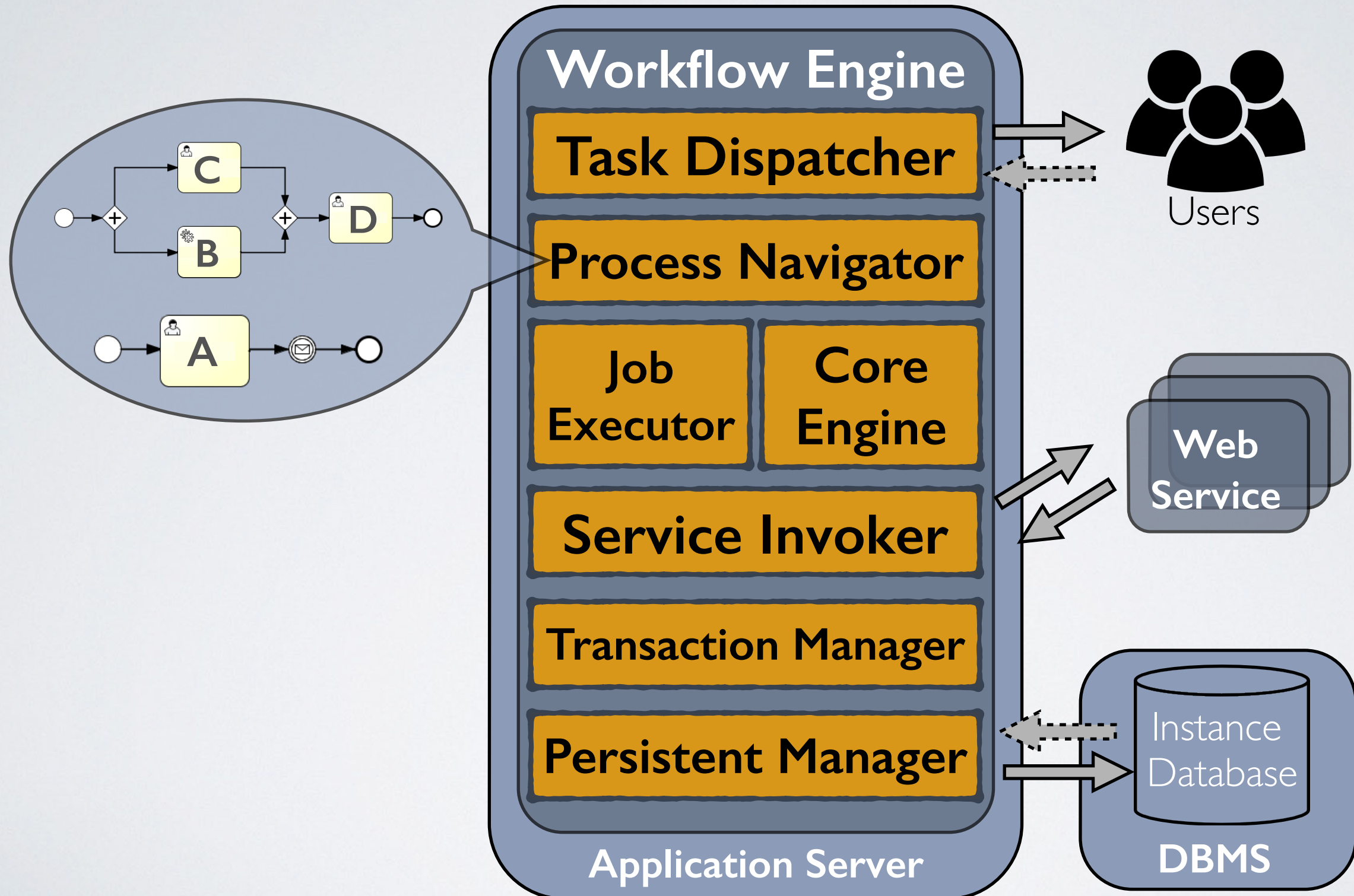


ON THE ROAD TO BENCHMARKING BPMN 2.0 WORKFLOW ENGINES

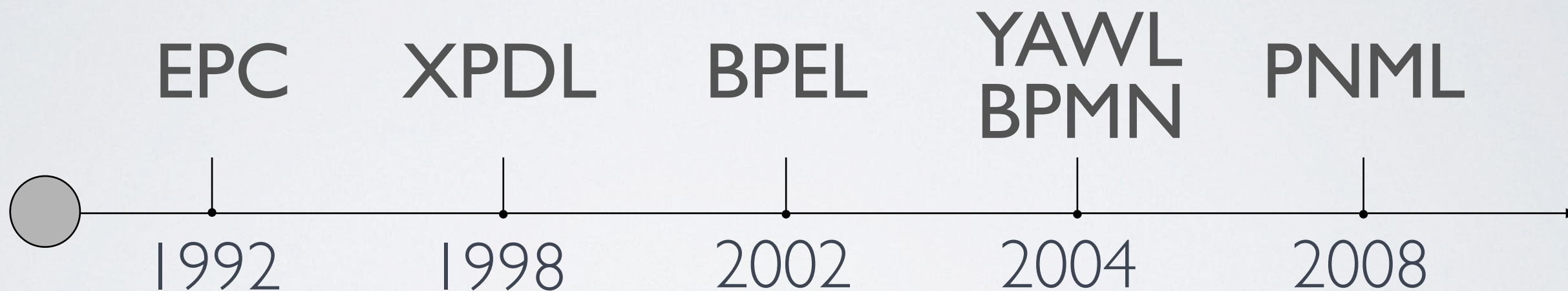
Marigianna Skouradaki, Dieter H. Roller, Frank Leymann
Institute of Architecture and Application Systems
University of Stuttgart
Germany

Vincenzo Ferme, Cesare Pautasso
Faculty of Informatics
University of Lugano (USI)
Switzerland

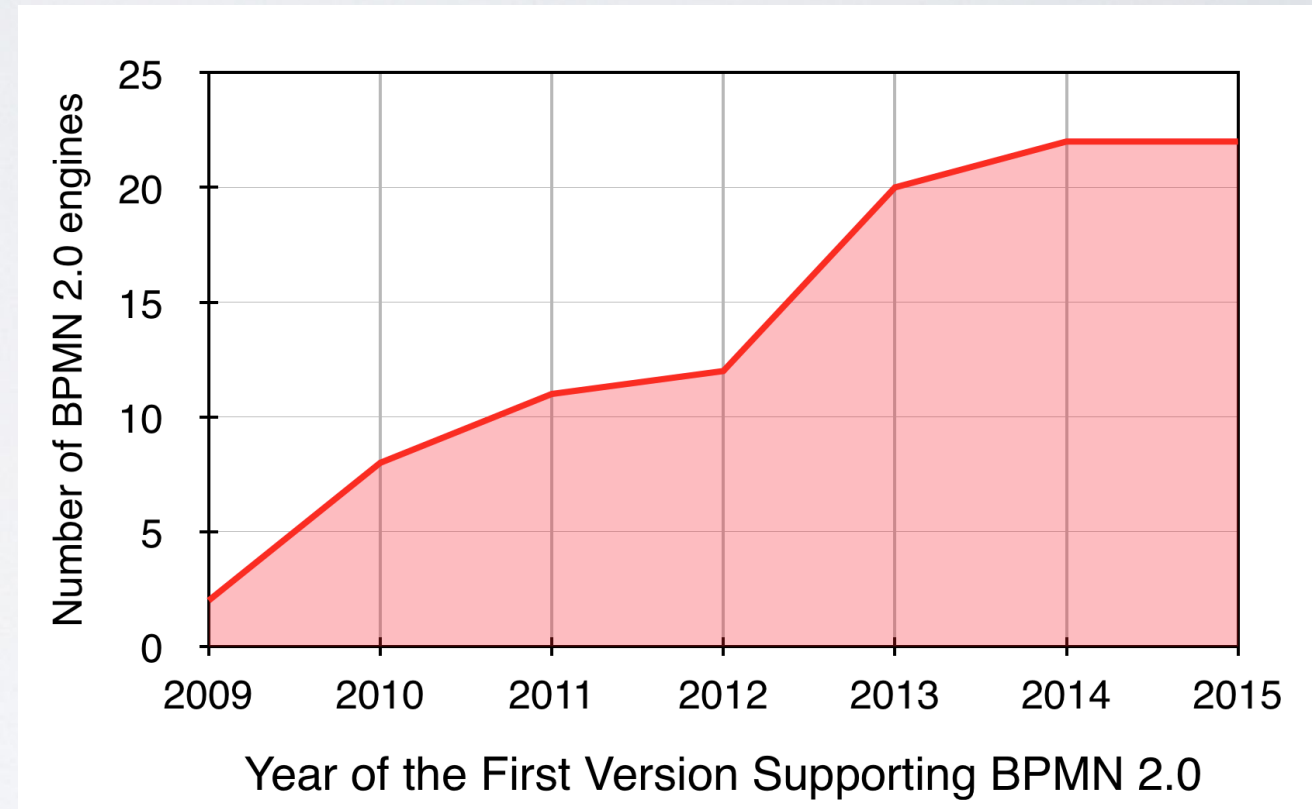
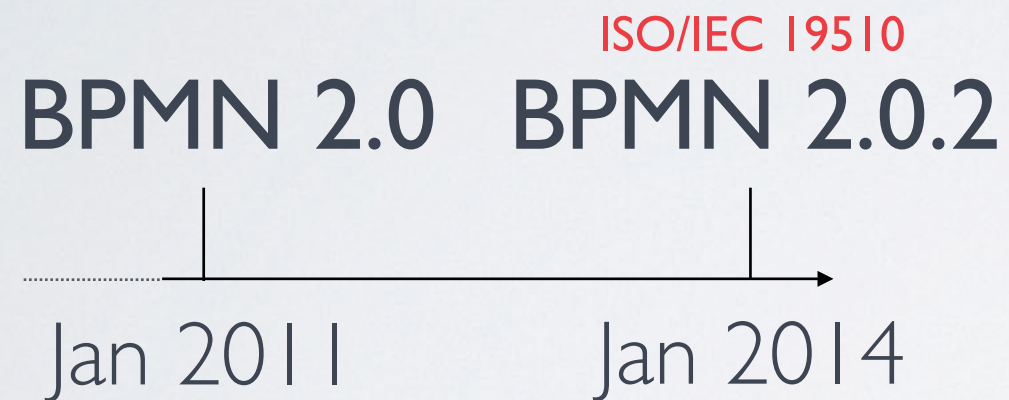
What is a Workflow Engine?



Many Business Process Modeling/Execution Languages



BPMN 2.0: A Widely Adopted Standard



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

Why do we need a benchmark?

companies, developers

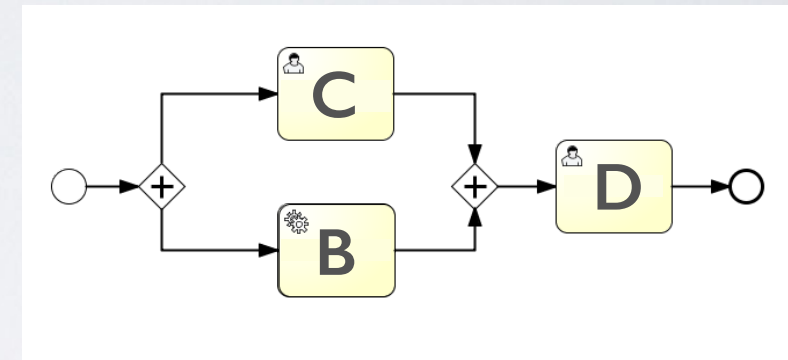
Why do we need a benchmark?

companies, developers

1. How to choose the best engine according to the company requirements?



2. How to choose the best engine according to the company business process models?



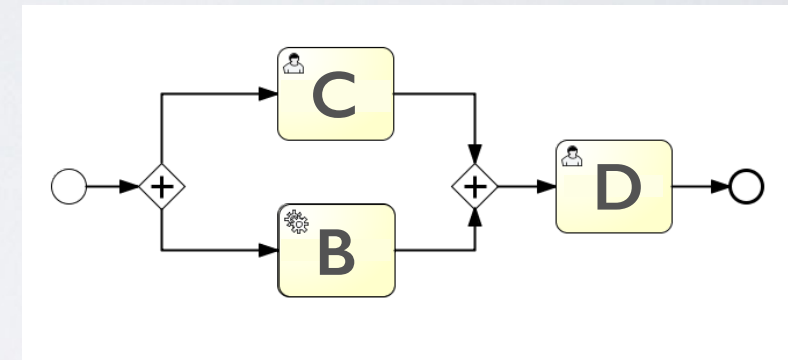
Why do we need a benchmark?

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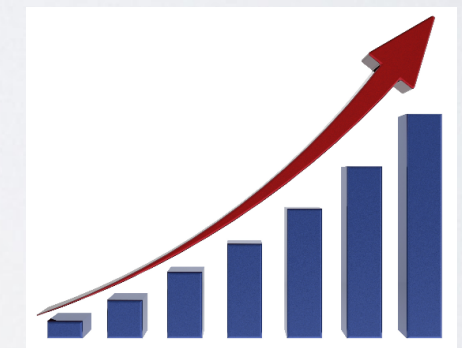
1. How to choose the best engine according to the company requirements?



