IBM Cloud Pak for Business Automation Demos and Labs 2023

Introduction to IBM watsonx Orchestrate.

V 1.4

Bu Feng Hou
houbf@cn.ibm.com

Juergen Lukas
jlukas@de.ibm.com

Paul Pacholski
pacholsk@ca.ibm.coom

Zhong Tao Gao
gaozt@cn.ibm.com

Table of Contents

1 Introduction 3
1.1 IBM watsonx Orchestrate 3
1.2 Lab Scenario 3
1.2.1 Client Onboarding Use Case 3
1.2.2 IBM watsonx Orchestrate Services Upsell Solution 3
1.2.3 Solution Architecture 3
1.3 Lab Overview 5
1.4 Lab Setup Instructions 6
1.4.1 Systems, Lab Files, and Credentials 6
1.4.2 Customize the OpenAPI File 6
1.4.3 Login to wxO 6
2 Exercise: Experience the Orchestrate "Builder" Role 8
2.1 Import Skills 8
2.2 Publish Skills to Skills Catalog 10
3 Exercise: Experience the Orchestrate "User" role 14
3.1 Add Skills from the Skill Catalog 14
3.2 Test the Solution As Is 16
3.3 Enhance User Experience with a Skill Flow 20
3.3.1 Create a Skill Flow 20
3.3.2 Configure Skill Flow 23
3.4 Add Skill Flow from the Skill Catalog 27
3.5 Test the Solution with Skill Flow 28
3.5.1 Prepare the Upsell Offer 28
3.5.2 Try Sending an Upsell Offer Email to your Client. 30
3.5.3 Approve the Upsell Offer 31
3.5.4 Send an Upsell Offer Email to your Client 33
3.5.5 Verify the Upsell Offer Email is in the Client's Mailbox. 34
Appendix A. Overview of the "Administrator" Role 35

1 Introduction

1.1 IBM watsonx Orchestrate

IBM watsonx Orchestrate uses natural language processing to draw from a catalog of basic and advanced skills to execute your requests - in context and the correct order. No specialized training is needed. Get started in minutes using prebuilt skills designed for you and your needs. IT doesn't even have to get involved (unless they want to, of course).

To learn more about IBM watsonx Orchestrate, click here. To see the technical documentation, click here.

1.2 Lab Scenario

1.2.1 Client Onboarding Use Case

Focus Corp is a business services provider that offers various services for different industries. Focus Corp uses a fully automated Client Onboarding solution to onboard services to its clients. Watch this video to see how client onboarding requests are completed: https://ibm.box.com/v/CLIENT-ONBORDING-USE-CASE

1.2.2 IBM watsonx Orchestrate Services Upsell Solution

The company's quarterly services upsell initiative is critical to demand generation; however, it is increasingly difficult to manage and execute. Quarterly sales campaigns are time-consuming and ineffective. It takes over ten weeks to complete quarterly promotions. Due to time limitations, the sales team cannot include all eligible customers. Managers are looking for a faster and more effective way of launching upsell offers.

In this lab, you will build an IBM watsonx Orchestrate solution that re-imagines the quarterly promotions process. You will be re-using the existing IT assets to author an intelligent, AI-driven solution that pulls customer data from the system of records and creates targeted emails.

> **Note:** From now on, we will use the acronym "wxO" to refer to IBM watsonx Orchestrate and "BAW" for IBM Business Automation Workflow.

1.2.3 Solution Architecture

Before we discuss solution architecture, let's introduce some key wxO programming model concepts.

1.2.3.1 What are Skills, Skill Flow, and Apps?

Skill is a wrapper around automation (such as BAW Service Flows exposed as REST API) that enables a non-technical user to invoke it through Natural Language. Skills are packaged in Apps.

Apps are collections of related skills with the same connection information and authorization. OpenAPI import files define Apps.

Skill Flow is the linear orchestration of skills from the same or different apps. A Skill Flow can also be "trained" to provide a Natural Language interface.

1.2.3.2 Solution Architecture

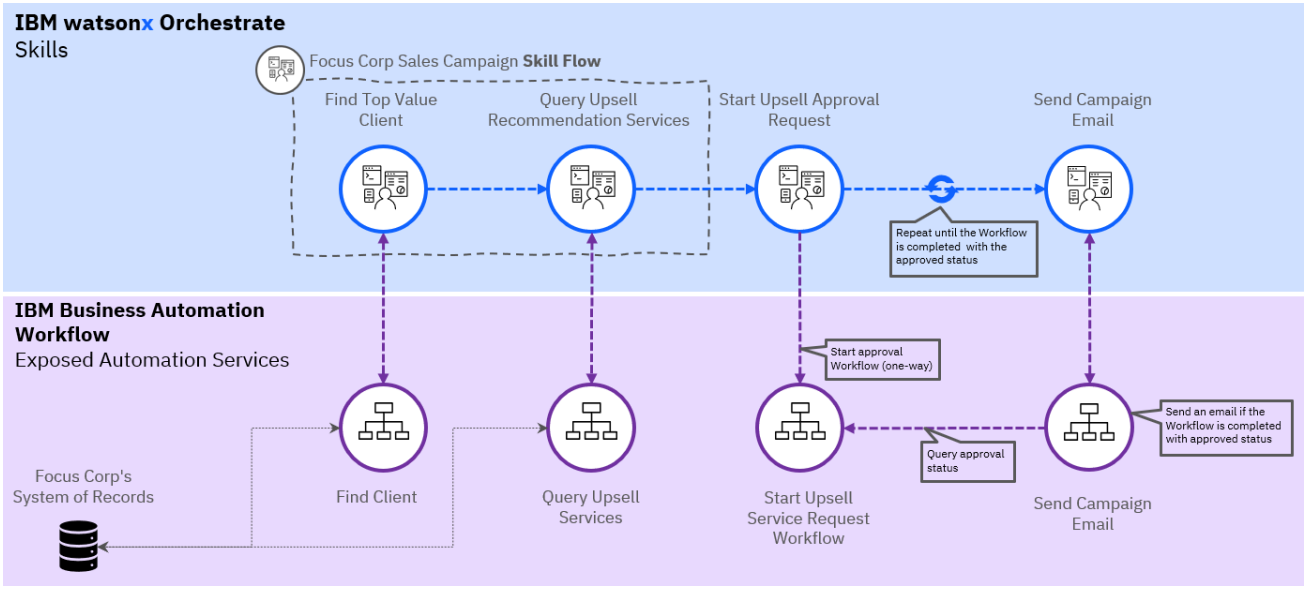


Figure 1. Upsell Campaign Solution: Skills and Services

Service Flows implement all Skills in BAW.

The user interaction starts when the sales specialist asks wxO to "start a sales campaign." This action invokes the Focus Corp Sales Campaign Skill Flow.

The first Skill in the Skill Flow retrieves a list of customers suitable for an upsell campaign from the System of Records. The second Skill suggests the appropriate upsell services. The user selects the client (from a list prepared by wxO) and specifies the upsell services (from a list prepared by wxO).

Next, based on wxO's suggestion (next best Skill), the user starts the Submit for Approval skill. This Skill triggers a Workflow that contains the upsell offer details. The sales manager must approve it before the sales specialist can ask wxO to send an upsell offer email to the Client (Send Campaign Email to Client).

The execution of the Send Campaign Email Skill is blocked until the manager approves the upsell offer. Once the approval step in the Workflow is completed, the sales specialist can ask wxO to send the email.

1.2.3.3 Skill Implementation

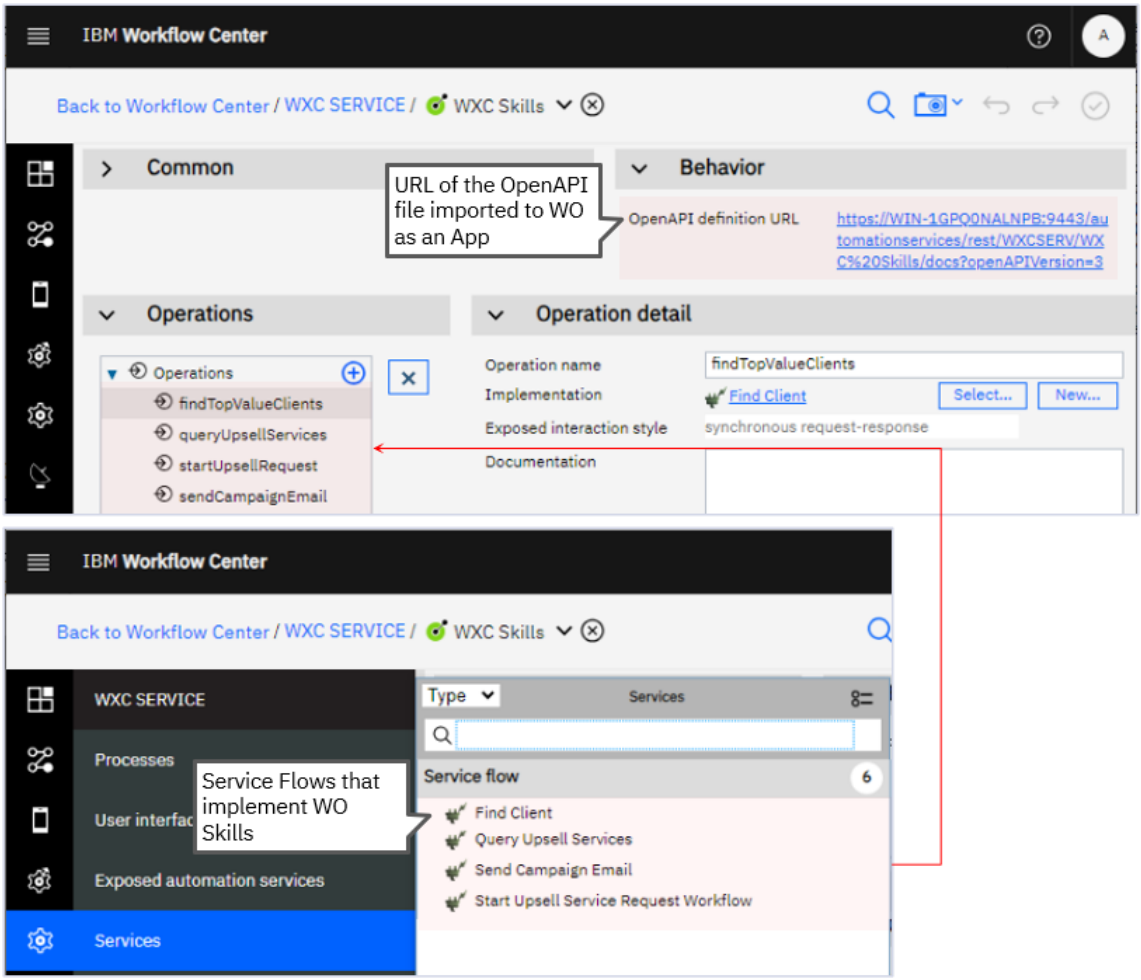


Figure 2. Service Flows that Implement wxO Skills

Skills are implemented using Service Flows authored using BAW and are exposed as operations in a single OpenAPI file.

1.3 Lab Overview

This lab is structured around the three roles defined in wxO – see the details here.

Role	Tasks Performed in this Lab
Builder	Import Skills Publish Skills to Skills Catalog Enhance User Experience with a Skill Flow
User	Add Skills from the Skill Catalog Test the Solution As Is Add Skill Flow (created by a Builder) from the Skill Catalog Test the Solution with Skill Flow
Administrator	Since we don't have an admin ID available to everyone, we would like to point you to Appendix A. Overview of the "Administrator" Role to familiarize you with this role.

Approximate Duration of this lab: 2-3 hours

1.4 Lab Setup Instructions

1.4.1 Systems, Lab Files, and Credentials

If you are performing this lab as 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 watsonx Orchestrate**
- **IBM Business Automation Workplace**
- **Local Webmail Server**

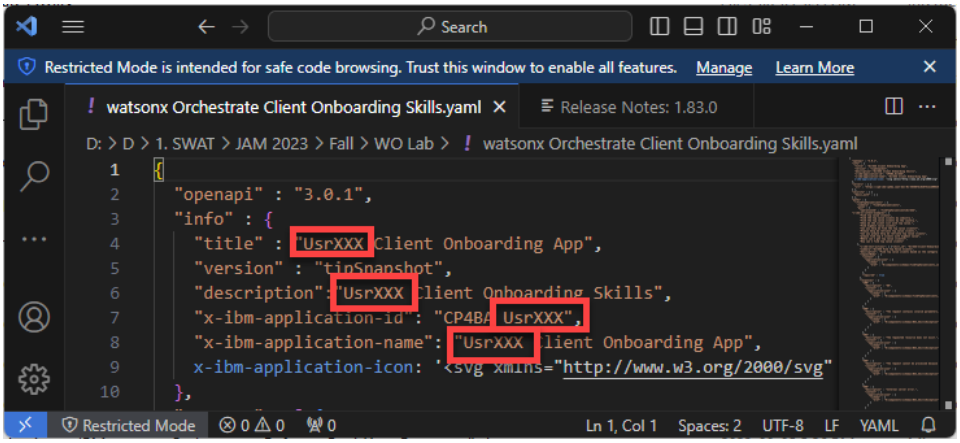
Download the **watsonx Orchestrate Client Onboarding Skills.yaml** file from the Lab Data folder onto your computer.

1.4.2 Customize the OpenAPI File

The OpenAPI file *watsonx Orchestrate Client Onboarding Skills.yaml* includes definitions of the REST call to invoke the four REST Services, which expose Service Flows authored in IBM Business Automation Workflow. You will use this file to create Skills in wxO. Since we are using a shared wxO environment, to ensure your Skills have unique names:

1. Use a text editor of your choice to **Open** the *watsonx Orchestrate Client Onboarding Skills.yaml* file (see 1.4.1 Systems, Lab Files, and Credentials)

2. Replace all occurrences of **UsrXXX** with **the user id you received** when registering for your CP4BA credentials., e.g., usr002.

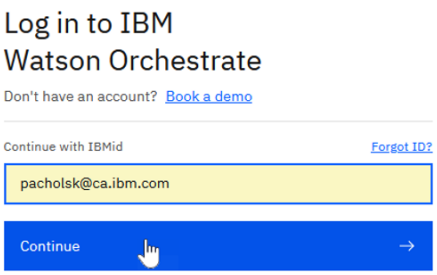


3. **Save and close** *watsonx Orchestrate Client Onboarding Skills.yaml* file.

1.4.3 Login to wxO

4. In your Web Browser, open **IBM wastsonx Orchestrate** (see 1.4.1 Systems, Lab Files, and Credentials)

5. Enter your IBM ID and click **Continue to log in**.



2 Exercise: Experience the Orchestrate "Builder" Role

The builder is responsible for providing and authoring the building blocks of wxO solutions. Based on the input from the end users of wxO solutions, the builder creates Skills from external services and adds them to the Skills Catalog.

You will create Skills from the BAW services defined in the *watsonx Orchestrate Client Onboarding Skills.yaml* file. In this lab part, you will add them to the Skill Catalog. See Figure 3 below:

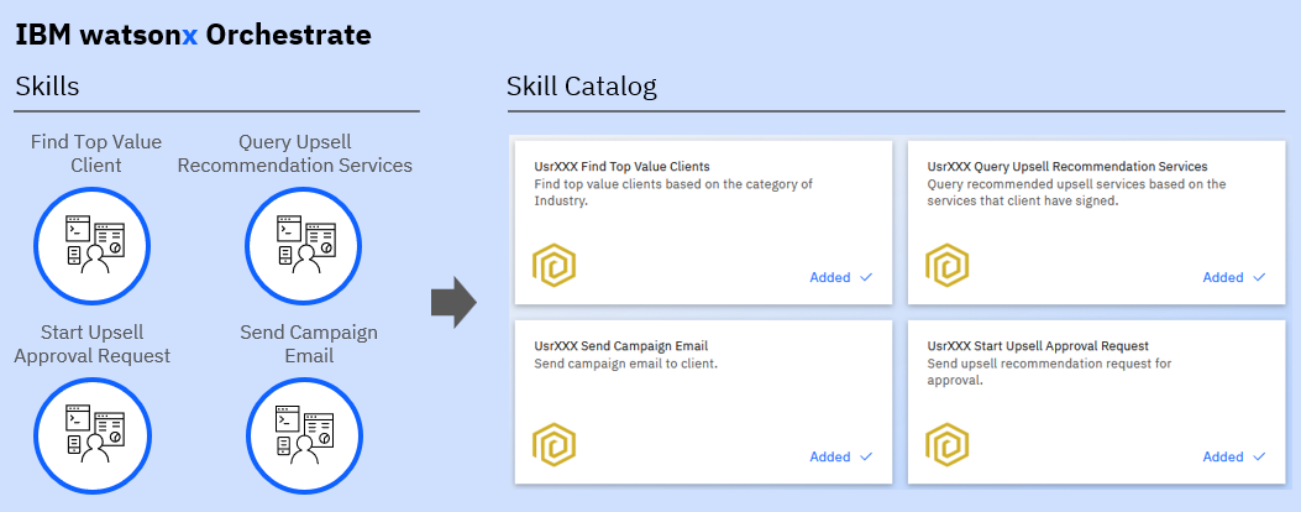
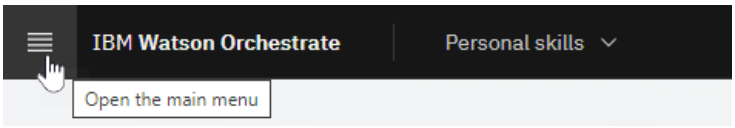


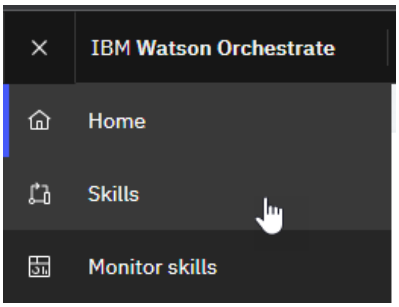
Figure 3. Skills and Skill Catalog

2.1 Import Skills

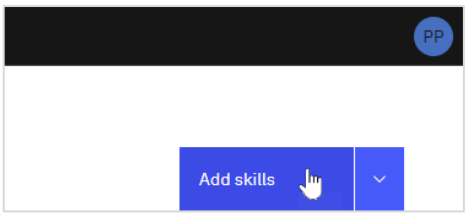
1. Click the **Hamburger** menu.



