Robotic Process Automation Projects

Build real-world RPA solutions using UiPath and Automation Anywhere

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Nandan Mullakara and Arun Kumar Asokan

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Table of Contents

Preface 1

Chapter 1: Getting Started with Robotic Process Automation 7

- **Technical requirements** 8
- **What is RPA?** 8
  - A quick definition 8
    - Benefits of RPA 9
  - Types of RPA 9
    - Attended automation 10
    - Unattended automation 10
- **Our RPA tools – UiPath and Automation Anywhere** 11
  - UiPath 11
    - UiPath Studio 12
    - UiPath Orchestrator 14
    - UiPath Robot 15
    - UiPath – an integrated view 16
  - Automation Anywhere 17
    - Enterprise Control Room 17
      - Build 18
      - Manage 18
      - Analyze 19
    - IQ Bot 20
- **Our projects** 20
- **Installation and setup** 21
  - Installing UiPath 21
    - UiPath Studio and Robot 21
  - Configuring Automation Anywhere 23
    - Registration and setup 24
    - Installing the bot agent and verifying the setup 24
- **Summary** 27

Chapter 2: Help Desk Ticket Generation 29

- **Technical requirements** 30
- **Project overview** 30
- **Project detail** 31
  - Project groundwork 33
    - Creating project folders 33
    - Creating an Excel sheet with ticket data 34
    - Registering and logging in to Zoho Desk 34
  - Main workflow 36
    - Project setup 36
    - Configuring the initial part of the main workflow 38

Reading from Excel 42
Exception handling 46
Invoking the Excel workflow from Main 48
Creating a support ticket in the Zoho Desk ticketing system 53
Recording ticket creation activities 55
Configuring the recorded activities 58
Validating successful ticket creation 64
Handling exceptions 67
Putting it all together 71
Testing the automation 75
Project enhancements 77
Summary 77
Chapter 3: CRM Automation 79
Technical requirements 79
Project overview 80
Project details 81
CRM preparation 82
Setting up the project 83
Extracting the customer list from CRM 84
Preparing the browser 85
Web recording 87
Data scraping 90
Using a Catch block for the Get Customer List Sequence 93
Looking up customer information 94
Creating a data table 95
Looping and creating company URLs 98
Extracting company details from Crunchbase.com 101
Invoking the RequestCustomerDetails workflow from the Main workflow 109
Updating the CRM with customer information 112
Looping through the data table and updating the CRM 113
Summary 120
Chapter 4: Moderating Social Media Using AI 121
Technical requirements 121
Project overview 122
Project detail 123
Getting started with the project 125
Project groundwork 126
Reading parameters from the configuration file 127
Passing the configuration parameters to the main workflow 131
Reading image files from the input folder and creating a list 133
Reading files in the input folder 133
Reading and writing the image path list to the ImageDetails Excel file 135
Handling exceptions for the BuildExcelList workflow 137
Testing the BuildExcelList workflow 138
Setting up the Google Cloud Vision API's key and credentials 140
Setting up the Google Cloud Vision API services 140

Setting up a credential manager 143
Reading credentials from Windows Credential Manager 146
Looping through images and invoking the Google Cloud Vision API 148
Installing the UiPath GoogleVision package from UiPath Go! 149
Adding SafeSearch to the main workflow 150
Updating the image sheet with the API results 153
Passing the parameters and invoking SafeSearch 155
Moving processed images to the Output folder 156
Testing the automation 159
Summary 160
Chapter 5: Purchase Order Processing with UiPath ReFramework 161
Technical requirements 162
Project overview 162
Robotic Enterprise Framework (ReFramework) 163
Project detail 165
Project groundwork 166
Creating the PO spreadsheet 166
Setting up Apptivo 167
Getting started with the project 168
Purchase order Dispatcher 169
Purchase order Performer 174
Init state changes 174
Updating the InitAllApplications workflow 175
Invoking the InitAllApplications workflow 177
Process state changes 178
Attaching and activating the PO application 179
Creating the POs 180
Preparing to input PO data 181
Inputting the PO data 184
Handling PO entry errors 189
Capturing the PO 191
Updating the PO in the spreadsheet 194
Testing the Automation 198
Summary 200
Chapter 6: Completing an RPA Challenge 201
Technical requirements 202
Project details 202
Project groundwork 203
Completing the challenge with UiPath 203
Getting started with the UiPath project 203
Creating the challenge automation 204
Reading the RPA challenge Excel data 204
Inputting data into the RPA challenge forms 205
Testing the UiPath challenge automation 208
Recapping the UiPath projects 208
Automation Anywhere A2019 208

- Completing the challenge with Automation Anywhere 209
  - Getting started with the Automation Anywhere control room 209
  - Creating the RPA challenge automation bot 211
    - Reading the RPA challenge Excel data 214
    - Preparing the RPA challenge website for input 217
    - Looping through each row and column 220
    - Iterating through each column and reading headers 223
    - Mapping and inputting the challenge data to the website 228
  - Testing the Automation Anywhere challenge automation 237
- **Summary** 237

