# NI Requirements Gateway™

**Getting Started with NI Requirements Gateway**

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11500 North Mopac Expressway    Austin, Texas 78759-3504    USA    Tel: 512 683 0100

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The following conventions are used in this manual:

» The » symbol leads you through nested menu items and dialog box options to a final action. The sequence **File»Page Setup»Options** directs you to pull down the **File** menu, select the **Page Setup** item, and select **Options** from the last dialog box.

This icon denotes a note, which alerts you to important information.

**bold** Bold text denotes items that you must select or click in the software, such as menu items and dialog box options. Bold text also denotes parameter names.

*italic* Italic text denotes variables, emphasis, a cross-reference, or an introduction to a key concept. Italic text also denotes text that is a placeholder for a word or value that you must supply.

monospace Text in this font denotes text or characters that you should enter from the keyboard, sections of code, programming examples, and syntax examples. This font is also used for the proper names of disk drives, paths, directories, programs, subprograms, subroutines, device names, functions, operations, variables, filenames, and extensions.

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**1**

# Installing NI Requirements Gateway

This chapter provides information about the NI Requirements Gateway system requirements, installation instructions, and a description of licensing information. This chapter is also a starting point for how you can familiarize yourself with NI Requirements Gateway.

Before you begin your test application, you must install NI Requirements Gateway on your computer. The NI Requirements Gateway setup program installs the software in approximately five minutes.

## Minimum System Requirements

To run NI Requirements Gateway 1.0, National Instruments recommends that your system meet the following requirements:

- Windows 2000 Service Pack 3 or later/
  Windows XP Service Pack 2 or later
- 800 MHz Pentium class microprocessor
- 256 MB of memory
- 70 MB of free hard disk space
- SVGA resolution or higher video adapter, with a minimum 800 × 600 video resolution
- Microsoft-compatible mouse
- Microsoft Internet Explorer version 6.0 or later

NI Requirements Gateway 1.0 is compatible with the following National Instruments application development environments:

- LabVIEW 7.0 or later
- LabWindows™/CVI™ 7.0 or later
- NI MATRIXx 7.1.6 or later
- NI TestStand 3.1 or later

# Installation Instructions

✎ **Note**    National Instruments recommends that you close all open applications before you install NI Requirements Gateway.

Unless you specify another location during installation, the NI Requirements Gateway installation program copies files to `<Program Files>\National Instruments\Requirements Gateway 1.0` after you complete the following steps:

1.  Insert the NI Requirements Gateway CD into the CD-ROM drive. If the CD startup screen is not visible, select **Run** from the Windows **Start** menu and run `setup.exe` from your CD.

2.  Follow the instructions in the dialog boxes.

# Licensing

When you run NI Requirements Gateway for the first time, it prompts you to activate a license for the product. If you do not activate a valid license, NI Requirements Gateway runs in Evaluation Mode and continues to prompt you to activate a license on each subsequent launch. In Evaluation Mode, you can use all of the features of the product for 30 days. After the 30 day evaluation period expires, you must activate a valid license to continue using the product.

✎ **Note**    This section is designed to assist you in understanding the licensing policies for NI Requirements Gateway. This document does not replace the National Instruments Software License Agreement and should only be used as a reference.

# Learning NI Requirements Gateway

The best way to familiarize yourself with NI Requirements Gateway is to complete the following tasks:

•   Read Chapter 2, *Introduction to NI Requirements Gateway*, of *Getting Started with NI Requirements Gateway* to familiarize yourself with concepts and features.

•   Complete the tutorials in subsequent chapters in *Getting Started with NI Requirements Gateway*. Chapters 7 through 11 describe how to use NI Requirements Gateway with external products.

- Read Chapter 2, *Presentation of NI Requirements Gateway*, of the *NI Requirements Gateway User Manual*, and familiarize yourself with the other chapters in that manual. You can open the document by selecting **Documentation»User Manual** from the **Help** menu in Requirements Gateway.

- Review the example projects in the `<Requirements Gateway>\ Examples` directory.

You can access additional documentation such as the *NI Requirements Gateway Customization Guide* and the coupling documents for various types by selecting **Documentation** from the **Help** menu in Requirements Gateway.

# 2

# Introduction to NI Requirements Gateway

This chapter provides a general overview of how to manage requirements and discusses the different windows in the Requirements Gateway application environment.
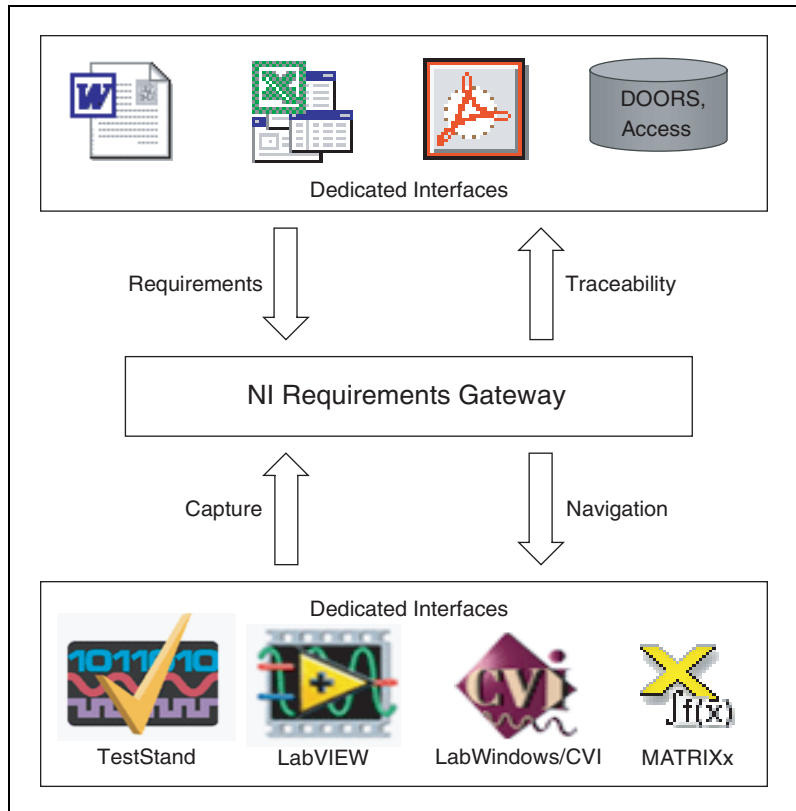
## NI Requirements Gateway Overview

NI Requirements Gateway is a requirements traceability solution that links your development and verification documents with formal *requirements* stored in documents and databases. NI Requirements Gateway improves the quality of the development process by effectively managing requirements traceability and impact analysis throughout a project's life cycle.

Most engineering projects start by defining high-level specifications, followed by more detailed specifications, as the project progresses. Specifications contain technical and procedural requirements that guide the product through each engineering phase. In addition, working documents, such as hardware schematics, simulation models, software source code, and test specifications and procedures must adhere to and cover the requirements defined by the specifications.

Figure 2-1 outlines how NI Requirements Gateway interacts with external products. NI Requirements Gateway allows you to configure which specification and working documents to process, configure the type of traceability information to capture from each document, and specify the traceability relationship between the specification and working documents. You can navigate between documents in Requirements Gateway and the external products.

**Figure 2-1.** NI Requirements Gateway Overview

NI Requirements Gateway performs coverage and impact analysis, graphically displays relationships between documents, and generates comprehensive reports. NI Requirements Gateway is an effective solution for enhancing project management by linking traceability information from any source it comes from.

NI Requirements Gateway includes the following features that allow you to:

• Manage project documents and graphically create traceability relationships between documents

• Customize types for importing various types of data from National Instruments and third-party products

• Use coverage analysis, impact analysis, and graphical views to visualize and analyze traceability relationships between documents

• Create filters to customize analysis and views

- Capture and compare project snapshots to determine changes in requirements and coverage
- Generate reports using default and custom templates

# Starting Requirements Gateway

When you launch Requirements Gateway, the main window is visible, as shown in Figure 2-2.



| 1 | Toolbar | 3 | Filter Ring Control | 5 | Project Workspace |
|---|---------|---|---------------------|---|-------------------|
| 2 | Menu Bar | 4 | View Tabs | 6 | Status Bar |
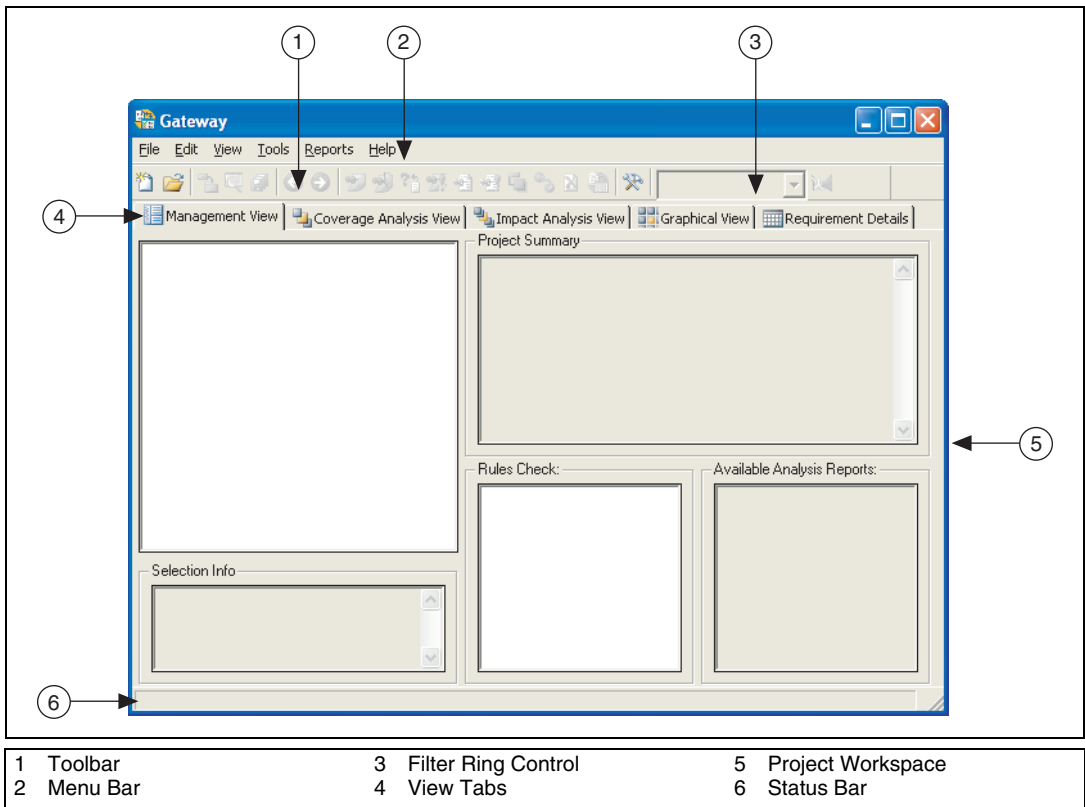
**Figure 2-2.**  Requirements Gateway Main Window

# Introduction to Requirements Gateway

The main window has four main parts: the menu bar, toolbar, project workspace, and status bar.

## Menu Bar

The menu bar contains the following menus: File, Edit, View, Tools, Reports, and Help. Browse the menus in the menu bar of the main window to familiarize yourself with their contents. The status bar displays a brief explanation when you hover over an item in the menu.

## Toolbar

The toolbar contains shortcuts to commonly used selections of the menu bar. Figure 2-3 shows the following six sections in the toolbar: Standard, Configuration, Navigation, View Options, Filtering, and Third Party.



| 1 Standard | 3 Navigation | 5 Filtering |
| 2 Configuration | 4 View Options | 6 Third Party |
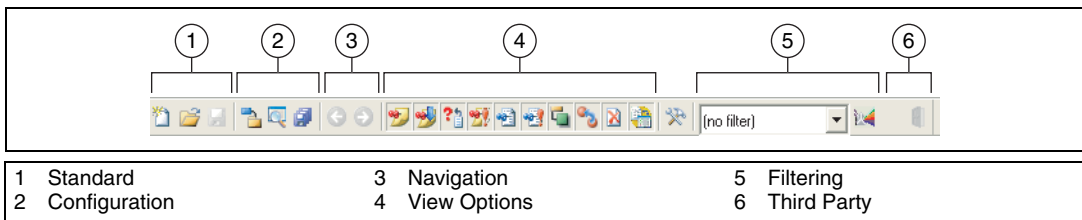
**Figure 2-3.** Requirements Gateway Toolbar

- **Standard**—Contains buttons for creating, loading, and saving project files.
- **Configuration**—Contains buttons for configuring projects, types, and snapshots.
- **Navigation**—Contains buttons to apply navigation commands previously performed within the coverage information of the Coverage Analysis View and Impact Analysis View.
- **View Options**—Contains buttons to control which traceability elements are visible in the Management View, Coverage Analysis View, and Impact Analysis View.
- **Filtering**—Contains the Filter ring control to configure and apply filters that specify the conditions by which to include requirements in an analysis or view.
- **Third Party**—Contains a button that applies to specific third-party products, such as Telelogic DOORS.

# Project Workspace

The project workspace is the main part of the application. It displays the project information and analysis for the loaded project. The project workspace contains tabs for displaying the contents of the project in different views. Each view may contain one or more panes.
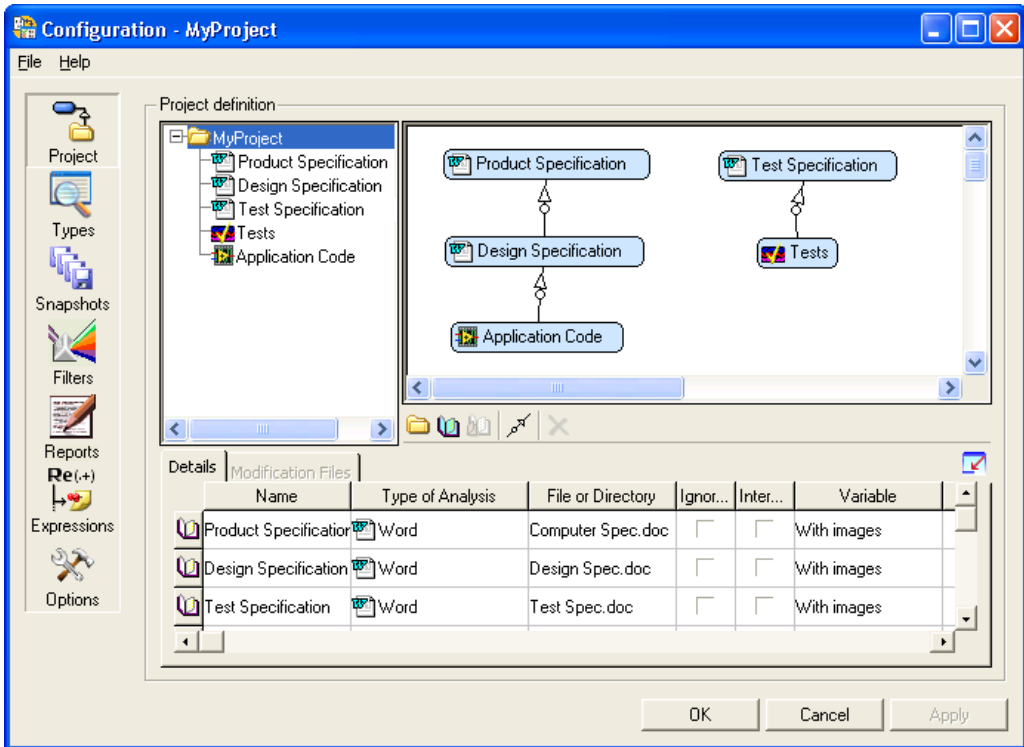
The project workspace contains the following views:

- **Management View**—Displays the documents in the project, the elements of each document, and a summary of coverage information for the project.

- **Coverage Analysis View**—Displays one level of covering elements, N–1, for a selected element of a document, and one level of covered elements, N+1, from other documents as defined by the project.

- **Impact Analysis View**—Displays all levels of covering elements, N–m, for a selected element of a document, and all levels of covered elements, N+p, from other documents as defined by the project.

- **Graphical View**—Displays each document graphically using a tree view with lines connecting requirement elements in documents and covering elements in other documents.

- **Requirement Details**—Displays each requirement and its *attributes* for a document in a table.

# Status Bar

The status bar displays common information in the application, such as descriptions for menu items or status while performing analysis.

# Configuration Dialog Box

Requirements Gateway launches the Configuration dialog box when you select a menu item or toolbar button to configure one of the following parts of your project: Project, Types, Snapshots, Filters, Reports, Expressions, or Options. The Configuration dialog box is shown in Figure 2-4.



**Figure 2-4.** Requirements Gateway Configuration Dialog Box

The Configuration dialog box contains the following panes:

- **Project**—Allows you to configure the project by specifying the documents to include, the type of each document, and the covering relationship between documents. Refer to Chapter 4, *Project Configuration*, in the *NI Requirements Gateway User Manual* located in the **Help** menu of the main window for more information about configuring projects.

- **Types**—Allows you to create new types or customize existing types for your project. Refer to the *NI Requirements Gateway Customization Guide* located in the **Help** menu of the main window for more information about customizing types.

- **Snapshots**—Allows you to create, manage, and compare snapshots of your project. Refer to Chapter 7, *Snapshot Management*, in the *NI Requirements Gateway User Manual* for more information about using snapshots.

- **Filters**—Allows you to define custom filters to analyze or display certain requirements from documents that meet specific criteria. You can enable filters using the Filter ring control on the toolbar in the Requirements Gateway main window. Refer to the *Filters* section of Chapter 5, *Project Analysis*, in the *NI Requirements Gateway User Manual* for more information about using filters.

- **Reports**—Allows you to define new custom reports. You can generate a default report or a custom report using the **Reports»Library Reports** submenu in the main window. Refer to Chapter 8, *Generating Documentation*, in the *NI Requirements Gateway User Manual* for more information about generating reports.

- **Expressions**—Allows you to test regular expressions. You can specify source text and a regular expression, and the pane displays the captured text returned by the regular expression.

- **Options**—Allows you to set the default font for the text in the application, set the password for the project, define environmental variables, and specify other miscellaneous settings for the application.

In the next chapter, you learn about the different windows and views in Requirements Gateway.

# 3

# Managing Requirements

In this chapter, you learn about the different windows and views in Requirements Gateway by creating a project, adding existing documents to the project, and reviewing the contents of the documents.

A project specifies the documents that Requirements Gateway analyzes and displays. A project also specifies which *type* to use for each document. A type defines how to select external files that represent a document, how to read the contents of the external files, how to interpret the contents as elements for managing requirements, and how to display the elements of the document.

Requirements Gateway contains a set of predefined types for the following data sources:

- Microsoft Word documents
- Microsoft Excel spreadsheets
- Telelogic DOORS databases
- IBM Rational RequisitePro databases
- TestStand sequence files and XML reports
- MATRIXx SystemBuild catalogs
- LabVIEW VIs
- LabWindows/CVI source code and function panel files
- Microsoft Access database files
- Acrobat PDF files
- Microsoft Visio project files
- Generic text files
- Generic source code files

# Creating a Project

✎ **Note**  The exercises in this manual modify the tutorial files located in the `<Requirements Gateway>\Tutorial` directory. You can restore the tutorial files to their original state by copying the files from the `<Requirements Gateway>\Tutorial\Original` directory into the `<Requirements Gateway>\Tutorial` directory.

In this exercise, you learn how to start the Requirements Gateway application and create a new project. You also learn how to add and configure documents in the project, review the contents of the documents, and use the views in the Requirements Gateway project workspace.

1. Launch Requirements Gateway by selecting **Start»All Programs» National Instruments»Requirements Gateway 1.0» Requirements Gateway**. You should now see the Requirements Gateway main window.

2. Select **File»New** to launch the Create a New Project and Save As dialog box, and navigate to the `<Requirements Gateway>\ Tutorial` directory.

3. Enter `MyProject` in the File name control and click **Save**.

Requirements Gateway creates a new project file, `MyProject.rqtf`, in the `<Requirements Gateway>\Tutorial` directory and displays the Project pane of the Configuration dialog box as shown in Figure 3-1. A project file defines which documents Requirements Gateway reads, the type of each document, and the covering relationship between those documents.
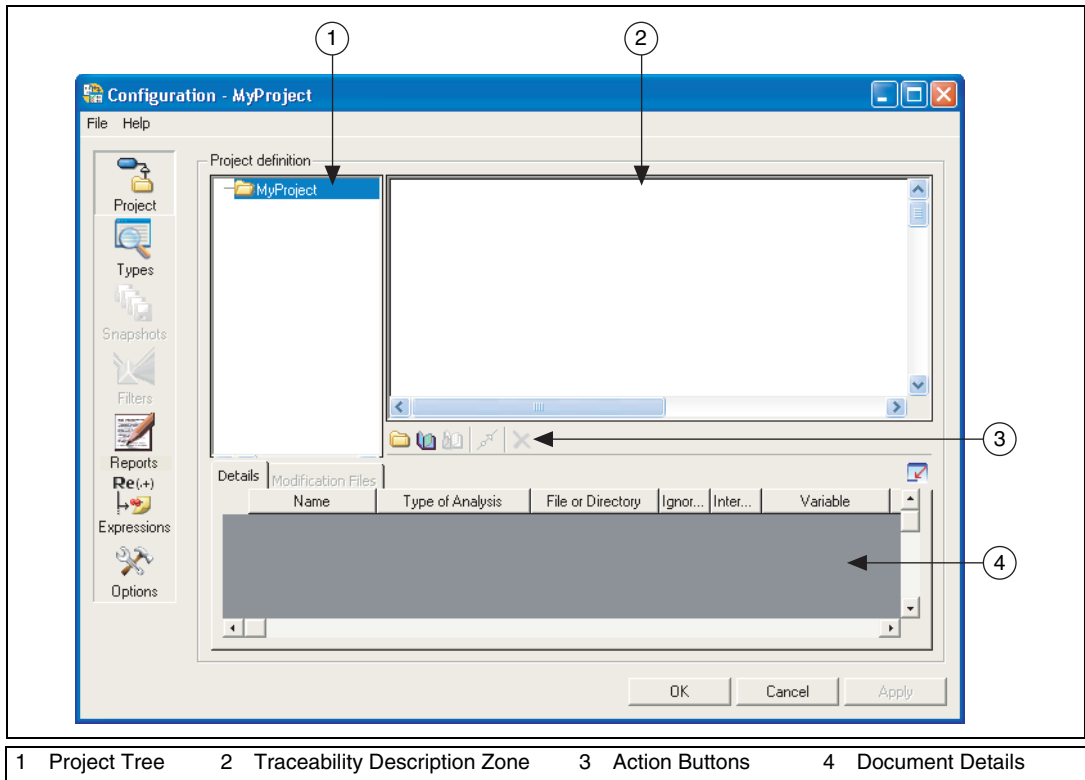
| 1 | Project Tree | 2 | Traceability Description Zone | 3 | Action Buttons | 4 | Document Details |

**Figure 3-1.** New Project in Configuration Dialog Box
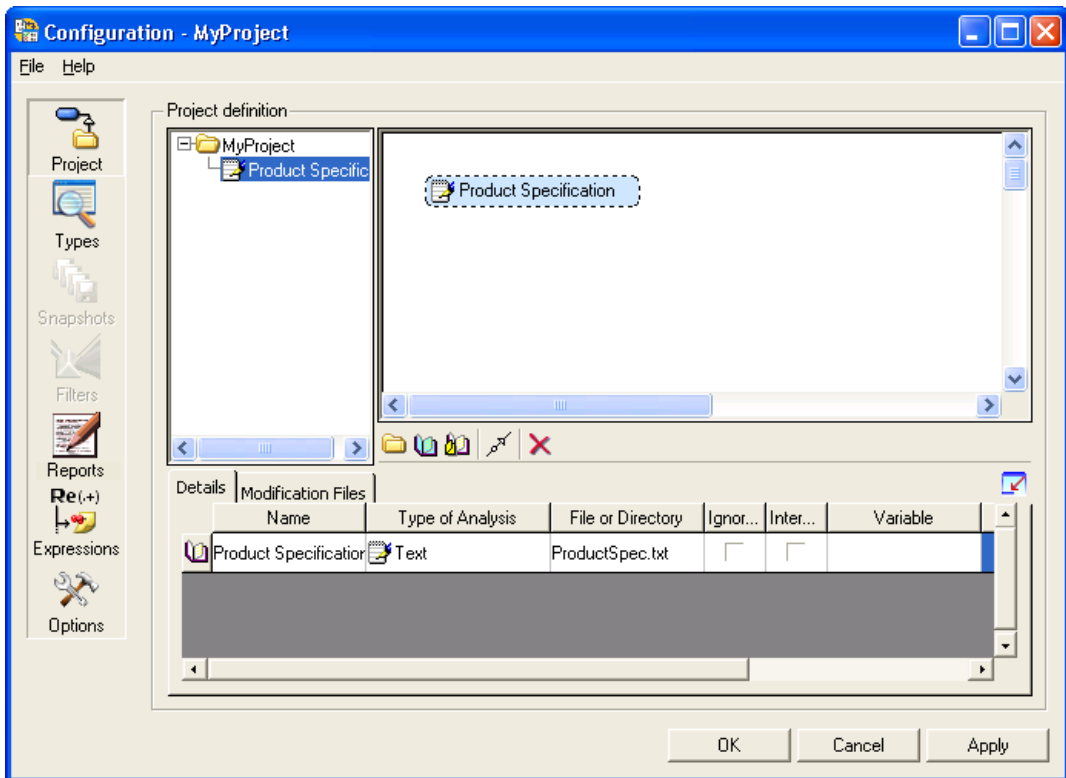
# Adding a Document

In this section, you learn how to add a specification document to the project you created in the *Creating a Project* section of this chapter.