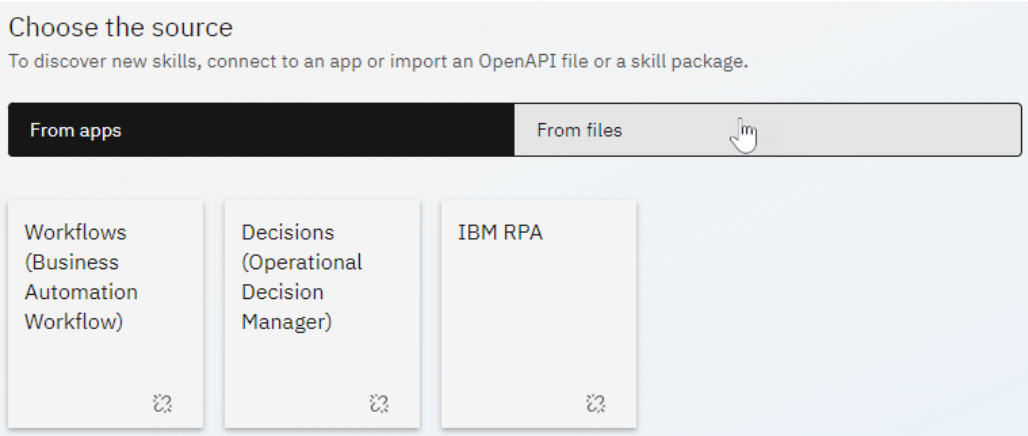
2. Click **Skills**



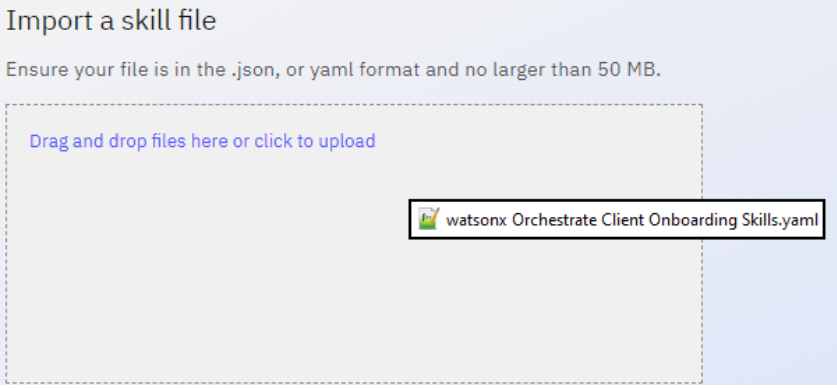
3. In the top-right, click **Add Skills**.



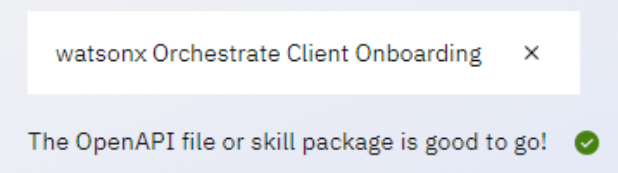
4. From Choose the source, click **From files.**



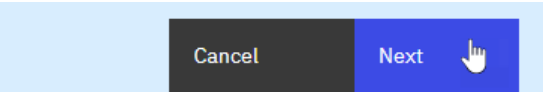
5. From your file system, drag and drop *watsonx Orchestrate Client Onboarding Skills.yaml* to **drag and drop files here** or click the **upload box**.



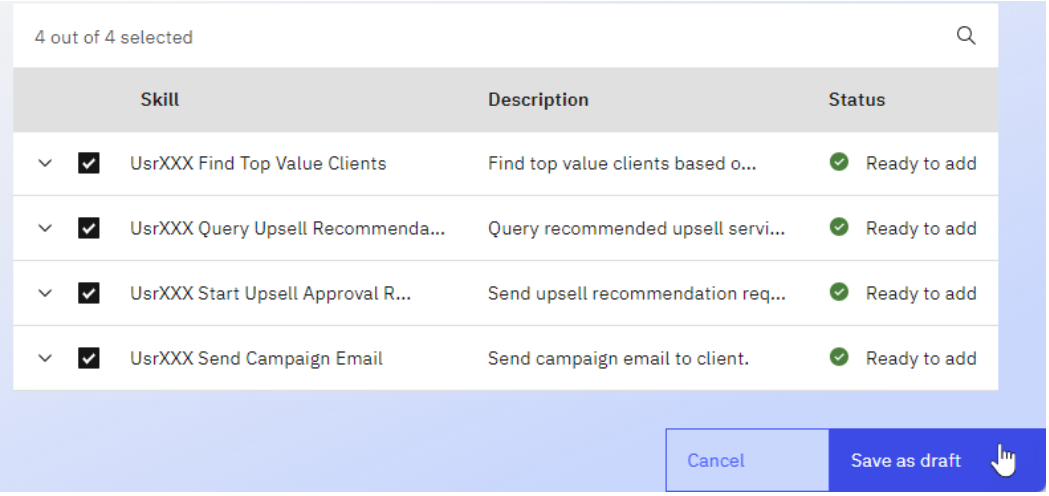
6. Make sure you see *"...good to go!"* message.



7. In the bottom-right corner, click the **Next** button.

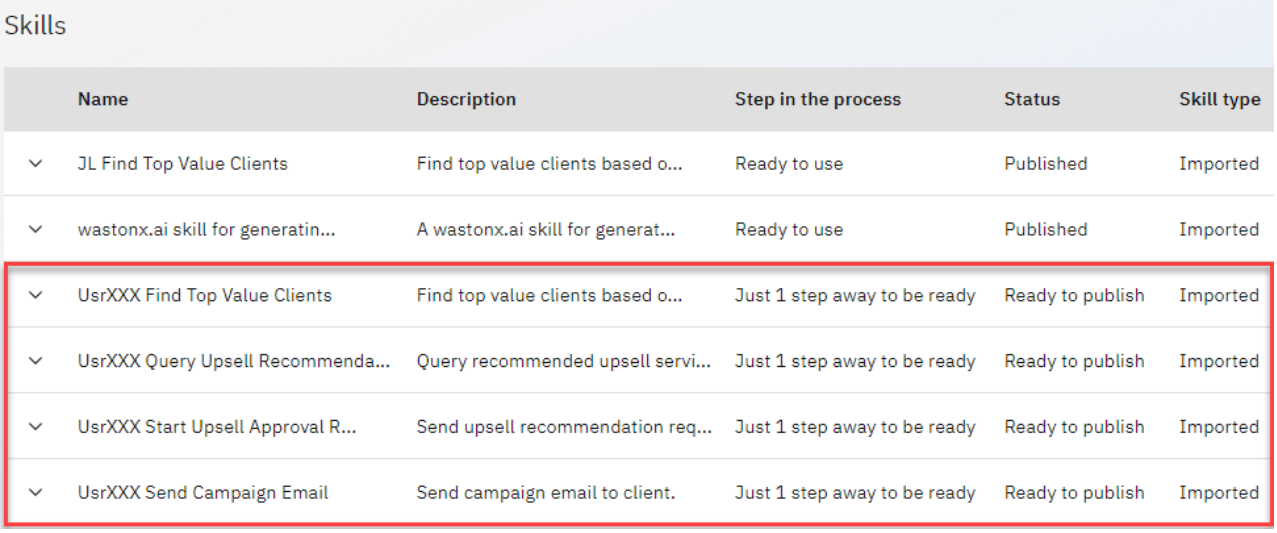


8. **Select** all four skills you imported and click the **Save as draft** button.



9. You will now see all the Skills, including the skills other users have published.

Note that your published skills will be prefixed with UsrXXX (where XXX is the user ID number you were provided with). Also, note that the Status of your skills is set to "Ready to publish."

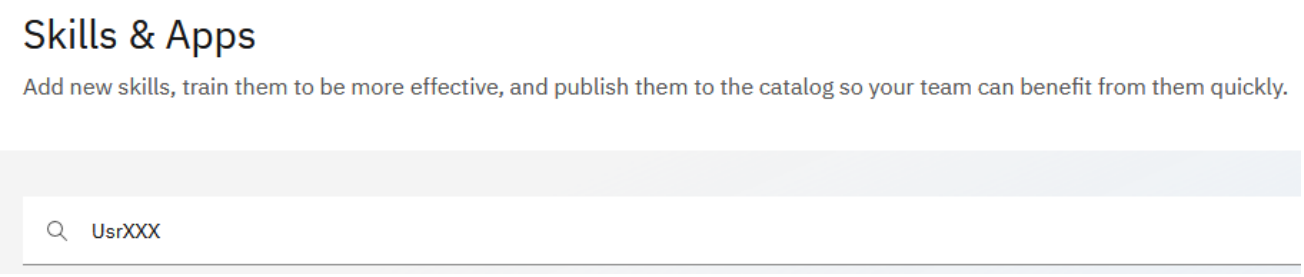


2.2 Publish Skills to Skills Catalog

The skills in the "Ready to publish" state can be published to make them available in the skill catalog. Before publishing, we can make some changes and enhancements. Let's explore Skill enhancement and publishing.

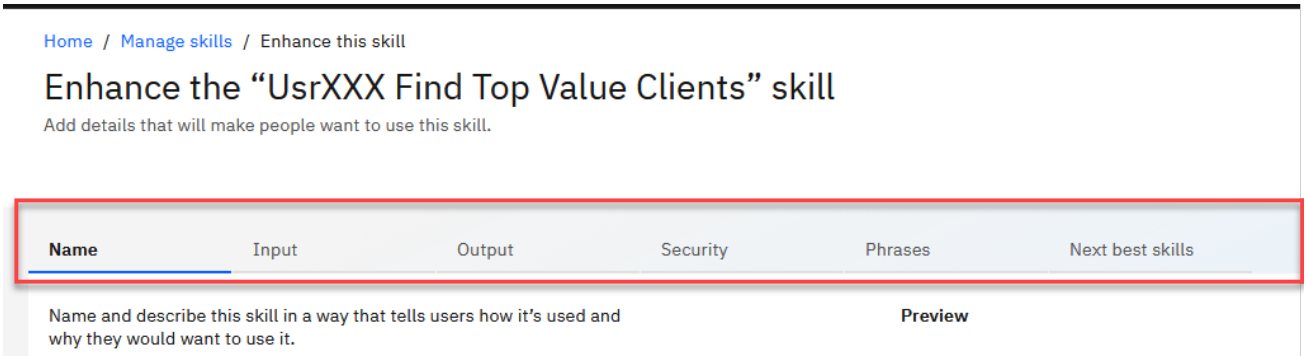
1. In the search field, enter **UsrXXX** (where XXX are the digits of your CP4BA credentials user id) and hit the **Enter key.**

Note: there may be hundreds of Skills to choose from!



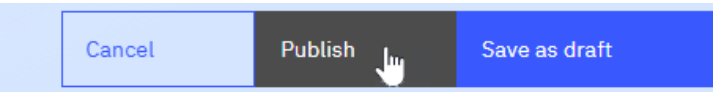
2. On the row with *UsrXXX Find Top Value Clients*, select the **vertical ellipses (3 dots),** and then click **Enhance the Skill**.

3. Examine the tabs that we can use to enhance a Skill before publishing.



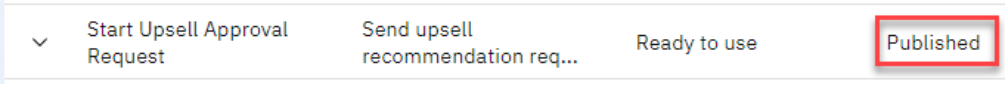
Tab	Enhancements
Name	Name and describe this Skill in a way that tells users how it's used and why they would want to use it. The preview shows how a skill tile will appear in the skill set and the catalog.
Input	When running the Skill, wxO asks for the necessary input to get the most accurate results.
Output	wxO responds with information that corresponds to the provided input.
Security	Specify the authentication type required to use this Skill and test the connection.
Phrases	Phrases are the text your user types in the chat box to find and use a skill.
Next best Skill	Select the skills you want Watson to suggest as the next skills people could use after they use this Skill.

4. In the bottom-right corner, click the **Publish** button.



5. **Rerun the Search** to see only your skills.

Note that the state has changed to Published.

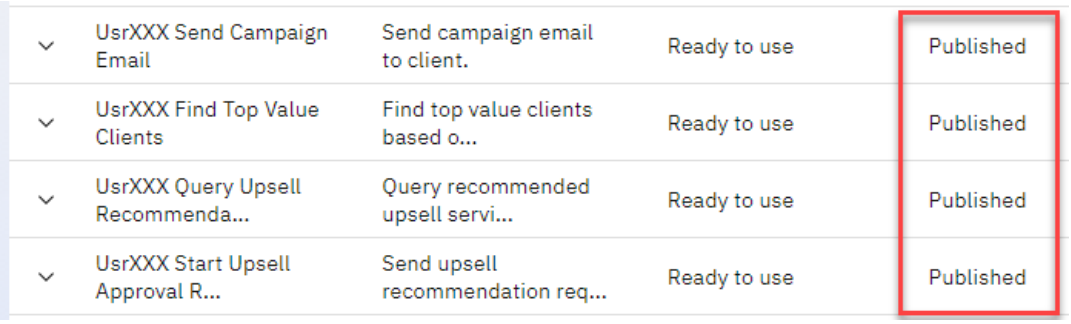


⌄	Start Upsell Approval Request	Send upsell recommendation req...	Ready to use	Published

6. Repeat the above five steps to publish the remaining three Skills.

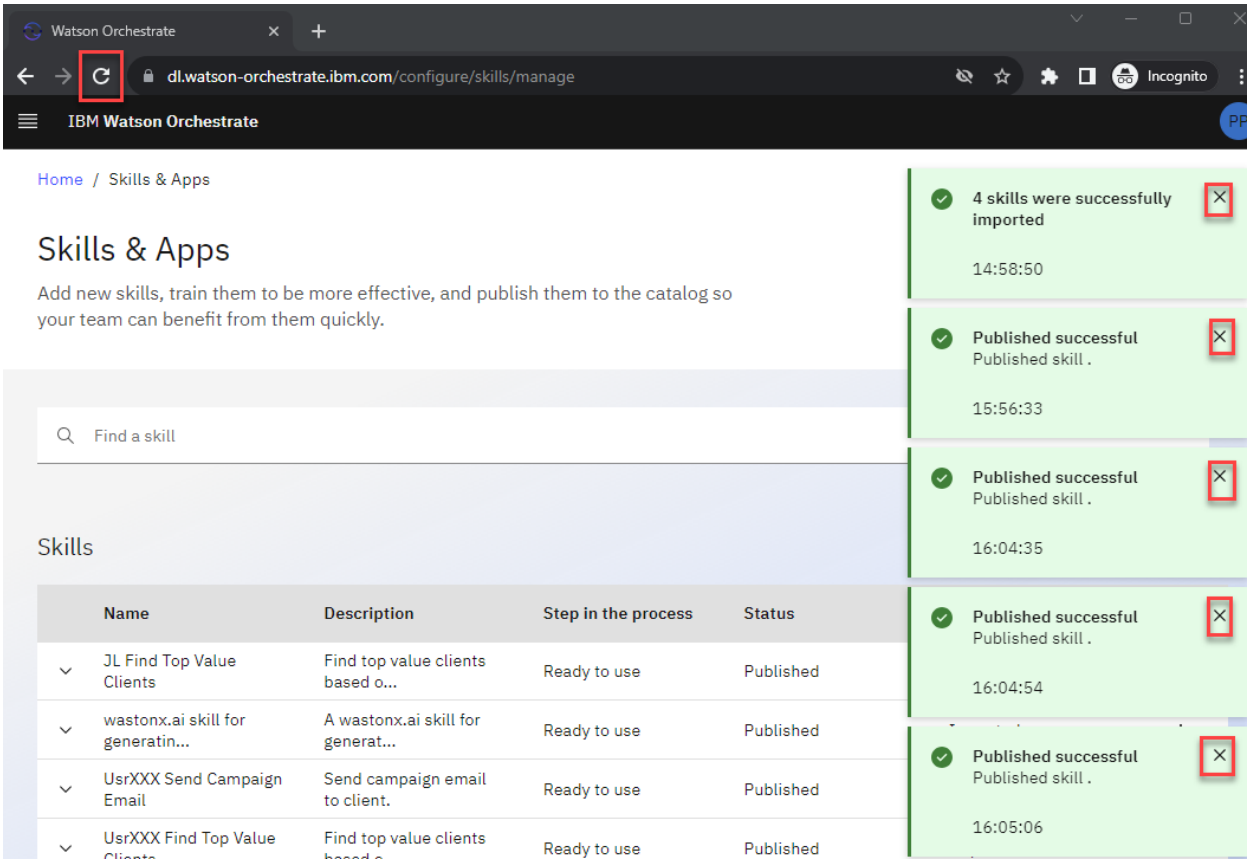
⌄	UsrXXX Query Upsell Recommenda...	Query recommended upsell servi...	Just 1 step away to be ready	Ready to publish
⌄	UsrXXX Start Upsell Approval R...	Send upsell recommendation req...	Just 1 step away to be ready	Ready to publish
⌄	UsrXXX Send Campaign Email	Send campaign email to client.	Just 1 step away to be ready	Ready to publish

7. Verify that all the Skills you have imported are published.



⌄	UsrXXX Send Campaign Email	Send campaign email to client.	Ready to use	Published
⌄	UsrXXX Find Top Value Clients	Find top value clients based o...	Ready to use	Published
⌄	UsrXXX Query Upsell Recommenda...	Query recommended upsell servi...	Ready to use	Published
⌄	UsrXXX Start Upsell Approval R...	Send upsell recommendation req...	Ready to use	Published

8. You will see several green information pop-ups. To dismiss them, click the **X** on each pop-up or click the **browser refresh button**.