Chapter 7: Sales Order Processing 239
- **Technical requirements** 239
- **Project overview** 240
- **Project details** 241
  - Project groundwork 242
  - Creating the Parent bot 242
    - Exception handling 243
    - Opening and reading Excel data 244
  - Creating the Child bot for SO processing 246
    - Using the recorder to capture SO creation 246
    - Filling in customer details for an SO 250
    - Filling in item details for an SO 253
    - Passing the SO number 255
  - Invoking the Child bot and updating the Excel sheet 258
    - Looping through rows and invoking the Child bot 258
      - Updating Excel with the SO number 261
    - Moving the Excel file to the Processed folder 262
  - Testing the automation 263
- **Summary** 264

Chapter 8: ERP User Administration 265
- **Technical requirements** 266
- **Project overview** 266
- **Project detail** 267
  - Project groundwork 268
    - Creating a user request PDF 268
    - Signing up for Saas application 268
    - Opening the Automation Anywhere A2019 control room 269
  - Creating the Parent bot 269
    - Exception handling 270
    - Extracting user details from PDF 270
    - Assigning user data to row variables 273
    - Extracting user details with String operations 277
    - Validating email addresses with regular expressions 279
  - Creating the Child bot for new user creation 281
    - Creating a new user in Freshsales 281
    - Handling form validation errors 286
    - Handling exceptions 289

Invoking the Child bot and creating the new user 291
Moving the PDF to the Processed folder on success 292
Notifying the user in case of insufficient data 294
Logging errors and sending email notifications 295
Triggers 296
Testing the automation 297
Summary 298
Chapter 9: Employee Emergency Notifications 299
Technical requirements 300
Project overview 300
Twilio 301
Project details 301
Project groundwork 302
Creating the employee spreadsheet 303
Signing up for Twilio 303
Opening the Automation Anywhere A2019 Control Room 307
Creating a Child bot to send messages 307
Exception handling 307
Saving Twilio credentials 308
Adding variables for the Child bot 310
Invoking the Twilio REST post method 312
Returning a response flag to the Parent bot 314
Unit testing the Child bot 316
Creating the Parent bot 318
Initializing Twilio and opening the employee Excel file 318
Looping through the employee list and sending text messages 319
Checking and logging responses from the Child bot 323
Exception handling in the Parent bot 325
Testing the automation 326
Summary 327
Chapter 10: Using AI and RPA for Invoice Processing 329
Technical requirements 330
Intelligent document processing 330
UiPath – Document Understanding 331
Automation Anywhere – IQ Bot 331
Project overview 332
Project details 334
Project groundwork 335
Opening the Automation Anywhere A2019 Control Room 336
Downloading sample invoices 336
Creating the IQ Bot learning instance 337
Setting up the initial IQ Bot learning instance 338
Reviewing and updating field mappings 339
Uploading invoices to IQ Bot 342
Downloading structured data from IQ Bot 345
Checking the automation 346

Automation Anywhere projects – recap 348
Summary 348
Appendix A: Appendix A and B for UiPath 351
Appendix A – Connecting UiPath Robot to Orchestrator 351
Getting started 351
Creating a Standard Robot in Orchestrator 352
Adding an environment for the Bot 354
Connecting Orchestrator to the local Robot 354
Appendix B – Publishing to Orchestrator 355
Publishing to Orchestrator 356
Creating a new process 357
Running the process 358
Scheduling the process 360
Appendix: Looking Forward and Next Steps 361
Other Books You May Enjoy 367
Index 371

1
Getting Started with Robotic Process Automation

Hello there! In this book, we will be guiding you through a few real-world **Robotic Process Automation** (**RPA**) projects. Thanks for joining us. By the time you complete this book, you will be equipped with knowledge, techniques, and the mindset to work on simple to medium complexity RPA projects with UiPath and Automation Anywhere with minimum guidance.

RPA is an exciting new technology that is being seen as the first step to using new and advancing technologies to automate enterprise processes. We will learn how RPA brings a level of advancement to automation that is much more evolved than the earlier automation process through its use of scripts, macros, and so on.

RPA is advancing rapidly and is part of a bigger movement to low code and no-code tools. Compared to traditional coding, these tools are easier to use and faster to deploy. Organizations are now using these rapid development tools with emerging technologies such as process mining, **artificial intelligence** (**AI**), and analytics to enable end-to-end process automation. We'll take an in-depth look at the future of RPA in the *Appendix – Looking Forward and Next Steps*.

In this first chapter, we will cover the following topics:

- A quick introduction to RPA, its benefits, and the types of RPA
- Overview of top RPA platforms – UiPath and Automation Anywhere
- Installing and setting up UiPath and Automation Anywhere

Technical requirements

To set up the RPA tools for this chapter, please ensure that you have the following:

- A machine that is running Windows 7 or above.
- At least 4 GB RAM, though ideally, your machine should have 8 GB or more.
- The Google Chrome and Internet Explorer web browsers installed.

If you have your hardware and software ready, then let's get started!

What is RPA?

Robotic Process Automation (**RPA**) excels at automating manual and repetitive tasks. RPA, therefore, gives us a tool that we can use to automate all the unexciting work you may have been doing so you can do some exciting work! With this tool, you have more time to spend on unique human activities such as delighting your team, boss, and customers.

So, let's have a quick look at what exactly RPA is and the amazing benefits that makes it the hot technology that it is today.

