# IBM Cloud Pak for Business Automation Demos and Labs 2021

## IBM RPA and Workflow Integration

V 1.2

Bu Feng Hou
houbf@cn.ibm.com
Paul Pacholski
pacholsk@ca.ibm.com
Olaf Hahnl
olaf.hahnl@de.ibm.com

**NOTICES**

This information was developed for products and services offered in the USA.

IBM may not offer the products, services, or features discussed in this document in other countries. Consult your local IBM representative for information on the products and services currently available in your area. Any reference to an IBM product, program, or service is not intended to state or imply that only that IBM product, program, or service may be used. Any functionally equivalent product, program, or service that does not infringe any IBM intellectual property right may be used instead. However, it is the user's responsibility to evaluate and verify the operation of any non-IBM product, program, or service.

IBM may have patents or pending patent applications covering subject matter described in this document. The furnishing of this document does not grant you any license to these patents. You can send license inquiries, in writing, to:

IBM Director of Licensing
IBM Corporation
North Castle Drive, MD-NC119
Armonk, NY 10504-1785
United States of America

The following paragraph does not apply to the United Kingdom or any other country where such provisions are inconsistent with local law: INTERNATIONAL BUSINESS MACHINES CORPORATION PROVIDES THIS PUBLICATION "AS IS" WITHOUT WARRANTY OF ANY KIND, EITHER EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF NON-INFRINGEMENT, MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. Some states do not allow disclaimer of express or implied warranties in certain transactions, therefore, this statement may not apply to you.

This information could include technical inaccuracies or typographical errors. Changes are periodically made to the information herein; these changes will be incorporated in new editions of the publication. IBM may make improvements and/or changes in the product(s) and/or the program(s) described in this publication at any time without notice.

Any references in this information to non-IBM websites are provided for convenience only and do not in any manner serve as an endorsement of those websites. The materials at those websites are not part of the materials for this IBM product and use of those websites is at your own risk.

IBM may use or distribute any of the information you supply in any way it believes appropriate without incurring any obligation to you.

Information concerning non-IBM products was obtained from the suppliers of those products, their published announcements or other publicly available sources. IBM has not tested those products and cannot confirm the accuracy of performance, compatibility or any other claims related to non-IBM products. Questions on the capabilities of non-IBM products should be addressed to the suppliers of those products.

This information contains examples of data and reports used in daily business operations. To illustrate them as completely as possible, the examples include the names of individuals, companies, brands, and products. All of these names are fictitious and any similarity to the names and addresses used by an actual business enterprise is entirely coincidental.

**TRADEMARKS**

IBM, the IBM logo, and ibm.com are trademarks or registered trademarks of International Business Machines Corp., registered in many jurisdictions worldwide. Other product and service names might be trademarks of IBM or other companies. A current list of IBM trademarks is available on the web at “Copyright and trademark information” at www.ibm.com/legal/copytrade.shtml.

Adobe, the Adobe logo, PostScript, and the PostScript logo are either registered trademarks or trademarks of Adobe Systems Incorporated in the United States, and/or other countries.

Cell Broadband Engine is a trademark of Sony Computer Entertainment, Inc. in the United States, other countries, or both and is used under license therefrom.

Intel, Intel logo, Intel Inside, Intel Inside logo, Intel Centrino, Intel Centrino logo, Celeron, Intel Xeon, Intel SpeedStep, Itanium, and Pentium are trademarks or registered trademarks of Intel Corporation or its subsidiaries in the United States and other countries.

IT Infrastructure Library is a Registered Trade Mark of AXELOS Limited.

ITIL is a Registered Trade Mark of AXELOS Limited.

Java and all Java-based trademarks and logos are trademarks or registered trademarks of Oracle and/or its affiliates.

Linear Tape-Open, LTO, the LTO Logo, Ultrium, and the Ultrium logo are trademarks of HP, IBM Corp. and Quantum in the U.S. and other countries.

Linux is a registered trademark of Linus Torvalds in the United States, other countries, or both.

Microsoft, Windows, Windows NT, and the Windows logo are trademarks of Microsoft Corporation in the United States, other countries, or both.

## Table of Contents

# 1 Introduction

IBM RPA provides a comprehensive set of Robotic Process Automation (RPA) features:

- **Unattended bots**
  Use an RPA-driven digital workforce to automate repetitive tasks without human intervention.
- **Attended bots**
  Remote Desktop Automation (RDA) enables a human workforce to augment work using bots to perform repetitive tasks on demand.
- **Intelligent Virtual Agent (IVAs) chatbots**
  Combine chat and RPA commands to create chatbots through multiple channels that can provide engaging client interactions.
- **Optical Character Recognition (OCR)**
  Process documents by extracting structured data from unstructured content.
- **Dashboards**
  Gain business insights into business operations.

By bringing RPA in-house, IBM can provide customers with additional benefits:

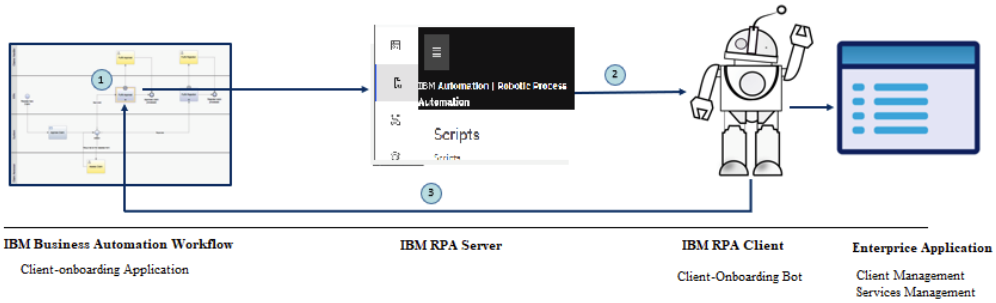
- **Faster time to value**
  Speed and simplicity of purchasing and deploying through easier licensing.
- **A comprehensive platform to automate all types of use cases**
  Tighter integrations between RPA and the rest of our platform.
- **Automate business and IT processes**
  Expand our automation mission to IT use cases.
- **Operationalize AI**
  Fulfill IBM's vision of operationalizing AI in every corner of the business.

You can explore the Documentation to understand more details about IBM RPA.

# 2 Overview

The objective of this lab is to learn how the bot designed in RPA Studio can easily be integrated into a business process developed with the Workflow capability in IBM Cloud Pak for Business Automation (the same applies when using the on prem IBM Business Automation Workflow (BAW)).

The integration steps between Workflow and RPA are as follows:



1. Workflow reaches the activity where a bot should be invoked. The activity is modelled by the designer of the process to call a service flow which uses an external service that invokes an RPA bot using the IBM RPA REST API.
2. The RPA server deploys the bot by passing business data to the RPA Client.
3. The RPA client agent performs the actual work by executing the bot script. As part of the end-to-end client onboarding solution, it will add client-onboarding information and signed services into backend applications. Once execution is finished, it will pass the output data back to Workflow process with a status code indicating if the bot script execution was successful or not.

## 2.1 Pre-requisites

For this lab, you need to access:

- **IBM Robotic Process Automation**: You need to reserve lab environment from IBM Asset Repo.
- **IBM Business Automation Studio**: 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.

All the pre-requisites have been pre-installed/configured in this lab template. The information below is just for information purposes.

IBM Products:

- IBM Robotic Process Automation Studio v20.12.5.
- IBM Cloud Pak for Business Automation v21.0.1.

Custom Solutions/Code:

- Client Onboarding Toolkit which contains the predefined business object definition and service flow to start the RPA bot matching the information required by the two backend systems below.
- A Java swing application simulating the backend, third-party system for the Client Management System.
- A web application simulating the backend, third-party Services Management System for managing the services a client has signed up to.

