Moving from IBM Case Manager to IBM Business Automation Workflow

-

Development and End-User View

Author:

Olaf Hahnl, Ph.D. (Olaf.Hahnl@de.ibm.com)
IBM DBA SWAT Technical Lead

Version: 1.0

Date: May 25, 2020

Table of Contents

Introduction

Intent of the Document

The intent of this document is to provide an overview to former IBM Case Manager customers of the latest state of the integration between the formerly separate products IBM Case Manager (ICM) and IBM Business Process Manager (BPM) into the new offering IBM Business Automation Workflow.

The focus is on the latest development approach as of IBM Business Automation Workflow 19.0.0.3 and how this impacts the end-user experience and the aspects that originate from the merge of ICM & BPM. Therefore, prior knowledge of ICM is expected. It is also beneficial to have some prior knowledge of BPM as it is beyond this document to explain base concepts of both ICM and BPM.

Development View

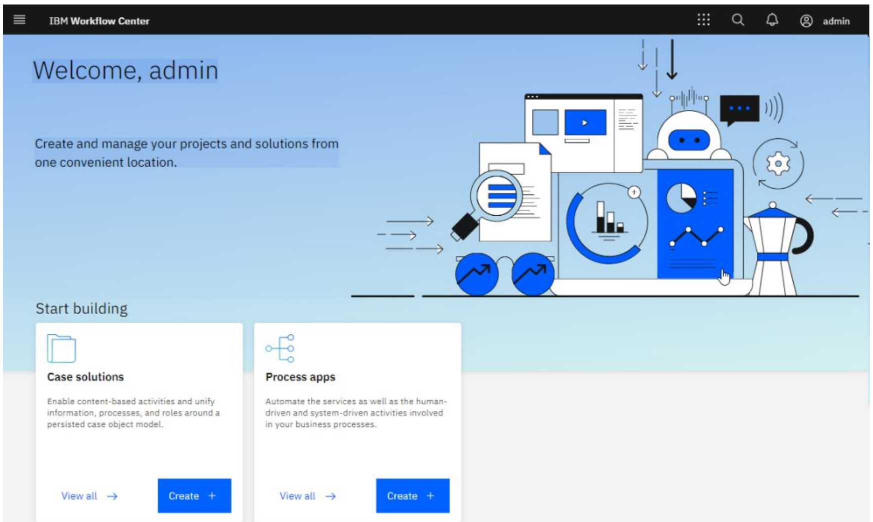
From the IBM Case Builder Landing Page to the IBM Workflow Center

In Business Automation Workflow the IBM Workflow Center is the central entry point to your Case solutions. The former IBM Case Builder Landing Page is still available and used to manage those Case solutions that have not been upgraded to the new Workflow project (for details refer to later sections).

In this section some of the core Workflow Center capabilities are introduced without expecting to give a full overview.

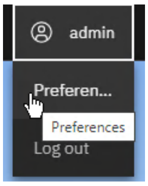
Core Capabilities of IBM Workflow Center

Below screenshot shows the homepage of the IBM Workflow Center (19.0.0.3). By clicking “Create” you can directly create a new “Case solution” (see the new Workflow Project Type for details) or “Process app” or by clicking “View all” you can browse through the ones available already.

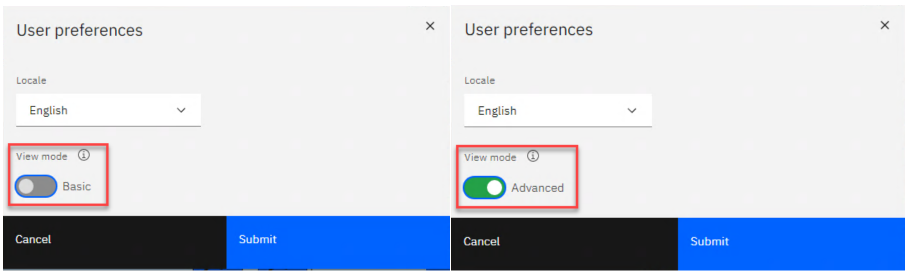


Basic and Advanced View Mode

The Workflow Center provides two “View modes”. You can configure the mode by going to the preferences via the user icon in the top right corner and selecting the “Preferences” option.



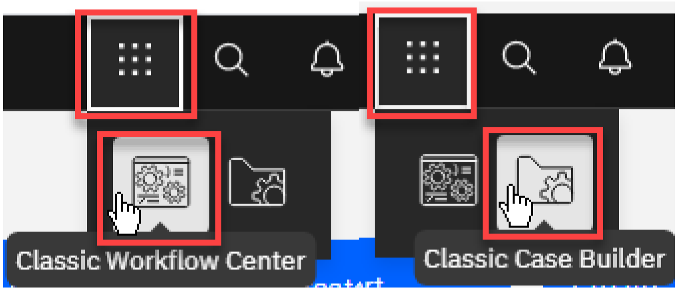
In the “User preferences” dialog you can choose between “Basic” and ”Advanced” view mode.



Depending on the view mode you choose, advanced options (e.g. the acronym when creating a Workflow project or template or the Administration view) are hidden (basic) or shown (advanced).

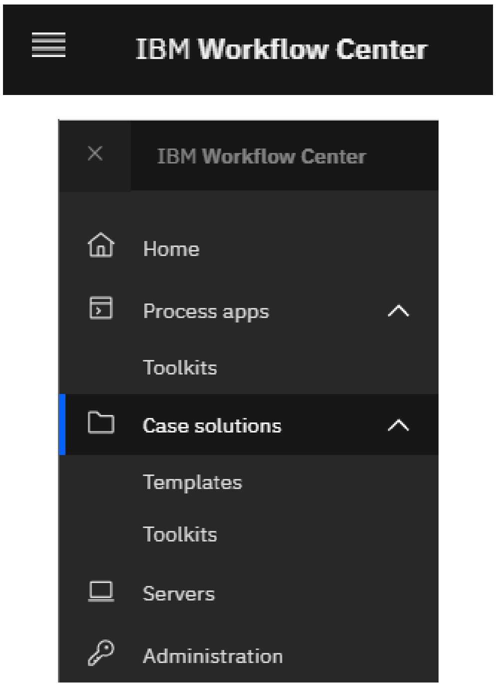
Switching to Classic Workflow Center and Classic Case Builder

By clicking the matrix icon (since 19.0.0.2) with nine dots in the top right corner and selecting one of the two icons you can launch the “Classic Workflow Center” or “Classic Case Builder”. This can be useful if you have Case solutions that have not been updated or should not be updated to the new Workflow project (see below). These Case solutions can still be found on the landing page of the Classic Case Builder.



Navigation options using slide out

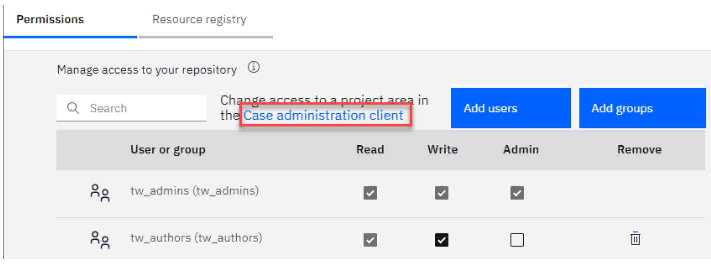
By clicking the hamburger icon in the top left corner, a slide out appears.



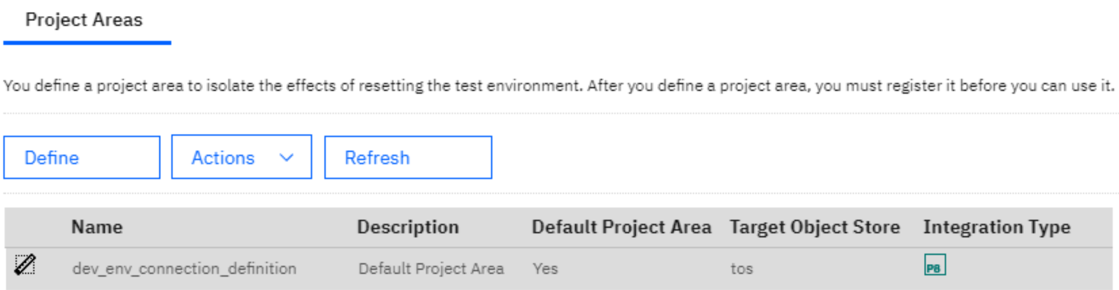
It provides an alternative way to browse Process apps (PA) and Case solutions. In addition, it provides access to Toolkits (TK), Case solution Templates, Servers and the Administration depending on the role and mode selected for the logged in user.

Managing Developer Access to the Workflow Center

By clicking on the “Administration” item in the slide out you get to the “Permissions” tab for Workflow Center. It provides the means to configure who can access the Workflow Center (repository) and what their privileges for the Workflow Center are.



The main entry point to work with any Workflow project is the Workflow Center and access is controlled using above UI. In addition, it is required to manage control to the “Project Areas” where the Case-aspects of the solution are stored. You can do so by launching the “IBM Business Automation Workflow Case administration” clicking the link highlighted above. This will take you to the “Projects Areas” tab.



From here multiple administrative activities can be performed. Adding users to or removing them from a project area allows to control who can create the Case-parts of a Workflow solution.

The New Workflow Project Type (since 19.0.0.1)

The new project type “Workflow Project” (since 19.0.0.1) optimizes the experience of how Case activities can be implemented through BPMN processes. Projects of this type are shown in the “Case solutions” category for familiarity and are therefore also referred to as Case solution project (e.g. in the documentation). To distinguish the Case solution project from the Case solution that you manage on the Case Builder landing page in this section we use the term Workflow project.

Previously it was required to create a “Case Solution” to define the Case artifacts and one or more Process Apps independent of the Case Solution. In these Process Apps you needed to create the BPMN process which you selected from the Case Activity of the Case Solution in Case Builder. Versioning and management of the Case Solution and Process App(s) needed to be done separately.

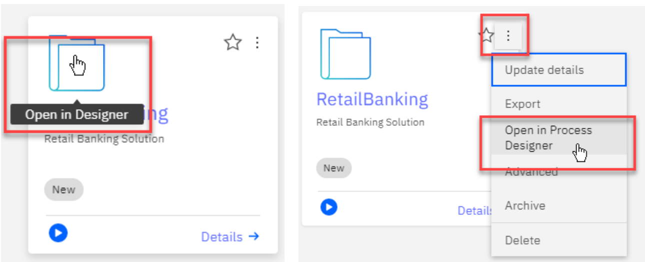
The five key characteristics/benefits of this new project type are (for details see the subsequent respective sections):

1. When a Workflow project is created internally a Process App is created and associated automatically with the Workflow project.
   This Process App will not show up individually in the Workflow Center on the “Process apps” page as it is considered internal and cannot be used outside of the Workflow project.
   In the Process Server, for example when using the Process Admin Console or various product REST APIs, the Process App is visible and can be used.

2. The deployment and management of a Workflow project transparently takes care of both, handling the Case and Process artifacts of the solution.
   Previously it was required to deploy the Case solution independent of the Process App.
3. BPMN processes that implement Case activities are added to the PA that is automatically part of the Workflow project. In addition, these processes are “aware” of the case and case activity they were started from. “Awareness” is reflected in a rich JS API being available to interact with the parent case as well as Content Objects that provide access both to the Case and Case Activity properties in a read/write fashion.
4. BPMN User Tasks that are part of a process that is used to implement a Case Activity in the associated PA are federated in the in-basket(s) of the Case Client. When claimed, they appear in the personal in-basket. When using a team derived from a Case role (see below) they can appear in Case role specific in-baskets.
5. When creating Case roles, a respective team in the associated PA is created that can be used to assign them to Lanes or User Tasks in BPMN processes. When users are associated to a Case role, BAW makes sure that these same users are associated to the team. That way User Tasks that use such a Case role and that are part of a process that implements a case activity appear in case role specific in-baskets.

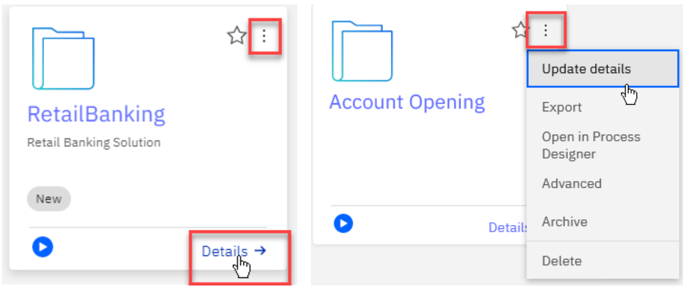
Launching the Case Designer or the (Web) Process Designer

By default, when clicking on the tile of a Workflow project it will open in the Case Designer (left). To directly open the (Web) Process Designer it is possible to click the three vertical dots followed by “Open in Process Designer” (right).



Administrative Actions on a Workflow Project

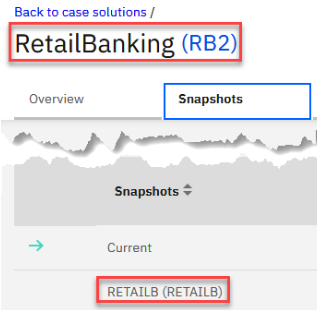
Administrative actions for a Workflow Project are available mainly from two locations. Clicking the three vertical dots in the upper right corner of the project tile offers some often-used actions. Alternatively, by clicking on the “Details” label on the tile you get to the details view of the project. Here these and many more actions plus some additional information about the project are available. Most of the actions are described in subsequent sections.



Determining the name and acronym of the Process App associated with Workflow Project

In situations where you need to perform actions on the Process App that is part of the Workflow Project (e.g. when using the Process Admin Console or BPM REST APIs) it is often required to know the name and acronym of the Process App and sometimes the snapshot name/acronym.

At the top of the administration view of the solution the name of the solution and in brackets the solution acronym is shown. Both the name and acronym of the associated PA are identical to the name and acronym of the solution.

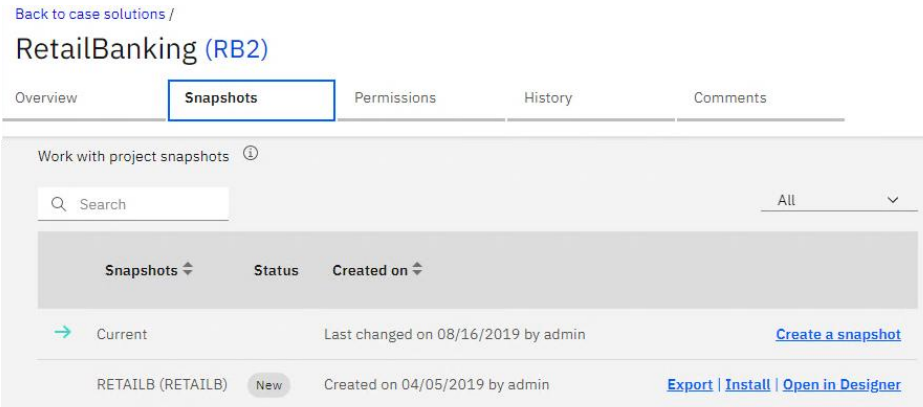


When on the "Snapshots" tab (see also next section) the list of snapshots with their names and in brackets their snapshot acronyms are shown. Again, the snapshot name and snapshot acronym of the associated PA are identical to the snapshot name and snapshot acronym of the solution.

Versioning Workflow Projects

Versioning of Workflow projects utilizes the snapshot capability previously already used for standalone Process Apps and Toolkits. A snapshot records the state of design artifacts at a container level at the time of taking the snapshot. A snapshot allows to give such a state a specific name, potential comments and has a date of creation.

A snapshot of a Workflow project stores the information about the versions of various Case design artifacts and BPM design artifacts. Therefore, when exporting a snapshot only those versions of design artifacts are exported that belong to this snapshot. It is important to note that taking a snapshot of a Workflow project does not include those stand-alone Process Apps that may be referenced from the Workflow project. These need to be versioned and managed separately.

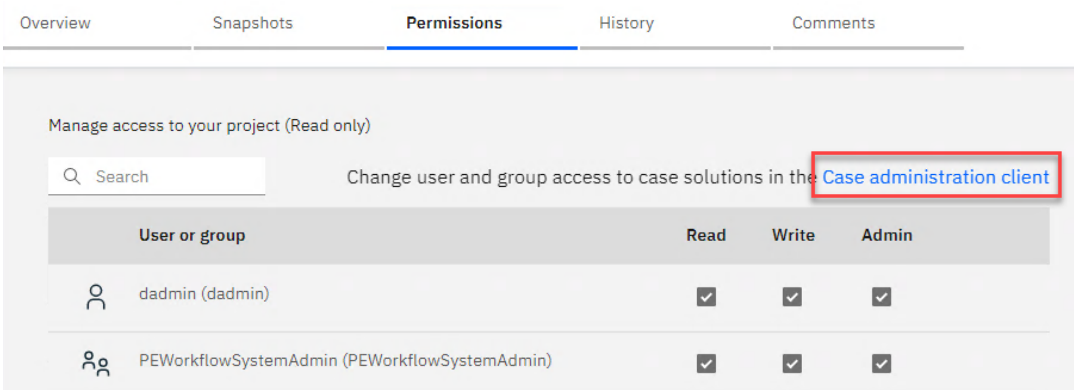


The BPM capability in Business Automation Workflow supports the scenario to install and use multiple snapshots of the same Process App at the same time. In such a situation, runtime artifacts like process instances utilize only those design artifacts that belong to the snapshot that they were started from. As this concept does not exist within the Case capability, for the Case part of a Workflow project only the latest versions of the artifacts are being used.

Therefore, for Workflow projects the snapshot capability should mostly be treated as a feature for design-time versioning whereas during runtime there is only one (the latest installed) version of the Case design artifacts that is being used.

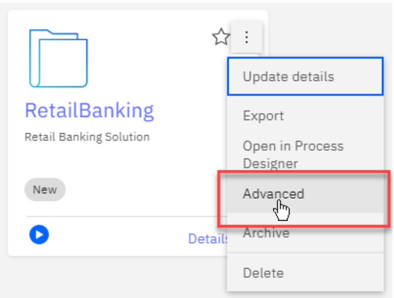
Setting Permissions on a Workflow project

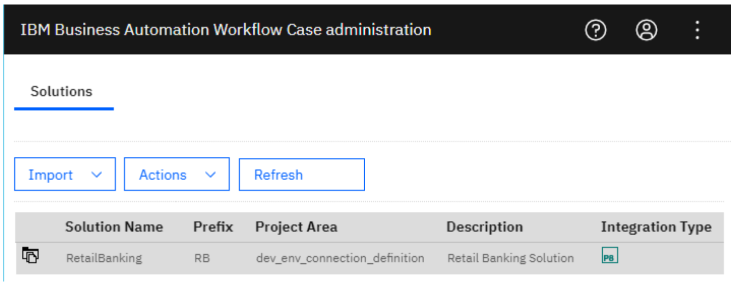
The “Permissions”-tab for a Workflow project shows the users and/or groups that have access to the Case project area. The tab is read-only and is not specific to the Workflow project you selected but to all Workflow projects stored in the Case project area. To modify who can access the project area you can click on the “Case administration client” link that brings up the “IBM Business Automation Workflow Case administration”. On the sub-tab “Security” you can add/remove users and groups that have access to the project area.



Accessing the Case Admin for a Solution

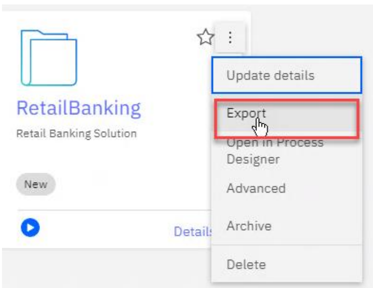
By selecting the “Advanced” menu item in the dropdown when clicking the three vertical dots you get to the “IBM Business Automation Workflow Case administration” showing the “Solutions” tab. From here various administrative functions like importing/exporting/deleting and managing Security Configurations and Audit Configurations are available. This is unchanged to prior IBM Case Manager releases.