2. How to choose the best engine according to the company business process models?



3. How to evaluate performance improvements during the engine development?



4. How to find out the engine bottlenecks?



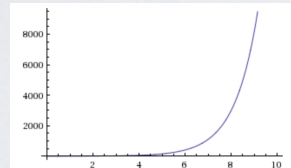
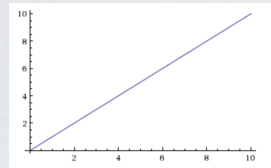
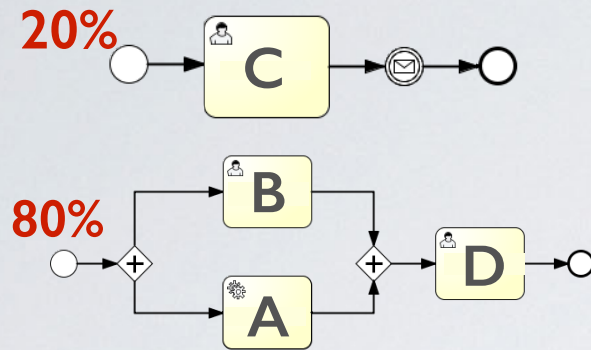
Main Challenges in Benchmarking BPMN 2.0 Workflow Engines

Main Challenges in Benchmarking BPMN 2.0 Workflow Engines

WORKLOAD CHARACTERIZATION

BENCHMARK EXECUTION

Main Challenges in Benchmarking BPMN 2.0 Workflow Engines



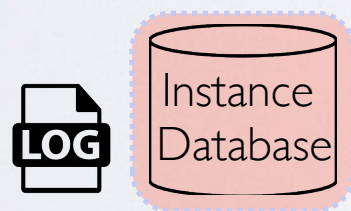
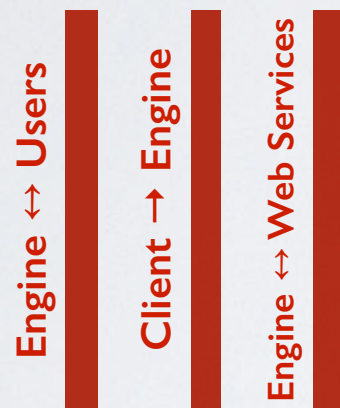
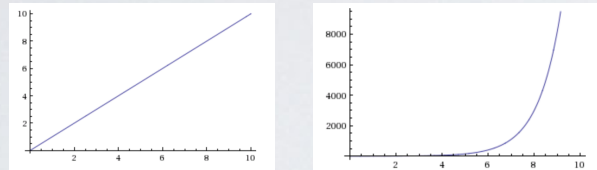
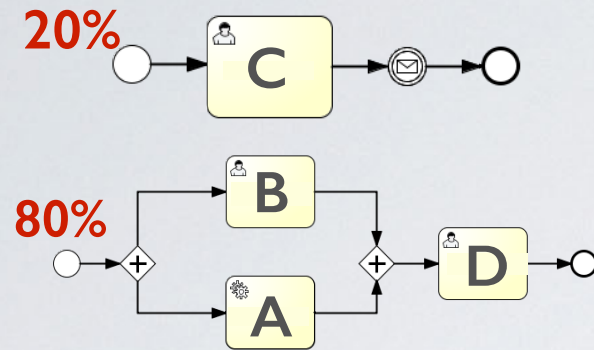
WORKLOAD CHARACTERIZATION

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

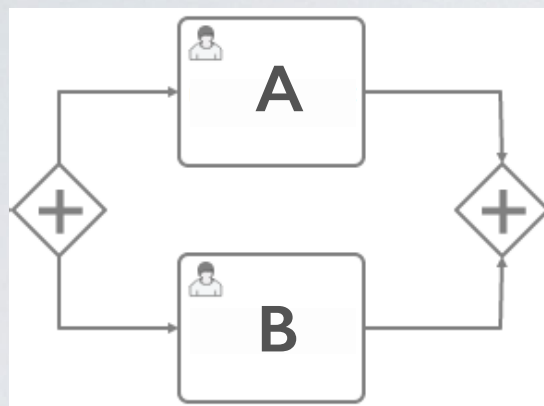
4. Asynchronous execution of business processes

5. Define meaningful and reliable KPIs

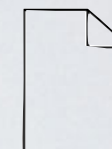
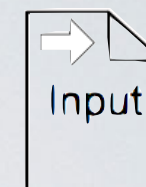
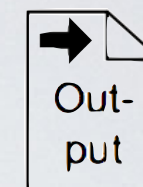
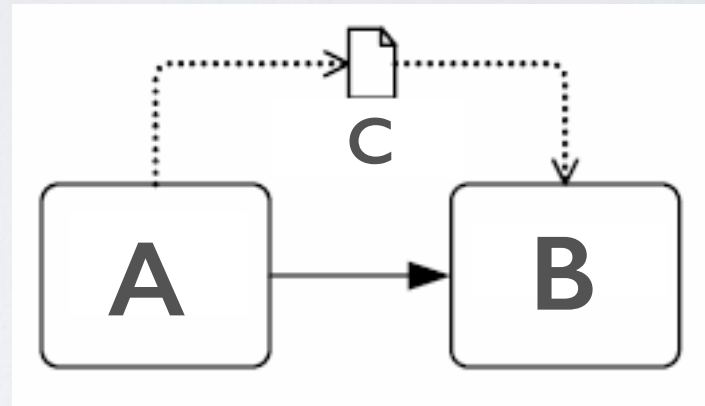
I. Define the Workload Mix

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Control Flow



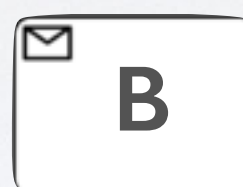
Data Flow



Events



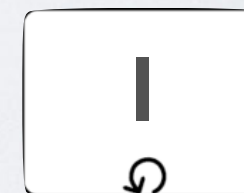
Activities



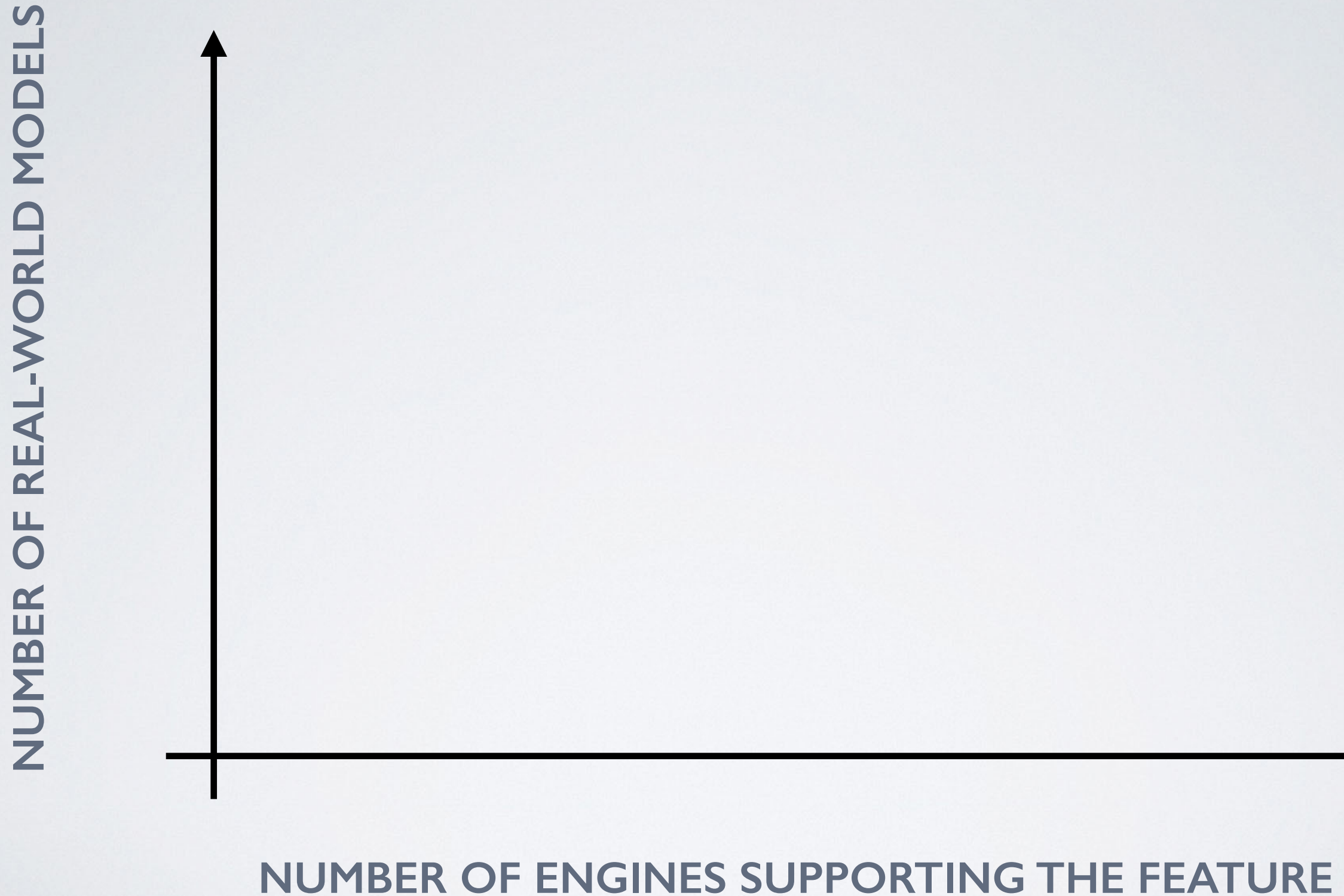
Task Types

- Send Task
- Receive Task
- User Task
- Manual Task
- Business Rule Task
- Service Task
- Script Task

