Oracle® Spatial and Graph
RDF Semantic Graph Developer's Guide
12*c* Release 1 -
Support for Ontology Editing with Protégé Desktop

August 2015

Provides usage and reference information about Oracle Database support for semantic technologies, including storage, inference, and query capabilities for data and ontologies based on Resource Description Framework (RDF), RDF Schema (RDFS), and Web Ontology Language (OWL).

Oracle Spatial and Graph RDF Semantic Graph Developer's Guide 12c Release 1 - Support for Ontology Editing with Protégé Desktop

This document is an addendum to the *Oracle Spatial and Graph RDF Semantic Graph Developer's Guide 12c Release 1*. Oracle Spatial and Graph RDF Semantic Graph Developer's Guide provides usage and reference information about Oracle Database Enterprise Edition support for semantic technologies, including storage, inference, and query capabilities for data and ontologies based on Resource Description Framework (RDF), RDF Schema (RDFS), and Web Ontology Language (OWL). The RDF Semantic Graph feature is licensed with the Oracle Spatial and Graph option to Oracle Database Enterprise Edition, and it requires the Oracle Partitioning option to Oracle Database Enterprise Edition.

Introduction

Protégé Desktop 4.3 (also referred to here as Protégé) is an open source graphical tool, created by Stanford University, for viewing and editing ontologies.

Oracle Spatial and Graph RDF Semantic Graph support for Protégé Desktop 4.3 (also referred to here as support for Protégé) provides the ability to view and edit ontologies in Oracle Database with Protégé Desktop. It implements a plugin that conforms to the Protégé-OWL 4.x plugin architecture, as described in the Protégé 4 Developer Documentation. It replaces the University of Manchester OWLAPI that is distributed with Protégé Desktop 4.3 to enable the support for Protégé.

Installing support for Protégé adds an Oracle menu to the Protégé menu bar. The menu items execute RDF Semantic Graph operations on one or more ontologies of interest stored in Oracle Database RDF graph store.

For information about Protégé Desktop, including links to documentation and download instructions see http://protege.stanford.edu/products.php - desktop-protege.

Prerequisites to install support for Protégé

- Oracle Database 12*c* Release 1 (12.1.0.1 or higher). Oracle Database 11*g* Release 2 (11.2.0.3 or higher) is also supported.
- Oracle JDK6 or JDK7
- Protégé Desktop 4.3

Installing support for Protégé on Windows

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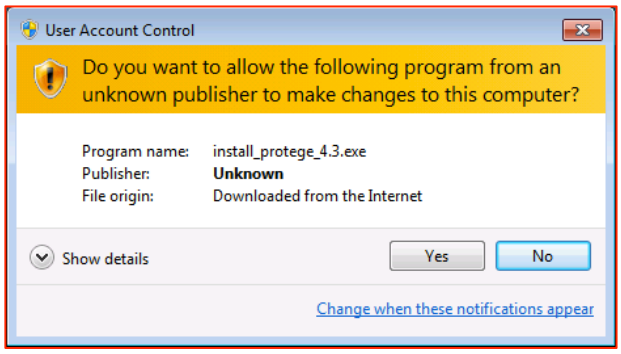
Objective

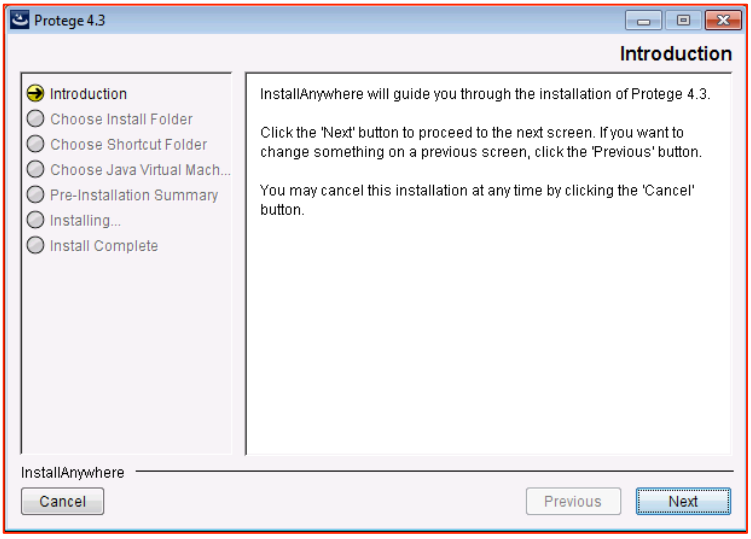
This document describes how to install Protégé Desktop 4.3 (also referred to here as Protégé), enable Graph RDF Semantic Graph support for Protégé (also referred to here as support for Protégé) and use Protégé to operate on ontologies stored in Oracle Database.

Installing Protégé Desktop

Assuming the Protégé Desktop 4.3 installer is available on your local disk, when running the installer under Windows, you will be asked for permission to start the Protégé *InstallAnywhere* wizard. Click Yes.



The installation wizard will guide you step by step in order to select the installation folder, create shortcuts and choose the Java VM to run Protégé.

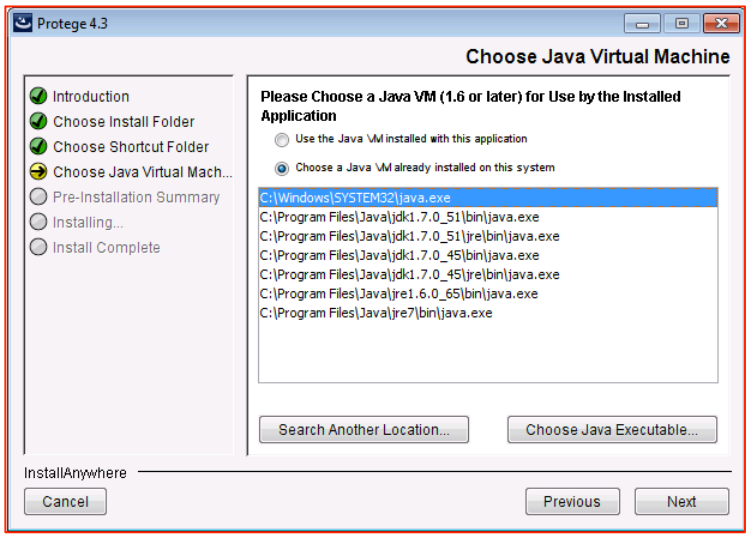


Protégé InstallAnywhere wizard

When installing, there are two important locations to remember that Protégé installer will ask:

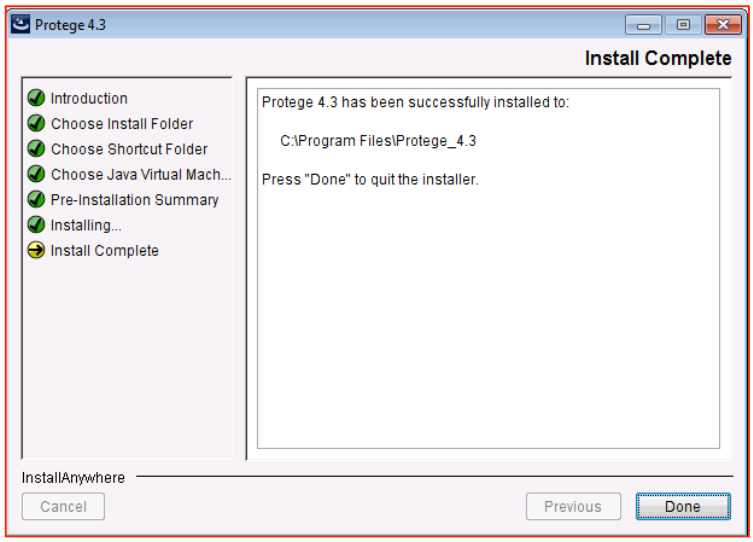
1. Location on the hard drive to install Protégé
2. Location of the Java Runtime Environment you wish to use

When choosing the Java VM you must select version 1.6 or later, and not select the embedded JVM. Choosing other versions of the Java VM may cause the plug-in to fail at startup.
There are known issues under Windows in which the embedded Java VM may fail to run Protégé.



Java VM Selection Step

Once the installation finishes, you will see a success message and the location of the installation as follows:



Install Complete Step

Installing Protégé on Other Operating Systems

Follow the instructions for installing Protégé in your desired operating system, which are located in the *Documentation* link on the download page for *Protégé Desktop 4.3*.

JDK 6 or later is recommended.

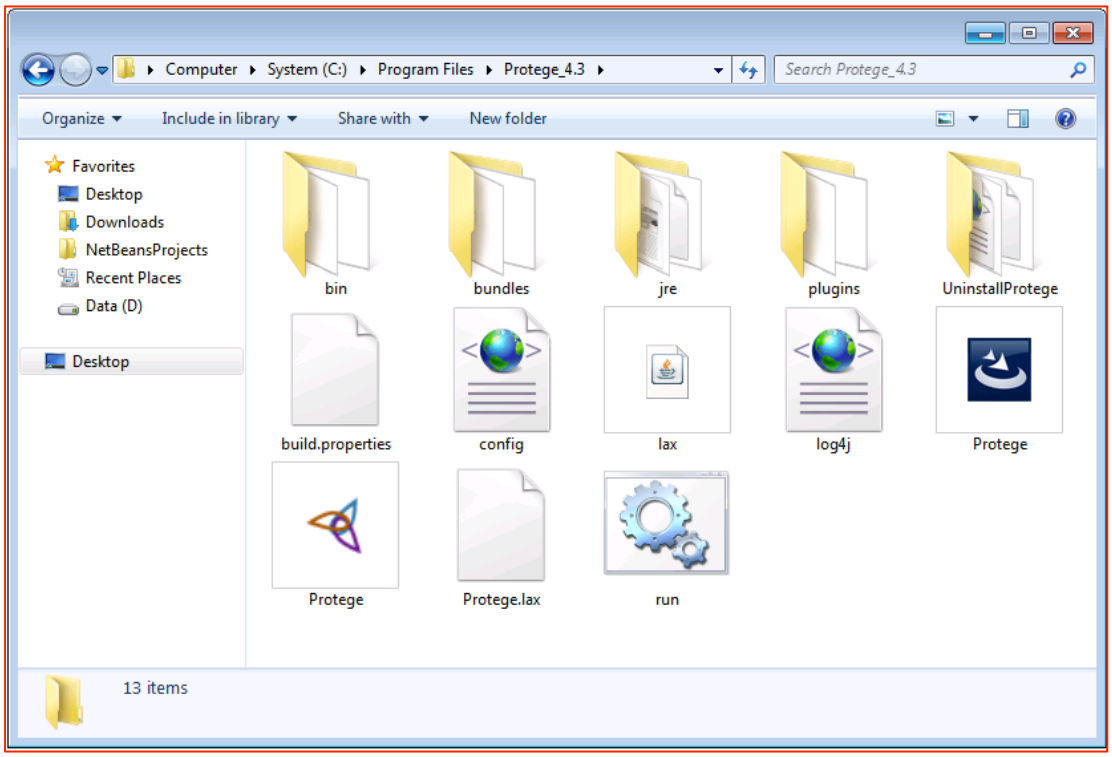
Enabling the support for Protégé

Downloading the Jar Files

The support for Protégé is implemented as a set of jar files. The distribution is available for download from Oracle's Support website My Oracle Support (support.oracle.com).

Adding the JAR files to Protégé

Once downloaded, the jar files must be added to the *plugins* folder inside the Protégé installation.
The files in the installation directory look like following

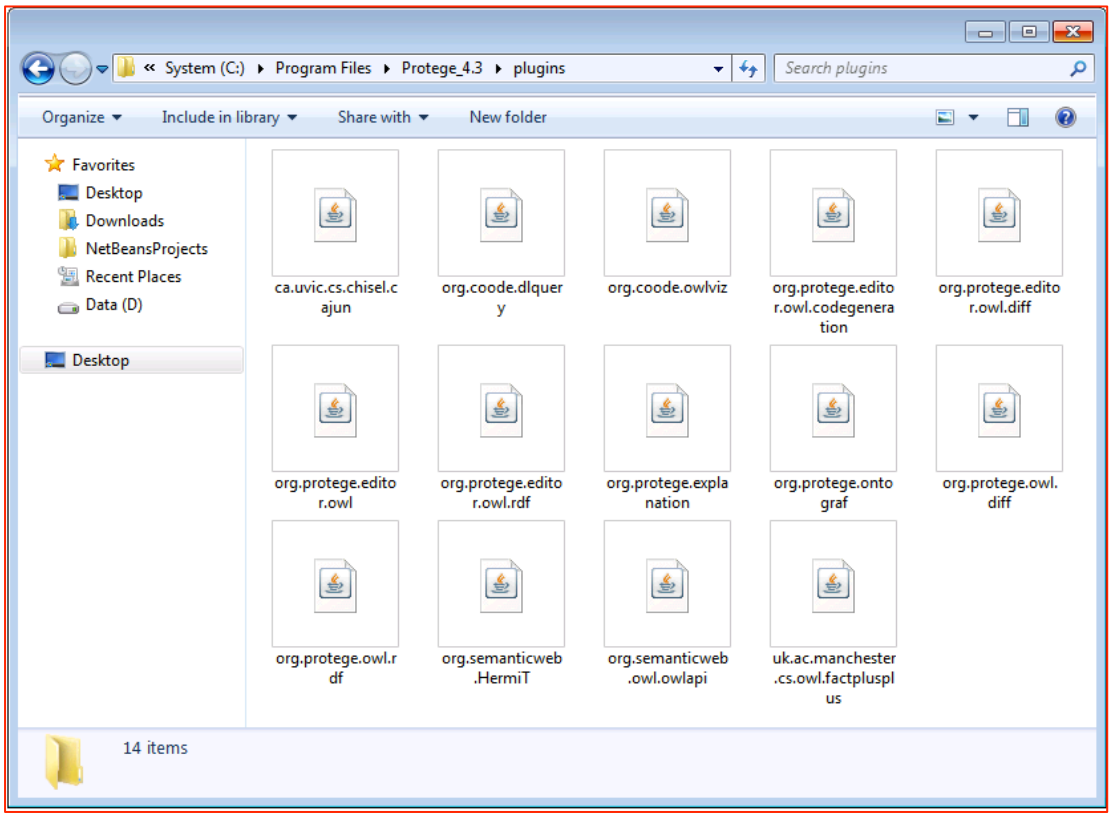


Protégé for Windows Installation Directory

The following jar must be replaced - org.semanticweb.owl.owlapi.jar

The following jar must be added - OraclePlugin.jar

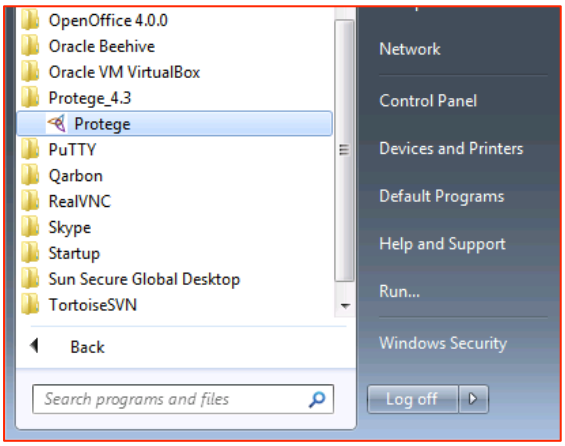
Inside the folder *plugins* you will find all the plug-ins that Protégé uses, and to enable support for Protégé you need to copy the jar file here and start the app. The folder for the plug-ins looks like the following:



