RPA Robotic Process Automation

Notes:

Global Exceptional Handler ~> The job of RPA Developers becomes easier by using this feature, since the handler only needs to be defined once per each automation project and, unlike the Try Catch blocks, does not need to be attached to each activity. It will execute every time an activity fails to execute.

Repo Browser ~> It allows you to browse through, open, and save shared automation projects stored in TFS and SVN repositories.

WebHook ~> Regardless of how complex the app network that was integrated with Orchestrator is, information can be sent to a variety of tools such as dynamic case management, business process management or even customer relationship management programs.

Development Robot Decoupling feature ~> a “floating” robot can be used between multiple machines by the Administrators in a Development environment without having to associate it with a certain machine. In addition, Standard Attended robots can also be converted to “floating” robots. and only Administrators can access this robot.

Activities Descriptions

VB - > Visual Basic

To create a variable click on activity dialog box and then create

Single activity can have multiple input boxes

Message box is used to print some output to screen, generally used to print the variabes

Open Browser-> To open a browser by program

Get visible Text -> used to indicate which text to work on and in output section select the variable name to store the data

Write Line-> used to write lines

Open Application -> used to open an application

Type Into -> used to write something inside the application

To generate new random values we can use the function new Random().Next(range)

To close any application, we can use the close application activity.

To get the path of the Desktop, use Environment.GetFolderPath(Environment.SpecialFolder.Desktop)

For filter with Gmail Smtp we can apply something like SUBJECT one-keyword-for-subject

Properties

Present on right hand side tab

used to define what our activity will do

Input

Title -> defines a message as for what the input is made for

Label -> used to define the question the user will be prompted with

Result -> the variable to store the input to

Variables

In UIPATH variables can store different types of data like

Numbers

Text

Images

Files

Colors

Data Types for variables are:

Integer

String (between " ")

Boolean (True or False)

Generic (All of the above)

Array of (A list of any type)

Default column in variable is used to set some default value for any variable

Scope is the region or field inside which a variable will be visible and can be used

WorkFlows

There are 3 types of workflows in UIPATH:

Sequence ~> If our process is linear and involves execution of several consecutive actions,its best

Flowchart ~> If our process involves complex connections between activities , then flowcharts are more convenient

State Machine->

Assign

It is used to assign some value to a variable

something like x=7 with x as variable

Control Flow

It is the process of defining the rules and the automatic decisions that will be taken during the execution of workflow,through the use of if/else decisions,loops,and so on.

Operators

% is represent by mod

!= is represent by <>

== is represent by =

** is represented by ^

// is represented by \

Binaray left shift operator is represented as <<

Binaray right shift operator is represented as >>

FlowChart

To check some in condition inside a flow chart we use Flow Decision

Sequence

It uses If activity for checking coditions

It consists of 3 columns

Condition ~> check the True or False condition

Then ~> it does the work if a specific condition is set True

Else ~> this block is run when the condition is found False

Loops

Loops are structures most often used to automate repeatitive tasks

easily implemented in Flowcharts

Always make sure to provide an exit point in the flowchart

Types of Loops in Sequence

1. while Loop (pre - condition check)

2. Do While Loop (post - condition check)

3. For Each Loop (it works on iteration over items of a list just like iteration in python list)

Select Folder

it is an action that allows you to access all files inside the specifed folder

To get files from a folder, in this Misc section of Select Folder type into the Value field

to get the list of files use the command Directory.GetFiles(path-of-folder)

Type of variable should be array of strings System.String()

Generic Value Methods

Certain functions inbuild in UIPATH that are helpful in type conversion are :

Split

Replace

Substring

Length

Contains

Trim

IndexOf

ToUpper,ToLower

ToInt

ToString

Data Manuplation

Scalar Variables ~> Holds a single value of a fixed type, for example Characters , Booleans , Numbers, Date Times

Collections ~> Like Arrays, Lists and Queues or Strings, Dictionaries

Tables ~> A Table is siilar to an array of dictionaries where values are accessible by row index and column names

Generic Value ~> It can represent basic types of data, including text,number and date/times.

ctrl + k create the variable with appropriate data type in properties of a particular activity

Get Password

By default UiPath is not able to type in a string into a password element

For that purpose, we use Get Password activity to create or convert a string to password type varaible qwerty12345 to ********

After creating a password type variable simply use Type Into activity to perform the task

To convert System.SecureString to System.String, we use new System.Net.NetworkCredential(String.Empty,SecureString).Password

Array and Lists & Dictionary

TO define an array type variable, with variable type Array of T or String[] and default array can also be written

To define an list we set the variable data type as List<String> and with default value as new List(of String) from ['v1','v2']

Invoke Method is used to append new elements to the List

Dictionary has the data type Dictionary<String,String> and values can be appended to it using simply Assign function and works like normal dictionary does

Syntax for dictionary is new Dictionary(Of String,Int32) From {{"key1",val1},{"key2",val2}}

String Functions

The string functions here works similarly as python

For example, to check if a String contains a particular word just use variable-name.Contains(word-to-find)

In Split(" "c) function,we can use ctrl + shift + space to find all kinds of examples we can use with split method

c in Split stands for toCharArray

In split function we can pass more then one delimeter to split string using an array as variable.Split({"word1 "," word2"},StringSplitOptions.None)

UiPath offers 2 different activities to apply regular expression on text:

Matches -> provides a list of all matches from a string based on provided regular expression, output syntax is like Output-variable(item-no).value with data type as System.Text.RegularExpressions.Match

IsMatch -> It checks for a single value, if it matches a particular value or not -> output as True or False

To replace multiple new lines, spaces, tabs, blank lines etc, we can use String.Join(" ",Variable-Name.Split({Environment.NewLine,vbcrlf,vblf," ",vbtab,vbcr,vbNewLine},StringSplitOptions.RemoveEmptyEntries))

To get the ASCII Value of any character, we can use Convert.ToByte(Convert.ToChar(variable)) and can later convert to int for manipulation

Handling Text

To print date just use the function Now.ToString

To print only Month And Year use Now.ToString('MMMM yyyy')

Datetime.ParseExact(“12/05/2019”,“dd/MM/yyyy”,System.Globalization.CultureInfo.InvariantCulture) to convert a string to DateTime data type

Table Activity

Read csv files by using activity Read CSV

To create a Table from csv file use the function output data table

it is preferable used while web scrapping

To access data from table just like DBMS use something like variable-name.Select("condition")

Table-Name.Select("Age > 20 AND Age <50").CopyToDataTable

To access a specific column of a specific row , use sampleData.Rows(0)("Name").ToString

We must use [] with the Select method when the column name contains spaces.

Accessing a specific value from a row, row("First").ToString

To color any cell, we can use set color range activity which takes an System.drawing.Color.red variable to highlight any cell with particular color

Quiz Lesson 3

How can a string variable called myString be converted to an all-capitals representation for future use? Ans. By using an Assign activity with myString on the left side and myString.ToUpper on the right side.

Which .Net method of the datatable object can be used to filter a table by a condition? Ans. Select

Which activity can be used to loop through each row from a DataTable? Ans. For Each Row

Which activity can be used to modify the value of an existing cell in a DataTable? Ans. Modify Cell Activity

How can you identify a column in a data table?(Select all that apply.) Ans. Using column index and name

Which of the following statements are true regarding the Output DataTable activity? Ans. Returns the data contained in a DataTable as a string in a csv format

The String.Format(“Input = {0} and Output = {1}”, “1”,”2”) expression returns which of the following text: Ans. Input = 1 and Output = 2

How can we test if a given address (a string variable called fullAddress) can be found on a particular street (a string variable called streetName)? Ans. fullAddress.Contains(streetName)

How can the index integer variable be displayed inside a Message Box activity? Ans. “Current index is: “ + index.ToString

Recording

Single time ESC pause the recording

Double Time Esc Stop the recording

To use some kind of hot-keys , do the following

Press Esc once ~> To pause the recording

In Type option use the send Hotkey option to use any shortcut

F2 pauses the recording for 3 seconds

Right-click exit the recording

In web recording , it will work similarly as selenium waiting time

UiPath has 4 types of Recording:

Basic

Desktop

Web

Citrix

Citrix is used for automating stuff with virtual machines

The recorder is able to record:

left clicks on buttons,checkboxes and other clickable items

Typing into editable fields

Some non-recordable things to remember are: These are Manual Recording

Keyboard Shortcuts

Modifier Keys

Right click

Mouse hover

etc

Desktop recorder is different from basic just because it provides a container based workflow that is different actions in same application are separated by different containers

Indicate on Screen is a good function that can be used to change the snapshot used for automation

Text function in recorder has copy function, that can be used to copy some text and store in a variable which is created itself

Basic Recording

generates a full selector for each activity and no container, the resulted automation is slower than one that uses containers and is suitable for single activities.

Actions are self-contained

Simpler Workflow

Can cause interference

Desktop

suitable for all types of desktop apps and multiple actions; it is faster than the Basic recorder, and generates a container (with the selector of the top-level window) in which activities are enclosed, and partial selectors for each activity.

Actions are contained inside an AttachWindow component

No interference issues

More Complex workflow

Web Recoring

designed for recording in web apps and browsers, generates containers and uses the Simulate Type/Click input method by default.

Citrix

used to record virtualized environments (VNC, virtual machines, Citrix, etc.) or SAP, permits only image, text and keyboard automation, and requires explicit positioning.

The Citrix Recording toolbar enables you to:

Click an image or text

Simulate keystrokes or hotkeys

Select and copy text from a window

Scrape UI elements

Look for elements or wait for them to vanish

Find an image or wait for it to vanish

Activate a window

Manual Recording

Various types of single actions that can not be automated by simple recording are done using manual recordings

Various Types of Single Actions are:

Start and Stop an App or Browser ~>These single actions enable you to open an app or browser, as well as close them, by pointing and clicking them.

Click ~> These types of actions enable you to record clicks on the desktop or a running application, select an option from a drop-down list or combo box, and select a check box or a radio button

Type ~> These single actions include those that require input from the keyboard, such as keyboard shortcuts and key presses. To achieve this, two pop-up windows are used to retrieve your keyboard input.

Copy ~> These actions enable you to copy a selected text from an opened application or web browser, so that you can use it later in the project. Screen scraping is also available under the Copy menu, as it enables you to extract images and text from an app or browser.

Mouse Element ~> These types of actions enable you to simulate mouse movements that cannot be recorded but give you access to more functionalities, such as right-clicking, hovering or double-clicking.

Find Element ~> These types of single actions enable you to identify specific UI elements or pause the automation until a particular window closes or an UI element is no longer displayed. The find relative element action is useful with apps that do not allow direct interaction with UI elements, such as Citrix.

Window Element ~> Window element actions enable you to close windows. Studio does this by hooking in the operating system to make sure the application is closed.

Text ~> Text single actions enable you to select or hover over text to make tooltips visible for scraping, right-click to make the context menu visible, copy and paste text and many others.

Image ~> Image single actions enable you to wait for a specified image to disappear, to find a specific image in an app or website, right-click or hover over an image and others. This type of manual recording can be useful with UI elements that are saved as graphics, as they cannot be highlighted as normal fields or text

Lesson 4 Quiz

How can you delay the Automatic Recording? Ans. By hitting the F2 key

Can you combine automatic recording with step-by-step recording in the same recording sequence? Ans. Yes

Which recording wizard would you use to automate Virtual Machine actions? Ans. Citrix Recording

When is it recommended to use Desktop recording? Ans. When you automate more steps in the same window

Which container will Basic Recording generate? Ans. No container

Data Scraping

Data Scraping is a function which can be used to Record any kind of data which is available in link form

For any kind of link to be extracted as data, you need to specify atleast two links together

Then click on next and provide the column names of each column or data type you wish to scrap data and want in csv or excel file

To extract more data of different type , click on Extract correlated data and follow the above steps only

The maximum number of fields represent the number of entries you wish to scrap over the webpage

After this, click on finish and click on the next button over the webpage from which you are scraping the data

The above task will make sure that the page will be click next as soon data from single page is extracted successfully

Data Scrapper is also able to extract a tabular data as well very easily, as it extracts the table itself on just single click

Input Methods

Default (Generally used,hotkeys can be used)

Window Messages(Can work in background,hotkeys can be used)

Simulate Type (Fastest,used or prefered with Virtual Machines,hotkeys can not be used)

Output Screen Scraping

Full Text ~> High speed and accuracy, can work in background and able to extract the hidden text

Native ~> Get text by position with high speed but unable to work in background

OCR ~> uses google and microsoft OCR and works great with citrix automation

UI Activities Properties

There are multiple activities that can be used to automate apps or web-apps and you can find them in the Activities panel, under the UI Automation category.

ContinueOnError – specifies if the automation should continue, even if the activity throws an error. This field only supports boolean values (True, False). The default value in this field is False.

DelayAfter – adds a pause after the activity, in milliseconds.

DelayBefore – adds a pause before the activity, in milliseconds.

TimeoutMS – specifies the amount of time (in milliseconds) to wait for a specified element to be found before an error is thrown. The default value is 30000 milliseconds (30 seconds).

WaitForReady - Before performing the actions, wait for the target to become ready. The following options are available:

None - Does not wait for anything except the target UI element to exist before executing the action

Interactive/Complete - Waits all of the UI elements in the target app to exist before actually executing the action.

Lesson 5 Quiz

Which is the best option for scraping tables from a web page?
Ans. Data scraping wizard

What is the Data Scraping wizard for?(Select all that apply.)
Ans. [Extracting whole tables from the web or other applications,Extracting correlated data from the web or other applications]

By using the Full Text scraping method, the robot is able to:
Ans. [Get editable text.,Get hidden information.,Get the entire visible text.]

Which of the text extraction methods can return the hidden text from a UI element?
Ans. FullText

Which of the following text scraping methods preserve the text position?
Ans. [OCR,Native]

Selectors

Selectors are the way we identify User Interface elements on the screen. They are a xml string which contain some properties that uniquely define the specified element.

These are of 2 types:

Full Selectors ~> Used in general automation

Partial Selectors ~> Comes in use when containerisation automation is done

A selector has the following structure: <node_1/><node_2/>...<node_N/>

WildCards

There are basically 2 types of wildcards in UiPath that are:

* ~> Replace any number of characters

? ~> Replace exactly one character

Highlight

It is an activity that is used to simple Highlight an UI Element as the name suggestes

UIExplorer

It is Automation Tool which is used to easily manage or edit the Selectors

To add some variable inside the selector the following way should be followed

<wind some-selectors-code "+ variable name +" further selector code>

It is used to be able to automate and manage dynamic selectors faced during web automation

Anchor Base Activity

This activity is used to find elements with unreliable selectors

It uses the position of elements on screen

Find Element this column is used to indicate the reliable field in the element we wish to search for our automation such as the name of the field

Activity Field is used to declare the task to be done once the indicated element or field is finded by Anchor Base Activity

Anchor Position ~> it is the property of this activity which can be used to define the position where the required element to search for

Relative Selector

It works in background and relies on the internal structure of application

Properties

Various properties of selectors are:

Validate ~>The button shows the status of the selector by checking the validity of the selector definition and the visibility of the target element on the screen.

Indicate Element ~>Indicate a new UI element to replace the previous one.

Repair ~> Enables you to re-indicate the same target UI element and repair the selector. This operation does not completely replace the previous selector. The button is available only when the selector is invalid.

Highlight ~> Brings the target element in the foreground. The highlight stays on until the option is disabled with a click. The button is enabled only if the selector is valid.

Edit Attributes ~> Contains all the application components needed to identify the target application (a window, a button etc.). This section is editable.

Edit Selector ~> Holds the actual selector. This section is editable.

Open in UI Explorer ~> Launches the UI Explorer. The option is enabled only for valid selectors.

Lesson 6 Quiz

Can variables be used to build dynamic selectors? Ans. Yes

How can you see the full list of attributes of Ui elements? Ans. By using the UiExplorer tool.

What is a Selector? Ans. The “path” to the UI element, starting from the root, all the way to target element.

Which of the following is true regarding the Anchor Base activity? Ans. Use the screen position of the anchor and the target element.

What are the supported wildcard characters for selectors in UiPath Studio? Ans. * and ?

Image and Text Automation

Mouse Activities

Using click image we can click on almost anything that is button,checkbox,textfield etc

Click Text uses oCR to scan the screen of Virtual Machine... where as click image faster and more reliable ut fails only if background color changes

This is done using Image Recording, it is preferred to be used when we are working on an image of a system that could be referred as the AWS instance or a Virtual Box

In this , the main function of recording is click image and the recording to be done manually only

click image -> this functin or activity is used as dragging and selecting an area with respect to which we can decide where to click

click Text it does the same way as click image but in a different manner, it takes an OCR of the image and tries to find the element with same name as provided and click with respect to its position

Keyboard Actions

If sometimes, the mouse actions fails to find the element , we can use the keyboard actions and automate the workflow using the keyboard shortcuts such as tab,ctrl+v etc.

Select and Copy

this activity is used to copy the selectable fields inside an virtual environment

it works similarly as , selecting the field we wish to copy

Scrap Relative

This activity is used to copy data from non-clickable area which is done or preferred to be done using Google OCR and it can be set to find element with respect to some relative position

Lesson 7 Quiz Time

Creating automations in a Citrix environment is challenging because: Ans. You need to interact with the app using Image Recognition or OCR.

Is Reset Clipping Region mandatory to be executed at the end of a scrape relative sequence? Ans. No, for the next actions we can use other Clipping Regions.

What activities can be used to interact with applications in a Citrix environment? Ans . Type into, Click Image, Click Text

How can you scrape a field on a Citrix Environment when the value in that field changes each transaction? Ans. Find a static element nearby and use Scrape Relative

Click Image and Click OCR Text are not 100% reliable in Citrix environments. What method can be used instead (when applicable) to have safer actions? Ans. Setting focus on a reliable element and then navigating around the app using keyboard (up/down arrows, tab, etc) or using keyboard shortcuts. (Failed in above attempt)

Having an app in a Citrix environment with multiple text-boxes that look the same (size/style), how can you identify one of them to type into? Ans. By clicking relative to an unique text/image next to the textbox., You can’t identify it if it doesn’t have something unique next to it (text/image).

Is it possible to click a button with Click Image Activity if the target is not visible on the screen? Ans. No, you could click a button which is not visible only using selectors

Consider having an application in Citrix Environment that has a button named ‘Accept’ and also a label that contains the Accept word. How can Click Text be customized in order to access the correct button? Ans. By using the Occurrence property.

