Requirement Management

Rational Software Architect Designer (RSAD) provides an integration with Rational DOORS Next Generation (DNG) which is part of the Rational Collaborative Lifecycle Management (Jazz CLM) solution. This integration allows you to visualize requirements from DNG in a view inside RSAD, and to create links from elements in your model to those requirements. Different kinds of links can be created to express how the model element relates to the requirement. For example, you can specify that a model element refines a requirement.

Once you have created links from model elements to requirements you can use them for several things:

- You can navigate from model elements to related requirements.
- You can perform impact and traceability analysis to understand how changes to the requirements will affect the model, and vice versa.
- You can export your model, including the requirement links, to a Design Room ONE web server. This server integrates with Jazz CLM, so that your links also can be seen on requirements in DNG. It also makes it possible to create links from other Jazz CLM tools to elements in your model, and to create reports using Rational Publishing Engine. For more information about Design Room ONE see the Design Room ONE User's Guide.

Note that the Requirement Management Integration feature is an optional feature when you install RSAD. Also note that this feature is available in the Design Room ONE update site that can be installed on top of RSAD. Due to the different release schedules of RSAD and Design Room ONE, the version included in Design Room ONE will often be newer. If you want to use that version, which is recommended, you should therefore not install the version that is included in RSAD. If you already have installed the RSAD version of the Requirement Management Integration feature, you must first uninstall it before you can install the version included in Design Room ONE.

