
SCALABILITY IN ROBOTIC PROCESS AUTOMATION

Hot Topic Report

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Introduction

The competition in the marketplace is increasing daily. RPA provides a multitude of advantages for organizations since it automates the repetitive business processes which in turn improves speed, quality, and productivity. The RPA technology can be integrated into existing legacy systems and applications. It works by accessing information from the existing IT systems. There are several ways the automation can be connected to the front end and the back end. The Robotic Process Automation (RPA) in Recruitment automates the process with limited human involvement. RPA is a new software technology that facilitates the makes it easy to build, deploy and manage software robots that emulate human actions interacting with digital systems and software. RPAs are in use in Healthcare, Retail, Telecommunications, Banking, Insurance and Manufacturing industries. Generally, in these industries RPA automates the tasks in data entries, update orders, entering and update customers data, help in supply chain procedures.

Although most of the companies are implementing Robotic Process Automation as their automation strategy, the scalability issues are becoming a major hurdle for most of the enterprises. Because of the increasing workload, the bot's resiliency in RPAs is ineffective. The more data stored or simultaneous users the software collects, the more strain is put on the RPA's architecture. In the initial stage, the organization which is opting to integrate RPA into their system may not realize the future prospect of workloads and integrate the system with the current scenario. This results in the scalability issues which impacts directly on the customer service, costs, and revenues. Because, the bots cannot handle the heavy load, they seem to break. Companies fail to estimate the complexities of their business processes, so, the bot will often malfunction. Since, scalability is a non-functional requirement, it is often neglected during the requirements phase. But this is the requirement that adds the value to the organization

implementing RPA. A scalable system saves both time and money for an organization in the long run.

Scalability

Scalability refers to the ability of a system to perform when large number or increasing volume of requests and higher system processing demands are yielded into the system. Scalability is one of the non-functional requirements of the software development. While the system designing task is in place, the Scalability requirements have to be mentioned and be accommodated during the requirement phases. Although, it is one of the important nonfunctional requirements, it is often not considered during the software development aspect.

A system is said to be unscalable if it cannot handle large workloads, higher level of traffic, increasing requests in the system and incur costs for the organization implementing the system. An unscalable system adds labor costs and degrade the quality of the system or cannot perform according to the required standards. This can eventually lead to loss in the revenue as it cannot handle the traffic, and not able to perform well leads to declining in the number of users and inability to board the new users.

Response versus demand

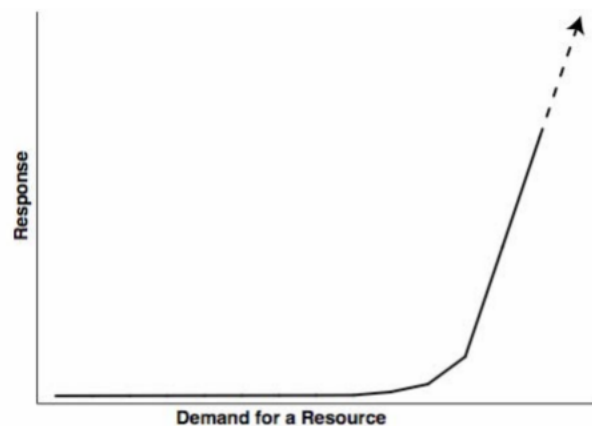


Figure from: On System Scalability - Charles B. Weinstock, John B. Goodenough

Let's look at the figure to understand Scalability through Response and the Demand. The Demand in the X-Axis refers to the demand for a resource or say a user is requesting for some information through the system. The Y-Axis refers to the response time for the demand to be completed. Initially, there is lower demand for the resource as there are lower number of users in the system. And the response time for the lower demand is very fast, almost negligible. But as the demand for a resource increases the response time increases accordingly. The inability of the system to handle large number of requests has resulted in the increase in the response time. If the curve is ever-increasing and there are no measures applied to account for the increasing demand and the response time, we can say that the system has reached to the limit of Scalability. The system later fails to provide the user with the result and eventually the system designers must increase the scalability of the system.

