IBM Cloud Pak for Business Automation Demos and Labs 2021

Using Services in IBM Business Automation Workflow

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V 1.0

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1 Introduction

1.1 IBM Business Automation Workflow

IBM Business Automation Workflow is software that combines business process management and case management capabilities in a single integrated workflow solution. It unites information, process, and users to provide a 360-degree view of work to help drive more successful business outcomes.

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

1.2 Lab Overview

In this lab, you will learn how to work with services.

External services are used to call an application or a service that is external to IBM Business Automation Workflow. For example, you can create an external service to call a Java application that sends out emails or create one that calls a REST API to do a credit check.

Automation services provide a unified way to leverage services within the IBM Cloud Pak for Business Automation platform. Capabilities such as Decisions & Workflow can expose automation services to be consumed throughout the platform. You will learn how to publish an automation service as a part of this lab and optionally learn how to consume one as a part of your Workflow.

1.3 Lab Setup Instructions

1. 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 **mailIntegration.jar** from the **Lab Data** folder onto your computer. This file contains the java implementation to send an email.

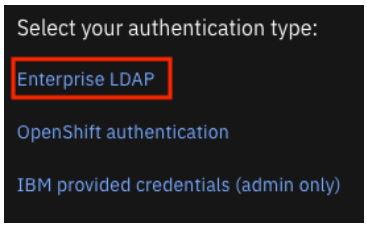
2 Exercise: Create an External Service

2.1 Introduction

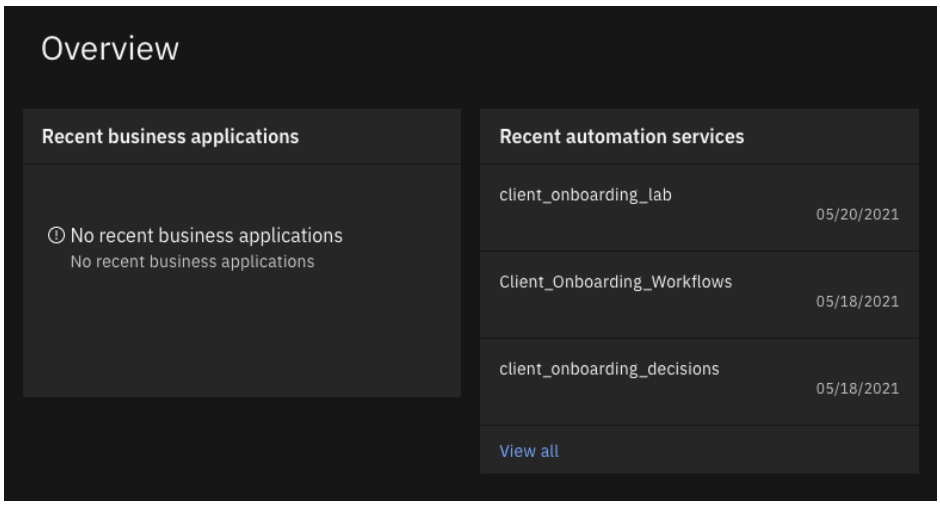
External services have various bindings like Java, REST API, Web Service, etc. In this exercise, we will create an external service that calls a Java application (jar file) that sends an email.

2.2 Exercise Instructions

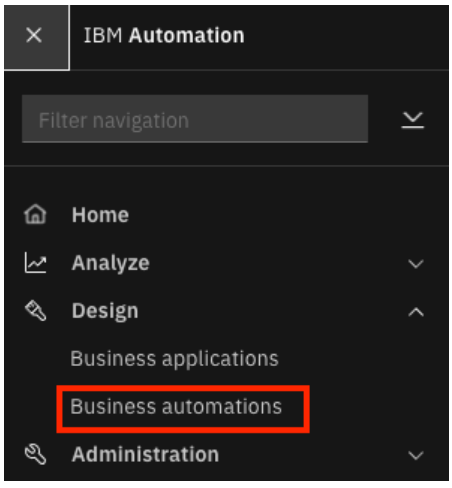
1. In your browser, login to IBM Business Automation Studio using the Enterprise LDAP option. Use the credentials you have received.



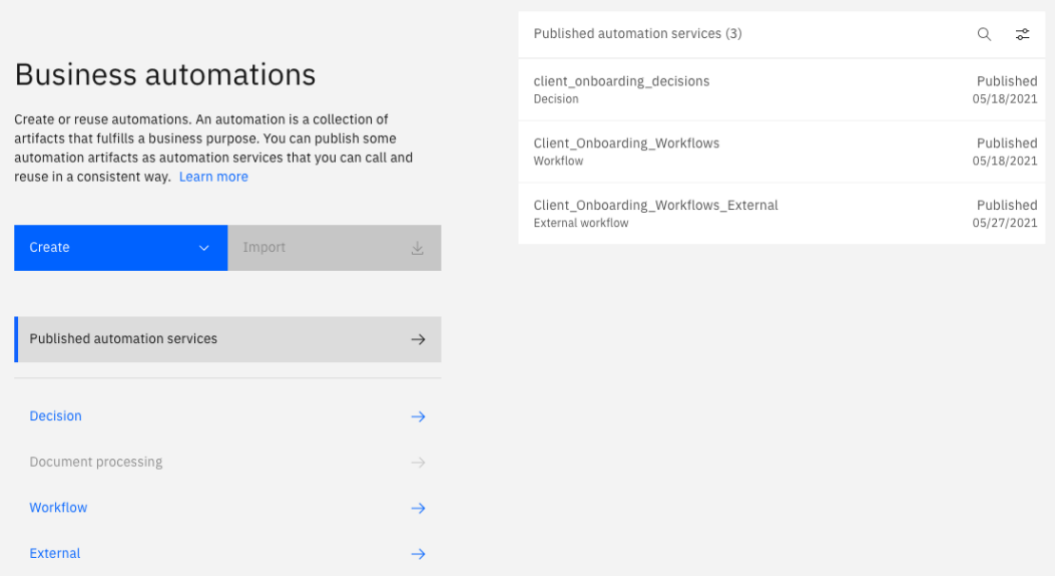
   The homepage contains cards that showcase recent artifacts across all installed Cloud Paks in the system. For IBM Cloud Pak for Business Automation, the recent business applications and automation services are shown.



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

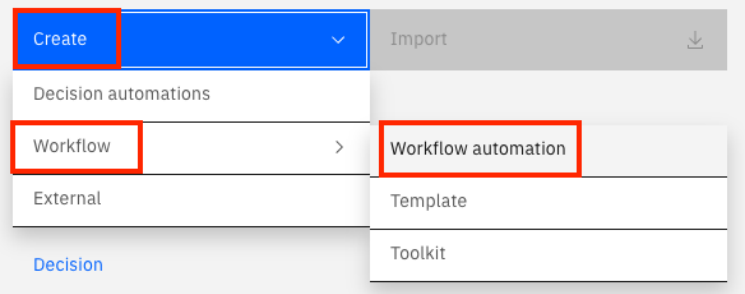


The default selection is **Published automation services** which shows the different automation services available to use in the platform. As a part of this lab, you will publish an automation service that allows consumers of the service to send emails from their workflows or applications.