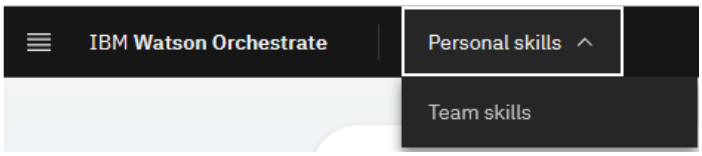
3 Exercise: Experience the Orchestrate "User" role

In this part of the lab, you will experience the "User" role:

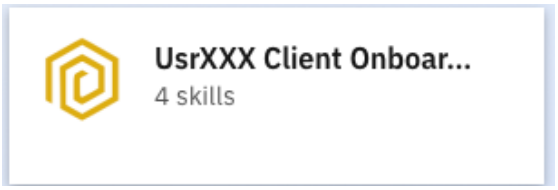
1. Add Skills from the Skill Catalog
2. Test the Solution As Is
3. Enhance User Experience with a Skills Flow (requires "Builder" role)
4. Add Skill Flow from the Skill Catalog
5. Test the Solution with Skill Flow

3.1 Add Skills from the Skill Catalog

There are two categories of skills: Personal skill sets and Team skills.

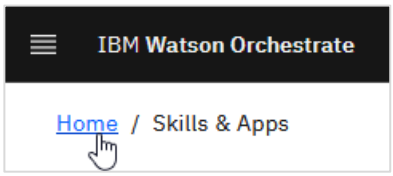


In the previous lab steps, you imported skills using the *watsonx Orchestrate Client Onboarding Skills.yaml* and added them to the Skills Catalog as an App.

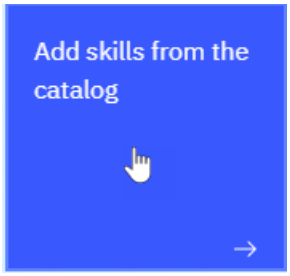


You will now add skills to Personal Skills from the Skill Catalog. Recall that you have added new Skills to the Skill Catalog in the previous part of the lab in the "Builder" role.

1. Click **Home** link

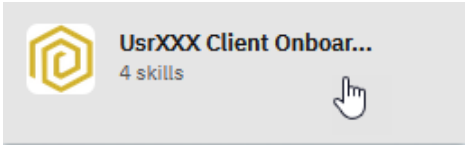


2. Click **Add skills** from the catalog.

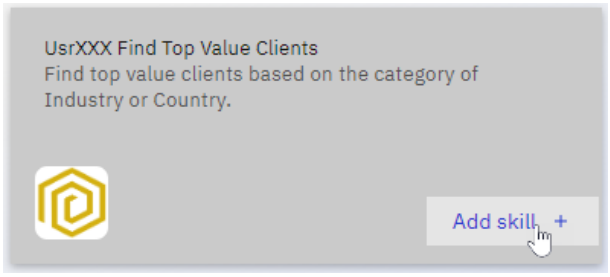


You should now see all the Apps available in the Skills Catalog.

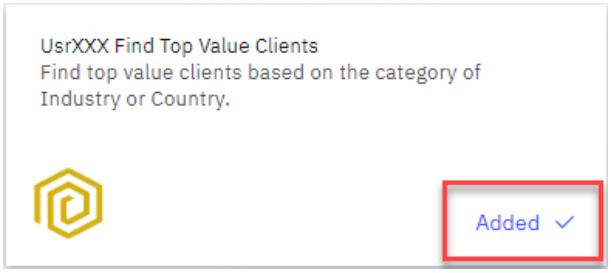
3. Locate the **UsrXXX Client Onboarding App** (remember that XXX are the last three digits of your CP4BA credentials user id) and **click on it** to open.



4. Locate **UsrXXX Find Top Value Clients** Skill, and click **Add Skill +**

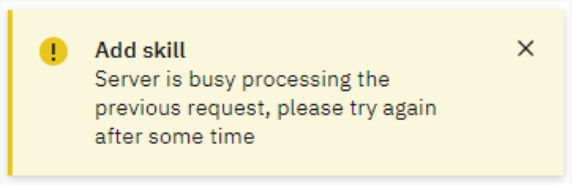


You should now see the *Added check mark* on your Skill.



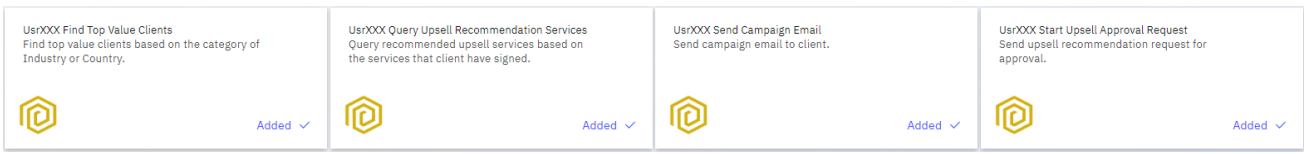
5. Repeat the above step for the other three Skills.

Note that if you click too fast, you will get this message.



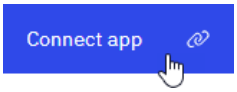
In this case, dismiss the message and repeat.

6. Make sure all Skills have the Added check mark.

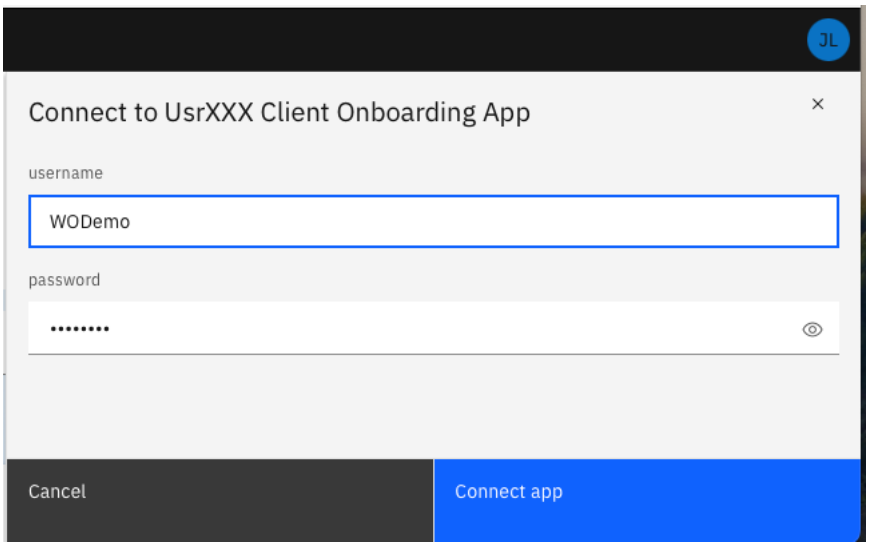


7. **Refresh the web page** or click **X** on all *Add skill information messages*

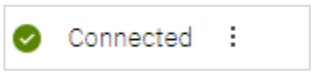
8. In the top-right corner, click **Connect app** to specify the security credentials for your Skills.



9. For *username,* enter **WODemo** and *password* **passw0rd** and click the **Connect app** button.

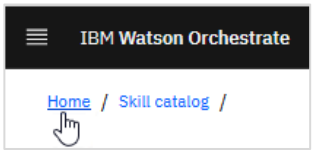


10. You should now see Connected in the top-right corner.



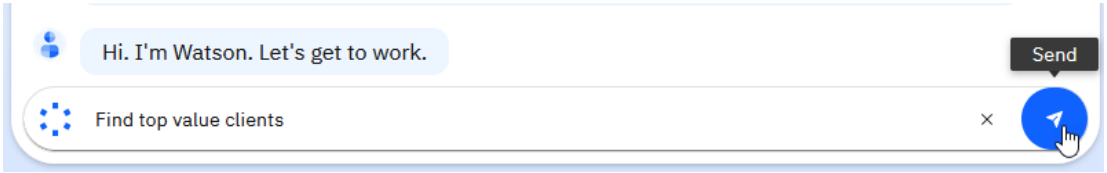
3.2 Test the Solution As Is

1. Click the **Home** link to exit the Skill catalog.

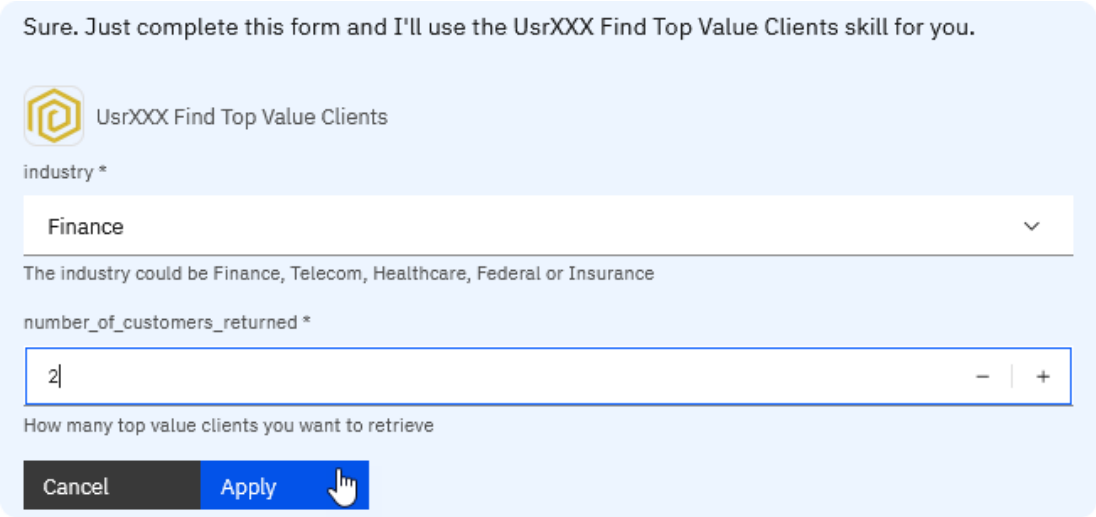


2. Enter the phrase **Find top value clients** and click **Send**

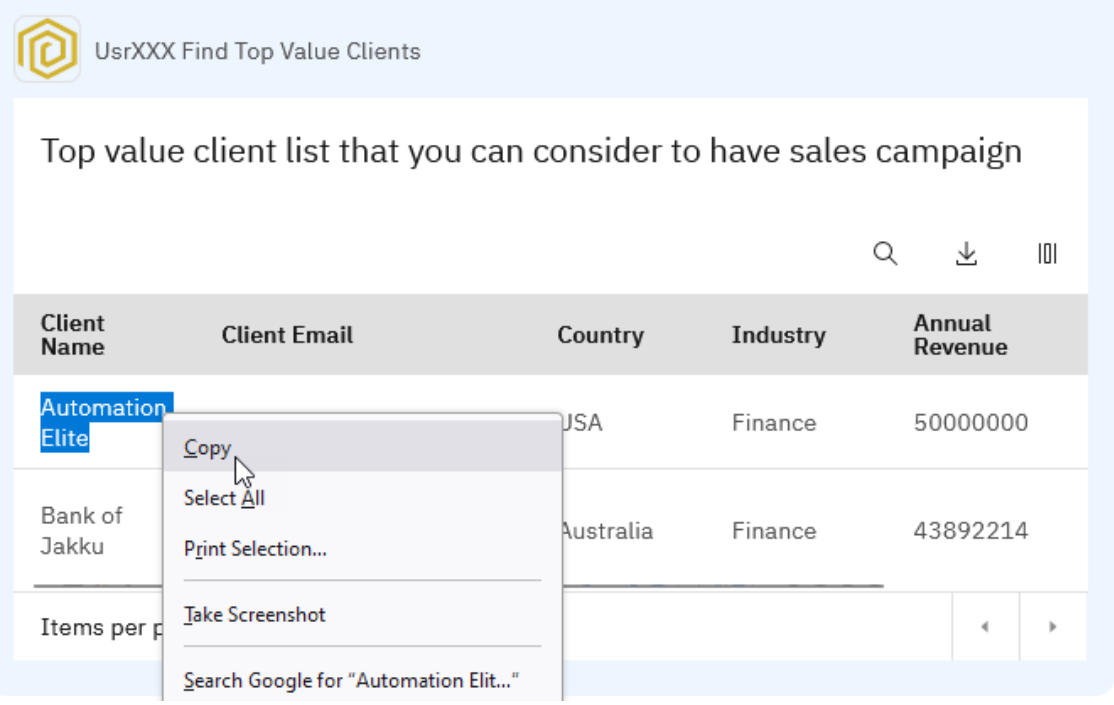
The *Find Top Value Client* Skill was activated and asks you for input!



3. Select **Finance** for *industry*; for *number_of_customers_returned*, enter 2 and click **Apply**.

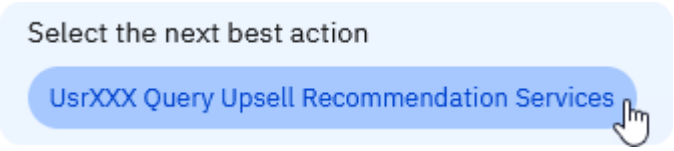


4. In the output returned, select **Automation Elite**, right-click, and choose **Copy**.



Suggested Enhancement: Suppose you selected Automation Elite as the target customer. You must copy the customer name to the clipboard and supply it to the *Query Upsell Recommendation Services*.

5. Click the next best action **UsrXXX Query Upsell Recommendation Services**.

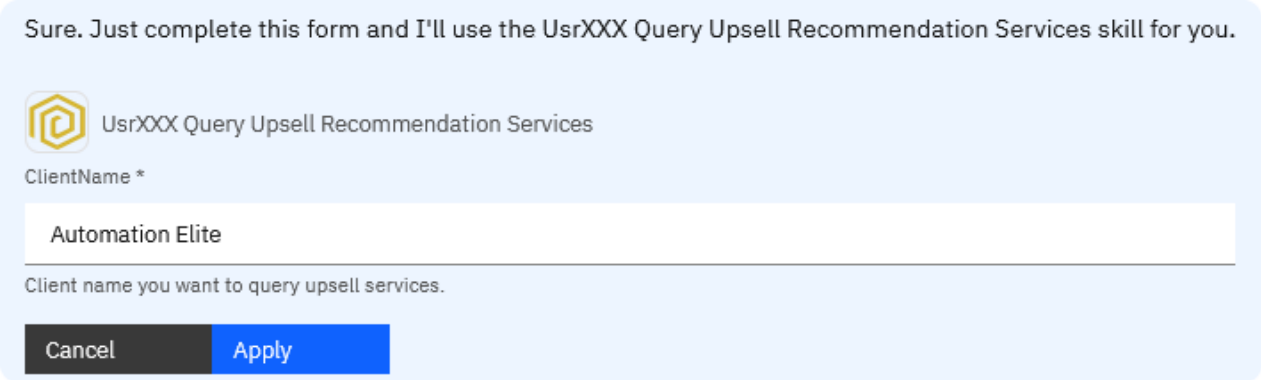


Note. In case you wondered how wxO knew the next best action is... You can annotate the OpenAPI file to specify the next action.

```
"/queryUpsellServices" : {
  "summary" : "queryUpsellServices",
  "post" : {
    "operationId" : "queryUpsellServicesUsrXXX",
"x-ibm-next-actions":
[{"skill_id":"watsonx-Client-Onboarding-Skills-UsrXXX__tipSnapshot__startUpsellRequestUsrXXX",
 "utterance":"UsrXXX Start Upsell Approval Request"}],
```

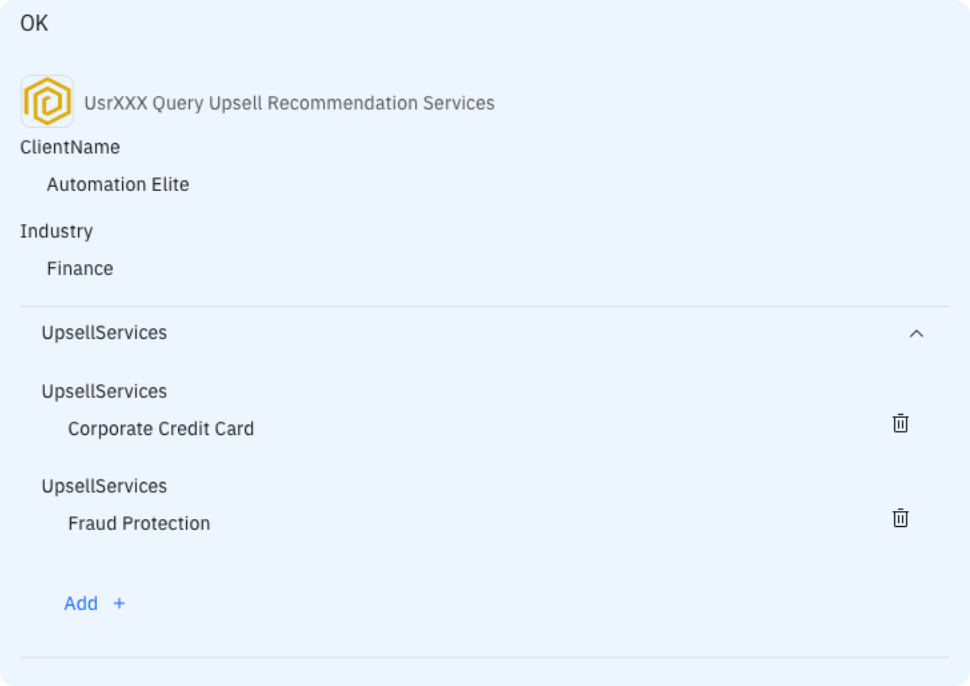
Suggested Enhancement: It would be nice if the *Query Upsell Recommendation Services* Skill were invoked automatically since we always want to find out what upsell services apply to the top-value customer to whom we want to send the upsell offer!