Ways to Increase the Scalable Capacity

The Scalability is designed based on the data structures that are used to store and organize data and different algorithms that are used to retrieve them from the data structures, implement the data structures and communicate with one another. The algorithms may be used to search these structures, to schedule activities or access to resources, to coordinate interactions between processes, or to update multiple copies of data at different places. There are two ways the scalable capacity of a system can be increased. Firstly, we can increase the scalability of a system without adding the resources to the system and another way is by adding the capacity to the system.

The first method of increasing the scaling is by modifying the existing data structures, modifying and improving the algorithms so that the algorithm can retrieve the data faster and decrease the response time. Another approach is by decreasing the amount of other work the systems needs to perform and by guiding the system to perform well when the system requires higher scalability.

The Second method is to improve the scalability of the system by adding the additional resources to the system. For example, if the system is giving an issue because of the memory intensive tasks requested by the user. The organization can speed up the process by adding more memory to the system.

The first method is not a sustainable measure to increase the capacity of the system. Since it involves directing the amount of work to other services, modifying data structure and improving algorithms, there comes a point of time when the algorithms can no longer be improved and retrieving data cannot be done faster as it would have already reached the optimum. This is one of the challenges for increasing the scaling capacity using this method. The challenge for the second method lies on the cost. Adding additional resources in the system to the account for the scalability issues once the system is already up and running can be a costly approach. An

organization should look for cost effective approach to address the scalability issue using this method.

Robotic Process Automation (RPA)

RPA is a software technology that emulates that human and performs the tasks as human does.

The robots or simply called 'bots' perform the repetitive business processes in an organization.

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business processes which in turn improves speed, quality, and productivity. The RPA

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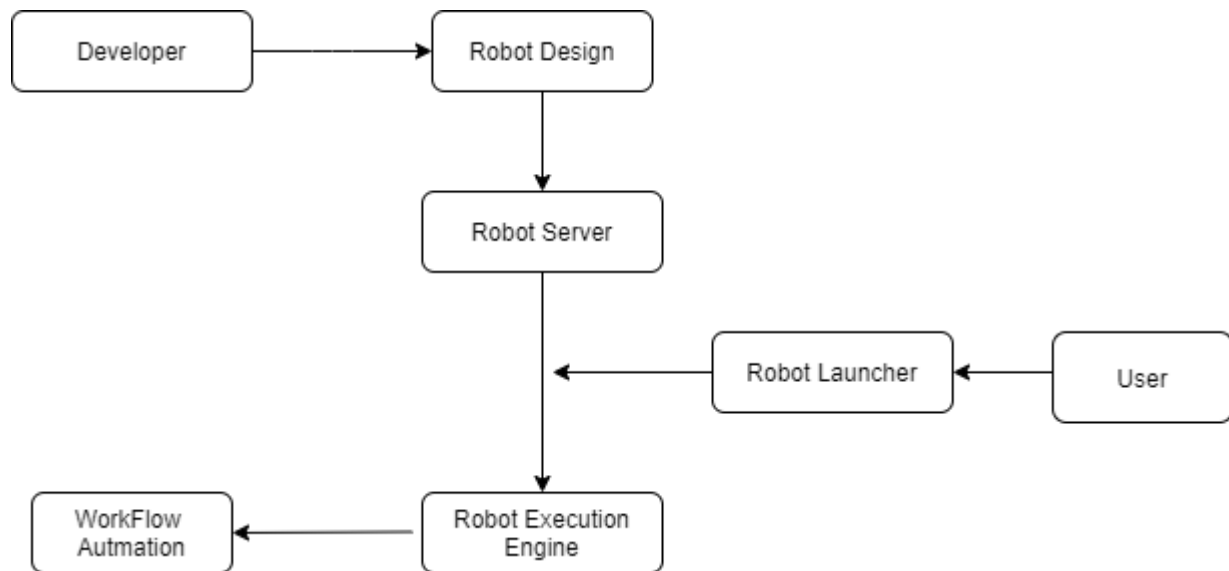
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How does RPA work:

A simple architecture of RPA



Developer – A computer programmer who can develop the solution.

