

SemTalk 2.1

Tutorial



CONTENTS

1	What is SemTalk 2?	1
1.1	What is an Ontology?	1
2	Getting Started	2
3	Instance Diagram	4
3.1	Creating an Instance	4
3.2	Duplicating an Instance	6
3.3	Removing or Deleting an Instance	8
4	Class Diagram	9
4.1	Creating a Class Diagram	9
4.2	Creating a New Class	10
4.2.1	General	12
4.2.2	Attributes	13
4.2.3	Associations	14
5	Saving	19
6	Insert	19
7	(Hyper-) linking Models and Namespaces	21
8	Comments	23
9	Expand	23
10	Browse	24
11	Remove	25
12	Refine / Detach	25
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13	Edit a diagram.....	27
14	Find	28
15	Visio Stencils	28
16	New Visio Master.....	29
17	Customize.....	31
18	Associations on Instances	34
19	Association Classes.....	35
19.1	Association Class Options	36
20	HTML Generator.....	38
21	Report Generator.....	40
22	Extras and Tools.....	43
22.1	Table Editor	43
22.2	Wizard and Wizard Window	44
22.3	Macros	45
22.4	Replace	45
22.5	SemTalk Options	45
22.5.1	Namespaces Options	46
22.5.2	Wizard Options.....	48
22.5.3	Shortcuts.....	50
22.5.4	Index.....	51
22.5.5	Explorer.....	51
22.5.6	Extras.....	53
23	Help.....	54

24	Export / Import Options.....	54
24.1	SemTalk Import.....	55
24.2	Semantic Web	56
24.3	More Export / Imports.....	59
25	Using OWL.vst.....	60
26	Quick – Reference Glossary	63

For your convenience, we have included a quick-reference glossary in this tutorial. It contains a list of important concepts for SemTalk 2. As you read this tutorial, you will find *terms* (in red color and italics). Place the cursor on such a term and while pressing the Ctrl-Key click on it with your mouse and you will jump directly to the quick-reference glossary.

SemTalk 2 minimum requirements:

- Microsoft Visio® 2003
- Microsoft .NET Framework Version 1.1 Redistributable Package

1 WHAT IS SEMTALK 2?

SemTalk 2 is a user-friendly editor for Semantic Web ontologies and processes. Because Microsoft Visio® is embedded in SemTalk 2 it combines the graphical strength of Microsoft Visio® and the consistency of a professional modeling tool.

New modeling methodologies for virtually any modeling problem are easily defined using SemTalk 2. Applying a graphically configurable meta model, Microsoft Visio® can be adapted to different modeling worlds such as *CASE* Tools, organizational models and object models.

The main purpose of this tutorial is to learn how to use SemTalk 2. This tutorial does not include specific methodologies nor *Semantic Web* or *BPM* use cases. It is assumed that the reader is familiar with the basic Microsoft Visio® functionalities.

The modeling of processes using specific business process modeling methods (e.g. CSA, EPC, BPMN, Promet and others) is covered in additional tutorials. You can find these tutorials at our homepage www.semtalk.com/manuals.

1.1 WHAT IS AN ONTOLOGY?

For the purposes of this tutorial an *ontology* is a formal explicit description of concepts (i.e. *classes*) in a domain of discourse, properties of each concept describing various features and attributes, and restrictions on properties and attributes (i.e. relation and data types). In simple words, an ontology is a formal model for a specific domain of knowledge. An ontology together with a set of individual *instances* of classes constitutes a knowledge base.

Ontologies are developed to provide a machine-understandable semantics of information sources that can be communicated between different agents (software and humans). Some reasons to develop ontologies are:

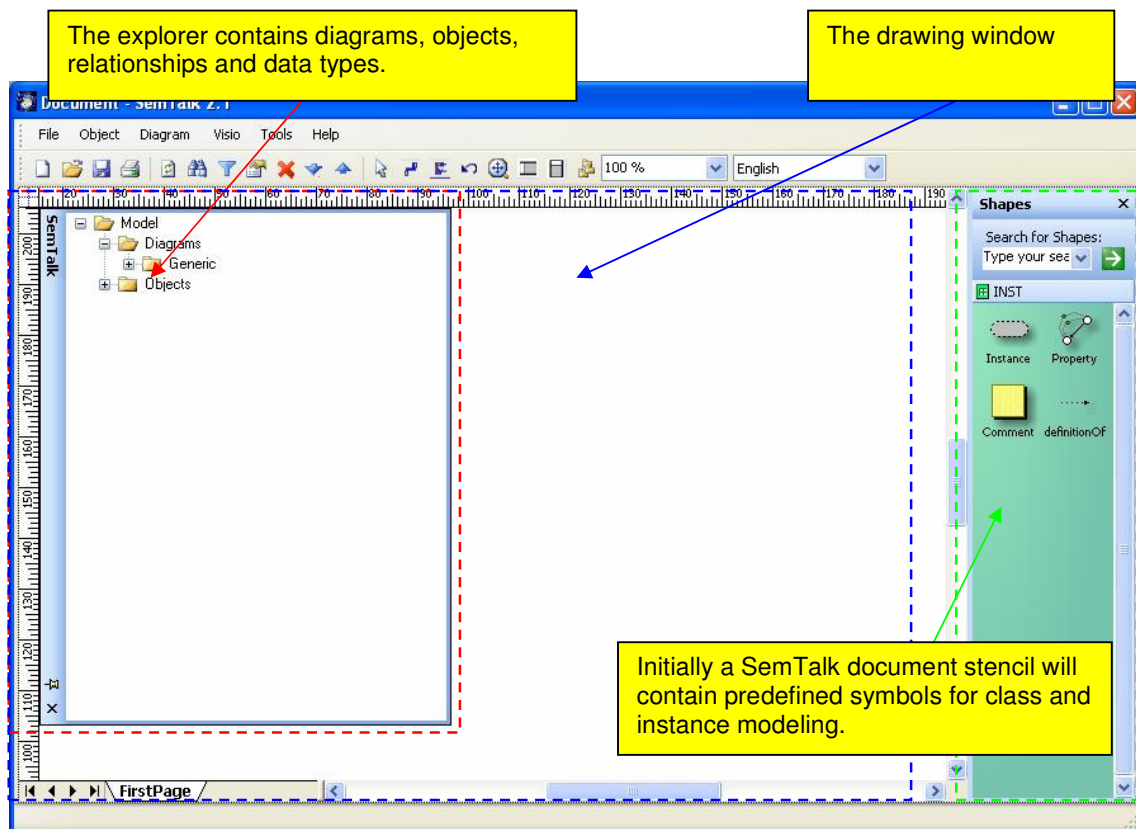
- to share common understanding of the structure of information among people or software agents.
- to enable reuse of domain knowledge.
- to make domain assumptions explicit.
- to separate domain knowledge from the operational knowledge.
- to analyze domain knowledge.

Web Ontology Language (OWL) is a W3C recommendation for the representation of ontologies. In case you want to work with OWL, you should use the OWL Template: File->New and select OWL.vst in the SemTalk program directory. In this tutorial we will use the SemTalk default notation, which is a subset of OWL. OWL Export / Import is explained at 24.4

2 GETTING STARTED

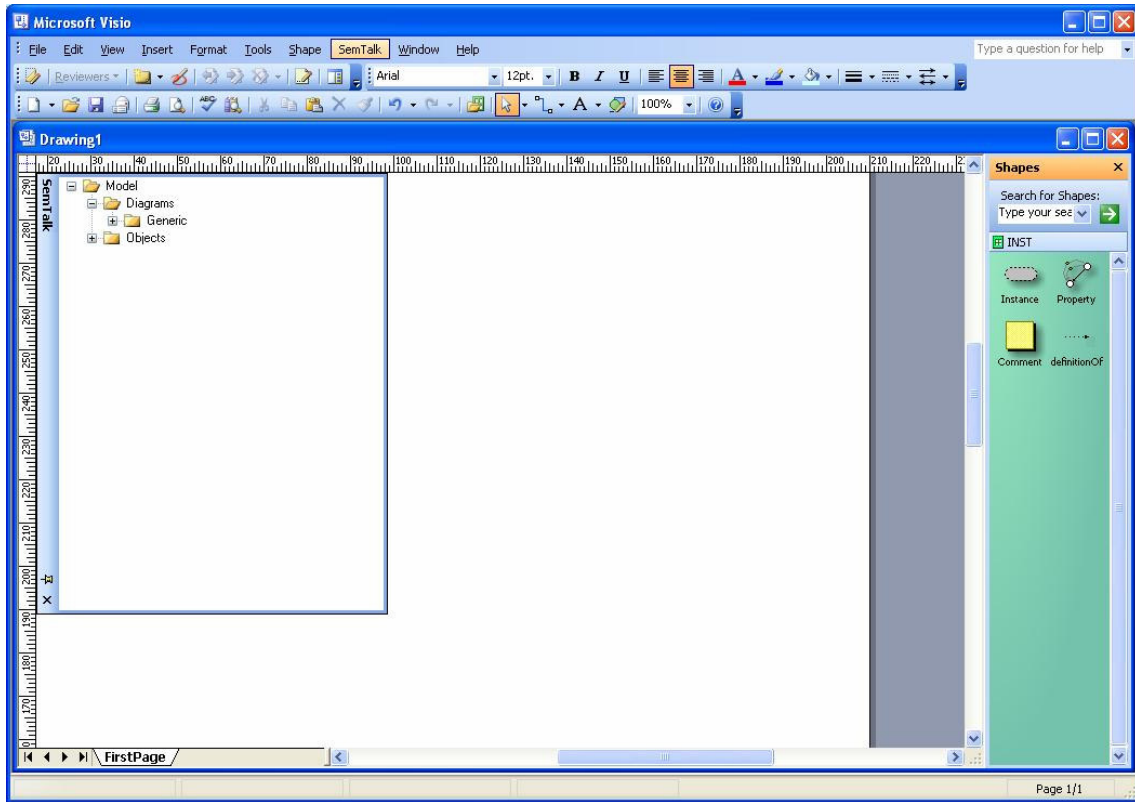
Start SemTalk 2 with its icon on the desktop or select **Start → Programs → SemTalk → SemTalk 2** and begin to work.

After doing this, the following screen will appear:



In this tutorial, we will develop a simple ontology about the banking sector.

You may also start SemTalk embedded into Visio. In order to do that you must have installed the SemTalk Visio Add-In. Start Visio 2003 and open a SemTalk Template (semtalk.VST or OWL.vst):



You will find SemTalk now embedded into the Visio Menu. Using SemTalk from Visio 2003 is recommended, if you need the collaboration functions of Microsoft Office 2003, especially Sharepoint Team Services integration. Please be aware that some functionality such as "Searching", "Save as Html" is available from Visio and from SemTalk. The SemTalk variant is obviously preferred. In this tutorial we will use the SemTalk program version.

3 INSTANCE DIAGRAM

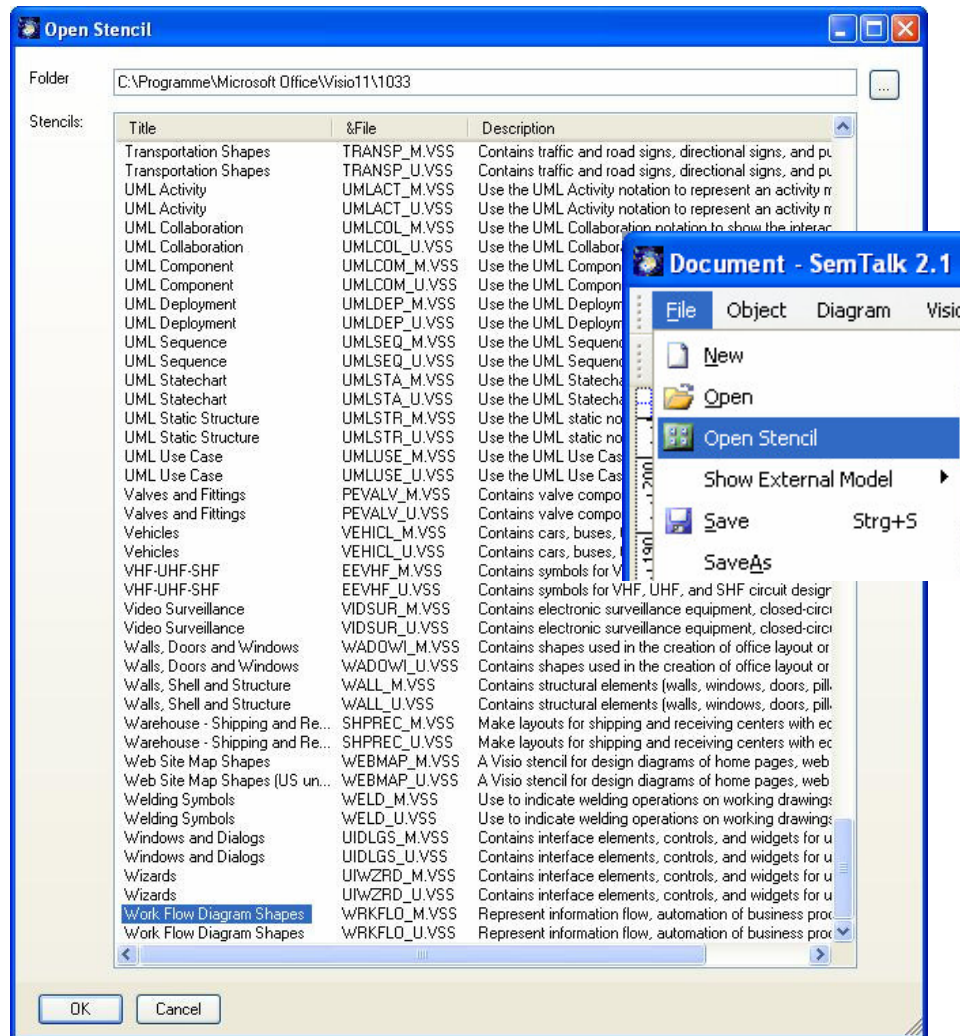
With the instance editor you will create diagrams for concrete objects having a specific identity. Instance diagrams are used in SemTalk solutions for business processes, org. charts, data warehouse cubes, product models etc. Virtually any Visio drawing containing real world objects such as buildings or a subway map would be an instance diagram.

Diagrams which are not instance diagrams are called class diagrams. Class Diagrams contain abstract objects like data types and classes. In the Visio world classes correspond to masters and instances to the shapes in the drawing. Class diagrams are explained in chapter 4.

3.1 *CREATING AN INSTANCE*

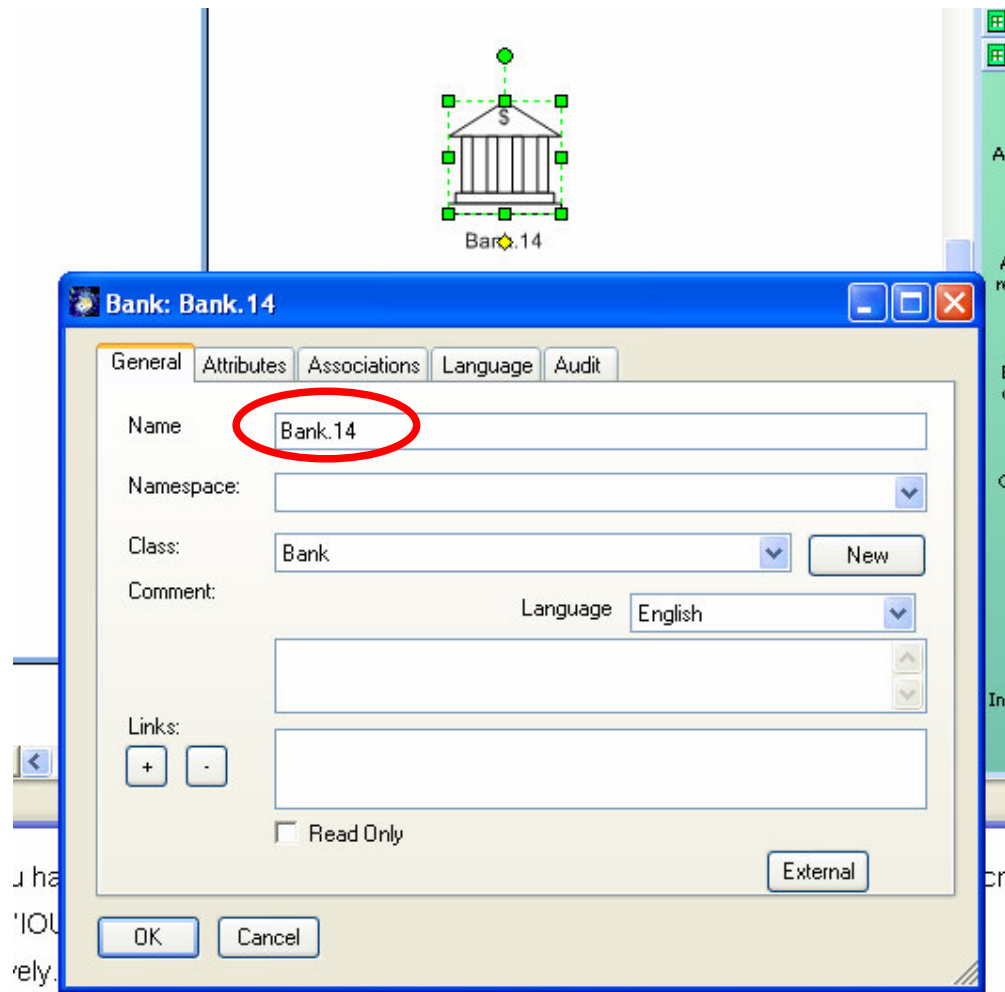
To create an instance just drag and drop an “Instance” symbol from a stencil in the drawing area. Please open a Visio® stencil e.g. File → Open Stencils. In the embedded Version use File->Shapes to open a stencil.

Now, please choose the stencil “Work Flow Diagram Shapes”.



Now, you can drag & drop your shape of preference in the drawing area. In this case, please use the shape titled “Bank”. Repeat this procedure once more. You can use the shape search function on top of the stencil window. In this way you can look for special shapes in the installed Visio® stencils. Please find a “Treasurer” shape now. Once you find it, drag & drop the shape in the drawing area twice.

SemTalk 2 assigns automatically an individual name to each object according to the name they have in the Visio® stencil. For example, “Bank.19” and “Bank.20” are different objects of the class “Bank”. To change the object’s name or other property make double-click on the shape or click the right button of your mouse and select “Edit”.



Once you have opened the dialog box (like above) change the name of each figure to “Acme Bank” & “IOU Bank” for the Bank and “John Doe” & “Mary Smith” for the “Treasurer “ respectively.

3.2 *DUPLICATING AN INSTANCE*

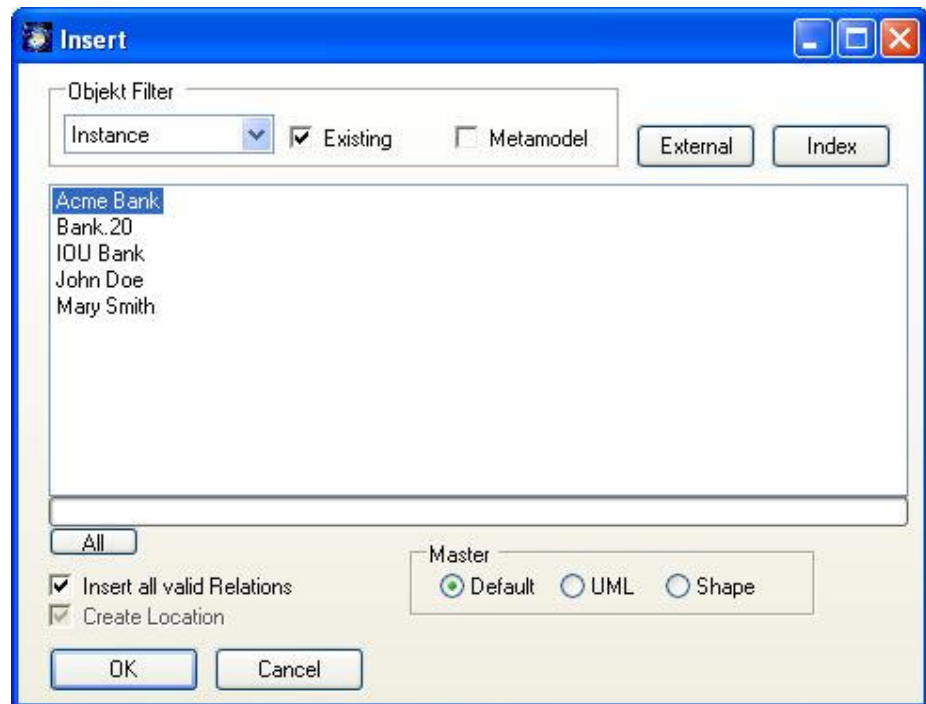
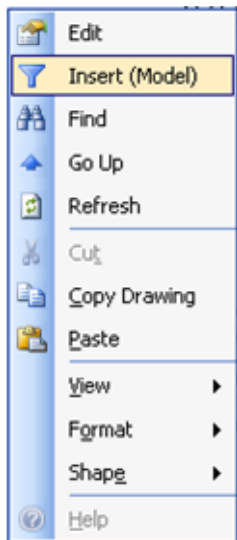
If you try to include, for example, the instance “Bank” one or more times in your model (ontology) using drag & drop from the stencil and you use the same class and namespace, you will get an error message.

