User Documentation

Work Package AA2: Secure Annotation Services

Server Side

The secure annotation server described below is the outcome of the DART AA2 work package with the primary purpose of providing fine-grained secure access to annotation servers primarily for Higher Educational institutions. It combines a number of different technologies, namely W3C's Annotea protocol, Internet2's Shibboleth middleware architecture for federated identity management and Sun's XACML (eXtensible Access Control Markup Language).

System requirements

- Java Runtime Environment (1.5.06)
- Apache Tomcat 5.0 or greater
- MySQL 4.1
- Shibboleth Internet 2 Single Sign On Infrastructure
- UQ Annotation Server

Installation

- Install Tomcat 5.0
    - Run the Tomcat server

- Install MySQL 4.1
    - Within MySQL create a database called "annoteaDB"

- Deploy the Annotea.war file:
    - Using the Tomcat Manager application available at http://yourcomputername:8080/manager/html (NOTE: you need to have manager privileges to do this)
    - Go to the Annotea configuration file available at $TOMCAT_HOME/webapps/Annotea/WEB-INF/classes/conf/
    - If you cannot find the Annotea directory within the webapps directory this means that Annotea has not been deployed correctly
    - Check the log in Tomcats log directory and search for the Catalina.out file (this should tell you what went wrong)
        - You should open either windows_preferences.xml or unix_preferences.xml according to the OS Tomcat is running on
        - The following preferences need to be changed according to your needs (the preferences file contains description of each):
            - M_DB_URL
            - M_DB_USER
            - M_DB_PASSWD
            - M_SERVER_PATH
            - M_UPLOAD_DIR

- Restart Tomcat:

    - You will need to restart Tomcat in order for the Annotea web application to make your changes

- Test Annotation server is working:
    - Try to access the following URL http://yourcomputername:8080/Annotea/AnnoteaServlet/policy/DEFAULT_POLICY (should return an XML file)
    - Try to post an annotation using an Annotea compliant client (ensure the client is pointing to your newly installed Annotea server)

Configuration

The only configuration file for the UQ Annotation server is contained in the preferences.xml (located in $TOMCAT_HOME/webapps/Annotea/WEB-INF/classes/conf/). A description of each of the preferences is described below:

Preference ID	**Description**
DEFAULT_POLICY	The default XACML policy to use for annotations
ROOT_TOPIC	
M_DB_URL	Access URL to the database
M_DB_USER	Username which to use to access database
M_DB_PASSWD	Password which to use to access database
M_DB	Database type (note: currently only supports MySQL)
M_IS_SECURE	Whether server is secure
M_ALLOW_UPDATE	Whether to allow update of annotations
M_ALLOW_DELETE	Whether to allow deletion of annotations
M_DEBUG	Whether logging should be enabled
M_SERVER_PATH	Path to annotation server
M_DBDRIVER_CLASS	Database driver class name
M_UPLOAD_DIR	Directory which to save uploaded files
M_LOGGING_PATH	Directory where logs should be kept

Note that for the preferences to be reloaded you may need to reload the Annotea web application within Tomcat. Also it is a good idea to keep a copy of the preferences file (windows_preferences.xml and unix_preferences.xml for respective platforms) as it will be replaced when redeploying newer versions of the server.

HOWTO

To test the annotation servers successful installation try to access the following URL http://your_computer_name:8080/Annotea/AnnotaServlet/policy/DEFAULT_POLICY. If this returns and XML document (XACML policy to be more precise), then the server should be working correctly. The best way to test the operation of the annotation server is to view the debugging log which the server generates in the location specified in the preferences.xml file.

Obviously to make use of the annotation server you will need to acquire an Annotea compliant client such as Annozilla, Amaya or the DART Annotea Sidebar. These

clients need to be configured to communicate with the server that you have deployed. For full instructions on the configuration and use of the DART Annotea Sidebar please refer to the Client Side documentation.

Once you have completed the instructions for the deployment of the annotation server you may consider using jk2 Apache Tomcat Connector to place your annotation server behind and Apache HTTP server.

Links to Software Packages

1. Apache Tomcat: http://tomcat.apache.org/
2. Apache HTTP Server: http://httpd.apache.org/
3. MySQL: http://www.mysql.com/
4. UQ Annotation Server: http://www.itee.uq.edu.au/~eresearch/projects/dart/outcomes/serverDownload.php
5. Annozilla (Annotea client): http://annozilla.mozdev.org/
6. Amaya (Annotea client): http://www.w3.org/Amaya/
7. Shibboleth: http://shibboleth.internet2.edu/
8. Link to Annotea Protocol

Client-Side

Although tools such as Amaya, Annozilla and Vannotea are suitable for attaching textual or hyperlink annotations to digital objects, none of these tools provide an interface that is suitable for specifying XACML access policies and attaching them to the annotations. Consequently we developed our own client-side application using C# and .Net which appears as a side-bar to the Internet Explorer browser.

In addition to the sidebars use as a plug-in to the Internet Explorer, the sidebar has also been used for the collaborative annotation of videos within the Vannotea project as well as the annotation of Crystallographic data within the JMOL browser.

System requirements

- Windows XP Operating System
- Internet Explorer 6 >
- .NET Framework 2.0
- Annotea compliant annotation server
- UQ Annotea Sidebar

Installation

Installation is a relatively trivial task once you have the Annotea sidebar installer and have .NET Framework 2.0. From there it is just a matter of running the installer and stepping through the instructions when prompted. It is advisable that you close any Internet Explorer windows prior to installation. Once the installation process is completed the sidebar should become accessible within Internet Explorer.