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Connecting to a DNG Server

The first thing you need to do, before you can create any requirement links, is to connect to the DNG server where your requirements are stored. Open the Requirement Management Explorer view. The quickest way is to use the Quick Access field in the toolbar:
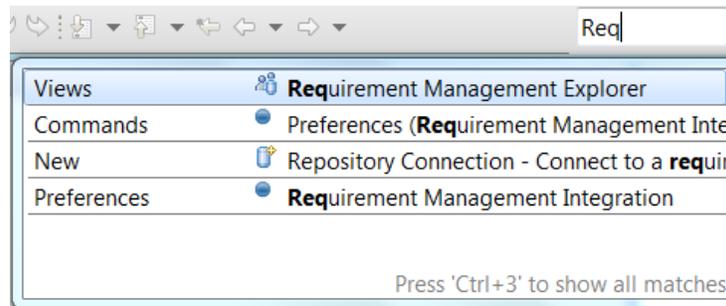
Then click the **Create a new connection** hyperlink.
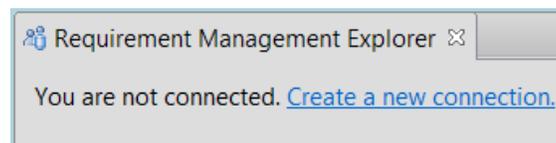
Enter the information needed for connecting to the DNG server. For example:
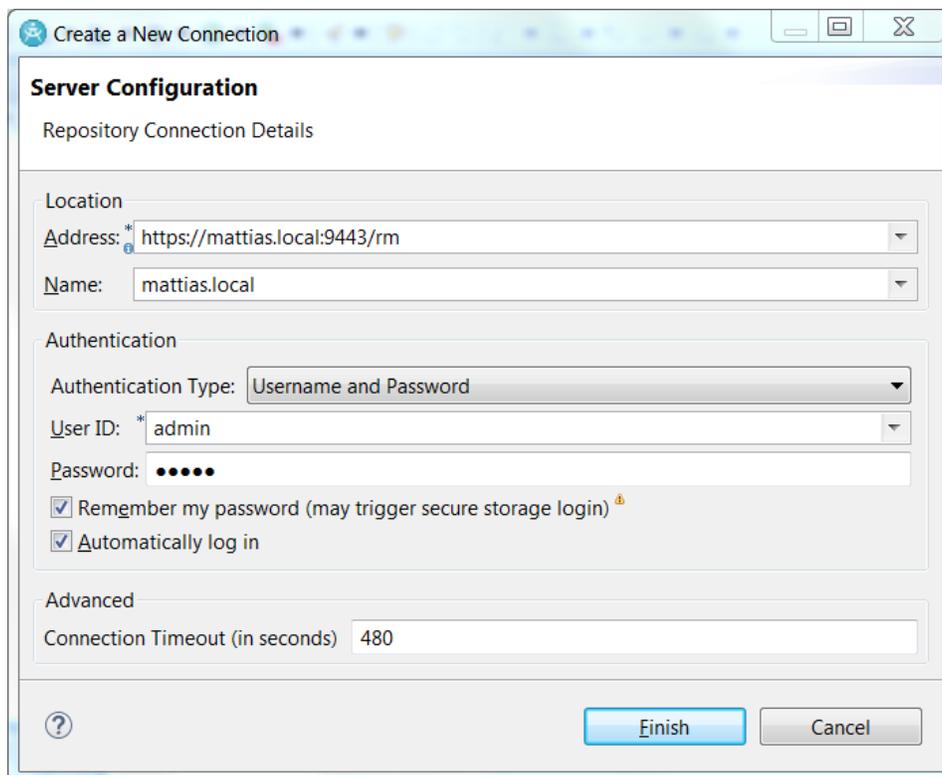
When connecting to the server you may see a warning if the certificate of your DNG server is not trusted. You can choose to accept the certificate and connect anyway.
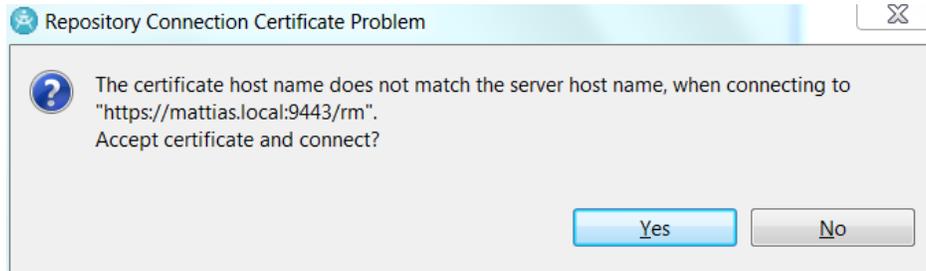
Once you are connected to the server, a dialog appears to let you choose which DNG project areas to connect to. Select the ones that contain the requirements you want to link to.
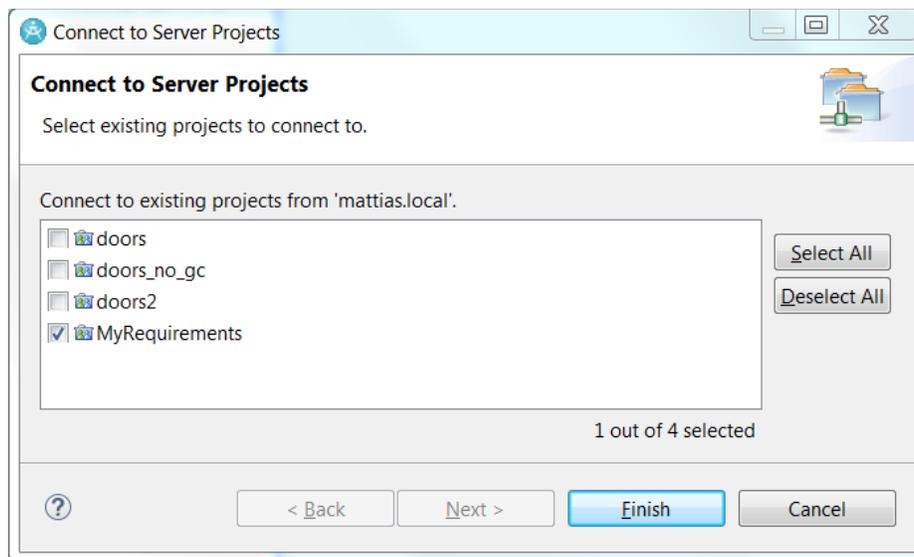
Connected servers and project areas are shown in the Requirement Management Explorer view.
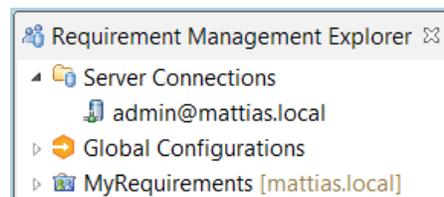
You will also see here any global configurations that you have defined in Jazz CLM. Global configurations is an optional feature of Jazz CLM, and if you didn't install it, nothing will appear under this node. See Global Configurations for more information about using global configurations with requirement management.

