
Collaborative Ontology Development with Protégé

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Outline

- Collaboration
- Multi-user Protégé – simultaneous editing
- Collaborative Protégé – collaboration support
- WebProtégé – web-based browsing and editing
- Moving forward

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Collaborative Ontology Development

- Collaboration: several users contribute to the development of one ontology
 - Mechanisms for carrying out discussions, and
 - Reach consensus (e.g., polling, moderators)
 - Collaboration workflows – no one-size fits all
- Social platform for developing ontologies
- Each community does it its own way

Evolution of ontologies

- More prevalent in several domains
- “More” complex (taxonomies, classification → more formal representations)
- Larger
- More inter-dependencies (imports)
- Developed by domain experts rather than by ontology engineers

Examples of collaborative development

- Gene Ontology (GO)
- NCI Thesaurus
- BiomedGT
- OBI, BIRNLex, RadLex
- Open Biomedical Ontologies (OBO)
- International Classification of Diseases (ICD-10++)

How do groups collaborate?

- Send (tons of) emails!
- Telecons ...
- Use source control frameworks (sourceforge, Gforge)
- Use Web-based collaboration frameworks (WebEx, Centra)
- Google Groups, Docs, Sites (Wave – to come)
- ... all is good, but how do I link all this to my ontology?!

What features would they need to support their collaboration?

- Threaded discussions in the context of an ontology:
 - Discuss about a class in the ontology
 - Discuss about a particular value of a property at a class/property/individual, or about an axiom (E.g., “*I do not agree to the statement that **Disease** has synonym **Disorder***”)
- Provenance information (*John did not agree last week, but he changed his mind this week*)

What features would they need to support their collaboration? (cont.)

- Complete change history
 - *Bob created 3 classes yesterday, but today he was kind of lazy. He also tried to delete a class created by John but was not allowed to*
- Yes, your boss could make statistics ... :)
- Discuss controversial changes
- Undo a change (quite a dangerous operation)
- Go back to any previous state in time of the ontology
(*Show me the ontology as it was yesterday at 4pm*)

What features would they need to support their collaboration? (cont.)

- Personalized views of an ontology based on:
 - User's role and tasks
 - *Reviewers of the Gene domain, will see only the Gene class subtree*
 - User's expertise
 - *Certain features are hidden for beginner users*
 - User's trust network
 - *Have the same ontology view as the other users in my group*

What features would they need to support their collaboration? (cont.)

- Sandbox capability
 - Try out some changes before others can see it
- Versioning
 - CVS and SVN – like, but also
 - Simultaneous editing

What features would they need to support their collaboration? (cont.)

- Access policies
 - User with different access rights: E.g., Editors are allowed to create content, while Reviewers are only allowed to read the ontology
 - “Classical” access rights: read, write
 - Different access right granularities:
 - Per ontology
 - Per part of ontology

What features would they need to support their collaboration? (cont.)

- Scalability, performance and reliability
- Flexible Workflow Support:
 - No two workflows are the same
 - Workflows evolve over time (e.g., requirements change)
 - Well thought-out workflows are needed: e.g., How should editing conflicts be handled?
 - Workflows and business rules should be enforced in the ontology tool

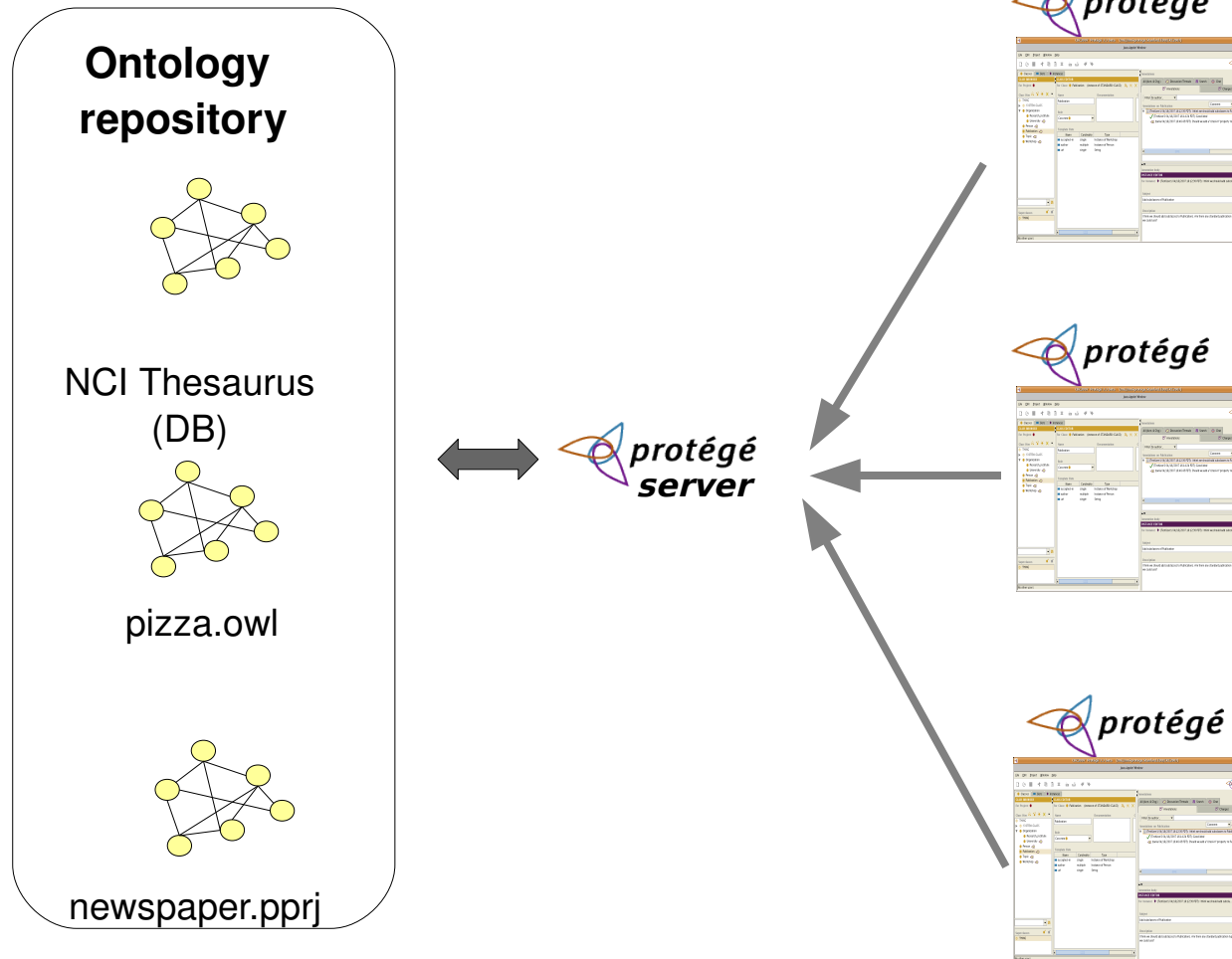
What they could use...

- Use ontology tools that support collaboration:
 - Collaborative Protégé
 - WebProtégé
 - BioPortal
- Other tools are available (see CKC 2007 workshop paper), but we are going to talk about x.Protégé

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Multi-user Protégé (a.k.a. Client - Server Protégé)

