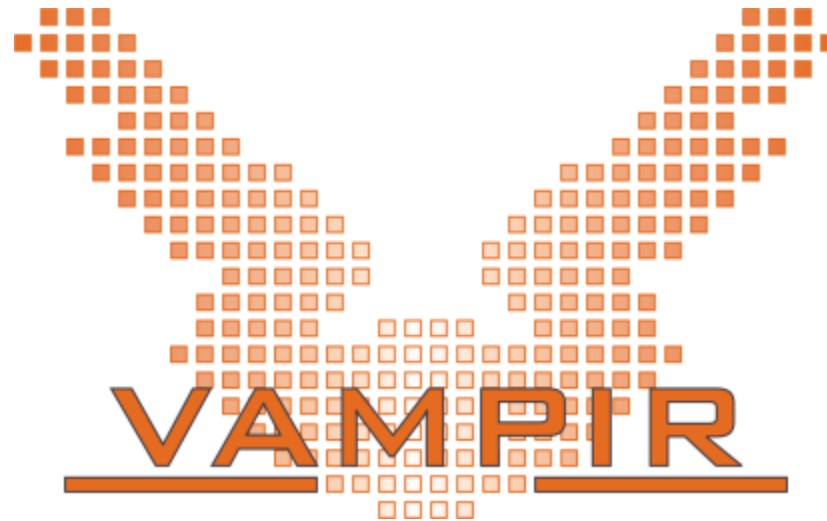
Compare multiple trace files by user-defined alignment of the master timeline.



- Vampir & VampirServer
 - Interactive trace visualization and analysis
 - Intuitive browsing and zooming
 - Scalable to large trace data sizes (20 TByte)
 - Scalable to high parallelism (20000 processes)
- Vampir for Linux, Windows and Mac OS X



Vampir is available at <http://www.vampir.eu>,
get support via vampirsupport@zih.tu-dresden.de



Staff at ZIH - TU Dresden:

Ronny Brendel, Holger Brunst, Jens Doleschal,
Ronald Geisler, Daniel Hackenberg, Michael Heyde,
Tobias Hilbrich, Rene Jäkel, Matthias Jurenz,
Michael Kluge, Andreas Knüpfer, Matthias Lieber,
Holger Mickler, Hartmut Mix, Matthias Müller,
Wolfgang E. Nagel, Reinhard Neumann, Michael Peter,
Heide Rohling, Johannes Spazier, Michael Wagner,
Matthias Weber, Bert Wesarg