1. Click the **Add a document** button. The cursor automatically moves to the Traceability Description Zone and the cursor outlines a document object. Click within the Traceability Description Zone to place the document.

   When you place the document, the document is added to the Project Tree pane. The Document Details pane displays the settings for the selected document in the Project Tree pane.

2.  In the Document Details pane, click in the **Name** column to select the **Document1** text. Type `Product Specification` and press **<Enter>** to rename the document. The name in the document object now displays the new name.

3.  Click in the **Type of Analysis** column and select **Text** in the ring control to instruct Requirements Gateway to analyze the document using the Text type.

4.  Click in the **File or Directory** column. The File Browse button is now visible on the right side of the control. Click the **File Browse** button and select `<Requirements Gateway>\Tutorial\ ProductSpec.txt`. Figure 3-2 displays the completed Configuration dialog box.



**Figure 3-2.**  Adding a Document to a New Project
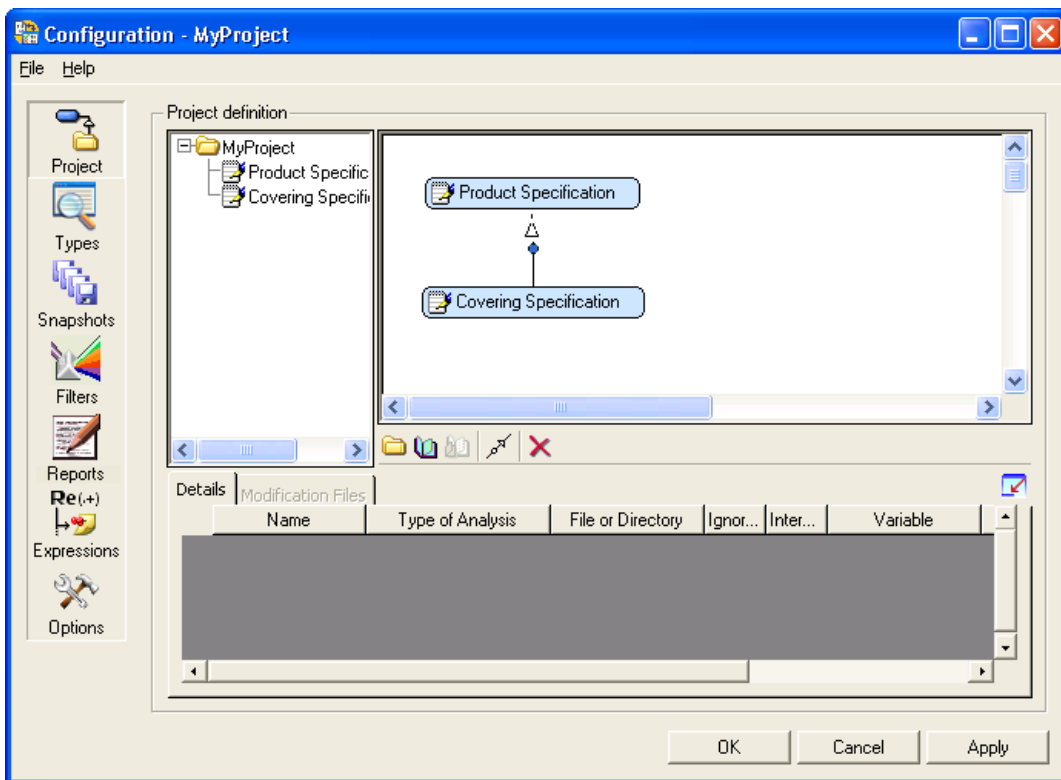
# Adding a Covering Document

A *covering document* is a document that contains *references* to requirements that are defined in another document. In this section, you learn how to add a new document to the project that covers the Product Specification document.

1. Click the **Add a document** button to add a second document in the Traceability Description Zone. Place the document below the Product Specification document.

2. In the Document Details pane, enter `Covering Specification` in the Name control, select **Text** from the Type of Analysis ring control, and browse to `<Requirements Gateway>\Tutorial\ CoveringSpec.txt` in the File or Directory control.

3.   Click the **Add a cover** button. The cursor moves to the Traceability Description Zone. Click the **Covering Specification** document and then click the **Product Specification** document. An arrow is now visible between the two documents as shown in Figure 3-3. This arrow indicates that the Covering Specification document covers the Product Specification document.
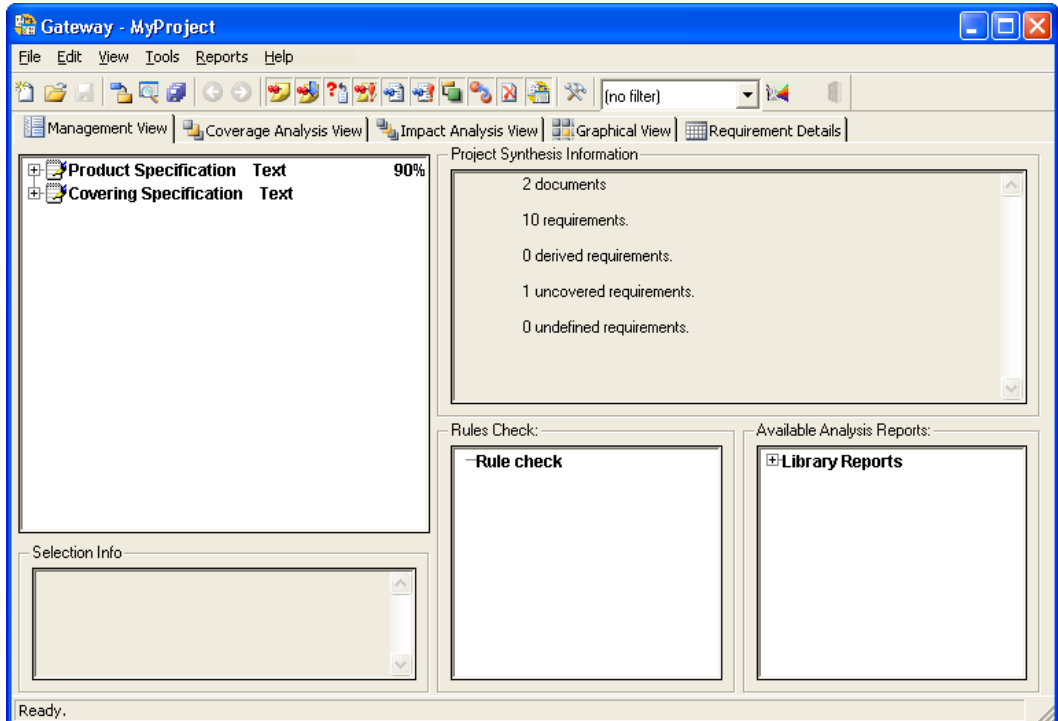


**Figure 3-3.**  Covering Document in Project

4.   Click **OK** to close the Configuration dialog box.

# Using the Management View

After you close the Configuration dialog box in step 4 of the *Adding a Covering Document* section, the main window is visible as shown in Figure 3-4.



**Figure 3-4.**  Management View

The upper left section of the Management View displays a list of the documents defined by the project in a tree view pane. The tree view pane contains two root nodes, one for each of the documents that you added to the project. The Project Synthesis Information section indicates that the project has two documents with ten defined requirements and one uncovered requirement.

Complete the following steps to familiarize yourself with the Management View and the documents that you included in the project.

1. Right-click the **Product Specification** document in the tree view pane and select **Navigate** from the context menu. Requirements Gateway

displays `ProductSpec.txt` in an external application as shown in Figure 3-5.

**Note** Requirements Gateway launches the application that is associated with `.txt` files for your computer. The default application for Windows 2000 and Windows XP is Microsoft Notepad.
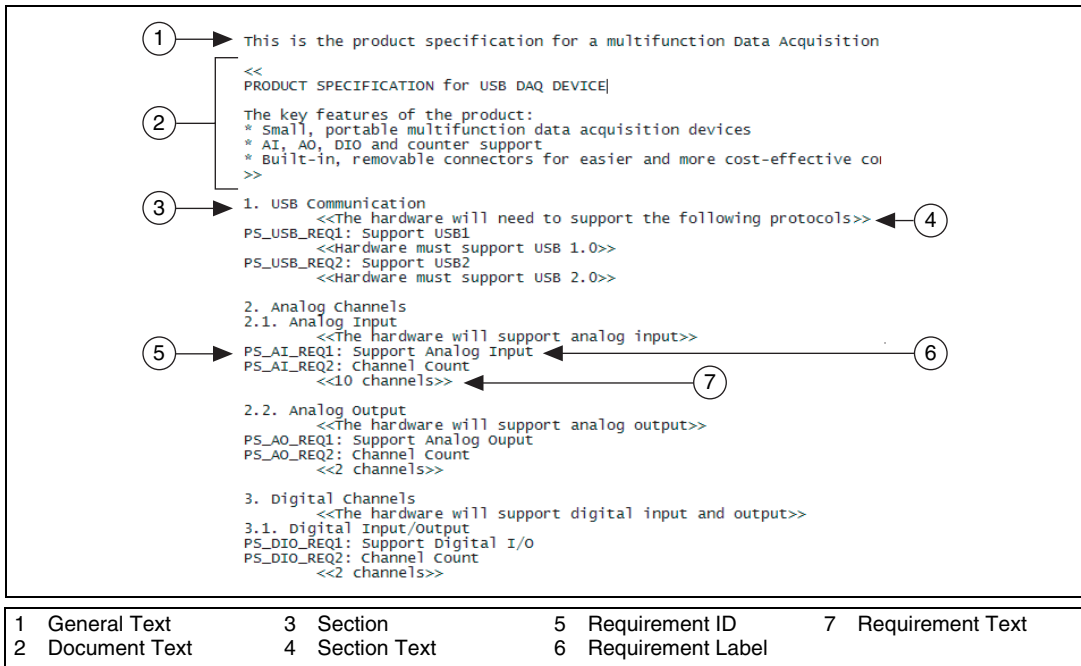


This is the product specification for a multifunction Data Acquisition

```
<<
PRODUCT SPECIFICATION for USB DAQ DEVICE|

The key features of the product:
* Small, portable multifunction data acquisition devices
* AI, AO, DIO and counter support
* Built-in, removable connectors for easier and more cost-effective co
>>

1. USB Communication
        <<The hardware will need to support the following protocols>>
PS_USB_REQ1: Support USB1
        <<Hardware must support USB 1.0>>
PS_USB_REQ2: Support USB2
        <<Hardware must support USB 2.0>>

2. Analog Channels
2.1. Analog Input
        <<The hardware will support analog input>>
PS_AI_REQ1: Support Analog Input
PS_AI_REQ2: Channel Count
        <<10 channels>>

2.2. Analog Output
        <<The hardware will support analog output>>
PS_AO_REQ1: Support Analog Ouput
PS_AO_REQ2: Channel Count
        <<2 channels>>

3. Digital Channels
        <<The hardware will support digital input and output>>
3.1. Digital Input/Output
PS_DIO_REQ1: Support Digital I/O
PS_DIO_REQ2: Channel Count
        <<2 channels>>
```

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 1 | General Text | 3 | Section | 5 | Requirement ID | 7 | Requirement Text |
| 2 | Document Text | 4 | Section Text | 6 | Requirement Label | | |

**Figure 3-5.** ProductSpec.txt Document

2. Review the contents of the text file in the external application. `ProductSpec.txt` specifies ten requirements.

The file contains three types of elements: sections, requirements, and text. The default Text type in Requirements Gateway interprets the contents of the file as follows:

- **Section**—Defined by numeric heading characters such as `2.1`. The text after the numeric heading is the *section*'s text.

- **Requirement**—Defined by an identifier that contains a set of arbitrary characters, followed by the characters, `REQ`, and ending with a numeric value. The label for the requirement is located after the identifier and is delimited by a colon character.

- **Text**—When delimited by the << and >> characters, the text is associated with the previously specified element. If an initial *text* element is specified at the beginning of the file, the text is associated with the document.

3. Exit the application that is displaying `ProductSpec.txt`.

4. In Requirements Gateway, select the **Covering Specification** document in the tree view pane.

5. Right-click the **Covering Specification** document and select **Navigate** from the context menu. Requirements Gateway displays `CoveringSpec.txt` in an external application.

6. Review the contents of the text file in the external application. `CoveringSpec.txt` contains section and text elements, but instead of requirements, the file contains references to requirements. A reference is defined by the prefix characters `[Covers:`, followed by a set of characters that represent the requirement identifier, and completed with a closing bracket character.

   `CoveringSpec.txt` specifies nine requirement references. Notice that the 1.2. USB 2.0 Speeds section of the document does not contain a requirement reference. This missing reference is discussed in step 16 of this exercise.

7. Exit the application that is displaying `CoveringSpec.txt`.

8. In Requirements Gateway, select the **Product Specification** document in the tree view pane. The tree view pane displays the percentage of covered requirements for a document, which is 90% for this document. The Selection Info section in the lower left corner of the window indicates that the document defines ten requirements, and one of the requirements is uncovered.

9.  Expand the child elements of the **Product Specification** document in the tree view pane of the Management View as shown in Figure 3-6.

**Note**    To expand a parent element and all its child elements, press **<Shift>** while clicking the plus icon to expand the parent element.

The tree view pane displays the section headings from the text file as parent elements and displays the requirements as child elements.
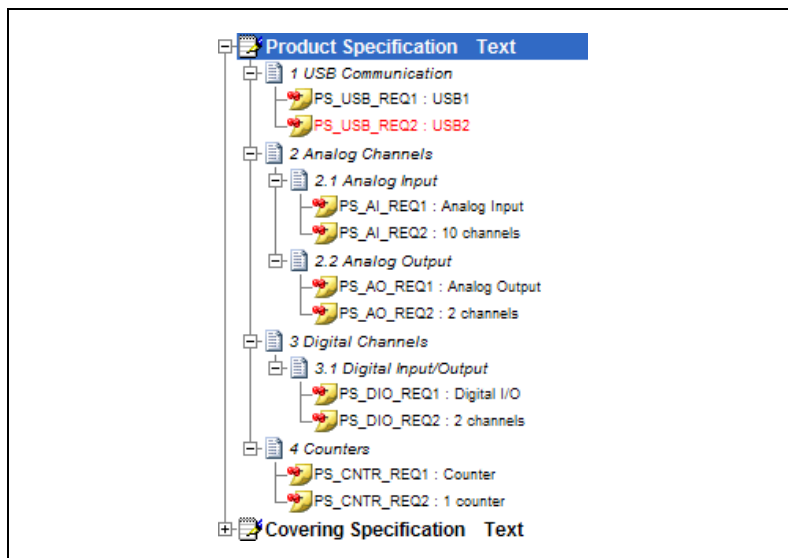


**Figure 3-6.**  Product Specification in Management View

10. Select the **PS_USB_REQ1** element in the tree view pane. The PS_USB_REQ1 element represents a requirement specified in the document. The Selection Info section indicates that the PS_USB_REQ1 element is a requirement and that the requirement is covered.

11. Select the **PS_USB_REQ2** element in the tree view pane. The Selection Info section indicates that the PS_USB_REQ2 element is also a requirement; however, the requirement is not covered. Requirements Gateway highlights the element name in red.

12. Collapse the **Product Specification** document in the tree view pane of the Management View.

13. Select the **Covering Specification** document in the tree view pane. The Selection Info section indicates that the document contains nine references to requirements.

14. Expand the child elements of the **Covering Specification** document in the tree view pane of the Management View, as shown in Figure 3-7.
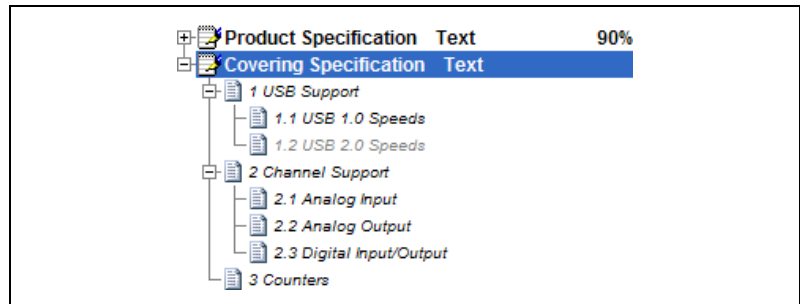


**Figure 3-7.** Covering Specification in Management View

15. Select the **1.1 USB 1.0 Speeds** element. The element represents a section specified in the document. The Selection Info section indicates that the section contains a reference to one requirement.

16. Select the **1.2 USB 2.0 Speeds** element. The Selection Info section for this element indicates that the section is empty and contains no references to any requirements.

17. Collapse the **Covering Specification** document in the tree view pane of the Management View.

18. Expand the elements of the **Rules Check** section of the Management View, as shown in Figure 3-8. The Rules Check section contains a summary of the rules flagged from analyzing the project. For this project, the section indicates that the PS_USB_REQ2 requirement is uncovered.



**Figure 3-8.** Rules Check Section of the Management View

Refer to Chapter 6, *Computations and Checks*, in the *NI Requirements Gateway User Manual* for more information about the various rules that Requirements Gateway defines.

You have completed this section of the tutorial. In the next chapter, you learn how to analyze the project using additional views in Requirements Gateway.

# 4

# Analyzing Requirements

As you learned in Chapter 3, *Managing Requirements*, the Management View summarizes the documents in the project, the structure and requirement-related information in each document, and any rules related to the project. This chapter teaches you how to use the Coverage Analysis View, the Impact Analysis View, and the Graphical View to obtain additional details about the requirements and the references that cover them.

# Using the Coverage Analysis View

Complete the following steps to analyze requirement coverage for the project that you created in Chapter 3, *Managing Requirements*.

1. Click the **Coverage Analysis View** tab in the main window. Check to make sure that the Product Specification and the Covering Specification documents in the Selection column are collapsed, as shown in Figure 4-1.
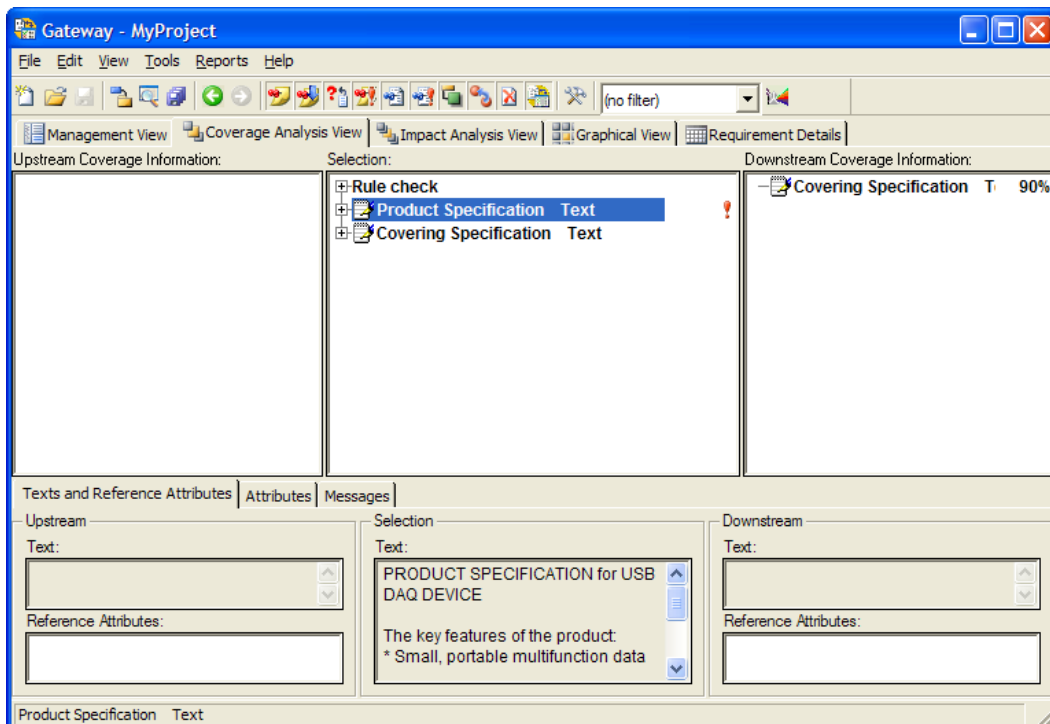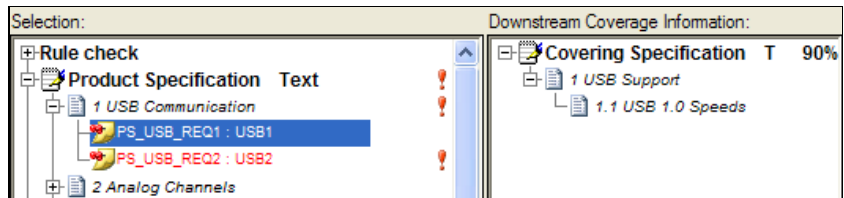


**Figure 4-1.** Coverage Analysis View

The Coverage Analysis View is divided into three columns. The columns in the upper half of the view contain the following tree view panes:

• **Upstream Coverage Information**—For a selected document in the Selection column, the Upstream Coverage Information tree view pane displays one level of covered requirements, N–1, from other documents as defined by the project.

• **Selection**—Displays the contents of the documents in the project.

- **Downstream Coverage Information**—For a selected document in the Selection column, the Downstream Coverage Information tree view pane displays one level of covering requirement reference elements, N+1, from other documents as defined by the project.

The lower half of the Coverage Analysis View contains the following three tabs. Each tab is divided into three columns that display details about the selected element in the upper half of the view.

- **Texts and Reference Attributes**—Displays the text for the selected element and any *reference attributes* for references linking the selection in the Selection column to the corresponding element in the Upstream Coverage Information or Downstream Coverage Information column.

- **Attributes**—Displays the attributes for the selected element.

- **Messages**—Displays helpful information, including rule violation details, for the selected element in the Selection column.

2. Click the **Product Specification** document in the Selection column. The Downstream Coverage Information column displays that the Product Specification document is covered by the Covering Specification document, and that the document covers 90% of the requirements.

3. Expand the child elements of the **Product Specification** document in the Selection column.

4. Click the **PS_USB_REQ1** requirement as shown in Figure 4-2. The Downstream Coverage Information column displays the 1.1 USB 1.0 Speeds section as a covering element because this section of the document contains a reference to the requirement. The tree view pane also includes the parent, 1 USB Support section of the covering document.



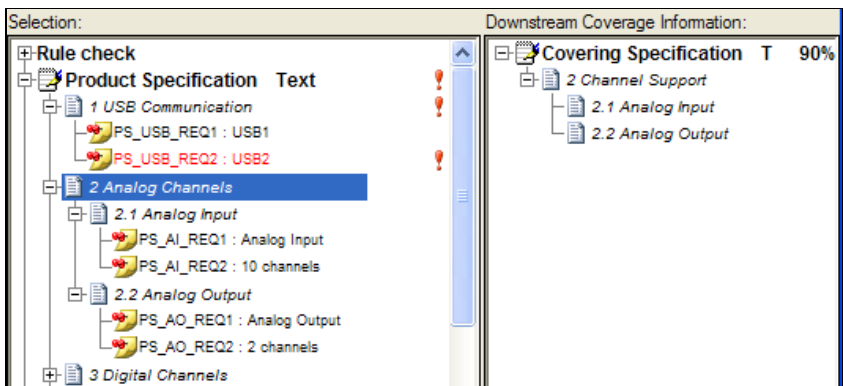**Figure 4-2.**  PS_USB_REQ1 Selected in Coverage Analysis View

5. Click the **PS_USB_REQ2** requirement as shown in Figure 4-3. The Downstream Coverage Information column does not display any covering elements because the covering document does not contain a reference to the requirement.
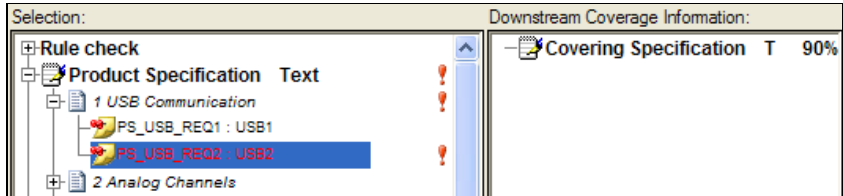


**Figure 4-3.** PS_USB_REQ2 Selected in Coverage Analysis View

6. Hover over the **exclamation** icon to the right of the PS_USB_REQ2 requirement to display a tooltip that contains the text, `1 uncovered requirement`. The Selection column displays the exclamation icon for an uncovered requirement and its parent elements in the document.

7. Click the **2 Analog Channels** section as shown in Figure 4-4. The child elements of the Analog Channels section contain four requirements: PS_AI_REQ1, PS_AI_REQ2, PS_AO_REQ1, and PS_AO_REQ2. The Downstream Coverage Information column displays both the 2.1 Analog Input and the 2.2 Analog Output sections as covering elements. In the covering document, the 2.1 Analog Input section contains references to the PS_AI_REQ1 and PS_AI_REQ2 requirements and the 2.2 Analog Output section contains references to the PS_AO_REQ1, and PS_AO_REQ2 requirements.



