

Extraction of User Behavior Profiles for Software Modernization

Master's Thesis

Gunnar Dittrich

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1. Motivation
2. Foundations and Technologies
3. Monitoring
4. Analysis
5. Evaluation
6. Conclusions and Future Work

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- ▶ b+m bAV-Manager to be modernized
- ▶ b+m gear platform update
 - ▶ Frontend: Vaadin framework
 - ▶ New DSL for the User Interface
- ▶ Dynamic analysis of user behavior with Kieker
- ▶ TeeTime for record processing and user behavior analysis
- ▶ Screen- and workflow improvements for the software
- ▶ Suggestions for the software modernization process

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DynaMod
*Dynamic Analysis for
Model-Driven Modernization*

kieker

TeeTime \equiv **b+m gear Java**

b+m Informatik



Wessbas

bAV-Manager

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- ▶ Update of Kieker in the old b+m gear platform
- ▶ Definition of a custom record in Kieker IRL
- ▶ General Spring interceptor for b+m gear applications
- ▶ Specific interceptor for the b+m bAV-Manager
- ▶ Platform service for workflow information retrieval

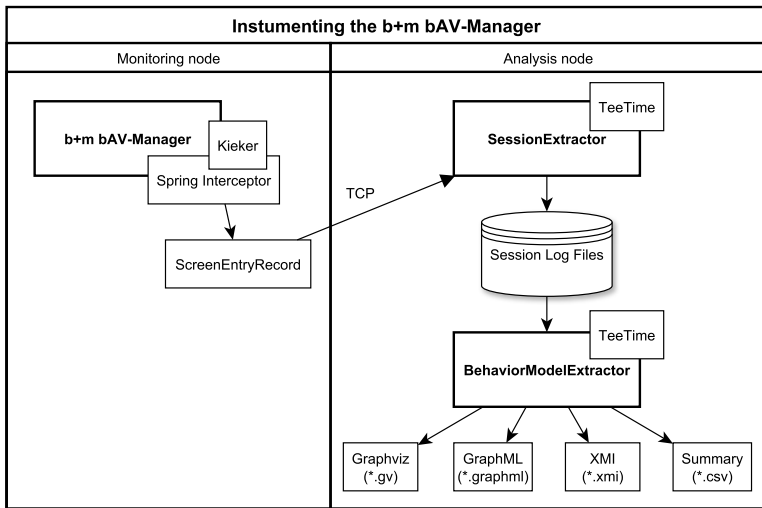
Custom record definition in Kieker IRL:

```
package de.bmiag.gear.util.monitoring
```

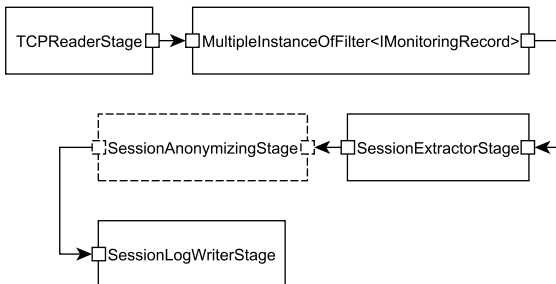
```
@author "Gunnar Dittrich"
```

```
entity ScreenEntryRecord {  
    string userName  
    long loginTime  
    string screenName  
    string flowName  
    string processName  
    string processExecutionId  
    long entryTime  
    string eventName  
}
```

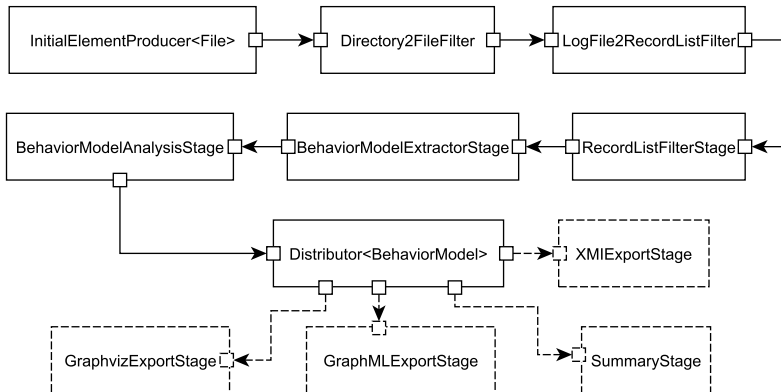
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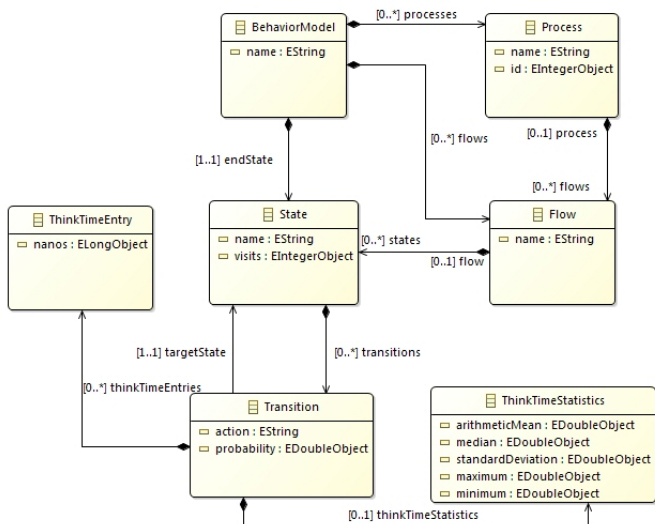
Architecture of the SessionExtractor:



Architecture of the BehaviorModelExtractor:



Meta-model for user behavior:



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- ▶ Experiment instrumenting the b+m bAV-Manager (unreleased version 3.11)
- ▶ Goal: "Identifying abnormal use of screen- and workflows in the application"
- ▶ Demonstration processes as tasks for the participants
- ▶ Focus on realistic usage (not software test)
- ▶ Five participants took at least one hour time each

- ▶ 53 session logs, 2381 recorded user activities
- ▶ Many views with less than 10 visits!
- ▶ 23 views without any visits!
- ▶ Most visits on *WorkflowClientTasks* (963), *AuftragBearbeiten* (313), *FirmaFindenWF* (143)
- ▶ Longest think time on view *GutachtenVerifizieren*
- ▶ 11 visits on *WorkflowEskalation*
- ▶ Processes with the most interruptions: *Stammdaten bearbeiten*, *Stammdaten betrachten*, *Gutachten*

Presentation of example graphs in yEd

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- ▶ Implemented tool for session extraction
- ▶ Implemented tool for behavior model analysis
- ▶ Visualization of user behavior with Graphviz/GraphML
- ▶ Instrumentation of b+m gear and the b+m bAV-Manager
- ▶ Experiment with software professionals
- ▶ Suggestions for the software modernization

- ▶ Repeat experiment on production system(s)
- ▶ Analysis of single users or user groups (roles)
- ▶ Implementation of the suggestions
- ▶ Improvement of the `SessionExtractor` and the `BehaviorModelExtractor`
 - ▶ Visualization (colors, highlighting, layout, etc.)
 - ▶ Filter, statistics
 - ▶ Unused views