TRACERJD: GENERIC TRACE-BASED DYNAMIC DEPENDENCE ANALYSIS WITH FINE-GRAINED LOGGING

Haipeng Cai and Raul Santelices

Department of Computer Science and Engineering

University of Notre Dame

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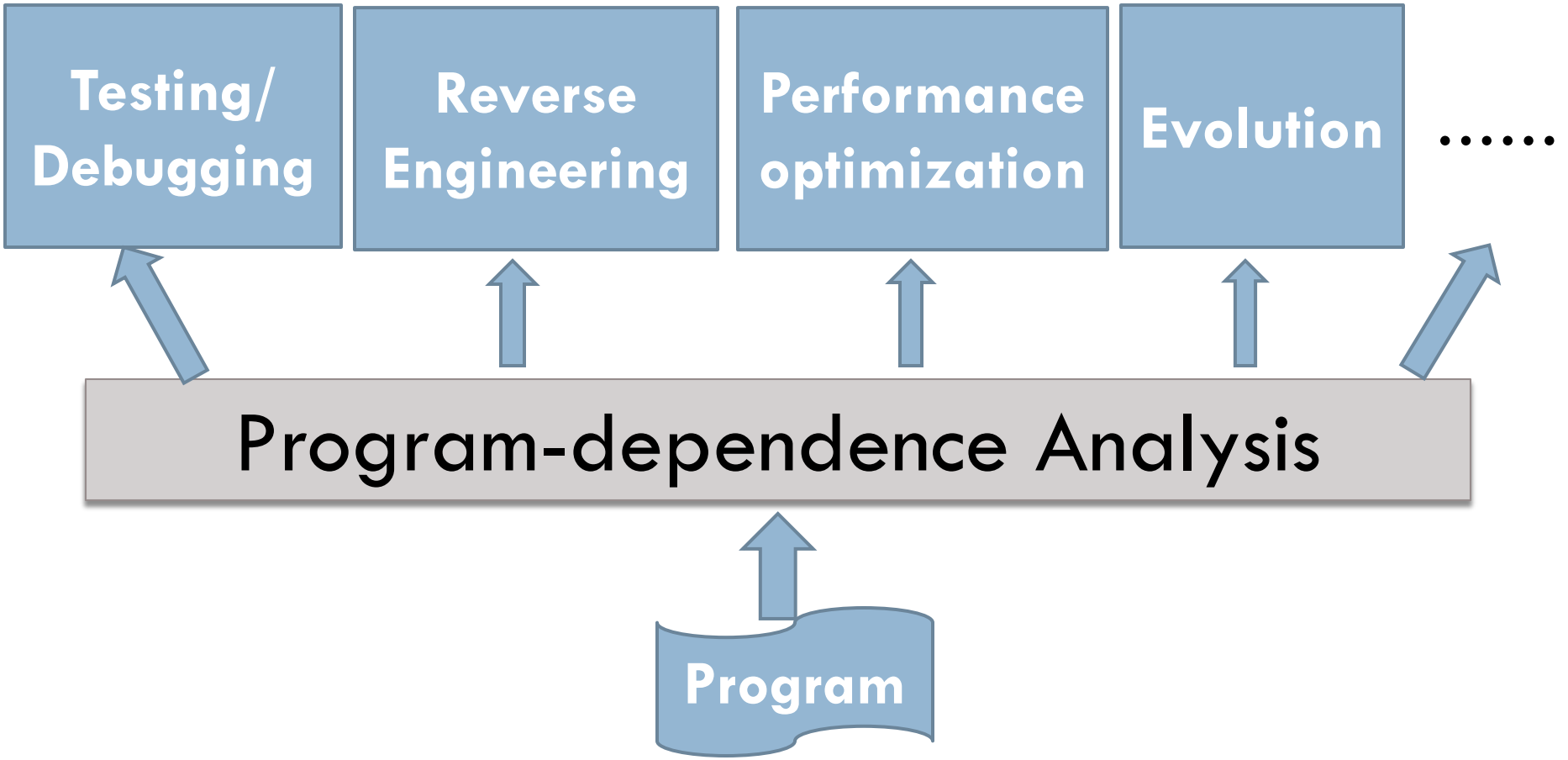
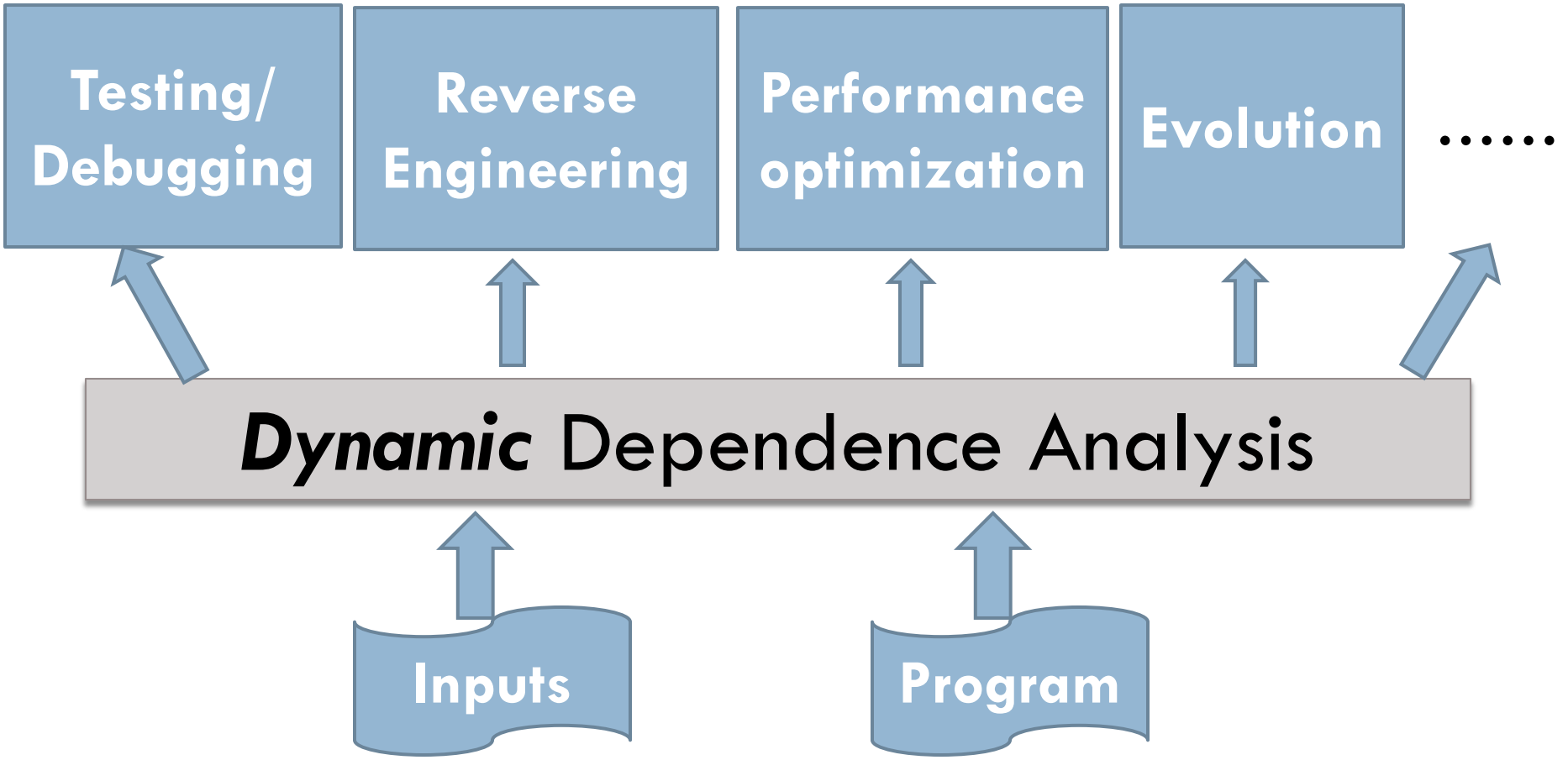
Context