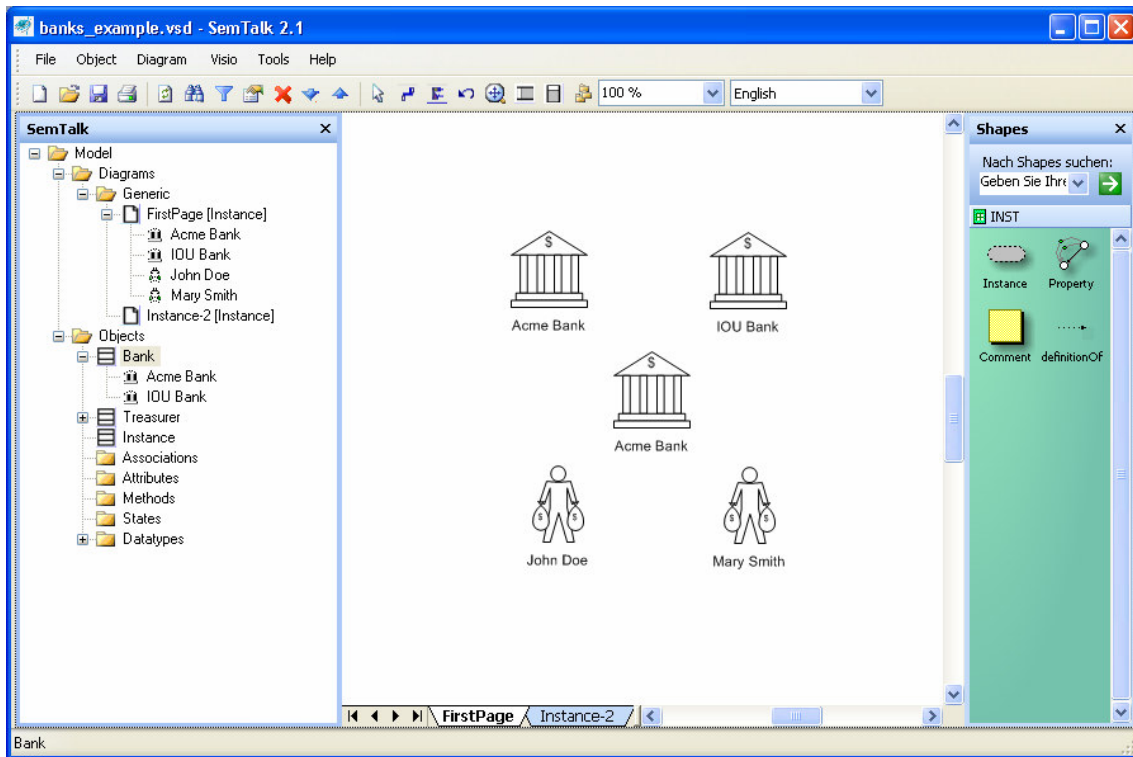


When duplicating an object with SemTalk 2, it is necessary to maintain its consistency. For example, if the user modifies the name of an object, the modification must also occur in every duplicate of that object. The “Insert” command has been included for this purpose.

Please, insert a second “Acme Bank” by right clicking on the drawing area.

From this context menu please select “Insert” and you will see the following dialog box. Check “Existing”, choose „Acme Bank“ and press OK.





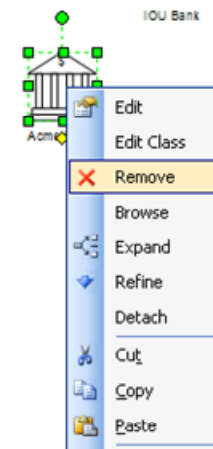
Now, every modification done on the object “Acme Bank” will be replicated in every of its instances.

3.3 REMOVING OR DELETING AN INSTANCE

At this moment, it is convenient to point out that with “Del-key”, “Ctrl-X” or “Object → Delete from Drawing” you are only **erasing** the chosen shape from the drawing area, but not **removing** it from SemTalk 2’s objectbase. In case you want to remove an object from the drawing area AND from the objectbase, you must use “Remove” from the context menu or “Object → Delete from Model”.


Please select the last “Acme Bank” in your drawing area and right-click on the shape.

In this way, the object “Acme Bank” will be removed from the objectbase and from the active page, as well as, from every other page of your SemTalk 2 file. In SemTalk 2 there is no Undo command that will not restore the removed object and its properties. If you **delete** an object, you may restore it in your diagram(s) by inserting it, like shown before.



SemTalk 2 model-based functions like **Browse**, **Find** and **Expand** will be described later in this tutorial.

4 CLASS DIAGRAM

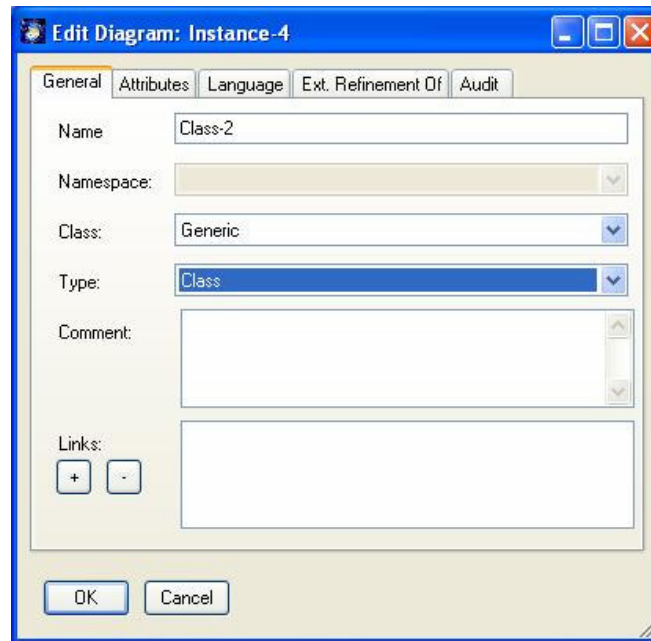
So far you have create instances of classes. The meaning of the Visio® shapes you previously used is defined in class diagrams. In our example, we used Visio® shapes related to banks and treasurers and we gave them individual names. In a class diagram we could now extend the definition of our model by defining that a treasurer works at a bank. This declaration is valid for the instances we modeled before. Furthermore, in the class diagram you can define attributes that are inherited by subclasses of your class. For example, the subclass “Home Loan Bank” will inherit attributes and relationships (e.g. employs - inverse relationship of “works at” - and number of branches) from the class “Bank”. Abstract classes, e.g. “financial institution”, have no Visio®-shape (yet) and therefore, you can use the general class symbol. 

4.1 CREATING A CLASS DIAGRAM

Each SemTalk 2 page has a type, i.e. an instance type or a class type. Thus, the first step is to define the page as a class diagram. To do this, insert a new page by:

- Diagram → New → Generic (in this case) or
- right-click on top of the page-tab and select “Insert Page” and name the new page “My classes”


Now right-click on the diagram area and choose “Edit”. You should now see the following dialog box.

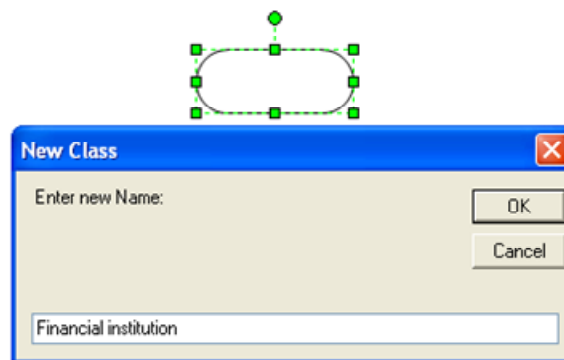


Please change now the diagram type to “Class”.

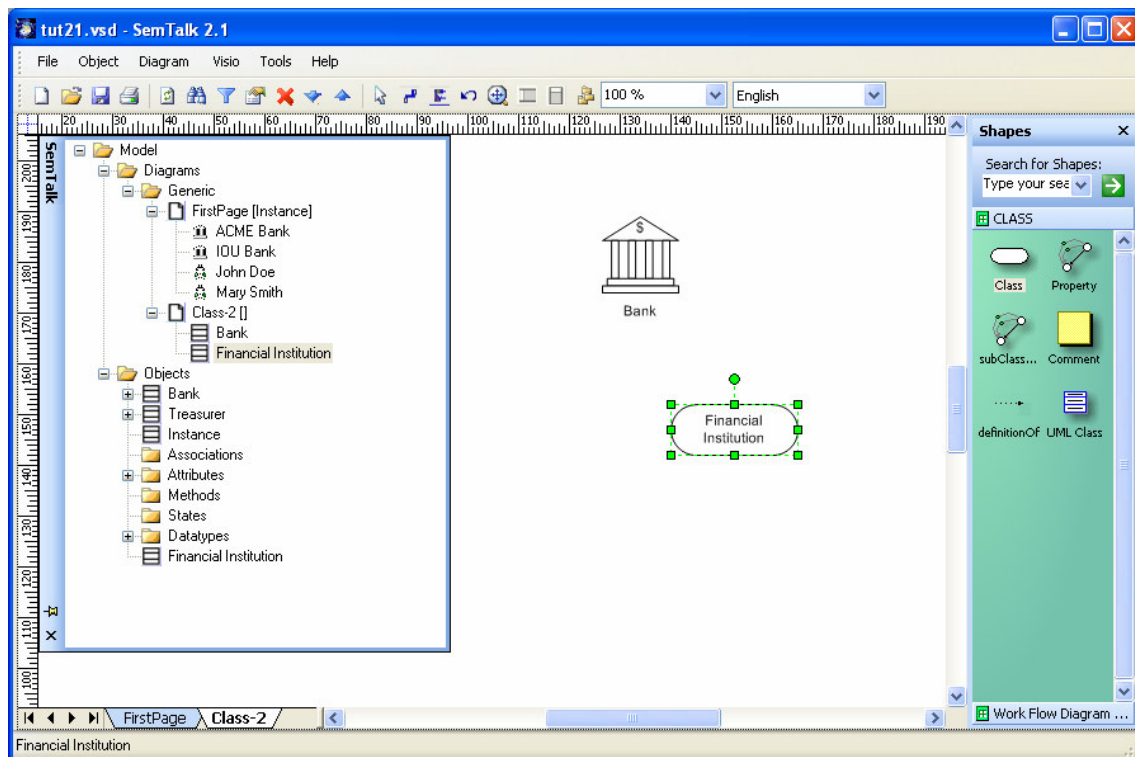
4.2 CREATING A NEW CLASS

At this moment, you are ready to begin defining classes. If you drag & drop the shape “Bank” in the drawing area you will define general properties of the class “Bank”. Remember that everything you define for a class is valid for its instances.

Inserting a new class using no predefined Visio® Master Shape is very easy. Please drag the class symbol from the “Class” stencil window  and drop it on the drawing area. Give the class a name, e.g. “Financial institution”, a press OK.



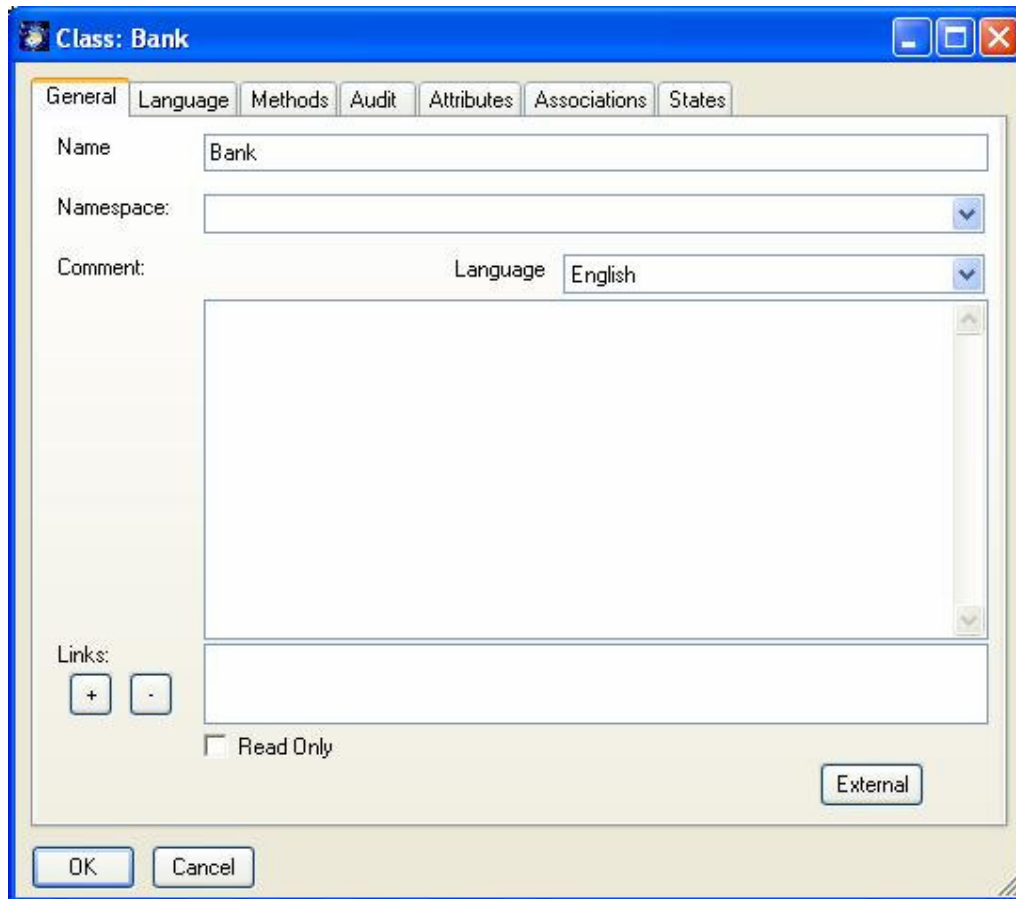
Now your diagram “My classes” should look like this:



To edit a class and its properties,

- double-click on the object or
- press the right button of your mouse and choose “Edit” from the context menu or
- from the menu select “Object → Edit” or
- find the object in the explorer as a child of “Diagrams → Generic → My classes” (context menu)
- find the object in the explorer as a child of “Objects” (context menu)

You should now see the following dialog box:



4.2.1 General

Name is the name of the object. You may change this name to specify the class name.

Namespace is the namespace of the class name for the object. The identifier of an object is the combination of a namespace and the name. E.g. "Tr#Treasurer" is the object named "Treasurer" in the namespace "Tr". There might be another object "Hu#Treasurer" which is also displayed as "Treasurer". Each name can be used in a namespace only once. You can clearly define an object companywide or even worldwide by combining of the name of an object and an *URN*, e.g. like this: "http://www.SemTalk 2.com/banking#Bank". Each name can be used in a namespace only once.

Comment is the description or definition of the class.

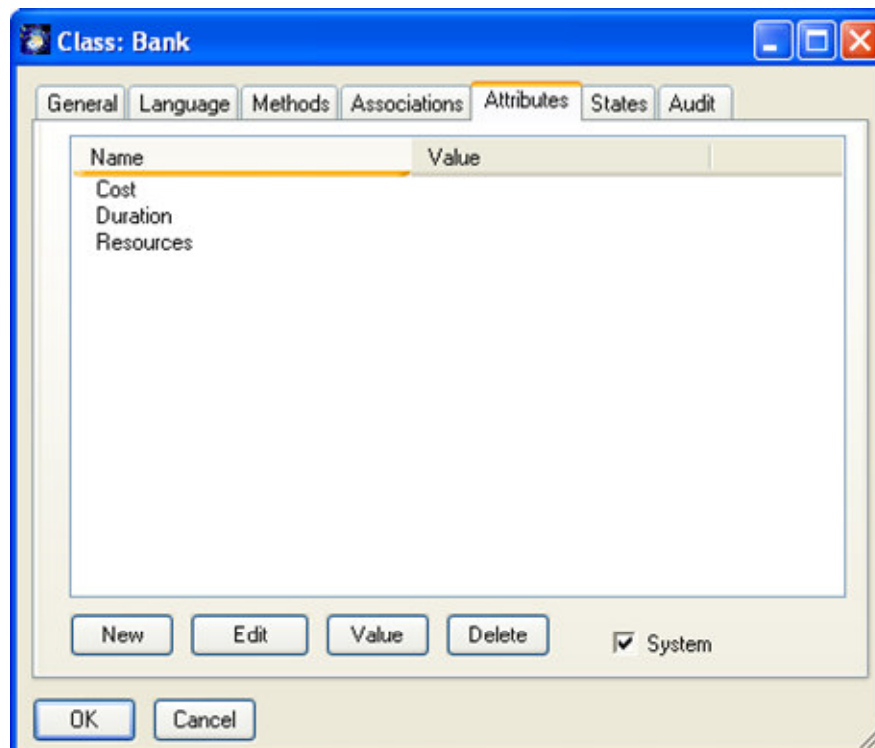
Language allows to specify comments in a chosen language. Objects may have multiple names in different languages and multiple comments.

Links, e.g. hyperlinks can be added or deleted using the context menu (right-click) of the Links text field or the “+” or “-“button respectively.

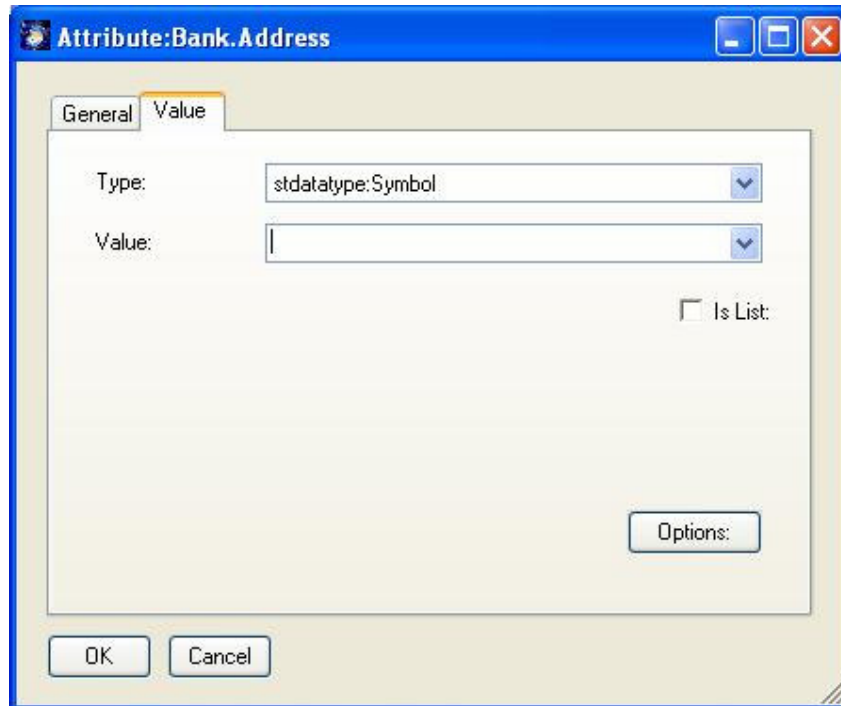
Read Only marks the class as read only and protects it e.g. from renaming or deletion.

4.2.2 Attributes

The attributes of a class can be defined and edited on the “Attributes tab”. Some Visio-Shapes have already attributes. You can use them, you can also edit them or just delete them. Please create the attribute “Address” by pressing “New”.



Double click or press the “Edit“ button to open the attribute details dialog box. The button “Delete” is intended to delete an attribute. “Value” is a convenient way to enter a larger piece of text into an attribute value.



Type specifies the type of this attribute e.g. Symbol, Boolean, Float or Number. Attributes do not require the selection of a type.

Value is the default value for this attribute.

Is List allows the use of multiple valued attributes. E.g. “red” and “green”.

Options specifies the options for values of that attribute E.g. “red” or “green” or “blue”. Those options will be used as options for the values combo box.

After closing the dialog, the value is shown in the right part of the attribute list.

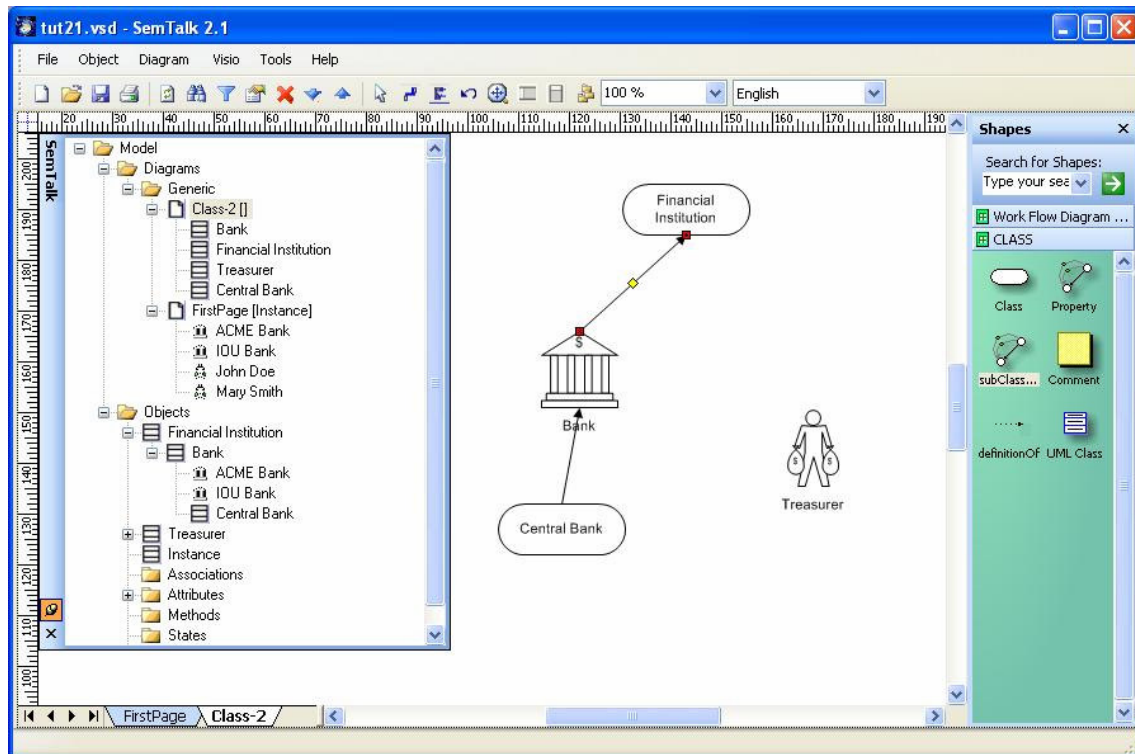
NOTE: The *inheritance* of attributes and values will be explained in the course of the next section.

4.2.3 Associations

Associations are shown and edited on the “Associations” tab of the class editor. The easiest way to define them is to do it graphically. In order to do this, we will add additional classes to this example.

