

Agent Architecture based on Semantic Knowledge Model



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Agent Technology Roadmap: Current MAS – lack of Internal Agent Knowledge Model, lack of interconnection with semantic web results (knowledge model representations) and commercial standards

MAS Standards: FIPA, MASIF

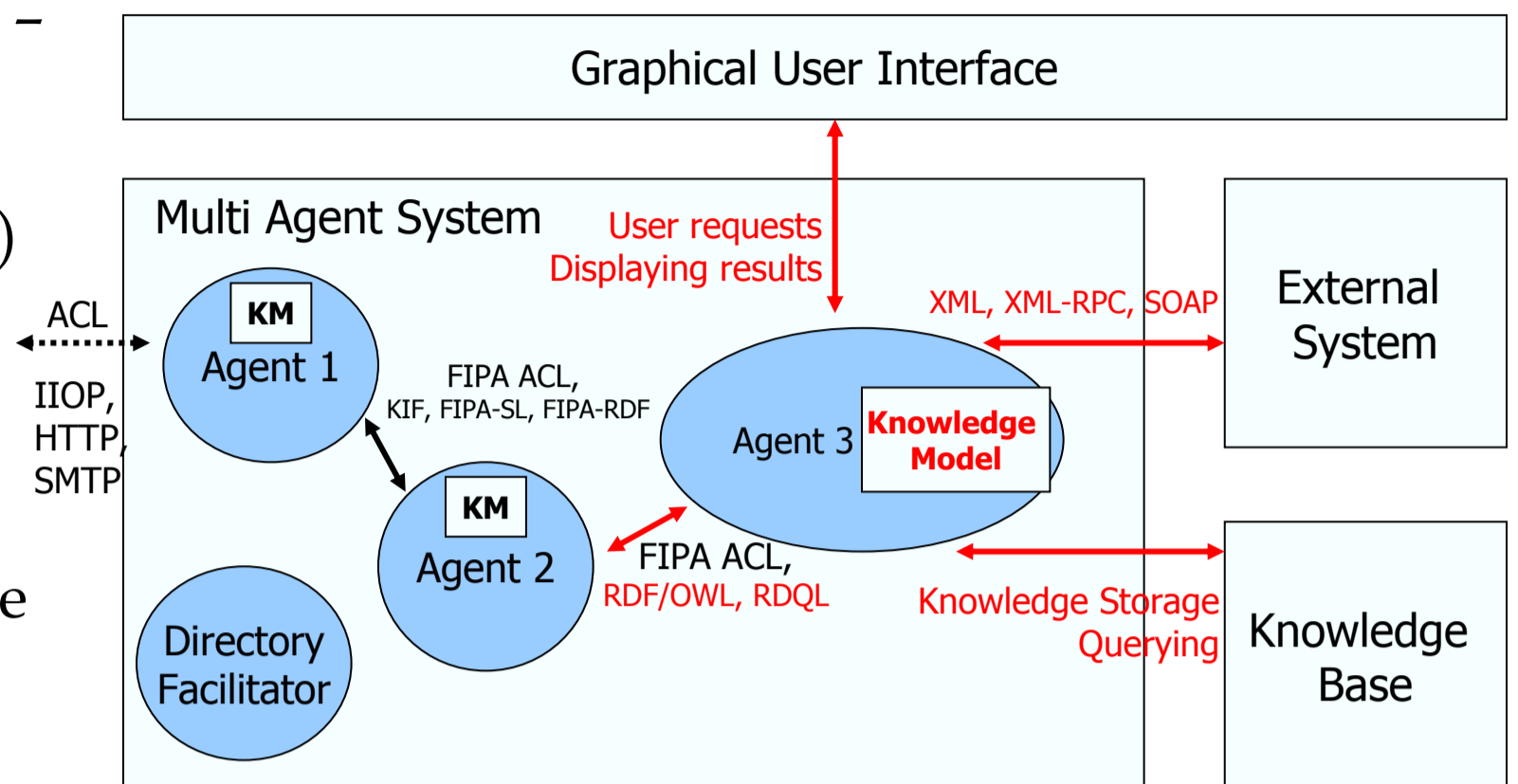
- Agent communication, agent platforms
- No standards for internal agent knowledge model with available implementations

JADE Agent System

- Support for ontologies based on FIPA-SL
- No Query engine, No Storage, No Inference

Ontologies in Semantic Web

- Knowledge Representation
- OWL-DL - Description Logic compatible
- Query and Storage Engines available
 - RDF, OWL, RDQL based



