Findings

Conclusions
Ontology-Based Software Architecture Documentation

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Introduction

Formal description of knowledge

Structuring of knowledge

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

'Ontology-based' documentation

Experiment

Efficiency and effectiveness of AK retrieval
7 questions about software project

File-based documentation versus Ontology based documentation

MS word File explorer Magicdraw 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
I need to find all alternatives and related decisions to this one decision.
I need to find all software and quality attributes affected by this decision.
- Different views on Architecture knowledge
- Different cross-sections required
'Ontology-based' documentation

Documentation:
- SADs
- System reference
- UML diagrams

Ontology:

Semantic Wiki tool
Ontology
Semantic Wiki tool
Experiment

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File-based documentation  vs  Ontology based documentation

MS word  File explorer  Magicdraw  Semantic Wiki
Findings

Correctness

Question 1

Time

File-based approach: No structure to find settings - Settings are not explicit
Ontology-based approach:

Question 3

Time

File-based approach:
- Structuring of decisions not fine-grained enough.
- Structure not consistent for decisions

Conclusions
Experiment - overall results

Ontology-based approach

- 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?

File-based approach:
- No structure to find settings
- Settings are not explicit

Ontology-based approach:
- More time leads to less time
- Setting impacts behavior
Correctness

File-based approach
- Some settings are recorded more informal

Ontology-based approach:
- Less correct
- More correct

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

File-based approach:
- Structuring of decisions not fine-grained enough.

File-based approach:
- Structure not consistent for decisions

Ontology-based approach:

Decision is about

Component

Behavior
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?

Correctness

File-based approach:
- Decisions are informally recorded

Ontology-based approach:

Less correct

More correct

no significant difference
• From which sources do you get software knowledge?

Mostly People

Documents
Sharepoint
Docfinder
Source code
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.
• 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/