ON THE ROAD TO BENCHMARKING BPMN 2.0 WORKFLOW ENGINES

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What is a Workflow Engine?

Workflow Engine

- Task Dispatcher
- Process Navigator
- Job Executor
- Core Engine
- Service Invoker
- Transaction Manager
- Persistent Manager

Application Server

DBMS

Users

Web Service

Instance Database

Context » BPMN 2.0 Adoption » Why a Benchmark? » Challenges » BenchFlow » Next Steps » Conclusions
Many Business Process Modeling/Execution Languages

- EPC: 1992
- XPDL: 1998
- BPEL: 2002
- YAWL: 2004
- BPMN: 2008
- PNML: 2008
BPMN 2.0: A Widely Adopted Standard

ISO/IEC 19510

BPMN 2.0  BPMN 2.0.2

Jan 2011  Jan 2014

https://en.wikipedia.org/wiki/List_of_BPMN_2.0_engines
Main Challenges in Benchmarking BPMN 2.0 Workflow Engines
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WORKLOAD CHARACTERIZATION

BENCHMARK EXECUTION
Main Challenges in Benchmarking BPMN 2.0 Workflow Engines

WORKLOAD CHARACTERIZATION

1. Define the Workload Mix
2. Define the Load Functions

BENCHMARK EXECUTION
Main Challenges in Benchmarking BPMN 2.0 Workflow Engines

WORKLOAD CHARACTERIZATION

1. Define the Workload Mix
2. Define the Load Functions

BENCHMARK EXECUTION

3. Deal with engine-specific interfaces and BPMN 2.0 customizations
4. Asynchronous execution of business processes
5. Define meaningful and reliable KPIs
I. Define the Workload Mix
1. Define the Workload Mix

Control Flow

Data Flow

Events

Activities

Task Types

Execution Behavior

- BPMN 2.0 Adoption
- Why a Benchmark?
- Challenges
- BenchFlow
- Next Steps
- Conclusions
1. Define the Workload Mix

NUMBER OF ENGINE SUPPORTING THE FEATURE

NUMBER OF REAL-WORLD MODELS

Context » BPMN 2.0 Adoption » Why a Benchmark? » Challenges » BenchFlow » Next Steps » Conclusions
I. Define the Workload Mix

- NUMBER OF REAL-WORLD MODELS
- NUMBER OF ENGINES SUPPORTING THE FEATURE

- 200
- 0
I. Define the Workload Mix

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<th>NUMBER OF REAL-WORLD MODELS</th>
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1. Define the Workload Mix

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Challenges
2. Define the Load Functions

Context » BPMN 2.0 Adoption » Why a Benchmark? » Challenges » BenchFlow » Next Steps » Conclusions
3. Deal with engine-specific interfaces and BPMN 2.0 customizations
4. Asynchronous execution of processes

Start

Loading Driver

Workflow Engine

Application Server

Instance Database

DBMS

Users

Web Service
4. Asynchronous execution of processes
The BenchFlow Project

“Design the first benchmark to assess and compare the performance of Workflow Engines that are compliant with Business Process Model and Notation 2.0 (BPMN 2.0) standard,”
1. Define the Workload Mix

What we need: even more (anonymized) real-world BPMN 2.0 process models
1. Define the Workload Mix

**What we need:** even more (anonymized) real-world BPMN 2.0 process models

**Context** » BPMN 2.0 Adoption » Why a Benchmark? » Challenges » BenchFlow » Next Steps » Conclusions
1. Define the Workload Mix

**What we need:** even more (anonymized) real-world BPMN 2.0 process models

**Skouradaki et al. [SOSE2015]**

**Graph Matching**

**Selection Criteria**

**REAL-WORLD PROCESSES**

**REOCCURRING STRUCTURES**
I. Define the Workload Mix

What we need: even more (anonymized) real-world BPMN 2.0 process models

Context » BPMN 2.0 Adoption » Why a Benchmark? » Challenges » BenchFlow » Next Steps » Conclusions
Enabling the Benchmark Execution

Workflow Engine

Application Server

Instance Database

DBMS

Loading Driver

Context » BPMN 2.0 Adoption » Why a Benchmark? » Challenges » BenchFlow » Next Steps » Conclusions
Enabling the Benchmark Execution

- **Faban**
- **harness**
- **Workflow Engine**
- **Application Server**
- **Instance Database**
- **DBMS**
- **Users**
- **Web Service**

**Loading Functions**

**Faban Drivers**

Context » BPMN 2.0 Adoption » Why a Benchmark? » Challenges » BenchFlow » Next Steps » Conclusions
Enabling the Benchmark Execution

1. Flexible deployment
2. Flexible HW Resources
3. Frozen Initial Condition
Enabling the Benchmark Execution

- Faban Drivers
- Workflow Engine
- DBMS

Faban Drivers

Workflow Engine

DBMS

Faban Docker
1. Automatically deploy and start the benchmark environment;
Enabling the Benchmark Execution

1. Automatically deploy and start the benchmark environment;
2. Automatically deploy the workload mix;
Enabling the Benchmark Execution

1. Automatically deploy and start the benchmark environment;
2. Automatically deploy the workload mix;
3. Determine when the benchmark ends;
1. Automatically deploy and start the benchmark environment;
2. Automatically deploy the workload mix;
3. Determine when the benchmark ends;
4. Collect the execution and process logs.
The BenchFlow Project Next Steps

• Release the first prototype of the Benchmark environment
  » Yes: Abstract the Interaction with the Engines; Automatic Deploy and Undeploy of the S.U.T.; Execution and Process Log Gathering
  » No: Automatic Generation of Drivers; Users, Web Services and External Catching Business Events

• Release the first prototype of the Workload Mix synthesizer

• First Experiments with KPIs Definition and Computation

• Collect More Process Models and Process Execution Logs

BACKUP SLIDES

- Cited Works;
- Related Works.

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[SOSE2015]

Related Works


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