

Progress Report

ITRW 324



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# Section A

# Project proposal

# **Introduction**

## **Background**

According to (Trivago 2018), people often pay various prices for the same service, depending on the kind of companies which cater for such services, hence the aim of Trivago is to compare such companies in an attempt to help the user find the best service recommendation according to affordability, rating and time . In like manner, people experience such difficulties in the bus industry in terms of ticket booking, which is where our mobile application comes in.

## **Problem description**

The problem at hand is that there are different prices for the same bus going to the same destination and bus users have to travel to different bus companies to book their tickets without knowing other available options. Some people who have a disability require specific busses and with the current system it is hard for them to find their needs. Moreover, when travelling people have specific preferences and needs. This brings to light the question: which bus company offers the best service to accommodate each passengers specific needs. This is a nationwide problem for people who rely on bus services to take them across the country. People need a simple solution to aid them in finding a bus service that offers the best service according to their needs and preferences.

## **Define the Scope**

### **- Possible solution**

Different passengers have different preferences when travelling, so they search for a bus ticket based on their preferences. Some base their choice solely on the price of the ticket, so they chose the cheapest available they come across without considering the ratings, distance as well as the time. The application can calculate the routes distance itself by checking the type of routes the buses are taking and calculating how long it will take for them to get there based on what city the customer wants to go to. The application has a filter that shows the customer if the bus accommodates disabled passengers. At the moment passengers have to enquire about their preferences individually and a single preference at a time. The proposed project is to compare travel offers from different travelling companies and display results subject to the passenger’s preference: subject to price, time, distance, disabilities facilities on buses, as well as ratings . Thereafter the passenger can choose the best offer from different companies that suits their travelling needs and receive all the information from the company as well as the route and the bus they selected. Moreover, this will be a convenient solution as it compares all these preferences for the user, saving them time and money and accessible at any time and place as it is a mobile application.

## **Techniques**

Based on (Dusted Codes 2015), there are various techniques that can be used in an effort to attempt to implement the solution, namely, Scrum, Kanban, Waterfall and Scrumban. However, the best technique to use for the solution is the Scrum technique as this is a Agile it is best suitable when there are many changes expected to be made. It is divided into four phases :

* The To-do Phase
* The in-Progress Phase
* The Completed Phase
* The Review Phase

The To-do phase is where all the tasks and sub tasks are added that need to be done in the development of the application solution. When the tasks in the To-do phase are started with ,they are then moved to the in-progress phase.The in-progress phase will be the guide to the group as to what tasks are being done at this time.The third phase which is the completed phase has all the completed tasks of the project , The review phase is where the scrum master and the group leader review the work that has been completed by the group if changes are needed then the scrum master will communicate with the group leader and corrections will be made in the next sprint.

## **Target Market**

Initially the application is targeted for regular bus users. Nevertheless, it is an ideal application for any travelling person that wants the best deal available at an affordable price. Furthermore, it will be a very useful application for tourists, people who do not have vehicles and people that have needs to travel long distance trips, for instance students that study at universities provinces away from their origin province.

## **Gain**

Throughout this project all group members are to gain different skills and experiences from developing the application and website. First and foremost all members will be dealing with mobile development which includes Ionic Framework as well as AWS EC2 and route 53 and APKs and SDKs refer to the technologies in the project section for details below, this on its own already is a new experience. Furthermore, usage of cloud hosting which includes AWS such as Amazon Aurora servers and database tools will be used and this will enhance the members knowledge on cloud computing. Most importantly as this is a group project, members will explore how well they work with other people, improve their communication skills and identify what their weaknesses are when working in a group.

Roles

# Technologies in the Project

The mobile application will make use of different softwares and technologies which include Java language and frameworks,API,Amazon web services(AWS Aurora), services Google maps API and SDKs.Here we will discuss the Technologies in detail.This will be implemented in the Ionic framework.

## Databases

### ERD design

Development and construction of the ERD is done in lucidchart,com

The ERD tables include all the types, the reason we chose to use lucidchart.com is the fact that we can use the software to export the ERD to Oracle SQL developer much faster. This saves time when it comes to creating the tables in SQL.

### Languages involved :SQL

Structured Query Language is the standard means of manipulating and querying data in relational databases, though with proprietary extensions among the products. This is the programming language that will be used to develop the database for the mobile application.

## Software used

### MySQL workbench

This software will be used to create our database locally all the tables from our ERD

Will be created and populated here. This software links up to our Amazon AWS server and Amazon AWS database.All changes made to the local files will automatically be added onto the Online database on AWS.

## Cloud services

The selection of which cloud service provider was based on the technologies we are using ,such as AWS , visual studio code ,Github, Ionic Framework Google Maps integration as well as over all features of the application

### Amazon tools

Amazon tools will be used with all its features, the reason we chose Amazon tools is the fact that setting it up with visual studio code and ou Android emulator is very simple and easy this integration helps us setup all the required libraries.

Amazon EC2

Amazon Elastic Compute Cloud forms a central part of Amazon.com's cloud-computing platform, Amazon Web Services, by allowing users to rent virtual computers on which to run their own computer applications.

We made use of EC2 to make a instance where we hosted our Ubuntu 18 server.

Here we hosted our database. It provides compute capacity that can be resized and made to web-scale cloud computing simpler for developers. Its interfaces authorizes you to get capacity with less friction. With EC2, we have utmost control of our computing resources and time to boot a new server instance is lessened, therefore quickening our scale capacity.

