BENCHFLOW

A FRAMEWORK FOR BENCHMARKING BPMN 2.0 WORKFLOW MANAGEMENT SYSTEMS

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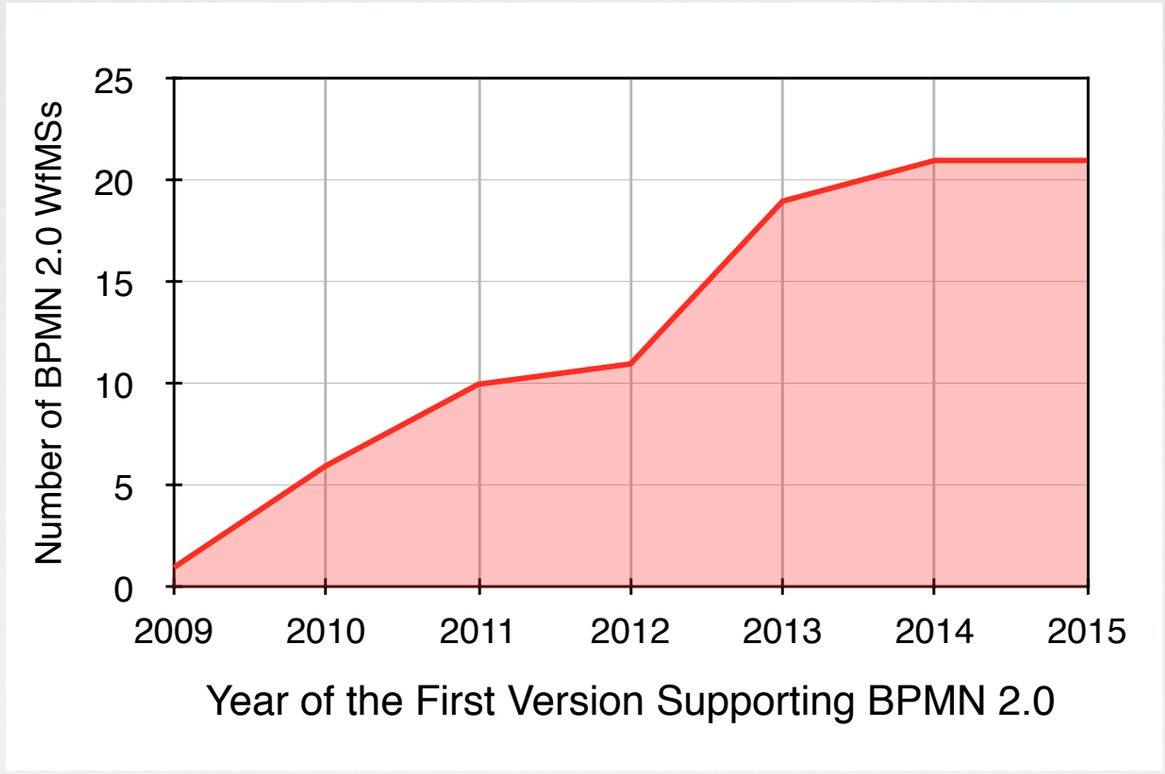
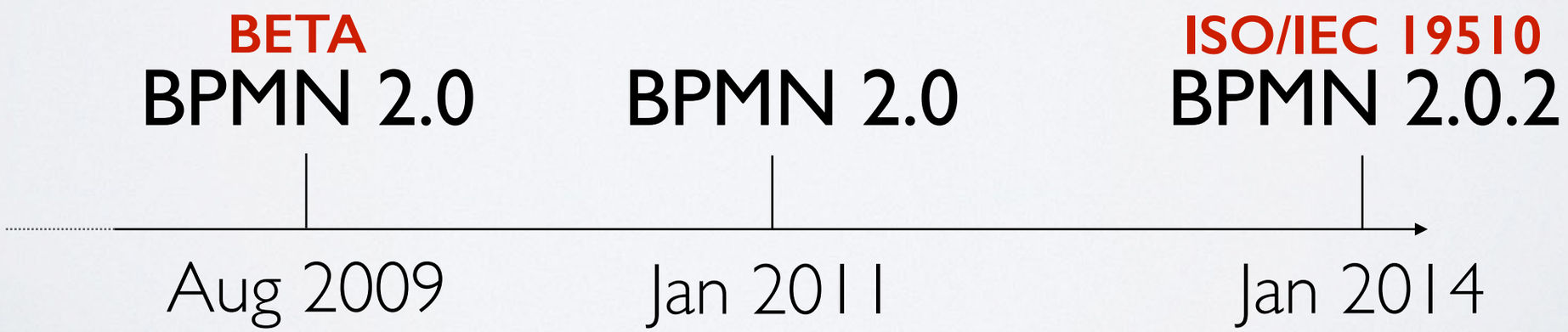
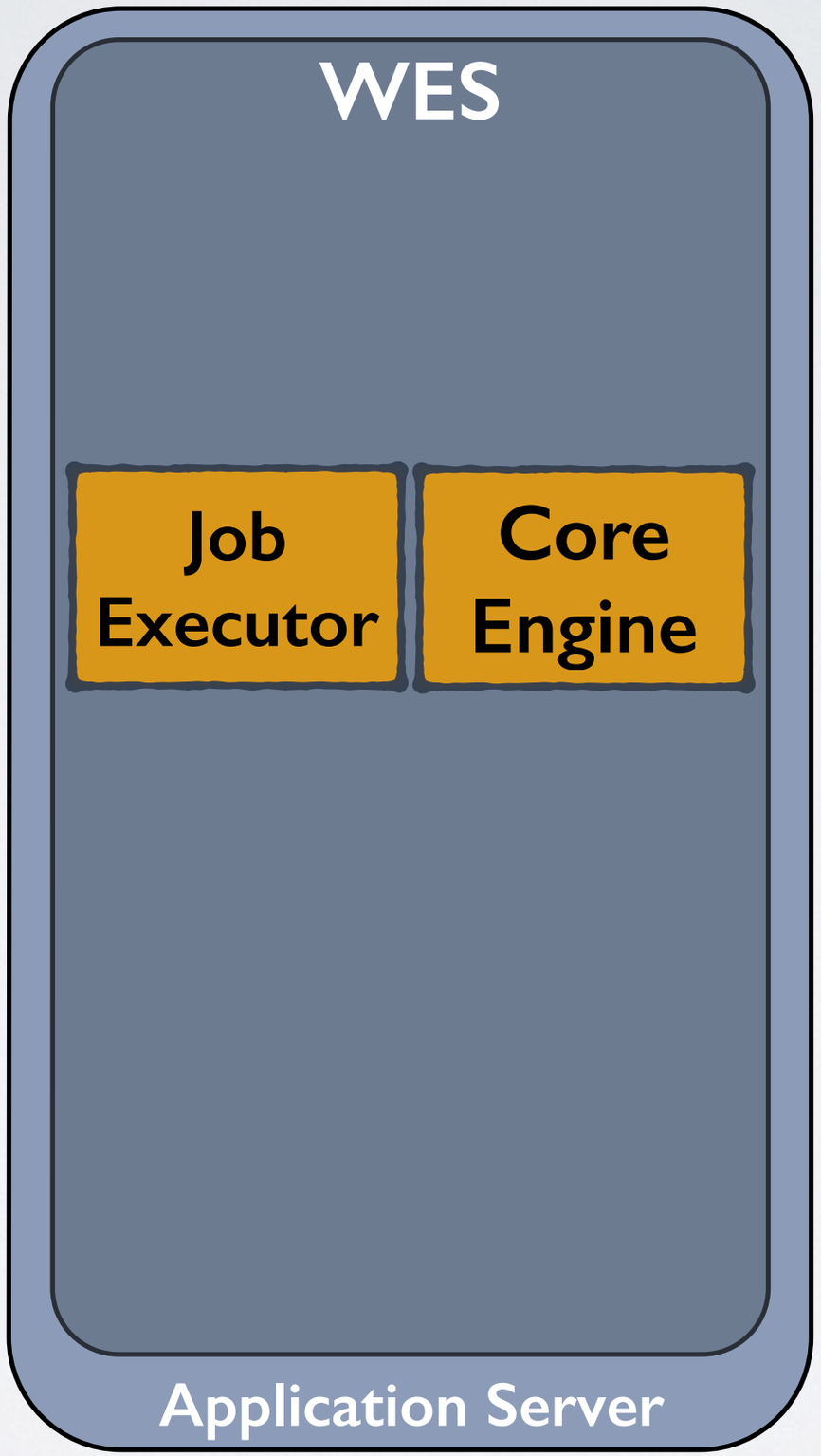
BPMN 2.0: A Widely Adopted Standard



https://en.wikipedia.org/wiki/List_of_BPMN_2.0_engines



Workflow Management System's Main Components



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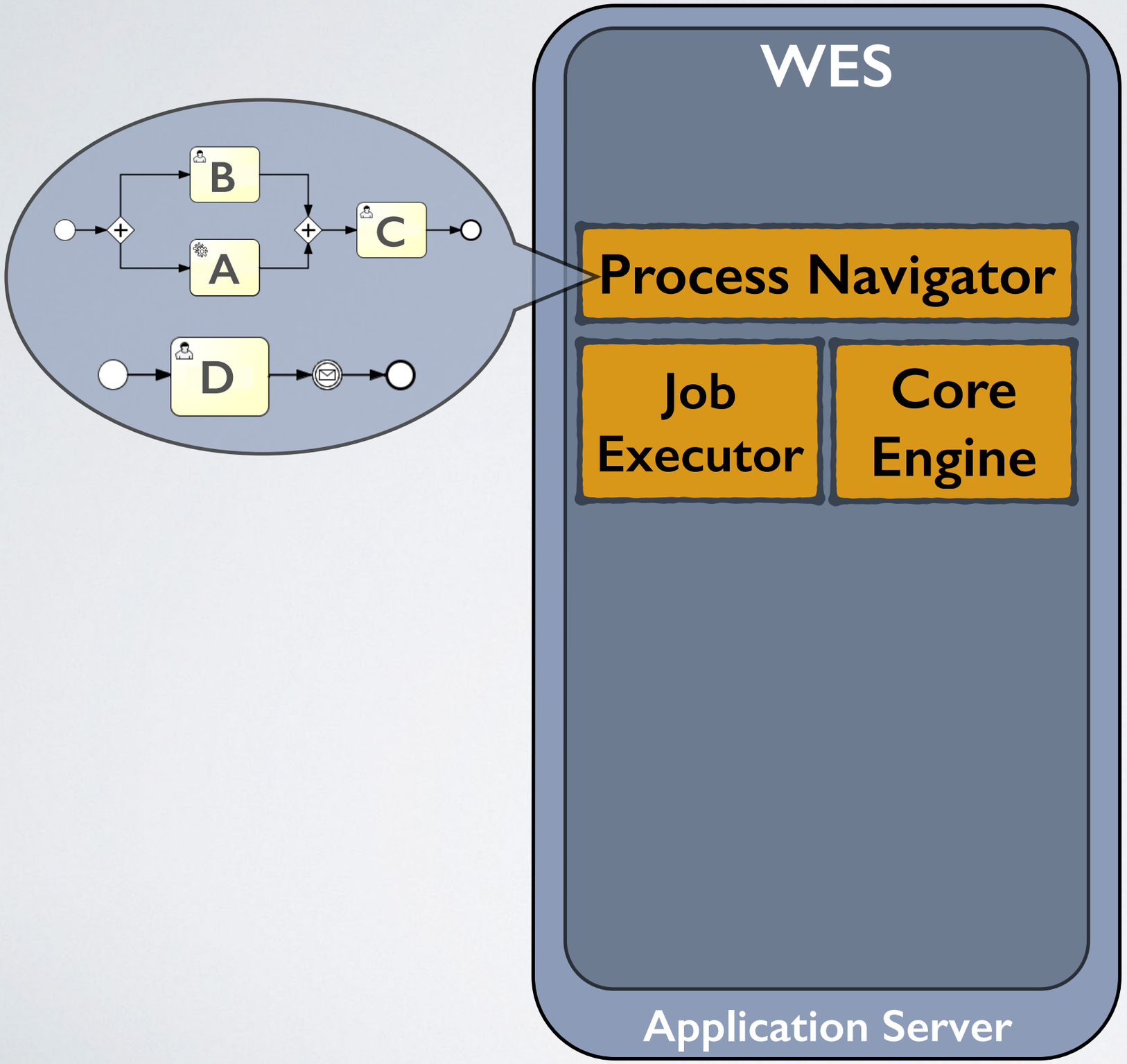

