Coupling Microsoft Word with NI Requirements Gateway

This document explains how NI Requirements Gateway interfaces with Microsoft Word. Use this document to familiarize yourself with using the Microsoft Word types in Requirements Gateway. Refer to Appendix A, *Third-Party Types Overview*, of the *Getting Started with NI Requirements Gateway* manual for more information about the elements of the Word types.

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Using the Word Types

Requirements Gateway includes the following default types for analyzing Word files:

- **Word**—Captures traceability information from a single Word (`.doc`) file. This type does not support Word 2007 (`.docx`) files, but you can use Word 2007 in compatibility mode to open Word 2003 or earlier (`.doc`) files. Use the WordX type for Word 2007 files.

- **WordX**—Captures traceability information from a single Word 2007 (`.docx`) file.

- **MultiWord**—Captures traceability information from multiple Word (`.doc`) files in a single parent directory. The MultiWord type analyzes all the Word files located in any subdirectories of the parent directory. The views in the main window display the parent directory, any subdirectories, and all Word files and their elements.

Note Requirements Gateway cannot open password-protected Word files.

Selecting Word Files to Analyze

When you add a Word or WordX document to a project, you must specify the files to include in the document. Click the **File Browse** button in the File or Directory column on the Project pane to launch the Open dialog box, in which you can browse for the individual `.doc` or `.docx` file you want to use.

When you add a MultiWord document to a project, you must specify the directory that contains the Word files you want to include in the document. Click the **File Browse** button in the File or Directory column on the Project pane to launch the Browse for Folder dialog box, in which you can select the directory you want to use.

Variables of the Word Types

When you add a Word, WordX, or MultiWord document to a project, you can specify document variables. When you select a Word, WordX, or MultiWord document on the Document Details pane of the Project pane of the Configuration dialog box, select a variable from the **Variable** ring control, as shown in Figure 1. Enable the option in the **Value** column to activate the selected variable.

Figure 1. Document Details Pane for a Word Document

The Word types includes the following variables:

- **With images**—Captures images in the Word document. You can capture most drawings or images inserted in a Word file, including vectorized images in Windows Metafile (WMF) format, even if the images are inserted directly in a Word paragraph. If the image is larger than 10 MB, Requirements Gateway does not capture the image.

- **With Character styles**—Adds information to the intermediate file about the Word character styles associated with the captured text. Enable this variable if you want to capture traceability information that uses specific character styles.

- **With Bookmarks**—Converts bookmark content to a form that Requirements Gateway can read from the intermediate file and include in the analysis.

- **With Annotations**—Converts annotation content, such as review comments, to a form that Requirements Gateway can read from the intermediate file and include in the analysis. This variable is not available for the WordX type.

- **One Cell Per Line**—Adds a carriage return between each column of a table in the intermediate file. This variable is not available for the WordX type.

Requirements Traceability

You can perform traceability analysis on Word documents by capturing traceability information from the text of the Word document or by creating references in the Graphical View in Requirements Gateway.

Capturing Information from a Word Document

You can capture traceability information from a Word document if the text of the Word document contains the correct syntax and uses the correct paragraph styles for requirements and references.

Requirements

The default Word types capture requirements in text that uses a Requirement_ID paragraph style. The default syntax for requirements is `reqid: req label`, where `reqid` is the requirement identifier and `req label` is the requirement title written in natural language. A colon (`:`) must separate the requirement identifier and label, otherwise the Word types capture the entire string as the requirement identifier.

References

The default Word types do not require references to use a specific paragraph style. The default syntax for references is `[Covers: reqid]`, where `reqid` is the requirement identifier. A reference statement can list multiple requirements separated by commas (`,`) or semicolons (`;`). For example, the reference `[Covers: REQ1, REQ2, REQ3]` covers three requirements.

In Requirements Gateway, right-click an upstream requirement covered by a downstream Word document and select **Copy For»Word Coverage** from the context menu to create the proper syntax for a reference in which the text in the Word document covers the upstream requirement. Requirements Gateway copies the reference statement to the clipboard so that you can paste the reference in the covering Word document to associate the text that follows the reference statement with the reference.

Text

The default Word types capture explanatory text for sections or requirements from body text that uses a Requirement_Text paragraph style.

Creating References from Requirements Gateway

You can use the Graphical View to create references between a requirement and a Word document or element of a Word document. Refer to the *NI Requirements Gateway Help* for more information about creating references using the Graphical View.

After you create a reference, you can click the Coverage Analysis View tab and select the covering document or element in the Selection column. The Upstream Coverage Information column shows all the requirements that the selected document covers. For references that you created in the Graphical View, Requirements Gateway identifies the covered requirements with an `internal creation` reference attribute.
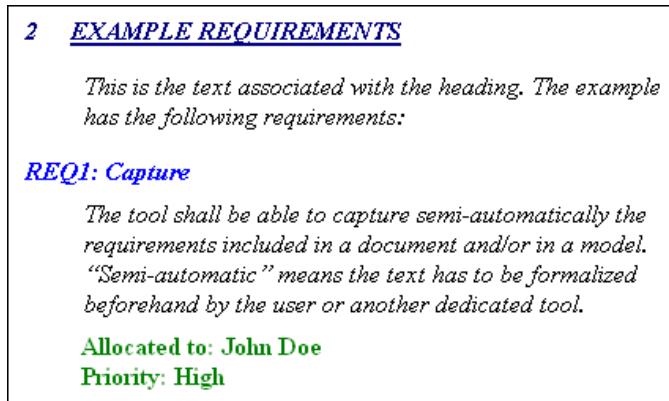
Intermediate File

The Word type captures the content of a Word document and generates an ASCII intermediate file that contains the following information for each traceability element:

- **Paragraph Style**—The name of the Word paragraph style applied to the element, such as Heading 1, Requirement_ID, Requirement_Text, Normal, and so on.

