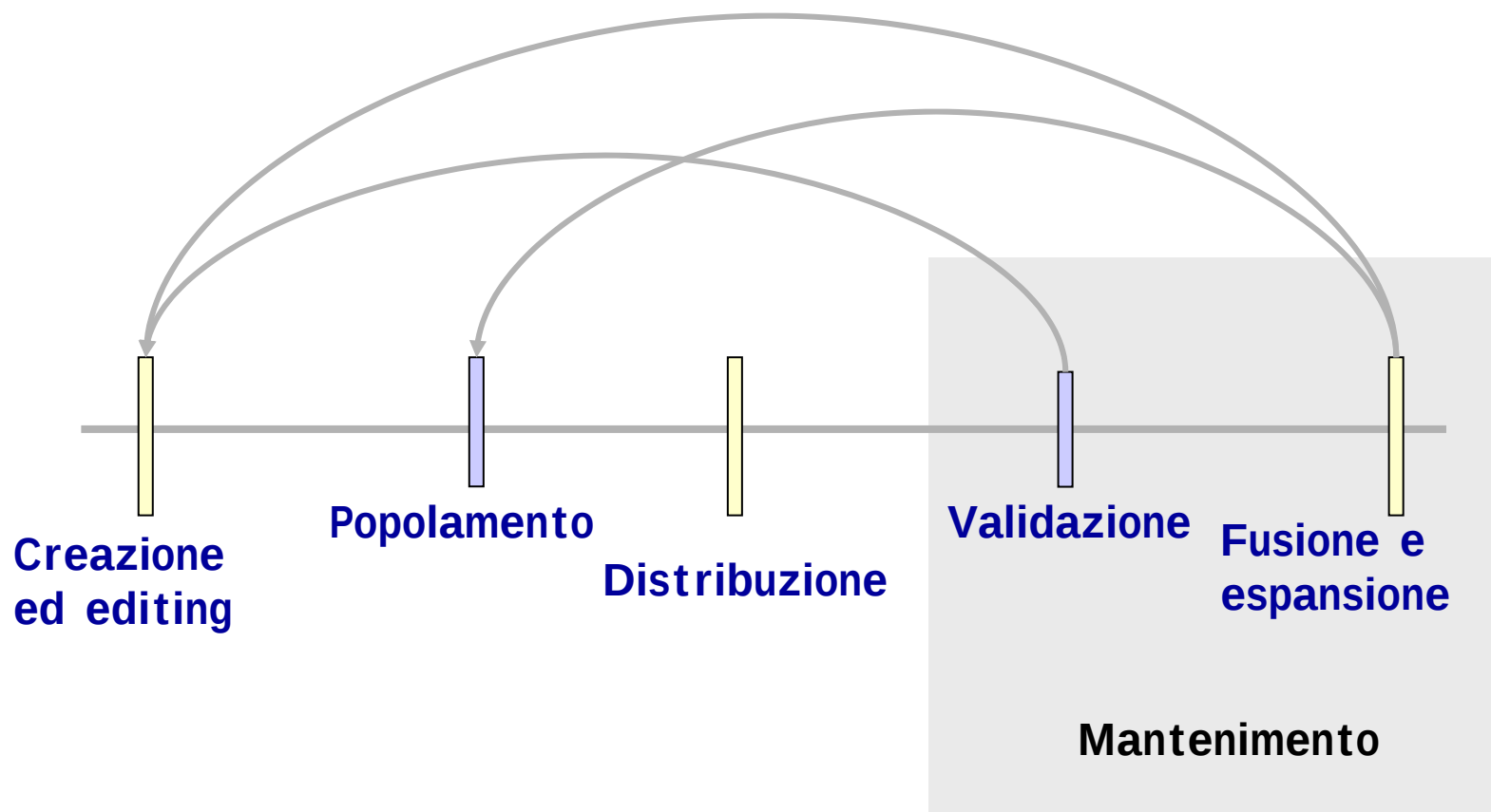
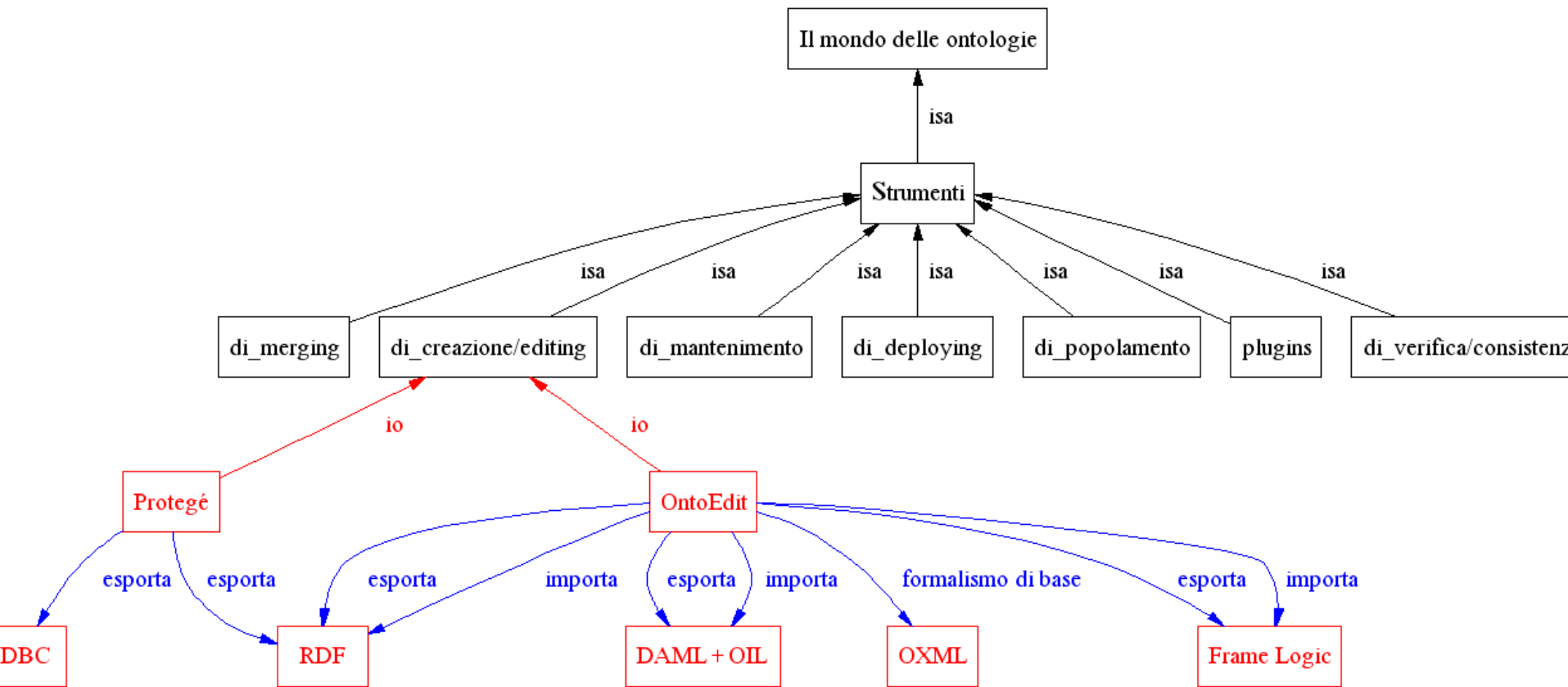
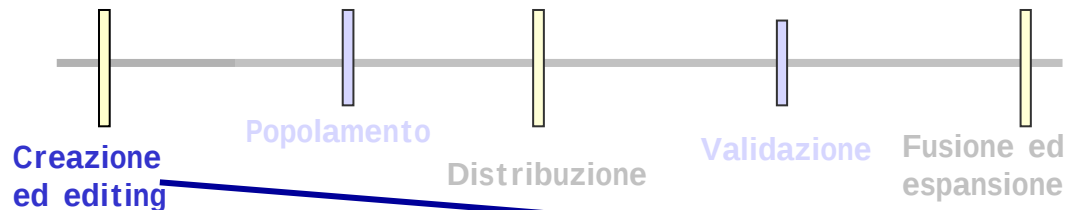


Ontologie - ciclo di vita



Un progetto ambizioso





Creazione di ontologie - ciò può essere fatto da zero, per mezzo di uno strumento di editing e creazione di classi/istanze (solitamente con un'interfaccia che è simile ad una struttura di un file system)