Robot Design – Here, the bot scripts are designed and the tasks that humans need to do are replicated to a bot.

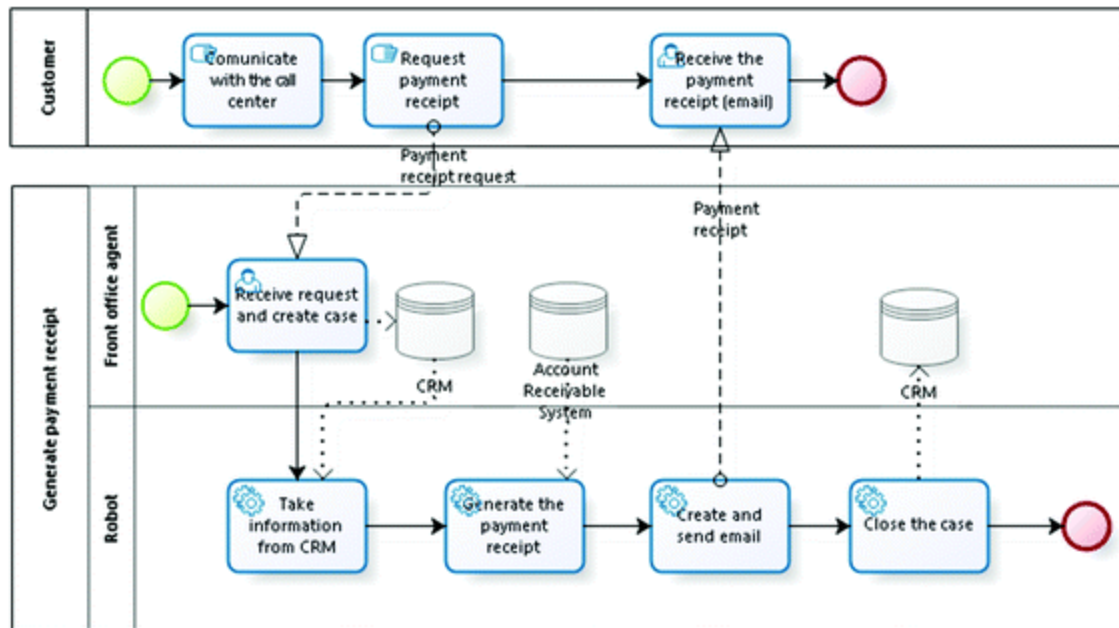
Robot Server –

User – User or employee in the business organization triggers the tasks to the Robot through the Robot Launcher.

Robot Execution Engine – Runs the actions sequentially as according to the bot scripts.

Workflow Automation – Uses the robots to automate the human tasks.

Use Case of RPA:



This is a use case of RPA to provide payment receipt to the customer. Firstly, the Customer communicates to request for the payment. Then, the front office agent receives the request and creates the case. In the third step, the Robot does all the task from taking the information from CRM to send payment receipt to the customer and finally close the place. The Robot has here replaced the mundane and repetitive task that humans had to do. Replacing this task by a robot creates efficiency in the tasks such as this.

Scalability in Robotic Process Automation

According to a study done by Deloitte, 53% of their initial respondents had already started the RPA journey whereas only 3% have managed to scale the RPA successfully.

Underestimate the Business Processes

The organizations seeking for implementing the RPA tend to underestimate the complexity of a business process. Underestimating the complexity results in the malfunction of the robots used in the system. The Robot design team cannot predict the weight of a business process and assign that task to a robot without analyzing the future consequences of doing so. Further, a robot designed for a specific business process mightn't have a heavy demand on the task assignment in the initial stage as the workload is lesser. But, when the workload increases, problems start to increase along with the workload. If more users retrieve data from the robot or push more business processes towards the bot, then the distress caused to the robot architecture is high. The misidentification or underestimation of the business process in the initial stage creates such issues. This leads to the Scalability issue as the robot cannot handle the workload and eventually the bot fails to complete the process.