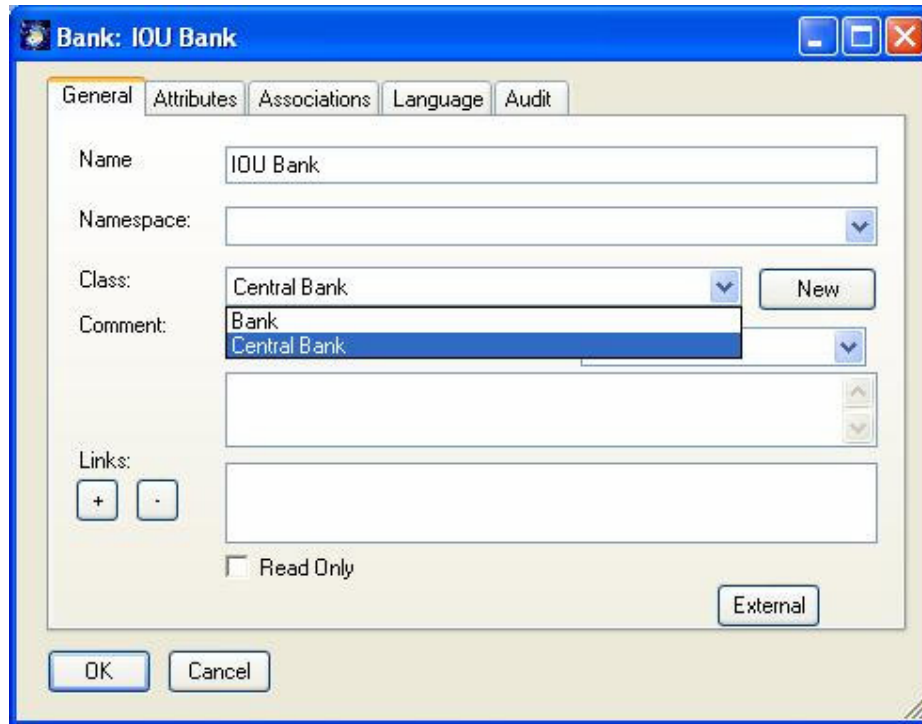
From the “Work Flow Diagram Shapes” drag & drop the Treasurer shape in your drawing area.

A class can have subclasses that represent concepts that are more specific than the superclass. The “subClassOf” association defines a taxonomic (subclass – superclass) hierarchy. Adding relationships is quite simple. Drag & drop the “subClassOf” shape somewhere in the drawing area or by clicking first over the “Connector Tool” and then clicking over the “subClassof” shape in the CLASS Stencil.



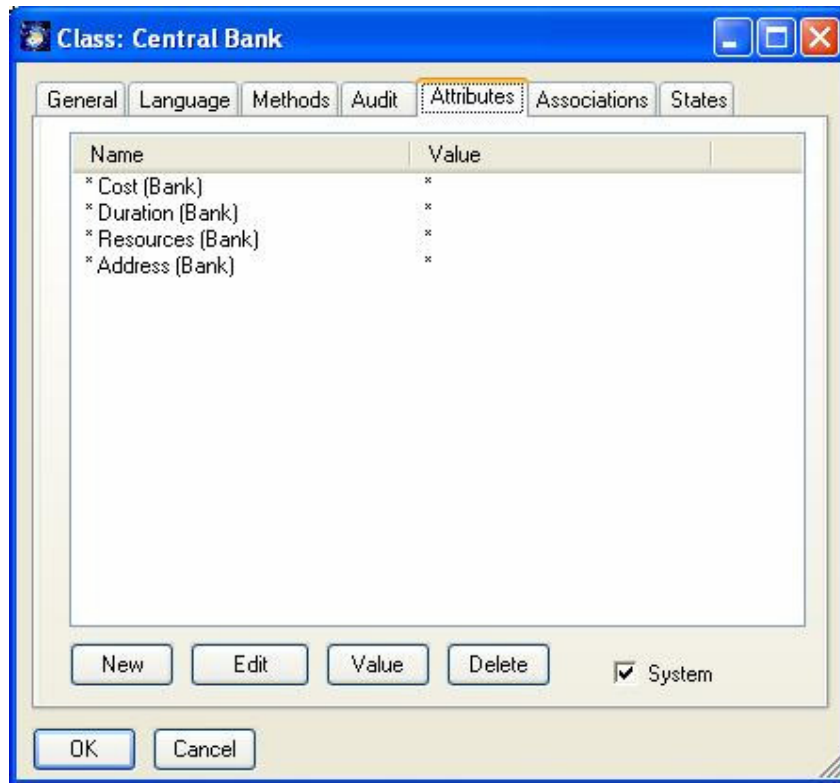
If you pull the end-point of the arrow over an object’s “connections point” you will notice that you can glue the relationship to that object. With the “Connector Tool” you just must click over the 2 shapes you want to relate. You can do it more than one time subsequently. A red coloring will tell you if the connection was successfully done. Select an end-point and glue your new relationship to the objects of your choice. Notice that in case of the “subClassOf” relationship the arrow points toward the superclass.

You can change the class of instances by using the “Class” combo box of this dialog box in the “Edit” dialog.

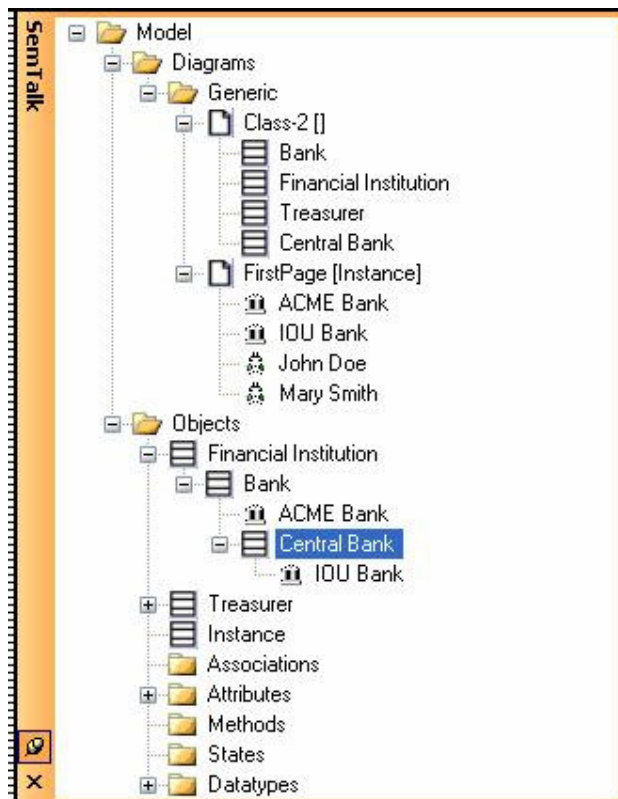


NOTE: Use always a singular name as object name. It is not recommended to model "Banks" classes, since the class "Bank" already describes one or more banks.

In our model "Central Bank" became a subclass of "Bank". It inherited the attributes of "Bank", but you can now add further attributes to "Central Bank" or change the values of inherited attributes using the "Edit" button. In the same way "Bank" is a subclass of "Financial institution".




Inherited attributes are characterized by a “*”. If you change the value of inherited attributes the SemTalk 2 object engine creates a local copy of the attribute. It will be deleted when you delete (reset) its value.

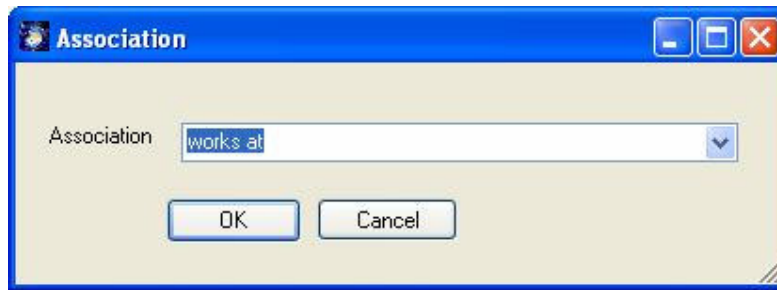


Please look at the model explorer.

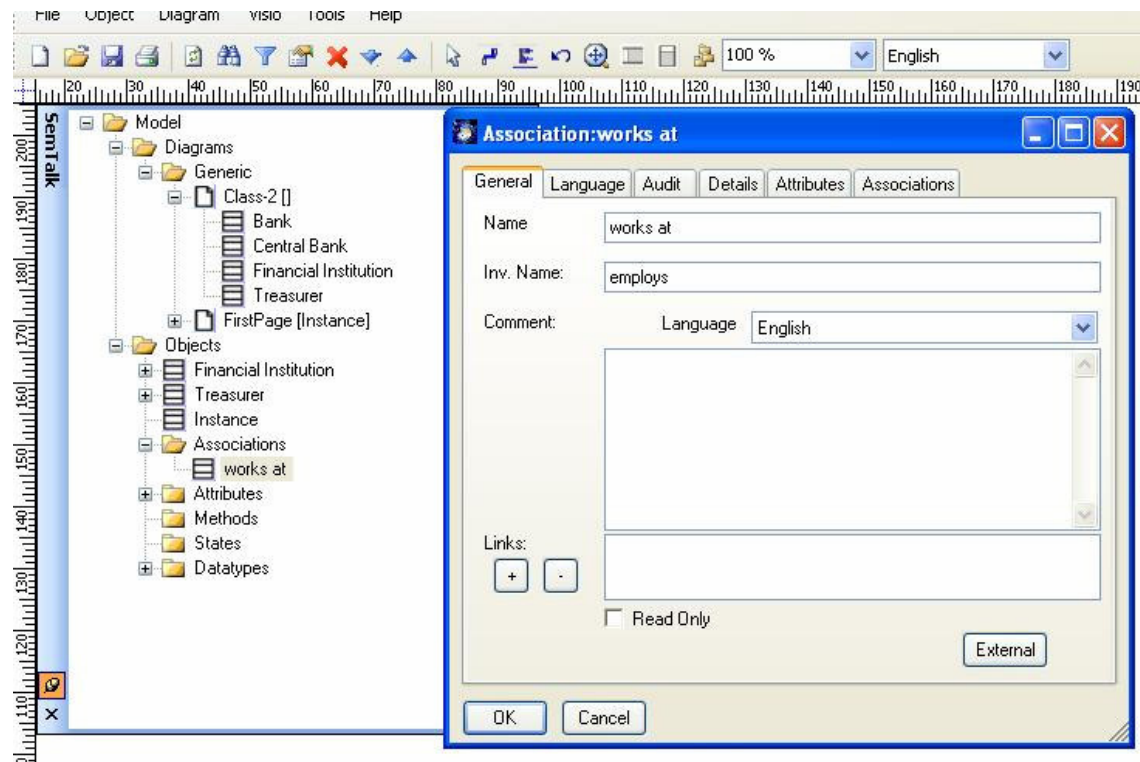
Under Diagrams the contents of “FirstPage” are listed as children of “Objects”. This is a graphical view of how classes are defined and it shows their inheritance tree structure.

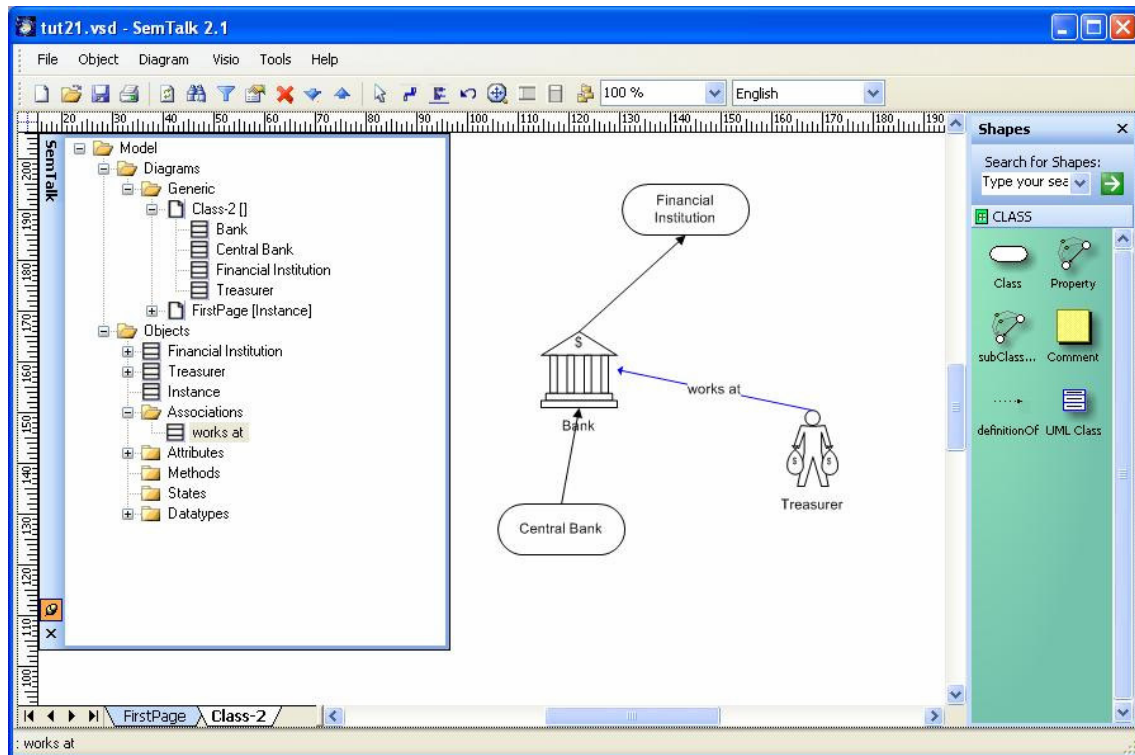
Please create a new association using the “Property” shape.  Define a new association between Bank and Treasurer.

As the Property name you may type “works at”



If you open the “Edit” dialog box for “Central Bank” and open the “Associations” tab, you will notice that the relationship “inv works at” has been inherited from “Bank”. “inv” means that it is the inverse relation. If you right-click on a link and choose “Edit” you can edit the properties of the association. To edit the relation class “works at” find this class in SemTalk’s Explorer under Associations. Edit this class and change “inv works at” to “employs”.





NOTE: “Remove” deletes the association from the model. Deleting using Delete from Drawing or the Del-key only removes it from the drawing. Classes and other objects behave in a similar manner.

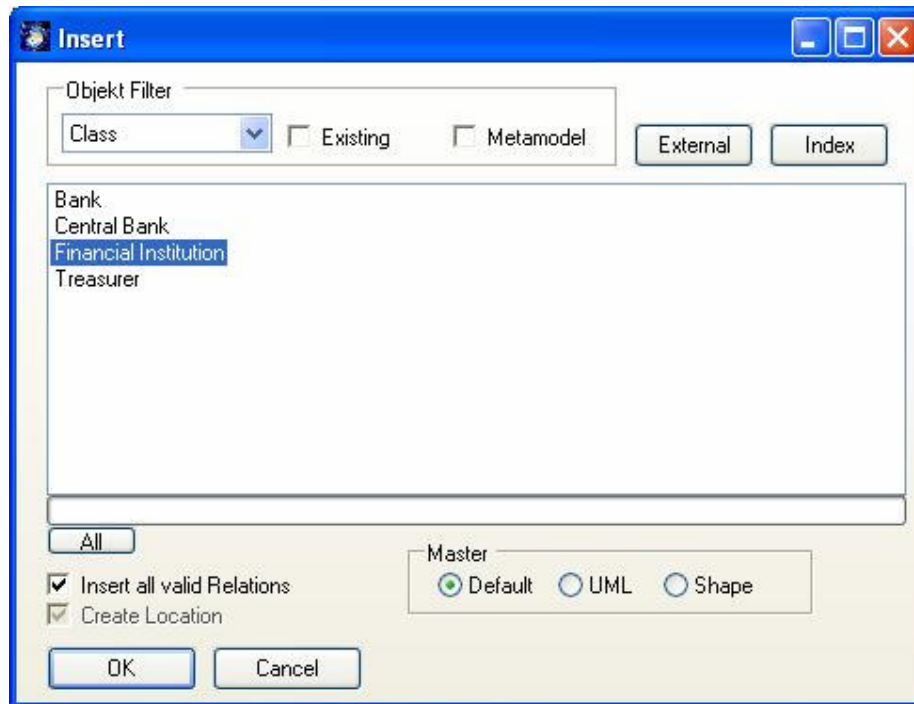
5 SAVING

Please use Save or Save As. In addition to Visio®’s VSD file, a *XML* file for the model is created.

6 INSERT

You can insert existing classes in new diagrams very easily with SemTalk 2. Please create a new diagram using Insert → Page option. Rename the diagram e.g. “Diagram2”

Right-click on the drawing area of the diagram and change the diagram type to class diagram (refer to section 4.1). Having done that, please right-click again on the drawing area and choose “Insert” to insert existing classes into the new diagram. Alternatively you may use the menu Diagram → Insert. You will see the following dialog box:



Type: You can insert classes, relation types or diagram types into generic class diagrams. For other diagram types restrictions may apply.

Existing: As default the list contains only objects which are not shown on the current page. If you check “Existing” you can insert those objects again.

Metamodel: Include classes which are set to “ReadOnly” (In most cases the element of the Metamodel).

External: Allows objects from an external model to be inserted. Refer to the next chapter for information about linking models.

Index: Allows objects from an external models found by the SemTalk 2 Indexer to be inserted.

Create Location: You can decide whether to insert an external object as reference or as a copy of it. You will find more information about linking models in the next section.

Insert all valid Relations: All relations, which are in the objectbase, to other objects on the diagram are being visualized.

Master: It specifies the shape to use. “Default” is until now used shape. “UML” uses a *UML* class shape. “Shape” searches for a shape master with the same name as the class.

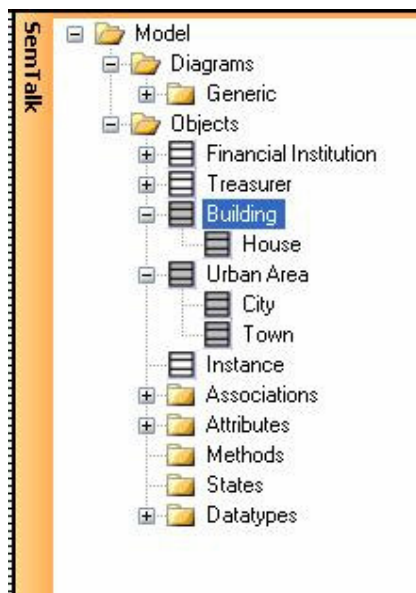
NOTE: You can change the size of the “Insert” dialog box with your mouse.

Please, choose “Financial institution” and press OK to insert the class.

7 (HYPER-) LINKING MODELS AND NAMESPACES

To insert external objects in a SemTalk 2 diagram an external model must be loaded first. Loading an external model is very easy. From the menu, select **File → Show External Model**. In the **Look in** list, click the drive, folder, or Internet location that contains the XML file you want to open. For the purpose of this tutorial, we created in advance an “Urban areas” model to be imported <http://www.semtalk.com/pub/urban.xml>. You can use **File → Show External Model->URL** to reference it.

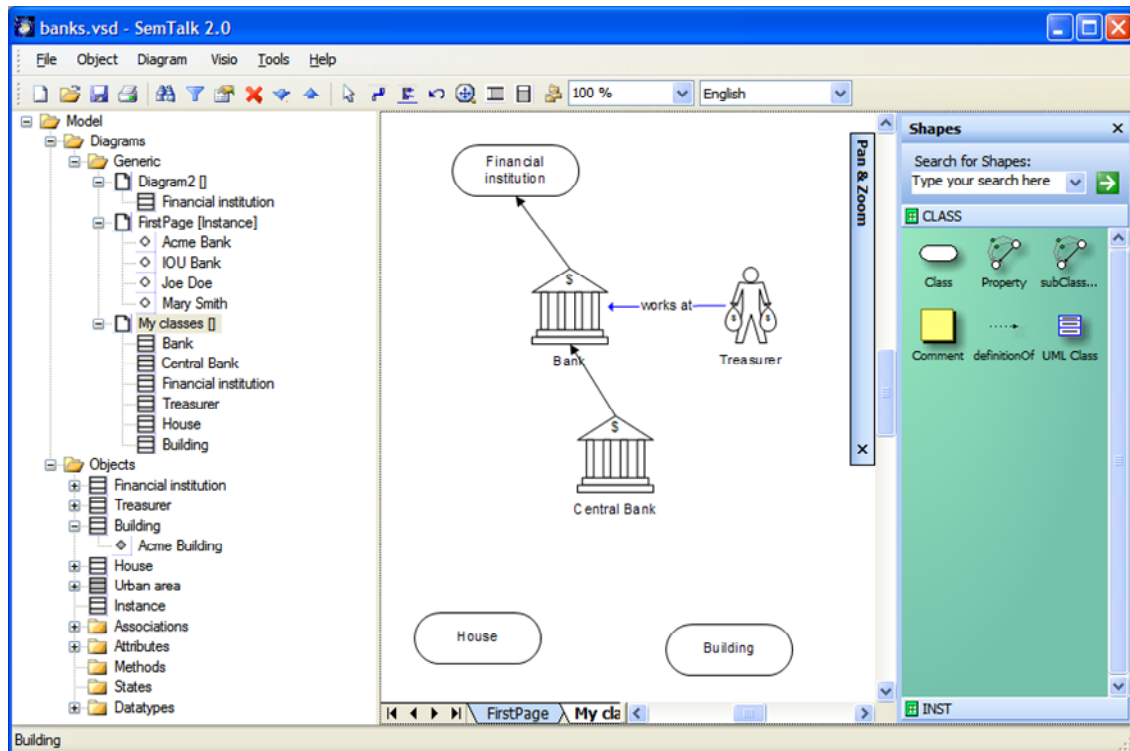
Once you have opened the XML file, SemTalk 2’s Explorer should look like this:



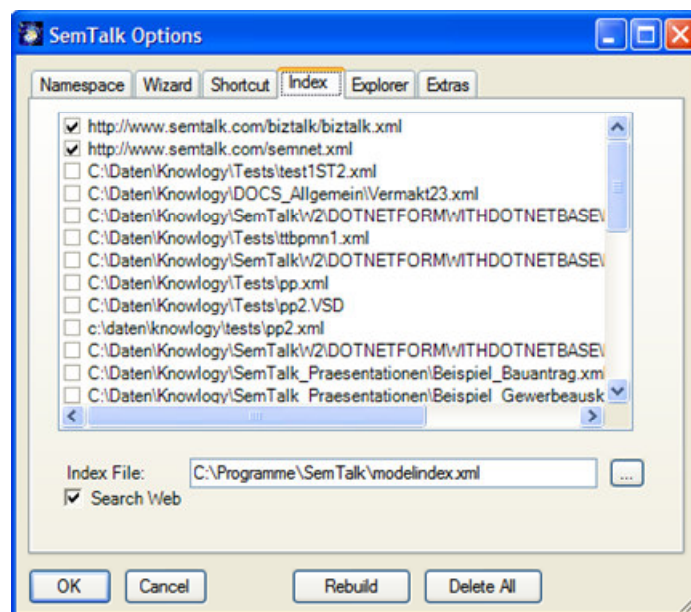
As you can see, the explorer contains new grey colored objects. These objects exist in the “to-be-imported” model. Until now, they exist only virtually in the “urban” model. To make them part of your model you have to import them. There are 4 ways to do this:

- Drag & drop the object(s) in your diagram.
- Menu Object->Import
- Right-click over the grey colored object in explorer
- Right-click over the drawing area of the diagram, where you want to insert the external objects and select “Insert”. Once you see the dialog box click the “External” button

Please insert the classes “Building” and “House” using the way you prefer. Please notice that the objects inserted can only use the “Default” or “UML” shapes.



