IBM Cloud Pak for Business Automation Demos and Labs 2022

Introduction to IBM Business Automation Application

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V 1.2

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1 Introduction

1.1 IBM Business Automation Application

IBM Business Automation Application provides a way to create apps that automate repetitive and time-consuming work by quickly building user interfaces that integrate tasks, data, and automations to drive efficiency across your business. Using a low-code application builder, IBM Business Automation Application Designer, users can create business applications (apps) that leverage the capabilities of the IBM Cloud Pak for Business Automation platform. The authored apps are deployed in the IBM Business Automation Application Engine and end users work with them in IBM Business Automation Navigator.

Additional information about IBM Business Automation Application can be found here.

1.2 Lab Overview

There are two types of users who use the Application Designer – Technical users and Business users. Technical users often create templates that are predefined starting points for business users to create their own applications. Templates can represent common-use case patterns and contain various artifacts that can be reused by business users in their applications. Applications & templates also contain toolkits that contain a collection of shared artifacts. These toolkits can be created by the technical user (e.g., a developer or a business partner), or contributed by another capability (e.g., Content or Workflow).

In this lab, you will perform the roles of both a technical user and a business user to create a toolkit, template and an application that is a part of the overall Client Onboarding end-to-end solution.

Approximate Duration: 2 hours

1.3 Lab Setup Instructions

1. If you are performing this lab as a part of an IBM event, access the document that lists the available systems and URLs along with login instructions. For this lab, you will need to access **IBM Business Automation Studio**.
2. Download the **Focus-Corp-Logo.png** file from the **Lab Data** folder onto your computer.

2 Exercise: Creating the Client Onboarding toolkit

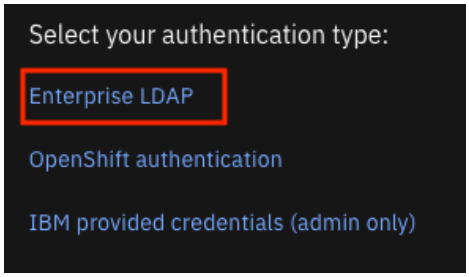
2.1 Introduction

In this exercise, we will create a reusable toolkit as a technical user. The toolkit will contain a reusable view that can be used in later exercises to create the **Client Onboarding** application.

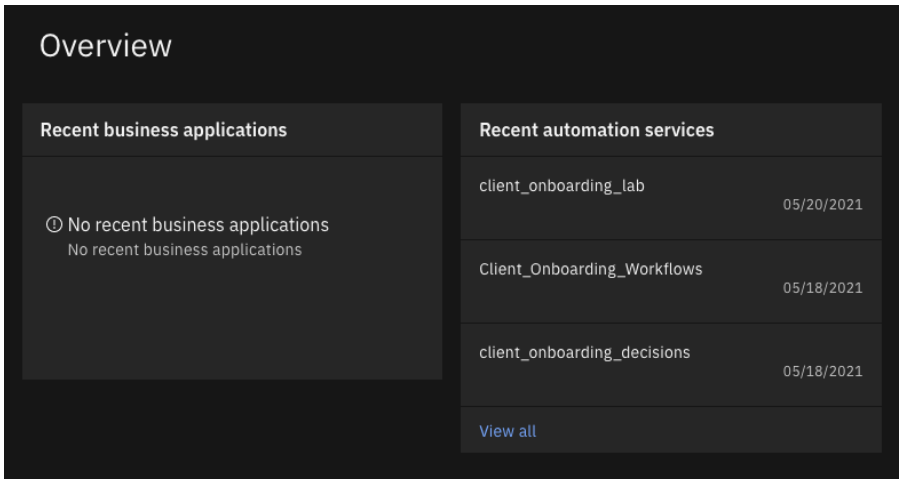
2.2 Exercise Instructions

2.2.1 Creating a toolkit

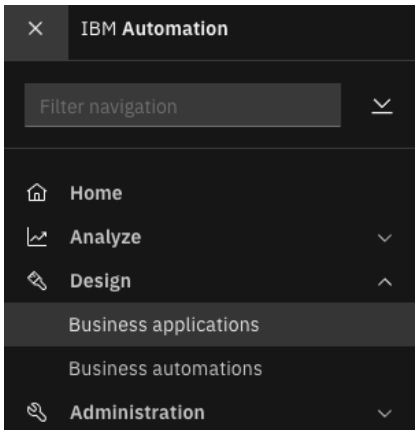
1. In your browser, login to IBM Business Automation Studio using the Enterprise LDAP option.



   The homepage (called Zen) contains cards that showcase recent artifacts across all installed Cloud Paks in the system. You may also see a dialog that allows you to go through a tour of the Zen UI. You can close this or choose to walk through the tour.



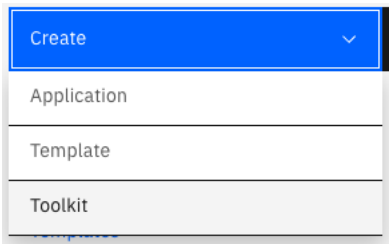
2. In the top-left corner, click on the menu icon and select **Design → Business applications** to access the application repository.



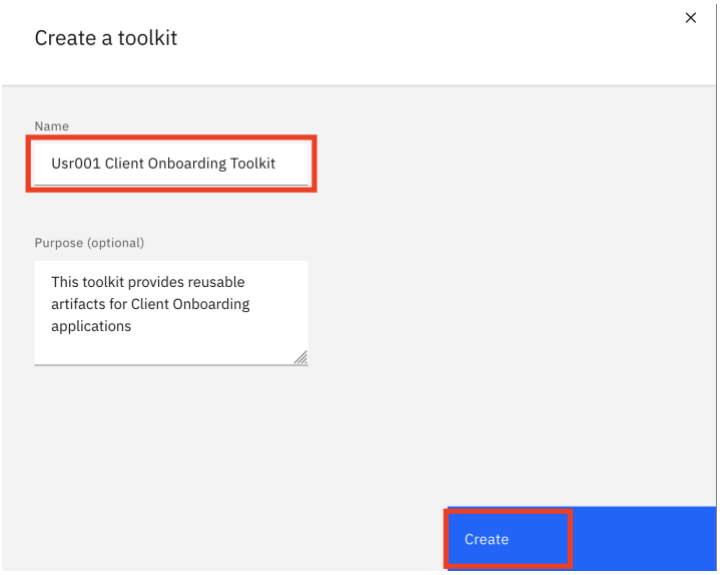
After opening the application repository, you may see a dialog with a tour to walk through the UI and capabilities. You can close this or choose to walk through the tour.

A toolkit contains reusable Views (UI elements) and Actions (Services). These artifacts can also be added to the template directly but adding them to a toolkit ensures that they can be reused by multiple other toolkits, templates, and applications.

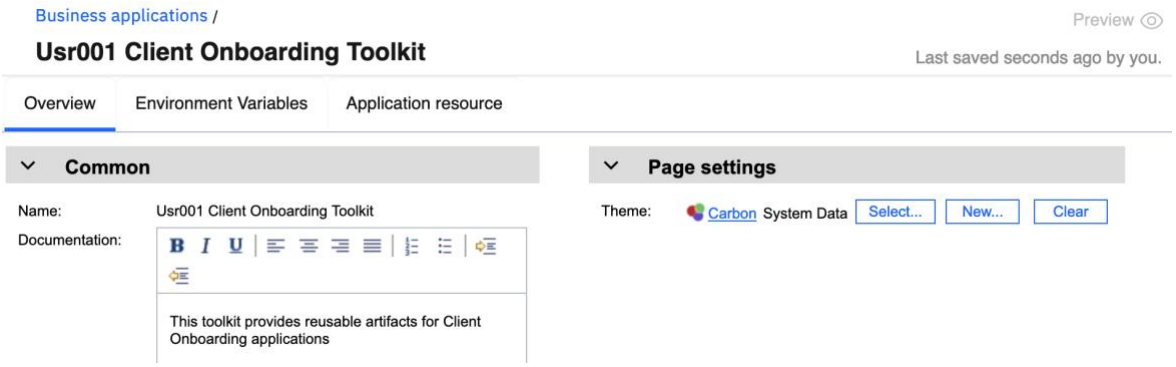
3. Click on **Create → Toolkit**.



4. For the **Toolkit name**, enter ***UsrNNN* Client Onboarding Toolkit** where *UserNNN* is your assigned username.
5. Provide an optional **purpose**.
6. Click on **Create**.



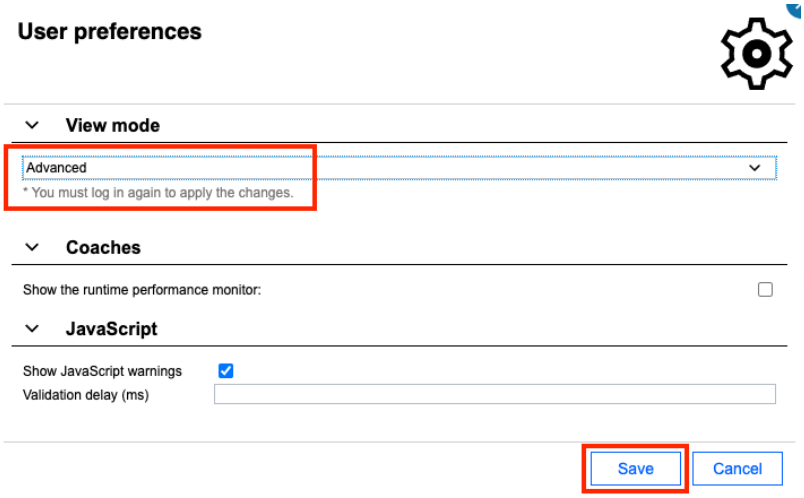
This will open the Application Designer Toolkit editor in a **Basic** view mode. In this mode, you cannot create any new artifacts as the capabilities in the Basic view mode are scoped down for ease of use for business users.



As we are now emulating a technical user, we will switch to the **Advanced** view mode.

7. In the top-right corner, click on the **User preferences icon**.

8. In the **View mode** dropdown, select **Advanced**.
9. Click on **Save**.



10. For the changes to be effective, **refresh** the browser window.

2.2.2 Creating reusable views

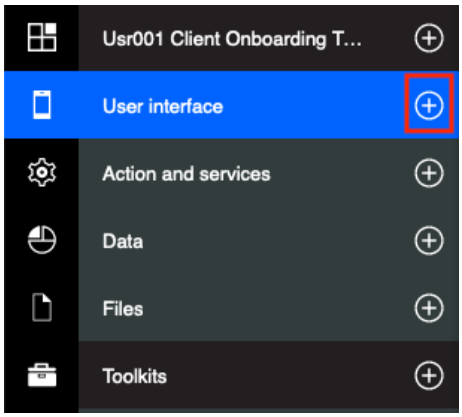
Now, notice that a library pane is available on the left-hand side, and this can be used to create new artifacts and add other toolkits as dependencies.

In this toolkit, we will add a view, **Custom Header**, that can be used by all templates & applications to display the logo of **Focus Corp**.

1. **Expand** the library pane by clicking on the **Library** icon in the bottom-left corner.

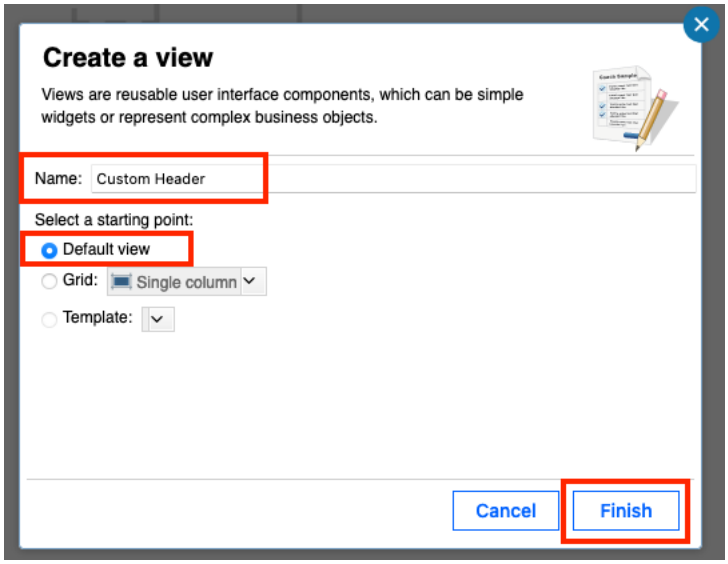
This shows the library menu which lists the different categories of artifacts you can create. The library pane also expands automatically if you click on one of the items in the collapsed panel.

2. In the library pane, click on the **+** button next to **User interface**.



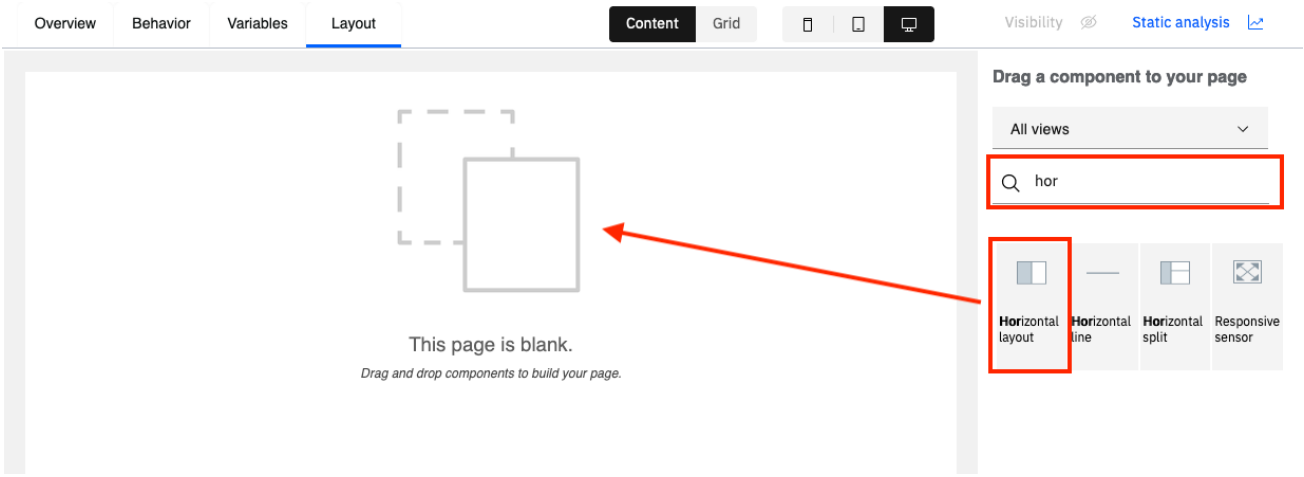
3. Select the **View** artifact.

4. In the **Name** field, enter **Custom Header**.



The starting point allows you to create views that have pre-configured UI elements within it. For this view, we will start with the Default view which is an empty view.

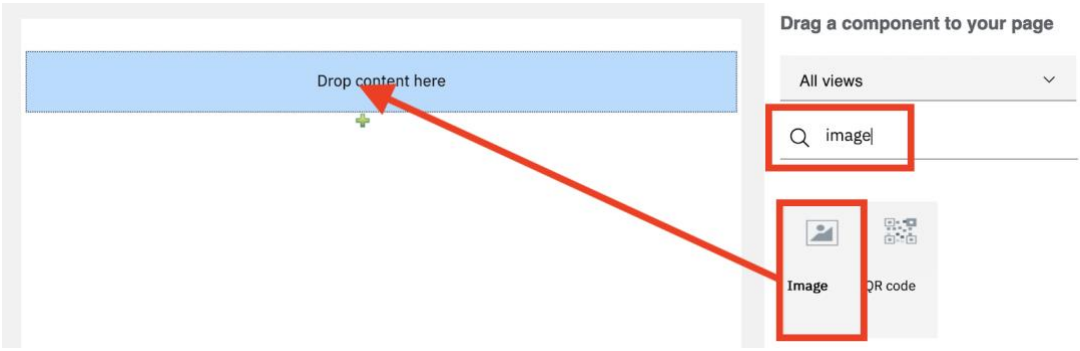
5. In the component palette on the right-hand side, enter **hor** in the **search** field.
6. Drag and drop the **Horizontal Layout** view onto the editor.



As the name suggests, the horizontal view can be used to house other views inside it horizontally.

Note: Hovering over the **info** icon on the view in the palette gives you more information about each view.