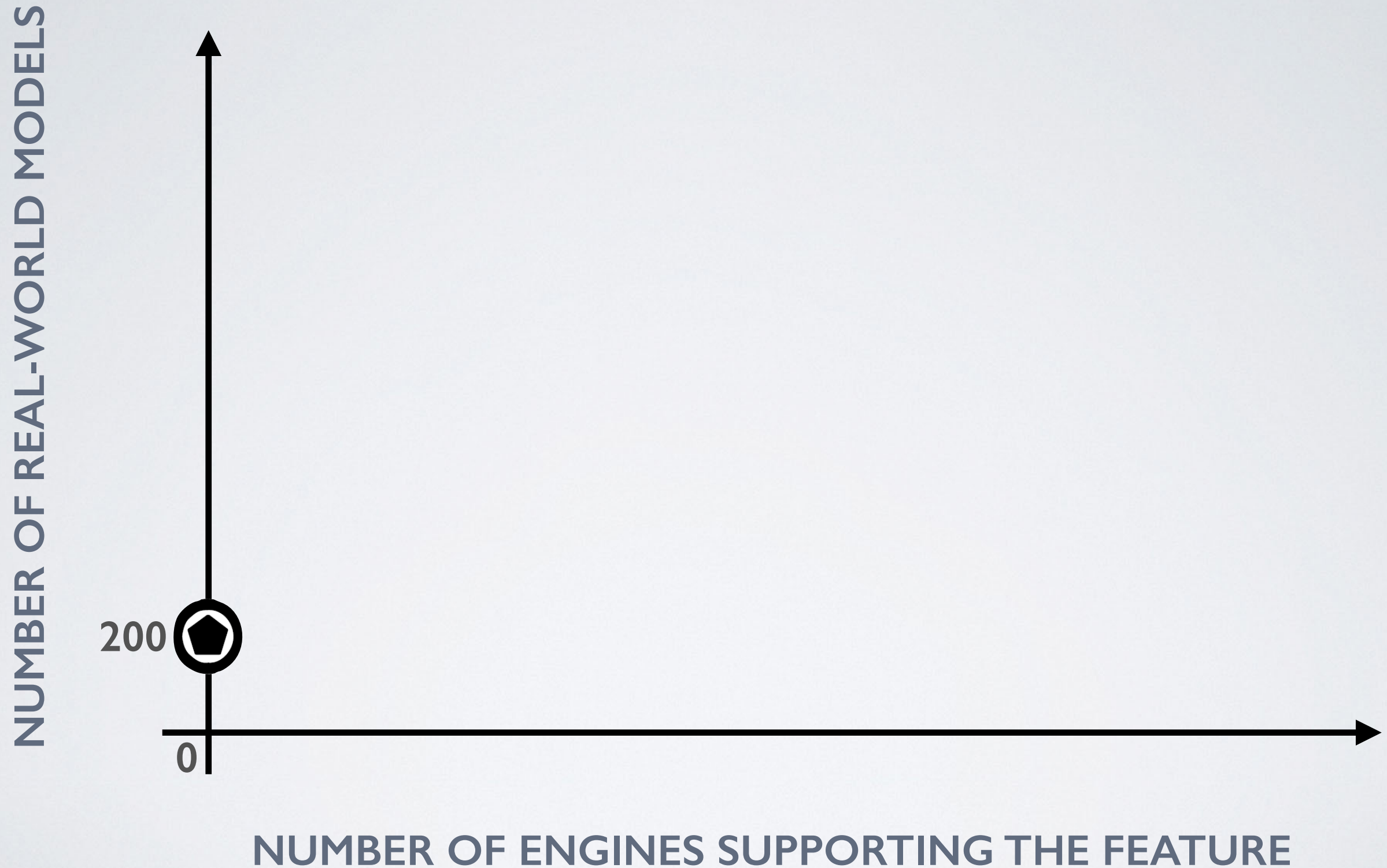
Execution Behavior



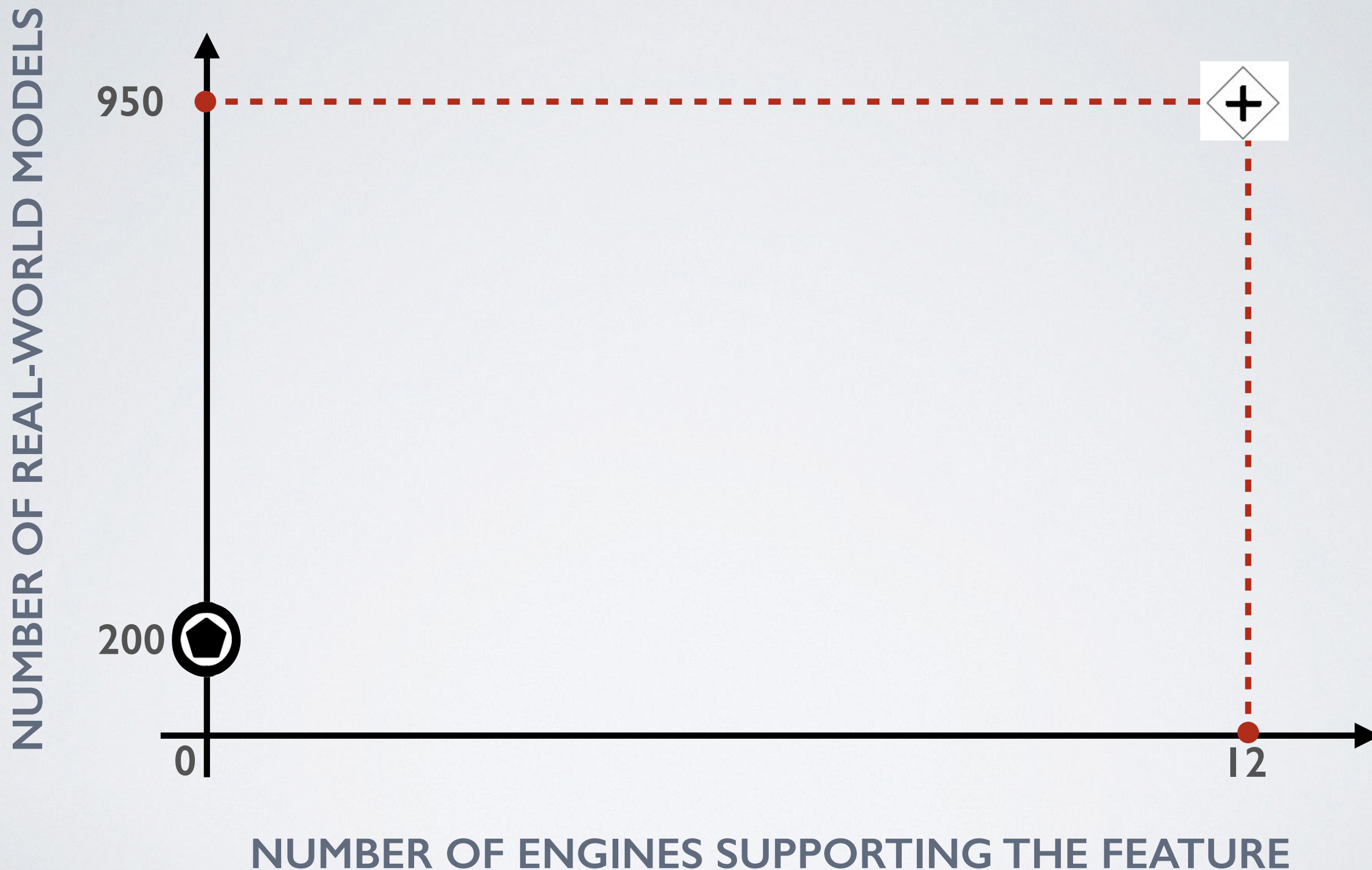
I. Define the Workload Mix



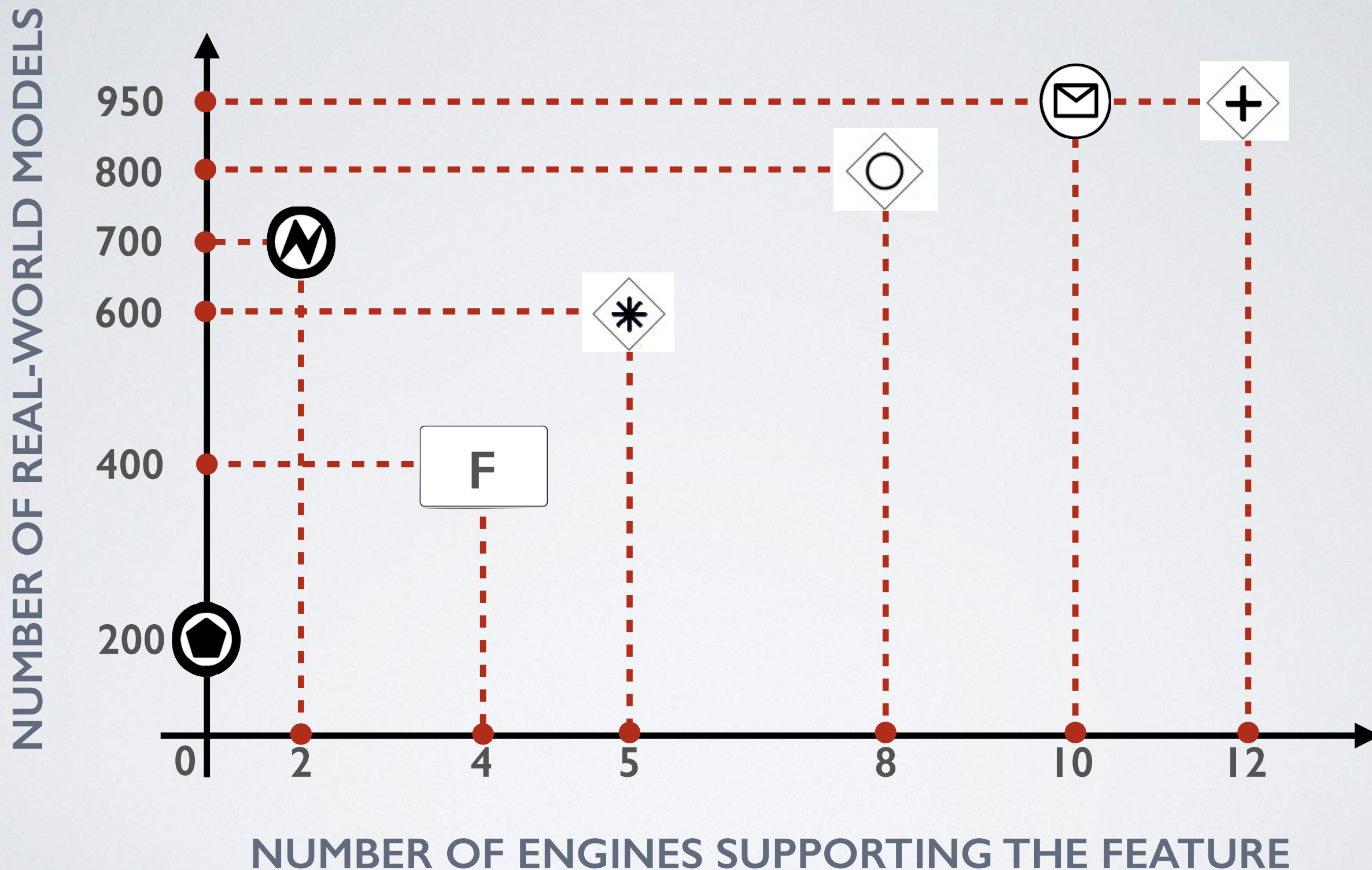
I. Define the Workload Mix



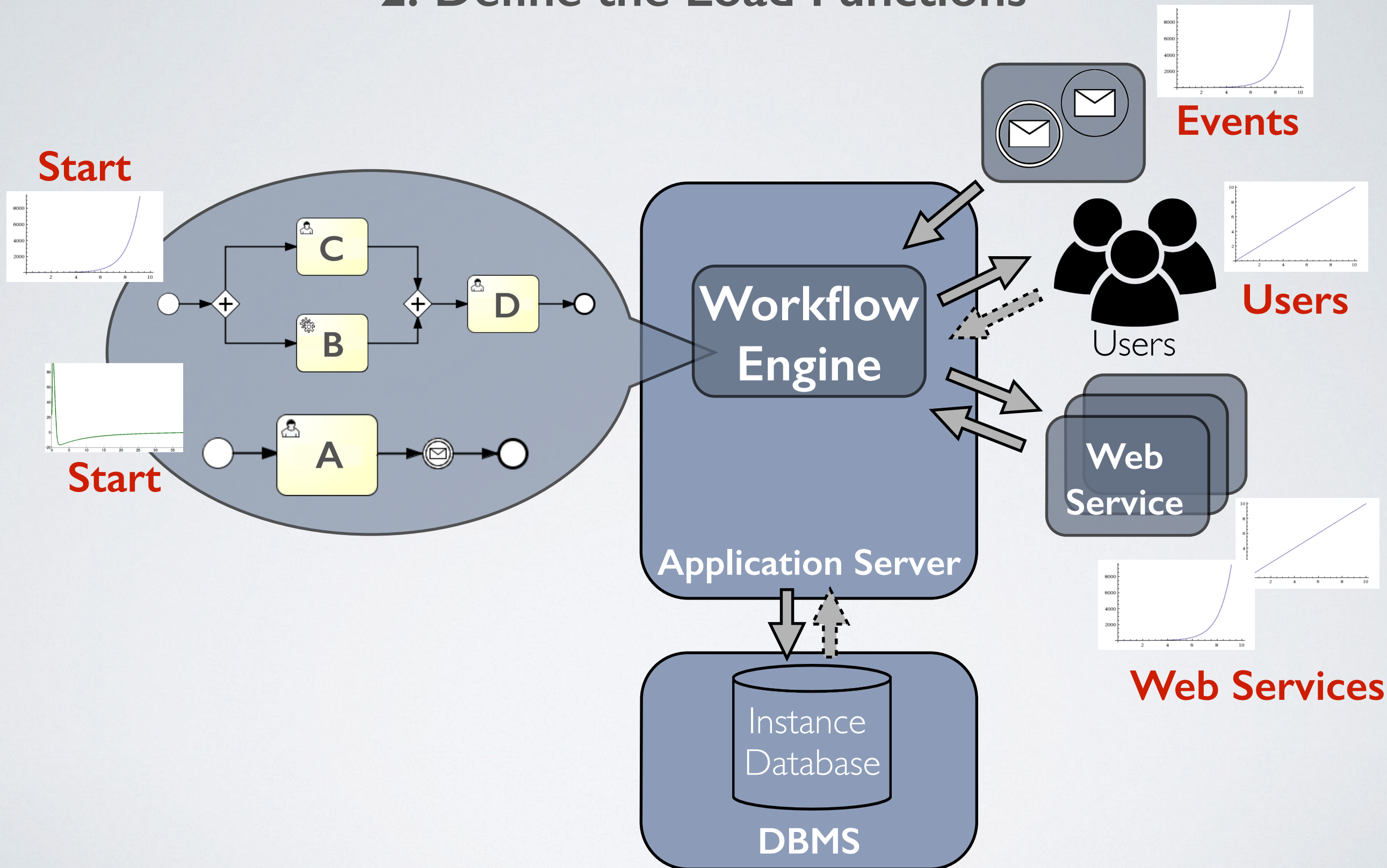
I. Define the Workload Mix



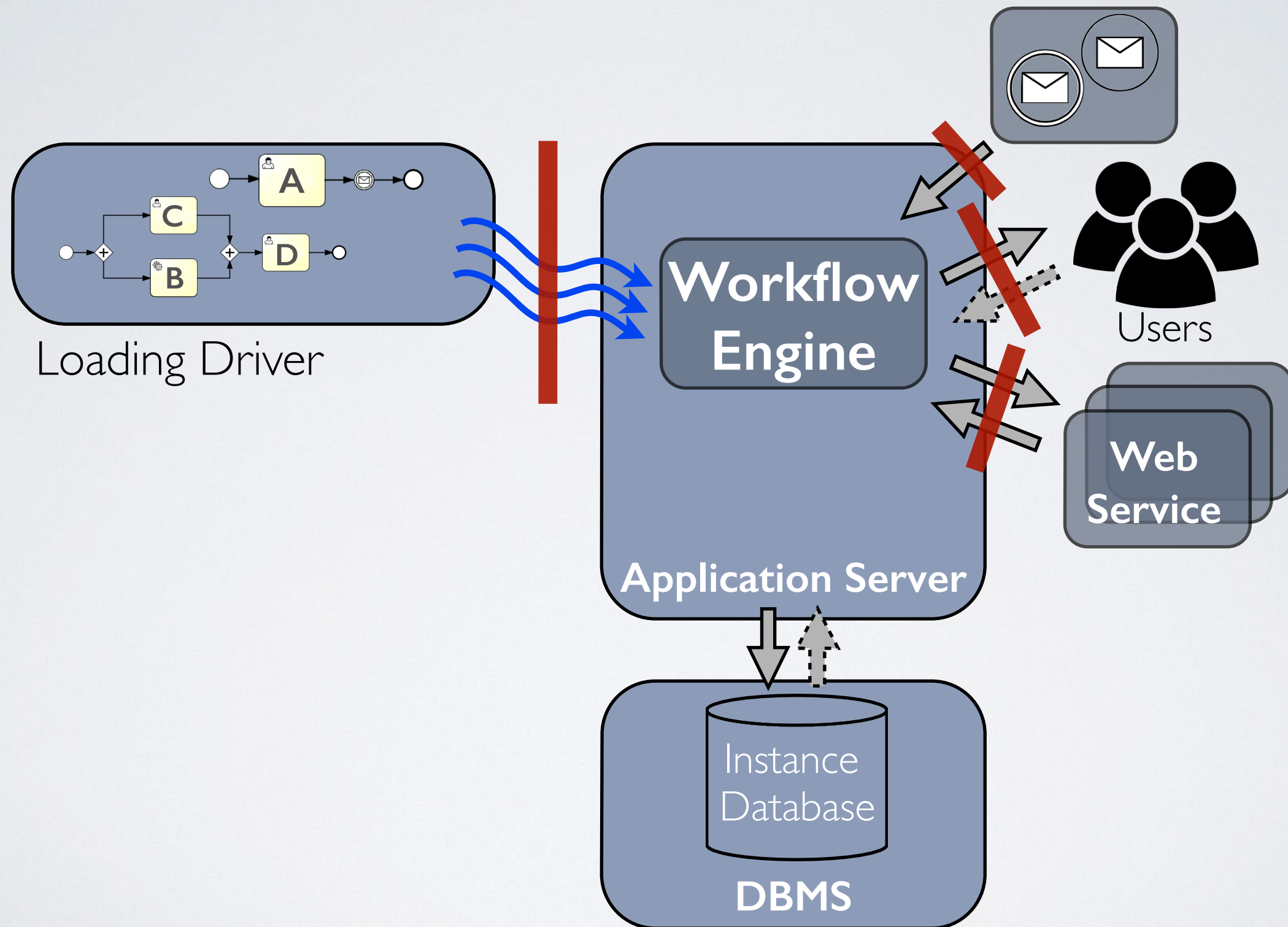
I. Define the Workload Mix