There are two ways for inserting objects from external models located in the Internet. You may want to insert objects from models that you indexed in advance. Indexing a model is quite simple. First select **Tools** → **SemTalk Options** and then select the "Index" tab.



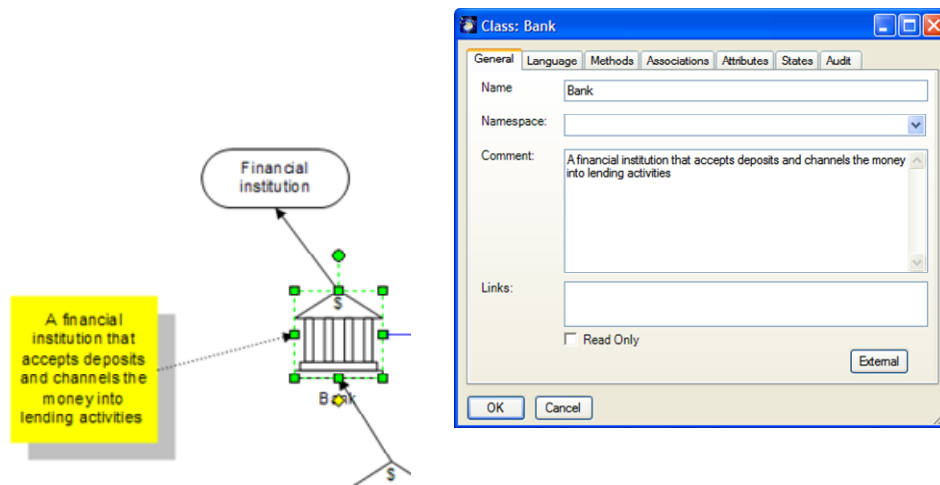
For the purpose of our example, please be sure to check www.semtalk.com/biztalk/biztalk.xml If this URN is not on your list, right-click the list, choose

new and enter the address. Press “Rebuild” to make sure that SemTalk has successfully indexed this model(s).

Now you are ready to import indexed objects by right clicking on your drawing area and select “Insert”. The procedure is similar to the one describe before in this chapter, but instead of pressing the “Extern” button, press the “Index” button to see the list containing all the indexed objects.

8 COMMENTS

In order to display a comment / definition of an object drag & drop the “Comment” shape in the drawing area and point with the “definition of” connector to one or more objects:

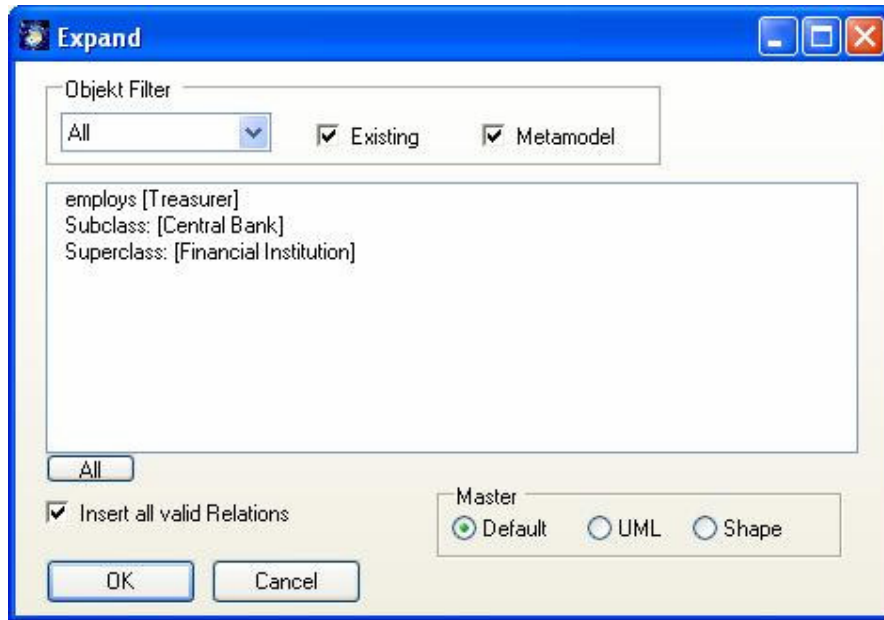


By double-clicking on the comment shape the “Edit” dialog of the object will open.

9 EXPAND

When models are expanded, diagrams are extended using information, which has already been modeled. For example, if a Bank is associated with Treasurer, we can add related objects to the active diagram based on information modeled in other diagrams.

Right-click “Expand” on the class “Bank” in diagram2. Alternatively, you may use the menu Object → Expand.



If you select “employs”, the class “Treasurer” will be shown in the diagram.

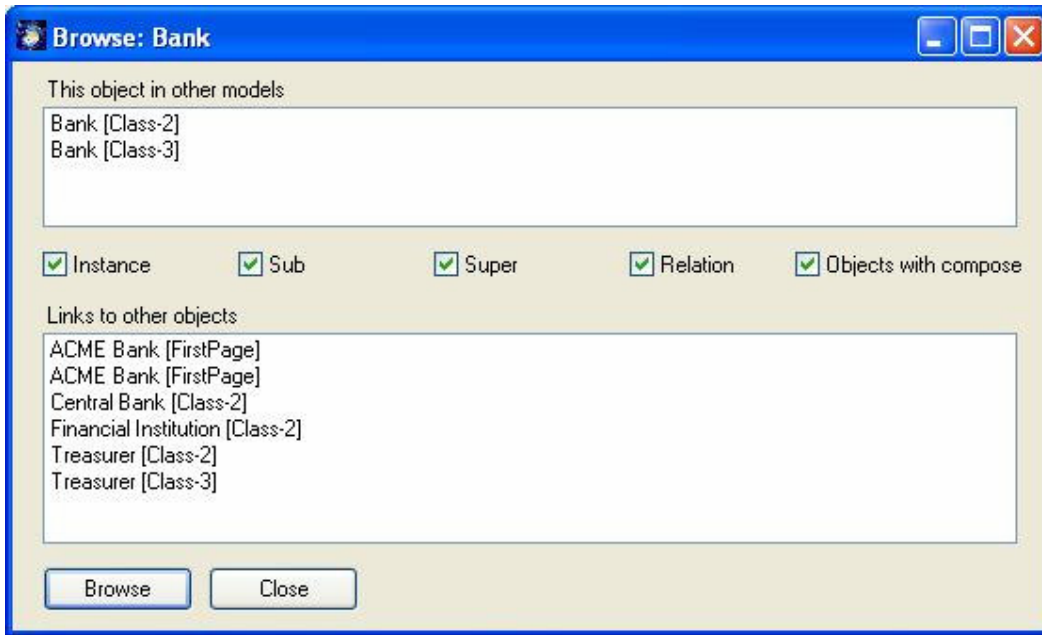
In case external objects are to be expanded, you will see an “External” button in the dialog box. If you select this button, locally related objects will no longer be seen in the dialog. Instead, the related objects of the external origin are visible. If you select such an object, you will get a reference to another external object.

In this way, a kind of Internet of connected reference models can be built. You can find an example at http://www.semtalk.com/semnet_files/XGRID_of_Models.htm.

10 BROWSE

With the “Browse” command in the context menu (right-click on an object) you can navigate to other visualizations of that object. Alternatively, you may use the menu Object → Browse.

The upper list box shows all diagrams that have a node for the object. The lower list box shows all diagrams that have a node with objects having a relationship to the object.



In order to navigate to other objects you can double-click on the object or select the desired object and press “Browse”. By checking / deselecting the checkboxes “Super”, “Sub”, “Relation” and “Instance” you can filter the objects in the lower list box. “Objects with compose” is used for Business Process Modeling only.

11 REMOVE

The “Remove” command on the context menu (right-click on a node) will delete the object or relationship from all diagrams in the model. Alternatively, you may use from the tool bar the menu Object → “Delete from Model”.

NOTE: Objects, which are not displayed on any diagram, can only be deleted from the model using the explorer. Select the object in the explorer and use “Delete from Model”.

12 REFINE / DETACH

The right-click command “Refine” attaches a diagram to an object. You can also use Object → Refine.

If the object has a refinement, “Refine” will open the corresponding diagram immediately as a result of a kind of hyperlink navigation.

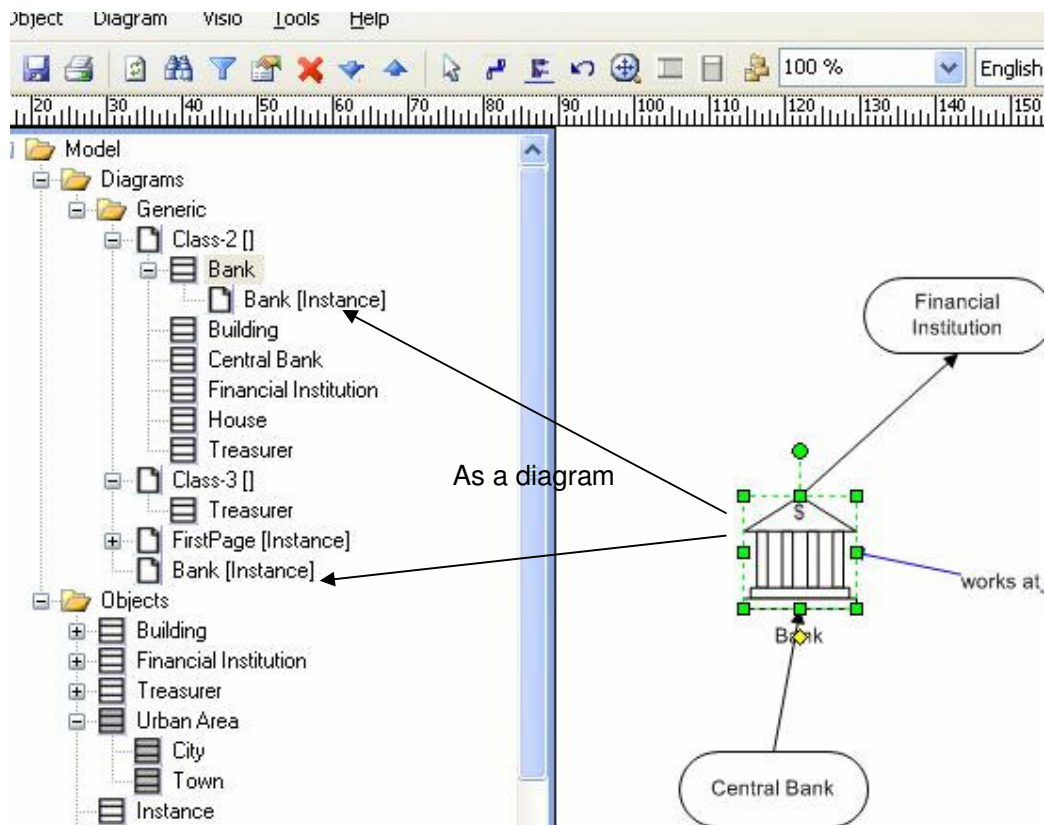
You can navigate back from the refinement to the refined object using Diagram → GoUp or selecting GoUp from the context menu of a diagram (by right-clicking on the drawing area of a diagram).

NOTE: Objects having a refinement are displayed with underlined text.

“External” assigns a diagram in another SemTalk model. Refining such an object will open the related SemTalk document.

NOTE: The diagrams are attached to the object, not to its visualization. This implies that the object is refined on all diagrams.

The resulting refinement tree is reflected in SemTalk explorer:



The command “Detach” removes the link to the diagram, but not the refined diagram itself.

A refinement is more than a shortcut for navigation. All objects on the refinement may have a specific relationship e.g. “subClassOf” to the refined object. For more details please see the following chapter.

13 EDIT A DIAGRAM

Please select a diagram and right-click the option “Edit”. You may also use SemTalk → Diagram → Edit.



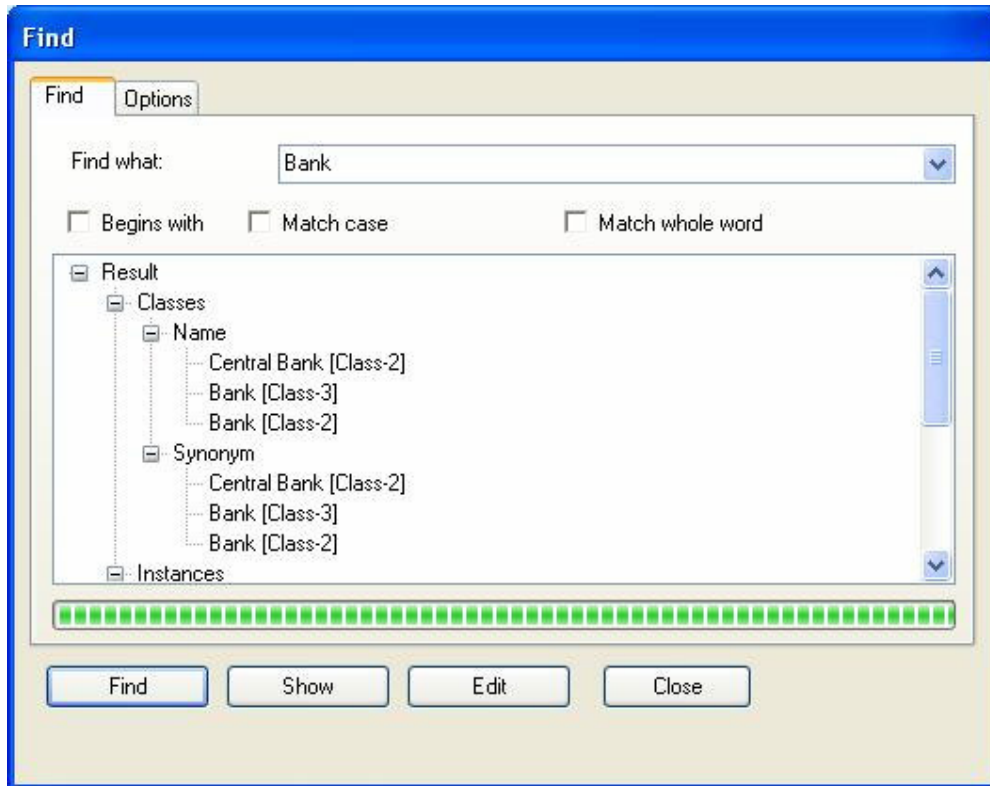
Name is the name of the diagram.

Class is the diagram class (or diagram type). Diagrams are also SemTalk objects. New diagram classes may be processes or product models. Details of how to do this can be found in a later chapter.

Type specifies the type of object being displayed in this diagram. There are class diagrams and instance diagrams.

14 FIND

Find is located on the context menu of the drawing pane or in the SemTalk menu. Using Find you can search objects displayed on your diagram or navigate to them.



Name is the string to match. Blank “Name” matches every object.

Begins with searches only for objects where the name starts with “Name”

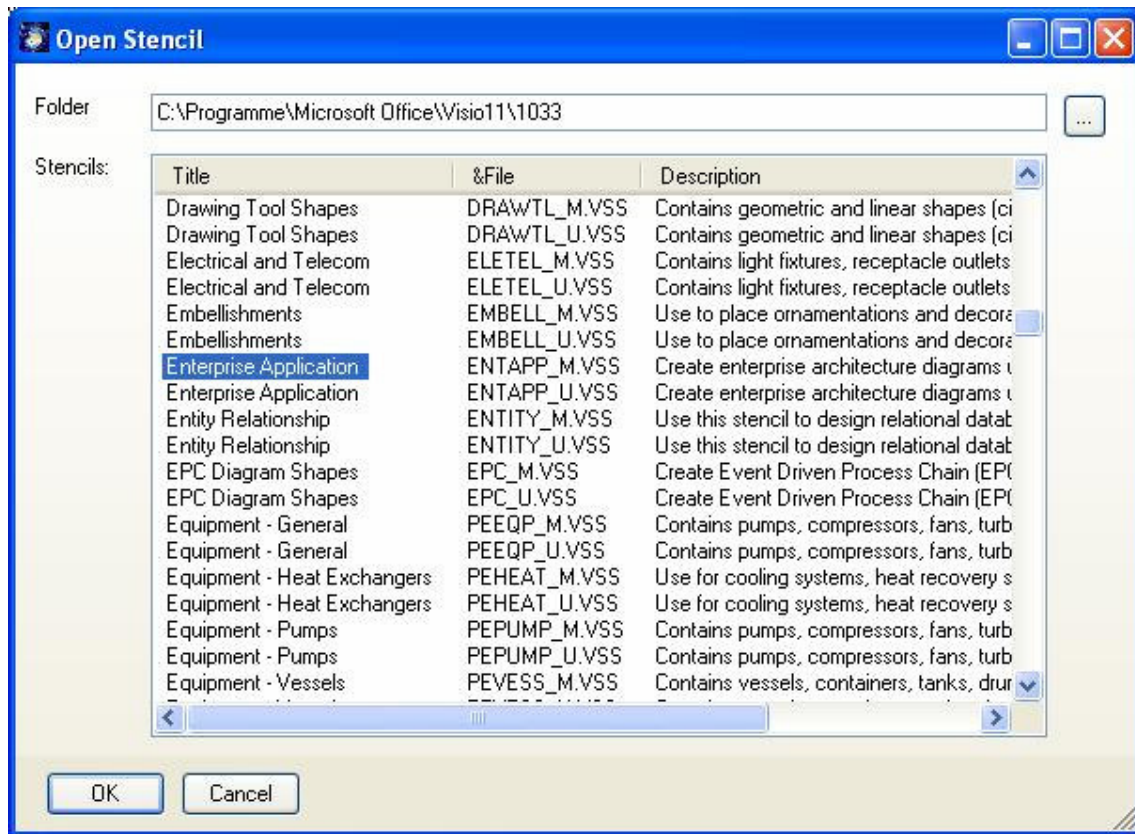
“Name” for object names, “Synonym” for alternative names, “Attributes” for attribute names, “Values” for attribute values and “Methods” for methods, etc. (Synonym and Methods are explained later on).

The tree diagram shows the matching objects and corresponding type. You may double-click an object or use the “Show” to go to the object.

15 VISIO STENCILS

You may define classes and instances based on Visio masters from any stencil. To open a Visio Stencil go to File → Open Stencil and you will see the following dialog box. Open a

Visio stencil e.g. Enterprise Application and drag a class to a class diagram. SemTalk creates for each master a class. You may have to rename the class afterwards to match your requirements.



If you drop a master's class into an instance diagram, SemTalk will create an instance for each shape that inherits from the class with the master's name.

16 NEW VISIO MASTER

Until now, you have created class diagrams with existing Visio-Master-Shapes or with abstract objects. You have also built instances with Drag & Drop.

If you want to create new Visio-Master-Shapes you have two possibilities. Either you copy an existing Visio-Master-Shape or you create a new one. Important is that the names of the template symbol correspond with the class names in the existing models. Therefore, please copy the respective Master-Shape and insert it in the "Document stencil". It is in the "Document stencil" where you can rename the symbol ("Master-Shape-Properties" in the master's context menu). Now, you can use the symbols from the "Document stencil" or create your own stencil to build your models.

For the purpose of this tutorial, we use the Visio-Master-Shape for “Person 2” as “Manager”. Please do as follows:

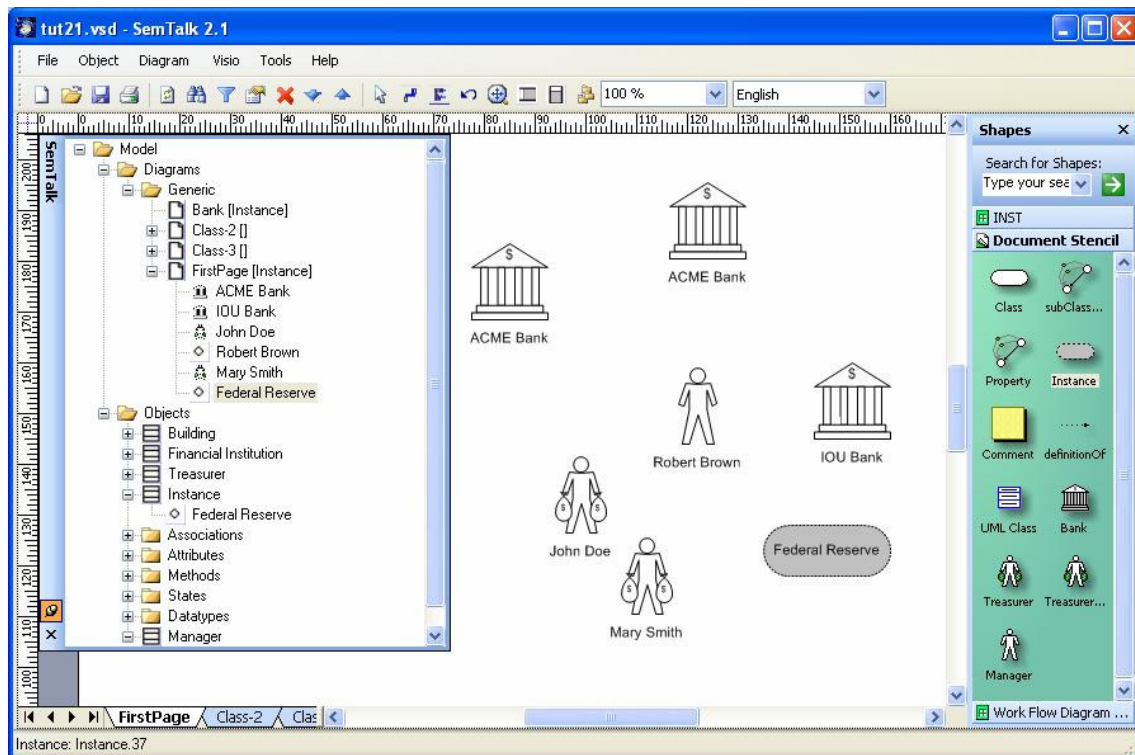
1. Open the “Document stencil” in the tool bar menu Visio → View → Document stencil.
2. Open the “Work flow diagram shapes stencil”. (File → Open Stencil → Work flow diagram shapes)
3. Drag & drop the master “Person 2” from the “Work flow diagram shapes stencil” in the “Document stencil”.

