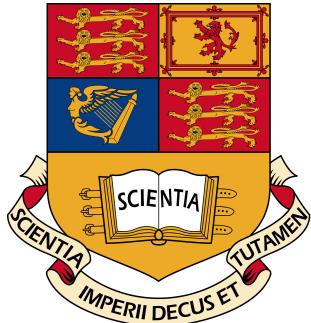


IMPERIAL COLLEGE LONDON

DEPARTMENT OF COMPUTING



Linking Charities Worldwide

Author:

Magdalena Sadowska

Supervisor:

Dr Anandha Gopalan

Submitted in partial fulfillment of the requirements for the MSc degree in MSc
Computing Science of Imperial College London

September 2016

Abstract

This work represents the journey taken to develop a proof-of-concept product in a form of web app that aimed to feature charities around the world, enabling them to compete for potential donations with the peer-to-peer campaign-like sites. It furthermore critically analyses the market needs for the product through the study of existing data and by conducting an empirical research. This work argues that although the product was met with enthusiasm, a number of limitations surfaces that could undermine the worldwide release of the product. It recommends that further, more country-specific research should be undertaken to fully analyse the extent of limitations.

Acknowledgments

I would like to express my deepest gratitude to Dr Anandha Gopalan for his expertise on the subject, enormous encouragement and insightful comments. Moreover, I would like to thank Miriam Gonzalez Piqueras for her participation in the non-profit organisation interview and her feedback regarding the platform as such. Lastly, I would like to thank Mohammad Mursheduzzaman for his co-operation on the Electronic List of Charities. Without all of the aforementioned professionals, this project would most certainly not have been possible to achieve.

Contents

1	Introduction	1
1.1	Motivation and Aims	1
1.2	Contributions	1
1.3	Contents	2
2	Background	4
2.1	Fundraising Methods	4
2.2	Existing Products	7
2.3	Charitable	9
3	Market Research	11
3.1	Quantitative Research	12
3.1.1	Methodology	12
3.1.2	Sample	12
3.1.3	Results	12
3.2	Qualitative Research	15
3.2.1	Methodology	15
3.2.2	Sample	16
3.2.3	Results	16
3.3	Overall Conclusions	18
4	User Journey	20
4.1	Methodology	20
4.2	Donor	21
4.3	Charity Owner	22
4.4	Service Admin	22
5	System Design and Implementation	24
5.1	Requirements	24
5.1.1	General Requirements	24
5.1.2	High Risk Requirements	27
5.2	Architecture	27
5.2.1	Considered options	27
5.2.2	Initial Architectural Diagram	29
5.2.3	Final Architectural Diagram	31
5.3	Components	33

5.3.1	Searching Service	33
5.3.2	Charity Verifier	33
5.3.3	Note Service	39
5.3.4	Email Service	39
5.3.5	Login Service	40
5.3.6	Register Service	40
5.3.7	Featured Charities Service	40
5.3.8	Database	42
5.3.9	Deployment	43
5.4	User Interface	45
5.4.1	Mood Board	45
5.4.2	Logo	46
5.4.3	Wireframes	46
5.4.4	Artwork	51
5.4.5	Implementation of designs	52
6	Evaluations	56
6.1	Architectural Design and Deployment	56
6.2	Templating	56
6.3	Database	58
6.4	Globe Design	59
6.5	Testing	60
6.5.1	System Testing	60
6.5.2	User Testing	61
7	Conclusions and Recommendations	64
7.1	Achievements	64
7.2	Essential Future Work	65
7.3	Recommendations	65
7.4	Final Conclusions	66
A	API Endpoints Table	71

Chapter 1

Introduction

1.1 Motivation and Aims

There is, unquestionably, a large number of non-profit organisations operating around the world, with over 165,000 registered bodies in UK solely[1]. However, a majority of all the yearly funds of more than 250 billion dollars raised by individuals collectively are distributed almost exclusively between a small number of non-profit organisations - those that are either the largest, or have the greatest media presence[2]. Moreover, an increasing number of the word-of-mouth campaigns ever since the launch of the Ice Bucket Challenge means that it is becoming more and more challenging to compete for donations per se.

This leads the charities that cannot afford to commence a successful social media campaign, to the risk of being left with no ability to help those in need, or even being closed down, which is, as NCVO argues, reportedly increasing each year[5].

The aim of this project was to develop a proof-of-concept product, providing the non-profit organisations around the world with an option to list themselves in an online platform. The intent behind the platform was to present the smaller charities with much needed exposure that they cannot often afford and so desperately need. Such a solution was additionally intended to provide the potential donors with an alternative choice of charities to donate to, and as a result helping twice - aiding the chosen cause and the charity as such.

This project, therefore, aimed to answer the following questions:

- Is it possible to design a platform for charities around the world to be part of?
- Is it possible to promote smaller charities in an ethical way?
- Is it possible to gain interest of charities to join the platform as such?

1.2 Contributions

The main contribution of this work is the development of the said product in a form of a web app acting as a prototype for the platform. The aim behind the platform

was to feature charities around the world, enabling them to compete for potential donations with the peer-to-peer campaign-like sites.

As a part of the development process an extensive market research was conducted to assess the need for such a product and discover potential difficulties surrounding the concept. Therefore, in addition to analysis of existing research conducted by a number of organisations, including Abila and Charities Aid Foundation, an empirical data was obtained that consisted of a survey aimed at potential donors and an interview with a non-profit organisation. Furthermore, a sample of Charity Registry bodies across the world were contacted, with moderate success, including the Australian Taxation Office, Hong Kong Inland Revenue and Nigerian Authority to asses potential limitations of the proposed approach of the development of the product.

It was concluded that although it is indeed possible to create such a platform, and the interest of potential donors in the product, although within a small, 52-person sample, was extremely high, the number of limitations surrounding the worldwide release of the product could appear problematic from the verification and accessibility standpoint. It is highly advised to conduct further, more country-specific research to fully analyse the extent of the limitations.

1.3 Contents

This report provides with a detailed account of the research, design and testing process of the proposed service and conclusions and recommendations that followed. The report is, therefore, divided into eight sections: Background, Market Research, User Journey, System Design and Implementation, Evaluations and Recommendations and Conclusions.

Background (Chapter 2), consists of the description of issues concerning charities and donations, along with a critical analysis of the existing products and the introduction of the Charitable service as a potential solution.

Market Research (Chapter 3), consists of both, qualitative and quantitative study on potential users of the platform. It additionally attempts to answer whether the current market would be open to the platform as such and it whether are any specific features that the platform should contain.

User Journey (Chapter 4), introduces three types of user groups distinguished for this project: Donor, Charity and Service Admin. The chapter provides with a description of the possible scenarios and the personas, as well as the possible touchpoints developed using the Five Es technique.

System Design and Implementation (Chapter 5), analyses the requirements, present the initial and the final architecture of the platform and provided with a detailed description of the components along with the designed and implemented art work.

Evaluations Chapter (6) critically analyses the specific architectural design implemented for this project and presents with the testing results, including the system

and the user testing.

The Recommendations and Conclusions section (Chapter 7) summarises the achievements and set backs of this project, aiming to answer whether the purpose of this project was achieved.

Chapter 2

Background

This chapter provides with an overview of various fundraising methods, as well as analyses existing products concerning charitable activities. Firstly, it illustrates the current fundraising approaches and assesses their levels of success. Secondly, it critically analyses products that could be considered as possible competitors, illustrating a visible opportunity to introduce a new product - the Charitable platform.

2.1 Fundraising Methods

There are many ways in which charities can raise awareness about the causes they assist. None of them, although some initially appearing otherwise, support smaller organisations. Amongst the standard methods of fundraising, such as street fundraising and traditional advertisement, new ways are constantly being invented and reshaped to promote particular causes and charities. Unquestionably, one of the most successful ways that completely revolutionised the way in which a specific cause or the charity could gain new supporters is by using social media to commence the so-called “social media campaigns”.

When the Ice Bucket challenge first emerged in 2014, no one could have predicted its success. A phenomenon of people pouring a bucket of iced water over their heads in order to raise donations and nominating others to do the same, included, amongst many, Bill Gates and Mark Zuckerberg, inspiring hundred thousands to follow. The campaign raised more than 100 million dollars in 30 days, providing with opportunities to fully fund a number of research projects. One of the projects - Project MinE identified a new gene associated with ALS, NEK1, that affect three per cent of all ALS cases, providing with new treatment possibilities[3].

UNICEF Sweden, on the other hand, attempted a different approach in 2013 by launching a campaign to illustrate that likes on Facebook have little impact on saving childrens lives that was inspired by research showing that one in seven people thought supporting a cause on the internet was as good as making a donation as such. Unfortunately, the campaign, although having hundred thousands of Facebook likes internationally, did not bring as much financial success as it hoped for. The campaign, although visually impactful, was criticised for almost “bullying the

The screenshot shows a news article from The Independent. At the top, there's a logo of a red bird with the word 'INDEPENDENT' next to it. Below the logo are navigation links for 'News', 'Voices', and 'Culture'. To the right are icons for search, user profile, and menu. Underneath the header, the article title is 'Ice Bucket Challenge funds major breakthrough in ALS research'. A subtitle below the title reads, 'It is a prime example of the success that can come from the combined efforts of so many people'. The author is Sadie Levy Gale, and the date is Wednesday 27 July 2016. There are also social sharing icons for Facebook, Twitter, and Email, with a count of 3K shares.

Figure 2.1: MinE impact

social media users into donating. Moreover, many argued that liking charity's activities already bring awareness of the organisation or a specific cause, bringing more potential donations as a result.



Figure 2.2: UNICEF campaign

UNICEF Sweden launched the campaign mainly as a response to the Stop Kony movement by Invisible Children that dominated Facebook and Twitter worldwide in 2012. The campaign asked to share a short film on social media, that raised awareness on Joseph Kony and his actions with Ugandan's Lord's Resistance Army (LRA) with regard to the forced recruitment of child soldiers. An ultimate goal of the movement was to capture Kony by the end of 2012. Although the campaign resulted in an action by United States Senate and contributed to the decision by the African Union to send troops, it was also very heavily critiqued for spreading of the misinformation on Kony's whereabouts, crisis as such and the mishandling the "Covering the Night" event it pledged to organise. Furthermore Alex de Wall, an Africa researcher, criticised the campaign as naive for elevating Kony to a "global celebrity instead of demystifying him".

Various charities directors and chief executives pledged to organize similar events in hopes to increase organisations' awareness, exposing those for potential funding as



Figure 2.3: Number of Invisible Children’s “Kony 2012” video views

a result. However, according to Matt Collins, a successful media campaign is a result of years of research and social media dedication across various departments, despite looking like an overnight success[3]. Therefore, time and costs associated with the organisation of the campaigns on a large scale, are very high and as a result smaller organisations are unable to afford those. ALS funds are currently handled in UK by Macmillian Cancer Support and ALS foundation group, whereas the famous Member is ran by the Prostate Cancer UK, all classified as being the “large organisations prior to the success of the campaigns.[9]

Furthermore, the number of charities, perhaps as a result of new awareness methods, and in particular the social media campaigns is growing. According to the Giving Reports, 2015 saw a 3.6 per cent increase in the charitable organisations.[6]

Therefore, as the number of charities grows, the number of donations increases and more innovative campaigns are being introduced[1], competing for donations becomes increasingly difficult. Such a task is becoming especially challenging for those organisations that cannot afford to raise the charity’s awareness through either

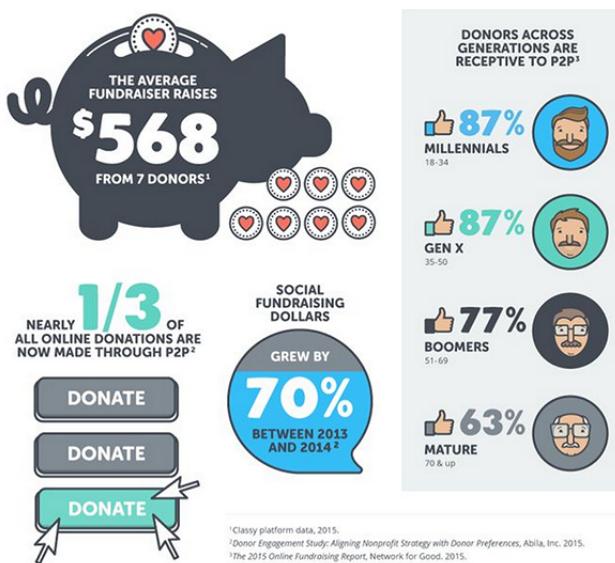


Figure 2.4: Worldwide Charity Statistics

traditional advertising, or by commencing a successful social media campaign. Thus, the introduction of new product that aims to provide smaller charities with means of exposure could become a game-changer for those organisations. Is it possible to create such a service, where a number of issues, such as worldwide verification of organisations or incorporation of a worldwide payment platform do exist? If so, how to ensure the service would indeed promote smaller charities, without being subjective? And, how to attract organisations on a world-scale as such?

2.2 Existing Products

There is a large number of services that offer platform to commence varying peer-to-peer donation services, with JustGiving and Givealittle having the largest market share. Peer-to-peer campaigns are a form of social media campaigns ran by individuals to compete for donations on behalf of chosen charities. However, most of these, although being indeed very successful, appear to concentrate fully on the causes that one can support, as opposed to specific charities. Moreover, these fail to provide with a simple, yet user-friendly search engine product for charities in addition to their current peer-to-peer approach.

However, as one could potentially use the online Charity Registry provided by the government for UK based charities and similar public services in countries of interest, what in particular would make Charitable not just another search engine?

Firstly, the Charity Registry does not offer a direct donation option, nor is particularly user friendly, allowing to search for specific charities only. Possibly, the target audience appear more mature due to design of the page and available finances information. Other services, such as Remember A Charity, target a small user group,

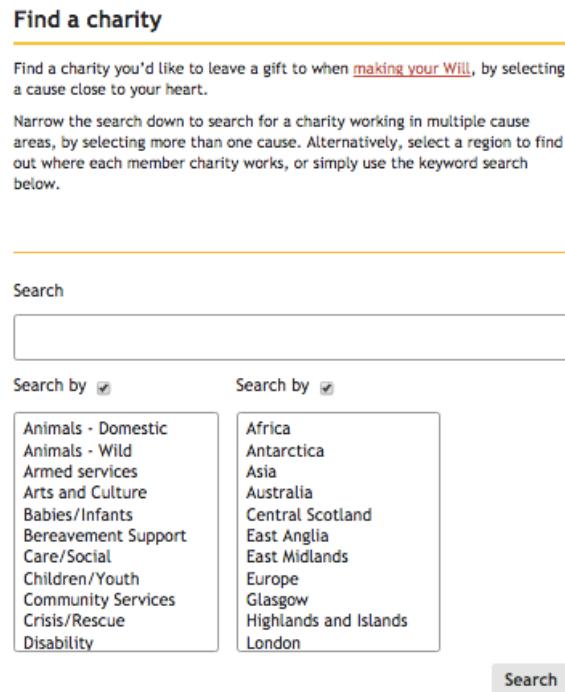


Figure 2.5: Remember A Charity search engine

having already specified a selection of charities to search through. Lastly, one could argue that people interested in donating could simply use Google to find charities of interest. However, very often small charities do not have finances to promote their websites, nor to concentrate on the content of their web pages as such.

According to Abila Donor Engagement Study[2], a number of organisations are missing opportunities by not using widely available data to drive strategy of their service forward. Recent industry data additionally illustrates that organizations lose approximately 57 per cent of donors each year due to uninspiring web pages[6].



Figure 2.6: Missed Opportunities

Meet Charitable - a proof of concept service that will try to answer above questions. Charitable aims to provide the donor with a memorable and user-friendly search engine, in a form of either a map or standard causes-based search and offer not only

results of charities that signed up for the service, but also ethically display featured ones in a form of sorting that are of smaller size and generated income, but could equally interest the donor.

2.3 Charitable

To Charitable, needs and wants of any users of the service was a driving force behind the service, as the most important aspect of this project was to ensure that user, regardless of the user group he or she belongs to, receives the best possible experience from the very first click. The available study and own empirical research on the content and design was conducted to question whether the service offered the best possible experience. It also ensured that every charity had the best possible representation of their organisation, by offering micropages with suggested content. To do so, the following will be implemented:

Donors look for strong content

To keep donors engaged, rich content to the interests of the donor, including personal stories, accomplishments, and being thanked make donors, were decided to feature in charity micropages. Although charities had the opportunity to display own content, the guidelines were provided in the welcome email to ensure that donors indeed feel involved with the service. Additionally, Charitable suggested to feature information on the way donor's money is being used and impact it can have.

There should be no unnecessary communication

A Charities Aid Foundation Study[7] illustrates that most non-profit organisations are under impression that more frequent communication with donors is more desired. However, most donors disagree. Therefore, based on these findings, initially Charitable will not be offering an option of newsletters to request more funding. Instead, it proposed a newsletter that is sent to update the user on the way his donation is used.



Figure 2.7: Content preferences

A choice

A number of donors feel pressured into donating the money to a well known organisation as supposed to small one, as they are afraid money would not be used for specified causes[6]. Additionally, some feel uncertain of where to start looking for alternatives. Also, due to huge popularity of peer-to-peer campaigns, there is a

possibility that sharing of donation on social media could play a small role when selecting a charity to donate money to. By providing with a uniform micropage design featuring relevant information on the way money is being used, as well as the same social media integration for all the charities, donors were provided with a fair choice.

Chapter 3

Market Research

Although, as demonstrated in the previous chapter, there is a high volume od data provided by, inter alia, Abila and Charities Aid Foundation, there were several questions specific to the platform that required to be answered. The questions that were derived from the analysis of existing research were as follows:

- How do potential donors find charities to donate to?
- What do they feel matters the most whilst making a decision on the choice of non-profit organisation to donate to?
- Would they be interested in donating to smaller organisations?
- Would the organisations be willing to provide with specific data to increase potential donation opportunities?

In order to provide with answers to these questions, both qualitative and quantitative research was conducted. Such “mixed” data collection has become increasingly popular and, according to Creswell and Clark, “variation in data collection leads to greater validity and answers the question from a number of perspectives”[10]. Therefore, it was decided that qualitative data would be obtained in the form of interview with the charity, and quantitative would be gathered as a survey. Although no ethical implications were found, both the qualitative and quantitative research participants were informed of the following through the consent form:

- The right to confidentiality and anonymity,
- Voluntary participation,
- The right to withdraw at any time without stating reason,
- The right to ask for data to be withdrawn.