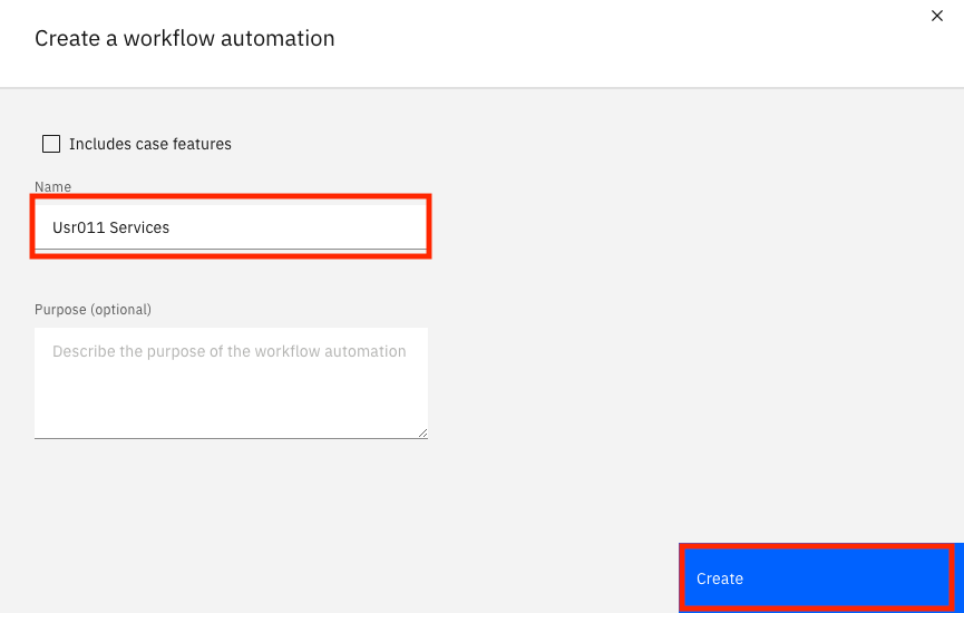


We first need to add a jar file to the project. This file contains the Java implementation to send an email.

3. Click on **Create → Workflow → Workflow automation**.

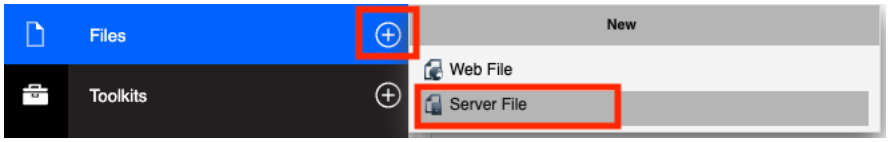


4. In the **Name** field, enter ***UsrNNN* Services** where *UsrNNN* is your username.
5. Click on **Create**.

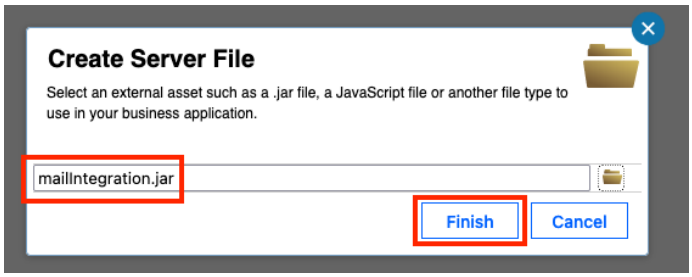


This opens the IBM Process Designer which is the primary modeling and designing tool in IBM Business Automation Workflow. Note that the Case Builder is not opened because we did not include the case features as a part of this solution's creation. The left-hand side pane of the Process Designer is the library pane where you can create and access different artifacts.

6. In the library pane, hover over **Files**, click on the **+** button and select the **Server File** option.

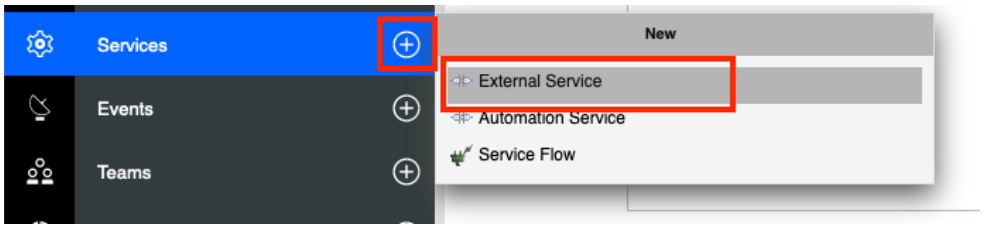


7. Select the **mailIntegration.jar** file downloaded as a part of the lab setup instructions.
8. Click on **Finish**.



Next, we will create the external service that uses this jar file.

9. In the library pane, hover over **Services**, click on the **+** button and select the **External Service** option.

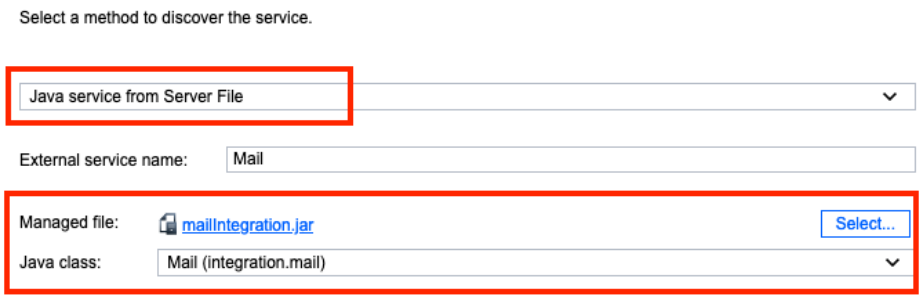


The external service discovery wizard pops up with two options. As we are integrating with a java application, we will use the default selection.

10. Click on **Next**.
11. For the **Select a method to discover the service** field, select **Java service from Server File** option.

    Note that there are other options like REST and Web Services available here to integrate with.

12. In the **Managed file** field, click on **Select** and pick the **mailIntegration.jar** file.
13. For the **Java class** field, select the **Mail** class.

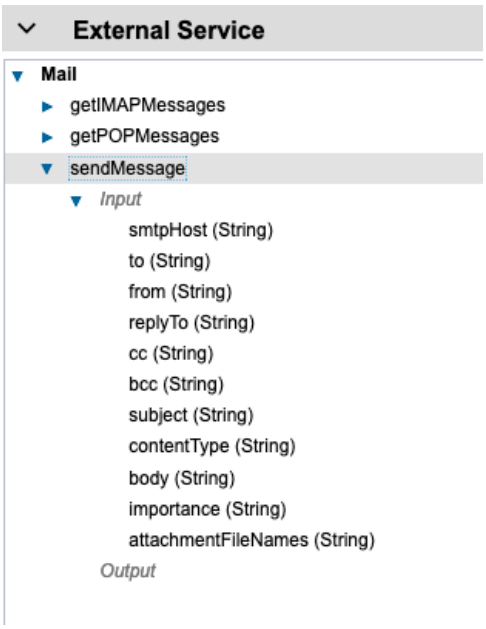


The external service name is automatically updated to match the name of the Java class.