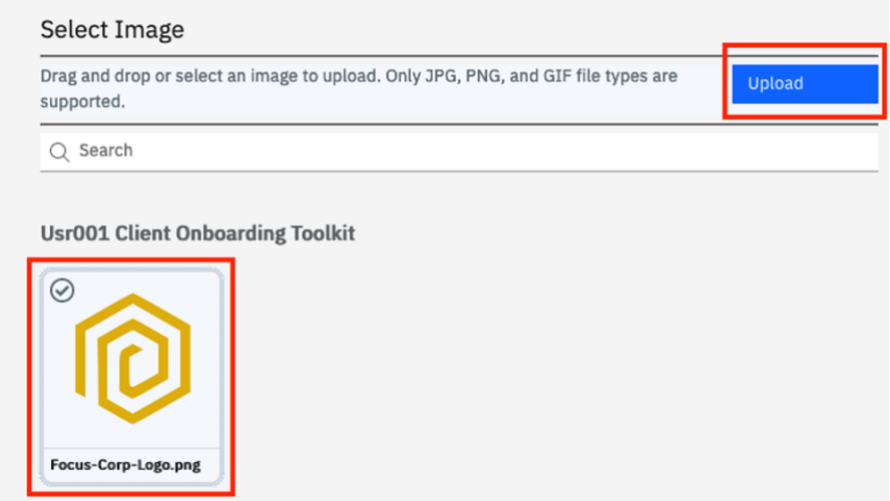
7. Next, look up the **Image** view by searching for **image** and drag and drop the view onto the just added horizontal layout.



8. Select the **Image** view in the editor and click on the **Select image** icon.

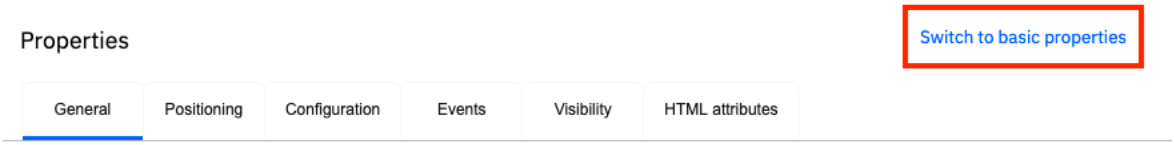
This opens the editor to select and upload new images.

9. Click on **Upload**.
10. Upload the **Focus-Corp-Logo.png** file that you previously downloaded as a part of the lab setup.
11. Select the uploaded file **Focus-Corp-Logo.png** in the dialog.



12. Click on **Select** to close the dialog.
13. To edit the size of the image, select the image and click on the **Properties** icon.

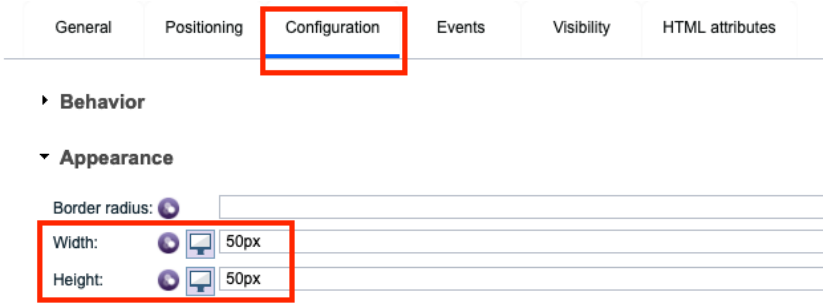
14. If the **Properties** pane shows multiple tabs such as **General, Positioning** and so on, click on **Switch to basic properties**.



This opens the user-friendly property editor that is specific to the **Image** view. Most out-of-the-box editors come with basic and advanced property editors to provide functionality to both business and technical users. Observe the design of the basic editor. Since we are acting as a technical user, we will switch back to the advanced properties editor.

15. Click on **Switch to advanced properties**.

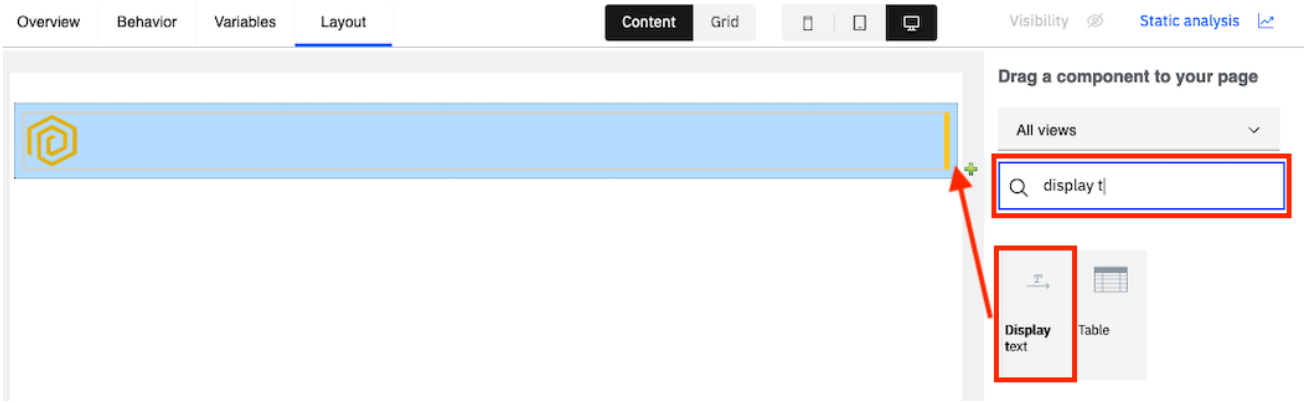
16. Click on the **Configuration** tab.
17. Expand the **Appearance** section.
18. For the **Width** and **Height** fields, enter **50px** as the values.



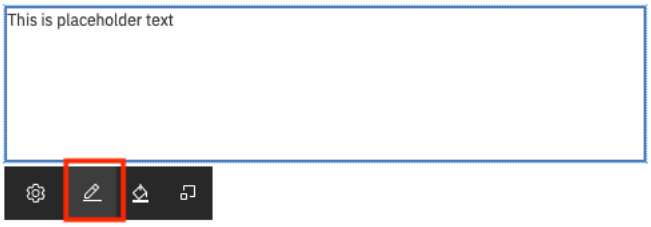
19. Click on **Done** to close the properties pane.

    Observe that the image size now reflects the specified width and height.

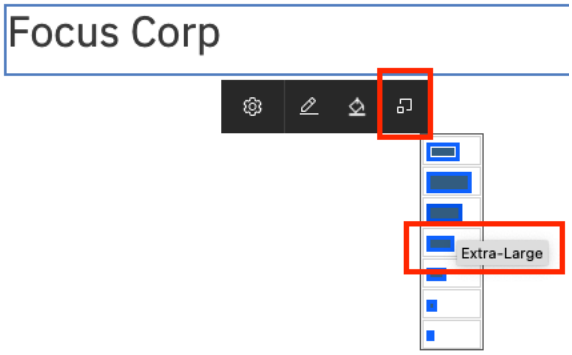
20. Add the **Display Text** view from the palette to the right of the logo within the horizontal layout.



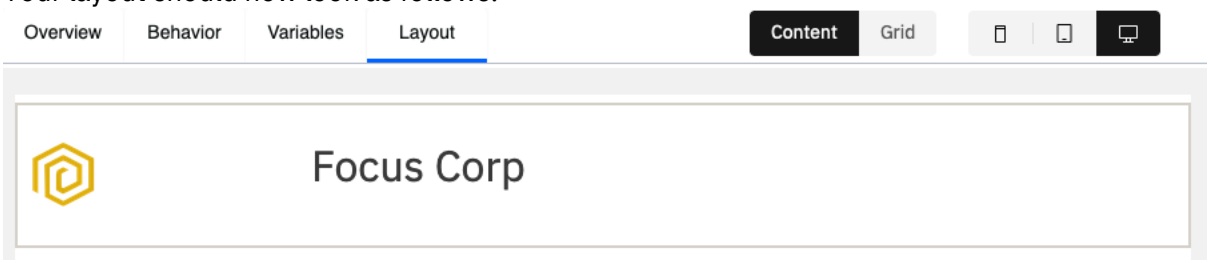
21. Type **Focus Corp** where it says **This is placeholder text**. If the text is not editable, click on the **Edit static text** button to edit it.



22. Click on the **Select size** icon on the displayed text and select the **Extra large** size to make the font size bigger.



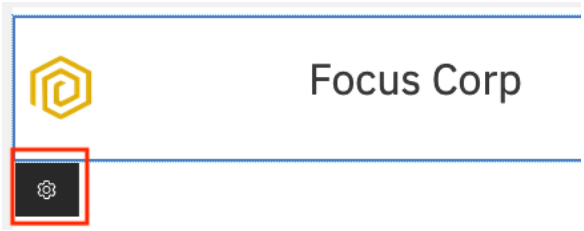
Your layout should now look as follows:



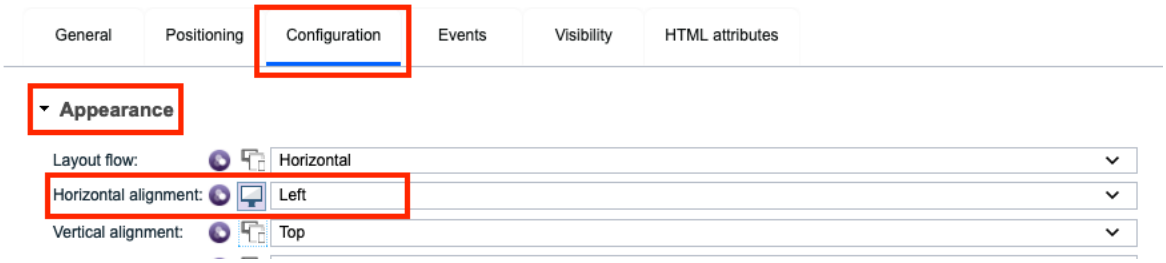
Tip: If you want to configure a view so that additional UI elements can be added to it when it is re-used, you can add the **Content Box** view within it. This allows the template or application to add other views within the view in your toolkit.

Next, we need to make the text appear closer to the logo. To do this, we will align the UI within the horizontal layout to the left.

23. Click on the **Properties** icon for the horizontal layout.

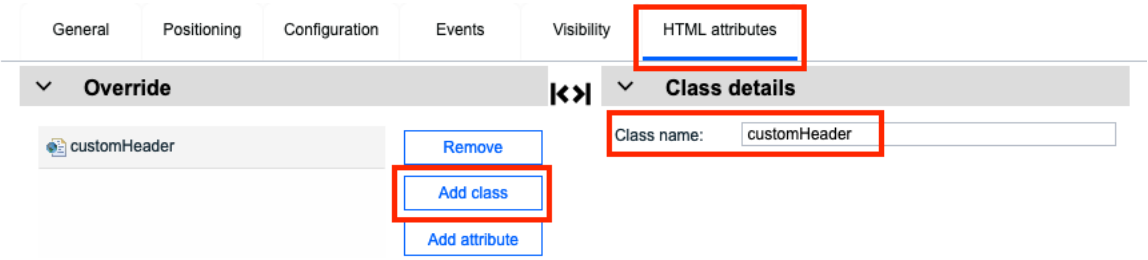


24. Click on the **Configuration** tab.
25. In the **Appearances** section, select **Left** as the value for the **Horizontal alignment** field.



Next, we will see how users can add custom CSS classes and define the CSS for a custom view.

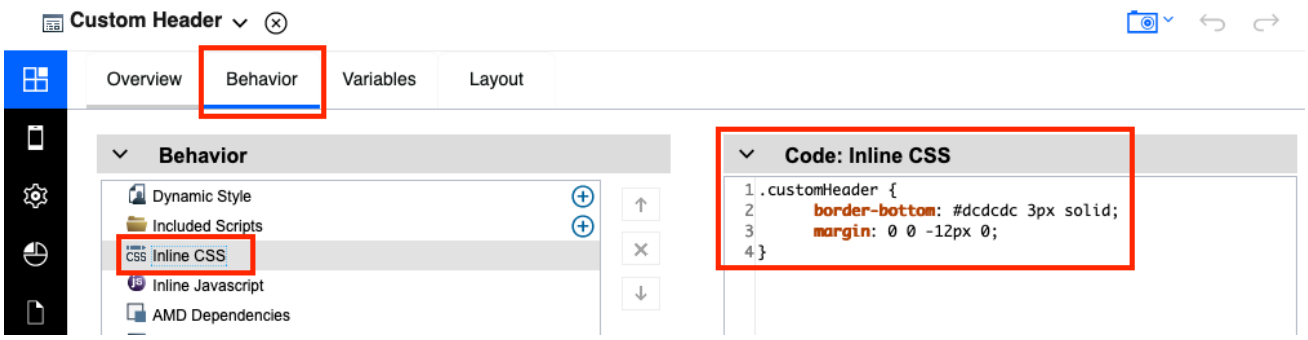
26. Click on the **HTML attributes** tab.
27. Click on **Add class**.
28. Enter **customHeader** as the **Class name**.



29. Click on **Done** to close the properties pane.
30. Click on the **Behavior** tab in the top bar.

31. Click on **Inline CSS** and enter the following CSS code:

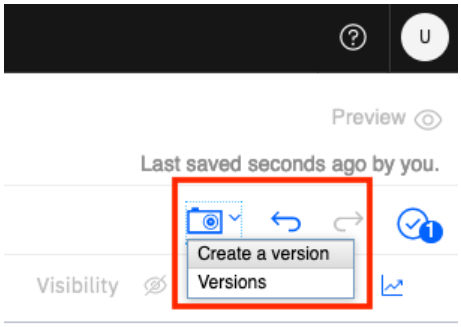
```
.customHeader {
  border-bottom: #dcdcdc 3px solid;
  margin: 0 0 -12px 0;
}
```



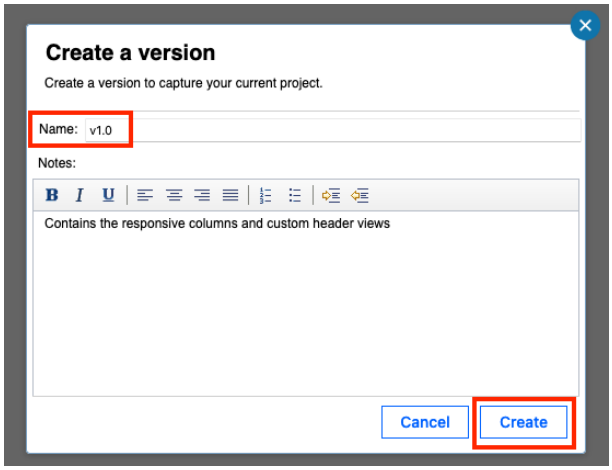
This will add a border to the bottom of the header and customize the margins. This is not required but just done as an example to show that even though the Application Designer is built for low-code and no-code, technical users can create highly customized views based on their design requirements. This completes the building of the **Custom Header** view. This view is now accessible by any template or application that uses the Client Onboarding toolkit. Next, we will create a version of this toolkit so that it can be used in other toolkits, templates, and applications. You can also clone versions in case you want to create a copy. This way a developer can create a new template using an existing template.

32. Click on the **Version** icon  in the top-right corner.

33. Click on **Create a version**.

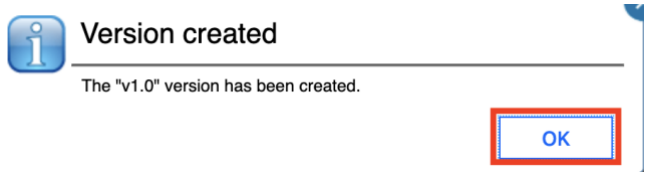


34. In the name field, enter **v1.0**, provide optional notes and click on **Create**.

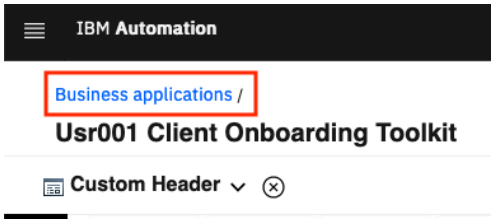


This automatically saves the artifacts and creates a new version of the toolkit.

35. Click on the **OK** button to confirm that the version was created.

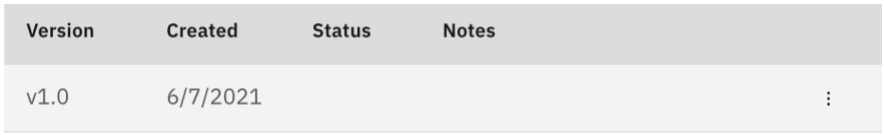


36. Click on **Business applications** in the top-left corner to go back to the repository.



37. Back in the repository, click on **Toolkits**.

38. Click on the **UsrNNN Client Onboarding Toolkit** tile. Do **NOT** click on the open button as it will reopen the toolkit. You should now see the **v1.0** version in the details on the right.



In the next exercise, we will use this toolkit in a **Client Onboarding** template. The template can then be used by application developers to create business applications based on the client onboarding template.

