Asking “What?”, Automating the “How?”: The Vision of Declarative Performance Engineering

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Performance-Relevant Concerns Spanning the Software Lifecycle

- Response time of service S?
- Utilization of server N?
- Most suitable architecture?
- Performance anti-patterns?
- Performance regressions?
- SLAs satisfied?
- What if changes?
Extensive Body of Software Performance Engineering Exists

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Problem Statement: Various Decisions to Apply SPE Correctly

- Which modeling language?
- Which modeling granularity?
- Granularity of instrumentation?
- Analytical solution? Simulation?
- How to reconfigure?
- Workload intensity?
- Ramp-up time? Duration?
- Monitoring (APM)
- Load Testing
- Online Performance Management
- Performance Analyst
Problem Statement: Various Decisions to Apply SPE Correctly

Performance Concerns

Software Performance Engineering

Challenges
- Choice and composition of solution strategy
- Parametrization
- Result filtering and interpretation

Established Methods, Techniques, Tools
- Measurement-based
- Model-based

System

Performance Analyst

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Vision: Declarative Performance Engineering

**Performance Concerns**

- Performance Analyst

**Software Performance Engineering**

- Established Methods, Techniques, and Tools

**Asking “What?“, Automating the “How?“**

**Declarative Performance Engineering (DPE)**

**System**
I say/define **what** I want to know,

the **how** will be automatically derived from what
What would be the response times of services X, Y and Z if the workload intensity doubles over the next week? Rough estimation is sufficient.

The resulting response times are …
Query Answering Process

Performance Query

Choice and Composition of Solution Strategy

Configuration

Processing

Result Filtering and Interpretation

Query Results

Note: Arrows depict dependencies or drives but do not imply strict ordering.
A Solution Strategy Expert chooses and composes model transformations and solution approaches to solve a query.

- Receipts can be formalized, implemented and reused if solution strategy is based on meta-model ➔ Solution Approach Adapters.
Many possible solution strategies for one query
- differ in speed, accuracy and provided statistic type
- Solution strategies may only be able to answer a subset of questions

Need for comparison of different solution strategies

A decision engine may chose a suitable solution strategy based on a set of solution strategies
I say **what** i want to know,

the **how** will be automatically derived from what

Questions?

Thank you for your attention

See you at the poster session!


Some Preliminary Work 2

- van Hoorn, A.. **Model-Driven Online Capacity Management for Component-Based Software Systems.** Dissertation, Faculty of Engineering, Kiel University. 2014.


- Kounev, S., Brosig, F., Huber, N. **The Descartes Modeling Language.** Technical report, Department of Computer Science, University of Wuerzburg, 2014