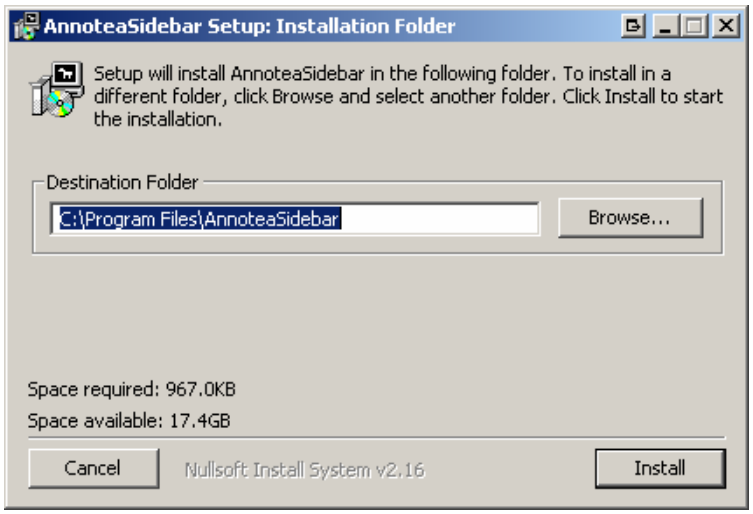


Figure 1: Annotea Sidebar Setup

HOWTO

Starting Up

Figure 2: Accessing Annotea Sidebar within Internet Explorer 7 illustrates how to access the Annotea Sidebar within Internet Explorer 7.0. The process should be relatively similar for Internet Explorer 6.

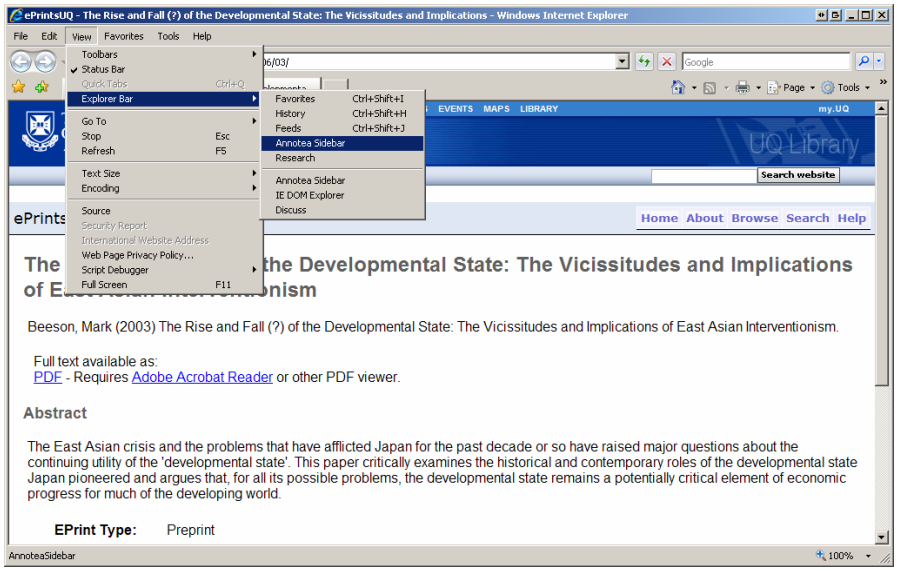


Figure 2: Accessing Annotea Sidebar within Internet Explorer 7

Once the sidebar has been displayed for the first time, it is necessary to reload the page, for the sidebar to trigger request for annotations for the particular page being displayed. The sidebar will then display the annotations for the particular resource being displayed within an Annotation Viewer. This list will include both annotations created by you as well as annotations created by other users who are using the same annotation server as yourself (note initially the sidebar uses the default annotation server hosted by UQ).