6. Paste **Automation Elite** for ClientName and click **Apply**.

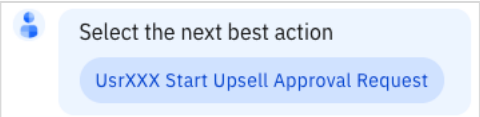


Suggested Enhancement: The selected customer name should have been automatically passed to the *Query Upsell Recommendation Services* Skill, so we do not need to copy and paste!

7. You will see the following response suggesting "Corporate Credit Card" and "Fraud Protection" as Upsell Services for the Client "Automation Elite."



8. wxO suggests another next best action skill:



At this moment, we don't want to call the next best action skill. Instead, we will focus on the suggested enhancements we have identified so far.

Let's use the wxO's **Skill Flow** feature to enhance the user experience and eliminate the issues we have encountered!

Creating a Skill flow in wxO requires the wxO Builder role.

3.3 Enhance User Experience with a Skill Flow

Let's review the usability enhancements we have identified when testing the As-Is Solution:

Suggested Enhancement
Suppose you selected Automation Elite as the target customer. You must copy the customer name to the clipboard and supply it to the *Query Upsell Recommendation Services*.
It would be nice if the *Query Upsell Recommendation Services* Skill was invoked automatically since we always want to find out what upsell services apply to the top-value customer to whom we want to send the upsell offer!
Start Upsell Approval Request should be started automatically since this would be the next logical action.

To address the user experience enhancements we have just identified, we will create a Skill Flow combining two Skills: *Find Top Value Clients* and *Query Upsell Recommendation Services.* After finding top-value clients, Focus Corp.'s sales professional preparing an upsell campaign would next look for upsell recommendations for the client he selects.

Also, after the completion, the Skill Flow will automatically invoke the next logical Skill (*Start Upsell Approval Request*) and pass the Client name and the upsell Services.

Finally, Skill Flow provides parameter mapping capabilities that address the parameter copy-and-paste issues we have identified.

The Figure below illustrates how we implemented the usability enhancements by leveraging Skill Flow parameter passing and Skill orchestration capabilities.

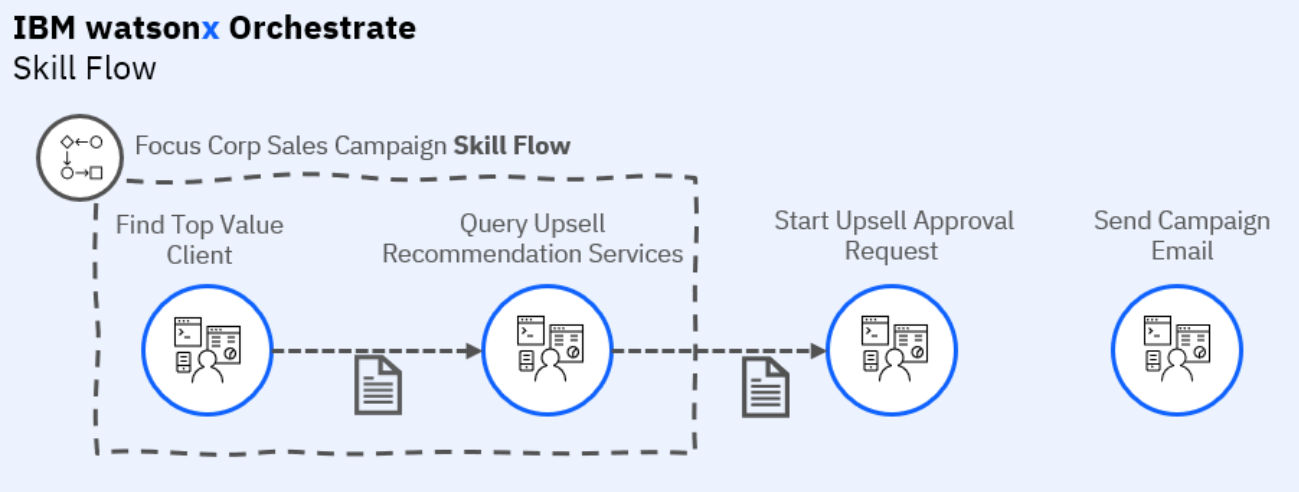
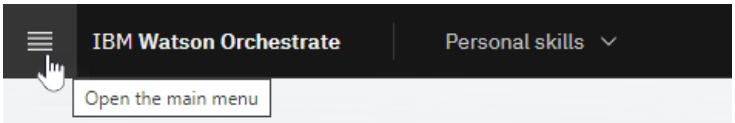


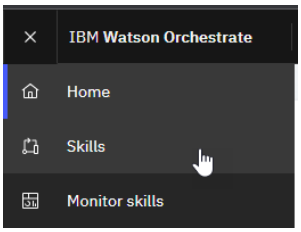
Figure 4. Skill Flow: Automated Skill orchestration and parameter passing

3.3.1 Create a Skill Flow

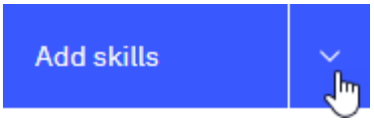
1. Click the **Hamburger** menu.



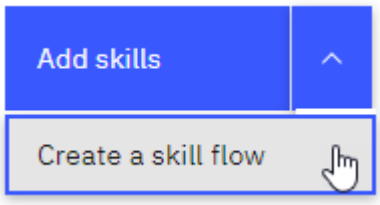
2. Click **Skills**



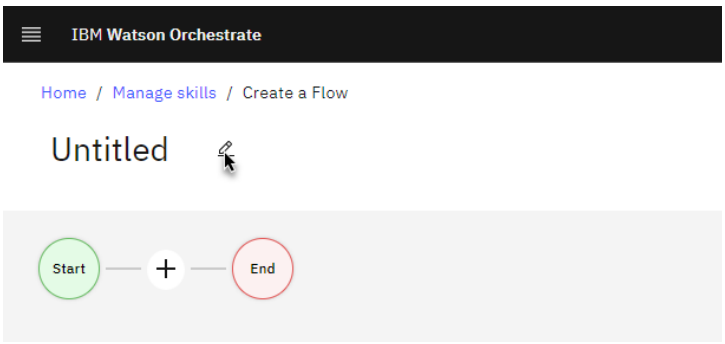
3. In the top-right, click the **dropdown** in **Add Skills**.



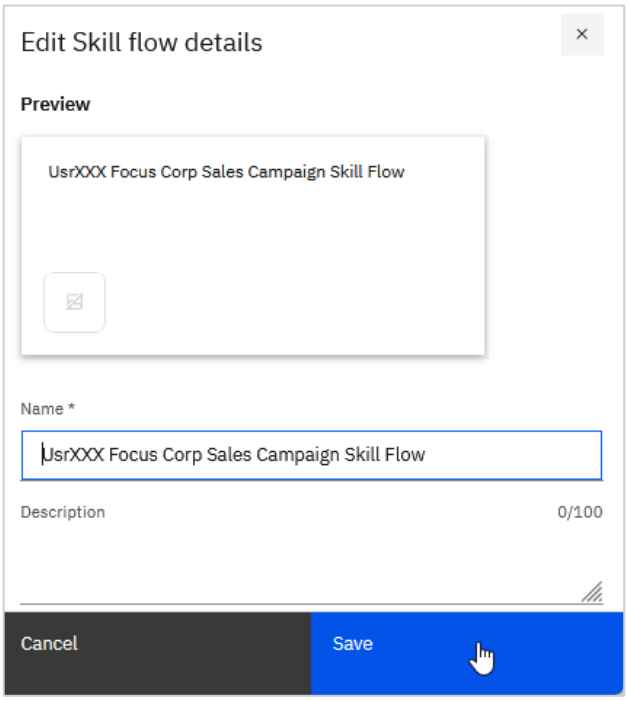
4. Click **Create a skill flow**.



5. Click the **pencil icon**.

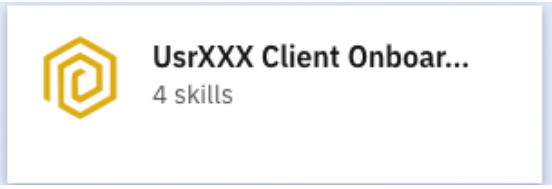


6. For *Name,* enter **UsrXXX Focus Corp Sales Campaign Skill Flow** (remember to replace XXX with your CP4BA credentials user id) and click **Save**.

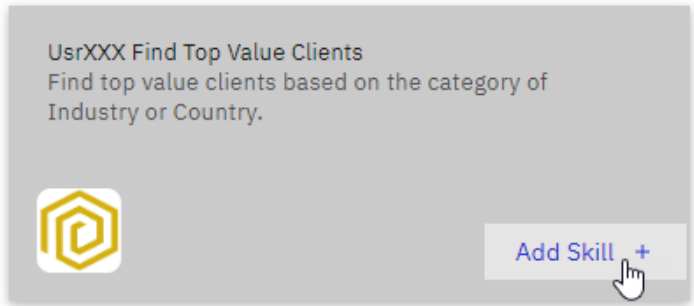


7. Click the **+ icon.**

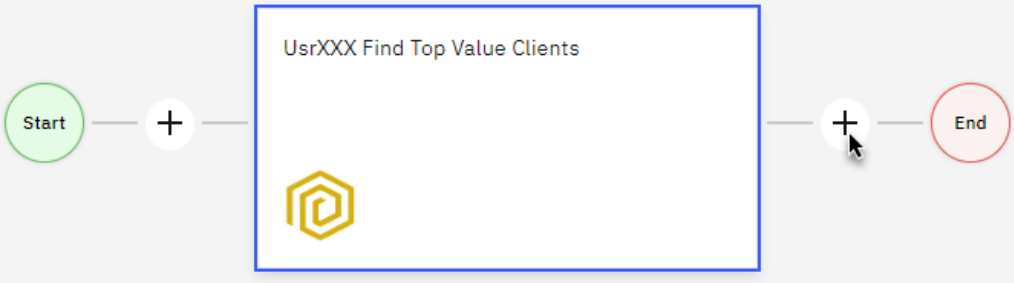
8. Find the App you created (UsrXXX Client Onboarding Skills App – remember XXX is your user id) and **click it.**



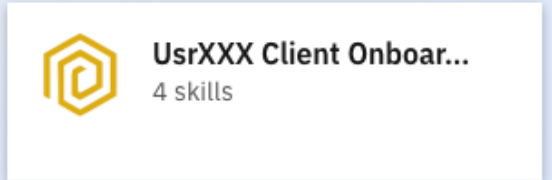
9. On UsrXXX Find Top Value Clients, click **Add Skill +**



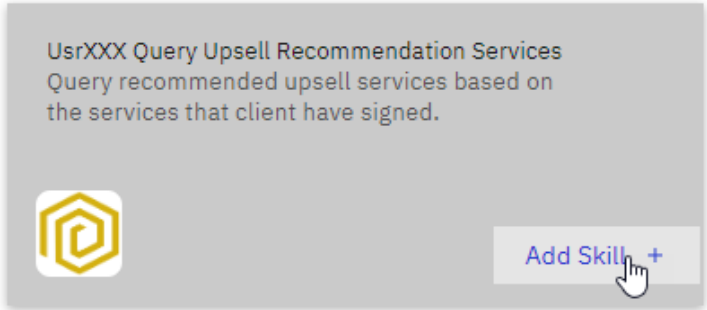
10. Click the right **+ icon.**



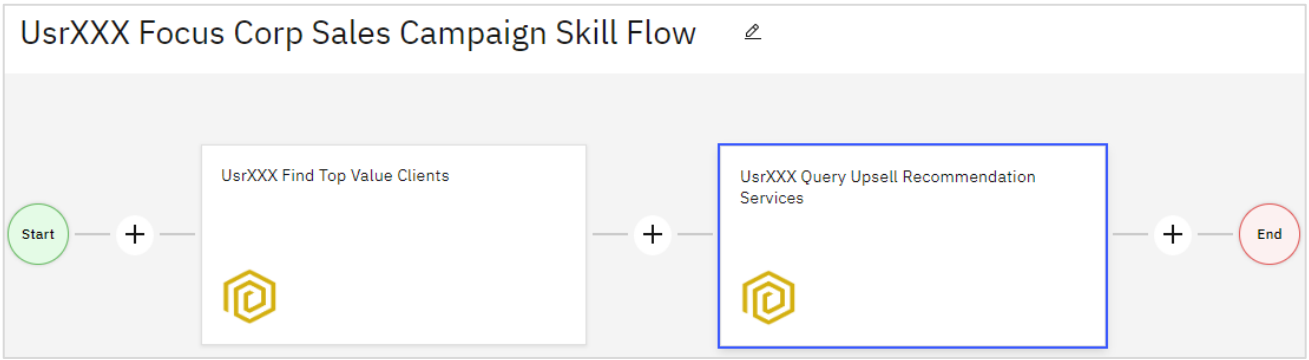
11. Find the App you created (UsrXXX Client Onboarding Skills App – remember XXX is your user id) and **click it.**



12. On UsrXXX Query Upsell Recommendation Services, click **Add Skill +**



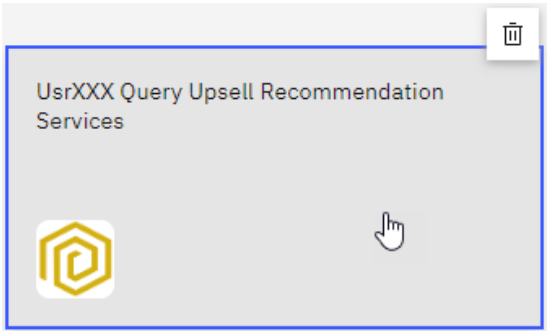
Your Skill Flow should look similar to this:



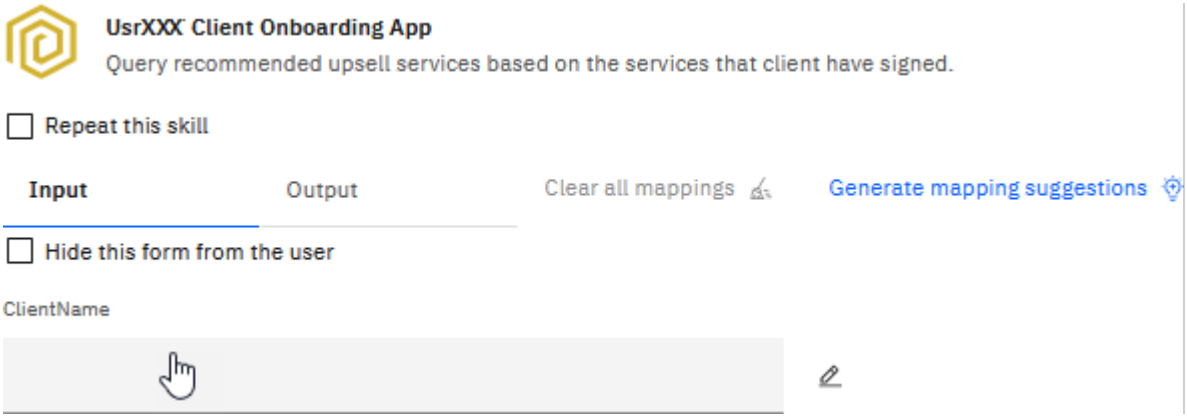
3.3.2 Configure Skill Flow

The *Find Top Value Clients* skill will return a list of top-value clients, including additional data for each client. But the *Query Upsell Recommendation Services* skill requires only a Client Name as input. We will need to map the Client Name from the output of the *Find Top Value Clients* skill to the input of the *Query Upsell Recommendation Services* skill.

