Responding to the Pandemic Using Robotic Process Automation

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NCDIT | NORTH CAROLINA DEPARTMENT OF INFORMATION TECHNOLOGY

Executive Summary

NCDHHS Mission - *In collaboration with our partners, NCDHHS provides essential services to improve the health, safety, and well-being of all North Carolinians.*

NCDHHS Vision - *Advancing innovative solutions that foster independence, improve health, and promote well-being for all North Carolinians.*

From the onset of the COVID-19 pandemic in 2020, many new challenges and issues were faced by North Carolinians, NCDHHS, and providers. We had to seek and consume information and services through digital channels that were continuously updated with the latest requirements, policies, needs, and news related to COVID and the vaccine. At the beginning of the COVID-19 epidemic, Team NCDHHS saw automation opportunities for hospitals and providers that were having difficulties entering vaccination data manually into the newly implemented COVID Vaccination Management System (CVMS) and handling the day-to-day management of new reporting requirements.

Team NCDHHS investigated new automation techniques and saw the potential for Robotic Process Automation (RPA), where bots could be programed to replace manual activities to take vaccination records and electronically enter that data into CVMS and have the data pushed to other areas within and external to the Department. Mass vaccination events presented a perfect use-case for RPA. In a single weekend, over 20,000 new vaccination records were created. These records had to be entered into CVMS within three days, which was an impossible task with manual entry. Hospitals, providers, and NCDHHS had to hire temporary workers to enter data and try to reduce the backlog. Additional staff were not sufficient – each mass vaccination event created further backlog. The introduction of RPA bot processes running 24/7 alleviated the need for temporary resources to manually enter new records and eliminated the backlog.

Based on this success, NCDHHS worked to establish an enterprise level Intelligent Automation RPA that was supported by a shared service technology platform that leveraged RPA software. The business drivers included:

- ❖ Leverage RPA technology, where applicable, to increase productivity and other efficiencies for providers and state employees which in turn will permit them to focus on higher value tasks requiring human interaction and decision making.
- ❖ Potentially reduce/eliminate errors in the manual tasks that are automated.
- ❖ Improve the customer and employee experience by eliminating redundant manual tasks.

Idea

Robotic Process Automation (RPA) is revolutionizing the way we work by providing a software solution that mimics human behavior to perform routine tasks and enhance problem-solving capabilities. This game-changing technology connects systems within the existing IT landscape without the need for costly integration.

Just as physical robots transformed manufacturing, RPA software streamlines business processes, earning its name "Robotic Process Automation." This "virtualized FTE" (or robot) manipulates application software and data just like a human does, effortlessly completing transactions and processes at a much higher speed. RPA works with legacy systems at the UI level, automating tasks without disrupting or replacing existing client or service provider applications.

Although it will not alter the process steps, RPA is an ideal solution for organizations facing complex business challenges. The individual technologies that comprise RPA have developed at a breakneck pace over the last decade, empowering organizations to automate their processes as they are deployed in public clouds, private clouds, or on-premises.

Our business partners within the Division of Public Health provided a list of the areas that needed automation:

- ❖ Vaccine administration (availability and provided doses)
- ❖ Reporting and feedback (Centers for Disease Control and Prevention, hospitals, providers, internal, and external)
- ❖ Patient vaccination status
- ❖ CVMS registration (provider and patient)
- ❖ Death Certificate registration
- ❖ ServiceNow integration for ticket tracking and feedback

Based on the list and ongoing collaboration our goal was to achieve the below outcomes:

- ❖ Eliminate the manual effort required of the providers.
- ❖ Provide timely data entry validations.
- ❖ Improve the vaccine order management and distribution process.
- ❖ Eliminate human error and increase data quality from manual data entry and speed up processing time, as well as validate the data against source systems.
- ❖ Timely reporting.
- ❖ Reduce staff resolution time.
- ❖ Improve quality management by implementing data validation rules.
- ❖ Allow more time for NCDHHS staff to perform regular activities by eliminating manual processing.
- ❖ Provide automated comparison and automated views to proactively capture out of sync issues.
- ❖ Eliminate manual Secure File Transfer Protocol processes.
- ❖ Automate email generation to providers for feedback.

