

**Tobor Inc.**

Backend Administration for Toborlerone Application

Detailed Process Description

Version 1.2

Revision History

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Document Classification

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| Classification | Company Confidential |
| Definition | Information is company confidential and needs to be protected |
| Context | Where loss of information confidentiality would result in significant harm to the interests of the Organization, financial loss, embarrassment or loss of information |

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# 1 Introduction

Tobor Inc. recently launched a new content aggregator application, Toborlerone, which promises to set the standard for efficiency and accuracy of content delivery apps. Initially a concept product, the app relies on manual backend interaction and administration. No-one thought this app could grow so quickly, but launch was extremely well received, and now the development department are struggling with capacity to improve the app. QA Consulting has been contracted to utilize Robotic Process Automation (RPA) techniques to automate the backend administration interactions around signups, aggregating content, content distribution, and reporting. These processes were selected due to their repetitive and time-consuming nature and the high volume and frequency of interactions. We hope to automate the majority of backend administration, in order to free up the development team to improve the app and work on other ongoing projects.

# 2 Manual Process

## 2.1 Overview

The backend administration process is split into 3 stages: Customer Registration, Content Aggregation and Distribution, and Reporting of app usage - including details of the execution of the previous steps. The steps required for each process stage are broken down in high-level detail below:

**Customer Registration**

* The process is triggered by a user request to register
* The user must send their details to the company via email
* On receipt of registration information, the details are stored in the customer database
* A confirmation email is sent to the new user
* Once registered, the user starts to receive their content at the intervals detailed at registration
* *At any time, an existing customer may request to change or remove their details*

**Content Aggregation and Distribution**

* Content based on individual user preference is aggregated from at least 3 sites
* An administrator ensures that there is no repeat content and information sent previously is not sent again
* The content is “tidied” to ensure it is clean and readable
* The content is then sent directly to the customer’s registered email
* *User content preference is selected from a variety of pre-defined categories – for development purposes, we will be working only with a small subset of these categories (Sport, Tech and Hobbies)*

**Reporting**

* All new user registrations are recorded for usage figures
* All user data interactions are recorded for audit purposes (including any changes and deletions)
* Several items are also recorded for every content transmission (e.g. user’s name and date sent)
* All the user registration, data interaction and content distribution details recorded are collated into a PDF
* The PDF “daily report” is sent via email to the company itself and then stored in a local folder

*Acronyms – PDF = Portable Document Format*

## 2.2 Detailed Process Flow

A screenshot of a cell phone

Description automatically generated

|  |  |  |  |
| --- | --- | --- | --- |
| Legend: flowchart colour-coordination indicates systems accessed | | | |
| Start of New Subprocess | Company’s User Database | Stored Process Logs | Company Email (Sending) |

# 3 Automation Proposal

## 3.1 Overview

QA Consulting propose to automate each stage of the backend administration process with an individual automated process. The details of the automation processes are as follows:

**Process 1 – User Registration and Data Handling**

An Unattended robot monitors the company inbox for new registrations or requests for alteration/removal of user details.

*For new customer registrations:*

* Retrieve registration email
* Extract new user details
* Validate that user does not already exist
* Register customer by storing details in user database
* Reply to user email with confirmation of registration (or notification of failure)
* Log new registration

*For alteration or removal of existing customer details:*

* Retrieve email request
* Extract existing user details, nature of the request (update/delete) and (optionally) new details to update to
* Identify existing user (and validate that they do indeed already exist)
* Remove user from database **OR** update details to new ones provided
* Reply to user email with confirmation of request completion (or notification of failure)
* Log user data interaction

**Process 2 – Content Aggregation and Distribution**

The process will run on an attended robot, so an administrator will be able to interact with theprocess as it is running. The robot could be scheduled to run at a particular time so the automation would be fully automatic.

* Load user details from database
* Identify customer preferences
* Search online for content based on preferences
* Check content (against logs) and aggregate into single document (including formatting)
* *Administrator would be able to intervene to review and, if necessary, format the document*
* Send content to user’s registered email
* Log content and user details

**Process 3 – Reporting**

An unattended robot can be manually triggered to produce summary reports on demand or scheduled to produce daily reports at a particular time.

* Retrieves new registration, user interaction and content distribution detail logs from a specified period (for daily reports - same day if scheduled at the end of play, previous day if scheduled first thing in the morning)
* Collates logs into a PDF report (some additional analysis might be required)
* The report is sent to the company using email
* The report is stored in a local folder

## 3.2 Automated Process Flow

The automated processes will adhere to the manual process flow – all actions currently performed manually by the backend administration team will be automated.