A quick definition

RPA allows software robots to carry out tasks on a computer just like a human would.

The best way to visualize RPA would be to think of someone working on the computer and doing their daily work by clicking through computer screens, sending emails, and so on. Now, what if the computer clicks through, enters the required data, and performs the same work automatically? That is what RPA helps us do.

Here is an example of what RPA can do for you.

Let's say you are responsible for processing invoices in an **Enterprise Resource Planning** (**ERP**). You would log in to your ERP, go to a specific screen, and enter the invoice details one by one. Now, if you'd like to automate this task with RPA, you would configure these task sequences to create a "bot." Once this bot has been deployed, it would carry out the same tasks automatically – it would log in automatically and carry out the tasks without you having to do this repetitive work!

RPA doesn't just automate ERP transactions. As we will see later, throughout our projects, there are many business areas where RPA comes in handy and automates business and IT processes. This results in some great benefits to businesses. Let's have a look at a few of them.

Benefits of RPA

The benefits of RPA are as follows:

- **Improved productivity:** More than 60% to 90% of the repetitive effort can be removed, with RPA increasing the output for each of your employees.
- **Rapid results and in-year benefits:** Rapid implementation and results are a key promise of RPA as you can conceive, design, develop, and deploy in weeks, not months or years.
- **Low startup costs:** Each of the bot licenses is less costly compared to other software tools and the bot can perform the work of about two to three **Full Time Equivalent** (FTE), ensuring the startup costs are low.
- **Reduced processing costs:** The costs of processing are reduced drastically as the bot costs around one third to one fifth the cost of an employee, depending on location.
- **Improved quality and accuracy:** Your bots perform assigned work with 100% accuracy, thereby reducing any rework that may have been required.
- **Improved compliance:** RPA activities are logged and can be reviewed at any time. This gives you a greater degree of oversight and control over your operations.

You can gain these benefits using two types of RPA that have emerged so far – one runs on your desktop and the other type runs on a server.

We will complete projects with both types of RPA in this book. Now, let's take a look at what these types of automation are.

Types of RPA

We have two kinds of RPA automation that are based on how the RPA tool helps you automate. One of them is like an assistant that you call upon to help you complete the tasks, while the other is a kind of automation that's mostly used for back-office work. What does that mean? Let's find out.

Attended automation

These are the assistants that run on your computer and help you complete parts of the tasks that you are performing. For example, if you usually copy and paste data from one application to multiple applications, you can invoke an attended RPA to take over just these sets of activities. The control is then returned to you by RPA to carry out the next set of tasks.

Attended automation solutions are installed on individual workstations. Sometimes, these desktops differ in terms of resolutions, display settings, and even graphics cards. This may lead to failure in terms of automation on a desktop, even though it was working well on another one.

This type of automation is popular with agents at call centers. With this, the long, repetitive processes that an agent does are replaced with single clicks! This greatly reduces the time it takes to train your representatives. Therefore, attended RPA can reduce the average handling times, improving your customer experience.

You would use attended bots for the following reasons:

- Tasks that need real-time human-system interaction
- To augment your employee's day-to-day work, enabling them to do it faster and better
- To help your employees understand and embrace automation

Unattended automation

If you don't need a representative or worker interaction to execute a process, you can usually run the process on a backend server. This is known as unattended automation, which can be used to automate back-office work.

In unattended automation, workflows are self-triggered and run on servers. They usually run to a predetermined schedule and are available 24/7. For example, you can batch your invoices and process them at certain times during the day. The bot would later send you a report, indicating the invoices that could not be processed automatically. You can review the report and only work on the invoices that need your intervention.

These automated tasks can be scheduled or started through control rooms. You can allocate tasks, adjust priorities, manage queues, and intervene, in the case of performance issues, through the control room.

Usually, unattended automation gives you more control over the automation process. It follows your rules to complete a process automatically. You would use unattended automation for the following reasons:

- Tasks that are structured and can be fully mapped
- To replace entire roles where possible
- To gather, sort, analyze, and distribute large amounts of data

You can use both unattended and attended automation either by themselves or together to implement use cases that give your business a distinct advantage. Most of the top tools give you the capability to implement both types of RPA. Let's look at two of them – UiPath and Automation Anywhere – both of which we will be using for our projects.

Our RPA tools – UiPath and Automation Anywhere

RPA tools help you automate business processes using multiple technologies. It all started with screen scrapping and workflow configurations to automate BPO processes. The emergence of AI technologies has helped the RPA tools include cognitive aspects. RPA, along with AI, is now being called "Intelligent Automation."

UiPath and Automation Anywhere are two of the top RPA platform vendors, as per the rankings from respected analysts such as Forrester and Gartner. They have taken different paths, as we will see, and have evolved into the top RPA platforms that we see today. In this book, we will be using these two platforms for our projects. So, let's understand a bit about them and their makeup before we dive into the projects.

UiPath

UiPath is a top RPA platform by many measures. The company is one of the most funded in this space and gives you a sense of what investors consider the best RPA tool in the long run.

It is quite popular and has a big community. The secret to this is that Uipath made the platform easily accessible quite early. It is also one of the easiest RPA platforms with a comparatively low learning curve. This is why we have selected UiPath as one of the platforms for our projects in this book.

