IBM Global Business Services Cognitive Automation Program

Improving Customer Experience through Cognitive Watson Automation technology

Executive Summary

IBM Global Business Services (GBS), in partnership with IBM Research global teams, has created a powerful end to end automation solution leveraging Watson technology. The infusion of cognitive solutions introduced various innovations that greatly helped to automate manual and repetitive activities to promote quality, efficiency and productivity for enhanced business outcomes. In essence, cognitive business solutions delivered the following:

- harnessed the power of Watson to answer end user questions and to resolve help desk queries;
- expand capacity by using virtual, robotic engineers to do repetitive tasks, freeing up resources to focus on higher value work;
- provide an uninterrupted flow of automation from cognitive query to triggering a virtual engineer to execute the work.

Since 2014, with senior leadership commitment from IBM Global Business Services and IBM Research, cognitive automation solutions have been deploying over thousands IBM client accounts across the world, over 40,000 IBM practioners now are leveraging automation innovations in IBM services delivery, the team have achieved >40% efficiency and productivity gains across our global workforce as measured in quantified labor hours saved and marked increases in key operational metrics.

IBM video on Youtube of how Automation can impact business outcomes:
https://www.youtube.com/watch?v=0g96DJaPNi0

IBM Application Innovation Consulting (AIC) driving client intimacy

IBM is a leader in cloud, analytics, mobile, social, and cognitive computing solutions. IBM Application Innovation Consulting applies leading technology, process and intelligence to design while continually building and enhancing outstanding user experiences powered by software. The integration of DevOps Innovation Services and Agile practices, along with IBM Design Thinking and a global network of talent, enables AIC to deliver continuous innovation with speed, quality, and at an effective cost point that meets our clients'   critical business needs.

Cognitive systems that are uniquely IBM

The rise of cognitive systems marks the birth of a new era and IBM is the leader in this space. Cognitive capabilities take analytics to the next level, fundamentally changing how systems are built and interact with humans.

Automation in the IT services industry is rapidly becoming an expected element for delivering and executing business processes, applications as well as infrastructure services. Developing and deploying automation solutions with excellence is our new business imperative as a services organization.

Solution and Approach
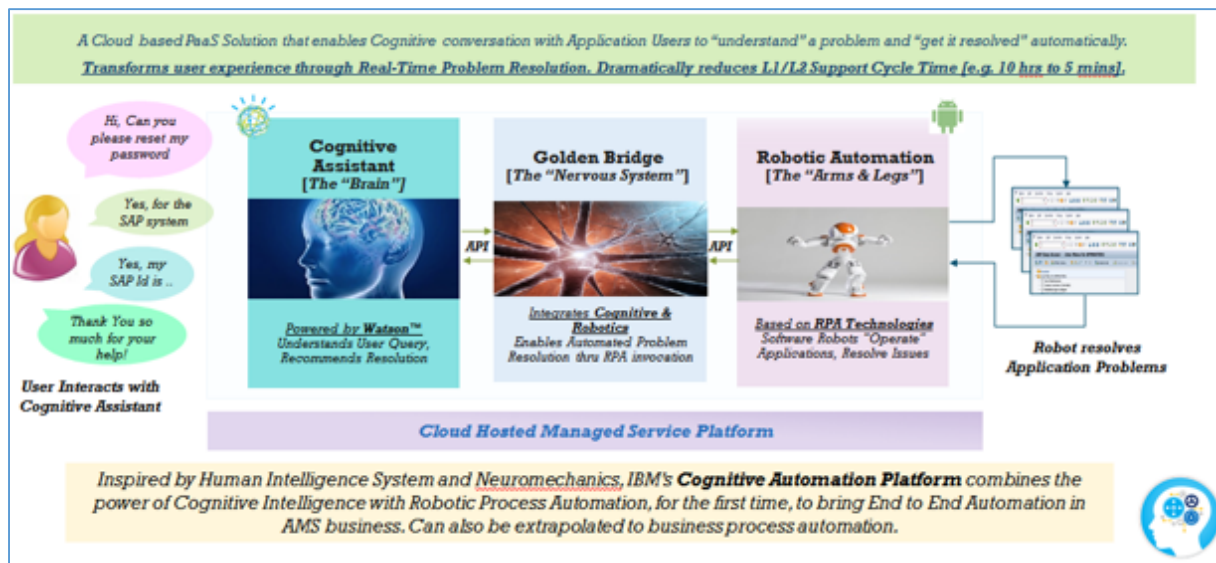
The IBM Cognitive Automation platform is developed for end to end capabilities by combining Cognitive natural language interaction with software robots (e.g.   Blue Prism), integrated through IBM's internally developed, proprietary Golden Bridge technology. Cognitive interactions function as the brain, with software robots functioning like arms and legs to execute tasks. Golden Bridge acts like the nervous system to send triggers from the brain to direct the   'arms and legs'   work activity.

