# Knoodl.com Semantic Wiki

Creating and using OWL vocabularies in a wiki

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## Agenda

What is a Semantic Wiki Building the Semantic Models Bootstrapping COI based vocabularies With WordNet context and description COI vocabularies in a semantic Wiki OWL models Semantic Wiki

## Wiki

A website where anyone can edit the content of the site easily Wiki's are now established as mainstream technology for collaboration On the world wide web Within the enterprise Also managing a lot of content Many kinds of files can be linked to or embedded into the wiki

#### Wiki Drawbacks

- Information is organized in a manner similar to a file system
  - It can be very difficult to find documents on a wiki after the wiki reaches a certain size
  - Just like the file system on your personal computer
    - Except: you organized everything on your laptop
    - Everyone else organized content on the wiki

#### Wiki Drawbacks

- Even though wikis are collaboration and content management systems
  - There is no information model that can be used to manage the content
  - Wikis contain structured, unstructured and others sorts of content

#### Semantic Wiki 1.0

- A wiki based tool for building formal semantics
  - Community based, collaborative
  - Both structured and unstructured content is managed in the same collaborative framework
  - Imports and exports OWL
  - Accessible by non domain experts

#### Semantic Wiki 2.0

A wiki that enables any content, structured and unstructured, to be "tagged" so the content can be queried and reasoned over

 Tagged means adding content to an OWL based ontology

An integrated and queryable knowledgebase
 Query is very different from search
 Queries can be embedded into the wikitext

# Wiki Vocabularies

#### Wiki Vocabularies

The semantics for any domain are created within the wiki as an OWL vocabulary

 Project management, event management, social networks, logistics, acquisition, bioinformatics, CRM

Multiple domain models might be available concurrently

Once the vocabulary is created and published the semantics can be leveraged to achieve

- Interoperability
- Integration
- Discovery
- Semantic matching
- Semantic Wikis

# Bootstrapping COI Vocabularies in a Semantic Wiki

## **Bootstrapping Ontologies**

#### Step 1: Start at the bottom

Build vocabularies from existing physical systems

#### Step 2: Collaborate

- The community can document, review, discuss and change
- Human-readable documentation <u>and</u> formal ontology definition

#### Step 3: Share and Use

- People access the vocabularies through web browsers to view the natural language documentation and navigate formal relationships
- Machines can download OWL ontologies and use for automated reasoning

#### Step 1: Start at the Bottom

Bootstrap from existing systems and models

- Import the schemas from databases to start building the terms in the vocabulary
- Messages, Excel, metadata repositories

Use a semantically enabled matching tool to associate semantics with the bootstrapped terms

- Combine the terms used with knowledge bases to discover and assign semantics to information
- Store the terms, definitions and semantics in vocabularies
- Built-in knowledge base is WordNet, but can also use custom domain-specific

## Vocabulary Management

#### Step 1: Extract semantics from existing data

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#### Vocabulary Management

Step 2: Create bootstrapped vocabulary



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#### Step 2: Collaborate

Creating vocabularies is naturally collaborative

- identify, define, document, standardize, edit, review, audit
- Involve the right people
- Reuse other vocabularies: benefit from the experts
- Community-oriented
  - A community consists of members that share experience, expertise and interest in a particular domain
  - Communities manage memberships, content, and access privileges
- Semantic Wiki
  - Captures the efforts of many over time
  - Adds semantic richness to wiki markup language

## Vocabulary Development



#### Step 3: Share and Use

#### Machines use ontologies

- The vocabularies are represented with formalism that are rich and precise enough for software
- Vocabularies can be downloaded as OWL ontologies
- People use natural language
  - (Most) People don't understand XML, OWL, RDF, or even HTML
  - People understand text, images, tables, charts, links
  - Follow existing web paradigms that people are comfortable with (browsers, links, pages, addresses, search, discussions, etc.)
- Keep the two parts together
  - People have to understand the vocabulary to maintain and use it
  - If parts are kept separate, more difficult to diverge
  - It's simply easier this way! (Manually aligning documentation with models is too much work)



# Semantic Wiki

#### Knoodl.com

Uses the Wiki paradigm to enable the development and use of OWL vocabularies by Communities of Interest (COIs)

W3C-based OWL editor, registry/repository

Facilitate sharing

#### Knoodl.com is ...

An internet application where people can collaborate with others in their communities of interest to

- Create, edit, share and find
- Vocabularies / ontologies
- OWL Repository
  - Free, but licensing controlled by COI's
- Institutional Knowledge Management
  - Users contribute content and benefit from the content
  - Vocabularies capture much of the institutional knowledge of an enterprise or community
  - Gain value over time

#### Knoodl.com

Knoodl is a collaborative framework

We need three groups of stakeholders contributing to the description and context of the domain

- Businesspeople
- Technical people
- Data people

 Knoodl provides the features for the business people to participate

#### Vocabulary Management

#### Evolve vocabulary collaboratively

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#### Vocabulary Management Use vocabulary to understand

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## Semantic Wiki

- Incorporate formal semantic technology into the preeminent collaboration technology
  - Features that facilitate the construction of formal semantic models
  - Features that make it simple and even automated to some extent to "link" facts to one or more models
    - Structured
    - Unstructured

## Semantic Wiki

- A collaborative tool to build integrated knowledge bases
  - Formal queryable information stores
  - Context of the queries is determined by the structure of the ontology
    - Axioms
    - Relationships
    - Assertions
  - Facts are captured as RDF
  - Integrates structured and unstructured content

## Semantic Tagging

- Browser plug in facilitates tagging any content while browsing any we site to any collection of semantic models
- Form based fact creation
  - Form is generated from the ontology
- Markup text or data
  - Highlight text or data and dynamically add the markup to the knowledgebase as facts
- Semantic models are selected from the registry at knoodl.com

# Thank You