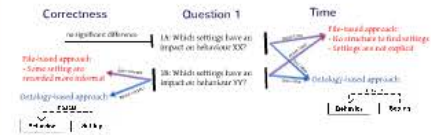


Introduction



Findings

Experiment - overall results
 Ontology-based approach
 More correct than other approaches
 More time spent for work questions
 More time spent for work questions

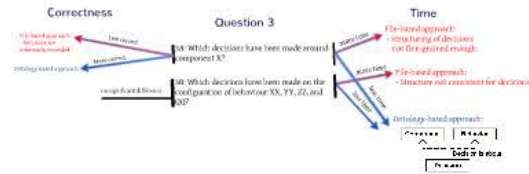


From which sources do you get software knowledge?

Mostly People: [Bar chart showing sources of knowledge]

Do you think it is worthwhile to set up a semantic wiki at Océ for searching software knowledge & documentation management?

Yes: 33.6% (n=28)
 No: 21.7% (n=18)
 I don't know: 44.6% (n=38)



Conclusions



Ontology-Based Software Architecture Documentation

Klaas Andries de Graaf



Antony Tang



Peng Liang



Hans van Vliet



Introduction

Formal description of knowledge:



"Ontology-based" data retrieval



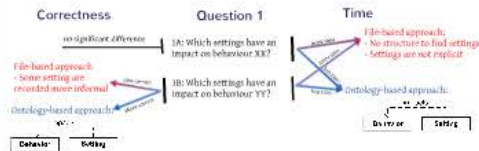
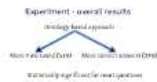
Structuring of knowledge:



Example:



Findings

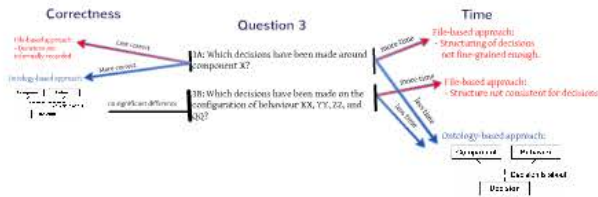


- From which sources do you get software knowledge?



- Do you think it is worthwhile to set up a semantic wiki at Océ for searching software knowledge & documentation management?

Yes - 115 (67.9%)
 No - 2 (1.2%)
 I do not know - 45 (25%)



