

Description: Guide to using and setting up a Workflow to be used in GENESIS64.

General Requirement: General understanding of GENESIS64, specifically AlertWorX and OPC DA.

Introduction

Workflows are a way to manipulate data from your project in real time. This can be used to drive different actions based on certain conditions. An example of this would be if an OPC tag is over thirty and the time is after midnight, then the system needs to send an email using AlertWorX.

Using Workflows in GENESIS64

When using Workflows as a part of your project, one aspect to consider is what you want to happen when certain events trigger or occur. Some considerations to keep in mind when designing these triggers are that Workflows is designed for light diagrams. The reason for this is that these will be processed repeatedly when a client is subscribed to a Workflow.

Since Workflows are for real time data, they should be designed to run quickly so that your event or actions within the Workflow are not delayed and appropriate users can see the needed information on time. These can also generate events that can be used by other products such as logging, reports, etc.

If your diagram needs to write a large amount of data, then you may want to consider using BridgeWorX64, which will allow large amounts of data to be moved between different data sources. To find out more information on the differences between Workflows and BridgeWorX64 look at the application note entitled, "BridgeWorX64 – Differences between Workflow and BridgeWorX64".

To configure Workflows, you would need to go to the "Actions" section in Workbench and these diagrams would be set up under the Workflows option. The next section will go into more detail on adding and modifying a Workflow.

Example using AlertWorX

Creating Workflow Diagram

For this example Workflow, we are going to create a diagram that sees if an OPC tag is greater than 10 and that the time is after the normal hours (in this case 10pm – 6am). Then if the OPC point matches both of those conditions, the diagram will send an email to the operators using Workflow.

1. Open Workbench and expand Actions → Workflows on your Project Explorer. Then, right click on Configurations and choose Add Folder.
2. On the new tab name the folder Emails and hit apply.
3. Right click on the new folder and choose Add Workflow.
4. On the new tab give the Workflow a name such as Email Operators. Then, open your activity library by selecting the gear icon on your diagram.

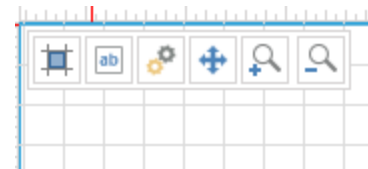


Figure 1 – Activity Library

5. Now in the diagram add a Real Time Input Block from your activity library and add in the reference to the OPC tag we want to monitor in the Data Sources section (Data Connectivity → OPC Data Access → Simulations → Float → Static).

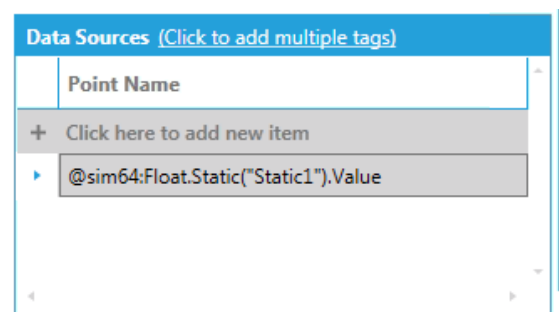


Figure 2 - Example Data Source

- There are other options in this window such as the options under Other Settings that set the scan rate for the tag and the Data Filter section, which is mainly used when reading Database data. For now, we will just change the Activity Name to be "Read OPC Tag".
- Then add a condition block called "Check OPC" underneath the Read OPC tag block we added and edit the expression for this block (in dialog box on right). We will use the previous Activity Output option to filter the OPC tag from the previous block to see if the value is greater than ten. See the example expression below.

```
IF ({{PrevActivityOutput:Row[0].Col[1]}} > 10)
THEN true
ELSE false
```

The reason the expression has the Col and the Row syntax is a reference to the Data Schema section of the Read OPC Block. Since we were reading an OPC tag, the first column is PointName, the second column is Value, the third column is Quality and the fourth column is Timestamp. For our expression, we want to read the value, so the expression would be the example above (the columns are zero based). If we had entered in multiple tags into the Data Sources field the data would be in multiple rows like in the following example table.

	PointName	Value	Quality	Timestamp
Tag1	Col 0, Row 0	Col1, Row 0	Col2, Row 0	Col 3, Row 0
..				
TagN	Col 0, Row N-1			Col 3, Row N-1

- After adding in the expression, click on any of the circles on the corners of the condition expression to add the True and False branches for your expression. If the tag is greater than ten, the true branch, we then want to check the time of the machine.

- Add another Real Time Input block into the diagram and connect it to the True statement from our condition block and call this "Check CurrentTime".
- Now add in the tag :CurrentTime which is found under My Computer → Diagnostics → Control and Diagnostics → CurrentTime.
- This tag is the current UTC time of the GENESIS64 system and we can use this to find out of the tag is after the normal working hours.
- Now add another condition block called "Check Time" under the Check CurrentTime block.

- Add the following expression for condition block:

```
IF ((totalhours(gettimeofday(tolocal(
{{PrevActivityOutput:Row[0].Col[1]})))) > 22
|| (totalhours(gettimeofday(tolocal(
{{PrevActivityOutput:Row[0].Col[1]})))) < 6)
THEN true
ELSE false
```

For this expression, the 22 and the 6 indicate the hours in 24 hour time (22 is 10pm and 6 is 6am). The functions around each output are to convert the CurrentTime tag to local time and pull the number of hours in the day.