UiPath started as DeskOver in 2005. They first started by building automation libraries and software development kits for companies such as IBM, Google, and Microsoft. These libraries are still part of some of the products from these companies.

UiPath, which was DeskOver at that time, launched the first UiPath Desktop Automation product line around 2012. This product specifically targeted the RPA market. They worked with BPO providers to realize the market fit with RPA.

Fast forward to today, and UiPath is a top enterprise RPA platform. The UiPath platform helps you develop automation rapidly while being secure and scalable.

The platform has three main components:

- UiPath Studio
- UiPath Orchestrator
- UiPath Robot

Let's check out each of these components.

UiPath Studio

You design and configure your process workflows in UiPath studio. It is a low-code environment where you drag and drop prebuilt components. These components are provided by UiPath and are called Activities. The following is a screenshot of UiPath Studio:

Appendix A and B for UiPath

Appendix A – Connecting UiPath Robot to Orchestrator

As we discussed in `Chapter 1`, *Getting Started with RPA*, UiPath Orchestrator is the central place to deploy and manage our bots.

To deploy the processes you build in Studio to Orchestrator, you have to connect the local UiPath Assistant (Robot) that we installed in `Chapter 1`, *Getting Started with RPA*, to your Orchestrator account in the cloud.

Let's learn how to connect a standard Assistant/Robot to the UiPath cloud platform containing Orchestrator.

Getting started

Let's start by doing some groundwork.

First, we will access Orchestrator on the cloud. To do so, perform the following steps:

1. Access the UiPath cloud platform (go to `platform.uipath.com`).
2. Log into the platform if needed.
3. Click on **Services** on the left-hand panel.
4. You should be able to find a default service. Click on its name.
5. This should open up Orchestrator's home page.

Next, let's get the machine name from UiPath Assistant. To do so, perform the following steps:

1. On your Windows PC, locate the **UiPath Assistant** application (go to **Start** and search for it).
2. Open up the Assistant application and click on **Settings** (the gear icon at the top) and choose **Orchestrator Configurations**.

3. Take note of the **Machine Name** in the Orchestrator configuration, as shown in the following screenshot:

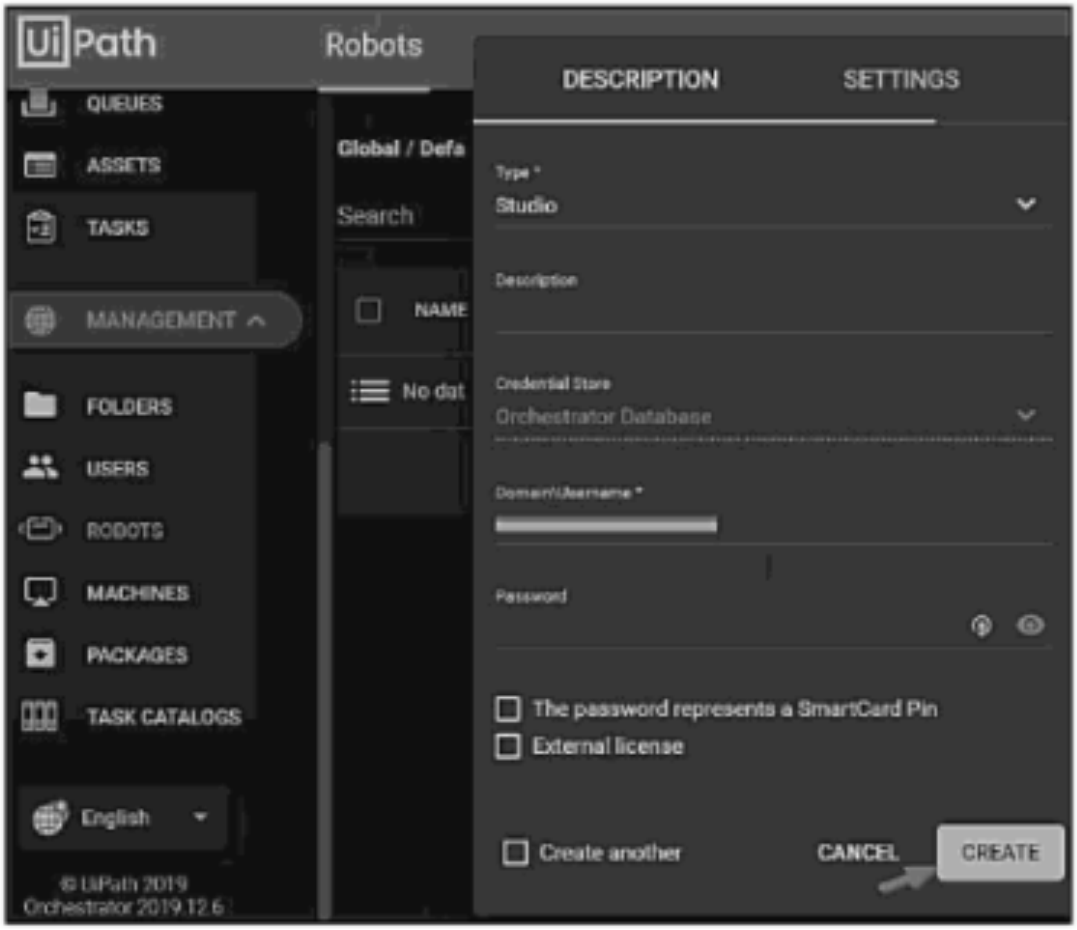
Now that we have the machine name, let's create the Orchestrator Robot.

