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Designing for adaptability and evolution in system of systems engineering

Implementation of the Goal and Contract Specification Language

D_6.4.2

Deliverable Information			
Nature	R	Dissemination Level	PU
Project	DANSE	Contract Number	INFISO-ICT-287716
Deliverable ID	D_6.4.2	Date	06.11.2013
Status	Final	Version	1.0
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CHANGE HISTORY

Version	Date	Reason for Change	Pages Affected
1.0	06.11.2013	Document creation	All

CONTENT

1	INTRODUCTION.....	5
1.1	INSTALLATION / PRE-REQUISITES.....	5
1.2	INSTALLATION NOTES.....	5
1.3	HOW TO OBTAIN A LICENSE.....	5
2	USING THE TOOL.....	6
2.1	CREATE A CONTRACT IN RHAPSODY.....	6
2.2	CREATE A CONTRACT IN THE GCSL EDITOR.....	8
2.3	EDITING A CONTRACT.....	9
3	WHAT IS NEW IN D6.4.2.....	12
3.1	GOAL SPECIFICATION.....	12
3.2	DYNAMICITY CONTRACTS.....	12

Content of Figures

Figure 1-1: License Check Tool.....	5
Figure 2-1: UPDM 2.0 and DANSE Profile.....	6
Figure 2-2: Add a Constraint to View.....	7
Figure 2-3: Rhapsody Constraint.....	7
Figure 2-4: Rhapsody Server and GCSL Editor.....	8
Figure 2-5: Create a Contract with the GCSL Editor.....	8
Figure 2-6: Select an existing Contract.....	9
Figure 2-7: Edit a Contract.....	10
Figure 2-8: Link Contract to model element.....	11
Figure 3-1: Contract Dialog.....	13
Figure 3-2: Dynamicity Contract Dialog.....	13

1 Introduction

The GCSL Editor allows the user to create and modify/refine GCSL statements in Rhapsody UPDM models. The Editor interacts with Rhapsody via an OSLC interface.

This document is an update of the previous D6.4.1 report and it is used as part of the tool documentation. Therefore only the section 3 differs from the previous report.

1.1 Installation / Pre-requisites

The following programs are required to run the tools contained in the installer bundle:

1. **Java JRE:** <http://www.oracle.com/technetwork/java/javase/downloads/index.html>
2. **IBM Rational Rhapsody 8.0**
3. **DANSE Profile for Rhapsody**

1.2 Installation Notes

Launch the installer bundle to perform the installation. If there is a previous installation, it is strongly recommended to run the uninstaller when prompted. If any of the prerequisites are missing, a message box should indicate so. The default installation options are recommended.

1.3 How to obtain a License

The tools in this bundle use a personalized license mechanism. The tools are not useable without a license. To obtain a license, please send a request with the following information to: danse-support@danse-ip.eu.

The installed tool will check the license on each start and if the license is not found or is not valid the window as in Figure 1-1 opens including the required information for the license request.

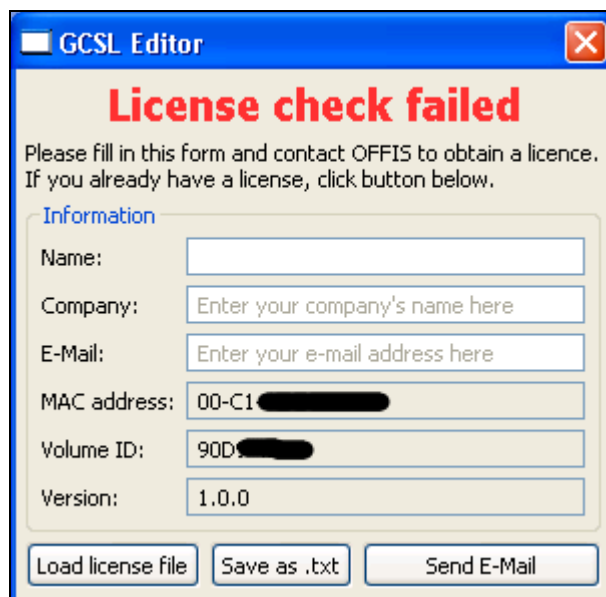


Figure 1-1: License Check Tool

2 Using the Tool

2.1 Create a Contract in Rhapsody

1. Open a UPDM 2.0 Rhapsody model
2. Add the DANSE Profile for Rhapsody to the model (see Figure 2-1)
3. Open a diagram view (e.g. a SV-1 System Interface Description) and add a Constraint (Drawing ToolBar - Common) to the view (see Figure 2-2)
4. Open the Feature Dialog of the new Constraint and add the GCSL stereotype
5. Open the Tags tab in the Feature Dialog and edit the contract/goal (see Figure 2-3)

