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mobile public employees*

Experiences with Using Protégé in a Knowledge Management Application: The Pellucid Study

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Overview

1. The Pellucid System
2. Generic Ontology
3. Contact Ontology
4. Document Ontology
5. Deployment Module
6. Experiences Using Protégé
7. Future Work and Open Questions





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The Pellucid System

- **Pellucid aims to enhance knowledge management for public employees.**
 - It is developing a customisable software platform ...
 - ... which is based on software agents ...
 - ... and which will be put into place at three pilot sites (local or regional governments in Italy and Spain).
- **The scope of Pellucid**
 - Pellucid is concentrating on ‘experience management’
 - The innovation lies in relating experience management to the working context.
- **The Pellucid System provides:**
 - Access to relevant documents, contacts and other advice
 - It is also able to offer advice spontaneously as well as respond to request for help

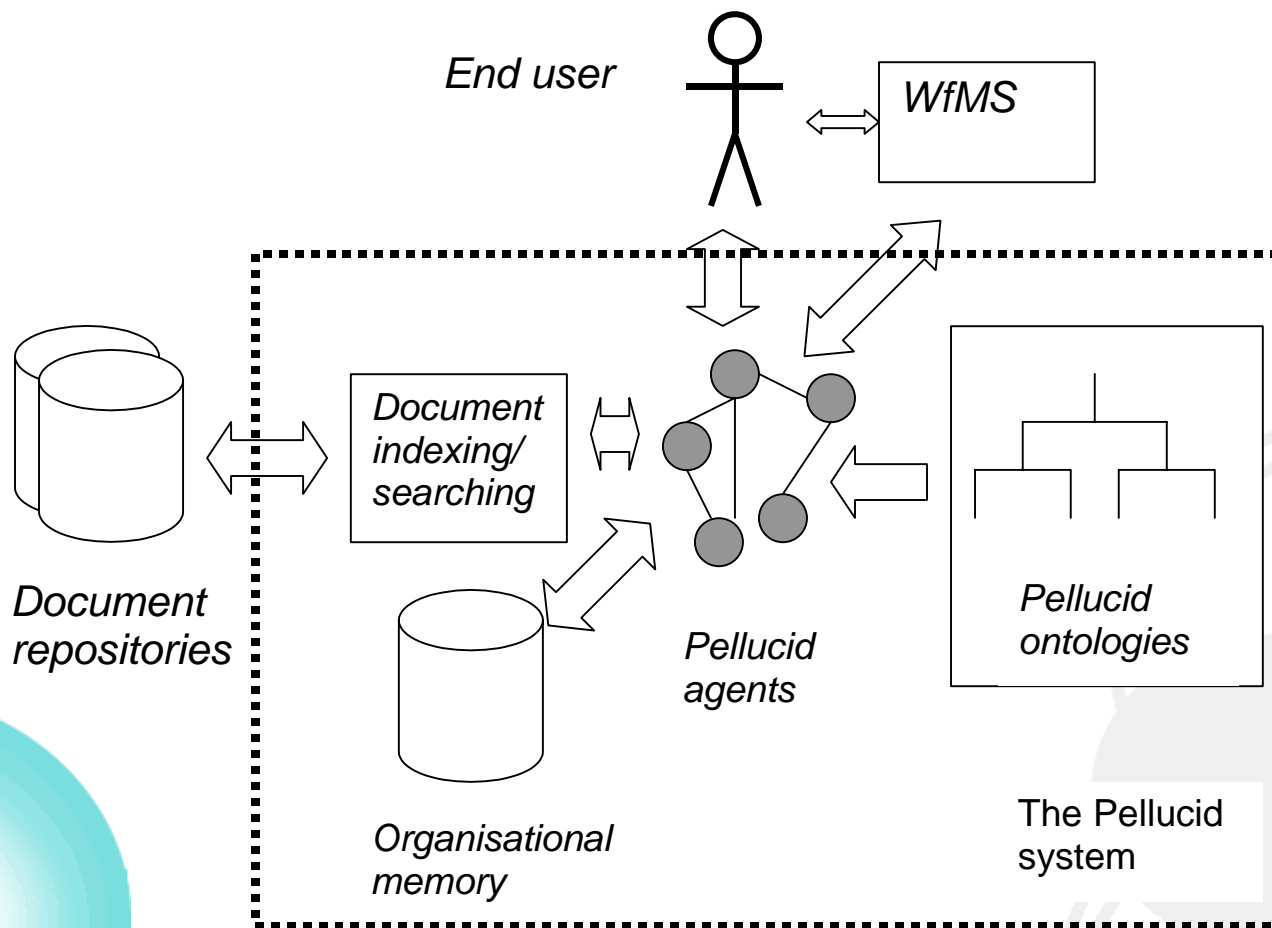




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The Pellucid System Conceptual View

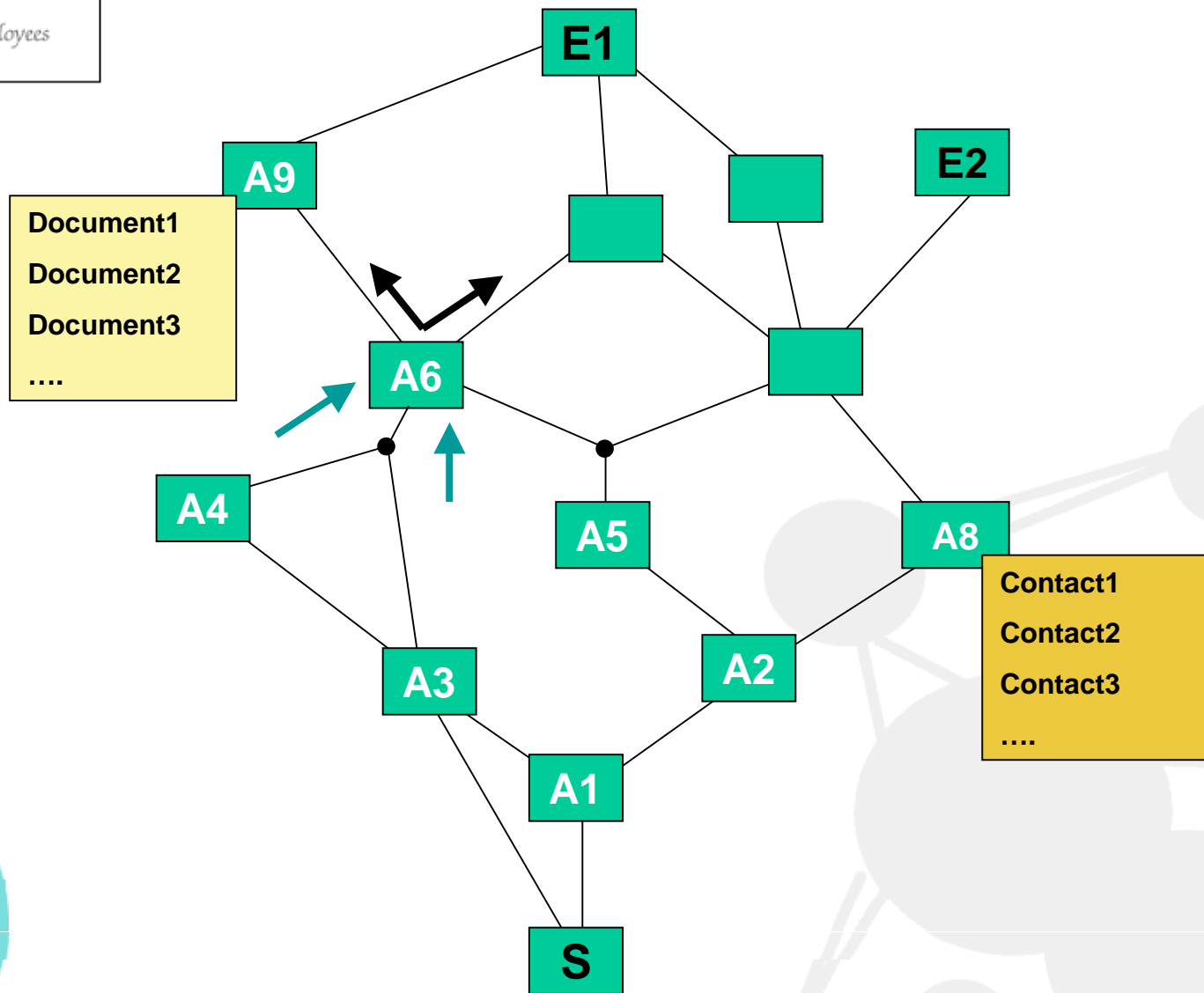




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Workflow-Based Knowledge Management