Creating a Standard Robot in Orchestrator

Head over to Orchestrator, which we opened in the first set of steps in the previous section. Now, let's create the Robot:

1. Click on **Robots** on the left-hand panel.
2. On the right-hand panel that opens up, click on **Add** (the plus (+) sign) and then choose **Standard Robot.**
3. In the form that pops up, enter the following information:
    - Machine: Enter the machine name from the local Orchestrator configuration (we took note of this previously).
    - Click on **Provision machine...** under the **Machine** field to provision the machine.
    - **Name**: Type in any name for the Robot.
    - **Type**: Select **Studio** as the Robot type since we want to connect to Studio.

- **Domain\Username**: Add the username that you use to log into your PC:
    1. Go to your Command Prompt (from **Search** or **Start**).
    2. Run the `whomai` command.
    3. Take note of the name and use it as the **Orchestrator Username**.
- **Password** (optional): Type in the Windows password for the specified username.
- Click on **Create** to create the bot in Orchestrator:



Adding an environment for the Bot

We will now choose an environment for the Robot to run in:

1. Within the **Robots** option, from the left-hand pane, click on the **Environment** tab in the top blue ribbon.
2. Click on **Add** (the plus (+) sign).
3. On the **Create Environment** form, provide a name for your environment.
4. Once created, choose the environment options (use the three dots on the right-hand side) and choose **Manage**.
5. Choose your Robot from the list and click **Update**.

Connecting Orchestrator to the local Robot

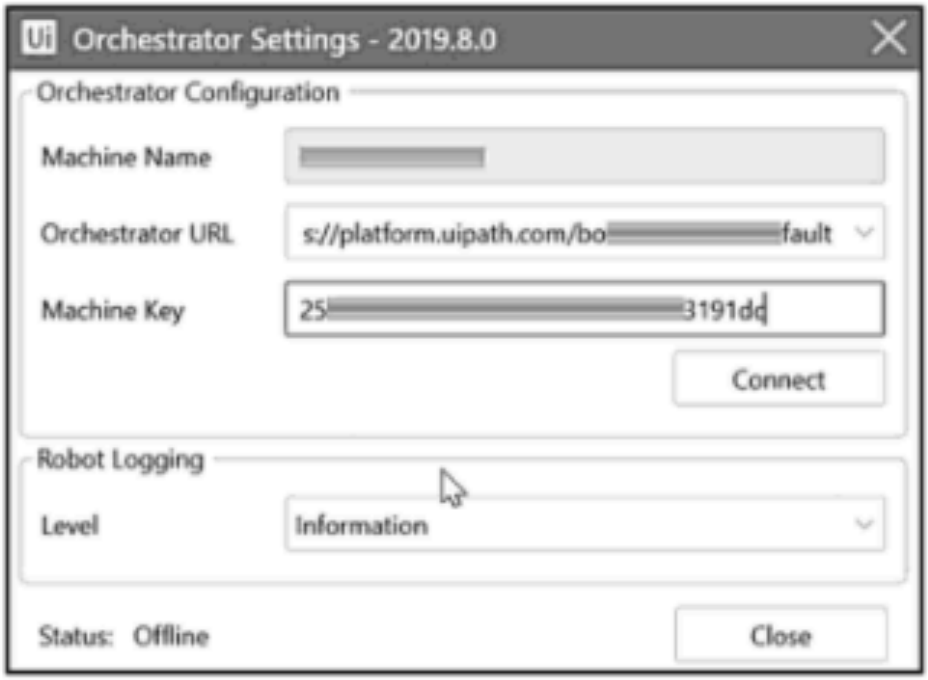
We are now ready to connect to our local Robot. To do that, we need some information from Orchestrator.

First, let's take note of the **Machine Key** from the **Machines** page on Orchestrator. To do that, perform the following steps:

1. Head over to **Machines** on the left-hand pane.
2. Choose the machine you provisioned (while adding the Robot) from the right-hand pane and choose **Options**.
3. Choose **Edit** (the three dots on right).
4. Copy the **Machine Key** value.

Next, let's also take note of the Orchestrator URL. In any web browser with Orchestrator open, copy the URL.

Finally, go back to **Orchestrator Settings** in the UiPath Assistant/Robot tray in your local machine. Fill in the URL and **Machine Key**, as shown in the following screenshot:



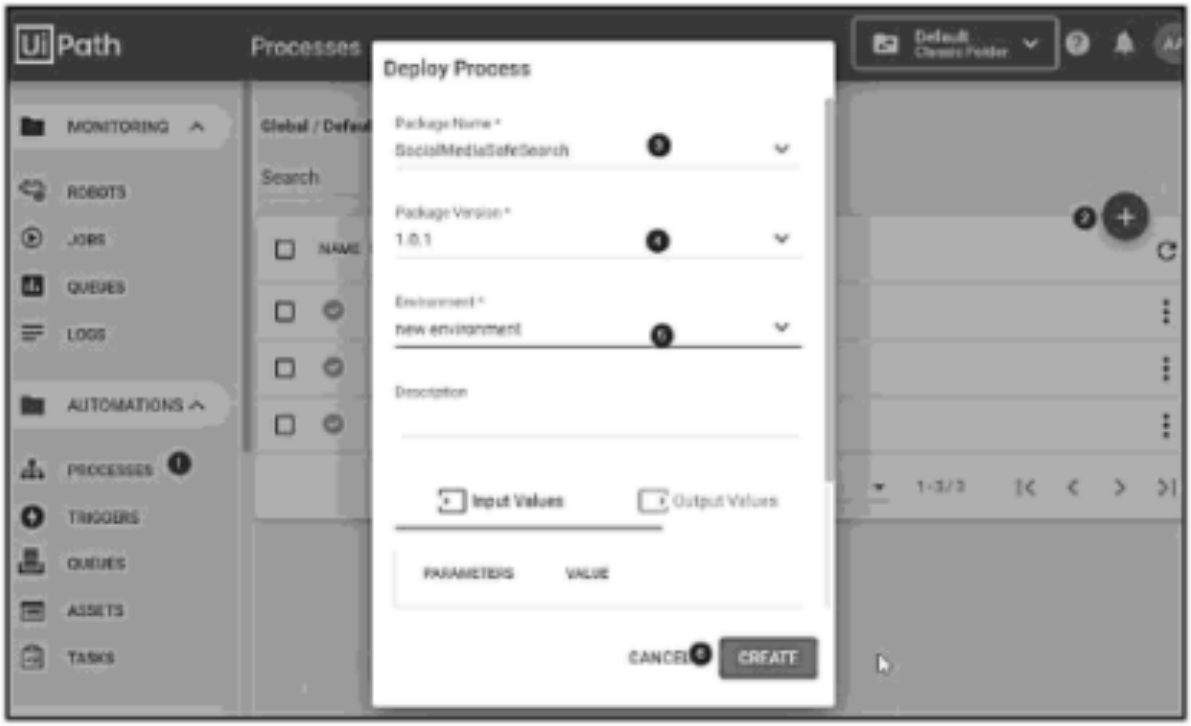
In the local Assistant/Robot Orchestrator settings window, the status should show **Connected, licensed**. In Orchestrator, within the **Robots** section, the Robot that you just added should have a status of **Available**, and there should be a green checkmark alongside the Bot's name.

Your Robot is now connected to Orchestrator.

Appendix B – Publishing to Orchestrator

Make sure Orchestrator and the Assistant/Robot are already connected. Please follow the steps detailed in Appendix A to do this.

These steps are depicted in the following screenshot:



Running the process

Once the process has been added, we need to create a Job in order to run it. Perform the following steps:

1. Click the **Jobs** option on the left-hand panel.
2. To start a Job, click on the **Start** (play) button.
3. In the pop-up form, do the following:
    - Choose a process that you want to run.
    - For **Execution Target**, choose an active Robot.
    - Click on **Start**. The Bot will start executing in the system:

Once the job has run successfully, you will see that **State** is **Successful**, with a green checkmark next to it.

Scheduling the process

You can also create a trigger so that the process runs at scheduled intervals. To do this, perform the following steps:

1. Click on **Triggers** from the left-hand pane.
2. Click on **Add** (the plus (+) sign) and choose **Time** on the next screen.
3. Provide a **Name** for the trigger.
4. Choose your timezone.
5. Choose the **Process** you like to schedule.
6. Choose your specific Robot.
7. Select the schedule you'd like the process to run (for example, you can schedule as `Daily` and add a specific time).
8. Finally, click on **Add** to schedule the process.

This is how you publish to Orchestrator and run or schedule a Robot. You can do this to run any of the UiPath projects in this book.

Appendix: Looking Forward and Next Steps

Robotic Process Automation (RPA) is a rapidly advancing field and is going through exponential change due to several internal and external factors.

Since the beginning of the Information Age, we have gone through many waves of process automation. We started with the computerization of lines of businesses led by **Management Information Systems (MIS)** groups within each organization. Once the businesses were computerized, we started looking for ways to optimize the business processes through **Business Process Management (BPM)**. While BPM focused on end-to-end processes, RPA emerged as a way to automate discrete tasks using existing user interfaces.

Now, with significant capital being invested, we can see that RPA platforms are expanding, with the inclusion of technologies such as **Artificial Intelligence (AI)**, **Computer Vision (CV)**, **Optical Character Recognition (OCR)**, process mining, chatbots, and many more. The RPA platforms are also morphing into enterprise-scale platforms with marketplaces, which we will explore in this appendix. This is leading to rapid changes and an RPA market that is much more advanced than the task automation that RPA started with.

Even as we wrote this book, a new version of Automation Anywhere A2019 was released. UiPath also came up with a new platform with products for each phase of the automation life cycle. We had to adjust to include the changes as they came up.

We are sure there will be many more rapid developments in this field. As we write this in March 2020, here is what we can see.

Future of RPA

RPA tools have emerged and are used as part of an enterprise-grade automation platform to connect processes with comprehensive controls and security. With advancing automation requirements, RPA vendors have added additional technologies to enable the automation of tasks that could not be automated with simple RPA.

