

## **IBM® Rational® Rhapsody® Gateway Add On**



### **Excel Coupling Notes**



***Rhapsody<sup>®</sup>***

**IBM<sup>®</sup> Rational<sup>®</sup> Rhapsody<sup>®</sup>  
Gateway Add On**

**Excel Coupling Notes**



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# Contents

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<b>Contents.....</b>	<b>5</b>
<b>Introduction .....</b>	<b>7</b>
<b>Excel Analysis .....</b>	<b>9</b>
Excel Versions Supported .....	9
Selecting the Excel File.....	9
Specific Parameters of an Excel Based Type.....	10
Adding a Cover .....	10
<b>Requirements Traceability .....</b>	<b>11</b>
Traceability Information in Excel .....	11
Describing Excel Type.....	11
Describing ExcelXML Type .....	11
Intermediate Files .....	12
Intermediate Txt File.....	13
Intermediate XML File .....	14
Customized Type Definition .....	16
New Type Creation .....	16
Defining your Own Type of Analysis .....	16



# Introduction

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This technical note describes how to capture the traceability information of requirements from Microsoft Excel using Rhapsody Gateway.

Some standard operations such as navigating in an Excel file from the Rhapsody Gateway tool, require the Excel tool to be installed. In addition, Excel also needs to be installed in order to generate a report in Excel format.

Refer to the *Customization Guide* and run the Coupling example for more information about what is described in this technical note.



# Excel Analysis

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This chapter describes how Rhapsody Gateway captures information items from Excel and how these information items are analyzed to be used as requirements, or references to higher level requirements.

This chapter covers the following topics:



- ◆ Getting information items from Excel.
- ◆ Configuring Rhapsody Gateway according to the traceability information in Excel.






## Excel Versions Supported

Rhapsody Gateway supports Excel 97, 2000, 2002, 2003 & 2007 versions.

## Selecting the Excel File

To insert an Excel file, follow these steps:

1. In the Project editor, click on the **Add a document**  button to insert a new document into the Traceability Description Area.
2. Select a **Type of Analysis** based on Excel, two types are available Excel and ExcelXML.
3. Click on the **File or Directory** field then on the **Browse**  button to select an Excel file (with the `xls` or `xlsx` extension) from the Rhapsody Gateway selection window.

 Details  Modification Files  Covers				
	Name	Type of Analysis	File or Directory	Ignor... Int
	Requirements	 Excel	Requirements.xls	<input type="checkbox"/>

## Specific Parameters of an Excel Based Type

When you select a type of analysis defined to capture information from Excel (either a default type or a customized one), you have the opportunity to define additional parameters:

- ◆ **Worksheet**—This option filters the analysis of specific worksheets.
- ◆ **With Rich Text**—This option gives you the possibility to get the rich text properties of a captured text (text color, bold, italic, underlined and strikethrough). The text is displayed formatted in the Text area. This piece of information can also be used in the report generation.
- ◆ **With text zones**—This option gives you the possibility to get the text typed in autoshapes.

ExcelXML types do not require any specific parameter definition.

## Analyzing Specific Spreadsheets

If you want to get a more focused intermediate file and limit the conversion of a dedicated document to specific spreadsheets for a dedicated document, you can specify its name or their names in the **Value** field of the document definition.

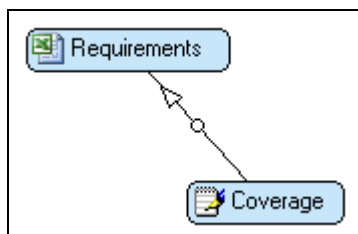
Details   Modification Files   Covers							
Name	Type of Analysis	File or Directory	Ignor...	Inter...	Bloc...	Variable	Value
Requirements	Excel	Requirements.xls	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Worksheet	Feuil1,Req.*

Spreadsheets names need to be split by commas.

## Adding a Cover

To define traceability, add a cover between the covering document and the covered document.

The Rhapsody Gateway project looks like the following:



Now the traceability analysis of the project can be performed.

# Requirements Traceability

---

There are many ways to enter traceability information in Excel.

## Traceability Information in Excel

Two kinds of Excel Type are available.