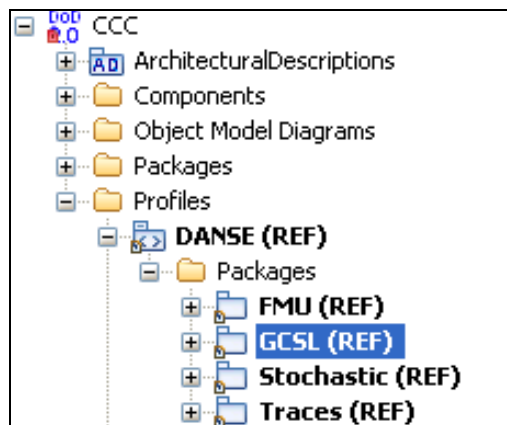


Figure 2-1: UPDM 2.0 and DANSE Profile

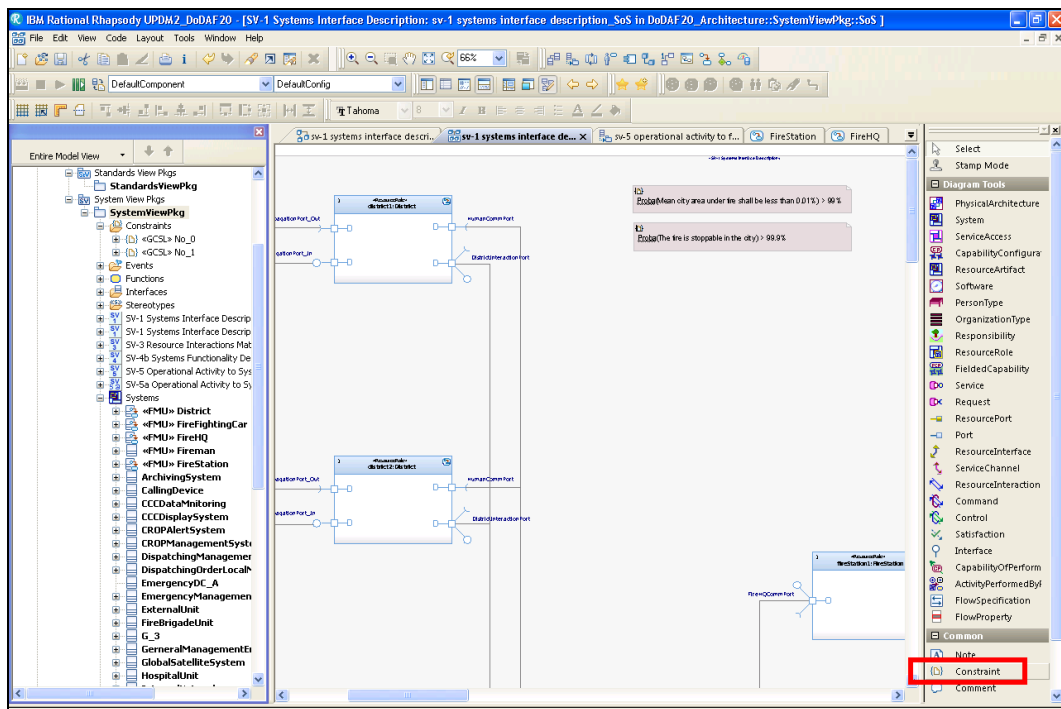


Figure 2-2: Add a Constraint to View

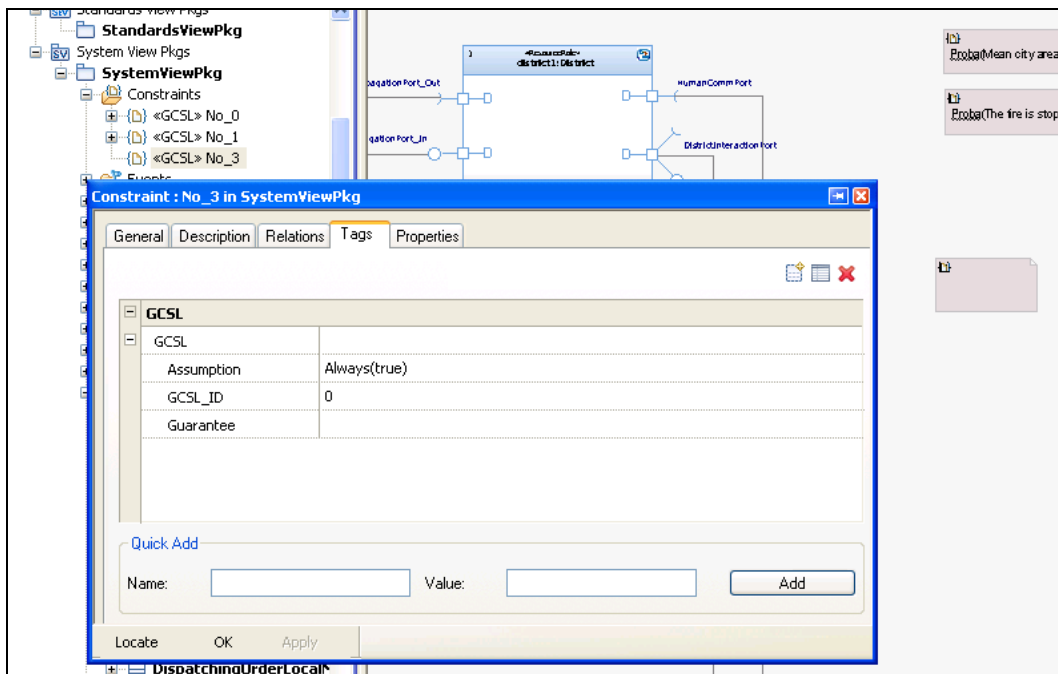


Figure 2-3: Rhapsody Constraint

2.2 Create a Contract in the GCSL Editor

1. Open a UPDM 2.0 Rhapsody model
2. Add the DANSE Profile for Rhapsody to the model (see Figure 2-1)
3. Start the OFFIS OSLC Server for Rhapsody and the GCSL Editor (Figure 2-4)
4. Via “New Contract” a new Contract/Goal is created in (the currently open project of the “first” instance of) Rhapsody (see Figure 2-5)