Testing/ Debugging
Reverse Engineering
Performance optimization
Evolution
.....
Program-dependence Analysis
Program

Context


Testing/ Debugging
Reverse Engineering
Performance optimization
Evolution
.....
Dynamic Dependence Analysis
Inputs
Program

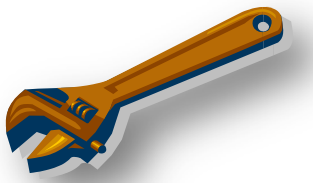
Status-quo

Some tools monitor high-level system states (e.g., network traffic, resource usage, …)

DTrace Valgrind ……

Some reports coarse-level runtime conditions (function invocations, exception trace, …)

JTracer JavaTracer ……



Others are applicable to specific tasks only (dynamic slicing, execution reduction, …)

JavaSlicer Code-Investigator ……

Problem

?

Only few techniques available capture fine-grained source-level dynamic dependence information that supports **a variety of** dependence-based **applications**

tool supports

Approach

TracerJD

Offers **generic/common** fine-grained dynamic dependence information to support various applications

Many specific tools can be built upon it

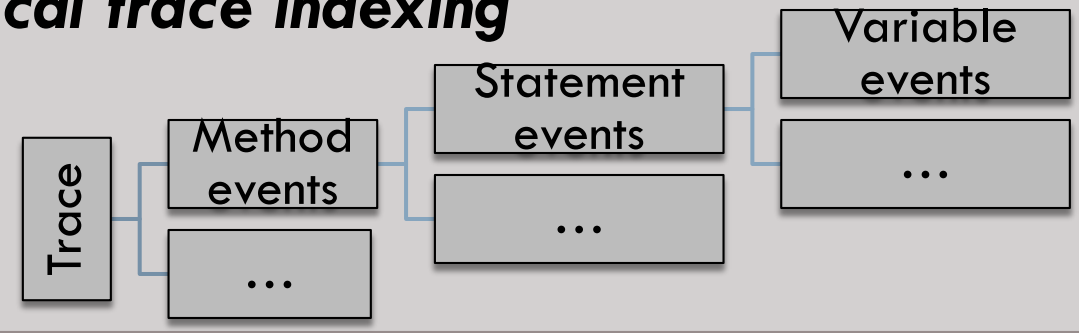
TracerJD

Application tools

Dynamic slicer | Performance profiler | .....