How can you improve accuracy when scraping with OCR a region that contains only digits? Ans. Use Google OCR with “Numbers Only” (Passed in above attempt)

Advanced Citrix Automation

Find Image

This activity is used to pause the state of program until an certain Element is not found or loaded completely

As output it gives the element which is defined to be found

Highlight

it is used to detect/show/highlight a certain element over screen

Highlighting a certian element can be done using

Clipping Region

Selector

Element

Highlight Time ~> The timeout or the amount of time for which to highlight a certain element is calculated in microseconds that is 2000 == 2 sec

In highlight the color can be defined as well for customized workflow

Working with opening applications

A better practice to open a certain app or application is to set shortcuts and open the app using send hotkey activity

Pick Activity

This activity is a container based activity which further accomodates Pick branches

This activity is used to set a certain activity to be completed in different possible conditions or scenarios

Basically we provide a same action like opening a folder to be automate but in more then one possible condition of screen or background

Lesson 8 Quiz Time

What can be done when the Windows Remote Connection doesn't allow sending hotkeys? Ans. It should work if the Windows Remote Connection is in 'full-screen' mode.

How can the robot pass a variable argument when opening an application in Citrix (eg: a web address for a browser)? Ans. In the command prompt, type in the path to the application and the argument

Which of the following activities can be used to select an item in drop down list, in Citrix?(Select all that apply.) Ans. Click Image , Click OCR Text

What happens if Find Image doesn't actually find the desired image? Ans. An exception is thrown..

What is the EASIEST navigation method to be used in a form within Citrix? Ans. By sending keyboard commands/hotkeys (Passed)

Excel Automation

Excel application scope ~> it is a container based activity and is used to do all workflows regarding the Excel file

Visible ~> It is an inbuilt activity which if we checked tells UiPath to work on file using MSOffice and if not then all tasks are performed internally

While using Direct access only single process can work where as while using MSOffice multiple can be done at the same time

A range can be specified by defining the cells separated by :. A1:C5

Build Data Table ~> this activity is used to create more data tables with very easy and simple GUI

Add Data Row ~> this activity is used to add another row(data) inside the build data table activity or table made from it

Append Range ~> It is used to append more data to same file

Data tables are zero-indexed same as a list in python

sort data table ~> This activity is used to sort some tabular data based on a certain column

Select Range ~> This activity is used to select a range of cells over which further actions like copy/delete/paste can be performed

Join Data Table ~> This activity is used to perform the JOIN operation

The Join Operation is of 4 types:

inner join

left join

full join

The table join criteria can be defined using either column data type or simple by column name written inside double-quotes

the conditions can be set as more then one or either on one using AND and OR logical operators

Output Data Table ~> This activity is used to convert a data table type variable to String

Read Cell ~> used to read a specific cell from an excel file

Write Cell ~> used to write in a specific cell from an excel file

All numeric data read by Read Range function from Excel is interpreted as an Double data type

Get row item ~> this activity is used to fetch the values of a specific column from a certain row

Add data row ~> this activity is used to add a new row in an Excel file using an array of data which is defined using circular or curly brackets as (var1,var2) or {var1,var2}

inputsTable.Rows.Count ~> it can be used to count the total number of rows

Use of Workbooks is prefferable over Excel files as they do not require Excel to be installed

To reverse a DataTable object, we can do so by Datatable-name.AsEnumerable.Reverse.CopyToDatatable

Using Macros with Excel

Macros can only be used with Excel Application Scope

Macros are saved in file with Macro Enabled Workbook extension that is .xlsm

Macros are written in vba and can be recorded in excel and edited for ease of use

The Macros activity has 2 inputs

Path of file that contains our macro

Object Array of parameters to be passed to the macro

The Macro activity has 1 output that can be used when working with Function instead of Sub

To Execute the Macro available in different file, we can give the macro name as FileNameContainingMacro.xlsm!MacroName

To Suppress any application alerts like delete confirmation, use Application.DisplayAlerts=False

To Create a Pie Chart, for any data use the following code sample

```
Sub PieChart()
'Code to create a Pie Chart
    ActiveSheet.Shapes.AddChart2(251, xlPie).Select
    ' Set the range of the data to create chart from
    ActiveChart.SetSourceData Source:=Range("Sheet1!$A$1:$B$5")
    CoverRangeWithAChart
End Sub
```

To Create a Bar Chart, for any data use the following code sample

```
Sub BarChart()
'Code to create a Bar Chart
   ActiveSheet.Shapes.AddChart2(201, xlColumnClustered).Select
   ActiveChart.SetSourceData Source:=Range("Sheet1!$A$1:$B$5")
   CoverRangeWithAChart
End Sub
```

To move the position of any chart, with reference to cell range, use the code sample

```
' Code to change the position of a chart
Sub CoverRangeWithAChart()
       Dim RngToCover As Range
       Dim ChtOb As ChartObject
       ' Define the range where you wish to put your chart at
       Set RngToCover = ActiveSheet.Range("L5:S19")
       Set ChtOb = ActiveChart.Parent
       ChtOb.Height = RngToCover.Height ' resize
       ChtOb.Width = RngToCover.Width   ' resize
       ChtOb.Top = RngToCover.Top      ' reposition
       ChtOb.Left = RngToCover.Left     ' reposition
End Sub
```

To Merge multiple columns

```
' Code to merge multiple cells of an excel
Sub MergeCell()
   Range("A1:F1").Select
   Selection.Merge
End Sub
```

Invoke VBA

Requires Trust Access to the VBA to be enabled inside the Excel

Invoke VBA activity enables developer to execute macros from outside the file without opening excel

Basically Invoke VBA activity works inside Excel Application Scope and is used to execute any VBA code present anywhere in the local system

The VBA code should be saved in a .vb extension file

This Activity requires Three parameters

File Input Path

Name of the Procedure to call

Array<object> for paramters to be passed

A sample vba code can be:

```
'Save this in a .vb file
```

```
Sub Macro1(Word1 As String, Word2 As String)

   Range("C2").Select

   ActiveCell.FormulaR1C1 = Word1

   Range("D2").Select

   ActiveCell.FormulaR1C1 = Word2

   Range("E2").Select

   ActiveCell.FormulaR1C1 = Word1 + " " + Word2

   Range("E3").Select

End Sub
```

This activity would be useful in scenarios where macros are not to be saved inside the same input file and thus no need to open the macro file for automation

Lesson 9 Quiz Time

What happens if the AddHeaders option is checked for Read Range Activity? Ans. The first row from the specified range is considered to be the column names

In order to loop through all the rows of a data table, which activity should be used? Ans. For Each row

What activity can you use to create a DataTable from an input string? Ans. Generate Data Table

What happens if you try to use a Write Range activity to a .xlsx file that does not exist? Ans. It will create that file for you and write the data in it.

Can Excel related activities be used without having the Excel Application installed? Ans. Yes, but only for xlsx files (Passed)

PDF Automation

Read PDF ~> This activity is used to read text from a PDF

Read PDF with OCR ~> It goes by the name and is able to read the Image Text present in the PDF

While using OCR to read PDF's , we have got 3 options

Google OCR

Microsoft OCR

Abby's OCR ~> Maintains the structure of text present in PDF

PDF activities are categorised into 2 parts:

Processing large chunks of data

Working on specific part of the file

Anchor base method is more reliable then others since it can handle structural changes

While trying to read text it is preferable to use Read PDF rather then Read PDF with OCR as OCR is more prone to errors

In properties of PDF, the range of PDF pages can be set in the following format "1-4"

Lesson 10 Quiz Time

Will the Read PDF with OCR activity open the PDF document on the screen in order to read it?Will the Read PDF with OCR activity open the PDF document on the screen in order to read it? Ans. No

What is the easiest way to get the invoice number from a native PDF file? Ans. Open the PDF file with Adobe Acrobat Reader and scrape only the relevant information.

Which of the following activities requires the PDF file to be opened with Acrobat Reader in order to read it? Ans. Get Text

How can a robot read only the first page of a PDF file, using the PDF activities? Ans. Set the Range property to: “1”

If the PDF contains both images and native text, what activity should you use to read all the text from it? Ans. Read PDF with OCR

Email Automation

Various activities supported in email automation are:

SMTP ~> used to send mails

POP3 ~> used to recieve mails supported by various domains

IMAP ~> supports reading messages as well as marking them read or shifting to different folders

Exchange ~> Microsoft supported activity for all kinds of email activities

Outlook ~> automate the pre installed outlook software

Four activities present to check mail are :

POP3

Outlook

IMAP

Exchange

The data type of messages is System.net.mail.message

Save Attachments activity is used to save attachments from a mail, it requires two arguments a mail type instance and path to save folder

mail.Headers('Date') provides the Date Timestamp for any mail

to filter mails fetched by UiPath set a filter in the properties menu such as "[RecievedTime] > '14/10/2019 09:41 AM'" or "[RecievedTime] > Now.AddDays(-1).ToString('MM/dd/yyyy hh:mm tt')"

Take Screenshot is the activity used to take a screen shot at run time which is to be saved in a certain location using save image activity

The attachment section of the Send Mail activity requires a file path to be sent

To make something like message Dynamic in sending messages we can use format type same as python just replace the content to be changed dynamically with {0} and provide the argument in body section of send mail activity

To Access Different Folders from Gmail, use the following format for MailFolder:

Inbox -> INBOX

All Mail -> [Gmail]/All Mail

Drafts -> [Gmail]/Drafts

Sent Mail -> [Gmail]/Sent Mail

Spam -> [Gmail]/Spam

Starred -> [Gmail]/Starred

Trash -> [Gmail]/Trash

Quiz Time Lesson 11

What activity can you use to send an email without entering the username and password of the email account? Ans. Send Outlook Mail Message

What activities can you use to send an email message? Ans. Send Outlook Mail Message. and Send SMTP Mail Message.

What is the supported variable type in the Output property field of all Get Mail activities (POP3, IMAP, Outlook, Exchange)? Ans. List (MailMessage)

If you are using the For Each activity to loop through a list of MailMessage variables, what should you set the TypeArgument property to? Ans. System.Net.Mail.MailMessage

The Send Outlook Mail Message activity will work without having Microsoft Outlook installed: Ans. False

Which of the following properties are found in the Get Outlook Mail Messages activity? Ans. MailFolder

Which of the following activities will allow you to only retrieve only unread messages? (Select all that apply.) Ans. Get OUTLOOK Mail Message and Get IMAP Mail Message

If you want to get only filtered MailMessage variables, what activity should you use? Ans. Get Outlook mail messages

Which Visual Basic property within the MailMessage class will you use to get the Date of an email? Ans. Headers("Date") (Passed)

Debugging And Exception Handling

Slow Steps ~> This is the tool provided with Debugging Toolkit , it highlights each activity executing

In Options ~> Highligh Element activity , highlights the UiElement being interacted with a Red Color

Breakpoint ~> It is set an activity where we feel some error migth occur and then we have 3 options to continue our program execution

Continue

Step Over

Step Into

In Input Activities we have an option Simulate check in their properties which tend to send the input using Background Processes without using the mouse or keyboard

Timeout property makes the activities wait for an element to appear or the activity to execute before giving an error

Element Exists ~> This activity returns a boolean value that is True or False for an Element to be present on sceen or not

Log Message ~> this activity can be used to set or give some message in output tab given in right side Properties panel... that is seen while execution

Find Element ~> Stops the workflow until an element is found

Wait Element Vanish ~> Waits for an element to disappear before continuing

Try Catch Finally

Try Catch activity ~> it works same as in programming , if any activity fails in Try block
then catch block will run followed by finally block

System.Exception ~> It catches all types of errors

To select all activities, it is easy by just dragging the cursor on all

Once the type of Exception is selected in catch block.. followed by enter collapses the try block and we can start addig activities to work when error occurs

rethrow activity ~> is used in catch block to show an error popup

exception.message this is a primitive variable which contains the error message that might have occured

Logging Levels

There are 6 log levels in UiPath:

Verbose

Trace

Information

Warning

Error

Critical

Each log level has its own significance

Verbose < Trace < Information < Warning < Error < Critical

Creating user-defined log fields that have the same name as a default log field causes the logging process to become corrupted and may cause issues in the workflow you are running.

Various Default Log Fields are:

Message - The log message.

Level - Defines the log severity.

Timestamp - The exact date and time the action was performed.

FileName - The name of the .xaml file being executed.

jobId - The key of the job running the process.

processName - The name of the process that triggered the logging.

processVersion - The version number of the process.

windowsIdentity - The name of the user that performed the action that was logged.

robotName - The name of the robot (as defined in Orchestrator).

for type conversion to integer we can use CInt as CInt(variable)

You can separate individual components of your automation into different workflow files and then call them using Invoke Workflow.

Quiz Time Lesson 12

If you need to know if a UI Element is available on the screen or not, what activity should you use? Ans. Element Exists

What does the Locals panel display when you are working in Debug mode? Ans. The current values of your variables.

How many Catches can you have in a Try/Catch block? Ans. There is no limit on the number of catches.

What activity can be used in a Citrix environment to check whether a UI element is displayed or not? Ans. Image Exists

The Finally block of a Try/Catch activity is executed when: Ans. Every time, regardless if an exception occurred or not. (Passed)

Project Organization

Following the best practices makes our project:

Reliable ~> Solid Robust workflows that can handle errors

Efficient ~> Shorter development time and smooth execution in production environment

Maintainable ~> Easy to update when changes are required

Extensible ~> New Usecases can be added

Best Practice

Pick an appropriate layout for each workflow

main WF -> flowchart/ state machine

bussiness logic -> flowchart

Ui Interactions(woring in same order) -> Sequence

Avoid nested If else and use flowchart instead

Break the whole process into smaller workflows

Develop and test pieces independently

reuse workflows across projects

collaborate working on separate files

Use Exception Handling

Put problematic workflows inside Try_Catch

Put externally invoked Workflows

Implement recover sequence

Make your workflows readable

Give descriptive names to activities

leave explanatory notes and comments using comment activity

log real time execution process

Keep it clean close applications,windows and web pages not being used

Invoke Workflow

UiPath offers an activity same as import in python that is Invoke Workflow activity

In this activity , we can execute any workflow and even pass arguments and import arguments

Arguments just work as values which are provided for variables and these arguments or values of variables, can be either given as input or can be extracted as an output for another activity

Direction column in variables define the redirection of values which can be In or Out or both In/Out

Deserialize JSON activity ~> It is used to parse a json file and can be used to read or extract data from it

to convert a variable... we can do it like convert.ToInt32(variable-name)

Quiz Time Lesson 13

What is the recommended layout for sequential activities? Ans. Sequence

What type of arguments can you use in a workflow? Ans. In/Out Out In

Is notifying the user via a Message Box activity a good way to keep track of a workflow's execution progress ? Ans. No

What is the recommended layout for a sequence of UI interactions? Ans. Sequence

Which of the following is a good example of a workflow name? Ans. GetCustomerNumber.xaml (Passed)

RPA Developer Foundation Training - Final Test

(Passed Successfully)

Level 2 Orchestrator Training

Link TO Version Details Of Different Orchestrators

UiPath Orchestrator is a web based application

It Enables efficient resource management

It allows Workload allocation, Scheduling and monitoring of robots

Streamlines the teamwork

Should Stop

This activity is used in workflow to stop a executing process from Orchestrator

It return a Boolean Value which can be used by Decision Flow

Asset

In UiPath Studio we have an activity called Get Asset

It gets the asset value from the Orchestrator and this activity works only when the workflow is published to Orchestrator

Asset is basically just a variable which can be defined in the Orchestrator and used by the workflow

It can be specified for multiple robots or individual that is using same asset variable for multiple bots with different values

In properties panel, name of asset should be written as string that is if the name is Name then in properties write it as "Name"

Assets are of 4 Data Types:

Credentials

Text

Boolean

Integer

Get Credentials

Credentials type requires 2 input values (Username and Password) in Studio as well as Orchestrator

Basically when Credential Asset is made with two values which are Username and Password

Then they are fetched and used at run time in Studio using Get Credential activity

To use the pass acquired from the Get Credentials we would need to use Type Secure Text activity

To use Windows Credentials use UiPath.Credential.Activities

Type Secure text

This activity is used to decrypt the .NET secured string from encrypted password to normal decrypted text

Queue

the transaction items in a queue are processed in chronological order

The items inside Queues can be processed by multiple Robots.

The priority order of a queue item is based on Priority and Deadline

The Priority is given in order that is High Priority and Low Deadline if any deadline is specified and if no deadline is specified then Only Priority is checked

A Queue Item with Priority and Deadline defined has more priority over a queue item with high priority and no deadline defined

Add Queue Item

This activity is used to send values or add the items to Queue in Orchestrator

DeadLine ~> This property is used to set a sepecific time limit within which the queue item is supposed or required to be processed e.g., datetime.Now.addHours(24)

PostPone ~> This property is used to postpone the activity upon reaching Deadline by some time like datetime.Now.addHours(2)

Multiple robots can be assigned to process the same Queue

Reference property can be set to an item to identify it uniquely in Orchestrator

ItemInformation ~> this property is used to define the values to be added in the Queue present in Orchestrator

Get Transaction Item

This activity is used to fetch values or items from the Queue made in Orchestrator

When this activity is set into loop it iterates over and fetch all the items in the Queue

transaction.SpecificContent("Column-name").toString

Set Transaction Status

It is used to set status of the processed item from the Queue

If the Status is not set by the Robot then it is set to Abandon automatically after 24 hour

Set Transaction Progress

It is used to set some Value for the progress column in Orchestrator regarding the Processes in Queues

Complete Documentation can be found at

Orchestrator

Terminating and stopping a process

Pressing Stop requires you to use the Should Stop activity in Studio while developing the process. The activity returns a boolean value. It informs whether the Stop button has been pressed in Orchestrator by the time the Control Flow reached the Should Stop activity. This is similar to a Save Game function in a computer game.

Pressing Kill is the equivalent of stopping a process from the Studio. Orchestrator will connect to your Robot and send a stop command to the process.

Trigger

Trigger is like Scheduling a process that is having Orchestrator press Play for you at a time which you specify.

