



## Multi Bots Processing Using Queues Concept in Microsoft Power Automate

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**Abstract-** Robotic Process Automation is a process which can mimic the repeated human work. RPA technology is the future. In future there will be a collaboration with Artificial Intelligence and RPA which will definitely change the world. RPA reduces human effort of doing work. The work which human takes to complete in hours that can be done in few minutes with help of RPA. There are many tools for RPA. Some of them are UiPath, Blue Prism, Automation Anywhere, Power Automate etc. and there are some features which varies in tools. As in Power automate there is no reliable way to run multi-bots simultaneously on different transactions/items for the same process at same time. This functionality is available in UiPath and Blue Prism. The goal of this research is to provide best reliable way to run multi bots using concept of queues in power automate tool with help of database and disaster recovery of process because power automate is a low cost tool with less coding as compared to other so small organization can also use RPA technology for automating the process.

**Keywords-** Robot Process Automation, AI, Queues, Bots, Multi Bots

### I Introduction

The use of robotic process automation (RPA) is a software system that simplifies the design, exploitation, and administration of software robots that replicate human tasks while dealing with digital systems and software. Just like people, software applications can do things like grasp what's on the screen, generate appropriate inputs, traverse systems, locate and extract data, and conduct a broad range of prescribed tasks. Yet software robots can accomplish this quickly and till then humans can get up and take a coffee break.

Robotic process automation (RPA) is a business automation technique based on software robots (bots) or Knowledge Engineering (AI)/digital workforce and is sometimes described to as software robotics (not to be confused with robot software).

### II Multi Bots Processing in RPA

Multi bots processing in RPA refers to the concept of utilizing multiple bots simultaneously to automate complex tasks or processes. Rather than relying on a single bot to complete an entire process, multi bots involve dividing the workload among multiple bots, allowing for parallel processing and increased efficiency.

Here's an overview of how multi bots processes work in RPA:

1. **Process Analysis:** The first step in implementing a multi bots process is to analyze the target process or task that requires automation.
2. **Task Allocation:** Once the process is broken down into smaller components, each subtask is assigned to individual bots.
3. **Synchronization and Communication:** To ensure coordination and seamless execution, the bots need to communicate with each other.
4. **Parallel Execution:** With multi bots, the assigned subtasks can be executed concurrently. Each bot performs its designated task simultaneously,
5. **Exception Handling:** It is essential to establish an exception handling mechanism to ensure that errors are captured, addressed, and reported appropriately.

### III Queues Functionality in RPA

Queues are a fundamental functionality in Robotic Process Automation (RPA) that enable efficient and organized management of work items or tasks within an automation process. Queues provide a structured way to store, prioritize, and distribute work items to bots for processing.

Overview of the functionality of queue in RPA:

1. **Work Item Storage:** Queues serve as repositories for storing work items or tasks that need to be processed by bots. Work items can be added to the queue

manually or automatically from various sources such as email, databases, or other systems.

2. **Prioritization and Ordering:** Queues allow prioritization and ordering of work items based on predefined rules or criteria.
3. **Load Balancing:** When multiple bots are available, queues facilitate load balancing by evenly distributing work items among the bots.
4. **Handling Complex Workflows:** Bots can retrieve work items from the queue, process them, and return them to the queue for further processing or routing to subsequent steps.
5. **Exception Handling:** If a bot encounters an error while processing a work item, it can be flagged or moved to an exception queue for manual intervention or further analysis.

#### IV Description of Technology

##### Robot Process Automation

Robotic Process Automation (RPA) is a technology that allows organizations to automate repetitive and rule-based tasks by using software robots or "bots" to mimic human actions and interactions within digital systems. RPA bots can interact with various applications, systems, and databases, just like humans do, to perform tasks such as data entry, data validation, report generation, and transaction processing.

RPA technology operates at the user interface level, interacting with applications and systems through the same interfaces and controls that humans use. It does not require changes to the underlying systems or the need for complex integrations. Instead, RPA bots work on top of existing software and applications, interacting with them as if they were human users. The Key components of RPA are Bot Creation and Configuration, Task Automation, Rule-Based Decision Making, Integration and Connectivity, Monitoring and Analytics.

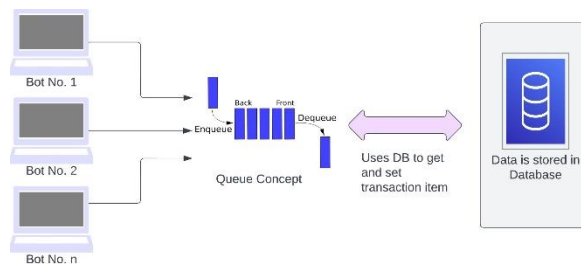
##### Power Automate Tool

Power Automate is a versatile low-code automation platform developed by Microsoft, designed to empower users to automate repetitive tasks, integrate various applications and services, and streamline business processes effortlessly. With an intuitive visual interface, users can create and deploy automated workflows, called flows, that connect disparate systems, enabling seamless data transfer and task execution. From simple data entry tasks to complex multi-step processes, Power Automate enables organizations to enhance productivity, reduce manual efforts, and accelerate digital transformation initiatives. Its extensive library of connectors and integration capabilities makes it an ideal solution for automating workflows across different business applications and cloud services.

