RecipeWorX
Quick Start

APPLICATION NOTE

March 2016

Description: An introduction to RecipeWorX and using recipes in GENESIS64 applications.

Introduction

RecipeWorX is a new component and is part of the GENESIS64 product family. It provides the capability to create, save, load and execute recipes.

A recipe is a collection of values that can be downloaded to equipment or data structures to make a product. For example, it can be used in:

- Pharmaceuticals
- Food and Beverage
- Chemicals

Configuration

There is a new Workbench Desktop Configurator in version 10.90. You can open Workbench Desktop by going to Start → All Programs → ICONICS → Workbench. You can find the RecipeWorX provider under the Platform Services node in the Project explorer (Figure 1):

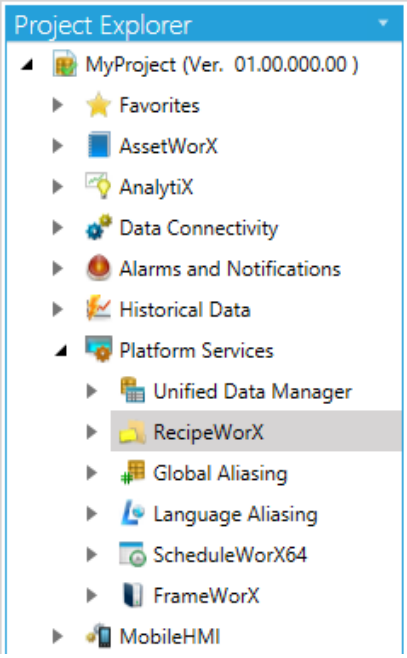


Figure 1 - Project Explorer

Under the RecipeWorX node you can add / edit / delete items on multiple levels (Figure 2).

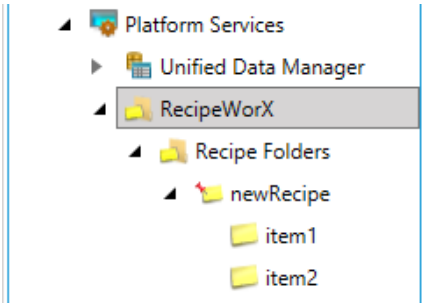


Figure 2 – RecipeWorX Structure

The RecipeWorX provider in Workbench Desktop is structured to three levels:

- Folders ~ groups of recipes
- Recipes ~ lists of ingredients that represent a product
- Recipe Items ~ variations of a recipe

Configuring a Recipe

A recipe is a named collection of predefined parameters, you can think of it as a list of ingredients for a product (for this example our product is "Soda"). A recipe is defined by its Tag List (Figure 3), where for each ingredient you can specify the:

- Tag name ~ data tag – input, used to parameterize each recipe item
- Name ~ alias for the "Tag name" and represents the specific raw material.
- Other options ~ data type, units, min, max, value expression and recipe percentage.

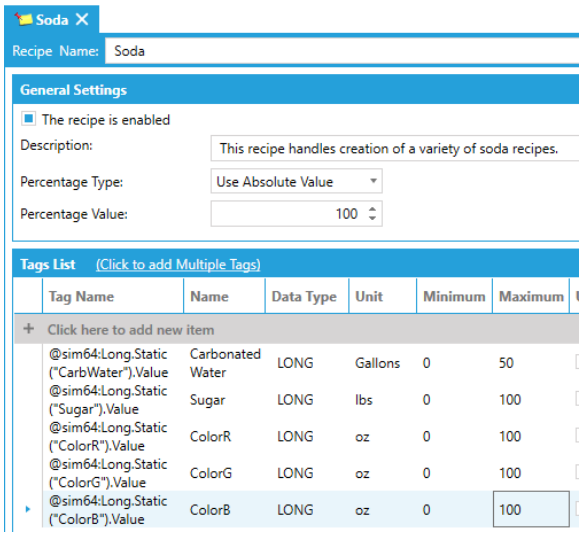
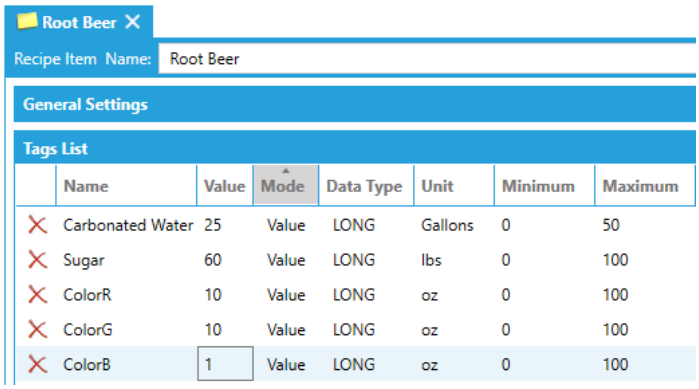


Figure 3 – Recipe

Configuring a Recipe Item

A Recipe Item (in this example it is "Cola" and "Root Beer") specifies tag values and it is used for recipe variations. In the item list (Figure 4 – Recipe Item) you can specify the exact value of each named tag in that recipe's tag list by modifying the relevant "Value" column.