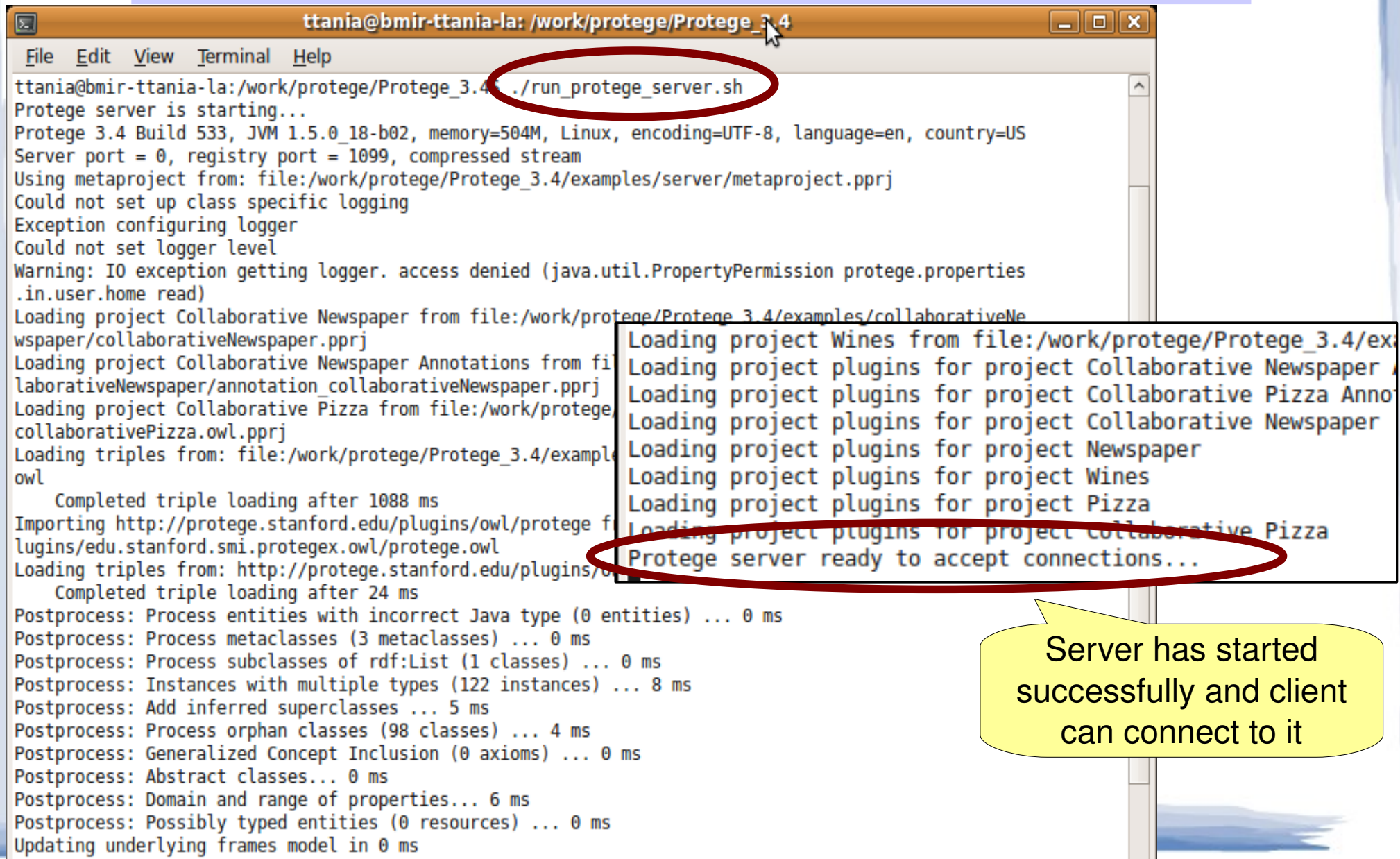


Multi-user Protégé - features

- Client-server architecture
- Simultaneous editing:
 - All changes are seen immediately by all clients
- Works with all backends of Protégé (OWL, frames, RDF)
- Recommended to be used with the database backend – support for transaction control

Starting the Protégé server

Execute the **run_protege_server** script from the Protégé installation directory



```
ttania@bmir-ttania-la: /work/protege/Protege_3.4
File Edit View Terminal Help
ttania@bmir-ttania-la:/work/protege/Protege_3.4: ./run_protege_server.sh
Protege server is starting...
Protege 3.4 Build 533, JVM 1.5.0_18-b02, memory=504M, Linux, encoding=UTF-8, language=en, country=US
Server port = 0, registry port = 1099, compressed stream
Using metaproject from: file:/work/protege/Protege_3.4/examples/server/metaproject.pprj
Could not set up class specific logging
Exception configuring logger
Could not set logger level
Warning: IO exception getting logger. access denied (java.util.PropertyPermission protege.properties
.in.user.home read)
Loading project Collaborative Newspaper from file:/work/protege/Protege_3.4/examples/collaborativeNe
wspaper/collaborativeNewspaper.pprj
Loading project Collaborative Newspaper Annotations from fi
laborativeNewspaper/annotation_collaborativeNewspaper.pprj
Loading project Collaborative Pizza from file:/work/protege
collaborativePizza.owl.pprj
Loading triples from: file:/work/protege/Protege_3.4/exampl
owl
Completed triple loading after 1088 ms
Importing http://protege.stanford.edu/plugins/owl/protege f
lugins/edu.stanford.smi.protegex.owl/protege.owl
Loading triples from: http://protege.stanford.edu/plugins/
Completed triple loading after 24 ms
Postprocess: Process entities with incorrect Java type (0 entities) ... 0 ms
Postprocess: Process metaclasses (3 metaclasses) ... 0 ms
Postprocess: Process subclasses of rdf:List (1 classes) ... 0 ms
Postprocess: Instances with multiple types (122 instances) ... 8 ms
Postprocess: Add inferred superclasses ... 5 ms
Postprocess: Process orphan classes (98 classes) ... 4 ms
Postprocess: Generalized Concept Inclusion (0 axioms) ... 0 ms
Postprocess: Abstract classes... 0 ms
Postprocess: Domain and range of properties... 6 ms
Postprocess: Possibly typed entities (0 resources) ... 0 ms
Updating underlying frames model in 0 ms
Loading project Wines from file:/work/protege/Protege_3.4/ex
Loading project plugins for project Collaborative Newspaper
Loading project plugins for project Collaborative Pizza Anno
Loading project plugins for project Collaborative Newspaper
Loading project plugins for project Newspaper
Loading project plugins for project Wines
Loading project plugins for project Pizza
Loading project plugins for project collaborative Pizza
Protege server ready to accept connections...
```

Server has started successfully and client can connect to it

Problems you may have..

- Server and client are behind a firewall
 - Solution: open 2 ports to be used by the server, and uncomment the ports line in the run_protege_script
 - Solution is described in detail on the Protégé wiki in the Multi-user tutorial

```
PORTOPTS="-Dprotege.rmi.server.port=5200 -Dprotege.rmi.registry.port=5100"
```

Configuring the server – The Metaproject

- The metaproject is used to configure the server: users, access policies, projects
- Stored by default in Protégé installation directory
`/examples/server`

Configuration of the Collaborative Protégé Server: The Metaproject

The screenshot displays the Protégé 3.4 beta interface with the 'metaproject' file open. The interface is divided into several panes:

- CLASS BROWSER:** Shows the class hierarchy for the 'metaproject'. The 'Project' class is highlighted, with its instances listed below it.
- INSTANCE BROWSER:** Shows the instances of the 'Project' class. The 'Collaborative Pizza' instance is selected.
- INSTANCE EDITOR:** Provides a detailed view of the 'Collaborative Pizza' instance, including fields for Name, Owner, Location, Description, and AllowedGroupOperation.

Four callout boxes provide additional context:

- Projects available on the server:** Points to the 'Project' class in the Class Browser.
- Policies on operations/p roject:** Points to the 'AllowedGroupOperation' table in the Instance Editor.
- Associated annotation project:** Points to the 'Collaborative Pizza Annotations (DO NOT USE THIS!)' instance in the Instance Browser.
- Project location on server:** Points to the 'Location' field in the Instance Editor.

Class Hierarchy (CLASS BROWSER):

- :THING
 - :SYSTEM-CLASS
 - Project (6)
 - User (142)
 - Group (3)
 - Operation (2)
 - GroupOperation (1)

Instance Browser (For Class: Project):

- CKC2007
- CKC2007 Annotations (DO NOT USE THIS!)
- Collaborative Newspaper
- Collaborative Newspaper Annotations (DO NOT USE THIS!)
- Collaborative Pizza
- Collaborative Pizza Annotations (DO NOT USE THIS!)

Instance Editor (For Instance: Collaborative Pizza):

Name: Collaborative Pizza

Owner: tania

Location: examples/collaborativePizza/collaborativePizza_localhost.owl.pprj

Description: The collaborative pizza project

AllowedGroupOperation Table:

allowedGroup	allowedOperation
World	Read, Write

AnnotationProject:

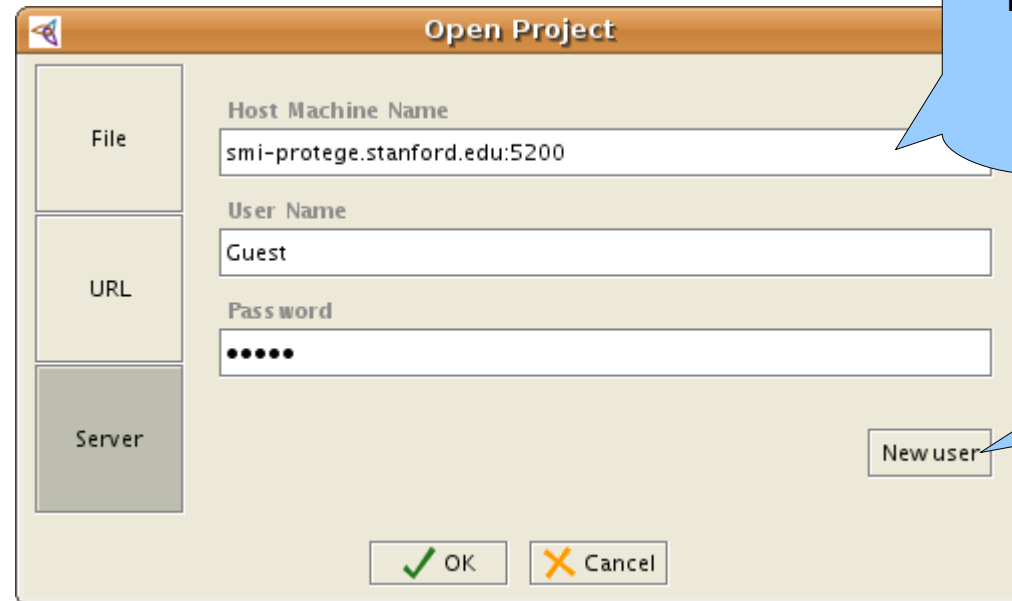
- Collaborative Pizza Annotations (DO NOT USE THIS!)

