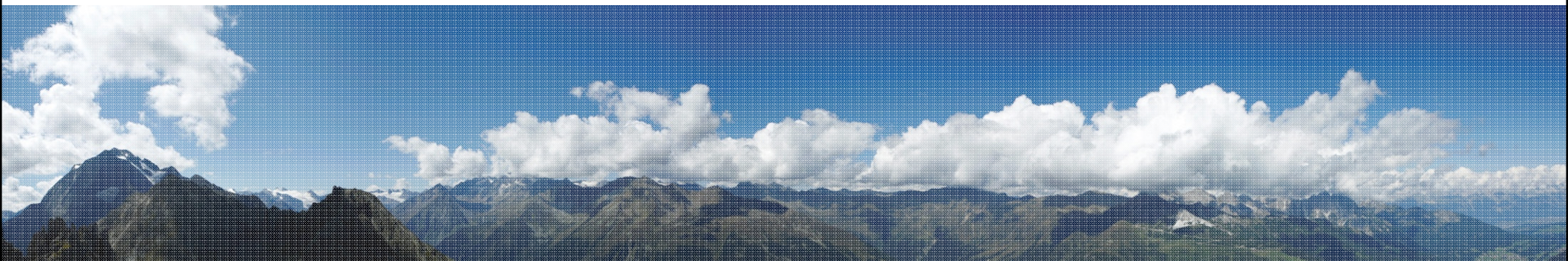


STI · INNSBRUCK

Collaborative Ontology Building

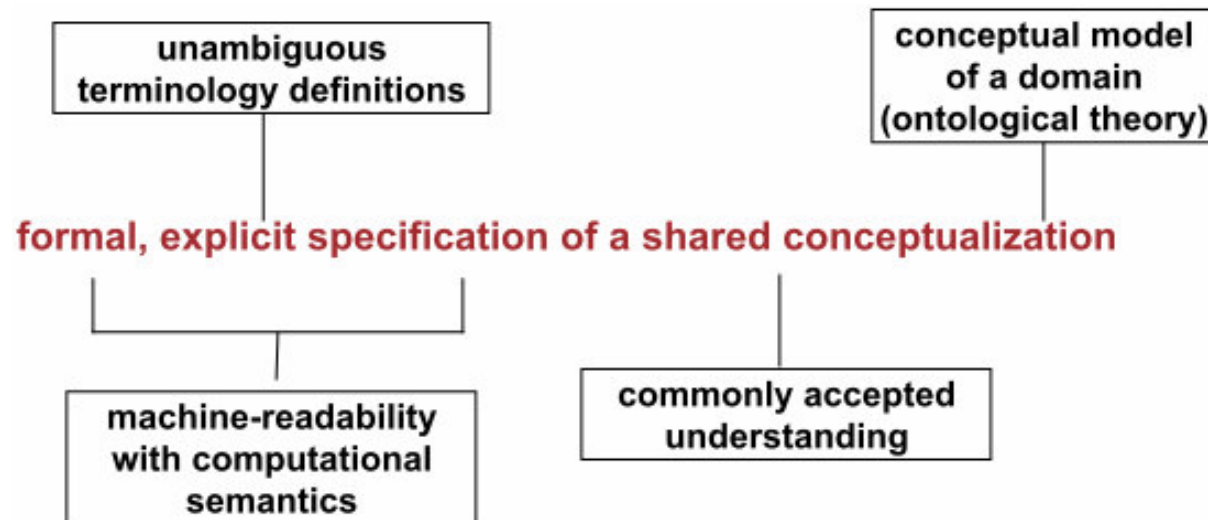
Seminar Applied Ontology Engineering – December 10, 2010
Hannes Klotz/ Elmar P. Wach





- **Introduction**
- Methodologies
- Tools
- Conclusion

Ontology*



Collaborative Ontology Building

“Two or more people interact and exchange knowledge in order to build a common, shared ontology in pursuit of a shared, collective, bounded goal.”**