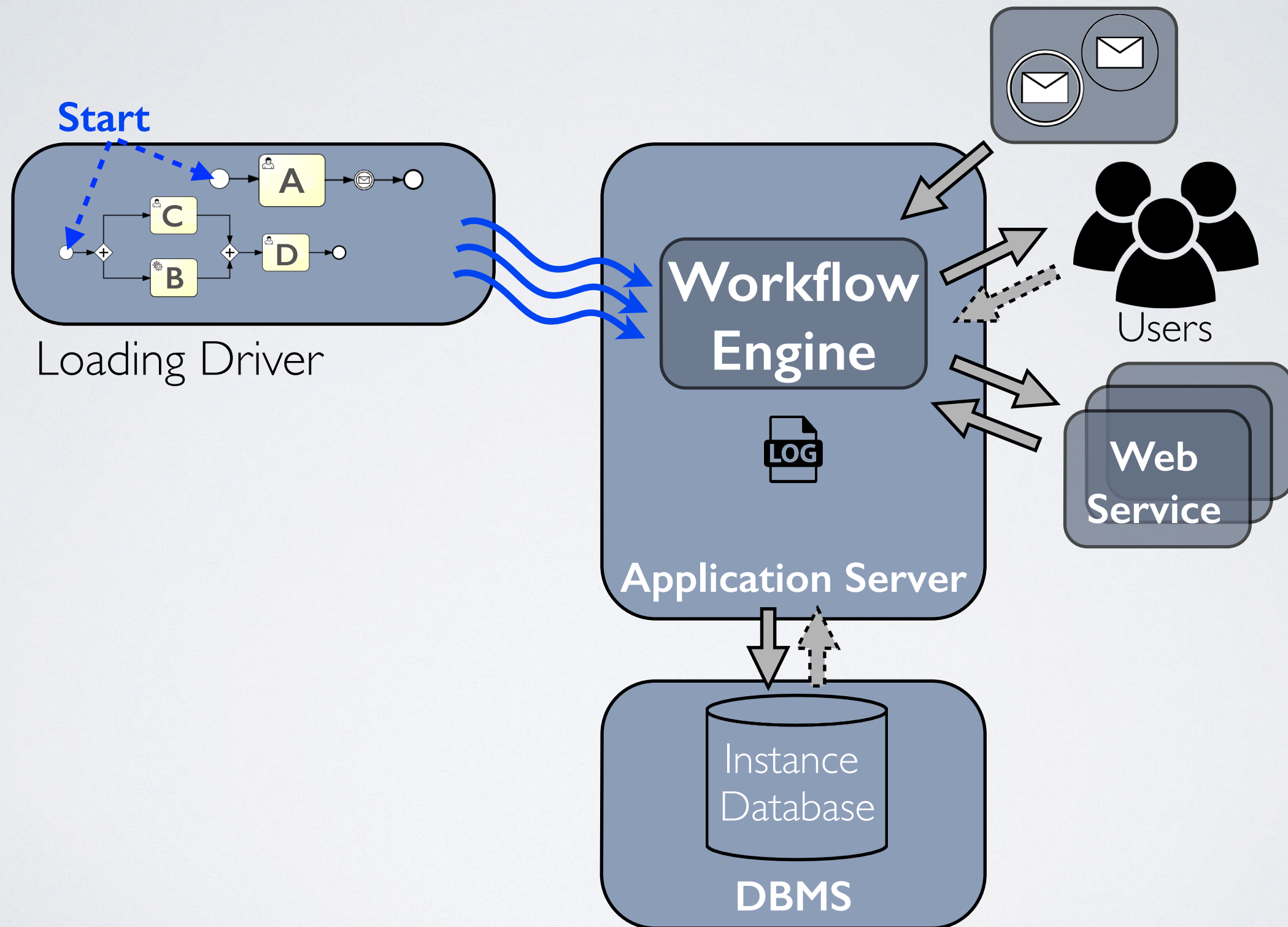
2. Define the Load Functions



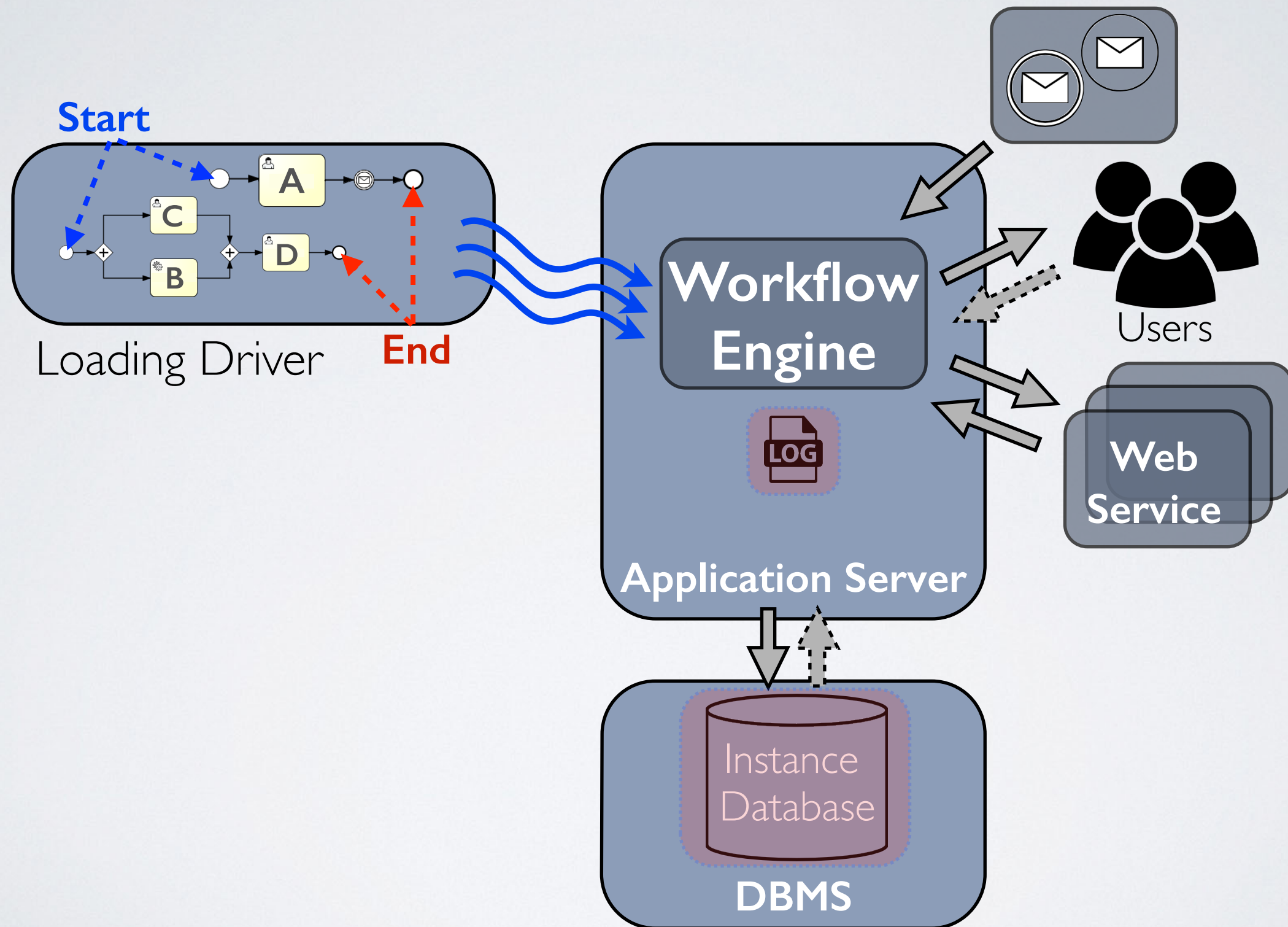
3. Deal with engine-specific interfaces and BPMN 2.0 customizations



4. Asynchronous execution of processes



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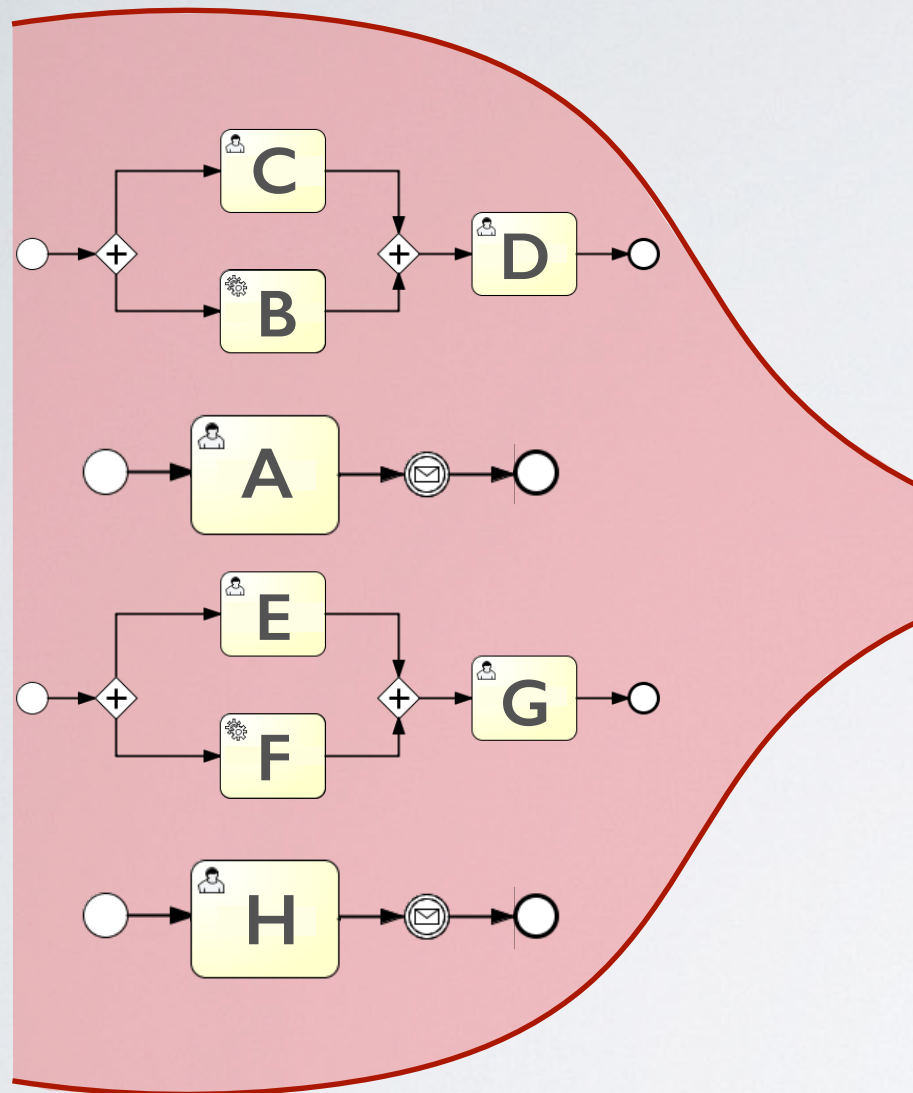