Steps to Use Orchestrator

Create your workflow that you wish to deploy over Orchestrator

Open the Following url Cloud Uipath

In Service section , select the StudentDefault service (UiPath Orchestrator will be opened)

Create a machine

Click on Machine in Left panel under MANAGEMENT section

Click on + icon followed by Standard Machine

In Name write the Name of your Laptop(you can get that from next step) and Description as you like

Click on Provision

Open UiPath Robot on your local Machine

Click on Settings icon

Select Orchestrator Settings option

Enter the Machine Key(you can get that by clicking on edit on Machine made in previous step)

In Orchestrator Url type the cloud-orchestrator-url

Click on Connect(Local System gets connected to Orchestrator at cloud)

Now to Add your Robot

In UiPath Studio , click on Publish button given in Design Panel(just click ok)

Select Machine Name given in previous step

In Username, type the name configured with your UiPath Studio

Click create

Set Environment

In Robots tab, Click on environments

add a new environment

Click on manage in properties of environment

Select your robot and click on Update

Set The Process

Go to Process Tab

Click on + icon

Select the Package Name and Environment

Click on Create

Finally you are ready to run/execute your bot

Go to Jobs

Click on Start Button

Select The Process made in previous step

Select your Robot

Click Start and all done

Level 3 Advance Training

UiPath Robotic Enterprise Framework

This Framework is a Template provided by UiPath for transactional activities or workflow

Transactional Activities~> Basically every project can be divided into 4 states

Initial State ~> Start/Open all applications

Get Transactional Information ~> Take Input or Fetch from Queue/Excel all the Data need to be processed or used for processing

Process Transaction ~> Process all the information(calculation,Decision taking,Data Conversion etc)

End Process ~> Close all the applications which are not required

It can be accessed through START panel of UiPath Studio in the Template Section

REFramework consists of few pre-build workflows which are used to simplify the Automation Task in a proper manner that are:

InitAllSettings ~> Processes / Reads the config file containing essential details

InitAllApplications ~> Start the Initial State and Open all neccessary applications

GetAppCredential ~> In terms of Login , gain user credentials with proper security

GetTransactionData ~> Get Transactional Information from User/Queues/Excel Files etc

SetTransactionStatus ~> Set the status for information being used(Processed/retried/abandon/NeedToBeProccessed etc)

KillAllProcess ~> To Stop the Process completely on recieving STOP signal

CloseAllApplications ~> Close the applications in Workflow as soon as their work is completed

TakeScreenshot ~> During Exception Occurrence, Used to Take Screenshot and store in Exceptions_Screenshots folder,to help developer

RefFramework is based on the principle that data is stored in the form of a Queue that is FIFO

Building productive Robots require:

Proper Exception Handling(try_Catch)

Recovery Abilities(ReStart or Recover from Possible failures)

Effective Logging(Secure the Status of Each part of workflow)

Reporting Functionalities(logs and screenshots)

High Maintainability

Extensibility(Easy to modify)

Reusability

Ease of Development

The Framework files can be downloaded from the following Github Repository link FrameWork

Request Credential ~> This is an activity used to get credentials from user same as input dialog

This Framework mainly works on State machine activity which includes

Main State Machine

Exceptions Handling

Recovery Methods

States

InitState(Config file,InitAllApplications) ~> Initialization(Open Application,login to website,startup required values etc)

Get Transaction Data(TransactionItem,TransactionNumber)

Process Transaction

End State

SetTransactionStatus

GetAppCredentials

The Flow of State Machine is like First the entry action is complete, then the triggers for the state's transitions are scheduled. When a transition to another state is confirmed, the activities in the exit action are executed, even if the state transitions back to the same state. After the exit action completes, the activities in the transition's action execute, and then the new state is transitioned to, and its entry actions are scheduled.

InitAllSettings

In The Reframework, it is the Initial xaml file to be used

It contains a Config workbook with 3 sheets

Settings ~> We can store any configuration related to the business process such as Urls,filepaths,credentials and any process specific piece of information

Constants ~> It stores the technical settings that are useful for Developers, it contains information like number of delays , retries, timeouts,image accuracy settings, static log parts

Assets

In Settings Sheet , there are 3 columns

Name ~> Always contains a string which is the key in the Dictionary

Value ~> Holds the dictionary value

Description ~> Holds the detailed account of each setting

Exceptions

There are 2 kinds of Exception that are:

Business Exception ~> In Case of issues in data , invalid data,missing information in data. business rule exceptions are something you defined while building the process(exceptions which are expected and there is no chance of record getting success even if we retry) Transaction status is set as failed and transaction is not re-tried

System/Application Exception ~> In case application not available(UI Element not available or unknown error) Transaction is re-tried

We can generate exceptions using the Throw activity, like to generate Business Exception use new BusinessRuleException("Message to Pass with Exception")

Working of REFramework

Note:

In case Exception occurs anywhere we set SystemError to exception with data type Exeption

At Every Phase of This Framework , logging is done for better development experience and Easy Debuggig

We always initiate the workflow with main.xml file

It contains a Flowchart with following Transactions

Init

Get Transaction Data

Process Transaction

End Process

Starting With Init transaction, It contains a Try_Catch_Finally block of activity

Assign a SystemError variable to nothing which used for Exception Verification

For first Time,by default reads the config file present at Folder/Data/config.xlsx to acquire basic pre-set settings/values and kills all initally running processes as defined in KillAllProcesss.xaml

Run InitAllApplications.xaml to open all required application upon which we have to work

Upon Failure of above process we move to EndProcess Transaction else

Move to Get Transaction Data transaction

It checks for StopSignal that is recieved from Cloud Console

Starts to access/fetch data from Queue in Orchestrator using Get Transaction Item which gives an Queue as output

If some Error occurs,logs are set and TransactionItem is set to Nothing

If no data/TransactionItem is fetched from above Transaction, The workflow moves towards End Process transaction else

Move to Process Transaction

In this, we initiate the main Processing workflow xaml file that uses the input and complete the task

If Some Error is Faced the workflow sets the Bussiness Exception and System Exception to initiate the Recovery Process

Most of the time, Upon recieving Error, its best to stop the processing

After Completion of the activities.. a Finally block is used to always set the transaction status of each Transaction Item

Upon Reaching the End Process transaction

It intially try to normally Close all applications and upon not being able to do so

It uses KillAllProcess to forcefully to its work

Transaction Processing

A transaction represents the minimum amount of data and the necessary steps required to process the data, as to fulfill a section of a business process

Once processed, the data is no more required

A Business process can be divided into 3 categories:

Linear ~> The steps of the process are performed only once and, if there is the need to process different data, the automation needs to be executed again.

INIT ~> GET DATA ~> PROCESS DATA ~> END

Iterative ~> The steps of the process are performed multiple times, but each time different data items are used

INIT ~> GET DATA ~> | Process Data in Loop | ~> END

Transactional ~> Similarly to iterative processes, the steps of transactional processes repeat multiple times over different data items. However, the automation is designed so that each repeatable part is processed independently

Dispatcher ~> The dispatcher is a process used to push transaction items to an Orchestrator queue. It extracts data from one or multiple sources and uses it to create Queue items to be processed by Performer robots.

Performer ~> The performer is a process used to pull transaction items from an orchestrator queue and process them as needed in the company. Queue items are processed one at a time.It uses error handling and retry mechanisms for each processed item.

Dispatcher and Performer models advantages:

Better seperation of processes (between dispatcher & performer)

Better separation & distinction between architecture and process layers

Better error handling and retry mechanism

Possibility to run processes across several machines (availability)

Better re-usability within your project's created components

Improved built-in configuration & Orchestrator integration

Previous workflows created without REFramework can be easily adapted and deployed in order to use REFramework and the dispatcher / performer model

Re-Framework Meetup Learning

In Config file, we have got 3 sheets

Settings ~> Contain data we wish to access such as email,url,username or password

Constant ~> Something like retry count

Assets ~>

A Config variable is of Dictionary (String,Object)

Reframework can be used for multiple input types (queues,datatable,array,list et)

UiPath Security Training

Layers in Orchestrator

Presentation Layer(accessed via browser)

Communication between clients (browser,robots) and Orchestrator is encrypted using the secure https channel

user session is saved in a session cookie(with a configured expiration time)

the password complexity is configurable

account automatic locking after a configurable number of failed attempts

Protection against CSRF token

Service Layer(containing the business logic)

Role-based access control(RBAC)

no data sent outside customers network

logging - default actions are logged for auditing, and so are the users actions

the section containing the encryption key in the configuration files can be encrypted

Persistence Layer ~> Build using SQL and elastic search

encrypted communication with SQL server

each password is encrypted with a different encryption key

login attempts are logged - result ,IP Address, timestamp , browser info

user roles can be defined for data stored in SQL server to prevent unauthorized access

Potential Risks associated with RPA Projects are:

Robots having access to Credentials normally used by human workers

Robots having access to privileged information such as personal data of commpany staff, financial data

Unauthorized modifications of automation workflows in the development or testing phase

Unauthorized modification of automation workflows or runtime parameters in the production environment

Features

Features are the characteristics that are embedded in the product or solution and implemented in order to enhance the security and mitigate risks

Guidelines

Best Practices to be used while setting up RPA workflows

Code Review

It aims to ensure that the process that will run on the live data is safe and no security breaches are possible

Checks whether the credentials are used only where needed and are not passed outside the trusted environment

Prevent sending sensitive data outside the trusted scope

Notes

We can keep track of RPA projects with multiple developers in working by keeping the source code files(XAML files) in Source Code Control System

To Store Credentials in UiPath we use:

Orchestrator Credential Assets ~> encrypted using AES 256 and stored on the SQL server base but should be configured with value per robot to prevent unauthorized access

Windows Credential Manager ~> works as a local machine storage and should be used only in case Orchestrator in not accessible

Protect Sensitive Data

Configuring a trusted Channel : VPN Connections,secure FTP sesions, HTTPS websites

Data encryption, when using untrusted channels

Usage of limited access environments, such as restricted shared folders or restricted Sharepoint domains

Environment Isolation

During RPA Projects the Developer Team and Production Team should work in different environments

Development Environment

The RPA Developers and their robots interact only with systems that have sandbox environments

the robots should not be able to connect to the UAT and production orchestartor

Production Environment

The robots permanently monitored for malicious tempering of packages and the execution of correct version of the package

access to the robots in the production should be restricted to the trusted individuals

Multitenancy

It is a feature of Orchestrator that allows complete seperation of Data among tenants, providing a dedicated share of the instance including its data,configuration, user and role management up unitl license management

In simple terms, using Single Orchestrator Instance an organisation can have, multiple role based users each having having seperate:

Robots

processes

Assets

Queues

Data

Configuration

Users

Roles

Protecting data in Transit and at Rest using

Transport Level Security 1.2 Protocol

Advanced Encryption Standard on 256-bit cipher

Secure Hash Algorithm 2

Quiz Time

What are the main differences between guidelines and security features? Ans. Guidelines are recommended general best practices, while security features are already implemented in the product

User access to the Orchestrator web app is protected using the following features: Ans. a) communication between client and Orchestrator is encrypted with HTTPS; b) Password complexity is configurable; c) the account is locked after a configurable number of unsuccessful attempts

Is Storing Credentials a feature or a guideline? Ans. Feature

Authenticating the users on the Orchestrator platform can be done with: Ans. Google accounts with OpenAuthentication 2.0,Local username and password,Active Directory username,using Windows Authentication, Azure Active Directory authentication

A valid SSL certificate is required to install Orchestrator. Ans. True

Is Package Securing a feature or a guideline? Ans. Feature

With the Account Lockout security feature you can prevent additional logins for a period of time after a number of failed attempts. Ans. True

The Audit page on the Orchestrator platform allows you to filter by: Ans. Component and Action

What is the common practice to keep the different versions of each XAML file in an RPA project? Ans. Source Code Control System

Packages uploaded into Orchestrator (either manually or published from Studio) are automatically uploaded by Orchestrator to all robots that can execute these packages. Ans. False

Orchestrator offers the functionality to create any number of custom roles. Ans. True

In an organization with Development, Testing and Production environments, an RPA Developer should not have access to the Production Environment Ans. true

CyberArk can be integrated with the Orchestarator in order to retrieve the robot credentials from CyberArk instead of SQL Server DB. Ans. True

Is Isolating Environments a feature or a guideline? Ans. Guideline

Security risks can appear in: Ans. Both development and production phases

UiPath Licensing Training

License for Studio

Named User ~> Single specific User, enables each user to access the software at any time ,on any machine

Concurrent User ~> Useful in BPO scenarios,indicates how many users can access the software simultaneously

Concurrent Runtime ~> Indicates the number of robots that can be simultaneously connected to Orchestrator , regardless of the user or machine

Server License ~> is required to install orchestrator instace

Notes

All the licenses for all the robots can be easily managed by Orchestrator

Named and Concurrent User License can not coexist in single orchestrator instance

All the platform license must have same anniversary date

Host Licensing

It provides full control of all the licenses belonging to an organization

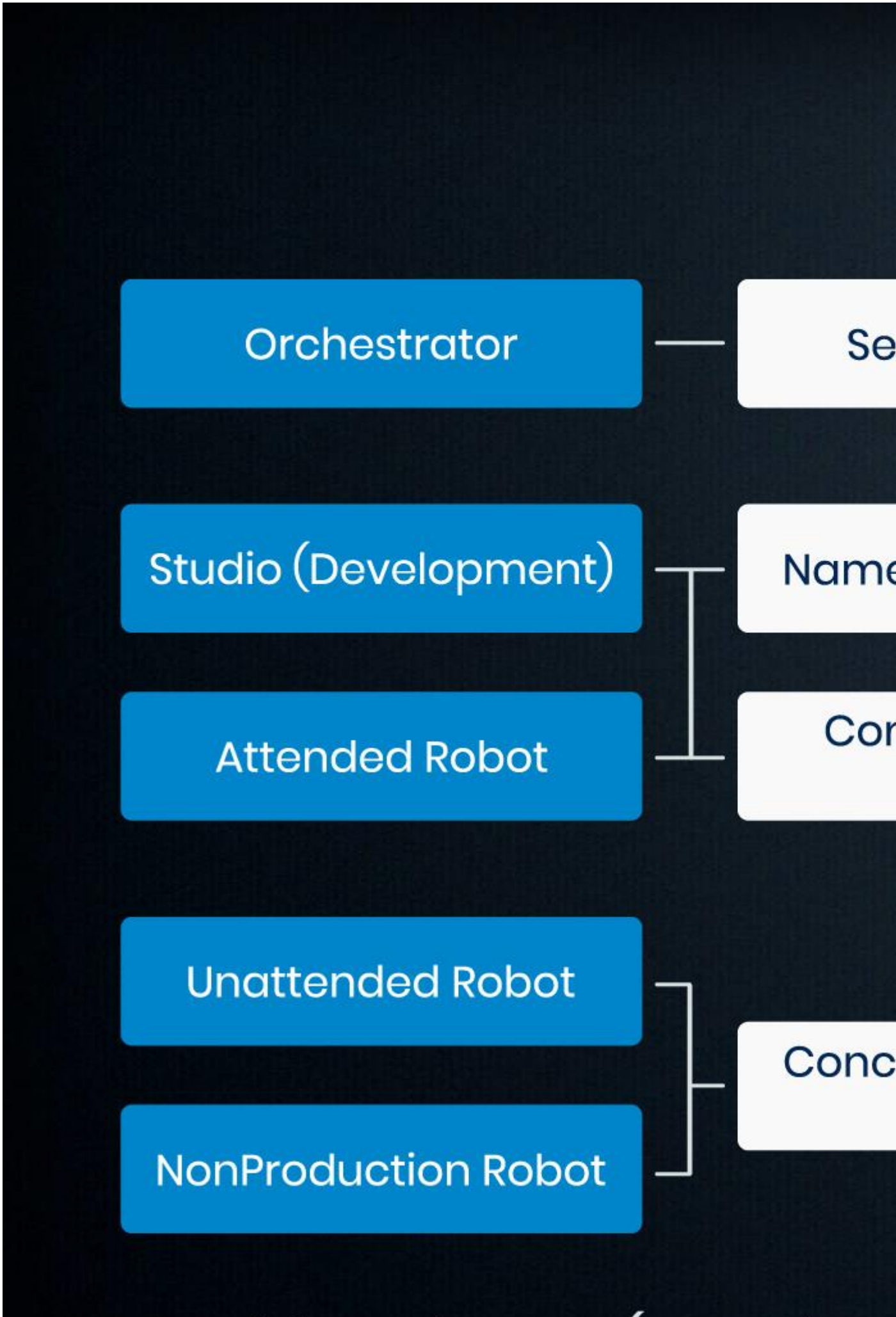
Allows centralised license management and distribution

StandAlone License

Used when Orchestrator is not used

Named User License

Node Locked License ~> completely similar to Concurrent User license


Orchestrator
Se
Studio (Development)
Name
Attended Robot
Cor
Unattended Robot
Conc
NonProduction Robot

License Activation

To Activate any license in machine follow the following steps:

Open CMD as administrator

CD to Uipath studio folder

run command regutil activate /email_address /license_code

To check if license activated successfully run command regutil.exe get-info, it shows complete information about license

To export the information to a file, run command regutil export-info /out_file=Path-to-store

QuizTime

What Robot type is used to test an automation workflow? Ans. NonProduction

A Node Locked License... Ans. Can be activated and used on a single machine,allows multiple users to work successively on a machine using the same software instance, is available for unattended robots

A developement robot Ans. Activates studio,enables workflow execution on local machine,ensures the ability to connect the local studio instance to orchestrator

A Concurrent User License is dedicated to a single specific user. Ans. False

Which license types are available for Attended Robots and Studio? Ans. Named User and Concurrent User

Which UiPath Platform licenses can be managed through Orchestrator? Ans. Concurrent User,Named User, Concurrent Runtime

Concurrent User licenses are usually suitable in BPO scenarios, for companies whose employees work in shifts. Ans. True

Named User and Concurrent User licenses can coexist within a single Orchestrator tenant. Ans. False

All the platform licenses (managed through Orchestrator) must have the same anniversary date. Ans. True

For Unattended Robots, the only available Standalone License option is Ans. Node Locked

The number of Concurrent Runtime licenses indicates... Ans. The number of robots that can be simultaneously connected to Orchestrator , regardless of the user or machine

What is the required license type in a scenario where employees must be able to execute processes whenever needed? Ans. Named User

SAP Automation

When automating SAP,start with recording the actions, most of the time it will work fine

To Interact with unrecognised elements you can use ClickText & ClickImage and keyboard shortcuts to reach difficult buttons or menu items

For Elusive UI Elements , simulate human activities that is what human will do activate it

For tabular data you have to use loops , although that is hardly SAP specific

To Read an tabular data of unknown length, read each row in an infinite loop until an operation fails

To work on checkboxes and special elements , use the getAttributes activity, it shows a bunch of hidden information that can prove to be very useful

QuizTime

Can SAP client be automated if it is web hosted? Ans. It's a trap. SAP is not available on web

In a situation where a data table cannot be scraped by using Data Scraping but each cell is accessible by selectors, how can the robot extract all the cells from a column with a large number of rows? Ans. By generating a selector for the first cell and configuringits TableRow property to iterate through all the rows

If you want to record a Click activity on an ephemeral element that appears only after focusing on a text-box relative to it, can that be done? Ans. Yes, press F2 and in the 3 second pause put the focus on the text-box.