* Gruber, T. R. 1993

** In the context of this presentation

Geographically distributed constructing an ontology

Easy-to-use tools

Synchronous vs. asynchronous editing

Jointly constructing an ontology

Data access control

Management of the interaction and
the communication between people

Detection and management of errors

Concurrent management and modification of the data

Task coordination

Recognition of moral right about the knowledge

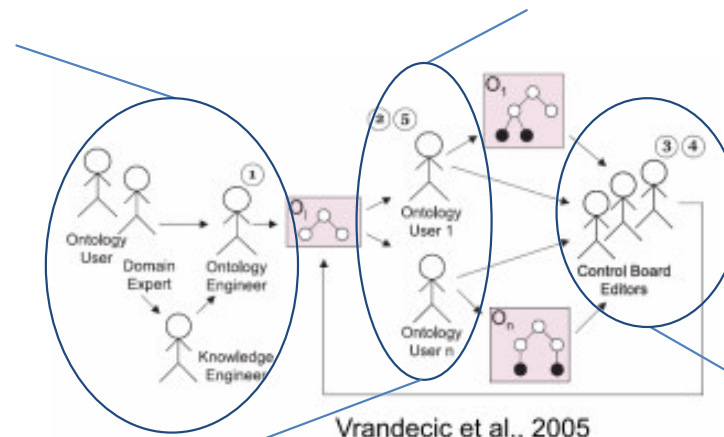


- Introduction
- **Methodologies**
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„Distributed, Loosely-controlled and evolving Engineering processes of oNTologies“

1. Build the ontology
„consensus building“

2. Locally adapt the ontology
„evolution“



5. Locally update the users' ontologies
„argumentation“

3. Analyse and select the changes
„shared ontology“

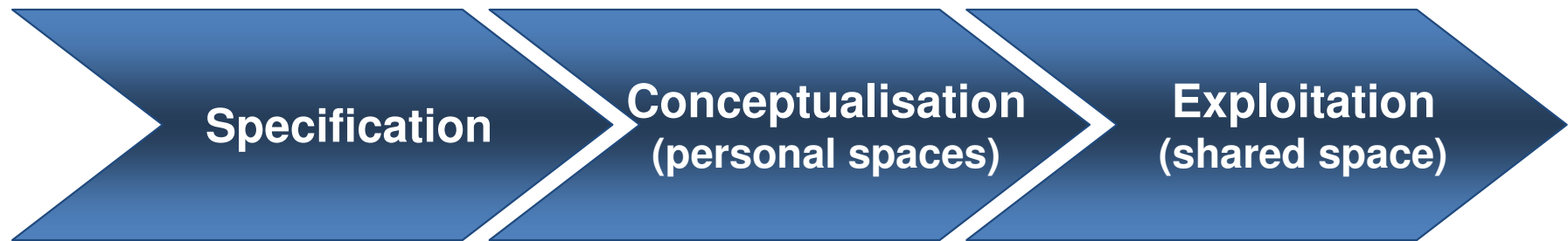
4. Revise regularly the ontology
„evolving local ontologies“

Developing **O**ntology-**G**rounded **M**ethods and **A**pplications

Approach:

- Groundings in the linguistic representations of knowledge (i.e. based on lexical resources)
 - Methodological separation of the domain versus application conceptualisation („lexons“) → Ontology double articulation principle
 - Lexon:
 - 5-tuple declaring a taxonomical or a non-taxonomical relationship
 - „Combination of a RDF/ OWL triple and its inverse“
 - Not restricted to a particular representation language
- Enhance the potential for re-use and design scalability

Human Centered Collaborative Ontology Engineering **M**ethodology



- Identify collaborators
- Discuss requirements
- Specify documents
- Reach consensus about the ontology

- Import existing ontologies
- Consult generic top ontologies
- Improvise ontologies („from scratch“)
- Compare ontology versions
- Map and merge ontology versions
- Enrich concepts

