

SAP® PowerDesigner®  
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# Requirements Modeling

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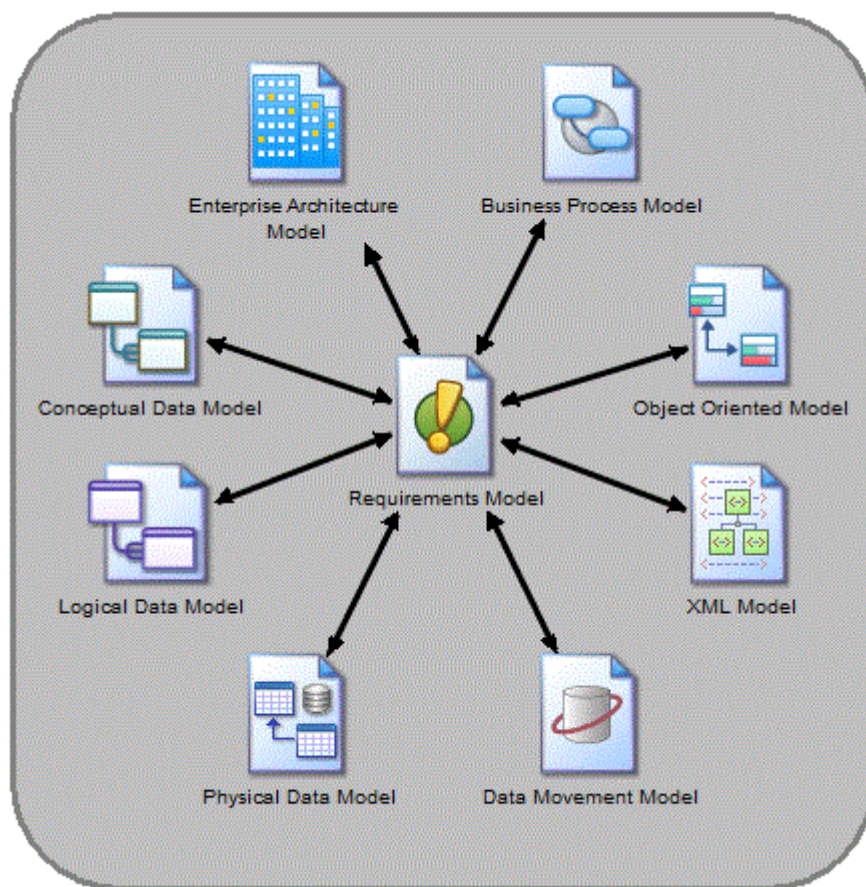
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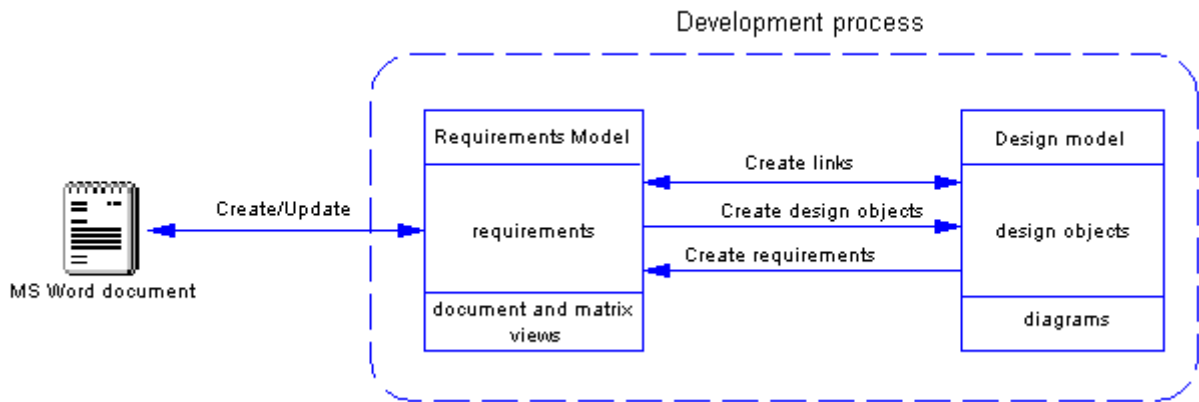


# 1 Getting Started with Requirements Modeling

A *requirements model (RQM)* helps you analyze any kind of written requirements and link them with users and groups who will implement them and with design objects in other models. You can use an RQM to represent any structured document (e.g. functional specification, test plan, business goals, etc.) and import and export hierarchies of requirements as MS Word documents.



You can create an SAP® PowerDesigner® RQM by importing an MS Word document, and keep the model and document synchronized along with all the design models and objects:



The following example shows a Requirement Model containing various views and an attached Word document, which specifies the requirements of the CyberFridge project:

The screenshot shows a software interface with a workspace tree on the left and a table of requirements on the right.

**Workspace Tree:**

- CyberFridge \*
  - Main view
  - Scenario / Requirement
  - Scenario / Use case
  - Requirements
    - 1. Project Description of Target System
    - 2. Scenario Descriptions
    - 3. Functional Requirements
    - 4. Non-Functional Requirements
    - 5. Development and Target Platforms
    - 6. Risk Analysis
  - Files
    - cyberFridge.rtf

**Table of Requirements:**

|   | Title ID   | Full Description   | Priority |
|---|------------|--|----------|
| 1 | <b>1.</b>  | <b>Project Description of Target System</b><br>The CyberFridge project is to use Internet connectivity, vision and mechanical systems to create an intelligent and productive refrigerator. Many of our daily tasks revolve around the | 1        |
| 2 | <b>2.</b>  | <b>Scenario Descriptions</b>   | 1        |
| 3 | <b>2.1</b> | <b>Scenario 1</b><br>Ann has had a horrible day. On the way to work  | 1        |

Special thanks to Dr Gregory Abowd and his team, Jeffrey Corn (Manager), Travis Works (Architect), John Garrard (Programmer), Kesniel Acton (Technical Writer), and Dinesh Krishna (Quality Assurance), who designed the CyberFridge project – Copyright 2004, Georgia Tech Research Corporation, Atlanta, Georgia 30332-0415, All Rights Reserved

#### **i Note**

Demo requirements models are available in the Examples directory.

## **Suggested Bibliography**

- INCOSE (International Council on Systems Engineering) – <http://www.incose.org>

## 1.1 Creating an RQM

You create a new requirements model by selecting ► *File* ► *New Model* ►.

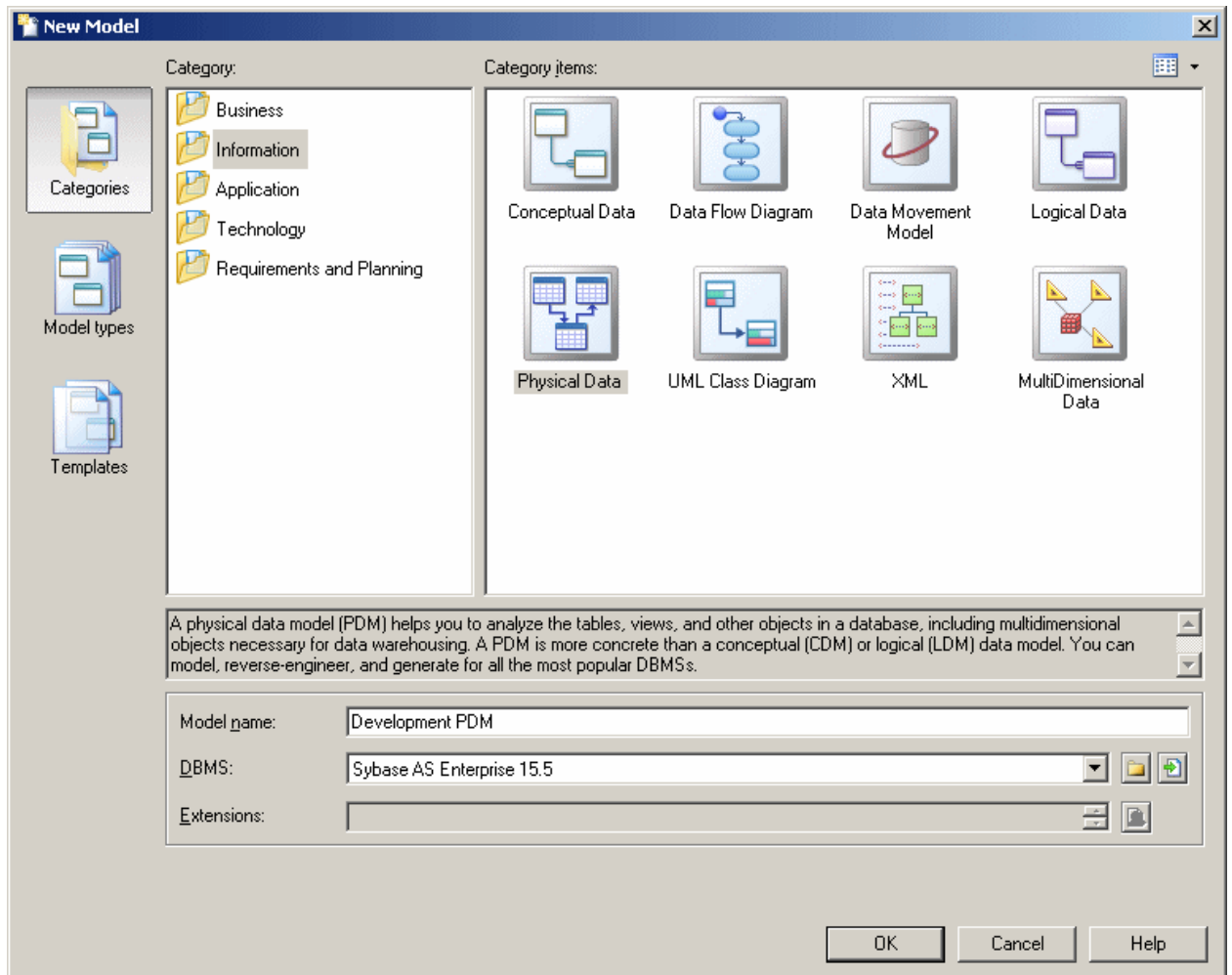
### Context

#### **i** Note

In addition to creating an RQM from scratch with the following procedure, you can also create a model by importing an existing MS Word document (see [Working with Word Documents and RQMs \[page 48\]](#)).

The New Model dialog is highly configurable, and your administrator may hide options that are not relevant for your work or provide templates or predefined models to guide you through model creation. When you open the dialog, one or more of the following buttons will be available on the left hand side:

- *Categories* - which provides a set of predefined models and diagrams sorted in a configurable category structure.
- *Model types* - which provides the classic list of PowerDesigner model types and diagrams.
- *Template files* - which provides a set of model templates sorted by model type.



## Procedure

1. Select **File > New Model** to open the New Model dialog.
2. Click a button, and then select a category or model type ( *Requirements Model* ) in the left-hand pane.
3. Select an item in the right-hand pane. Depending on how your New Model dialog is configured, these items may be first diagrams or templates on which to base the creation of your model.  
Use the *Views* tool on the upper right hand side of the dialog to control the display of the items.
4. Enter a model name. The code of the model, which is used for script or code generation, is derived from this name using the model naming conventions.
5. [optional] Click the *Select Extensions* button and attach one or more extensions to your model.
6. Click **OK** to create and open the requirements model .

### Note

Sample RQMs are available in the Example Directory.

## 1.1.1 RQM Properties

You open the model property sheet by right-clicking the model in the Browser and selecting [Properties](#).

Each requirements model has the following model properties:

Table 1:

| Property          | Description   |
|-------------------|---|
| Name/Code/Comment | Identify the model. The name should clearly convey the model's purpose to non-technical users, while the code, which is used for generating code or scripts, may be abbreviated, and should not normally include spaces. You can optionally add a comment to provide more detailed information about the model. By default the code is auto-generated from the name by applying the naming conventions specified in the model options. To decouple name-code synchronization, click to release the = button to the right of the <a href="#">Code</a> field. |
| Filename          | Specifies the location of the model file. This box is empty if the model has never been saved.  |
| Author            | Specifies the author of the model. If you enter nothing, the Author field in diagram title boxes displays the user name from the model property sheet Version Info tab. If you enter a space, the Author field displays nothing.  |
| Version           | Specifies the version of the model. You can use this box to display the repository version or a user defined version of the model. This parameter is defined in the display preferences of the Title node.  |
| Default view      | Specifies the view displayed by default when you open the model.  |
| Keywords          | Provide a way of loosely grouping objects through tagging. To enter multiple keywords, separate them with commas.   |

The following tabs are also available:

- [Detail](#) - Provides fields to record workloads assigned to four individuals or groups. Model workloads are read-only fields calculated as the sums of all requirement workloads.
- [Requirement Traceability Links](#) - Lists links to design objects and external files.



## 1.2 Customizing your Modeling Environment

The PowerDesigner requirements model provides various means for customizing and controlling your modeling environment.

### 1.2.1 Setting Model Options

You can set RQM model options by selecting ► [Tools](#) ► [Model Options](#) ► or right-clicking the diagram background and selecting [Model Options](#).

You can set the following options on the Model Settings page:

Table 2:

| Option                       | Description  |
|------------------------------|--|
| Name/Code case sensitive     | Specifies that the names and codes for all objects are case sensitive, allowing you to have two objects with identical names or codes but different cases in the same model. If you change case sensitivity during the design process, we recommend that you check your model to verify that your model does not contain any duplicate objects.  |
| External Shortcut Properties | <div><p>Specifies the properties that are stored for external shortcuts to objects in other models for display in property sheets and on symbols. By default, <a href="#">All</a> properties appear, but you can select to display only <a href="#">Name/Code</a> to reduce the size of your model.</p><div><p><b>i Note</b></p><p>This option only controls properties of external shortcuts to models of the same type (PDM to PDM, EAM to EAM, etc). External shortcuts to objects in other types of model can show only the basic shortcut properties.</p></div></div> |

For information about controlling the naming conventions of your models, see *Core Features Guide > Modeling with PowerDesigner > Objects > Naming Conventions*.

#### 1.2.1.1 Customizing Requirement Codes

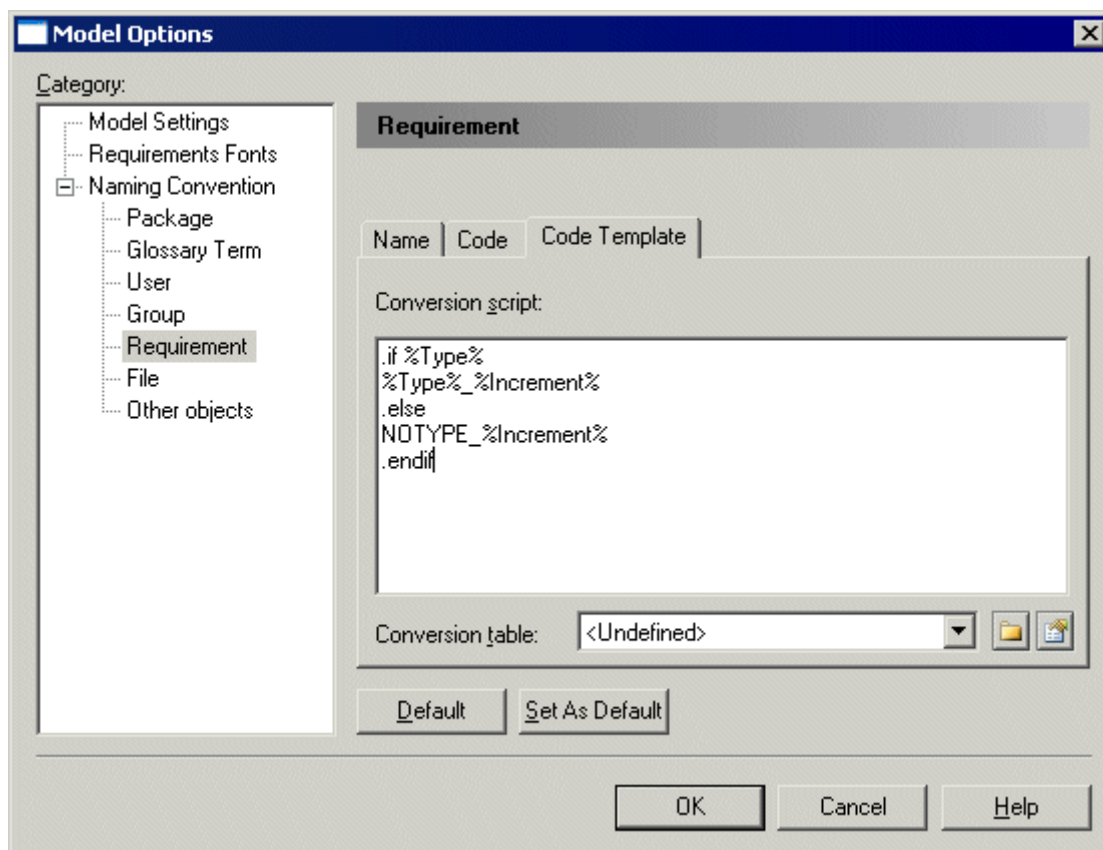
Requirement codes are automatically computed from the other attributes of the requirement. You can customize requirement codes in the [Code Template](#) tab of the [Requirement](#) page of the [Model Options](#) dialog.

#### Procedure

1. Select ► [Tools](#) ► [Model Options](#) ► to open the Model Options dialog, and then select ► [Naming Convention](#) ► [Requirement](#) ► in the [Category](#) tree view.

2. Click the [Code Template](#) tab and enter a GTL script in the [Conversion Script](#) field.

The default script is `REQ_%-4:Increment%` in which the RQM-specific `%increment%` variable ensures code uniqueness. For detailed information about writing GTL scripts, see *Customizing and Extending PowerDesigner > Customizing Generation with GTL*.



3. [optional] Select a conversion table.
4. Click [OK](#) to return to your model.

#### **i** Note

You can modify individual requirement codes directly in the requirement property sheet or the document view. If you modify a code, the [User-Defined](#) button is depressed to indicate that the modified code no longer follows the code template definition. To return to the default code template click the [User-Defined](#) button to release it.

