

Chapter 4

OWL

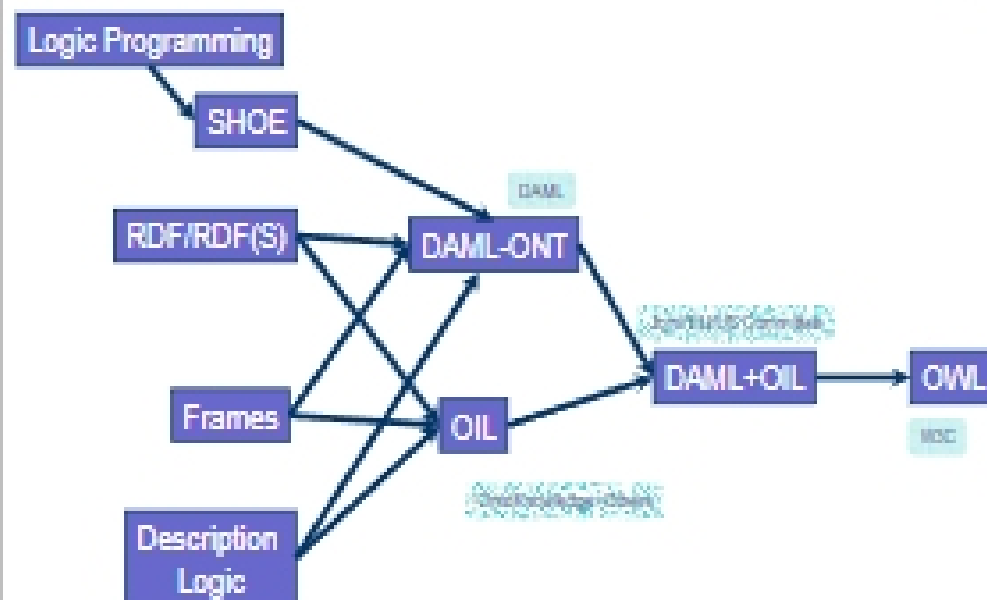


Based on slides from Grigoris Antoniou and Frank van Harmelen

Outline

1. A bit of history
2. Basic Ideas of OWL
3. The OWL Language
4. Examples
5. The OWL Namespace
6. Future Extensions

The OWL Family Tree



A Brief History of OWL: SHOE

- Simple HTML Ontology Extensions
- Sean Luke, Lee Spector, and David Rager, 1996
SHOE allows World-Wide Web authors to annotate their pages with ontology-based knowledge about page contents. We present examples showing how the use of SHOE can support a new generation of knowledge-based search and knowledge discovery tools that operate on the World-Wide Web.
- Supported adding "semantic" tags defined in an ontology plus prolog-like rules to web pages.

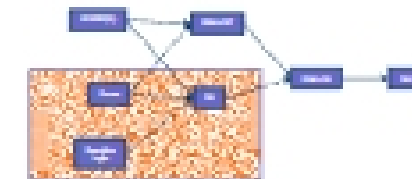
A Brief History of OWL: SHOE

```
<META HTTP-EQUIV="Instance-Key"
CONTENT="http://www.cs.umd.edu/~george"> <USE-ONTOLOGY "our-
ontology" VERSION="1.0" PREFIX="our" URL="http://ont.org/our-
ontL.html">
```

```
...
<CATEGORY "our.Person">
<RELATION "our.firstName" TO="George">
<RELATION "our.lastName" TO="Cook">
<RELATION "our.marriedTo" TO="http://www.cs.umd.edu/~helena">
<RELATION "our.employee" FROM="http://www.cs.umd.edu">
```

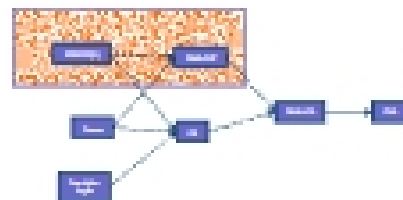
A Brief History of OWL: OIL

- Developed by group of (largely) European researchers (several from EU OntoKnowledge project)
- Based on frame-based language
- Strong emphasis on formal rigour.
- Semantics in terms of Description Logics
- RDFS based syntax



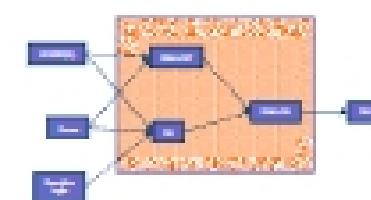
A Brief History of OWL: DAML-ONT

- Developed by DARPA DAML Program.
 - Largely US based researchers
- Extended RDFS with constructors from OO and frame-based languages
- Rather weak semantic specification
 - Problems with machine interpretation
 - Problems with human interpretation



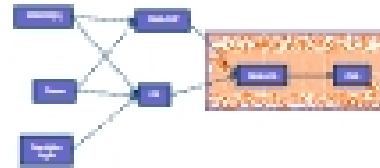
A Brief History of OWL: DAML+OIL

- Merging of DAML-ONT and OIL
- Basically a DL with an RDFS-based syntax.
- Development was carried out by "Joint EU/US Committee on Agent Markup Languages"
- Extends ("DL subset" of) RDF
- Submitted to W3C as basis for standardisation
 - Web-Ontology (**WebOnt**) Working Group formed



A Brief History of OWL: OWL

- W3C Recommendation (February 2004)
- Based largely on the March 2001 DAML+OIL specification
- Well defined RDF/XML serializations
- Formal semantics
 - First Order
 - Relationship with RDF
- Comprehensive test cases for tools/implementations
- Growing industrial take up.



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2. **Basic Ideas of OWL**
3. The OWL Language
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Requirements for Ontology Languages

- **Ontology languages allow users to write explicit, formal conceptualizations of domain models**
- The main requirements are:
 - a well-defined syntax
 - efficient reasoning support
 - a formal semantics
 - sufficient expressive power
 - convenience of expression

Expressive Power vs Efficient Reasoning

- There is always a tradeoff between expressive power and efficient reasoning support
- The richer the language is, the more inefficient the reasoning support becomes
- Sometimes it crosses the *noncomputability* border
- We need a compromise:
 - A language supported by reasonably efficient reasoners
 - A language that can express large classes of ontologies and knowledge.