

Trace Management and Analysis for Embedded Systems

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Tracing Embedded Systems

- **Embedded Systems** are everywhere!
 - Increasingly complex hardware and software
 - Application debugging and profiling is extremely difficult
- **Execution traces** can help the embedded software analysis

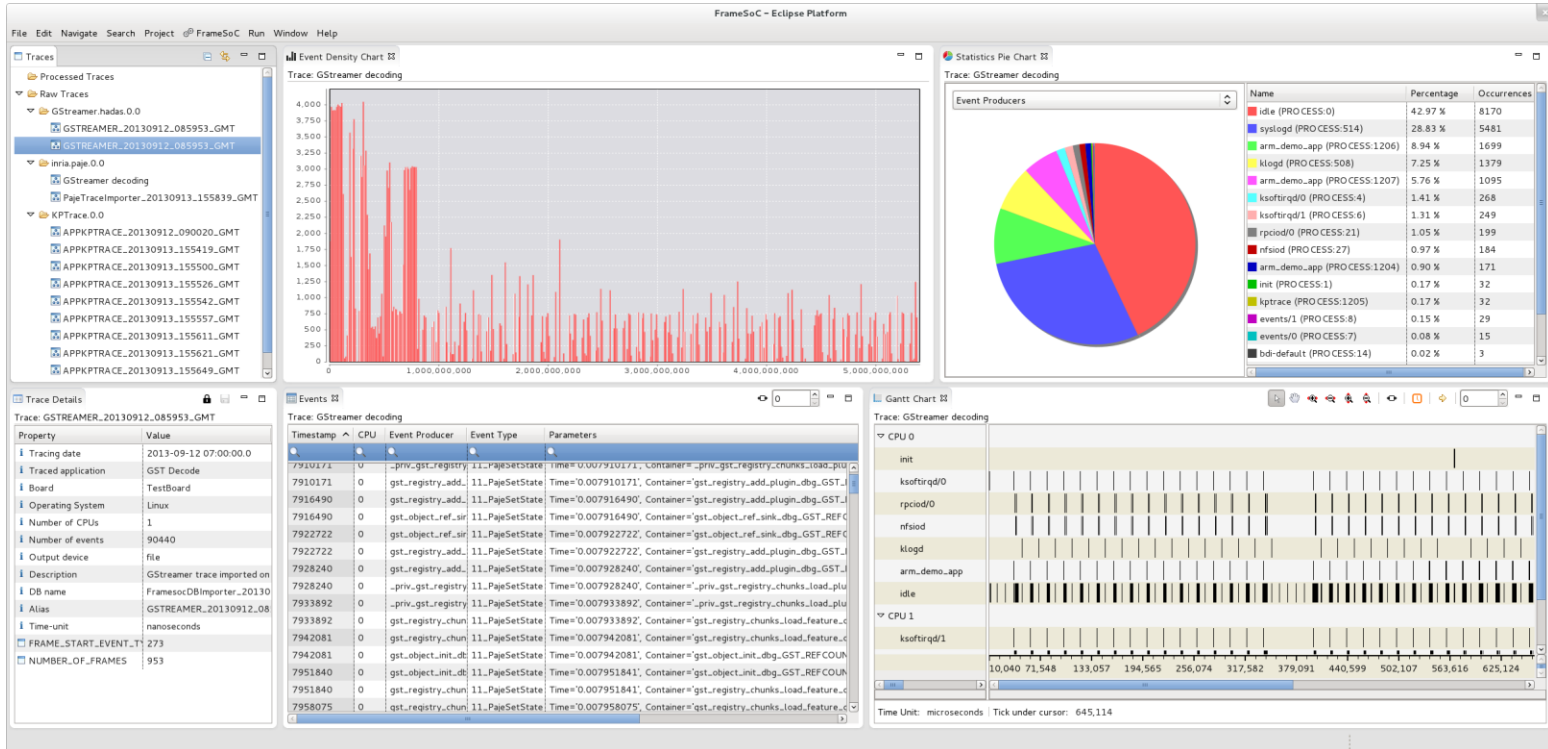


ISSUES

- Different formats
- Different analyses
- Data volume
- Visualization scalability