- **Numbering**—Numbers applied to a sequence of elements, such as headings for numbering section elements.

- **Text**—The text of the element, such as the text of the requirement.

Figure 2 shows an example of a Word source document, in which:

- The heading `2. Example Requirements` uses the Heading 1 paragraph style

- The requirement `REQ1: Capture` uses the Requirement_ID paragraph style

- The explanatory text for the heading and the requirement use the Requirement_Text paragraph style

- The attributes `Allocated to: John Doe` and `Priority: High` use the Normal paragraph style

Figure 2. Word Source File

The intermediate file that the Word type generates includes the name of the paragraph style, any numbering used, and the associated text, as shown in Figure 3.

```
Heading 1        2 Example Requirements
Requirement_Text         This is the text associated with the
heading. The example has the following requirements:
Requirement_ID   REQ1: Capture
Requirement_Text         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 dedicated tool.
Normal  Allocated to: John Doe
Normal  Priority: High
```

Figure 3. Word Intermediate File

The intermediate file captures the numbering for the heading, but does not display any numbering for the other elements.

Converting Table Information

When the Word types capture information from a table, the intermediate file uses the vertical line (|) character to specify the beginning of a paragraph in a table cell, followed by a number to indicate the column. The intermediate file numbers columns from left to right. The intermediate file indicates table rows by starting a new line of text.

Figure 4 shows an example of information stored in a Word table, in which:

- The heading `2. Example Requirements` uses the Heading 1 paragraph style.
- The first paragraph in each cell uses a My_Style paragraph style
- The second paragraph in each cell uses a Normal paragraph style

Figure 4. Word Table in a Source File

Figure 5 shows the intermediate file generated for the source document.

```
Heading 1       2 Example Requirements
|1 My_Style     Capture|1 Normal       The tool shall be able
to capture semi-automatically the requirements included in a
document and/or in a model. |2 My_Style Update information when
source changes|2 Normal The tool shall take into account the
successive versions of the documents and models.
|1 My_Style     Multiple requirements definition|1 Normal
The tool shall be able to consider several requirements
definitions created by the user.|2 My_Style      Traceability
Reports|2 Normal        The tool shall generate traceability
reports including all or part of the traceability information,
using these user-defined templates.
```

Figure 5. Word Table in an Intermediate File

Multiple paragraphs in the same cell appear on the same line in the intermediate file as |1<style> first paragraph|1<style>second paragraph|2<style> second column.

Using Character Styles

You can capture text that uses specific character styles, in addition to paragraph styles. Select **With Character styles** from the Variable ring control on the Document Details pane of the Project pane and enable the option in the **Value** column for the Word document in which you want to capture text that uses a specific character style.

Figure 6 shows an example of a paragraph in a Word source file that uses the Normal paragraph style, where the words max response time use the Requirement character style.

The system shall have a *max response time* of 10 milliseconds.

Figure 6. Paragraph in a Word Source File with In-Line Character Style

The intermediate file indicates the style for the whole paragraph followed by a new line that specifies the character style and the associated characters, as shown in Figure 7.

```
Normal   The system shall have a max response time of 10
milliseconds.
Requirement      max response time
```

Figure 7. Paragraph in a Word Intermediate File with In-Line Character Style

Note The default Word types do not capture specific traceability information, such as requirements, that character styles specify. You must create a custom Word type if you want to capture traceability information that character styles specify.

Creating Custom Word Types

The organization and format of a Word document can vary and does not always adhere to the format that the default Word types define. You can create a custom type for capturing information from Word documents with alternate formatting for traceability information by duplicating the default Word type and modifying the duplicate. Refer to Chapter 5, *Customizing Types*, of the *Getting Started with NI Requirements Gateway* manual and Chapter 2, *Customizing Types and Type Elements*, of the *NI Requirements Gateway Customization Guide* for more information about creating custom types.

Selecting a Conversion Tool

When you create a custom Word type, you must select a conversion tool from the **Convert tool** ring control on the Analysis tab of the Types pane of the Configuration dialog box. The intermediate file that a custom Word type generates must conform to the format that the conversion tool expects.

You can select from the following conversion tools:

- **Word**—Captures only numbering and text as part of the intermediate file.

- **WordWithStyles**—Captures style information in addition to numbering and text as part of the intermediate file. The default Word types use this conversion tool.

- **WordX**—Same as the WordWithStyles conversion tool, but used to convert information from Word 2007 (`.docx`) files.