As far as the survey was concerned, the anonymity was granted ad hoc, whereas in the interview none of the rights were exercised by the participant. Although it could be argued that due to public image concerns charity could have made such a choice, the questions as such were not of invasive nature.

This chapter presents and analyses the gathered data.

3.1 Quantitative Research

Donor survey, “An Empirical Research on Donation Habits” was introduced to analyse user’s donation habits and possible needs that could be incorporated into the platform. The questionnaire was made accessible online and a total of 52 participants took part in the process.

3.1.1 Methodology

The structure of the survey consisted of a mixture of 5 multiple choice and rating scale questions. Although the option to skip questions was provided, only 1 participant decided to exercise such right in the question 2 - “How do you usually find charities to donate to?”. Collected data will be presented in the form of tables, charts and text.

3.1.2 Sample

The research participants of the survey were individuals from various backgrounds, age groups, genders and locations. Awareness of the research was raised through postings on online social media platforms, that were shared several times by English, Polish, Spanish and Mexican nationals. Moreover, personal invitations were additionally sent via e-mail. However, only a small fraction of users representing the donors across the world participated in the process, therefore the sample could be regarded as an insufficient representation of market on a large scale. Although the research proved to be extremely helpful, should the platform was to transition from the proof-of-concept product to a professional service, further market research is highly recommended.

3.1.3 Results

The survey was grouped into two sets: The Information and the Preference. The Information set aimed to learn more about potential donors with respect to donation habits, which was helpful in understanding the potential user base. The Preference set, on the other hand, was created to comprehend what kind of features would be best received, if were a part of the platform.

One of the first questions that were asked in the Information set was the frequency with which participants decide to donate to, as listed in Figure 3.1.

Additionally, one participant added that he or she donates:

“Twice a month regularly, but also on other occasions if I see an ad on the tube or FB, or if there is a special crisis.”

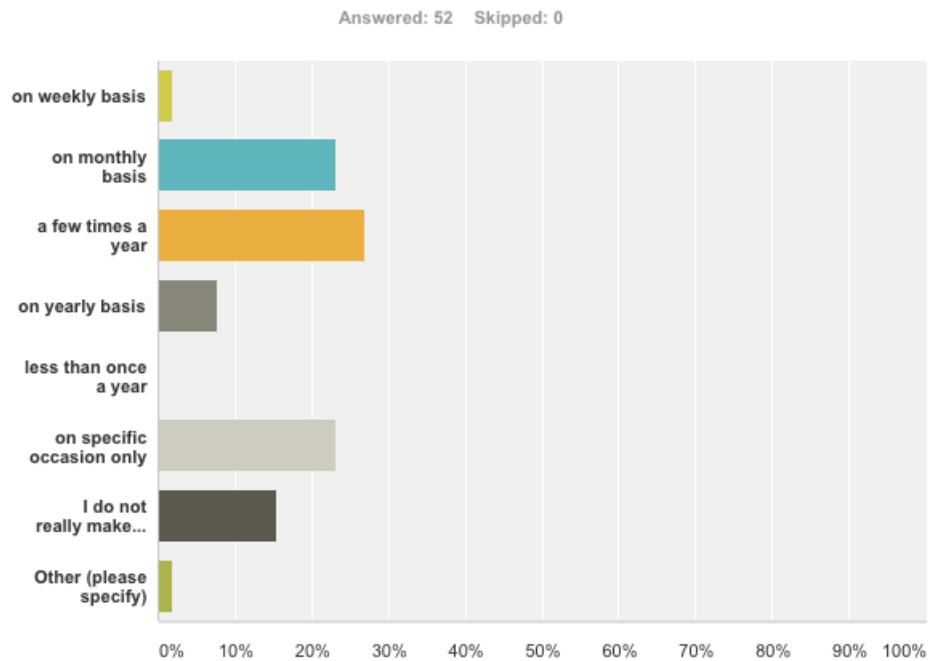
Furthermore, 11 percent of respondents stated that they do not make any donations. The following options were chosen as the reasoning behind the decision:

Table 3.1: Question 2, No donation reasoning

I do not have enough funds to share	3 participants
I do not believe my donation will be used as promised	5 participants
I do not feel comfortable with sharing my personal information	2 participants
I do not like the idea of donating money or goods	2 participants
I do not know where to donate	0 participants
I do not think my donation will make a difference	0 participants

Moreover, one respondent specifically stated that they are only interested in causes and do not mind which charity would receive the donation that they made.

How often do you donate to charities or non-profit organisations and bodies?

**Figure 3.1:** Question 1, Donation habits

As the majority of participants are regular donors, it could be concluded that there is, indeed, a market for a platform like Charitable. Moreover, as the donors can be returning to the platform on regular basis, it would be suggested to employ features aimed to the group specifically, such as, possibly, specific events or competitions. It must be noted that such, however, does not fall within the scope of this project and it would be highly advised to conduct additional research to find new business opportunities.

The last question from the Information set was to learn how potential donors find the charities to donate to. The following were the responses:

Table 3.2: Question 3, Finding the right charity to donate to

Answer Choices	Responses
I search for charities of my interest online	9.80%
I ask family or friends	19.61%
I donate to charities that have helped me in the past	19.61%
I am being approached by fundraisers	31.37%
I am influenced by the adverts and posters I see on TV/tube/online	17.65%
I notice charity office locally	13.73%
I notice charity office whilst on a trip	1.96%
I notice a social media campaign(e.g. Ice Bucket Challenge)	27.45%
I do not donate	11.76%
Other (please specify)	17.65%

Moreover, 9 participants stated collectively that they use the following:

1. Use own experience as an ex-fundraiser;
2. Charities that workplace suggests;
3. Tube adverts;
4. What's App campaigns.

Interestingly, peer-to-peer social campaigns were not a clear leader in the answer board, as assumed prior to the empirical research. That, along with all the responses chosen almost evenly could suggest that donors are indeed open to various methods of finding new charities to donate to. The most surprising outcome, however, was to see that only 1 participant out of 52 selected an option of finding charities abroad. This could either indicate a low interest in charities on global scale or a lack of available sources other than trips to view organisations from various countries. Although it would be desirable to conduct further research on that matter, in particular amongst larger sample, the first Preferences Stage question revealed that 43 participants agree that they “(...) would like to learn about charities from countries other than mine”. The finding illustrates that Charitable could have a great potential to become a successful alternative to modern fundraising.

Another result worth noting was to learn that over 55 percent of the participants stated that they do not believe there are currently too many charities and that they do feel that not enough non-profit organisations support the causes that they are interested in. As there are over 165 000 charities in UK solely and only a small percentage does receive large funding, it could indeed indicate that the public is only aware of the charities that have significant budget to advertise. Therefore, introducing Charitable could be a great attempt to educate on alternative choices.

Lastly, the following was stated about the preferences:

1. A large number of potential donors (29 participants) are interested to know how many donations (on average) the charity receives annually.
2. 40 participants would like to receive an update on the way the donation was used and whether it has made any difference.
3. 31 participants would like to be informed about new charities that support causes that no other charity seems to support.
4. 10 participants would like to be specifically recognised for made donations.
5. 17 participants would like to know whether charity is using social media.

The results provided with an excellent insight into behavior and needs of potential users of the platform. From the given results, it can be concluded that the product promoting smaller charities and providing with an option to view non-profit organisations from around the world as such could become a great alternative to current fundraising methods. The fact that although only 1 participant is currently donating to charities found abroad, the majority is interested in learning more about organisations on global scale. Additionally, a large interest lies in the size of organisation. Therefore, the platform could indeed become a successful one.

However, should there was an opportunity to conduct further research, it would be advised to prepare more user-specific questions, such as the age group, the country of origin, sex and average wages as a part of the Information set to observe any relation between socio-economic backgrounds and donation habits. That could potentially provide with greater suggestions for the User Interface and overall opportunities relating to advertisement of the platform.

Additionally, as far as the Preference set is concerned, enquiring in the future research about the type of donations donors prefer to grant could also provide with opportunities the platform could explore further. For instance, an option of donating tangible items listed as “needed” by the charities could potentially be yet another game-changing movement in the modern fundraising.

3.2 Qualitative Research

An interview, “An Empirical Study on the Charity Engagement with Potential Donors”, was introduced to ensure the needs of charities were met with regard to the representation of those organisations willing to join the platform.

3.2.1 Methodology

The interview was available both, online and as a printed set of questions. Initially, it was aimed to interview charities from 3 backgrounds: a small organisation that did not have a particular virtual exposure, a small charity with large online exposure, and a medium to large sized organisation with large online activity base. However, after contacting multiple small, medium and large charities, including Cricklewood

Millenium Green Trust, Shelter and MS Society, no response was received, therefore only a one medium-sized charity - Manos Unidas, was interviewed to gain a perspective on Charitable. A total number of 7 open-ended questions and 2 multiple choice questions were asked and results will be presented in the form of diagrams, tables and text. None of the questions were skipped.

3.2.2 Sample

Although a number of charities were contacted, either electronically or personally, only one participated in the interview. Moreover, contacted charity currently resides in Spain, therefore, although the project is aiming to promote charities across the world, it would be highly desirable to interview charities from within the United Kingdom first. Furthermore, one participant is not the best representation of the market as such, therefore further empirical research would need to be obtained in the instance where the platform was to be released.

3.2.3 Results

Questions were grouped into three sets: Charity Profile, Marketing and Views on Platform. The first set of questions aimed to create a charity's profile to understand more about the organisation. It was summarised as follows:

Table 3.3: Manos Unidas profile

Name:	Manos Unidas
Number of Employees:	As of 2015: approximately 350 (including both volunteers and employers) in Madrid, over 5 000 globally (including volunteers, employers and scholars)
Average Number of Donations a Year:	Number of donations for 2015: 78 665
Source of Donations:	"The income received by the charity comes from different donors: members, schools, churches, from wills. Biggest percentage of donors comes from members."

The second set of questions aimed to learn about the habits charity employs regarding marketing and its online presence. The charity chose the following:

Furthermore, it was stated that approximately 2.6 percent of the annual budget is allocated to the advertising as such. According to the charity representative, it does not appear to be enough to compete with larger charities, however there exists a general knowledge about the charity amongst Spanish residents. The advertising as such is conducted online (using Facebook and Google Campaigns), via TV, press and billboards.

Moreover, as far as specific website activities are concerned, charity indicated that they use the following:

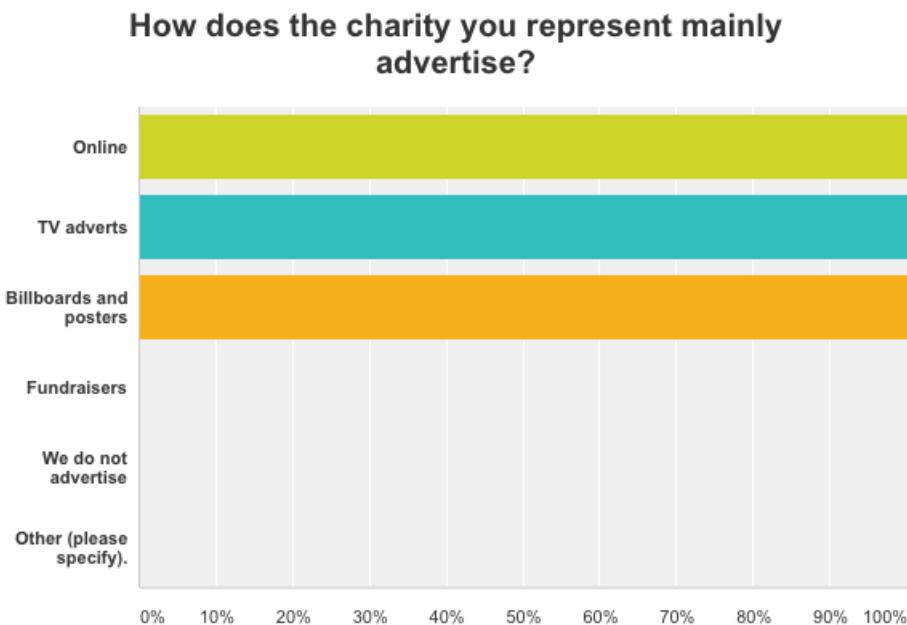


Figure 3.2: Question 3, Advertisement habits

1. Website
2. Facebook, with the general page profile;
3. Twitter, with daily activities and over 33 000 followers;
4. LinkedIn, with the general page profile;
5. Listed Directory - Yelp Spain.

The charity does not seem to be currently enrolled into charity-specific websites, it also does not have blog. Upon learning about the idea behind the Charitable platform, it stated the following:

“It sounds like a great opportunity to let the world know about our organisation free of charge, which does not happen often. It could be a completely unique product that could help many.”

The charity representative also would be willing to provide with the following information to be displayed for the potential donors to increase possible exposure to donations:

Lastly, the charity representative had suggested in the comments box that they would like the platform to ensure they can add charity-specific information on current projects and not to “just provide with answers to a list of questions”.

Although only one charity was interviewed, the responses illustrate that the product could potentially become helpful with the free advertisement of charities. It also

Table 3.4: Questions 7, 8 and 9 - Manos Unidas sharing preferences

Likely to share	Prefer to keep private
The amount of projects created by the charity during the year	Exact way donation was used (very hard to follow each donation)
Description of most popular projects in general	
Average number of donations	
Average number of employees	
Source of donations	
Contact details	

provided with an insight on the willingness to share the information on the size of the charity and a number of employees. That could possibly help potential donors with understanding of the overall market and provide those that are willing to donate to smaller non-profit organisations with the knowledge that they actually do exist. Furthermore, the interviewed charity suggested that, although originally aimed to be included, a specific update of the donor on the exact way his or her donation was used could not be possible, as it would be too time-consuming to track each donation specifically. Instead, a general news letter could be introduced instead.

3.3 Overall Conclusions

The research provided with an insight on the needs of the platform. Taking into consideration results from the both, survey and the interview, the following can be concluded:

- Potential donors appeared more enthusiastic in the product than charities as such;
- Potential donors would like to know whether the charity is larger or smaller;
- Potential donors would like to know how, more specifically, their contribution has helped the cause;
- Potential donors would like to learn more about charities from various countries;
- Once able to receive a response from the a charity, an overall response to the platform was highly positive;

The most interesting point of the research was to discover the general lack of interest by charities in participation in the interview. However, as charities were approached without the demonstration of the platform as such, it could be likely that at that stage the charities were not seeing the benefits the platform could provide them with. Therefore, it is highly advised to contact charities once more, providing them with a link to the platform or a direct short demonstration of the product. If a similar

response would then be observed, it could be concluded that more emphasis would need to be placed on generating potential members.

Chapter 4

User Journey

Previous chapter attempted to research the potential market questioning needs of prospective users of the platform. This chapter, on the other hand, concerns specific scenarios that could take place during the interaction with the platform.

4.1 Methodology

To conceptualise the Charitable's content and functionality, three groups of users were established: Donor, Charity and Service Administrator[11]. Each group of users was then given a set of specific scenarios based on a particular persona. A persona, as Alan Cooper explains, is a “(...) ”representation of a user, typically based off user research and incorporating user goals, needs, and interests.”[11]. It is considered that a strong persona that could form a realistic user base is the one that reflects patterns in research, have specific needs that would appeal to several users and help understand the product needs.

Once scenarios were developed for each persona, the basic user journeys were then derived for each of the user group to fulfil identified gaps in existing products and help with the development process. The journeys were created through an application of the “5 Es” technique - a technique consisting of five stages of the journey that the user could undergo:

1. Entice - goals and motivations of the user to engage with the service;
2. Enter - the first encounter;
3. Engage - the process of achieving goals and motivations;
4. Exit - the last engagement of the user;
5. Extend - the ways of inviting the user back to the service.

Such a technique is often used by the leading design firms, including IDEO and it allowed to ensure that the product has taken into consideration a variety of features needed by different users.[11].

4.2 Donor

Table below lists potential scenarios that could take place:

Table 4.1: Donor User Journey

Persona	Need State
John: "I want to donate money to Africa without anyone knowing."	Anonymous donation Search by country
Bob: "I want to donate money to dolphins and I want everyone to know about it!"	Sharing on social media Search by cause
Kate: "I want to donate money to kung-fu dolphin fighters. If there are no such charities, I want to be informed about them."	Search by cause If no cause, notification service
Annie: "I hate creating accounts for everything. I want to donate money to dolphins without any fuss. But, I also want my friends to know how generous I am."	Anonymous donation but possibility of sharing on social media
Kris: "I want to donate, but not sure where for what cause"	Featured causes/charities
Suzie: "I want to donate only to charities in my city that look after dolphins in need"	Filtering option for results

Overall goal for donors was therefore concluded to include the following: searching through charities by location or cause, exploring possible donation options, viewing more specific information about the charity, donating to a charity of choice anonymously or through the account, editing and adding information and preferences for notification if user decided to create an account.