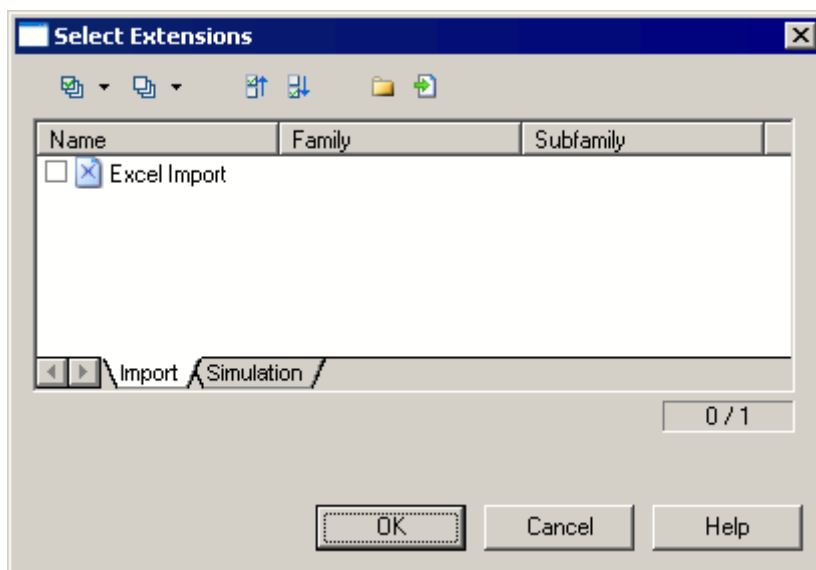
For detailed information about working with naming conventions, including conversion tables, see *Core Features Guide > Modeling with PowerDesigner > Objects > Naming Conventions*.

## 1.2.2 Extending your Modeling Environment

You can customize and extend PowerDesigner metaclasses, parameters, and file generation with extensions, which can be stored as part of your model or in separate extension files (\*.xem) for reuse with other models.

To access extensions defined in a \*.xem file, simply attach the file to your model. You can do this when creating a new model by clicking the [Select Extensions](#) button at the bottom of the New Model dialog, or at any time by selecting **Model > Extensions** to open the List of Extensions and clicking the [Attach an Extension](#) tool.

In each case, you arrive at the Select Extensions dialog, which lists the extensions available, sorted on sub-tabs appropriate to the type of model you are working with:



To quickly add a property or collection to an object from its property sheet, click the menu button in the bottom-left corner (or press F11) and select [New Attribute](#) or [New List of Associated Objects](#). For more information, see *Core Features Guide > Modeling with PowerDesigner > Objects > Extending Objects*.

To create a new extension file and define extensions in the Resource Editor, select **Model > Extensions**, click [Add a Row](#), and then click [Properties](#). For detailed information about working with extensions, see *Customizing and Extending PowerDesigner > Extension Files*.

## 1.2.3 Traceability Links

Traceability links provide a flexible means for creating a connection between any object in any type of model and any other object in the same model or any other model of any type. Traceability links have no formal semantic meaning, but can be followed when performing an impact analysis or otherwise navigating through the model structure.

To create a traceability link between objects in the same diagram, select the [Link/Traceability Link](#) tool in the Toolbox. Click inside the symbol of the object that is dependent and, while continuing to hold down the mouse button, drag the cursor and release it on the symbol of the object on which it depends.

In the following example, the **Work** entity is shown as being dependent on **School** through a traceability link:



To create a traceability link to any object in any model that is open in the Workspace, open the property sheet of the dependent object, click its *Traceability Links* tab, and click the *Add Objects* tool. Use the *Model* list to select a different model, select the object to point to and click *OK* to create the link and return to the dependent object's *Traceability Links* tab.

You can optionally specify a type for any traceability link in the *Link Type* column.

Click the *Types and Grouping* tool to perform various actions on this tab:

- To make a link type available for selection in the *Link Type* column, click the *Types and Grouping* tool and select *New Link Type*. Enter a *Name* for the link type and, optionally, a *Comment* to explain its purpose, and then click *OK*.

#### **i** Note

Traceability link types created in this way are stored as stereotypes in an extension file embedded in the model. To work directly with this file click the *Types and Grouping* tool and select *Manage Extensions*. For detailed information about working with these files, see *Customizing and Extending PowerDesigner > Extension Files*.

- To control the display and grouping of links, click the *Types and Grouping* tool and select:
  - *No Grouping* - to display all the links in a single list.
  - *Group by Object Type* - to display links to different types of objects on separate sub-tabs. To add a link to a new object type, click the plus sign on the leftmost sub-tab.
  - *Group by Link Type* - to display different link types on separate sub-tabs. To add a new link type, click the plus sign on the leftmost sub-tab.

#### **i** Note

To see all of the objects that point to an object via traceability links, open its property sheet, click its *Dependencies* tab, and click the *Incoming Traceability Links* sub-tab.

## 2 Requirements Views

A requirements model contains a set of requirements and other objects, which can be displayed and manipulated in any number of requirements views.

You can create the following kinds of objects in an RQM:




Table 3:

| Object        | Description  |
|---------------|--|
| Requirement   | A feature that must be provided by the development process, which should be defined as precisely as possible, and can be assigned to a user or group for implementation (see <a href="#">Requirements (RQM) [page 23]</a> ).     |
| User          | A person that is involved in the implementation of one or more requirements (see <a href="#">Users and Groups (RQM) [page 39]</a> ).   |
| Group         | A group of users that is involved in the implementation of one or more requirements (see <a href="#">Users and Groups (RQM) [page 39]</a> ).   |
| Glossary term | [deprecated] A word used in a requirements model, which should be defined as precisely as possible to avoid misunderstandings and to set a common vocabulary (see <a href="#">Glossary Terms (RQM - Deprecated) [page 41]</a> ). |
| Business rule | Written statements describing rules that your business must follow (see <a href="#">Business Rules (RQM) [page 42]</a> ).  |

You can create requirement views to organize your requirements and other objects from the Browser or the toolbar:

- In the requirements view toolbar, select one of the following tools:

Table 4:

| Tool  | Description   |
|---|---|
|  | <a href="#">Create a Requirements Document View</a> - To list requirements in a hierarchy (see <a href="#">Requirements Document Views [page 14]</a> ).   |
|  | <a href="#">Create a Traceability Matrix View</a> - To display the links between requirements and design objects (from other types of models), external files or other requirements (see <a href="#">Traceability Matrix Views [page 20]</a> ). |
|  | <a href="#">Create a User Allocation Matrix View</a> - To display the links between requirements and the users and groups who will fulfill them (see <a href="#">User Allocation Matrix Views [page 22]</a> ).                                  |

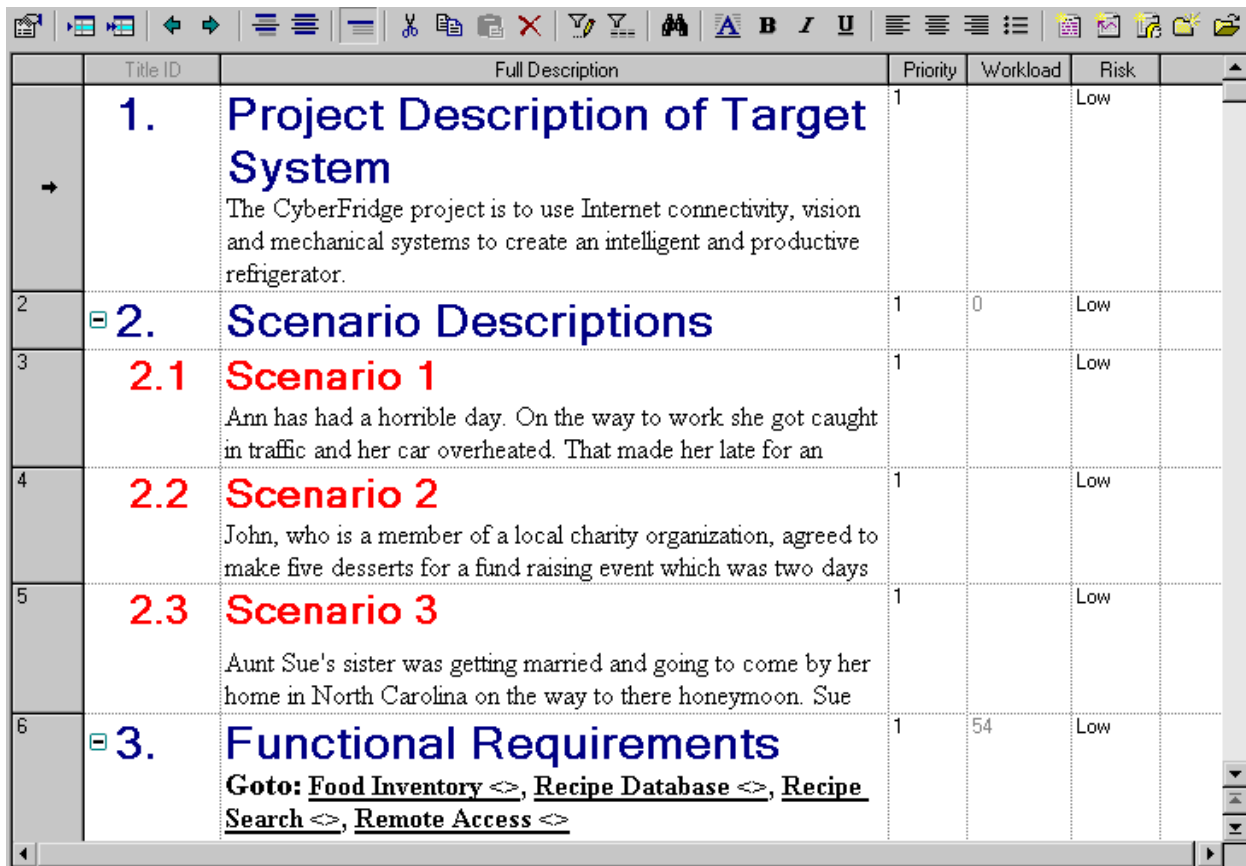
- Right-click the model in the Browser and select **► New ► [Type] View ►**.



You can navigate between requirements views in the Browser or by selecting **View > Diagram > Select View** to open the Select View dialog box, and double-clicking the view to open.

## 2.1 Requirements Document Views

A *requirements document view* displays a list of written requirements in a hierarchic grid. Multiple views can be created with different filters to display various subsets of requirements.


















The screenshot shows a software interface with a toolbar at the top containing various icons for editing and navigation. Below the toolbar is a table with the following structure:





|   | Title ID   | Full Description  | Priority | Workload | Risk |
|---|------------|---|----------|----------|------|
| → | <b>1.</b>  | <b>Project Description of Target System</b><br>The CyberFridge project is to use Internet connectivity, vision and mechanical systems to create an intelligent and productive refrigerator. | 1        |          | Low  |
| 2 | <b>2.</b>  | <b>Scenario Descriptions</b>  | 1        | 0        | Low  |
| 3 | <b>2.1</b> | <b>Scenario 1</b><br>Ann has had a horrible day. On the way to work she got caught in traffic and her car overheated. That made her late for an   | 1        |          | Low  |
| 4 | <b>2.2</b> | <b>Scenario 2</b><br>John, who is a member of a local charity organization, agreed to make five desserts for a fund raising event which was two days  | 1        |          | Low  |
| 5 | <b>2.3</b> | <b>Scenario 3</b><br>Aunt Sue's sister was getting married and going to come by her home in North Carolina on the way to there honeymoon. Sue   | 1        |          | Low  |
| 6 | <b>3.</b>  | <b>Functional Requirements</b><br><u>Goto: Food Inventory &lt;&gt;, Recipe Database &lt;&gt;, Recipe Search &lt;&gt;, Remote Access &lt;&gt;</u>  | 1        | 54       | Low  |

A requirements model can have as many requirements document views as necessary. You can filter the requirements displayed in views (see [Customizing Columns and Filtering Rows \[page 17\]](#)) or separate your hierarchy of requirements into packages (see [Packages \(RQM\) \[page 37\]](#)), which can have their own views.

The following tools are available on the requirements view toolbar:

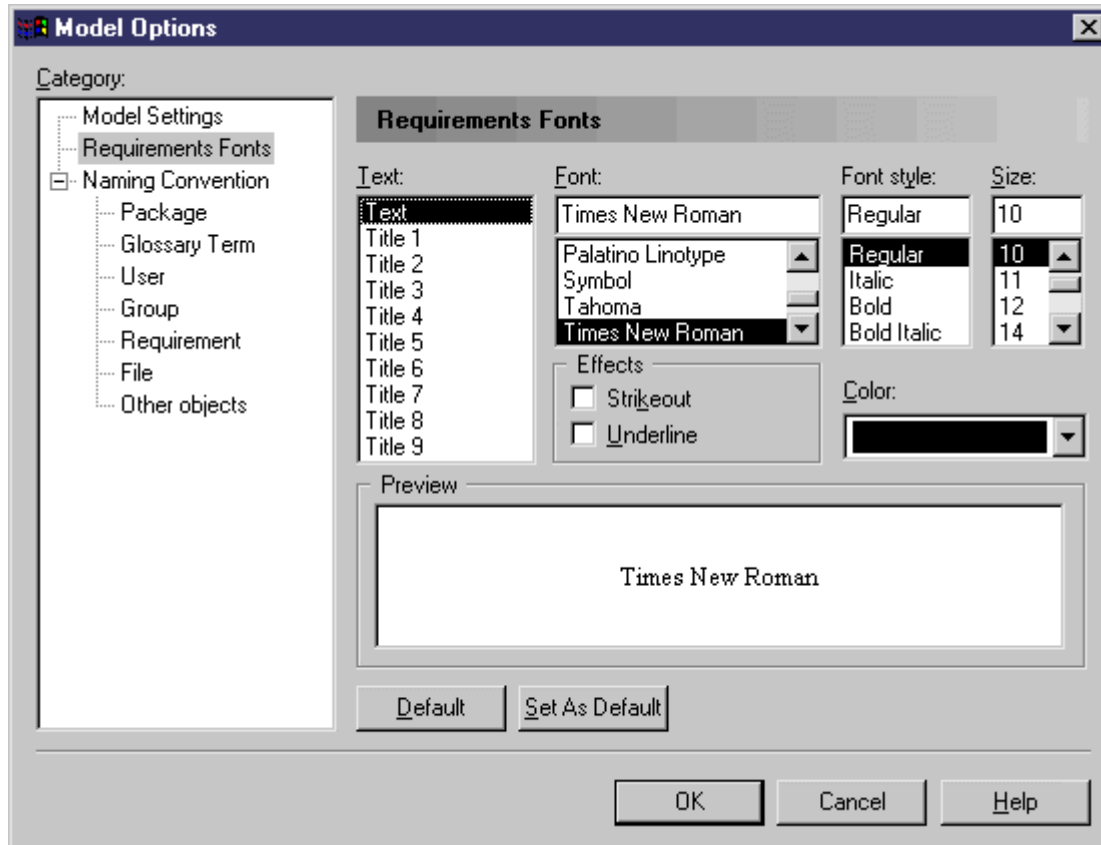
Table 5:

| Tools   | Description   |
|---|---|
|    | <i>Properties [Alt+Enter]</i> - Opens the property sheet of the selected requirement.   |
|    | <i>Insert an Object [Ctrl+I]</i> and <i>Insert a Sub-Object [Ctrl+Shift+I]</i> - Create a new requirement as a sibling, or as a child to the selected requirement.  |
|    | <i>Promote</i> and <i>Demote</i> - Raises or lowers the selected requirement by one level.  |
|    | <i>Show Titles and Texts</i> and <i>Show Titles Only</i> - Shows the titles and descriptions or only the titles of all requirements in the view.<br><br>Also available from ► <i>Requirements</i> ► <i>Show Titles and Texts</i> ► and ► <i>Requirements</i> ► <i>Show Titles Only</i> ►. |
|    | <i>Show Current Title and Text / Show Current Title Only</i> - Toggle between showing the title and description or only the title of the selected requirement.<br><br>Also available from ► <i>Requirements</i> ► <i>Show Current Title and Text / Show Current Title Only</i> ►          |
|  | <i>Expand all Objects</i> and <i>Collapse all Objects</i> – Opens or closes all levels in the requirements hierarchy.<br><br>Also available from ► <i>Requirements</i> ► <i>Expand all Objects</i> ► and ► <i>Requirements</i> ► <i>Collapse all Objects</i> ►                            |
|  | <i>Cut [Ctrl+X]</i> , <i>Copy [Ctrl+C]</i> , and <i>Paste [Ctrl+V]</i> - Perform the standard clipboard actions.  |
|  | <i>Delete [Ctrl+D]</i> - Deletes the selected requirement.  |
|  | <i>Customize Columns and Filter</i> - Opens a dialog to change the columns displayed in the list or define a filter (see <a href="#">Customizing Columns and Filtering Rows [page 17]</a> ).  |
|  | <i>Enable/Disable Filter</i> - Toggles the filter specified in the Customize Columns and Filter dialog.   |
|  | <i>Find [Ctrl+F]</i> - Opens a dialog to search for text.   |
|  | <i>Format [Ctrl+M]</i> - Opens a dialog to specify fonts and styles.  |
|  | <i>Bold</i> , <i>Italic</i> , and <i>Underline</i> - Format the selected text.  |
|  | <i>Align Left</i> , <i>Align Center</i> , and <i>Align Right</i> - Align the selected text.   |
|  | <i>Bullets</i> - Indent and bullet the selected text.   |

| Tools   | Description  |
|---|--|
|  | <a href="#">Create a Requirements Document View</a> , <a href="#">Create a Traceability Matrix View</a> , and <a href="#">Create a User Allocation Matrix View</a> - Creates a new view. |
|  | <a href="#">Create a Package</a> - Creates a package, which you use to subdivide your requirements. You will be prompted to specify a first view in the package.                         |
|  | <a href="#">Open a Requirements View</a> - Opens a dialog to move to another view.   |
|  | <a href="#">Export to Excel</a> - Saves the list to a *.xls, *.xlsx, or *.csv format (specify the format in the <a href="#">Save as type</a> field in the Save as dialog).               |

## 2.1.1 Customizing Title and Description Fonts

To set model options for requirements fonts, select **Tools > Model Options**, and select the [Requirements Fonts](#) sub-category in the left-hand Category pane.



