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Business Processes in Motion™

PNMsoft Knowledge Base

Sequence User Guides

Process Lab

PNMsoft UK 38 Clarendon Road Watford Hertfordshire WD17 1JJ

Tel: +44(0)192 381 3420 • Email: info@pnmsoft.com • Website: www.pnmsoft.com

Microsoft Partner

Gold Application Development

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Introduction

This document provides an overview of the Process Lab (previously called the Debugger). The Process Lab is an extension of the App Studio. The Process Lab is a developers tool, which enables Sequence developers to analyze workflow execution in an controlled environment.

The Process Lab allows the developer to step through the execution of a workflow activity-by-activity, displaying the status (data and metadata) at every stage. The Process Lab is activated from the App Studio toolbar and enables users to start a new instance workflow, or to connect to an existing workflow instance.

Note: The Process Lab obeys the Permissions module. Therefore, you have to have the appropriate permissions in order to view an activity and/or submit data through the Process Lab.

Accessing the Process Lab

The Process Lab provides you (as a developer) with a way to see activity behavior as it runs, thus eliminating much of the guess-work when things don't quite work as intended.

The Process Lab provides you with the two basic options:

- You can open a new instance.
- You can open an existing instance.

You will find the ability to open an existing instance and examine it extremely useful in cases of workflow execution errors as it allows you to view where the error occurred and why. This feature also allows you to stop your work at any point during execution and return to the Process Lab at a later date to continue analyzing the workflow.

The Process Lab makes all workflow activities visible, e.g. both human-activities and server side activities, which do not appear in the regular runtime activity tree.

The Process Lab runs on the regular runtime engine. Therefore, any instance generated by the Process Lab acts like a real instance, i.e. messages will be sent (unless you temporarily disable this feature), tasks assigned etc.

> **Note: Notify the relevant users when you run a Process Lab instance that include them, to prevent misunderstandings.**
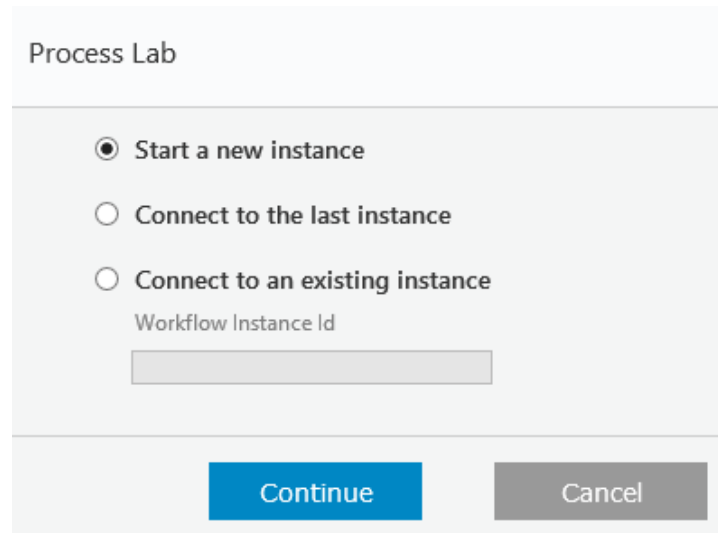
To access the Process Lab:

1. Open a workflow in the Sequence App Studio.
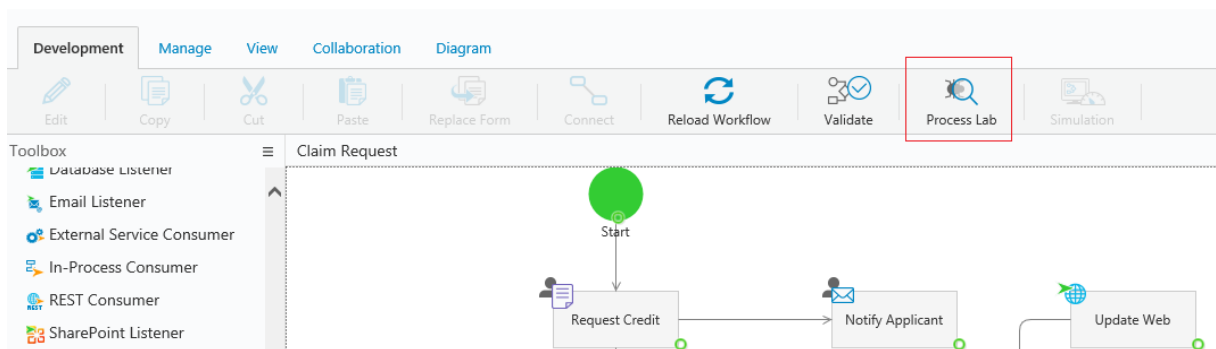
Sequence App Studio Development Tab

2. Click **Process Lab**. The *Process Lab Dialogue* box appears.

Process Lab Dialogue Screen

3. In the *Process Lab* dialogue box select the desired option:

- **Start a new instance** - begins analyzing a new workflow instance.
- **Connect to the last instance** - analyze the last workflow instance.
- **Connect to an existing instance** - analyze an existing workflow instance.

Note: If you choose to connect to an existing instance, you have to provide an appropriate workflow instance id.