The diagram below illustrates the “5 Es” and corresponding touchpoints required to satisfy the scenarios:

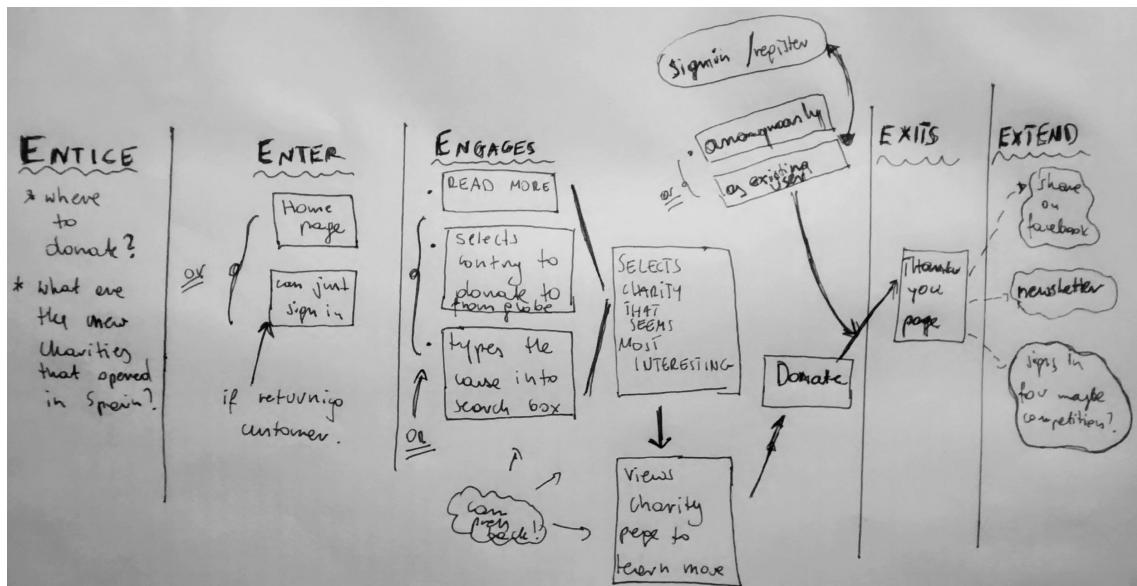


Figure 4.1: Developed touchpoints

4.3 Charity Owner

The table below illustrates the basic scenarios of a Charity Owner:

Table 4.2: Charity User Journey

Persona	Need State
SaveDolphins: "We want to make some changes to information displayed in search engine."	Content management
SaveDolphinsB: "We are a discrete charity. We do not want people to..."	Control over sharing of donation (to some extent)
SaveMammals: "We want to see how our page will look like if we edit too much:"	Live preview
SaveDolls: "We are not too sure what we can actually write to sound cool..."	Basic content suggestion

Charity Owner should be able to manipulate the content of a micropage, with a set of guidelines to help the charity owner represent the charity to highest standards. The owner initially should also have an option to set the social media sharing preference, however this feature was not made available in the final project. From the gathered further research it became evident that such was not a concern for the charities. Therefore, the Touchpoints in this particular user group could be described as follows:

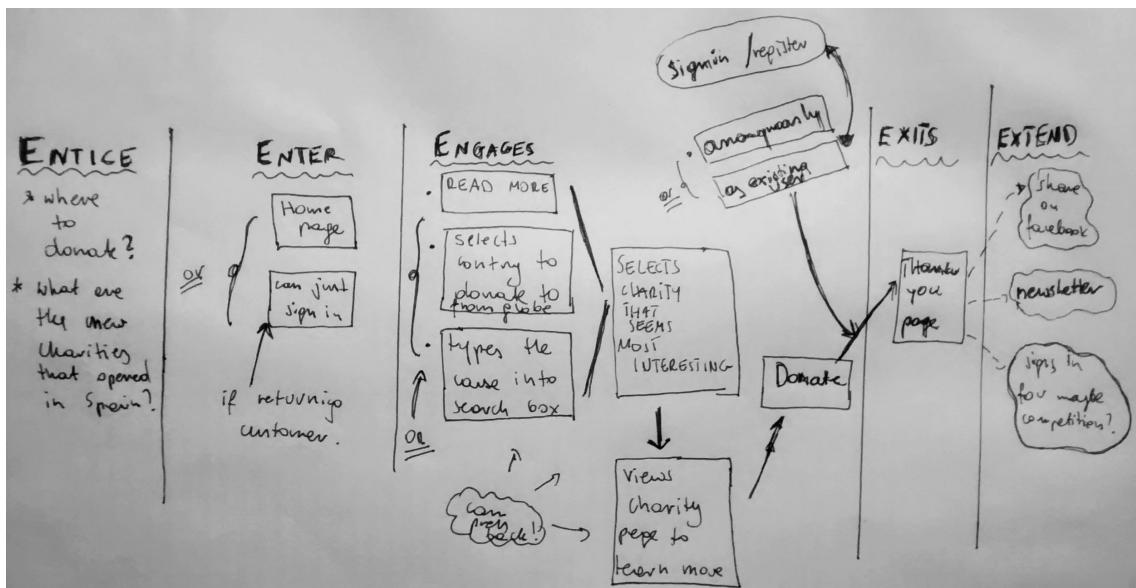


Figure 4.2: Developed touchpoints

4.4 Service Admin

As an addition, Service Admin group was also established. An idea behind the Service Admin was to provide with greater support of the platform, as well as the ev-

ery day maintenance of Charitable. Moreover, Service Admin could also potentially increase business opportunities, should the project was successful. The probable business opportunities could include the engagement of existing charities in specific events, sourcing of new members and targeted advertisement. The table below illustrates a sample of potential scenarios:

Table 4.3: Service Admin User Journey

Persona	Need State
Don: "I want to see which charities are viewed the most"	Data Tracking
Adam: "I want to see which charities have registered - you never know if we can one day call those that did not register with us to promote our services..."	Display of information from database
Eve: "I want to change "About us" but all developers are sick..."	Separate static pages from the overall product

The figure below depicts developed touchpoints:

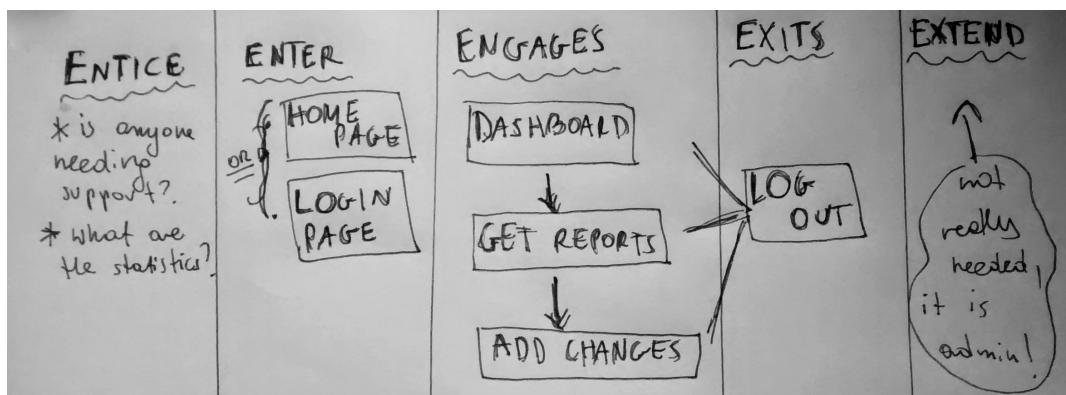


Figure 4.3: Developed touchpoints

It is important to note that initially this user group was developed as an additional user group that could be regarded as an enhancement of the project. In the final outcome, however Service Admin became an essential part of the platform regarding the verification of the charity, which will be explained in following chapters in a greater detail.

Chapter 5

System Design and Implementation

This chapter concentrates on the gathered requirements and the general design approach to the platform. Furthermore, it provides with the more specific implementation of the architecture components and features as such. It furthermore includes a detailed description of design process and implementation of the art work. Such consist of a number of items, such as mood board, wireframes, specific implementation of the designs in the front end, as well as the logo development and the evolution of images as such.

5.1 Requirements

Requirements were gathered through the analysis of the gathered and conducted research and user journeys, as presented in the previous chapters. More specific low level requirements were created through a simplified version of van Lamsweerde's KAOS goal-oriented model[12], by questioning how and why each high level requirement can be implemented in this project.

5.1.1 General Requirements

The first set of general requirements was developed at the early stages of the research. Table 5.1 illustrates a list of initial general, high level requirements. During the development and further, more specific research phases it quickly became evident that a large number of requirements was no longer feasible, became unnecessary or not justified. A number of requirements were also re-written and/or completely replaced. Therefore, the table 5.2 depicts revised general requirements.

Table 5.1: Initial Requirements

	Description	Risk*
Minimum Requirements	Enable the charity to add and edit their information	L
	Enable the donor to search through a list of charities registered in UK that signed up to Charitable	L
	Enable the donor to edit their information	L
	Allow for donation through the service to charity directly	H
	Allow the donor to sign up for notifications, separately to the account, or as a part of their account settings	L
	Allow donor to share donation on social media platform (either anonymously or when donor registers)	L
	Provide with a service management interface with a list of registered charities in the system	L
	Enable donor to edit their information	L
Additional Requirements	Introduce charity verification for the rest of the world	H
	Explore enhancement of the search engine by adding a web crawler or existing API to add charities automatically in addition to the sign up process	H
	Expose the API using Swagger	H
	Tracking of the data using Google Analytics	H
	Enable user to search through a list of charities registered in other countries	H
	Create a live preview of edited information by the charity	H
	Provide with language support other than English	H

*Risk: categorised as high (H) or low(R), depending on its impact and occurrence. The following were considered in the classification: human (lack of development experience) software (bugs with chosen tools and frameworks) and schedule (inability to complete given specifications within given time framework)

Table 5.2: Revised Requirements

	Description	Risk	Status*
Minimum Requirements	Enable the charity to add and edit their information	L	Completed
	Enable the charity to log in to the service	L	Completed
	Enable the donor to search through a list of charities that signed up to Charitable using the globe	H	Completed
	Enable the donor to search through a list of charities that signed up to Charitable using the search box	L	Completed
	Enable donor to register to the service	L	Completed
	Enable the donor to log into the service using Facebook or the service as such	H	Completed
	Enable donor to edit their information	L	Completed
	Allow for donation through the service to charity directly	H	Not completed
	Allow the donor to sign up for notifications, separately to the account, or as a part of their account settings	H	Partially completed
	Allow donor to share donation on social media platform (either anonymously or when donor registers)	L	Completed
	Receiving an email communication upon registration to the service (any user group)	L	Completed
	Introduce charity verification for the UK	H	Completed
	Providing with the user interface for Admin activities	L	Completed
	Promoting smaller organisations	H	Completed
Additional Requirements	Introduce charity verification for the rest of the world	H	Partially completed
	Expose the API using Swagger	H	Not Completed
	Tracking of the data using Google Analytics	H	Not Completed
	Enable user to search through a list of charities registered in other countries	H	Partially completed
	Create a live preview of edited information by the charity	H	Completed
	Provide with language support other than English	L	Not Feasible

*Status: Not completed - possible to achieve but not attempted due to time constraints; Partially Completed - attempted but unfinished due to time constraints; Not feasible - not attempted and not possible to achieve due to lack of finances

5.1.2 High Risk Requirements

There were several elements marked as High Risk ones, both in the Minimum Requirements pool and the Additional Requirements one. Firstly, enabling the donor to search through a list of charities that signed up to Charitable using the globe included D3.js data visualisation tool not used in the past, therefore there was a chance that the feature would result in difficulties, which was the case during the actual development process. Secondly, login for any user was marked as a high risk element due to complex nature of authentication processes. Furthermore, the donation process as such was marked as a high risk element and as not completed. The platform consisted of a number of issues to research, therefore this project concentrated on other elements in a greater detail. The notifications as such were only implemented in the front end due to time constraints and an introduction of a verification system in UK was marked as a high risk element due to an amount of research required and a number of unknowns surrounding the issue. Lastly, all the additional requirements, except for the language support, were marked as high risk elements.

5.2 Architecture

5.2.1 Considered options

The main architectural choice faced in this particular project was between monolithic, microservice and service oriented architecture (SOA) designs[13].

- **Monolithic:** Monolithic architecture describes a single-tiered application. In such a design, used for instance by Etsy, the user interface, data and general code base is within one single project from a one single platform. It is a self-contained application and it performs all the tasks required for a fully functional service. [14] Such architecture allows for a faster initial development and an improved integration. However, it also complex to maintain due to large codebase and lacks flexibility, as upgrading a specific, even smallest feature would mean that the whole service would need to go offline.
- **Service Oriented Architecture:** In SOA, a software is designed to provide services to other components via network protocol. A service as such is a completely independent element responsible for a particular task, or a set of tasks[13]. Such a design has a huge advantage with regards to flexibility and maintenance of the overall service, as it supports scalability and availability of the service my allowing multiple deployments of a particular component. However, a complete validation of input parameters takes place each time the service interacts with another service. Additionally, the number of messages that a single component sends, can be in millions, meaning the SOA-based service would be become increasingly slower where a number of components increases.
- **Microservice:** Microservice design, used by services such as Netflix and Amazon, originated from the SOA design. It is a distributed systems architecture,

like SOA, however it eliminates issues associated with the SOA's lack of efficient validation of parameters and less complex inter service communication[14, 15]. Additionally, microservices promote continuous delivery and deployment of each element. As each element, similarly to SOA, is independent, the issues associated with load balancing or refactoring are kept to minimum, allowing for efficiency and reliability. However, the inter service communication and deployment of the overall service is more time consuming and complex than in monolithic or SOA designs.

As Charitable is a proof-of-concept project that could be expanding in the future to offer more and more services and to support more and more countries, it was initially decided that a distributed approach was a highly beneficial one to implement in this project. It was furthermore decided that microservices were more efficient as opposed to SOA, due to its more reliable communication between services.

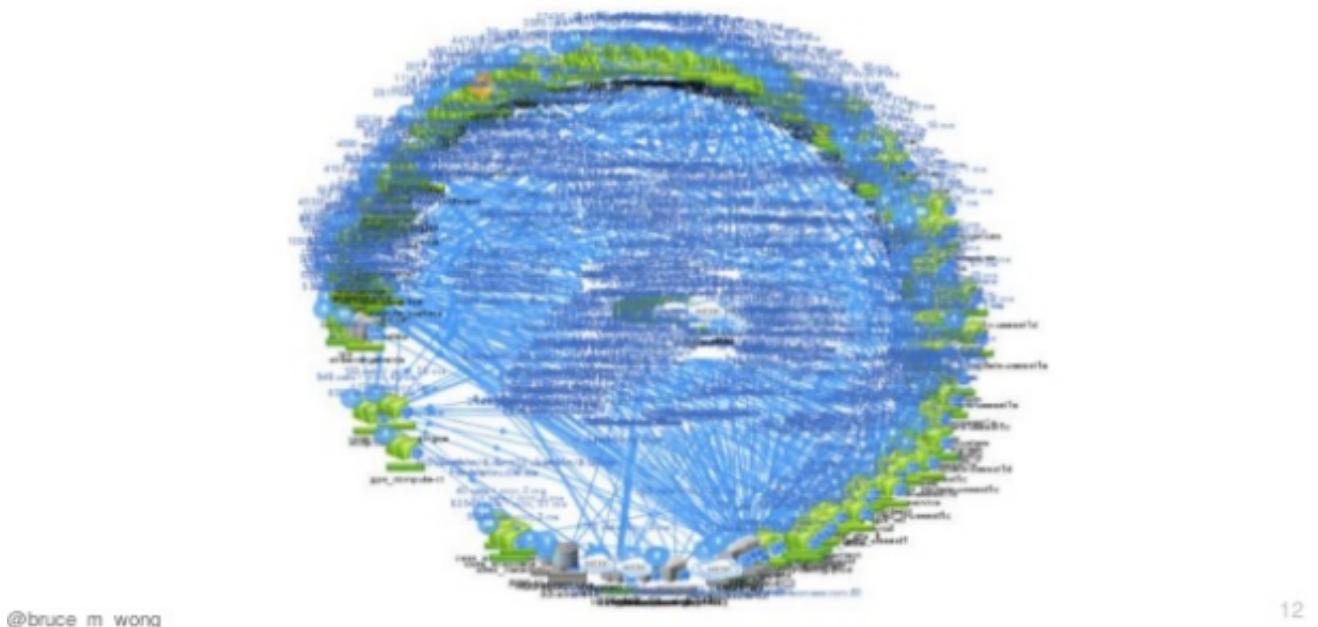


Figure 5.1: Sample MicroService overview at Netflix.

Additionally, as far as a specific microservice architecture is concerned, there were two main approaches that could have been implemented: server-less and the traditional, server-based one. Server-less architecture, with Amazon Lambda along with Amazon API Gateway, is regarded as a particularly new architectural design, where no explicit infrastructure is required, including servers, deployment or installed software. Amazon Lambda acts as application “back end”, whereas Amazon API Gateway provides with HTTP endpoint for a static Amazon S3-hosted website. Although regarded as easier to implement and develop, it was decided that server-based approach would have been more suitable, as the server-less architecture has not been widely used as of yet and does not have large documentation, should the support was required.

However, it must be noted that microservices are regarded as a very complex architectural structure, therefore opting for such a design was a very high risk decision.

Firstly, the design must correctly identify independent services, otherwise the integration and intercommunication between the services could be impossible to achieve. It also introduces complexity with regard to tools and frameworks, such as an application of Load Balancer, Messaging Queue, Discovery Service and other "glue" code that would not be needed to implement in monolithic applications. Lastly, it must be mentioned that no prior web development, aside from HTML and CSS bug-fixing during Quality Assurance internship was attempted by the researcher in the past, adding even higher risk in achieving the desired architecture.

5.2.2 Initial Architectural Diagram

As it was initially concluded that the microservice architecture was more beneficial in this instance, the first task was to divide the overall project into specific microservices. Such was achieved by analysis of requirements, existing enterprise microservice applications, such as Netflix, and general microservices requirements of independence and small code base.

The platform was initially intended to consist of the following elements:

- **Landing Page Microservice:** This microservice was to provide a server-side landing page that would have been the first page for the user from any User Group to see. It proposed to feature an interactive map for the user to select a specific country to donate to, as well as a standard textbox search.
- **Static Pages Microservice:** This microservice was intended to be responsible for serving of the static pages such as About and Contact. The reason why static pages were considered as a separate microservice was to allow for manual updates of the pages without interference with other codebase.
- **Login Microservice:** This microservice was proposed to obtain user tokens (both charity and general user) that were to be stored in Cache.
- **Charity CRUD Microservice:** With responsibilities such as generating and changing content of charity micropages, Charity CRUD (Create, Read, Update, Delete) microservice was intended to be one of the crucial microservices in this project.
- **User CRUD Microservice:** This particular microservice was aimed to allow the user to update user information, change notifications frequency, see previous donations and share chosen ones on social platforms.
- **Notifier Microservice:** This microservice was aimed to be responsible for the observation of existing charities in the database. Should the user be searching for a particular cause and no results were found, user would have an option to be notified of charities of his or her interest via email.

- **Sharer Microservice:** This microservice was to allow the user to share his donation information on social media by fetching the donation id from the event queue and filtering out those donations that were specified as "not to be shared" by particular charities.
- **Search/Retrieval Microservice:** This microservice was intended to be responsible for searching through the list of charities and returning all the relevant results.
- **Gateway API and Load Balancing Microservice:** The main aim behind microservices is to provide with load balancing in the case of failure of connection or where distribution of microservice is required. Load Balancer was to be responsible for that task. Gateway API, on the other hand, was to be the first point of contact with the user and was to forward the request to relevant microservices.

