

Processes and Workflows in IBM RPA

Session 2171 (NA), 2360 (EMEA), 2447 (APAC)

Lab Exercise Guide



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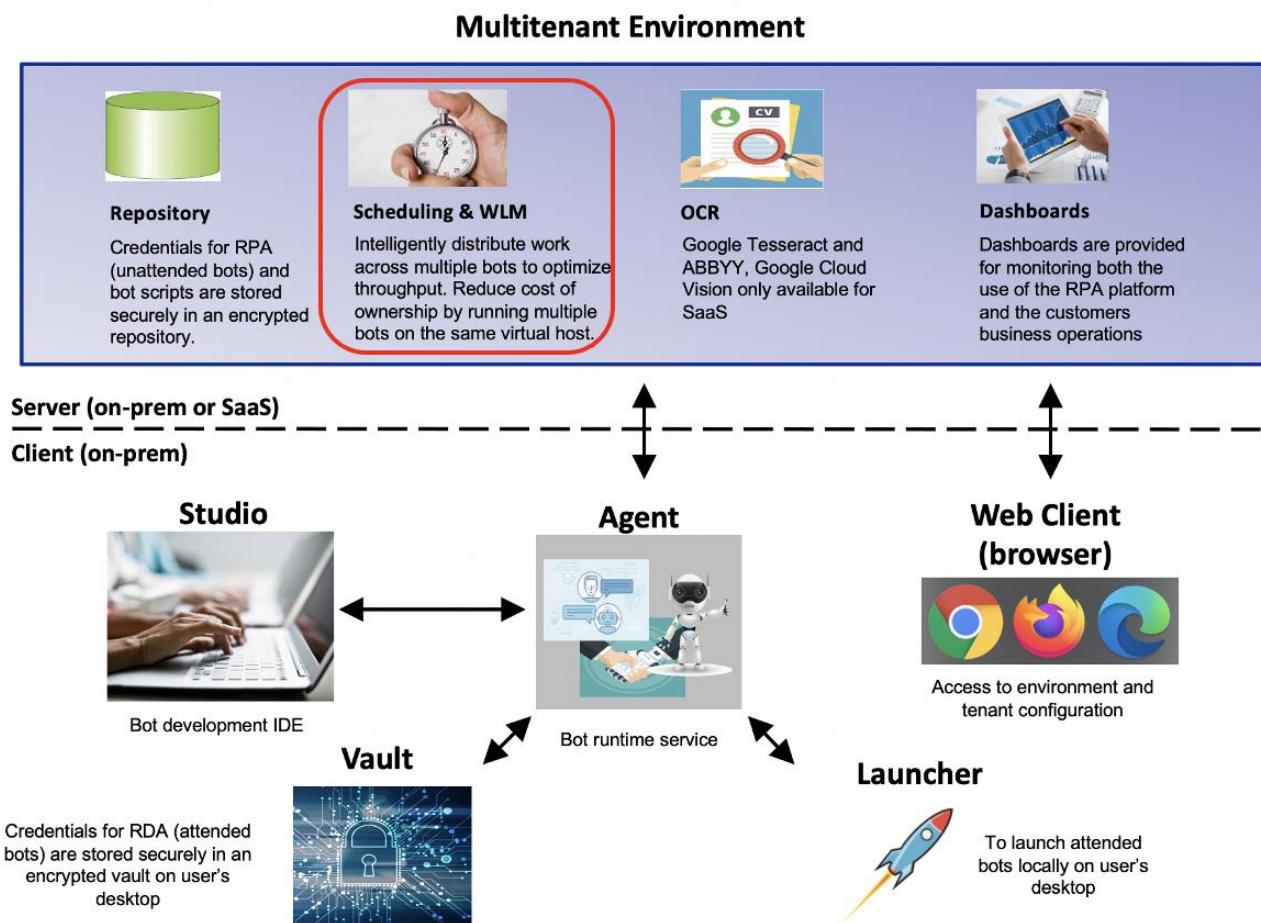
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1 Introduction

In this hands-on lab you will learn the basics of using more advanced workload management and bot deployment options that IBM RPA has to offer. Namely **Processes** (aka Orchestrations) and **Workflows**. Both of the concepts give more flexibility to deploying your automations and how to control their execution.



Both processes and workflows are configured and taken into use via Web Client – **RPA Portal** hereafter –, but they have some clear differences.

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Dashboard

Scripts

Workflow

- Control Panel
- Processes
- Workflows

1.1 Process

Process manages automation scripts at execution level to ensure that an instance goes through the entire designed path that includes one or more steps. Process and the steps are configured using the RPA Portal. Some of the characteristics for the concept are:

- Includes one or more steps, each represented by an automation script (bot).
- Steps are started placing items to step **input queues**, also called as user queues.
- There is no need to schedule the executions, the bot runtime is free for other tasks, until you have items to be executed in the input queue.
- Workload balancing is flexible and easy to configure, for example placing more machines (runtimes) for a given step to process the load.
- Individual steps can be stopped for maintenance or allocating more resources for other activities.
- The direction of the execution of the steps has only two paths, success and failure.
- There is no time management for the executions, for example, to define that a certain step can only be executed in a specific day window (4 ~ 7 PM).
- The actual script logic has no control over the process execution, for example step 2 starts executing always after 1 since there's no way of skipping directly to step 3 based on script instructions.

1.2 Workflow

Workflow is already designed and defined at development level, where developer creates a BPMN (Business Process Model and Notation) definition for execution sequence to be followed, ties the BPMN tasks with the automation script routines and creates controls for specific treatments (suspension, recovery). Some of the characteristics for the concept are:

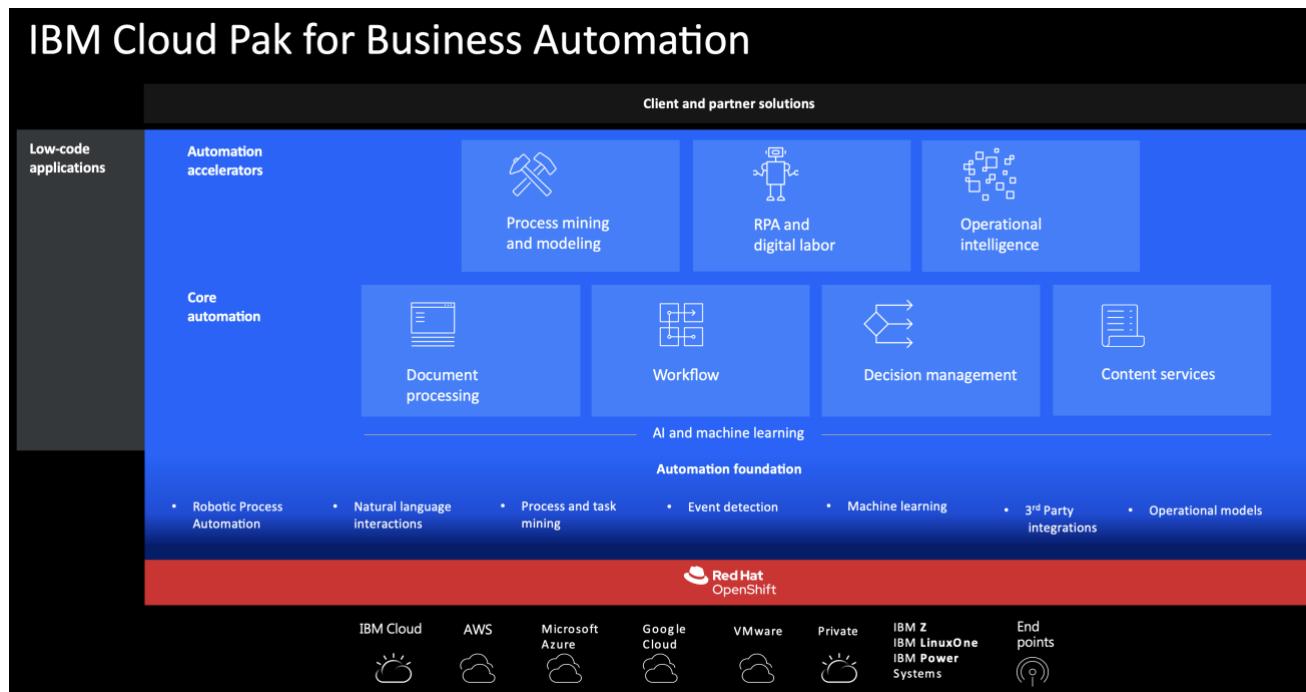
- The developer has greater control over the execution flow, in fact, developer implements the execution flow logic as an automation script presenting the different tasks in the designed workflow.
- Using a workflow inside an automation script is optional. Script can for example do some data validations and if satisfied, then use workflow.
- Multiple workflows can be used in a single script. Script can for example use different workflows to process different type of data.
- The script implementing the workflow tasks and the logic needs to be triggered via API, Schedule, RDA or as part of process.
- There is the possibility to create a **batch**, to group executions and facilitate monitoring.
- Possibility of the SaaS client to write execution data to a local database, thus having all the execution information locally available for querying and reporting.
- When workflow is run, IBM RPA internal process flow control engine will make sure it's executed based on the workflow design.
- Developer can control workflow execution by suspending, canceling, restarting and batching up the instances using the various workflow commands within the automation script.
- Since workflows are used from a “normal” automation script, they can be scheduled as needed.

1.3 Prerequisites

Everything you need in order to complete the lab is available in your lab environment. All you need is your computer and an internet connection. Let's get started!

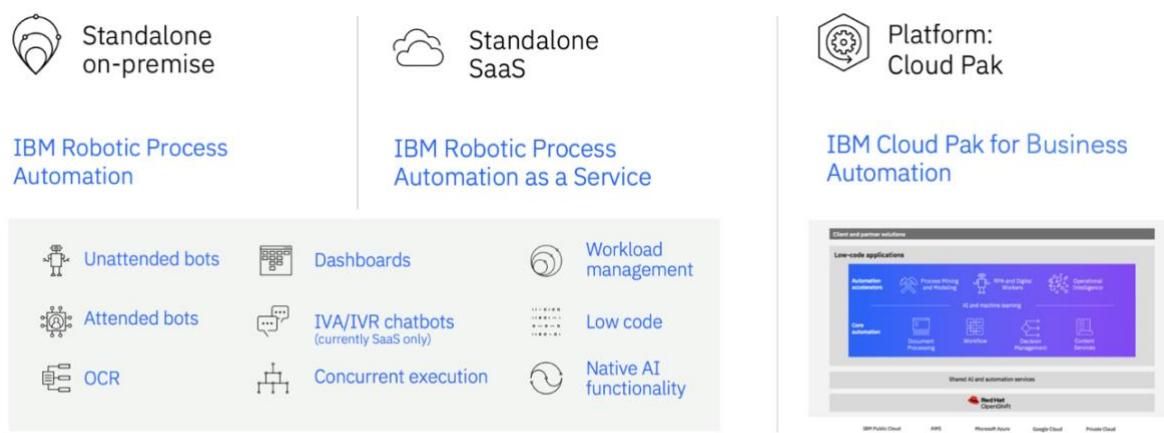
2 Product Background

IBM Robotic Process Automation (RPA) is originally based on WDG Automation RPA solution that IBM acquired in summer 2020. Being of the pure SaaS RPA solutions and combining some really interesting technical capabilities – like the IVAs (Intelligent Virtual Agents) – WDG Automation was well suited for IBM's holistic view on business automation and IBM Cloud Pak for Business Automation platform.



IBM Cloud Pak for Business Automation (CP4BA) is a business automation platform that offers a total solution for automation your business. It has several automation capabilities including core automation, automation accelerators and low-code design experience.

IBM RPA is available as a stand-alone solution deployed on-prem, as a service (SaaS) and as a part of IBM Cloud Pak for Business Automation.



IBM RPA capabilities extend normal RPA capabilities in several categories. Infused AI-services, flexible concurrent execution model, native multitenancy and intelligent workload management using processes and workflows – the topic for this lab – being the obvious ones.

IBM RPA features

 <p>Cloud software as a service</p> <p>A full-featured cloud-based RPA software as a service solution enables organizations to accelerate time to value. On-premises also available.</p>	 <p>Unattended bots</p> <p>Use an RPA digital workforce to automate repetitive tasks without human intervention.</p>	 <p>Attended bots</p> <p>Enable your human workforce to augment work using bots to perform repetitive tasks on demand.</p>
 <p>Integrated chatbots</p> <p>Combine chat and RPA commands to create intelligent virtual agents (IVAs) deployable on multiple channels to provide engaging client interactions.</p>	 <p>Out-of-the-box capture</p> <p>RPA commands for data extraction and classification, with built-in, best-in-class OCR. Expand to advanced use cases with intelligent capture from Cloud Pak for Automation.</p>	 <p>Dashboards</p> <p>Gain business insights into business operations.</p>
 <p>Intelligent workload management</p> <p>Intelligently distribute work across multiple bots to minimize bot idle time and optimize throughput.</p>	 <p>Low-code editor</p> <p>600+ commands with pre-built integrations to common applications (Outlook, Word, PDF, SAP, etc.) make it faster and easier to build bots.</p>	 <p>End-to-end platform</p> <p>RPA is included in IBM Cloud Pak for Automation so you can start small and scale, using only the automation capabilities that you need, when you need them.</p>
		 <p>Native AI functionality</p> <p>AI commands, including machine learning, decisioning and fuzzy logic, are available via the drag-and-drop interface so you can build bots that learn, think and reason.</p>

More information about IBM RPA can be found from the links below:

- Product documentation: <https://www.ibm.com/docs/en/rpa/20.12>
- IBM RPA Community: <https://ibm.biz/rpa-community>
- IBM RPA Recipes presentations: <https://ibm.biz/rpa-recipes>
- IBM RPA videos on YouTube:
https://www.youtube.com/channel/UCvxMqa_bUERHDgtfbKKY9qw/videos
- Learning journey for IBM RPA in IBM Training (free):
https://www.ibm.com/training/journey_description?journeyId=177

More information about IBM Cloud Pak for Business Automation can be found from <https://www.ibm.com/cloud/cloud-pak-for-business-automation>.

3 Accessing your lab environment

You will be provided with a link to access your THINK 2021 lab. This link will lead you to IBM SOLEIL platform that we are using to host the lab environments. There's a useful “How to access my lab” video on the event page that we recommend you watch before starting your lab.

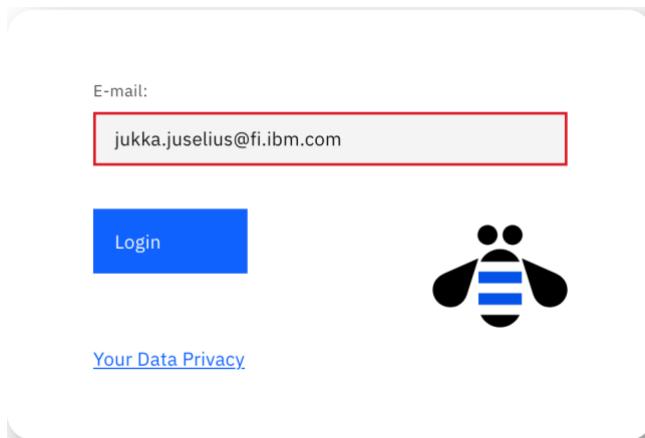


How to access my lab

Please watch this short video before attempting a lab for the first time.



After watching the video, login using **your email** that you used to register for THINK 2021.

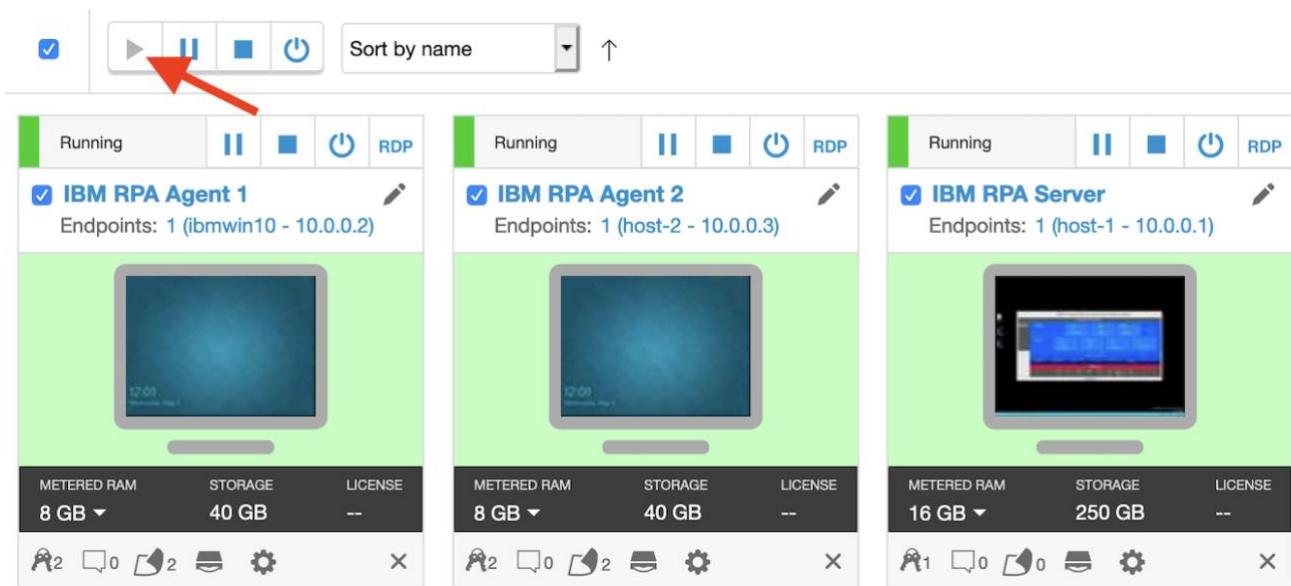


You will be moved to your lab front page that you can use to open this lab document (**Lab Guide**-button) and to access your individual lab environment (**Launch Lab**-button).