The Metaproject - Policies

- Policies are operations allowed for a group of users: E.g. “World can Read, Write” and are attached to a project
- A policy can be reused for several projects
- Predefined operations (read, write, display in project list, admin, etc.) - see wiki
- Most predefined policies are enforced: Read, Write, etc.
- You can define your own policies and enforce them in your application using Protégé policy manager

Connecting to a Collaborative Protégé server

File menu -> Open ... -> Server



The 'Open Project' dialog box has a title bar with a small icon and the text 'Open Project'. On the left is a vertical sidebar with three buttons: 'File', 'URL', and 'Server'. The 'Server' button is highlighted. The main area contains three text input fields: 'Host Machine Name' with the text 'smi-protege.stanford.edu:5200', 'User Name' with the text 'Guest', and 'Pass word' with masked characters '.....'. At the bottom right of the main area is a button labeled 'New user'. At the bottom center are two buttons: 'OK' with a green checkmark icon and 'Cancel' with an orange X icon.

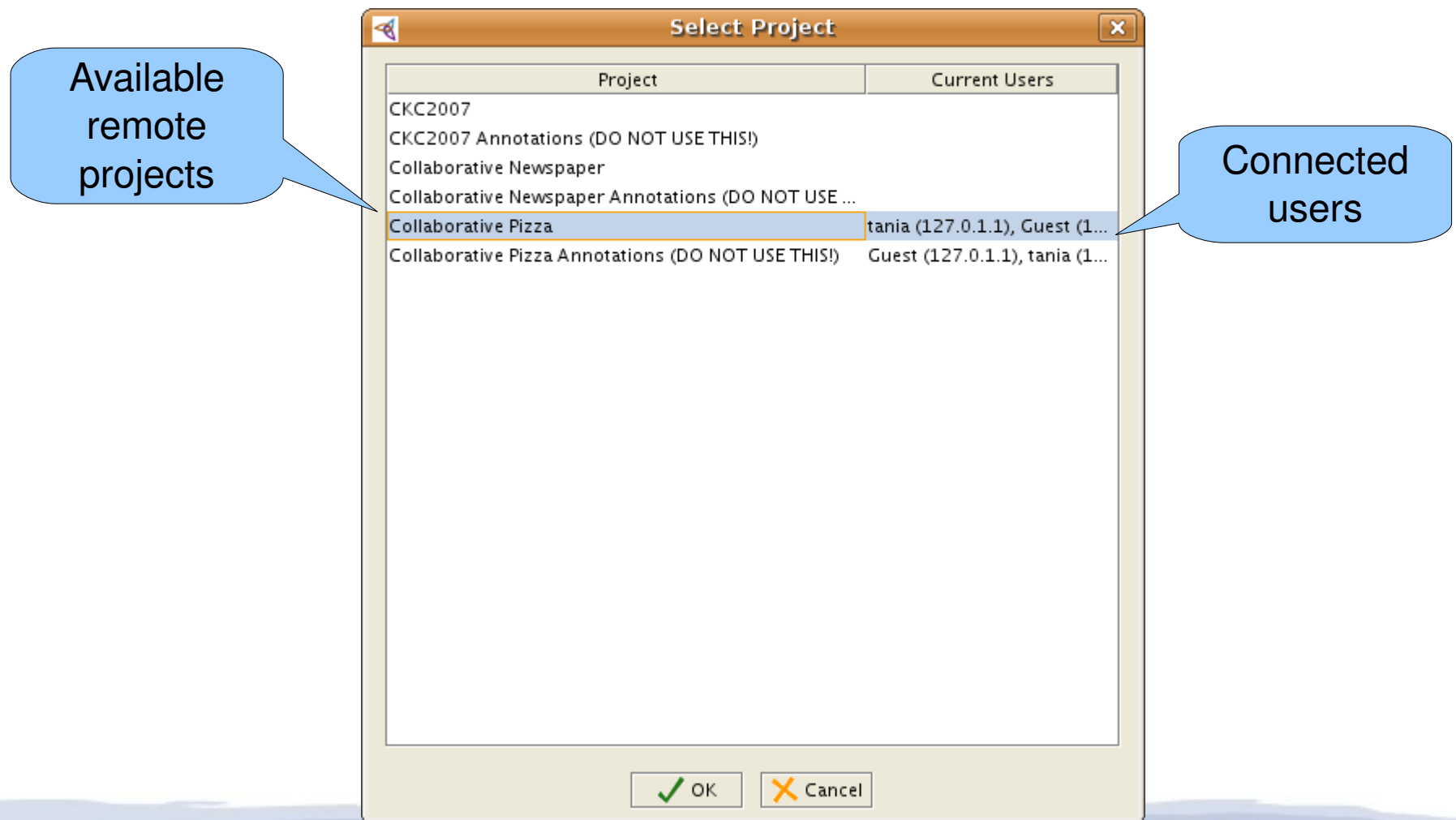
The server host name
(might be different
during demo)

Create
new user

Web-start and applet demo: <http://smi-protege.stanford.edu/collab-protege/>

Selecting a remote project

Select from the projects list: **Collaborative Pizza**



After connecting this is what you should see..

Collaborative+Pizza Protégé 3.4 beta (rmi://smi-ttania-la/Collaborative+Pizza)

File Edit Project OWL Reasoning Code Tools Window Collaboration Help

Metadata(pizza.owl) OWLClasses Properties Individuals

SUBCLASS EXPLORER

For Project: ●

Asserted Hierarchy

- owl:Thing
 - DomainConcept
 - ValuePartition

CLASS EDITOR for DomainConcept (instance of owl:Class)

For Class: <http://www.co-ode.org/ontologies/pizza/2005/10/18/pizza.owl#DomainConcept> Inferred View

Property	Value
rdfs:comment	

owl:Thing

ValuePartition

Collaboration

Discussion Threads Search Chat

Annotations Changes All (Ann. & Chg.)

Filter By author... Go

Annotations on DomainConcept

- ttania (10/23/08 09:59): This is a comment on the DomainConcept class
- ttania (10/23/08 10:02): Re: This is a comment on the DomainConcept class

Details

Author: ttania Created: 10/23/2008 21:59:18 GMT-08:00

Subject: This is a comment on the DomainConcept class

Add Internal Link To ?

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>

If you **click on the link above**, a window will pop up with the details of class Pizza.

Logic View Properties View

Administering the Protégé server

- Can be done with the Admin application
- Allows you to see the current projects, their status, connected sessions, and to administer them; and shut down the server
- Needs special policy configured in the metaproject

The screenshot shows the 'Open Project' dialog box. The 'Server' tab is selected in the left sidebar. The 'Host Machine Name' field contains 'localhost', the 'User Name' field contains 'Admin', and the 'Password' field is masked with dots. A 'New user' button is located to the right of the password field. At the bottom, the checkbox 'Administer server (requires privileges)' is checked and highlighted with a red circle. The 'OK' and 'Cancel' buttons are at the bottom center.

The Server Admin - Projects

The screenshot shows a web-based administrative interface for a Protege server. The window title is 'Administer Protege Server (Logged in as Admin)'. It has three tabs: 'Projects', 'Sessions', and 'Server Control'. The 'Projects' tab is active, showing a table of remote projects. The 'Collaborative Pizza' project is selected and highlighted. Below the table, there is a section for 'Details on project: Collaborative Pizza', which includes 'Statistics' (Estimated round trip time, Milliseconds to calculate frame cache, Transaction Isolation Level) and 'Users' (a table of active sessions). A 'Refresh' button is at the bottom.

Administer Protege Server (Logged in as Admin)

Projects Sessions Server Control

Remote projects

Project	Status	Sessions
Collaborative Newspaper	SHUTTING_DOWN	[]
Collaborative Newspaper Annotations	READY	[]
Collaborative Pizza	READY	[Session(id=102, user=Guest), Session(id=106, user=Ray Ferguson)]
Collaborative Pizza Annotations	READY	[Session(id=107, user=Ray Ferguson), Session(id=103, user=Guest)]
Pizza	CLOSED_FOR_MAINTENANCE	[]

Details on project: Collaborative Pizza

Statistics

Estimated round trip time (ms): 6

Milliseconds to calculate frame cache: 6

Transaction Isolation Level: NONE

Users

Session ID	User	IP Address	In Transaction?	Server Backlog
102	Guest	127.0.1.1	<input type="checkbox"/>	0
106	Ray Ferguson	127.0.1.1	<input type="checkbox"/>	0

Refresh

Projects status

- A project on the server can be in 3 different status:
 - **READY** – users can open it
 - **SHUTTING_DOWN** – a shut down was scheduled, project is not available anymore
 - **CLOSED_FOR_MAINTENANCE** – project is not available, maintenance can be performed on it on the server side (and after that it can be restarted)

Shutting down a project for maintenance

Administer Protege Server (Logged in as Admin)

Projects Sessions Server Control

Remote projects

Project	Status	Sessions
Collaborative Newspaper	SHUTTING_DOWN	[]
Collaborative Newspaper Annotations	READY	[]
Collaborative Pizza	READY	[Session(id=102, user=Guest), Session(id=106, user=Ray Ferguson)]
Collaborative Pizza Annotations	READY	[Session(id=107, user=Ray Ferguson), Session(id=103, user=Guest)]
Pizza	CLOSED_FOR_MAINTENANCE	[]

