

Project Title

Occupation Medicine FormSG Email Listener Automation

Project Lead and Members

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Organisation(s) Involved

Woodlands Health

Healthcare Family Group(s) Involved in this Project

Healthcare Administration

Applicable Specialty or Discipline

Operations

Project Period

Start date: 01 December 2021

Completed date: 31 December 2021

Aim(s)

To transform data into insights, and drive informed decision making with the long term goal of enhancing productivity and improving value based outcomes

Background

See poster appended/ below

Methods

See poster appended/ below

Results

See poster appended/ below

Lessons Learnt

The proposed solution helps to consolidate FormSG emails into a database for analysis. ELA's architect covers email management system, transforming data with MVC and building a sustainable database. This automation creates efficiency through a gain of productivity, flexible adoption and continuity and error reduction and resulting in quality patient care with minimal manpower. The two use cases presented show how one innovation can improve the culture of transparency and accountability within WH, leading to improved patient care and opportunities for future digitization.

For the UAT stage, it would be more beneficial if we could pilot the automation with more users to receive more feedbacks on functionality.

Conclusion

See poster attached/ below

Additional Information

Automation is a promising solution to substitute tedious, repetitive, time-consuming tasks. Email Listener Automation enhances productivity, time-saving, flexible adaptation and continuity, and error elimination. The proposed solution implementation does not incur additional cost and can be readily tuned based on feedback from stakeholders. ELA has created an automated process for data population in the database without much human intervention and maintenance.

Adding data analysis to automation, we have also raised situational awareness among clinicians, empowering them to make better-informed decisions and policies on the COVID-19 situation for the WH staff community. Given the richness of data channelling into hospital systems daily, we should harness the opportunities that automation can bring us. This automation is not restricted to FormSG and can be extended to emails with patient care data.

Project Category

Technology

Product Development, Commercialisation, Minimal Viable Product

Keywords

Occupation Medicine, FormSG, Email Listener Automation

Name and Email of Project Contact Person(s)

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Background

With daily inflow of manually collected data to facilitate decisions on operations planning, there is an urgency to create a reliable and sustainable data repository. Within Woodlands Health's Occupational Medicine (OM), FormSG was adopted as the primary collection platform for administrative data. The output from FormSG responses was stored as email and OM staff manually transferred the data to Excel for further analysis. This manual process was repetitive, time-consuming and prone to errors especially when high volume of responses were received¹.

Email Listener Automation was developed to resolve these issues. The solution uses the design of Model-View-Controller² to execute the process in a seamless manner and is deployed in two use cases. With implementation, productivity gained (93%-99% manpower savings) can be observed in the use cases. Such process automation provides benefits of low cost implementation, flexible adaptation and continuity, error elimination, manpower resource reduction and improvement in quality of patient care. Quality storage of data also provide evidence-based support for hospital management improvement and quality service initiatives.