Click the Launch Lab -button. This will lead you to your environment dashboard page.

Your lab environment has three (3) virtual machines (VM) that should have already been started up for your convenience (green background, status “Running”), but if for some reason they are not, you can start your VMs by clicking the “play button” ► in the top control bar just above the VMs (see the arrow pointing the control in the picture below). If you do need to start them, the starting sequence will take about 2 minutes.

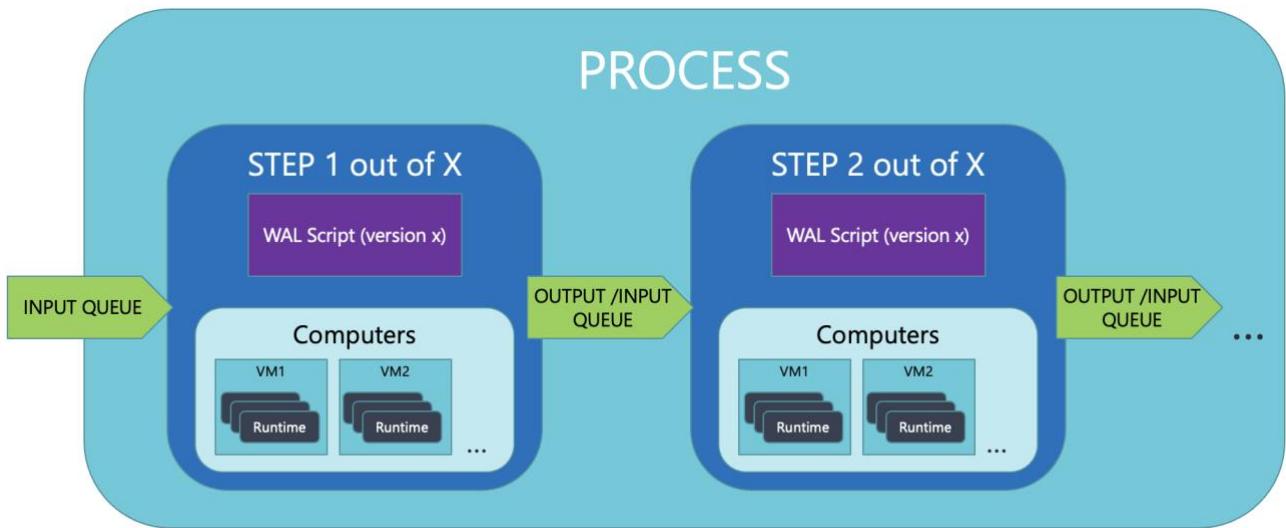


As you learned from the “How to access my lab” video, you can now access the VM machines just by clicking the VM display icons. Now you are good to go. Let’s start the lab exercise!

4 Defining and running a Process

Let's start with defining a **process** that is also often called as an **orchestration**. As already mentioned in the [Introduction](#), processes are defined and configured using the RPA Portal, after we have prepared the automations scripts for it. This means that we have no control over the orchestration at the script level but using the process configuration we create to our IBM RPA Server Tenant.

The picture bellow represents the logical structure of a process definition.



- Process can have one or more **Steps**.
- Process is started by putting data to the **input queue** of the first step.
- Each step is represented with a certain version of a **WAL script** (automation script developed).
- One or more **Computers** are assigned to run each step.
- Computers might have more than one **Runtime** that they can use for processing the process instances (concurrent processing).
- Steps follow each other in a sequence mediated by queues. When a step finishes, it can put the data forward to the input queue of the next step.

4.1 Requirements for your scripts

There are couple of things that you need to be aware when preparing your scripts to used together with processes:

- Since the scripts that you use in processes are started automatically by the process orchestrator, they need to start with the ***Get Current Message from Queue***-command. The queue defined here, needs to be the queue that is defined as your input queue for your process step to which your script is assigned to.
- If you want to use any of your script variables (business data you assign to them in your script) for dashboarding, you need to use the ***Bind Process Variables***-command before assigning any values to your script variables.

Get Current Message from Queue

Bind Process Variables

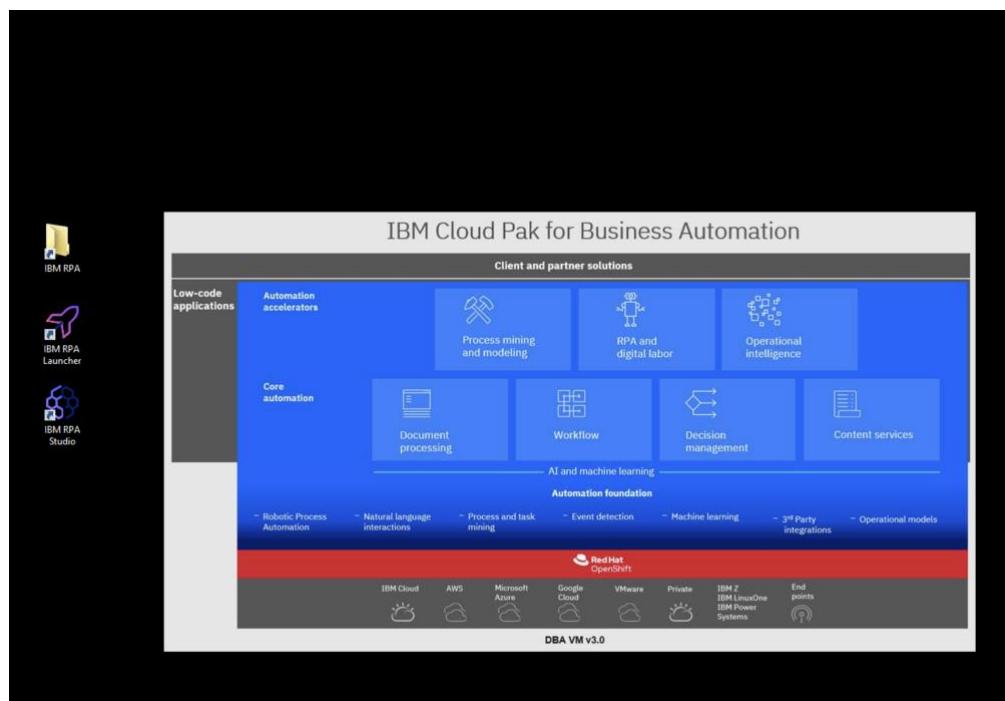
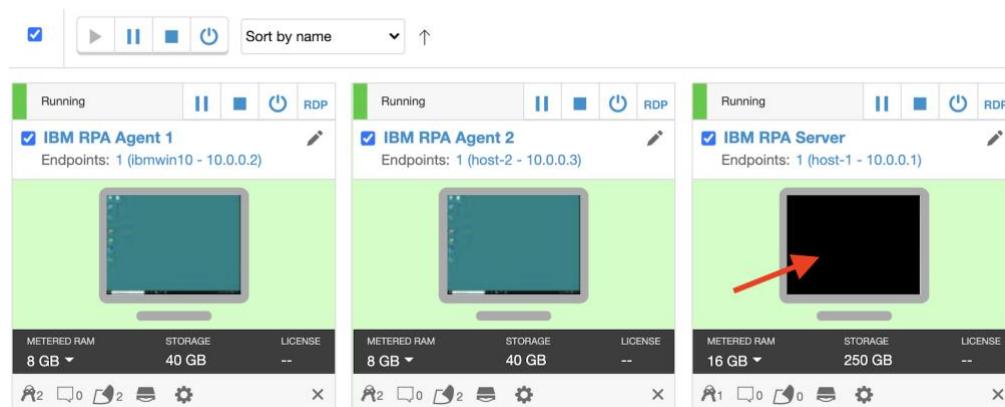
Bind Process Variables

For this part of the exercise, we will provide the automation scripts, but you need to create a process definition using them.

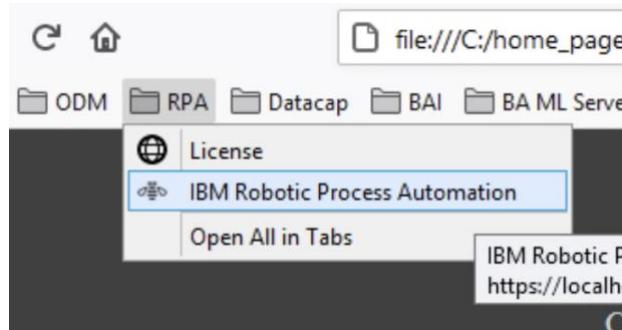
4.2 Create a process definition and execute it

We will now use the IBM RPA Server's RPA Portal to define a process to handle some sales leads using two steps: 1) to insert sales leads to a web-based system and 2) to insert recorded interest from the sales lead to an interest tracking Windows application.

1. Make sure that you have the virtual desktop open for the **IBM RPA Server**.



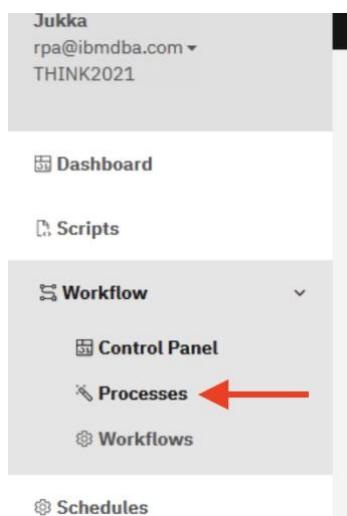
- Within the virtual desktop, open Mozilla Firefox web browser from the task bar and use the bookmarks toolbar to open **RPA → IBM Robotic Process Automation**.



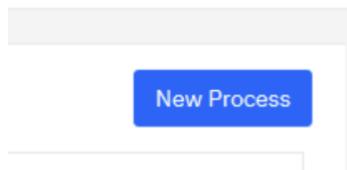
- This opens the login screen for your IBM RPA Server's RPA Portal. Use the username **rpa@ibmdba.com** to login.

- Since we only have one tenant (THINK2021) defined to our IBM RPA Server, we cannot select the tenant. Use **passw0rd** as your password and click **Login**.

5. When the RPA Portal is opened, you should see the Scripts view. **Expand the Workflow menu from the left-hand side menu section and select Processes.**



6. In the Process view, there is already a test process defined, but you can ignore it for now. **Click New Process**.



7. There are 4 steps and different type of information you need to define for your process. In the first step (General) you need to provide some naming information. Use the following:
 - Process Name: **SalesLeadsTHINK2021**
 - Description: **Lab exercise for THINK 2021** (or whatever you want to)
 - Label for Singular: **Sales lead**
 - Label for Plural: **Sales leads**

Also notice, that we could be defining a workflow to be created for each process instance, but we will not be doing that. This option gives us an opportunity to use processes and workflows together though. **Click Next**.

The screenshot shows a workflow configuration interface with a top navigation bar featuring four tabs: General, SLA Configuration, Steps, and Variables. The General tab is selected, indicated by a blue background and white text. Below the tabs, the page title is "General" and the status is "Step 1 of 4". The main form area contains fields for "Process Name" (SalesLeadsTHINK2021) and "Description" (Lab exercise for THINK 2021). There is also a dropdown for "Workflow" and another for "Workflow Version". A section for labeling instances follows, with "Label for Singular" set to "Sales lead" and "Label for Plural" set to "Sales leads". At the bottom right are "Go back", "Next", and "Finish" buttons.

General

Step 1 of 4

Process Name: SalesLeadsTHINK2021

Description: Lab exercise for THINK 2021

Select a workflow to be created with each process instances (optional)

Workflow:

Workflow Version:

What may the instances be called?

Label for Singular: Sales lead

Label for Plural: Sales leads

Go back Next Finish

8. In the next step (SLA Configuration) you can set the values target waiting, handling and processing times. These values are then used in the Control Panel view for your process. Set the values to:

- Target Waiting Time: **00:00:30**
- Waiting Time Required Service Level: **75%**
- Target Handling Time: **00:00:30**
- Handling Time Required Service Level: **75%**
- Target Processing Time: **00:00:55**
- Processing Time Required Service Level: **80%**

Click **Next**.

SLA Configuration

Step 2 of 4

What is the desired time interval for an instance to wait to start being processed? What is the minimal acceptable percentage of instances that is required to meet this target?

Target Waiting Time:

00:00:30

Waiting Time Required Service Level:

75%

What is the desired time interval for an instance to finish the whole process after starting? What is the minimal acceptable percentage of instances that is required to meet this target?

Target Handling Time:

00:00:30

Handling Time Required Service Level:

75%

What is desired time interval, including waiting time, for an instance to finish the whole process? What is the minimal acceptable percentage of instances that is required to meet this target?

Target Processing Time:

00:00:55

Processing Time Required Service Level:

80%

Previous

Next

Finish

9. Next, we need to configure the steps for the process. As mentioned, there can be one or more steps. We will configure two. One for handling the sales leads and the other one for storing the interests reported in the sales leads. Use the following to configure the first step:

- Step Name: **Process Sales Leads**
- Input Queue: **SLTest**
- Output Queue (On Success): **ITTest**
- Priority on Success Queue: **Normal**
- Output Queue (On Error): **Mark as error**
- Priority on Error Queue: **Normal**
- Script: **SalesLeadProcess**
- Version: **1 – “V1”**
- Computers: **JKJ-VM1** and **JKJ-VM2** (click the box the select the computers)

Steps Step 3 of 4

New Step Expand all Collapse all

Process Sales Leads

Step Name: Process Sales Leads

You need to select an input queue for items to be processed and optionally a success and error queue to move items upon completion

Input Queue:	SLTest	x -
Output Queue (On Success):	ITTest	-
Priority on Success Queue:	Normal	-
Output Queue (On Error):	Mark as error	-
Priority on Error Queue:	Normal	-

Didn't find your queue? Click [Here](#) to create a new queue or click [Here](#) to refresh data if you already created it.

Which scripts will process the items in the input queue?

Script:	SalesLeadProcess	x -
Version:	1 - "V1"	x -

Where will this script run?

Computers:	JKJ-VM1 x JKJ-VM2 x
Group:	

10. Since we want to define also the second step, click the **New Step** button and define the second step as follows:

- Step Name: **Track Interests**
- Input Queue: **ITTest** (note that is the output queue for the previous step)
- Output Queue (On Success): **Mark as success**
- Priority on Success Queue: **Normal**
- Output Queue (On Error): **Mark as error**
- Priority on Error Queue: **Normal**
- Script: **SalesLeadInterestTracker**
- Version: **1 – “V1”**
- Computers: **IBMBAW** (click the box the select the computers)

Click **Next**.

> Process Sales Leads ✓

Track Interests ✓

Step Name: Track Interests

You need to select an input queue for items to be processed and optionally a success and error queue to move items upon completion

Input Queue:	ITTest	x
Output Queue (On Success):	Mark as success	▼
Priority on Success Queue:	Normal	▼
Output Queue (On Error):	Mark as error	▼
Priority on Error Queue:	Normal	▼

⚠ Didn't find your queue? Click [Here](#) to create a new queue or click [Here](#) to refresh data if you already created it.

Which scripts will process the items in the input queue?

Script:	SalesLeadInterestTracker	x
Version:	1 - "V1"	x

Where will this script run?

Computers:	IBMBAW x
Group:	

[Previous](#) [Next](#) [Finish](#)

11. The last step is to define the process variable we want to track. This is important to find specific instances from the RPA Portal instances view and to store the business variables to IBM RPA Server's Process context for dashboarding. We will define 4 variables:

- **customer** (Type: text, Business Key: **Yes**)
- **customer_state** (Type: text, Business Key: No)
- **customer_city** (Type: Text, Business Key: No)
- **interest** (Type: Text, Business Key: No)

Variables	customer			
customer_state				
customer_city				
interest				

Process variables can be bound to script variables in order to have their values stored in a database along with change history

Variable Name:

Type:

A business key is an index which identifies an instance based on a value with business meaning. Instance identification will be set upon the first assignment of the business key variable's value. You can have only one variable set as business key per process and it cannot be modified after creating process instances

Business Key:

Previous **Next** **Finish**

12. Finally, click **Finish** to save your process definition. Click **Yes**, when asked “Are you sure?”.



Are you sure?