Details on project: Collaborative Pizza

Statistics

Estimated round trip time (ms): 6

Milliseconds to calculate frame cache: 6

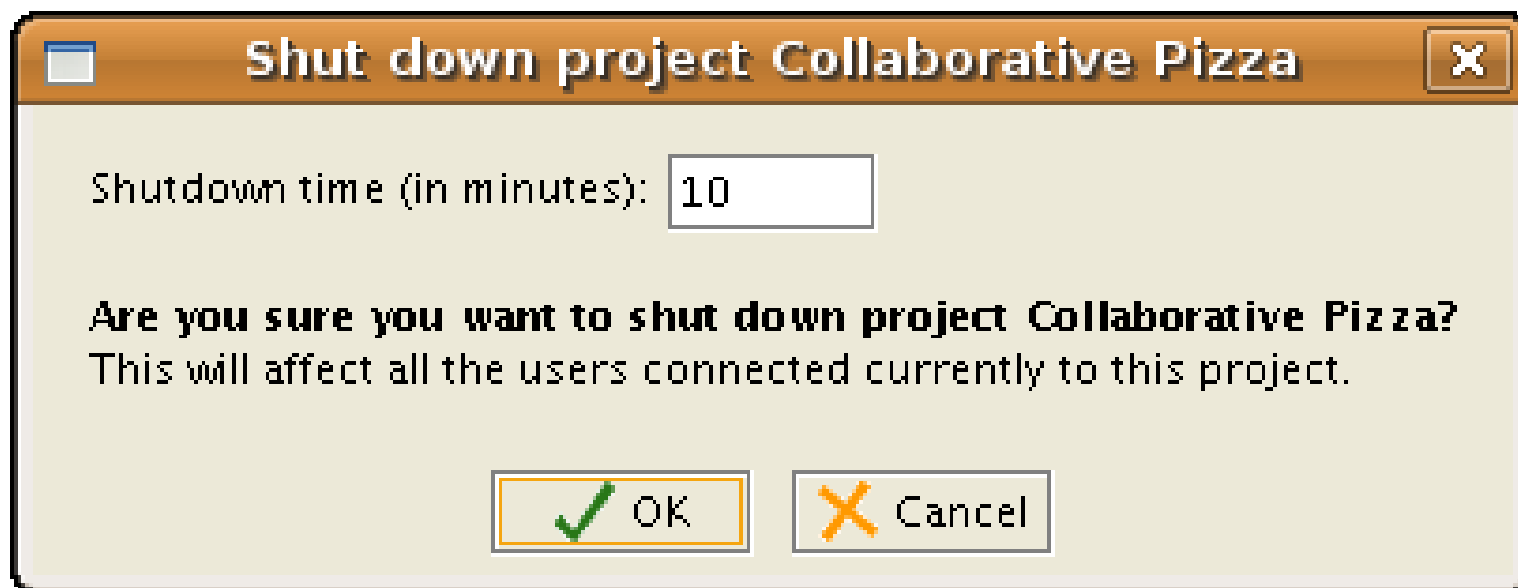
Transaction Isolation Level: NONE

Users

Session ID	User	IP Address	In Transaction?	Server Backlog
102	Guest	127.0.1.1	<input type="checkbox"/>	0
106	Ray Ferguson	127.0.1.1	<input type="checkbox"/>	0

Refresh

Shutting down a project for maintenance



You may also cancel a shut down of a project

Clients will be notified that the project is going to be shut down with repeating notifications.

Once the project has shut down, the clients will close the connection to the server cleanly.

Server Admin - Sessions

Administer Protege Server (Logged in as Admin)

Projects Sessions Server Control

Live sessions

Id	User name	User IP	Project	Login time
*109	Admin	127.0.1.1	[(none)]	10:52:29, 2009.02.13
110	Ray Ferguson	127.0.1.1	[(none)]	12:16:32, 2009.02.13
111	Ray Ferguson	127.0.1.1	[Collaborative Pizza]	12:17:01, 2009.02.13
112	Ray Ferguson	127.0.1.1	[Collaborative Pizza Annotations]	12:17:14, 2009.02.13
113	Ray Ferguson	127.0.1.1	[(none)]	12:17:15, 2009.02.13
114	Guest	127.0.1.1	[Collaborative Pizza]	12:17:26, 2009.02.13
115	Guest	127.0.1.1	[Collaborative Pizza Annotations]	12:17:33, 2009.02.13
116	Guest	127.0.1.1	[(none)]	12:17:35, 2009.02.13

Refresh

If you have the right privileges, you can kill a user session.

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Collaborative Protégé Features

- Extension of existing Protégé system
- Support for:
 - annotating ontology components and changes in the ontology
 - discussion threads
 - proposals and voting
 - searching and filtering
 - defining users, groups, policies
- Works in Protégé 3.x OWL and Frames
- Available in multi-user and stand-alone modes
- Distributed with Protégé installation

<http://protege.stanford.edu/doc/collab-protege/>

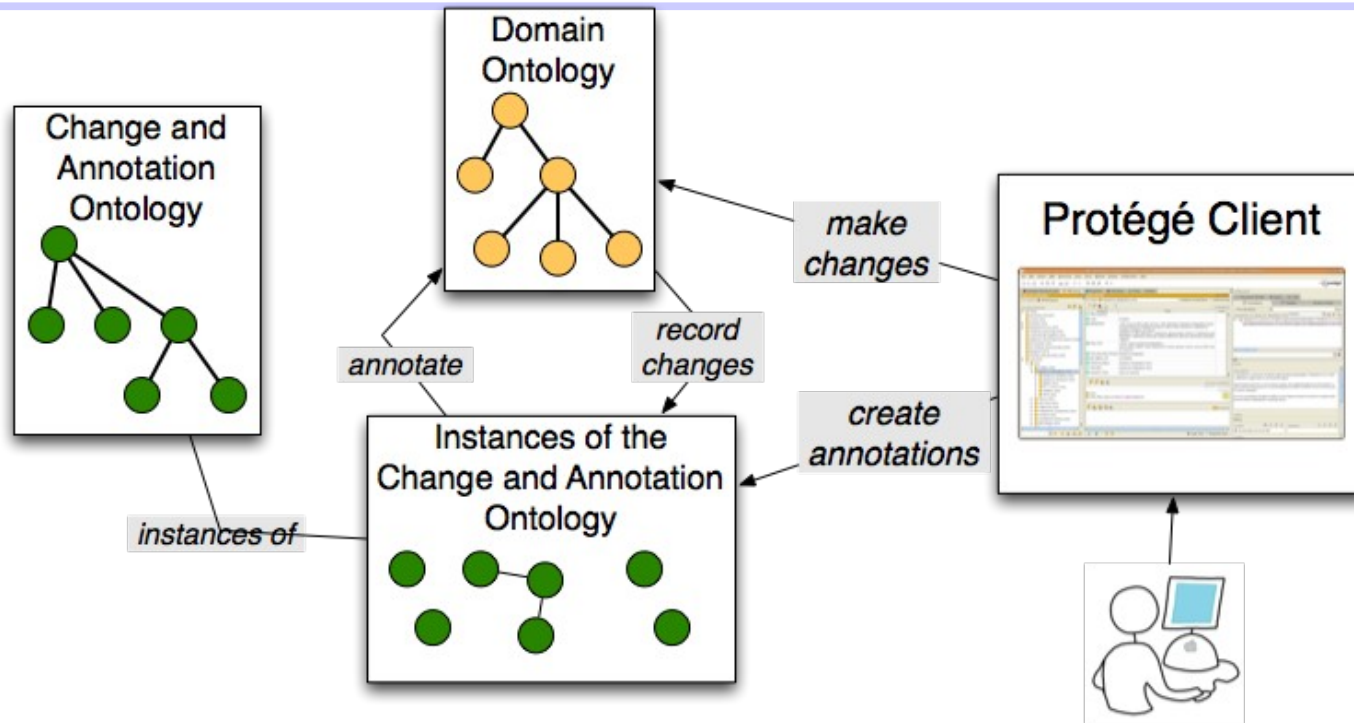
Collaborative Protégé GUI

The screenshot displays the Protégé 3.4 beta interface for a collaborative ontology project named 'collaborativePizza'. The main window is divided into several panels:

- SUBCLASS EXPLORER:** Located on the left, it shows an asserted hierarchy for the project. The hierarchy starts with 'owl:Thing' and branches into 'DomainConcept', 'Country', 'IceCream', and 'Pizza'. The 'Pizza' class is highlighted with a callout bubble saying "has annotations".
- CLASS EDITOR for DomainConcept:** Located in the center, it shows the class 'DomainConcept' with its properties, including 'rdfs:comment'. A callout bubble points to the 'rdfs:comment' property, saying "Annotations".
- Collaboration Panel:** Located on the right, it contains several tabs: 'Annotations', 'Changes', 'Discussion Threads', and 'Search'. The 'Annotations' tab is active, showing a list of annotations on the 'DomainConcept' class. Two annotations are visible: 'ttania (10/24/08 07:59): This is a comment on the DomainConcept class' and 'ttania (10/24/08 08:02): Re: This is a comment on the DomainConcept class'. A callout bubble points to the 'Collaborative Tabs' header. Below the list, there is a 'Details' section with fields for 'Author' (ttania), 'Created' (10/23/2008 21:59:18 GMT-08:00), and 'Subject' (This is a comment on the DomainConcept class). At the bottom, there is a 'Description' section with text explaining how to use internal links, such as '@http://www.co-ode.org/ontologies/pizza/2005/10/18/pizza.owl#Pizza'.