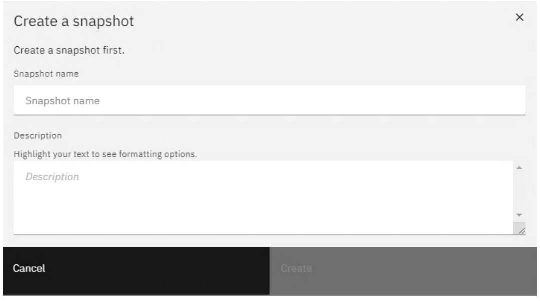


Exporting Workflow Projects

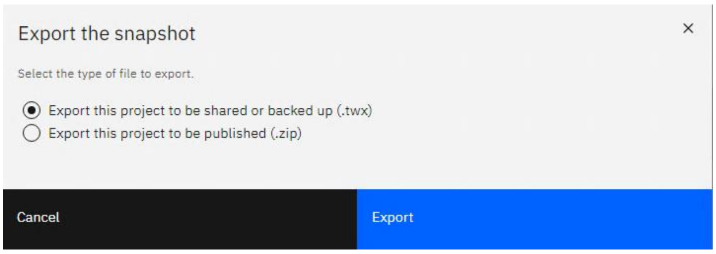
Using the IBM Workflow Center, you can directly export a Workflow project using the “Export” option in the dropdown when clicking the three vertical dots on the project tile.



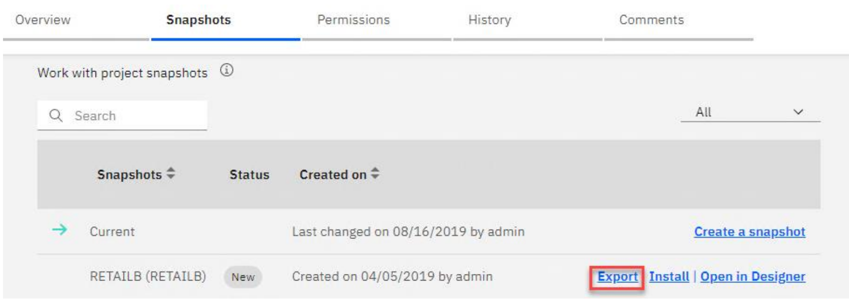
As only a snapshot can be exported, when using this action while working on the "Current" (not a specific snapshot), you are first asked to create a new snapshot.



Afterwards a dialog is shown to export the snapshot you just created. The dialog offers two options. The first option "Export this project to be shared or backed up (*.twx)" creates a "twx" file. It is an archive that contains all artifacts of the Workflow solution (including both the BPM and the Case artifacts). This twx can be used as a backup or can be imported in another Workflow Center. The second option "Export this project to be published (*.zip)" creates a zip file. The archive also contains all artifacts of the solution but is meant for "connected" or "disconnected" installation (see next section) of the solution to a Workflow Server.

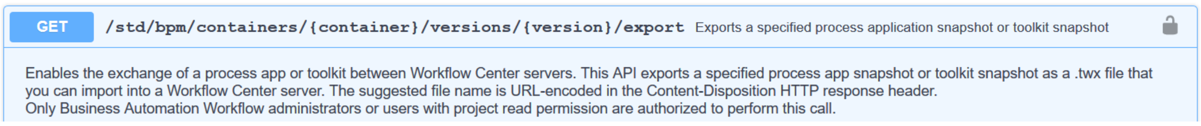


The other option to export a snapshot from Workflow Center is to click on "Details" on the project tile, switch to the "Snapshots" tab and select the "Export" link next to the snapshot you want to export.



You can also create a new snapshot of "Current" and then export the newly created snapshot. The dialog and options are identical as shown above.

In addition to programmatically exporting a snapshot a REST command exists to perform the export.



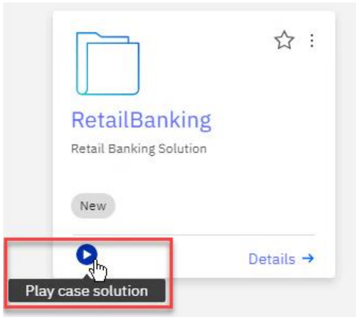
For more details refer to the Knowledge Center [IBM Business Automation Workflow Operations REST APIs](#).

Deploying a Workflow Project in the Development Environment for Iterative Development

Before being able to test the current state of your Workflow project in the Workflow Center environment you need to deploy your Workflow solution to the embedded test server. This is done the same way as in IBM Case Manager. In the Case Builder click the "Deploy" button at the top right when having opened a Workflow project. The icon next to the Deploy button reflects the status of your Workflow project deployment to the test server.

Playing a Workflow Project in the Development Environment for Iterative Development

Once your Workflow project is deployed to the test server you can test or play a it directly from Workflow Center by clicking the "Play" button in the lower left corner of the project tile (left screenshot) or via the "Play" button in the upper right corner of the Case Builder (right screenshot). This can be used for testing/debugging purposes or to demonstrate the current state of the solution to interested parties at any time.

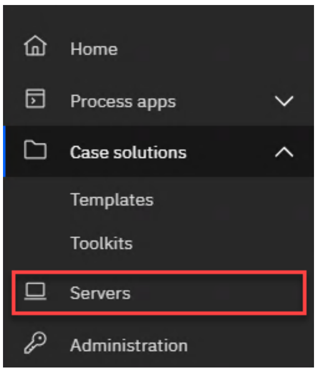


The "IBM Business Automation Case Client" is launched from the Workflow Center or Case Builder in a separate window with the selected Case solution being opened ready for testing.

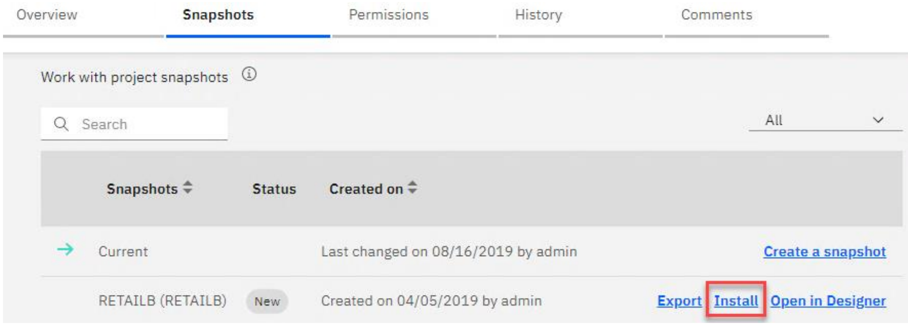
Installing Workflow Projects to Staging and Production

To install a Workflow project to a Workflow Server a snapshot is required. Either you use an existing snapshot, or you can create a new snapshot as shown above.

IBM Business Automation Workflow provides two approaches to deploy solutions to a Workflow Server. The first is called deployment to a connected server (available since 19.0.0.2). For this you register one or more Workflow Servers with your Workflow Center. These Workflow Server are called "connected" servers. You can manage these by clicking on the "Servers" entry in the slide out when clicking the hamburger icon in the top left corner.



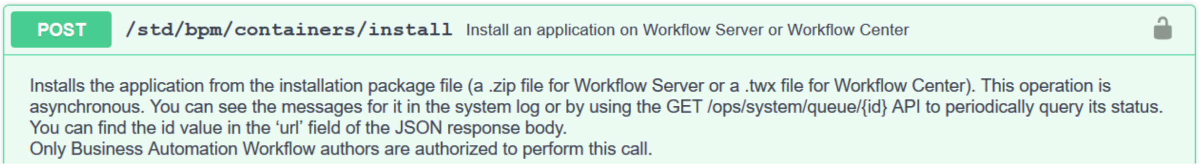
This type of deployment can be triggered directly from the Workflow Center by clicking the “Install” link next to a snapshot and selecting the online Workflow Server to install to.



The deployment to a connected server is often used for deployments to staging environments. It is an easy and fast way of deploying solutions.

The second way is to perform a deployment to a “disconnected” server. Disconnected in that sense means that the Workflow Server is not connected to the Workflow Center. Quite often a firewall may separate the Workflow Center from a production Workflow Server preventing direct connectivity other reasons can be general governance and separation of duties considerations.

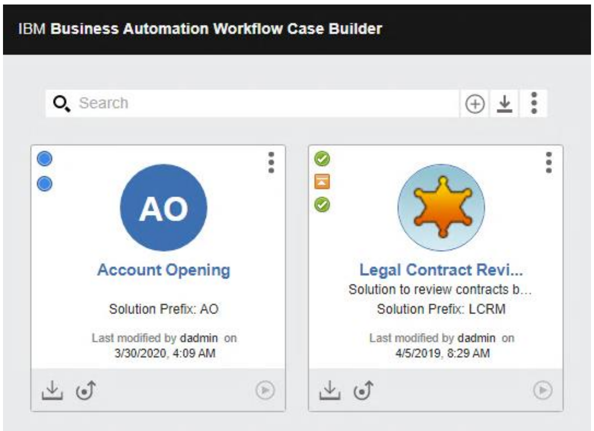
For deployment to a disconnected server you first need to export the snapshot you want to install from the Workflow Center as described before. Then you can use another REST API to install the snapshot which will install the BPM artifacts as well as Case artifacts to the target Workflow Server.



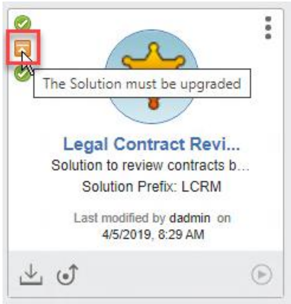
For more details refer to the Knowledge Center [IBM Business Automation Workflow Operations REST APIs](#).

Upgrading Case Solutions and Promoting Case Solutions to Workflow Projects

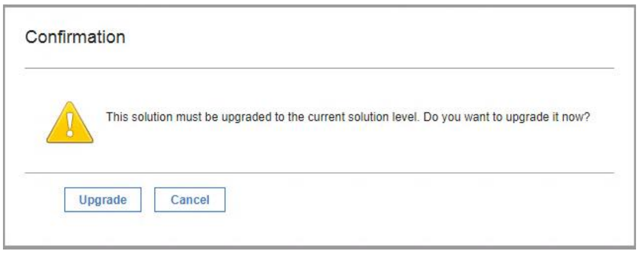
Case solutions that you have built with IBM Case Manager or that you have created with Business Automation Workflow but directly from the Case Builder landing page continue to be available from the Case Builder landing page as usual.



Upgrading Case Solutions to be Usable in BAW > 18.0.0.0.
To work with Case solutions originating from IBM Case Manager or IBM Business Automation Workflow prior to 18.0.0.0 you first need to “Upgrade” them as indicated by the yellow icon in the top left corner of the solution tile as shown below.

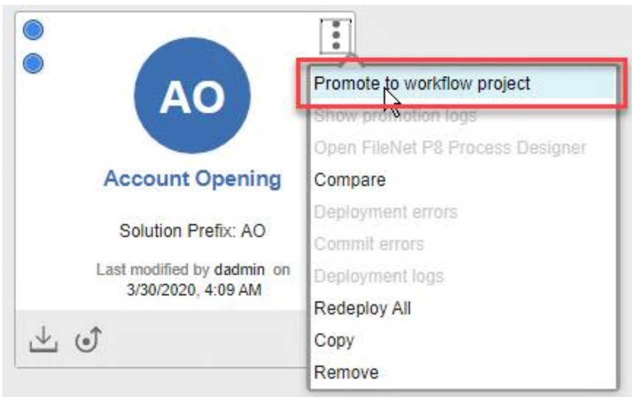


The actual upgrade takes place when you try to open the Case solution and choose to “Upgrade” the solution.

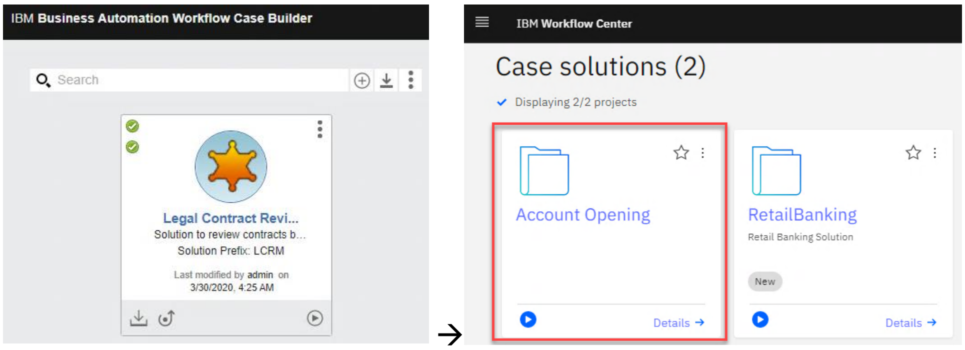


Promoting a Case Solution to a Workflow Project
To take advantage of the capabilities offered by the new Workflow Center to manage and deploy unified projects and use the other benefits describes previously, you can promote your Case solution to a Workflow project. The new Workflow project is automatically migrated to the Workflow Center (where they are labeled "Case solutions" for familiarity). Once promoted, the Case solutions are no longer visible on the Case Builder landing page.

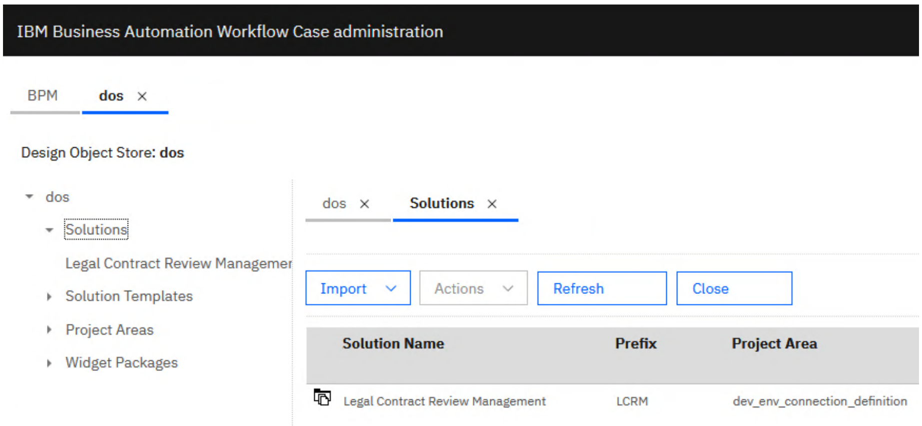
You can promote a Case solution to become a Workflow project by selecting the “Promote to workflow project” option in the dropdown when clicking the three vertical dots on the Case solution tile.



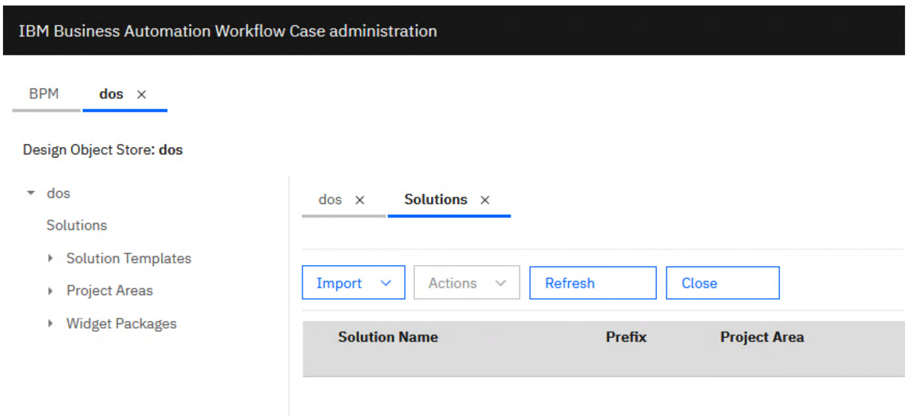
As soon as it is promoted, the Case solution will no longer appear on the Case Builder landing page (left screenshot) but appears as a new tile in the Workflow Center (right screenshot). In addition, through the promotion a Process App is created under the covers. The Process App is not listed as an individual Process App as it just exists as part of a Workflow project. Combined the former Case solution and the Process App now form the Workflow project.



Finally, while, before being promoted, the Case Solution is shown in the Case Admin navigator desktop as part of the Solutions in the Design Object Store in the Workflow Center environment,



this is no longer true after the promotion (screenshot below).



The actions you can perform on a Case Solution through the Case Admin navigator desktop are available from the Workflow Center for a Workflow Project (see previous chapter).

As the Workflow Center view does not exist in a Workflow Server environment there is also no way to launch the “IBM Business Automation Workflow Case administration” with the “Solutions” tab for the current Workflow project. Therefore, for Workflow Servers the entry point is still the Case Admin navigator desktop where even promoted solutions will still be shown as part of the Solutions in the Design Object Store.

Working with Case Solution Templates

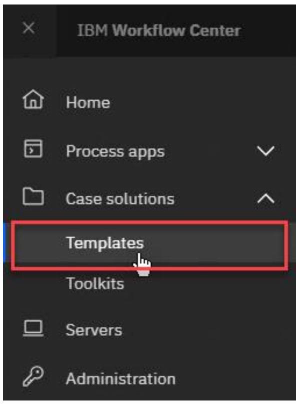
As known from IBM Case Manager, IBM Business Automation Workflow supports the creation of Workflow project templates (Case solution templates).

A Case solution template is a predefined starting point that can be used to quickly create a Case solution in the Workflow Center. A template can represent a common-use case pattern, such as a document renewal template, workflow dashboard template, and so on.

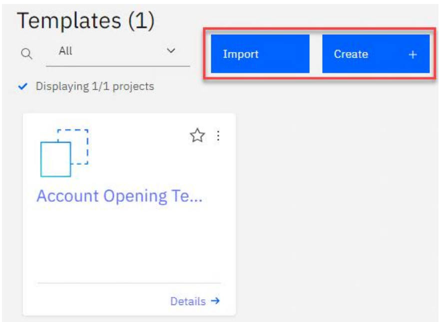
We need to distinguish Case solution templates that are created through Workflow Center from those that were created in IBM Case Manager or in IBM Business Automation Workflow but through the Case Builder landing page. We refer to the latter as legacy Case solution templates.

Creating, Managing and Using Workflow Center Case Solution Templates

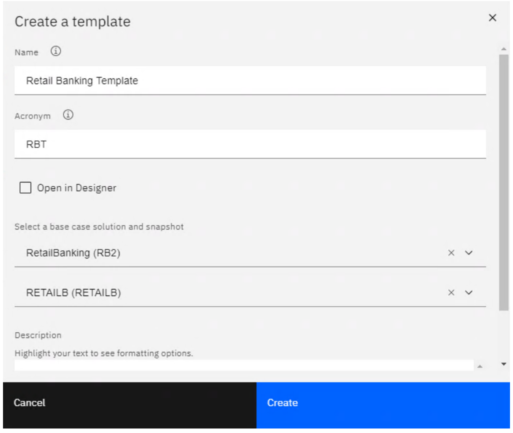
The first aspect to consider is the management and creation of these templates. Management is available when selecting the "Templates" option from the slide out after clicking the hamburger icon in the top left corner of the Workflow Center.



The page shows all available templates. It also provides two options to either import an existing template from a "twx" file or to create a new template based on an existing Workflow project.

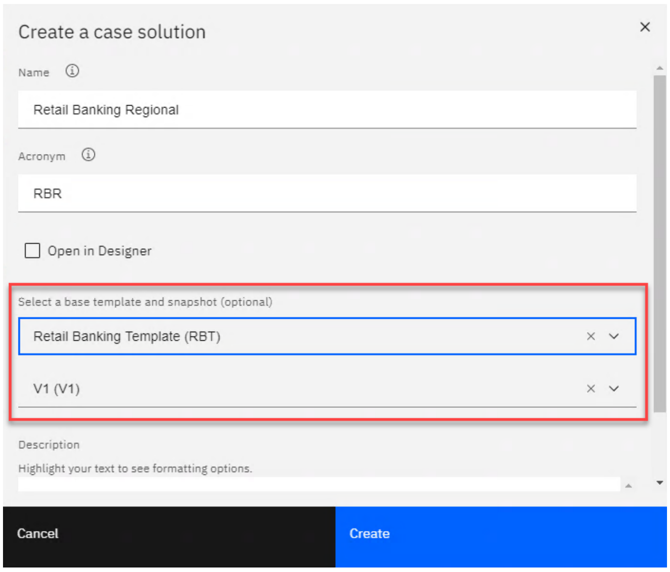


When clicking the "Create" button a dialog is shown that requires the "Name" of the template to be created and depending on your view mode an "Acronym" that gets prepopulated based on the name. Next you select an existing Workflow project and the snapshot to base the template on. Finally, you can provide a description for the template. Most of the administrative actions known from a Workflow project are also available for templates when clicking the "Details" link on the template tile.



To be able to create a Workflow project you first need to create a snapshot of the newly created template.

The second aspect to consider is the creation of a Workflow project (Case solution) based on a template. When clicking the “Create” button on the “Case solutions” page, you can either create an empty project or base it on a template. The dialog provides a dropdown menu to first select the template and then one of the available snapshots of the template.



