UMBC

AN HONORS UNIVERSITY IN MARYLAND

F-OWL: *An OWL Reasoner in Flora-2*

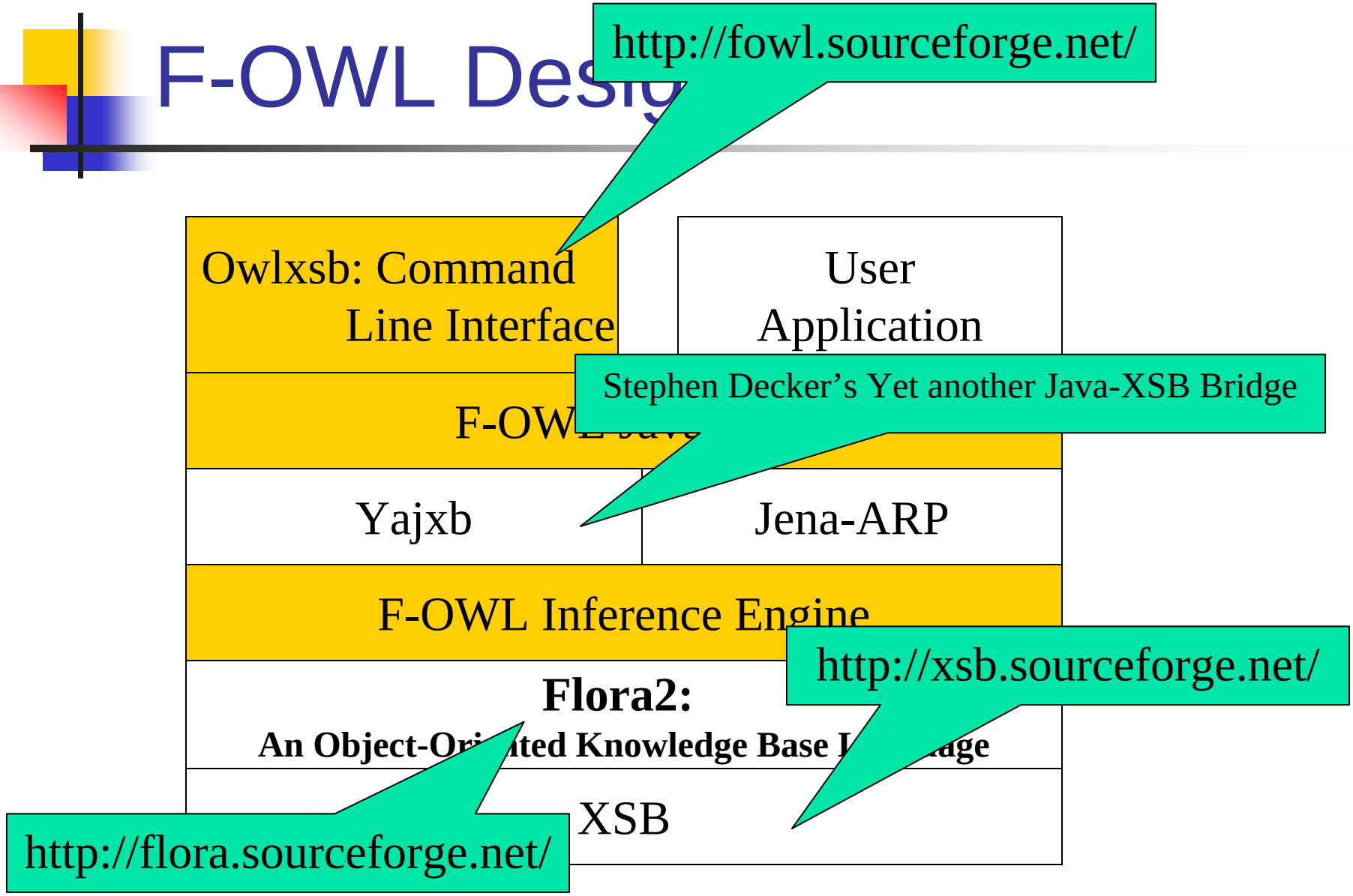
Youyong Zou, Harry Chen,
Tim Finin, Lalana Kagal

http://fowl.sourceforge.net/

Feature

- Supports RDF and OWL-Full
- Supports RDF/N-Triple query
- Supports Dynamic Import
- Provides a Java API
- Tested with the RDF and OWL test cases