The BenchFlow Project

“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 ,,



I. Define the Workload Mix



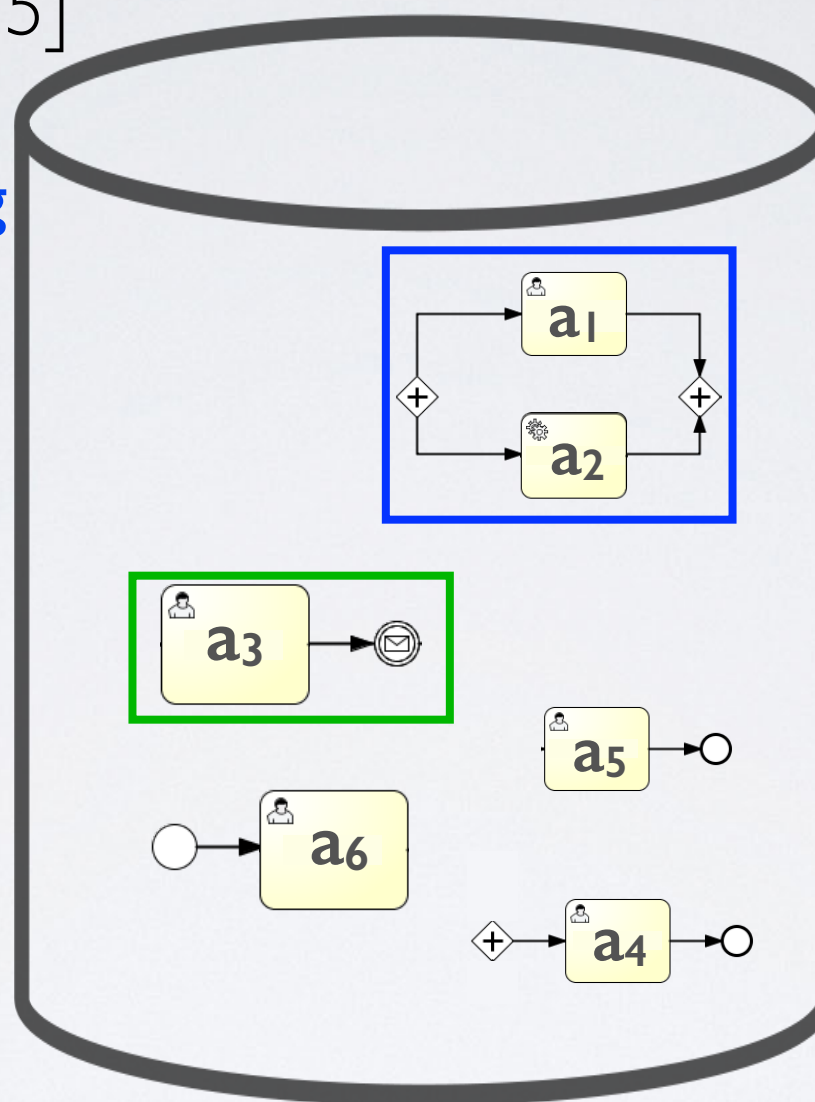
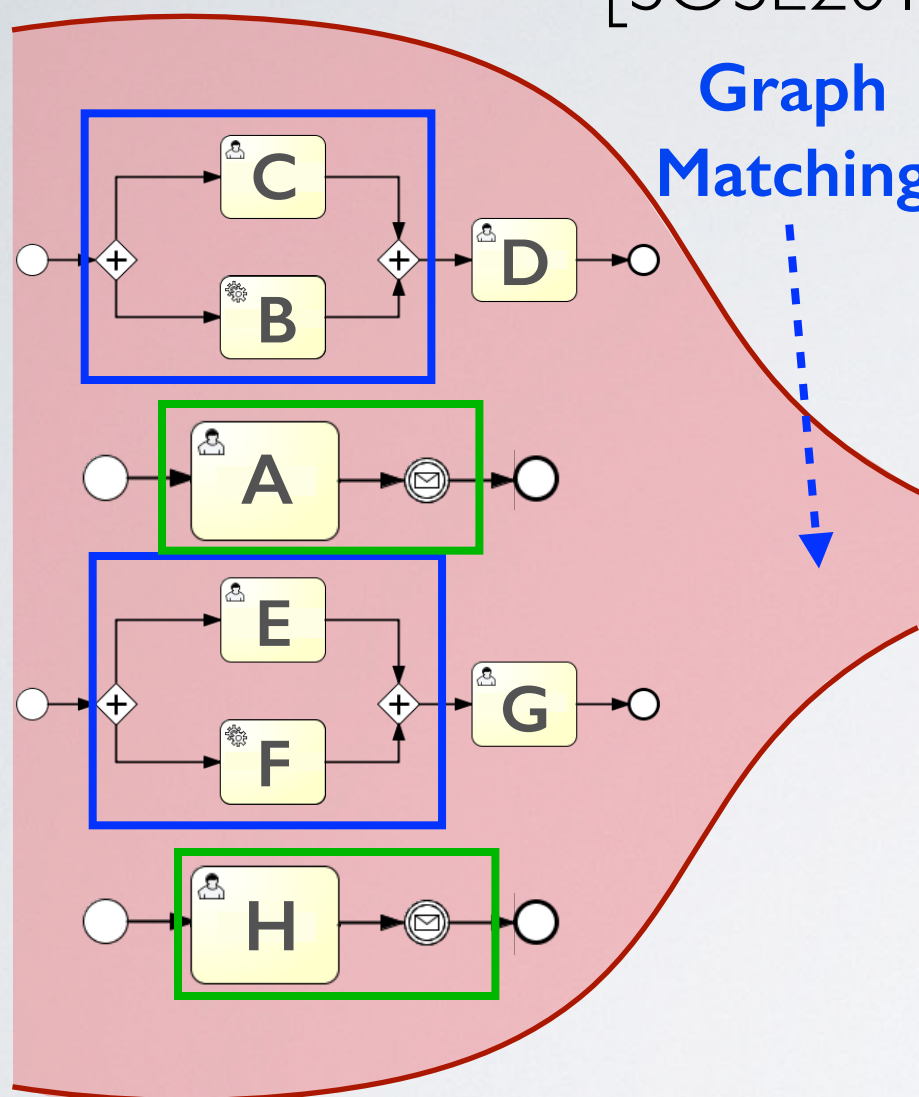
REAL-WORLD
PROCESSES

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

I. Define the Workload Mix

Skouradaki et al.
[SOSE2015]

Graph
Matching



REAL-WORLD
PROCESSES

REOCCURRING STRUCTURES

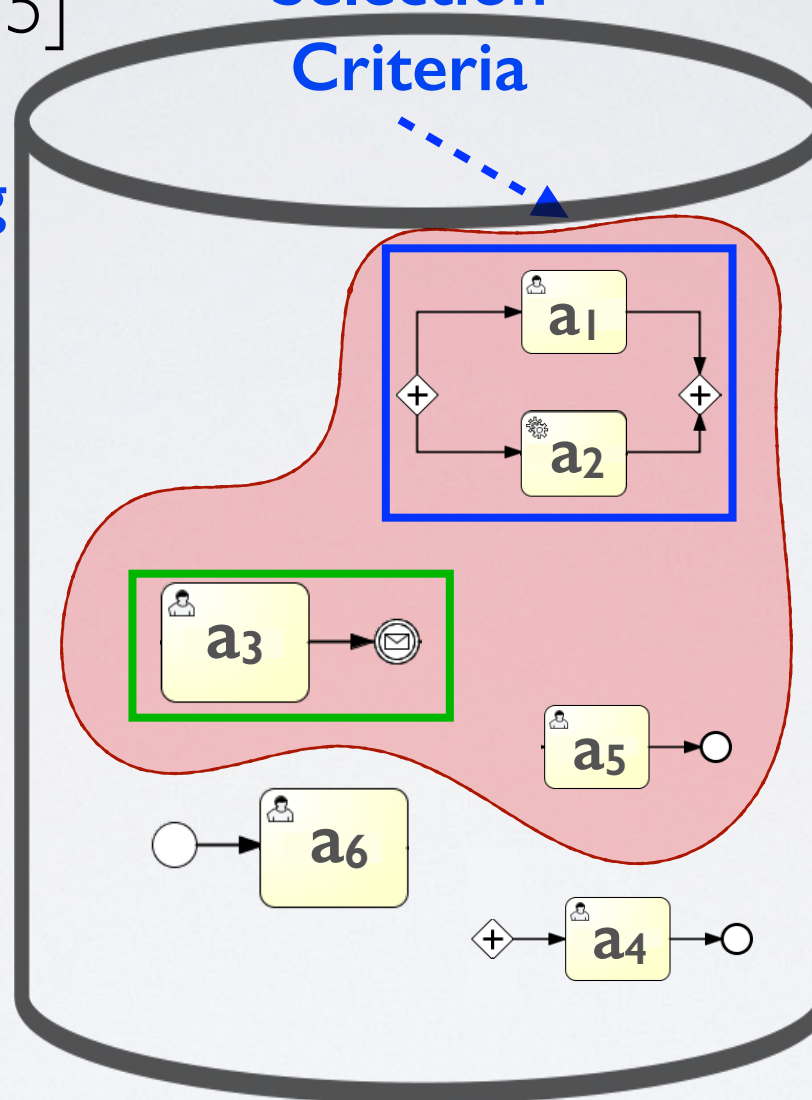
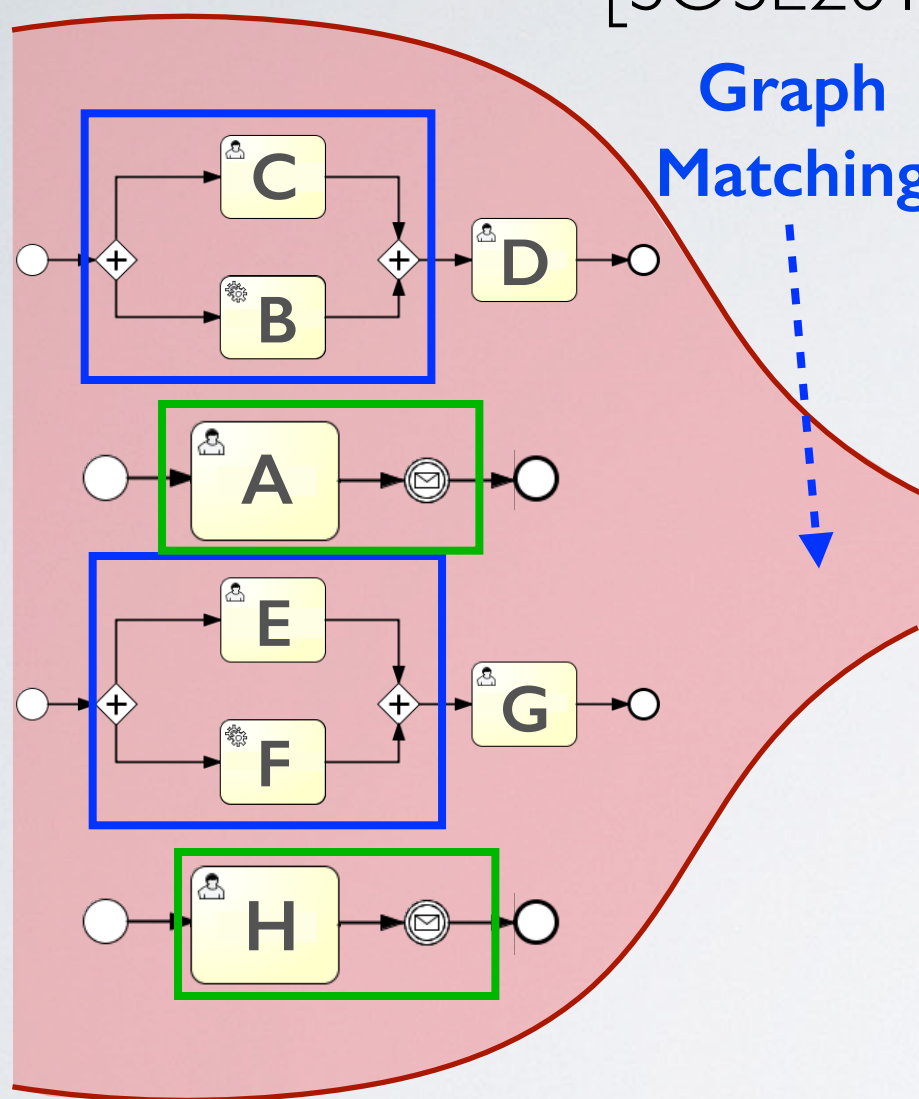
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Graph
Matching