Once a Workflow project is created, there is no further relationship between the template it was created from and the Workflow project.

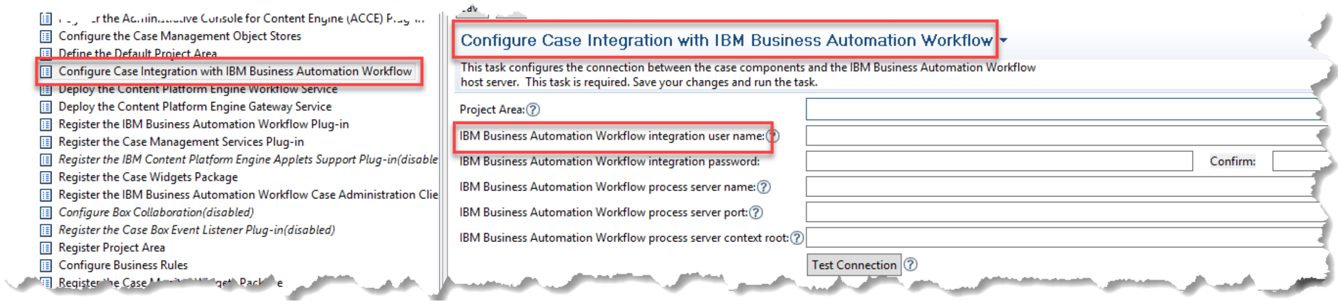
“Promoting” Legacy Case Solution Templates to Workflow Center Case Solution Templates
Existing legacy Case Solution Templates can be used to create new Case Solutions in the from the Case Builder landing page. If you want to be able to create Workflow Projects based on your legacy Case Solution Templates, you need to follow these steps to “promote” them to Case Solution Templates within Workflow Center:

1. First create a Case solution in the Case Builder based on your legacy Case solution template
2. Promote this Case solution to a Workflow Project
3. Create a snapshot of the Workflow Project
4. Create a new Case Solution Template from within Workflow Center as described previously
5. Create a snapshot of the newly created Case Solution Template to be able to create new Workflow Projects based on it

Administrative User used for Communication between Case and BPM Side

The "IBM Automation Workflow Case configuration tool" offers multiple tasks that need to be executed when configuring the Case capability of BAW.

The "Configure Case Integration with IBM Business Automation Workflow" task is of special interest in the context of this document as the setting has implications both while designing a Workflow solution as well as when executing a Workflow solution.



The "integration user name" is used at design time or runtime in the following scenarios:

- When discovering the available processes for a Process App when creating an "Activity with existing process" (see later chapter)
  Therefore, the user defined as "integration user name" needs to have at least "Read" access to the Process App that should be discovered.
- When starting the BPMN process that implements a Case activity
  The communication between the Case and BPM capability within BAW takes place using the user as specified as "integration user name". The BPMN process will therefore be started with the identity of this user and not the user that may have manually started the Case activity. Similarly, the communication back from the BPMN process to the Case engine to report back the successfully or unsuccessful completion of the BPMN process uses this technical user.

Data Model Synchronization between Case Builder and Process Designer

One of the major benefits of the new Workflow project type is that Business Automation Workflow (since 19.0.0.2) has tight integration between selected Case related artifacts as used in the Case solution and the Process related artifacts as used in the Process App. This is achieved by making the Case related data definitions (at design-time) and their respective data (at runtime) available on the BPM side. The synchronization happens one way from the Case side to the Process side where the artifacts on the Process side or read-only. The synchronization automatically takes place whenever the Case artifacts are saved in Case Builder.

Below sections discuss the various data definitions in the Case Builder and how they appear in Process Designer. In the chapter about implementing a case activity with a "New Process" explains details about how these data definitions and respective instance can be accessed and what they are used for. Below table provides a summary of the mapping of artifacts.

Case Builder Artifact	Process Artifact
Role	Team (Mapped to)
Choice List	Choice List (New)
Case Property	Content Object Property (New)

Business Object	Content Object (tagged as 'Business Object') (New)
Case Type Property	Content Object (tagged as 'Case') (New)
Activity Property	Content Object (tagged as 'Activity') (New)

Pre-condition for Data Model Synchronization and Enabling/Disabling it

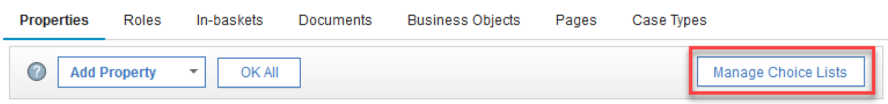
Content Object support requires a Content Platform Engine (CPE) version of at least 5.5.3. When you use IBM Business Automation Workflow 19.0.0.2 or newer with the embedded CPE this is always true and Content Object support is automatically enabled. If you are using an external CPE with BAW 19.0.0.2 or newer and your version of CPE is earlier than 5.5.3, content object support is automatically disabled. If you later upgrade your external CPE to version 5.5.3 or later, you can manually enable content object support by using the BPMConfig command and the -update and -enableContentObjectSupport parameters, as described in the topic BPMConfig command-line utility.

You can also use the same command and parameter to disable content object support regardless of the Content Platform Engine version. This is specifically useful in the two scenarios:

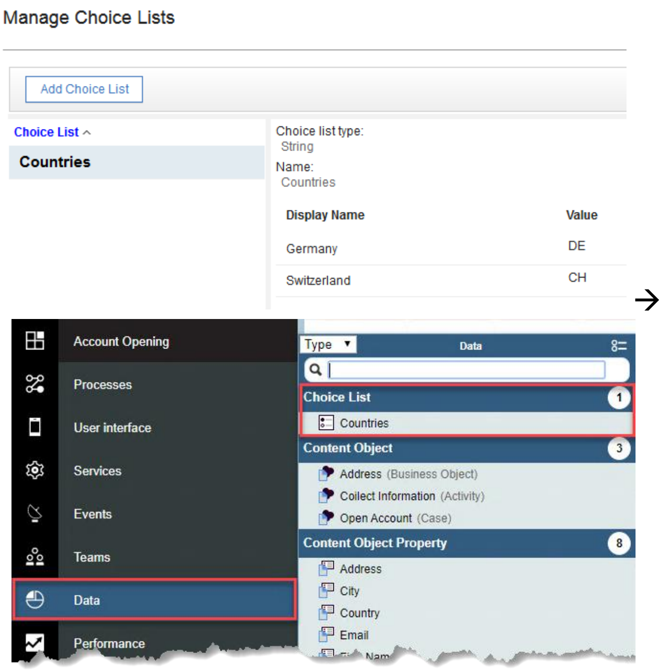
1. If you are using Content Platform Engine as a container for integration with Business Automation Workflow and the Content Platform Engine version is 5.5.3.
2. If your Workflow Center environment uses a Content Platform Engine that support Content Objects (e.g. as it uses the internal CPE) but our staging and/or production environment(s) are using an external CPE prior to version 5.3.3 that therefore does not yet support Content Objects.

Choice List

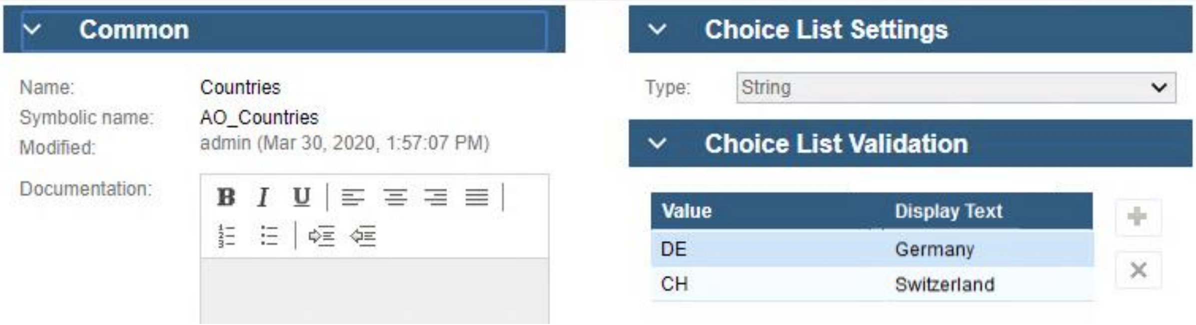
When you create, modify or delete one or multiple "Choice Lists" in the Case Designer



and save your changes, the changes are reflected in the "Data" category, sub-category "Choice List" in Process Designer.

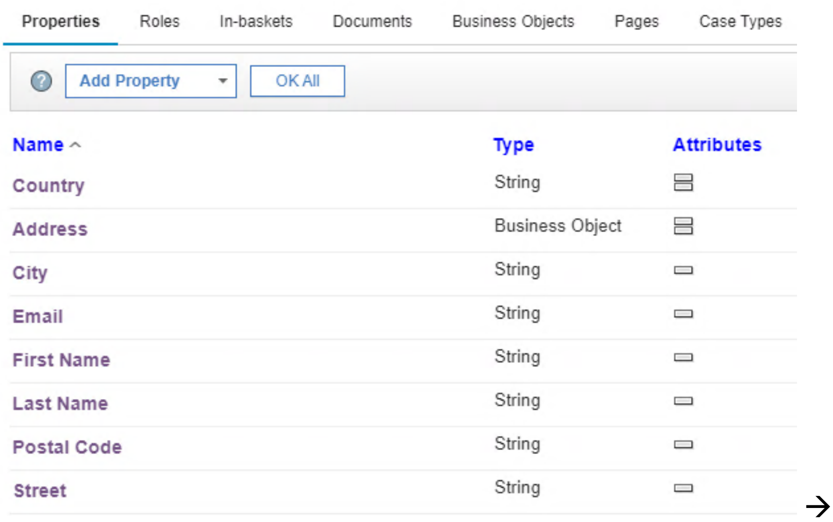


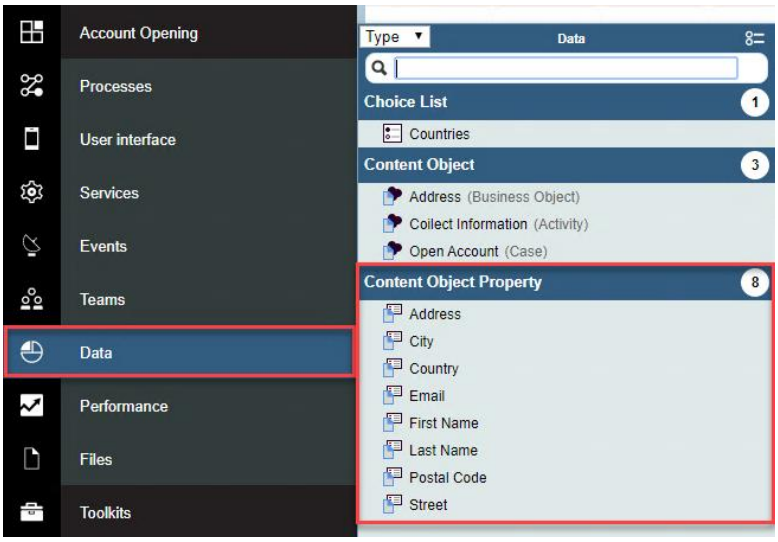
Opening a Choice List in Process Designer lets you explore the definition of the Choice List in read-only mode.



Properties

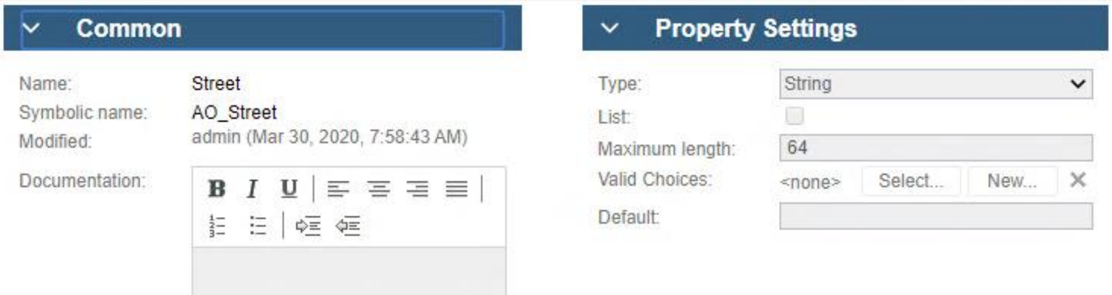
When you create, modify or delete one or multiple “Properties” in the Case Designer on the level of the Case solution and then save your changes, the changes are reflected in the “Data” category, sub-category “Content Object Property” in Process Designer.



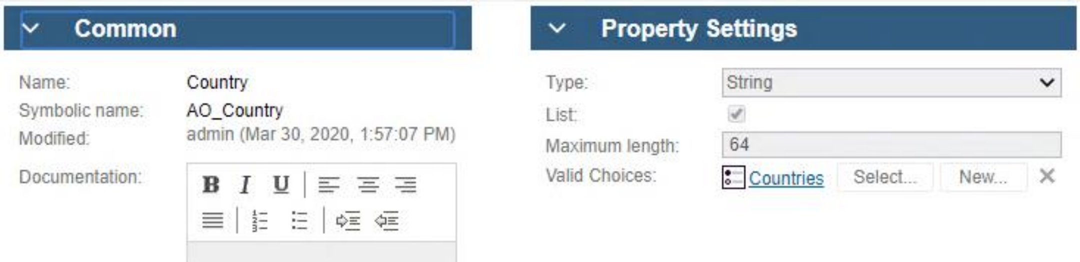


Opening a Content Object Property in Process Designer lets you explore the definition of the Content Object Property in read-only mode. Depending on the definition on the Case Builder side, the type of the Content Object Property can either be:

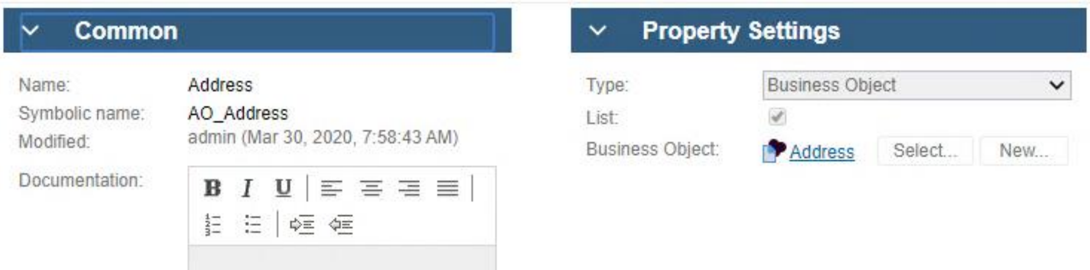
1. A simple type like “String”



2. A simple type but with a Choice List attached to it

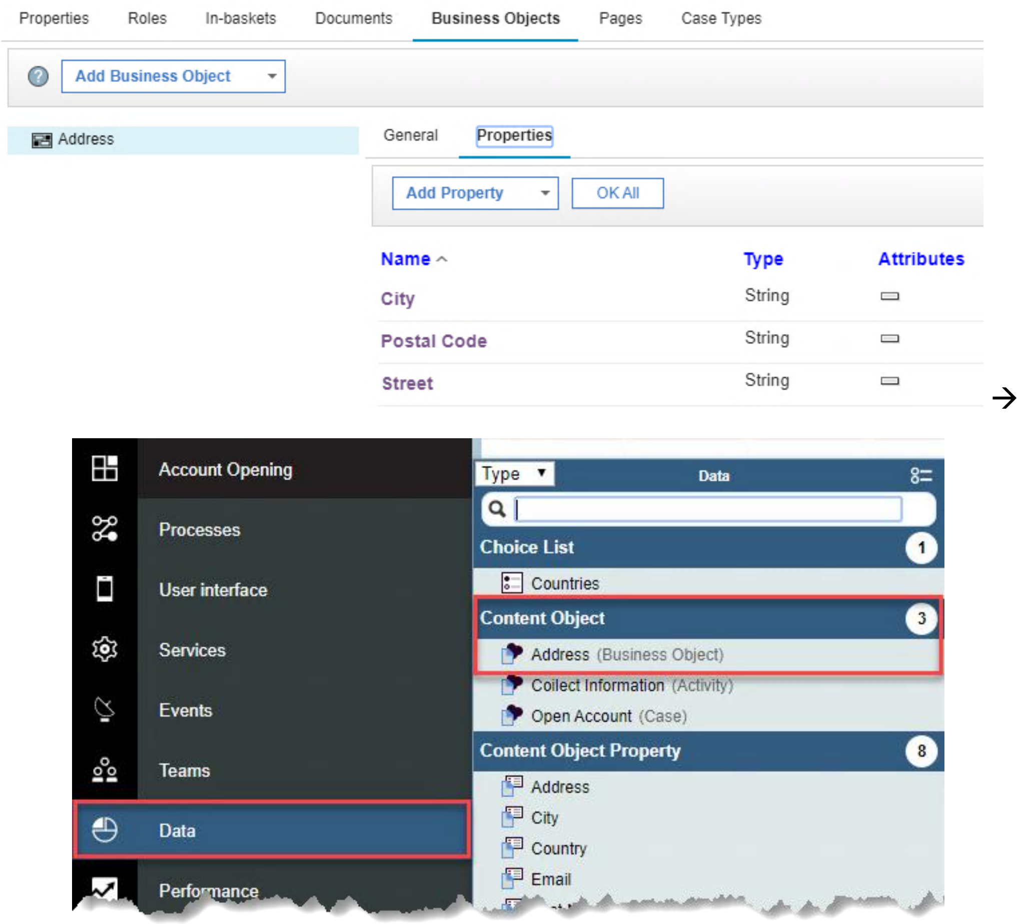


3. A business object pointing to a Business Object as defined in Case Builder and also made available in Process Designer (see below).



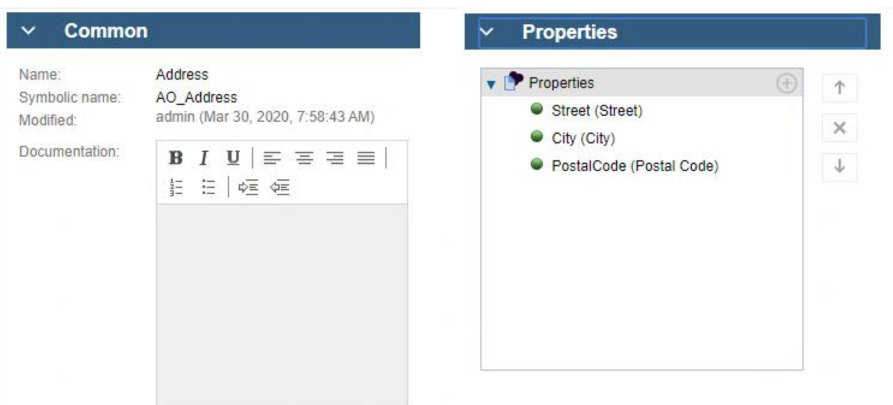
Business Objects

When you create, modify or delete one or multiple “Business Objects” in the Case Designer and save your changes, the changes are reflected in the “Data” category, sub-category “Content Object” in Process Designer.



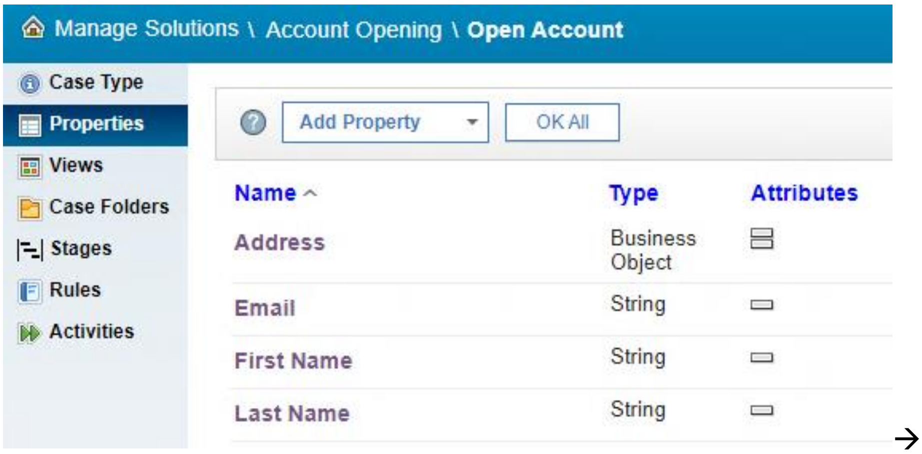
As the “Content Object” category contains content objects of different types, the different types are expressed by using tags. In the case of a Data Object, the content object is also tagged with “Business Object”.