Conclusions

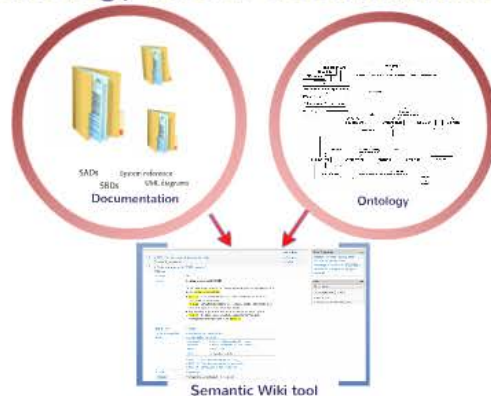


Introduction

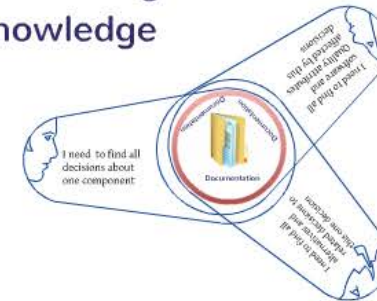
Formal description of knowledge



'Ontology-based' documentation



Structuring of knowledge



- Different views on Architecture knowledge
- Different cross-sections required

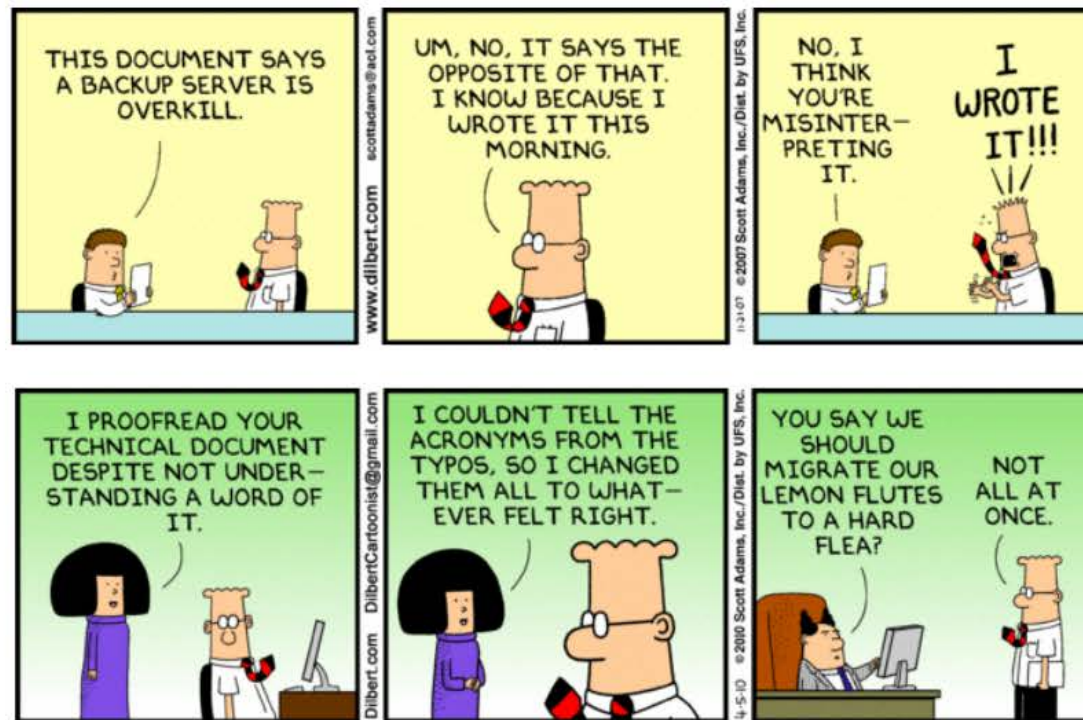
Experiment

Efficiency and effectiveness of AK retrieval

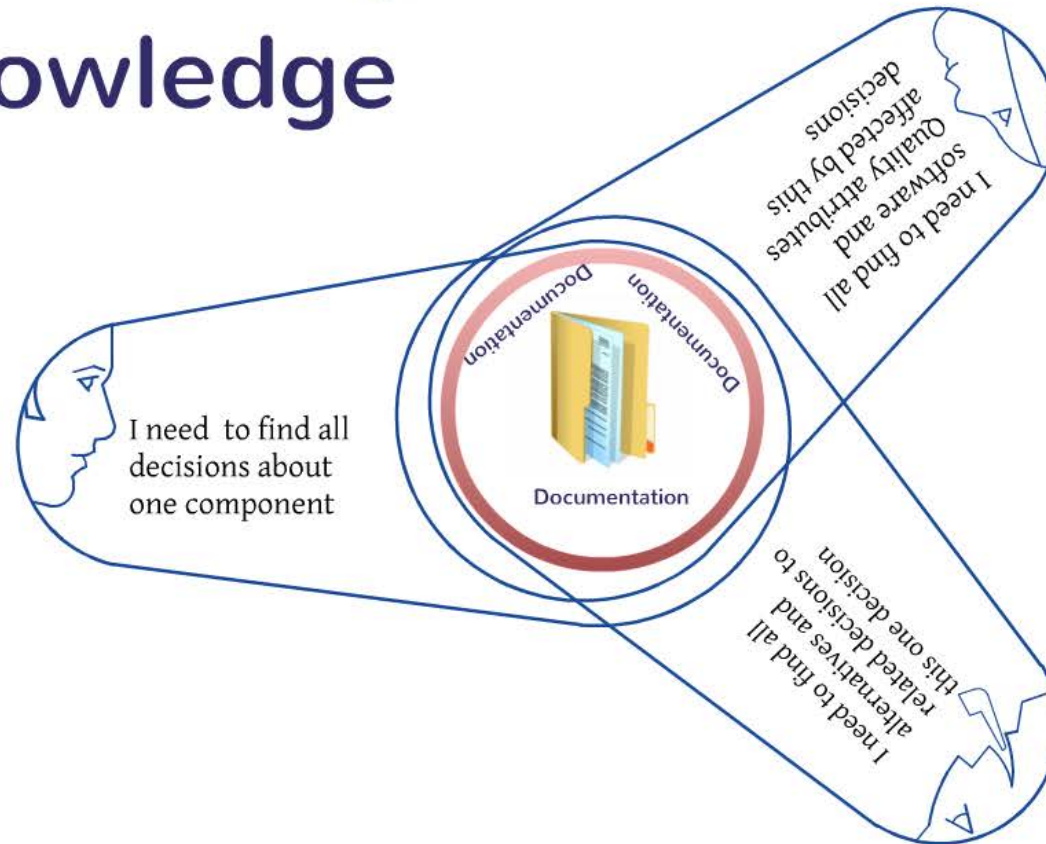
7 questions about software project

- File-based documentation → MS word
File explorer
Magicdraw
-versus-
Ontology based documentation → Semantic Wiki