Figure 2-4: Rhapsody Server and GCSL Editor

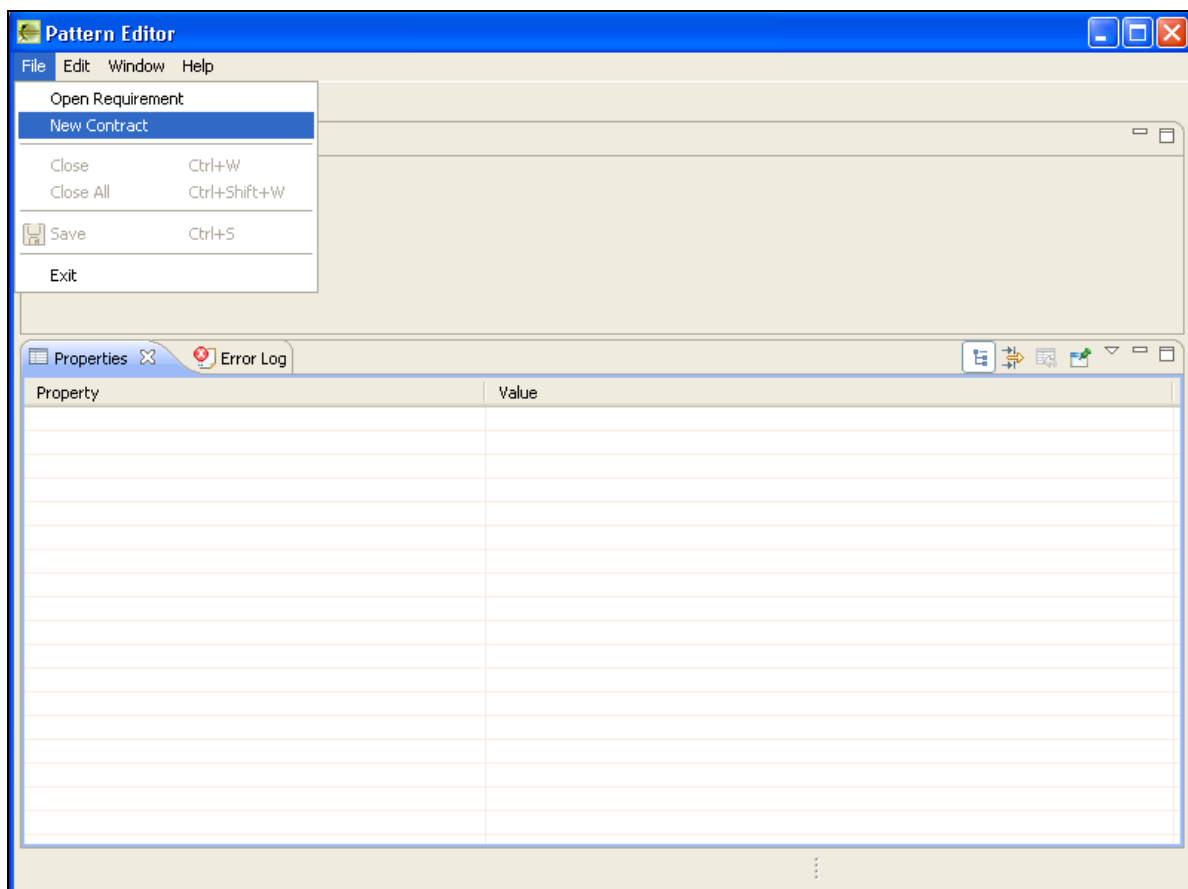


Figure 2-5: Create a Contract with the GCSL Editor

2.3 Editing a Contract

To edit the contract one can do it directly in Rhapsody or use the GCSL Editor. The benefit of using the GCSL Editor is that the list of GCSL pattern and a syntax check is integrated which is not available in Rhapsody. In order to edit an existing contract in the Editor open the UPDM model which contains the contracts you want to edit and start the click on “Open Requirement” in the Editor. A tree view of the model opens where a contract can be selected (see Figure 2-6).