This action will result in the following outcomes:
 Business key cannot be modified after creating instances.
 Process variables cannot be modified.
 Do you want to continue?

No **Yes**

Good! Now you have your process defined. Next, we will trigger it and observe how it runs.

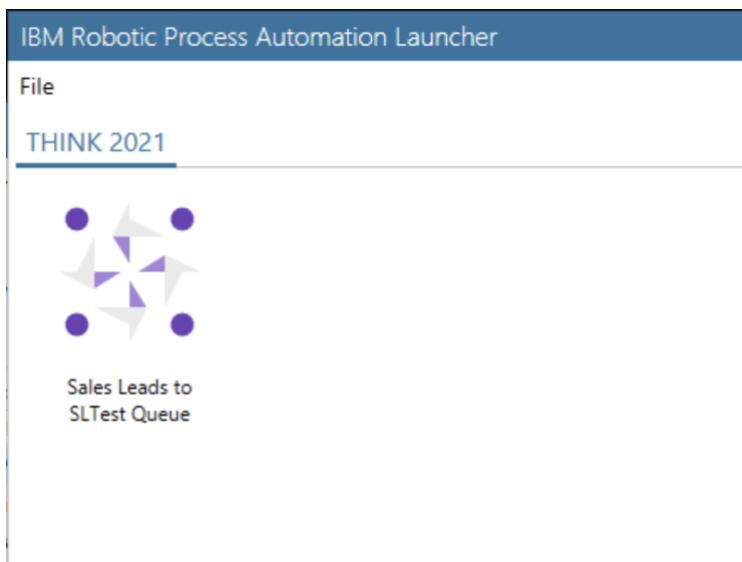
4.3 Run your process

As mentioned earlier, the process will be automatically run, when we push some data to the input queue of the first step of the process. We have provided you with a script that you can run using the Launcher. The script will write 12 sales lead records – as separate messages – to the SLTest queue that we just defined as the input queue for the Process Sales Leads step, the first step in our process.

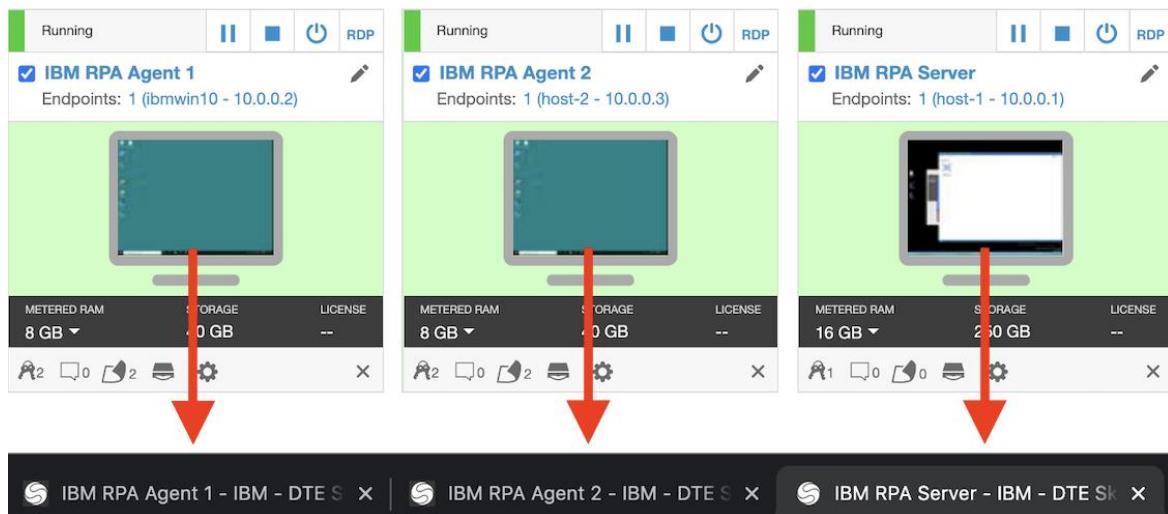
1. Within the IBM RPA Server virtual desktop run the Launcher application by **double-clicking the Launcher shortcut**.



2. You need to authenticate to Launcher. Use the following the login:
 - Username: **rpa@ibmdba.com**
 - Password: **passw0rd**
3. When the launcher opens you will see one tab named THINK 2021 and one button / icon to start the Sales Leads to SLTest Queue bot script, **BUT DO NOT RUN THE BOT YET!!**



4. In order to observe the process execution, make sure that you have opened the virtual desktops of all the three VMs in your separate browser tabs. Also, that you have logged in to JKJ-VM1 and JKJ-VM2 as Administrator to see their desktops. If you have not, make sure to login as **Administrator** using the password **ilovedemos**.

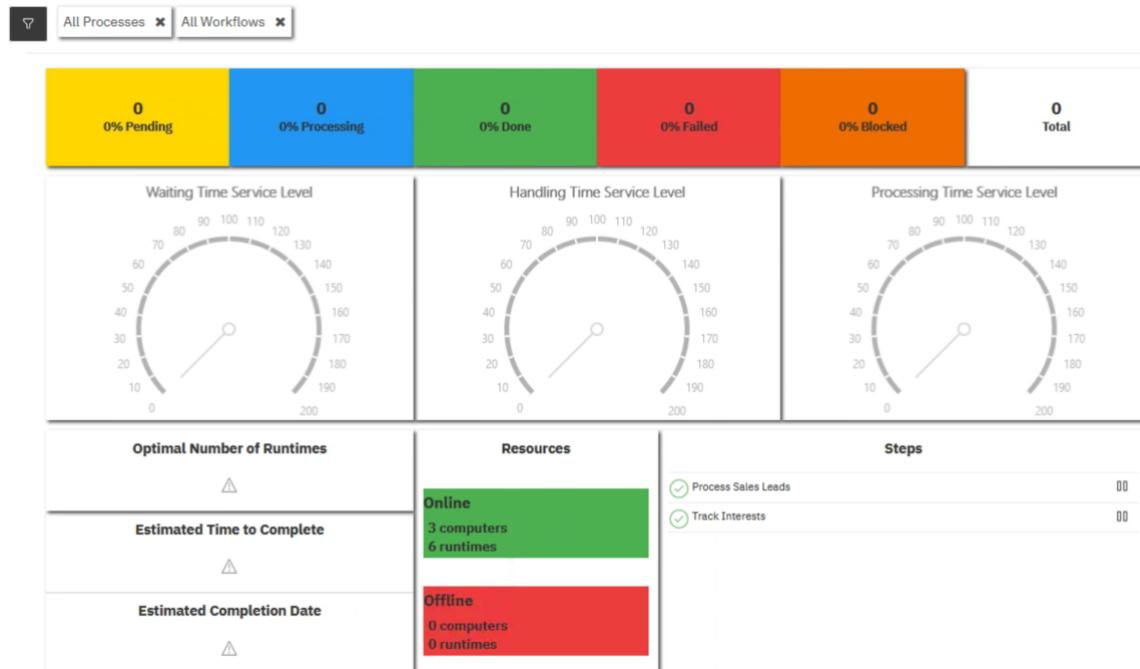


5. You should also open the Control Panel view in your IBM RPA Server RPA Portal. You should still be logged in and seeing the Processes defined to your tenant. Click the ellipsis menu at the end of **SalesLeadsTHINK2021** and select **Control Panel**.

Show	10	entries	Search:		
Process Name	Description	Label for Instances	Modified By	Modification Date	⋮
SalesLeadsTHINK2021	Lab exercise for THINK 2021	Sales lead/Sales leads	Jukka	4 minutes ago	Details Control Panel Instances

Showing 1 to 1 of 1 entries

This will open the control panel view for your process.



Let's have a closer look at the control panel before running the script in the Launcher to start your process execution.

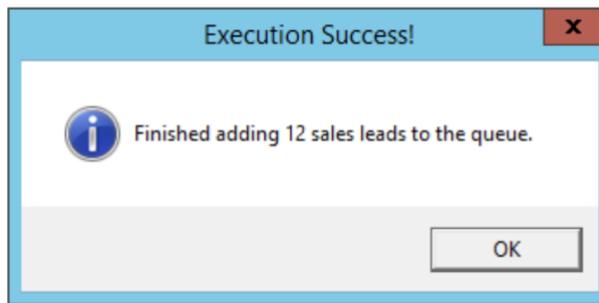
- On the top, you can see the number and the percentage of execution instances in different stages.
- The three gauges in the middle show you the SLA performance of the process.
- The left-hand side lower corner shows the estimated values for optimal number of runtimes, estimated time to complete all the process instances and also the estimated completion date. This part of the control panel will activate when your process starts executing and changed automatically to reflect the current situation when the execution moves forwards.
- The Resources section shows you the status of the computers and the available number of runtimes to execute the process instances. As we assigned computers JKJ-VM1 and JKJ-VM2 for the first step and IBMBAW for the second step of the process, we see 3 computers altogether. All the computers have been assigned 3 runtimes for concurrent execution, but only 2 of those have been defined for “queue-based processing” as we see below for JKJ-VM1 (capacity value and the percentage of queues runtime percentage). Hence, we have 6 runtimes available – 2 per each computer.

The screenshot shows a configuration form for a computer resource. The fields and their values are:

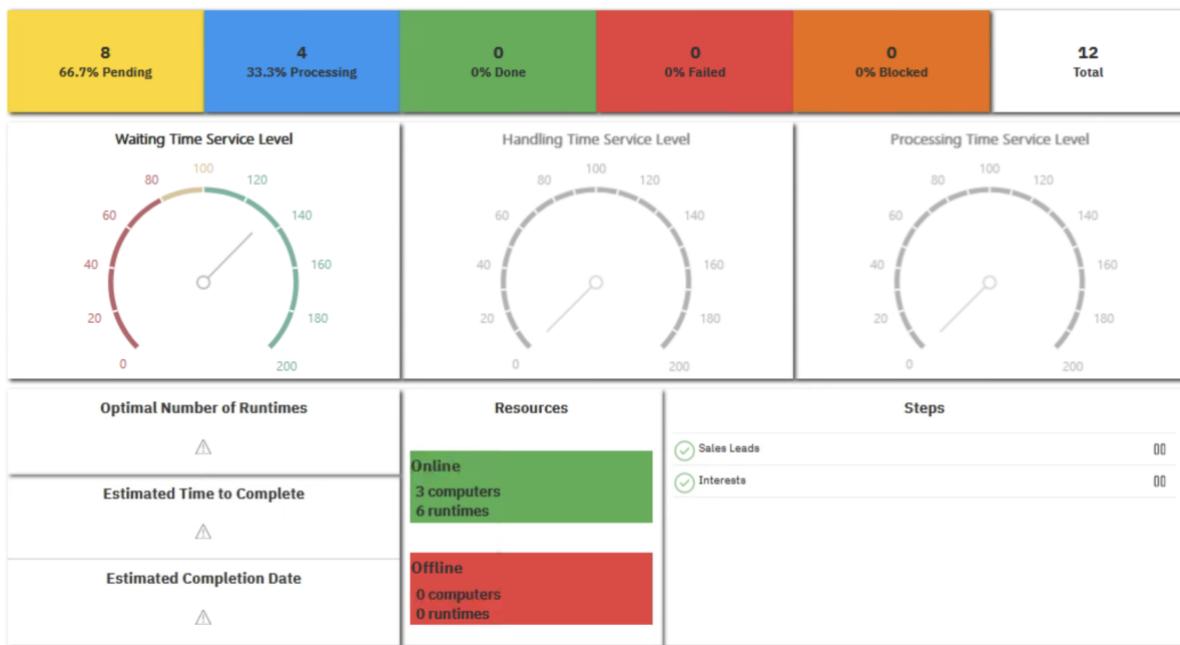
Name *	JKJ-VM1	
Credential	JKJ-VM Admin	New Credential
Physical address	(empty)	
Vnc Password	(empty)	
Computer Type *	Runtime Server	
Queues runtime percentage	70%	
Standing by runtimes	(empty)	
Capacity *①	3	

At the bottom are two buttons: [Cancel](#) and [Save](#).

- The Steps section lists the defined steps for the process. Notice that both of the steps are started by default, but you can pause / play them using the controls provided.
6. Now, when you have all the three desktops opened so that you can easily move between them and Control Panel opened for your process, you're good to go!
 7. Double-click the **Sales Leads to SLTest Queue** button / icon in the Launcher application. This will run the script that writes 12 sales leads to the SLTest queue. Once script is executed you will see a message box saying that the execution was successful. **Click OK to close it.**



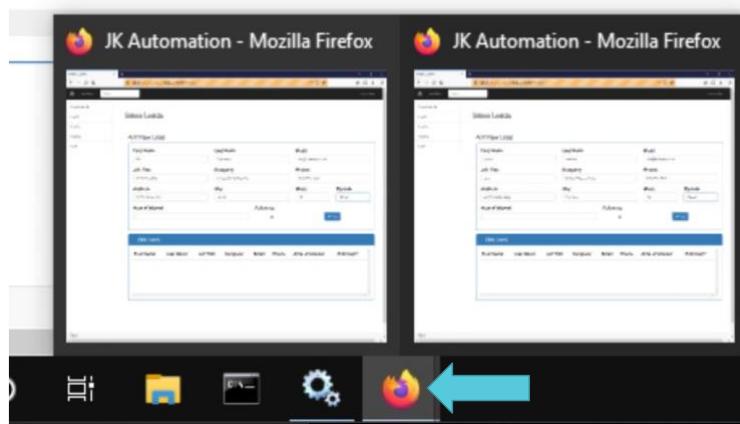
- Look at the Control Panel for your process and **click the refresh icon** on the right-hand side top corner, to verify that processing has started. You should be able to see the similar view as presented below.



First 4 instances have been started and 8 are in Pending status. This is because both computers assigned to execute the first step (JKJ-VM1&2) had both 2 available runtimes and have thus started processing the first 4 instances, 2 each computer.

- Switch to see the virtual desktop of JKJ-VM1 or JKJ-VM2. You should see 2 Mozilla Firefox browsers opened and sales leads inserted to a web-based system that we're using to store the sales leads. If you do not see the browsers, just wait for a while and next 2 should be opened soon.

TIP: If you hover over the Firefox icons in the Window taskbar, you can see the actions for both of the opened windows.



- When the processing moves forward, you should start seeing the Interest Tracking application briefly opened, interest information typed in and the application closed within the virtual desktop of IBM RPA Server where you also have your Control Panel view open. This is because we defined the IBM RPA Server computer (IBMBAW) to execute the second step of the process.

Email	Area of Interest
otto@autocars.com	Autonomous Cars

Feel free to move between the opened virtual desktops to see how the processing is happening in all of the three computers (virtual machines) that we're using here.

You can also go back to Control Panel view anytime to refresh the view and see the current status of the processing.

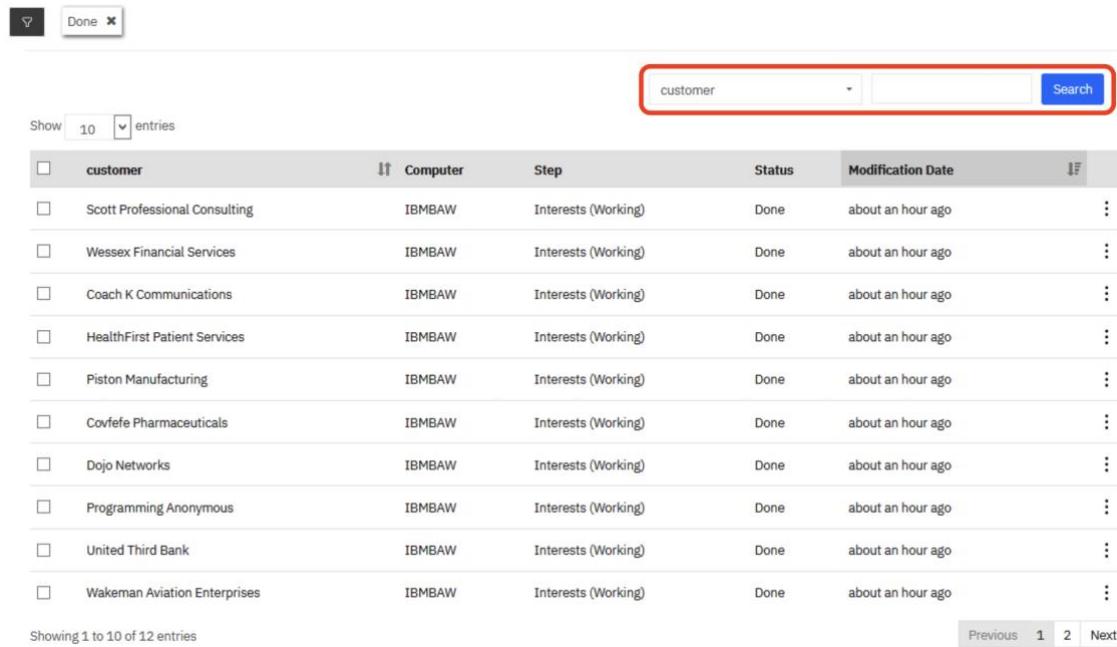
- When processing is totally done, you should see the following status in your Control Panel.



