Integrated Observation and Modeling Techniques to Support Adaptation and Evolution of Software Systems

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Adaptation & Evolution

**Adaptation:** Predominantly automatic selection of predefined changes.

**Evolution:** Predominantly manual changes based on evaluation results.
iObserve Project Focus
Challenges

Software systems increasingly depend on

- 3rd party services
- 3rd party service infrastructures

- Run-time changes in execution environment under limited control
- Limited visibility of internals of 3rd party elements
Solution Approach

- Runtime monitoring
- Benchmarking
- Anomaly detection
- SOA, Cloud
- Online testing
- Anomaly detection
- Performance prediction
- Meta modeling
- Benchmarking
- ...

CAU
Christian-Albrechts-Universität zu Kiel

DUISBURG-ESSEN

KIT
Karlsruhe Institute of Technology
SPP Context

Knowledge Carrying Software
- Application and system models
- Enriched Models@Runtime

Platforms and Environments for Evolution
- Measurement technologies
- Test and prediction environments
- Analysis and assessment of software system
Evaluation Benchmarks

• CoCoME
  • SPP Benchmark application

• Eclipse Skalli
  • Project management system
  • Web-based application with REST-API
  • Led by SAP Research
# iObserve Milestones

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<th>Month 12 (Initial Phase)</th>
<th>Month 24 (Integration and Evaluation)</th>
<th>Month 36 (Finalization)</th>
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<td><strong>Advanced Obeservation Techniques</strong></td>
<td>Monitoring infrastructure, simple aggregation</td>
<td>Advanced data aggregation, filtering and mapping</td>
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<td><strong>Descriptive Models@Runtime</strong></td>
<td>Software metrics model &amp; query language, meta-model candidates</td>
<td>Model evaluations and evolved meta-models for SAM, SBM and CEM</td>
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<td><strong>Anomaly Detection</strong></td>
<td>Techniques for local anomaly detection</td>
<td>Initial integration of simulation with local and external anomaly detection</td>
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<td><strong>Evaluation &amp; Experiments</strong></td>
<td>CoCoME scenarios &amp; evaluation infrastructure</td>
<td>Collection of evaluation results, Eclipse Skalli Scenarios</td>
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