Protégé plugins folder

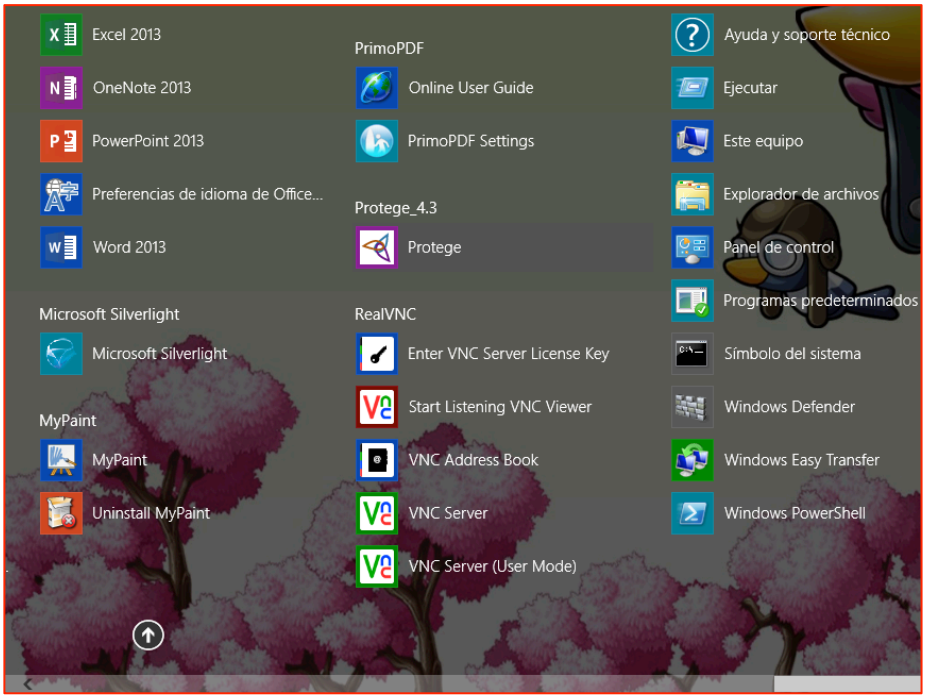
Executing Protégé on Windows 7

On Windows 7, Protégé has an executable file, which is added to the Start menu under All Programs.



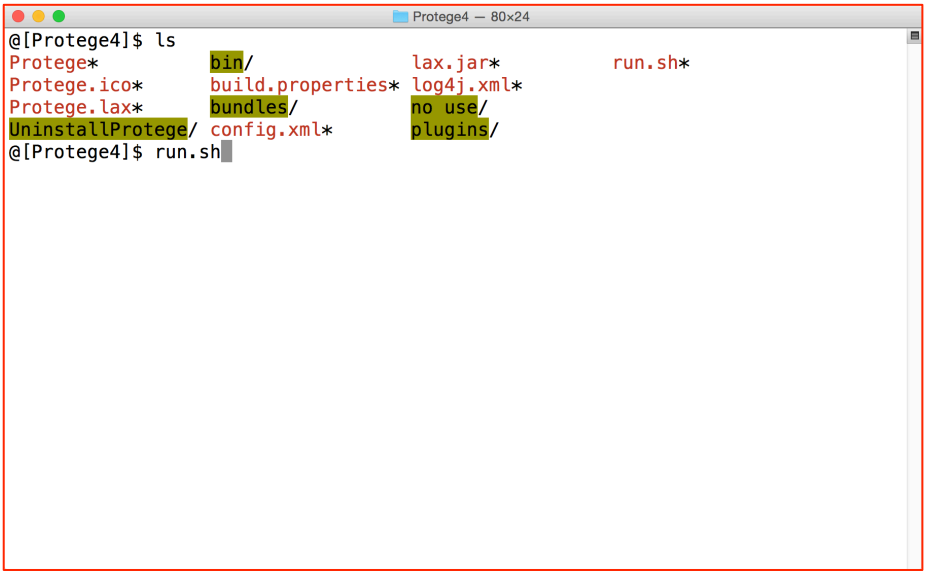
Executing Protégé on Windows 8

On Windows 8, Protégé has an executable file, which is added to the Apps view under the Protégé_4.3 category.



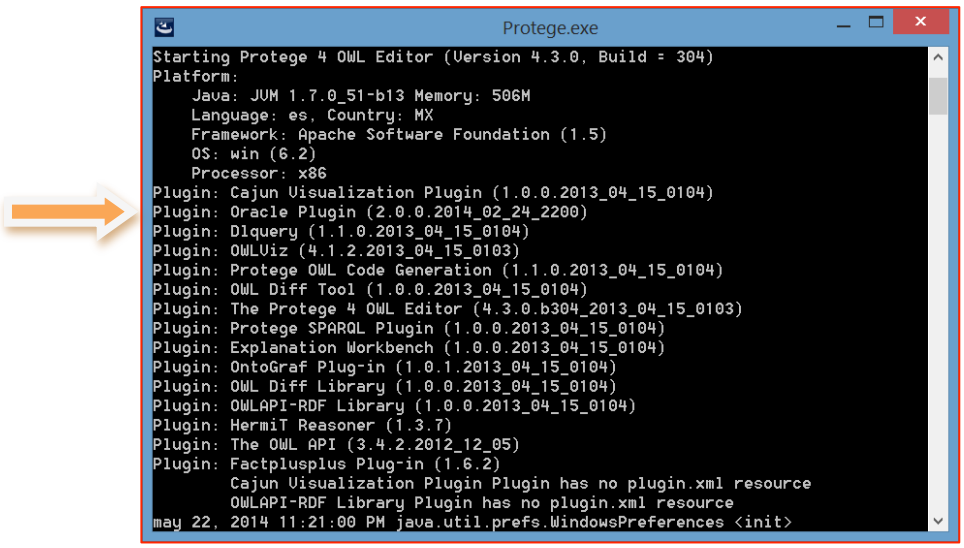
Executing Protégé on Linux Systems

For Linux systems the start script, *run.sh,* is in the Protégé installation directory. To run this script, type *sh run.sh* using a terminal window as shown below.

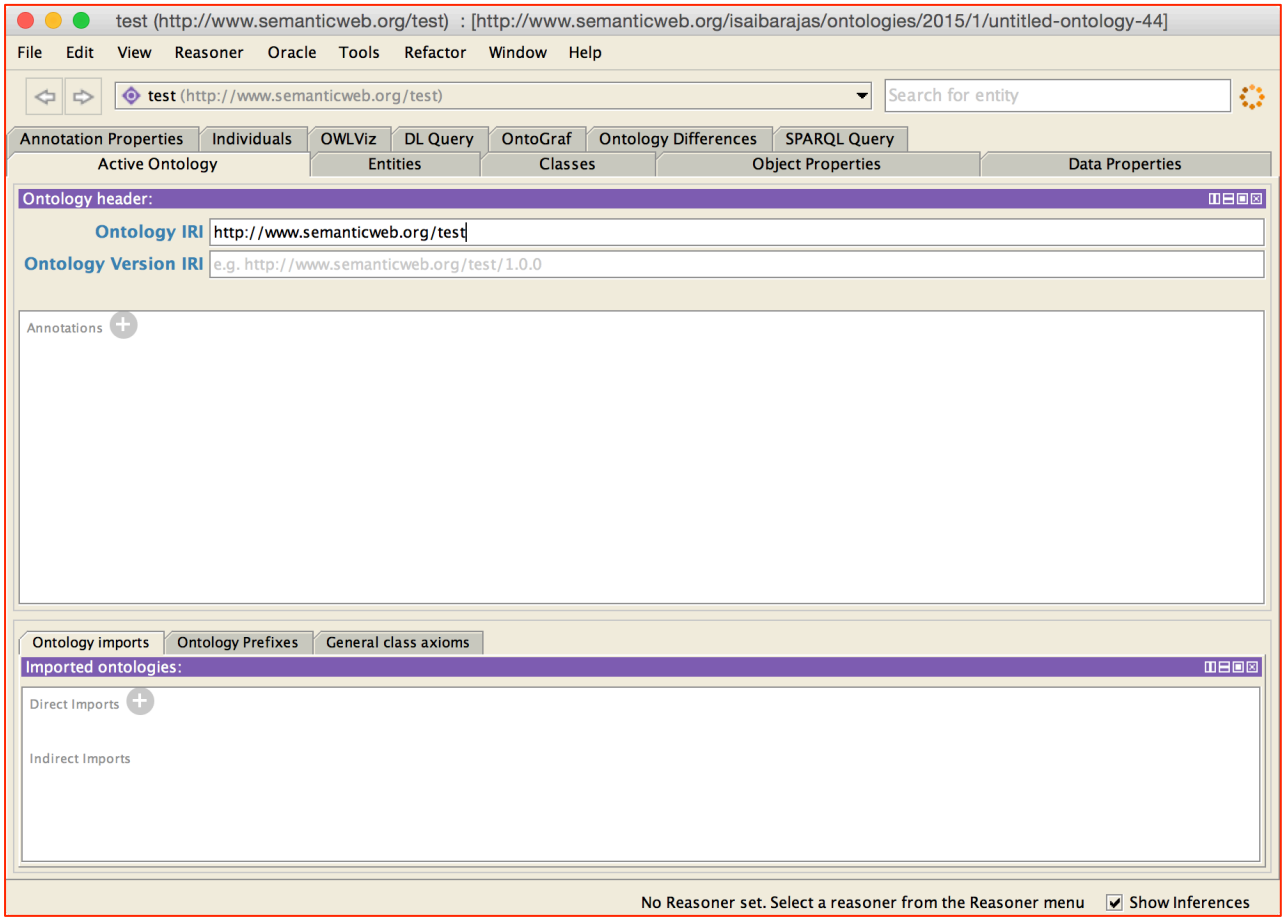


Verifying support for Protégé Installation

Once started, you will see information about your platform and a list showing which plug-ins are enabled. If the support for Protégé was successfully installed in Protégé, the list of plug-ins will include *Oracle Plugin* as shown below



Once the Protégé application is displayed, the support for Protégé will add *Oracle* to the menu bar. At this point support for Protégé is ready for use.



The Fact++ Plug-in

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How to Disable Fact++ Plug-in

When running Protégé you may encounter the following message about missing libraries or platforms not supported:

In this case, you must delete or remove the *uk.ac.manchester.cs.owl.factplusplus.jar* file inside the *plugins* folder and restart Protégé.

OpenJDK Warning

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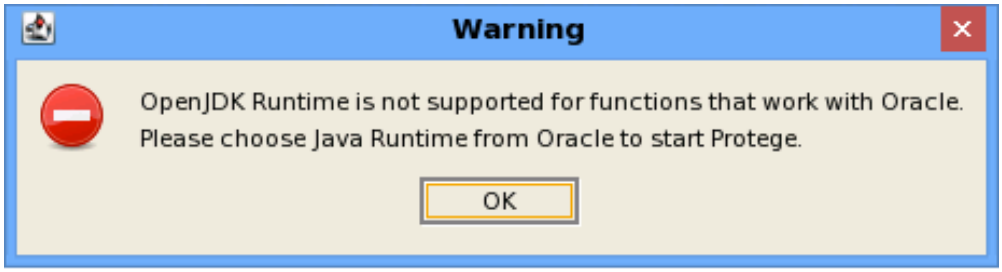
Install Java Runtime from Oracle

When running Protégé you may encounter the following message about OpenJDK Runtime not supported:



In this case, you must install a Java Runtime from: https://**java**.com/download and set the JAVA_HOME variable to point to the newly installed Java Runtime before you restart Protégé.

Using the support for Protégé

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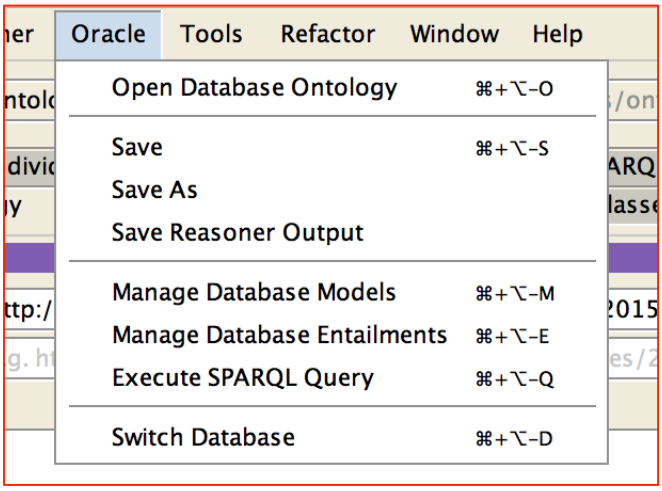
The support for Protégé adds a menu tab with a set of options to Protégé.



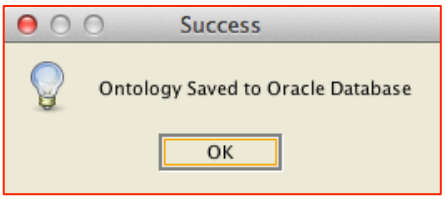
The Oracle Menu

The main application of Protégé will include a menu with the options *Open Database Ontology, Save, Save As*, *Save Reasoner Output, Manage Database Models, Manage Database Entailments* and *Switch Database*.