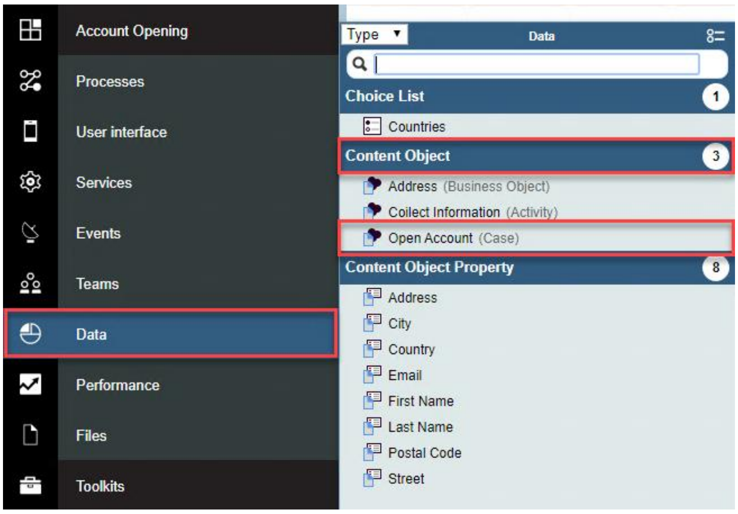
Opening the Content Object of type Business Object in Process Designer lets you explore the definition of the Business Object in read-only mode.



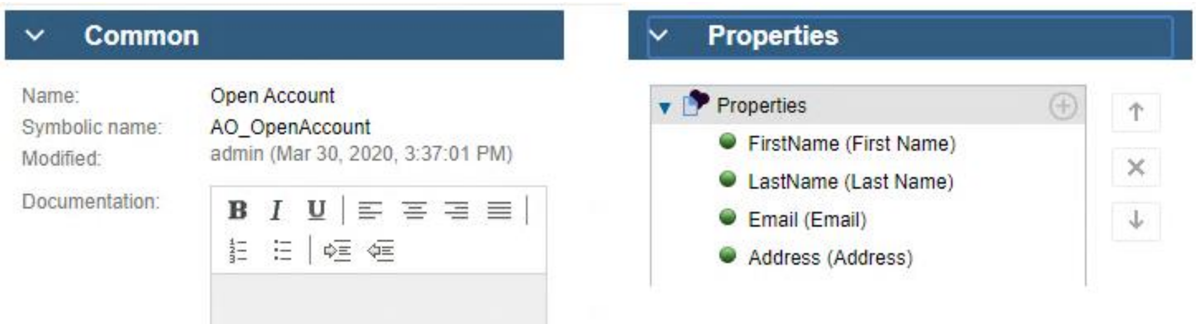
Case Content Objects

For each Case Type that you define in the Case Client a Content Object tagged as “Case” with the name of the Case Type is created in the “Data” category, sub-category “Content Object Property” in Process Designer.





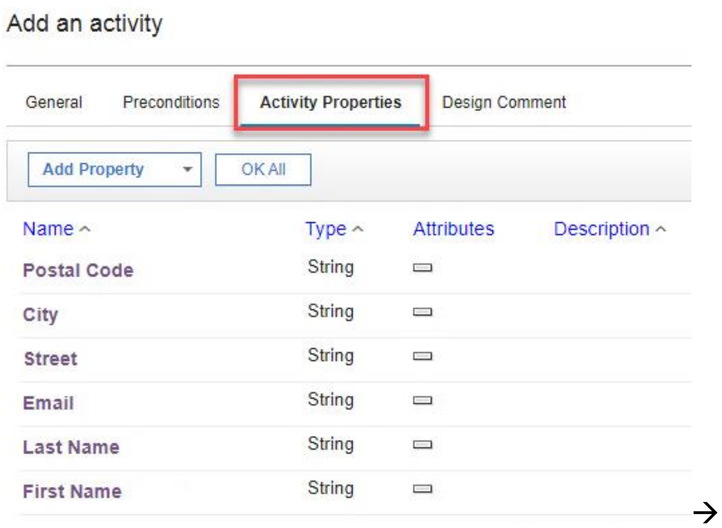
The “Properties” you define for the Case Type become properties of the respective (Case) Content Object and can be seen when opening it in read-only mode.

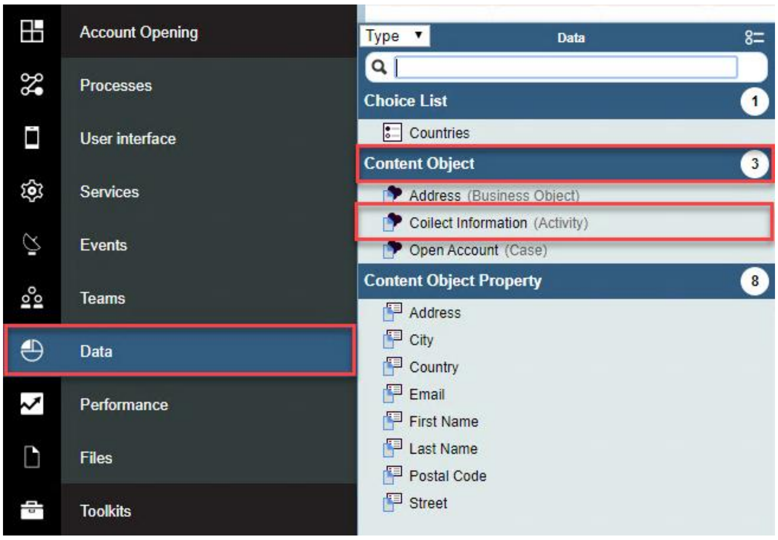


When you create, modify or delete one or multiple “Case Types” or their “Properties” in the Case Designer and then save your changes, the changes are reflected in the “Data” category, sub-category “Content Object Property” and/or within the respective (Case) Content Objects in Process Designer.

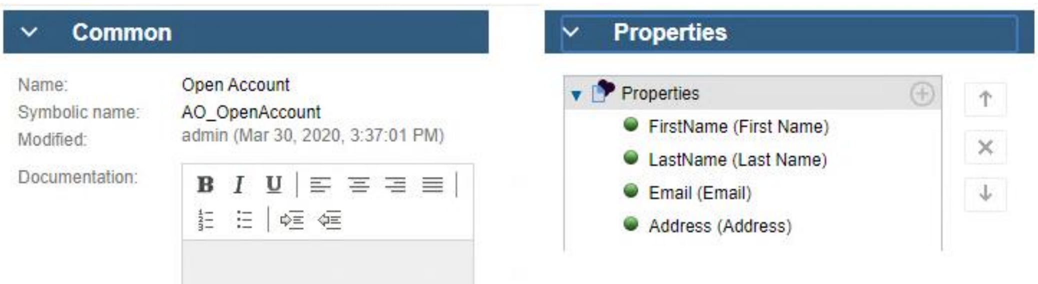
Activity Content Objects

For each Activity of a Case Type that you define in the Case Client using the "New Process" option (see below) a Content Object tagged as "Activity" with the name of the Activity is created in the "Data" category, sub-category "Content Object Property" in Process Designer.





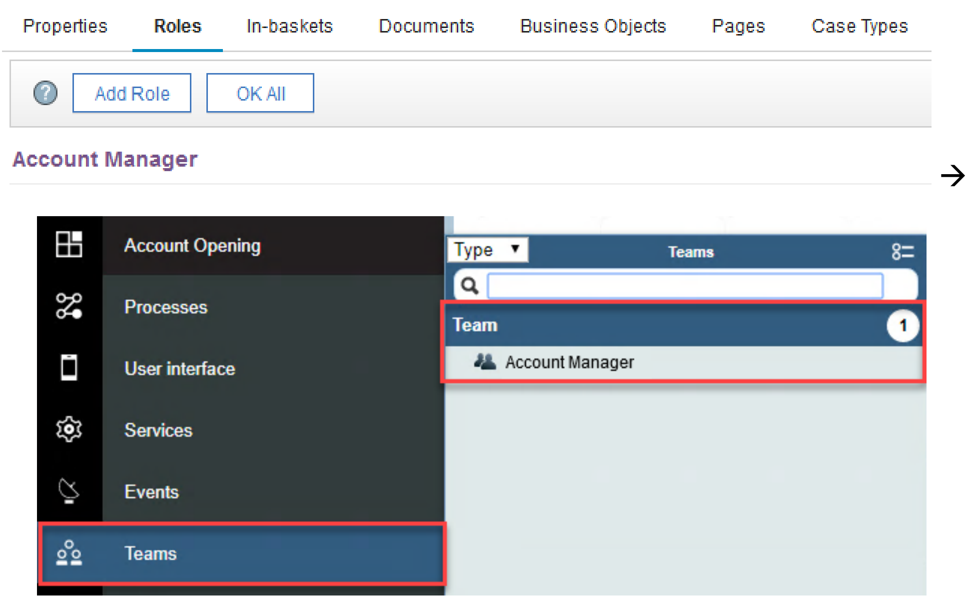
The "Activity Properties" you define for the "Activity" become properties of the respective (Activity) Content Object and can be seen when opening it up in read-only mode.



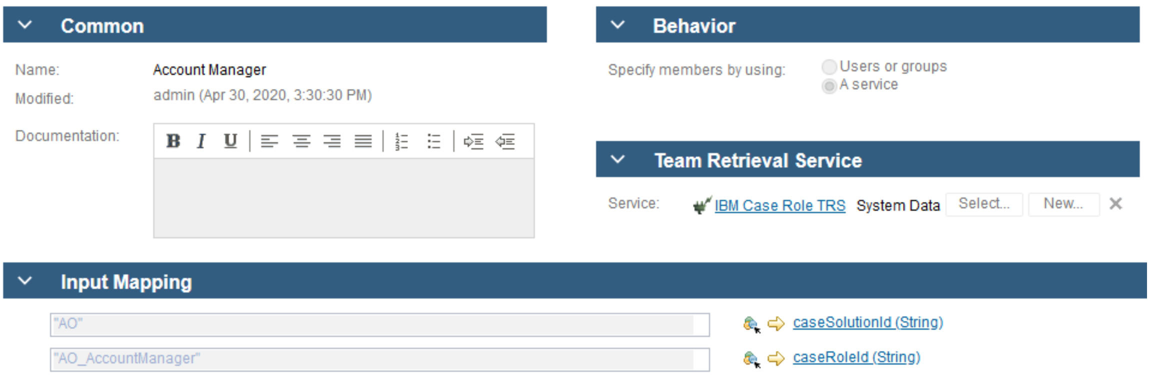
When you create, modify or delete one or multiple "Activities" or their "Activity Properties" in the Case Designer and then save your changes, the changes are reflected in the "Data" category, sub-category "Content Object Property" and/or within the respective (Activity) Content Objects in Process Designer.

Case Roles/Teams

For each "Role" that you define in the Case Client a Team with the name of the role is created in the "Teams" category in Process Designer.



While you can open the team in read-only mode you will not directly see any members of the team. Instead a Team Retrieval Service is configured with two input values representing the Case solution ID and the Case role ID. This in the end leads to a single BPM internal group being used to determine the members of the team.



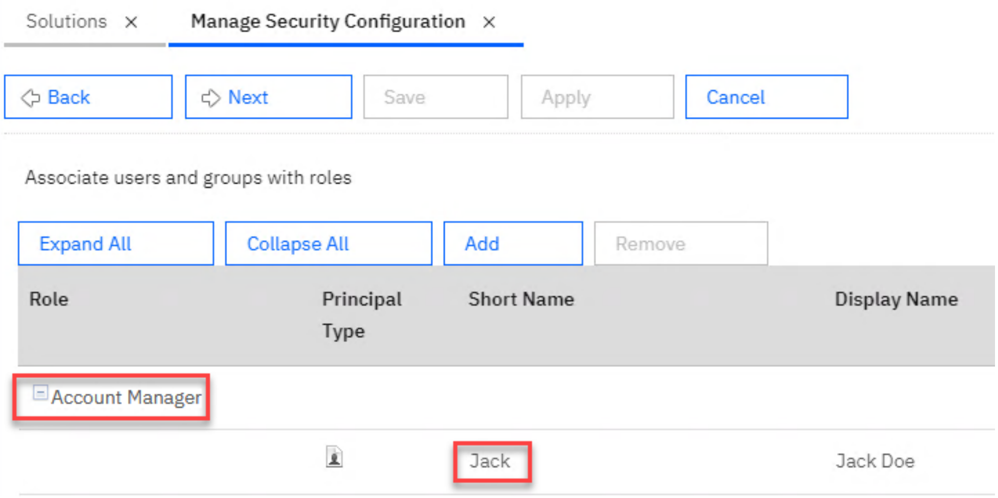
The group name is derived from the input values with the group being visible in the Process Admin Console.

The Knowledge Center points out:

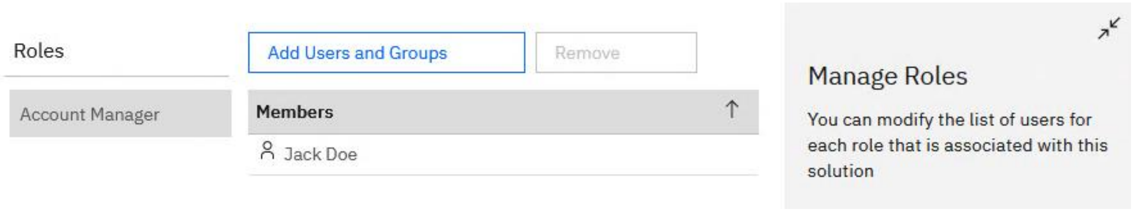
> "in IBM® Business Automation Workflow, there are user groups that have names that begin with the prefix "caseRole_". These user groups are created in the context of the new case and process integration capability that synchronizes Case Builder roles and Process Designer

teams. You should never manually delete or modify these groups by any means, such as by using the Process Admin Console or by using a REST or JavaScript API."

The actual members of the internal group that is used by the team are populated through modifications of the role assignments in the Case UIs. One way to modify the Case role assignments is in the "Security Configuration" in the Workflow Case administration client as shown below. When saving a modified Security Configuration that contains any changes for a specific role, these changes are automatically synced with the linked BPM internal group.



Alternatively, the same synchronization happens when using the "Manage Roles" capability provided for a Case solution administrator in the Case Client.



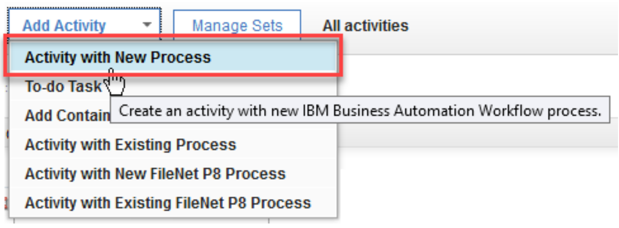
Implementing Case Activities through BPMN processes

In IBM Case Manager it was possible to invoke processes modelled in IBM Business Process Manager. With the merge of the two capabilities into one offering, IBM Business Automation Workflow, these capabilities have been extended in various ways. In addition, usage of a BPMN processes is now the recommended way how to implement Case activities.

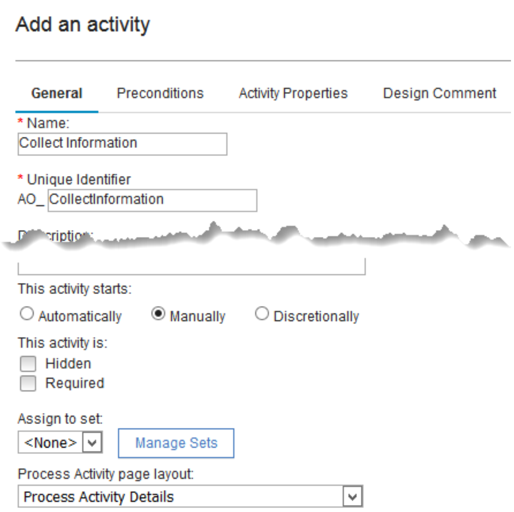
It is important to note that your existing solutions will continue to run unchanged while IBM encourages to use BPMN processes instead of FileNet P8 processes going forward!

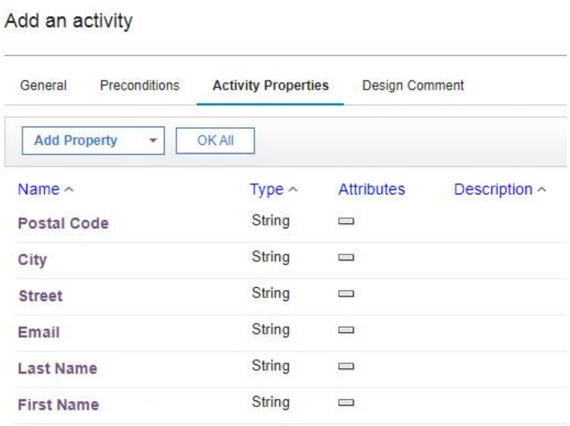
Activity with New Process (since 19.0.0.1)

When creating a new case "Activity" one of the options is to create it "with New Process" which means with a BPMN process.

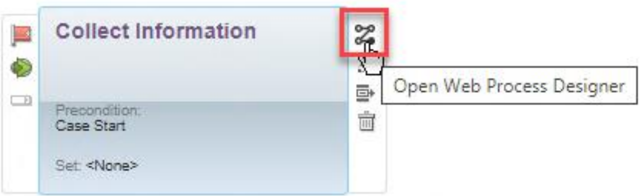


The options to set for the new Case activity are mostly identical to before when you used P8 processes to implement the activity. The only difference is the "Process Activity page layout" dropdown at the bottom of the page. We will look at this option in detail in a later section. In the example the following properties were added on the activity level.

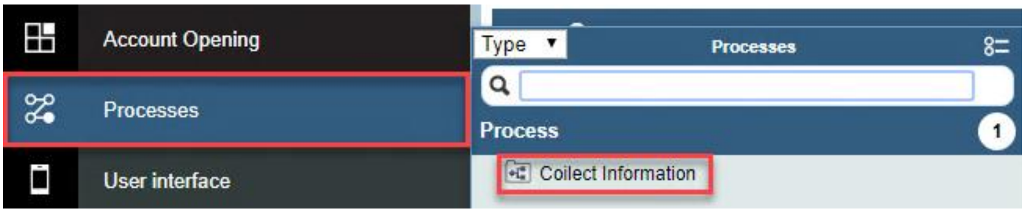




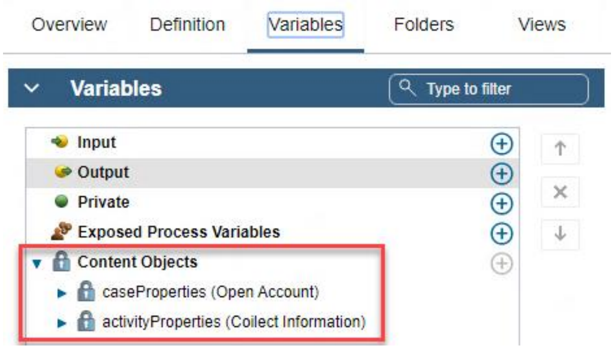
This implementation choice creates a so called "locally managed process" in the Process App associated with the Workflow project. "Locally managed" means that some of the characteristics of the process like the name are read-only and that the process cannot be renamed but is managed by BAW. This is different to the case where you manually create a process in Process Designer yourself and have full control over it.



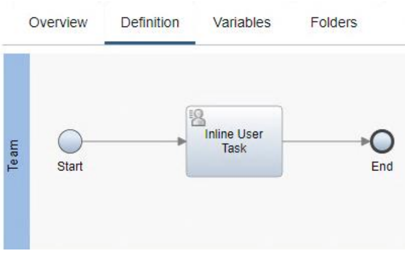
Once created, the activity is shown. When hoovering over the top right icon you can open the associated process from here. You need to first save your changes before the process is created and can be opened this way. In Process Designer the process is also shown in the “Processes” category. The name of the process resembles the name of the Case activity.



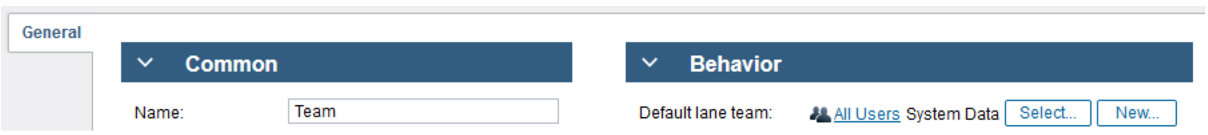
The process that got created through BAW has no input or output variables defined but instead two Content Objects (since 19.0.0.2). One represents the properties on the case-level, the other the properties on the activity-level.