At the bottom of the window, there are buttons for 'Logic View' and 'Properties View'.

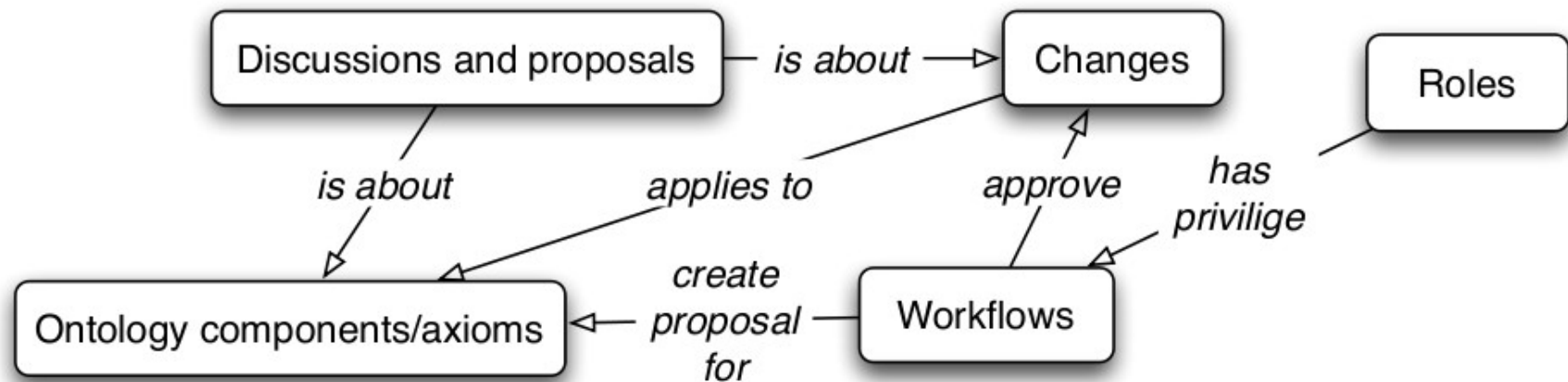
Basic collaborative mechanism in Protégé



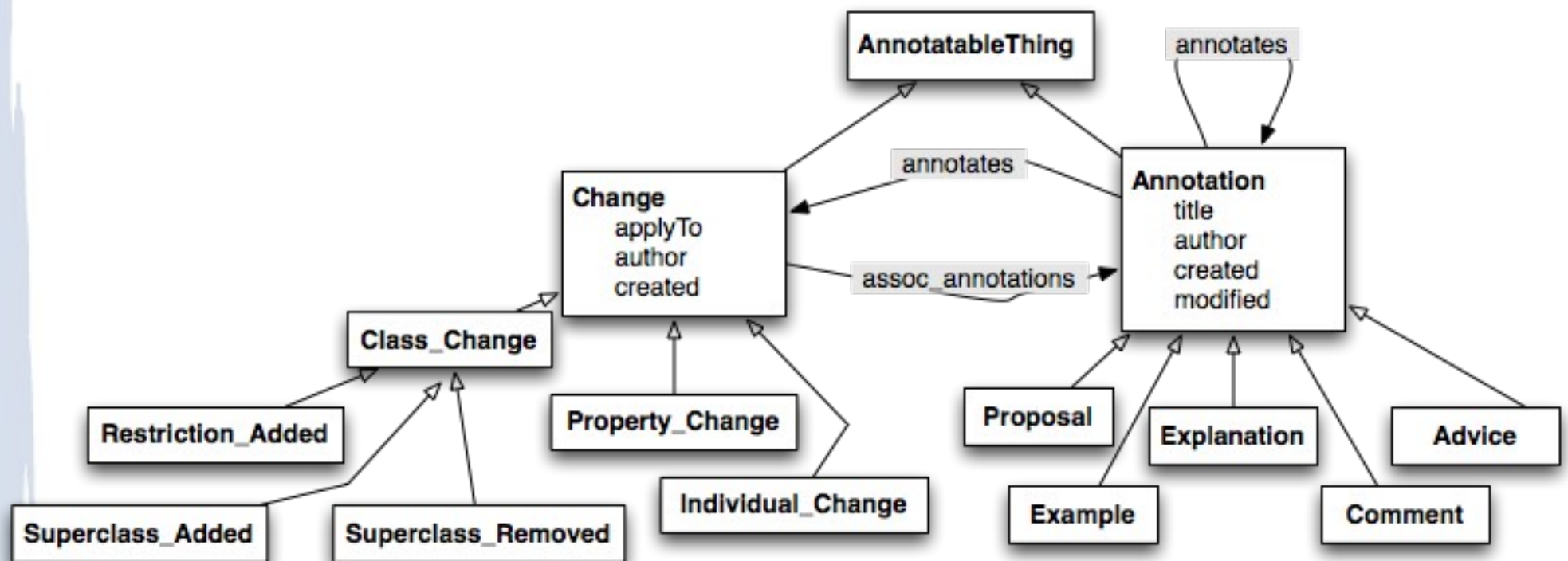
- **Ontology editor component:**
 - basic ontology editing functionalities
- **Annotation component:**
 - user ontology is annotated with annotation instances from the Annotation ontology
- **Change tracking component:**
 - changes are stored as instance of the Annotation ontology

Ontologies for supporting the collaborative development process

- We used ontologies for representing:
 - **Ontology components** (e.g., classes, properties, individuals)
 - **Changes** (e.g., Domain changed for a property)
 - **Roles** (e.g., Manager, Editor, SME, etc.)
 - **Annotations** (e.g., comments on classes, or changes)

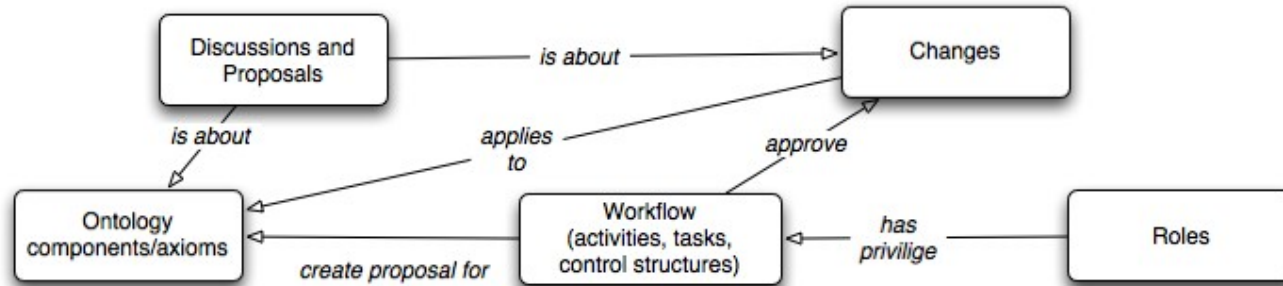


The Changes & Annotation Ontology (ChAO)

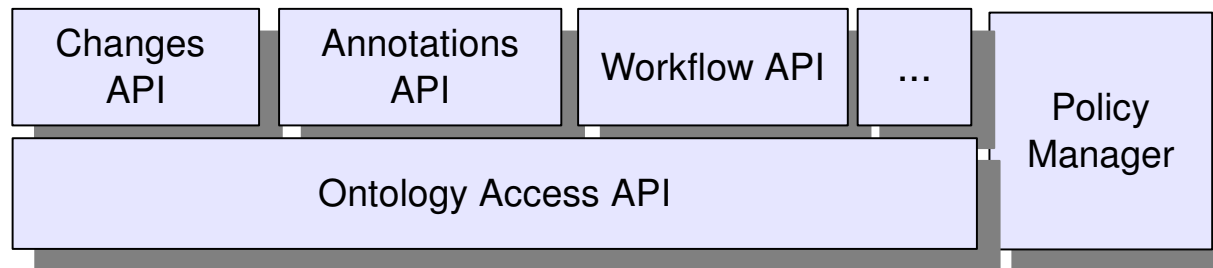


The Collaboration Framework

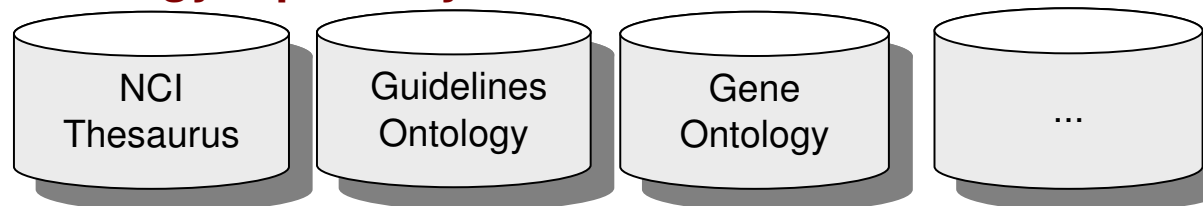
Ontologies supporting the collaboration process