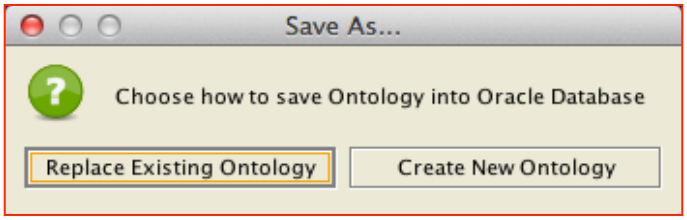
When an ontology is loaded, the *Save* option will make an incremental edit that is saved in Oracle Database, whereas the *Save As* option will replace the ontology or create a new one.

After choosing *Save* or *Save As*, a message window will pop up to report weather the ontology was saved or if there was an error, as shown below.

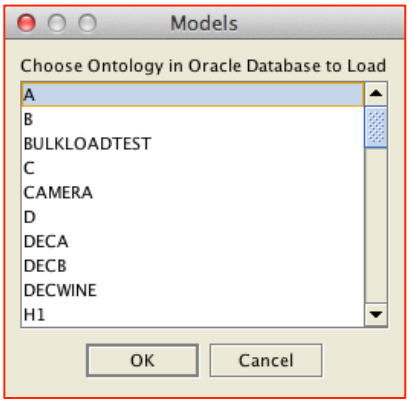
The message may be delayed depending on the size of your ontology, configuration of Oracle Database and network speed.



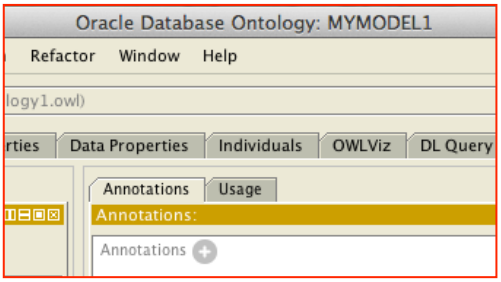
The *Save As* option displays a menu to choose between overwriting an existing ontology and creating a new one in the database.



When using the *Open Database Ontology* option, a dialog will display all the ontologies that the current user can load from Oracle Database. After selecting and loading an ontology, the main application will display the name of the ontology in the window title bar.

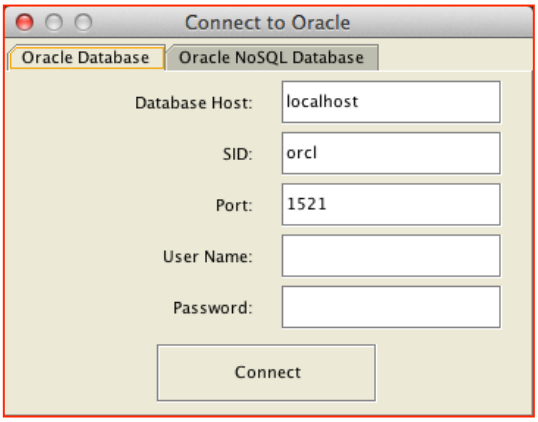


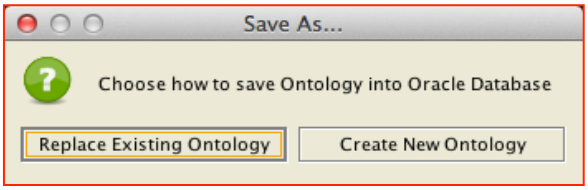
Loading Ontology Dialog



Ontology Name on the Top Border

The first time you try to save the ontology you create, the database connection dialog is displayed so that you can establish an Oracle Database connection. Once a database connection is successfully established, the *Save* and *Save As* options allow you to replace an existing ontology or create a new ontology, as shown below.



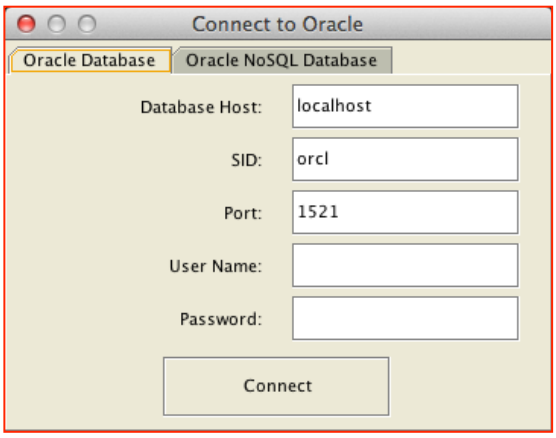


First Time Saving Dialogs – When Saving a Protégé Ontology to the Database

Connecting to a Database

From the Oracle menu choose *Switch Database,* which enables you to input the database connection information.

The following illustrations show tabs for connections to Oracle Database:



After inputting the required information to connect to Oracle Database, ontologies can be loaded using the *Open Database Ontology* option. A dialog with all available ontologies for the current users will be displayed so that you can choose which ontology to read from and load into Protégé.

After choosing the ontology, the load time will vary depending on your network connection speed and the size of the model.

There is no data loading progress indicator in Protégé, the application may appear non-responsive while the ontology is being loaded.

Using Protégé

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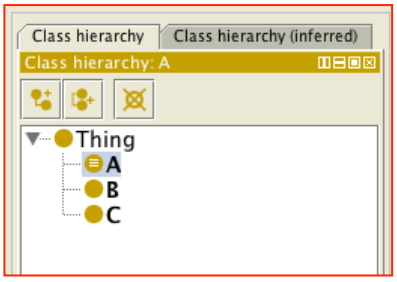
Protégé is a visual editor for the Web Ontology Language. The main application is tab-based with options to edit *Classes*, *Object Properties*, *Data Properties*, *Individuals* and *Annotations*.

The support for Protégé provides compatibility with the database by providing conversion between Triples and OWL APIs in order for Protégé to be able to exchange information with it.

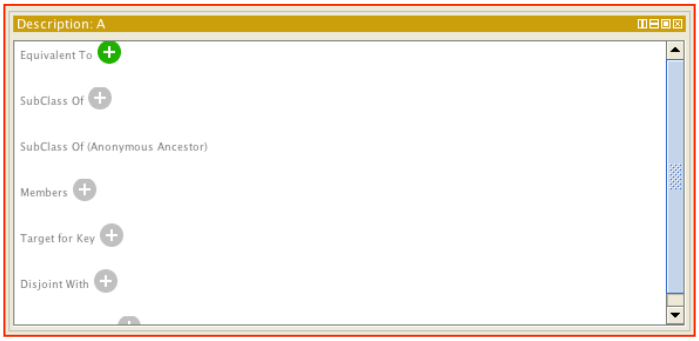
Editing Classes

Once the main application is loaded, the classes can be edited in the *Classes* tab. All classes are a subclass of Thing (owl:Thing) and are selected for editing in the *Class hierarchy* as shown below.

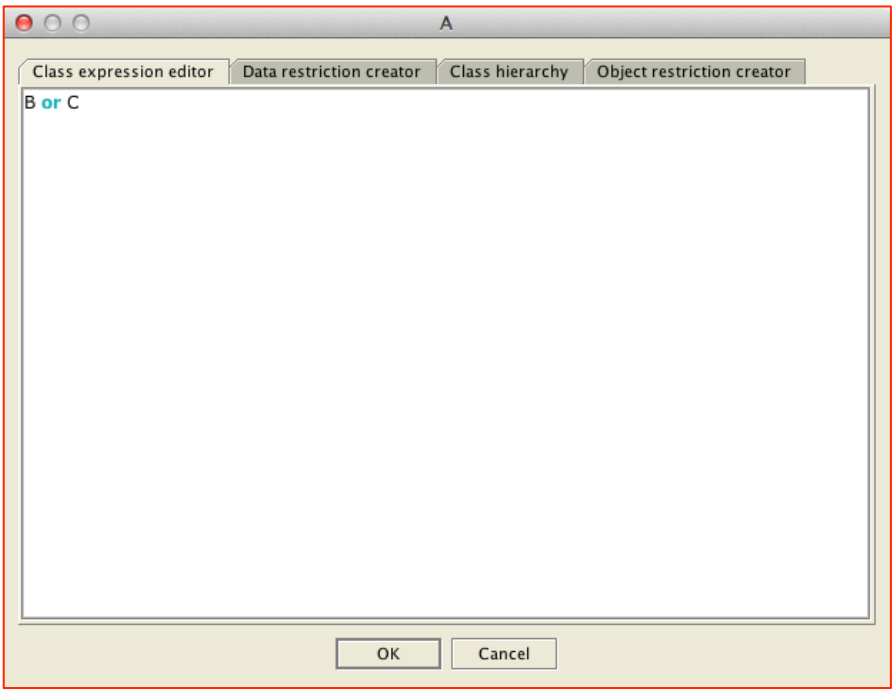


Here you have the options to add a subclass or sibling class or to remove one. Once a Class is added, you can select it to add annotations and descriptions of it.

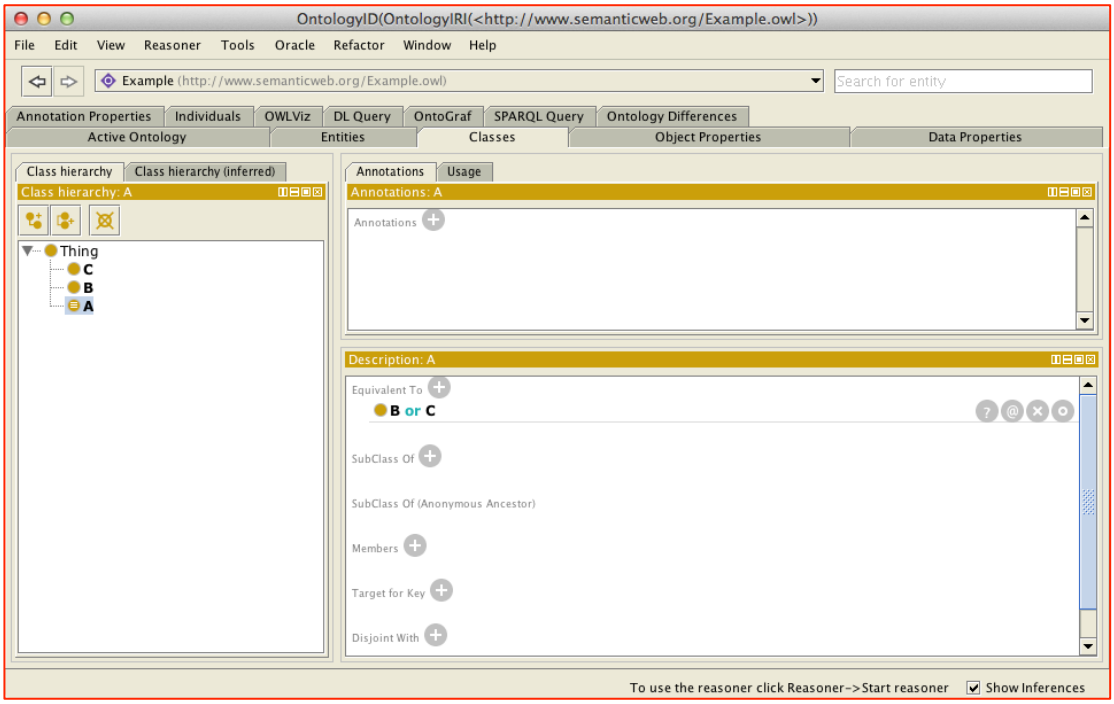
The following is an example of how to add a union.



From the Description Panel, Press the Plus Sign next to Equivalent To for class "A"



In the Class Expression Editor, Type "B or C"

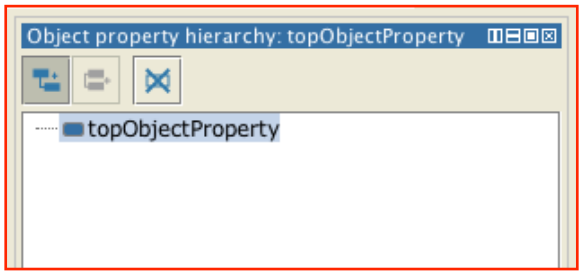


The Equivalence Will Be Displayed When Selecting The Class "A"

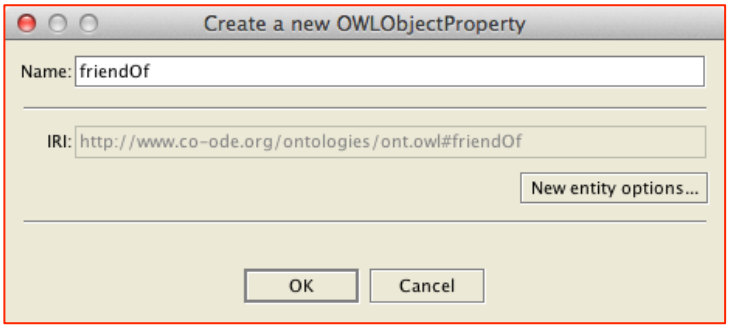
Editing Object Properties

Object properties are edited in the *Object Properties* tab; as with the classes tab, you will have a hierarchy with *topObjectProperty* as the root of all object properties.

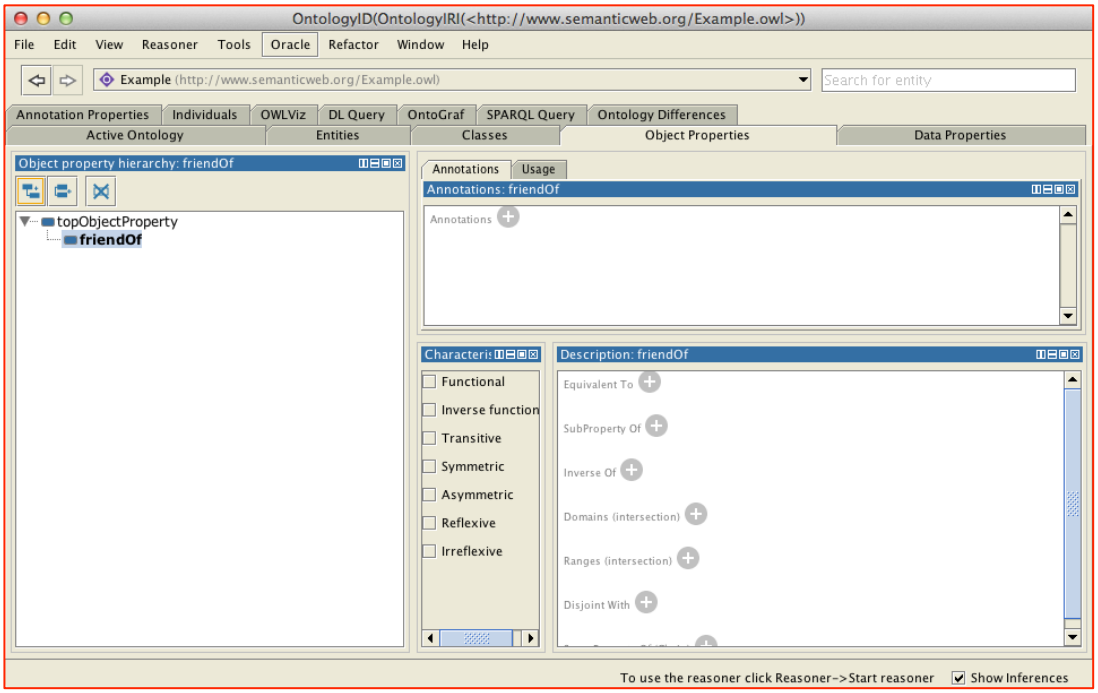
The following is an example of adding an object property.