## 3.3 Target Systems & User Requirements

| Name | Description | User Permissions/Access |
| --- | --- | --- |
| MS Outlook | Company Email | QA email account used to mimic company email  Robot Inbox required to receive registration or user data alteration/removal requests  Required to send confirmation emails, content distribution emails and daily reports |
| User Database | Access to database of all existing users | Create new users (registration)  Read users (validate new users, retrieve preferences and email addresses for aggregation and distribution)  Update and Delete users’ details if requested |
| Application Logs | Storage for logs of all new registrations, user interactions and content distribution details | Create new logs for user registrations or interactions and details of content distributions  Read all logs for auditing or reporting |
| Chrome Browser | Online search capability for aggregating online content | Access to internet search capable browser and sites including:  https://www.bestrandoms.com/ |
| Foxit Reader | PDF reader and editor | Read and create PDF log reports |

## 3.4 Impacted Business Areas

* Backend Administration Team

## 3.5 Workload

The following metrics related to the automation have been provided by the Backend Administration Manager

|  |  |
| --- | --- |
| Average no. of daily user data requests (registration/update/removal) | 30 New Registrations, 5-10 Data Interactions (Update/Delete) |
| How many active users are receiving aggregated content (increases at rate of new user registration) | 567 in production database (Using 50 users as test case) |
| How many websites’ content must be aggregated? | Minimum 3 |
| How frequent is content distribution? | Daily or Weekdays Only (Potential to expand options to include Weekly) |
| How frequent is report generation? | Ideally Daily, but currently reporting is only done sporadically |
| Are there any periods when a higher workload is anticipated? | During sporting events or around major news stories |
| How many people do this process per day? | 1 (Roberto Fernandez – Backend Application Manager) |

**On average, it takes Roberto 15 minutes (0.25 hours) to process a user registration or update or remove a user’s details, 240 minutes (4 hours) to aggregate, check, tidy and distribute users’ content and 45 minutes (0.75 hours) to produce a report every day.**

**Automating the steps below will realise an average time saving of 885 minutes (14.75 hrs) per day for Backend Administration:**

* Registering New Users – 15 minutes x 30 registrations = **450 minutes (7.5 hours)**
* Updating/Deleting User Details – 15 minutes x 10 requests = **150 minutes (2.5 hours)**
* Aggregating and Distributing Content – **240 minutes (4 hours)**
  + Aggregation – 40 minutes x (minimum) 3 categories = ***120 minutes (2 hours)***
  + Distribution – *0.2 minutes (~12 seconds)* x 567 users = ***120 minutes (2 hours)***
* Producing Reports – **45 minutes (0.75 hours)**

## 3.6 Operational Constraints

* Registration requests can be received any time, but content will only be distributed the same day if request is received before the morning cut-off (11:30 AM)
* Due to GDPR, the company do not wish to disclose any real data to Consultants. They have provided a service, however, that replicates the format of user data for development and testing purposes, a dataset of 50 users should be sufficient for such purposes.
* Access to Company email and servers is limited so a decision has been made to use Gmail email accounts to mimic users and QA Email accounts to mimic the Company.
* A smaller subset of customer preference categories has been provided for content aggregation development and testing (Sports, Tech, Hobbies). At least 3 sites and 1 preference must be used for each aggregation.

## 3.7 Delivery

The project will (~~be presented on Friday the 26~~~~th~~ ~~of June 2020)~~ now be presented on Monday the 29th of June 2020, so the development, testing and delivery of the automation and all supporting documentation must be complete by then.

## 3.8 Contact List

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# 4 Automation Details

## 4.1 Automation Walkthrough – User Registration and Data Handling

### 4.1.1 Parse Emails

* Log into email client with relevant credentials
* Retrieve all unprocessed emails (or wait for email to arrive)
* For each email:
  + Retrieve sender address
  + Retrieve subject line
  + Retrieve email body
  + Categorize by subject line:
    - If subject = REGISTER -> 4.1.2 (Register New Customer)
    - If subject = CHANGE -> 4.1.3 (Update Customer Details)
    - If subject = DELETE -> 4.1.4 (Remove Customer Details from System)

### 4.1.2 Register New Customer

On EXCEPTION, skip to -> 4.1.5 (Reply to User Request) and reply with notification of failure, including exception details.