Rename the master “Person 2” to “Manager” in the “Document stencil” by right-clicking on the symbol and select “Rename Master” from the context menu.

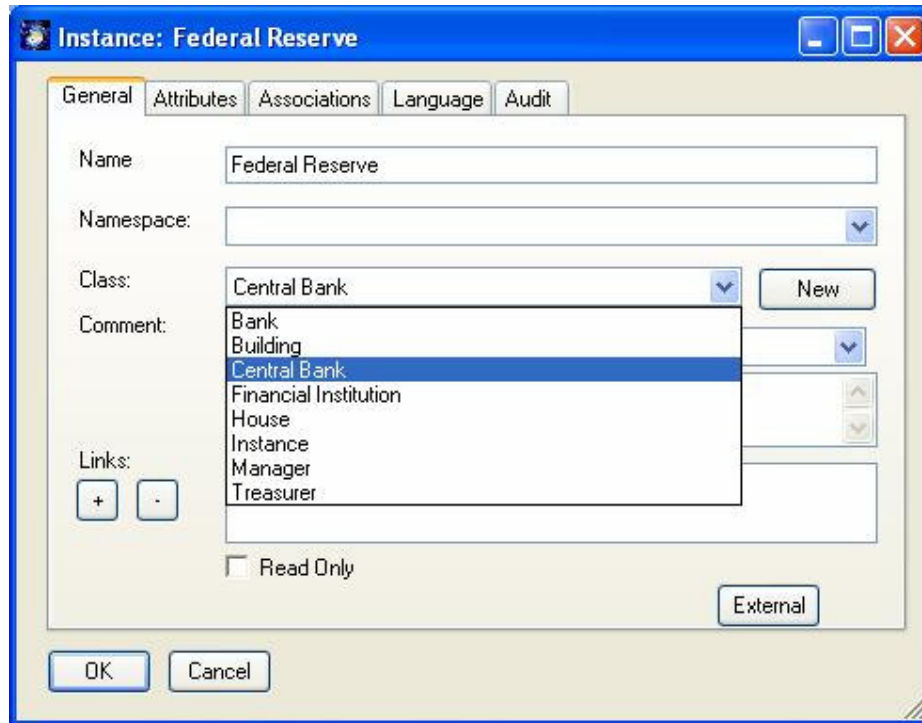
NOTE: IN SemTalk 2 you can not create or edit graphically a Visio master. Stencils and masters can be edited only in Visio.

Please drag a “Manager” and drop it in your instance diagram. Then, assign the “Manager” a name.

You can also use the generic Instance symbol. Please, drag the “Instance” master from the “INST” stencil and drop it in the drawing area.



When you create instances with the “Instance” master, you can choose any class you wish. Assign the corresponding instance the class “Central Bank”.



The instance “Federal Reserve” refers to the class “Central Bank”. You can make the connection to any subclass defined in the class diagram. In other words, you can neither represent a Treasurer nor a Manager with the Bank symbol and vice versa.

With the “New” button you can create directly new classes. Instances have their own namespace, their own comments and links.

Attributes are inherited from the classes, but they can be overridden.

17 CUSTOMIZE

Customize specifies how objects will be displayed. In addition to the object’s name, it is possible to show any attribute or association value.

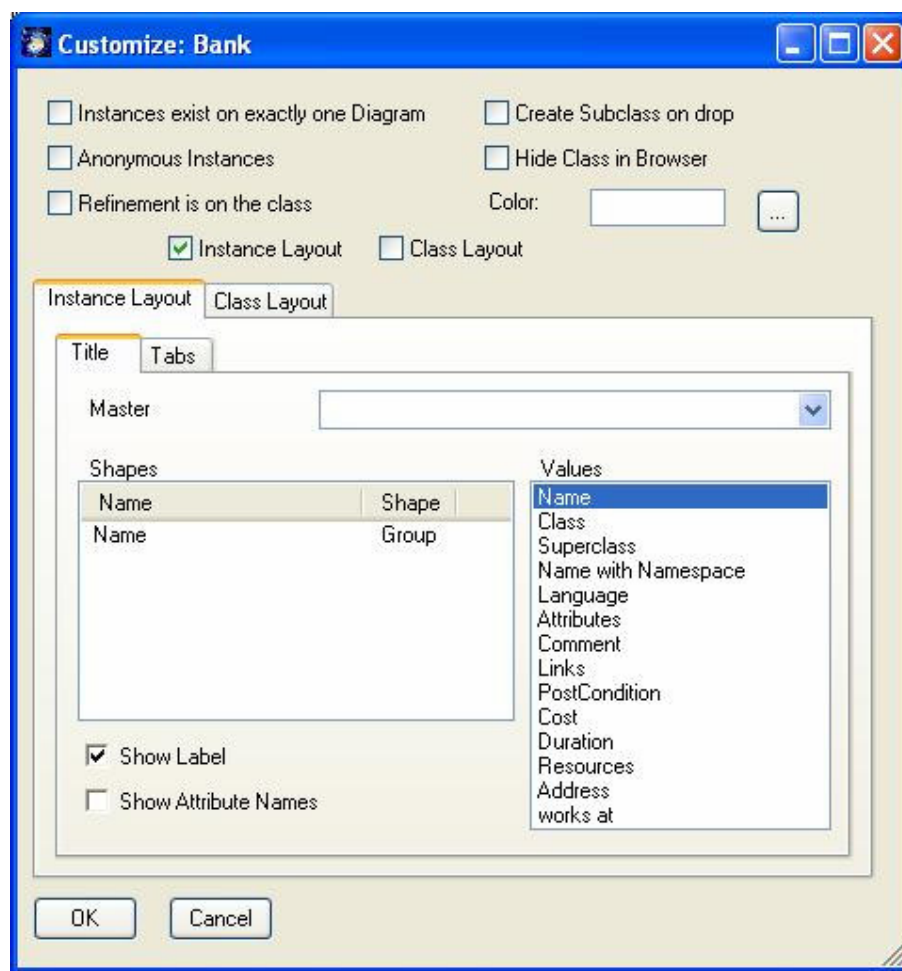
Layout specification may be overwritten in subclasses or within single instances. Please select the Bank class from the explorer and select the menu Object → Customize. In the dialog box select the “Instance Layout” tab and the “Title” sub tab.

“Instance Layout” specifies how instances of the class (or its subclasses) will be displayed in instance diagrams. “Class” Layout specifies how the class itself or its subclasses will be displayed in class diagram.

If you want to use instance layout for a specific class, you MUST check the “Instance Layout” checkbox. If you want to use class layout for a specific class, you MUST check the “Class Layout” checkbox.

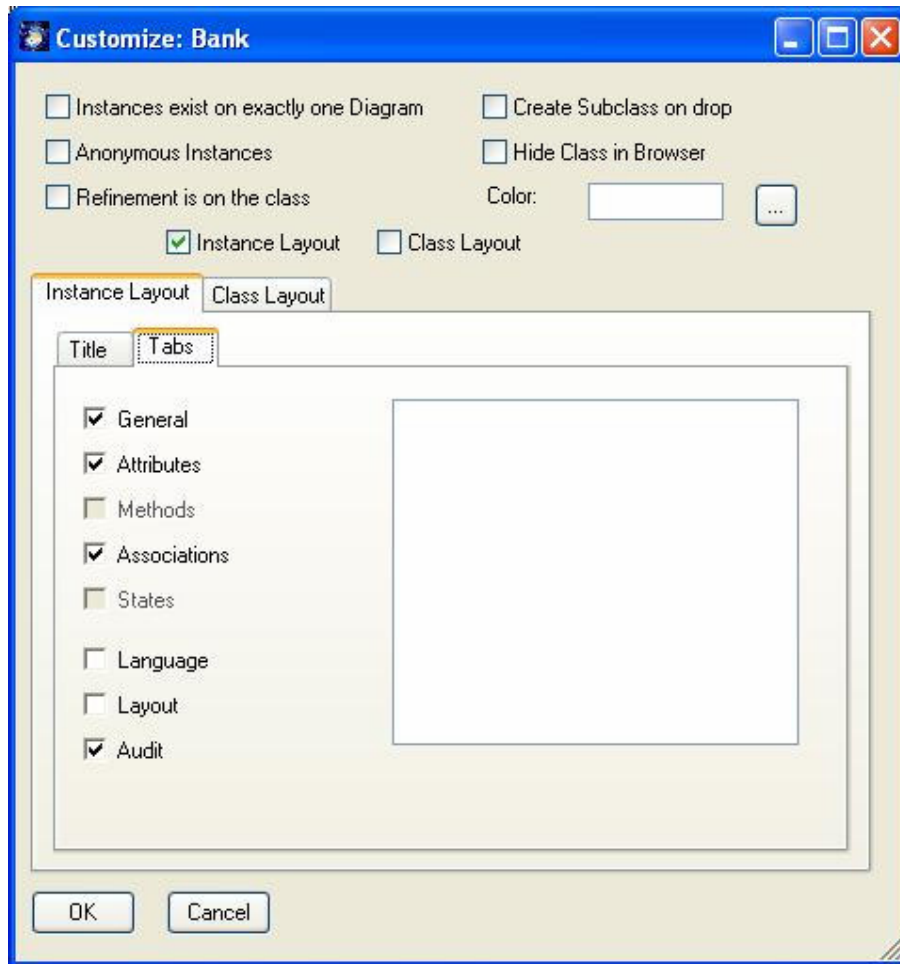
The left list box shows all currently selected attributes and the right list box shows all possible attributes or associations. Right clicking in the list boxes to add and remove selections.

In case you have complex shapes, you can choose, by right-clicking on the name in which subshape the value will be displayed. You can address up to 5 subshapes. Multiple attributes can be displayed in the same subshape. Using “Group” you can specify, that you will select the shape itself (and not a subshape).



“Tabs” are used to customize the appearance of the object edit dialog.

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Here you can select which tabs to show in the object editor. The check boxes on the left side enable or disable SemTalk's system-defined tabs. If you were using a specific modeling method (e.g. a specific process modeling method) you would see a list of check boxes with the name of the method-defined tabs for that method.

NOTE: In the screenshot you can see the other SemTalk tabs - Methods, States and Language. In particular, the language tab is quite useful for specifying alternative names for the object. The SemTalk "Find-Dialog" also searches for label in different language ("synonyms").

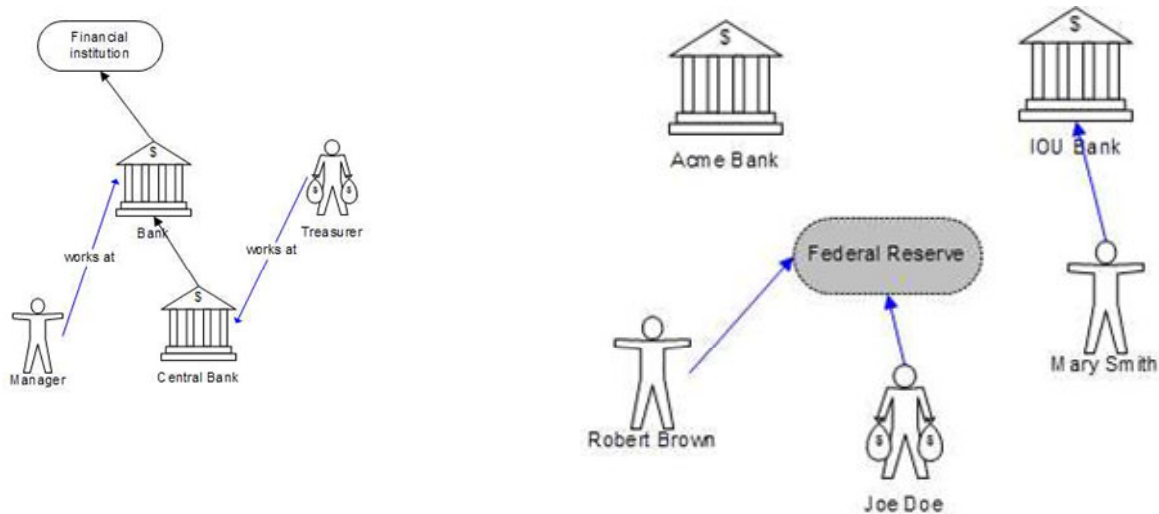
Instances exist on exactly one Diagram	Instances will be deleted from the objectbase as soon as they are deleted from the diagram.
Anonymous Instances	Behavior often used for activities in processes. You must have a master named as the class. If you renamed an instance of

	the class, a new super class for the instance is created. The instance is not individually named. Its name is super class name + "." + ID
Refinement of Class	Used together with "Anonymous Instances": refinement will be attached to the super class and to the instance. E.g. the activity "write Book" will be refined by the same subprocess in all processes where write book is used
Create Subclass on Drop	Similar to "Anonymous Instances" but used on classes. Every time a class master or class from explorer is dropped onto a class diagram, a new subclass is created instead of inserting the class in the diagram
Hide in Explorer	This class is not shown as a root class in the SemTalk Explorer
Color	Shapes showing instances of the class will get the specified color overwriting the color of the master

18 ASSOCIATIONS ON INSTANCES

The property connector is used to define associations between instances. If a connection is made to an instance, a dialog box pops up and offers the possible associations specified in the class of the instance. Only for the purpose of our example, a "Treasurer" works only at a "Central Bank", but does not work at a "Bank".

You may change the association class of each existing link by right-clicking the connector and choosing "Change Relation". Associations, which are not specified in the class model, are not allowed between instances. In this way, SemTalk adds semantics to Visio shapes.

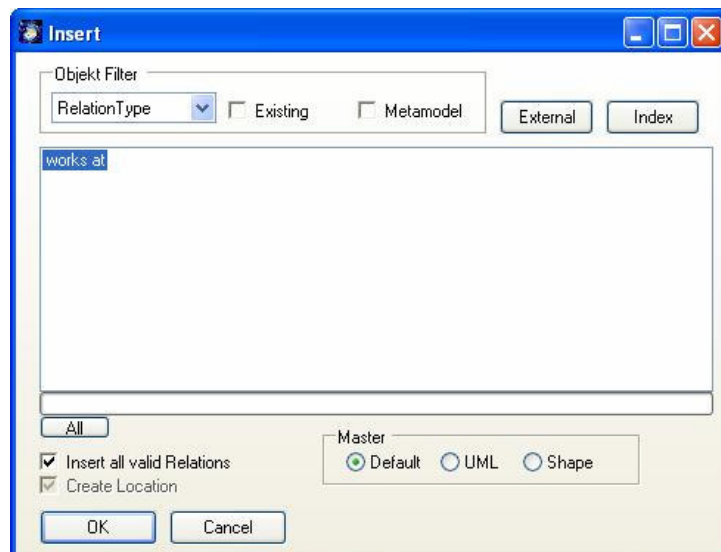


In the “Associations” tab of the instance edit dialog, you may edit an association (property). Associations are ordinary instances of their association class. You may define associations on associations.

19 ASSOCIATION CLASSES

Since associations are instances of an association class, they are used to define attributes. In our example, we can add an attribute “arrival time” on the class, which can then be edited for each instance.

Please add the association class “works at” to your class diagram, using right click insert on the background of the diagram. Select “Relation Type” in the type combo box and then “works at” in the list box.



The class will be displayed in the class diagram. You may add now attributes, subclasses and new associations.

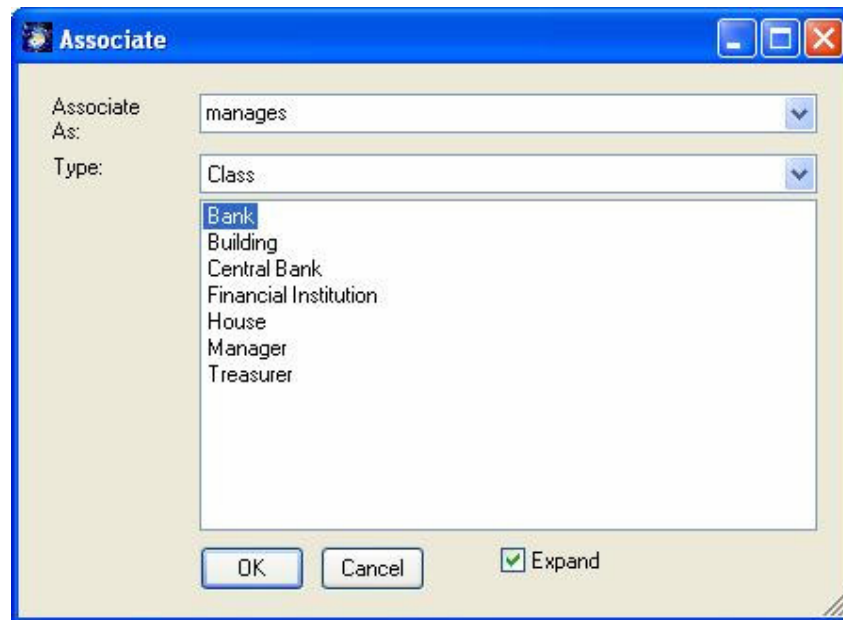
If you need a specific Visio connector for an association class, you can drop a Visio Connector to a stencil and rename it to the name of the relationship you want to use. Using the new master shape will automatically select the specified

relation with the matching name.

19.1 ASSOCIATION CLASS OPTIONS

Associations cannot only connect instances with instances, but they can also be used to connect instances with classes and vice versa.

Please create the association class “manages” by associating the classes “Manager” and “Bank”.

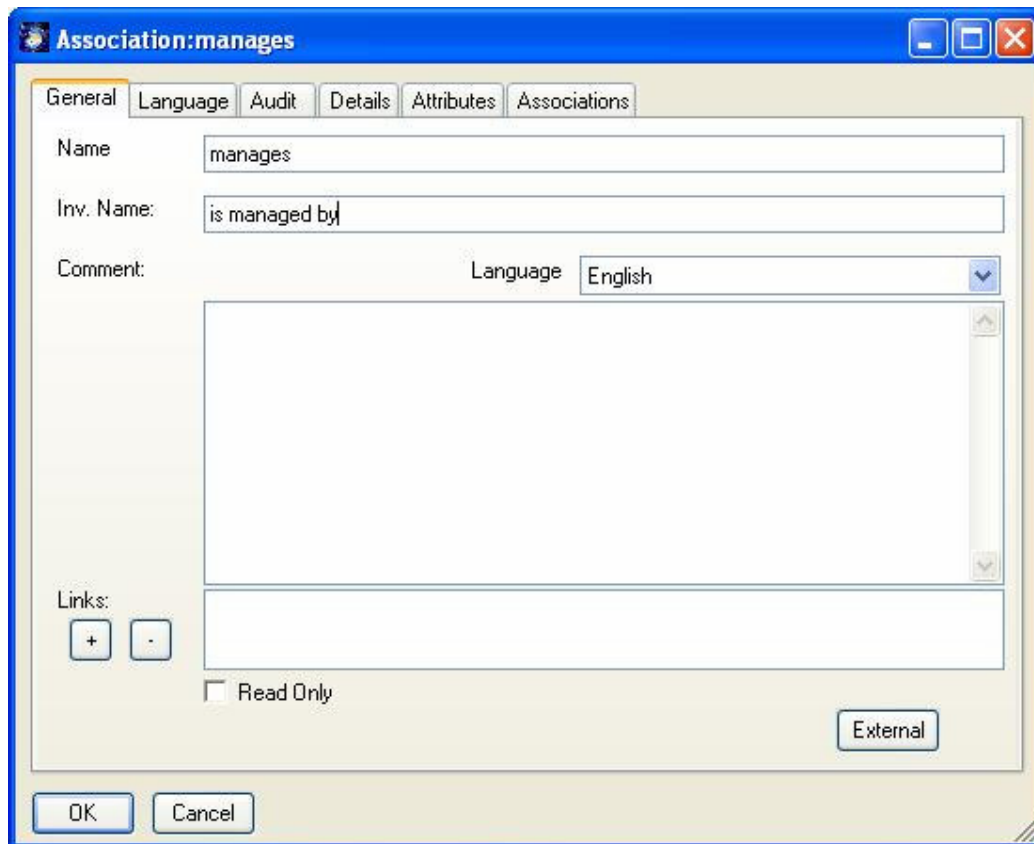


Select “manages” in the explorer as a direct child node of “Associations“. Open the dialog box using right click “Edit” (context menu).

NOTE: You may edit any object from the explorer using right-click edit as classes, instances, diagrams and diagram classes.

