

Description: Guide configuring Global Expressions in the Unified Data Manager.

OS Requirement: Windows Server 2003 x64/Vista x64/ Server 2008 x64/Windows 7 x64/ Server 2008 R2 x64

General Requirement: Installation of GENESIS64 v10.6

Introduction

The Unified Data Manager (UDM) provides a centralized management of commonly used expressions, groups, value sets, registers, and event triggers across the GENESIS64 suite. This document will help you understand global expressions from the configuration point of view and will demonstrate how they are used.

Expressions

You can create expressions in the UDM and use it in all other GENESIS64 applications. Each global expression is implemented as a single expression data tag, which recalculates on input values or on trigger data tags. Client applications can access these expression data tags as read/write data tags. Expressions can also accept parameters to provide further functionality.

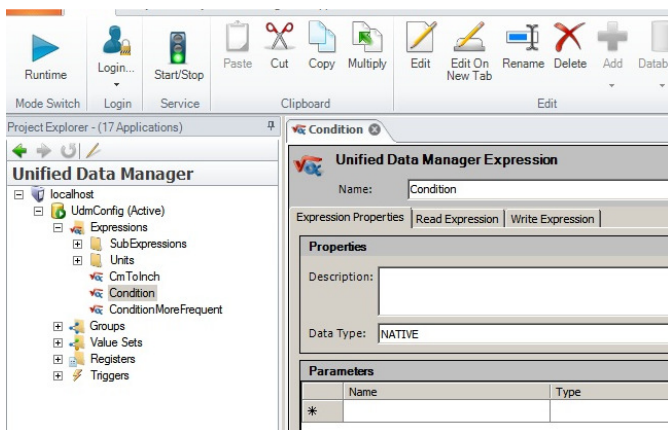


Figure 1 - Unified Data Manager with an Expression Configuration

Creating a New Expression

1. Launch the UDM by going to **Start → Programs → ICONICS → GENESIS64 → Tools → Unified Data Manager**. This will open the Workbench with the UDM provider.
2. Create a new configuration database by right clicking on your server at the root of the tree and select **New Database**.
3. Follow the Create Database Wizard to create a new configuration database. You can check or uncheck "Include Sample Data" checkbox.
4. You should now have a new configuration database. Right click it and select **Make Active**.

5. In the tree-control in the left-hand pane, expand this new configuration, right-click on Expressions and select **Expression**.

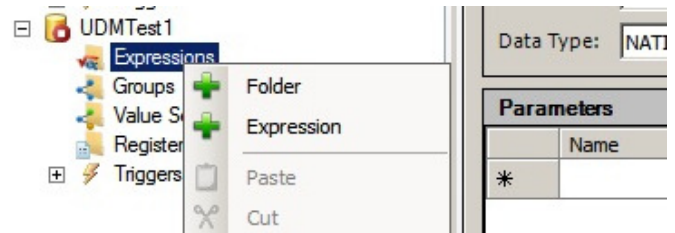


Figure 2 - Adding a new expression

NOTE: You can select to create a new Folder instead of a new Expression Item. Folders are used to logically organize the expressions.

6. Enter **SumExample** in the Name field of the expression.

Simple Read Expression

First, we will create a simple expression, which calculates a sum of three data points (e.g. FastL000, FastL001, and FastL002).

1. Once you have created the expression, select the **Read Expression** tab and click **Expression Editor** button.
2. Write the point names enclosed with double curly brackets **{{ }}** or browse them one by one via **Variables** button, which opens **OPC UA Browser**, and add them with addition sign "+". Your expression should look similar to Figure 3.

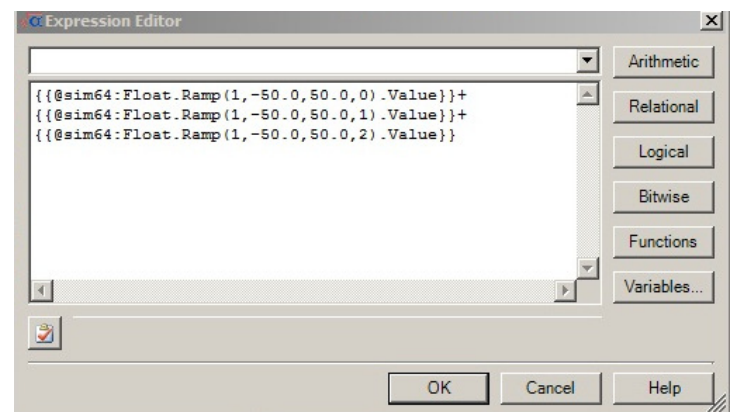


Figure 3 - Example Read Expression

NOTE: You can also specify a tag to enable/disable this expression based upon a certain condition that you can specify if you check Use Trigger Tags check box.