From the Hierarchy Panel, Select the "topObjectProperty" and Then Press "Add sub property"



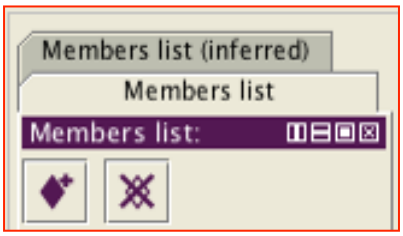
A Dialog Allows Us to Input the Desired Name for the Object Property



Once the Object Property is Added, We Can Edit the Description/Characteristics/Annotations

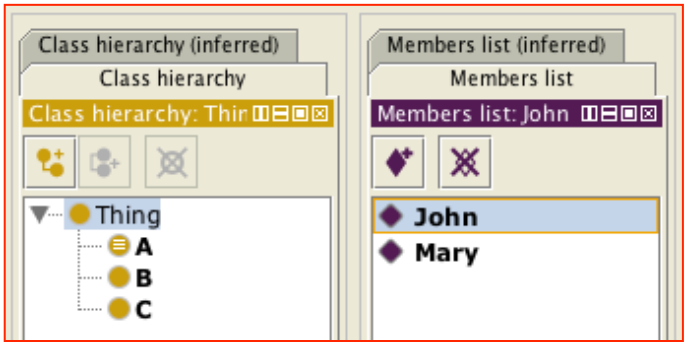
Editing Individuals

The Individuals tab differs from the rest of the tabs by adding a hierarchy for classes and a members list for the individuals. Individuals can belong to a specific class or be part of the Thing class. Once a class is selected, you can add/remove individuals from the members by using the Add/Delete buttons as shown below.

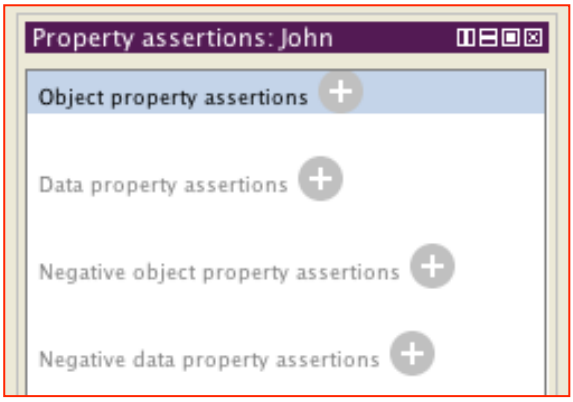


Once an individual is added, you can choose it from the members and edit its description, assertions and annotations.

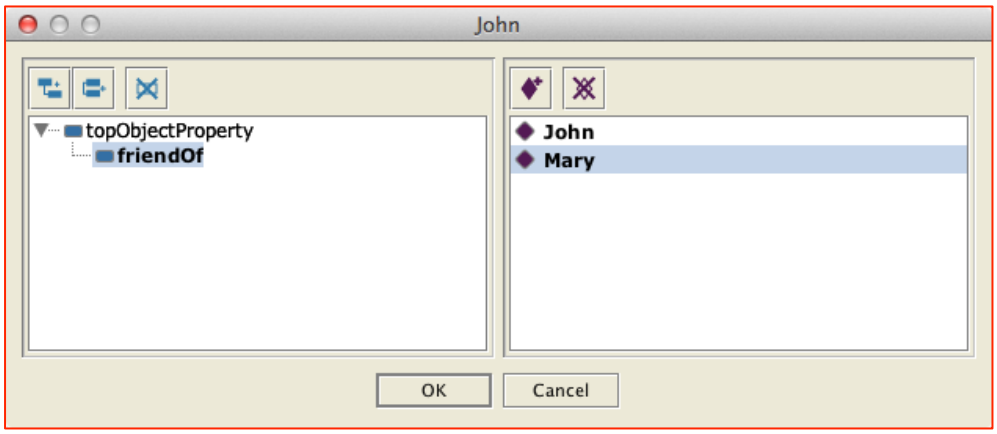
The following is an example of individuals with Object Property Assertions.



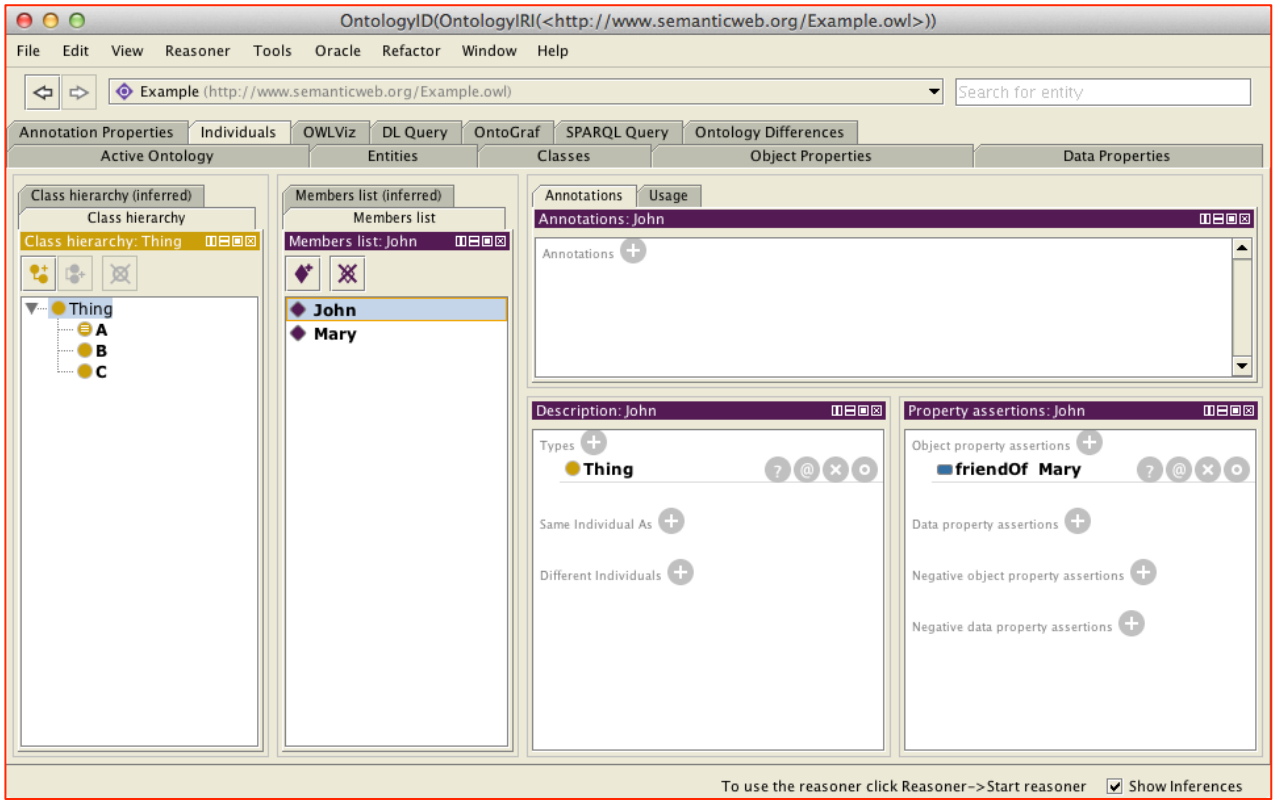
First Add Two Individuals to the Thing Class



On the Property Assertions of One of the Individuals, Press "Object property assertions"



An Editor Lets You Choose an "Object Property" and "Individual" to Create the Assertion



Once Selected, the Object Property Assertion Will be Displayed in the Assertion Panel

Using a Reasoner with Protégé

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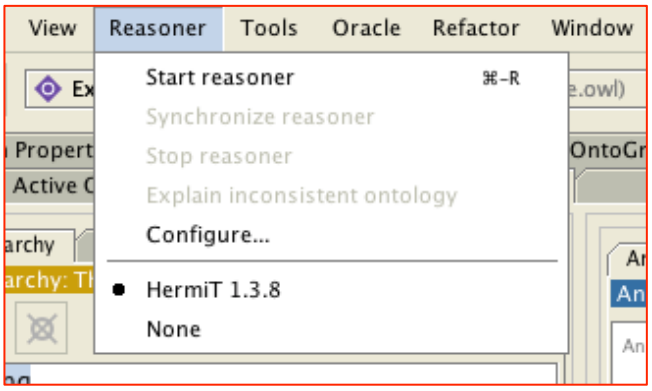
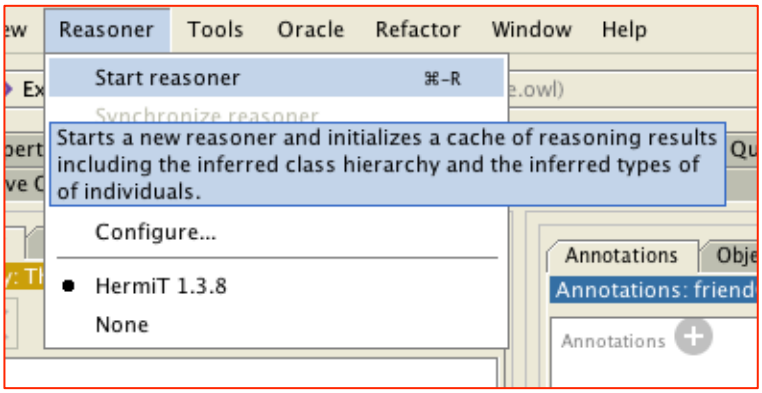
Starting a Reasoner

Protégé comes bundled with *HermiT* and *Fact*. In order to start, you must select a reasoner from the *Reasoner* menu.

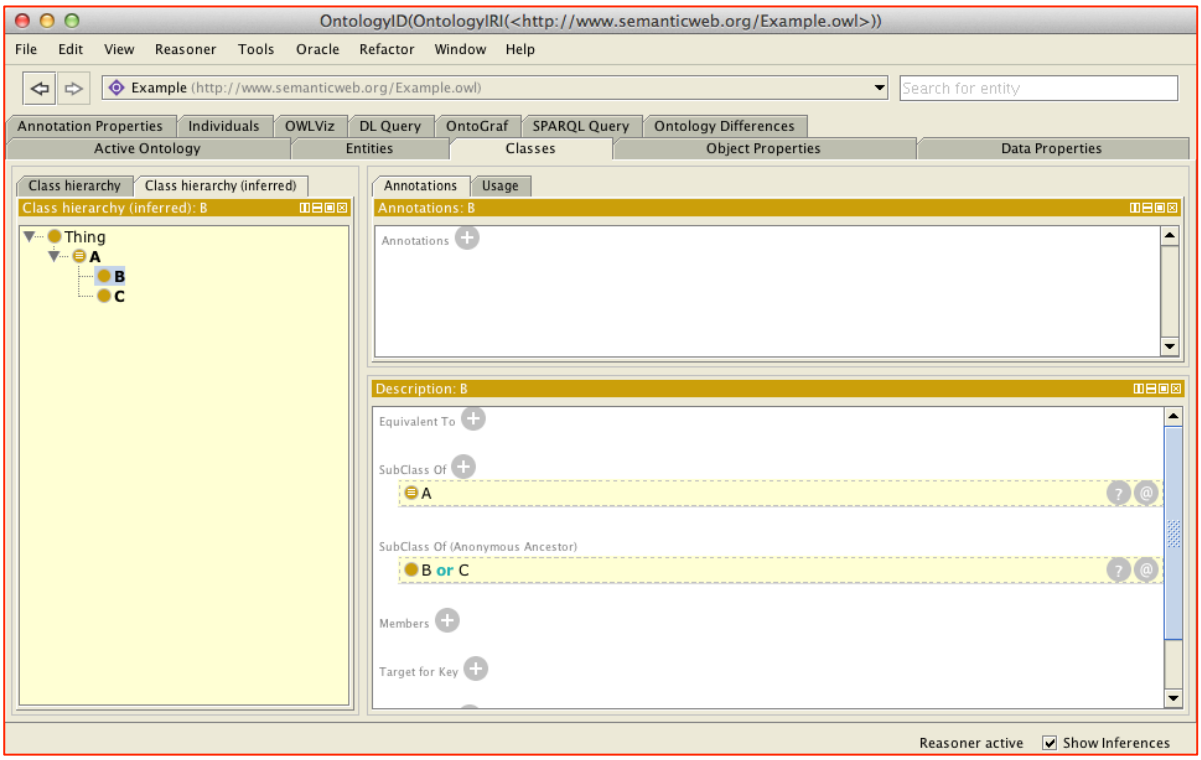


After selecting the reasoner, you can start the inferencing on the ontology by selecting the *Start reasoner* option from the *Reasoner* menu as shown below.



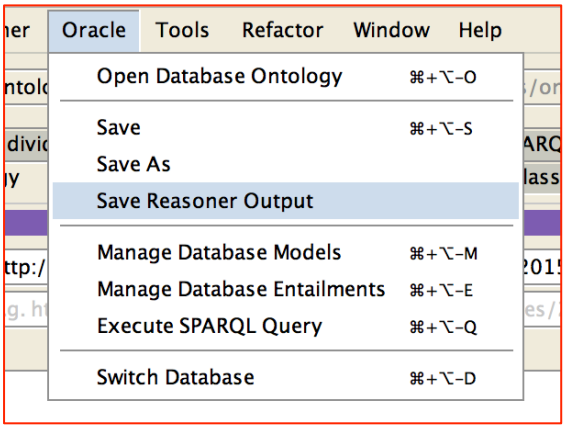
After the process is completed, the inferred classes and individuals will appear as a highlighted element in each of the description panels of their corresponding types. These elements cannot be edited, and you can easily access them by selecting the inferred class hierarchy and members list.