The diagram below illustrates the initial overall architecture, including microsevices components, Gateway API, as well as the inter-service communication in the form of queue (marked by dotted red lines) and HTTP requests (represented with black solid lines). The diagram also illustrates the database access each microservice was thought to require (a shared database is represented by black writing, whereas a quick-query access represented by green writing relates to a searching tool for quick scan of required data).

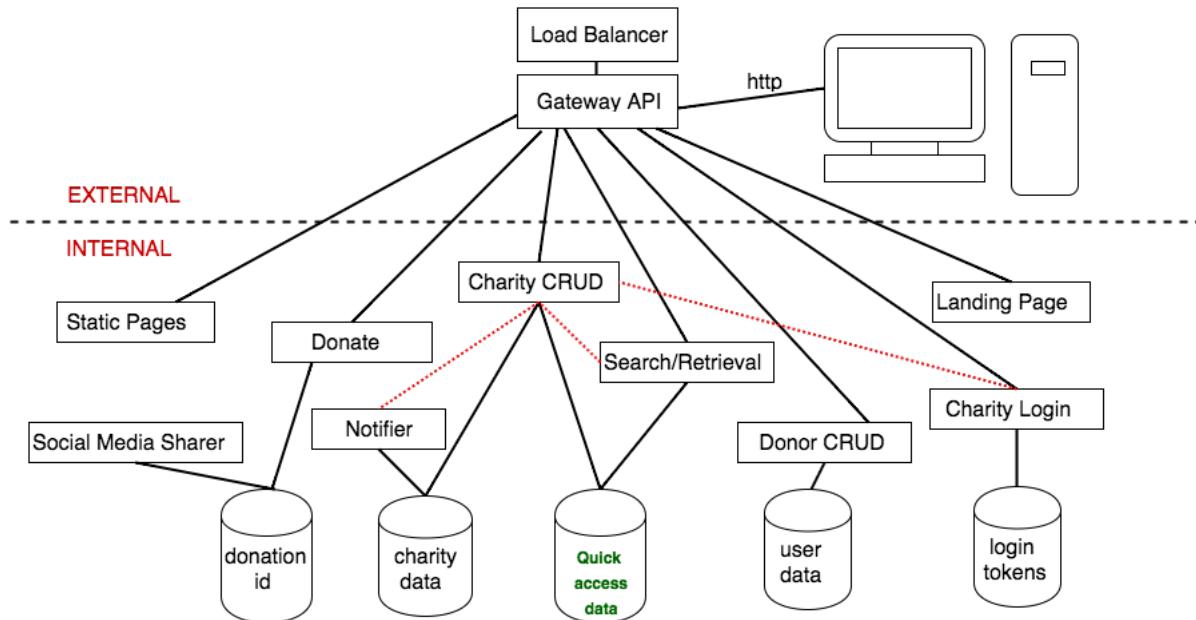


Figure 5.2: General Architecture Diagram

All the back end for the project was initially intended to be written in Java8. The majority of microservices were to implement Spring Boot and Spring Cloud for the Web Model-View-Controller (MVC) and Kubernetes for the communication and integration of the microservices.

5.2.3 Final Architectural Diagram

The initial architectural design was created during early stages of the research. As the requirements kept on evolving based on the findings, it was required that the architecture was adapted to reflect the changes. Furthermore, certain architectural goals could not have been met in the given time space due to issues associated with the charity verification process, as mentioned in the Requirements section. Table 5.3 presents with the evolution of the architecture, listing the reasoning behind implemented changes.

Table 5.3: Microservices Design Evolution

MICROSERVICE	EVOLUTION
Landing Page	Remained; additional tasks of calling correct microservice depending on user's choice
Static Pages	Microservice merged with the Landing Page microservice, as it was decided that "About" and "Contact" pages should feature an earliest opportunity
Login	Implemented separate token-based Login service per each user.
Charity CRUD	Charity CRUD evolved to include services like Email Service and Preview
User CRUD	Developed as initially proposed
Notifier	Merged with Charity CRUD – due to re-evaluation of the priorities of the project the notification service was left in the backlog and only partially implemented.
Sharer	Merged with Charity CRUD, as only the button logic was required
Donate	Developed as a separate service; partially completed only basic functionality
Search/Retrieval	Merged with Charity CRUD
Gateway API/Load Balancer	Removed due to lack of deployment
Service Admin	Added microservice for charity verification and administration

Moreover, the Figure 5.3 illustrates the general final architecture diagram, which includes all the services that were developed, along with the intercommunication and Landing Page acting as a primary Gateway API. The diagram furthermore illustrates the database access each service required, which was, as in the case of the initial design, a shared database. More specifically, the component diagram depicted in the Figure 5.4 illustrates the specific microservice structure that was used and services that were implemented by each of the microservices.

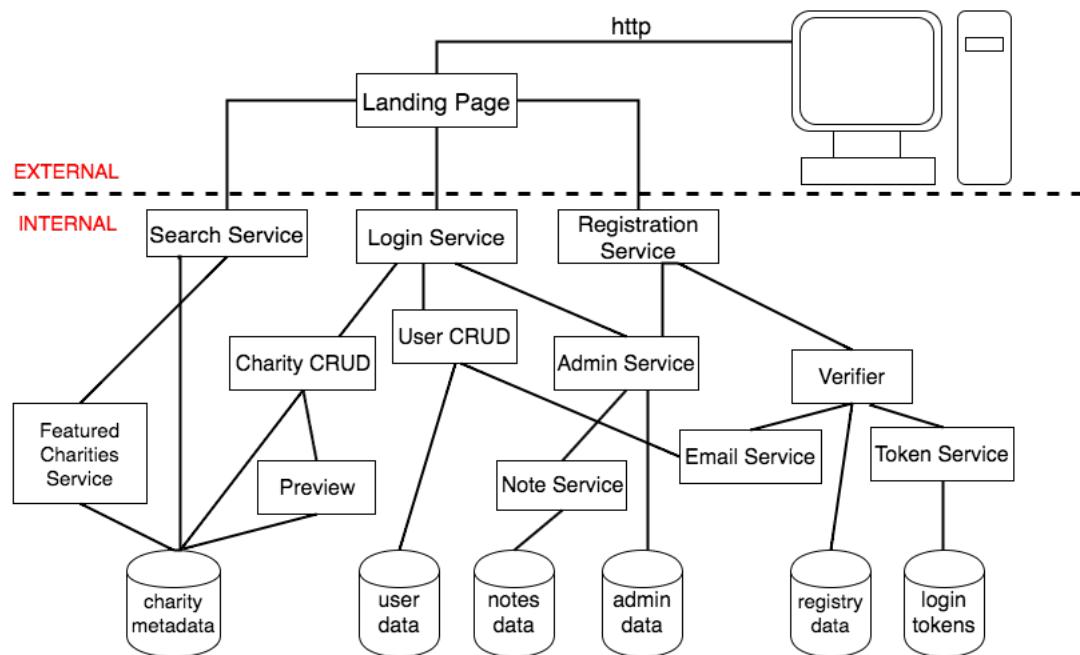


Figure 5.3: Final Architectural Diagram

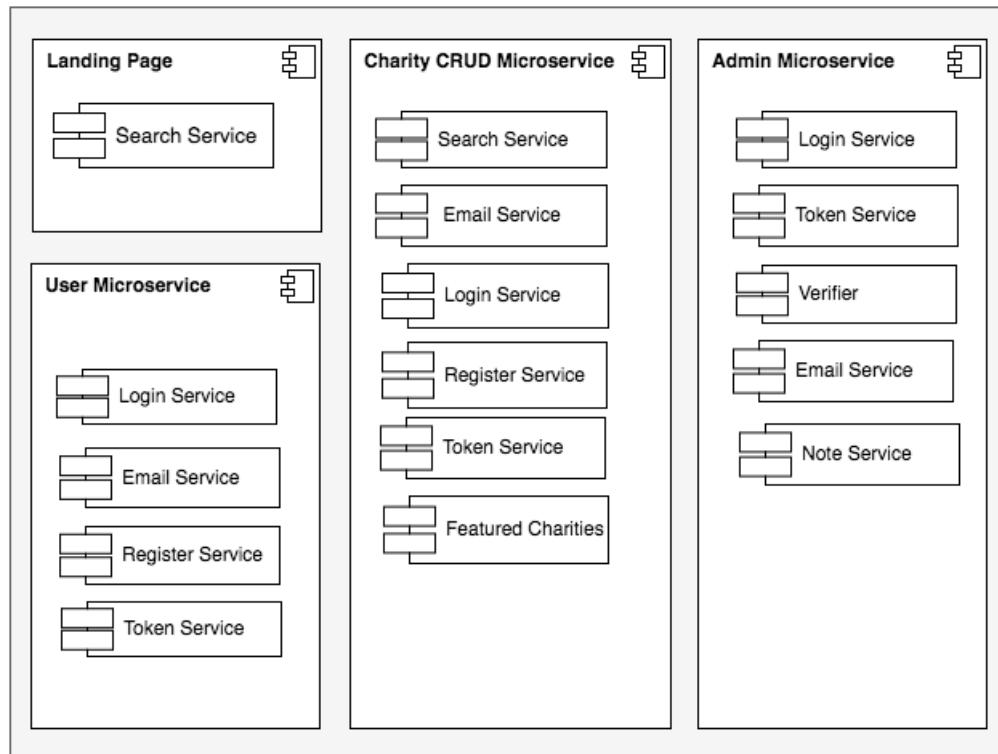


Figure 5.4: Specific Microservices and services that they included

5.3 Components

Prior to discussion of each element in detail, it must be mentioned that the back end for an overall project was implemented using Java 8. However, as the structure of microservices allows for the flexibility with regard to languages and tools, Java 8 does not need to be the only language used in this project in the future.

Moreover, although a number of the the MVC frameworks were considered for this project, including GWT (Google Web Toolkit) and Spring, it was decided that the backbone projects were to be created with and Spring Boot a “simplified MVC framework based on Spring. It was concluded that GTW was not suitable for this project, as, according to research conducted by RebelLabs[16], other frameworks are generally required in addition to GTW, therefore such would introduce unnecessary complexity. Moreover, Spring framework, although appearing as an ideal solution due to its self-contained and well documented features, appeared time-consuming to set up. Therefore, after conducting additional research it was discovered that Spring-Boot - a pre-configured and pre-sugared set of Spring frameworks/technologies to reduce that boiler plate configuration would suit the project best.

Lastly, the general communication within the system took place via REpresentational State Transfer (REST) over HTTP protocol, with data transfer implemented using JSON. REST is an architectural style of network systems with focus on resources. REST/HTTP is a highly efficient, stateless and layered style that supports caching[20, 21]. It is not only most flexible choice with regards to resource access, but is also considered as easy to learn and implement, therefore was perfect for the project like Charitable.

5.3.1 Searching Service

This service was responsible for querying of the MongoDb Charity model collection from the pool of verified charities. It implemented a complex querying system and enabled to search for the charity through the charity’s name, location, associated tags and it allowed for the partial searching through the implementation of regex (regular expressions). Moreover, it ignored the casing. Although the searching was working correctly and adapted several search methods, it would be advised to implement the ElasticSearch instead due to its much more advanced querying system.

5.3.2 Charity Verifier

An issue that was one of the most complex ones to solve in this particular project, was to find a suitable verification process for charities willing to sign up to the service. Verification was necessary to prevent potential spread of incorrect information and fraud that could lessen the quality of Charitable as a result and open potential legal floodgates relating to handling of donations.

It is important to mention that legal process of registering charities in each country differs due to the rules set out either by the governing body given legislative powers

to do so, or by the legislation setting out the legal framework as such. Although Charitable is not responsible for tracking whether the non-profit organisation was set up accordingly to legal guidelines, the governing body or legislations often dictate the way the information on registered and legally approved charities is stored and can be accessed by the third parties.

For instance, a majority of developed countries and places such as UK, Australia, US, Canada or Hong Kong provide means to store the charity data electronically, which can be searched through on the governing body's website. For example, Inland Revenue Department for Hong Kong provides with a basic search for a specific charity.

Figure 5.5: Inland Revenue Charity Search Engine

The search, however, is limited to only one result and entered data must fully or partially match the charity's name. Australia, Canada and US opted in for similar approaches.

The UK's Charity Commission, on the other hand, provides with the more sophisticated search of up to 500 results that can include financial and contact information of charities in question and can be sorted by the income or sector. Additionally, Charity Commission introduced the data download feature in the late 2014, updating the tool on monthly basis. Therefore, as far as a verification of charity is concerned, the most ideal solution to implement in Charitable platform was to make use of data stored electronically.

However, as the data became available in UK only in December 2014, it was necessary to conduct further research to ensure that such process could be implemented in all the countries with electronic registries. After speaking directly with the Australian Taxation Office representative, who confirmed that data is indeed available, yet must be handled with care, and receiving no responses from several other bodies, it became apparent that making use of the charity registry bodies could prove difficult and further research is highly recommended.

Moreover, the possible verification process for developing countries is still being questioned. For instance, in Nigeria, as set out by the Companies and Allied Matters Act, 2004, the Corporate Affairs Commission (CAC) is vested with responsibility for non-profit organisations. The body dictates that in order to register the non-profit organisation, it is necessary to fill in the form sent by the CAC. If the CAC is then satisfied with the said form, it, as per section 594(1) shall:

"cause the application to be published in two daily newspapers circulating

in the area where the corporation is to be situated, and at least one of the newspapers shall be a national newspaper”

The screenshot shows the 'Search for charities by their registered details' page. On the left, there's a sidebar with links for 'Find charities', 'Advanced Search', and 'Search by charity contact postcode'. Below that is a 'charity search' section with a search bar and an 'Advanced Search' link. The main content area has several sections: 'Search for' (with radio buttons for 'Registered charities', 'Removed charities', 'Registered and removed charities', and 'Charities with latest documents overdue'), 'Type of charity' (dropdown menu 'All charities'), 'Keywords' (text input with radio buttons for 'Match all words' or 'Match any word'), 'Search in' (checkboxes for 'Charity name', 'Charity objects', or 'Charity activities'), 'Where the charity operates' (dropdown menu 'In any area' or 'Specific Areas'), 'Classification' (dropdown menus for 'What the charity does', 'Who the charity helps', and 'How the charity operates'), 'Registration date' (date range inputs 'From' and 'To'), 'Removed date' (date range inputs 'From' and 'To'), and 'Income range' (dropdown menu 'Please select range'). At the bottom right are 'Search' and 'Reset' buttons.

Figure 5.6: Charity Commission search

Therefore, should an individual was in need to learn whether a specific charity is indeed a registered body, a visit to the local Newspaper Archive would be as successful as contacting the body directly. Additionally, most of the developing countries also do not provide electronic access to data, requiring to contact relevant bodies for confirmation. Lastly, it must be recognized that in certain countries, including United Arab Emirates, there are strict laws that prohibit the operation of any charity registered outside the United Arab Emirates, hence launch of Charitable would there not be possible.

Thus, it was decided to divide the problem into a set of smaller issues. In order to do so, it was decided that due to available data the verification process would be firstly fully implemented for United Kingdom solely. Then, if successful, the process would be extended to the other countries that have or will plan to make the data widely available in near future, starting from those that have the largest numbers of donors, as listed in Chapter 2. Following that, a verification approach of those countries without electronic data will still be required to be brainstormed accordingly.

UK Verification Process

As far as the registration process in UK was concerned, the initial verification that was considered included comparison of the charity details with a charity registry solely. Firstly, data was required to be downloaded and prepared to use by the Charitable platform. With the help of the Python script developed by the Commission, the SQL Server data was converted into an CSV file format. Once completed, the CSV file was then parsed into a Mongo Document to then compare such with an organisation to verify.

However, during the process it was discovered that the Mongo Document had a large number of charities missing. After writing errors into “parsing_errors” file, it was discovered that a part of similarly looking data prevented saving of charity objects into Mongo document.

21966	392396 AS AMENDED BY SPECIAL RESOLUTION REGISTERED AT COMPANIES HOUSE ON 06/12/2010
21967	392421 AS AMENDED BY SPECIAL RESOLUTION(S) DATED 27/08/1991
21968	392460 AS AMENDED BY SPECIAL RESOLUTION(S) DATED 03/05/1996
21969	392461 AS AMENDED BY SPECIAL RESOLUTION(S) DATED 27/04/1998
21970	392462 AS AMENDED BY SPECIAL RESOLUTION(S) DATED 20/04/2000
21971	392463 AS AMENDED BY SPECIAL RESOLUTION(S) DATED 05/08/2005
21972	392464 AS AMENDED BY SPECIAL RESOLUTION(S) DATED 30/04/2008
21973	392465 AS AMENDED BY SPECIAL RESOLUTION(S) DATED 28/02/2011
21974	392475 NOW ARTICLES ADOPTED BY SPECIAL RESOLUTION DATED 08/08/2011
21975	392476 AS AMENDED BY SPECIAL RESOLUTION REGISTERED AT COMPANIES HOUSE ON 23/09/2011
21976	392525 AS AMENDED ON 18/04/1998
21977	392526 AS AMENDED ON 15/03/2000
21978	392590 AS AMENDED ON 20/04/1994
21979	392591 AS AMENDED ON 26/04/1997
21980	392592 AS AMENDED ON 18/05/1999
21981	392593 AS AMENDED ON 20/05/2002
21982	392594 AS AMENDED ON 13/04/2003
21983	392595 AS AMENDED ON 06/11/2007
21984	392612 AS AMENDED BY RESOLUTION DATED 17/01/2011
21985	392619 AS AMENDED BY SPECIAL RESOLUTION(S) DATED 20/07/2010
21986	392709 AS AMENDED BY SPECIAL RESOLUTION(S) DATED 22/07/1991
21987	392730 AS AMENDED ON 24/06/1996
21988	392786 AS AMENDED BY SPECIAL RESOLUTION(S) DATED 06/11/2002
21989	392787 AS AMENDED BY SPECIAL RESOLUTION(S) DATED 29/01/2003
21990	392788 AS AMENDED BY SPECIAL RESOLUTION(S) DATED 23/07/2003
21991	392789 AS AMENDED BY SPECIAL RESOLUTION(S) DATED 06/08/2005

Figure 5.7: The errors file

After further investigation it was discovered that the Commission script treated semi-colons as a start of the next line, ill-formatting the CVS file. The issue was resolved by manually replacing semicolons with blank spaces, which fixed the problem. However, should the project was to become a professional platform, Charity Commission should be informed about the issue so that the manual fix would not be needed for the future updates.