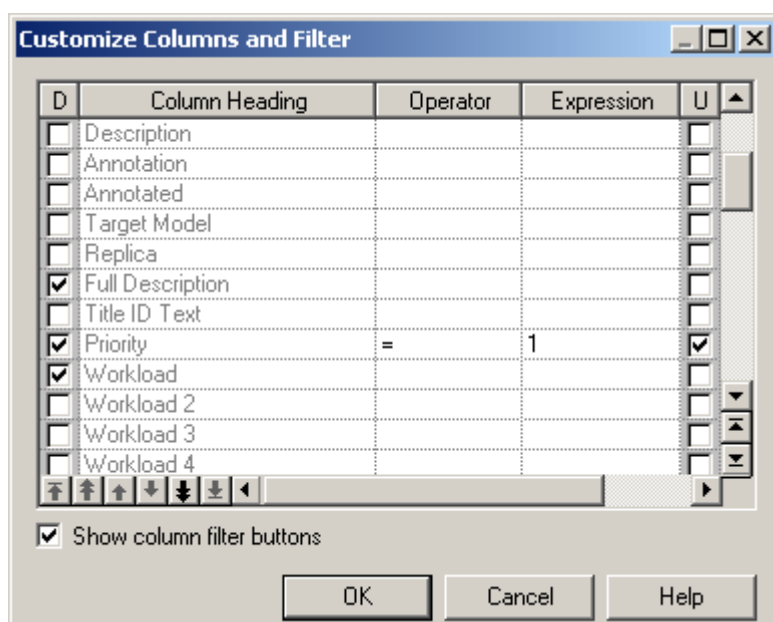
You can specify the font and its characteristics for any of the requirement levels by selecting the level in the [Text](#) box and the necessary requirements in the other fields.

## 2.1.2 Customizing Columns and Filtering Rows

You can customize the columns displayed and use criteria to filter the rows in a requirements document view.

### Procedure

1. Click the [Customize Columns and Filter](#) tool:



2. To specify columns to display, select or clear check boxes in the [Displayed \(D\)](#) column.
3. To reorder the display of columns, use the arrow buttons at the bottom-left corner of the list.
4. To filter the rows displayed, enter an expression in the expression column (see [Defining a Filter Expression](#) [page 17]).
5. Click **OK** to return to the view with the changes applied.

### 2.1.2.1 Defining a Filter Expression

You can define expressions to filter PowerDesigner lists directly in the list with the in-column filters or through the [Customize Columns and Filter](#) dialog.

The following operators are available

Table 6:

| Operator    | Finds items that are...  |
|-------------|--|
| =           | [default] Equal to the expression.   |
| >           | Greater than the expression.   |
| >=          | Greater than or equal to the expression.   |
| <           | Less than the expression.  |
| <=          | Less than or equal to the expression.  |
| Not Equal   | Different from the expression.   |
| In List     | Within the comma-separated list of values given in the expression (or the items selected in the list in the in-column filter). For example: "global", "Architecture", "proc"       |
| Not In List | Outside the comma-separated list of values given in the expression (or the items selected in the list in the in-column filter).  |
| Between     | Located in the range between defined by the two values given in the expression and separated by a comma. For example, to find values between A and E, enter: A,E                   |
| Not Between | Located outside the range defined by the two values given in the expression and separated by a comma. For example, to find values outside of the range between A and E, enter: A,E |
| Empty       | Null. No expression is necessary with this operator.   |
| Not Empty   | Not null. No expression is necessary with this operator.   |

You can use the following wildcards when entering a filter expression:

Table 7:

| Wildcard | Description  |
|----------|--|
| *        | Any string (from none to any number of characters). For example P* finds "protocol" and "Paris". |
| ?        | Any character. For example ????? finds "Table" and "inner" but not "Seller".                     |
| \        | Escapes the special characters *, ?, and \. For example, \?\\ finds "?\".                        |



## Examples

The following examples show some possible combinations of operators and expressions:

Table 8:

| Operator | Expression                  | Find   |
|----------|-----------------------------|--|
| =        | <b>W*</b>                   | Work, Washington                             |
| =        | <b>*CODE</b>                | AREA CODE, COUNTRY CODE, CITY CODE           |
| >        | <b>1??</b>                  | 200, 405, 609                                |
| Between  | <b>0, 8</b>                 | 0,1,2,3,4,5,6,7,8                            |
| In List  | <b>*_emp_???, *_grp_???</b> | div_emp_fun, _emp_idn, div_grp_fun, _grp_idn |
| =        | <b>*\?</b>                  | Is this book ready for production?           |

### 2.1.3 Requirements Views Properties

To view or edit a requirement view's properties, double-click its Browser or list entry. The property sheet tabs and fields listed here are those available by default, before any customization of the interface by you or an administrator.

The *General* tab contains the following properties:

Table 9:

| Property                 | Description  |
|--------------------------|--|
| Name/Code/Comment        | Identify the object. The name should clearly convey the object's purpose to non-technical users, while the code, which is used for generating code or scripts, may be abbreviated, and should not normally include spaces. You can optionally add a comment to provide more detailed information about the object. By default the code is generated from the name by applying the naming conventions specified in the model options. To decouple name-code synchronization, click to release the = button to the right of the <i>Code</i> field. |
| Stereotype               | Extends the semantics of the object. You can enter a stereotype directly in this field, or add stereotypes to the list by specifying them in an extension file.  |
| Traceability matrix type | [traceability matrix views only] Use the list to select the type of linked objects (Design Object, File or Requirement) displayed in the traceability matrix view  |
| Parent                   | Name of the model or package to which the requirements view belongs  |
| Default view             | If checked, the current requirements view (document, traceability or user allocation view) is displayed by default when opening the model  |

## 2.2 Traceability Matrix Views

A *traceability matrix view* displays the links between requirements and objects from other types of models, external files or other requirements.

You can create as many traceability matrix views as you need. You can add and delete links, filter the rows and columns displayed, and print or export the matrix.

|                                     | 2.1 Scenario 1 | 2.2 Scenario 2 | 2.3 Scenario 3 |  |
|-------------------------------------|----------------|----------------|----------------|--|
| 3. Functional Requirements          |                |                |                |  |
| 3.1 Food Inventory                  |                |                |                |  |
| 3.1.1 User list                     |                |                |                |  |
| 3.1.2 Item requested from inventory |                | ✓              |                |  |
| 3.1.3 Addition to Inventory         |                |                |                |  |
| 3.1.4 Remove from inventory         |                |                |                |  |
| 3.2 Recipe Database                 |                |                |                |  |
| 3.2.1 Recipe viewer                 |                | ✓              | ✓              |  |
| 3.2.2 Category management           |                |                | ✓              |  |
| 3.2.3 New recipe                    |                |                |                |  |
| 3.2.4 Change recipe                 |                |                |                |  |
| 3.2.5 Download recipe               |                |                |                |  |
| 3.3 Recipe Search                   |                |                |                |  |
| 3.3.1 Possible recipe               |                |                |                |  |
| 3.3.2 Prepare purchase              | ✓              | ✓              | ✓              |  |
| 3.3.3 Frequently used recipes       | ✓              |                |                |  |
| 3.3.4 Suggestion                    |                |                |                |  |
| 3.4 Remote Access                   |                |                |                |  |
| 3.4.1 Internet access               | ✓              |                |                |  |
|                                     |                |                |                |  |
|                                     |                |                |                |  |
|                                     |                |                |                |  |

Current cell properties

☒ Delete traceability link (Spacebar or Del)











Link type: Undefined


The *Current cell properties* group box displays the type of the link and, for MS Word files, the associated bookmark (see [Creating a Bookmark in an MS Word Document \[page 33\]](#)). You can modify the links in the following ways:

- To add a link, click in the appropriate cell, and then click the [Create traceability link](#) button at the bottom of the matrix (or press the [Spacebar](#) or [V](#)). You can optionally specify the type of link. To define additional link types, see [Customizing a List of Values \[page 26\]](#).
- To delete a link, click in a cell containing a link, and then click the [Delete traceability link](#) button at the bottom of the matrix (or press the [Spacebar](#) or [Del](#)).
- To select all the cells in a row or column, click the appropriate header. To select multiple cells, rows, or columns, use the [Ctrl](#) key. To select ranges, use the [Shift](#) key or drag the cursor over the required area.

The following tools are available on the traceability matrix view toolbar:

Table 10:

| Tools   | Description   |
|---|---|
|    | <i>Properties [Alt+Enter]</i> - Opens the property sheet of the selected requirement.   |
|    | <i>Copy [Ctrl+C]</i> - Copies the entire grid to the clipboard.   |
|    | <i>Select Rows/Columns [Ctrl+N]</i> - Opens a selection box which allows you to select rows and columns to display in the matrix either by hand or by defining a filter.  |
|    | <p><i>Display Only Non-Empty Rows/ Columns [Ctrl+R]</i> and <i>Display Only Empty Rows/Columns [Ctrl+E]</i> - Displays only <i>full</i> rows and columns (to focus on requirements with links) or only <i>empty</i> rows and columns (that need to be linked).</p> <p>Also available from ► <i>Requirements</i> ► <i>Display Only Full Rows/Columns</i> ► and ► <i>Requirements</i> ► <i>Display Only Empty Rows/Columns</i> ►.</p> |
|   | <i>Vertical/Horizontal Column Header</i> - Toggles between vertical and horizontal orientation of column headers.   |
|  | <i>Shrink to Fit</i> - Shrinks row and column headers to fit their contents.  |
|  | <i>Create a Requirements Document View</i> , <i>Create a Traceability Matrix View</i> , and <i>Create a User Allocation Matrix View</i> - Creates a new view.   |
|  | <i>Create a Package</i> - Creates a package, which you use to subdivide your requirements. You will be prompted to specify a first view in the package.   |
|  | <i>Open a Requirements View</i> - Opens a dialog to move to another view.   |
|  | <i>Export to Excel</i> - Saves the list to a *.xls, *.xlsx, or *.csv format (specify the format in the <i>Save as type</i> field in the Save as dialog).  |

| Tools   | Description  |
|---|--|
|  | <p><a href="#">Change Traceability Matrix Type</a> - Opens a dialog to let you specify the type of objects you want to link to your requirements. You can choose between:</p> <ul style="list-style-type: none"> <li>• <a href="#">Design objects</a> (from other types of models) – To show how requirements are fulfilled in the analysis and design processes.</li> <li>• <a href="#">External files</a> (MS Word, MS Excel, etc) - The links with MS Word are managed automatically. You can also link requirements with pieces of various documents (e.g. a planning document).</li> <li>• <a href="#">Requirement objects</a> - to manage interconnected requirements. For example, you could link customer requirements to design requirements, and on to specification requirements. The requirement-to-requirement matrix view allows you to check that all requirements are present at each level.</li> </ul> <p>For information about linking requirements to other objects via their property sheet <a href="#">Requirement Traceability Links</a> tab, see <a href="#">Linking Requirements with Design Objects and External Files [page 28]</a>.</p> |

## 2.3 User Allocation Matrix Views

A *user allocation matrix view* displays the links between requirements and the users and groups who will fulfill them.

You can create as many user allocation matrix views as you need. You can add and delete links, filter the rows and columns displayed, and print or export the matrix.

|   | Architect | Programmer A | Programmer B | Technical Writer |  |
|---|-----------|--------------|--------------|------------------|--|
| 1. Project Description of Target System | ✓         |              |              |                  |  |
| 2. Scenario Descriptions                |           |              |              |                  |  |
| 2.1 Scenario 1                          | ✓         |              |              |                  |  |
| 2.2 Scenario 2                          | ✓         |              |              |                  |  |
| 2.3 Scenario 3                          | ✓         |              |              |                  |  |
| 3. Functional Requirements              |           |              |              |                  |  |
| 3.1 Food Inventory                      |           | ✓            |              | ✓                |  |
| 3.1.1 User list                         |           | ✓            |              | ✓                |  |
| 3.1.2 Item requested from inventory     |           | ✓            |              | ✓                |  |
| 3.1.3 Addition to Inventory             |           | ✓            |              | ✓                |  |
| 3.1.4 Remove from inventory             |           | ✓            |              | ✓                |  |
| 3.2 Recipe Database                     |           |              | ✓            | ✓                |  |
| 3.2.1 Recipe viewer                     |           |              | ✓            | ✓                |  |
| 3.2.2 Category management               |           |              | ✓            | ✓                |  |
| 3.2.3 New recipe                        |           |              | ✓            | ✓                |  |
| 3.2.4 Change recipe                     |           |              | ✓            | ✓                |  |
| 3.2.5 Download recipe                   |           |              | ✓            | ✓                |  |
| 3.3 Recipe Search                       |           | ✓            |              | ✓                |  |
| 3.3.1 Possible recipe                   |           | ✓            |              | ✓                |  |
| 3.3.2 Prepare purchase                  |           | ✓            |              | ✓                |  |
| 3.3.3 Frequently used recipes           |           |              | ✓            | ✓                |  |
| 3.3.4 Suggestion                        |           |              | ✓            | ✓                |  |

Current cell properties

☒ Remove User Allocation (Spacebar or Del)

Type:

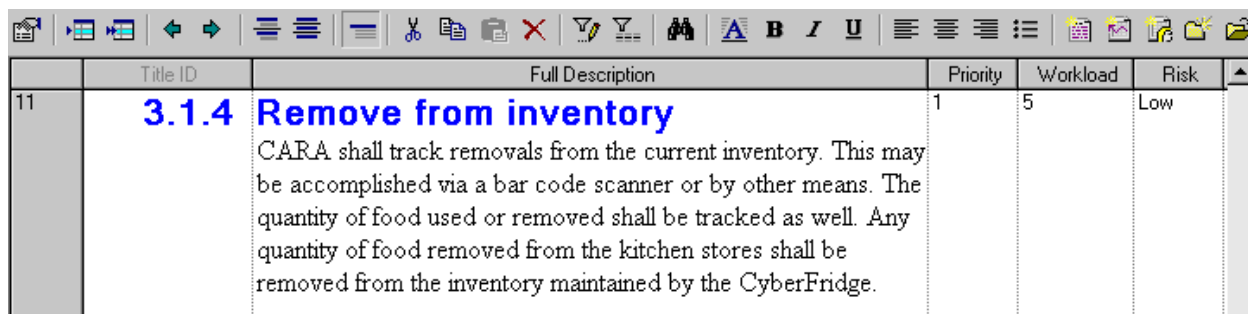
### **i** Note

User allocation matrix views are completed in the same way as traceability matrix views (see [Traceability Matrix Views \[page 20\]](#)).

## 2.4 Requirements (RQM)

A requirement is a clear and precise description of an action that must be implemented during a development process. Requirements can have a priority, status, workload, and other properties assigned to them, and can contain sub-requirements.





|    | Title ID     | Full Description  | Priority | Workload | Risk |
|----|--------------|---|----------|----------|------|
| 11 | <b>3.1.4</b> | <b>Remove from inventory</b><br>CARA shall track removals from the current inventory. This may be accomplished via a bar code scanner or by other means. The quantity of food used or removed shall be tracked as well. Any quantity of food removed from the kitchen stores shall be removed from the inventory maintained by the CyberFridge. | 1        | 5        | Low  |

Note: All columns (except Title ID) are editable.

## 2.4.1 Creating a Requirement

You can create a requirement in a requirements document view or from the Browser or *Model* menu.

- Click in an empty row in a requirements document view.
- Click the *Insert an Object* or *Insert a Sub-Object* tool in the toolbar at the top of a requirements document view.
- Select **Model > Requirements** to access the List of Requirements, and click the *Add a Row* tool.
- Right-click the model, a package, or a requirement in the Browser, and select **New > Requirement**.

For general information about creating objects, see *Core Features Guide > Modeling with PowerDesigner > Objects*.

## 2.4.2 Requirement Properties

To view or edit a requirement's properties, double-click its Browser or list entry. The property sheet tabs and fields listed here are those available by default, before any customization of the interface by you or an administrator.

The *General* tab contains the following properties:

Table 11:

| Property | Description  |
|----------|--|
| Parent   | [read-only] Displays the name of the parent requirement. For top-level requirements this is the model name.                |
| Title ID | [read-only] Displays the number expressing the place of the requirement in the requirements hierarchy. For example: 1.3.2. |
| Title    | Specifies the name of the requirement.   |

| Property    | Description   |
|-------------|---|
| Code        | Generates a unique code for the requirement. You can override an individual requirement code by typing directly in this field. You can also modify the template used to generate the codes (see <a href="#">Customizing Requirement Codes [page 9]</a> ). |
| Description | Specifies a detailed description of the requirement. This field is also available on (and synchronized with) the Notes tab.   |
| Keywords    | Provide a way of loosely grouping objects through tagging. To enter multiple keywords, separate them with commas.   |

The *Detail* tab contains the following properties:

Table 12:

| Property     | Description   |
|--------------|---|
| Comment      | Provides space for any comment on the requirement.  |
| Stereotype   | Extends the semantics of the object. You can enter a stereotype directly in this field, or add stereotypes to the list by specifying them in an extension file.   |
| Type         | Specifies the type of the requirement, as viewed from the process point of view. You can specify your own types (see <a href="#">Customizing a List of Values [page 26]</a> ).  |
| Status       | Specifies the present validation status for the requirement. You can specify your own status levels (see <a href="#">Customizing a List of Values [page 26]</a> ).<br><br>If you change the status of a requirement containing sub-requirements, a message is displayed warning that the change will be propagated to all its sub-requirements. If you change the status of a sub-requirement, it may change the status of its parent requirement, which can only have the lowest status held by any of its sub-requirements. |
| Priority     | Specifies the priority level attached to the requirement. Select a value in the list or type a value. The value cannot be null or negative, and is limited to one decimal (for example: 1.9).   |
| Selected     | Specifies that the requirement has been selected to be implemented in the project. If this checkbox is cleared, the requirement is excluded from the project and the sum of workloads.  |
| Risk         | Specifies the level of risk associated with implementing the requirement. You can specify your own risk levels (see <a href="#">Customizing a List of Values [page 26]</a> ).   |
| Verification | Specifies the type of testing to be applied to the development of the requirement. You can specify your own verification types (see <a href="#">Customizing a List of Values [page 26]</a> ).   |
| Workload 1-4 | Specifies the workloads assigned to four individuals or groups (see <a href="#">Assigning Workloads [page 37]</a> ). Workloads for requirements with sub-requirements are read-only fields calculated as the sums of all sub-requirement workloads.   |

The following tabs are also available:

- [Requirement Traceability Links](#) - Lists links to design objects, other requirements, and external files (see [Linking Requirements with Design Objects and External Files \[page 28\]](#)).
- [Related Glossary Terms](#) - Lists terms attached to the requirement (see [Glossary Terms \(RQM - Deprecated\) \[page 41\]](#)).