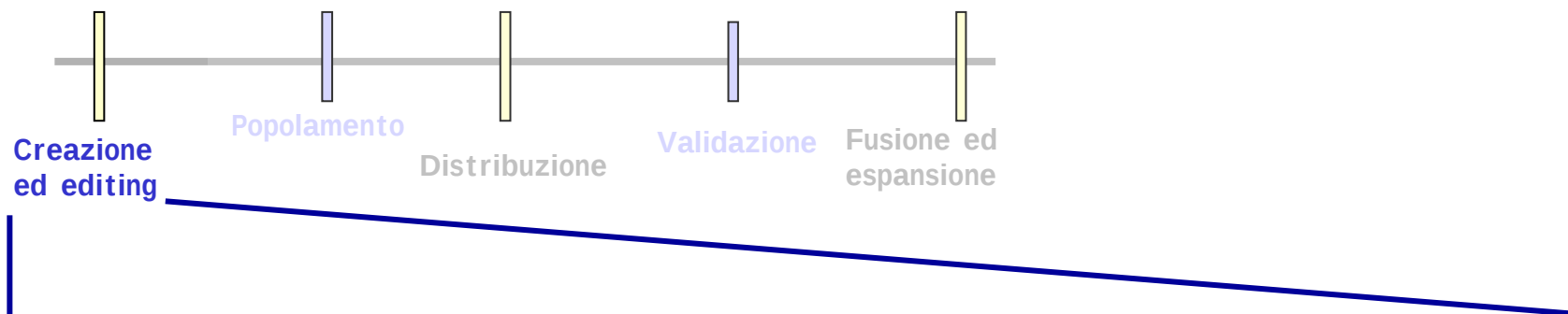
The image displays two screenshots of ontology editing software interfaces.

Left Screenshot: OntoOntology Protégé 2.0 beta

- Project Tree (Left):** Shows a hierarchy starting with `:THING` and `:SYSTEM-CLASS`. Under `:SYSTEM-CLASS`, there is a folder `Il mondo delle ontologie` containing `Formalismi/Linguaggi` and `Strumenti`. Under `Strumenti`, there is a folder `di_creazione/editing` containing `Ontoedit` and `Protégé`. Below this is a folder `plugins` containing `OntoOntology_Class_2` (highlighted), `di_popolamento`, `di_deploying`, `di_mantenimento`, and `di_verifica/consistenza`.
- Main Workspace:** Shows a `Relationship` tab with `Superclass` selected. The `Concept hierarchy` panel shows a tree structure starting with `DEFAULT_ROOT_CONCEPT`, which has a child `Vehicle`. `Vehicle` has children `TransportVehicle` and `TransferVehicle`. `TransportVehicle` has children `Plane`, `Train`, `Car`, `Ferry`, `Motorbike`, and `Ship`. `TransferVehicle` has children `CityBus`, `Underground`, `Taxi`, and `RentalCar`. At the bottom, there is a `Customer` node.

Right Screenshot: OntoEdit Professional

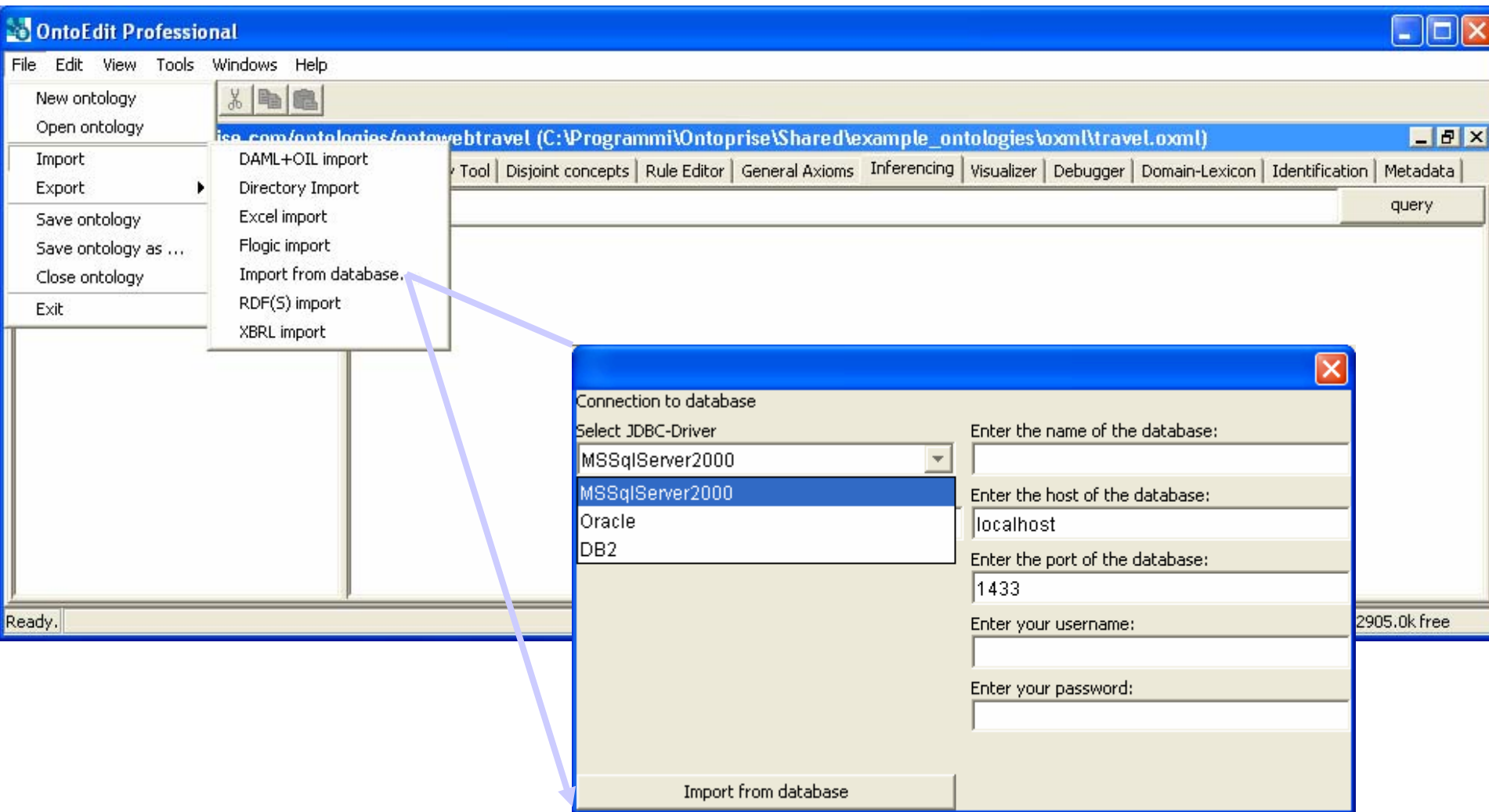
- Project Tree (Left):** Shows a hierarchy starting with `:THING` and `:SYSTEM-CLASS`. Under `:SYSTEM-CLASS`, there is a folder `Il mondo delle ontologie` containing `Formalismi/Linguaggi` and `Strumenti`. Under `Strumenti`, there is a folder `di_creazione/editing` containing `Ontoedit` and `Protégé`. Below this is a folder `plugins` containing `OntoOntology_Class_2` (highlighted), `di_popolamento`, `di_deploying`, `di_mantenimento`, and `di_verifica/consistenza`.
- Main Workspace:** Shows a `Relationship` tab with `Superclass` selected. The `Concept hierarchy` panel shows a tree structure starting with `DEFAULT_ROOT_CONCEPT`, which has a child `Vehicle`. `Vehicle` has children `TransportVehicle` and `TransferVehicle`. `TransportVehicle` has children `Plane`, `Train`, `Car`, `Ferry`, `Motorbike`, and `Ship`. `TransferVehicle` has children `CityBus`, `Underground`, `Taxi`, and `RentalCar`. At the bottom, there is a `Customer` node.



Esistono strumenti di assistenza in questa fase per:

- la creazione di una nuova ontologia è possibile riutilizzare, in tutto o in parte, ontologie che sono state già sviluppate;
- l'importazione da database esistenti - spesso le informazioni utili alla creazione sono già disponibili in forma strutturata: schemi dei data base, cataloghi di prodotti, pagine gialle. Molte delle recenti versioni di editor di ontologie importano schemi di data base;
- l'estrazione di concetti da testi in linguaggio naturale;
- l'estrazione di concetti da pagine WEB;
- la generazione di ontologie a partire da un strumenti di *brainstorming*

Importare ontologie dati e schemi da altre ontologie. Esempio in Ontoedit



Concetti WordNet importati in una ontologia Protegé

Ricerca in

Fase di integrazione: aggiunge
il concetto di wordnet

Ontologia in Protegé

The screenshot shows the Protegé 2000 interface with the following components:

- Search Window (Left):** Displays search results for the term "column". The results are organized into a table with columns for "Superstring" and "Part of Speech".
- Definitions Window (Center):** Displays the definition for the selected term "column".
- Classes Window (Right):** Displays the ontology hierarchy, showing the relationship between classes. The "column" class is highlighted as a subclass of "structure".