AWS Route 53

AWS Route 53 does the connection of user requests to infrastructure executing in AWS. We used it to configure Domain Name System health checks in order to route traffic to the right endpoints, even to do the monitoring of the state of the application and endpoints, whether they are healthy or not. It helped us control traffic on a global scale via a range of routing methods such as Geo DNS, Weighted Round Robin, Based Routing and Geoproximity. Management of the routing of end-users to the application endpoints is made simpler.

With Route 53 and our domain profider we linked up the server the

### Amazon aws server

Amazon aws server is a online server that we created, on this server we host our azure database which is connected to the local mySQL workbench database called Busalot\_DB.

## Google Maps API

We will make use of google maps API to show the routes of all busses to the user. Google has provided us with the free API to make use of their services and integrate it into our application in such a way that it does most of the work for us. The Google maps API kit will work with our database structures and read from our cloud database. We will display a google maps live view on the application. Google maps is part of our web application as it requires internet connection to give us live feedback and makes use of the Phones GPS location and provides live feedback on traffic.Links will be added into our Database as NVARCHAR (max) values.

# Git

Repositories will be used to pull and push code to the main project. Git is the world's most used code sharing platform and it will be used throughout the development of the application. Each person in the group will have access to the development repository on their GitHub account.

They will also only be able to push to the second draft as this will be our working repository. The main Repository will only be updated as soon as the main developer and the project leader has  
review and revised the work that was done by the rest of the team. Git  
integration will help us finish the development faster. Visual studio community  
makes it very easy to implement Git as it is a built in feature that uploads  
changes automatically to the draft repository.

# Project Roles

|  |  |  |  |
| --- | --- | --- | --- |
| **Main and Sub-tasks** | | **Assigned to:** | **Expected Assistance from:** |
| 1. Scope Research | * All the constraints and included aspects of the project. | * **The whole group** | **n/a** |
| 1. Mobile 2. Technologies | * Android Research | * Nardus Snyman | Mc Donald Fonyo |
| 1. Methodology Research | * Scrum * Waterfall * Kanban * Scrumban Research | * Rankotsana Malapile * Bang Themba | Maria  Baloyi |
| 1. Database Design | * SQL Research * ERD model design | * Tebello Ramatsieli * Bang Themba | Nardus Snyman |
| * MySQL workbench server * MySQL workbench server management studio 2017 installation process * Creation of queries * Creation of google maps routes and city location links | * Bang Themba * Maria Baloyi * Rankotsana Malapile | The group |
| * Amazon aws account * Creation Setup | * Nardus Snyman * Tebello Ramatsieli |
| * Amazon aws account * Server setup * Database set up * Set up connection with awsserver to mySQL workbench server * Database population | * Mc Donald Fonyo * Rankotsana Malapile * Thabang Temba | Maria Baloyi |
| * Mobile Application Development | * Mobile Application * GitHub linked to visual studio | * Mc Donald Fonyo * Rankotsana Malapile * Nardus Snyman * Bang Themba | Tebello Ramatsieli |

Table: project proposal

# Swot Analysis

**Purpose:** To best create an  
affordable bus ticket system.

**Strengths:** No walk-in services required, costs  
are low because most of our software is free, faster and easy access to the  
mobile application.

**Weaknesses:** The developers need to learn new  
operating systems, lack of concentration on single platforms.

**Opportunities:** Mobile app so accessible anywhere  
at any time, Saves passengers time to compare different offers, Helps user  
filter their search for a bus subject to user preference, bus industry with  
increasing potential, and the demand for new application increases day by day.

**Threats:** Other available bus ticket systems. Expense for running marketing ads for clients attraction purposes.

# Budget

Our estimated costs will amount to R 120.00

1. Visual Studio code: Free

4. Amazon AWS: Free But might cost us due to sizeof project.(subject to change)

5. Google Maps API: Free

6. Cloud Hosting(Amazon Server): Free for one year

7. MySQL Workbench : Free

8. Domain purchase R75.00

# Gantt chart



# Conclusion

The proposed solution should compare different user preferences (subject to price, shortest route etc.) saving them time and money for the users travelling needs. Having discussed different aspects for developing the solution the group concluded that the goal to different user preferences (subject to price, shortest route etc.) will be reached.

# List of terms

***Cloud computing*** - making use of remote network servers hosted on the internet to store and process data rather than on a local server or personal computer

***Mobile development*** - the act of process by which a mobile application is developed for mobile devices

**Ionic framework** -framework used to develop cross platform applications

***Webstorm***- It is IDE that is used to edit code such as javascript and it provides full support to languages such as html, javascript and css.

***API*** - abbreviation for Application Programming Interface which is a set of commands which interfaces the programs with the processors

***Cloud Hosting*** - an alternative to hosting website on single servers (either dedicated or shared servers)

**SDK**:Software Development Kit

AWS Amazon serviced

**HTML :**Hypertext Markup Language

**CSS:** Cascading Style Sheets

**Javascript:**JavaScript, often abbreviated as JS, is a high-level, interpreted programming language.

# Notation

This project research will be referenced in the Harvard notation. The reason we use the Harvard notation is because it is required from the NWU. Moreover, Harvard notation is a very formal and academicals way of citing reports.