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Pellucid Agents

- **Interaction Layer (IL)**

- The Personal Assistant Agent (PAA)

- **Process Layer (PL)**

- The Monitoring Agent (MA)
- The Role Agent (RA)
- The Task Agent (TA)
- The Capitalization Agent (CA)

- **Access Layer (AL)**

- The Information and Search Agent (ISA)





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Organisational Memory

- Store all relevant knowledge gathered, created and accumulated during the system life cycle
 - Ontologies and instances
 - Indexes
- The technology – object database
 - Ontology instances stored as objects using JDO (Java Data Objects)
 - Lucene as text indexing engine



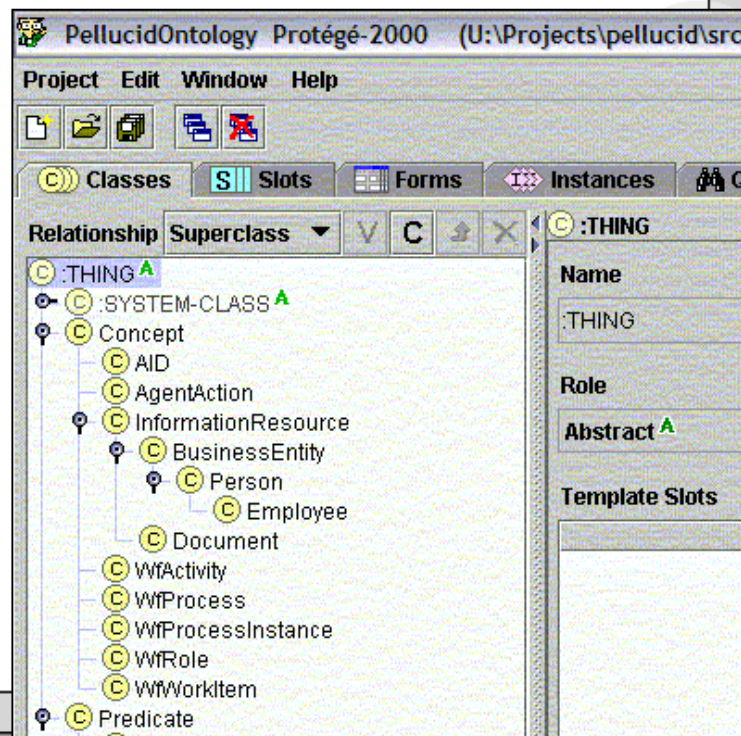


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Ontologies

- **Ontology = formal conceptualisation of a domain**
 - CLASSES of things
 - PROPERTIES they have
- **Why use an ontology?**
 - Allows structured communication of knowledge
 - Guarantees mutual understanding
- **Ontologies are basis for agent communication**
 - JADE agents talk in FIPA-SL with user-defined ontologies.