Other solution simplifying the process that could have been introduced instead was to store the data in the SQL-based database, with preference of SQL Server, due to nature of the given file format, hence skipping the usage of the Comissions Python script. However, as the entire Charitable platform operates on Mongo no-SQL database, such would introduce more complexity than the chosen solution involving the script.

An alternative to having an access to data as such for the purposes of verifying the charity against the registry as such, could be building a web crawler that would enter given charity's data into the basic search on governing body's website. However, in the instance where Charitable was to become a popular platform, a number of requests for verification of charities could be treated as Denial of Service (DoS) attack by Commissions internal system.

It must be mentioned that if charity has an income below 5 000 pounds, these are either exempt or exempt from regulation by the Charity Commission. Therefore, those charities won't be listed in the registry. Having that in mind, it was decided that using the registry as a sole verifier would not be a particularly successful one.

Thus, as a final solution a two-step verification process was developed, consisting of the following:

- Charity Registry Verification.
- Email Verification.

Firstly, the Charity Registry Verification step included comparison of entered registration details against Charity Registry. If details matched, a "isDataVerified" flag is set to TRUE. Otherwise, the flag is set to FALSE.

No.	Charity	Contact Name	Phone Number	Email Address	Registration No	Notes	Verify
1	114TH STOKE-ON-TRENT AND NEWCASTLE-UNDER-LYME DIVISION 1ST TRENTHAM SCOUT GROUP						
2	GREAT CHEVERELL PRE-SCHOOL						
3	THE INNER WHEEL CLUB OF STOURPORT-ON-SEVERN BENEVOLENT FUND	KUKU					
4	TestingTokens2	KUKU					
5	TestingEmailToken	Token Token	123-456-789				

Figure 5.8: Flagged charities bucket, Charity Admin

The second step - Email Verification - sends an email to the provided email address during the registration process with a URL to a token generated on the "Register" button click. If the URL is clicked on, the "isEmailVerified" flag is then set to TRUE. If both flags equal to TRUE, the charity is verified, the charity owner receives a welcome message and the charity page can be edited and listed in the Charity Repository. Otherwise, an overall verification fails and manual verification is then required. The manual verification can be accessed by the Service Admin, who can then view the

reasons for rejection and contact the charity directly, which resolves any issues that smaller charities could have with the registration process.

As far as the application of the verification process globally is concerned, if the sign-up details are not matched with the registry - being always the case for the non-UK organisations, the charity will be automatically transferred to the Flagged pool, triggering a manual verification from the Service Admin. Such, as in the UK-based case, could include messaging, phoning or writing to the charity in question, or, additionally, contacting the relevant governing body. The process at present, is, however, time-consuming and could introduce high costs involved with international affairs, therefore more research would be required to introduce improvements.

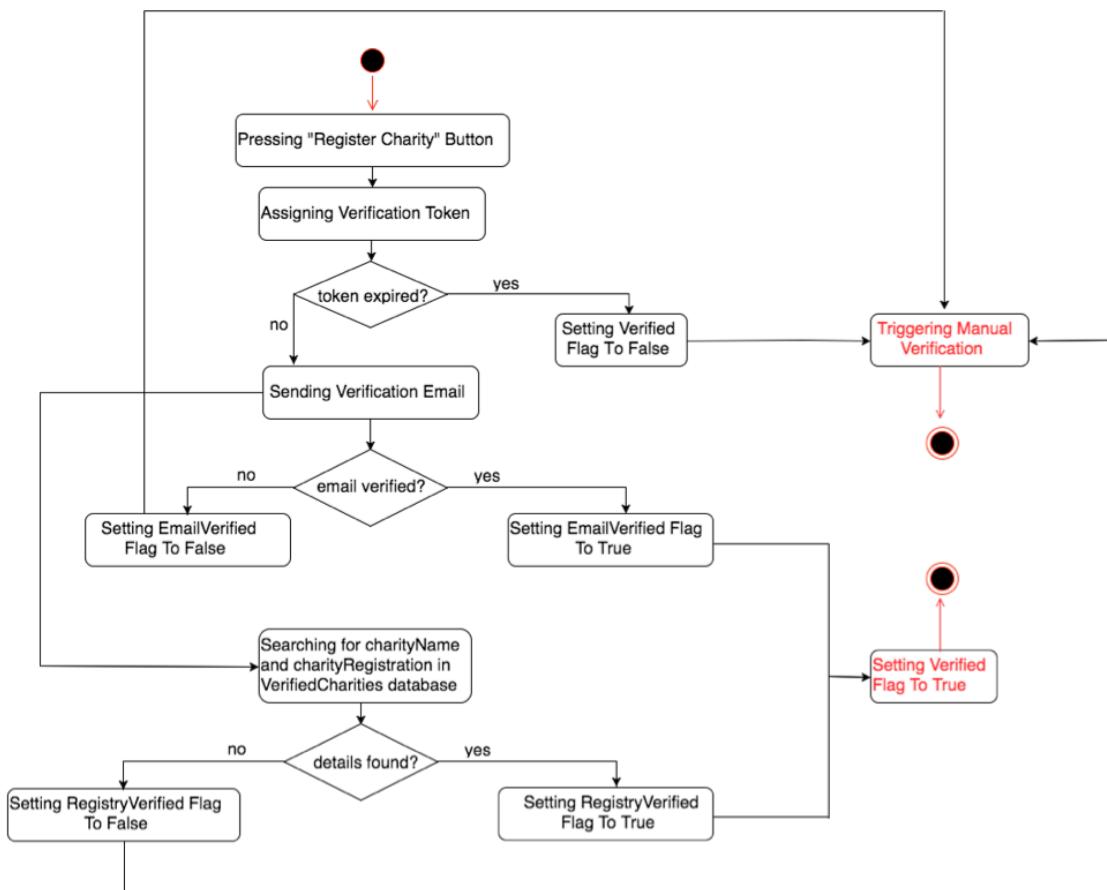


Figure 5.9: Two-step Verification Activity Diagram

Moreover, aforementioned internal legal procedures in particular countries may not allow for such solution, should that was adopted across other countries. It must be additionally noted that it is unknown what format of data is available by the other countries. Prepared parser works currently only with CVS files, therefore it is possible that additional parsers are to be written to meet the requirements.

Lastly, it must be mentioned that during the testing of Verification service it became evident that the email verification was taking a significant amount of time. To resolve the issue, a separate thread was introduced for that purpose, reducing the wait time

from 30 to 10 seconds.

5.3.3 Note Service

This service was introduced to ensure that it was possible for several Charitable Admins to work on charity approvals simultaneously. In order to do so, a list of non-verified charities with corresponding contact details, a rejection reason, note section and a manual approval button was featured in a form of table. The idea behind such was to ensure that if for a particular reason, either relating to issues with the Verification Service itself or charity details as such, a charity in question could be contacted by a Charitable representative, noting any escalation resolutions. This feature was designed specifically in the instance of expansion of the service.

5.3.4 Email Service

The aim behind the email service was to enable the connection to the SMTP server for sending of the verification and welcome emails.

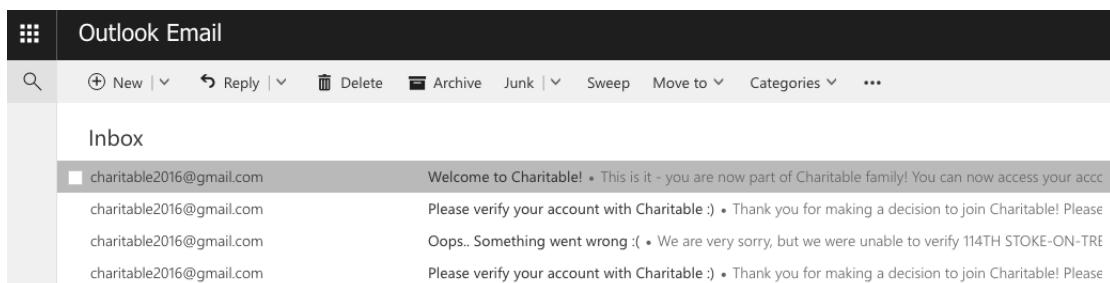


Figure 5.10: Test of correct and incorrect verification, along with a welcome email

An Oracle's Java API Library - JavaMail - was used to implement the connection with the STMP server. JavaMail API defines a number of classes that model a mail system. Although there are email services such as MailChimp that allow for sending emails and newsletters to a large user base with minimal coding required, JavaMail was chosen due to flexibility associated with own design of the service, as well as a flexible integration with the code base. Moreover, such a solution provided with a possibility to develop a free-of-charge service, which is not the case with the pre-existing ones, where there exists a surcharge after a specific threshold of sent emails was exceeded.

A test account - “charitable2016@gmail.com” was used as the sender and researcher's personal email was adapted as the test receiver.

No greater issues were met during the development stage of this service.

5.3.5 Login Service

Login service was developed for each user group: Donor, Charity and Service Admin. There were several choices considered for the implementation of the login functionality. Firstly, there exist either session-based or token-based authentication methods. Session-based authentication is a server-based authentication usually implemented in memory. The access to various services can be obtained via cryptographic ticket when a valid set of credentials are submitted by the client. With a large number of users authenticating, the server overhead increases. Such an approach does not work with regard to microservices implementation, therefore for this project token-based approach was implemented. Token-based authentication, is stateless, therefore tokens can be requested by the various services without passing the credentials. The tokens are sent in the HTTP header, therefore keeping with the stateless HTTP requests. Such an approach provides with an extra security and scalability.

In general, the login service was implemented in a similar way for the each user group, except for the addition of the Social Login with Facebook for the Donor. The token was generated using SecureRandom class from the Java Security library as a Big Integer and converted into the string representation of that Big Integer in the specified radix, being the string representation of the number in base 32, as opposed to base 10. The token was then passed into header and requested where the login access was required. The relevant checks for the token were implemented while serving the templates.

As far as the Social Login is concerned, a one page approach was implemented using AngularJS, Spring Social and OAuth2.

5.3.6 Register Service

This particular service used Charity CRUD API, as found in Appendix A, and in particular the POST Endpoint to save the charity datato MongoDb document. The service, moreover, used Verifier and Email Service to complete the action.

5.3.7 Featured Charities Service

One of the questions faced during the development phase of this project was concerning the promotion of smaller charities in an ethical way.

There were several options considered for this project. The first option was to introduce ranking - a position at which a particular charity would appear in the search results. Higher ranking would correspond to lower number (starting at 1), whereas lower ranking would countdown from the last result. Such an approach, currently in use by most of the search engine based products, enables to promote certain results, as, according to Chitika, first 5 results get an estimated average of over 75 cent of all of the traffic[18].

Such a ranking strategy is taking into consideration a number of factors, such as the relevancy to the search, the quality of the result and a multitude of social and

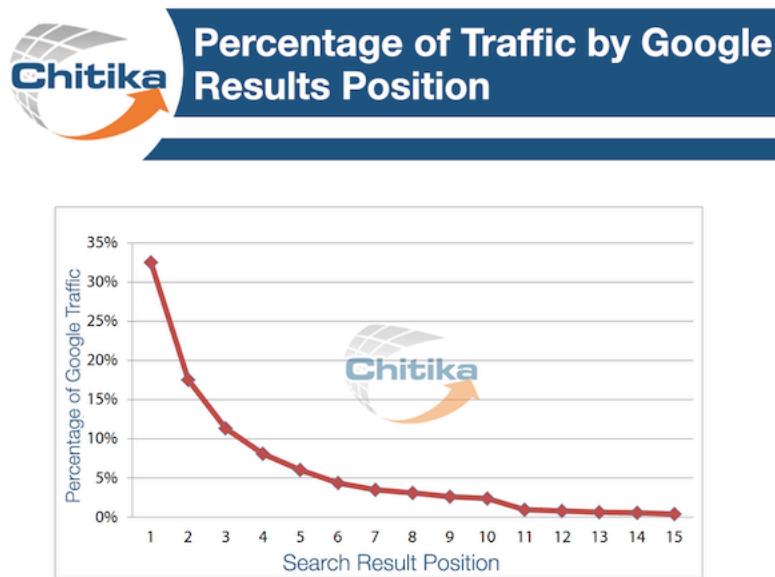


Figure 5.11: Research results on Google ranking

geological circumstances. Google, for instance, uses approximately 200 factors to determine the site's ranking and implements a PageRank algorithm to calculate an average ranking score[19].

However, after some speculation, it was decided that the introduction of a ranking system could prevent Charitable from providing the potential donors with a fair choice. Although there was no intent in providing with advertisement opportunities to increase the ranking, which is the major contributor to unfair ranking practices, it was decided that intervening with the results as such could raise ethical questions by the charities, especially in the case where such information was not made clear to the users of the platform. The results were, therefore, decided to be displayed in an alphabetical order.

Instead, a more suitable approach taken in this instance was to provide with visible sorting options of the given results. It was possible to sort the results using the following options:

- By the number of employees in the ascending order;
- By the number of employees in the descending order;
- By the average number of donations that the charity receives in the ascending order;
- By the average number of donations that the charity receives in the descending order;
- By the default alphabetical order.

Such an option provided with an advertisement of smaller charities that could be chosen by potential donors themselves, as opposed to enforcing anything on the

user. An application of sorting was implemented through resending of the current searching request with chosen sorting parameters, which was resolved through the back end via Comparable class and a relevant MongoDB query.

Additionally, to ensure that the platform was clearly providing with transparency and the lack of subjectivity, a "Recently Added Charities" feature was developed to list the most recent 5 charities that created a profile with Charitable.

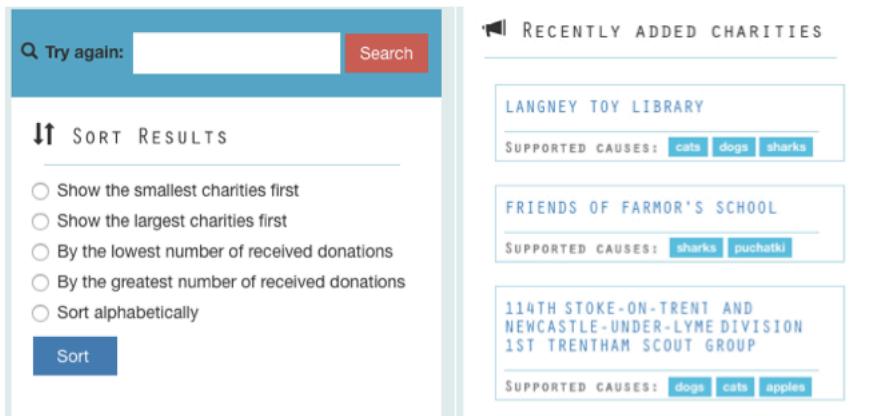


Figure 5.12: Sorting and featuring options

Lastly, a potential development opportunity that could be added in the future could include a more sophisticated feature - "Suggested Charities". This option could apply a machine learning technique to learn about user's previous activities on the page and suggest any similar charities that could be of interest. However, it must be noted that this feature would be at its best if there was a regular traffic from the returning user.

5.3.8 Database

It was decided that the project required one shared database, storing queried data, as well as a general metadata. There were two main options considered for the choice of the database - the SQL (Structured Query Language) and so-called NoSQL databases. The SQL databases, including MySQL, PostgreSQL and SQLite, have been considered as a primary data storage mechanism designed around the ACID properties: Atomicity, Consistency, Isolation, and Durability since the 1960s. SQL data is stored in a form of tables and relations between the tables are expressed through the usage of keys and data aggregation.

NoSQL databases, on the other hand, although invented around similar time to the SQL data storages, only recently gained in popularity. These, including MongoDB, Redis and Cassandra, use no schema and consist of "documents" instead of traditional tables. That allows for the documents in collection to have different fields and structures, therefore providing with greater flexibility and faster access to data.

It was, therefore, decided that flexibility provided by the no-SQL option would ful-

fill the needs of this project to a greater extent. Furthermore, no-SQL databases are thought to provide with an easier integration through a chosen development language, which was more desirable due to time constraints.

As far as a particular no-SQL database was concerned, MongoDb was chosen as the most suitable one due to its greatest popularity amongst developers, resulting in the largest support and documentation base. Moreover, MongoDb is considered as the leader in journaling capabilities and dynamic queries on large data sets. Redis, on the other hand, although considered as faster, would work best with the rapidly changing data and a foreseeable database size, such us live stock feed, whereas Cassandra is mostly recommended for largest data sets, compromising the speed. Therefore those were concluded as not fitting the nature of the project.

Additionally, it must be noted that the documents stored by the MongoDb are saved in the BSON (Binary JSON) format, allowing for easier exporting of data, should that was required. Furthemore, MongoDB provides with an option of two-phase commit, as well as a traditional lock system to ensure atomicity and concurrency[22], which were desired features to handle multiple donation transactions concurrently.

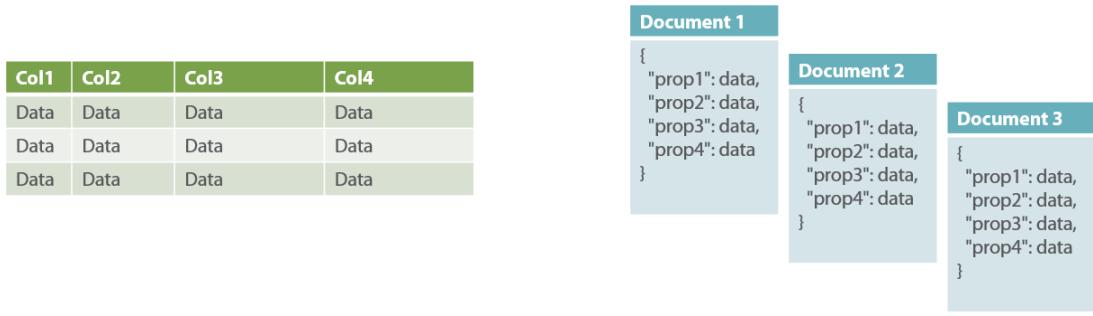


Figure 5.13: Difference in schema between Relational and NoSQL databases[23]

As far as the documents are concerned, the main collections that were created included the Charity, Donor, Admin and Login Request, storing information such as tokens, personal details and the additional metadata.

5.3.9 Deployment

It must be mentioned that it was not possible to fully deploy the project due to time constrains. However the process was fully researched and an appropriate deployment methodology was chosen.