# References

Dusted Codes. 2015. When to use Scrum? Waterfall vs. Scrum vs. Kanban vs. Scrumban. https://dusted.codes/when-to-use-scrum-waterfall-vs-scrum-vs-kanban-vs-scrumban Date of access: 08 Nov 2015.

Powell-Morse, A. 2016. Waterfall Model: What Is It and When Should You Use It. https://airbrake.io/blog/sdlc/waterfall-model Date of access: 08 Dec 2016.

Trivago. 2018. *About*. [ONLINE] Available at: https://company.trivago.com/about [Accessed 25 July 2018

# Progress Report Section B

# Introduction

In section b, this report discusses the progress of the group made so far in terms of the schedule planned in the gantt chart as can be seen above in section a of this report. This includes the technologies used thus far in the project, the struggles encountered in completing the tasks, as well as the contribution of each group member in the project.

# Gantt progress

Thus far the project’s progress in on schedule though some aspects that had to be covered to date are still in progress due to various struggles. The fallbacks faced up to date are listed below:

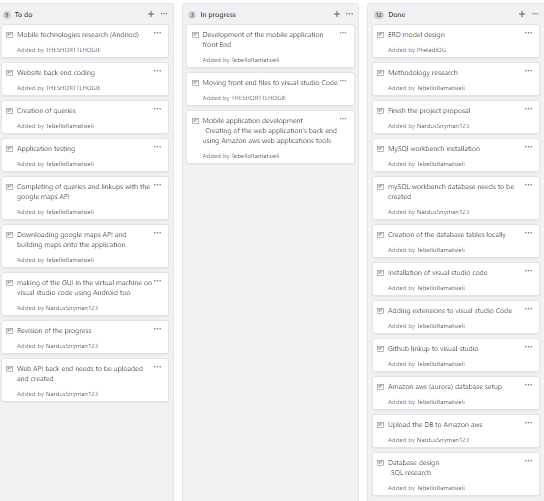
* Ionic framework in visual studio code and Webstorm.
* Creation of google maps routes and city location links
* Creation of queries

All these fallbacks are currently being addressed and already in progress. Despite these fallbacks that have been faced thus far, there has been tremendous progress and successful tasks up to date. These tasks are listed below:

* Scope and research entailing mobile technologies research
* Methodology research (Scrum, waterfall, kanban, scrumban)
* ERD model design
* Database design
* Installation of mySQL workbench
* Amazon aws account creation
* Amazon aws(aurora) server creation
* Amazon aws(aurora) database setup
* Setting up connection with aws server to mySQL workbench server
* Creation of database tables locally
* Creating the web application and back-end using Amazon aws web tools and application

Evidently from the lengthy list of successful tasks listed above there has been progress up to date based on the gantt chart from the initial project proposal.

# Scrum Methodology task progress



# 

# Group meetings.

Meetings were arranged on Flock. Attendance was taken at each meeting, the agenda for the day was share

d in the introduction of every meeting, which would determine the necessary steps needed to take with the group work. The various personalities of group members go well with one another, as where one is weak, another is strong. Attendendance has also been good overall.

# Technologies

# lucidchart.com

The group created the ERD inc.com this is a software for wireframing and creating ERD diagrams. The software is easy to use as compared to a difficult to use software such as Visio, which saved us a great deal of time, as we easily made connections.

## MySQL workbench

The MySQL workbench was downloaded and linked with Amazon aws to be able to create the tables and necessary queries on both programs . The MySQL workbench enabled the creation of our tables and queries. As soon as the SQL tables were created we connected it to Amazon aws(aurora) SQL database platform to allow online and offline interaction.

## Amazon aws(aurora)

Amazon aws(aurora) is a cloud computing service created by Amazon for building, testing, deploying, and managing applications and services through a global network of Microsoft-managed data centers. Mobile application and SQL database is hosted on Amazon aws for better management to the group throughout the building of the application. The application will be build, tested and deployed through this cloud computing service.

## Amazon aws server

Amazon aws server is a cloud computing service that we used for building,testing,deploying and managing applications and services through a global network of microsoft managed data centers,the server service enabled us to host our website on the platform and also the database.

## Visual studio Code

Visual studio Code is used to edit computer programs or codes , as well as websites, web apps, web services and mobile apps.This software allows for extensions to be added or even removed to enhance the flexibility of the programmer.The website is coded on this software.

WebStorm

Webstorm is a IDE, we used Webstorm to develop our mobile application using the Ionic framework. We installed the Ionic Framework using cmd which took us some time with a lot of trouble shooting, We then launched and hosted locally the final android app with the Ionic emulator.

## Progress in terms of the scope of the project

The current progress done on the project can be seen on the Gantt chart and also in the methodology progress todo table above, Group 24 tries to make sure that we keep up with the time schedule planned during the proposal of the project. The current state of the project is on schedule according to the Gantt chart, Many of the small tasks have been completed and the back end of both the website and the mobile app on the in-progress state. The group has had a very productive meeting with the Demies that were provided for our group. We discussed big issues and complex tasks ahead. The demies made us aware of how hard it is to integrate Google Maps into our database.