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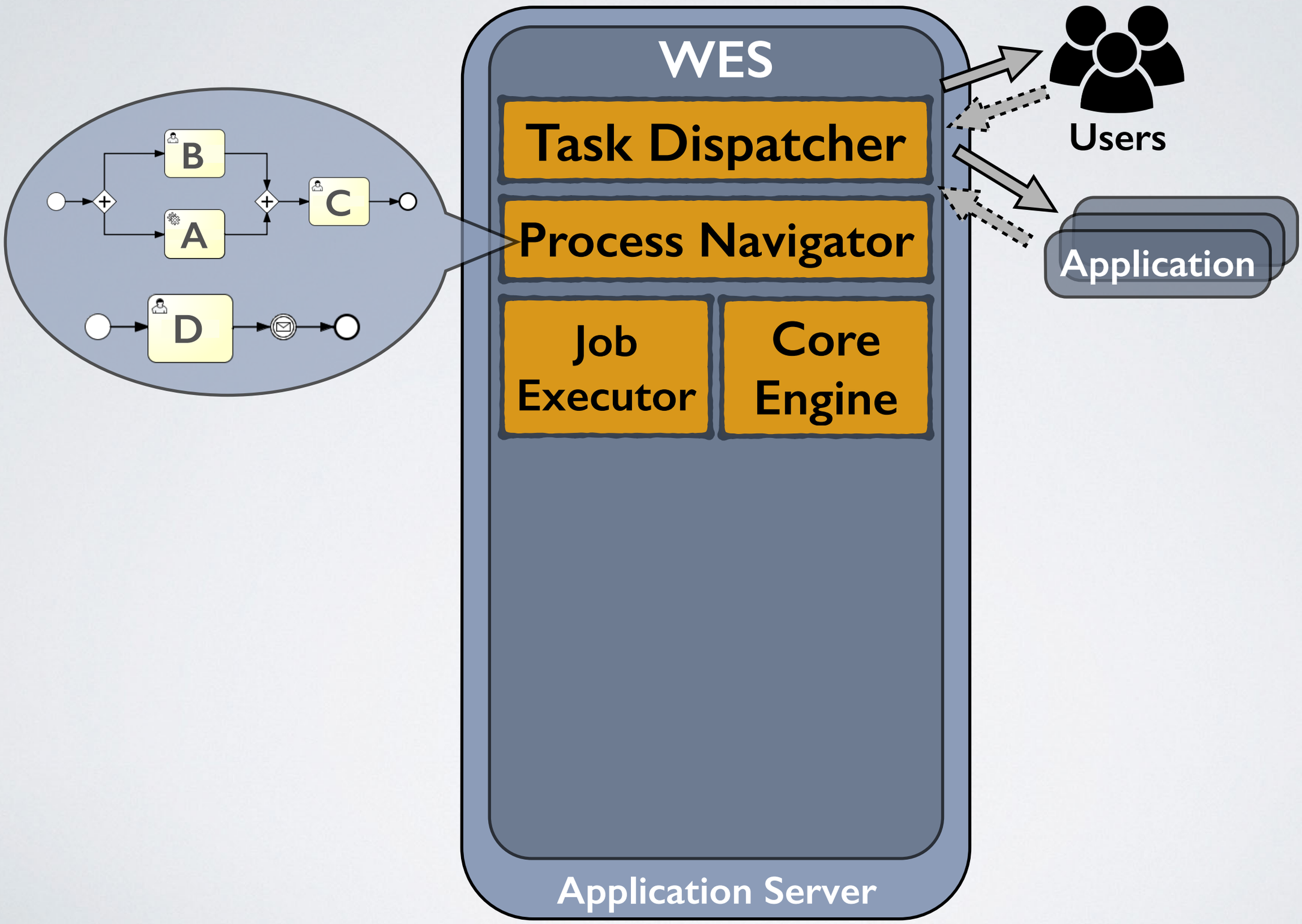

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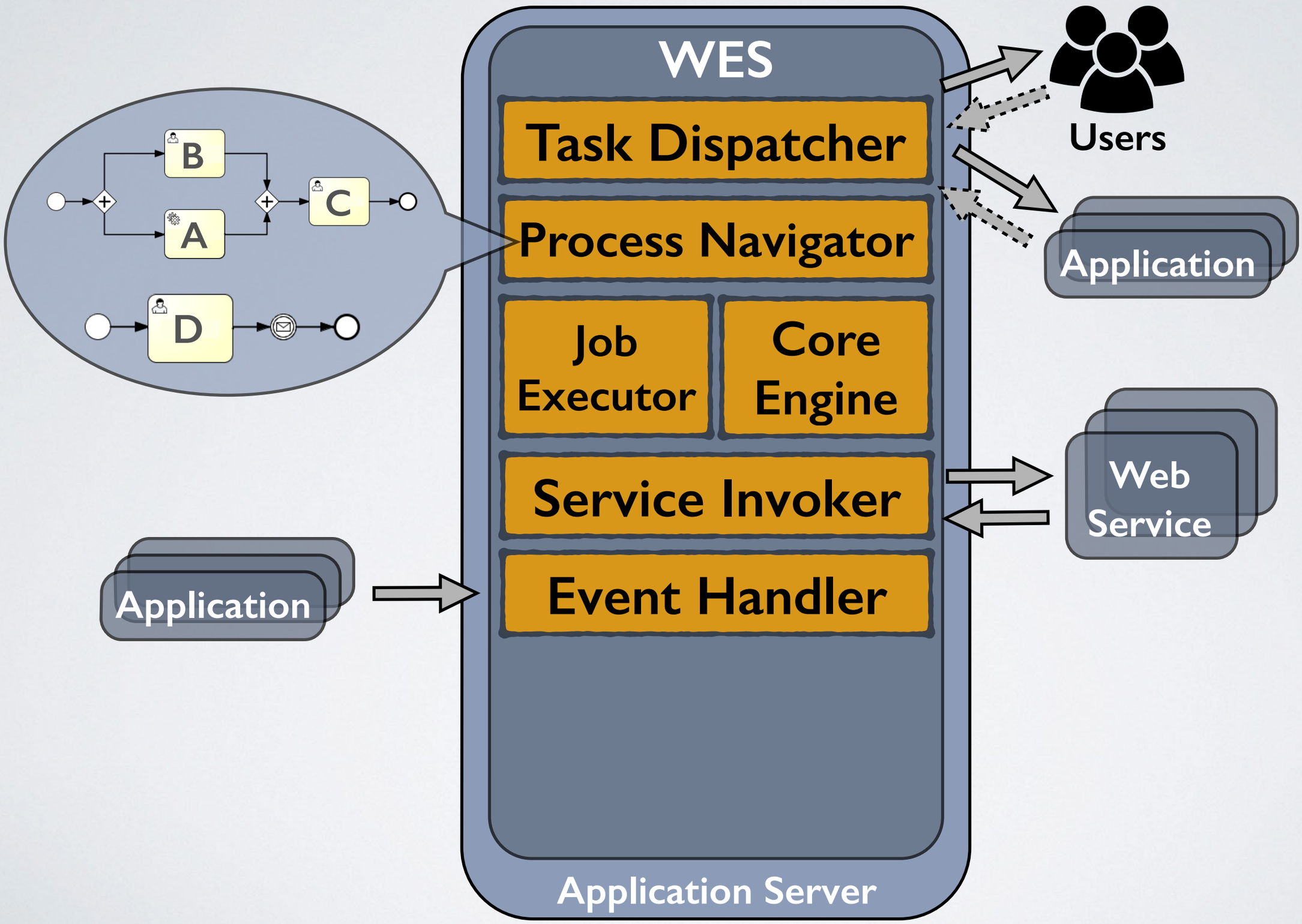

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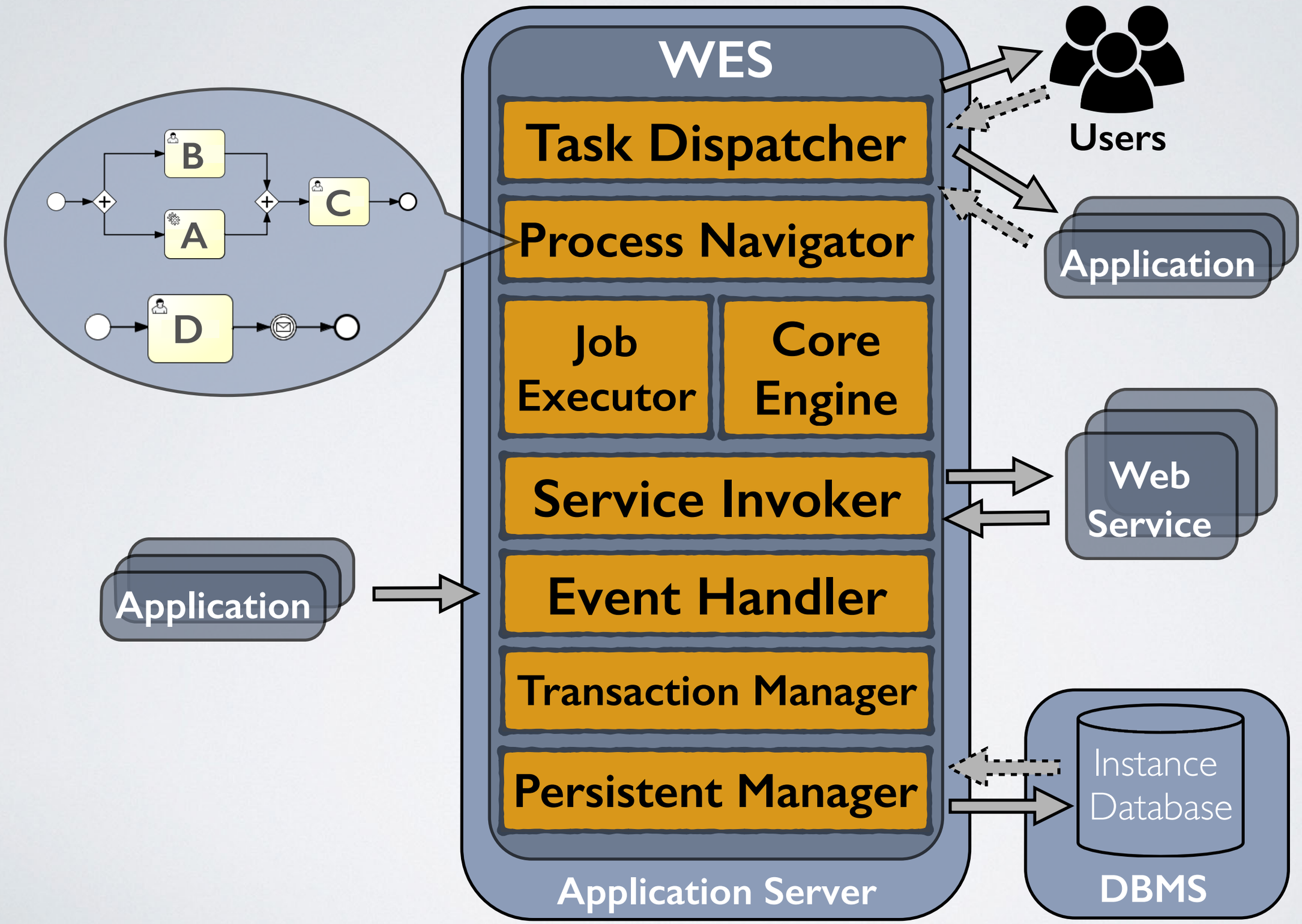

Workflow Management System's Diversification

Supported Languages

- **BPMN, BPEL, Petri-Nets, YAML**

Functionalities

- Dynamic workflow changes
- Integration capabilities

System's Architecture

- Distributed workflow support
- Migrating workflow objects support
- Transactional workflow support

Deployment Infrastructure

- Standalone
- Cluster Deployment
- Cloud Deployment
- Mobile Deployment

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The BenchFlow Project

"Design the first benchmark to assess and compare the performance of WfMSs that are compliant with Business Process Model and Notation 2.0 standard."