With the configurator you can specify a variation of the recipe (in this case "Root Beer" consists of 25 gallons of carbonated water, 60 lbs. of sugar, 10 oz. of colorR, 10 oz. of ColorG, and 1 oz. of ColorB).



Name	Value	Mode	Data Type	Unit	Minimum	Maximum
Carbonated Water	25	Value	LONG	Gallons	0	50
Sugar	60	Value	LONG	lbs	0	100
ColorR	10	Value	LONG	oz	0	100
ColorG	10	Value	LONG	oz	0	100
ColorB	1	Value	LONG	oz	0	100

Figure 4 - Recipe Item

Runtime

Two new controls were added in GraphWorX64 (Figure 5) for manipulation of a recipe and its items in the Runtime mode of a GraphWorX64 display. You can access these controls by first opening GraphWorX64. Click on Start → All Programs → ICONICS → GENESIS64 → GraphWorX64 → GraphWorX64. Then in GraphWorX64, locate the Recipe Controls under the "Controls" section in the Ribbon Menu. The two new controls are the:

- Recipe Navigator Control ~ contains a navigation tree that reflects the recipe database as configured from the RecipeWorX provider in Workbench Desktop.
  Provides commands for data manipulation between the Runtime Grid Control and database / OPC tags.
- Recipe Grid Control ~ allows reading / writing / editing tag or parameter values.

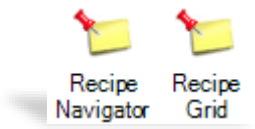


Figure 5 – Recipe Controls

RecipeWorX Navigator Control

This control is used for navigation and for data manipulation. Using the right click context menu in runtime, the Recipe Navigator supports the following commands:

- Copy Recipe Item ~ copies the selected item
- Delete Recipe Item ~ deletes the selected item
- Download Recipe ~ downloads the current values of the recipe item to OPC tags
- Load Recipe ~ loads the selected item to the Grid Control
- Save Recipe ~ applies any changes from the Recipe Grid to the Recipe Item
- Upload Recipe ~ uploads values from the relevant OPC tags to the Recipe Item and updates the Grid with those new values.

The context menu for recipe items:

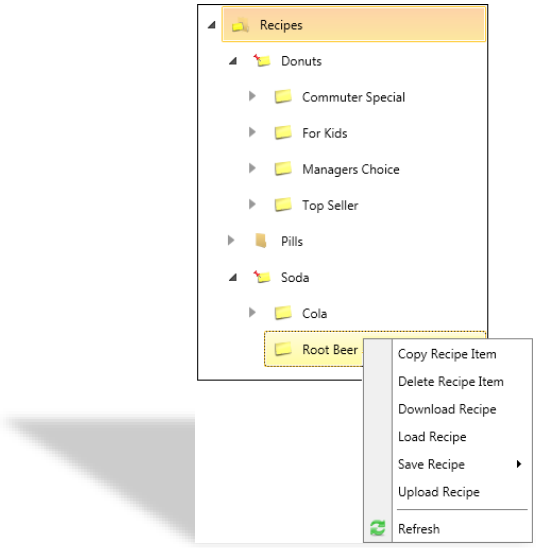


Figure 6 – Navigator Control

RecipeWorX Grid Control

The Recipe Grid control (Figure 7) displays the loaded recipe item(s) and allows recipe editing in runtime mode. Parameters for the current Recipe Item are visualized in the Grid Control. The column "Value" can be changed directly through this control. Changes need to be applied by clicking *Apply Changes* in the Ribbon or by using the *Save* command. If you want to change the value of the OPC tag connected to Value, you need to use *Upload / Download* commands, otherwise the change stays only in Recipe.

The Recipe Grid can be paired with a navigator to load selected recipes. When both controls are added to a GraphWorX64 display they are paired by default, and the commands from Navigator will affect the current Grid.