### Describing Excel Type

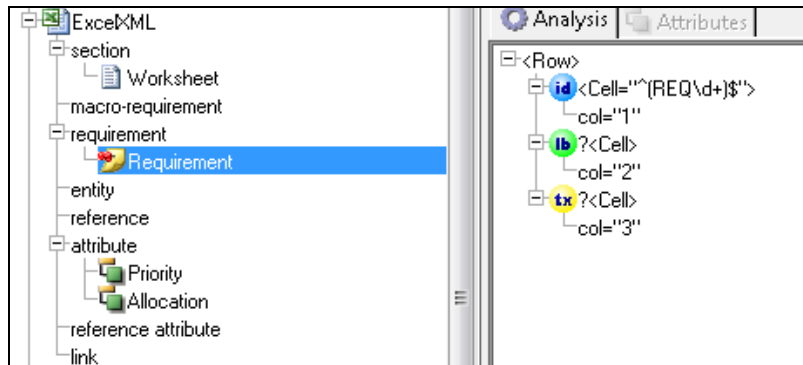
Default configuration of the Excel type of analysis considers:

- ◆ Requirements are written using the syntax:
  - `REQxx` in the first column of the worksheet. `REQxx` is the requirement ID, `xx` being digits.
  - `<requirement name>` in the second column. This requirement name is the “title” of your requirement, written using natural language.
  - Requirement Text in the 3rd column.
- ◆ References:
  - Syntax is `[Covers: <requirements>]`: Use the string `[Covers:...]`, `<requirements>` are your requirement ID(s). If you list several requirement IDs, insert `,` or `;` between them. For example, use `[Covers: REQ1]` or `[Covers: REQ1,REQ2,REQ3]`.
  - If you want to create your references in an Excel document already managed by Rhapsody Gateway as covering your higher level document containing requirements, select a requirement in this document, right-click the requirement and select `Copy For > Coverage` in the contextual menu.
  - This coverage information can be inserted in any of the Excel columns.

### Describing ExcelXML Type

The ExcelXML type is easier pattern definition and lower the risk of erroneous extraction than the Excel type.

Default configuration of the ExcelXML type of analysis is as follows.



## Intermediate Files

An intermediate file is usually deleted at the end of the conversion process. However, you can keep this intermediate file available, for helpful training or customization purpose, by activating this option in the Project Editor.

Details   Modification Files   Covers					
	Name	Type of Analysis	File or Directory	Ignore...	Intermediate file
	Requirements	Excel	Requirements.xls	<input type="checkbox"/>	<input checked="" type="checkbox"/>

## Intermediate Txt File

If you choose Excel type for the conversion, Rhapsody Gateway creates an intermediate file called <document\_name>.txt, containing the information extracted from Excel.

You can consider the Excel file Requirements.xls used in the Coupling Excel example to analyse how the converter works.

## Basics

Consider for instance the following Excel document extract:

ReqID	Label	Definition
REQ1	Capture	The tool shall be able to capture semi-automatically the requirements included in a document and/or in a model. "Semi-automatic" means the text has to be formalized beforehand by
REQ2	Update information when source changes	The tool shall take into account the successive versions of the documents and models, and update automatically the traceability
REQ3	Multiple requirements definition	The tool shall be able to consider several requirements definitions created by the user. For example, if Safety requirements, Functional requirements and Performance requirements are defined using different syntaxes and formats, these formats can
REQ4	Traceability Reports	The tool shall generate traceability reports including all or part of the traceability information, using these user-defined templates.
REQ5	Navigation to the Authoring tool	The tool shall allow navigation from the information displayed in the main window and the authoring tool from which the

The following intermediate file is then created in the **intermediate** sub-directory of the project directory.

```
Worksheet :      Requirements
|1
|1      |2      |3 The default Excel type of analysis considers :      |
|1      |2      |3 - A requirement unique ID in the first column, with t      |
|1      |2      |3 - A requirement label in the second column, |4
|1      |2      |3 - A requirement text in column 3      |4
|1      |2      |3 - A 'Priority' attribute in column 4      |4
|1      |2      |3 - An 'Allocation' attribute in column 5      |4
|1 ReqID |2 Label      |3 Definition      |4 Priority      |5 Alloca
|1 REQ1  |2 Capture   |3 The tool shall be able to capture semi-automat
|1 REQ2  |2 Update information when source changes      |3 The tool shall
|1 REQ3  |2 Multiple requirements definition      |3 The tool shall be able
|1 REQ4  |2 Traceability Reports |3 The tool shall generate traceability r
|1 REQ5  |2 Navigation to the Authoring tool      |3 The tool shall allow n
End_of_Conversion
```

More generally, for tables, the intermediate file contains:

```
Worksheet : <worksheet name>
|<column number> Your text |<column number> Your text...
|<column number> Your text |<column number> Your text...
...
Worksheet : <worksheet name>
|<column number> Your text |<column number> Your text...
...
End_of_Conversion
```

### Warning:

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If a date predating 01/01/1970 is displayed in an Excel cell, it will not be printed in the intermediate file.