BenchFlow Framework: Requirements & Functionalities

System Under Test (SUT)

- Automate the SUT deployment
- Simplify the SUT's deployment configuration
- Adapt to different API provided by different WfMSs
- Deal with the asynchronous execution of business processes

BenchFlow Framework: Requirements & Functionalities

Performance Benchmark

- **Simulate all the entities interacting with the WfMS**
- **Accomodate and automate different kinds of performance test:**
  - **Ensure reliable execution**
  - **Ensure repeatability**
- **Automate the performance data collection and analyses**

Similar Tools:
SOABench, SOArMetrics, Betsy, LoadUI + SoapUI

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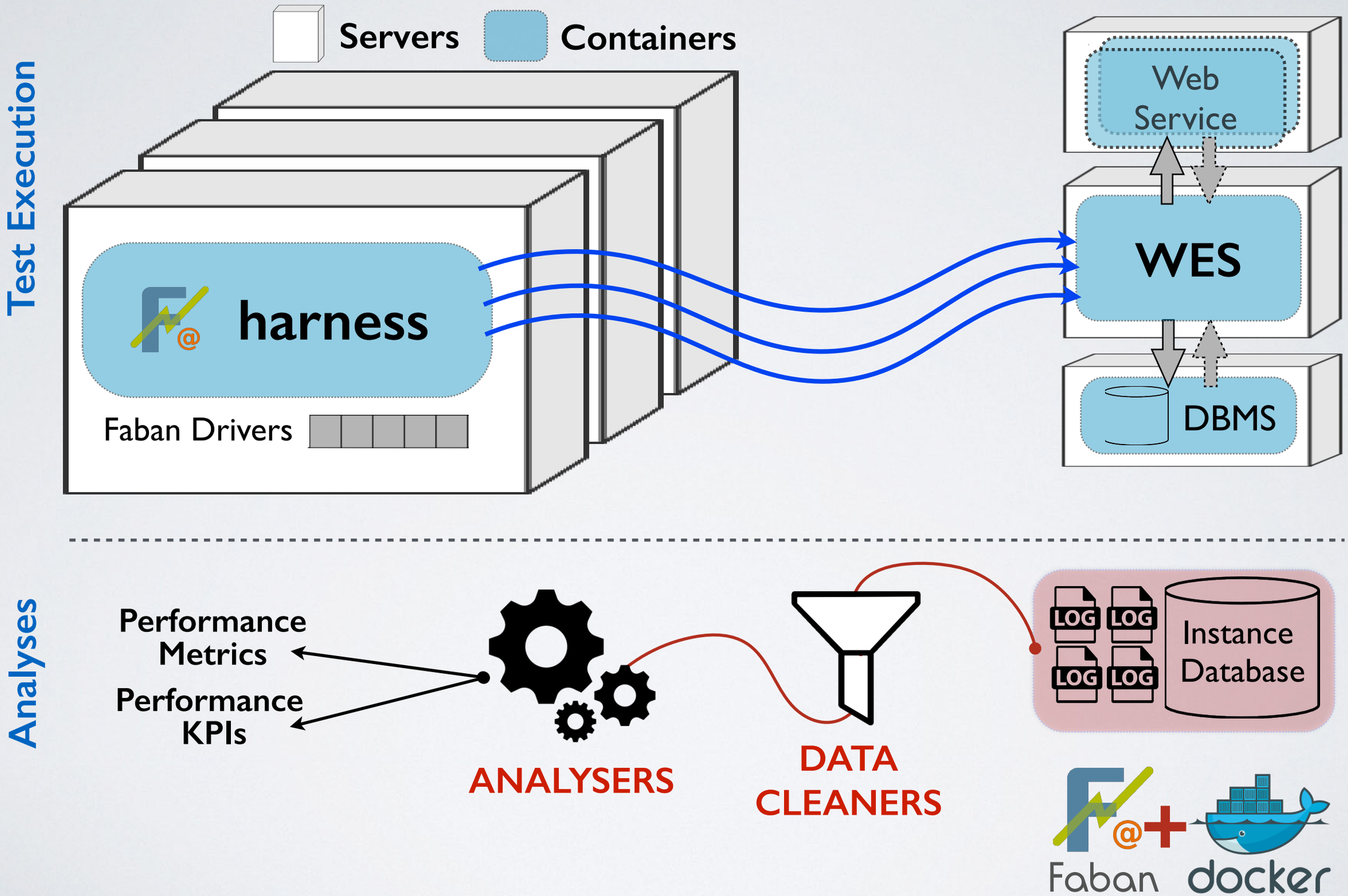
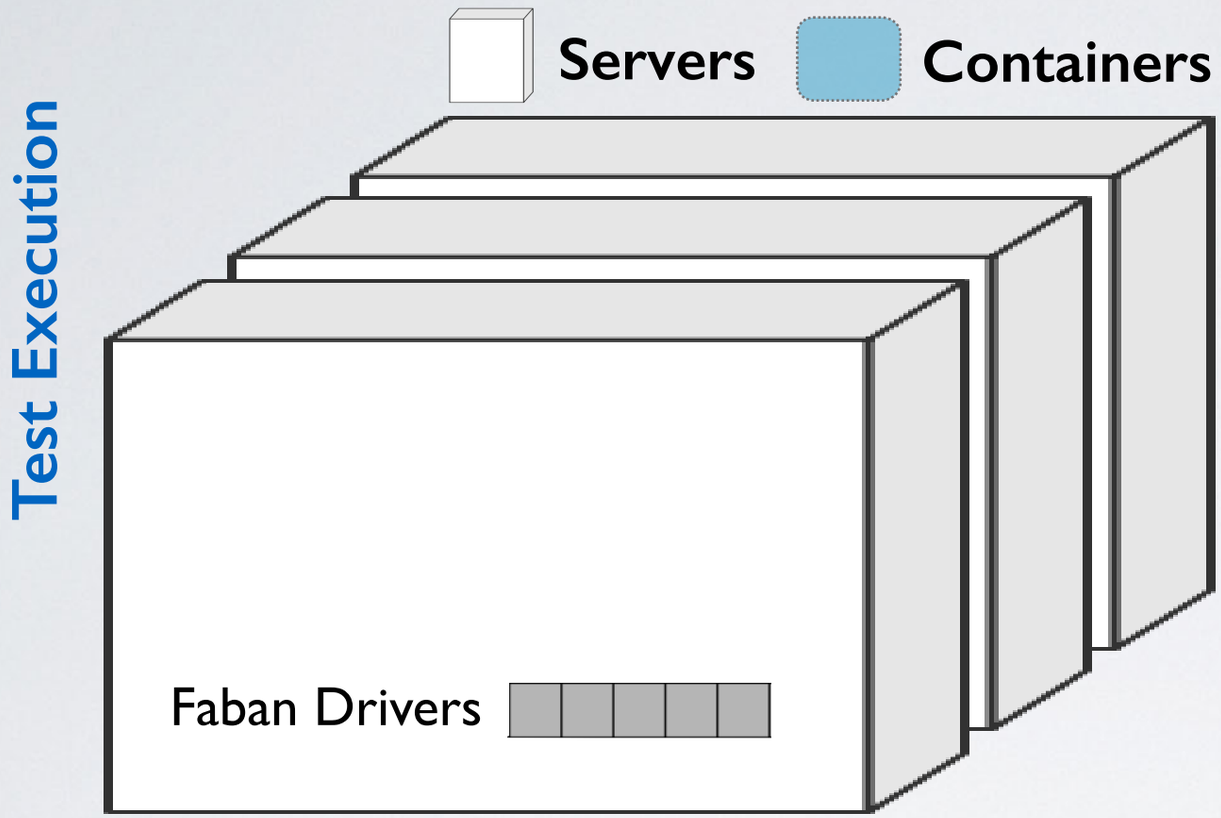


BenchFlow Framework



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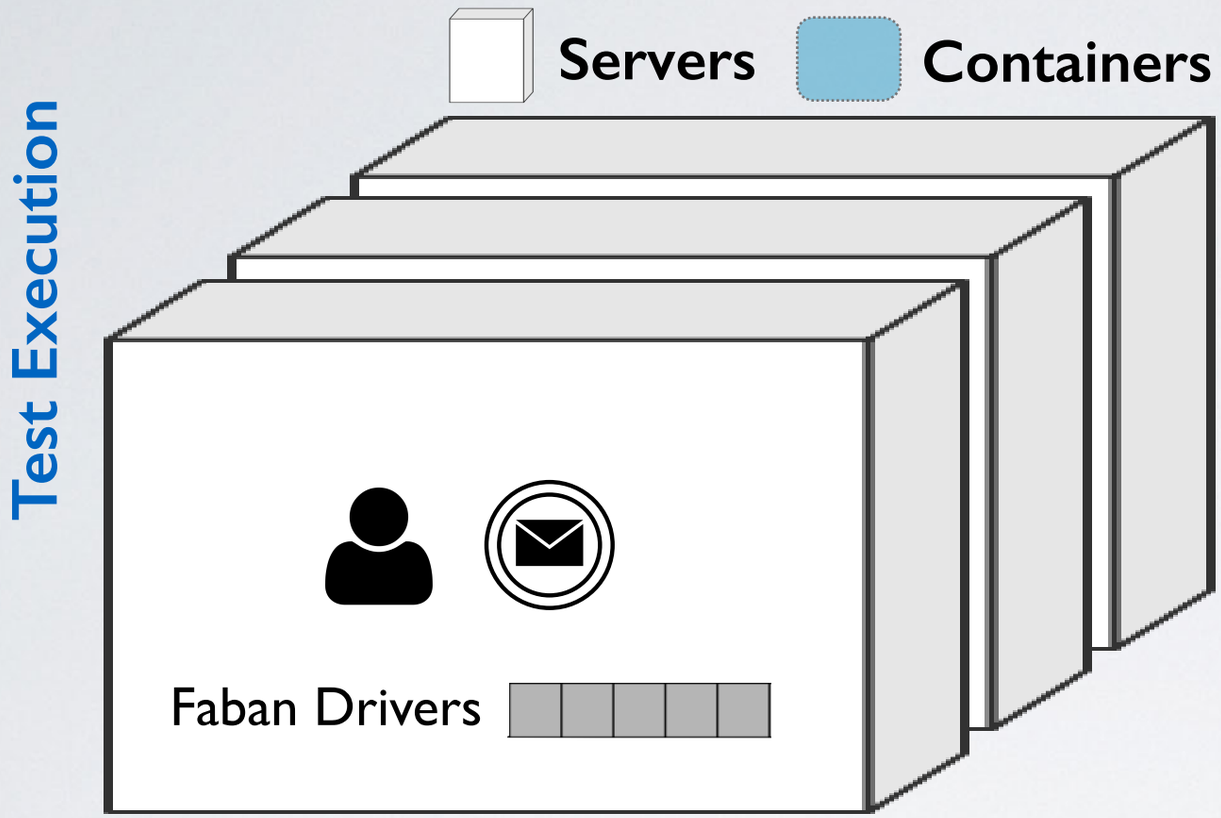