Selection
Criteria



REAL-WORLD
PROCESSES

REOCCURRING STRUCTURES

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

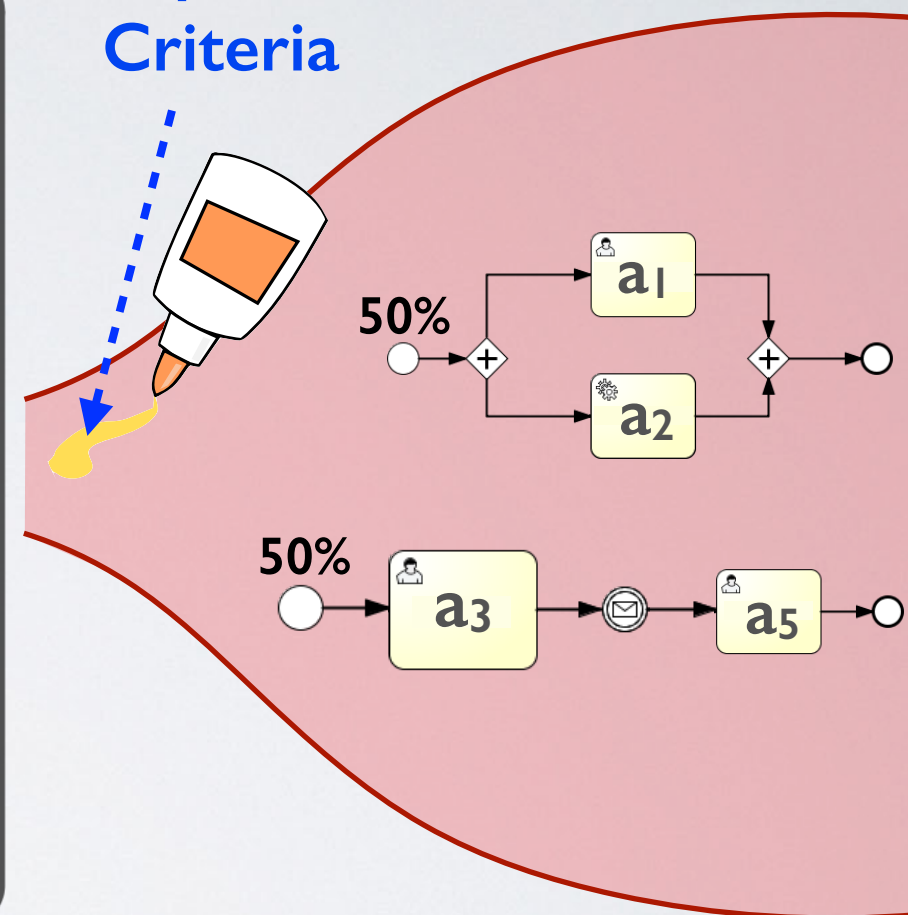
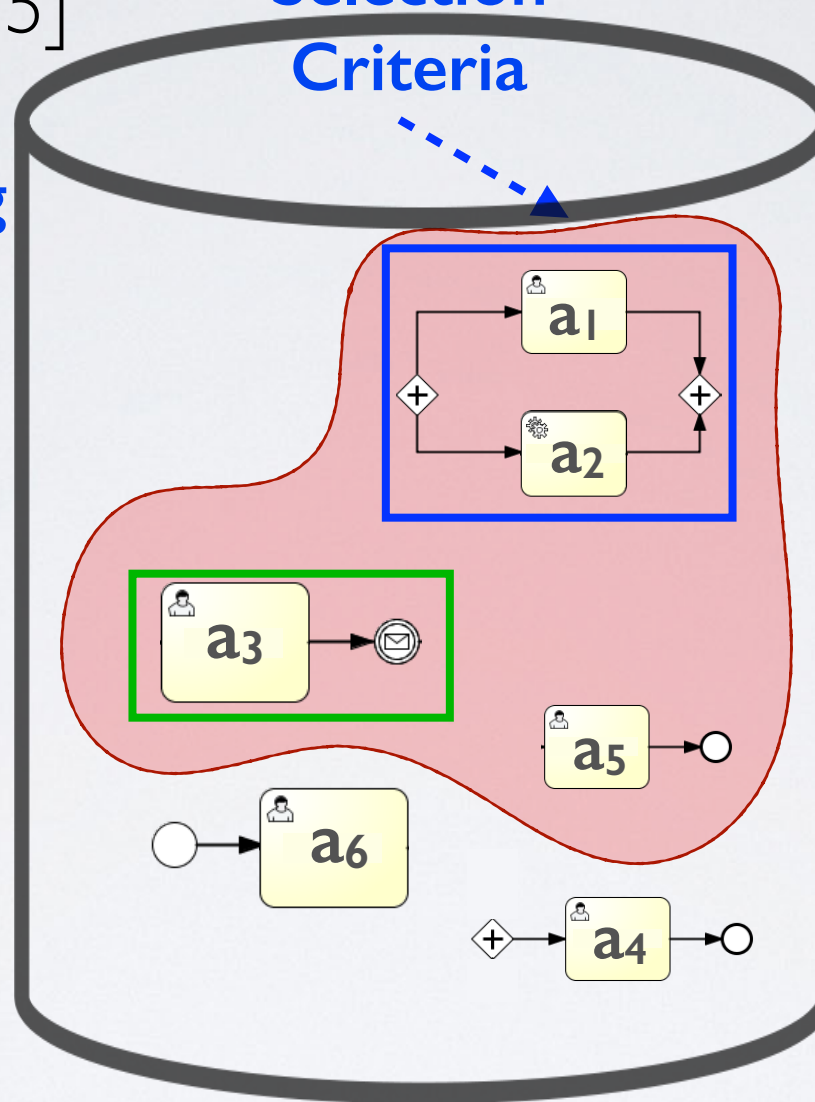
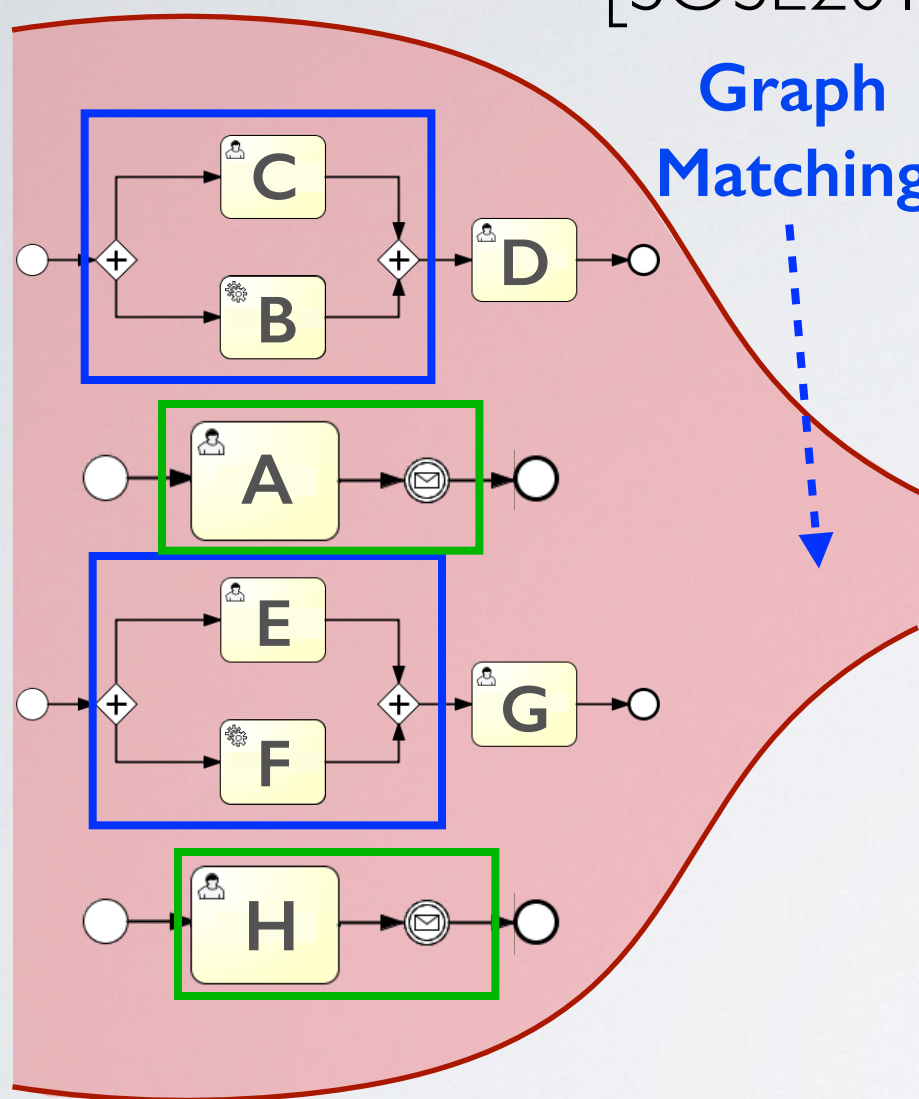
I. Define the Workload Mix

Skouradaki et al.
[SOSE2015]