API access



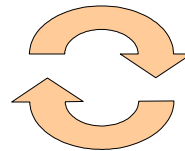
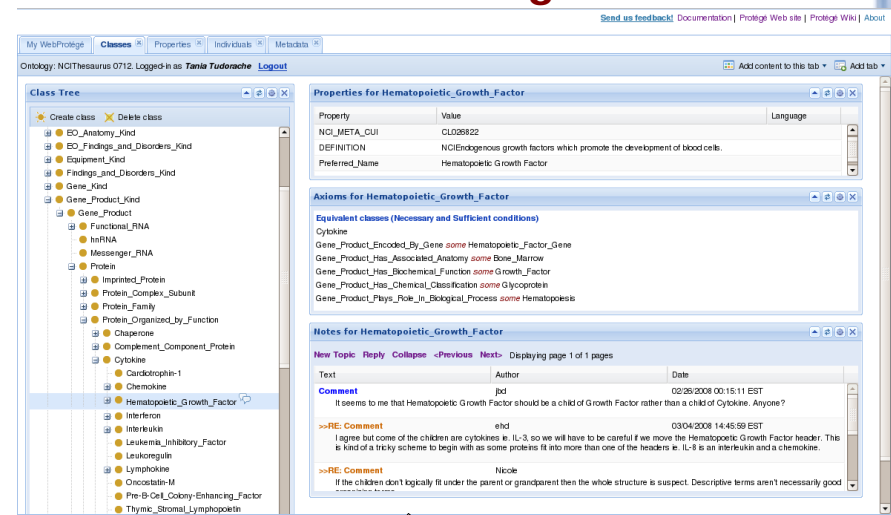
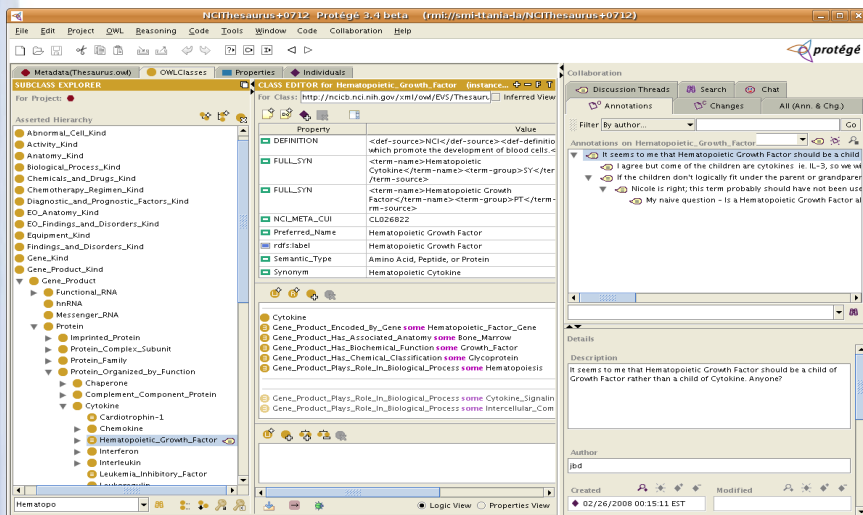
Ontology repository



The Collaborative Framework + Clients

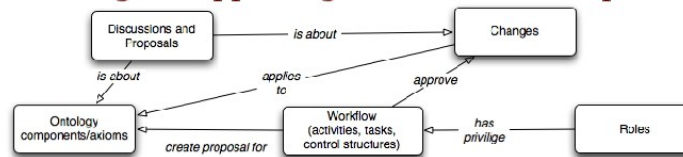
Collaborative Protégé

WebProtégé

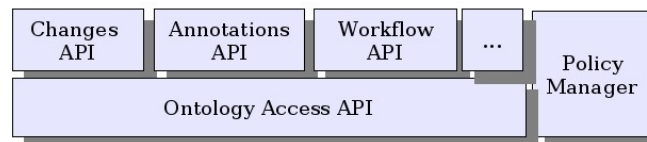


Collaborative Framework

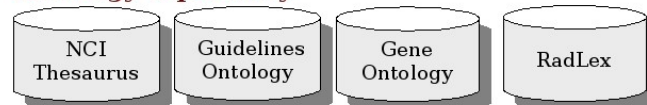
Ontologies supporting the collaboration process



API access



Ontology repository



Annotations and Discussion Threads

- Annotations are linked to a specific **ontology component**
- Different **types** of annotations
- Annotations types can be **extended** with no extra coding
- Users may annotate:
 - classes
 - properties
 - individuals
 - the ontology as a whole
- Annotations may be **filtered** and **searched** based on different criteria

The screenshot displays a web application interface for managing annotations and discussion threads. The top navigation bar includes tabs for 'Annotations', 'Changes', 'Discussion Threads', and 'Search'. Below this, a 'Filter' dropdown is set to 'By author...'. The 'Discussion Threads' section shows a list of threads, with the selected thread being 'sdc (02/26/08 06:15): Business Rules'. The 'Details' section for this thread shows the author as 'sdc', the creation date as '02/26/2008 00:15:06 EST', and the subject as 'Business Rules'. The description of the thread is a list of questions regarding the plan for reviewing BiomedGT data.

Collaboration

Annotations Changes Discussion Threads Search

Filter By author... Go

Discussion Threads

Comment

- ▼ sdc (02/22/08 05:34): Business Rules - child of NCI Administrative Concept -- we need a pl
- ▼ sdc (02/26/08 06:15): Business Rules
 - ▶ sdc (03/04/08 11:25): Should we put this discussion on one of the bi-weekly meetin
 - ▶ ehd (02/26/08 06:15): General Many of these concepts are common words so we wil
- ▶ jb (02/26/08 06:15): It seems to me that Hematopoietic Growth Factor should be a child of C
- ▶ ehd (02/26/08 10:07): Discussion of the Collaboration Tab
- ▼ jb (03/04/08 08:46): CD47 seems to have a mistake among its asserted biochemical functio
 - ▶ ehd (03/04/08 08:53): Yes that should be removed it was probably supposed to be Imm
 - ▶ sdc (03/04/08 11:17): John, will you fix this? (Note, this would be a good candidate f
- ▶ jb (03/04/08 09:46): This term is clearly mis-assigned to the cell adhesion molecules. Swiss
- ▶ jb (03/04/08 10:01): Integrin alpha 5 is listed in two instances among the Cell Adhesion Mol
- ▶ sdc (02/26/08 06:25): Gene Products Discussion Thread

Details

Author: sdc Created: 02/26/2008 00:15:06 EST

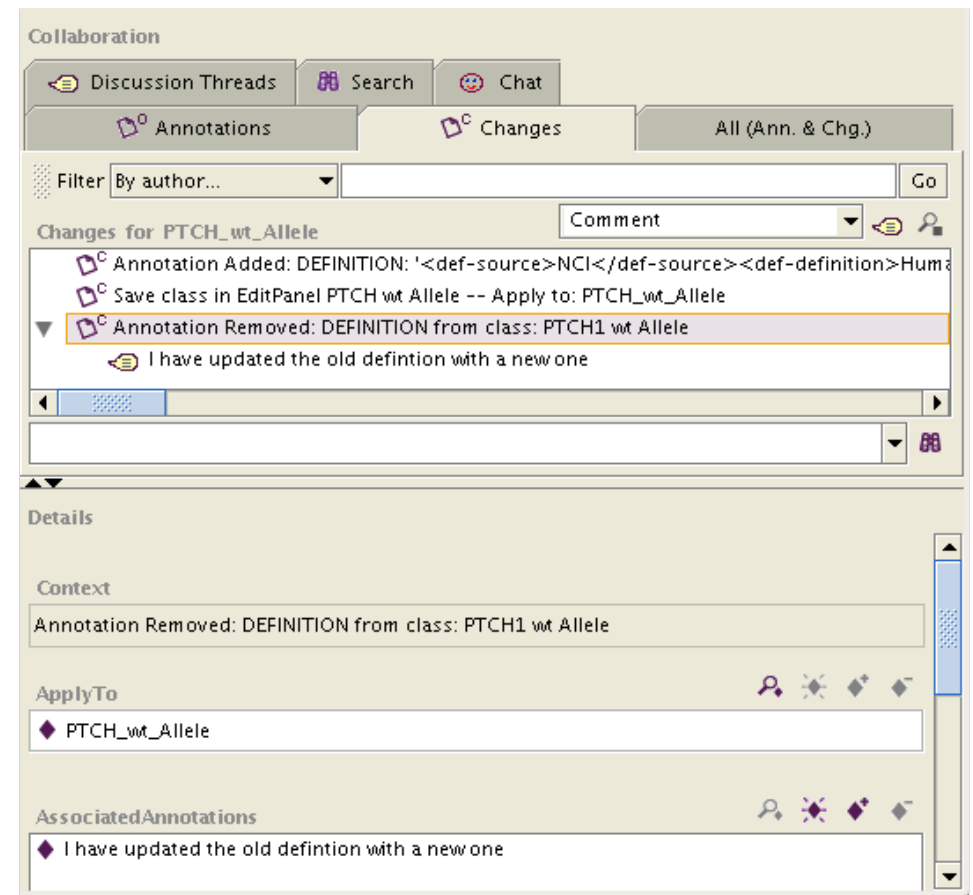
Subject: Business Rules

Add Internal Link To ?