# Main and Sub-tasks

### **Scope Research**

### Assigned to:The whole group **Methodology Research**

### Rankotsana Malapile

Maria Baloyi  
**Scrum Research**  
  
**Database Design**

Thabang Temba

Tebello Ramatsieli  
  
**SQL Research**

Thabang Temba

Tebello Ramatsieli

Nardus Snyman

Maria Baloyi

Rankotsana Malapile

McDonald Fonyo

**ERD model design**  
Thabang Temba  
Nardus Snyman

**MySQL workbench installation process**  
Creation of google maps routes and city location links(50% complete)

Thabang Temba  
Maria Baloyi  
Rankotsana Malapile  
The group  
**Amazon aws account**

1. Creation  
2. Set up

**Amazon aws account  
Server setup  
Database set up  
Set up connection with aws server to MySQL server**  
Nardus Snyman

Mc Donald Fonyo  
 **Database population**  
Mc Donald Fonyo  
Rankotsana Malapile

**Website Development**

Index - Maria Baloyi and Tebello Ramatsieli the front end and backend

Company Login - Mc Donald Fonyo the front end

Company Portal - Rankotsana Malapile and Thabang Temba the front end and the backend

Register - Mc Donald Fonyo the front end and Nardus Snyman the backend

Forgot - Nardus Snyman the front end

Contact - Maria Baloyi the front end

About - the front end

**Mobile Application Development**

Mc Donald Fonyo - the backend

Nardus Snyman - the front end

**Website Development**

**In Progress**

The front end of the website

Responsiveness of the website

**Mobile Application Development**

**In Progress**

The Front-end of the Mobile Application

Editing the pages of the app with WebStorm  
Ionic Framework to design the front end UI  
GitHub linked to GitKraken

# The struggles

The group encountered struggles with communication, due to this there were some misunderstandings, which at the end caused conflicts, because people did not see eye to eye on solution ideas. There were also some transport problems, which caused some inconveniences such as meetings having to be postponed, as well as late coming of some group members.The most extreme struggle encountered on the backend was learning Php ,reading and writing queries to the database,making the server secure from failure,making the google maps API work on the maps.Learning to use Ionic Framework for the front-end creation of the mobile app.

The struggles identified above are experienced by almost every member of the group due to everyone having to learn the semantics of the technologies used.

# The struggles we encountered

**Rankotsana**

The challenge that i faced in creating or designing a page in the website is responsiveness and another challenge that i faced was that i had to make sure that it will be accessible so accessibility was a huge challenge because there were factors that i had to consider, i had to ensure that it is user friendly and the page is ready for submission in terms of the group deadline. Another challenge that i faced was the deleting function the backend another challenged that i encountered was ajax part of the company info page. The delete function was also a challenge.

**Thabang**

Conflict resolution because communication was a problem and another challenge that i faced when creating the website was to make sure that the experience is consistently good throughout the website. Another challenge that i faced a lot of changes were being made in the interface so more data had to be added to the table.

**Mc Donald**

Time management and my meetings were clashing so that resulted in me being late for some of the meeting although i made it to the meeting. The meetings that were scheduled with the demis was missed twice because they were scheduled at the same time as my other module’s meeting. In terms of the website i struggled with learning the different frameworks like ms azure, xamarin and google api and also the responsiveness of the websites of various screens.

**Maria Baloyi**

Struggles were planning of tasks allocated to me and how to divide my time to do them while having other tasks for other modules, which made me less organized at times. The struggles I faced with Github was to create branches.

**Tebello Ramatsieli**

Finding a suitable cloud hosting service was a challenge and initially the group decided to use Microsoft Azure. The account was created and everything was linked and set up. However, after thirty days familiarizing with this service the account demanded the group to pay and the group had to change to a different and more convenient cloud hosting service(AWS). This transition between the two services was challenging because now the group was pressed for time and had to familiarize afresh with the new service.

**Nardus Snyman(group leader)**

Communicating the project idea to the group was a struggle as people didn't understand the concept completely, I also struggled with getting the group to decide on simple decisions such as selecting pictures and design elements. This was dealt with easily and was simply solved. I then had issues in getting some members access to computers and made our work a bit longer.

The back end is something that I had to learn about as I only have worked with PHP , The group also don't have a lot of experience in app development and web development, This made my work a bit harder as the group leader to get everybody to understand what is expected. I am really enjoying our group, but I know I can improve my planning and communication skills.

# Conclusion

The conclusion is that the group is a little bit behind schedule(approximately 10 days) , the reason for this is the fact that the group decided to implement and add a complete website for the project that corresponds to the mobile application. This set the group back in terms of the Gantt planning that was done in Section A on the project proposal.Furthermore, the group has had a few conflicts in terms of deciding on numerous solutions. The Group Leader has listened to what everybody felt and needed improvement and has worked on resolving most of the issues. At the current time of the compiling of this progress report the group has seen the demis twice. The group also demonstrated to the demis the front end of the website and explained the project in detail. At this point in time the group leader decided to divide the group into two teams ,

The first team will be handling the website in its entirety finishing off the progress made this far by adding the PHP back end ,and google maps features.

The second team will start working on the design of the mobile application and setting up visual studio Community with Webstorm and the Ionic Framework.

# 

# 

# Progress Report Section C

# Introduction

The group has made some changes regarding the project, we decided to use php for the backend instead of node.js as previously decided, and added encryption for security, specifically md5 encryption with extra salt added in the front and at the back of the password . We have made the website to be responsive on all devices.We looked at Xamarin and the Ionic Framework for the development of the mobile. And we have decided to use ionic. However, there was not enough time to create a fully functional mobile app that has all the functions contained in the website so we decided to make a simple mobile app because we ran out of time.