14. Click on **Finish**.

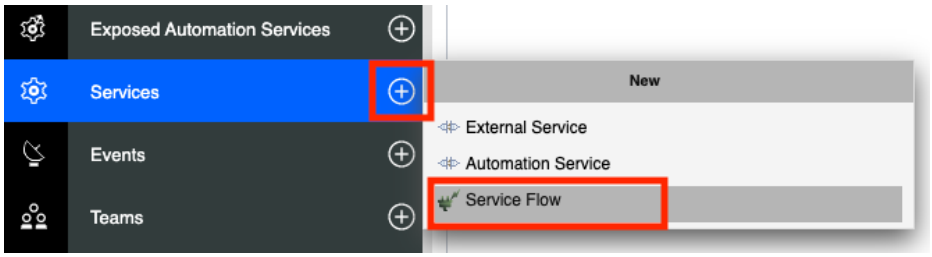
This opens the External Service editor that contains the methods defined within the Mail class of the jar file. Each method has its own signature (inputs and outputs) which is translated into the external service for low-code integration in Workflow.

15. Expand the **sendMessage** operation and the **Input** section to view its details.



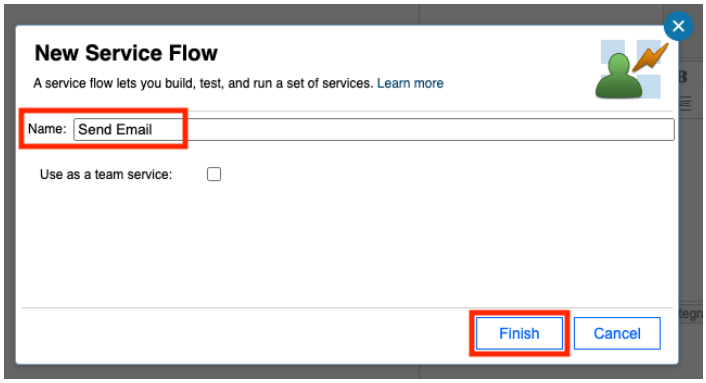
Here you can see the inputs that can be used to send an email. As the method has no outputs, the output section is empty. Next, we will create a service flow to be able to invoke the **sendMessage** operation. To make the service flow re-usable, it can be published as an automation service or be put in a toolkit where other Workflows can consume it. In the next exercise, we will see how to publish an automation service so that it can be re-used.

16. In the library pane on the left, hover over **Services**, click on the **+** button and select **Service Flow**.

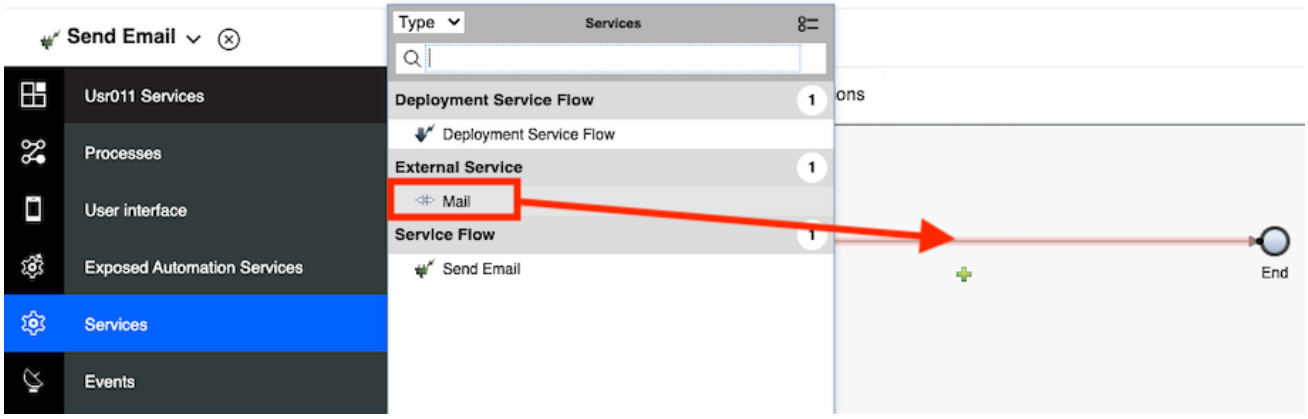


17. In the **New Service Flow** wizard, enter **Send Email** as the name.

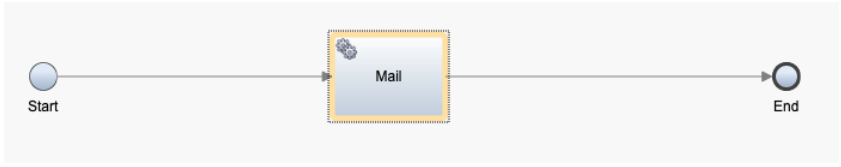
18. Click on **Finish** to open the service flow editor.



19. In the library pane on the left, click on **Services** and drag the **Mail** external service on the line connecting the **Start** and **End** node.

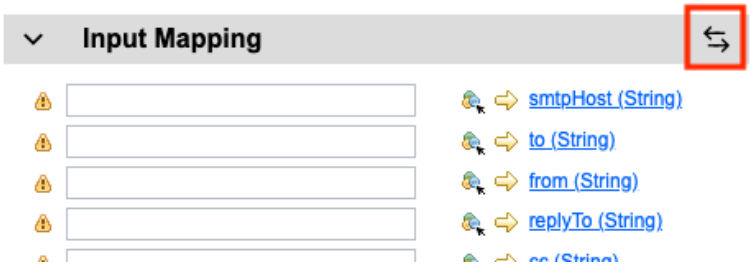


Your diagram should now look as follows:



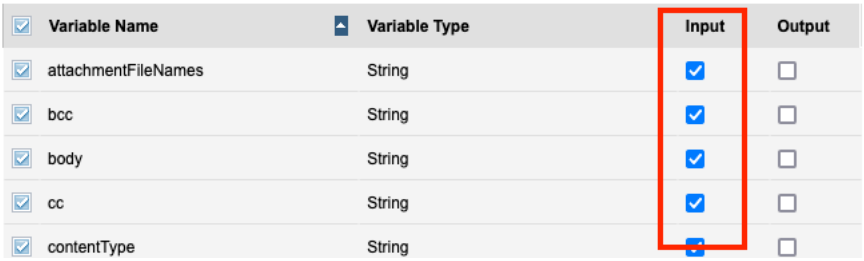
20. In the properties pane at the bottom, under the **Implementation** section, select the **sendMessage** operation.

21. Switch to the **Data Mapping** tab.
22. Click on the **auto-map** icon for the **Input Mapping** section.



This opens the variable creation wizard which allows us to automatically create the variables required to call the service.

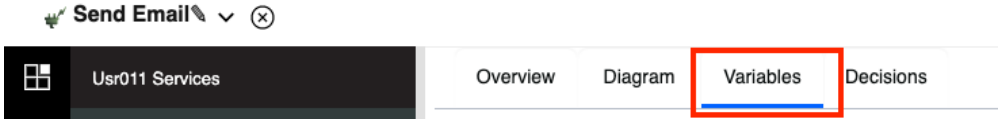
23. In the variable creation wizard, select the **Input** checkboxes for all variables.



24. Click on **Finish**.

    You can see in the **Data Mapping** tab now that all inputs have a variable assigned to them.

25. Click on the **Variables** tab at the top.

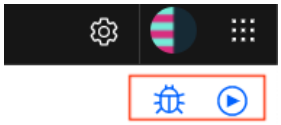


    Here, you can see all the variables available as input variables. This means that any Workflow invoking this service, can provide these variables as inputs.

26. Click on one of the inputs like **subject**.

    In the section on the right, you can provide default values for each input. This is useful for both testing, debugging, and providing default values valid for your Workflow.

    The **Debug** and **Run** icons in the top-right corner allow users to debug and execute the service flow.