Search Results Table:

Superstring	Part of Speech
agony column	NOUN
chromatography column	NOUN
column	NOUN
column chromatography	NOUN
column inch	NOUN
columnar cell	NOUN
columnar epithelial cell	NOUN
columnnea	NOUN
columnisation	NOUN
columnist	NOUN
with column	NOUN
lally column	NOUN
newspaper column	NOUN
spinal column	NOUN
support column	NOUN
vertebral column	NOUN

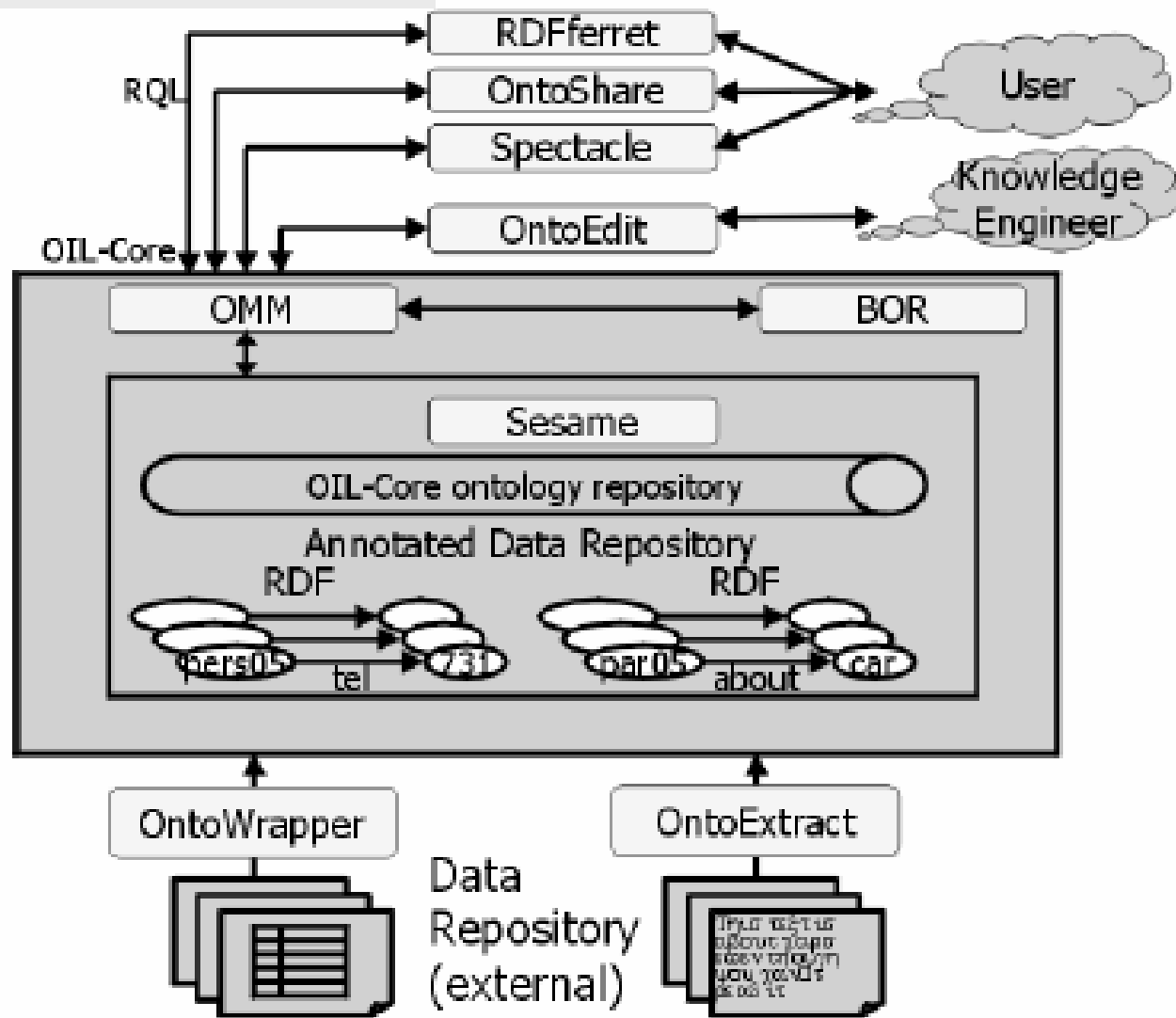
Definitions:

a line of (usually military) units following one after another
a vertical glass tube used in column chromatography; a mixture is poured
a linear array of numbers one above another
anything tall and thin approximating the shape of a column or tower, "the
an article giving opinions or perspectives
a vertical structure standing alone and not supporting anything (as a mc
a tall cylindrical vertical upright

Classes:

- Thing
- SYSTEM-CLASS
- WordNet_ROOT
- Elemento
- entity
- object
- artifact
- block
- instrumentality
- device
- support
- structural member
- upright
- column
- shaft
- base
- structure
- supporting structure
- pedestal
- location
- region
- top
- capital

