IBM Global Business Services
White paper

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Using artificial intelligence to optimize the value of robotic process automation

The biggest payoff occurs when robotic process automation (RPA) and artificial intelligence (AI), or cognitive computing—two complementary forms of automation—are integrated to drive cognitive automation.

Introduction

The interest and use of robotic process automation (RPA) has rapidly increased to support repetitive, labor-intensive and transactional business processes. For many enterprises, RPA has emerged as a best-fit alternative to making huge IT investments in order to make business processes more efficient. An Everest study finds that the service delivery automation (SDA) software market size has been doubling in the last two years and is expected to be somewhere between USD270 and USD300 million in 2017.[1] The study also reveals that 78 percent of shared services organizations are implementing or planning to deploy RPA.[2]

The most common processes enabled by RPA today include back-office administrative processes and workflow within IT, finance, procurement and human resources functions, as well as industry-specific operations across banking, insurance and mortgage. Any business process that has digital information in a structured format, as well as a logic-based (if-then) rules structure, typically present a reasonable case to be considered for RPA. **Automation through RPA can offer a return on investment (ROI) often ranging between 30 and 50 percent according to IBM internal analyses.**

However, in situations where structured, digital information becomes difficult to capture on the front end, or the application of business process rules requires judgement and context, how do we deploy RPA?

Artificial intelligence (AI) is here! With the expansion of AI (or cognitive computing) technologies in the areas of data capture, pattern recognition, and decision support, compelling techniques exist to address current deployment challenges and expand the reach and range of traditional RPA products. The outcome will be greater enterprise value and the rise of cognitive automation.

This white paper provides a point of view on how cognitive computing can address the challenges of RPA and speaks to specific examples of complex process automation and intelligent automation using IBM Watson® in business process services.

What does RPA do today?

According to the Institute of Robotic Process Automation and Artificial Intelligence (IRPAAI), "Robotic process automation (RPA) is the application of technology that allows computer software or a "robot" to capture and interpret existing applications for processing a transaction, manipulating data, triggering responses and communicating with other digital systems."[3]

RPA enlists software robots to perform complex, nested routines that cut across multiple applications and interact with these systems without the need to build complex and rigid system-to-system interfaces. Although robots can be configured to interface directly with applications through pre-existing application programming interfaces (APIs), these platforms are equally able to work through systems' graphical interfaces, including web browsers and Citrix terminal sessions. This means that robotic automation can be deployed in a relatively short period of time measured in days and weeks, instead of more heavy, traditional IT programming efforts that can take months and require a much larger upfront investment. This makes software robots an attractive way to drive operational cost reduction, particularly within repetitive, rules-based processes that failed to attract the attention of past system-to-system automation efforts from IT and business stakeholders.

"It's not uncommon to find that we are able to drive 30% to 50% reductions in operational costs of transactional activities within shared services operations through use of RPA technologies."

— Douglas Williams, RPA Program Lead
IBM Cognitive Process Services

However, despite the attractive potential, there are noteworthy technical limitations within today's RPA products that prevent achieving the full value of RPA projects.

These challenges include:

- Conversion of non-digital process inputs
- Ability to identify target data fields within unstructured document formats
- Ability to accommodate for changing rules or business logic with relative ease
- Generation of insights from transactional performance data within a robotized process
- Ability to interpret contextual understanding of instruction sets upstream of robotic activity

How can cognitive technologies be applied to address these challenges?

IBM recognizes that the ability to address these technical challenges will unlock significant additional value within RPA-enabled business operations. In response, IBM leverages the powerful capabilities introduced through IBM Watson services for assistance. Let us explore how these technical capabilities are being used in RPA operations.

On-ramp to non-digital process inputs

Cognitive computing provides a new way of interacting with non-digital, upstream processes to collect and transcribe information in a manner that can then be leveraged downstream in the process by robots. For example, chatbots or digital assistants are deployed within helpdesk functions to interact with an end user, replacing the human agent in a traditional call center.

These chatbots can engage in natural language dialog with the caller and discern, through a series of interactions, the nature of the call and then capture information required to further handle the request. The chatbot will then trigger a robot, passing the required information to the robot to complete the request.