Name	Unit	Min	Max	Value	Data Tag
Carbonated Water	Gallons	0	50	25	@sim64:Long.Static("CarbWater").Value
Sugar	lbs	0	100	60	@sim64:Long.Static("Sugar").Value
ColorR	oz	0	100	10	@sim64:Long.Static("ColorR").Value
ColorG	oz	0	100	10	@sim64:Long.Static("ColorG").Value
ColorB	oz	0	100	1	@sim64:Long.Static("ColorB").Value

Page 1 of 1

Figure 7 - Grid Control

Both Controls are connected using an alias - "pairing key". By default it is "RECIPE1" and you don't need to do anything to pair your controls.

Figure 8 – Properties of Grid Control

Using the new GENESIS64 RecipeWorX

1. Launch Workbench.
2. Expand the Project.
3. Go to Platform Services → RecipeWorX → Recipes.

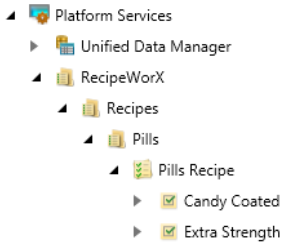


Figure 9 – RecipeWorX Structure

There you will see all available levels as shown in Figure 9: Folder (Pills), Recipe (Pills Recipe), and Recipe Item (Candy Coated).

Creating a new Recipe and Recipe Item

1. Right click on a parent folder -> Add Recipe
2. Specify name of the Recipe and continue with adding a parameter (includes OPC tag in "Tag List" section).

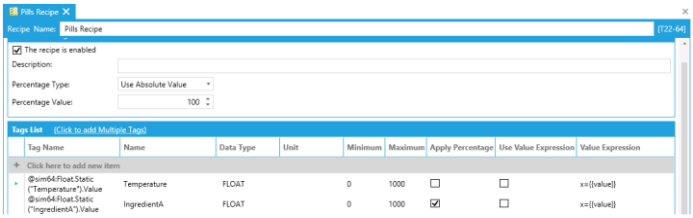


Figure 10 - Recipe

In this example, the recipe is called "Pills Recipe" and includes tags for "Temperature" and "IngredientA" parameters. OPC tag *@sim64:Float.Static("IngredientA").Value* is named "IngredientA". This name will be used in next step.

3. Right click on the Recipe -> Add Recipe Item

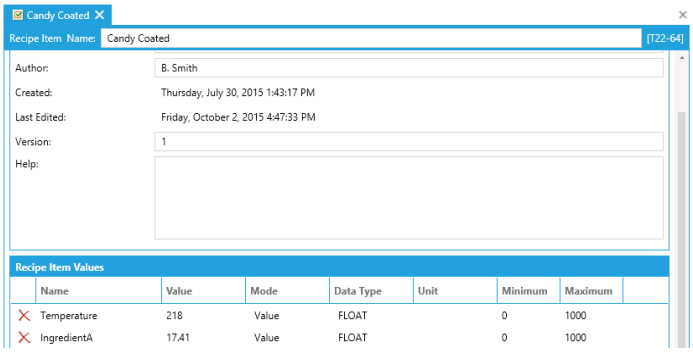


Figure 11 - Recipe Item

When you create the Recipe Item under the Recipe, you have predefined parameters specified in the Recipe ("Temperature" and "IngredientA"). As you can see they are named per the "Name" column in the parent Recipe.

Here you can insert the concrete value for the named OPC tag. In our example, *"Candy Coated"* based on *Pills Recipe* is made with *17.41* of *IngredientA* (*Unit* was not specified).

Creating, Saving and Loading

1. Right-clicking on a Recipe (Pills Recipe in this case) will provide you an option to call command ***New Recipe Item***. Click on it and a new item will be created and added to the configuration.
2. You can specify "Value" for the OPC tag, just click into the cell and enter / change the value.
3. Either use ***Apply Changes*** in Ribbon menu, or use the ***Save*** command.
4. For showing selected Recipe Item, right-click on the item and select ***Load*** command.

Downloading and Uploading

1. Change "Value" in Grid control, e.g. for "Temperature".
2. ***Save*** the change.
3. Monitor the Process point connected to OPC tag for Temperature: *@sim64:Float.Static("Temperature").Value*
4. Use the ***Download*** command. You will see the value in the OPC tag from the last step is changed based on the changed value in the Grid control.
5. Vice versa, change the value in the process point and on the selected Recipe Item use command ***Upload***; the new value is uploaded to the grid and the configuration.