## 2.2 References

1. IBM Robotic Process Automation Documentation
2. IBM Robotic Process Automation Command Documentation

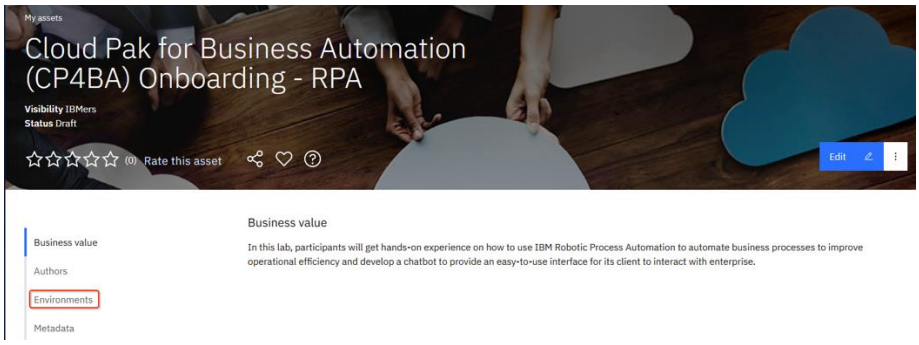
# 3 Accessing the Environment

If you have already reserved lab environment from IBM Asset Repo and registered your RPA account, please go to Chapter 4 directly.

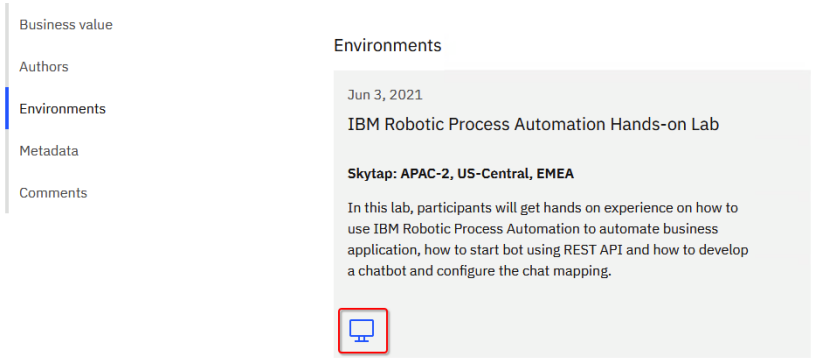
## 3.1 Reserve Environment

To get started with the IBM RPA lab, please follow below steps to reserve an environment:

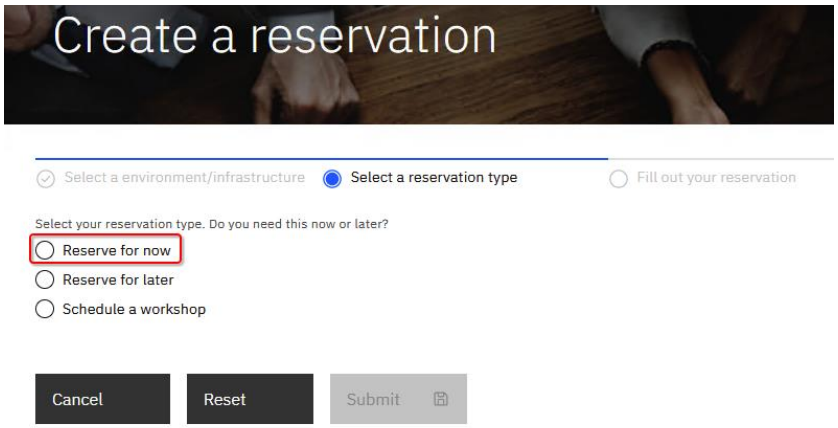
1. Click here to open IBM Asset Repo Reservation portal. You need to use your IBMID to login to the portal.




2. Click **Environments** on the left panel, then click the icon.




3. Select **Reserve for now**, then click **Submit**.



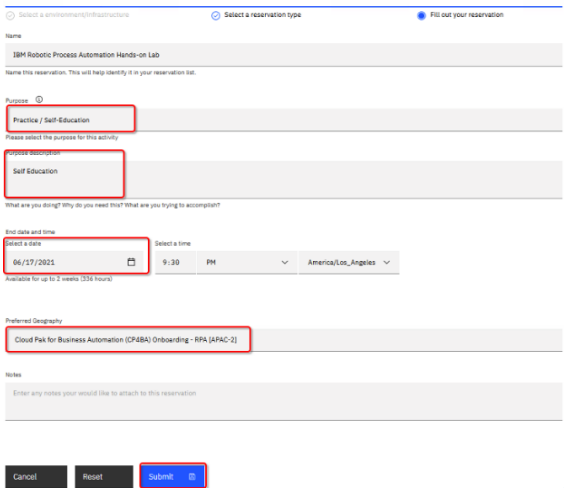

4. On the reservation page, make the appropriate selections as below. Once done, click **Submit**.

   **Purpose**: Select Practice/Self-Education.

   **Purpose description**: Enter something like **Self Education**.

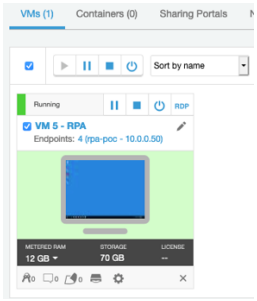
   **End date and time**: Select the end date and time that the environment will be deleted.

   **Preferred Geography**: Select the geography where your environment will be created. In order to get better network connection, suggest you to select the same geography as where you located in.




5. Once you have reserved an environment, you will receive an email with a link to access the management console for the environment including a password (**Desktop Access Information**). It also contains a URL to access the IBM RPA Rest Service remotely (**Application Service Information)**. This will be used in the Workflow and RPA integration scenario exercise.


6. Click the desktop access link above to open your environment. When you are prompted to enter environment password, please enter the desktop password above. Wait a few minutes, your environment will be started as below.

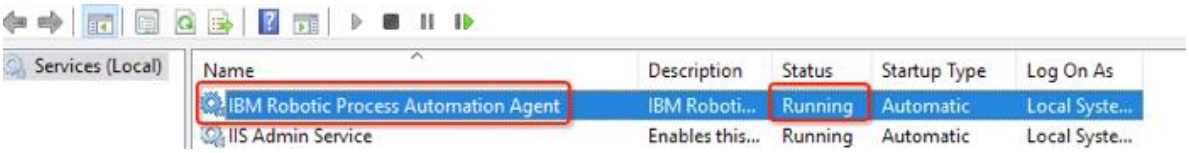



## 3.2 Activate RPA license

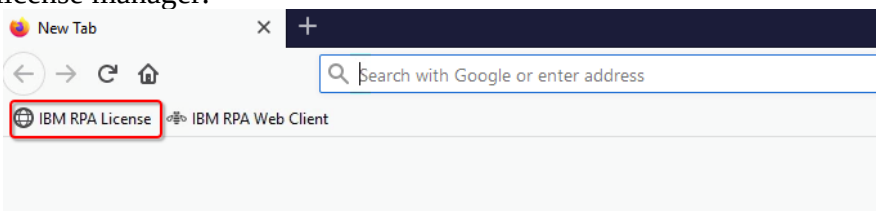
Before you can start and log into IBM RPA Studio, you need to re-activate the RPA license every time the RPA agent machine (or in our case the VM 5) is restarted. This is caused by special lab infrastructure setup and configuration and only required for this lab.

1. Click **VM 5 – RPA** to open the Windows environment in web browser.
2. Click Service from Windows toolbar.

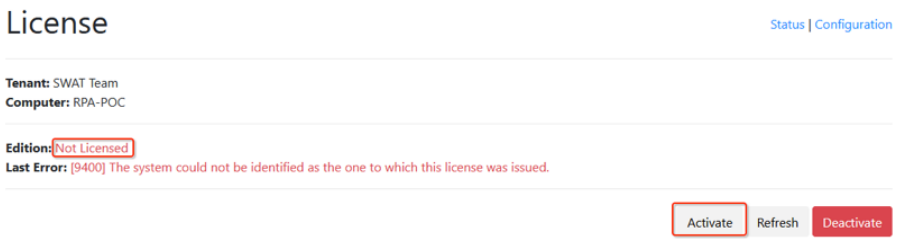
3. Check and ensure that the **IBM Robotic Process Automation Agent** service is in running status through Windows Service Manager.