Scope Creep

A project's requirements tend to increase during a project lifecycle. It is not feasible to identify all the requirements in the beginning. But, the organization and the development team that doesn't control the scope creep can disrupt the scaling of the RPA. All the scope of the business processes should be identified in the beginning. All the business processes require different robots and each business processes can be identified in the beginning. And developing the robots according to each business processes can help control the scope creep during the RPA design and development.

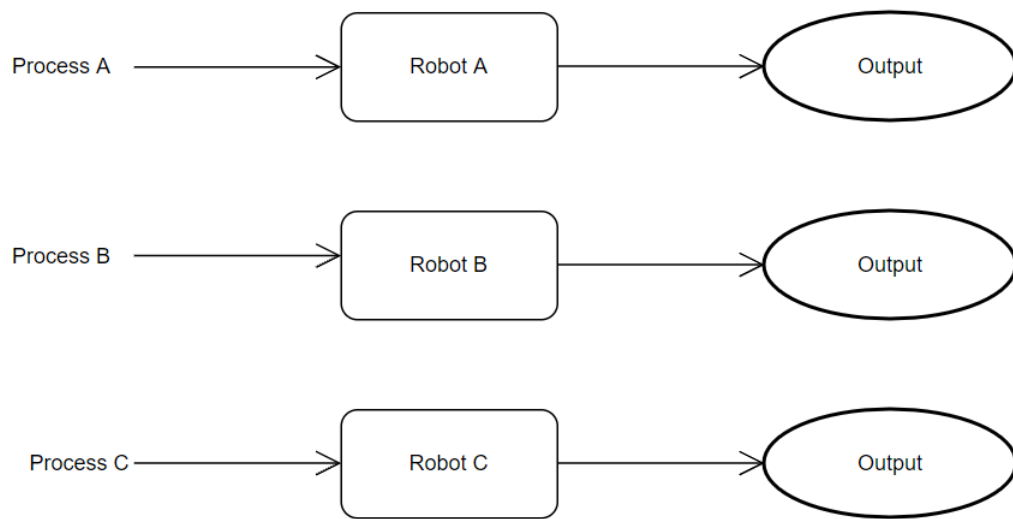
Choosing the wrong processes

An organization tends to choose the wrong processes to automate. Here, wrong process refers to a very highly complex process. The processes to be automated must correctly identify the vision and the strategy of the tasks that a Robot must perform. The organization should identify the processes that can be made scalable rather than the complex processes that makes a Robot prone to breakdowns. Starting with the incorrect methods/processes is definitely going to create the organization hindrance to successfully implement the RPA. Choosing the complex processes not only impact in the scalability of the Robots but also results in the significant automation costs.

Ways to address Scalability in an RPA

Handling the Increasing Workload

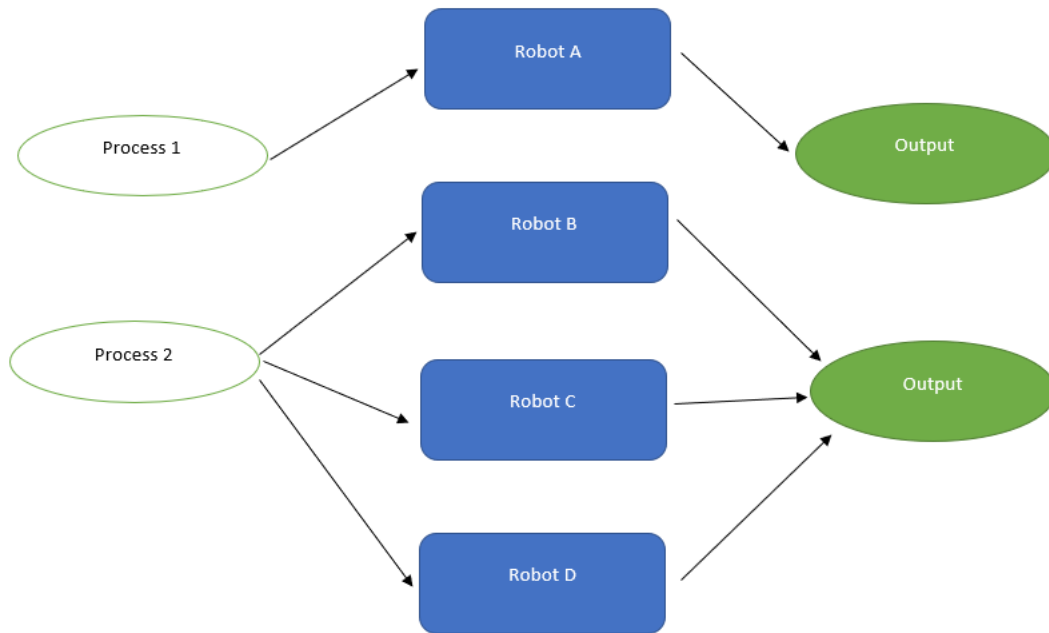
A major pitfall of RPA is the design of robots that cannot handle the Increased Workload. And, it is a challenge for the developers to address these issues.