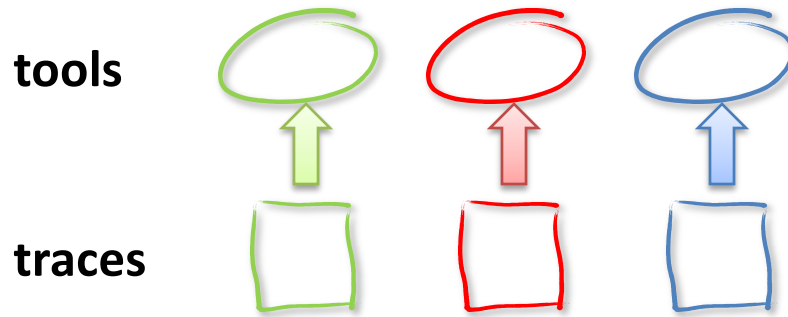
FrameSoC: trace analysis infrastructure

- To solve the above issues we propose **FrameSoC**

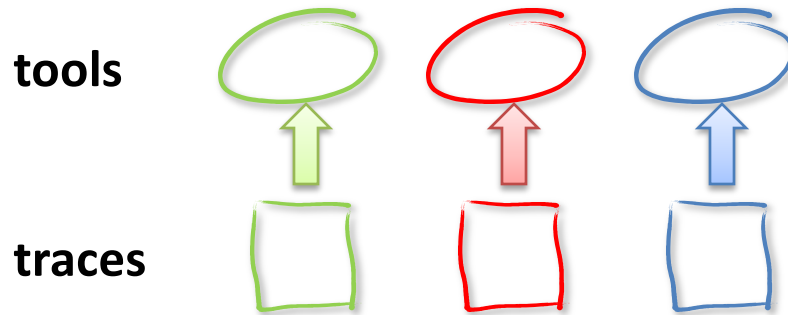


- FrameSoC is developed within the **SoC-Trace** project
 - **INRIA, UJF, STMicroelectronics, ProbaYes, Magillem**

