Improving the Usability of an Integrated Decision Support System for Design Decision Making

Jiping Xu, 26.02.2018, Kick-off Presentation

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Outline

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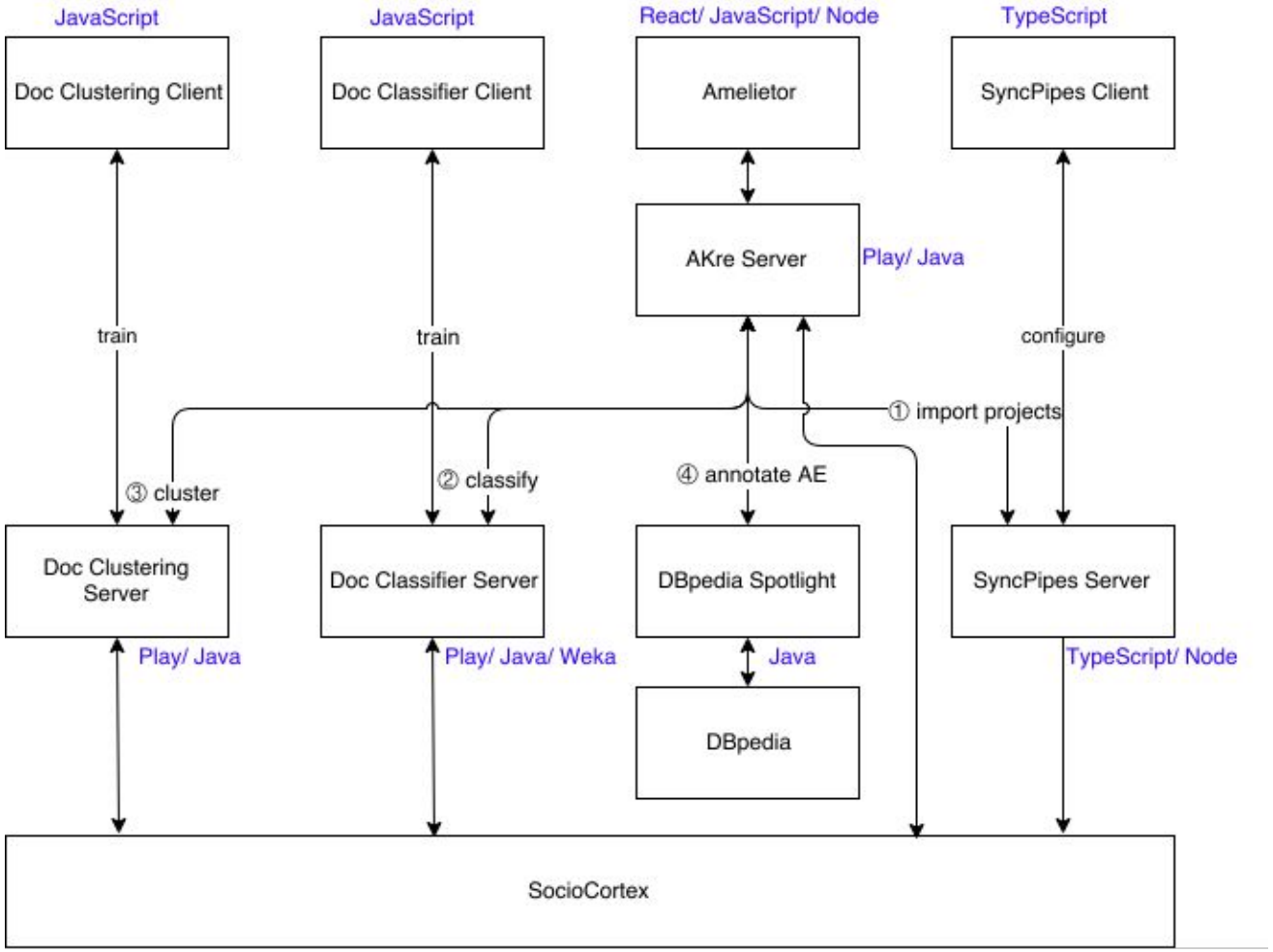
Motivation

- Software architecture is the result of a set of architectural design decisions [1].
- These design decisions involve important choices on core components to satisfy and balance stakeholders' concerns [2].
- Benefits of capturing design decisions: lower costs of change, reusability [3], …
- Difficulties of making design decisions: not rational, biased [4], …

Design decisions are important to the success of the software, but it is difficult to make good decisions. So there is a need for a system to support architects and developers in the process of design decision making - Architecture Management Enabler for Leading Industrial software (AMELIE).

Motivation - AMELIE

- A system of systems
- Developed by different people at different time



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Research questions

RQ1: What are the requirements of a decision support system (DSS) for making design decisions?