Nice! Sales leads processing done. Using three different computers all executing concurrently

12. Finally, click the green “done” tile  to open the instance data for all the successfully processed sales leads. Notice that we can see the customer’s name in the first column. This is because we defined the customer variable as our business key.

Notice that you can also search the instance data using the different variables we defined for your process. Give it a go and find the instances (sales leads) where the customer was from New York.



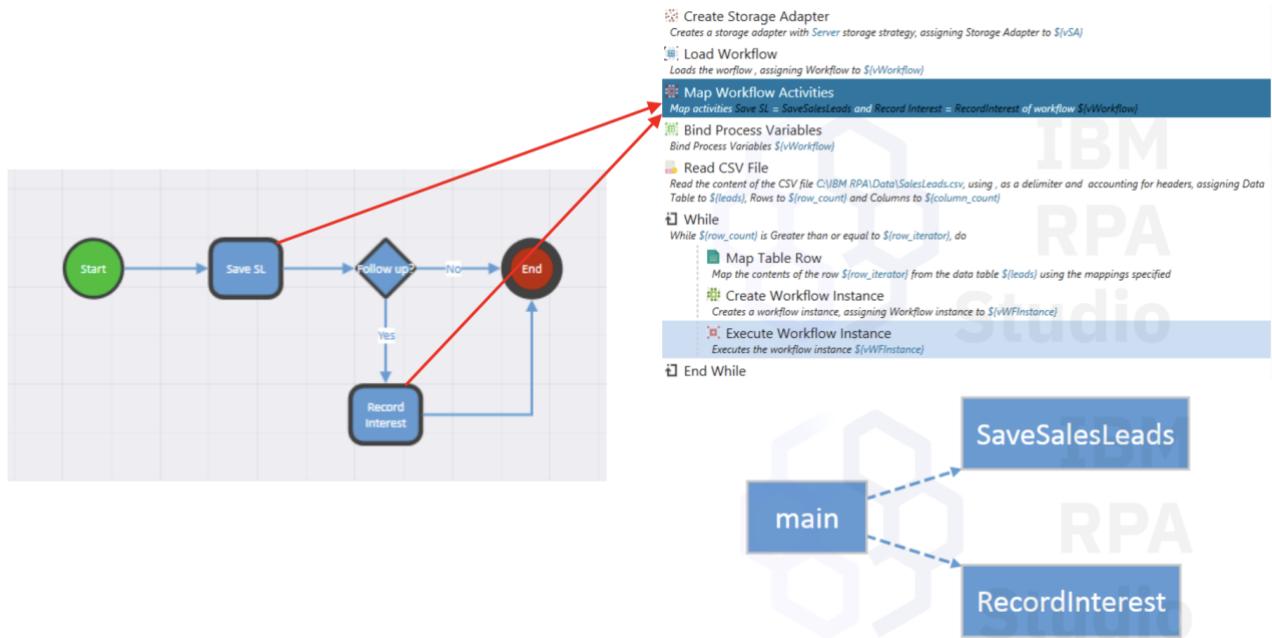
Process Instances					
	customer	Computer	Step	Status	Modification Date
<input type="checkbox"/>	Scott Professional Consulting	IBMBAW	Interests (Working)	Done	about an hour ago
<input type="checkbox"/>	Wessex Financial Services	IBMBAW	Interests (Working)	Done	about an hour ago
<input type="checkbox"/>	Coach K Communications	IBMBAW	Interests (Working)	Done	about an hour ago
<input type="checkbox"/>	HealthFirst Patient Services	IBMBAW	Interests (Working)	Done	about an hour ago
<input type="checkbox"/>	Piston Manufacturing	IBMBAW	Interests (Working)	Done	about an hour ago
<input type="checkbox"/>	Covfefe Pharmaceuticals	IBMBAW	Interests (Working)	Done	about an hour ago
<input type="checkbox"/>	Dojo Networks	IBMBAW	Interests (Working)	Done	about an hour ago
<input type="checkbox"/>	Programming Anonymous	IBMBAW	Interests (Working)	Done	about an hour ago
<input type="checkbox"/>	United Third Bank	IBMBAW	Interests (Working)	Done	about an hour ago
<input type="checkbox"/>	Wakeman Aviation Enterprises	IBMBAW	Interests (Working)	Done	about an hour ago

Good job! This concludes the first part the lab. Next, we will turn our attention to workflows.

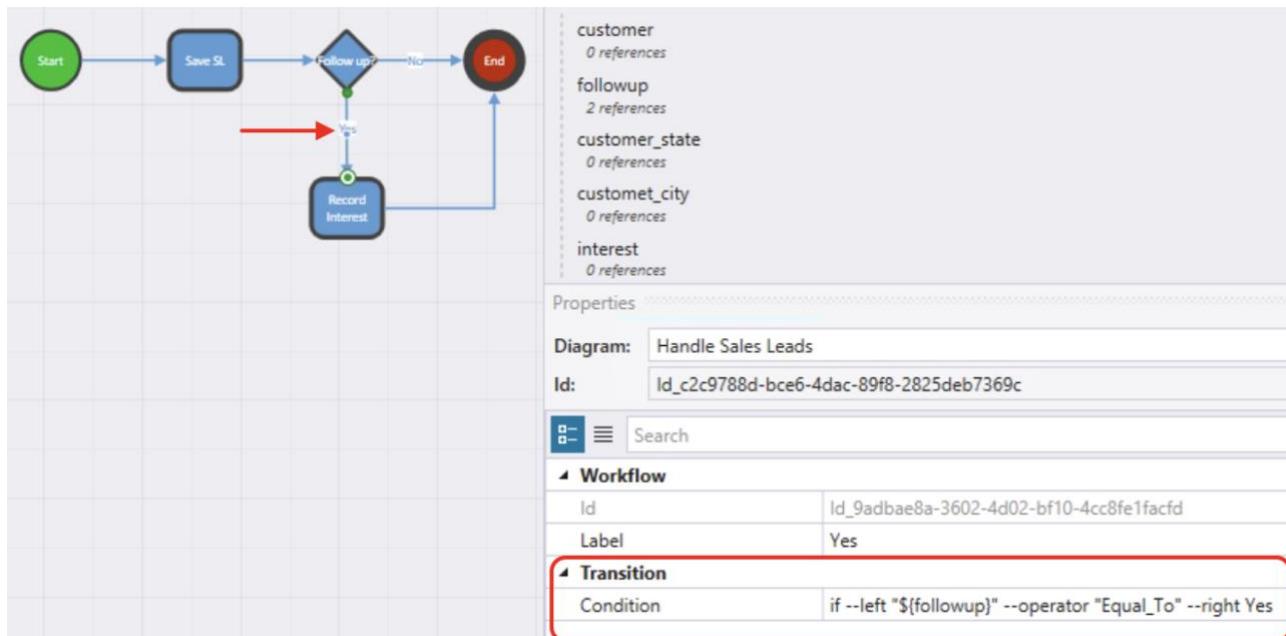
5 Create and execute a workflow

As mentioned in the [Introduction](#), IBM RPA Workflows are quite different from Processes. Workflow is designed and implemented already during development and therefore the implementation itself has total control over the different steps that we decide to use in our workflow.

The basis for a workflow is a BPMN (Business Process Model and Notation, the de facto standard for workflow models) model. The developer creates the model using the IBM RPA Studio and then implements the logic for the workflow tasks using the WAL script assigning the script **Routines** to workflow tasks.



Also notice that you can use WAL (WDG Automation Language) to define the transition conditions for your workflow.



So, a workflow acts as a design document for the automation as well it can control the flow between the tasks. Here, in our exercise we have a simple use case of handling the same sales leads that we did with the process we defined in the previous part of this lab guide. But of course, in real life your workflow design and automation can be as complex as needed.

Right, let's stop explaining and start developing!

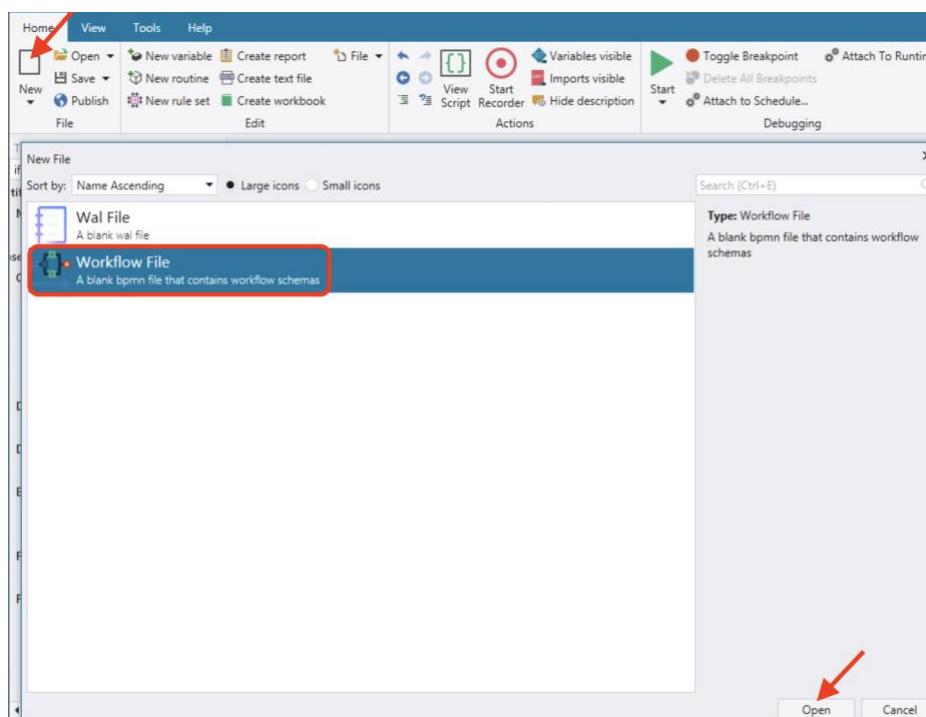
5.1 Create workflow

IBM RPA Studio has integrated workflow editor that allows developers to design workflows for IBM RPA.

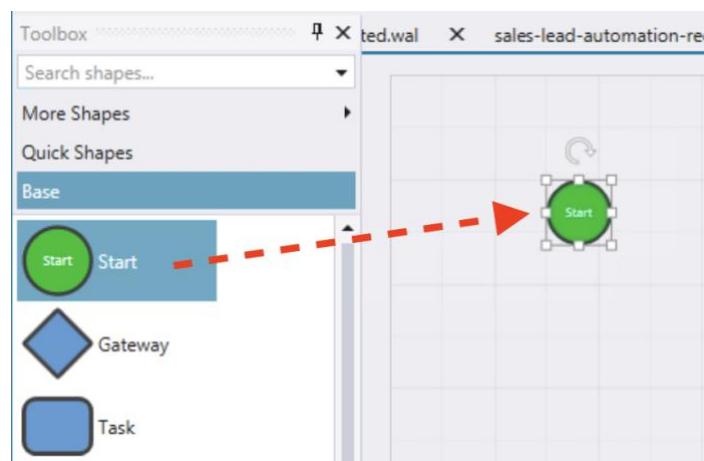
1. If not already open – within your IBM RPA Server virtual desktop – open the IBM RPA Studio by double-clicking the IBM RPA Studio shortcut on your desktop.



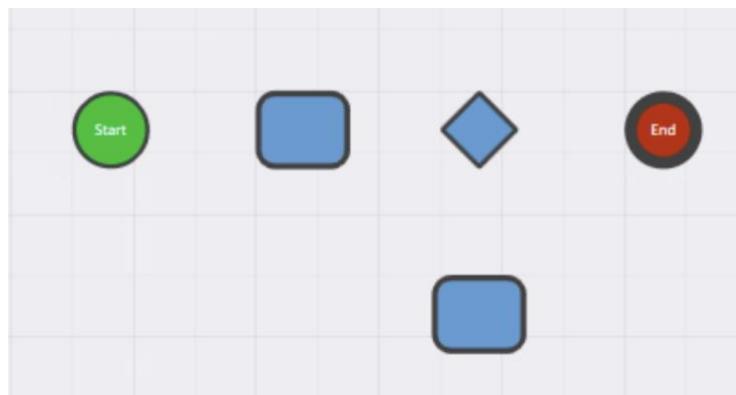
2. Because you already authenticated to open the Launcher application during the previous part of this lab guide, you should not need to login. But if your session has been inactive for a while, you might need to do it. Use the following the login:
 - Username: **rpa@ibmdba.com**
 - Password: **passw0rd**
3. When the Studio opens up, click the **New document icon** from the top toolbar, select **Workflow File** and click **Open** to open the workflow editor.



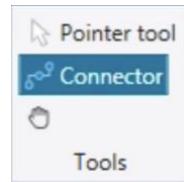
4. Drag and drop a **Start element** to your empty canvas.



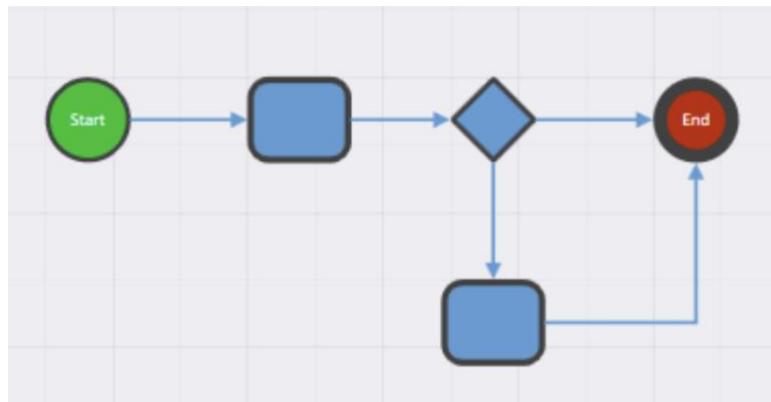
5. Add also **two Task elements, one Gateway** and an **End** to the canvas to have something similar presented in the picture below.



6. Click the Connector form the top toolbar to select the connector tool.

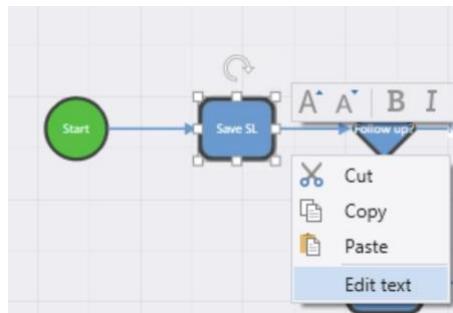


Connect the elements starting from the Start all the way to End to achieve the situation presented below.



When done, **deselect the Connector tool** by selecting the **Pointer tool** just above the Connector in the Tools section of the top toolbar.

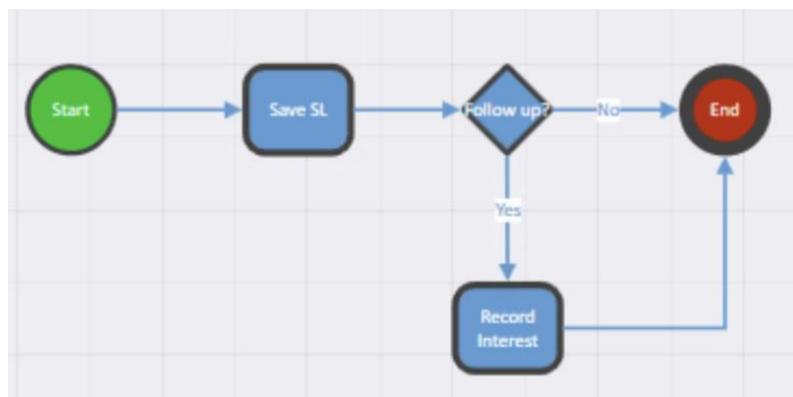
7. Next, we want to name our elements. **Right-click the first Task element**, select **Edit text** and type in “Save SL”.



8. Using the same approach, edit the text for Gateway to show “Follow up?” and the Task below the Gateway to “Record Interest”.

Also set the text for the connectors coming out from the Gateway: “Yes” to connector between the Gateway and Record Interest and “No” to connector leading to End.

The idea here is to proceed to Record Interest task only if follow up was requested for the sales lead we’re processing.



