

INFS3101/7100 Ontology and the Semantic Web

Module 14 Ontology Servers

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Last lecture: Key Terms



- ❖ **Common logic** is a language to express **predicates**. Can map OWL Full to CL. But CL is richer than OWL Full, so can be used to extend OWL. But need to be careful, since CL open to paradox.

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What is an Ontology Server

- ❖ An ontology is a complex information object
- ❖ Information systems are used to manage complex information objects
- ❖ An information system intended to manage an ontology is called an **ontology server**
- ❖ The database core of an ontology server is called an **ontology repository**
- ❖ Closely related to Computer-Aided Software Engineering tools

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An Ontology Server is Used

- ❖ **At design time**
 - Assists the ontology engineers in the design and construction of the ontology
- ❖ **At commit time**
 - When a player wants to join an exchange, they need help to commit to the ontology
- ❖ **At run time**
 - Mediates the exchange of messages

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Design Time Requirements

- ❖ Store fragments and their developing relationships
- ❖ Check integrity constraints without preventing violations
- ❖ Certify that an ontology satisfies all constraints
- ❖ Tools to support abstract data types and metaproperties
- ❖ Visualise aspects of the ontology
- ❖ Help the user find relevant parts of the ontology (ontology browsing)
- ❖ Manage imported ontology modules
- ❖ Version control: multiple versions at the same time
- ❖ Documentation
- ❖ Publishing in computer-processable forms

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Commit Time Requirements

- ❖ Tools to help a new player align their local conceptual models with the ontology
- ❖ Mediate among data models
- ❖ Mediate among natural languages
- ❖ Find relevant objects in ontology
- ❖ Present minimal coherent aspects
 - All object on which desired objects depend
- ❖ Allow player to subscribe to aspect of ontology
- ❖ Publish notifications of new versions of aspect

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RunTime Requirements

- ❖ Maintain directories of players, roles and objects
- ❖ Validate messages as conforming to particular versions of the ontology
- ❖ Act as a broker for certain kinds of activities
 - Eg auctions
- ❖ Host virtual enterprises
- ❖ Maintain archives of messages

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Repository

- ❖ Ontology model represented in a metamodel
 - MOF, RDFS, Common Logic
- ❖ Repository schemas generated from metamodel
 - Relational DB
 - OODB
 - RDF triple store
 - Oracle v10.2 has one
- ❖ Ontology not too large, but is complex

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Reasoning Capability

- ❖ Translate to and from transport representations like XML
- ❖ Execute queries like SQL
- ❖ Navigate classification hierarchies like Yahoo!
- ❖ Satisfiability and subsumption checking like description logics
- ❖ Maybe even a full predicate calculus theorem prover

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Summary: Key Terms



- ❖ **Ontology server** needed at design time, commit time, run time. Significant information system in its own right. Built on **repository**. Needs **reasoning capability**.

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Resources

- ❖ **Essential**
 - Nil
- ❖ **Further**
 - Starlab ontology server (on web site)
 - Stanford KSL ontology server project (on web site)

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