Note that the support for Protégé will not save the inferred elements in the database.

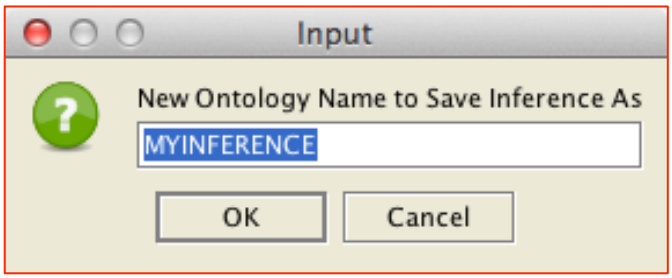


Saving Inferred Ontology

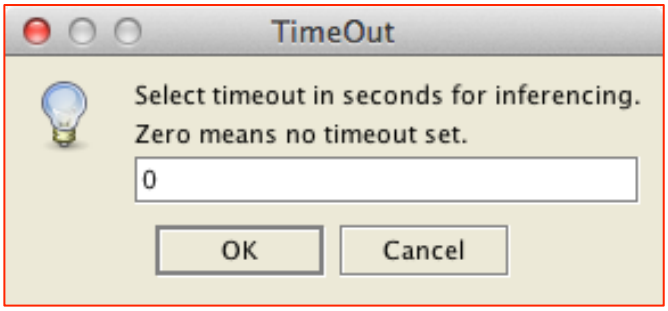
To save the inferred ontology, you must select *Save Reasoner Output* from the Oracle menu.
You must start a reasoner first in order to save the inference.



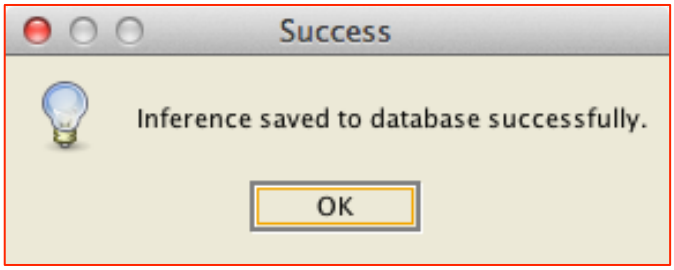
You will be asked to input a name to save the inference as a new ontology in the database.



The process of inferencing is resource-intensive, and can sometime take a long time to complete, depending on complexity. Before processing the inference, you will be asked to provide a timeout in seconds for the inference process to stop trying to complete the inference when this time is reached (setting the timeout to zero means there is no time limit).



Once the inference process reaches its timeout or completes, a message dialog will be displayed, giving feedback about the operation, such as follows:



If the inference does not complete in the allocated time, the process may be retired with increased timeout.

Using the Model Manager

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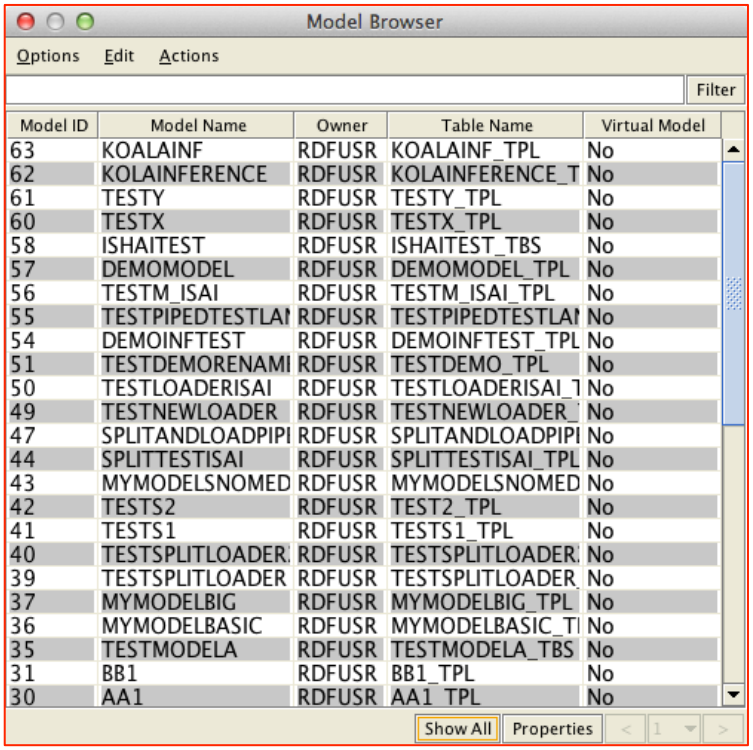
RDF Semantic Graph supports models and virtual models in Oracle Database. Models store ontologies, asserted data and entailments. (See the RDF Semantic Graph Developer's Guide for details.) The support for Protégé can manage and bulk load RDF Semantic Graph models. To do this click *Oracle > Manage Database Models*.



The Model Browser has a row for each model in the associated database connection, with the following information about each model: Model ID, Model Name, Owner (schema), Name of the RDF application table, and whether it is a Virtual Model. You can specify a string to Filter the displayed results, and you can click Show All to show all the models.

The Model Browser has the following menus and menu items:

- **Options menu**:
  - **Update**: Updates the display based on the current metadata and data.
  - **Pagination**: Specifies the maximum results to be displayed per page.
- **Edit menu**:
  - **Copy**: Copies the text from the selected row or rows to the system clipboard.
  - **Copy All**: Copies the text from all rows to the system clipboard.
- **Actions menu**:
  - **Drop Model**: Drops (deletes) the selected model. To select the model, click in its row. When prompted, confirm that you want to delete the selected ontology.

For Oracle Database, this action is implemented using the PL/SQL SEM_APIS.DROP_SEM_MODEL procedure.

- **Empty Model**: Truncates the selected model by deleting the data from its RDF application table but not the table itself. To select the model, click in its row. When prompted, confirm that you want to truncate the selected ontology.

  For Oracle Database, this action is implemented using the SQL statement TRUNCATE TABLE, which is described in *Oracle Database SQL Language Reference*.

- **Rename Model**: Renames the selected model (not a virtual model). To select the model, click in its row. When prompted, specify the new name for the selected ontology.

  For Oracle Database, this action is implemented using the PL/SQL SEM_APIS.RENAME_MODEL procedure.

- **Create Model**: Creates a model that is not a virtual model. If you click **Advanced**, you can specify the tablespace and whether to use basic compression, in addition to the model name. After the model is created, it appears in the Model Browser display.

  For Oracle Database, this action is implemented using the PL/SQL SEM_APIS.CREATE_SEM_MODEL procedure.

- **Create Virtual Model**: Creates a virtual model. Specify the models and rulebases to be used in creating the virtual model. After clicking **Create VM**, specify the new name for the new virtual model. After the virtual model is created, it appears in the Model Browser display.

  For Oracle Database, this action is implemented using the PL/SQL SEM_APIS.CREATE_VIRTUAL_MODEL procedure.

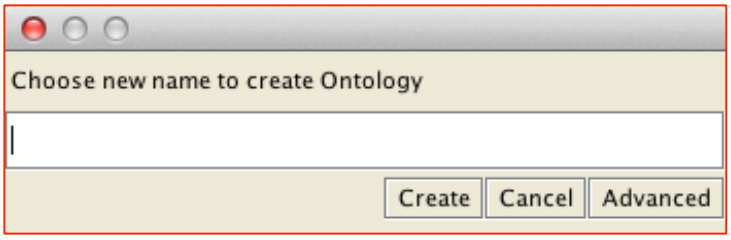
- **Remove Virtual Model**: Drops (deletes) the selected virtual model. To select the virtual model, click in its row. When prompted, confirm that you want to delete the selected virtual model.

  For Oracle Database, this action is implemented using the PL/SQL SEM_APIS.DROP_VIRTUAL_MODEL procedure.

- **Load RDF Data**: Loads RDF data into the selected model. To select the model, click in its row. Select the tab for desired main option: Load Files; Load All Files from Directory; Split, Save & Load; or Save & Load. (The available fields depend on the option selected.)

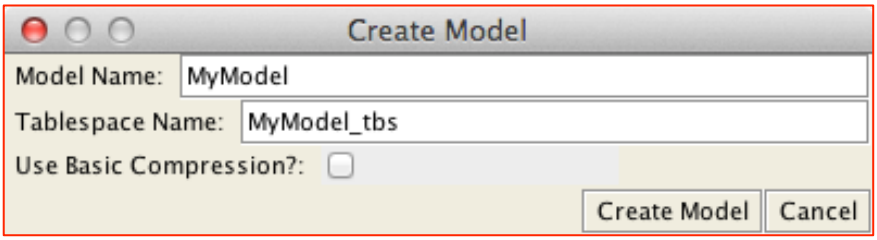
Creating Models

To create a model, you must select *Create Model* from the Actions menu.



Model creation.

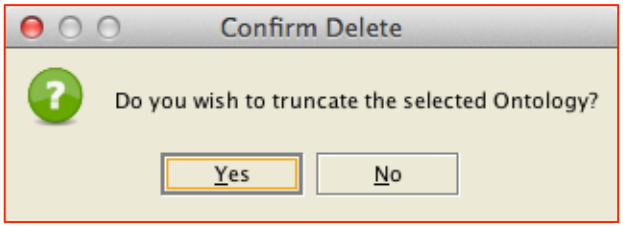
You will be asked to input a name to save the model into the database.
You will also be given the choice to specify the advanced options.



Advanced model creation.

Empty Models

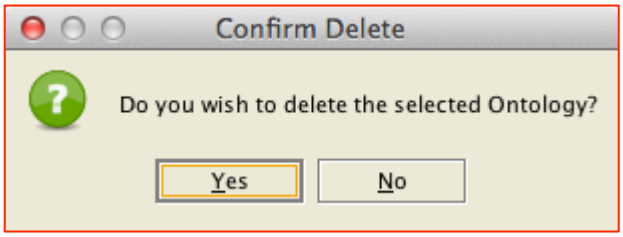
To empty a model, you must select *Empty Model* from the Actions menu.



You will be asked to confirm before truncating the selected model.

Delete Models

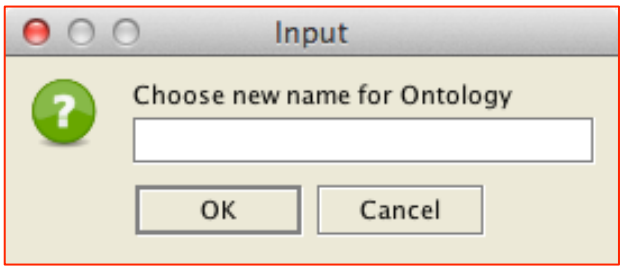
To delete a model, you must select *Drop Model* from the Actions menu.



You will be asked to confirm before deleting the selected model.

Rename Models

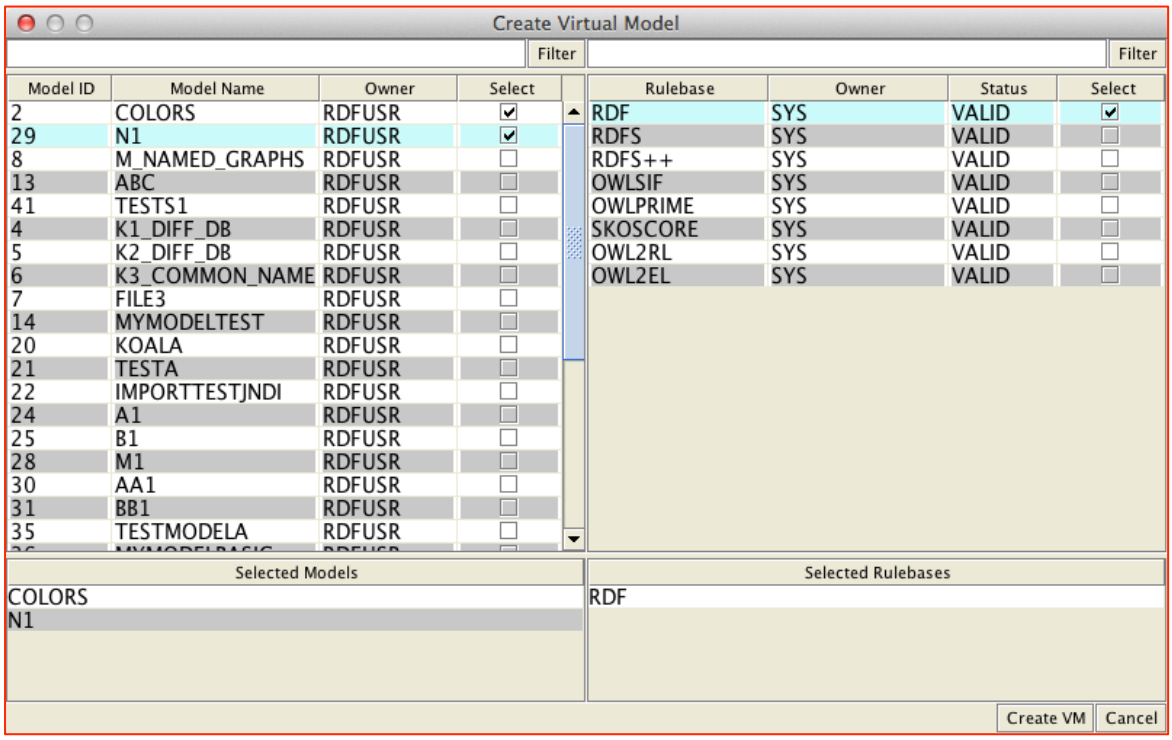
To rename a model, you must select *Rename Model* from the Actions menu.



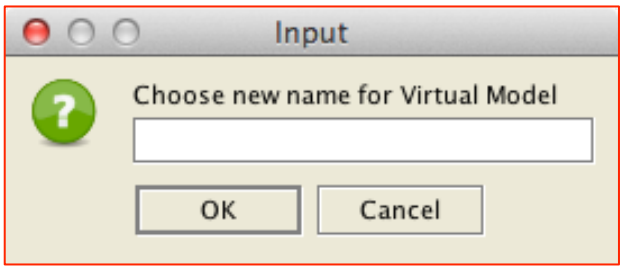
You will be asked a new name to rename the model.