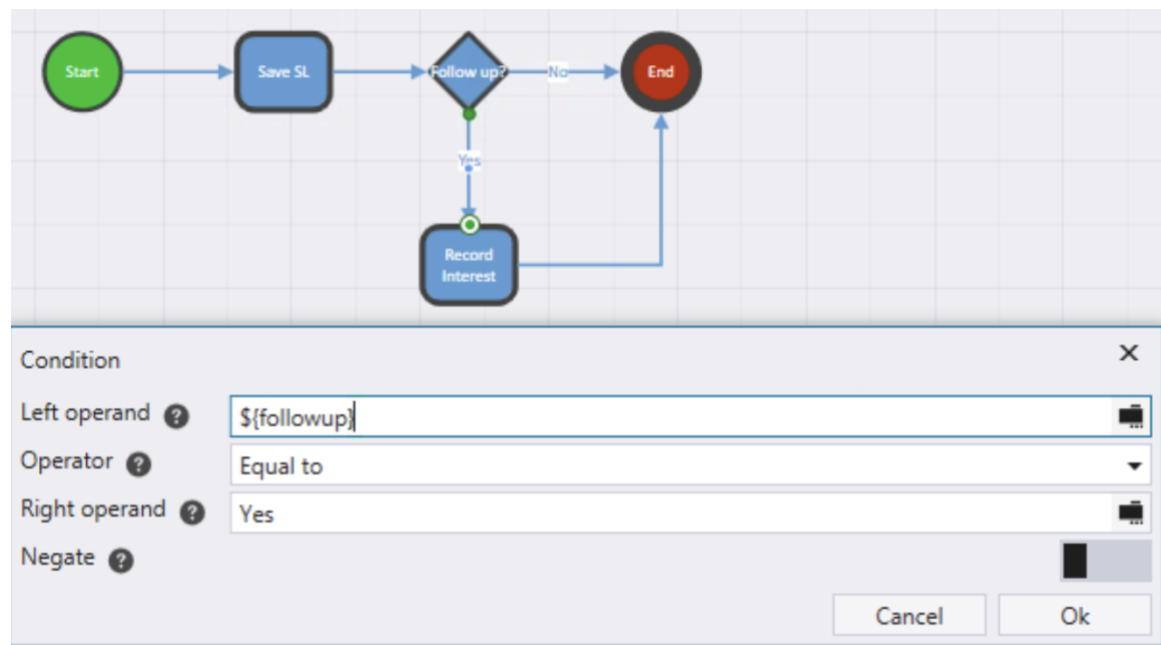
9. In order to set the transition conditions for the different branches, we need to create variables. Variables created here in the workflow design, will also be automatically available for the workflow context when we define the workflow uploading the definition to our IBM RPA tenant using the RPA Portal. These variables will also be mapped with the WAL script variables to enable tracking for the workflow.



Click **New variable icon** variable on the top toolbar and create variables:

- **customer** (String)
- **customer_state** (String)
- **customer_city** (String)
- **followup** (String)
- **interest** (String)

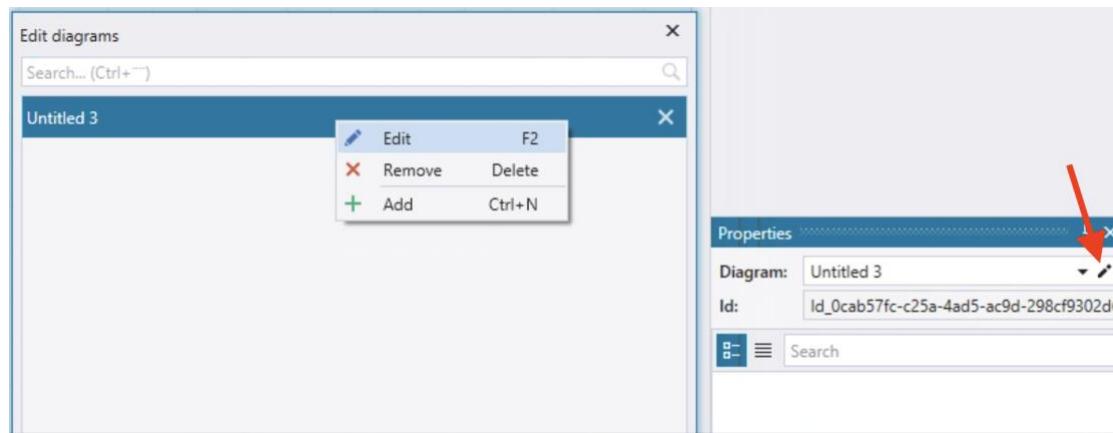
10. Now we can set the conditions for our two connectors emerging from the Gateway element. Right-click the connector named “Yes” (leading to Record Interest), select **Edit Condition** and set the condition as shown below. Click **Ok** to save the condition.



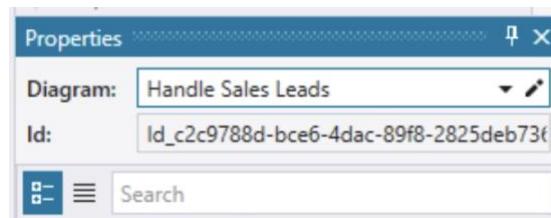
11. Similarly, set the condition for the “No” connector, just use “No” as the Right operand.

Condition	
Left operand	<code> \${followup}</code>
Operator	Equal to
Right operand	No
Negate	<input type="checkbox"/>
Cancel Ok	

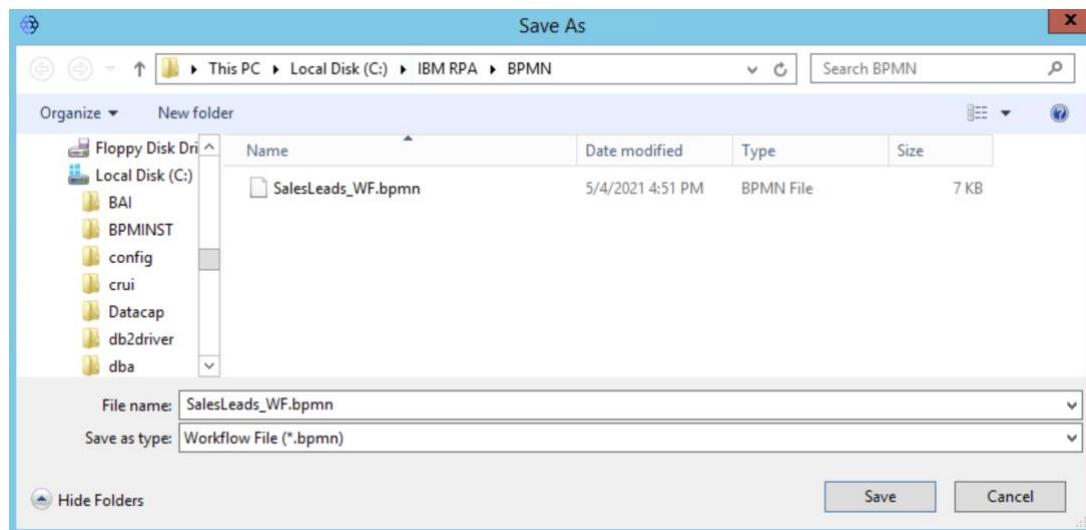
12. We still want to name our new workflow diagram. Click the pen icon from the Properties section and the Edit diagrams window will open. Right-click your Untitled diagram and select Edit.



13. Name your diagram “Handle Sales Leads” and click Save to close the Edit diagrams window. You should now see the name of the diagram in the Properties section.



14. Finally, save your workflow design by clicking Save from the top toolbar. Save it to folder C:\IBM RPA\BPMN and name it SalesLeads_WF.bpmn.



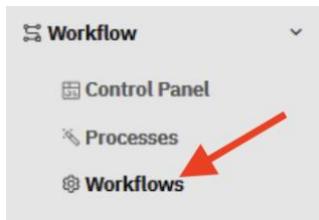
5.2 Upload workflow to IBM RPA tenant

Before we start using a workflow definition with automation scripts, we need to create a workflow definition also to our IBM RPA tenant and upload the BPMN-file that we just defined.

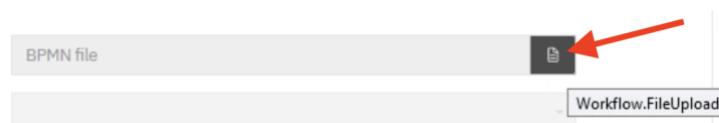
1. Open the RPA Portal within the IBM RPA Server virtual desktop, if not already open.

- Within the virtual desktop, open Mozilla Firefox web browser from the task bar  and use the bookmarks toolbar to open **RPA → IBM Robotic Process Automation**.
- This opens the login screen for your IBM RPA Server's RPA Portal. Use the username **rpa@ibmdba.com** to login.
- Since we only have one tenant (THINK2021) defined to our IBM RPA Server, we cannot select the tenant. Use **passw0rd** as your password and click **Login**.

2. Expand the Workflow menu and **select Workflows**.



3. From the right-hand side, click **New Workflow**-button .
4. This will open New Workflow configuration. Click the file upload icon at the end of the Workflow definition file -field and select the BPMN-file that we just created (**C:\IBM RPA\BPMN\SalesLeads_WF.bpmn**).



5. Select **Handle Sales Leads** for the Process using the pull-down menu (the only available process that we have in our BPMN-file), name the workflow **SalesLeadsWF**, enable Production Version and click **Next** to proceed.

Workflow definition file:	SalesLeads_WF.bpmn
Process:	Handle Sales Leads - Id_c2c9788d-bce6-4dac-89f8-2825deb7369c*
Name:②	SalesLeadsWF
Production Version:	Yes

6. Similarly, we set the SLA Configuration for Process, we can do it also for Workflow. Set the values to your liking, for example as presented below. Click **Save**.

What is the desired time interval for an instance to wait to start being processed? What is the minimal acceptable percentage of instances that is required to meet this target?

Target Waiting Time: 00:00:45

Waiting Time Required Service Level: 75%

What is the desired time interval for an instance to finish the whole process after starting? What is the minimal acceptable percentage of instances that is required to meet this target?

Target Handling Time: 00:00:45

Handling Time Required Service Level: 75%

What is desired time interval, including waiting time, for an instance to finish the whole process? What is the minimal acceptable percentage of instances that is required to meet this target?

Target Processing Time: 00:01:15

Processing Time Required Service Level: 80%

Previous → **Save** **Finish**

7. The next step in the configuration would be localization of the names we use in the workflow, but we can skip it. **Scroll to bottom and click Next.**
8. Since we defined the variables already to our workflow file, they appear now automatically. Expand the customer variable, set Business Key to **Yes** and then click **Finish**.

> customer_city ✓

▼ customer ✓

These variables can be mapped to script variables in order to have their value stored.

Variable Name: customer

Type: Text

Variable Scope: Workflow

Is this variable a business key? Check this if you want this variable as an identifier. You can have only one business key at a time. If you opt not to choose any variable as a business key the internal ID will be shown as the identification in the Workflow Instances History

Business Key: Yes

> customer_state ✓

Previous **Next** **Finish**

Nice job! You have now uploaded your BPMN-file to RPA your tenant and created a workflow definition that you can use from automation scripts.

5.3 Create WAL script

Now that we have the workflow defined, we can turn our attention to the automation script that will be used to implement and run the workflow.

To save some time, we will provide a ready-made script for you to use, but you need to edit the script a bit to make it work together with the workflow.

1. In IBM RPA Studio, open WAL script named **sales-lead-workflow-START.wal** from C:\IBM RPA\WAL.



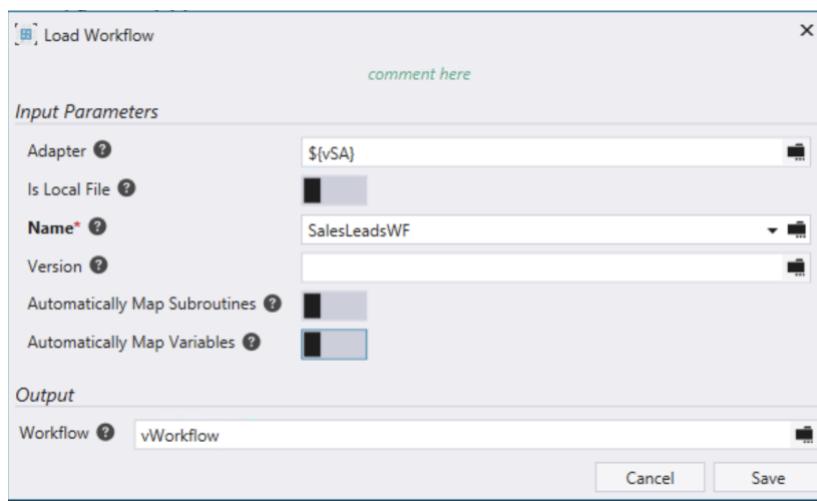
Let's examine the script commands:

- **Create Storage Adapter:** we need to create connection to the data associated with workflow instances. This can be “Server” (our IBM RPA tenant) or a local database. We use the “Server” option.
- **Load Workflow:** this is used to load a workflow that we then use to create a workflow instance for all the sales leads we want to process.
- **Map Workflow Activities:** this command is used to map the tasks we defined to our workflow design to routines of our automation script.
- **Bind Process Variables:** this command we used also for our process implementation and can be also used for workflow implementations. It binds the variables defined in the workflow to the variables that we use in the automation script.
- **Read CVS File:** reads the sales leads from the CSV-file.
- **While / End While:** looping through the sales lead data to handle all the individual sales leads.

- **Map Table Row:** mapping of sales lead data to automation script variables.
- **Create Workflow Instance:** this creates a workflow instance based on earlier loaded workflow definition. The workflow is created for each sales lead that we process in the while loop.
- **Execute Workflow Instance:** handing the control over to process flow control engine to handle the sales lead as defined with the workflow design.

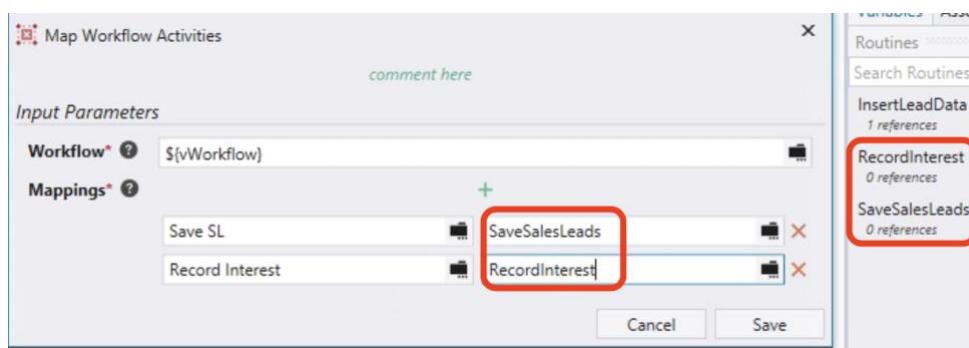
Most of the commands are already preconfigured, but we need to configure some of them to show you how the needed mappings are done.

2. Double-click the **Load Workflow** command. You need to make sure that the Name of the workflow is the same that you defined to the tenant when you uploaded the BPMN-file. If you defined the name as it was instructed, the correct one should be already selected. If needed, change the value.



Notice that if we would use exactly the same names for our workflow defined tasks and for the automation script Subroutines – also for variables – we could just enable mapping them automatically and avoid setting the next two commands. Click **Save** to close the configuration.

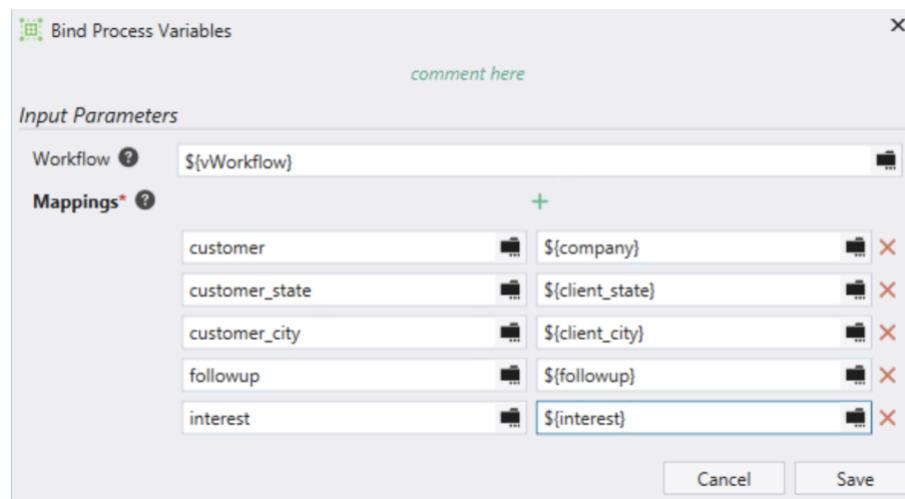
3. Open the configuration for **Map Workflow Activities** command. This is where you map your workflow tasks / activities to the subroutines of your automation script. Notice that we have already the subroutines for you to use. The first column in the mappings is for the workflow task name and the second for the subroutine name that we want to use. See the picture below for the correct configuration.