4. Click **Continue**. The Process Lab opens.

To open an existing workflow instance directly from the Administration homepage:

1. From the Administration homepage, in the Monitor and Control section,
    click **Open Process Lab**.
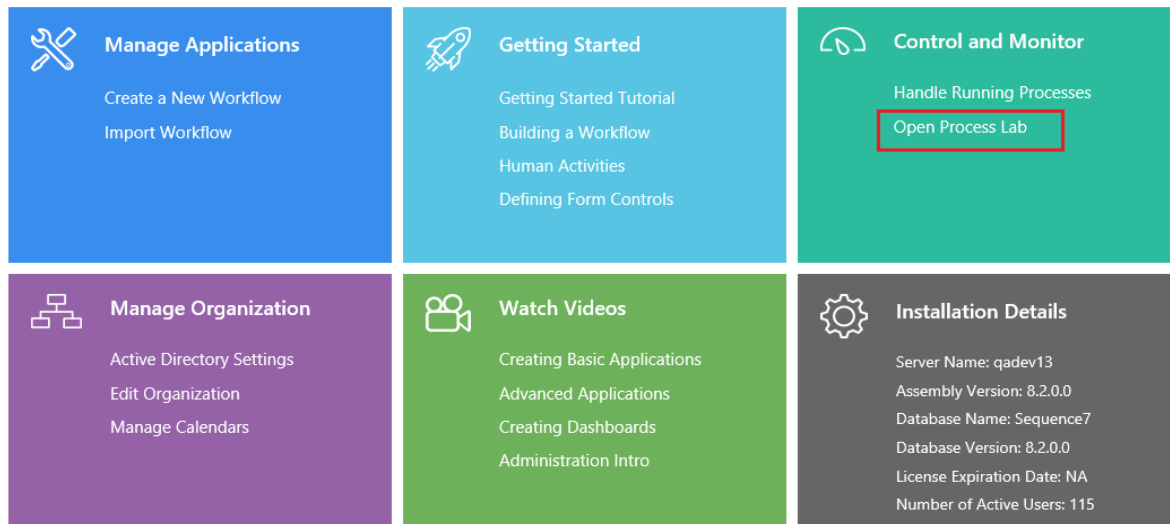
Open Process Lab

The following window appears:

Workflow Instance Id

2. Enter the workflow instance ID and click **Continue**.

The Process Lab opens, displaying the workflow instance you specified.

Process Lab Desktop

The Process Lab desktop consists of several components which enable the workflow developer to run a process in a step-by-step manner, and trace both the user data and the workflow meta-data concurrently.
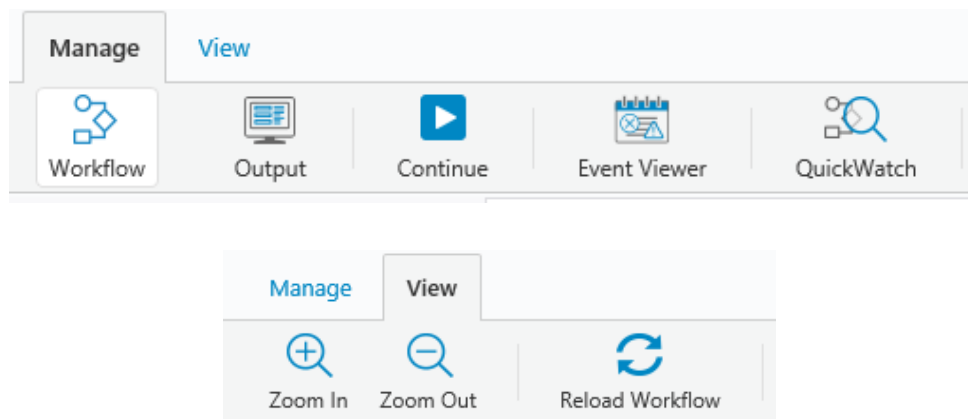
The Process Lab Desktop Consists of the following components, numbered accordingly in the screen below

1. [Process Lab Toolbar](#)

2. [Process Pane](#)

3. [Properties Pane](#)

4. [Workflow display area tab](#)
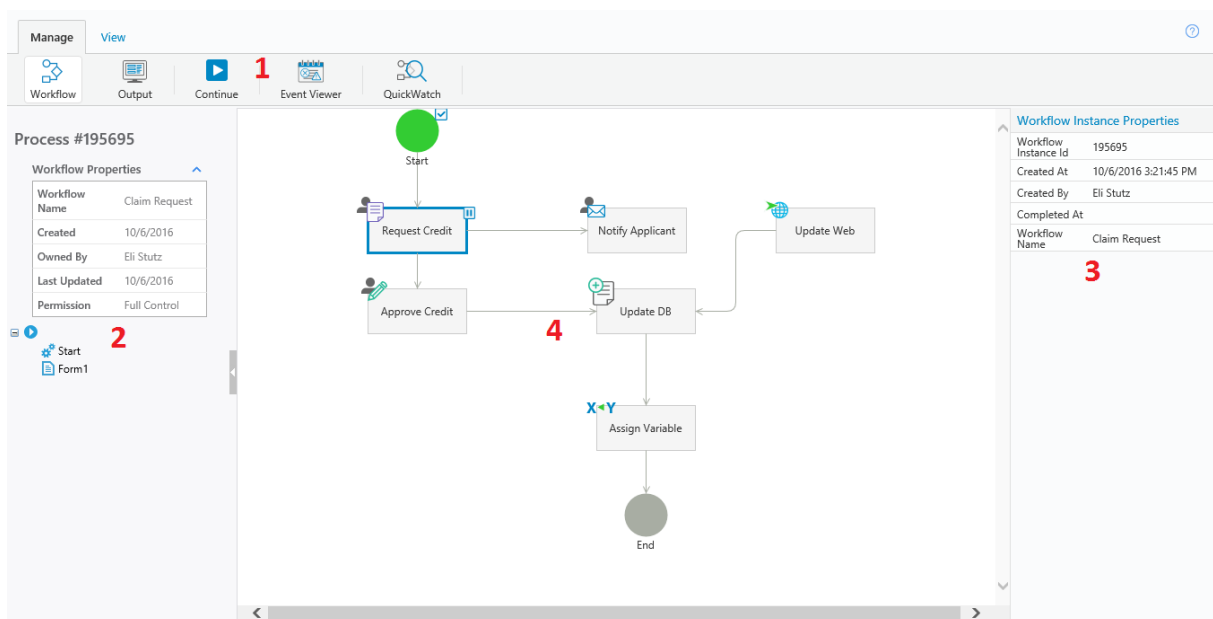
Process Lab Desktop

Process Lab Toolbar

Process Lab Toolbar

The Process Lab top ribbon includes the following options:

- **Workflow** – View the workflow in the Process Lab window (default).
- **Output** – View the workflow output (e.g. user forms, messages).
- **Continue** - Continue workflow operation after a breakpoint halt.
- **Event Viewer** – Review Sequence event log.
- **QuickWatch** – Monitor and evaluate specific workflow elements during execution/analyzing.
- **Zoom In** - Enlarge the diagram display.
- **Zoom Out** - Reduce the diagram display.
- **Reload Workflow** – Reload the workflow and refresh the display.

