More Service Orientation to Open Ontology Repositories

– Hets and TNTBase like to enter

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Introduction

- Key issue: how to incorporate various ongoing OOR-related software development efforts.
- Is *incorporation* what we really want?
- OntologySummit2008 Communiqué „Towards an Open Ontology Repository“:

  “The core approach for the Open Ontology Repository is a federated, **service oriented architecture**. This approach provides for distributed ontology storage, repository management and service support.”

  => OOR as loose coupled system

  => OOR as system of web services?
How much SOA is in BioPortal?

from NCBO Architecture Roadmap Report 20080424_Final
How much SOA is in BioPortal?

Many components “loosely coupled”, but all enclosed in a specific framework (Spring) of a specific platform (Java)!

SOA should facilitate service connection across frameworks and platforms!
Architecture of the heterogeneous tool set Hets

Tools for specific logics
- Text
  - Parser
    - Abstract syntax
    - Static Analysis
    - Interfaces
    - XML, Aterm
- Theorem provers
  - Rewriters
  - Conservativity and Model checkers

Logic graph
- Haskell
  - Isabelle
  - HasCASL
  - SoftFOL
  - CoCASL
  - ModalCASL
  - CASL
  - CASL-DL
  - OWL-DL

Tools for heterogeneous specifications
- Text
  - Parser
    - Abstract syntax
    - Static Analysis
    - Global Environment
    - Interfaces
    - XML, Aterm
    - WWW, GUI
- Heterogeneous development graphs
  - Heterogeneous inference engine
  - Decomposition of proof obligations
  - Management of proofs & change
  - Heterogeneous proof trees

Grothendieck logic
- (Flattened logic graph)
TNTBase

TNTBase = Subversion + Berkeley DB XML
(s. http://tntbase.org/)

TNTBase services:

- Real Versioning
- Enhanced search and indexing
- Fragment extraction
- Structural difference
- Pre- and post process scripting
  - (e.g. translation, validation, quality check, etc)
Connecting TNTBase, Hets, and BioPortal

Diagram showing the integration of TNTBase, Hets, and BioPortal through various tiers and frameworks.
Connecting TNTBase, Hets, and BioPortal

Problems:
- HETS is not implemented in Java, but Haskell
- TNTBase is not a RDBMS but XML DB
User wants to explore a fragment of a certain OWL ontology version in Common Logic

Coordinated Web Services:
1) `getOntology(Id,version).extractFragment(signature)`
2) `translate(from:OWL,to:CommonLogic)`
Complex Use Case Scenario

1) Match pairwise a set of ontologies that are in different logics
   - Logic translation: Hets
   - Matching: Falcon

2) given a set of concepts: extract those modules from these ontologies that contain synonym concepts to the input concepts.
   - Module extraction: Pellet

3) merge modules and check for consistency.
   - Module merge: Hets
   - Consistency check: SPASS

4) Present merged module as Graph
   - Ontology to Graph structure: Hets
   - Graph layout: graphviz
   - Rendering: Firefox

Many distributed services involved on different platforms and implemented in different programming languages.

SOA: Interoperable as web services
Conclusion

Observations:

- OOR-related software is usually developed for different platforms, frameworks, and programming languages.
- An OOR can take advantage of these tools in a SOA.
- Most OOR-related tools can easily extended to Web Services.
  ➔ would push OOR development and get more contributors

Coordination issues in collaborative OOR development:

- Definition web service APIs
  ➔ Analysis of use cases.