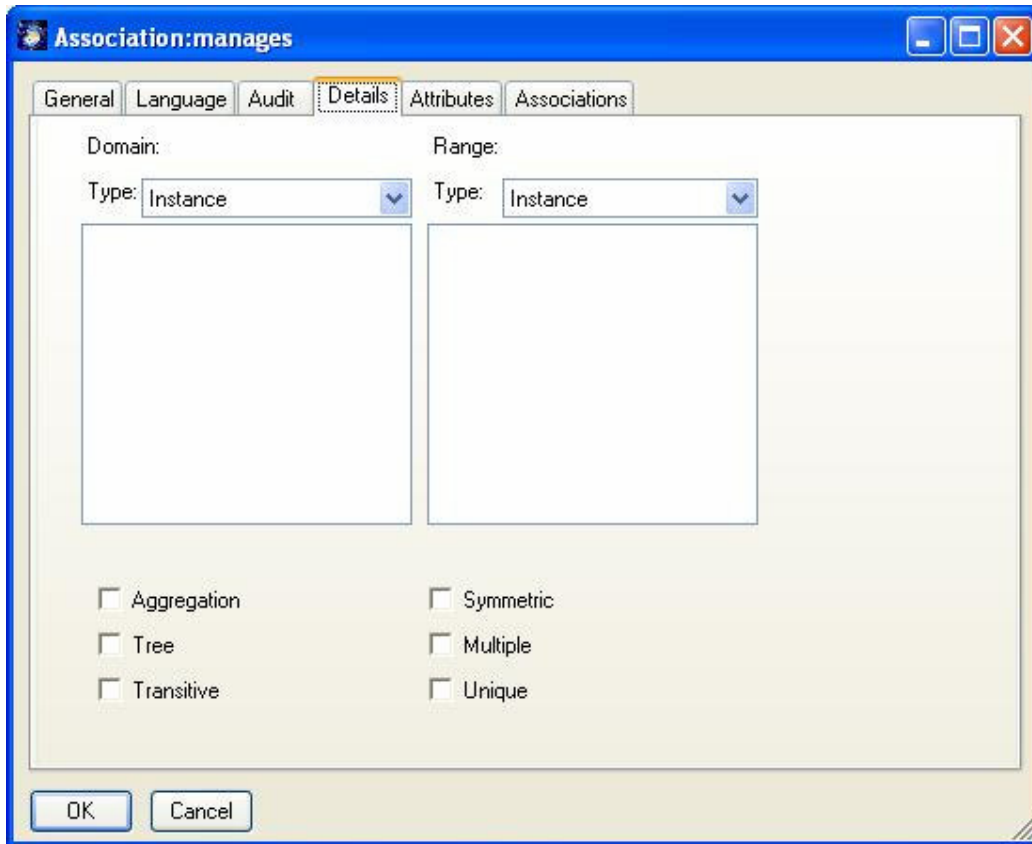
Using the Association Class Editor, you can specify an *instance: A* single item of information that is representative of a type.

inverse name for the association and properties as aggregation and transitive.



The tab “Details” presents other options to specify which types of object may be associated (class or instance) and some of their cardinalities.

In case of an aggregation, the class own relations and its inherited relations will be shown. When working with an aggregation, the relations of a subclass will be added to those from of a superclass.

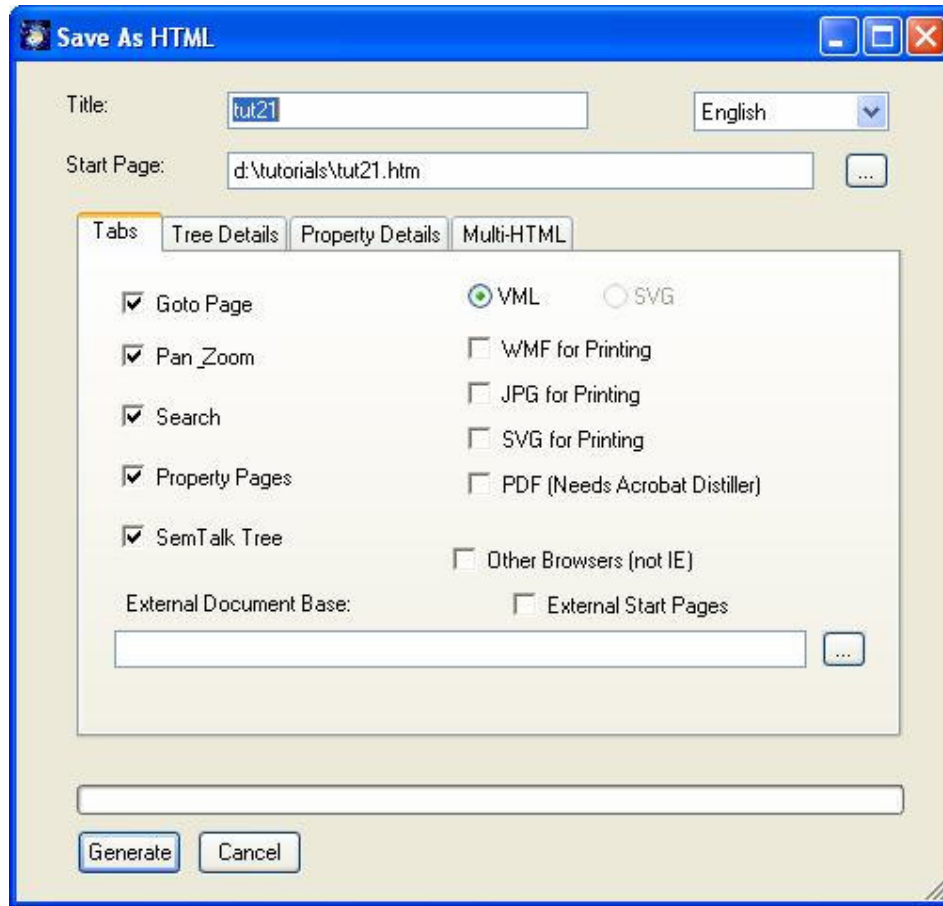


Aggregation can be here understood as a “is part of” relationship. With “Tree” you prevent cycles. A transitive relation is e.g. “bigger”. When A is bigger than B and B is bigger than C, then A is bigger than C. In case of symmetric relations, the inverse name is the same as the name. “Multiple” means that between two objects more than one relation of the same kind are allowed. “Unique” means that only one relationship of this relation class is allowed to exactly one other object.

20 HTML GENERATOR

In order to create an HTML version of your model you File->Save As HTML.

In the following dialog specify the name of the main (start) htm page. You must save your diagram before using the HTML generator.



Title specifies the name of the Website. In case of working with multilingual models, the next field is used to specify the language in which the Website will be saved.

Stat page determines the file path of the start page to be generated. Do not generate to network drives. Always generate to a local directory such as C:\myhtml and transfer the html afterwards to the fileserver.

External Document Base field is used to specify the file directory where the linked documents (to the model objects) are located. The path can be absolute or relative to the directory where you save the html.

Other options are used to determine which elements and functionalities are to appear on the Website to be generated.

Options	Description
Goto Page	Facilitates a fast navigation across the diagrams.

Pan Zoom	Allows zooming of the diagrams.
Search	Enables the search in the website.
Property Pages	Shows the properties of a selected object in a diagram
SemTalk Tree	Reproduces the same SemTalk explorer in the Website
WMF, SVG, JPG, PDF	For each page a printable copy in the desired format will be created, to simplify printing of individual pages
Other Browsers	Visio is generating HTML for IE 6. HTML for other browsers than IE has much less functionality and generates a large number of small html pages
External Start Pages	For each object it generates an own start page, where external models can be referenced.

Under “Tree Properties” you can choose which object types are to be displayed. Normally, classes and diagrams will be displayed, but you can also choose associations, attributes, synonyms or instances.

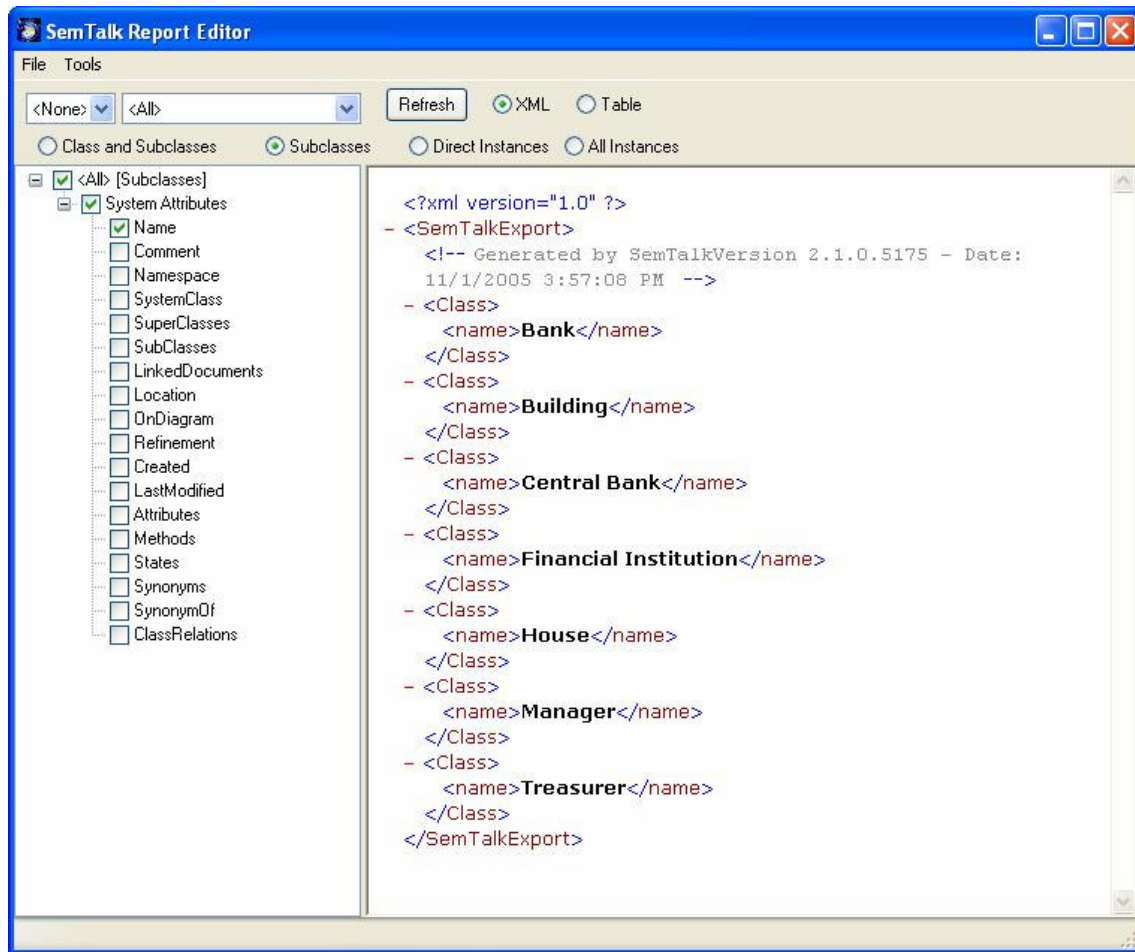
The tab “Property Details” contains the options to choose which properties are to be shown in the property part.

Finally, under the tab “Multi-HTML” you can decide which models to connect within your Website. In order to do that, the connecting models must be located in the same file directory as your current model, as well as, the already generated HTML versions of these models. Do not forget to reference previously the objects to the respective models.

21 REPORT GENERATOR

In addition to all the multiple possibilities to view your business process, SemTalk offers you a comfortable way of generating reports of every model.

To create new reports open SemTalk Report Editor selecting File → Report → Report Editor. You will see the following dialog:



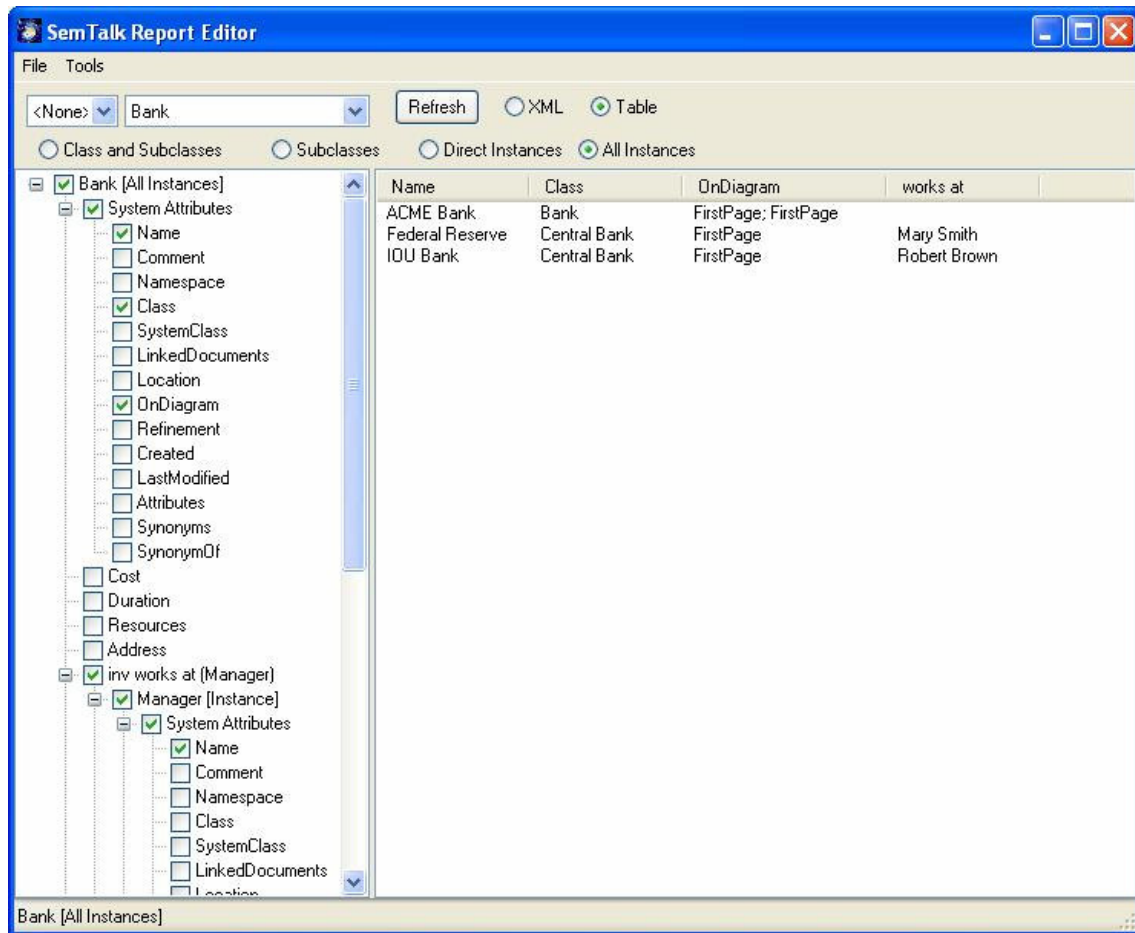
With SemTalk Report Editor you can create reports, save and reuse report formats. The tree structure shows the logical structure of the query and the attribute which are included. The right part shows the result of the query as XML or as a table.

In the right combo box we can select "Bank". The option "All Instances" will list direct and indirect instances of Bank. We can see now the attributes and related objects in the treeview.

For the picture have selected Name, Class and the diagram on which the is displayed as well as the inverse relation of manages. As output format we have chosen a tabular view.

The structure of the reports is determined by the objects, attributes and associations in the model. The queries can be nested as deep as you need.

The XML output can be saved as an XML file. The table output is saved as html table, which can be opened in a lot of tools including MS Excel.

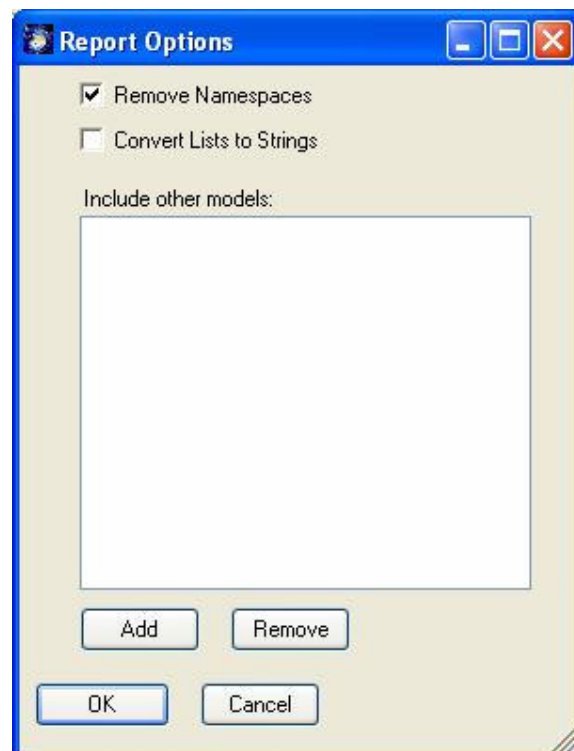


Use the menu option Tools → Options to specify additional options for report.

“Convert Lists to strings” will concatenate multiple value to one string and write that into a cell instead of creating multiple rows.

“Include other model” allows to run a multi model report. Other models will be virtually merged in before the report is being executed. Please make sure, that you are

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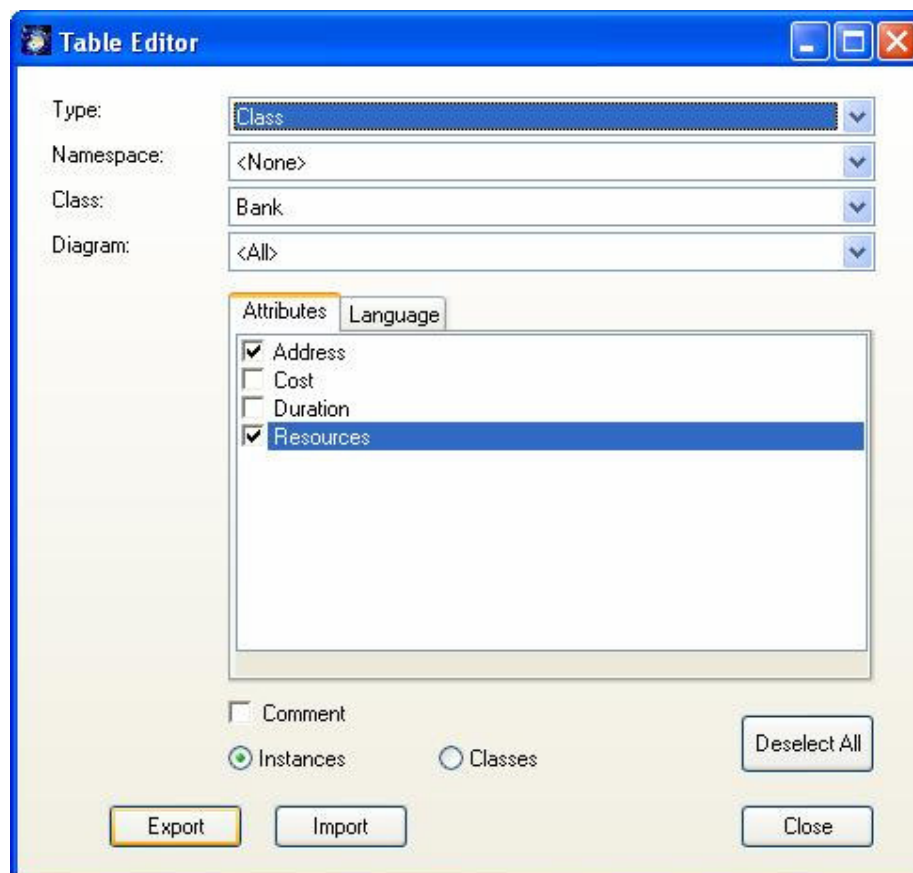
using models with a compatible meta model.

22 EXTRAS AND TOOLS

Under the menu option Tools SemTalk, different functionalities have been grouped. With the explorer options, you can hide or show SemTalk's Explorer by selecting "Show Explorer". With "Refresh", you will actualize the explorer.

22.1 TABLE EDITOR


The Table Editor you have at your disposal another way to edit information in your models. You will create and use Microsoft Excel tables to visualize and edit information about classes and instances in your models.



With the “Export” button an Excel table will be created and opened with the attributes you selected. You can edit the attribute values in this table and with the button “Import” import the information you edited in the Excel table. The Language tab allows the fast translation of objects.

22.2 WIZARD AND WIZARD WINDOW

SemTalk has a consistency wizard (Merlin), which checks some rules while modelling.

By right-clicking menu  and selecting “Show” or “Hide” you activate or deactivate the wizard. “Replay” replays the last wizard comment. If the “DoMagic” command is available, you can allow the wizard directly to fulfil his proposal.

NOTE: If you are not able to hear the wizard, you may have to install the speech-engine from <http://www.microsoft.com/msagent/>.

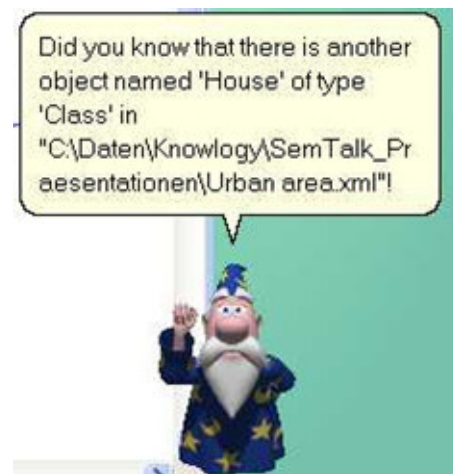
“MS Agent Character” is the used MS Agent character.

Other characters are found at MSAGENT/CHARS/*.acs or at the MS Agent web site.

When an inconsistency situation occurs (e.g. a class already exists in an indexed model) and is detected by the Wizard, it will “tell” you about it (in case the corresponding speech-engine has been installed) or just present it to you as legend.

The “Wizard Window” records all the messages that the wizard has presented you. If you want to see these messages, go to Tools → Wizard Window.

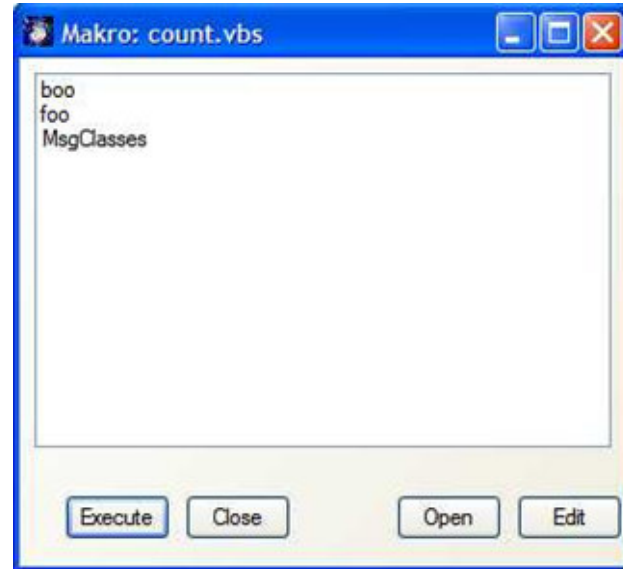
The Wizard configuration will be explained later in this tutorial.



22.3 MACROS

The “Macros” command allows you to run small SemTalk complementary applications written in a script language.