Click **Save** to close the configuration.

- Open the configuration for **Bind Process Variables** command. This is the same command that we used for binding the variables for process context, but when we define a workflow, as we do, this applies also to workflow variables. See the picture below to the correct configuration.

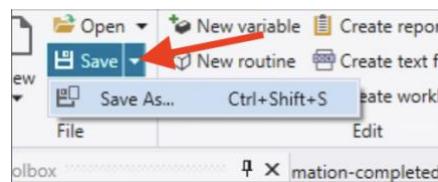
Yet again, the first column is for the variable names that we defined to our workflow and the second one for the variables we use here in the automation script.



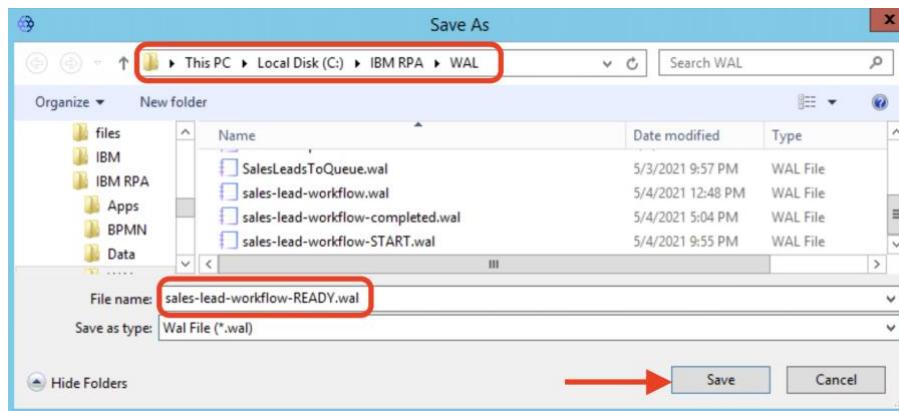
Hint: use the variable selector tool to select the matching automation script variables.

Click **Save** to close the configuration.

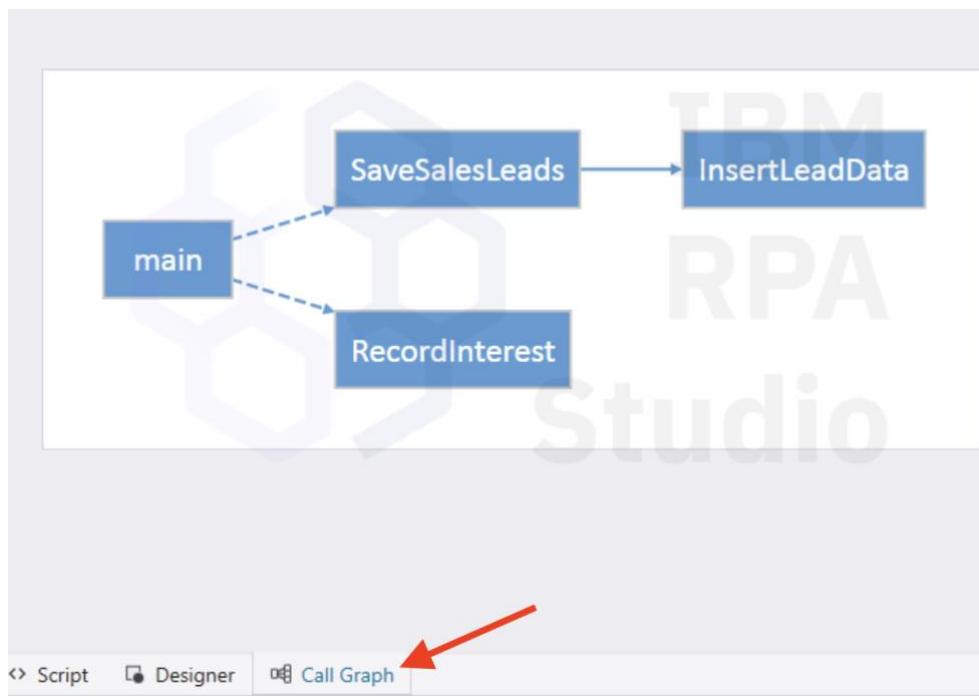
- All the other commands are preconfigured. Click the **dropdown icon** besides the Save in the top toolbar and select **Save As....**



- Make sure to save to **C:\IBM RPA\WAL**-folder and name your **script sales-lead-workflow-READY.wal**.



7. Switch to **Call Graph** view to the structure of your script. You should be seeing this:



OK. Now we have our automation script ready to run the workflow!

5.4 Run the automation using the workflow

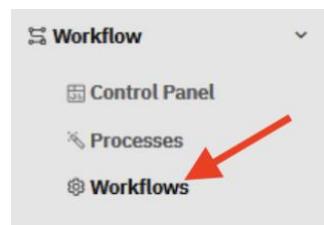
The automation script we just prepared can be run as a normal automation script. This means that we can use scheduling or Web API to trigger it. We could also be using it as part of the process – to combine the flexibility of workflows to administrative advantages of processes. We can also test and run the script directly within the IBM RPA Studio.

1. Move back to **Designer** view. Click the **Start** icon on the top toolbar to start the automation.
2. Sit back and see the bot executing. [You should see the sales leads being stored to the web system one by one, and those that have Follow up enabled, also used to record the interest using the](#)

[Interest Tracking Windows application](#). When all the sales leads are processed – all 12 of them – the Studio exits from the debugging view back to development view.

As we can see, this use case is certainly not the best example to run using the workflow capability, but this was merely for the sake of a simple demonstration.

3. If not already open, login and open your IBM RPA tenant RPA Portal. Expand the Workflow menu and select Workflows.



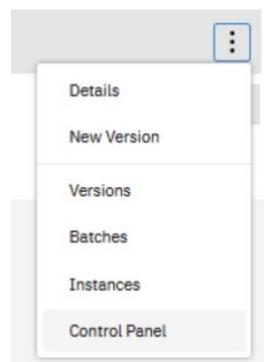
4. Click the name of the workflow we just used, **SalesLeadsWF**. This will open the instance data for the individual workflow we just executed.

Workflow Instances

Workflows / Instances

SalesLeadsWF - Instances					Time Window:	15 minutes
		All Statuses	All Versions			
		Show	10	entries	Search:	
Instance name	Instance Status	Modification date	Current Node	Next Node		
Wessex Financial Services	Done	15 minutes ago	No		⋮	
HealthFirst Patient Services	Done	16 minutes ago	Id_e4cec17b-5eca-47ac-8b7d-a95b459e0a73		⋮	
Coach K Communications	Done	16 minutes ago	Id_e4cec17b-5eca-47ac-8b7d-a95b459e0a73		⋮	
Programming Anonymous	Done	16 minutes ago	No		⋮	

5. Go back to Workflow list and click the ellipsis menu for the SalesLeadsWF. This allows you to navigate to different other views as well.



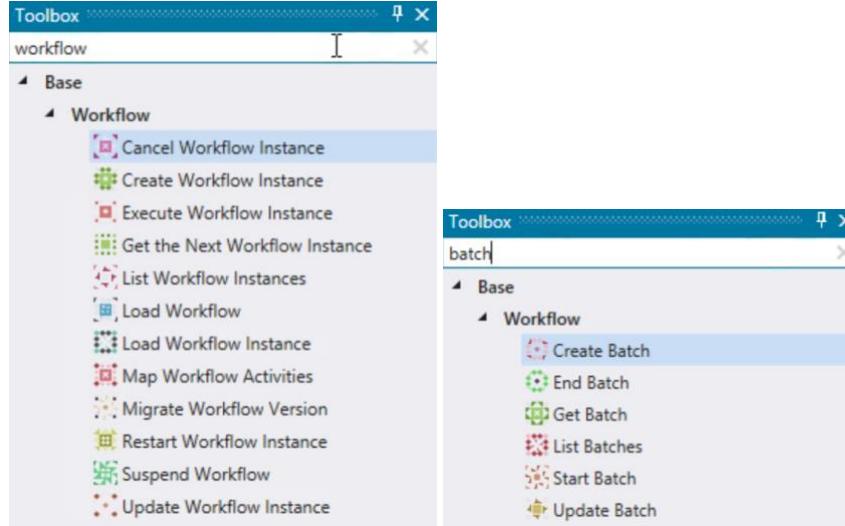
Click **Control Panel** to see the control panel view to the workflow.



Feel free to explore the instance data in more detail if you want.

5.4.1 About Workflow capabilities

One thing to mention before we move forward is to mention that there are much more capabilities to use with workflows. If you open your IBM RPA Studio and search commands from the command toolbox with “workflow” and “batch”, you’ll see what we’re talking about.



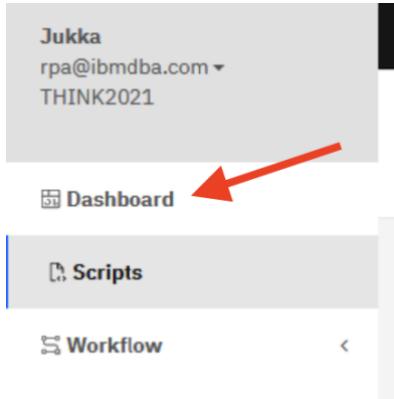
Developers can use all of these commands to create and run batches, suspend and restart workflows using the automation script logic. So, it's fair to say that there's a plenty of new lab topics for IBM RPA Workflows 😊

But for now, that's it for the Workflows. Hope you learned something new! Next, dashboards.

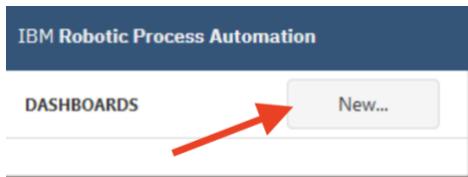
6 Creating dashboards

One of the benefits on using processes and workflows is their ability to bind business variables to their execution context. The variable data is stored to your RPA Server by default, and you can use the data to build your own dashboards with the RPA Portal. Let's briefly look how this works.

1. Open the RPA Portal within the IBM RPA Server virtual desktop, if not already open.
 - Within the virtual desktop, open Mozilla Firefox web browser from the task bar  and use the bookmarks toolbar to open **RPA → IBM Robotic Process Automation**.
 - This opens the login screen for your IBM RPA Server's RPA Portal. Use the username **rpa@ibmdba.com** to login.
 - Since we only have one tenant (THINK2021) defined to our IBM RPA Server, we cannot select the tenant. Use **passw0rd** as your password and click **Login**.
2. Click **Dashboard** from the left-hand side menu bar. This will open the dashboard view to new browser tab.

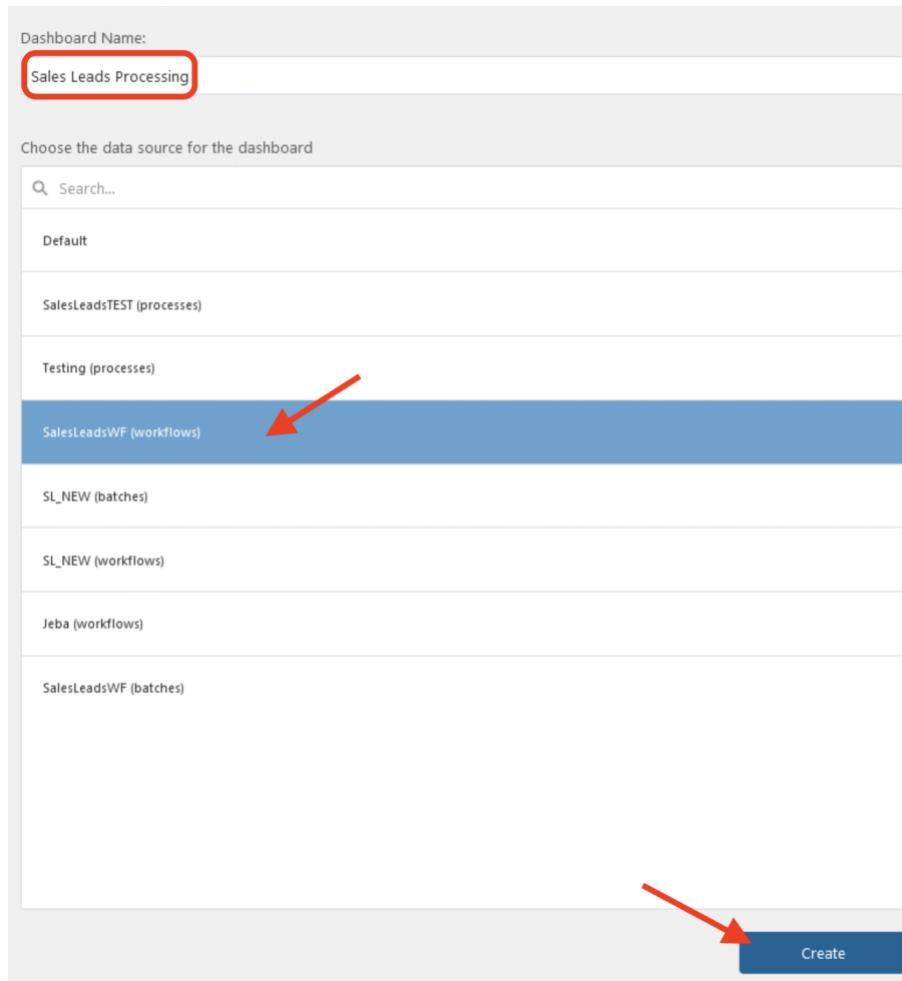


3. By default, the view is empty. IBM RPA has some out-of-the-box dashboards as well, but they have not been installed to the lab environment. OK, let's create one. Click **New**.

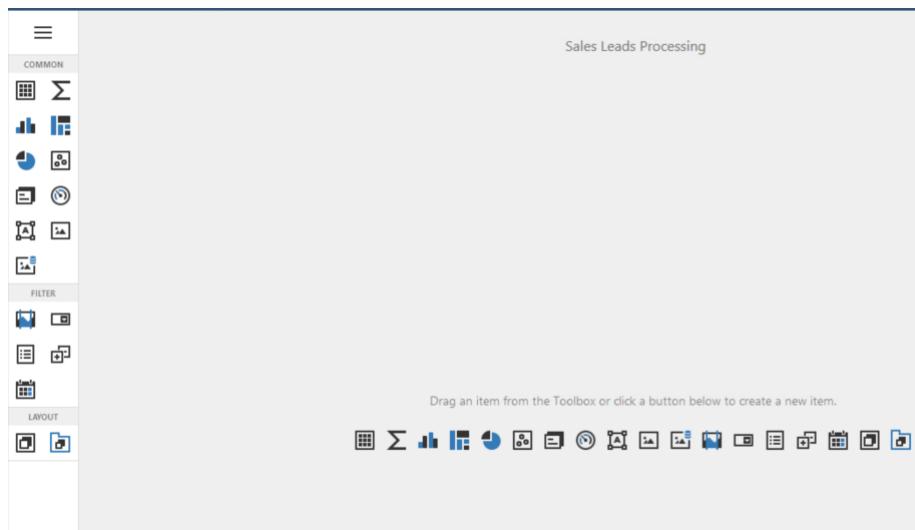


4. You can now name your dashboard and select the data source for it. Name it **Sales Leads Processing**, select **SalesLeadsWF (workflows)** as your data source and click **Create**.

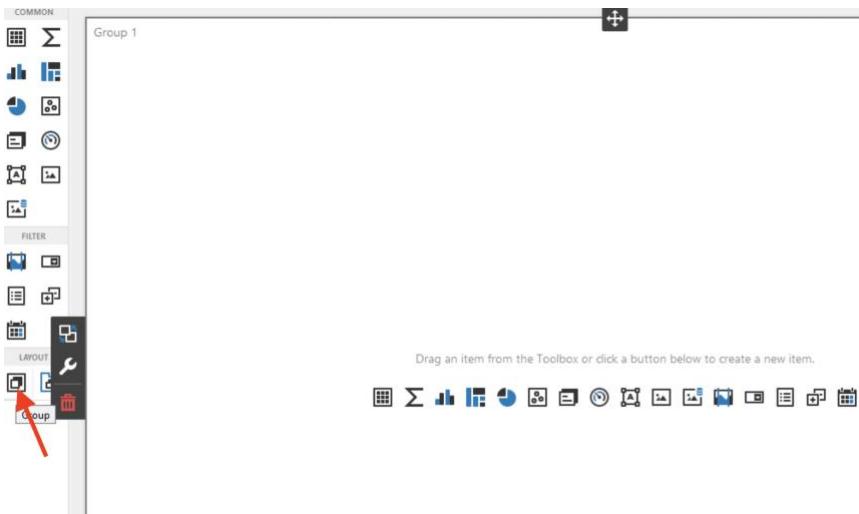
Note that you do not have all the options for data source that are presented in the picture below. The picture is from a test environment and therefore has more data sources available.