F-OWL Design


http://fowl.sourceforge.net/
Owlxsb: Command Line Interface
User Application
Stephen Decker's Yet another Java-XSB Bridge
Yajxb
Jena-ARP
F-OWL Inference Engine
http://xsb.sourceforge.net/
Flora2:
XSB
http://flora.sourceforge.net/

F-OWL Inference Engine

- A set of rules that reason over the data model of RDF-S & OWL
  - Implemented in Flora-2
- A set of rules that map XML DataTypes into XSB terms
- A set of rules that perform ontology consistency checks
- A set of rules that “glue” together the upper Java API calls to the lower layer Flora-2/XSB rules

F-OWL Java API

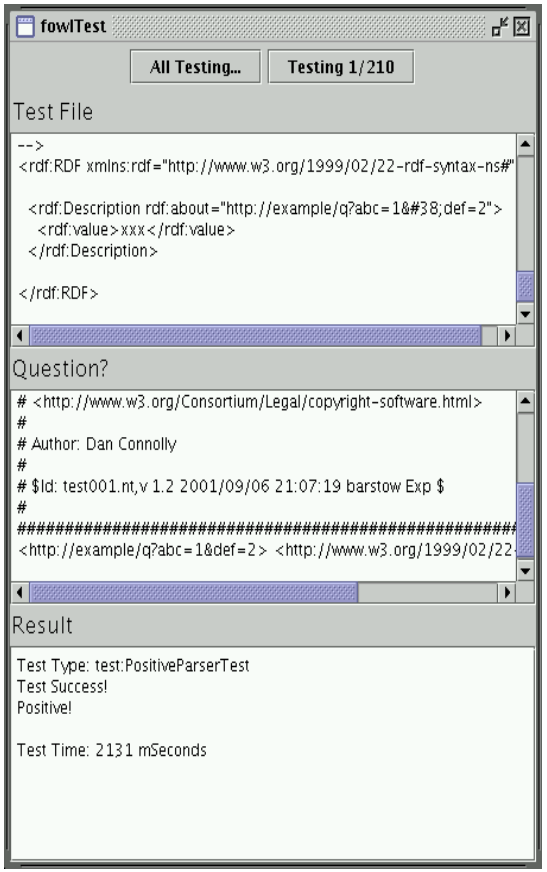
- Core class: fowlEngine
  - Public method
    - init(): starts XSB engine
    - startFlora(): loads Flora-2 modules
    - startFOWL(): loads F-OWL modules
    - rule(): executes a specified rule
    - load(): imports OWL(RDF/XML) from a specified URI
    - query(): execute N-Triple query

owlxsb: F-OWL's CLI

- Users can
  - import OWL docs into the KB
  - modify stored triples
  - execute queries over the stored N-Triples
  - execute RDF/OWL test cases
  - manage Namespace mapping table
  - … also access f-owl documentation