Materials and Methods

Project Deployment of Email Listener Automation

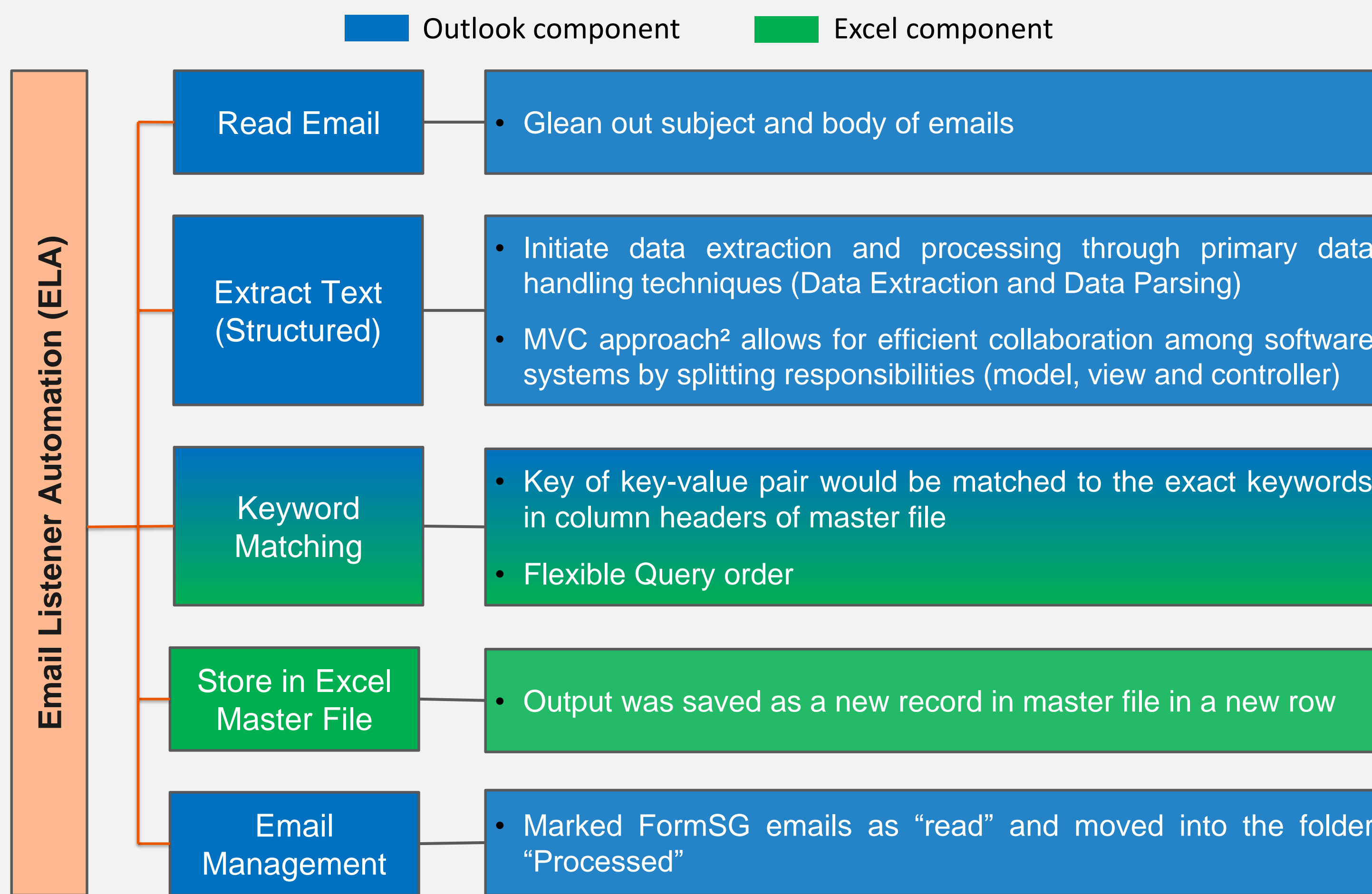
Use case 1: Pre-employment Medical Review project

To store administrative data of newly employed staff into a database.

Use case 2: ARI Surveillance project

To capture COVID-19 statistics of staff who have reported ill on the S3 server and FormSG during the COVID-19 period. A real-time dashboard was created to visualise the master file's updated data.