Dynamic dependence querying subroutines

Hierarchical trace indexing

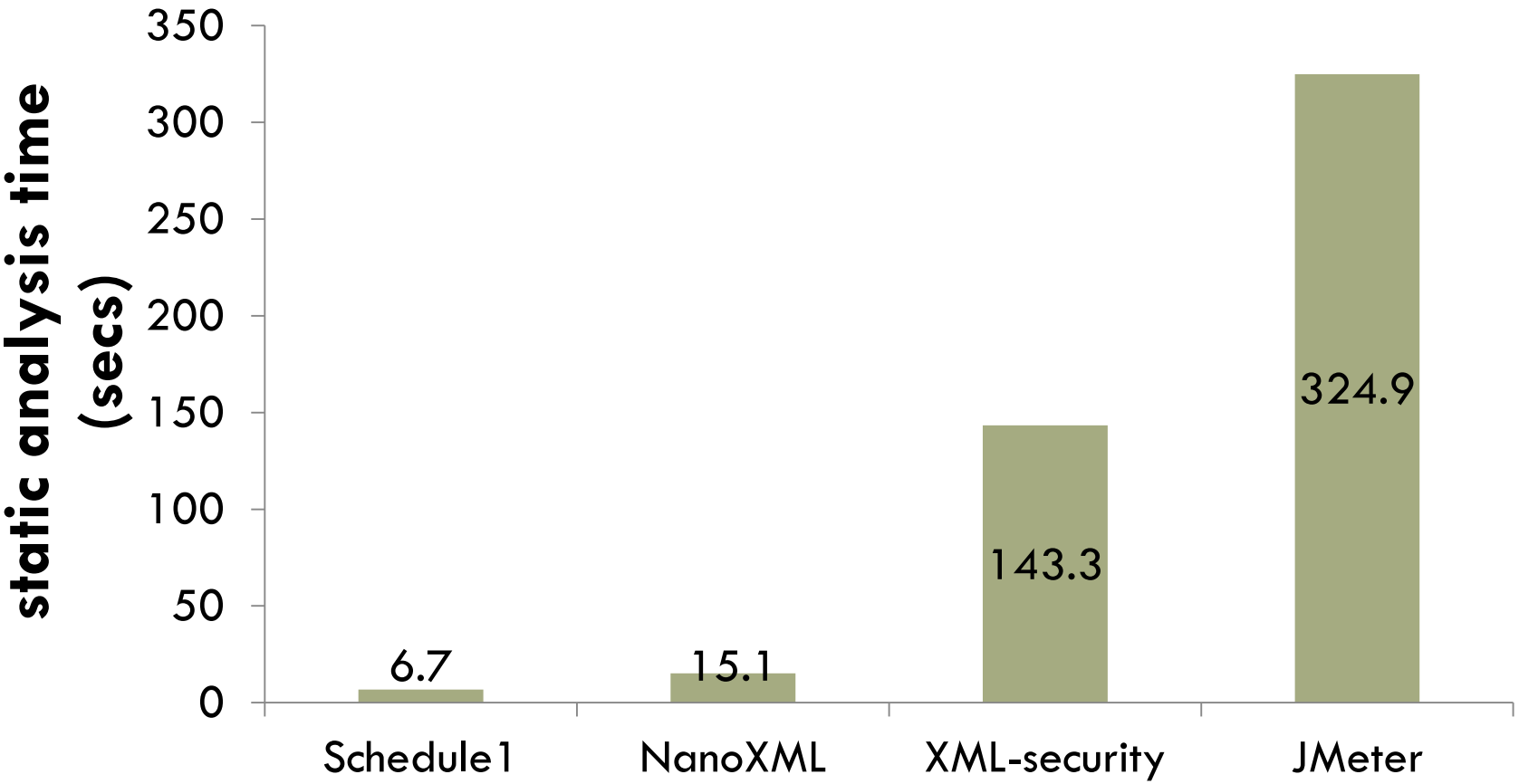


Structured logging of execution events

Method calls/returns | Statement occurrence | Variable definitions/uses