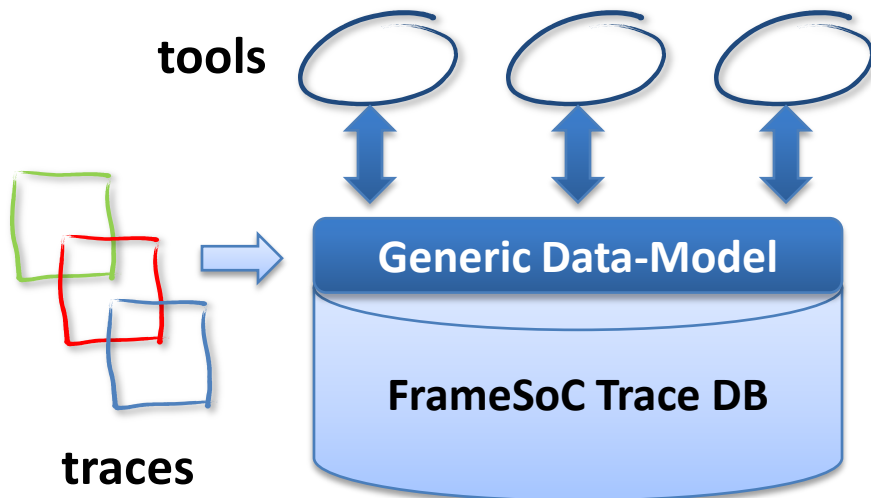
Many formats, many tools



Many formats, many tools

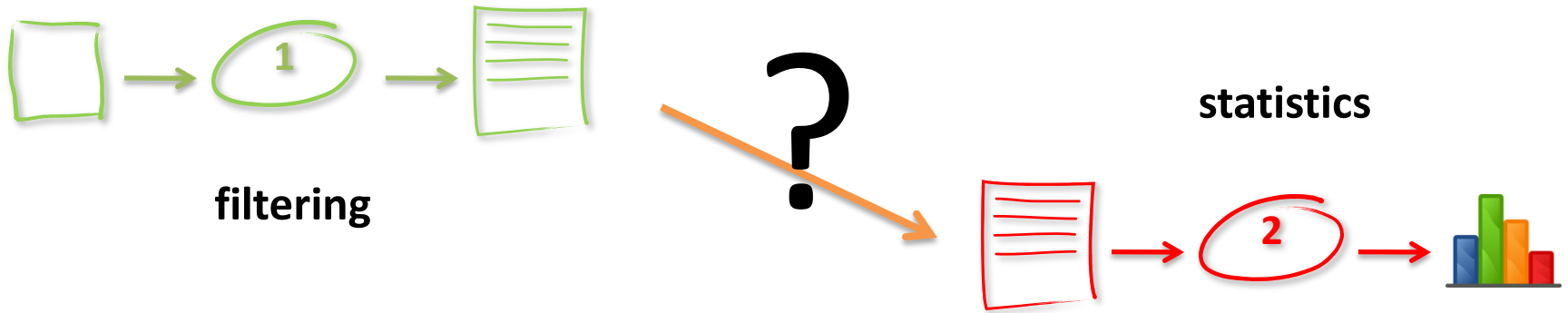


FrameSoC

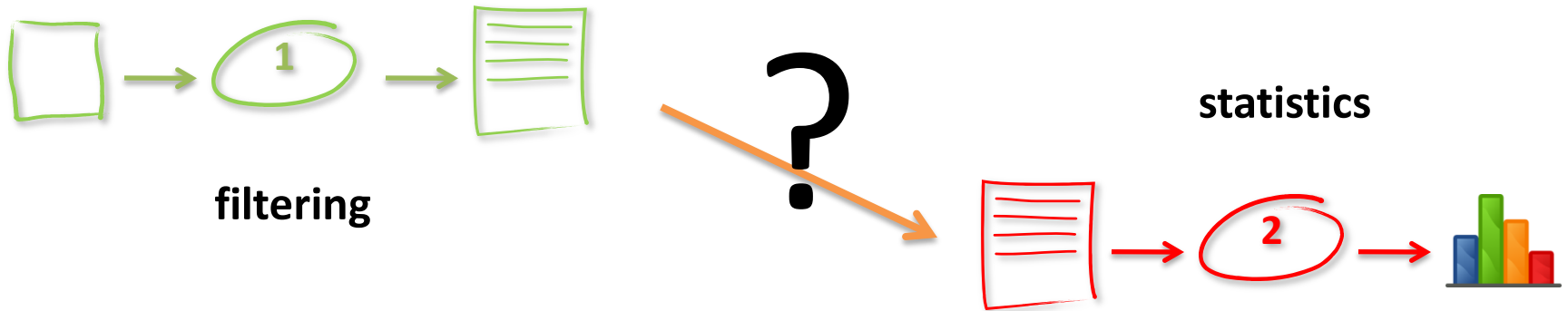


- Represent **different trace formats**
- Store **various trace metadata**
- Store trace **analysis results**