#### Note






The RQM glossary terms are deprecated and are replaced by the enterprise glossary model (see [Core Features Guide > Administering PowerDesigner > Deploying an Enterprise Glossary and Library](#)).

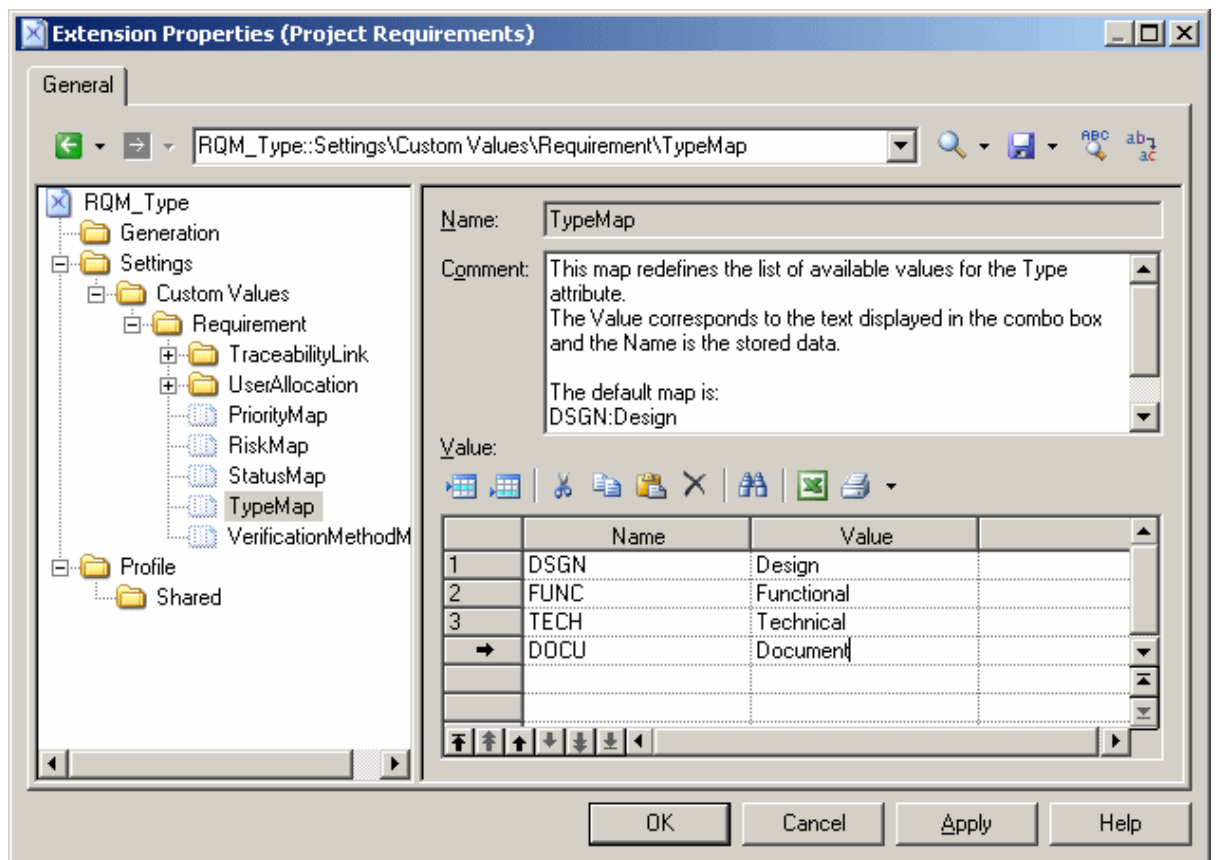
- [User Allocations](#) - Lists the users and groups attached to the requirement (see [Users and Groups \(RQM\) \[page 39\]](#)).

## 2.4.2.1 Customizing a List of Values

Some requirement properties such as [Risk](#), [Status](#), and [Type](#), come with predefined lists of values, which you can modify by creating an extension.

### Procedure

1. Select  [Model](#)  to open the List of Extensions and click the [Add a Row](#) tool.
2. Type a name and a code for the new extension, click [Apply](#), and then click the [Properties](#) tool to open it in the Resource Editor.
3. In the left pane, expand the  [Settings](#)  [Custom Values](#)  category and expand the entries to display the lists available for customization:
  - [Priority](#)
  - [Risk](#)
  - [Status](#)
  - [Type](#)
  - [Verification Method](#)
  - [TraceabilityLink/Link Type](#) (under the category)
  - [UserAllocation/Type](#)
4. Select a list to display the currently available values in the right-hand panel.
5. In the [Value](#) table, click the [Add a Row](#) tool, and then type a new name (which is used internally) and value (which will appear in the property list):



6. Add additional values as necessary, and then click **OK** to save your changes and return to the List of Extensions.
7. Click **OK** to return to your model. The new values are now available in the appropriate property list.

#### **i** Note






If you have several extensions defining list values attached to your RQM, the union of all the different values defined for each property will be available.

## 2.4.3 Linking Requirements with Design Objects and External Files

You can link requirements to design objects (objects from other types of models), external files, and other requirements on the [Requirement Traceability Links](#) tab. You can, optionally, specify a [Link Type](#) for each link.

The following tools are available on this tab:

Table 13:

| Tool  | Description  |
|---|--|
|  | <a href="#">Properties</a> - opens the property sheet representing the linked object in the requirements model.  |
|  | <a href="#">Open External File</a> - opens the linked external file.   |
|  | <a href="#">Add Links to Design Objects</a> - attaches design objects to the requirement (see <a href="#">Attaching Design Objects to Requirements from the RQM [page 28]</a> ).   |
|  | <a href="#">Add Link to External File</a> – attaches any external file to the requirement. For MS Word files, you can link to a specific bookmark in the file (see <a href="#">Creating a Bookmark in an MS Word Document [page 33]</a> ). |
|  | <a href="#">Add Links to Other Requirements</a> – attaches another requirement (from the current or another RQM) to the requirement.   |

### **i** Note

Requirement traceability links are similar to but separate from the traceability links that are available for linking any object with any other object, and which are listed on the [Traceability Links](#) tab (see [Traceability Links \[page 11\]](#)).

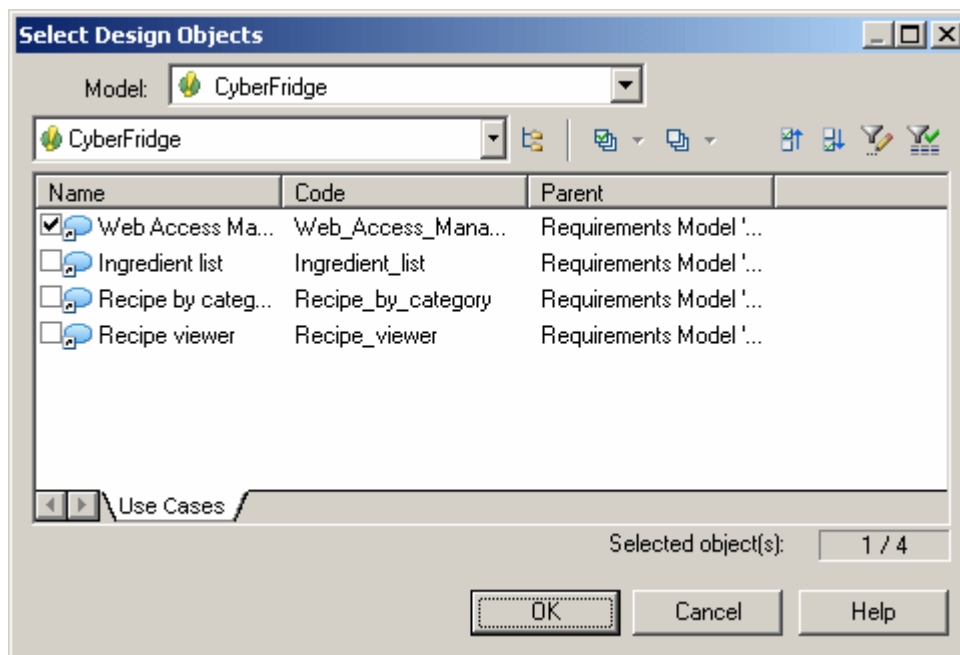
### 2.4.3.1 Attaching Design Objects to Requirements from the RQM

When a design object fulfils a requirement, you should attach it to the requirement. Both models must be open in your workspace.

#### Procedure

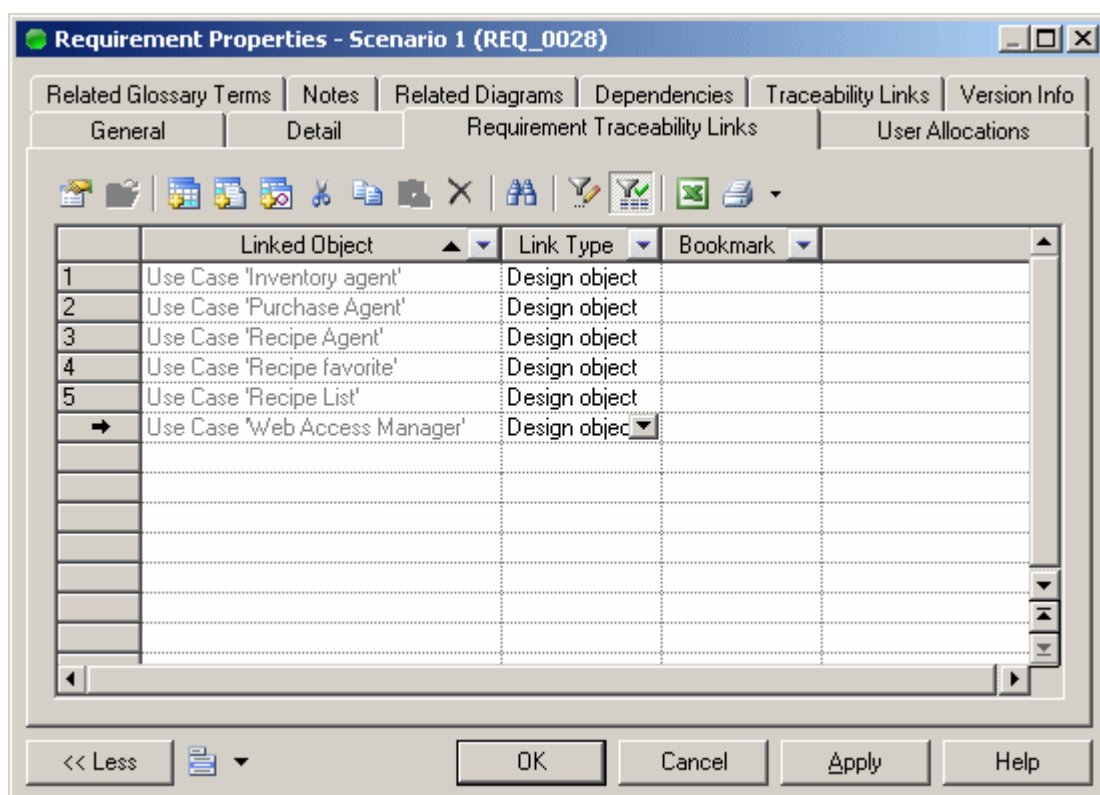
1. Open the property sheet of the requirement and click the [Requirement Traceability Links](#) tab.
2. Click the [Add Links to Design Objects](#) tool to open the Select Design Objects dialog.
3. Choose the appropriate design model in the [Model](#) list, and then select the design objects you want to attach to the requirement.





4. Click **OK**.

The design objects are attached to the requirement and listed on its [Requirement Traceability Links](#) tab:

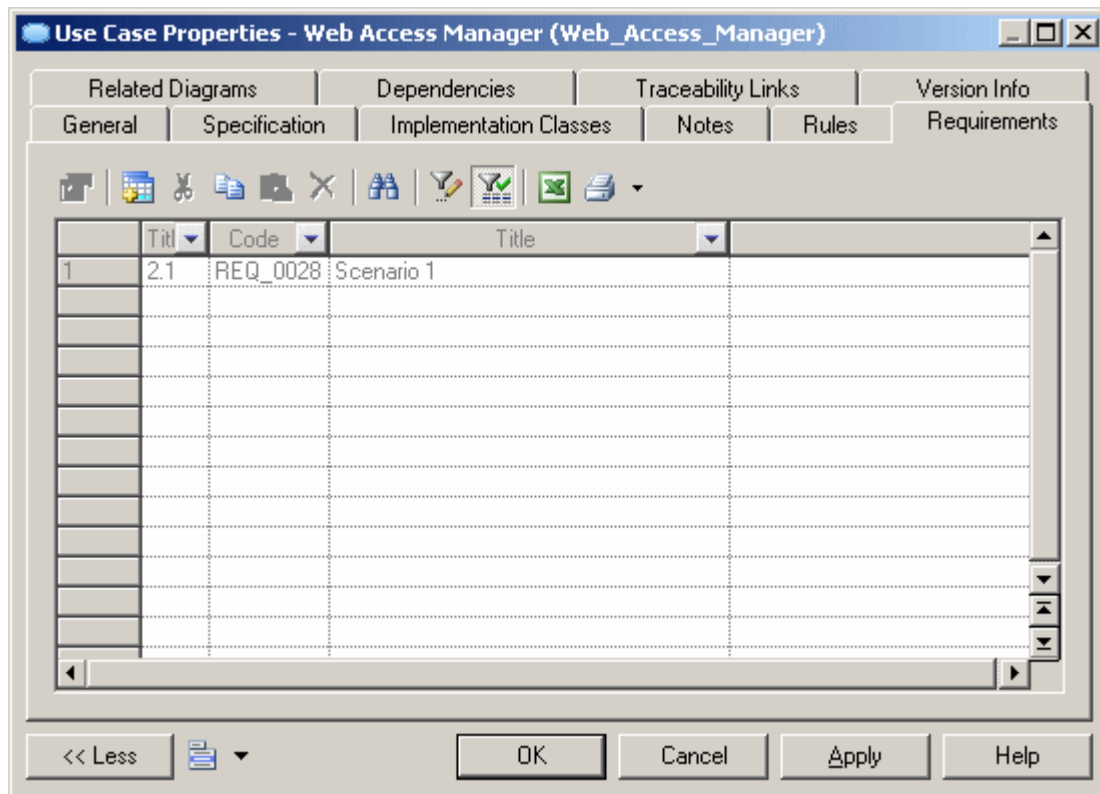


5. Click **OK** to return to your model.

## Results

To open the property sheet of a design object from the *Requirement Traceability Links* tab of a requirement property sheet, select it in the list and click the *Properties* tool. As design objects are stored as shortcuts in requirements models, you must click the *Properties* tool to the right of the *Name* field in the shortcut properties sheet to access the full properties of the design object

The requirement is listed on the *Requirements* tab of the design object:



## 2.4.3.2 Attaching Requirements to Design Objects from the Design Model

To verify that the design process fulfills the requirements, you should attach requirements to objects in your design models.

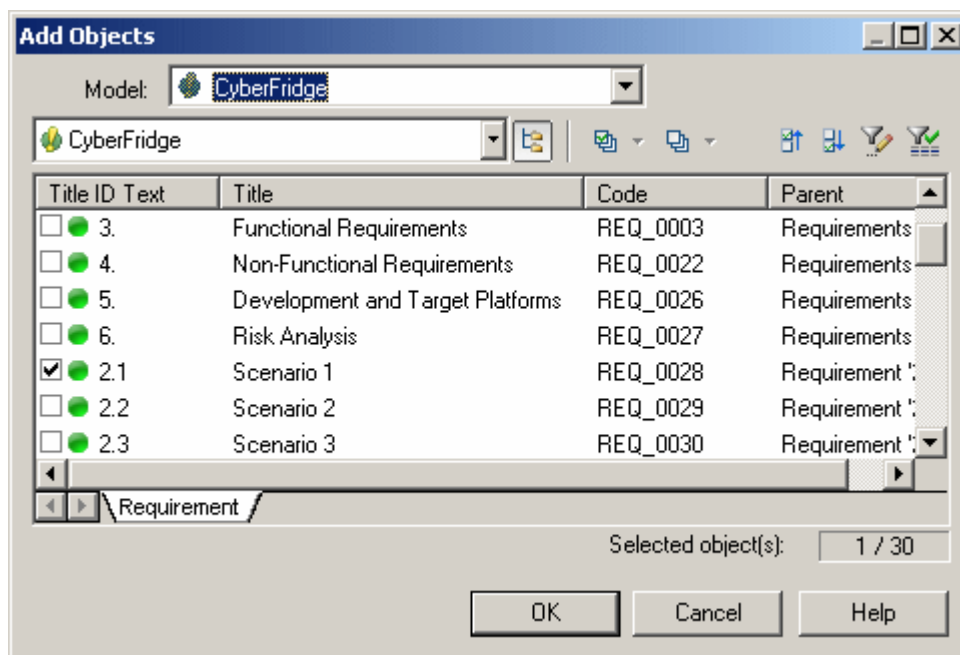
### Context

#### Note

Before you can attach requirements to your design objects from your design model you may need to activate the display of the Requirements tab by selecting **Tools > Model Options** and selecting the *Enable links to requirements* option in the *All Objects* group box of the *Model Settings* tab.