Formal description of knowledge

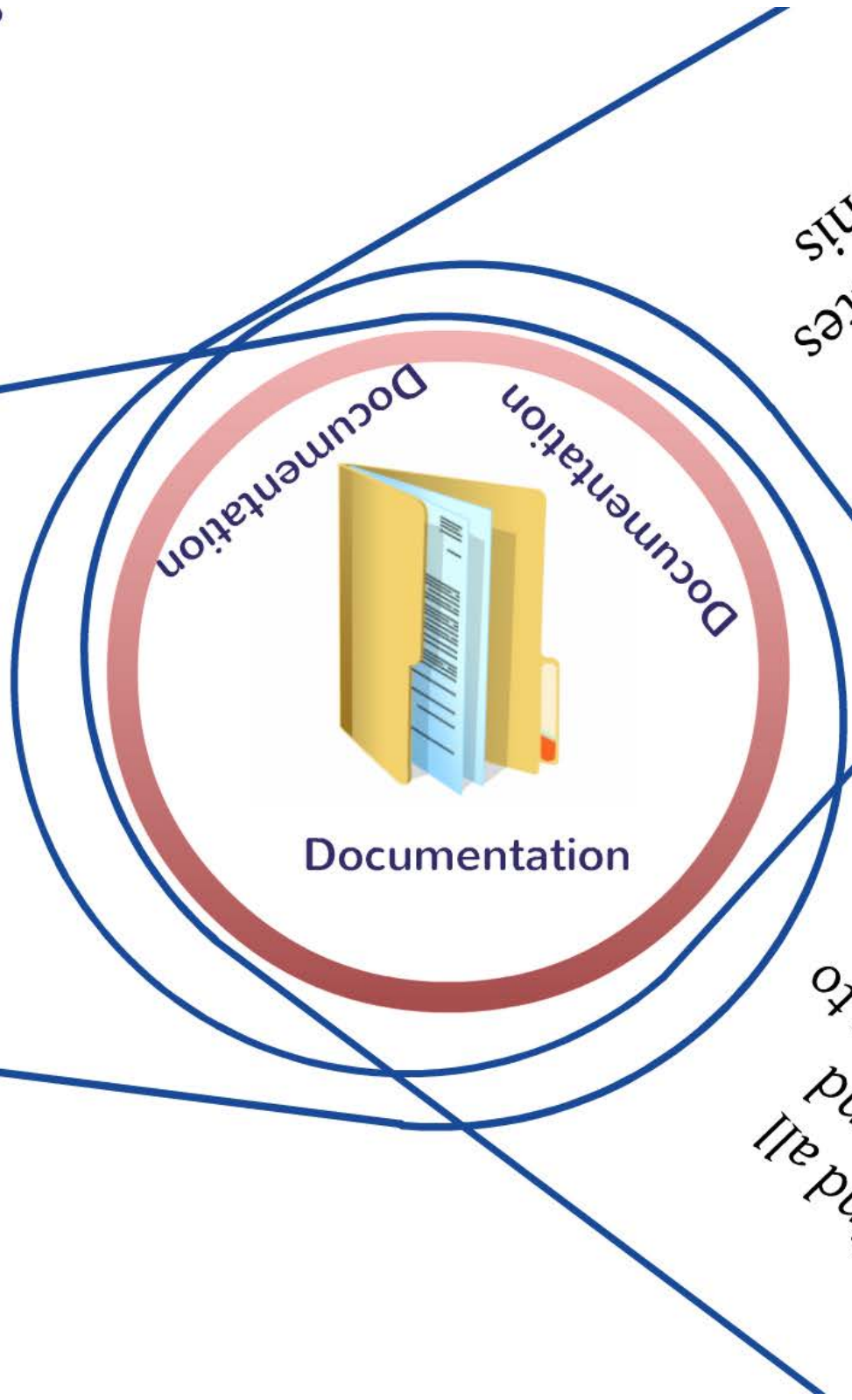


Structuring of knowledge



- Different views on Architecture knowledge
- Different cross-sections required

I need to find all decisions about one component

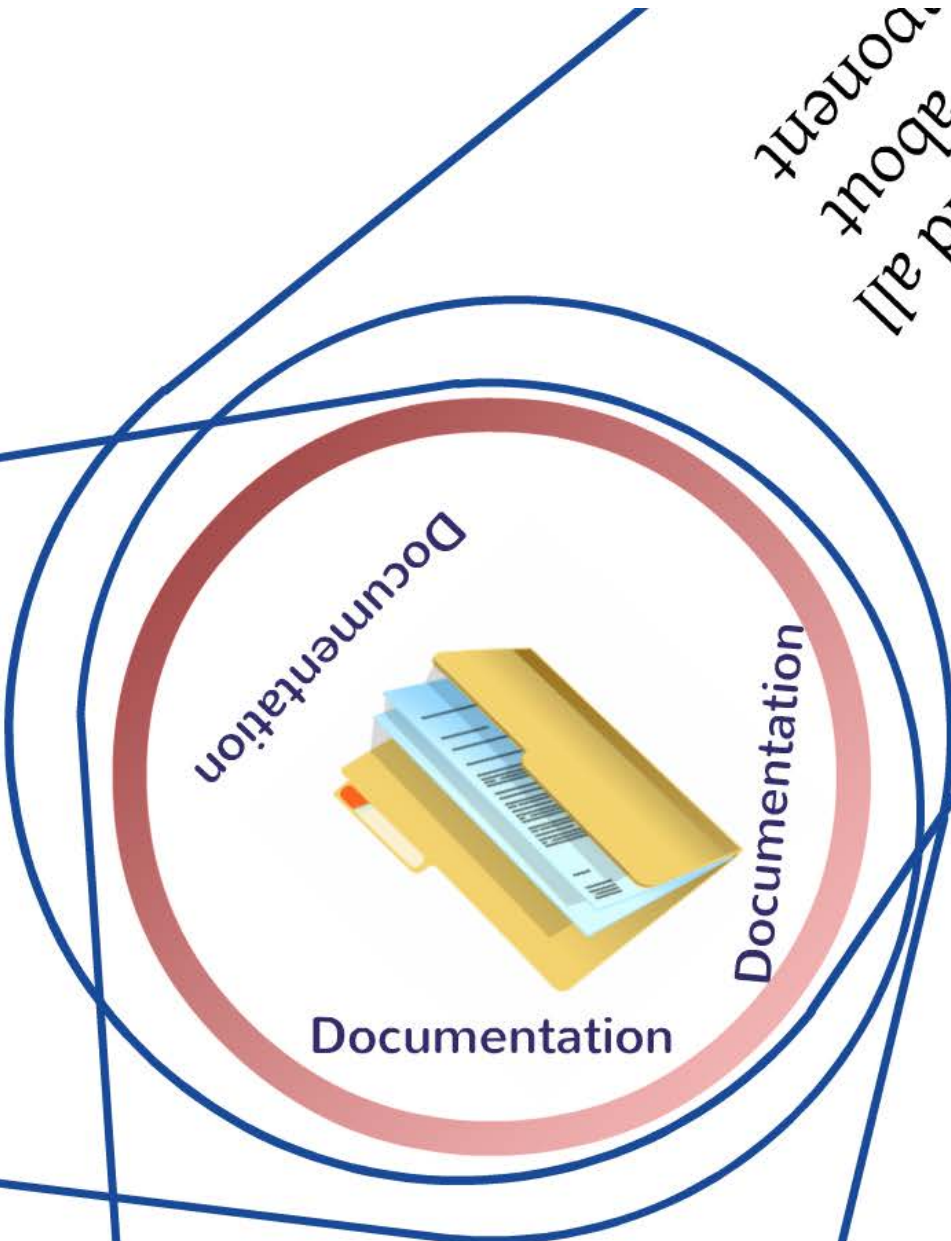


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I need to find all alternatives and related decisions to this one decision