Firstly, there were three particular deployment designs to consider with regard to microservices: Multiple Services per Host, Single Service per Host or by adapting the Platform as a Service (PaaS) strategy.

Multiple Services per Host approach is thought as more beneficial from a host management and cost point of view, however it could also introduce several issues, including lack of compatibility and difficulty with regard to the monitoring of the CPU.

Moreover, it could additionally limit deployment artifact options, which, to some extent, takes away from the purpose behind microservices design in the first place[15].

The second option with regard to deployment considers Single Service per Host model. Such eliminates issues associated with the monitoring and remediation, allowing to reduce potential points of failure, as in the case of an outage of one service, where such would impact that service solely. That, however, could introduce significant costs related to a number of servers and hosts required.

Lastly, PaaS is a cloud-based model with a higher level of abstraction than Single Service per Host model. PaaS model requires a technology-specific artifact, such as Java's WAR file and automatically provisions, runs and scales those as required. Although such provides with much reduced complexity, it eliminates flexibility associated with the Single Service per Host model.

It was concluded that should the project was fully deployed, it was recommended to apply the Single Service per Host model. Although could prove expensive in the future, it is considered, according to Sam Newman, as the strongest solution for microservice scaling services at present[15].

Moreover, as a part of the deployment, each microservice requires to be "wrapped" in a container, or a virtual machine that allows for an easy deployment of multiple instances of the same microservice, should that was required. Docker and Vagrant were the main options considered for this project. It was decided that Docker would be the most optimal choice, as Imperial College London uses the tool internally, therefore if required, help was available.

Furthermore, the main purpose of the microservices architecture is to ensure that the possible outrages are as isolated as possible, as well as to distribute the workload across multiple resources[14]. Therefore, a Load Balancer and a Domain Name System for IP addressing of particular containers are required as a part of the microservices deployment strategy.

There are, currently, a number of choices for the both, Load Balancer and IP addressing systems. Considered options were, inter alia, Kubernetes, as well as the Ribbon, Eureka and Zuul combination. Kubernetes is a Google's Docker container cluster management system that extends Docker capabilities through the introduction of Load Balancer and NodePort for the IP addressing as one service. Ribbon, Eureka and Zulu, on the other hand, are separate services developed by Netflix, with the Ribbon being used for the load balancing, Eureka for the service discovery and Zuul to apply intelligent routing strategy. Although it is believed that Netflix is a leader in the microservices design and the usage of separate services provides with greater flexibility, for this particular project it was concluded that Kubernetes would be the best option due to a reduced number of tools required.

The deployment stage that was implemented in this project included the Docker imaging through the Docker CENT OS containers and a partial application of Ku-

bernetes. Should a full implementation of Kubernetes was achieved, the last stages would include the introduction of rolling deployment, monitoring and a thorough end-to-end testing. To avoid the costs associated with the chosen Single Host per Service model, there was also a possibility to take an advantage of the Imperial Cloud Service (CSG) system.

5.4 User Interface

5.4.1 Mood Board

As the background research discovered, the largest user group of the web-based charity platforms was considered to be the millenials. The design therefore was mainly directed to this particular age group, aiming to be colorful and light-hearted, which was additionally observed to be missing from existing platforms that were opting in for formal designs. Furthermore, aside from the more formal approach, it was noticed that other platforms often display upsetting photos of those in need. The mood of Charitable aimed to concentrate on the joy of giving, instead of adding the pressure to help the vulnerable. The design of the platform was particularly important to ensure that the platform is as unique as possible.

The choice of the color pallet aimed to include shades of blue, light gray and white. It is believed that such color pallet has calming, trusting and neutral psychological properties, suiting the platform perfectly. The mood board below represents the look and feel that Charitable aimed to achieve. It must be noted that the following is merely a representation of aimed design; it does not contain actual images used in the final design as such.



Figure 5.14: Look and feel that was aimed for Charitable

5.4.2 Logo

The Charitable logo aimed to capture the mood of the platform, ensuring the representation of a playful, yet heart warming nature of Charitable. At first, it was attempted to produce a logo that was more complex, as seen below.



Figure 5.15: Concept design of the Charitable logo

However, after adding such to the platform header, it was discovered that a simple logo would be more readable and would appear more professional[17]. Therefore, the final design featured a simple heart along with the name of the platform.



Figure 5.16: Final design of the Charitable logo

Although to some the logo could appear too simplisitc, according to

5.4.3 Wireframes

A number of wireframes, including Landing Page, Results Page, Charity Micropage, Admin, Login and Registration Pages, were produced prior to the implementation of the design. The purpose behind the creation of wireframes was to ensure that a uniform design could be implemented and no feature was ommitted or unnecessarily designed. These also helped to visualise the platform in the early stages of the project, ensuring all the User Journeys were satisfied. The wireframes were produced using a Wireframe.CC tool[24]. The wireframes for pages such us Terms and Conditions and Email Verification Page were not designed due to their small contents.

Landing Page

The Landing Page wireframe aimed to feature two main elements: Search by Location map and Search by Cause search engine. It was believed that underneath the map and engine a short introduction to the service would be provided. The final design, however, featured short introduction before the search feature, as it was discovered the lack of explanation from the start could prove confusing to users.

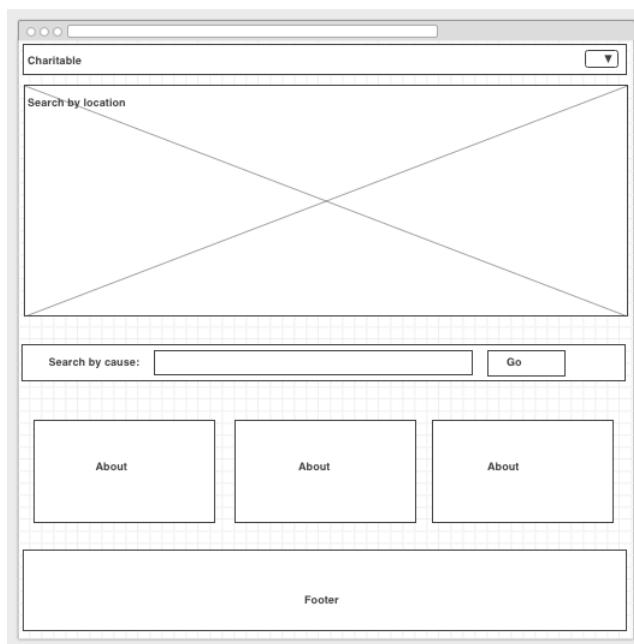


Figure 5.17: Landing Page wireframe

Results Page

The results page wireframe aimed to feature a scrollable set of result cards on the left hand side, with the results filter and a list of relevant featured charities on the right hand side.

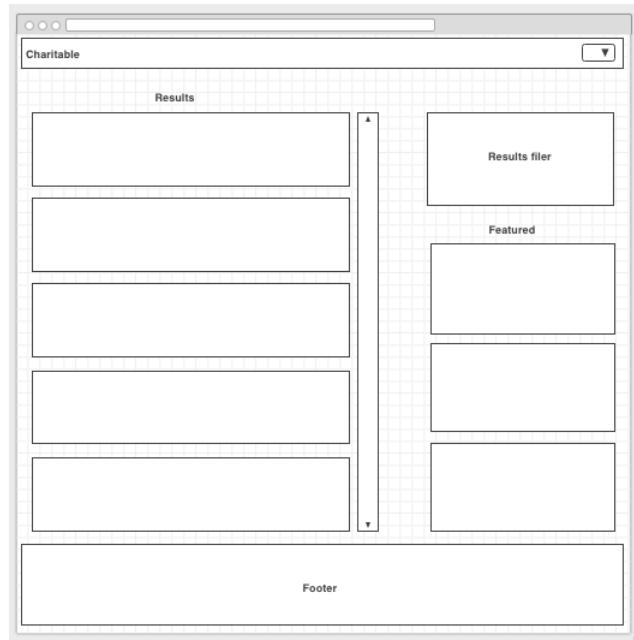


Figure 5.18: Results wireframe

Individual Charity Microage

An individual micropage for each charity will be generated with a custom text. It must be noted that Charitable will provide guidelines on desired content, such as list of causes the chairty supports, as well specific contact details.



Figure 5.19: Individual Charity Micropage wireframe

Donate Page

The Donate page was designed to feature a "Thank you" image with a short message, followed by the registration and login in window and a "Donate anonymously" link. Additionally, a box of similar charities was thought to feature at the bottom.

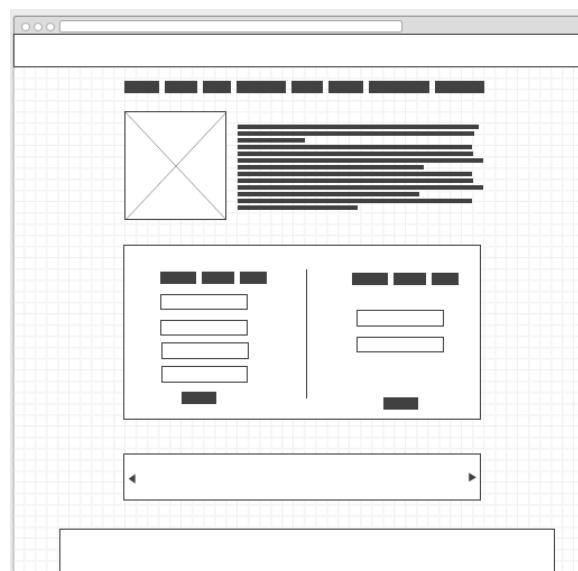


Figure 5.20: Donate wireframe

Login and Registration Pages

The wireframe for the general login pages, including those for Service Admin, Donor and Charity, were designed to be uniform.

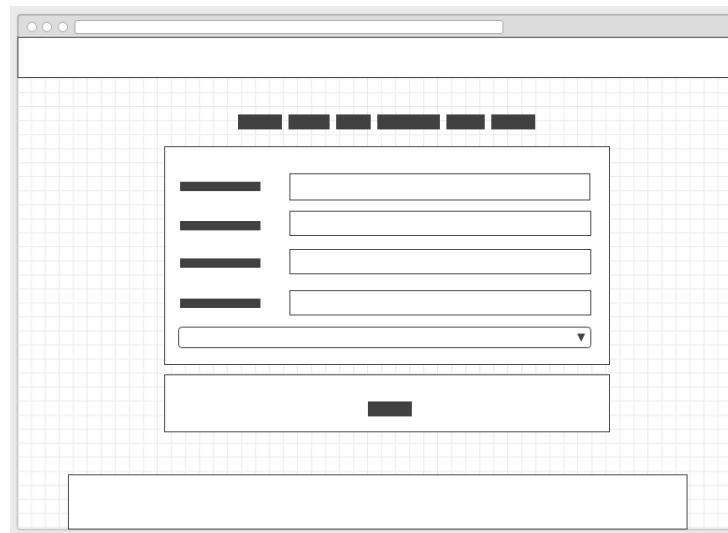


Figure 5.21: Login wireframe

Similarly to login, one registration wireframe was created for the Donor, Charity and Service Admin to ensure the uniform design.

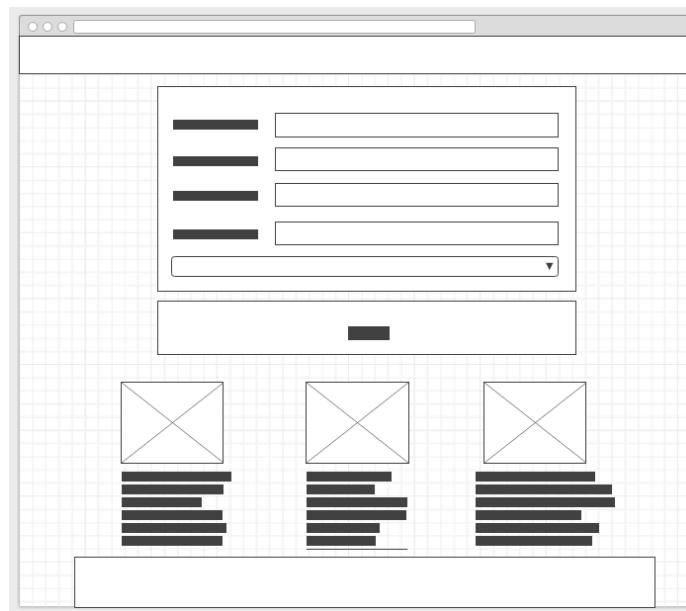


Figure 5.22: Registration wireframe

General Admin Pages

One uniform wireframe was also created for admin pages for all three user groups. It was decided that the admin page would feature a left-side menu and a content page on the right hand-side.



Figure 5.23: Admin Pages wireframe

Service Admin - Dashboard

As far as the Service Admin user group is concerned, the dashboard page was created to feature a summary of activities on Charitable platform, including the number of verified/flagged charities and recently added ones.

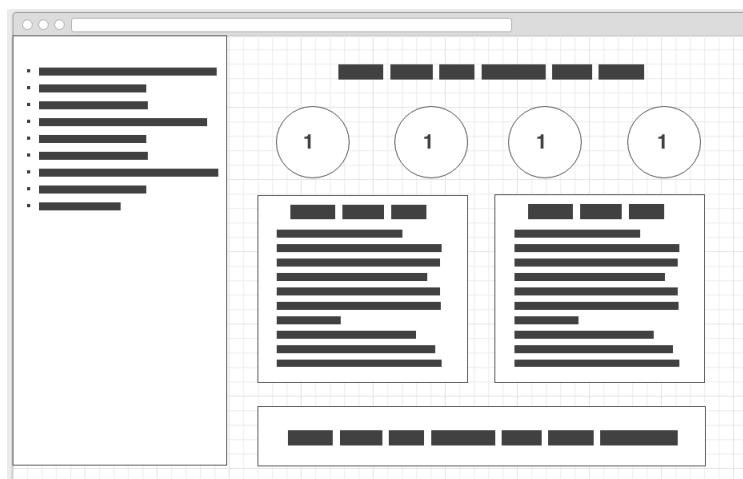


Figure 5.24: Admin Dashboard wireframe

Service Admin - Verification Page

The verification page as such was designed to include the table of all the charities., with the contact details and appropriate actions.



Figure 5.25: Charity Verification wireframe

5.4.4 Artwork

As far as the art used for the project is concerned, several images, including the Landing Page images, were found on the FreePik service - a platform featuring Royalty Free images. These were allowed to be used in any commercial work, as long as the website was given an appropriate credit, which was an ideal scenario should Charitable was to become a commercial project.

To ensure the uniformity of the page, remaining images were transformed to match the style of the main image. For instance, the image below was edited by adding elements from the main Landing Page image to form a Charity Micropage leading image, as depicted by Figures 5.26 and 5.27. It is also important to mention that the images were carefully chosen and edited to represent various backgrounds, cultures and age groups to allow the potential users of the platform to associate with Charitable, as well as promote diversity[11].



Figure 5.26: Results Page

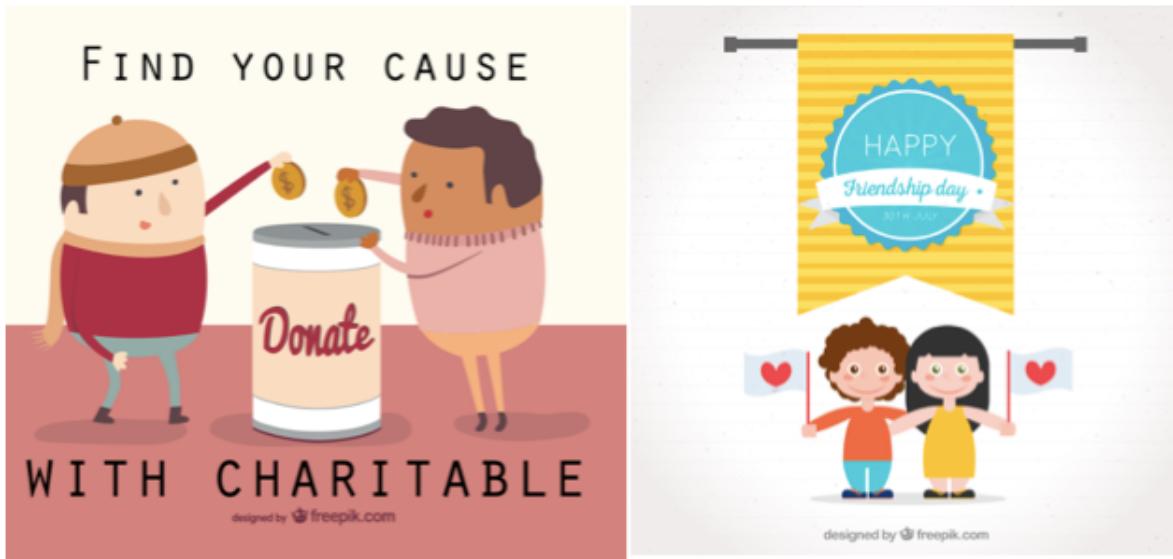


Figure 5.27: Images used for the editing



Figure 5.28: Final image used in the project

5.4.5 Implementation of designs

Implementation of designs as such was decided to be fully responsive, as according to research conducted by Abila[2], the highest number of donors across different age groups prefer to do so using mobile devices. The most suitable option to achieve a fully responsive template in a timely fashion was through the implementation of a responsive CSS framework. The CSS frameworks do not only provide with an option of simplicity regarding the responsiveness, but also those add the consistency across internal tools, as well as provide with the most professional look in the shortest amount of time. There was a number of options considered, including Bootstrap, Semantic UI, Pure and Kube CSS.

It was decided that Bootstrap was the most optimal choice due to its huge popularity. To date, the framework was favored over 90,000 times on Github[25] and was developed by Twitter. The support from a well-known company provides with reliability, stability, thorough documentation and a range of features. Although such huge interest in Bootstrap also means that it is an extremely widely used by developers around the world resulting in a number similarly looking web pages, Bootstrap was mainly used for the purposes of grid layout and main fluid containers, necessary for the use of responsive features. The styling of the containers and other elements as such was additionally applied to override the default look and feel provided by the Bootstrap.



```
.baby-blue {
    background-color: #87CDDE !important;
}

.light-blue{
    background-color: #dfecdc !important;
}

.blue{
    background-color: #dbf0db !important;
    padding-bottom: 0;
    padding-left: 5%;
    padding-right: 5%;
}

.dark-blue {
    background-color: #0066cc !important;
    margin-top: 5%;
}

.white {
    background-color: #ffffff !important;
}

.green {
    background-color: seagreen !important;
}

.pink {
    background-color: #ff9999 !important;
}
```

Figure 5.29: A sample from the custom CSS design

The Globe was implemented using the D3.js library. D3.js is a JavaScript library for producing dynamic, interactive data visualizations in web browsers³. The central principle behind the D3.js is to provide with the f a CSS-style selector to select a given set of Document Object Model (DOM) nodes, then use similar operators to jQuery to manipulate the created content. Once that was achieved, the Geo Projection feature was implemented to present countries data in a form of a spinning, interactive globe.