In a SAP application, you would like the robot to click on a specific folder in a folder hierarchy. The panel containing the hierarchy doesn't allow more granular selectors inside of it, thus no selector can be created for a specific folder. What can be used? Ans. A Click Image activity, A Click Text activity with Native as scraping method.

Some UI Elements are not selectable in SAP client, but some of them are. Which might be the problem? Ans. The scripting is enabled only on the client side

Which is the easiest method in order to extract a table from SAP that has the scripting enabled on both sides? Ans. Using the Data Scraping wizard

How can the robot identify if a checkbox is checked or not? Ans. By using get Attribute activity

Consider having to click a button which cannot be accessed by using a selector. What other options can be used? Ans. Click relative to an element that can be identified by a selector,Use a Click Image activity set to click the image of that button, See if clicking the button can be replaced with sending a combination of keys.

RPA Developer Continuous Learning

Regex Selectors

A Regular Expression, regex or regexp is a sequence of characters that define a search pattern.

In order to use it:

You can specify the target search tag by using matching:<tag_name>='regex';

You can specify the search pattern by using <tag_name>='<regex_command>' e.g., aaname={{regex}} matching:aaname='regex' where regex is variable with required expression

Fuzzy Selector

Fuzzy string matching is a technique to search strings which are not 100% match, and match a pattern approximately, rather than exactly.

A selector's fuzzy search capability enables you to locate strings based on a pattern, rather than on an exact match to your input.

In order to use the fuzzy search capabilities, you need to include in the top-level tag of the target selector a matching option:

You can specify the target search tag by using matching:<tag_name>=fuzzy;

Determines the matching threshold by using fuzzyLevel:<tag_name>=<numerical_value>.

The values supported are numerical from 0 to 1, a closer to 0 value returns results with lower similarity, and a value closer to 1 returns the results with higher similarity.

If more elements are found, the target action is executed on the first one. e.g., aaname={{regex}} matching:aaname='fuzzy' fuzzylevel:aaname='0.7'

Non-Greedy Selector

Non-Greedy search gives you the option to search the subsequent tags in all the windows that match the top-level tag.

In order to use the Non-Greedy search capabilities, you need to include in the top-level tag of the target selector an Idx() attribute: You can search through all active window instances for the element matching the top-level tag by using <idx='*'>.

Please note that the <idx='1'> option only searches through the window instances in focus.

So if there are multiple tabs open and you want Bot to apply or find the given selectors to all tabs without bringing them to foreground then we use these Non-Greedy Selector

Non-Greedy Selectors are supported only for and .

Note:

You should extend the selector definition to have a new namespace for search matching and for the fuzzy level where: matching = regex, fuzzy, fuzzywords, fuzzyLevel = 0 .. 1

WebDriver

WebDriver is a remote control interface that enables introspection and manipulation of Document Object Model (DOM) elements in web browser.

The Document Object Model (DOM) is a cross-platform and language-independent interface that treats an XML or HTML document as a tree structure wherein each node is an object representing a part of the document.

Using this protocol, headless browser automation (simulate work) becomes possible automating web pages through the WebDriver API,without having to install extensions and even without using the GUIs

Headless testing is when you run a UI-based browser test without showing the browser UI. It's running a test or running a script against a browser but without the browser, UI starting up.

Types of supported drivers:

Chrome Driver

Mozilla Firefox

Installing the Web Driver Protocol

Start by downloading the WebDriver executable corresponding to the browser you want to use;

Install and download WebDriver in a location of your choice,such as C:\webdriver\Chrome

Select the Path variable either from User or System and Edit

Click and set path as C:\webdriver\Chrome

Restart the Robot Service for the changes to take effect and you are good to go

Activity Configuration

To enable the WebDriver capabilities in your browser activities select the browser you are using from the BrowserType field , then the WebDriver option from the Communications Method

To perform activities without the Headless Browser leave the Hidden checkmark unchecked within the Properties panel else vice-versa

Triggers

In New Orchestrator, we have 2 types of triggers:

Time Triggers (ex Schedule) : plans a recurrent job

Queue Trigger : Triggers job whenever new items are added to Queue

A Queue can have only 1 trigger associated with it

When we enable an SLA,the association between the process and the queue is automatically made

Credential Store Integration in Orchestrator

A Credential Store is a named location within a secure store from which you can retrieve robot credentials and credential assets when needed.

Mostly Used ones are:

CyberArk integration

Azure KeyVault integration

Orchestrator database (default)

To add 3rd party plugins, edit the web.config file found in the installed orchestrator files by looking for plugins.SecureStores and add file names simply by adding values using comma. and restart orchestrator service

IT Automation

The activities are built on top of the official APIs or SDKs provided by the technology vendors (e.g. Microsoft, Amazon, VMware, Citrix, and others)

The activities run in the background, not via the UI

The activities are developed and owned by UiPath

They are published on the official feed and we offer long term support and official maintenance

The activities are certified and scanned with VERACODE and FOSSA

What are the capabilities of IT Automation Activity Packages?

Easy to Use - Easily create, update, manage and run IT automation processes

The list of supported technologies is continuously expanding - Automation for On-Premise and Cloud IT infrastructures & services, User Management systems, Virtualized Environments;

Seamless integration - secure integration with your existing Systems & Applications.

Examples: Deploy Server(Cloud/onprem), AD-Create User/Reset User Password, VMware export VM to OVF...and many more

Features

easy to use by drag and drop

reduced setup time

background running via APIs

no additional costs with implementation

blends with your existing partner ecosystem

secure Veracode certified

official long-term support by UiPath

Integration

Self Service & Delegation, Triggers, Integrations

schedule jobs from the Orchestrator web application - for example, the controlled maintenance power-off of a datacenter

jobs automatically triggered by an event - for example, a password reset based on a ticket

nightly trigger a servers power-off job to stop unused computers and save costs.

Orchestrator mobile app

start process jobs from your mobile devices

access logs and reports on the go

reply to Long Running Workflows approval requests

react to critical IT requests in real time.

Integrate the existing IT scripts in the UiPath automations

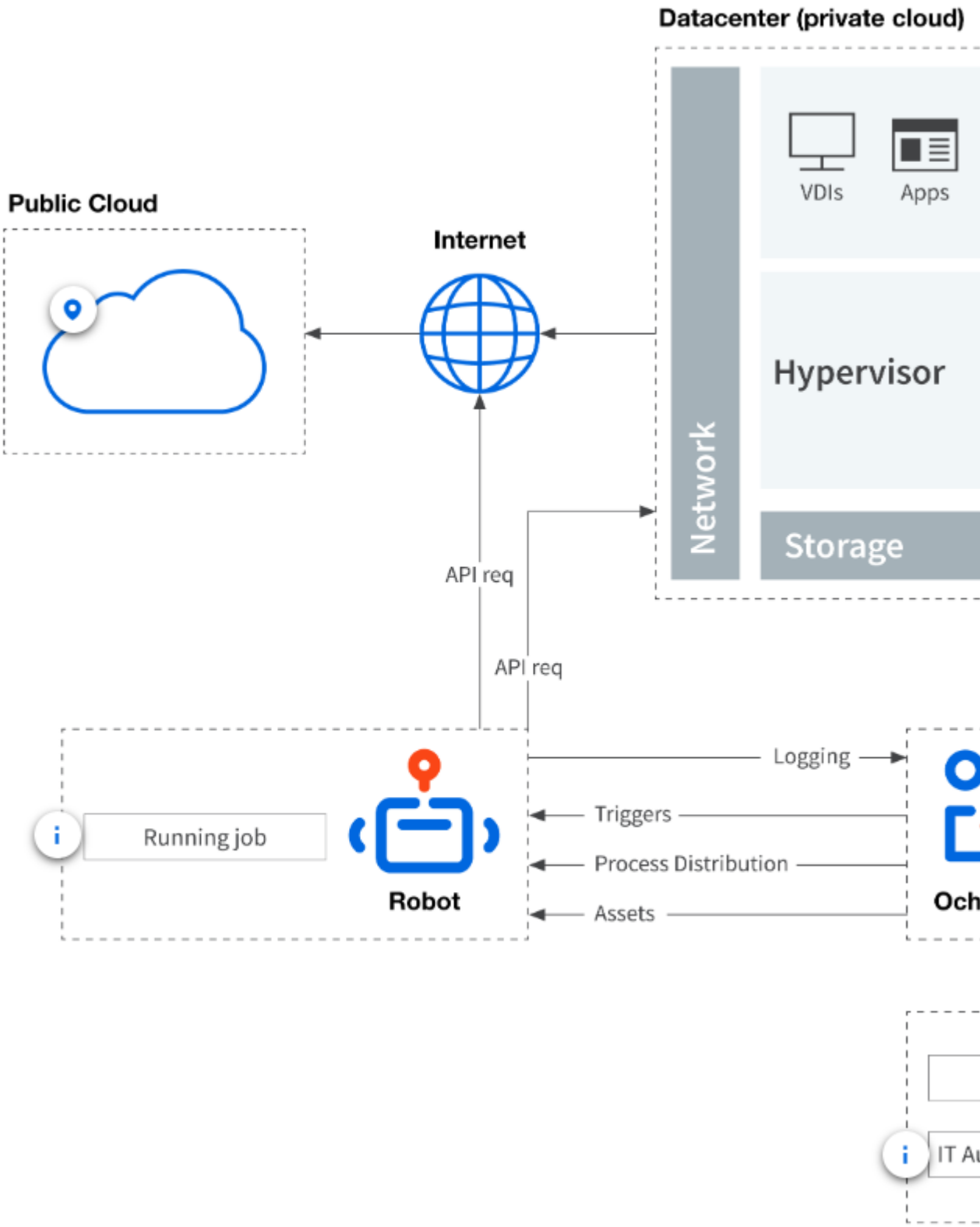
increased security - for example, credentials can be safely stored in Orchestrator assets or secure vaults

access control - delegate workflow executions to other colleagues

mobility: run them on the go

integrated with approval and persistence

support for Audit / ISO certifications - logging layer and reporting.



Important Terms

Microsoft Active Directory

Active Directory (AD) is a directory service that Microsoft developed for the Windows domain networks. It is included in most Windows Server operating systems as a set of processes and services. Active

Directory uses Lightweight Directory Access Protocol (LDAP) versions 2 and 3, Microsoft's version of Kerberos, and DNS.

Fore more info

Domain Controller

A Server running in Active Directory Domain Service(AD DS) is called a domain controller.It authenticates and authorizes all users and computers in a Windows domain type network-assigning and enforcing security policies for all computers and installing or updating software

sAMAccountName

The sAMAccountName property is a login name used to support clients and servers from the previous versions of Windows, such as Windows NT 4.0,Windows 95,Windows 98, and LAN Manager.The login name must be less than 20 characters and be unique among all security principal objects within the domain

Fore more info

Microsoft Exchange Server

Microsoft Exchange Server is a mail server and calendaring server developed by Microsoft. It runs exclusively on Windows Server operating systems

Fore more info

MailBox

User mailboxes are Exchange mailboxes that are associated with people,typically one mailbox per person. Each user mailbox has an associated Active Directory account that gives the person access to the mailbox to send and receive email messages and create meetings and appointments

Fore more info

Exchange Management Shell

The Exchange Management Shell is built on Windows PowerShell technology and provides a powerful command-line interface that enables the automation of Exchange administration tasks.

It can be used to:

Create email accounts

Create Send connectors

Receive connectors

Configure mailbox database properties

Manage distribution groups

Bulk Operations

In fact, when you do something in the Exchange admin center (EAC), the Exchange Control Panel (ECP), or the Exchange Management Console (EMC), it's the Exchange Management Shell that does the work behind the scenes.

Fore more info

Active Directory and Exchange Server Activity

Prerequisites for Active Directory

Active Directory Server

Username

Password

It offers activities for Microsoft Active Directory Domain Services (AD DS)

It provides a hierarchical data storage for objects in a network.This set of activities enables IT professionals to easily automate important operations with Active Directory objects like users,groups,and computers

Possible operations that can be automated are:

Creating and updating user groups

Managing group membership

AD object management

Access control and

rights management

Microsoft Exchange Server

Install Exchange Management shell on the Exchange Server

The machine where the workflow is running should be domain-joined with the Exchange Server, and access should be available - FQDN(Fully Qualified Domain Name) of the Exchange Server should be known/resolved by the robot machine. e.g., Mail.devsl.local

It offers administration activities for On-Prem Microsoft Exchange Server 2016 and 2019

With these activities, you can delete and create Exchange mailboxes , as well as enable and disable archiving for existing mailboxes.

Various Possible Processes that can be automated

Employees Onboarding

When a new employee is hired in a company, the HR department provides the input for a UiPath automation process which can be in any format, let's say Excel.

Our workflow will create a corresponding new user account in Active Directory, will generate a random password for it and will set it to expire after the first login, and lastly adds the user account to a list of specified groups.

Employees Offboarding

When an employee leaves the company, the associated Active Directory user account is removed from the groups it belongs to and the user account is disabled.

Password Reset & User Account Unlock

These are the most common IT operations that are happening on a daily basis in any company. Automating them will make the life of IT admins easier.

For example, employees can make requests to an IT Help Desk Chatbot which automatically triggers a UiPath process to respond to their requests for password reset or user account unlock. This can happen almost instantly.

Active Directory Objects Management

These are the most common IT operations that are happening on a daily basis in any company. Automating them will make the life of IT admins easier.

For example, employees can make requests to an IT Help Desk Chatbot which automatically triggers a UiPath process to respond to their requests for password reset or user account unlock. This can happen almost instantly.

Access Control & Rights Delegation

You can manage the access to miscellaneous resources via Active Directory group memberships.

Orchestration Process

Long-running workflows

A Long running workflow is a workflow which needs to wait for an external service to complete a period of time to pass or a Human user to provide input before it can continue

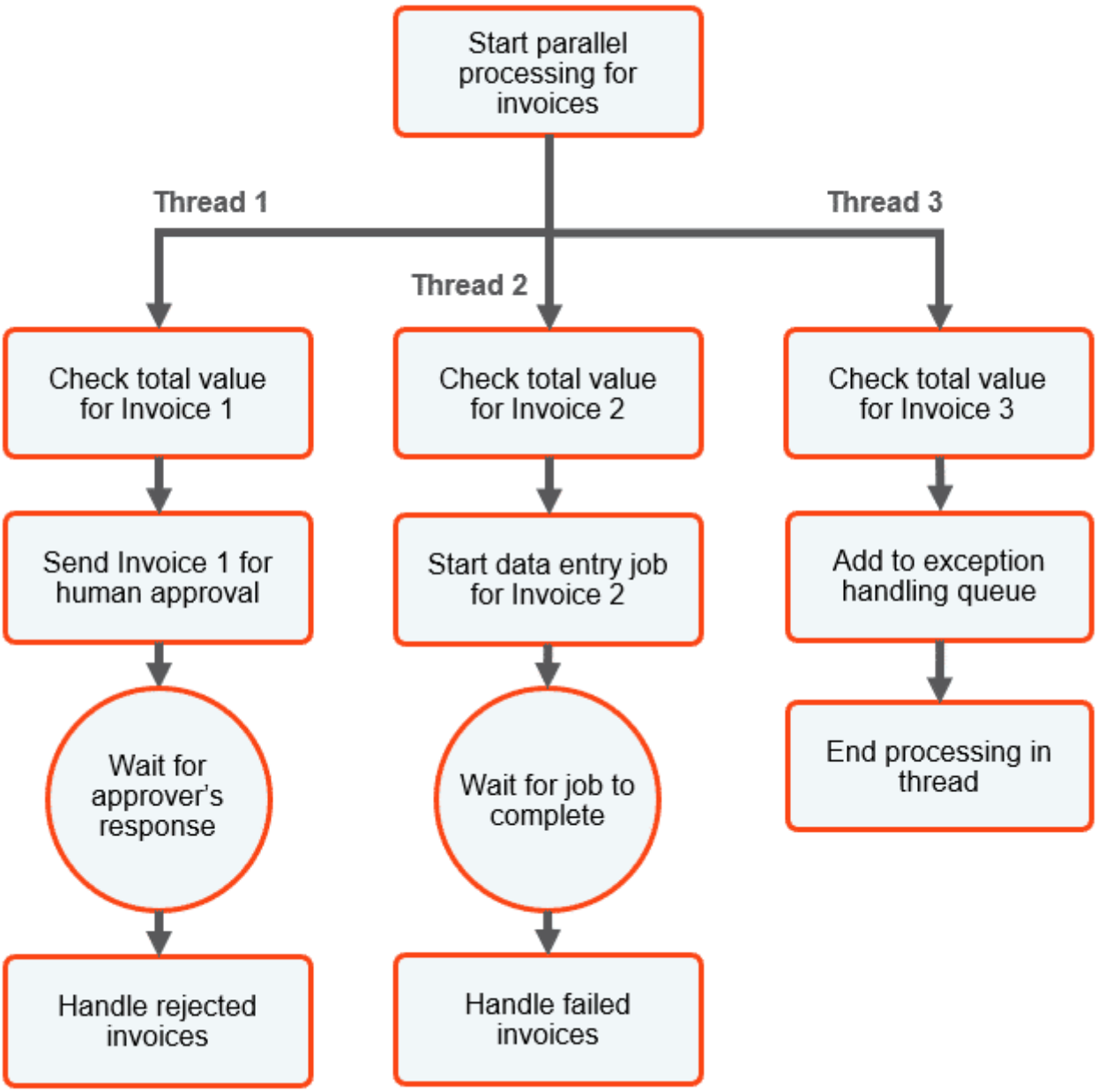
These go into a suspended state until the conditions are met for it to resume. This greatly reduces resource usage

While the long-running workflow is waiting, the workflow context (The state variables ad of the execution) remains persistent

Asynchronous Processing

When executing a set steps synchronously,like in the case of a For Each activity, the system waits for each iteration of the loop to complete before executing to the next one.

