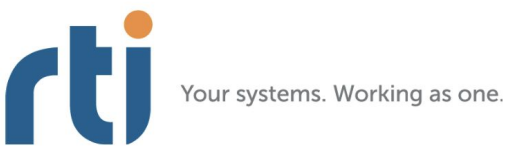
RTI System Designer

(Prototype Feature)

Getting Started Guide

Version 0.1



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Contents

Introduction

This document assumes you have a basic understanding of RTI® Connext™ DDS application development and concepts, such as a DDS Domain, DomainParticipant, Topic, DataWriter and DataReader. For an overview of these concepts, please see the ***RTI Connext DDS Core Libraries Getting Started Guide***.

This Tool is based on RTI® XML-Based Application Creation - a mechanism to simplify the development of Connext DDS applications. For an overview of its functionality please see the ***RTI Connext DDS Core Libraries XML-Based Application Creation Getting Started Guide***.

RTI System Designer is a tool that allows you to graphically design and configure Connext DDS systems. You can see it as a User Interface to XML-Based Application Creation, a technology that allow to specify in XML format all the aspects of a DDS System:

- The *Data Types* that will be used to communicate information in the system
- The *Topics* that will be used in the domain, associating each *Topic* with a *Data Type*
- The *DomainParticipant* that can potentially be used, giving each a **participant name**
- The *DataWriters* and *DataReaders* present within each *DomainParticipant*, each associated with its corresponding *Topic*.

The application code simply indicates the participant configuration name of the *DomainParticipant* that the application wants to create. The XML-Based Application Creation infrastructure takes care of the rest: creating the *DomainParticipant*, registering the types and *Topics*, and populating all the configured Entities.

Writing this XML can be quite challenging. Using a good editor with autocompletion capabilities along with the XML Schema provided can be of great help. But it is still quite complicated, especially when as the project gets bigger and involves multiple files.

The *RTI System Designer* UI tool can help ease this process and manage the complexity of a large system.

Installing the RTI System Designer

The *RTI System Designer* is distributed as a zip file and is available for the following architectures:

- Darwin 64 bit (Mac OsX)
- Windows 32 and 64 bit
- Linux 32 and 64 bit

Once you unzip the bundle, you can cd into the **bin** directory and run the `rtiddssystemdesigner` script.

RTI System Designer has a server component and a UI that will run inside a browser. The script will both start the server and it will try to open your default browser pointing to the right address.

If the browser won't start you can open a new webpage and go to:

`http://localhost:5000/index.html`

The *RTI System Designer* allows to create and to import existing XML files containing:

- QoS
- Types
- Domain Libraries
- Participant Library

Trying RTI System Designer

Online Demo

You can access a live version of the *RTI System Designer* without installing it by visiting

`https://community.rti.com/downloads/experimental/system-designer`

This will allow you to test a demo version of the *RTI System Designer* and learn more about it before you even download it and install it.

Download it

Once you are on the online demo you can will see a button called "Get it now!" that will allow you, after a short registration, to get a copy of the tool:

Start it

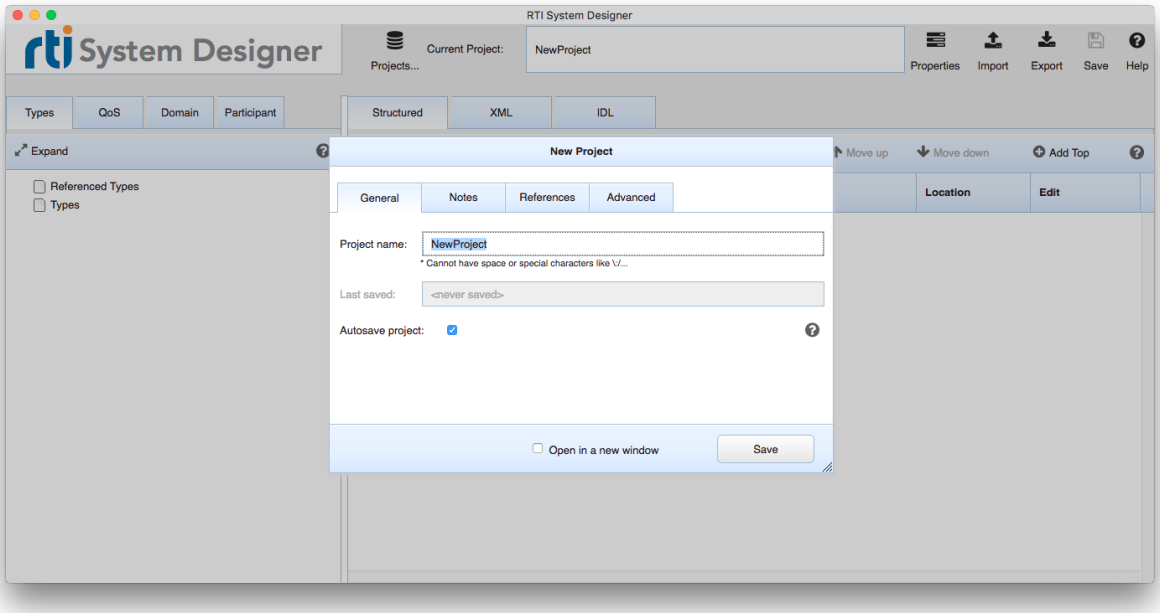
Once you downloaded the tool, all you have to do is to execute the script in the bin directory:

```
./bin/rtiddssystemdesigner[.bat]
```

Using the RTI System Designer

First Execution

The first time you start the *RTI System Designer*, the application will prompt you to create a new project as in the following screenshot:



Just insert a Project Name and Click Save.

Use existing XML File

There are two supported ways to use existing XML files:

- **Upload** an XML file: the content of XML files ***uploaded*** into the UI tool will be

part of the **Referenced** participants, domains, types and QoSs and they **cannot** be modified.
- **Import** an XML file: the content of XML files ***imported*** into the UI tool will be part of the **Local** participants, domains, types and QoSs and **can** be modified.

Upload an XML File

In this example we will upload an existing XML file that you can find in the example directory:

```
<install directory>/example/ShapesExample.xml
```

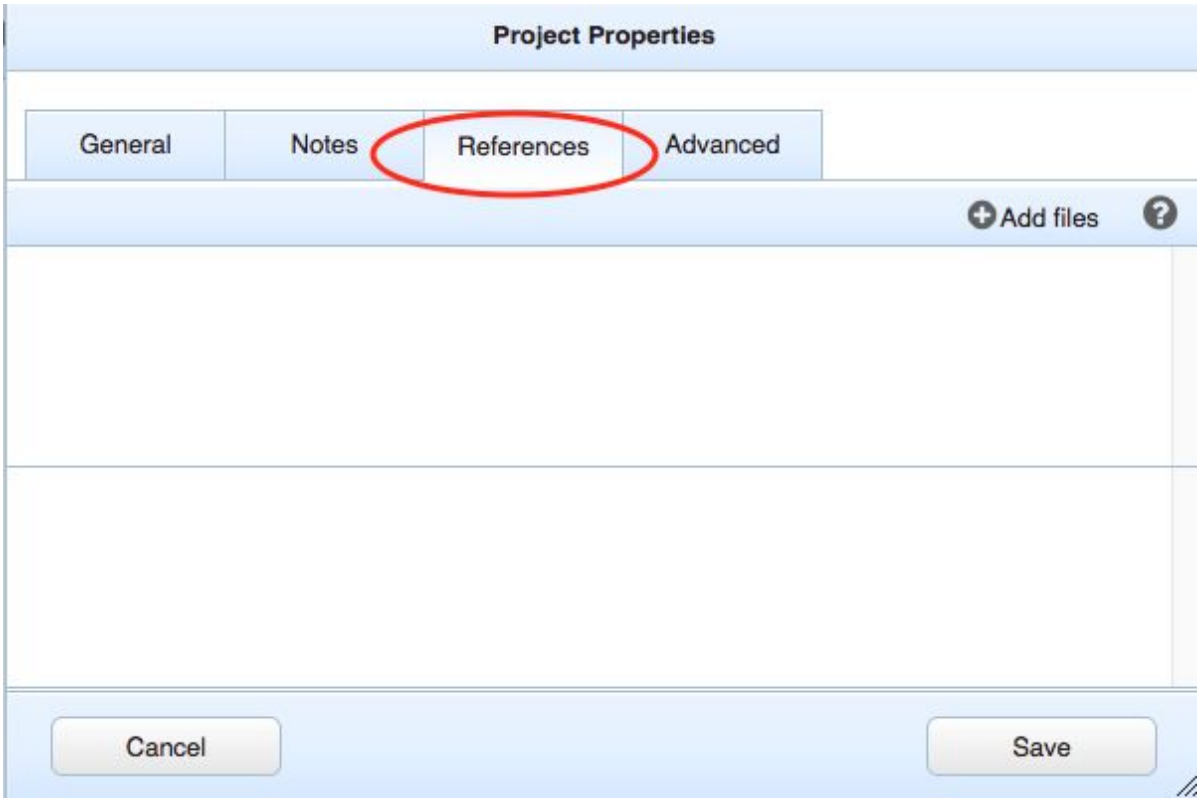
This file contains:

- Type Definition
- QoS definition
- Domain Library
- Participant Library

All these elements will be added to the Imported sections and the user will be able to browse and use them in his project, but not modify them.

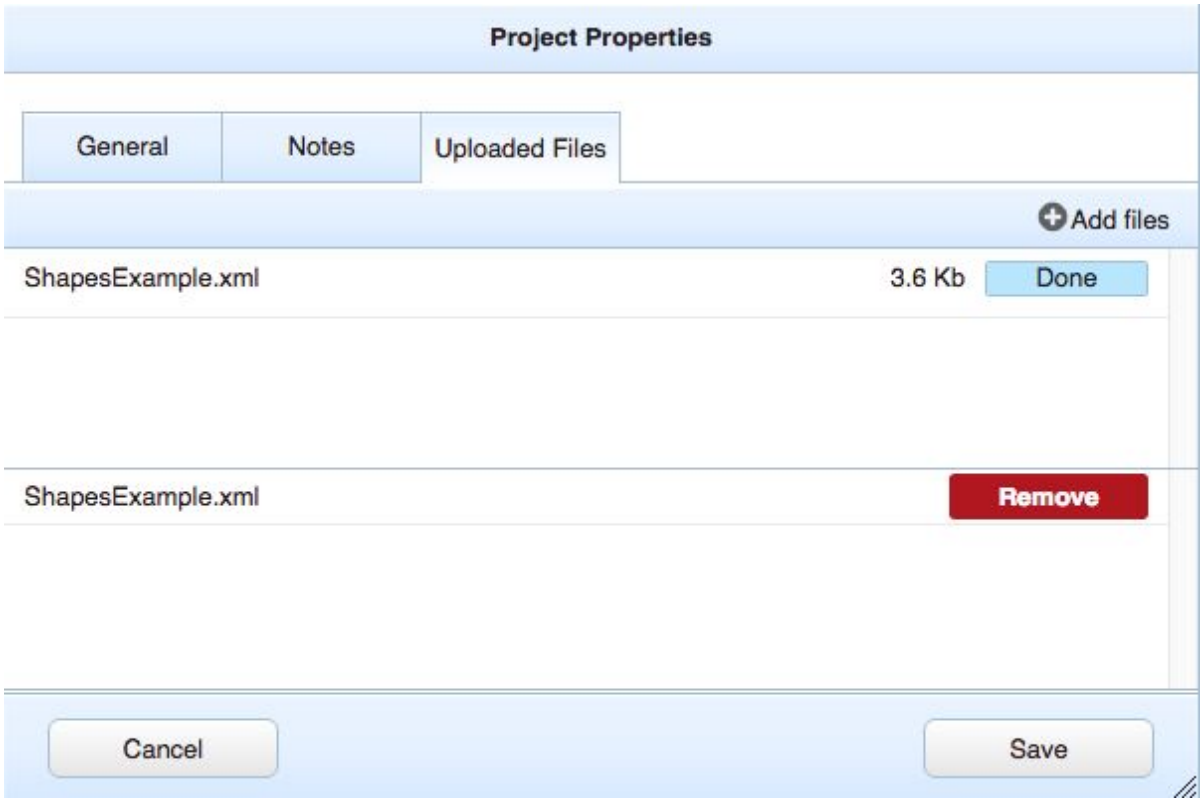
To upload the content of this file inside the UI, select the **Properties** button in the top bar:

And then select the **References** Tab:



You can now select the Add files button to access a file system browser and select the file to upload.

During the upload you can see a status bar next to the file being uploaded. Once the file is uploaded it will be appear in the bottom part of the popup:



You can always come back to this windows to remove file by clicking on the Remove button next to the File Name.

After the you are done, you can select “Save” to apply the changes to the model.

Importing an XML file

In this example we will upload an existing XML file that you can find in the example directory:

```
<install directory>/example/ShapesExtExample.xml
```

This file contains:

- A new type definition
- A New Domain Library

All these elements will be added to the Local sections and the user will be able to browse, use and modify them.

To Import a file, just select the 

button from the Top Bar:

A file system browser will be presented; select the file and click ok. The elements should have been added to the relative tabs and be ready to be modified.

Online Help

Using the tool you will often see an help icon:  . You can click that icon to see online tips and to understand what to do next.