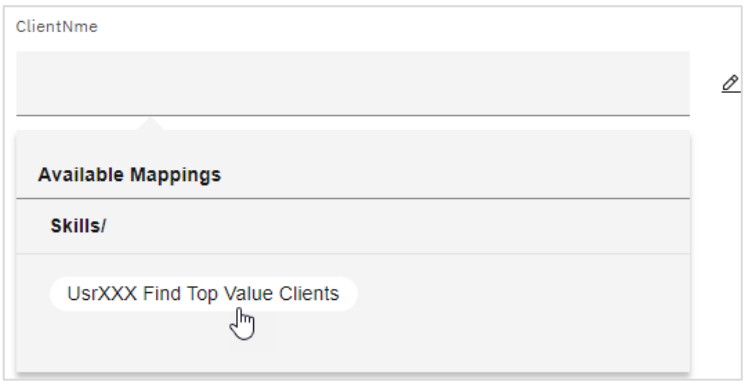
1. Click the **UsrXXX Query Upsell Recommendation Services** Skill



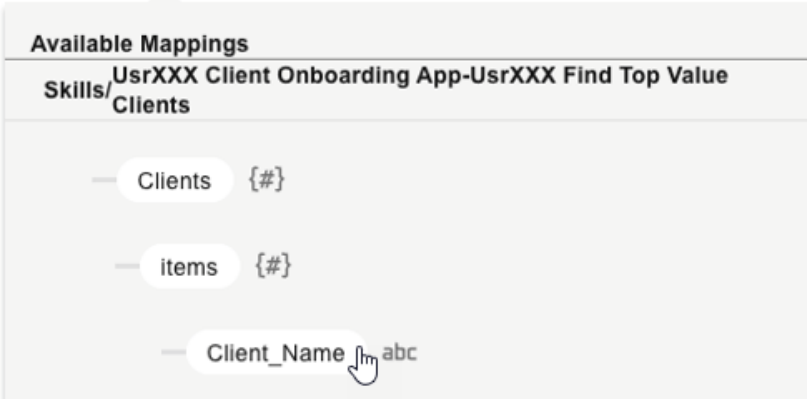
2. In the *Input* Tab, click on the **ClienName** entry field.



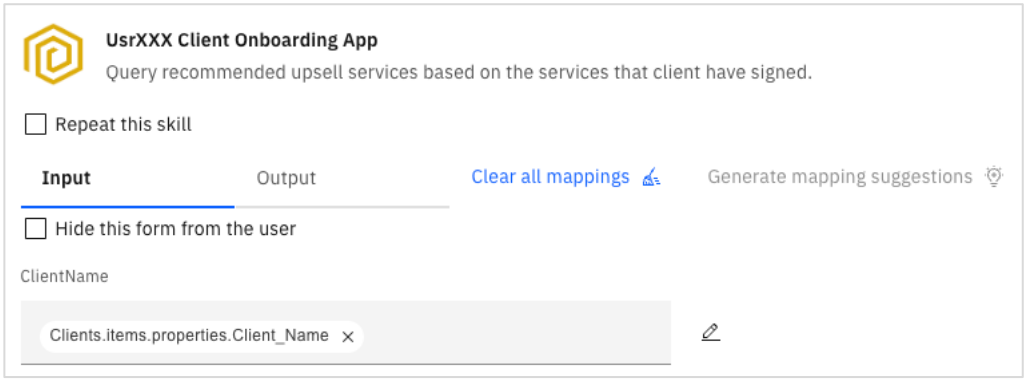
3. Click **UsrXXX Find Top Value Clients**



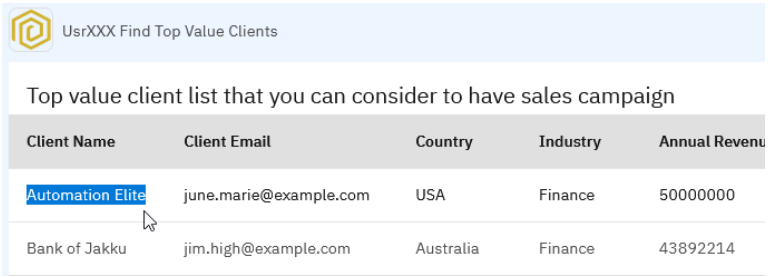
4. Please scroll down to find **Client_name** and select it.



You should now see *Client_Name from Find Top Value Clients* Skill mapped as input to Query Upsell Recommendation Services.



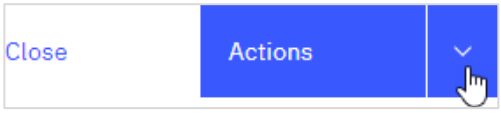
Suggested Enhancement: Note that this will eliminate the issue we encountered: the need to copy and paste the client name.



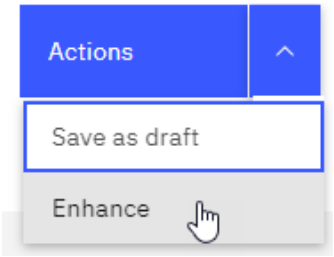
The parameter mapping feature will automatically select the client name from the *Find Top Value Clients* Skill and pass it to the *Query Upsell Recommendation Services* Skill.

5. In the top-right, click the **dropdown** in **Actions**.

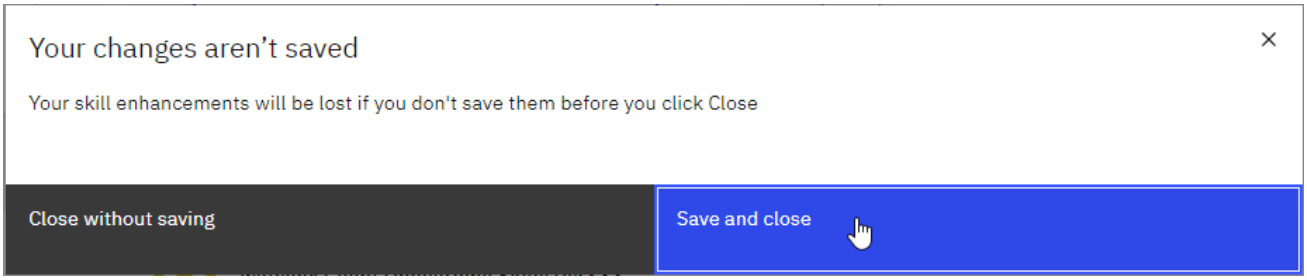
Note: You may have to scroll up to the top to see the Actions button



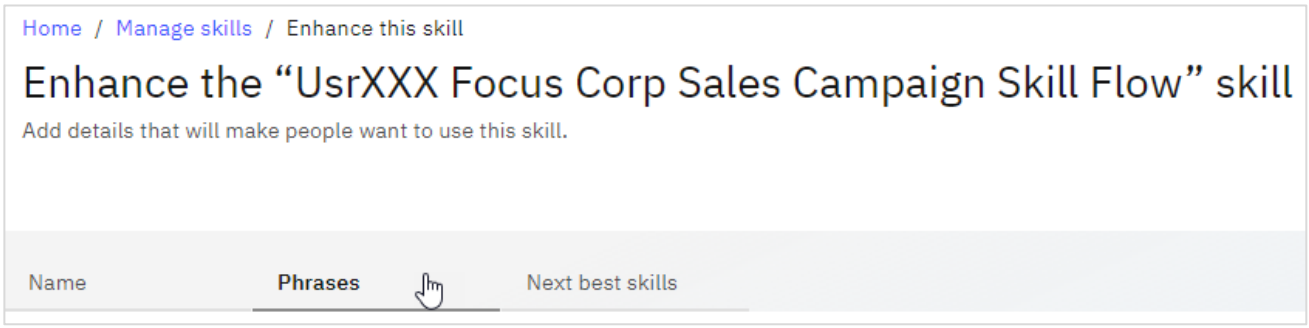
6. Click **Enhance**.



7. Click **Save and close**.



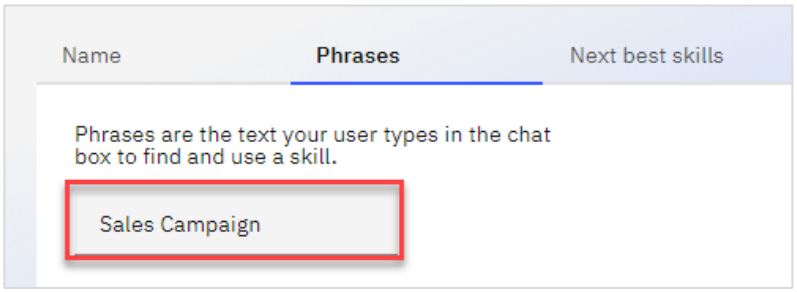
8. Select **Phrases** tab



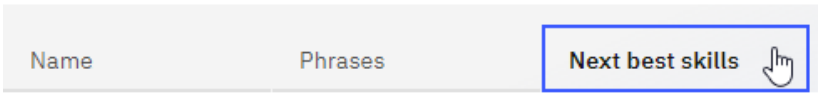
Phrases are the text your user types in the chat box to find and use a skill.

9. Enter **Sales Campaign** for phrase.

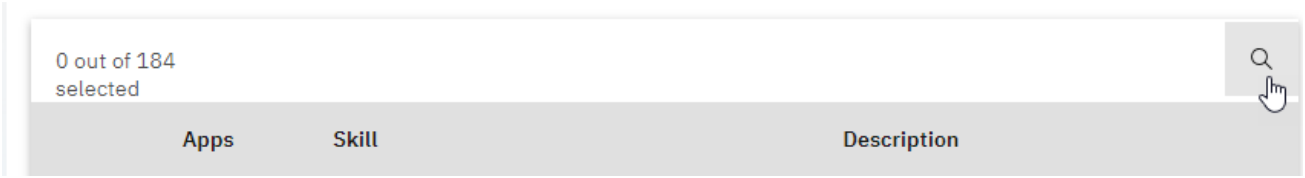
Note, if you want to enter multiple phrases, press enter after entering one phrase, then you can add another one.



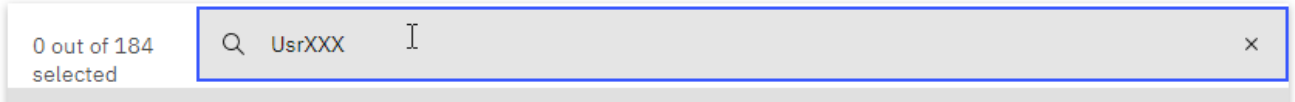
10. Click the **Next best skills** tab.



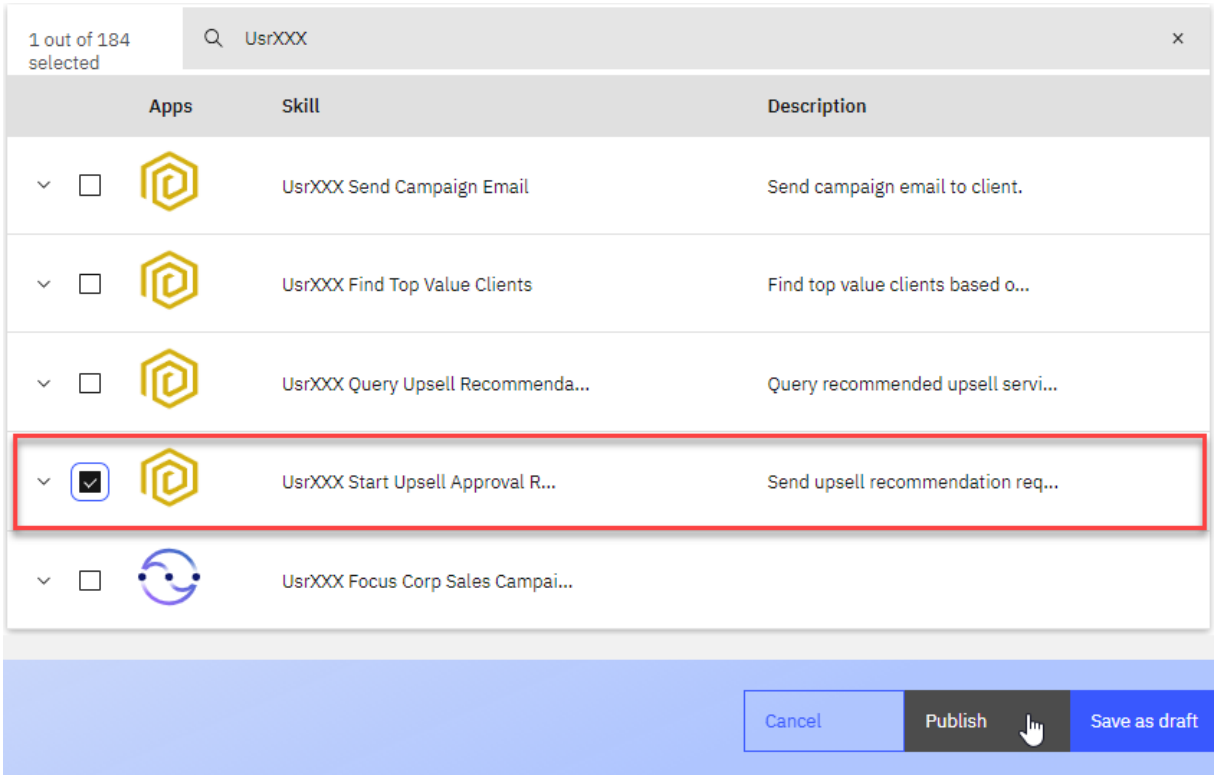
11. There may be hundreds of Skills to choose from! Click the **Magnifying Glass icon** to use the search feature.



12. Enter **UsrXXX** (where XXX are the digits in your CP4BA credentials user id) and hit the **Enter key.**

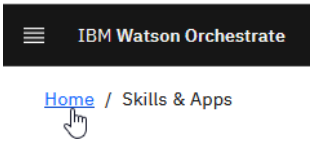


13. Select **UsrXXX Start Upsell Approval Request** as the next best Skill and click **Publish**.

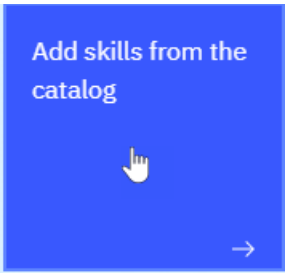


3.4 Add Skill Flow from the Skill Catalog

1. Click the **Home** link.

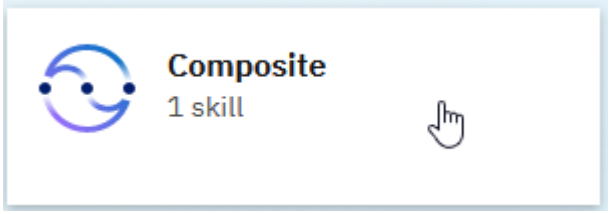


2. Click **Add skills from the catalog**.

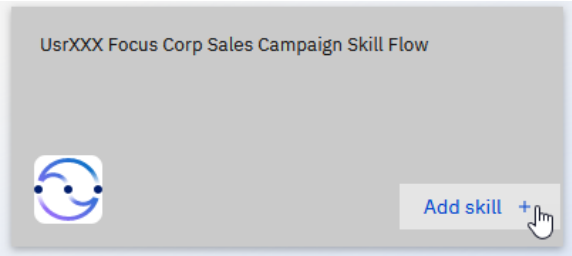


You should now see all the Apps and Skill Flows (Composite) available in the Skills Catalog.

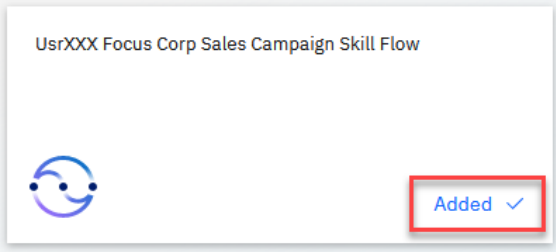
3. Locate the **Composite** tile and **click on it** to open.



4. Locate **UsrXXX Focus Corp Sales Campaign Skill Flow** and click **Add Skill +**



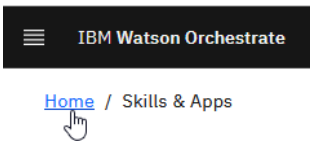
You should now see the *Added check mark* on your Skill.