Un'interessante architettura

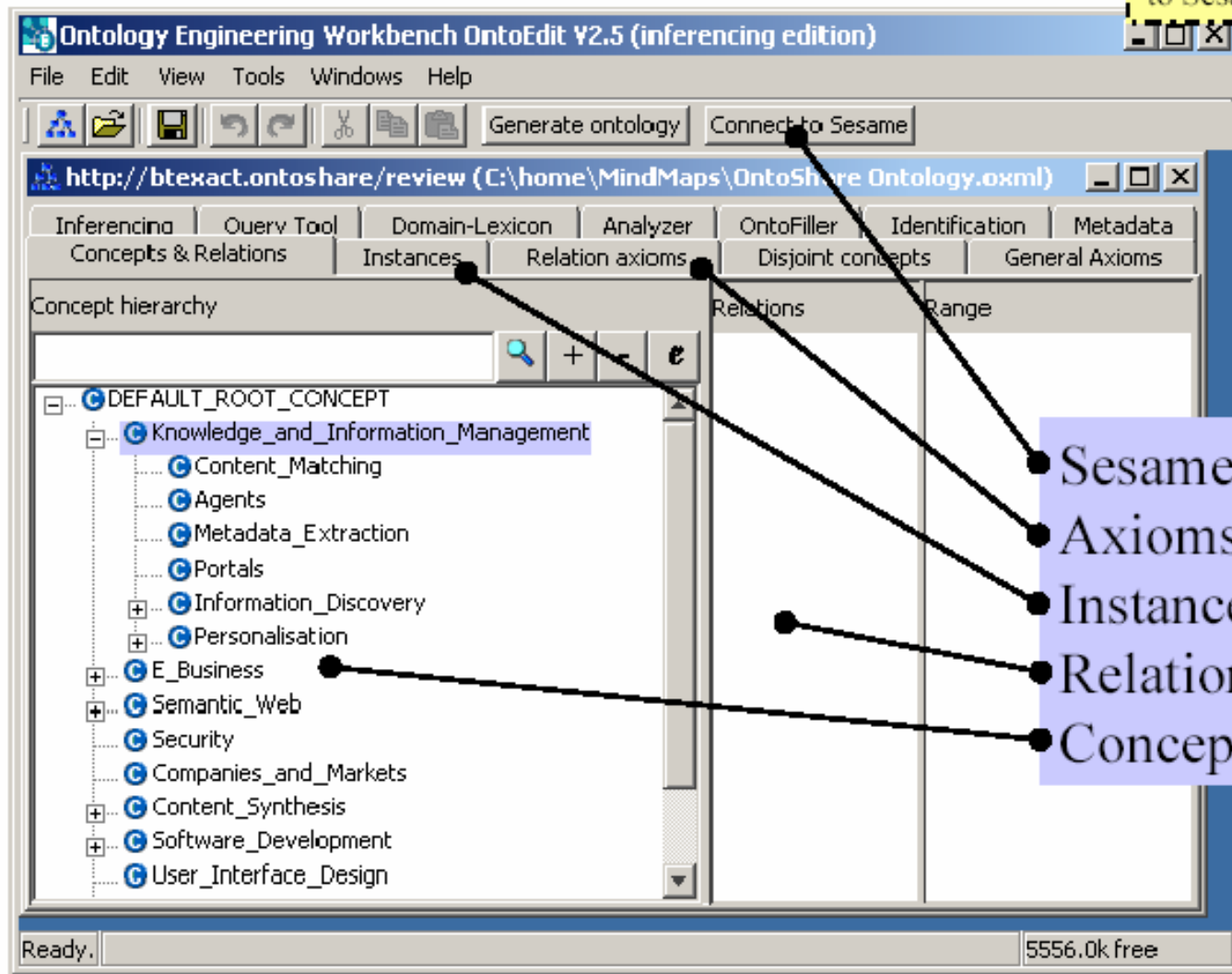


On-to-knowledge: Semantic Web Enable Knowledge Management- Sure et al

OntoEdit Sesame Plugin



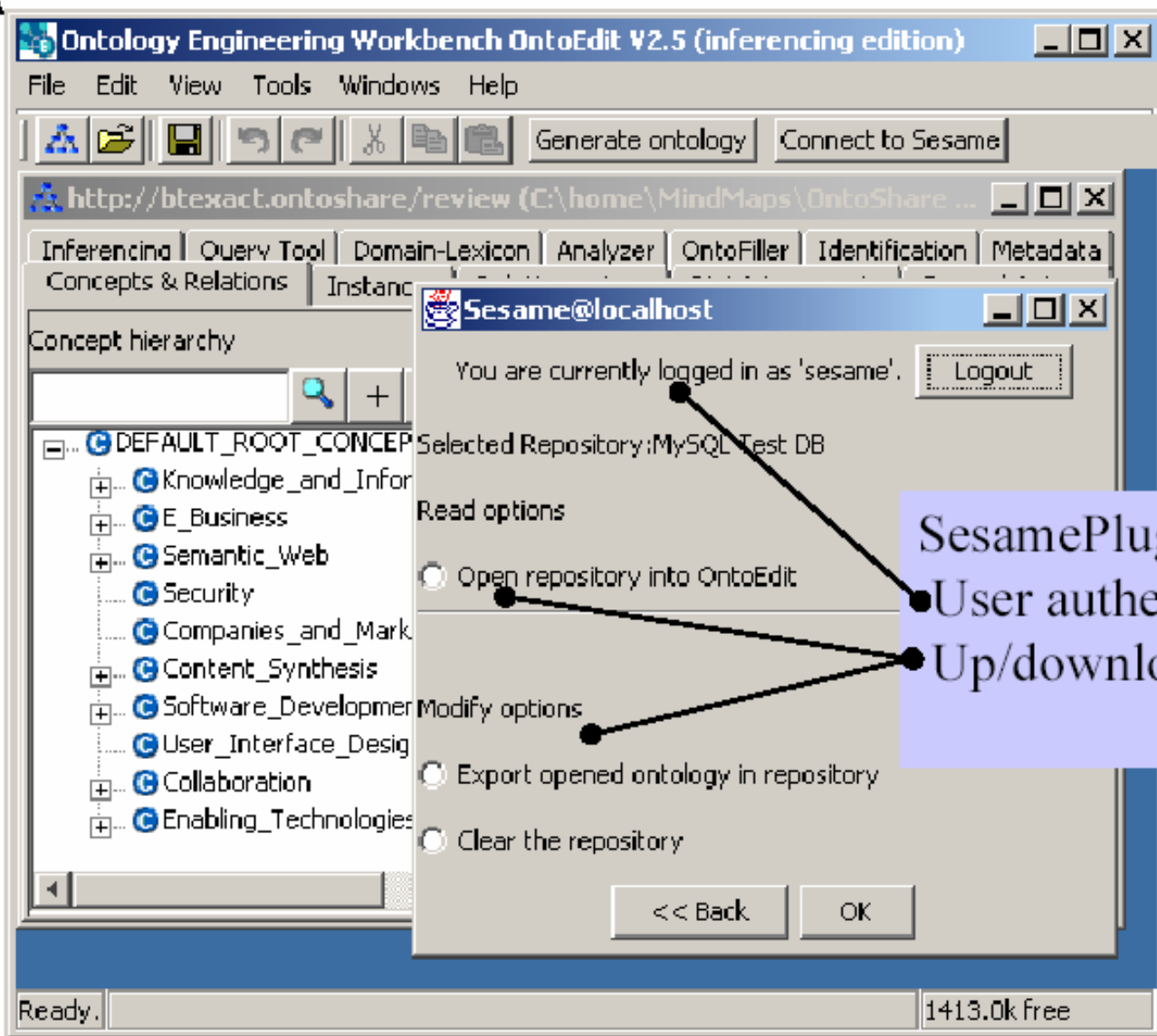
OntoEdit
Interactive ontology
refinement and storage
to Sesame



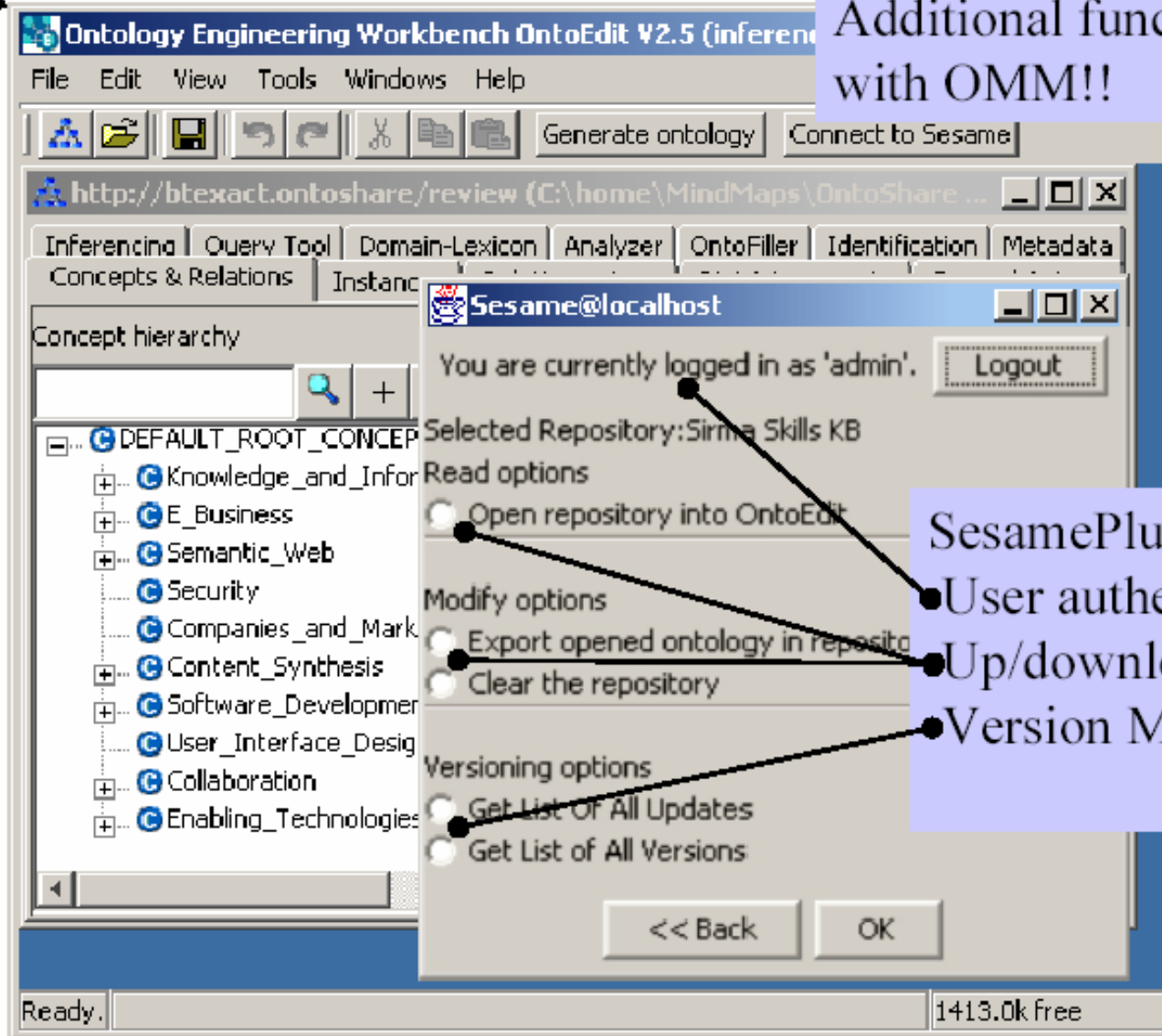
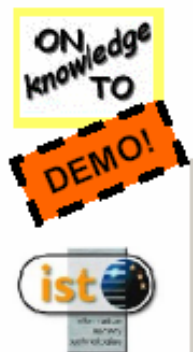
SesamePlugin
Axioms
Instance Editor
Relations
Concept Hierarchy