“I hate CLI” --> I want GUI

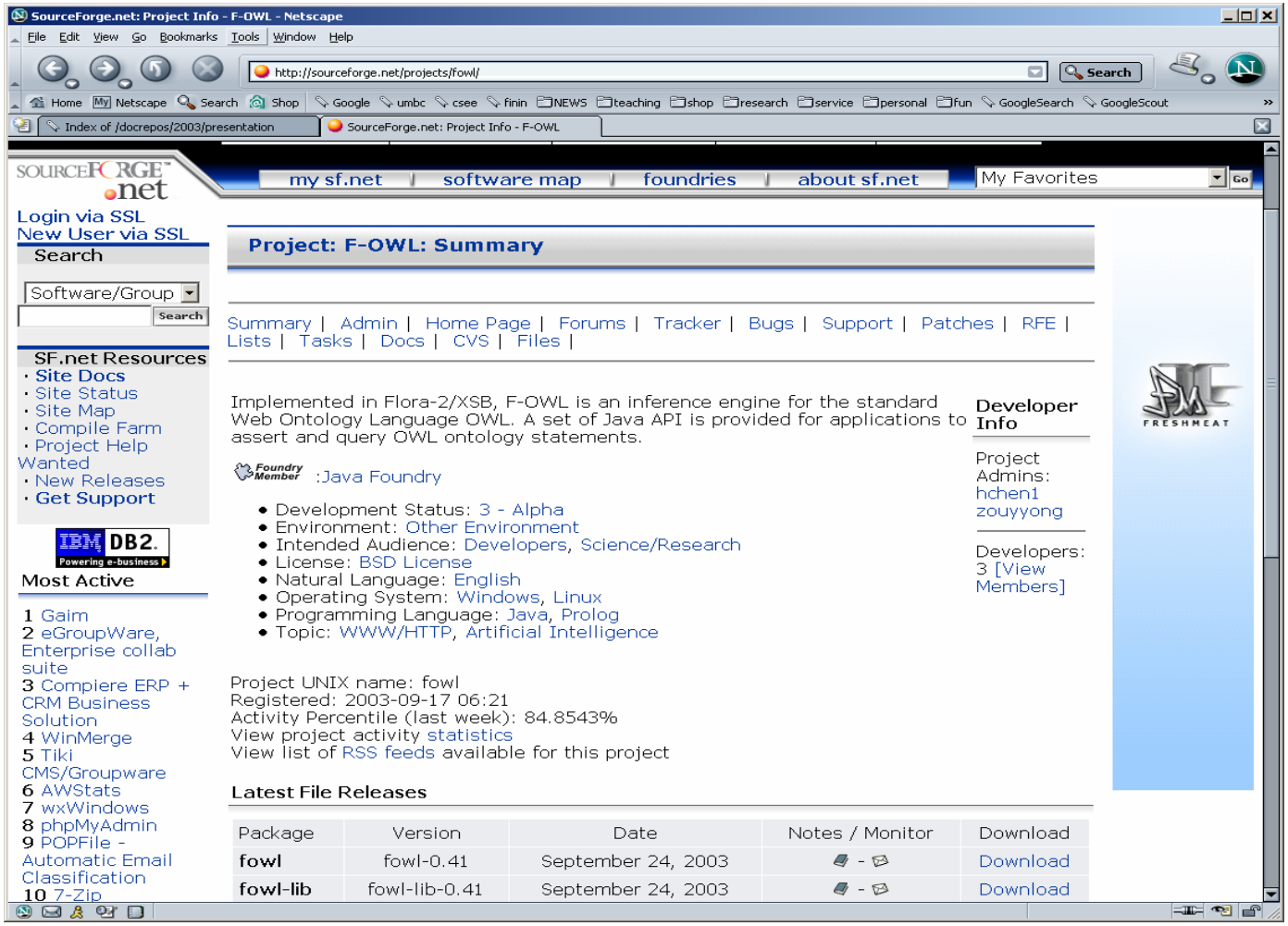
- Read & parse RDF/OWL Manifest files
- Fetch RDF/OWL test files at runtime
- Extensive log report



F-OWL on Sourceforge

http://fowl.sourceforge.net/

F-OWL is an open source project hosted on sourceforge



F-OWL tests “Test Cases”

- Use of OWL Namespace: *Check OWL Syntax*
- Entailment Tests: *Load Premises file, Prove Conclusion file is TRUE*
- Non-Entailment Tests:*Load Premises file, Prove Conclusion file is FALSE*
- OWL for OWL Tests: *Prove conclusion is TRUE*
- Consistency Tests: *Load the file, Run consistency checker, Prove the file can be satisfied.*
- Inconsistency Tests: *Prove the file cannot be satisfied via consistency checker.*
- Import Entailment/Level Tests: *load imported ontology, check for import loop!*