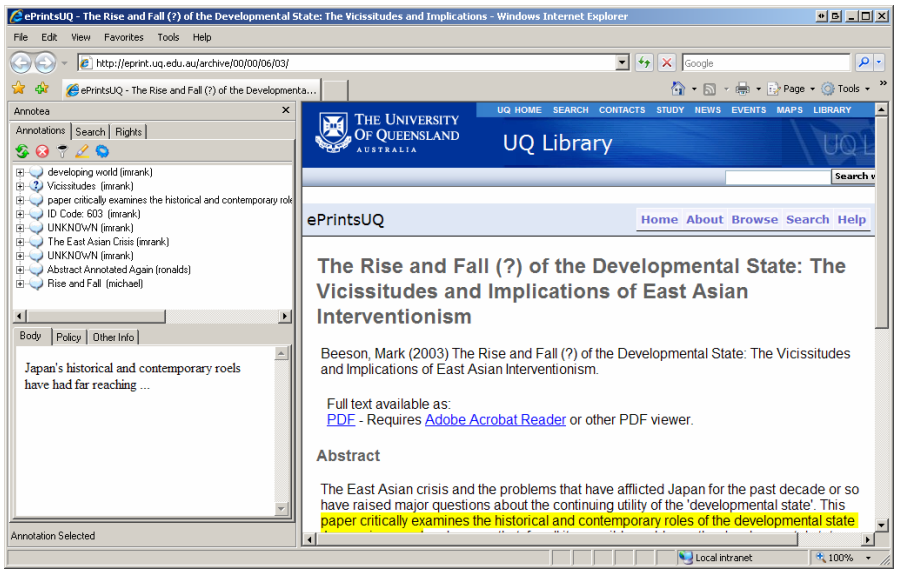


Figure 3: Annotea Sidebar within Internet Explorer 7

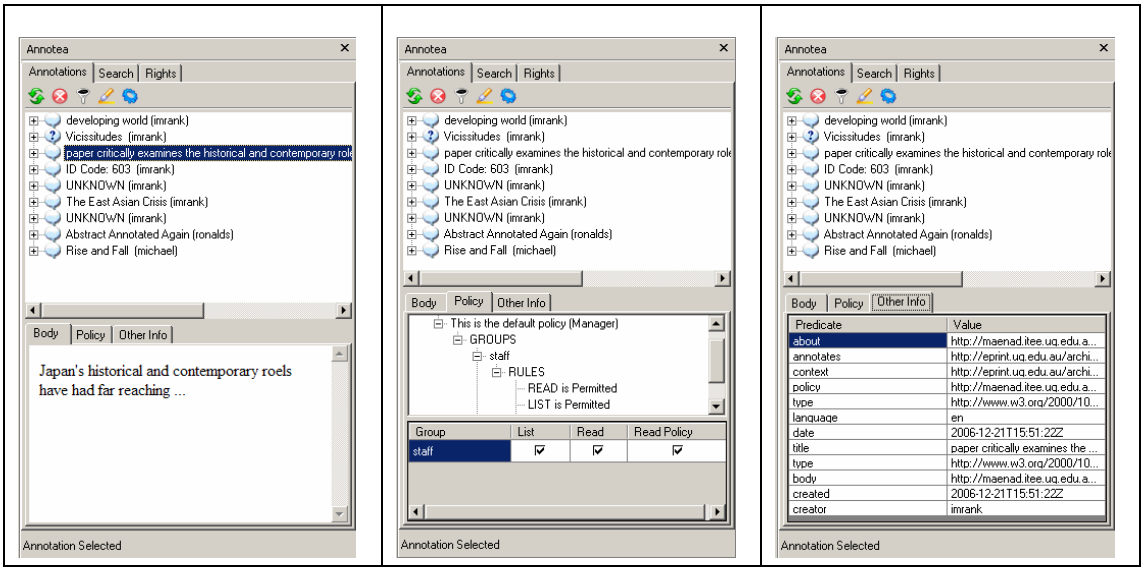


Figure 4: Annotea Sidebar Annotation Information (a) body (b) policy (c) other information

On selecting an annotation you are provided with three different views below the list of annotations, of the information contained for the annotation. Firstly you can view the annotation body. This body is simply a reference to another URL, which maybe hosted on the annotation server or be external to the annotation server. Depending on the type of annotation created, it can even link to other media files such as an audio or video recording (see Section Annotation Creation for more details on how to do this).

The policy tab provides a view of the XACML policy which is related to the annotation. The Policy Viewer basically displays the contents of the XACML policy in a hierarchical view about the different types of groups and their respective privileges to 3 different types of actions. For more in depth discussion of the XACML policies and their use within the Annotea Sidebar refer to Implementing Secure Annotation Services paper.

The third tab contains metadata associated with the annotation. The Annotea data model is based upon RDF, which is at its lowest level simply a set of subject-predicate-value triples. In the case of Annotea, the annotation is subject and the predicate and value is Meta-data associated with the annotation such as its creator, title and creation date. In addition to this, the other information tab also allows a user to browse information which may have been created by a different Annotea client, which has domain specific information which is not interpretable by the Annotea Sidebar. This tab always users to browse through this information.

In addition to the information displayed within the Annotea Sidebar, the sidebar also displays the context of the annotation within browser. In the case of the Annotea Sidebar within Internet Explorer, the context is displayed as highlighting of the text within the web page that was selected during the annotation process (see Annotation Creation section for more details on creating annotations).

Configuration

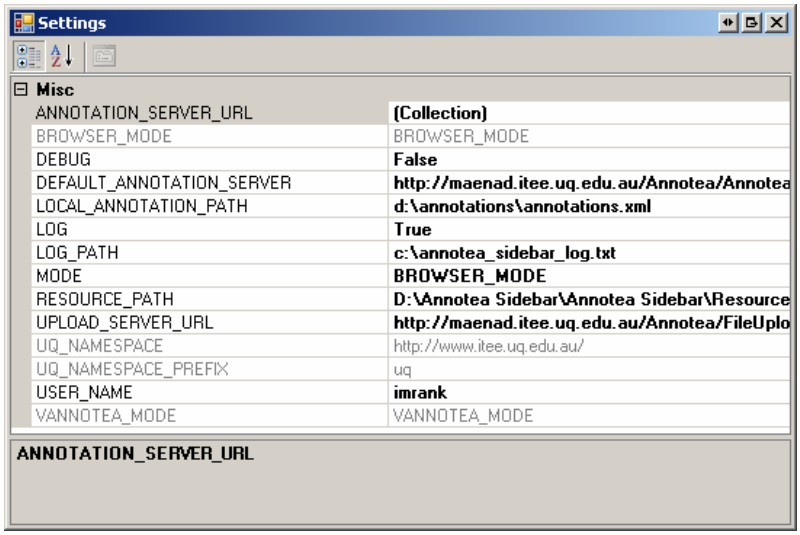


Figure 5: Annotea Sidebar configuration

The configuration of the sidebar is done through the simple settings dialog box which is accessible through the settings toolbar option in the Annotations tab of the sidebar. Description of the various options is described below:

Setting	Description
ANNOTATION_SERVER_URL	A list of the annotation server URLs from which you wish to retrieve the annotations.
DEBUG	Whether or not to perform debugging
DEFAULT_ANNOTATION_SERVER	The default annotation server which to post your annotations.
LOCAL_ANNOTATION_PATH	Location where locally saved annotations should be stored.
LOG	Whether or not to log the operation of the Annotea Sidebar (used for debugging).
LOG_PATH	The path in which to save the logging information.
USER_NAME	The name which should be used for the creator of the annotation.