Email Listener Automation Technical Details



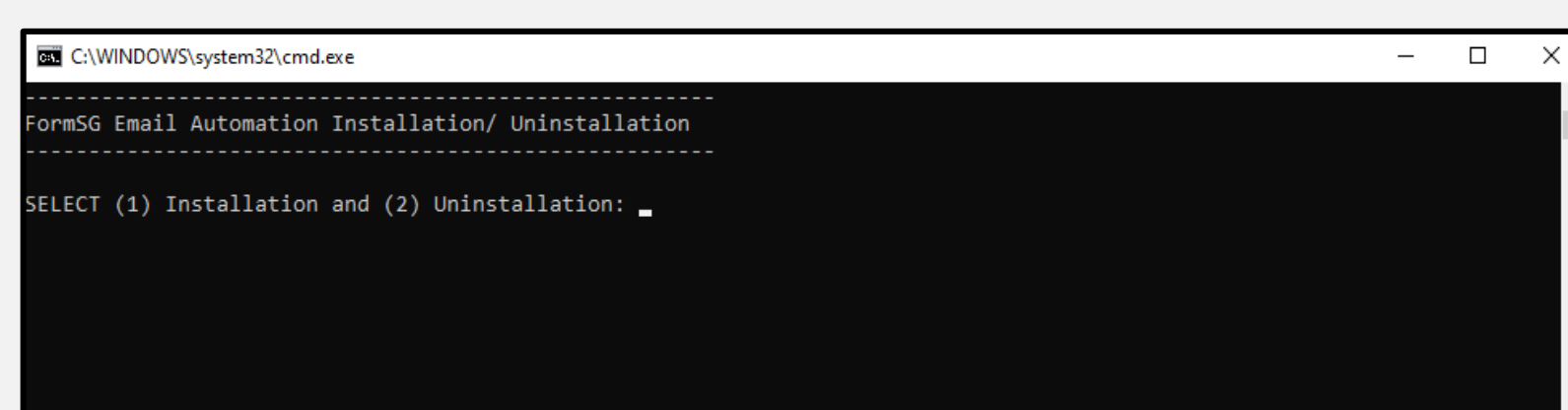
This process would repeat in the backend whenever a new response entered the inbox. Users could continue their daily routine operations tasks without any disruptions.

Dashboard

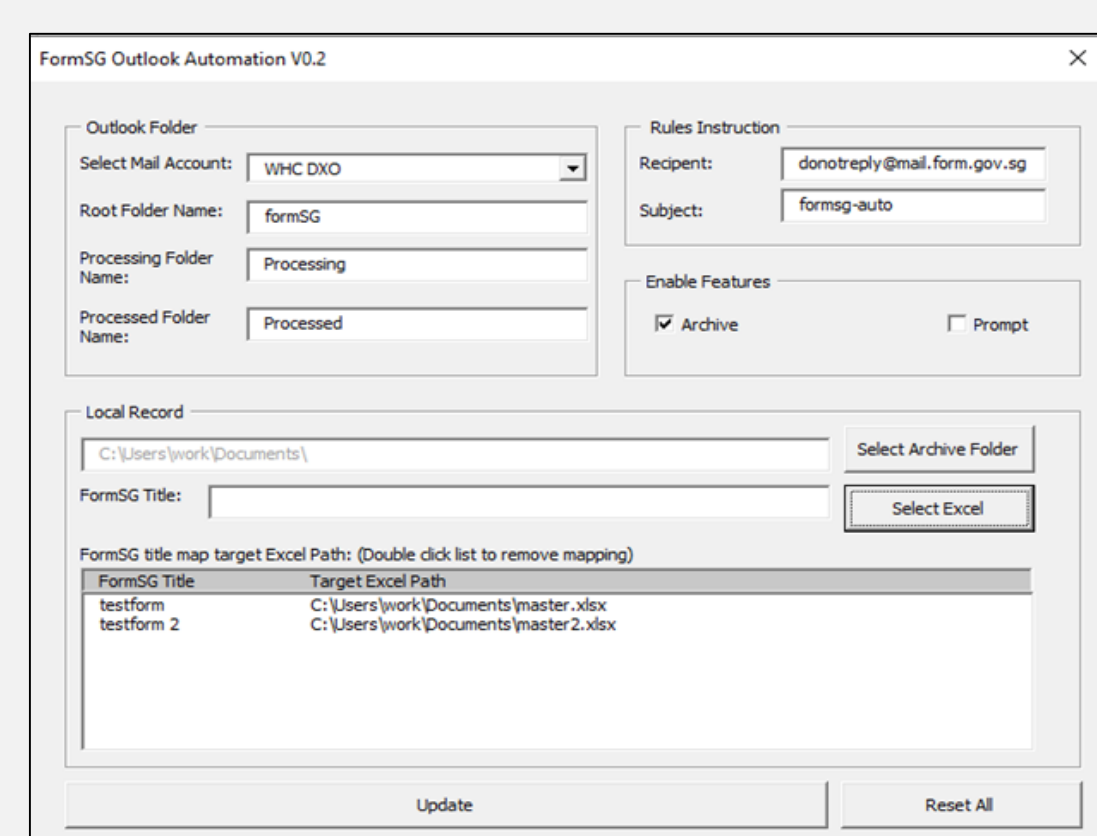
A dashboard was created in Use case 2 to visualise COVID-19 staff data. The dashboard was supported by two data sources, FormSG and S3 server.

