Extraction of Operational Workflow-based User Behavior Profiles for Software Modernization

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Motivation

- Priorization of (human) ressources for maintaining and modernizing frequently used views
- Identification of unused views to discontinue their development and support
- Adaptation of intended workflows which are actually bypassed by the users

How do users work with a software application's graphical user interface (GUI)?

=> Visualization of the operational user behavior

The b+m bAV-manager

- An administration software for customer and calculation data in the field of company pension scheme

- In cooperation with a third-party calculation engine, it creates expert opinions for several valuation and accounting regulations.

Agenda

Our Approach

Data Collection
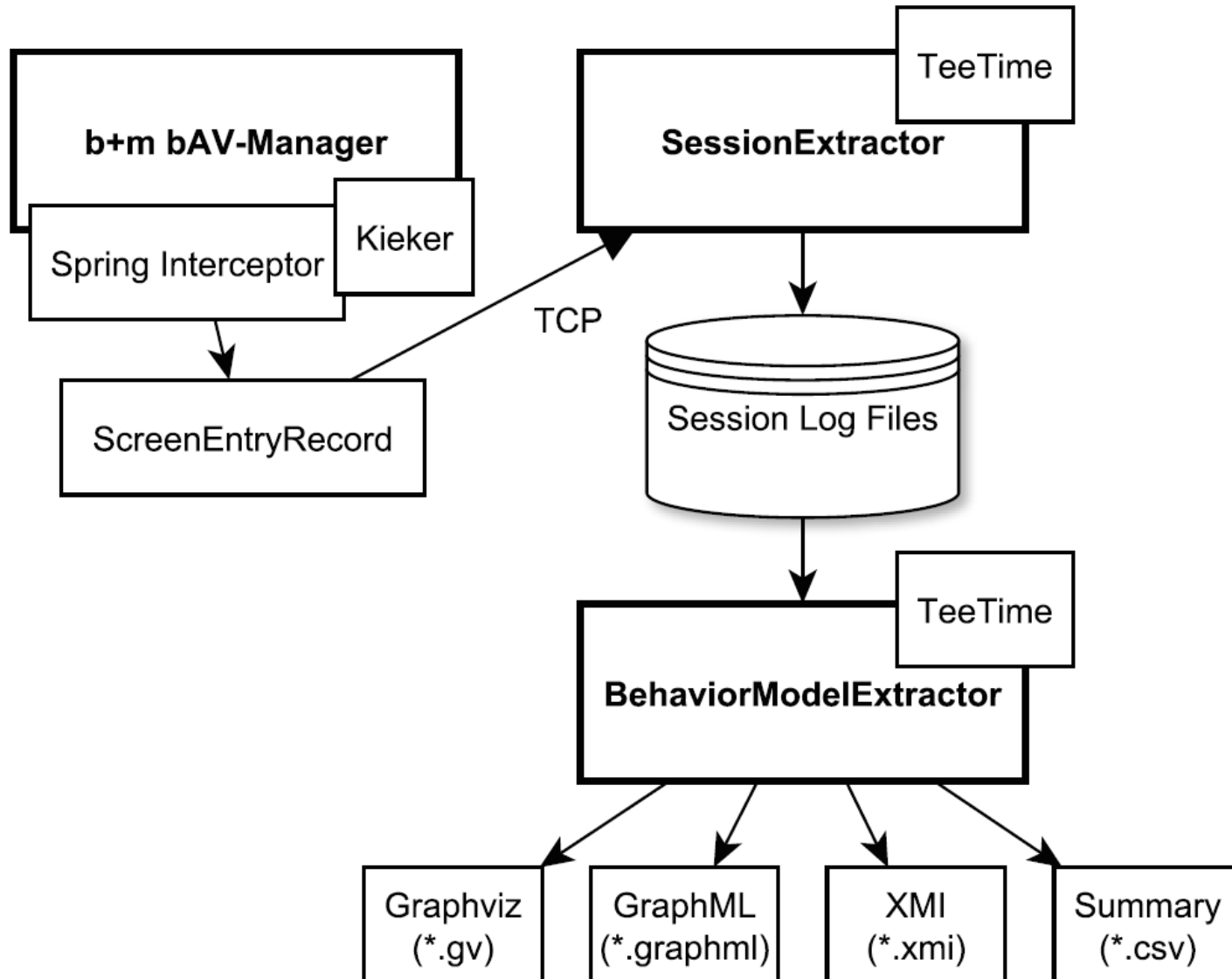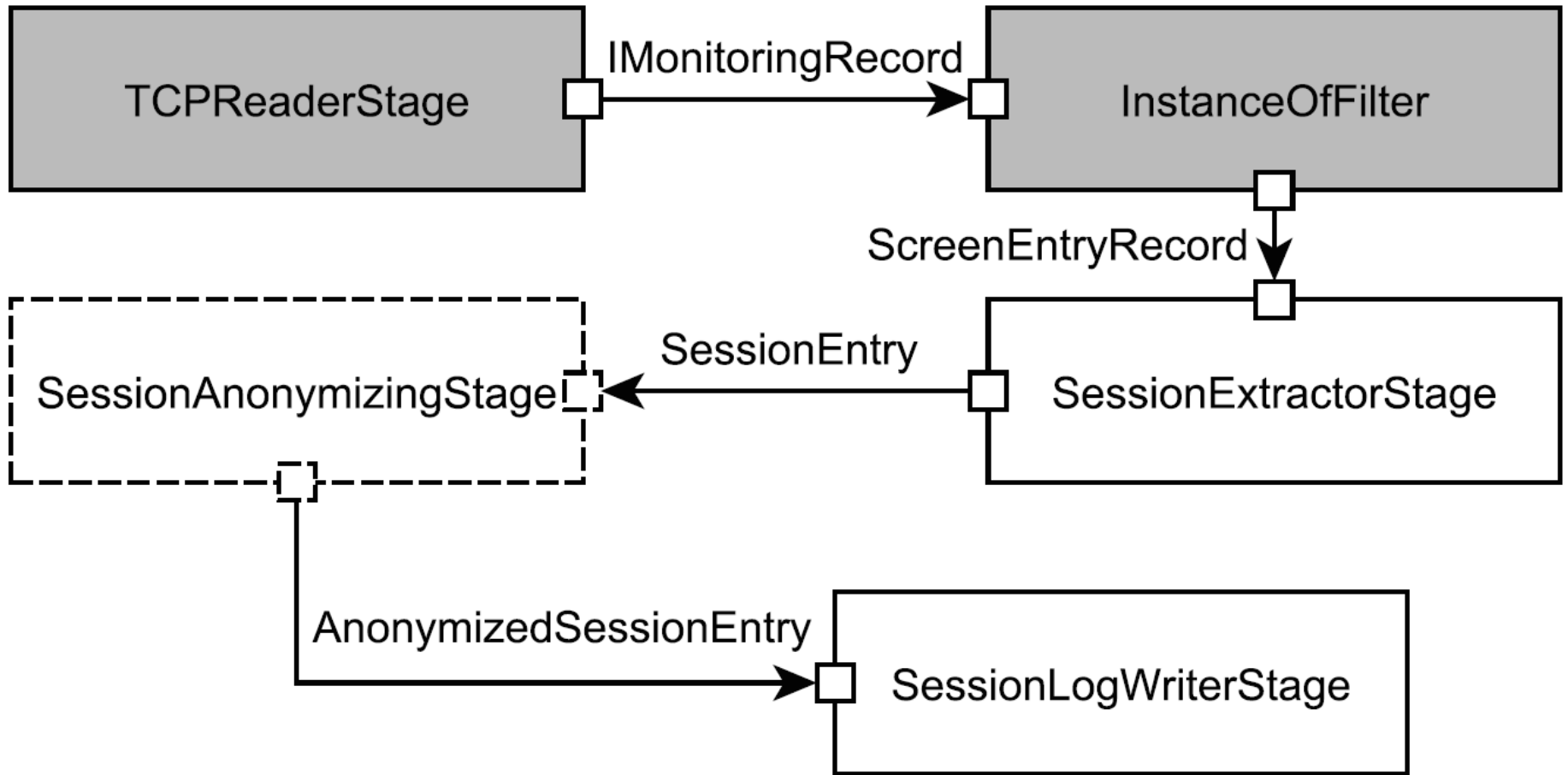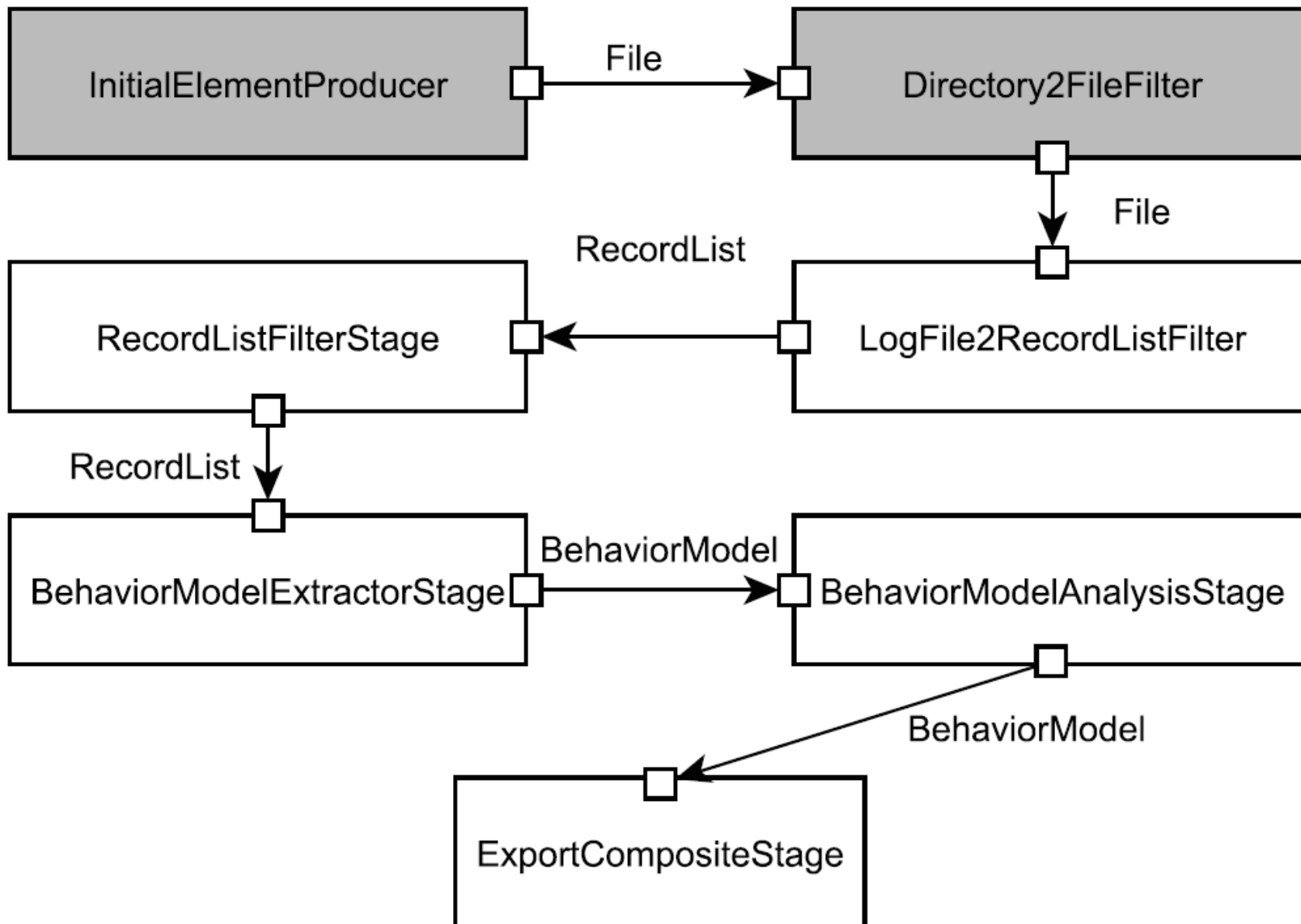
```
package de.bmiag.gear.util.monitoring.record

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

Our monitoring record defined with Kieker's Instrumentation Record Language (IRL)

Behavior Model Extractor

Case Study

- Instrumented bAV-Manager with Spring interceptors and the `ScreenEntryRecords`

- Asked five b+m employees (developers, architects, and project managers)

- Execute 11 common business processes

Goal:

"Identifying abnormal screenflows and workflows by users of the monitored application"

Methodology using GQM

Questions:
1. Which screenflows do significantly differ from the expectations of the professionals?
2. In which workflows does the usage significantly differ from the process definition?

Metrics:
- visits per screen
- think times
- transition probabilities

Results

- Collected 53 session logs with 2381 recorded user activities

- Identified 23 of 109 screens which were not visited at all

- Retrospectively, 8 of them were classified as obsolete by the professionals

- Recognized unusual workflows by a high number of visits on the error screen

- Greatest number of unusual incoming and outgoing transitions (not part of the process definition)

An Example Behavior Model
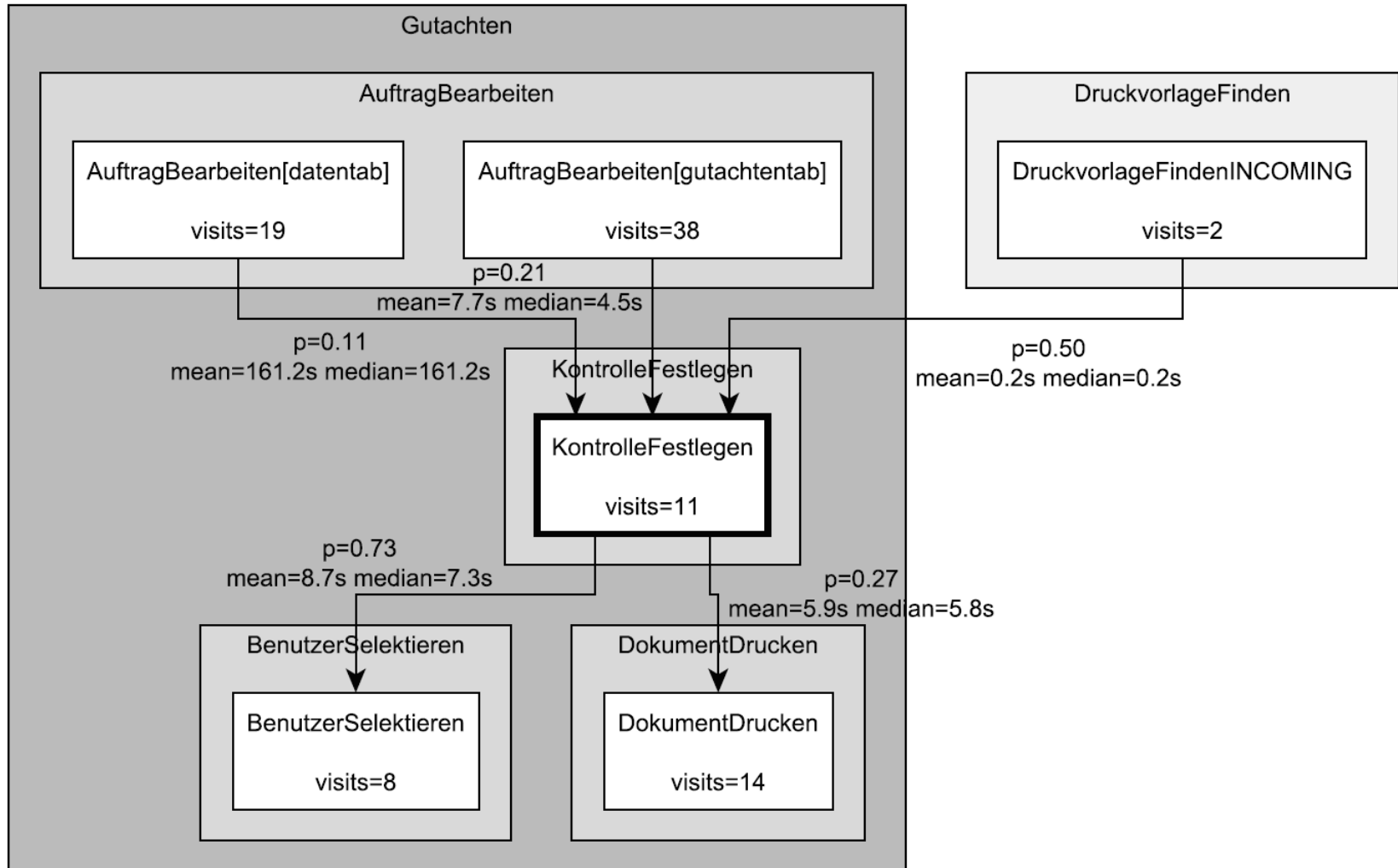
Excerpt of an example behavior model of the b+m bAV-Manager calculation process (dark grey) including its subprocesses (light grey) and screens (white).

Conclusions

- Approach to extract and visualize workflow-based user behavior profiles
- Feasibility shown by an industrial real-world application

http://kieker-monitoring.net

http://teetime.sourceforge.net

Future work

- Repetition of the experiment on productive systems of the b+m bAV-Manager's customers
- Visualization of process information to improve the screenflow for the users since they often lack orientation.