



# COMPARATIVE ANALYSIS OF RPA TOOLS-UIPATH, AUTOMATION ANYWHERE AND BLUEPRISM

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DOI: 10.47760/ijcsma.2020.v08i11.001

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*Abstract: Robotic process automation is one of the emerging fields in digital transformation. It is used to automate the redundant and repetitive task and as a result contributes towards building a large digital workforce. It also reduces the use of manpower and time requirement whereas increasing the accuracy and revenue generation. There are various service platforms which provide tools for robotic process automation. Three major among these are- Automation anywhere, UiPath and BluePrism. These platforms facilitate the development of software bots which can take up repetitive human tasks. These bots follow defined or recorded actions to perform the given task in a controlled ecosystem developed by such platform providers. Although RPA is much of a corporate attraction, its academic research background is unexplored. This paper presents a comparative analysis of the three platform provider for development of bots to automate business processes.*

*Keywords: Robotic process automation, digital workforce, RPA tools, software bots.*

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## 1. Introduction

Continuous digital transformations have changed the world to a great extent. Business processes are also not left untouched with such transformations. One such technology is Robotic Process Automation. According to IEEE Standards Association, Robotic Process Automation is defined as “A preconfigured software instance that uses business rules and predefined activity choreography to complete the autonomous execution of a combination of processes, activities, transactions, and tasks in one or more unrelated software systems to deliver a result or service with human exception management.” [1] Almost all the industries including human resources, finance, healthcare, insurance, telecommunication, infrastructure and many more have used RPA tools to automate their business processes. In next decade, almost 50% of such industries plan to automate the repetitive work including front and back office tasks. It is expected that with the introduction of RPA in business processes efficiency, accuracy and speed will increase. On the other hand this will also result in increase in digital workforce that can eventually cause loss of employment to a certain extent. The basic purpose of RPA is to automate the recurring tasks in a way humans were doing it with higher accuracy and speed. RPA affects core business processes immediately in various applications. It will instantaneously affect applications like employee payroll, employee work status adjustment, new recruitment with different skill set, accounts receivable and payable, invoice and inventory management, software installations and data migration etc[2].

Industry 4.0 revolution has severely impacted the industries. Digitalisation has been an important aspect of this revolution. RPA has served as an important technology for this purpose. It can significantly affect the profitability and degree of competition among the peers [3]. New challenges and opportunities are always associated with new technologies. If used strategically, RPA can help to manage resources in an efficient way and it can also result in organizational growth can also be sped up. Robotic Process Automation (RPA) is the rule-based automation of business processes by software bots for imitating human behaviour in performing



different repetitive tasks, thus helping to reduce tedious work done by employees [4]. RPA is implemented using software bots also known as artificial intelligence workers. Such AI workers build digital workforce.

Data collection and filtering is very repetitive and tedious task. Approximately 17% of the task done by an organization is data collection, and 16% is data pre processing and filtering [5]. Usually humans undertake these tasks. Data collection, processing and filtering takes up lots of time and energy of the employees. RPA can be used to automate these processes which will eventually result in less time consumption and less human intervention. RPA tools provide a platform to create and deploy such software bots. These bots are capable of mimicking human actions. With the implementation of RPA in a business process, digital workforce is employed.

RPA can be used to automate variety of tasks like front office task, back office task, end to end processes, sending daily details or updates etc. If such repetitive task is assigned to a digital workforce than human workforce can be utilised to do more intelligent and value added tasks. RPA tools provide various methods to design and deploy such bots. One method is to provide sequence of actions to be performed and another way is to use recorders. Recorders are much easier way of designing a bot and it does not require any programming knowledge at all. These recorders use components of artificial intelligence to identify parts of task which a user wants to automate. When artificial intelligence is integrated with RPA, it becomes capable of doing human like work with high degree of cognitive capabilities.

RPA is capable of addressing various issues at various levels in the organisational hierarchy and at the same time organisation can face various challenges while employing RPA techniques [3]. Some basic problems and challenges faced by an institution while employing RPA are - induction of insecurity among workers, fear of losing confidential information by hacking or by system crash, constant change in the type of work an employee takes up, proactive planning is needed, overall process must be maintained under human supervision etc are some to be named. Some of the reasons for organisations to employ RPA to automate their business processes are- to minimise the human errors, maximise the accuracy, minimise the time taken to perform repetitive tasks by human workers, capability to work 24X7, reduction in human workforce and increase in digital workforce, increased capability of handling large data sets etc are a few to be named. Employing RPA for any business firm gives many advantages [6], a few of them are listed below-

- Accuracy- RPA almost erased typos errors and other human errors and increased accuracy to a very high level. It also maintains uniformity in the data acquisition process.
- Free of biases- while acquiring data or data filtering no favouritism of biases can hamper work of RPA.
- Low Technical Barrier- a person with low technical knowledge or low programming knowledge can configure a bot with an ease using RPA development tools
- Compliance- Bots provide 100% compliance to the given instructions. Also they provide audit trail history to analyse the working of a bot.
- Consistency- Bots can perform same task repetitively for hours or even days with same accuracy and efficiency without getting tired or hampering the performance.
- Human resource utilization- Man power can be utilised in more fruitful way. Those personnel who were engaged in doing repetitive tasks can be assigned some more useful tasks.
- Quality of service- RPA can certainly improve quality of services provided by a business with increased efficiency and accuracy.
- Reliability- Bots can apply rules without fail, perform certain tasks without making mistakes and does not change course of action in different iterations.