Note: The Event Viewer shows the Sequence server log, which includes every event logged, and not just your local events.

| Event Viewer				Refresh
Type	**Date**	**Time**	**Description**	
ⓘ Information	10/4/2009	1:15:30 PM	SEQUENCE Background Runtime Service. Redirecting workflows. Finished redirecting workflow instance: 20.	
ⓘ Information	10/4/2009	1:15:29 PM	SEQUENCE Background Runtime Service. Redirecting workflows. Finished redirecting workflow instance: 7.	
ⓘ Information	10/4/2009	1:15:29 PM	SEQUENCE Background Runtime Service. Redirecting workflows. Starting to redirect workflow instance: 8.	
ⓘ Information	10/4/2009	1:15:29 PM	SEQUENCE Background Runtime Service. Redirecting workflows. Finished redirecting workflow instance: 8.	
ⓘ Information	10/4/2009	1:15:29 PM	SEQUENCE Background Runtime Service. Redirecting workflows. Starting to redirect workflow instance: 7.	
ⓘ Information	10/4/2009	1:15:29 PM	SEQUENCE Background Runtime Service. Redirecting workflows. Finished redirecting workflow instance: 4.	
ⓘ Information	10/4/2009	1:15:29 PM	SEQUENCE Background Runtime Service. Redirecting workflows. Starting to redirect workflow instance: 5.	
ⓘ Information	10/4/2009	1:15:29 PM	SEQUENCE Background Runtime Service. Redirecting workflows. Finished redirecting workflow instance: 5.	
ⓘ Information	10/4/2009	1:15:29 PM	SEQUENCE Background Runtime Service. Redirecting workflows. Starting to redirect workflow instance: 12.	
ⓘ Information	10/4/2009	1:15:29 PM	SEQUENCE Background Runtime Service. Redirecting workflows. Finished redirecting workflow instance: 12.	
ⓘ Information	10/4/2009	1:15:29 PM	SEQUENCE Background Runtime Service. Redirecting workflows. Starting to redirect workflow instance: 13.	
ⓘ Information	10/4/2009	1:15:29 PM	SEQUENCE Background Runtime Service. Redirecting workflows. Finished redirecting workflow instance: 11.	
ⓘ Information	10/4/2009	1:15:29 PM	SEQUENCE Background Runtime Service. Redirecting workflows. Starting to redirect workflow instance: 10.	
ⓘ Information	10/4/2009	1:15:29 PM	SEQUENCE Background Runtime Service. Redirecting workflows. Finished redirecting workflow instance: 10.	
ⓘ Information	10/4/2009	1:15:29 PM	SEQUENCE Background Runtime Service. Redirecting workflows. Starting to redirect workflow instance: 11.	

Sequence Event Log

Process Pane

The process pane provides the following process related information:

- Activity Properties box
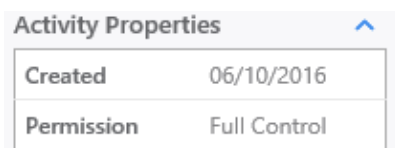- Workflow Properties box
- Activities Tree
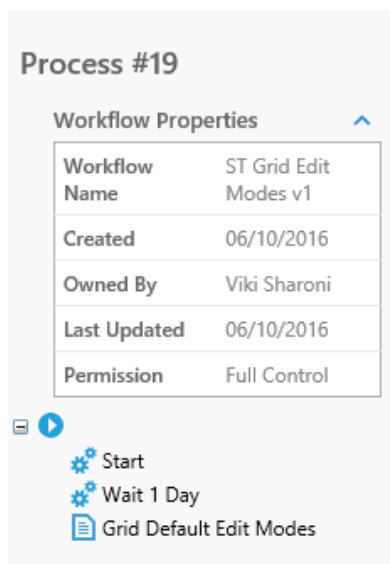
Process Pane

Activity Properties box

The *Activity Properties* box is located above the workflow's *Tree View*. It provides specific activity data:

- **Created**: When the activity instance was created.
- **Permission**: Your current permissions with regard to this activity.

Activity Properties Box
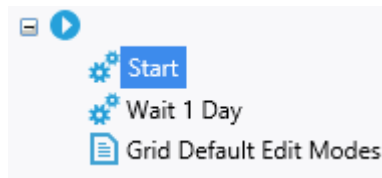
Workflow Properties box

The *Workflow Properties* box is located above the workflow's *Tree View*. It provides overall workflow data such as Workflow name and Workflow instance.
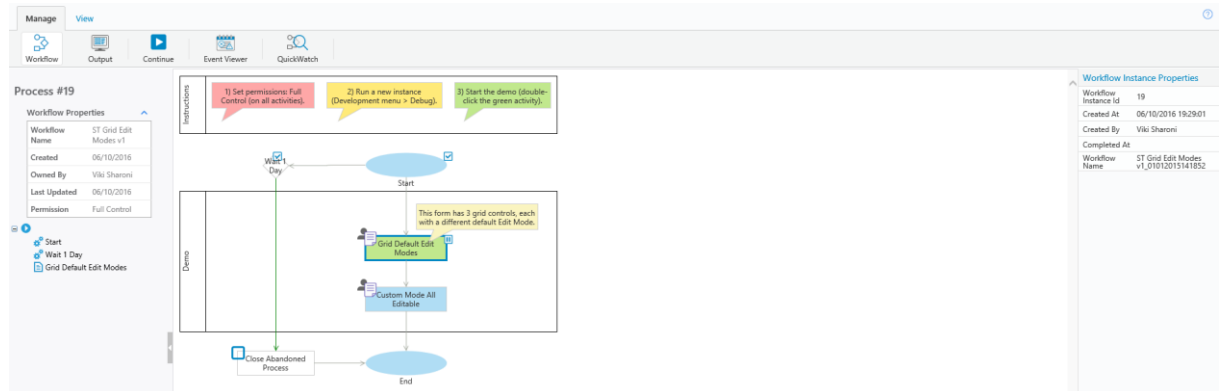
Workflow Properties Box

Activities Tree View

The *Tree View* provides a presentation of the activities which already took place in the process which is similar to the tree view presented in the runtime environment. The difference is that in the Process Lab environment, you can view server side activities (stored procedures, web service activities, etc.) as well as human activities.