**Figure 4-4.** 2 Analog Channels Section Selected in Coverage Analysis View

8. Double-click the **2.1 Analog Input** section in the Downstream Coverage Information column. Requirements Gateway navigates to the 2.1 Analog Input section in the Selection column, as shown in Figure 4-5. The Upstream Coverage Information column displays that 90% of the requirements in the Product Specification document are covered by the Covering Specification document, and that the PS_AI_REQ1 and, PS_AI_REQ2 requirements are specifically covered by references from the 2.1 Analog Input section in the Selection column.
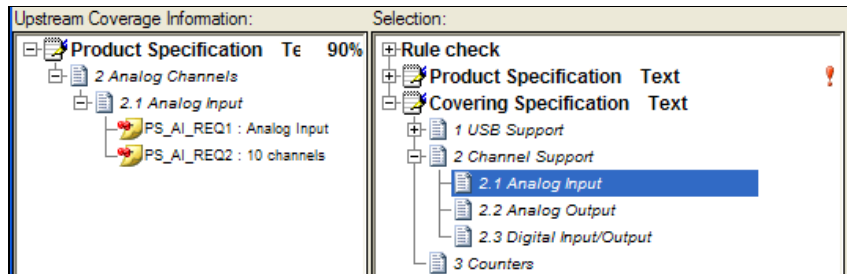


**Figure 4-5.** 2.1 Analog Input Section Selected in Coverage Analysis View

9. Expand the **1 USB Support** section of the Covering Specification document to view the 1.2 USB 2.0 Speeds element.

10. Double-click the **1.2 USB 2.0 Speeds** element in the Selection column to launch `CoveringSpec.txt` in an external application.

11. Edit the file by adding a reference to the PS_USB_REQ2 requirement below the 1.2. USB 2.0 Speeds section as shown in Figure 4-6.

```
1. USB Support
1.1. USB 1.0 Speeds
    <<Hardware supports USB 1.0>>
    [Covers: PS_USB_REQ1]

1.2. USB 2.0 Speeds
    <<Hardware supports USB 2.0>>
    [Covers: PS_USB_REQ2]

2. Channel Support
2.1. Analog Input
    <<Hardware supports analog input>>
    [Covers: PS_AI_REQ1]
    <<10 channels>>
    [Covers: PS_AI_REQ2]
```

**Figure 4-6.** PS_USB_REQ2 Reference in Covering Document

12. Save the changes to `CoveringSpec.txt` and exit the application.

13. Return to Requirements Gateway. When the main window of Requirements Gateway is displayed, the application prompts you indicating that the Covering Specification document was modified. Click **Yes** to reload the file. Requirements Gateway analyzes the new document and updates the view as shown in Figure 4-7.
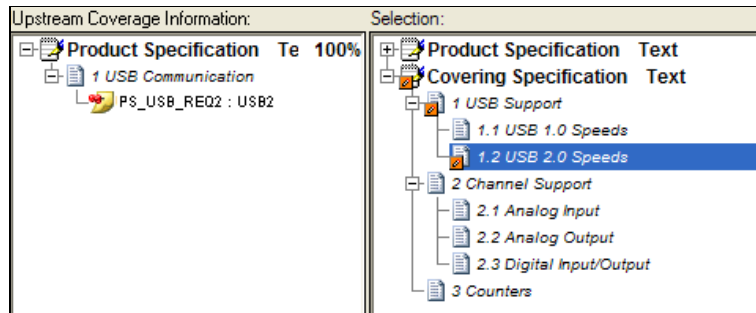


**Figure 4-7.**  Covering Specification Document After Reload

The Upstream Coverage Information column now indicates that the Covering Specification document covers 100% of the requirements in the Product Specification document, the PS_USB_REQ2 requirement is now shown as covered by the 1.2 USB 2.0 Speeds element, and the icon for the 1.2 USB 2.0 Speeds element and its parent elements indicate a change occurred.

In summary, the Coverage Analysis View allows you to select elements from a project document and display requirement coverage one level upstream and one level downstream from the selected document. In the next exercise, you learn how to use the Impact Analysis View.

# Using the Impact Analysis View

The Impact Analysis View displays traceability information from all downstream and upstream documents, as opposed to the Coverage Analysis View, which displays only the immediate downstream and upstream documents.

In this exercise, you learn how to add a third document to the project and how to use the Impact Analysis View.

## Adding a Second Downstream Document

Complete the following steps to add a third document to MyProject.rqtf that you created in Chapter 3, *Managing Requirements*.

1. Select **File»Edit Project** to launch the Project pane of the Configuration dialog box.

2. Click the **Covering Specification** document in the Traceability Description Zone.

3. In the Document Details pane, enter Design Specification in the Name control, select **Text** in the Type of Analysis ring control, and browse to <Requirements Gateway>\Tutorial\ DesignSpec.txt in the File or Directory control.

4. Click the **Add a document** button to add a third document in the Traceability Description Zone. Place the document below the Design Specification document.

5. In the Document Details pane, enter Test Specification in the Name control, select **Text** in the Type of Analysis ring control, and browse to <Requirements Gateway>\Tutorial\TestSpec.txt in the File or Directory control.

6. Click the **Add a cover** button to begin adding a covering link. Click the **Test Specification** document and then click the **Design Specification** document to create an arrow between the two documents as shown in Figure 4-8.
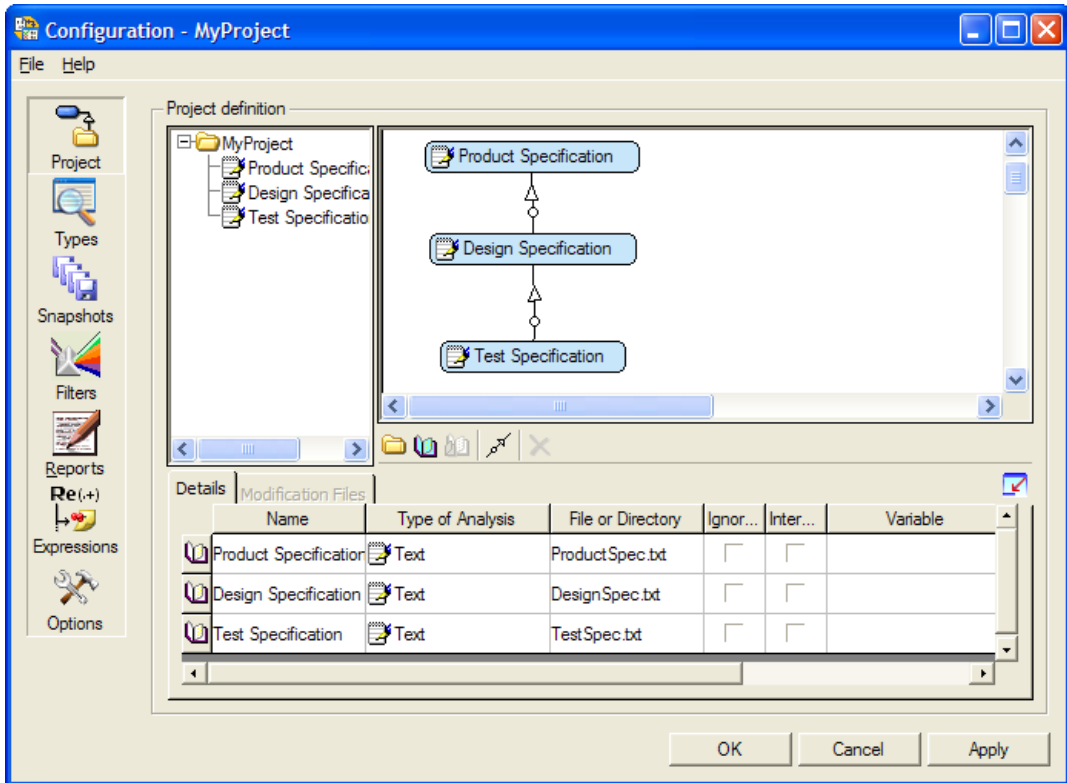
**Figure 4-8.** Two Levels of Covering Documents in Project

7.  Click **OK** to close the Configuration dialog box.

8.  Click **Yes** when Requirements Gateway prompts you to reanalyze the project. Your new project is now properly configured to analyze the new documents.

9.  Return to the Requirements Gateway main window and click the **Impact Analysis View** tab.

10. Collapse the three documents in the Selection column.

## Reviewing the New Documents

Complete the following steps to review the contents of the two new documents:

1.  Double-click the **Design Specification** document in the Selection column to display `DesignSpec.txt` in an external application.

2.  Review the contents of the text file in the external application. `DesignSpec.txt` contains similar sections and text elements as found in `CoveringSpec.txt`, but `DesignSpec.txt` also contains 25 additional requirements. These additional requirements are covered by references in the Test Specification document.

    Figure 4-9 displays the 1.1 USB 1.0 Speeds section of the file, which contains a reference to the PS_USB_REQ1 requirement and contains two additional derived requirements, DS_USB1_REQ1 and DS_USB1_REQ2. A *derived requirement* is a requirement that is defined in a document but is not directly associated with the coverage of an *upstream document*.

```
1. USB Support
1.1. USB 1.0 Speeds
     <<Hardware supports USB 1.0>>
     [Covers: PS_USB_REQ1]

DS_USB1_REQ1: Low Speed
     <<1.5 Mbps>>
DS_USB1_REQ2: High Speed
     <<12 Mbps>>

1.2. USB 2.0 Speeds
     <<Hardware supports USB 2.0>>
```

**Figure 4-9.** Derived Requirements in Design Specification

To associate a requirement with the coverage of an upstream document, you must specify the requirement immediately before the reference that covers the upstream document as shown in Figure 4-10. These requirements are sometimes referred to as non-derived requirements.

```
1.2. USB 2.0 Speeds
     <<Hardware supports USB 2.0>>

DS_USB2_REQ1: Low Speed
     <<1.5 Mbps>>
     [Covers: PS_USB_REQ2]
DS_USB2_REQ2: Med Speed
     <<12 Mbps>>
     [Covers: PS_USB_REQ2]
DS_USB2_REQ3: High Speed
     <<480 Mbp>>
     [Covers: PS_USB_REQ2]
```

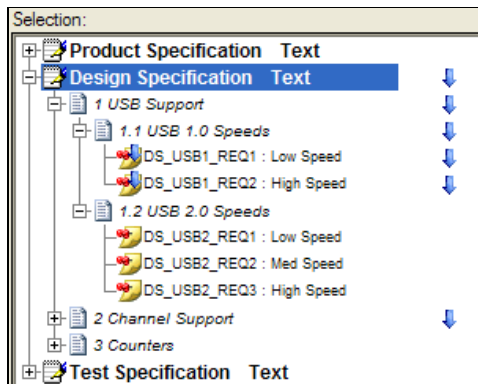**Figure 4-10.** Non-Derived Requirements in Design Specification

Requirements Gateway displays derived and non-derived requirements in the Impact Analysis View.

3.  Exit the application that is displaying `DesignSpec.txt`.

4.  Double-click the **Test Specification** document in the Selection column to launch `TestSpec.txt` in an external application.

5.  Review the contents of the text file in the external application. `TestSpec.txt` contains 25 references for the requirements specified in the Design Specification document.

6.  Exit the application that is displaying `TestSpec.txt`.

## Performing Impact Analysis

Complete the following steps to learn how to analyze the new documents using the Impact Analysis View:

1.  Expand the **Design Specification** document in the Selection column to display the derived requirements, DS_USB1_REQ1 and DS_USB1_REQ2, and the non-derived requirements, DS_USB2_REQ1, DS_USB2_REQ2, and DS_USB2_REQ3, as shown in Figure 4-11. Requirements Gateway displays different icons for derived and non-derived requirements, and displays a navigation arrow icon to the right side of the requirement to highlight derived requirements.



**Figure 4-11.** Derived and Non-Derived Requirements

2. Expand the **Product Specification** document and select the
   **PS_USB_REQ1** requirement, as shown in Figure 4-12. The
   Downstream Impact Information column displays only the covering
   1.1 USB 1.0 Speeds section from the Design Specification document
   because the 1.1 USB 1.0 Speeds section does not contain any
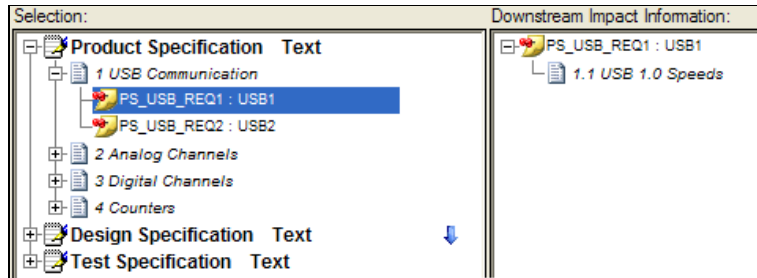   non-derived requirements that are covered by the Test Specification
   document.



**Figure 4-12.** PS_USB_REQ1 Downstream Impact Analysis

3. Select the **PS_USB_REQ2** requirement as shown in Figure 4-13. The
   Downstream Impact Information column displays the non-derived
   requirements from the covering Design Specification document, but
   also the sections from the Test Specification document that cover the
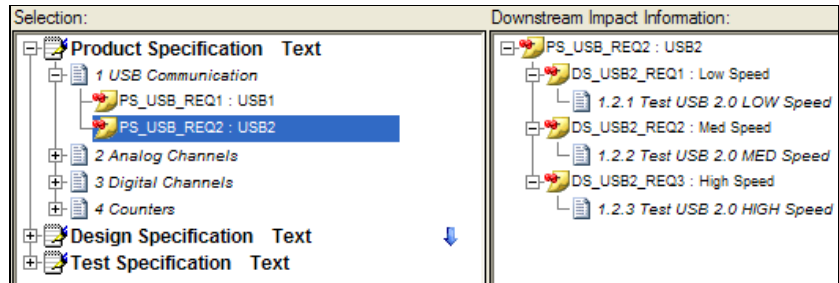   non-derived requirements.



**Figure 4-13.** PS_USB_REQ2 Downstream Impact Analysis

In the next section, you learn how to graphically view traceability
information.

# Using the Graphical View

The Graphical View displays each document as an object with its traceability elements displayed in a tree view within the object. Thin, black lines represent covering references between requirements elements of a document and elements in another document. You can also reposition documents, adjust the width of the documents, pan, zoom, and resize the containing page.

Complete the following steps to graphically view your project documents:

1. Click the **Graphical View** tab.

2. Select the **PS_USB_REQ1** requirement in the Product Specification document. The Graphical View highlights the PS_USB_REQ1 requirement, the covering 1.1 USB 1.0 Speeds section, and the line between the elements, as shown in Figure 4-14.
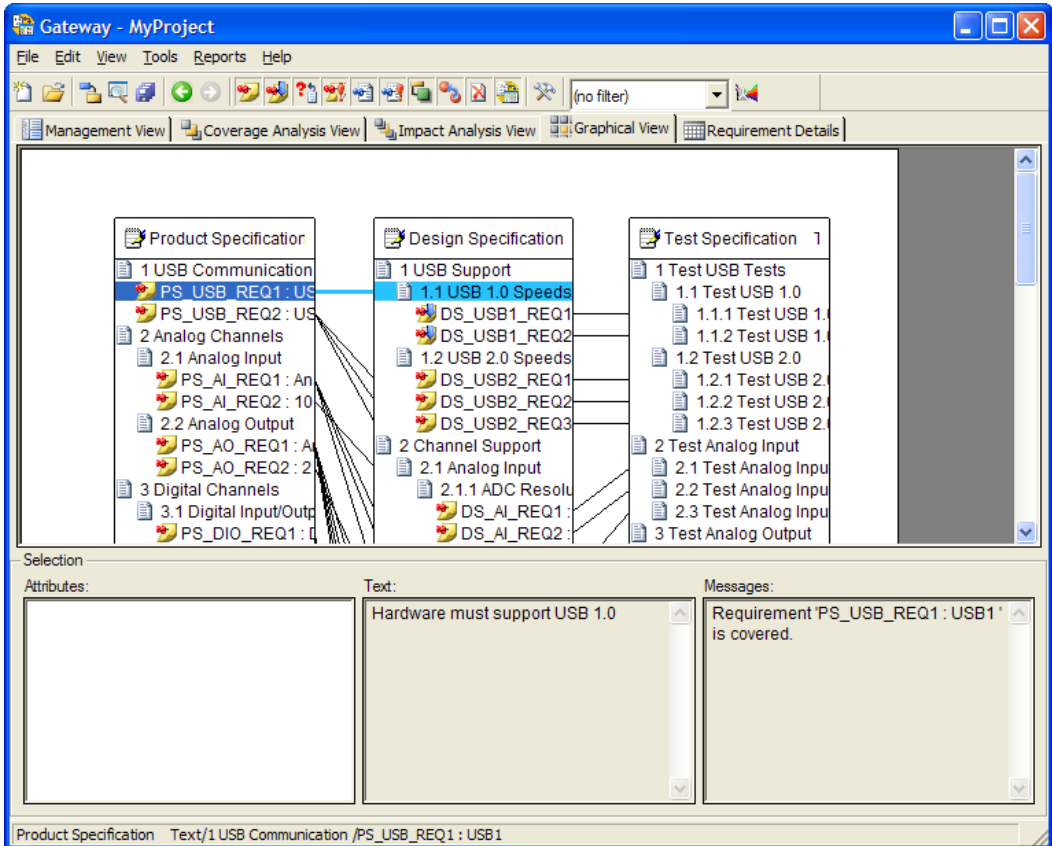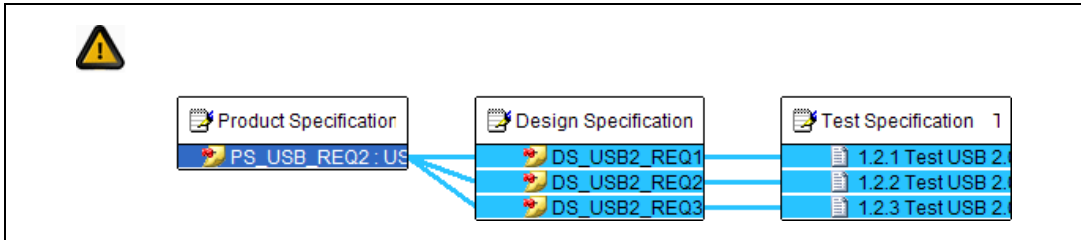
**Figure 4-14.**  PS_USB_REQ1 Selected in Graphical View

3.  Select the **PS_USB_REQ2** requirement. The Graphical View highlights the PS_USB_REQ2 requirement and additional elements from the two *downstream documents*.

4.  Right-click in the **Graphical View** and select **View Graph for Selection** from the context menu. When you make this selection, the view only displays the highlighted elements from the three documents, as shown in Figure 4-15.



**Figure 4-15.** PS_USB_REQ2 Selected in Graphical View

5.  Right-click in the Graphical View and select **Show All Elements** from the context menu to display all the elements of the documents again.

6.  Click the header of the Test Specification document to select the entire document.

7.  Right-click the **Test Specification** document and select **Hide Selected Documents** from the context menu. The Graphical View hides the Test Specification document and displays the traceability information for the remaining two documents.

8.  Right-click in the Graphical View and select **Show All Elements** in the context menu to display all of the documents again.

As your document gets larger or more complex, you can perform the following tasks to control the Graphical View:

•   Resize the Graphical View by selecting the lower right corner of the page and dragging the page corner to increase or decrease the page size.

•   Move the documents within the Graphical View by selecting the document header and dragging the header to a new location.

•   Resize the width of a document by selecting the document header and dragging the resize handles that appear on the right side of the document.

•   Zoom in and out by pressing **<Ctrl>** while rolling your mouse wheel up or down, or by selecting either **Zoom»100%** or **Zoom»Fit in page** from the context menu.

In the next chapter, you learn how to generate reports for a project.

# 5

# Generating Reports

In this chapter, you learn how to generate reports and create customized reports.

## Generating a Built-in Report

NI Requirements Gateway installs the following library reports:

- **Traceability Matrix**—Lists the upstream to downstream covered links and the downstream to upstream covering links.

- **Analysis Results**—Summarizes the coverage analysis for a project.

- **Project Description**—Describes the project and its documents.

- **Upstream Impact Analysis**—Lists the upstream traceability information for selected elements of the project.

- **Downstream Impact Analysis**—Lists the downstream traceability information for selected elements of the project.

- **Synthesis of Added Information**—Summarizes any added attributes, references, text, and covering links in the project.

- **Rules Checking**—Contains a summary of any rules highlighted by the project.

Complete the following steps to generate a Project Description report for the project that you created in Chapter 4, *Analyzing Requirements*.

1. Click the **Management View** tab in the main window. Check to make sure that the documents are collapsed in the tree view pane.

2. Select **Reports»Library Reports»Project Description** to display the Save As dialog box.

3.  Check to make sure you are in the `<Requirements Gateway>\`
    `Tutorial` directory, enter `ProjectDescription` in the file name
    control, and click **Save**. Requirements Gateway generates and displays
    the report in Microsoft WordPad or Microsoft Word, as shown in
    Figure 5-1.

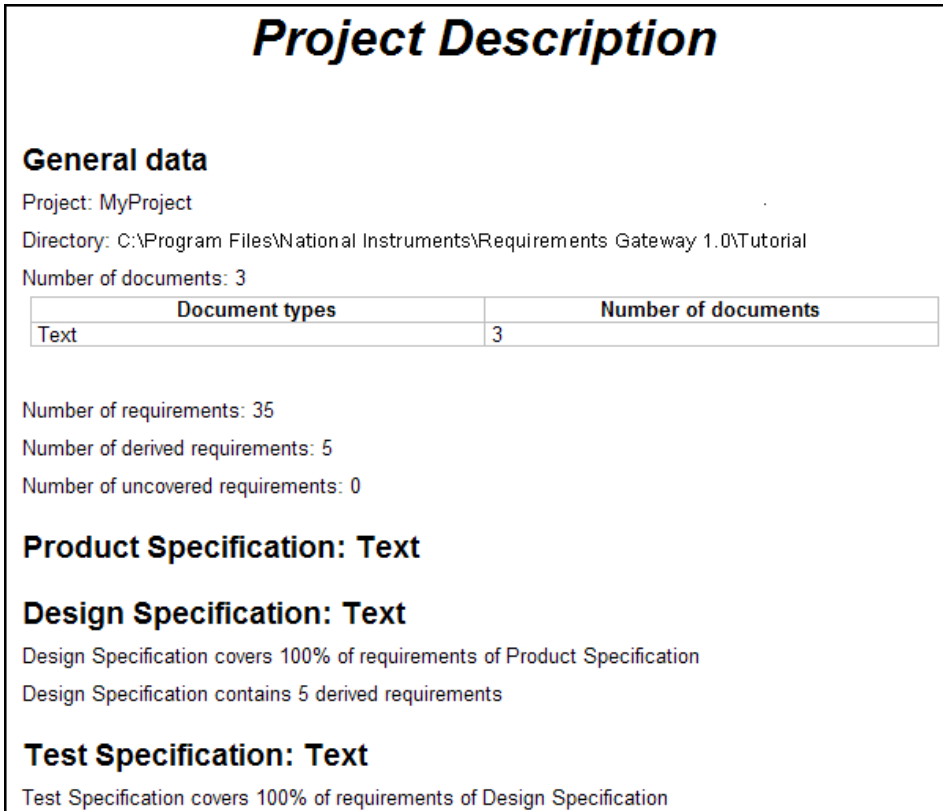4.  Review the contents of the report.

# Project Description

## General data

Project: MyProject

Directory: C:\Program Files\National Instruments\Requirements Gateway 1.0\Tutorial

Number of documents: 3

| Document types | Number of documents |
| --- | --- |
| Text | 3 |

Number of requirements: 35

Number of derived requirements: 5

Number of uncovered requirements: 0

## Product Specification: Text

## Design Specification: Text

Design Specification covers 100% of requirements of Product Specification

Design Specification contains 5 derived requirements

## Test Specification: Text

Test Specification covers 100% of requirements of Design Specification

**Figure 5-1.** Project Description Report

5.  Exit the application that is displaying the report.

# Creating a Custom Report

Refer to the *Customizing Reports* chapter in the *NI Requirements Gateway Customization Guide* for more information about customizing reports. Complete the following steps to create a custom report that lists the requirements defined in each document of the project.

