IT Emerging Technology Review Paper

Cloud Seeding Robotic Process Automation

Assignment 2

By

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Abstract

Every Automated task cuts down the redundant jobs performed by human force, while the human workforce can be trained and employed in better, efficient and effective jobs. RPA is a technology where computer software (BOTS) similarly drives existing enterprise application software as a user does it. In other words, unlike traditional application software, Robotic automation is a tool that operates other application software through the existing application's user interface. Tools like blue prism, uipath, Automation Anywhere, etc. help in converting a workstation to act as a bot and further robotically perform the tasks fed by the administrator. With RPA technology Every workstation can be converted into a bot and make it work like a human 24/7, and with a huge workload number of workstations can be scaled to as many as possible, network them into the cluster, and automatically allocate the tasks between them using work queue technology. However, having thousands of workstations in this way sounds hasty, the solution to this problem is CLOUD, and that's what this Survey paper intends to reach out to society and organization. Seeding the RPA tools in the cloud helps us to virtually create an unlimited number of bots that can work 24/7. Commercial cloud lenders like AWS, Google, Microsoft through their cloud services offer High-speed computing, Security, Autoscaling, Load balancing, Secure data storage. In a nutshell, Cloud computing has been a boon, and Cloud plays a vital role in setting up an automated Organization using RPA technology, which can run 24/7 effectively and efficiently.

Keywords: RPA, Cloud computing, Robotic processing automation, Autoscaling, load balancing, Automation, cloud.

1. Introduction

Most of the automated tasks that implement cross-border applications require multiple machines to be coordinated. However, the trend has been completely changed now (V. Marbukh,2016). The concept of interaction between automation and robots[bots] has a long history — efforts to categorize network protocols evolved since the 1980s when General Motors developed the Manufacturing Automation Protocol (MAP), while IEEE Robotics and Automation Society established a core committee in May 2001, where some workshops and conferences were setup (V. Marbukh,2016).

Cloud Robotics was introduced under the initiative of Google In 2010, to enlighten the view where the Internet played a vital role in parallel computation and backing up data resources related to previous task on "Remote Brained robots" (A. Anwar, A. Sailer, A. Kochut, C. O. Schulz, A. Segal, and A. R. Butt,2015).

Cloud computing has proved to be helpful for industry where complete infrastructure of any organization Like a database, computing, networking, etc. can be placed in the cloud, and with the invention of RPA, even the workforce can be put on cloud (A. Anwar, A. Sailer, A. Kochut, C. O. Schulz, A. Segal, and A. R. Butt,2015). In the present business environment, several organizations are looking at cloud for solutions to maintain their organizational costs and expand their business infrastructure and bring in state of the art tools to run their organization along with serving their prestigious customers (V. Marbukh,2016).

While Robotic Processing Automation (RPA) is a technology that can be classified as Software Robots (BOTS) or Artificial intelligence workers (A.Zamkow,2016). However, it should not be confused with industrial automation; it automates time-consuming, repeated and redundant tasks of the humans to improve cost-benefit, reliability, and efficiency of work outcomes (A.Zamkow,2016).

This survey paper intends to highlight seeding RPA in the cloud and virtually creating an organization that runs 24/7 with minimal human interference and is organized under several potential aspects like Robotic Processing Automation, Cloud Computing, Autoscaling, Load Balancing, Work queues, etc.

2.0 Definitions

2.1 Cloud

"A model for enabling ubiquitous,convenient,on-demand network access to a shared pool of configurable resources (e.g., servers, storage, networks, applications, and services) that can be rapidly provisioned & released with minimal management effort / service provider interaction" (NIST, 2009).

2.2 Robotic Process Automation (RPA)

Robotic Processing Automation (RPA) is a technology that can be classified as Software Robots (BOTS) or Artificial intelligence workers (A.Zamkow,2016). Which, automates time-consuming, repeated and redundant tasks of the humans to improve cost-benefit, reliability, and efficiency of work outcomes (A.Zamkow,2016).

2.3 Virtualization

Virtualization as a concept in the light of cloud computing is used to manage and compute resources at the remote location (R. Rauscher and R. Acharya,2014). Virtual hosts mange these resources and dynamically distribute it to users , on demand as a service.