Test Results

- Published at the W3C web site

  http://www.w3.org/2003/08/owl-systems/test-results-out.html

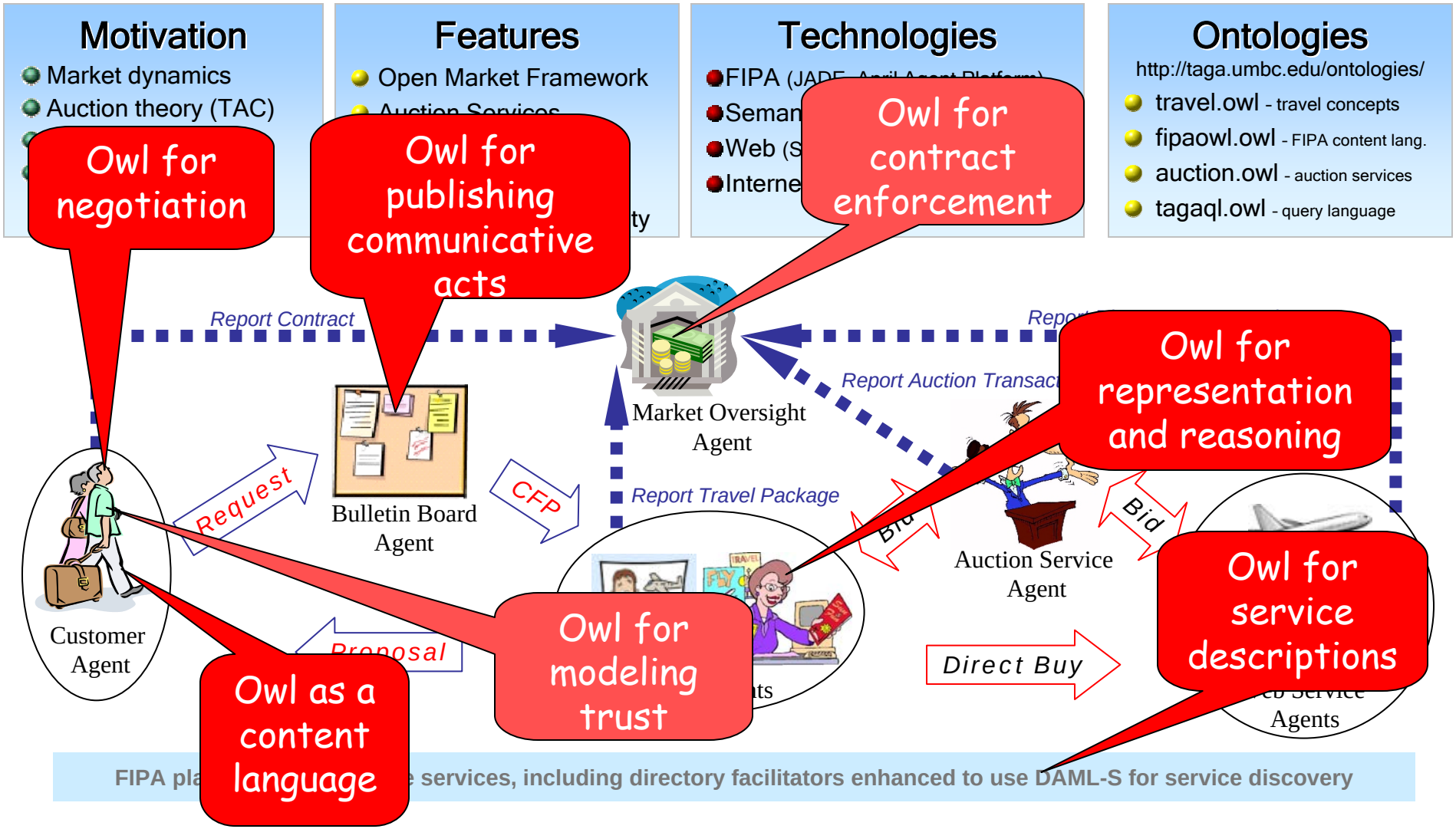
- F-OWL fails on:
  - Some large test files (e.g., food and wine)
  - OWL DL Files with Complex XSD datatype:

    for example: “invR-N-times-M-to-1”

Uses…

- F-OWL is / will be used in four Ph.D. dissertations at UMBC
  - Pervasive computing (Harry Chen)
  - Policy language (Lalana Kagal)
  - OWL+Bayesian reasoning (Zhongli Ding)
  - Multiagent systems (Youyong Zou)
- Motivation: all need an OWL reasoner as part of a hybrid reasoning system
- Prolog provides a good host environment