* Check sender address is not already registered:
  + If no user is associated with this address -> CONTINUE
  + If user is already registered -> EXCEPTION (User already registered)
* Retrieve, from the email body, the following customer details:
  + First Name
  + Last Name
  + Address - including:
    - Street
    - City
    - Post Code
    - Country
  + Email
  + Content Preference
  + Interval
* If any of the previous details are missing or invalid -> EXCEPTION (Registration data incomplete/invalid)
* ELSE -> Store retrieved details for new customer in the company’s user database
* SUCCESS – Skip to -> 4.1.5 (Reply to User Request)

### 4.1.3 Update Customer Details

On EXCEPTION, skip to -> 4.1.5 (Reply to User Request) and reply with notification of failure, including exception details.

* Check sender address is registered to an existing customer:
  + If user is already registered -> CONTINUE to update this user’s details
  + If user is not registered -> EXCEPTION (User not registered) -> Prompt to register (In section 4.1.5)
* Retrieve, from the email body, the following updated details:
  + First Name
  + Last Name
  + Address - including:
    - Street
    - City
    - Post Code
    - Country
  + Email
  + Content Preference
  + Interval
* **Any data remaining the same will still need to be included in email!**
* If any of the previous details are missing or invalid (e.g. cannot be blank) -> EXCEPTION (Update data incomplete)
* ELSE -> Update details stored in the database for the recognized user to match the new details supplied
* SUCCESS – Skip to -> 4.1.5 (Reply to User Request)

### 4.1.4 Remove Customer Details From System

On EXCEPTION, skip to -> 4.1.5 (Reply to User Request) and reply with notification of failure, including exception details.

* Check sender address is registered to an existing customer:
  + If user is already registered -> CONTINUE to delete this user’s details
  + If user is not registered -> EXCEPTION (User not registered)
* Remove all details stored for the user
* SUCCESS – Proceed to -> 4.1.5 (Reply to User Request)

### 4.1.5 Reply to User Request

* Reply by email to sender address based on process state
* If SUCCESSFUL, include:
  + Confirmation of successful interaction
  + Description of interaction (Registration, Change of details or Removal of details)
  + Any further information (i.e. if just registered, when the first content transmission will be)
* If process FAILED, include:
  + Notification of failure
  + Details of attempted action
  + Reason for failure
  + Advice on how to reattempt/proceed
* Check for undelivered mail, If undelivered -> EXCEPTION (Undelivered interaction response)
  + If undelivered -> reattempt once -> If delivery fails again -> Log for follow up by administrator

### 4.1.6 Log Process

* Move request email to relevant folder (Registrations, updates or removals) for records/audit
* Create log item including the following details:
  + User’s name
  + User’s email address (include both sender address and stored email if email has been changed)
  + Date and time of request
  + Nature of request (registration, change of details or removal of user) and relevant details:
    - If registration -> include new user details
    - If change of details -> include old and new user details
    - If removal of user -> DO NOT include further details (see GDPR)
  + Process completion state (Success/Failure)
    - If FAILED -> include details of exception/reason for failure
* Add item to process logging system

## 4.2 Automation Walkthrough – Content Aggregation and Distribution

### 4.2.1 Generate User Data (Needed For Testing Only)

*Variables inside [square brackets] are stored in the config file*

* Open (Chrome) Browser
* Initialize a Data Table with the following headers:
  + First name
  + Last name
  + Street
  + City
  + Postcode
  + Country
  + Phone number (including country calling code)
* Loop while number of new users < desired number of users [50]
  + Navigate to ‘First Name Generator’ [https://www.bestrandoms.com/random-names]
    - Scrape (first instance of) first name text
  + Navigate to ‘Last Name Generator’ [https://www.bestrandoms.com/random-last-names]
    - Scrape (first instance of) last name text
  + Navigate to ‘Address in UK Generator’ [https://www.bestrandoms.com/random-address-in-uk]
    - Scrape Street text
    - Scrape City text
    - Scrape Postcode text
    - Scrape Country text
    - Scrape Country Calling Code text
    - Scrape Phone Number text
  + Process text to isolate only the value (without data label)
  + Concatenate the country calling code and phone number (with prefixed zero removed)
  + Save retrieved details as a new row in the Data Table
  + Increment the number of new users count by 1
* Write out Data Table to a CSV file [UserDetails.csv]
* Close the browser

### 4.2.2 Retrieve User Preference

* Access customer database (for testing we will use the generated dummy data in [UserDetails.csv])
* Iterate through stored customers’ details
* For each customer (If the user’s distribution interval criterion is met):
  + Retrieve customer’s email address and content preference from the database
  + Start an aggregation/distribution job for this user with the retrieved preference

### 4.2.3 Search For Content

Actions 4.2.3 through 4.2.6 are completed for each customer (i.e. process each queued aggregation/distribution job)