Create Virtual Models

To create a virtual model, you must select *Create Virtual Model* from the Actions menu.



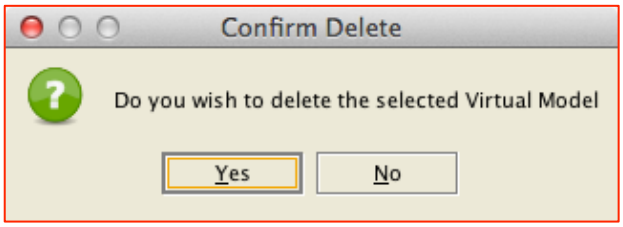
You will be shown a list of all available models and rulebase, which the current user has access to.
To create the virtual model you must choose the desire models and rulebase by selecting their respective checkbox. Selected elements will be display in a list below.
Regular expressions are supported for the filter.



Once you click Create, you will be asked to input a name to save the entailment into the database.

Delete Virtual Models

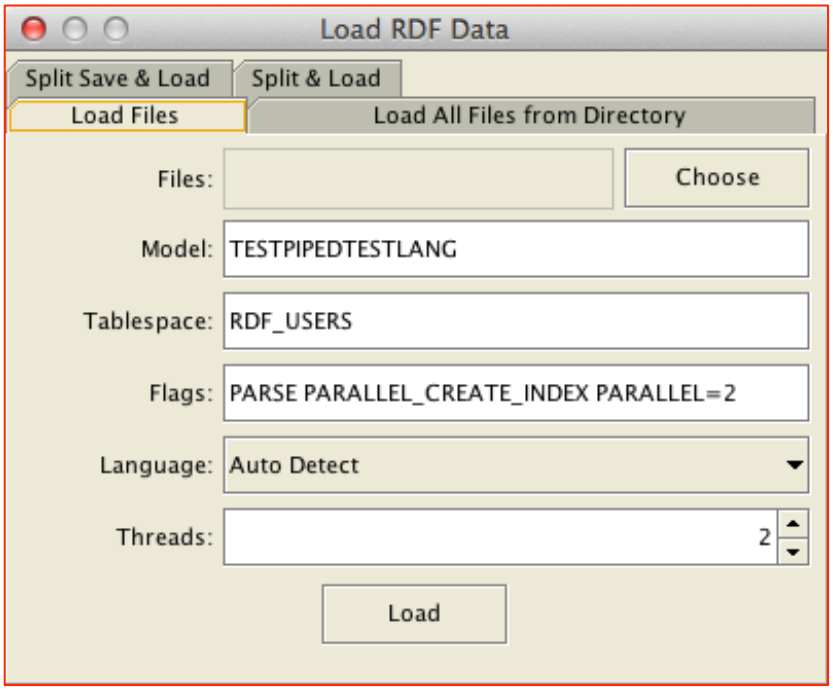
To delete a virtual model, you must select *Remove Virtual Model* from the Actions menu.



You will be asked to confirm before deleting the selected virtual model.

Loading RDF Data

To load RDF data into a model, you must select *Load RDF Data* from the Actions menu.



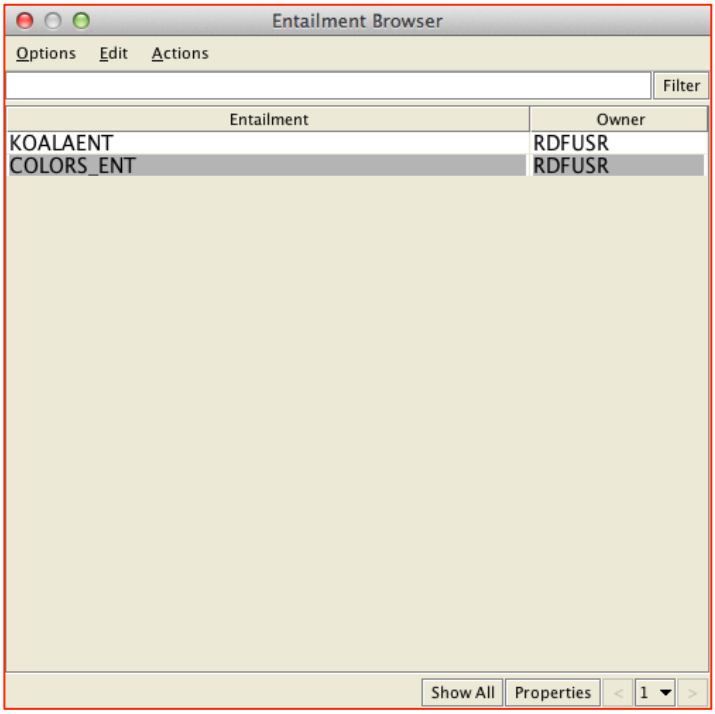
The loader allows the user to *Load Files*, *Load All Files from Directory*, *Split Save & Load* and *Split & Load*. User can choose the option that best fit the loading needs and will be displayed a series of options to improve the loading which allows flags, language selection and threads.

Zip and GZip compressed files are supported.

The loader supports the following formats:

N-Triple, N-Quad, RDF/XML, OWL/XML, OWL, OWL Manchester, OBBO, KRRS2, TTL and Turtle.

The auto select option will try all supported formats in order to load.



The Entailment Browser has a row for each entailment in the associated database connection, with the following information about each entailment: Entailment Name and Owner (schema). You can specify a string to Filter the displayed results, and you can click Show All to show all the entailments.

The Entailment Browser has the following menus and menu items:

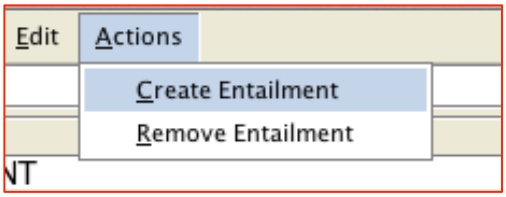
- **Options menu**:
  - **Update**: Updates the display based on the current metadata and data.
  - **Pagination**: Specifies the maximum results to be displayed per page.
- **Edit menu**:
  - **Copy**: Copies the text from the selected row or rows to the system clipboard.
  - **Copy All**: Copies the text from all rows to the system clipboard.
- **Actions menu**:
  - **Create Entailment**: Creates an entailment. Specify the models and rulebases to be used in creating the entailment. After clicking **Create**, specify the name for the new entailment, and optionally click **Advanced** for advanced options. After the entailment is created, it appears in the Entailment Browser display.

    For Oracle Database, this action is implemented using the PL/SQL SEM_APIS.CREATE_ENTAILMENT procedure.
  - **Remove Entailment Model**: Deletes the selected entailment. To select the entailment, click in its row. When prompted, confirm that you want to delete the selected entailment.

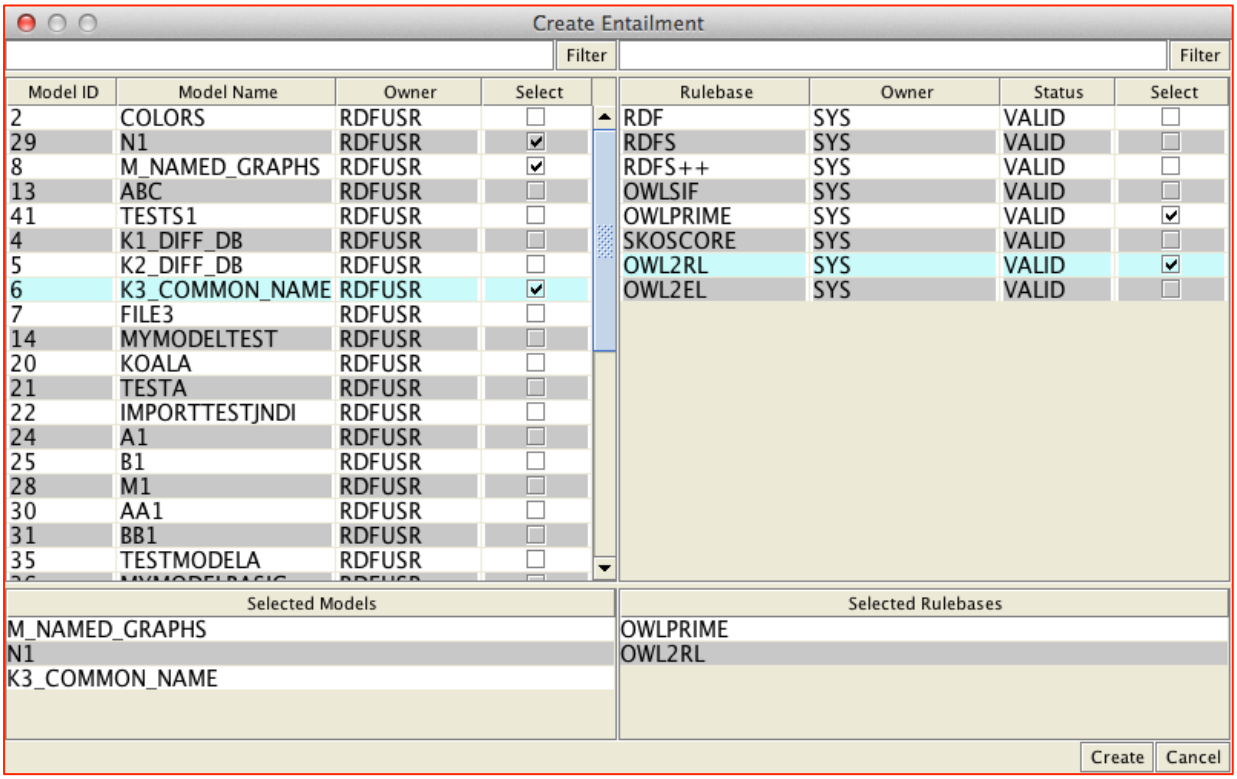
    For Oracle Database, this action is implemented using the PL/SQL SEM_APIS.DROP_ENTAILMENT procedure.

Creating Entailments

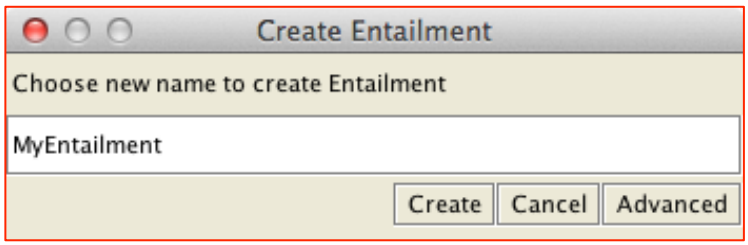
To create an entailment, you must select *Create Entailment* from the Actions menu.



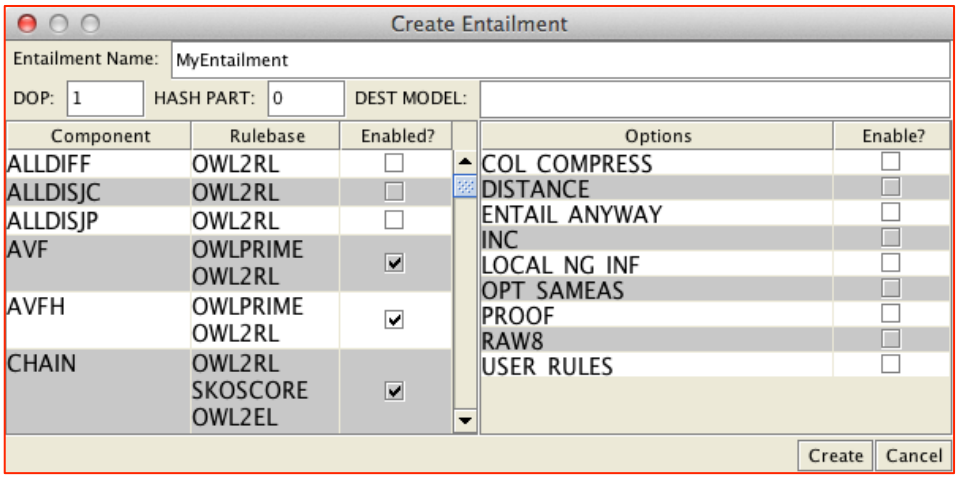
You will be shown a list of all available models and rulebase, which the current user has access to.
To create the entailment you must choose the desire models and rulebase by selecting their respective checkbox. Selected elements will be display in a list below.
Regular expressions are supported for the filter.



Once you click Create, you will be asked to input a name to save the entailment into the database.
You will also be given the choice to specify the advanced options.



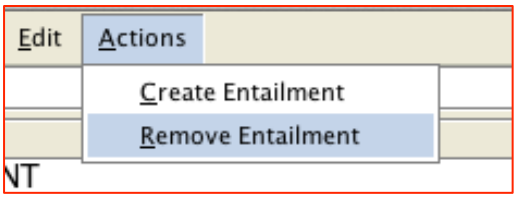
Entailment creation.



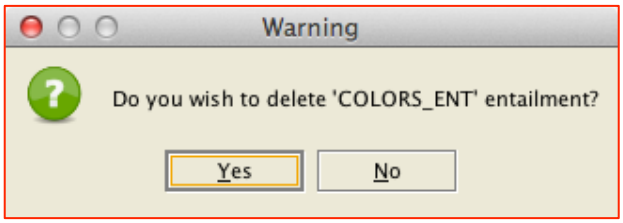
Advanced entailment creation.

Deleting Entailments

To delete an entailment, you must select *Create Entailment* from the Actions menu.



You will be asked to confirm before deleting the selected entailment.



Handling owl:imports of Ontologies Stored in Oracle Database

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OWL allows import of the contents of entire ontologies in other ontologies with owl:imports assertion(s).

Protégé supports *owl:imports* of ontologies stored in a file system or ones that can be accessed through a valid URL.

The support for Protégé allows you to import ontologies stored in Oracle Database.

To reference (ow:imports) an ontology from Oracle Database you must generate the XML catalog, load the catalog, specify the ontology name and data source by creating a redirect, and importing the database ontology.

Importing an Ontology

In order to import ontologies from Oracle Database you must load the XML Catalog generated by Protégé and manually specify the ontology ID and its Datasource.

Generating the XML Catalog

Start Protégé from scratch and save the current ontology into a directory on your local file system without making changes to the temporal ontology, then open the saved ontology into the current editor.

After reloading the saved ontology, a catalog file will be generated in the directory where the ontology was saved.

XML Catalog Structure

The XML catalog file contains the redirects of ontologies that have an ontology IRI that is not the same as its physical location or the data source identifier. Below is an example catalog file.