- Inspect ontologies
- Compare versions
- Publish comments



- Define design criteria for the ontology
- Determine evaluation

- Develop first ontology for orientation
- Refine in several steps

- Revise the ontology until consensus is reached
- „Delphi“ method*
- Or: NGT**
[Karapiperis and Apostolou 2006]

- Use the ontology

* Technique for collecting views of several stakeholders

** Nominal Group Technique: Technique to make pooled judgements and decisions in in-groups that meet face-to-face

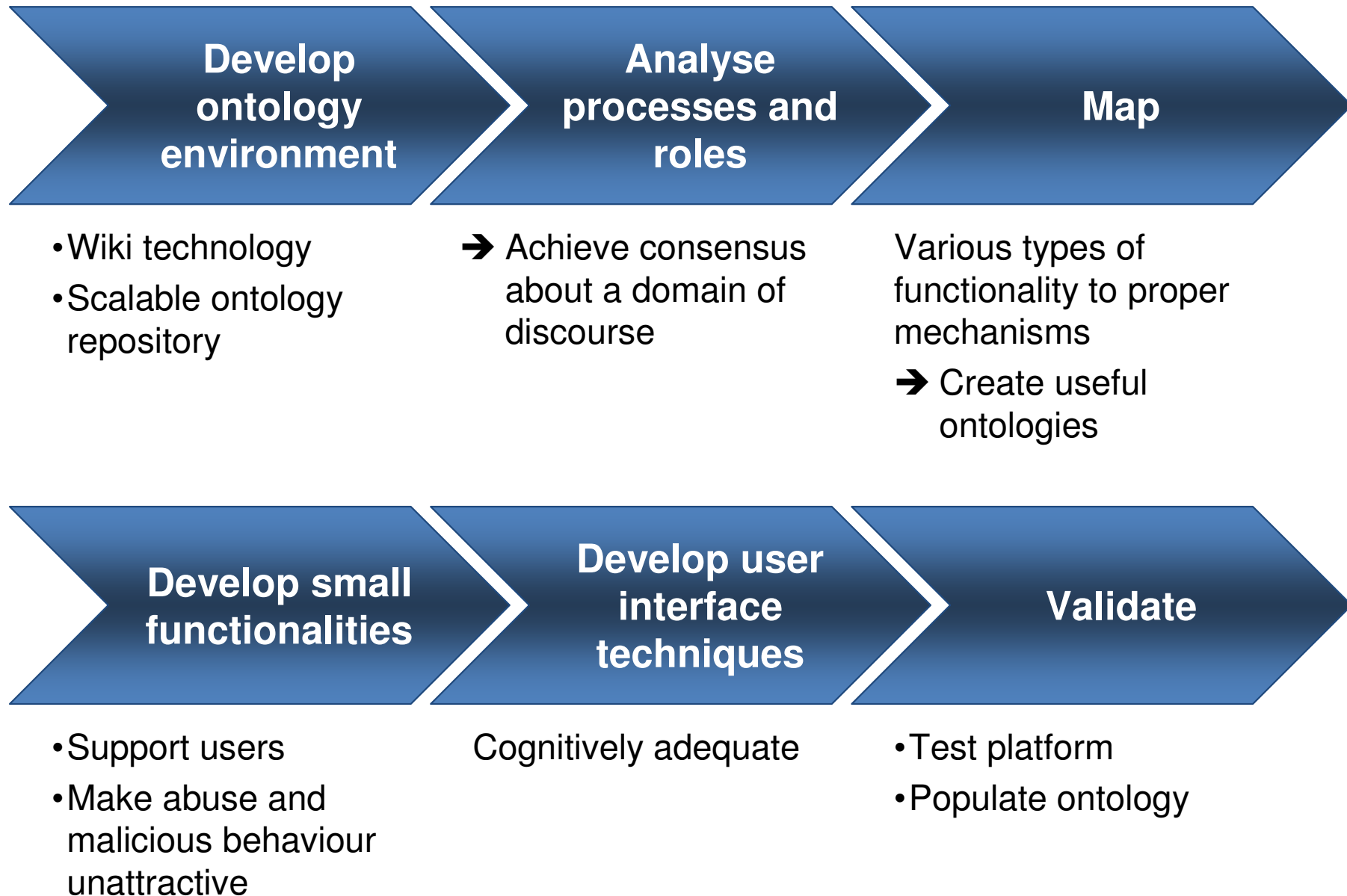
Knowledge Annotation Initiative of the Knowledge Acquisition Community
(built the Research Topic ontology)