##### V Research Methodology

After analyzing all tools and power automate completely it is found that in power automate there is no proper way to process multi bots on different transaction at same time for same process. Power Automate has a preview feature of work queue

but that is not reliable for production use they also mentioned that in their documents. So in this research a way is found for multi bots processing in power automate tool and disaster recovery of process.



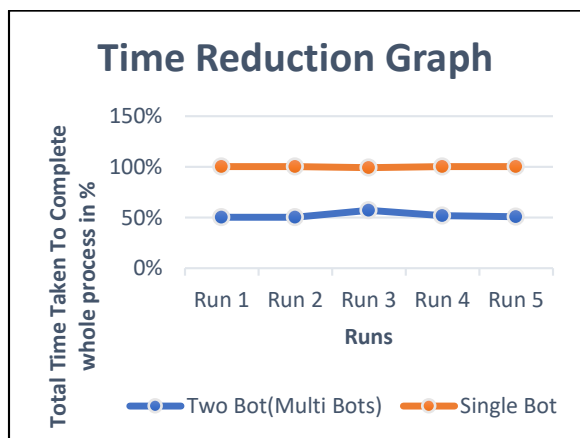
**Fig 1:** How Multi Bots work with Queue Concept

All the transactions items are inserted in database and now the multi bots use queue concept and dequeue one transaction item and set its status to "in progress". Any number of bots can work on these transaction items until no queue item is left with "new" status. As shown in figure 1.

For achieving this we have to follow several things and steps.

1. **Tables in Database:** Create tables in database which include
  - Queue id column where the id of the queue is stored by which it differentiates between queues when working with multi processes it can easily find the data for that particular process for which it had to work.
  - Queue Item Status column for the queue item status.
  - Queue Item Data column for the data where we put the data for further process.
  - Some other column like timestamp, reference, process id queue item id that is primary key with auto increment.
  - ❖ Status column will tell whether the data is successfully completed or in progress mode while working on the item after completion of work it will mark it item status "Success" and move to queue item history table where all the queue item will be stored after completion.
  - ❖ Table for storing result and third table for storing the Api of cloud flows and flag value.
2. **Dispatcher Desktop Flow:** Create a flow In Power Automate Desktop which when trigger automatically store the data on which we have to work further in Queue Item data table by using queries or stored procedure. That data can be stored in configuration file of excel or by web data extraction on websites.
3. **Main Desktop Flow which will work on Multi Bots:** After dispatcher flow there is another desktop flow which will work on the queue item data for further process. It will use db queries or stored procedure to grab the queue item data whose status is "New" and timestamp then lock that transaction item and mark the status "In Progress". By doing this we avoid deadlock as when other bot come to grab data it will not take the





**Fig 9:** Time Taken to Complete Same Process by Single Bot and Two Bots (Multi Bots)

In this work example the dispatcher flow inserted 4 linkedin profile in queue item table for their data extraction if it run with single bot it will take much time so the main flow ran on 2 bots that iterated on queue item data then mark it as 'In Progress' then after successful data extraction move that queue item row in queue item history with status 'Success' and the extraction result will be stored in result data table. and another bot doing the same thing. In the end it provide the result to user and by using this multi bot concept the 2 bots run reduced the time by 50% we can include many bots according to the infrastructure and while increasing number of bots more time will be reduced. When one bot fail due to shut down of machine or any machine related issue. After resubmitting it. It will take another machine from the group and continue the work from the queue item where the error occurred. We don't have to run dispatcher process again for that process this concept also achieved the objective of research that is disaster recovery by using queue item data table.

## VII Conclusion

The objective of this work was to run multi bots with help of queues concept for the same process using Power Automate tool to complete it faster as this functionality was missing in power automate at the time of research and now it is in preview feature but not reliable to use in production use. By this research work the bot will work on multi bots and take less time to complete the assigned work because all bots will work simultaneously on different item/transactions using queue concept and database. And other was the disaster recovery of the process if there is any failure in accessing bot or any issue with machine in between by this disaster recovery concept the bot will hire another machine from the machine group which help in failure recovery or if the failure is in between then after resubmitting it. It will start from the next queue item whose status is new and the process will not start from dispatcher flow because the data is not lost, it is stored in database. This work is reliable and accurate. With help of this research work any organization can use Power Automate with multi bots processing for their automation.

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