The example shows three subroutines contained in the file count.vbs. You can open a new macro file by clicking “Open”. Edit will open a script editor (not part of SemTalk). “Execute” will run the selected subroutine.



22.4 REPLACE

The “Replace” command is used to globally replace strings (rename) in different object properties. You have the following options:

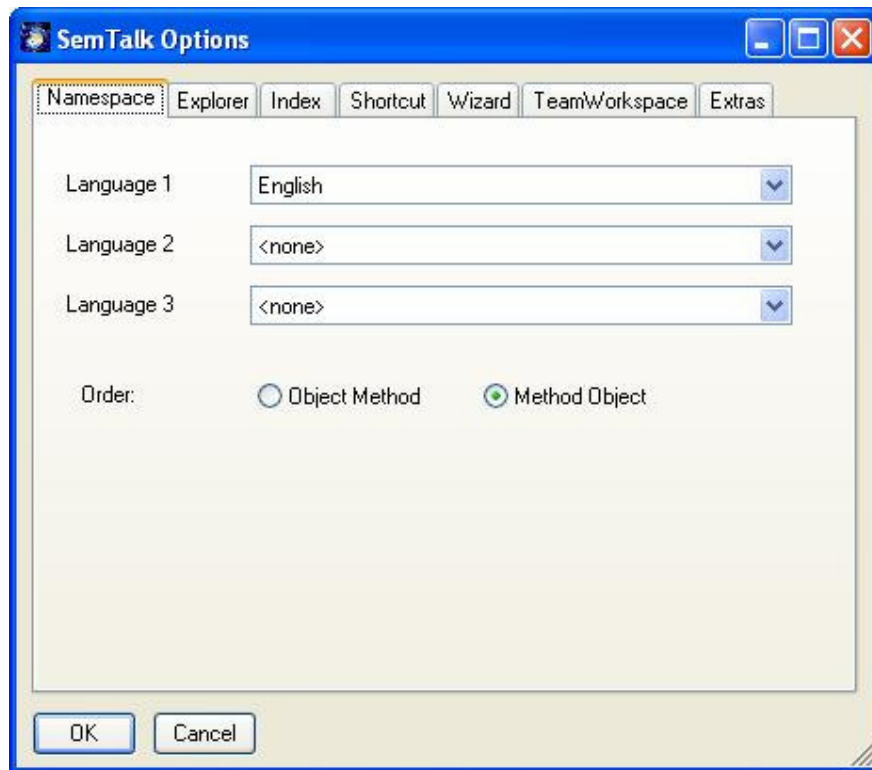
Name	Global replacement of a string in object names
Location	Global replacement of a string in object locations (references)
Path	Global replacement of a string in object attachments (documents)
Namespace	Global replacement of a string in object namespaces

22.5 SEMTALK OPTIONS

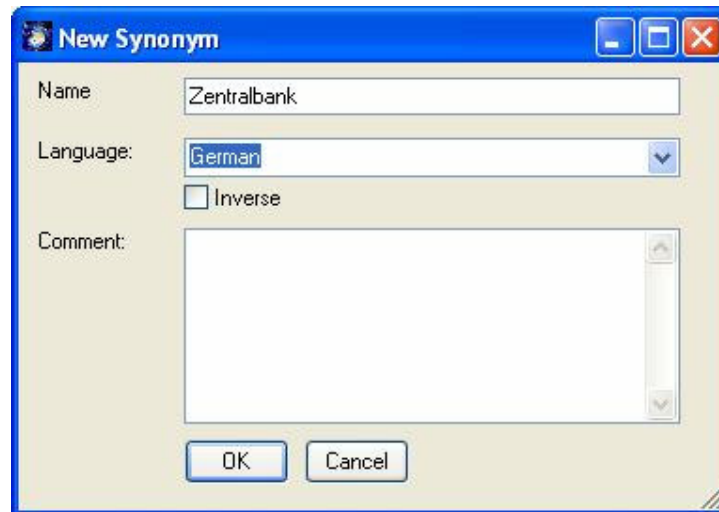
SemTalk 2 configuration options are found under the menu command “SemTalk Options” (Tools → SemTalk Options)

22.5.1 Namespaces Options

Under the tab “Namespaces” you can specify the language priority for your models. You may specify a neutral language (option “<none>”) to develop a standard version of your model. In our example, we have specified “English” as our model language. Language 1-3 use used to specify sublanguage. E.g. Language 1 is English and Language 2 is Medical. If there is no definition in Language 3, Language 2 is used. If there is no definition in Language 2, Language 1 is used.



The “Object Method” and “Method Object” options are to indicate the semantic order of the name in which classes and instances of activities are identify. For example, in English an activity would be expressed as “Method Object”, but in German it is expressed as “Object Method”.

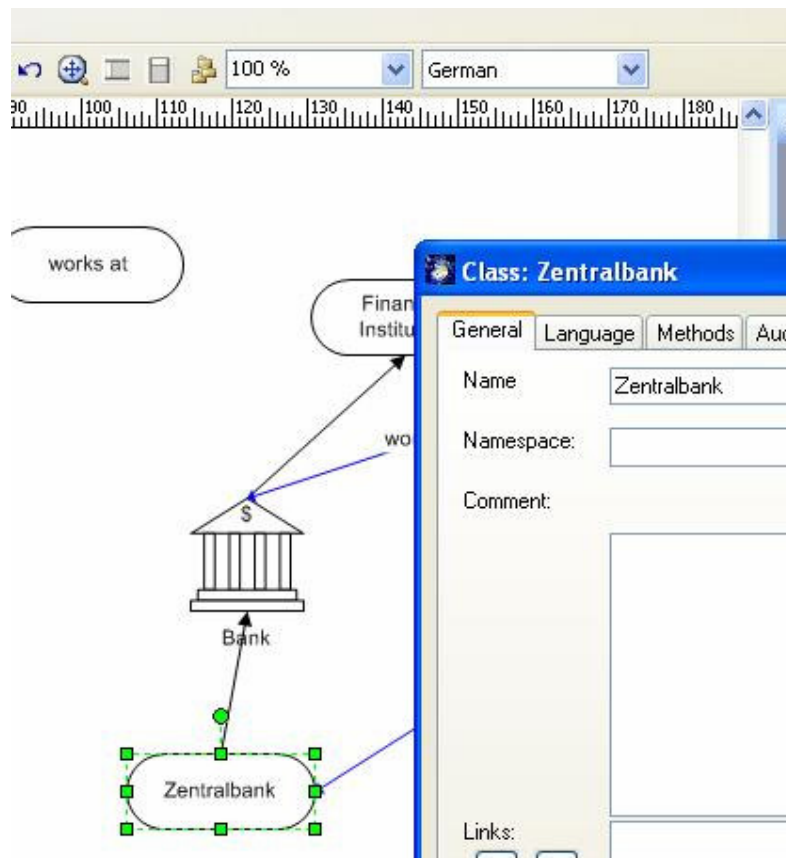


Let us add another language. In order to do that, please open now the edit dialog for the class “Central Bank”. Under the tab “Language” press “New” enter the German term for central bank “Zentralbank” and press OK. In the next Synonym dialog please enter German as language.



You should be able to see now on the menu toolbar German as one of the optional languages for your model.

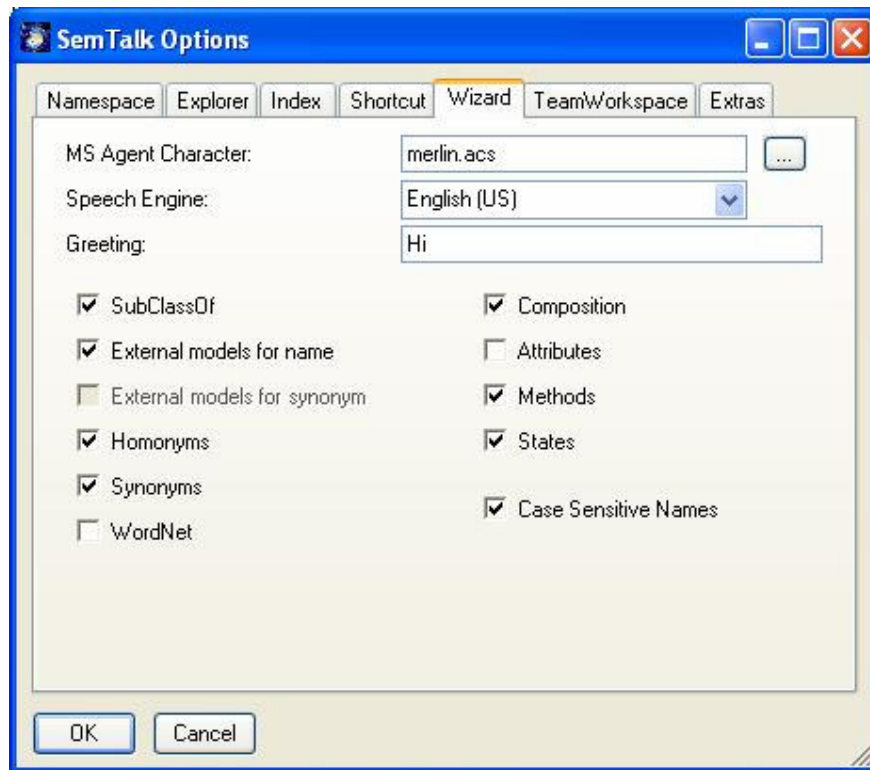
If you are working with multilingual models, it is recommended to choose a neutral language, develop the first version of your model, and then change to a different language to specify the object synonyms in that other language.



If you specify “German” as Language 1, every object that has a synonym in German will have a shape label in German, as well as the name in the edit dialog.

22.5.2 Wizard Options

As mentioned before, SemTalk has a consistency wizard. SemTalk Wizard can be configured with the tab “Wizard”.



SubClassOf	<p>Checks whether the “SubClassOf” connector points from the intended subclass and not the superclass. This is a very popular mistake.</p> <p>Checks whether the name of the subclass is included in the name of the superclass.</p>
External models for name	The name of the object has been found in another indexed model.
External models for synonym	The name of the object has been found as a synonym in another indexed model.
Homonyms	There is another object with the same name in another namespace.
Synonyms	The name has already been used as a synonym.
Case Sensitive Names	The object exists with a slightly different spelling.
Composition	The object name consists of words which are already used in other objects.

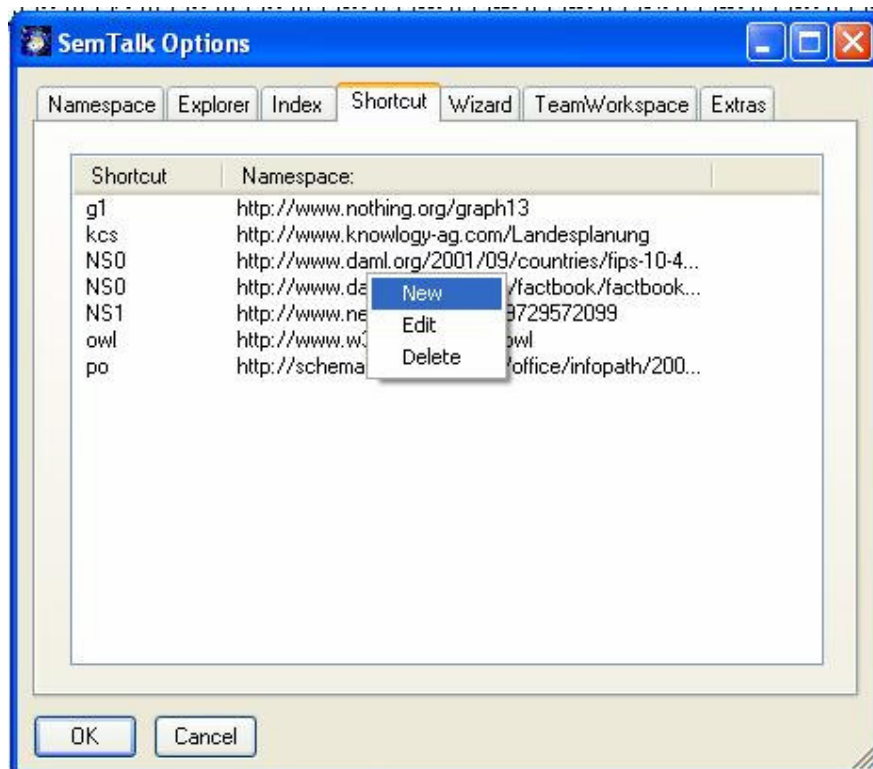
Attributes	The object name contains a word that has been used as an attribute
Methods	The object name contains a word that has been used as a method
States	The object name contains a word that has been used as a state

22.5.3 Shortcuts

If you are using references to external models, namespaces (URNs) can get quite long. In the “Shortcuts” dialog you can define shortcuts for namespaces which are used in all SemTalk dialogs. Shortcuts are assigned for the current user and apply to all objects in the current model.

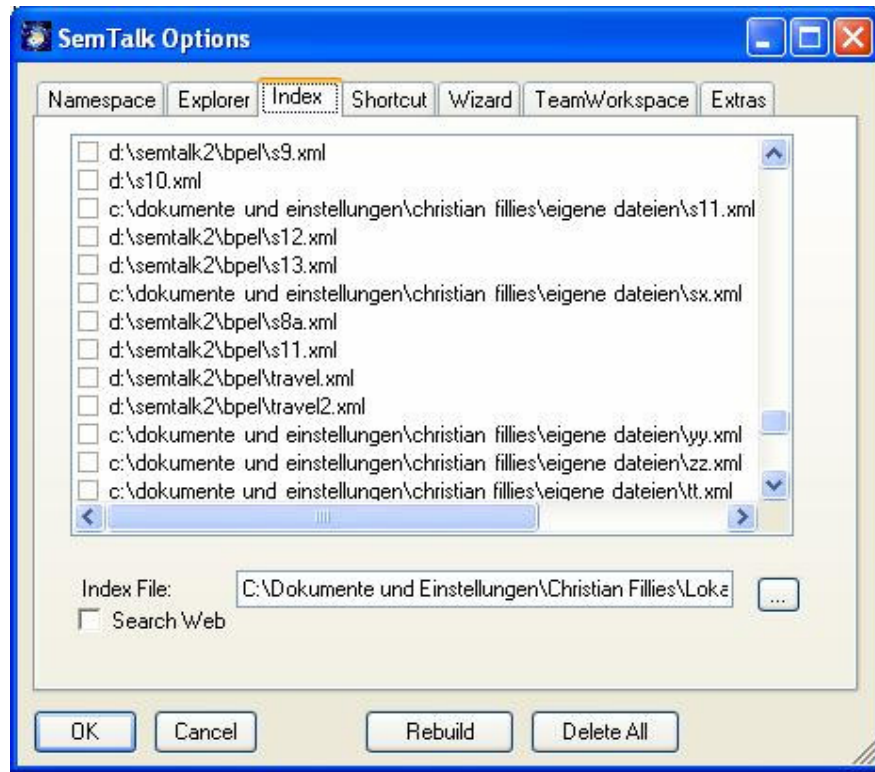
Using Add/Delete/Edit you can add and assign shortcuts for namespaces used in the current model.

OWL Import will automatically add all those namespaces and shortcuts found in the OWL file.



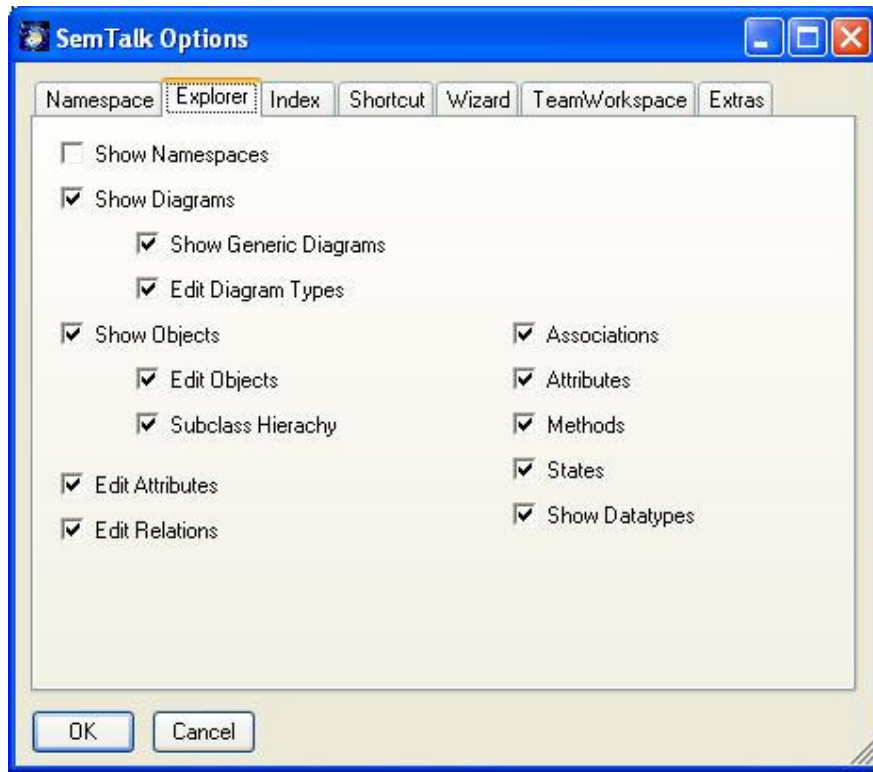
22.5.4 Index

You can index objects from external models. Indexing a model is quite simple. Under the “Index” tab check those file paths or URN’s of those models that you wish to index. If this URN is not on your list, right-click the list, choose new and enter the address. Press “Rebuild” to make sure that SemTalk has successfully indexed this model(s).



22.5.5 Explorer

Using the explorer options, you can customize the appearance of SemTalk’s Explorer. The explorer options are saved with the model (xml-file).

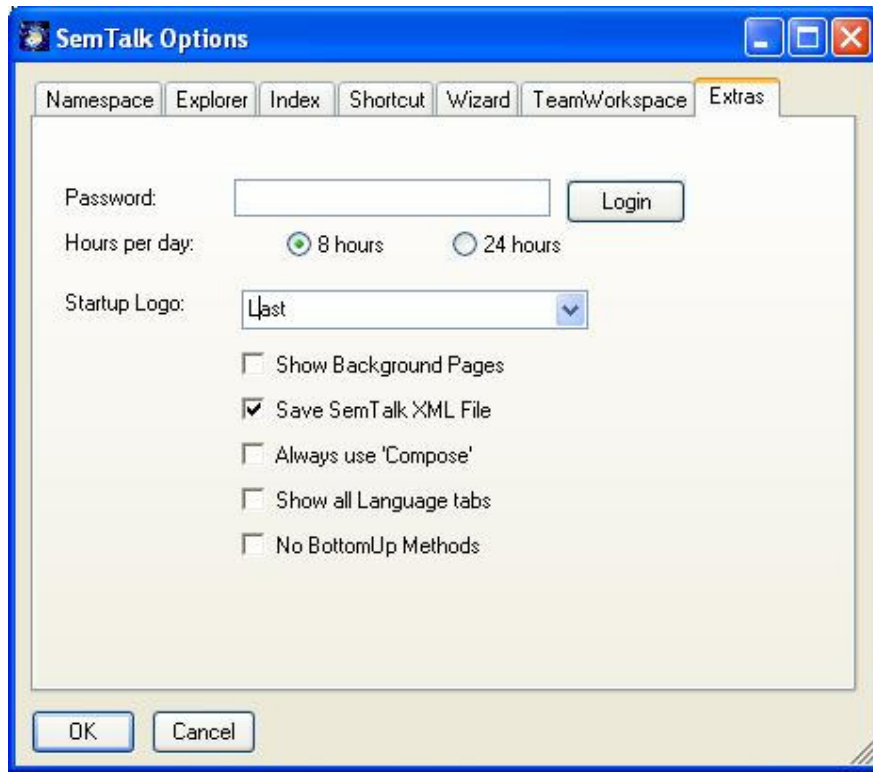


Show Namespaces	Displays the object identifier in the treeview: Namespace#Name
Show Diagrams	Show the „Diagrams“ subtree.
Show Generic Diagrams	Show diagrams without a specific user defined type. These oftenthe meta models
Edit Diagram Types	Create, edit and delete diagram types
Show Objects	Show the “Objects” subtree.
Edit Objects	Create, edit and delete object from the browser
Subclass Hierachy	Show subclasses as inheritance hierachy. If you do not select this option all classes are listed alphabetically.
Edit Attributes	Edit and delete attributes.
Edit Relations	Edit and delete relation types (association types)
Associations	Show the “Associations” subtree.
Attributes	Show the “Attributes” subtree.
Methods	Show the “Methods” subtree.
States	Show the “States” subtree.
Datatypes	Show the “Datatypes” subtree.

22.5.6 Extras

At the “Extras” Tab you can define the following options:

Save SemTalk XML File	Check this option to create an xml file of the current model without graphical information. Useful to reference models.
Password	Enter a password to lock all those objects that have been defined as “Read Only”.
Hours per day	Specify how many working hours a day has. Used with business process models and simulation.
Show Background Pages	Background pages are usually hidden. Check this option if you need to change them. No SemTalk objects can reside on background pages
Always use ‘Compose’	Indendent for process modeling. Applies Object->Compose to every new activity
Show all Language tabs	Language tab is always visible in Edit dialogs without customizing each individual class
No BottomUp Methods	Indendent for process modeling. At Object->Compose new verbs can be entered that are not defined in a class model
Startup Logo	Change the Splashscreen



23 HELP

The Help command provides the user useful functionalities.