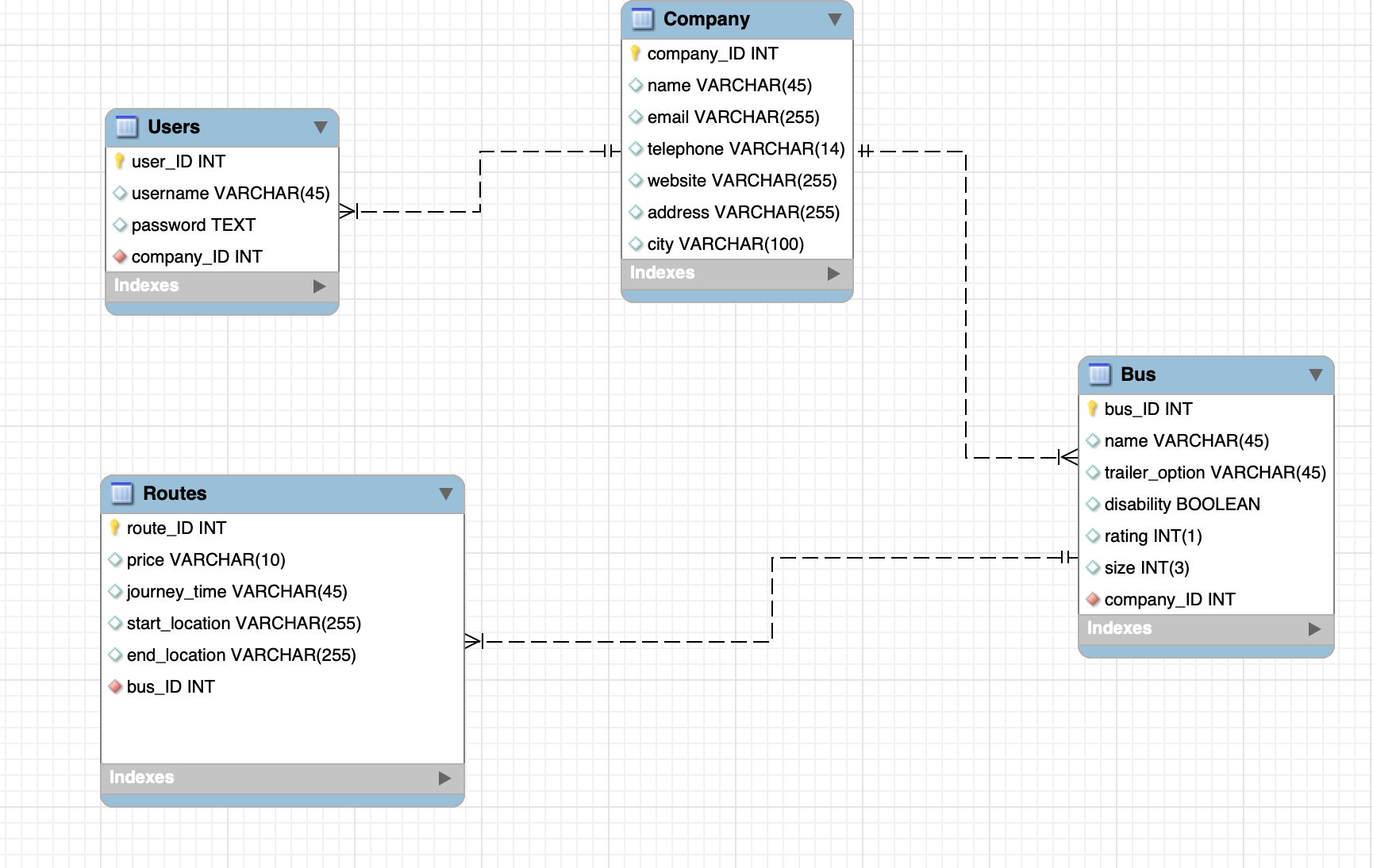
# Technology

## Database

We switched from Microsoft Azure to AWS. We tested our website with fake data and we realised that the ERD that we created had to be altered because there was some unnecessary information that was on the ERD. After the ERD was changed we were able to get simplified information to display to the users of the website.

Before we moved our Database to our AWS Aurora instance we hosted it Locally using the XAMPP technology, this gave us the ability to test the website and make sure Our AJAX and Queries we did with jQuery were running properly without giving us any errors or constraint problems

## ERD Design , backward engineering



## AWS Route53 and AWS EC2

Route53 is a cloud domain name system and we used this service on AWS in order for us to register a name for our website (busalot.co.za). We also used Route53 to link the domain name with the IP address. Another service that we found very useful is EC2. Furthermore, we used EC2 because it helps deploy the website faster and it also helped reduce the need to forecast traffic.

## FIlezilla and FTP uploading

We used the Filezilla to upload our html backend and CSS files onto the server DNS.

## Security and encryption

In terms of security we added user authentication so that not just anyone can access the database. On the the encryption side we decided to use MD5. However, since MD5 encryption is not the safest we also decided that we will be adding salting on top of the encrypted passwords and then we saved the fully encrypted and salted passwords in the database.