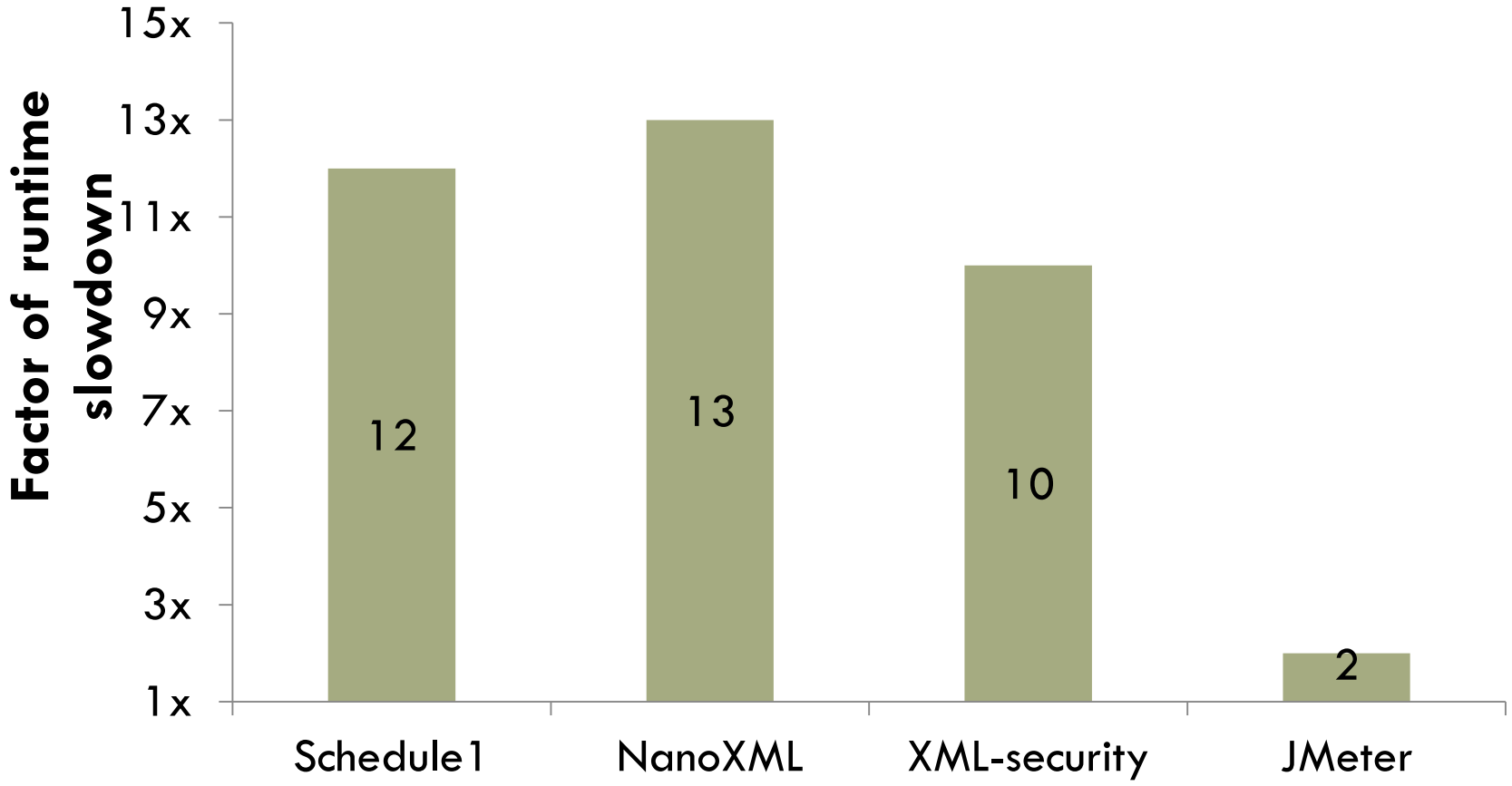
Performance

- Instrumentation time



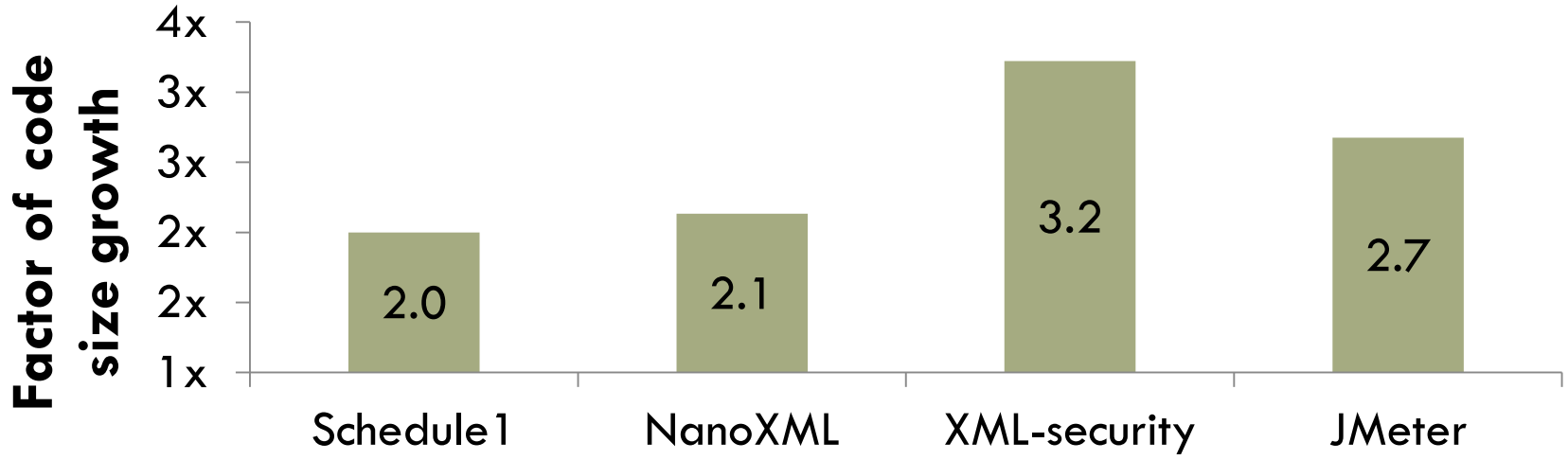
Performance

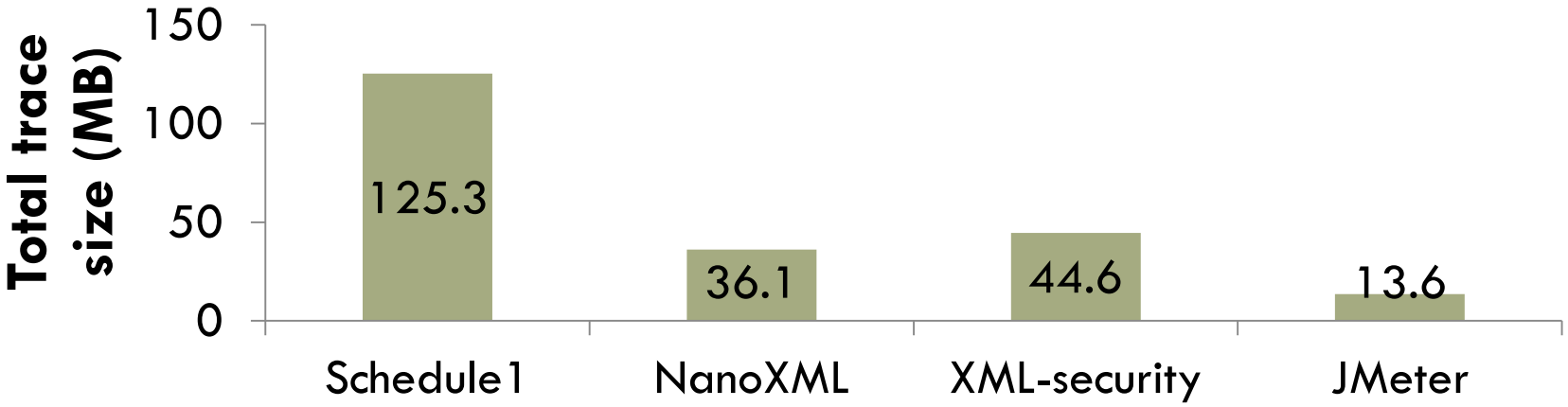
- Runtime slowdown



Performance

