

The FrameSoC Software Architecture for Multiple-View Trace Data Analysis

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Execution Trace Analysis

• Execution traces help the understanding of application behavior - *debugging*, *profiling*



Issues

 huge amount of data complex information

FrameSoC User Perspective





Traces are difficult to analyze!

We need an effective analysis environment

FrameSoC System Perspective

Easy engineering of a dynamic set of analysis views



- easy to add new views
 - custom Eclipse extension point
 - base class for common behavior
- consistent view behavior
 - view highlight, trace deletion
 - react to changes in other views

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- Multiple-view graphical user environment for trace analysis
- Software infrastructure for building new analysis views

Achieved goals

Multiple views on trace data



see trace data from different perspectives - do not skip relevant information have different levels of abstraction

✓ Global view consistency



different views on data are consistent - same color code, same time interval

Multiple-View Correlation

Publish-Subscribe Inter-View Communication

eclipse Eclipse Framework

real system

3 M

events

- decoupled communication
 - easy incremental evolution
 - shared variables among views
- basic view management plugin/extension point mechanism



> uniform behavior

Modular design and easy development



> decoupled view communication easy to add new analysis views

FrameSoC in action! **Zoom** on the first Well-defined top-down analysis workflow native peak and visualize it We trace a parallel application on in the Gantt. FrameSoC multiple-view correlation both a real system and in *Simgrid*. simulated system Isolate the problem to the memory model **Zoom** on a smaller interval and visualize SIMGRID it in the Table. Analyst's knowledge of the system Problem found! **Filter** on state transitions 900 k - *Simgrid* made the hypothesis of infinite events and inspect event **details**. memory, thus ignoring swapping operations - Removing this hypothesis solves the problem We identify a pattern of memory-related events: - Allocating **Future works** Reclaiming Validation with new concrete use cases New analysis views Objective Diagnosis tool tracking user interactions Automatic definition of analysis workflows simgrid native First FrameSoC open-source Allocating and Reclaiming: 20% of native trace **release** at the end of June 2014



