Engineering Virtual Domain-Specific Service Platforms

Specific Targeted Research Project: FP7-ICT-2009-5 / 257483

IRET
Installation and User Guide

Abstract

This document is presented as a practical User Guide for IRET tool, from the installation of Eclipse IDE, through the construction of a model, to the advanced functionality of merging models.

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1 Introduction

IRENE (INDENICA Requirements ElicitatioN mEthod) borrows from KAOS, which is a well-known requirements elicitation framework, and also from some previous work done at Politecnico di Milano, to provide the user with a “complete” solution to elicit the “usual” functional and non-functional requirements, but also to state the foreseen adaptation capabilities and also the requirements in terms of the variability that should be embedded in the system-to-be. Moreover, requirements can be classified as either crisp, that is, they are either satisfied or not satisfied, and fuzzy, to embed flexibility in the system and be able to reason in terms of different degrees of satisfaction. The idea is to offer a comprehensive and homogenous solution to let users specify the requirements of their INDENICA platforms, even if the proposal can cover a wider spectrum.

IRENE offers a set of graphical symbols to let the user state the structure of the requirements, and also some textual annotations to refine and better specify the concepts. As for this last aspect, IRENE can be used in two different ways. Annotations can be added in the form of natural language, to ease the user in his/her work, but also to allow for an incremental specification of requirements, but they can also be stated using formal notations. The current version of IRENE is prescriptive as far as requirements and adaptation are concerns, while it is still open as for variability.

Even if IRENE could easily be used to specify single applications, the focus on service platforms imposes a methodological shift. We think that a platform could be specified as if it were a “conventional” single solution, whose aim is to provide services to others, which in turn may create different applications. But, it could also come from the identification of some “reference” applications, which are then used to generalize the concepts and define a single and coherent specification. In the first version of IRENE, this blending process is mainly in the head of the analyst, but we plan to extend it and provide suitable solutions in the next (and final) version.

A prototype tool called IRET (IRENE Toolset) supports all these aspects. IRET is implemented as an Eclipse plug-in and fully supports IRENE to allow users easily define complete and coherent requirements models. This document is a practical user guide for installing and using IRET as an Eclipse project.

2 Prerequisites

You must provide any machine administrator's credentials in order to be sure all the installation process will be correctly driven. Other prerequisites for Eclipse environment are explained below.

We have successfully tested IRET on Eclipse 3.6 (*Helios*) and 3.7 (*Indigo*) on the following operating systems:

- Ubuntu 11.04
- Windows 7
- Mac OS X v. 10.7.5 "Lion"

3 Step by step installation

1) Download ECLIPSE IDE "INDIGO"[1] Release at:

   http://www.eclipse.org/downloads/packages/eclipse-ide-java-ee-developers/indigosr2

2) Extract the .zip file into your OS and launch "***eclipse.exe***". The first step is to define a path for the Eclipse workspace:

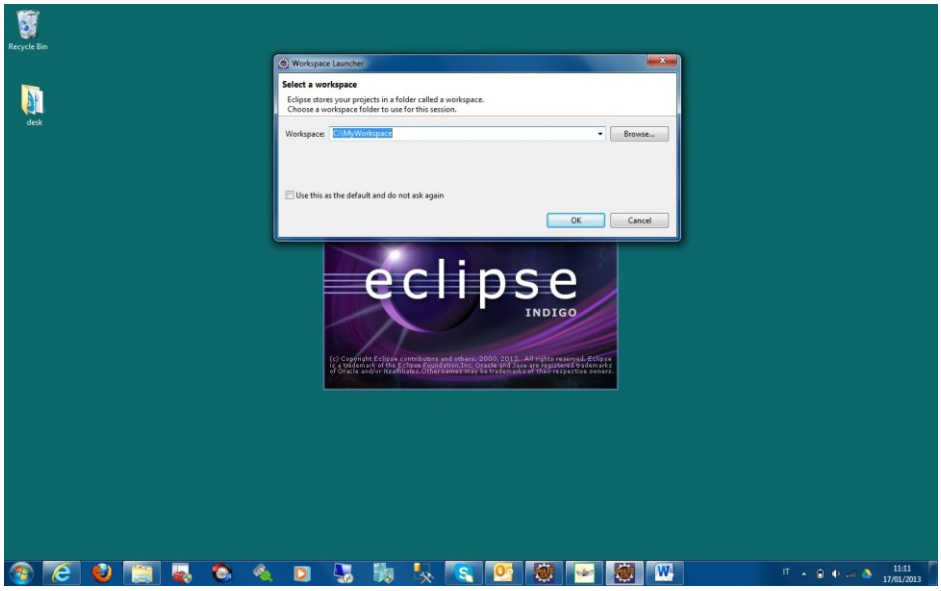


Figure 1 Defining Eclipse workspace

3) From menu "***Windows***" –> "***Preferences***" add the following update sites in order to get all the pre-requisite plugins:

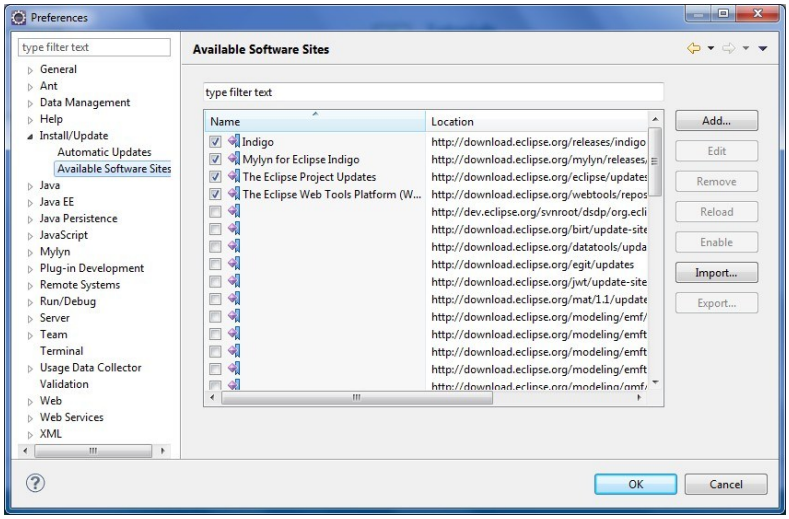


Figure 2 Defining Update Sites

[1] INDIGO is the release INDENICA has been developed and tested with. No warranties of compatibility can be assured with other releases.