1.  Select **Reports»Edit Reports** to display the Reports pane of the Configuration dialog box.

2.  Click the **New report** button. Requirements Gateway adds a new report to the project as shown in Figure 5-2.
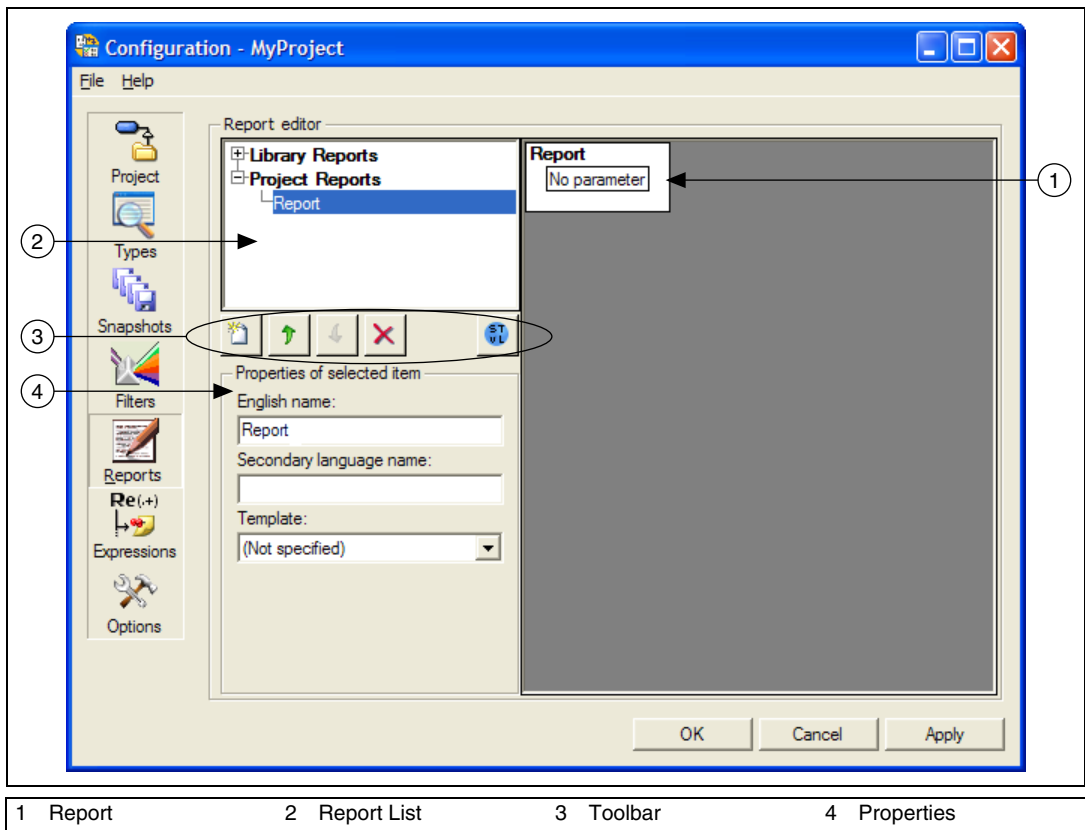


| 1   Report | 2   Report List | 3   Toolbar | 4   Properties |
|------------|-----------------|-------------|----------------|

**Figure 5-2.** Reports Pane of Configuration Dialog Box

The Reports pane consists of the following sections:

- **Report**—Displays the active report selected in the Report List.

- **Report List**—Lists the reports defined by the application and the reports defined by the project.

- **Toolbar**—Contains buttons to create, rearrange, and delete reports from the Report List. In addition, the Report elements button toggles the controls below the Report List to either display the properties of the selected item in the report or the available properties to insert in the report.

- **Properties**—Contains the following sections which display separately when you toggle the Report elements button.

    - **Properties of selected item**—Displays the settings associated with the active element selected in the report.

    - **Available properties to insert**—Displays the elements that you can insert into the report. When you select an element of the report, valid elements that you can insert into the selected element are highlighted with bold text.

3. Enter `Requirements` in the English name control.

4. Select **portrait.rtf** in the Template ring control.

5. Select the **Requirements** object in the report. The Requirements object is highlighted.

6. Click the **Report elements** button to display the Available properties to insert section.

   The Available properties to insert section contains the following three tabs:

   - **Structures**—Contains elements that define the structure of the report, such as text, paragraph, list, or table.

   - **Data**—Contains elements associated with the object you select in the report, such as the project, a document, or a requirement.

   - **Parameters**—Contains data type elements that you can pass to a structure element.

7. Click the **Data** tab.

8. Select the **project»Contents»analyzed documents** element and drag and drop the element to the selected item in the report as shown in Figure 5-3.
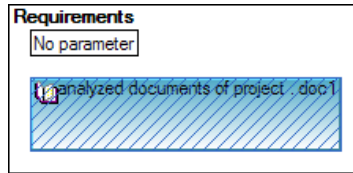


**Figure 5-3.** Inserted Analyzed Documents Element

The analyzed documents element directs the report to loop on all of the documents in the project.

9. Click the **Report elements** button to display the Properties of selected item section. Notice that the Variable name control value defaults to doc1. This variable represents the active document while looping on all documents in the project.

10. Click the **Report elements** button and click the **Structures** tab.

11. Select the **paragraph** element and drag and drop the element to the analyzed documents element. Requirements Gateway adds a paragraph to the report for each document in the project. Steps 12 through 24 define the structure and content of the paragraphs.

12. Select the **text** element and drag and drop the element to the paragraph element.

13. Select the **Report elements** button and enter Document: in the English text control.

14. Click to the right of the **Document:** text element in the report to highlight the entire paragraph element.

15. Click the **Report elements** button and click the **Data** tab.

16. Select the **doc1»Identification information»name** element and drag and drop the element to the right of the **Document:** text element as shown in Figure 5-4.
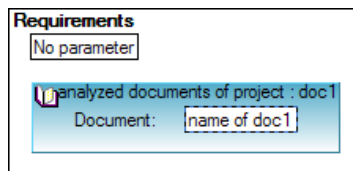


**Figure 5-4.** Inserted Name of Doc1 Element

17. Select the **analyzed documents of project : doc1** element in the report.

18. Click the **Structures** tab.

19. Select the **table** element and drag and drop the element to the bottom of the analyzed document of project element.

20. Drag and drop a **text** element to each of the elements in the upper half of the table and assign `Requirement` and `Text` to each of the table header elements.

21. Select the area below the column headers as shown in Figure 5-5.
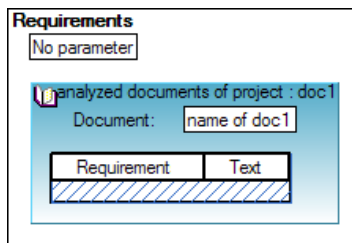


**Figure 5-5.**  Inserted Column Text Elements

22. Drag and drop the **doc1»Contents»requirements** element from the Data tab to the lower half of the table.

23. Drag and drop the **table row** element from the Structures tab to the requirements of doc1 element.

24. Drag and drop the **req1»Identification information»display** element and the **req1»Identification information»text** element from the Data tab to each of the cells in the new table row as shown in Figure 5-6.
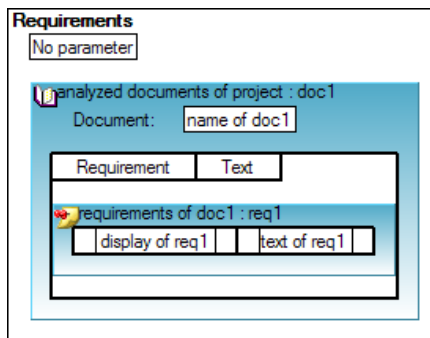


**Figure 5-6.**  Final Custom Report

25. You have completed creating your custom report. Click **OK** to close the Configuration dialog box.

26. Select **Reports»Project Reports»Requirements** from the main window to display the Save As dialog box.

27. Enter `Requirements` in the file name control and click **Save**. Requirements Gateway generates and displays the report file in Microsoft WordPad or Microsoft Word, as shown in Figure 5-7.

28. Review the contents of the report.



## Requirements

Document: Product Specification

| Requirement | Text |
| --- | --- |
| PS_USB_REQ1 : USB1 | Hardware must support USB 1.0 |
| PS_USB_REQ2 : USB2 | Hardware must support USB 2.0 |
| PS_AI_REQ1 : Analog Input | |
| PS_AI_REQ2 : 10 channels | |
| PS_AO_REQ1 : Analog Output | |
| PS_AO_REQ2 : 2 channels | |
| PS_DIO_REQ1 : Digital I/O | |
| PS_DIO_REQ2 : 2 channels | |
| PS_CNTR_REQ1 : Counter | |
| PS_CNTR_REQ2 : 1 counter | |

Document: Design Specification

| Requirement | Text |
| --- | --- |
| DS_USB1_REQ1 : Low Speed | 1.5 Mbps |
| DS_USB1_REQ2 : High Speed | 12 Mbps |

**Figure 5-7.**  Final Generated Report

29. Exit the application that is displaying the report.

# 6

# Customizing Types

The organization and formatting of data can vary between documents, and does not always adhere to the format required by the default implementation of a type. In this case, you can either modify the document to conform to the format required by the type, or you can create a custom type that processes the format defined by the document. In this chapter, you learn how to customize the definition of a type to conform to the data format in a file.

## Review File Formats

For most types, NI Requirements Gateway captures potential traceability information by translating an external file, such as a Microsoft Word document, into an intermediate text or XML file. The type analyzes the intermediate file and captures the required structure and traceability information. Refer to the *NI Requirements Gateway Customization Guide* and the coupling document for the specific type to understand the content and format of the intermediate text or XML file. You can open the documents by selecting **Documentation** from the **Help** menu in the Requirements Gateway main window.

The Text type directly processes the contents of a text file, without the use of a translated intermediate file. In this section, you will evaluate the format of a text file and customize a type to analyze the contents of the file.

Complete the following steps to review the contents of the files that the custom type analyzes:

1.  Select **File»Open** to launch the Open dialog box and navigate to the `<Requirements Gateway>\Tutorial` directory.

2.  Select **CustomTypeProject.rqtf** in the list control and click **Open**. Requirements Gateway opens the project file and displays the documents in the main window.

3.  Click the **Management View** tab and collapse all of the documents in the tree view pane.

4.  Double-click the **Product Specification** document in the tree view pane to launch `CustomProductSpec.txt` in an external application.

5. Review the contents of the text file in the external application. Figure 6-1 displays a portion of the text from `CustomProductSpec.txt`.

```
 - USB Communication              # The hardware will
    [REQ: USB1] USB1              # Low & High Speeds
    [REQ: USB2] USB2              # Low, Med, and High

 - Analog Channels
   - Analog Input                 # The hardware will
     [REQ: AI] Analog Input      # +/- 12 Volts
     [REQ: AI_COUNT] 10 channels
```

**Figure 6-1.**  Text from CustomProductSpec.txt

6. Double-click the **Covering Specification** document in the tree view pane to launch `CustomCoveringSpec.txt` in an external application.

7. Review the contents of the text file in the external application. Figure 6-2 displays a portion of the text from the file.

```
 - USB Support
   - USB 1.0 Speeds              #Hardware supports USB
     [REF: USB1]

   - USB 2.0 Speeds              #Hardware supports USB
     [REF: USB2]
```

**Figure 6-2.**  Text from CustomCoveringSpec.txt

The default Text type cannot recognize and analyze the requirements, references, and text elements within these two documents. The Product Specification and Coverage Specification documents contain the following traceability formalisms:

• Each document specifies two levels of sections. A first-level section is preceded by a minus character, and a second-level section is preceded by two space characters and a minus character.

• Requirements are specified by [REQ: id], where id is a set of characters that represent the requirement. You can also follow a requirement with an optional text label.

• References are specified by [REF: id], where id is a set of characters that represents the requirement.

- Text associated with a section or requirement is specified by the # character.

8. Exit the external applications.

# Creating a Custom Type

When you customize a type, you have to decide whether to duplicate an existing type or create a new type. Since the Product Specification and Coverage Specification documents adhere to a very different *formalism* than defined by the default Text type, you will create a new type.

Complete the following steps to create a new type:

1. Select **File»Edit Types** to display the Types pane of the Configuration dialog box. The Types pane contains the following three sections:

    - **Types List**—Displays the list of types available in Requirements Gateway. The final folder in the list represents the custom types defined for any projects in the directory of the current project file.

    - **Type Toolbar**—Contains buttons to copy, delete, and add new elements to the types list or to the elements of a specific type.

    - **Selection Properties**—Displays the settings associated with the selected type or element of a type in the tree view.

2. Click the **Tutorial** folder in the tree view.

3. Click the **Add new element** button. Requirements Gateway adds a new element, Type, to the Tutorial folder in the tree view.

4. Enter My Type in the Name control.

5. Select **Text** in the Convert tool ring control to instruct Requirements Gateway to interpret any document that uses the type as a general text file, similar to the default Text type.

6.  Select **Text** in the Edit tool ring control to instruct Requirements Gateway to launch the application associated with the file type when you navigate to the document. Figure 6-3 displays the new type.
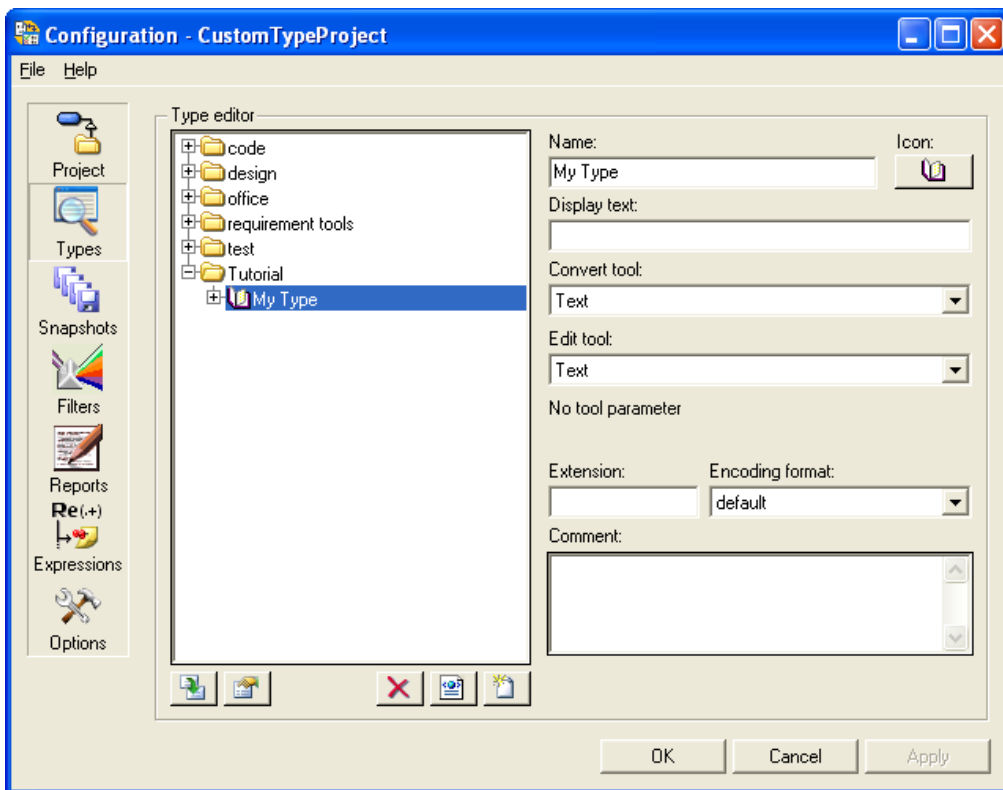


**Figure 6-3.** New Type Created

7.  Expand the child elements under the **My Type** element in the Types List.

The elements under My Type in the tree view define how Requirements Gateway identifies traceability information in an intermediate text or XML file that represents the data extracted from a project document. Type elements use *regular expressions* to specify patterns in the text of the intermediate file for Requirements Gateway to identify instances of an element. Types that use intermediate XML files also specify the structure of the XML data to identify traceability information.

Table 6-1 lists the elements that a type might define and the purpose of each element. Chapters 7 through 11 and Appendix A in this manual contain similar tables with information that is specific to the type that the chapter discusses.

**Table 6-1.** Type Elements

| Element | Description |
|---|---|
| Section | Specifies how to identify and display the structural elements for a document. For example:<br><br>• Headings in a text or Microsoft Word file<br><br>• Files in a directory<br><br>• Rows in a database<br><br>• Sequences, step groups, and steps in a TestStand sequence file |
| Requirement | Specifies how to identify and display requirements for a document. For example, a requirement element might interpret `[REQ: reqid]` as a requirement, where `reqid` is the requirement identifier. |
| Macro-Requirement | Specifies how to identify and display macro-requirements for a document. A macro-requirement element defines a starting location and an ending location, where any requirement element between the locations are associated with the macro-requirement. For example, a macro-requirement element might interpret `[MacroReq_reqid]` as a starting location and `[End_of_MacroReq]` as an ending location, where `reqid` is the macro-requirement identifier. |
| Entity | Specifies how to identify and display an entity for a document. An entity element is similar to a section element except that Requirements Gateway triggers a rule violation if a reference element does not follow an entity element. |
| Reference | Specifies how to identify references to requirements for a document. Requirements Gateway does not display reference elements; however the reference is associated with a preceding section or entity element. For example, an element might interpret `[Covers: reqid]` as a requirement, where `reqid` is the identifier of the covered requirement. |
| Attribute | Specifies how to identify and display attributes of requirement elements for a document. An attribute element has a name and a Boolean, string, or numeric value. An attribute element might define the priority or owner of a requirement. |

**Table 6-1.** Type Elements (Continued)

| Element | Description |
|---|---|
| Reference Attribute | Specifies how to identify and display attributes of reference elements for a document. A reference attribute element has a name and a Boolean, string, or numeric value. A reference attribute element might define the type of coverage for a reference. |
| Link | Specifies how to identify and display a non-covering reference to a requirement, or a reference to a section or entity. The link element must refer to the identifier of the requirement, section, or entity. You can use the link element to navigate from the link element to the requirement, section, or entity element. |
| Text | Specifies how to identify text associated with a preceding section, entity, requirement, or attribute element. |
| Picture | Specifies how to identify pictures associated with a preceding section or entity element. NI Requirements Gateway 1.0 supports images with EPS and WMF file formats. |

8. Select the **section** element in the tree view.

9. Click the **Add new element** button. Requirements Gateway adds a new section element named Section1 to the tree view.

10. Enter `^-[ \t]*([^#\n\r]*).*$` in the Regular expression control. Figure 6-4 displays the new section element.
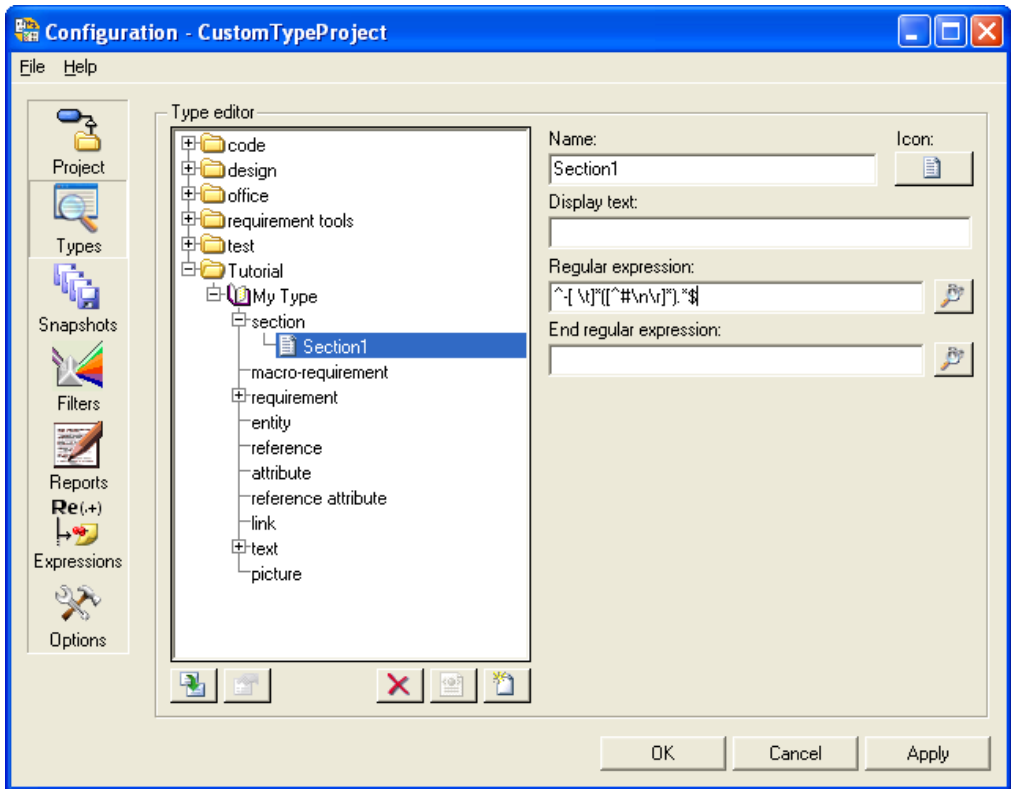


**Figure 6-4.** Regular Expression For Section1

This regular expression specifies the pattern of text to match in the file to locate section elements and their text. Table 6-2 lists the components that this expression contains.

**Table 6-2.** Section1 Regular Expression Components

| Expression | Purpose |
|---|---|
| ^ | Specifies to start pattern matching at the beginning of a line. |
| - | Specifies that the next character must be the minus character. |
| [ \t]* | The surrounding bracket characters specify that a character must match either a space or a tab character, and the asterisk specifies that the text must contain zero or more matches. |
| ( ) | Specifies that any text that matches the inside pattern is returned as a field. This returns the text associated with the section. |
| [^#\n\r]* | The ^ character specifies that the pattern cannot match any of the following specified characters: #, new line, or a carriage return. This forces the pattern to stop at the # character, if the # character exists. |
| .* | Specifies to match zero or more of any of the characters. This pattern process the # character, if it exists, and any subsequent text. |
| $ | Specifies to match the end of a line. |

11. Click the **Add new element** button. Requirements Gateway adds a new section element named Section2 under the Section1 element.

12. Enter `^[ \t][ \t]-[ \t]*([^#\n\r]*).*$` in the Regular expression control. This regular expression is similar to the expression in step 10, with the addition of two extra required spaces or tabs preceding the minus character.

13. Select the **requirement** element in the tree view.

14. Click the **Add new element** button. Requirements Gateway adds a new requirement element named Requirement1.

15. Enter `\[REQ: ([^\]]+)\][ \t]*([^#\r\n]*)` in the Regular expression control. Table 6-3 lists the components that this expression contains.

**Table 6-3.** Requirement1 Regular Expression Components

| Expression | Purpose |
|---|---|
| `\[REQ:` | Specifies to match the characters, `[REQ:` followed by a space character. |
| `([^\]]+)` | Specifies to return one or more characters that do not include the closing bracket character. This returns the requirement identifier. |
| `\]` | Specifies to match the closing bracket character. |
| `[ \t]*` | Specifies to match zero or more space or tab characters. |
| `([^#\r\n]*)` | Specifies to return zero or more characters that do not include the `#` character, new line, or carriage return. This returns the requirement label. |

16. Select the **reference** element in the tree view.

17. Click the **Add new element** button. Requirements Gateway adds a new section element named Reference1.

18. Enter `\[REF: ([^\]]+)` in the Regular expression control. This regular expression specifies to return one or more characters between the space character after `[REF:` and the closing bracket character. This returns the requirement identifier for the reference.

19. Select the **text** element in the tree view.

20. Click the **Add new element** button. Requirements Gateway adds a new section element named Text1.

21. Enter `#[\t ]*(.+)$` in the Regular expression control. This regular expression specifies to return as the text value all characters between the `#` character and the end of line, excluding any preceding space or tab characters after the `#` character.

22. Click **Apply** to save the new type.

23. Click **Yes** when Requirements Gateway prompts you to reanalyze the project.

# Using a Custom Type

Complete the following steps to configure the documents in your project to use the new type:

1.  Click the **Project** button in the Configuration dialog box to open the Project pane.

2.  For each document in the project, select **My Type** in the Type of Analysis ring control.

3.  Click **OK** to close the Configuration dialog box.

4.  Click **Yes** when Requirements Gateway prompts you to reanalyze the project.

5.  Click the **Management View** tab and review the contents of each document. The Project Summary section indicates that the two documents have ten requirements and zero uncovered requirements as shown in Figure 6-5.
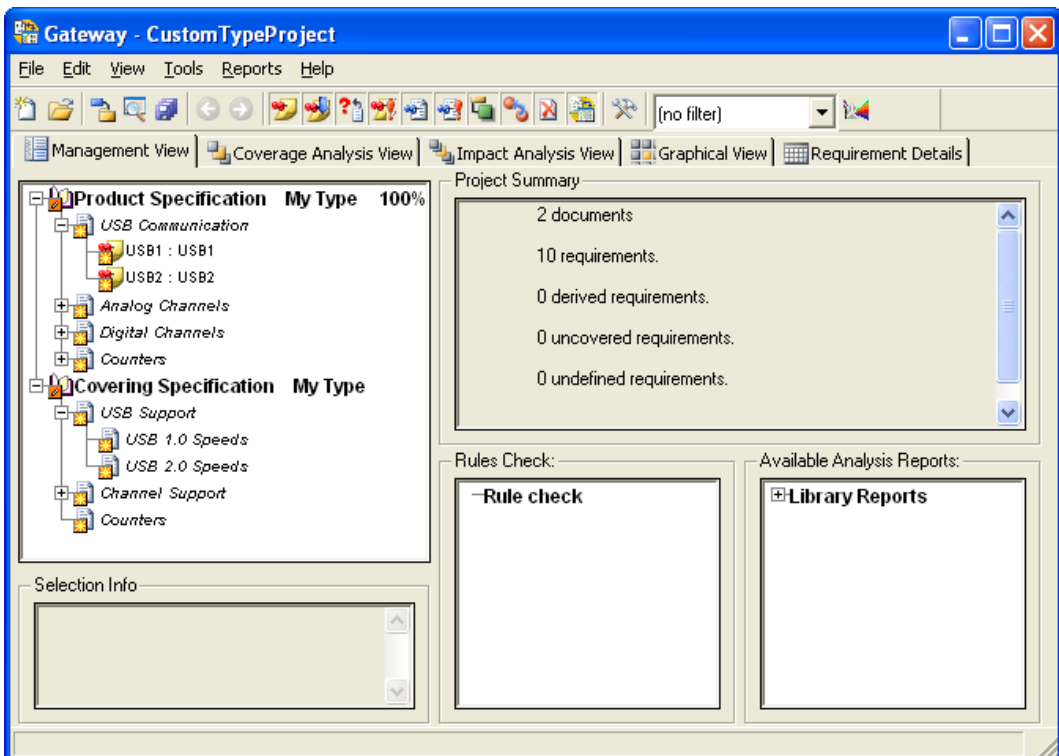


**Figure 6-5.** CustomTypeProject

You have completed the basic tutorials for using NI Requirements Gateway. Chapters 7 through 11 demonstrate how to use NI Requirements Gateway with the following specific products: TestStand, MATRIXx, LabVIEW, LabWindows/CVI, and Telelogic DOORS. Refer to Appendix A, *Type Overviews,* for a general overview of other types that NI Requirements Gateway supports.