27. Click on the **Finish editing** button in the upper-right corner to finish the editing of this service flow.

In the next exercise, you will publish an Automation Service that invokes this Service Flow.

3 Exercise: Create and Publish an Automation Service

3.1 Introduction

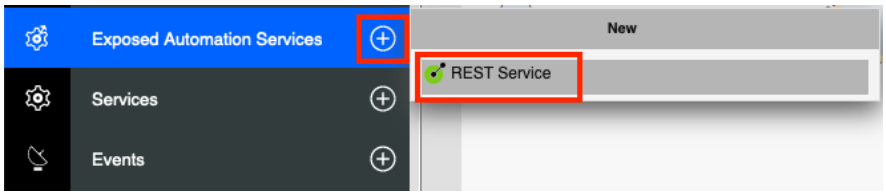
In this exercise, we will create an automation service containing an operation that invokes the service flow created in the previous exercise. We will then see how to publish this automation service.

3.2 Exercise Instructions

1. Open the ***UsrNNN* Services** workflow project if not already open.

   You can do this by going to the Business automation repository in **IBM Business Automation Studio**.

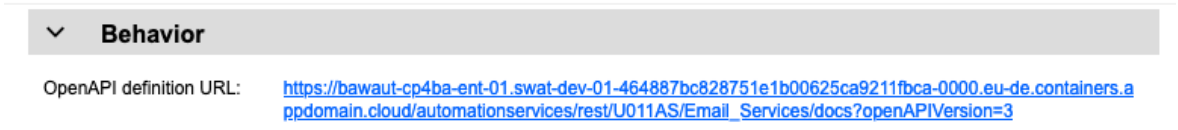
2. In the library pane on the left, hover over **Exposed Automation Services**, click on the **+** button and select the **REST Service** option.



3. In the **Name** field, enter **Email_Services**.
4. Click on **Finish**.

This opens the **REST Service** editor where you can add multiple operations. In this exercise, we will only add one operation to send emails.

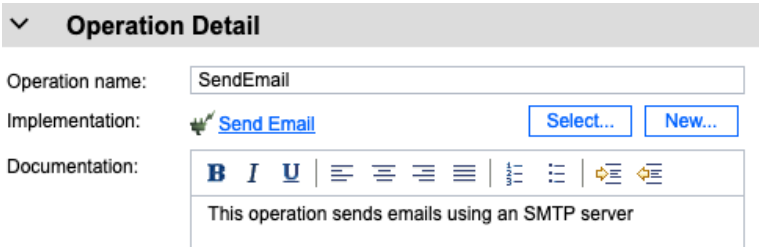
REST Services also provide an OpenAPI definition URL. The OpenAPI spec defines a standard, language-agnostic interface for REST APIs.



Note: The URL you see may be different compared to what's in the screenshot based on your lab environment.

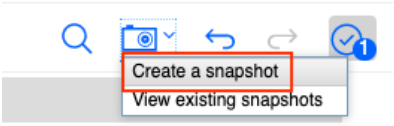
5. In the **Operations** section, click on the **+** button to add a new operation.

6. In the **Operation Detail** section on the right, enter **SendEmail** in the **Operation name** field.
7. For the **Implementation** field, click on the **Select** button and select the **Send Email** service flow created in the previous exercise.

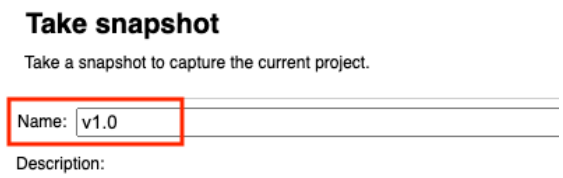


Next, we will need to create a version of this workflow project so that the REST service can be published as an automation service.

8. Click on the **Version** button in the upper right corner and select **Create a snapshot**.



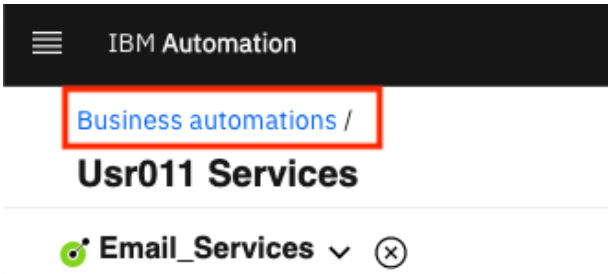
9. In the snapshot creation wizard, enter **v1.0** in the **Name** field.



10. Click on **Finish**.

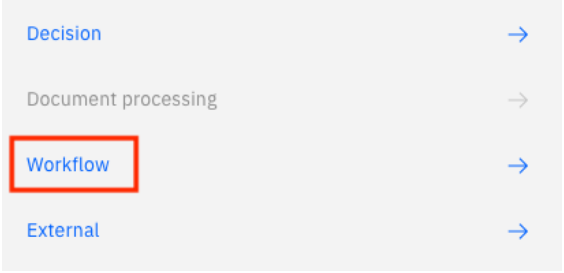
Next, we will publish this version so that is available for use throughout the platform.

11. Click on **Business automations** in the upper-left corner.



This takes you back to **Business automations** in the **IBM Business Automation Studio**.

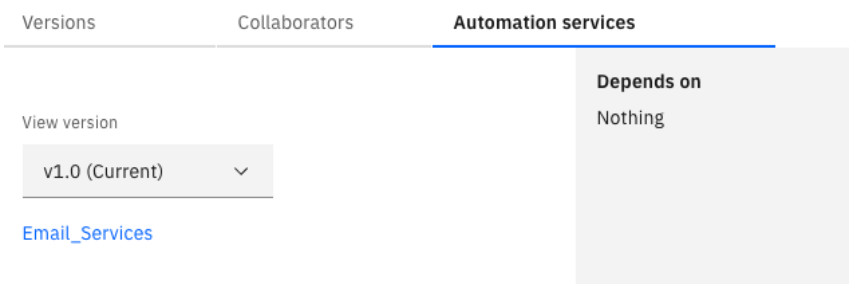
12. Click on **Workflow**.



13. Click on the ***UsrNNN* Services** tile to open its details. Do not click on the open button but on the tile itself.

    The project details open on the right.

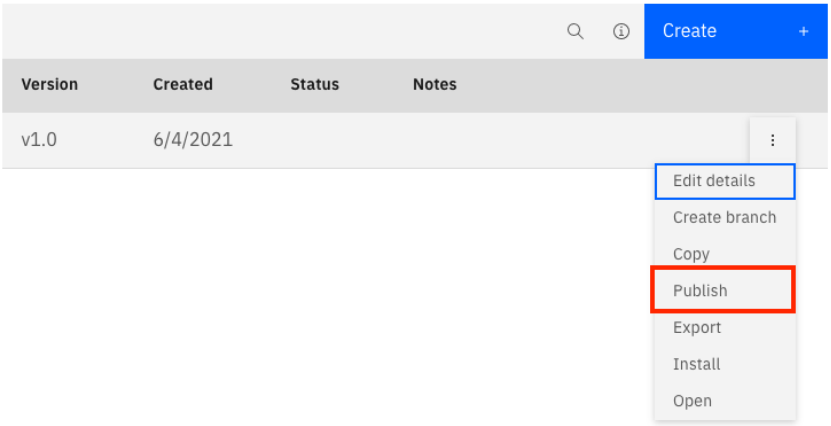
14. Click on the **Automation Services** tab.