a) MDT Update Site:
http://download.eclipse.org/modeling/mdt/updates/releases/
b) GMF Tooling Update Site:
http://download.eclipse.org/modeling/gmp/gmf-tooling/updates/releases-3.0.0/
c) XText Update Site:
http://download.eclipse.org/modeling/tmf/xtext/updates/composite/releases
d) IRET Update Site:
http://indenica.dei.polimi.it/iret/update-site

4) Select "***Help***" -> "***Install New Software***" then provide the URL to IRET Update Site: http://indenica.dei.polimi.it/iret/update-site

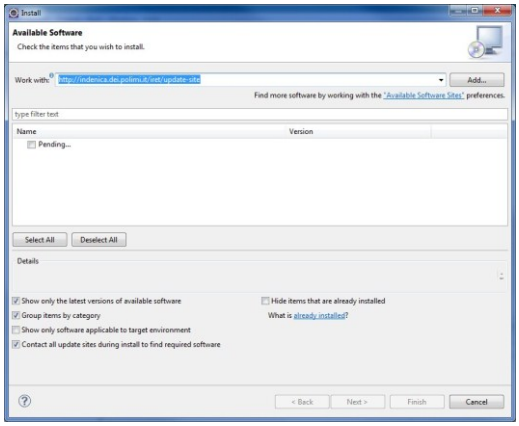


Figure 3 IRET update site

Make sure both the first and the last option are checked in order to get the last version and all the dependencies of IRET.

5) Select the categories and features as needed and click the Next button. Follow the steps for installing IRET (accept the license agreement and ignore the security warning for installing software of unsigned content, etc.), and restart Eclipse as prompted. Finally, you have successfully installed IRET.

4 Creating a Diagram

First of all you must define a container where all your work will be stored within your work-space. This is a ***New Project***:

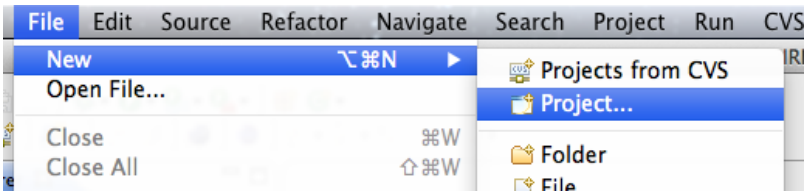


Figure 4 How to create a new Project

Be sure to select **General Project** in the next wizard. Choose a name for your project then press Finish to complete this step. You can see your project folder on the *Package Explorer* window:

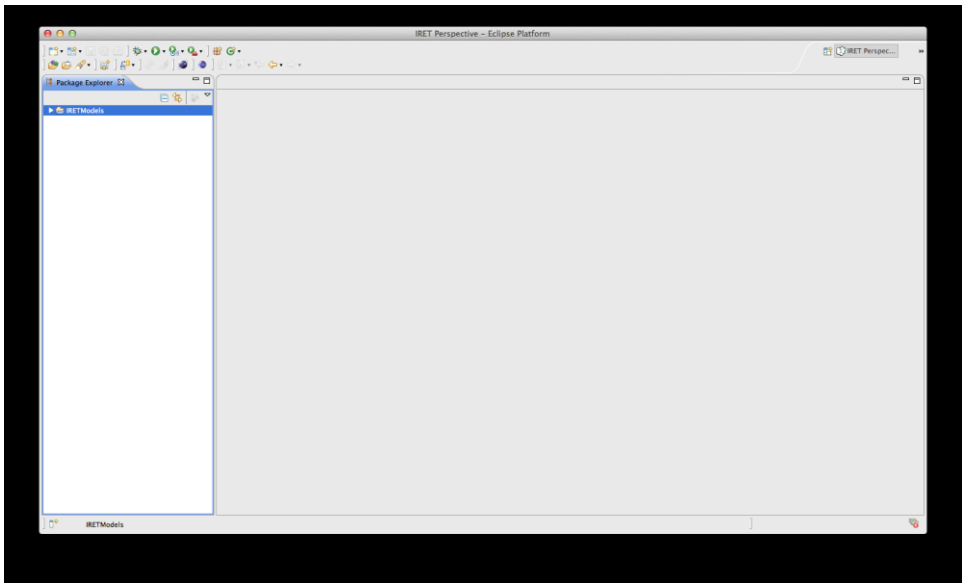


Figure 5 IRET Perspective

Now you are ready to create your first diagram. Right-click on the project, then chose *"New" -> "iret Diagram"*:

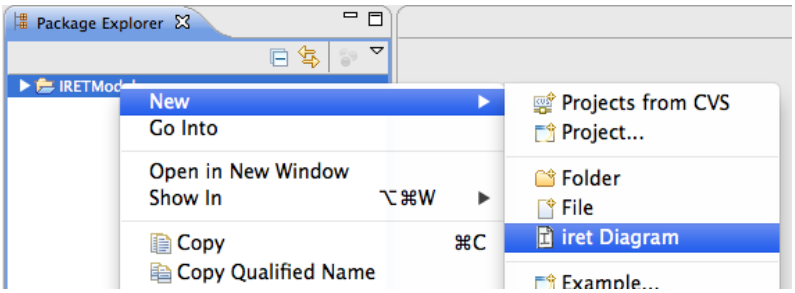


Figure 6 How to create a new IRET Diagram

Chose a name for the diagram and type it into File name textbox. Be sure not to change or delete the ".iret_diagram" extension. Then the IRET Perspective is shown to you:

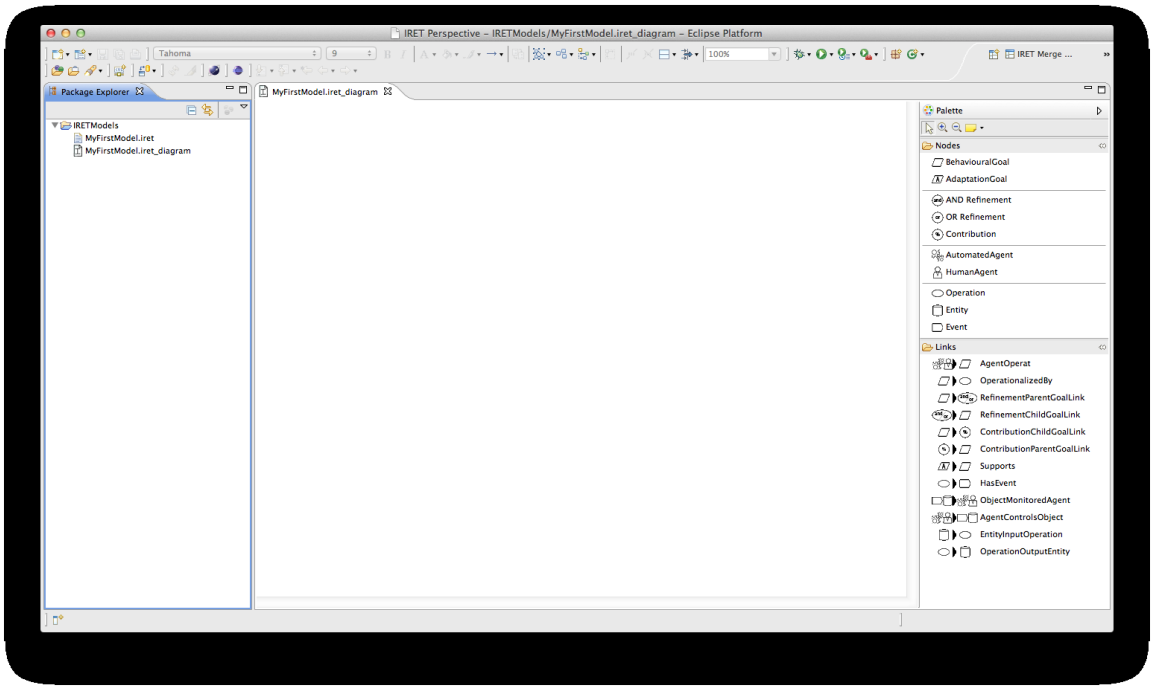


Figure 7 IRET Perspective Workspace

IRET Perspective is a workspace combination of panels and menus where you can find all the instruments for creating and setting your models. In a default layout you can see two windows (also named views. Pay attention in avoiding to confuse the layout views with the diagram views as described further): the ***Package Explorer***, on the left, and the ***Editor***.

5 Working with IRET

5.1 Definitions

A **Diagram** is the graphical representation by shapes of any process, technology, logical sequence, chain, etc. In IRET you have a *.iret_diagram* file for it.

The **Model** is the semantic description of a Diagram in a XML file.

A **View** is a Diagram that is described in the same model as another one. Views are useful to split complexity. Logically a View should be the portion or the integration of a main diagram, but it can also be completely independent from it. A model can contain many Views.

5.2 The workspace

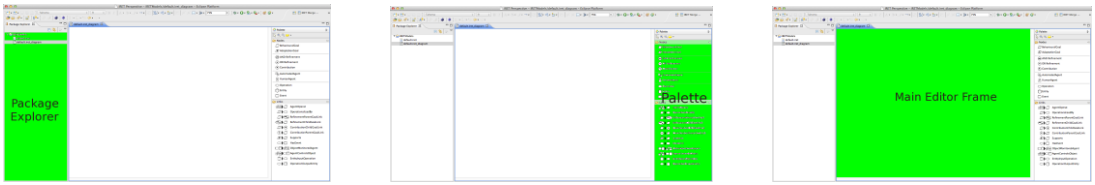


Figure 8 The three panels of IRET perspective

5.2.1 The Package Explorer

The **Package Explorer** is a tree viewer for all your projects and the models defined into them. From here you can:

- Accessing the wizard for:
  - creating a new project
  - creating a new IRET Diagram
  - merging two models
- creating a new View for an existing IRET Model
- (the last two wizard will be further explained)
- create a new folder into an existing project
- import/export an existing project into workspace
- deleting a project from the workspace (you will prompt to choose whether deleting also its files or not)
- access the physical file of a model into the machine file system
- copying a diagram and/or its model
- delete a diagram/model

Many others Eclipse environment standard options are available here trough right-click context menu, but they are not pertinent with IRET diagram management.

5.2.2 The Palette

On the **Palette** view you can find all the shapes (called Nodes) and the Links available to draw a diagram:

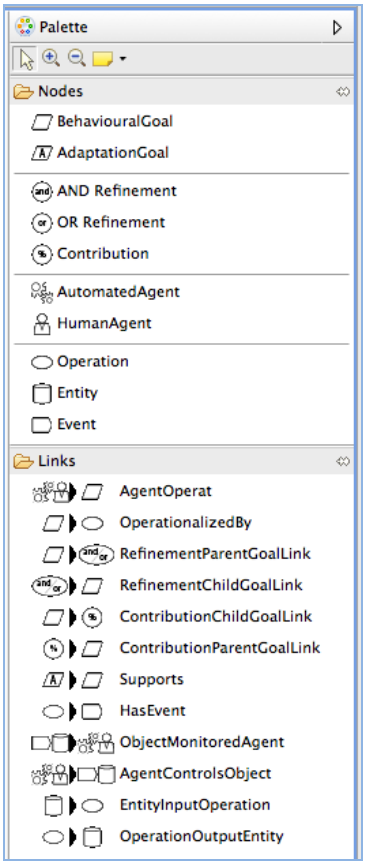


Figure 9 The Palette: available Nodes and Links

You can drag & drop any Node shape into your editor main frame or double-clicking on it.