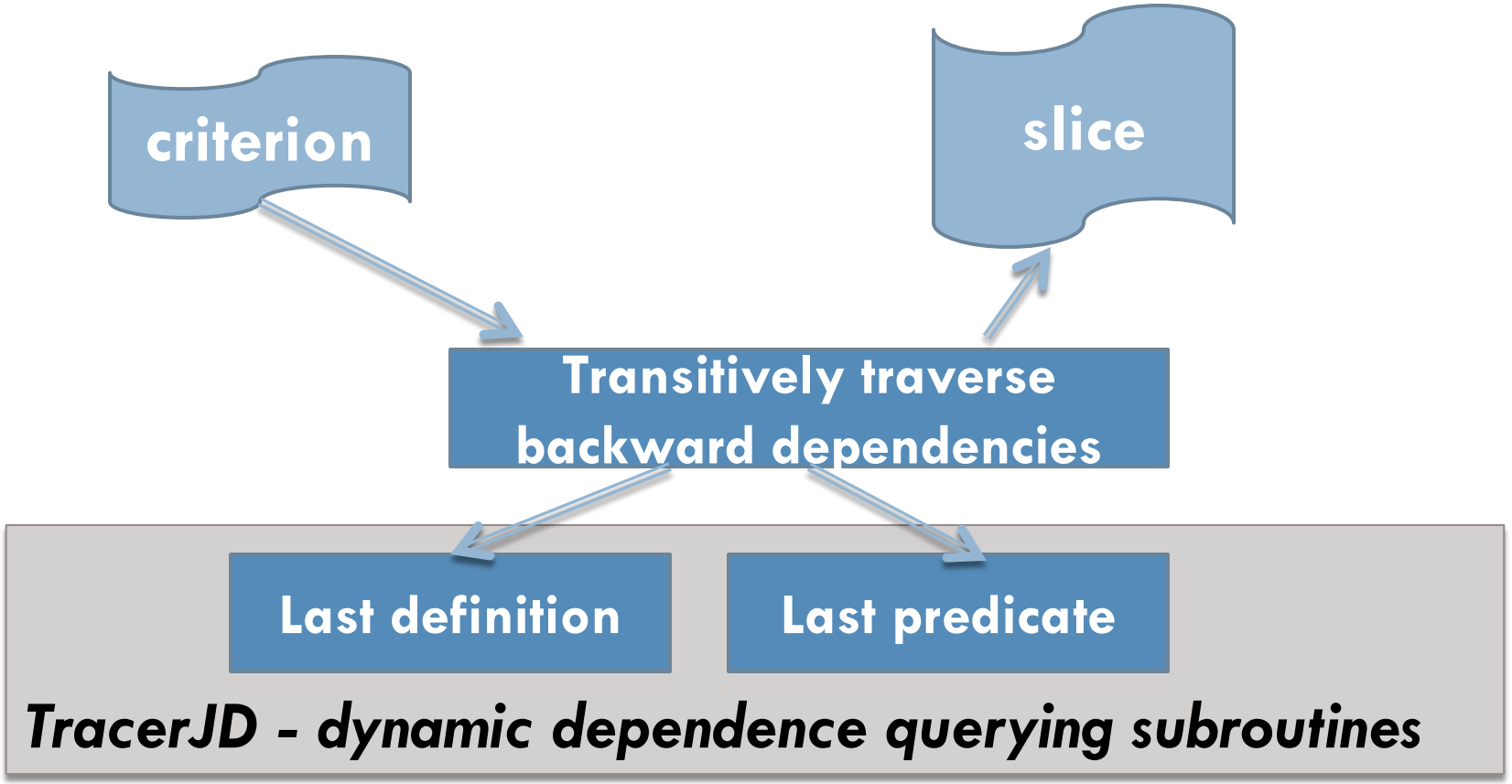
- Storage costs





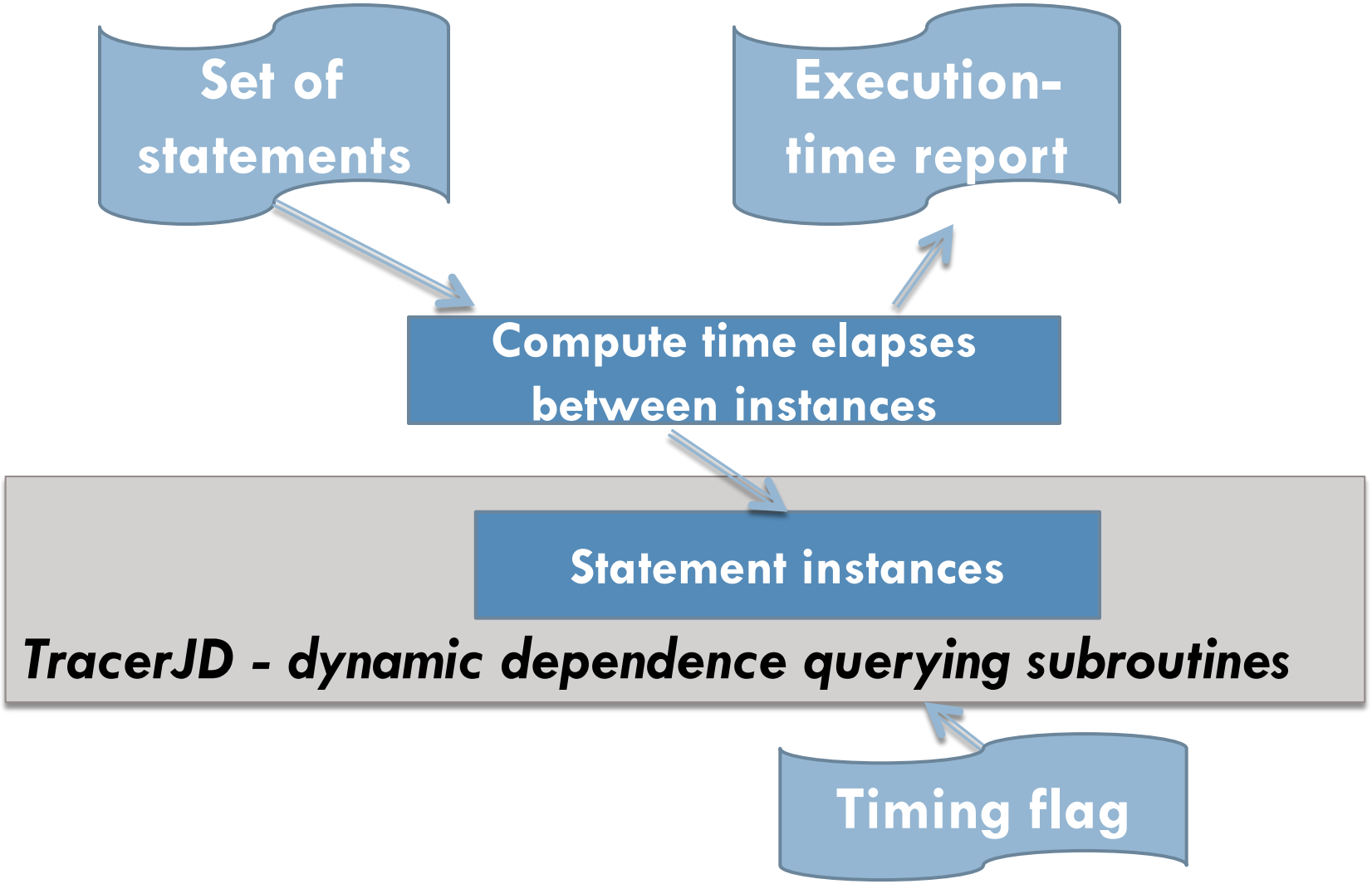
Use scenarios

- Scenario 1: dynamic slicing



Use scenarios

- Scenario 2: performance profiling



Conclusions

- A framework that provides generic dynamic dependence information to support various applications
- An effective trace indexing scheme that enables efficient dynamic-dependence querying
- Two example client analyses that offer readily utilities and demonstrate the flexibility of building diverse applications

Acknowledgements

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All of you for time and attention

Q&A

PLEASE ASK QUESTIONS