3. Click the Apply button to save your changes.

Using the Expression

1. Launch GraphWorX64 by going to **Start → Programs → ICONICS → GENESIS64 → GraphWorX64**.
2. Insert a Process Point and open the Data Browser.
3. Navigate to **OPC Classic Servers → My Server → Global Expressions** and select the expression you just created.

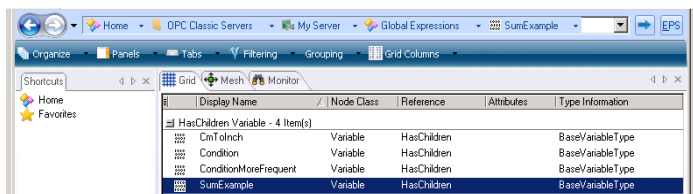


Figure 4 - Selecting an Expression from Data Browser

4. Enter Runtime and you will see results of the read expression we configured.

Read/Write Expression Used for Scaling

One of the most common uses of global expressions is scaling and conversion of values. In this section we will show how to create an expression that will scale an OPC Tag value by 10.

1. Create a new expression as described in the previous example and enter **ScaledExample** for the Name.
2. Under the **Read Expression** tab, open the Expression Editor and select a Simulation tag OPC UA. You will see its syntax in double curly brackets. Append “/10” at the end of the line to divide it by 10. This expression will divide a value that comes from the selected source by 10.
3. Select the **Write Expression** tab and check the **Enable Write Expression** check box.
4. In the Expression Editor, select manually **{{input}}**. This is a keyword used to represent the input coming from the Write action performed from a client. Append “*10” at the end of line. This expression will multiply the input by 10.

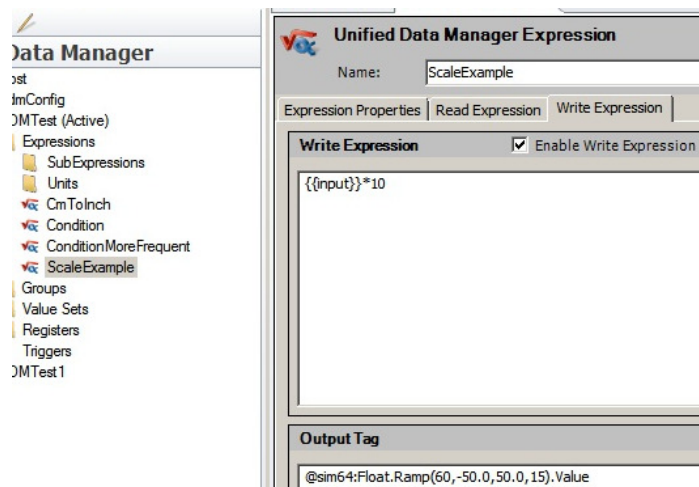


Figure 5 - Multiplying the Input by 10

5. In the Output **Tag** section at the bottom, select point you selected at step 2 using the **Browse** button.

NOTE: You should keep in mind that the **Output Tag** can be only a **single point**. If you use a complex **write** calculation involving more tags, you can select only a single point where the result will be written to.

Expression with Parameters

More complex expressions can be created which take multiple parameters in its calculations. In this example we will use two parameters which take in two OPC Tag strings. The Read Expression will add these two resulting OPC values.

1. Create a new expression and enter **Addition** for the Name.
2. On the **Expression Properties** tab add two Parameters called **tag1** and **tag2**.
3. Select **String** for the Type from the dropdown.

Parameters					
	Name	Type	Padding Align	Padding Char	Number Of Places
	tag1	STRING	LEFT	-	0
	tag2	STRING	LEFT	-	0

Figure 6 - Adding Two New String Parameters

4. Select the **Read Expression** and enter the following expression:

$$x = \{ \{ \langle \text{tag1} \rangle \} \} + \{ \{ \langle \text{tag2} \rangle \} \}$$

NOTE: When referring to a parameter, its name must be enclosed by **<<>>**.

5. The expression is now ready for use. When you browse for the tag in the Data Browser it will have the following syntax:

@exp64:Addition("tag1","tag2").Value

6. You need to substitute the “Tag1” and “Tag2” parameters with OPC Tag names in your client.

NOTE: Parameters can be used in all previous examples instead of constants.

We have just gone through some of the basic steps in utilizing global expression. For more information on using global expressions in the Unified Data Manager, please refer to the Help documentation.