5.2.3 The Editor Frame: Nodes and Links

The **Editor Frame** is the main workspace where you can draw and manage all the Nodes and Links of your diagrams. You can place new Nodes by:

- double clicking the node on the palette
- drag & drop the node from the palette to the main area of the editor
- choosing the node from the contextual palette that appears if you lie the pointer anywhere on the main editor area, as shown in the picture below:

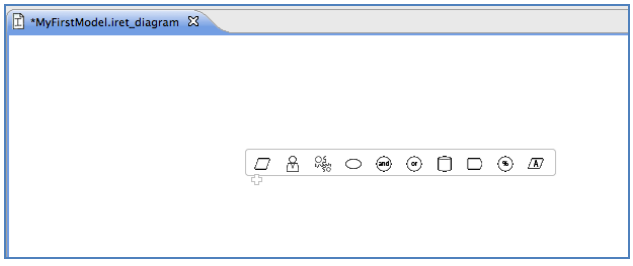


Figure 10 The contextual menu on main editor frame

Once you have placed a node you must give it a short description/name in the textbox below the figure where the cursor appears:

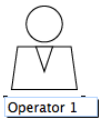


Figure 11 A node shape and its name label

At any moment you can change this label by double-clicking on it. Also moving any element is possible by drag & drop it whenever and wherever on the editor main area. The zoom function is available on the Toolbar and through the mouse roll or the right-click contextual menu:

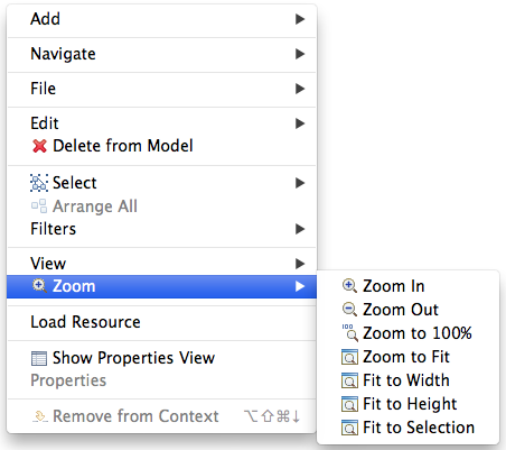


Figure 12 The Zoom function from the contextual menu

Here you can also find the Arrange All function that is especially useful to put in order all the elements in big and complex diagrams, where links and nodes seem to mat each other.
To delete a shape you can use the right-click context menu and choose Delete from Model:

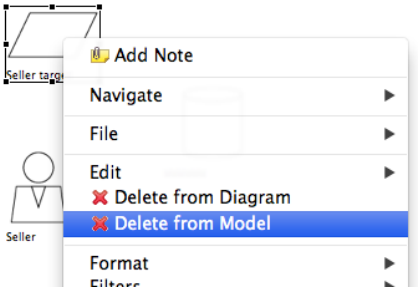


Figure 13 Always delete any object by choosing "Delete from Model"

This option is important to maintain the consistence between the diagram and the model. If you chose Delete from Diagram the shape will be only removed from the diagram, but its reference will remain in the *.iret* model file.

The connections between the Nodes are established by **Links**. Here is the simplest way to draw a link:

- Click on the shape: a border will appear with two small arrows on it
- Hold the left button on the arrow that indicates the direction you want the link to be driven to and go to the next shape you want to join, then release the button:

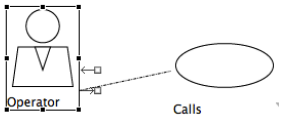


Figure 14 How to create a Link

There is a second way by using the palette. Choose the right link on the palette. There are all the possible combinations between the nodes. In the main frame hold on the source node shape and drag the mouse to the destination node shape, then release.

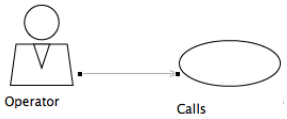


Figure 15 How to create a Link choosed from the Palette

As for any shape, to delete a link right-click on it and chose ***Delete from Model***.

5.2.4 Properties

You can access any shape's properties by the right-click context menu:

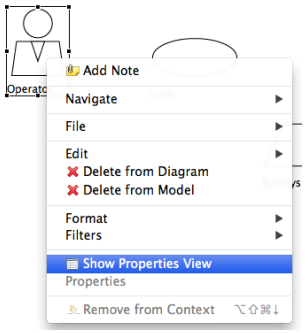


Figure 16 How to access element Properties

A new view opens:

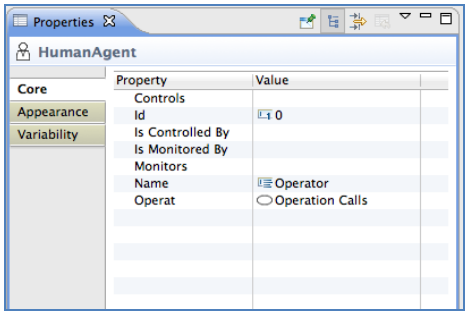


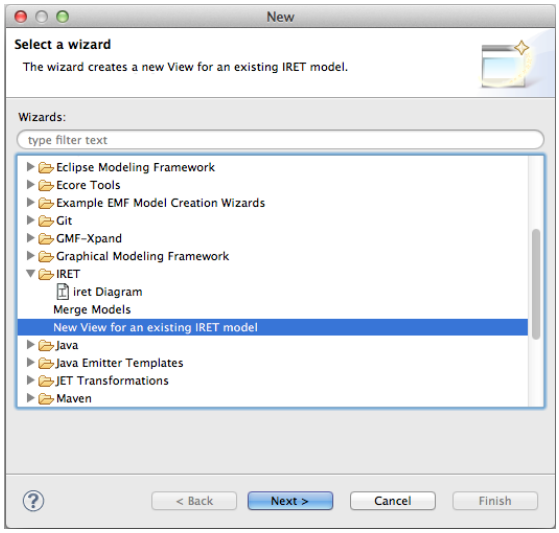
Figure 17 Propoerties for a node

There are three main categories of properties:

- **Core**: groups all the semantic/functional properties of the node (such as its Id, name, relationships…)
- **Appearance**: groups all the shape/graphical properties (such as the font options of the label and of the background)
- **Variability**: a descriptive description of the node variability

5.3 Creating a new View

As defined before a **View** is a new diagram of a main model. The model contains all the elements (nodes and relationships) of its associated view. Each diagram corresponds to a View. It means that Views can be defined starting from an existing model. From the "*File*" -> "*New*" -> "*Other*" toolbar menu or from the contextual menu on the Package Explorer choose the IRET wizard **New View for an existing IRET model**:



then choose the *.iret* model you want to add a new view to:

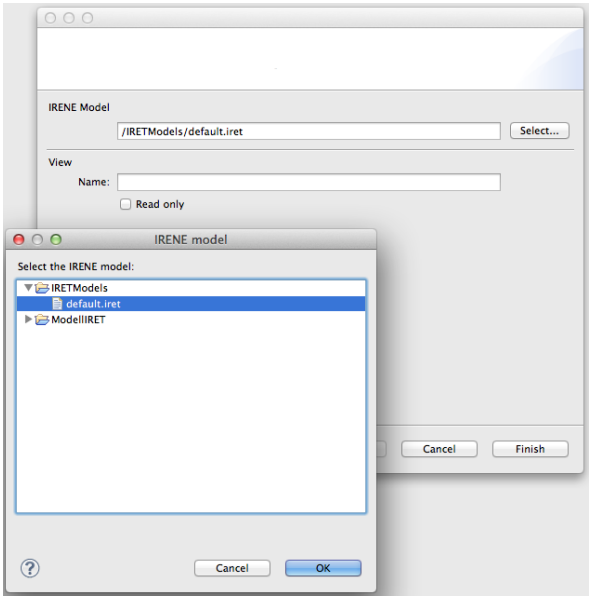
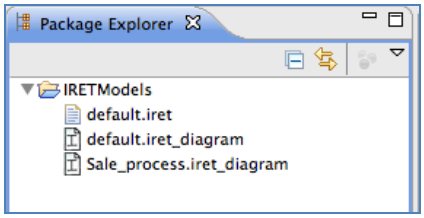


Figure 18 How to create a View

You can browse through all the models in your projects. Type a Name for the new diagram then press Finish. The main editor frame refreshes with a new blank workspace tab so you can draw a new diagram as described before.
In the Package Explorer you can see the new diagram under the original model. Both diagrams are described into the same model because the second one is a view. You can define as many views as you need for each model.




```
<?xml version="1.0" encoding="UTF-8"?>
<iret:IreneModel xmi:version="2.0" xmlns:xmi="http://www.omg.org/XMI
  <contains xsi:type="iret:ANDRefinementLink" xmi:id="_munVsDVeEeKqo
    <refinedGoal xmi:id="_munVsTVeEeKqoZm6zeCHsQ" name="Process Orde
  </contains>
  <contains xsi:type="iret:ANDRefinementLink" xmi:id="_mupx8DVeEeKqo
    <refinedGoal xmi:id="_mupx8TVeEeKqoZm6zeCHsQ" name="Process Orde
  </contains>
  <contains xsi:type="iret:BehaviouralGoal" xmi:id="_mumuoDVeEeKqoZm
  <contains xsi:type="iret:BehaviouralGoal" xmi:id="_munVsjVeEeKqoZm
  <contains xsi:type="iret:BehaviouralGoal" xmi:id="_mun8wDVeEeKqoZm
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  <contains xsi:type="iret:AutomatedAgent" xmi:id="_muoj0DVeEeKqoZm6
  <contains xsi:type="iret:AutomatedAgent" xmi:id="_muoj0TVeEeKqoZm6
  <contains xsi:type="iret:HumanAgent" xmi:id="_muoj0zVeEeKqoZm6zeCH
  <hasView xmi:id="_kdYS4TVeEeKqoZm6zeCHsQ"/>
  <hasView xmi:id="_kox20ITMEeKS0eIKUOWMCQ" label="Sale_process"/>
</iret:IreneModel>
```

Figure 19 The new View

5.4 Merge

The merge function provides to fuse two input models into a single one as the result of a semantic analysis process between the nodes. A particular perspective was implemented for this purpose. The figure shows how to switch to this perspective.