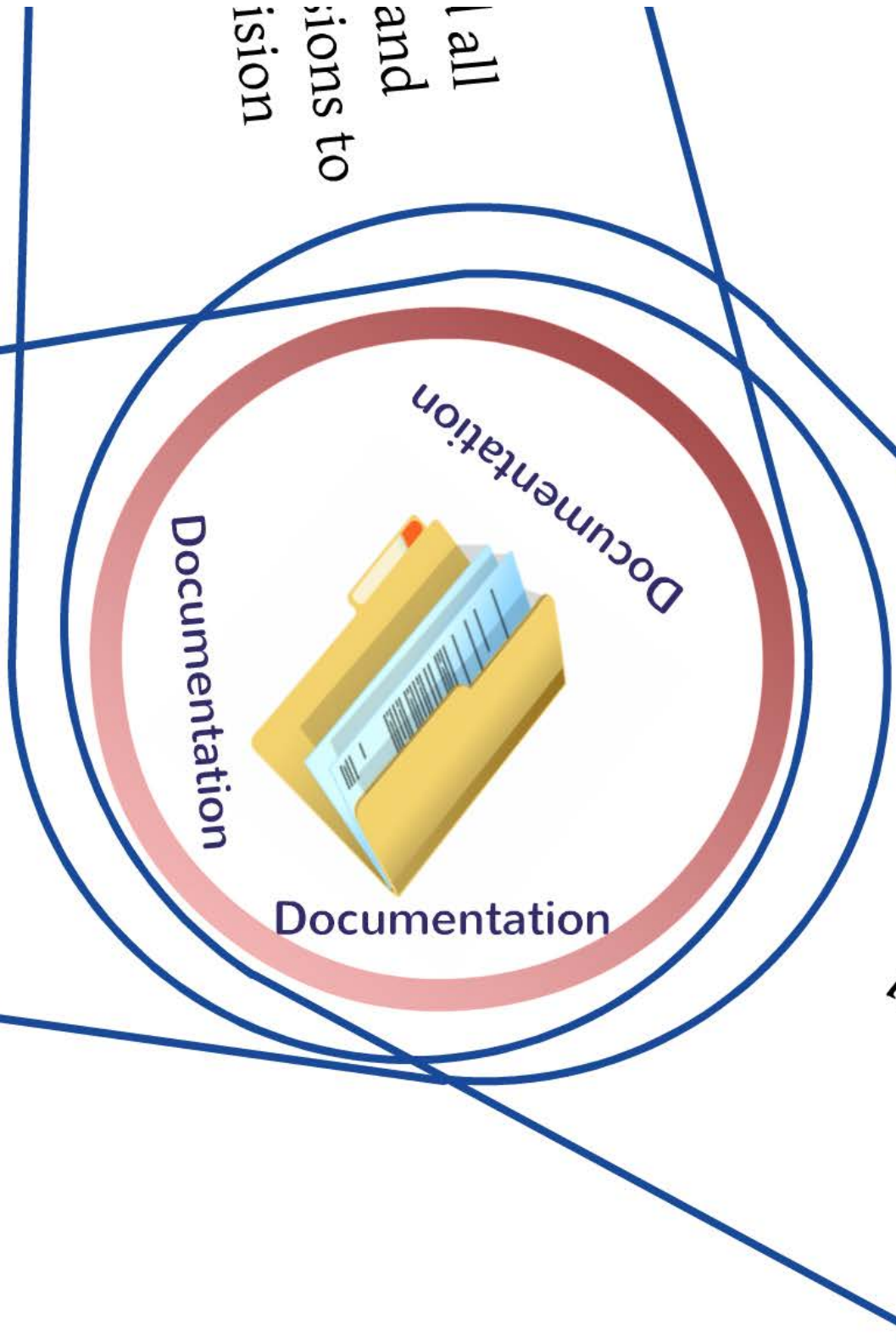


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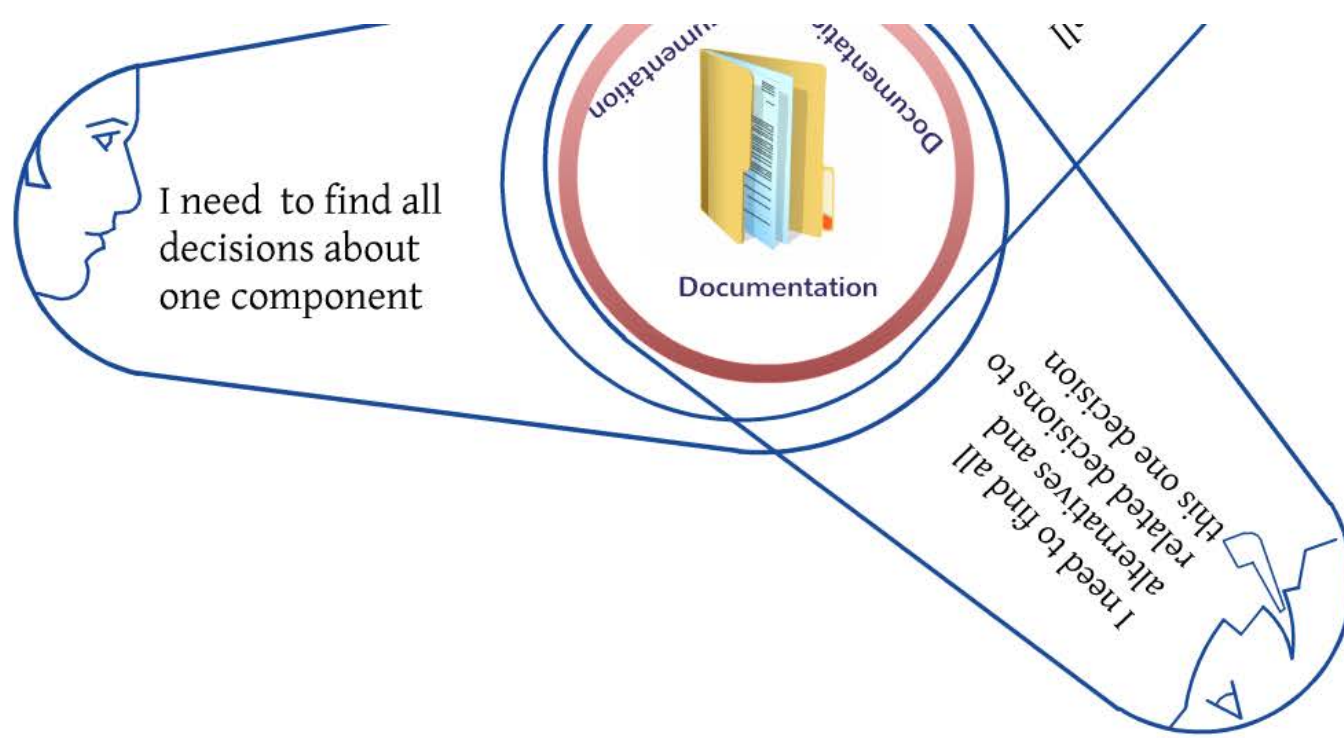