Description: Business Rules - Questions re: plan for reviewing
a. Do we care whether anything in caDSR might have coded with this? This is BiomedGT. I don't think BiomedGT needs most of it.
b. Do we want to review date created? Report from Steph/Sharon?
c. Many are related to grants/ contracts/ admin processes - can we remove these?
d. Few in there for FDA - will those be in Lyuba's set of terms?
e. Manual or batch removal?

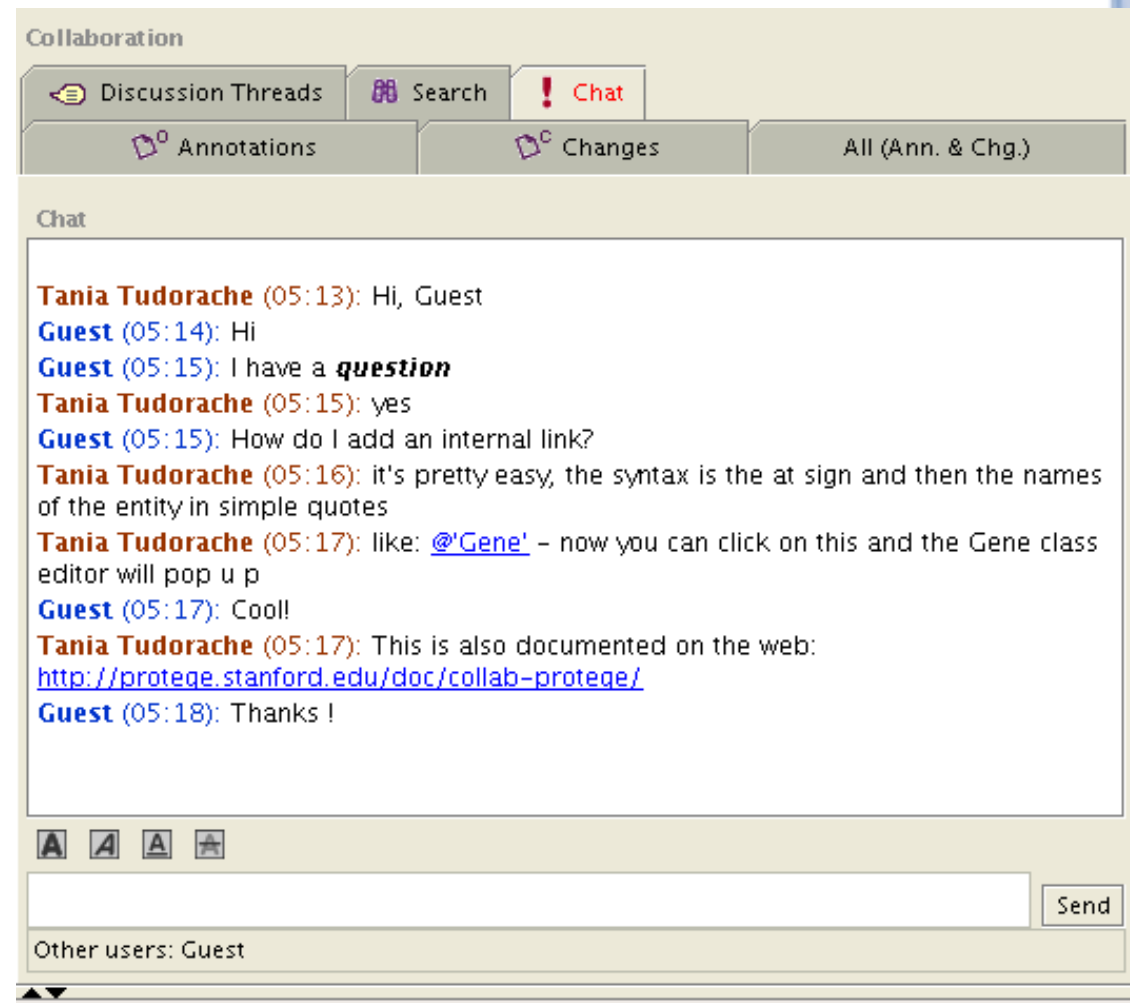
Changes Tab

- See the **history** of a concept
- Users may **comment on changes**; for example on a class rename operation or on a change of a domain property
- Browse the change details (e.g. author, creation date, sub-changes, etc.)



Chat Tab

- Exchange live messages between users connected to the same Protégé server
- Supports **HTML formatting** (hyperlinks, bold, italics, etc.)
- **Internal links** to ontology entities (e.g., @'Gene')
- Chat available also as a Tab plug-in



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- Moving forward

WebProtégé – an alternative client for Collaborative Protégé

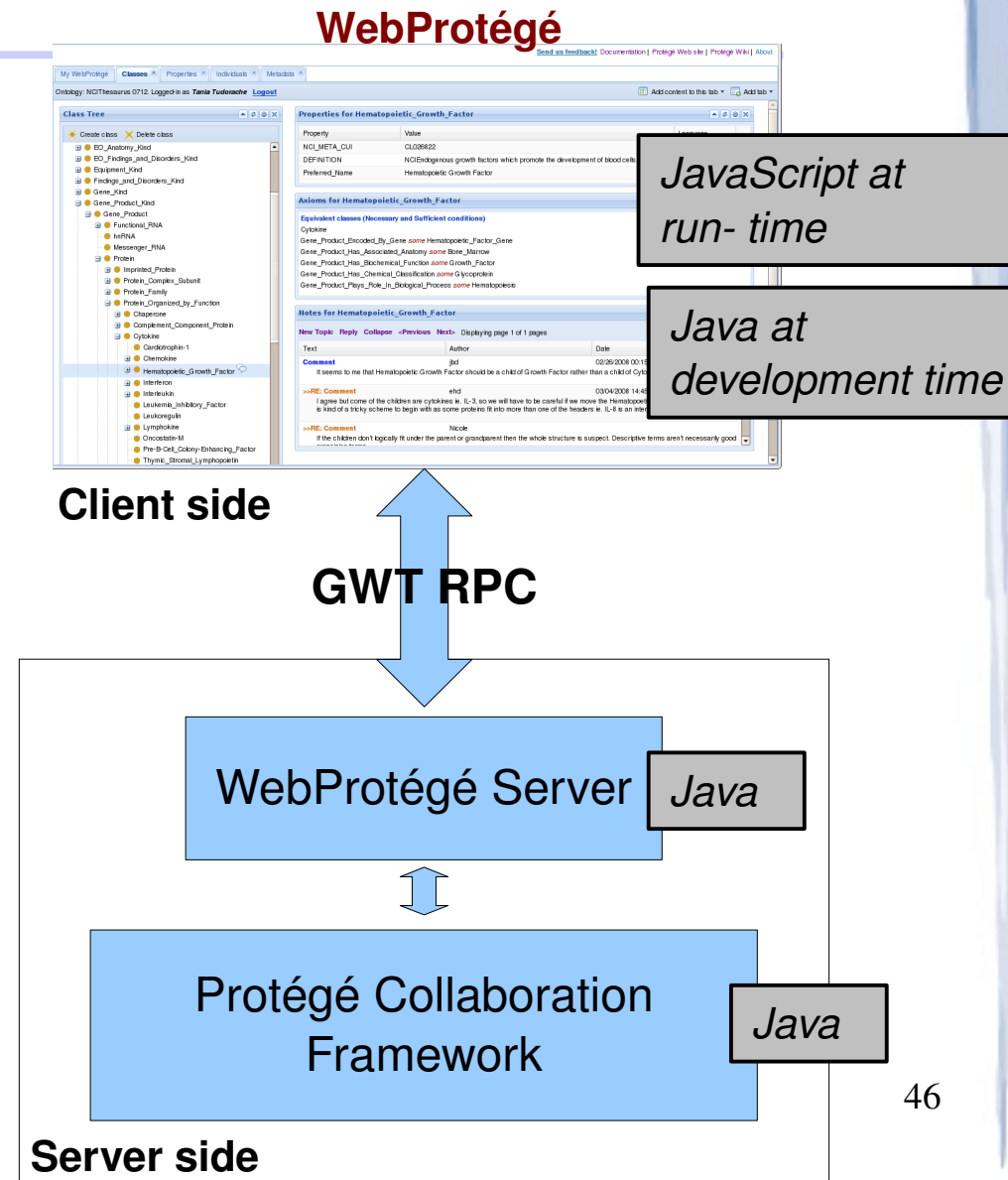
- WebProtégé is an open source light-weight ontology editor for the Web
- It is a Collaborative Protégé client
- Main features of WebProtégé:
 - Browsing of ontologies on the Web
 - Lightweight ontology editing
 - Designed using a portal metaphor: The user interface is composed of reusable components, called portlets
 - Customizable UI by drag-n-drop and by showing or hiding different ontology tabs
 - Extensible: Developers may easily implement their own tabs and portlets

GWT – Google Web Toolkit

- GWT: write web client applications in Java
- GWT compiles the Java code into optimized JavaScript
- The server side is written in Java
- Client-Server communication through RPC (JSON, others also available)

WebProtégé - Architecture

- 2 sides of the story: server and client
- Server is completely implemented in Java and makes API calls to Protégé
- Client side is developed in Java, and later compiled into JavaScript
- Communication between server – client is done with GWT RPC (can be done in other ways, too)