Shibboleth Authentication

When a user includes an annotation server which is protected by Shibboleth, then it is necessary that they authenticate them selves prior to being able to access the annotations. Once you have identified yourself with the IDP, you should be able to access the annotations (according to the access control defined for the specific annotation).

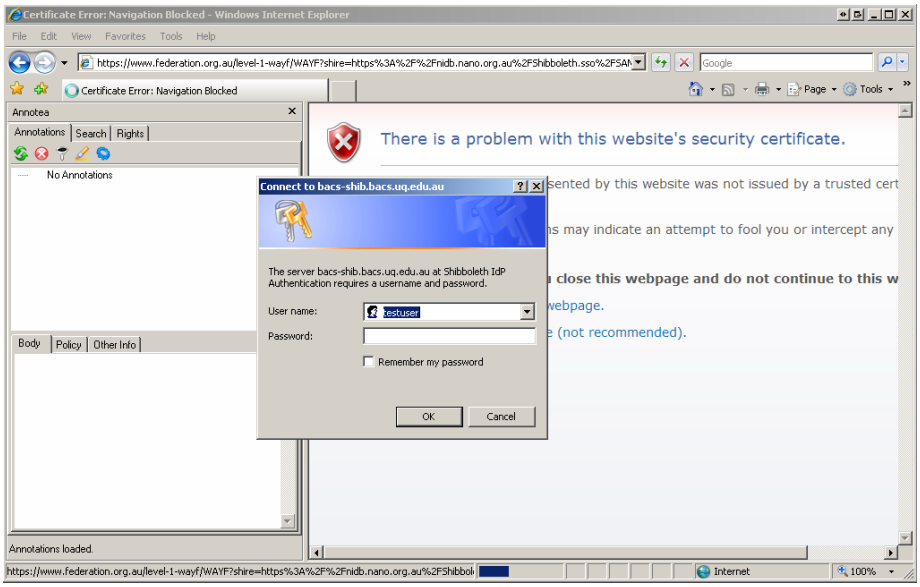


Figure 6: Shibboleth Authentication Prompt

Annotation Creation

The first step in creating an annotation is to select some text within the web page and right-click on the text. This will bring up the context menu, which will now include the "Annotate Selection" option. On clicking the "Annotate Selection" menu item, you will be presented with the annotation creation dialog box.

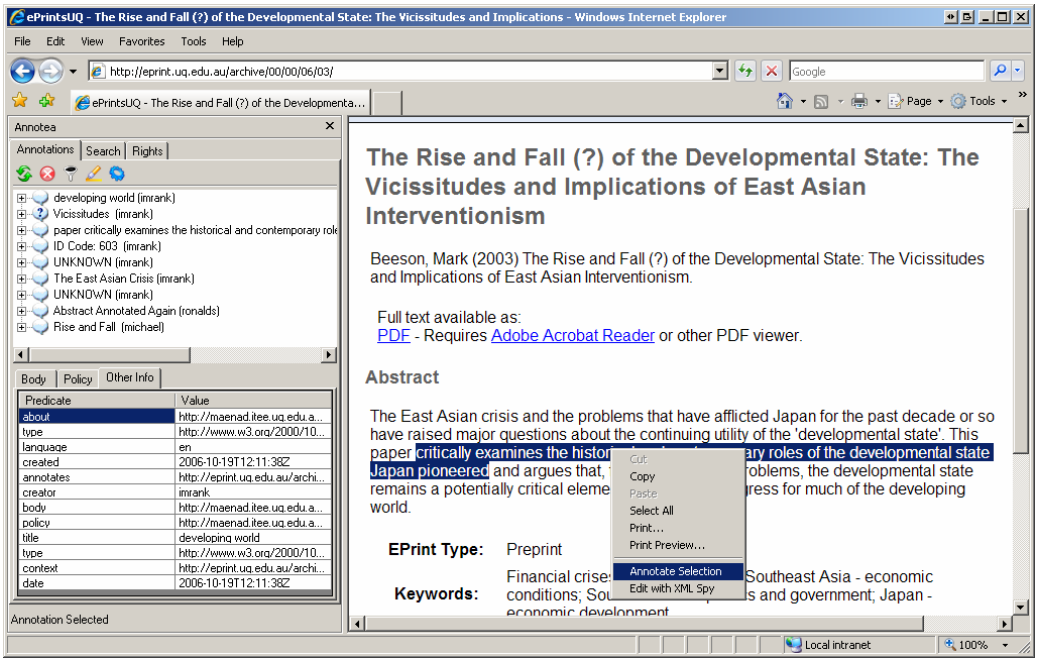
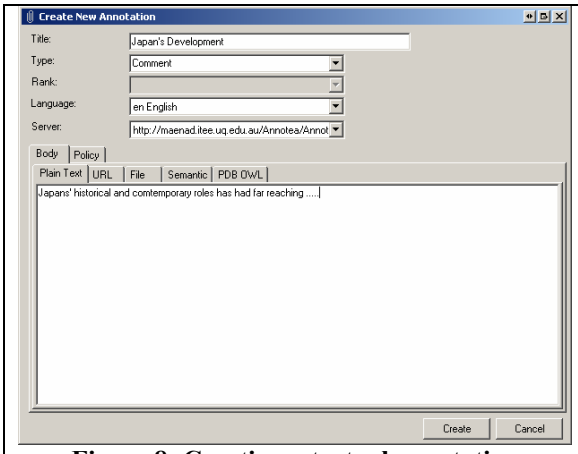
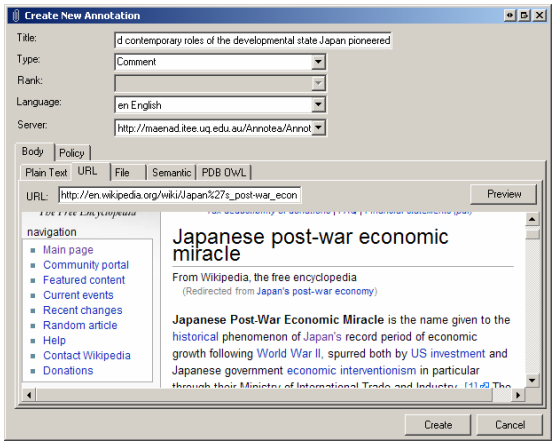
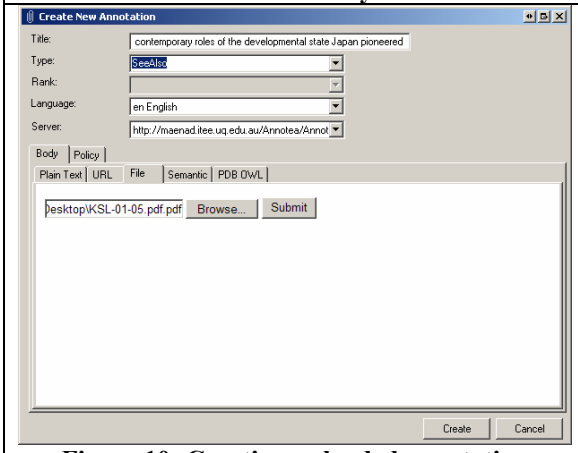