Implementation

Each use case was assessed to determine the business case and potential impacts of automating the process being reviewed. Priorities were set by looking at the current workload required to execute the process and resources pain points. The main goals of automation were concerned with reducing manual work for all resources related to supporting the COVID-19 efforts, decreasing response time, improving accuracy, and enabling better reporting.

There were many new challenges that had to be addressed before automation could start, including purchasing and setup of the RPA infrastructure. UiPath software was chosen as the automation tool for our RPA efforts and installed on the NCDHHS Amazon Web Services (AWS) Cloud instance.

Integration of "bots" into the NCDHHS technology infrastructure was our biggest challenge. Since "bots" are designed to mimic human activities, they needed to use the same access credentials as human workers. Working with our internal Privacy and Security Office as well as the State of North Carolina Enterprise Security and Risk Management Office, a decision was made that the "bots" would be set up with the same credentials as the human that was performing the activity manually, which included multi-factor authentication. Each "bot" was given a unique name and user id that could only be used for the specific activity being performed and assigned to them within UiPath. With that major hurdle eliminated development activities began.

Automation Skillsets Developed:

- ❖ Complex end-to-end data entry and integrations in CVMS
- ❖ Collaborative virtual agents to find vaccine shots
- ❖ Research on vaccination history status
- ❖ Form digitization (Optical Character Recognition [OCR])
- ❖ Compliance reporting Centers for Disease Control (CDC)
- ❖ Vaccine inventory reporting email communications and warnings
- ❖ Lab reporting performance metrics
- ❖ SQL Server automation metric reporting
- ❖ Provisioning of providers
- ❖ Provider information reconciliations
- ❖ Open/close ServiceNow tickets

Main Processes That Were Automated:

CVMS RPA   Automated entry of patient vaccine information into CVMS. The process spans recipient creation, patient registration, vaccine appointment detail, vaccine administration entry, and reconciliation back to providers.
Daily Summary Feedback on Testing   Automated aggregation of COVID daily lab test data (Business Intelligence Data Platform) using Tableau. Provides test results for the previous 3 days for each lab/facility administering vaccinations.
Provider Profile Automation   Automated the creation of provider profiles on the Vaccines.gov website according to specified details about each provider listed within CVMS.
CDC Deleted Records   Automated reporting of orphaned records within CVMS (includes date the record was orphaned and CVMS case numbers).
Vax Finder / Admin   Automated transfer of vaccination inventory data from the SFTP to the CDC Vaccine Finder website.
Outbound Reporting   RPA solution that pulls and distributes daily reports for large providers to support mandates for reporting as well as their ability to monitor and track various data elements from Vaccine Inventory, HCLM Error, and Vaccine Recipient reports via a secured file transfer channel. This includes Provider Exception reporting
Outbound Reporting – Enhancement   Enhance the outbound reporting to include the newly identified reports: ► Allocation Report   ► HCP Healthcare Roles   The reports need to be made available in the HCP (Healthcare Portal) for the bot to retrieve.
OCR / RPA – Death Certification Form   Leverage the existing OCR/RPA tool that was built during the last phase of work to automate processing of the Death Certificate Form within the NC DAVE system.
Patient Vaccination Status   Automated validation of last patient vaccination received prior to a provider administering a subsequent dose.
Data Quality ServiceNow (SNOW) Help Desk Ticketing   Use UiPath RPA to run a CVMS data quality report to proactively open SNOW tickets in order to properly audit and monitor data issues. The RPA bot will leverage the "State Provider Data Exception Report" to build the SNOW tickets.
NCIR and CVMS Reconciliation   Automated bidirectional reconciliation between NCIR and CVMS of active providers, daily vaccinations, and/or inventory data.

Impact

With the implementation of RPA technologies, NCDHHS has made significant strides in business use case process improvements and service delivery, revolutionizing how technology is utilized, and how agencies and partners collaborate towards a common goal. These improvements provided the necessary groundwork to tackle the challenges posed by COVID-19 while also increasing self-sufficiency, accuracy, and productivity. Thanks to the implemented automations and process improvements, NCDHHS realized numerous benefits that improved overall operations. There are many benefits to NCDHHS's RPA implementation:

Improved efficiency: the introduction of RPA increased FTE productivity and capacity and added scalability and flexibility in handling demand changes, eliminating the need for additional temporary staff for data entry.