You can add additional server connections using the command **New – Requirement Repository Connection** in the context menu.
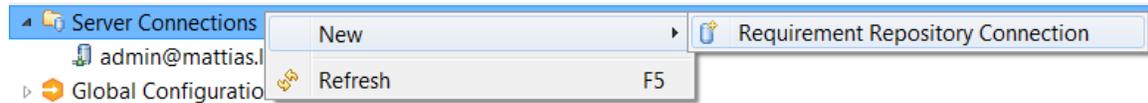
You can also add or remove connected project areas for a server connection by means of the **Connect to Projects** context menu command.
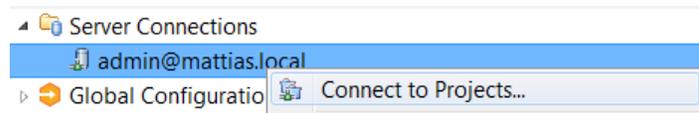
RSAD attempts to immediately login to a connected server as soon as the server connection is created, or when opening a workspace that already contains a server connection. However, you can also use explicit **Login** and **Logout** commands that are available in the context menu of the server connection. One situation when these are handy is when the login session has timed out. If it appears as if the connection to the DNG server is broken, the reason may be that you have been idle long enough for the login session to expire. In this case, do an explicit **Logout** (because RSAD still thinks you are logged in) followed by a **Login**.

Linking Model Elements to Requirements

There are five types of links you can create from a model element to a requirement. Use the type of link that best represents how the model element is related to the requirement:

- **Derives From**
  The model element originates from or is significantly influenced by the requirement.
- **Elaborates**
  The model element elaborates the requirement. For instance, it can give an example of how the requirement could be implemented.
- **Refines**
  The model element is a refinement of the requirement. For example, a textual requirement can be refined using a use case that describes the requirement in more detail.
- **Satisfies**
  The model element satisfies the requirement. For example, a use case can satisfy a functional requirement.
- **Trace**
  The model element has a trace to the requirement. For example, an attribute can be traced to the requirement that is the reason it was added to the model.

There are a few different ways to create the links from model elements to requirements. These are described in the sections below.

Creating Links from the Links Property Tab

The Requirement Management Integration feature adds a Links tab in the Properties view for all model elements. From there you can create links from the model element to requirements.