When executing the steps asynchronously,like in the case of a Parallel for Each activity ,multiple transactions can be processed at the same time. The transactions are executed in different threads. Threads are series of activities that can run concurrently.



When should we choose Orchestration Process

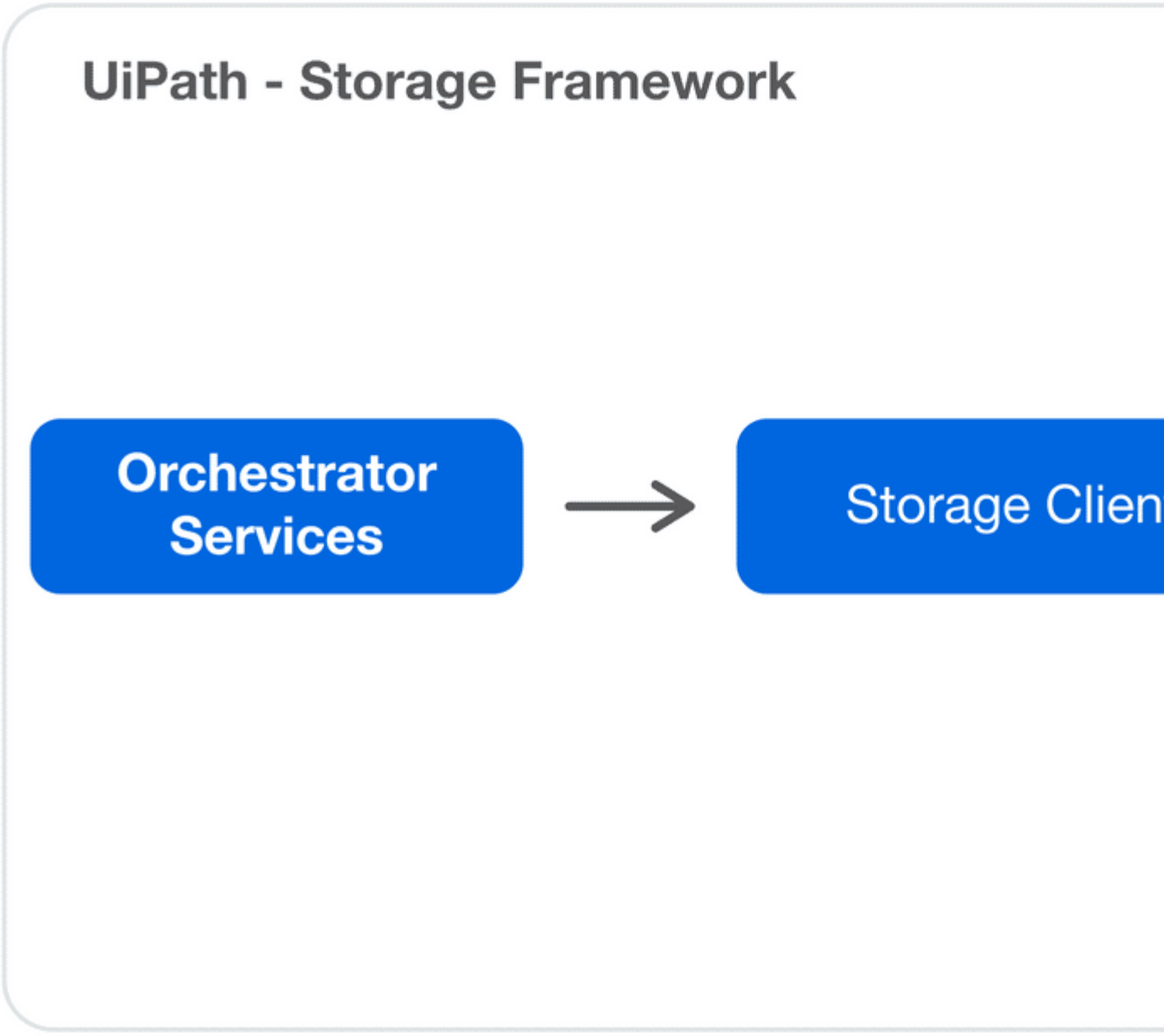
When our process will run in an unattended environment and requires that we use a rules engine to stitch together robot tasks, human tasks and asynchronous processing.

When the execution of our process needs to wait for an event to complete and we don't want the robot to keep polling for resources

Universal Blob Storage

The Universal Blob Storage allows you to publish a set of generic storage API methods. By using this approach, the application services become agnostic of the native storage provider

The UBS makes the process of switching between different flavours of storage solutions easy and transparent, facilitating cost optimization, performance scaling and data center improvements



UiPath - Storage Framework

Definition of Terms

Storage ~> Abstract a key-value storage solution.The Storage Client API interface is compliant with the Object Storage cloud terminology.The API user should design the data with respect to a flat model(bucket like).

Storage Provider ~> The underneath implementation of the persistence system, the storage wapped by the Storage Client API interface

Storage Bucket ~> Bucket as it is described by the Object Storage concepts. By analogy with the traditional file systems, the bucket should be read as a disk volume

Storage Content ~> The actual data being persisted into the wrapped storage solution

Storage Content Prefix ~> The mechanism to logically group the saved content under a single bucket

Storage Location ~> It fully describes the location of the content inside the storage, that's the tuple (key,prefix,bucket). The key must be unique across the enclosing bucket

Storage Transaction ~> It's a best effort mechanism to address the all-or-nothing request for a set of storage commands

AI Computer Vision Demo

To install, first we need to remove UIAutomation activities which comes pre-installed

Go to Manage Package and install Computer Vision activities package given officially by UiPath

It Gives various activities and Computer Vision Recorder

server path is cv.uipath.com

ESC ~> Stop Recorder

F2 ~> Delay

F5 ~> Refresh CV scope

ALT + left ~> to back to main page

All the activities are selected based on Anchors

yellow color ~> Similar selections are present on screen

red color ~> Selection is not unique or does not have proper unique anchor

green color ~> selection and its anchor is unique and usable

CV Highlight ~> This activity is used to highlight any particular element in our workflow during execution. It can use output object of some activity as its input object to detect and highlight an object/element

Article for more learning

Intelligent OCR Activities

Taxonomy Manager ~> Create and edit a set of document types that are sorted by Groups and Categories

The created taxonomy can be used by converting it into a .NET data type with the Load Taxonomy activity

The Digitize Document activity is used to turn the docs into digitalized docs generating classification algos used by the Classify Document Scope activity

The Classify Document Scope activity allows for the usage of any classification algorithm to identify the type of a document

classificationResults.Any tells if classification is possible or data is possible to be extracted

The Data Extraction Scope activity enables us to retrieve information from documents based on the taxonomy and document type by calling the data extraction algorithms we configure

The object can be mapped to a DataSet using the Export Extraction Results activity, or used as-is for more complex queries

The Train Classifiers and Extractors scope activity allows for the completion of the feedback loop for any classifiers and data extraction algorithms capable of learning (the Keyword Based Classifier for example)

Important Docs to be referred when using these activities Intelligent OCR activities

These are similar to IQBot functioning

UiPath Remote Extension

Used to automate applications inside Remote Applications

Needs to be installed in Remote Systems

Can be obtained through Contacts form from UiPath website easily

helps to use any NativeDesktop RDP and Citrix Automation

RPA Solution Architect Role

The RPA Solution Architect will design the end-to-end architecture of the RPA solution,typically this is achieved through a diagram that represents the logical connections between the robots, the entities used, all the involved sub-processes, and the input and output data

Involved in various stages such as development,testing and performance analytics

Decide how many robots to be used,what their configurations are going to be and how they will be split between files and Orchestrator assets as well as what Queues, schedules and documents will be used

Logging and Reporting

Needs knowledge of Servers,storage,firewalls,load balancers, routers etc.

Stages of an RPA Project

Infrastructure Setup (Enable)

Designing the server architecture

Installing and configuring the architecture

Setting up dev,test & production environments

Project Governance (Preparation)

Agreeing on the project development approach

Reviewing the RPA best practices

Workflow Design (Design)

Filling the Process Design Document (PDD)

Creating test cases and data

Designing the solution

Workflow Development (Build)

Building the workflows

Performing Unit and Functional testing

Creating the Development Specification Document (DSD)

Quality Assurance (Test)

Executing the test cases

Reporting the results

Making the Go/NoGo descision

Hypercare (Sustain)

Performing workflow support

Managing Changes and improvements

Python

The Python Activities can be used using the Package UiPath.Python.Activities

This Package Consists of following activities:

Python Scope

Load Python Script

Invoke Python Method

Get Python Object

Run Python Script

Python Scope

This Activity is used to set or connect UiPath robot with python environment installed on your system.

This activity requires path to the folder containing the python.exe file

UiPath currently only supports python version < 7

The Path to python.exe can be acquired from the Windows Environment Variables tab

Make sure python 3.6 or less version can be accessed by cmd using python keyword.

Load Python Script

This activity enables two kind of inputs

Code ~> You can just type the complete code as within "" (Double Quotes)

File ~> Best approach is to write your code in a python file and give path to the file in this input field

This activity gives an python instance to be referred to in another activites

Invoke Python Method

This activity is used to execute specific functions from our python code that are present in python instance which is the output of the Load Python Script activity

This activity enables 3 kinds of parameters:

Input Parameters ~> Any number of input you would like to provide to your function. This input should be in the format of object The object should be like {"some string","charcater like /"} Assuming our python code is

```
from collections import Counter


def CalculateCharacterLength(string,char):
    strDict = Counter(string)
    return strDict[char]
```

Instance ~> It takes python instance to work upon

Name ~> The input to this field is the exact function name to be called

The output of this activity is a python object or python instance which again needs to be converted to .net object to be used along with other activities

Get Python Object

This activity is used to Convert Python object to required data type to be used in other uipatha ativities

Run Python Script

This activity is used to execute any python code as similar to double-clicking an python .py file

Use Case

To Send Images in Email Body embeded inline, we can use following python code along with our bot

```
# Send an HTML email with an embedded image and a plain text message for
# email clients that don't want to display the HTML.
import smtplib
from email.mime.multipart import MIMEMultipart
from email.mime.text import MIMEText
from email.mime.image import MIMEImage


def SendMail(From,To,Password,Message,Subject,ImgPath):
    # Define these once; use them twice!
    strFrom = From
```

```
    strTo = To

    # Create the root message and fill in the from, to, and subject headers
    msgRoot = MIMEMultipart('related')
    msgRoot['Subject'] = Subject
    msgRoot['From'] = strFrom
    msgRoot['To'] = strTo
    msgRoot.preamble = 'This is a multi-part message in MIME format.'

    # Encapsulate the plain and HTML versions of the message body in an
    # 'alternative' part, so message agents can decide which they want to display.
    msgAlternative = MIMEMultipart('alternative')
    msgRoot.attach(msgAlternative)

    #msgText = MIMEText('This is the alternative plain text message.')
    #msgAlternative.attach(msgText)

    # We reference the image in the IMG SRC attribute by the ID we give it below
    # '<b>Some <i>HTML</i> text</b> and an image.<br><img src="cid:image1" width=20px
height=30px><br>Nifty!'
    msgText = MIMEText(Message, 'html')
    msgAlternative.attach(msgText)

    # This example assumes the image is in the current directory
    fp = open(ImgPath, 'rb')
    msgImage = MIMEImage(fp.read())
    fp.close()

    # Define the image's ID as referenced above
    msgImage.add_header('Content-ID', '<image1>')
    msgRoot.attach(msgImage)

    # Send the email (this example assumes SMTP authentication is required)

    smtp = smtplib.SMTP('smtp.gmail.com',587)
    smtp.starttls()
    smtp.login(strFrom,Password)
    smtp.sendmail(strFrom,strTo,msgRoot.as_string())
    smtp.quit()
```

return "Mail Sent"

UiPath Test Suite

Software Testing ~> Software testing is the process of verifying that a software meets certain requirements and behaves as expected

The requirements can be differentiated into 2 aspects:

Functional ~> refers to an expected behaviour

Non Functional ~> System Efficiency

Different levels of Testing:

Unit or Component Testing ~> In this one we focus on testing individual 'code' units, down to the level of methods and functions (done by software developers)

Integration Testing ~> In this we focus on the interactions between the components or systems

System Testing ~> In this we focus on the behaviour of an entire software system or product. Also referred to as End-to-End testing

Acceptance Testing ~> In this testing, we include end users and other key stakeholders, to check how the users behave with the software differently or as intended.

Different types of testing:

Black Box Testing (Focus on Input & Output) ~> Black box testing solely focuses on providing a certain input and verifying the output

White Box Testing (Access to Implementation) ~> White box testing provides a certain amount of access to the source code to the tester

Manual Testing (Run by a person) It is further divided into * Scripted (Requires Processing) ~> pre-defined steps of operations, followed by specific verification steps * Exploratory (Requires Thinking) ~> Manually performed, but it typically provides only a high-level charter,then it leaves the rest to the actual testing to explore in detail.

Automated Testing (Run unattended by a Robot) It is further divided into * UI Testing ~> Test the business layer * API Testing ~> Test the API layer. It includes several interfaces and protocols, such as Soap, Rest, Queues and many other

Activity Coverage Widget -> The Activity Coverage Widget calculates the total number of activities that were successfully run form the original workflow or flowchart.Once an activity has run successfully it will be become green.While the workflow runs the widget gets updated in real time.

The coverage of each individual workflow can be verified individually by highlighting them;

When creating new test cases in StudioPro by right-clicking an RPA Workflow and selecting Create Test Cases you will be presented with the standard Given, When, Then containers structure

The RPA workflow which was right-clicked was automatically invoked in the When section

The Then section acts as the verification point. This is achieved by using a Verify Control Attribute activity that checks if the path for the output folder has been created.

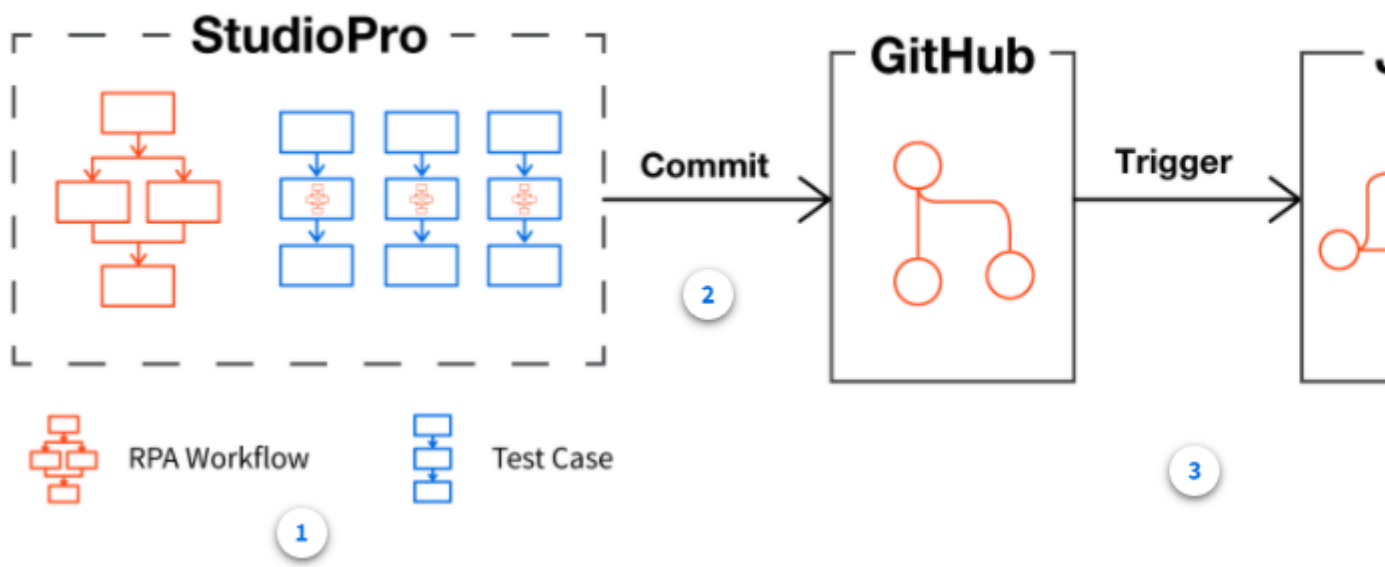
Data-driven test cases can be easily created by right-clicking simple test cases and selecting Add test data or by selecting the Create Data-Driven Test Case button from the ribbon section

For any changes in the excel, the user needs to reload that test data into the bot

The Studio, itself builds arguments with same name as column name to use excel data

Verify Control Attribute -> This activity checks if the output of any activity is equal to the given fixed input

The output of this activity is visible in the Output Panel



For more info on Jenkins integration with RPA, Check Out

UiPath Document Understanding

This topic is divided into 7 sections:

Introduction

Taxonomy

Digitize

Classify

Extract

Validate

PostPreprocessing

Introduction

Document Understanding is the ability to extract and interpret information and meaning from a wide range of document types, storage formats (e.g., images, PDFs, text), and objects (e.g., handwriting, stamps, logos).

There are two types of data extraction methodologies:

Rule-Based data extraction

Model-Based data extraction

Rules-Based data extraction ~> It relies on a set of rules to extract data from a document (like using regex)

Model-Based data extraction ~> It is based on Machine Learning

Semi-structured document ~> it extracts the same data from each document, and it requires a pre-trained ML model with further retraining

Non-structured document ~> It needs to "read" the text to extract the meaning and identify the right data.Thus it also requires pre-trained models and retraining.

OCR is a method that reads text from images,recognizing each character and its position.It comes handy in the Digitize step of the process when dealing with non-native documents, like scanned files

Document Understanding Framework

Taxonomy ~> In this pre-processing step, you can add multiple document types and the fields you are interested in extracting.e.g., Total Amount,Patient Name , User/Product Id etc

Digitization ~> As the documents are processed one by one, they go through the digitiation process.The outputs of this step are the Document Object Model and a string variable containing all the document text and are passed down to the next steps

Classification ~> If you are working with multiple documents types in the same project, to extract data properly you need to know what type of document you're working with. The important thing is that you can use multiple classifiers in the same scope,you can configure the classifiers and, later in the framework, train them. The classification results help in applying the right strategy in extraction

Extraction ~> Extraction is getting just the data you are interested in. In this framework, you can use different extractors, for the different document structures, in the same scope application.The extraction results are passed further for validation.

Validation ~> The extracted data can be validated by a human user through the Validation Station. Validation results can then be exported and used in further automation activities

Export ~> Use the validated information or save it in datatable or anywhere else you want.