Precisely, digital workforce, trustworthy business transformation, better methods of handling voluminous and structured/unstructured data and return on investment are some of the added advantages of deploying RPA in business processes.

## 2. Overview

While deploying RPA technologies to automate business processes, it is very important to select right tasks or processes to automate [7]. If correct processes are not selected for automation than instead of contributing in return of investment RPA can create processes blockage and bottlenecks or it can even slower the business processes. Some characteristics of the processes to be selected for automation are- highly rule based, works on



voluminous data, has digitised input, highly manual and repetitive, needs low exception handling, less complex and well documented processes. To automate a business process one needs to have an access to any of the RPA tools. RPA tools basically comprise of three components- a graphical modelling tool, an orchestrator and some additional tools. The modelling tool facilitates the design process and simple drag and drop approach makes it easy to use for naive users too. The orchestrator is used for managing and executing bots. It is used in development, testing and production phases. Additional tools are specific to vendors. These can include- analytics tool, scheduler, collaborator, audit tools or some artificial intelligence features. RPA software tools must be able to work in various environments like desktop, web and citrix environment. These tools must facilitate design and deployment of bots for specific purpose logically but with lesser programming language knowledge. Data acquisition must be permitted from diverse data sources. Usually RPA bots should be saved in cloud locations and they should be reused when required. Also there must be a management module that should take up tasks like versioning, maintaining audit trails, scheduling and collaboration etc.

Basically RPA tools have one of the two architecture types among client server architecture and web based orchestrator. Client-server architecture is a network architecture in which every node is either a client or a server. Whereas a web-based orchestrator assist to connect automated tasks into an integrated workflow that is defined to achieve an exact aim. The three top most RPA tools are UiPath, Automation Anywhere and BluePrism.

### 2.1 Automation Anywhere

Automation anywhere is one of leading service providers among RPA tools. The architecture of AA is client – server based. Three basic components of AA are Bot creator, Control room and Bot runner. Bot creator allows the easy design and automation process for bots. Control room manages execution and scheduling of bots in addition to maintaining credentials, managing security issues and client permissions and assesses. Bot runner is used to run the bot and record its analytics which is sent back to the control room. AA supports three types of bot creation namely- Task Bot, Meta Bot and IQ bot. Task bots are widely used to automate rule based and repetitive tasks whereas Meta bot are used to create building blocks of bots which can be reused in some other task bot. On the other hand IQ bots are equipped with cognitive and intelligent characteristics used for processing unstructured data. AA provides three types of recorders to record user activities and convert it into a script for a bot. Screen recorder, smart recorder and web recorder are used to automate the task by mimicking user actions. Some additional features of automation anywhere are BOT INSIGHTS which is analytics engine of AA that allows to visualize user data and take business insights from it, BOT FARM which allows companies to buy RPA tools on a usage basis rather than on a capacity or license basis and BOT STORE which is AA marketplace where various plug and play bots are available

### 2.2 UiPath

UiPath is a global software company that provides a platform to develop software bots for automate business processes. UiPath is a web orchestrator based architecture developed on .NET framework. Main components of UiPath are UiPath studio, UiPath Orchestrator and UiPath Robots. The studio provides various activities and workspace to design and execute user defined bot. It is easier to use since it uses drag and drop approach while working with activities. The orchestrator allows the user to upload a bot in cloud, deploy it and manage its resources. It also manages the bot queues, provisioning, configuration, logs etc. The robots are used to perform tasks like human beings. They can be of two types-attended and unattended. The attended bots need human intervention for completing their tasks whereas unattended bots work independently on their own. UiPath provides five types of recorders-basic recording used for single activity, desktop recording used for capturing multiple actions which can be between various apps, web recording which is used to record web and browser activities , image recording and citrix recording are used for virtual environments and is capable of image, text and keyboard automation. Orchestrator is one of the most important components of UiPath. It is used to manage multiple bots in the environment. For establishing communication between the bots, assets have been introduced. Assets can also store user credentials. For workload management queues are used in UiPath. It also manages audit trails and logs to keep a check upon the bot activities.