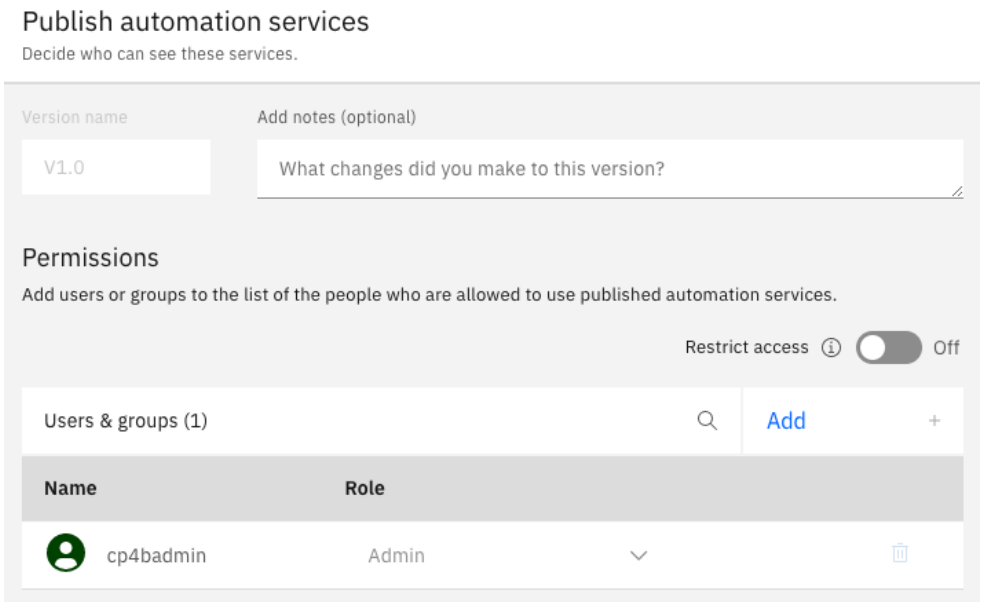
    This tab shows the current version, which automation services it provides and depends on. As this solution only provides an Automation Service but does not consume one, the **Depends on** section shows **Nothing**.

15. Click on the **Versions** tab.

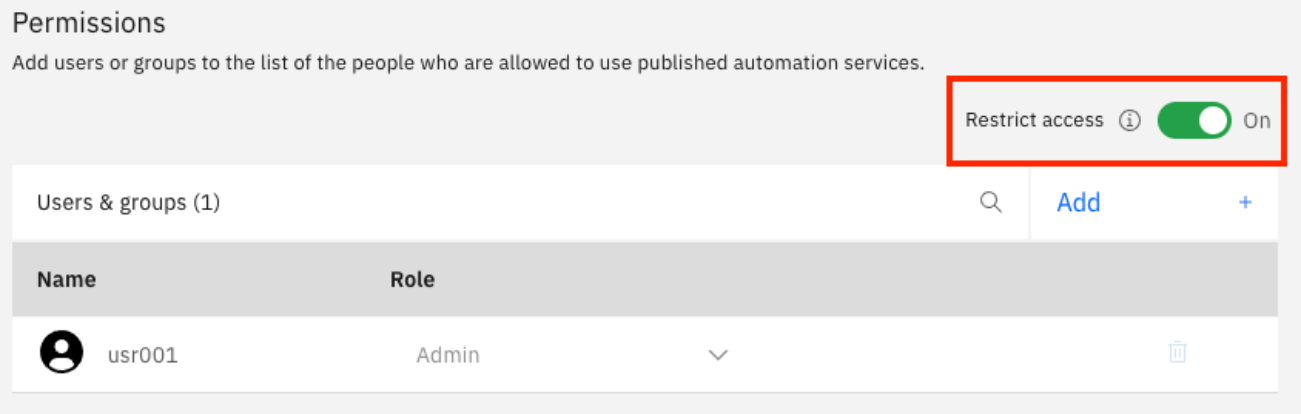
16. Hover over the **v1.0** version and click on the 3-dot menu, then select **Publish**.



    This brings up the dialog to add notes and permissions to the published automation service.



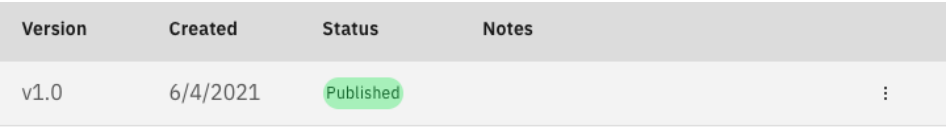
17. Click on the **Restrict access** toggle to turn access control on.



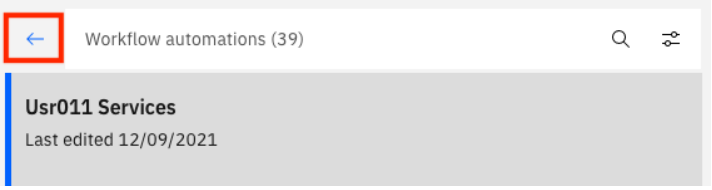
Note that you can assign different roles to the users and groups in this automation service and that you can add additional users and groups using the **Add** button.

18. Click on **Publish**.

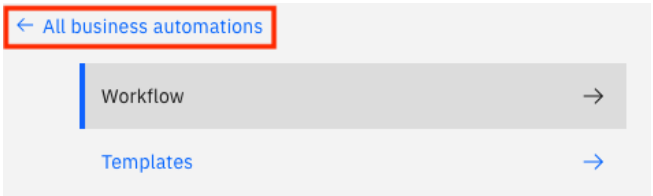
The version status will show **Published** after a few seconds.



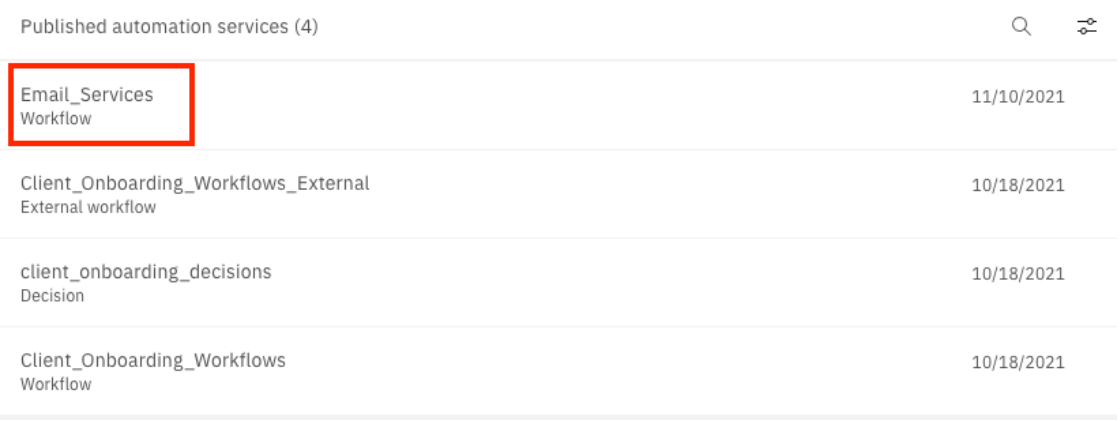
19. Click on the **Back** button in the upper-left corner.



20. Click on **All business automations**.



21. The list of published automation services will now show the **Email_Services** automation service.



The next **optional** exercise shows you how to consume & execute an automation service in Workflow.