## Backend

We decided to use php instead of using node.js because one of our group members had an extra module added and it focused on PHP. Moreover, the group was also comfortable with using PHP because we were more familiar with PHP and there was not enough time to learn node.js. Another problem we encountered was that we couldn't get the reset link to work because we were behind schedule. If we get an opportunity to make this project better and with more time then we would definitely add that feature as well as the feature whereby we send emails to busalot.

## Mobile Application

For the development of the mobile application, we used Ionic Framework due to its simplicity. Ionic Framework allows for development at once, meaning that we do not have to develop it multiple times for various devices, which saved much of our time. Framework is also low cost and maintenance is minimal. Our mobile application is published on the Android APK platform. Ionic. The mobile application displays the routes if searched in a table, similar to the home index page of the Busalot website using the emulator.

Since the exams started ,we had less time to work on the mobile app which led us to looking for the applicable Ionic front-end template template and we only changed a few things on the front-end. The only section we had to do for the mobile app was the back-end. We will be using the Macbook as the emulator of the mobile app.

## Extra features we wished to add, but could not

On the website, we wanted the travelers to be able to reserve a seat in advance before travelling, but we did not have sufficient time to carry that out, as we had to first focus on the main parts of the project, which was to compare prices, ratings, services to cater for the disabled travelers. We wanted to be able to indicate available seats with green tags and occupied ones with red tags on the website when the client wants to book a bus ticket.

We wanted to add time and date of booking, however we realized that it would require us to add more records and increase the scope of the project, which may have delayed us in getting done on time. We wanted to add a payment portal, but could not due to security reasons, as we the website would be hosted live, which could put the personal banking details of clients in jeopardy, so for that reason, we ruled it out.0

## Group Struggles

### Rankotsana

The challenge that i faced in creating or designing a page in the website is responsiveness and another challenge that i faced was that i had to make sure that it will be accessible so accessibility was a huge challenge because there were factors that i had to consider, i had to ensure that it is user friendly and the page is ready for submission in terms of the group deadline. Having to change from xamarin to aws was a challenge because the group was already familiar with xamarin and the changes caused a setback in terms of getting and reading data.

### Thabang

Conflict resolution because communication was a problem and another challenge that i faced when creating the website was to make sure that the experience is consistently good throughout the website. Another challenge that i faced a lot of changes were being made in the interface so more data had to be added to the table.

### Mc Donald

Time management and my meetings were clashing so that resulted in me being late for some of the meetings although i made it to the meeting. The meetings that were scheduled with the demis was missed twice because they were scheduled at the same time as my other module’s meeting. In terms of the website i struggled with learning advanced javascript to code the scripts of the client side. Working with MySQL workbench wasn’t stressful including its integration with AWS Aurora. Having to change from Xamarin to Ionic Framework was a hassle since i had invested time into researching about how to use it to develop a native app.The Ionic app development process wasn’t stressful because we managed to find a template that’s relative to the app idea and it was used.The back-end of the app was nearly the same as one of the app. The responsiveness of the websites for various screens was achieved too.

### Maria Baloyi

Struggles were planning of tasks allocated to me and how to divide my time to do them while having other tasks for other modules, which made me less organized at times. The struggles I faced with Github was to create branches, I also struggled to use Bitrix24 due to its complexity. Time management was an issue for me in terms of one or two meetings that I arrived late for due to the distance travelled from home to campus, as I stay far from campus and also using public transportation.

### Tebello Ramatsieli

Due to unforeseen circumstances the group had to change from Microsoft Azure hosting services to Amazon AWS cloud hosting services. The transition from one service to another was very challenging as we had to learn and adapt to AWS having already learned and familiarised ourselves with Microsoft Azure..

### Nardus Snyman

Communicating the project idea to the group was a struggle as people didn't understand the concept completely, I also struggled with getting the group to decide on simple decisions such as selecting pictures and design elements. This was dealt with easily and was simply solved. I then had issues in getting some members access to computers and made our work a bit longer.

The back end is something that I had to learn about as I only have worked with PHP , The group also don't have a lot of experience in app development and web development, This made my work a bit harder as the group leader to get everybody to understand what is expected. I am really enjoying our group, but I know I can improve my planning and communication skills.

# Group dynamics

These are the main topics that formed part of our group dynamic structure

* Scrum methodology how did we use it
* Meetings
* Resources
* Arrangements
* Communications
* Hierarchy
* Conflicts
* Problem solving
* Access to internet/Git/and IDE’s

## General Group dynamic

Despite the challenges we went through as a group such as misunderstandings, we worked well together as we could resolve any conflicts that we encountered by using good communication skills, in an effort to understand the point that the other person was making. Furthermore, as each and every single one of us have our own weaknesses and strengths pertaining to our skills, the approach we used regarding the tasks that were allocated to each member was that where one was struggling with something, someone else who understood it better was appointed as an assistant to that person.

## Individual Experience of the group dynamic

### **Rankotsana**

I enjoyed our group project it was a very nice project and reflecting back I found that we spent some time doing the front end and unnecessary part of the code, which put us a little bit behind schedule. There we some struggles in the group in terms of communication and i’d like to believe that we have sorted out our differences. Moreover, I have learned that when it comes to working with each other, due to personality differences, it sometimes causes competition among those group members, because of the unwillingness of accepting the ideas of others above their own. That is where ego comes in, because that would lead group members to compare themselves to each other, as opposed to focusing on working as a team, which makes it an unpleasant experience for the rest of the group members. Furthermore, I have learned that working well as a team increases ideas that can be implemented via brainstorming, and discussions done at group meetings.