- A rather new field, various requirements from researchers
- Industry partner - Siemens AG: real-world use cases

RQ2: How to improve the *usability* of an existing DSS that supports design decision making?

- Usability (end-users)
- Maintainability (developers)
- Understandability (end-users, developers)
- Learnability (end-users, developers)

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Approach

Phase 1

- Conduct literature review
- Familiarise with AMELIE, set up all relevant sub-systems
- Artifact: a list of requirements

Phase 2

- Perform usability test to get end-user feedback about existing AMELIE UI
- Implement UI changes
- Integrate systems

Phase 3 (see next slide)

- Create end-user manual
- Create developer documentation
- Create API reference

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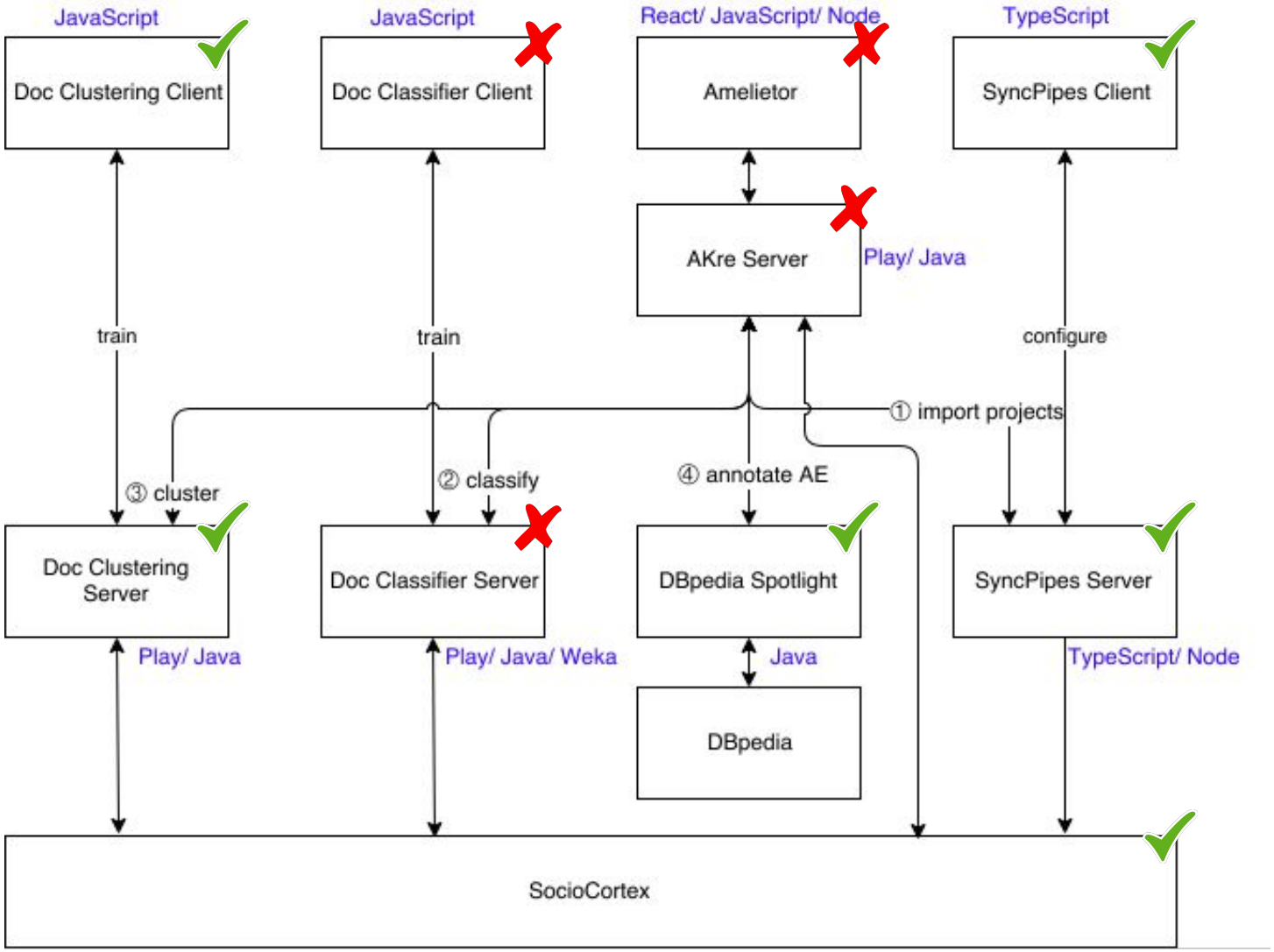
Approach - cont'd

✓: with documentation

✗: without documentation

Phase 3



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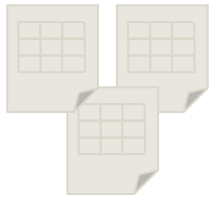
Current State