Training Classifiers and Extractors ~> Classification and Extraction are as efficient as the classifiers and extractors used are.If a document wasn't classified properly, it means it was unknown to the active classifiers. The same way goes for the incorrect data extraction.

Intelligient OCR Activities

Taxonomy Manager ~> With the Taxonomy Manager Wizard, you can create the Taxonomy for your document understanding project, meaning the information that you want to extract and the type of that information. e.g., Data Table,Text,Date etc

Load Taxonomy ~> Loads the taxonomy created with the help of the Taxonomy Manager into a variable that can be further userd with other activities

Digitize Document ~> For scanned documents or images, this activity will use OCR to extract the text and the Document Object Model, a JSON object containing information regarding the positions of the words on the document. (For digital documents, the text will be extracted without the use of the OCR engine)

Classify Document Scope ~> The scope allows multiple classifiers to be used in order to classify the documents. You can find classifiers in the intelligent OCR actvity package, as well as in other UiPath or third-party packages(e.g., Abbyy activities)

Configure Classifiers Wizard ~> Use it to configure the Classify Document Activity. It allows multiple classifiers to be used in order to classify the documents. You can also establish a confidence threshold for each type of classifier

Data Extraction Scope ~> The scope allows multiple extractors to be used in order to extract the data from the documents. e.g., UiPath.DocumentUnderstanding.ML.Activities or your own extractor

Configure Extractors Wizard ~> With this Wizard, you can customize which extractors will be used for each individual field,of each document type.

Present Validation Station ~> Opens the Validation Station, which enables you to review and correct document classification and automatic data extraction results.

Integrated Validation Station ~> This activity pair allows for the creation of Validation Station human tasks in a web-based environment, through UiPath's Actions

Validation Station ~> The extracted data can be corrected and confirmed by a human user through the Validation Station

Export Extraction Results ~> Once you have extracted information, you can use it as it is, or save it in a DataTable format that can be converted very easily into an Excel file

Train the Classifiers and Extractors used ~> Sometimes, the workflow may fail to recognize the document or extract the correct data. To improve the classifiers and extractor's performance, even if they recognized the correct data, they should be trained.

Taxonomy

It starts with categorizing the documents and defining the information you want to extract.

Group the documents based on the department or purpose of the documentextract tables and names or even pick the language document is written in.

There can be only one taxinomy file per project stored in Document Processing folder under the project folder

Once the taxonomy file is created then it can be used in the workflow using Load Taxonomy activity

Taxonomy Manager

Defining the Document Type:

Select or create the group and category that the document is a part of

Add new document type and define its fields

Note: A group can contain multiple categories and a category can contain multiple document types

Defining Document Fields

Editing the name of the document,its belongings, and define the fields that interest you in extracting

Defining the fields in the document, selecting the area and pairing them with their respective variable

New Field ~> Selecting New Field opens up the window on the right,where you can edit the field's information

Editing the Documents Field

Choose a name for the field,specify whether it is multi-value and choose its type Taxonomy Manager Doc To store taxonomy file at different location

Digitizing Scanned and Native Documents

All the documents that are to be processed (native and scanned) must pass through this step in order for the robot to understand the kind of document it's working with and what data is relevant

Turning the document into a DOM and extracting the text is done with the Digitize Document activity

The Degree of Parallelism defines how many pages the workflow will analyze in parallel

Supported Entensions are: .png, .gif, .jpe, .jpg, .jpeg, .tiff, .tif, .bmp and .pdf More About Digitize Documentation

Document Object Model

This contains basic information regarding the processed document such as name,content type,text length, and information about each page

Variable data type is document

It is used during validation For More...

Document Classification

This step is used when dealing with multiple document types

It is done using Classify Document Scope activity

The Document Classification Scope Wizard will open at selecting the Configure Classifiers option and it allows users to customize which classifier will be used for each individual type of document

For this, first we create a classify.json file

We have 2 classifiers by default

Intelligent Keyword CLassifier

Keyword Based Classifier

Keyword based requries various kinds of keywords that may came up in the document in different forms, such as for Invoices : statement,invoice,invoiec , in-voice, in voice etc

Configure Classifier is used to select the document type for which the classifer is supposed to be used

We can have multiple classifiers used at the same time

Present Classification Station

In Many cases, document files comes as a package. within the same file, there are multiple document types that contain different sets of information and which need to be treated separately as far as data extraction and post-processing goes.

This activity is used to :

manually split files into logical documents, by selecting a document type and a tange of pages applicable for it

Verify any automatic classification and splitting of a file into logical documents and perform correctios to the automatically proposed classification and separation

Steps:

After the Classify Document Scope, add the Present Classification Station activity

At run time, the classification station will open and show the automatic classification results

If needed, one can adjust the Classification results.

After clicking on the Save button, the workflow continues with the human validated classification information Classification Station Doc

Data Extraction

This is the step to extract the required data from the documents

Data Extraction Scope

Based on the structure of the document, different extractors come to play

The Data Extraction Scope Wizard will open at selecting the Configure Extractors option and it allows users to customize which extractors will be used for each individual field

It allows users to mix and match extractors as well as use extractors in parallel based on which extractor has the highest confidence level

If classification result is provided then Document ID is not required

Steps to work with form extractor:

We added the Form Extractor inside the Data Extraction scope and provided the API Key from the Cloud Platform account. Next, we started to Manage Templates

Created a new template for the W-4 form, using a file from the project's folder, and the OmniPageOCR and we stared configuring it

We matched the first page with representative keywords. To make the multiple selections, we pressed the CTRL key

We started matching the fields with the values defined in the taxonomy. We did this either by choosing the selection mode or pressing the D+X keys.

When we finished mapping all the values, we saved the template.

For unstructured or semi-structured data, we can also regex based extractor

For semi-structured data, ML Extractors can also be used

They can be installed using UiPath.DocumentUnderstanding.ML.Activities package

Things to remember:

The endpoint for community work is https://invoices.uipath.com

API key can be found at platform.uipath.com

Set-up each field in correspondant to pre-configured field types/names

Other Endpoints can be found at

Validation

For 100% accuracy of the results, human validation is always recommended. This step is triggered by the Present Validation Station activity

Present Validation Station

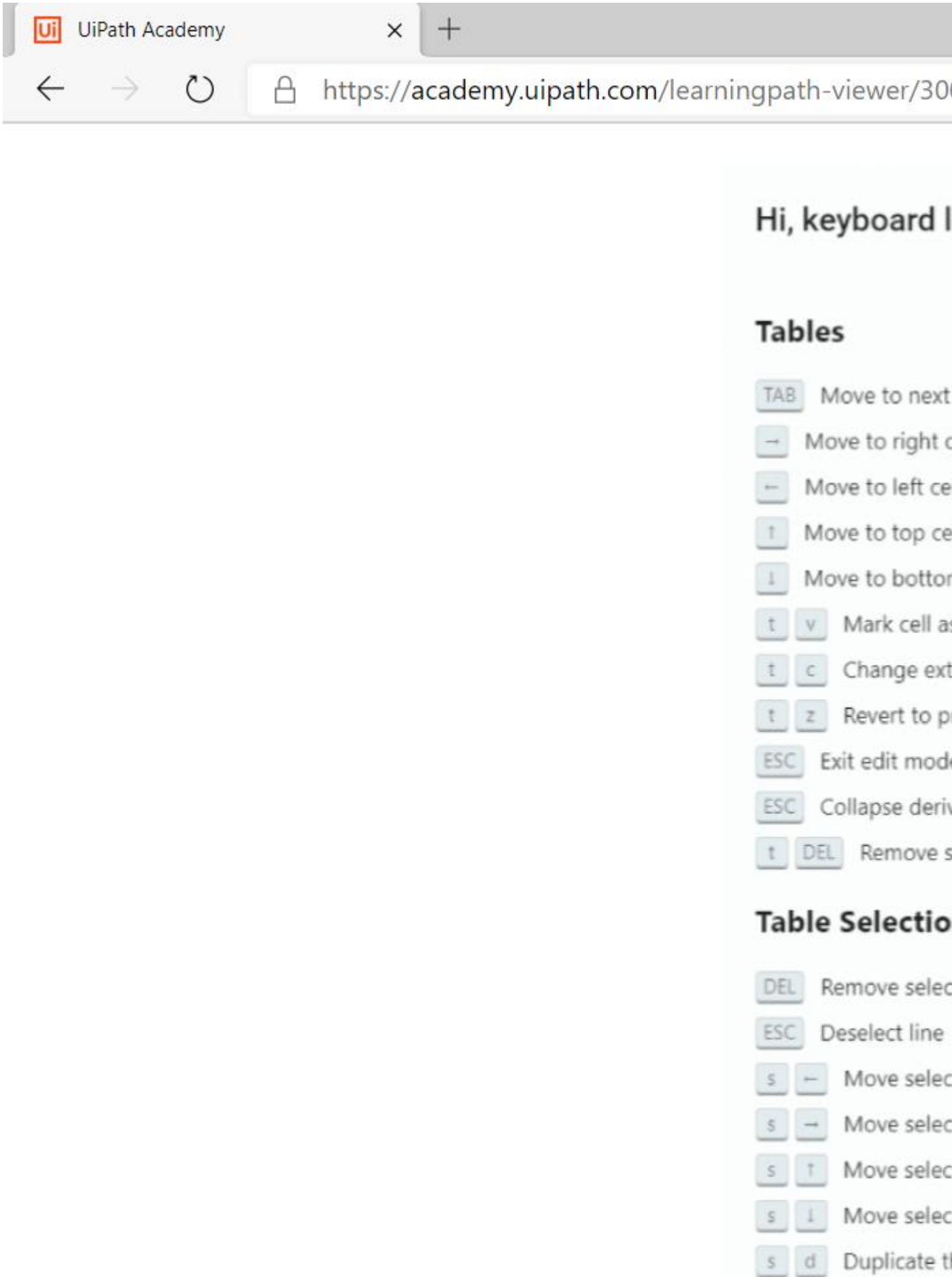
This activity triggers the opening of the validation station.

It's the tool that allows you to review and, if necessary correct the document classification and automatic data extraction results

Use this activity inside a Try-Catch activity to check and workaround of business exceptions

For More...

KeyBoard
Shortcuts


UiPath Academy
https://academy.uipath.com/learningpath-viewer/30
Hi, keyboard l
Tables
TAB Move to next
→ Move to right c
← Move to left ce
↑ Move to top ce
↓ Move to bottor
t v Mark cell as
t c Change ext
t z Revert to p
ESC Exit edit mode
ESC Collapse deriv
t DEL Remove s
Table Selectio
DEL Remove selec
ESC Deselect line
s ← Move selec
s → Move selec
s ↑ Move selec
s ↓ Move selec
s d Duplicate t

Exporting Extraction Results

After you validate the extracted data, you can export it to whatever environment you need in order to consume it. The extraction results can be exported as a DataSet variable which can be further processed.

Export Extraction Results

This activity export the data extracted to a DataSet.

When used with the automatic extraction results and the IncludeConfidence flag is to True, it is the perfect way of accessing the extracted data,with the purpose of any RPA-based validation logic available

The DataSet variable output by the Export Extraction Results activity has a fixed structure as follows:

Table named Simple Fields ~> Contains columns with name equal to each field name in your document type, and the values (on the subsequent lines) pertaining to each field. More than one value in a column is possible if :

You define a field as multi-value in your taxonomy

for a field, with multiple suggestions

Table named Simple Fields - Formatted ~> it is same as simple fields but it provides the output in proper formatted way like for date YYYY-MM-DD and for Address and Name fields, these values contain a JSON representation of the Address and Name parts respectively

A collection of tables ~> two for each table field in the document type

Note:It is strongly recommended, for easy identification and understanding of the output DataSet content, to exercise by looping through the DataSet.Tables in a For Each activity, and writing each Table in a sheet of an Excel file using the Write Range activity.

Train Classifiers Scope

This activity has ability to train the classifiers using either the output of the Human Validated Classification Station or the output of the Validation Station - as both sets of information are human confirmed and can be ingested by the classifiers to self-learn

It is used using Train Classifier Scope activity

Intelligent Form Extractor

Used got extracting handwritten words/characters from documents

Has few limitations for Community edition:

The size of the documents is limited at 1 page.

Community endpoints are rate-limited per IP address at 50 requests per hour.

If the rate-limit is reached, an 429 - Too Many Requests error is displayed, and the IP address is blocked for 1 hour. To Learn More...

Access to On Demand Webinar to Document Understanding

Schedule Task using Windows Scheduler

Note: This process is not officially supported by UiPath

To Schedule your bot, follow the given steps

Publish your bot to packages that is create a .nupkg file

Create a .bat file with content as "Path-to-UiRobot.exe" -file "path-of-nupkg" e.g., "C:\Users\piyus\AppData\Local\UiPath\app-20.6.0-beta0093\UiRobot.exe" -file "C:\ProgramData\UiPath\Packages\JU.ParentPortal.1.0.1.nupkg"

Open Windows Task Scheduler

Click on Create Task

Give some name to your Bot Schedule

Set Configure for to Windows Vista , Windows Server 2008

In Triggers tab create a new trigger, select On a Schedule and set some time

In Actions tab, set things as

Action: Start a Program

Program/Script: cmd

Add a argument: /c "file-name-with-extension"

Start in : path-to-the-directory-containing-file(without double quotes)

In Conditions tab, uncheck the box with Start task only at AC Power

Click ok and close the scheduler, bot is scheduled successfully

Automation Hub

It ia collaborative tool for automation opportunity identification,pipeline management and process repository

Automation Hub is used by :

Employees with automation ideas ~> Business users need transparency on the automation program, on the one hand,and an easy way to contribute their ideas and expertise

The C-suite ~> The C-suite needs a single source of truth on the performance of the automation program, as well as reliable and easy to read information for the decision making process

Center of Excellence Leaders and their teams ~> Center of Excellence members need one place to store all the information, documentation and contribute to the automation ideas to turn them into reality.

Process Mining

UiPath Process Mining is a Process Mining Solution that transforms data from your IT systems into visual interactive dashboards,allowing you to see existing value decreases, bottlenecks and discrepancies, as well as understanding the root-causes and possible risks.

System Administrator

Setup and **maintenance** of the platform

The only user role that needs **direct server access**

Mostly needed in the beginning of implementation

Mostly part of the **IT department**

Application Developers

Create **apps** for business users

Do **not** need **direct access** to server

Access to **all source data**

Technical expertise for handling data and creating dashboards is required

Training is needed, **domain knowledge** is recommended

.

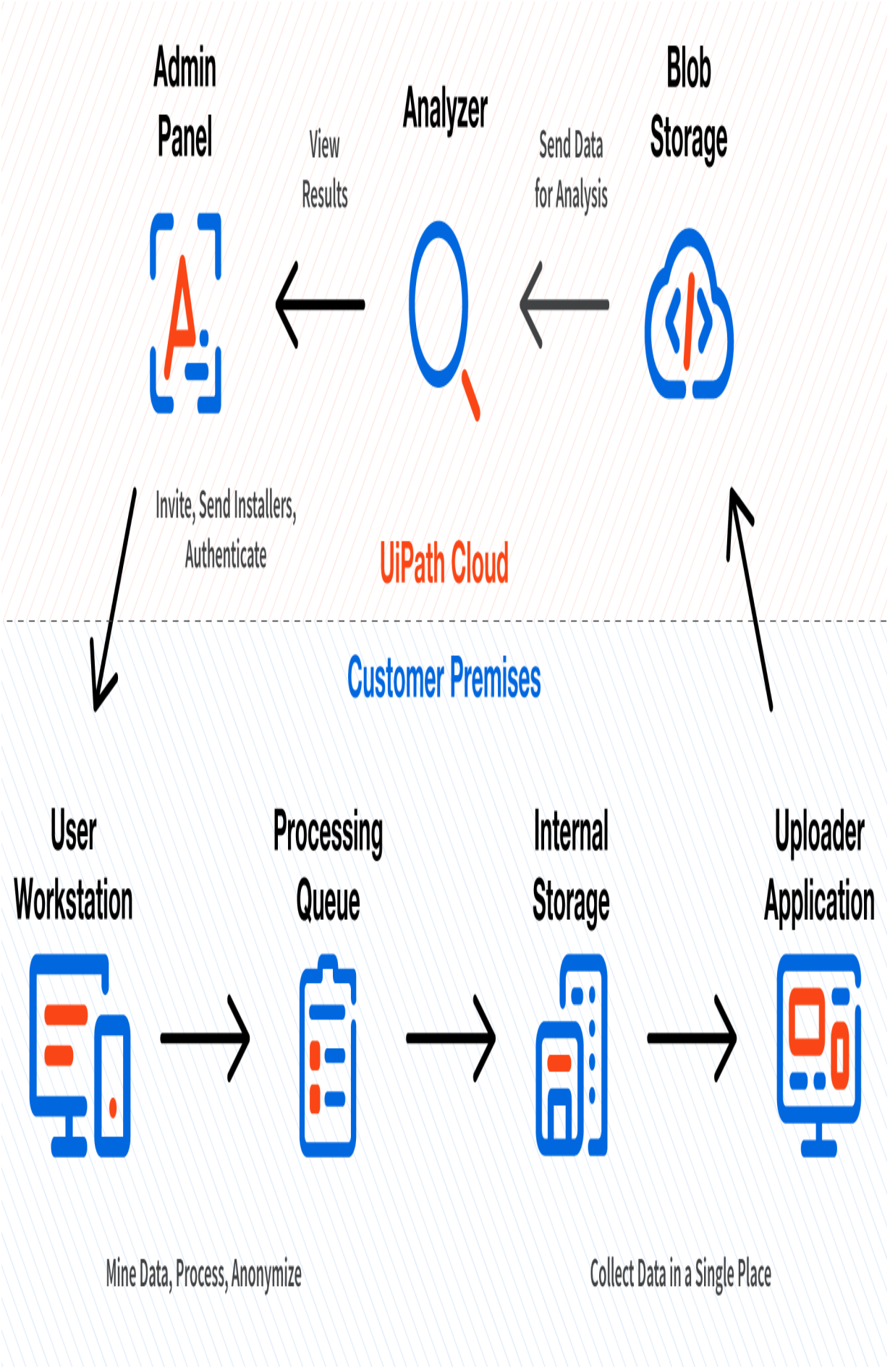
Process Users

Uses the **applications** created by the application developers

Data access is **limited** to what is needed

No technical expertise required

Required training **minimal**


Admin Panel
View Results
Analyzer
Send Data for Analysis
Blob Storage
Invite, Send Installers, Authenticate
UiPath Cloud
Customer Premises
User Workstation
Processing Queue
Internal Storage
Uploader Application
Mine Data, Process, Anonymize
Collect Data in a Single Place