3 Exercise: Creating the Client Onboarding template

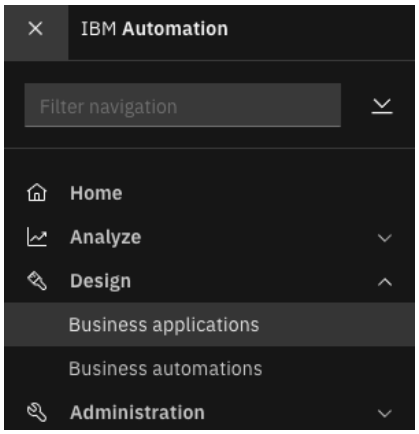
3.1 Introduction

In this exercise, we will create a template that will form as the start point for the **Client Onboarding** application in the next exercise.

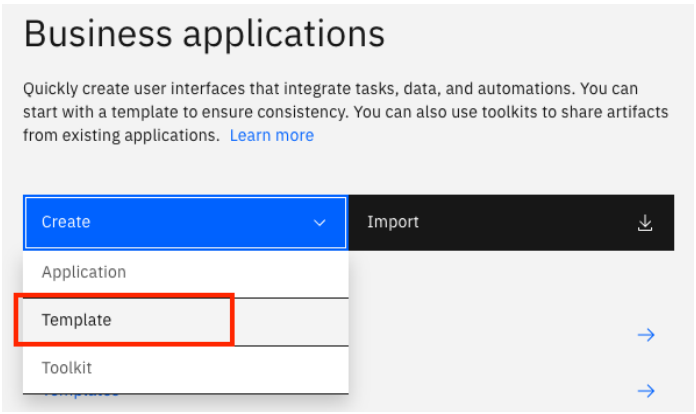
3.2 Exercise Instructions

3.2.1 Creating a template with toolkit dependencies

1. In your browser, open the IBM Automation page and login with the username & password assigned to you.
2. In the top-left corner, click on the menu icon and select **Design → Business applications** to access the repository.



3. Click on **Create** and select **Template**.

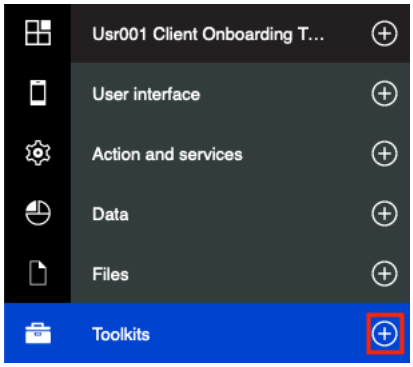


4. In the **Name** field, enter ***UsrNNN* Client Onboarding Template**.
5. Provide an optional **purpose**.
6. Click on **Create**.

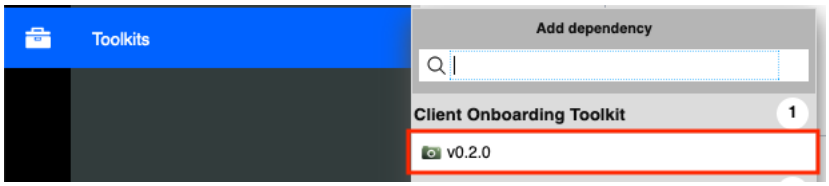
This opens the template editor at the Starting Page. When an application is launched, this is the first page that a user will see. An application can contain several pages.

Next, we will add two toolkit dependencies that are required to build this template. The first toolkit is the pre-built **Client Onboarding Toolkit** that contains some artifacts required for this lab. The second toolkit is the ***UsrNNN* Client Onboarding Toolkit** that we just created.

7. In the Library pane, click on the **+** button next to **Toolkits**.



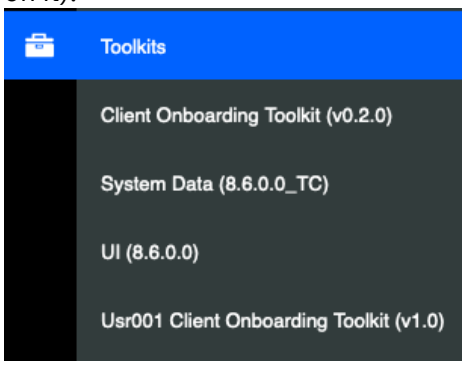
8. Select the last version under **Client Onboarding Toolkit**.



Note: The version number shown might differ from the screenshot.

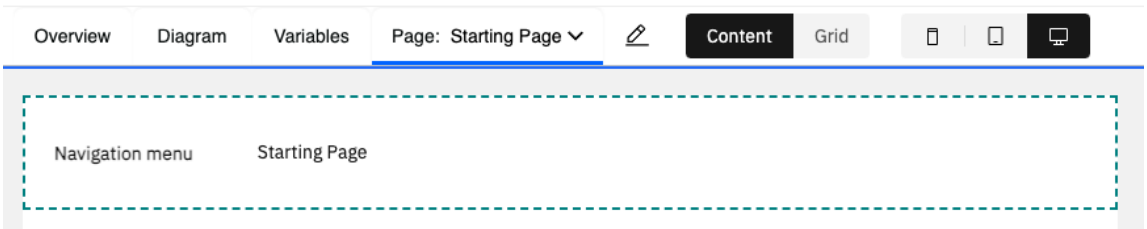
9. Similarly, add the latest version of the ***UsrNNN* Client Onboarding Toolkit** you created in the previous steps.

   The toolkits section should look as follows when expanded (you can expand the section by clicking on it):



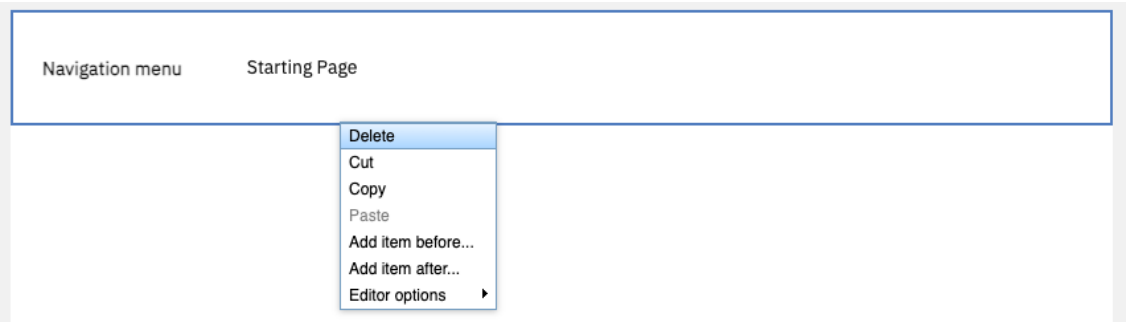
   The **System Data** and **UI** toolkits are added to each application, template, and toolkit automatically.

Next, we will update the UI for the **Starting Page**. The default page contains a navigation menu that shows the different pages in an application. The default navigation menu can be automatically updated as you add new pages and can also be customized to include additional navigational components that you may require in your application.



Using this menu is optional. As we don't need a navigation menu for this use-case, we will delete it.

10. Right click on the **Navigation menu** and click **Delete**.



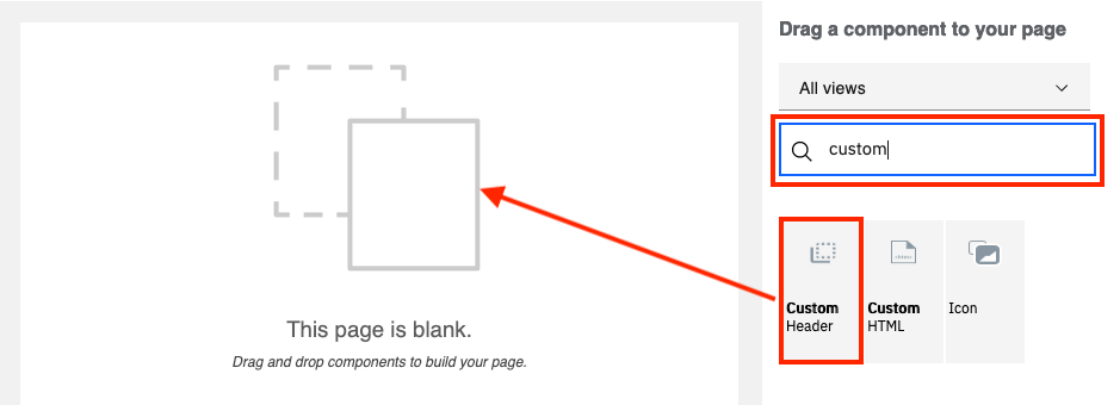
There should now be a message in the UI that says "This page is blank". If you still see "Default Navigation Bar", then right click on that, and delete it as well. Note that the default navigation menu can be added back later even if you choose to delete it now.

Next, we will update the **Starting Page** to include the UI necessary for any **Client Onboarding** application. The UI will call out to any required automation services. Automation services are services that are published by developers using other capabilities of the platform e.g., Workflow and Decisions.

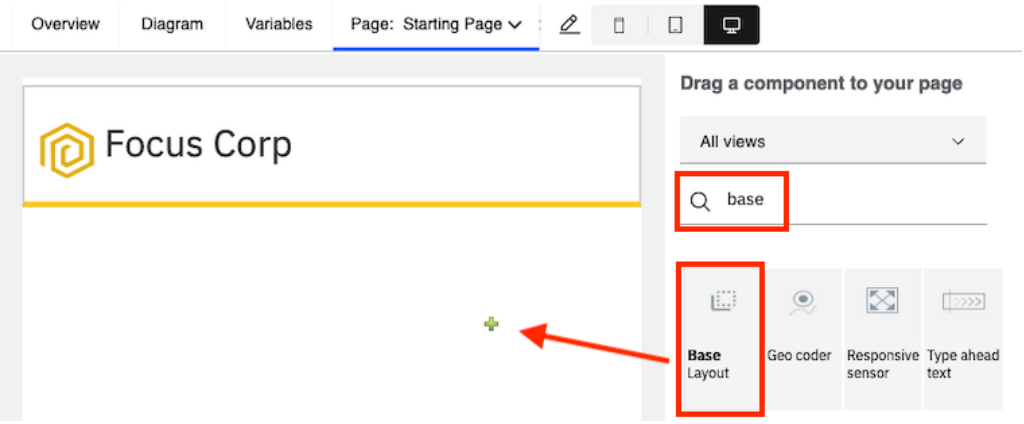
3.2.2 Creating UI that integrates with the Workflow capability

We will start by adding the **Custom Header** and **Base Layout** reusable views from the toolkits we just added to the template.

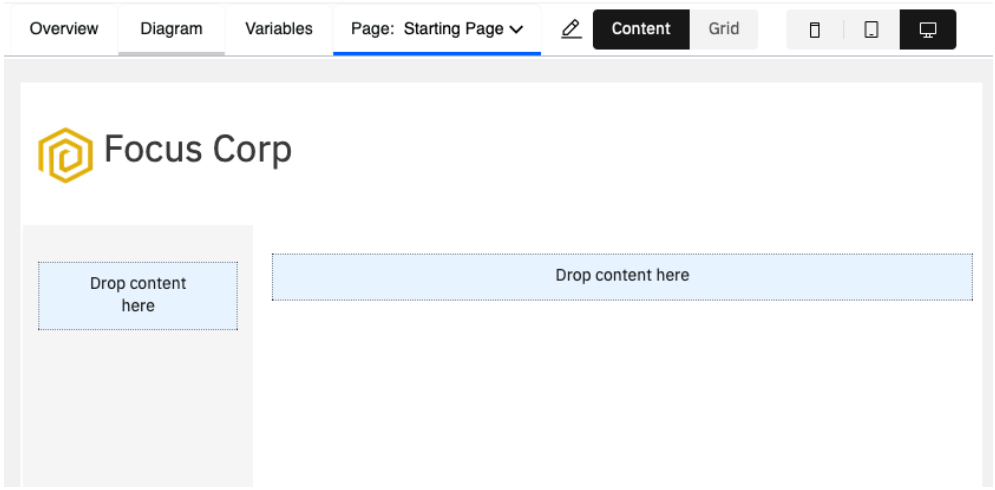
1. In the palette on the right-hand side, enter **custom** in the search field.
2. Drag and drop the **Custom Header** view onto the blank page.



3. Similarly, drag and drop the **Base Layout** view below the header.



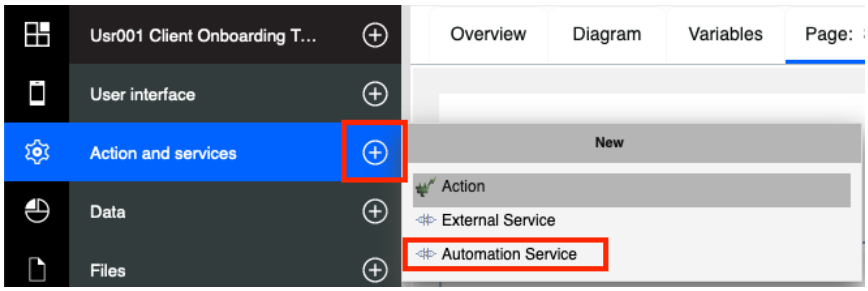
Your layout should now look as follows:



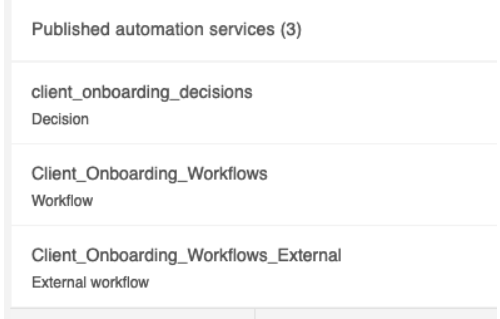
As you can see, you can add other views inside of the **Base Layout** view. This is because the Base Layout view uses the view **Content Box** that can contain additional UI elements.

Next, we will add an **automation service** to the template that will allow us to get the details of a client that is being onboarded. This automation service is published by the developer of a Workflow application and provides the details of a client based on the name of a known client. There are multiple ways to add an automation service to a template or an app. Let's look at the first one.

4. In the library pane on the left-hand side, click on the **+** button next to **Action and services** and select **Automation Service** as the artifact to create.



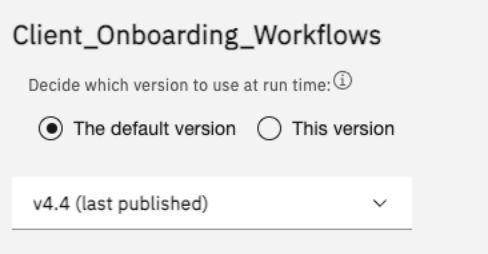
This launches the Automation Service discovery wizard that lets us add existing Automation Services to the template. The wizard shows all available Automation Services that are published from various capabilities of the Automation platform i.e., **Decision, Workflow** & **External Workflow**. The **External workflow** automation service is defined in an external Workflow system that can be both, a traditional install, or containerized install. For the Client Onboarding scenario, the automation service to trigger a new Client Onboarding workflow is in an external Workflow system.



You may see a different list than the screenshot based on the system you are using.

5. Select the **Client_Onboarding_Workflows** automation service.

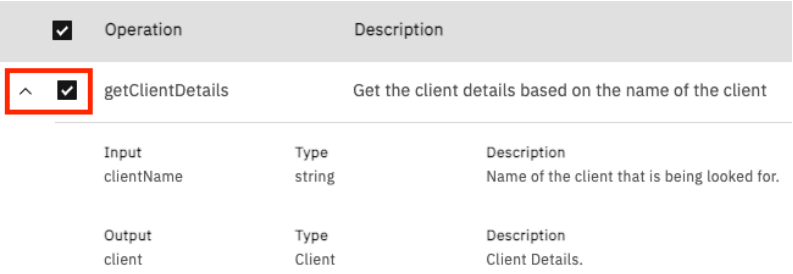
   This shows the available operations within this automation service which in this case are **getClientDetails** and **submitClientDocument**. In the dropdown at the top, the last published version of the automation service is automatically selected. The dialog also gives us the option to select whether we want to use the default version at run time. What this means is that if a new version of the automation service is available, the application will automatically use that version during execution. We will keep that option selected.



6. Click on the **twisty** icon next to the **getClientDetails** operation to view its details.

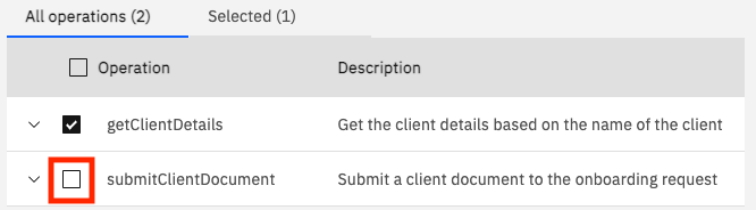
   Here you can see that the automation service requires the input **clientName** and provides the details of the **client** as the output.

7. Select the **getClientDetails** operation.



   For this template, we need only the **getClientDetails** operation.

8. **Uncheck** the **submitClientDocument** operation.