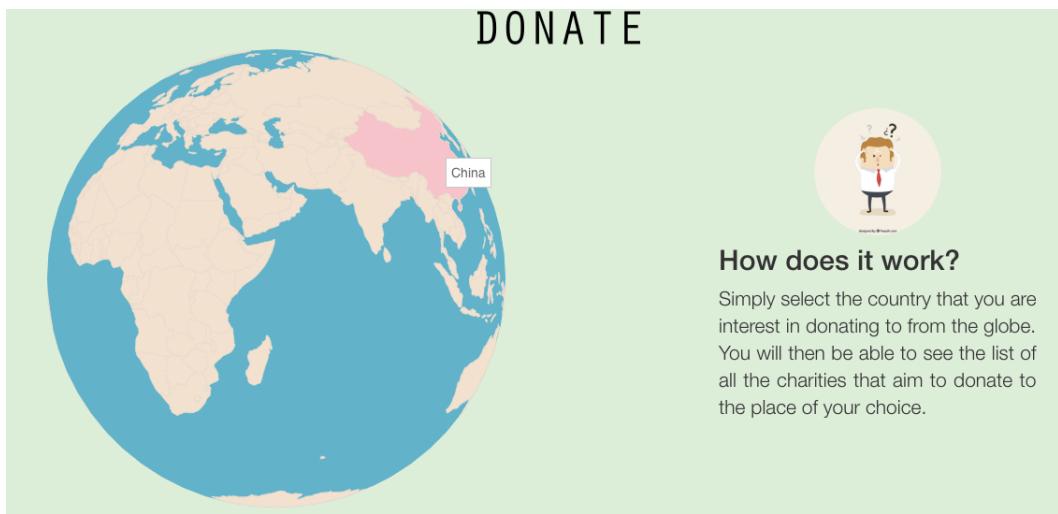


Figure 5.30: Globe design

The images 5.31 and 5.32 present the sample implementation of Bootstrap base with own designs.

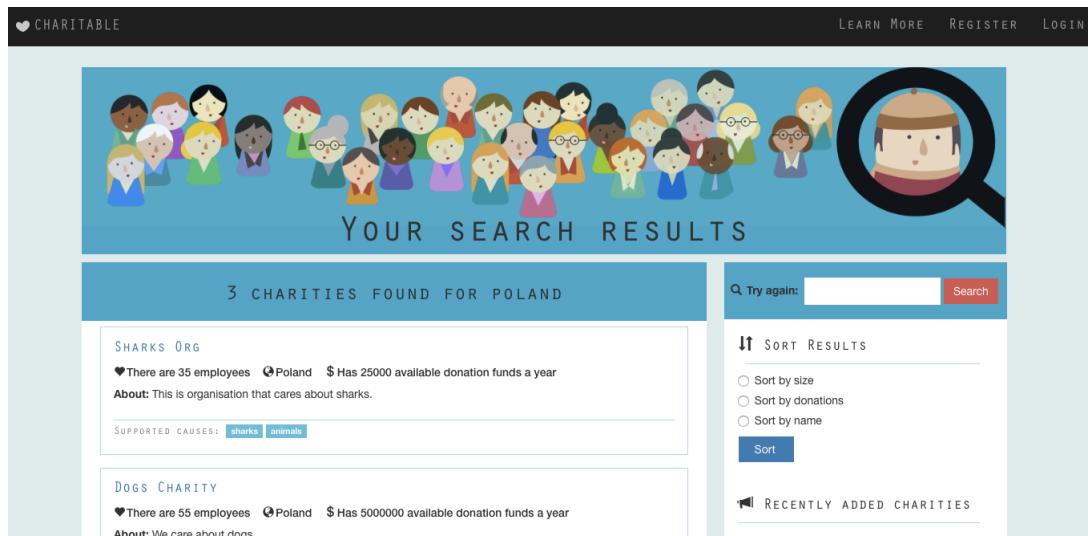


Figure 5.31: Search Page design

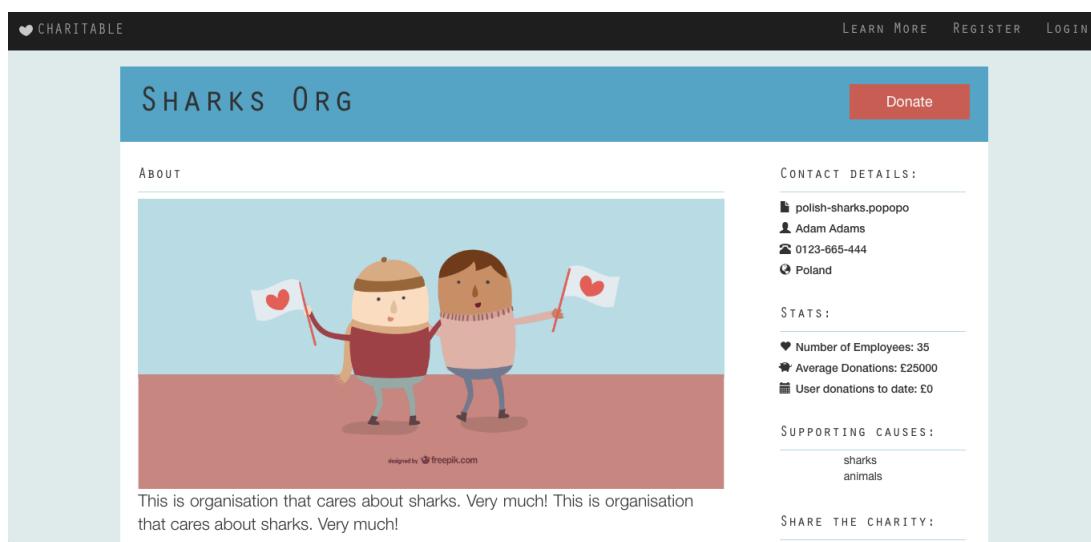


Figure 5.32: Charity individual page design

Chapter 6

Evaluations

The purpose of this chapter is to evaluate certain choices relating to the development of the platform. More specifically, the architectural design, the templating, database and globe design are critically analysed in this chapter, along with the presentation of testing results.

6.1 Architectural Design and Deployment

Although each individual microservice was designed to be simple and consisting of a specific task, such an architecture was written based on an enterprise product. Therefore, the chosen design, although initially perceived as feasible in the given time frame, was concluded as a particularly complex one due to the number of microservices involved. None of the required tools and frameworks needed for the development of microservices were used by the researcher in the past, therefore the lack of relevant knowledge on the processes significantly slowed down the development of the product. Moreover, as the purpose of this project was to create a proof-of-concept platform, one could argue that perhaps a better solution was to implement a simpler monolithic architecture to achieve more features for the platform and re-consider the microservice structure at a later date.

6.2 Templating

One of the biggest difficulties that significantly slowed down the development process was the choice of the template engine. After some research, it was concluded that natural template engine would suit the project best, with a specific choice of Thymeleaf. Due to its excellent integration with Spring MVC and a number of good reviews, it was decided that Thymeleaf would be a perfect engine to incorporate into project. Although syntax was extremely fast to learn and implementation of simple logic could not have been easier, it was quickly discovered that Thymeleaf severely lacks flexibility that was needed for the project.

Such introduced a number of unnecessary bugs that were difficult and time-consuming to resolve. Moreover, logic that should be resolved in the back-end often ended up

```

<div><!--Header content container-->
    <h6 class="orator-header text-center">Your search results</h6>
</div><!--Header content container-->
<!--Left column grid-->
<div class="col-sm-8 white" style="margin: 0; padding: 0">
    <div class="white">
        <!--Results box grammar-->
        <div class="blue2" style="margin: 0; padding: 1%">
            <div th:if="${numberOfResults} eq 0">
                <h3 class="text-center orator-header-medium"> No charities found for
                    <td th:text="${searchQuery}"></td>!
                </h3>
            </div>
            <div th:if="${numberOfResults} eq 1">
                <h3 class="text-center orator-header-medium">
                    <td th:text="${numberOfResults}"></td> charity found for <td th:text="${searchQuery}"></td>
                </h3>
            </div>
            <div th:if="${numberOfResults} gt 1">
                <h3 class="text-center orator-header-medium">
                    <td th:text="${numberOfResults}"></td> charities found for <td th:text="${searchQuery}"></td>
                </h3>
            </div>
        </div><!--end results box grammar-->
    </div>
</div>

```

Figure 6.1: Example of simple logic incorporated into Thymeleaf to display correct grammar depending on number of results

featured in Thymeleaf, which introduced difficulty regarding future maintenance of the platform and unnecessary confusion.

The biggest issue regarding the Thymeleaf was relating the form handling process. As a default, all the requests that are handled by the form in Thymeleaf are of type GET, and on several occasions if the type was explicitly changed to POST or PUT, it was not recognised in Thymeleaf, unless the in-line AJAX (asynchronous JavaScript and XML) requests were implemented instead. Interestingly, on some occasions, such as the Note taking feature, Thymeleaf did not pose any form handling issues. Although thoroughly investigated, with help requested on both Thymeleaf forum and StackOverflow forum, it was not clear why such was the case.

Another issue regarding the choice of Thymeleaf as a templating platform was concerning serving of the pages as such. It was discovered that any project using Thymeleaf templates could not serve static pages with any other URL than the full name of the file. Therefore, a large proportion of the platform includes URLs that are not modified in any way. For instance, the “*/update-charity.html URL was intended to equal as “*/add, however such was simply ignored by the Thymeleaf. After several days of research and enquires on Thymeleaf, Spring and StackOverflow forums it was concluded that it was not possible to add any settings to enable such behavior.

Therefore, in order to serve static pages with custom URLs alongside Thymeleaf generated views, a separate microservice without Thymeleaf would have to be developed, which did not seem either practical or necessary.

In retrospective, the best choice of the template generator would have included a client-side template, for instance Angular.js. As Angular.js was used for the User Login microservice, it illustrated how seamless the experience would have been overall

```

package com.charitable.charity.crud.controller;

import org.springframework.stereotype.Controller;
import org.springframework.web.bind.annotation.RequestMapping;

@Controller
public class StaticController {

    @RequestMapping("/add")
    public String addCharity() {
        return "add-charity.html";
    }

    @RequestMapping("/terms-and-conditions")
    public String displayTerms() {
        return "terms.html";
    }

    @RequestMapping("/editNotes")
    public String displayNotes() {
        return "update-notes.html";
    }

}

```

Figure 6.2: Part of the attempted Static Controller to serve static pages

regarding the development of the project as such. Although regarded as a perfect one-page app engine, it can also work extremely well as a multi-page app, eliminating lack of flexibility introduced by Thymeleaf. Initial fears of client-side template engine now, appears to unjustified comparing it to the issues encountered during the development process.

6.3 Database

Although MongoDb is currently one of the most popular choices for microservice architecture, as it provides with seamless concurrent activities and its ease of integration with various programming languages[22], it is concluded that the choice of MongoDb as the main database for this project was not the most suitable one.

Firstly, the schema-less design kept all the data disorganised and, in some instances, repeated.

Secondly, it became apparent that providing relevant relations for the purpose of the quick querying and ease of data analysis was the better option, as opposed to querying methods provided by MongoDb. The querying as such was not as sophisticated as expected.

Moreover, certain operations available in the SQL-based databases, such as the MIN()

```
{
  id: "57a729bc300474b7c0dcb558",
  charityName: null,
  charityWebsiteName: null,
  charityContactName: null,
  charityTel: null,
  charityEmail: null,
  registrationNumber: null,
  charityAddress: null,
  charityShortDescription: null,
  charityDescription: null,
  employeesNo: 0,
  averageDonations: 0,
  categoryList: null,
  username: null,
  password: null,
  verified: false,
  verifiedEmail: false,
  verifiedData: false,
  token: null,
  notes: null
},
```

Figure 6.3: Charity document design

function that returns the smallest value of the selected column, or SQL AVG() function providing with the average value of a numeric column, were not available in MongoDb. In particular, when experimenting with the featured charities option that required randomised results, it was necessary to manipulate the data using Java libraries instead. Although one could argue it was not the most complex request, the lack of certain functions introduced unnecessary research.

6.4 Globe Design

Although the interactive globe was one of the stand-out features of the platform, the implementation of such was not very practical. Firstly, the globe required a “zoom-in” option, as certain countries appeared too small on the screen. The “zoom-in” can be implemented in D3.js through the right click, however, due to the on click action needed for searching purposes, such was not possible to implement. After searching for an alternative to the right click, no other possible options were found. Furthermore, should such was indeed present, each country would require a CSV list of cities, along with translation of these into a svg image for border purposes. Providing with such data for each country would not only be extremely time-consuming, but also would significantly increase the space required for the overall project.

Moreover, it was not possible to implement a solution to the scenario in which no charities were featuring in a particular country. As charities sign up to the platform as opposed to having a charity base from the start, a number of selectable countries at

first would be limited. Therefore, user experience could be undermined significantly, if the user had a number of no results upon clicking on the globe in row. It was initially thought to grey-out the countries that did not at that particular moment feature any charities, however, it was soon discovered that such would pose huge difficulties, as either a connection with the database in the front end would have to be created, or a search page crawler would need to be developed to check a number of results beforehand. As far as the database connection is concerned, a Mongoose - a MongoDB tool designed to work in an asynchronous environment - would be required, however such was regarded as not necessary for the proof-of-concept project.

6.5 Testing

6.5.1 System Testing

As far as the system testing is concerned, two main sets of tests were conducted: the Database Connection tests and the Charity Verifier. As the majority of the platform was based on Mongo Documents and querying of the database, it was crucial to ensure that such was created, set up and queried properly. Secondly, for the Charity Verifier, a sample group of charities was created - those that matched the charity registration details with the charity registry, and those that did not. Such an approach ensured the correct application of the service and allowed to discover issues relating to the querying order of relevant models.

Secondly, the entire REST API system was additionally tested using Postman - a Chrome extension providing with a range of features designed specifically to test RESTful APIs. Some of the features included definition of collection of requests, a simple way of adding and modifying headers and parameters and a history functionality that allowed to view the previous results and specific JSON documents.

Using Postman has not only provided with a great range of features, but it has also eliminated the need of the mock server such us WireMock, which has helped to reduce testing time significantly.

Moreover, the system was thoroughly tested manually throughout the entire development process of the platform. Such an approach allowed to discover issues concerning the User Interface. For instance, the Note Service, although with the back end working correctly, was displaying the same note for every table entry due to incorrect naming of the table container.

As the product was not deployed, the integration testing was not possible to implement. However, the local setting was tested using the aforementioned Postman.

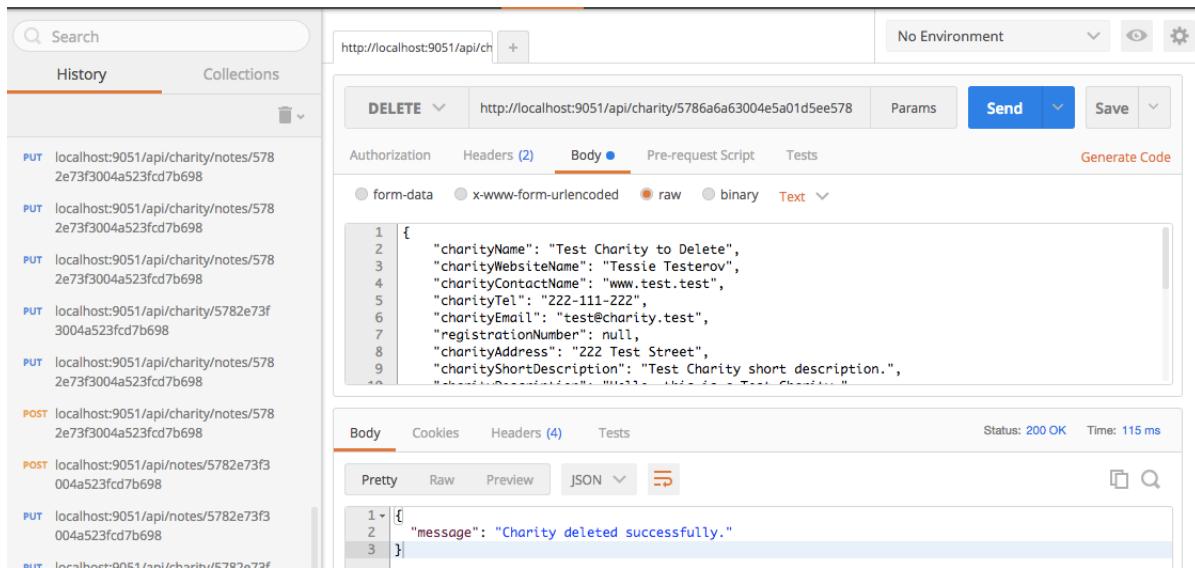


Figure 6.4: Sample POSTMAN RESTful API testing

6.5.2 User Testing

A brief User Testing was conducted to gather an independent opinion on the created product. The User Testing consisted of presentation of scenarios developed as part of the User Journey to 4 individuals.

Methodology

The conducted User Testing consisted of presentation of Donor scenarios developed as part of the User Journey to 4 individuals. The specific tested scenarios included:

- Testing the basic Donor Journey searching for Polish charities;
- Testing the basic Donor Journey searching for the charities supporting shark causes;
- Viewing the individual charity page;
- Viewing information on the platform as such;
- Logging in with Facebook.

As the final product was not deployed, one individual was invited to test the product directly and three - by providing with an access to the researcher's computer using the TeamViewer software.

Sample

Four individuals, an 18-year old male, a 42-year old female, a 31 year old male and a 23 year old female, were invited to participate in the user testing. The age difference was chosen specifically to ensure that the design of the artwork was appealing to various age groups. However, it must be noted that a greater variety and a larger sample would need to take part in the testing in the future to ensure such an aim could be achieved.