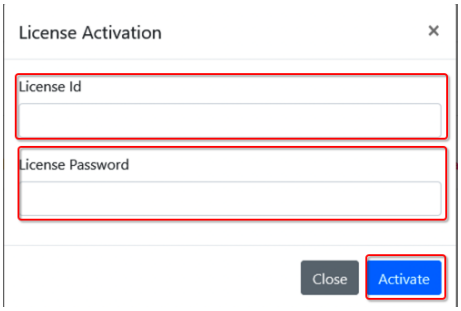

4. Start Firefox, click **IBM RPA license** from the bookmark toolbar to open IBM RPA license manager.



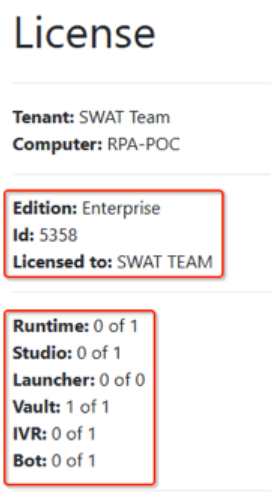

5. You will see the message **Not Licensed**. Click **Activate** button to open the License Activation window.




6. Enter the License ID and License Password and click the **Activate** button. You can get the License ID and License Password from here.



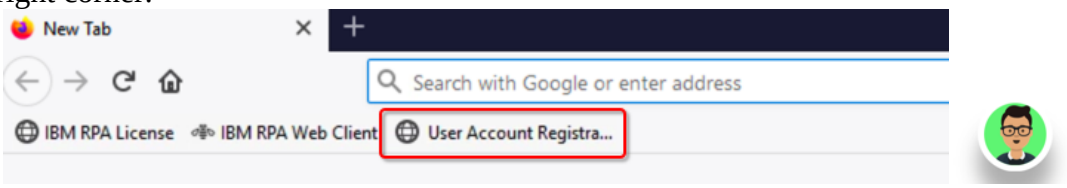

When the license is activated, you should be able to see the number of licenses available for each component.



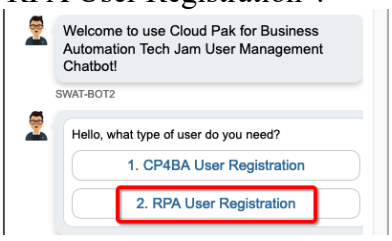

## 3.3 Register your user account

This lab requires two types of user accounts. One is for IBM RPA to grant you access to the IBM RPA tenant and Studio to develop, test and publish bot scripts. This is required for exercise 1 and exercise 2. The second user account grants you access to IBM Cloud Pak for Business Automation components running on Red Hat OpenShift Kubernetes Service hosting on IBM Cloud. This is required for the Workflow to RPA integration scenario in exercise 4. Please follow below steps to register your RPA account if you don't have access to the IBM RPA tenant yet.

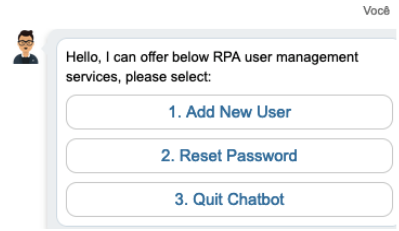
1. Start Firefox, click **User Account Registration** from the bookmark toolbar to open the user account management chatbot. Click the floating robot button at the bottom-right corner.




2. Once you see chatbot message requesting you to select the type of user account, select "RPA User Registration".

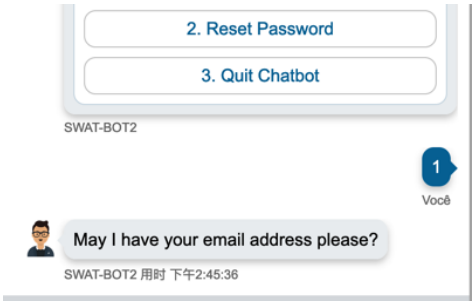



3. Wait for the chatbot message and select "Add New User".

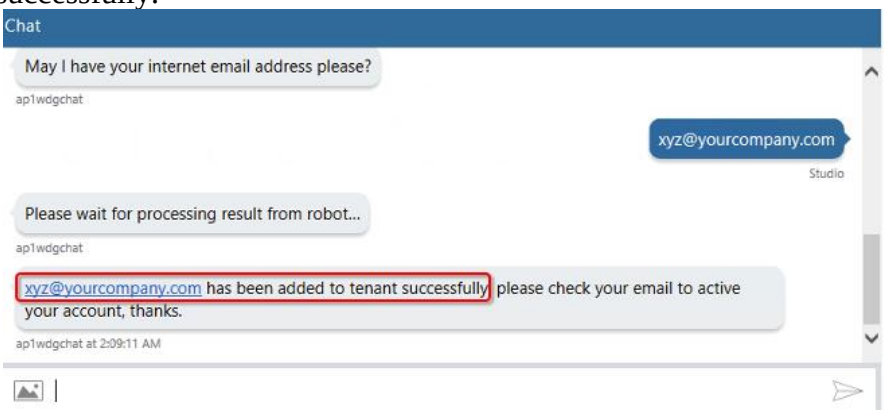



4. Wait for message from the chatbot requesting to enter your email address.

   Please note: Your email address is required to grant you access to the IBM RPA tenant only. It will not be used for any other purpose. In case you have any objection to provide your email address, please stop and contact your lab host.

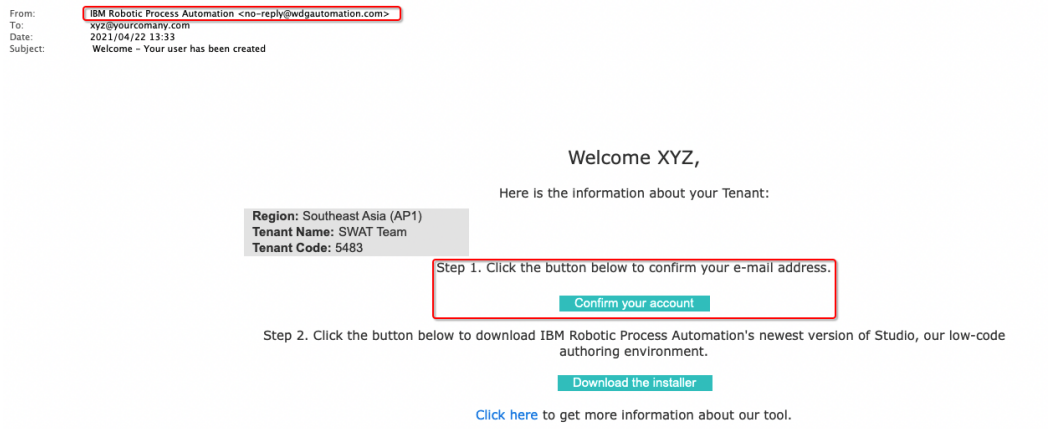



5. Enter your email address. Then wait for the chatbot to register your account. This may take a minute or two. Once the chatbot finishes registering your account, it will prompt a message to indicate that your account has been added to the RPA tenant successfully.

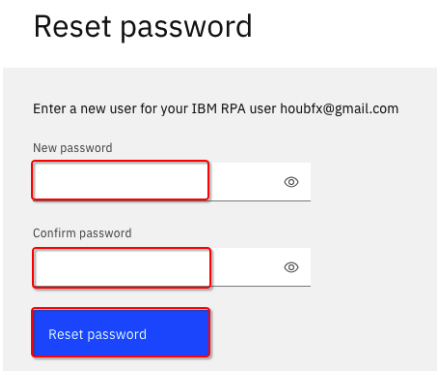



6. Check your mailbox. You should receive an email from **IBM Robotic Process Automation** as below. Click **Confirm your account** from **Step 1.**

   *Since IBM Robotic Process Automation Studio has been installed on the lab environment, Step 2 is not required. You could download the installer and install it on your own machine if you like.*

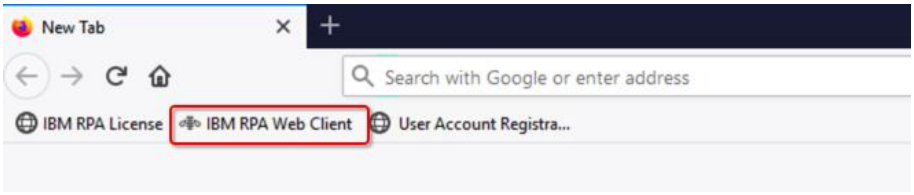



7. Enter new password for your account. Once done, click **Reset password** which will activate your account with the password you set here.