WebProtégé UI

- Portal metaphor (inspired from MyYahoo and iGoogle)
 - Portlets are panels that have some functionality (e.g. display the properties of a class) and can be dragged around
 - Users can customize the layout of WebProtege:
 - Enable/disable tabs
 - Customize the portlets in a tab
 - Configuration is stored on server and it per project/user
- Uses a 3rd party widget library: GWT-ext

WebProtégé GUI – showing the NCI Thesaurus

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My WebProtégé **Classes** Properties Individuals Metadata

Ontology: NCIThesaurus 0712. Logged-in as **Tania Tudorache** [Logout](#)

Add content to this tab Add tab

Class Tree

Create class Delete class

- EO_Anatomy_Kind
- EO_Findings_and_Disorders_Kind
- Equipment_Kind
- Findings_and_Disorders_Kind
- Gene_Kind
- Gene_Product_Kind
 - Gene_Product
 - Functional_RNA
 - hnRNA
 - Messenger_RNA
 - Protein
 - Imprinted_Protein
 - Protein_Complex_Subunit
 - Protein_Family
 - Protein_Organized_by_Function
 - Chaperone
 - Complement_Component_Protein
 - Cytokine
 - Cardiotrophin-1
 - Chemokine
 - Hematopoietic_Growth_Factor**
 - Interferon
 - Interleukin
 - Leukemia_Inhibitory_Factor
 - Leukoregulin
 - Lymphokine
 - Oncostatin-M
 - Pre-B-Cell_Colony-Enhancing_Factor
 - Thymic_S

Properties for Hematopoietic_Growth_Factor

Property	Value	Language
NCI_META_CUI	CLO26822	
DEFINITION	NCIEndogenous growth factors which promote the development of blood cells.	
Preferred_Name	Hematopoietic Growth Factor	

Axioms for Hematopoietic_Growth_Factor

Equivalent classes (Necessary and Sufficient conditions)

Cytokine
Gene_Product_Encoded_By_Gene *some* Hematopoietic_Factor_Gene
Gene_Product_Has_Associated_Anatomy *some* Bone_Marrow
Gene_Product_Has_Biochemical_Function *some* Growth_Factor
Gene_Product_Has_Chemical_Classification *some* Glycoprotein
Gene_Product_Plays_Role_In_Biological_Process *some* Hematopoiesis

Notes for Hematopoietic_Growth_Factor

[New Topic](#) [Reply](#) [Collapse](#) [Previous](#) [Next](#) Displaying page 1 of 1 pages

Text	Author	Date
Comment It seems to me that Hematopoietic Growth Factor should be a child of Growth Factor rather than a child of Cytokine. Anyone?	jbd	02/26/2008 00:15:11 EST
>>RE: Comment I agree but come of the children are cytokines ie. IL-3, so we will have to be careful if we move the Hematopoietic Growth Factor header. This is kind of a tricky scheme to begin with as some proteins fit into more than one of the headers ie. IL-8 is an interleukin and a chemokine.	ehd	03/04/2008 14:45:59 EST
>>RE: Comment If the children don't logically fit under the parent or grandparent then the whole structure is suspect. Descriptive terms aren't necessarily good	Nicole	

<http://bmir-protege-dev1.stanford.edu/webprotege/>

First page in WebProtégé

WebProtégé - Mozilla Firefox

File Edit View History Bookmarks Tools Help

http://bmir-protege-dev1.stanford.edu/webprotege/WebProtege.html#Collat

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My WebProtégé Classes Properties Individuals Metadata

Ontology: Collaborative Pizza. [Login](#) for more features.

Add content to this tab Add tab

Name	Description	Owner	Action
Biomedical Resource Ontology	The Biomedical Resource Ontology	Daniel Rubin	Open in Protege
CA ADI 2003	The CA ADI 2003 project	Samson Tu	Open in Protege
Collaborative Newspaper	A frames example project about Newspapers. The project supports the collaborative features.	Ray Fergerson	Open in Protege
Collaborative Pizza	The OWL pizza project with collaborative toppings..	Jennifer Vendetti	Open in Protege
Human Studies	The Human Studies ontology	Herb Hagler	Open in Protege
OBI (demo version)	Ontology for Biomedical Investigations Link to home page	Daniel Schober	Open in Protege
OCReStart Here	the OCR Start Here ontology	Samson Tu	Open in Protege
OCReStartHere wBFO	the OCReStartHere wBFO ontology	Samson Tu	Open in Protege
OCRestart-all	the OCR Restart All ontology	Samson Tu	Open in Protege
OMV_2_4	Ontology Metadata Vocabulary. Link: http://omv.ontoware.org/	Amir Ghazvinian	Open in Protege
RadLex	A Lexicon for Uniform Indexing and Retrieval of Radiology Information Resources External Link	Daniel Rubin	Open in Protege
Wines	A Frames project for wine lovers (no collaboration support). This project is configured as <u>read-only</u> .	Natasha Noy	Open in Protege
ckc_challenge	An ontology about research with collaborative sup WWW07.		Open in Protege

Select a project

Open the same ontology in Collaborative Protégé for editing

<http://bmir-protege-dev1.stanford.edu/webprotege/>

Opening Collaborative Pizza

WebProtégé - Mozilla Firefox

File Edit View History Bookmarks Tools Help

http://bmir-protege-dev1.stanford.edu/webprotege/WebProtege.html#

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My WebProtégé **Classes** Properties Individuals Metadata

Ontology: Collaborative Pizza. [Login](#) for more features. **Login to edit**

Add content to this tab Add tab

Class Tree

Create class Delete class

- owl:Thing
 - AnotherTestClass
 - DomainConcept
 - Country
 - Pizza
 - CheeseyPizza
 - InterestingPizza
 - MeatyPizza
 - NamedPizza
 - NonVegetarianPizza
 - RealltalianPizza**
 - SpicyPizza
 - SpicyPizzaEquivalent
 - VegetarianPizza
 - VegetarianPizzaEquivalent1
 - VegetarianPizzaEquivalent2
 - PizzaBase
 - PizzaTopping
 - MINE_EQUIPMENT
 - SomeClass
 - TestClass

Discussions

Properties for RealltalianPizza

Property	Value	Language
rdfs:comment	This defined class has conditions that are part of the definition: ie any Pizza that has the country of origin, Italy is a RealltalianPizza. It also has conditions that merely describe the members - that all RealltalianPizzas must only have ThinAndCrispy bases.	en
rdfs:label	PizzaitalianaReal	pt
hasTopping	PizzaTopping	
hasBase	PizzaBase	

Axioms for RealltalianPizza

Equivalent classes (Necessary and Sufficient conditions)

Pizza
hasCountryOfOrigin *has* Italy

Superclasses (Necessary conditions)

hasBase *only* ThinAndCrispyBase

Notes for RealltalianPizza

New Topic Reply Expand <Previous Next> Displaying page 0 of 0 pages

Text	Author	Date
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Drag-n-drop, resize, close portlets

WebProtégé installation

- Tomcat or another servlet engine
- Download the war file from the WebProtégé wiki page
- Follow the step-by-step Administrators' Guide

Extending WebProtégé

- Plug-in infrastructure very similar to Protégé's: create your own tabs and portlets
- Just extend: AbstractTab and AbstractEntityPortlet
- Implement your own RPCs, if needed
- Reuse existing portlet code
- Writing a tab – as easy as creating an empty class that extends AbstractTab
- Promise to have soon some more documentation :)

Outline

- Collaboration
- Multi-user Protégé – simultaneous editing
- Collaborative Protégé – collaboration support
- WebProtégé – web-based browsing and editing
- Moving forward

What's next?

- We are far from done ...
- Near future:
 - Migrate Collaborative Protégé and WebProtégé to Protégé 4
 - WebProtégé:
 - Finalize the plug-in mechanism
 - Improve the editing support
 - Migrate to a new widget library
 - Documentation!

What's next? (cont.)

- Medium term:
 - Support collaboration features that are not yet available
 - Conflict management
 - Workflow support
 - Evaluate the tools in different projects (We need your help!)
- Long term:
 - Who knows :)

Get involved!

- If you would like to get involved, talk to us!
- Contributions from the community are welcome
- Implement your own plug-ins for WebProtégé
- If you used any of the tools, we would be happy to get your feedback!

THANK YOU!

Resources

- Collaborative Protégé Users' Guide
 - http://protegewiki.stanford.edu/index.php/Collaborative_Protege
- Collaborative Protégé paper:
 - Supporting collaborative ontology development in Protégé, T. Tudorache, N. F. Noy, S. W. Tu, M. A. Musen, 7th International Semantic Web Conference, Karlsruhe, Germany, Springer. Published in 2008, http://bmir.stanford.edu/file_asset/index.php/1374/BMIR-2008-1331.pdf
- WebProtégé short paper:
 - Web-Protege: A Lightweight OWL Ontology Editor for the Web. Tania Tudorache, Jennifer Vendetti and Natalya Noy, http://www.webont.org/owled/2008/papers/owled2008eu_submission_40.pdf
- Try WebProtégé out:
 - <http://bmir-protege-dev1.stanford.edu/webprotege/>
- Accessing Collaboration features from other applications:
 - http://protegewiki.stanford.edu/index.php/ChAO_API
- Protégé client-server tutorial
 - http://protegewiki.stanford.edu/index.php/Protege_Client-Server_Tutorial