3.0 Literature Review

3.1 Robotic Process Automation

Robotic Processing Automation (RPA) is a technology that can be classified as Software Robots (BOTS) or Artificial intelligence workers, in the light of Artificial intelligence and analytics technology plays a vital role in technology boost and a jaw-dropping customer service experience (E. Campos, R. Matos, P. Maciel, I. Costa, F. A. Silva and F. Souza,2015). Fig 1. Shows Manual process vs RPA

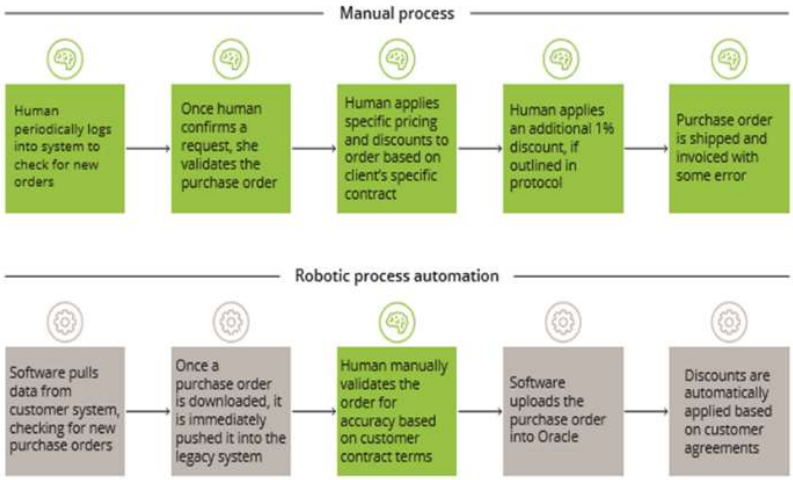

Fig 1. Manual process vs. RPA (R. Rauscher and R. Acharya,2014)

Implementation of RPA is done on the use-cases consisting of a low level of complexity, higher volume, and routine-work (R. Rauscher and R. Acharya,2014).

Right from retail business to wholesale services and tertiary sectors like banks, Information Tech to Human resorce management ,and task force that are core components of an organization, RPA opens its opportunity for firms at many stages like data entry , business and knowledge processing units etc those are redundantly performed by humans (D.Schatsky, C.Muraskin, and K.Iyengar, 2017).

Using traditional automation tools, the developer develops Scripts or application program interfaces to automate a task and make an interface with the backend process. While with RPA tools it allows data to be handled between multiple tools and applications (D.Schatsky, C.Muraskin, and K.Iyengar, 2017). RPA tools mimic the exact movements and operations a human does in a real-life graphical user interface.

3.2 Cloud Computing

On-demand cloud services are now widely available, which include Amazon Web Service's compute, storage etc, Google Cloud services, and Microsoft Azure. All These provide resources on paid basis which organizations can make use of to setup their business firms and even for public purpose for short-term computing tasks, web application developers usually use these services (B. Kehoe, S. Patil, P. Abbeel and K. Goldberg, 2015). Making use of the cloud, bots host data from physical servers to be stored in the cloud where all the compute happens , meanwhile making use of cloud database to access the data and store the data , in the process learning the enviriornment the bot belongs to in order to perform the tasks effectively and efficiently (G. Hu, W. P. Tay and Y. Wen,2012).

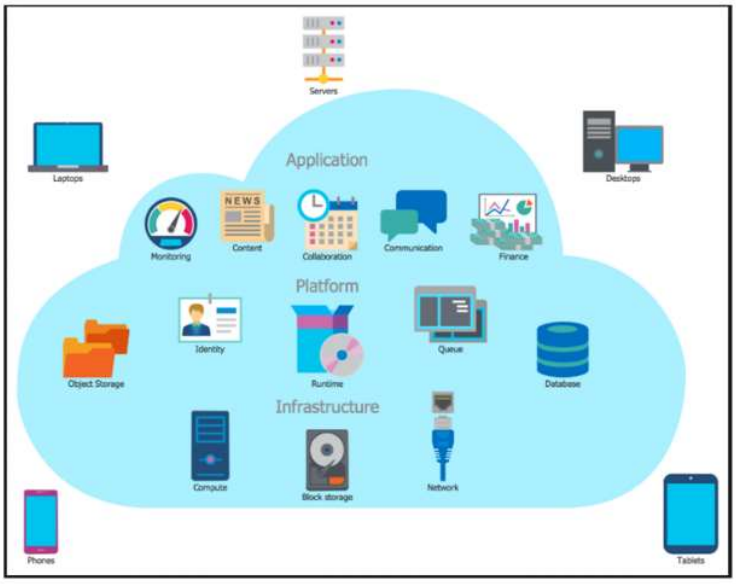

Fig 2. Cloud Architecture (G. Hu, W. P. Tay and Y. Wen,2012)

Figure 2 shows the overview architecture of the cloud, where different cloud services like, compute , database etc are made use of several cloud hosted network devices (G. Hu, W. P. Tay and Y. Wen,2012).