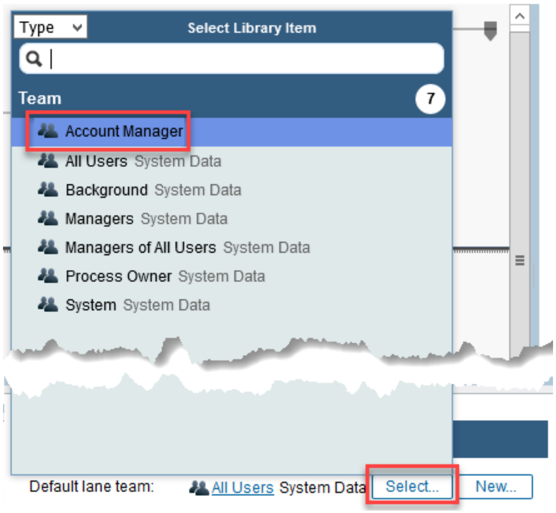
As will be shown later these Content Objects are being used in a read/write way to interact with the case and the activity that the process is associated to. By default, the process has a single “Inline User Task” activity.



The lane that the activity is put into is labeled “Team” and the “Default lane team” is set to “All Users”. It is not recommended to use “All Users”. Therefore, you normally replace this team by one that fits your business needs, most likely one that corresponds to a Case role that you created on the Case side.

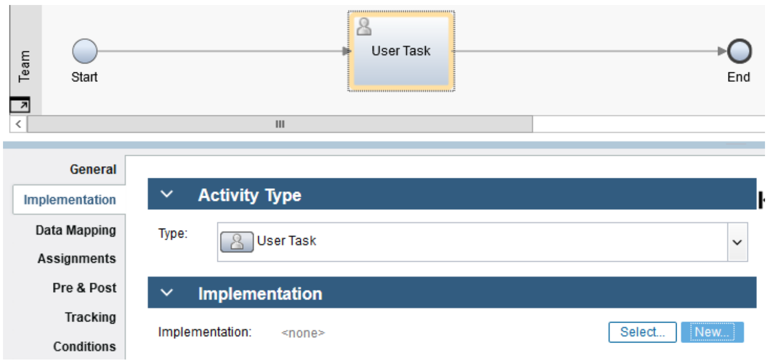


By clicking the “Select” button it is possible to assign an arbitrary team that is defined in the PA. More specifically one of the teams that was automatically created when a Case role was created in Case Designer can be selected. In this case this is the “Account Manager” team, which is associated to the respective Case role. This in turn will make the user task appear in any in-basket that is associated to this Case role.

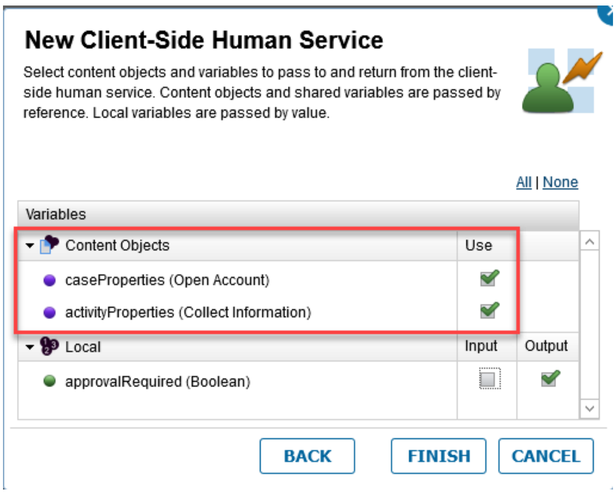


Using Case Objects in a Client-Side Human Service

One common use case is to include one or multiple User Tasks in the process that will be shown to case workers.

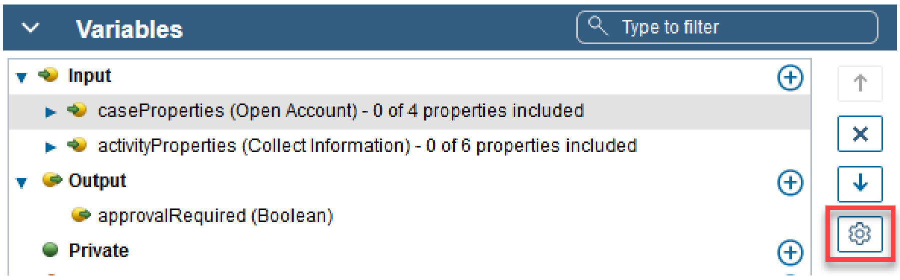


When creating a Client-Side Human Service (CSHS) as an implementation for a User Task, it is possible to specify, if one or both of the Content Objects are to be used by the CSHS. As these objects are implicitly readable/writeable you can't select Input and/or Output but just Use.

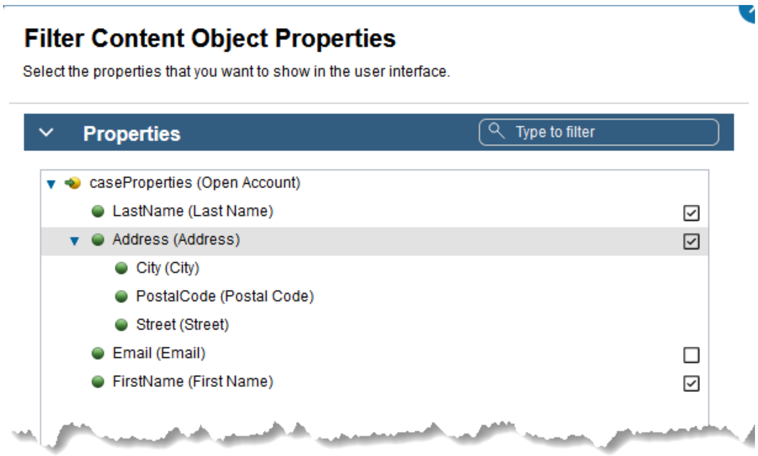


In the case of normal BPM variables of type Business Object, the whole object is sent to the browser where the CSHS is running during execution, even when only one of the properties is actually used. If such a Business Object is large, this creates a significant overhead and can degrade performance significantly. Another factor is, even if the data is not shown in the UI, that the content is part of the page source and can be easily viewed using Browser tools, potentially creating a security risk. Therefore, it is best practice in the BPM capability to just pass the data to the CSHS that is really required.

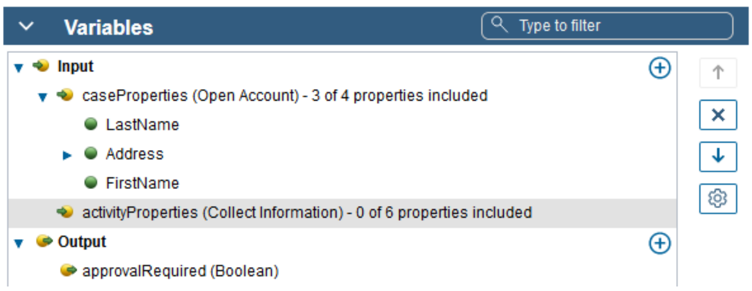
In the case of Content Objects these are predefined objects that cannot be altered. To still avoid above mentioned issues a “Configure” button for Content Objects has been introduced in BAW 19.0.0.2 in the CSHS UI. It allows to filter down which properties should be made available in the CSHS. By default, none of the properties is included.



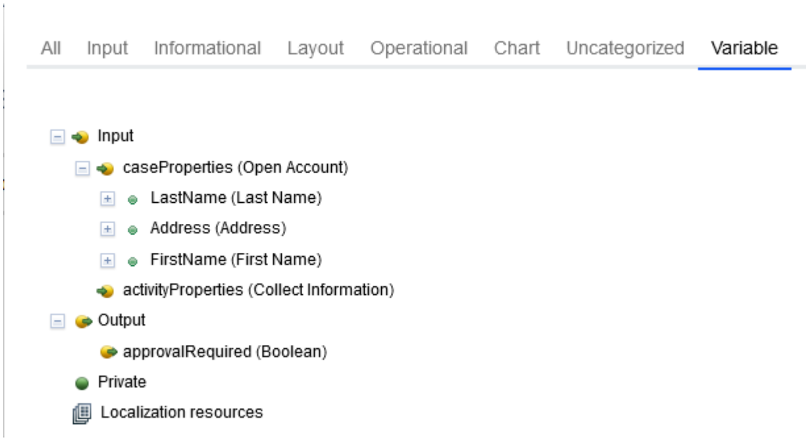
You need to explicitly add one or multiple properties using the “Filter Content Object Properties” dialog. Note that only the top-level properties can be selected. Therefore, a Business Object like “Address” can either be included with all its properties or not at all.



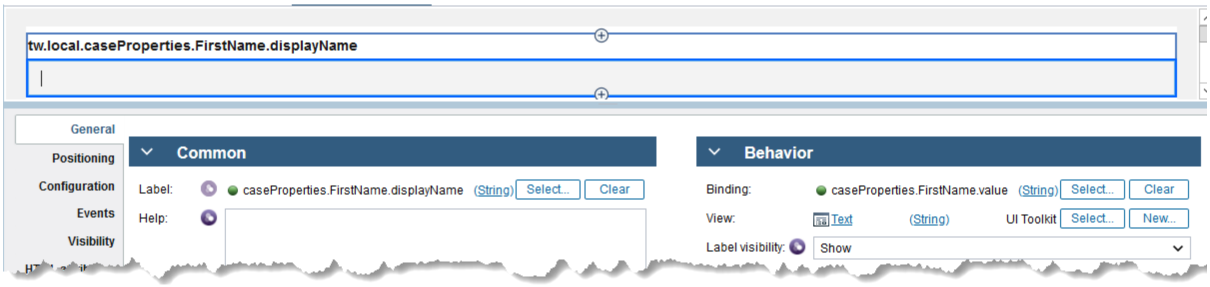
Once the selection has been made, the dialog allows to expand the Content Object to show the included properties.



In the Coach editor the configured properties are available to be used, as can be seen in the screenshot below.

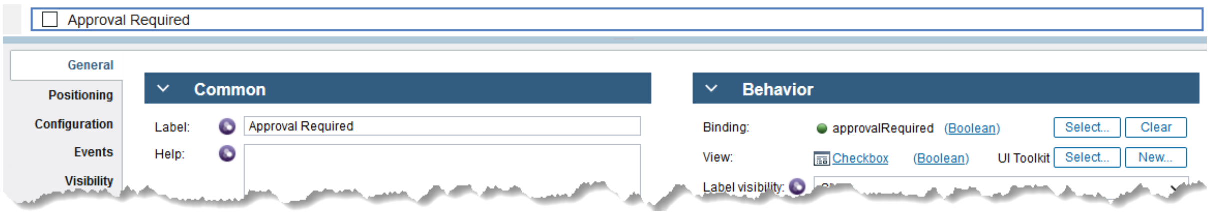


When you for example select one of the properties like “FirstName”, a new text control (also called view) will be added to the Coach. The label is automatically bound to the “displayName” of the property and the “value” of the property is used as binding for the view.



As Content Objects are readable/writeable in nature, when the field is updated during runtime and the change persisted the change is directly modifying the respective Case or Case Activity property.

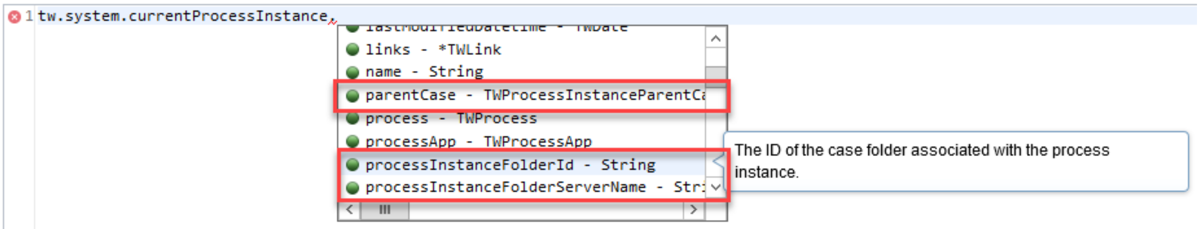
The approach of a property having both a display name and a value is familiar from the Case-side of BAW but is not otherwise known in the BPM capability. In the BPM capability a variable/property only directly contains the value but has no display name as shown for the Boolean “approvalRequired” output variable.



Using JS API within the BPM capability to Interact with the Process’s Parent Case

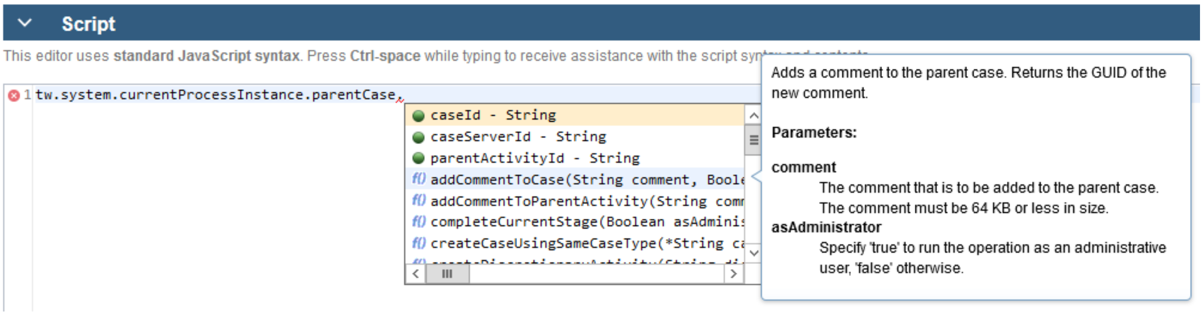
Starting with BAW 19.0.0.2 JavaScript APIs have been introduced to access and interact with the parent case from which the process was started.

Since BAW 19.0.0.3 the API has been reorganized, streamlined and extended to make it easier to use. The new namespace “tw.system.currentProcessInstance.parentCase” has been introduced. It contains most of the new API. In addition, it has two properties that provide access to the case folder associated with the process instance and the name of the server associated with the process instance case folder. The latter two properties are helpful when interacting with the case using Service Flows from the Content Management Toolkit.



Solutions developed with previous versions of BAW using the previous API properties and methods contained in the "tw.system.currentProcessInstance" namespace will continue to work unchanged. Content Assist will only show the new API to encourage its sole usage.

Below screenshot shows a small selection of properties and operations available, including inline help.



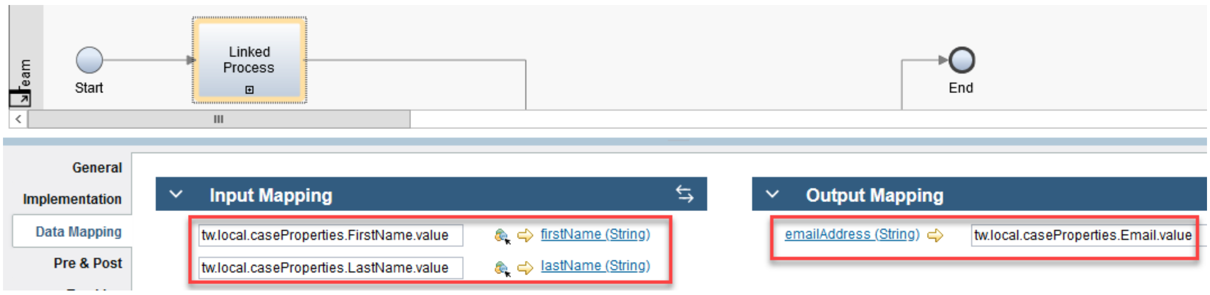
When a Service Flow or a Linked Process was started by a process that implements a Case activity the JS APIs are also available within the Service Flow or Linked Process.

Please refer to the Knowledge Center article JavaScript API in processes and service flows.

Passing Case Object values to Linked Processes or Service Flows

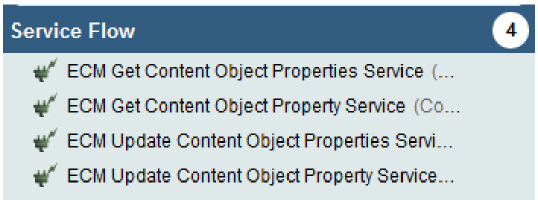
Approach 1

When using one or multiple Linked Processes and/or Service Flows from the process, these cannot define Content Objects. Therefore, it is necessary to define the input and output variable in the Linked Process/Service Flow and use the data mapping capability to map from and to the respective Content Object properties.

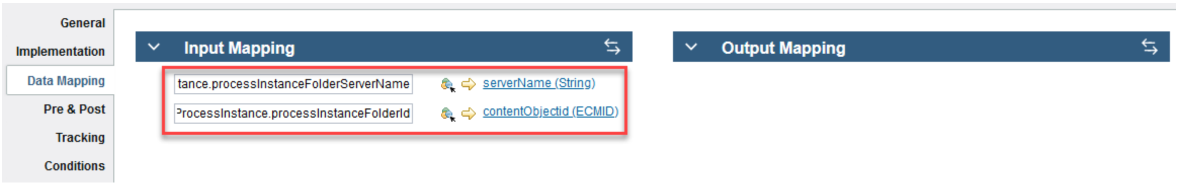


Approach 2

An alternative to passing in and out relevant properties of the Content Object for the Case is to utilize the four Service Flows that have been added in BAW 19.0.0.1 to the Content Management TK. They all take the "contentObjectid" and "serverName" as inputs.



Imagine you want to work with the parent case from your process instance in a linked process or Service Flow. You would pass in the values for these two parameters by retrieving the `processInstanceFolderId` and `processInstanceFolderServerName` properties that are available in the TWProcessInstance object as shown in the screenshot.



This approach might be useful when you need access to many of the Case prop0erties. Another use case for a linked process is making sure to have the latest values of the Case properties. A solution would be to load them right before they are needed not running the risk of passing in data to the process that is stale when used.

While it is easy to use for the parent case of a process that implements a Case activity the approach is not limited to the parent case but any case (e.g. a case linked to the parent case) as the case folder id is passed.

Approach 3

As pointed out in the previous chapter the JS APIs to access the parent case properties are also available in Service Flows and Linked Processes when the top-level process implements a Case activity.

In this situation the Service Flow or Linked Process can only be used and tested as part of a parent process that implements a Case activity. If wider use or local testing is required one of the other approaches may be better suited.

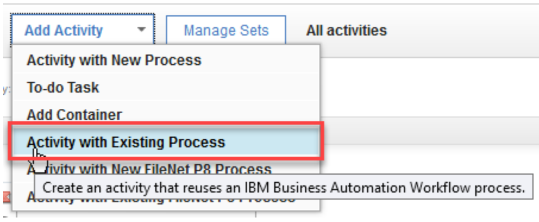
Automatic Upgrade of the Process App of a Workflow Project when Upgrading to BAW 19.0.0.3+

When you created a Workflow project in BAW 19.0.0.1 Content Objects and the associated artifacts as well as Teams have not been created as data model synchronization was just introduced in BAW 19.0.0.2. Starting with BAW 19.0.0.3 when you open the solution for editing in Case Builder and the Content Object support is enabled, the data model synchronization will be performed, and the Content Objects will be added to the BPMN processes that implement respective Case activities.

Other than that, the BPMN processes will not be touched and can continue to run unchanged. This provides the opportunity to exploit Content Objects in future versions of the BPMN processes without the need to recreate the Case Activities and the BPMN processes.

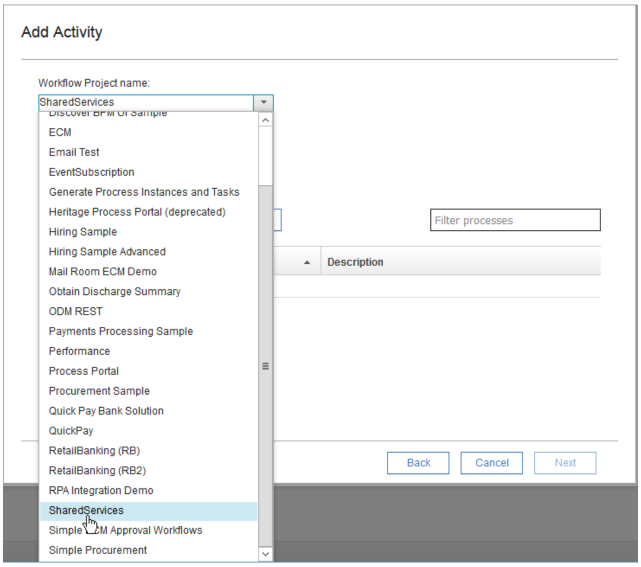
Activity with Existing Process

Another option when creating a new case "Activity" is to create it "with Existing Process" which again refers to a BPMN process.