Process Lab Tree View

Selecting an activity in the tree view will present its properties in the activity properties pane, and mark it in the workflow display tab in case it is visible.

Process Lab Desktop

Properties Pane

The *Properties* pane displays the properties of either a workflow or a selected object (activity or connection).
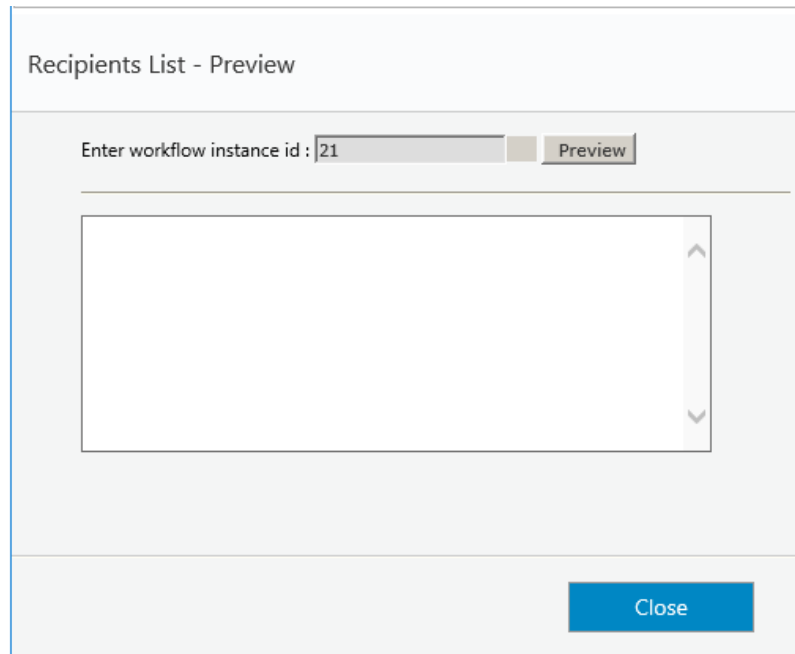

Process Lab Properties Pane

In addition, the *Properties* pane provides quick access to previewing activities and connections data, including messages and recipients' preview, business rules evaluation, and web service XML data. It also provides, in a similar manner, the ability to test an activity (where relevant).

This feature provides you with insight into the workflow's execution processes, aiding you in discovering the source of the execution problems.

Note: Preview is available only for properties that have a [...] button.

To preview an activity's properties (or test):

1. Click [...] next to the property of interest in the Properties' pane. The *<Property> Preview* page opens.
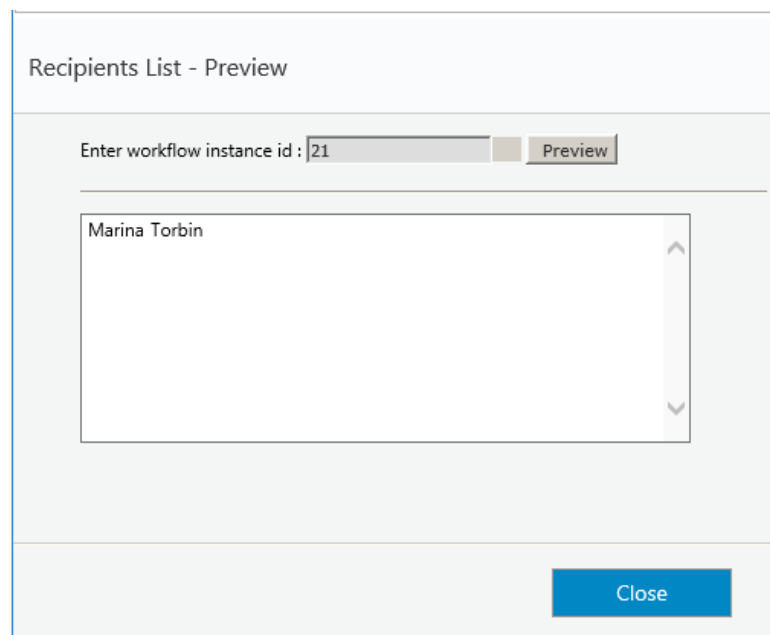
<Property> - Preview Screen

2. Click **Preview**. The relevant content appears in the screen's box.

Property Preview

Note: If the property name is "Test <xxx>" – then the Preview will actually run a relevant test.
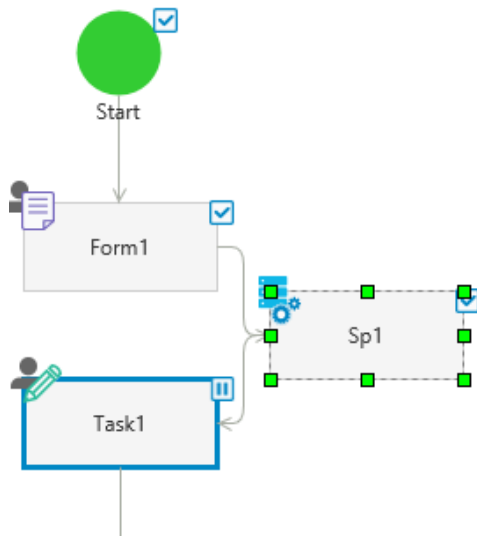
Activity Instance Properties

Activity Instance Id	108
Created At	06/10/2016 20:06:31
Created By	Viki Sharoni
Completed At	06/10/2016 20:06:31

Activity Properties

| Activity Name | Sp1 |
| Activity Type | Stored Procedure |

Behavior

| Compensation | |

Data Source Properties

| SP Name | spWFADummy |
| Test SP | ... |

Test Preview

3. Click **Close** to return to the Process Lab desktop.

Note: In some activities you will find the button Test instead of Preview. The procedure is similar – only this time you will be testing the execution.