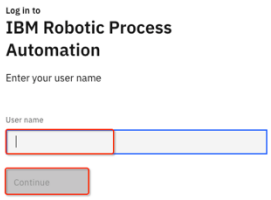



Please follow below steps to check if your account has been registered and activated successfully:

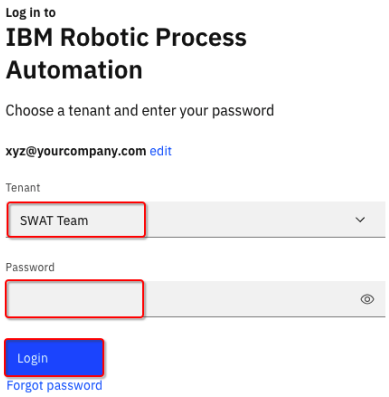
8. Start Firefox, click **IBM RPA Web Client** from the bookmark toolbar.




9. **Enter** the **email address** you used to register your account in the web client login page and **click** the **Continue** button.




10. **Enter** the **password** you set when activating your account, make sure to select **SWAT Team** tenant. Once done, **click** the **Login** button.




You should now be successfully logged into the web client. In case you can't login, please check if you entered the correct username and password. If so, please contact your lab host.

# 4 Build it yourself – Step-by-step instructions

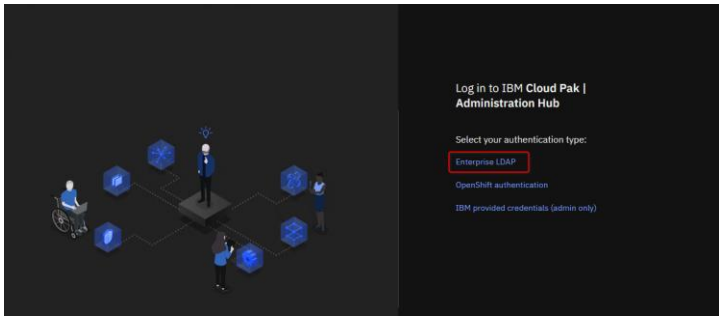
IBM RPA provides a REST API for other applications to start bots. In this exercise, you will learn how a Workflow process activity can call an RPA bot to automate a swivel-chair task so far performed by a human. It will take about 30 minutes to complete this exercise.

In the sequence of the scenario flow, it is assumed that the bot script is created first or is already available in the enterprise. Then you will model the business process and modify the implementation and data mapping accordingly to call the bot from the process. In this exercise, you can use your script if you have performed the **Application Automation Using IBM RPA lab**. Or you can use the **ClientManagement** script which has been published into the tenant already.

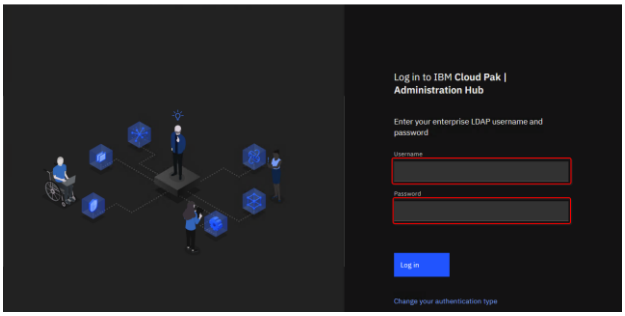
To simplify the development experience, a toolkit named Client Onboarding Toolkit has been provided and deployed on the IBM Cloud Pak for Business Automation environment running on IBM Red Hat OpenShift Kubernetes Service. The toolkit provides various functionalities including a data model that the client onboarding application uses and a service flow that calls an RPA bot using the IBM RPA REST API.

### 4.1.1 Explore the Client Onboarding Toolkit

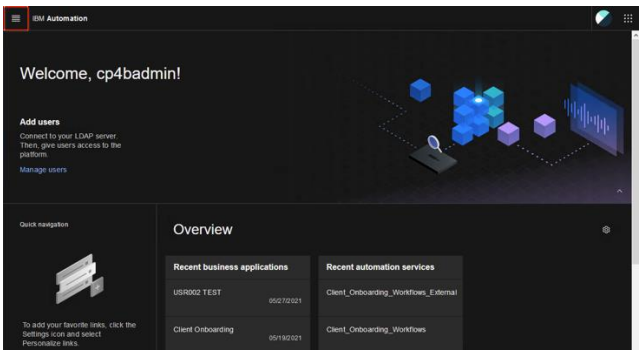
1. In your browser, login to **IBM Business Automation Studio**, select authentication type as **Enterprise LDAP**.



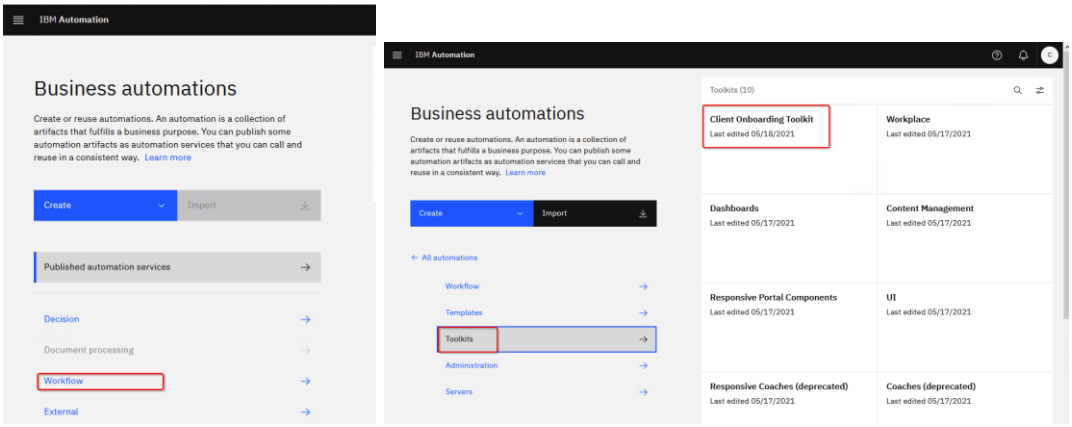

2. Enter your IBM Cloud Pak for Business Automation username and password. Click the **Login** button to login to IBM Automation hub.




3. Click the hamburger icon ☰ in the top-left corner in the IBM Automation hub and select **Design→Business Automations** in the slideout.