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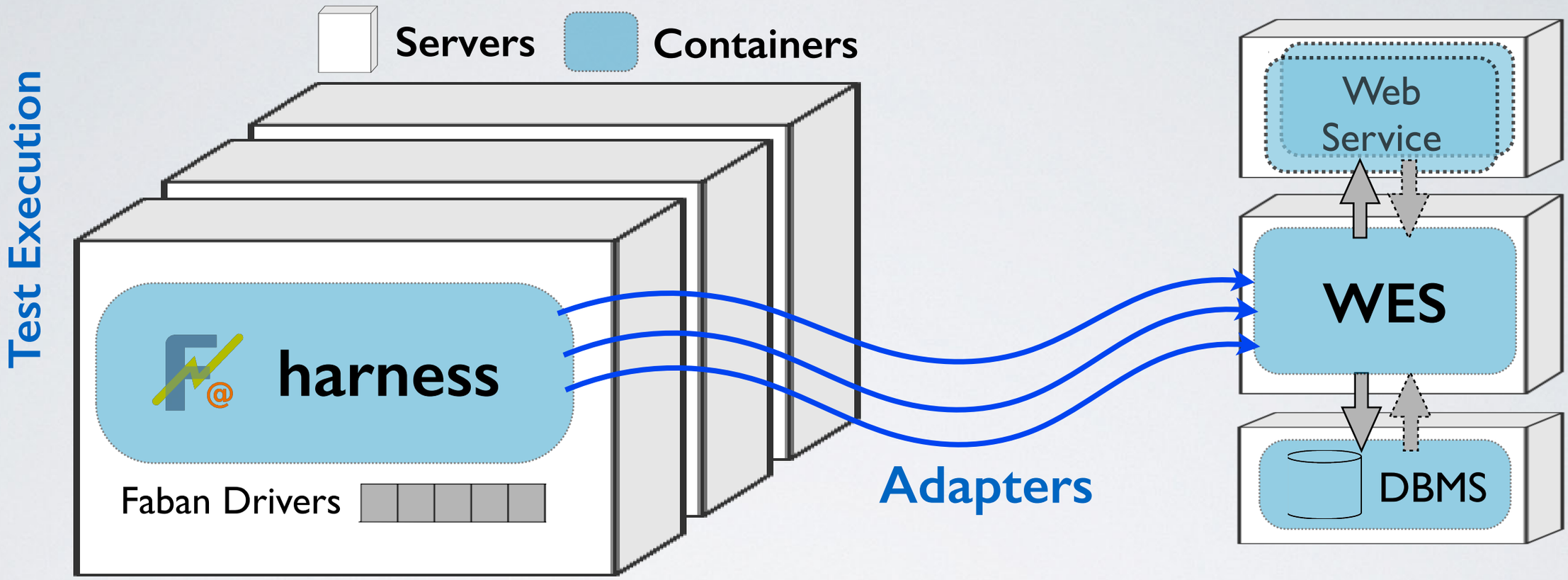

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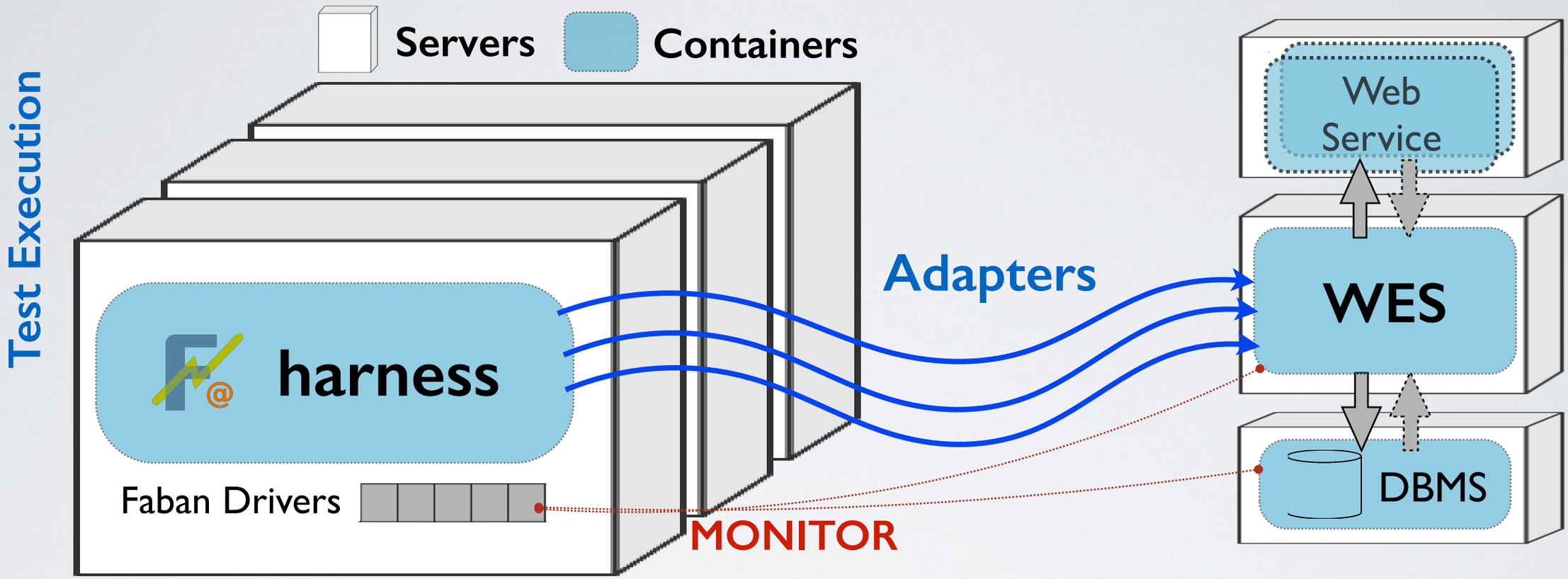

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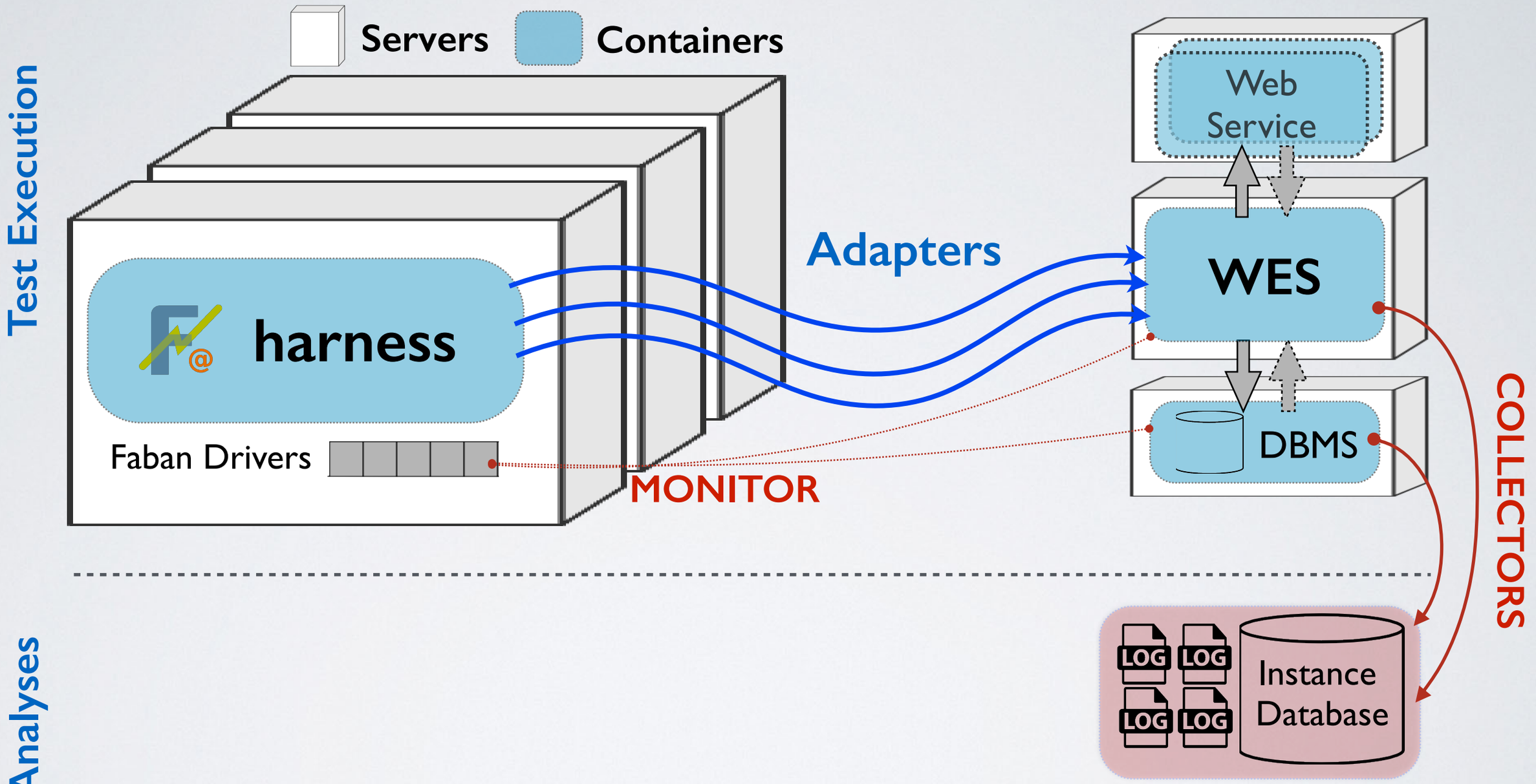

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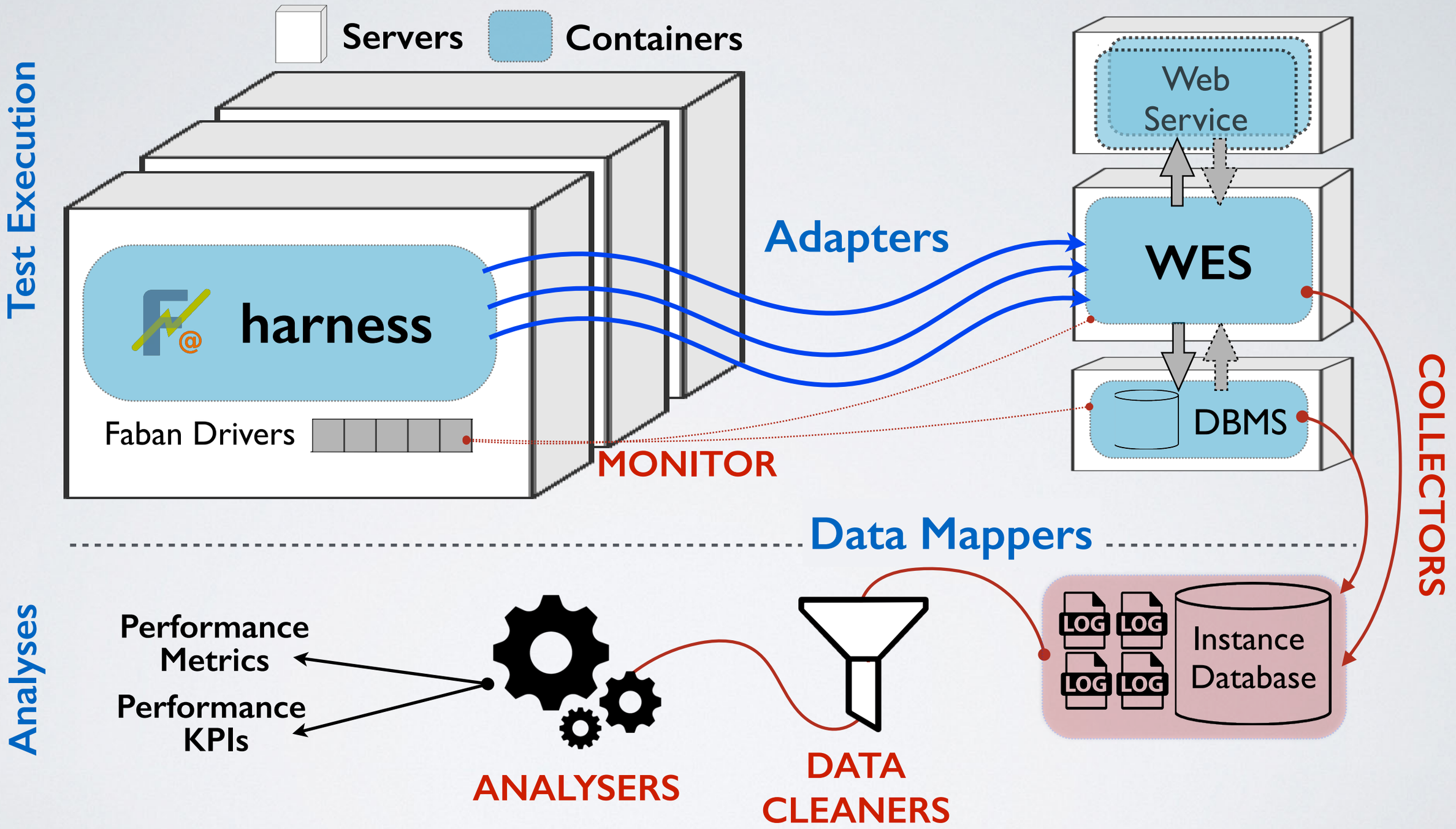
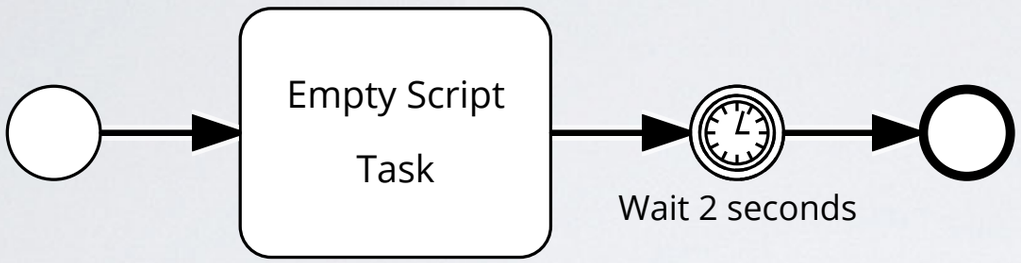
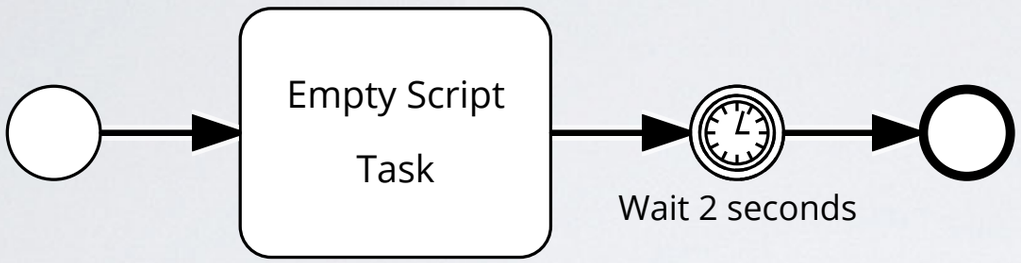