Workflow View

The **Workflow** view opens the display area and provides a graphical view of the workflow instance progress, as well as the ability to select an activity in order to review its properties through the activity *Properties* pane.

Note: An activity which has been instanced includes Checkmark symbol. An activity which is currently executing includes a Pause symbol (and appears flashing, from v8.0 and above).
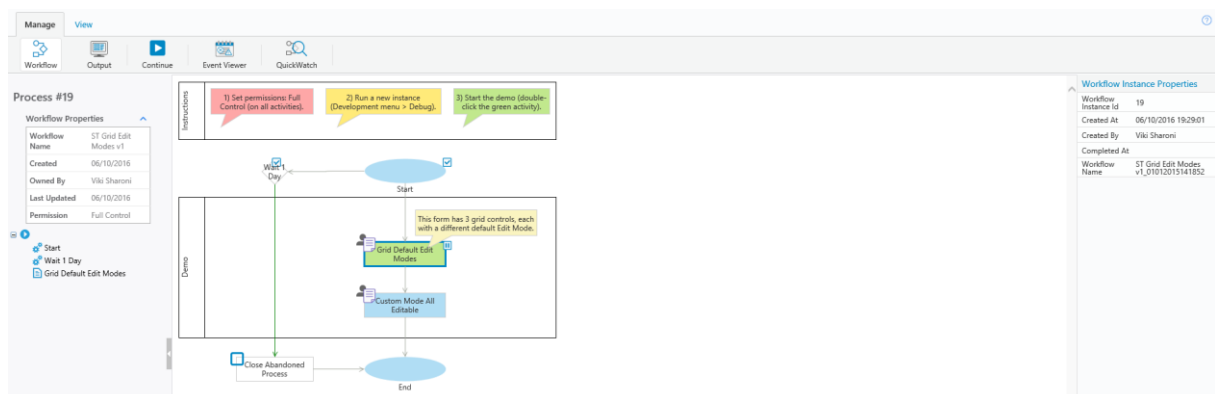


The Process Lab Display Area Tab

Introducing Breakpoints

Breakpoints provide control and flexibility when analyzing a workflow. The Process Lab enables developers to add breakpoints in the workflow, in the *Workflow* display area.

Breakpoints are added at the connection between a pair of activities. During analyzing, the Process Lab halts workflow execution at the breakpoints in your workflow.

A *Breakpoint* is displayed as a colored circle placed over the arrow connecting an activity either to a connection or to a following activity:

- Yellow breakpoints denote an active breakpoint – the process was stopped at a connection between an active instance and an activity that has not yet been executed.

- Red breakpoints denote an idle breakpoint – the thread has not yet reached the linked activities, or already passed it
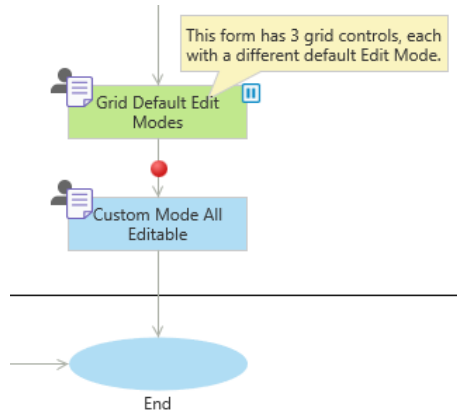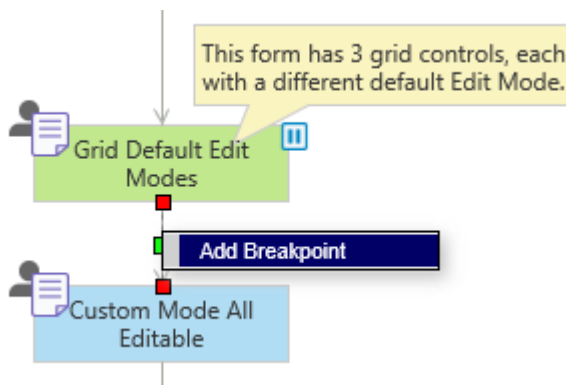

Breakpoints

Note: When adding a breakpoint during a specific workflow production, the breakpoint is not unique to the current analyzing instance. It will carry over to all future analyzing instances of the specific workflow until it is manually removed. The new breakpoints will not influence an instance that has already started the analyzing runtime.

To add a breakpoint:

1. In Process Lab, click **Workflow**.

2. Select the connection you wish to workflow to halt at.

3. Right-click the connection object and then click **Add Breakpoint**. A colored circle appears on the connection arrow.

Add Breakpoint

To remove a breakpoint

1. In the Process Lab, switch to the workflow display area tab by clicking on it.

2. Select the breakpoint you wish to remove from the workflow.

3. Right-click the breakpoint object

4. Select **Remove Breakpoint** from the popup menu. The colored circle representing the break point will disappear from the connection arrow.
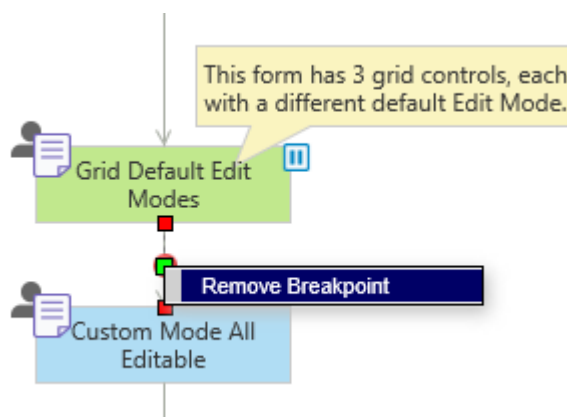

Remove Breakpoint

Process Lab Output View

The **Output** view is relevant only with regard to human activities. The **Output** view provides a way to review a human activity output, whether it is a form or a notification message.