Used Technology

- RDF, OWL, RDQL
- XML, XML-RPC
- Java, MAS

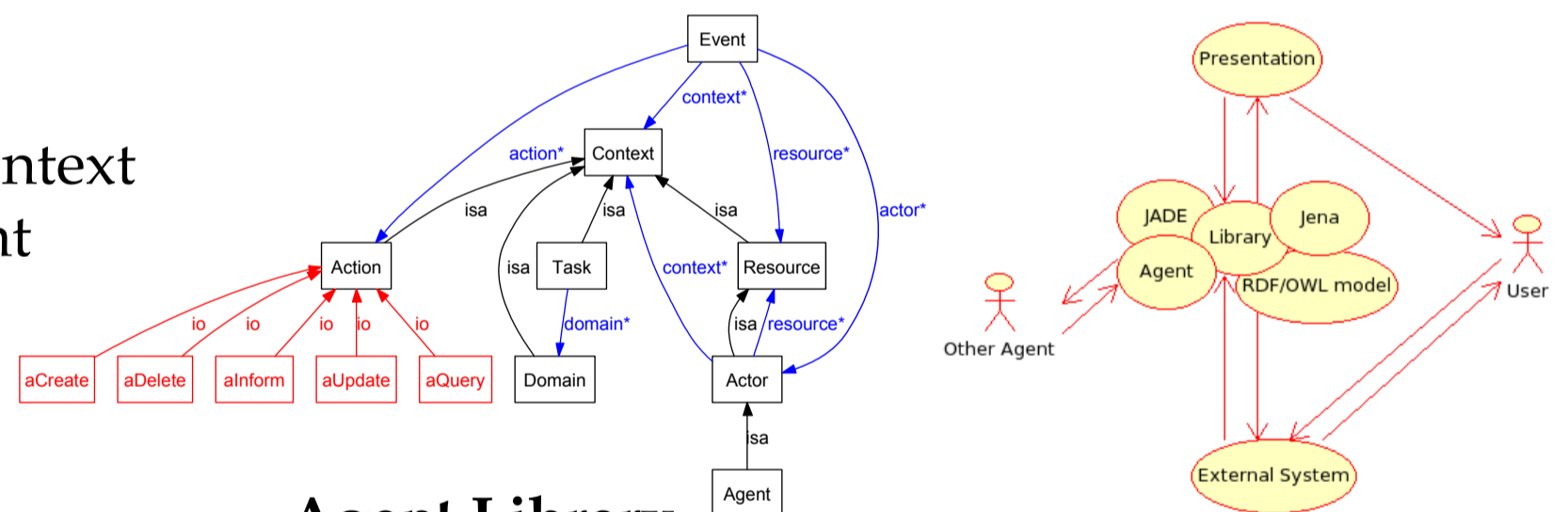
Used Tools

- JADE
- Jena
- Protégé



Agent Knowledge Model

- Events, Resources, Actions, Actors, Context where actors need to be modeled
- Described by Description Logic (compatible with OWL-DL), Graph Representation
- Actor Context updating function/algorithm (Actor Environment State)
- Resources updating function/algorithm (result of fulfilled actor goals)



Software Development Methodology

- **Knowledge Modeling:** Extending Model with Protégé Editor following CommonKADS models
 - Organizational or Environment Model
 - Task Model
 - Agent or Actor Model

Results

- Ontology in Protégé exportable to OWL
- Concrete Algorithms actors' context and resources updating
- **System Design:**
 - UML Diagrams for concrete Domain
 - Use Case, Sequence and Class Diagram

Agent Library

- Support for OWL based Agent Knowledge Model
- Support for XML-RPC connection to receive event and send plain XML
- Support for Presentation of Ontological Knowledge (RDF/OWL => plain XML + XSL => HTML)
- Support for agent communication using FIPA ACL with OWL and RDQL as content languages
- JADE and Jena Integration
- Available on JADE official website to MAS community (year 2005 – 577 downloads)

JADE		Java Agent Development Framework		The latest official version is JADE 3.3	
an Open Source platform for peer-to-peer agent based applications					
description & value	community & developers	JADE board	application & business	papers & resources	news
faq	mailing lists	add-ons & 3rd party sw	bugs & suggestions	to do list	source code
sections	AgentOWL	?	Jan 2005	tested with JADE version 3.2	PhD student at Institute of Informatics SAS, Bratislava, Slovak Republic.
<ul style="list-style-type: none"> • faq • mailing lists • bugs & suggestions • to do list • source code (NEW!) 					