### **Thabang**

Reflecting back on the project i would say that working in a group is not as easy as it looks, because every group member has their own distinct personality, which may often clash, for example someone who always thinks he is right may often clash with someone who is opinionated. Moreover, getting one's point across is a constant communication flaw for me, it is important to explain the point I am trying to make without any misunderstanding or any misconceptions from other group members, and this takes good speaking skills that I have learned from working in a group. I have learned that understanding is also important when it comes to speaking, it is important to seek to understand first before being understood. In terms of the actual work that went into the website, it was very difficult to learn new languages and make them work together because i was not familiar with the integration of more than three languages. But overall i enjoyed working on the project with the group they are hard working and driven students.

### **Nardus**

My reflection on the project is that of the group leader, Many struggles I encountered personally working with the group . Main issues I saw were communication.This was definitely one thing we could have improved . Planning was also a part of the work that we could have done more on which would have saved us time when it came to execution. I have learned the importance of working well as as team, because it leads to creativity, which is important in the formulation of ideas as well as solutions to the problems at hand. Working as a team also leads to learning, as there is something a group member knows that others do not know can bring understanding to them, as well as when we all do research together on concepts we chose to implement, this promotes learning throughout the project. The coming together of ideas when working together allows us to pick the best ideas and solutions to problems, as well as put together the strengths of each person in an effort to come up with the best possible solutions. I have learned what it is to be a leader, and the importance of controlling my emotions due to the pressure that comes with being a leader, for example controlling anger is important, because things do not always work according to plan, and it is best to remain calm when they do not.

### **Maria**

The conflicts I encountered due to misunderstandings in the group, has helped me to understand the viewpoint of the other group member. It has taught me how to approach conflict, which is to be fast to listen, and slow to speak, which helps prevent future conflicts. I have learnt to take the feelings of other group members into consideration, and also take into account the thoughts of other group members. I have learnt the importance of voicing out any dissatisfactions and any concerns I may be having. Moreover, I have also learned the proper approaches to use when involved in a conflict if I find myself in one, such as the tone in which I am to speak, in order to come across more understandable to the other group member involved in the conflict, as being loud does not always help as it could lead to further disagreements, but rather speaking in a tone that properly gets the point across to the other group member with no misconception on the other side. Working in a group has taught me the importance of planning before attempting to execute tasks, because given the short time to accomplish our project, it is of utmost importance to do planning in order to avoid unnecessarily ending up under pressure. Planning leads to good decision making, which is a result of problem solving, and this has taught me how to be a problem solver. In the process of problem solving, it is important to get all necessary information to solve it, which brought about learning. The drive and dedication of my fellow group members have taught me how to keep a positive attitude and not give up when encountering a challenge.

### **Mc Donald**

I have learned that working together as a team is a results in efficiency, because together we are able to attain both short and long term goals set by the group. Working as a team has also taught be to be supportive to other group members, as it helps encourage group members, which is crucial as it is easy for one to give up when coming across a challenge. Moreover, I have learned that working well as a team encourages the involvement of everyone in the group as everyone has to be assigned their tasks. The setting of short term deadlines by the group has taught me to work under pressure, as it required me to learn how to manage my time effectively. Moreover, learning how to manage my time has taught me not to procrastinate, which was useful. The scrum methodology also helped me keep track on the tasks that were expected of me, the tasks that I was currently busy with, as well as the tasks that I was behind with (which were a few due to what I have learned).

### **Tebello Ramatsieli**

Group work is always challenging for a number of reasons. However, at the end of it all the project was successful despite the challenges that were faced throughout the development. Through this experience i learned the importance of communication and time management while dealing with big projects. It was an enjoyable experience as we were dealing with new technologies that we hadn’t dealt with before and we were very proud of our final product as a group. Not only was the final product satisfying, it has also expanded my knowledge, which will be crucial for when I go to the working field, as I will have to implement what I have learnt while working together with my fellow group members. Moreover, I have learned that not only does the knowledge learnt com inhandy in the work field, but I have also learned that working as a group in itself is preparation because that is the environment in the work field, as more often than not, work is divided into groups.

# Technologies Overview

We learned about the advantages of using MySQL Workbench as opposed to a different platform such as Oracle, as MySQL was designed to work best for web applications, therefore it was more reliable, provided good scalability as well as good performance. The good performance of built-in database for read and write functions, in terms of reading, it is for both easy and difficult level queries. We also learned about the advantages of using the Ionic Framework as opposed to using other platforms such as Android Studio’s Native development using C++ or Java, and others. Keeping in mind that we were behind schedule, it was our best option of developing a mobile application as it is quicker.

## Individual description on technologies

### **Rankotsana Malapile**

The part i enjoyed the most was the creation of the GUI because even though i was not all that familiar with it i, wanted to learn more about it and build on my limited knowledge about it, as it could become useful for me in the workplace. I learnt a lot in this project and i was also able to use some of the knowledge we got from the workshops presented to us in terms of implementing it in our project. I was responsible for the front end of the company info page, this page requires knowledge of html and javascript as well as css. For the front end i have to familiarize myself with php which was a struggle because it is a language that i don't know but i had to learn it which was a fun experience and youtube videos and well as weschool was a great reference. In terms of planning of how i will do my task i implemented what i learned in the workshop which is scrum. I learned on how to use github and mysql workbench.i also learned about hosting a website which was very interesting because it's something that i was never exposed to, technologies that i had to also to learn aws and azure.