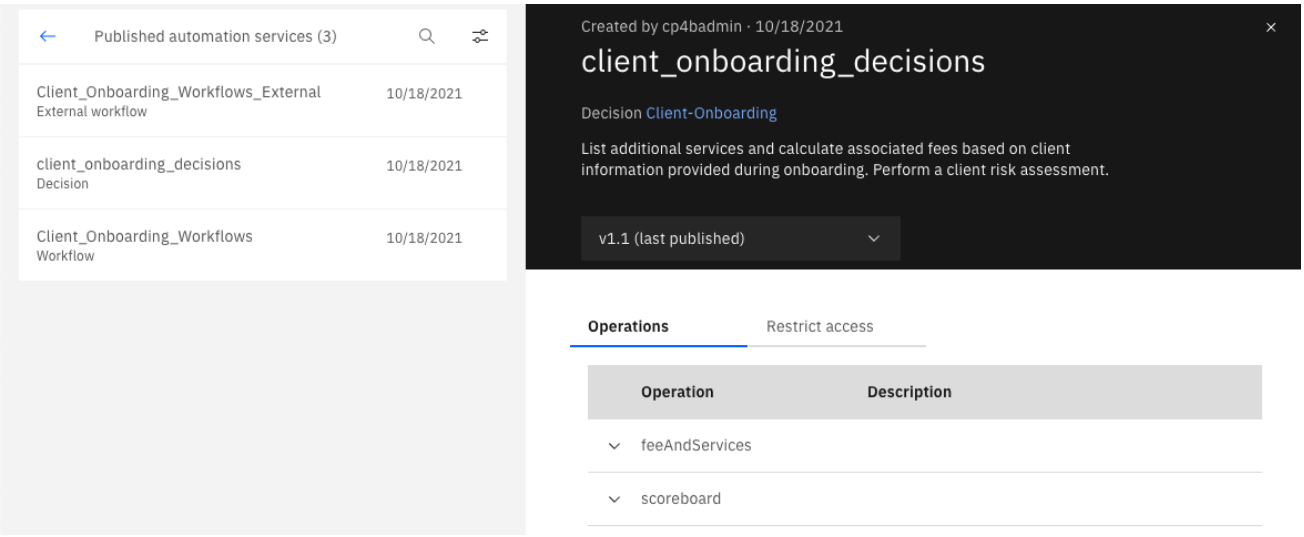
4 Optional Exercise: Consume an Automation Service

4.1 Introduction

In this exercise, we will consume an automation service that is published using the IBM Automation Decision Service capability. This automation service invokes a decision that scoreboards a client i.e., gives an artificial intelligence backed risk assessment and classifies the client as Segment 1 or 2.

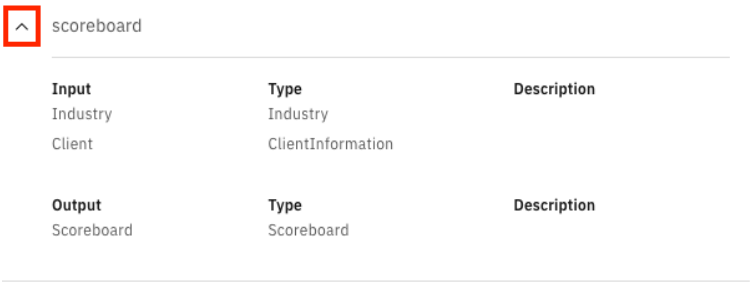
4.2 Exercise Instructions

1. In the **Published automation services** section, click on **client_onboarding_decisions** to view its details.



   An automation service can contain multiple operations. The table on the right shows the operations available along with a description for each operation. For this exercise, we will consume the **scoreboard** operation as the description matches our goal of scoreboarding the client.

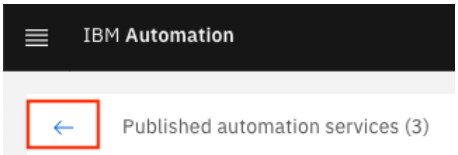
2. Click on the **twisty** icon next to **scoreboard** to view more details about the operation.



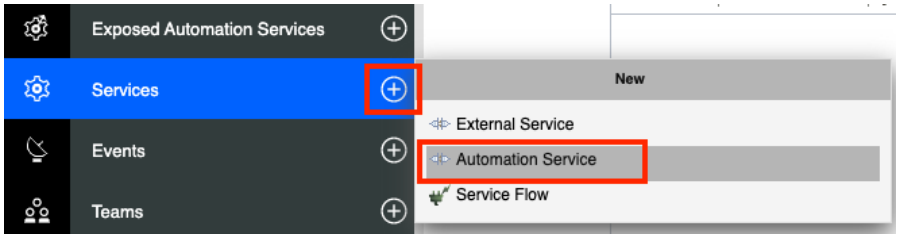
   Here, we can see the inputs and outputs that are specified for this operation. This means that anyone consuming this automation service will need to provide an **industry** and **client information** and will receive the **scoreboard** in return.

   We will be consuming this automation service in a Workflow.

3. Click on the **Back** button in the top-left corner.

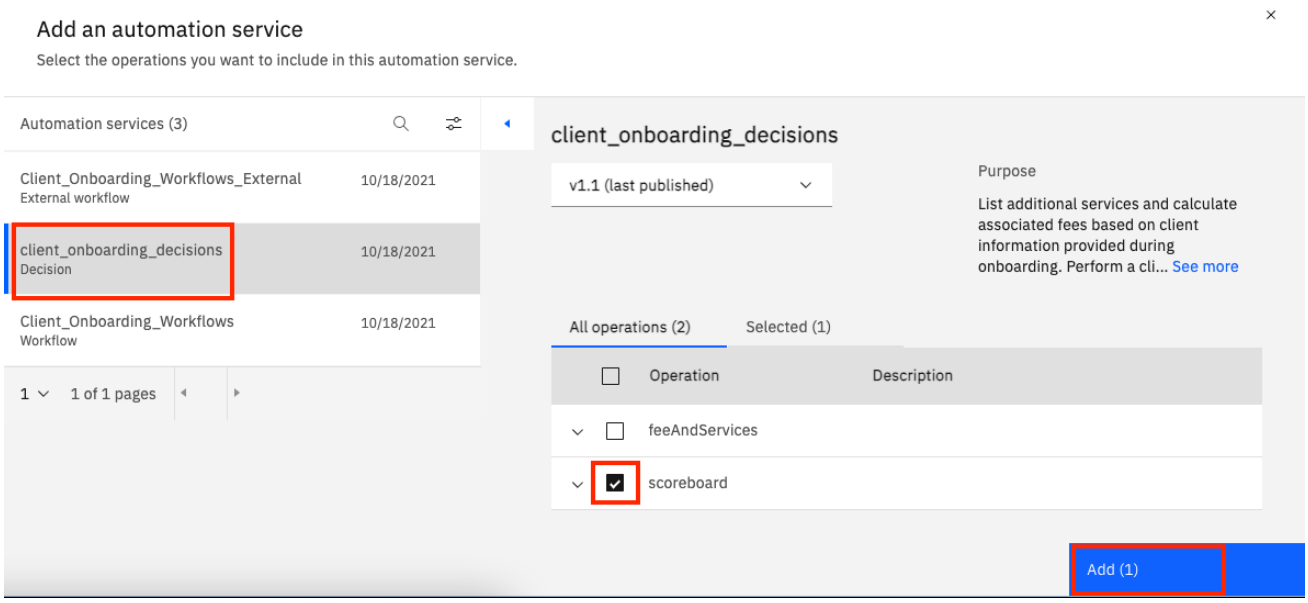


4. Click on **Workflow**.
5. Open the ***UsrNNN* Services** workflow project created in the previous exercise.
6. In the library pane, hover over **Services**, click on the **+** button and select **Automation Service**.