There are three familiar service models of the cloud available where the organizations can decide upon implementation of their work infrastructure (B. Kehoe, S. Patil, P. Abbeel, and K. Goldberg, 2015).

- SAS.
- PAS.
- IAAS.

  Where they mean software as a service at the top level, platform as a service at intermediate level and infrastructure as a service at ground level

Meanwhile, commercial clouds can be classified into four models .

- Private cloud: exclusively for the use of a single organization.
- Community cloud: for use by a specific community that has shared concerns.
- Public cloud: provisioned for general public use.
- Hybrid cloud: with mix of 2 or more cloud types.

3.3 Life Cycle of a Bot

A bot platform supports the life cycle of bot-building, which includes all the aspects of building a bot from scratch. Bot scripts automate the common tasks that bot developers develop (A.Zamkow,2016). Figure 3 demonstrates the diagram of the lifecycle of a bot.

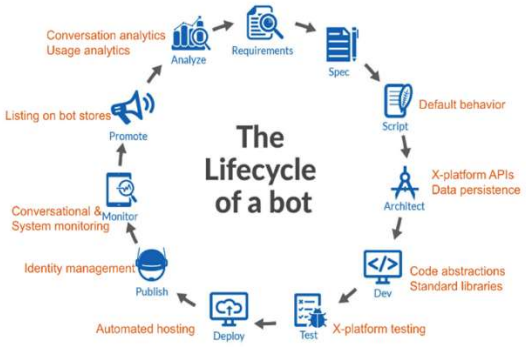

Fig 3. Life Cycle of a Bot (A.Zamkow,2016)

- **Requirements** are custom to each bot.
- **Spec**: what requirements it should possess
- **Script**: bot platform can set up default scripts, and behaviors for bots, they are required to introduce themselves and act on its own, handle Null requests, etc. These default scripts can be used to automate these usual behaviors (A.Zamkow,2016).
- **Architect**: A bot platform allows the architect to focus purely on business logic.
- **Dev**: bot platform helps to achieve an easier and quicker development stage.
- **Test**: bot platform must include an emulator and also a mechanism to test the bot instantly across multiple messaging channels (A.Zamkow,2016).
- **Deploy**: An efficient bot platform highlights a one-click delivery, instant one time deploy.
- **Publish**: submission and approval process varies from channel to channel.
- **Monitor**: when monitoring is automated, it is one of the best features of a good bot platform, which includes both system monitoring, and conversation-monitoring with the use of simulated pre-defined scripts (A.Zamkow,2016).

- **Promote**: Different bot platforms help in automating the listing process at multiple bot stores (A.Zamkow,2016).
- **Analyze**: To track conversational flow and usage metrics, automated built-in analytics happens to be a prominent feature that bot platform deploys (A.Zamkow,2016).

4.0 Discussion

4.1 Auto-Scaling

Auto-scaling is a way to automatically scale up or down the number of computing resources that are being allocated to your application based on its needs at any given time (R. Poddar, A. Vishnoi, and V. Mann,2015). For some cloud applications/services which may encounter different workloads at a different time, automatic resource provisioning has to work efficiently and effectively while many commercial cloud services work to respond user requests quickly without interruption (V. Shah and H. Trivedi,2015) .A virtual server can be used to handle user requests. In some situations, the number of requests could increase so quickly that the server becomes overloaded. If the cloud platform could detect such situations, then it can dynamically add additional servers to share the workload. And when the workload decreases compute capacity can be scaled down to save the resources(R. Poddar, A. Vishnoi and V. Mann,2015).

Another approach for auto-scaling is to use a predictive approach that predicts future workload and arranges the system accordingly (C. Chen, S. Chen, F. Yin, and W. Wang,2015). By using this type of approach, efficient auto-scaling relies on how the prediction mechanism can predict future workload. In a way to get a good prediction result, the auto-scaling mechanism can use

a mathematical/statistics algorithms, that is, an autoscaling mechanism increases or decreases the number of virtual resources accordingly (E. Campos, R. Matos, P. Maciel, I. Costa, F. A. Silva, and F. Souza,2015).