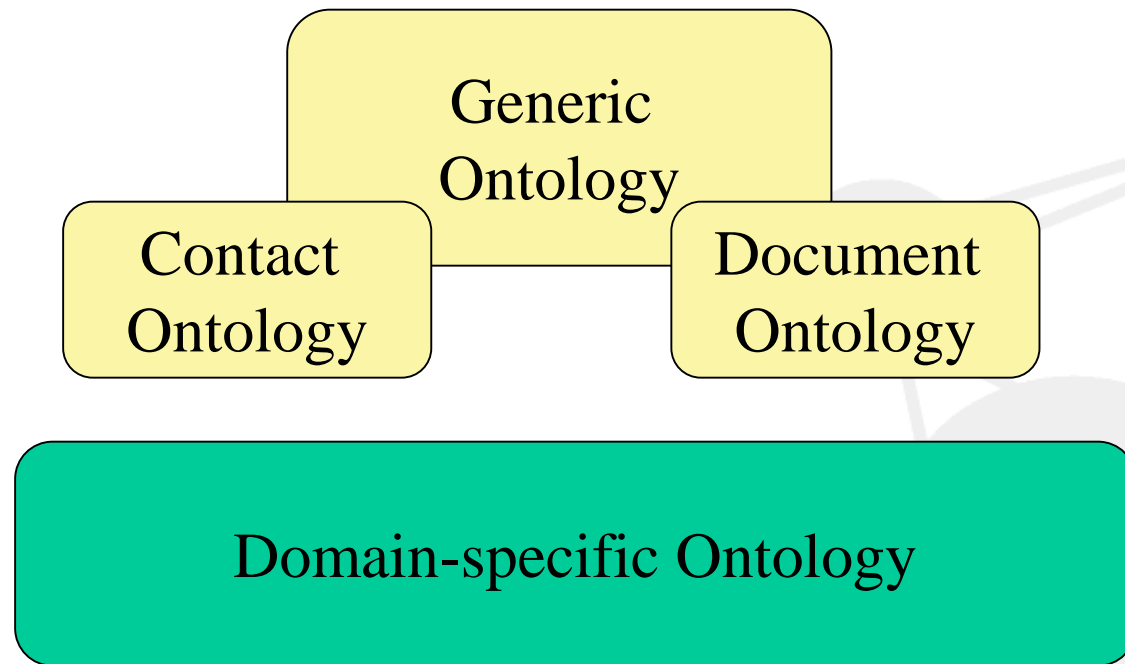




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Ontologies

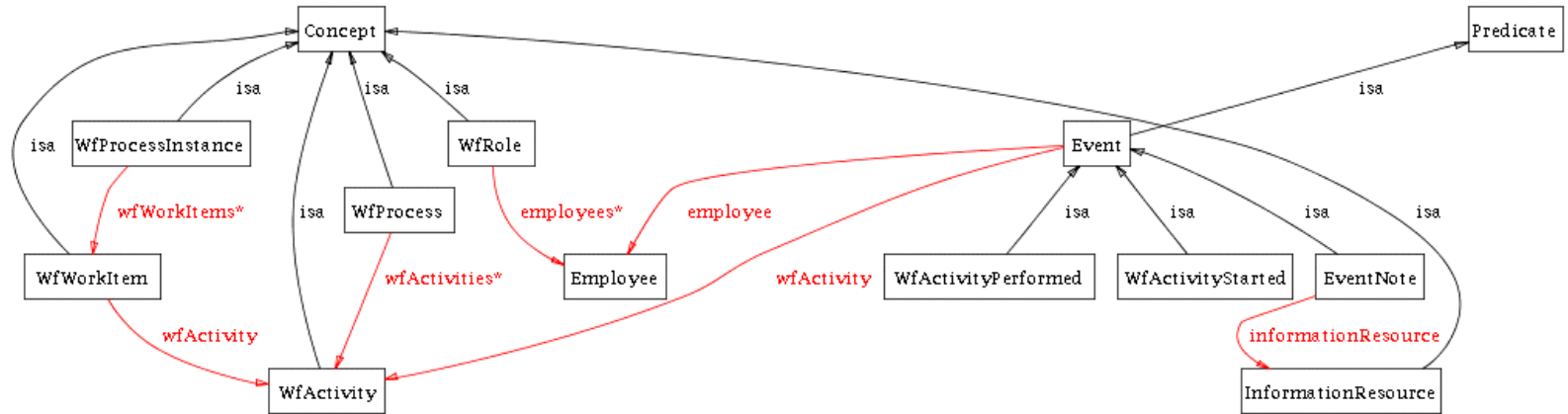
- Generic ontology provides core concepts
- Extended into Contact and Document ontologies
- Support extension into Domain-Specific ontologies





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Generic Ontology



Ontologies in Pellucid consist of:

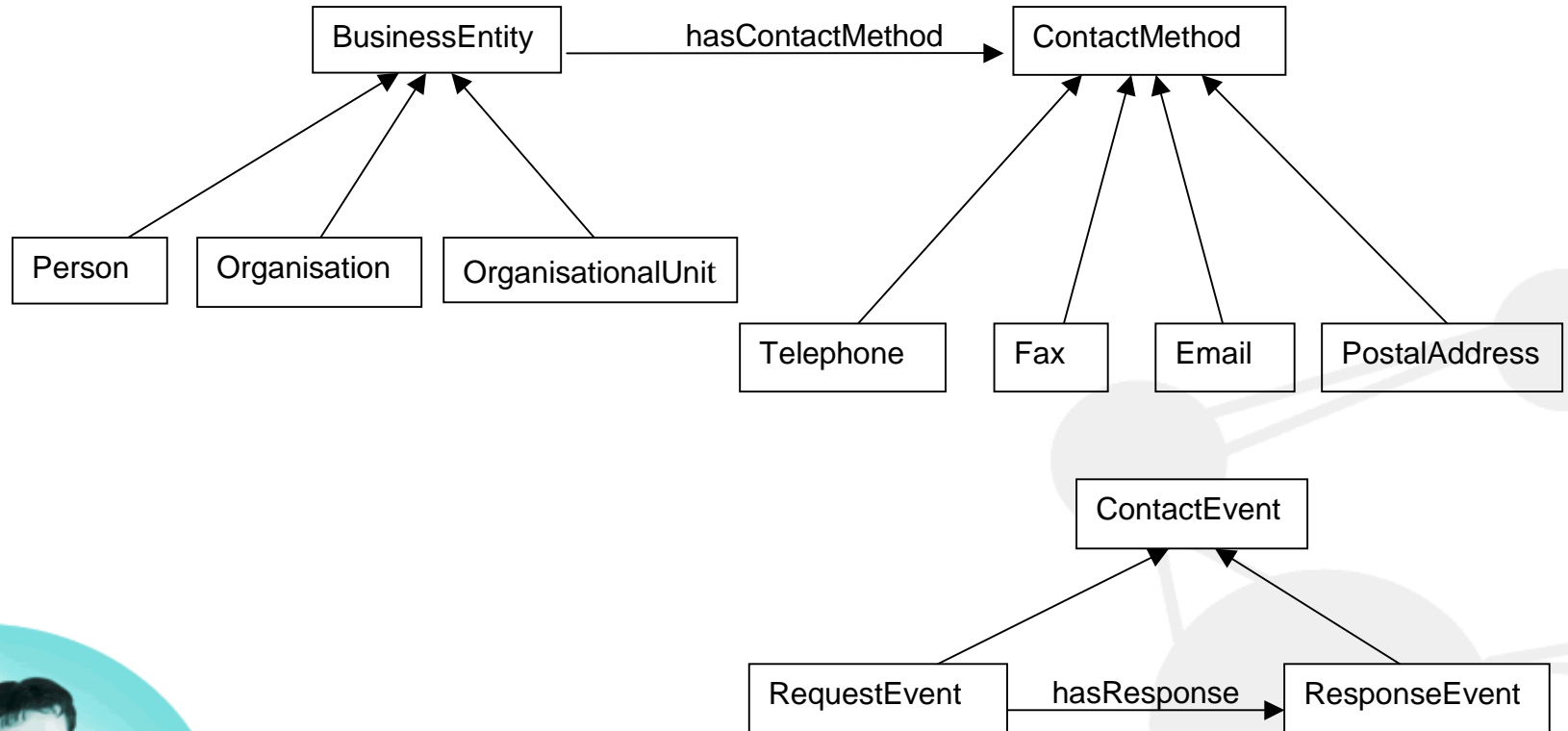
- Concepts – concrete elements (e.g.: “Employee” or “WfActivity” or “Document”)
- Predicates – relations between two or more Concepts (e.g.: “DocumentUsed”)





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Contact Ontology





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Implementing Contact Ontology in Protégé

The screenshot shows the Protégé ontology editor with the following components:

- Classes Tab:** Active, showing a class hierarchy. The **BusinessEntity** class is highlighted with an orange oval. Below it, the **EventContact** class is also highlighted with an orange oval.
- Relationships:** Sup... (Superoptions), V (Visualize), C (Class), and X (Close).
- BusinessEntity Class Details:**
 - Name:** BusinessEntity
 - Role:** Concrete
 - Template Slots:**

	Name
S	address
S	email
S	phone
S	title





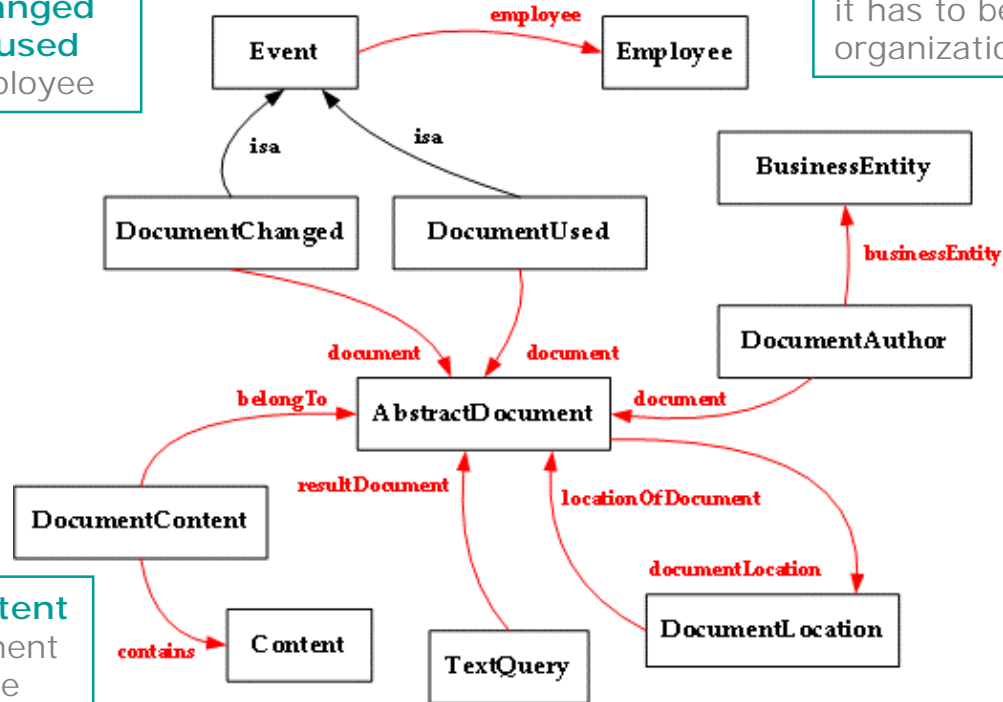
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Document Ontology

The document can be **changed** as well as **used** by the employee

The **author** of the document can be any **BusinessEntity** which means that not necessary it has to be Pellucid organization employee



The **Content** of document allows the Pellucid to know what is inside of the document