Travel Agent Game in Agentcities



http://taga.umbc.edu/

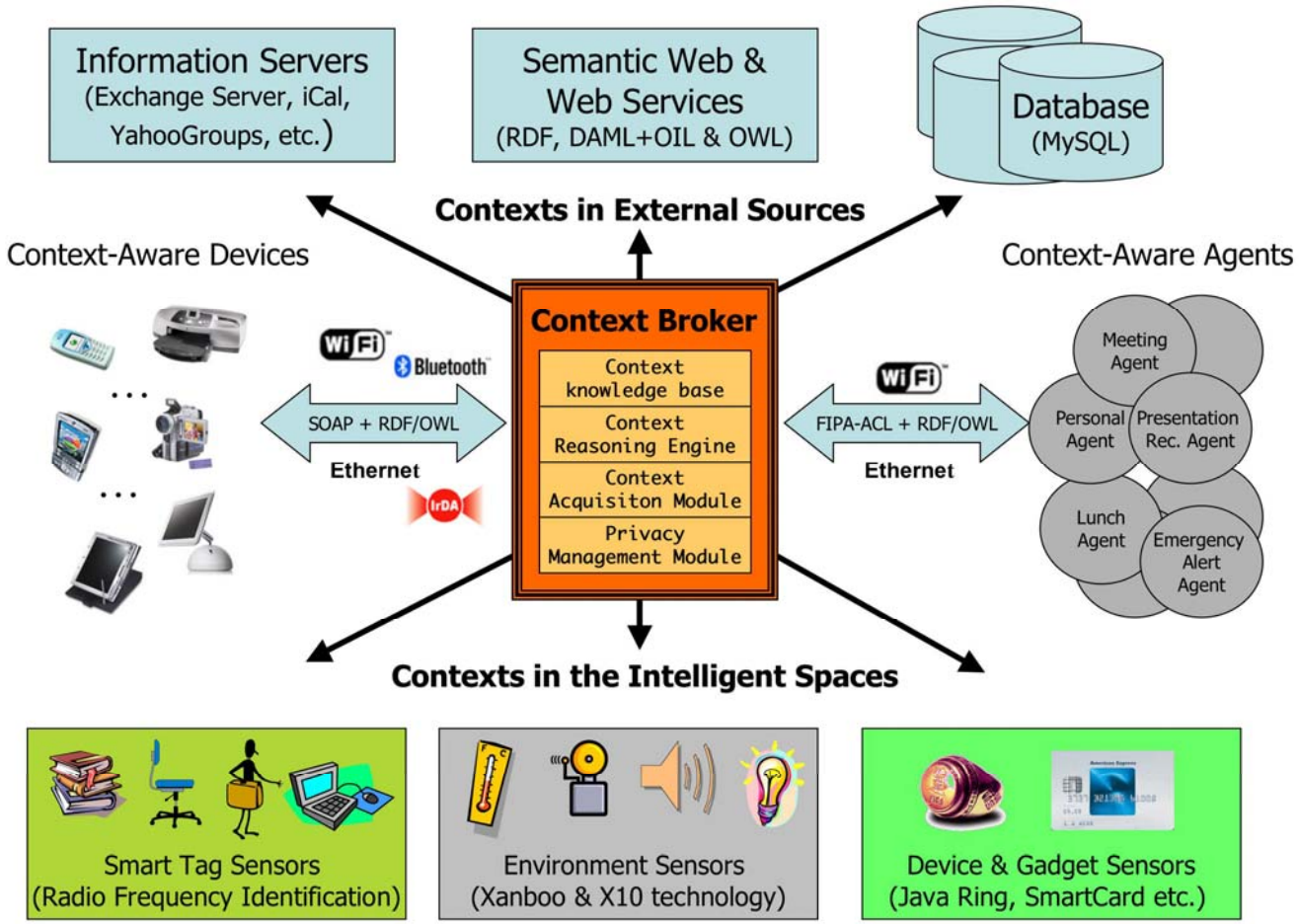
礼 Rei Policy Language

- A declarative policy language for describing policies over actions
- Based on deontic concepts (permission, prohibitions, obligations and dispensations) and speech acts (delegate, request, etc.)
- Represented in RDF and OWL
- Current policy reasoner in XSB with a custom policy IDE in Eclipse

UMBC Cobra

OWL usage

- Ontologies
- Content language
- F-OWL reasoner
- REI policy language
- DAML-Time components



http://cobra.umbc.edu/

Bayes OWL

- Probabilistic extension of OWL to support uncertain ontology representation and reasoning
- Approaches
  - Extend OWL for probabilistic annotation
  - Translate OWL ontology to Bayesian network (OWL-BN)
  - Probabilistic mappings between individual OWL-BN
  - Treat ontology reasoning (within and across ontologies) as Bayesian inference
- Plan for next year
  - Preliminary investigation on probabilistic concept mapping between OWL-BNs

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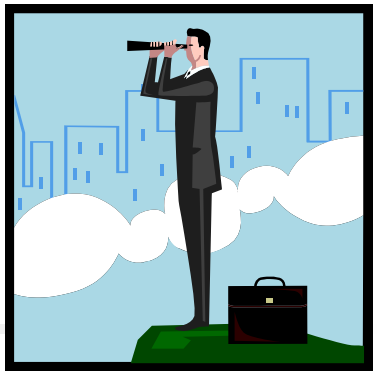
Future Work



- Better Support XSD data types
- Include additional rules to reasoning over OWL-Full
- Provide Web-base GUI to F-OWL
- Support additional query languages
  - RDQL/RQL
- Storing triples in MySQL
- Optimizations