> *Note: The Process Lab obeys the Permissions module. Therefore, you have to have the appropriate permissions in order to view an activity and/or submit data through the Process Lab.*

This view is also used to insert user data to workflow forms in order to simulate a live process. You may take the place of any other user who is expected, for example, to fill out a form – and fill out the form yourself, thus pushing the execution forward along the workflow's thread, and allowing you to observe the workflow's execution process.

> *Note: You must select an activity (either through the workflow view or through the activities tree view) prior to switching to the output view.*
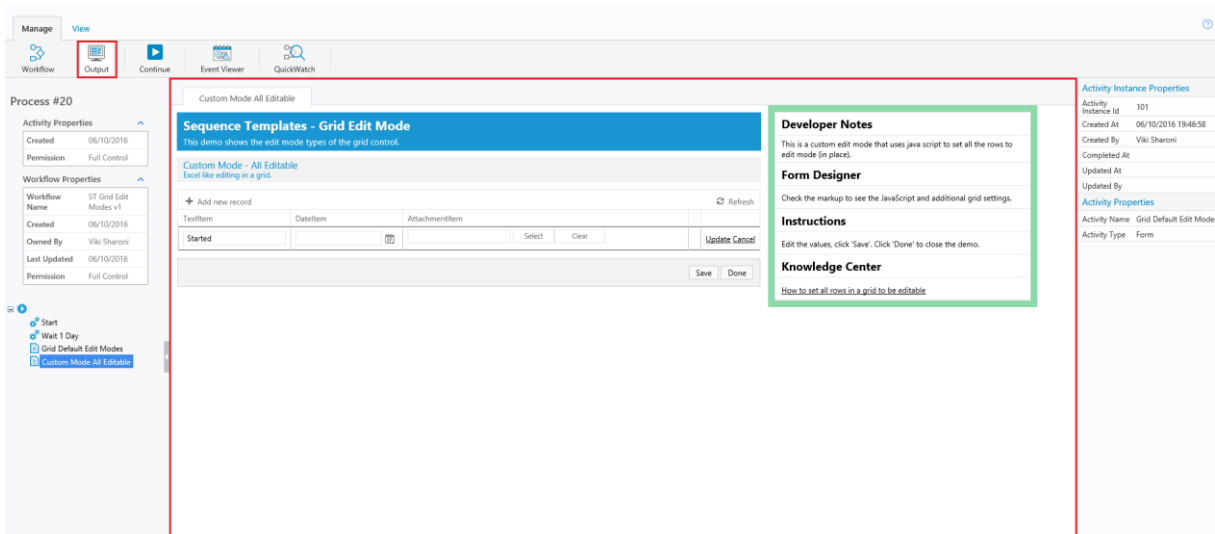
The Process Lab Activity Output View

To view/fill-out a form or view a notification

1. In Process Lab, select an action.

2. Click **Output**. The selected activity's output can be viewed.

3. If the output is a notification: You can read the message and then click **Workflow** to return to the Process Lab desktop.

    OR:

    If the output is a form: You can fill out the form and then click **Workflow** to return to the Process Lab desktop.

QuickWatch

It's not always easy to achieve visibility on workflow data. QuickWatch is a kind of workflow "ultrasound" that enables you to zoom in and analyze workflow metadata, data, variables or expressions. This enables you to troubleshoot and monitor the workflow, helping you answer questions such as "Why did the workflow take a specific path?" "Why did we receive this answer from an integration activity?" and "What went wrong with this expression?" You can use QuickWatch to monitor the value of any item or expression which you can generate in Sequence' Expression Wizard.

The evaluation result is displayed in a hierarchical view, enabling you to drill down into the result structure and examine the instance metadata and data, such as: UACT tables data, integration activities request/response, etc. In addition, there is a set of object visualizers that provide an alternative and user-friendly view of the elements in the result hierarchy.

For example, you have defined a variable, such the status of an insurance claim, which is based on an expression comprised of process fields. As the process executes, the value of this variable changes. QuickWatch enables you to monitor this change over time.

QuickWatch may be used to analyze processes that are in development or in production. You can use QuickWatch for troubleshooting, as you can view the value of items for processes instances that are in progress or have already completed. Since QuickWatch provides the object structure, it can also be used to help you create useful expressions.

> **Note: To use QuickWatch, you need at least Read Only permission for the workflow.**

To monitor a workflow element using QuickWatch:

1. In the Process Lab top ribbon, click **QuickWatch**.
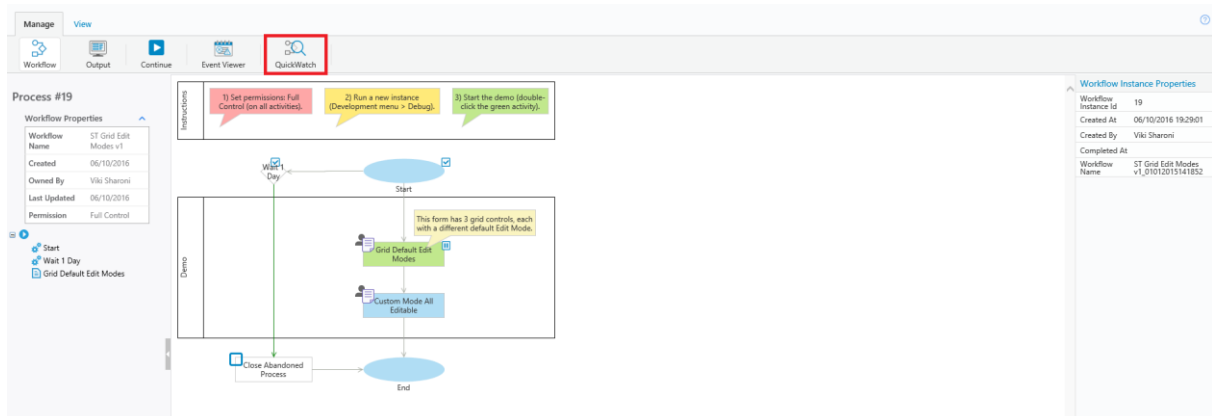
QuickWatch in the Process Lab