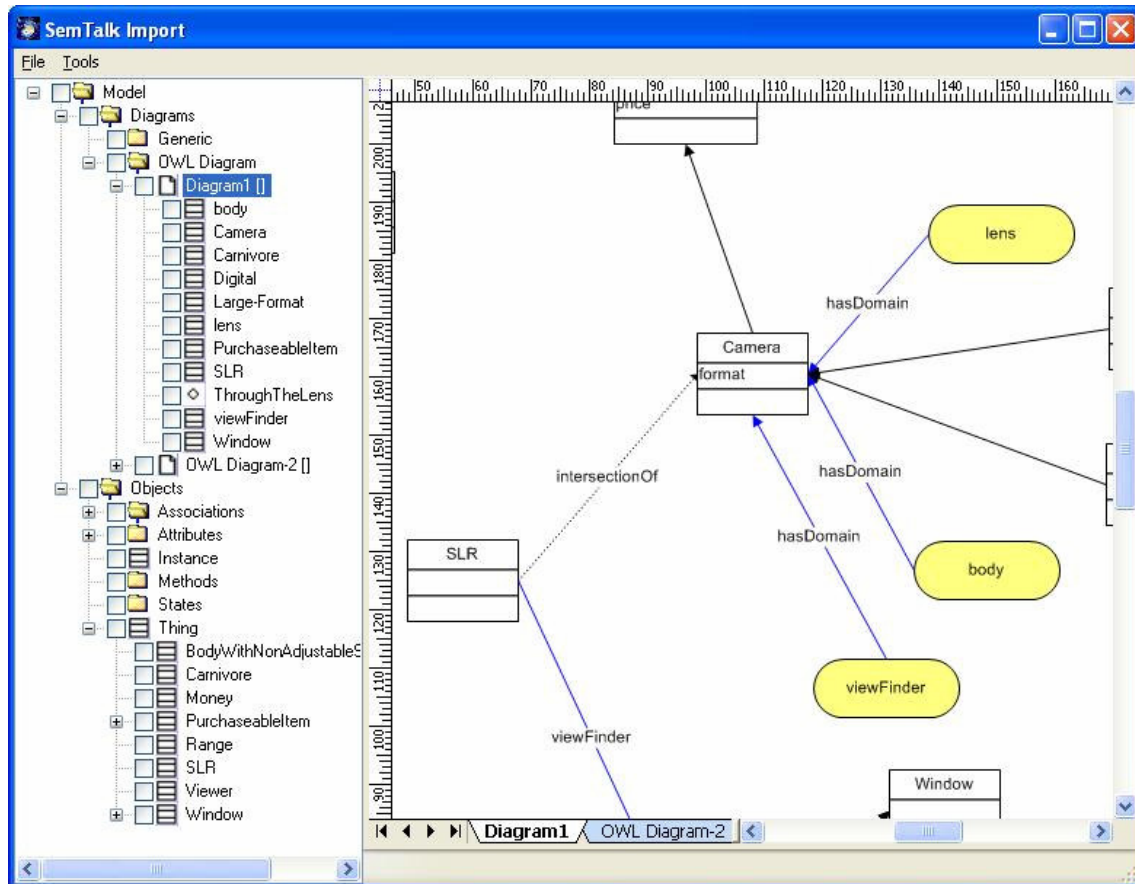
Index	Opens a short menu reference in HTML format.
Check and Repair	Checks the consistency of a model and repairs any detected inconsistency. Using this function has the risk of deleting corrupt information and objects, which have inconsistency problems.
Upgrade	Rebuilds menus after the import of SemTalk 1 models
Registration	Register your SemTalk license (SemTalk Key) here.
About SemTalk	Version and license info

24 EXPORT / IMPORT OPTIONS

The ability of the “Export / Import” options depend on the modeling method and the template been used.

24.1 SEMTALK IMPORT

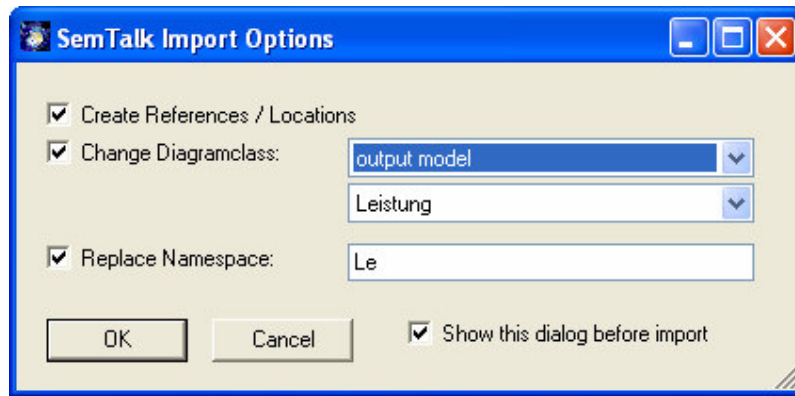
In order to merge SemTalk models use **File→Export/Import→Import**. Using import complete or partial models can be merged. Select an existing model and the following import window will appear:



On the left hand side there is a treeview similar to the SemTalk Explorer where you can select objects by diagram or by hierarchy. Additional objects may be imported. On the right side there is a Visio control for previewing the page to be imported (Note: preview is not available for the Visio embedded version, Note 2: Do not try to change anything in the preview. You can not save it anyway)

Please check those objects or diagrams you want to import and afterwards use File->Import.

An Import Options dialog is popping up which allows to specify some parameters for the import.



Create References / Locations	Each object will get a reference to the imported file so that it can be updated using Object->Refresh afterwards
Change Diagram class	Use this option to import method specific ontologies / Class models
Replace Namespace	Replace the namespace of imported classes

SemTalk Import is an option if you want to import complete diagrams or a large set of objects. If you need single objects “Show External Model” with Drag&Drop (Chapter 7) is more convenient.

24.2 SEMANTIC WEB

Semantic Web is a new Internet made of data. Models made for the Semantic Web are called ontologies. W3C came up with some recommendations to store information in the Semantic Web: RDF (~Instances), RDFS (~some aspects of classes as you have seen in SemTalk so far), OWL (<http://www.w3.org/TR/owl-features/>, complete description logic).

In SemTalk we are using Semantic Web data structures to exchange data in a vendor independent way. Any SemTalk model can be exported completely to OWL. Most OWL ontologies can be imported to SemTalk and used as class models for various purposes.

If you want to use SemTalk as an OWL editor, you should use the OWL template OWL.vst which was developed in conjunction with www.cerebra.com and has all the additional constructs which are needed to cover the complete set of OWL feature. If you need to exploit these features we recommend to use SemTalk in conjunction with reasoners such as www.cerebra.com, www.ontoprise.com, FACT or RACER.

To order to import OWL, RDFS, RDF data use File→ Export/Import → Semantic Web.

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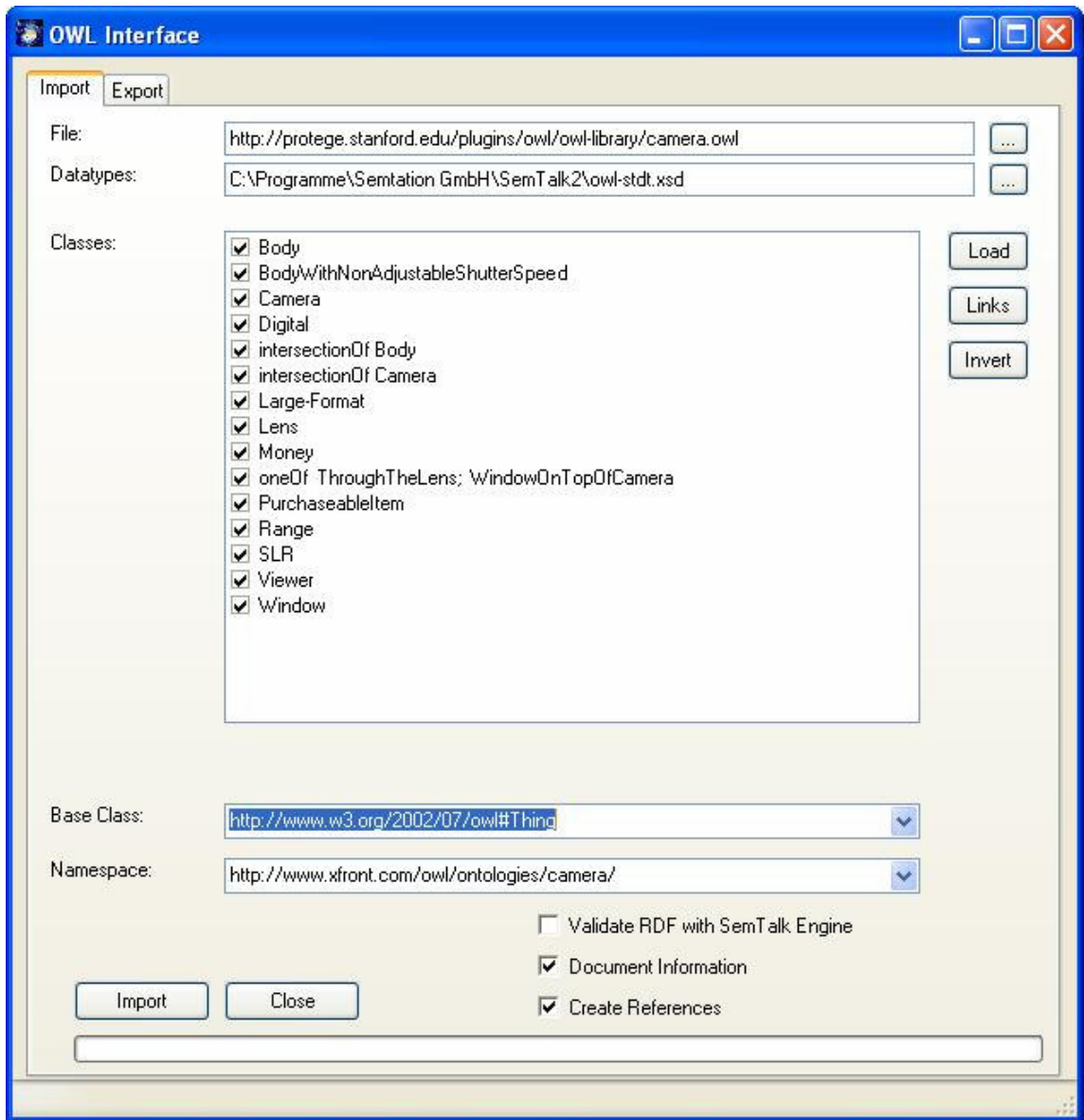


Abb. 1: OWL Import Dialog

As an import file you can select for example: <http://protege.stanford.edu/plugins/owl/owl-library/camera.owl>. Additional SemTalk datatypes are needed. The standard OWL datatypes can be found in the SemTalk program directory.

Note: Instead of importing complete ontologies you can use “Show External Model” with Drag&Drop (Chapter 7) and open an OWL file or URL.

Load	redisplay the contents of the file in the listbox
Links	selects objects related to the current selection in the listbox
Invert	inverts the selection of the listbox
Base Class	is a common superclass for all object to be imported

Namespace	is the default namespace for all object to be imported
Validate RDF with SemTalk Engine	only those associations with are defined at classes are allowed and imported
Document Information	is meta data of the document
Create References	Each object will get a reference to the imported file so that it can be updated using Object->Refresh afterwards

Exporting to OWL or RDFS is pretty simple:

The screenshot shows the 'OWL Interface' dialog box with the 'Export' tab selected. The dialog contains the following fields and options:

- Export Classes
- Export Instances
- Remove Local Namespace
- Export Meta Model
- File: ...
- URN: ▾
- Prefix:
- Base Class: ▾
- Export Document Information
- Title:
- Date:
- Creator:
- Subject:
- Description:

At the bottom, there are 'Export' and 'Close' buttons, and a progress bar.

You can choose to export classes, instances, metamodel (read only classes) etc.

A base URN can be selected. If you assert a Base Class, only subclasses of that class will be exported. If you have selected some objects in your drawing, only those objects will be exported.

24.3 MORE EXPORT / IMPORTS

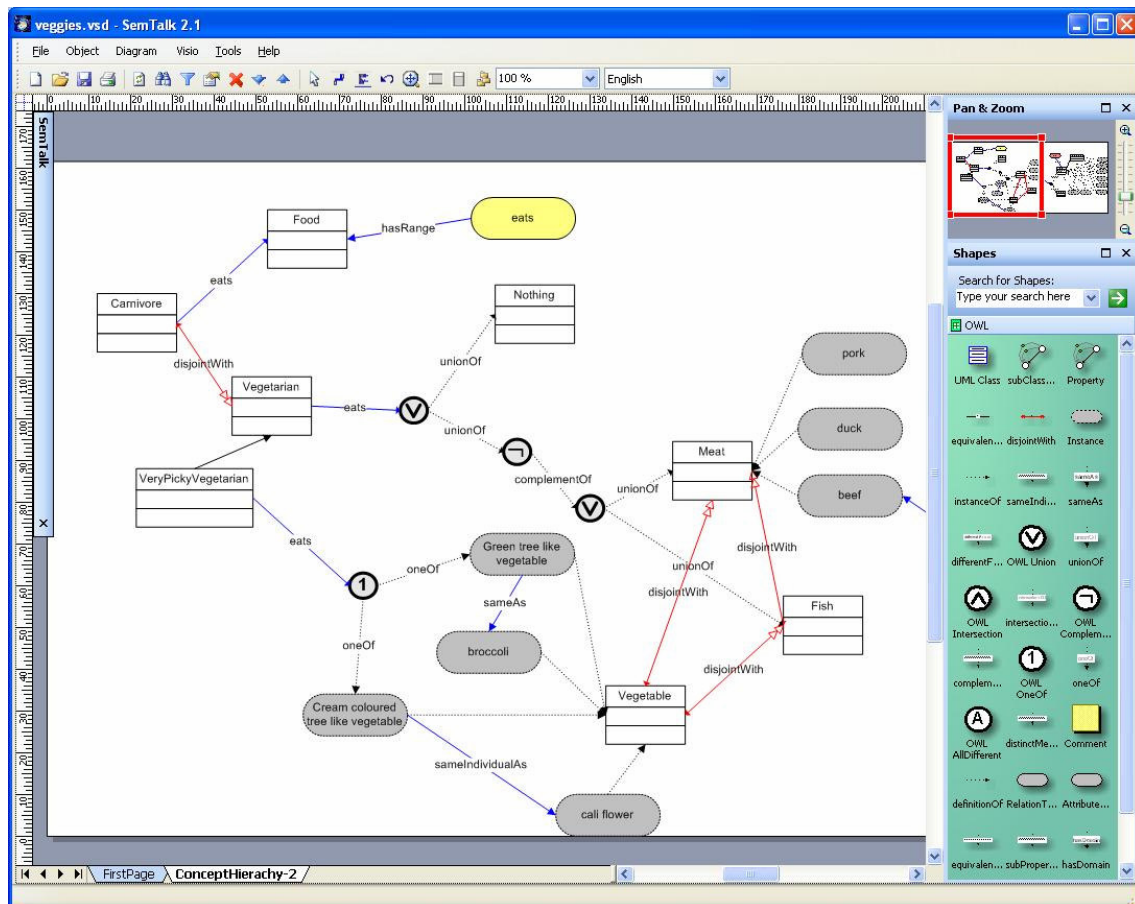
The following is a short summary of export import options.

Import Picture	Insert a picture such as bmp, jpg etc in the drawing.
MS PowerPoint	Export to MS PowerPoint 2003. For MS Office only the 2003 version is supported. For Office XP and Office 2000 use SemTalk 1.2.5
MS Word	Export to MS Word 2003
MS Excel	Import from MS Excel 2003. Provides an MS Excel sample macro to create SemTalk objects via the SemTalk API.
MS Project	Export and Import to MS Project. Available for KSA ("ksa.vst"), EPC ("epc.vst") and others.
SAP Solution Composer	Import Solution Maps and other diagrams from the SAP Solution Composer, which must be installed. Use the template "cview.vst"
SAP Objects	Import Business Objects, Roles, KPIs and other objects from the SAP Solution Composer, which must be installed.
SAP R/3 4.6c Reference Model	Import processes of the SAP's R/3 Reference model. An reference model database is required which can be obtained from SAP's Value SAP (Asap) CD. Use the template "epc.vst"
EPML (ARIS)	Import and export of EPC models from other EPC tools such as ARIS via ARIS XML using the tool independent standard EPML http://wi.wu-wien.ac.at/Wer_sind_wir/mending/EPML/ Use the template "epc.vst"
XTM Topic Map	Import of ISO Topic Maps using the XTM format for Topic Maps
BPEL4WS	Export of the Web Services format BPEL4WS e.g. for BizTalk. Use the template bpmn.vst
WSDL Import	Create object definitions from XML-Schema files / WSDL. To be used with BPMN

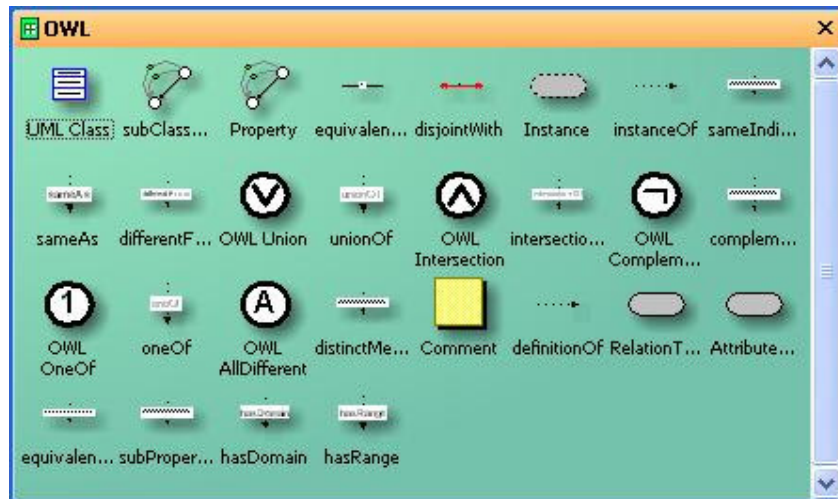
25 USING OWL.VST

In order to use SemTalk as an OWL editor you may open the OWL template. File->New and select OWL.vst.

This tutorial does not intend to teach you how to apply OWL to the modeling of your business problem. Please refer to the Spec (<http://www.w3.org/TR/owl-features/>) or to OWL tutorials out on the web (<http://www.cs.man.ac.uk/~horrocks/ISWC2003/Tutorial/>) to learn about the underlying ideas of OWL.



The OWL template contains additional shapes to create OWL Diagrams. An OWL diagram is basically a class diagram which also allows instances and some more restriction. The OWL stencil has some additional shapes compared to the standard SemTalk class stencil:



The main difference compared to standard SemTalk is, that SemTalk assumes “Closed Word Semantics” while OWL assumes “Open World Semantics”. “Open World Semantics” assumes that every two object can denote the same concept unless someone states that they are different. This is crucial for the global vision of Semantic Web.

For everything ignored by SemTalk you might use a reasoner such as www.cerebra.com, www.ontoprise.com, FACT or RACER.

equivalentClass	Two classes actually denote the same concept. Ignored by the SemTalk Engine but exported to OWL
disjointWith	No instance is allowed to be instance of both classes. Ignored by SemTalk Engine but exported to OWL
Instance	Just an instance
instanceOf	Graphically displays that the object is instance of a class. An instance can be instance of multiple classes. Supported by the SemTalk Engine.
sameIndividualAs, sameAs	Two instances denote the same object. Ignored by the SemTalk Engine, which assumes closed world semantics
differentFrom	Two instances are denoting different objects. Default for SemTalk
OWL Union	An abstract class describing the union of a

	set of other classes. Use the unionOf relation to specify that set. Ignored by SemTalk Engine but exported to OWL
unionOf	Relation from a OWL Union class to other classes
OWL Intersection	An abstract class describing the intersection of a set of other classes. Use the intersectionOf relation to specify that set. Ignored by SemTalk Engine but exported to OWL
intersectionOf	Relation from a OWL Intersection class to other classes
OWL ComplementOf	An abstract class describing that instances of that class are not instance of another class. Use the complementOf relation to specify that other class. Ignored by SemTalk Engine but exported to OWL
complementOf	Relation from a OWL ComplementOf class to other classes
OWL OneOf	An abstract class describing that instances of that class are one of a set of other instances. Use the oneOf relation to specify that set. Ignored by SemTalk Engine but exported to OWL
oneOf	Relation from a OWL OneOf class to instances defining that class
OWL AllDifferent	Operator specifying that all related instances are different. (Default in SemTalk)
distinctMember	Member of an AllDifferent Set
AttributeType	Graphically displays an Attribute Class (“DataProperty” in OWL)
RelationType	Graphically displays an Association Class (“ObjectProperty” in OWL)
equivalentProperty	Two AttributeTypes or RelationTypes have same meaning. Ignored by SemTalk Engine but exported to OWL

subPropertyOf	Subclassing of properties. Partially supported by SemTalk Engine but exported to OWL
hasDomain	Relation from a property to its domain. This can also be specified using the edit dialog Details tab. Supported by the SemTalk Engine
hasRange	Relation from a property to its range. This can also be specified using the edit dialog Details tab. Supported by the SemTalk Engine

26 QUICK – REFERENCE GLOSSARY

BPM: Acronym for Business Process Modeling. Different methodologies are used to define how business processes are described.

class: A collection of things sharing a common attribute.

CASE: Acronym for computer-aided software engineering, computer-aided systems engineering. Software used for the automated development of systems software, i.e. , computer code. CASE tools automate methods for designing, documenting, and producing structured computer code in the desired programming language.

DAML: DAML (DARPA Markup Language) is a semantic markup language for Web resources. It builds on earlier W3C standards such as RDF and RDF Schema, and extends these languages with richer modelling primitives.

inheritance: In computer object-oriented programming is the hierarchical transfer of all definitions and methods of a class to its subclasses.

instance: A single item of information that is representative of a type.

inverse name: An association points from object A to object B. The association name explains how to interpret this relationship. On the other hand, the inverse name of an association indicates the relationship from object B to object A.

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ontology: Formal specifications of the terms in a domain and the relations among them.

RDF: (Resource Description Framework) is a framework for metadata and provides for interoperability for applications in “machine-understandable” information on the Web.

RDFS: (Resource Description Framework Schema) represents a mechanism to use RDF to describe RDF vocabularies. The specification defines a basic vocabulary for this purpose, as well as an extensibility mechanism to anticipate future additions to RDF.

Semantic Web: An extension of the current Web in which information is given well-defined meaning, enabling computers and people to work in better cooperation.

UML: Unified Modeling Language. General-purpose programming language used to develop complex object-oriented projects.

URN: URNs (Uniform Resource Name) serve as persistent, location-independent, resource identifiers.

WordNet: a machine-readable lexical database organized by meanings; developed at Princeton University

XML: eXtensible Markup Language. It is the simplest version of the SGML (Standard Generalized Markup Language) standard for creating and designing HTML documents. It is designed to improve the functionality of the Web by providing more flexible and adaptable information identification.