With the addition of these new technologies, all the top RPA tools now offer a platform for automation. Each platform offers an "operating system" that can be used to build and manage Bots. You can then add additional components such as AI-ML, which you need for your automation, using components provided by the vendors themselves, their partners, or community members. So, RPA is becoming a gateway technology to using new or advancing technologies and paradigms for automation.

Most RPA software vendors are adding to the core RPA function in a few common areas. These areas include the following:

- Artificial intelligence (AI-ML)
- Process mining and/or process discovery
- Intelligent document processing (OCR/ICR/ML)
- Conversational AI (Chatbots)
- Advanced analytics

Gartner has come up with the term **hyperautomation** to refer to this approach of using a basket of technologies, including RPA for automation.

Hyperautomation

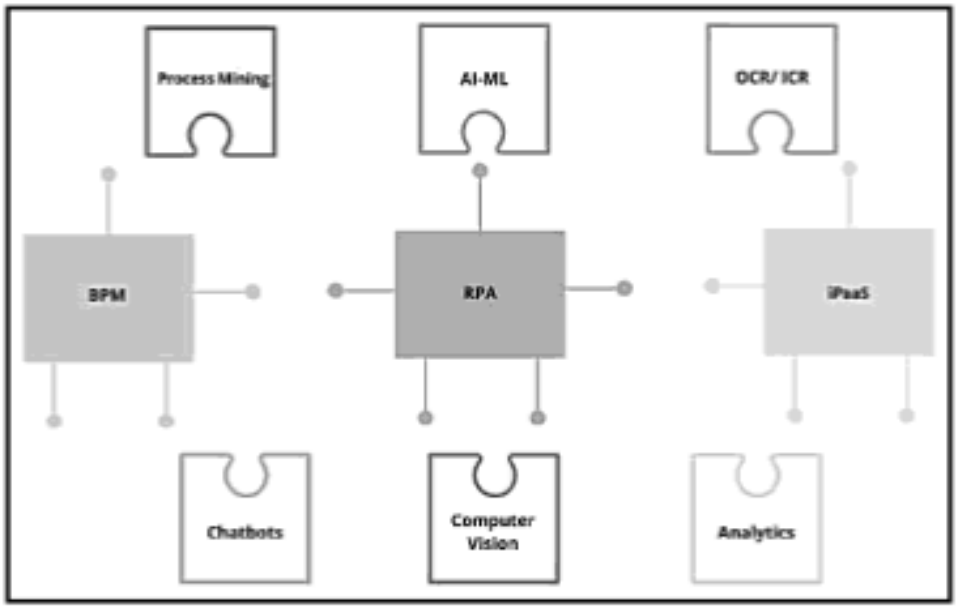
Garner stated the following about hyperautomation:

> *"Hyperautomation refers to an approach in which organizations rapidly identify and automate as many business processes as possible. It involves the use of a combination of technology tools, including, but not limited to, machine learning, packaged software, and automation tools to deliver work."*

Hyperautomation is the first and one of the most important trends in Gartner's "Top 10 Strategic Technology Trends for 2020." Gartner suggests using a wider spectrum of tools beyond RPA for automation. Along with RPA, Gartner recommends using **intelligent Business Process Management Suites (iBPMSes)**, **integration Platform as a Service** (**iPaaS**) platforms, and decision management systems. Including these tools, which provide an orchestration layer, Gartner suggests using technologies such as process mining, ingestion engines, OCR, computer vision, analytics, user experience, and **Machine Learning** (**ML**).

If all this seems a bit confusing to you, the key idea of hyperautomation is to build the plumbing to drop in emerging technologies (such as AI-ML) to enable better and wider automation. While we still do not know which tool will end up being the tool of choice to provide the orchestration layer, we can say that RPA is still one of the best choices.

Here is an example of what hyperautomation can look like:



Considering these developments, let's look at a few rapidly emerging technologies and trends to watch out for.

Future technologies and trends

As the heading suggests, let's look at some of the technologies and trends we'll see in the future.

Artificial intelligence (AI)

Everyone looking to get to the next stage of RPA implementation is adding different aspects of AI to their automation initiatives. As per Deloitte, initiatives that scale are more likely to use a combination of RPA and AI. According to their study, almost half (45 percent) of organizations scaling automation combine RPA and AI. The automation programs also report whether the automation initiatives meet or exceed their expectations.

Among AI, we are seeing lots of implementations with ML, computer vision, and **Natural Language Processing** (**NLP**). These are being used in specific use cases where AI is enabling smart detection, prediction, and execution; for example, to read emails (NLP), image or video processing (computer vision), and sentiment detection. As per a study conducted by Deloitte, the most popular AI solutions being implemented are ML-based solutions, expert or rule-based systems, and NLP-based solutions.

Let's look at two key areas where AI is being used with RPA other than ML.

Document processing

By most estimates, more than 70% to 80% of data in enterprises are in documents – mostly PDFs, scans, and forms. Digitizing this information opens up many use cases for automation.

With AI, document processing has been able to overcome many challenges, as noted in `Chapter 10`, *Using AI and RPA for Invoice Processing*. The IQ Bot project we completed in that chapter gave you a glimpse into the document processing capabilities that are being added to RPA. You can also add document processing to RPA using Cloud AI (for example, Google, Microsoft, and Amazon) or use dedicated OCR/ICR vendors such as Abbyy, Hyland, Kofax, or Hyperscience.