### 2.3 BluePrism

BluePrism is another leading company which provides RPA solutions and RPA tools. It is based on Java & .NET framework and provides drag and drop approach for bot designing. Four main components of BluePrism are process diagram, process studio, object studio and application modeller. Process diagrams are business workflows which are created by utilising core programming concepts. These graphical representations of workflows are used to create, analyse, modify and scale business capabilities. Process studio provides a platform to create process diagrams with various drag and drop activities. Object studio is used to create visual basic objects which are used to communicate with other applications. Application Modeller is the functionality to create application models with Object Studio. This exposes the UI Elements of a target application to Blue Prism program. BluePrism introduces connected-RPA which works in association with artificial intelligence and cognitive capabilities. BluePrism also provides control room for analysing bot activities and audit trails. It has also integrated cross platform support for many other AI and cloud technologies. Work queues are used for workload management for managing execution of multiple bots simultaneously. BluePrism also supports intelligent surface automation, multi-language interface support, customised dashboard, robot screen capture etc to name some.

### 3. Table of Comparison

Comparative analysis of three leaders in RPA industry has been summarised below.

Criteria of comparison	Automation Anywhere	UiPath	BluePrism
<b>Architecture</b>	Client server architecture	Web based orchestrator	Client server architecture
<b>Popularity</b>	Less popular than UiPath and BP but more than other RPA tools. AA is gaining popularity day by day.	Most Popular RPA tool. Topping the charts from a long time.	Very popular but less than UiPath.
<b>Product Availability</b>	One month trial is available in enterprise edition whereas community edition is available to use with only BotCreator rights. Audit log and management are not available. No API features are available. Control room repository access is not available	Community edition is available for all to use but the bots created cannot be distributed. Enterprise edition is available on 60 days free trial with 1 orchestrator, 10 Licenses for UiPath Studio, StudioX, Studio Pro, 10 Attended, 10 Unattended, 10 Test , 2 AI Robots, 10 Action Center, 1 Insights.	Provides one month free trial of the product. It has limitation of 15 processes and 1 digital worker. In learning edition free licence is given for 180 days with limitation of 1 digital worker and 5 processes.
<b>Usability</b>	UI is complex. More suited for people with proper coding knowledge and developers.	UI is very simple and easy to use. Can be used by naive users too.	UI is simple and provides easy generation of bots.
<b>Type of processes that can be automated</b>	Can be used for back-office and front office automation.	Can be used for back-office and front office automation.	Can be used for back-office automation.
<b>Recorders</b>	Three types of recorder- Smart, screen and web. These recorders can be used for desktop as well as web applications.	Five types of recorder – Basic, web, desktop, image and citrix. With a robust set of recorders UiPath makes it easier to capture human actions to mimic it further.	No recorders are available. One has to create a process using drag and drop features.
<b>Cognitive capability</b>	Medium cognitive capabilities	Medium cognitive capabilities	Low cognitive capabilities



<b>Coding requirement</b>	Supports both recordings and drag drop approaches. So coding is not mandatory	Supports both recordings and drag drop approaches. So coding is not mandatory	No recorders but use of process diagrams and in built functionality makes it easy to use. Supports coding but it is not mandatory.
<b>Pricing</b>	Cloud starter 9000\$ (Customisable) Approx 20000\$ annually	Customisable as per requirement Approx 18000\$ annually	Around 15000\$ annually
<b>Reliability &amp; security</b>	High security is provided. AA provides credential vault to save confidential user information which is encrypted strongly	Credential manager is used to save user data which is sensitive and confidential. Proper encryption has been incorporated.	Security is provided by saving sensitive information in BluePrism credential manager. User can choose algorithm to generate key and where to save it
<b>Encryption Algorithm</b>	RSA with 2048 bit master key is used for encryption AES-256 bit key is used for data encryption	Supports encryption algorithms like AES, DES, RC2, Rijndael, and TripleDES.	Cipher Obfuscation is used for credential information. Source code obfuscation for all codes which reduces risk of attacks or reverse engineering or patching.
<b>Certification</b>	Available online	Available online	Available online
<b>Clients</b>	Google,Siemens,Cisco,Dell,	PWC, Lufthansa, HP, DHL	O2, Walgreen, Heineken.

Table 1: Table of Comparison between Automation Anywhere, UiPath & BluePrism

#### 4. Conclusion

Before employing any of the RPA tools a company must first identify processes that are repetitive and needs to be automated. Wrong process selection can hamper the return on investment severely. After the process selection a proper tool which fulfils the process requirement should be selected. Automation Anywhere, UiPath and BluePrism are the three top RPA tools. Each of them has a different set of functionalities which makes them more appropriate for certain industries. Automation Anywhere is designed for mid and large sized companies in banking, finance, IT telecom and healthcare sectors. Digital workforce of AA is focused on purchase, payment and HR management makes it suitable for banking, finance and IT sectors. BluePrism is designed large sized companies. It provides strong support for back office automation and thus makes it more suitable for media manufacturing companies and healthcare companies. UiPath is designed for both mid sized and large sized companies. It provides strong support for both front office automation and back office automation which makes it useful in various industries like human resources, insurance and infrastructure.

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