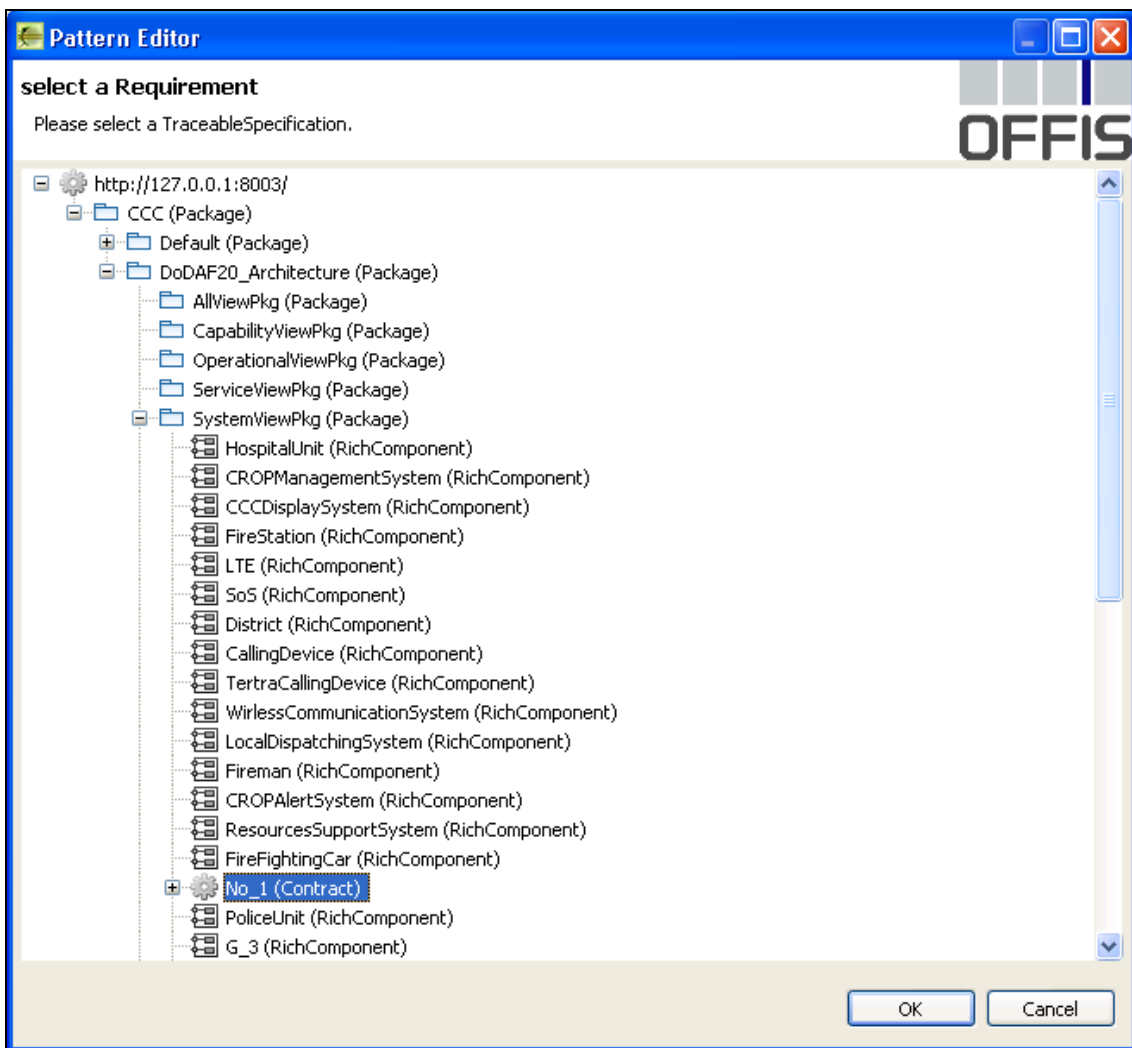


Figure 2-6: Select an existing Contract

In Figure 2-7 the Assumption of the Contract “No_1” is selected. In the Properties view the used “always condition” pattern is displayed. Note that with opening the dropdown menu the list of GCSL pattern is displayed and the user can select one of these. Below the “Pattern” section a “Description” and the entry for

Version	Status	Date	Page
1.0	Final	30.04.2013	9 of 13

the “condition” is shown. The “Pattern Properties” section depends on the selected “Pattern” and the user must only “fill the holes” of the pattern with the specific content. This content is automatically checked for correctness of the syntax.