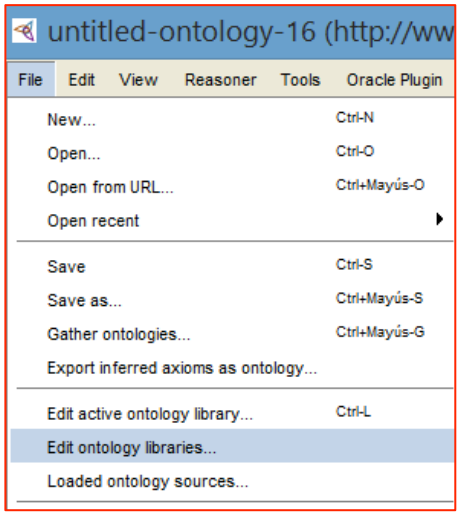
```
<?xml version="1.0" encoding="UTF-8" standalone="no"?>
<catalog prefer="public" xmlns="urn:oasis:names:tc:entity:xmlns:xml:catalog">
   <uri id="User Edited Redirect" name="urn:N1" uri="jndi-name:oracle-database:N1DS:N1"/>
</catalog>
```

You can manually add an entry in the catalog by using the following format

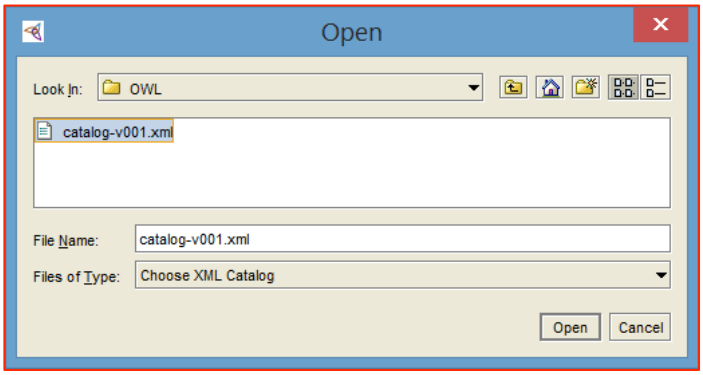
<uri id=”User Edited Redirect” name="[Ontology IRI]" uri="[physical location or data source]"/>

Loading the XML Catalog

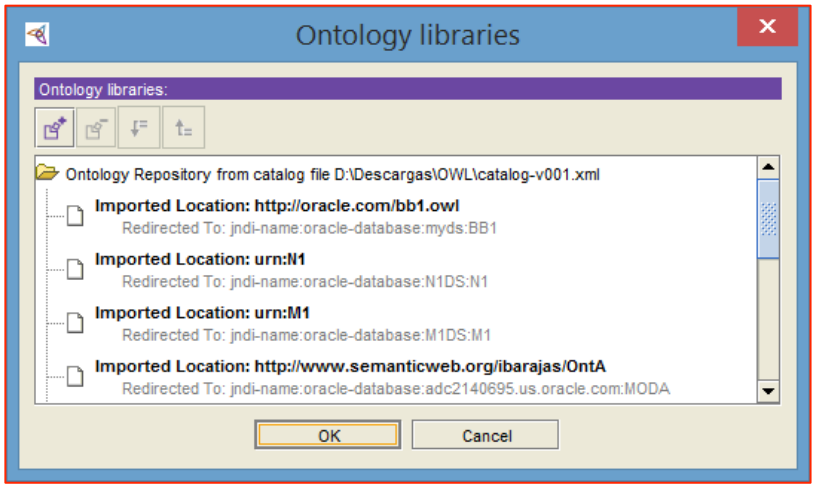
Once you have loaded an ontology you can import one or multiple ontologies from the database by selecting *Edit ontology libraries* option from the *File* menu.



Select the *catalog-v001.xml* file, which contains the redirects from ontology IDs to physical locations or Data Sources.

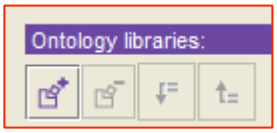


After the catalog is loaded you will see the ontology libraries containing the catalog locations and all the redirects.



Adding an Oracle Database Ontology Data Source Redirect

You can add a redirect by opening the ontology library from the *Edit Active Ontology Library* option from the *File* menu, and clicking the *Add Redirect* button.

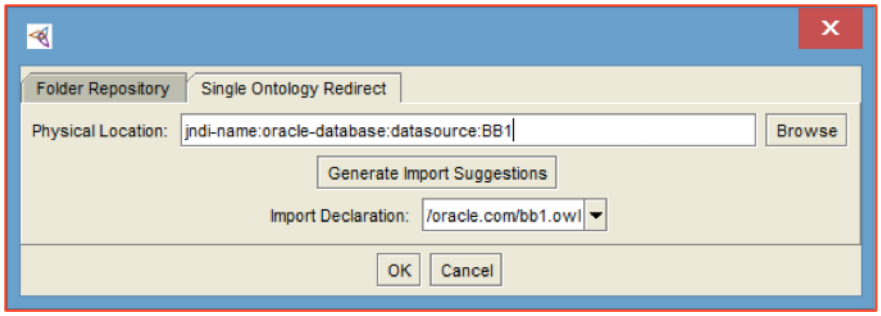


Add Redirect Button

The redirect needs to use the Ontology IRI as the Import Declaration and Data Source syntax as follows:

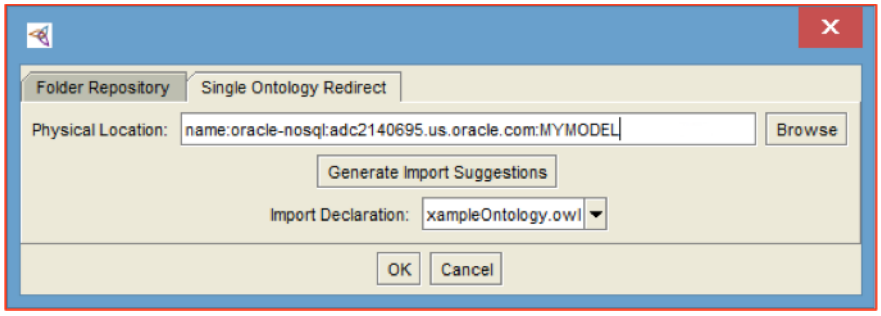
Note that when adding a new entry to the catalog, there is a known issue in which you must switch focus between the text areas in order for the OK button to be enabled.

jndi-name:oracle-database:[Data Source Name]:[Oracle Database Model Name]



Data Source Syntax to redirect an ontology to a model stored in Oracle Database

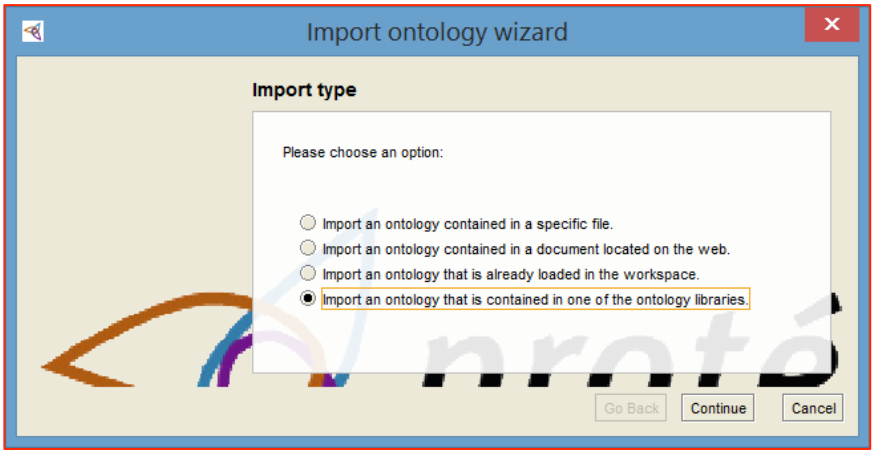
jndi-name:oracle-nosql:[Data Source Name]:[Oracle Database Model Name]



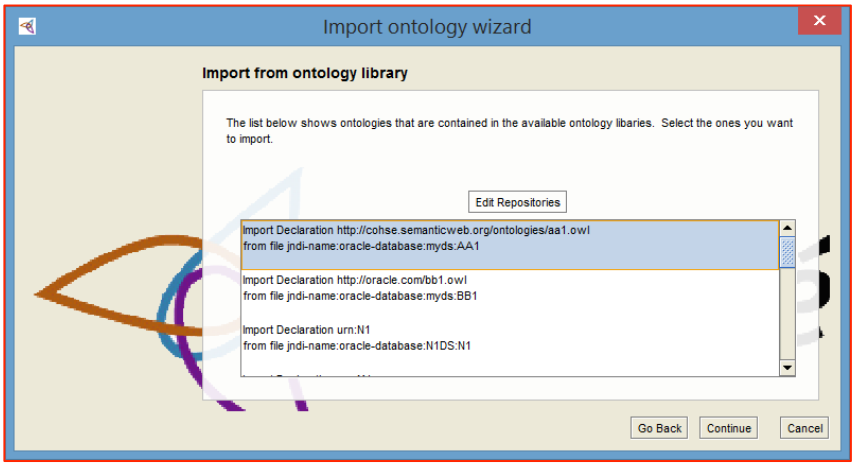
Data Source Syntax to redirect an ontology to a model stored in Oracle NoSQL Database

Importing a Database Ontology

Use the *Import Wizard*, located in the *Ontology imports* tab and choose *Import an ontology that is contained in one of the ontology libraries*, as shown below



Select the ontology to import and Protégé will verify the import.



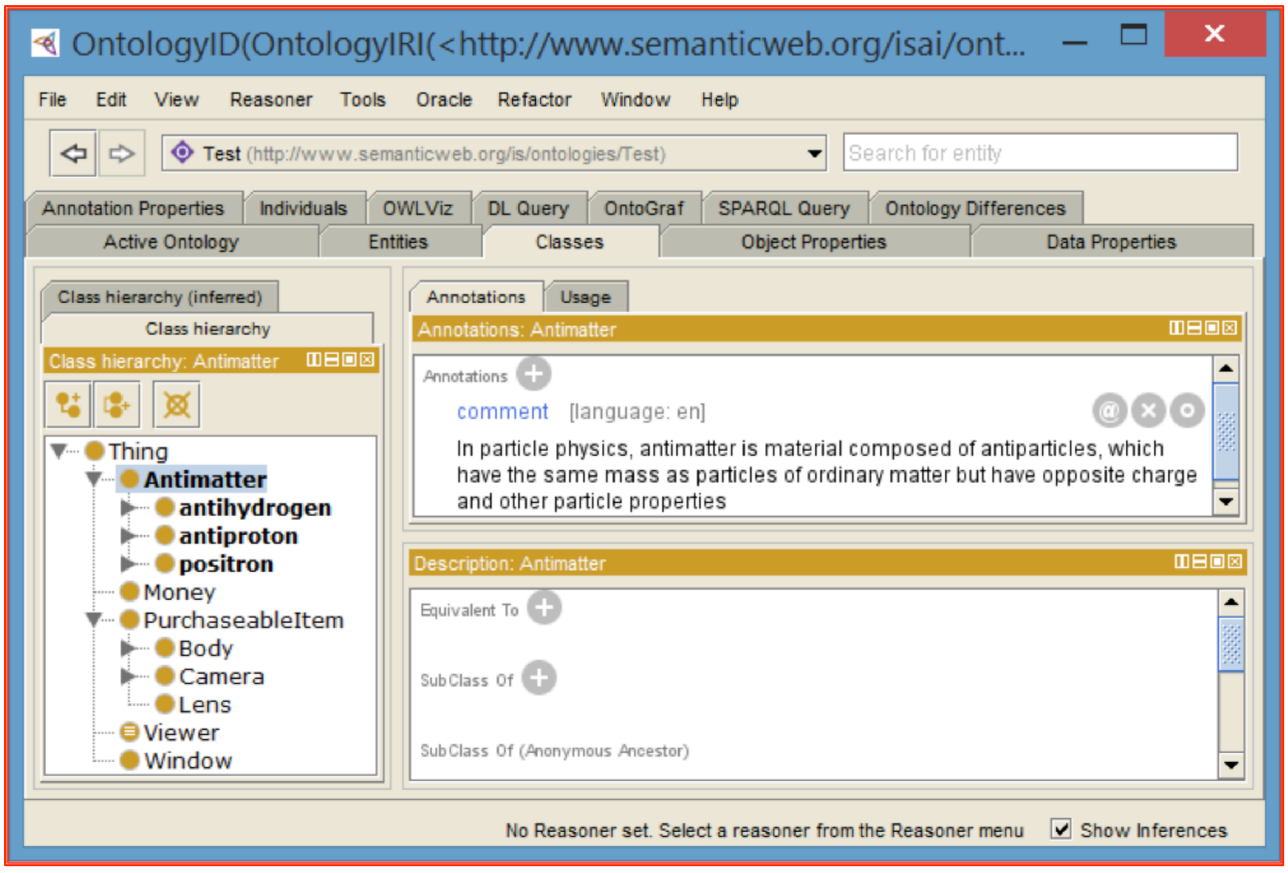
After the import has been verified, click Finish to complete the import.

Once the ontology is imported, the *Ontology imports* tab will display the name of the imported ontology, and all indirect imports if applicable.

You will need to input the connection information for the data source specified in the ontology redirect for ontologies imported from Oracle Database.

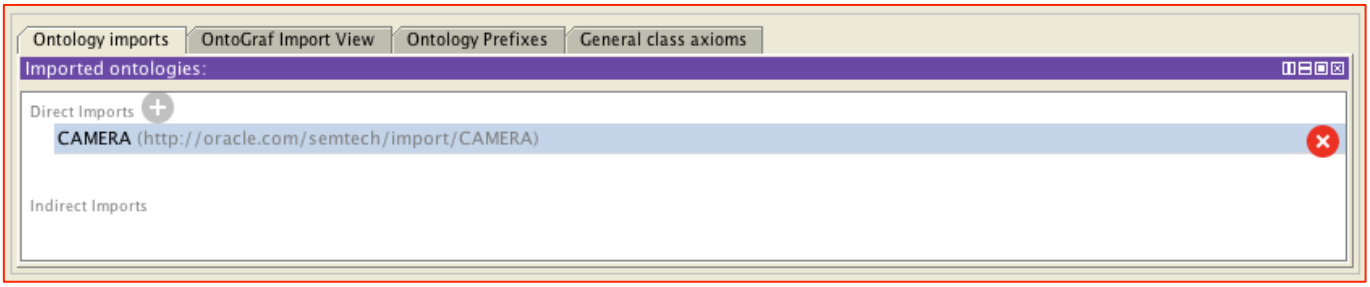
"Ontology imports" tab located under the "Active Ontology" tab

The imported ontologies elements will be displayed using light fonts and the elements belonging to the ontology will be displayed using bold fonts, as shown below.