Start by clicking the **Add a new link** button.
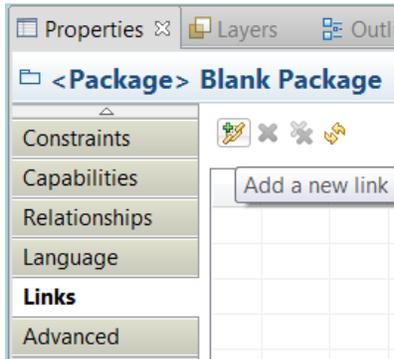
The **Add Link** dialog appears. Choose the type of link to create in the *Link Type* drop-down. If you have multiple connections and/or project areas, use the *Project* drop-down to select the project area that contains the requirement you want to link to. Use the *Type* drop-down to select whether you want to link to a requirement or a collection of requirements.
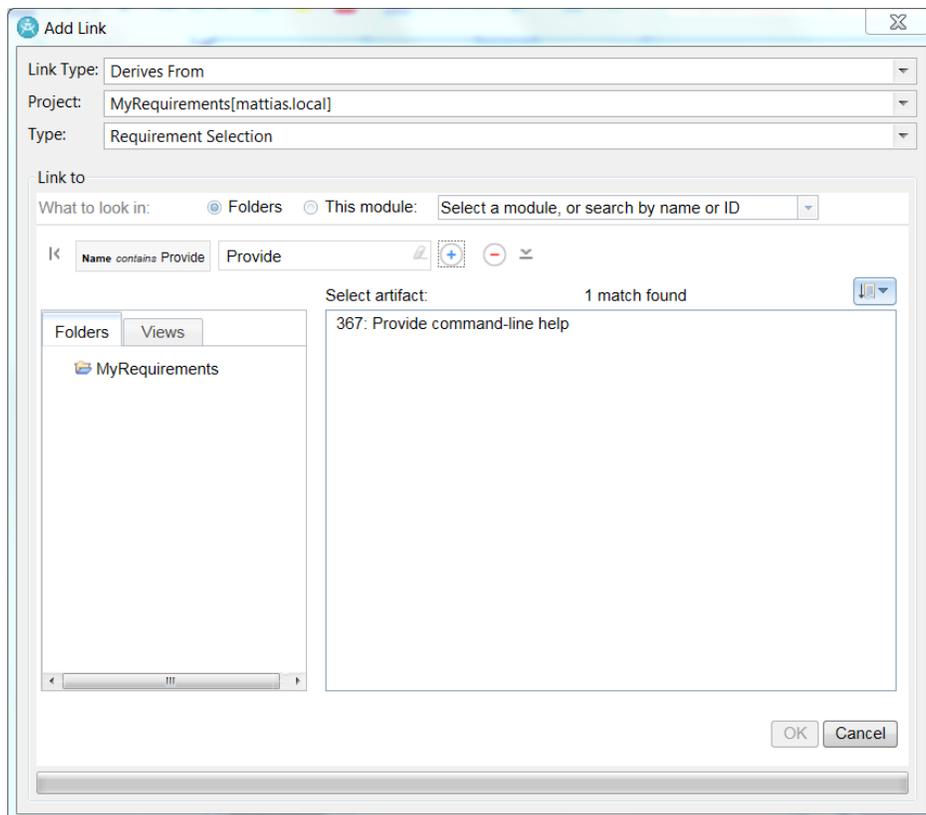
The area in the **Link to** group is populated by DNG. You may have to resize the dialog to make it fit. You can use the features provided by DNG in this dialog to search for the target requirement or collection. Once you have found it, select it and press the **OK** button to create the link. The created link appears in the Links tab in the Properties view.
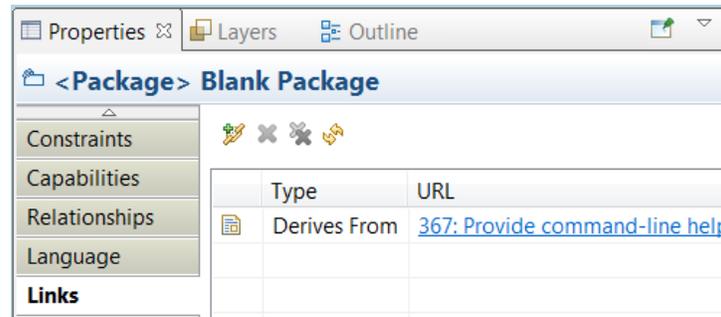
Use the **Delete Link** toolbar button in this view to delete a selected link. Use **Delete All Links** if you want to delete all links from the model element.

You can double-click on a link to navigate to the target requirement or collection in DNG. By default, it will be opened in the internal web browser, but you can use an external web browser instead by changing the preference in **General – Web Browser**.

Creating Links Using the Requirement Management Explorer

The Requirement Management Explorer view shows all requirements and collections that are contained in a project area. The folders that contain the requirements and collections are also shown.
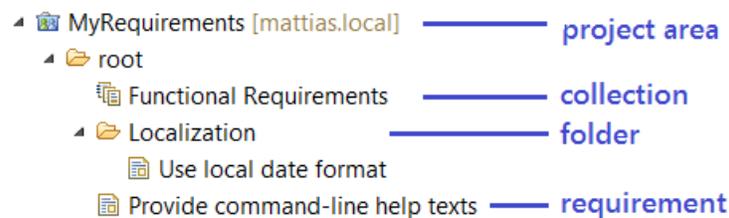
You can create links to requirements and collections shown in this view by dragging and dropping model elements from the Project Explorer onto the target requirement or collection. This way of creating links can be faster than using the Properties view, especially in case you want to link multiple model elements to the same requirement. You can then simply select all those model elements and drag and drop them onto the target requirement.

You can also drag requirements and collections from the Requirement Management Explorer view and drop them onto a model element shown in a diagram. This will both create a link from the model element to the requirement or collection, as well as visualize it using a URL element on the diagram. Here is an example:
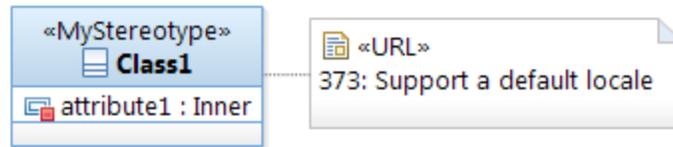
If you select the URL element you can see more information about the linked requirement in the Properties view. You can also edit the URL there, but this is not recommended since the changes may be overwritten when you synchronize the links (see Refreshing and Synchronizing Links).