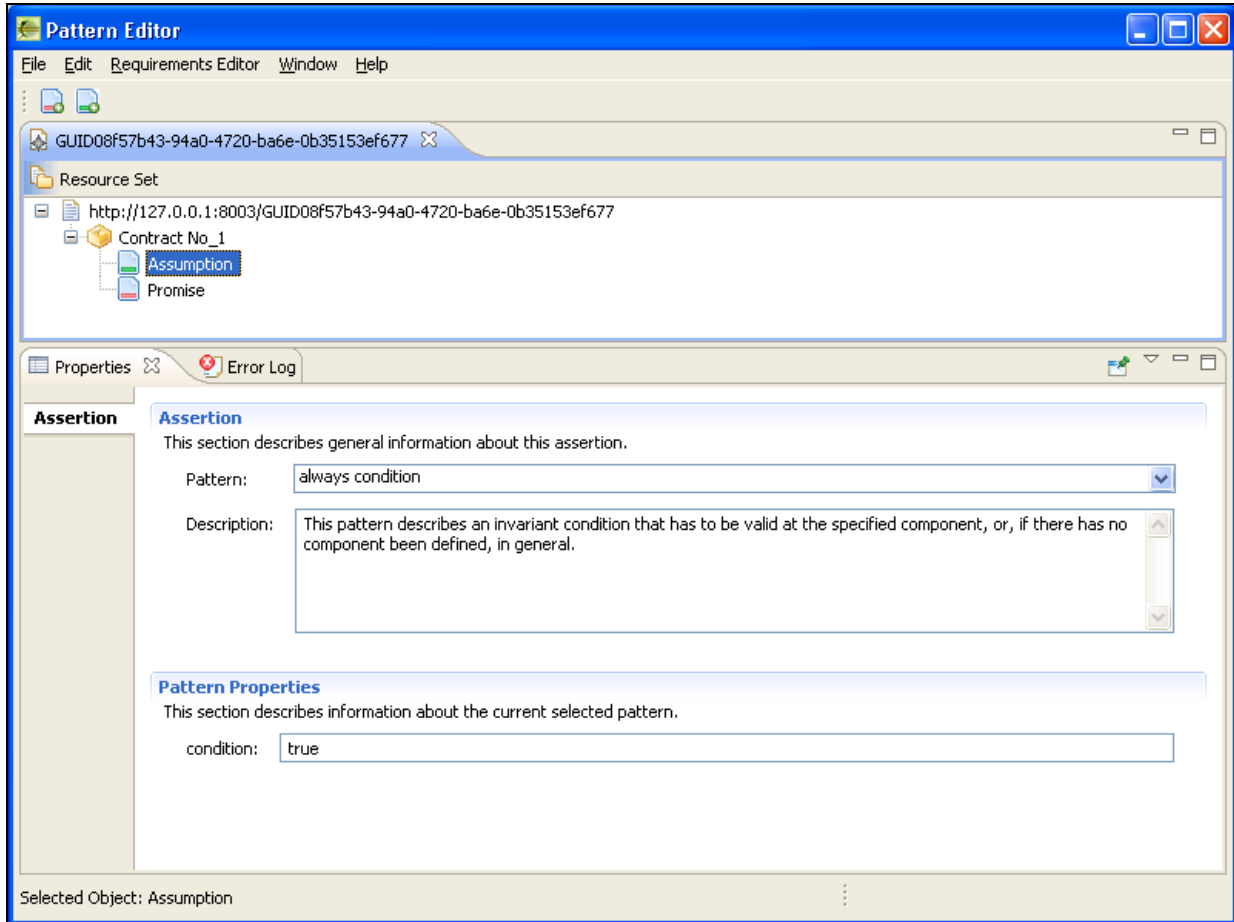


Figure 2-7: Edit a Contract

Any changes of the contract are stored in the Rhapsody model if the user “saves” them.

To distinguish between global and local contracts the user have to select a “Anchored Element” in the Feature Dialog within Rhapsody (see Figure 2-8). The anchored element is the component which shall satisfy the Contract.