Graph
Matching

Selection
Criteria

Composition
Criteria



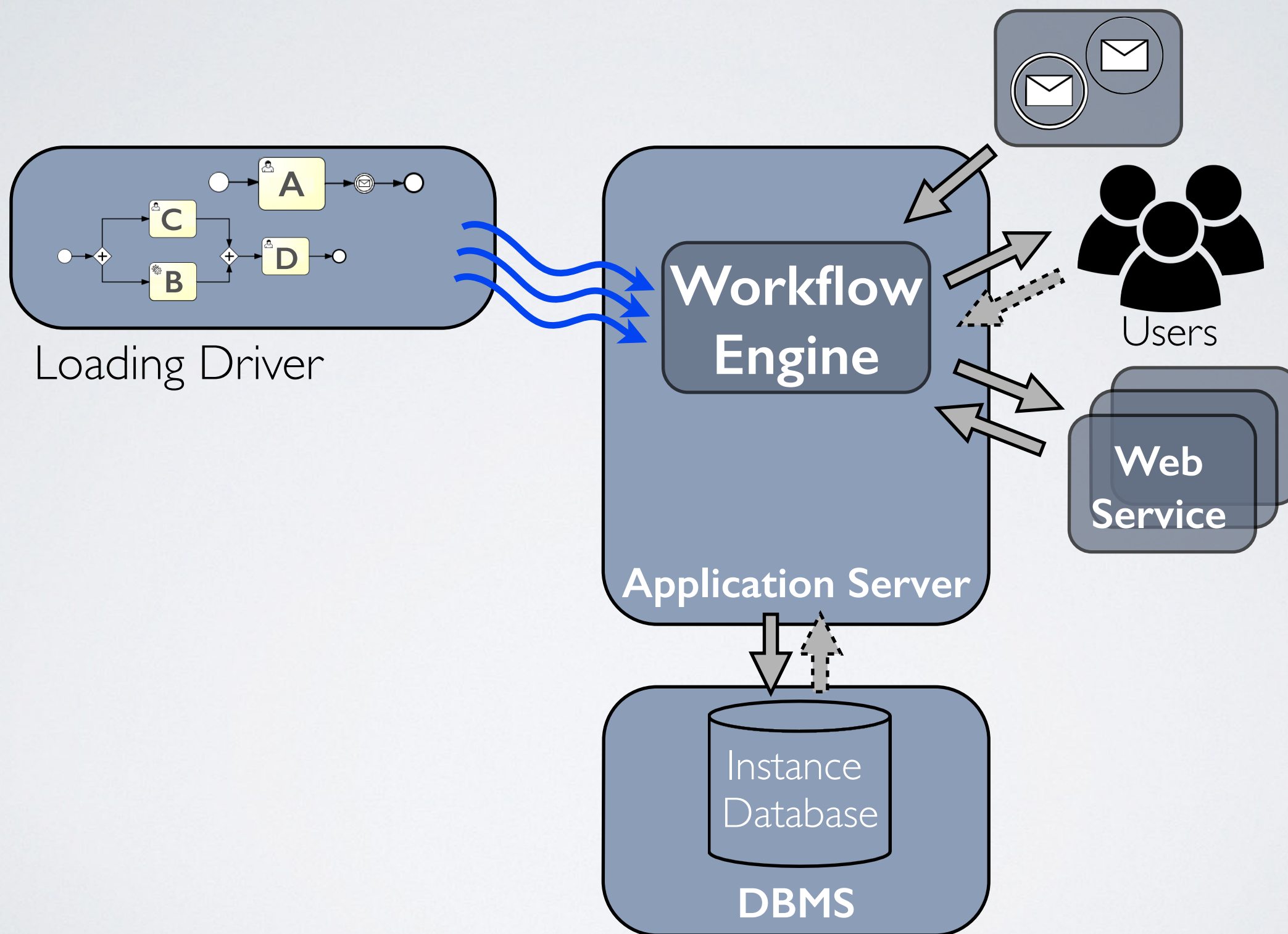
WORKLOAD MIX

REAL-WORLD
PROCESSES

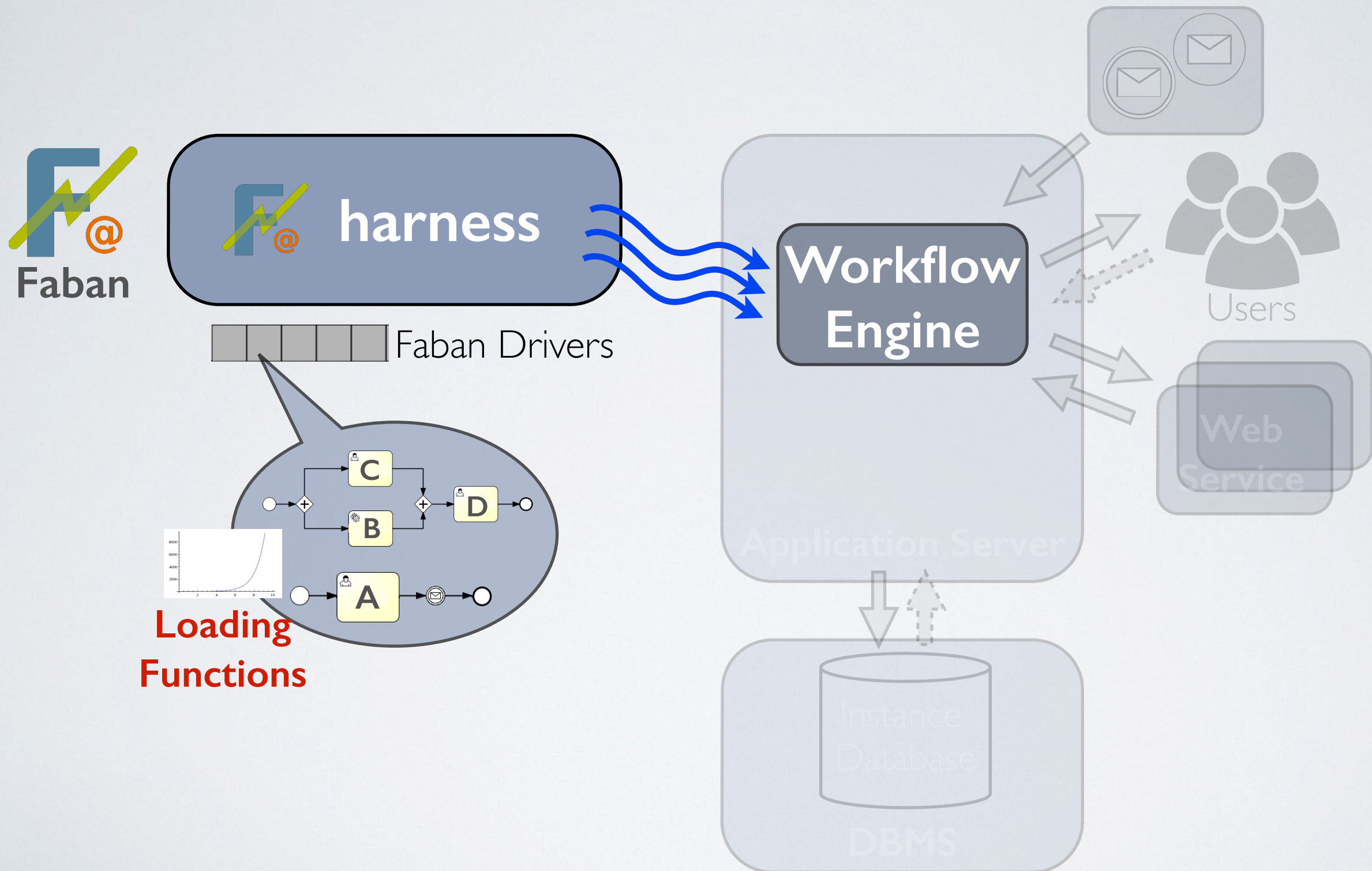
REOCCURRING STRUCTURES

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

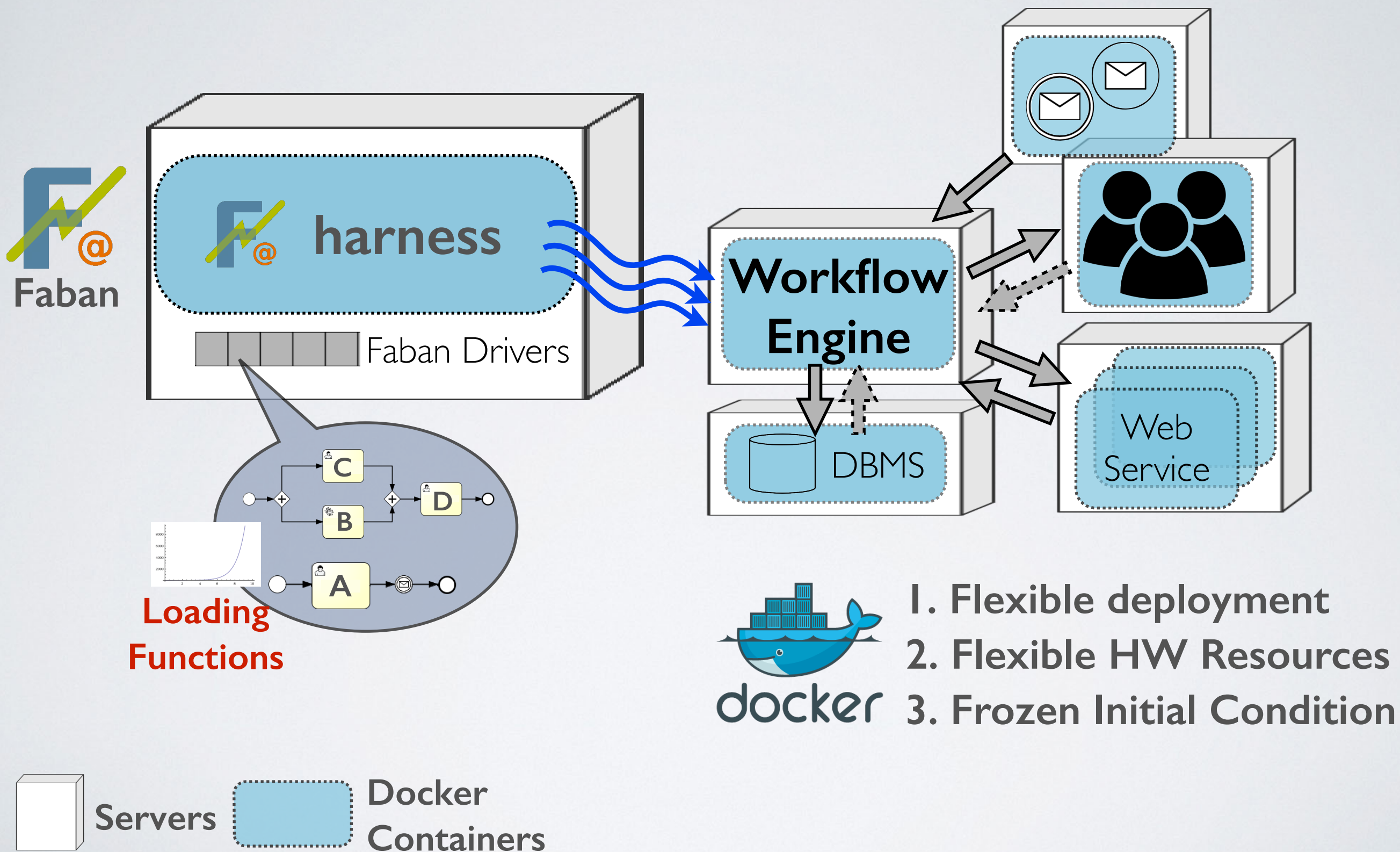
Enabling the Benchmark Execution



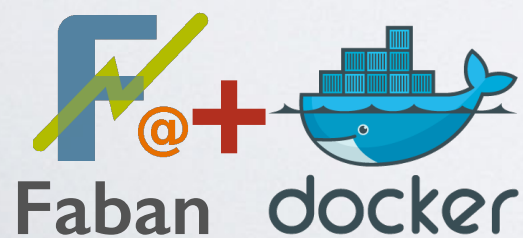
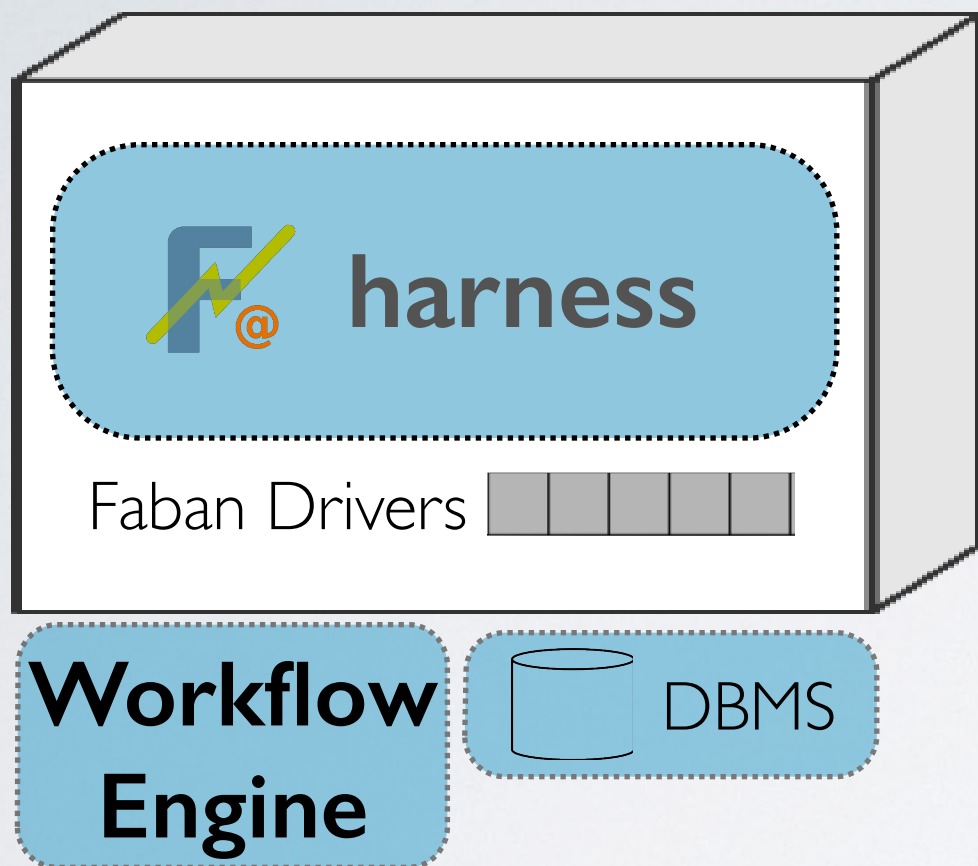
Enabling the Benchmark Execution