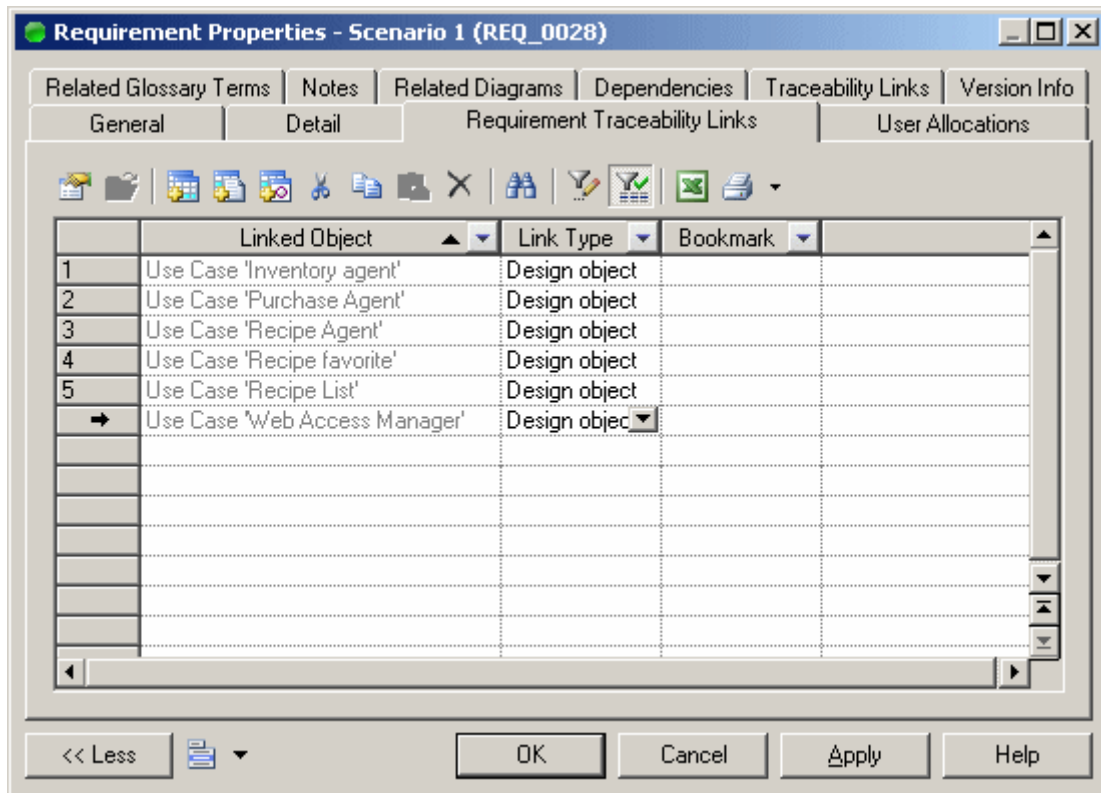
### Procedure

1. Open the property sheet of the design object and click the *Requirements* tab.
2. Click the *Add Objects* tool to open a dialog listing all the requirements available in the selected RQM.



3. [optional] Change the selected model to select another RQM open in the workspace or click the *Include Sub-Objects* tool to display all the sub-requirements.



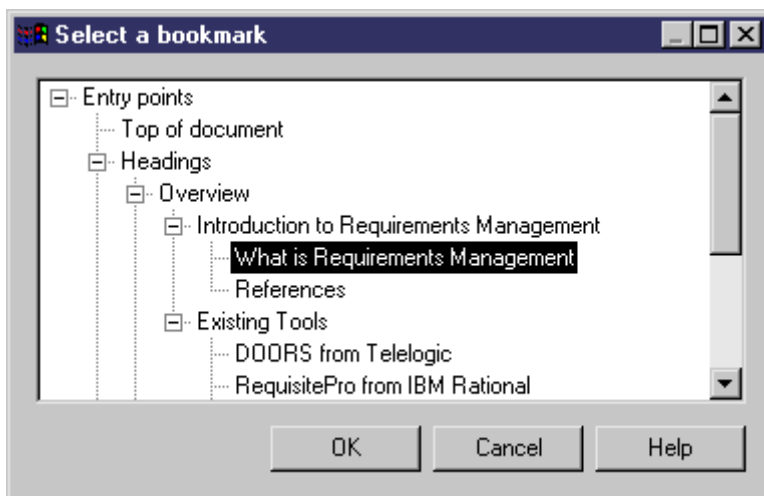


### 2.4.3.3 Creating a Bookmark in an MS Word Document

You can create bookmarks in a MS Word document attached to the model.

#### Procedure

1. Open the property sheet of a requirement and click the [Requirement Traceability Links](#) tab
2. Click the [Add Link to External File](#) tool and select an MS Word file. A message is displayed indicating that the system is parsing the MS Word document to extract its paragraph titles.
3. When the parsing is over, a dialog is displayed inviting you to select a place in the document to which to attach the requirement. Expand the **Entry points** node, to reveal the headings hierarchy, and select a heading:



4. Click **OK**. The selected heading is displayed in the *Bookmarks* column on the *Requirement Traceability Links* tab, and is also available in any traceability matrix view featuring the requirement.

To open the Word document at the selected location, select the linked file in the *Requirement Traceability Links* tab of the requirement property sheet, and click the *Properties* tool.

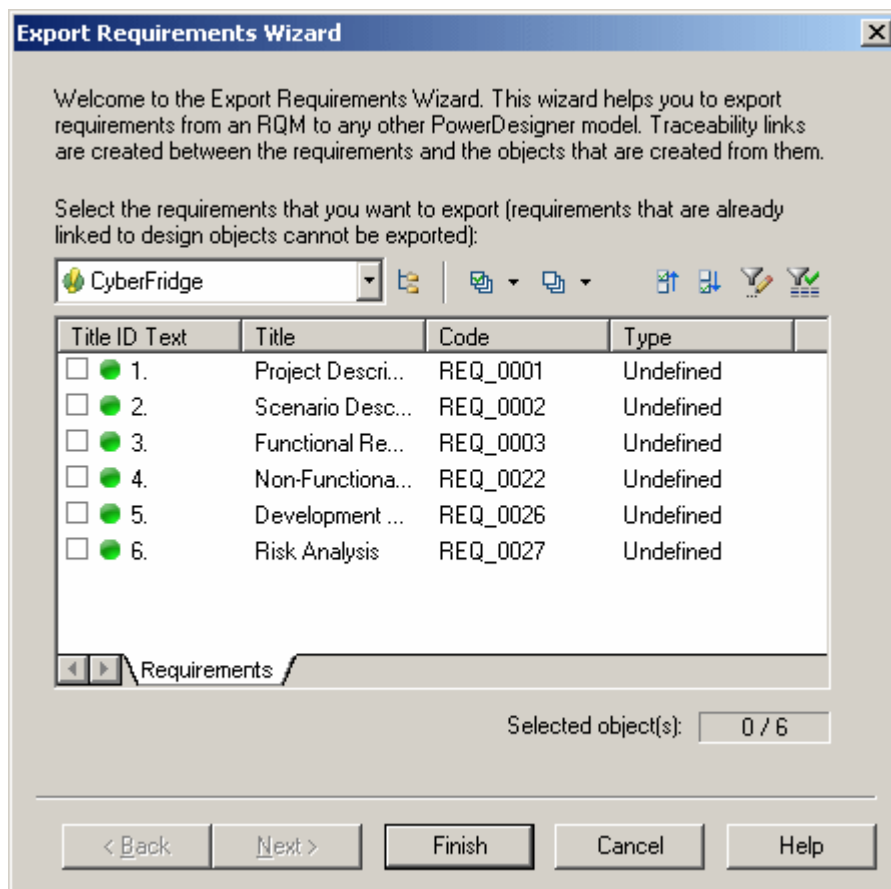
To modify the location, click the bookmark cell in the *Requirement Traceability Links* tab and click the Ellipsis button.

## 2.4.3.4 Exporting Requirements as Design Objects

The Requirement Export Wizard allows you to export requirements as design objects in other PowerDesigner models. The resulting design objects bear the same name and code as their originating requirements and are connected to them via requirement traceability links.

### Procedure

1. Select **► Requirements ► Export Requirements as Design Objects ►** to open the Export Requirements Wizard:



2. Specify the requirements that you want to export as design objects, and then click [Next](#).
3. Specify the model to which you want to export the requirements from among the models open in the workspace, and then click [Next](#).
4. Specify the kind of objects that you want to create in the target model (for example, classes in an OOM), and then click [Finish](#) to start the export.

The design objects created from the requirements appear in the specified design model.

## Results

### **i** Note

By default, the symbols of the new design objects do not appear in the diagram. To display them, you can either drag and drop the design objects from the Browser to the diagram, or select **► Symbol ► Show ► Symbols**, in the menu bar, and select the symbols in the Show Symbols dialog box.

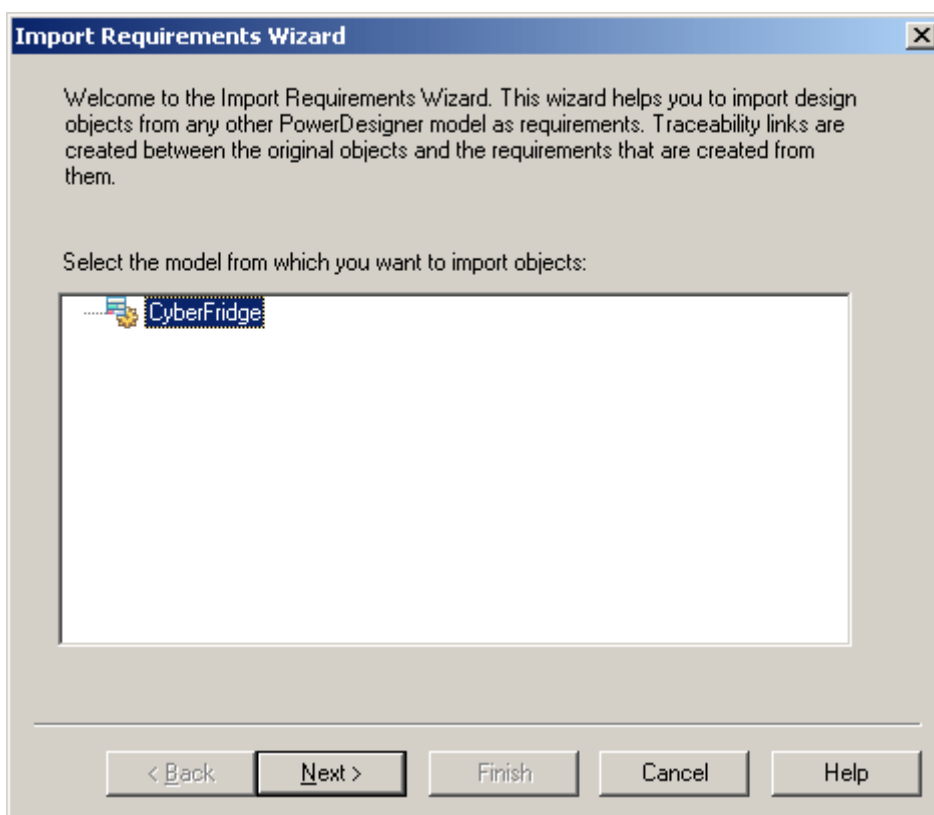


## 2.4.3.5 Importing Design Objects as Requirements

The Requirement Import Wizard allows you to import design objects as requirements. The resulting requirements bear the same name and code as their originating design objects and are connected to them via requirement traceability links.

### Procedure

1. Select **Requirements > Import Design Objects as Requirements** to open the Import Requirements Wizard:



2. Specify the model from which you want to import the requirements from among the models open in the workspace, and then click [Next](#).
3. Specify the design objects that you want to import to the RQM by selecting them from among the sub-tabs in the selection field, and then click [Next](#).
4. Specify the location within the RQM where you want to create the requirements, and then click [Finish](#).

The requirements created from the design objects appear in the RQM at the specified location.

## 2.4.4 Assigning Workloads

A *workload* is the time assigned to a person or team to satisfy a requirement. Values must be greater than or equal to zero, and limited to one decimal place (for example: 3.5).

No time unit is enforced to measure workloads but, in order to allow PowerDesigner to properly calculate totals, you should decide on and consistently use the same unit (hour or day) for all workloads.

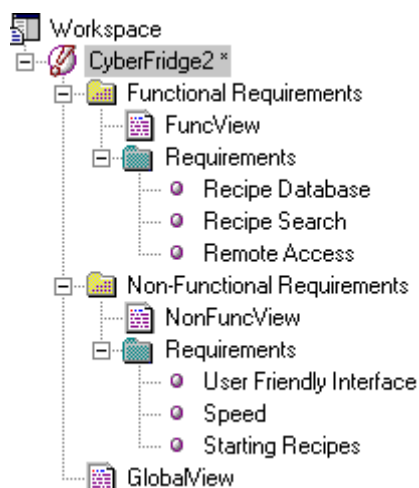
You assign workloads to requirements on their *Detail* tab, where there are fields to record workloads assigned to four individual people or groups.

You can only assign workloads to requirements that have no sub-requirements. Workloads for parent requirements, packages, and the model are read-only fields calculated as the sums of all their sub-requirement workloads.

## 2.5 Packages (RQM)

You can divide your requirements model into packages in order to avoid manipulating the entire set of requirements and to provide views on particular logical subsets of the requirements. You could create packages to represent different tasks, domains, or subject areas.

In the following example, one package contains functional requirements and the other contains non-functional requirements:



You can create packages as peers and divide packages into subpackages as necessary. Each package has its own default requirements view (document, traceability or user allocation view) and you can create others if required.

In a requirements model, packages only appear in the Browser tree view. To add requirements to a package, you can:

- Create requirements directly in the package document view(s).
- In the Browser, select requirements from the model Requirements folder, and drag and drop them onto the package or one of its sub-requirements.

You can link requirements in different packages of the same model together from the *Requirement Traceability Links* tab of the requirements property sheet (see [Linking Requirements with Design Objects and External Files \[page 28\]](#)).

## 2.5.1 Creating a Package

You can create a package in a requirements document view, or from the Browser or *Model* menu.

- Click the *Create a Package* tool in the toolbar at the top of a requirements document view.
- Select **Model > Packages** to access the List of Packages, and click the *Add a Row* tool.
- Right-click the model or package in the Browser, and select **New > Package**.

For general information about creating objects, see *Core Features Guide > Modeling with PowerDesigner > Objects*.

## 2.5.2 Package Properties

To view or edit a package's properties, double-click its diagram symbol or Browser or list entry. The property sheet tabs and fields listed here are those available by default, before any customization of the interface by you or an administrator.

The *General* tab contains the following properties:

Table 14:

| Property             | Description  |
|----------------------|--|
| Name/Code/Comment    | Identify the object. The name should clearly convey the object's purpose to non-technical users, while the code, which is used for generating code or scripts, may be abbreviated, and should not normally include spaces. You can optionally add a comment to provide more detailed information about the object. By default the code is generated from the name by applying the naming conventions specified in the model options. To decouple name-code synchronization, click to release the = button to the right of the <i>Code</i> field. |
| Stereotype           | Extends the semantics of the object. You can enter a stereotype directly in this field, or add stereotypes to the list by specifying them in an extension file.  |
| Use parent namespace | [package only] Specifies that the package does not represent a separate namespace from its parent and thus that objects created within it must have codes that are unique within the parent container. If this property is not selected, then the package and its parent package or model can both contain objects with the same code.   |
| Default view         | Specifies the requirements view displayed by default when you open the package   |
| Keywords             | Provide a way of loosely grouping objects through tagging. To enter multiple keywords, separate them with commas.  |

The following tabs are also available:

- [Detail](#) - Provides fields to record workloads assigned to four individuals or groups. Package workloads are read-only fields calculated as the sums of all requirement workloads (see [Assigning Workloads \[page 37\]](#)).
- [Requirement Traceability Links](#) - Lists links to design objects and external files (see [Attaching Design Objects to Requirements from the RQM \[page 28\]](#)).

## 2.6 Users and Groups (RQM)

*Users* are all the people concerned by at least one requirement defined in a requirements model. *Groups* are teams of users (e.g. a QA team) concerned by at least one requirement defined in a requirements model.

Users and groups are attached to requirements via the [User Allocations](#) tab of the requirements property sheet, or via user allocation matrix views.

The [Dependencies](#) tab of a user or group property sheet displays:

- The list of requirements assigned to that user or group
- The groups or child groups linked to that user or group

### 2.6.1 Creating a User or Group

You can create a user or group from the Browser or [Model](#) menu.

- Select [Model > Users](#) to access the List of Users or [Model > Groups](#) to access the List of Groups, and click the [Add a Row](#) tool.
- Right-click the model or package in the Browser, and select [New > User](#) or [New > Group](#).

For general information about creating objects, see *Core Features Guide > Modeling with PowerDesigner > Objects*.

## 2.6.2 User and Group Properties

To view or edit a user or group's properties, double-click its Browser or list entry. The property sheet tabs and fields listed here are those available by default, before any customization of the interface by you or an administrator.

The [General](#) tab contains the following properties:

Table 15:

| Property          | Description   |
|-------------------|---|
| Name/Code/Comment | Identify the object. The name should clearly convey the object's purpose to non-technical users, while the code, which is used for generating code or scripts, may be abbreviated, and should not normally include spaces. You can optionally add a comment to provide more detailed information about the object. By default the code is generated from the name by applying the naming conventions specified in the model options. To decouple name-code synchronization, click to release the = button to the right of the <a href="#">Code</a> field. |
| Stereotype        | Extends the semantics of the object. You can enter a stereotype directly in this field, or add stereotypes to the list by specifying them in an extension file.   |
| Email address     | E-mail address of the user or group.  |

In addition, the Group property sheet contains the following tabs:

- [Group Users](#) - lists the users and groups who belong to the group.

### 2.6.2.1 Attaching Users and Groups to a Group

You can attach users and groups to a group from the group's property sheet.

#### Procedure

1. Open the property sheet of a group, and click the [Group Users](#) tab.
2. Click the [Add Objects](#) tool to open the Add Objects dialog box.
3. The [User](#) sub-tab lists the available users in the model. Select the users you want to attach to the current group.
4. Click the [Group](#) sub-tab. This sub-tab lists the available groups in the model. Select the groups you want to attach to the current group and click [OK](#) to return to the Group property sheet.

The selected users and child groups are displayed on the [Group Users](#) tab.

## Results

### Caution

You must not select child groups that are, at the same time, parent groups of the current group (see [Group Checks \[page 46\]](#)).

## 2.7 Glossary Terms (RQM - Deprecated)

Glossary terms are clearly defined words used to avoid misinterpretations in a requirements model. Use the [Description](#) sub-tab on the [Notes](#) tab of a glossary term property sheet, to give a full and precise description of a glossary term.