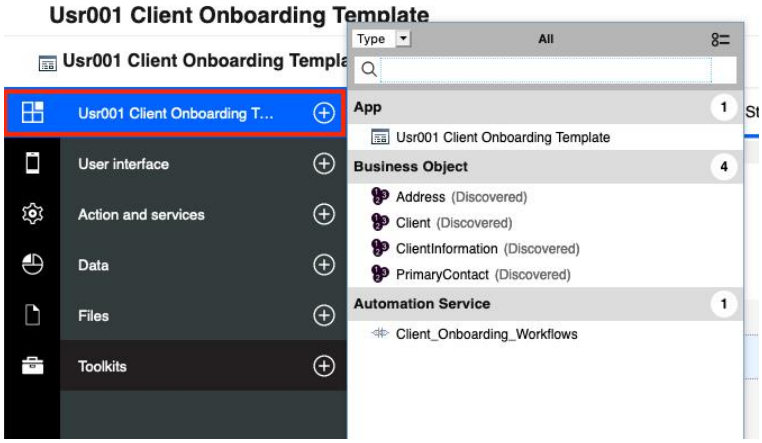


9. Click on **Add (1)** to add that automation service to the template.

   This automatically opens the **Client_Onboarding_Workflows** automation service in the editor. This editor shows the details of the operation just like it did in the automation service discovery wizard.

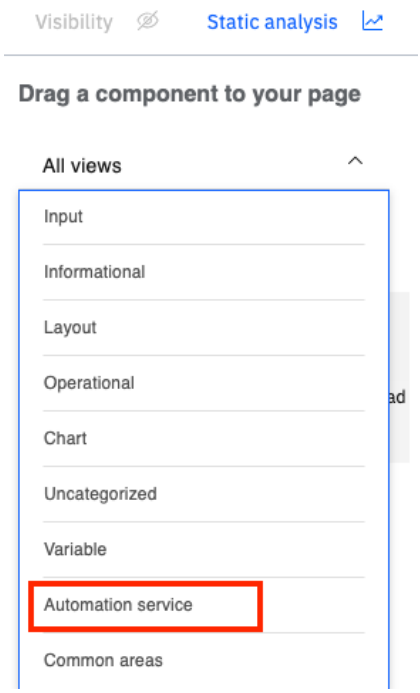
10. Close the editor for **Client_Onboarding_Workflows** by clicking on the **X** button in the top-left corner.

11. Click on the first row (name of your template) in the library pane.



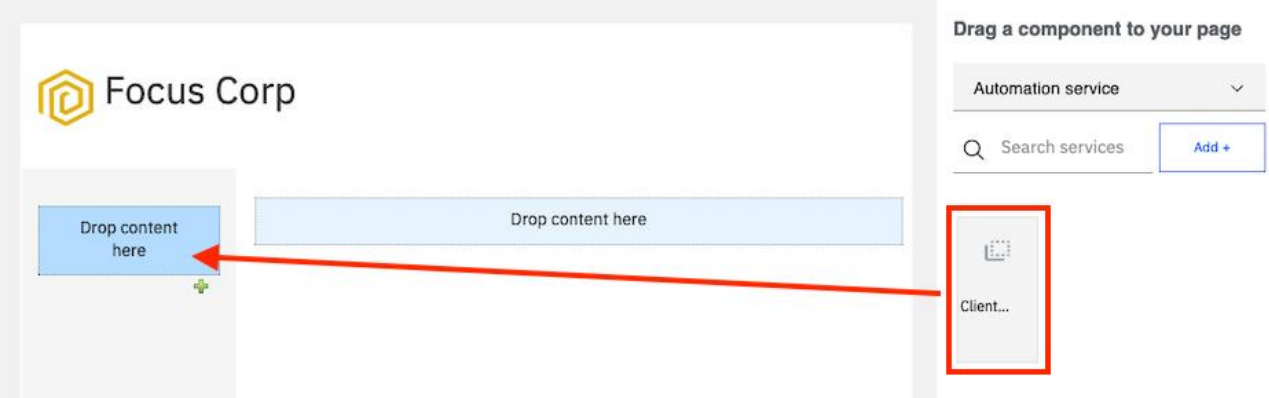
The automation service **Client_Onboarding_Workflows** is added to the template along with all the business objects required to execute the service. Business objects are artifacts that encapsulate the business data just like Views encapsulate the UI.

12. Back in the editor, in the palette on the right-hand side, switch to the **Automation service** option where it currently says **All views**.



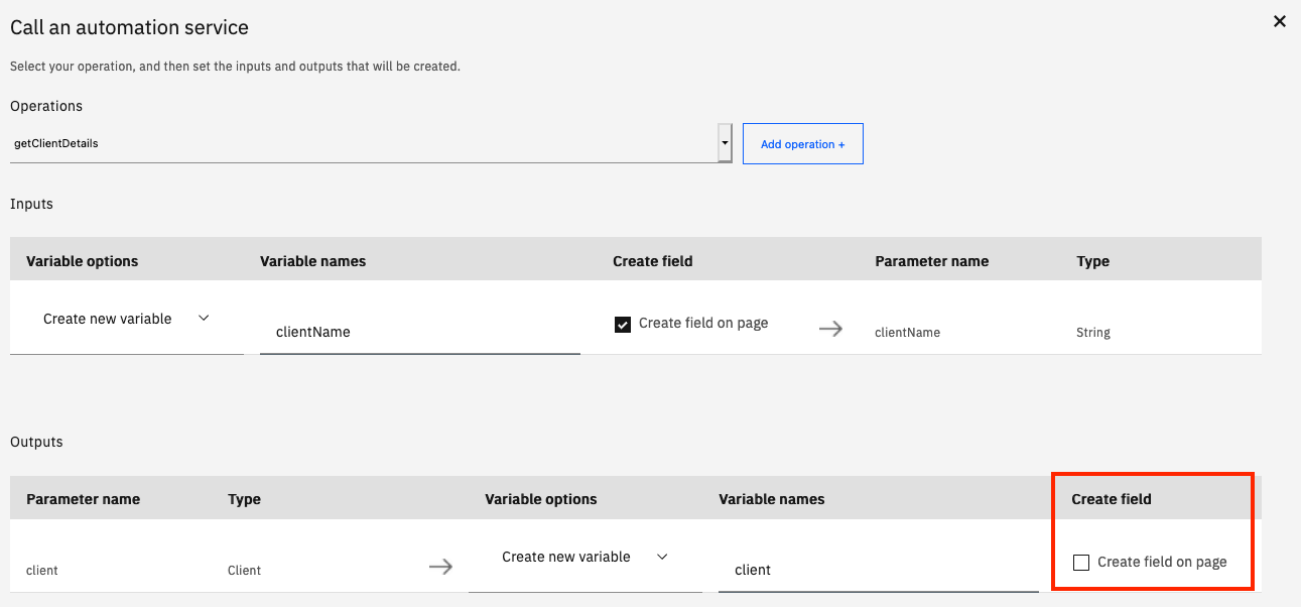
You will see that the **Client_Onboarding_Workflows** automation service is also shown here (you may have to clear any text present in the search field first). The right-hand side palette contains not only Views representing UI but also services and variables that can be dropped to the editor to create the relevant UI automatically. Users in the advance view mode have more views, than the users in the basic view mode.

13. Drag and drop the automation service from the palette to the grey column on the left where it says **Drop content here**.



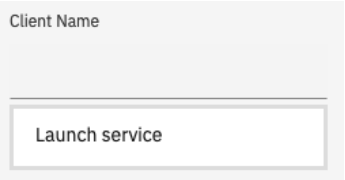
This pops up a wizard to call the automation service from the starting page. This wizard contains the list of operations available within the automation service and the inputs and outputs relevant to that operation. It also provides the users the ability to automatically create new variables and UI fields required to call this automation service.

14. Uncheck the **Create field on page** option for the **Output** as we will create the UI for the output in a different place on the page than the one we dragged the automation service to.

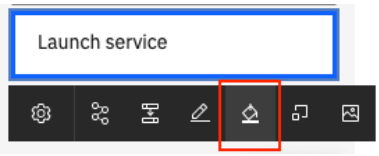


15. Click on **Done**.

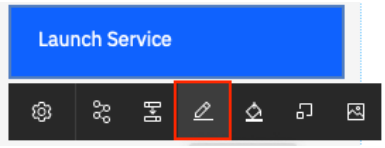
This adds the **Client Name** field on the page along with a **Launch service** button that will call the automation service when it is clicked.



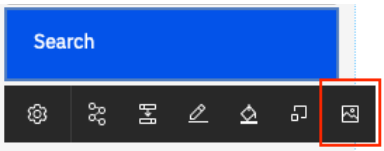
16. Click on the **Launch service** button and then click on the **Select color** icon.



17. Select the **Primary (dark blue)** color.
18. Click on the **Change label** icon to change the label of the button.



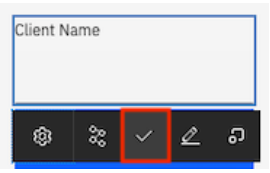
19. Update the label of the button to **Search**.
20. Click on **Select icon** to add an icon to the button.



21. In the select icon wizard, enter **searc** and pick one of the icons to show on the button.

Next, we will add validation to the **Client Name** field so that it is marked as required.

22. Click on the **Client Name** field and then click on the validation icon



This shows the page validation wizard. The page validation wizard allows both technical and business users to validate items on a page when a certain event occurs. By default, the **clientName** field is marked as **Required** as we clicked on the validation icon for that field.

Note the other two section in the page validation wizard:

- **Stage on this page when errors exist**: This allows the developer to select a navigation event (e.g.: a button) that takes the user away from the page. If errors exist, the navigation event will not be triggered and the user will stay on the current page.
- **Disable this view when errors exist:** This allows the developer to select a view that can be disabled when errors exist on the page.

We will leave the two sections empty as they are not required for our use case.

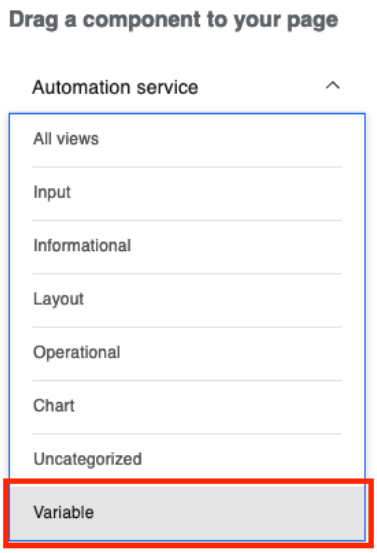
23. Click on the **OK** button to close the page validation wizard.

You will now see a red asterisk next to the client name field denoting it as a required field.

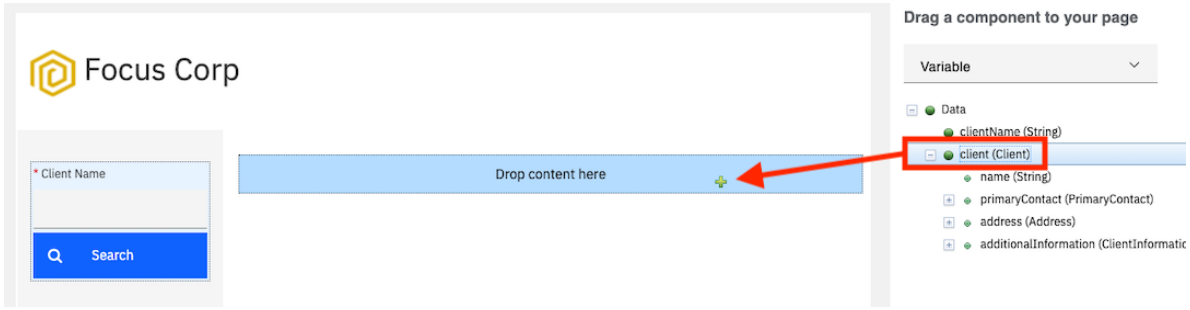
Note: This wizard can also be accessed by clicking on the validation icon next to the name of the page in the top toolbar.

Now that we've configured the client name field, we will add the UI fields to show the client details on the page. The client details will be filled when the **Search** button is clicked as it is the output of the automation service we added to the template before.

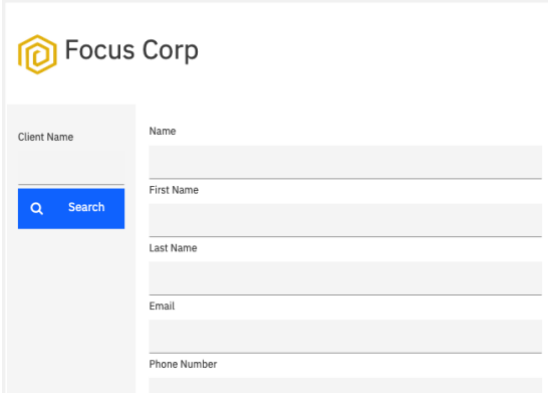
24. In the palette on the right-hand side, select the **Variable** option.



25. Drag and drop the **client** variable into the right column on the page.

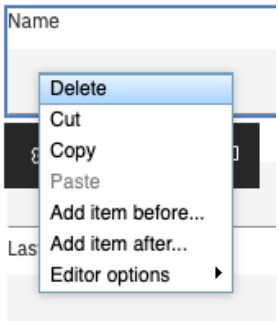


This automatically creates all the fields required to show the client details on the page. Scrolling down on the fields will show you that the fields created automatically point to the right view depending on the type of field. For example, the **Defaulted payment** field is a checkbox because the field is bound to a variable that is a Boolean.



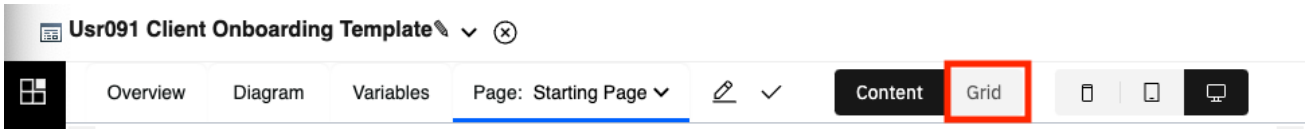
Next, we will customize the UI that was automatically created by dragging and dropping the variable.

26. Right click on the **Name** field and delete it as we already have the client name in the left column.

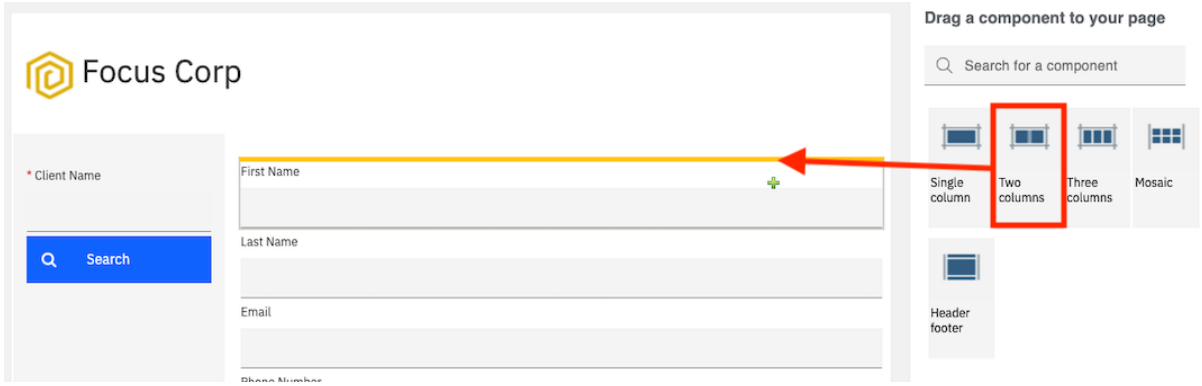


Next, we want to make the page responsive so that a desktop screen can show more views vs a mobile or a tablet screen. We can do that use **Grids**.

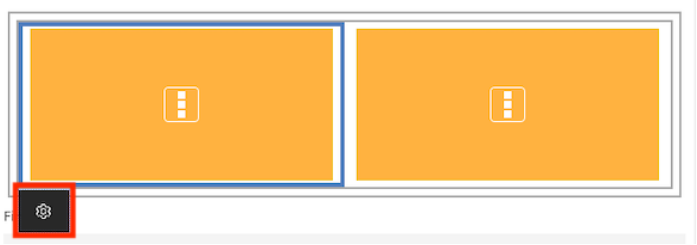
27. In the top-toolbar, click on **Grid**.



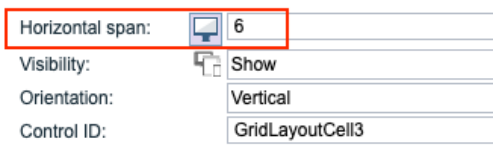
28. From the right-hand side palette, drag and drop the **Two columns** grid above the **First Name** field.