I need to find all software and Quality attributes affected by this decisions



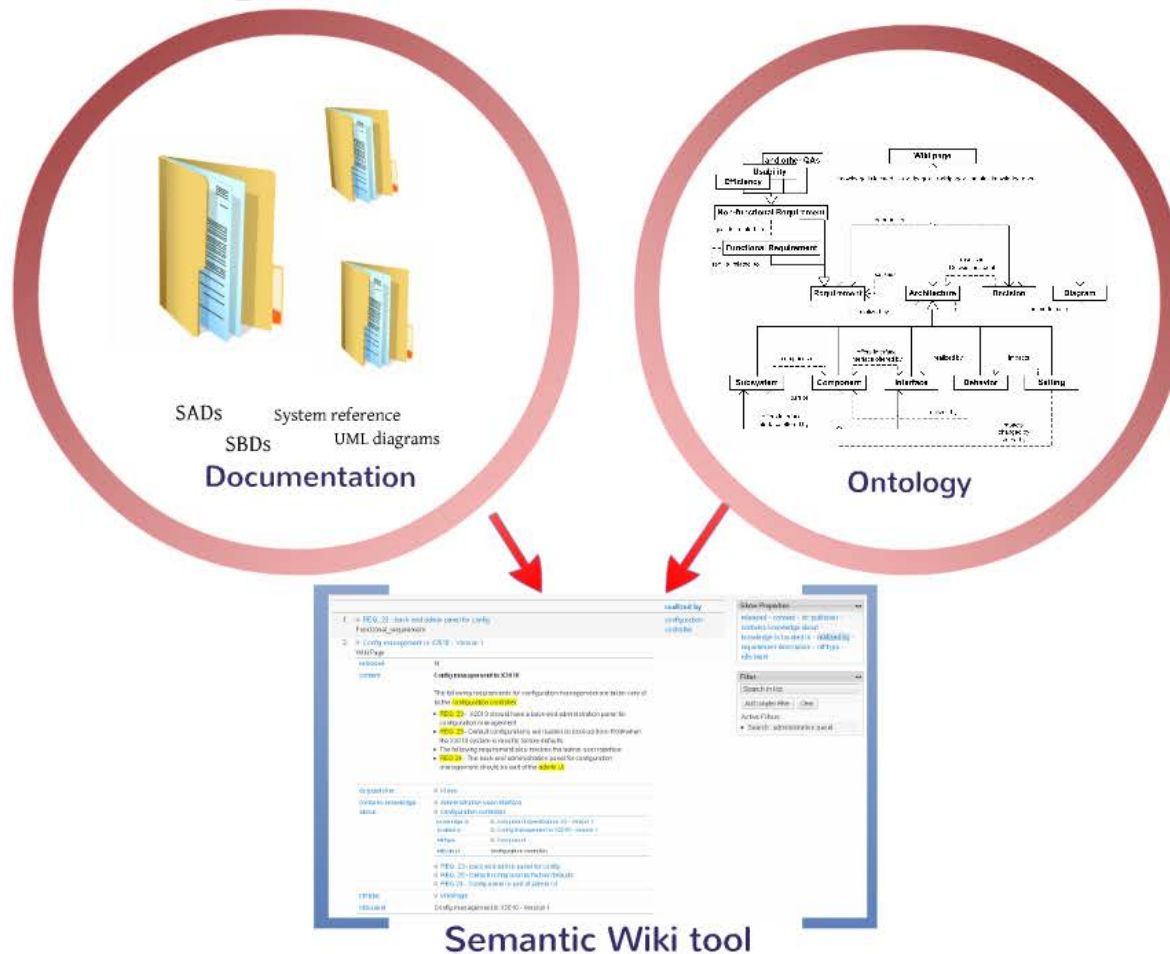
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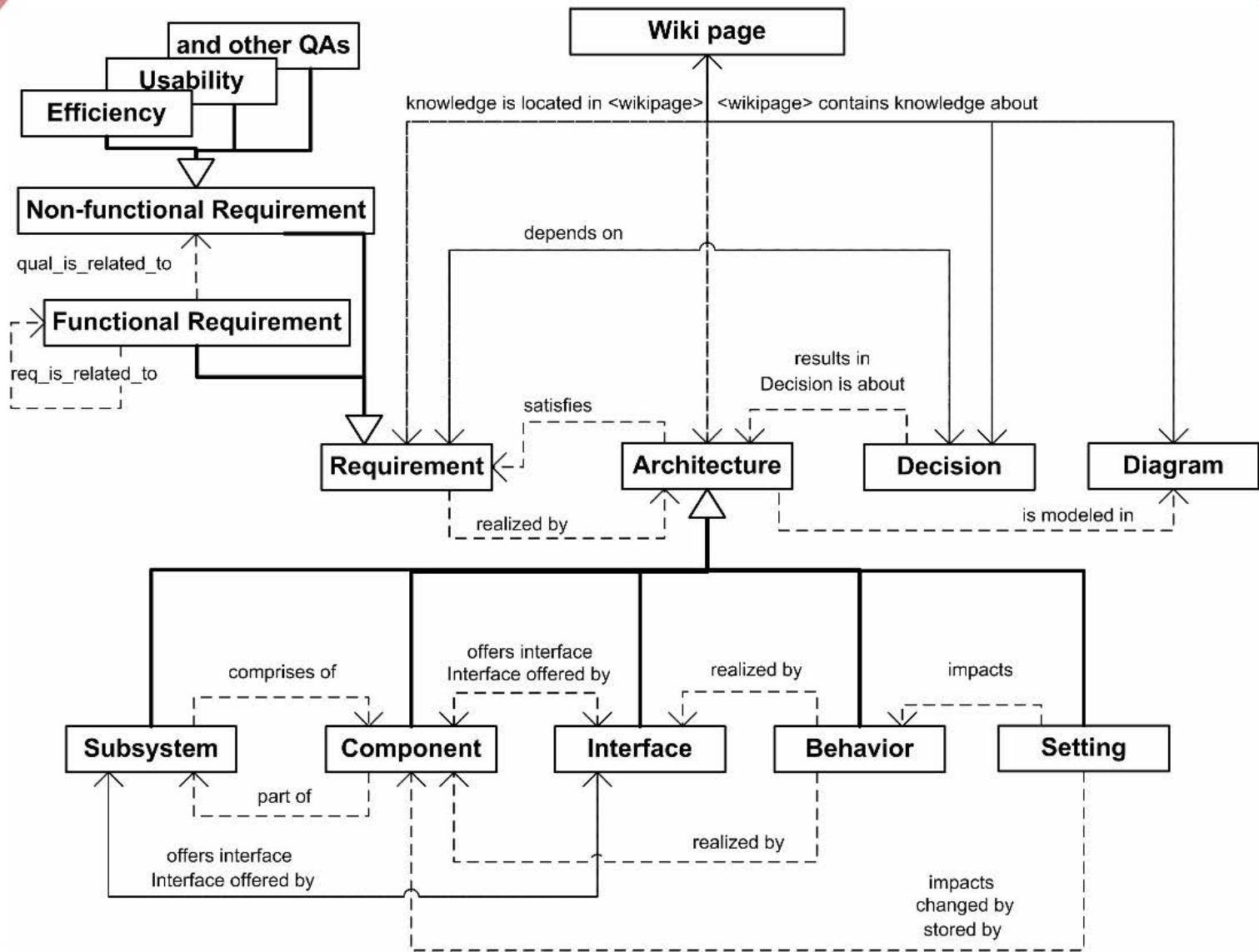
II



- **Different views on Architecture knowledge**
- **Different cross-sections required**

'Ontology-based' documentation





Ontology



1. [REQ. 23 - back end admin panel for config](#)
Functional_requirement

2. [Config management in X2010 - Version 1](#)
WikiPage

released N

content **Config management in X2010**

The following requirements for configuration management are taken care of by the **configuration controller**

- **REQ. 23** - X2010 should have a back-end administration panel for configuration management
- **REQ. 25** - Default configurations are loaded on boot-up from ROM when the X2010 system is reset to factory defaults
- The following requirement also involves the admin user interface
- **REQ. 24** - The back-end administration panel for configuration management should be part of the **admin UI**

dc:publisher [Klaas](#)

contains knowledge about [Administration user interface](#)
[configuration controller](#)

knowledge is located in [Component Specification X3 - Version 1](#)
[Config management in X2010 - Version 1](#)

rdf:type [Component](#)

rdfs:label configuration controller

[REQ. 23 - back end admin panel for config](#)
[REQ. 25 - Default config boot by factory defaults](#)
[REQ. 24 - Config panel is part of admin UI](#)

rdf:type [WikiPage](#)

rdfs:label Config management in X2010 - Version 1

realized by
configuration controller

Show Properties

released · content · dc:publisher · contains knowledge about · knowledge is located in · **realized by** · requirement description · rdf:type · rdfs:label

Filter

Search in list

Add complex Filter Clear

Active Filters:

- Search: administration panel

Semantic Wiki tool

Experiment

Efficiency and effectiveness of AK retrieval

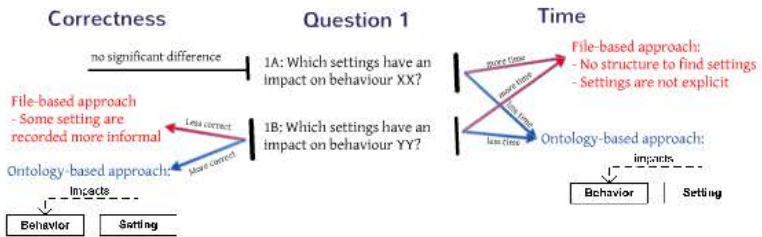
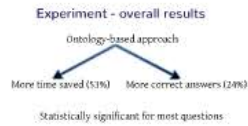
7 questions about software project

File-based documentation → MS word
File explorer
Magicdraw
-versus-

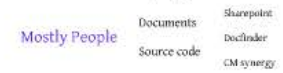
Ontology based documentation → Semantic Wiki



Findings

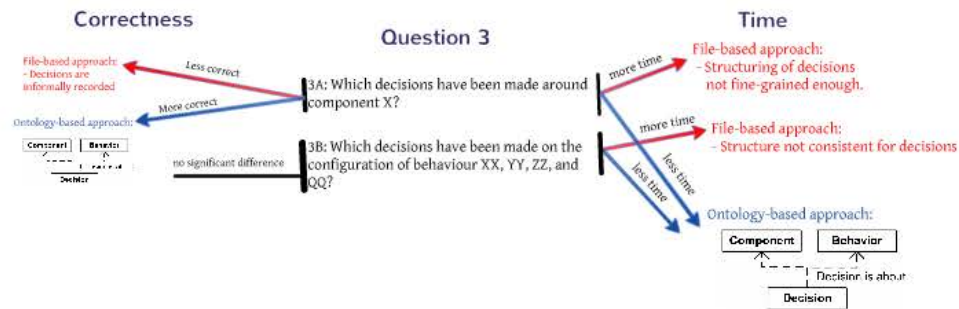


From which sources do you get software knowledge?



Do you think it is worthwhile to set up a semantic wiki at Océ for searching software knowledge & documentation management?

- Yes - 17.5 (67.3%)
- No - 2 (7.7%)
- I do not know - 6.5 (25%)



Conclusions

Experiment - overall results

Ontology-based approach



```
graph TD; A[Ontology-based approach] --> B[More time saved (53%)]; A --> C[More correct answers (24%)];
```

More time saved (53%)

More correct answers (24%)

Statistically significant for most questions

Question 1

1A: Which settings have an impact on behaviour XX?

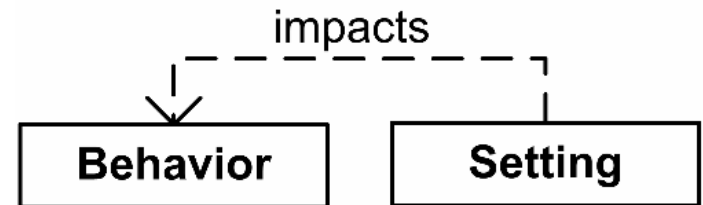
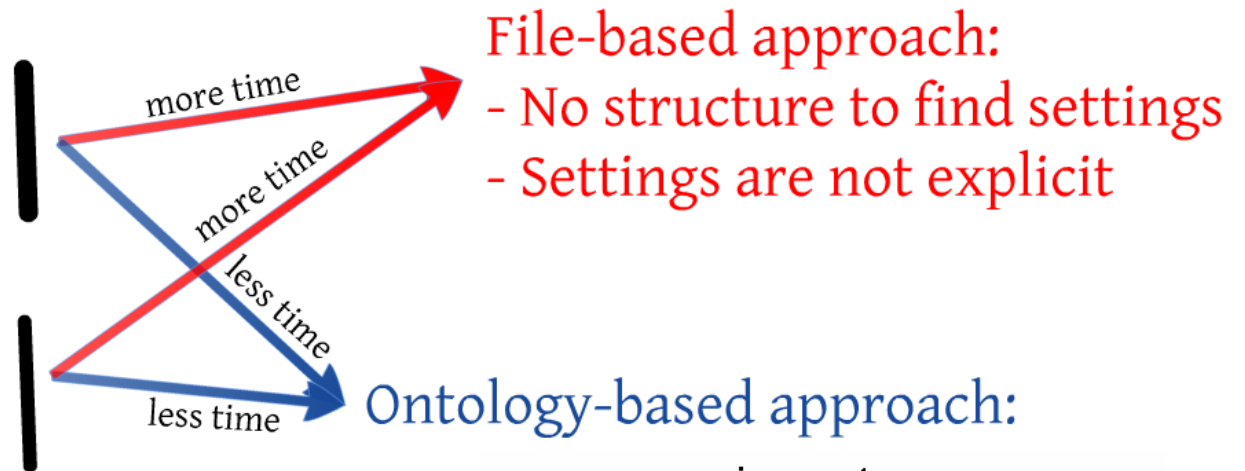
1B: Which settings have an impact on behaviour YY?

Question 1

1A: Which settings have an impact on behaviour XX?

1B: Which settings have an impact on behaviour YY?

