

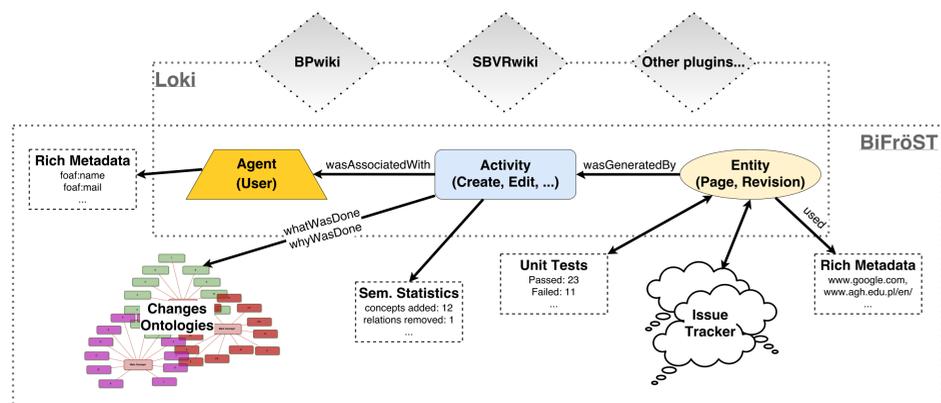
## ABSTRACT

One of the powerful and popular tools that are used to support Collaborative Knowledge Engineering (CKE) are Semantic Wikis. They are easily accessible and provide ACL mechanisms, but they lack a good versioning mechanism. In this paper an extended version of such a mechanism is proposed. Besides elements that appear in every Wiki system, like simple changelog and place for discussion, it incorporates changes ontologies, rich metadata, semantic metrics and reasoning unit tests. All of them are gathered into the form of the provenance graph that can be serialized into Turtle syntax and (automatically) analyzed. First prototype of such a mechanism for Loki wiki called BiFröst was developed.

## CKE ISSUES

- (1) Is there a way to identify **good sources and users**?
- (2) **Conflicts are natural**: different views on the same subject or bad will of users. How can we resolve them?
- (3) Different **kinds of users** (e.g. knowledge enhancers, spellcheckers) and different **types of changes**. How to identify and use them?

## BIFRÖST FRAMEWORK



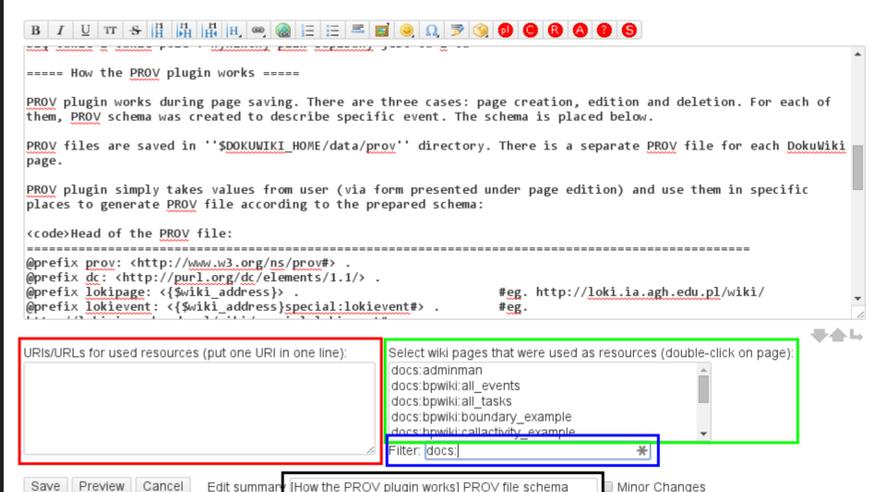
**Changes ontologies:** What was done? (e.g. *New content added*) and **Why** it was done? (e.g. *Errors fixing*)  
**Rich metadata:** internal (other pages) and external (e.g. books) sources; user data: name, e-mail, etc.

**Semantic stats:** how many concepts, instances, relations were added, removed?  
**Unit tests:** test cases executed during page saving (to ensure the quality).  
**Issue tracker:** place for discussion between experts.

## DOKUWIKI AND LOKI AS A BASE

- |  |   |
|--|---|
| <p><b>DokuWiki:</b></p> <ul style="list-style-type: none"> <li>• Plain text, simple markup,</li> <li>• ACLs, Version Control,</li> <li>• Web interface.</li> </ul> | <p><b>Loki:</b></p> <ul style="list-style-type: none"> <li>• SemWiki based on Prolog,</li> <li>• Dynamic queries,</li> <li>• Modular architecture.</li> </ul> |
|--|---|

## USER INTERFACE



## USE CASE SCENARIOS

- Get rid of bad changes.** Quick identification of bad changes (poor tests' stats) that should be examined. It is possible to block the ability to save changes if new revision is worse than previous one (less tests were passed).
- Sources analysis.** By combining tests' statistics and sources lists, to determine which sources have low quality and shouldn't be used in the future.
- User types identification.** Thanks to the changes ontology, we can identify different kinds of users, e.g. good users and bad users (who introduces bad changes) or creators (they add a lot of text) and annotators (they provide many new relations for existing text).
- Underdeveloped pages indication.** If there are not too much concepts and relations on a page, maybe it is a good time to pay attention to it?
- Motivation by gamification.** Accurate metrics allow for awarding points, giving them badges and creating leaderboards to motivate them.

## VERSIONING GRAPH

```

1 Head of the PROV file:
2 =====
3 @prefix prov: <http://www.w3.org/ns/prov#> .
4 @prefix dc: <http://purl.org/dc/elements/1.1/> .
5 @prefix loki: <http://loki.ia.agh.edu.pl/wiki/ns#> .
6 @prefix lokipage: <{wiki_address}> . #eg. http://loki.ia.agh.edu.pl/wiki/
7 @prefix lokievent: <{wiki_address}special:lokievent#> .
8 @prefix lokiuser: <{wiki_address}user:> .
9
10 Page creation & edition. New page revision ({NewRev}) is created or edited based on
    previous page revision ({OldRev}):
11 =====
12 lokipage:({page})_{NewRev} a prov:Entity ;
13   prov:specializationOf      lokipage:({page}) ;
14   prov:wasRevisionOf         lokipage:({page}).{NewRev} ;
15   prov:wasGeneratedBy       lokievent: [created,edited]_{page}_{
    $NewRev} .
16
17 lokievent: [created,edited]_edited_{page}_{NewRev} a prov:Activity ;
18   prov:wasAssociatedWith   lokiuser: {author} ;
19   dc:description           "{comment}" ;
20   loki:whatWasDone         "{whatWasDone}" ;
21   loki:whyWasDone          "{whyWasDone}" ;
22   prov:used                lokipage: {page}_{OldRev} ,
23                             {link1} ,
24                             {link2} .
25
26 Page deletion:
27 =====
28 lokievent: deleted_{page}_{NewRev} a prov:Activity ;
29   prov:used                lokipage: {page}_{OldRev} ;
30   prov:wasAssociatedWith   lokiuser: {author} ;
31   dc:description           "{comment}" ;
32   loki:whatWasDone         "{whatWasDone}" ;
33   loki:whyWasDone          "{whyWasDone}" .
  
```

## SELECTED REFERENCES

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## INFO

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