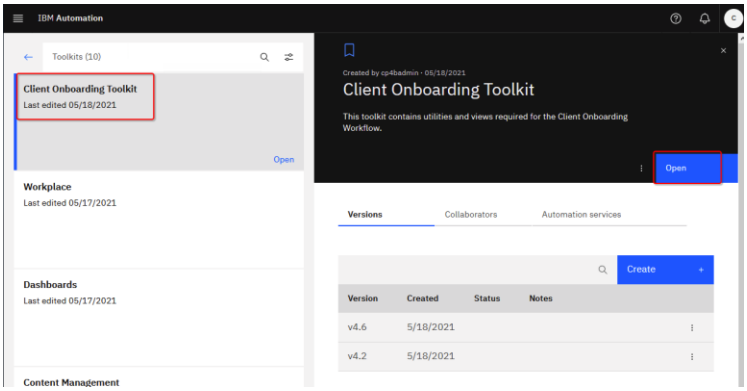



4. Click **Workflow** and then click **Toolkits.** You should see the **Client Onboarding Toolkit** listed on the right.



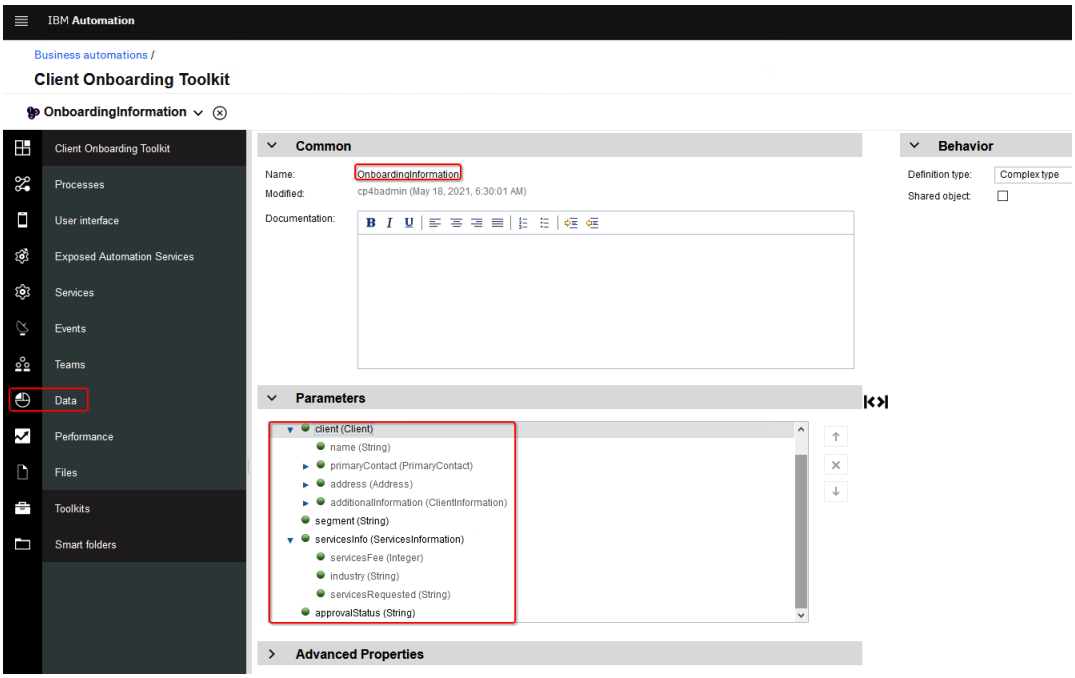
5. Click on the **Client Onboarding Toolkit** and then click the **Open** button on the right to open the toolkit in Workflow Designer.

   *In case you see any popup error message window, just ignore it as this is caused by slow network issue and will be closed automatically.*




6. The **Client Onboarding Toolkit** contains two types of services that will be used in this lab. One is a data model which is the data structure of the onboarding information which will be added into the Client Management System. Another is a service flow to start the RPA bot.

   Familiarize yourself with the data model first by clicking **Data** on left panel and selecting the **OnboardingInformation** business object. As explained in exercise 1, client onboarding contains four types of information – **client**, **segment**, **servicesInfo** and **approvalStatus**. You can dig into each business object to understand more details.




7. Familiarize yourself with the service flow **Call RPA Bot** by clicking **Services** from left panel and then selecting it.

1. Check the input and output variables by clicking the **Variables** tab.

   **Input**:

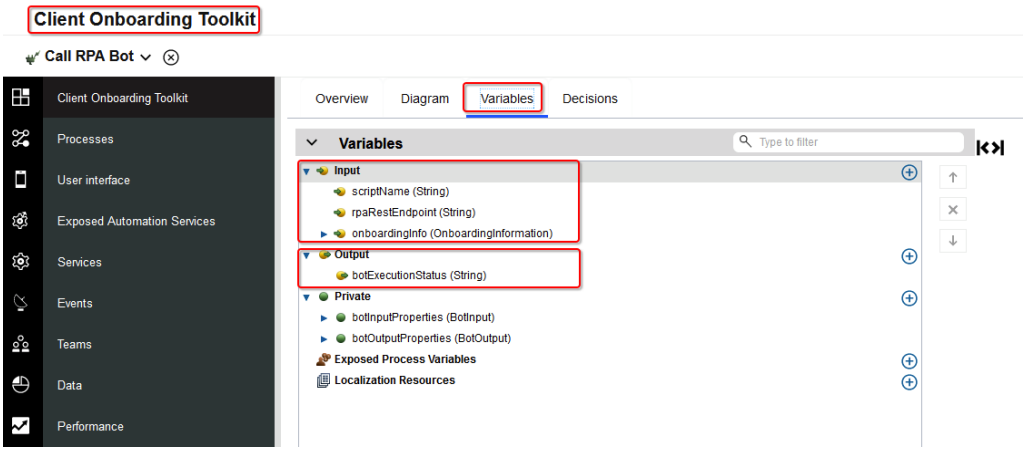
   **scriptName**: This is the bot script you are going to start, the script must be published to the tenant.

   **rapRestEndpoint**: This is the IBM RPA REST API endpoint address. The endpoit address format is https://RPAAgentHost:Port. The default port for the IBM RPA REST API to start a bot on an individual agent machine is 8099. RPAAgentHost is the RPA agent machine to execute the bot on. In this lab, since the RPA agent machine runs in an isolated environment. It has been configured to be publically accessable through an "Application Service". The address of application service is included in your reservation mail.

   **onboardingInfo**: This is the client and its signed services business data that will pass to bot to process.

   **Output**:

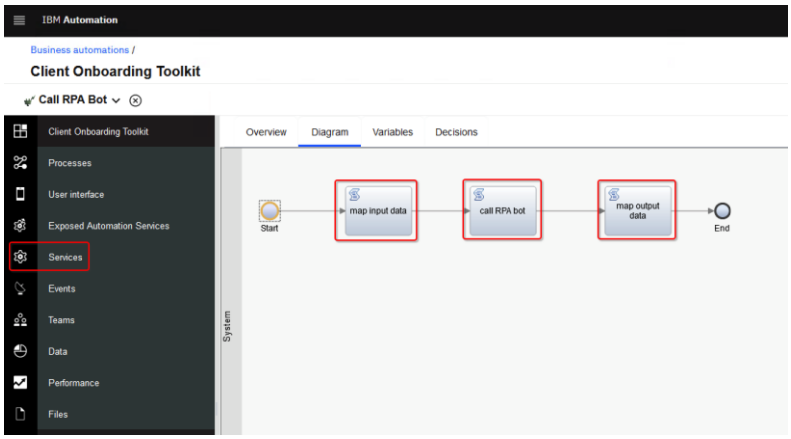
   **botExecutionStatus**: Indicates if the bot execution was successful or failed.




2. Check the service flow implementation by going back to the **Diagram** tab. It has three activities:

   - **map input data**: This activity is to prepare the business data as input parameters when calling the RPA bot. It basically transforms the business object into a JSON string.
   - **call RPA bot**: This activity is to call an external service named **IBM RPA RestServer** to start a bot. Please refer to the documentation to learn more details about how to discover an existing REST service with an OpenAPI specification and generate an external service that you can use in a service flow.

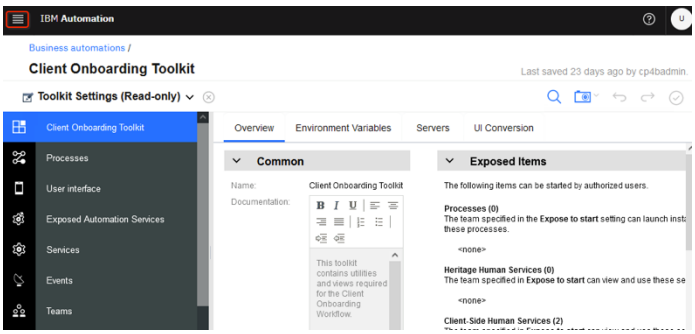
- **map output data**: This activity is to process the output data returned from the bot.



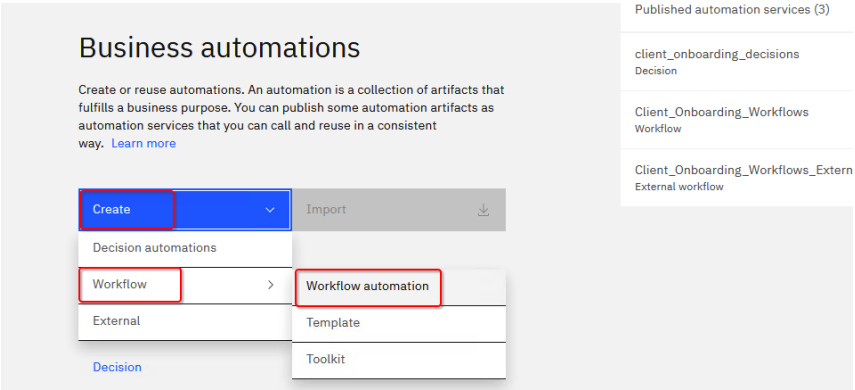

### 4.1.2 Develop a Workflow Process to start an RPA Bot

The entire end-to-end client onboarding solution involves many components including automation application, content management, automation decision service, and mobile capture. You can refer to the other labs to learn how to develop other parts of the client onboarding solution. To showcase how an activity in a Workflow process can call an RPA bot to add client onboarding information to backend applications, instead of creating a complete end-to-end client onboarding solution, we will create a simplified process to illustrate how to call the RPA bot using the **Start RPA Bot** external service introduced above.