OntoEdit/SesamePlugin @ BT



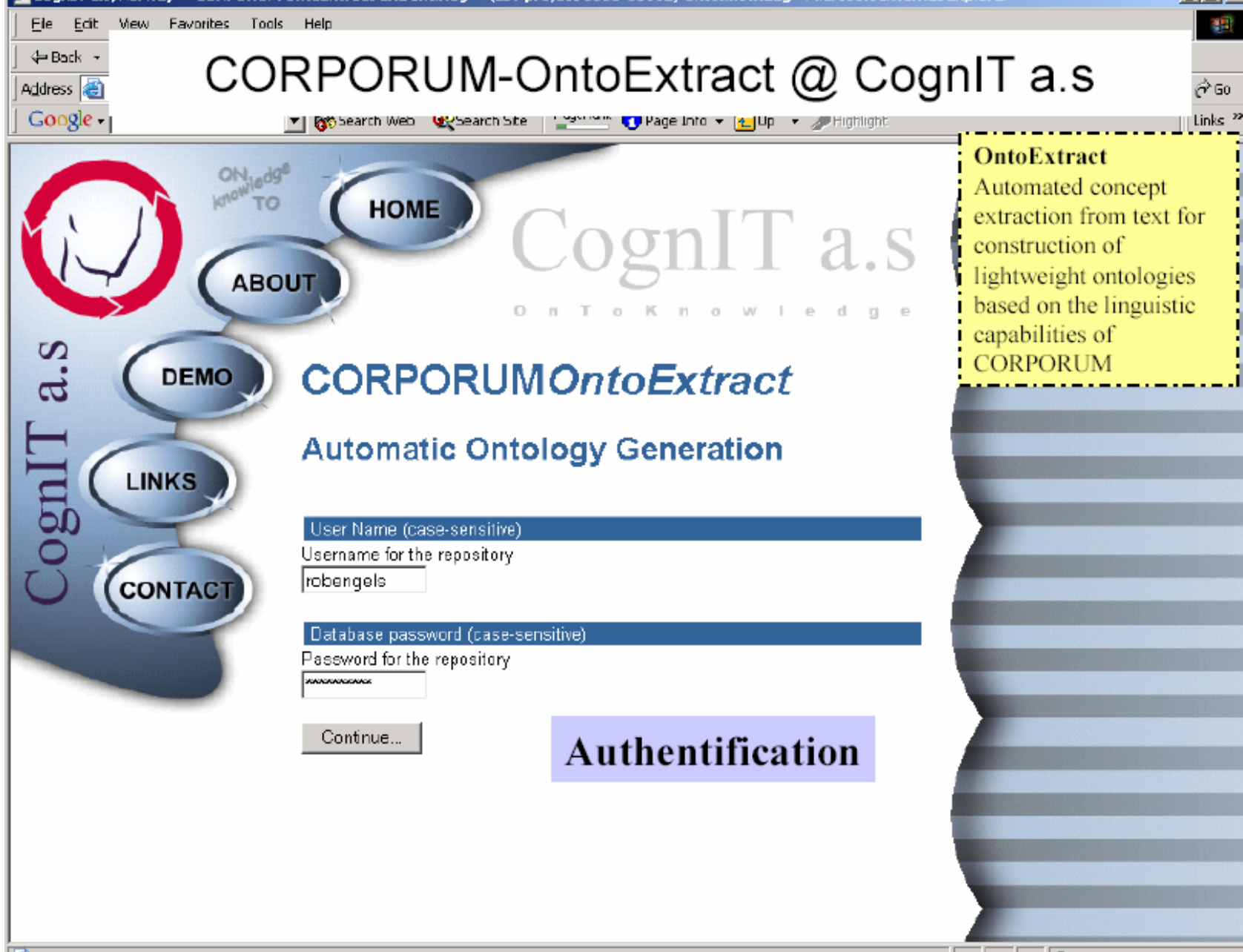
OntoEdit/SesamePlugin @ BT



Additional functionalities with OMM!!

SesamePlugin:

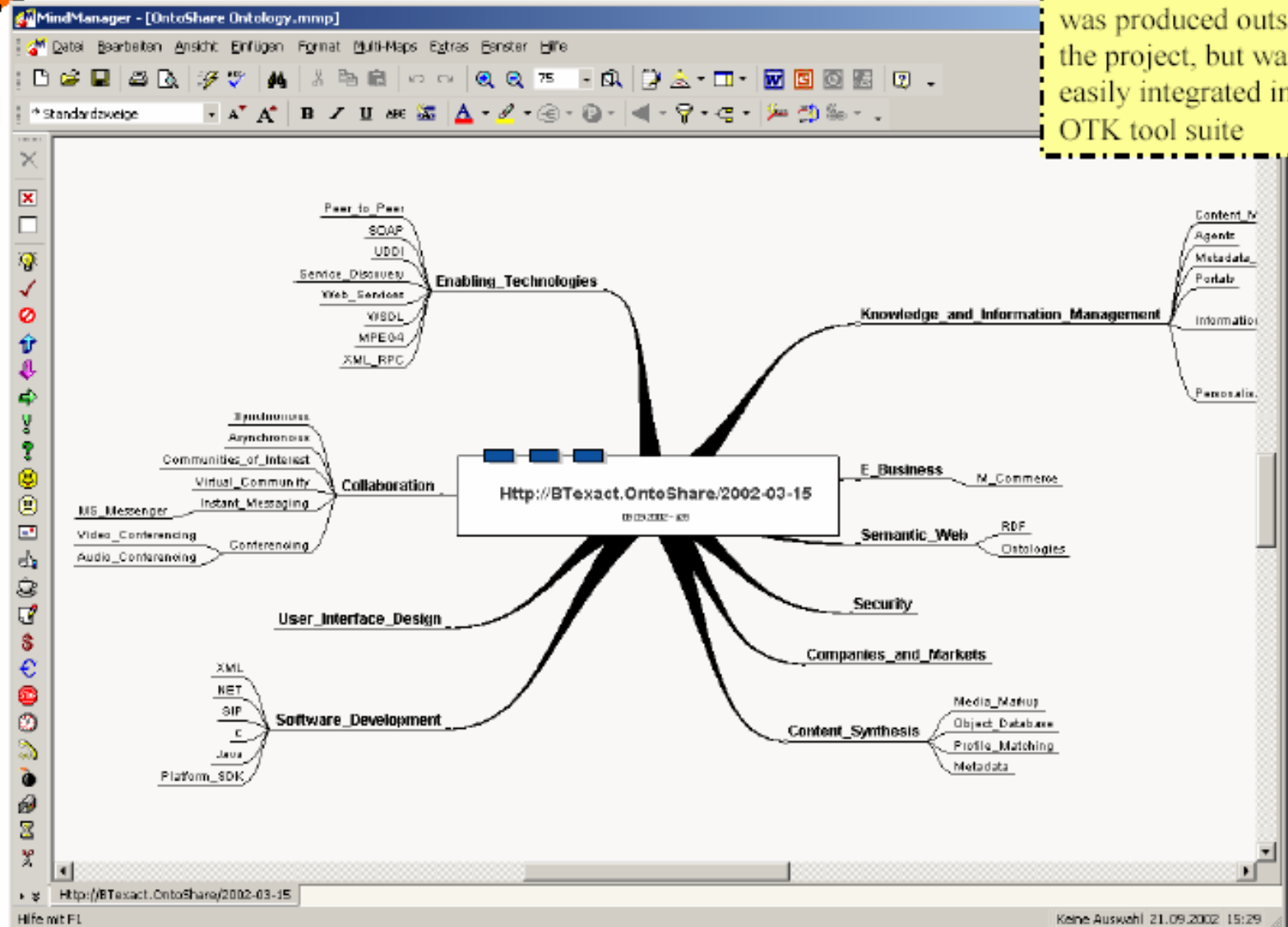
- User authentication
- Up/download
- Version Management