Figure 7: Selecting Text to annotate

Within the Annotation creation dialog box, you will be given a number of different options for the body of the annotation. The various annotation bodies are described below:

 **Figure 8: Creating a textual annotation**	Simplest type of annotation body, which is simply a textual annotation. In this annotation you simply enter text corresponding to your comment, question, opinion, etc.
 **Figure 9: Creating an annotation referencing external body**	An annotation which links to an existing web resource, for example an article which maybe relate to the resource being annotated.
 **Figure 10: Creating uploaded annotation**	In this annotation body type, the annotator is able to submit a locally stored file (e.g. image, audio/video, PDF) to the annotation server, which is hosted there and is linked to in the annotation body.

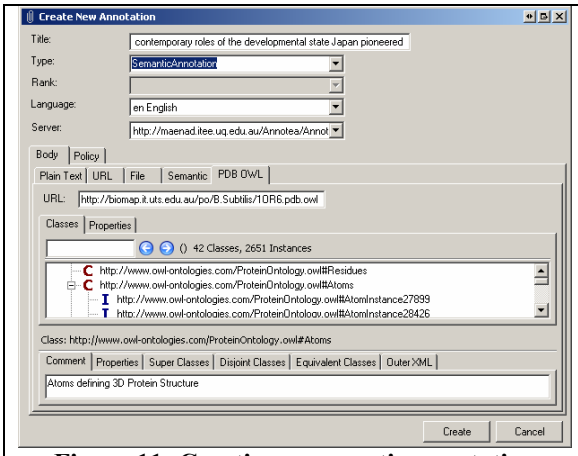


Figure 11: Creating a semantic annotation

This type of annotation allows a user to associate semantic information from an web-accessible ontology such as WordNet, and use this semantic information to conduct semantic searches on the annotations.

During the creation of an annotation you are given the option to attach a policy which determines access rights to your annotation. You have the option of either having reference to an existing policy or creating a new copy of the policy. The advantage of using a copy over a reference is that if the creator of the policy decides to modify the policy, this will be reflected in your annotations access constraints. However creating new copies for each annotation obviously requires the creation of a potentially large set of policies.