- For the true branch of this new condition block add an end activity and have the end expression be x=1. This will allow AlertWorX to send out an email when the Workflow changes the input to one.
- On the False branch for Check Time, add another end block but make sure to set the end expression to x=0,
- Now on the false branch for Check OPC, we want to stop the Workflow, since the OPC tag is not greater than 10. Add an end block and set the expression to x=0.
- Now hit apply so that the changes are saved for the diagram
- The final Diagram for the transaction should look similar to the screenshot below.

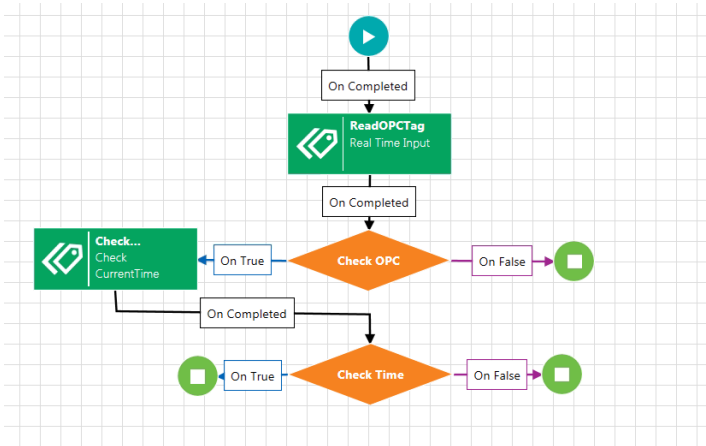


Figure 3 - Completed Diagram

Connecting to AlertWorX

The final part to setup is setting up AlertWorX to trigger based on the OPC point when trying to send out emails. To find out more information about AlertWorX, look at the application note called AlertWorX - Alert Notification for Email and SMS. Follow the steps below to setup an email node

1. In Workbench, expand Alarms and Notifications → AlertWorX → Configurations and right click on Email and choose Add Email Node.
2. Call this email node Email and setup the Hardware and Data section with the SMTP server information as shown in the example screenshot. Make sure to setup the connection information correctly for the SMTP server you are going to use.

Figure 4 - Email Settings

3. After setting this up, make sure to select the text box "Use UA Points", which will allow you to trigger the AlertWorX email when the OPC point changes from false to true.

4. Now for the Notification Message, make sure to setup some information in the Subject line and the Message text so that the operators will be able to identify that the OPC tag we were monitoring is greater than ten.
5. Then make sure to put the Send and the Status as your Workflow Result which can be found by browsing My Computer → Actions → Workflow → Emails → Email Operators → Result (the example path would be wf:Emails/Email Operators.Result).

The final setup for the email message should look similar to the example below:

Figure 5 - Message Setup

6. Then start the Mail Server service and write to the OPC tag so that it is greater than ten. Make sure to have the active time correct otherwise the Workflow will not trigger. The expression on the second condition can be checked by putting the following expression in a process point in GraphWorX64:

```

IF ( (totalhours(gettimeofday(tolocal(
{{:CurrentTime}})))) > 22 ||
(totalhours(gettimeofday(tolocal(
{{:CurrentTime}})))) < 6)

```

```

THEN true
ELSE false

```

This expression is the same as the one on the condition that checks the time and this will show you if the condition will be true for the time.

After both conditions are true, then the wf:Emails/Email Operators.Result tag will change to one and trigger the AlertWorX Email. When the tag goes back to zero, an email will not be sent out.

Utilizing a Workflow

Once the Workflow has been created, it needs a client to subscribe to it before it will run. This is done by subscribing to either the OPC AE “Trigger” tag, or to one of the OPC DA diagnostic points that is available for each Workflow. While one of these tags is on scan, the Workflow will continue to run.

These tags can be found in the Data Browser in Actions underneath the Workflow folder.

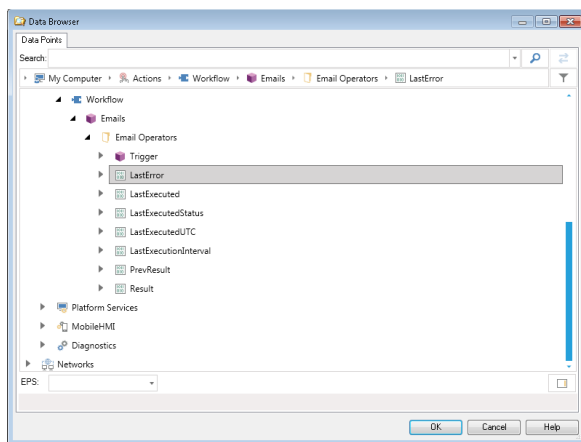


Figure 6 - Workflow Diagnostic Points

Each one of these points also shows information about when the Workflow triggered and whether the Workflow was successful or not. When trying to determine why a Workflow did not return the expected result, the data returned by these points is a good place to start.