Results

The most memorable feedback received from the user testing was the following reaction by the 18 year old male after the basic charity search was conducted:

"Wow. Can we search again?"

Such a response was the most desirable one, indicating that the product could indeed be the one the users would return to. During the observation of male's interaction it appeared that the search was intuitive and easy to use. No questions were asked with regard to the search process as such. However, the 42 year old female, although initially displaying strong emotions of approval of the globe search, inquired about zoom capabilities. As such is not currently supported, she expressed that she would prefer to see feature in order to achieve more specific results.

Moreover, a 23 year old female stated the following about the searching journey for the charities in UK, with an option to view the charity micropage:

"I love that this can be done from anywhere around the globe. When can I sign up? Is it possible yet? I love the idea because there were so many UK charities that I saw when I studied here and I wanted to keep supporting them, but I couldn't since I am in Cyprus."

Such an excellent feedback yet again shows that Charitable could be a greatly received platform, should it was introduced on wider scale.

The table 6.1 presents with the summary of responses. However, it must be mentioned that tested scenarios were very limited and more user testing would be highly necessary. Furthermore, it was not possible to implement changes suggested by the users due to time constrains and a late request for the feedback as such, therefore application of the suggestions would be a next step in the development of the platform per se.

Table 6.1: User Testing summary

JOURNEY	GENERAL FEEDBACK
Searching for the charity in Poland through the globe option	- Majority "impressed" with the globe - Possible improvements: drop-down option for countries or zoom in
Searching for the charity supporting sharks	- Purple search container seems to be too bright on the landing page - Majority preferred to use the globe
Viewing of the shark charity page	- Footer seemed to be too long for the page - Art seemed suitable to the content - Donate button was clearly visible
Viewing of the "About Charitable" section	- Satisfied with the journey. - Informative and inspiring content, although would prefer more information on the platform.
Viewing of the donor page	- Informative text
Viewing of the donor login	- Art does not appear as appealing as the rest of the content

Chapter 7

Conclusions and Recommendations

This work illustrated the journey taken to research, develop and test Charitable - a proof-of-concept product in a form of a web app. The product aimed to provide the non-profit organisations around the world with an option to list themselves in an online platform. The intent behind such was to present the smaller charities with an exposure to potential donors. Moreover, as it was found that a large amount of funding is given solely to either larger organisations, or those organisations with the strongest marketing, the introduction of such product was thought to provide the potential donors with the greater choice.

7.1 Achievements

Main achievements in this work included an attempt to answer the following questions:

- Is it possible to design a platform for charities around the world to be part of?
- Is it possible to promote smaller charities in an ethical way?
- Is it possible to gain interest of charities to join the platform as such?

As far as the first question is concerned, this project illustrated that it is indeed possible to design a platform for the charities around the world to be part of. A number of services allowing to, *inter alia*, create charity profiles and search through them demonstrated that from the technical standpoint (excluding additional complexity introduced by the chosen architectural design) these were not problematic to achieve. However, as the unfinished status of the work further depicts, the worldwide release of the product would require a large amount of research into each potential country prior to the release of the platform. Although a unique verification system was developed, at present it would fully apply to United Kingdom solely. The system would also be relevant to other countries including Australia, that provide with an access to the downloadable Charity Registry data. In any other instance, a manual verification would be necessary, therefore such a solution could prove to be too time-consuming to consider as a reliable form of verification on a global scale.

Secondly, an issue of the promotion of smaller charities in an ethical way was resolved through an introduction of the Featured box. Although several options were considered, including presentation of the results in the ascending order of received donations or the size of the charity as such, it was decided that a thin line between promotion of charities and restriction of choice for donors would be crossed. Therefore, the most optimal solution appeared to be a development of a separate box containing randomly generated charities from the “poorest and smallest” pool.

The last question concerning the willingness of charities to sign up to the platform was addressed through an empirical research. As the research outcome illustrated, the interviewed charity appeared very enthusiastic about the product. However, unlike in the case of the potential donors survey, there was a genuine lack of response to the invitation to the interview from the non-profit organisations. That could possibly suggest that a detailed marketing strategy would need to be developed to attract the potential charities.

7.2 Essential Future Work

There are number of improvements that this platform would require. Firstly, it would be essential to fully deploy Charitable to obtain a more specific user feedback within a greater sample to ensure that the experience of interacting with the developed product to date was as intended. After relevant fixes based on the received feedback would be implemented, the next step would include further development of the platform to provide with the Donation Service as such. The project was concerned mainly with the general feasibility of the product as such, therefore no in-depth research was conducted in this area. Moreover, the specific fixes concerning the security of the platform would need to be applied to ensure that the user data from each of the user groups was as secure as possible. The Gateway API would also be required to limit exposed endpoints, which is currently the case with the Landing Page acting as one. Also, an improvement relating to the charity search as such should be applied in the form of implementation of the ElasticSearch. Such would ensure that more advance queries could be resolved, resulting in a much better user experience.

Lastly, a more sophisticated tagging feature would need to be implemented to greatly enhance the usability of the platform. Such would include the creation of clickable tags that would enable the user to search through various categories. Moreover, that would also provide with existing tag suggestions for the charities so that no multiple tags are created for the same causes due to spelling mistakes or noun forms.

7.3 Recommendations

In addition to essential features, a number of issues that arose during the research and development phase could be researched further to enhance the product.

Firstly, a thorough market research amongst larger sample is highly recommended. Such could bring to light issues concerning the feasibility of the product in its present form and suggest more possible features to include as a part of the. Moreover, a number of potential opportunities could lie in the way donations are collected as such. One respondent of the donor survey stated that they do not usually donate money, but prefer to donate the goods. An interesting area to possibly explore further could include potential donors supplying certain goods, including dry foods or furniture and clothes directly to charities in question. The platform could potentially help with the delivery bookings. Such a solution could prove to be a novel one and could gain a number of potential donors who are not convinced that the donations they grant are being used for advertised causes.

Lastly, a Suggested Charities feature could be the next possible topic to research further. The feature could possibly apply a machine learning algorithm to list potential charities a returning user could possibly visit.

It must be noted, however, that listed recommendations are only one of the many that could possibly introduce a new way of raising charity awareness.

7.4 Final Conclusions

This work presented with a journey taken to research and develop the “Linking Charities Worldwide” project.

Chapter One aimed to introduce the project and its goals and contributions.

Chapter Two - the Background - provided with an overview of the current market and products. More specifically, it discussed available fundraising methods, that included street fundraising, general advertisement and social media campaigns. It concluded that a number of smaller charities were unable to compete for donations due to lack of sufficient funds and, as a result, were unfit to raise adequate awareness of supported causes. Through an analysis of existing research, the chapter furthermore introduced a possible solution in a form of web app - the Charitable platform and highlighted major differences between other platforms for charitable causes. .

Chapter Three - The Market Research - presented the results of the conducted empirical research to understand whether the platform would be indeed used by either potential donors, or the charities per se. The quantitative research illustrated that there would indeed be interest in the product and provided an insight into the features that participants responded positively to. The qualitative research, on the other hand illustrated that although enthusiastic upon learning more about the platform, charities were difficult to approach, therefore the conclusions gathered from the findings suggested an allocation of additional time slots in the future to investigate the lack of approachability further, which could have an impact on the platform per se.

Chapter Four - The User Journey - applied all the gathered research to create three

user groups - Donor, Charity and Admin in order to write relevant possible scenarios using the 5Es technique. Moreover, it presented with the developed potential list of touchpoints per each user group that proved helpful in understanding of the requirements needed to develop the platform.

Chapter Five - System Design and Implementation - presented with chosen architectural design, being microservices and describing each of the services and components developed as a part of the platform. It furthermore discussed charity verification process in greater detail as a part of the Verifier Service, along with the Featured Service concerning the issues relating to promotion of smaller charity as such, illustrating that the two were the major difficulties faced in this project. Charity verification, needed to prevent dishonest activities, was thought to be a particularly challenging one due to varying registration processes across the world, preventing a uniform application of the Verifier service. The Featured service, on the other hand, introduced sorting as opposed to page ranking to reduce unethical and subjective ranking of the results. Lastly, this chapter provided with design and implementation stages of the Charitable's front end.

Chapter Six - Evaluations - critically analysed certain approaches applied to the development of the project, such us the adopted technique, used template system and the database. It argued that should there was a possibility to re-develop the platform, alternative approaches would be applied to avoid a number of unnecessary issues associated with the chosen technique. It furthermore presented with the user testing results that provided with an insight into experiences associated with the usage of the platform as such.

Bibliography

- [1] Tech, N. and Good (2015) 20 must-know fundraising and social media stats. Available at: <http://www.nptechforgood.com/2015/09/16/20-must-know-fundraising-and-social-media-stats/>. [Accessed: 25 May 2016]. pages 1, 6
- [2] Abila Donor Engagement Study (2015). Available at: [urlhttp://www.abila.com/wp-content/uploads/2015/12/Abila-Donor-Engagement-Study.pdf](http://www.abila.com/wp-content/uploads/2015/12/Abila-Donor-Engagement-Study.pdf) [Accessed: 18 May 2016]. pages 1, 8, 52
- [3] Charity Campaigns (2015). Available at: <https://www.theguardian.com/voluntary-sector-network/2015/apr/14/viral-campaigns-like-ice-bucket-challenge-hurt-other-charities> [Accessed: 1 September 2016]. pages 4, 6
- [4] How Charities get donations (2009). <https://www.theguardian.com/society/gallery/2009/feb/16/charity-finance> pages 6, 8, 9
- [5] Are more charities closing? (2015). Available at: <http://blogs.ncvo.org.uk/2015/08/19/are-more-charities-closing/> [Accessed: 1 June 2016]. pages 1
- [6] Fundraising Effectiveness Survey Report (2016). Available at: <http://www.afpnet.org/files/ContentDocuments/FEP2016FinalReport.pdf>. [Accessed: 13 July 2016]. pages 6, 8, 9
- [7] Charities aid foundation (CAF) - charity giving made simple (2016) Available at: <https://www.cafonline.org/>. [Accessed: 27 May 2016]. pages 9
- [8] Recent charity register statistics: Charity Commission (2014) Available at: <https://www.gov.uk/government/publications/charity-register-statistics/recent-charity-register-statistics-charity-commission>. [Accessed: 19 May 2016]. pages
- [9] Green, C. (2014) There are too many charities doing the same work, claims charity commission chief executive. Available at: <http://www.independent.co.uk/news/uk/home-news/there-are-too-many-charities-doing-the-same-work-claims-charity-commission.html>. [Accessed: 3 June 2016]. pages 6

- [10] Bulscara, C. Using a Mixed Methods Approach to Enhance Your Research (2003), Available at: https://www.nd.edu.au/downloads/research/ihrr/using_mixed_methods_approach_to_enhance_and_validate_your_research.pdf [Accessed: 29 August 2016]. pages 11
- [11] Allen, J. and Chudley, J., 2012. Smashing UX design: Foundations for designing online user experiences (Vol. 34). John Wiley Sons. pages 20, 51
- [12] Van Lamsweerde, A. and Letier, E., 2004. From object orientation to goal orientation: A paradigm shift for requirements engineering. In Radical Innovations of Software and Systems Engineering in the Future. (pp. 325-340). Springer Berlin Heidelberg. pages 24
- [13] Alonso, G., Casati, F., Kuno, H. and Machiraju, V., 2004. Web services (pp. 123-149). Springer Berlin Heidelberg. pages 27
- [14] Newman, S., 2015. Building Microservices. " O'Reilly Media, Inc.". pages 27, 28, 44
- [15] Villamizar, M., Garces, O., Castro, H., Verano, M., Salamanca, L., Casallas, R. and Gil, S., 2015, September. Evaluating the monolithic and the microservice architecture pattern to deploy web applications in the cloud. In Computing Colombian Conference (10CCC), 2015 10th (pp. 583-590). IEEE. pages 28, 44
- [16] White, O. (2015) Top 4 java web Frameworks revealed: Real life usage data of spring MVC, Vaadin, GWT and JSF.[ONLINE] Available at: <http://zeroturnaround.com/rebellabs/top-4-java-web-frameworks-revealed-real-life-usage-data-of-spring-mvc-vaadin-gwt-and-jsf/>. [Accessed 5 August 16]. pages 33
- [17] Hardy, G., 2011. *Smashing Logo Design: The Art of Creating Visual Identities* (Vol. 24). John Wiley & Sons. pages 46
- [18] No 1 Position in Google Gets 33 of Search Traffic (2016). Available at: <https://searchenginewatch.com/sew/study/2276184/no-1-position-in-google-gets-33-of-search-traffic-study> [Accessed: 21 August 2016]. pages 40
- [19] Google (20Archive of Fun Facts. Available at: <https://web.archive.org/web/20130702063520/http://www.google.com/competition/howgooglesearchworks.html> [Accessed: 21 August 2016]. pages 41
- [20] Barry, D.K. (2000) Semantic vocabularies. Available at: <http://www.service-architecture.com/articles/web-service>. [Accessed: 5 June 2016]. pages 33
- [21] RESTful web services: The basics (2015). Available at: <http://www.ibm.com/developerworks/library/ws-restful/> [Accessed: 3 June 2016]. pages 33

- [22] MongoDB (2014) Perform Two phase commits MongoDB manual 3.2. Available at: <https://docs.mongodb.com/manual/tutorial/perform-two-phase-commits/>. [Accessed: 27 May 2016]. pages 43, 58
- [23] Relational databases vs. NoSQL document databases (2015). Available at: <https://lennilobel.wordpress.com/2015/06/01/relational-databases-vs-nosql-document-databases/>. [Accessed: 29 June 2016]. pages 43
- [24] Wireframe (2016) Minimal wireframing tool. Available at: <https://wireframe.cc>. [Accessed: 7 June 2016]. pages 46
- [25] Otto, Mark (17 January 2012). Building Twitter Bootstrap Mark Otto. pages 53
- [26] Hardeep, S., 2013, Designing, Engineering, and Analyzing Reliable and Efficient Software. pages
- [27] 2016, F.S.S. (2016) Zen and the art of developing a good software process - flexible software solutions. Available at: <http://www.flexss.co.uk/zen-and-the-art-of-developing-a-good-software-process/>. [Accessed: 13 June 2016]. pages
- [28] Creating Personas (2016). Available at: <http://www.uxbooth.com/articles/creating-personas/>. [Accessed: 7 July 2016]. pages

Appendix A

API Endpoints Table

GENERAL ENDPOINTS:	DESCRIPTION:
http://localhost:9050	TEMPLATE; Landing page
http://localhost:9051/search?query={searchquery}&sort={sortingChoice}	TEMPLATE; Results Page, including search query and sort type(optional)
http://localhost:9051/view-charity/{charityId}	TEMPLATE; individual charity micropage.
http://localhost:9051/terms.html	TEMPLATE; Terms and Conditions Page
http://localhost:9051/add-charity.html	TEMPLATE; register charity page
http://localhost:9051/admin-login.html	TEMPLATE; consuming login API
http://localhost:9051/charity-login.html	TEMPLATE; consuming charity login API
http://localhost:9051/upadate-charity.html	TEMPLATE; consuming charity edit API
CHARITY SERVICE ENDPOINTS:	DESCRIPTION:
http://localhost:9051/api/charity	POST – create charity.
http://localhost:9051/api/charity/{charityid}	GET – view specific charity of a given charity id
http://localhost:9051/api/charity/{charityid}	PUT – edit specific charity of a given charity id
http://localhost:9051/api/charity/{charityid}	DELETE – delete a charity of a given charity id.
http://localhost:9051/api/charity/all	GET a list of all charities
http://localhost:9051/admin/login	POST – post login request details to get a login token
http://localhost:9051/admin/main/{id}	PUT – edit charity details of a specific charity
http://localhost:9051/admin/main/{id}	TEMPLATE; dashboard for an admin page of a particular charity id.
http://localhost:9051/admin/preview/{id}	TEMPLATE; preview a changes made to a charity of a specific id
SERVICE ADMIN ENDPOINTS:	DESCRIPTION:
http://localhost:9051/general/	POST – create an admin

http://localhost:9051/general/{username}	GET – get admin by username
http://localhost:9051/general/{username}	PUT – edit existing admin details
http://localhost:9051/general/all	GET – view all admins
http://localhost:9051/general/login	POST – post login details
http://localhost:9051/general/account	TEMPLATE; returns either service dashboard or “unauthorized” view
http://localhost:9051/general/account/findNotVerified	TEMPLATE – returns a list of unverified charities with the rejection reason
http://localhost:9051/general/account/findAll	TEMPLATE – returns a list of all charities with status
CHARITY ENDPOINTS:	DESCRIPTION:
http://localhost:9051/api/charity	POST – create charity.
http://localhost:9051/api/charity/{charityid}	GET – view specific charity of a given charity id
http://localhost:9051/api/charity/{charityid}	PUT – edit specific charity of a given charity id
http://localhost:9051/api/charity/{charityid}	DELETE – delete a charity of a given charity id.
http://localhost:9051/api/charity/all	GET a list of all charities
NOTE SERVICE ENDPOINTS:	DESCRIPTION:
http://localhost:9051/api/charity/notes/{charityid}	PUT – edit a note of a specific charity
http://localhost:9051/api/note	POST – create a note
http://localhost:9051/api/note/{id}	GET – view a note of a specific id
http://localhost:9051/api/note/all	GET - View all notes
http://localhost:9051/update-notes.html	TEMPLATE; consuming note edit API
TOKEN SERVICE ENDPOINTS:	DESCRIPTION:
http://localhost:9051/authenticate/{token}	GET – view token. TEMPLATE; serve “Authenticated” or “Rejected” views.

USER SERVICE ENDPOINTS:	DESCRIPTION:
http://localhost:9052/authenticate/{token}	GET – view token. TEMPLATE; serve “Authenticated” or “Rejected” views
http://localhost:9052/	TEMPLATE; serve AngularJS views of login and log out
PREVIEW END POINTS:	DESCRIPTION:
http://localhost:9051/admin/preview? charityName={charityName} &charityRegNumber={charityRegNumber} &charityContactName={charityContactName} &charityTel={charityTel} &charityAddress={charityAddress} &charityWebsiteName={charityWebsiteName} &email={email} &employeesNo={employeesNo} &averageDonations={averageDonations} &charityShortDescription={charityShortDescription} &charityDescription={charityDescription} &categoryList={categoryList}	GET; Consuming the update profile API of specified parameters.