39. Click on the yellow portion of one of the columns in the grid and click on the **Properties** icon to open the properties of that column.

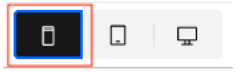


In the Properties pane, observe that the value in the **Horizontal span** is field is **6**.



A grid is a container that is **12 units** wide. This means that the column with a span of **6** will take half the width of the grid. This property is useful to create UIs that are responsive. i.e. work on devices with different screen sizes.

40. Click on **Cancel** at the bottom.
41. In the top toolbar, select the **Small screen** option.

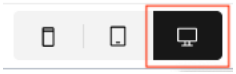


Observe how the editor now contains a mock mobile view to emulate a small screen and the columns of the grid automatically react to the change in screen size.

42. Open the **Properties** view of one of the grid columns once again**.**

You can see that the **Horizontal span** is now set to **12** which means that it will span the entire width of the container. The icon besides the value also displays a mobile icon showing that the value is set for mobiles only. Users can create complex applications that are responsive by using grids and modifying the horizontal span based on the design requirements of that application.

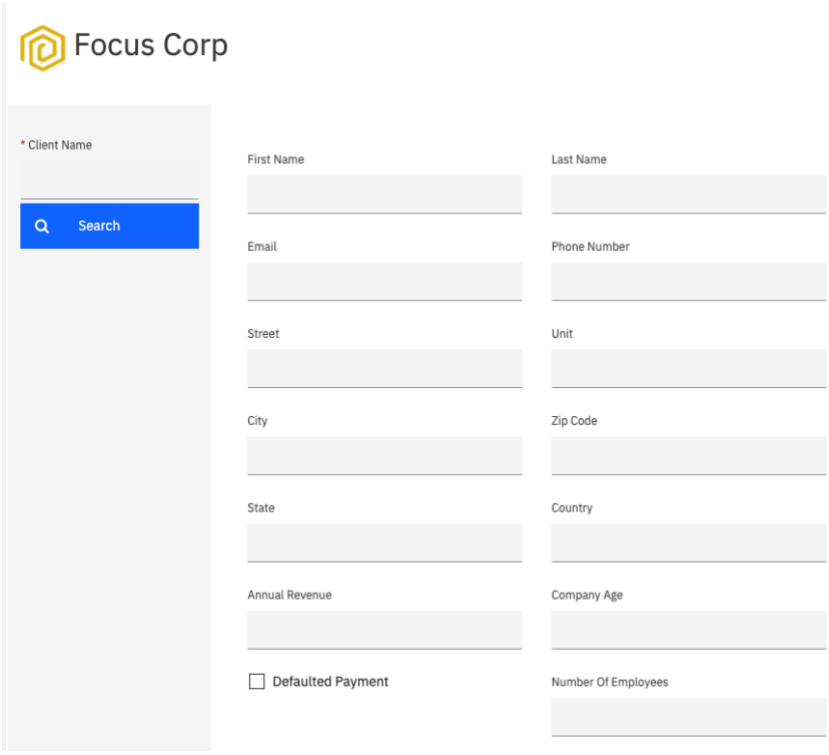
43. Close the property editor by clicking **Cancel** and switch back to the **Large screen** editor.



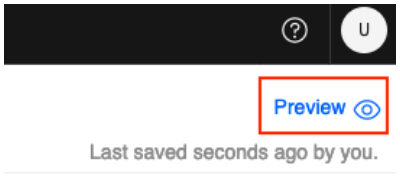
44. Click on **Content** in the top toolbar.
45. Drag and drop the **First Name** and **Last Name** fields to the left and right columns of the grid.

They should now be side-by-side:

46. Optionally, you can switch back to the **Grid** view, and add additional grids to the page to customize it. You can add additional grids by hovering over the existing ones and clicking the **+** button or drop more **Two Column** grids from the palette onto the page. Adding additional grids means that on larger screens, more fields are displayed horizontally and on a smaller screen, they will be displayed vertically. If you do this for all fields, your page will look similar to the screenshot below:



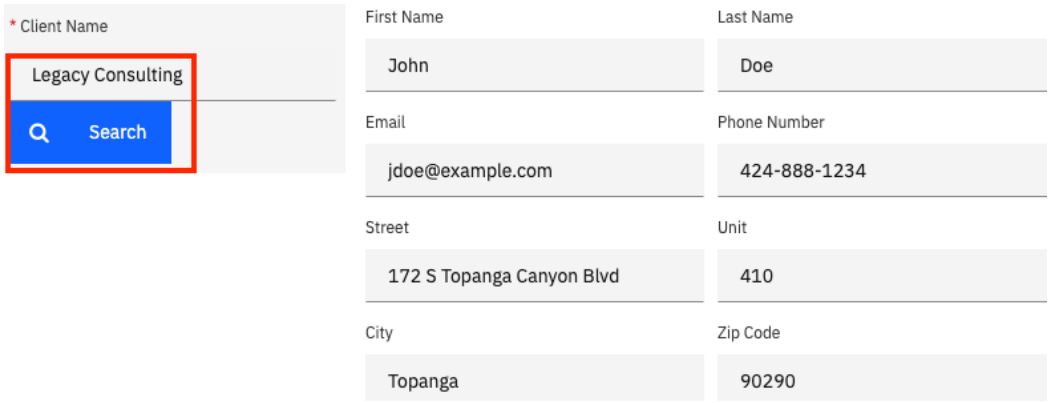
47. Click on **Preview** in the top-right corner to preview the template built so far and test it.



Clicking on the preview button deploys the template as an app to a **Playback Application Engine** that is separate from the **Business Automation Application Engine** used for apps published to production. Once the deployment is complete, it launches the app in a new window.

Note: You may have to allow browser pop-ups to see the previewed app.

48. Once the app launches, enter **Legacy Consulting** in the **Client Name** field on the left.
49. Click on **Search**.

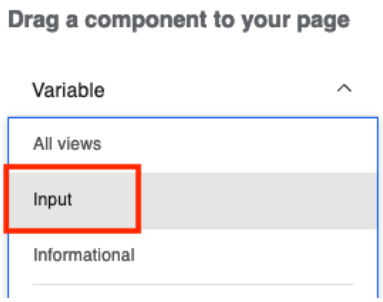


This calls the automation service and fills in the fields on the page with the output of the service. As the automation service is published by a Workflow developer, the automation service in the background invoked the Workflow service to get the details of the client.

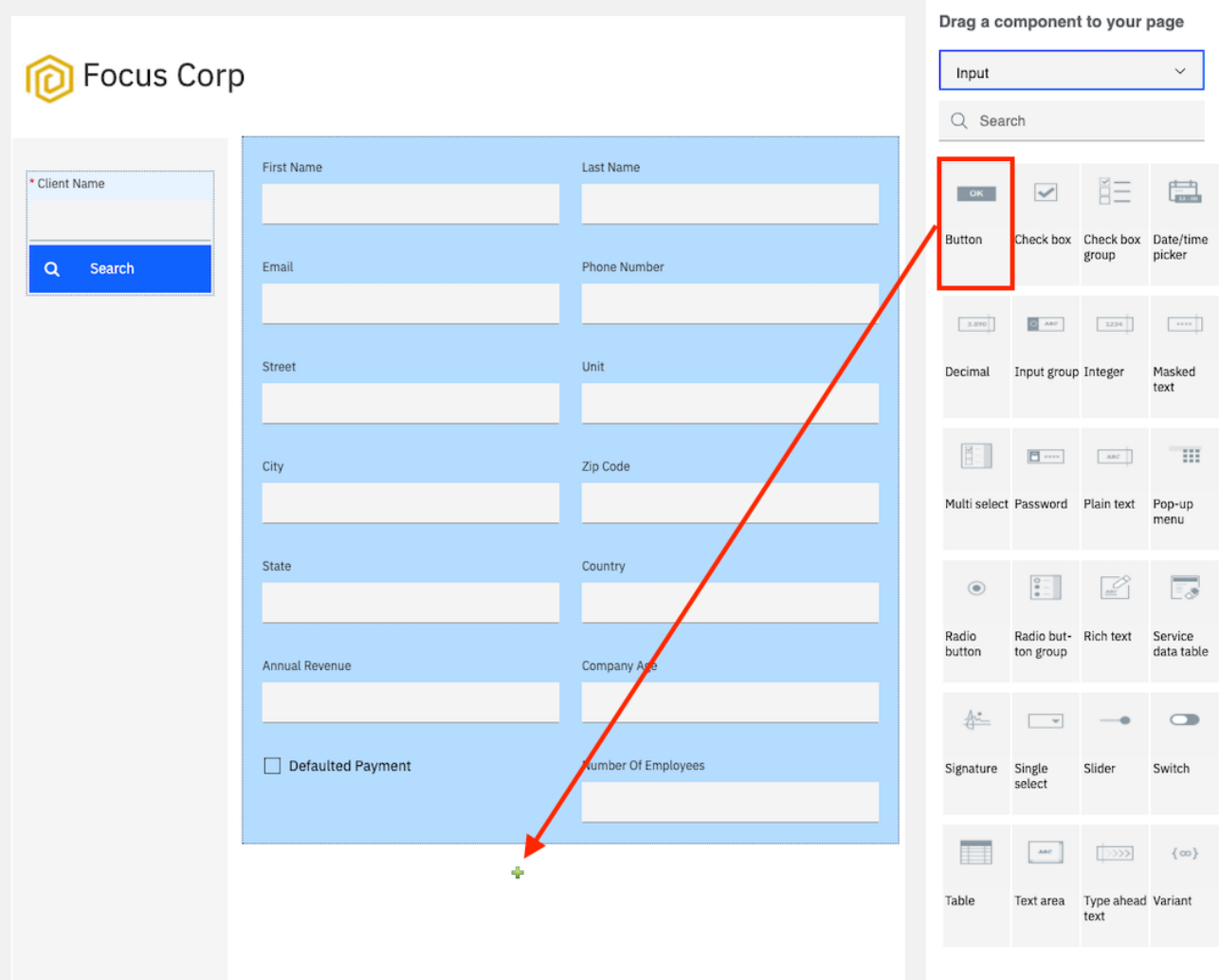
50. **Resize** the browser window in different sizes to verify the responsiveness of the app.
51. **Close** the browser window displaying the previewed app.

Next, we will add a button that takes us to a new page to review documents associated with the client being onboarded. This will allow you to see how a user can integrate with the Content capability using the out-of-the-box Content toolkit.

52. In the palette on the right, select the **Input** option in the dropdown.



53. Drag and drop the **Button** view below the grid on the page.



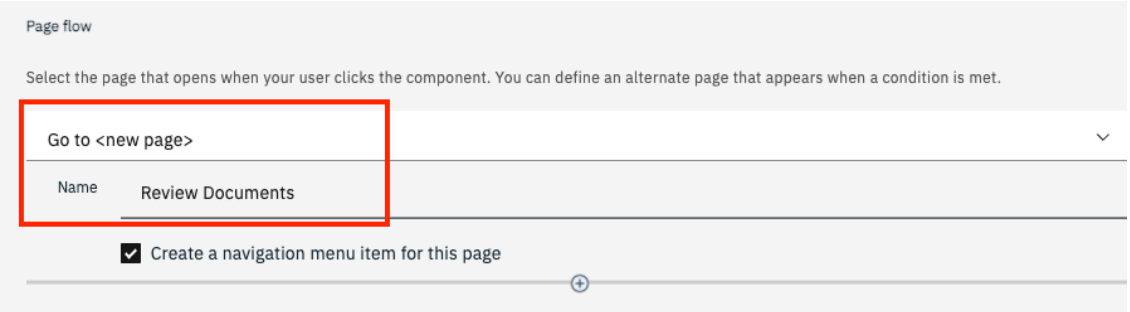
Hint: You know the view is being added below the grid, when the grid is highlighted in blue.

Adding a button to the page shows the **Next step** wizard that allows users to configure the steps to be performed when this button is clicked. The first page contains **Service** options i.e., which service should be executed when the button is clicked. In this case, we just want to go to a new page so we can leave the default option **Does not call a service** selected.

54. Click on **Next**.

    This shows the **Page flow** part of the wizard where users can select the page the app should navigate to on the click of the button.

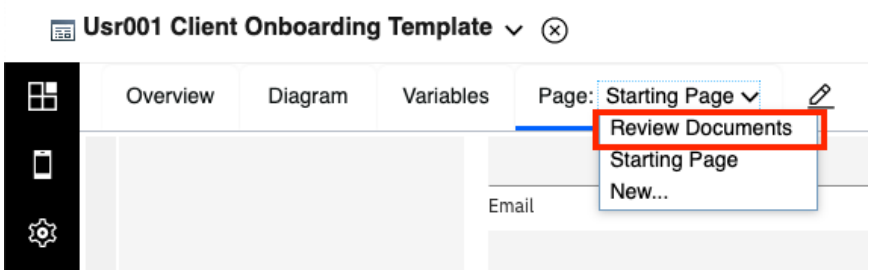
55. Click on the dropdown and select **Go to <new page>**.



Notes:

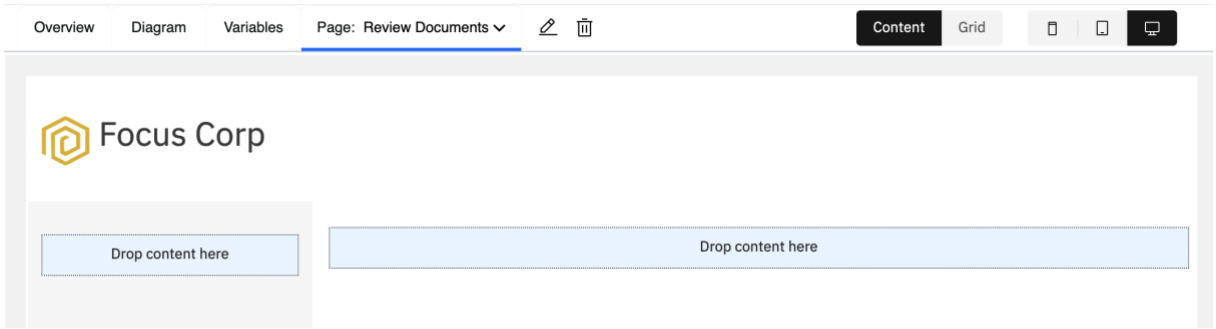
- A button can both call a service and navigate to another page on a click. The service will be called before navigating to the selected page.
- The **Create a navigation menu item for this page** is checked by default. If you re-add the default navigation menu to the UI, it will contain menu items to all pages of the application.
- The **+** button below the name field, allows users to conditionally navigate to a different page based on the value of a variable. For example, you can go to a specialized page if the client's annual revenue is above a certain amount. For the purposes of this lab, we will not be doing that. If you did click on the button, you can remove the added option by clicking on the **x** icon next to it.

56. In the **Name** field, enter **Review Documents**.
57. Click on **Done** to close the wizard.
58. Style the button to call it **Review Documents**, with a **dark blue** color and a **document icon**.
59. In the page dropdown at the top, select the **Review Documents** page to edit its layout.



As you can see, the default navigation menu now shows **Starting Page** and **Review Documents**.

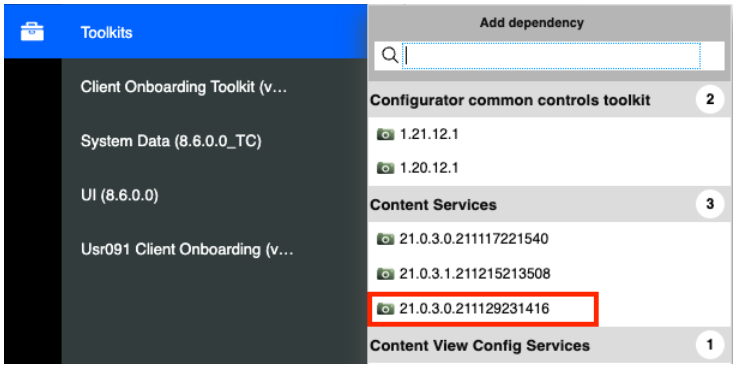
60. Delete the default navigation menu from the **Review Documents** page.
61. Add the **Custom Header** and **Base Layout** views to the editor like we did for the **Starting Page**.



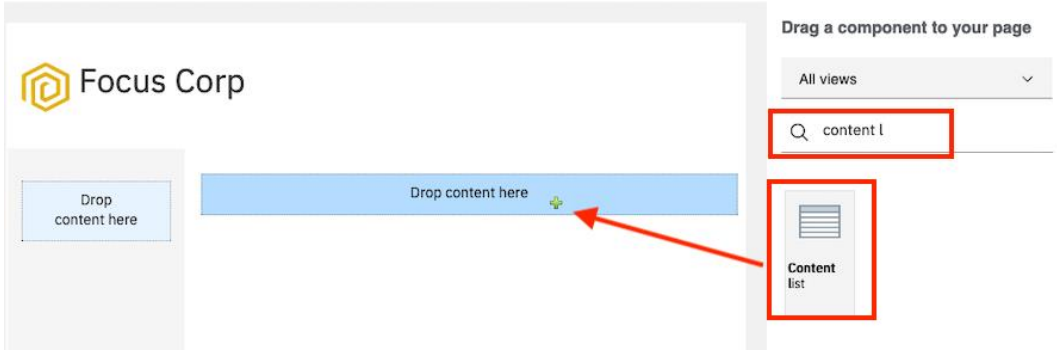
As we need to interact with the Content capability next, we will add the out-of-the-box **Content Services** toolkit to the template.