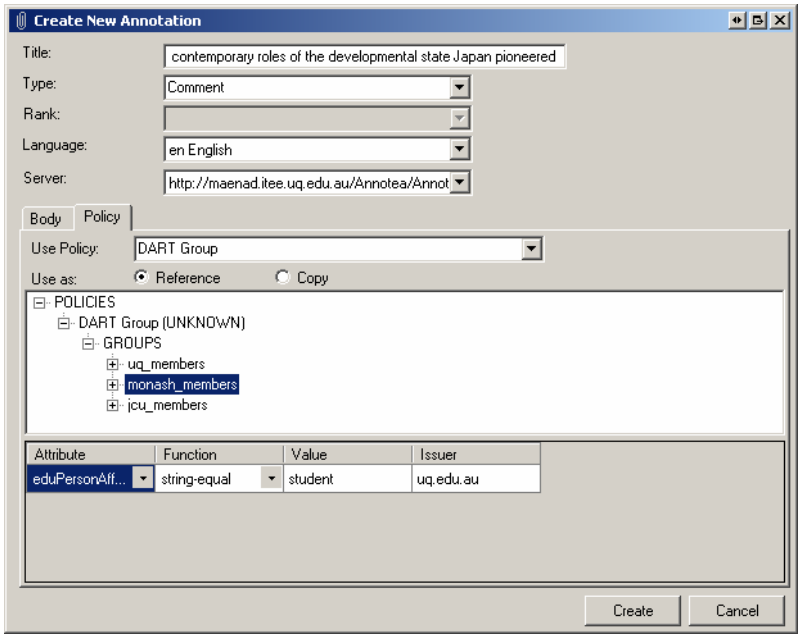


Figure 12: Attaching a policy with your annotation

Reply/Update/Delete

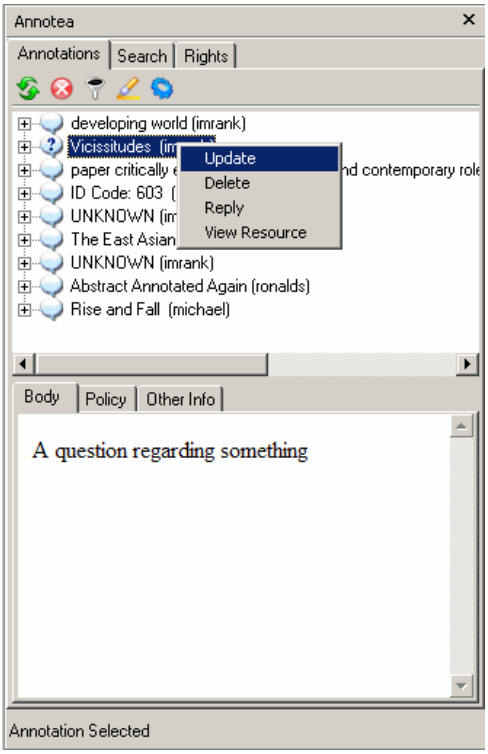


Figure 13: Update/Reply/Deletion of annotations

A natural process within the use of the Annotea Sidebar is the reply to other people's annotations and in doing so provide a framework for collaborative exchange of ideas and opinions. The process of replying to an annotation involves right-clicking on an annotation and accessing the "Reply" menu item from the context menu. This will in turn display the Annotation creation dialog box, and the operation for the creation of a reply is identical to that of a normal annotation.

Updating of annotation bodies, follows the same process as that of creating a reply, with the option included as a context-menu for each individual annotation within tree view. Deletion follows exactly the same pattern, with the annotation being deleted from the server the annotation tree view being reloaded to reflect the annotations deletion.

Filtering

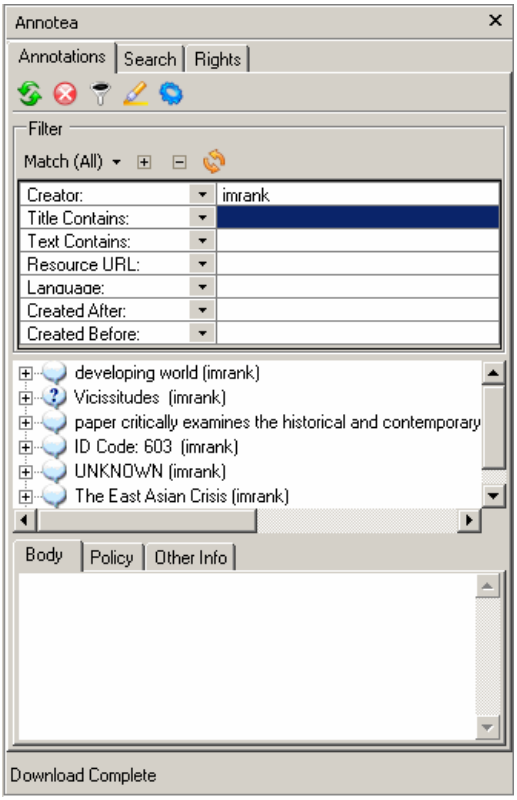


Figure 14: Filtering annotations

An annotations value is often determined by its provenance information, such as who created the annotation, the language of the annotation or the date on which the annotation was created. Using the filter option, users are able to filter out annotations based on the meta-data associated with it. This option also allows you to reduce the volume of annotations which you need to navigate through.