3.5 Test the Solution with Skill Flow

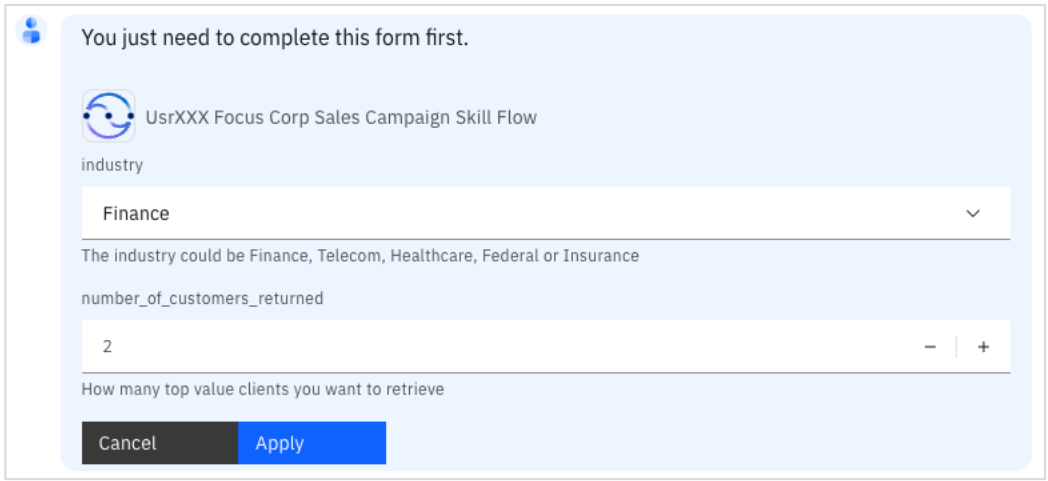
3.5.1 Prepare the Upsell Offer

1. Click the **Home** link.

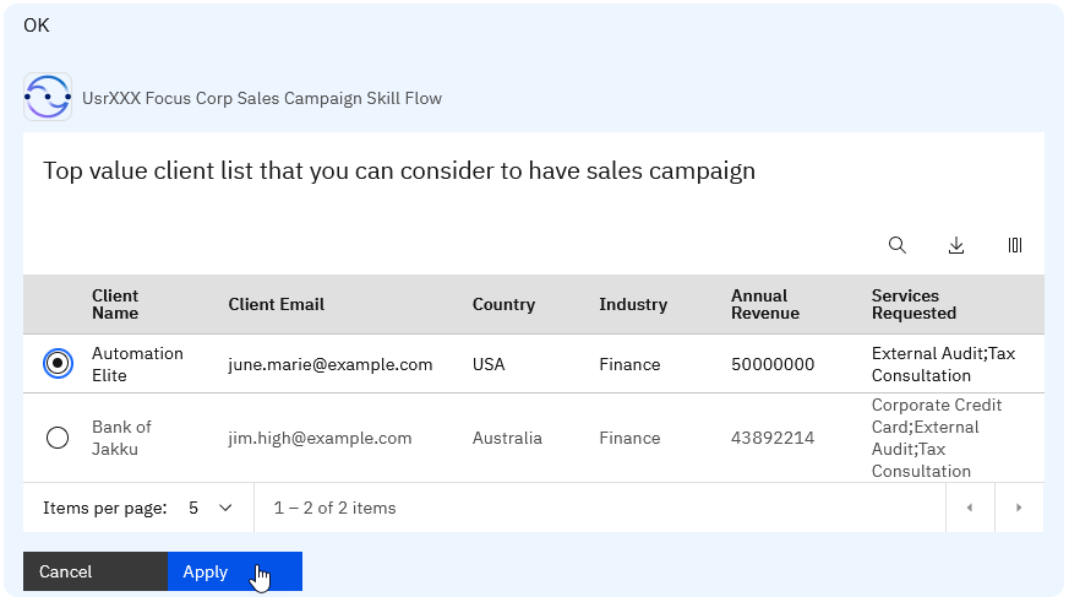


2. Enter the **start sales campaign** phrase and click **Send**

3. Select **Finance** for *industry*; for *number_of_customers_returned*, enter **2** and click **Apply**.

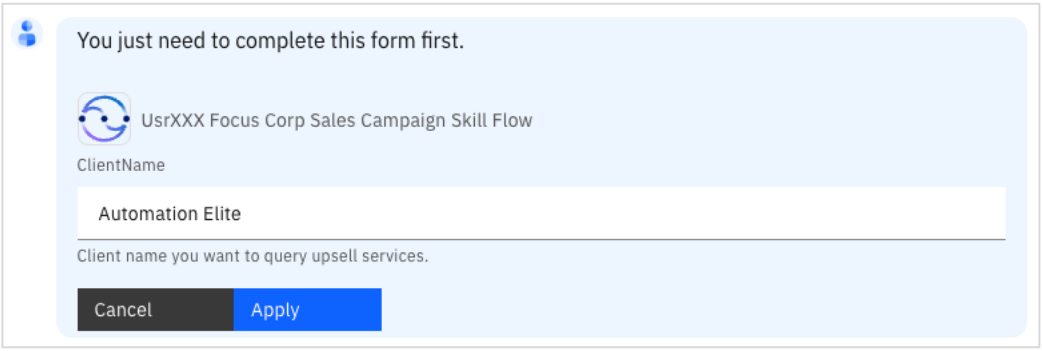


4. Use the radio button to select **Automation Elite** and click **Apply**.



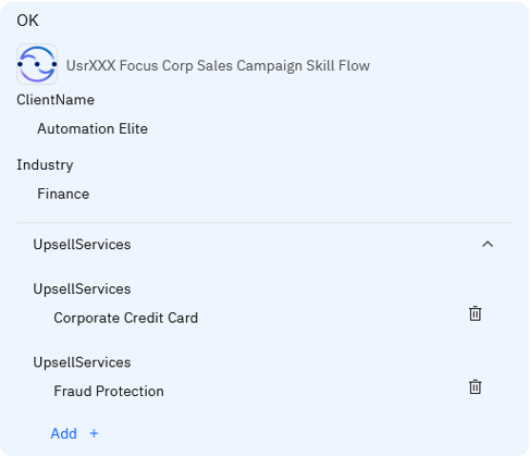
5. Click **Apply**

> **Note:** The Skill Flow we created in the steps above will now automatically call the *UsrXXX Query Upsell Recommendation Services* Skill as defined. It will also use the parameter mapping we defined to prefill the ClientName field of this Skill with the ClientName we chose in the previous step.



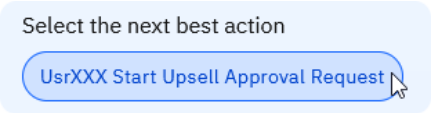
6. You should now see the recommended upsell Services.

> Note: The ClientName was automatically copied to the next Skill in the Skill Flow. You did not need to copy and paste!



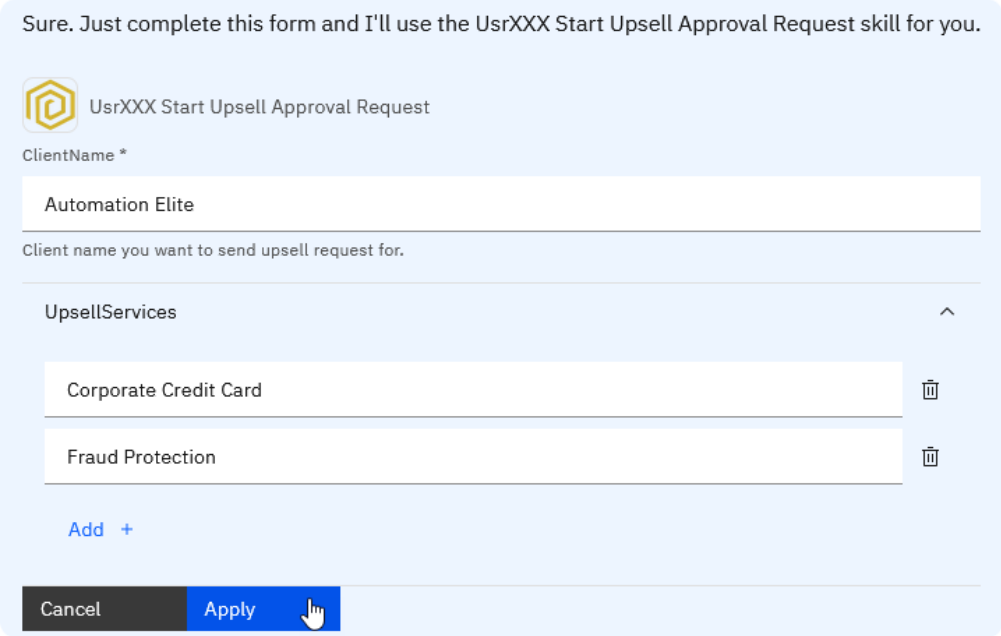
7. Click the **UsrXXX Start Upsell Approval Request** button.

> Note: This is the Skill you selected as the recommended next best Skill after completing the Skill Flow.



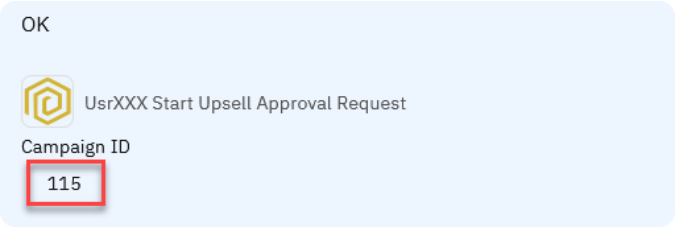
8. Click **Apply** to launch the Start Upsell Approval Request.

> Note:
>
> The wxO automatically filled the output of the previous Skill (Client Name, Recommended Upsell Services) into the input fields of this Skill. wxO can do this automatically if the previous skill's output matches the next skill's input.
>
> If you like, you could, at this step, also change (add or remove) the upsell Services that the Query Upsell Recommendations Skill recommends.



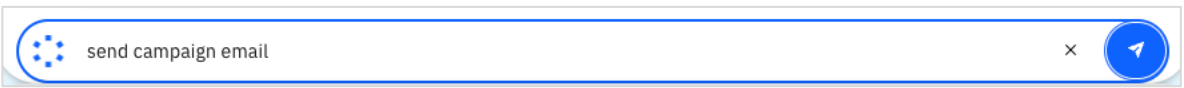
9. Copy the **Campaign ID** to the clipboard.

> Note: If the sales manager approves the offer, you need the Campaign ID to email the upsell offer to the client.

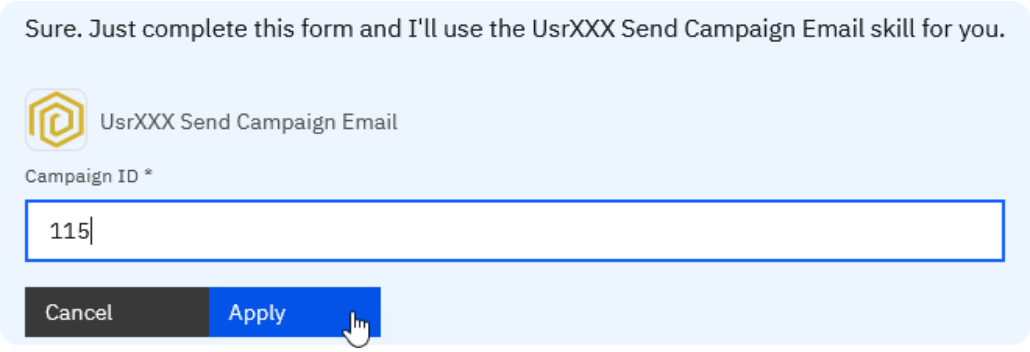


3.5.2 Try Sending an Upsell Offer Email to your Client.

1. Type the **send campaign email** phrase and click **Send**

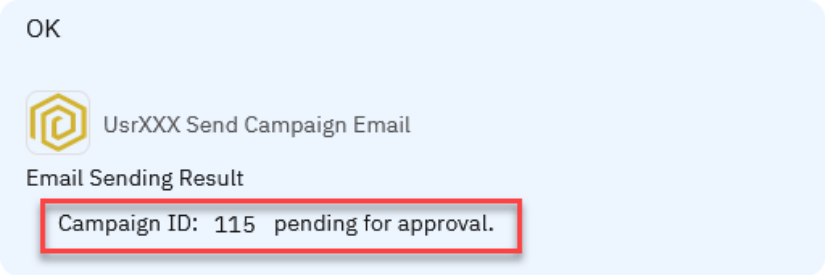


2. For *Campaign ID* enter your **Campaign ID** and click **Apply**.



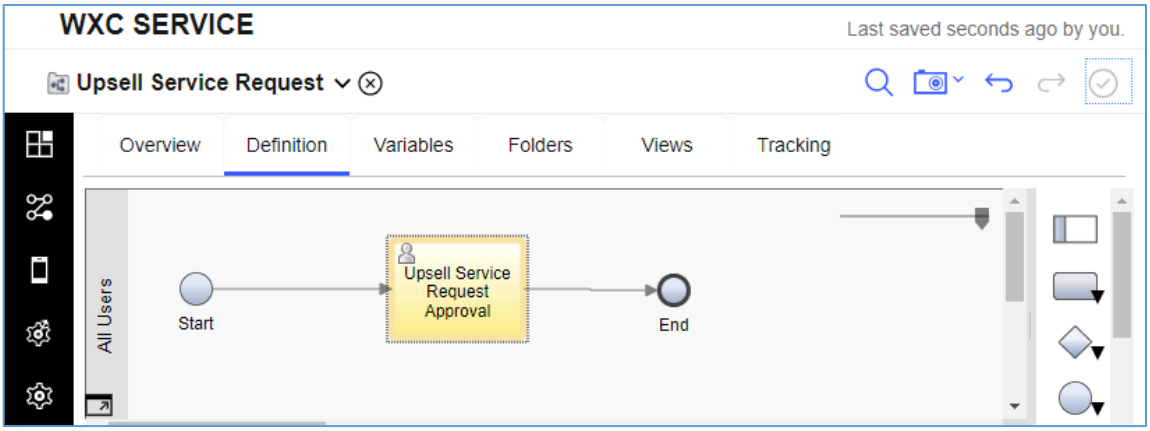
3. Examine the reply from wxO.

You cannot send the email because the Sales manager has not yet approved your Services upsell offer!



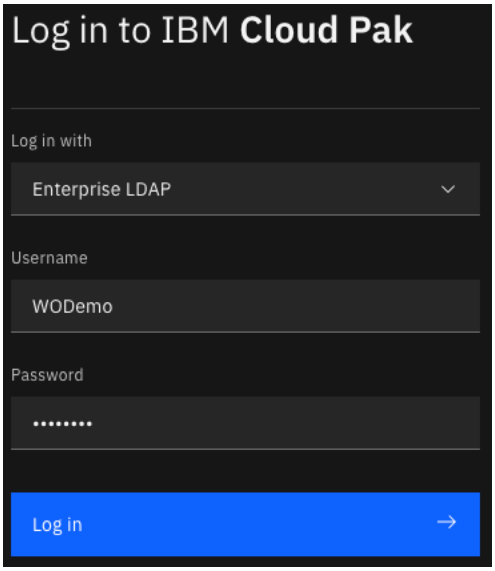
3.5.3 Approve the Upsell Offer

The *Start Upsell Approval Request* Skill started a BAW Workflow. The Sales Manager must complete the approval task (Upsell Service Request Approval).

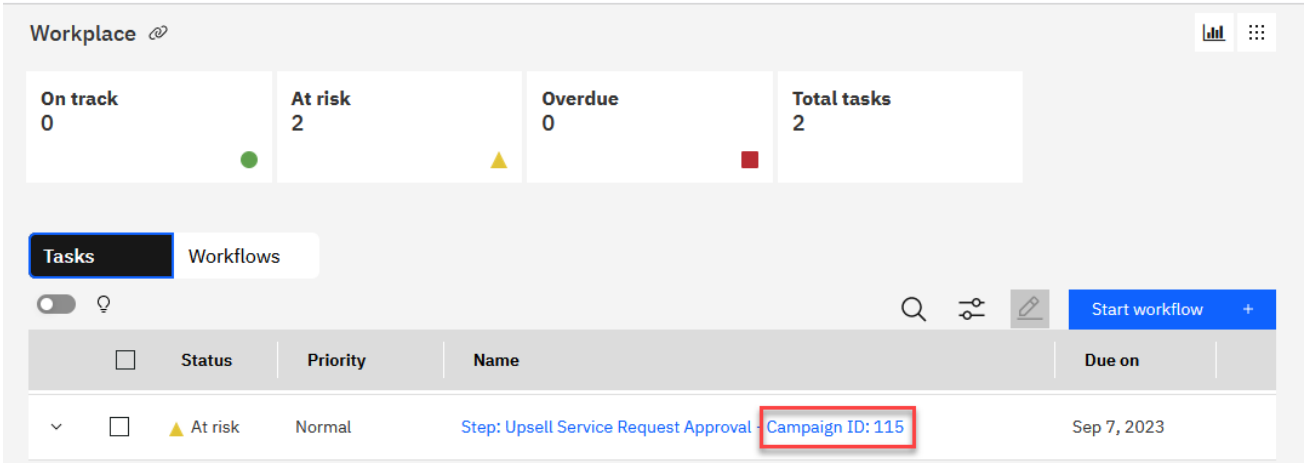


1. Open **IBM Business Automation Workplace** in your browser (see 1.4.1 Systems, Lab Files, and Credentials)

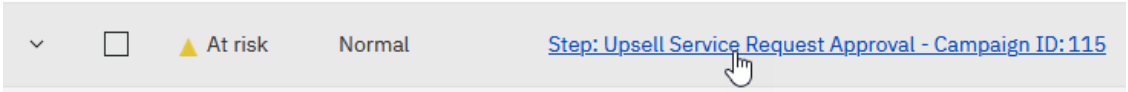
2. Select **Enterprise LDAP** for *Log in with*, for *username* enter **WODemo,** for *password* **passw0rd,** and then click the **Log in** button.