- Coordinating agent
→ Ontopic agent
- Ontopic agents
communicate
- Ontopic agents →
Coordinating agents

- From knowledge in
the template

- Knowledge from all
ontopic agents (who
used the same
pattern)





- Introduction
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Cooperative construction of consensual knowledge bases

- Consensual
- Cooperatively constructed
- Constitent
- Connaissance



Netscape: CO4 MAIN MENU for B3

File Edit View Go Bookmarks Options Directory Window Help

Back Forward Home Edit Reload Images Open Print Find Stop

Location: <http://lotse.inrialpes.fr:1080/cgi-bin/hydrop>

CO4 MENU

NAME: [B3](#)

STATE: Simple Base

GROUP BASE: B2

News:

1 [initiative\(s\)](#)

1 [proposal\(s\)](#)

0 [tell\(s\)](#)

0 [log\(s\)](#)

Management

Refresh

Help

CO4 MESSAGES

Initiatives :

- (achieve :sender B3 :receiver B2 :reply-with 1 :langage tropes :content (progn (progn (let ((o [...]) [more](#)
 - o date: Tue Jun 16 16:50:19 1998 ,
 - o surrogate: 1, state: UNANSWERED,
- (register :sender B3 :receiver B2 :reply-with 0)
 - o date: Tue Jun 16 15:47:57 1998 ,
 - o surrogate: 0, state: ACCEPTED,

Deny Purge

Proposals :

- (achieve :receiver B2 :sender B3 :reply-with 1 :langage tropes :content (progn (progn (let ((o [...]) [more](#)
 - o date: Tue Jun 16 16:50:19 1998 ,

Accept Reject

Tells:

Logs:

Netscape: CO4 MAIN MENU for B1

File Edit View Go Bookmarks Options Directory Window Help

Back Forward Home Edit Reload Images Open Print Find Stop

Location: <http://lotse.inrialpes.fr:1080/cgi-bin/hydrop>

CO4 MENU

NAME: [B1](#)

STATE: Simple Base

GROUP BASE: B2

News:

1 [initiative\(s\)](#)

1 [proposal\(s\)](#)

0 [tell\(s\)](#)

0 [log\(s\)](#)

Management

Refresh

Help

[troeps](#) | [famille](#) | [enfant](#)

object #<< enfant 1 >> in the concept [enfant](#)