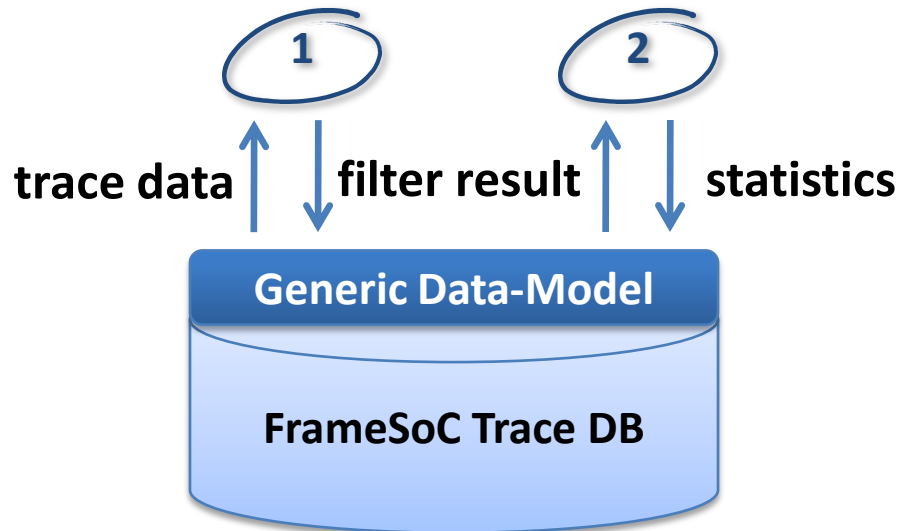
Analysis workflow



Analysis workflow



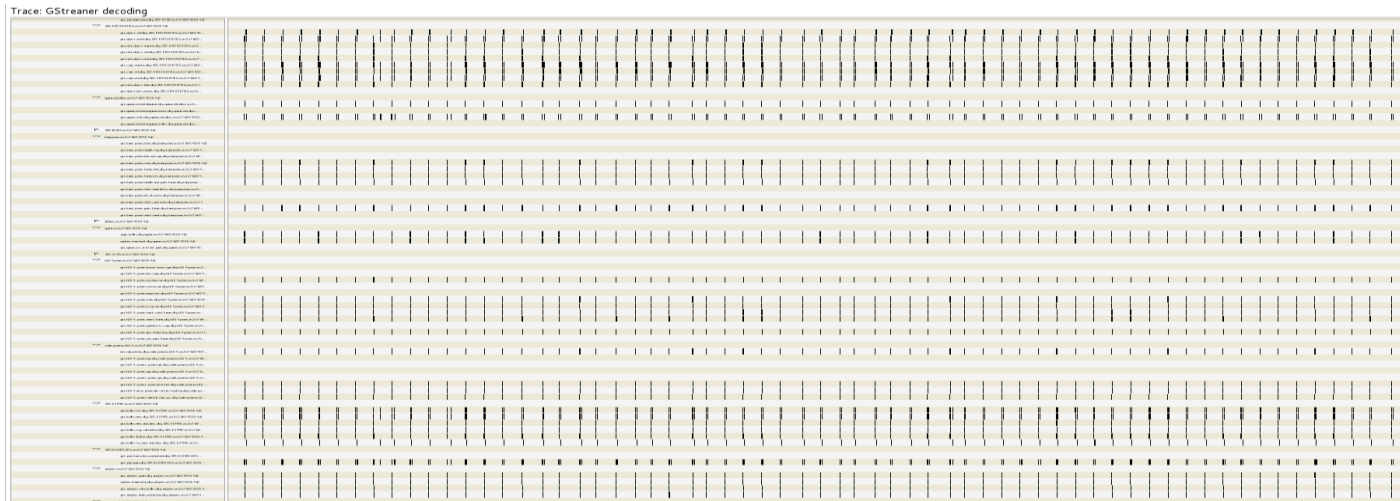
FrameSoC



Store analysis results

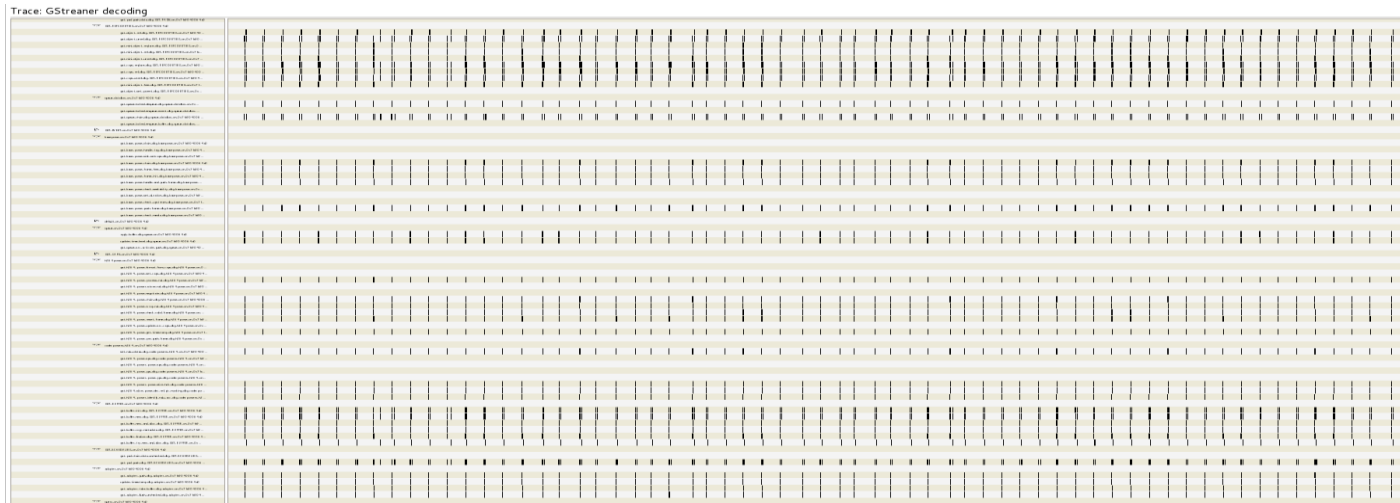
- Tool cooperation
- Avoid long recomputations