Reduced risk and improved resiliency: with proactive reporting, RPA provided increased audit coverage leading to higher contract compliance and fewer incidents of fraud.

Optimized performance: the automation of certain processes improved accuracy, increased predictability, reduced cycles and cycle time, and introduced better traceability. With RPA, each action performed by a bot is logged, allowing organizations to track and review activities, identify errors, and trace them back to the process step or bot where they occurred.

Improved communication: the implementation automated the feedback and delivery of accurate information, including emails to stakeholders about important updates and successful runs. It also provided visibility into task execution and data handling, tracking each step performed by the bot and creating and audit trail of the process.

Additional improvements:

- ❖ Accuracy – Reduction in process error rates. Outbound reporting, Patient Vaccination Status, and Daily Summary Feedback Testing all had over a 96% accuracy rate – an increase of 16% over previous accuracy rates
- ❖ Consistency – Identical processes and tasks eliminating output variation
- ❖ Capacity Building – Obtained, improved, and retained the knowledge necessary for the job
- ❖ Productivity – Freed up human resources for higher value-added tasks related to service delivery
- ❖ Scalability – Instant ramp up and down to match demand peaks and troughs
- ❖ Retention – Shifted human effort towards more stimulating tasks of providing services instead of redundant manual data entry
- ❖ Reliability – RPA processes run without human intervention so there are no sick days or vacation required; services provided 24x7, 365 days per year

Quantitative Benefits:

Multiple NCDHHS business areas and external entities were assisted including Immunization Branch, Communicable Disease Branch, Epidemiology Branch, Providers/Labs, Public Health Information Network, Health Information Exchange, Centers for Disease Control, NCDHHS Help Desk, NCDHHS Data Team, Customer Service and Community Rights Team and many others.

- ❖ 40+ process owners helped
- ❖ Over 8 million automation transactions processed

❖ 120K staff hours saved for NCDHHS
❖ 65K staff hours saved for providers
❖ Automation provided for 1200+ labs providing COVID-19 testing

Increases in efficiency:

CVMS RPA
Manual entry of recipient creation, patient registration, appointment detail, administration entry, and reconciliation took approximately 8 minutes per record. With the introduction of the RPA process, the bot was able to enter each record in approximately 1 minute. This represents an **87.5% increase in efficiency**. Additionally, the RPA bot is able to do this entry 24/7.
Provider Profile Automation
Manual entry of provider profiles on the Vaccines.gov website took approximately 25 minutes per entry. The RPA process takes 4 minutes per entry, an **84% increase in efficiency.**
Outbound Reporting
Manual reporting of data like vaccine inventory, HCLM error, and vaccine recipient reports for large providers took approximately 15 minutes per provider. The RPA process can complete the steps in 5 minutes per provider, a **66.6% increase in efficiency.** The RPA process currently delivers reporting for 35 providers, **saving 350 minutes daily.**
OCR / RPA – Death Certification Form
Leverage the existing OCR/RPA tool that was built during the last phase of work to automate processing of the Death Certificate Form within the NC DAVE system. **The RPA process saves 14 minutes per death certificate transaction.**
Patient Vaccination Status
Automated validation of last patient vaccination received prior to a provider administering a subsequent dose. **This saves approximately 365 hours annually.**
NCIR and CVMS Reconciliation
Automated bidirectional reconciliation between NCIR and CVMS of active providers, daily vaccinations, and/or inventory data. **The elimination of dual data entry resulted in an 80% time savings, with approximately 18,000 hours saved.**

With the overwhelming success of RPA technologies delivered to support the efforts of COVID-19, NCDHHS has implemented a strategy to utilize RPA as an enterprise platform service. The mission is to partner with NCDHHS Application Development Portfolio Teams, the Technology and Architecture Team and Business Divisions to maximize utilization of RPA solutions, establish technical governance, and foster a culture of agile delivery, thereby meeting NCDHHS business requirements quickly and efficiently.