### AutoShapes

If some autoshapes are placed in sheets, if the **With text zones** is selected, the autoshape texts are all stored in the intermediate file at the end of the **Worksheet** which contains these autoshapes. For a **Worksheet** the intermediate file is as follows:

```
Worksheet : <worksheet name>
...
BeginTextZone_<Excel_textzone_id>:
<Text of the autoshape>
EndTextZone_<Excel_textzone_id>
BeginTextZone_<Excel_textzone2_id>:
<Text of the autoshape2>
EndTextZone_<Excel_textzone_id>
Worksheet : <worksheet name>
...
```

### Intermediate XML File

If you choose ExcelXML type for the conversion, Rhapsody Gateway creates an intermediate XML file called <document>.xml, containing the description of all the Excel objects, along with their properties.

#### XML Tag

A **tag** is a generic name for an <element>. An opening **tag** looks like <element>, while a closing **tag** has a slash that is placed before the element's name: </element>.

From now, the term **tag** will refer to the opening of an element.

#### XML Attribute

**Attributes** are used to specify additional information about the element. An **attribute** for an element appears within the opening **tag**. The syntax for including an **attribute** in an element is:

```
<tag attributeName="value">
```

#### Application to the XML file built by the converter

The converter communicates with Excel and builds an XML file with the obtained information.

## Note

As the Excel terms are similar to XML terms, the analysis of the XML file can be confusing.

The file structure is always the same for all Excel configurations.

```
<?xml version="1.0" encoding="ISO-8859-1" ?>
<!-- Generator: x2txt -->
- <Workbook>
- <Worksheet name="Requirements">
- <Row num="18">
  <Cell col="1" label="A">ReqID</Cell>
  <Cell col="2" label="B">Label</Cell>
  <Cell col="3" label="C">Definition</Cell>
  <Cell col="4" label="D">Priority</Cell>
  <Cell col="5" label="E">Allocation</Cell>
</Row>
- <Row num="19">
  <Cell col="1" label="A">REQ1</Cell>
  <Cell col="2" label="B">Capture</Cell>
  <Cell col="3" label="C">The tool shall be able to capture semi-automatically the requirements. The word "automatic" means the text has to be formalized beforehand by the user or another person.
  <Cell col="4" label="D">High</Cell>
  <Cell col="5" label="E">John Doe</Cell>
</Row>
```

## Note

`worksheet` is an XML Tag (worksheet is the name of the XML tag and the Excel term), `name="..."` is an XML attribute.

The description of the tags used in the XML file are developed below.

The worksheet is introduced by the following tag:

```
<worksheet name="TableName">
```

For each row of the worksheet, all attributes are listed using the same syntax:

```
<row num="RowNumber">
```

For each cell of a row, all attributes are listed using the same syntax:

```
<cell col="ColumnID" label="LabelName"><![CDATA[1]]></cell>
```

`![CDATA[1]]` corresponds to the first element of the first column.

Rhapsody Gateway creates an intermediate file which contains all the worksheets.

## Customized Type Definition

### New Type Creation

As Excel manages objects and texts, and Rhapsody Gateway expects requirements, it is necessary to indicate how properties can be captured as requirements or references to higher level requirements. This capture can be performed due to the definition of Types of Analysis.

Types of analysis also contain definitions of Attributes, Text, etc.

This work can be performed by Application Engineers or the Support team, but also by advanced users thanks to this *Coupling Note* and the *Customization Guide*.

Select **File > Edit Types** to launch the **Type Editor** and select an Excel based type in the office folder.

Duplicate this type in order to create your own: right click the Excel type in the Type Editor and select **Duplicate**.

### Defining your Own Type of Analysis

Refer to the *Customization Guide* to learn more about this customization.