Trace overview



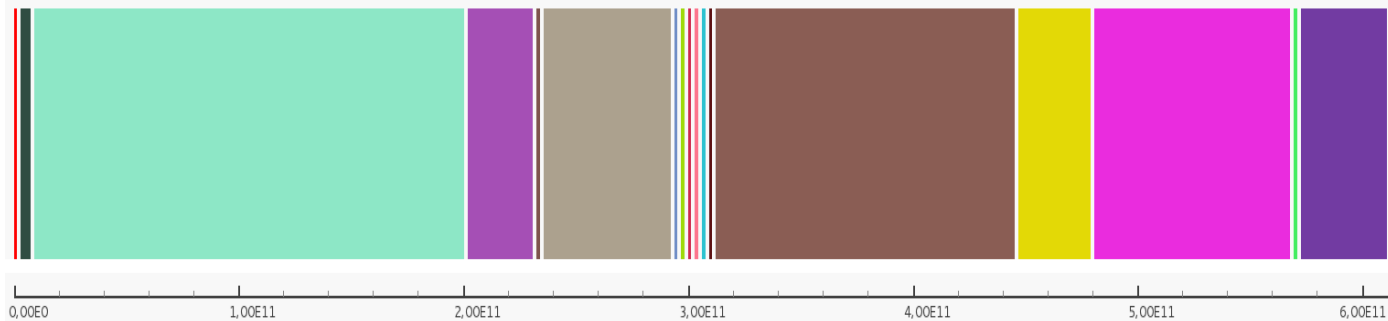
Traditional Gantt Chart

Trace overview



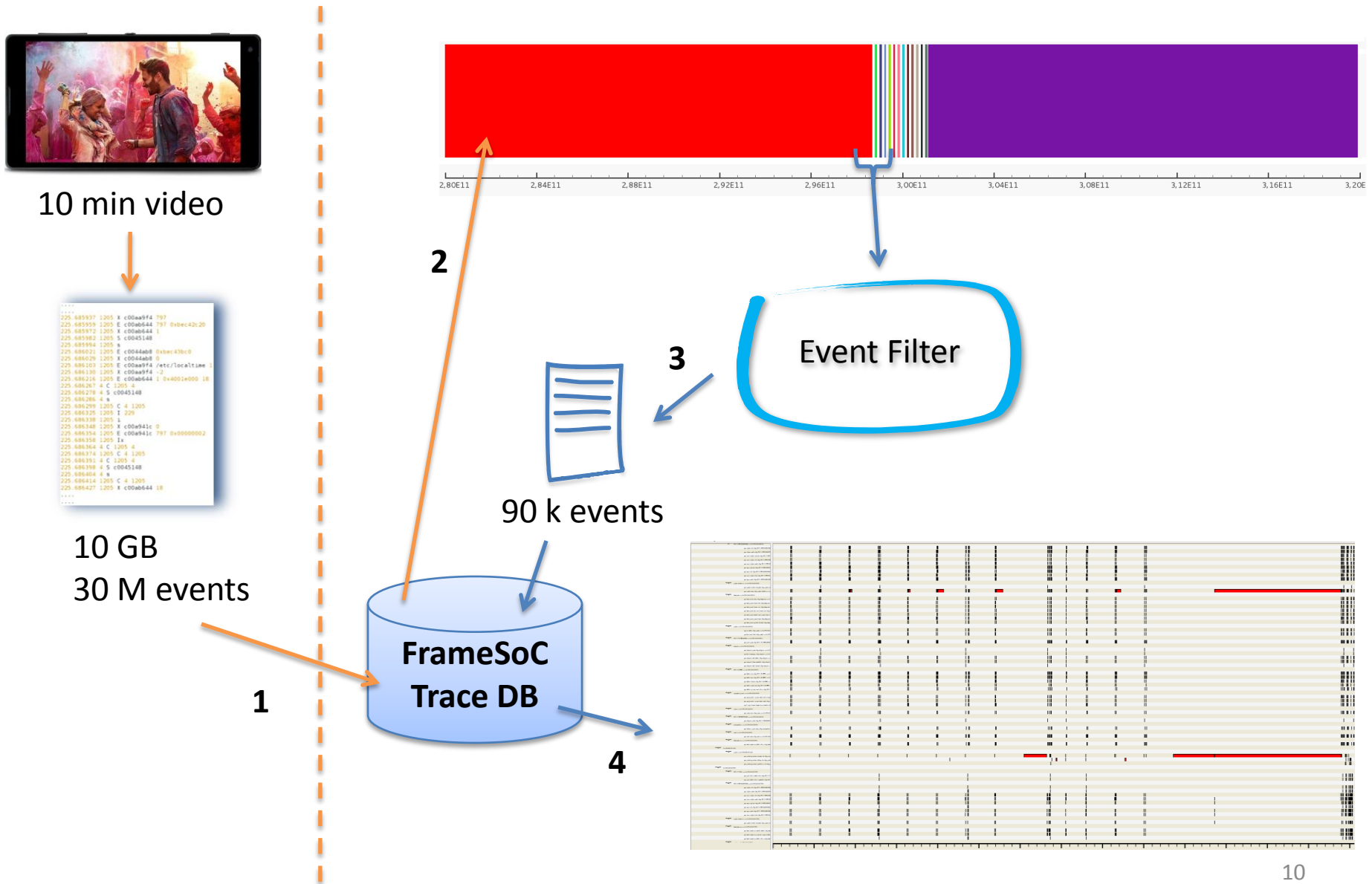
Traditional Gantt Chart

FrameSoC



FrameSoC aggregated visualization tool

An example: FrameSoC in action



FrameSoC performance

- **Trace Import**
 - We are able to manage huge traces (up to 100 GB)
 - Import time (**15 s** for **100 MB**)
- **Event Filtering**
 - Less than **0.1 s** to retrieve **100000 events**
 - Depending only on the result-set size and not on trace size
- **Result storage**
 - Compute stats on 3 GB trace: **3 min**
 - Retrieve saved stats: **0.1 s**

Conclusions...

✓ **Rich and generic data model**

- Solve the problem of format heterogeneity

✓ **Support for analysis result storage**

- Allow rich workflows via tool cooperation

✓ **Innovative aggregated visualization**

- Synthetic view of the whole trace behavior

...and Perspectives

⊕ Validate FrameSoC with new **real use-cases**

⊕ Add **new analysis tools** with SoC-Trace partners



First **open-source release** of FrameSoC in June 2014

Questions?