Implementation

User Intuitive Email Listener Automation Installation

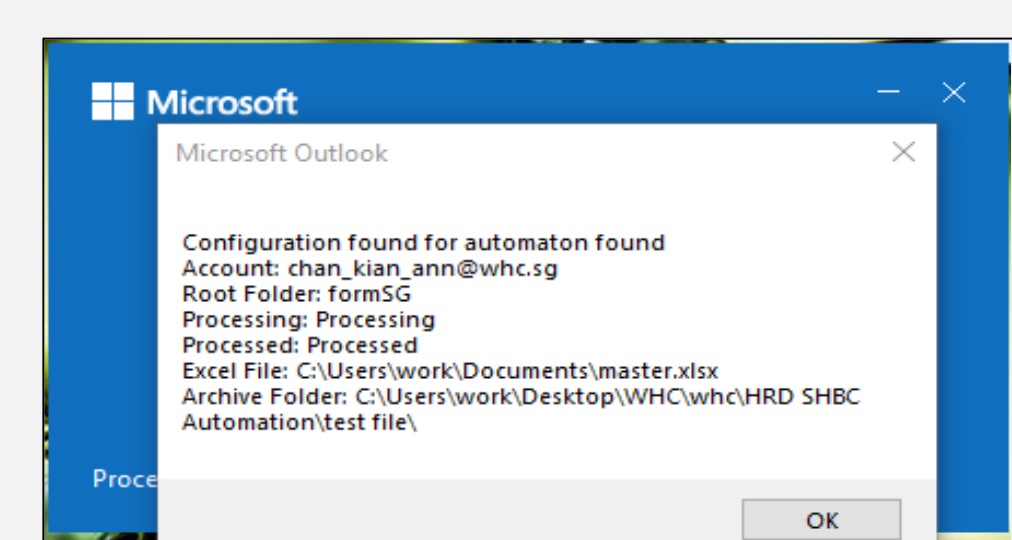


Step 1: Open the installer file. It will launch a program

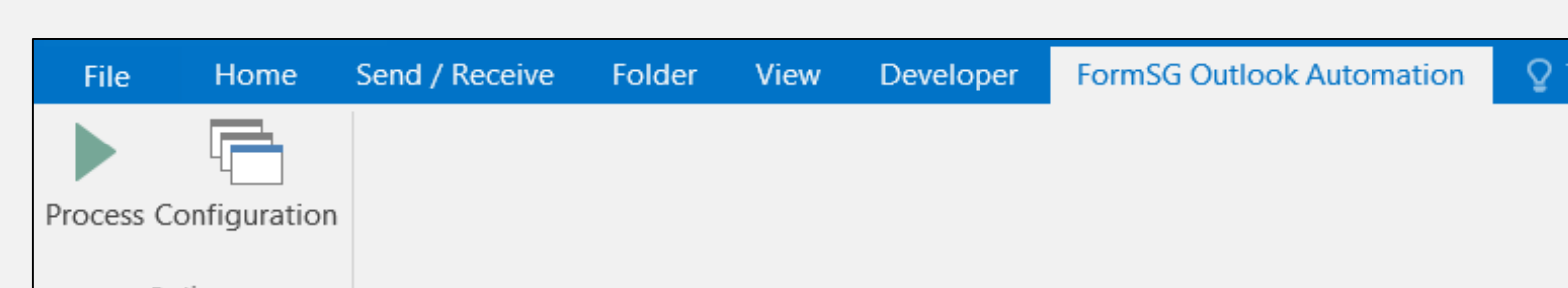


Step 2: Once completed, users would see a customised ribbon "FormSG Outlook Automation" in their Outlook.