Removing an Imported Ontology

To remove an imported Ontology, click the X icon, located to the right of the ontology on the Ontology Imports tab.



Executing SPARQL Query's in Oracle Database

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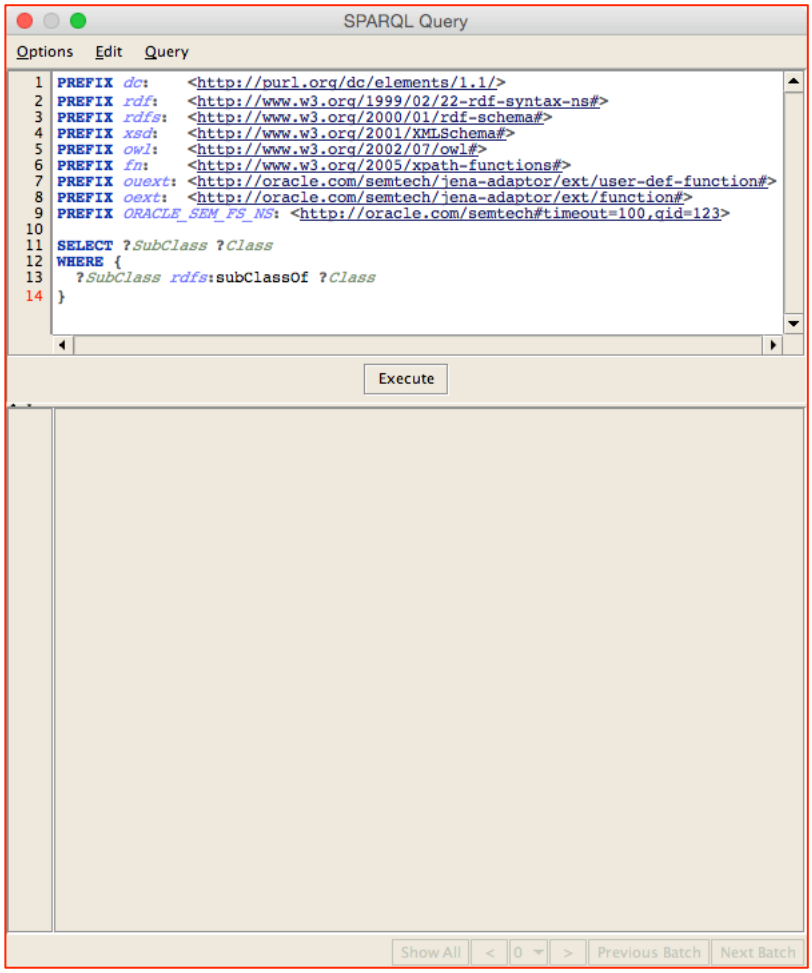
SPARQL contains capabilities for querying required and optional graph patterns along with their conjunctions and disjunctions. The SPARQL Query option allows you to query Oracle Database models. To execute SPARQL Query's click *Oracle > Execute SPARQL Query*.



The SPARQL Query has the following menus and menu items:

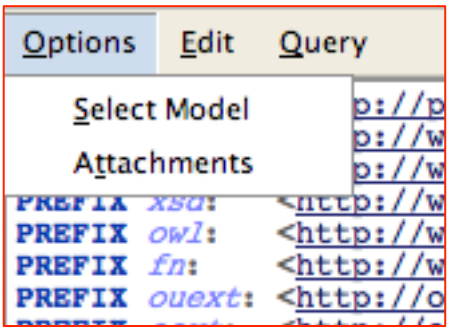
- **Options menu**:
  - **Select Model**: Selects the model to query.
  - **Attachments**: Selects the attachments for a model in Oracle Database (Models and Rulebase's).
- **Edit menu**:
  - **Copy**: Copies the text from the selected elements to the system clipboard.
  - **Copy All**: Copies the text from all result rows to the system clipboard.

- **Paste**: Paste content from the system clipboard into the query input area.
- **Undo**: Undo the last change.
- **Redo**: Redo the last change.

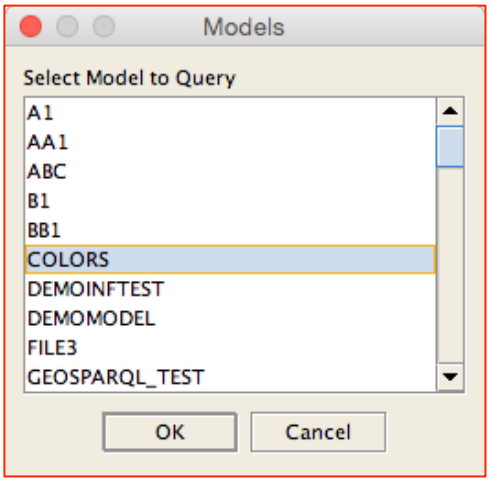
- **Query menu**:
  - **Execute**: Executes the current query.
  - **Execute from file**: Executes a query from a file.
  - **Example Query**: Sets an example query in the input area.
  - **Previous Query**: Changes the query into the previous successfully executed one.
  - **Next Query**: Changes the query into the next successfully executed one.

Selecting Database Models

To select a model, you must select *Select Model* from the Options menu.



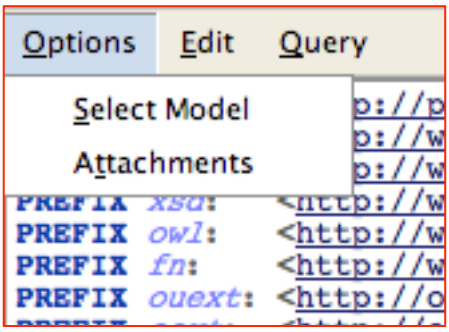
A dialog will display all the ontologies that the current user can load from the database. After selecting and loading an ontology, the application will display the name of the ontology in the window title bar.



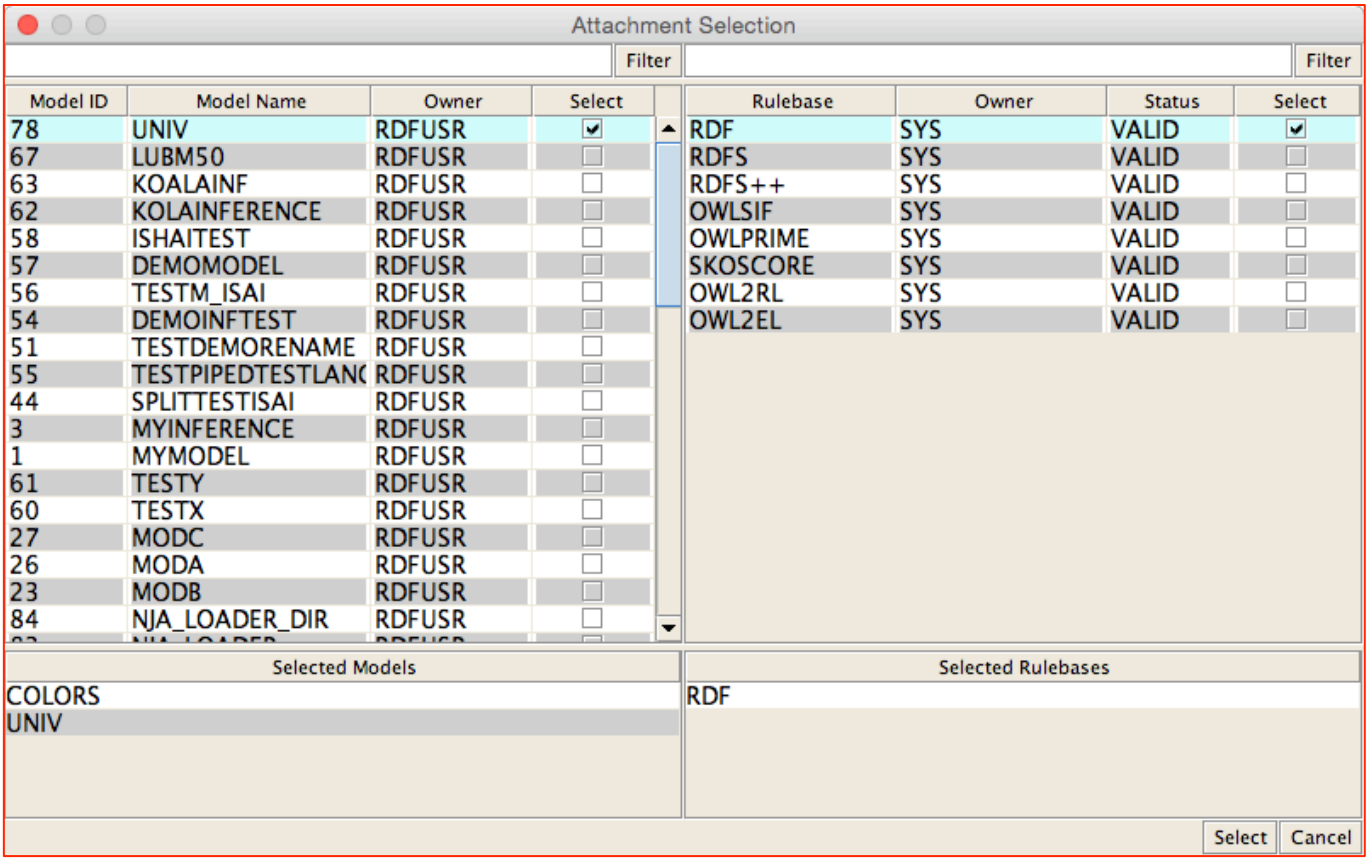
Once the model has been selected the user can start executing SPARQL queries. If the user did not choose a model and executes a query the application will display the models selection dialog in order to execute the query.

Selecting Database Attachments

To select attachments, you must select *Attachments* from the Options menu.

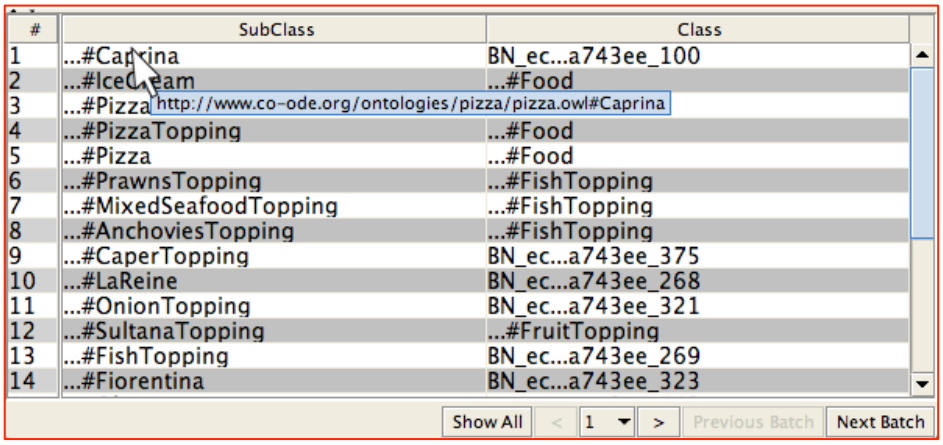


You will be shown a list of all available models and rulebase, which the current user has access to.
To set the attachments you must choose the desire models and rulebase by selecting their respective checkbox. Selected elements will be display in a list below. Once selected click select button in order to save changes.
Regular expressions are supported for the filters.



Navigating Through Results

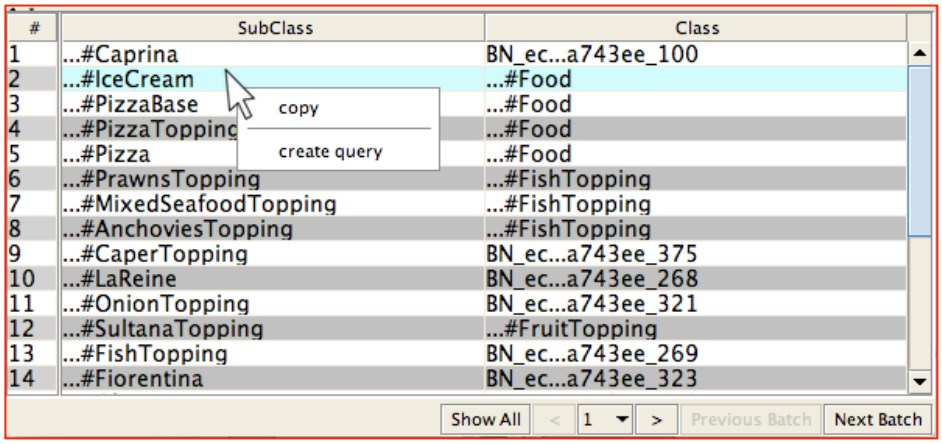
After a query is executed the results will be displayed in a table in which URI's will be displayed using prefixes if available or hiding the prefix of the resource if a valid prefix is not found. To display the full URI the user can hover the mouse over the cell containing the desire element and the full blown URI will be displayed in a tooltip.



Results are shown in batches of 250 elements, distributed in 10 pages. To move between the batches of data the user needs to use the *Next Batch* and *Previous Batch* buttons and to move between the data in a batch the user can use the arrow buttons or the dropdown option.
The complete batch can be displayed by selecting the *Show All* button.

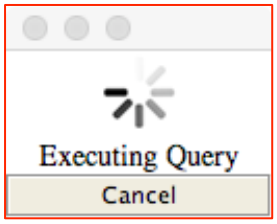
Generating Queries

After results of a query are displayed, the user can right click a cell and a menu will be displayed showing options to copy the full blown URI of the selected resource and an option to create a query that will return all information about the selected resource.
If a user chooses to generate this query, it will be generated in the input area but not executed.



Cancel a Long Running Query

Because some applications need to be able to terminate long-running SPARQL queries, a cancel option is included in the loading animation.



The query will also be terminated from the database side using a unique query ID (qid) value. Using the following Oracle prefix can set this ID:

```
PREFIX ORACLE_SEM_FS_NS: <http://example.com/semtech#qid=8761>
```

The qid attribute value is of long integer type. You can choose a value for the qid for a particular query based on your own application needs.
If the user does not specify a qid in the query, the application will automatically generate one for the current query.

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