3.2.3 Creating UI that integrates with the Content capability

1. Add the **Content Services** toolkit as a dependency to the template. If there are multiple versions listed, pick the version that starts with **21.0.3**.

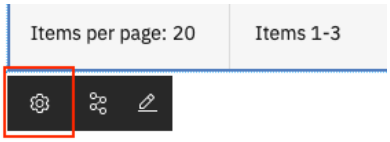


2. From the palette on the right-hand side, drag and drop the **Content list** view onto the editor.



   This view is a part of the **Content Services** toolkit and provides a low-code way to interact with documents and folders in a content repository.

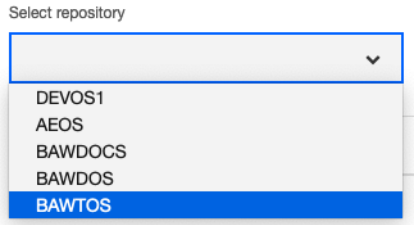
3. Open the **Properties** pane for the view.



4. If the properties pane opens in advanced mode, switch to the basic mode.

We will now need to select a repository that we want to view the list of documents from.

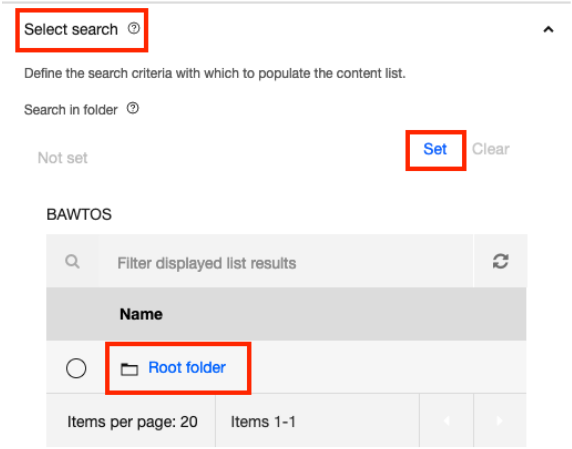
5. In the **Select repository** field, select the target object store of your system (**BAWTOS**).



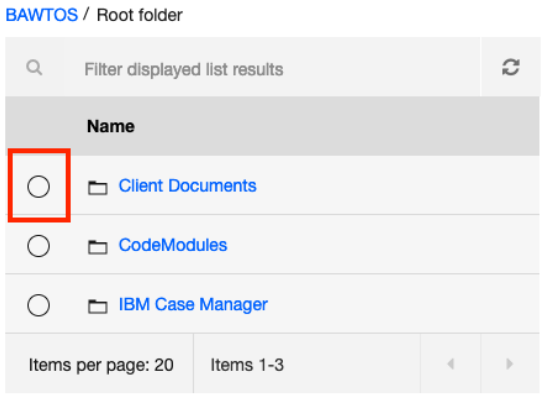
Next, we want to search for documents in the **Client Documents** folder of this repository that have a property **Client Name** that matches the name of the client being onboarded.

6. Expand the **Select search** section.
7. Click on **Set**.

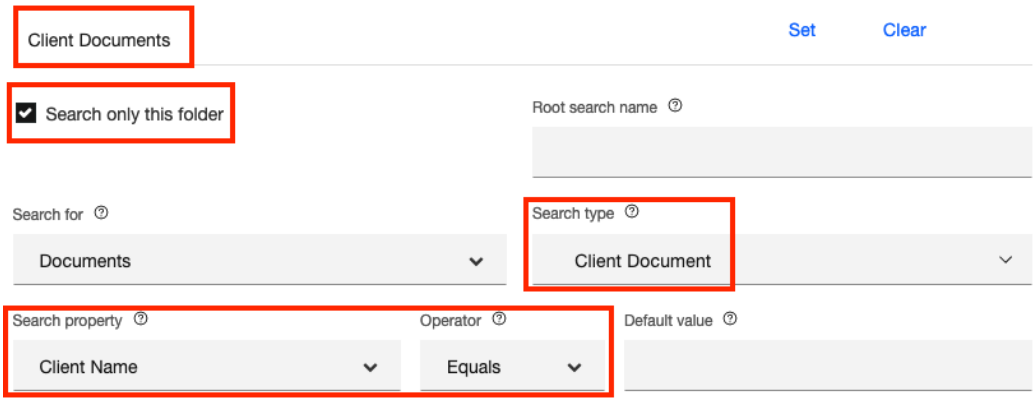
8. Click on **Root Folder**.



9. Select the **Client Documents** folder.



10. Select the **Search only this folder** checkbox to avoid checking subfolders.
11. In the **Search type** field, select the **Client Document** type.
12. In the **Search property** field, select the **Client Name** property.
13. In the **Operator** field, select the **Equals** operator.



The configuration for the Content List also allows developers to enable search filters instead of providing a search property.

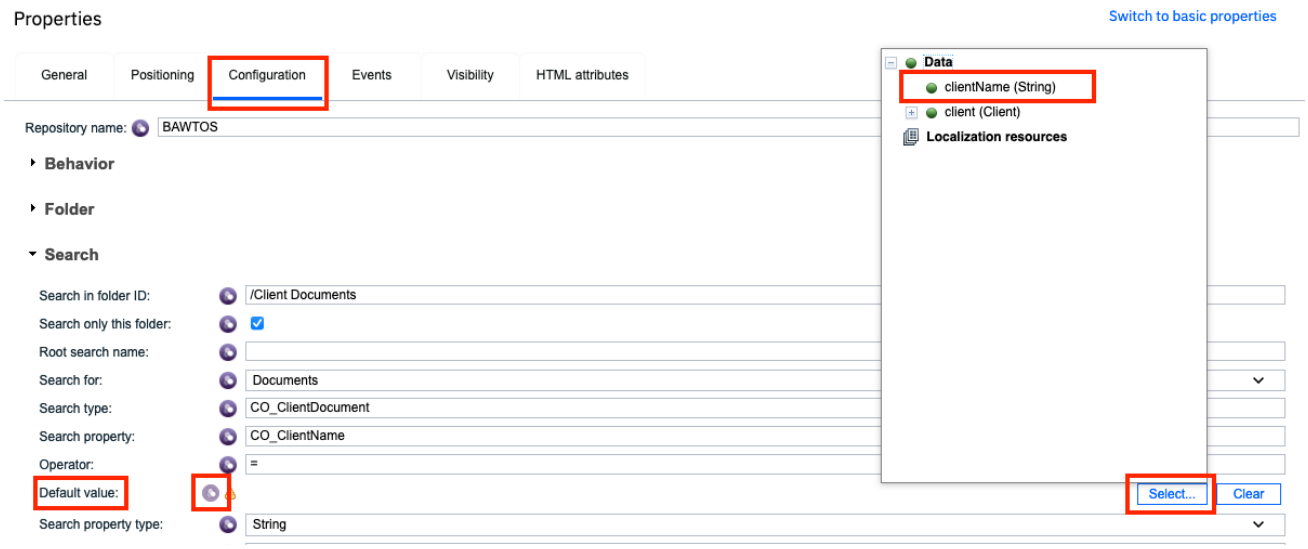
14. Click on **Add Filter +**

    Under the **Filter property** field, you can see that the developers can choose from all the document properties in the selected repository.

15. Click on **Cancel** to close the **Edit filter** popup as we don't need any filters for our use-case.

For the search property, we want the **Default value** to be the name of the client. Since this is a variable, we will have to use the advanced mode.

16. At the top of the properties pane, click on **Switch to advanced mode**.
17. Click on the **Configuration** tab.
18. Expand the **Search** section.
19. For the **Default value** field, click the variable picker icon and **Select** the **clientName** variable.



20. Click on **Done** to close the properties pane.
21. Click on **Preview** in the top-right corner to preview the changes made to the template.
22. Once the app opens in a new window, enter **Legacy Consulting** in the **Client Name** field and click on **Search**.
23. Click on **Review Documents** to go to the next page.

    Verify that the **Content List** does a search for **Legacy Consulting** and shows two documents
24. Close the preview window to go back to the Application Designer.

3.2.4 Persisting data within an application

When you preview the template again, the app starts fresh with no data persisted in it. For cases where users want to work on an app but come back to it later, the Application Designer provides the ability to persist the data so that it can be accessed again when an app is re-launched. Next, we will enable this persistence for the variables that were automatically created on the addition of the automation service.

Note: When a user starts an application, they "own" the instance of that application. A user can only run a single instance of an application at the time and cannot pass the ownership/control of that application to another user.

1. Click on the **Variables** tab of the template.

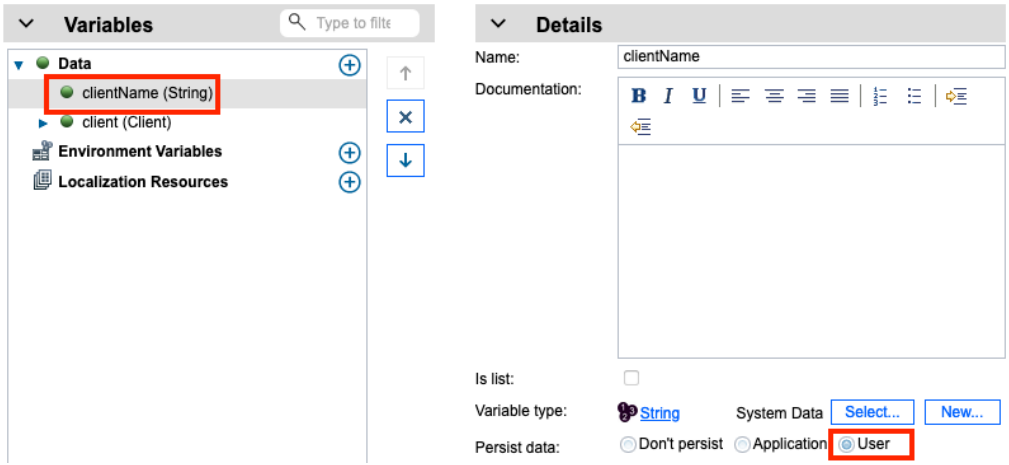
2. Click on the **clientName** variable.

   The **Persist data** field offers options to persist the data for an application or a user.

   - The application option persists the data in the context of an application and any user launching this app will see data persisted by other users.
   - The user option persists the data in the context of an application **only** for that user. Other users launching this app will work with their own data.

   In both cases, the persisted data remains even if the application ends, and a new instance of the application is launched. The user can choose to clear the persisted data using JavaScript on the end of an application. The JavaScript can use the low-code mechanisms provided by Application Designer as you will see later in this exercise.

3. For this lab, select the **User** option.



4. Repeat the data persistence step for the **client** variable.
5. **Preview** the template.
6. Enter **Legacy Consulting** in the **Client Name** field.
7. Click on **Search**.
8. Click on **Review Documents** to go to the next page.
9. Close the preview window.
10. Preview the template again.

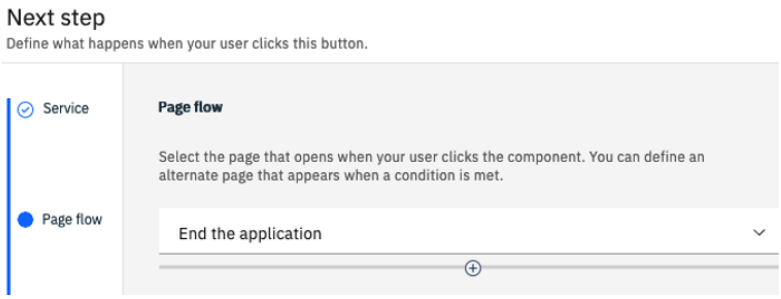
    You will see that the client data is now persisted. Next, let's see how the user can use low-code JavaScript to clear the persisted data when the application ends. For this we will first need to add a button that ends the application.

11. Close the preview window and go back to the Application Designer.
12. In the **Review Documents** page, add a **Button** below the **Content List**.

This brings up the **Next step** wizard. At this point, in the Client Onboarding end-to-end scenario, we call an automation service from an external Workflow system to launch a new Client Onboarding Workflow. For this lab, as we have already learnt how to call an automation service, we will just end the application.

13. Click **Next**.

14. In **Page flow**, select **End the application**.

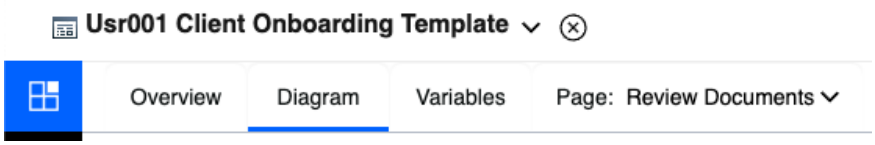


When you end an application, the application window is closed. We can customize this behavior.

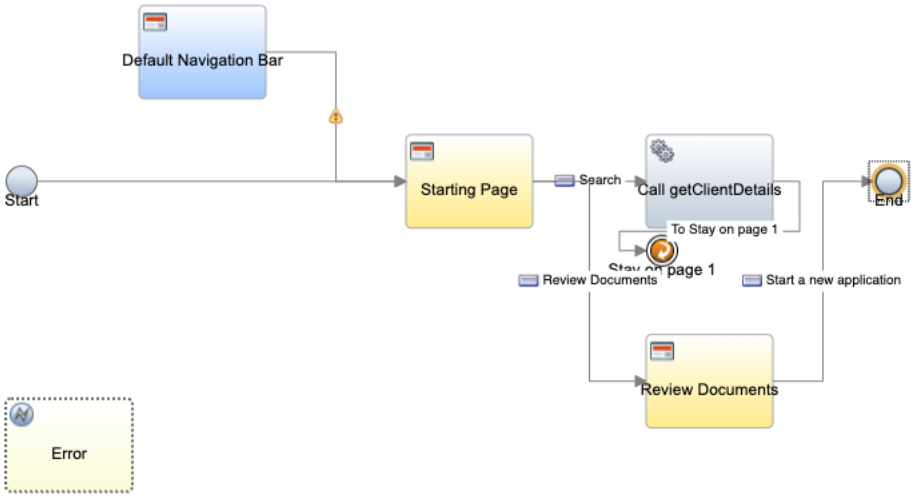
15. Click on **Done** to close the wizard.
16. Customize the button by calling it **Start a new application**, changing the color to **dark blue**, adding an icon.

Next, we will update the template so that the application restarts when we end it.

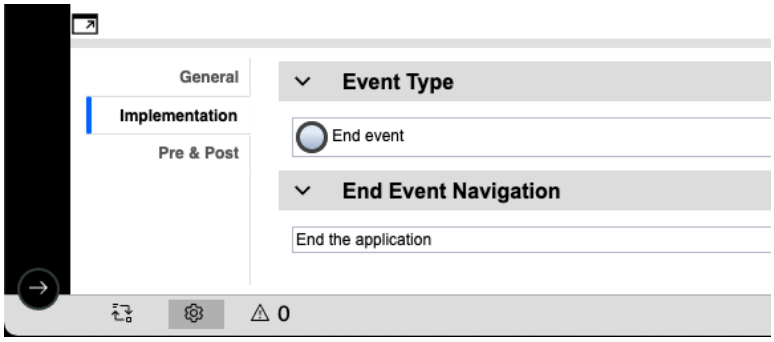
17. Select the **Diagram** tab at the top.



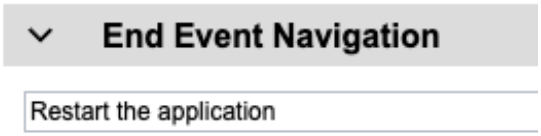
18. Click on the **End** node in the auto-generated diagram.