Admin Panel ~> A cloud hosted web application that allows the customer to configure the projects. The portal enables an admin to invite and manage users, configure project settings and visualize results from past projects

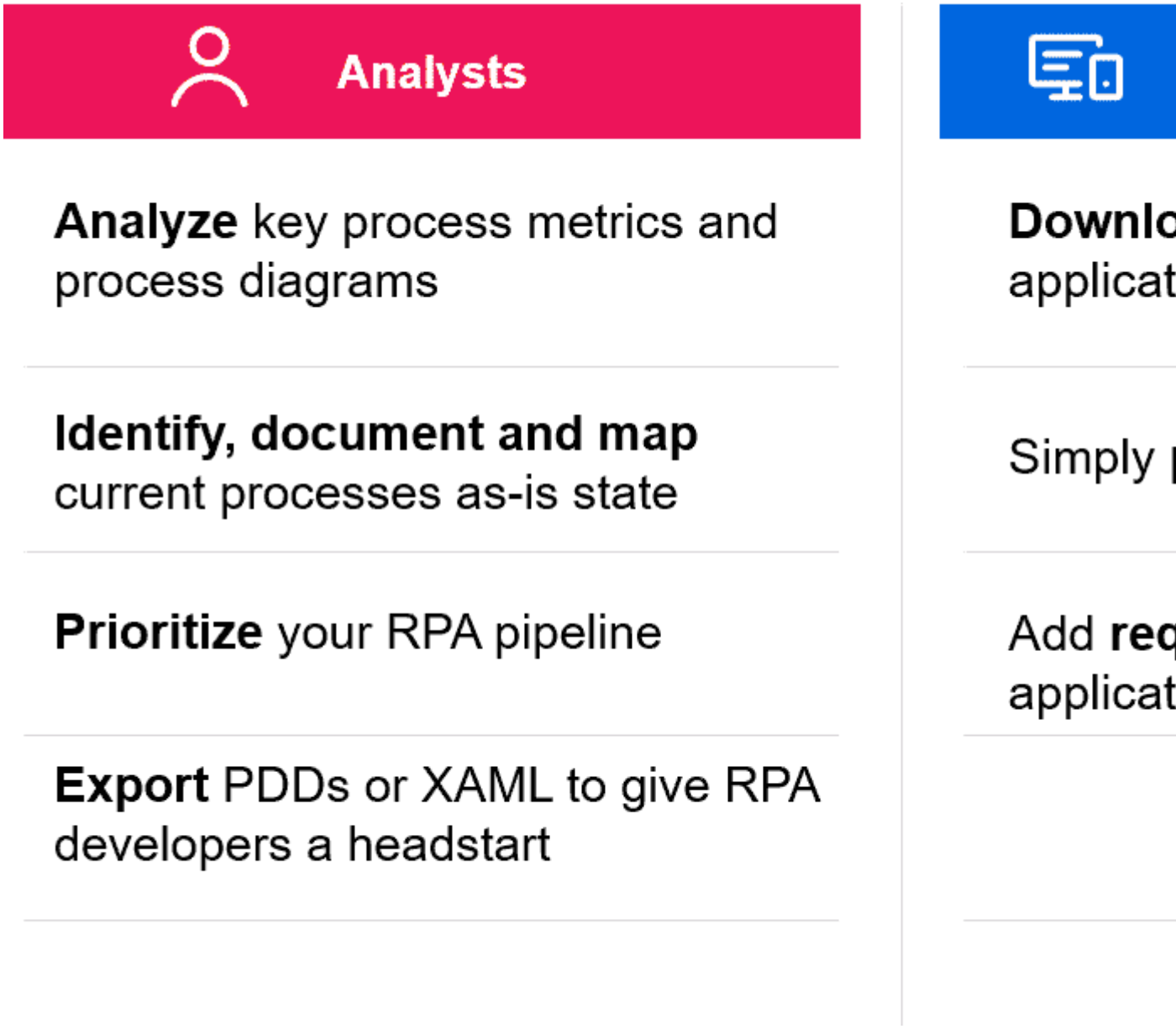
User Workstation (Recorder) ~> The Recorder runs on the users machine and collects data about the tasks they perform. To be more specific, the recorder collects data about the application that the user interacts with, captures keystrokes and clicks,and takes a screenshot for each action

Processing Queue ~> The Data Preprocessing component analyzes locally all the captured data and removes the non-essential or confidential information, based on the configurations that the admin set. It also encrypts and packages the data in order to prepare it for uplaod.

Internal Storage ~> The packaged data is stored on customer premises, in internal storage

Uploader Application ~> Using the uploader application, the data is uploaded to the UiPath cloud

Analyzer ~> Analyzer will decrypt the data and will apply AI to identify tasks. After the analysis is finished, data can be imported and visualized in the admin panel.



Other Features

Dashboard Tab ~> The Dashboard tab is used to track the progress of the project and keep the stakeholders informed by using the graphical displays of the real-time data available.

Users tab ~> The admin can invite users to participate in a study and they can view and manage the users recording status and the user's activity

Settings Tab ~> Helps the admins configure the projects by setting up the data volume limits, configuring the folder path for the data to be stored, and managing the list of applications to be recorded

Processes Tab ~> The admin can view information about the completed processes and import new files provided by the UiPath Representative after the Analyzer stage has been completed

Task Capture

It is a process discover tool that helps you get detailed insights about automation candidates directly from your employees.

It is mainly used by employees with deep expertise on the process analyzed (or Subject Matter Experts, as they are called often) and by Business Analysts.

Task Capture is not licensed separately, but rather comes bundled with Automation Hub. For every Automation Hub license, you will get an unlimited amount of Task Capture activations.

Features

New Process Definition Document (PDD) template

Save the diagram as an image

New localizations

Offline activation

Telegram API Messaging

To send any message using telegram bot API, we will require a bot agent to send messages as a user

To create a Telegram Bot:

Open Telegram and search for BotFather (telegram official user)

Join the channel and send message /newbot

Give a name to your Bot and a unique Username

Once done you will receive a message similar to

Use this token to access the HTTP API: 136XXXXXXX:AAHYYYYYYY

Keep your token secure and store it safely, it can be used by anyone to control your bot.

Save the HTTP API token which is your BOTToken very securely as it can be used to send messages using your created bot.

To use the created bot, we need to add it in some group and for that:

Create a new group

Add all the members you want to be in that group

click on Add Member and search for @BotUsername where BotUsername is the username provided by you while creating Telegram Bot

Now the final thing required is our chatid for that:

Open Browser

Navigate to https://api.telegram.org/bot<YourBOTToken>/getUpdates

You will see a message similar to

"message":{"message_id":2,"from":{"id":607760321,"is_bot":false,"first_name":"Piyush","last_name":"Agarwal","username":"Pykid","language_code":"en"},"chat":{"id":-1001266203044,"title":"Test","type":"supergroup"},"date":1598157993,"text":"Hello"}}]}

Copy and save the chat id as found in this message -1001266203044 and now we are ready to integrate it with our own Bots

In Manage Packages, include UiPath.Web.Activities

Using Http Request activity set, the end point as https://api.telegram.org/bot<BOTToken>/sendMessage?chat_id=<ChatID>&text=<TextToSent>

Request Method can be POST as well as GET

Accept response as JSON

Authentication is not required so set it as None and Client Certificate fields as Empty

You can test by clicking on Preview and if you receive the Response as


```
{
  "ok": true,
  "result": {
    "message_id": XX,
    "from": {
      "id": XXXXXXXX,
      "is_bot": true,
      "first_name": "Testbot",
      "username": "Testbottestingbot"
    },
    "chat": {
      "id": XXYYYYYYY,
      "title": "Test",
      "type": "supergroup"
    },
    "date": 1598160256,
    "text": "Hello World"
  }
}
```


And you Bot is ready.

Database Connectivity with UiPath

UiPath uses UiPath.Database.Activities package to inegrate with database

Connect ~> To connect to the MySql database set the connection string as "Server=localhost;Database=db-name;Uid=user-name;Pwd=user-password;" and create an output connection conn

Execute Query ~> To Perform Select operation on database, use it by giving existing connection as conn

Execute Non Query ~> To Perform Insert/Update/Delete operations on the database

Insert ~> To perform insert operation for a set of rows, this activity is used to insert a complete tabular data in the datatable inside database

Stored Procedures ~> It can be used by using Execute Query activity by changing the command type to stored procedure

String Builder

It can be used to create a long string

Its syntax is new StringBuilder with data type System.text.StringBuilder

A good use-case is to send DataTable as Mail Message to anyone

Steps to Convert Excel DataTable into Html Table:

Create a StringBuilder variable called strbuilder

Use Append function of StringBuilder to append text for HTML code

builder.Append("

<html>

<head>

<style>th,tr,td{border: 1px solid black;}</style>

<body>

<table><tr>")

For each column name to be inserted as header, use For each activity with value as DataTable.Columns and data-type as System.Data.DataColumn

Append the column headers as

builder.Append("

<th>"+item.ColumnName.ToString+"</th>"

)

Similarly Append cells values for each row and every column of individual row

Windows Application using UiPath Apps

UiPath Apps is the latest feature of UiPath 2020 that gives you freedom to develop & customize an App like interface and integrate with your Orchestrator & UiPath Bot

For this Application, npm should be installed in system.

You can download it using Node JS

Once the Process is ready -> Convert into package and publish it to Orchestrator

Go to UiPath Sample Application

Download the Zip file

Open Main.js file and do the required minor changes

Change RUNTIME URL : This is the URL of your UiPath App, After publishing your app when you open it, the url of the browser is what we need

Window Paramet : if you wish you can change the window size

Open package.json , here you can change the display name which is the title of windows application

icon.jpg image is the Windows Application icon, that you can replace with any other image just with same name

Once done, open your cmd and move to respective directory with files

Run the command, npm start -> It will verify for requirements necessary for our application

Run the command, npm run dist to develop the final .exe files which can be run on client machine

This application requires Bot to be connected to Orchestrator so that app can properly trigger the bot

Allow any User to use UiPath App

We can create an app and allow any person to access it without installing UiPath in his system

The User would need to just create an account on UiPath Cloud and the creator of app should add the user in his organization

Role -> It can be understood as an position in the Tenant with specific powers/privileges to services

Group -> It is a group of users you want to categorise with similar powers

UiPath App Roles -> In UiPath app there are 2 roles which can be provided to a user (only one per user)

User (can run) -> User with this role will only be able to run the app

Co-Author (can edit and run) -> User will be able to edit the app and run as well

Process

Create a new Group (will be helpful with multiple users)

Login to your UiPath Cloud

Go to Admin -> Users and Groups

Click on Groups -> Add Group

Give a name, say UiPath Apps

Create a new Role

Launch your Orchestrator

Go to Tenant -> Roles

Add a new Role, say AppUser

Add Tenant Permission : Webhook (View) and Folder Permission: Job (Create)

Click Review and Submit

Add the group created in step 1 to Orchestrator

In My Folders, select Default -> the folder to which user would have access

Go to Settings (Top Right)

Click on Assign User or Group

Enter UiPath Apps and click on Assign

Assign a role to this group

Go to Tenant in Orchestrator

Go to Users

You will see uipath apps listed, click on More Actions

Select Edit and choose Role as AppUser and Update

To add any user to this group

Go back to your UiPath Cloud

Go to Admin -> Users and Groups

Click on Users

Click on Invite Users

Select Group membership as UiPath Apps

Enter the users email and click on Invite

Finally to give access to run your app,

Go to your UiPath App

From the More Options of your created App select Share

Click on Add User

Enter the user name to whom you want to give access

Assign a Role, say User (can run)

With this when user accepts the invite and create his account he will have access to your Tenant and will be able to access apps

User will not have any access to other services or Orchestrator and will only be able to see Webhook calls

And next time to add a new user, you will just have to add him to UiPath Apps Group and give access to specific App you want.

Custom Input

This activity is used to get data from HTML webpages

It requires a JS to be embeded into the code that is

```
<!DOCTYPE html>

<html>

<!-- Simple HTML Code -->

<body>

<h2>Simple Form</h2>


<form action="/action_page.php">

  First name:<br>

  <input type="text" name="firstname" id="FirstName">

  <br>

  Last name:<br>

  <input type="text" name="lastname" id="LastName">

  <br>

  Age:<br>

  <input type="text" name="age" id="Age">

  <br><br>

  <input type="submit" value="Submit" id="SubmitButton">

</form>

<!-- Simple Html code ended -->

<!-- Important Script to get data -->

<script>

   document.getElementById("SubmitButton").onclick = function() {

                  var FirstName = document.getElementById("FirstName").value;

                  var LastName = document.getElementById("LastName").value;

                  var Age = document.getElementById("Age").value;

                  var OutputString = "{\"First_Name\":\"" + FirstName + "\","  +  "\"Last_Name\":\"" +
LastName + "\"," + "\"Age\":\"" + Age + "\"}";


                  window.external.setResult(OutputString);

                  };

</script>
```

<!-- Important Script to get data ended -->

</body>

</html>

For better use of the Output Variable, we can use the deserialize JSON activity from the UiPath.Web.Activities to create an JSON object that can be easily used.

Forms

It provides a look of BootStrap

Dismissed Property -> Used to check if the form is filled or abruptly closed that is True if closed abruptly

To insert data inside forms from outside, we can use FormFieldsCollection where Name refers to FieldKey and Value we want to insert

To Convert a datatable into a Json Object, we use Newtonsoft.Json.JsonConvert.SerializeObject(Table-Name)

If above code doesn't work, then open Imports and add Newtonsoft namespace in it

To insert a DataTable data inside a form, we just same TextFields to represent tabular data for single row with Same FieldKey Name as Column Name placed inside the DataGrid Component

DataGrid and EditGrid both works the same way just different with looks

To Create drop-downs dynamically,probably like States and respective city names

```
// This code will make the do block of form execute without closing the form

const.updateOnChange = instance.updateOnChange;

instance.updateOnChange = function(flags,changed){

   if (flags.modified){

      instance.emit('dropdownChanged','drop');

   }

   return updateOnChange.call(instance,flag,changed);

}
```

And if the body is executed then again the parameters/variables are reassigned into the form

Action Center

UiPath Action Center is the component of the UiPath RPA Platform meant to enable Humans to start processes, then step in, validate, and make decisions regarding the work of Robots in complex processes that require exceptions, escalations, and approvals. Thus, it provides the means for end to end process automation

Whenever bots require human validation,make decisons or anything in which human input is required then, it can use Actions Center to create a form and wait for the input or pause the current task and move to another work

Regardless on how Action Center is accessed, be it from On-Premises or Cloud Services, the functionality of the platform will be the same

Users can have different levels of permission with the platform, being able to View or Manage activities.

Users can resolve tasks as well as start processes from the Action Center platform

If you are looking for a specific task, you can either search for it directly if you remember the task's name, use the Sort by Priority or Filter by Priority functions

Activities outside Action Center such as creating a Jira ticket or adding data to Salesforce can also trigger task creation and completion inside Action Center.

Parts of Action Center

Actions Panel -> This is where tasks are managed.Here you can view, select, search for specific tasks and filter through them

Controls -> Different control options will be displayed depending on the type of interaction required by the assigned activity

Tab Selection -> From here you can access the Home,Actions and Processes Tabs.

Tasks -> Here one can view at task in detail.

Action Status

Unassigned Action Status -> Once an action is generated for a Human user, it will be displayed in the Actions page with the Unassigned Status.This means that no user has been allocated to it

Completed Actions Status -> Once an action is completed by our Human user, it will be displayed in the Actions page with the Completed status and this will allow the Robot to resume the automated business process

Pending Action Status -> If an action is already assigned to a Human user it will be displayed in the Action page having the Pending status. Most likely a queue of such items will form and will be completely in order depending on their priority

UiPath ChatBot

UiPath gives the feature to create your own chatbot by integrating the Orchestrator with the dialogflow and leveraging the power of google dialogflow engine and NLP power

To create your own chatbot, visit chatbot.uipath.com

Steps:

Click on Create new (+)

Give a name to the Connection and Save

Next go to https://dialogflow.cloud.google.com/

Create an Agent and chatbot with features as you like and test in dialogflow

In Build Part, Connect your Dialogflow agent and Orchestrator Service

In Map Part, Map the process with single intent that has all the required variables

You are all set

Steps to Connect Dialogflow agent

Open your Dialogflow Console

Click on Settings Gear icon

Copy the Project-ID and paste in connection details

Open https://console.cloud.google.com/

Select your Project, Same as Project ID

Go to Navigation > IAM & Admin > Service Accounts

Create a new Service Account

Give any name to account and role of Dialogflow API Admin and click on Done

Copy the Email to Chatbot Connection as Service Account

Generate a key from Service Account by clicking on the side 3 dots and copy the Private Key to Chatbot Console

Click on connect and you are done

Steps to Connect Orchestrator Service

Set Deployment type as UiPath Cloud

Open https://cloud.uipath.com/

Go to Admin

Open the Drop-down of your Tenant Name

Click on API Access

Copy all the details to Chatbot Console

Click on Connect and you are Done

Encrypt Text

Encryption of content can be done using UiPath.Cryptography.Activities

It consists of 4 features:

Encrypt Text

Decrypt Text

Encrypt File

Decrypt File

The Algorithms that can be used are:

AES

DES

RC2 (Non-FIPS)

Rijndael (Non-FIPS)

TripleDES

The Key or Password for the files to be encrypted with are user-defined and thus you can basically Password-Protect your files using this package

Encoding field are the inputed with the methods of System.Text.Encoding

The activites are easy to use and can be utilized for maintaining data security over the cloud

LINQ Query

LINQ stands for Language Integrated Query

Its general syntax is for <range> in <iterable> where <condition> group <grouping> select <result>

Few examples for using LINQ with UiPath are:

To get all rows of datatable as enumerable from row in DT1.AsEnumerable select row

To get all distinct values present in a particular column (from row in DT1.AsEnumerable group row by variable1=row.item(column-name/index) into grp=Group select variable1).toList

To convert the data table of list elements like above, (from row in DT1.AsEnumerable group row by variable1=row.item(column-name/index) into grp=Group select Convert.toString(variable1)).toList