Submit Edit

Creator: B1

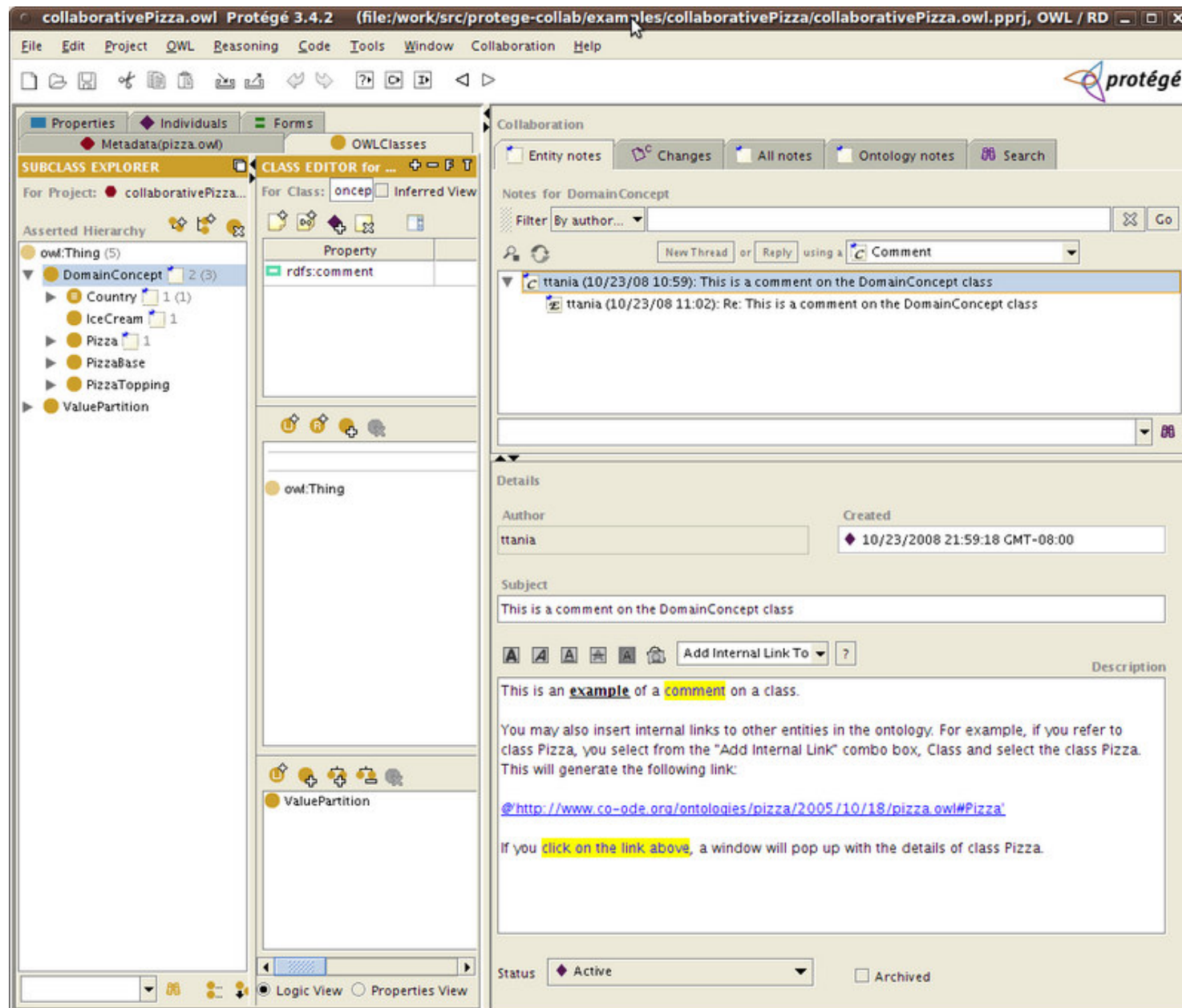
Its slot values are

- [rang](#) = 1
- [prenom](#) = " marianne"