RecipeWorX Data Management

Additional information about the currently loaded recipe is exposed through data access tags. These tags can be found in the Data Browser under *Data Sources/Platform Services/Recipes/ .Recipe Management*

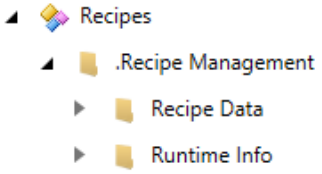


Figure 12 - Data Management tags

Recipe Management Data Access provides:

- **Recipe Data** ~ provides detailed information about the currently loaded recipe, such as Author and RecipeName. The tags that provide information about a particular row in the recipe are: *DataTag, MaxValue, MinValue, Unit, Value, and ValueName.*

- **Runtime Information** ~ provides Runtime-related information about the results for uploading or downloading recipes:

  - *DownloadedErr* – number of tags that failed to download for the last download operation.
  - *DownloadedOk* – number of tags that were downloaded successfully for the last download operation.
  - *DownloadedPending* – number of tag downloads pending for the last download operation.
  - *LastRecipeDownloaded* - the name of the last recipe that was downloaded.
  - *LastRecipeUploaded* – the name of the last recipe that was uploaded.
  - *RequestedErr* – number of tags requested in error for the last upload or download.
  - *RequestedOk* – number of tags requested successfully for the last upload or download.
  - *RequestedPending* – number of tags requests pending for the last upload or download.
  - *UploadedErr* – number of tags that failed to upload for the last upload operation.
  - *UploadedOk* – number of tags that were uploaded successfully for the last upload operation.
  - *UploadedPending* – number of tag uploads pending for the last upload operation

Each of these tags contains an alias parameter, which by default matches the default Recipe Alias for the Recipe Navigator and Recipe Grid.

For example, this tag would show the author of the currently loaded recipe item: rcpm:RecipeData.Author("<#RECIPE1#>")

Some tags also contain a row parameter, to specify a particular row in the grid (a parameter of the recipe item). These row numbers start at zero for the first row.

For example, this tag will display the value of the parameter (ingredient) for the first row:
rcpm:RecipeData.Value("<#RECIPE1#>",0)
Note: the parameter "0" is index of first row (first parameter).

Additional features

Security options for Commands

Commands are secured by ICONICS Security. For User or Group you can specify the rights under Application Actions list. Forbidden commands will disappear from the context menu.

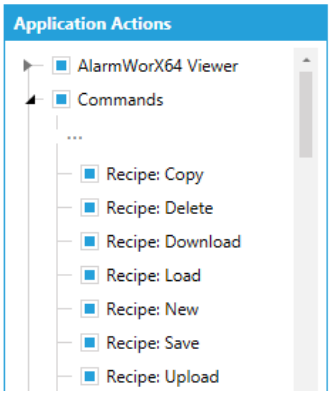
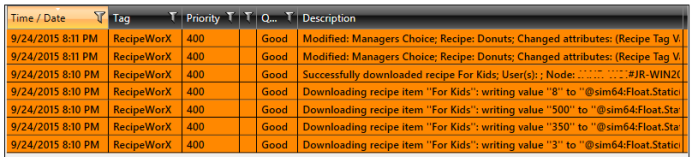


Figure 13 - Security options for Commands

RecipeWorX in GenEvents

For monitoring RecipeWorX actions you can use GenEvent logs. They can be browsed in standard way using AlarmWorX Viewer.



Time / Date	Tag	Priority		Q...	Description
9/24/2015 8:11 PM	RecipeWorX	400		Good	Modified: Managers Choice; Recipe: Donuts; Changed attributes: (Recipe Tag V.
9/24/2015 8:11 PM	RecipeWorX	400		Good	Modified: Managers Choice; Recipe: Donuts; Changed attributes: (Recipe Tag V.
9/24/2015 8:10 PM	RecipeWorX	400		Good	Successfully downloaded recipe For Kids; User(s): ; Node: #JR-WIN2(
9/24/2015 8:10 PM	RecipeWorX	400		Good	Downloading recipe item "For Kids": writing value "8" to "@sim64:Float.Static
9/24/2015 8:10 PM	RecipeWorX	400		Good	Downloading recipe item "For Kids": writing value "500" to "@sim64:Float.Sta
9/24/2015 8:10 PM	RecipeWorX	400		Good	Downloading recipe item "For Kids": writing value "350" to "@sim64:Float.Sta
9/24/2015 8:10 PM	RecipeWorX	400		Good	Downloading recipe item "For Kids": writing value "3" to "@sim64:Float.Static

Figure 14 - Events related to Recipes

Troubleshooting

Cannot browse for Recipe via Data Browser or Navigation Tree?

➔ Verify whether ICONICS Recipe Point Manager service is running.