# 7

# Using NI Requirements Gateway with TestStand

In this chapter, you learn how to use TestStand to cover requirements defined in another document. In addition, you learn how to validate the coverage of a step executed by analyzing an XML report. You must have TestStand 3.5 or later installed on your system to complete the following tutorial.

## Adding TestStand Documents to Projects

The TestStand type allows you to add TestStand documents to a project. When you configure a TestStand document, you can select sequence, project, or workspace files. Typically, you use a TestStand document to cover requirements in a specification document. For example, the steps in a sequence may cover the requirements for testing a product.

Complete the following steps to add a TestStand document to a project:

1. Select **File»Open** to launch the Open dialog box and navigate to the `<Requirements Gateway>\Tutorial` directory.

2. Select **TestStandProject.rqtf** in the list control and click **Open**. Requirements Gateway opens the project file and displays documents in the main window.

3. Click the **Management View** tab and collapse the documents in the tree view.

4. Double-click the **Specification** document in the tree view to launch `TestStandSpec.txt` in an external application.

5. Review the contents of the text file in the external application. Notice that the specification contains four requirements. The requirement in the Product section specifies the overall test sequence. The three requirements in the Parts section specify individual tests for the sequence.

6. Exit the application that is displaying `TestStandSpec.txt`.

7. In Requirements Gateway, select **File»Edit Project** to launch the Project pane of the Configuration dialog box.

8. Click the **Add a document** button to add a new document in the Traceability Description Zone. Place the document below the Specification document.

9. In the Document Details pane, enter `TestStand Files` in the Name control and select **TestStand** from the Type of Analysis ring control.

10. Click in the **File or Directory** column. The File Browse button is visible on the right side of the control. Click the **File Browse** button to display the Select Files to Include in Document dialog box.

    The Select Files to Include in Document dialog box allows you to include multiple sequence files in a TestStand document. You can add individual sequence files, all of the sequences in a TestStand workspace file, or all of the sequence files in a directory. In addition, when you select a directory in the list view, you can specify whether to include all of the subdirectories.

11. Click **Add Sequence File** and select `<Requirements Gateway>\ Tutorial\TestStandWidgetTests.seq`.

12. Click **Open** to add `TestStandWidgetTests.seq` to the list view of the Select Files to Include in Document dialog box.

13. Click **OK** to close the Select Files to Include in Document dialog box.

14. Click the **Add a cover** button to begin adding a covering link. Click the **TestStand Files** document and then click the **Specification** document to create an arrow between the two documents.

15. Click **OK** to close the Configuration dialog box.

16. Click **Yes** when Requirements Gateway prompts you to reanalyze the project.

17. Expand the contents of the two documents in the Management View as shown in Figure 7-1. Requirements Gateway displays `TestStandWidgetTests.seq` under the TestStand Files document.
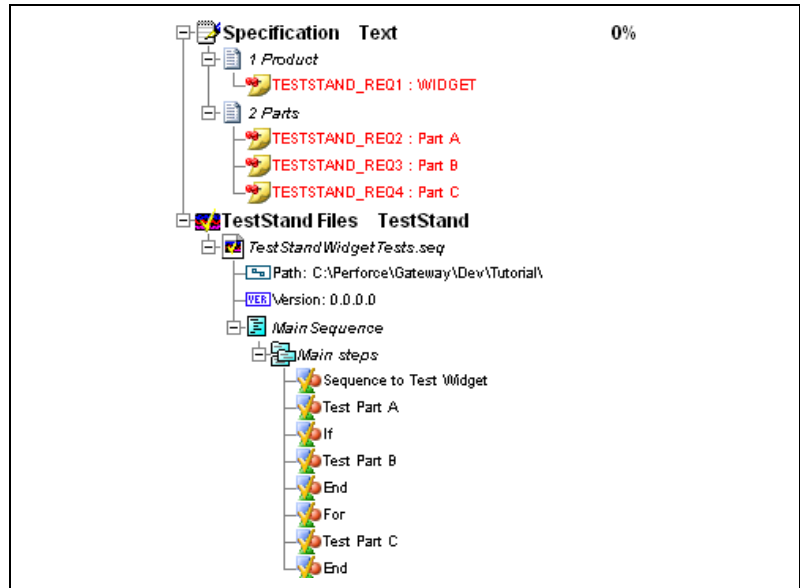


**Figure 7-1.**  TestStand Document in Project

# Adding References to TestStand Files

Complete the following steps to specify references in a TestStand sequence:

1. Select the **TESTSTAND_REQ1** requirement in the Specification document.

2. Right-click the **TESTSTAND_REQ1** requirement and select **Copy For»TestStand Requirements Property**. Requirements Gateway copies the required covering syntax for TestStand to cover the selected requirement.

3. Double-click the **MainSequence»Main steps** section of `TestStandWidgetTests.seq`. Requirements Gateway launches TestStand and opens the sequence file.

4. In TestStand, select **Edit»Sequence Properties** to display the Sequence Properties dialog box. The title of the Sequence Properties dialog box is specific to the sequence that you select. For the

MainSequence sequence, the Sequence Properties dialog box is named MainSequence Properties, as shown in Figure 7-2.

5. Select **<insert new item>** in the Requirements List and paste the text from the clipboard using **<Ctrl-V>**. TestStand adds TESTSTAND_REQ1 to the list as shown in Figure 7-2.
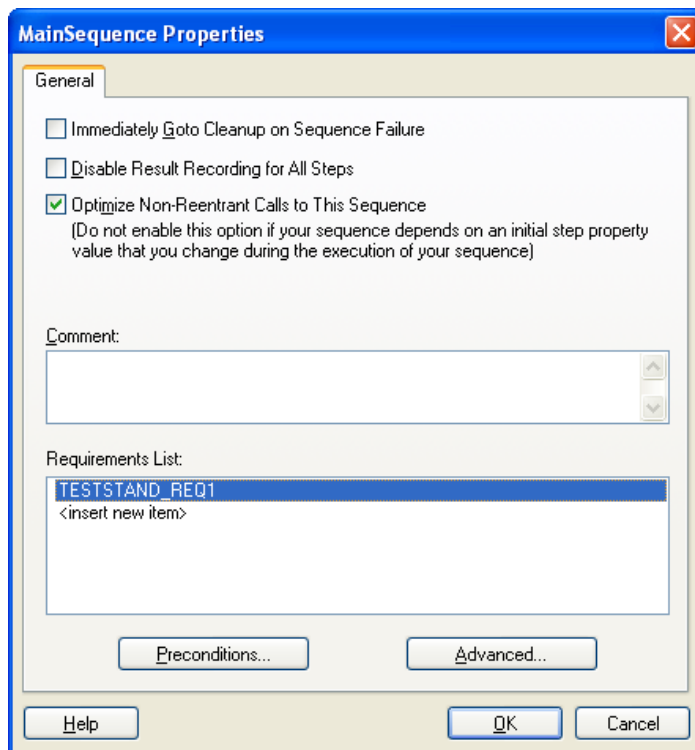


**Figure 7-2.** TestStand Sequence Properties Dialog Box

6. Click **OK** to close the Sequence Properties dialog box.

7. Double-click the **Test Part A** step to display the Step Properties dialog box. The title of the Step Properties dialog box is specific to the step that you select. For the Test Part A step, the Step Properties dialog box is named Test Part A Properties.

8. Click the **Requirements** tab.

9. Select **<insert new item>** in the Requirements List and enter the TESTSTAND_REQ2.

10. Click **OK** to close the Step Properties dialog box.

11. Repeat steps 7 through 10 to add TESTSTAND_REQ3 to the Requirements List for the Test Part B step, and TESTSTAND_REQ4 to the Requirements List for the Test Part C step.

12. Select **File»Save** to save the changes to the sequence file and return to Requirements Gateway. Click **Yes** when Requirements Gateway prompts you to reload the TestStand Files document.

13. Expand the contents of the two documents in the Management View. Notice that Requirements Gateway displays that the coverage is 100%.

14. Click the **Coverage Analysis View** tab and the **Graphical View** tab to review the coverage of requirements in the Specification document by the elements of the TestStand Files document.

15. You have completed this tutorial and may exit TestStand.

In the next section, you will learn how to add TestStand XML Report documents to a project.

# Adding TestStand XML Report Documents to Projects

The TestStand XML Report type allows you to show the execution coverage of the steps in TestStand sequences. When you configure a TestStand XML Report document, you select an XML report file.

Complete the following steps to add a TestStand XML Report document to your project and review the execution coverage:

1. Select **File»Edit Project** to launch the Project pane of the Configuration dialog box.

2. Click the **Add a document** button to add a new document in the Traceability Description Zone. Place the document below the TestStand Files document.

3. In the Document Details pane, enter XML Report in the Name control and select **TestStand XML Reports** from the Type of Analysis ring control.

4. Click in the **File or Directory** column. The File Browse button is visible on the right side of the control. Click the **File Browse** button to display the Select Files to Include in Document dialog box.

   The Select Files to Include in Document dialog box allows you to include multiple reports. You can add individual report files or all report files in a directory. In addition, when you select a directory in the list view, you can specify whether to include all of the subdirectories.

5.  Click **Add XML Report File** and select `<Requirements Gateway>\Tutorial\TestStandWidgetTestsReport.xml`.

6.  Click **Open** to add the selected file to the list view of the Select Files to Include in Document dialog box.

7.  Click **OK** to close the Select Files to Include in Document dialog box.

8.  Click the **Add a cover** button to begin adding a covering link. Click the **XML Report** document and then click the **TestStand Files** document to create an arrow between the two documents.

9.  Click **OK** to close the Configuration dialog box.

10. Click **Yes** when Requirements Gateway prompts you to reanalyze the project.

11. Expand the contents of the XML Report document in the Management View as shown in Figure 7-3. Requirements Gateway displays the `TestStandWidgetTestsReport.xml` file under the XML Report document.
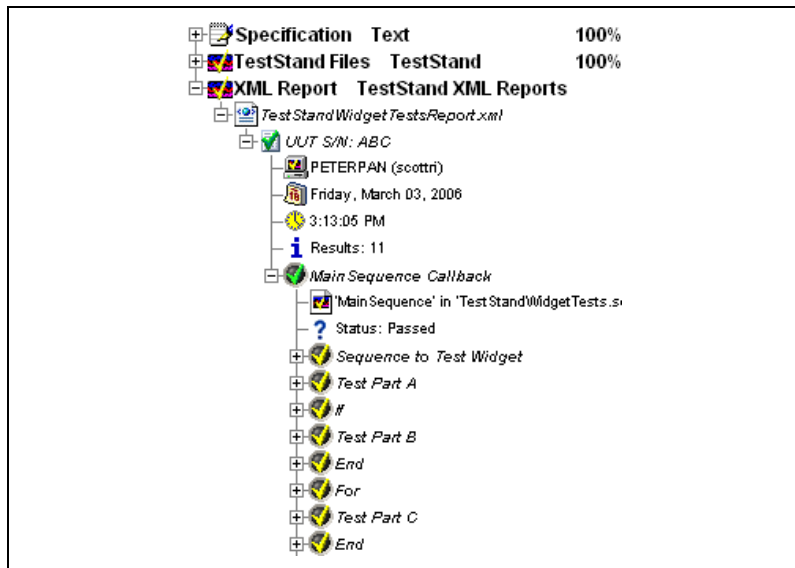


**Figure 7-3.** TestStand XML Report Document

12. Click the **Coverage Analysis View** tab. Expand the **TestStand Files** document to display the steps in the Main steps section of `TestStandWidgetTests.seq`.

13. Select the **Main steps** section. The Downstream Coverage Information column displays the status for all of the steps in the Main steps section in the XML Report document.

14. Select the **Test Part A** step in the Main steps section. The Downstream Coverage Information column displays a status of `Done` for the Test Part A step in the XML Report document.

15. Click the **Impact Analysis View** and the **Graphical View** tabs to review the coverage of requirements in the Specification document by the TestStand Files and XML Report documents.

You have completed this tutorial. The next section provides an overview of the TestStand types.

# TestStand Types Overview

This section provides an overview of the TestStand type and the TestStand XML Reports type.

## TestStand Type

Use the TestStand type to analyze traceability information specified in TestStand files. The default TestStand type searches for traceability information stored in the comment or requirements properties of steps, sequences, sequence files, project files, and workspace files.

The TestStand type defines the following document settings:

**Table 7-1.** TestStand Type Document Settings

| Document Setting | Description |
|---|---|
| File or Directory | Select a sequence or workspace file, or a directory that contains sequence files. For a directory, you can specify whether to include subdirectories. |
| Variables | Not defined |

The TestStand type defines the following default elements:

**Table 7-2.** TestStand Type Default Elements

| Element | Description |
|---------|-------------|
| Section | Displays the sequences and step groups of sequence files, the hierarchy of workspaces, and the files in directories. Also displays steps that cannot generate results as a section element. |
| Requirement | Displays the steps that can generate results as requirements, which can be covered by a document of the TestStand XML Reports type. The TestStand XML Reports type uses the unique ID of the step as the requirement identifier. |
| Macro-Requirement | Not defined |
| Entity | Not defined |
| Reference | Specified by entering a requirement identifier in the requirement list property of a step, sequence, sequence file, project file, or workspace file. You can also specify references by entering [Covers: reqid] in a comment of a step, sequence, or sequence file, where reqid is the requirement identifier. |
| Attribute | Indicates the comments, paths, and versions of files. |
| Reference Attribute | Not defined |
| Link | Not defined |
| Text | Not defined |
| Picture | Not defined |

You do not need to customize any of the type definition settings for the TestStand type.

You can customize the definition of the TestStand type to conform to the data format that a file contains. Refer to *Coupling TestStand with NI Requirements Gateway* for more information about customizing the TestStand type. You can open the document by selecting **Coupling TestStand** from the **Help** menu in Requirements Gateway.

# TestStand XML Reports Type

Use the TestStand XML Reports type to determine the execution coverage of the steps specified by a TestStand document. The default TestStand type defines steps that can generate results as requirements using the unique ID of a step as the requirement identifier. The default TestStand XML Reports type uses the same identifier that is stored with a step result as a requirement reference.

**Note**  The TestStand XML Reports type cannot analyze ATML reports, only XML results. In addition, TestStand does not allow you to generate two report files at the same time. Refer to the following online support document, *Generating Two Reports in TestStand* at `ni.com/zone`, to learn how to alter the process model to generate two report files.

The TestStand XML Reports type defines the following document settings:

**Table 7-3.** TestStand XML Reports Type Document Settings

| Document Setting | Description |
|---|---|
| File or Directory | Select an XML report file or a directory that contains XML report files. For a directory, you can specify whether to include subdirectories. |
| Variables | Not defined |

The TestStand XML Reports type defines the following default elements:

**Table 7-4.** TestStand XML Reports Type Default Elements

| Element | Description |
|---|---|
| Section | Displays the results of an XML report file, the files within directories, and the critical failure stack for failing *Units Under Test (UUTs)*. |
| Requirement | Not defined |
| Macro-Requirement | Not defined |
| Entity | Not defined |
| Reference | Specified by a step result in an XML report file. The requirement identifier is the unique step ID stored with the result. |
| Attribute | Indicates UUT and step result information. |
| Reference Attribute | Indicates the status of the step result. |

**Table 7-4.** TestStand XML Reports Type Default Elements (Continued)

| Element | Description |
|---------|-------------|
| Link | Specified by a critical stack failure element which refers to its associated step result. |
| Text | Not defined |
| Picture | Not defined |

You do not need to customize any of the type definition settings for the TestStand XML Reports type.

You can customize the definition of the TestStand XML Reports type to conform to the data format that a file contains. Refer to *Coupling TestStand with NI Requirements Gateway* for more information about customizing the TestStand XML Reports type. You can open the document by selecting **Coupling TestStand** from the **Help** menu in Requirements Gateway.

# 8

# Using NI Requirements Gateway with MATRIXx

In this chapter, you learn how to use NI Requirements Gateway with MATRIXx.

## Adding MATRIXx Documents to Projects

The MATRIXx type allows you to add MATRIXx documents to a project. When you configure a MATRIXx document, you select a SystemBuild catalog file or a specific model in a catalog file. You typically use a MATRIXx document to cover requirements in a specification document. For example, the blocks in a superblock may cover the requirements for a simulation model.

Complete the following steps to add a MATRIXx document to a project:

1. Select **File»Open** to launch the Open dialog box and navigate to the `<Requirements Gateway>\Tutorial` directory.

2. Select **MATRIXxModel.rqtf** in the list control and click **Open**. Requirements Gateway opens the project file and displays documents in the main window.

3. Click the **Management View** tab and collapse the document in the tree view.

4. Double-click the **Specification** document in the tree view to launch `MATRIXxSpec.txt` in an external application.

5. Review the contents of the text file in the external application. Notice that the specification contains four requirements. The requirement in the Model section specifies the purpose of the superblock, and the three requirements in the Blocks section specify the key blocks that the model must include.

6. Exit the application that is displaying `MATRIXxSpec.txt`.

7. In Requirements Gateway, select **File»Edit Project** to launch the Project pane of the Configuration dialog box.

8.   Click the **Add a document** button to add a new document in the
     Traceability Description Zone. Place the document below the
     Specification document.

9.   In the Document Details pane, enter `MATRIXx Model` in the Name
     control and select **MATRIXx** in the Type of Analysis ring control.

10.  Click in the **File or Directory** column. The File Browse button is
     visible on the right side of the control. Click the **File Browse** button to
     display the Select Files to Include in Document dialog box.

     The Select Files to Include in Document dialog box allows you to
     include multiple models in a MATRIXx document. You can add
     individual superblocks, catalog files, or all of the catalog files in a
     directory. In addition, when you select a directory in the list view, you
     can specify whether to include all of the subdirectories.

11.  Click **Add MATRIXx Catalog** and select `<Requirements
     Gateway>\Tutorial\MATRIXxModel.cat`.

12.  Click **Open** to add the selected file to the list view of the Select Files
     to Include in Document dialog box.

13.  Click **OK** to close the Select Files to Include in Document dialog box.

14.  Click the **Add a cover** button to begin adding a covering link. Click
     the **MATRIXx Model** document and then click the **Specification**
     document to create an arrow between the two documents.

15.  Click **OK** to close the Configuration dialog box.

16.  Click **Yes** when Requirements Gateway prompts you to reanalyze the
     project.

17. Expand the contents of the two documents in the Management View as shown in Figure 8-1. Requirements Gateway displays the superblocks under the MATRIXx Model document.
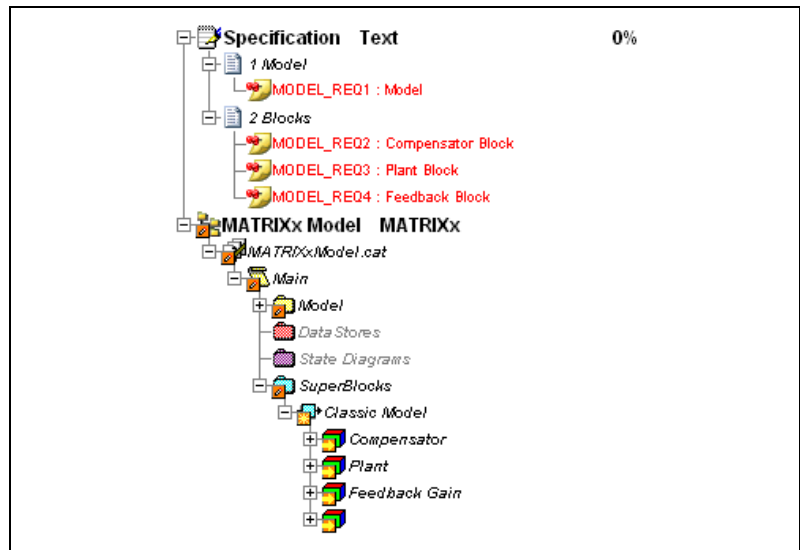


**Figure 8-1.**  MATRIXx Document in Project

# Adding References to MATRIXx Blocks

Complete the following steps to specify references in a MATRIXx model:

1. Select the **MODEL_REQ1** requirement in the Specification document.

2. Right-click the **MODEL_REQ1** requirement and select **Copy For» MATRIXx Comment**. Requirements Gateway copies the required covering syntax for a MATRIXx comment to cover the selected requirement.

3. Navigate to **MATRIXxModel.cat»Main»SuperBlocks** and double-click the **Classic Model** element. Requirements Gateway launches MATRIXx SystemBuild and opens the SuperBlock window.

4. In the SuperBlock window, select **File»SuperBlock Properties** to display the SuperBlock Properties dialog box.

5. Click the **Comment** tab.

6.  Paste the text from the clipboard using **<Ctrl-V>** in the textbox control. MATRIXx adds [Covers: MODEL_REQ1] to the comment as shown in Figure 8-2.

**SuperBlock Properties**

Name
Classic Model                                    Inputs    Outputs
                                                 1         1

Attributes | Code | Inputs | Outputs | Document | Comment

[Covers: MODEL_REQ1]

Editor
Microsoft Word (rtf)              ○ Comments
                                  ○ User Parameters
         Launch...                   Advanced...

OK                    Cancel                    Help
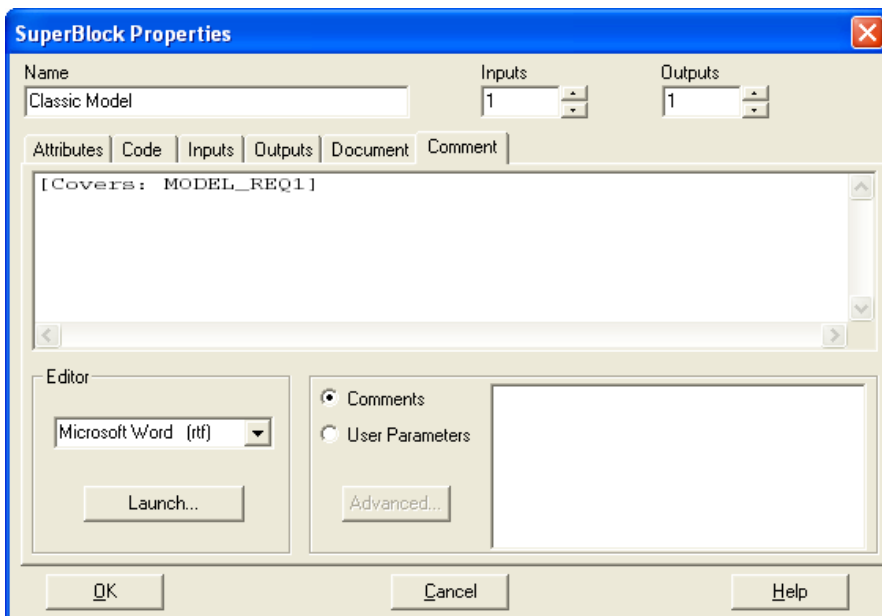
**Figure 8-2.** SuperBlock Properties Dialog Box

7.  Click **OK** to close the SuperBlock Properties dialog box.

8.  Click the **Compensator** block.

9.  Select **Edit»Block Properties** to display the Block Properties dialog box.

10. Click the **Comment** tab.

11. Add [Covers: MODEL_REQ2] to the textbox control.

12. Click **OK** to close the Block Properties dialog box.

13. Repeat steps 8 through 12 to add [Covers: MODEL_REQ3] to the comment for the Plant block, and [Covers: MODEL_REQ4] to the comment for the Feedback Gain block.

14. Select **File»Update** to save the changes to memory.

15. Select **File»Close Window** to close the superblock.

16. In the SystemBuild Catalog Browser, select **File»Save As** to save the changes to disk. Select <Requirements Gateway>\Tutorial\ MATRIXxModel.cat and overwrite the file on disk.

17. Return to Requirements Gateway and click **Yes** when Requirements Gateway prompts you to reload the MATRIXx Model document.

18. Expand the contents of the two documents in the Management View. Notice that Requirements Gateway displays that the coverage is 100%.

19. Click the **Coverage Analysis View** and the **Graphical View** tabs to review the coverage of requirements in the Specification document by the elements of the MATRIXx Model document.

20. You have completed this tutorial and may exit MATRIXx.

The next section provides an overview of the MATRIXx type.

# MATRIXx Type Overview

Use the MATRIXx type to analyze traceability information specified in the models defined in SystemBuild catalog files. The default MATRIXx type searches for traceability information stored in the comments or the Requirements_s user parameter of a model object.