To list different columns from a table just like SQL using aggregate functions, (from row in DT1.AsEnumerable group row by var1=row.item(0) into grp=Group let col1_sum = grp.SUM(Function(x) CDbl(x.item(column-index))) let col2_sum = grp.SUM(Function(x) CDbl(x.item(column-index))) select {var1,col1_sum,col2_sum})

LINQ queries are way faster then normal uipath activities probably 10 times

Structure of Linq

Obtain Data Source

Define Filters

Define Grouping Operations

Define Result

Its general syntax is for <range-variable> in <iterable> where <condition> group <grouping-logic> select <result>

To get a list of range of numbers using LINQ, you can use (from num in list1 select num+1).toList

To get the type of Linq Query result, you simply use GetType function

Linq with Excel

Enumerable Data is a collection of data that can be iterated over, though AsEnumerable is not really required in latest uipath versions

Group keyword refers to a Group type for a variable name

New With is something we use when we want to group our rows based on multiple columns and it is used together with another keyword called Key

To get the entires column values for a particular column, from row in DT1.AsEnumerable select row.item(0)

To get the desired data type for the values in our collection, from row in DT1.AsEnumerable select Convert.toString(row.item(0))

To get a list of distinct items in a column, (from row in DT1.AsEnumerable select Convert.toString(row.item(0))).toList.Distinct.toList or (from row in DT1.AsEnumerable group row by pn=row.item("column-name"/index) into grp=Group select pn).toList

To get sum of a column for duplicate columns, (from row in DT1.AsEnumerable group row by pn=row.item("column-name"/index) into grp=Group select grp.Sum(Function(x) x.item("column-name"/index))).ToList

To get multiple columns altogether, (from row in DT1.AsEnumerable group row by pn=row.item(0) into grp=Group let var1=grp.Sum(Function(x) x.item("column-name"/index)) select {pn,var1.ToString}).ToList

To convert the list to a dictionary, we can use ToList.ToDictionary(Function(x) x(0),Function(x) x(1))

To use select function of Group method, syntax is like grp.Select(Function(x) x.Field(OfString)("columnName"/index))

To group rows based on multiple column conditions, use (from row in DT.AsEnumerable group row by pn=New With {Key.A=row.item("column-name"/index),Key.B=row.item("column-name"/index)} into grp=Group select {pn.A,pn.B}).ToList

To merge different row values for a particular column, use (from row in DT.AsEnumerable group row by pn=New With{Key.A=row.item(0),Key.B=row.item(1)} into grp=Group select {pn.A,pn.B,String.Join("/",grp.select(Function(x) x.Field(of string)("Status")))}).ToList(0)

To get a list of DataRow object which is grouped based on some specific columns, we can use (from row in DT.AsEnumerable group row by pn=New With{Key.A=row.item(0),Key.B=row.item(1)} into grp=Group select grp.First).ToList -> In this rows will be grouped on the basis of first and second column and the first group item will be available

AI Fabric

ML Skill -> activity used to check the input

Upload File -> activity used to re-train the model

In Enterprise Trial, we get only 2 Robots which is equivalent to using 4 ML Models and we would need to keep one license free for pipeline if we want our ML Model to train as well

To retrain any model, go to Object Detection

ML Skills are deployed on an Tenant and not on Orchestrator such that ML Skill created on Tenant1 won't be available on Tenant2

OOTB Models

Also known as Out of the Box Packages

Can be found under ML Packages

It contains various machine learning models for different use-cases

Image Analysis

It has two packages: Image Moderation and Object Detection

Image Moderation is used to check the moderation level of images

It is non-trainable

Object Detection

Identify objects from images

Trained on COCO Dataset

It is Retrainable

Guide for Object Detection

Go to AI Fabric

Create a Project

Click ON ML Packages

Select Object Detection from Open Source Packages

Create a package using basic informations

Go to ML Skills

Package Major Version = 1, Minor Version = 0, create the package (takes 3~4 minutes)

Status of package can be check in ML SKills Tab in the orchestrator

Requires the Package UiPath.MLServices.Activities in Studio

Create Input Output folder in the home directory and store the test data in input folder

Use ML activity to upload the file and get an json output having base64 string of identified objects and prediction data

To convert the base64 string to image, we can leverage
the https://marketplace.uipath.com/listings/encode-decode-activities custom activity

English Text Classification

It is a retrainable model

It is based on RoBERTa

Documentation

Micah's Data Set for classification

Restaurant Sentiment Analysis Kaggle Data

Language Detection is supported by Facebook and can detect the language of the text

A Good approach to re-train the model, would be to do it weekly

Guide to English Text Classification

Get the data to train the model

Use Restaurant Data Kaggle Data

The above data is classified into Positive and Negative

The standard splitting of data should be 80-20

Replace all 1 to Yes and 0 to No

Create New Project

Click on create DataSets

Create a folder for Train Set and upload the Train.csv data

Create a folder for Test Set and upload the data

Navigate to ML Packages and select the English Text Classification Model

Go to pipeline and create new

Choose the Train run and Train Data folder

First Column name used be input and second as target, if you want different headers,create parameters

Save the pipeline

Download the trained model from the pipeline which can be used later on in any projects

Once the Train data is deployed, run the same on Evaluation pipeline where data will be Test Data

For ML skills , model versions are minor & major as 1

Create a new process with ML Package and Web Activities package

Rest procedure is same as earlier with Object Detection

Sentiment Analysis

We don't need any dataset as it is an Pre-trained Model and thus can not be Retrained

Open sourced by facebook research, trained on Amazons product data review

Possible predictions are Very negative, Negative, Neutral, Positive, Very Positive

Mostly used AI Fabric model

Blog with Usecases

Guide to Sentimental Analysis

Create your ML Package (V2)

Create ML Skill

Simply your skill is ready and thus it can be utilized in any studio workflow

The ML skill would definitely give an error if no input is passed to it

Language Comprehension

All the models are NLP based models

Question Answering

Can give answer for any question by analyzing given paragraph

We don't need any dataset as it is an Pre-trained Model and thus can not be Retrained

Input is in the form of json string

Example "{\"paragraph\": any text,\question\: any question}"

Newline characters are not supported inside paragraph

Semantics Similarity

Finds similarity between 2 sentences

Score of 0 -> No Similarity

Score of 5 -> High Semantic Similarity

Text Summarization

Works for about 300 characters only as of now

Provides back an summary of paragraph provided to it as an input

Language Translation

All the packages are Non Re-Trainable

There are few language translation models:

English To French

English To German

English To Russian

German To English

Russian To English

The models are open-sourced by Facebook AI Research

Input and Output are simple strings

To detect the language of any string, there are two ways:

Language Detection model

Google Vision Package -> Can detect language from image

Deploying these models are also very simple and easy to use, same as other

TPOT Model

It is an Trainable model

After Successful training, it provides us with Trained ML Model that is model.sav

Need to Train the Model :

By Train Pipeline

By Evaluation Pipeline

The Ratio should be of 80:20 Percentage

The TPOT Model takes input in an json format as

{"column-name1":[value-column1],"column-name2":[value-column2],"column-name3":[value-column3]...}

Predicted values are not exact but close to the range of expected value

Accuracy is directly proportional to the Training Data

Invoke Method

The Invoke method activity helps us call a method that is outside the standard built-in activities

The activity calls a public method of a specified type or object

It acts either on Target Type or Target Object

Uses

When we have a class library/DLL in vb.net or c# and want to call the method

When we want to use a method which does not generate an output, thus can not be used in an Assign activity

When we want to use a method which generates several pieces of output (example, TryParse which generates a Bool and Int32)

Method Types

Method Type define the way of configuring the Invoke Method activity

It is of 2 types:

Static -> Target Type and MethodName are used (TargetObject not)

Instance -> The object from which the method or members are derived needs to be defined (TargetObject is used)

To figure out whether a method is a Static or an Instance method, you can check the Method signature in on the MSDN website. Below, you can find the signatures for a Static method, Round(Decimal), and an Instance method Sort(Comparison).

A quick way to tell what kind of method you are dealing with is to check if the method signature contains the word "static. If it does, the method is static. If it doesn't, it's instance.

GSuite

There are various GSuite features that we can leverage using UiPath

Such as

Sheets

AppsScripts

Calendar

Docs

Drive

Gmail

Everything works inside the GSuite Application Scope

There are 2 things required to use GSuite Activities

ClientID

ClinetSecret

Set the OAuthClient to Custom

In Configure scopes, select the Suite Apps you want to use

Now you can drag and use any activity from GSuite inside the Scope

To Access the applications on Gsuite, first time user will have to give access to the application on Browser opened by UiPath and Google might show the Application to be Untrusted but nothing to worry and Move Advance and Give the Required Permissions

Delete File activity removes the file from the Drive completely that is it can not be retrieved from Bin

Configure Scope is an activity that is used to provide access to the Application to specific resources, needs to be done only once

Generating ClientID and Secret

Goto https://console.cloud.google.com/

Create a New Project

Goto APIs & Services in the Left Navigation Bar

Open Library

Select Google Drive API and Google Sheets API

Repeat Step 3 and Go to OAuth Consent Screen

Create an new app, give any name you prefer

Repeat Step 3 and Go to Credentials

Create a credential, and save the ClientID and SecretKey

Remember not to share these with anyone

Object ID of Sheet

In GSuite, we do not access files based on names rather using objectId

To get the ObjectId, we have got 2 ways:

Through URL as
in https://docs.google.com/spreadsheets/d/1Bmi3TMxLE2OMGk2Wz1mFm3O3HJyDdyAwrvZcXxEz2Fw/edit#gid=0 the object id is 1Bmi3TMxLE2OMFk2Wz1mFm3O3HJyDdyAwrvZcXxEz2Fw that is betwwen /d/ and /edit

Through Drive activity Find Files and Folders, we specify the SearchExpression as "name = 'nameoffile-withoutExtension'"

Access Files from Folder

To access all the files from a folder, we need the object id of the respective folder

To get the Object Id of folder, we can use the Find files and Folders activity with input as "name='Folder-Name'" and save the Id in a variable say FolderId

To get a list of Google.Apis.Drive.v3.Data.File which is basically a file present in Google Drive again use Find files and Folders activity with input as """+FolderId+"' in parents and name contains '*'" which will give a list of files available in the mentioned folder

Bugs

FileExtension property does not return any string

FullFileExtension property does not return any string

Download File activity will download the files with just path being given but will download "Excel" as "PDF" only

Generate QR Code

QR Codes can automated using UiPath.QRCodeLib.Activities

It provides us with activities to read QR Code from images directly or by providing an path to the image

It also gives us activities to generate QR Code either directly saving image to path or creating an image variable to be used

Fix Robot Error

Install all latest Windows Updates.

Uninstall Studio from Apps & Features menu

Navigate to these folders and make sure to delete any leftover files

rmdir /s /q "C:\Program Files (x86)\UiPath"

rmdir /s /q "C:\Program Files (x86)\UiPath Platform"

rmdir /s /q "C:\Program Files\UiPath"

rmdi r /s /q "C:\Program Files\UiPath Platform"

rmdir /s /q C:\ProgramData\UiPath

rmdir /s /q %APPDATA%\UiPath

rmdir /s /q %APPDATA%\NuGet

rmdir /s /q %LOCALAPPDATA%\Temp\nuget

rmdir /s /q %LOCALAPPDATA%\Temp\NuGetScratch

rmdir /s /q %LOCALAPPDATA%\NuGet

rmdir /s /q %LOCALAPPDATA%\UiPath

rmdir /s /q %APPDATA%\Roaming\UiPath

rmdir /s /q %USERPROFILE%\.nuget

Get your latest Stable Studio Community Edition .exe installer from our Automation Cloud resources:

After installation, you get a few choices to license your Studio. The most foolproof method is to connect your Robot to Orchestrator

Microsoft Teams

To send an message to any channel, we can use Incoming Webhook connector

To configure this connector in any channel:

In the left panel, click on ... icon

Search for Incoming Webhook in Find an app

Click on Add to a team

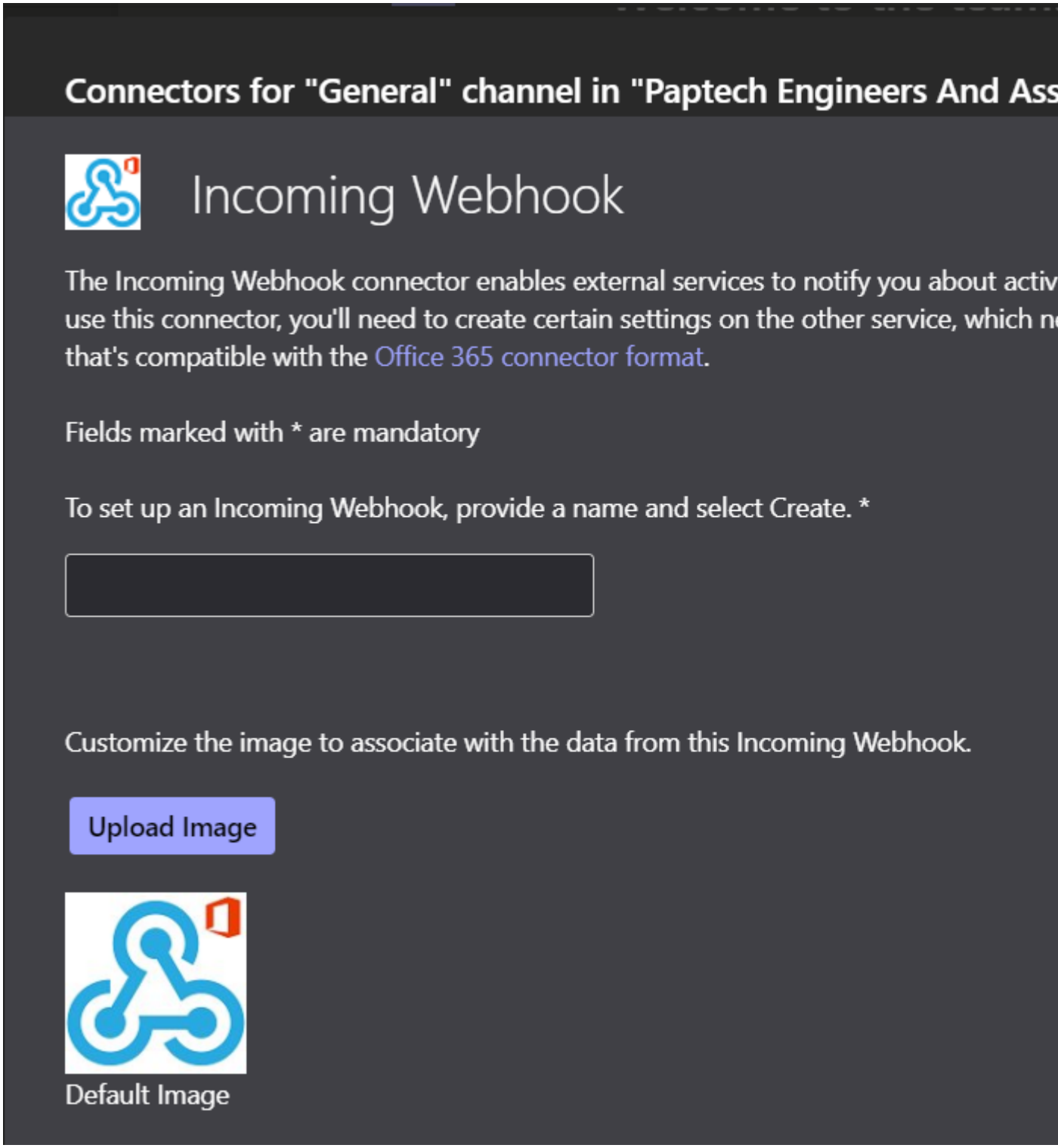
Select the channel name

Click on setup a connector

Give any name to webhook

Upload an image for it (optional)

click on create and copy the end-point



Use HTTP Request from UiPath.Web.Activities to send an message in backend to teams as

Request Type: Post

BodyFormat: application/json

Body: "{'Text':'Any message you want to send'}

API

To call any API certain parameters are fixed which can be created as variables like

Tenant Name

Account Logical Name

Folder Id

Orchestrator Url

To call API 2 headers are always required

```
{
   "Authorization": "Bearer <access_token>",
   "X-UIPATH-TenantName": "<tenant Name>"
}
```

Authenticating API

For this, use Postman

Get the following information from uipath cloud

User Key

Account Logical Name

Tenant Name

Client Id

Create a POST request on url https://account.uipath.com/oauth/token

Headers as

```
{
   "Content-Type": "application/json",
   "X-UIPATH-TenantName": "<Your Tenant Name from above>"
}
```

Body as

```
{
   "grant_type": "refresh_token",
   "client_id": "<your client id>",
   "refresh_token": "<your user key>"
}
```

Click on Send

Copy the access_token received in Response

Remember this access token will be valid for the next 24 hours to use any other API

Get All Environment Names

To Get folder id

Open your orchestrator

Select the particular folder

from url fetch the id fid=xxxxx

Use a GET request using {{url}}/odata/Environments?$expand=Robots

Set Headers as

X-UIPATH-TenantName: tenantName,

X-UIPATH-OrganizationUnitId: <copy folder if from url>

Set Authorization as

Bearer Token: <access_token>

This will result in an Response in an JSON format containing the required information

Similarly we can get multiple details from Orchestrator like Processes,Jobs,Queues,Assets etc

Get Particular Asset

The idea behind calling any API is same as above

For this the Request URL will be {{url}}/odata/Assets?$filter=Name eq 'Test'

for the ?$filter=Name eq 'Test' part, in Postman go to Params and set value as $filter: Name eq 'assetName'

Business Analyst Training

The main components of a process are :

Inputs - which are events that trigger the process

Process Flows - these are sequences of subprocesses or activities undertaken in the process

Source Applications - representing the applications or systems used to perform the subprocesses or activities of the process

Outputs - which represent the result generated by the process

A Procedure is a functional document that describes the way a process is carried out.

Workflows and procedures are created only after the business has decided (based on the input provided by the BA) on what process needs to be automated

A Procedure mainly explains:

When each part of the process needs to occur

The way a process is carried out

Who is responsible for each part of the process

How to handle exceptions

Role of BA

A Business Analyst is a bridge between the stakeholders requesting a solution and the ones delivering the solution

Understands the business requirements a& problems

Transalates the business problem into technology problem and provides a high-level solution

Assists in solution design and confirms the solution

Validates that the solution does what was intended to do

Skills Required

Curiosity

Communication Skills

Patience

Business & Industry Knowledge

Analytical Skills

Vision