Innovations

GBS Cognitive Automation consists of key innovation modules that can standalone or be combined for a fully solution, for example, Cognitive Assistant and Golden Bridge for Robotic Automation.

Cognitive Assistant: The goal of Cognitive Assistant is procedural assistance either as a self–assist solution (assisting the end-users directly) or as agent-assist solution, with the value proposition of increasing productivity and cost savings with efficient problem resolution. In building such a system there exist considerable technical challenges. The knowledge required for training any cognitive system, is not available in well-documented high fidelity format. Practitioners over the years have gained the institutional knowledge and expertise of resolving issues and this tacit knowledge is not documented in any format. Further, there exist a huge variation across the users in reporting the same issue. The issues can be reported in ambiguous ways and requires disambiguation through manual intervention. Thus a cognitive assistant solution needs to be able to handle such linguistic variations, disambiguate the context, and learn and self- adapt through its usage. To address these technical challenges, IBM Research team has developed two assets – iCurate and iAssist.

iCurate provides a problem ticket analysis tool, to cluster tickets into common repeat problem categories. It uses unstructured information present in ticket description and resolution to identify the common repeat problems and resolution patterns and clusters the tickets accordingly. iCurate also support bottom up intent extraction from technical documents in forms of Application Interface Documents, Functional Documents, Process documents and more. These documents can be ingested into iCurate, which parses these documents, chunks the many documents and extracts high fidelity text

and indexes them. Furthermore, it uses the section, sub-section headings and other structural clues to generate a bottom up intent which maps to Q/A pair. Once the Q/A pairs are created either directly or using the documents these are then ingested into Watson and trained.

iAssist is a web-based 'implicit dialoging' module to disambiguate the user queries automatically using a domain specific knowledge graph. In packaged application support like SAP and Oracle, the knowledge graph is automatically constructed from standard error-code / messages and the questions authored by SMEs. The graph consists entities as nodes and edges as the actions associated with those entities, linking the entities further to error codes and Q/As. When ambiguous user queries are posted to iAssist, the solution leverages the knowledge graph to identify the right entities in the query and appropriately suggest step-by-step guidance and navigates the user towards an error. In cases, where the question context is not ambiguous iAssist will directly query Watson for the answer.

Golden Bridge for Robotic Automation: The "Golden Bridge" solution is developed by IBM Research as a lightweight bridging technology to seamlessly integrate the interactive, cognitive side of the automated solution with robotic process automation. Golden Bridge can trigger a virtual engineer (software robot) via cognitive dialog (e.g. user chat interface to reset a password), a scheduled event, a monitored event (e.g. disk space approaching full), or other user or system generated activity.

Golden Bridge uses an extensible framework to allow plug in/out adapters easily for different customer situations, on both event system side and automation system side. The Standard Operating Procedure (SOP) inside of Golden Bridge is neutral for automation system varying, and uses specific adapter for specific target automation system. Golden Bridge allows to define an orchestration of multiple SOPs for resolving a complex problem, which may involve various automation steps and/or various automation systems. The orchestration is driven by an engine like a conversation, interacting with automation processes and human intervention.

