I, Ira Allen, declare as follows:

1. I provide this declaration about a white paper that I co-authored in 2017. While I am being compensated for my time in preparing this declaration, I have no stake in the outcome of this proceeding nor am I being compensated for my testimony. The statements in this declaration are based on my own personal knowledge and recollection.

2. From 1998 to 2022, I worked at International Business Machines Corporation (IBM), in various roles. IBM is one of the oldest, most well-known multinational technology companies for computer hardware and software. IBM has been a trailblazer in several different computer technologies, including natural language processing and process automation. In 2017, I was the Global Robotics and Process Automation Senior Technologist. My job responsibilities included setting the automation strategy and identifying the underlying technologies necessary to achieve the strategy.

3. My educational background is as follows: I obtained a Bachelors Degree in Statistics and Operations Research (Business Administration) in 1977. I am also an inventor on over 30 patents in a wide range of technical areas including in the fields of medical, sensors, mechanical, optical, and intelligent workflows.

4. I have examined and reviewed the following:

- D. Williams and I. Allen, "Using artificial intelligence to optimize the value of robotic process automation," IBM White Paper (2017) ("Williams", Exhibit A)

- https://www.itworldcanada.com/assets/using-artificial-intelligence-to-optimize-the-value-of-robotic-process-automation ("Williams IT World Canada Post", Exhibit B)

5. Exhibit A is a true and correct copy of a white paper titled "Using artificial intelligence to optimize the value of robotic process automation." I am one of two authors of this white paper ("Williams"). It was published and made publicly available online at https://www.ibm.com/downloads/cas/KDKAAK29#:~:text=Intelligent%20automation%20using%20AI%20technologies,upon%20observations%20and%20conditional%20logic at least as early as September 2017. The September 2017 date on Exhibit A accurately reflects the date that the article was made publicly available on IBM's website. To the best of my knowledge, my white paper has been available on IBM's website since September 2017.

6. Williams (Exhibit A) was published and made publicly available on IBM's website. IBM stores and make publicly available white papers and research papers for purposes of advancing the study of science and information technology, and for marketing IBM products. IBM's database is online, freely accessible to anyone in the public, and known in the industry for publishing and making papers

related to interesting technologies available to the public. Interested members of the public would have searched on IBM's website and/or using a search engine like Google search and would have found my white paper.

7. Exhibit B is a true and correct copy of a post on IT World Canada's website that allows interested members in the public to download my white paper. It was published and made publicly available at https://www.itworldcanada.com/assets/using-artificial-intelligence-to-optimize-the-value-of-robotic-process-automation at least as early as September 16, 2017. The September 16, 2017 date on Exhibit B accurately reflects the date that the article was made publicly available on IT World Canada's website. To the best of my knowledge, my white paper has been available for download for free on IT World Canada's website since September 16, 2017.

8. IT World Canada is a leading Canadian online resource for IT professionals. It publishes newsletters, reports, blogs, and white papers on topics of interest to the industry for purposes of disseminating information (daily tech news, product reviews, videos, technology podcasts and features, etc.) about technological advances to engineers and scientists. IT World Canada is online, available to anyone in the public (both within and outside of Canada), and searchable via its own search bar and search engines like Google.

* * *

I declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true, and that these statements were made with knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under section 1001 of Title 18 of the United States Code.

Dated: July 24, 2023

Ira Allen

in Dallas, Texas

EXHIBIT A

IBM Global Business Services
White paper

September 2017

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.

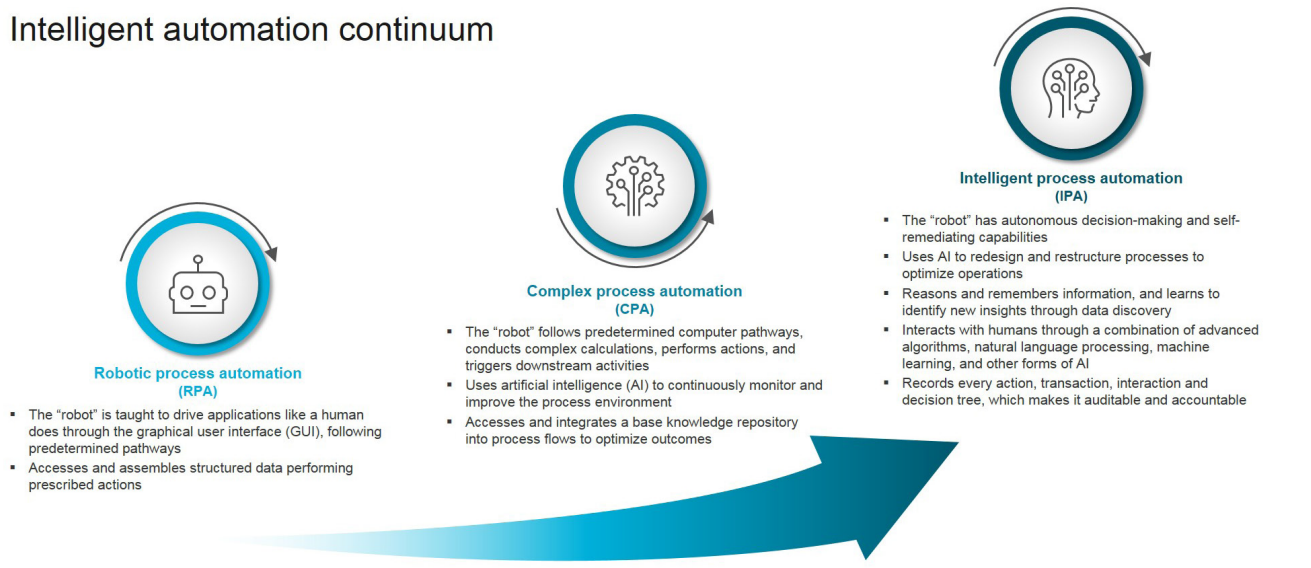

Figure 1. This diagram shows IBM's intelligent automation continuum.

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

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

[3] *Institute of Robotic Process Automation & Artificial Intelligence*

[4] *IBM bog post: IBM Datacap Insight Edition — at the forefront of Cognitive Computing*

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EXHIBIT B

IT

Reports and Whitepapers

Using artificial intelligence to optimize the value of robotic process automation

By **IT World Canada** - September 16, 2017

For many enterprises, robotic process automation (RPA) has emerged as a best-fit alternate to make huge IT investments in order to make business processes more efficient. 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, there are questions about how to deploy RPA. With the expansion of AI (or cognitive computing), techniques exist to address deployment challenges and expand the reach and range of traditional RPA products.

Download this white paper to learn how AI can address the challenges to RPA and solve business challenges.