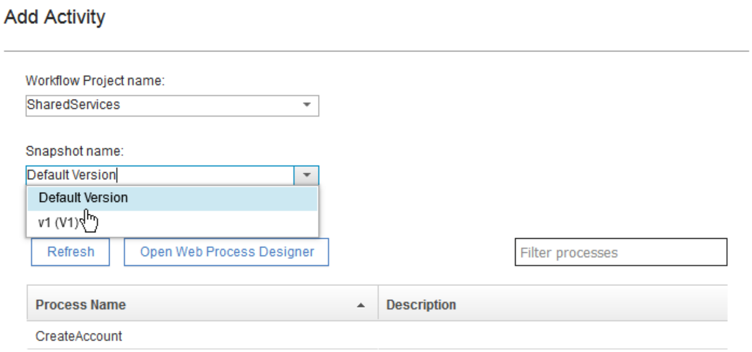
The options to set for the new Case activity are mostly identical to before when you used P8 processes to implement the activity. Again, you can select the "Process Activity page layout" dropdown at the bottom of the page. We will look at this option in detail in a later section. What is also new is that in one step of the wizard you have to select which existing process to use. For this, multiple selections and configurations have to be made:

1. Selecting one of the Process Apps (Workflow projects) available from the Workflow Center. It is important to note that while all are listed, the "cell admin" user needs to be given access to the Process App, otherwise the selection of this Process App will result in an error.

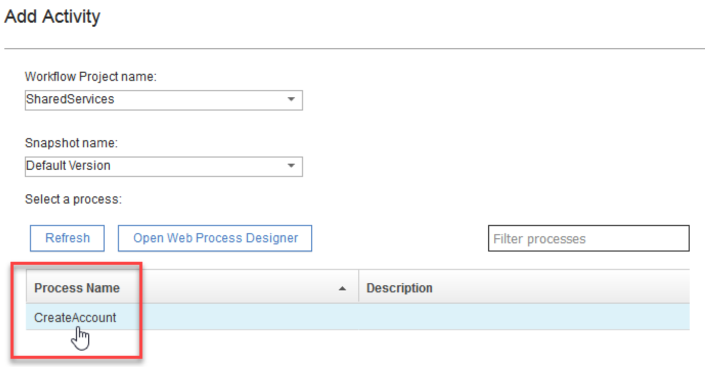


2. Selecting the "Snapshot name" for the Process App to select a process from.
   Here all the snapshots including "Default Version" can be selected. In a Workflow Center environment "Default Version" refers to the Head (which is where development takes place). In a Workflow Server environment "Default Version" is the snapshot of the Process App that is marked as default.
   The benefit of using "Default Version" is that during development time, changes can easily be made without the need to deploy and activate the Process App and make changes to the Case solution. The benefit of selecting a specific snapshot is, that once the combination is

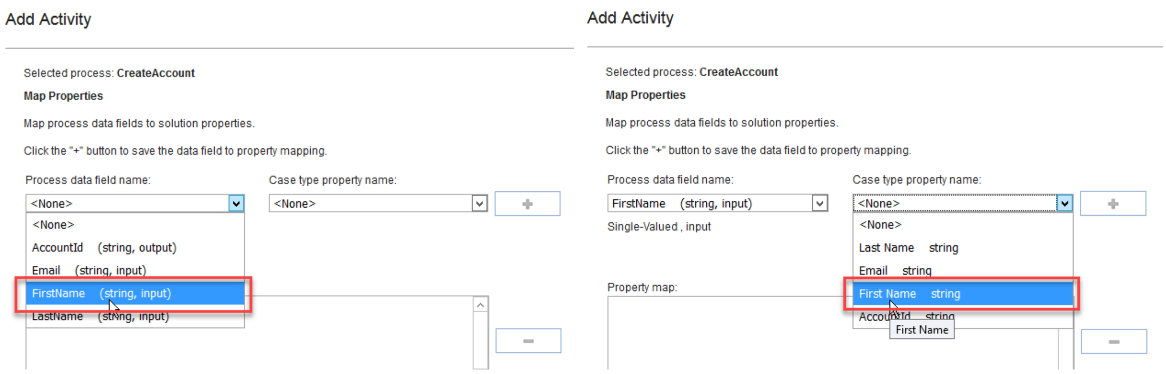
tested there is no risk that the implementation is modified in an unexpected way when a new snapshot of the referenced Process App is deployed and declared as default.

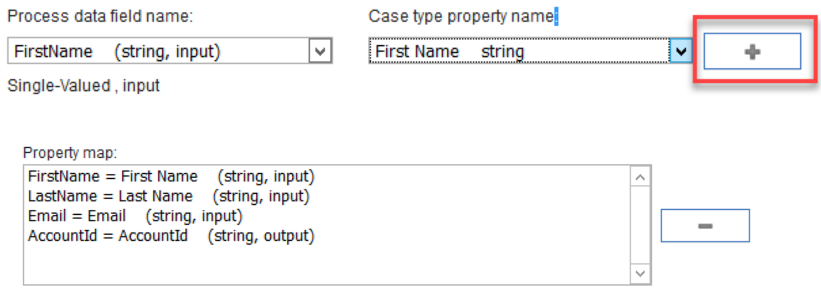


3. Finally, you have to select one of the available processes that should be invoked when the activity is started.



Once the process is selected on the next page it is required to specify the mapping between the input and output variables of the process and the Case type properties. This is required as the invoked process does not provide the convenience of the Content Objects to access the properties.





Until BAW 19.0.0.1 the approach to reuse an existing process was the only way to implement a Case activity with a BPMN process. Since then the recommended approach is to use the “Activity with New Process” in most cases. This is due to the four main benefits mentioned earlier:

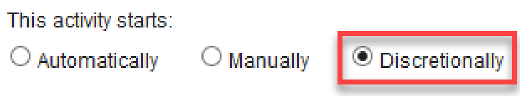
1. Process and Case artifacts are versioned and deployed in one entity, the Workflow project.
2. Simple read/write access to Case/Case Activity properties via Content Objects.
3. Broad JS API to interact with the parent case of the process.
4. Ability to use Case Role/Team synchronization with the benefit to include BPMN User Tasks in role in-baskets.

Therefore, beyond backward compatibility there are limited use cases for this option.

Implementing Discretionary Case Activities through BPMN Processes

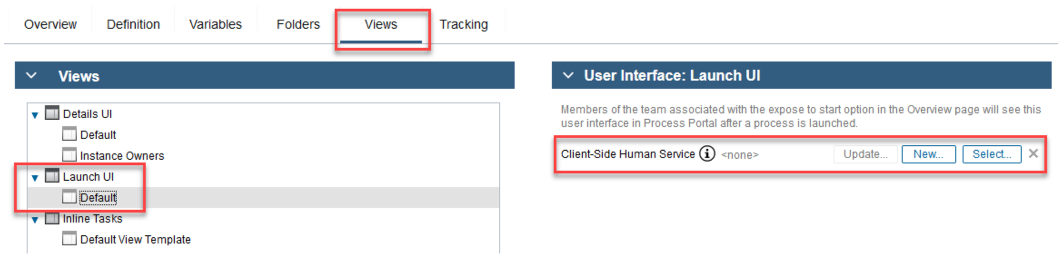
A Discretionary Activity can be added to a Case programmatically (API) or by the Case Worker in Case Client. Unlike a Custom Activity, a Discretionally Activity has the screen flow determined at design time.

Starting with BAW 19.0.0.3 a Discretionary Activity can be implemented as a BPMN processes. Independent of using “Activity with New Process” or “Activity with Existing Process” the start option “Discretionally” can be selected



Beyond the activity being started at the case worker's discretion there is another difference to automatic or manual activities backed by a BPMN process. The process that implements the Discretionary Activity can include a “Launch UI” that will be displayed when the user selects to start the activity.

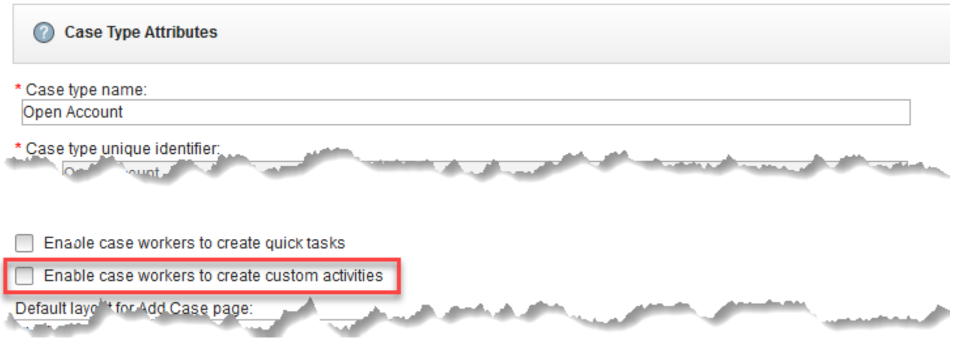
A Launch UI can be specified in the “Views” tab of the process. A Launch UI is implemented as a Client-Side Human Service. The generated human service has an “Enter Data” coach, with a control for each mapped process variable.



A Launch UI can be used to allow Case Workers to provide input to the process in addition to the case and activity properties.

Custom Activities

When enabled at design time, Case Workers may create custom activities to address unexpected (or) one-time activities related to a case. They are defined at runtime using the Custom Activity Editor.

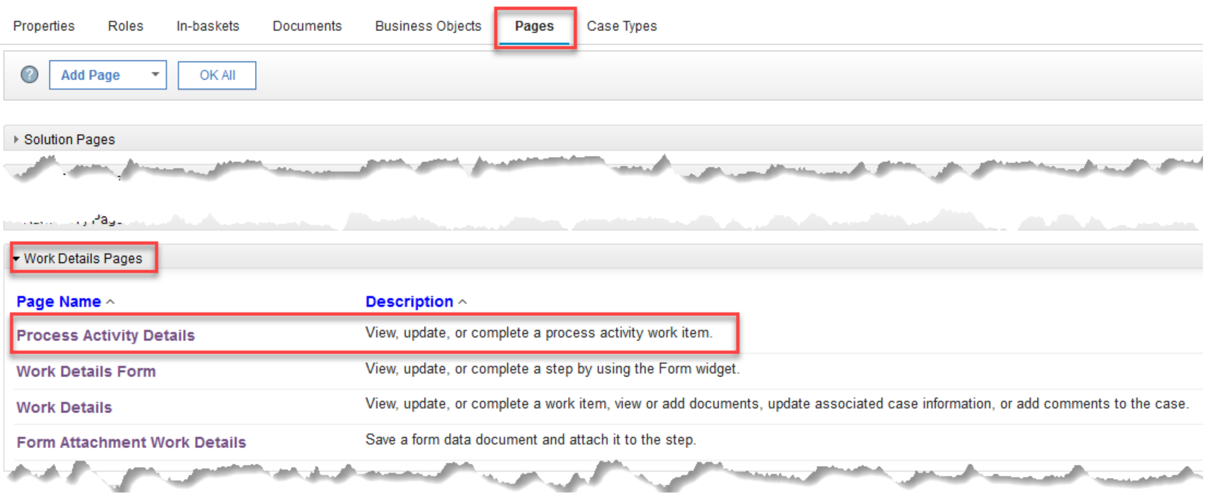


Technically, custom activities that you design result in FileNet P8 processes. BPMN processes at this time have no concept of being designed dynamically at runtime through a business user. The closest is a new offering called IBM Automation Workstream Services that allows business users to design simple processes. Therefore, Custom Activities continue to be based on P8 processes.

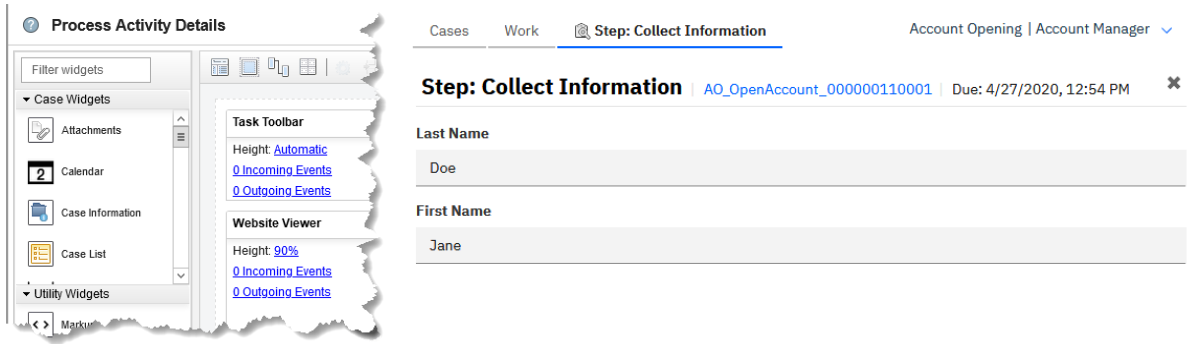
Until BAW 19.0.0.2 it was required to have at least one activity in the Case that was implemented using a P8 process for custom activities to work. Otherwise at runtime an error was shown when trying to create a Custom Activity. Since BAW 19.0.0.2 Custom Activities can be used even when all Case activities are implemented using BPMN processes (and therefore none is using a P8 process implementation).

Creating Custom Process Activity Details Pages

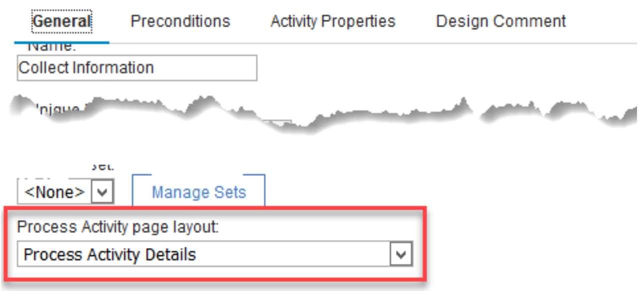
With the introduction of the capability to show task originating from BPMN processes in in-baskets in the Case Client, the new customizable Work Details Page “Process Activity Details” was introduced. It Is used to display such tasks.



This default page contains two widgets, the “Task Toolbar” and a “Website Viewer”. In the latter the UI of the BPMN User Task is embedded in an iFrame. You can modify the page but must keep at least these two widgets.

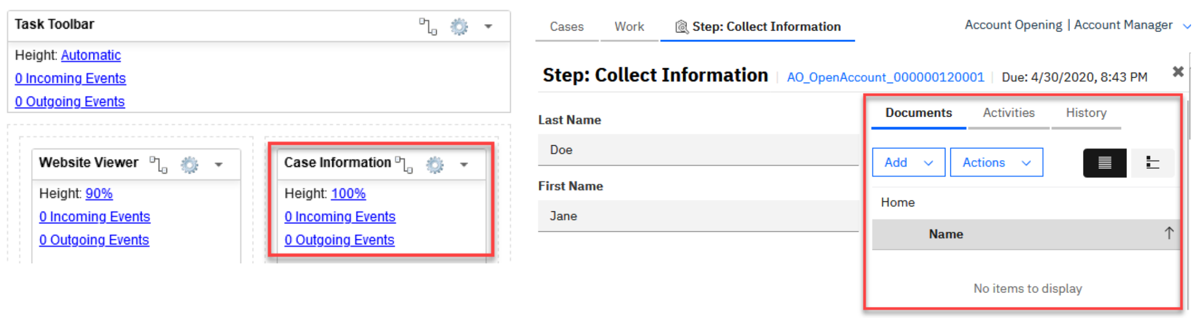


Starting with BAW 19.0.0.3 the solution developer can create any number of custom Process Activity Details pages. When creating an activity backed by a BPMN process or when editing it you can now select one of the available Process Activity page layouts to be used for this specific activity. By default, the default “Process Activity Details” page is selected.



The capability is particularly useful to add Case widgets that provide capabilities that cannot easily be duplicated using the Coach technology that is used to define the user interface for the BPMN tasks.

One such example is the “Case Information” widget that can be configured for example to show the Documents, Activities and History of the case. As there are no pre-built views available, it would be a lot of effort to duplicate a similar UI in the Client-Side Human Service directly. It is much easier to create a custom page by copying the original “Process Activity Details” page and adding the “Case Information” widget to the page.

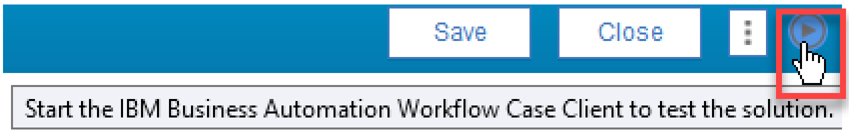


In other cases, like displaying the list of documents attached to a case or displaying one of these documents, views exist for the Coach technology. Therefore, you can choose whether to use these views or to rely on Case widgets via a custom Work Details Page. One of the guiding principles should be consistency of the UI.

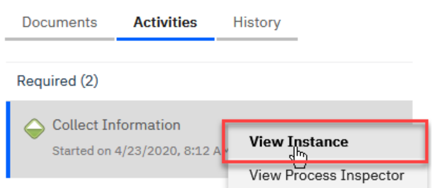
Launching Process Inspector from a Case during Development

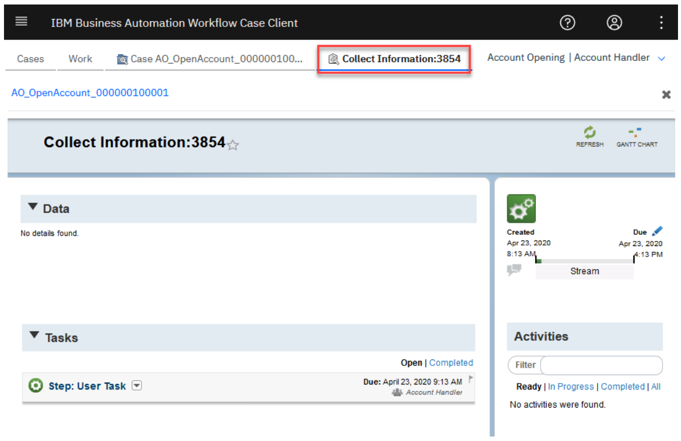
During development of a Case solution where activities are implemented using BPMN processes, you may sometimes need to find the process that is run as part of an activity to debug it.

BAW 19.0.0.2 introduced the ability to select either “View Instance” or “View Process Inspector” from the context menu of an activity that is implemented using a BPMN process. The “View Process Inspector” capability is only available in the Workflow Center when the Case Client was launched through the “Play”-button within a Case solution. It is meant for development purposes.

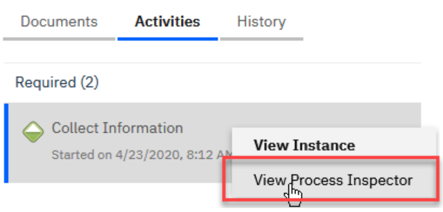


Selecting “View Instance” opens the BPMN process instance details UI in a new tab of the Case Client as shown below.