19. In the properties pane at the bottom, click on the **Implementation** tab.



20. Change the value for the **End Event Navigation** dropdown to **Restart the application**.

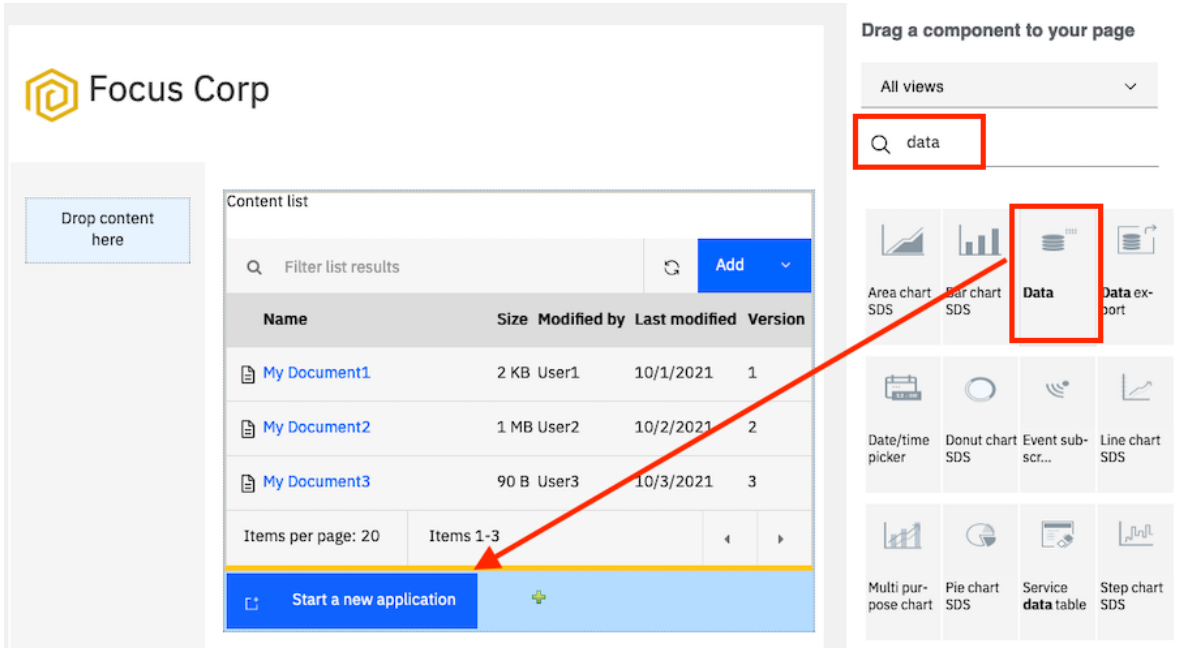


This setting allows us to customize the behavior of an application when a user decides to end it. In this case, the application ends when the **Start a new application** button is clicked.

Next, we want to clear the persisted data when the button is clicked. For this we will need to access the data defined in the **client** variable. To do this, we can use the **Data** view.

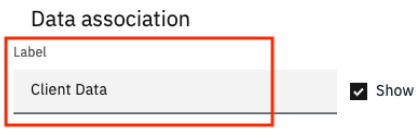
21. Click on **Page: Review Documents** at the top to go back to the page editor.

22. Drag the **Data** view from the palette on the right above the button.



This brings up the **Data association** wizard where you can bind data to the view.

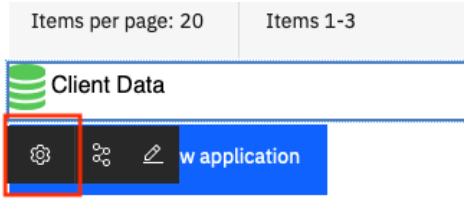
23. Update the label to **Client Data**.



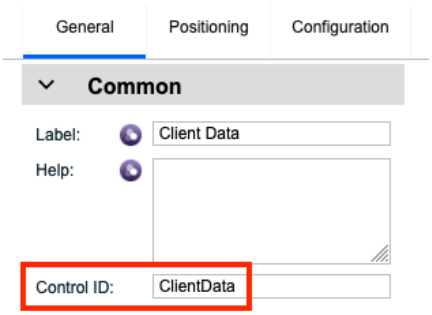
24. Click on **Select existing**.

25. In the **Select existing variable** field, select the **client** variable.

26. Click on **Done** to close the data association pane.
27. Open the properties pane for the **Client Data** view.

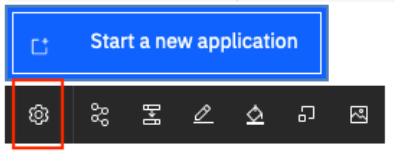


28. In the properties pane, update the **Control ID** field to **ClientData**.



The **Control ID** can be used in low-code JavaScript to access that view. Each out-of-the-box view comes with its own methods that can be invoked once the view is accessed. We will access the **Data** view when the **Start a new application** button is clicked and clear the data stored within in to delete the persisted data from the system.

29. Click on **Done** to close the properties pane.
30. Open the properties pane for the **Start a new application** button.

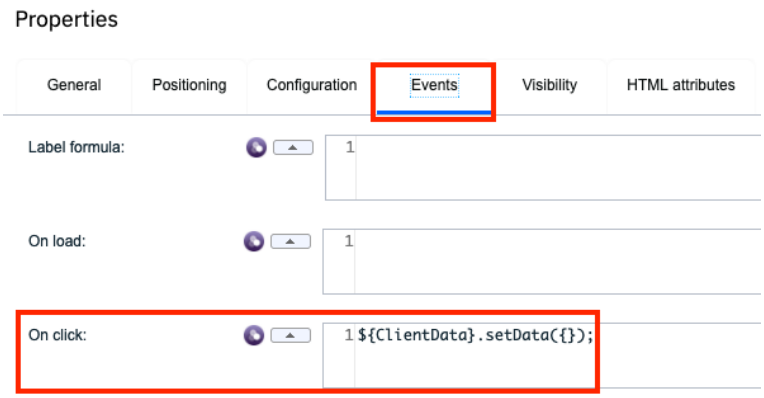


31. Click on **Switch to advanced properties** in the top-right corner.
32. Click on the **Events** tab.

The event tab lists events specific to a view where users can add their code. In this case, we will update the **On Click** event to add code that accesses the **Client Data** view and clears the data associated with it.

33. In the **On Click** event handler, add the following code:

```
${ClientData}.setData({});
```



- **${ClientData}** accesses the **Client Data** view previously added.
- **setData** is a method available for the **Data** view that sets data to the input of the method.
- **{}** is an empty object provided to the input of the **setData** method to clear the persisted data.

34. Click on **Done** to close the properties pane.
35. Preview the template.
36. If the persisted data is not already shown, enter **Legacy Consulting** as the name of the client, do a search for the client details.
37. Go to the **Review Documents** page.
38. Click on **Start a new application**.
39. The client details should now be cleared.

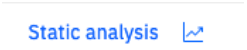
    You will notice that the name of the client is still there as we put that into a different variable, **clientName**, that was not cleared in the Javascript. You can optionally choose to clear the persisted data for it.

40. **Close** the previewed application and go back to Application Designer.

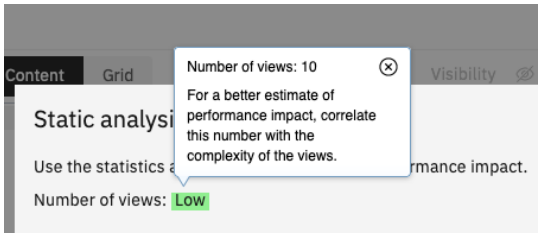
3.2.5 Analyzing the performance of an application

Before making this template available, we want to analyze it from a performance perspective. There is a static analysis which looks at the number of views on the page and a runtime analysis which analyses the page in real-time. For this lab, we will focus on the static analysis.

1. In the top-right corner, click on **Static Analysis**.



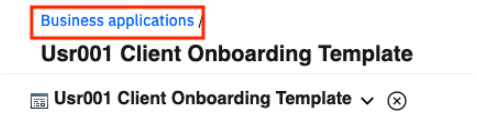
2. Hover over the **Low** label to show more details on the page:



   This gives us an estimate of the performance impact (the number of views you see might vary from the screenshot). Keep in mind that a low number of views with a high complexity can also cause performance issues. If the page had repeatable views such as a table, the static analysis would also list those views and warn the developer that large lists can cause performance issues.

3. Create a new version of the template called **v1.0** using the version icon  in the top-right corner.

4. Click on **Business Applications** in the top-left corner to go back to the repository.



With that you have successfully created the Client Onboarding template that can be used by business users to create Client Onboarding applications. You will do that in the next exercise.

4 Exercise: Creating the Client Onboarding application

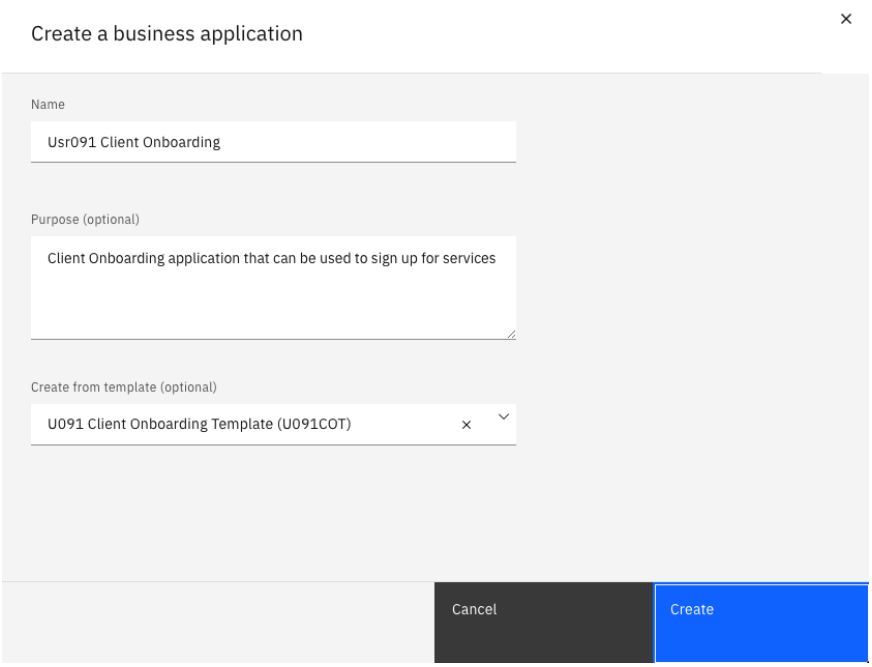
4.1 Introduction

In this exercise, we will create the **Client Onboarding** application based on the template created in the previous exercise. The application developer will use the template as a starting point and expand on it by adding an automation service (published by a developer using the Decisions capability) along with relevant UI that allows the client to sign up for services offered by Focus Corp. We will also use the **Basic view mode** to emulate the development experience of a business user.

4.2 Exercise Instructions

4.2.1 Creating an application from a template

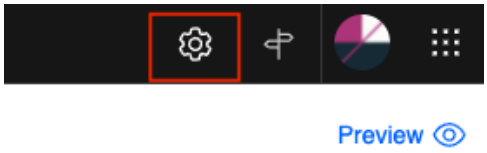
1. In your browser, open the IBM Automation page and login with the username & password assigned to you (if not done so already).
2. In the top-left corner, click on the menu icon and select **Design → Business applications** to access the application repository.
3. Click on **Create** and select **Application**.
4. In the **Name** field, enter ***UsrNNN* Client Onboarding**.
5. In the **Create from template** field, select the template created in the previous exercise i.e. ***UsrNNN* Client Onboarding Template**.
6. Provide an optional purpose.
7. Click on **Create**.



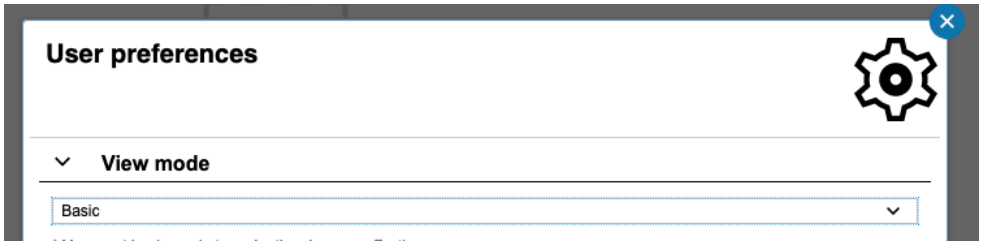
A new application will now be created based on the Client Onboarding template. This means that all toolkit dependencies, views, pages, etc. from the template will be copied to the application.

Note: If a template is updated, the application developer can choose to update the application to the latest version of the template. This will update all the toolkit dependencies as defined in the template but keep everything else as-is in the application.

8. In the top-right corner, click on the **User preferences** icon.



9. In the **View mode** dropdown, select **Basic**.



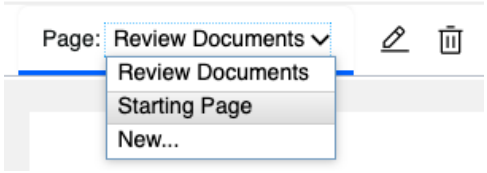
10. Click on **Save**.
11. For the changes to be effective, **refresh** the browser window.

    As you can see, the UI is a lot simpler to use now. For example, the library pane on the left is no longer visible, the tabs on the top (Variable, Layout, etc. are also hidden). This also means that the basic user cannot add new toolkit dependencies to the application. This allows the application developer to focus purely on the application and build UIs using existing services.

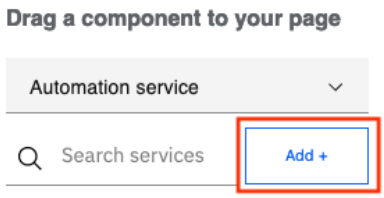
    The application developer wants to now add UI to the first page of the application that can be used to sign up for services and show a fee associated with those services.

4.2.2 Creating UI that integrates with the Decisions capability

1. Switch to the **Starting Page** in the top-left corner.

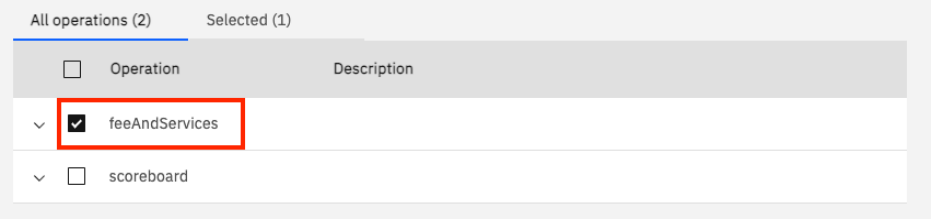


2. In the palette on the right-hand side, select the **Automation Service** option.
3. Click on **Add +**.



4. Select the **client_onboarding_decisions** automation service.

5. Select only the **feeAndServices** operation.



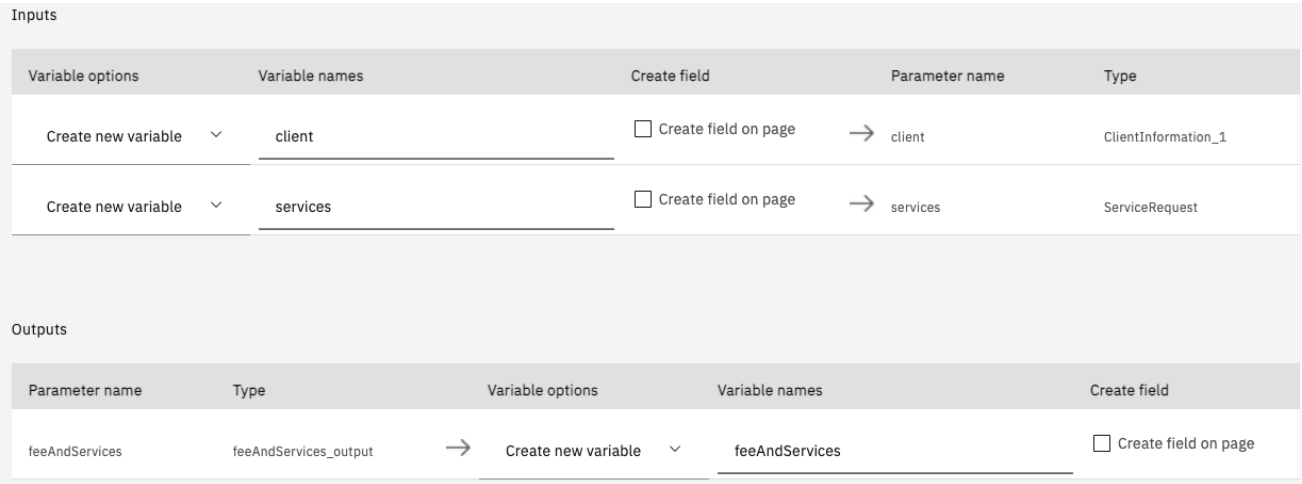
6. Click **Add (1)**.

   The automation service is now available to use in the application. Previously, we added an automation service to the page by dragging and dropping it to the page. While that is still possible (and the easier way), in this exercise, we will try a different approach and add a button first and then configure it to call the automation service. This is helpful because there are other views (e.g., Navigation Event) that can be used to call automation services that use the same principle.