3. Find the task related to your **Campaign ID**.



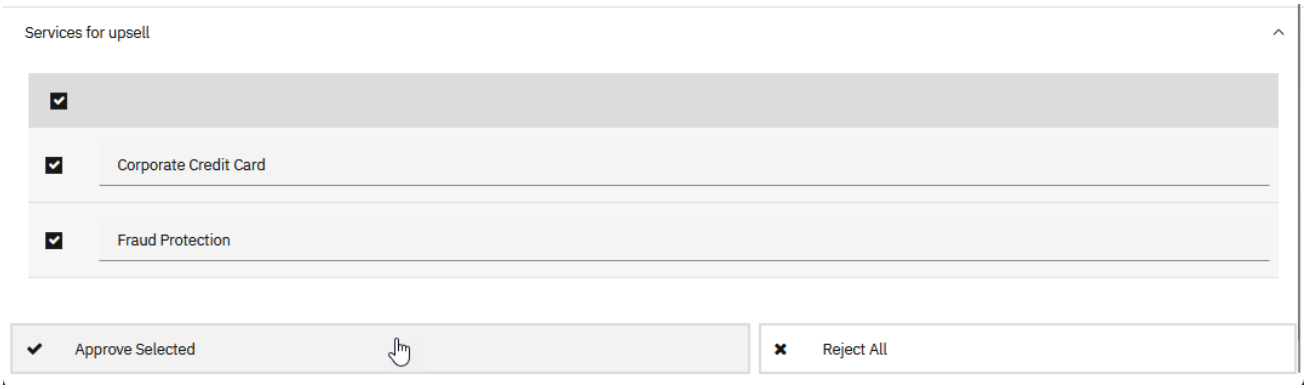
4. Click the **task link** to claim and work with the task.



5. On the *Claim task* window, click **Claim**.

6. Scroll to the bottom of the form and click the **Approve Selected** button.

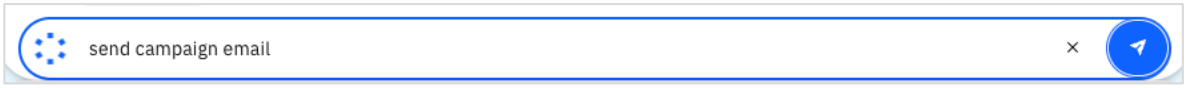
Note. As Sales Manager, you can make the final changes to the services upsell offer.



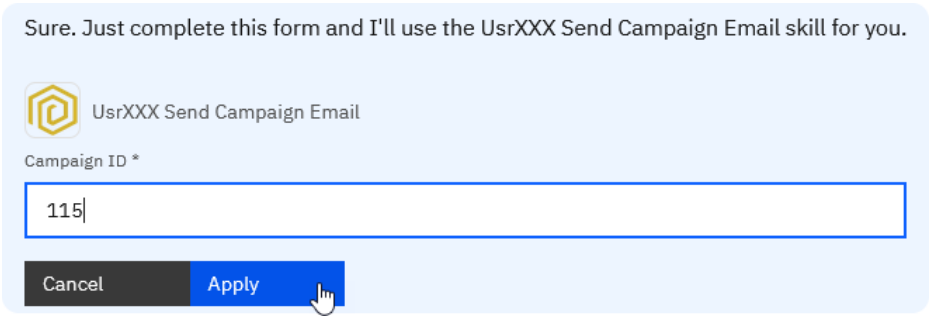
3.5.4 Send an Upsell Offer Email to your Client.

1. Switch back to the wxO environment.

2. Type the **send campaign email** phrase and click **Send**

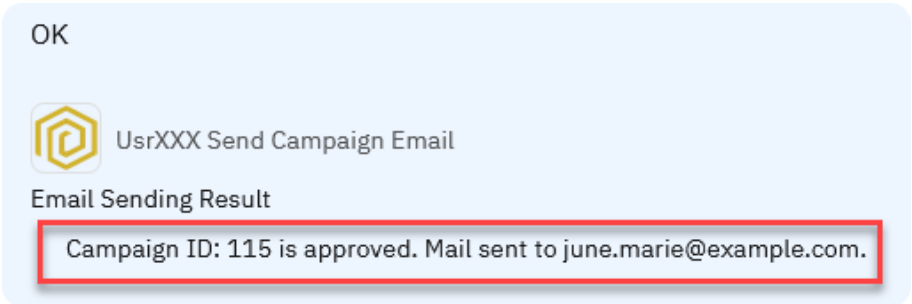


3. For Campaign ID, enter your **Campaign ID** and click **Apply**.



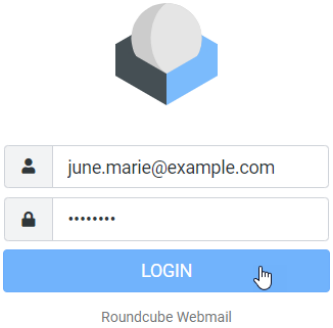
4. Take a look at the reply from wxO.

Note. Since the Sales Manager approved your Services upsell offer, wxO could send the email.

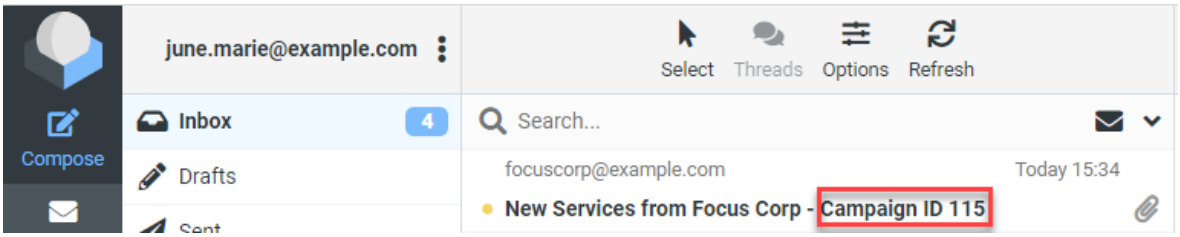


3.5.5 Verify the Upsell Offer Email is in the Client's Mailbox.

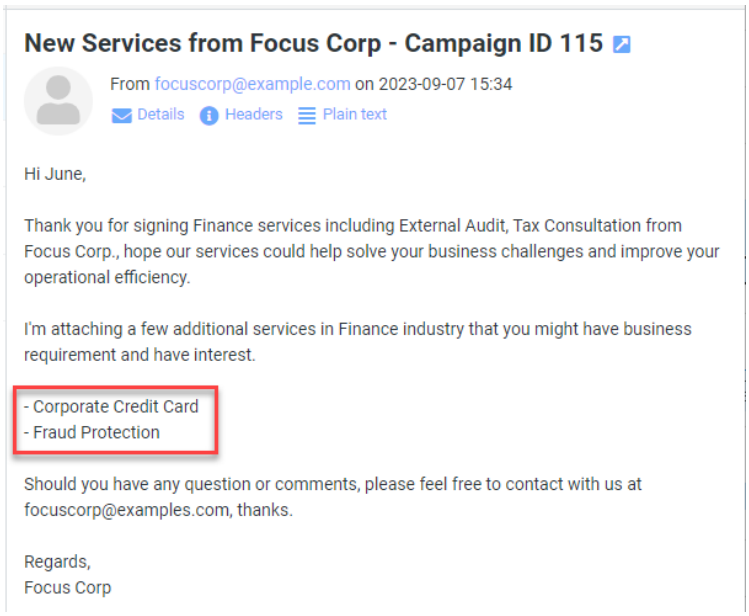
1. Open the **Local Webmail Server** in your browser (see 1.4.1 Systems, Lab Files, and Credentials)
2. Enter the credentials of **june.marie@example.com** / **passw0rd** and click the **LOGIN** button.



3. Verify that you have an email with your Campaign ID in the subject.



4. Click the **New Services from Focus Corp – Campaign ID XXX** email to open it.
5. Verify you see the same upsell services wxO selected for the Automation Elite client.



Congratulations on completing the lab!

Appendix A. Overview of the "Administrator" Role

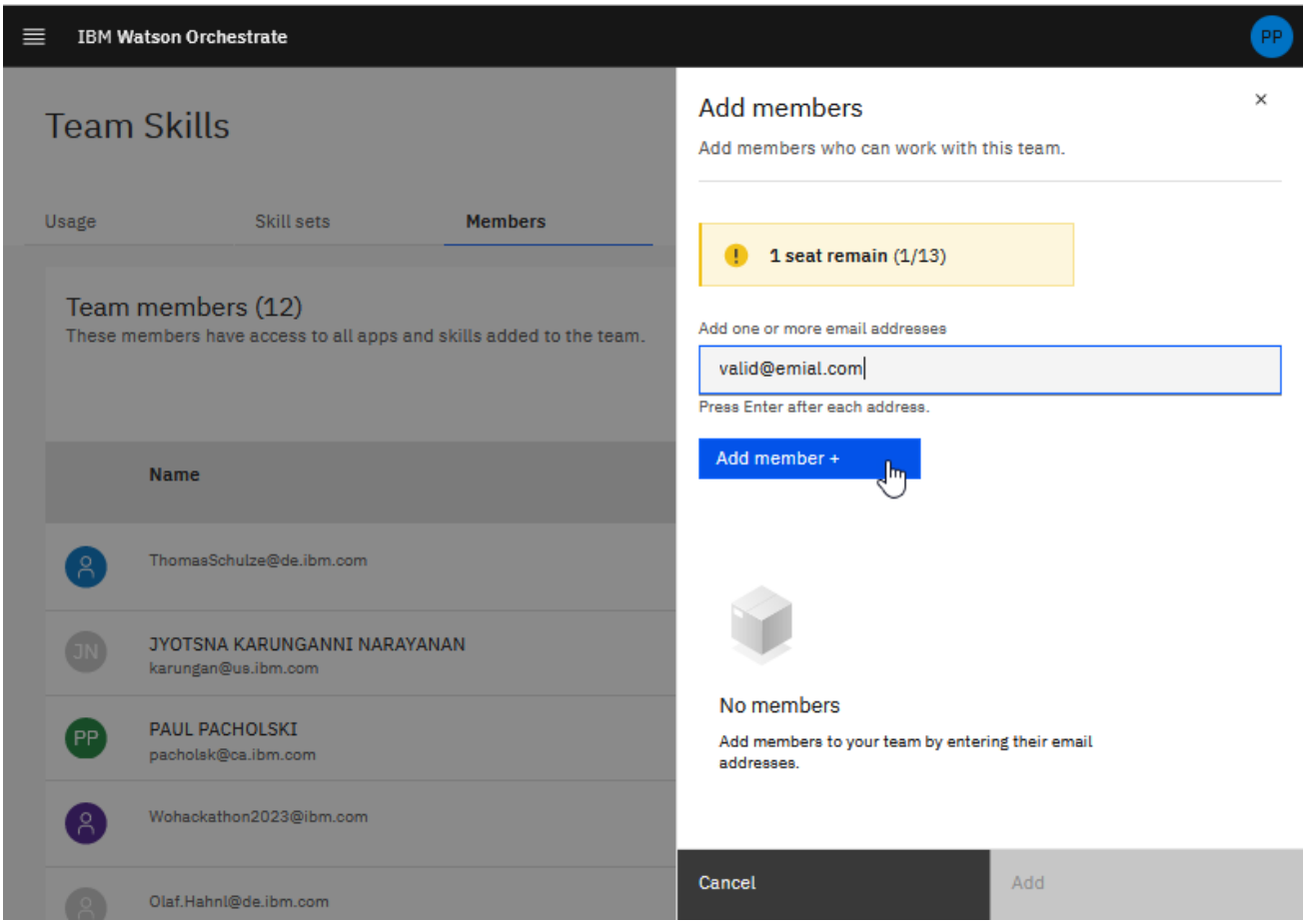
Managing teams

Teams are composed of roles: Admin, Builder, and User. Every team needs at least one Admin who first created the team.

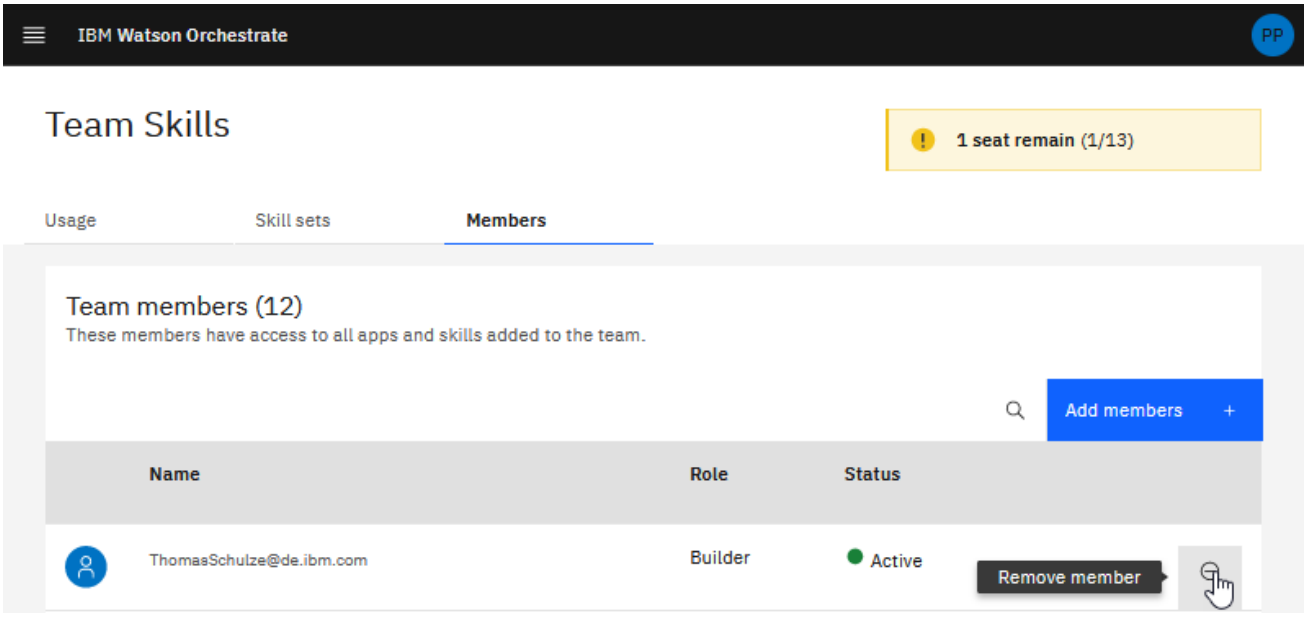
By default, when you start using IBM watsonx Orchestrate™, you are the admin of your team of one. You need to invite a user into your team to create a team. You can invite as many team members as you have seats in your license. Of those seats, you can assign any user any of the three roles, but each role has a purpose that might limit what a user can see or do.