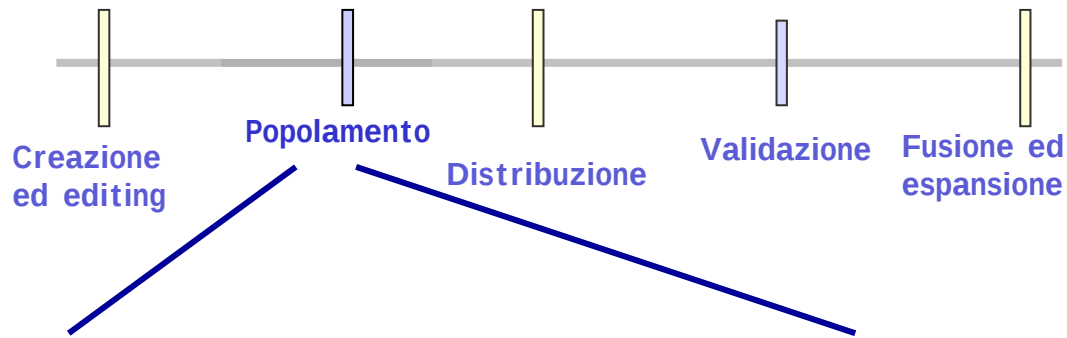


Da **DEMO!** Final Review On-To-Knowledge Amsterdam (NL), 2002-10-14
York Sure (ed.) With contributions from OTK partners! **OTK Tool Suite DEMO**

Mind2Onto @ BT

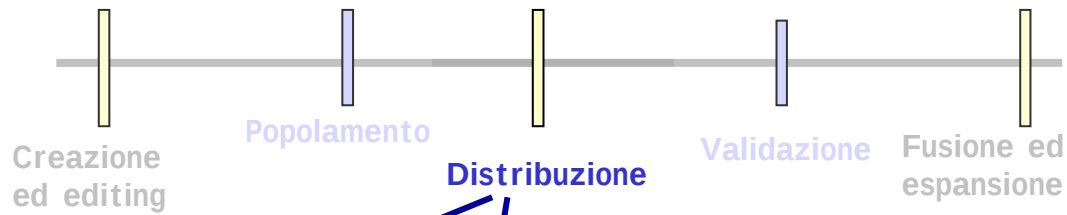
MindManager
A lightweight
brainstorming tool that
was produced outside
the project, but was
easily integrated into the
OTK tool suite



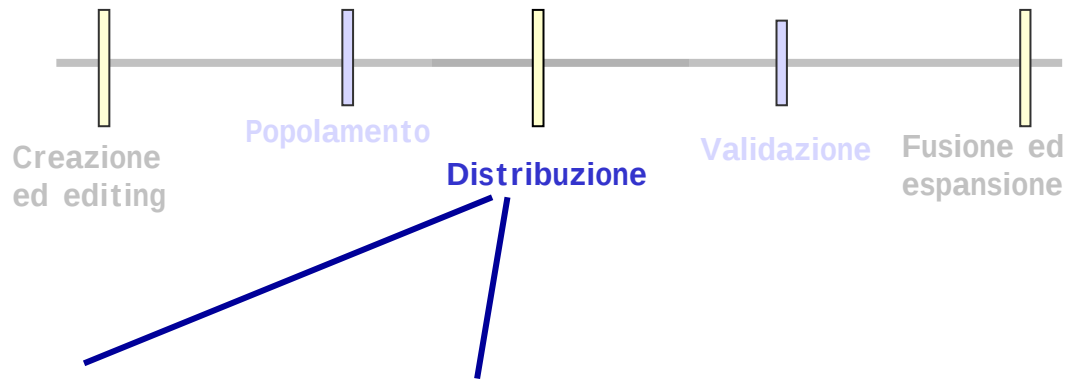


Popolamento di ontologie – riguarda il processo di generazione delle istanze dei concetti in un'ontologia e del collegamento di esse a sorgenti esterne - il popolamento di un'ontologia può essere fatto manualmente o in maniera semi-automatico.

- le pagine Web ordinarie sono una buona fonte di istanze di concetti di ontologie (molto strumenti per il popolamento sono basati sull'annotazione delle pagine web);
- fonti di istanze sono spesso disponibili in cataloghi di prodotti, parti di liste, tabelle di database;



Distribuire ontologie [compromesso per la traduzione della parola Inglese **deploying** = spread out a) stendere, spiegare, aprire sparpagliare b) distribuire, prolungare, dilazionare]



Perché distribuire ontologie?

- un'ontologia fornisce un indice naturale delle istanze che essa descrive e quindi può essere usata come un aiuto di navigazione nel ricercare informazione sulle istanze di concetti;
- metodi complessi possono usare le ontologie per ricercare similarità nel recupero delle informazioni;
- alcuni formalismi (DAML+OIL, OWL, Frame Logic) hanno capacità di esprimere vincoli mediante assiomi sui concetti di un'ontologia; i motori logici quindi di ragionamento contenuti all'interno di un'ontologia possono essere utilizzati per *tracciare* conclusioni circa le istanze in un'ontologia;

Annotazione di pagine WEB (1) SHOE (Simple HTML Ontology Extensions)

Il codice HTML

```
<HTML><HEAD><TITLE> My Page </TITLE>
</HEAD>
<BODY>
<P> Hi, this is my web page.   I am a graduate student and a research assistant.
<P> Also, I'm 52 years old.
<P> My name is George Stephanopolous.
<P> Here is a pointer to my <A   HREF="http://www.cs.umd.edu/smith"> graduate advisor.</A>
<P> And <A HREF="http://www.cs.umd.edu/papers/paper.ps"> is a paper I recently wrote.
<h3> Brun Hilda </h3> Brun Hilda is a visiting lecturer here from Germany who doesn't have her own web page.  However,
because I am such a nice person, I have agreed to let part of my web page space belong to her.  She is 23.
</BODY>
</HTML>
```

L'ontologia sia immagazzinata a:

<http://www.cs.umd.edu/projects/plus/SHOE/onts/cs.html>.

Nel processo viene indicato come

```
<USE-ONTOLOGY          ID="cs-dept-ontology"
URL=http://www.cs.umd.edu/projects/plus/SHOE/onts/cs.html VERSION="1.0"
PREFIX="cs">
```

Annotazione di pagine WEB (2) SHOE (Simple HTML Ontology Extensions)

L'ontologia

```
<DEF-CATEGORY NAME="Organization" ISA="base.SHOEntity">
<DEF-CATEGORY NAME="Person" ISA="base.SHOEntity">
<DEF-CATEGORY NAME="Publication" ISA="base.SHOEntity">
<DEF-CATEGORY NAME="ResearchGroup" ISA="Organization">
<DEF-CATEGORY NAME="Department" ISA="Organization">
<DEF-CATEGORY NAME="Worker" ISA="Person">
<DEF-CATEGORY NAME="Faculty" ISA="Worker">
<DEF-CATEGORY NAME="Assistant" ISA="Worker">
<DEF-CATEGORY NAME="AdministrativeStaff" ISA="Worker">
<DEF-CATEGORY NAME="Student" ISA="Person">
<DEF-CATEGORY NAME="PostDoc" ISA="Faculty">
<DEF-CATEGORY NAME="Lecturer" ISA="Faculty">
<DEF-CATEGORY NAME="Professor" ISA="Faculty">
<DEF-CATEGORY NAME="ResearchAssistant" ISA="Assistant">
<DEF-CATEGORY NAME="TeachingAssistant" ISA="Assistant">
<DEF-CATEGORY NAME="GraduateStudent" ISA="Student">
<DEF-CATEGORY NAME="UndergraduateStudent" ISA="Student">
<DEF-CATEGORY NAME="Secretary" ISA="AdministrativeStaff">
<DEF-CATEGORY NAME="Chair" ISA="AdministrativeStaff Professor">
```

Annotazione di pagine WEB (3) SHOE (Simple HTML Ontology Extensions)

Il risultato

```
<HTML><HEAD><TITLE> My Page </TITLE>
</HEAD>
<BODY>
<P> Hi, this is my web page.  I am a graduate student and a research assistant.
<P> Also, I'm 52 years old.
<P> My name is George Stephanopolous.
<P> Here is a pointer to my <A  HREF="http://www.cs.umd.edu/smith"> graduate advisor.</A>
<P> And <A HREF="http://www.cs.umd.edu/papers/paper.ps"> is a paper I recently wrote.
<h3> Brun Hilda </h3> Brun Hilda is a visiting lecturer here from Germany who doesn't have her own web page.  However,
because I am such a nice person, I have agreed to let part of my web page space belong to her.  She is 23.
</BODY>
</HTML>
```



```
<INSTANCE KEY="http://www.cs.umd.edu/users/george/">
<USE-ONTOLOGY ID="cs-dept-ontology" URL="http://www.cs.umd.edu/projects/plus/SHOE/onts/cs.html"
VERSION="1.0"PREFIX="cs">
<CATEGORY NAME="cs.GraduateStudent">
<CATEGORY NAME="cs.ResearchAssistant">
<RELATION NAME="cs.name"><ARG POS=TO VALUE="George Stephanopolous"> </RELATION>
<RELATION NAME="cs.age"> <ARG POS=TO VALUE="52"></RELATION>
<RELATION NAME="cs.advisor">
```