The MATRIXx type defines the following document settings:

**Table 8-1.**  MATRIXx Type Document Settings

| Document Setting | Description |
| --- | --- |
| File or Directory | Select a catalog file, individual superblocks from a catalog file, or a directory that contains catalog files. For a directory, you can specify whether to include subdirectories. |
| Variables | Not defined |

The MATRIXx type defines the following default elements:

**Table 8-2.** MATRIXx Type Default Elements

| Element | Description |
|---------|-------------|
| Section | Captures the superblocks or models in a catalog file to display their hierarchy, similarly to SystemBuild. The display contains a list of models, superblocks, state diagrams, and datastores. |
| Requirement | Specified by [REQ: reqid] in a comment field of an object or the Requirements_s user parameter, where reqid is the requirement identifier. |
| Macro-Requirement | Not defined |
| Entity | Not defined |
| Reference | Specified by [Covers: reqid] in a comment field of an object or the Requirements_s user parameter, where reqid is the requirement identifier. |
|  | You can specify references in the comments of superblocks, blocks, datastores, state diagrams, bubbles, and transitions. |
|  | You can also specify references in the objects that support user parameters, specifically superblocks, blocks, and state diagrams. |
| Attribute | **Block Type**—Indicates the type of block. |
|  | **Attribute**—Specified by (#name) in a comment field of an object or the Requirements_s user parameter, where name is the name of the attribute. The attribute must appear after the corresponding requirement. |
| Reference Attribute | **Attribute**—Specified by (*name) in a comment field of an object or the Requirements_s user parameter, where name is the name of the attribute. The attribute must appear after the corresponding reference. |
| Link | Indicates a link to the corresponding superblock, state diagram, or datastore element in the object lists. |
| Text | Not defined |
| Picture | Not defined |

You do not need to customize any of the type definition settings for the MATRIXx type.

You can customize the definition of the MATRIXx type to conform to the data format that a file contains. Refer to *Coupling MATRIXx with NI Requirements Gateway* for more information about customizing the MATRIXx type. You can open the document by selecting **Coupling MATRIXx** from the **Help** menu in Requirements Gateway.

**9**

# Using NI Requirements Gateway with LabVIEW

In this chapter, you learn how to use NI Requirements Gateway with LabVIEW.

## Adding LabVIEW Documents to Projects

The LabVIEW type allows you to add LabVIEW documents to a project. When you configure a LabVIEW document, you select one or more VI files. You typically use a LabVIEW document to cover requirements in a specification document. For example, the VIs in an LLB may cover the requirements for functions in an instrument driver, or the VIs in an application may cover requirements for the graphical user interface and its underlying logic.

Complete the following steps to add a LabVIEW document to a project:

1. Select **File»Open** to launch the Open dialog box and navigate to the `<Requirements Gateway>\Tutorial` directory.

2. Select **LabVIEWProject.rqtf** in the list control and click **Open**. Requirements Gateway opens the project file and displays documents in the main window.

3. Click the **Management View** tab and collapse the document in the tree view.

4. Double-click the **Specification** document in the tree view to launch `LabVIEWSpec.txt` in an external application.

5. Review the contents of the text file in the external application. Notice that the specification contains four requirements. The requirement in the Logic section specifies the purpose of the VI. The three requirements in the Front Panel section specify controls and indicators for the front panel.

6. Exit the application that is displaying `LabVIEWSpec.txt`.

7. In Requirements Gateway, select **File»Edit Project** to launch the Project pane of the Configuration dialog box.

8. Click the **Add a document** button to add a new document in the Traceability Description Zone. Place the document below the Specification document.

9. In the Document Details pane, enter `LabVIEW Files` in the Name control and select **LabVIEW** from the Type of Analysis ring control.

10. Click in the **File or Directory** column. The File Browse button is visible on the right side of the control. Click the **File Browse** button to display the Select Files to Include in Document dialog box.

    The Select Files to Include in Document dialog box allows you to include multiple VI files in a LabVIEW document. You can add individual VI files, all of the VIs from an LLB, or all of the VIs in a directory. In addition, when you select a directory in the list view, you can specify whether to include all of the subdirectories, and you can specify whether to include the subVIs of a selected VI.

11. Click **Add LabVIEW File** and select `<Requirements Gateway>\ Tutorial\LabVIEWSignalAdder.vi`.

12. Click **Open** to add the selected file to the list view of the Select Files to Include in Document dialog box.

13. Click **OK** to close the Select Files to Include in Document dialog box.

14. Click the **Add a Cover** button to begin adding a covering link. Click the **LabVIEW Files** document and then click the **Specification** document to create an arrow between the two documents.

15. Click **OK** to close the Configuration dialog box.

16. Click **Yes** when Requirements Gateway prompts you to reanalyze the project.

17. Expand the contents of the two documents in the Management View as shown in Figure 9-1. Requirements Gateway displays the `LabVIEWSignalAdder.vi` file under the LabVIEW Files document.
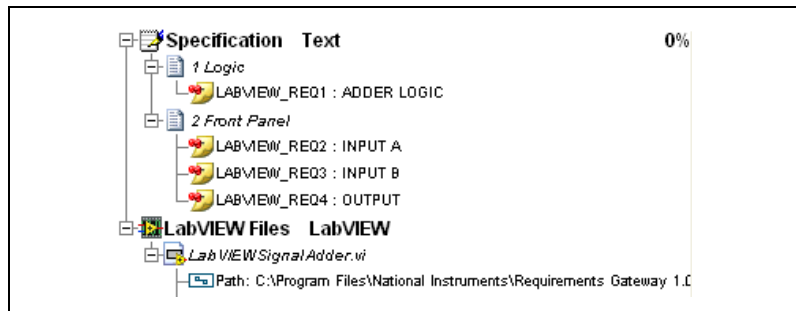


**Figure 9-1.** LabVIEW Document in Project

# Adding References to LabVIEW VIs

Complete the following steps to specify references in a LabVIEW VI:

1.  Select the **LABVIEW_REQ1** requirement in the Specification document.

2.  Right-click the **LABVIEW_REQ1** requirement and select **Copy For»LabVIEW Reference**. Requirements Gateway copies the required covering syntax for a LabVIEW comment to cover the selected requirement.

3.  Double-click the **LabVIEWSignalAdder.vi** file under the LabVIEW Files document. Requirements Gateway launches LabVIEW and opens the VI front panel.

4.  In LabVIEW, select **File»VI Properties** to display the VI Properties dialog box.

5.  Select **Documentation** in the Category control.

6.  Paste the text from the clipboard using **<Ctrl-V>** in the **VI description** control, after the existing comments. LabVIEW adds [Covers: LABVIEW_REQ1] to the description, as shown in Figure 9-2.
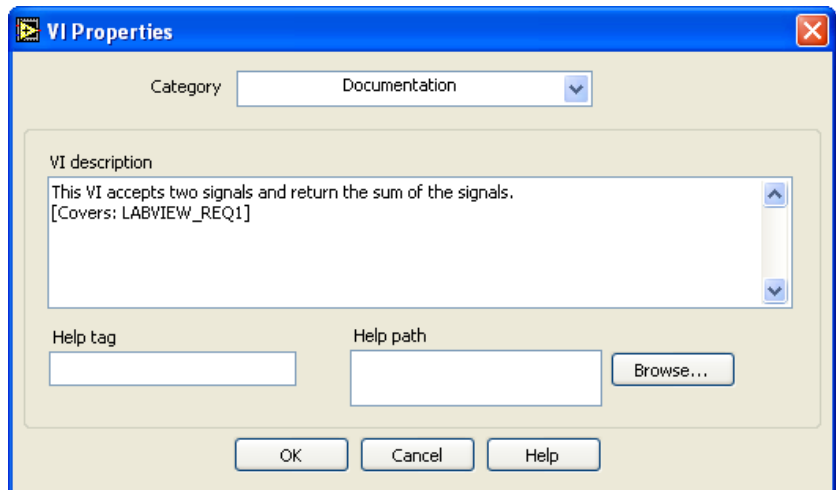


**Figure 9-2.**  LabVIEW VI Properties Dialog Box

7.  Click **OK** to close the VI Properties dialog box.

8.  Right-click the **Input A** control on the front panel and select
    **Description and Tip** to display the Description and Tip dialog box.

9.  Add [Covers: LABVIEW_REQ2] to the Description control as shown
    in Figure 9-3.
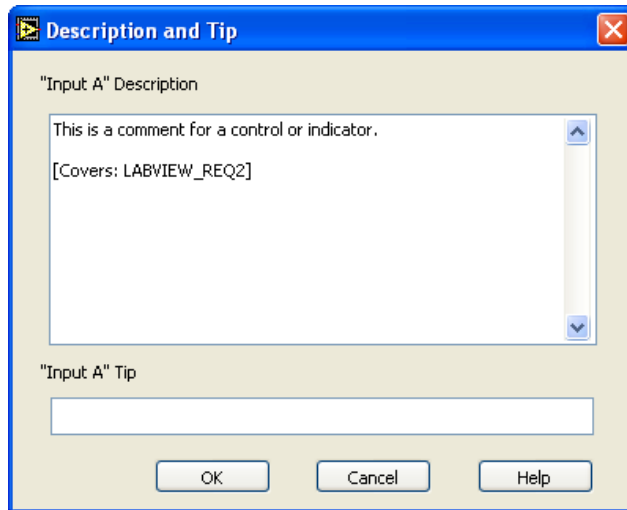


**Figure 9-3.**  LabVIEW Description and Tip Dialog Box

10. Click **OK** to close the Description and Tip dialog box.

11. Repeat steps 8 through 10 to add [Covers: LABVIEW_REQ3] to the
    comment for the **Input B** control, and [Covers: LABVIEW_REQ4] to
    the comment for the **Output** indicator.

12. Select **File»Save** to save the changes to memory.

13. Select **File»Close** to close the VI and return to Requirements Gateway.

14. Click **Yes** when Requirements Gateway prompts you to reload the
    LabVIEW Files document.

15. Expand the contents of the two documents in the Management View.
    Notice that Requirements Gateway displays the controls and indicators
    that contain references under the LabVIEWSignalAdder.vi file, and
    that the coverage is 100%.

16. Click the **Coverage Analysis View** and the **Graphical View** tabs to review the coverage of requirements in the Specification document by the elements of the LabVIEW Files document.

17. You have completed this tutorial and may exit LabVIEW.

The next section provides an overview of the LabVIEW type.

# LabVIEW Type Overview

Use the LabVIEW type to analyze traceability information specified in the description fields of a VI or the controls and indicators of a VI.

The LabVIEW type defines the following document settings:

**Table 9-1.** LabVIEW Type Document Settings

| Document Setting | Description |
|---|---|
| File or Directory | Select one or more VI or LLB files, or directories that contain VI or LLB files. You can specify whether to include all of the subVIs of a selected VI or LLB, or to include subdirectories of a selected directory. |
| Variables | Not defined |

The LabVIEW type defines the following default elements:

**Table 9-2.** LabVIEW Type Default Elements

| Element | Description |
|---|---|
| Section | Indicates a selected VI, VIs within a directory or LLB, and the controls and indicators of each VI that contains traceability information. |
| Requirement | Specified by [REQ: reqid] in a description field of a VI, control, or indicator, where reqid is the requirement identifier. |
| Macro-Requirement | Not defined |
| Entity | Not defined |
| Reference | Specified by [Covers: reqid] in a description field of a VI, control, or indicator, where reqid is the requirement identifier. |
| Attribute | **Attribute**—Specified by (#name) in a description field of a VI, control, or indicator, where name is the name of the attribute. The attribute must appear after the corresponding requirement. |

**Table 9-2.** LabVIEW Type Default Elements (Continued)

| Element | Description |
|---------|-------------|
| Reference Attribute | **Attribute**—Specified by `(*name)` in a description field of a VI, control, or indicator, where `name` is the name of the attribute. The attribute must appear after the corresponding reference. |
| Link | Not defined |
| Text | Not defined |
| Picture | Not defined |

You do not need to customize any of the type definition settings for the LabVIEW type.

Refer to *Coupling LabVIEW with NI Requirements Gateway* for more information about customizing the LabVIEW type. You can open the document by selecting **Coupling LabVIEW** from the **Help** menu in Requirements Gateway.

# 10

# Using NI Requirements Gateway with LabWindows/CVI

In this chapter, you learn how to use NI Requirements Gateway with LabWindows/CVI.

## Adding LabWindows/CVI Documents to Projects

The LabWindows/CVI type allows you to add LabWindows/CVI documents to a project. When you configure a LabWindows/CVI document, you select one or more source files. You typically use a LabWindows/CVI document to cover requirements in a specification document. For example, the functions in source files may cover the requirements for a library or tests, or the requirements for a graphical user interface and its underlying logic.

Complete the following steps to add a LabWindows/CVI document to a project:

1.  Select **File»Open** to launch the Open dialog box and navigate to the `<Requirements Gateway>\Tutorial` directory.

2.  Select **CVILibrary.rqtf** in the list control and click **Open**. Requirements Gateway opens the project file and displays documents in the main window.

3.  Click the **Management View** tab and collapse the document in the tree view.

4.  Double-click the **Specification** document in the tree view to launch `CVISpec.txt` in an external application.

5.  Review the contents of the text file in the external application. Notice that the specification contains five requirements. The requirement in the Header section specifies a requirement for the header file. The four requirements in the Source Code section specify functions for the library.

6.  Exit the application that is displaying `CVISpec.txt`.

7.  In Requirements Gateway, select **File»Edit Project** to launch the Project pane of the Configuration dialog box.

8. Click the **Add a document** button to add a new document in the Traceability Description Zone. Place the document below the Specification document.

9. In the Document Details pane, enter `CVI Library` in the Name control and select **LabWindows/CVI** from the Type of Analysis ring control.

10. Click in the **File or Directory** column. The File Browse button is visible on the right side of the control. Click the **File Browse** button to display the Select Files to Include in Document dialog box.

   The Select Files to Include in Document dialog box allows you to include multiple files in a LabWindows/CVI document. You can add individual source files, a workspace or project file, or all of the files in a directory. In addition, when you select a directory in the list view, you can specify whether to include all of the subdirectories.

11. Click **Add Workspace or Project File** and select `<Requirements Gateway>\Tutorial\CVILibrary.cws`.

12. Click **Open** to add the selected file to the list view of the Select Files to Include in Document dialog box.

13. Click **OK** to close the Select Files to Include in Document dialog box.

14. Click the **Add a cover** button to begin adding a covering link. Click the **CVI Library** document and then click the **Specification** document to create an arrow between the two documents.

15. Click **OK** to close the Configuration dialog box.

16. Click **Yes** when Requirements Gateway prompts you to reanalyze the project.

17. Expand the contents of the two documents in the Management View as shown in Figure 10-1. Requirements Gateway displays the LabWindows/CVI workspace under the CVI Library document.
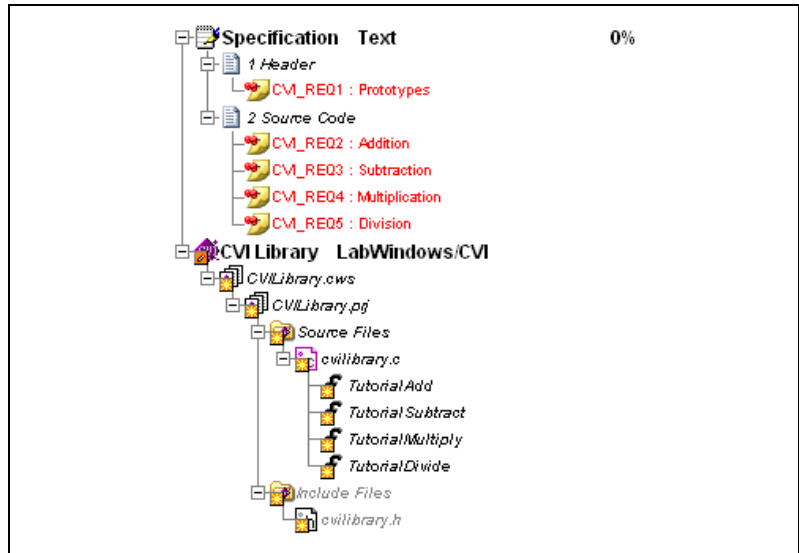


**Figure 10-1.** LabWindows/CVI Document in Project

# Adding References to LabWindows/CVI Files

Complete the following steps to specify references in a LabWindows/CVI source file:

1. Select the **CVI_REQ1** requirement in the Specification document.

2. Right-click the **CVI_REQ1** requirement and select **Copy For» LabWindows/CVI Comment**. Requirements Gateway copies the required covering syntax for a LabWindows/CVI comment to cover the selected requirement.

3. Double-click the **CVILibrary.cws** file under the CVI Library document. Requirements Gateway launches LabWindows/CVI and opens the workspace.

4. In LabWindows/CVI, double-click the **CVILibrary.h** file in the tree view to open the file.

5. Place your cursor at the beginning of the second line in the file and paste the text from the clipboard using **<Ctrl-V>**. LabWindows/CVI adds `// Implements CVI_REQ1` to the file functions as highlighted in Figure 10-2.

```
// This is the header for the static library.
// Implements CVI_REQ1

// Function prototypes
float TutorialAdd (float a, float b);
float TutorialSubtract (float a, float b);
float TutorialMultiply (float a, float b);
float TutorialDivide (float a, float b);
```

**Figure 10-2.** CVILibrary.h

6. Save the changes to the file and close the document.

7. In LabWindows/CVI, double-click the **CVILibrary.c** file in the tree view to open the file.

8. Enter the highlighted comments for each of the functions as shown in Figure 10-3.

```
// This is the source file for the static library.


// Function Add
// Implements CVI_REQ2
float TutorialAdd (float a, float b)
{
     return a + b;
}

// Function Subtract
// Implements CVI_REQ3
float TutorialSubtract (float a, float b)
{
     return a - b;
}

// Function Multiply
// Implements CVI_REQ4
float TutorialMultiply (float a, float b)
{
     return a * b;
}

// Function Divide
// Implements CVI_REQ5
float TutorialDivide (float a, float b)
{
     return a / b;
}
```

**Figure 10-3.** CVILibrary.c

9.  Save the changes to the file, close the document, and return to Requirements Gateway. Click **Yes** when Requirements Gateway prompts you to reload the LabWindows/CVI Files document.

10. Expand the contents of the two documents in the Management View. Notice that Requirements Gateway displays the coverage as 100%.

11. Click the **Coverage Analysis View** and the **Graphical View** tabs to review the coverage of requirements in the Specification document by the elements of the CVI Library document.

12. You have completed this tutorial and may exit LabWindows/CVI.

The next section provides an overview of the LabWindows/CVI type.

# LabWindows/CVI Type Overview

Use the LabWindows/CVI type to analyze traceability information specified in source code files or in the help for function panel files. The default LabWindows/CVI type searches `.c`, `.h`, and `.fp` files. The type displays the function with C source and function panel files. The default type recognizes both C and C++ style comments in source files.

The LabWindows/CVI type defines the following document settings:

**Table 10-1.** LabWindows/CVI Type Document Settings

| Document Setting | Description |
| --- | --- |
| File or Directory | Select individual source files, a directory that contains source files, or a LabWindows/CVI workspace or project file. For a directory, you can specify whether to include subdirectories. |
| Variables | Not defined |

The LabWindows/CVI type defines the following default elements:

**Table 10-2.** LabWindows/CVI Type Default Elements

| Element | Description |
| --- | --- |
| Section | **Directory**—Identifies the selected directory and subdirectories. |
|  | **File**—Identifies a file located in a directory or project. |
|  | **Function**—Identifies a function in a file. |
| Requirement | Not defined |

**Table 10-2.** LabWindows/CVI Type Default Elements (Continued)

| Element | Description |
|---|---|
| Macro-Requirement | Not defined |
| Entity | Not defined |
| Reference | Specified by `Implements reqid` within a C or C++ comment or in the help of a function panel, where `reqid` is the requirement identifier.<br><br>References are associated with a function if the comment is in the function or immediately precedes the function; otherwise the references are associated with the file. |
| Attribute | Not defined |
| Reference Attribute | Not defined |
| Link | Not defined |
| Text | Not defined |
| Picture | Not defined |

You do not need to customize any of the type definition settings for the LabWindows/CVI type.

Refer to *Coupling LabWindows/CVI with NI Requirements Gateway* for more information about customizing the LabWindows/CVI type. You can open the document by selecting **Coupling LabWindows/CVI** from the **Help** menu in Requirements Gateway.

# 11

# Using NI Requirements Gateway with DOORS

In this chapter, you learn how to use NI Requirements Gateway with Telelogic DOORS.

DOORS types allow you to add DOORS documents to a project. You typically use a DOORS document to define requirements for a Requirements Gateway project. When you configure a DOORS document, you select a formal module in DOORS as the source of traceability information.

A Telelogic DOORS module contains a tree of objects similar to numeric headings in a Microsoft Word document. An object specifies header text, contains descriptive text, and is identified by a unique ID within the module. A module also defines object attributes, where each object in the module can define its own attribute values. The data types for attributes include Boolean, numeric, date, and string values.

Telelogic DOORS is flexible in how you can store data in a module, resulting in multiple ways that you can specify traceability information. Requirements Gateway has two DOORS types, DOORS Basic and DOORS Advanced, which adhere different formalisms for identifying requirements. The following tutorial uses the DOORS Advanced type. Refer to the *DOORS Types Overview* section in this chapter for an overview of each of the DOORS types. In addition, review the examples included with NI Requirements Gateway for additional examples of custom DOORS types.

## Defining Requirements in DOORS

Complete the following steps to import a tutorial project into Telelogic DOORS:

1. Launch Telelogic DOORS and log into the database. Telelogic DOORS displays the main window. Your user login must have the authority to create projects.

2. Select **File»Restore»Project** to launch the Restore Project dialog box.

3.  Click **Browse** and navigate to the `<Requirements Gateway>\` `Tutorial` directory.

4.  Select **RequirementsGatewayTutorial.dpa** and click **Open**.

5.  Click **OK** on the Restore Project dialog box. Telelogic DOORS displays the contents of the project in the Restore Project dialog box. Click **OK** to create the RequirementsGatewayTutorial project in the database.

6.  Select the **RequirementsGatewayTutorial** project in the tree view to display the Requirements module in the list view, as shown in Figure 11-1.
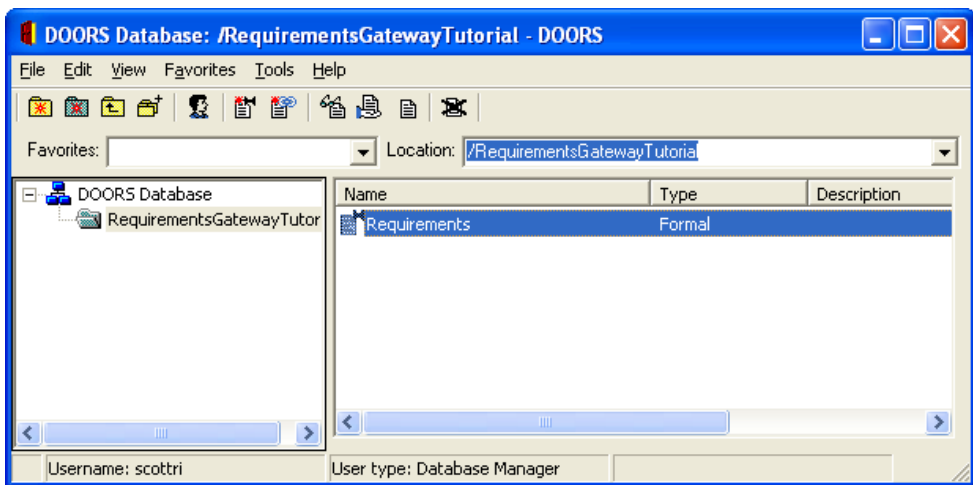


**Figure 11-1.** DOORS Database

7.  Double-click the **Requirements** module to open the Formal Module window as shown in Figure 11-2. The Requirements module contains similar information to the text specification document, `ProductSpec.txt`, used in Chapter 3, *Managing Requirements*. The DOORS Advanced type uses attribute values to determine whether an object is a requirement and to specify the requirement identifier.
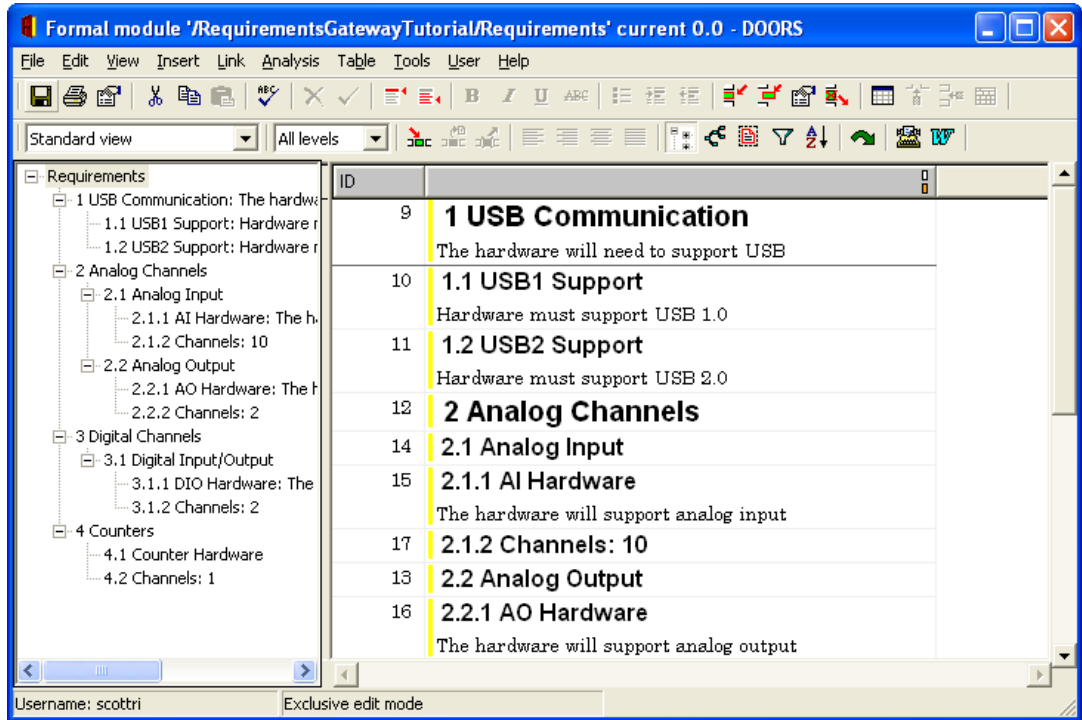
**Figure 11-2.** DOORS Formal Module Window

8.  In the Formal Module window, select **Insert»Column** to display the New Column dialog box.

9.  Enter `ObjectType` in the Title control and select **ObjectType** in the Attribute ring control.

10. Click **OK** to close the New Column dialog box. Telelogic DOORS adds a new column to the view.

11. Repeat steps 8 through 10 to add another column in the display for the ReqID attribute as shown in Figure 11-3. The DOORS Advanced type interprets objects with the ObjectType attribute set to Requirement as a requirement, and uses the ReqID attribute value as the requirement identifier.

| ID | | ObjectType | ReqID |
|---|---|---|---|
| 9 | **1 USB Communication**<br>The hardware will need to support USB | | |
| 10 | **1.1 USB1 Support**<br>Hardware must support USB 1.0 | Requirement | **PS_USB_REQ1** |
| 11 | **1.2 USB2 Support**<br>Hardware must support USB 2.0 | Requirement | **PS_USB_REQ2** |
| 12 | **2 Analog Channels** | | |
| 14 | **2.1 Analog Input** | | |
| 15 | **2.1.1 AI Hardware**<br>The hardware will support analog input | Requirement | **PS_AI_REQ1** |
| 17 | **2.1.2 Channels: 10** | Requirement | **PS_AI_REQ2** |
| 13 | **2.2 Analog Output** | | |
| 16 | **2.2.1 AO Hardware**<br>The hardware will support analog output | Requirement | **PS_AO_REQ1** |
| 18 | **2.2.2 Channels: 2** | Requirement | **PS_AO_REQ2** |

**Figure 11-3.** New Columns in Formal Module Window

12. Select **View»Save As** to display the Save As dialog box.

13. Enter `Requirements Gateway Advanced` in the Name control and click **OK** to save the changes to the view.

14. Select **File»Close** to close the window.

# Adding DOORS Documents to Projects

Complete the following steps to create a project with a DOORS document:

1. In Requirements Gateway, select **File»New** to launch the Create a New Project and Save As dialog box, and navigate to the `<Requirements Gateway>\Tutorial` directory.