### Caution

The RQM glossary terms are deprecated and are replaced by the enterprise glossary model (see *Core Features Guide > Administering PowerDesigner > Deploying an Enterprise Glossary and Library*).

Glossary terms are attached to requirements via the [Related Glossary Terms](#) tab of the requirements property sheet. The [Dependencies](#) tab of a glossary term property sheet displays the requirements associated with the glossary term.

### 2.7.1 Creating a Glossary Term

You can create a glossary term from the Browser or [Model](#) menu, or from the [Related Glossary Terms](#) tab in the property sheet of a requirement.

- Select  [Model](#)  to access the List of Glossary Terms, and click the [Add a Row](#) tool.
- Open the [Related Glossary Terms](#) tab in the property sheet of a requirement, and click the Create an Object tool.
- Right-click the model or package in the Browser, and select  [New](#) .

For general information about creating objects, see *Core Features Guide > Modeling with PowerDesigner > Objects*.

## 2.7.2 Glossary Term Property Sheet General Tab

To view or edit a glossary term's properties, double-click its Browser or list entry. The property sheet tabs and fields listed here are those available by default, before any customization of the interface by you or an administrator.

The *General* tab contains the following properties:

Table 16:

| Property              | Description  |
|-----------------------|--|
| Name/Code/<br>Comment | Identify the object. The name should clearly convey the object's purpose to non-technical users, while the code, which is used for generating code or scripts, may be abbreviated, and should not normally include spaces. You can optionally add a comment to provide more detailed information about the object. By default the code is generated from the name by applying the naming conventions specified in the model options. To decouple name-code synchronization, click to release the = button to the right of the <i>Code</i> field. |
| Stereotype            | Extends the semantics of the object. You can enter a stereotype directly in this field, or add stereotypes to the list by specifying them in an extension file.  |

## 2.8 Business Rules (RQM)

A business rule is a rule that your business follows. It is a written statement specifying what an information system must do or how it must be structured. It could be a government-imposed law, a customer requirement, or an internal guideline.

In the case of the Requirements Model, a business rule should be used as a *super requirement*, i.e. a requirement defined for requirements. For instance, a business rule could be a methodological rule for writing requirements.

Business rules are not available by default in a requirements model and must be activated before you can use them.

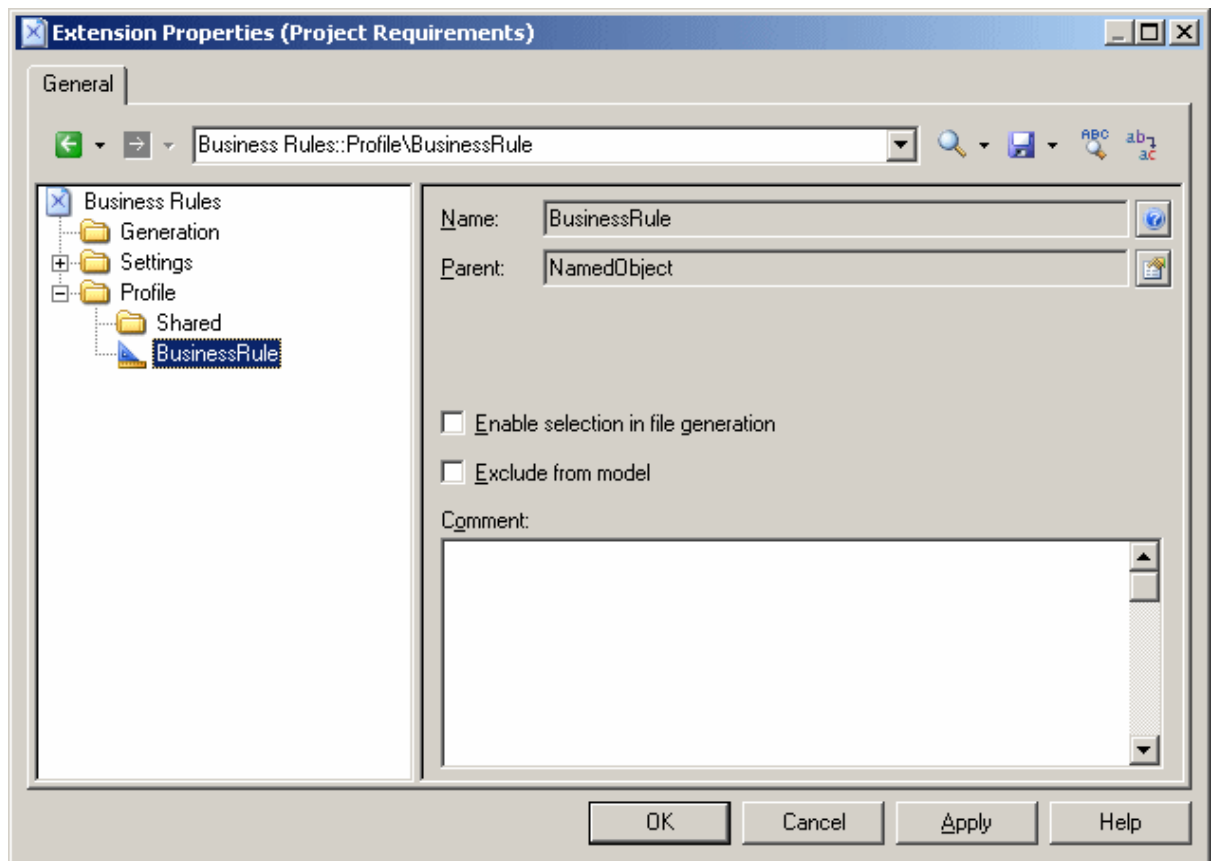
### 2.8.1 Activating Business Rules in an RQM

Business rules are not available by default in an RQM, and must be activated through an extension.

#### Procedure

1. Select **Model** > **Extensions** to open the List of Extensions and click the *Add a Row* tool.
2. Type a name and a code for the new extension, click *Apply*, and then click the *Properties* tool to open it in the Resource Editor.

3. In the left pane, right-click the *Profile* category and select *Add Metaclasses* to open the Metaclass Selection dialog, click the PdCommon sub-tab, select BusinessRule, and click *OK* to add this metaclass to your profile:



4. Click *OK* to save your changes and return to the List of Extensions.
5. Click *OK* to return to your model.

You can now create business rules from the List of Business Rules (available at ► *Model* ► *Business Rules* ►), and attach them to your requirements from the *Rules* tab of your requirements property sheets.

For detailed information about using business rules, see *Core Features Guide* > *Modeling with PowerDesigner* > *Objects* > *Business Rules*.



## 3 Checking an RQM

The requirements model is a very flexible tool, which allows you quickly to develop your model without constraints. You can check the validity of your RQM at any time.

A valid RQM conforms to the following kinds of rules:

- Each object name or code must be unique a RQM
- Each user must be allocated to at least one requirement
- Each glossary term should be attached to at least one requirement

### Note

We recommend that you check your requirements model before generating another model from it. If the check encounters errors, generation will be stopped. The [Check model](#) option is enabled by default in the Generation dialog box.

You can check your model in any of the following ways:

- Press F4, or
- Select  [Tools](#) , or

The Check Model Parameters dialog opens, allowing you to specify the kinds of checks to perform, and the objects to apply them to. The following sections document the RQM-specific checks available by default. For information about checks made on generic objects available in all model types and for detailed information about using the Check Model Parameters dialog, see *Core Features Guide > Modeling with PowerDesigner > Objects > Checking Models*.

### 3.1 Requirement Checks

PowerDesigner provides default model checks to verify the validity of requirements.

Table 17:

| Check   | Description and Correction  |
|---|---|
| Name/Code contains terms not in glossary      | [if glossary enabled] Names and codes must contain only approved terms drawn from the glossary. <ul style="list-style-type: none"><li>• Manual correction: Modify the name or code to contain only glossary terms.</li><li>• Automatic correction: None.</li></ul>                                      |
| Name/Code contains synonyms of glossary terms | [if glossary enabled] Names and codes must not contain synonyms of glossary terms. <ul style="list-style-type: none"><li>• Manual correction: Modify the name or code to contain only glossary terms.</li><li>• Automatic correction: Replaces synonyms with their associated glossary terms.</li></ul> |

| Check                                   | Description and Correction  |
|---|---|
| Name/Code uniqueness                    | <p>Object names must be unique in the namespace.</p> <ul style="list-style-type: none"> <li>Manual correction: Modify the duplicate name or code.</li> <li>Automatic correction: Appends a number to the duplicate name or code.</li> </ul>   |
| Empty description on atomic requirement | <p>An atomic requirement (as opposed to a composite requirement) should have a description.</p> <ul style="list-style-type: none"> <li>Manual correction: In the requirement property sheet, enter a description in the <i>Description</i> box of the <i>General</i> tab.</li> <li>Automatic correction: None.</li> </ul> |

## 3.2 User Checks

PowerDesigner provides default model checks to verify the validity of users.

Table 18:

| Check   | Description and Correction  |
|---|---|
| Name/Code contains terms not in glossary      | <p>[if glossary enabled] Names and codes must contain only approved terms drawn from the glossary.</p> <ul style="list-style-type: none"> <li>Manual correction: Modify the name or code to contain only glossary terms.</li> <li>Automatic correction: None.</li> </ul>                                      |
| Name/Code contains synonyms of glossary terms | <p>[if glossary enabled] Names and codes must not contain synonyms of glossary terms.</p> <ul style="list-style-type: none"> <li>Manual correction: Modify the name or code to contain only glossary terms.</li> <li>Automatic correction: Replaces synonyms with their associated glossary terms.</li> </ul> |
| Name/Code uniqueness                          | <p>Object names must be unique in the namespace.</p> <ul style="list-style-type: none"> <li>Manual correction: Modify the duplicate name or code.</li> <li>Automatic correction: Appends a number to the duplicate name or code.</li> </ul>   |
| Existence of user allocation                  | <p>A user should be allocated to at least one requirement.</p> <ul style="list-style-type: none"> <li>Manual correction: Attach the user to a requirement, by using the <i>User Allocations</i> tab of the requirement property sheet, or delete the user.</li> <li>Automatic correction: None</li> </ul>     |

## 3.3 Group Checks

PowerDesigner provides default model checks to verify the validity of groups.

Table 19:

| Check   | Description and Correction   |
|---|--|
| Name/Code contains terms not in glossary      | [if glossary enabled] Names and codes must contain only approved terms drawn from the glossary. <ul style="list-style-type: none"><li>• Manual correction: Modify the name or code to contain only glossary terms.</li><li>• Automatic correction: None.</li></ul>   |
| Name/Code contains synonyms of glossary terms | [if glossary enabled] Names and codes must not contain synonyms of glossary terms. <ul style="list-style-type: none"><li>• Manual correction: Modify the name or code to contain only glossary terms.</li><li>• Automatic correction: Replaces synonyms with their associated glossary terms.</li></ul>  |
| Name/Code uniqueness                          | Object names must be unique in the namespace. <ul style="list-style-type: none"><li>• Manual correction: Modify the duplicate name or code.</li><li>• Automatic correction: Appends a number to the duplicate name or code.</li></ul>  |
| Existence of user                             | A group must contain at least one user or another group of users. <ul style="list-style-type: none"><li>• Manual correction: Attach a user or another group to the group, by using the <a href="#">Group Users</a> tab of the group property sheet, or delete the empty group.</li><li>• Automatic correction: None</li></ul>  |
| Circular group definition                     | One group cannot be at the same time parent and child of another group. <ul style="list-style-type: none"><li>• Manual correction: Remove a group (parent group) from the <a href="#">Group Users</a> tab of another group (child group) property sheet. The parent group is displayed in the <a href="#">Dependencies</a> tab of the child group property sheet.</li><li>• Automatic correction: None</li></ul> |

## 3.4 Package Checks

PowerDesigner provides default model checks to verify the validity of packages.

Table 20:

| Check                                    | Description and Correction   |
|--|--|
| Name/Code contains terms not in glossary | [if glossary enabled] Names and codes must contain only approved terms drawn from the glossary. <ul style="list-style-type: none"><li>• Manual correction: Modify the name or code to contain only glossary terms.</li><li>• Automatic correction: None.</li></ul> |

| Check  | Description and Correction  |
|--|---|
| Name/Code contains synonyms of glossary terms          | <p>[if glossary enabled] Names and codes must not contain synonyms of glossary terms.</p> <ul style="list-style-type: none"> <li>Manual correction: Modify the name or code to contain only glossary terms.</li> <li>Automatic correction: Replaces synonyms with their associated glossary terms.</li> </ul>   |
| Name/Code uniqueness                                   | <p>Object names must be unique in the namespace.</p> <ul style="list-style-type: none"> <li>Manual correction: Modify the duplicate name or code.</li> <li>Automatic correction: Appends a number to the duplicate name or code.</li> </ul>   |
| List of missing terms in object names/codes in package | <p>[if glossary enabled] This special check lists all the terms that are used in the names or codes of all the objects contained in the model or package.</p> <ul style="list-style-type: none"> <li>Manual correction: An administrator with write permission on the glossary can double-click the line for this check in the <a href="#">Result List</a> to open a merge window in which you can select to add some or all of these missing terms, as appropriate, to the glossary.</li> <li>Automatic correction: None.</li> </ul> |

## 3.5 Glossary Term Checks

PowerDesigner provides default model checks to verify the validity of glossary terms.

Table 21:

| Check   | Description and Correction  |
|---|---|
| Name/Code contains terms not in glossary      | <p>[if glossary enabled] Names and codes must contain only approved terms drawn from the glossary.</p> <ul style="list-style-type: none"> <li>Manual correction: Modify the name or code to contain only glossary terms.</li> <li>Automatic correction: None.</li> </ul>  |
| Name/Code contains synonyms of glossary terms | <p>[if glossary enabled] Names and codes must not contain synonyms of glossary terms.</p> <ul style="list-style-type: none"> <li>Manual correction: Modify the name or code to contain only glossary terms.</li> <li>Automatic correction: Replaces synonyms with their associated glossary terms.</li> </ul>                                     |
| Name/Code uniqueness                          | <p>Object names must be unique in the namespace.</p> <ul style="list-style-type: none"> <li>Manual correction: Modify the duplicate name or code.</li> <li>Automatic correction: Appends a number to the duplicate name or code.</li> </ul>   |
| Unused glossary term                          | <p>A glossary term should be attached to at least one requirement.</p> <ul style="list-style-type: none"> <li>Manual correction: Attach the glossary term to a requirement, by using the <a href="#">Related Glossary Terms</a> tab of the requirement property sheet, or delete the glossary term</li> <li>Automatic correction: None</li> </ul> |

## 4 Working with Word Documents and RQMs

PowerDesigner provides an optional addin, which allows you to import a Word document into an RQM and to export an RQM to MS Word format. The RQM and the Word document will be linked, allowing you to keep the two versions synchronized.

You can leverage the capabilities of PowerDesigner to link requirements to design objects in other models, while retaining a requirements document in a format familiar to less technical users. You can either start from a Word document and create an RQM, or start from an RQM and create a Word document. In both cases, the Word document and the RQM can be linked to allow easy updating.

### Note

The MS Word addin is not installed by default during the PowerDesigner installation process. In order to install it, you must expand the Requirements Model node on the Features page of the PowerDesigner installer, and select the Word Addins feature. For detailed information about installing PowerDesigner, see *Installation Guide > Installing PowerDesigner*.

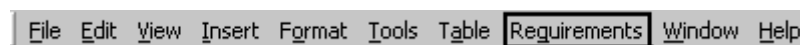
In order to link an RQM with a Word document, your environment must conform to all of the following requirements:

- MS Word 2000 or higher is installed on your machine
- You have selected to install the Word Addins during your installation of PowerDesigner. To do so, expand the Requirements Model node on the Features page of the PowerDesigner installer, and select the Word Addins feature.
- You have enabled the Microsoft Word Import Export add-in in PowerDesigner. To do so, select **Tools > General Options**, click the Add-Ins category and then select Microsoft Word Import Export. Note that the add-in only works if the system code page is consistent with the model language. For example, if you are working with a Chinese model, your system code page must be Chinese.
- You have selected the WordToRqm.dot template in MS Word (select **Tools > Templates and Add-Ins**).
- The titles in the Word document are formatted with Word heading styles, and use only MS Word numbering.
- Heading styles must not increase by more than one level. For example, a title with Heading 1 must not be followed by a subtitle with Heading 3

## 4.1 Installing the RQM Menu and Toolbar



The first time you open or create an RQM, the MS Word Import Export add-in is registered in HKEY\_CURRENT\_USER\Software\Microsoft\Office and by default the Requirements menu and toolbar should appear in the MS Word interface.

### Context



The following tools are available in the toolbar:

Table 22:

| Tool  | Description  |
|---|--|
|  | Create/Update a Requirements Model from the Document<br>For more information, see <a href="#">Creating an RQM from a Word Document [page 50]</a> and <a href="#">Updating a Word Document Linked to an RQM [page 63]</a> . |
|  | Detach the Document from the Requirements Model<br>For more information, see <a href="#">Unlinking RQMs and Word Documents [page 65]</a> .   |

If the menu and toolbar do not appear in MS Word, you can install them manually:

### Procedure

1. In Word, select **Tools > Customize**, click the *Commands* tab, and select *Tools* in the Categories pane.
2. Select *COM Add-Ins* in the Commands pane, and drag this command to any menu item.
3. Select the *COM Add-Ins* command to display the COM Add-in dialog box, and select the *PowerDesigner Requirements COM Add-Ins for MS Word* check box. If you deselect the check box, the add-in menu and toolbar disappear from your MS Word environment.

---

## 4.2 Creating an RQM from a Word Document


You can create an RQM from a Word document by exporting it from within Word or importing it from within PowerDesigner.

### Context

#### Note

To import a Word document into an existing RQM or one of its packages, right-click the model or package in the Browser, and select *Import from Word Document*.