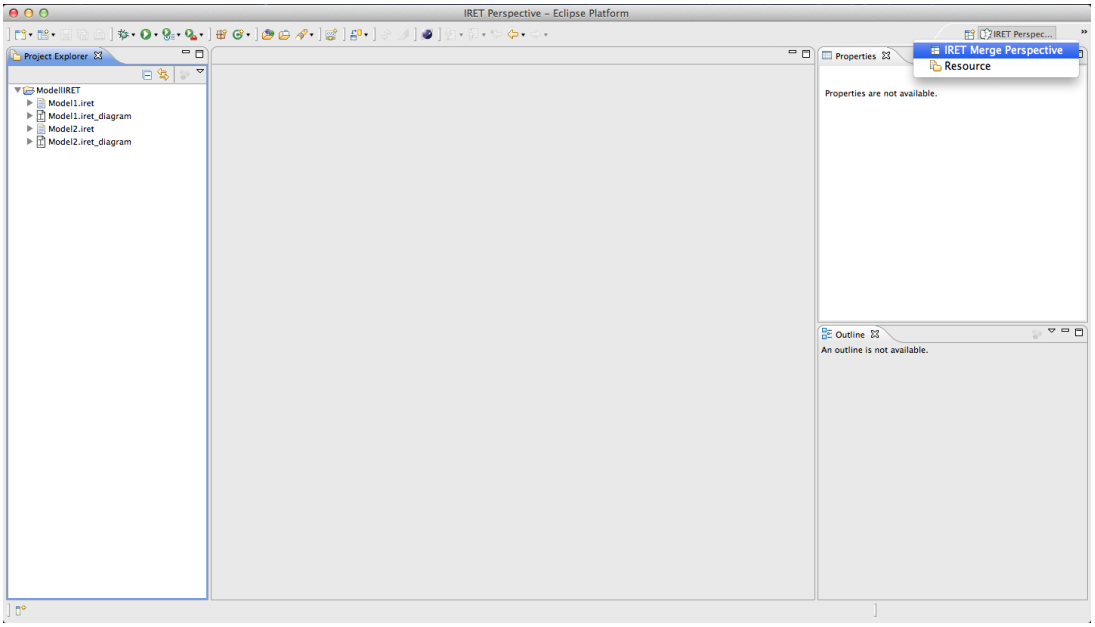


Figure 20 Switching the IRET Merge Perspective

On the left bottom corner a particular view part panel is displayed. Its functionalities were explained further in this paragraph.

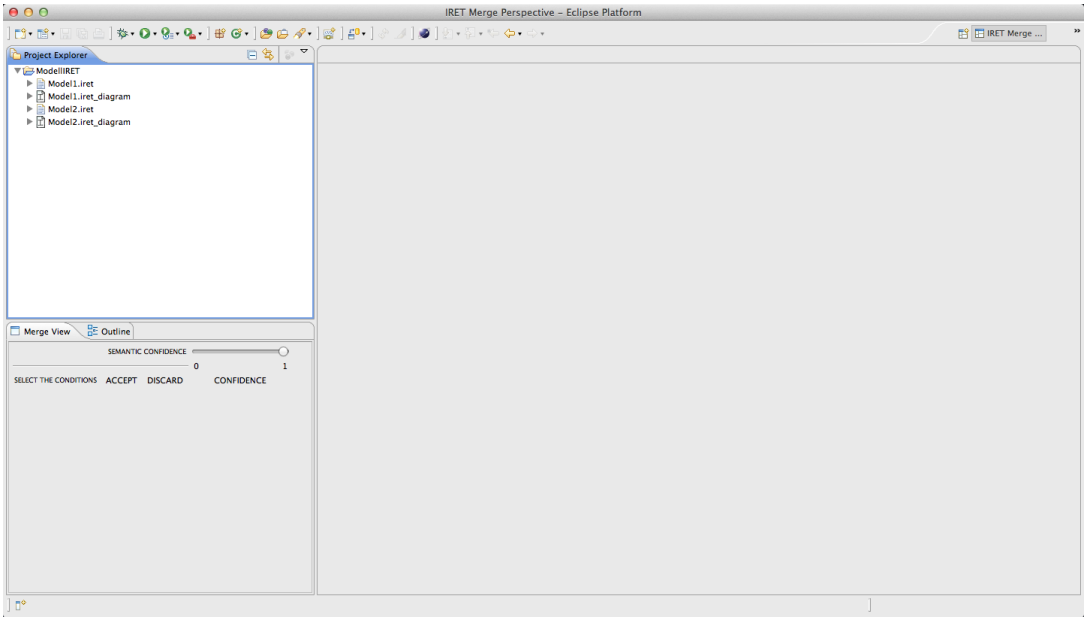


Figure 21 The IRET Merge Perspective

A wizard drives the user trough the process, as shown in the following figure:

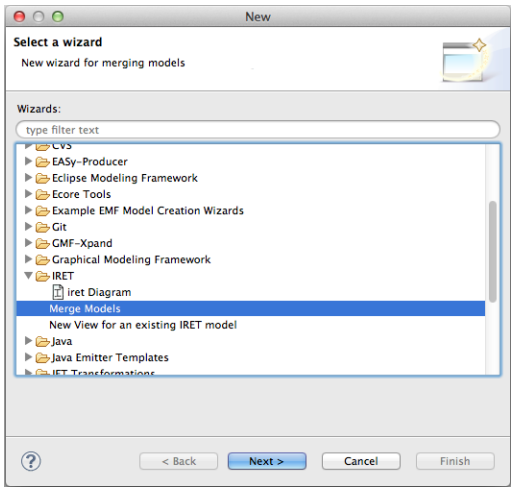


Figure 22 How to access the Merge function

The first steps are to choose the input models to be merged and the name of the resultant output model.