Searching

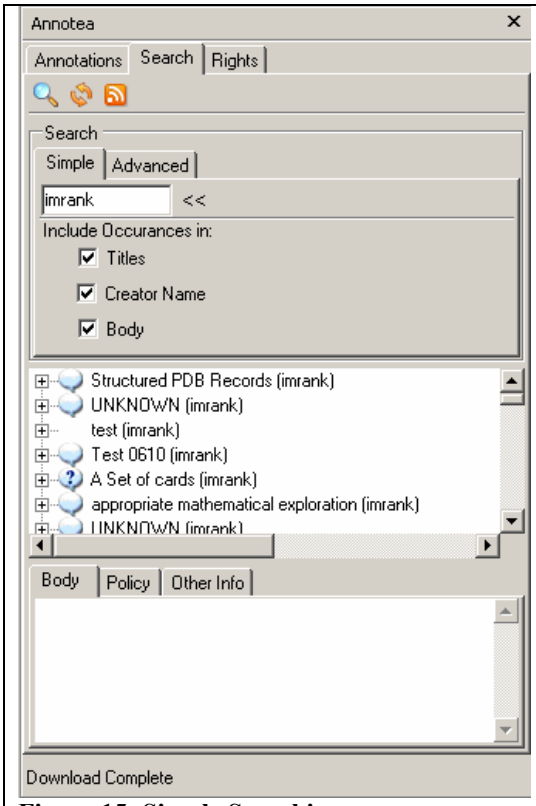


Figure 15: Simple Searching

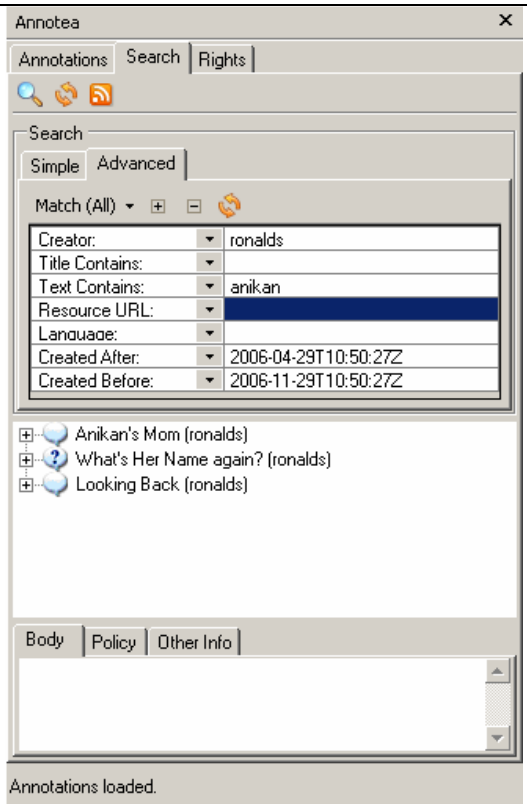


Figure 16: Advanced Searching

Searching for annotations is available within the Search tab of the Annotea sidebar. There are two options for searching for annotations. Firstly the simple option which lets you search for annotations based on three common meta-data associated with annotations (these being the title, creator name and body of the annotation). For searching for other set of meta-data such as dates, you are able to use the advanced search option.

The results of the search are displayed in the Annotation Viewer similar to how it is displayed for within “Annotations” tab. Double clicking on any of the annotations will open the resource that was annotated in the browser window and the annotations associated with this resource will be available within the “Annotations” tab.

Viewing Policies

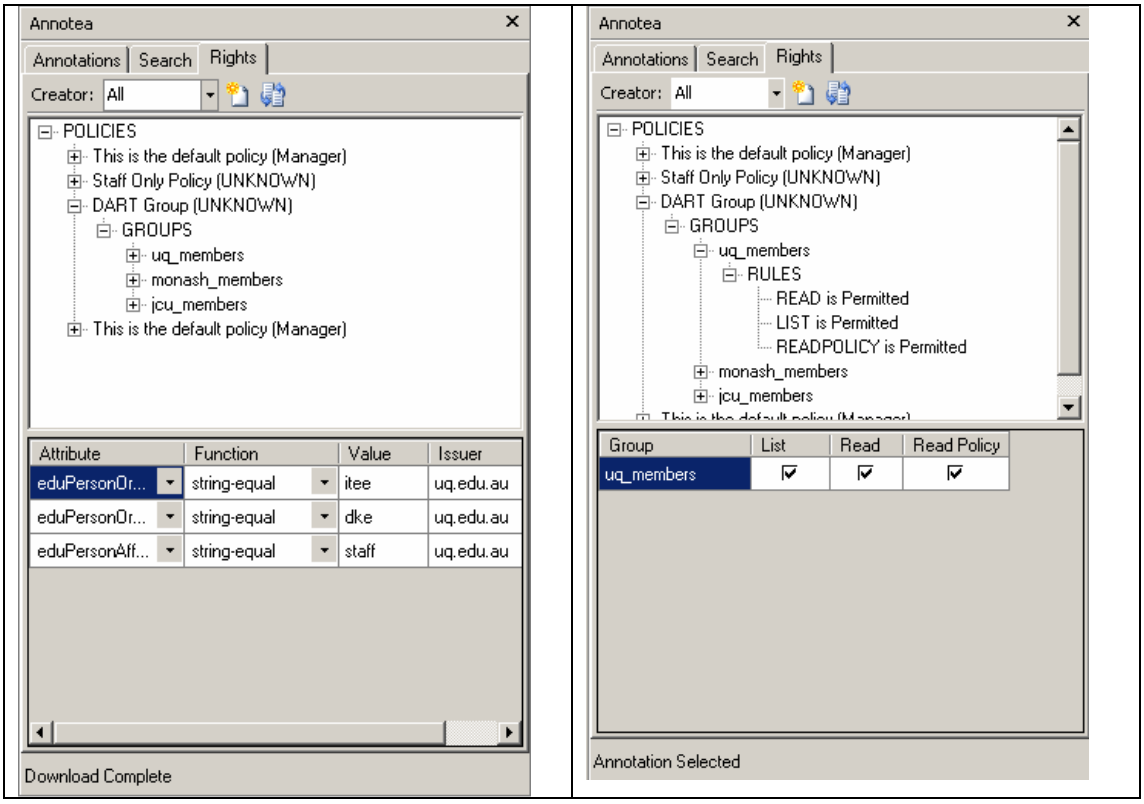


Figure 17: Browsing policies (a) group definitions (b) access rights

Policies are stored along with the annotations on the annotation server and are accessible through a unique URL. Creators are able to specify whether or not to share their policies with other users. In the normal scenario, policies are really only meant to be created by administrator users for other users to use in creating access privileges for their annotations.