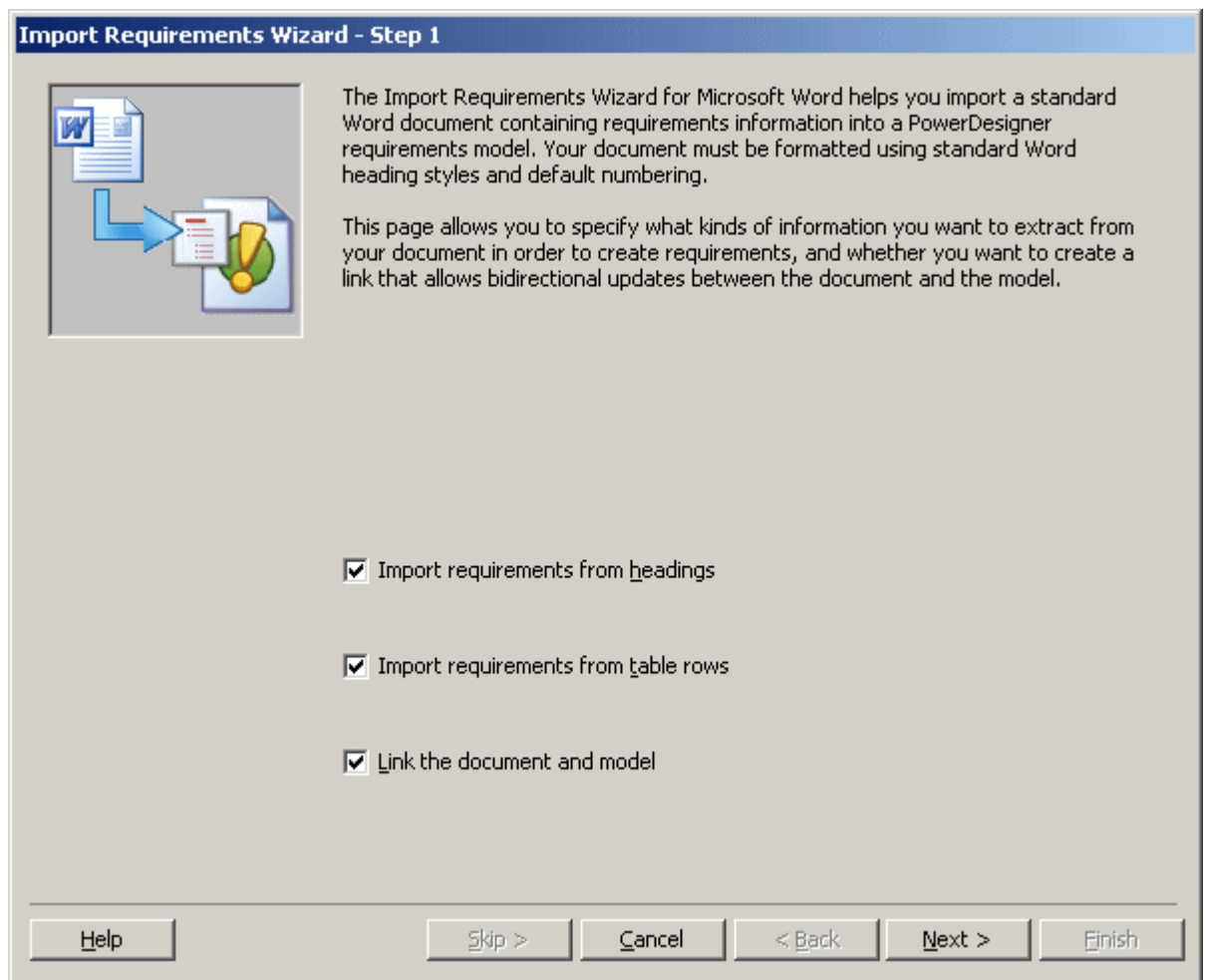
### Procedure

1. In PowerDesigner, select  *File* > *Import* > *Word Document* , navigate to the document to be imported, and then click *Open*.

or

In Word, with the document open, select  *Requirements* > *Create/Update a Requirements Model* , or click the Create/Update a Requirements Model tool.

If PowerDesigner is not presently open, it will be launched at this time, and the Import Requirements Wizard opens:



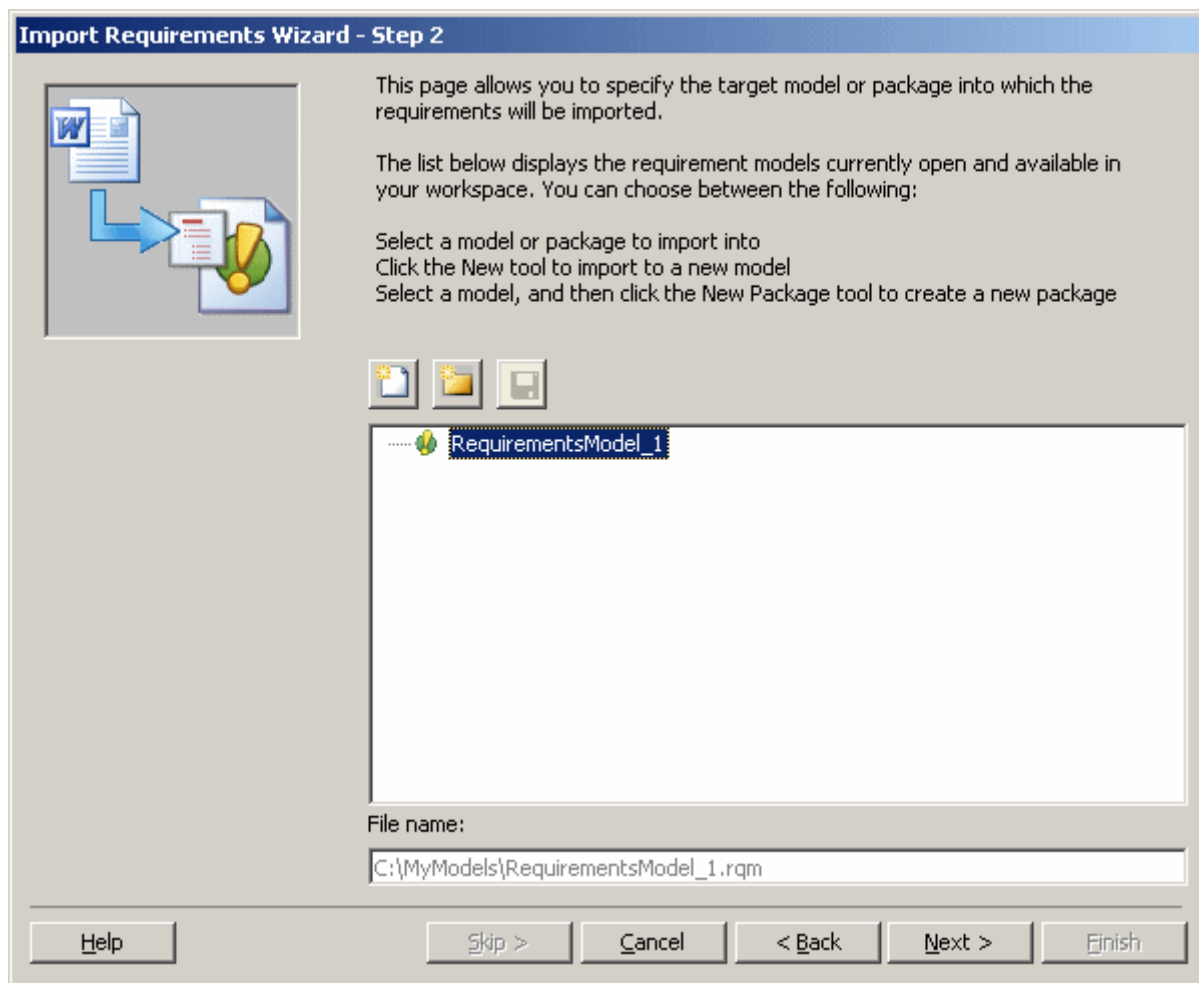
2. Choose whether you want to:

- Import requirements from document headings (default), and/or
- Import requirements from document tables

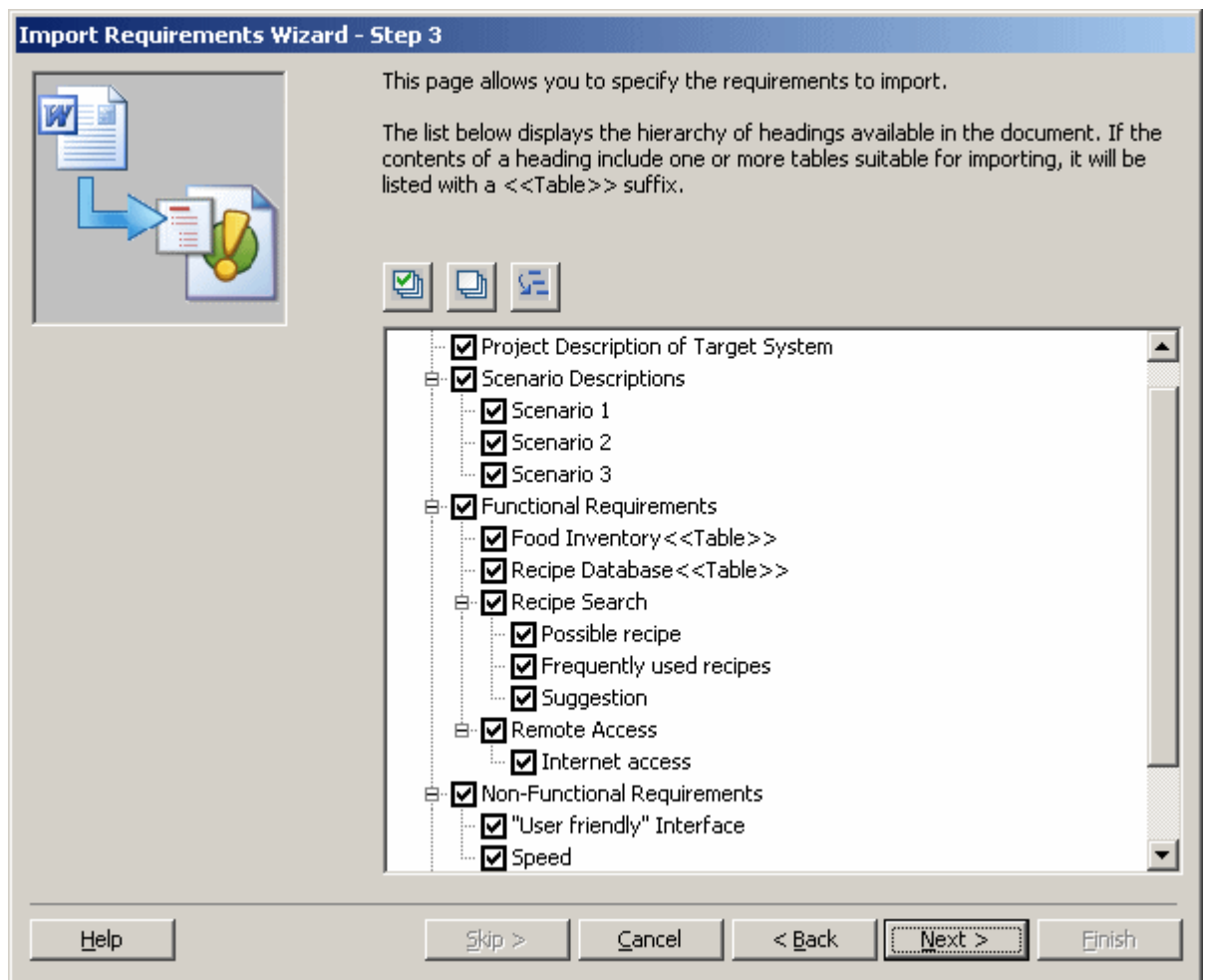
You can also specify that the document will from now on be linked to the Rqm, enabling easy synchronization of the two.

3. Click Next to go to the next screen:





4. This screen lists requirement models open in the PowerDesigner workspace. You can select an existing model or create a new one by clicking the New tool.
5. Click Next to go to the next screen. If the selected model is not saved you will be prompted to save it now:



6. This screen lists all the headings available in the Word document. All are selected by default. You can deselect and reselect headings using the tools above the list. When your selections are complete, click Next to go to the next screen:

**Import Requirements Wizard - Step 4**

This page allows you to define mappings between table columns found in your document and requirement properties. The table is displayed along with the list of its headings. Select each table in turn in the "Current Heading" list to display each of its headings. For each heading that you want to import, select a requirement attribute from the right-hand column to hold its values in the model.

Current heading:

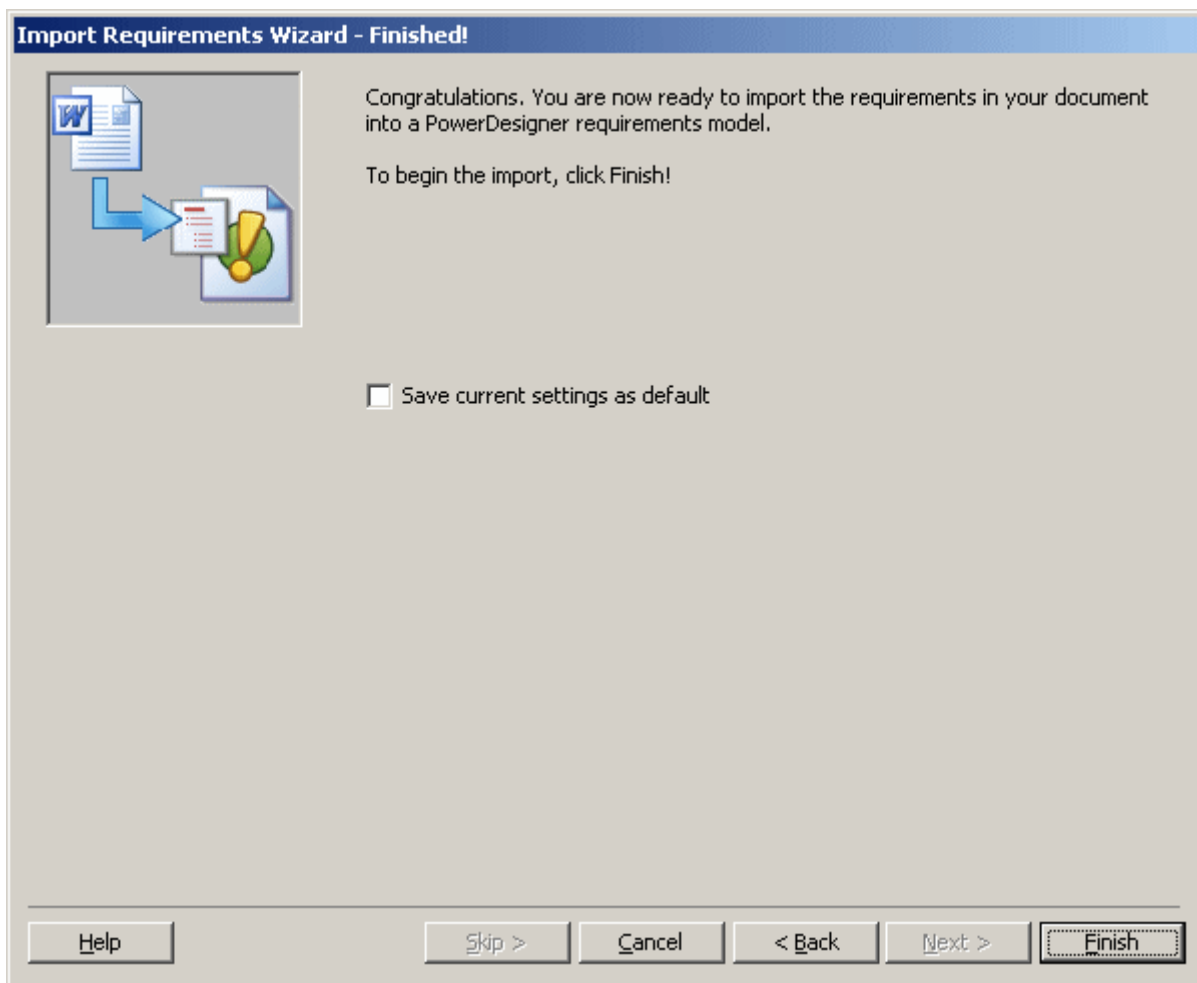
| Requirement                   | Description  | In Beta?   |
|-------------------------------|--|------------|
| User list                     | The CyberFridge shall give the user a list of all food items currently in its inventory. CARA shall order this list according to criteria set by the user. These criteria shall include, but will not be limited to: food categories, alphabetical list, and time remaining before the items should be removed from the inventory. | Yes        |
| Item requested from inventory |  | CARA shall |

| Table heading | Requirement attribute |
|---------------|-----------------------|
| Requirement   | Title                 |
| Description   | Description           |
| In Beta?      | Selected              |
|               |                       |
|               |                       |
|               |                       |
|               |                       |

Heading to insert before the table:

- If there are tables in your document and you have selected to import requirements from them, this screen lists the tables and invites you to specify mapping between any unresolved table headings and their equivalent requirement attributes in the RQM. If there is no suitable attribute, you can choose Extended Attribute, and PowerDesigner will create a new extended attribute to hold this column's entries. You can also specify a heading to insert before the table.
- Click Next to go to the next screen:





10. This final screen invites you to save your current settings as the default. Click Finish to begin the import.

The RQM is created in the PowerDesigner workspace, and the Files folder in the Browser contains the file of the linked Word document:

|   | Title ID | Full Description   | Code     | Priority |
|---|----------|--|----------|----------|
| 1 | 1.       | <b>Project Description of Target System</b><br>The CyberFridge project is to use Internet connectivity, vision and mechanical systems to create an intelligent and productive refrigerator.  | REQ_0001 | 1        |
| 2 | 2.       | <b>Scenario Descriptions</b><br><u>Scenario 1:</u> Ann has had a horrible day. On the way to work she got caught in traffic and her car overheated. That made her late for an important meeting with a new perspective client. This  | REQ_0002 | 1        |
| 3 | 3.       | <b>Functional Requirements</b><br><u>Goto: Food Inventory &lt;&gt;, Recipe Database &lt;&gt;, Recipe Search &lt;&gt;, Remote Access &lt;&gt;</u>   | REQ_0003 | 1        |
| 4 | 3.1      | <b>Food Inventory</b><br>CARA will keep track of what food items are currently in the kitchen, and will keep track of vital information about each item - how much is on hand, the expiration date, etc. In particular, CARA shall be able to perform the following actions: | REQ_0004 | 1        |

## Results

You can also import a Word document into an existing RQM or one of its packages as follows.

