**Air Ticket Inquiry RPA Project**

**Overall Design**

Revision History

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **SN** | **Contents** | **Version** | **Drafted by** | **Reviewed by** | **Modified on** | **Remarks** |
| 1 | Drafted the initial release of the document | V1.0 | Devneet Mohanty |  | 2021.09.30 |  |

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# Design Constraints

The design plan has the following constraints:

1. Unable to accurately pick selectors of date pickers in Southern Chinese Airlines, Eastern Chinese Airlines and Trip website due to a smaller number of unique identifiers which can guarantee 100% accuracy.
2. Unable to gather full airport names from Eastern Chinese Airlines website as it is not present in any of the existing selectors.
3. Unable to guarantee 100% execution rate in all runs due to cookies and cache refresh issues which change the entire UI of Southern Chinese Airlines website in many of the runs.

# Design Overview

## About Laiye RPA products

|  |  |  |
| --- | --- | --- |
| SN | Name | Description |
|  | Laiye Commander | Required |
|  | Laiye IDP | Not required |
|  | License type | Unattended: Floating License  Attended: Floating License |
|  | Versions of Laiye RPA products | Laiye Creator: 5.5.0  Laiye Worker: 5.5.0  Laiye Commander: 5.5.0 |

## Overall design

### Overall interaction

According to the basic requirements of this project, the interaction between the RPA platform and other systems is shown in the figure below. Determining system boundaries and interaction conditions is helpful for process design.

Open Exchange Web Service API

Southern Chinese Airlines Ticket Booking Web Portal

API Calls

RPA Process

RPA Platform

DLL Calls

MS Outlook

Eastern Chinese Airlines Ticket Booking Web Portal

RPA Process

MS Excel

Trip Travel & Hotel Booking Web Portal

DLL Calls

RPA Process

**Application Programmable Interfaces**

**Airlines & Tourism Web Portals**

**Laiye RPA**

Note:

1. The RPA platform needs to interact with all the web portals to extract flight information data.
2. The RPA platform can interact with various airlines and tourism web portals by simulating human operation through the RPA process.
3. According to the requirements of business, for using the exchange rate for converting rates of Chinese Yuan to USD, the RPA platform shall be interacting with API.
4. Any exception encountered by the RPA platform during the execution shall be notified and reported to Laiye Examination Team.

## Deployment solution

The overall deployment of the solution will take in two different modes of operation namely, Attended and Unattended mode. As per the license configuration for the process, Floating Attended and Floating Unattended license would be used.

Under attended mode, the parameters will be fetched from the configuration file present within the project folder which will be run from UiBot Worker on a trigger mechanism every day at 17:00 PM

Under unattended mode, the parameters will be fetched from the Laiye Commander and configuration file present within the project folder which will be deployed from Laiye Commander to UiBot Worker on a schedule mechanism every day at 18:00 PM

# Laiye RPA Design

*(Enter the Laiye robotic process automation (RPA) design according to your project and add sections as needed.)*

## Laiye Commander configuration

|  |  |  |
| --- | --- | --- |
| SN | Name | Description |
|  | User | devneetmohanty15@TestDept |
|  | Department | Devneet Mohanty |
|  | Parameter | A total of 9 groups of parameters, see the table below for details |

### Commander parameter

|  |  |  |  |
| --- | --- | --- | --- |
| Parameter Name | Type | Value | Description |
| Email address | text | laiye\_exam@laiye.com | The email address of the business to be notified in case of either successful or failed executions. |
| China Southern Airlines | text | https://www.csair.com/en/ | The Chinese Southern Airlines website URL from where the data needs to be extracted. |
| China Eastern Airlines | text | http://ph.ceair.com/ | The Chinese Eastern Airlines website URL from where the data needs to be extracted. |
| Trip | text | https://www.trip.com/ | The Trip website URL from where the data needs to be extracted. |
| Exchange Rate API | text | https://open.exchangerate-api.com/v6/latest/USD | The endpoint for Open Exchange Rate web service which returns the exchange rates in terms of USD. |
| Place of Departure | text | Guangzhou | The place of departure for the flights to be searched. |
| Place of Arrival | text | Beijing | The place of arrival for the flights to be searched. |
| maxRetryNum | text | 3 | The maximum attempts of retry to be performed in case of exceptions. |
| logLevel | text | 2 | The log level at which the logging needs to be performed. |

## Laiye Worker configuration

|  |  |  |
| --- | --- | --- |
| SN | Name | Description |
|  | Address | https://commander.ui.bot |
|  | User | devneetmohanty15@TestDept |

## Process design of Laiye Creator

For detailed design of business process, see each document

A picture containing text

Description automatically generated

### Business processes

|  |  |  |  |
| --- | --- | --- | --- |
| SN | Process bot | Feature | Schedule |
|  | Ticket inquiry\_Unattended | Extracts the flight details as per the specified parameters from Laiye Commander in Chinese Southern Airlines, Chinese Eastern Airlines and Trip website. Upon extracting all the information, it analyzes the cheapest flight options, generates an output report, and sends it to the business. | The unattended process is scheduled from Laiye Commander every day at 18:00 PM |
|  | Ticket inquiry\_Attended | Extracts the flight details as per the specified parameters from Configuration file in Chinese Southern Airlines, Chinese Eastern Airlines and Trip website. Upon extracting all the information, it analyzes the cheapest flight options, generates an output report, and sends it to the business. | The unattended process is scheduled from Laiye Commander every day at 18:00 PM |

1. Scheduling process description

The bots for this process are divided into two different categories as per the mode of the execution: Unattended and Attended.

