

USING SYSTEM EXECUTION EXECUTION TRACES TO ANALYZE PERFORMANCE PROPERTIES OF SOFTWARE SYSTEMS

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System execution traces (execution logs) are traditionally used to evaluate functional properties of a software system. Prior research, however, has shown the usefulness of system execution traces in evaluating software system performance properties. Due to the complexity and verbosity of a system execution trace, however, higher-level abstractions, *e.g.*, dataflow models are required to support such evaluation. Our current research effort therefore has focused on extending this dataflow model based system performance analysis in two folds. In one aspect, we have considered adapting the dataflow model when the system execution trace does not contain properties required to support performance analysis. In the other aspect, we have developed techniques to auto-generate the supporting dataflow model from a system execution trace. The second aspect is critical because it is hard to manually craft a dataflow model for large and complex software systems, especially distributed software systems.

The tool and technique we developed for adapting the dataflow model is called System Execution Trace Adaptation Framework (SETAF); whereas, the tool and technique for auto-generating the dataflow model from a system execution trace is called Dataflow Model Auto Constructor (DMAC). Our current results from applying SETAF to several open-source production software applications show that there are 3 main patterns for adapting system execution traces to support performance analysis if they do not already have the required properties. Likewise, our current results from applying DMAC to the same software applications show that DMAC is able to auto-construct a dataflow model that covers up to 95% of the originating system execution trace.

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