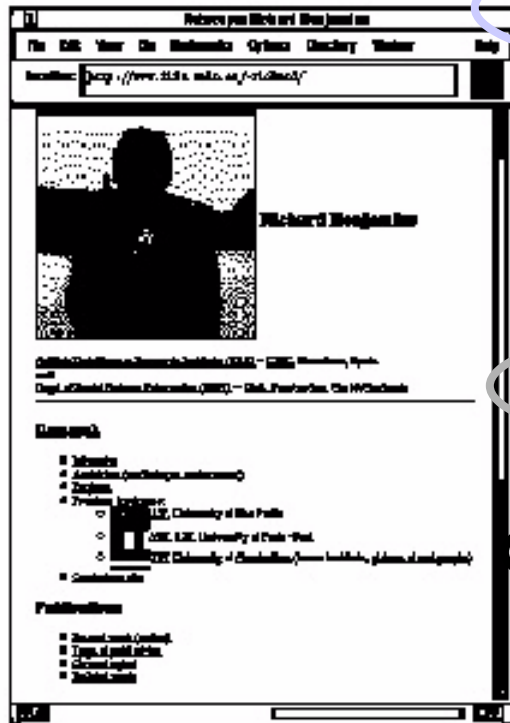
Pagina annotata.

Annotazione di pagine WEB (4) SHOE (Simple HTML Ontology Extensions)

Inferenze in SHOE

- **member(?org2,?person) :- member(?org1,?person) ^ subOrganizationOf(?org1,?org2)**
 <DEF-INFERENCE DESCRIPTION="member(?org2,?person) if member(?org1,?person) and subOrganizationOf(?org1,?org2)">
- <INF-IF>
 - <RELATION NAME="member">
 - <ARG POS=1 VALUE="org1" USAGE=VAR>
 - <ARG POS=2 VALUE="per" USAGE=VAR>
 </RELATION>
 <RELATION NAME="subOrganizationOf"> <ARG POS=1 VALUE="org1" USAGE=VAR>
 <ARG POS=2 VALUE="org2" USAGE=VAR>
 </RELATION> </INF-IF>
 - <INF-THEN>
 <RELATION NAME="member"> <ARG POS=1 VALUE="org2" USAGE=VAR>
 <ARG POS=2 VALUE="per" USAGE=VAR>
 </RELATION>
 </INF-THEN></DEF-INFERENCE>

Annotazione di pagine WEB (5) – Esempio in HTML^A DI ONTOBROKER



```

<html>
<head><TITLE> Richard Benjamin </TITLE>
<a onto="page:Researcher"> </a>
</head>

<H1> <A HREF="pictures/rich.gif">
<IMG align=middle SRC="pictures/richard.gif"> </A>
<a onto="page:photo=href"
HREF="http://www.iiia.csic.es/~richard/pictures/richard.gif"
></a>

<a onto="page:firstName=body">Richard</a>
<a onto="page:lastName=body">Benjamin</a>
</h1> <p>

<A onto="page:affiliation=body" HREF="#card">
Artificial Intelligence Research Institute (IIIA) </A> -
<a href="http://www.csic.es/">CSIC</a>, Barcelona, Spain
<br>
and <br>
<A onto="page:affiliation=body" HREF="http://
www.swi.psy.uva.nl/">

```

Con HTML A si possono stabilire (annotare):

- il valore di uno slot;
- relazione fra due o più oggetti

Annotazione di pagine WEB (6) - Esempio in HTML^A DI ONTOBROKER

```

<HTML>
<HEAD>
<a onto="page:Researcher"> </a>
<TITLE> Richard Benjamins </TITLE>

<meta http-equiv="Content-Type" content="text/html; charset=windows-1252"></meta>
</HEAD>

<body BGCOLOR="#FFFFFF">

<H1>
I moved back to the <a HREF="http://www.swi.psy.uva.nl/usr/richard/home.html">
University of Amsterdam</a>.
</H1>

<H1> <a HREF="http://www.iiia.csic.es/~richard/pictures/id-rich.gif">
</a>
<a onto="page[photo=href]"
HREF="http://www.iiia.csic.es/~richard/pictures/richard.gif" ></a>

<a onto="page[firstName=body]">Richard</a>
<a onto="page[lastName=body]">Benjamins </a>
</H1> <p>.....

```

Annotazione di pagine WEB (7) - Esempio in HTML^A DI ONTOBROKER

L'ontologia di riferimento è scritta in Frame Logic

Class Hierarchy	Attribute Definitions	Rules
Object[Person :: Object. Employee :: Person. AcademicStaff :: Employee. Researcher :: AcademicStaff. Publication :: Object.	Person[firstName ==>> STRING; lastName ==>> STRING; eMail ==>> STRING; ... publication ==>> Publication]. Employee[affiliation ==>> Organization; ...]. Researcher[researchInterest ==>> ResearchTopic; ...].	FORALL P ₁ , P ₂ P ₁ [cooperatesWith ->> P ₂] <- P ₂ [cooperatesWith->> P ₁]. FORALL P, Pub Pub:Publication [author ->> P] <-> P:Person [publication ->> Pub].

Annotazione di pagine WEB (8) – Esempio in HTML^A DI ONTOBROKER

La differenza fra SHOE ed Ontobroker – è spiegata nella nota 8 del libro “A Silver Bullet for Knowledge Management and Electronic Commerce

- **8. SHOE** (cf. [Luke et al., 1996], [Luke et al. 1997]) introduced the idea of using ontologies for annotating web sources. There are two main differences to **Ontobroker**. First, the annotation language is not used to annotate existing information in web pages, but to add additional information and annotate them. That is, in **SHOE** information must be repeated and this redundancy may cause significant maintenance problems. For example, an affiliation must once be provided as a text string rendered by the browser and a second time as annotated metainformation.

In this respect, **SHOE** is close to meta-tags in HTML. Ontobroker uses the annotations to directly add semantics to textual information that is also rendered by a browser. A second difference is the use of inference techniques and axioms to infer additional knowledge **SHOE** relies only on database techniques. Therefore, no further inference service is provided. **Ontobroker** uses an inference engine to answer queries. Therefore, it can make use of rules that provide additional information.

Strumenti di aiuto all'annotazione - OntoMat Annotizer

OntoMat-Annotizer

File Edit View Tools Window Help

Ontology Browser

HTML Browser 2

URL: file://localhost/C:/Documents and Settings/francomele/Desktop/probaOnt

[an error occurred while processing this directive]

Tools for OIL

- OILED: <http://img.cs.man.ac.uk/oil/>

OilEd is a simple ontology editor which allows the user to provide a simple, freeware editor that demonstrates a full ontology development environment - it will not only support the construction and integration of ontologies, versioning, argumentation construction. Rather, it is the "NotePad" of ontology editors and to demonstrate how we can use the Oiled editor.

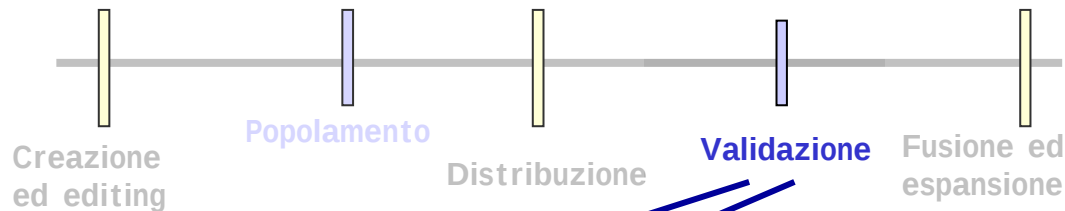
OilEd is available as freeware, but we ask that you please

HTML Source Annotation

State: Go to: file://localhost/C:/Documents and Settings/francomele/index.shtml

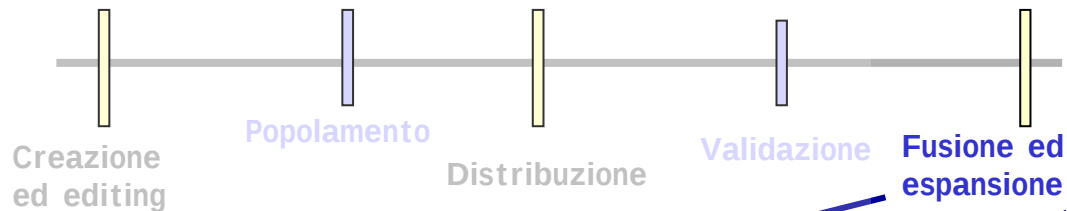
Namespace: http://yournamespace.org#

2504.0k free



Validazione riguarda errori e/o omissioni di concetti/istanze contenute in un'ontologia. Ci sono molti modi in cui un'ontologia può essere validata al fine di migliorarla ed espanderla. La validazione più importante riguarda la semantica formale, ossia, sul significato dei costrutti (classi e relazioni fra classi) di un'ontologia.