### **Thabang Temba**

In terms of technology i was able to learn a lot of new languages for instance php, html, javascript and so on. I was very familiar with SQL so the mySQL workbench was not much of a curve ball for me. However, when it came to technologies and languages and so on, my main struggle was to make them all work together to achieve one goal. Another interesting thing that i have learnt was how github works, yes i’m not the best at it but it has taught me how an application is managed and how it can be used by the whole team to work on one project. AJAX was also very interesting as I have never made use of hosting a website on a web server.I think the group benefited from moving from Azure to AWS Aurora tools, as it showed us all the important parts of backend hosting that the group lacked knowledge off.

### **Nardus Snyman**

I have learnt alot about various project management tools which includes ,Github,GitKraken ,was the selected and implemented tool that was agreed as the main project management tool and version control system. Everyone had access to every active or recently worked on aspect of the project through github.I have the SQL knowledge which then made mySQL much simple.AWS EC2 and Route 53 were really nice to work with and there were so much to read up on. I am going to do my AWS certification and this gave me some insights to what I can expect when studying and writing for the exam. Furthermore new technologies that we used were API’s such as Google Maps. The Alerts we used were also nice. A thing i would have implemented in the making of the front end pages would have been CSS grid and CSS elements for easy built in responsiveness using their CSS style sheets.

### **Tebello Ramatsieli**

The development of this project exposed me to new technologies that i was not exposed to before and enhanced my understanding and skills in working with technologies that i already knew. I had the opportunity to work with Ionic framework and angular. It may have not been a thorough experience with ionic and angular but the little that we worked with them was an amazing experience when creating the simulation of the mobile app as we focused mainly on the development of the website. I already had experience with Php and HTML but working on this project enhanced my knowledge and understanding in regard with the mentioned languages. The most exciting part for me was learning how to host the website and make it interact with the SQL database to get the required results. It was very challenging and we did a lot of research in regards with this and discovered a lot of information that we were not even aware of. For instance it is amazing how many services amazon has to offer and the opportunity that we as students get to these services offered by amazon. .

### **Mc Donald**

This specific project taught me a lot of things which i wasn’t exposed to before . I had to do more research and make use of online forums more than actual coding itself.The previous options really helped me on this project including the workshop we attended.I had an insight on how to use gitkraken,github and mySQL workbench.Working with JQuery and Ajax was a learning curve for me and i believe my group members also went through the same struggle but i enjoyed the whole project sessions.I learnt a lot about the IT industry.

### **Maria Baloyi**

I have learned how AWS Route 53 is used which I didn’t know before, I was so used to demoing all our previous projects using a locally hosted database. This is where I assisted the group with XAMMP and MySql Workbench. I enjoyed doing the front end design and responsiveness with Pheladi and we worked so well making a front end user interface that we think was really professional looking. I had to Learn about AJAX as each group member was given back end functions to complete. Before doing my PHP Jquery parts I did a lot of research on my own. The group also gave me resources to study up such as w3schools.com, this free resource site helped me when I struggled with some AJAX data send parts. Working with PHP was very interesting, It was the most basic way to do back end development and I think learning this is important going into the future of my IT career.

# Things the group mentioned they would have liked to have Learned or experience

The group overall agreed at the end of the project development phase and demo that we would have liked to learned a few other things. The technology that came up most was node.js and react.js, angular.js the group really enjoyed AWS moving from Azure which platform the group really found lacking in resources. AWS documentation helped a lot. The group also came to the conclusion that with some better planning and more time that we lost with one group member leaving for a week because of family issues was to add the APK of our complete mobile app to a Android phone and demo on the device itself. The group also saw challenges in work division and getting parts of the project together initially, The group mentioned that having a workshop about Github early in the project would have helped a lot. There was also two group members who came late into the group but there contributions in terms of understanding the technologies and making use of it, helped the group make the work for each group member a little easier in terms of scope. This also meant that we decided to expand the project to a mobile application so that the scope would be efficient in terms of size. Finally we concluded that the project itself is a very good concept to take into honours. As the expansion of features that could have been added to the project if the time was a bit more were extensive. During the process of planning we went with curtain technologies that we knew , but as time progressed and we researched our problems we moved to technologies that solved these issues.

In terms of what we wanted to do with the project we wanted to add payment feature as well as O authentication to the website to reset passwords of registered companies. We also wanted to include seat selection and dates.

On the mobile we wanted to add Google maps integration and show the routes.

In a future version we would have done and completed these features.

# Conclusion

In conclusion, the initial plan of the project was that the group would be split into two parts in terms of the backend as well as the front end on the mobile application side. However, this goal could not be achieved because there was a lot of work to be done on the website end and this caused the group to fall behind when it came to the schedule we had set on completing the project. Furthermore, this caused us to focus on the main functionality of the website and neglect some of the extra functionalities that we had in mind for the website. Moreover, these setbacks caused the group a lot of time in terms of the creation of the mobile app hence the mobile app only has basic functionality. In terms of the group work, we tried to overcome most of the challenges we faced for instance, communication, lack of resources and personal struggles while working in the project. However, this project was a great opportunity to learn different languages and work in different scenarios.