* 1. Unattended Mode:   
       
     The process needs to be scheduled every day at a specified time from Laiye Commander on the UiBot Workers having the Unattended – Floating License. At the scheduled time, task will be automatically created and be pushed to designated Laiye Worker through task management of Laiye Commander, and Laiye Worker executes them in sequence.
  2. Attended Mode:

The process needs to be downloaded from Laiye Commander on the UiBot Workers having the Attended – Floating License. Upon downloading the task, triggers need to be created based on the schedule on which the process need to be executed every day. At the scheduled time, task will be automatically triggered and be monitored as well using the Log functionality of UiBot Worker. If required, the process can be executed on “Clone” mode which run in a separate desktop, but the Windows login information needs to be supplied before the run.

### Command Library

Through the demand analysis, it is found that some functional codes in each process can achieve common purpose, so the corresponding codes are set as command libraries for the use of cleaning up applications, fetching configuration values and parameters from both Laiye Commander and excel file along with sending emails to business for both negative and positive scenarios. In this project, the use of the command library is described below:

1. Cleaning up applications

CleanUp(processName): Cleans up any running application whose process name has been specified

* Parameter input: processName
* Parameter description: Fetch the process name from the configuration file. The function will take the process name to forcefully kill the application to ensure no process IDs are running in background via Command Utility.

1. Fetching data from Laiye commander

InitializeFromCommander(): Fetches the parameters for the process from Laiye Commander and sets up the global configuration variable

1. Fetching data from configuration file

InitializeFromConfig(configFilePath): Fetches the parameters for the process from the specified configuration file which is of .xlsx format.

* Parameter input: configFilePath
* Parameter description: The configuration file usually set up at the res folder consisting of all the configuration details when unattended process will be triggered. In case of attended version of the process, the parameters and the credential name to be retrieved from Windows Credential Manager is also defined in the file.

1. Fetching credentials from Windows

FetchCredentialsFromWindows(credentialName): Fetches the credential details for the credential name supplied from the Windows Credential Manager. The credential stored should be of generic type.

* Parameter input: credentialName
* Parameter description: The credential name under Windows Credential Manager where the credential details are stored and need to be fetched.

1. Sending emails to business

SendEmail(senderEmailId, receiverEmailId, emailSubject, emailBody, emailAttachment): Sends the email with specified email subject, body and attachment if provided to the receiver email id specified from the email configured under the Outlook profile of the machine.

* Parameter input: senderEmailId
* Parameter description: The mail ID of the business user who needs to be notified. This is maintained in the configuration file in case of Attended version or is set up at Laiye Commander in case of unattended version.
* Parameter input: receiverEmailId
* Parameter description: The mail ID of the under which the Outlook profile has been configured on the machine where the process needs to be deployed. This is maintained in the configuration file.
* Parameter input: emailSubject
* Parameter description: The email subject which needs to be the part of the email to be sent. The email subjects for both positive and negative scenarios are maintained in the configuration file.
* Parameter input: emailBody
* Parameter description: The email body which needs to be the part of the email to be sent. The email body template for both positive and negative scenarios are maintained in the configuration file which needs to be updated accordingly in the blocks before call this command.
* Parameter input: emailAttachment
* Parameter description: The email attachment file path which needs to be the part of the email to be sent. The email attachment can be passed as a blank string if no attachment needs to be sent along with the email.

## Running environment configuration

### System environment configuration

|  |  |  |
| --- | --- | --- |
| **SN** | **Name** | **Description** |
|  | Resolution | The machine resolution and zoom ratio of environment where the Laiye Worker is located, and the development environment should be the same (the resolution of the development environment for all processes in this project is 2560\*1600; the zoom ratio is 100%) |
|  | Browser | The Chrome browser in the environment where the Laiye Worker is located needs to be configured for compatibility |
|  | Excel tools | The environment where the Laiye Worker is located must have Microsoft-Office software (the 2016 version is agreed upon) |
|  | Outlook tools | The Outlook profile needs to be configured and allow external applications for the automated sending of mails. |

# Other Designs

## Laiye RPA plug-in

1. DevneetExcelPlugin.dll

Function description: This plug in has been created in order to perform advanced excel operations such as dynamically determining the range of any excel file.

* DevneetExcelPlugin.getRangeOfCells(filePath,sheetName);  
    
  Input parameter: File path of the excel file, Sheet name in the excel file

Function: Get the range of cells used in the given sheet name in the specified excel file path.

## Process O & M Design

### O & M tools

Perform O & M by controlling Laiye Worker remotely through Laiye Commander or logging in to the destination machine where Laiye Worker is deployed using the VPN+RDP application.

### Exception notification

When an exception occurs in the process and the retries number exceeds the maximum, the process will send the process name and exception information to relevant people through email via Outlook respectively for prompting. Notification receiver is a configurable item.