Workflow

The *RTI System Designer* has for tabs. They each represent one of the section in the XML-Based Application Creation. We suggest you start defining a Type and proceed with the definition of the QoS**.** Once you are done you can move to the Domain Tab, register your types and declare your topic. At the end you can, in the Participant Tab, defines your participant along with readers and writers.

Of course you can always, and probably you will, go back and forth to tweak the system.

Exploring the Tabs

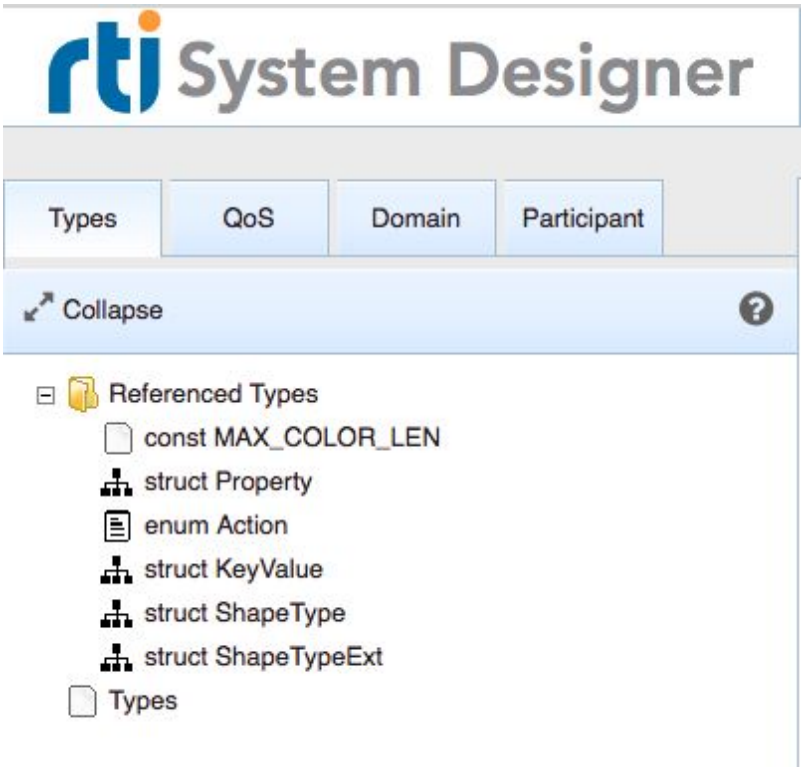
The Types TAB

In this tab you can visualize and edit all the type that are going to be part of your DDS system.

Exploring Referenced Types

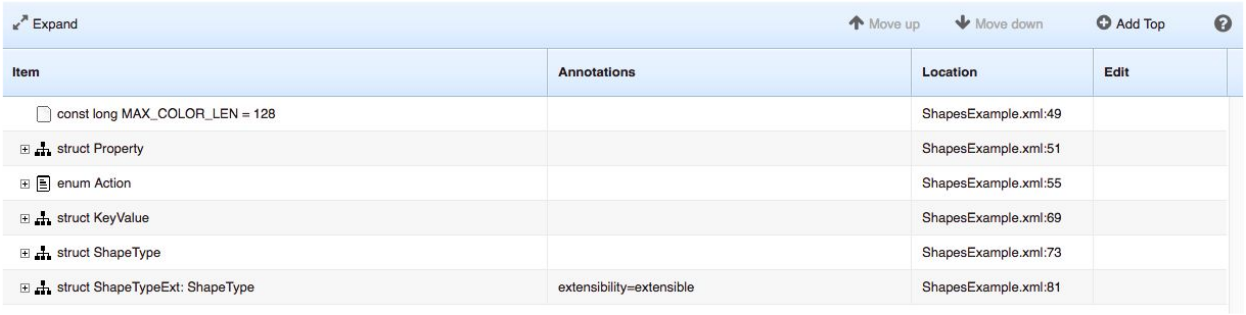
Once you uploaded a file as shown above, you will notice, in the left panel, a new tree called “Referenced Types” under the “Type Tab”:

You can use the Expand/Collapse button to explore your imported types:



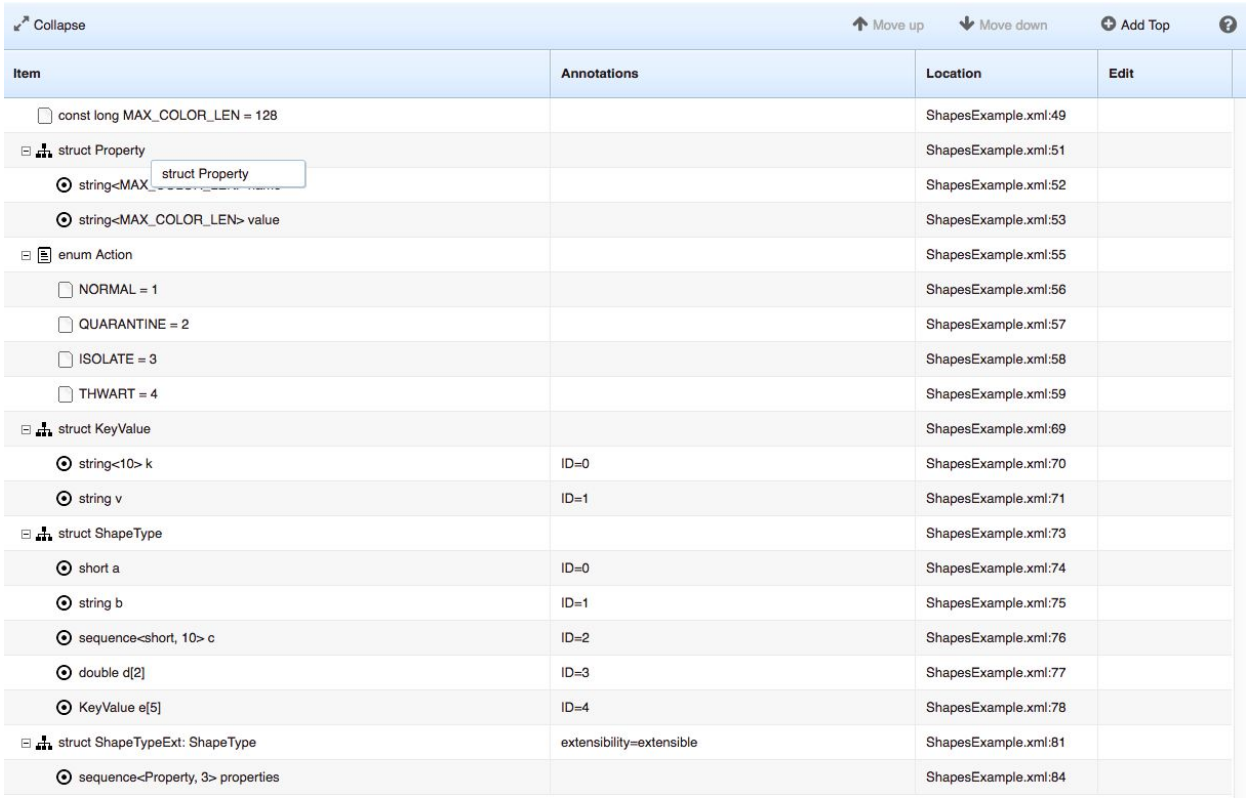
For a more detailed view of the types you can look at the main panel: it has 3 tabs:

- Structured View
- XML View
- IDL View



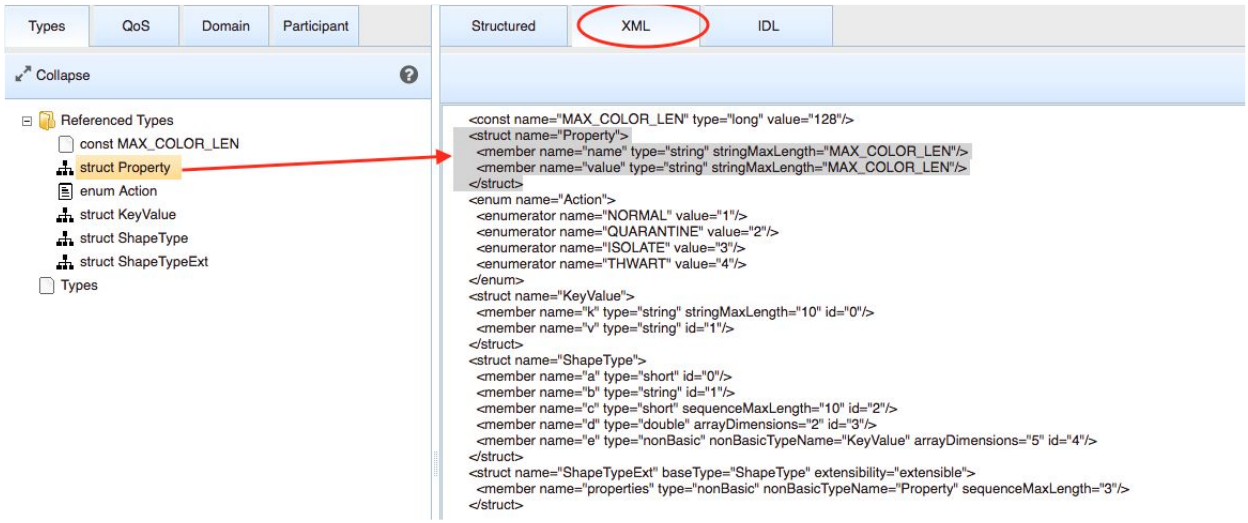
The Expand/Collapse 

button will allow you to go as deep as needed when exploring types:

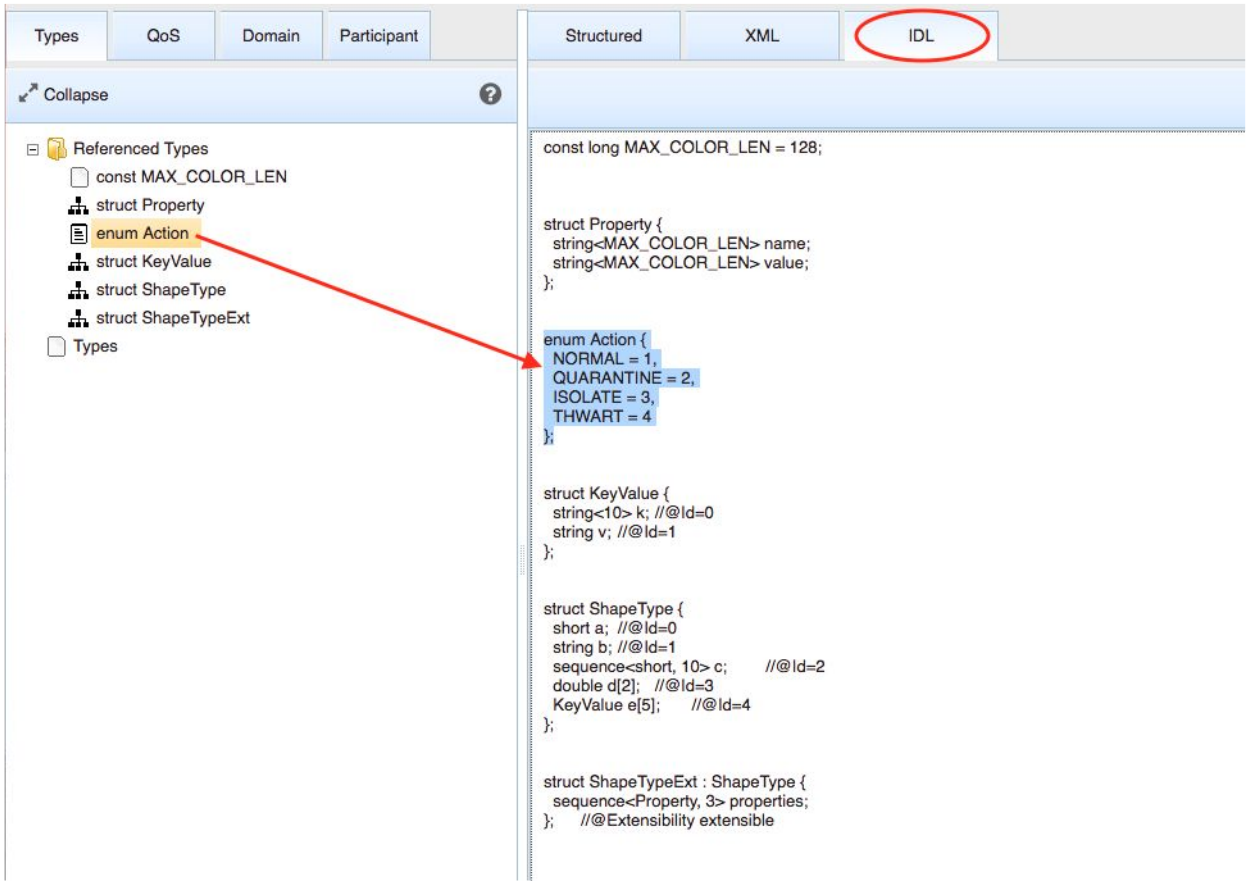


In the **Item** column you will see the name and type of a specific element of your type.
In the **Annotations** column, you can see things, like the ID of a member, if it is a key or if it is an optional or extensible member.
The **Location** column will indicate in which file and at which line member is defined.
The **Edit** column is only available for Local types.