Performance Metrics and KPIs



TEST PROCESS

Performance Metrics and KPIs



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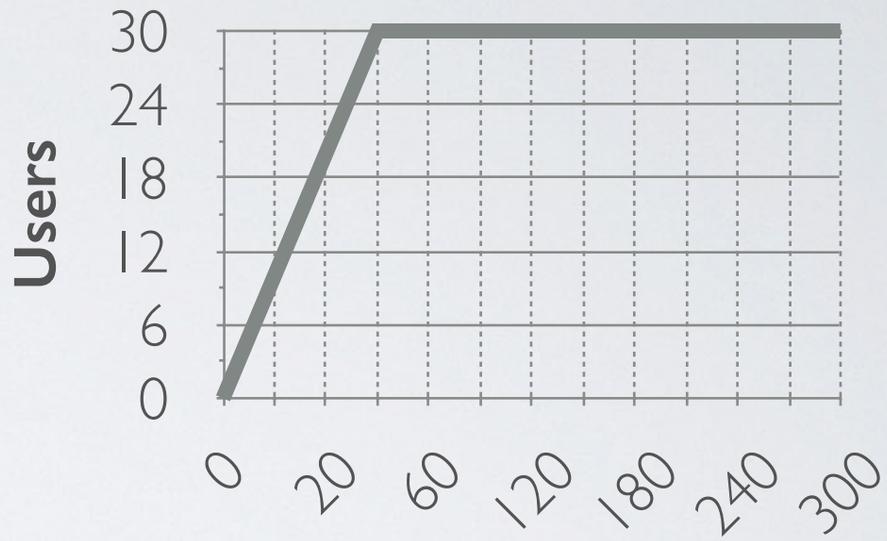
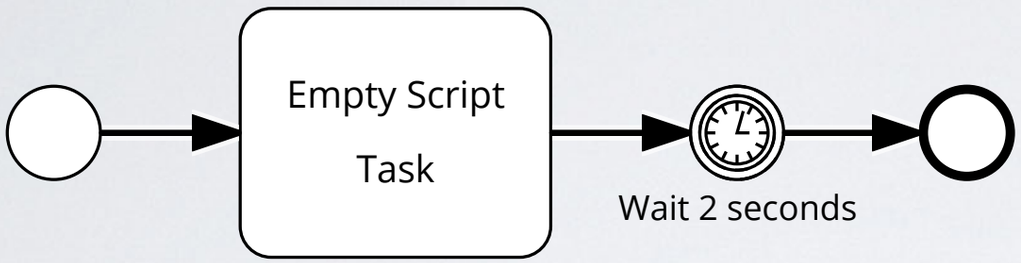


LOAD FUNCTION

Performance Metrics and KPIs



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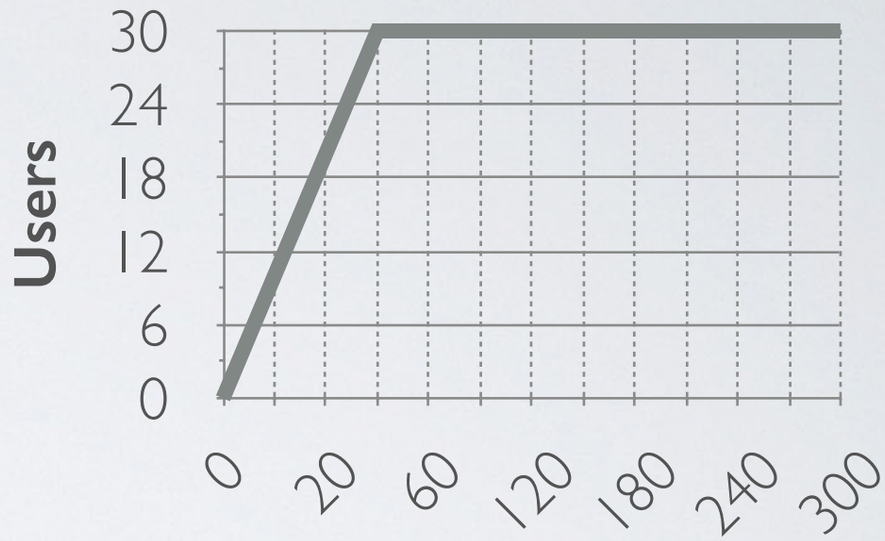


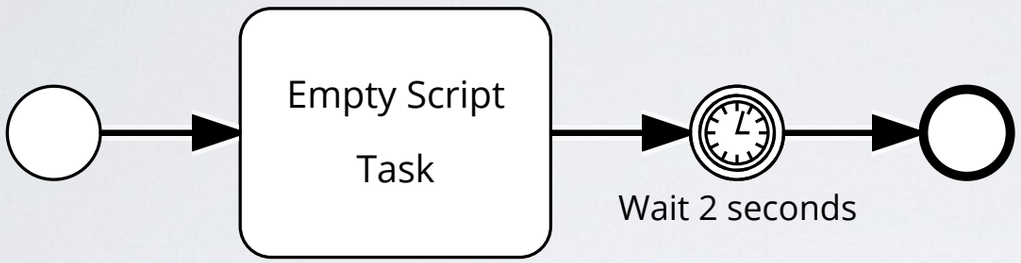
LOAD FUNCTION

Load Drivers

CPU	64 Cores @ 1400 MHz
RAM	128 GB

TEST ENVIRONMENT

Performance Metrics and KPIs



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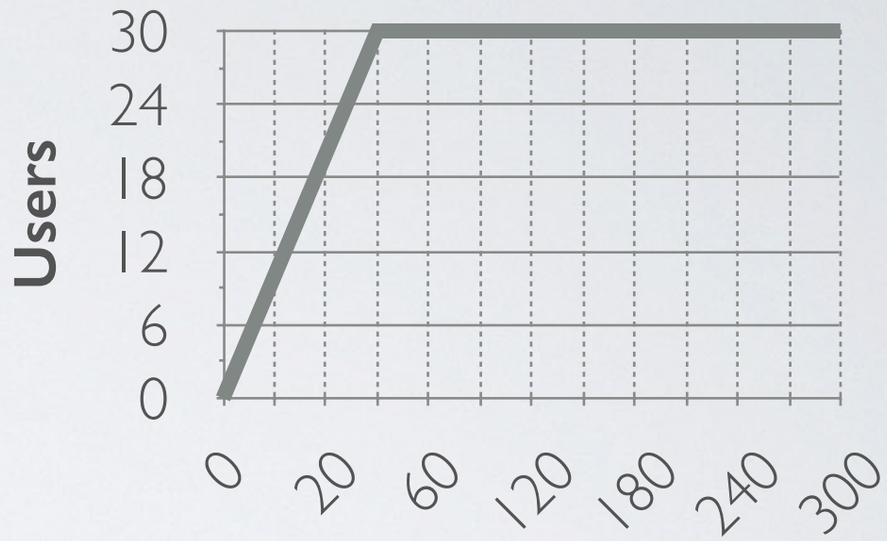

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CPU	64 Cores @ 1400 MHz
RAM	128 GB

WES

CPU	12 Cores @ 800 MHz
RAM	64 GB

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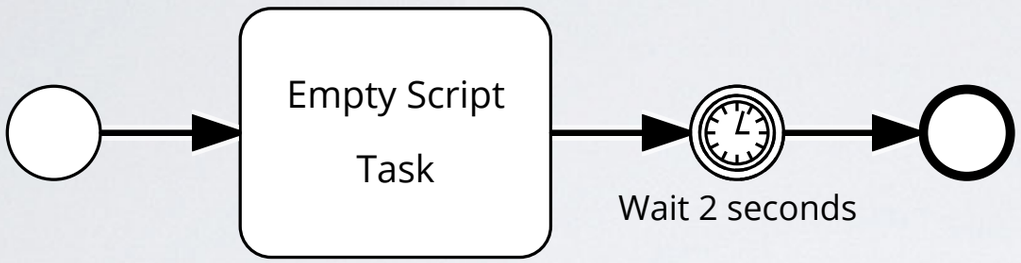
Performance Metrics and KPIs



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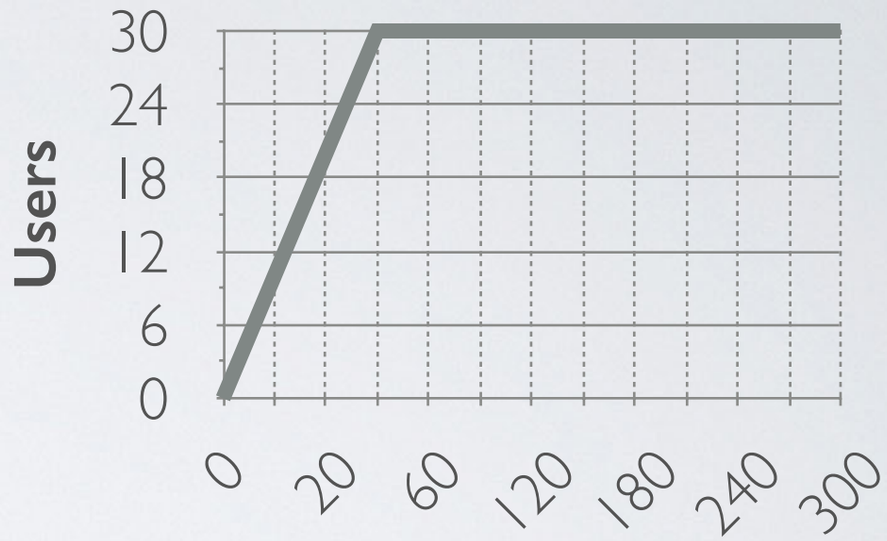