Classification
Find similar instances
Guessed values

Made by [Troeps knowledge server](#) on 06/16/98 17:04:05 MET DST

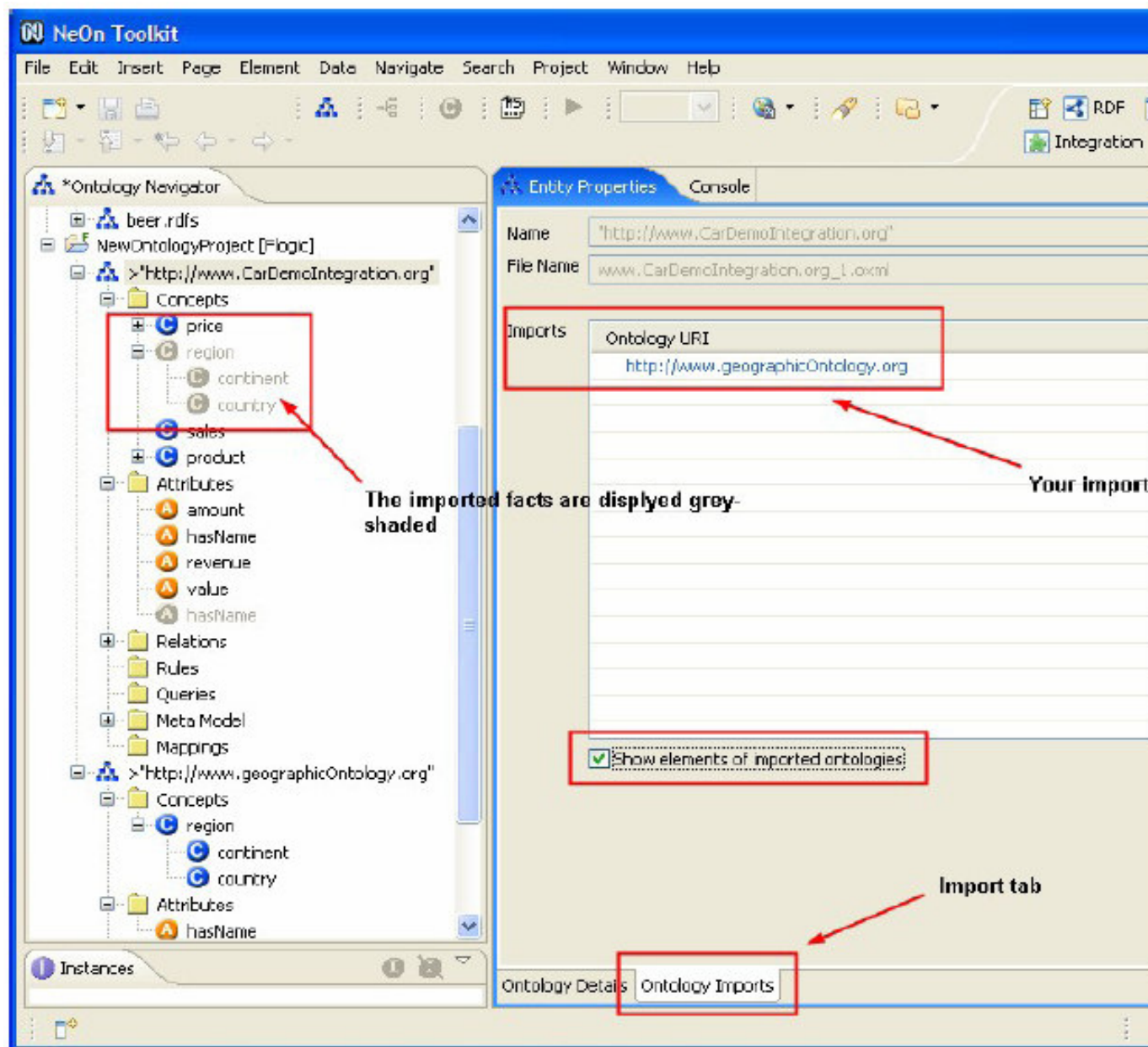
- Central element is a change and annotation ontology (CHAO)
- Gathers and provides information about ontology changes
- Focused on collaborative environments
- Plugins to support different ontology evolution scenarios
 - Synchronous/asynchronous ontology editing
 - Continuous editing/periodic archiving
 - Curation/no curation
 - Monitored/no monitored ontology changes



The screenshot displays the Protégé 3.4.2 interface with the following components:

- Subclass Explorer:** Shows a hierarchy of classes under `owl:Thing`, including `DomainConcept` (with 2 subclasses), `Country` (1), `IceCream` (1), `Pizza` (1), `PizzaBase`, `PizzaTopping`, and `ValuePartition`.
- Class Editor:** Currently editing the `oncep` class, showing the `rdfs:comment` property.
- Collaboration Panel:** Displays a list of notes for the `DomainConcept` class. The notes are:
 - ttania (10/23/08 10:59): This is a comment on the DomainConcept class
 - ttania (10/23/08 11:02): Re: This is a comment on the DomainConcept class
- Details Panel:** Shows the details for the selected comment, including:
 - Author:** ttania
 - Created:** 10/23/2008 21:59:18 GMT-08:00
 - Subject:** This is a comment on the DomainConcept class
 - Description:** This is an **example** of a **comment** on a class. You may also insert internal links to other entities in the ontology. For example, if you refer to class Pizza, you select from the "Add Internal Link" combo box, Class and select the class Pizza. This will generate the following link:
[@http://www.co-ode.org/ontologies/pizza/2005/10/18/pizza.owl#Pizza](http://www.co-ode.org/ontologies/pizza/2005/10/18/pizza.owl#Pizza)
If you **click on the link above**, a window will pop up with the details of class Pizza.
- Status:** Active