Creating links by drag and drop will prompt you for what kind of link to create.
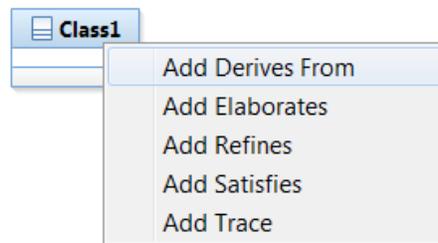
You can avoid this prompting by Setting a Default Link Type.

To navigate to a linked requirement, right-click on the element in the diagram or Project Explorer are perform the command **Navigate – To URL**.

Setting a Default Link Type

If you tend to use one of the link types more frequently than the others, you can set the default link type in the Requirement Management Integration preference page:
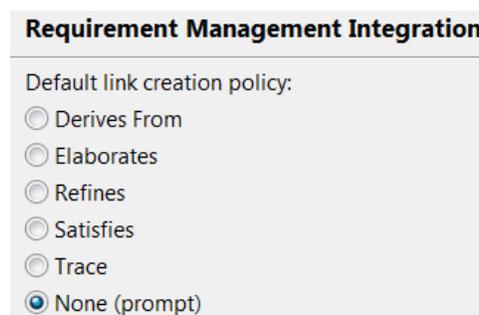
The default is to prompt for the link type each time a link is created.

Links View

If your model contains many links to requirements and collections on several different model elements, you can use the Links View to get an overview of all links in the model. The easiest way to open this view is to use the Quick Access field in the toolbar.
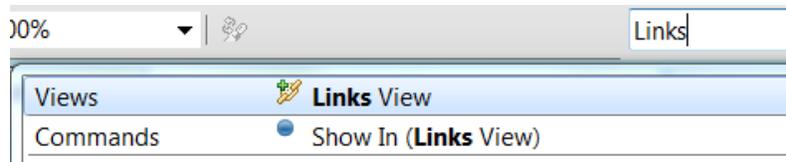
The Links view by default shows all links in your workspace. Also links contained in unloaded models will be included if the option **Show links from unloaded models** in the view menu is set.
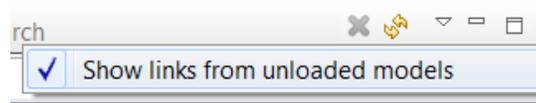
You can use the **Filter** field to find links of interest. What you type in this field is matched against all columns in the Links view and only those links that match the typed text will be shown. You can use wildcard characters in the filter string (* matches zero to many arbitrary characters, and ? matches exactly one arbitrary character). Here is an example of filtering to show only links of Trace type that are located in the Application project:

You can also click the column headers to sort the links (for example to find all links of a particular kind, or all links located in a particular project).

You can navigate from a link to the model element that is its source by means of the **Show in Project Explorer** context menu command.
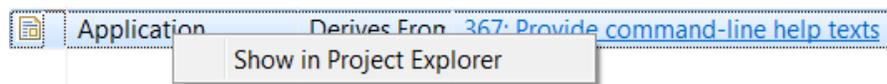
Double-click on a requirement or collection to navigate to it in DNG.

Refreshing and Synchronizing Links

Some information about linked requirements are stored in the RSAD model, for example the requirement name. This information is written when establishing the link to the

requirement, and it makes it possible to show information about linked requirements even when the DNG server is not available.

If you change the name of a requirement or collection in DNG that you have linked to from a model element, the links will not be immediately updated in RSAD. To make it happen you need to run the command **Synchronize Links** that is available in the context menu of projects in the Project Explorer. If you want to perform such synchronization for all projects in the workspace it's more convenient to use the command **Synchronize all links in loaded models** that is available in the Requirement Management Explorer.

Note that link synchronization will change the model, in case any linked requirement was changed, so be prepared to save it afterwards.

Sometimes you may not want to change the model, but still update the information that is shown in RSAD for linked requirements. In this case you can just refresh the link information. This can be done from the Links tab in the Properties view or in the Links View by pressing the **Refresh Links** button . In the Requirement Management Explorer view the **Refresh View** button does the same thing. Note that requirement information shown in diagrams requires synchronization to update – a refresh is not enough.