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CPU	64 Cores @ 1400 MHz
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DBMS

CPU	64 Cores @ 2300 MHz
RAM	128 GB

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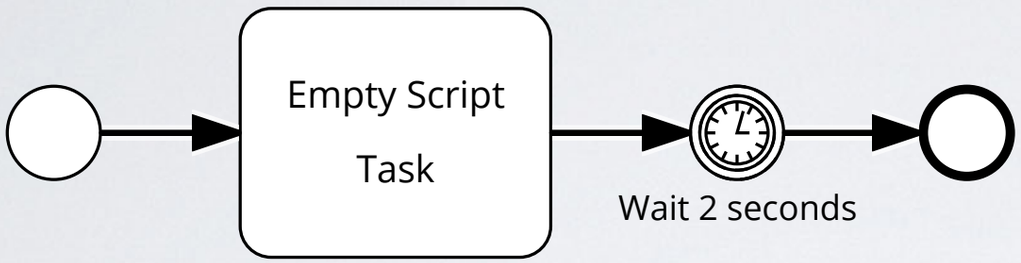
Performance Metrics and KPIs



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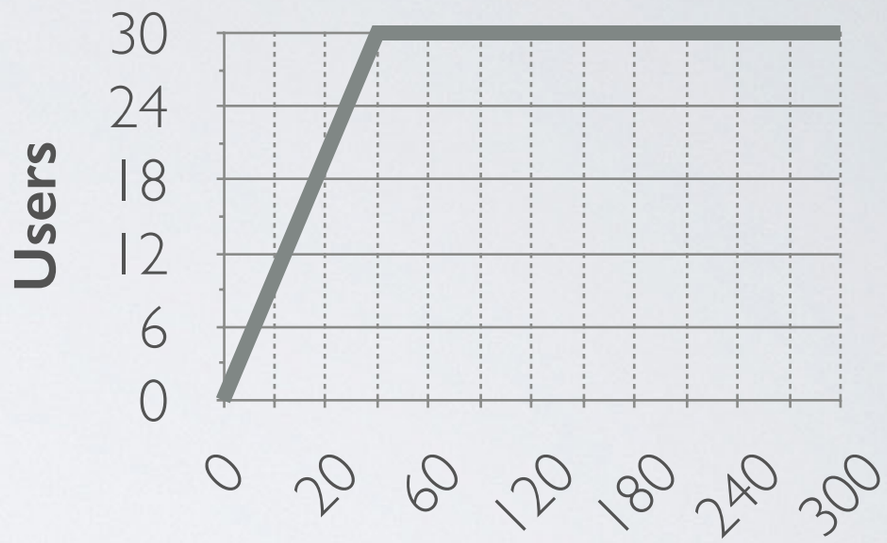


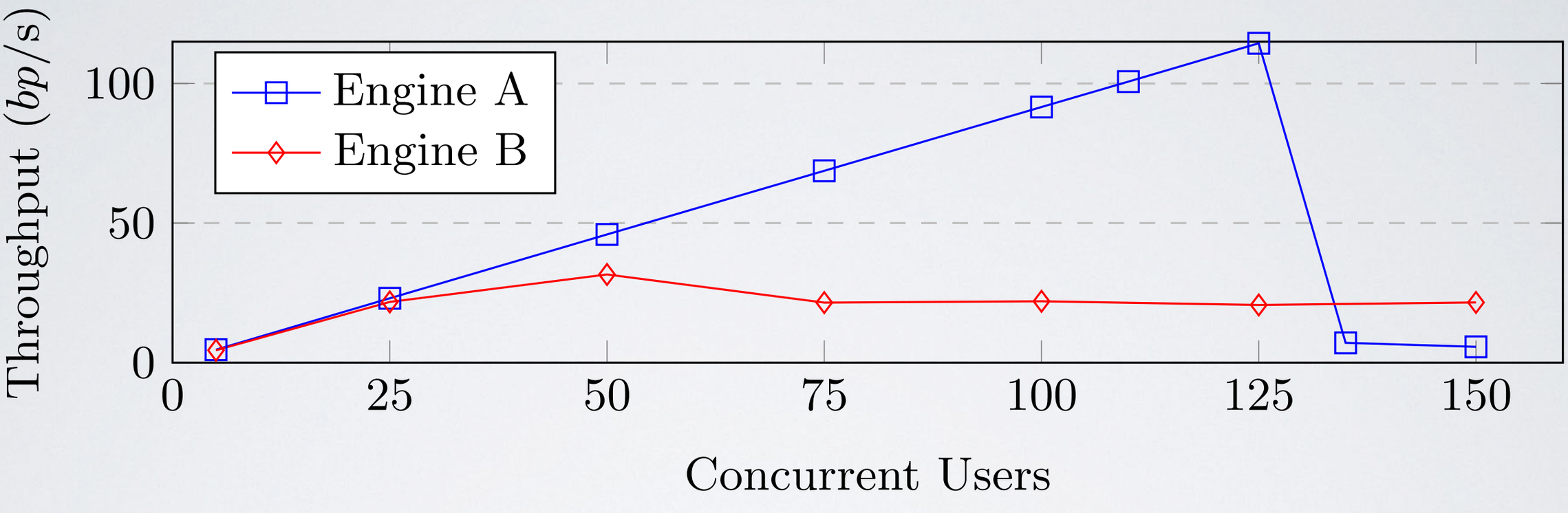
LOAD FUNCTION

	Load Drivers		WES		DBMS	
CPU	64 Cores @ 1400 MHz	**CPU**	12 Cores @ 800 MHz	**CPU**	64 Cores @ 2300 MHz
RAM	128 GB	**RAM**	64 GB	**RAM**	128 GB

TEST ENVIRONMENT

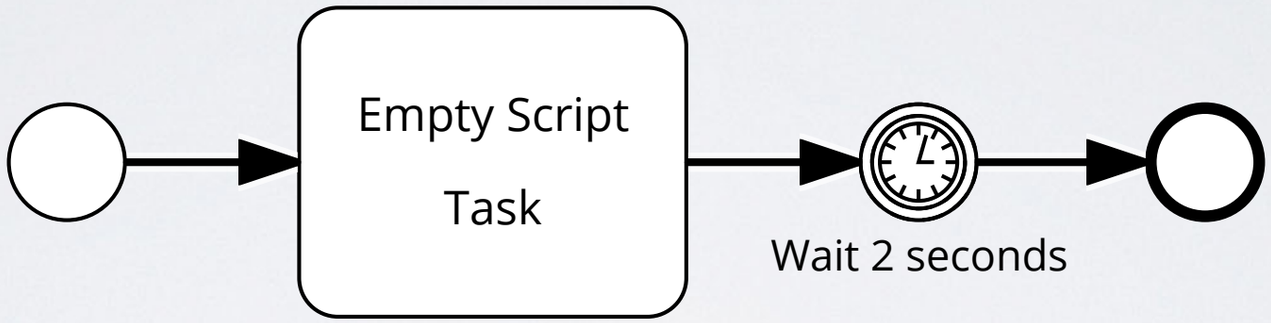
10 Gbit/s

Throughput



$$Throughput = \frac{\#BPInstances(bp)}{Time(s)}$$

Instance Duration Time



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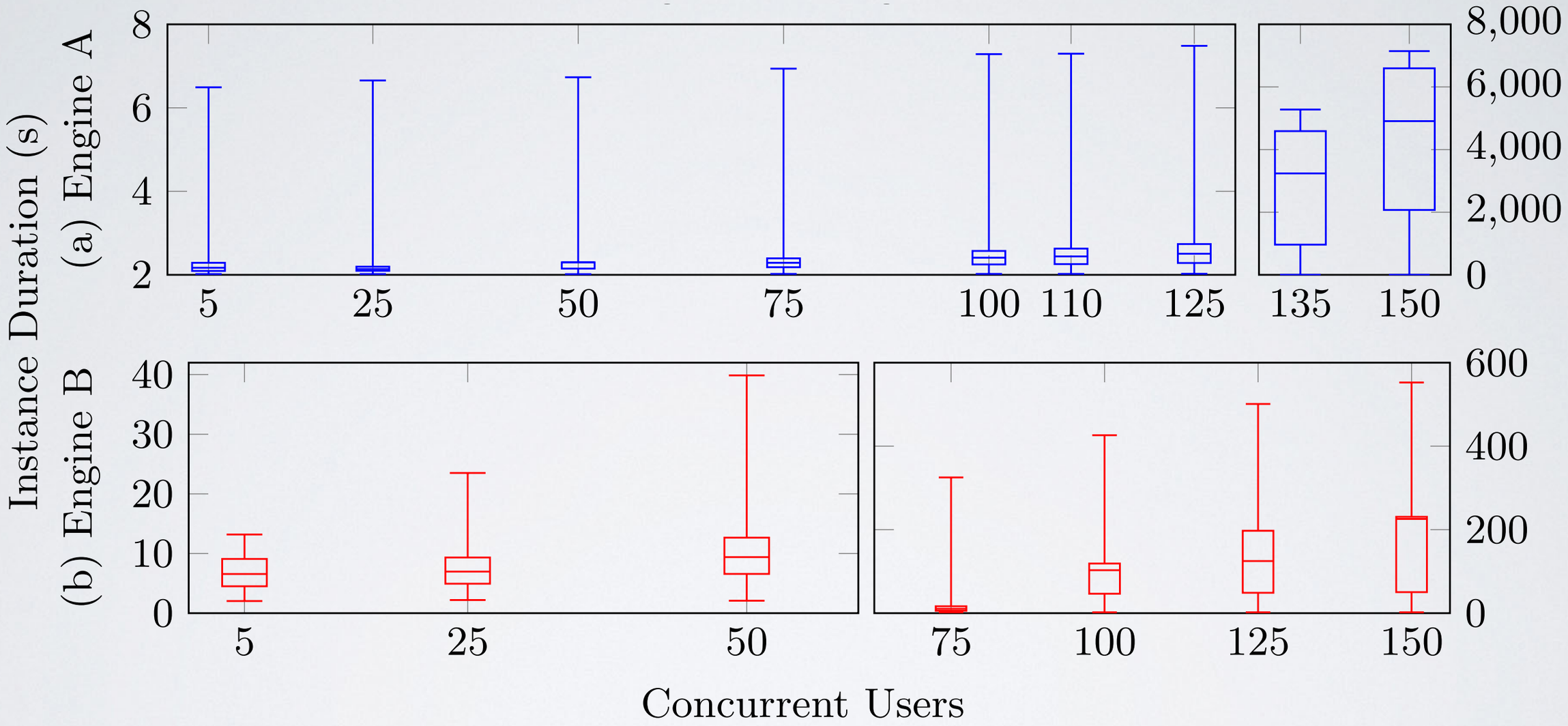
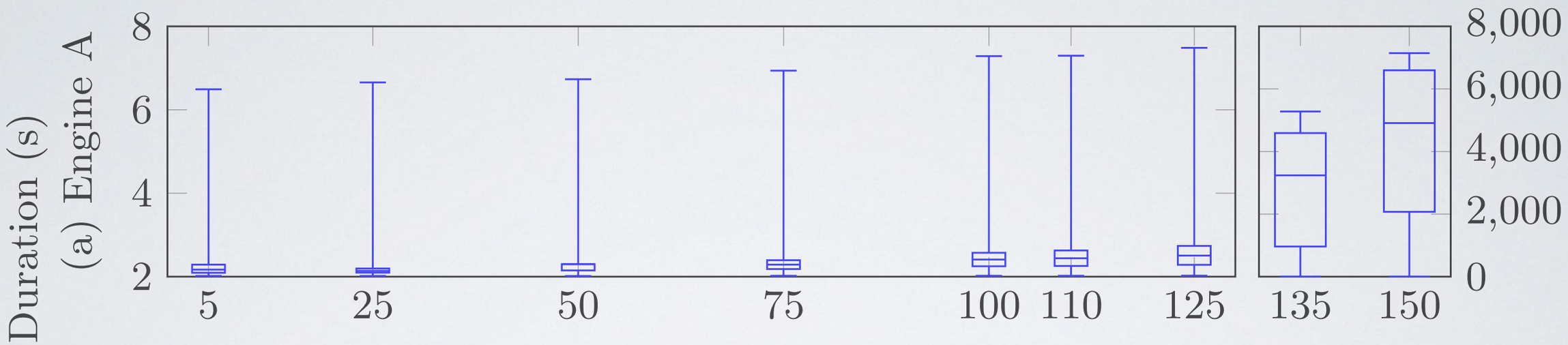