Alcuni strumenti automatici sono stati costruiti per determinare quando in un'ontologia sono presenti contraddizioni e di individuare una migliore classificazione di un concetto di un'ontologia in accordo gli altri concetti dell'ontologia stessa;



Fusione ed espansione - il compito della manutenzione di un'ontologia (oltre ad una continua validazione di eventuali nuovi concetti inseriti) può richiedere la fusione (merging) di una o più ontologie di diversa provenienza. Quando ciò accade occorrono strumenti di aiuto che:

- ricercano nelle ontologie concetti simili (solitamente per nome) e forniscano suggerimenti per la fusione di concetti;
- effettuano confronti più elaborati basati su comune istanze o confronto di concetti che sono in relazione con altri concetti.

Protégé-2000

Project Edit Window Help Prompt

Classes Slots Forms Instances Queries Prompt

Suggestions Conflicts Creating operation

Source classes Source slots Source instances

OntologiaA

- THING
- SYSTEM-CLASS
- CLASS
- SLOT
- FACET
- CONSTRAINT
- ANNOTATION
- KB_7708_00002 m
- A m
 - B m
 - C m

OntologiaB

- THING
- SYSTEM-CLASS
- CLASS
- SLOT
- FACET
- CONSTRAINT
- ANNOTATION
- B m
 - E m
 - F m

merged

- THING
- SYSTEM-CLASS
- A--OntologiaA
 - B
 - E--OntologiaB
 - F--OntologiaB
 - C--OntologiaA

merge classes

OntologiaA OntologiaB

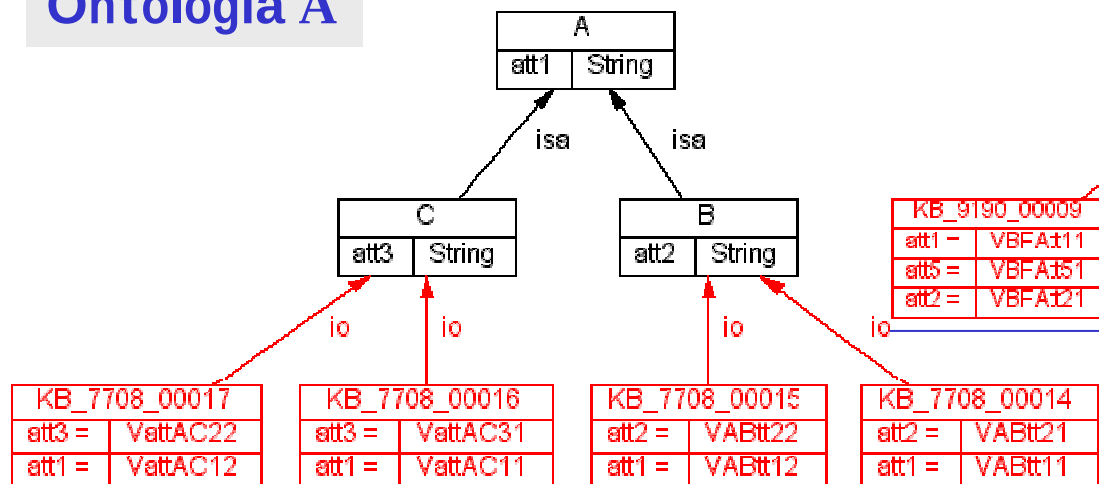
Choose class Choose class

parents (up to the root) subclasses instances

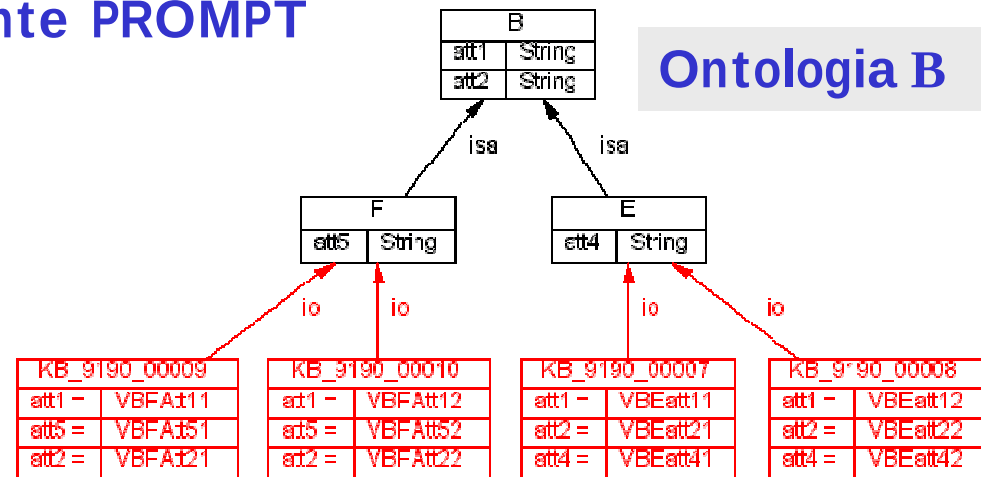
Do It ToDo list

Risultato dell'integrazione mediante PROMPT

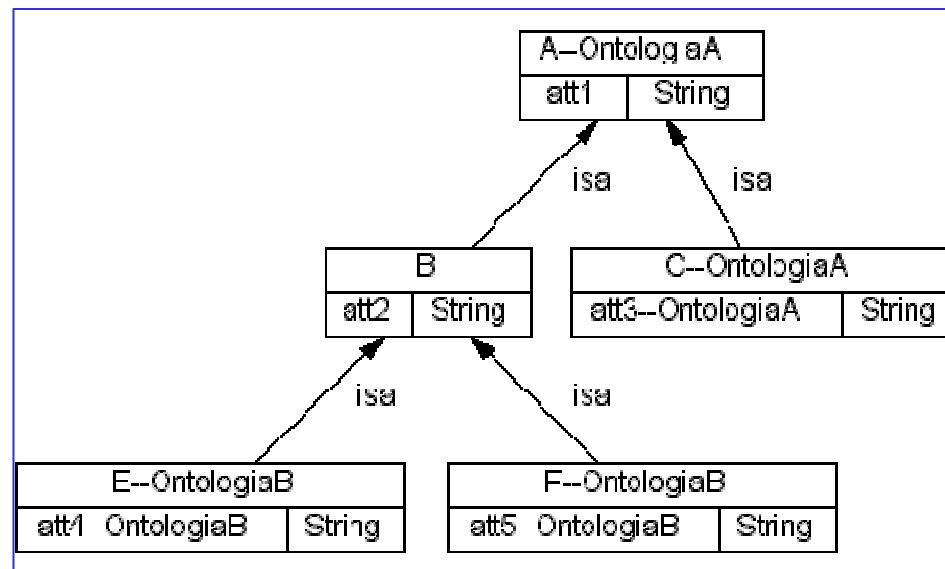
Ontologia A



Ontologia B



Ontologia risultante



Il plugin **PROMPT** permette di gestire multiple ontologie in Protegé 2000. Usando PROMPT è possibile:

- **Unire due ontologie in una (merge mode);**
 - **Suggerimenti**
 - suggerisce il merge di classi con similarità linguistica
 - suggerire la copia di una frame
 - suggerisce la rimozione di superclassi di classi
 - **Conflitti**
 - indica l'esistenza di cicli
 - **Nuove operazioni**
- **Estrarre una parte di un'ontologia;**
- **Trasportare frame fra progetti;**
- **Comparare due versione della stessa ontologia e creare una nuova versione**

Portali semantici: annotazione, personalizzazione e altre classi di problemi