Conversational AI

RPA Bots are using NLP and **Natural Language Understanding** (**NLU**) to interact with customers and employees through voice or text. With RPA and chatbots, users can converse with automated processes in natural language.

Through these conversational AI solutions, enterprises are expanding in terms of the variety and complexity of the use cases that are being automated. You can expose this automation to customers and employees through these conversational channels. End users can now interact with your automation through mobiles, the web, and even social apps. The inclusion of these conversational journeys improves end user experiences.

Process mining and process discovery

Process mining is a set of techniques that enable enterprises to understand the actual processes that are followed in organizations. Most end users visualize these processes as simple workflow diagrams. The reality is that the actual processes being followed by people on the ground are much more complex. Process mining helps you visualize and analyze these complex processes.

While we do RPA, we usually come back from looking at end users with simple workflows. We discover the complexity of the process as we progress through the automation. End users point out the branches that have been missed, one by one. Process complexity and identifying processes for automation and prioritizing them are some of the challenges for RPA.

Process mining and process discovery come to the rescue here. We can now add process mining with RPA. Both UiPath and Automation Anywhere have their own offerings in this area that can be used. There are also dedicated process mining vendors who have tailored their offerings to help with RPA process discovery and prioritization. You can also analyze and track the impact of your RPA automation.

Like RPA, process mining vendors have been adding more features as there is increasing interest and investments coming into this space as well. Some of the process discovery tools even allow you to generate an RPA **Process Definition Document** (**PDD**) automatically. Some of the RPA vendors claim that process mining or discovery can generate and provide you with skeleton RPA code that you can customize. This is an evolving field and some analysts are predicting that with more data, we will see that the creation of Bot scripts can be automated to a large extent.

RPA as a service

As we mentioned earlier, Automation Anywhere came up with a new version – A2019 – as we wrote this book. We pivoted to completing all our projects in A2019, which is a good example of delivering RPA from the cloud as a service.

As we saw with A2019, all the development, testing, deployment, and monitoring phases are carried out from a web-based control room. We downloaded and installed an agent on the desktop that the control room connected to in order to execute the automation locally. With this approach, you now have the ability to create automation from anywhere and across multiple operating systems. You can even start your automation on one device and finish it on another device.

We may also see new RPA models, such as pay as you use licensing RPA platforms, which will reduce the licensing cost of bots as competition intensifies in this product space.

RPA marketplaces

As we saw, RPA vendors are providing a way for us to plug in emerging technologies. These technologies are included as components that are provided by the RPA vendors themselves, partners, and even people like you. These components are usually available on a marketplace. Here are the marketplaces from the top RPA vendors:

- **UiPath Connect Marketplace**: An extensive library of reusable RPA components
- **Blue Prism Digital Exchange** (DX): A central place to find and include pre-built "skills"
- **Automation Anywhere Bot Store**: Includes digital workers (Bots) that can automate tasks

All these platforms allow you to automate better by enabling you to add a wide variety of technologies to solve business problems. These components can usually be added to your automation through drag-and-drop interfaces for easy configuration.

As these RPA platforms grow, we should see more participation and a greater variety of components that we can include in our automation. You could soon find pre-built components for the most typical automation scenarios.

Conclusion

These are the technologies and trends we can see as of now. RPA has played an important role in operating core processes during the COVID-19 pandemic period, and the adoption of RPA and hyperautomation is going to be accelerated by these global disruptions, so it would be prudent to master these key technologies to stay relevant in the job market. Also, stay on top of these and other evolving trends as you look to automate business processes.

Good luck!

Robotic Process Automation Projects

Robotic Process Automation (RPA) helps businesses to automate monotonous tasks that can be performed by machines.

This project-based guide will help you progress through easy to more advanced RPA projects. You'll learn the principles of RPA and how to architect solutions to meet the demands of business automation, along with exploring the most popular RPA tools – UiPath and Automation Anywhere. In the first part, you'll learn how to use UiPath by building a simple helpdesk ticket system. You'll then automate CRM systems by integrating Excel data with UiPath. After this, the book will guide you through building an AI-based social media moderator using Google Cloud Vision API. In the second part, you'll learn about Automation Anywhere's latest Cloud RPA platform (A2019) by creating projects such as an automated ERP administration system, an AI bot for order and invoice processing, and an automated emergency notification system for employees. Later, you'll get hands-on with advanced RPA tasks such as invoking APIs, before covering complex concepts such as Artificial Intelligence (AI) and machine learning in automation to take your understanding of RPA to the next level.

By the end of the book, you'll have a solid foundation in RPA with experience in building real-world projects.

Things you will learn:

- Explore RPA principles, techniques, and tools using an example-driven approach
- Understand the basics of UiPath by building a helpdesk ticket generation system
- Automate read and write operations from Excel in a CRM system using UiPath
- Build an AI-based social media moderator platform using Google Cloud Vision API with UiPath
- Explore how to use Automation Anywhere by building a simple sales order processing system
- Build an automated employee emergency reporting system using Automation Anywhere
- Test your knowledge of building an automated workflow through fun exercises

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