On the configuration interface, users could set FormSG titles, recipient email account, preferred email management and location of respective master files.



Step 3a: Upon successful installation, a notification of the automation properties would appear whenever Outlook was launched.



Step 3b: In the event that FormSG email was not picked up by ELA, users could click on the "Process" button to force run the automation for troubleshooting.

Implementation

User Acceptance Testing (UAT)

- Performed UAT³ with a small group of users for a month (Dec 2021)
 - Verification process:** confirmed if the automation was properly implemented and executed in user's laptop.
 - Validation process:** ensured the correct data was captured in master file.
 - Error identification process:** Errors identified was resolved as the error might be a fault in the design or coding phase

Results

Use case 1

Time observed from the point an unread mail arrived in the inbox to the point data were being consolidated into master file was measured. 50 to 150 records had been received monthly by OM since deployment (6 Dec 2021) with 34 questions in FormSG.

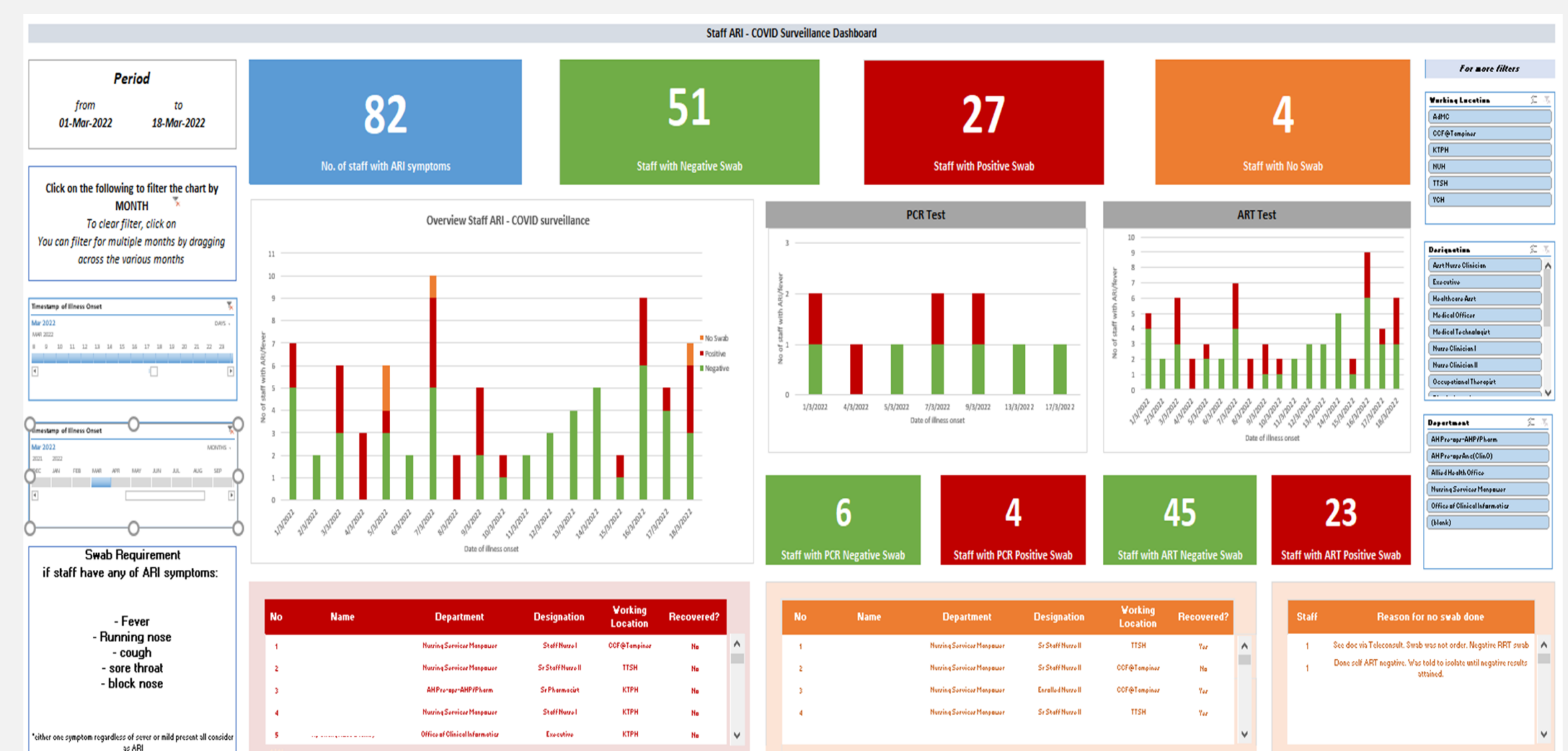
Method	Process	Total Time	Productivity Gained
	Copy and Paste		
Manual	0.1*34*50 = 170 min 0.1*34*150 = 510 min	170 ~ 510 min	
VBA (Automation)	5 min	5 min	97.1 ~ 99.0%