The *QuickWatch* window appears. Click the **+** beside '(result)' to expand the workflow tree:

QuickWatch Window

By default, the *QuickWatch* window displays all of the metadata the workflow. This information is displayed in the following columns:

- **Name:** the name of the workflow element.
- **Value:** the current value of the element.
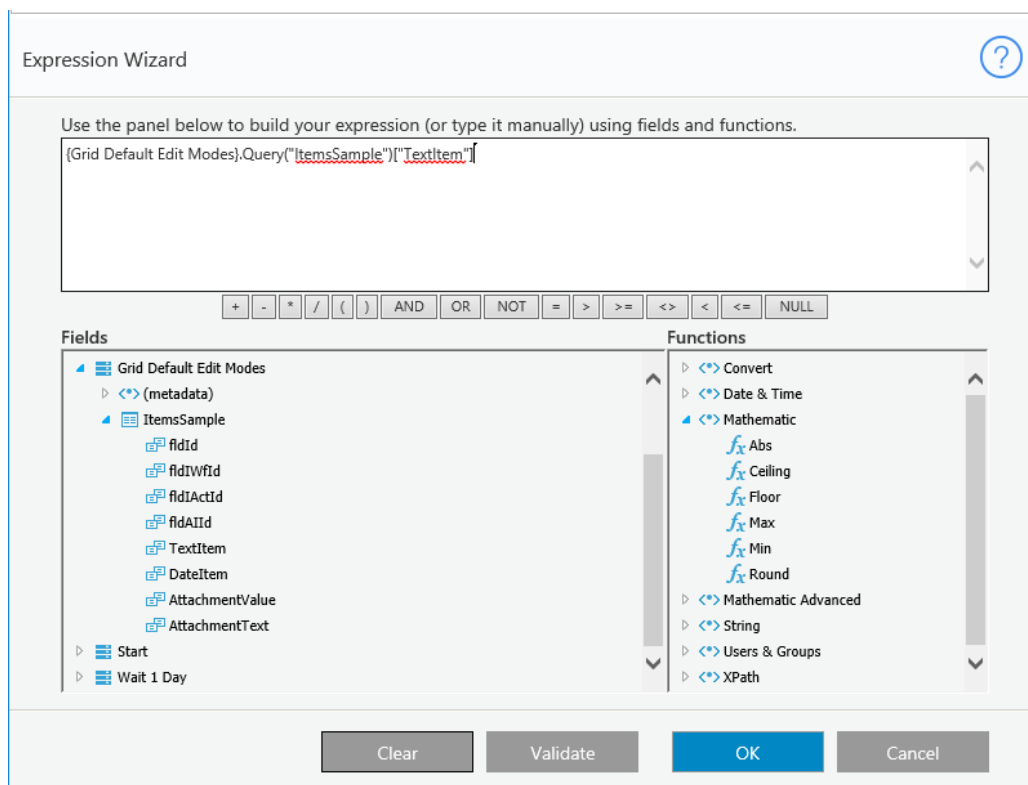- **Type:** the type of element (e.g. int).

Now you can monitor the value of a specific element, e.g. one of the workflow variables:

Monitoring a Variable Using QuickWatch

To monitor a value of an expression using QuickWatch:

1. Click ⬚ on the upper-right side of the *QuickWatch* window. The *Expression Wizard* appears:

Expression Wizard

2. Create an expression whose value you wish to monitor using the Expression Wizard tools, and click **OK**.

3. In the *QuickWatch* window, click **Validate** to validate the expression.

Warning: If you validate an sqlt expression, it will execute the SQL statement.

(Optional) You can click **Detailed Output** to view a detailed result of the validation (including the parsed expression):
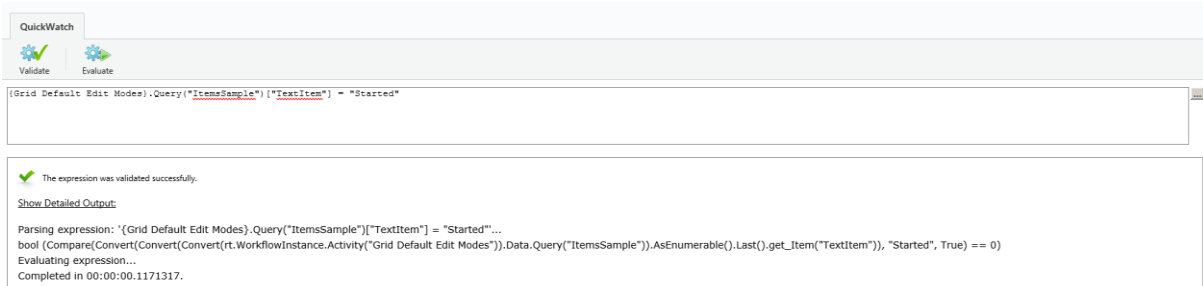
Validating an Expression in QuickWatch

4. Click **Evaluate**. The area below shows the expression you created and its current value:

QuickWatch		

Validate   Evaluate

{Grid Default Edit Modes}.Query("ItemsSample")["TextItem"] = "Started"