The XML View will show the types in the XML format. You can highlight a specific member by selecting it in the left tree panel:



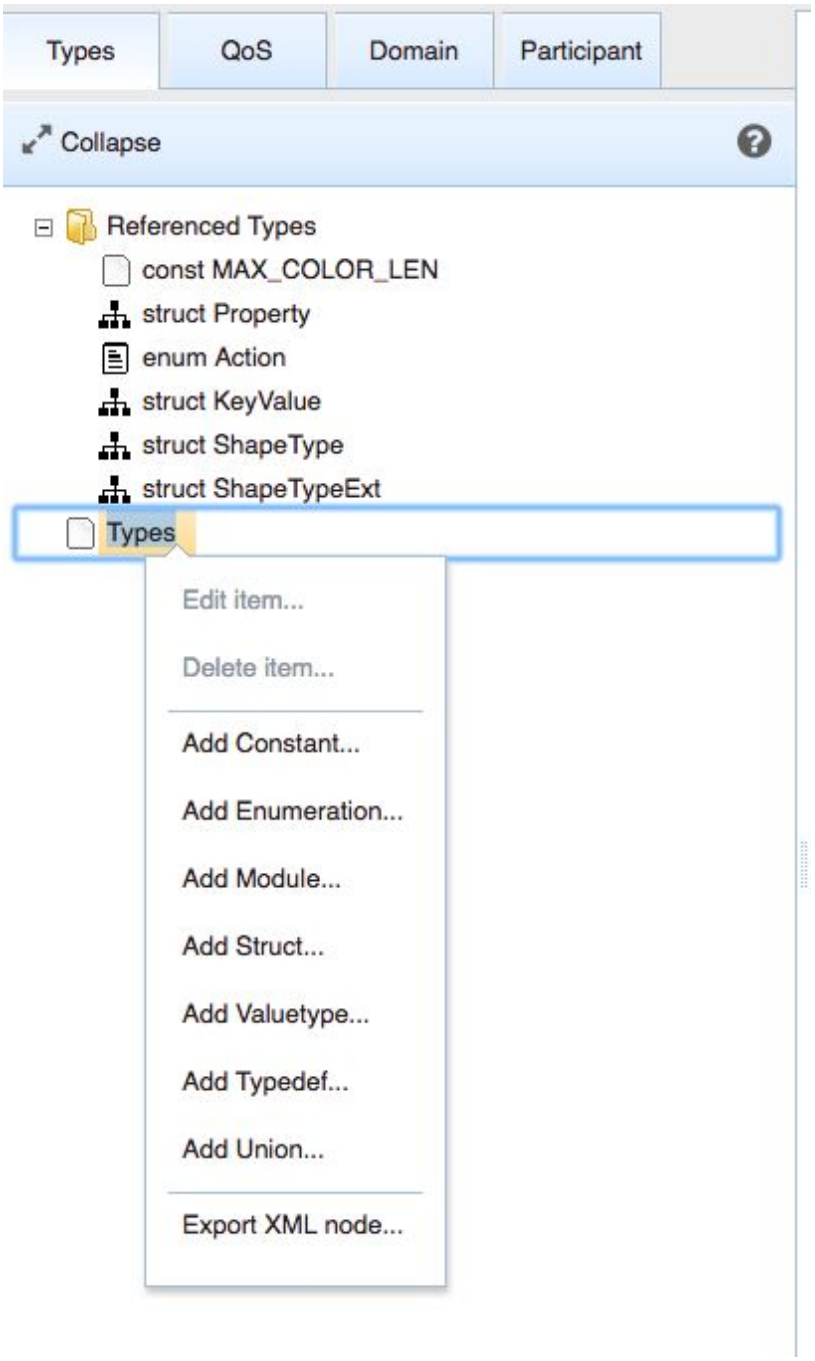
Finally, the IDL Tab will show you the IDL definition of the type:



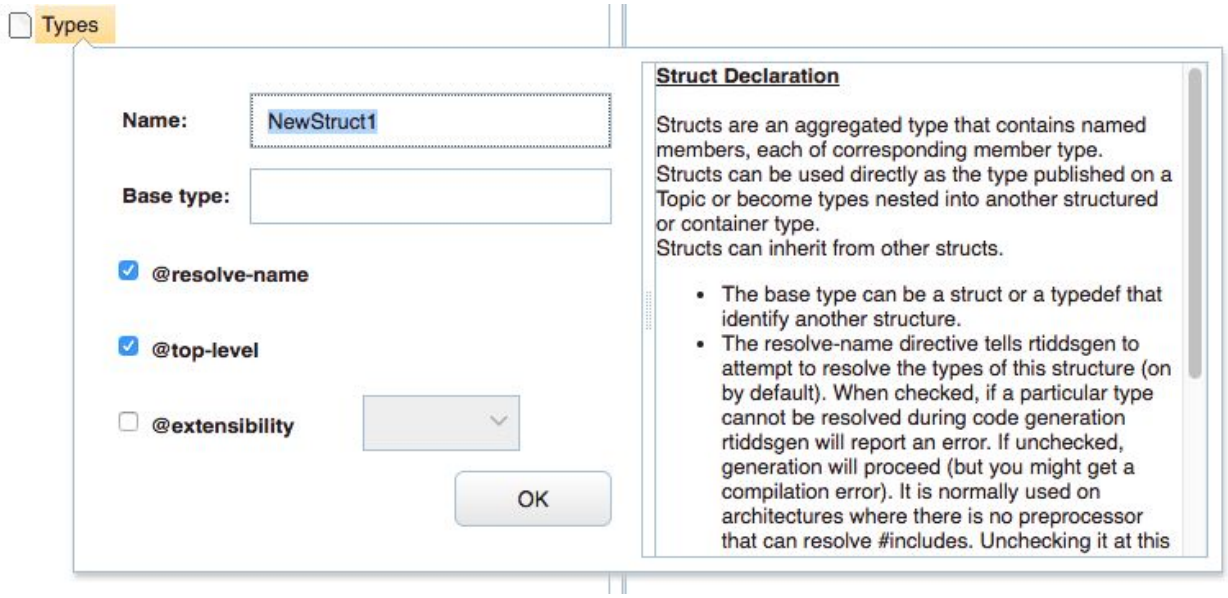
Add Local types

To introduce new types in your project, just right click on the “Types” node in the Tree

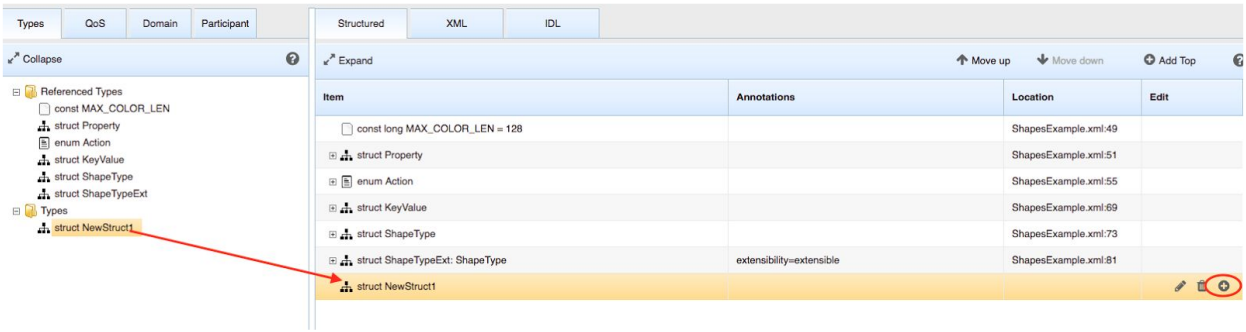
View and add one of the top level types:



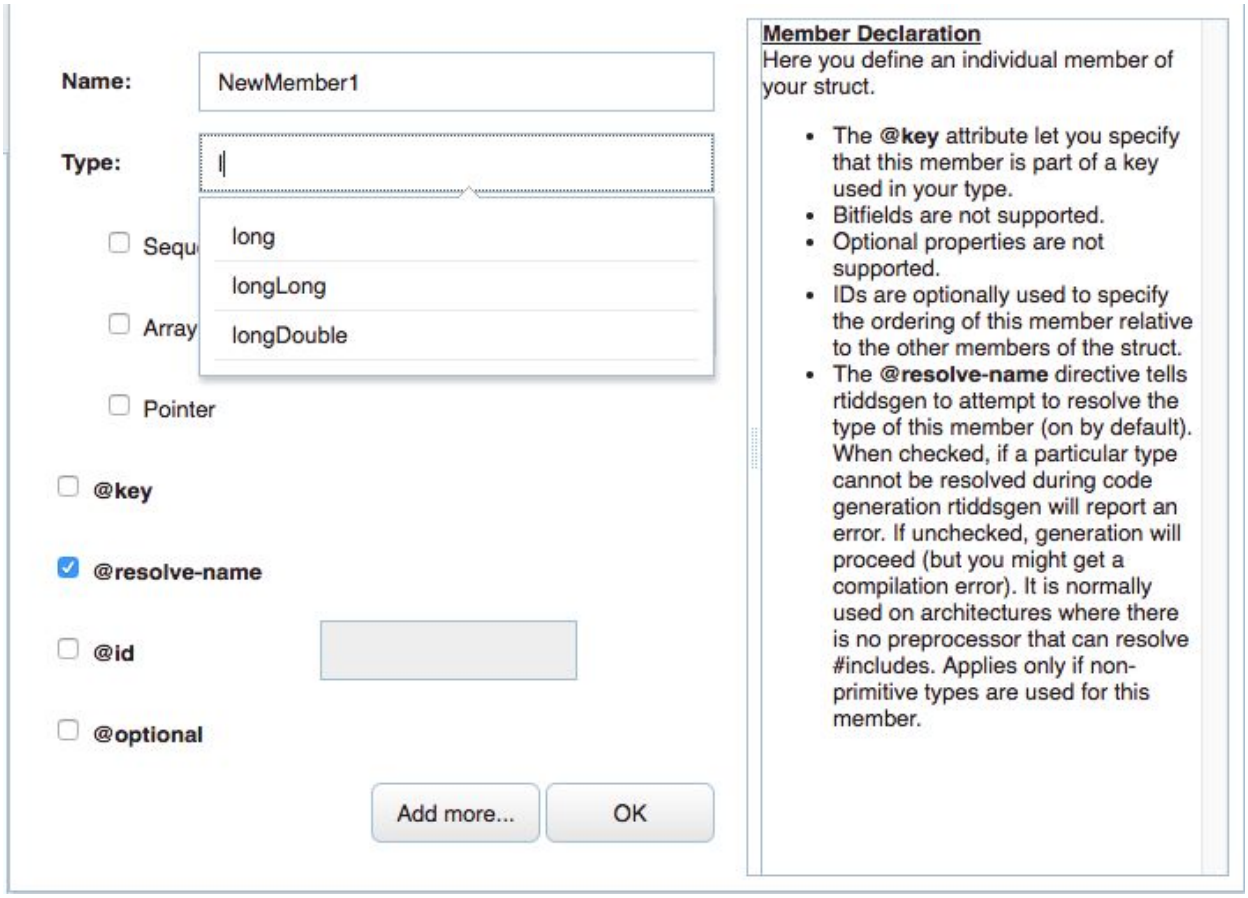
A pop up will guide you on how to create a new top level type:



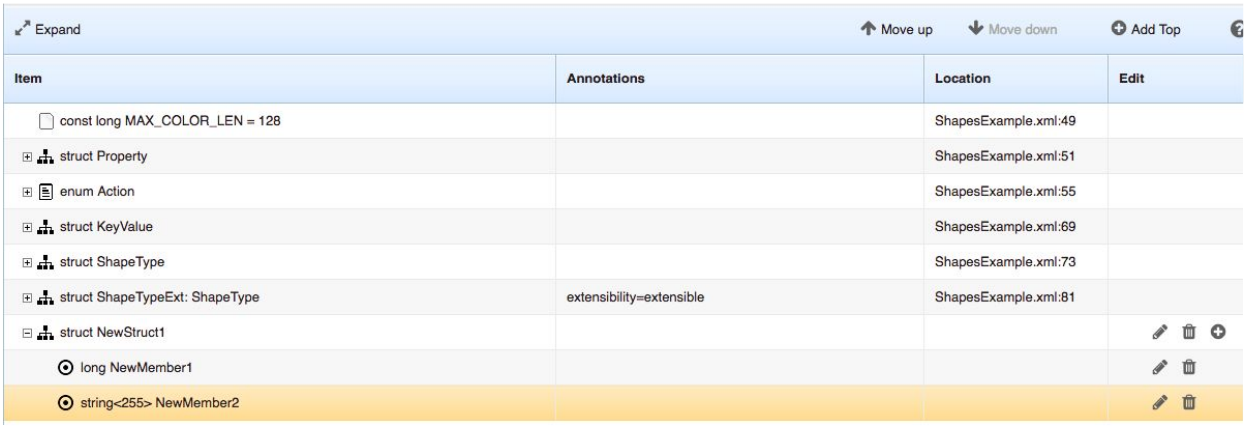
Once the top level is added, you can go to the structured view and populate the new type using the button:



A pop up will help you in selecting the types and the right values:



This is how the new type would look after adding a couple of members:

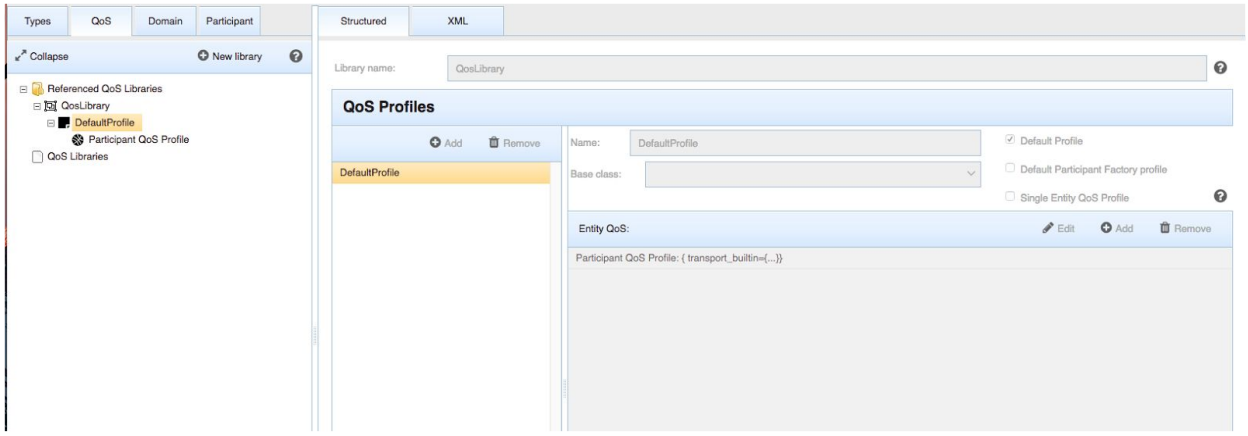


You can change the position of the members using the  buttons.