Fig. 4: Aggregated Process Instance Duration Comparison

Instance Duration Time and CPU Utilisation



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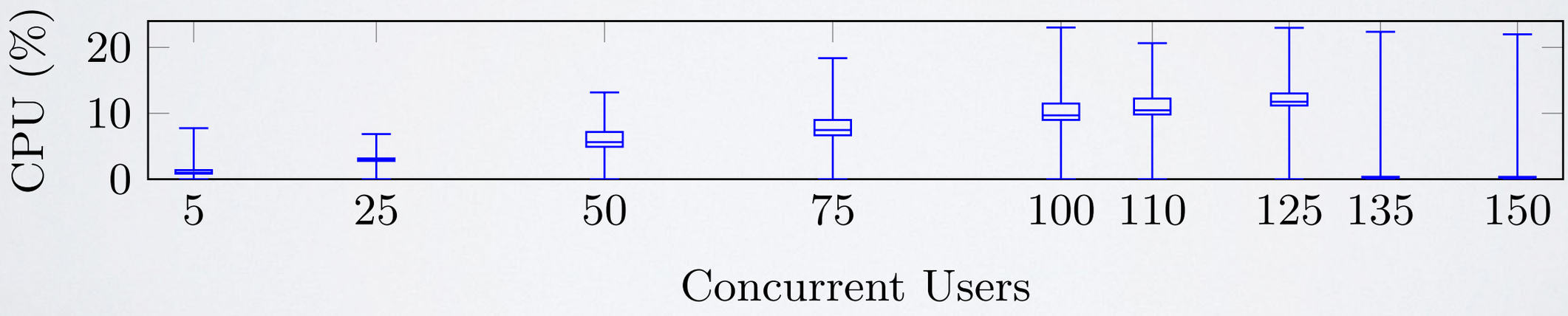

Fig. 5: Aggregated CPU Usage (Engine A)

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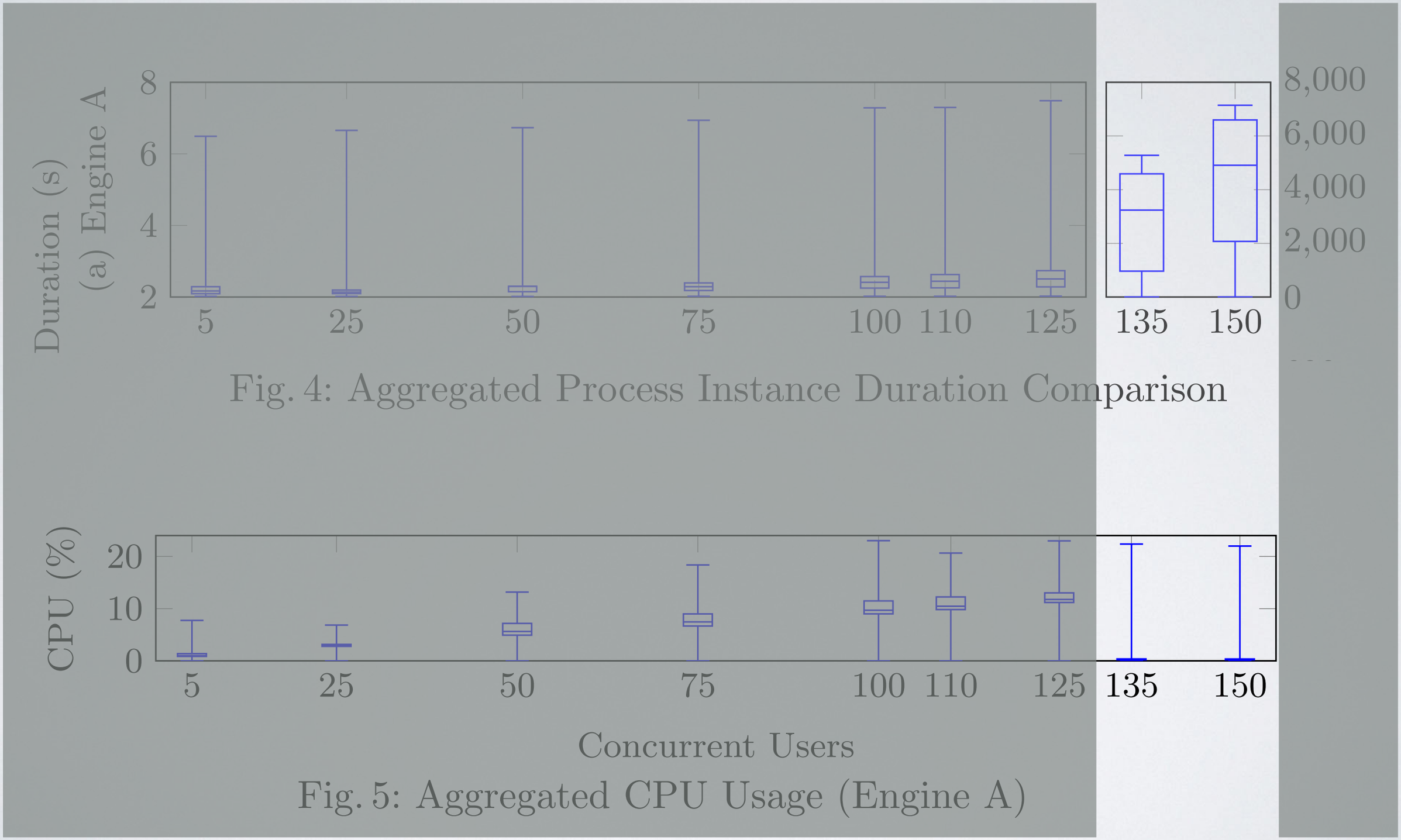

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Fig. 5: Aggregated CPU Usage (Engine A)

Future Work

Experiments

- Perform the first *real-world* experiments
- Increase the number of supported WfMSs
- Simplify and automate the execution of common performance tests: Load Test, Spike Test, Scalability Test, …

BenchFlow Framework

- Release a development version on GitHub

  benchflow

Highlights

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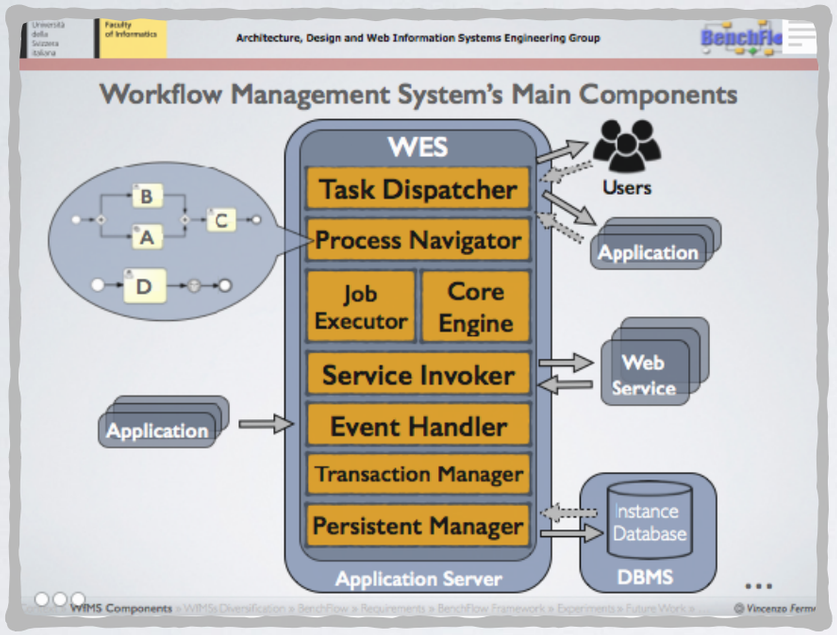

Workflow Management System

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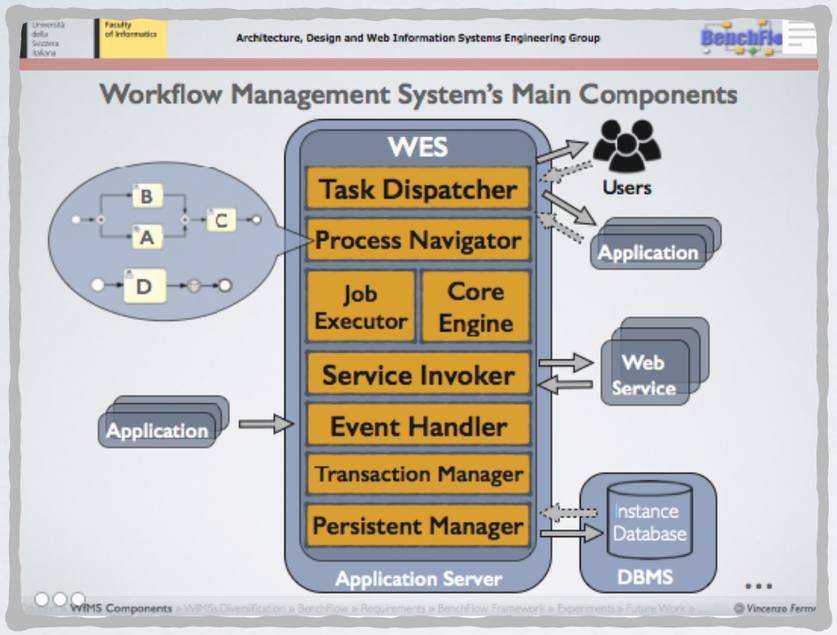

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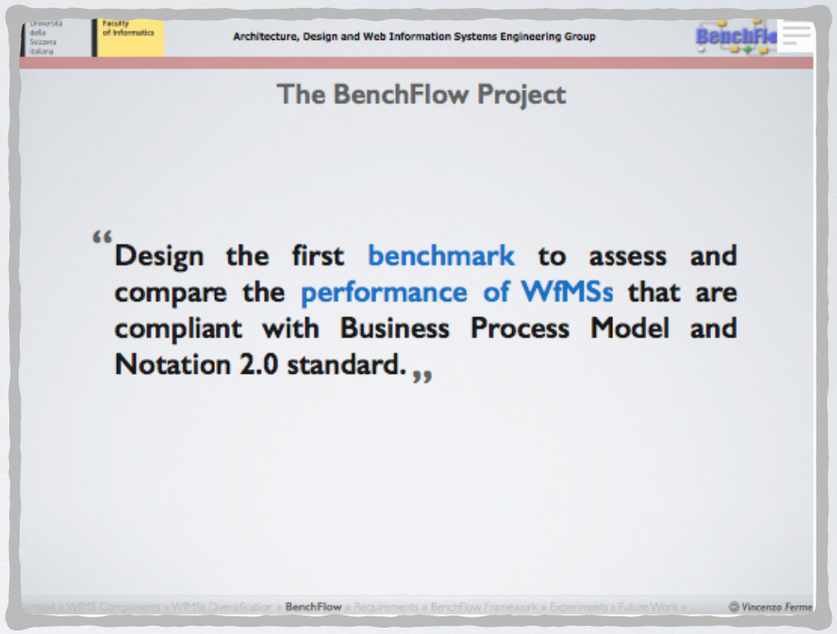