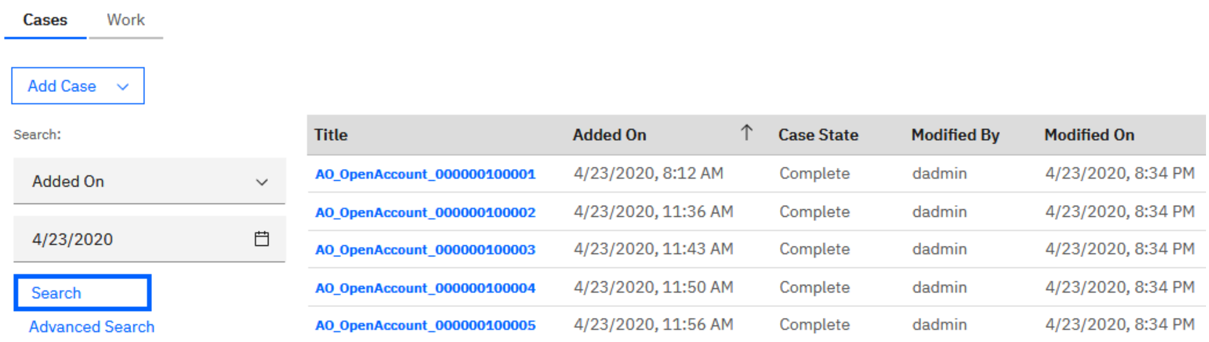


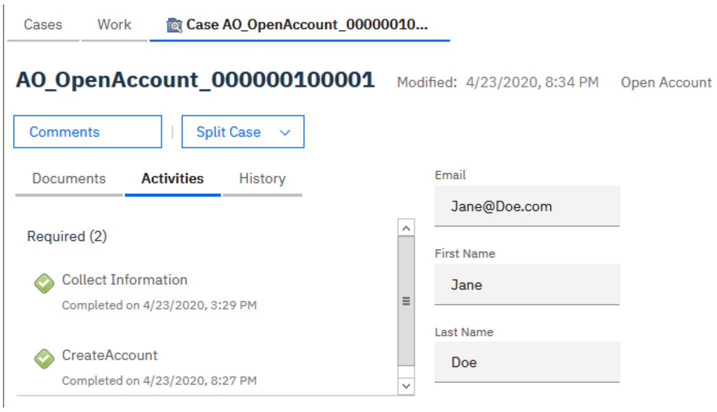
Selecting “View Process Inspector” opens the Process Inspector showing the process instance that implements the activity. A defect in BAW 19.0.0.3 currently prevents this from working correctly. The problem will be fixed in the next release.



Using Process Inspector to Investigate the status, flow and variable of BPMN processes

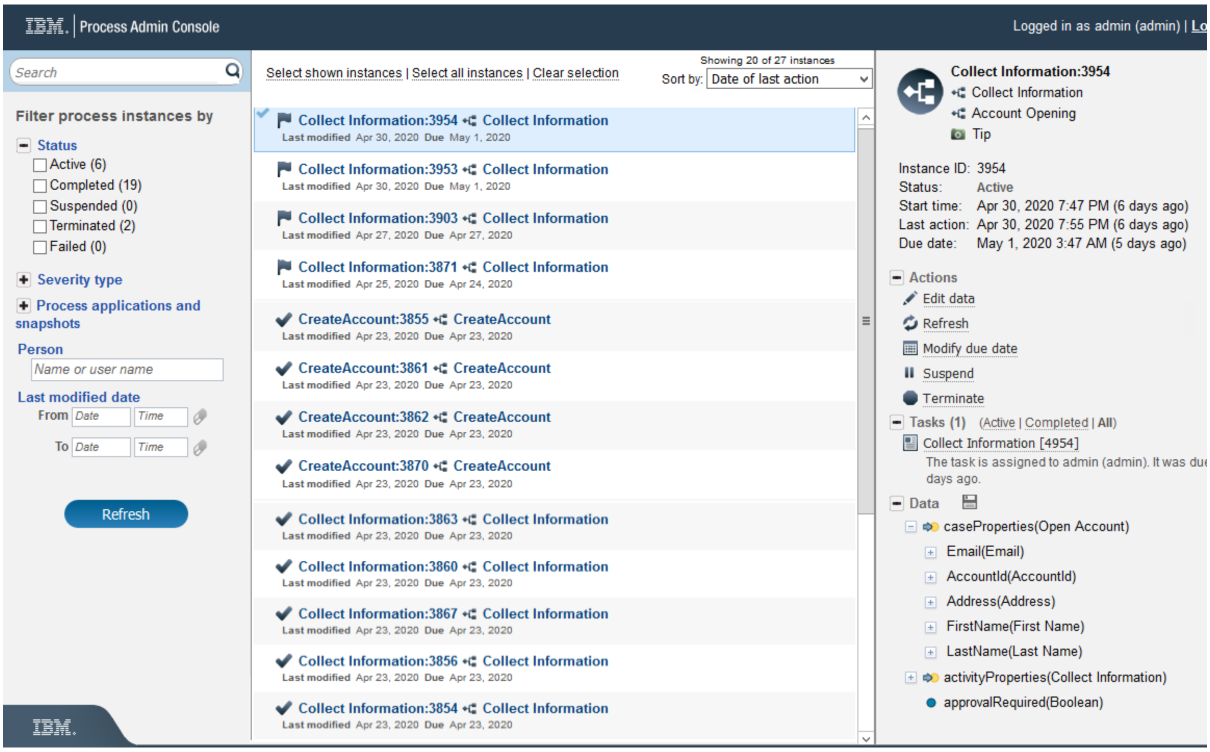
On the Case-side you are used to use the Cases search and opening a Case to review the activities of the case including its Case properties and other properties.





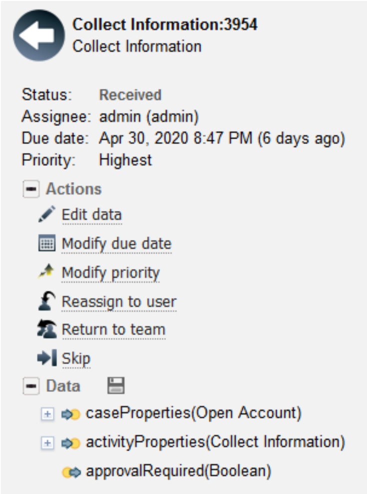
During development or when needing to investigate the state of a process in production Process Inspector is the major tool to be used by developers or solution administrator on the BPMN side. It is not meant for business users.

You can either launch Process Inspector from a specific Case activity as shown above or via the URL “https://<server-name>:<port>/ProcessInspector/”.



On the left-hand side you can define filter criteria to search for specific process instances, e.g. by state, modification date or source Process App. In the middle column the process instances are listed to match the filter criteria specified on the left. When selecting a specific instance in the middle the right-hand column shows information about that instance.

The top contains basic information about the instance. This is followed by actions that can be taken on the instance. The available actions depend on the state of the process instance. Next the list of currently active Tasks is shown. When clicking on a task the right-hand side changes and displays information about the selected task, potential actions to be taken and data of the task.



Both on the process level as well as on the task level you can browse the data. If the process/task is active you can also modify the data from here.

Monitoring Workflow Solutions with IBM Business Automation Insights

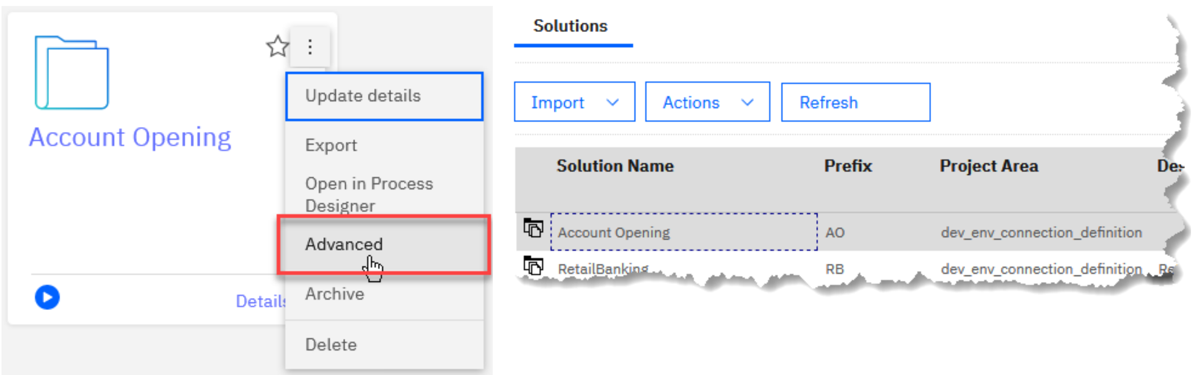
IBM Business Automation Insights (BAI) provides visual insights to business owners and feeds a data lake to infuse artificial intelligence into IBM Digital Business Automation. BAI is part of the Cloud Pak for Automation.

For BAI to work business events need to be emitted, in our scenario from IBM Business Automation Workflow. The BPM and Case capability within BAW have their own way to enable the emission of business data.

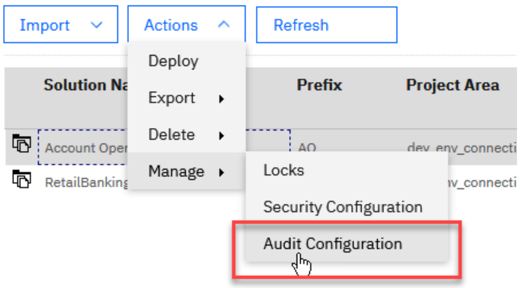
Business Event Emission from a Case

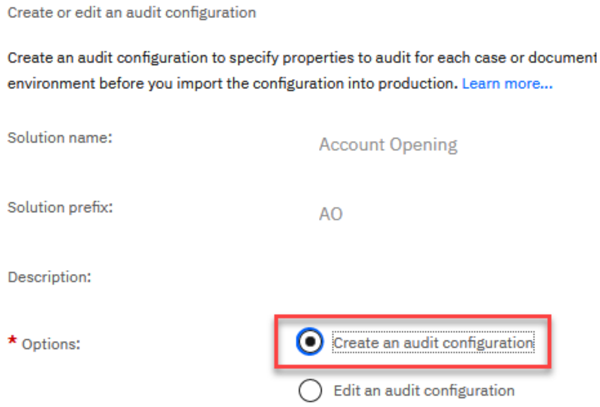
To emit business data from a Case, you must [configure the audit log] for the properties that need to be emitted into BAI. Configuration of the audit log is generally unchanged compared to IBM Case Manager. In BAW, when the Case Event Emitter is configured on the server level, the audit log events are also emitted to BAI.

First step is to [create an audit configuration] for the Case Solution to enable emission of business data. Selecting the “Advanced” menu item in the dropdown when clicking the three vertical dots on the project tile you get to the “IBM Business Automation Workflow Case administration” showing the “Solutions” tab.

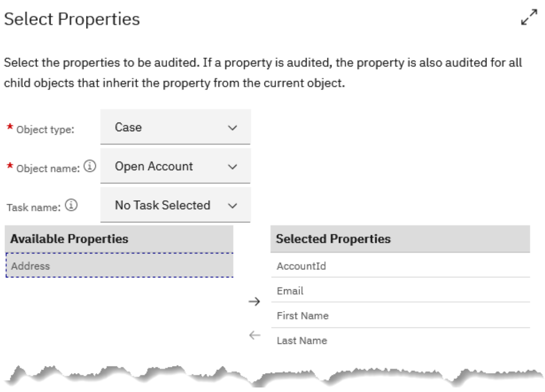


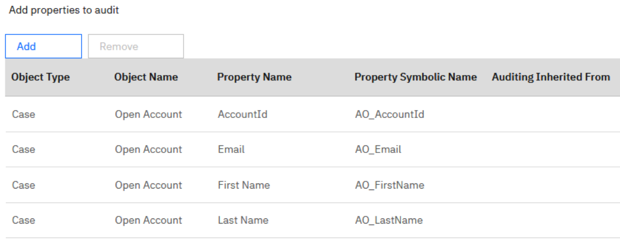
Selecting **Actions → Manage → Audit Configuration** create an Audit Configuration or edit an existing one.





The next step is to select a Case Type and its Case properties and Case Activity properties to audit.



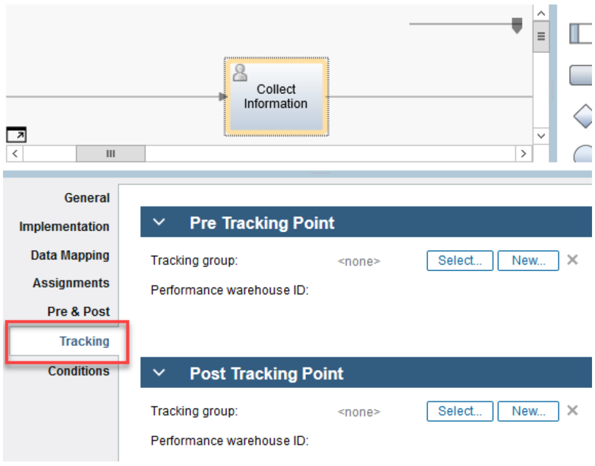


Business Event Emission from a BPMN Process

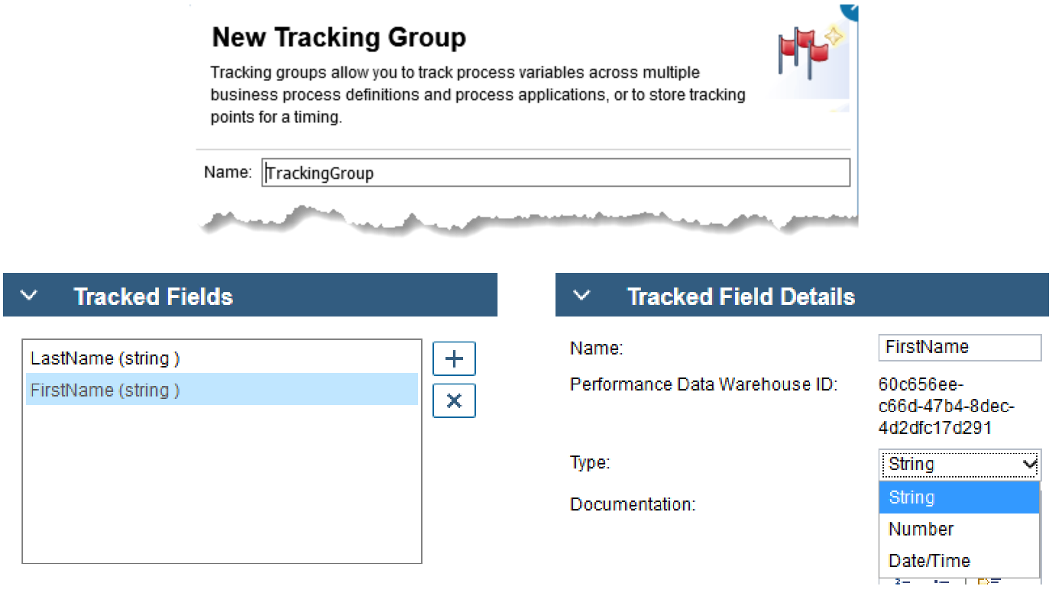
Depending on the business requirements it may be enough to just modify the Audit Configuration of the Workflow project to emit the solution's Case-related properties. In scenarios where the BPMN processes contain variables in addition to the solution's Case-reöated properties, they will have to be emitted from the BPMN process.

To emit business data from a BPMN process, you must enable tracking on the variables that need to be emitted into BAI. There are different ways to track variables in a BPMN process. The most common way is to use the Tracking Groups approach.

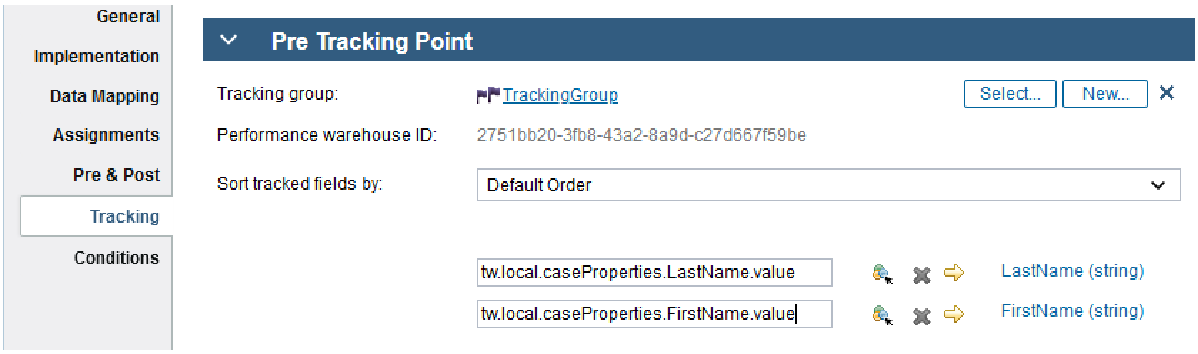
You can configure tracking on the level of a process activity by going to the "Tracking" tab. Here you can configure both a "Pre Tracking Point" that fires before the activity is executed and a "Post Tracking Point" that fires after the activity is executed. From this dialog you can either select an existing tracking group or create a new one.



After giving the new tracking group a name you can add one or multiple named tracking fields that can be of type String, Number or Date/Time.



Once the tracking group is saved, back in the process you see that you can now map any process variable or property of a Case Object to the property of the tracking group.



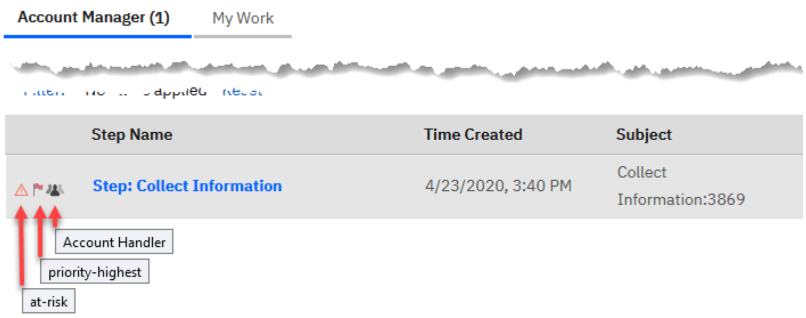
For the events to actually be sent to BAI the BPM event emitter needs to be configured on the server level as well.

End user View

Federated In-Baskets

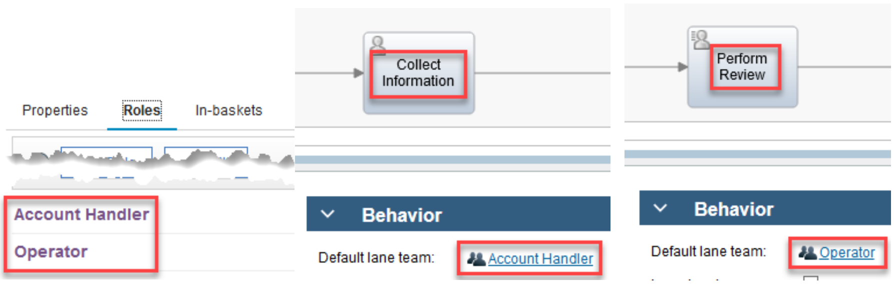
Starting with BAW 19.0.0.2 federation of tasks coming both from the P8 processes as well as the BPMN processes is supported in the Case Client. For BPMN user tasks to be shown in in-baskets they need to originate from a process that got started as part of running a case activity.

Tasks that are BPMN User Tasks show up to three status icons in the first column. The first indicates whether a task is overdue or even at risk (icon shown below). The second icon is an indicator for the priority of the task and the third provides information for unclaimed tasks for which Case role the task is available.

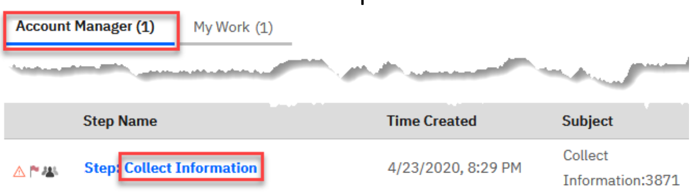


From a BPMN User Task perspective you are free to define the assignment for it. Let's look at three different situations and how these are reflected in the Case Client starting with BAW 19.0.0.3. The assumption is that the user is a member of the Team assigned to the task but has not yet claimed the task:

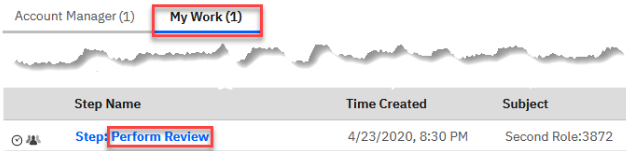
1. A Case role is defined in the Case solution and the respective team created in BPM capability is assigned to the User Task. (The screenshot shows two Case roles and two User Tasks each with one of the two created teams assigned.)



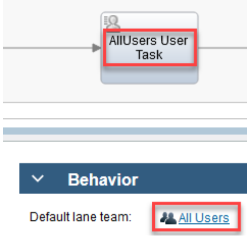
   a. An in-basket specific to the Case role is shown in the list of in-basket in the Case Client (here the in-basket for the Account Handler role is visible)
   → The User Task will be shown in the role-specific in-basket.