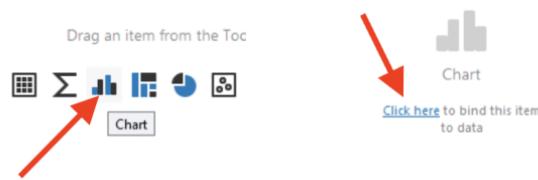
5. You now see the embedded dashboard editor view. There are a lot of different type of controls available, but for this lab, we're just using the basic ones.



6. Click **Group** icon under the layout section from the left-hand side menu area. This will create a group that acts as a container for your dashboard items.



7. Next, click **Chart** icon from the opened group canvas. This will add a chart item to the group. Click the “Click here” link to define the data binding for the chart. This will open the Binding configuration.



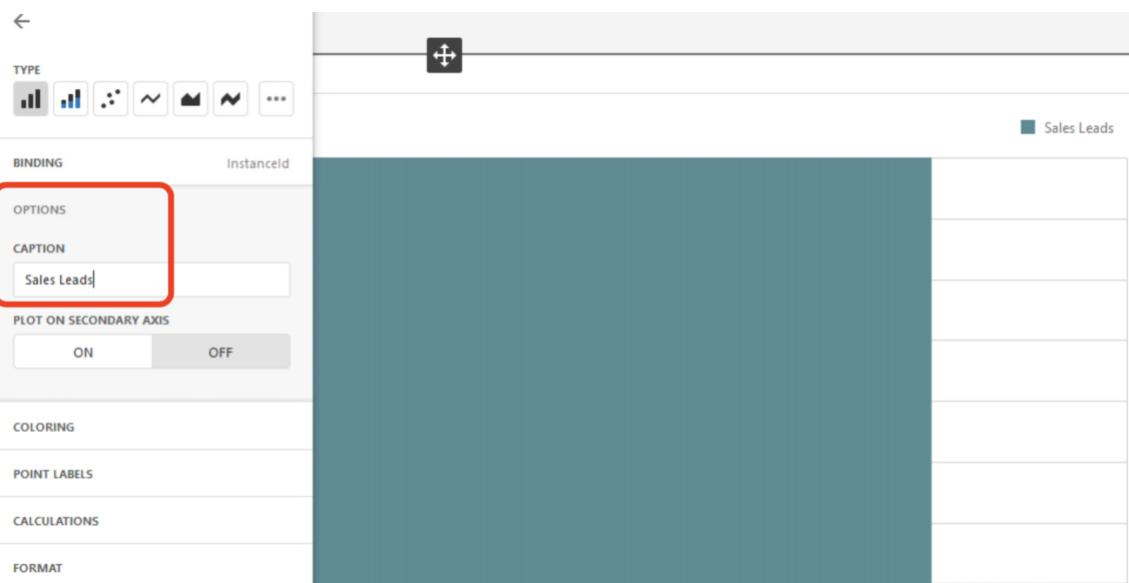
8. Select Configure Values, expand SalesLeadsWF and click on Instance Id.

Binding Type	Value	Level
- SalesLeadsWF	customer	ab
	customer_city	ab
	customer_state	ab
	followup	ab
	Instance Id	F
	interest	ab
+ Workflow Instances		
+ Workflows		

Select also **Count Distinct** as the summary type.



9. This will automatically select the count for all the distinct processed sales leads, and you should see the chart updating automatically. As you can see, there are several configuration options. Open the OPTIONS and set the caption to Sales Leads. Feel free to browse through the other configurations for the binding.

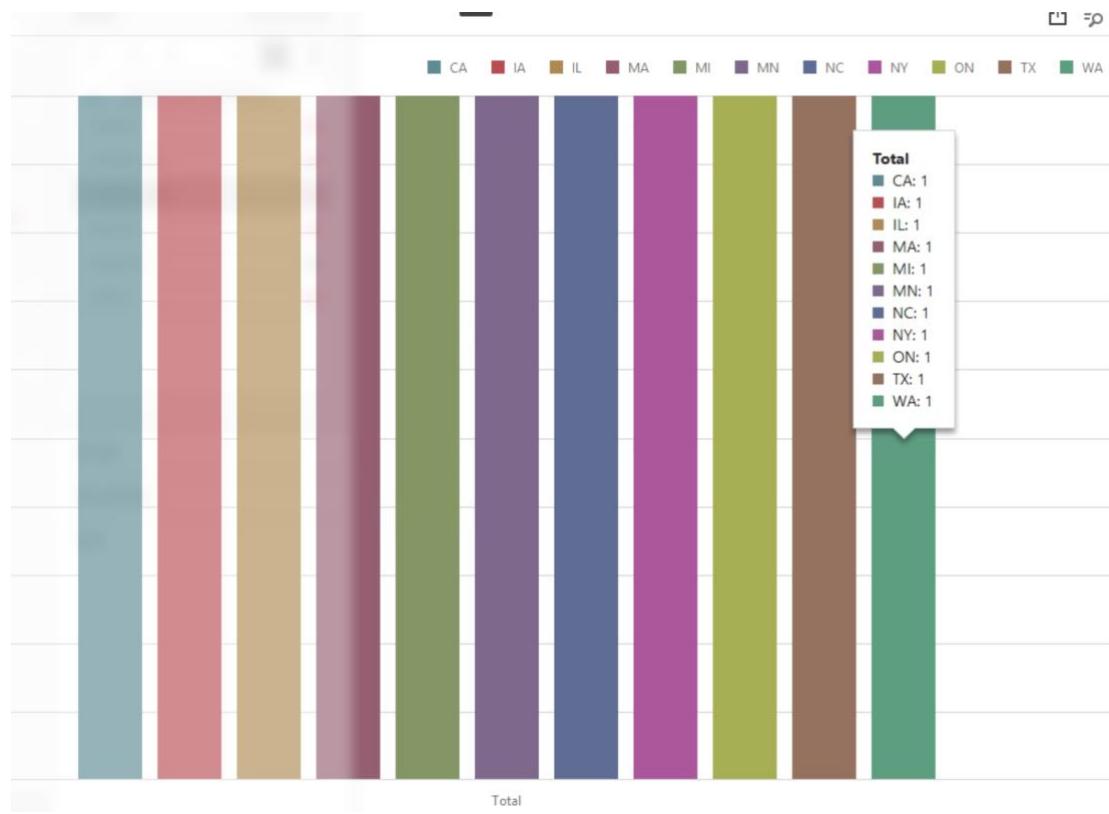


10. Next, click **Add Series** (changes to Configure Series). We want to see how the instances are distributed by customer state.

Click the list icon if the data categories are not shown, expand again **SalesLeadsWF (workflows)** and then click **customer_state**.

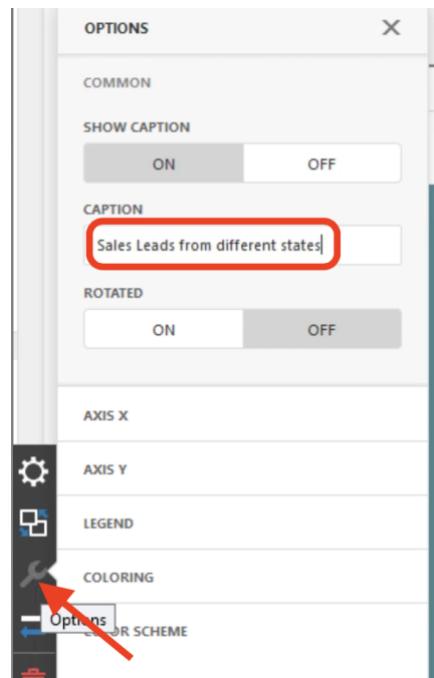
Category	Series	Label
customer	customer	ab
	customer_city	ab
	customer_state	ab
	followup	ab
	Instance Id	F
	interest	ab

11. This will automatically change the chart to show the sales lead numbers per customer state information.

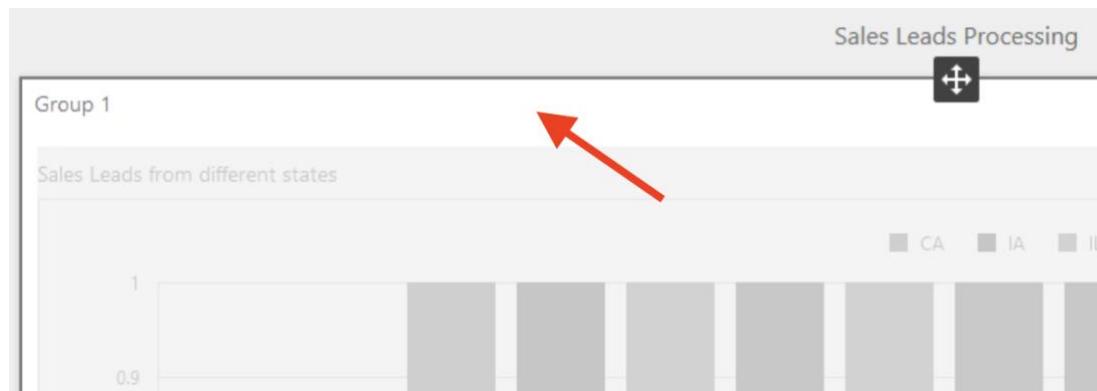


As we can see, our test material was quite dull, one lead per state 😊

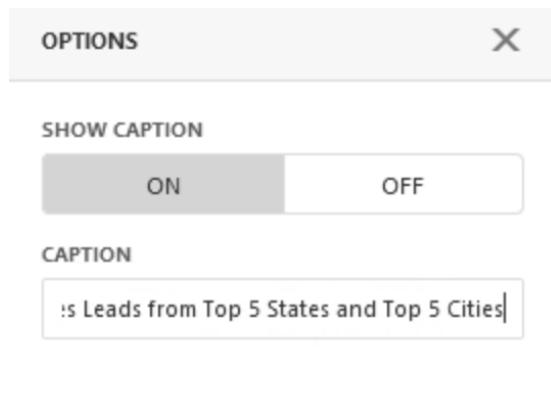
12. Click Options (the wrench icon) and set the chart caption to **Sales Leads from different states**.



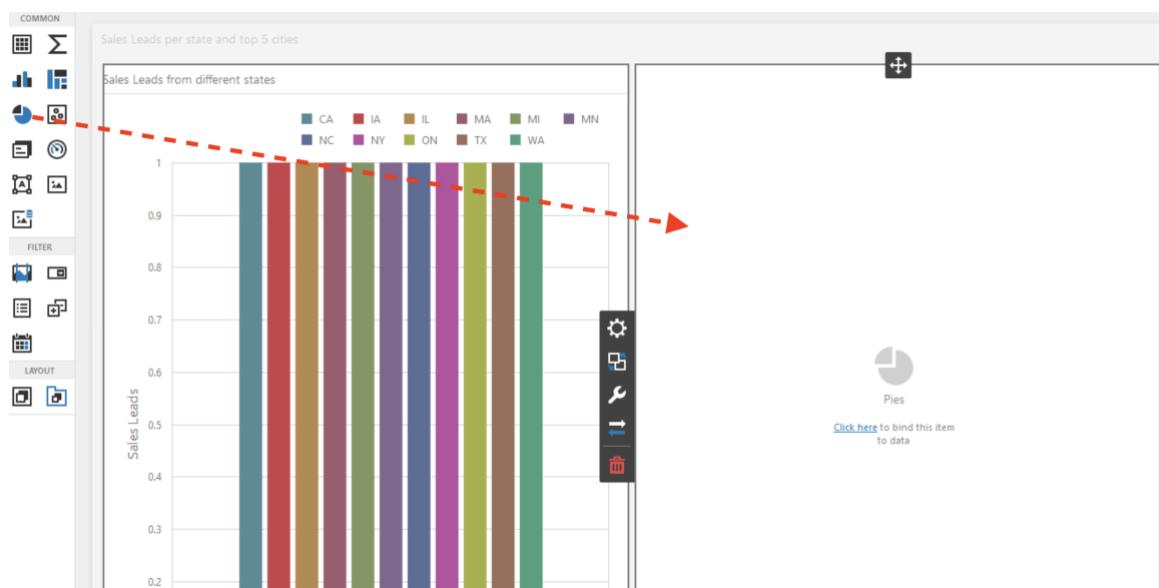
13. Click the group background to select the Group 1 container.



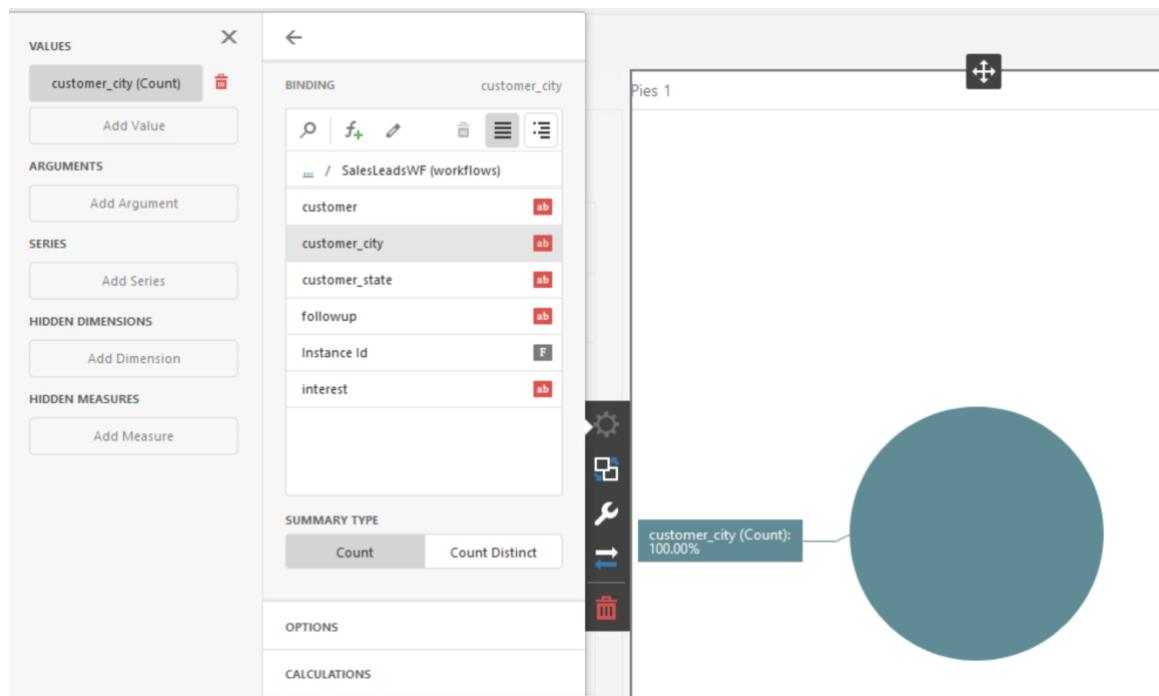
14. Click “the wrench icon” to open the options for the group and set its caption to **Sales Leads from Top 5 states and Top 5 cities**.



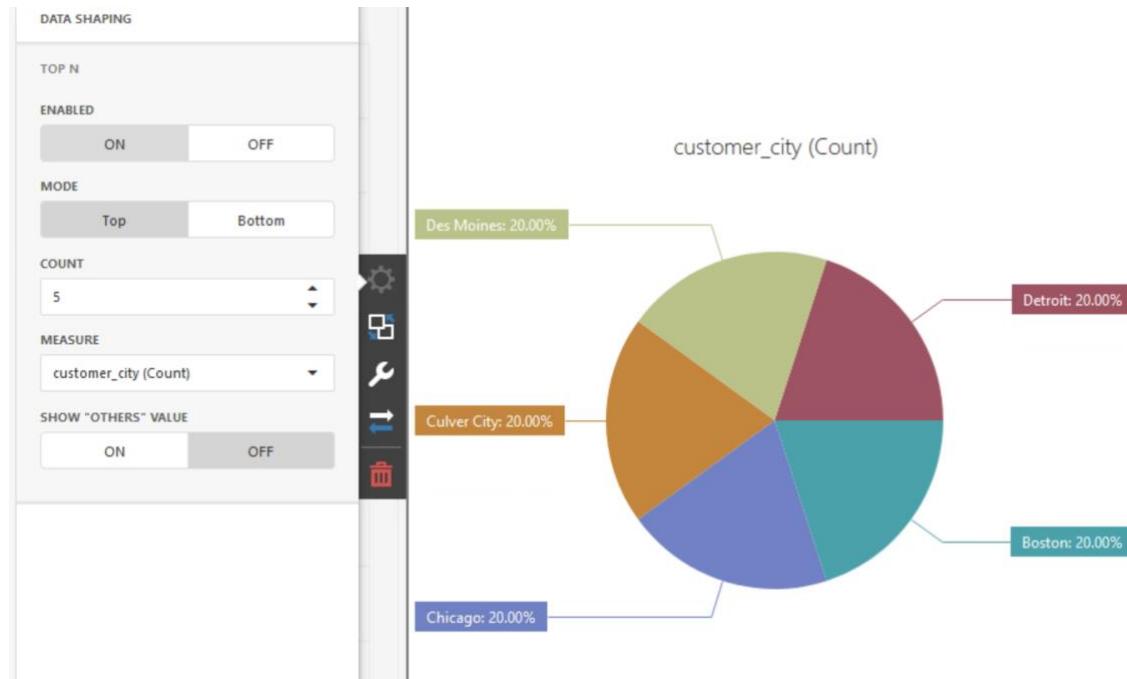
15. When group still selected, drag and drop a **Pie Chart** from the left-hand side menu bar to the right of the states chart we just configured.