7. Drag and drop a **Button** view above the **Review Documents** button.

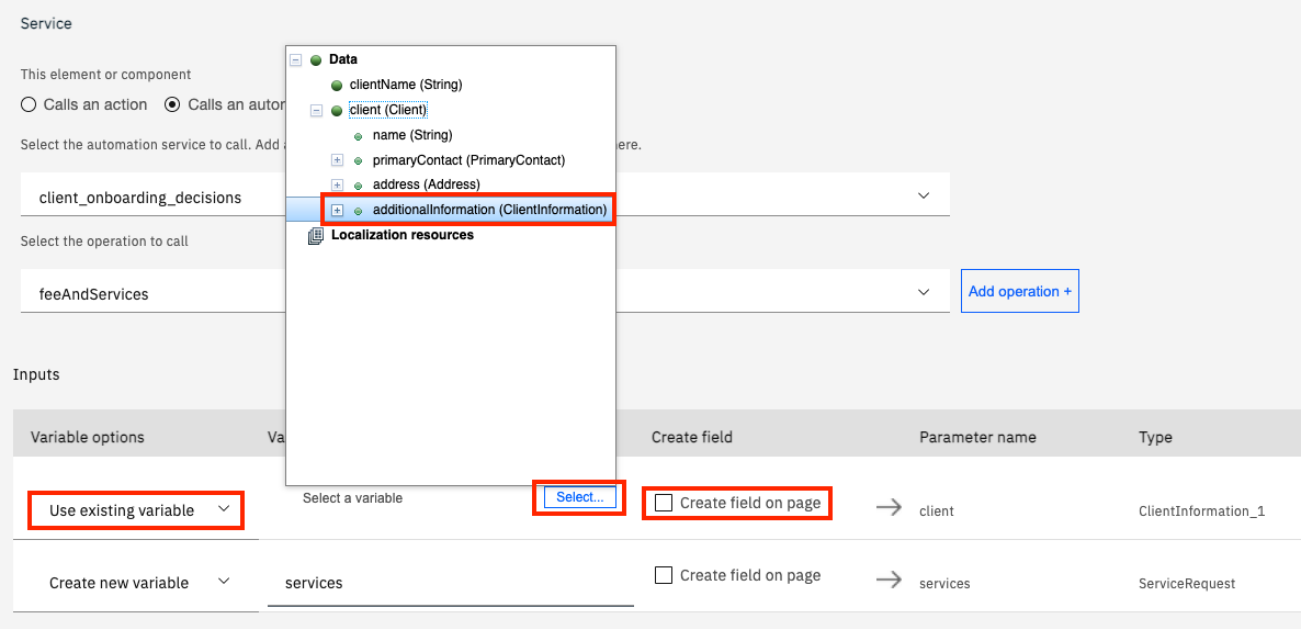
8. In the **Next Step** wizard, select **Calls an automation service**.
9. In the **Select automation service to call** field, select **client_onboarding_decisions**.
10. In the **Select operation to call** field, select **feeAndServices**.

    The **Inputs** and **Outputs** now show in the wizard. These show the inputs and outputs defined for the **feeAndServices** operation for the **client_onboarding_decisions** automation service. As you can see, the inputs required to get the fee and services i.e. **client** with data type **ClientInformation_1** and **services** with data type **ServiceRequest**. The **_1** is appended as another business object with the name **ClientInformation** already exists in this application (from the discovery of the first automation service in the previous exercise to get the client details).



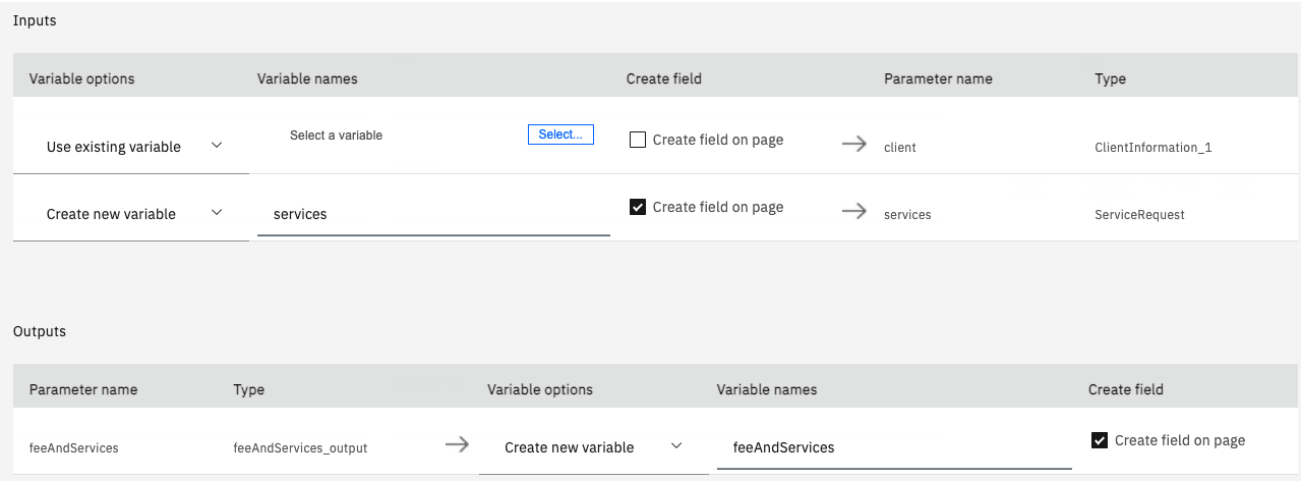
Next, we will map variables to the fields in these sections. In some cases, we will use existing variables that were created on the creation of the first automations service in the template and in other cases, we will create a new variable.

11. In the **Inputs** section, for the **client** input, select the **Use existing variable** option under **Variable options**.
12. Click on **Select** besides **Select a variable** and choose the **client → additionalInformation** variable.
13. **Uncheck** the **Create field on page** checkbox as we already have fields on the page for the additional information.



14. For the **services** input, **check** the **Create field on page** checkbox.
15. For the **feeAndServices** output, **check** the **Create field on page** checkbox.

    Your inputs and outputs must now look as follows:

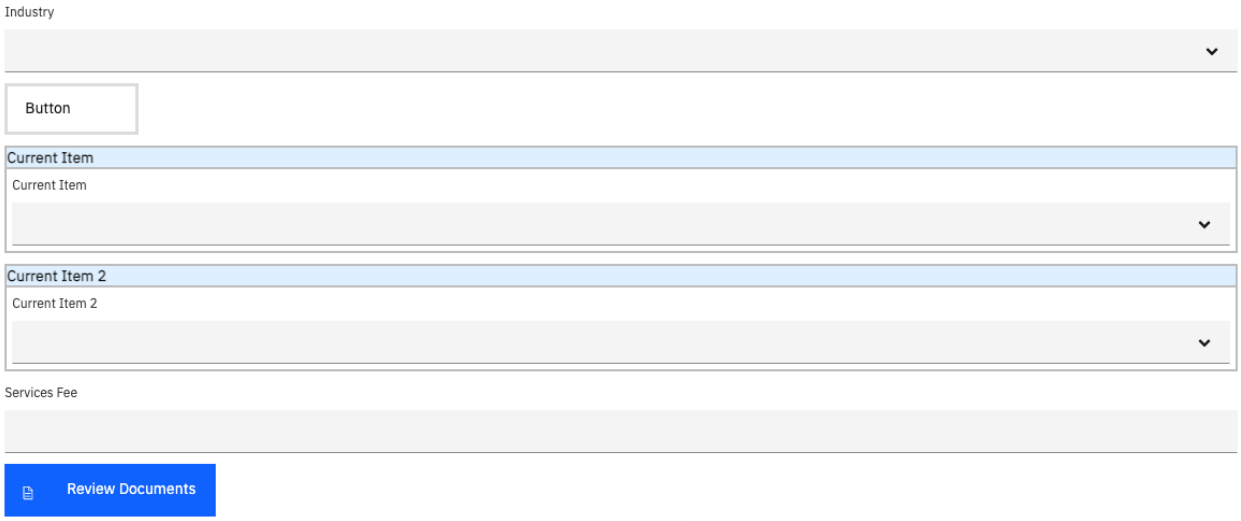


16. Click **Next**.

    We want to stay on the current page when this button is clicked so we will make no changes to the page flow.

17. Click **Done**.

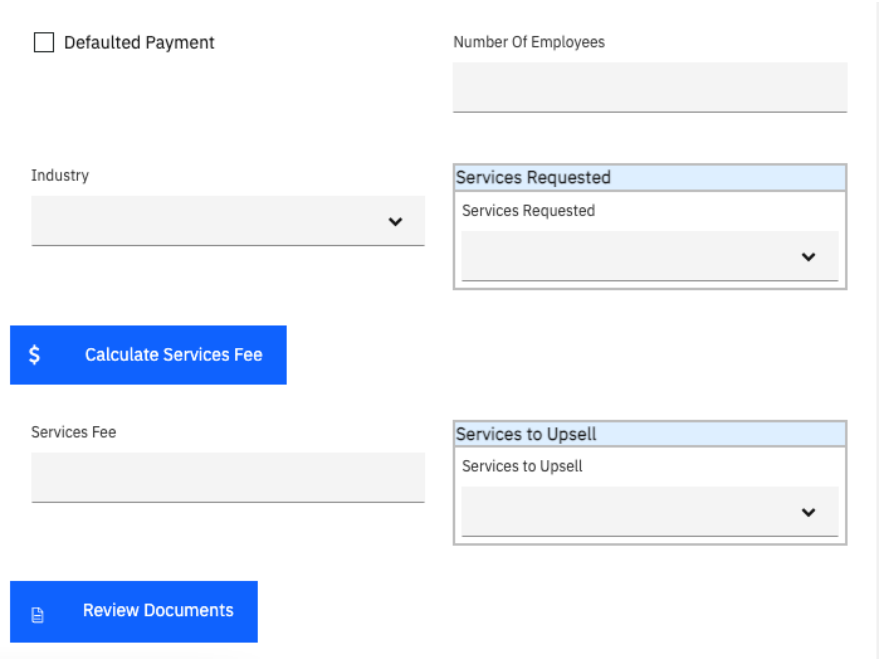
This automatically adds the fields associated with the automation service as configured in the **Next Step** wizard.



You can see here that the **Industry** field is a dropdown as it contains a list of pre-defined industries that is automatically configured using the details in the automation service. Similarly, the **Current Item** and **Current Item 2** views represent the list of services requested and services to upsell respectively.

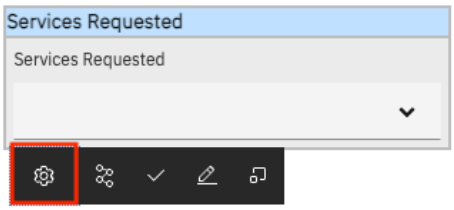
18. Customize the button by calling it **Calculate Services Fee**, changing the color to **dark blue**, and by adding an icon.
19. Click on the dropdown below the **Calculate Services Fee** button (where it says **Current Item**) and use the **Edit label** icon to change the label to **Services Requested**.
20. Similarly, change the label of the dropdown for **Current Item 2** to **Services to Upsell**.
21. Drag and drop the **Calculate Services Fee** button between the two dropdowns.
22. Drag and drop a **Two Column** grid above and below the **Calculate Services Fee** button.
23. In the left column above the button, drag and drop the **Industry** field.
24. In the right column above the button, drag and drop the **Services Requested** field (make sure you select the outer edge of the field when selecting and dragging it).
25. In the left column below the button, drag and drop the **Services Fee** field.
26. In the right column below the button, drag and drop the **Services to Upsell** field (make sure you select the outer edge of the field when selecting and dragging it).

Your UI should now look as follows:



Next, we only want to show the services that are relevant to the chosen industry.

27. Open the properties for the **Services Requested** dropdown.

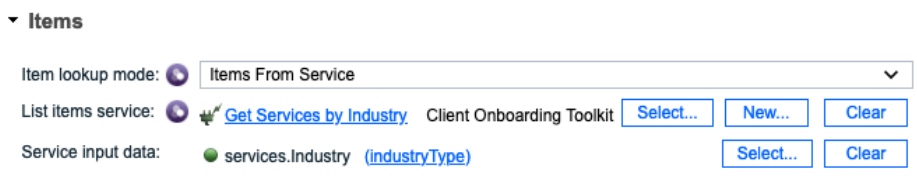


In the basic properties mode, if you scroll down, you will see a list of all the services that is easily configurable by the application developer. The **Select** (dropdown) view provides different item lookup modes. One of the options is to dynamically look up items to shown in the dropdown based on a specified input. This can be done using an action and as a part of this lab, a pre-built action is provided contains the services to display based on the chosen industry.

28. In the top-right corner, click on **Switch to advanced properties**.

    Observe that the available tabs here are reduced as we are in the basic view mode.

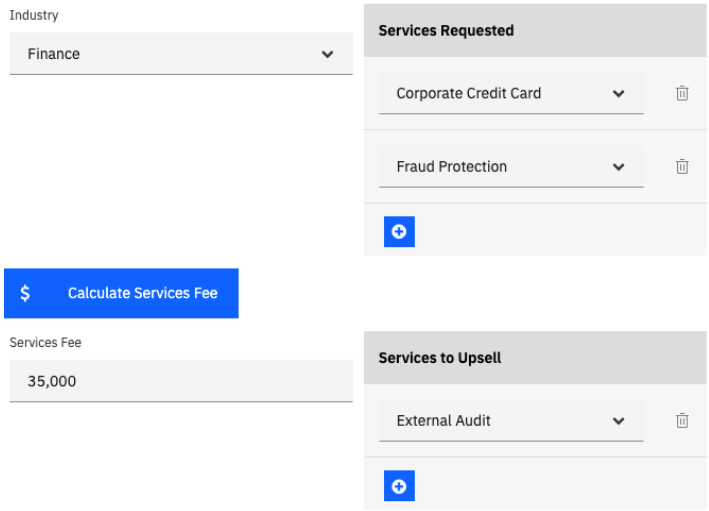
29. Click on the **Configuration** tab.
30. Expand the **Items** section.
31. For the **Item lookup mode** field, select **Items from Service**.
32. For the **List items service** field, select the **Get Services by Industry** action.
33. For the **Service input data** field, select the **services → Industry** variable.



34. Click on **Done**.

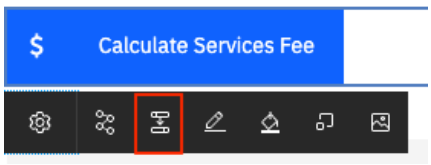
With that, we have successfully updated the application and the UI required to call the automation service. Time to test it.

35. Click on **Preview**.
36. Enter **Legacy Consulting** as the name of the client.
37. Click on **Search**.
38. Choose **Finance** as the **industry**.
39. In the **Services Requested** field, click on the **+** button and select **Corporate Credit Card** as a selected service. Verify that the dropdown only shows financial services.
40. Optionally, click on the **+** button and add another service.
41. Click on **Calculate Services Fee**.
42. Verify that the **Services Fee** is **21,000** and the **Services to Upsell** shows an additional service.

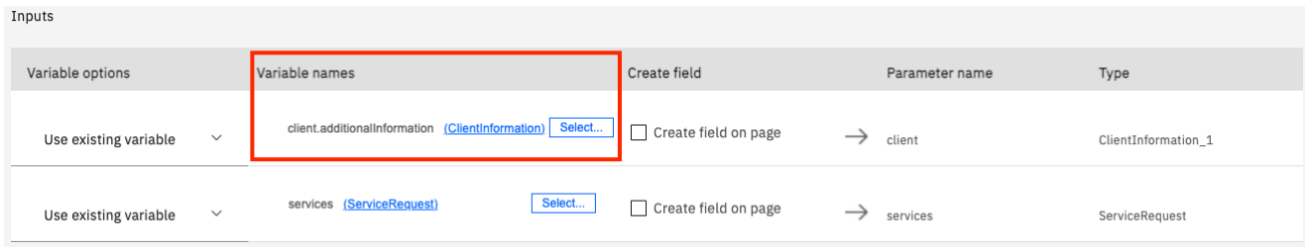


Note: If the **Services fee** and **Services to upsell** fields are still empty and you see a red dotted line around them, then perform the following steps:

- **Close** the preview window
- Refresh the Application Designer tab
- Click on the **Next Step** icon for the **Calculate Services Fee** button



- Ensure that input parameter, **client**, has the **client → additionalInformation** variable selected



- Preview the app and try to calculate the services fee for a financial service again

43. **Close** the preview window once you've successfully tested your application.

As you can see, the developer of an application integrates with multiple services built within the IBM Cloud Pak for Business Automation platform using automation services and the experience remains the same from an application development perspective.

The administrator can export the application as a .zip file and publish it to an IBM Business Automation Navigator desktop. The published app will then execute on the IBM Business Automation Application Engine.

With that you have successfully completed the creation of the Client Onboarding application.

Congratulations on completing the lab!