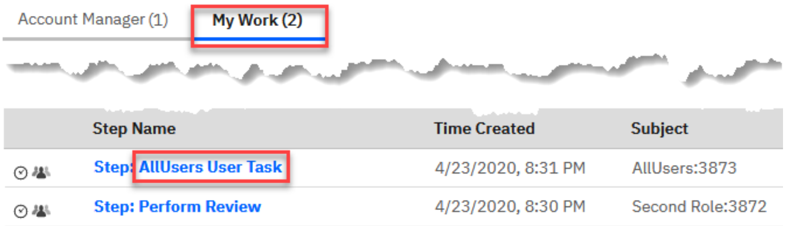
b. No in-basket specific for the Case role is shown in the Case Client (the in-basket for the Operator role is not visible)
→ The User Task will be shown in the personal in-basket (default name “My Work”)



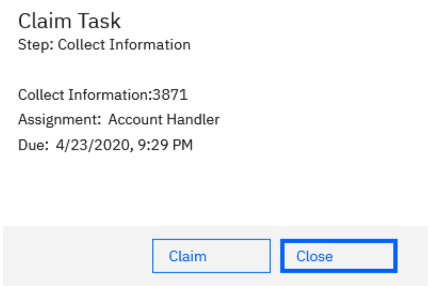
2. The assignment for the User Task is not based on a team created based on a Case role



→ The User Task will be shown in the personal in-basket (default name “My Work”)

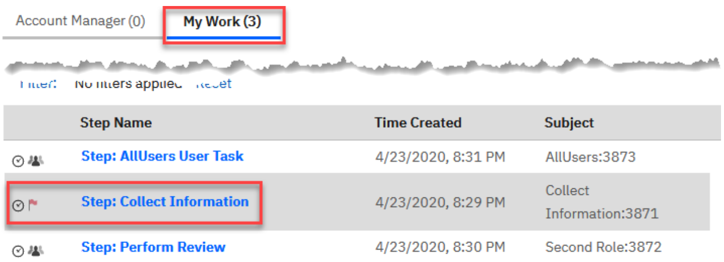


BPMN User Tasks need to be explicitly claimed before the user can work on them. When clicking on such a task to open it, it can be claimed via a pop-up window like below.



The task is then opened as another tab in the Case Client interface creating a unified user experience.

Whenever the task is claimed but not completed, the claimed task is shown in the personal in-basket. At this point the icon with three people is no longer shown.

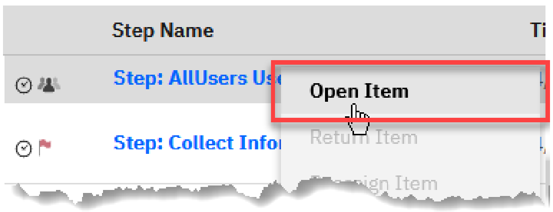


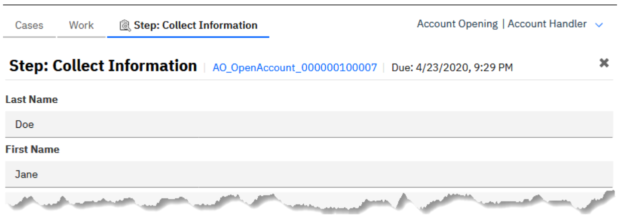
Starting with BAW 19.0.0.2 columns of an in-basket that are marked “Sortable” in Case Builder observe the sort order also for BPMN User Tasks in Case Client. This is also true when the list of tasks contains a combination of BPMN tasks and P8 tasks.

Context Menu Items for BPMN User Tasks

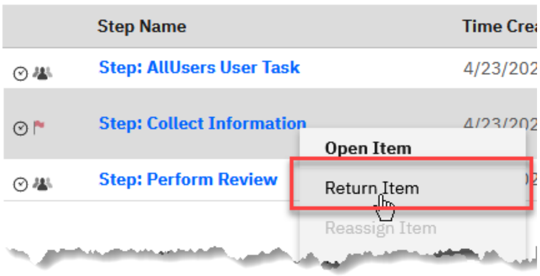
Right-clicking on a BPMN User Task in an in-basket in the Case Client brings up a context menu for this task. Depending on the configuration defined for the “Work” Solution Page, the state of the User Task and role of the user, different context menu items are shown and are active or disabled.

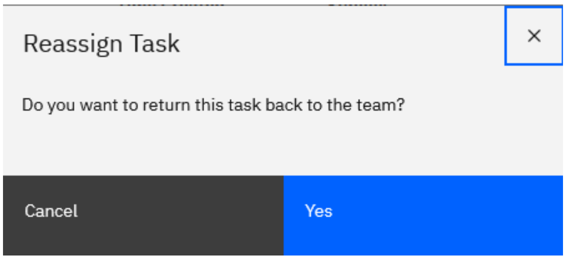
The “Open Item” action opens the UI (based on the “Process Activity Details Page” configured for this task) to work on the task as a new tab in the Case Client.



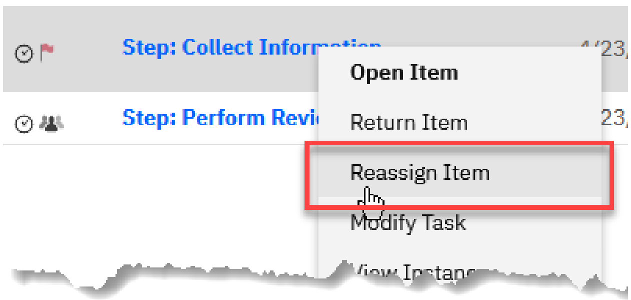


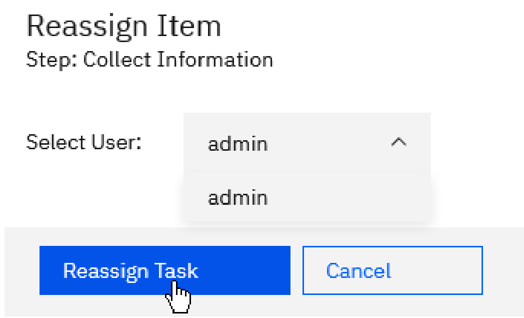
For a task that the current user has already claimed the “Return Item” action is available. It can be used to return this task back to the list of tasks that can be claimed and worked on by any user that is part of the assignment of the task.

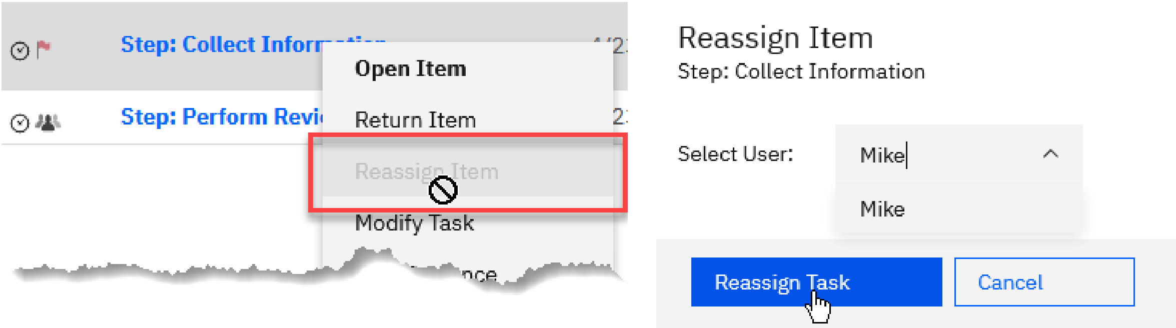




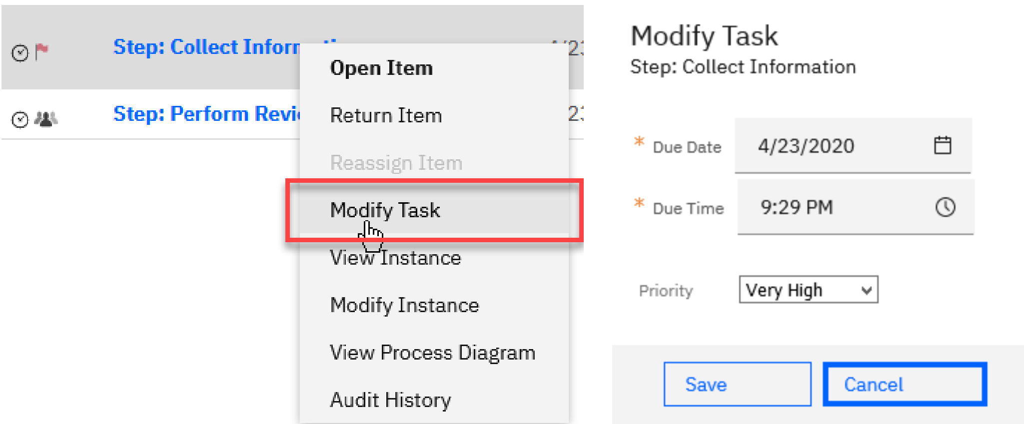
When a User Task can be potentially worked on by more than one person (in the screenshot potential owners are admin & Mike) the “Reassign Item” option is available, otherwise it is disabled. When the task is not yet claimed, the “Reassign Item” dialog only provides the current user to select from which basically allows to claim the task for oneself without opening it (top right picture, where logged in as admin). If the user has already claimed the task the “Reassign Item” dialog provides a list of all other potential owners of the task to select from. After reassigning the task, it is owned by the user selected.



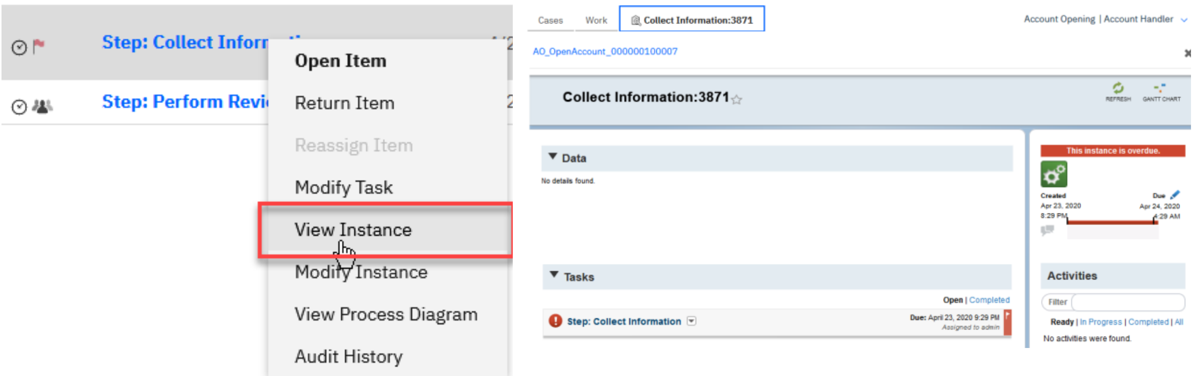




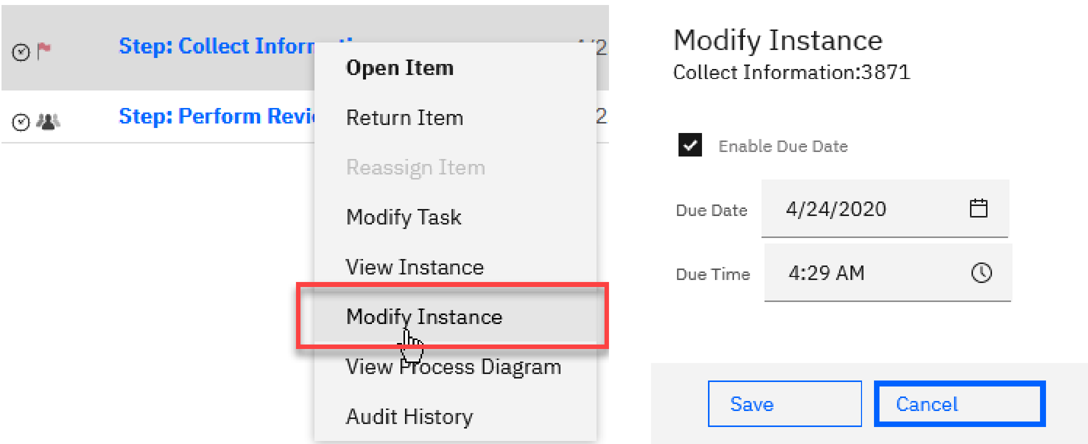
The “Modify Task” action allows to set the “Due Date”, “Due Time” and “Priority” of the BPMN task.



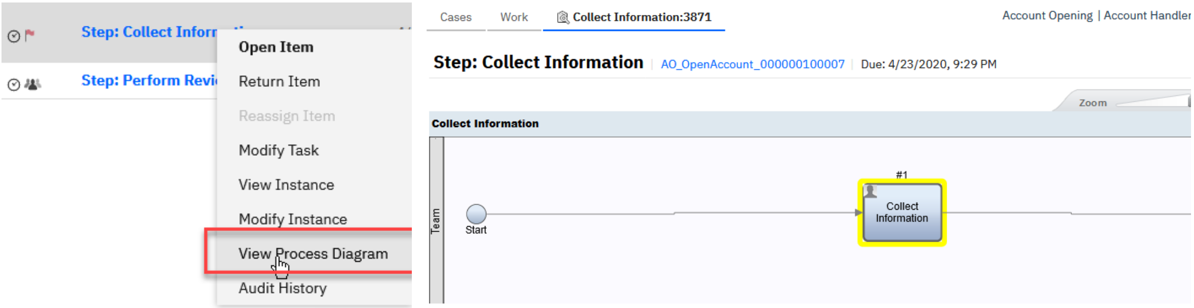
The “View Instance” action opens the Process Instance UI as a new tab in the Case Client.



The “Modify Instance” action allows to modify the “Enable Due Date” option and if it is enabled to set the “Due Date” and “Due Time” values for the process instance.

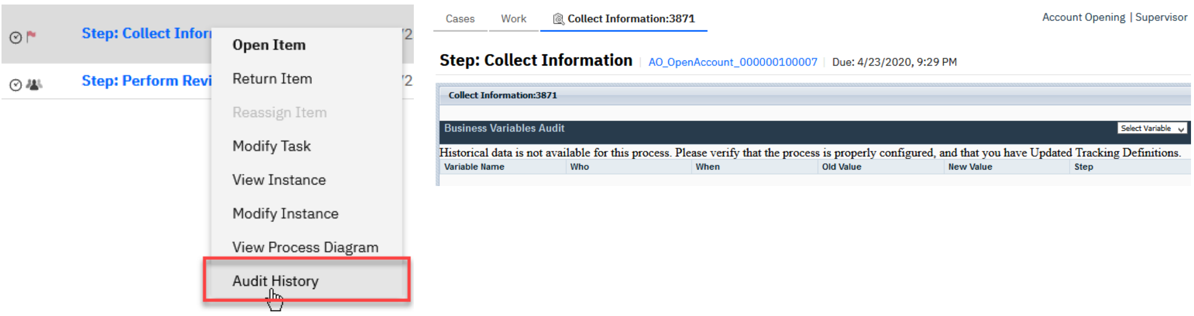


The "View Process Diagram" action opens the Process Diagram for the process instance that contains this user task as a new tab in the Case Client.



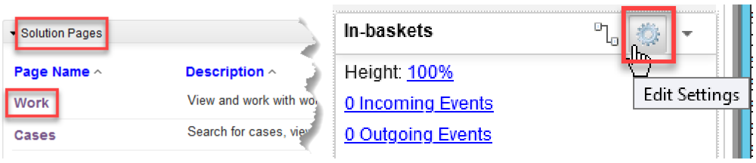
The "Audit History" action opens a new tab in the Case Client that shows information about who, when and what variables have changed for the process instance that this task belongs to. This capability requires "Autotracking" for the process to be enabled. Autotracking automatically captures data at the entry and exit of each item.

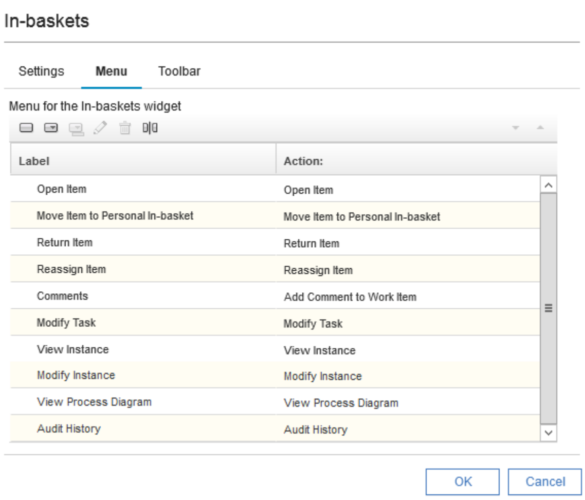
As autotracking can have a significant performance impact, it is in general discouraged to be enabled. Therefore, usage of the "Audit History" is to be looked at very carefully, potentially removing the option from the context menu (see below).



Customizing the Context Menu Items for BPMN User Tasks

The context menu items as shown in the previous section are the default context menu items for a BPMN User Task as defined in the "Work" "Solution Page".





You can either customize the context menu of the default Work solution page or make a copy of the default page, customize the context menu for this copy and use the copy for one or multiple in-baskets.

Appendix

Terminology Changes

The first set of terminology changes were introduced when IBM Business Process Manager and IBM Case Manager were integrated. Below table lists the old and the new names as introduced in IBM Business Automation Workflow (BAW) 18.0.0.1.

Former Name	New Name
IBM Business Process Manager	IBM Business Automation Workflow
IBM Case Manager	IBM Business Automation Workflow
IBM Process Center	IBM Workflow Center
IBM Process Server	IBM Workflow Server
Case Manager Builder	Case Builder
Case Manager Client	Case Client
Process Designer (Content Platform)	IBM FileNet Process Designer

Table 1: Terminology Changes as of IBM Business Automation Workflow 18.0.0.1

In BAW 18.0.0.2 another terminology change was made.

Former Name	Renamed to
(Case) Task	(Case) Activity

Table 2: Terminology Change as of IBM Business Automation Workflow 18.0.0.2

Common Terms

Below table briefly introduces some terms from the IBM Business Process Manager world that appear throughout this document but may not be known to readers with an IBM Case Manager background.

Concept	Short Explanation
Process App/Process Application (PA)	Process Apps formerly called Process Applications (PAs) are top-level, deployable containers for business processes and other artifacts used in BPM solutions. Artifacts in a PA are available only to that PA. A PA has a name, an acronym, and an optional description.
Toolkit (TK)	Toolkits (TKs) are containers you use to store artifacts that are shared across PAs. To make artifacts available across PAs, you put them in a TK and add the TK as a dependency to the PA. PAs can share library items from one or more TKs, and TKs can share library items from other TKs. Overall a dependency hierarchy is created that starts with the PA. The product comes with a set of System Toolkits that provide resources that you can use as you build your Process Apps. The TKs cannot be edited. Custom TKs are all those TKs that customers or Business Partners create and maintain themselves.
Snapshot	Any versioning of BPM artifacts is done at the container level (PA or TK), not at the level of the individual artifacts. Snapshots record the state of items at a container level at a specific point in time. Snapshots are immutable. Modifications can only be done on CURRENT, sometimes called TIP (which is comparable with what other versioning systems call ‘head’) for a container (PA/TK).

Process (BPMN)	A process is a set of related activities, along with supporting information such as data and content. In the same flow you can have activities linked by connectors forming a structured flow or ad-hoc activities with pre-conditions that are outside of the structured flow. The activities can be part of a structured flow, or ad-hoc activities that are not part of a structured flow.
User Task	Activities of type User tasks must be completed by process participants and are associated with Human services by default.
Service Flow	Service flows are used to model services for business processes. They can consist of a series of steps with conditions, error handling, embed rule logic and can call other service flows. From within service flows you can also call REST services, Web Services, and Java code.
Business Object (BPM)	Custom variable types are defined by using business objects. You can create your own business objects. These can contain base types as well as other business objects.
Group (BPM internal)	Business Automation Workflow internal groups can be created to contain users and other internal or external (e.g. LDAP) groups. BPM Internal Groups can be managed by those responsible for the BAW environment whereas groups originating from a corporate user registry often requires corporate authority to be created and modified.
Team	A team is a group of users who perform similar tasks. It consists of a set of members and optionally a team of managers. The members are specified either individually or through internet or external groups. Teams are mostly used to assigned them to User Tasks. That way you can specify which people can work on which User Tasks and which people (those that are part of the manager team) can manage the work assignment for example by reassigning work from one user to another.
Client-Side Human Service (CSHS)	Human services provide the logic and user interface through which users can view and interact with data or process instances. Client-Side Human Services use web technology to improve the human-service performance and run on the client-side in the web browser.
Coach	Coaches comprise user interface elements called views. You use views to build a coach or page or multiple pages, then use the coach as part of a client-side human service to build the user interface that you need.