A Framework for Application Performance Monitoring and Dynamic Software Analysis

—Preview for Invited Demo/Poster Presentation—

André van Hoorn, J. Waller, and W. Hasselbring

Software Engineering Group
University of Kiel, Germany

April 24, 2012 @ ICPE '12, Boston, MA
Use cases in research and practice:

• Online/offline performance evaluation and feedback, e.g.,
  Continuous monitoring of application behavior and usage
• Performance anomaly detection and diagnosis
• (Self-)adaptation control
• Extraction of software architectural (performance) models and visualizations
• Simulation (replaying previously monitored stimuli; measurement, logging, and analysis)
Kieker: Example Workflow and Use Cases
Preview for Invited Demo/Poster Presentation

Use cases in research and practice:

• Online/offline performance evaluation and feedback, e.g.,
  • Continuous monitoring of application behavior and usage
  • Performance anomaly detection and diagnosis
  • (Self-)adaptation control
  • Extraction of software architectural (performance) models and visualizations
  • Simulation (replaying previously monitored stimuli; measurement, logging, and analysis)
Kieker: Example Workflow and Use Cases
Preview for Invited Demo/Poster Presentation

Software system with monitoring instrumentation
Monitoring probe
Measurement
Monitoring log/stream
Analysis configuration (Web GUI)
Analysis
Plugins

Use cases in research and practice:
• Online/offline performance evaluation and feedback, e.g.,
• Continuous monitoring of application behavior and usage
• Performance anomaly detection and diagnosis
• (Self-)adaptation control
• Extraction of software architectural (performance) models and visualizations
• Simulation (replaying previously monitored stimuli; measurement, logging, and analysis)
Kieker: Example Workflow and Use Cases
Preview for Invited Demo/Poster Presentation

Software system with monitoring instrumentation

Monitoring probe

Measurement

Monitoring records

Monitoring log/stream

Analysis configuration (Web GUI)

Analysis

Plugins

Visualizations

Use cases in research and practice:

- Online/offline performance evaluation and feedback, e.g.,
- Continuous monitoring of application behavior and usage
- Performance anomaly detection and diagnosis
- (Self-)adaptation control
- Extraction of software architectural (performance) models and visualizations
- Simulation (replaying previously monitored stimuli; measurement, logging, and analysis)

A. van Hoorn, J. Waller, W. Hasselbring
Kieker (ICPE ’12 Poster/Demo Preview)
April 24, 2012 @ ICPE ’12, Boston, MA
Use cases in research and practice:

- Online/offline performance evaluation and feedback, e.g.,
- Continuous monitoring of application behavior and usage
- Performance anomaly detection and diagnosis
- (Self-)adaptation control
- Extraction of software architectural (performance) models and visualizations
- Simulation (replaying previously monitored stimuli; measurement, logging, and analysis)
Use cases in research and practice:

- Online/offline performance evaluation and feedback, e.g.,
Kieker: Example Workflow and Use Cases
Preview for Invited Demo/Poster Presentation

Use cases in research and practice:
- Online/offline performance evaluation and feedback, e.g.,
  - Continuous monitoring of application behavior and usage

A. van Hoorn, J. Waller, W. Hasselbring

Kieker (ICPE ’12 Poster/Demo Preview) April 24, 2012 @ ICPE ’12, Boston, MA 2 / 3
Kieker: Example Workflow and Use Cases
Preview for Invited Demo/Poster Presentation

Use cases in research and practice:

- Online/offline performance evaluation and feedback, e.g.,
  - Continuous monitoring of application behavior and usage
  - Performance anomaly detection and diagnosis

Software system with monitoring instrumentation
Monitoring probe
Monitoring records
Monitoring log/stream
Analysis configuration (Web GUI)
Analysis
Plugins
Visualizations

Workload Anomaly Detection

0.0
0.5
1.0
1.5
2.0

Anomaly score

SRV0::
@3:..Bookstore
SRV0::
@1:..Catalog
SRV0::
@2:..CRM
SRV1::
@1:..Catalog

searchBook()
getBook(..)
getOffers()

<<execution container>>

<<deployment component>>

1635
543
1092
573
1062

$1635

A. van Hoorn, J. Waller, W. Hasselbring
Kieker (ICPE '12 Poster/Demo Preview)
Use cases in research and practice:

- Online/offline performance evaluation and feedback, e.g.,
- Continuous monitoring of application behavior and usage
- Performance anomaly detection and diagnosis
- (Self-)adaptation control
Use cases in research and practice:

- Online/offline performance evaluation and feedback, e.g.,
  - Continuous monitoring of application behavior and usage
  - Performance anomaly detection and diagnosis
  - (Self-)adaptation control
- Extraction of software architectural (performance) models and visualizations
Use cases in research and practice:

- **Online/offline performance evaluation and feedback**, e.g.,
  - Continuous monitoring of application behavior and usage
  - Performance anomaly detection and diagnosis
  - (Self-)adaptation control
- ** Extraction of software architectural (performance) models and visualizations**
- **Simulation** (replaying previously monitored stimuli; measurement, logging, and analysis)
Kieker Framework

- Modular, flexible, and extensible architecture (Probes, records, readers, writers, filters etc.)
- Pipes-and-filters framework for analysis configuration
- Distributed tracing (logging, reconstruction, visualization)
- Low overhead (designed for continuous operation)
- Evaluated in lab and industrial case studies (since 2006)
Kieker Framework

- Modular, flexible, and extensible architecture (Probes, records, readers, writers, filters etc.)
- Pipes-and-filters framework for analysis configuration
- Distributed tracing (logging, reconstruction, visualization)
- Low overhead (designed for continuous operation)
- Evaluated in lab and industrial case studies (since 2006)

Kieker is open-source software (Apache License, V. 2.0)

http://kieker-monitoring.net
Kieker Framework

- **Modular, flexible, and extensible architecture** (Probes, records, readers, writers, filters etc.)
- **Pipes-and-filters framework** for analysis configuration
- **Distributed tracing** (logging, reconstruction, visualization)
- **Low overhead** (designed for continuous operation)
- **Evaluated in lab and industrial case studies** (since 2006)

Kieker is open-source software (Apache License, V. 2.0)

http://kieker-monitoring.net

Kieker is distributed as part of SPEC® RG's repository of peer-reviewed tools for quantitative system evaluation and analysis

http://research.spec.org/projects/tools.html