BenchFlow Project

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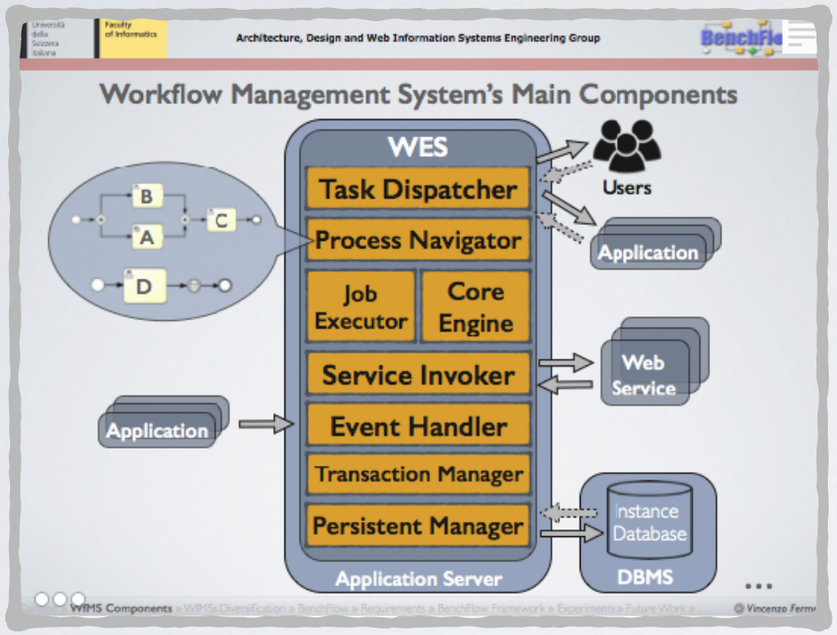

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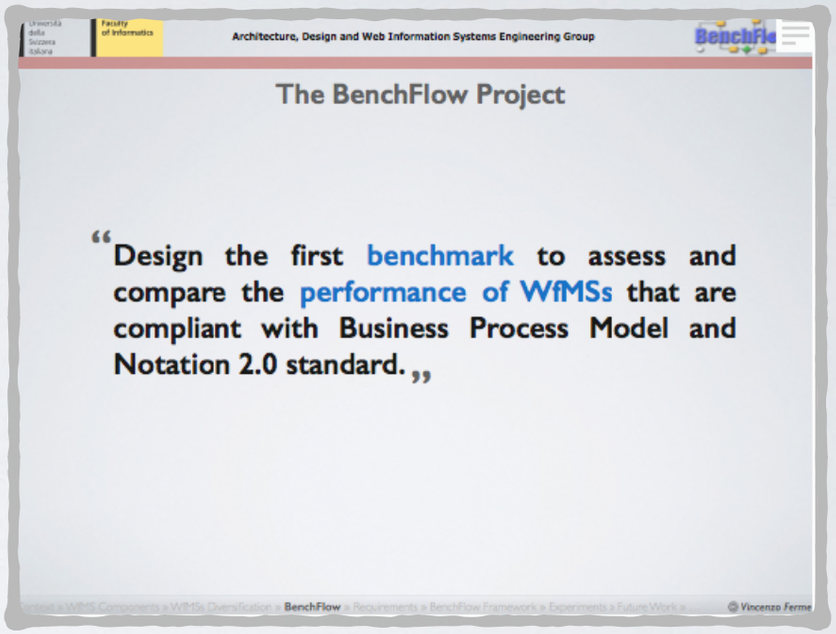

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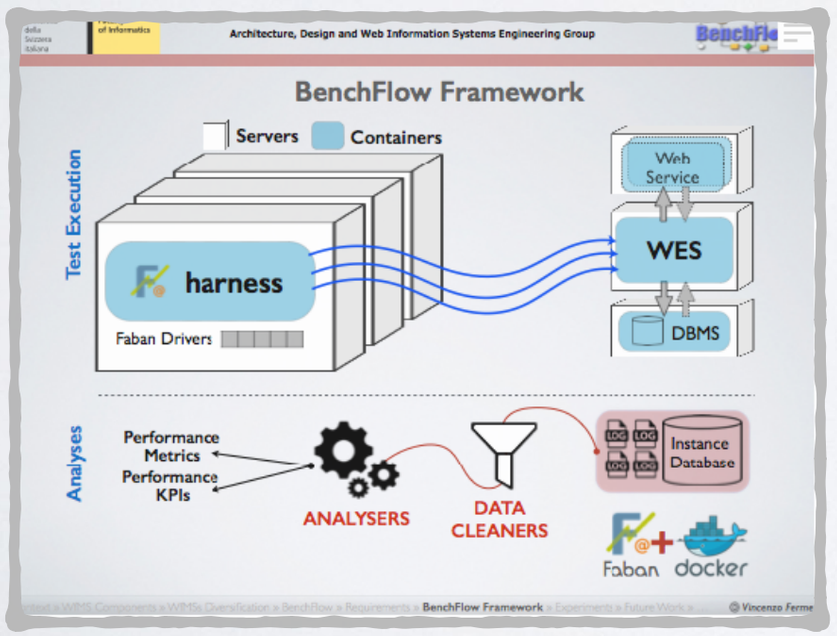

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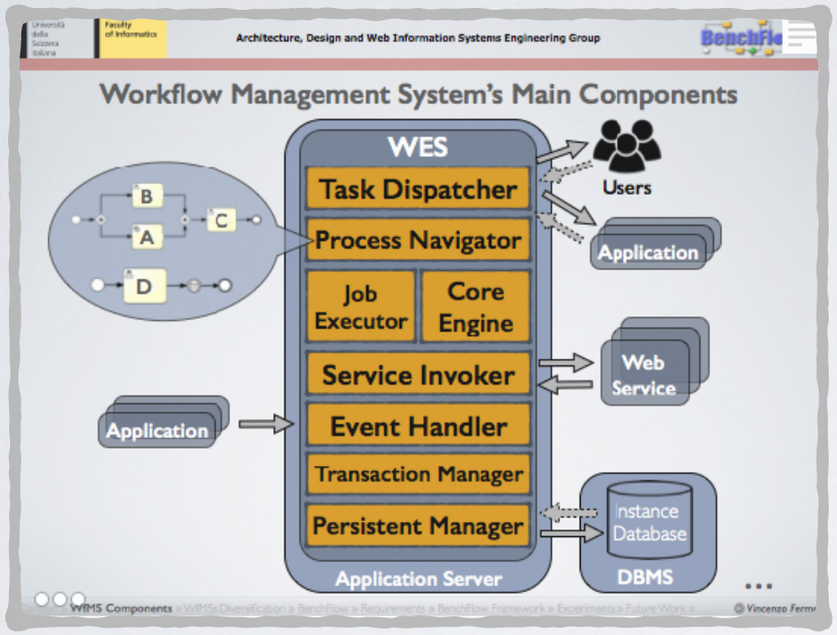

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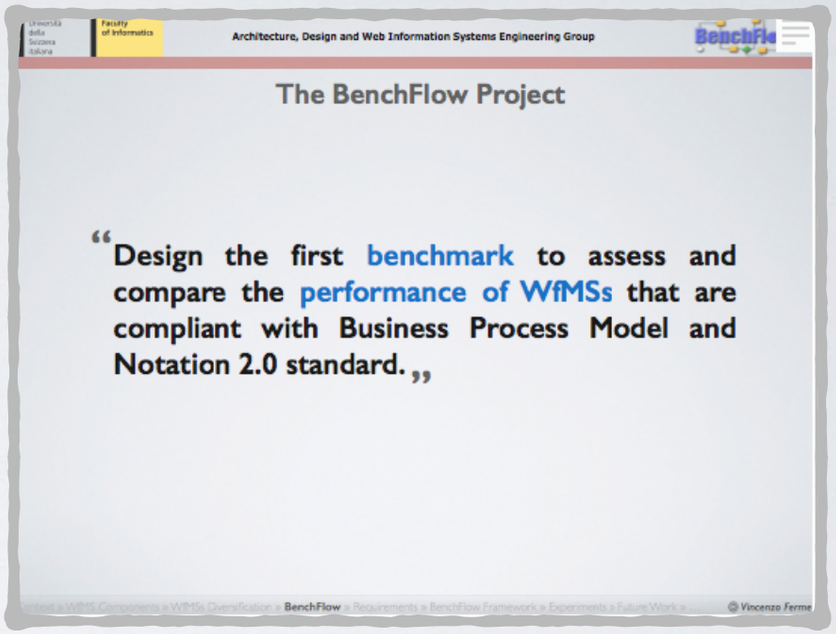

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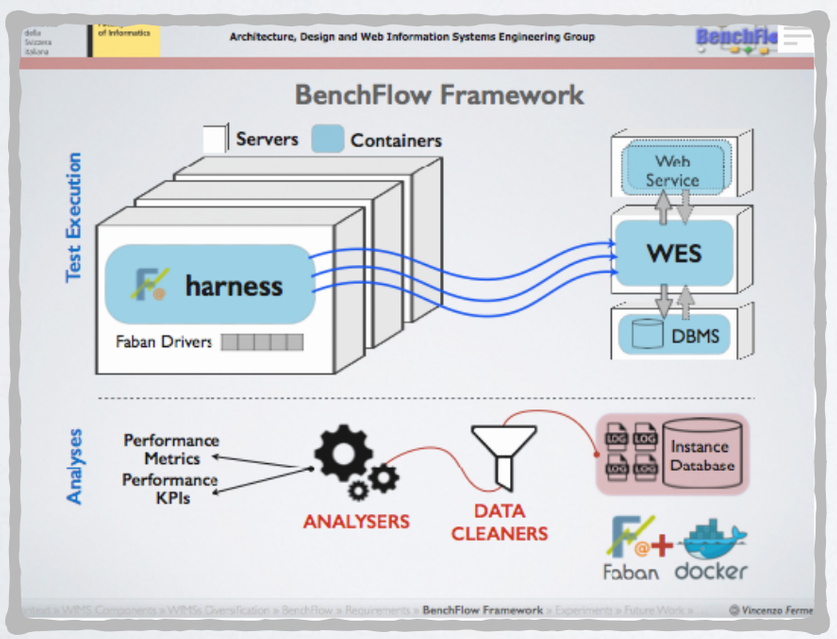

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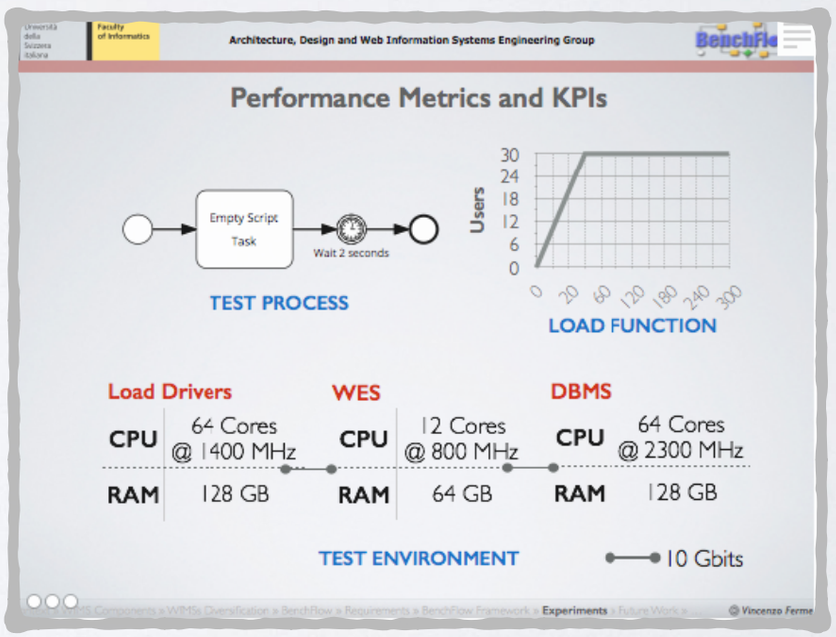

Proof of Concept

Call for Action

Process Models

- We want to characterise the Workload using Real-World process models
- **Send us your executable BPMN process models, even anonymised!**

Execution Logs

- We want to characterise the Workload using Real-World behaviours
- **Send us your execution logs, even anonymised!**

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Università della Svizzera italiana

Faculty of Informatics

Architecture, Design and Web Information Systems Engineering Group

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http://benchflow.inf.usi.ch

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