Use case 2

Time measured was from the point an unread incoming mail to the point individual was matched on the real-time dashboard in master file. Compared to use case 1, use case 2 has an additional requirement of matching the extracted records to infected staff (identified from S3) on the real time dashboard. An average of 8 records were received weekly since deployment on 6 Dec 2021 with 8 questions in FormSG.

Method	Process		Total Time	Productivity Gained
	Identifying of staff to S3 data	Dashboarding		
Manual	0.3*8*18 = 43 min	30 min	73 min	
VBA (Automation)	5 min		5 min	93.2%

The dashboard was able to accurately present an account of the COVID-19 situation by identifying staff infected by COVID-19 using their personal identifier (NRIC) in S3.



Discussion and Conclusion

Challenges

Time spent setting up to...

- Transfer the exact questions in FormSG survey to Excel master list
 - Pre-define the pathway to read the master file.
- Once this time consuming work is completed, the rest is straightforward.

Delays might happen...

- If users have not opened Outlook for a while, leading to accumulation of FormSG emails in inbox.
- Functional behaviour of the automation may differ between laptops due to laptop specifications. These "bugs" were picked up during the UAT phase and rectified.

Benefits

- High productivity improvement**
 - Productivity gained was 97-99% in Use Case 1 and 93% in Use Case 2.
 - ELA frees staff time, allowing them to focus more on value-added tasks.
- Easy maintenance and sustainability**
 - ELA can run in the background without much disruption to daily operations.
 - It allows for an organised manner of storing emails in accounts.
- Scalability and seamless**
 - Scalability of ELA is limitless and staff can easily extend this skillset to other projects involving FormSG.
 - ELA can be well-adapted to all types of structured emails, since the core of the program is the same.
- Minimisation of human errors**
 - ELA eliminates human errors, eliminating tedious and repetitive tasks that will undermine the quality of work.
- Quality patient care with minimal manpower (Dashboard in Use Case 2)**
 - Improves transparency and accountability of COVID-19 situation within WH.
 - WH clinicians could accurately identify staff who had contracted COVID-19 from the real time self-reporting system in S3 and FormSG during the deployment period (Dec 2021 to present).
 - Improves the situational awareness of clinicians, allowing them to make informed decisions to address any potential cluster outbreaks that warrants concern among WH staffs.
 - With improved staff care, quality of patient care and hospital performance can be maintained.