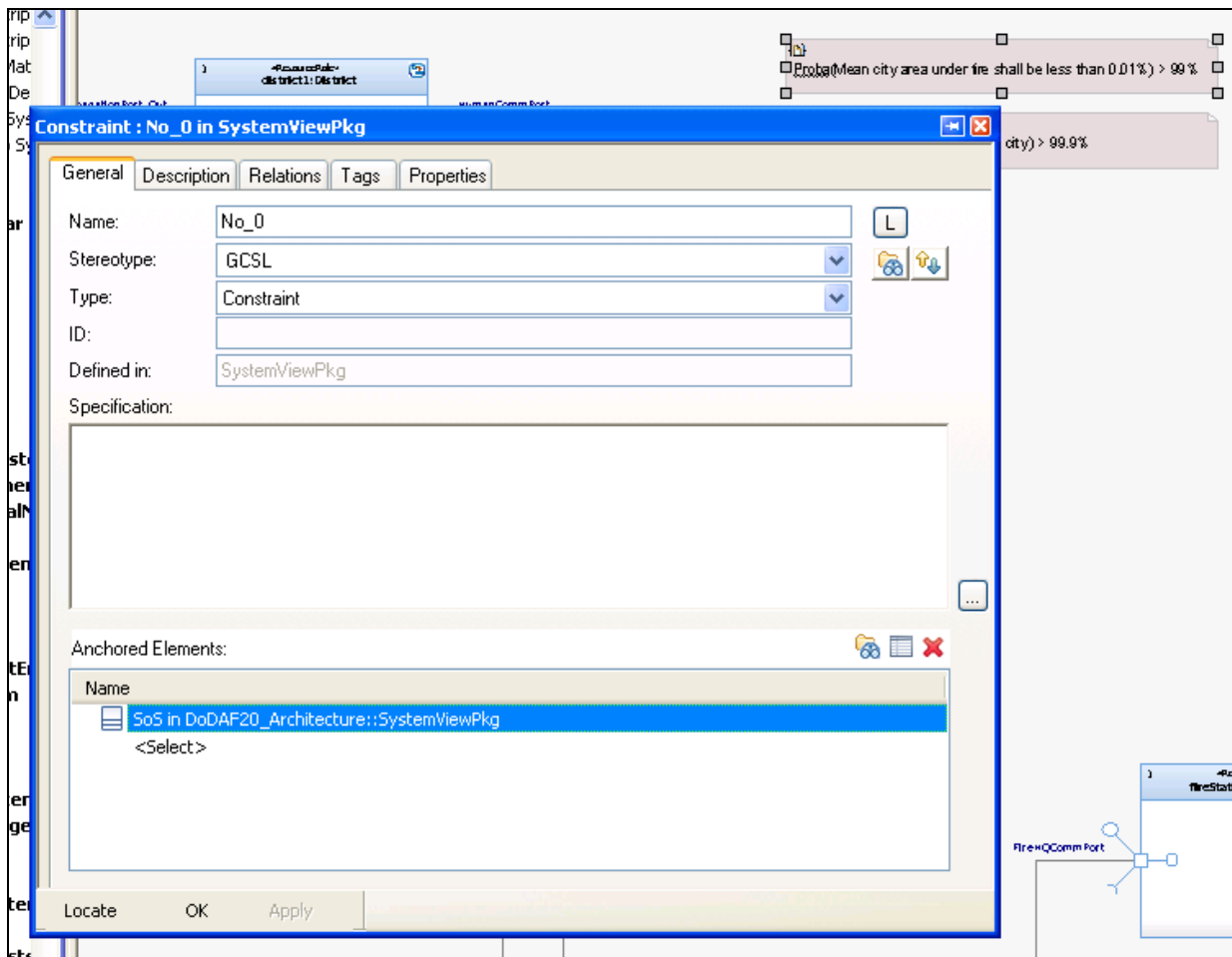


Figure 2-8: Link Contract to model element

3 What is new in D6.4.2

This section includes the changes of the updated version of the GCSL Editor. The usage description of the previous sections is still valid and the new features of the extended GCSL specification are added in the following.

3.1 Goal Specification

The language extension as described in section 4 of the D6.3.2 “GCSL Specification” document is supported by a text field in the editor that supports checking the syntax of the definition of metrics that refer to attribute, classes and objects in the model. These references are full qualified names of the elements and thereby clearly defined.

3.2 Dynamicity Contracts

The new class of contracts – the dynamicity contracts – are supported by an additional layout of the contract dialog which supports not only the common features but also the reference to an architectural characterization as defined in D6.3.2 section 3.6 “Syntax of a GCSL Contract”. In Figure 2-1 the initial Contract Dialog is illustrated which contained the “Type” and “Scope” dropdown menus which have been removed because of redundancy. The new Dynamicity Contract Dialog (see Figure 3-2) contains in addition the ability to specify an architectural characterization in OCL which is checked for correctness of the syntax.