Name	Value	Type
(result)	True	bool

Evaluating an Expression using QuickWatch

Values of specific types can be viewed in several ways accordingly to visualizers that are defined for those types. Developers can modify existing visualizers or add new types of visualizers.
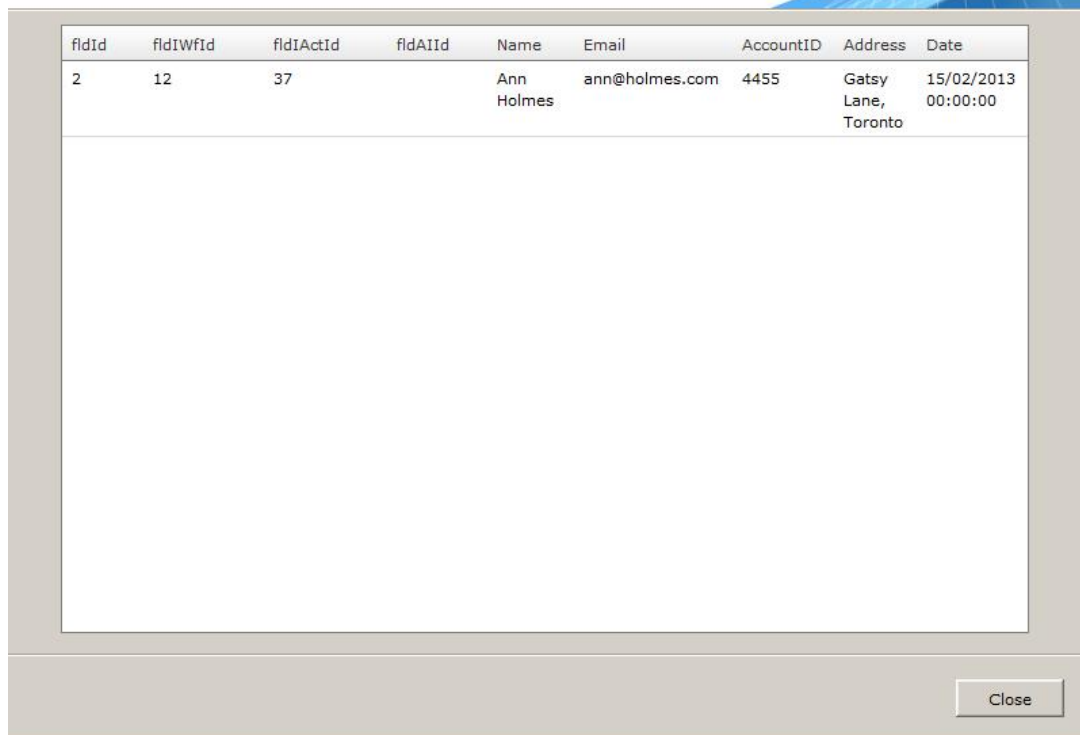
5. (Optional) In the Value column, you can click the [icon] icon to view a visualization of specific elements as text, xml, Data Model element or Query (for queries only). This opens a separate window with the visualization you selected:

XML Visualizer

XML Visualizer

```
-<soap:Envelope>
  -<soap:Body>
    -<RetrieveEntity>
       <entityName>lead</entityName>
       <id>2fa5fd47-f036-e211-a0e2-00155d002336</id>
       <columnSet  xsi:type="q1:AllColumns"/>
    </RetrieveEntity>
  </soap:Body>
</soap:Envelope>
```
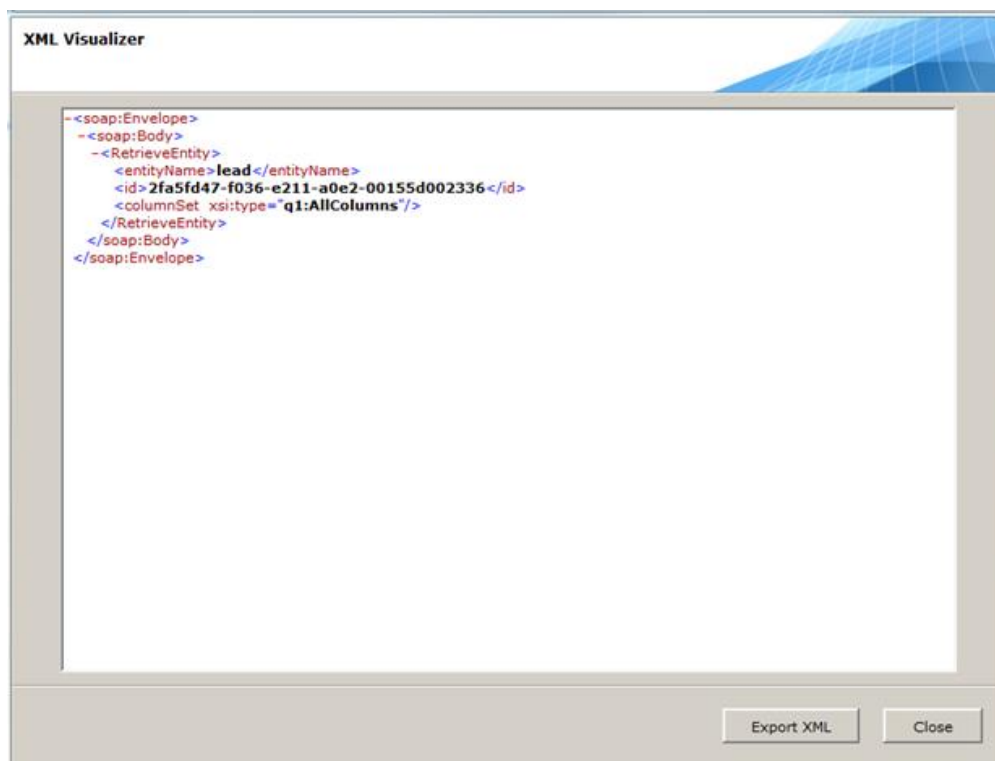
Export XML   Close

Note: Click Export XML to export the XML from the Visualizer.

Query Visualizer

> **Note: You can configure additional visualizers by editing the Web.config file in the following directory: <Administration site root directory>/Debugger/Visualizers**

To return to the workflow tree, reenter "`wf`" in the QuickWatch expression area and click **Evaluate**.

> **Note: You can evaluate SQL expressions using QuickWatch. Do to so, you must be a Global Administrator.**