2. Enter `DOORSProject` in the File name control and click **Save**.

3. Click the **Add a document** button to add a document in the Traceability Description Zone.

4. In the Document Details pane, enter `Product Specification` in the Name control and select **DOORS Advanced** from the Type of Analysis ring control.

5. Click in the **File or Directory** column. The File Browse button is visible on the right side of the control. Click the **File Browse** button to display the Select DOORS module dialog box.

   The Select DOORS module dialog box allows you to log in and navigate to a DOORS database to select a module.

6. Enter your Telelogic DOORS user and password in the DOORS login section and click the **Update DOORS tree** button. Requirements Gateway accesses the DOORS database and lists the projects and modules in the tree view.

7. Select the **DOORS Database»RequirementsGatewayTutorial» Requirements** element in the tree view.

8. Click **OK** to close the Select DOORS module dialog box.

9. Click the **Add a document** button to add a second document object in the Traceability Description Zone. Place the document below the Product Specification document.

10. In the Document Details pane, enter Covering Specification in the Name control, select **Text** in the Type of Analysis ring control, and navigate to <Requirements Gateway>\Tutorial\ CoveringSpec.txt in the File or Directory control.

11. Click the **Add a cover** button to begin adding a covering link. Click the **Covering Specification** document and then click the **Product Specification** document to create an arrow between the two documents.

12. Click **OK** to close the Configuration dialog box.

13. Click **Yes** if Requirements Gateway prompts you to reanalyze the project.

14. Expand the contents of the two documents in the Management View as shown in Figure 11-4. Requirements Gateway displays the contents of the DOORS module. Notice that Requirements Gateway displays the coverage as 100%.

**Note**  If you are completing this tutorial prior to the exercise in Chapter 3, *Managing Requirements*, Requirements Gateway displays the coverage as 90%.
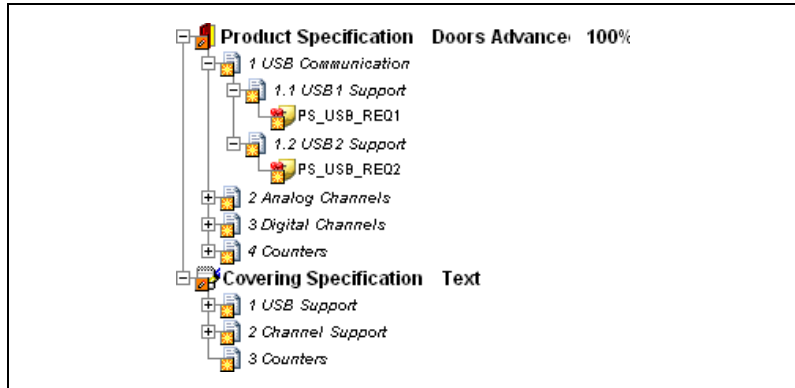
**Figure 11-4.** DOORS Project

15. Click the **Coverage Analysis View** and the **Graphical View** tabs to review the coverage of requirements in the Specification document by the elements of the DOORS module.

# Exporting Documents to DOORS

Requirements Gateway allows you to export documents and traceability links in your project back to the Telelogic DOORS database so that you can access the analysis performed by Requirements Gateway directly in Telelogic DOORS.

Complete the following steps to export the Covering Specification document to the Telelogic DOORS database:

1. Select the **Covering Specification** document in the tree view pane of the Management View.

2. Click the **Export Elements to DOORS** button in the toolbar to display the Export elements to DOORS dialog box.

3. Select the **RequirementsGatewayTutorial** element in the Target tree view.

4. Enter Covering Module in the New module control as shown in Figure 11-5.
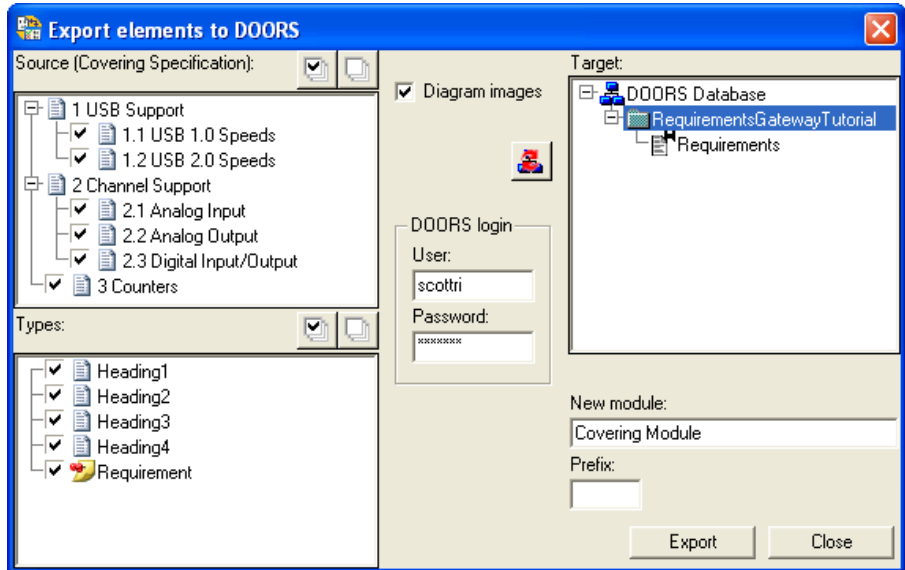
**Figure 11-5.**  Export Elements to DOORS Dialog Box

5.  Click **Export** to display a confirmation dialog box that lists the new elements to export to DOORS as shown in Figure 11-6.
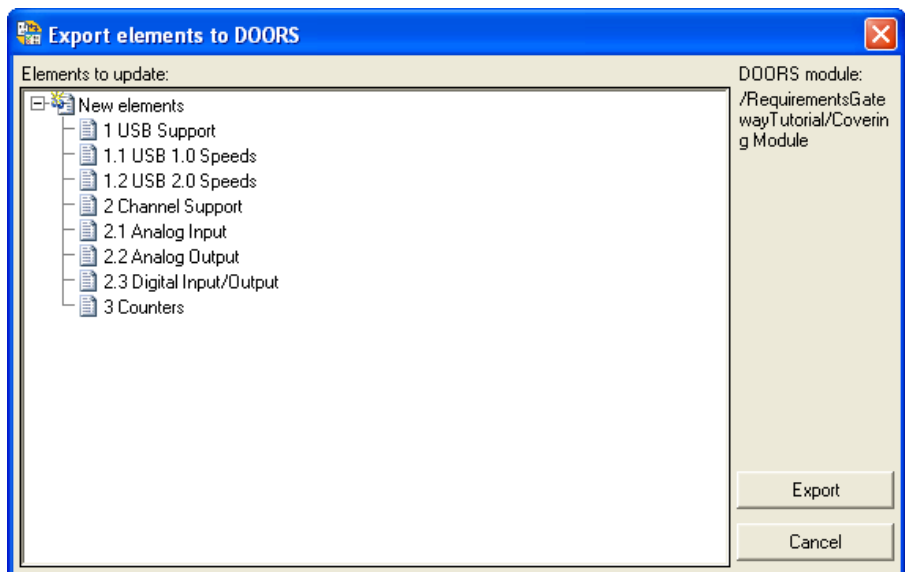


**Figure 11-6.**  Confirmation for Export Elements to DOORS

6. Click **Export** again.

7. Click **OK** when Requirements Gateway displays a prompt stating that the operation completed.

✎ **Note**  If you did not close the Formal Module window for the Requirements Module in Telelogic DOORS, Requirements Gateway cannot export the Covering Specification document and create links. If the export operation fails, close the Formal Module window and try again.

8. Click **Close** to close the Export elements to DOORS dialog box.

9. Return to the DOORS application and select **View»Refresh** to display the Covering Module in the database.

10. Double-click **Covering Module** to display the module as shown in Figure 11-7. The content of the module mirrors the traceability information displayed in Requirements Gateway, and links exist between the Covering Module and the Requirements Module.



**Figure 11-7.**  CoveringSpec.txt in DOORS
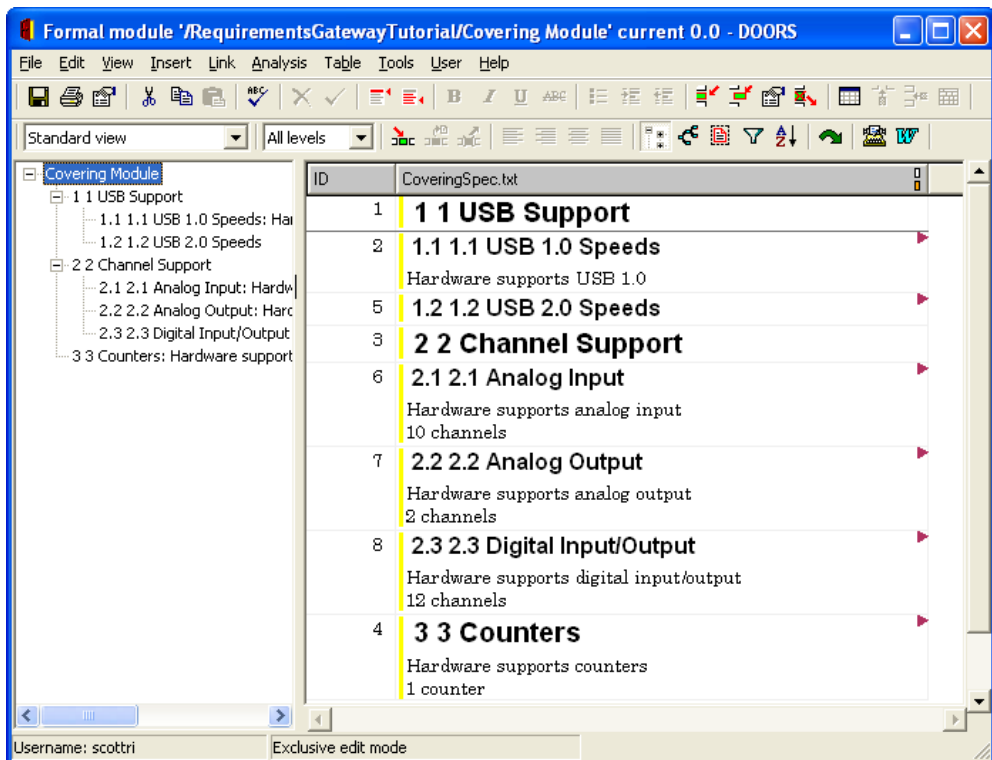
11. Select **File»Close** to close the window.

12. You have completed this tutorial and may exit DOORS.

The next section provides an overview of the DOORS type and the DOORS Advanced type.

# DOORS Types Overview

Use the DOORS types to analyze traceability information specified in Telelogic DOORS modules. You must have Telelogic DOORS installed on your system to use the DOORS types.

The organization and format of your module data may not adhere to the format required by the default DOORS types. You can customize the definition of the DOORS type to conform to the formalism adhered to by the modules in a DOORS database. Refer to *Coupling DOORS with NI Requirements Gateway* for more information about customizing the DOORS types. You can open the document by selecting **Coupling DOORS** from the **Help** menu in Requirements Gateway.
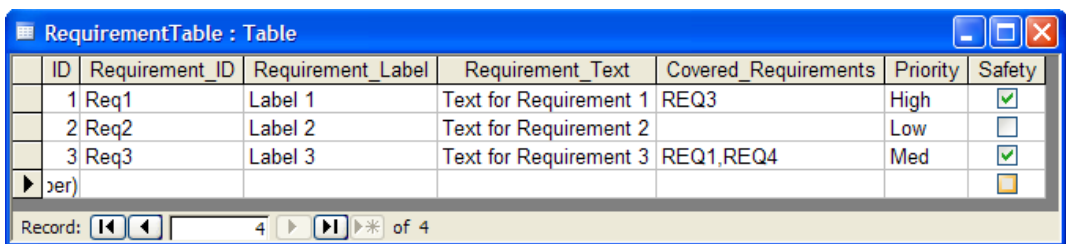
# DOORS Type

The default DOORS type uses a Requirement Boolean object attribute to determine whether objects in a module are requirements. In addition, the type uses the ID of the object as the requirement identifier.

A DOORS module example that contains the default requirement traceability information for the DOORS type is shown in Figure 11-8.



**Figure 11-8.**  DOORS Basic Module

The DOORS type defines the following document settings:

**Table 11-1.**  DOORS Type Document Settings

| Document Setting | Description |
|---|---|
| File or Directory | Select a module in the DOORS database. |
| Variables | **Module name**—Specifies the path to the module within the database. |
| | **Capture diagrams**—Specifies to import DOORS images. |
| | **Extract only defined attributes**—Specifies to only extract the attributes from objects that are defined by the type, which can improve performance when collecting data from DOORS. |

The DOORS type defines the following default elements:

**Table 11-2.**  DOORS Type Default Elements

| Element | Description |
|---|---|
| Section | Indicates the objects in a module. |
| Requirement | Specified by a value of `True` in the Requirement Boolean object attribute. The type uses the ID of the object as the requirement identifier. |
| Macro-Requirement | Not defined |
| Entity | Not defined |
| Reference | Specified by an out-link from an object in the module to another object. |
| Attribute | Not defined |
| Reference Attribute | Not defined |
| Link | Not defined |
| Text | Not defined |
| Picture | Not defined |

You do not need to customize any of the type definition settings for the DOORS type.

## DOORS Advanced Type

The default DOORS Advanced type uses the value of ObjectType object attribute to determine whether objects in modules are a requirement. In addition, the type uses the value of the ReqID object attribute as a requirement identifier.

A DOORS module example that contains the default requirement traceability information for the DOORS Advanced type is shown in Figure 11-9.

| ID | ReqID | | ObjectType | Priority |
|---|---|---|---|---|
| 1 | | **1 Calling the elevator** | | |
| 2 | REQ1 | A potential passenger can be on any of the floors and can call an elevator by pressing either the up or button to call the elevator. | Requirement | High |
| 3 | REQ2 | The potential passenger waits for the doors to open before entering into the elevator. The potential passenger now becomes a passenger | Requirement | Medium |
| 6 | | **2 In the elevator** | | |
| 7 | REQ3 | Once in an elevator, a passenger can select the floor or a number of floors where he wants to go to. Modif | Requirement | High |
| 8 | | Each elevator will have a list of floors to visit : Once the elevator has been called by a potential passenger or a passenger has selected a destination, then the elevator will move to the appropriate floor. | Comment | |

**Figure 11-9.** DOORS Advanced Module

The DOORS Advanced type defines the following document settings:

**Table 11-3.** DOORS Advanced Type Document Settings

| Document Setting | Description |
|---|---|
| File or Directory | Select a module in the DOORS database. |
| Variables | **Module name**—Specifies the path to the module within the database. |
| | **Capture diagrams**—Specifies to import DOORS images. |
| | **Extract only defined attributes**—Specifies to only extract the attribute from objects that are defined by the type, to speed up data collection from DOORS. |

The DOORS Advanced type defines the following default elements:

**Table 11-4.**  DOORS Advanced Type Default Elements

| Element | Description |
|---|---|
| Section | Indicates the objects in a module. |
| Requirement | Specified by a value of `Requirement` in the ObjectType object attribute. The type uses the value of the ReqID object attribute as the requirement identifier. |
| Macro-Requirement | Not defined |
| Entity | Not defined |
| Reference | Specified by an out-link or in-link for an object in the module. |
| Attribute | **Priority**—Specified by the Priority object attribute. |
| Reference Attribute | Not defined |
| Link | Not defined |
| Text | Not defined |
| Picture | Not defined |

You do not need to customize any of the type definition settings for the DOORS Advanced type.

## Exporting Elements to DOORS

The DOORS types allow you to upload traceability information from covering documents into the DOORS database. The DOORS types create a new module for the covering document and links the references in the document to the requirements in DOORS. Refer to *Coupling DOORS with NI Requirements Gateway* for more information about sending traceability information back to DOORS. You can open the document by selecting **Coupling DOORS** from the **Help** menu in Requirements Gateway.

# A

# Type Overviews

This appendix contains brief summaries of features of the types supported by NI Requirements Gateway.

## Access

Use the Access type to analyze traceability information specified in tables of a Microsoft Access database. The default type analyzes the text located in fields with specific names. You must install Microsoft Access on your system to use the Access type.

The organization and format of a database table can vary, and does not always adhere to the format required by the default Access type. You can customize the definition of the Access type to conform to the data format that a table contains. Refer to *Coupling Microsoft Access with NI Requirements Gateway* for more information about customizing the Access type. You can open the document by selecting **Coupling Access** from the **Help** menu in Requirements Gateway.

An example table that contains the default requirement traceability information is shown in Figure A-1.

| | ID | Requirement_ID | Requirement_Label | Requirement_Text | Covered_Requirements | Priority | Safety |
|---|---|---|---|---|---|---|---|
| | 1 | Req1 | Label 1 | Text for Requirement 1 | REQ3 | High | ☑ |
| | 2 | Req2 | Label 2 | Text for Requirement 2 | | Low | ☐ |
| | 3 | Req3 | Label 3 | Text for Requirement 3 | REQ1,REQ4 | Med | ☑ |
| ▶ | ber) | | | | | | ☐ |

Record: ◄◄ ◄ [ 4 ] ► ►► ►* of 4

**Figure A-1.** Access Table

The Access type defines the following document settings:

**Table A-1.**  Access Type Document Settings

| Document Setting | Description |
|---|---|
| File or Directory | Select a Microsoft Access database file (`.mdb`). |
| Variables | **Table**—Specifies the name of the table to analyze. |

The Access type defines the following default elements:

**Table A-2.**  Access Type Default Elements

| Element | Description |
|---|---|
| Section | **Table**—Identifies the tables within the database. |
| Requirement | Specified by entering the requirement identifier in the Requirement_ID field of a table, and the requirement label in the Requirement_Label field of a table. |
| Macro-Requirement | Not defined |
| Entity | Not defined |
| Reference | Specified by entering the list of requirement identifiers, separated by comma, in the Covered_Requirements field of a table. |
| Attribute | The default defines the following attributes as examples:<br><br>• **Priority**—Specify a text value in the Priority field of a table.<br><br>• **Allocation**—Specify a text value in the Allocation field of a table.<br><br>• **Safety**—Specify a Boolean value in the Safety field of a table.<br><br>• **Category**—Specify a text value in the Category field of a table. |
| Reference Attribute | Not defined |
| Link | Not defined |
| Text | Specified by entering text in the Requirement_Text field of a table. |
| Picture | Not defined |

You do not need to customize any of the type definition settings for the Access type.

✎ **Note**    When Requirements Gateway attempts to open a database, Microsoft Access might display a Security Warning dialog box requesting permission to open the file. If you do not grant permission, or if Microsoft Access already has the database open with exclusive access, Requirements Gateway fails to open the database.

# Acrobat PDF

Use the Acrobat PDF type to analyze traceability information specified in Adobe Acrobat PDF files. The organization and format of text data can vary between files, and does not always adhere to the format required by the default Acrobat PDF type. You can customize the definition of the Acrobat PDF type to conform to the data format that a file contains.

An example PDF file that contains the default requirement traceability information is shown in Figure A-2.

```
This is an example PDF document

1. Heading 1 Text
1.1. Heading 2 Text
    [Covers: PS_REQ1]

    DS_REQ1: Label
    <<Derived Requirement Text>>
    Priority: High

1.1.1. Heading 3 Text
[MacroReq_DS_ALL]
    <<Macro Requirement Text>>
    [Covers: PS_REQ2]

    DS_REQ2: Requirement Label
    <<Requirement Text>>
    DS_REQ3: Requirement Label
    <<Requirement Text>>
[End_of_MacroReq]
```

**Figure A-2.** Acrobat PDF Document

The Acrobat PDF type defines the following document settings:

**Table A-3.** Acrobat PDF Type Document Settings

| Document Setting | Description |
|---|---|
| File or Directory | Select an Adobe Acrobat PDF file (`.pdf`). |
| Variables | Not defined |

The Acrobat PDF type defines the following default elements:

**Table A-4.**  Acrobat PDF Type Default Elements

| Element | Description |
|---------|-------------|
| Section | Specified by `n.n.n.n.  text`, where `n` is a numeric value and `text` is the label for the section. The type supports up to four numeric levels. |
| Requirement | Specified by `prefixREQnn: label`, where `prefix` is non-spaced alphanumeric characters, `nn` is a numeric value, and `label` is any text. |
| Macro-Requirement | Specified by `[MacroReq_reqid]`, where `reqid` is the requirement identifier and ends with `[End_of_MacroReq]`. |
| Entity | Not defined |
| Reference | Specified by `[Covers: reqid1, reqid2]`, where `reqid` is the identifier of the covered requirement. |
| Attribute | **Priority**—Specified by `Priority: text`, where `text` must be one of the following: Low, Med, or High. The attribute must appear after the corresponding requirement.<br><br>**Allocation**—Specified by `Allocated to: text` where `text` is the attribute value. |
| Reference Attribute | Not defined |
| Link | Not defined |
| Text | Specified by `<<text>>`, where `text` is the requirement text value. The requirement text must appear on a new line after the corresponding section or requirement element. |
| Picture | Not defined |

You do not need to customize any of the type definition settings for the Acrobat PDF type.

# Code

Use the Code type to analyze traceability information specified in source code files. The default Code type searches for C++ style comments specified in `.c`, `.h`, and, `.cpp` source files. The type does not list the functions defined in the files.

You can customize the definition of the Code type to conform to the comment style that a file contains. Refer to *Coupling Code Files with NI Requirements Gateway* for more information about customizing the Code type. You can open the document by selecting **Coupling Code** from the **Help** menu in Requirements Gateway.

An example Code file that contains the default requirement traceability information is shown in Figure A-3.

```
// This is example code
// Implements REQ_LIBRARY

// Implements REQ_FUNC1
int Function1(int a, int b)
{
    return a + b;
}
```

**Figure A-3.**  Code Type Source Code Document

The Code type defines the following document settings:

**Table A-5.**  Code Type Document Settings

| Document Setting | Description |
|---|---|
| File or Directory | Select a directory that contains source files (`.c`, `.h`, `.cpp`). |
| Variables | **Prompt when files change**—Specifies whether Requirements Gateway prompts you to perform a reload operation when a source code file is modified. |

The Code type defines the following default elements:

**Table A-6.**  Code Type Default Elements

| Element | Description |
|---|---|
| Section | **Directory**—Identifies the selected directory and any subdirectories. <br><br> **File**—Identifies a file located in a directory. |
| Requirement | Not defined |
| Macro-Requirement | Not defined |
| Entity | Not defined |

**Table A-6.** Code Type Default Elements (Continued)

| Element | Description |
|---------|-------------|
| Reference | Specified by `// Implements reqid` within a source file, where `reqid` is the requirement identifier. |
| Attribute | Not defined |
| Reference Attribute | Not defined |
| Link | Not defined |
| Text | Not defined |
| Picture | Not defined |

You may need to customize the following type definition settings for the Code type.