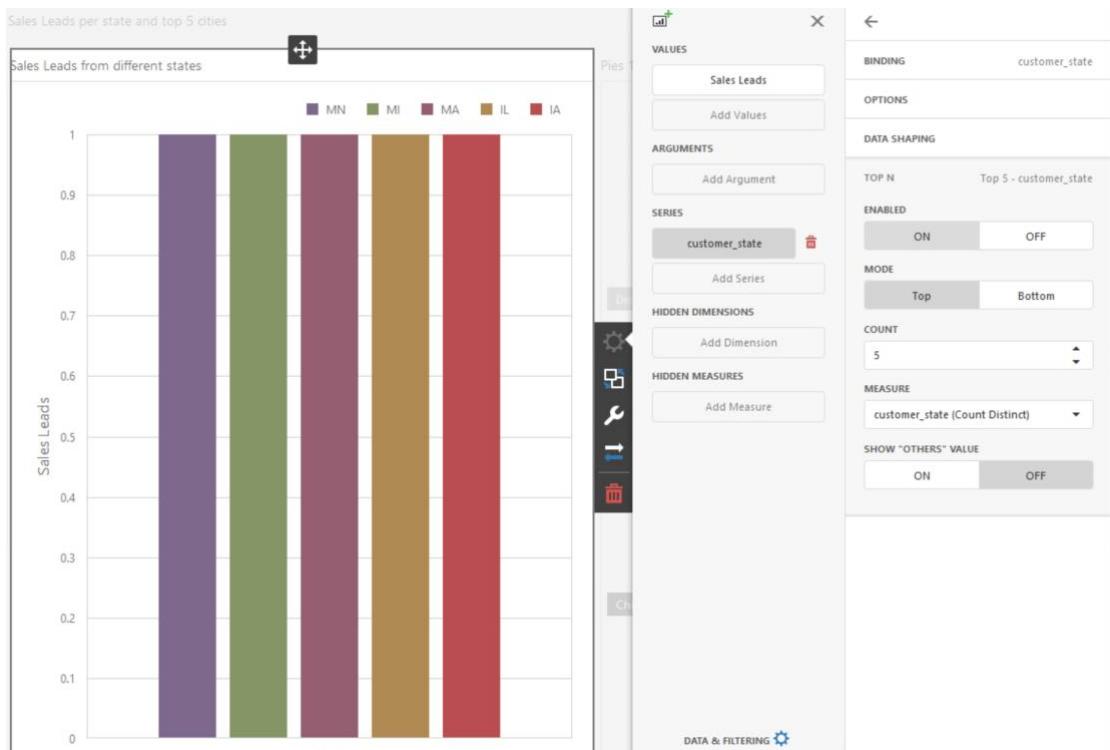
16. Open the data binding and click **Add Value**, select **customer_city** under SalesLeadsWF (workflows).



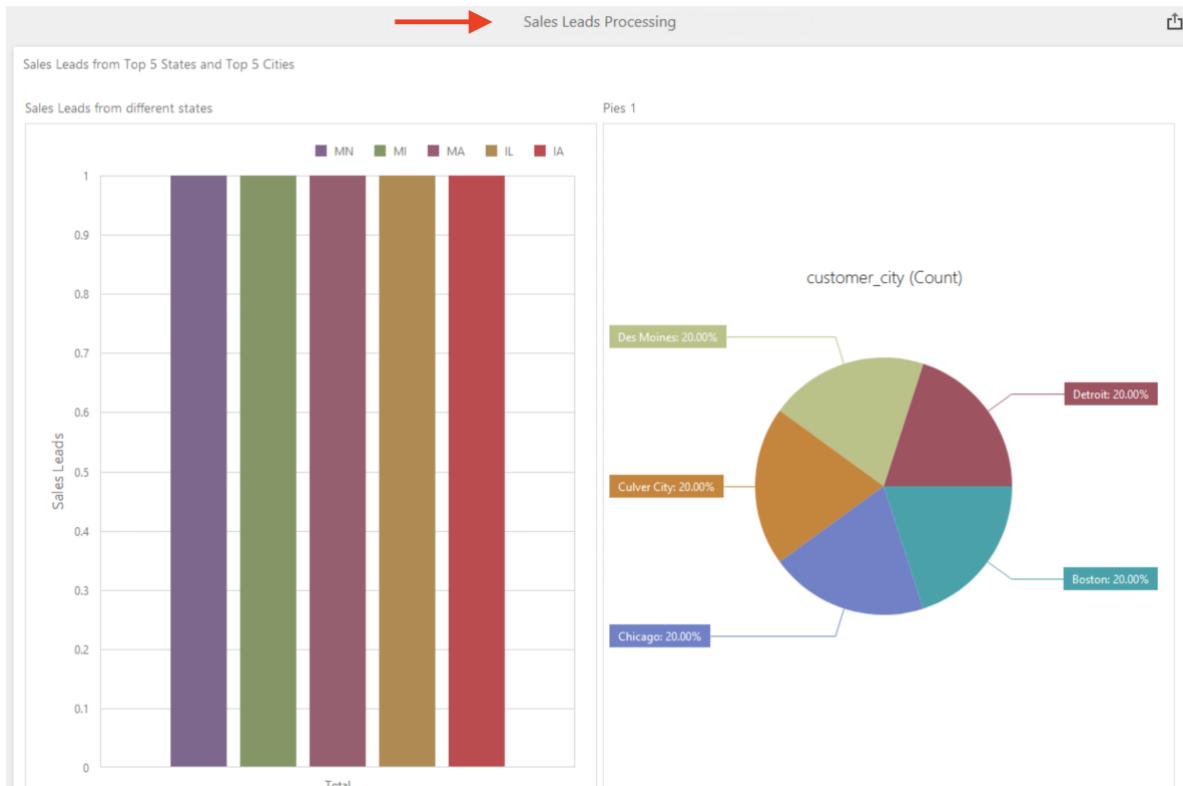
17. Next, select **Add Argument**, select **customer_city**, open **TOP N** at the bottom of the configuration options and set Enabled **ON**. You should something similar than presented below.



18. Go ahead and enable Top 5 for the series data (customer_state) of the bar chart also.

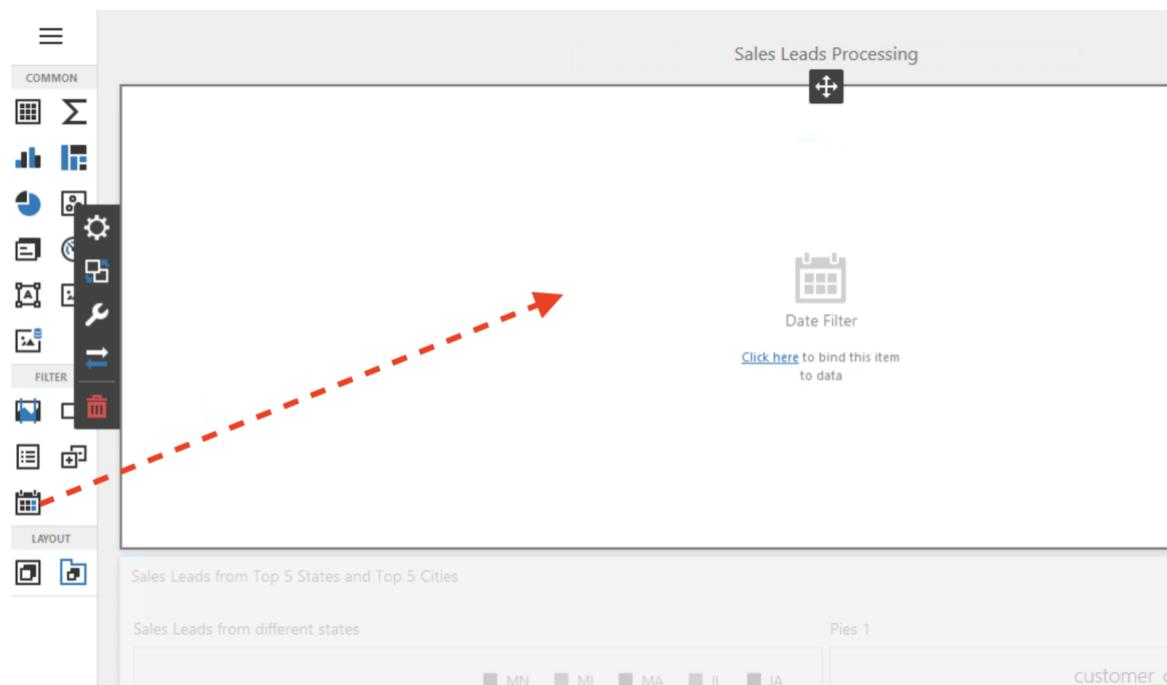


19. Click the grey area besides your dashboard header Sales Leads Processing to see what you now have. You should see something similar than the picture below.



20. Needless to say, you could set the legends and headers for the pie chart also, but let's move to our last task and add a filter to our dashboard.

Drag and drop a **Date Filter** above your group with the bar and pie chart.



21. Open the data binding, select **Dimension** and **Workflow Instance Completion Date** under **Workflow Instances category**. Also set GROUP INTERVAL to **Date-Hour**.

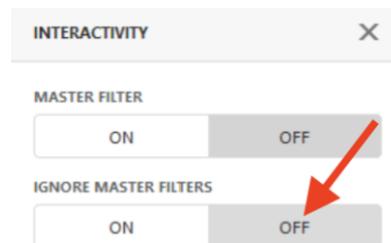


22. In order to make use of the filter with your charts, you still need to set Interactivity options for your group that holds the charts.

Click the **white space besides** your “Sales Leads from Top 5 States and Top 5 Cities” group caption to select the group and then click the **Interactivity icon** on the side menu.



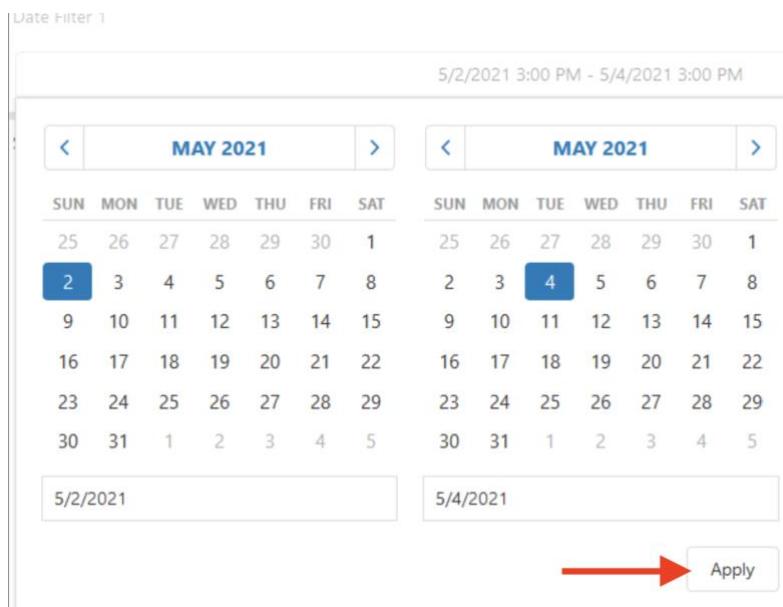
Make sure that IGNORE MASTER FILTERS is turned **OFF!**



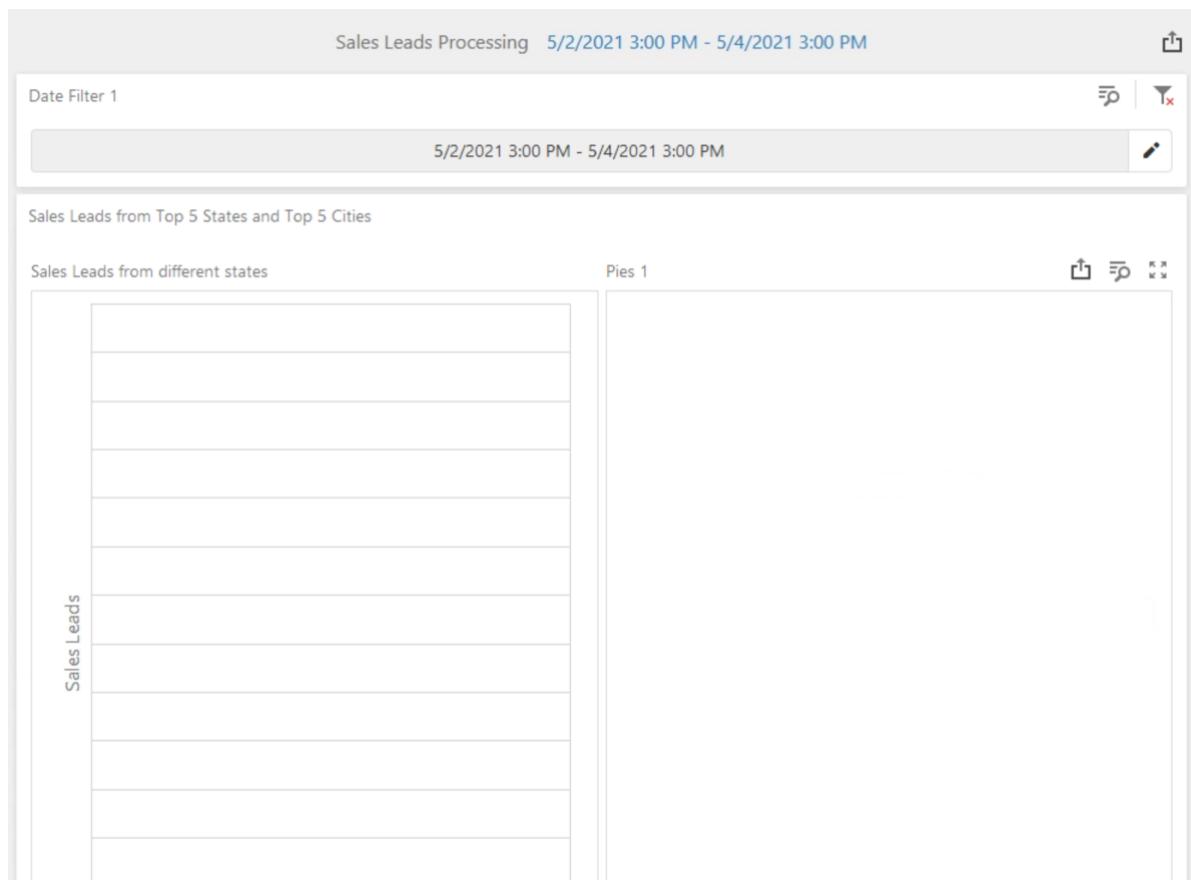
23. Good, that's enough configuration. Let us test the dashboard. Click **Switch to Viewer** on top right of the page and when asked, click **Save** to save your dashboard.



24. Click the Date Filter and **set the date range couple of days back** (there should not be any data before today) and click **Apply**.



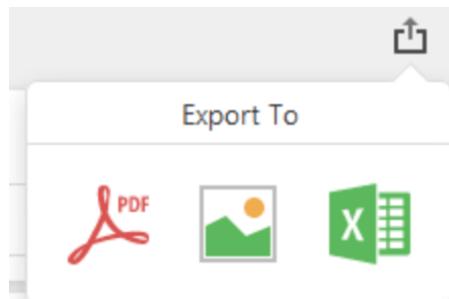
25. And as you can see, your dashboard does not display any data, because before today there is no data to show. Also notice that the data range also is shown at the top besides your dashboard name, showing the active filter range.



26. You can deactivate the filter by clicking the icon on top right of the Date Filter section.

27. Finally, notice the export icons  on the dashboard. There's one for the hole dashboard, but if you hover over the individual elements (groups / charts), you can reveal the controls also for them.

The data from the dashboard can be exported as PDF, picture or as Excel file.



Nicely done! This concludes the dashboard section of the lab. As you saw, there's a lot of configuration options and settings that we did not touch during the lab and the embedded dashboard editor is really rich on different options. This was just to show you the basics and how easy it is to create business dashboards in IBM RPA. Feel free to investigate more on your own 😊

THANKS FOR PARTICIPATING!