Today, IBM is using chatbots for vendor inquiry helpdesk where it replaces a human agent to interface with suppliers who want to understand the status of their payments. Using chatbots, we have replaced the call center agent and now use a virtual agent to interact directly with the supplier. Through several scripted questions, the virtual agent can surmise that the supplier is asking for status on their payment and, thus, trigger an RPA robot to access the appropriate enterprise resource planning (ERP) backend system, validate the caller's details, retrieve necessary information, and provide status back in real-time to the supplier. The chatbot then closes the call and updates the ticket management system used to track call center activities.

In a real-life example within HR operations, the virtual agent has helped our contact centers improve in over 50 percent of our first contact resolutions, obtaining travel and expense and payment status, updating our backend systems, and closing the inquiry in record time.

Chatbots can be used in a variety of other processes and across industries such as mortgage, banking, insurance, healthcare and others to help reinvent call center operations.

Ability to identify target data fields within unstructured document formats

Approximately 80 percent of data in organizations is unstructured, the majority being in documents, emails and email attachments.[4] Robots are unable to initiate an automated process if the source data is in a format that prevents the robot from ingesting this data into the automated flow of activities. For instance, in today's financial operations, it is not uncommon to find human engagement required to map, survey and extract key data fields from within these documents and then pass this information to a robot for further processing. Cognitive capabilities such as IBM Datacap and IBM Watson Explorer can ingest these unstructured documents and extract the relevant fields, thus removing additional manual work from the end-to-end process.

IBM is successfully deploying cognitive capture solutions to solve these exact business challenges. A common solution addresses the manual and error-prone process around accounts payable. One specific use case is from a global company that uses IBM's solution to automate the extraction of data from their invoices, which are often in different formats. The system intelligently finds and extracts dozens of data elements, often spanning multiple pages, including invoice number, vendor name, invoice date, purchase order (PO) number, addresses, amounts, currency type, and line item details. The results: 80 to 90 percent of the data is extracted in a large portion of these invoices, which dramatically reduces processing time. The data are then seamlessly handed off and ingested into their ERP system to be leveraged by a robot.

Ability to accommodate for changing rules or business logic with relative ease

Business processes typically contain rules and policies that must be followed during transaction processing. One can hard-code these rules into the RPA products today; however, the maintenance of rule logic can become labor-intensive for the developer if the process rules change frequently.

Furthermore, in some cases where nested, if-then logic routines exist, programming these rules become more problematic. In light of this situation, IBM has introduced Watson Policy Management Library (WPML), which allows business process owners to draft, create and amend rules and policy changes outside of the RPA product using normal conversational text. The robot then interacts with WPML to look up and apply rules related to automated process.

To illustrate this complex process automation, we have an example in procure-to-pay invoice processing, a policy states: "If the invoice amount is **more than USD100,000** for promotional spends, an approval from manager, **EMPLOYEE NAME**, with email address **EMPLOYEE NAME@xyz.com** is required." The text in bold is an editable text for the policy, which can be changed by simply logging into WPML as an administrator and editing the field with the new information. This can be achieved within minutes by the business organization versus introducing the need to initiate a robotic application change request. The robot interacts with WPML and the new rule logic is processed accordingly.