### 4.2.1 Links Between an RQM and a Word Document

If you select to create a link between the RQM and Word document during the import process, then they will be synchronized and can be updated when either changes.

## Word Document Properties Sheet

A Word document is linked to an RQM (or package) through custom properties and requirement tags, and the link details are displayed on the *Custom* tab of the Word document's property sheet.

To display the document property sheet, select **File > Properties** from within Word.

**CyberFridge2.doc Properties** [?] [X]

General | Summary | Statistics | Contents | Custom

Name:

Checked by  
Client  
Date completed  
Department  
Destination  
Disposition

Type:

Value:  ☐ Link to content

Properties:

| Name                                | Value     |
|-------------------------------------|-----------|
| Requirements Model ID               | {1F863E96 |
| Requirements Model Name             | Requireme |
| File Path of the Requirements Model | C:\TEMP\C |
| Synchronization Date                | 23/09/200 |

<< Less

## Custom Tags

The actual linking is performed by custom tags in the document:

[PDRQM:{A7C188D9-DA79-4C02-B1A2-42700B3D9D93},REQ\_0003]

## Functional Requirements¶

**Goto:** Food Inventory, Recipe Database, Recipe Search, Remote Access°.¶

[PDRQM]{EBAE5891-9013-44C5-899A-37794823D803},REQ\_0004]

### 'Food Inventory'¶

CARA will keep track of what food items are currently in the kitchen, and will keep track of vital information about each item -- how much is on hand, the expiration date, etc. In particular, CARA shall be able to perform the following actions:¶

[PDRQM]{2042DC74-333B-4E2A-A29A-448C8048C7B9},REQ\_0005]

### User list¶

The CyberFridge shall give the user a list of all food items currently in its inventory. CARA shall order this list according to criteria set by the user. These criteria shall include, but will not be limited to: food categories, alphabetical list, and time remaining before the items should be removed from the inventory.¶

[PDRQM]

Each requirement is placed between a [PDRQM] tag with a unique ID to indicate its start, and a [/PDRQM] tag to indicate its end. To display the requirement tags, click the Show/Hide tool:



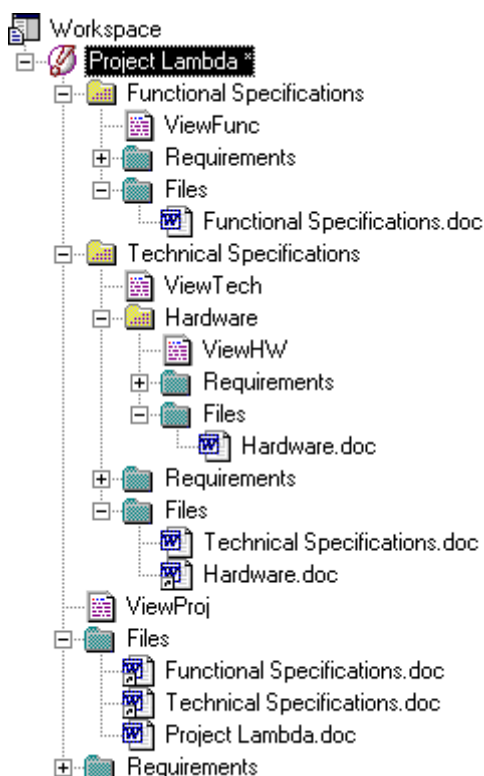
## Browser Files Folder

The linked Word document is shown in the PowerDesigner Browser in a *Files* folder attached to the model (or package).

When an RQM contains packages, each package can be linked to a specific Word document. A package cannot be linked to more than one document.

If the model is itself linked to a document, only the requirements which do not belong to a package are linked to the document.

For example:



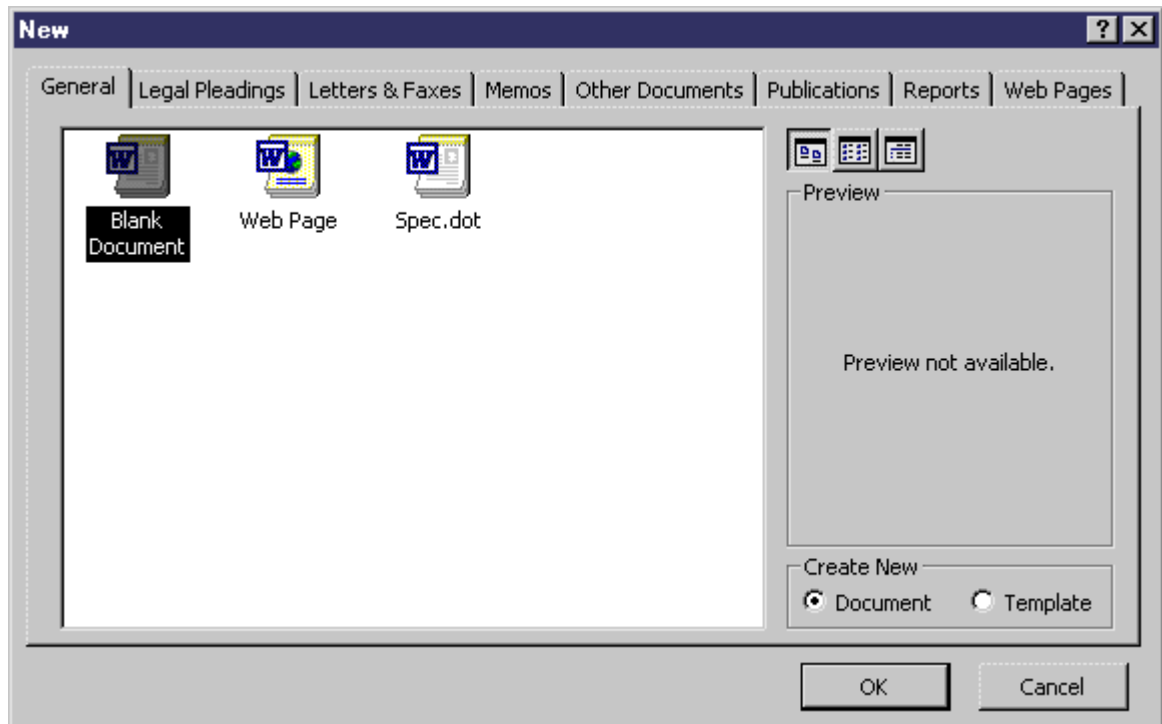
Note: The Files folder of the model item contains the model file and a shortcut for each package file.





## Procedure

1. In PowerDesigner, select **Tools** > **Export as Word Document**.
2. [If the RQM has not been saved] The Save As dialog box will open. Select a directory and enter a file name for the model, and then click **Save**.
3. Word opens with the New dialog box:



4. In the **General** tab, click **Blank Document** or a template icon (with a .dot extension - you might want to use a template for predefined Word heading styles), and click **OK**.
5. The Save As dialog box opens. Select a directory and enter a file name for the document, and then click **Save**.
6. The Export Table Mapping dialog opens. You can choose to:
  - Export composite requirements as headings and subheadings, or
  - Export composite requirements as table rows – you can additionally select which properties to export in this mode, by selecting or deselecting the checkboxes to the left of the list, and the titles of table columns by editing the text in the **Table Header** column.
7. Click **OK** to begin the export. The requirements are written to the document. Each requirement is placed between a [PDRQM] tag with a unique ID to indicate its start, and a [/PDRQM] tag to indicate its end:

[PFCOM(11DE818E-80B1-4191-9C1F-B21CB02A3411)XREQ\_0001]]

## 1→ Project Description of Target System¶

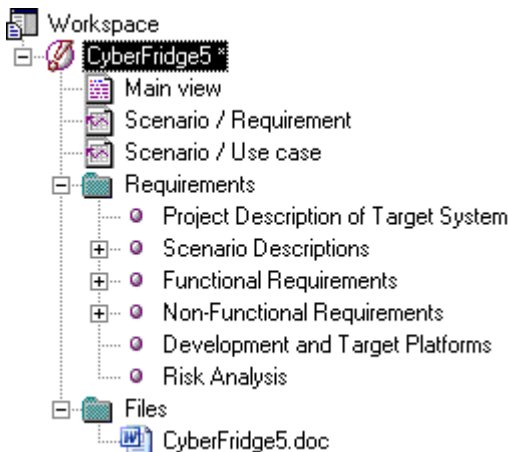
The CyberFridge project is to use Internet connectivity, vision and mechanical systems to create an intelligent and productive refrigerator. Many of our daily tasks revolve around the refrigerator, and a CyberFridge would allow the automation of many of these routine tasks. Our project is a specific subset of this area which will allow you to use a recipe system to determine what recipe you would like to fix, and let you know if the items to make it reside in your kitchen. Specifically known as C.A.R.A. (Clifford Automated Recipe Agent) the recipe agent will primarily serve the purpose of electronically making a shopping list and telling to its user the items which are lacking for a certain recipe and those items which currently reside in the fridge. CARA will therefore cross index the current inventory of the fridge and a recipe database in order to suggest what meals to make and what ingredients are to be bought (i.e. our grocery list). The recipe database will essentially have recipes of specific types of dishes (ex. Chinese, Italian, etc.) which the family living in the home would like to eat. The database will also record the more popular dishes selected previously, which are determined by the number of times a certain dish is requested in relation to other dishes. Our database can also be updated to add new recipes at the user's discretion. ¶

[PFCOM(11DE818E-80B1-4191-9C1F-B21CB02A3411)XREQ\_0001]]

## 2→ Scenario Descriptions¶

[PFCOM(11DE818E-80B1-4191-9C1F-B21CB02A3411)XREQ\_0001]]

The RQM and the Word document are automatically linked, and the Word file is attached to the model (or the package), in the Files folder in the Browser:



## 4.4 Inserting an RQM into an Existing Word Document

You may want to insert an RQM or one of its packages into an existing Word document. This would allow you to insert a list of requirements maintained in an RQM into a more general project document.

### Context

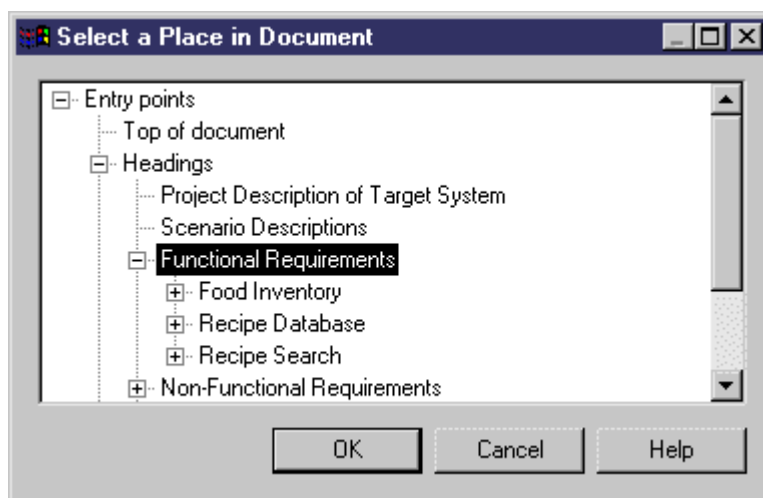
The following procedure assumes you have an RQM open in the workspace, which is not linked to an existing document. Word need not be open.

## Procedure

1. In PowerDesigner, select **Tools > Merge with an Existing Word Document** to display the Open dialog box.
2. Navigate to the required Word file and click Open. Note that, if Word is already open, you may need to click its blinking taskbar button.

PowerDesigner parses the document to determine its structure and then the Select a Place in Document dialog box opens:

3. Expand the Entry points node and all its sub-nodes, and select a title beneath which you want to insert the requirements:



4. Click OK to begin the insertion of the RQM in the document. When the process is complete, the RQM and the Word document are automatically linked, and the Word file is attached to the model (or the package), in the Files folder in the Browser.
5. Double-click the Word file in the Browser tree view to open it and view the added requirements.

## 4.5 Updating a Word Document Linked to an RQM

You can update a Word document linked to an RQM so that it includes any changes made in the model.

### Context

#### **i** Note

If you add graphics to a linked Word document, do not try to update the document from the RQM, you will lose the graphics. Modify the document and then update the model from the document.

## Procedure

1. In PowerDesigner, open an RQM previously linked to a Word document and make any necessary changes.
2. Right-click the model or package entry in the Browser and select *Update Word Document*. Word is launched and the document is parsed and updated.




## 4.6 Updating an RQM Linked to a Word Document



You can update an RQM linked to a Word document so that it includes any changes made in the document.

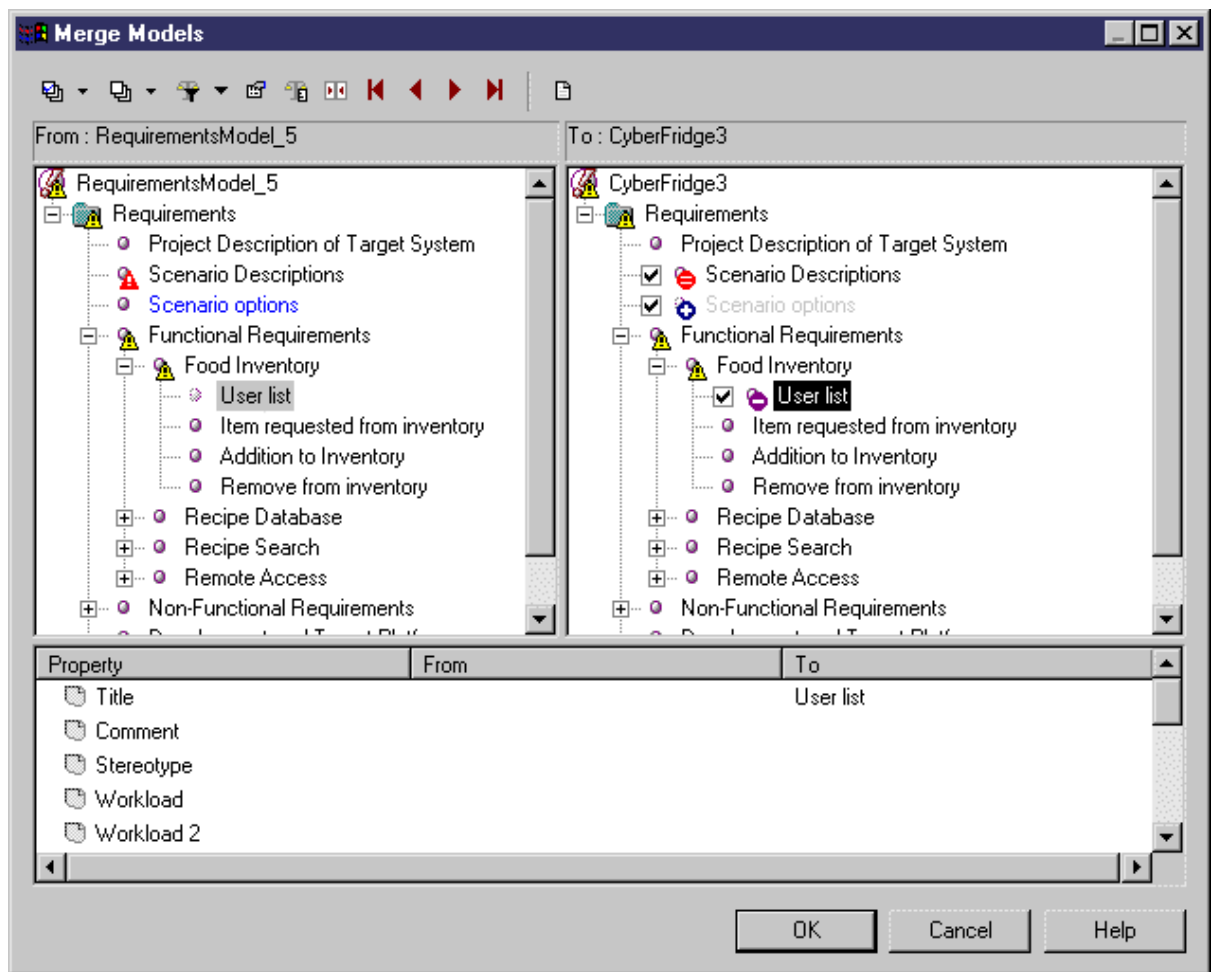
### Procedure

1. In Word, open a document previously linked to an RQM and make any necessary changes.

#### Note

When editing a Word document linked to an RQM we strongly recommend that you make visible the Field Codes (select  *Tools*  *Options* , and select Field Codes in the Show group box). Edits to an existing requirement must be made within its [PDRQM] tags, and new requirements must be added outside of these tags.

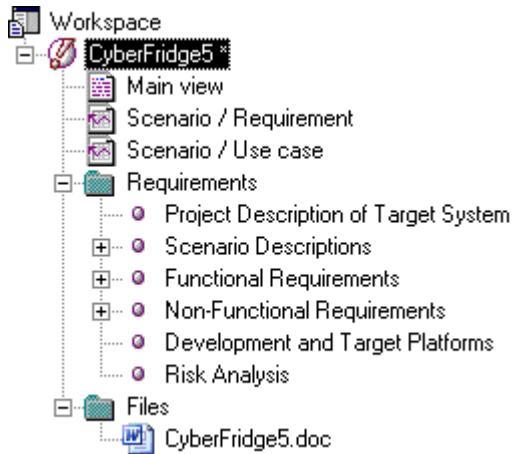
2. Select  *Requirements*  to open the Import Requirements Wizard to step 3, which displays all the requirements titles in a tree format. The titles already linked to a requirement have their check box selected and grayed. You cannot deselect them. Any new requirements are selected but not grayed and requirements that have been deleted are no longer visible.
3. Select or deselect headings to import as required, and then click Finish to begin the update. The Merge Models dialog box opens, with the structure of the modified Word document displayed in the left panel, and the existing RQM displayed in the right panel:



4. Review your changes and then click OK to update the RQM.

## 4.7 Unlinking RQMs and Word Documents

You can detach an RQM from a Word document in Word by selecting **Requirements > Detach the Document from the Requirements Model** or in PowerDesigner by deleting the Word file in the Browser.



The requirement tags are deleted from the Word file, which is removed from the [Requirement Traceability Links](#) tab of the model, package, and requirements property sheets.

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