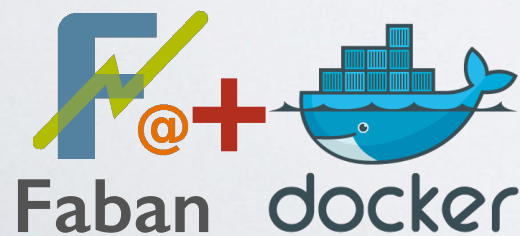
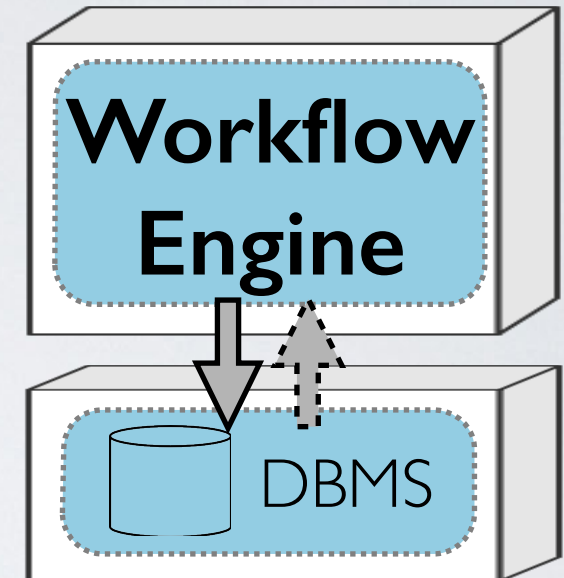
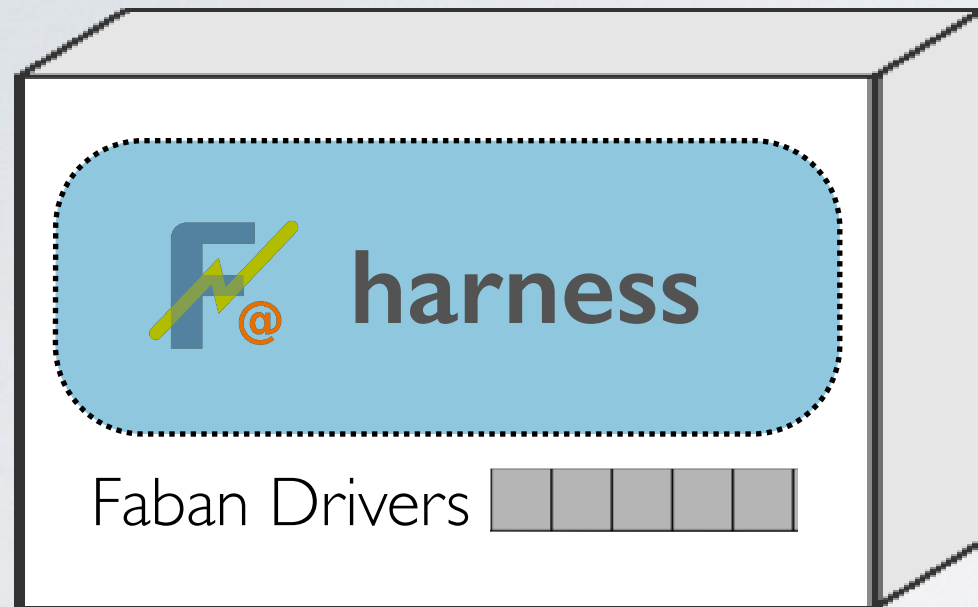
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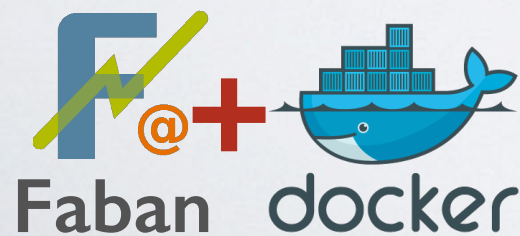
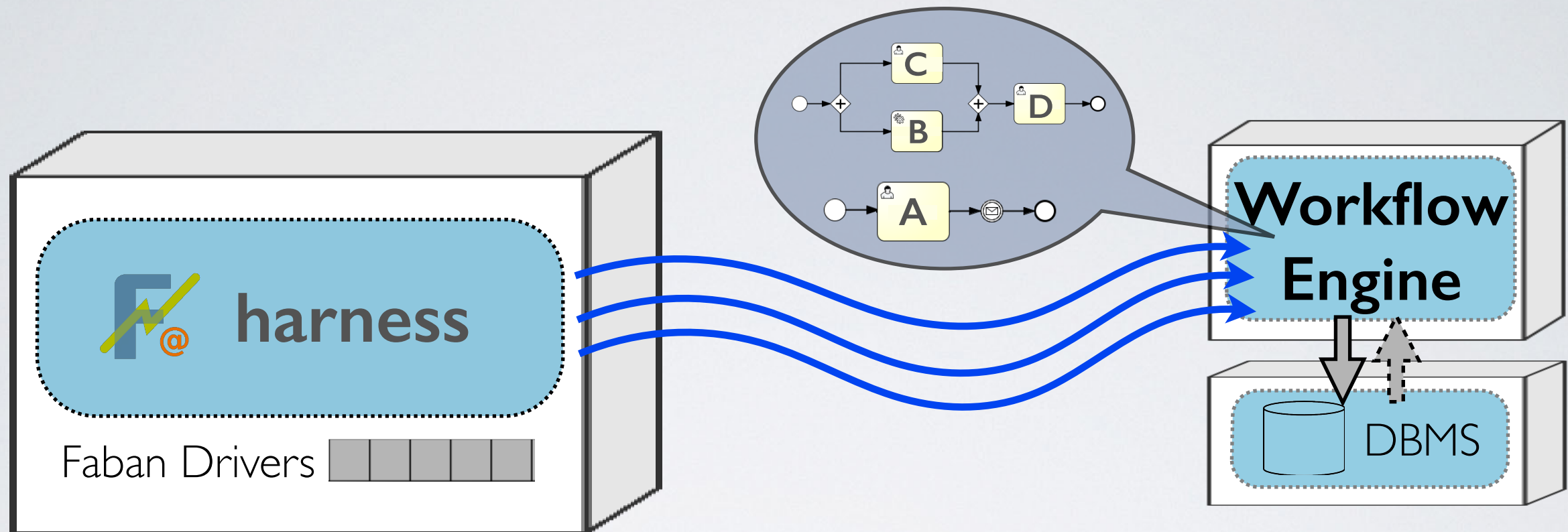


Enabling the Benchmark Execution



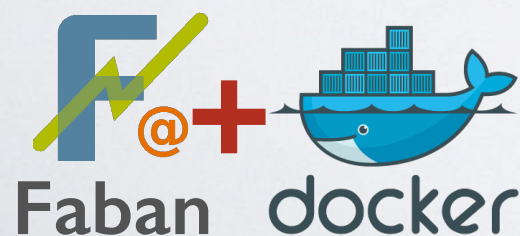
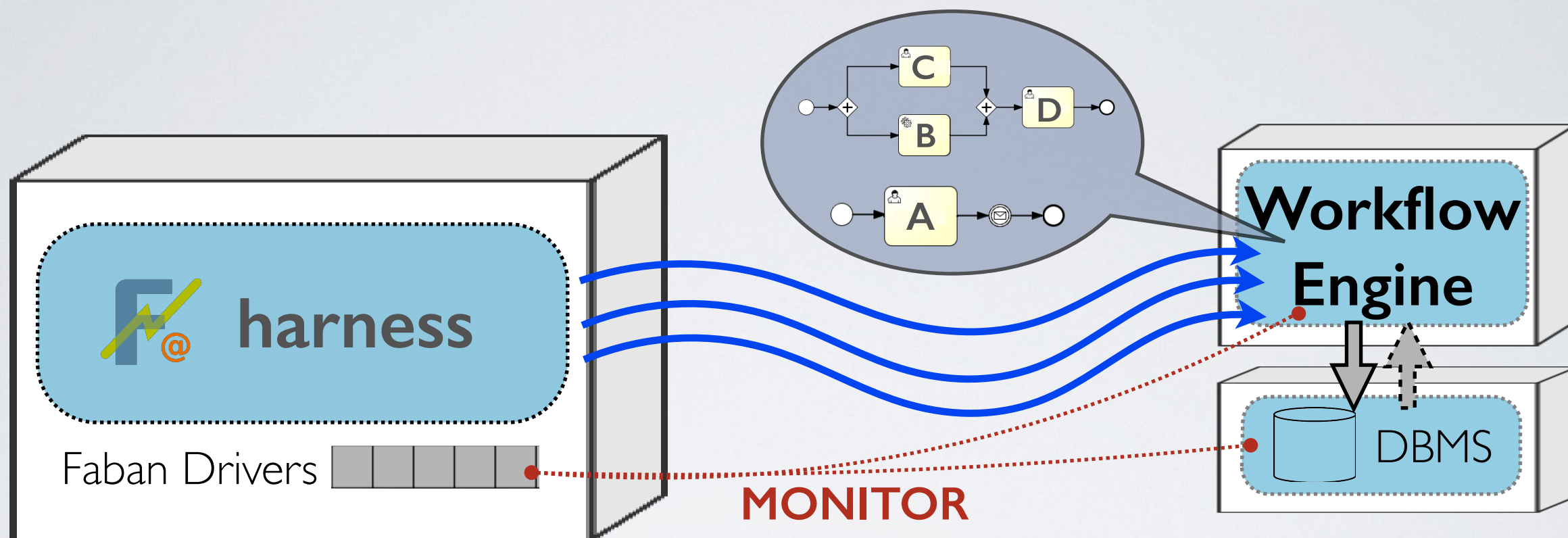
1. Automatically deploy and start the benchmark environment;

Enabling the Benchmark Execution



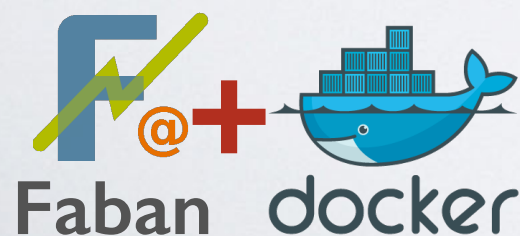
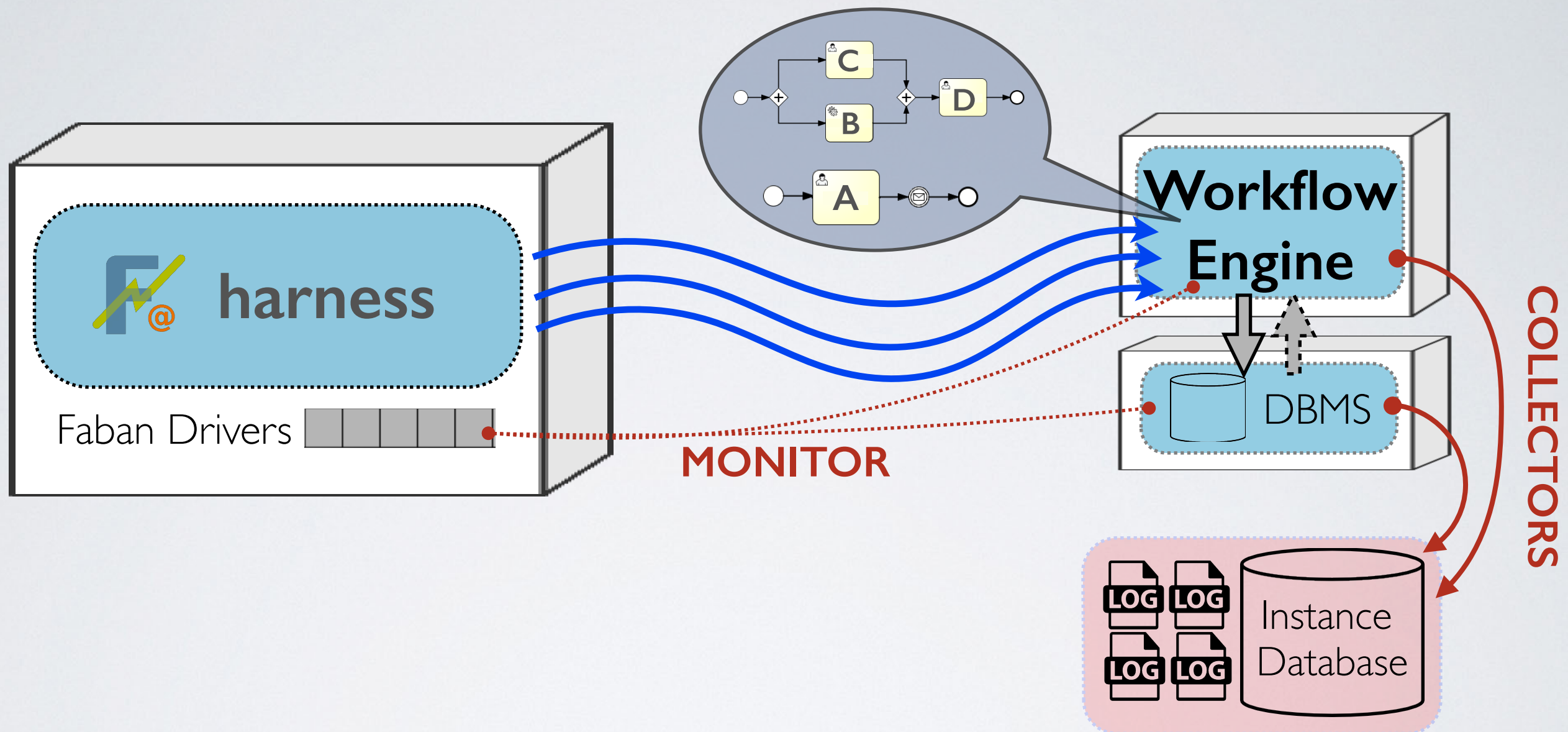
1. Automatically deploy and start the benchmark environment;
2. Automatically deploy the workload mix;

Enabling the Benchmark Execution



1. Automatically deploy and start the benchmark environment;
2. Automatically deploy the workload mix;
3. Determine when the benchmark ends;

Enabling the Benchmark Execution



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**

BenchFlow Project: <http://design.inf.usi.ch/research/projects/benchflow>

BACKUP SLIDES

- Cited Works;
- Related Works.

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University of Stuttgart
Germany

Vincenzo Ferme, Cesare Pautasso
Faculty of Informatics
University of Lugano (USI)
Switzerland

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[SOSE2015]

Skouradaki, Marigianna; Goerlach, Katharina; Hahn, Michael; Leymann, Frank. ***Application of Sub-Graph Isomorphism to Extract Reoccurring Structures from BPMN 2.0 Process Models***. In Proceedings of 9th International IEEE Symposium on Service-Oriented System Engineering (SOSE 2015). San Francisco Bay, USA, March 30 - April 3, 2015. (to appear)

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