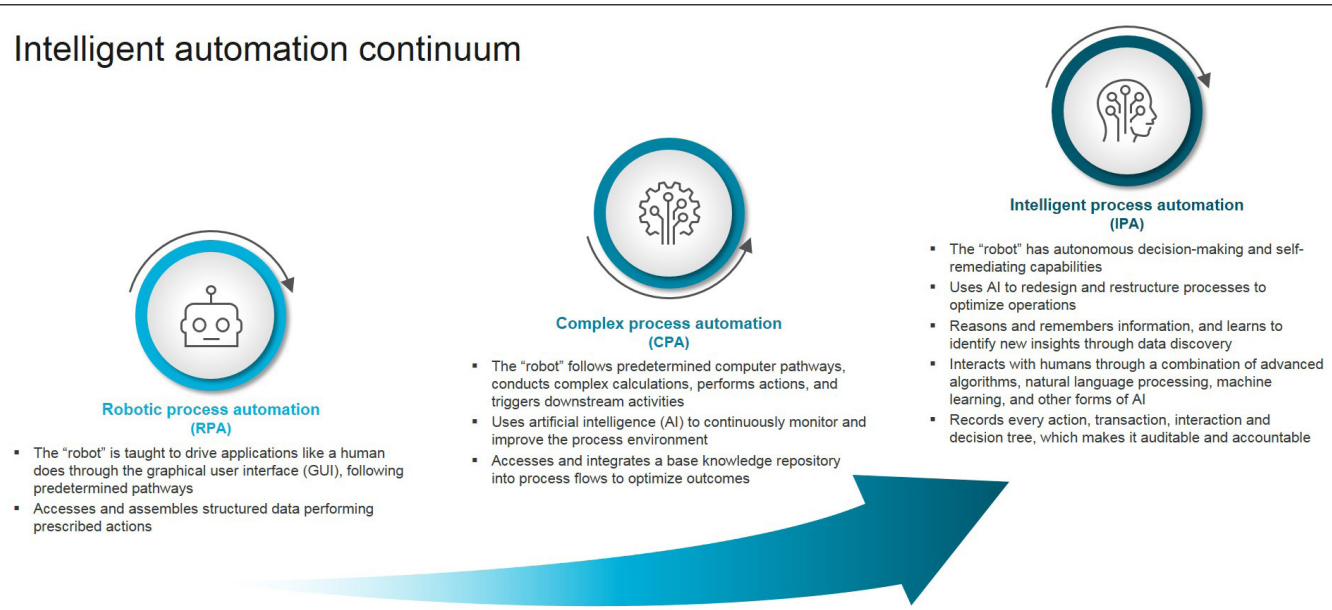

Figure 1. This diagram shows IBM's intelligent automation continuum.

Draws insights from transactional information

A wealth of process diagnostical information is captured by RPA tools during the normal course of transactional execution. Information such as transaction volumes, transaction cycle time, exception or defect rates, and reasons for exceptions can all be extracted from the robotic tools and used to drive increased throughput and yields. To do so, statistical techniques and methods must be applied. IBM has leveraged cognitive analytic features within Watson Analytics to perform these sorts of statistical analyses that discover relationships, test correlations and search for insight—thereby enabling more effective root-cause analysis and identifying sustainable improvement opportunities.

For example, IBM uses Watson Analytics to harvest the rate of unexpected job terminations within the operational footprint of deployed robots across business process services. Using drill-down capabilities, IBM can isolate the most common job runs that terminate and the error code stored within the robot data log. As a result, IBM has been able to isolate the most common error, establish corrective actions, and improve straight through processing by 50 percent.

Ability to trigger robots based upon understanding of upstream situational awareness

Intelligent automation using AI technologies replaces human involvement in work dispatching. They can monitor and survey system and business processes and initiate robotic work dispatching to perform actions based upon observations and conditional logic. IBM leverages a combination of tools to accomplish this goal. IBM utilizes AI application performance monitoring to bring the surveillance function into play, and combines with another IBM product called Golden Bridge, which completes the work dispatch function, resulting in the assignment of tasks to robots for execution.

The benefits of combining RPA and AI

AI can be combined with RPA to enable new and compelling use cases and unlock new levels of value in two primary new ways:

1. Extending RPA to areas that were previously unfit for automation
2. Increasing the yield of robotics within a currently enabled process

Deployment of these cognitive tools promises new levels of productivity and innovation—freeing human workers to focus on higher-value activities and bringing industrial-level quality, consistency and auditability to business processes. Furthermore, human workers can use these techniques to interface with robots in more human-like ways, providing the opportunity for humans and machines to interact and cooperate seamlessly, driving new levels of efficiency and productivity.

How can you get started?

Organizations are attracted to the potential of cognitive automation but recognize the need for expert guidance in developing an overall technical roadmap, implementing a robust governance model, selecting and integrating appropriate technologies, and achieving financial objectives.

One approach is to launch an enterprise-level automation competency chartered to design and champion a cognitive automation strategy and provide the necessary support to operationalize and execute this strategy. IBM has considerable experience in this arena and can add immediate value.

Why IBM?

IBM can offer:

- A full lifecycle of services, including designing an automation strategy and roadmap, setting up automation Centers of Excellence (CoEs), implementation, virtual workforce management, change management and governance
- One of the world's first and largest cognitive consulting practice, with approximately 3,000 cognitive consultants
- First-of-a-kind IBM proprietary "integration layer," bridging IBM Watson's AI capabilities with robotic automation technologies
- Experience implementing a Cognitive Agent Assist tool from IBM for hundreds of clients
- World-leading relationships with Blue Prism®, Automation Anywhere, WorkFusion, and other leading providers
- Proven governance and change control methodologies for a systematic approach to automation programs

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[2] *Everest Group, Service Delivery Automation (SDA): Explosive Growth | Market Insights,™ 2016*

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