This brings up the list of published automation services available in the platform where you can select which one you want to consume.

7. Click on **client_onboarding_decisions**.
8. Uncheck the **feesAndServices** operation.

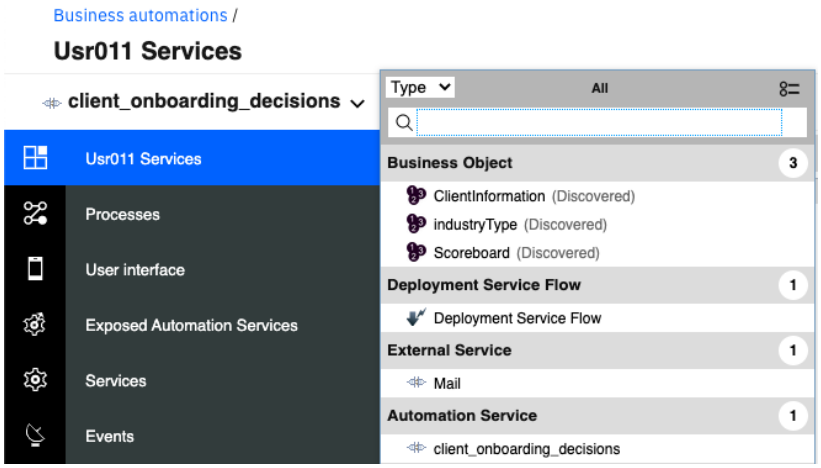


At the top, you can select which version of the automation service you want to consume. By default, the last published version is always chosen. We will leave that selection as is.

9. Click on **Add (1)**.

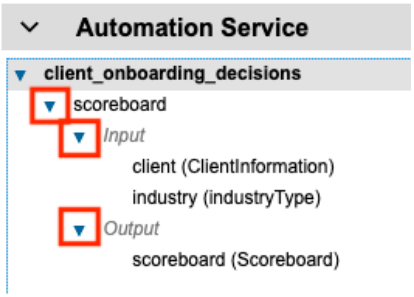
This creates the artifacts necessary to create the automation service in your workflow project and opens the Automation Service. This includes any business objects that are required to call the service. The editor for the automation service has an interface similar to that of the external service editor from the previous exercise. Let's look at the objects created.

10. Click on the title of your project in the library pane to show the list of artifacts.



As you can see, the **ClientInformation, industryType** & **Scoreboard** business objects are automatically discovered as they are the inputs and outputs required to invoke the service. Next, we will take a deeper look at the automation service.

11. Click on the **twisty** icon for the **scoreboard** operation to see its details.
12. Click on the **twisty** icons for the **Input** and **Output**.

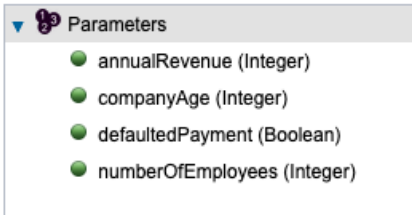


13. Click on **client** under **Input**.

    On the right, the details for the parameter are shown including its type: ClientInformation.

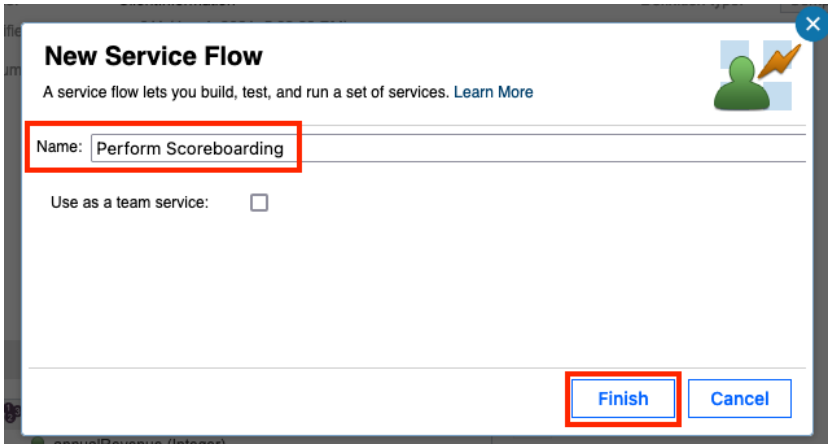
14. Click on **ClientInformation** to open the business object and see its parameters.

15. In the **Parameters** section, you can see the different parameters within this business object:



You can similarly explore the other inputs and outputs for the automation service. Next, we will create a Service Flow that can invoke this automation service.

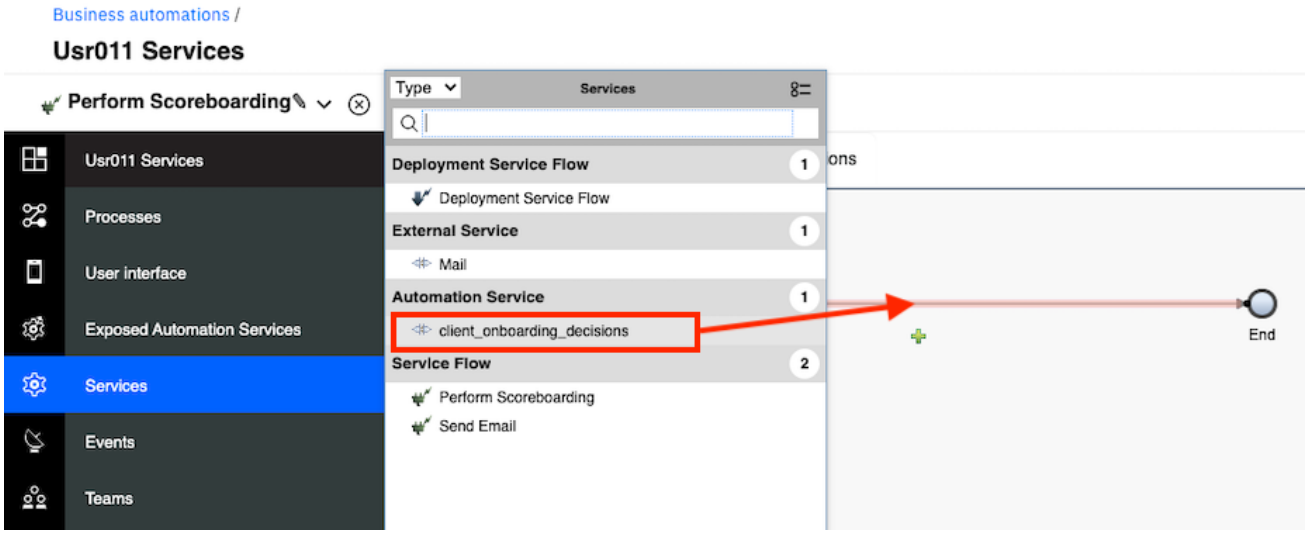
16. In the library pane on the left, hover over **Services**, click on the **+** button and select **Service Flow**.
17. In the New Service Flow wizard, enter **Perform Scoreboarding** as the name.
18. Click on **Finish**.