Three key activities:

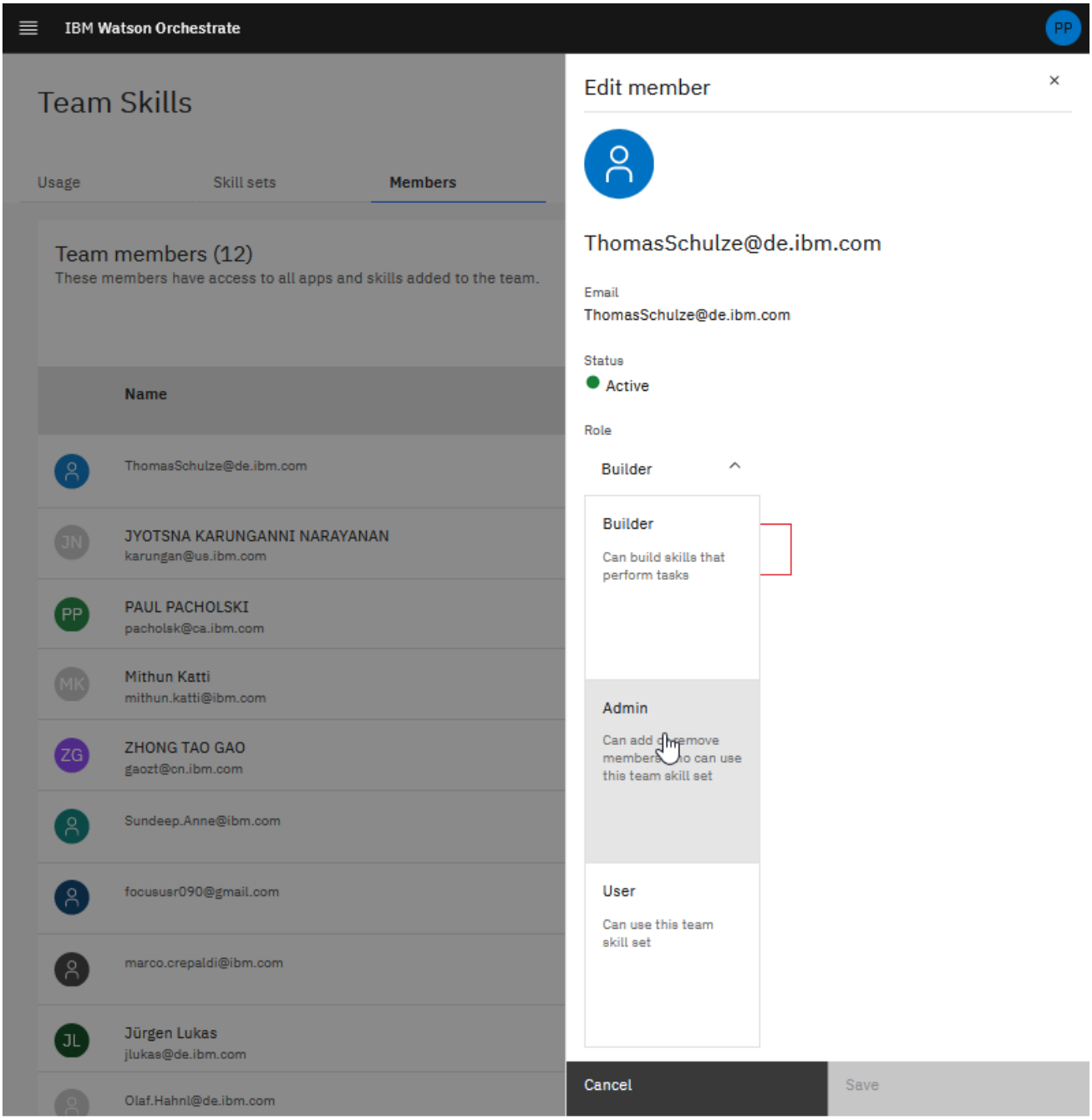
1. Adding Users



2. Removing users



3. Adding Roles to Users



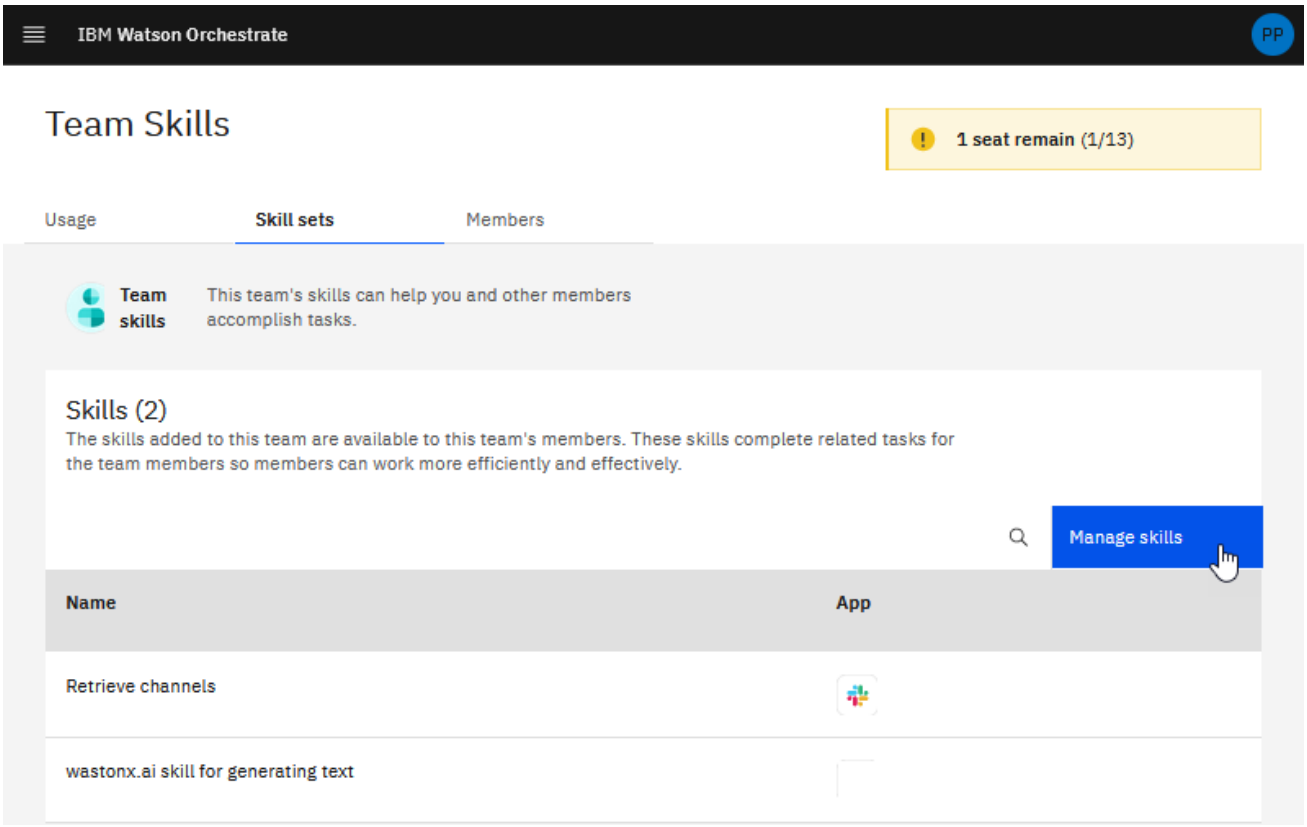
Managing team skill sets

Fundamentally, there isn't a big difference between your team skill set and your personal skill set. But only with the Admin role, you can add, use, and remove skills to the team skill set like you do with your personal skill set. For more information about roles and access, see Adding team members and defining roles.

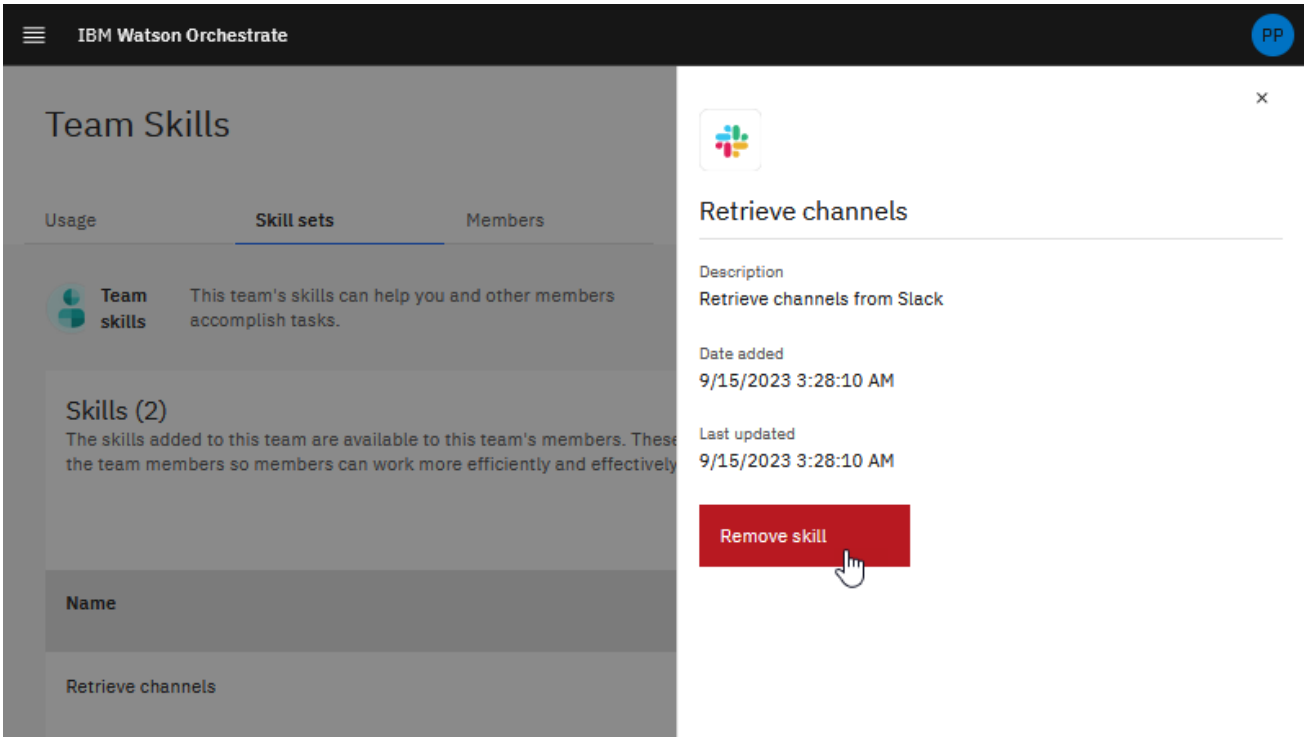
Once a skill is made available on the team skill set, anyone on a team can use this kill. To use a team skill set's Skill, the user must click the Team skill set tab on the IBM watsonx Orchestrate home page and invoke any available skills the same way as they would for any skill in any skill set.

Two key activities:

1. Adding skills to your team skill set

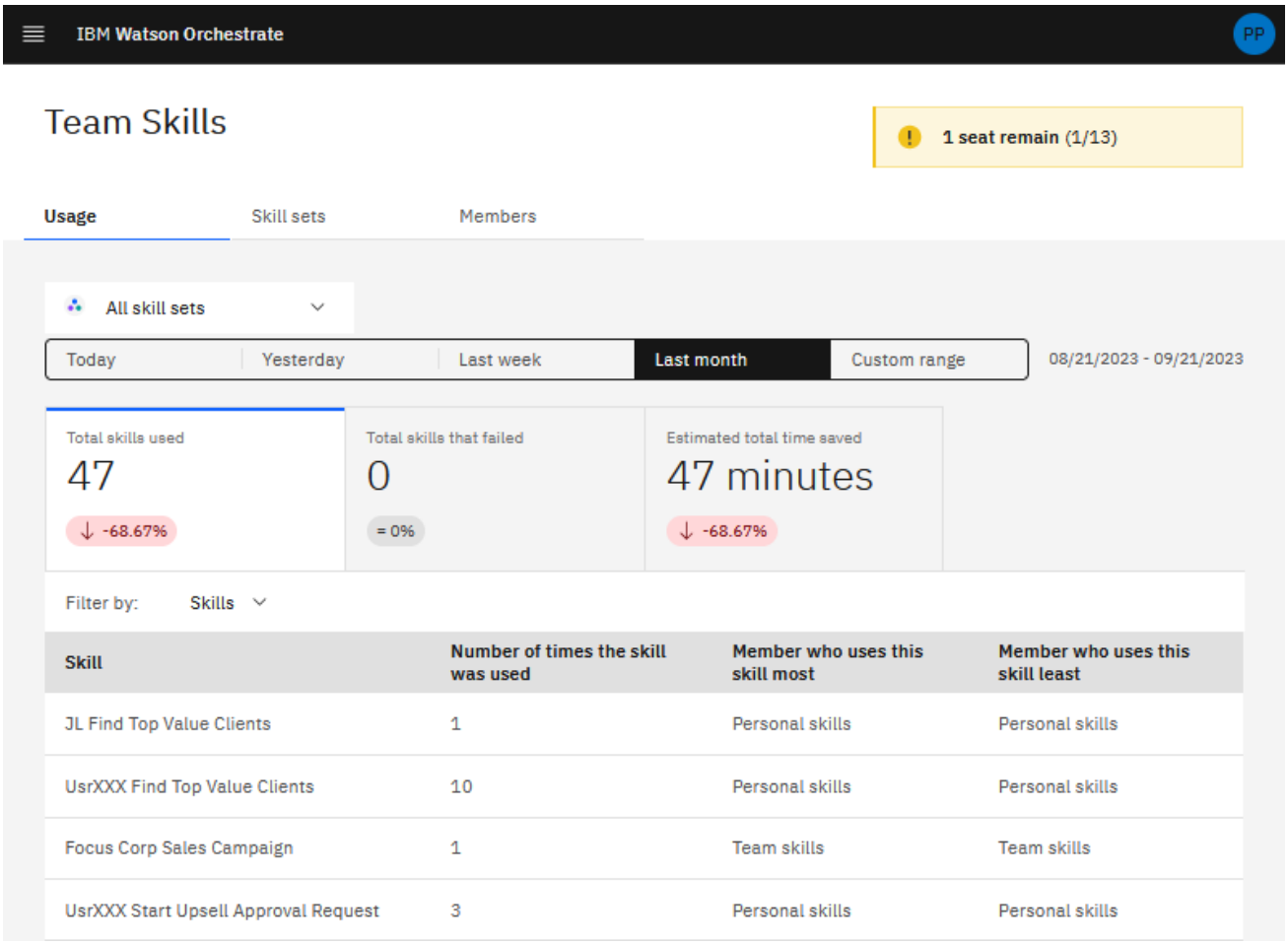


2. Removing skills from your team skill set



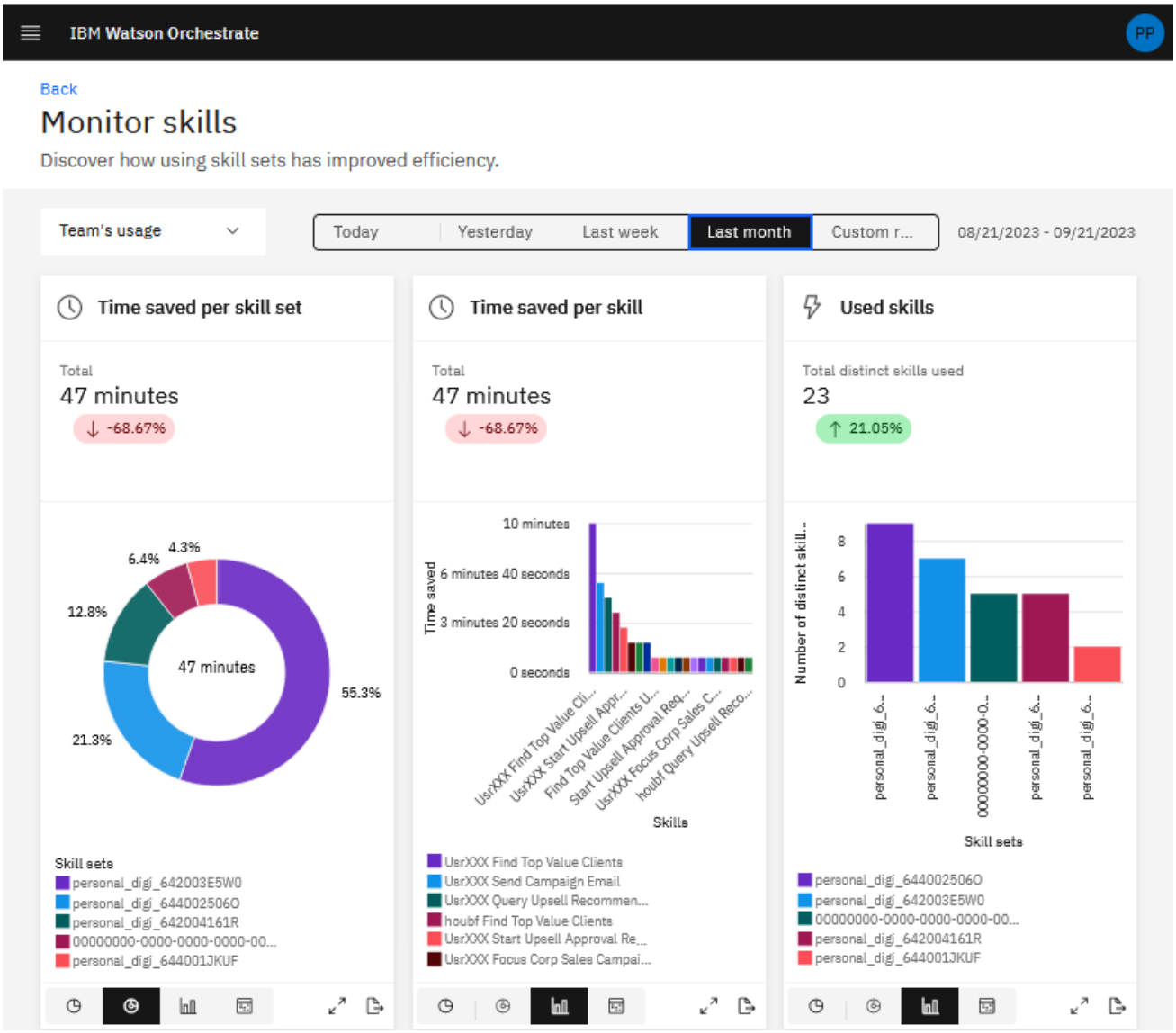
Monitoring team skill sets

Admin roles can view statistics about how their teams use skills and skill sets to complete tasks. The Usage tab (and the team's dashboard) is not visible to the User or Builder role.



Monitor usage

You can monitor, evaluate, and assess the performance of your skills in IBM watsonx Orchestrate. The monitoring page includes prebuilt charts that were created from your data to highlight the skills usage and how your efficiency increased by using the skills from the skill sets. You can review and compare the details in the prebuilt charts to arrive at a factual business strategy.



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 US 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.

UNIX is a registered trademark of The Open Group in the United States and other countries.

© Copyright International Business Machines Corporation 2020.

This document may not be reproduced in whole or in part without the prior written permission of IBM.

US Government Users Restricted Rights - Use, duplication or disclosure restricted by GSA ADP Schedule Contract with IBM Corp.