In RPA, the Robots are designed to perform a process and provide an output for that process.

Each process is destined to a different Robots and the Robots provide an output for that process.

The robots are designed in the similar manner to provide the scalability. So, in the scenario where there is high demand of work to be done through Process A, the Robot A mightn't be able to process the tasks. Eventually, because of the heavy workload the Robot gets prone to breaking. Overall, the organization will fail to implement the RPA successfully because of the scalability issues.



To address the increased workload, a robot can be designed in such a way that it can address the increased workload in each of the processes. The robots can be made flexible enough to perform processes from different inputs. In the above scenario, let us assume that the workload in Process 1 is lower so the Robot A can singlehandedly perform the task and provide the output for the user. Whereas there is a heavy workload in Process 2, so to complete the task 3 Robots; Robot A, Robot B, Robot C are assigned, and it provides the output to the users. This process can address the increasing workload and address the scalability issues as compared to designing a Robot that can only perform a single process.

Work Division Developer and Support Team

Developers and are not the support people. This is one of the big challenges when you go at scale. People forget that the developer built it and they will support it. The developer should have test credentials and support team has the production credentials. The developers head should be kept down on building out the next automation and the support team keeps the robots alive and make the minor changes when there are other changes in the system.

Right Project Design Documentation

PDD should be written correctly. Developer team can efficiently and effectively design the robots with a well written PDD without having to go back and forth to understand the deliverables written in a PDD. A PDD will with a well mentioned scope creep helps the developer team to identify what a robot function should be and the developer can develop a robot according to its functionality and address the scalability issues. Apart from that the developer saves a lot of development time as well.

Tools

The organizations must use all the tools they have in their hands. As an organization is approaching to introduce RPA into the system, they should be certain that they are using process mining and discovering big aspects of the RPA which makes a big difference in the organization. Also, they must use task mining and know what each people involved in developing the RPA duties and responsibilities are when succeeding to each one of the steps involved. The automation hub should be used to collect different ideas from across the organizations.

Conclusion and Recommendations to the implementing organization

Robotic Process Automation tools performs the tasks across the business systems in the same way the humans do. Implementing RPA has a wide range of benefits to any organization. Some of the benefits are Increased Customer Satisfaction, Increased productivity, increase in accuracy of the processes, decrease the cost and eventually increase the profit. Integrating RPA into the organization system leverages high Return on Investment to an organization. However, one of the major pitfalls for failure of RPA is the RPA with the unscalable capacity. Although, Scalability is a non-functional requirement it is the indispensable requirement in an RPA. The scalability issues delay the tasks to be completed by a robot, and, eventually in the long run, the RPA projects fail. Before, implementing the RPA, the organization must clearly set out the vision and objective it wants to achieve. The Project Design Documentation is one of the fundamentals that sets out the functionality of the RPA. The stakeholders should design PDD with right requirements which will address the scalability issues. One of the major issues in Scalability is inability of a system to handle the increasing load. This increasing load can be addressed by building up a flexible robot that can solve multiple processes. This addresses the scalability issues. There should be optimum use of RPA tools to take full advantage to create a scalable working RPA system.

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