1. **Click** the hamburger icon ☰ in the top-left corner from Workflow Designer, select **Design→Business automations**.

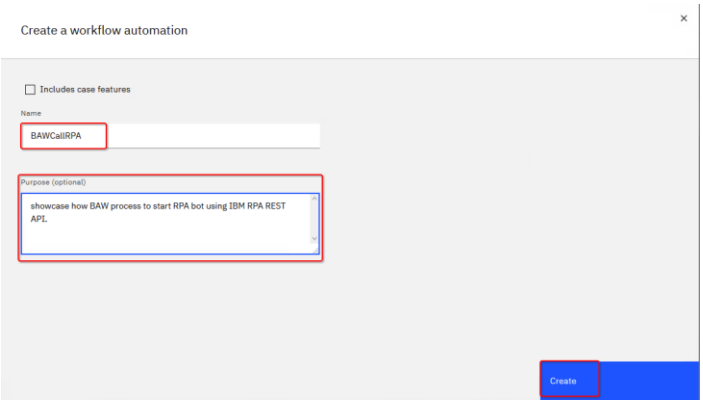



2. Click the **Create** button and select **Workflow→Workflow automation**.



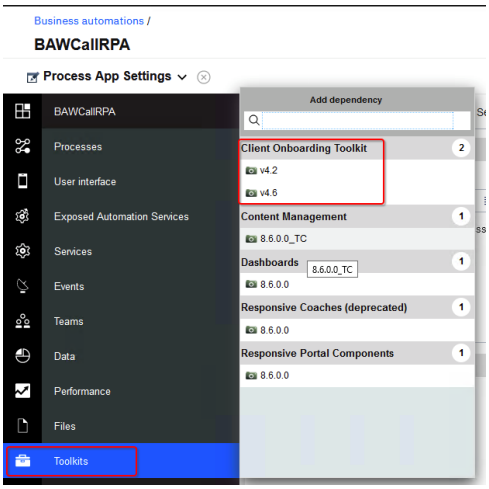

3. Leave the checkbox "Includes case features" unchecked. Enter a name for the workflow automation. You can use any name, for example – **BAWCallRPA**.

   You are using a shared environment where multiple users create business automations. To avoid conflict**s** and **ensure** that your workflow automation has a **unique name**, please **include** your **initials or user name** in the workflow automation's name. For **Purpose**, although this is optional, it is recommended to enter some text to describe the purpose of this workflow automation. Once done, click **Create**.

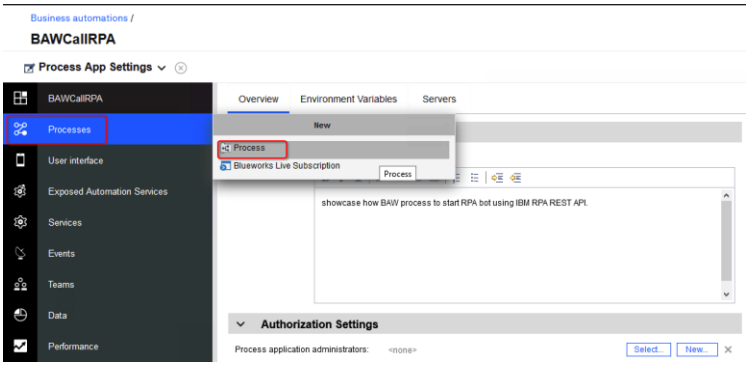



4. In order to use the data model and external service from the Client Onboarding toolkit, the toolkit needs to be added as a dependency. Click the ⊕ icon on the right next to the **Toolkits** label. Then click on the latest version of the Client Onboarding Toolkit to add it as a dependency.

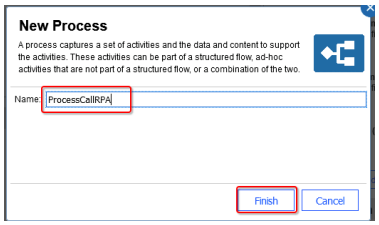
*Notes: The version number may be different, please always select the latest version/version with the highest version number.*



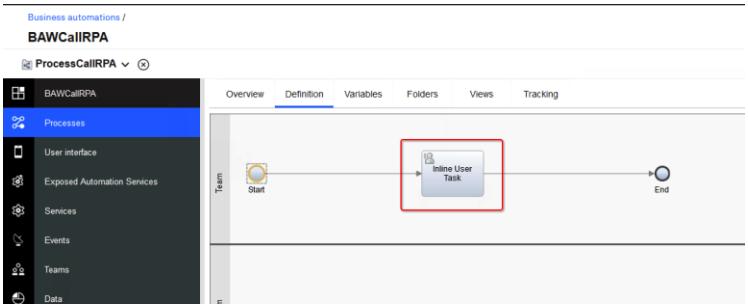

5. Click the ⊕ icon on the right of the **Processes** label and then click **Process**.



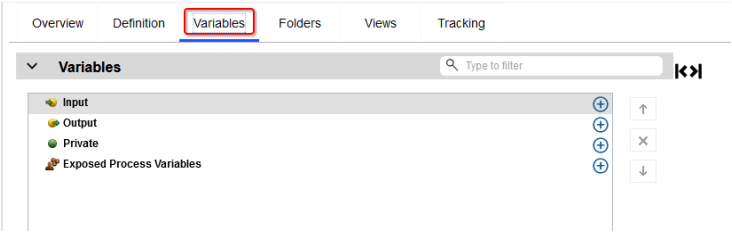

6. Enter a name for the new process, for example – ProcessCallRPA, then click **Finish.**



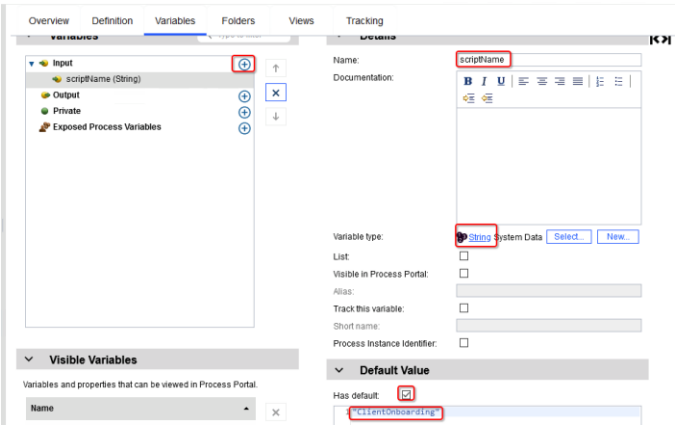

The newly created ProcessCallRPA process is opened in Workflow Designer. It initially contains one inline user task. We will change its implementation to call the RPA bot through a service flow provided in the Client Onboarding Toolkit.



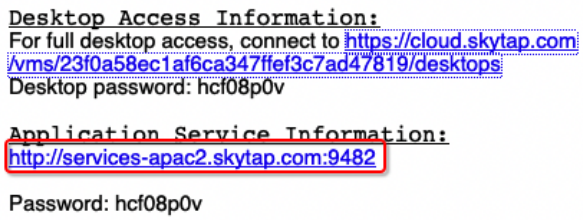

7. Click on the **Variables** tab to switch to Variables view.



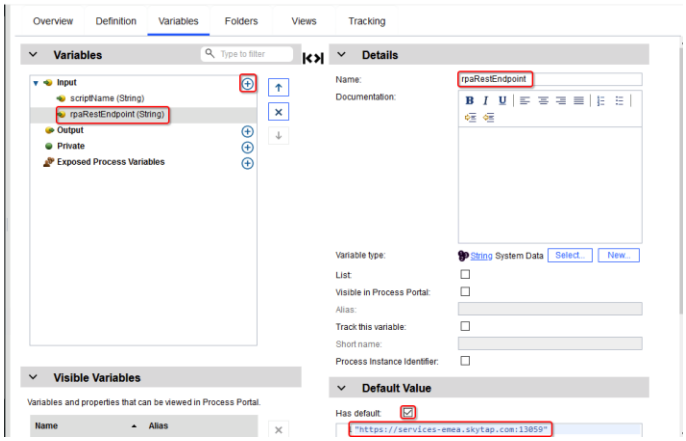

8. Click the ⊕ icon next to the **Input** label to add the first input variable. Change its name to **scriptName**, keep its type as **String**. Check **Has default** and **set** the **value** to the script name you published to the tenant if you have performed the **Application Automation using IBM RPA lab**, or set the value to **ClientManagement** which is a pre-deployed script in the tenant.