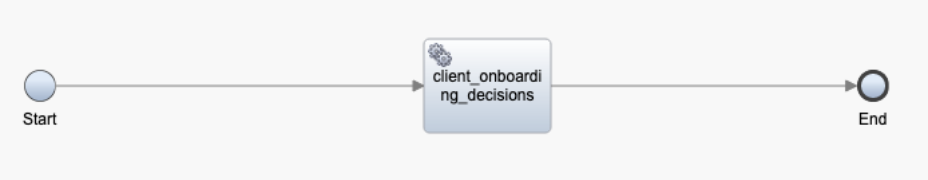
The service flow editor now opens with the default diagram connecting the **Start** and **End** nodes.

Now, we want to add a call to the automation service between the line connecting the **Start** and **End** nodes.

19. In the library pane on the left, click on **Services** and drag the **client_onboarding_decisions** automation service on the line connecting the **Start** and **End** node.



Your diagram should then look as follows:



20. Click on the **client_onboarding_decisions** service task between the **Start** and **End** nodes.

21. In the properties pane at the bottom, under **Implementation** select the **scoreboard** operation.

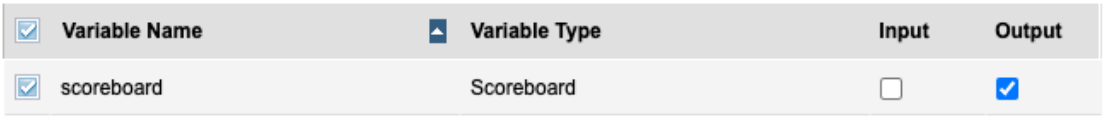
22. Switch to the **Data Mapping** tab.
23. Click on the **auto-map** icon for the **Input Mapping** section.

This brings up the variable creation wizard which allows us to automatically create the required variables. We want this service flow to be reusable so that it can be called by other artifacts (such as a human service). To do that, we can select the **client** and **industry** as inputs to this service flow. This means that anyone calling the **Perform Scoreboarding** service flow can provide these two variables as inputs.

24. Select the **Input** checkboxes for both **client** and **industry**.

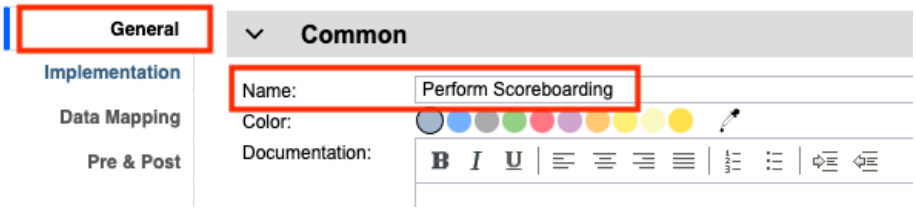
We would check the output checkboxes if we were modifying the input. This way any artifact calling the service flow would be able to get the updated values as the output to the flow.

25. Click on **Finish**.
26. Repeat the steps above to auto-map the output variable **scoreboard**. In this case however, select the **Output** checkbox.



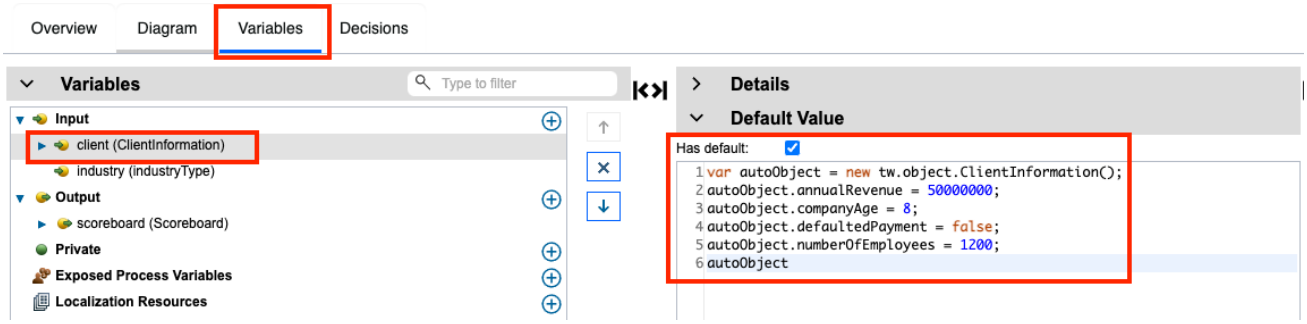
Your data mapping section should now look as follows:

27. Switch to the **General** tab.
28. Change the name of the task to **Perform Scoreboarding**.

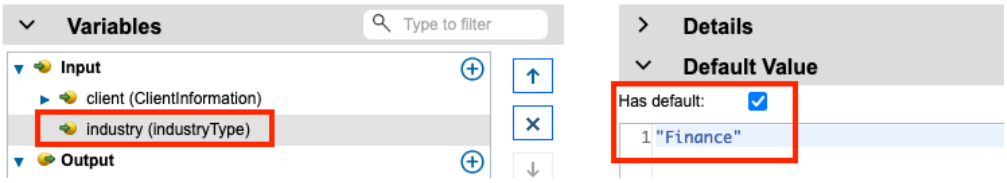


Now, to test this service flow, we will need to provide some default values.

29. Click on the **Variables** tab at the top.
30. Select the **client** input variable.
31. On the right-hand side, **check** the checkbox for the **Has Default** field.
32. Update the following values in the autogenerated script:
    a. **annualRevenue:** 50000000
    b. **companyAge**: 8
    c. **defaultedPayment**: false
    d. **numberOfEmployees**: 1200



33. Click on the **industry** input variable.
34. **Check** the **Has default** checkbox.
35. Update the industry in the autogenerated script to **Finance**.

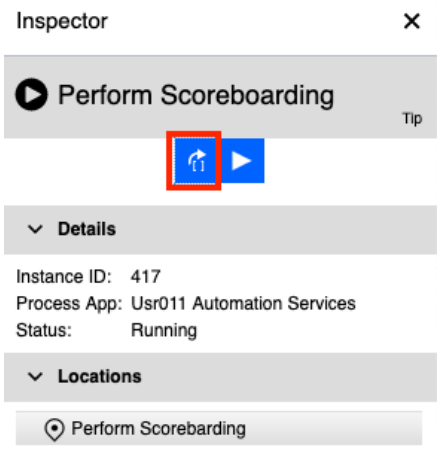


With the default values added, we are now ready to test the automation service.

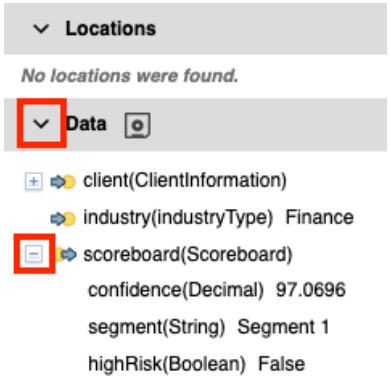
36. Click on the **Diagram** tab at the top.

37. Click on the **Debug** icon in the upper-right corner.

38. Click on the **Step over** button to invoke the automation service.



39. Click on the **twisty** icon to expand the **Data** section.
40. Expand the **scoreboard** variable.
41. Verify that the values shown match the screenshot below:



With that, you have successfully completed this exercise and learned how to consume an automation service. The service flow that encapsulates this automation service can now be reused throughout the project to call the decision service.

Congratulations on completing the lab!