TextQuery is predicate to perform **full text searching** within indexes





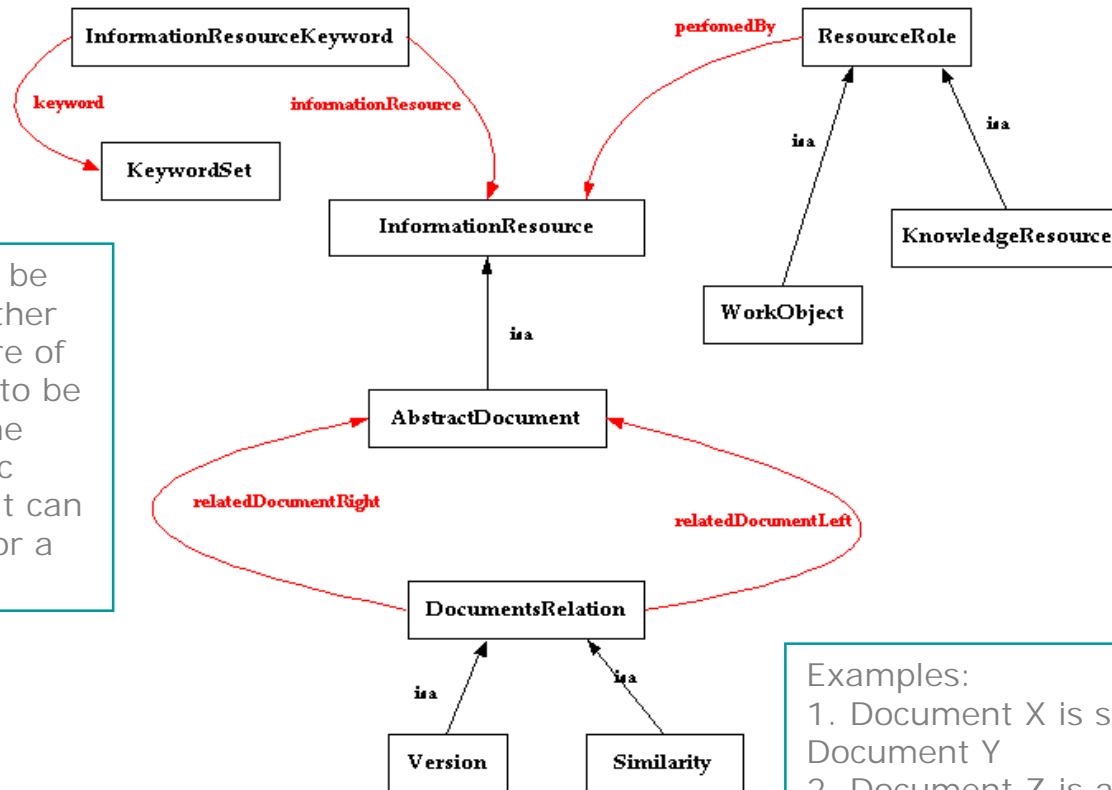
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Document Ontology

InformationResource can be described using **keywords**

And **plays** different **roles** in organization

Document can be related to another one. The nature of the relation is to be described in the domain specific ontology. But it can be a **version** or a **similarity**.



Examples:

1. Document X is similar to Document Y
2. Document Z is a version of Document U

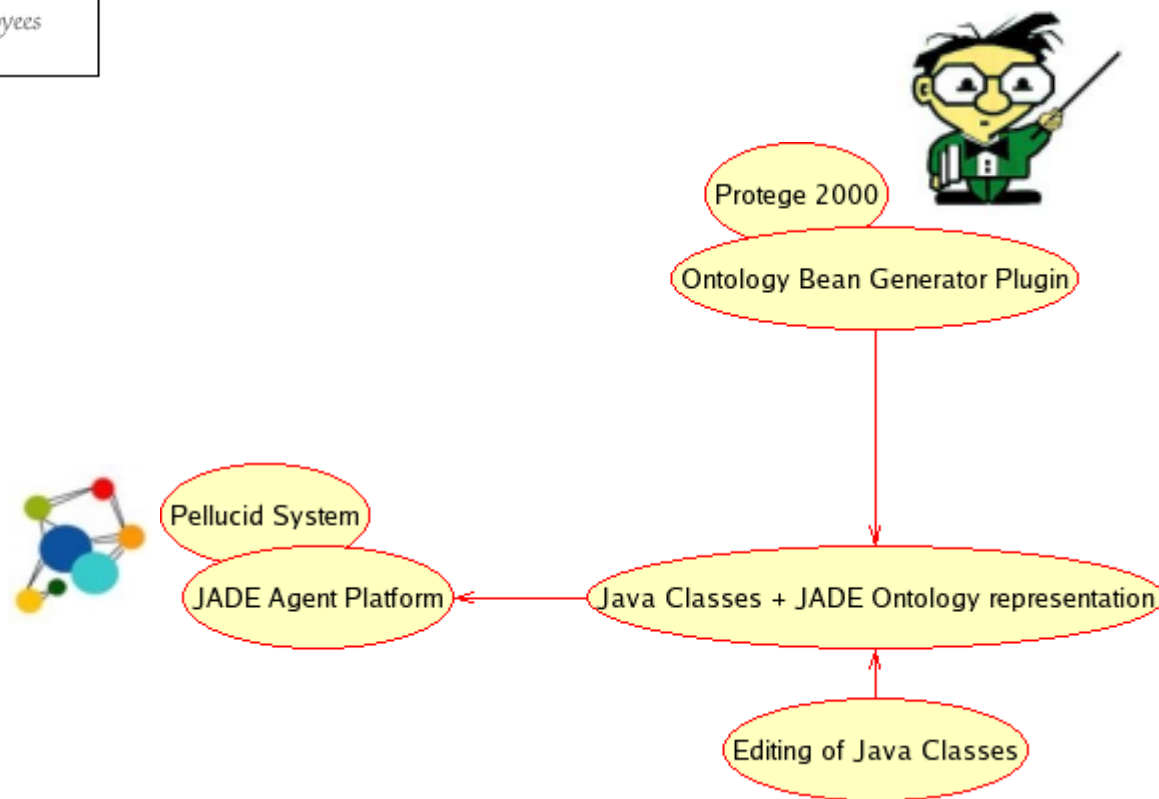




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Ontology Conversion to JADE





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Deployment Module

Protege - 2000



Content Reference Model from JADE

Ontology

Initial Ontology
Instances

Save in
RDF

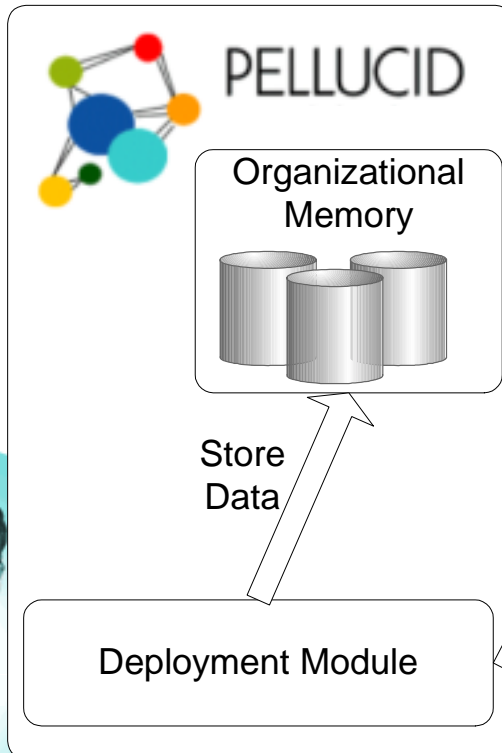
RDF file

```
<rdf:RDF xmlns:rdf="&rdf;" ...>
<Pellucid:DocumentAuthor
  rdf:about="&Pellucid;Pellucid_00225"
  rdfs:label="Pellucid_00225">
  <Pellucid:businessEntity
    rdf:resource="&Pellucid;Pellucid_00261"/>
  <Pellucid:document
    rdf:resource="&Pellucid;Pellucid_00285"/>
</Pellucid:DocumentAuthor>
.....
</rdf:RDF>
```

Jena

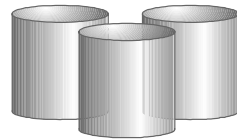


Parse the file using **Jena**



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Organizational
Memory



Store
Data

Deployment Module





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Experiences using Protégé

- We have used the following Protégé extensions:

- RDF storage model
- Ontology Bean Generator Tab plug-in
- Ontoviz Tab plug-in

- Some extra features in development:

- User-friendly way to display ontology instances (knowledge)
 - We did this in the JADE implementation by adding a method to each ontology class. So Instances were displayed as string.
- User-friendly way to display ontology information
 - Assigning human readable text to ontology elements and slots
 - Multi-language support for presenting ontology





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Future Work and Open Questions

- **More reasoning in Pellucid**

- Domain-specific reasoning
- Experience knowledge discovery where ontology instances are input for:
 - Classification – categorization into previously defined groups
 - Clustering – finding groups of experiences
 - Association rules – detecting trends, relations
- Experience generalization and aggregation

- **Extend the work to other contexts**

- Contact and Document management are only instances of a more general case
- Time management

- **Explore other facilities associated to Protégé**





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Thank you !