- Developed to using ontologies for large-scale semantic applications in the distributed organizations
- Handle multiple networked ontologies
- Toolkit features methods and tools for managing knowledge that is
 - Distributed
 - Heterogenous
 - Contextualized
 - Developed collaboratively.
- Toolkit is based on Eclipse platform
- Provides currently 45 plug-ins
- Toolkit supports two different ontology languages
 - F-logic
 - OWL

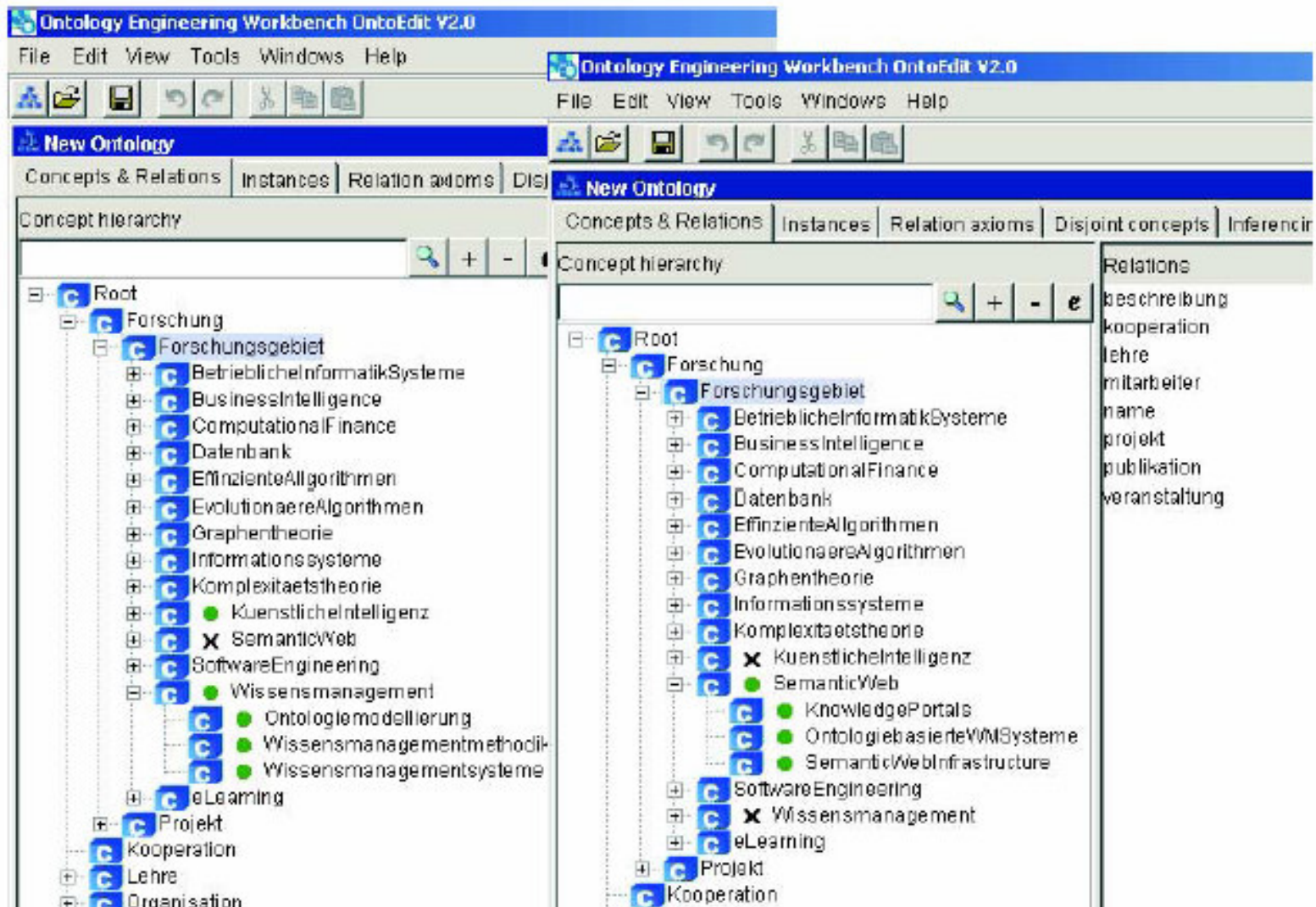


The screenshot displays the NeON Toolkit interface with the following components and annotations:

- Ontology Navigator:** Shows a tree view of ontologies. The ontology `>"http://www.CarDemoIntegration.org"` is selected, and its `price` concept is highlighted with a red box. A red arrow points to this box with the text: **The imported facts are displayed grey-shaded**.
- Entity Properties Console:** Shows the details for the selected ontology. The `Imports` section is highlighted with a red box and contains the text: `Ontology URI` and `http://www.geographicOntology.org`. A red arrow points to this box with the text: **Your imports**.
- Show elements of imported ontologies:** A checkbox is checked and highlighted with a red box.
- Import tab:** A red arrow points to the `Ontology Imports` tab at the bottom of the console, labeled **Import tab**.

- OntoEdit
 - Ontology engineering environment and
 - collaborative ontology editing environment
- Combines
 - methodology-based ontology development
 - with capabilities for collaboration and inferencing
- Ontologies stored using XML serialization
- Modeling at a conceptual level
 - Independent of concrete representation language
 - Using GUI's representing views on conceptual structures
- Conceptual model of ontology