The third tab in the Annotea Sidebar, provides user a way in which to browse through a list of policies available to the user. This list is filtered if the annotation server has been Shibbolized and is using a specific type of policy. Figure 17 illustrates displays the policies, and the respective parts of the policies. Figure 17 (a) displays the definition of a particular group based on a set of attributes with certain values for the DART Group policy. Figure 17 (b) displays the definition of the access rights which the group “uq_members” have for the annotation. For more in depth discussion of the policy structure and definition please refer to “Implementing a Secure Annotation Service”.

Creating/Updating Policies

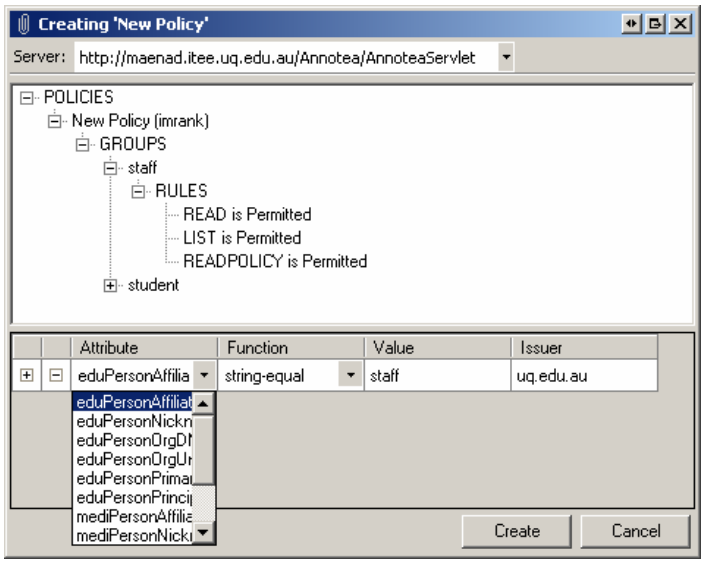


Figure 18: Creation of a new policy

The creation and updating of an annotation policy is something which although intended to be intuitive enough for general users to use, is intended primarily for administrative users who are more familiar with XACML and policy definition. The process of defining a policy begins with the user presented with a template of an existing policy, which the user can then modify according to their requirements.

Some of the operations which a user can perform in the creation of a policy are as follows:

- Rename the policy
- Add/Remove groups
- Add/Remove attribute definitions which define groups
- Modify access to specific actions for different groups

Upon clicking on the “Create” button once the user has completed the creation of the policy, the sidebar sends the policy information to the annotation server. The annotation server then makes it available through a unique URL. The sidebar will now display your policies along with other policies hosted by the annotation server during the creation of new annotations.

RSS Feeds

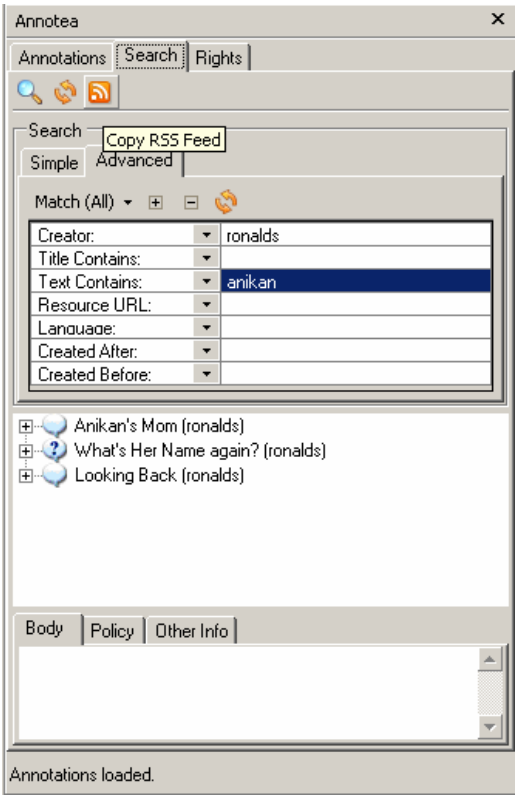


Figure 19: Retrieving search results as RSS feeds

RSS feeds provide a model in which users can subscribe to receive information on a particular topic. Users are able to subscribe to RSS feeds corresponding to specific queries to the annotation server. For example a user may wish to subscribe particular author's annotations. In this way, a user is able to view updated annotations by a particular author within any RSS client. This option is accessible through the RSS feed button in the "Search" tab.

Links to Software Packages

1. .NET Framework 2.0: http://www.microsoft.com/downloads/details.aspx?FamilyID=0856eacb-4362-4b0d-8edd-aab15c5e04f5&displaylang=en
2. Internet Explorer 7: http://www.microsoft.com/windows/ie/downloads/default.mspx
3. UQ Annotation Server: http://www.itee.uq.edu.au/~eresearch/projects/dart/outcomes/serverDownload.php
4. Live Annotation Server: http://maenad.itee.uq.edu.au/Annotea/AnnoteaServlet
5. Reference to Secure Annotations Paper
6. Annotea Protocol: http://www.w3.org/2001/Annotea/User/Protocol.html
7. Co-Annotea: http://www.itee.uq.edu.au/~eresearch/projects/dart/outcomes/coannotea.php

8. Crystallography Annotation Tool: http://www.itee.uq.edu.au/~eresearch/projects/dart/outcomes/crystallography.php
9. Implementing a Secure Annotation Service: http://www.itee.uq.edu.au/~eresearch/papers/2006/ipaw2006.pdf