

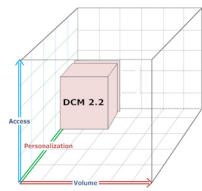
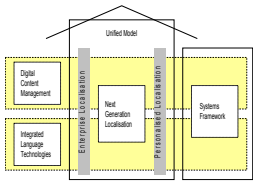
Content-driven Change Impact Determination

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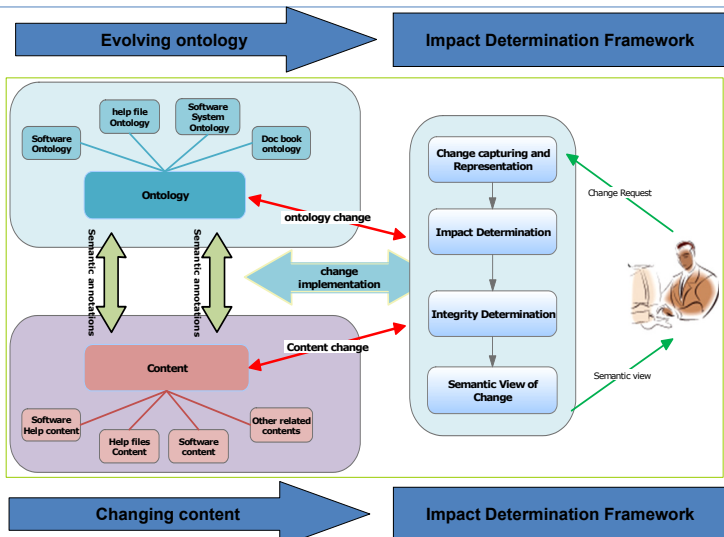
Introduction

For ontology-based systems, that are built to provide support for content-based systems and services, it is crucial to deal with the dynamically changing nature of the content. Content contains elements that correspond to concepts in a domain ontology or other ontologies. It also contains other elements that correspond to instances of the ontologies. Due to this, a change made in the content implies either a change in the structure and/or a change in the instances of the ontology.

Content-driven Changes

- Changes in content or ontologies may result lots of unseen and cascaded changes and impacts.
- The problem aggravates when content-centric systems use interrelated and interdependent multi-ontologies since the impact of a single operation may reach to multiple content artefacts and ontologies.
- This effect may propagate back to affect the instances in the content, leaving the system in a vicious circle

Framework of Impact determination



The framework depicts the different changes (Ontology change and content change) and the relationship between the content and the ontologies. It further shows the processes involved in determining impacts of changes in a dynamic environment.

1. Change Capturing and Representation

Change capturing focuses on identifying changes in the ontology and in the content.

Change capturing

Ontology models

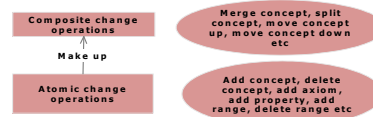
are used to formalize ontologies and identify ontology changes accurately

Subject models

are used to formalize content and facilitate the identification of content change accurately

Change representation

Representation of changes efficiently to ensure minimum impact



It has been discovered that the way the operations are organized (order and operation type) is one factor for minimizing the effects of composite change operations

2. Impact Determination

Structural impact

Changes on the structure → structural impact
add concept (application SW, SW)

Semantic impact

Changes on the semantic → Semantic impact
add disjoint(application SW, System SW)

3. Integrity Determination

Consistency and validity determination

- checks the consistency of the ontology and the content and corrects the inconsistencies or alerts the ontology engineer.
- checks the validity of the instances (annotations in this case) and corrects the invalidity or alerts the ontology engineer

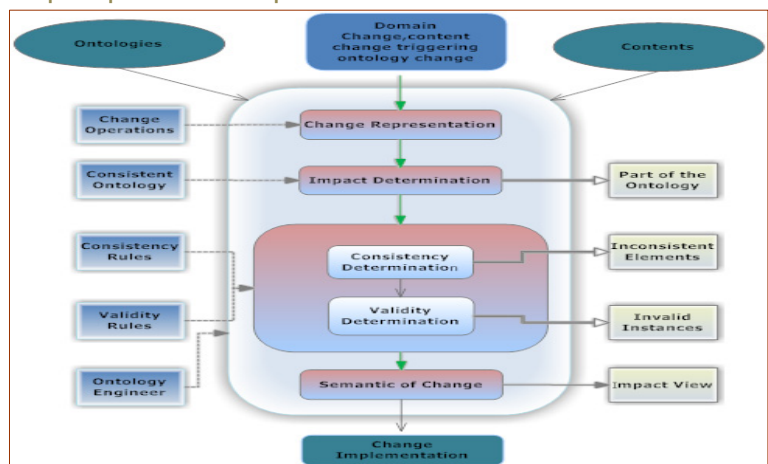
4. Semantic View of Change

Graphical representation of changes

Viewing effects of change operations graphically enables the ontology engineer to see the effects in a better way

Using Graphical Languages

Input- process- output View of the Framework



References:

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3. Qin, L., Atluri, V.: Evaluating the validity of data instances against ontology evolution over the semantic web. Information and Software Technology. 51(1)(2009) 83–97
4. Stojanovic, L.: Methods and tools for ontology evolution. PhD thesis, University of Karlsruhe (2004)