 - Internally stored in powerful ontology model
 - Mapped onto different, concrete representation languages

Tool - OntoEdit



Ontology Engineering Workbench OntoEdit V2.0

File Edit View Tools Windows Help

Ontology Engineering Workbench OntoEdit V2.0

File Edit View Tools Windows Help

New Ontology

Concepts & Relations Instances Relation axioms Disj

Concept hierarchy

- Root
 - Forschung
 - Forschungsgebiet
 - BetrieblichInformatikSysteme
 - BusinessIntelligence
 - ComputationalFinance
 - Datenbank
 - EffizienteAlgorithmen
 - EvolutionaereAlgorithmen
 - Graphentheorie
 - Informationssysteme
 - Komplexitaetstheorie
 - KuenstlicheIntelligenz
 - SemanticWeb
 - SoftwareEngineering
 - Wissensmanagement
 - Ontologiemodellierung
 - Wissensmanagementmethodik
 - Wissensmanagementsysteme
 - eLearning
 - Projekt
 - Kooperation
 - Lehre
 - Organisation

New Ontology

Concepts & Relations Instances Relation axioms Disjoint concepts Inferencir

Concept hierarchy

- Root
 - Forschung
 - Forschungsgebiet
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 - SemanticWeb
 - SoftwareEngineering
 - Wissensmanagement
 - KnowledgePortals
 - OntologiebasierteWMSsysteme
 - SemanticWebInfrastructure
 - eLearning
 - Projekt
 - Kooperation

Relations

- beschreibung
- kooperation
- lehre
- mitarbeiter
- name
- projekt
- publikation
- veranstaltung



- Introduction
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- Building ontologies is
 - Difficult
 - Time-consuming
- Special methodologies and tools help
- Many methodologies published and tools developed
- Still scientific work to be done
 - Commonly agreed collaborative methodology
 - one standard tool
 - Or: Strengths-weaknesses-matrix for methodologies and tools

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Thank you very much