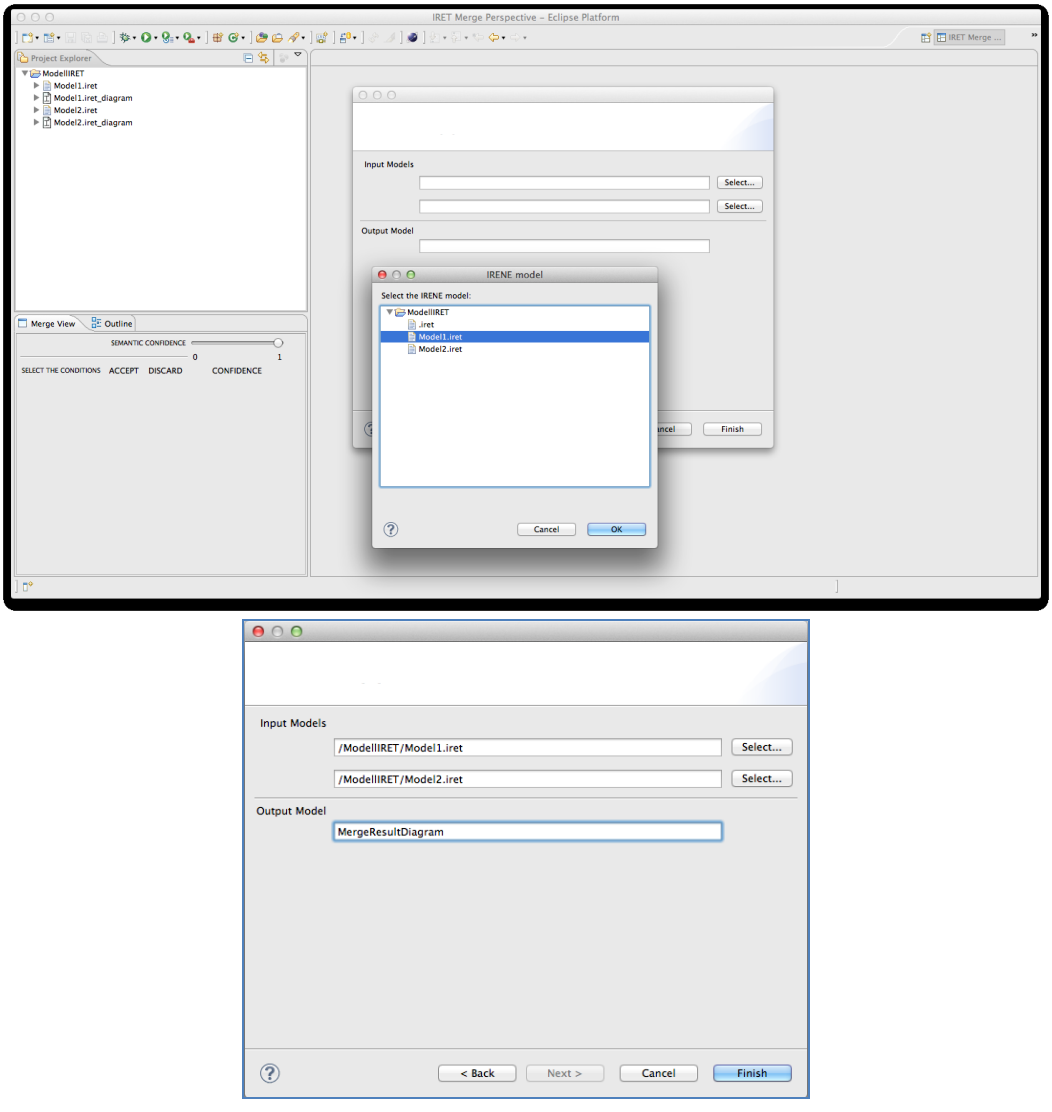


Figure 23 Where to choose the models to merge and name the output model

By pressing the Finish button a process starts to analyze the nodes of the two models looking for similarities. This process is basically based on the comparison of two properties: the Name and the Priority.
The results appear on the Merge View panel. The user can decide to accept or discard each of the conditions the comparison process has found. Discarding an equality condition on a couple of nodes means to force the algorithm to consider them different, despite the comparison process has identified them as equal ones.
There's also a Sematic Confidence scale regulator the user can play with. By setting the regulator nearest 1 means to apply a strict semantic confidence, so that only nodes that strictly matche the comparison algorithm are considered equals. The less you move to 0, the less the confidence is applied, so paradoxically a confidence set to 0 means not to perform any comparison and considering any node belonging to the first input model different from any other ones of the second model, despite any equal property they could have in common.

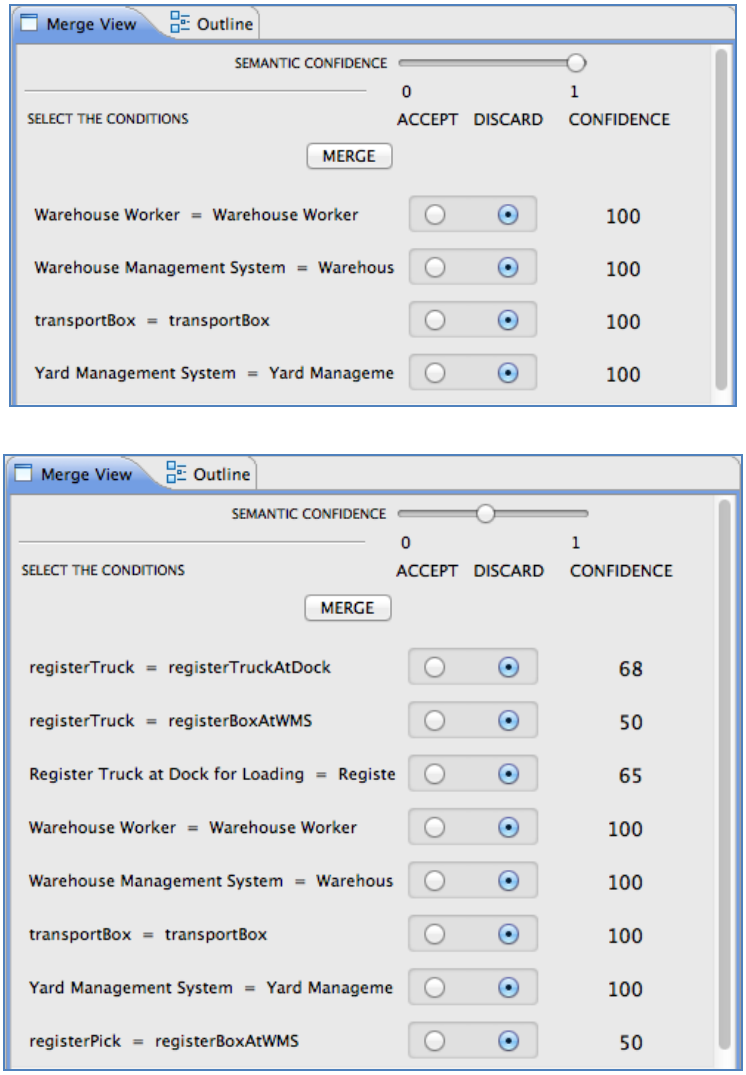


Figure 24 Acting on the Semantic Confidence lever

When you decide which nodes must be merged because you consider them as the same one check the ACCEPT option for them. The node of the primary diagram will be highlighted:

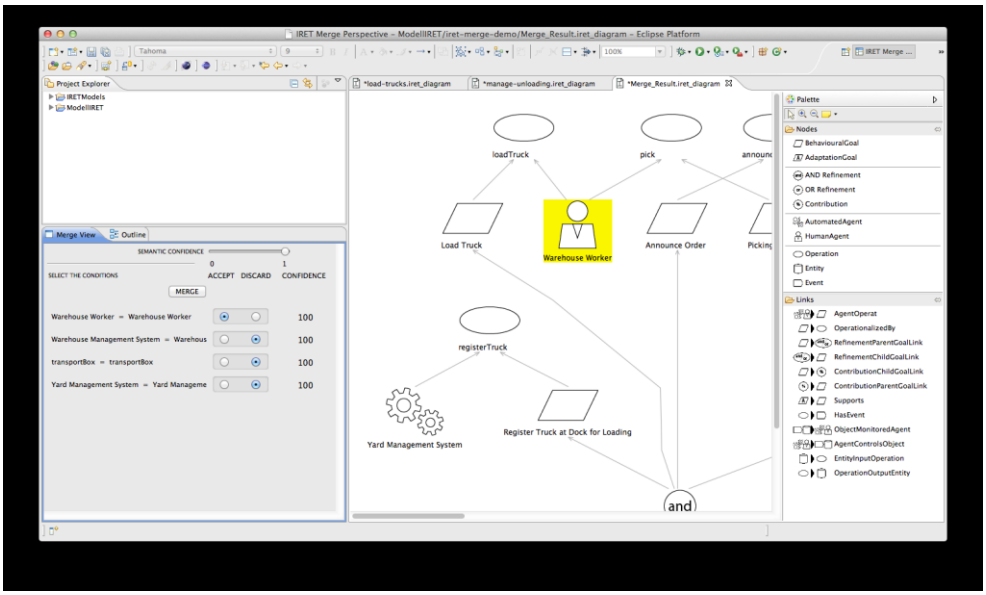
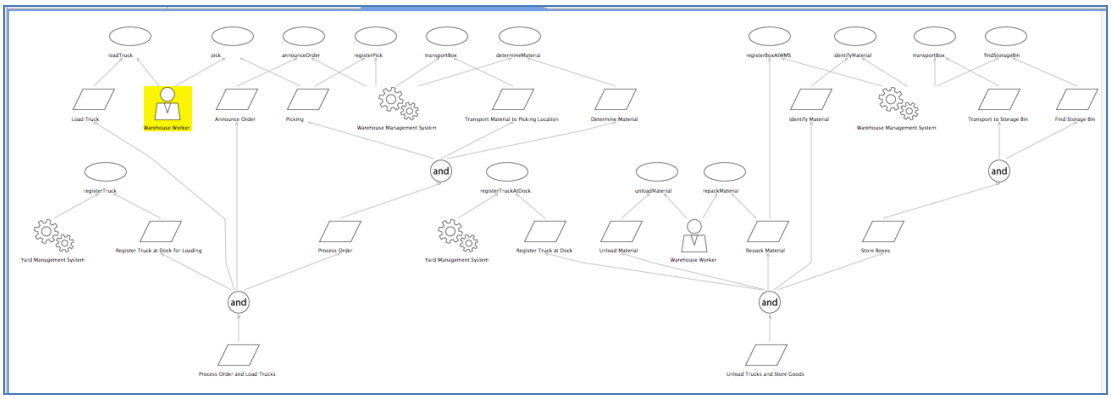


Figure 25 The element(s) to be merged is(are) highlighted on the primary model

Finally by pressing the MERGE button you will see all the elements of the two diagrams moving on the editor frame in order to reorganize themselves into the final diagram:



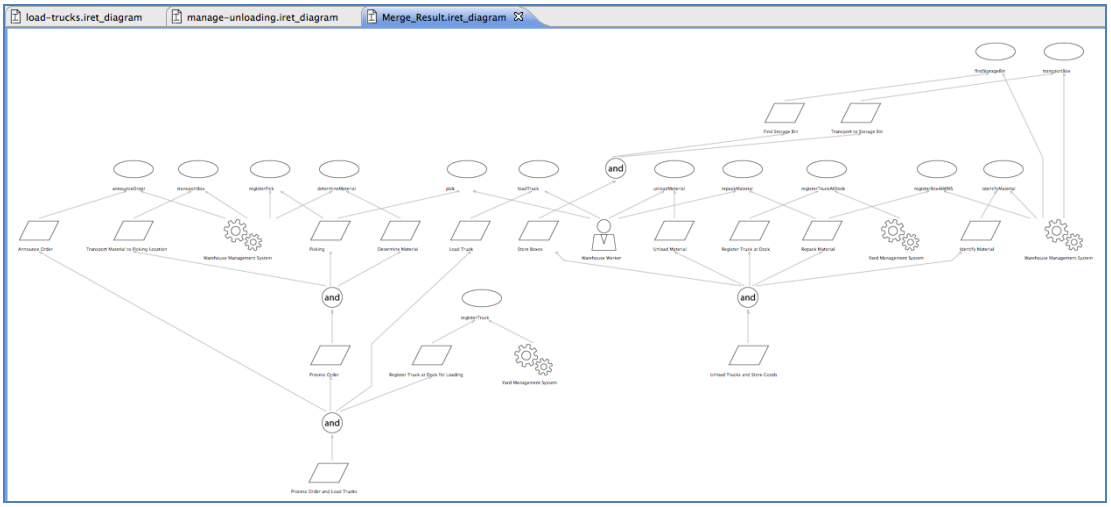


Figure 26 The two diagrams before and after the merge