Global Configurations

If you have installed support for global configurations in Jazz CLM, all global configurations that you have defined in the GC application will appear under the Global Configuration node in the Requirement Management Explorer view:
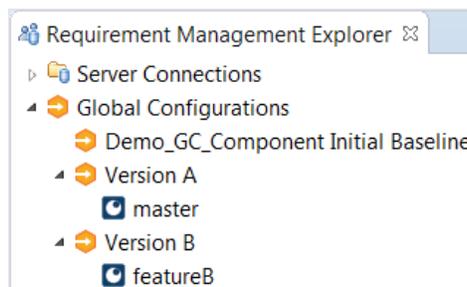
Under each global configuration the associated Design Room ONE local configuration is shown, if any.

Double-click a global configuration to make it active. The active global configuration is used when you need to create a link to a requirement or collection in a DNG project area that has support for configurations enabled. In this case there may be multiple versions of the target requirement or collection. The active global configuration may reference a

local configuration in DNG, such as a stream or baseline, that defines the specific version of the target requirement or collection.

The active global configuration is also used when you navigate a requirement link, so that you reach the correct version of the target requirement. DNG shows an error message if you have selected a global configuration that does not contain a local configuration in DNG that contains the target requirement.

At most one global configuration can be active at any point in time. The active global configuration is marked with a checkmark.
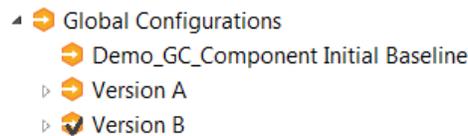
Use the context menu command **Unset Active Configuration** to deactivate a global configuration.

Make sure that you have set a global configuration as active before you attempt to access a DNG project area with support for configurations enabled, for example when creating or navigating a link. Otherwise you may not get the right version of the target requirement.

When you change the active global configuration, links may resolve to new versions of requirements. The requirements may have different names or descriptions in those versions. However, for performance reasons RSAD does not immediately update its views to reflect this. You need to refresh the links to make this happen (see Refreshing and Synchronizing Links). Note that if DNG cannot be contacted when refreshing links, the information about the linked requirements will come from the versions that were selected by the global configuration that was active when the links were created (or when later synchronizing the links). This data is stored in the model and can hence be shown even when the DNG server is not available.

If you version your model in an SCM system, such as Git or Clearcase, you typically want to keep consistency between the version of the model and the linked requirements. It is therefore important that when you switch to another global configuration, that you then also open the corresponding version of your model (for example by checking out another branch or ref in Git). To remember which local version (also known as a local configuration) in your SCM system that belongs to a particular global configuration, just expand the global configuration node in the Requirement Management Explorer view. By default you will also be prompted with a dialog when switching active global configuration.
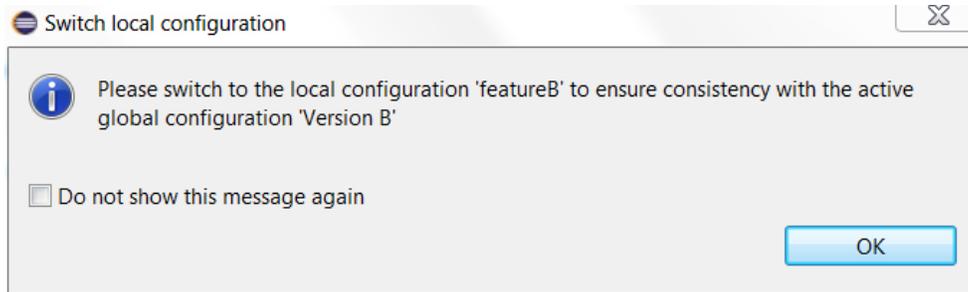
Mark the checkbox to avoid this prompt in the future. If you later want to turn on prompting again, set the preference *Requirement Management Integration – Prompt for switching local configuration*.

Traceability and Impact Analysis

The **Query** context menu in the Project Explorer provides commands for conducting traceability and impact analysis. When your model elements have links to requirements or collections, these queries treat such links as dependencies, and visualize them in a diagram. These visualizations can provide valuable insights about how model elements trace back to requirements (traceability analysis) or how changes to a requirement would impact the model (impact analysis). For example, the below impact analysis diagram (generated by means of the command **Query – Impact Analysis – All Suppliers**) shows how a class Globalize is impacted if certain requirements or other dependent classes (DateTimeFormatter) are modified.