* Open (Chrome) Browser
* Navigate to predefined content site
* Search for content based on preference
* Scrape latest/most relevant content from site
* Check content against logs for duplicates (i.e. no content to be sent to a user more than once)
  + If duplicated -> EXCEPTION -> log duplicate and repeat 4.2.3 (except the first step)
  + If not duplicated -> save to pending transmission document -> CONTINUE to 4.2.4 (Aggregation)

### 4.2.4 Aggregate Content

* Repeat step 4.2.3 (Search for Content) until enough content has been compiled (minimum of 3 sites)
* Process all content to ensure that it is appropriate, tidy, clear, concise, and uniformly formatted

### 4.2.5 Send Aggregated Content to User

* Access email system with relevant credentials
* Create new email with the following parameters:
  + Addressed to user’s registered email address
  + Give email a relevant subject line (e.g. User’s name – Content category – Date)
  + Compile processed, personalized content into body of email
* Send email containing aggregated content to user
* Check for undelivered mail, If undelivered -> EXCEPTION (Undelivered content transmission)
  + If undelivered -> reattempt once -> If delivery fails again -> Log for follow up by administrator

### 4.2.6 Log Process

* Store sent content distribution email in the Distributions folder for records/audit
* Create log item including the following details:
  + User’s name
  + User’s email address
  + Date and time of transmission
  + Content preference
  + First (at least) piece of content
  + Process completion state (Success/Failure)
    - If FAILED -> include details of exception/reason for failure
* Add item to process logging system

## 4.3 Automation Walkthrough – Reporting

### 4.3.1 Retrieve Process Logs

* Access process reporting system
* Retrieve all process logs for the specified period (e.g. same day for daily reports)
* Organize logs by type (e.g. new registrations, user data interactions, content transmissions)

### 4.3.2 Collate Logs Into Report

*No template has been provided but it might be worthwhile to create one to speed up report formatting*

* Create new PDF
* Populate PDF with retrieved logs
* Format log details to be clear and easily readable
* Save PDF and continue to 4.3.3 (Report Publishing)

### 4.3.3 Publish Report

* Access email client with relevant credentials
* Create new email:
  + Address email to company email address
  + Set the subject line to be “Daily Report – {Insert date of report}”
  + Attach PDF report to email
* Send email to company inbox
* Save report to a local file

## 4.4 Reporting

### 4.4.1 Business Exceptions

|  |  |
| --- | --- |
| Exception | Solution |
| New user registration is for an existing customer | Inform user that they already have an account and ask if they wished to update/remove their details |
| No new, relevant content can be found | Prompt administrator to expand the range of accessible sites and/or categories to encompass more content |
| Email ‘bounces back’ from customer | At first, reattempt transmission, if email again fails to send, then log issue sending and store email for administrator to follow up later |

### 4.4.2 System Exceptions

|  |  |
| --- | --- |
| Exception | Solution |
| Any system (see target systems list) unavailable or any screen/pop-up box/window/button/link/table within the system unavailable | Suspend process and report availability issues to Backend Application Manager immediately for resolution |

Since each process already logs its successes, failures and/or any supporting details to be collected and aggregated into a daily application usage report (emailed to the company inbox), it is unnecessary to produce and email a performance report after each time the process runs (showing worked cases, exceptions and a cumulative processing log). Performance reporting will thus be incorporated into the existing reporting process previously discussed and will be structured as detailed below.

### 4.4.3 Performance

When the Reporting process is triggered, a performance report and processing log will be emailed to a Tobor Inc. company email as an excel file where it will be stored locally.

**Performance Report**

This will contain all exceptions (business and system) and successes for the automated processes, based on a specified period or, by default, since the previous daily report. The logs include details for all new customer registrations or user data interactions such as updates or removal from the system and all content transmissions to customers.

**Processing Log**

This will show cumulative successes from the automated processes:

### 4.4.4 Triggers

The Customer Registration and Customer Details Update/Removal Processes will be triggered on receipt of a user registration or data interaction (update/delete) email request to the monitored inbox. Or optionally (and for testing purposes) the processes can be triggered manually and will process all outstanding requests in the inbox.

The Content Aggregation and Distribution Process will be scheduled to run at a specified time after the morning cut-off for new user registrations and will aggregate and distribute personalized content to all registered users. The process can be fully automated or attended by an administrator to ensure content quality checks are passed. It can also be triggered manually for all users or a specified user in case of failed transmissions or for testing purposes.

The Reporting Process will be scheduled to run each day automatically and produce a ‘daily report’ of all logs for that day. It can also, however, be manually triggered to produce reports for a specified period for audit or testing purposes.