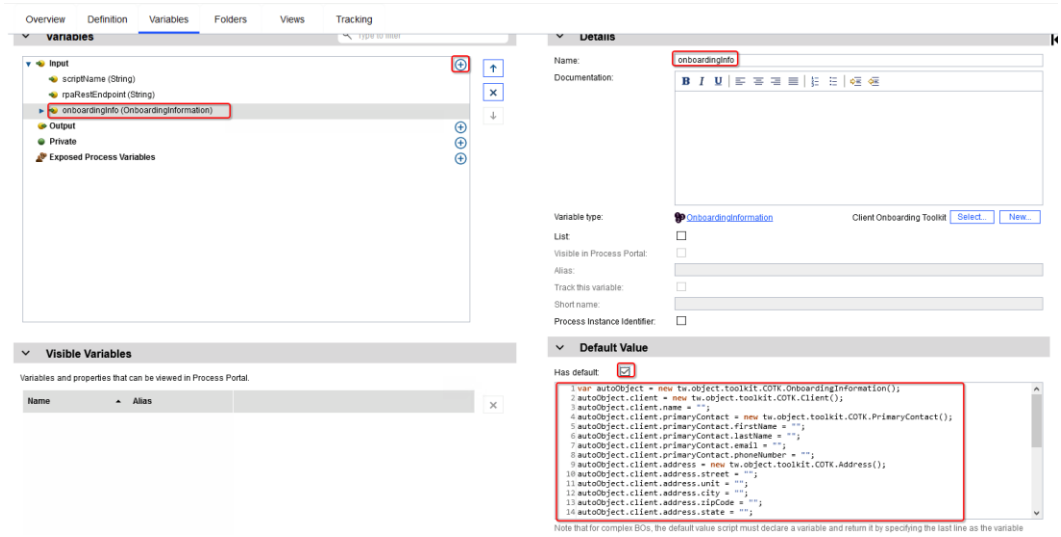

9. Go back to your mail box and find the reservation email your receieved after reserved the environment from IBM Asset Repo, **Copy** the address of application service from your reservation mail as below.




10. Switch to Workflow designer window, click the ⊕ icon again to add the second **input** variable. Change its name to **rpaRestEndpoint** and keep its type as **String**. Check **Has default** and set the default value to Application Service address you copied above, make sure to change **HTTP** to **HTTPS**.




11. Click the ⊕ icon again to add the third **input** variable. Change its name to **onboardingInfo** and change its type to **OnboardingInformation**. Check **Has default** which will automatically generate JavaScript to construct the business object and set the default values.

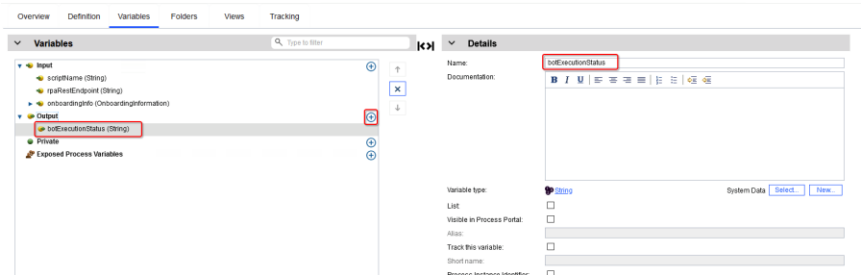



Since the auto-generated JavaScript only constructs the business object structure and sets the default values, please replace the existing script with below JavaScript to set the default value for this variable,

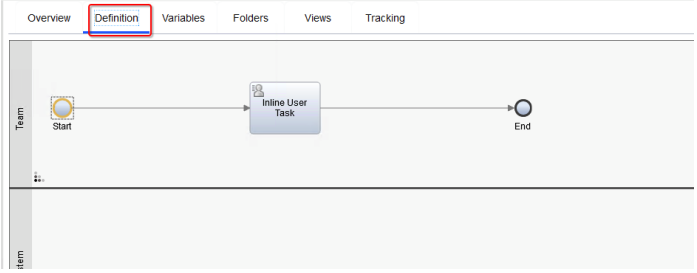
```
var autoObject = new tw.object.toolkit.COTK.OnboardingInformation();
autoObject.client = new tw.object.toolkit.COTK.Client();
autoObject.client.name = "Automation Elite Inc.";
autoObject.client.primaryContact = new tw.object.toolkit.COTK.PrimaryContact();
autoObject.client.primaryContact.firstName = "June Marie";
autoObject.client.primaryContact.lastName = "Sample";
autoObject.client.primaryContact.email = "jmarie@example.com";
autoObject.client.primaryContact.phoneNumber = "517-555-0000";
autoObject.client.address = new tw.object.toolkit.COTK.Address();
autoObject.client.address.street = "3974 Carson St";
autoObject.client.address.unit = "1A";
autoObject.client.address.city = "Lansing";
autoObject.client.address.zipCode = "48911";
autoObject.client.address.state = "MI";
autoObject.client.address.country = "United States of America";
autoObject.client.additionalInformation = new tw.object.toolkit.COTK.ClientInformation();
```

```
autoObject.client.additionalInformation.annualRevenue = 50000000;
autoObject.client.additionalInformation.companyAge = 10;
autoObject.client.additionalInformation.defaultedPayment = true;
autoObject.client.additionalInformation.numberOfEmployees = 1200;
autoObject.segment = "Segment 1";
autoObject.servicesInfo = new tw.object.toolkit.COTK.ServicesInformation();
autoObject.servicesInfo.servicesFee = 2500;
autoObject.servicesInfo.industry = "Telecom";
autoObject.servicesInfo.servicesRequested = "Fibre Internet";
autoObject.approvalStatus = "Approved";
autoObject
```

12. Click the ⊕ icon next to the Output label to add an **Output** variable. Change its name to **botExecutionStatus** and keep its type as **String**.