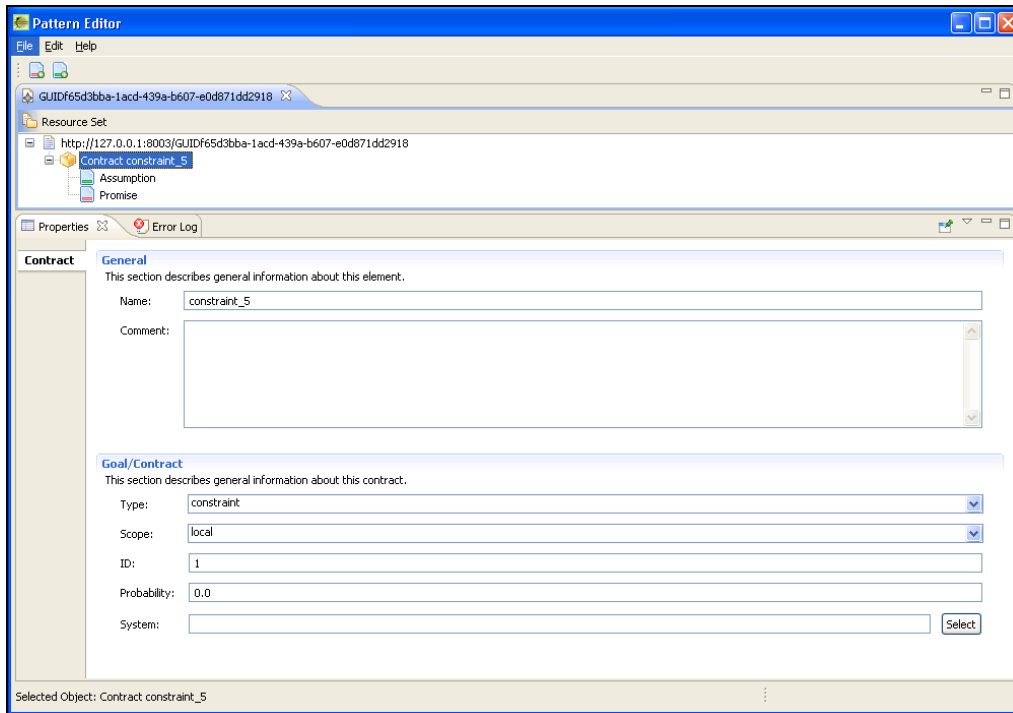


Figure 3-1: Contract Dialog

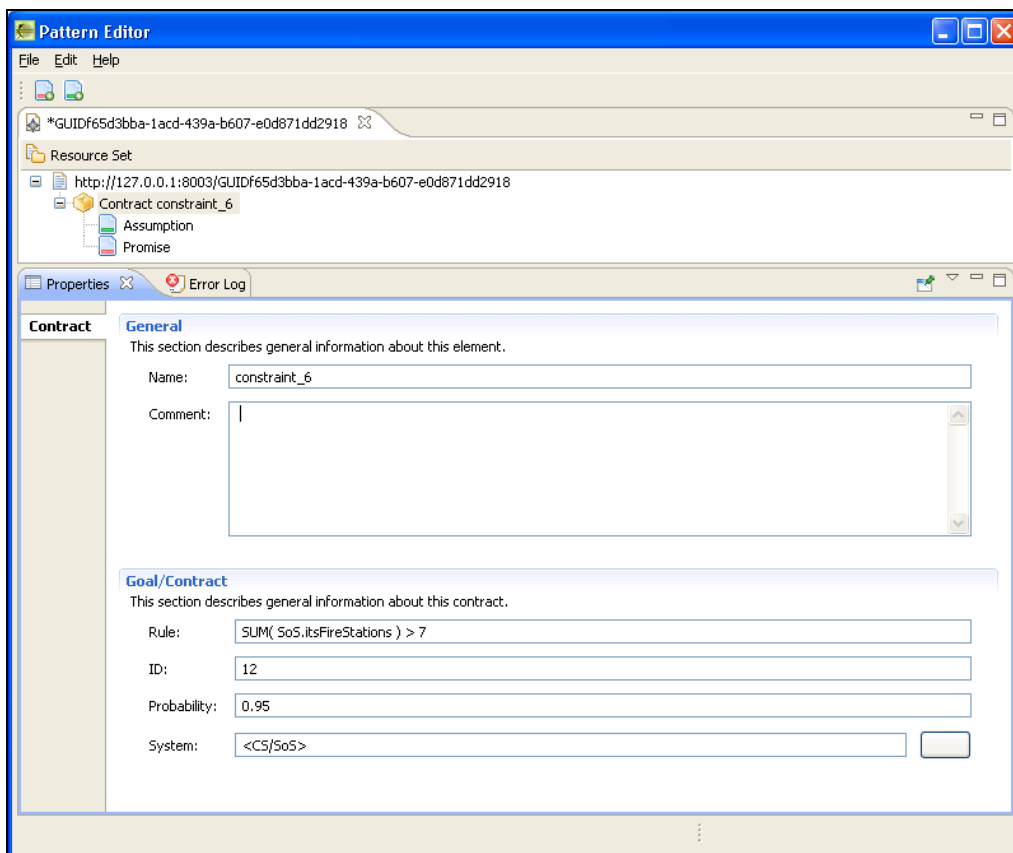


Figure 3-2: Dynamicity Contract Dialog