4.2 Load-Balancing

Load balancing refers to efficiently distributing the incoming network traffic across a group of servers, also known as a server pool. Load balancing aims to optimize resource use, maximize throughput, minimize response time, and avoid overload of any single resource which can go down if not share the load (V. Shah and H. Trivedi,2015).

4.3 Work-Queue

These are nothing but the list of jobs or cases, kept in a shared location, and cases are fed into the queue. Compute resources having access to them could pick the job, process it and finish it (V. Shah and H. Trivedi,2015). While each computes resource picks up a job to perform, and an environmental lock will be placed on the job, and no other computer resource can access it except the one who picked it originally. In this way several thousands of jobs can be distributed among the clustered computing resources and the task can be performed simultaneously and parallelly (V. Shah and H. Trivedi,2015).

4.4 Boom of Bots

Companies have chosen not to displace workers rather think, how technology and humans can work together symbiotically. Automation can be deployed by either “automating,”

"information," or both (D.Schatsky, C.Muraskin, and K.Iyengar, 2017). With advances in automation, there is a symbiotic relationship between automation and robots where the nexus is bridged by smart machines solving the problems (L.P. Willcocks, M.C. Lacity,2017). We can undisputedly conclude that automation will create a set of workers including bots and humans who work in a nexus without crossing each others limits (L.P. Willcocks, M.C. Lacity,2017).

On a horizon of one to five, we can anticipate a few scenarios.

- Bots and RPA together will set the benchmark for the way services are delivered and not replce humans with AI workers (A.Zamkow,2016).
- The waves will rise, with the superior "ease of engagement" with respect to domestic /in-house projects (A.Zamkow,2016).
- Projects and workforce will flow inside the economy as they will be the cutting edge technology to look for (A.Zamkow,2016).
- Through automation, there will be a healthy competition between the service providers, which results in cost cutting and enhancing the services delivered (A.Zamkow,2016).

4.5 Advantages

RPA ends work redundancy by humans, where humans are involved performing the same tasks every single day. Which would not only be cost-effective for the organization but directly being time-efficient, where a bot can be made to work like a human 24/7 (L.P. Willcocks, M.C.

Lacity,2017). With increase in workload, resources/ computing devices can be scaled up accordingly and likewise can be scaled down during low workload.

Cloud and RPA together Save us physical space, literally placing everything on cloud.

RPA Can work across multiple platforms like web, windows, java, and other mainframe applications flawlessly (L.P. Willcocks, M.C. Lacity,2017).

4.6 Problems

Loss of jobs because of Automation is a myth. Companies are not just blindly replacing humans with machines, but in reality creating an effective workgroup, where each one works effectively in their sphere (L.P. Willcocks, M.C. Lacity,2017).

Logical Scripting errors are not the problems that we can blame bots for, as it is a human scripting error, and one should take care of it while scripting.

Automation preventers block the automation process, and many websites are including them these days. However, RPA is all about automating enterprise applications (L.P. Willcocks, M.C. Lacity,2017). Sometimes even minor changes would require bot re-configuration by altering the scripts. Tasks that require judgment and creativity cannot be automated, as RPA is all about Process Automation.

5.0 Implication

The paper intends to propose a cloud-RPA architecture to address the idea of a Virtual Organization running on the cloud, RPA and cloud rogether will create a healthy workforce where each one will be performing effectively in their respective spheres. Intervention of powerful technology like automation and cloud will open the doors to a new bench mark which will change the dynamics of cloud robotics. Deployment of scalable resources with high computing power will not only be cost effective but in turn increasing the efficiency and reducing the time consumption. To be clear RPA is the future of process automation and management.

6.0 Conclusion

In a nutshell, business and process management will see a lot of changes and the reason being Robotic Process Automation. This paper intends to link RPA with Cloud technology, where a virtual organization can be set up to run 24/7 with minimal human interference. Thanks to powerful cloud services like Amazon Web Services (AWS), Microsoft Azure, etc. which acts as a bridge to implement RPA for Startup companies, Never the less Largescale Investors can afford their Cloud infrastructure and unleash the potential of RPA.

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