**Table A-1.** Code Type Settings

| Type Setting | Description |
|--------------|-------------|
| Encoding | Specifies the type of file to read. The default options include:<br><br>• **Default**—ANSI encoding (ISO 8859-1)<br><br>• **UTF8**—8-bit Unicode transformation format<br><br>• **UCS2**—2-byte Unicode Little Endian format<br><br>• **UCS2be**—2-byte Unicode Big Endian format |
| Filters | Specifies the file types to analyze. |
| Include subdirectories | Specifies whether to search for files in the subdirectories of the selected directory you specify. |

# Code C

Use the Code C type to analyze traceability information specified in C and C++ source code files. The default Code C type searches `.c`, `.h`, and, `.cpp` files. The type displays the functions defined in the `.c` and `.cpp` source files. The default type recognizes both C and C++ style comments.

Refer to *Coupling Code Files with NI Requirements Gateway* for more information about customizing the Code C type. You can open the

document by selecting **Coupling Code** from the **Help** menu in
Requirements Gateway.

An example Code C file that contains the default requirement traceability
information is shown in Figure A-4.

```
// This is example code
// Implements REQ_LIBRARY

// --------------------
// Implements REQ_FUNC1
// --------------------
int Function1(int a, int b)
{
    // Implements REQ_MAIN
    return a + b;
}

/* ------------------------
   Implements REQ_FUNC1
------------------------*/
int Function1(int a, int b)
{
    return a + b;
}
```

**Figure A-4.**  Code C Type Source Code Document

The Code C type defines the following document settings:

**Table A-7.**  Code C Type Document Settings

| Document Setting | Description |
|---|---|
| File or Directory | Select a directory that contains source files (`.c`, `.h`, `.cpp`). |
| Variables | **Prompt when files change**—Specifies whether Requirements Gateway prompts you to perform a reload operation when a source code file is modified. |

The Code C type defines the following default elements:

**Table A-8.** Code C Type Default Elements

| Element | Description |
|---------|-------------|
| Section | **Directory**—Identifies the selected directory and any subdirectories.<br><br>**File**—Identifies a file located in a directory.<br><br>**Function**—Identifies a function in a file. |
| Requirement | Not defined |
| Macro-Requirement | Not defined |
| Entity | Not defined |
| Reference | Specified by `Implements reqid` within a C or C++ comment of a source file, where `reqid` is the requirement identifier. A reference is associated with a function if the comment is in the function or immediately precedes the function, otherwise the references is associated with the file. |
| Attribute | Not defined |
| Reference Attribute | Not defined |
| Link | Not defined |
| Text | Not defined |
| Picture | Not defined |

You may need to customize the following type definition settings for the Code C type.

**Table A-2.** Code C Type Settings

| Type Setting | Description |
|--------------|-------------|
| Filters | Specifies the file types to analyze. |
| Include subdirectories | Specifies whether to search for files in the subdirectories on the selected directory you specify. |

# DOORS

For an overview of the DOORS types, refer to Chapter 11, *Using NI Requirements Gateway with DOORS*.

# Excel

Use the Excel type to analyze traceability information specified in Microsoft Excel worksheets. You must have Microsoft Excel installed on your system to use the Excel type. The default Excel type searches worksheets for traceability information that adheres to a specific format with specific columns.

The organization and format of worksheet data can vary between documents, and does not always adhere to the format required by the default Excel type. You can customize the definition of the Excel type to conform to the data format that a worksheet contains. Refer to *Coupling Microsoft Excel with NI Requirements Gateway* for more information about customizing the Excel type. You can open the document by selecting **Coupling Excel** from the **Help** menu in Requirements Gateway.

An example worksheet that contains the default requirement traceability information is shown in Figure A-5.

|  | A | B | C | D | E |
|---|---|---|---|---|---|
| 16 |  |  |  |  |  |
| 17 |  |  |  |  |  |
| 18 | **ReqID** | **Label** | **Definition** | **Priority** | **Allocation** |
| 19 | **REQ1** | Capture | The tool shall be able to capture semi-automatically the requirements included in a document and/or in a model. "Semi-automatic" means the text has to be formalized beforehand by the user or another | High | John Doe |
| 20 | **REQ2** | Update information when source changes | The tool shall take into account the successive versions of the documents and models, and update automatically the traceability | High | Tim Jones |
| 21 | **REQ3** | Multiple requirements definition | The tool shall be able to consider several requirements definitions created by the user. For example, if Safety requirements, Functional requirements and Performance requirements are defined using different syntaxes and formats, these formats can be independently | Medium | John Doe |
| 22 | **REQ4** | Traceability Reports | The tool shall generate traceability reports including all or part of the traceability information, using these user-defined templates. | High | Malcolm Hawkins |
| 23 | **REQ5** | Navigation to the Authoring tool | The tool shall allow navigation from the information displayed in the main window and the authoring tool from which the information has been captured | Low | John Doe |

**Figure A-5.**  Excel Worksheet

The Excel type defines the following document settings:

**Table A-9.** Excel Type Document Settings

| Document Setting | Description |
|---|---|
| File or Directory | Select a Microsoft Excel file (.xls). |
| Variables | Not defined |

The Excel type defines the following default elements:

**Table A-10.** Excel Type Default Elements

| Element | Description |
|---|---|
| Section | Indicates the sheets within a worksheet file. |
| Requirement | Specified by REQnn in the first column of a sheet, where nn is a numeric value in the requirement identifier. The text in the second cell specifies the label for the requirement. |
| Macro-Requirement | Not defined |
| Entity | Not defined |
| Reference | Specified by [Covers: reqid1, reqid2] within a cell of a sheet, where reqid is the identifier of the covered requirement. |
| Attribute | **Priority**—Specified by the text located in the fourth cell in a row that contains a requirement. The value must be one of the following: Low, Med, or High.<br><br>**Allocated**—Specified by the text located in the fifth cell in a row that contains a requirement. |
| Reference Attribute | Not defined |
| Link | Not defined |
| Text | Specified by the text located in the third cell in a row that contains a requirement. |
| Picture | Not defined |

You may need to customize the following type definition settings for the Excel type:

**Table A-3.** Excel Type Settings

| Type Setting | Description |
| --- | --- |
| Convert Tool | Supports the following two options: Excel and ExcelWithColNumbers. |
| Analyzed Worksheet | Specifies the name of a specific worksheet within the document to convert. If no name is specified, the type analyzes all worksheets in the file. |

# LabVIEW

For an overview of the LabVIEW type, refer to Chapter 9, *Using NI Requirements Gateway with LabVIEW*.

# LabWindows/CVI

For an overview of the LabWindows/CVI type, refer to Chapter 10, *Using NI Requirements Gateway with LabWindows/CVI*.

# Large Code

Use the Large Code type to analyze traceability information specified in a large number of source code files. The default Large Code type searches for C++ style comments specified in .c, .h, and, .cpp source files. The type does not list the functions defined in the files. When you configure a document that uses the Large Code type, you must specify a Filter Expression variable that the type uses to select the lines in source files to process. For the default type, you typically specify (.*Implements.*) as the Filter Expression.

Refer to *Coupling Code Files with NI Requirements Gateway* for more information on customizing the Large Code type. You can open the document by selecting **Coupling Code** from the **Help** menu in Requirements Gateway.

An example Large Code file that contains the default requirement traceability information is shown in Figure A-6.

```
// This is example code
// Implements REQ_LIBRARY

// Implements REQ_FUNC1
int Function1(int a, int b)
{
    return a + b;
}
```

**Figure A-6.**  Large Code Type Source Code Document

The Large Code type defines the following document settings:

**Table A-11.**  Large Code Type Document Settings

| Document Setting | Description |
|---|---|
| File or Directory | Select a directory that contains source files (`.c, .h, .cpp`). |
| Variables | **Filter Expression**—Specifies a qualifying expression the type uses to locate lines within files to analyze. |

The Large Code type defines the following default elements:

**Table A-12.**  Large Code Type Default Elements

| Element | Description |
|---|---|
| Section | **Directory**—Identifies the selected directory and any subdirectories.<br><br>**File**—Identifies a file located in a directory. |
| Requirement | Not defined |
| Macro-Requirement | Not defined |
| Entity | Not defined |
| Reference | Specified by `// Implements reqid` within a source file, where `reqid` is the requirement identifier. |
| Attribute | Not defined |
| Reference Attribute | Not defined |
| Link | Not defined |

**Table A-12.** Large Code Type Default Elements (Continued)

| Element | Description |
|---------|-------------|
| Text | Not defined |
| Picture | Not defined |

You may need to customize the following type definition settings for the Large Code type.

**Table A-4.** Large Code Type Settings

| Type Setting | Description |
|--------------|-------------|
| Encoding | Specifies the type of file to read. The default options include:<br><br>• **Default**—ANSI encoding (ISO 8859-1)<br><br>• **UTF8**—8-bit Unicode transformation format<br><br>• **UCS2**—2-byte Unicode Little Endian format<br><br>• **UCS2be**—2-byte Unicode Big Endian format |
| Filters | Specifies the file types to analyze. |
| Include subdirectories | Specifies whether to search for files in the subdirectories of the selected directory you specify. |

# MATRIXx

For an overview of the MATRIXx type, refer to Chapter 8, *Using NI Requirements Gateway with MATRIXx*.

# RequisitePro

Use the RequisitePro type to analyze traceability information specified in the packages of IBM Rational RequisitePro projects. You can customize the definition of the RequisitePro type to conform to the data format that a package contains. Refer to the *Coupling RequisitePro with NI Requirements Gateway* for more information about customizing the RequisitePro type. You can open the document by selecting **Coupling RequisitePro** from the **Help** menu in Requirements Gateway.

An example IBM Rational RequisitePro package is shown in Figure A-7.
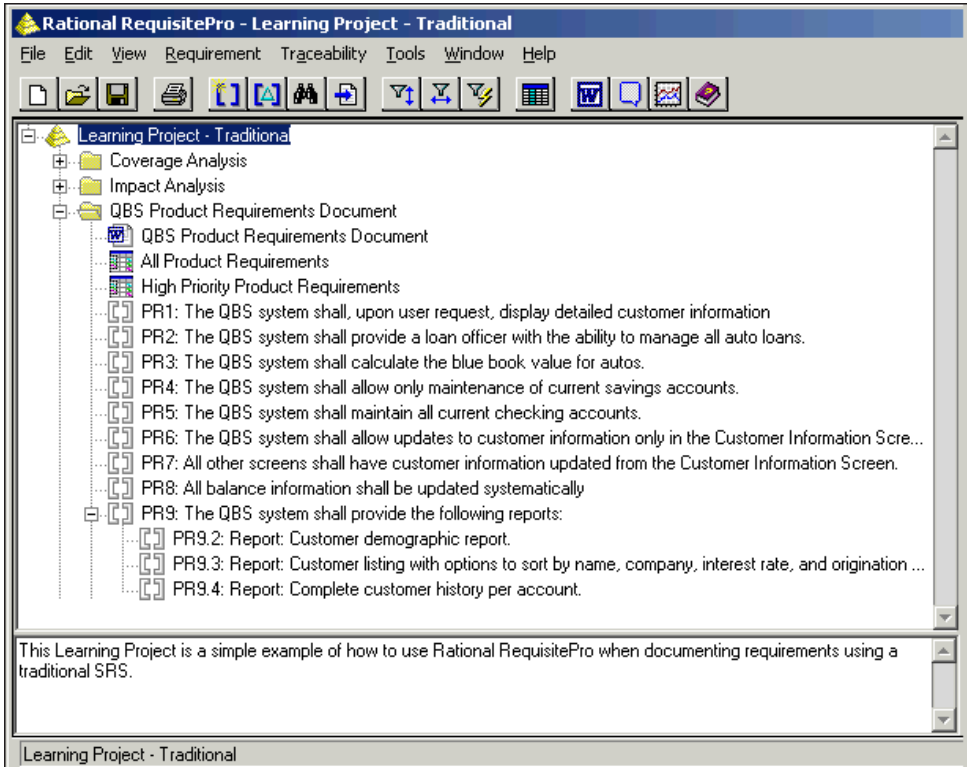


**Figure A-7.**  IBM Rational RequisitePro Project

The RequisitePro type defines the following document settings:

**Table A-13.**  RequisitePro Type Document Settings

| Document Setting | Description |
|---|---|
| File or Directory | Select an IBM Rational RequisitePro project file (.rgs). |
| Variables | **Package Name**—Specifies the package within the project to analyze. If no name is specified, the type analyzes all packages in the project. |

The RequisitePro type defines the following default elements:

**Table A-14.** RequisitePro Type Default Elements

| Element | Description |
|---------|-------------|
| Section | Displays the packages with a project. |
| Requirement | Specified by requirements within a package. The identifier for the requirement in RequisitePro is the requirement identifier in Requirements Gateway. |
| Macro-Requirement | Not defined |
| Entity | Not defined |
| Reference | Specified by any inverse references. |
| Attribute | **Priority**—Indicates the value of the priority attribute associated with a requirement.<br><br>**Difficulty**—Indicates the value of the difficulty attribute associated with a requirement. |
| Reference Attribute | Not defined |
| Link | Not defined |
| Text | Indicates the text associated with a requirement or package in a project. |
| Picture | Not defined |

You do not need to customize any of the type definition settings for the RequisitePro type.

# Text

Use the Text type to analyze traceability information specified in text files. The organization and format of text data can vary between files, and does not always adhere to the format required by the default Text type. You can customize the definition of the Text type to conform to the data format that a file contains.

An example text file that contains the default requirement traceability information is shown in Figure A-8.

```
This is an example text document

1. Heading 1 Text
1.1. Heading 2 Text
    [Covers: PS_REQ1]

DS_REQ1: Label
    <<Derived Requirement Text>>
    - Priority: High

1.1.1. Heading 3 Text
[MacroReq_DS_ALL]
    <<Macro Requirement Text>>
    [Covers: PS_REQ2]

DS_REQ2: Requirement Label
    <<Requirement Text>>
DS_REQ3: Requirement Label
    <<Requirement Text>>
[End_of_MacroReq]
```

**Figure A-8.**  Text Document

The Text type defines the following document settings:

**Table A-15.**  Text Type Document Settings

| Document Setting | Description |
|---|---|
| File or Directory | Select a text file (.*). |
| Variables | Not defined |

The Text type defines the following default elements:

**Table A-16.**  Text Type Default Elements

| Element | Description |
|---------|-------------|
| Section | Specified by `n.n.n.n. text`, where `n` is a numeric value and `text` is the label for the section. The type supports up to four numeric levels. |
| Requirement | Specified by `prefixREQnn: label`, where `prefix` is non-spaced alphanumeric characters, `nn` is a numeric value, and `label` is any text. |
| Macro-Requirement | Specified by `[MacroReq_reqid]`, where `reqid` is the requirement identifier and ends with `[End_of_MacroReq]`. |
| Entity | Not defined |
| Reference | Specified by `[Covers: reqid1, reqid2]`, where `reqid` is the identifier of the covered requirement. |
| Attribute | **Priority**—Specified by `-Priority: text`, where `text` must be one of the following: Low, Med, or High. The attribute must appear after the corresponding requirement. |
| Reference Attribute | Not defined |
| Link | Not defined |
| Text | Specified by `<<text>>`, where `text` is the requirement text value. The requirement text must appear on a new line after the corresponding section or requirement element. |
| Picture | Not defined |

You may need to customize the following type definition settings for the Text type.

**Table A-5.**  Text Type Settings

| Type Setting | Description |
|---|---|
| Encoding | Specifies the type of file to read. The default options include: <br><br> • **Default**—ANSI encoding (ISO 8859-1) <br><br> • **UTF8**—8-bit Unicode transformation format <br><br> • **UCS2**—2-byte Unicode Little Endian format <br><br> • **UCS2be**—2-byte Unicode Big Endian format |

# TestStand

For an overview of the TestStand types, refer to Chapter 7, *Using NI Requirements Gateway with TestStand*.

# Word

Use the Word type to analyze traceability information specified in a Microsoft Word file. Use the MultiWord type to analyze all Microsoft Word files in a directory. The default Word types use styles to identify sections, requirements, text, and references and uses formatting to identify attributes and *macro-requirements*.

The organization and format of text data can vary between files and does not always adhere to the format required by the default Word types. You can customize the definition of the Word types to conform to the data format that a file contains. Refer to *Coupling Microsoft Word with NI Requirements Gateway* for more information about customizing the Word types. You can open the document by selecting **Coupling Word** from the **Help** menu in Requirements Gateway.

An example Microsoft Word file that contains the default requirement traceability information is shown in Figure A-9.

```
Heading 1 Text
Heading 2 Text
        [Covers: SOFTWARE]              ←Reference uses formatting

SOFTWARE1: Label                        ←Requirement uses "Requirement_ID" style
        Derived Requirement Text        ←Text uses "Requirement_Text" style
        Priority: High                  ←Attribute
Heading 3 Text
[MacroReq_HARDWARE_ALL]                 ←Macro Requirement Text
        [Covers: HARDWARE]              ←Reference associated with Macro Requirement

        HARDWARE1: Label                ←Requirement uses "Requirement_ID" style
            Requirement Text            ←Text uses "Requirement_Text" style
        HARDWARE2: Label                ←Requirement uses "Requirement_ID" style
            Requirement Text            ←Text uses "Requirement_Text" style
        HARDWARE3: Label                ←Requirement uses "Requirement_ID" style
            Requirement Text            ←Text uses "Requirement_Text" style
[End_of_MacroReq]
```

**Figure A-9.** Microsoft Word Document

The Word type defines the following document settings:

**Table A-17.** Word Type Document Settings

| Document Setting | Description |
|---|---|
| File or Directory | Select a Microsoft Word file (`.doc`) when using the Word type or a directory using the MultiWord type. |
| Variables | Not defined |

The Word type defines the following default elements:

**Table A-18.** Word Type Default Elements

| Element | Description |
|---|---|
| Section | Indicates the text that uses Heading style. Optionally, you can use numbering. |
| Requirement | Specified by using the `Requirement_ID` style for the text on an entire line. The label for a requirement is delimited by a colon character. |

**Table A-18.** Word Type Default Elements (Continued)

| Element | Description |
|---------|-------------|
| Macro-Requirement | Specified by [MacroReq_reqid], where reqid is the requirement identifier and ends with [End_of_MacroReq]. |
| Entity | Not defined |
| Reference | Specified by [Covers: reqid1, reqid2], where reqid is the identifier of the covered requirement. |
| Attribute | **Priority**—Specified by Priority: value, where value must be one of the following: Low, Med, or High. The attribute must appear after the corresponding requirement.<br><br>**Allocation**—Specified by Allocated to: text, where text is the allocation identifier. The attribute must appear after the corresponding requirement. |
| Reference Attribute | Not defined |
| Link | Not defined |
| Text | Specified by using the Requirement_Text style for the text that appears after the corresponding section or requirement element. |
| Picture | Specified by inserting a picture into the document from the clipboard.<br><br>Specified by selecting **Insert»Picture»From File**, and selecting either **Insert** or **Insert and Link** on the Insert Picture dialog box. You cannot select Link.<br><br>NI Requirements Gateway 1.0 supports images with the following file formats: EMF and WMF. |

You do not need to customize any of the type definition settings for the Word type.

# Visio

Use the Visio type to analyze traceability information specified in Microsoft Visio drawing files. The default Visio type uses custom properties to identify requirements and references for pages and shapes.

You can customize the definition of the Visio type to conform to the data format that a file contains. Refer to *Coupling Microsoft Visio with NI Requirements Gateway* for more information about customizing the Visio type. You can open the document by selecting **Coupling Visio** from the **Help** menu in Requirements Gateway.

An example Microsoft Visio file that contains the default requirement traceability information is shown in Figure A-10.
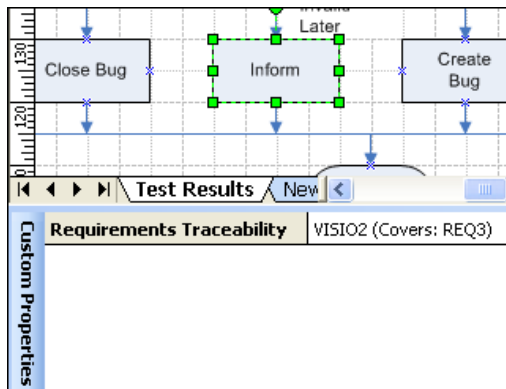


**Figure A-10.**  Microsoft Visio Document

The Visio type defines the following document settings:

**Table A-19.**  Visio Type Document Settings

| Document Setting | Description |
| --- | --- |
| File or Directory | Select a Microsoft Visio file (.vsd). |
| Variables | Not defined |

The Visio type defines the following default elements:

**Table A-20.**  Visio Type Default Elements

| Element | Description |
|---------|-------------|
| Section | Indicates the pages in a file and the shapes on a page. |
| Requirement | Specified by VISIOnn in the Requirements Traceability custom property of a page or shape, where nn are numeric characters in the requirement identifier. |
| Macro-Requirement | Not defined |
| Entity | Not defined |
| Reference | Specified by [Covers: reqid1, reqid2] in the Requirements Traceability custom property of a page or shape, where reqid is the requirement identifier. |
| Attribute | Not defined |
| Reference Attribute | Not defined |
| Link | Not defined |
| Text | Not defined |
| Picture | Captures the image of each page in a drawing file. |

You do not need to customize any of the type definition settings for the Visio type.

# B

# Technical Support and Professional Services

Visit the following sections of the National Instruments Web site at `ni.com` for technical support and professional services:

- **Support**—Online technical support resources at `ni.com/support` include the following:
    - **Self-Help Resources**—For answers and solutions, visit the award-winning National Instruments Web site for software drivers and updates, a searchable KnowledgeBase, product manuals, step-by-step troubleshooting wizards, thousands of example programs, tutorials, application notes, instrument drivers, and so on.
    - **Free Technical Support**—All registered users receive free Basic Service, which includes access to hundreds of Application Engineers worldwide in the NI Developer Exchange at `ni.com/exchange`. National Instruments Application Engineers make sure every question receives an answer.

      For information about other technical support options in your area, visit `ni.com/services` or contact your local office at `ni.com/contact`.

- **Training and Certification**—Visit `ni.com/training` for self-paced training, eLearning virtual classrooms, interactive CDs, and Certification program information. You also can register for instructor-led, hands-on courses at locations around the world.

- **System Integration**—If you have time constraints, limited in-house technical resources, or other project challenges, National Instruments Alliance Partner members can help. To learn more, call your local NI office or visit `ni.com/alliance`.

If you searched `ni.com` and could not find the answers you need, contact your local office or NI corporate headquarters. Phone numbers for our worldwide offices are listed at the front of this manual. You also can visit the Worldwide Offices section of `ni.com/niglobal` to access the branch office Web sites, which provide up-to-date contact information, support phone numbers, email addresses, and current events.

# Glossary

## A

attribute
Describes a requirement. An attribute has a name and a Boolean, numeric, or string value. A requirement can only have one attribute with a specific name. You can use attributes and their values when you define filters, which specify which requirements to analyze or display.

## C

covering document
A document that contains references to requirements that are defined in another document.

## D

derived requirement
A requirement that is defined in a section or entity, but the section or entity does not cover requirements at a higher level.

downstream document
A document that contains references that cover the requirements in a selected document. When you configure a covering link in a project, a downstream document points to an upstream document.

## E

entity
An element that must contain a reference to a requirement. If a defined entity does not contain any reference, Requirements Gateway displays a warning message.

## F

formalism
Structural elements and syntax that define traceability information in a document. Documents must adhere to the formalism the types define in Requirements Gateway

# L

link                          A non-covering reference to a requirement or reference to a section or entity.

# M

macro-requirement             *Super-requirement* that encapsulates requirements and pass its attributes, text, or links onto those requirements. If the macro-requirement is directly referenced by a forward element, all of the requirements that it contains are considered referenced by this element.

# R

reference                     Indicates the coverage of a requirement. A reference points to a macro-requirement, requirement, or derived requirement.

reference attribute           Describes the type of coverage for a reference, such as partial coverage or provisional coverage. An attribute has a name and a value, Boolean, numeric, or string. A reference can only have one attribute with a specific name.

regular expression            A mechanism to select specific text from within a string. An expression contains literal characters, wildcard characters, and operators to locate text patterns in the string. For example, the expression `REQ[0-9]+` matches any text that contains the characters `REQ` followed by one or more digits. Requirements Gateway implements regular expression pattern matching using the same syntax and semantics as Perl.

requirement                   Expresses either a need or constraint, such as a technical constraint, cost, or deadline.

# S

section                       A hierarchical element that represents structure within a document. Sections represent heading levels in a text or Microsoft Word file, objects within a file or database, or files and directories on disk.

# T

text
Descriptive wording associated with a section, entity, requirement, or attribute.

type
Defines how to select external files that represent a document, how to read the contents of the external files, how to interpret the contents as elements for managing requirements, and how to display the elements of the document.

# U

Units Under Test (UUTs)
The devices or components that you are testing.

upstream document
A document that contains requirements that are covered by a selected document. When you configure a covering link in a project, a downstream document points to an upstream document.

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