Deployment Journey and Customer Benefit
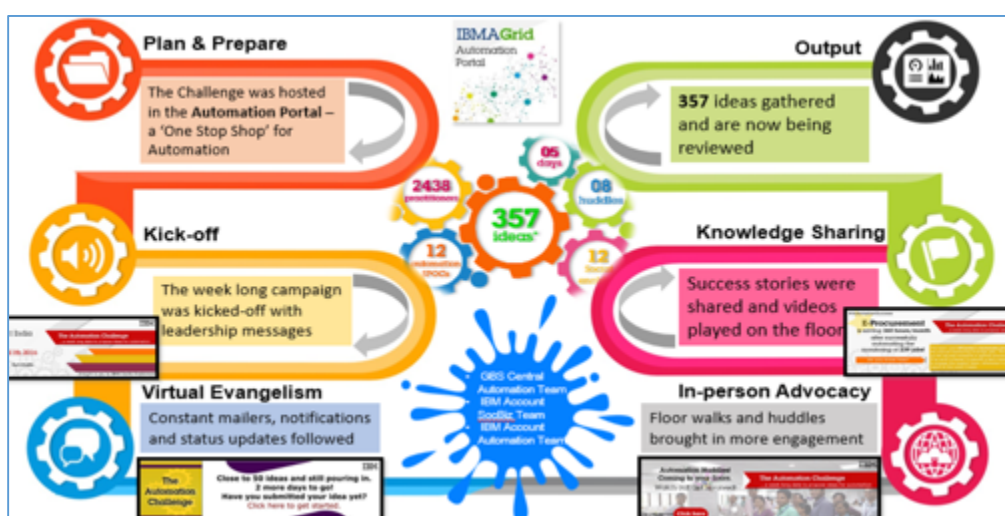
To better understand what could be automated and how innovation could drive the automation for client accounts, the team starts from IBM account idea generation workshop journey with result of ideas, plans and actions. As result, hundreds of success stories is growing, IBM automation community grows 70,000 practioners to learn automation process, progress and practices at daily basis.

With rapidly expanding the deployment of these IBM Research innovations across IBM's AIC account portfolio, the team has significantly reduced L0/L1 support tickets with an upstream effect of reduction of L2 functional tickets, and have started to redirect >20% of technical and functional staff to higher value work activities. This has also resulted in the avoidance of costly process worker turnover and better retention of institutional knowledge through automation.

Example Trend (representative from IBM account):

Automation Trend Chart (FTE Effort Savings)
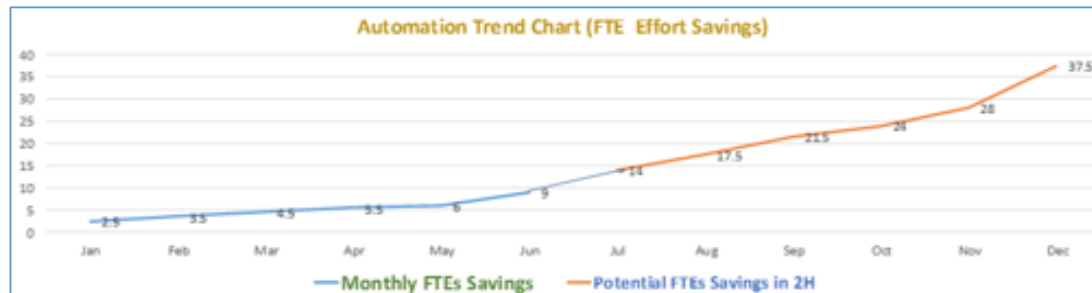
To ensure success, the IBM practioners outlined FIVE critical success factors:

1) Enlighten the team: Ensure that leadership takes the time to educate the team on why automation is of benefit to the team. Communicate regularly through road shows, 'lunch and learns', internal social channels, and more.

2) Start small and expand: Selecting the right place to start is imperative (e.g. working with one functional support team at a time). This allows some 'hot housing' (refer to points 3, 4 and 5 below) to bring the team up to speed before moving onto the next functional area. Leverage agile methodology with multiple Sprints to ensure gold class collaboration/ accountability across the team.

3) Set a new standard: Establish automation as the standard operating procedure for the defined scope (e.g. incidents and routine change requests). Driving usage is critical to improving the quality of the automation in use, particularly cognitive system 'learns' through continuous feedback

4) Showcase successes: Communicate the benefits that individuals and teams are achieving. Celebrate success to create momentum!

5) Continuously improve: Automation solutions have the power to learn over time with user feedback. Every time the cognitive solution provides an answer, it gets feedback that drives the learning cycle. Active user feedback improves the solution's ability to answer more complex questions in the future.

Summary

IBM has just scratched the surface of possibility in the automation arena. Empathetic, conversational systems of the future, fueled by cognitive, robotic and augmented reality will enhance human productivity like never experienced before. It's a new age of technology disruption and the IBM team has embraced the challenge of leading the world into the cognitive era of computing!