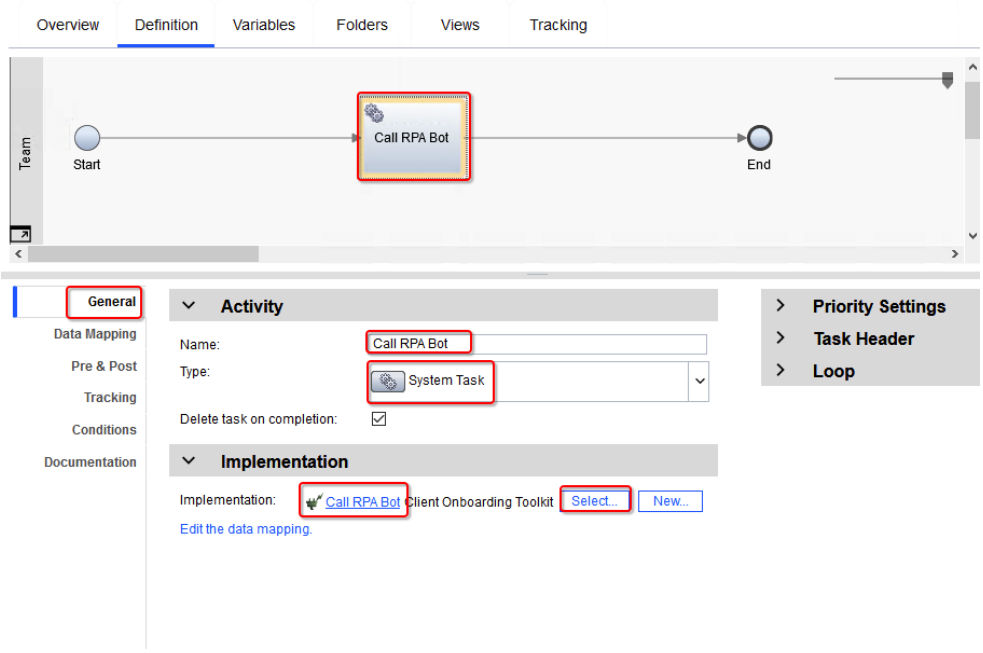



13. Click the **Definition** tab to switch back to the process diagram view.

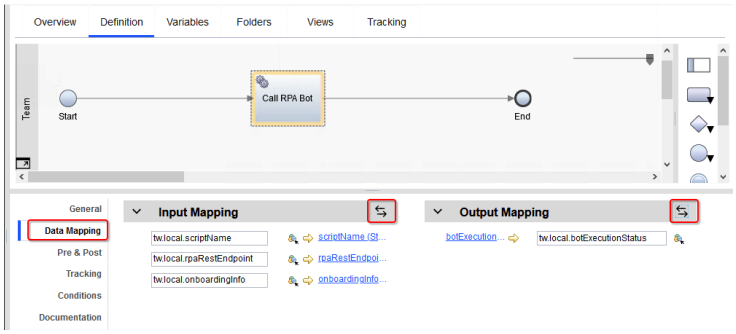



14. Select the **Inline User Task**, go to **General** tab at the bottom and configure the task as below,

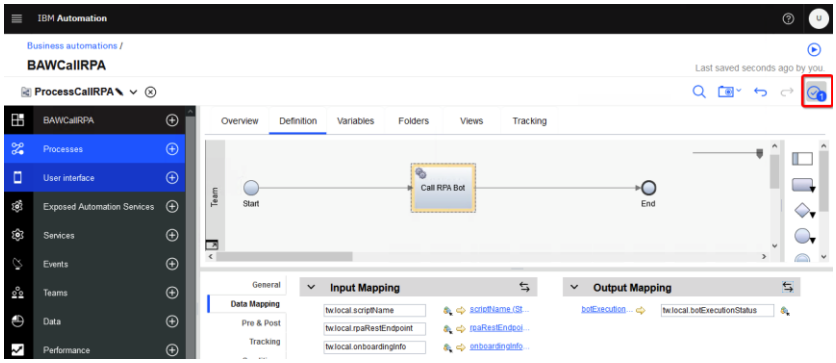
| | |
|---|---|
| **Name**: | Change the name to **Call RPA Bot**. |
| **Type**: | Select **System Task**. |
| **Implementation**: | Click the **Select** button and select **Call RPA Bot** which is a service flow provided in the Client Onboarding Toolkit. |




15. Switch to the **Data Mapping** tab of the activity. Click the ⇆ icon for both the Input and Output Mapping. It will automatically map the input and output variable as below.




16. Click the icon in the top-right corner in Workflow Designer to save your changes.

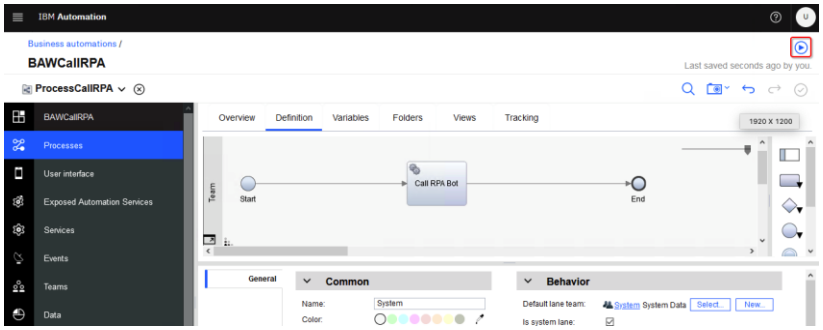



You have successfully created a process in Workflow, changed its implementation from an initial Inline User Task that needs to be manually performed by a human to calling a service flow that calls an RPA bot to automatically add the client and signed services to two backend systems.

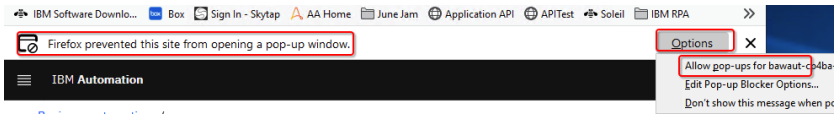
### 4.1.3 Verification Instructions

Using the Playback and Inspector capabilities you can quickly test the process directly from the development environment without publishing it to a Workflow server. We will use it to validate if the Workflow process authored above can successfully start the bot.

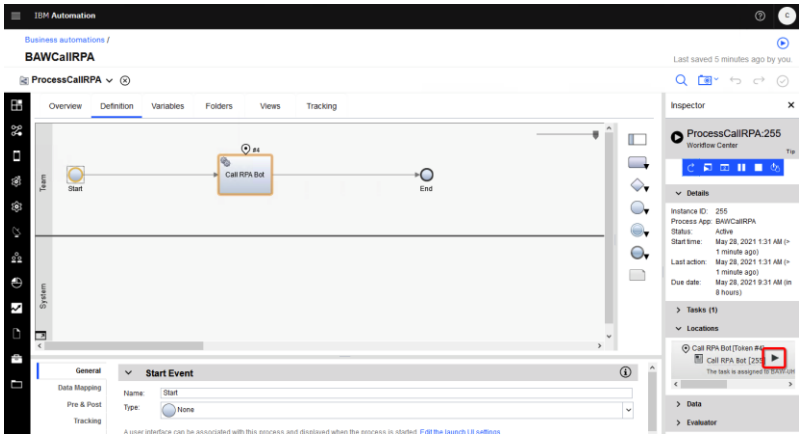
1. Click the icon in the top-right corner in the Workflow Designer window. It will start a new process and show it in the Inspector.




*If you see warning message indicating Firefox prevented this site from opening a pop-up window, click the* ***Options*** *and then select "Allow pop-ups for…" to allow Firefox to open a pop-up window.*

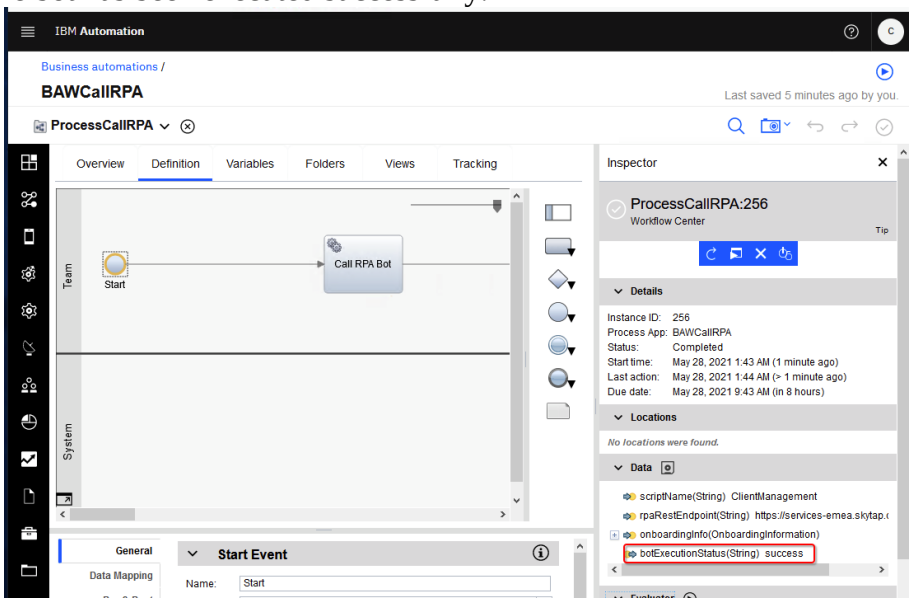



2. A new process instance will be started as below. It will call the service flow which will call the external service to start the bot execution on VM 5.




3. **Watch the Windows desktop on VM 5 – RPA**, but don't touch the keyboard or mouse. The bot will be started. It will first start the Client Management System Java application to add the client information and grab the client ID. Next it will start the Service Management System web application to add the signed services for the client. Once the bot execution finishes, close the Firefox pop-up window and return back to **Inspector.**

4. Check the bot execution status by reviewing the value of the output variable **botExecutionStatus**, As assigned in the bot script, its value is “success” indicating the bot has been executed successfully.




## Summary

In this exercise, you have learned:

- How to publish a bot script to a tenant.
- How to implement an activity to call a service flow which will use an external service to invoke a bot.
- How to invoke an RPA bot script through the IBM RPA REST API.

**Congratulations, you have successfully completed this Lab!!!**