Phase 1 completed

- Select literatures
- Collect requirements
- Remove duplicates
- Refine requirement descriptions
- Share with project manager/architect/researcher independently
- Consolidate results from them



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Current State - cont'd

- Artifact: a list of requirements
  - 31 requirements related to architectural knowledge management
  - 15 requirements focused on architectural design decisions

Example:

No.	Description	Siemens*	AMELIE**
1	Integration with other tools [6, 7, 10]: automatic or semi-automatic integration with others tools during different phases of software lifecycle.	Y	Y
2	Reasoning capability [7]: basic inference mechanism that can automatically detect inconsistencies, state new questions or perform some fuzzy reasoning.	Y	-
3	Architectural decision consequence analysis [8, 9, 11]: the main consequences of a decision are the changes in the model when a decision is executed. In addition, new decision topics can be introduced.	Y	P

* Is this a real-world use case from our industrial partner?

** Is this already supported by AMELIE?

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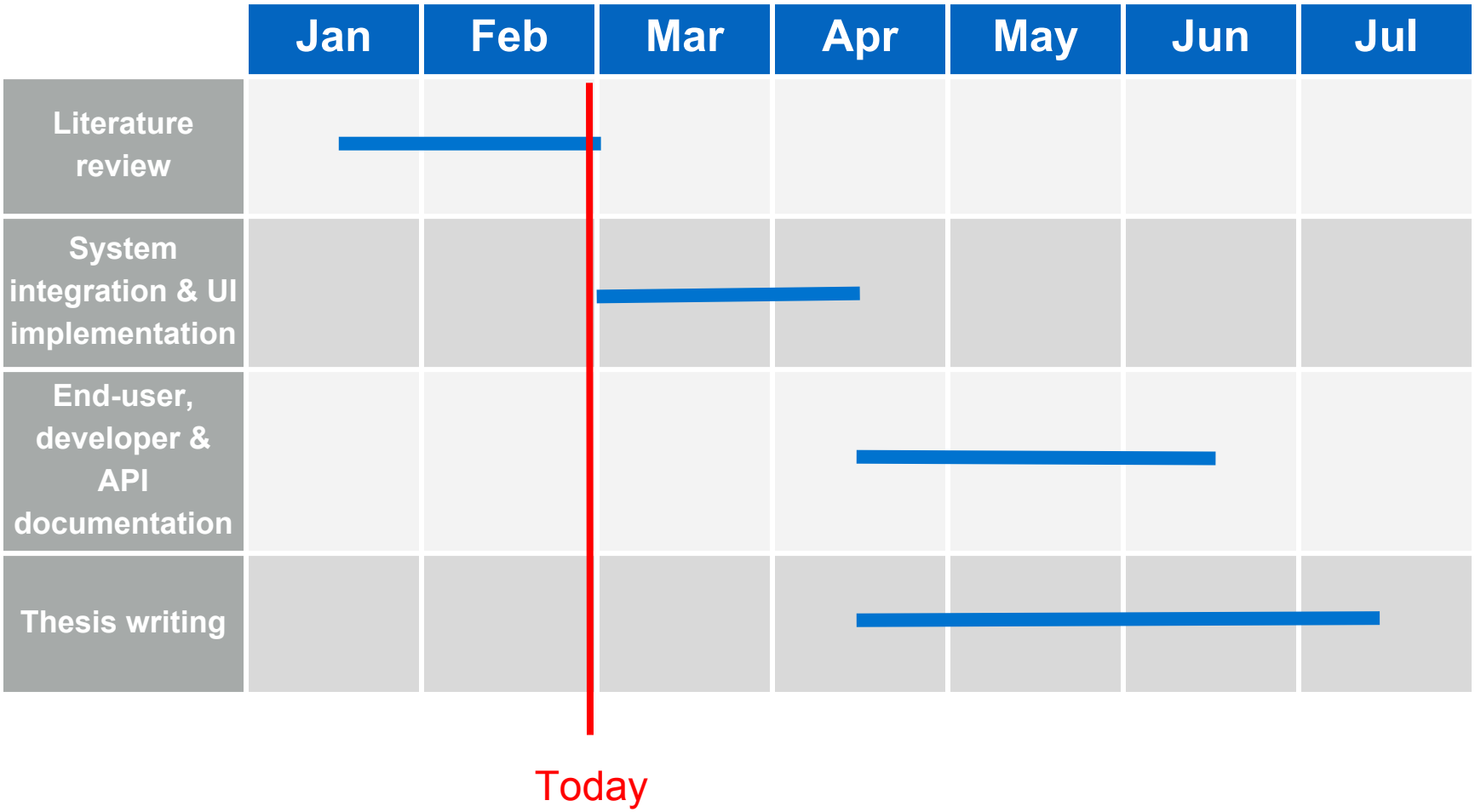
Timeline



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