Time



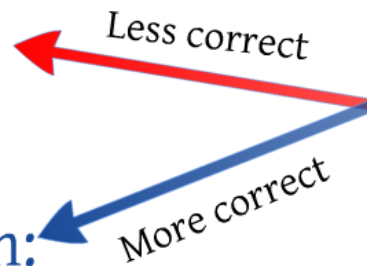
Correctness

Question 1

no significant difference

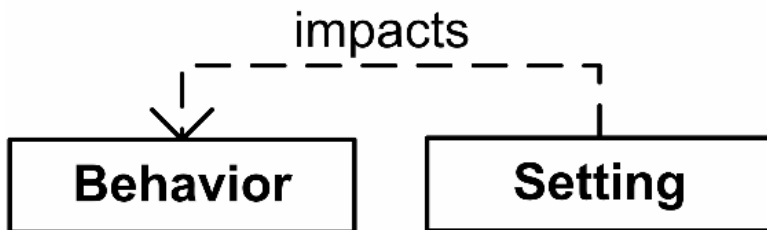
1A: Which settings have an impact on behaviour XX?

File-based approach
- Some settings are recorded more informal



1B: Which settings have an impact on behaviour YY?

Ontology-based approach:



Question 3

3A: Which decisions have been made around component X?

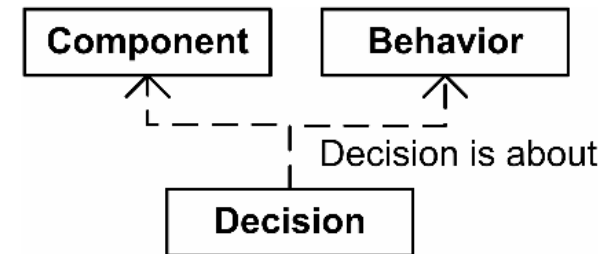
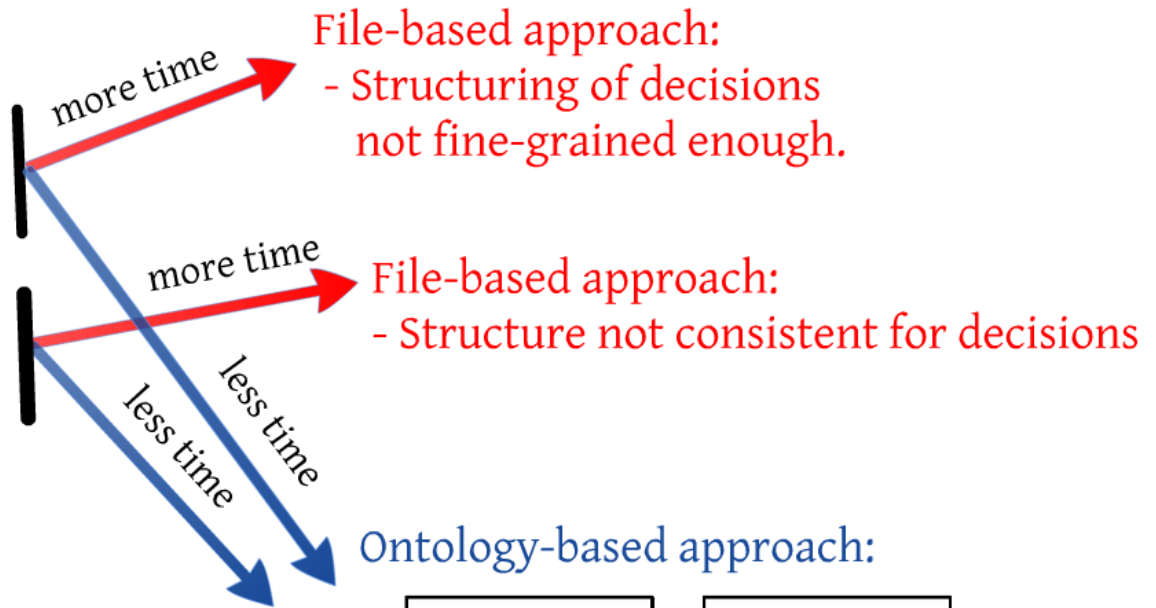
3B: Which decisions have been made on the configuration of behaviour XX, YY, ZZ, and QQ?

Question 3

3A: Which decisions have been made around component X?

3B: Which decisions have been made on the configuration of behaviour XX, YY, ZZ, and QQ?

Time



- From which sources do you get software knowledge?

Mostly People

Documents	Sharepoint
Source code	Docfinder
	CM synergy

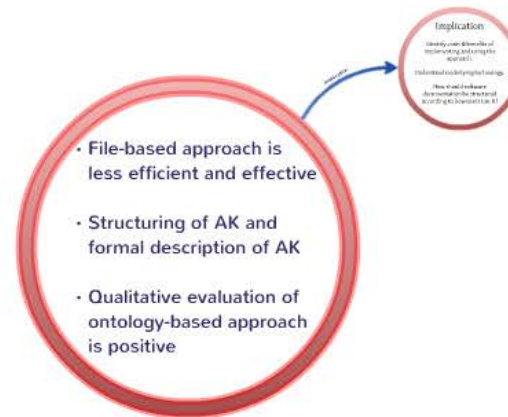
- Do you think it is worthwhile to set up a semantic wiki at Océ for searching software knowledge & documentation management?

Yes - 17.5 (67.3%)

No - 2 (7.7%)

I do not know - 6.5 (25%)

Conclusions



- File-based approach is less efficient and effective
- Structuring of AK and formal description of AK
- Qualitative evaluation of ontology-based approach is positive

Implication

Identify costs & benefits of implementing and using the approach.

Understand underlying technology.

How should software documentation be structured according to how users use it?



Many thanks!

Questions?

See how the ArchiMind tool works at
<http://archimind.few.vu.nl/>