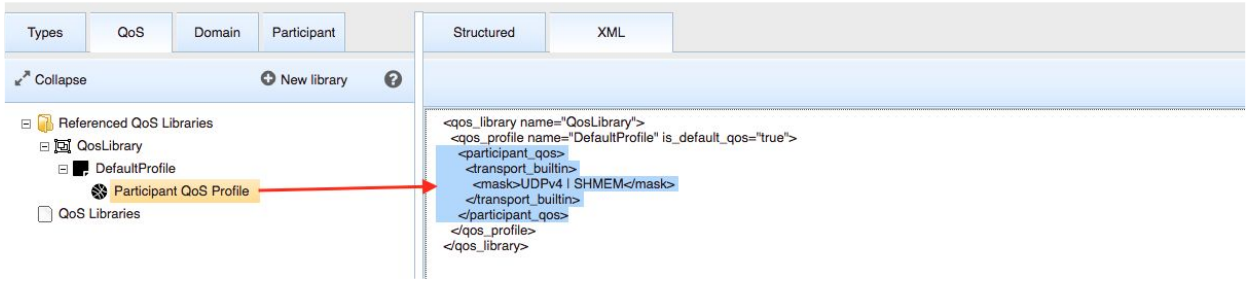
The QoS TAB

As all the tabs, the QoS Tab, has a tree on the left panel that will show you QoS coming from the references files and the qos Created in the Local project.

You can select a Profile on the right side and see the details on the main panel. Both in a structured view:

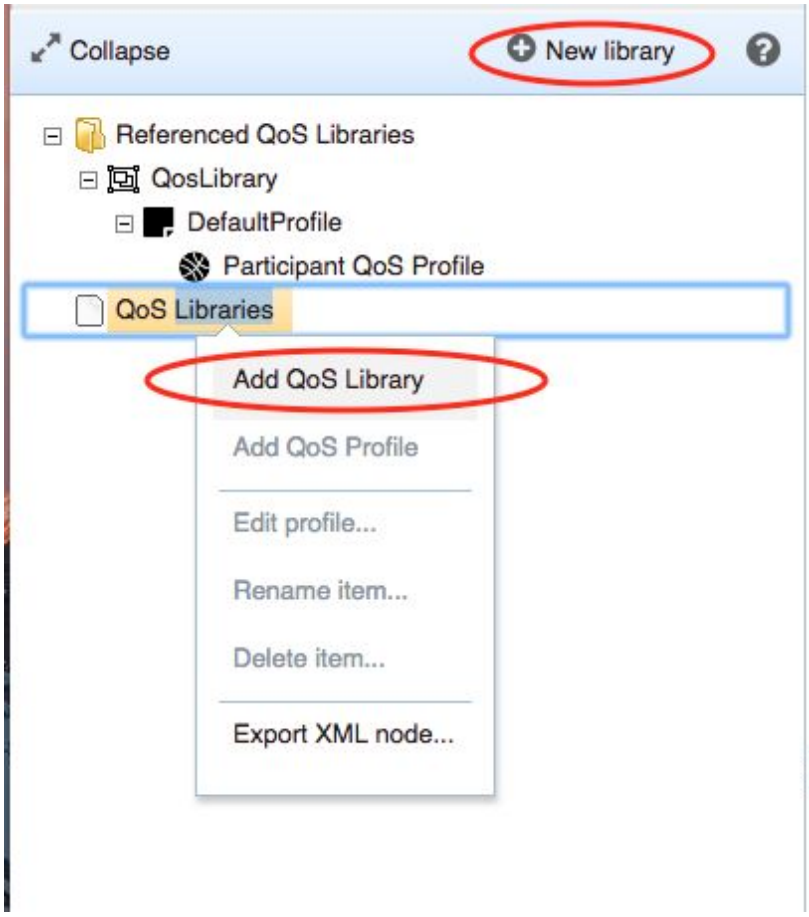


Or in the XML format:

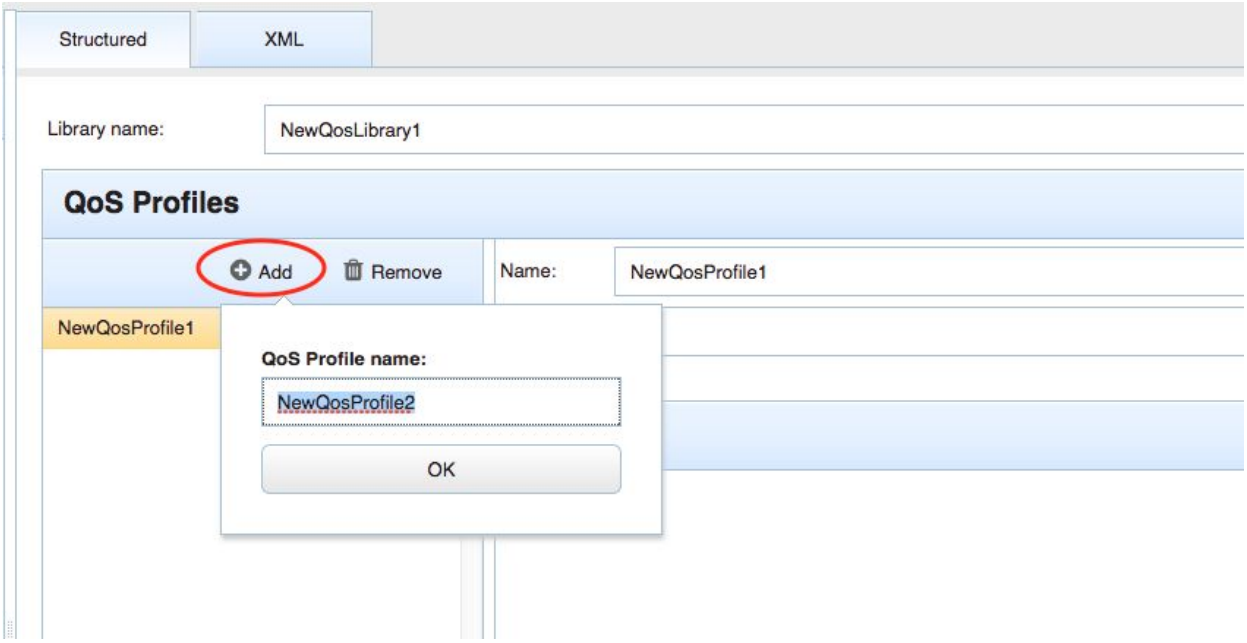


To add new QoS to your local configuration, you can click the 

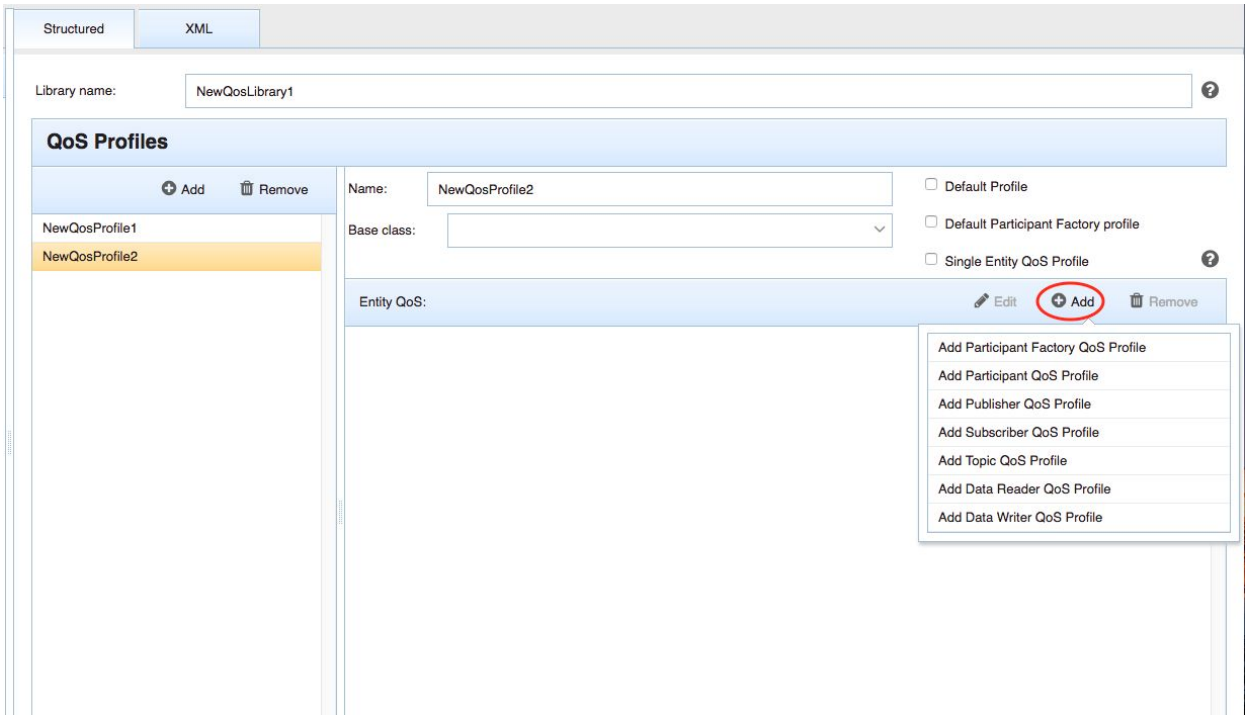
button or right click on the QoS Libraries tree:



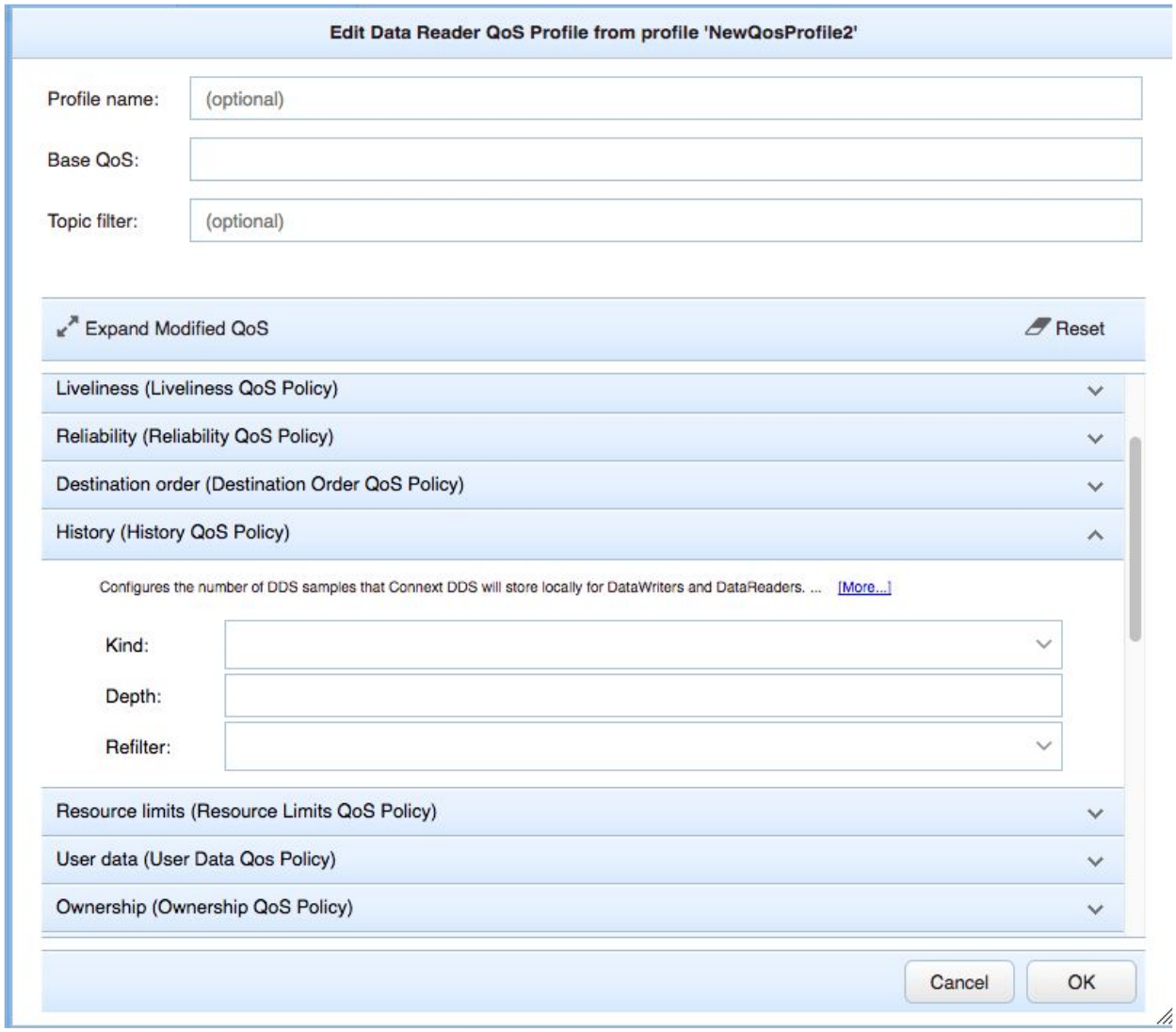
You can them add QoS Profiles to that library using the Add button in the main panel:



Once you have your profiles, you can select one of them and add QoS for a specific Entity:

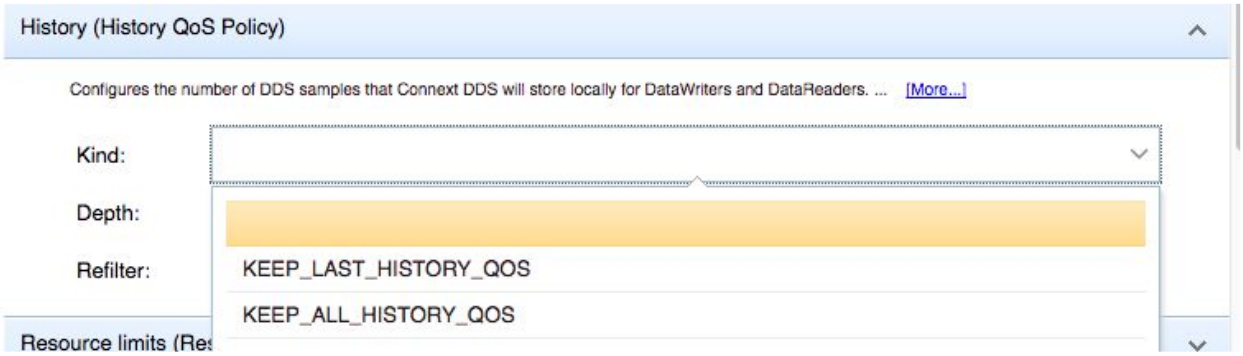


When an Entity is selected, a popup will be presented that will allow you to set all the QoS related to that Entity. You can browse all of them and select  to set and get more informations on a specific setting:

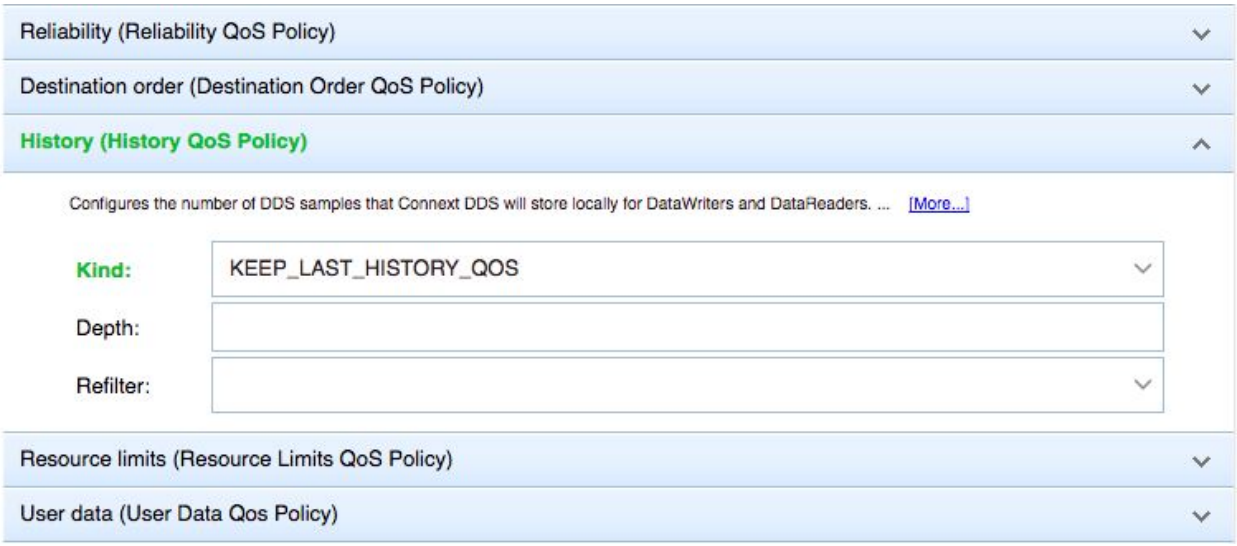


A short explanation is shown and a link to [More…] information for that specific policy is provided.

For each QoS policy, suggestions and checks are provided:



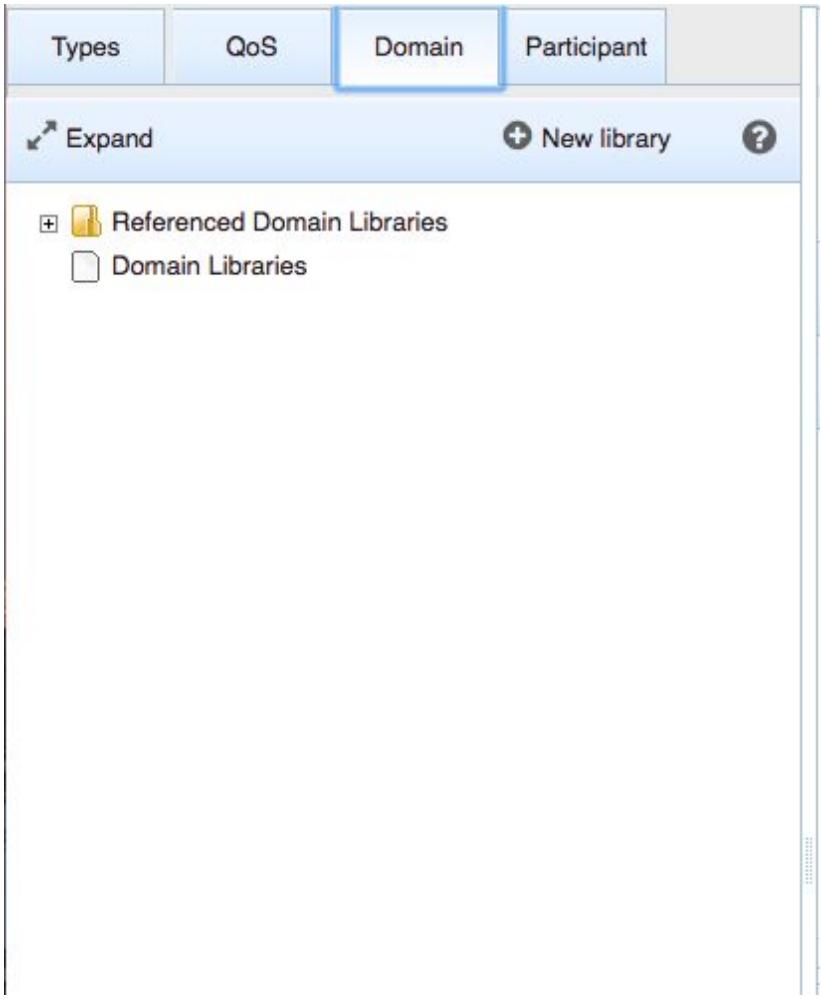
Once the QoS is set, it will be highlighted in green to indicate that is being set:



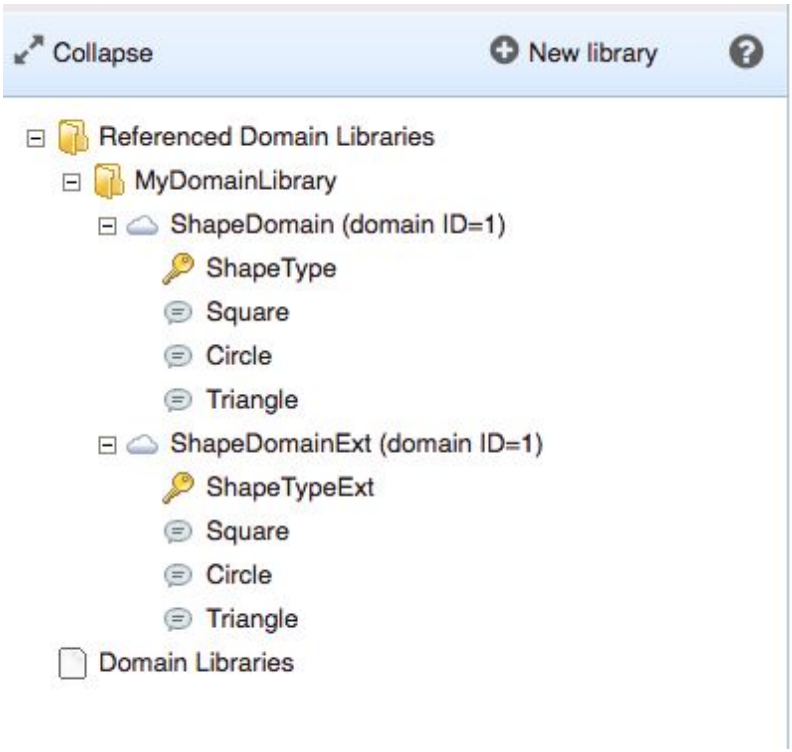
The Domain Tab

Exploring Referenced Domain Libraries

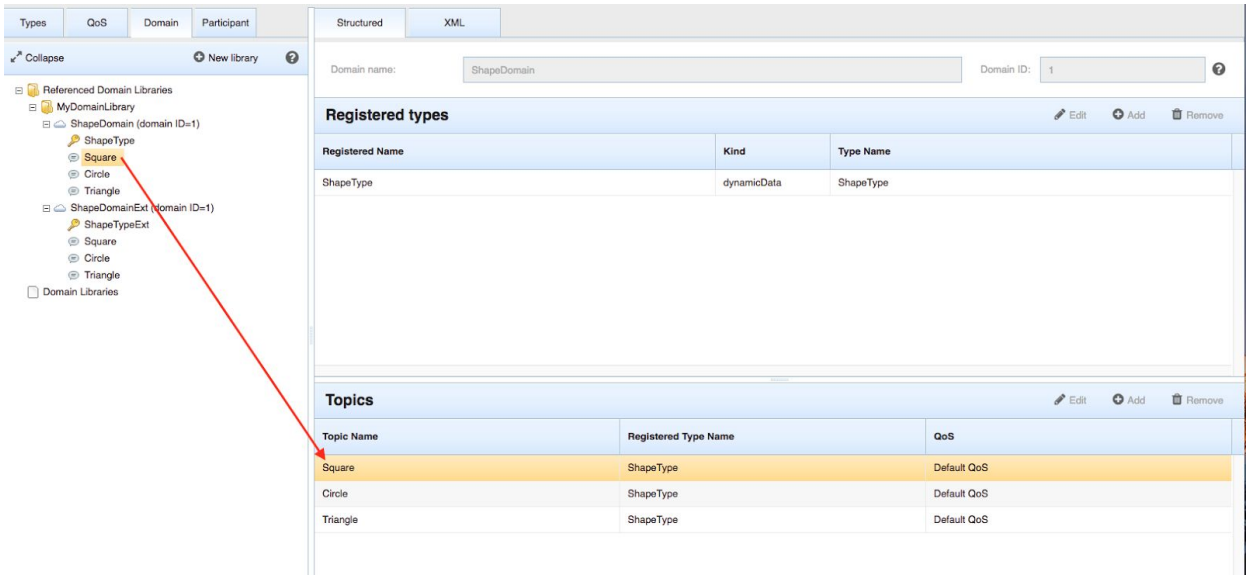
Once you uploaded a file as shown above, you will notice, in the left panel, a new tree called “Referenced Domain Libraries” under the “Domain Tab”:



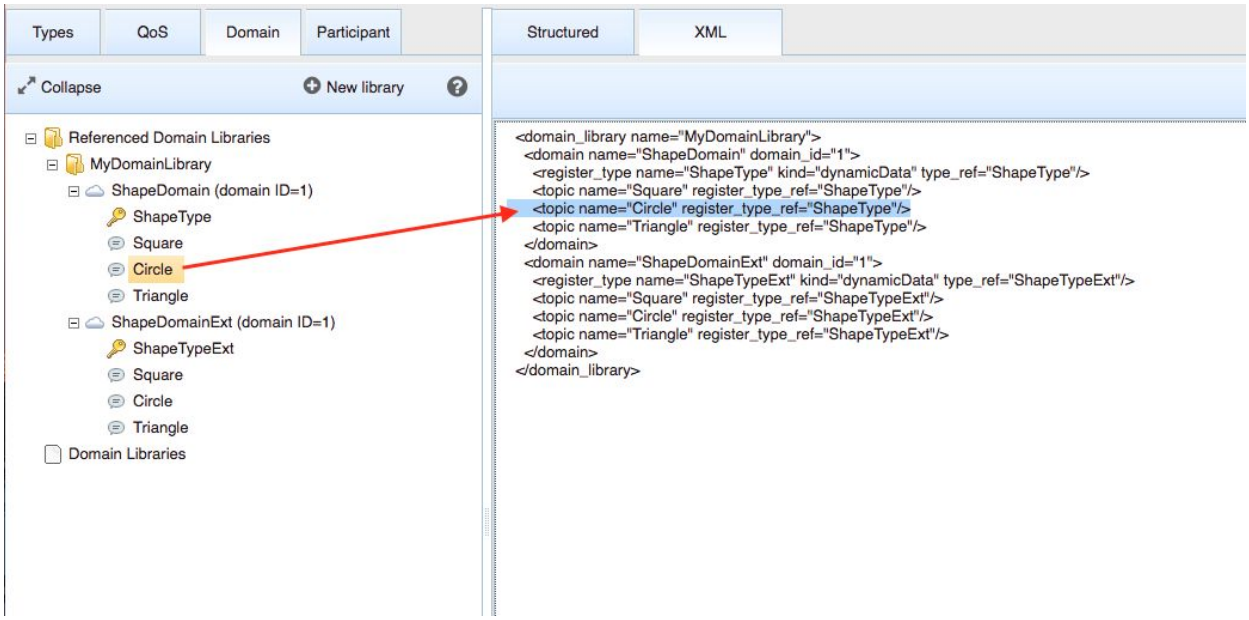
You can expand/collapse the whole tree using the “Expand/Collapse” button on top of the page:



You can then select any element on the tree and see the details on the main panel. Both in a structured view:



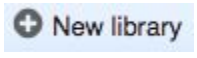
Or in the XML Format:



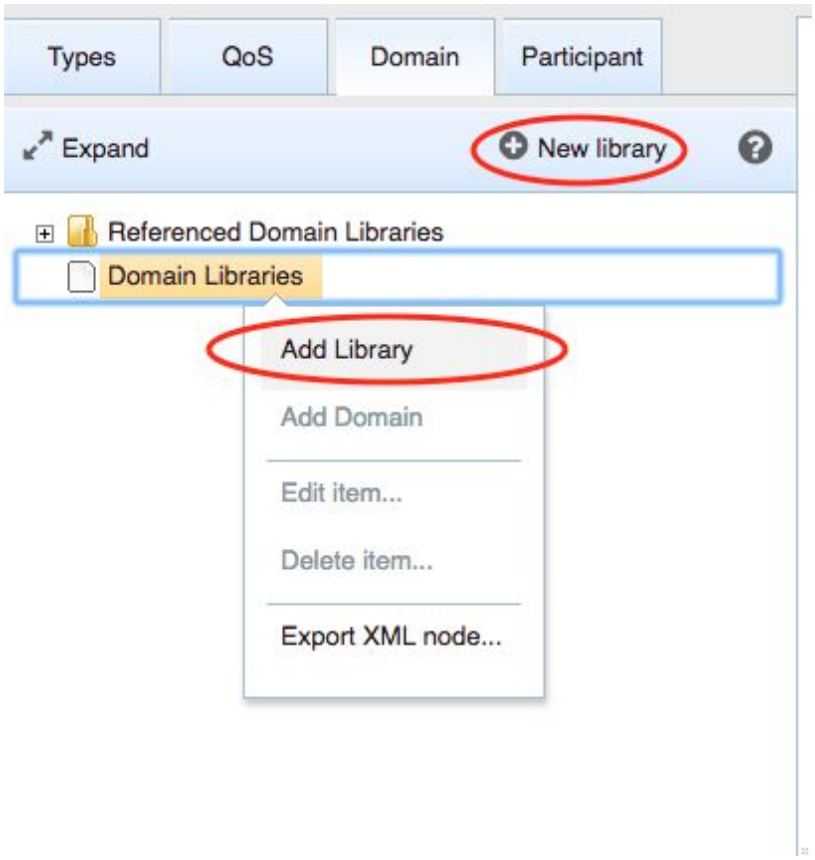
Adding Local Domains

As you can see, the imported example has a Domain called *Shape Domain* that contains a *ShapeType* and three topics *Square, Circle and Triangle.*

Let's see how you can create a new Domain Library containing a new Type and a new Topic.

To start, right click on the " Domain Libraries" tree or use the 

button:



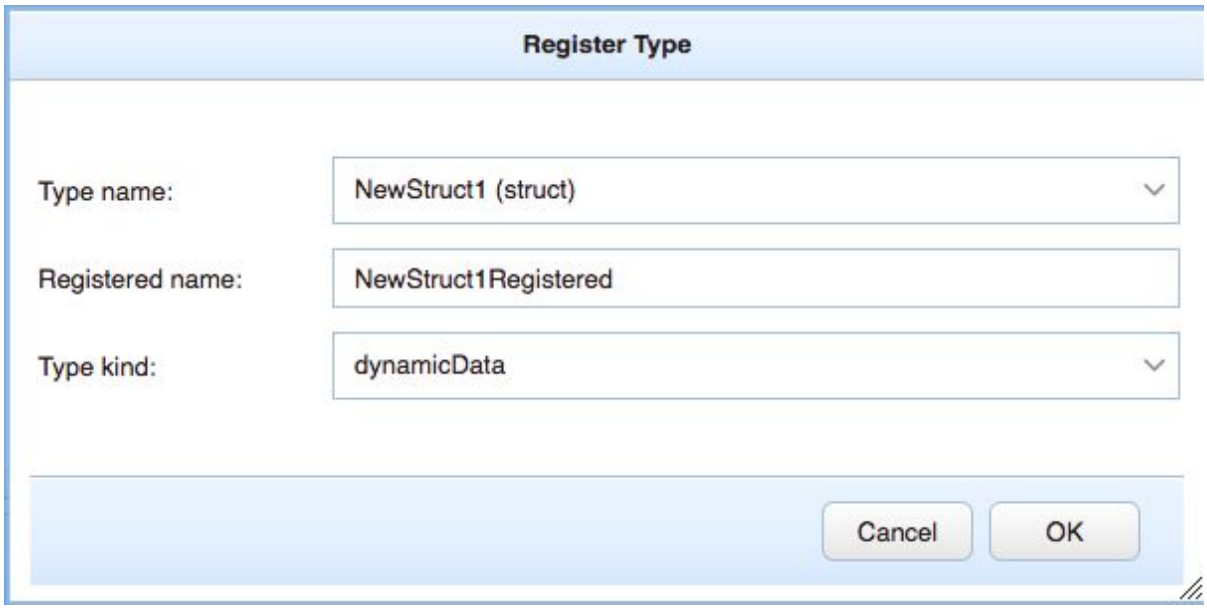
A dialog box will let you pick a name. In this example will call it *NewDomainLibrary1.* Once the library has been added, right click on it and choose “Add Domain”. A dialog box will be presented:

In this dialog box you can pick the name (*NewDomain1*) and you can select the domain

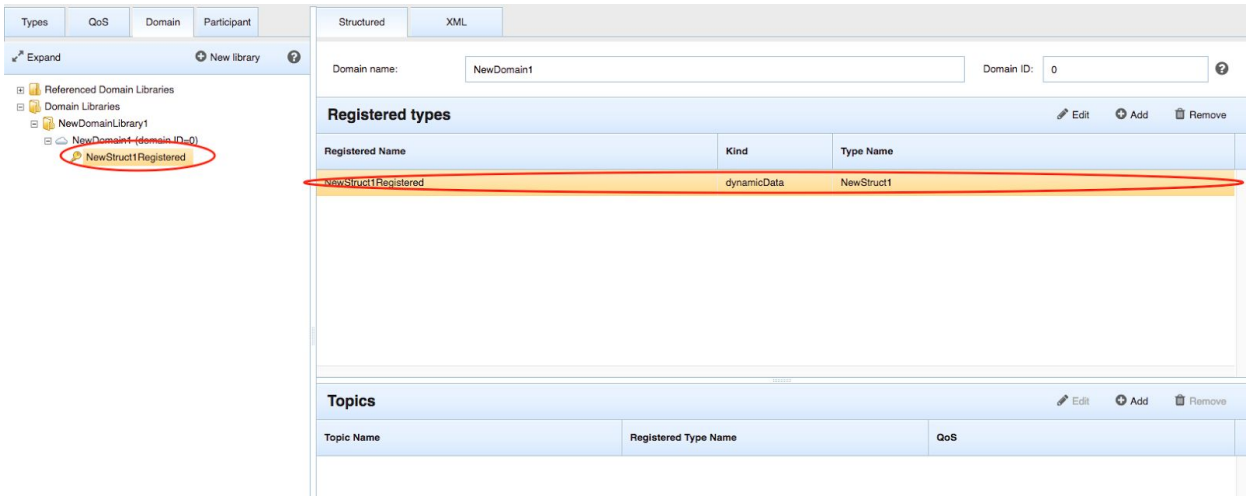
id (0).

Register a new Type

To Register a new type, select Add in the **Registered types** table; a pop-up will be presented allowing the user to choose a name, a kind and the type name from a list:

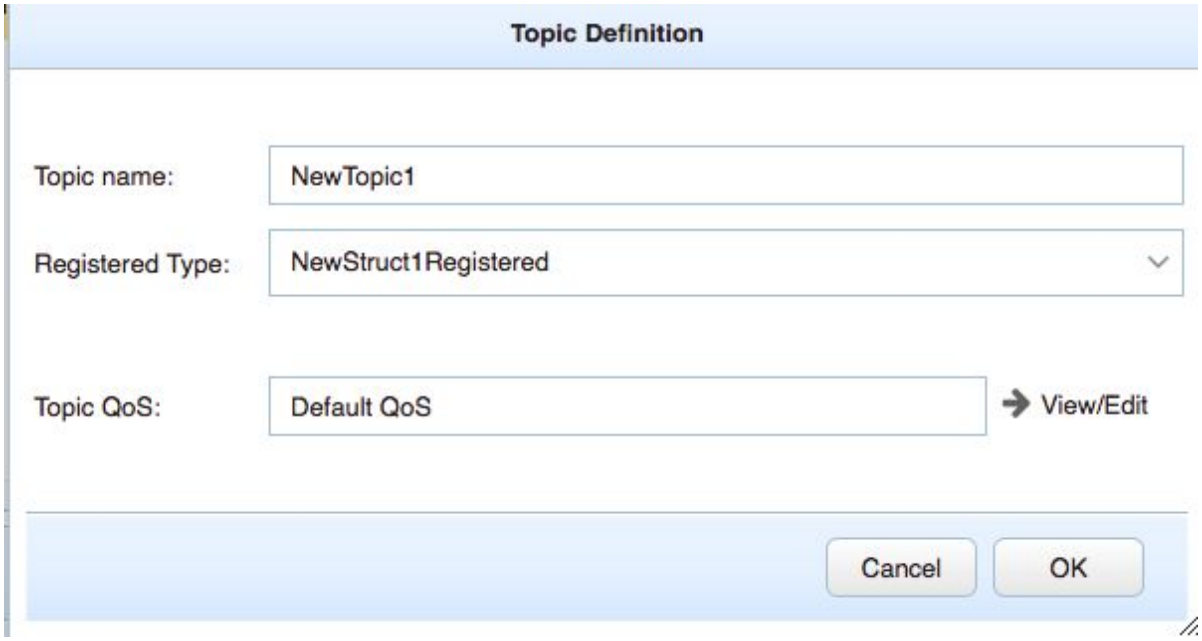


Once OK is clicked, you will see that the new type is visible in the left three and in the Registered type table in the context panel:



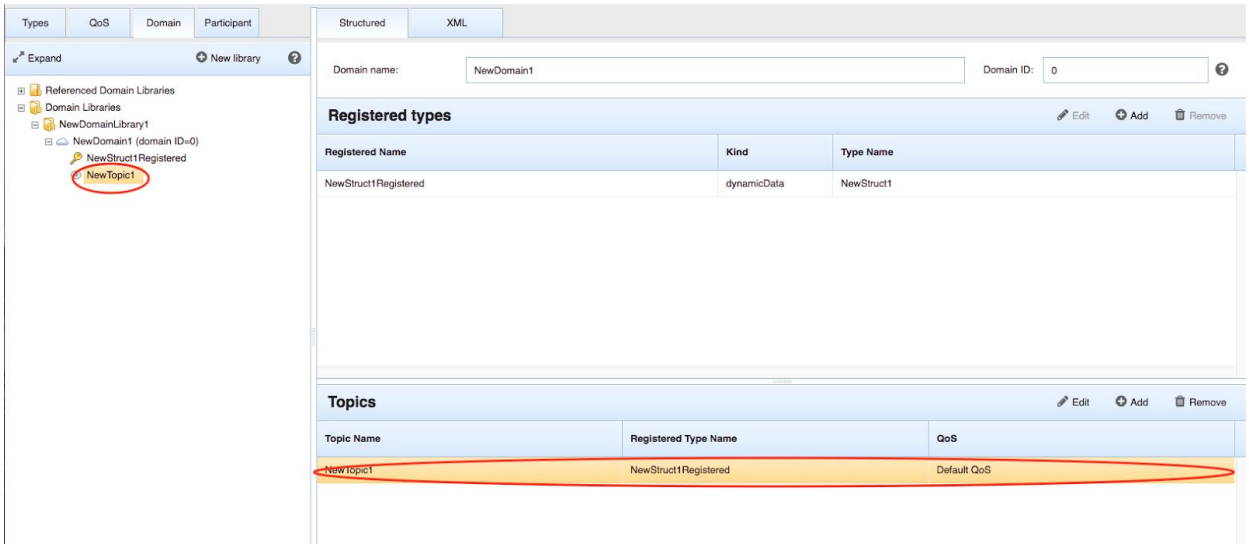
Register a new Topic

To register a new Topic just click Add in the Topics table. A pop up will be presented:

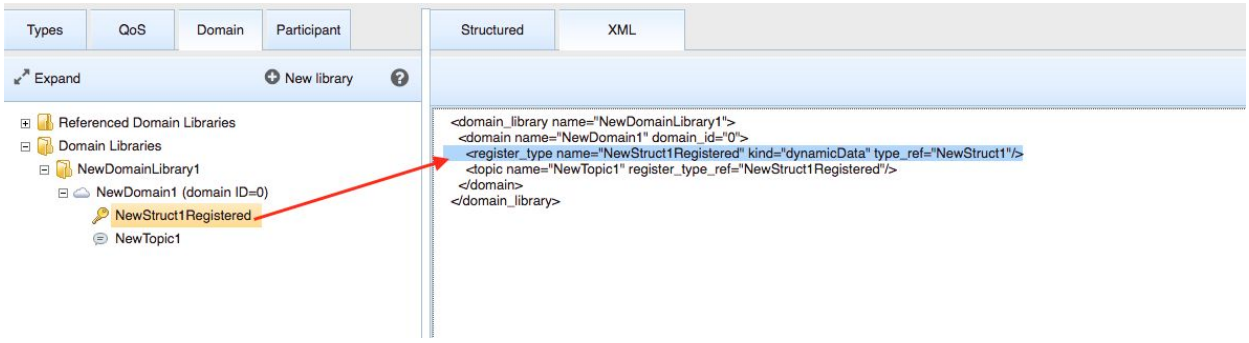


Input your topic name and select one of the available Registered types from the drop down menu.

Once you click ok, the new topic will be available on the left tree and in the context panel:



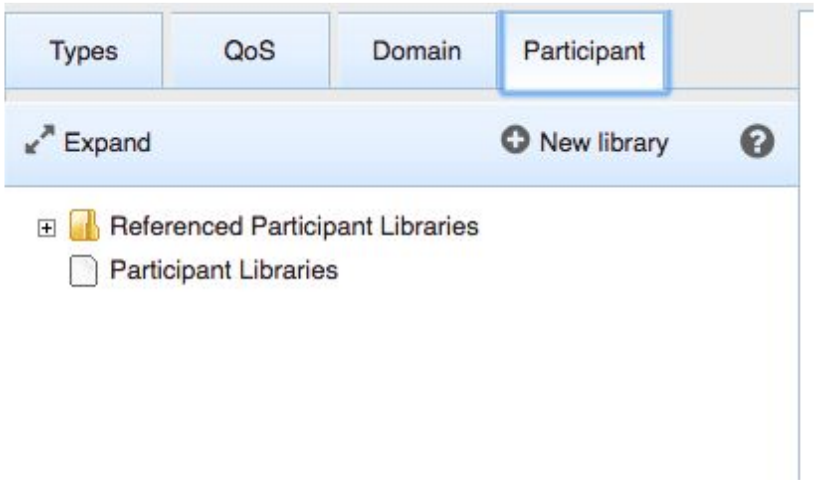
Of course, you can also see the XML definition:



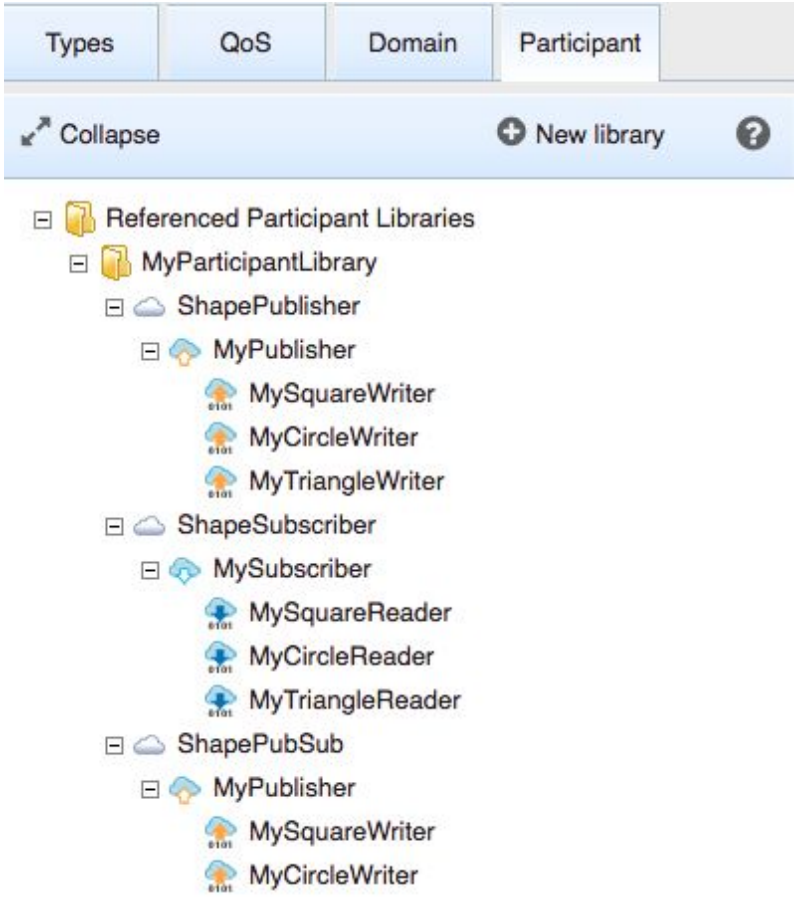
Participant Library TAB

Exploring Referenced Participant Library

Once you uploaded a file as shown above, you will notice, in the left panel, a new tree called “Referenced Participants Libs” under the “Participant Tab”:



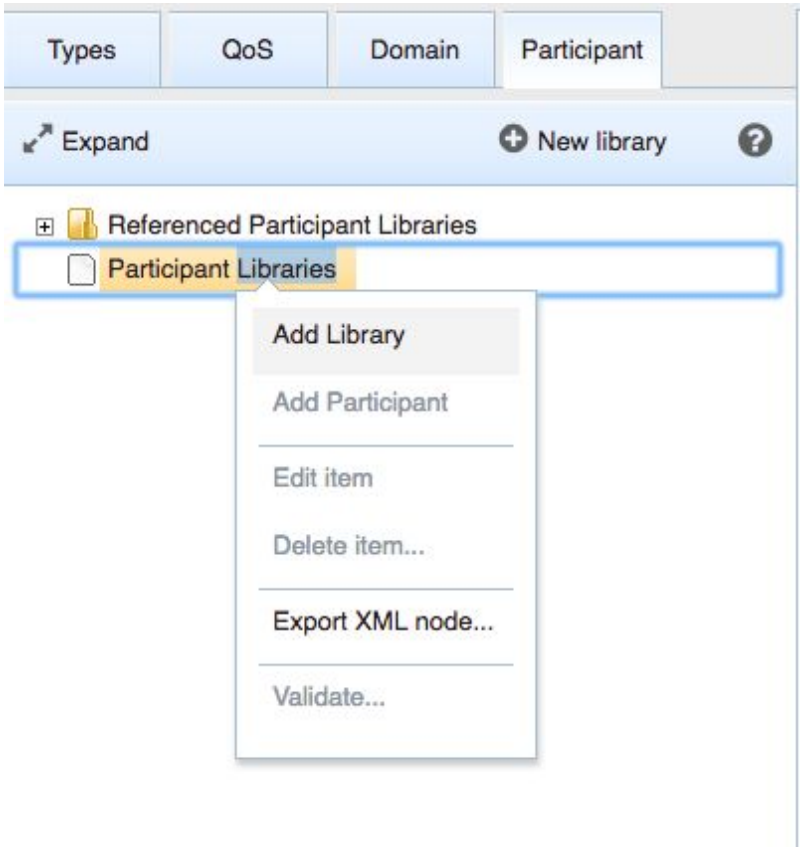
You can expand/collapse the whole tree using the “Expand” button on top of the page:



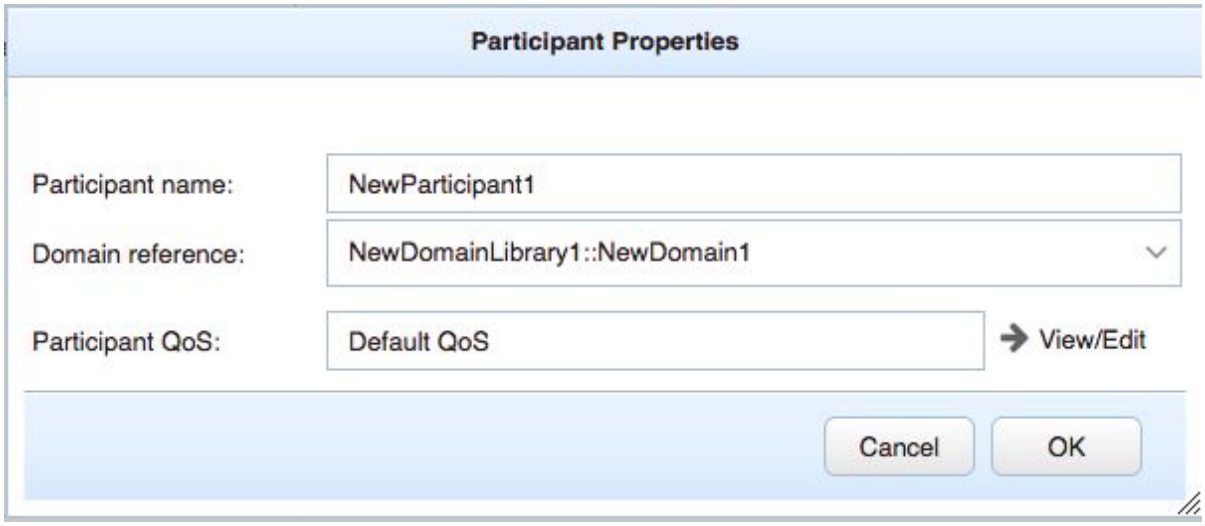
Adding Local Participants

Let's see how you can create a new Participant Library containing readers and writers for another topic.

To start, right click on the "Local Participant Libs" tree:

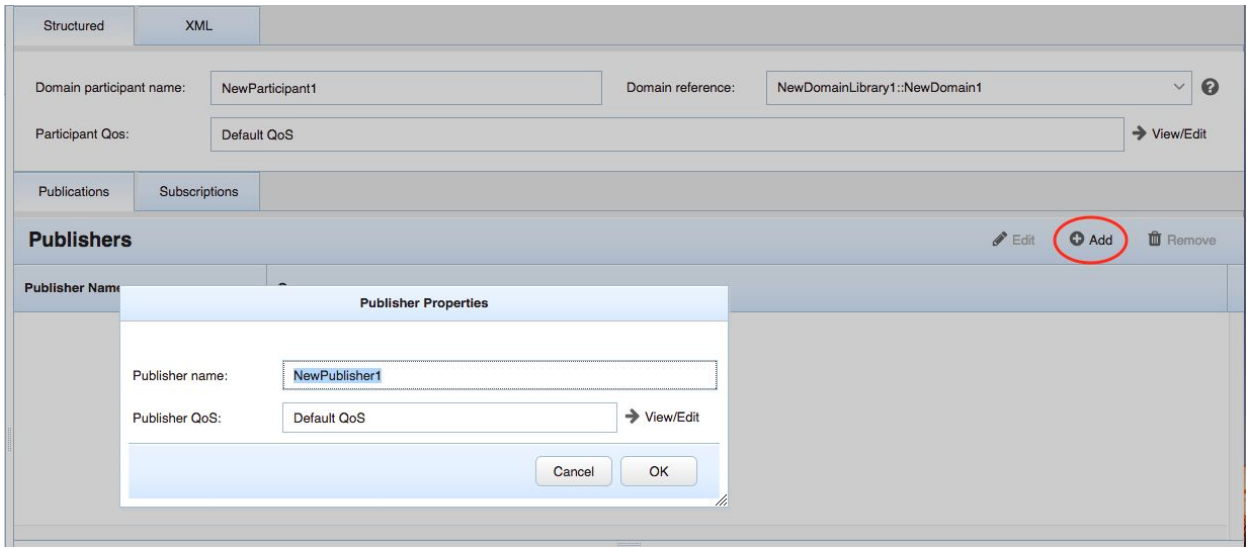


A dialog will let you pick a name. In this example will call it *NewParticipantLibrary1.* Once the library has been added, right click on it and choose "Add Participant". A dialog box will be presented:



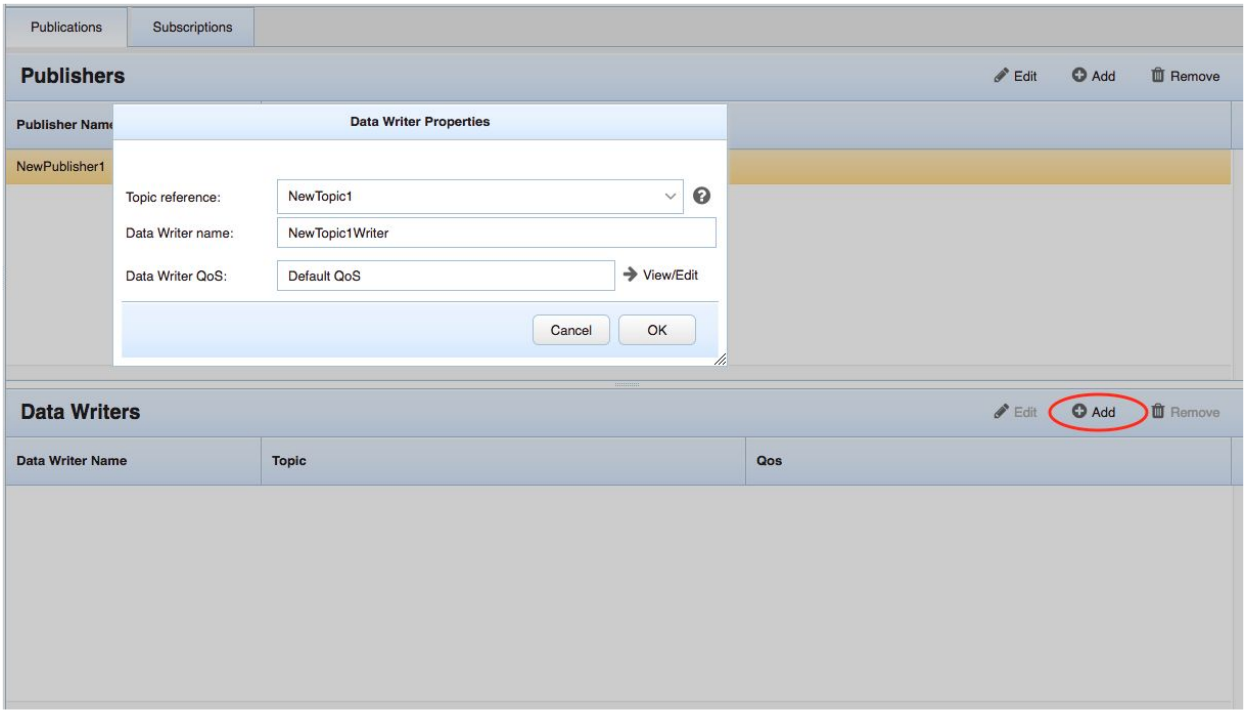
In this dialog box you can pick the name (*NewParticipant1*) and you can select one of the available Domain Participant References. You can also select one of the available QoS profiles and customize them.

To add a new Publisher just select the “Add” button in the **Publishers** table:

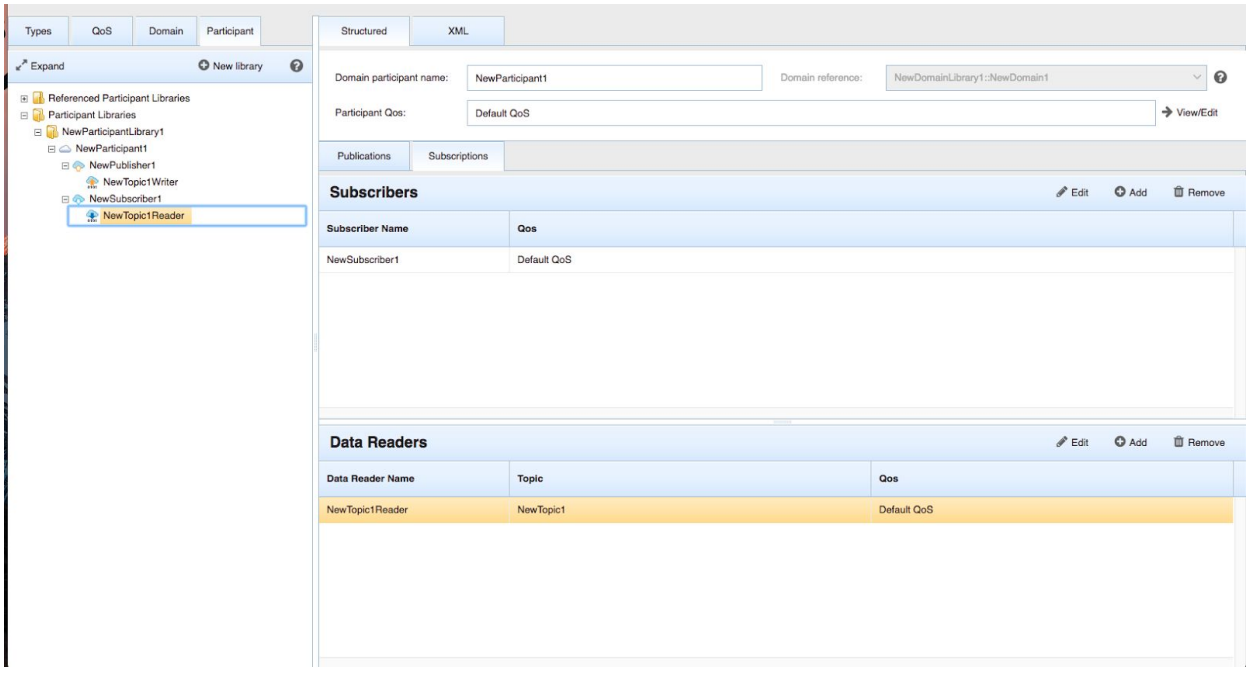


A dialog box will be presented to allow you to pick a name and the QoS.

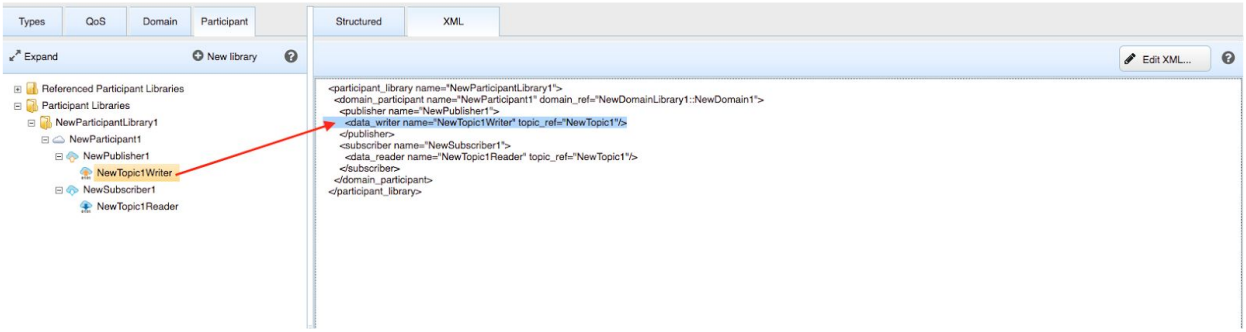
Once you add the publisher (*NewPublisher1)* you can select it and add a writer in the same way by clicking “Add” in the writer's table. A dialog box will let you select a name and a topic:



You can do the same for adding a subscribers and a readers. This will be the result:

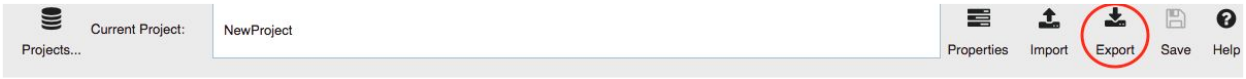


As you can see all the newly created entities are visible in the “ Participant Libs” tree on the left panel. You can also see the result in XML:

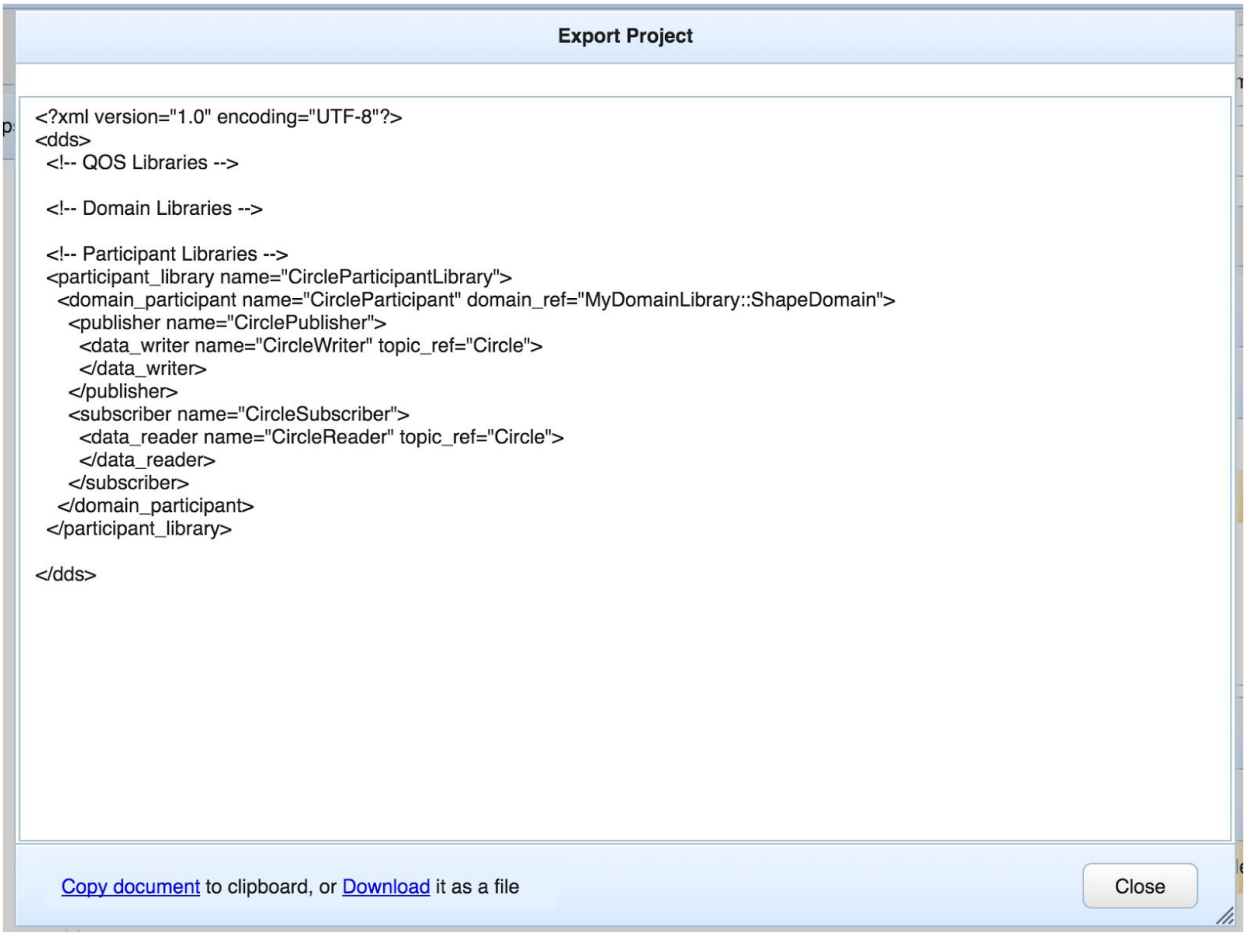


Export an XML Application Creation File

If you want, you can generate an XML Application Creation File by using the “Export” button on the top right of the UI:



When you click on “export” a dialog box will be presented showing you the XML result:



You can copy or download the file using the links at the bottom of this dialog.

Additional Notes about RTI System Designer

This section contains additional information that applies to the RTI System Designer (MCT CE)

Using fully qualified names when referring to objects

When referring to another type, you can either use the target datatype without namespace (in this case the search will occur in the same module you are working on), or you must specify the full namespace of the target object. In particular, **partial namespace qualification is not supported because it is naturally ambigue**.

I.e. Suppose you have this type (using IDL syntax):

```
module MyModule {
    module AnotherModule {
        struct BaseType {
```

```
            short x;
            short y;
        };
    }
}
```

Then suppose you want to create another structure inside `AnotherModule` that extends `BaseType`, you have two choices:

- Use just the name `BaseType` to specify the base class
- Use the fully qualified name `MyModule::AnotherModule::BaseType`

Partial qualification like '`AnotherModule::BaseType`' is not accepted by the tool because it is ambiguous.

Release Notes

What's New/Fixed in this Version

Known Issues and Limitations

System Designer

- ❏ Export: copying functionality not supported in older browser

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